STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

# DESIGN-BUILD PACKAGE

## VOID FOR BIDDING

DATE AND TIME OF TECHNICAL AND PRICE PROPOSAL SUBMISSION: **OCTOBER 17, 2001** AT **5:00 PM**

DATE AND TIME OF PRICE PROPOSAL OPENING: **OCTOBER 26, 2001** AT 10:00 AM

PROJECT NO: 8.1674402 KILOMETERS: 14.4

FEDERAL-AID NO. HP-NHF-77-1 (151)14

CONTRACT ID C200231

COUNTY: MECKLENBURG

ROUTE NO: I-77

T.I.P. NO : I-3311A

LOCATION: I-77 FROM I-85 TO NORTH OF THE PROPOSED CHARLOTTE OUTER LOOP

TYPE OF WORK: DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE DESIGN-BUILD PACKAGE

NOTICE:

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

_____ 5% BID BOND OR BID DEPOSIT REQUIRED

_____

**PROPOSAL FORM FOR THE CONSTRUCTION OF PROJECT NO. 8.1674402**

**IN MECKLENBURG COUNTY, NORTH CAROLINA**

**Date_____ 19___**

**DEPARTMENT OF TRANSPORTATION,**

**RALEIGH, NORTH CAROLINA**

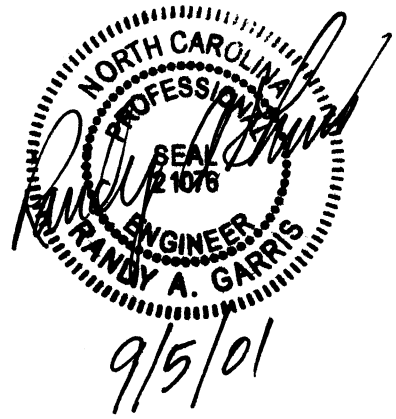
**The Design-Builder has carefully examined the location of the proposed work to be known as Project No. 8.1674402; has carefully examined the preliminary plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the Design-Build Package, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned Design-Builder agrees to bound upon his execution of the proposal and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen calendar days after the written notice of award is received by him. The undersigned Design-Builder further agrees to provide all design services and all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with the 1995 Standard Specifications for Roads and Structures by the dates(s) specified in the Design-Build Package and in accordance with the requirements of the Engineer, and at the lump sum price(s) for the various items given on the sheets contained herein.**

**The Design-Builder shall provide a Technical Proposal, a Price Proposal and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to design,construct and complete State Highway Project No. 8.1674402 in MECKLENBURG county, for the lump sum price(s) bid by the Design-Builder in his Price Proposal and according to the proposal, plans, and specifications prepared by said Department and/or Design-Builder, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.**

The published volume entitled "North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, July 1995 with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the Construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer.

Accompanying this Proposal is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Design-Builder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the Standard Specifications; otherwise said deposit will be returned to the Design-Builder.



**CONTRACT TIME AND LIQUIDATED DAMAGES:** **7-1-95**

The date of availability for this contract is December 3, 2001.

The completion date for this contract is no later than November 1, 2004.

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 stated in the contract. Should an observation period extend beyond the final completion date, the acceptable completion of the observation period shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are Four Thousand Dollars ($4,000.00) per calendar day.
D1G03

**PROGRESS SCHEDULE:**

The Design-Builder shall be responsible for planning, scheduling and reporting the progress of the work to ensure timely completion of the contract.

The Design-Builder shall submit a schedule in accordance with the following:

**CRITICAL PATH METHOD PROJECT SCHEDULE (CPM):**

**DESCRIPTION:**

The work of this provision consists of the Design-Builder planning, scheduling, designing, and constructing this project using a Critical Path Method Project Schedule (CPM). Use the CPM for coordinating and monitoring all the work specified in this contract including all activities of subcontractors, vendors, suppliers, utilities, railroads, NCDOT, and all other parties associated with the design or construction of this project. The work covered by this section includes but is not limited to submittals, major procurement, delivery, construction activities, submitting an initial CPM, and providing monthly updates to the CPM The schedule shall have considered the time requirement for ordering articles of special manufacture to meet specific requirements of the work and for any inspection requirements of the various sections of the specifications, such as Section 1072 when structural steel fabrication inspection is required. Make sure that all activities quantified in the contract are included in the CPM.

**MATERIALS:**

Use software for the CPM that generates files that are compatible with Primavera Project Planner.

**REQUIREMENTS:**

**(A) Float**

Float is defined as the amount of time between when an activity "can start or finish" (early start or early finish) and when an activity "must start or finish" (late start or late finish). Float is a shared commodity for the use of NCDOT and/or the Design-Builder and is not for the exclusive use or benefit of either party. Both parties have the full use of the float until it is depleted.

**(B) Design-Builder's Scheduling Representative**

Designate an individual from the Design-Builder's organization, prior to submission of the Initial Critical Path Method Schedule, who will be the Design-Builder's authorized representative responsible for the development, updating, and revising of the Design-Builder's CPM schedule. Have the scheduling representative represent the Design-Builder in all matters regarding the schedule and attend all schedule related meetings. The scheduling representative must be skilled in the application of computer network schedules on construction projects of the magnitude and complexity of this project.

**(C) Initial Critical Path Method Schedule (ICPM)**

Within thirty (30) calendar days of receiving the Notice of Award, submit an ICPM for approval. Within twenty-one (21) calendar days of receipt of the Design-Builder's ICPM, the Engineer will complete the review of the ICPM. If required, a Joint Review Conference will be convened at which the Engineer and the Design-Builder will make any necessary corrections or adjustments to the ICPM. If a revision to the ICPM is necessary due to the Engineer's review or a Joint Review Conference, submit a revised ICPM within seven (7) calendar days after the date of the Joint Review Conference. The Engineer will respond to the submitted revised ICPM with seven (7) calendar days of receipt.

Once the ICPM has been accepted, it becomes the CPM of record. Acceptance of the ICPM in no way attests to the validity of the assumptions, logic constraints, dependency relationships, resource allocations, manpower and equipment, or any other aspect of the ICPM. The Design-Builder is and will remain solely responsible for the planning and execution of work in order to meet project milestones or contract completion dates.

Include the following in the ICPM submittal:

(1) A time scale diagram containing the following:
   (a) an acceptable scale and format
   (b) all activities clearly labeled
   (c) all activity identification clearly shown for each activity

(d) all relationships between activities shown

(2) Tabular reports containing the following:
(a) Precedence diagrams with activities listed and lead and lag times shown
(b) Activity duration shown. All activities must have a duration of not more than 20 days unless otherwise approved. Divide activities with longer durations into subgroups of activities not exceeding 20 working days in duration. Indicate logical start and end points (e.g. stationing, staging, etc.) for each subgroup.
(c) Activity descriptions shown
(d) Early start and finish dates shown
(e) Late start and finish dates shown
(f) Status (critical or not) shown
(g) Total float shown
(h) Responsibility (i.e. Design-Builder, specific subDesign-Builder, specific supplier, NCDOT, etc.) shown

(3) Written narrative complying with the requirements listed below

(4) Data disk containing all of the information in the ICPM. The disk must be compatible with Primavera Project Planner software.

**(D) Written Narrative**

Provide a written narrative that explains the sequence of work, the critical path, interim completion dates, project phasing, non-work days or periods, maintenance of traffic, and labor and equipment resources. In addition, explain in the written narrative how the Design-Builder has provided for permit requirements, environmental requirements, coordination with other public contractors, milestone dates, other entities, coordination with utility companies, special non-work days or periods, and weather in the ICPM.

Provide the following information for each activity listed in the ICPM:

(1) Estimated start and completion date
(2) Description of work to be done including the type and quantity of equipment, labor, and material to be used
(3) Description of the location on the project where activity occurs
(4) Description of planned production rates (e.g. cubic yards (cubic meters) of excavation per day/week)
(5) Description of work days per week, holidays, number of shifts per day, and number of hours per shift
(6) Description of expected and critical delivery dates for equipment or material that can affect timely completion of the project

(7) Identify the vendor, supplier, or subDesign-Builder to perform the activity. State all assumptions made in the scheduling of the subDesign-Builder's or supplier's work.
(8) Utilize the written narrative to explain the following:
  (a) relationship between activities not obviously identified
  (b) equipment usage and limitation
  (c) manpower usage and limitations
  (d) use of additional shifts and/or overtime
  (e) activity codes, abbreviations, and activity identification system
  (f) all calendars used in the CPM
  (g) constraints (date or time constraints)
  (h) all abbreviations used in the ICPM
  (i) scheduling of weather and/or temperature sensitive activities
  (j) describe critical completion dates for maintaining the design and construction schedule

**(E) Schedule Updates**

Submit an update of the CPM of record monthly and at the preconstruction conference. The data date for the CPM update will be seven days prior to the cut-off date for the monthly partial payment. Submit the update within seven calendar days of the data date. Failure to submit the CPM update may result in the Engineer withholding partial payments. Upon acceptance, the monthly update will become the CPM of record for the time period between its data date and the next approved update or revision.

Include in the monthly updates activity data as specified in (1) through (4) under (C) Initial Critical Path Method Schedule using actual activity start dates. Use the monthly update to describe the project progress to date. Include in the written narration a description of the work performed during the update period, the current critical path, the amount of float on the critical path, any delays or disruptions experienced during the update period, any change in manpower or equipment, and any potential delays or disruptions.

**(F) Revisions to the Schedule of Record**

A revision to the schedule of record is defined as one or more of the following:

(1) a change in the original duration of an activity
(2) a change in the logic of the schedule
(3) a change to resources
(4) a change to any Actual date, previously established
(5) the deletion or addition of an activity
(6) a change to, addition of, or deletion of a constraint (date or time constraint)
(7) a change to, addition of, or deletion of an activity code

(8) a change to an activity description
(9) any change other than updating an activity

Whenever a revision is proposed for any of the above reasons, contact the Engineer and verbally discuss the revision. If the revision is considered minor, the Engineer may allow the revision to be included in the next update of the CPM. If the revision is not considered minor, submit for approval the proposed revision with the same requirements as the ICPM including the following:

- an updated CPM including the proposed revision
- a written narrative that describes the reason for the revision, the resulting critical path, and all particulars of the revision including but not limited to:
  (1) changes in the method or manner of the work
  (2) changes in the specifications
  (3) changes in resources
  (4) extra work
  (5) addition or deletion of work
  (6) increased or decreased quantities
  (7) defective work
  (8) acceleration of work

Submitted revisions will be responded to within fourteen (14) calendar day after receipt. If the Design-Builder is required to resubmit the proposed revision, do so within seven (7) calendar days after receipt of the Engineer's comments. The Engineer reserves the right to reject any proposed revision which adversely affects the NCDOT, utilities, or other interested parties.

No measurement or direct payment will be made for Design-Builder costs relating to preparation and submission of schedules and reports and revisions thereto, the cost being considered as included in the lump sum Design-Build price

Acceptance of the Design-Builder's schedules by the Engineer is not to be construed as relieving the Design-Builder of its obligation to complete the work within the contract time; or as granting, rejecting, or in any other way acting on the Design-Builder's requests for adjustments to the date for completing contract work, or claims for additional compensation. Such requests shall be processed in strict compliance with other relevant provisions of the contract.

**PARTNERING:** **7-1-95**

As a part of its quality management program, the North Carolina Department of Transportation intends to encourage the formation of a cohesive relationship with the Design-Builder and its principal subContractors and suppliers. This relationship will be structured to draw on the

strengths of each organization to identify and achieve reciprocal goals. The objectives are safe, effective, and efficient contract performance; and completion within budget, on schedule, and in accordance with the plans and specifications.

This relationship will be bilateral in makeup and participation will be totally voluntary. The cost associated with effectuating this relationship will be agreed to by both parties and shall be shared equally.

To implement this initiative prior to starting work in accordance with the requirements of Section 108 of the Standard Specifications and prior to the preconstruction conference, the Design-Builder's management personnel and NCDOT's Construction Engineer will initiate a partnering development seminar/team building workshop. Project personnel working with the assistance of the Construction Unit will make arrangements to determine attendees at the workshop, agenda of the workshop, duration, and location. Persons required to be in attendance will be the NCDOT Resident Engineer, the NCDOT Division Construction Engineer, and key project personnel; the Design-Builder's senior management personnel, the Design-Builder's on-site project manager, and key project supervisory personnel for both the prime Design-Builder ,the CEI Firm and principal subDesign-Builders and suppliers. The project design engineers, FHWA, and key local government personnel will also be invited to attend as necessary.

Follow-up workshops may be held periodically throughout the duration of the contract as agreed by the Design-Builder and the North Carolina Department of Transportation.

The establishment of the partnering charter on a project will not change the legal relationship to the contract nor relieve either party from any of the terms of the contract.

D1G16

**BID DOCUMENTATION:**

General:

The successful Proposer (Design-Builder) 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. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department and preserved by that institution or facility as specified in the following sections of this provision.

Bid Documentation:

The term "bid documentation" as used in this provision means all written information, working papers, computer printouts and diskettes, 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-Builder equipment rates, Design-Builder 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 bid. The term "bid

documentation" also includes any manuals which are standard to the industry used by the Proposer in determining the bid. 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. The term does not include bid documents provided by the Department for use by the Proposer in bidding on this project.

Submittal of Bid Documentation:

A representative of the Proposer 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 (10) calendar days after the notice of award is received by him. Bid documentation will be considered a certified copy if the Proposer includes a letter to the Department from a chief officer of the company stating that the enclosed documentation is an EXACT copy of the original documentation. The letter must be signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature MUST be notarized at the bottom of the letter. 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. The container shall be clearly marked "Bid Documentation" and shall also show on the face of the container the Proposer's name, Proposer's address, the date of submittal, the Project Number, and the County.

Affidavit:

In addition to the bid documentation, an affidavit signed under oath by an individual authorized by the Proposer to execute the bid shall be included. The affidavit shall 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. 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 such bid documentation has been included.

Verification:

Upon delivery of the bid documentation, the Department's Contract Officer and the Proposer's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Proposer'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 Proposer's representative, immediately place the complete bid documentation and affidavit in the container and seal it. Both parties will deliver the sealed container to a banking institution or other bonded document storage facility selected by the Department for placement in a safety deposit box, vault, or other secure accommodation.

Duration and Use:

The bid documentation and affidavit shall remain in escrow until sixty (60) calendar days from the time the Design-Builder receives the final estimate; or until such time as the Design-Builder 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 related to the contract; or until authorized in writing by the Design-Builder. 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-Builder against the Department, or receipt of a letter from the Design-Builder authorizing release, the Department may obtain the release and custody of the bid documentation. If the bid documentation remains in escrow sixty (60) calendar days after the time the Design-Builder receives the final estimate and the Design-Builder 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 shall instruct the banking institution or other bonded document storage facility to release the sealed container to the Design-Builder.

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

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 (10) calendar 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 Proposers for a period up to 180 days. Award may then be made to the next lowest responsible Proposer or the work may be readvertised and constructed under the contract or otherwise, as the Board of Transportation may decide.

Escrow Agreement:

The Proposer will be required to sign an Escrow Agreement within ten (10) calendar days after the notice of award is received by him. A copy of this Escrow Agreement document will be mailed to the Proposer with the notice of award. The Proposer and Department will sign the Escrow Agreement at the time that the bid documentation is delivered to a Banking Institution or other facility as outlined above. The Proposer's failure to sign the Escrow Agreement at the time the bid documentation is delivered 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 Proposers for a period up to 180 days. Award may then be made to the next lowest responsible Proposer or the work may be readvertised and constructed under the contract or otherwise, as the Board of Transportation may decide.

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-Builder 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-Builder 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.

Cost and Escrow Instructions:

The cost of the escrow will be borne by the Department. The Department will provide escrow instructions to the banking institution or other bonded document storage facility consistent with this provision.

Payment:

There will be no separate payment for all costs of compilation of the data, container, or verification of the bid documentation. Payment at the lump sum price for the Design-Build project will be full compensation for all such costs.

**EXECUTION OF SIGNATURE SHEETS AND DEBARMENT CERTIFICATION: 7-17-90**

The Proposer's attention is directed to the various sheets in the Design-Build Package which are to be signed by the Proposer. A list of these sheets is shown below. The signature sheets are located behind the item sheets in the Design-Build Package. The bid bond is inserted in the Design-Build Package.

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

2. Bid Bond (Proposal Insert)

The Proposer shall certify his and 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 signature sheets in the Design-Build Packages. 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 Proposers certification of "status" under penalty of perjury under the laws of the United States.

D1G17

**SUBMISSION OF DESIGN-BUILD PROPOSALS: 6-16-92**

The Proposer's attention is directed to the fact 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, and prior to the time, indicated in the Design-Build Package.

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.

5. If Disadvantaged Business Enterprises (DBE) goals are established for this contract, the Proposer shall complete the form Listing of DBE Subcontractors contained elsewhere in this proposal in accordance with the Project Special Provision entitled Disadvantaged Business Enterprises.

In addition to the above requirements, failure to comply with any of the requirements of Articles 102-8, 102-10 or 102-11 of the specifications may result in a Design-Build Proposal being rejected.

D1G18

**SCHEDULE OF ESTIMATED COMPLETION PROGRESS: 7-16-90**

The Design-Builder's attention is directed to the Standard Special Provision entitled "Availability Of Funds Termination Of Contracts" included elsewhere in this Design-Build Package. 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 (Dollar Value) |
|---|---|
| 2002 (7/1/01 - 6/30/02) | 29% of Total Amount Bid |
| 2003 (7/1/02 - 6/30/03) | 39% of Total Amount Bid |
| 2004 (7/1/03 - 6/30/04) | 26% of Total Amount Bid |
| 2005 (7/1/04 - 6/30/05) | 6% of Total Amount Bid |

The Design-Builder shall also furnish his own progress schedule in accordance with Article 108-2. Any acceleration of the progress as shown by the Design-Builder's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

D1G19

**DISADVANTAGED BUSINESS ENTERPRISE** **1-18-00**

POLICY

It is the policy of the North Carolina Department of Transportation that Disadvantaged Business Enterprises shall have the opportunity to participate in the performance of contracts financed in whole or in part by Federal Funds in order to create a level playing field.

OBLIGATION

The Design-Builder, subcontractor, and sub-recipient shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Design-Builder shall carry out applicable requirements of 49 CFR 26 in the award and administration of federally assisted contracts as approved by the Federal Highway Administration. Failure by the Design-Builder to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the Department deems necessary.

This obligation shall be incorporated into any subsequent contract at any level that is executed under the terms of this contract.

GOALS

The following **Construction** goal for participation by Disadvantaged Business Enterprise (DBE) is established for this contract:

Disadvantaged Business Enterprises 10 %

The Design-Builder shall exercise all necessary and reasonable steps to ensure that Disadvantaged Business Enterprises participate in at least the percent of the contract as set forth above as goals for this contract.

Only those firms certified by the Department can be counted toward this contract goal. The Department will provide oversight and direction in carrying forth this Program.

LISTING OF DBE SUBCONTRACTORS

All Proposers, at the time the Price proposal is submitted, must also submit a listing of DBE participation on the appropriate form (or facsimile thereof) contained elsewhere in this proposal in order for the bid to be considered responsive. Proposers must indicate the total dollar value of

DBE participation for the contract. In the event the Proposer has no DBE participation, he is still required to indicate this on the forms by entering the word or number zero. Blank forms will not be deemed to represent zero participation. PROPOSALS SUBMITTED WHICH DO NOT HAVE DBE PARTICIPATION INDICATED ON THE APPROPRIATE FORM WILL NOT BE READ PUBLICLY. These Proposals will not be considered for award by the Department and they will be returned to the Proposer.

Only those DBE firms with current certification by the Department will be considered acceptable for listing in the Proposers submittal of DBE participation.

A. The Design-Builder shall indicate on the form for listing of DBE subcontractors contained elsewhere in this proposal the following required information:

REQUIRED INFORMATION

(1) The names and addresses of DBE firms committed to participate in the contract;

(2) The types of work and agreed upon prices of work to be performed by each DBE firm; and

(3) The total dollar amount to be paid to each DBE based on agreed upon prices.

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

The Proposer is required to submit written documentation of the Proposer/offeror's commitment to use a DBE subcontractor whose participation it submits to meet a contract goal and written confirmation from each DBE, listed in the proposal form, indicating their participation in the contract.

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

C. If the DBE participation submitted in the proposal by the apparent lowest responsive Proposer in response to Paragraph A does not meet or exceed the DBE contract goal, the apparent lowest responsive Proposer must submit information to satisfy the North Carolina Department of Transportation that sufficient Good Faith efforts have been made to meet the contract goals. One complete set and nine copies of this information must be received in the

office of the State Contractual Services Engineer no later than 12:00 noon of the sixth day following opening of proposals. Where the information submitted includes repetitious solicitation letters it will be acceptable to submit a sample representative letter along with a distribution list of the firms being solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal as necessary to demonstrate compliance with the factors listed below which the Department considers in judging good faith efforts. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Where the Proposer fails to provide this information by the deadline, the Department may impose one or more of the following sanctions: (1) disqualify the Design-Builder and any affiliated companies from further bidding for a period of time of no more than 90 days from the date of disqualification as established in notification by certified mail, (2) disqualify the Design-Builder and any affiliated companies for award of all contracts for which bids have been received and opened, (3) disqualify the Design-Builder from the contract in question.

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

(1) Whether the Proposer attended any pre-bid meetings that were scheduled by the Department to inform DBEs of subcontracting opportunities.

(2) Whether the Proposer provided solicitations through all reasonable and available means (e.g. advertisings in newspapers owned and targeted to the Disadvantaged) at least 10 days prior to bid opening. Whether the Proposer provided written notice to all DBEs listed in the NCDOT DBE directory, within the Divisions and surrounding Divisions where the project is located, that specialize in the areas of work (as noted in the DBE Directory) that the Proposer will be subcontracting.

(3) Whether the Proposer followed up initial solicitations of interests by contacting DBEs to determine with certainty whether they were interested. If a reasonable amount of DBEs within the targeted Divisions do not provide an intent to quote or no DBEs specialize in the subcontracted areas, the Proposer must notify DBEs outside of the targeted Divisions that specialize in the subcontracted areas, as well as call the project Compliance Officer in the Office of Civil Rights to give notification of the Proposer inability to get DBE quotes.

(4) Whether the Proposer selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime Design-Builder might otherwise perform these work items with its own forces.

(5) Whether the Proposer provided interested DBEs with adequate and timely information about the plans, specifications and requirements of the contract.

(6) Whether the Proposer negotiated in good faith with interested DBEs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any rejection should be so noted in writing with a description as to why an agreement could not be reached.

(7) Whether quotations were received from interested DBE firms but rejected as unacceptable without sound reasons why the quotations were considered unacceptable. The fact that the DBE firms quotation for the work is not the lowest quotation received will not in itself be considered as a sound reason for rejecting the quotation as unacceptable. The fact that the Proposer has the ability and/or desire to perform the contract work with its own forces will not be considered as sound reason for rejecting a DBE quote. Nothing in this provision shall be construed to require the Design-Builder to accept unreasonable quotes in order to satisfy contract goals.

(8) Whether the Proposer specifically negotiated with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be sublet includes potential for DBE participation.

(9) Whether the Proposer made any efforts and/or offered assistance to interested DBEs in obtaining the necessary equipment, supplies, materials, insurance, and/or bonding to satisfy the work requirements in the bid proposal.

(10) Any other evidence that the Proposer submits which show that the Proposer has made reasonable Good Faith efforts to include DBE participation.

In the event one Proposer is the apparent low Proposer on more than one project within the same letting located in the same geographic area of the state, as a part of the good faith effort the Department will consider allowing the Proposer to combine the DBE participation as long as the overall goal value of all projects is achieved.

Where the apparent lowest responsive Proposer fails to submit sufficient participation by DBE firms to meet the contract goal and upon a determination by the Goal Compliance Committee based upon the information submitted that the apparent lowest responsive Proposer failed to make sufficient reasonable efforts to meet the contract goal, the Proposer will be offered the opportunity to meet in person for administrative reconsideration. Administrative reconsideration will be heard by a committee appointed by the Department. Members of this committee will be officials who did not take part in the original determination by the Goal Compliance Committee. The Proposer will have the opportunity to present written documentation or argument concerning the issue of whether it met the goal or made an adequate good faith effort. The Proposer will receive a written decision on the reconsideration. Explaining the basis for finding that the Proposer did or did not meet the goal or made adequate Good Faith efforts to do so. The result of the reconsideration process is not administratively appealable to the Department.

In the event that the Department does not award the contract to the apparent lowest responsive Proposer, the Department reserves the right to award the contract to the next

lowest responsive Proposer that can satisfy the Department that the contract goal can be met or that adequate good faith efforts have been made to meet the goal.

DBE DIRECTORY

Included with this Design-Build Package is a list of Disadvantaged Business Enterprises (DBE) which have been certified as such by the North Carolina Department of Transportation. Only those DBE firms with current certification may be listed in the proposal form.

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

REPLACEMENT OF DBEs

(A) Performance Related

If any DBE Subcontractor submitted on the form for listing of DBE Subcontractors, contained elsewhere in this proposal form, is terminated or fails to complete its work on the contract for any reason, the Design-Builder shall take all necessary, reasonable steps to replace the DBE Subcontractor with another DBE Subcontractor to perform at least the same amount of work of the contract as the DBE that was terminated.

To demonstrate necessary, reasonable Good Faith efforts, the Design-Builder shall document the steps he has taken to replace any DBE Subcontractor who is unable to perform successfully with another DBE Subcontractor. Such documentation shall include but not be limited to the following:

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

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

(1) The names, addresses, and telephone numbers of DBEs who were contacted;

(2) A description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed; and

(c) For each DBE contacted but rejected as unqualified, the reasons for the Design-Builder' conclusion.

(d) Efforts made to assist the DBEs contacted, if needed, in obtaining bonding or insurance required by the Design-Builder.

The Design-Builder will not terminate a DBE subcontractor listed in the proposal form for convenience or perform the work with its own forces or those of an affiliate without the written approval of the Engineer. If the Design-Builder fails to demonstrate reasonable efforts to replace a

DBE firm that does not perform as intended or completes the work with its own forces without the Engineer's approval, the Design-Builder will be disqualified from further bidding for a period of up to 6 months after notification by certified mail.

(B) Decertification

1. If a Prime Design-Builder has listed a DBE firm in his proposal and that DBE Subcontractor is subsequently decertified by the Department after a Request for Subcontract has been approved, then the Department will not require the Prime Design-Builder to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal but may not be counted toward the overall program goal.

2. If a Prime Design-Builder has listed a DBE firm in his proposal and the DBE firm is decertified prior to the Department approving a Request for Subcontract for the named DBE firm, the Prime Design-Builder shall take all necessary and reasonable steps to replace the DBE subcontractor with another DBE subcontractor to perform at least the same amount of work to meet the contract goal or demonstrate that it has made a Good Faith effort to do so.

DEFINITIONS

For purposes of this provision the following definitions will apply:

(1) Socially and economically disadvantaged individuals means a person who has a net worth of $750,000.00 or less and is a citizen or lawful permanent resident of the United States and who is:

(a) A Black American

(b) A Hispanic American

(c) A Subcontinent Asian American

(d) A Native American

(e) An Asian-Pacific American

(f) A Woman

(g) Members of other groups, or other individuals found to be economically and socially disadvantaged by the Small Business Administration under Section 8(d) of the Small Business Act, as amended (15 U.S.C. 637(d)).

(h) Members of other groups, or other individuals found to be economically and socially disadvantaged by the N. C. Department of Transportation under the Criteria for Disadvantaged Business Enterprises as published by the Department.

(2) Disadvantaged Business Enterprise (DBE) means a for-profit small business concern.

(a) That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation in which 51 percent of the stock is owned by one or more such individuals; and

(b) Whose management and daily business operation are controlled by one or more of the socially and economically disadvantaged individuals who own it,

COUNTING DBE PARTICIPATION TOWARD MEETING THE DBE GOAL

(1) If a firm is determined to be an eligible DBE firm and certified by the Department, the total dollar value of the participation by the DBE will be counted toward the goal. The total dollar value of participation by a certified DBE will be based upon the value of work actually performed by the DBE and the actual payments to DBE firms by the Design-Builder.

(2) When a DBE performs as a participant in a joint venture, the Design-Builder may count toward its DBE goal a portion of the total value of participation with the DBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the DBE performs with its forces.

(3) (a) The Design-Builder may count toward its DBE goal only expenditures to DBEs that perform a commercially useful function in the work of a contract. A DBE is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibilities by actually performing, managing, and supervising the work involved. To determine whether a DBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.

(b) Consistent with normal industry practices, a DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal. Work that a DBE subcontracts to a non-DBE firm does not count toward the contract goal. If a DBE Design-Builder or Subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the DBE shall be presumed not to be performing a commercially useful function. The Departments decision on the rebuttal of this presumption is subject to review by the Federal Highway Administration but is not administratively appealable to USDOT.

(c) The following factors will be used to determine if a DBE trucking firm is performing a commercially useful function.

(1) The DBE firm must be responsible for the management and supervision of entire trucking operation
(2) The DBE must itself own and operate at least one fully licensed, insured and operational truck
(3) The DBE will receive full credit for all trucks it owns, insures, operates, and employs drivers
(4) The DBE will receive full credit for all trucks leased from a certified DBE firm
(5) The DBE will only receive credit for the fees or commission for trucks leased from a non-DBE firm
(6) Trucks may be used by others during the term of the lease so long as the lease gives priority to the DBE for the use of the truck(s).

The DBE may present evidence to rebut this presumption to the Department for commercially useful functions.

(4) A Design-Builder may count toward its DBE goal 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from DBE regular dealer and 100 percent of such expenditures to a DBE manufacturer.

(a) For purposes of this provision, a manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Design-Builder.

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

(5) A Design-Builder may count toward its DBE goal the following expenditures to DBE firms that are not manufacturers or regular dealers:

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

(b) The fees or commissions charged for assistance in the procurement of the materials and supplies, or for transportation charges for the delivery of materials or supplies required on a job site(but not the cost of the materials and supplies themselves), toward DBE goals, provided the fees are not from a manufacturer or regular dealer and provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

REPORTING DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION

When payments are made to Disadvantaged Business Enterprise firms, including material suppliers, contractors at all levels (prime, subcontractor, or second tier subcontractor) shall provide the Engineer with an accounting of said payments. This accounting shall be furnished the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in (1) withholding of money due in the next partial pay estimate; or (2) removal of an approved Design-Builder from the prequalified Proposers list or the removal of other entities from the approved subcontractors list.

**RETAINAGE AND PROMPT PAYMENT:** **6-19-01**

Retainage:

The Department will not deduct and hold any retainage from the Design-Builder on this project.

The 1995 Standard Specifications shall be revised as follows:

Sub-Article 109-4(A), pages 80 and 81

Delete the second, third, fourth, and fifth paragraphs of this subarticle.

Insert the following:

"The Department will withhold an amount sufficient to cover anticipated liquidated damages, as determined by the Engineer."

Prompt Payment of Monies Due SubContractors, Second Tier SubContractors and Material Suppliers and Release of Retainage

The Design-Builder, subContractor, or second tier Contractor, shall within seven calendar days of receipt of monies, resulting from work performed on the project or services rendered, pay subContractors, second tier subContractors, or material suppliers, as appropriate. This seven-day period begins upon knowledgeable receipt by the contracting firm obligated to make a subsequent periodic or final payment. These prompt payment requirements will be met if each firm mails the payment to the next level firm by evidence of postmark within the seven-day period.

This provision for prompt payment shall be incorporated into each subcontract or second tier subcontract issued for work performed on the project or for services provided.

The Design-Builder may withhold up to 3% retainage if any subcontractor does not obtain a payment and performance bond for their portion of the work. If any retainage is held on subcontractors, all retainage shall be released within seven calendar days of satisfactory completion of all work. For the purpose of release of retainage, satisfactory completion is defined as completion of all physical elements and corresponding documentation as defined in the contract, as well as agreement between the parties as to the final quantities for all work performed in the subcontract. The Department will provide internal controls to expedite the determination and processing of the final quantities for the satisfactorily completed subcontract portions of the project.

Failure of any entity to make prompt payment as defined herein may result in (1) withholding of money due to that entity in the next partial payment until such assurances are made satisfactory to this provision; or (2) removal of an approved Design-Builder from the prequalified bidders list or the removal of other entities from the approved subcontractors list.

D1G24

**CERTIFICATION FOR FEDERAL-AID CONTRACTS: 3-21-90**

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

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

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

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

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

D1G27

**DOMESTIC STEEL AND IRON PRODUCTS:** **7-1-95**

All steel and iron products which are permanently incorporated into this project shall be produced in the United States except minimal amounts of foreign steel and iron products may be used provided the combined project cost of the bid items involved does not exceed one-tenth of one percent (0.1 percent) of the total amount bid for the entire project or $2,500.00, whichever is greater. This minimal amount of foreign produced steel and iron products permitted for use by this Special Provision is not applicable to fasteners. Domestically produced fasteners are required for this project.

All steel and iron products furnished as "domestic products" shall be melted, cast, formed, shaped, drawn, extruded, forged, fabricated, produced, or otherwise processed and manufactured in the United States. Raw materials including pig iron and processed pelletized and reduced iron ore used in manufacturing "domestic" steel products may be imported; however, all manufacturing processes to produce the products, including coatings, must occur in the United States.

Before each steel or iron product is incorporated into this project or included for partial payment on a monthly estimate, the Design-Builder shall furnish the CEI Firm a notarized certification certifying that the product conforms to the above requirements of this Special Provision. The CEI Firm will forward a copy of each certification to the Materials and Tests Unit.

Each purchase order issued by the Design-Builder or a subcontractor for steel and iron products to be permanently incorporated into this project shall contain in bold print a statement advising the supplier that all manufacturing processes to produce the steel or iron shall have occurred in the United States. The Design-Builder and all affected subcontractors shall maintain a separate file for steel products permanently incorporated into this project so that verification of the Design-Builder's efforts to purchase "domestic" steel and iron products can readily be verified by an authorized representative of the Department or the Federal Highway Administration.

D1G31

**U.S. DEPARTMENT OF TRANSPORTATION HOTLINE:** **11-22-94**

To report bid rigging activities call:

1-800-424-9071

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

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

D1G32

**SUBMISSION OF RECORDS - FEDERAL-AID PROJECTS:** **12-15-98**

The Design-Builder's attention is directed to the Standard Special Provisions entitled "Required Contract Provisions - Federal-Aid Construction Contracts" contained elsewhere in this Design-Build Package.

This project is located on the National Highway System. If the final construction cost of this project equals or exceeds **One Million Dollars**, the Contractor must submit federal form FHWA-47. D1G34

**SUBSURFACE INFORMATION:** **7-1-95**

Subsurface information is available on this project. D1G37

**PLANT PEST QUARANTINES:** **9-18-95**
**(IMPORTED FIRE ANT, WITCHWEED, AND NOXIOUS WEEDS)**

Regulated Articles:

The Design-Builder shall obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture (1-800-206-9333) or (919-733-6932) for any regulated article used on this project originating in a quarantined county. The certificate or limited permit shall accompany the article when it arrives at the project site.

Regulated article(s) included:

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.

2. Plants with roots including grass sod.

3. Plant crowns and roots.

4. Bulbs, corms, rhizomes, and tubers of ornamental plants.

5. Hay, straw, fodder, and plant litter of any kind.

6. Clearing and grubbing debris.

7. Used agricultural cultivating and harvesting equipment.

8. Used earth-moving equipment.

9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading witchweed, imported fire ant or other noxious weeds.

D1G41

**COOPERATION BETWEEN CONTRACTORS:** **7-1-95**

The Design-Builder's attention is directed to Article 105-7 of the Standard Specifications.

It is anticipated that a project to construct a portion of the Charlotte Outer Loop (R-2248D) within the limits of this project will be let to contract prior to the completion of this project.
It is anticipated that a future project (U-3115AA) to add ITS cameras along Speedway Blvd. and cable and conduit routing along I-85 (South of this project) to tie to the MRTMC will be let prior to the completion of this project. It is also anticipated that a future contract will be let for signal work at the Harris Blvd./Reames Rd./I-77 interchange prior to the completion of this project.

The Design-Builder on this project shall cooperate with any Contractor working within or adjacent to the limits of this project to the extent that the work can be carried out to the best advantage of all concerned. D1G43

**TRAINING REQUIREMENTS:** **7-1-95**

The Proposer's attention is directed to the Standard Special Provision "Training Special Provision" included elsewhere in this Design-Build Package.

The number of trainees to be trained on this project shall be **ten**.

D1G44

**RECYCLED PRODUCTS OR SOLID WASTE MATERIALS:** **7-1-95**

It is the policy of the Department of Transportation to aid in reduction of materials that become a part of our solid waste stream. To that extent the Department encourages contractors to initiate, develop, and utilize products and/or construction methods that incorporate the use of recycled or solid waste products in this project. For the purpose of this provision recycled products or waste materials will be those products or materials which would otherwise become solid waste and are collected, separated, or processed and reused or returned to reuse in the form of raw materials or products that are incorporated into a beneficial reuse on the project. Targeted materials include but are not limited to the following: plastic, glass, paper, cardboard, shingles, tires, fly ash, bottom ash, sludge and construction and demolition debris.

This provision will not be applicable to reclaimed asphalt materials used in accordance with the Section 611 of the Standard Specifications and shall not be applicable to any recycled or solid waste materials that are specified for use by the Department on this project.

To utilize recycled or solid waste materials, the Design-Builder shall submit to the Department of Transportation a Recycled Products or Solid Waste Materials Proposal for approval. This proposal shall be submitted to the Resident Engineer and the Design Services Unit. The proposal shall contain, as a minimum, the following.

1. A statement that the request for the modification is being made as a Recycled Products or Solid Waste Materials proposal.

2. A description of the difference between the existing contract requirements and the proposed modification and the comparative advantages and disadvantages of each.

3. If applicable, a complete drawing of the details covering the proposed modifications and supporting computations shall be included in the submittal. The preparation of new designs or revisions to the design shown in the contract drawings shall be accomplished by a professional engineer registered in North Carolina. The Department may waive this requirement based on the extent, detail, and complexity of the design needed to implement the proposal.

4. An itemized list of the contract requirements that would be modified and a recommendation of how to make each modification.

5. A statement of the time by which approval of the proposal must be issued by the Department to maintain the completion date of the contract.

The Design-Builder shall be responsible for obtaining any and all permits which may be required for the hauling, storing, or handling of the targeted materials.

The Design-Builder shall provide certification which verifies the source of the material, and the percentage of targeted materials to be utilized.

The Department reserves the right to reject, at its discretion, any Recycled Products or Solid Waste Materials proposal. The Engineer will be the sole judge of the acceptability.

The provisions of Article 104-3 of the Standard Specifications do not apply to a Recycled Products or Solid Waste Materials proposal.

Restrictions of conditions imposed by the Design-Builder for use of the proposal by the Department on other projects shall not be valid.

The Department will not be liable to the Design-Builder for failure to accept or act upon any Recycled Products or Waste Materials proposal submitted pursuant to this provision nor for any delays to the work attributable to any third party claims, or fines that may be levied as a result of the Design-Builder's decision to use targeted materials.

D1G45

**SAFETY VESTS:** **6-19-01**

All Design-Builder's personnel, all subcontractors and their personnel, and any material suppliers and their personnel must wear an OSHA approved reflective vest or outer garment at all times while at the project site.

D1G47

**COAL FLY ASH IN EMBANKMENTS:** 2-17-98

DESCRIPTION:

This specification allows the Design-Builder an option to use coal fly ash (coal combustion by-products) in embankments as a substitute for conventional borrow material.

When fly ash is used as a substitute for earth borrow material:

- Notify the Engineer and CEI Firm at the preconstruction conference or with at least forty days in advance of the intent to use fly ash.
- Provide the specific locations and construction details of the placement as stated in Section .1703 of the Solid Waste Management Law.
- Submit material properties and laboratory analysis of ash typical of the source to the Department prior to use for consideration of approval. Test data shall include characteristics of the ash leachate as determined by the EPA Toxicity Characteristic Leaching Procedure (Method 1311).
- Provide the material from a supplier including all transportation and all necessary permits for transportation and storage before placement.
- Coordinate delivery of volumes, trucking requirements and ash moisture content.

The Engineer and the Resource Conservation Engineer in the Design Services Unit will coordinate the requirements of Section .1700 of 15A NCAC 13B Solid Waste Management Rules and notify the Design-Builder that all the necessary requirements have been met before the placement of structural fill using coal combustion by-products is allowed.

MATERIAL:

Supply coal fly ash from a Department approved source. A list is maintained by the Resource Conservation Engineer.

The following fly ash is unacceptable:

- Frozen material.
- Ash from boilers fired with both coal and petroleum coke.

Deliver fly ash in covered vehicles.

Prevent dusting of fly ash by conditioning with water. Excessively wet or dry and uncovered material arriving at the site will be rejected.

CONSTRUCTION METHODS:

Place coal fly ash in the core of the embankment section with a minimum of 4 feet (1.2 meters) of earth cover to the outside limits of the embankments or subgrade and a minimum of 4 feet (1.2 meters) above the seasonal high ground-water table. Comply with Rule 15A NCAC 13-B Section 1704 Solid Waste Management Law.

Construct embankments by placing fly ash in level uniform lifts with a maximum lift of 10 inches (250 meters) but not greater than can be compacted to a minimum density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than 1 percent above optimum as determined by AASHTO T-99, Method A or C.

D2G02

**CLEARING AND GRUBBING: 7-1-95**

Clearing on this project shall be performed to the limits established by Method "II" shown on Standard No. 200.02 of the Roadway Standards.

D2G03

**DISPOSAL OF WASTE AND DEBRIS: 5-15-01**

Revise the 1995 Standard Specifications as follows:

Page 387, Article 802-2

Delete the first paragraph and No. 1, including a., b., c., and d., and insert the following:

1. Where electing to dispose of waste in a waste or disposal area, other than active public waste or disposal areas which have been permitted by the Solid Waste Management Division of the North Carolina Department of Environment, Health and Natural Resources or on North Carolina Department of Transportation Right-of-Way, submit jointly with the Property Owner a notarized Development, Use, and Reclamation Plan for each waste or

disposal area proposed for use. As part of the Reclamation Plan, perform the following prior to wasting:

**a. Material Description:**

Detail the type of waste material proposed in the area. Only material originating from North Carolina Department of Transportation projects and complying with the requirements of the Solid Waste Disposal Act will be permitted within the proposed waste or disposal area.

**b. Topography**

Detail the existing topography and locations of the proposed access and egress haul roads. Detail the proposed final topography of the waste or disposal area showing any proposed drainage systems. If a pond is to be constructed or remain, the minimum depth must be a least 4 feet (1.2 meters) as determined from the water table at the time of the reclamation plan is executed. The slope of the soil below the water must be between 5:1 and 2:1. The slope of the sides above the water line must be 2:1 or flatter.

**c. Slopes:**

Rock and earth waste shall be shaped to contours which are compatible to and blend with the adjacent topography. All rock shall be covered with a minimum 6 inch (150 mm) layer of earth material either from project waste or from borrow. As an exception, side slopes constructed of all rock material will not require earthcovering. All slopes shall be on a 2:1 or flatter except that rock slopes shall be on a stable angle of repose.

**d. Construction Debris:**

Construction debris and all broken pavement and masonry shall be covered with a minimum 6 inch (150 mm) thick layer of earth waste material from the project or borrow. The completed waste area shall be shaped as required above for disposal of earth or rock waste.

**e. Erosion Control**

Detail the temporary and permanent erosion control measures, along with design calculations, that are intended during use of the site and as part of the reclamation. Unless considered impractical due to special circumstances, provide in the plan for the use of staged permanent seeding and mulching and appropriate fertilizer topdressing on a continual basis during site use and the immediate total reclamation of the site when the site is no longer needed. Define the seed mixture proposed for establishing temporary and/or permanent vegetation. Establish permanent stand of vegetation prior to acceptance of project.

**f. Evaluation for Potential Wetlands and Endangered Species**

Hire an experienced environmental consultant to perform an assessment of the Waste site for potential conflicts with wetlands, Areas of Environmental Concern (CAMA), and federally protected species.

Delineate the boundaries of any wetlands or jurisdictional surface waters (streams) encountered. Follow the standard practice for documenting the wetland delineation including completion of the Army Corps of Engineer's approved "wetland data form". Document information including data regarding soil, vegetation and hydrology. Maintain a minimum 25 foot (7.6 meter) buffer adjacent to all sides of the wetland boundary and a minimum 50 foot (7.6 meter) buffer adjacent to any stream. Depict the limits of the delineated wetland and surrounding buffer on the Reclamation Plan. Do not dispose of waste and debris in any area under the Corps of Engineers' or any other environmental agencies' regulatory jurisdiction unless and until the NCDOT permit has been modified to permit such disposal activity in the jurisdictional area.

Perform a site assessment for federally listed threatened or endangered species to include habitats which may support these species. Provide to the Engineer a detailed report on the assessment findings. If federally listed threatened or endangered species or habitat which may support such species exist on the proposed waste site, notify the Engineer prior to continued pursuit of such site.

**g. Buffer Zones:**

Allocate sufficient area between the nearest property line and the tie-in of the slope to natural ground to allow for the operation of excavation, hauling, and seeding equipment and for the installation of any and all erosion control devices required. Leave additional undisturbed area between the source and any water course or body to prevent siltation of the water course or body and the movement of the shore line either into the water course or body or into the waste areas. Determine if any additional buffer zones are required by the adjoining property owners or other government agencies and comply with those requirements. (Suggested minimum distances are 10' (3 m) from property lines and 50' (15 m) from water bodies or water courses. Do not place waste material within the 100-year floodplain.

**h. Approval**

Obtain written approval from the Engineer prior to wasting within the proposed waste or disposal area.

Submit a revised or additional reclamation plan if the non-permitted waste or disposal area is expanded by more than one acre (.4047 hectare) or is significantly changed from the previously approved submittal."

Page 387, Article 802-2

In No. 2, first paragraph, third line, insert the words "and drainage" after the word "appearance" and before the word "of".

Page 388, Article 802-3

Delete this article and replace with the following:

Payment for the work covered by this section including, but not limited to, furnishing any waste areas; providing and implementing a Development, Use, and Reclamation Plan; any right of access to waste areas; disposing of waste and debris; dressing and shaping of waste areas; furnishing and spreading earth material over debris, rock, broken pavement, and masonry; clearing and grubbing of waste areas; and hauling waste and debris to waste areas or permitted and landfills; and any tipping fees required for disposal in permitted landfills will be included in the lump sum price for Construction of the project.

D2G16

**BORROW EXCAVATION:** **5-15-01**

Revise the 1995 Standard Specifications as follows:

Page 110, Subarticle 230-4(A)

In the second paragraph, delete the last sentence and insert the following:

"Once all borrow has been removed from the source or portion thereof, the stockpiled topsoil shall be spread uniformly over the area and permanently seeded and mulched."

Page 111, Subarticle 230-4(C)

In the second paragraph, delete No. 3a., b., c., and d., and insert the following:

**a. Topography**

Detail the existing topography and locations of the proposed access and egress haul roads. Detail the proposed final topography of the borrow source showing any proposed drainage systems. Excavate the source according to the plan and dress and shape it in a continuous manner to contours which are comparable to and blend in with the adjacent topography. Grade the source to drain such that no water will collect or stand. Provide a functioning drainage system for the source. If drainage is not practical, and the source is to serve as a

pond, the minimum depth must be at least 4 feet (1.2 meters) as determined from the water table at the time the reclamation plan is executed. The slope of the soil below the water must be between 5:1 and 2:1. The slope of the sides above the water line must be 2:1 or flatter.

**b. Erosion Control**

Detail the temporary and permanent erosion control measures, along with design calculations, that are intended during use of the site and as part of the reclamation. Unless considered impractical due to special circumstances, provide in the plan for the use of staged permanent seeding and mulching and appropriate fertilizer topdressing on a continual basis during site use and the immediate total reclamation of the site when the site is no longer needed. Define the seed mixture proposed for establishing temporary and/or permanent vegetation. Establish permanent stand of vegetation prior to acceptance of project.

**c. Buffer Zones:**

Allocate sufficient area between the nearest property line and the tie-in of the slope to natural ground to allow for the operation of excavation, hauling, and seeding equipment and for the installation of any and all erosion control devices required. Leave additional undisturbed area between the source and any water course or body to prevent siltation of the water course or body and the movement of the shore line either into the water course or body or into the borrow source. Determine if any additional buffer zones are required by the adjoining property owners or other government agencies and comply with those requirements. (Suggested minimum distances are 10' (3 m) from property lines and 50' (15 m) from water bodies or water courses. Where it is necessary to drain the borrow source, perform this work in accordance with Section 240.

**d. Evaluation for Potential Wetlands and Endangered Species**

Hire an experienced environmental consultant to perform an assessment of the borrow source for potential conflicts with wetlands, Areas of Environmental Concern (CAMA), and federally protected species. This evaluation will not be required for permitted commercial sites

Delineate the boundaries of any wetlands or jurisdictional surface waters (streams) encountered.. Follow the standard practice for documenting the wetland delineation including completion of the Army Corps of Engineer's approved "wetland data form". Document information including data regarding soil, vegetation and hydrology. Maintain a minimum 25 foot (7.6 meter) buffer adjacent to all sides of the wetland boundary and a minimum 50 foot (7.6 meter) buffer adjacent to any stream. Depict the limits of the delineated wetland and surrounding buffer on the Reclamation Plan. Do not remove borrow material in any area under the Corps of Engineers' or any other environmental agencies' regulatory jurisdiction unless and until the NCDOT permit has been modified to permit such disposal activity in the jurisdictional area.

Perform a site assessment for federally listed threatened or endangered species to include habitats which may support these species. Provide to the Engineer a detailed technical report on the assessment findings. If federally listed threatened or endangered species or habitat which may support such species exist on the proposed borrow site, notify the Engineer prior to continued pursuit of such site.

**e. Approval**

Obtain written approval from the Engineer prior to removing any material from the proposed borrow source.

Submit a revised or additional reclamation plan if the non-permitted borrow source is expanded by more than one acre (0.4047 hectare) or is significantly changed from the previously approved submittal."

Page 113, Article 230-6

After the third paragraph and before the fourth paragraph, add the following paragraph:
"No direct payment will be made for the work of Evaluation of Potential Wetlands and Endangered Species as outlined above. Payment at the contract lump sum price for Construction of Design-Build project will be considered full compensation for this work."

D2G17

**AGGREGATE PRODUCTION:** **1-20-98**

Provide aggregate from a producer who utilizes the new Aggregate Quality Control/Quality Assurance Program which is in effect on the date of the letting.

No price adjustment is allowed to Design-Builders or producers who utilize the new program. Participation in the new program does not relieve the producer of the responsibility of complying with all requirements of the Standard Specifications. Copies of this procedure are available upon request from the Materials and Test Unit.

D5G02

**FINE AGGREGATE:** **1-20-98**

The 1995 Standard Specifications shall be revised as follows:

Page 500, Table 1005-2

Add the following paragraph at the end of the table:

"**For Standard Sizes 2S and 2MS the following gradations apply.

The minimum percent shown above for material passing the No. 50 (.300mm) and No. 100 (.150mm) sieves may be reduced to 5 and 0, respectively, if the aggregate is to be used in air-entrained concrete containing more than 400 pounds of cementitious materials per cubic yard (237 kg/cubic meter) or in non-air-entrained concrete containing more than 500 pounds of cementitious material per cubic yard (297 kg/cubic meter) or as subdrain fine aggregate."

D5G03

**SHOULDER AND FILL SLOPE MATERIAL:** **6-19-01**

**General:**

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the Standard Specifications except as follows:

Construct the top 6 inches (150 mm) of shoulder and fill slopes with soils capable of supporting vegetation.

Provide soil consisting of loose, friable, sandy material free of subsoil admixtures, refuse, stumps, rocks, roots, root mats, or other unsatisfactory material.

Provide soil with a P.I. greater than 6 and less than 25 and with a pH ranging from 5.5 to 6.8. Remove stones and other foreign material 2 inches (50 mm) or larger in diameter. All soil is subject to test and acceptance or rejection by the Engineer.

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

**QUALITY MANAGEMENT SYSTEM FOR ASPHALT PAVEMENTS:** **02-20-01**
**(SUPERPAVE Version)**

**609-1 DESCRIPTION.**

The work covered by this provision consists of the production and construction of asphalt mixtures and pavements in accordance with a quality management system as described in these specifications. These specifications shall apply to all materials and work performed in accordance with the Superpave Hot Mix Asphalt Pavements provisions. All applicable provisions of Division 6 of the Standard Specifications, except as modified herein, shall apply. The Design-Builder shall perform all quality control activities in accordance with the Department's "Hot Mix Asphalt Quality

Management System" (HMA/QMS) Manual which is in force on the date of the contract advertisement.

The "Asphalt Price" used to calculate any price adjustments set forth in this provision shall be $35 per theoretical ton. This price shall apply for any asphalt mix type.

**609-2 DESCRIPTION OF RESPONSIBILITIES.**

**(A) Quality Control:**

The Design-Builder shall provide and conduct a quality control program. A quality control program is defined as all activities, including mix design, process control inspection, sampling and testing, and necessary adjustments in the process that are related to production of a pavement which meets all requirements of the specifications. In addition the CEI Firm shall perform inspection of the work in accordance with the established standard procedures and practices of the Department.

**(B) Quality Assurance:**

The Department will conduct a quality assurance program. A quality assurance program is defined as all activities, including inspection, sampling, and testing related to determining that the quality of the completed pavement conforms to specification requirements. Quality assurance shall be performed on a minimum of 10% of the samples taken.

**609-3 MIX DESIGN/JOB MIX FORMULA REQUIREMENTS.**

All requirements of the Project Special Provision titled Asphalt Plant Mix Pavements Superpave, shall apply.

**609-4 FIELD VERIFICATION OF MIXTURE AND JOB MIX FORMULA ADJUSTMENTS.**

The Design-Builder shall conduct field verification of the mix at each plant within 30 calendar days prior to beginning production of each new mix design. A mix design shall be considered new until at least one full test series has been performed with all the mix control criteria test results being within the applicable individual test limits or meeting the specification requirements, whichever is applicable. The mix will then be considered a confirmed mix. Anytime more than a 90 calendar day lapse in quality control testing of any confirmed mix has occurred, mix verification shall again be performed. Mix production of both new and confirmed mix designs must occur within 30 calendar days after mix verification or mix(es) must be reverified.

Field verification testing shall consist of a minimum of one full test series on mix sampled and tested according to "Required Sampling and Testing" specified in Subarticle 609-5(D). The mix verification sample shall be obtained and split in accordance with current procedures in the Superpave HMA/QMS Manual**.** Plant production of mix to the project shall not begin until all field verification test results have been completed and the mix has been satisfactorily verified by the

Design-Builder's Level II Technician and approved by the Engineer. Satisfactory verification shall be when all volumetric mix properties are within the applicable mix design criteria and the gradation and binder content are within the individual test limits for the mix type being produced.

In addition to the required sampling and testing, all preliminary inspections and plant calibrations as outlined in the HMA/QMS Manual, shall be performed. Records of these calibrations and mix verification tests shall be retained by the Design-Builder and copies shall be furnished to the Engineer for review and approval prior to beginning production of the mix. The Engineer's approval of the mix verification in no way releases the Design-Builder from his responsibility to produce a mix that fully meets the Specification requirements.

The initial mix verification of all new mix designs shall be conducted with the plant set up to produce the aggregate blend and binder content in accordance with the initial JMF. If the Design-Builder and/or the Engineer determine from results of quality control tests conducted during mix verification, and/or production to the project, that adjustments to the JMF are necessary to achieve specified mix properties, adjustments to the JMF may be made within tolerances permitted by specifications for the mix type being produced. An exception to this is that there shall be no reduction of asphalt binder content when the field production VMA computes below the minimum specification requirement. All JMF adjustments must be approved by the Engineer and documented in writing.

Failure by the Design-Builder to fully comply with the above mix verification requirements shall result in immediate production stoppage by the Engineer. Normal production shall not resume until all mix verification sampling and testing, calibrations, and plant inspections have been performed and approved by the Engineer.

## 609-5 DESIGN-BUILDER'S QUALITY CONTROL SYSTEM.

### (A) Personnel Requirements :

All sampling, testing, data analysis and data posting shall be performed or directly supervised by a certified Superpave QMS asphalt plant technician. All certifications shall be in accordance with the Department's Asphalt Technician Certification Program.

The Design-Builder shall provide at least one certified Superpave Asphalt Technician Level I at all times at each plant site during production of material for the project. A plant operator who is a certified Level I Technician may be utilized to meet this requirement when daily production of each mix design is less than 100 tons (metric tons) and the next regularly scheduled random sample location is not within that tonnage. When performing in this capacity, the plant operator will be responsible for all quality control activities which are necessary and required. Any absence of the Level I Technician, other than those for normal breaks and emergencies, must be pre-approved by the appropriate QA Supervisor or his designated representative(s). Any extended absence of the Technician that has not been approved will result in immediate suspension of production by the Engineer. All mix produced during this absence will be accepted in accordance with Article 105-3 of the Standard Specifications.

The Design-Builder shall have a certified Asphalt Technician Level II readily available to respond to mix problems and make any necessary adjustments in a timely manner. The Level II Technician may serve in a dual capacity and also fulfill the Level I requirements specified above.

The Design-Builder and the CEI Firm shall each provide at least one certified QMS Roadway Technician with each paving operation at all times during the placement of asphalt. This person shall be responsible for monitoring all roadway paving operations and shall directly supervise quality control activities and processes.

An organizational chart, including names, telephone numbers and current certification numbers, of all those responsible for the quality control program shall be posted in the Design-Builder's laboratory while asphalt paving work is in progress.

**(B) Field Laboratory Requirements:**

For a contract with 5000 or more total tons (metric tons), the Design-Builder shall furnish and maintain a Department certified Superpave laboratory at the plant site. The laboratory shall include a minimum of 320 square feet (30 square meters) of floor space (exclusive of toilet facilities), equipment, and supplies for performing Design-Builder quality control testing. Convenient telephone and fax machine access for QMS personnel shall be provided by the Design-Builder at the plant site.

For a contract with less than 5000 total tons (metric tons) of asphalt mix, the Design-Builder may conduct the quality control testing in a certified off-site Superpave laboratory. All other requirements in these specifications shall still apply.

The laboratory testing equipment shall meet the requirements of the test methods herein identified in Subarticle 609-5(D) "Required Sampling and Testing."

Laboratory equipment furnished by the Design-Builder or his representative shall be properly calibrated and maintained. The Engineer shall be allowed to inspect measuring and testing devices to confirm both calibration and condition. If at any time the Engineer determines that the equipment is not operating properly or is not within the limits of dimensions or calibration described in the applicable test method, the Engineer may stop production until corrective action is taken. The Design-Builder shall maintain a record of calibration results at the laboratory.

**(C) Quality Control Plan:**

The Design-Builder will not be required to submit a written quality control plan to the Department; however, the Design-Builder shall perform quality control activities required by these specifications and accepted asphalt industry quality control practices and procedures.

**(D) Required Sampling and Testing of Mixture:**

The Design-Builder's quality control process shall include, at a minimum but not be limited to, the sampling and testing of all parameters outlined in these provisions using test methods and

frequencies as specified herein. The Design-Builder shall obtain randomly selected samples in accordance with the latest edition of the Department's "HMA/QMS Manual" and shall log all samples taken on forms provided by the Engineer. All samples taken shall be split, unless otherwise specified, and retained in accordance with these procedures.

Unless otherwise directed by the Engineer, the untested portion of the Design-Builder's split samples and the tested TSR specimens shall be retained for 5 calendar days at the plant site commencing the day the samples are tested. The QC Gyratory compacted specimens shall be retained for 2 calendar days commencing the day the specimens are prepared. Disposal permission may be given by Quality Assurance personnel prior to these specified storage periods. The split portion of the Design-Builder's mix verification and referee mix samples shall be retained until either procured by or disposal permission is given by QA personnel. All retained samples shall be stored in a dry and protected location.

The Design-Builder shall maintain minimum test frequencies as established in the schedule below. All tests shall be completed within 24 hours of the time the sample was taken, unless specified otherwise within these provisions. Should the specified tests not be completed within the required time frame, production will cease at that point until such time the tests are completed.

The Design-Builder may utilize innovative equipment or techniques not addressed by these specifications to produce or monitor the production of mix, subject to approval by the Engineer.

Should the Design-Builder's testing frequency fail to meet the minimum frequency requirements as specified below, all mix without the specified test representation shall be considered unsatisfactory. If the Engineer allows the mix to remain in place, payment will be made at 50 percent, of the theoretical asphalt tonnage, at the "Asphalt Price" set forth in Article 609-1 of this scope of work.

**QUALITY CONTROL MINIMUM SAMPLING AND TESTING SCHEDULE**

The Design-Builder shall sample and test the completed mixture from each mix design at the following minimum frequency during mix production:

| Accumulative Production Increment | Number of Samples per Increment |
|---|---|
| 750 tons (750 Metric Tons) | 1 |

If production is discontinued or interrupted before the accumulative production increment tonnage is completed, continue the increment on the next production day(s) until the increment tonnage is completed. Obtain the random sample within the specified increment at the location determined in accordance with the most current edition of the Department's HMA/QMS Manual. When daily production of each mix design exceeds 100 tons (100 metric tons) and a regularly scheduled random sample location for that mix design is not reached during that day's production, perform at least one partial test series consisting of Items A & B in the schedule below. These partial test series and associated tests do not substitute for the regularly scheduled random sample for that increment.

During mix production the Design-Builder shall conduct quality control sampling and perform a full test series consisting of Items A thru I as scheduled below:

Asphalt Mixture - Sampled From Truck at Plant (AASHTO T 168) (Split Sample Required)

A. Binder Content, % (Design-Builder may select either option below):
   1. Ignition Furnace (AASHTO T 308 Modified)
   2. Other: Design-Builder may request and use other means of determining percent asphalt binder, subject to approval by the Engineer.
B. Gradation on Recovered Blended Aggregate from Mix Sample (AASHTO T 30 and T 11) Grade on all sieves specified on JMF
C. Maximum Specific Gravity (AASHTO T 209)
D. Bulk Specific Gravity of Compacted Specimens (AASHTO T 166), Average of 3 specimens at $N_{des}$ gyrations
E. Air Voids (VTM), average of 3 specimens at $N_{des}$ gyrations
F. Voids in Mineral Aggregate (VMA) (calculation)
G. Voids Filled with Asphalt (VFA) (calculation)
H. $P_{0.075}/P_{be}$ Ratio
I. % Maximum Specific Gravity at $N_{ini}$ (calculation)

In addition to the above schedule, conduct the following sampling and testing as indicated:

1. Aggregate Stockpile Gradations* (AASHTO T 27 and T 11) (sampled from stockpiles or cold feed system as follows:)
   a. Coarse Aggregates (Approved Standard Sizes)
      1. At beginning of production*
      2. Weekly thereafter*

   b. Fine Aggregates (Stone Screenings, Natural Sands, Etc.)
      1. At or within 1 week prior to mix verification (Gradations Valid for Multiple Mix Designs),
      2. weekly after mix verification*,
      3. anytime production is stopped due to plant mix gradation related problems

2. Reclaimed Asphalt Pavement (RAP) Extraction (AASHTO T 164 and T 30) (sampled from stockpiles or cold feed system at beginning of production & weekly thereafter). Have RAP approved for use in accordance with Section 611 of the Standard Specifications.
3. Combined Aggregate Moisture Content (AASHTO T 255) Drum Plant Only (sampled from stockpiles or cold feed system a minimum of once daily).
4. Retained Tensile Strength(TSR)-(AASHTO T283 Modified):

   Option 1: Mix sampled from truck at plant, tested, and results furnished to the Engineer within seven (7) calendar days after beginning production of each new

mix design. From the split sample, QC prepares and submits within 5 calendar days of the sample date, an additional set of specimens to the QA Lab for TSR testing. (Split Sample Required for Option 1)

Option 2: Mix sampled from truck at plant with one set of specimens prepared by the Design-Builder and then tested jointly by QA and QC at a mutually agreed upon lab site within first seven (7) calendar days after beginning production of each new mix design. Specimens must be tested on either a recording test press or a test press that maintains the peak load reading after the specimen has broken.

Additional TSR testing required prior to mix production in accordance with above procedures is required when a change is made in anti-strip additive dosage or when a new anti-strip additive source or grade is utilized, unless otherwise approved by the Engineer. Other TSR test(s) may be directed as deemed necessary. TSR testing not required for mix verification, but may be performed at that time.

5. % Maximum Specific Gravity at $N_{max.}$ (Split Sample Required)
    a. Sampled from plant produced mix during mix verification
    b. 3 specimens compacted at $N_{max}$ gyrations
    c. $\%G_{mm}@N_{max}$ calculated from average of 3 specimens.

*In lieu of the aggregate stockpile gradations performed by QC, gradation quality control data conducted by the aggregate producer, which is representative of the Design-Builder's current stockpiles, may be furnished.

**(E) Documentation (Records):**

The Design-Builder shall document all observations, records of inspection, samples taken, adjustments to the mix, and test results on a daily basis. Results of observations and records of inspection shall be noted as they occur in a permanent field record. Adjustment to mix production and test results shall be recorded on forms provided by the Engineer.

All such records shall be made available to the Engineer, upon request, at any time during project construction. All QC records and forms shall be completed and distributed in accordance with the most current edition of the Department's "HMA/QMS Manual". At the end of each quarter, a copy of the control charts (with the moving average shown in red) shall be provided to the Engineer in a neat and orderly manner. All QC testing forms shall be maintained by the Design-Builder for 90 calendar days after completion of the form(s).

Failure to maintain QC records and forms as required, or to provide these records and forms to the Engineer upon request, may result in production stoppage until the problem is resolved.

Falsification of test results, documentation of observations, records of inspection, adjustments to the process, discarding of samples and/or test results, or any other deliberate

misrepresentation of the facts will result in the revocation of the applicable person's QMS certification. There will be no pay for all tonnage represented by the falsified test(s) results or documentation. The Engineer will determine acceptability of the mix in question. If mix represented by the falsified results is determined not to be acceptable, it shall be removed and replaced with mix which complies with the Specifications.

**(F) Documentation (Control Charts):**

Standardized control charts furnished by the Department shall be maintained by the Design-Builder at the field laboratory. All QC full test series test results on mix incorporated into the project shall be recorded on control charts the same day tests are conducted.

Results of quality assurance tests performed by the Engineer will be posted on the Design-Builder's control charts as data becomes available.

The following data shall be recorded on standardized control charts:

1. Aggregate Gradation Tests
    a. For each mix type : one sieve size smaller than the mix nominal maximum size
    b. For all mix types : 2.36 mm and 0.075 mm sieves

2. Binder Content, %

3. Bulk Specific Gravity ($G_{mb}$) of Compacted Specimen at $N_{des}$ (measured)

4. Maximum Specific Gravity ( $G_{mm}$) Determined by AASHTO T 209

5. Percent Voids in Total Mix at $N_{des}$ Gyrations

6. Percent Voids in Mineral Aggregate at $N_{des}$ Gyrations

7. $P_{0.075}$/Pbe Ratio

8. % Maximum Specific Gravity ($G_{mm}$) at $N_{ini}$ Gyrations

Both the full test series individual test values and the moving average of the last four (4) data points will be plotted on each chart. Partial test series results will not be plotted on the control charts. The Design-Builder's individual test data will be shown in black and the moving average in red. The Engineer's assurance data will be plotted in blue. The warning control limits shall be drawn with a dash green line, the moving average control limits with a dash blue line, and individual test limits with a dash red line.

The moving average(s) shall be continuous with the following exceptions. A new moving average(s) shall be re-established only when :

1. A change in the binder percentage or aggregate blend is made on the JMF, or

2. The Design-Builder elects to stop or is required to stop production after one or two moving average values, respectively, fall outside the warning limits as outlined in Subarticle 609-5(I), or
3. Reverification of the mix is required due to a 90 day lapse in QC testing.

In addition, if the Design-Builder fails to stop production after two consecutive moving averages exceed the warning limits, but does stop production at a subsequent time, a new moving average shall be re-established beginning at the actual production stop point. The moving averages for all mix properties shall be re-established. Moving averages will not be re-established when production stoppage occurs due to an individual test result exceeding the Specification requirements.

All full test series test results shall be part of the plant quality control record and shall be included in moving average calculations with the following exception. When the Design-Builder's testing data has been proven incorrect, the correct data as determined by the Engineer shall be used in lieu of the Design-Builder's data to determine the appropriate pay factor in accordance with Subarticle 609-5(I). In this case, the test results and any related data proven incorrect shall be replaced.

**(G) Control Limits:**

The following shall be established as the control limits for mix production. Control limits for the moving average and warning limits are based on a moving average of the last four (4) data points. All control limits will be applied to data given on the current JMF except VMA, $P_{0.075}$/Pbe Ratio, and % $G_{mm}$ @ $N_{ini}$. The VMA control limits will be based against the minimum specification requirement for that mix type. The $P_{0.075}$/Pbe Ratio and % $G_{mm}$ @ $N_{ini}$ control limits will be based against the maximum specification requirements for each mix type.

| | | **Control Limits** | |
|---|---|---|---|
| Parameter | Warning | Moving Average | Individual Test |
| 2.36 mm Sieve | ± 4.0 | ± 5.0 | ± 8.0 |
| 0.075 mm Sieve | ± 1.5 | ± 2.0 | ± 2.5 |
| Asphalt Binder Content, % | ± 0.3 | ± 0.5 | ± 0.7 |
| Air Voids, % @ $N_{des}$ | ± 1.0 | ± 1.5 | ± 2.0 |
| VMA, % @ $N_{des}$ | -0.5 | -0.8 | -1.0 |
| $P_{0.075}$ / Pbe Ratio | 0.0 | N / A | +0.4 |
| %$G_{mm}$ @ $N_{ini}$ | 0.0 | N / A | +1.0 |

**(H) Warning Bands:**

Warning bands are defined as the area between the Warning limits and Moving Average limits.

**(I) Corrective Action:**

All required corrective actions are based upon initial test results and shall be taken immediately upon obtaining those results. In the event situations occur which warrant more than one corrective action and/or adjustment, give precedence to the more severe of these actions. Stopping production when required takes precedence over all other corrective actions. The Design-Builder shall document all corrective actions.

Production of a mix shall cease immediately when either of the following occurs. Production of that mix to the project shall not resume until approval is given by the Engineer.

1. when an individual test result for a mix control criteria (including results for required partial test series on mix) exceeds both the individual test control limits and the applicable specification design limits, or
2. when two consecutive binder content test results exceed the individual limits, or
3. when two consecutive field TSR values fail to meet the minimum specification requirement.

Acceptance of all mix failing to meet the individual test control limits (including results for required partial test series on mix) or minimum TSR requirements as described above will be determined in accordance with Article 105-3. In addition, any mix which is obviously unacceptable will be rejected for use in the work.

Failure to stop production when required due to an individual test not meeting the specified requirements shall subject all mix from the stop point tonnage to the point when the next individual test is back on or within the warning limits, or to the tonnage point when production is actually stopped, whichever occurs first, to be considered unacceptable.

Failure to stop production when required due to two consecutive TSR tests failing to meet the specification requirements shall subject all mix from the stop point tonnage to the point when the next TSR test meets or exceeds the specification requirement, or to the tonnage point when production is actually stopped, whichever occurs first, to be considered unacceptable.

In either case, this material shall be removed and replaced with materials which comply with the specifications, unless otherwise approved by the Engineer.

The Design-Builder shall immediately notify the Engineer whenever any moving average value exceeds the warning limits. If two consecutive moving average values for any one of the mix control criteria fall outside the warning limits, the Design-Builder shall cease production of that mix and make adjustments. The Design-Builder may elect to stop production after only one moving average value falls outside the warning limits. In either case, a new moving average shall not be determined until the fourth test after the elective or mandatory stop in production. Normal production of the mix in question shall not be resumed until approved by the Engineer.

If the process adjustment improves the property in question such that the moving average after four additional tests is on or within the warning limits, the Design-Builder may continue production with no reduction in payment.

If the adjustment does not improve the property in question such that the moving average after four additional individual tests stays in the warning bands, the mix shall be considered not to be within reasonably close conformity, but reasonably acceptable. Reduced payment for the mix in question will be applied starting from the plant sample tonnage at the stop point to the sample tonnage when the moving average is on or within the warning limits in accordance with the following table.

Payment for Mix Produced in the Warning Bands

| Parameter | Pay Factor** Percent "Asphalt Price"*** |
|---|---|
| 2.36mm or 0.075mm Sieves | 90 % |
| Binder Content | 85 % |
| VTM @ $N_{des}$ | 70 % |
| VMA @ $N_{des}$ | 90 % |

** If more than one pay factor is involved for the same mix quantity, only the lower of the pay factors shall be applied to the mix unit bid price.

***Based on the theoretical tonnage at the "Asphalt Price" referenced in Article 609-1

If the adjustment does not improve the property in question such that the moving average after four additional tests exceeds the moving average control limits, the mix shall be considered not to be within reasonably close conformity with specifications. If the Engineer determines the mix is reasonably acceptable based on test data and an inspection of the completed pavement and allows it to remain in place, the mix will be accepted in accordance with Article 105-3. If the mix is determined to be unacceptable, the mix shall be removed and replaced with materials which comply with the specifications. In either case, the adjustment or removal, respectively, for the mix in question will be applied starting from the plant sample tonnage at the stop point to the sample tonnage when the moving average is on or within the warning limits. In addition, any mix which is obviously unacceptable will be rejected for use in the work.

Failure to stop production and make adjustments as described above due to two consecutive moving average values falling outside the warning limits shall subject all mix produced from the stop point tonnage to the tonnage point when the moving average is back on or within the warning limits or to the tonnage point when production is actually stopped, whichever occurs first, to be considered unacceptable. This material shall be removed and replaced with materials which comply with the specifications, unless otherwise approved by the Engineer.

**(J) Allowable Retesting for Mix Deficiencies:**

The Design-Builder may elect to resample and retest for plant mix deficiencies when individual QC test(s) exceed one or more of the mix property target(s) by more than the tolerances indicated below. The retesting shall be performed within 10 days of the initial test results. Retesting shall be approved by the Engineer prior to being performed and shall be in accordance with the Department's "GUIDELINES FOR RETESTS OF PLANT MIX DEFICIENCIES". Retests for

any mix deficiency other than as listed below will not be allowed unless otherwise permitted by the Engineer. Acceptance of the mix in question will be based on the retest data in accordance with Article 105-3.

The Department reserves the right to direct the Design-Builder to resample and retest at any time or location as directed by the Engineer.

| | | | |
|---|---|---|---|
| 1. | VTM | -- | by more than +/- 2.5% |
| 2. | % Binder | -- | by more than +/- 1.0% |
| 3. | VMA | -- | by more than - 2.0% |
| 4. | 0.075 mm sieve | -- | by more than +/- 3.0% |
| 5. | 2.36 mm sieve | -- | exceeds Specification Mix Design Limits and one or more of the above tolerances are also exceeded. |
| 6. | TSR | -- | by more than - 15% from Specification Limit |

**609-6 QUALITY ASSURANCE OF MIXTURE.**

Quality assurance will be accomplished in the following ways:

1. by conducting assurance testing of split samples obtained by the Design-Builder at a frequency equal to or greater than 10% of the frequency required of the Design-Builder;
2. by periodically observing tests performed by the Design-Builder;
3. by monitoring required control charts exhibiting test results of control parameters;
4. by directing the Design-Builder to take additional samples at any time and any location during production (in lieu of the next scheduled random sample) ;
5. by conducting verification sampling and testing on samples taken independently of the Design-Builder's quality control samples; and
6. by any combination of the above

In all cases, the Engineer's quality assurance and verification testing will be independent of the Design-Builder's tests. The Department's quality assurance program will be conducted by a certified QMS technician(s).

The Engineer will conduct assurance tests on split samples taken by the Design-Builder for quality control testing. These samples may be the regular quality control samples or a sample location selected by the Engineer from any location in the process. The frequency will be equal to or greater than 10% of that required of the Design-Builder as stated in Subarticle 609-5(D), - "Required Sampling and Testing". The Engineer may select any or all split samples for assurance testing. Results of quality assurance tests will be provided to the Design-Builder within 3 working days after the sample has been obtained, except for verification TSR test results which will be provided within 7 calendar days.

Differences between the Design-Builder's and the Department's split sample test results will be considered acceptable if within the following limits:

| Test Parameter | Acceptable Limits of Precision |
|---|---|
| 25.0mm, 19.0mm sieves (Base Mixes) | ±10.0 % |
| 12.5 mm sieve (Intermediate Mixes) | ±6.0 % |
| 9.5mm, 4.75 mm sieves (Surface mixes) | ±5.0 % |
| 2.36 mm sieve (All mixes) | ±5.0 % |
| 0.075 mm sieve (All mixes) | ±2.0 % |
| Asphalt Binder Content | ±0.5 % |
| Maximum Specific Gravity Mix ($G_{mm}$) | ±0.020 |
| Gyratory Bulk Specific Gravity ($G_{mb}$)@ $N_{des}$ | ±0.030 |
| TSR | ± 15.0% |

In the event comparison test results are outside the above acceptable limits of precision or the quality assurance test results are either outside the individual test control limits or fail to meet specification requirements, the Engineer will immediately investigate the reason for the difference. If the potential for a pavement failure is present, the Engineer may suspend production, wholly or in part, in accordance with Article 108-7 while the investigation is in progress. The Engineer's investigation may include but not be limited to the following:

1. Joint testing of any remaining split samples,

2. Review and observation of the QC technician's sampling and testing procedures

3. QC equipment,

4. Comparison of split sample test results on mix currently being produced.

If reasons for the difference cannot be determined, payment for the mix in question will be determined in accordance with Article 105-3.

The Engineer will periodically witness the sampling and testing being performed by the Design-Builder. If the Engineer observes that the sampling and quality control tests are not being performed in accordance with the applicable test procedures, the Engineer may stop production until corrective action is taken. The Engineer will promptly notify the Design-Builder of observed deficiencies, both verbally and in writing. The Engineer will document all witnessed samples and tests.

The Engineer will obtain verification samples for testing independent of the Design-Builder's quality control process. These samples will be split for testing by the Engineer and the Design-Builder.

**609-7 ACCEPTANCE OF MIXTURE.**

The Engineer will base final acceptance of the mix on the results of random testing made on split samples during the assurance process and validation of the Design-Builder's quality control process as outlined in Subarticle 609-5(I) and Article 609-6.

**609-8 CONSTRUCTION REQUIREMENTS.**

**(A) MATERIALS**

All materials utilized in the production of hot mix asphalt shall meet the applicable requirements of the provisions titled "ASPHALT PLANT MIX PAVEMENTS – SUPERPAVE", except as modified therein for the type of plant mix pavement being constructed.

Reclaimed Asphalt Material may be used in hot mix asphalt in accordance with the provisions of Section 611 of the Standard Specifications, except as modified herein.

**(B) EQUIPMENT**

Equipment for production, placement and compaction of the hot mix asphalt shall meet the applicable requirements of Division 6 of the specifications and any special provisions included in the contract, unless otherwise approved in writing by the Engineer.

**609-9 FIELD COMPACTION QUALITY MANAGEMENT.**

**(A) Design-Builder Quality Control of Density**

The Design-Builder shall perform quality control of the compaction process in accordance with applicable provisions of Article 610-11 of the Standard Specifications, except as modified herein. The Design-Builder may elect to use either cored sample density procedures or nuclear gauge density procedures. The method of density quality control shall be provided to the Engineer by the Design-Builder at the preconstruction conference.

Nuclear density control procedures shall be in accordance with the Department's most current Nuclear Gauge Operator's Manual. This manual may be obtained through the Department's M & T Soils Section. Density shall be determined by the backscatter method of testing using a thin-lift nuclear gauge, with printer, which has been approved by the Department. The Design-Builder shall furnish, maintain, and operate the nuclear gauge.

The gauge operator shall have been certified by the Department. The gauge shall have been calibrated within the previous 12 months by an approved calibration service. The Design-Builder shall maintain documentation of such calibration service for a 12 month period.

The Design-Builder shall establish acceptable control strips at locations approved by the Engineer. Control strips shall be 300 feet (91 m) in length for the laydown width of the paver. Nuclear density control strips shall be placed at the minimum frequencies specified in the

Department's most current Nuclear Gauge Operator's Manual. Core sample control strips shall be placed anytime the Design-Builder is proceeding on limited production due to failing densities. In addition, control strips shall be placed anytime deemed necessary by the Engineer.

The minimum frequency of sampling and testing by either method shall be on the basis of test sections consisting of not more than 2000 linear feet (600 linear meters) of pavement at the paver laydown width. All pavements 4.0 feet (1.2 m) or wider, full width paved shoulders, full width temporary pavements, and all full width travel lane pavements, including normal travel lanes, turn lanes, collector lanes, ramps, and loops, shall be sampled and tested unless otherwise approved.

For base and intermediate mixes (surface mixes not included) used to widen pavements less than 4.0 feet (1.2 meters), for all mixes used in intersections (exclusive of the full width travel lanes), and for irregular areas, a specified density will not be required provided the pavement is compacted using equipment and procedures approved by the Engineer. Irregular areas are defined as areas that have irregular shapes that make it difficult to compact with conventional asphalt rollers.

When cored sample control is being utilized, the testing frequency shall consist of a minimum of one random 6 inch (152 millimeters) core sample taken from each test section, except that not less than three cored samples shall be taken from each mix type and/or lot placed on a given day. When nuclear gauge control is being utilized, the testing frequency shall consist of five random gauge readings (one random reading from each of five equally spaced increments) from each test section.

Check core samples may be taken by the Design-Builder for any of the below reasons.

1. When cored sample control is being utilized and a core sample(s) is more than 2.0 percent below the average of all core samples from the same lot, that core(s) sample may be checked.
2. When nuclear gauge control is being utilized and a control strip fails solely because of any individual core(s) being more than 1.0 percent below the minimum density, that core(s) sample may be checked.
3. When a control strip fails and a core sample(s) is more than 2.0 percent below the average of the control strip, that core(s) may be checked.

For each core sample that is in question, there shall be three check samples taken: one adjacent to the initial sample and one ten feet ( 3 meters) in each direction, longitudinally, of the initial sample. The results of these 3 check samples will be averaged and this average will be used instead of the initial core results in question. The initial core sample results will not be used if check samples are taken. Check samples must be taken within 2 calendar days of the date of the initial sample. Only one set of check samples per sample location will be allowed. If full depth cores are necessary at these check sample locations, separation of the layer to be tested will be the responsibility of the Design-Builder. All check samples shall be taken in the presence of a representative of the Engineer. In addition, a QA comparison core sample(s) may be taken adjacent to one or more of these check samples.

The Design-Builder shall maintain minimum test frequencies as established above. Should the Design-Builder's density testing frequency fail to meet the minimum frequency as specified above, all mix without required density test representation shall be considered unsatisfactory and if allowed to remain in place, will be paid for at 50 percent of the theoretical asphalt tonnage, at the "Asphalt Price" set forth in Article 609-1 of this provision.

All QC nuclear density tests shall be conducted the same day that the mix being tested was placed and compacted. All core samples shall be cored no later than the beginning of the next production day, not to exceed three (3) calendar days. QC core samples shall be tested and test results submitted to the Engineer within one working day of the time the samples were taken. If the specified density tests are not completed within the applicable time frame, production will cease at that point until such time the required tests are completed .

Unless otherwise directed by the Engineer, the Design-Builder's quality control density core samples shall be retained at the plant site for 5 calendar days commencing the day the samples are tested, or until disposal permission is granted by the QA personnel, whichever occurs first. The Department's quality assurance comparison and verification core samples shall be retained in a sealed container at the plant site until obtained by quality assurance personnel. All retained density samples shall be stored on a smooth, flat surface in a cool, dry protected location.

The Design-Builder shall operate on a limited production basis if any of the following occurs due to failing densities:

three consecutive failing lots, or three consecutive lots with one or more test sections more than 3.0% below the minimum requirement, or either one or a combination of the above, not to exceed two production days.

Limited production is defined as the production, placement, and compaction of a sufficient quantity of mix to construct only a 300 foot (91 m) control strip plus 100 feet (30 m) of pavement adjacent to each end of the control strip. The Design-Builder shall remain on limited production until such time as satisfactory density results are attained or two control strips have been attempted without achieving acceptable density test results, whichever occurs first.

If the Design-Builder fails to achieve satisfactory density at this point, production of mix shall cease until such time as the cause of the failing density test results can be determined. As an exception, the Engineer may grant approval for the Design-Builder to produce a different mix design of the same type mix if quality control and quality assurance plant mix tests indicate the failing densities may be attributed to a mix problem(s). If the Design-Builder does not operate by the limited production procedures as specified above, the three consecutive failing lots or two production days, whichever is applicable, and all mix produced thereafter will be considered unacceptable. This material shall be removed and replaced with material which complies with the Specifications, unless otherwise approved by the Engineer.

**(B) Quality Assurance of Density**

The Departments quality assurance program for density will consist of the following:

1. by retesting randomly selected quality control test sections (either cores or nuclear) at a frequency equal to or greater than 10% of the frequency required of the Design-Builder;

2. by periodically observing tests performed by the Design-Builder;

3. by testing randomly selected comparison core samples taken adjacent to the Design-Builder's quality control core samples [8 inches (200 millimeters) center-to-center] at a frequency equal to or greater than 10% of the frequency required of the Design-Builder;

4. by conducting verification sampling and testing on test sections (either core or nuclear) independently of the Design-Builder's quality control test sections.

Comparison and verification core samples will be taken in the presence of a DOT technician, and either delivered directly to the appropriate QA Lab by a DOT technician or placed in a sealed container and delivered to the Design-Builder's QC Lab for QA testing.

Results of all density quality assurance tests will be provided to the Design-Builder within 3 working days after the samples have been obtained by the QA personnel.

Differences between the Design-Builder's quality control and the Department's quality assurance test results will be considered acceptable if within the following limits.

| Test | Acceptable Limits of Precision |
|---|---|
| Retest of QC Core Sample | ±0.030 (Specific Gravity) |
| Comparison QA Core Sample | ±0.050 (Specific Gravity) |
| Nuclear Comparison of QC Test (Average of 5 Tests in Test Section) | ±2.0 % (% Compaction) |

In the event test results are outside the above acceptable limits of precision or the quality assurance test results are below the minimum specification requirements, the Engineer will immediately investigate the reason for the difference. If the potential for a pavement failure is present, the Engineer may suspend production, wholly or in part as stated in Article 108-7 of the Standard Specifications while the investigation is in progress. The Engineer's investigation may include checking of the Design-Builder's testing equipment, comparison testing of other retained quality control samples, or additional core sample testing of the roadway pavement in question. If additional core samples are necessary to resolve the difference, the Design-Builder shall core these samples at the direction of the Engineer and these will be tested jointly by the Design-Builder's quality control and Department's quality assurance personnel. If the reason for the difference cannot be determined, payment for the mix in question will be determined in accordance with Article 105-3 of the Standard Specifications. If the reason for the difference is determined to be an error or other discrepancy in the quality control test results, the applicable quality assurance test results will be used to determine compliance with the Specification density requirements.

**(C) Acceptance of Density**

The Department will evaluate the asphalt pavement for density compliance after the asphalt mix has been placed and compacted using the Design-Builder's quality control test results, the Department's quality assurance test results, including verification samples, and by observation of the Design-Builder's density quality control process. Minimum density requirements for all Superpave mixes will be 92% of the maximum specific gravity($G_{mm}$). Density compliance for nuclear gauge control will be as provided in Subarticle 610-11(C) of the Standard Specifications. Density compliance for core samples will be determined by use of the average maximum specific gravity($G_{mm}$), until a moving average of the last four maximum specific gravities is attained. Once a moving average of the last four maximum specific gravities is established, the last $G_{mm}$ moving average in effect at the end of the same day's production will then be used to determine density compliance.

The pavement will be accepted for density on a lot by lot basis. A lot will consist of one day's production of a given job mix formula on the project except that separate lots will be established for acceptance when portions of the pavement being placed falls in either the "New" construction or "Other" construction categories as described below. In addition, individual map sections will be evaluated as separate lots, unless otherwise approved by the Engineer. The Engineer will determine the final category and quantity of each lot for acceptance purposes.

The "New" construction category will be defined as pavements meeting all three of the following criteria:

1. pavement placed on a new aggregate or soil base compacted to the specified density or pavement placed on a new asphalt mix layer (excluding wedging and leveling); and

2. pavement which is within a designated travel lane and is the final traffic pattern ; and

3. pavement which is 4.0 feet (1.2 meters) or wider.

As an exception, when the first layer of mix is placed on an unprimed aggregate base and is 2.0 inches (50 millimeters) or less in thickness, the layer will be included in the "Other" construction category.

The "Other" construction category will include all pavement except as described above.

A failing lot for density acceptance purposes is defined as a lot for which the average of all test sections fails to meet the minimum specification requirement. In addition, any lot or portion of a lot that is obviously unacceptable will be rejected for use in the work.

If the Engineer determines that a given lot of mix which falls in the "New" category does not meet the minimum specification requirements but the work is reasonably acceptable, the lot will be accepted at a reduced pay factor in accordance with the following formula. The reduced pay

factor will apply to the theoretical asphalt tonnage, at the "Asphalt Price" set forth in Article 609-1 of this provision.

$$PF = 100 - 10(D)^{1.465}$$

where: PF = Pay Factor (computed to 0.1%)
D = the deficiency of the lot average density, not to exceed 3.0%

Acceptance of all failing lots in the "Other" category will be made under the provisions of Article 105-3 of the Standard Specifications.

When the deficiency of the lot average is greater than 3.0%, the Engineer will determine whether or not the mix is reasonably acceptable. If it is reasonably acceptable, the mix will be paid for at 50 percent, of the theoretical asphalt tonnage, at the "Asphalt Price" set forth in Article 609-1 of this scope of work.. If it is determined not acceptable, the mix will be removed and replaced with mix meeting the requirements of this specification.

Any reduction in pay due to failing densities will be in addition to any reduction in pay due to failing mix property test results on the same mix.

**609-10 COMPENSATION**

The production and construction of all asphalt mixtures and pavements shall be performed in accordance with these provisions. There will be no direct payment for work covered by this provision. Payment at the contract lump sum price for the Construction of the Design-Build project will be full compensation for all work covered by this provision.

D6G02

**ASPHALT BASES AND PAVEMENTS (MARSHALL AND SUPERPAVE): 02-20-01**

The 1995 Standard Specifications shall be revised as follows:

PRIME COAT:
Page 283, Article 600-1
Delete the second paragraph in this Article.

ASPHALT GRADE DESIGNATION:
Page 283, Division 6
Throughout Division 6, change the wording "Grade AC-20" to read "Grade PG 64-22"and the wording "asphalt cement" to read "asphalt binder".

TACK COAT:
Page 286, Article 605-7

Delete the first sentence of the first paragraph and substitute the following:

Tack coat shall be uniformly applied at a rate from 0.04 to 0.08 gallons per square yard (0.18 to 0.36 liters per square meter).

COMPOSITION OF MIXTURES (MIX DESIGN AND JOB MIX FORMULA):
Page 302, Article 610-3
Delete this entire article and insert the following:

610-3 COMPOSITION OF MIXTURES (MIX DESIGN AND JOB MIX FORMULA):

(A) Mix Design-General:

The asphalt plant mix design shall be prepared utilizing a mixture of coarse and fine aggregate, asphalt binder, mineral filler, and other additives when required. Size, uniformly grade, and combine the several aggregate fractions in such proportions that the resulting mixture meets the grading and physical requirements of these specifications for the specified mix type. Materials which will not produce a mixture within the design criteria required by these specifications will be rejected, unless otherwise approved.

At least 10 days prior to starting of asphalt mix production, submit in writing and in electronic form the mix design and proposed job mix formula (JMF) targets for each required mix type and combination of aggregates to the Engineer for review and approval. Prepare the mix design using a Department approved mix design technician in an approved mix design laboratory for the appropriate mix type. For Marshall mixes, perform the mix design in accordance with AASHTO T 245, recommended procedures in the Asphalt Institute publication "Mix Design Methods for Asphalt Concrete" MS-2, Sixth Edition or later using the Marshall Method of Test and an automatic mechanical compaction hammer. For Superpave mixes, perform the mix design in accordance with the Superpave mix design system as described in AASHTO PP 28 "Standard Practice for Designing Superpave HMA" as modified by the Department. Perform, document, and submit all mix designs in accordance with Department policies and procedures and computer programs. Submit the mix design and proposed job mix formula targets on approved forms and in the format required by the Department for the appropriate mix type. In addition, submit the mix design data in electronic format using the Department's latest mix design computer programs and procedures for the specified mix type.

Reclaimed asphalt pavement materials (RAP) may constitute up to 50 percent by weight of the total material used in a recycled mixture, except for Type S 12.5D mixtures and mixtures containing reclaimed asphalt shingle material (RAS). Reclaimed shingle material may constitute up to 6 percent by weight of total mixture for any mix. When both RAP and RAS are used, the combined percentage of RAP and RAS shall not be greater than 15 % by weight of total mixture, unless otherwise approved by the Engineer.

For Type S12.5D mixes, the maximum percentage of reclaimed asphalt material shall be 15% and the virgin asphalt binder shall be PG 76-22. For all other recycled mix types, when the percentage of RAP is 15 percent or less of the total mixture, or when the percentage of binder contributed by RAP is 15 percent or less of the total binder in the completed mix, the virgin binder PG grade shall be as specified for the specified mix type. When the percentage of RAP is greater than 15 but not more than 25 percent of the total mixture, and the percentage of binder contributed by the RAP is greater than 15 but not more than 25 percent of the total binder in the completed mixture, the virgin binder PG grade shall be one grade below the specified grade (both high and low

temperature grade) for the specified mix type. When the percentage of RAP is greater than 25 percent of the total mixture and the percentage of binder contributed by the RAP is greater than 25 percent of the total binder in the completed mix, the Engineer will establish and approve the asphalt binder grade.

Should a change in the source of RAP or RAS be made, the Engineer may require a new mix design and/or job mix formula. Samples of the completed recycled asphalt mixture may be taken by the Department on a random basis to determine the PG grading on the recovered asphalt binder in accordance with AASHTO MP 1. If the grade is determined to be a value other than specified, the Engineer may require the Design-Builder to adjust the additional asphalt binder formulation and/or blend of reclaimed material to bring the grade to the specified value.

The minimum tensile strength ratio (TSR) value of the mixture shall be as specified in TABLE 2 of these provisions for both mix design and production tests, unless otherwise approved by the Engineer. The TSR value shall be determined in accordance with AASHTO T 283, as modified by the Department. No Freeze-Thaw cycle is required. Mix Design TSR tests shall be conducted using the same materials that are to be used in mix production and shall be conducted in a Department approved laboratory.

When required or directed by the Engineer, the additional asphalt binder shall contain an approved anti-strip additive in accordance with the requirements of Section 622. The percentage of anti-strip additive shall be as approved by the Engineer.

When the mix design is submitted, submit TSR specimens and data to the appropriate Division QA Laboratory in accordance with Department policies and procedures.

In addition, when requested by the Engineer, submit to the Department's Materials & Tests Unit in Raleigh, representative samples of each mix component, including RAP, RAS, mineral filler, asphalt binder, chemical anti-strip additive and hydrated lime as noted below. Provide the samples at least 10 days prior to beginning placement of mixture.

250 lb. (115 kg) of each coarse aggregate
150 lb. (70 kg) of each intermediate and fine aggregate
150 lb. (70 kg) RAP and / or RAS
1 gal. (4 liters) of mineral filler and/or baghouse fines
2 gal. (8 liters) of asphalt binder
1 gal. (4 liters) of hydrated lime
1 pint (0.5 liters) of chemical anti-strip additive

When the submitted aggregate samples are combined according to the Design-Builder's proposed blend percentages, the combined gradation must be within the gradation band defined by the design criteria specified in Table 610-1 for each sieve or the samples will not be considered representative and new samples may be required.

(B) Mix Design Criteria:

Design asphalt concrete mixtures which conform to the gradation requirements and design criteria for the specified mix type.

Use an anti-strip additive in all Superpave asphalt mixes. It may be hydrated lime or a chemical additive or a combination of both. When a chemical additive is used, add at a rate of not less than 0.25% by weight of binder in the mix. When hydrated lime is used, add at a rate of not less than 1.0 % by weight of the total dry aggregate.

(C) Job Mix Formula:

Establish the job mix formula (JMF) gradation target values within the design criteria specified for the particular type of asphalt mixture to be produced. Establish the JMF asphalt binder content at the percentage which will produce voids in total mix (VTM) at the midpoint of the specification design range for VTM, unless otherwise approved. The formula for each mixture will establish the following: blend percentage of each aggregate fraction, the percentage of reclaimed aggregate, if applicable, a single percentage of combined aggregate passing each required sieve size, the total percentage of asphalt binder (by weight of total mixture), the percentage of asphalt binder to be added to the mixture (for recycled mixtures), the percentage of chemical anti-strip additive to be added to the asphalt binder or percentage of hydrated lime to be added to the aggregate, the temperature at which the mixture is to be discharged from the plant, the required field density, and other volumetric properties.

Have on hand at the asphalt plant the approved mix design and job mix formula issued by the Department, prior to beginning the work.

The job mix formula for each mixture will remain in effect until modified in writing, provided the results of QMS tests performed in accordance with Section 609 on material currently being produced conform with specification requirements.

When a change in sources of aggregate materials is to be made, a new mix design and job mix formula will be required before the new mixture is produced.

When unsatisfactory results or other conditions make it necessary, the Engineer may revoke the existing job mix formula or establish a new formula.

ANTI-STRIP ADDITIVE EQUIPMENT:

Page 305, Subarticle 610-5(B)1

Delete the second paragraph of this subarticle and substitute the following:

When chemical anti-strip additive is to be added to the asphalt binder at the asphalt plant in lieu of at the terminal, equip the plant with an in-line blending system capable of metering the additive within ±10 percent of the amount specified by the JMF. Provide a thermostatically controlled heating system capable of heating and maintaining the additive tank, contents and distribution system at the additive supplier's recommended temperature for the additive being used. Interlock the additive metering system with the asphalt binder control equipment in such a manner as to automatically vary the additive feed rate to maintain the required proportions. Provide a system which will automatically indicate in the plant control room the amount or rate of flow, when flow is occurring, and when flow is obstructed or stops. Inject the additive into the asphalt binder feed line prior to introduction into the aggregate. Equip the feed line with an in-line blending device capable of thoroughly mixing the additive with the asphalt binder prior to mixing with the aggregate. Provide a metering system capable of being calibrated, checked and monitored for accuracy and amount of additive used.

In addition, equip the system with an in-line totalizing flow meter capable of measuring the actual gallons (liters) of anti-strip additive which is injected into the asphalt binder being introduced into the aggregate. Provide a system which is capable of being easily read but not capable of being reset. Install the totalizer meter in the anti-strip feedline beyond the calibration bypass and as close to the actual point of additive introduction into the feedline as practical.

When hydrated lime anti-strip additive is used, provide a separate bin or tank and feeder system to store and proportion the lime into the aggregate in either dry or slurry form. Mix the lime and aggregate by pugmill or other approved means to achieve a uniform lime coating of the aggregate prior to entering the drier. When the lime is added in dry form, the aggregate must contain at least 3 percent free moisture. The stockpiling of lime treated aggregate will not be permitted.

Control the lime feeder system by a proportioning device which is accurate to within ±10 percent of the specified amount. Provide a proportioning device with a convenient and accurate means of calibration and which is interlocked with the aggregate feed or weigh system so as to maintain the correct proportion. Provide a flow indicator or sensor which is interlocked with the plant controls such that production of the mixture will be interrupted if there is a stoppage or reduction of the lime feed.

SPREADING AND FINISHING:

Page 312, Article 610-9.

Delete the second, third, and fourth paragraphs on this page and substitute the following:

Pavers shall be equipped with a screed control system which will automatically control the longitudinal profile and cross slope of the pavement through the use of either a mobile grade reference(s), including mechanical, sonic and laser grade sensing devices, an erected string line(s), joint matching shoe(s), slope control devices or other approved methods or combination of methods. Unless otherwise specified, a mobile grade reference system capable of averaging the existing grade or pavement over a minimum 30 foot (9 meter) distance shall be used. The position of the mobile reference system shall be established such that the grade sensor is at the approximate midpoint of the system.

An erected fixed stringline shall be used for both longitudinal profile and cross-slope control when required by the contract. When an erected fixed string line is required, the Design-Builder shall furnish and erect the necessary guide line for the equipment. The stringline shall be supported with grade stakes placed at maximum intervals of 25 feet (7.6 meters) for the finished pavement grade.

The 30 foot (9.1 meter) minimum length mobile grade reference system shall be utilized to control the longitudinal profile when placing the initial lanes and all adjacent lanes of all courses, including resurfacing and asphalt in-lays, unless otherwise directed or approved by the Engineer. A joint matching device (short ±6 inch shoe) may be utilized only when approved by the Engineer.

The automatic slope control system shall be utilized, unless otherwise approved by the Engineer. The Engineer may waive the use of automatic slope controls where the existing surface (subgrade, base, asphalt layer, etc.) exhibits the desired slope of the final surface. In addition, the Engineer may waive the use of automatic slope controls in areas where the use of such equipment is impractical due to irregular shape or cross section (such as resurfacing). When the use of the automatic slope controls is waived, the Engineer may require the use of mobile grade references and automatic controls on either or both sides of

the paver. Manual screed operation will be permitted in the construction of irregularly shaped and minor areas, subject to approval by the Engineer.

In the case of a malfunction of the automatic screed control equipment, the Design-Builder may manually operate the paver for the remainder of the work day provided this method of operation produces acceptable results. Work shall not be resumed thereafter until the automatic system is functional.

RECLAIMED ASPHALT MATERIALS (SHINGLES):
Page 320, Subarticle 611-2(A)(1)
At the end of this subarticle, add the following classification of reclaimed asphalt material:

(e) Reclaimed Asphalt Shingles:

Reclaimed asphalt shingle (RAS) material shall be produced as a waste by-product of the manufacturing process for roofing shingles. The RAS material shall be uniformly processed by ambient grinding or granulating methods such that 100% will pass the ½ inch (12.5 mm) sieve when tested in accordance with AASHTO T 27. The test shall be performed on ground asphalt shingle material prior to extraction of the asphalt. The use of discarded used shingles or shingle scrap from re-roofing of commercial or residential buildings will not be allowed.

ASPHALT MATERIALS:
Page 321, Subarticle 611-2(C)
In the first paragraph, the third line, delete the word "viscosity".

COMPOSITION OF RECYCLED MIXTURES:
Page 321, Article 611-3
Delete the entire article and insert the following:

611-3 COMPOSITION OF RECYCLED MIXTURES ( MIX DESIGN AND JOB MIX FORMULA).

Recycled asphalt mixture shall be uniform and may be composed of reclaimed asphalt pavement (RAP), reclaimed asphalt shingles (RAS), new aggregates, asphalt binder, and additives combined in the proportions established by a mix design and job mix formula in accordance with Article 610-3 as modified herein. Materials which will not produce a mixture meeting the requirements of the appropriate section of the specifications will be rejected, unless otherwise approved by the Engineer.

ASPHALT BINDER FOR PLANT MIX MATERIALS:
Page 330, Article 620-2
Delete the first paragraph of this article and insert the following:

All asphalt binder materials shall meet the grading requirements of AASHTO MP 1 for the specified grade, except as modified herein.

ANTI-STRIP ADDITIVE:
Page 283, Division 6
Throughout this Division, change the wording “non-strip additive” to read “anti-strip additive”.

Page 332, Articles 622-3, 622-4, and 622-5
Delete these articles in entirety and substitute the following two articles:

622-3 GENERAL REQUIREMENTS.

Incorporate an anti-strip additive into the mixture when required. It may be either chemical additive mixed with the asphalt binder or hydrated lime added to the aggregate or a combination of both. Indicate the type (lime or chemical), supplier, and shipping point of the anti-strip additive on the mix design. Note on the asphalt binder delivery ticket the rate (or quantity), brand and grade of chemical additive when added at the asphalt supplier's terminal.

Introduce and mix chemical anti-strip additive into the asphalt binder at either the supplier's terminal or at the asphalt plant site at the dosage required by the JMF. Use in-line blending equipment to incorporate the additive at either location. When added at the asphalt plant, use equipment which meets the requirements described in Subarticle 610-5(B)1. When added at the supplier's terminal, use equipment which in-line blends the required additive for a minimum of 80% of the asphalt binder loading time.

Hydrated lime conforming to the requirements of ASTM C 977 shall be used when lime is selected as the anti-strip additive. The lime shall be added at a rate of not less than 1.0% by weight of dry aggregate in accordance with Subarticle 610-5(B)1.

622-4 COMPENSATION.

There will be no direct payment for the work covered by this section. Payment at the contract lump sum price for the Design-Build project will be full compensation for all work covered by this section.

ASPHALT BINDER:
Page 522, Article 1020-2
Delete the entire article and insert the following:

1020-2 ASPHALT BINDER.

Performance graded asphalt binder shall meet the requirements of AASHTO MP 1. Testing of the binder shall be performed by the supplier prior to delivery to the asphalt plant. Air blown asphalt will not be permitted. Where modification of the asphalt binder is required to meet the specified grade, modification shall be accomplished using a SBS or SB polymer, unless otherwise approved by the Engineer.

Page 524, Subarticle 1020-9(B)
Change "Grade AC-20" to read "Grade PG 64-22".

DUST/ASPHALT BINDER RATIO FOR MARSHALL ASPHALT PLANT MIX PAVEMENTS:

Asphalt Plant Mix Pavements (Marshall Mixes) produced in accordance with the following sections of the Standard Specifications shall be designed and produced with a Dust/Asphalt Binder ($P_{200}/AC_{EFF}$) Ratio as noted below. The $P_{200}$ is defined as the aggregate percent passing the No. 200 (0.075 mm) sieve, by mass of aggregate as determined by AASHTO T 11. The $AC_{EFF}$ is defined as the percent effective asphalt content, by mass of total mixture.

Section 630, ACBC, Type HB……0.6 – 1.4
Section 635, SABC & SASC, Type F-1……0.6 – 1.2
Section 640, ACBC, Type H & HDB……0.6 – 1.4
Section 645, ACSC, Type I-1, I-2 & HDS..……0.6 – 1.2

RETAINED TENSILE STRENGTH RATIO (TSR) FOR MARSHALL MIXES:

Asphalt Plant Mix Pavements (Marshall Mixes) produced in accordance with Sections 630, 635, 640, and 645 of the Standard Specifications shall be designed and produced with a minimum Retained Tensile Strength Ratio (TSR) of 85 percent for all mixtures, except for ACBC, Type HB, the minimum TSR shall be 80 percent. The TSR shall be performed in accordance with AASHTO T 283 "Resistance of Compacted Bituminous Mixtures to Moisture Induced Damage" as modified by the Department at the design/JMF asphalt content with no freeze-thaw cycle.

D6G03

**ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES: 11-21-00**

The approximate asphalt binder content of the asphalt concrete plant mixtures used on this project will be as follows:

| | |
|---|---|
| Asphalt Concrete Base Course, Type B 25.0X | 4.3% |
| Asphalt Concrete Intermediate Course, Type I 19.0X | 4.7% |
| Asphalt Concrete Surface Course, Type S 9.5X | 6.5% |
| Asphalt Concrete Surface Course, Type S 12.5X | 5.5% |

The actual asphalt binder content will be established during construction by the CEI Firm within the limits established in the Standard Specifications or Project Special Provisions.

D6G08

**FINAL SURFACE TESTING - ASPHALT PAVEMENTS: 6-16-98**

Acceptance testing of the longitudinal profile of the finished pavement surface shall be performed in accordance with these provisions using a North Carolina Hearne Straightedge (Model No. 1). The straightedge shall be furnished and operated by the Design-Builder to determine and record the longitudinal profile of the pavement on a continuous graph. Final surface testing is considered to be an integral part of the paving operation and is subject to observation and inspection by the CEI Firm and the Engineer as deemed necessary.

The straightedge shall be pushed manually over the pavement at a speed not exceeding 2 miles per hour (3 kilometers per hour). Profiles shall be taken in the outside wheel path (approx. 3 ft (1 m) inside the outer edge of a 12 ft (3.6 m) Lane) of all lanes except the inside lane where the profile shall be taken in the inside wheel path. One pass of the straightedge shall be made in each full width travel lane, with the recording wheel located in the appropriate wheel path for each profile.

Profiles shall be taken as soon as practical after the pavement has been rolled and compacted but in no event later than 24 hours following placement of the pavement unless otherwise authorized by the Engineer. Profiles shall be taken over the entire length of final surface travel lane pavement exclusive of structures, approach slabs, paved shoulders, loops, ramps that are 1500 ft (500 m) or less in length, and tapers or other irregular shaped areas of pavement. Full width acceleration or deceleration lanes, ramps that are over 1500 ft (500 m) in length, turn lanes, and collector lanes, are considered as part of the pavement to be tested in accordance with this provision.

At the beginning and end of each day's testing operations, and at such other times as determined necessary by the Engineer, the straightedge shall be operated over a calibration strip so that correct operation of the straightedge can be verified by the CEI Firm and/or the Engineer. The calibration strip shall be a 100 ft (30 m) section of pavement that is reasonably level and smooth. Each day's calibration graphs shall be submitted with that day's test section graphs to the Engineer. The calibration of the straightedge shall be in accordance with the current NCDOT procedure titled "North Carolina Hearne Straightedge - Calibration and Determination of Cumulative Straightedge Index". Copies of this procedure may be obtained from the Department's Pavement Construction Section.

The straightedge graph shall be plotted at a horizontal scale of approximately 25 ft per inch (3 m per cm) with the vertical scale plotted at a true scale. Station numbers and references (bridges, approach slabs, culverts, etc.) shall be recorded on the graphs, and distances between references/stations shall not exceed 500 ft (150 m). The Date, Project No., Lane Location, Wheel Path Location, Type Mix, and Operator's Name shall also be recorded on the graph by the operator.

Upon completion of each day's testing, the Design-Builder shall evaluate the graph and then submit to the CEI Firm and the Engineer within 24 hours after profiles are completed. The Engineer will furnish results of the acceptance evaluation to the Design-Builder within 48 hours after receipt. All graphs shall be retained by the Engineer.

Blanking bands of 0.2 inches, 0.3 inches, and 0.4 inches (5 mm, 7.5 mm, and 10 mm) shall be used to evaluate the graph for acceptance. The 0.2 inch and 0.3 inch (5 mm and 7.5 mm) blanking bands are used to determine the Straightedge Index (SEI), which is a number that indicates the deviations that exceed each of the 0.2 inch and 0.3 inch (5 mm and 7.5 mm) bands within a 100 ft (30 m) test section. The Cumulative Straightedge Index (CSI) is a number representing the total of the SEIs for one lot, which consist of 25 consecutive 100 ft (30 m) test sections. In addition, the 0.4 inch (10 mm) blanking band is used to further evaluate deviations on an individual basis. The Cumulative Straightedge Index (CSI) will be determined by the CEI Firm in accordance with the current procedure titled "North Carolina Hearne Straightedge - Calibration and Determination of Cumulative Straightedge Index". Prior to furnishing the results to the Design-Builder, the Engineer will verify the results.

The pavement will be accepted for surface smoothness on a lot by lot basis. A test section represents pavement one travel lane wide and 100 ft (30 m) in length. A lot will consist of 25 consecutive test sections, except that separate lots will be established for each travel lane, unless otherwise approved by the Engineer. In addition, full width acceleration or deceleration lanes,

ramps that are over 1500 ft (500 m) in length, turn lanes, and collector lanes, will be evaluated as separate lots. If after the placement of an applicable pavement layer, a lot is less than 2500 feet (750 m) any relevant incentive or disincentive shall be prorated over that section.

The pay adjustment schedule for the Cumulative Straightedge Index (CSI) test results per lot is as follows:

| CSI **Before or After Corrective Actions** | ACCEPTANCE CATEGORY | CORRECTIVE ACTION **Before Corrective Action** | PAY ADJUSTMENTS **After Corrective Action** |
|---|---|---|---|
| 00 | Acceptable | None | $300 incentive ---- None |
| 10, 20 | Acceptable | None | $100 incentive ---- None |
| 30, 40 | Acceptable | None | No Adjustment ---- Either Before or After Correction |
| 11, 21, 50, 60 | Acceptable | Allowed | $300 disincentive --_- Either Before or After Correction |
| 31, 41, 51, 61 | Acceptable | Allowed | $600 disincentive --- Either Before or After Correction |
| Any other number | Unacceptable | Required | Per CSI after Correction(s) (not to exceed 100% Pay) |

Any deviation that exceeds a 0.4 inch (10 mm) blanking band shall be corrected by the Design-Builder such that the deviation is reduced to 0.3 inches (7.5 mm) or less.

Corrective actions shall be performed at the Design-Builder's expense and shall consist of cold milling, diamond grinding, overlaying, by removing and replacing, by indirect heating and rerolling, or other methods subject to approval of the Engineer. Scraping of the pavement with any blade type device will not be allowed as a corrective action. Cold milling and grinding shall be performed until the required surface tolerance and a uniform cross section are achieved. Milled areas shall be neat and of uniform surface appearance. Overlays shall be of the same type mix, full roadway width, and to a depth established by the Engineer. Tapering of the longitudinal edges of the overlay will not be allowed.

Corrective actions will not be allowed for lots having a CSI of 40 or better. If the CSI indicates "Allowed" corrective action, the Design-Builder may elect to take necessary measures to reduce the CSI in lieu of accepting the disincentive. Corrective action as specified above shall be taken by the Design-Builder if the CSI indicates "Required" corrective action.

Where corrective action is allowed or required, the entire lot will be retested, unless the Engineer allows retesting of the applicable test section(s) only. No disincentive will apply after corrective action if the CSI is 40 or better. If the retested lot after corrective action has a CSI indicating a disincentive, the appropriate disincentive shall be applied.

Incentive pay adjustments will be based only on the initially measured CSI, prior to any corrective work. Where corrective actions have been taken, payment will be based on the CSI determined after correction, not to exceed 100 percent payment.

In the event the Design-Builder produces a pavement surface that is unacceptable according to the requirements of this provision, the CEI Firm and/or the Engineer may suspend the Design-Builder's operations. Production shall not resume until such time as the Design-Builder assures the CEI Firm and the Engineer that he can produce a pavement surface that will meet these requirements. The Design-Builder may do this by making necessary adjustments to the equipment, methods, and/or personnel.

Areas excluded from testing by the N.C. Hearne Straightedge will be tested by using a non-mobile 10-foot (3 m ) straightedge. The variation of the surface from the testing edge of the straightedge between any two contact points with the surface shall not be more than 1/8 inch (3 mm). Deviations exceeding the allowable tolerance shall be corrected in accordance with the corrective actions specified above, unless other corrective measures are permitted by the Engineer.

The Design-Builder is required to furnish the North Carolina Hearne Straightedge(s) necessary to perform this work. The Design-Builder will be responsible for all costs relating to the procurement, handling, and maintenance of these devices. The Department has entered into a license agreement with a manufacturer to fabricate, sell, and distribute the N.C. Hearne Straightedge. The Department's Pavement Construction Section may be contacted for the name of the current manufacturer and the approximate price of the straightedge.

No direct payment will be made for the work covered by this section. Payment at the contract lump sum price will be full compensation for all work covered by this section including, but not limited to, performing testing in accordance with this specification, any corrective work required as a result of this testing and any additional traffic control as may be necessary.

D6G14

**GUARDRAIL OFFSET BLOCKS:** **8-15-00**

The 1995 Standard Specifications shall be revised as follows:

Page 550, Subarticle 1046-3(D)

Delete this requirement and insert the following:

The Design-Builder shall use timber, plastic, or composite offset blocks with steel beam guardrail on wood or steel posts (regular and temporary). The use of steel offset blocks with steel beam guardrail will not be allowed.

Timber offset blocks shall meet the requirements of Subarticle 1046-3(C).

Plastic or composite offset blocks shall be made from a minimum of 50% recycled plastic and wood fiber waste. The minimum specific gravity shall be 0.950. The minimum compressive strength in the lateral dimension shall be 1600 p.s.i. The maximum water absorption allowed over the theoretical lifetime of the block shall not exceed 10% by weight. The material shall be resistant to termites and ants with no more than 10% infestation expected to occur during the theoretical lifetime of the blocks. The theoretical lifetime is considered to be 20 years. Recycled material is defined as material which has been traditionally disposed of in a landfill. Recycled plastic or composite blocks shall be fabricated to the same dimensions as wood offset blocks with a 5% ± dimensional tolerance. The Design-Builder shall certify that the material composition of the blocks is recycled material, that the recycled blocks meets the requirements of NCHRP report 230 or 350 and that the block is approved by the Federal Highway Administration.

Treated wood, recycled plastic or composite offset blocks are allowed for use with steel posts provided the blocks are routed, at least the thickness of the flange, to receive the face of the post. Holes in the posts and blocks shall be 3/4" dia. and attached by a single bolt 5/8" dia.

When treated wood, recycled plastic or composite offset blocks are used with steel posts backup plates are not required.

D8G01

**CONCRETE BRICK AND BLOCK PRODUCTION:** **1-20-98**

Provide concrete brick and block from a producer who utilizes the new Solid Concrete Masonry Brick/Unit Quality Control/Quality Assurance Program which is in effect on the date of the letting.

No price adjustment is allowed to Design-Builders or producers who utilize the new program. Participation in the new program does not relieve the producer of the responsibility of complying with all requirements of the Standard Specifications. Copies of this procedure are available upon request from the Materials and Test Unit.

D8G02

**STREET SIGNS AND MARKERS AND ROUTE MARKERS:** **7-1-95**

The Design-Builder shall move any existing street signs and markers and route markers out of the construction limits of the project and install the street signs and markers and route markers so that they will be visible to the traveling public if there is sufficient right of way for these signs and markers outside of the construction limits.

Near the completion of the project and when so directed by the Engineer, the Design-Builder shall move the signs and markers and install them in their proper location in regard to the finished pavement of the project.

Any signs or markers which cannot be relocated due to lack of right of way, or any signs and markers which will no longer be applicable after the construction of the project, shall be stockpiled at locations directed by the Engineer for removal by others.

The Design-Builder will be responsible to the owners for any damage to any street signs and markers or route markers during the above described operations.

D9G01

**FLOWABLE FILL:** **5-15-01**

Description:

This specification shall give the Design-Builder an option to use (a controlled low-strength material) flowable fill as a substitute for conventional fill material.

Flowable fill may be substituted for backfilling roadway trenches containing water, sanitary sewer, storm sewer and utility pipes and conduits. The Design-Builder has an option of filling culvert pipes and leaving them in place instead of removing them. The Design-Builder shall provide a method to plug the ends of the existing pipe in order to contain the flowable fill in the drainage pipes to the satisfaction of the CEI Firm. When approved by the CEI Firm, flowable fill may be used for backfilling retaining walls, bridge abutments, and other applications where conventional fill material has traditionally been used.

Materials:

All materials shall meet the requirements of Division 10 shown below:

Fine aggregate.....Article 1014-1
(Bottom ash, although not included in Article 1014-1, may also be used with permission of the CEI Firm.)

Portland cement.....Article 1024-1
Type IP blended cement.....Article 1024-1
Fly ash.....Article 1024-5*

*Certain requirements of this article and ASTM C618 may be waived with the permission of the CEI Firm.

Type 1S blended cement.....Article 1024-1
Water.....Article 1024-4
Chemical Admixtures.....Article 1024-3**

** High-air generators or foaming agents may be used in lieu of conventional concrete air-entraining agents with the permission of the CEI Firm.

Composition and Design:

The Design-Builder shall submit to the CEI Firm the proposed mix design(s) on M & T Form 312 at least 35 days prior to use. Mix proportions shall be determined by a testing laboratory which has been approved by the N.C. Division of Highways and shall be based on laboratory trial batches meeting the following requirements:

| | Excavatable | Non-Excavatable |
|---|---|---|
| Compressive Strength | (1,035 KPa)(150 psi)(max.) @ 56 days | (862 Kpa)(125 psi)(min.) @ 28 days |
| Approximate quantities per cubic yard: | | |
| Cement | (18 Kg-45 Kg)(40-100 lbs.) | (45 Kg-68 Kg)(100-150 lbs.) |
| Fly ash | * * * | * * * |
| Fine Agg. (SSD) | * * * | * * * |
| Water (approximate) | As Necessary | As Necessary |
| Air | 0 - 35% | 0 - 35% |

*** Amounts singly or in combination to make the mix yield one cubic yard.

To achieve desired placement consistency, flowability may be adjusted by varying the water content, with appropriate quantitative changes in other materials. Less flowable mixes are desirable when it is necessary to put traffic back on a roadway quickly or when less buoyant fill is needed to backfill pipes that could float out of position. Mixes to be pumped will need fly ash.

The Design-Builder shall state on Form 312 the intended use of the material. The Form shall be accompanied by a listing of compressive strength of at least three (100 mm x 200 mm) 4" x 8" cylinders at the age of 28 or 56 days, depending on whether the mix is to be excavated or not. The cylinders shall be air cured during the entire period before testing. The CEI Firm will advise the Design-Builder in writing of the acceptability of the mix design.

Placing:

Flowable fill material shall be discharged directly from the truck into the space to be filled, or by other methods approved by the CEI Firm. The mix may be placed full depth or in lifts as site conditions dictate. In roadway trenches, the material shall be brought level with the bottom of the pavement and then paved over. Between filling and paving operations, steel plates may be placed over the trench to accommodate traffic.

D10G01

**TIMBER POSTS AND BRACES:** **1-20-98**

The 1995 Standard Specifications shall be revised as follows:

Page 552 , Subarticle 1050-2(A)

In the second paragraph, delete the second sentence and insert the following:

"Log veneer cores shall not be used for posts and braces unless they contain at least one inch (25 millimeters) of Sapwood for their entire circumference on both ends".

D10G03

**STRUCTURAL TIMBER AND LUMBER:** **1-19-99**

The 1995 Standard Specifications shall be revised as follows:

Page 655, Subarticle 1082-2(C)

In the first paragraph, change “Grade No. 2 SR” to read “Grade No. 1”.

Page 655, Subarticle 1082-2(D)

At the end of the second sentence of the first paragraph, change “Grade No. 2 SR” to read “Grade No. 1”.

Page 655, Subarticle 1082-2(E)

At the end of the second sentence of the first paragraph, change “Grade No. 2 SR” to read “Grade No. 1”.

Page 657, Subarticle 1082-3(F)

At the end of the fourth paragraph, change “19 percent” to read “25 percent”.

D10G04

**IRON CASTINGS:** **7-20-99**

The 1995 Standard Specifications shall be revised as follows:

Page 606, SubArticle 1074-6(B):

In the first sentence of the first paragraph, delete the words “Class 30” and replace with “Class 35”.

D10G05

**ASPHALT CONCRETE PLANT MIX PAVEMENTS – (SUPERPAVE): 2-20-01**

## 610-1 DESCRIPTION.

The work covered by this section consists of the production, delivery, placement and compaction of Superpave hot mix asphalt base, intermediate, and surface courses.

The work shall include one or more courses of asphalt mixture constructed on a prepared surface in accordance with these specifications and any additional requirements of Division 6 of the Standard Specifications which may be applicable; and in reasonably close conformity with the lines, grades, thickness, and typical sections shown on the plans or established by the CEI Firm. The gradation and design criteria requirements for the various mix types are given in Table 1 and Table 2 of these provisions.

Where the asphalt plant mix incorporates reclaimed asphalt pavement materials, the plant mix will be considered to be a recycled asphalt plant mix and the provisions of Section 611 of the Standard Specifications, except as modified herein, will be applicable.

The asphalt mixture shall be produced, placed, tested, and accepted in accordance with the Project Special Provisions "Section 609, Quality Management System for Asphalt Pavements (Superpave Version)".

## 610-2 MATERIALS.

### (A) Asphalt Binder:

Asphalt binder materials shall be Performance Graded (PG) asphalt binder materials conforming to the requirements of AASHTO MP 1 and applicable requirements of Section 620 and Section 1020 of the Standard Specifications, except as modified herein. Testing of the asphalt binder shall be performed by the supplier prior to delivery to the asphalt plant. Air blown asphalt will not be permitted. Where modification of the asphalt binder is required to meet the specified grade, the modification shall be accomplished using a SBS or SB polymer.

### (B) Aggregate:

Coarse and Fine aggregate shall conform to the requirements of Section 1005 and Section 1012 of the Standard Specifications except as modified herein. The consensus property criteria in Table 2 apply to the coarse aggregate blend or fine aggregate blend. Source property criteria apply to individual aggregate sources.

Standard size coarse aggregate meeting the requirements of Table 1005-1 of the Standard Specifications and these provisions shall be used unless otherwise approved by the CEI Firm.

The coarse aggregate blend shall meet the requirements of Table 2 for course aggregate angularity (CAA) when tested in accordance with ASTM D 5821. NOTE: 95/90 denotes that at least 95% of the coarse aggregate (+No.4) (4.75 mm) has one fractured face and at least 90% has two or more fractured faces.

The fine aggregate blend shall have a minimum fine aggregate angularity (FAA) as indicated in Table 2 when tested in accordance with AASHTO TP 33, Method A.

The fine aggregate blend shall have a minimum sand equivalent (SE) percentage as indicated in Table 2 when tested in accordance with AASHTO T 176.

Flat and Elongated Particles in the coarse aggregate blend when tested in accordance with ASTM D 4791 (Section 8.4) on the No. 4 (4.75 mm) sieve and larger shall be a maximum of 10% by weight of flat and elongated particles with a 5:1 aspect ratio (maximum to minimum) for all pavement types except there is no requirement for Type S 9.5 A and Type S 9.5 B (See Table 2, F&E).

Resistance to Abrasion of each individual coarse aggregate by use of the L. A. Abrasion machine when tested in accordance with AASHTO T 96 shall be a maximum of 55%. Stone screenings shall be produced from stone which has a maximum percentage of wear of 55 % when tested in accordance with AASHTO T 96 using test grading A.

Soundness of individual aggregate sources by use of sodium sulfate when tested in accordance with AASHTO T 104 for 5 cycles shall be a maximum of 15%.

Clay Lumps and Friable particles in individual aggregate sources when tested in accordance with AASHTO T 112 shall be a maximum of 0.3%.

Mineral Filler shall conform to the requirements of AASHTO M 17.

**(C) Reclaimed Asphalt Pavement:**

Reclaimed Asphalt Materials (RAP) shall conform to Section 611 of the Standard Specifications as modified herein.

**(D) Reclaimed Asphalt Shingles:**

Reclaimed asphalt shingle (RAS) material shall conform to Section 611 of the Standard Specifications as modified herein.

**(E) Anti-strip Additive:**

An anti-strip additive shall be used in all Superpave asphalt mixes. It may be hydrated lime or a chemical additive or a combination of both.

The mixture shall produce the minimum tensile strength ratio (TSR) value as specified in TABLE 2 of these provisions for both mix design and production tests, unless otherwise approved by the CEI Firm. The TSR value shall be determined in accordance with AASHTO T 283, as modified by the Department. No Freeze-Thaw cycle is required. Mix Design TSR tests shall be conducted using the same materials that are to be used in mix production and shall be conducted in accordance with procedures outlined in Section 609 as modified herein.

When a chemical additive is used, it shall be added to the virgin asphalt binder prior to introduction into the mix in accordance with Section 622 of the Standard Specifications. Chemical additive shall be added at a rate of not less than 0.25% by weight of asphalt binder. Any chemical additive or particular concentration of chemical additive found to be harmful to the asphalt material or which causes the performance grading of the original asphalt binder to be out of specifications for the grade required shall not be used.

When hydrated lime is used, it shall conform to the requirements of ASTM C 977. Hydrated lime shall be added at a rate of not less than 1.0 percent by weight of total dry aggregate.

## 610-3 COMPOSITION OF MIXTURES (JOB MIX FORMULA).

**(A) General:**

The composition of the asphalt plant mix (including the mix design and job mix formula) shall be established in accordance with Section 610-3 of the Standard Specifications as modified herein.

**(B) Mix Design Criteria:**

Asphalt Concrete mixtures shall conform to the gradation requirements and design criteria in Table 1 and Table 2 for the mix type specified. The mix type designates the nominal maximum aggregate size and the design traffic level. Nominal Maximum size is defined as one standard sieve size larger than the first sieve to retain more than 10 percent aggregate. Maximum sieve size is defined as one standard sieve size larger than the nominal maximum size.

Table 1 provides gradation control points that shall be adhered to in the development of the design aggregate structure for each mix type. Aggregate gradations shall be equal to or pass between the control points, unless approved in writing by the CEI Firm.

Table 2 provides the aggregate properties and mix design criteria for the various mix types.

**(C) Mix Design Procedures and Requirements:**

The proposed Superpave Mix Design Data shall be prepared in accordance with AASHTO PP 28 as modified by the Department and shall include but not limited to the following information:

1. Source and percentage of each aggregate component to be used in the design aggregate blend gradation, including RAP and RAS.

2. Percentage of asphalt binder in RAP and RAS.

3. Average gradation of each aggregates component, including RAP and RAS.

4. The following material properties: bulk specific gravity (Gsb), apparent specific gravity (Gsa) and absorption of the individual aggregate components to be used when tested in accordance with AASHTO T 84 and T 85, except that the effective bulk specific gravity (Gse) of the RAP and RAS aggregate determined by AASHTO T 209 shall be reported. Coarse aggregate angularity, fine aggregate angularity, flat and elongated percentages, and sand equivalent for the total aggregate blend shall be reported.

5. Source(s), modification method, and percent of modifier by weight of the asphalt binder, if modified.

6. The supplier, source, grade, and equi-viscous mixing and compaction temperatures of the asphalt binder. Equi-viscous temperatures shall be determined using the rotational viscometer in accordance with ASTM D 4402 corresponding to the recommended Superpave viscosity ranges:

   Range for mixing = 0.150 to 0.190 Pa-s
   Range for compaction = 0.250 to 0.310 Pa-s

   When PG 76-22 or modified binders are used, the temperatures shall be based on the documented suppliers recommendations.

7. Name of product, manufacturer, shipping point, grade, and percentage of anti-strip additive used in mix design. The TSR data determined in accordance with AASHTO T 283 as modified by the Department.

8. Target value for percent passing each standard sieve for the design aggregate gradation. The data will show the percent passing for the 50.0, 37.5, 25.0, 19.0, 12.5, 9.5, 4.75, 2.36, 1.18, 0.600, 0.300, 0.150 and 0.075 mm sieves applicable for the specified mix type. The percentages shall be in units of one percent of aggregate passing, except the 0.075 mm sieve, which shall be in units to one-tenth of one percent. Percentages shall be based on the dry weight of aggregate determined in accordance with AASHTO T 11 and T 27.

9. The volumetric properties of the compacted mixture calculated on the basis of the mixture's maximum specific gravity determined by AASHTO T 209 (mixture must be aged in accordance with AASHTO PP 2) and the bulk specific gravity of the specimens determined by AASHTO T 166, Method A, for each asphalt content tested. Properties shall be determined and reported in accordance with the requirements of AASHTO PP 28 except as modified herein, and Department Superpave Mix Design Policies and Procedures.

10. Graphical plots of the percent asphalt binder by total weight of mix (Pb) versus the following properties (all at the design number of gyrations, Ndes, specified.
    a. SGC bulk gravity Gmb @Ndes
    b. % Gmm @Nini
    c. Voids in total Mix (VTM)
    d. Voids Filled With Asphalt (VFA)
    e. Voids in Mineral Aggregate (VMA)
    f. % Compaction vs. Log of Gyrations

11. Graphical plot of the design aggregate structure (design blend) on FHWA 0.45 power chart showing the applicable Superpave control points, restricted zone, and maximum density line. All standard sieves shall be plotted.

12. The proposed target value of asphalt binder content by weight of total mix and specification design properties at that percentage.

When the mix design is submitted to the Mix Design CEI Firm the Design-Builder shall also submit TSR specimens and data to the appropriate Division QA Laboratory in accordance with Department policies and procedures. In addition, when requested by the CEI Firm, the Design-Builder shall submit to the Department's Materials & Tests Unit in Raleigh, representative samples of each mix component, including RAP, RAS, mineral filler, asphalt binder, chemical anti-strip additive or hydrated lime as noted below. Provide the samples at least 10 days prior to beginning placement of mixture.

250 lb. (115 kg) of each coarse aggregate
150 lb. (70 kg) of each intermediate and fine aggregate
150 lb. (70 kg) RAP and / or RAS
1 gal. (4 liters) of mineral filler and/or baghouse fines
2 gal. (8 liters) of asphalt binder
1 gal. (4 liters) of hydrated lime
1 pint (0.5 liters) of chemical anti-strip additive

When the submitted aggregate samples are combined according to the Design-Builder's proposed blend percentages, the combined gradation shall be within the gradation band defined by the design criteria specified in Table 1 for each sieve or the samples will not be considered representative and new samples may be required.

**TABLE 1**

**SUPERPAVE AGGREGATE GRADATION REQUIREMENTS**

| Standard Sieve (mm) | Percent Passing Criteria (Control Points) Nominal Maximum Sieve Size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9.5 mm | | 12.5 mm | | 19.0 mm | | 25.0 mm | | 37.5 mm | |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| | | | | | | | | | | |
| 50.0 | | | | | | | | | | 100 |
| 37.5 | | | | | | | | 100.0 | 90.0 | 100.0 |
| 25.0 | | | | | | 100.0 | 90.0 | 100.0 | | 90.0 |
| 19.0 | | | | 100.0 | 90.0 | 100.0 | | 90.0 | | |
| 12.5 | | 100.0 | 90.0 | 100.0 | | 90.0 | | | | |
| 9.50 | 90.0 | 100.0 | | 90.0 | | | | | | |
| 4.75 | | 90.0 | | | | | | | | |
| 2.36 | 32.0 | 67.0 | 28.0 | 58.0 | 23.0 | 49.0 | 19.0 | 45.0 | 15.0 | 41.0 |
| 1.18 | | | | | | | | | | |
| 0.600 | | | | | | | | | | |
| 0.300 | | | | | | | | | | |
| 0.150 | | | | | | | | | | |
| 0.075 | 4.0 | 8.0 | 4.0 | 8.0 | 3.0 | 8.0 | 3.0 | 7.0 | 3.0 | 6.0 |
| | | | | | | | | | | |
| | Restricted Zone | | | | | | | | | |
| 4.75 | | | | | | | 39.5 | 39.5 | 34.7 | 34.7 |
| 2.36 | 47.2 | 47.2 | 39.1 | 39.1 | 34.6 | 34.6 | 26.8 | 30.8 | 23.3 | 27.3 |
| 1.18 | 31.6 | 37.6 | 25.6 | 31.6 | 22.3 | 28.3 | 18.1 | 24.1 | 15.5 | 21.5 |
| 0.600 | 23.5 | 27.5 | 19.1 | 23.1 | 16.7 | 20.7 | 13.6 | 17.6 | 11.7 | 15.7 |
| 0.300 | 18.7 | 18.7 | 15.5 | 15.5 | 13.7 | 13.7 | 11.4 | 11.4 | 10.0 | 10.0 |

**TABLE 2**
**SUPERPAVE MIX DESIGN CRITERIA**

| Mix Type | Design ESAL's (millions) (a) | Binder PG Grade (b) | Compaction Levels No. Gyrations @ $N_{ini}$ | $N_{des}$ | $N_{max}$ | Volumetric Properties (c) VMA (Min.) | VFA | VFA | $\%G_{mm}$ @ $N_{ini}$ | Consensus Aggregate Properties CAA | CAA | SE | F&E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S-9.5A | < 0.3 | 64 - 22 | 6 | 50 | 75 | 15.0 | 70 - 80 | 3.0-5.0 | • 91.5 | 75 / - | 40 | 40 | -- |
| S-9.5B | 0.3 - 3 | 64 - 22 | 7 | 75 | 115 | 15.0 | 65 - 80 | 3.0-5.0 | • 90.5 | 75 / - | 40 | 40 | -- |
| S-9.5C | 3 - 30 | 70 - 22 | 8 | 100 | 160 | 15.0 | 65 - 76 | 3.0-5.0 | • 89.0 | 95/90 | 45 | 45 | 10 |
| S-12.5B | < 3 | 64 - 22 | 7 | 75 | 115 | 14.0 | 65 - 78 | 3.0-5.0 | • 90.5 | 75 / - | 40 | 40 | 10 |
| S-12.5C | 3 - 30 | 70 - 22 | 8 | 100 | 160 | 14.0 | 65 - 75 | 3.0-5.0 | • 89.0 | 95/90 | 45 | 45 | 10 |
| S-12.5D | > 30 | 76 - 22 | 9 | 125 | 205 | 14.0 | 65 - 75 | 3.0-5.0 | • 89.0 | 100/100 | 45 | 50 | 10 |
| I-19.0B | < 3 | 64 - 22 | 7 | 75 | 115 | 13.0 | 65 - 78 | 3.0-5.0 | • 90.5 | 75 / - | 40 | 40 | 10 |
| I-19.0C | 3 - 30 | 64 - 22 | 8 | 100 | 160 | 13.0 | 65 - 75 | 3.0-5.0 | • 89.0 | 95/90 | 45 | 45 | 10 |
| I-19.0D | > 30 | 70 - 22 | 9 | 125 | 205 | 13.0 | 65 - 75 | 3.0-5.0 | • 89.0 | 100/100 | 45 | 50 | 10 |
| B-25.0B | < 3 | 64 - 22 | 7 | 75 | 115 | 12.0 | 65 - 78 | 3.0-5.0 | • 90.5 | 75 / - | 40 | 40 | 10 |
| B-25.0C | > 3 | 64 - 22 | 8 | 100 | 160 | 12.0 | 65 - 75 | 3.0-5.0 | • 89.0 | 95/90 | 45 | 45 | 10 |
| B-37.5C | > 3 | 64 - 22 | 8 | 100 | 160 | 11.0 | 63 - 75 | 3.0-5.0 | • 89.0 | 95/90 | 45 | 45 | 10 |

| | Design Parameter | Design Criteria |
|---|---|---|
| All Mix Types | 1. %Gmm @ Nmax | • 98.0%(d) |
| | 2. Dust to Binder Ratio (P0.075 / Pbe) | 0.6 - 1.4 |
| | 3. Tensile Strength Ratio (TSR) | 85% Min. (e) |

NOTES:
(a) Based on a 20 year design period.
(b) When Recycled Mixes are used, the binder grade to be added shall be in accordance with Article 610-3(A) of these provisions.
(c) Volumetric properties based on specimens compacted to Ndes as modified by the Department.
(d) Based on specimens compacted to $N_{max}$ at selected optimum asphalt binder content.
(e) AASHTO T 283 Modified (No Freeze-Thaw Cycle required). TSR for Type B-25.0 and B-37.5 shall be 80% minimum.

**610-4 CONSTRUCTION REQUIREMENTS.**

**(A) Asphalt Mixture Production:**

Asphalt mixture production shall be in accordance with Article 610-5 of the Standard Specifications as modified herein.

The mixing temperature at the asphalt plant shall be established on the job mix formula between 265°F (130°C) and 350°F (175°C) or as approved by the CEI Firm. Unless otherwise requested by the Design-Builder, the JMF temperature will be established as follows:

| | | |
|---|---|---|
| Mixes with binder grade: | PG 64-22 | 300°F (149°C) |
| | PG 70-22 | 315°F (157°C) |
| | PG 76-22 | 335°F (168°C) |

The temperature of the mix in the hauling vehicle at the asphalt plant shall be within +/- 15°F (+/- 8°C) of the JMF temperature. The temperature of the mix immediately prior to discharge from the hauling vehicle shall be within +15°F (+8°C) to -25°F (-14°C) of the JMF temperature.

**(B) Storage System:**

Storage facilities shall be in accordance with applicable provisions of Section 610 of the Standard Specifications.

**(C) Hauling of Asphalt Mixture:**

Hauling of asphalt mixture shall be in accordance with Article 610-8 of the Standard Specifications as modified herein.

**(D) Spreading and Finishing:**

Spreading and finishing of the asphalt mixture shall be in accordance with Article 610-9 of the Standard Specifications, except as modified herein.

Asphalt mixtures shall not be produced or placed during rainy weather, when the subgrade or base course is frozen, or when the moisture on the surface to be paved would prevent proper bond. Asphalt material shall not be placed when the air temperature, measured in the shade away from artificial heat at the location of the paving operation and the road surface temperature in the shade is less than the following temperatures.

| Asphalt Concrete Type | Air Temperature | Road Surface Temperature |
|---|---|---|
| ACBC, Types B 25.0B, & C, B 37.5C | 35°F(2°C) | 35°F(2°C) |
| ACIC, Types I 19.0B, C, & D | 35°F(2°C) | 35°F(2°C) |
| ACSC, Types S 9.5A & B, S 12.5B | 40°F(5°C) | 50°F(10°C) |
| ACSC, Types S 9.5C, S12.5C & D | 50°F(10°C) | 50°F(10°C) |

In addition, surface course material which is to be the final layer of pavement shall not be placed between December 15 and March 16.

As an exception to the above, when in any day's operations, the placement of a layer of asphalt base course material or intermediate course material 2" or greater in thickness has started, it may continue until the air temperature drops to 32°F(0°C).

No plant mix base course or intermediate course shall be placed that will not be covered with surface course during the same calendar year or within 15 days of placement if the plant mix is placed in January or February. Failure of the Design-Builder to cover the plant mix as required above will result in the CEI Firm notifying the Design-Builder in writing to cover the plant mix with a sand seal. The sand seal shall be applied in accordance with the requirements of Section 660 of the Standard Specifications, except that Articles 660-3, 660-11, and 660-12 will not apply. This work shall be performed by the Design-Builder at no cost to the Department. In the event the Design-Builder fails to apply the sand seal within 72 hours of receipt of such notice, the CEI Firm may proceed to have such work performed with Department forces and equipment. The cost of such work performed by Department forces will be deducted from monies due or to become due to the Design-Builder.

**(E) Compaction and Density Control:**

Compaction and density control of the pavement shall be in accordance with the requirements of Articles 609-9, 610-10, and 610-11 of the Standard Specifications, except as modified herein.

All asphalt plant mix shall be compacted to a minimum density of 92.0% of the maximum specific gravity as determined by AASHTO T 209, except as noted below. All pavements 4.0 feet (1.2 meters) or wider, full width paved shoulders, full width temporary pavements, and all full width travel lane pavements, including normal travel lanes, turn lanes, collector lanes, ramps, and loops, shall be sampled and tested, unless otherwise approved.

For base and intermediate mix types (surface mix types not included) used to widen pavements less than 4.0 feet (1.2 meters), for all mix types used in intersections (exclusive of full width travel lanes), and for irregular areas, a specified density will not be required provided the pavement is compacted using equipment and procedures approved by the CEI Firm. Irregular areas are defined as areas which have irregular shapes which make them difficult to compact with conventional asphalt rollers.

**(F) Joints:**

Construction of joints shall be in accordance with Article 610-12 of the Standard Specifications.

**(G) Surface Smoothness Requirements:**

The surface of the pavement after compaction shall conform to the requirements of Article 610-13 of the Standard Specifications except in the case where the Project Special Provision titled, "FINAL SURFACE TESTING - ASPHALT PAVEMENTS" is included in the contract. In that case, the project special provision shall apply.

**(H) Maintenance:**

Maintenance of the completed pavement shall be in accordance with Article 610-4 of the Standard Specifications.

**610-5 COMPENSATION.**

All costs associated with all work covered by this provision, including but not limited to producing, weighing, transporting, placing and compacting the plant mix as specified in Section 610 of the Standard Specifications except as modified above, furnishing the aggregate, asphalt binder, anti-strip additive, and all other materials for the plant mix; furnishing and applying tack coat as specified in Section 605; furnishing scales, maintaining the course until final acceptance of the project; making any repairs or corrections to the course that may become necessary, providing and conducting quality control as specified in Section 609 and surface testing of the completed pavement shall be included in the contract lump sum price for the project.

D6R09

# GENERAL:

## USE OF TERMS:

Throughout this Design-Build Package and all manuals, documents and standards referred to in the Design-Build Package the terms Contractor, Bidder, Design-Builder, Design-Build Team and Proposer are synonymous.

## REVIEW AND APPROVAL OF DESIGN SUBMITTALS:

Major design milestones and required design submittals shall be identified as activities on the approved CPM for the project. Submittals will be reviewed within 10 working days (15 days for temporary structures) of the activity date identified on the approved CPM unless otherwise stipulated in the scope of work. All submittals (four full size copies) shall be made simultaneously to the Resident Engineer (two copies) and to the designated person in the Highway Design Branch (two copies). No work shall be performed prior to the approval of the design submittals.

## OVERVIEW:

The project will widen I-77 from four lanes to an eight lane facility, basically in the median, from I-85 to North of the proposed Charlotte Outer Loop approximately 8.9 miles. Some outside widening will be done to add auxiliary lanes north and south of the crossing of the Charlotte Outer Loop. The existing pavement will be rehabilitated. Except for the Harris Blvd./Reams Rd./I-77 interchange, no work will be done to any existing overpass structures. Basically, the existing bridges on I-77 will be widened to accommodate the proper number of lanes. New bridges may be required at I-85 NB to I-77 NB and at I-77 NB crossing I-77 SB. Intelligent Transportation Systems (ITS) will be required. Interchange work will be limited to ramp gore areas and acceleration and deceleration lanes, except for the Harris Blvd./Reams Rd./I-77 interchange.

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.

The Department will be responsible for obtaining a 404 Permit and will furnish the mainline pavement design. The Department will also provide base surveys and electronic plan sheets. No right of way is required as construction is expected to take place within the existing right of way.

## SCOPE:

The scope of work for this project will include design, construction and construction engineering and management of the project. The design work will include all aspects to provide a eight lane interstate highway. The designs shall meet all appropriate latest versions of AASHTO Policy on

Geometric Design of Highways and Streets, AASHTO Standard Specifications for the Design of Highway Bridges, Manual of Uniform Traffic Control Devices, and all NCDOT design criteria.

Construction will include but is not limited to all necessary roadway work, drainage, utility coordination, erosion and sediment control work items, foundation design, substructure work and superstructure work. Construction engineering and management, including quality control and quality assurance will be the responsibility of the Design-Builder. Construction will comply with NCDOT Standard Specifications for Roadways and Structures Edition of 1995 and any special provisions.

Areas of work required for this project will include, but are not limited to the following items:

1. Supplemental Surveys
2. Drainage Design
3. Final Roadway Plan Preparation
4. Preliminary and Final Bridge Design
5. Traffic Control
6. Signing
7. Intelligent Transportation System
8. Noise Wall Design
9. Construction
10. Project Management
11. Construction Management
12. QC/QA including inspections and testings
13. Roadway Lighting

All designs are to be done in Metric units utilizing Microstation J format with Geopak 2001 software.

**DESIGN, CONSTRUCTION AND CEI WORK PERFORMED BY DESIGN-BUILDER:**

The design work consists of the preparation of all construction documents for the widening of I-77 as outlined in the Scope of Work section of this package. All the design features of this project are expected to be within the existing right-of-way. The Design-Builder shall prepare final designs, construction drawings and special provisions.

The Design-Builder 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-Builder in performing the work.

There shall be no assignment, subletting or transfer of the interest of the Design-Builder in any of the work covered by the Contract without the written consent of the State, except that the Design-Builder may, with prior notification of such action to the State, sublet property searches and related services without further approval of the State.

The Design-Builder shall certify all plans, specifications, estimates and engineering data furnished by him.

All work by the Design-Builder is to be done 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 Secretary of Transportation as provided in Title 23, US Code,Section 109 (b). The decision of the State is to control in all questions regarding location, type of design, dimension of design, and similar questions.

If a team member that is identified in the qualifications package changes after the team has been "short listed", the Design-Build Team shall notify the Department in writing immediately. The team shall present the Department of the name of the individual who will replace the person that left the team. The Department reserves the right to reject the team from further consideration in the development of the proposal package.

**ETHICS POLICY:**

Employees employed by the Design-Builder or employees employed by any subconsultant for the Design-Builder 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 listing of Registered Qualified Engineering Firms.

**APPROVAL OF PERSONNEL:**

The DEPARTMENT shall have the right to approve or reject any personnel, assigned to a project by the Design-Builder.

The Design-Builder or any subcontractor for the Design-Builder which are employed to provide services for this project shall not discuss employment opportunities or engage the services of any person or persons, now in the employment of the State during the time of this contract, without written consent of the State.

In the event of engagement, the Design-Builder or their subcontractors shall restrict such person or persons from working on any of the Design-Builder'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. "Involvement" shall be defined as active participation in any of the following activities:

- Drafting the contract

- Defining the scope of the contract
- Selection of the firm for services
- Negotiation of the cost of the contract (including calculating manhours or fees);and
- Administration of the contract.

An exception to these terms may be granted when recommended by the Secretary and approved by the Board of Transportation.

Failure to comply with the terms stated above in this section shall 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.

**PERMIT RESPONSIBILITIES:**

The Department will obtain the necessary Department of the Army 404 permit and the section 401 water quality certification for this project. These permits will be based on preliminary design information as shown in the permit drawings included herein. It will be the Design-Builder's responsibility to provide the necessary permit drawings depicting construction details to the Department as the Department will have to have the permit modified to reflect those details. The Design-Builder shall take into consideration the time required for the permit modification.

The Design-Builder shall be responsible for developing the permit application package for all jurisdictional impacts that are incurred due to any design that requires the acquisition of additional right-of-way. If additional right-of -way is required the Design-Builder shall engage the services of a competent environmental consultant to conduct an environmental screening of the additional area. The Design-Builder shall forward the application to NCDOT and NCDOT will submit the application to the appropriate agencies.

If any staging areas are located outside the existing right-of-way, the Design-Builder shall engage the services of a competent environmental consultant to conduct Federally listed Threatened and Endangered Species surveys in these areas.

**SUBMITTAL OF PROPOSALS:**

**General:**

Technical and Price Proposals will be accepted until **5:00 P.M. Eastern Standard Time on Wednesday, October 17, 2001**, at the office of the Contract Officer, 1020 Birch Ridge Drive, Century Center Complex Bldg. B, Raleigh, NC. No Proposals will be accepted after the time specified.

Technical and Price Proposals will be accepted before and on the published date, and until the time specified. Proposals shall be submitted in 2 separate, sealed parcels containing the Technical Proposal in one and the Price Proposal in the other. Parcels shall be clearly marked to identify the

project and the proposer. Each parcel shall also be clearly marked to identify the contents as the Technical Proposal or Price Proposal, as applicable.

**Stipend:**

A stipulated fee of $40,000 will be awarded to each proposer on the short-list who provides a responsive, but unsuccessful, proposal. If a contract award is not made, all responsive proposers shall receive the stipulated fee. The stipulated fee shall be paid to eligible proposers within ninety days after the award of the contract or the decision not to award. Once award is made, unsuccessful proposers will be notified of the opportunity to apply for the stipulated fee. If the Design-Builder agrees to accept the stipulated fee; in consideration for payment of the stipulated fee, the Department reserves the right to use any ideas or information contained in the proposals 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 proposers. Unsuccessful Design-Build proposers may elect to refuse payment of the stipulated fee and retain any rights to its proposal and the ideas and information contained in it.

**Technical Proposal:**

Technical proposals shall be submitted in 8 copies and should address the technical elements of the design and construction of the project. Technical Proposals shall be on 8 1/2" X 11" pages printed on one side, double spaced ,with a font size of 12. The maximum number of pages, excluding appropriate plans sheets ,shall be 50 (fifty). The selection process will consider the understanding of the project, the anticipated problems and the solutions to those problems. Detailed criteria for completing the Technical Proposal follows later in this section. Key Project Team members, identified in the Request for 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. Randy Garris P.E. at the address below:

NCDOT-Design Services Unit
Century Center-Building B
1020 Birch Ridge Drive
Raleigh, NC 27610

Technical Proposals shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Project No: 8.1674402
TIP NO. I-3311A
Mecklenburg County
I-77 From I-85 to North of the Proposed Charlotte Outer Loop

**TECHNICAL PROPOSAL**

Submitted By: (Design-Build Proposer's name)

**Price Proposal:**

The Price Proposal shall be submitted by returning the Design-Build package with the item sheets completed and all required signatures and bonds. Failure to execute the required documents may render the proposal non-responsive.

Price Proposals shall be submitted in a sealed package. The outer wrapping will clearly indicate the following information:

Project No. 8.1674402
TIP NO. I-3311A
Mecklenburg County
I-77 From I-85 to North of the Proposed Charlotte Outer Loop

**PRICE PROPOSAL**

Submitted By: (Design-Build Proposer's name)

**TECHNICAL PROPOSAL EVALUATION:**

The 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 firm's understanding of the project, their selection of appropriate design criteria, and their approach for completing all design and construction activities. The proposal will be evaluated on how well each of the following items is addressed:

| EVALUATION FACTOR | POINTS |
|---|---|
| 1. Responsiveness to RFP | 48 |

| | |
|---|---|
| 2. Innovation | 23 |
| 3. Construction | 24 |
| 4. Oral Interview | 5 |

**TECHNICAL PROPOSAL EVALUATION CRITERIA:**

1. **Responsiveness to RFP – 48 points**

- **Design Management – 5 points**

  Describe the Proposer's concept of design management. The proposal shall identify key positions and subordinate organizational units.

  Describe the plan for the coordination of civil/structural, utilities, traffic maintenance, constructability and environmental responsibility.

  Provide a narrative description of the proposed location of the design office(s).

  A description of how the designs developed by different firms and offices will be integrated.

  A description of how design personnel will interface with the construction personnel.

  Describe the overall strengths of the Design team and their ability to fulfill the design requirements of this project.

- **Quality Management – 15 points**

  Describe how the Proposer will comply with the quality control requirements for both design and construction. Specifically, include a narrative describing the Design-Builder's understanding of the Department's construction quality control philosophy for this project and how the Design-Build Team will implement it. The narrative shall include both design and construction activities.

  Describe the Proposer's approach to Quality Control during construction as it relates to the Construction Engineering and Inspection firm. Describe philosophies, coordination, and general approaches to inspection that will ensure that the final product will be of high quality.

- **Human and Natural Environmental Responsibility – 5 Points**

  Describe the Proposer's approach to ensuring that the concerns of surrounding citizens will be addressed through adequate design and appropriate construction procedures. Describe the approach to ensuring that all work will be performed in accordance with approved permits, rules, regulations and policies of the Department and appropriate agencies.

- **Design Features – 10 points**

  Show plan view of design concepts with key elements noted.

  Identify preliminary horizontal and vertical alignment of all roadway elements.

  Show typical sections for the mainline of the project.

  Identify drainage modifications and designs to be implemented.

  Identify the appropriate design criteria for each feature. Identify any deviations, including proposed design exceptions, from the established design criteria that will be utilized. Explain why the deviation is necessary.

  Describe any Geotechnical investigations to be performed by the Design-Build Team.

- **Design Participation by Disadvantaged Business Enterprises – 3 Points**

  Describe the Proposer's approach to ensuring that Disadvantaged Business Enterprises (DBE) will have opportunity to participate in the design of the project. DBE firms to be utilized in the design and CEI work shall be noted in the submittal for this RFP. It is expected that DBE design firm participation will be at least 5% of the overall design cost. The overall approach to ensuring DBE participation in all areas of work also needs to be addressed.

- **Structure Features – 5 points**
  Identify any special bridge design features to be constructed.

  Identify types of any retaining walls and /or noise walls if applicable.

  Address the approach to coordinating any necessary efforts with railroad owners.

- **ITS Components and Project Signing – 5 Points**

  Describe the proposer's approach to addressing the ITS requirements of the project. Address issues such as schedule and approach of relocating existing ITS equipment, implementing new ITS equipment, database modifications, tying into the Metrolina Regional Transportation Management Center, and other physical components of the work. Describe design, construction, and efficiency of the signing.

**2. Innovation – 23 points**

- **Overall Schedule and Milestones – 20 points**

  Provide a schedule for the project including both design and construction. The schedule shall show the sequence and continuity of operations, as well as the month of delivery of usable segments of the project.

- **Miscellaneous – 3 points**

  Identify any aspects of the design or construction elements that the firm considers to be innovative. Include a description of alternatives that were considered whether implemented or not.

  Identify the source of project materials.

  Identify any special aesthetics considerations that will be part of the design.

**3. Construction – 24 points**

- **Construction Management – 5 points**

  Describe the Proposer's concept of the project construction management organization and how it inter-relates with the other elements of the Proposer's organization for the project. Provide a brief narrative description of the Proposer's proposed plan for performing construction on the project. This description shall include at least the following:

  A construction organization chart for the project, showing the relationships between functions shown on the chart and the functional relationships with subcontractors. The chart shall indicate how the Proposer intends to divide the project into work segments to enable optimum construction performance.

  A description of those categories of work which the Proposer anticipates will be performed by the Proposer's own direct labor force and those categories which will be performed by subcontractors.

  The Proposer's plans and procedures to insure timely deliveries of materials to achieve the project schedule.

  Describe the overall strengths of the construction team and their ability to fulfill the construction management requirements of this project.

- **Maintenance and Protection of Traffic – 12 points**

  Describe the traffic control concept that will be used for each construction phase. Describe how traffic will be maintained through the project and describe the Proposer's understanding of the time restrictions noted in the RFP. Specifically describe how business and residential access will be maintained, if applicable.

- **Utility Relocation Plans – 2 points**

  Describe how any utility conflicts will be addressed.

- **Safety Plan – 5 points**

  Describe the safety considerations specific to the project. Discuss the Design-Build Team's overall approach to safety.

**4. Oral Interview – 5 points**

- **Content – 5 points**

  The Design-Build Team's Project Management Team shall present a brief introduction of the project team. Introductory comments are to be held to a maximum of 15 minutes. The Department will use this interview to ask specific questions about the teams background, philosophies, and approach to the project. Presentation and questions and answers shall not exceed 90 minutes.

  The Department will use the information presented in the oral interview to assist in the evaluation of the technical proposal.

**SELECTION PROCEDURE:**

There will be a Technical Review Committee (TRC) composed of Project Managers, and three or more senior personnel from involved engineering groups as well as a representative from FHWA that will evaluate the Technical Proposal on the basis of the criteria provided in the Design-Build Package.

The selection of a Design-Builder will involve both technical quality and price. At the location, time and date indicated in the Design-Build package, the technical proposals shall be submitted and will

then be presented to the TRC for evaluation. The TRC shall first determine whether or not the proposals are responsive to the requirements of the Design-Build Package. Each responsive technical proposal shall be evaluated based on the rating criteria provided in the Design-Build Package. The TRC will submit an overall technical proposal score for each firm to the Manager of the Contract Office Section. A maximum quality credit percentage will be assigned for each project as determined by the TRC.

Quality Credit Evaluation Factors for Technical Proposals

| | |
|---|---|
| Responsiveness to RFP | 48 |
| Innovation | 23 |
| Construction | 24 |
| Oral Interview | 5 |
| Maximum Score | 100 |

The Manager of the Contract Office Section shall 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 percentage for this project will be 15%.

Quality Credit Percentage for Technical Proposals

| Technical Score | Quality Credit (%) | Technical Score | Quality Credit (%) |
|---|---|---|---|
| 100 | 15.00 | 84 | 7.00 |
| 99 | 14.50 | 83 | 6.50 |
| 98 | 14.00 | 82 | 6.00 |
| 97 | 13.50 | 81 | 5.50 |
| 96 | 13.00 | 80 | 5.00 |
| 95 | 12.50 | 79 | 4.50 |
| 94 | 12.00 | 78 | 4.00 |
| 93 | 11.50 | 77 | 3.50 |
| 92 | 11.00 | 76 | 3.00 |
| 91 | 10.50 | 75 | 2.50 |
| 90 | 10.00 | 74 | 2.00 |
| 89 | 9.50 | 73 | 1.50 |
| 88 | 9.00 | 72 | 1.00 |
| 87 | 8.50 | 71 | .50 |
| 86 | 8.00 | 70 | 0.00 |
| 85 | 7.50 | | |

If any of the technical proposals were considered non-responsive, the manager of the Contract office will notify those Design-Builders of that fact. The Manager of the Contract Office shall publicly open the sealed price proposals and multiply each Design-Builder's price proposal by the Quality Credit Percentage earned by the Design-Builder's technical proposal to obtain the Quality Value of each Design-Builder's technical proposal. The Quality Value will then be subtracted from each Design-Builder's price proposal to obtain an Adjusted Price based upon Price and Quality combined. Unless all proposals are rejected, the Department will recommend to the State Transportation Board that the Design-Builder 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.

As Example of Calculating Quality Adjusted Price Ranking

| Proposal | Technical Score | Quality Credit (%) | Price Proposal ($) | Quality Value ($) | Adjusted Price ($) |
|---|---|---|---|---|---|
| A | 95 | 12.50 | 3,000,000 | 375,000 | 2,625,000 |
| B | 90 | 10.00 | 2,900,000 | 290,000 | 2,610,000 |
| C | 90 | 10.00 | 2,800,000 | 280,000 | 2,520,000* |
| D | 80 | 5.00 | 2,700,000 | 135,000 | 2,565,000 |
| E | 70 | 0.00 | 2,600,000 | 0 | 2,600,000 |
| * Successful Proposer – Contract Cost $2,800,000 | | | | | |

**Final Draft Revised 8/24/01**

**ROADWAY DESIGN SCOPE OF WORK:**

- Widen existing I-77 from 4 lanes to 8 lanes from north of I- 85 to north of the proposed Outer Loop. North of the Outer Loop the project should transition from 8 lanes and widen from 4 lanes to 6 lanes. Both sections will utilize median widening.

- The outside and inside paved shoulders should be 3.6 meters in width and consist of full depth pavement.

- Rumble strips will be required on the outside and inside paved shoulders.

- Rehabilitate the existing pavement by milling the pavement and using an asphalt overlay pavement design provided by NCDOT.

- The Design-Build Team will provide any pavement design required for temporary pavement. This design must be submitted to NCDOT for review. NCDOT will provide the mainline and auxiliary lane pavement designs.

- The Department will furnish base mapping and a preliminary design. This design is very preliminary in nature and should be used as a general concept by the Design Build Team.

- The interchange at Reames Road / Harris Boulevard should be designed to accommodate an entrance loop ramp in the northwest and southeast quadrant. The existing structure and roadway approaches should be widened to a six-lane section with a 1.2 meter monolithic island and sidewalks on each side. No horizontal offset will be required for the monolithic island. Curb and gutter will be required inside the interchange from ramp terminal to ramp terminal. The eastbound approach to the ramp terminals on the West Side should be built to full width and squared off 30 meters west of the ramp radii. The westbound approach on the East Side of the ramp terminals should be transitioned to match the existing roadway. The relocated ramp in the north west quadrant should be designed to minimize the need of additional right of way. Any additional right of way required for the construction and future maintenance of this ramp will be acquired by the Department. The interchange modification request to FHWA will not be a part of this project.

- From north of Reams Road to north of the Proposed Charlotte Outer Loop (TIP project R-2248D) outside widening will be required along I-77 to accommodate the future Outer Loop project. The widening will consists of constructing the auxiliary lanes, acceleration and deceleration lanes, and stubbing out the ramp gore areas. Construction of median crossovers required for project R-2248D will be performed under this project. The final roadway plans for this section will be provided by NCDOT. Some modifications to the roadway plans through this section may be required. The bridge design through this section is complete; therefore, these plans should not be revised without written consent from the Department.

- No work should be done on any overpass structures north of I-85 except for the Reames Road / Harris Boulevard structure and those that may require utility attachments. Vertical clearances at overpass should be maintained in accordance with NCDOT Bridge Policy. The NCDOT Bridge Policy minimum vertical clearance for exiting structures to remain in place will also apply for the Reames Road / Harris Boulevard structure designated to be widened. Minimum vertical clearance will also be required to provide for future resurfacing along I-77.

- Designs should meet interstate standards, 110 km/h (70 mph) design speed, in accordance with the AASHTO 2001 Guidelines, NCDOT Design Manual, NCDOT Roadway Standard Drawings, North Carolina Standard Specifications for Highways and Structures and any standard or project special provisions contained herein. Some design exceptions may be required.

- Recognize the need for any special roadway design details and request special drawings from the Design Services Unit. (i.e. any special concrete median barriers, concrete barriers for pier protection, guardrail details, pavement repair details, etc.)

- Utilize concrete barrier Standard 854.02 where deemed necessary.

- All guardrail placement shall be in accordance with NCDOT standards and special details

- The designs for median crossovers required for traffic control on project R-2248D on I-77 will be provided by NCDOT. (See the project Special provision entitled Cooperation Between Contractors contained elsewhere)

- The Department will provide traffic projections. Evaluate capacity of freeway at acceleration and deceleration lanes. Improvements should be made to maintain a LOS C or better. The latest version of HCM will be required to analyze the highway capacity. Some exceptions may be required to avoid environmental impacts.

- All work is to be done within the existing right of way unless noted otherwise. Any retaining walls, special slope designs or additional easements, if required, will be the responsibility of the Design-Build Team.

- Noise wall design, including any geotechnical information to design the foundation, will be the responsibility of the Design-Build Team. The wall shall be the NCDOT standard concrete pile and panel wall. A draft copy of the Final Noise Report (Supplement Number 2) will be provided by the Department. Barrier option 2 should be utilized for the proposed noise wall location and height requirements.

- Designs are to be done in Metric units utilizing Microstation J and Geopak 2001 software.

- Known wetland limits are delineated and shown in electronic plans.

- Hardcopies and electronic plans will be required as a deliverable to NCDOT for reviews.
- Project must follow the step-by-step approval process with FHWA.
- All Design Criteria must be approved prior to beginning designs.
- Any additional surveys, including but not limited to the roadway, structures, or underground utilities, will be the responsibility of the Design Build Team.
- Widened outside shoulders for Bus Rapid Transit should begin just north of the I-85 entrance /exit ramps and end just south of the Harris Boulevard / Reames Road interchange. North of the Proposed Outer Loop outside shoulders should also be widened for BRT to the end of the project. At interchanges, no provision for BRT will be required along ramps or between exit ramp and entrance ramp terminals.
- Sufficient data must be provided to check the proposed vertical alignment and wedging computations.
- The maximum bridge rail offset to achieve sight distance on the inside of a horizontal curve shall not exceed the standard guardrail offset.

## ITS FUNCTIONAL SPECIFICATIONS/SCOPE OF WORK:

### Table of Contents

## 1.0 INTRODUCTION

The Metrolina Regional Transportation Management Center (MRTMC) currently manages traffic along an approximate 24 kilometer stretch of I-77 from the South Carolina line north to the interchange of I-77 and Sunset Road. As part of the I-3311A project, I-77 will be widened from its interchange with I-85 north approximately 24 kilometers. This widening will impact the existing intelligent transportation system (ITS) devices located along I-77 from the I-85 interchange to Sunset Road. The purpose of these functional requirements is to direct the Contractor to relocate the effected existing ITS devices, and expand the MRTMC as defined in these functional requirements and as shown in the functional plans. This ITS work will be performed in two stages: relocation of existing equipment and installation of new field equipment and central hardware. The relocation of the existing field devices includes closed circuit television (CCTV) cameras, remote monitoring traffic sensors (RTMS), dynamic message signs (DMS), fiber optic cable, conduit, and junction boxes. The expansion of the MRTMC incorporated in this project will include the expansion of ITS devices from the interchange of Sunset Road north on I-77 to the Hambright Road overpass. This ITS expansion will also include upgrading, expanding, and enhancing equipment and software in the MRTMC building. The Contractor will be responsible for incorporating all relocated and new devices into the existing MRTMC system. This project will not include modifications to the existing MRTMC operating software. Modifications will only be made to the system database and system map to include the ITS elements. Section 1.0 of these function specifications provides an overview of the existing system communication architecture. The text and figures have been extracted from the System User's Guide Volume 3 (Communication Subsystem) developed by Honeywell Technology Systems Incorporated for NCDOT (March 2001). A copy of this document is attached for reference.

### 1.1Existing Communication Architecture

The existing Metrolina Regional Transportation Management Center (MRTMC) system consists of:

- On-Freeway Detection Subsystem
- On-Freeway CCTV Subsystem
- Video Subsystem
- TMS Hardware Subsystem
- Communications Subsystem
- TMS Software

The subsystems are interfaced and incorporated into the Traffic Management System (TMS) Software. For detailed operating instructions see the Software System Users Guide.

The main elements of the MRTMC Communications Subsystem are:

- Cabletron Ethernet Hubs
- Other Ethernet Hubs
- Network Management Element
- SONET Network

- RFL IMUX2000s (Nodes)
- IFS transceivers

A high-level conceptual subsystem relation diagram is shown in Figure 1-1. A simplified RTMS communication diagram is shown in Figure 1-2. A simplified DMS communication diagram is shown in Figure 1-3. A simplified CCTV communications diagram is shown in Figure 1-4. Detailed diagrams of the existing Communications Subsystem can be found in the System User's Guide Volume 3 (Communications Subsystem) which is attached to this document.

In most cases the field data interface to a SONET ring for transmission to the MRTMC. There are three point-to-point exceptions:

- All camera video is point-to-point from the field location to the MRTMC.
- RTMSs 4 and 5
- All I-85 DMSs use dial up modems to provide point-to-point communications with the MRTMC
- Cameras 21, 22, 23, and 24 are close enough to the MRTMC that the camera control signals simply use the transceivers at either end to supply point-to-point communications. (Cameras 27 and 28 also connect in this manner, but are part of the MRTMC security system.)

### 1.1.1 Cabletron Hubs

The Cabletron Hubs are located in the MRTMC and are used to interface the TMC Hardware Subsystem with other elements of the MRTMC system as shown in Figure 1-1. Interface to the field is through the field equipment hubs. Physical connections can be found in the attached System User's Guide. A patch panel system allows the function of a field equipment hub to be reassigned to the other field equipment hub in case of failure.

### 1.1.2 Network Management Element

The Network Management Element (NME) provides status information on the equipment to the Node level. The NME uses HP OPENVIEW to provide monitoring for certain system components to report anomalies.

### 1.1.3 SONET

The heart of the MRTMC communications system is an ALCATEL OC-12 Dual Ring SONET. The dual ring provides a fully redundant SONET network. There are 3 existing SONET hubs in the SONET network. SONET hub 1 and SONET hub 2 are located along I-77 in Old Castle building and are named HUB 1 and HUB 2. The third SONET hub is named HUB 3 and is located in the MRTMC. The hubs are interconnected through single mode fibers. When the hubs are interconnected they become the dual counter-rotating OC-12 SONET Ring.

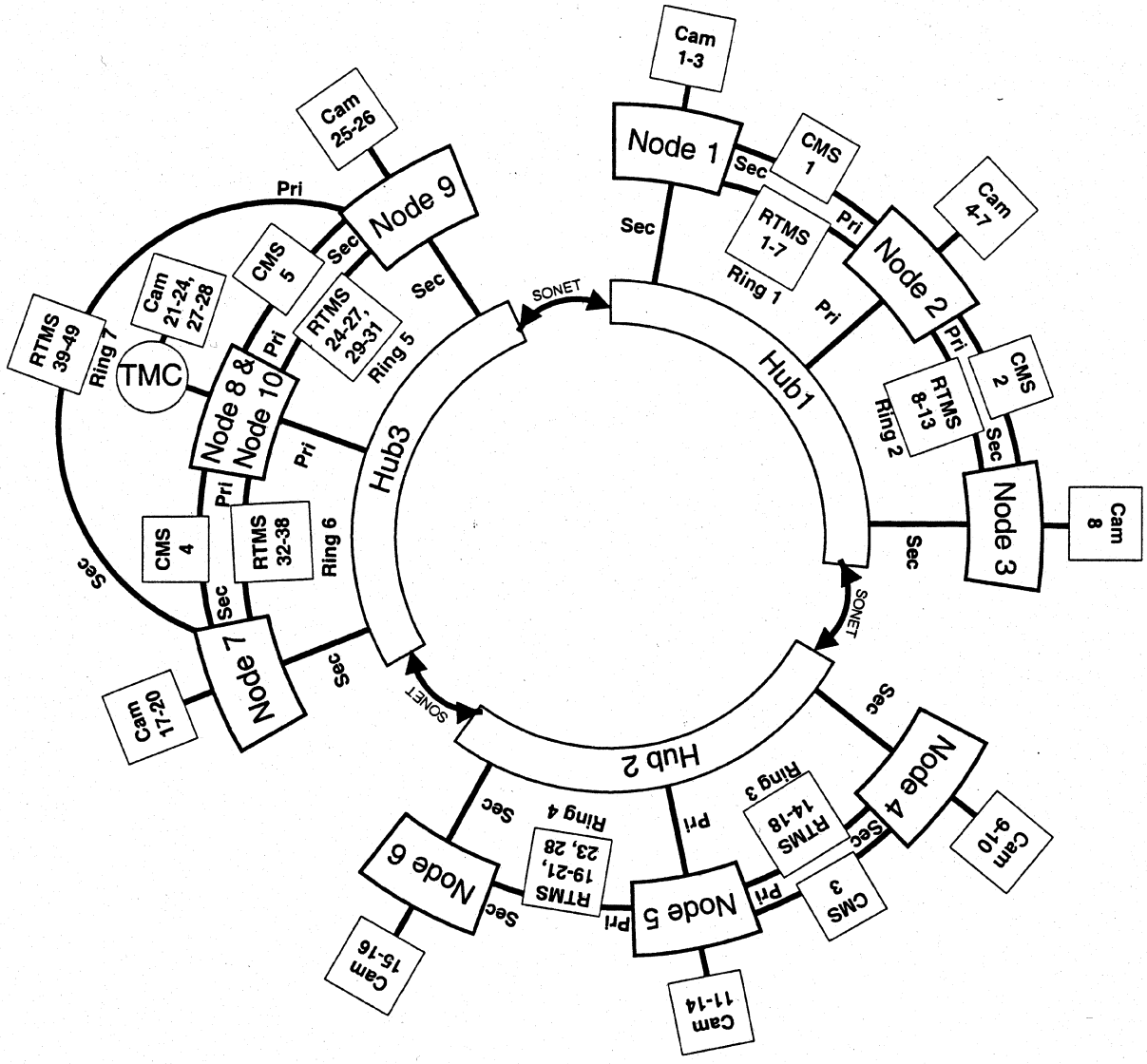
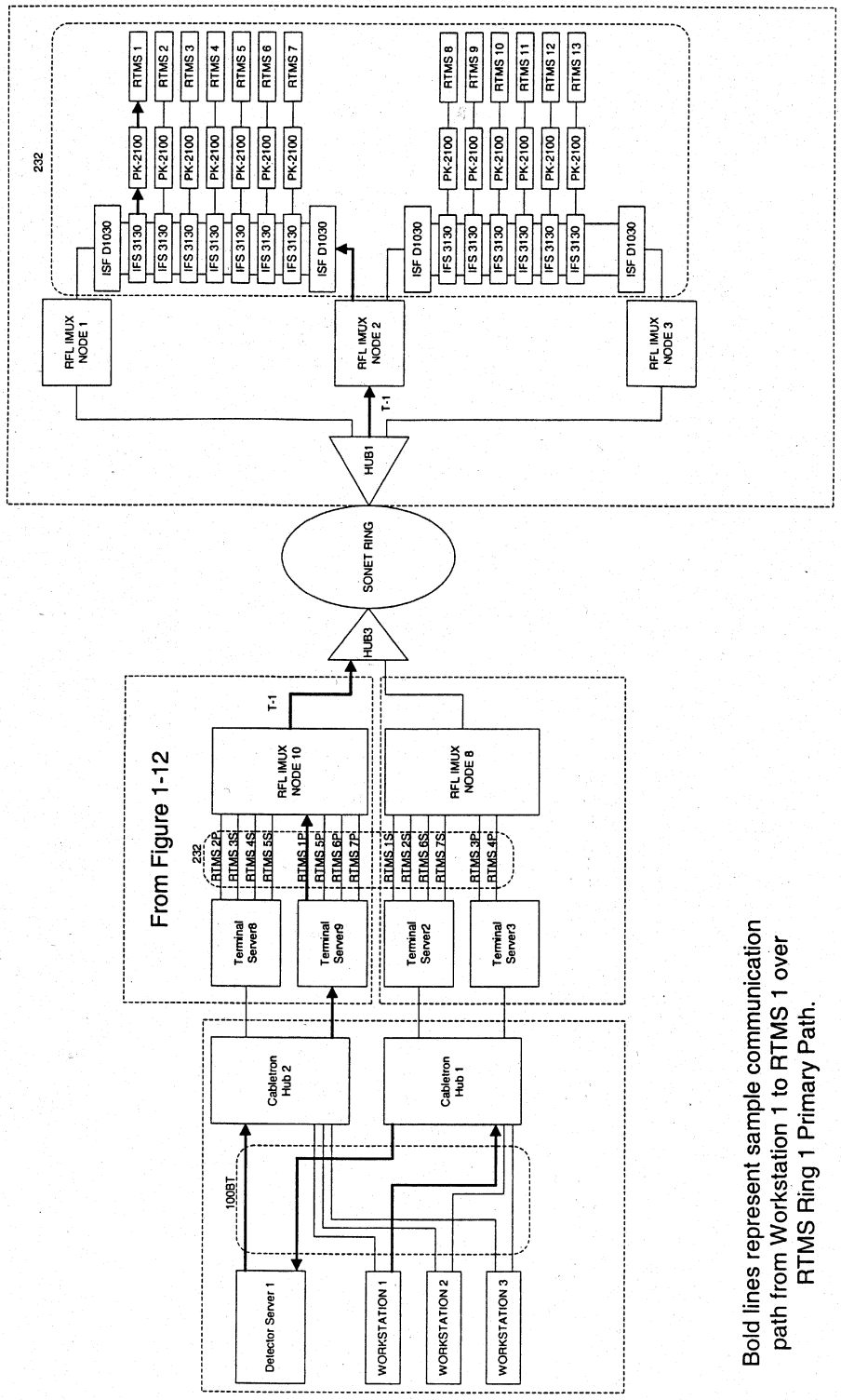



**Figure 1-1. High-Level Conceptual Subsystem Relationship Diagram.**
**(The Communications Subsystem element is shaded for reference)**




Bold lines represent sample communication path from Workstation 1 to RTMS 1 over RTMS Ring 1 Primary Path.

**Figure 1-2. Typical Simplified RTMS Communication Diagram**

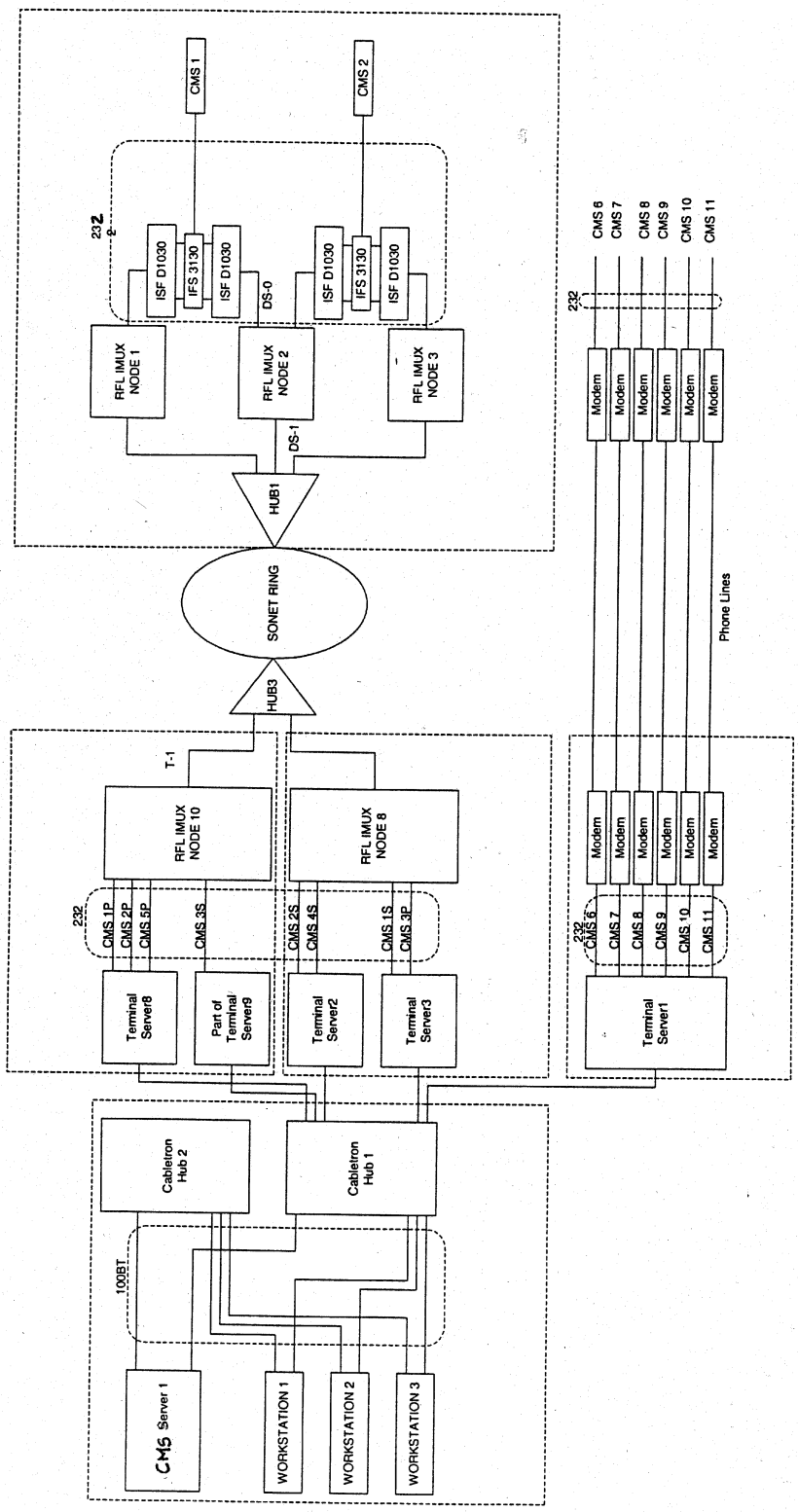



**Figure 1-3. Typical Simplified CMS Communication Diagram**

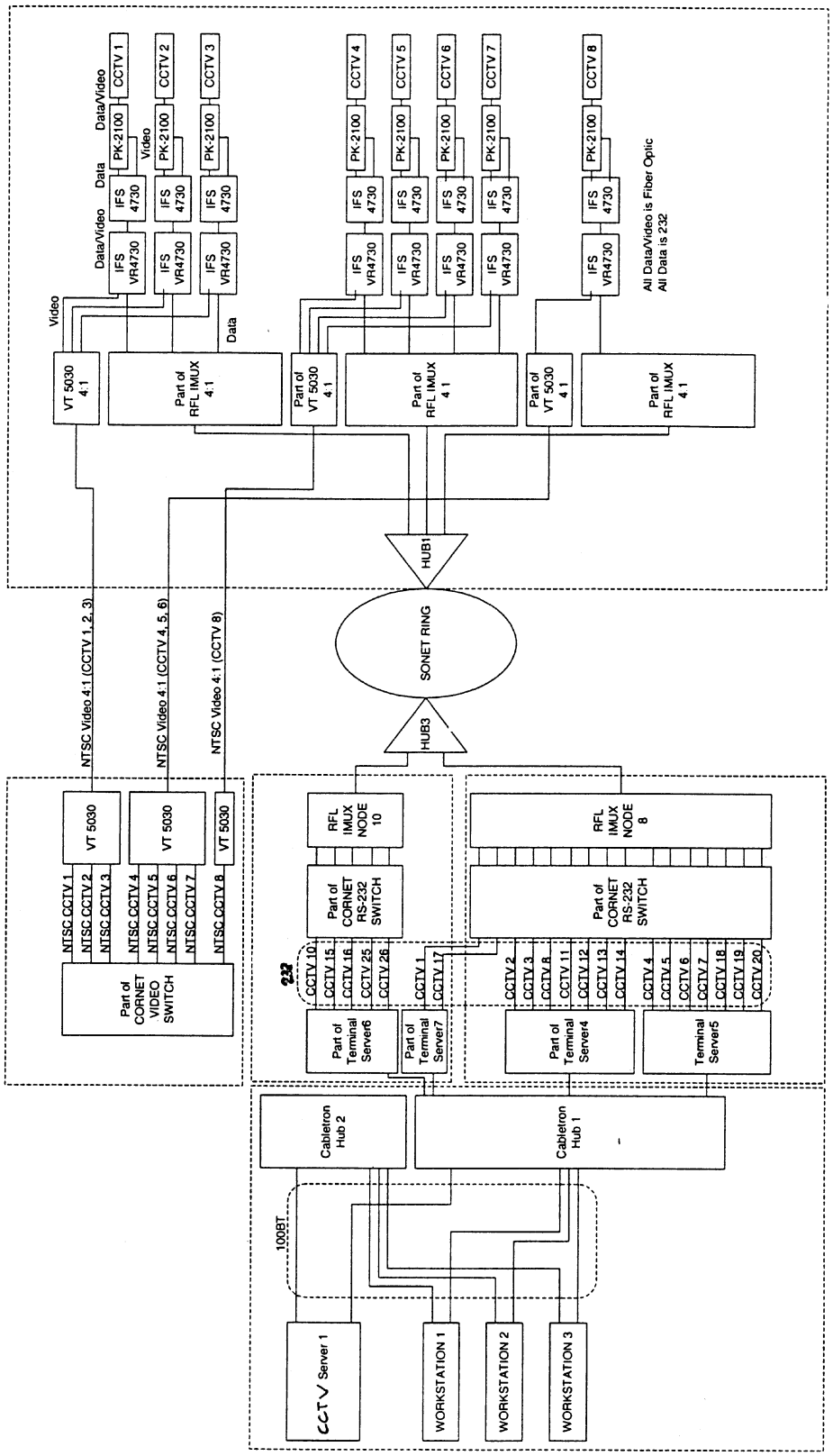



**Figure 1-4. Typical Simplified CCTV Communication Diagram**

The SONET requires a precision clock reference to function properly. The MRTMC SONET uses GPS receiver and a redundant Datum Timing system to provide this precision timing reference.

### 1.1.4 RFL IMUX2000

Interfaced to the SONET are RFL IMUX2000s which are associated with NODES 1-10. These devices are located in the hub and multiplex the DSO channel data into DS-1 (1.544 megabit) data streams onto the OC-12 SONET. The DSO data originates in the various field equipment cabinets along the Interstate and in the MRTMC.

## 1.2 Subsystems and Data Flows

Typical simplified communications data flow are shown in Figure 1-2 through Figure 1-4. The detailed data flow from the MRTMC to a field device are shown in the attached System User's Guide. The request for data originates in the MRTMC software residing on the TMS Hardware Subsystem.

### 1.2.1 RTMS Subsystem and Data Flow

There are 49 existing RTMSs collecting traffic data and transmitting this data to the MRTMC for processing. The RTMSs are pole mounted in a side fire configuration collecting data from up to eight detection zones. The cabinets that house the communication equipment are of two different designs. The first type of RTMS installation is a pole mounted cabinet and the second type is a 344 standard traffic cabinet. The equipment used in these cabinets is identical, as well as the way it interfaces into the system. The RTMSs are arranged in equipment rings for communication purposes. The rings are addressable RS232 with redundant modems and operate in the "drop and insert" mode. The data circulating on the ring is "dropped" at each modem. The data is examined to determine if it is applicable to that particular RTMS. If it is not, it is "inserted" back into the ring. Existing ring elements are shown in Table 1-1.

Table 1-1. RTMS Ring Elements

| Ring Number | RTMSs on Ring |
|---|---|
| 1 | 1-7 |
| 2 | 8-13 |
| 3 | 14-18 |
| 4 | 19-21, 23, 28 |
| 5 | 24-27, 29-31 |
| 6 | 32-38 |
| 7 | 39-49 |

A simplified sample data flow for a request for data from RTMS 1 located on the freeway is shown in Figure 1-2. The request will be a poll request initiated either automatically by the system server in the MRTMC or manually by an operator at a workstation. The system server sends an Ethernet packet through the Cabletron Hub to the Terminal Server where it is then converted to an RS-232 protocol data request. The RTMS data request is transmitted to the TMC node RFL IMUX2000 as a DSO data where it is multiplexed with other DSO channels into

a DS-1 (1.544 megabit) data stream. The DS1 data stream is then sent to the ALCATEL SONET and becomes one of the sub channels on the SONET OC-12 carrier.

The data request for RTMS-1 primary path is through SONET Hub 1, Node 2. The SONET demultiplexes the OC-12 down to the DS1 channel and sends the data to Node 2. Node 2 demultiplexes the data into SDO channels. Due to its unique addressing, the data is directed to the IFS 1030 transceiver to be sent on RTMS Ring 1. The RTMS Ring is made up of any number of RTMSs configured with IFS 3130 transceivers in a drop-inject configuration. Due to the addressing in the RTMS data request, it will be only be accepted by RTMS 1 and rejected by the other RTMSs on the ring.

Between the RTMS and the IFS transceiver is a microprocessor controlled multiplexer, known as a PK-2100. The PK-2100 throughputs the request for data directly to the RTMS. However, when the response data is sent to the PK-2100 from the RTMS, the PK-2100 multiplexes in the door alarm and cabinet over-temperature alarm with the RTMS data transmission to the MRTMC. This RTMS data is sent back to Node 2 at the DS0 rate to the IFS 1030 transceiver. There it is multiplexed into the DS1 data stream for input to SONET Hub 3 at the MRTMC.

The data is received at the MRTMC and is de-multiplexed into a DS1 stream by SONET Hub 3. The DS1 data is de-multiplexed by the RFL IMUX2000 down to a DS0 channel. This DS0 data is sent to the same channel of the terminal server for a protocol change from RS-232 to Ethernet. The data is sent on the Ethernet LAN to the Cabletron hub where it is routed to the requesting system server for processing. The server processes the data and provides the operator with an update of the system.

In the event that RTMS 1 did not respond in the allotted time, the system would poll RTMS 1 on its secondary path, which uses a different terminal server through Hub 1, Node 1. All RTMSs, DMSs, and camera control use the SONET for communication to the MRTMC (with the exception of cameras 21, 22, 23, 24, 27, and 28; and the DMSs on I85 which use point-to-point modems).

### 1.2.2 DMS Subsystem and Data Flow

There are 11 existing DMSs interfaced to the MRTMC system. These signs provide the motorist with real-time information of traffic conditions and assist in the control or rerouting of traffic during incident rings just like the RTMSs. The six DMSs along I85 use dial up modems to provide point-to-point communications with the MRTMC. A simplified data flow diagram is shown in Figure 1-3.

### 1.2.3 CCTV Subsystem and Data Flow

The existing MRTMC system has 26 existing COHU cameras on-freeway and 2 COHU cameras at the MRTMC for security. These cameras provide the visual verification of an incident that is detected by the system. The system communications pan/tilt/zoom control data to the cameras 21, 22, 23, 24, 27, and 28 via RS-232 point-to-point. The remainder communicate through the ALCATEL SONET network. The camera responds to a MRTMC control command with an acknowledgement.

A simplified data flow diagram is shown in Figure 1-4. Video is transmitted from the camera to the MRTMC via an IFS 4730 video/data multiplexer to the node cabinet. At the node cabinet, the video and data is demultiplexed into individual streams. The acknowledge data is then input into the RFL IMUX2000 where it becomes one of many data streams muliplexed onto the DS-1 link to the ALCATEL SONET. The Video from a camera is multiplexed with up to 3 other video streams using the IFS 5030 at the node for transmission to the TMC. The Video path is a point-to-point circuit between the CCTV and the TMC for cameras 21, 22, 23, 24, 27, and 28.

### 1.2.4 Video Subsystem

The video subsystem is located in the MRTMC and provides the video resources to provide: display, record, annotate, switch, image capture, and quad combining of the real-time video received from the COHU cameras. In addition, the video system provides the capability to demodulate up to eight cable TV signals.

All video sources can be displayed on a 48 cube Electrosonic Video Wall, the monitors in the 5 workstations, or the large monitors located in conference room and event staging room. The Electrosonic Video Wall consists of 48 monitors configured as 3 video walls of 16 video cubes per wall. The right and left walls are 16 individual video displays. The center wall receives and displays both NTSC video and RGB (Red, Green, and blue) high –resolution graphics. The center wall has various configurations to display either video or a combination of both video inputs.

The video system also provides the general public with the ability to see single frames of video on the NCDOT web page through the use of frame grabbers.

### 1.2.5 TMS Hardware Subsystem

The TMS Hardware Subsystem consists of five workstations, eight servers, and a RAID system. The servers are named for the function they perform. Along with the server, the TMS Hardware Subsystem provides three black and white printers, one color printer, one scanner, four administrative computers, and one remote access computer. The remote computer is a stand-alone computer configured to support limited operator functions at a remote location. All the other computers and printers are linked together through the Ethernet LAN of the MRTMC System. Details of the TMS Hardware Subsystem can be found in the attached System User's Guide.

## 2.0 System Functional Requirements

The Contractor shall complete the work for the relocation of existing ITS field devices within one year of notice to proceed so that the field devices may be used to assist in managing traffic during construction. The Contractor shall complete the installation and incorporation of all new ITS field devices into the MRTMC system prior to the completion of the roadway widening project. All new and relocated existing field devices shall be fully functional in the existing MRTMC subsystems. This work will include expansion of the video switch and terminal servers to accommodate the additional field devices.

Upgrading of system components in the MRTMC that are not essential for the operation of the new field devices (upgrading system servers, workstations, etc) shall be performed during the last stages of the roadway construction to ensure that the system is capable of working under its existing structure and that the latest technology is procured as part of the project.

The selected Contractor will be required to submit a detailed project schedule for the ITS elements of this project in Microsoft Project (or similar software) format including a critical path method (CPM) chart. The CPM chart shall include all project submittal and approval dates required for the project. The Contractor shall submit a list of required project submittals and approvals as part of their technical proposal.

The purpose of this chapter is to provide a description of the functional requirements of the system. The devices furnished and installed by the Contractor shall be of the same manufacturer and model of the existing devices unless otherwise approved by the Engineer.

## 2.1 General Requirements

### 2.1.1 Standard Specifications

All work shall be performed to meet or exceed the requirements of these functional specifications and plans. All work shall be performed in accordance with the North Carolina Department of Transportation (NCDOT) Traffic Signal Specifications, including all addenda and supplements (also referred to herein as the "NCCSS"); the NCDOT Roadway Standard Drawings, and the NCDOT Standard Specifications for Roads and Structures (also referred to herein as the "Standard Specifications"). The current edition of these specifications and publications in effect on the date of advertisement shall apply.

### 2.1.2 Other Codes and Standards

All electrical equipment shall conform to the latest version of the applicable standards of the National Electric Manufacturer's Association (NEMA), the Underwriters' Laboratories, Inc. (UL), the Electronic Industries Association (EIA), the International Municipal Signal Association (IMSA), and the National Electrical Safety Code (NESC). All materials and workmanship shall conform to the requirements of the NESC, standards of the American Society for Testing and Materials (ASTM); American National Standards Institute (ANSI); and any state laws and city codes and ordinances that apply.

### 2.1.3 Submittals and Reviews

All submittals and reviews shall comply with these project special provisions. Provide NCDOT with a minimum of 20 working days for reviews of conformance. The Contractor shall submit 100% project plans and specifications for approval by the NCDOT prior to beginning construction. Submittals should be made on half-size plan sheets.

2.1.3.1 Proposal Submittals

Submit as part of technical proposals, for Department review and approval, a block diagram that identifies (by make and model number) all portions of proposed equipment subsystems and depicts their connectivity and functional relationship.

### 2.1.3.2 Submittals for review of conformance

Prior to Construction the Contractor shall provide a detailed set of preliminary plans and project specifications, including block diagrams of all system elements, for Department review and approval. No construction on the ITS portion of this project can begin until NCDOT has approved the 100% plans and specifications. As part of the preliminary plans, submit product information sheets for all components of each proposed subsystem.

Depict proposed device locations in the preliminary plans package. Provide detailed shop drawings for each type of device, indicating types of materials proposed for each component, assembly techniques, layout of devices, and wiring schematics. Provide parts listings with circuit and board designation, part type and class, power rating, component manufacturer, and mechanical part manufacturer.

Develop a typical detail and specification for lightning protection for each device type. At a minimum the Contractor shall use NCDOT typical details, unless otherwise directed by the Engineer. Provide detailed plans and specifications for all device mountings. Develop specifications for the testing of the proposed devices that shall be included in the preliminary design package. Describe how all components of the subsystem are to be tested, the schedule of the testing, and the thresholds for acceptance. Describe how the proposed subsystems will be incorporated into the MRTMC system database and mapping.

Use the NCDOT's existing device identification scheme for use in identifying existing and proposed devices via the system software on-screen display. The existing device identification is a follows:

RTMS 0I0077S0006.27

Where: RTMS = equipment type (RTMS, CCTV, DMS, etc.)
0I = Interstate
0077 = Route number
S = direction (southbound, northbound)
0006.27 = mile marker

The Engineer will review this information and provide comments on the proposed design and components to the Contractor. Revise the design as directed by the Engineer and submit a revised design that reflects the Engineer's comments. The Engineer will advise the Contractor in writing when the design is approved for construction.

### 2.1.3.3 Submittals for information only

Submit to the Engineer the following information:

- Manufacturer's warranty information on all devices furnished with each device subsystem. (The information shall be presented in an organized manner using ring binders with annotated section dividers.)
- All manuals (user guides, owners manuals, etc.) furnished by the manufacturer for all devices used in each device subsystem.

The Contractor shall provide detailed wiring diagrams showing all I/O addressing for each new device installed.

### 2.1.4 Warranty Requirements

The performance of all relocated and new devices shall be warranted by the Contractor for one (1) year after the final acceptance of the entire project by the NCDOT. NCDOT will operate the MRTMC during the one (1) year warranty period. A list of all relocated and new field equipment to be included in the warranty is listed in Tables 2-1 and 2-2. Additional equipment included in the warranty includes all field and central equipment installed as part of the project, including all new fiber optic cable, conduits, etc. The warranty shall include all preventative and emergency maintenance. The warranty will not include existing system software unless modified by the Contractor.
Investigate, diagnose and report device failures within 24 hours of the receipt of the report from NCDOT. Repair or replace failed communication devices for device subsystems within 48 hours of the diagnoses.

As part of the proposal package, the Contractor shall submit to the Engineer a warranty plan for the system.

### 2.1.5 Electromagnetic Compatibility

Provide equipment under this Contract that resists and is not impaired by ambient electrical or magnetic fields, such as those caused by power lines, transformers, and motors. Install line filters as required by the NCTSS on all equipment. Equipment furnished and/or installed by the Contractor shall not radiate signals that adversely affect other equipment. Provide equipment that meets FCC and Bellcore GR-1089-CORE (or approved equivalent) requirements for electromagnetic compatibility.

### 2.1.6 Testing Requirements

#### 2.1.6.1 Test plan

Submit a detailed test plan to the Engineer for approval at least 45 working days prior to initiation of any testing. Identify all required testing levels for the specific equipment provided. Identify the test organization including the roles and responsibilities of the quality assurance organization. For each piece of equipment that requires testing, the test plan shall at a minimum, delineate the following:

- Submittal schedule of test procedures
- Start time of each level of testing
- Test duration including any re-tests that are required or anticipated

- Submittal of the completed and signed off test report

.

Table 2-1. Relocated Equipment

| Equipment | Existing Centerline Station | | Existing Offset from Centerline | | Proposed Centerline Station | | Proposed Offset from Centerline | |
|---|---|---|---|---|---|---|---|---|
| CCTV 23 | Northbound | 15+40 | 30 m | west | Northbound | 15+35 | 50 m | west |
| JB 123 | Southbound | 17+70 | 10 m | east | Southbound | 18+65 | 10 m | east |
| JB 111 | Northbound | 14+55 | 140 m | west | Northbound | 14+45 | 140 m | west |
| RTMS 44 | Northbound | 14+55 | 140 m | west | Northbound | 14+45 | 140 m | west |
| JB 131 | Southbound | 18+25 | 200 m | east | Southbound | 18+45 | 195 m | east |
| JB 129 | Southbound | 19+90 | 8 m | east | Southbound | 19+60 | 10 m | east |
| JB 130 | Southbound | 20+50 | 25 m | east | Southbound | 20+65 | 10 m | east |
| JB 133 | Southbound | 20+90 | 20 m | east | REMOVED | REMOVED | REMOVED | REMOVED |
| JB 135 | Southbound | 23+95 | 7 m | east | Southbound | 23+95 | 30 m | east |
| SE-60 | Southbound | 23+95 | 7 m | east | Southbound | 23+95 | 30 m | east |
| JB 136 | Southbound | 25+20 | 7 m | east | Southbound | 20+25 | 15 m | east |
| RTMS 30 | Southbound | 25+40 | 12 m | east | Southbound | 25+40 | 20 m | east |
| JB 136A | Northbound | 25+85 | 10 m | west | Northbound | 25+85 | 15 m | west |
| DMS 05 | Northbound | 34+80 | --- | --- | Northbound | 34+70 | --- | --- |

Table 2-2. Proposed Equipment

| Equipment | Centerline Station | | Offset from Centerline | |
|---|---|---|---|---|
| CCTV 29 | Southbound | 6+25 | 15 m | west |
| CCTV 36 | Southbound | 18+55 | 30 m | west |
| RTMS 24A | Southbound | 33+45 | 12 m | west |
| JB 152A | Northbound | 37+55 | 15 m | east |
| SE 67A | Northbound | 37+55 | 15 m | east |
| JB 153A | Southbound | 37+15 | 16 m | west |
| CCTV 30 | Southbound | 37+15 | 16 m | west |
| RTMS 25A | Southbound | 41+75 | 11 m | west |
| RTMS 26A | Southbound | 49+95 | 20 m | west |
| RTMS 27A | Southbound | 57+75 | 20 m | west |
| SE 73 | Northbound | 58+05 | 7 m | east |
| JB 164 | Northbound | 59+35 | 10 m | east |
| JB 165 | Northbound | 59+55 | 20 m | east |
| CCTV 31 | Northbound | 63+35 | 12 m | east |
| RTMS 50 | Northbound | 63+35 | 12 m | east |
| RTMS 51 | Southbound | 63+00 | 10 m | west |
| JB 166 | Northbound | 63+35 | 12 m | east |
| SE 74 | Northbound | 63+35 | 12 m | east |
| RTMS 52 | Northbound | 68+55 | 9 m | east |
| JB 167 | Northbound | 68+55 | 9 m | east |
| SE 75 | Northbound | 68+55 | 9 m | east |
| RTMS 53 | Southbound | 68+20 | 10 m | west |
| RTMS 54 | Northbound | 73+80 | 10 m | east |
| JB 168 | Northbound | 73+80 | 10 m | east |
| SE 76 | Northbound | 73+80 | 10 m | east |
| RTMS 55 | Southbound | 73+45 | 10 m | west |
| JB 169 | Northbound | 75+10 | 12 m | east |
| SE 77 | Northbound | 75+10 | 12 m | east |
| CAB 41 | Northbound | 75+10 | 12 m | east |
| DMS 06 | ---------- | 75+10 | ---------- | ---------- |
| JB 170 | Northbound | 79+05 | 10 m | east |
| SE 78 | Northbound | 79+05 | 10 m | east |
| RTMS 56 | Northbound | 79+05 | 10 m | east |
| RTMS 57 | Southbound | 78+55 | 11 m | west |
| JB 171 | Northbound | 84+45 | 13 m | east |
| SE 79 | Northbound | 84+45 | 13 m | east |
| CCTV 32 | Northbound | 84+45 | 13 m | east |
| RTMS 58 | Northbound | 84+45 | 13 m | east |
| RTMS 59 | Southbound | 84+10 | 13 m | west |
| JB 172 | Northbound | 89+85 | 11 m | east |
| SE 80 | Northbound | 89+85 | 11 m | east |
| RTMS 60 | Northbound | 89+85 | 11 m | east |
| RTMS 61 | Southbound | 89+50 | 13 m | west |
| JB 173 | Northbound | 95+20 | 12 m | east |
| SE 81 | Northbound | 95+20 | 12 m | east |

Table 2-2. Proposed Equipment (Continued)

| Equipment | Centerline Station | Offset from Centerline |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| RTMS 62 | Northbound | 95+20 | 12 m | east |
| RTMS 63 | Southbound | 94+90 | 17 m | west |
| JB 174 | Northbound | 97+00 | 16 m | east |
| JB 175 | Northbound | 98+40 | 11 m | east |
| JB 176 | Northbound | 100+00 | 10 m | east |
| SE 82 | Northbound | 100+90 | 10 m | east |
| RTMS 64 | Northbound | 100+90 | 10 m | east |
| RTMS 65 | Southbound | 100+00 | 16 m | west |
| CCTV 33 | Southbound | 100+75 | 16 m | west |
| JB 177 | Northbound | 104+25 | 11 m | east |
| JB 178 | Northbound | 104+75 | 20 m | east |
| JB 179 | Northbound | 106+50 | 16 m | east |
| SE 83 | Northbound | 106+50 | 16 m | east |
| RTMS 66 | Northbound | 106+50 | 16 m | east |
| RTMS 67 | Southbound | 106+30 | 13 m | west |
| JB 180 | Northbound | 111+90 | 11 m | east |
| SE 84 | Northbound | 111+90 | 11 m | east |
| RTMS 68 | Northbound | 111+90 | 11 m | east |
| RTMS 69 | Southbound | 111+75 | 13 m | west |
| RTMS 70 | Northbound | 117+25 | 16 m | east |
| JB 181 | Northbound | 117+25 | 16 m | east |
| SE 85 | Northbound | 117+25 | 16 m | east |
| CCTV 34 | Northbound | 117+25 | 16 m | east |
| RTMS 71 | Southbound | 116+95 | 13 m | west |
| JB 182 | Northbound | 120+90 | 14 m | east |
| SE 86 | Northbound | 120+90 | 14 m | east |
| HUB 4 | Northbound | 120+90 | 14 m | east |
| NODE 11 | Northbound | 120+90 | 14 m | east |
| JB 183 | Northbound | 122+60 | 11 m | east |
| SE 87 | Northbound | 122+60 | 11 m | east |
| RTMS 72 | Northbound | 122+60 | 11 m | east |
| RTMS 73 | Southbound | 122+10 | 12 m | west |
| JB 184 | Northbound | 124+00 | 11 m | east |
| JB 185 | Northbound | 124+30 | 11 m | east |
| JB 186 | Northbound | 128+00 | 10 m | east |
| SE 88 | Northbound | 128+00 | 10 m | east |
| RTMS 74 | Northbound | 128+00 | 10 m | east |
| RTMS 75 | Southbound | 127+40 | 12 m | west |
| JB 187 | Northbound | 133+45 | 15 m | east |
| SE 89 | Northbound | 133+45 | 15 m | east |
| CCTV 35 | Northbound | 133+45 | 15 m | east |
| RTMS 76 | Northbound | 133+45 | 15 m | east |
| RTMS 77 | Southbound | 132+85 | 14 m | west |
| DMS 07* | ---------- | ---------- | ---------- | ---------- |
| DMS 08* | ---------- | ---------- | ---------- | ---------- |

**DMS 07 is to be located on I-77 south of the project limits between Exit 11 and Exit 12 for northbound traffic, DMS 08 will be located on I-77 north of the project limits approximately 97 meters south of mile marker 22 for southbound traffic.*

Revisions to the test plan shall be provided to the Engineer at the Monthly Progress Meeting. A critical path method (CPM) chart shall be developed to track the sequence and completion of test plans for each level of testing, including periodic revisions.

Notify the Engineer of the proposed date, time and location of all testing 45 working days in advance of the test being performed. All testing shall be performed by the Contractor and may be observed by the Engineer. The Engineer may perform additional testing at any time during the project. A flow chart of the required testing levels is included in the Appendix for reference.

### 2.1.6.2 Test procedures

Prepare and submit test procedures Unit Tests and System Acceptance Tests (SATs) to be performed. Provide test procedures for review and approval by the Engineer before any tests are conducted. The review period will not exceed 20 working days from receipt of the test procedures. The test procedures shall include the following:

- A step-by-step outline of the test sequence to be followed, showing a test of every function of the equipment of system to be tested.
- A description of the expected operation, output, pass/fail criteria, test results, and criteria for re-test.
- A summary cross reference of test procedures to these Special Provisions.
- An estimate of the test duration and proposed test schedule.
- A data form to be used to record all data and quantitative results obtained by the test.
- A failure analysis and corrective action plan as described herein, for failed equipment as a result of Unit Tests and SATs.
- A description of any special equipment, setup, manpower, or conditions required for the test.
- Provisions for logging make, model, serial number, and calibration expiration date of test equipment.

Each device and subsystem shall be tested in accordance with the testing plan and procedures developed by the Contractor and approved by the Engineer. Include tests of the individual components as well as a test of the overall subsystem. Test each subsystem from the field cabinet, and from a workstation in the MRTMC.

### 2.1.6.3 Unit Tests

After field equipment and fiber optic cable is installed and the Unit Test plan has been approved by the Engineer, conduct Unit Tests. At a minimum, the Unit Tests shall exercise all the non-network functional requirements of the equipment being installed and demonstrate compliance with these Special Provisions. The Contractor shall furnish all necessary test equipment and the means to operate it at the field site.

Corrective action: Failed equipment and corrective actions taken shall be summarized in a monthly progress report and presented to the Engineer for approval. If the corrective action requires redesign of a failed device, the Contractor shall provide the serial number tracking documentation to prove that all units have been successfully retrofitted. Re-testing to ensure the adequacy of the corrective action shall be conducted by the Contractor at no additional cost. Results of the Unit Tests shall be provided to the Engineer for approval.

#### 2.1.6.4 System Acceptance Testing (SAT)

The Contractor shall perform the SATs twice, once after installation of all field devices (including terminal server and video switch expansion), and again after installation of the remaining equipment in the MRTMC (file servers, workstations, etc.). The purpose of performing the SAT twice is to ensure that the system functions properly with the expanded system early in the project, and maintains its original functionality after the central servers are replaced at the end of the project. SATs shall be performed in accordance with the SAT manual developed for the original MRTMC system. A copy of the SAT procedures is included in the proposal package.

When failure occurs during testing, the Contractor shall repair the system and rerun the affected portions of the SAT to the Engineer's satisfaction. The SATs shall be performed successfully prior to interim and final acceptance of the system. NCDOT shall be present during the SAT. NCDOT will rerun the SAT during the one year extended warranty period. The Contractor shall repair/replace any failed equipment as a result of this test.

### 2.1.7 Documentation and Software

#### 2.1.7.1 General

Supply equipment with operations and maintenance manuals that comply with applicable Bellcore/Telcordia specifications. Provide documentation that includes:
Supply manuals on all equipment that include information on installation, theory of operations, troubleshooting, part replacement, and parts identification. Schematics, block diagrams, and spare parts list shall conform to delivered equipment.

- As-Installed Engineering Drawings.
- Software manuals for commercial software.
- Installation plan test plan , test procedures and test report.
- Architectural drawings for hub buildings.
- Equipment layout
- Use licenses for commercial software/firmware.
- Spare parts analysis and "As Supplied" inventory list.
- Status Report (monthly)

#### 2.1.7.2 Specific Documentation

Supply a systems-level manual that provides an overview of the system, its operation, its interconnects and troubleshooting procedures. This manual will be an update to the existing System User's Manual to include the new equipment installed as part of this project. Test equipment used in system-level test shall be provided in a table format. Provide a detailed system operations and maintenance plan. Provide ten (10) copies of this manual.

Provide manuals associated with the operational understanding, interconnect, and maintenance of subsystems. Apply Bellcore/Telcordia documentation requirements to contents and format. Provide ten (10) copies of each manual.

Provide detailed manuals related to functional electronic units such as optical transceivers, D4 multiplexers, video code transceivers and other related network equipment. Provide ten (10) copies of each commercial manual for each functional type of equipment (by identical part number) installed on the project.

#### 2.1.7.3 Installation and Interconnect Drawings

Provide all engineering drawings associated with equipment installation and interconnection in both hard copy form and electronic format. Clearly indicate on drawings

- signal designations
- signal interconnections
- interconnection location
- interconnection number (terminal, jack, connector pin, etc)
- cable/wire/fiber assignments

#### 2.1.7.4 Delivery of Documentation

Provide all documentation in preliminary form for review by the Engineer. For documentation specifically created for this project, the Engineer may disapprove the submittal if not in compliance with these specifications. For standard product documentation, provide examples for the Engineer's review prior to construction to verify compatibility with Bellcore/Telcordia Standards. All documentation shall represent as delivered and as-installed equipment and interconnects. System acceptance shall not be considered until all documentation has been delivered and conditionally accepted.

#### 2.1.7.5 Software

Provide two copies of all commercial-off-the-shelf (COTS) software used in the system with associated documentation and user licenses. Supply two copies in a digital form readily usable in the system for contractor-generated software. Designate one copy as a master and one as a working copy each with a user license. Document and fully test Contractor software. IEEE Standard 1063 "Standard for Software User Documentation," Bellcore ST-STS-000050, "Software Systems for Telecommunications," and referenced Bellcore software reliability and quality specifications shall apply to Contractor-developed software.

## 2.2 Relocation of Existing Devices

### 2.2.1 Introduction

NCDOT has installed RTMS Detectors, dynamic message signs (DMS), closed circuit television (CCTV) cameras, fiber optic cable, junction boxes, splice enclosures, and underground conduit on portions of I-77 within the project limits. The Contractor will be required to relocate and/or replace the affected existing equipment to new locations as shown in the preliminary plan set into the MRTMC to accommodate the widening of portions of I-77. The Contractor will use the existing conduit system (wherever feasible) for communication with devices located on, or near, I-77. The Contractor shall determine, in conjunction with their design efforts, where existing

conduit may be reused and where new conduit will be required. The Contractor may not reuse existing equipment after it has been removed.

### 2.2.2 Closed Circuit Television Cameras (CCTV)

The MRTMC includes a CCTV subsystem for use in monitoring traffic conditions along sections of I-77. The cameras are generally located as shown on the preliminary plan set. Video surveillance is also provided for security purposes at all nodal buildings and for the parking lot and exterior areas of the MRTMC. The existing CCTV cameras assemblies are comprised of Cohu™ Model 1322-1000 cameras with Model PT570P/PP pan/tilt/zoom, and Model MPC-D-111 camera control receivers. Pole mounted CCTV cameras and their associated Control Technologies Model 4005-334 controller cabinets will be re-located from their existing locations to new locations as shown in the preliminary plans. The Contractor is responsible for determining the precise camera pole height and cabinet location. The Engineer shall approve pole locations prior to any equipment being installed.

Camera communications is accomplished using Siecor™ single-mode fiber-optic cables, splice and termination units, and International Fiber Systems (IFS™) video optical transceivers (Model VT4730WDM-232) in the controller cabinet. These transceivers combine video and data (pan/tilt/zoom) over a single fiber. At the corresponding node, a receiving video optical transceiver is in place (IFS Model VR4730WDM) to separate out the video and data streams. The video is then typically processed (if not home runned to the MRTMC) along with up to three other video signal through an IFS VT5030 Video multiplexer to transmit the video signals back to the MRTMC. The data stream is processed into the RFL IMUX2000 located at the node to then be distributed through the SONET network. Restore and verify that all existing controller cabinet equipment and communications is functioning normally after relocation.

#### 2.2.2.1 Construction Requirements

Prior to relocating any CCTV cameras, the Contractor shall submit to the Engineer for approval a CCTV relocation plan. The plan shall detail by device how the CCTV camera will be relocated and the time when the relocation will occur and duration of outage. For each camera being relocated, install the new camera support pole of similar type prior to relocating the existing camera. Camera mounting height shall be determined by the camera siting study referenced in Section 2.3.2.1. The Contractor is responsible for providing pole and foundation designs and obtaining electrical service (including paying for engineering and construction for obtaining the electrical service). The Engineer shall approve pole and foundation designs prior to any equipment being installed.

Provide all necessary cabling from the new pole to the new or relocated junction box prior to moving the camera and controller cabinet. Relocate existing camera and controller cabinet to new pole and make all necessary connections. Splice new fiber drop into existing or relocated splice enclosure into same fibers as the original fiber connection. No more than two cameras shall be out of service at one time. Cameras shall not remain out of service for more than 24 consecutive hours. Remove the existing pole, foundation and all other abandoned equipment and return poles to the NCDOT. Controller cabinets and foundations shall be of the same size and type as the

existing CCTV cabinets and foundations. Electrical grounding shall be performed in accordance with the NCTSS and as detailed in the functional plans.

### 2.2.3 Dynamic Message Signs (DMS)

The MRTMC includes a DMS subsystem for use in traveler information along the proposed sections of I-77
DMS communications is accomplished using of Siecor ™ SMFO cables, splice and termination units, and International Fiber Systems (IFS ™) optical RS-232 drop/repeat transceivers (Model D3130-SC) in the controller cabinet. At the corresponding field node, an end-point transceiver is in place (IFS Model D1030) to transmit message signals back to the MRTMC through an RFL IMUX2000 and onto the SONET network. Restore and verify that all existing controller cabinet equipment and communications is functioning normally after relocation.

### 2.2.4 Remote Traffic Monitoring Sensors (RTMS Detectors)

The MRTMC includes an existing detector subsystem for use in monitoring traffic conditions along the proposed sections of I-77. The existing detectors are comprised of Electronic Integrated System (EIS) RTMS units mounted on metal poles. RTMS detectors and their associated Control Technologies Model 4005-334 controller cabinets will be re-located along I-77 in locations shown on the preliminary plans as a result of construction widening activities.

#### 2.2.4.1 Construction Requirements

Prior to relocating any RTMS devices, submit a relocation plan and schedule to the Engineer for approval. The relocation plan should identify by device each RTMS that is to be relocated, the proposed schedule of relocation and schedule for field adjustment of the RTMS. Relocations of the RTMS field devices should not begin until the Engineer has approved the RTMS relocation plan.

RTMS ring 5 shall be expanded to include the new RTMS locations 24A, 25A, 26A and 27A. The primary circuit for RTMS ring 5 should be re-spliced to connect to the new RFL IMUX2000 / Node 11 to be located in the new Hub 4 Building that will be constructed as part of this project. The secondary circuit for RTMS Ring 5 shall remain connected to RFL IMUX2000 / Node 8.

To minimize down time, the RTMS units shall not be relocated until all other portions of the relocated RTMS system (conduit system, communications, poles, etc.) have been installed. This is necessary as the existing RTMS ring 5 primary channel will be spliced into the new Node 11. An existing and proposed communication schematic for RTMS Ring 5 is included in the functional plans. Fiber optic communications from the new node to the MRTMC should be complete and tested prior to relocating the RTMS devices. Install new metal pole and all necessary wiring prior to moving an RTMS location. Contractor is responsible for preparing pole and foundation designs and obtaining electrical service. The Engineer shall approve the pole and foundation designs prior to any new equipment being installed. Relocate existing RTMS to new pole. Mount at approved height and splice fiber drop into existing or relocated splice enclosure. RTMS ring 5 shall not remain out of operation for more than one week. After completion of the RTMS relocation, the Contractor shall fine tune the detection areas as specified by the Engineer.

Revised detection zones shall be installed within one week of RTMS Ring 5 being brought back on-line (within two weeks of being removed from operation).

New RTMS cabinets and foundations (if not pole mounted) shall be of the same type and size as the existing RTMS cabinets and foundations. Electrical grounding shall be performed in accordance with the NCTSS and as detailed in the functional plans.

### 2.2.5 Conduit Plant

The MRTMC includes an existing conduit plant along the proposed sections of I-77. The existing conduit plant is comprised of a 100 mm conduit with four 32 mm inner ducts with fiber-optic and communication lead-in cables (RTMS, DMS, CCTV, etc.). As shown on the plans, sections of the existing conduit plant will conflict with the roadway widening. In these sections, as shown on the plans, the conduit plant will be removed/abandoned and new conduit will be installed. Conduit shall be either removed by the Contractor or abandoned in place as approved by the Engineer. Salvageable junction boxes shall be removed and returned to the NCDOT.

*Note: Electrical circuits shall not be placed in the same conduit and junction box as data communication circuits.*

#### 2.2.5.1 Construction Requirements

Prior to removing existing conduit, the Contractor shall provide the Engineer, for approval, a removal plan as part of the system construction plan set. The plan should detail by section of conduit to be replaced (a section of conduit being defined as between junction boxes). The plan shall include a schedule for work and time for interruption of service. The Contractor shall submit the plan for approval 30 working days prior to the planned initiation of construction. The Contractor shall replace the existing inner-duct system with a multi-duct system consisting of 4 – 32 mm polyethylene ducts. The multi-duct system shall be installed in accordance with NCDOT standard specifications and Section 2.3.5 of these functional specifications. To minimize interruption in communication, prior to removing existing conduit the Contractor shall install all of the new conduit, junction boxes, splice enclosures and fiber optic cable. The Contractor shall splice the new communications cable into the existing communication fiber prior to removing section of the existing conduit inner ducts and junction boxes. Splicing shall be performed to maintain the existing buffer tube and fiber color coding scheme. The Contractor shall install pull string in each empty duct, and install one tracer wire in the same inner duct as the new fiber, as defined in Section 2.3.5.3 of these functional specifications. Tracer wire shall be installed per NCDOT standard specifications. All new junction boxes shall be of minimum size as the existing junction boxes and shall provide positive drainage. A typical junction box detail is included in the functional plan set.

### 2.2.6 Fiber Communications Plant

The MRTMC includes an existing fiber-optic communication plant along the proposed sections of I-77. The existing fiber communication plant is comprised of Siecor single-mode fiber-optic cables and Siecor FBT-048-FDU splice/termination units inside Control Technologies Model 4005-334 controller cabinets. The fiber-optic cables located inside the existing conduit to be removed or

abandoned, as defined in Section 2.2.5 of these functional specification, shall be likewise removed or abandoned and new fiber optic cable of the same size and type shall be installed into the newly constructed conduit to accommodate construction-widening activities.

#### 2.2.6.1 Construction Requirements

Meet the same requirements for constructing new fiber communication plant in Section 2.3.6 of these functional specifications. Install fiber optic cable as shown on the preliminary plans. Existing video and data channels (with the exception of the primary channel for RTMS ring 5 as described above), including all buffer and fiber color schemes, in the existing 24 fiber cable shall be maintained in a new 24 fiber cable. Splicing information is included in the system as-built plans, but shall be field verified by the Contractor. The Contractor shall be responsible for removal and disposal of the existing communication cable.

## 2.3 Furnish and Install New Devices

### 2.3.1 Introduction

The MRTMC expansion includes furnishing and installing new RTMS Detectors, dynamic message signs (DMSs), closed circuit television (CCTV) cameras, a SONET Hub and Node, fiber optic cable, splice enclosures, junction boxes, and underground conduit. The Contractor will be required to incorporate the new devices into the existing central database and communication system described in these Special Provisions.

### 2.3.2 Closed Circuit Television Cameras (CCTV)

The MRTMC includes a CCTV subsystem for use in monitoring traffic conditions along the proposed sections of I-77. Install eight new CCTV cameras (CCTV 29 – 36) as shown on the preliminary plan set. The contractor shall verify and revise as necessary the general CCTV location shown on the preliminary plans. Video surveillance shall be provided for security purposes at all nodal buildings, this shall be made possible through the use of a camera, or cameras, on I-77. CCTV cameras located along I-77 shall use video optical transceivers and multiplexers as specified in these documents for communication of the video signal.

#### 2.3.2.1 Functional Requirements

Provide color cameras, enclosed in environmentally pressurized domes, mounted on poles and equipped with zoom lenses and pan-and-tilt mechanisms. All cameras furnished on the MRTMC shall be equipped with source identification generator. To ensure compatibility with the existing equipment, provide Cohu™ 3800 series (or approved equivalent) cameras inside an environmental dome housing, compatible with the existing system software, unless otherwise approved by the Engineer or required to support compatibility.

Presets shall be provided on both the zoom lens and the pan/tilt mechanism. The presets shall allow either the system or the operator to command the lens and the pan/tilt to predefined locations.

Based on initial observations of candidate camera locations, the camera support poles will range in height from 10 to 17 meters. The Contractor shall determine the camera mounting height and location by performing a camera siting study. The camera siting study shall include field checking the proposed CCTV locations with a bucket truck and video camera and making field adjustments as necessary. An NCDOT representative shall be present during the camera siting study. The results of this study shall be submitted to the Engineer for review. Provide support poles and foundations that are consistent with the existing CCTV poles. The Contractor is responsible for providing pole and foundation designs and obtaining electrical service (including paying for engineering and construction for obtaining the electrical service). The Engineer shall approve pole and foundation designs prior to any new equipment being installed.

Provide a camera with 6.35mm interline transfer charge couple device (CCD) with digital signal processing capabilities and a 16:1 minimum optical zoom and an 8:1 minimum digital zoom. Provide selectable black-and-white integration and normal color operation modes.

### 2.3.2.2 Interface Requirements

Provide a multipoint RS-232 communication interface compatible with the existing CCTV central system equipment. If the controller uses another type of digital communication, such as RS-422, provide the appropriate converter. Provide each camera with a unique, easily changeable ID, with the range of permissible IDs encompassing at least the values 1 through 250.

Provide NTSC standard output interface (EIA-170) for video transmission with a signal-to-noise ratio of 48 dB or better.

### 2.3.2.3 Physical & Environmental Requirements

Provide a dome camera housing that is secured to the camera connection box with a mounting plate/attachment designed to a minimum 5X factor of safety when subjected to a 145 kilometers per hour (km/h) wind with a 1.3 gust factor. Provide a housing that is keyed so that, after being removed from the camera connection box for service, it can be reinstalled with exactly the same orientation. Ensure cabling from the camera assembly to the camera connection box is not exposed. New cabinets and foundations shall be of the same size and type as existing CCTV cabinets and foundations.

### 2.3.2.4 Construction Requirements

Provide coaxial video cables with BNC connector terminations. A minimum of two meters of slack for each camera lead shall be provided in the base of the camera support pole and in the associated controller cabinet.

Surge Suppression/Bonding: Install coaxial cables with surge suppressors that meet or exceed the following minimum characteristics:

- The clamping voltage shall be 11 volts between the shield and center conductor signal line.
- The response time shall be five nanoseconds or less.
- Bipolar silicon avalanche diode technology shall be used in a single stage device.
- The module shall dissipate a minimum of 50 Joules.

- The module shall have BNC connectors.

Install RS-232/RS-422 converters as required. Provide the camera control lead-in cables with in-line surge suppression in accordance with manufacturer recommendations.

The Contractor shall develop and install 16 presets for each camera. Preset locations shall be approved by the Engineer.

Perform stand-alone and system testing as described in the General Requirements section.

Connect new CCTV cameras 29 and 36 directly to the MRTMC. Cameras 30 and 31 shall be routed to existing Node 9 and combined in a 4:1 mux with existing CCTVs 25 and 26. CCTV cameras 32, 33, 34, and 35 shall be combined in a 4:1 mux in the Node 11 located in the new Hub 4 building. A communication detail for the new CCTV devices is included in the functional plans. New CCTV cameras shall be routed through existing video distribution amps in the MRTMC prior to being connected to the CORNET video switch.

### 2.3.3 Dynamic Message Signs

The MRTMC includes a DMS subsystem for use in disseminating information to travelers along the proposed sections of I-77.

The DMS to be installed along I-77 for northbound traffic south of the I-85 interchange between exit 11 (Brookshire) and exit 12 (LaSalle St) and the DMS to be installed along I-77 for southbound traffic 97 meters south of mile marker 22 are not shown on the functional plans. At these locations, the contractor shall install a new DMS signs and cabinets in conformance to these functional specifications, and shall provide a six fiber drop cable to a new junction box at each locations, and splice the DMSs into the existing communication cable.

The DMSs located along I-77 shall integrate with Intelligent Multiplexers and optical transceivers as specified in these documents for communication with the central system software.

#### 2.3.3.2 Interface Requirements

The DMSs provided shall meet the interface requirements for Dynamic Message Signs of the NCDOT Signing Section. The DMSs shall interface with the MRTMC communications system as detailed in the functional plans. A six fiber drop cable shall be routed to the new DMSs and the spliced into the communications system as detailed in the functional plans.

### 2.3.4 Remote Traffic Monitoring Sensors (RTMS Detectors)

The MRTMC includes a detector subsystem for use in monitoring traffic conditions along the proposed sections of I-77. The detectors shall generally be located as shown on the preliminary plan set. Detectors located along I-77 shall integrate with Intelligent Multiplexers and optical transceivers as specified in these documents for communication of the collected data.

### 2.3.4.1 Functional Requirements

Provide Electronic Integrated System (EIS), Model X2, RTMS detectors compatible with the existing system software, unless otherwise approved by the Engineer or required to support compatibility.

### 2.3.4.2 Interface Requirements

Provide each RTMS detector with 8 contacts for indication of presence in 8 detection zones, and a 9th contact used for RS-232 RTS or Power-On indication. Contacts shall be rated for 100ma and 350V AC or DC. Opto-isolation protects internal circuits against surges of up to 6KV. Provide surge protection compliant with IEEE standard 587-1980 Category C.

Provide RTMS with optically-isolated serial RS-232 interface that operates at 9600 bps rate and is compatible with the Z-World PK2100 Alarm Controller, as well as the Optical Transceivers.

### 2.3.4.3 Physical & Environmental Requirements

Provide RTMS detectors that are no greater than 200 x 300 x 150 mm in size, and weighing no more than 4.5 kilograms. Provide a weatherproof NEMA 4X enclosure.

Provide RTMS detectors that meet the following operating limits:

- Temperature range -37 to +74°C
- Humidity Up to 95% Relative Humidity
- Vibration 2g up to 200Hz sinusoidal
- Shock 5g 10ms half sine wave
- Wind Winds up to 160 km/h (100mph) will not degrade performance
- Precipitation (rain or snow) up to 100mm/h

New RTMS cabinets and foundations (if not pole mounted) shall be of the similar type and size as existing RTMS cabinets and foundations.

### 2.3.4.4 Construction Requirements

Mount RTMS detectors to structures shown on the preliminary plans using manufacturer recommended brackets (vertical or horizontal). Poles shall not flex more than 5 degrees.

Assign the RTMS devices to device rings (multi-drop channels) for incorporation into the SONET network. RTMS 50 through 57 shall be configured as RTMS Ring 8 with the primary channel assigned to Node 11 and the secondary channel assigned to Node 9. RTMS 58 through RTMS 65 shall be configured as RTMS Ring 9 with the primary channel assigned to Node 11 and the secondary channel assigned to Node 9. RTMS 66 through 77 shall be configured as RTMS Ring 10 with the primary channel assigned to Node 11 and the secondary channel assigned to Node 9. A communications schematic of the RTMS Ring connections is shown in the functional plans.

Calibrate each RTMS according to manufacturer calibration procedures. Calibration should provide appropriate adjustments for adjusting a zone's reference speed. Perform stand-alone and system testing as described in the General Requirements section.

### 2.3.5 Conduit Plant

The MRTMC system shall include a conduit plant that will be multi-duct system comprised of four 32 mm diameter high-density polyethylene ducts as shown in the functional plans. Conduit for device drop cables (RTMS, DMS, CCTV, etc.) will be 50 mm high-density polyethylene or PVC conduit.

*Note: Electrical circuits shall not be placed in the same conduit and/or junction box as data communication circuits.*

#### 2.3.5.1 Functional Requirements

The Contractor shall install a multi-duct conduit system with junction boxes along the proposed sections of I-77 shown on the plans. The multi-duct conduit shall include a four 32 mm diameter ducts. The ducts shall be high-density polyethylene or PVC with color coding conforming to EIA/TIA 598 (1-6). A 50 mm high-density polyethylene or PVC conduit shall be used for drop cables to field devices as shown in the plans. All unused ducts shall be sealed with mechanical removable, reusable water-proof sealing devices and shall contain pull ropes.

Exposed conduit and conduit installed on bridges shall be galvanized metal. Expansion joints shall be provided at each expansion point on the bridge. A sealed (waterproof) service box with fiber cable service loop(s) shall be provided on each side of the bridge to accommodate bridge expansion and contraction. Where very long runs across bridges are required, a sealed service box shall be included on the bridge to facilitate movement without tensioning the fiber cable. Conduit shall be sealed on the entrance to the "off bridge" service boxes with cable movement allowed on conduit crossing the bridge.

#### 2.3.5.2 Physical & Environmental Requirements

Ducts shall have a coefficient of friction of 0.09 or less when tested in accordance with Bellcore GR-356-CORE.

Duct used in directional drilling installations shall have an outer diameter to minimum wall thickness ratio, also known as Standard Dimension Ratio (SDR) of 11.

Ensure the reels are suitable for storing, shipping, and the installation of the duct using the directional bore installation method called for in these functional specifications.

Plugs and sealing fittings for sealing empty conduit and occupied conduit shall be durable and easily removable and reusable and produce a watertight seal. Plugsand sealing fittings shall be designed for the diameter of the duct and cable, shall cause no damage to the cable when installed, and shall have a rope tie on the inside end for connection of a pull rope. Each duct shall have a

separate pull string. Plugs, and sealing fittings used for fiber optic duct shall provide a watertight and airtight seal of at least 138 kPa. Plugs that seal ducts containing fiber optic cable shall be of the split design to allow installation and removal around in-place cables. Plugs and sealing fittings shall be approved by the Engineer.

New junction boxes shall be of the same design and size as existing junction boxes and shall provide positive drainage. Install junction boxes as shown in the details in the plans.

### 2.3.5.3 Construction Requirements

Install one "green" #14 AWG THWN solid copper locator wire in one of the four multi-ducts (existing and newly constructed) and conduits for drop cables to facilitate locating underground fiber optic cables. Install the locator wire in a continuous strand in the duct with a fiber optic cable. Locator wire shall not be installed in an empty inner duct unless none of the ducts have cables. Only one locator wire is needed in each trench. Do not splice ends of tracer wire together. In ducts containing the fiber optic cable and tracer wire, seal the conduit with an Engineer approved conduit sealing bushing. Ensure the installation provides a watertight seal. In no instances are bare ends of tracer wire allowed in junction boxes or cabinets. All runs of tracer wire through junction boxes shall be continuous or capped and sealed to provide a waterproof, weathertight seal. Any tracer wire ends terminating in cabinets shall be capped and sealed to provide a waterproof and weathertight seal. Tracer wire should be pulled into the conduit simultaneously with the fiber optic cable Where tracer wire is spliced, provide waterproof butt splices. For Tracer wire through a junction box, splice or cap and seal tracer wire in a waterproof manner. Splicing is allowed only in cabinets and junction boxes. Connect tracer wires to equipment ground buss in all cabinets.

Install expansion couplings in conjunction with conduits located on bridges and inside pipe sleeves in accordance with these special provisions and the manufacturer's recommended installation procedures.

Solvent cement used for joining shall conform to the requirements of ASTM D2564.

When obstructions are encountered during fiber optic conduit installation, the obstruction shall be bypassed by deflecting the conduit at a rate of at least 10:1. A minimum 900 mm radius and maximum 90 degree bends may be used to avoid obstructions at locations where 10:1 deflection is not possible, provided the least degree bend needed to clear the obstruction is used. Flexible bends may be utilized when needed to facilitate proper location of the fiber optic conduit, only at locations approved by the Engineer. Fiber optic conduit runs between any 2 junction boxes shall not employ more than 4 bends, or exceed an angular sum of 270 degrees.

Perform work in accordance with the Traffic Signal Specifications, Sections 17.3 through 17.5. Do not cut roadway pavement or driveways.

Contact "One-Call," "No-Cuts," "ULOCO," or other utility location service as directed by the Engineer prior to performing any underground work. Mark all existing underground facilities.

Splicing together of conduit or duct of different material composition is prohibited.

Install all duct and conduit with sweeps and bend radii that do not exceed 20 times the outside diameter of the fiber optic cable to be used on this project.

At locations where trenching methods are used, furnish underground detectable marker tape, Approved by the Engineer, with the wording "WARNING -- Fiber Optic Cable". Place metallic marker tape at a depth of 300-450 mm below the finished grade.

Conduit sizes shall be as specified in the Plans. The Contractor may, at his own expense, use larger size conduit, in which case it shall be for the entire length of the run with no reducing couplings permitted. Trenched conduit shall be placed a minimum of 750 mm below the surface.

After installation of any new underground conduit 9 meters or greater in length is completed, such conduits shall be tested with a mandrel having a diameter 6 mm smaller than the diameter of the conduit and a length of 50 mm. All conduits that will not allow passage of the mandrel shall be repaired to the satisfaction of the Engineer. If repairs cannot be performed, the conduit shall be removed and replaced at the Contractor's expense. After the mandrel test, all conduits shall be scoured with a stiff wire brush slightly larger in diameter than the conduit. The Contractor shall clear all conduits in the presence of the Engineer.

Roadway pavements shall not be disturbed without the written approval of the Engineer. Unless otherwise called for on the Plans, place conduit under pavement using directional boring.

Conduits terminating in equipment cabinet foundations shall extend a minimum of 50 mm above the foundation. Conduits shall enter junction boxes from the side or bottom and shall terminate neither less than 50 mm nor more than 100 mms from the side or bottom of the box to leave the major portion of the box clear. All bends shall be of long sweep, free from kinks, and of such easy curvature to permit the drawing in of cables without damage to insulation, unless otherwise shown in the plans. Conduit and fittings shall be in accordance with the joint industry conference requirements. Proposed conduit runs shown on the plans are approximate and may be changed with the approval of the engineer provided that any additional cost is borne by the contractor.

Directional Drill

Directional drilling of the multi-duct system shall be accomplished by directional drilling a 125 mm high-density polyethylene conduit and pulling the multi-duct through the outer-duct.

Furnish for the Engineer's approval, a plan showing the proposed method of handling, including the size and orientation of the staging area, arrangement and position of drilling rigs, pipe guides, etc., complete as assembled.

Contact "One-Call," "No-Cuts," "ULOCO," or other utility location service as directed by the Engineer prior to performing any underground work to locate the lateral and vertical position of underground utilities transverse to and parallel to the proposed bore.

Remove and replace any conduit damaged in directional boring operations at no expense to the Department.

Mechanically drill all holes from a surface staging area provided for the drilling equipment and workers. Backfill pits or trenches excavated to facilitate drilling operations immediately after the boring has been completed. The diameter of the completed drilled hole shall conform to the outside diameter and circumference of the conduit as closely as practical. Pressure grout with an approved bentonite slurry mixture to fill any voids which develop during the installation operation and which the Engineer determines to be detrimental to the construction.

Replace all sidewalk segments removed for directional drilling in whole sections, using same materials as surrounding sidewalk or material approved by the Engineer.

Submit Manufacturer's literature for the bore rig proposed for use on this project to the Engineer for approval. Use a boring machine manufactured by Vermeer, Ditch Witch, UTILX(FlowMole) or an approved equivalent. Provide adequate grounding for all boring machines.

Provide an operator who is factory-trained to operate the make and model of the boring machine proposed for use on this project. Furnish a drill operator who has a minimum of one year's experience operating the make and model of boring machine proposed for use on the project. Furnish for the Engineer's review and approval written documentation of the drill operator's training and experience at least two weeks prior to commencing any directional boring on the project.

The use of water and other fluids in connection with the boring operation will be permitted only to the extent necessary to lubricate cuttings. Jetting shall not be permitted and the use of water alone as a drilling fluid shall not be permitted. Use a drilling fluid/slurry consisting of at least 10% high grade, carefully processed bentonite to consolidate excavated material, seal the walls of the hole and furnish lubrication for subsequent removal of material and immediate installation of the pipe.

Excavated material will be placed near the top of the working pit and disposed of as required. Provide a means of collecting and containing drilling fluid/slurry that returns to the surface, such as a slurry pit. Provide measures to prevent drilling fluids from entering drainage ditches and storm sewer systems. Prevent drilling fluid/slurry from accumulating on or flowing onto sidewalks, other pedestrian walkways, driveways or streets. Immediately remove any slurry that is inadvertently deposited on pedestrian walkways using methods approved by the Engineer.

Transport drilling slurry waste from the site and dispose of such slurry in a method that complies with Local, State and Federal laws and regulations.

Install all conduits transgressing under roadways and guardrails at a minimum depth of 3 meters below surface and a minimum horizontal distance of 1.5 meters outside the roadbed, shoulder and/or guardrail unless otherwise approved by the Engineer. Bring conduit to grade at slope that does not violate the fiber optic cable bending radius, does not cause the conduit and or duct to

deform longitudinally or along it circumference, and is within the horizontal drilling device's manufacturer's suggested performance limits.

Use a digital walkover locating system to track the drill head during the horizontal directional boring operation. The person performing the digital walkover location shall meet the same training and experience requirements specified for the boring machine operator above. At a minimum, the locating system shall be capable of determining the pitch, roll, heading, depth and horizontal position of the drill head at any point along the bore.

During each drilling operation, locate the drill head every three meters along the drill and prior to crossing any transverse underground utility or structure. Unless the Engineer approves otherwise, do not deviate from the proposed line and grade previously approved by the Engineer by more than two percent.

Utilize a drill head suitable for the type of material being drilled and sized no larger than the outer diameter of the conduit to be installed. Direct the drill head as needed to obtain the proper depth and desired ending location as needed and approved by the Engineer. Once the drill head has reached its final boring location, remove the head and install a reamer of appropriate size to simultaneously facilitate back boring of the drill hole and installation of the conduit.

Ensure the bentonite slurry mixture is applied as the conduit installation process is occurring.

Once the physical installation of the conduit is begun, the operation shall be carried on without interruption, insofar as practical, to prevent the conduit from becoming firmly set.

Splicing or joining of the directional drill duct is prohibited. With the Engineer's Approval, install a junction box at all locations where splicing or coupling of the directional drill duct would be necessary due to problems encountered with the installation method or as called for in the functional plans.

At all points where the conduit is to transverse under a roadway ensure the conduit maintains a minimum depth of three meters.

Upon completion of the boring operation and conduit installation, furnish the Engineer with an as-built profile drawing and a plan drawing for the drilled conduit showing the horizontal and vertical locations of the installed conduit.

In no case shall the Contractor fill any new duct or conduit to a capacity that will exceed the requirements of the National Electrical Code.

### 2.3.6 Fiber Communications Plant

The communication system shall use single mode fiber optic cable as the communications backbone and for branch circuit communication with on-freeway devices.

### 2.3.6.1 Functional Requirements

Fiber optic cable, jumper cables, and distribution equipment shall be fabricated by a certified ISO 9001 manufacturer. All fiber cable provided under this Contract shall be from the same manufacturer utilizing identical specifications and shall be compatible with the exiting fiber optic cable. All fiber cables shall be dielectric.

Fiber optic cable shall contain single mode optical fibers, loose tube, filled with a water-blocking material, and shall be suitable for installation in underground conduit and field cabinets. Fiber optic cable shall comply with the requirements of RUS 1755.900.

Optical fiber physical and performance requirements for all optical fibers in the cable shall, as a minimum, comply with the following requirements:

- Maximum attenuation: 0.4dB/km at 1310nm; 0.3dB/km at 1550nm
- Attenuation uniformity: no point discontinuity greater than 0.1 dB at either 1310nm or 1550nm
- All connectors shall be ST connectors.

Information accompanying the reel shall include the following either stenciled or lettered on the reel, or provided on a weatherproof tag firmly attached to the reel:

- Factory order number
- Job number
- Ship date
- Manufacturer's cable code
- Type of cable (single mode, outdoor, indoor)
- Beginning and ending length markings
- Measured length and attenuation

Provide Siecor FBT-048 fiber-optic splice units, unless otherwise approved by the Engineer or required to support compatibility with fiber-optic cables and components.

### 2.3.6.2 Interface Requirements

Provide fiber-optic connectors compatible with existing and proposed optical communication equipment. The measured attenuation of the connector (inclusive of coupler and mated test connector) shall not exceed 0.5 dB for all connectors provided.

### 2.3.6.3 Physical & Environmental Requirements

Cable length and shipping requirements: Cable shall be furnished in one continuous length per reel, and shall be free from optical splices.

Buffer tubes: Optical fibers shall be contained inside a loose buffer tube. Each buffer tube shall contain 6 or 12 fibers as required for cable size. The buffer tubes shall allow free movement of the fibers without fiber damage during installation or normal operation, including expansion and contraction of the buffer tubes.

When less than 5 buffer tubes are required in the loose tube cable, filler rods shall be included in the cable core to lend symmetry to the cable cross-section. The diameter of the filler rods shall match the diameter of the buffer tubes.

The cable shall have a central member designed to prevent buckling of the cable. The cable core interstices shall be filled with a non-nutritive to fungus, electrically non-conductive, water-blocking material such as water-swellable tape that is dry to the touch. The water blocking material shall be free from dirt and foreign matter. The cable shall contain at least 1 ripcord under the sheath for easy sheath removal. Provide cables that operate under the following environmental conditions:

- Minimum storage temperature range: -40 °C to +70 °C
- Minimum operating temperature range: -20 °C to +70 °C

### 2.3.6.4 Construction Requirements

Communications fiber assignment sheets -- These sheets shall show the use of each fiber for each cable segment between splice locations, thereby defining the communications path between the MRTMC and all field devices. These sheets shall be prepared and submitted to the Engineer for review in hard copy and electronic format.

The fiber optic cable shall be installed in conduit, field cabinets, hub buildings, and the MRTMC in quantities and locations shown in the Plans and in accordance with manufacturer's installation techniques and procedures. Furnish and install all jumper cables and termination equipment that are functionally necessary to connect fiber optic cable to the required end equipment.

Install fiber optic cable as a continuous run and without splices between controller cabinets and/or hubs. Determine the length of fiber optic cable necessary to reach from one end of the cable run to the other end of the cable run, including cable slack requirements. Label all fiber optic cables at each end of the cable run, at the point the cable enters a cabinet and at the point the cable exits the cabinet and in all junction boxes. Identify the cable number and the string numbers of the fibers contained within all fiber optic cables. Cable names/identifies shall be placed on all cables. The Contractor shall follow the existing cable naming and labeling convention used in the MRTMC.

Installation of fiber optic cable and jumper cable indoors shall meet the minimum requirements of local building codes and NEC Article 770, inclusive of the Fine Print Notes (FPN). Optical cable shall not be pulled over edges or corners, over or around obstructions, or through unnecessary curves or bends. Bend radius criteria of 10 times the cable diameter under no stress and twenty times cable diameter under stress shall not be exceeded. Manufacturer approved pulling grips, cable guides, feeders, shoes, and bushings shall be used to prevent damage to the cable during installation.

Before installing any fiber optic cable in conduit, all cable pulling equipment shall be approved by the Engineer and the cable manufacturer. The cable pulling equipment shall come with a meter to display pulling tension and a mechanism to ensure that the maximum allowable pulling tension cannot be exceeded at any time during installation.

Furnish and install attachment hardware, installation guides, and other necessary equipment, not specifically listed herein, as necessary to install the fiber optic cable.

Fiber optic cable in junction boxes shall be appropriately looped and tied to the side wall. Provide the following minimum slack requirements for installed fiber cables:

- 5 meters of slack in junction boxes (for every 150 meters of linear cable run)
- 5 meters of slack in controller cabinets
- 9 meters of slack in hub buildings and the MRTMC
- Jumper cables shall be a minimum 3 meters in length.

Only splice individual fibers at locations that require splicing. Full-cable splicing is not warranted at cabinet installations, except when required to connect cables from two separate cable reels. Protect all splices and store in fiber optic splice units or an integrated fiber-optic splice and termination unit that is housed in field cabinets, hub buildings, or the MRTMC. All spare fibers in the 12 fiber drop cables shall be terminated in the equipment cabinet that they serve. Trunk line fibers shall be terminated in patch panels in Hub 4 and the MRTMC.

Perform all splices by means of the fusion splice technique and do not induce more than 0.05 dB attenuation for each splice. Splices found to exceed 0.05 dB attenuation shall be re-spliced, at no additional cost to the Department, by the Contractor until this requirement is met.

Protect each splice in a protective sleeving or housing and secured in splice trays located in a fiber optic splice unit or an integrated fiber optic splice and termination unit. Bare fibers shall be completely re-coated with a protective heat-shrink coating prior to placement in a sleeve or housing. Provide heat-shrink coating approved for use by the fiber optic cable manufacturer and installed in such a manner as to protect the fiber from scoring, dirt accumulation, moisture intrusion, and microbending.

Termination of distribution and trunk fibers shall not exceed a measured attenuation of 0.5 dB at each termination. Fiber terminations shall be neatly, and permanently labeled to designate transmit or receive (when appropriate) and the string number. Spare fibers shall be labeled as “spare” with the string number. Provide protective covers on unused terminations. Install fiber counts as shown on the preliminary plans.

### 2.3.7 Communications System Expansion

The communications network shall use an OC-12 network for on-freeway communications. The chassis provided for the RFL IMUX2000 at the new Hub 4 shall be expandable to accommodate a minimum of 12 additional data channels. The system shall use multiplexed video over fiber-optic cables. Components shall match or provide compatibility with existing communication equipment as required to complete a working expansion system.

The on-freeway communications system for the MRTMC shall provide a folded ring architecture for fault-tolerance.

#### 2.3.7.1 General Requirements

Maintain continuity and compatibility with the existing communication equipment network. The project area is to the north of the current communication network limits at Node 9. Node 9 is interconnected directly with the MRTMC, unlike other nodes that are connected to a SONET hub. The existing communication network is comprised of 3 SONET hubs, two in the field and one at the MRTMC. Add a compatible fourth hub in the field as a result of this expansion project south of the Alexanderana Road overpass as shown on the preliminary plans. For new folded distribution rings to field devices, furnish and install new master optical modems at existing nodes (Node 9) and their counterparts at the new SONET hub facility. Include new devices into the existing network management element. Include all new communication components into the respective existing network management element.

#### 2.3.7.2 Existing Communication Components

The following is a listing of the existing communication equipment in the MRTMC system. While most of these components are still available from their respective manufacturers, some have been superceded by newer models as noted in subsequent sections of these specifications.

- Optical Transceivers (OTRs): IFS Model D3130-SC (DMS/detector) and D3130 (node/hub)
- Video Optical Transceivers (VOTRs): IFS Model VT4730WDM (camera) and VR4730WDM (node/hub)
- Video Multiplexers (VMUXs): IFS Model VT5030 (hub) and VR5030 (TMC)
- Intelligent Multiplexer (IMUX): RFL IMUX2000 (node/hub)
- Synchronous Optical Network (SONET) backbone: Alcatel 1603/12 SM (hubs)
- Fiber Optic Cable and Termination Units: Siecor fiber cables and FBT-048 splice units
- Network Management System (NMS): Alcatel NME and HP Openview v4 (TMC)

#### 2.3.7.3 Low speed fiber optic transceivers (OTR)

Furnish and install optical transceivers at field device locations (detectors and DMS) and in node cabinets depicted on the plans. Provide separate communication rings for DMS apart from detectors (i.e. group devices of the same protocol on the same communications channel).

##### 2.3.7.3.1 Functional Requirements

Provide drop and repeat capability for OTRs at all field cabinet locations. Provide master modem functionality at the corresponding node. Provide redundant master modems, placing each master in a separate node with the ring of field cabinets in between (e.g. Node 9 and in a proposed new hub). Provide International Fiber Systems (IFS) Model D9130-SC (supercedes previous model D3130-SC) drop/repeat and D9130E-SC end-point optical transceivers compatible with the existing communication system and software, unless otherwise approved by the Engineer or required to support compatibility. OTRs operate using four single-mode fibers (two upstream and two downstream).

#### 2.3.7.3.2 Interface Requirements

Provide fiber-optic connectors identical to those on the existing and proposed optical communication equipment. Provide RS-232 connectors and adapters compatible with the PK2100 Alarm Controller (field cabinet) and the RFL IMUX2000 (node/hub). Provide single-mode fiber-optic transceivers operating at 1300nm with connectors compatible with existing and proposed fiber-optic patch panels and distribution equipment (i.e. ST, SC).

#### 2.3.7.3.3 Physical & Environmental Requirements

Provide stand-alone OTRs in field device cabinets. Provide rack-mount OTRs in nodes and hubs. Rack-mount OTRs shall be compatible with the existing IFS Model R3 modem chassis. The existing chassis in Node 9 currently has 5 spare slots available. This capacity must be collectively shared with the OTRs and VMUXs described in these special provisions. Provide a compatible modem chassis if additional slots are required.
Operating Temp: -40° C to +74° C, ambient
Storage Temp: -40° C to +85° C, ambient

#### 2.3.7.3.4 Construction Requirements

Two uplink single mode fibers (1 transmit and 1 receive) and two downlink fibers (1 transmit and 1 receive) for a total of 4 fibers shall be connected to each OTR using optical connectors in the field cabinet and in the communication node/hub.

Provide two master OTRs for each fiber ring. One shall be configured as a primary master/secondary slave OTR located in a primary hub/node, and the other as a primary slave/secondary master OTR located in an alternate hub/node. In field cabinets, the OTRs shall be interconnected to PK2100 Alarm Controllers (Detectors) or the DMS controller through an RS-232 interface channel. All field communication OTRs shall be configured as slave devices. Connect the two master OTRs to the RFL IMUX2000 in the respective communication node/hub. Perform stand-alone and system testing as described in the General Requirements section.

### 2.3.7.4 Video optical transceivers (VOTR)

Furnish and install video optical transceivers at field CCTV locations and in node cabinets depicted on the plans.

#### 2.3.7.4.1 Functional Requirements

Provide International Fiber Systems (IFS), Model VT4730WDM-SC in the field cabinet with a corresponding VR4730WDM-SC-R3 in the node/hub that are compatible with the existing communication system and software, unless otherwise approved by the Engineer or required to support compatibility. VOTRs operate using one single-mode fiber. Provide unidirectional video from the camera to the node/hub, and bi-directional RS-232 data between the camera and the hub using single-mode fiber-optics.

#### 2.3.7.4.2 Interface Requirements

Provide single-mode fiber-optic transceivers operating at 1300nm with connectors identical to those on the existing and proposed optical communication equipment. Provide composite video NTSC connectors and adapters compatible with the CCTV camera and controller equipment. Provide RS-232 connectors and adapters compatible with the camera controller and the RFL IMUX2000 (node/hub).

#### 2.3.7.4.3 Physical & Environmental Requirements

Provide stand-alone VOTRs in field CCTV cabinets. Provide rack-mount VOTRs in nodes and hubs. Rack-mount VOTRs shall be compatible with the existing IFS Model R3 modem chassis. If video is terminated in Node 9, the existing chassis in Node 9 currently has 5 spare slots available. This capacity must be collectively shared with the OTRs and VMUXs described in these special provisions. Provide a compatible modem chassis if additional slots are required.
Operating Temp: -40° C to +74° C, ambient
Storage Temp: -40° C to +85° C, ambient

#### 2.3.7.4.4 Construction Requirements

Connect one single mode fiber to each VOTR using optical connectors in the field cabinet and in the communication node/hub. In field cabinets, the VOTRs shall be interconnected to the CCTV camera output and the controller receiver through their respective NTSC and RS-232 interfaces. Perform stand-alone and system testing as described in the General Requirements section. At the field node/hub, connect the NTSC output from the VOTR to the corresponding VMUX. At the field node/hub, connect the RS-232 output to an RFL IMUX2000 data port.

### 2.3.7.5 Video Multiplexer (VMUX)

Furnish and install video optical multiplexers at field CCTV locations and in node cabinets depicted on the plans.

#### 2.3.7.5.1 Functional Requirements

Provide International Fiber Systems (IFS), Model VT7430-R3-SC in the field node/hub with a corresponding VR7430-R3-SC in the MRTMC that are compatible with the existing communication system, video system, and software, unless otherwise approved by the Engineer or required to support compatibility. VMUXs operate using one single-mode fiber. Provide unidirectional video for 4 NTSC video channels from the field node/hub to the MRTMC.

#### 2.3.7.5.2 Interface Requirements

Provide composite video NTSC connectors and adapters compatible with CCTV camera controller equipment and VOTRs. Provide single-mode fiber-optic transceivers operating at 1300nm with connectors compatible with existing and proposed fiber-optic patch panels, distribution equipment, and communication equipment (i.e. ST, SC).

#### 2.3.7.5.3 Physical & Environmental Requirements

Provide rack-mount VMUXs in field node/hubs and the MRTMC. Rack-mount VMUXs shall be compatible with the existing IFS Model R3 modem chassis. The existing chassis in Node 9 currently has 5 spare slots available. This capacity must be collectively shared with the OTRs and VOTRs described in these special provisions. Provide a compatible modem chassis if additional slots are required.
Operating Temp: -40° C to +74° C, ambient
Storage Temp: -40° C to +85° C, ambient

#### 2.3.7.5.4 Construction Requirements

Connect one single mode fiber to each VMUX using optical connectors in the field node/hub and in the MRTMC. In field nodes/hubs, the VMUXs shall be interconnected to the respective VOTR camera outputs. Perform stand-alone and system testing as described in the General Requirements section.

### 2.3.7.6 Intelligent Multiplexer (RFL IMUX2000)

The MRTMC includes an RFL IMUX2000 subsystem for use in managing data to/from detectors, DMS, and pan/tilt/zoom camera controls. RFL IMUX2000s are located in field nodes/hubs where optical ring master modems and video optical receivers are terminated. Integrate field devices located along the proposed sections of I-77 with Intelligent Multiplexers and optical transceivers as specified in these documents for communication with the MRTMC.

#### 2.3.7.6.1 Functional Requirements

Provide an RFL IMUX2000 in the new Hub 4 building that is compatible with the existing and proposed communications and central software system. Equip the RFL IMUX2000 with Simple Network Management Protocol (SNMP) software. Equip the RFL IMUX2000 with all pertinent power supplies (redundant), alarm modules, status modules, and common logic modules for each equipment chassis. Provide appropriate number of serial interfaces to terminate field device communications and terminate data channels at the MRTMC. Provide voice channel communications compatible with existing RFL IMUX2000 capabilities for communicating between RFL IMUX2000 locations with a telephone headset. The new RFL IMUX2000 will be identified as Node 11.

#### 2.3.7.6.2 Interface Requirements

Provide serial connectors and adapters (e.g. RS-232, RS-422, etc.) compatible with the CCTV controllers, detectors, DMS, and existing communication and video switching equipment and software. The existing RFL IMUX2000 chassis' use a 4 port module from RFL to interconnect field device communication channels. Where connecting to SONET, provide DS-1 electrical connectors that are compatible with existing and proposed SONET multiplexer equipment. Where additional field nodes are installed, provide optical interface adapters to support transmission of DS-1 carrier over single-mode fiber-optics to the nearest SONET hub facility or the MRTMC.

#### 2.3.7.6.3 Physical & Environmental Requirements

Provide rack-mount RFL IMUX2000 in the new field node/hub. Rack-mounted RFL IMUX2000 shall be compatible with the EIA-310 483 mm equipment racks (no larger than 3RU in height). Operating Temp: -20° C to +55° C, ambient

#### 2.3.7.6.4 Construction Requirements

Connect each VOTR's RS-232 camera control connector to a data port on the RFL IMUX2000. Connect master optical modems (RS-232) from DMS and detectors to separate data ports on the RFL IMUX2000. Connect RFL IMUX2000 DS-1 electrical port to an available DS-1 timeslot on the SONET multiplexer. At the MRTMC, expand Mini-DACS to accommodate sufficient DS-1 channels for the additional RFL IMUX2000 field units installed on this project. Integrate additional communication channels on RFL IMUX2000 Loc 10 and/or Loc 8 in the MRTMC to accommodate the new field devices. Perform stand-alone and system testing as described in the General Requirements section.

### 2.3.7.7 Synchronous Optical Network (SONET) Communications Backbone

The project area is to the north of the current communication network limits at Node 9. Node 9 is interconnected directly with the MRTMC, unlike other nodes that are connected to a SONET hub. The existing communication network is comprised of three SONET hubs, two in the field and one at the MRTMC. This project will install a new SONET Hub 4 north of Node 9 just south of the proposed interchange with I-485. The multiplexed data communication from Node 9 will be rerouted to the new SONET Hub 4 to be processed on the SONET network.

#### 2.3.7.7.1 Functional Requirements

Components shall match or provide compatibility with existing SONET equipment as required to complete a working expansion system. The existing three hubs are comprised of Alcatel 1603/12 SM multiplexers configured in an OC-12 ring. Each SONET mux includes an ADC DSX-1 manual cross-connect panel (DSX-1B-23 or equivalent). The chassis provided for the RFL IMUX2000 at the new Hub 4 shall be expandable to accommodate a minimum of 12 additional data channels. Provide optical modules with a range designed to accommodate the link loss budget for the distance between the MRTMC and the proposed new hub (with a 3dB safety margin). Provide and install a –48 VDC power supply for the SONET equipment. Modify the SONET NME software, as well as incorporate the new hub into the network management system.

#### 2.3.7.7.2 Interface Requirements

Provide a minimum of 6 DS-1s at proposed SONET hub locations for data communications with RFL IMUX2000s and other field communication equipment. Provide single-mode optical interfaces compatible with existing optical connectors and patch panel equipment at the three existing hubs.

#### 2.3.7.7.3 Physical & Environmental Requirements

Provide SONET multiplexers capable of operating from 0 to 40°C operating temperatures. SONET equipment including miscellaneous equipment such as cross-connect panels, shall not exceed 7RU of mounting height in a 584 mm equipment rack.

#### 2.3.7.7.4 Construction Requirements

Physical jumper cable connections shall terminate the initial DS-1 interface requirements to network equipment (e.g. RFL IMUX2000, etc.) for the associated communication hubs and at the MRTMC. At the MRTMC, the DS-1 communication requirements for the new field hub shall be physically terminated and provisioned for service. If additional mini-DACS ports are installed, configure the mini-DACS for the additional DS-1 circuits to the proposed field hub. Neatly interface network equipment cables (from RFL IMUX2000 and other DS-1s) with the SONET cross-connect panel.

### 2.3.7.8 Electronic Chassis and Cabinets

Provide standard cabinets complying with EIA 310D or Bellcore TR-TSY-000487 equivalent within the MRTMC or field shelters. Cabinets shall include all cooling provisions for installed equipment, all internal power distribution, a utility power strip supporting AC power for test equipment and alarms on front and rear doors. Alarms shall be reset upon door closure. Alarm report by the network management system shall include location, cabinet number, date/time opened and date/time closed. Cabinets shall also include over temperature alarm with appropriate dead band to prevent oscillatory alarming.

All electronic chassis and factory integrated cabinets shall contain a permanently attached "tag" which contains:

- Functional identification of the unit.
- Model number.
- Part number.
- Serial number.
- Manufacturer's name.
- Manufacturer's address.

All removable and replaceable PCB modules shall include a permanently attached part number and functional identification. All connectors, switches, and indicators shall be marked with function. All power connectors and circuit breakers shall be marked with maximum voltage/current capacity. All voltages higher than 28 VDC or any voltage contacts which have high current capability if shorted (such as battery) and which may be exposed during maintenance to

inadvertent contact shall be protected and marked. All cables shall be permanently marked with cable number and information designating from/to units and associated connectors. Schematics, parts lists and other documentation shall correspond to equipment part numbers and component designations as delivered and installed.

### 2.3.7.9 Hub Building

The hub building shall be of a pre-cast, pre-assembled concrete construction with a washed aggregate finish. Assembly of the building shall occur inside an environmentally controlled plant environment. The hub buildings shall be shipped to the site pre-assembled and installed on a prepared slab and foundation on a prepared site. Obtain all necessary permits required to provide a complete installation.

#### 2.3.7.9.1 Functional Requirements

The hub building shall be a modular, prefabricated unit, containing all of the equipment specified herein. The hub building shall be completely weatherproof. All structural panel joints shall be sealed with a suitable joint sealant to prevent water absorption and freeze-thaw damage. The building shall be supplied with lifting lugs for handling and installation. The walls shall be provided with pre-cast openings for air conditioning, doors, and conduit penetrations as shown on the Plans.

Design building walls to withstand wind loads of 190 kph. Building sub floor shall be part of the modular unit and constructed of concrete with a design rated load capacity of 13.2 kPa. Construct and seal the sub-floor to prevent entry of moisture debris, rodents, and insects and to support the integrated building grounding system. Roof design load: 2.4 kPa minimum.

Provide a raised flooring system with modular removable steel panels. Provide each steel panel with the capability of supporting a uniform load of 115 kilograms placed on one square foot area at any location on the panel. Provide each panel with the capability of supporting a concentrated load of 450 kilograms placed on a square inch area at any location on the panel.

Provide an integrated building grounding system with common grounding plate and interconnecting ground bus for communication equipment racks and power grounds as defined in the NEC.

Provide transient voltage surge suppressor (TVSS) designed for permanent connection and service entrance application to protect electrical and communication equipment from damaging transients and electrical line noise. Provide TVSS that is UL 1449 listed, and tested and approved for ANSI/IEEE C62.41-1991 Categories A, B, and C.

Provide an Uninterrruptible Power Supply (UPS) in an identical fashion as the existing hub buildings.

### 2.3.7.9.2 Interface Requirements

Provide an access control secured entry system, and environmental alarms that are compatible with the central monitoring equipment at the MRTMC for existing hub buildings.

### 2.3.7.9.3 Physical & Environmental Requirements

The operating ambient temperature of equipment installed in existing or new commercial buildings shall be 0ºC to +50ºC with ability to withstand short operating periods at +55ºC during air conditioning repair. The ambient operating temperature of field hub equipment shall be -20ºC to +60ºC The Contractor shall provide an integrated field SONET equipment cabinet or field building with fault tolerant air conditioning as may be required, complying with this ambient environment. Internal heat load of equipment in the field equipment cabinet or building shall be considered in the design and selection of air conditioning. Where air conditioning is required, fault tolerance is required for air conditioning, including back-up power. Where air conditioning is required below the level that heat exchangers operate, cooling by fan shall be used. All air conditioning control shall be automatic.

The Hub building shall be equipped with fault tolerant 120 VAC air conditioning units of Energy Efficiency Rating (EER) of 8.5 or greater in size to provide cooling to Hub electronic equipment installed in the building. The Contractor shall size the air conditioning based on heat load of the equipment plus 30% expansion. The Contractor shall include in the heat load analysis any heat dissipated by utility lighting, test equipment, air conditioning, motors, UPS battery charges, and up to two maintenance personnel. The Contractor may consider utility power and facilities manning to be intermittent for periods of 12 hours. The air conditioning system shall include thermostatic control with temperature adjustments over a minimum range of +15ºC to +35ºC. The air conditioning system shall be sized to adequately cool the facilities with a single air conditioner and further sized to:

- Maintain the interior of the building at +20ºC ± 10º with ambient outside temperature ranging from -30ºC to +55ºC with solar loading. A ± 20• C variation in internal temperature shall be allowed at temperature extremes. Recover to normal room ambient temperature from a 5 minute period with the door open, in no longer 5 minutes.

- Consider cooling that may be required due to internal heat generation by equipment, with outside ambient temperatures around +3ºC. This may require the ability to cool through use of just fans at ambient temperatures where air conditioner efficiency become ineffective.

The redundant air conditioners shall be installed in the wall of the building and shall have a steel bar security guard to prevent theft and facilities entry. Installation, preventative maintenance (change of filters) and corrective maintenance shall be from the interior of the building.

A temperature monitor shall be provided which disconnects the primary and secondary equipment branch power circuits if the temperature within the building exceeds the maximum operating temperature of equipment plus 5ºC. The temperature monitor shall be adjustable from +50ºC to +75ºC. An alarm shall be provided to the Network Management Subsystem prior to automatic

system shutdown due to over-temperature condition. A warning alarm shall also be provided when the building temperature is within 5ºC of selected shutdown temperature.

The air conditioners shall have a programmable control (7 day, 24 hour clock with battery back-up) that shall be selectable for automatic air conditioning switch over. The air conditioning unit shall also have remote control commanded via the communications network from the Network Management Subsystems that can be used to command switchover. Where the building has reached a high ambient temperature due to air conditioning failure or extended lengths of door opening, it shall be possible to activate both air conditioners to accelerate cooling of the building. Where the building reaches 5ºC before shutdown, both air conditioners shall be automatically activated. Air conditioners shall be sized to cool the building using a single unit, not requiring both air conditioners to operate during normal conditions. Whenever both air conditioners are activated, an alarm signal shall be sent to network management subsystem.

As part of the network management system, the air conditioning system shall include sensors and network alarm signal interfaces to:

- Report a failure of the air conditioning unit.
- Report activation of air conditioners.
- Report a building over or under temperature conditions via the network management channel. The over/under temperature alarm shall have a selectable dead band to prevent alarm cycling.
- Report over-temperature power shutdown.

The air conditioner may be a critical point failure in the communications network. For this reason the air conditioners selected shall have a proven high operational reliability. A mean true between failure of 43,800 hours to a 95% confidence level shall be met. Service life shall be 10 years minimum. Air conditioners shall not require extensive, preventative maintenance other than changing filters and periodically cleaning heat exchanger coils. Where permanent, changeable filters are used, two spare filters shall be provided for each air conditioner. Where disposable filters are used, a two years supply of disposable filters shall be supplied. Consideration shall be given to corrosive air pollutants found along the freeway and rain and impact on building equipment.

The air conditioning units shall be mounted for easy removal inside of the building. A rain shield shall be provided on the exterior. Condensation drain shall be redundant and shall be ducted away from the building, assuring that no water condenses inside of the building.

### 2.3.7.9.4 Construction Requirements

Install foundation and hub building in accordance with NCDOT standards and local ordinances. Exact foundation dimensions and details shall be coordinated with hub building manufacturer for support of design load, given the soil conditions at each site and the wall and floor connection

details. The Contractor shall submit detail designs and specifications for the hub building. The Engineer shall approve the design of the hub building prior to the construction of any new equipment.

The building shall be off-loaded (using the lifting lugs supplied with the building), anchored to the slab, and leveled, all in accordance with the manufacturer's instructions. Only stainless steel shims may be used for leveling.

Perform all work necessary to have a metered power service installed at the hub building.

## 2.4 TMC System Modifications

### 2.4.1 Introduction

Upgrades to the MRTMC system to be performed with this project include modifications to the existing system database, modifications to the network management system and hardware replacement/upgrades. Database upgrades will include updating the system to monitor and control the relocated and additional ITS field devices, and incorporating the new lanes (on a link by link basis, where a link is the section of roadway between two RTMS units). Software upgrades necessary include using the Sherrill-Lupinski (SL) graphics tool to update the system map to depict the correct number of lanes, the new devices installed, and the expanded coverage area.

### 2.4.2 Central Site Hardware Modifications

#### 2.4.2.1 Video Switch Expansion

The existing CORNET video switch shall be expanded as part of this project. The video switch shall be expanded based on manufacturer guidelines and maintain the same level of functionality as existing. The video switch shall be expanded as part of the construction of the new field devices to accommodate the expanded system.
The existing switch is a CORNET MTX-64 NTSC video switch running CorScan 400 Server software version 4.0.5. The switch consists of four engines with the capacity for 19 cards (16 I/O, one backup I/O, and 2 RS-232 cards. The engines are arranged in a quad-matrix with full redundancy. Each I/O card will accommodate 4 inputs and 4 outputs. Each engine currently includes 14 I/O cards and 2 RS-232 cards, for an existing maximum capacity of 112 inputs (4 engines x 14 cards per engine x 4 I/Os per card divided by two to provide redundancy). The Contractor shall provide and install three (3) new I/O cards (2 I/O and 1 backup I/O) for each engine, for a total of 12 new I/O cards. The new I/O cards shall be installed based on manufacturer guidelines and shall maintain the same level of functionality and redundancy as existing.

#### 2.4.2.2 Terminal Server Expansion

The contractor shall install three (3) new DEC Terminal servers into the racks in the MRTMC. The terminal servers shall be DECSERVE700 unless otherwise approved by the Engineer. The

terminal servers shall be integrated into the MRTMC central hardware communications system. Connections to the new terminal servers shall be made as shown in the functional plans.

The new terminal servers shall be installed at the same time the new field hardware is installed.

#### 2.4.2.3 File Server Upgrade and RAID Expansion

The Contractor shall upgrade the following file servers located in the communications room in the MRTMC:

- Detector Server 1
- Detector Server 2
- Back-up Server
- Video Server
- Internet Server
- Main Server
- DMS Server
- Incident Server
- IMUX Proxy Server
- CORNET Server

The file servers listed above shall be upgraded to the current (at the time of replacement) NCDOT performance standards for GIS computer workstations. The Contractor shall contact NCDOT's Engineering Technology Systems at (919) 508-1907 to obtain the performance standards and historical costs. Existing server software shall be removed from the existing file servers and installed on the new file servers. No new software will be installed on the computer workstations. The Contractor shall also replace the four existing file server monitors. The monitors shall at a minimum be the same size and graphics capability as the existing monitors. The new file servers shall be tested and approved by the Engineer to determine that all system functionality has been maintained.

The current RAID file server includes a Redundant Array of Inexpensive Disks (RAID) storage subsystem that provides a total capacity of at least 10 GB (gigabytes). Expand the storage capacity of the existing RAID to at least 30 GB.

##### 2.4.2.3.1 Functional Requirements

The new file servers shall maintain all of their existing functionality. The expanded RAID shall maintain all of the existing functionality.

#### 2.4.2.4 Workstation & Monitor Upgrades

Upon completion and acceptance of all field devices, the Contractor shall upgrade the existing five workstations in the MRTMC. The workstations shall be upgraded to the current (at the time of replacement) NCDOT performance standards for GIS computer workstations. The Contractor shall contact NCDOT's Engineering Technology Systems at (919) 508-1907 to obtain the performance standards and historical costs. Existing workstation software shall be removed from the existing workstations and installed on the new workstations. No new software will be

installed on the computer workstations. Existing COTS software on the workstations include: Windows NT, Microsoft Office Suite, Hummingbird Exceed, SL Graphics Modeling Software, Oracle 7.3, Netscape Communicator, and WinFaxPro. All software and information stored on the existing workstation hard drives shall be transferred to the new machines. Existing licenses will be transferred to the new computer hardware. The new workstations shall be tested and approved by the Engineer to determine that all system functionality has been maintained.

The Contractor shall schedule the workstation and monitor upgrades such that no more than two (2) workstations are out of service at any time.

#### 2.4.2.5 Network Management Element (NME)

The existing system uses a Unix workstation and HP Openview for the NME. The Contractor shall procure devices for the MRTMC that support the SNMP. The contractor shall obtain the SNMP drivers from the equipment manufacturer's, install those drivers, and incorporate the new devices into the NME.

### 2.4.3 Central Site Software Modifications

#### 2.4.3.1 Update System overview map

The Contractor shall use the existing SL-GMS graphics package to modify the existing system map. Modifications to the existing map will include: extending the map to include the limits of this project, assigning roadway laneage on a link (between RTMS devices) basis, and adding new ITS field elements (RTMS, CCTV, and Hub). The Contractor shall incorporate the RTMS devices into the system overview map such that the links are color coded and automatically update (in the same fashion as the existing map) to demonstrate the speeds between the links. All new ITS device icons on the map (CCTV, DMS, RTMS, lanes, etc.) shall maintain the have the same level of functionality as the existing map. Information obtained by clicking on the icons and lanes should be the same as is available on the existing map. The SL-GMS graphics package uses a hardware dongle for licensing purposes. To upgrade the system map the Contractor will either have to procure, at their own expense, and additional dongle to allow them to have modifications at their facility, or make the required modifications at the MRTMC. If the contractor elects to make modifications to the map at the MRTMC, these modifications may not be made during the normal system operating hours.

#### 2.4.3.4 Modifying the System Database to accommodate new Field Devices

The contractor will be required to configure and modify the system database to incorporate all new devices installed with this project to make the device a fully functional component of the MRTMC system.

Field devices are configured using external software or the device keypad according to the manufacturer's instructions. The devices must be configured using addressing and communication parameters compatible with the configuration of the central system.

The EasyStreets database maintenance utility provides a user interface for adding new devices to the system database. The MRTMC System User's Guide provides instruction in the use of the EasyStreets database maintenance utilities. In addition to the list of equipment defined within the system, the database includes lane designations, segments, and incident parameters associated with the field devices. The contractor will be required to update the database for all of these devices (with the exception of incident parameters which will be installed by the NCDOT at a later date).

The delivery documents associated with each system build contain updated information on database contents. The contractor will be required to assure new device parameters do not conflict with any existing database parameters as defined in the most recent delivery documents.

The MRTMC system utilizes SL-GMS as a graphics engine. SL-GMS provides utility programs for updating and maintaining graphic displays. The SL-GMS utilities required to maintain the map are located on the development computer. The contractor will be required to update the system map to include the new devices, and lanes.

The contractor will be required to update the system database to reflect the impact of relocating existing devices. This will include updating the equipment database and map display using the utilities identified in the section describing adding new devices.

## 2.5 Plans of Record Documentation

Prior to final acceptance, the Contractor shall provide one complete set of plans of record, in both reproducible and digital format, and product information sheets.

The plans of record drawings prepared by the Contractor shall designate the spare and occupied multi-ducts.

The plans of record drawings shall include splicing details that include information on spare fiber quantities, identifying fibers by buffer tube and fiber color.

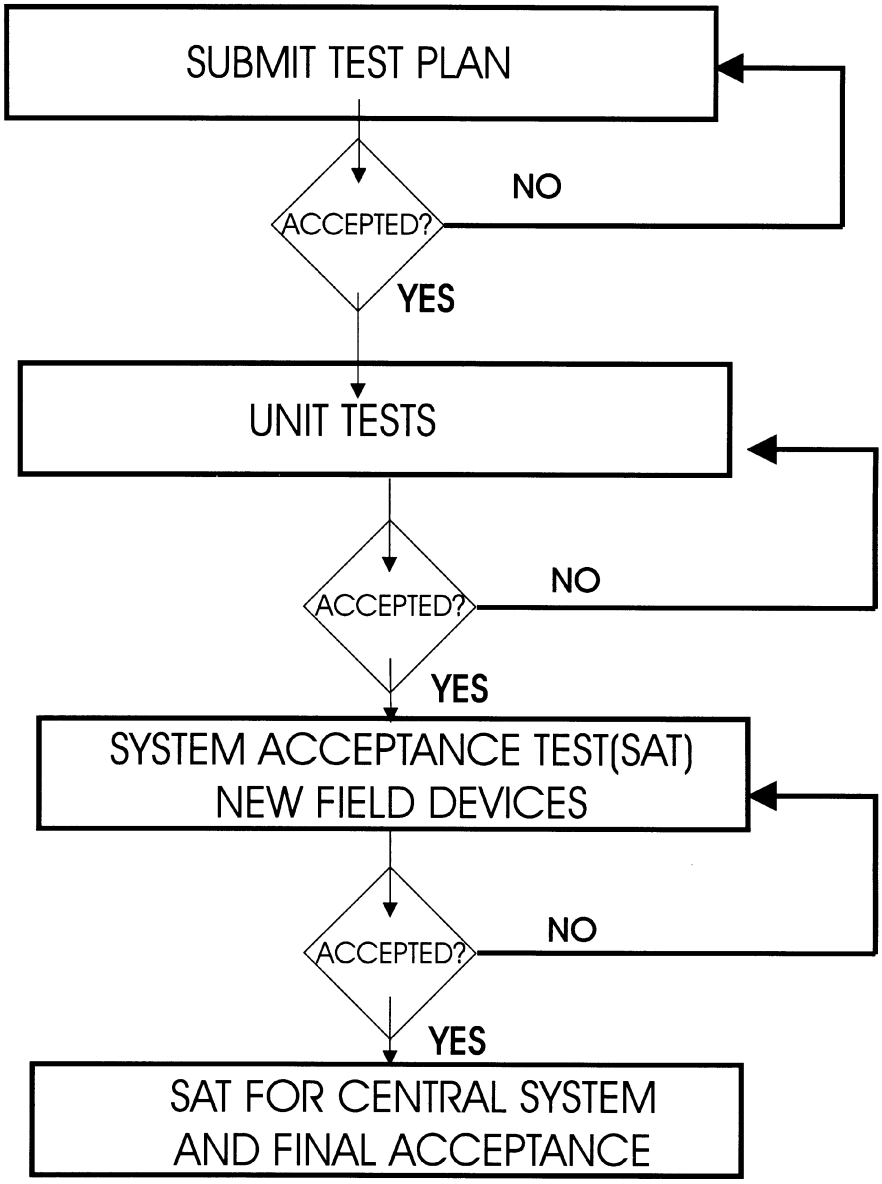
Splice points, branch circuits, fiber number and patch panel connector assignment shall be included on engineering and plans of record drawings.

During the final testing, the Contractor shall record the sequential meter markings at each splice point in the cable on the plans of record provided to the Department.

Plans of record shall include field and central connection details for all new and relocated devices. The Contractor shall submit plans of record to the Engineer for review and approval.

# APPENDIX

# TEST PROCEDURES



## Pavement Scope: (5/04/01) TMH

Rehabilitate existing mainline pavement by milling to a depth of 60 mm and replacing with 80 mm of I19.0D. Overlay with 80 mm of S12.5D. All punchouts and other areas of high severity distress are to be patched with B25.0C and capped with 1 lift (40 mm) of S12.5D. In patching the existing pavement, the Design-Build team shall remove the asphalt and concrete to the depth of the top of the aggregate base. Areas of pavement patching will be proposed by the Design-Builder and subject to the approval of the Engineer. **All pavement repairs are to be completed before milling begins.**

Pavement design to be used for I-77 widening, shoulder construction, ramps, and y-lines are shown in the table below. Where stabilization is shown, the subgrade is to be stabilized with either lime to a depth of 200 mm or cement to a depth of 175 mm.

| Line | Surface | Intermediate | Base | Stabilization |
|---|---|---|---|---|
| I-77 Mainline & Shoulders | 80 mm S12.5D | 80 mm I19.0D | 290 mm B25.0C | Yes |
| I-85 NB to I-77 NB Ramp | 80 mm S12.5C | 100 mm I19.0C | 230 mm B25.0C | Yes |
| I-85 SB to I-77 SB Ramp | 80 mm S12.5C | 100 mm I19.0C | 230 mm B25.0C | Yes |
| Harris Blvd / Reames Rd. Widening | 80 mm S12.5C | 100 mm I19.0C | 130 mm B25.0C | Yes |
| Harris Blvd Loop to SB I-77 | 80 mm S12.5B | 100 mm I19.0B | 80 mm B25.0B | Yes |
| EB Reames Rd to NB I-77 | 80 mm S12.5B | 100 mm I19.0B | 80 mm B25.0B | Yes |

Undercut excavation may be required when pavement removal is done.

The Design/Build team will be responsible for design of all temporary pavements and for the evaluation of existing shoulders regarding their suitability for carrying traffic during construction. Temporary pavements will be designed in accordance with the most recent version of the NCDOT Interim Pavement Design Procedure. Temporary pavement designs are to be submitted for review and comment using the contract submittal process. The expected duration for traffic on the temporary pavement must be included as part of the submittal.

**SOILS AND FOUNDATION DESIGN SCOPE OF WORK:**

I. GENERAL:

The Design/Build (D/B) team shall obtain the services of a firm prequalified for geotechnical work from the Highway Design Branch List. This firm or the geotechnical engineer employed by this firm shall have previous experience with designing foundations for the NCDOT Soils and Foundation Design Section. A Foundation Design Recommendation Report shall be prepared by this prequalified geotechnical firm for use by the D/B team in designing structures, embankments, retaining walls, noise walls and temporary structures for this project. All subusurface investigation or laboratory testing shall be performed by a prequalified geotechnical firm in accordance with the current NCDOT *Geotechnical Unit Guidelines and Procedure Manual*.

II. DESCRIPTION OF WORK:

All design methodology and soil parameters for any geotechnical analysis or design shall be submitted with the Design-build Bid Package. All designs of foundations, slopes, retaining walls, noise walls and temporary structures shall be in accordance with the current AASHTO *Standard Specifications for Highway Bridges*, NCDOT *Structure Design Manual* and NCDOT *Roadway Design Manual*. Designs shall also be in accordance with the Soils and Foundation Design Section *Roadway and Structure Foundation Guidelines*.

A. Structures

Two existing bridges for I-77 over Colonial Pipeline will be widened. Per Colonial Pipeline, driving or vibration of piles or sheeting is not allowed for any interior bents of these bridges.

If spread footings are selected for any of the bridges, the bottom of footing elevation shall be at or below the weathered rock elevation.

Foundations shall be designed for service loads using allowable stress design. The ultimate bearing capacity of all driven piles will be determined by "Method B - Wave Equation Analysis" outlined in Division II, Section 4.4 of the current AASHTO *Standard Specifications for Highway Bridges*.

Drilled pier and pile bent foundations shall be analyzed using COM 624, Lpile, Florida Pier or FB-Pier. All drilled piers shall be "fixed" such that an increase in pier length will not significantly reduce the top deflection.

B. Roadway

All unreinforced fill slopes shall be 2:1 or flatter and shall have a minimum stability factor of safety of 1.3. All cut slopes shall have a minimum stability factor of safety of 1.5. Limiting equilibrium methods, such as Modified Bishop, Simplified Janbu, Spencer or any other generally accepted method, shall be used for slope stability analysis.

Retaining walls or reinforced slopes shall be designed and constructed as necessary to avoid right-of-way impacts. Modular block walls may not be used as critical structures. A critical structure is defined as a wall supporting interstate highways, bridge abutments and wing walls as well as walls over 6 meters in height.

Noise walls shall be designed in accordance with 1992 AASHTO *Guide Specifications for Structural Design of Sound Barriers.*

Embankments shall be designed and constructed such that 90% of primary consolidation occurs before paving. Reinforced bridge approach fills in accordance with the NCDOT standard are required for both end bents on all bridges.

C. Temporary Structures
Design of temporary retaining structures, which include earth retaining structures and cofferdams, shall be in accordance with Section 4 of the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works.*

III. SUBMITTALS
The Foundation Design Recommendation Report as well as any retaining walls, reinforced slopes or temporary structure designs shall be submitted for review to the NCDOT Soils and Foundation Design Section. Submittals shall include 100% complete full size plans, special provisions and calculations. Upon request, the NCDOT Soils and Foundation Design Section will furnish generic special provisions for submittals, if available. The D/B team shall make changes/corrections to plans and special provisions as directed by NCDOT. All submittals including the Foundation Design Recommendation Report, plans, special provisions and calculations shall be sealed by a professional engineer licensed in the state of North Carolina.

IV. CONSTRUCTION REQUIREMENTS:
All construction and materials shall be in accordance with the NCDOT 1995 *Standard Specificat*ions and the current NCDOT *Project Special Provisions.*

Settlement plates shall be used to verify that 90% of the primary consolidation has occurred before paving. The settlement plates shall be surveyed weekly and the measurements shall be recorded on forms provided by the NCDOT.

The D/B team shall provide quality control for the bridge foundations including pile driving records and drilled pier inspection forms (NCDOT will provide standard forms). Bearing on weathered rock for spread footings shall be verified in the field during construction.

Copies of any inspection forms relating to foundations, settlement or retaining walls shall be sent to the NCDOT Soils and Foundation Design Section. Non-destructive testing (NDT) on any drilled piers will be performed by the NCDOT. See Drilled Piers Special Provision for details.

ROADWAY AND STRUCTURE FOUNDATION GUIDELINES:

The Design-Builder shall be responsible for (but not limited to) addressing the following items for the roadway and structure foundation design of the project.

1. Analyze the stability of embankments and utilize recognized geotechnical engineering designs and construction methods to ensure embankment stability.
2. Analyze embankment settlement and if necessary, recommend mitigation through the use of surcharges, waiting periods and/or excavation of compressible material.
3. Address the following regarding embankment problems:
    a. The feasibility of using geo-textiles to achieve stability, reduce excavation of soft soils and reduce the effect of settlement on the roadway.
    b. The feasibility of using wick drains to speed up the rate of consolidation of compressible soils beneath embankments.
    c. The need for settlement gages, slope inclinometers and other embankment monitoring devices and their placement and location.
4. Determine the feasibility and recommend types of retaining walls or sheeting for permanent or temporary situations and evaluate the following items:
    a. Internal and External Stability
    b. Bearing Capacity
    c. Construction Procedure
    d. Settlement
    e. Drainage
5. Determine amount of and recommend methods to mitigate any differential settlement problems at locations of culverts and utilities.
6. Analyze the stability of cut sections. Utilize recognized geotechnical engineering designs and construction methods to ensure cut slope stability.
7. Analyze the stability of roadway approaches (to the distance from the bridge that affects the stability and design of the bridge foundations) and particularly the end slopes under the bridge, utilizing recognized geotechnical engineering designs and construction methods to ensure stability.
8. Recommend pile, drilled pier or spread footing foundations for structures with regard to bearing capacity, settlement, constructability and lateral stability.
9. Recommend allowable bearing pressure for spread footings considering bearing, settlement, adjacent foundations, water table, etc.
10. Address the following regarding pile and/or drilled pier foundations:
    a. Method of support – skin friction, end bearing or combination.
    b. Tip elevations.
    c. Allowable load.
    d. Settlement.

e. Number and location of test piles or piers, load tests and/or dynamic testing for piles.
f. Wave equation analysis using an appropriately chosen pile hammer and cushion material for piles.
g. Pile points.
h. Effects of pile driving or drilled pier installation on adjacent construction or existing structures.
i. Negative skin friction for piles.
j. Lateral stability and allowable horizontal deflections.
k. Point of fixity or point of rotation.
l. Lateral squeeze for piles.

11. The Design-Builder shall include in the geotechnical recommendations report a summary table of the bridge foundation recommendations including the following:
    a. State project number, TIP number, county, description, bridge station.
    b. Bent stations, types of foundations, allowable loads, bottom of cap or footing elevations, pile lengths, tip elevations.

12. The following items, when applicable, shall be addressed as notes on plans or comments and attached to the summary table:
    a. End slope and extent and type of slope protection.
    b. Waiting periods.
    c. The necessity of battered piles
    d. Point of fixity or point of rotation elevations.
    e. Minimum tip elevations.
    f. Steel pile points for steel piles or steel pile tips for concrete piles.
    g. The number and location of test piles and/or dynamic testing.
    h. Required rock socket for drilled piers.
    i. Range of allowable hammer energies for concrete piles.

    Any other items affecting the foundation of the structure should be addressed on the summary sheets and all final recommendations should be included on the summary sheets.

The Design-Builder's attention is directed to the latest design guide entitled *Soils and Foundations Workshop Manual*, NHI Course No. 13212, Publication No. FHWA HI-88-009, published by the FHWA.

## TRAFFIC CONTROL PLAN SCOPING DETAILS:

### I. GENERAL REQUIREMENTS

#### 1-TRAFFIC CONTROL PLANS

Design and prepare the Traffic Control Plan for the project. The Traffic Control Plan must be submitted to NCDOT for review and approval. Comply with the time-frame specified in the project schedule for the review and return of the Traffic Control Plan. Development of the Traffic Control Plan should proceed as follows:

- Submit for approval a Staging Concept for construction of the project. A Staging Concept is a description of the sequenced phases and steps to be followed in implementing the construction plans. The Staging Concept must be approved before proceeding further with the development of the Traffic Control Plan.

- Construction can proceed only with an approved and sealed Traffic Control Plan, including phasing. A total Traffic Control Plan set will not be required to begin phased construction activities on this project. Upon approval of the Staging Concept, proceed with the development of the Traffic Control Plan for each Phase. Construction can begin on a Phase once the Traffic Control Plan for that Phase has been approved and sealed.

The Traffic Control Plan will include lane closures, detours, temporary pavement construction, traffic control devices, temporary lane markings, construction signing and sequencing notes. The plan will identify lane widths, transition taper widths and any geometry necessary to define temporary roadway alignments, including crossovers. The plan will address the pavement design to be used for temporary roadway pavements and the riding surface for temporary patterns on existing/proposed roadways. North Carolina Department of Transportation Roadway Standard Drawings for Traffic Control will be incorporated into the plans for most work activities and detailed phasing plans will be required where traffic control activities and device placement cannot be entirely covered by these standard drawings.

Develop Traffic Control Plan details to be at a scale of 1:500 unless otherwise agreed upon (overviews should be at a scale of 1:2000). The North Carolina Department of Transportation's Traffic Control Web Page should be utilized when developing the Traffic Control Plan. The Traffic Control Web Page is continuously updated and provides key information necessary in preparing the Traffic Control Plan. For any additional information, contact the Traffic Control Section at (919) 250-4159.
Website Address: http://www.doh.dot.state.nc.us/preconstruct/traffic/congestion/tc/

Coordinate with the Engineer to promote public awareness for this project. Hold coordination meeting with the NCDOT one month prior to beginning of construction. The NCDOT will be responsible for the initial public information effort through it's IMPACT team. Once the project is announced formally to the public, it will be the Design-Builder's responsibility to hold public meetings and press conferences, making media announcements, distributing flyers, and posting advertisements.

In addition, inform the following groups at least 2 weeks in advance of any construction activities which will have significant impact on the public:
Governmental agencies, municipalities directly affected by the construction, transportation services, emergency services, neighborhood groups, private homes, industry and businesses, and any other organization as deemed necessary by the Engineer.

Use traffic control devices that conform to all NCDOT requirements and are listed on the Department's Approved Products List. Traffic counts will be provided for use during development of traffic control plans and to verify time restrictions listed under project requirements

**2-FINAL PAVEMENT MARKING PLANS**

Prepare Final Pavement Marking Plans at a scale of 1: 500 unless otherwise agreed upon. Plans will consist of typical plans for installation (NCDOT Roadway Standard Drawings for Pavement Markings will be used where applicable). Prepare detailed plans showing lane lines, edge lines, gore markings, stop bars, symbols and word messages, crosswalks and other appropriate markings. In addition, prepare detailed plans for all signalized intersections and any locations where North Carolina Roadway Standard Drawings do not completely describe the required markings.

Use pavement marking products listed on the Department's Approved Products List and install according to the NCDOT Specifications and in accordance with manufacturer's requirements. For any additional information, contact the Traffic Control Section at (919) 250-4159.

## II. PROJECT REQUIREMENTS

The following requirements apply at all times for the duration of the construction project.

### TIME RESTRICTIONS

A) Maintain 2 lanes of traffic in each direction of **I-77 and I-85 including Ramps & Loops** as follows:

Monday-Sunday 7:00am-8:00pm

The Liquidated Damages are Ten Thousand Dollars ($10,000) per hour.

B) Do not stop traffic or close road on **I-77 and I-85 including Ramps & Loops** as follows:

Monday-Sunday 6:00am-12:00am (midnight)

The Liquidated Damages for closing **I-77 and I-85 including Ramps & Loops** between 6:00am-12:00am (midnight) are Two Thousand Five Hundred Dollars ($2,500) per 15 minutes.

- Do not stop traffic between the hours of 12:00 am (midnight) and 6:00am for more than 15 minutes on **I-77 including Ramps & Loops** for any operation requiring a road closure.

The Liquidated Damages are Two Thousand Five Hundred Dollars ($2,500) per 15

minutes.

- Do not stop traffic between the hours of 12:00 am (midnight) and 6:00am for more than 15 minutes on **I-85 including Ramps & Loops** for any operation requiring a road closure.

The Liquidated Damages are Two Thousand Five Hundred Dollars ($2,500) per 15 minutes.

However, a 30 minute road closure between the hours of 12:00 am (midnight) and 6:00am is allowed to hang girders over **I-85 including Ramps and Loops**.

The Liquidated Damages are Five Thousand Dollars ($5,000) per 30 minutes.

C) Do not conduct multi-vehicle hauling during peak hours on **I-77 and I-85 including Ramps & Loops** as follows:

SB I-77: Monday-Sunday 6:00am-9:00am
NB I-77: Monday-Sunday 3:00pm-7:00pm
SB and NB I-85: Monday-Sunday 6:00am-12:00am (Midnight)

Submit to the Traffic Control Section a detail plan for work zone access. Multi-vehicle hauling on NB and SB I-77 during daytime non-peak hours can begin once the work zone access plan has been approved. Otherwise, Multi-vehicle hauling will be restricted on NB and SB I-77 between the hours of 8:00 pm and 6:00am.

D) Do not close or narrow travel lanes on I-77 and I-85 **including Ramps & Loops** during holidays and special events as follows:

Holiday

For New Year's, between the hours of 7:00 am December 31st to 8:00 pm January 2nd. If New Year's Day is on a Saturday or a Sunday, then until 8:00 pm the following Tuesday.

For Easter, between the hours of 7:00 am Thursday and 8:00 pm Monday.

For Memorial Day, between the hours of 7:00 am Friday to 8:00 pm Tuesday.

For Independence Day, between the hours of 7:00 am the day before Independence Day and 8:00 pm the day after Independence Day.

If Independence Day is on a Saturday or Sunday, then between the hours of 7:00 am the Thursday before Independence Day and 8:00 pm the Tuesday after Independence Day.

For Labor Day, between the hours of 7:00 am Friday to 8:00 pm Tuesday.

For Thanksgiving, between the hours of 7:00 am Tuesday to 8:00 pm Monday.

For Christmas, between the hours of 7:00 am the Friday before the week of Christmas Day and 8:00 pm the following Monday after the week of Christmas.

For any Nascar Car Race at the Lowe's Motor Speedway, between the hours of 6:00 am the Thursday of the week of the race until 8:00pm the following Monday after the race.

For any Carolina Panthers game in Charlotte, from 3 hours before the game until 3 hours after the game.

For any special events which create unusually high traffic volumes, between the hours of 7:00 am the Friday of the week of the event and 8:00 pm the Monday after the week of the event. Such events may be at Ericson Stadium, the Charlotte Convention Center, or other arena. The Engineer will provide guidance on what events constitute unusually high traffic volumes.

The Liquidated Damages are Ten Thousand Dollars ($10,000) per hour.

## LANE CLOSURE REQUIREMENTS

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

F) Close the open travel lane adjacent to the work area when personnel and/or equipment are within 1.5m of the open travel lane on an undivided facility or within 3m of the open travel lane on a divided facility. Use Roadway Standard No. 1101.02 unless the work area is protected by barrier or guardrail.

G) When work is being performed behind a lane closure on one side of the travelway, do not perform work involving heavy equipment within 5m of the edge on the opposite side of the travelway.

H) Do not install more than 4.8 km of lane closure on I-77 and I-85, measured from the beginning of the merge taper to the end

of the lane closure. Place sets of three drums perpendicular to the edge of the Travelway on 150m centers in the closed travel lane. These drums shall be in addition to channelizing devices.

I) Do not install more than 1 simultaneous lane closure in any one direction on I-77 and I-85.

J) Maintain a minimum width of 3.3 m on all open lanes of I-77 and I-85. A minimum 0.6m offset from the edge of travel to any Traffic Control Device is required at all times.

If 3.3m lanes are used on I-77 or I-85, an oversize, overwidth detour is required. If 3.3m lanes are used, provide an oversize, overwidth detour signs and route in coordination with the oversize/ overwidth permit section.

## PAVEMENT EDGE DROP-OFF REQUIREMENTS

K) Backfill at a 6:1 slope up to the edge and elevation of existing pavement in areas adjacent to an open travel lane that has a drop-off as follows:

Backfill drop-offs that exceed 50mm on roadways with posted speed limits of 72 km/hr (45 mph) or greater.

Backfill drop-offs that exceed 75mm on roadways with posted speed limits less than 72 km/hr 45 mph.

Backfill with suitable compacted material, as approved by the engineer, at no expense to the department.

L) Do not exceed a difference of 40mm in elevation between open lanes of traffic.

## TRAFFIC PATTERN ALTERATIONS

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

## SIGNING

N) Provide Permanent Signing within and off the project limits.

O) Provide Detour Signing within and off the project limits.

P) Cover or remove all Detour Signs within and off the project limits

when a detour is not in operation.

Q) Insure all necessary signing is in place prior to altering any traffic pattern.

## TRAFFIC BARRIERS

R) Protect the approach end of portable concrete barrier at all times during the installation and removal of the barrier by either a truck-mounted impact attenuator or a temporary crash cushion.

Offset the approach end of portable concrete barrier a minimum of 10m from oncoming traffic or protect at all times by a temporary crash cushion.

Install portable concrete barrier with the traffic flow, beginning with the upstream side of traffic. Remove portable concrete barrier against the traffic flow, beginning with the downstream side of traffic.

Install drums on 30m centers to close or keep closed the section of the roadway until the barrier can be placed or after barrier is removed.

Offset the Portable Concrete Barrier a minimum of 0.6m from the edge of travel on I-77 and I-85.

## TRAFFIC CONTROL DEVICES

S) Space channelizing devices in work areas equal in meters to 2/3rds the posted speed limit, except 3m on-center in radii and 1m off the edge of an open travelway, when lane closures are not in effect.

T) Place type III barricades, with Road Closed Sign R11-2 attached, of sufficient length to close entire roadway. Stagger or overlap barricades to allow for ingress or egress.

U) Place sets of three drums perpendicular to the edge of the Travelway on 150m centers when unopened lanes are closed to traffic. These drums shall be in addition to channelizing devices.

## PAVEMENT MARKING AND MARKERS

V) Install pavement markings and pavement markers on the final surface of **I-77 and I-85 including Ramps & Loops** as follows:

150mm Wide Thermoplastic Snowplowable

W) Install pavement markings and pavement markers on interim layers of pavement on **I-77 and I-85 including Ramps & Loops** as follows:

150mm Wide Paint/Tape Temporary Raised

X) Tie proposed pavement marking lines to existing pavement marking lines.

Y) Replace any pavement markings that have been obliterated by the end of each day's operation.

Z) Place two applications of paint on new asphalt with temporary traffic patterns which will remain in place over three (3) months. Place the second application of paint upon ample drying time of the first.

## MISCELLANEOUS

AA) A "Rolling Road Block" may be used on I-77 and I-85. Use two trucks with "Pilot Car Follow Me" signs and rotating beacons to slow traffic. Maintain a minimum speed of 32km/hr (20 mph) for the "rolling road block". Close the on-ramps or stop on-ramp traffic when the "rolling road block" is used in the vicinity of the ramps. Place changeable message signs flashing the message "slow-moving traffic ahead" 3.2 km (2 miles) in advance of the "rolling road block" vehicles.

AA)Police may be used to maintain traffic during traffic shifts.

BB) Install all work zone warning signs no more than 3 days prior to the beginning of work on I-77 and I-85.

CC) Provide towing of disabled vehicles at all times on this project including a safe area away from construction work to place vehicles when towed.

DD) When portable concrete barrier is placed on the outside shoulder of the project, provide a 4m shoulder at least 60m in length every mile to be used as a vehicle breakdown area.

EE) Provide portable temporary lighting to conduct night work on I-77 and I-85 in accordance with the NCDOT Standard Specifications for Roads and Structures.

Revised 8-24-01

**STRUCTURES SCOPE OF WORK :**

Design shall be in accordance with AASHTO, NCDOT Structure Design Manual, and NCDOT Bridge Policy Manual. Construction and Materials shall be in accordance with NCDOT Standard Specifications and NCDOT Structure Design Unit Project Special Provisions and NCDOT Structure Design Unit Standard Drawings.

Bridge 308 I-77 NBL over I-77 SBL

- Replace bridge on new alignment. Width shall be in accordance with the Roadway Typical Section. Bridge length shall provide for an additional lane on I-77 SBL.

Bridge 303 I-77 SBL over I-85

- Widen bridge to required width in accordance with the Roadway Typical Section.
- Widen existing approach slabs.
- Rolled beams or plate girders can be used to widen the bridge.

New Structure Ramp E over I-85

- Provide new structure. Width shall be in accordance with the Roadway Typical Section.

Bridges 351 (I-77 NBL) and 352 (I-77 SBL) over the Colonial Pipe Line

- Widen bridges to required width in accordance with the Roadway Typical Section. Details for continuous for live load for the widened portion shall match the existing details.
- Widen existing approach slabs.
- Utilize drilled shaft foundation for widening existing bents.
- Perform Class I, IA, and IB surface preparation on the existing bridge decks and approach slabs. The widened portion of the bridge decks and approach slabs shall also be scarified using Class I and IA surface preparation. The existing bridge decks and approach slabs and widened bridge decks and approach slabs shall be overlaid with a minimum 32 mm of latex modified concrete. The approach roadway asphalt pavement shall be placed to provide a smooth transition to the bridges taking into account the increase in grade due to the latex modified concrete overlay.

**Bridge 349 (SR 2113 over I-77)**

- Widen bridge to required width in accordance with the Roadway Typical Section.
- Widen existing approach slabs. (Statement about minimum vertical clearance removed.
- Rolled beams or plate girders can be used to widen the bridge.

**Bridges 303, 308, and 349**

- The paint system on the existing structural steel for these bridges contains lead and Article 107-1 of the Standard Specifications shall apply. Any costs resulting from compliance with applicable state or federal regulations pertaining to handling of materials containing lead based paint shall be included in the lump sum bid for the project.

Box Culvert Extensions

- Extend existing concrete box culverts as required to achieve proposed roadway widths and alignments.

## SCOPE OF LIGHTING/ELECTRICAL WORK:

REVISED FINAL DRAFT: AUGUST 22, 2001

**OVERVIEW**

Design, build and inspect roadway lighting equipment necessary to replace existing equipment in conflict with construction, and maintain the lighting system(s) for the duration of the project. The project includes renovating the remaining roadway lighting equipment that is not in conflict with construction, including new control systems, new circuitry in conduit and high-pressure sodium luminaires. Prepare PS&E in accordance with Section 1400 of the Standard Specifications, and accompanying portions of the Standard Drawings. Provide any Project Special Provisions, special details and non-standard pay items that may be required. Submit catalog cuts for proposed materials, in accordance with section 1400-3 of the Standard Specifications. A Professional Engineer must seal submittals for high mast light standards. Provide final lighting plans on separate "For Lighting Construction Only" plan sheets. Provide "As-Built" plans, if field changes are required during construction. Submit photometric calculations, preliminary design and special provisions, along with other interim plan review documents.

Photometric calculations consist of computer-generated spacing charts or foot-candle and uniformity graphs that demonstrate how the proposed lighting system will illuminate the proposed roadway typical sections. Include the future HOV lane as a travel lane to be illuminated. Templates may be used to design lighting provided by high mast light standards.

**CONSTRUCTION CONFLICTS**

Existing roadway lighting is in conflict with construction at three interchanges within the limits of the project. Upon request, DOT will provide copies of plans showing the existing lighting system as it was proposed when originally installed. Determine what lighting system equipment is in conflict with construction. Remove the affected light standards, arms, luminaires, and high mast standards with luminaires and lowering devices, and deliver them in good condition to the

Huntersville maintenance yard. Abandon, or remove and dispose of, existing concrete foundations and circuitry in conflict.

Install new light standards and high mast light standards to replace equipment in conflict with construction. Use Equipment that is comparable to existing equipment that is not in conflict. Use breakaway couplings or bases meeting current AASHTO requirements. Provide luminaires, lamps, arms and lowering devices, along with required circuitry in conduit. Design the new lighting in accordance with AASHTO recommended light levels and uniformity ratio, for the proposed roadway lane configuration and interchange design. Design circuitry for a maximum of 3% voltage drop per feeder circuit.

**RENOVATION**

This work involves equipment and circuitry that are not in conflict with construction, but are part of the existing lighting at each interchange. At the I-85/I-77 interchange, confine the renovation to the equipment powered from the three control systems inside the Ramp terminals. Renovate all DOT owned and maintained lighting at the Sunset Rd. and Harris Blvd. interchanges. Determine if there are any missing or damaged poles, foundations, arms, or high mast standards and lowering devices. Replace the damaged or missing equipment. Abandon or remove existing circuitry, and replace all circuitry with new copper conductors in conduit. Replace all lighting control systems. Remove any salvageable control system equipment, and deliver it in good condition to the Huntersville maintenance yard. Replace all cobra-head luminaires and high mast luminaires, and install high-pressure sodium lamps.

**MAINTENANCE**

Phase lighting construction to allow existing lighting to remain in operation as long as possible. Make all reasonable efforts to prevent "dark spots" in the lighting systems. Assume responsibility for routine maintenance of the lighting systems for the duration of the contract. DOT will continue to pay the monthly power bills. DOT will assume maintenance responsibility for the completed lighting systems after the project is accepted, and there is no chance of construction-related damage.

## SIGNING SCOPE OF WORK:

General: Upgrade the signing on the mainline and y-lines within the project limits in accordance with the 2000 Edition of the MUTCD and the North Carolina Supplement to the MUTCD. Signing plans may extend beyond project limits, if a sign message is needed to give motorist ample warning or guidance. Please refer to the attached guidelines for preparing signing plans. Signs will be furnished by the Department. Department Furnished signs specification is available on the Departments ftp site.

-L- Signing

All advance guide sign messages will need to be erected on overhead sign structures due to additional lanes. Any signs that have supports attached to existing overhead bridges will be replaced with overhead sign structures. Replace ground-mounted signs (supplemental guide signs, types D, E and F signs) and supports. Any signs (i.e. Logo signs) that are not to be replaced but may need to be relocated due to construction shall be the responsibility of the DESIGN-BUILD FIRM to determine the new locations and design the new supports. For the interchanges on I-77 near the proposed Charlotte Outer Loop project, the DESIGN-BUILD FIRM shall design the overhead structures to accommodate future advance guide signs for the Outer Loop. NCDOT is currently designing the signing for the Charlotte Outer Loop and will provide the information to the DESIGN-BUILD FIRM upon completion for inclusion in the plans. All future sign locations (overheads and ground-mounted supplemental guide) for the Outer Loop interchange will be noted on the signing plans.

-Y- Signing

Replace all ramp and y-line ground-mounted signs (supplemental guide signs, types D, E and F signs) and supports. Any signs that are not to be replaced but may need to be relocated due to construction shall be the responsibility of the DESIGN-BUILD FIRM to determine the new locations and design the new supports. If necessary, the DESIGN-BUILD FIRM will need to determine if new overhead structures are needed or if proposed signs can be erected on any existing structures.

**DMS Locations**

Design and construct four DMS ( three new DMS' and one existing DMS) locations and appropriate connections. The proposed location of DMS-1 will be on northbound I-77 approximately 951 meters south of mile-marker 17. The proposed location of DMS-2 will be on southbound I-77 approximately 97 meters south of mile-marker 22. The proposed location of DMS-3 will be on I-77 northbound approximately 420 feet north of the existing pedestal mounted DMS between Exits 11 and 12. One existing DMS structure located on the I-77 southbound lane in advance of the I-85 interchange will need to be remounted on a new structure due to the widening. The DESIGN-BUILD FIRM will need to design the appropriate structure, footings, and connections. A copy of a generic DMS specification will be available electronically to the DESIGN-BUILD FIRM to use in the development of the DMS specifications. The DESIGN-BUILD FIRM is responsible for coordinating with Division 10 and the Metrolina Regional Transportation Management Center (MRTMC) to ensure the compatibility of the new DMS software, hardware and systems with the existing DMS system and Control Software. The DESIGN-BUILD FIRM in coordination with Division 10 and MRTMC shall determine the existing hardware and software package(s)that shall control and communicate with the new DMS systems. The DESIGN-BUILD FIRM shall coordinate with and provide necessary documentation and materials (hardware specifications, communication protocols, driver files, and etc.) on existing hardware/software to the new DMS systems' manufacturer to ensure design, development, installation, and integration of new DMS systems that are 100% compatible with the existing systems in operation. The DESIGN-BUILD FIRM shall define a comprehensive integration and test plan in the DMS specifications. This integration and test plan shall ensure that the newly installed DMS systems function properly and without errors using

the identified existing hardware and software package(s). Furthermore, the integration and test plan shall ensure that existing ITS systems and components shall not be negatively affected by the installation of new DMS systems.

## GUIDELINES FOR THE PREPARATION OF
### SIGNING PLANS

**I. Signing Information Available Electronically**

Non-proprietary computer software for support and sign design is available upon request. Please contact the designated Project Manager (PM) if the software is needed.

II. Description of Work Required of Design-Build Firm

An understanding of the signing sections of the MUTCD, NC Supplement to the MUTCD, NCDOT Standard Specifications, and NCDOT Roadway Standard Drawings are required for design and development of signing plans.

**A. Signing Plan Preparation:** Prepare signing plans (SP) on Microstation 95 or latest version used by NCDOT to include the following information and supporting documentation:

**1. General Requirements:** Accurate 1" = 100', (for metric projects 1:1000), CADD drawings of roadway plans, hereafter referred to as signing plan view sheets, which show pavement, paved shoulders, bridges, culverts, guardrail, drainage pipe, survey lines, right-of-way lines, stationing as labeled on roadway plans, equalities, north orientation for each sheet, signalized intersections labeled, beginning Signing project station, and ending Signing project station. Proposed traffic flow arrows shall be shown on these sheets at the beginning and end of each sheet, at overhead sign locations, and following any lane transitions.

**2. Sign Locations:** Locations of re-erected existing signs, existing signs remaining in place, proposed signs, and future signs by station on L-lines, Y-lines, and ramps is required except when stationing is not available. When stationing is not available, such as outside of the project limits, signs are required to be dimensioned from a fixed point or sign spacing shall otherwise be indicated on plans. Graphic representation of all existing, proposed, and future signs on the L-lines, Y-lines, and ramps are to be positioned on the plans as traffic would see them.

**3. Sign Design:** Sign designs showing all sign face fabrication details are required. Signs shall be designed to accommodate future messages when necessary. (Sign design spreadsheet is available electronically through FTP.)

**4. Ground Mounted Support Design for Type A and B Signs:** Determination of S dimensions from X-sections (or from field survey when X-sections are not available) is required for Type A and B ground mounted signs. Design of supports is required using these S dimensions. Support chart

including support sizes, lengths, and weights, for all Type A and B ground-mounted signs is required. (Spreadsheets are available electronically through FTP.)

**5. Special Provisions:** Project Special Provisions for special signing items are required to be written by the DESIGN-BUILD FIRM, unless previously written and sealed by NCDOT. When written by the DESIGN-BUILD FIRM, these provisions are required to be sealed by a Professional Engineer of the DESIGN-BUILD FIRM. For the DESIGN-BUILD FIRM reference, the Project Special Provisions written and sealed by the Department are included in the files available upon request.

**6. Overhead Sign Assembly:** An overhead sign assembly cross-section sheet is required for each overhead sign assembly, hereafter referred to as a structure line drawing. These sheets include lane widths, slopes, location of supports, S dimensions at support locations, positioning of signs relative to travel lanes, sign messages and / or future messages, future signs, vertical clearance, existing and proposed guardrail, walkway detail (if required), labeling of facility and direction of travel, windload and deadload requirements to be used for the design of structure and footings, and all applicable notes.

**7. Lighting Design Sheets by NCDOT:** Lighting system design sheets prepared and sealed by NCDOT will be provided to the DESIGN-BUILD FIRM for inclusion in final plans.

**B. Signing Plan Submittals:** The DESIGN-BUILD FIRM shall make submittals according to the guidelines set by the Project Manager to be review by the Traffic Engineering and Safety Systems Branch Signing Section. Below are the recommended submittals for the signing plans:

Notes: 1) Prior to the Interim Plan Submittal, the Design–Build firm shall submit their signing concept for the proposed project. The concept shall show all existing and proposed advance guide and supplemental signs for the project. Once the concept has been submitted, the plans will be reviewed and commented on within ten working days. Once the plans have been reviewed, it may be necessary to schedule a meeting between the Design-Build Firm and the Signing Section to discuss any changes made to the concept.

2) An overview of the entire project (plan view sheets only) on 1 roll-out sheet may be requested by the NCDOT for one or more milestones in addition to or in lieu of ½ size prints.

3) Once signing plans have been submitted to the Signing Section, the plans will be reviewed and commented on within **fifteen working days** turnaround period.

**1. Interim SP review:** 2 (1/2 size) sets of Signing Plans (or 2 copies of roll out ½ size plan view) consisting of the signing plan view sheets with locations of all existing, proposed, future signs (including messages), and all necessary sign relocations in the format of the final product; sign designs; completed type E and F sign sheets; ground-mounted sign support chart with support designs and design calculation information (S-Dimension Worksheets) for proposed and relocated signs; structure line drawings completed in the format of the final product; quantities estimate and

computations; summary of quantities sheet with list of applicable Roadway Standard Drawings; and draft of Project Special Provisions (other than those prepared and sealed by NCDOT). The approval of this submittal shall complete 50% of the SP work.

Submittal of 1 (1/2 size) set of interim SP is required for approval by Signing Engineer, field personnel, and FHWA.

**2. Final Plan submittal:** Original sealed set of approved signing plans and 5 (1/2 size) bond copies, original quantities estimate and computations, sign designs in binder including cover sheet listing signs (form for cover sheet available electronically through FTP), original of all required Project Special Provisions sealed by Professional Engineer, design files on CD that have name of sealer, registration number, and date of sealing inserted where seal, signature, and date are located on original plans, and all other supporting documentation shall be submitted for final acceptance by the Signing Section of the Traffic Engineering and Safety Systems Branch. The approval of this submittal shall complete 100% of the SP work.

**C.** The Signing Section may require that certain items in the preparation of the signing plans conform to the methods currently in use by the Signing Section. The Signing Section may provide the DESIGN-BUILD FIRM with forms, charts, computer programs (except proprietary), or other information, and request that these items be used by the DESIGN-BUILD FIRM in the preparation of plans.

**D.** It shall be the responsibility of the DESIGN-BUILD FIRM that all signing (and components thereof) shall be designed in accordance with the "MUTCD for Streets and Highways", the "North Carolina Supplement of the MUTCD" and the "NCDOT Standard Specifications for Roads and Structures".

## III. Work Standards

**A.** The plans, sign designs, sign support designs, design and quantity calculations, project special provisions, any other supporting documentation, and design files on CD shall be submitted to the Department upon completion of the work and become the property of the Department.

**B.** All plan sheets shall conform to the requirements of the signing section. A 4 ½ " x 4 ½ " area for full size sheets, directly below the project information block in the upper right corner of all sheets, shall be left blank and unobstructed.

**C.** Project Special Provisions - the North Carolina Department of Transportation Standard Specifications for Roads and Structures, 1995*, and the Standard Special Provisions issued by the Division of Highways shall apply for materials and construction on all work described above. The DESIGN-BUILD FIRM shall prepare thorough and complete Project Special Provisions covering those items of material, work, and other conditions for the signing items of the project which are not covered at all, or not covered as desired in the Standard Specifications or Standard Special

Provisions. These Project Special Provisions shall be submitted for review at the time prints of final plans are submitted for review. The 100% submittal of these Project Special Provisions shall be sealed by a Professional Engineer employed by the DESIGN-BUILD FIRM.

The Standard Special Provisions prepared by NCDOT are available for viewing on the Department's electronic files through FTP. When required for the project, these provisions will be printed and sealed by NCDOT.

**D.** Overhead Sign Lighting Details will be made available on the Department's electronic files through FTP.

## HYDRAULICS DESIGN SCOPE OF WORK

All aspects of highway drainage design including but not limited to:

- Evaluate outside ditches to insure adequacy and upgrade only if needed.
- Median Drainage Design and analysis of existing crosspipes
- All design in accordance with criteria provided in the North Carolina Division of Highways "Guidelines for Drainage Studies and Hydraulics Design-1999" and the addendum "Handbook of Design for Highway Drainage Studies-1973"
- Box Culvert Extension
- Revise permit drawings after drainage design is complete
- Review Culvert Survey Reports and Storm Drainage Design caculations

## Construction Inspection

The Contractor shall employ a private engineering firm to perform Construction Inspection for all work required under this contract. This private engineering firm is to be a separate entity, unaffiliated with the Contractor in any way. Private engineering firms must be prequalified under the Department's normal prequalification procedures prior to bid submission. This Scope of Work describes and defines requirements for the construction inspection, materials sampling and testing, and technician level contract administration by the private engineering firm (commonly referred to as "Construction Engineering & Inspection" (CEI) firms) required for construction of this project.

A. General

A.1 The CEI firm shall be responsible for all construction inspection, field materials sampling and testing, and technician level contract administration for the construction of the project.

A.2 The CEI firm shall be responsible for all technician level construction administrative functions as defined in this scope of work and in accordance with the Department's Construction Manual and any other referenced manuals and processes.

A.3 The CEI firm shall utilize effective control procedures such that the construction of the project is performed in reasonably close conformity with the plans, specifications, and contract provisions.

A.4 The CEI firm shall be responsible for providing qualified technical personnel in appropriate numbers at the proper times such that all contract administration responsibilities are effectively carried out. Qualified technicians shall have all certifications necessary to perform the work required under this contract. For this project the CEI firm shall provide a maximum of 15 (fifteen) employees.

A.5 All work shall be performed in accordance with the established standard procedures and practices of the DEPARMENT. The CEI firm shall be familiar with Departmental standard procedures and practices as set forth in the Construction Manual and associated manuals and with informal procedures and practices for construction contract administration used by the DEPARTMENT. This includes adhering to all safety policies and procedures established by the DEPARTMENT. Failure on the part of the CEI Firm to perform this work as expected will result in suspension of all work on the project until adequate inspection processes are in place.

B. Work Standards

B.1 It shall be the responsibility of the CEI firm to ensure that the project is constructed in reasonably close conformity with the plans, specifications, and contract provisions.

B.2 The CEI firm shall document any observed omissions, substitutions, defects, and deficiencies noted in the work, take corrective action necessary, and advise the DEPARTMENT accordingly.

B.3 The CEI firm shall, in a timely manner make normal and routine project decisions consistent with the DEPARTMENT'S policies and procedures and general guidance by the DEPARTMENT'S Resident Engineer.

B.4 The CEI firm shall make and record such measurements as are necessary to assure that minimum sampling and testing requirements are being met and to calculate and document quantities for payment as required.

B.5 The CEI firm shall monitor on-site and off-site construction operations and inspect all materials entering into the work as required such that the quality of workmanship and materials is such that the project will be completed in reasonably close conformity with the plans, specifications, and other contract provisions. The CEI firm shall keep detailed, accurate records daily of construction operations and significant events that affect the work.

B.6 The standard procedures and practices of the DEPARTMENT for inspection of construction projects are set out in the DEPARTMENT'S Construction Manual. The CEI firm shall perform inspection, sampling and testing, and technician level contract administration in accordance with these standard procedures and practices and other accepted practices as may be appropriate.

B.7 The CEI firm shall perform field sampling and testing of component materials as described in the Minimum Sampling Guide and completed work items such that the materials and workmanship incorporated into the project are in reasonably close conformity with the plans, specifications, and contract provisions. CEI firm personnel performing sampling and testing must have appropriate certifications for each test that is performed.

B.8 The CEI firm shall perform all necessary review and inspection of the hot-mix asphalt roadway operations.

B.9 The CEI firm shall maintain, on a daily basis, a complete and accurate record of all activities and events relating to the project and a record of all construction work completed, including quantities of materials used and work accomplished in conformity with the DEPARTMENT'S policies and procedures.

B.10 The CEI firm shall prepare inspector's daily reports of the construction operations in accordance with the DEPARTMENT'S Construction Manual.

B.11 The CEI firm shall maintain records of all sampling and testing accomplished and analyze such records required such that acceptability of materials and completed work items is determined. The CEI firm shall furnish records on a weekly basis to the Department’s Resident Engineer for inclusion into the HiCAMS computer system.

B.12 The CEI firm shall, at a minimum, each month prepare a comprehensive tabulation of the quantity of each work item satisfactorily completed to date. Quantities shall be based on daily records or calculations. Calculations shall be retained. The tabulation will be submitted to the DEPARTMENT'S Resident Engineer who shall prepare and submit the progress payment estimate.

B.13 The CEI firm shall provide timely interpretations of the plans, specifications, and contract provisions. The CEI firm shall consult with the DEPARTMENT'S Resident Engineer when an interpretation involves complex issues or may have a

significant impact on the cost of performing the work or is known to be an area of dispute with the Contractor.

B.14 The CEI firm shall monitor each construction operation to the extent necessary to determine whether construction activities violate the requirements of any permits. The CEI firm shall notify the Contractor immediately of any violations or potential violations and require his immediate resolution of the problem. Permit violations shall be reported to the DEPARTMENT'S Resident Engineer immediately.

B.15 If ground disturbing activities are a part of this project, the CEI firm shall perform an erosion control inspection weekly and/or after every significant rainfall event. The list of deficiencies will be provided to the DEPARTMENTS' Resident Engineer as well as the Contractor's Project Manager. The CEI firm shall maintain an updated copy set of erosion control plans in accordance with DEPARTMENT policy.

C. Data and Services to be Furnished by the Department

C.1 The DEPARTMENT will furnish to the CEI firm Construction Manuals, Minimum Sampling Guides, Standard Specifications, project diaries, and any Departmental forms necessary for the performance of the Scope of Work.

C.2 The DEPARTMENT will perform Quality Assurance on a minimum of 10% of the samples taken. Samples shall be held at a secure site approved by the Engineer and made available for pick-up by NCDOT. The Department reserves the right to inspect any and all processes and procedures at any time.

**D. Miscellaneous Provisions**

D.1 The control and supervision of all phases of the Scope of Work performed by the CEI firm shall be under the direction of a Professional Engineer or a person with an acceptable combination of education and experience. The CEI firm shall assign at all times a staff of competent, qualified technicians adequate in number and experience to perform the described Scope of Work.

D.2 The CEI firm shall maintain all books, documents, papers, accounting records, and other information pertaining to costs incurred on this project and to make such materials available at its offices at all reasonable times during the contract period and for three (3) years from the date of final payment by the DEPARTMENT, the Federal Highway Administration, or any authorized representative of the DEPARTMENT or Federal Highway Administration. Copies thereof shall be furnished to the DEPARTMENT and/or Federal Highway Administration if requested.

D.3 Employees of the CEI firm or employees of any subconsultant for the CEI firm to provide inspection 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 the CEI firm from the DEPARTMENT'S list of prequalified Engineering Firms for Construction Engineering and Inspection.

D.4 The DEPARTMENT shall have the right to approve or reject any personnel, assigned to a project by the CEI firm.

The CEI firm or any subcontractor for the CEI firm which are employed to provide engineering SERVICES for this project shall not discuss employment opportunities or engage the services of any person or persons, in the employment of the Department, without written consent of the Department.

In the event of engagement, the CEI firms or their subcontractors shall restrict such person or persons from working on any of the CEI firms' contracted projects in which the person or persons were formerly involved while employed by the Department. The restriction period shall be for the duration of the contracted project with which the person was involved. "Involvement" shall be defined as active participation in any of the following activities:

- Drafting the contract;
- Defining the scope of the contract
- Selection of the CEI firms' firm for services
- Administration and/or inspection of the contract.

An exception to these terms may be granted when recommended by the Secretary and approved by the Board of Transportation.

Failure of the CEI firm to comply with the terms stated above in this section shall be grounds for termination of the subcontract on this project and/or not being considered for selection of work on future contracts for a period of one year.

E. Compensation

E.1 Compensation for Construction Inspection shall be included in the lump sum item for "Design, Construction and Inspection". Payment will be made based on a percentage of work performed.

E.2 Payment for "Design, Construction and Inspection" shall be full compensation for all work performed in accordance with this provision. This includes full payment for all vehicles, office space, inspection equipment, materials, training requirements, surveying equipment, and any other incidentals as may be necessary to accomplish this work.

F. Other

F.1 The Resident Engineer & the Assistant Resident Engineer will be Department employees maintaining their traditional duties and responsibilities.

F.2 All QMS asphalt lab Quality Assurance testing necessary for this project will be performed by the Department.

F.3 Materials sampling, testing, or approval required in state or out of state precast concrete, steel manufacturing, and other fabricating facilities where the Department's Materials and Tests Unit routinely performs these functions will continue to be performed by the Department.

F.4 DBE goals for this contract do not include participation by any DBE CEI firms. Contract goals must be met utilizing highway construction contractors.

## CEMENT AND LIME STABILIZATION OF SUB-GRADE SOILS:

### GENERAL

The scope of work consist of the following:

1. Sampling Sub-grade soils
2. Conducting Laboratory tests to determine:
   a. Soil classifications
   b. Moisture-density Characteristics
   c. Quantity of lime or cement required to achieve specified strengths
3. Designating areas to be stabilized by either lime or cement and the required rates of application.
4. Conducting field tests to determine unconfined compressive strength

**SAMPLING**

Take soil samples, after project has been graded to within 50± mm of final sub-grade elevation. Sample top 200 mm at a minimum frequency of one sample per 300 linear meters for classification tests and one sample per 1000 linear meters for moisture density tests and lime or cement mix design tests in each lane. Additional samples may be taken to ensure that all the

predominant soil types, limits of distribution of these soils and different site conditions have been represented.

**CLASSIFICATION TESTS**

Perform the following tests to determine AASHTO classifications of different soils in accordance with AASHTO specifications as modified by NCDOT. Copies of these modified procedures can be obtained from Materials and Test Unit's Soil Sub-unit.

TABLE 1

| TEST | AASHTO DESIGNATION |
|---|---|
| Dry Preparation of Disturbed Soils | T-87 |
| Particle Size Analysis of Soils | T-88 |
| Determining the Liquid Limit of Soils | T-89 |
| Determining the Plastic Limit and Plasticity Index of Soils | T-90 |

**MOISTURE DENSITY TEST**

Based on the criteria set in Table 2, below, perform the Moisture Density Tests, using either lime or cement. Use 10% cement by weight in soil cement, 4% lime by weight, in soil-lime mixtures. Conduct the tests in accordance to AASHTO T-99, and T-134 for soil-lime and soil-cement mixtures respectively. In each case determine the maximum dry density and optimum moisture content.

TABLE 2

**CRITERIA FOR SELECTING LIME OR CEMENT**

| PROPERTY | A | B |
|---|---|---|
| Percent passing #200 Sieve | 35 Max | 36 Min |
| Liquid Limit | 40 Max | 41 Min |
| Plasticity Index | 10 Max | 25 Min |

Use cement for all soils meeting criteria in Column "A"
Use Lime for all soils meeting criteria in Column "B"
Designer can choose either lime or cement for all soils not meeting all criteria in either column A or B.

DETERMINING THE APPLICATION RATES FOR SOIL-CEMENT AND SOIL LIME MIXTURES

## SOIL CEMENT

Make specimens at optimum moisture content using a quantity of cement in the range of 8 to 12 percent by weight. Compact the specimens to a minimum density of 95% of maximum Dry Density obtained using AASHTO T 134. Make a minimum of 2 specimens for each selected cement rate. Cure the specimens for 7 days in a moist room maintained at a temperature of 23 +/–1.5° C and a humidity of 100%. At the end of curing period, immerse the specimens in water for 4 hours, after immersion test the specimens using the unconfined Compressive Strength test (AASHTO T 208 Section 7). Report the maximum strength obtained and the percent strain corresponding to it. Select the rate of cement that provides a minimum unconfined Compressive Strength of 1,900 KPA.

### SOIL LIME MIXTURES

The procedure for soil lime mixtures is similar to soil cement with the following exceptions:

1. The quantity of lime required is in the rage of 3.5 to 6.5 percent by weight.
2. Compact specimens to a minimum density of 95% of maximum dry density obtained by AASHTO T99.
3. Do not immerse the specimens in water at the end of the curing period.
4. Select the rate of lime that provides a minimum unconfined compressive strength of 400 KPA.

### SUBMITTALS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION

1. Submit all laboratory test results for review.
2. Submit a sketch in plan view showing areas of the project to be stabilized by either lime or cement and application rates for each stabilizer.
3. Submit any other documentation that would support recommendations made in 2 above.

### CONSTRUCTION OF LIME TREATED SUBGRADE

Construct the lime treated sub-grade as specified in Section 501 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures with the following exceptions:

**Subsection 501-4 Equipment**
Contractor's equipment will not require engineer's approval.

**Subsection 501-8 (A) General**
Paragraph #1 is not applicable to this project.

**Subsection 501-9 (B) Preliminary Curing**
Amend as follows: Allow a minimum of 2 days and a maximum of 4 days for preliminary curing.

**Subsection 510-10 Compacting, Shaping, and Finishing**
Last paragraph is not applicable.

**Subsection 501-11 Thickness**
Last two paragraphs are not applicable.

**Subsection 501-15 Method of Measurement**
The entire sub-sections are not applicable.

**Subsection 501-16 Basis of Payment**
The entire sub-section is not applicable.

**CONSTRUCTION OF CEMENT TREATED SUBGRADE**

Construct the soil cement sub-grade as specified in section 542 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures, with the following exceptions:

**Subsection 542-4 Equipment**
Contractor's equipment will not require Engineer's approval.

**Subsection 542-7 Application of Cement**
First paragraph is not applicable.

**Subsection 542-11 Thickness**
Paragraphs 2 and 3 are not applicable.

**Subsection 542-16 Method of Measurement**
This entire sub-section is not applicable.

**Subsection 542-17 Basis of Payment**
This entire sub-section is not applicable.

**UNCONFINED COMPRESSIVE STRENGTH:**

Allow a minimum of seven days curing before testing for strength. Test lime stabilized sub-grades using Dynamic Cone Penetrometer. Sketch of the design of this equipment and testing procedures can be obtained from NCDOT Geotechnical Unit. Required unconfined compressive strength for lime is 400 KPA. For Cement stabilized sub-grades, make field specimens, cure them for seven days and test them in the laboratory. Required unconfined compressive strength for soil cement is 1900 KPA. In both cases one test will be required for every 135 meters per 3.8 meters lane, at random locations selected using random number tables.

**SUBMITTALS FOR REVIEW DURING CONSTRUCTION**

Submit unconfined compressive strength test results for review.

**R/W UTILITY SCOPE OF WORK:**

**Overview:** The Design Build Firm shall be responsible for coordinating all utility relocations. Coordination shall include any necessary utility agreements when applicable. The Firm will be responsible for non-betterment utility relocation cost when the utility company has prior rights of way/compensable interest. The utility company will be responsible for the relocation cost if they can not furnish evidence or prior rights of way or a compensable interest in there facilities.

**Preparation for relocating utilities within the existing or proposed highway Rights of Way.**

A. The Design Build Firm will be required to use the guide lines as set forth in the following:

(1) NCDOT Utility Manual – Policies & Procedures for Accommodating Utilities on Highway Rights of Way.

(2) Federal Aid Policy Guide – Subchapter G, Part 645, Subparts A & B

(3) Federal Highway Administration's Program Guide, Utility Adjustments & Accommodations on Federal Aid Highway Projects.

(4) NCDOT Construction Manual Section 105-8

(5) NCDOT Right of Way Manual – Chapter 16 "Utility Relocations"

B. NCDOT will provide the best available information pertaining to the existing utilities. The Design Build Firm will be responsible for confirming the location of the utilities, type of facility and identify the utility owner in order to coordinate the relocation of any utilities in conflict with the project.

**Arrangements for Protection or Adjustments to existing utilities**

A. The Design Build Firm will make the necessary arrangements with the utility owners for adjustments, relocating or removals where the Firm and Utility Company determine that such work is essential for safety measures and performance of the required construction.

– The Design Build Firm should not commence work at points where the highway construction operations are adjacent to utility facilities, until making arrangements with the utility company 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 Firm shall be responsible for damage

to the existing or relocated utilities resulting from his operations. In the event of interruption of any utilities by the project construction, the Design Build Firm will promptly notify the proper authority (Utility Company) and cooperate with the authority in the prompt restoration of service.

– The Design Build Firm should plan to accommodate for certain utility adjustments, reconstruction, new installation and routine maintenance work that may be underway or take place during the progress of the contract.

B. In the event of a utility conflict, the Design Build Firm will request that the utility company submit relocation plans (Highway Construction Plans to be provided by the Design Firm to Utility owners) showing existing utilities and proposed utility relocation for approval by the NCDOT.

The Firm will be required to submit (2) two copies of the Utility Relocation Plans to the NCDOT for review and approval prior to relocation work beginning.

C. The cost in relocating utilities due to the highway construction will be the responsibility of the Design Build Firm except when the utility company does not have compensable interest in their existing facilities. A compensable interest is identified as follows:

(1) Existing or prior easement rights within the limits of the project, either by recorded right of way or adverse possession.

(2) Entities covered under General Statute 136-27.1. Statute requires the NCDOT to pay the non-betterment cost for certain water and sewer relocations.

D. The Design Build Firm will be required to utilize the NCDOT Standard Utility Relocation and/or Encroachment Agreement as necessary in relocating utilities. The Utility Relocation Agreement will be utilized if the firm is participating in the cost of relocating the utility due to construction. The NCDOT Assistant Branch Manager of Right of Way must execute approved agreements. The NCDOT Right of Way Utility Section maintains the above mentioned agreements.

E. If the Design Build Firm elects to make arrangements with a utility company to incorporate a new utility installation or relocation as part of the highway construction. Any negotiated utility work done by the firm and associated cost for the work will be between the firm and the utility company. It is recommended that the Design Build Firm make arrangements to relocate water or sewer line facilities in which the entities are covered under General Statute 136-27.1 are occupying a compensable interest. This cost will be borne by the Firm.

## Preparation for Communication Cables/Electrical Services for Lighting, Signing & ITS Devices

A. Prior to establishing the location for new meter poles, the Design Build Firm will coordinate with the local Power Distribution Company concerning accessibility of E/C Service and safety in maintenance of the meter.

B. All service taps that require a parallel installation within the C/A will require plans for review and approval by the NCDOT prior to the installation.

– Preferably, parallel service installations within a C/A should be buried and located as close to the R/W line as practical. However, due to unusual circumstances the NCDOT may approve aerial installations.

C. The Design Build Firm will be responsible for any cost concerning service taps provided by the utility company.

## Preparation for Adjusting Existing Utilities due to Proposed Traffic Management Systems Fiber Optic Communication Cables

A. See Traffic Management Scoping Outline

B. The Design Build Firm will be responsible for all cost in coordinating and adjustments of utilities for any proposed ITS Communication Cable.

## ROADSIDE ENVIRONMENTAL SCOPE DETAILS:

Revised 4/23/01

**NOTICE:** Time must be allowed for the D/B Team to make any changes to the Erosion and Sediment Control Plans deemed necessary by the NCDOT Roadside Environmental Unit. The D/B Team must have an Erosion and Sediment Control Plan approved by the NCDOT Roadside Environmental Unit before **any** land disturbing activities can commence.

Erosion and Sediment Control Plans should at minimum address the following:

I. Complete Set of Plans
   A. Clearing and Grubbing Phase
      - use correct NCDOT symbology
      - utilize adequate perimeter controls (temporary diversions, silt fence, etc.)
      - utilize rock measures w/ sediment control stone @ drainage outlets
      - take in account existing topography
      - protect existing streams
      - show phasing for culverts
      - delineate any Environmentally Sensitive Areas (50 ft. each side of streams and tributaries)

   B. Final (Intermediate) Grade Phase
      - use correct NCDOT symbology
      - protect proposed inlets with RIST-A, RIST-C, PIST-A, etc.
      - utilize temp. slope drains and earth berms at top of fill slopes 10ft(3m) or higher : utilize rock energy dissipater @ outlet of slope drain.
      - show any areas of streambank reforestation (based on permit)
      - devices at all drainage turnouts should utilize sediment control stone (TRSD-B, TRSC-A, etc.)
      - need adequate silt storage for 1800 cubic feet per acre

II. Detail Sheets and Notes
   A. Reforestation sheet(s): regular, wetland, streambank
   B. Sod placement detail sheet
   C. Construction entrance detail
   D. Special details and notes

III. Title Sheet
   A. Show correct notes: HQW, critical habitat, clearing and grubbing, etc.
   B. Show correct standards for project

C. List of standard NCDOT symbology

IV. Special Provisions

A. Include all Seeding and Mulching information (seed mixes, rates, etc.)
B. Environmental commitments
C. Special designs (Environmentally Sensitive Areas, HQW, Critical Habitat, Trout, etc.)

- Plan submittals must include all pertinent design information required for review, such as design calculations, drainage areas, etc.

- The NCDOT Roadside Environmental Unit will provide a sample set of Erosion and Sedimentation Control plans (including any special details or special provisions used by the NCDOT REU) to the D/B Team for reference if requested. The NCDOT REU will also provide their Microstation Erosion Control tool palette for the D/B Team's use.

- Plans must address any environmental issues raised during the permitting process.

# DIVISION 1
# GENERAL REQUIREMENTS

## SECTION 101
## DEFINITIONS OF TERMS

### 101-1 GENERAL

Whenever the terms defined in this section are used in those specifications, in any of the contract documents, or on the plans, the intended meaning of such terms shall be as defined in this section.

### 101-2 ABBREVIATIONS

AAN _____American Association of Nurserymen
AAR _____Association of American Railroads
AASHTO __American Association of State Highway and Transportation Officials
ACI _____American Concrete Institute
ADT _____Annual Average Daily Traffic
AED _____Associated Equipment Distributors
AGC _____Associated General Contractors of America
AIA _____American Institute of Architects
AISC _____American Institute of Steel Construction
AISI_____American Iron and Steel Institute
ANSI_____American National Standards Institute, Inc.
ARA _____American Railway Association
AREA _____American Railway Engineering Association
ASLA _____American Society of Landscape Architects
ASTM _____American Society for Testing and Materials
AWWA____American Water Works Association
AWS _____American Welding Society
AWPA_____American Wood Preserver's Association
CRSI _____Concrete Reinforcing Steel Institute
DHV _____Design Hourly Volume
EEI _____Edison Electric Institute
FHWA_____Federal Highway Administration, U.S. Department of Transportation
FSS _____Federal Specifications and Standards, General Services Administration
GS _____General Statutes of North Carolina
IES_____Illuminating Engineering Society
NEC National Electrical Code
NEMA_____National Electrical Manufacturers Association
NESC _____National Electrical Safety Code

SPIB Southern Pine Inspection Bureau
SSPC Steel Structures Painting Council
UL Underwriters' Laboratories, Inc.
AMRL AASHTO Materials Reference Laboratory
CCRL Cement and Concrete Reference Laboratory

**101-3 ACT OF GOD.**

Events in nature so extraordinary that the history of climate variations and other conditions in the particular locality affords no reasonable warning of them.

**101-4 ADDITIONAL WORK.**

Additional work is that which results from a change or alteration in the contract and for which there are existing contract unit prices, provided in the original contract or an executed supplemental agreement.

**101-5 ADMINISTRATOR.**

The State Highway Administrator.

**101-6 ADVERTISEMENT.**

The public advertisement inviting Request for Qualifications for the design and construction of specific projects.

**101-7 ARTICLE.**

A primary numbered subdivision of a section of the standard specifications.

**101-8 AWARD.**

The decision of the Board of Transportation to accept the proposal of the selected Design-Builder for work which is subject to the furnishing of payment and performance bonds, and such other conditions as may be otherwise provided by law, the Request for Proposals, and the Standard specifications.

**101-9 BASE COURSE.**

That portion of the pavement structure of planned thickness placed immediately below the pavement or surface course.

**101-10 BID (OR PROPOSAL).**

The offer of a Design-Builder in the form of a Design-Build price proposal and a Design-Build technical proposal to perform the work and to furnish the labor and materials at the prices quoted.

**101-11 BID BOND OR BID DEPOSIT.**

The security furnished by the Proposer with his proposal as guaranty that he will furnish the required bonds and execute such documents as may be required if his proposal is accepted.

**101-12 BIDDER.**

An individual, partnership, firm, corporation, or joint venture formally submitting a proposal for the work contemplated. On Design-Build projects the word refers to respondents to the Design-Build Proposal invitation.

**101-13 BOARD OR BOARD OF TRANSPORTATION.**

The Board created by the provisions of G.S. 143B-350 for the purpose of formulating policies and priorities for the Department of Transportation, and awarding all state highway construction contracts.

**101-14 BRIDGE.**

A structure including supports, erected over a depression or an obstruction such as water, highway, or railway, and having a track or passage way for carrying traffic or other moving loads and having a length measured along the center of the roadway of more than 20 feet between undercopings of end supports, spring lines of arches, or between extreme ends of openings for multiple reinforced concrete box structures.

Bridge Length. The length of a bridge structure is the overall length measured along the line of survey stationing back to back of backwalls of abutments, if present, otherwise end to end of the bridge floor.

Bridge Width. The clear width measured at right angles to the longitudinal centerline of the bridge between the bottom of curbs, guard timbers or face of parapets, or in the case of multiple height of curbs, between the bottoms of the lower risers.

**101-15 CALENDAR DAY.**

A day shown on the calendar beginning and ending at midnight.

**101-16 CHIEF ENGINEER.**

The Chief Engineer, Operations, Division of Highways, North Carolina Department of Transportation.

**101-17 COMPLETION DATE.**

That date set forth in the special provisions or as revised by authorized extensions, by which date it is required that the work set forth in the contract be satisfactorily completed.

**101-18 CONSTRUCTION EASEMENT.**

A right owned by the Department of Transportation in a parcel of land owned by a third party outside the highway right of way for the purpose of containing construction which exceeds the right of way.

**101-19 CONTRACT.**

The executed agreement between the Department of Transportation and the successful Proposer, covering the performance of the work and the compensation therefor.

The term contract is all inclusive with reference to all written agreements affecting a contractual relationship and all documents referred to therein. The contract shall specifically include, but not be limited to, the Design-Build Package, the Design-Build Technical Proposal, the Design-Build Price Proposal, the printed contract form and all attachments thereto, the contract bonds, the plans, the standard specifications and all supplemental specifications thereto, the standard special provisions and the project special provisions contained in the Design-Build Package, and all executed supplemental agreements, all of which shall constitute one instrument.

**101-20 CONTRACT ITEM.**

A specifically described unit of work for which a unit or lump sum price is provided in the original contract or an executed supplemental agreement. Synonymous with "Pay Item".

**101-21 CONTRACT LUMP SUM PRICE.**

The amount proposed for a lump sum item that has been submitted by the Design-Builder in his price proposal.

**101-22 CONTRACT PAYMENT BOND.**

A bond furnished by the Design-Builder and his corporate surety securing the payment of those furnishing labor, materials, and supplies for the design and construction of the project.

**101-23 CONTACT PERFORMANCE BOND.**

A bond furnished by the Design-Builder and his corporate surety guaranteeing the performance of the contract.

**101-24 CONTRACT TIME.**

The number of calendar days inclusive between the date of availability and the completion date, said dates being set forth in the contract, including authorized extensions to the completion date.

**101-25 CONTRACT UNIT PRICE.**

The unit price for a unit item established in an executed supplemental agreement.

**101-26 CONTRACTOR.**

The successful Proposer to whom the contract has been awarded, and who has executed the contract documents and furnished acceptable contract bonds.

**101-27 CULVERT.**

Any structure not classified as a bridge which provides an opening under the roadway.

**101-28 CURRENT CONTROLLING OPERATION OR OPERATIONS.**

Any operation or operations, as determined by the Engineer, which if delayed would delay the completion of the project.

**101-29 DATE OF AVAILABILITY.**

That date, set forth in the Request for Proposals, by which it is anticipated that the Contract will be executed and sufficient work sites within the project limits will be available for the Design-Builder to begin his controlling operations.

**101-30 DEPARTMENT OR DEPARTMENT OF TRANSPORTATION.**

A principal department of the Executive Branch which performs the functions of planning, design, construction, and maintenance of an integrated statewide transportation system.

**101-31 DIVISION OF HIGHWAYS.**

The division of the Department of Transportation which, under the direction of the Secretary of Transportation, carries out state highway planning, design, construction, and maintenance functions assigned to the Department of Transportation.

**101-32 DRAINAGE EASEMENT.**

A right, owned by the Department of Transportation, in a parcel of land owned by a third party outside the highway right of way, to construct and maintain ditches, channels, or structures for directing the course and flow of water outside the highway right of way.

**101-33 EASEMENT.**

A property right to use or control real property of another.

**101-34 ENGINEER.**

The Chief Engineer Operations, Division of Highways, North Carolina Department of Transportation, acting directly or through his duly authorized representatives.

**101-35 EQUIPMENT.**

All machinery and equipment, together with the necessary supplies, tools, and apparatus for upkeep and maintenance, all of which are necessary for the proper construction and acceptable completion of the work.

**101-36 EXTRA WORK.**

Work found necessary or desirable to complete fully the work as contemplated in the contract for which payment is not provided for by the contract unit or lump sum prices in the original contract. Extra work shall not be work which in the terms of the specifications and special provisions is incidental to work for which there is a contract price or work for which payment is included in some other contract unit or lump sum price.

**101-37 FINAL ACCEPTANCE DATE.**

That date on which all work set forth in the contract and work modified by the Engineer is satisfactorily completed excluding any observation periods not specifically made a part of the work by the specifications or special provisions.

**101-38 FINAL ESTIMATE.**

The document which contains a final statement of all quantities and total dollar amount for each item of work performed during the life of the contract including any adjustments to those amounts made under the terms of the contract. The final statement will be titled The Final Estimate and will be the document utilized to document final payment to the Design-Builder. Receipt of this document by the Design-Builder will begin the time frame for filing of a verified claim with the Department as provided for in G.S. 136-29 of the General Statutes of North Carolina.

**101-39 FINAL ESTIMATE ASSEMBLY.**

As constructed plans and other project records which establish the final statement of quantities to be paid and document work performed on the project.

**101-40 FORCE ACCOUNT NOTICE.**

A written notice to the Design-Builder that extra work ordered by the Engineer will be paid for as force account work.

**101-41 FORCE ACCOUNT WORK.**

Work that is paid for in accordance with Article 109-3 or on the basis of the force account formula provided in the contract.

**101-42 HIGHWAY.**

A general term denoting a public way for purposes of vehicular travel, including the entire area within the right of way. Synonymous with "Road" and "Street".

**101-43 HOUR.**

One of the 24 equal parts of a day.

**101-44 INSPECTOR.**

The authorized representative of the Engineer assigned to make a detailed inspection of any or all portions of the work and materials.

**101-45 INTERMEDIATE COMPLETION DATE.**

That date set forth in the contract or as revised by authorized extensions, by which date it is required that the portion of work set forth in the contract be satisfactorily completed.

**101-46 INTERMEDIATE COMPLETION TIME.**

The time set forth in the contract or as revised by authorized extensions, by which it is required that the portion of work set forth in the contract be satisfactorily completed.

**101-47 INTERMEDIATE CONTRACT TIME (DAYS).**

The number of calendar days inclusive between the date of availability and the completion date, said dates being set forth in the special provisions, including authorized extensions to the intermediate completion date.

**101-48 INTERMEDIATE CONTRACT TIME (HOURS).**

The number of hours inclusive between the time of availability and the intermediate completion time, said times being set forth in the special provisions, including authorized extensions to the intermediate completion time.

**101-49 INVERT.**

The lowest point in the internal cross section of a pipe or other culvert.

**101-50 INVITATION TO BID.**

The notification that proposals will be received for the design and construction of specific projects.

**101-51 LABORATORY.**

The testing laboratory of the Department of Transportation, Design-Builder, or any other testing laboratory which may be designated or approved by the Engineer.

**101-52 LOCAL TRAFFIC.**

Traffic which must use the facility under construction in order to reach its destination.

**101-53 MAJOR AND MINOR CONTRACT ITEMS.**

Major contract items are listed as such in the project special provisions. All other original contract items and extra work shall be considered as minor items.

**101-54 MATERIALS.**

Any substances which may be incorporated into the construction of the project.

**101-55 MEDIAN.**

The center section of a divided highway which separates the traffic lanes in one direction from the traffic lanes in the opposite direction.

**101-56 PAVEMENT STRUCTURE.**

The combination of base and surface courses placed on a subgrade to support the traffic load and distribute it to the roadbed.

**101-57 PAY ITEM.**

Synonymous with "Contract Item".

## 101-58 PLANS.

The project plans, Standard Drawings, working drawings and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions and details of the work to be performed

(A)Standard Drawings:

Drawings approved for repetitive use, showing details to be used where appropriate. All Standard Drawings approved by the Department plus subsequent revisions and additions. Standard Drawings are available for purchase from:

Randy A. Garris, PE
State Contract Officer
1591 Mail Service Center
Raleigh, NC 27699-1591

(B) Initial Plans:

Department-furnished drawings included as part of the Design-Build Package.

(C) Project Plans:

Construction drawings prepared, sealed and completed by the Design-Builder. Specific details and dimensions peculiar to the work, which are completed by the Design-Builder.

(D)Working Drawings and Supplemental Drawings:

Supplemental design sheets, shop drawings, or similar data which the Design-Builder is required to submit to the Engineer as described in the Scope of Work.

(E) As-Constructed Drawings:

Final drawings prepared by the Design-Builder, documenting the details and dimensions, of the completed work.

## 101-59 PROJECT.

The specific section of the highway together with all appurtenances, and the design and construction to be performed thereon under the contract.

## 101-60 PROJECT SPECIAL PROVISIONS.

Special provisions peculiar to the project and not otherwise thoroughly or appropriately set forth in the standard specifications or plans.

## 101-61 PROPOSAL FORM.

This definition is deleted for this project.

## 101-62 RIGHT OF WAY.

The land area shown on the plans as right of way to be furnished by the Department of Transportation within which the project is to be constructed.

**101-63 ROAD.**

Synonymous with "Highway" and "Street".

**101-64 ROADBED.**

The graded portion of a highway usually considered as the area between the intersections of top and side slopes, upon which the base course, surface course, shoulders, and median are constructed.

**101-65 ROADSIDE.**

A general term denoting the area within the limits of the right of way adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

**101-66 ROADWAY.**

The portion of a highway within limits of construction.

**101-67 SECTION.**

A numbered chapter of the standard specifications.

**101-68 SHOULDER.**

The portion of the roadway adjacent to the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

**101-69 SIDEWALK.**

That portion of the roadway primarily constructed for pedestrian traffic.

**101-70 SKEW ANGLE.**

The angle between the centerline of the project and the centerline of a pipe, culvert, bridge pier, bent, abutment, or other drainage feature, measured to the right of the project centerline facing in the direction of progressing stations.

**101-71 SPECIAL PROVISIONS.**

Project special provisions and standard special provisions taken together as one body of special provisions.

**101-72 SPECIFICATIONS.**

The general term comprising all the directions, provisions, and requirements contained or referred to in the standard specifications, including the supplemental specifications, together with such additional directions, provisions, and requirements which may be added or adopted as special provisions.

**101-73 STANDARD SPECIAL PROVISIONS.**

Special directions or requirements not otherwise thoroughly or appropriately set forth in the standard specifications and which are peculiar to a selected group of projects.

**101-74 STANDARD SPECIFICATIONS.**

The general term comprising all the directions, provisions, and requirements contained or referred to in this book entitled "Standard Specifications for Roads and Structures", and in any subsequent revisions or additions to such book that are issued under the title "Supplemental Specifications".

**101-75 STATE.**

The State of North Carolina.

**101-76 STATION.**

A station, when used as a term of measurement, will be 100 linear feet measured horizontally. When used as a location, it will be designated point on the project.

**101-77 STREET.**

Synonymous with "Highway" and "Road".

**101-78 SUBCONTRACTOR.**

An individual, partnership, firm, joint venture, or corporation to whom the Design-Builder, with the written consent of the Engineer, sublets any part of the contract.

**101-79 SUBGRADE.**

That portion of the roadbed prepared as a foundation for the pavement structure including curb and gutter. On portions of projects which do not include the construction of a base course or pavement, the presence of the subgrade will not be recognized during the life of such contract.

**101-80 SUBSTRUCTURE.**

All of that part of the structure below the bearings of simple and continuous spans, spans, skew back of arches and tops of footings of rigid frames, together with the backwalls, and wingwalls.

**101-81 SUPERINTENDENT.**

The representative of the Design-Builder authorized to supervise and direct the construction for the Design-Builder and to receive and fulfill directions from the Engineer.

**101-82 SUPERSTRUCTURE.**

All of the part of the structure exclusive of the substructure.

**101-83 SUPPLEMENTAL AGREEMENT.**

A written agreement between the Design-Builder and the Department of Transportation covering amendments to the contract.

**101-84 SUPPLEMENTAL SPECIFICATIONS.**

General revisions or additions to this book of standard specifications which are issued under the title of "Supplemental Specifications", and which shall be considered as part of the standard specifications; or specifications, regulations, standards, or codes referenced in the contract documents.

**101-85 SURETY.**

A corporate bonding company furnishing the bid bond or furnishing the contract payment and performance bonds.

**101-86 TEMPORARY CONSTRUCTION EASEMENT.**

A temporary right, owned by the Department of Transportation, in a parcel of land owned by a third party outside the highway right of way, for the use of the Department of Transportation during the construction and which reverts to the third party on completion of construction.

**101-87 THROUGH TRAFFIC.**

Traffic which can reach its destination by a route or routes other than the facility under construction.

**101-88 TIME OF AVAILABILITY.**

That time, set forth in the special provisions, by which it is anticipated that sufficient work sites within the project limits will be available for the Design-Builder to begin his controlling operations.

**101-89 TOTAL AMOUNT BID.**

Same as total price bid. The total amount bid will be considered to be the correct sum total obtained by adding together the amounts bid for every item in the Design-Build Price proposal.

**101-90 UNBALANCED BID.**

A bid which includes any unbalanced bid price.

**101-91 UNBALANCED BID PRICE.**

A unit or lump sum bid price that does not reflect reasonable actual costs which the Proposer anticipates for the performance of the item in question along with a reasonable proportionate share of the Proposer's anticipated profit, overhead costs, and other indirect costs.

**101-92 WORK.**

Work shall mean the furnishing of all labor, materials, equipment, and incidentals necessary or convenient to the successful completion of the project, or any part, portion, or phase thereof, and the carrying out of all duties and obligations imposed by the contract.

**101-93 WORKING DRAWINGS.**

Stress sheets, shop drawings, erection drawings, falsework drawings, cofferdam drawings, catalog cuts, or any other supplementary drawings or similar data which the Design-Builder is required to submit to the Engineer for review and/or approval.

**101-94 DESIGN-BUILD.**

A form of contracting in which the successful proposer undertakes responsibility for both the design and construction of a project.

**101-95 DESIGN-BUILDER.**

An individual, partnership, joint venture, corporation or other legal entity that furnishes the necessary design and construction services, whether by itself or through subcontracts.

**101-96 DESIGN-BUILD PACKAGE.**

The documents prepared by the Department for a Design-Build project, containing all forms, information, drawings or other documentation furnished to proposers to guide the preparation and submittal of a proposal for a Design-Build project.

**101-97 DESIGN-BUILD PROPOSAL.**

A proposal to contract consisting of a separately sealed technical proposal and a separately sealed price proposal submitted in response to a request for proposal on a Design-Build project. The technical proposal and price proposal, in some cases, may be scheduled to be submitted on different dates.

**101-98 DESIGN-BUILD PRICE PROPOSAL.**

The part of a design-Build proposal containing the offer of a Proposer, submitted on the prescribed forms, to perform the work and furnish the labor and materials at the price quoted.

**101-99 DESIGN-BUILD TECHNICAL PROPOSAL.**

A submittal from a proposer, in accordance with requirements of the Design-Build Package, for the purpose of final selection.

**101-100 PROJECT MANAGER.**

The Department's authorized designee responsible for the administration of the Design-Build project.

**101-101 TECHNICAL SPECIFICATIONS.**

Additions and revisions to the Standard Specifications covering conditions and requirements peculiar to a Design-Build project.

**101-102 TABLE OF VALUES.**

A table prepared prior to beginning of construction listing estimated quantity of items for which a testing frequency is defined in the Minimum Sampling Guide. This estimate will be

used to determine required frequency of testing for materials and products incorporated into construction, and shall be updated monthly and provided to the Engineer.

**5-11-01 Version**

# SECTION 102
# PROPOSAL REQUIREMENTS AND CONDITIONS

## 102-1 INVITATION TO BID.

This section is deleted from this project and replaced with the special provision titled "Submittal of Proposals", which discusses the process used to evaluate the Technical and Price proposals.

## 102-2 PREQUALIFICATION FOR PROPOSERS.

Proposers shall prequalify with the Department. The requirements for prequalification will be furnished each prospective Proposer by the Engineer upon receipt of a written request. A Price Proposal or Technical Proposal will not be opened unless all prequalification requirements have been met by the Proposer and have been found to be acceptable by the Engineer.

In addition to the Experience Questionnaire, prequalification requirements will include provisions for the evaluation of a firm's safety record. A completed 'Safety Index Rating' form must be on file with the Department. To be prequalified to bid each firm must maintain a satisfactory safety index. An overall safety index equal to or greater than 60 is considered satisfactory. In addition, an index between 60 and 69 may be considered marginal and may result in an in-depth safety audit of a firm's safety practices. An overall safety index equal to or less than 59 is considered unsatisfactory and will prohibit prequalification of new firms or the requalification of existing firms at the time of their biennium renewal.

When an existing prequalified company's safety index becomes unsatisfactory as described above, the Engineer may require the Design-Builder to state in writing the reason(s) for the unsatisfactory rating and produce such supporting data as may be necessary to evaluate the circumstances surrounding the rating. When the Design-Builder cannot provide justification to raise the unsatisfactory safety index, the Engineer may invoke one or more of the following sanctions:

1. Removal of the firm from the list of prequalified bidders
2. Placement of the firm on probation for up to two years
3. Auditing of the firm's safety practices
4. Giving a written warning to correct any safety deficiencies

Firms not approved or disqualified to bid due to an unsatisfactory safety index will not be approved or reinstated to bid until they can provide adequate evidence that all safety deficiencies have been corrected.

Upon a determination by the Department that all prequalification requirements have been met, the applicant will be assigned a Prequalification Number. This Prequalification

Number will thereafter be assigned to all applicants for prequalification or requalification which the Department determines are under sufficient common ownership and management control to warrant prequalification as a single entity. This determination by the Department shall be based on the information submitted with the Experience Questionnaire and any other information obtained by the Department.

No Proposer will be prequalified who, at the time of the application for prequalification is determined by the Engineer to lack the financial capability to complete projects.

Proposers shall comply with all applicable laws regulating the practice of general contracting as contained in Chapter 87 of the General Statutes of North Carolina.

## 102-3 CONTENTS OF DESIGN-BUILD PACKAGES.

A Design-Build Package will be furnished by the Department to the selected Proposers from among the respondents to the Request for Qualifications. Each Design-Build Package will be marked on the front cover by the Department with an identifier of the Proposer to whom it is being furnished. This package will state the location of the project and will show a schedule of contract items for which Technical and Price proposals are invited. It will set forth the date and time Technical and Price Proposals are to be submitted and will be opened. The package will also include any special provisions or requirements which vary from or are not contained in any preliminary plans or standard specifications.

The package will also include the printed contract forms and signature sheets for execution by both parties to the contract. In the event the Proposer is awarded the contract, execution of the Design-Build Proposal will be considered the same as execution of the contract by the Proposer.

All papers bound with the package are necessary parts thereof and shall not be detached, taken apart, or altered.

The plans, standard specifications, and other documents designated in the Design-Build package shall be considered a part of the Design-Build package whether attached or not.

Up to 3 copies of the Design-Build Package will be furnished to each prospective Proposer upon request. Additional copies may be purchased for the sum of $25 each. **The copy marked with the Proposers name and prequalification number is to be returned to the Department.**

## 102-4 COMBINATION BIDS.

**This section is deleted for this project.**

## 102-5 INTERPRETATION OF QUANTITIES IN PROPOSAL FORM.

**This section is deleted for this project.**

## 102-6 EXAMINATION OF PRELIMINARY PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK.

The Proposer shall examine carefully the site of the work contemplated, the preliminary plans and specifications, and the Design-Build Package.. The submission of a Technical Proposal and a Price Proposal shall be conclusive evidence that the Proposer has investigated and is satisfied as to the conditions to be encountered; as to the character, quality, and scope of work to be performed; the quantities of materials to be furnished; and as to the conditions and requirements of the proposed contract.

A Proposer is cautioned to make such independent investigation and examination as he deems necessary to satisfy himself as to conditions to be encountered in the performance of the work and with respect to possible local material sources, the quality and quantity of material available from such property, and the type and extent of processing that may be required in order to produce material conforming to the requirements of the specifications.

## 102-7 SUBSURFACE INFORMATION.

If Subsurface Information is available on this project, a copy of the Subsurface Information may be obtained from the Department. A copy of the Subsurface Information will be mailed to the prospective proposers upon request.

The Subsurface Information and the Subsurface Investigation on which it is based was made for the purpose of information only. The various field boring logs, rock cores, and soil test data available may be reviewed or inspected in Raleigh at the office of the Geotechnical Unit. Neither the Subsurface Information nor the field boring logs, rock cores, or soil test data is part of the contract.

General soil and rock strata descriptions and indicated boundaries are based on a geotechnical interpretation of all available subsurface data and may not necessarily reflect the actual subsurface conditions between borings or between sampled strata within the borehole. The laboratory sample data and the in situ (in-place) test data can be relied on only to the degree of reliability inherent in the standard test method. The observed water levels or soil moisture conditions indicated in the subsurface investigations are as recorded at the time of the investigation. These water levels or soil moisture conditions may vary considerably with time according to climatic conditions including temperature, precipitation, and wind, as well as other nonclimatic factors.

THE PROPOSER IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE INFORMATION ARE PRELIMINARY ONLY. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINIONS OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE PROPOSER IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS THEY DEEM NECESSARY TO SATISFY THEIRSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE PROPOSER SHALL HAVE NO CLAIM FOR ADDITIONAL

COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

## 102-8 PREPARATION AND SUBMISSION OF PRICE PROPOSALS .

All Price Proposals shall be prepared and submitted in accordance with the following listed requirements:

1. The Design-Build Package provided by the Department shall be used and shall not be taken apart or altered. The Price Proposal shall be submitted on the same form which has been furnished to the Proposer by the Department as identified by the Proposers name marked on the front cover by the Department.

2. All entries including signatures shall be written in ink.

3. The Proposer shall submit a lump sum price for every item in the Design-Build Price Proposal.
   The lump sum prices bid for the various contract items shall be written in figures.

4. An amount bid shall be entered in the Design-Build Package for every lump sum item and the price shall be written in figures in the "Amount Bid" column in the Design-Build Package.
5. The total amount bid shall be written in figures in the proper place in the Design-Build Package. The total amount bid shall be determined by adding the amounts bid for each lump sum item.
6. Changes in any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. A representative of the Proposer shall initial the change in ink.
7. The Price Proposal shall be properly executed. In order to constitute proper execution, the Price Proposal shall be executed in strict compliance with the following:
   a. If a Price Proposal is by an individual, it shall show the name of the individual and shall be signed by the individual with the word "Individually" appearing under the signature. If the individual operates under a firm name, the bid shall be signed in the name of the individual doing business under the firm name.
   b. If the Price Proposal is by a corporation, it shall be executed in the name of the corporation by the President, Vice President, or Assistant Vice President. It shall be attested by the Secretary or Assistant Secretary. The seal of the corporation

shall be affixed. If the Price Proposal is executed on behalf of a corporation in any other manner than as above, a certified copy of the minutes of the Board of Directors of said corporation authorizing the manner and style of execution and the authority of the person executing shall be attached to the Price Proposal or shall be on file with the Department.

c. If the Price Proposal is made by a partnership, it shall be executed in the name of the partnership by one of the general partners.

d. If the Price Proposal is a joint venture, it shall be executed by each of the joint venturers in the appropriate manner set out above. In addition, the execution by the joint venturers shall appear below their names.

e. The Price Proposal execution shall be notarized by a notary public whose commission is in effect on the date of execution. Such notarization shall be applicable both to the Price Proposal and to the non-collusion affidavit which is part of the signature sheets.

8. The Price Proposal shall not contain any unauthorized additions, deletions, or conditional bids.

9. The Proposer shall not add any provision reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.

10. The Price Proposal shall be accompanied by a bid bond on the form furnished by the Department or by a bid deposit. The bid bond shall be completely and properly executed in accordance with the requirements of Article 102-11. The bid deposit shall be a certified check or cashier check in accordance with Article 102-11.

11. The Price Proposal shall be placed in a sealed envelope and shall have been delivered to and received by the Department prior to the time specified in the Design-Build Package.

## 102-9 COMPUTER BID PREPARATION.

**This section is deleted from this project**

## 102-10 NON-COLLUSION AFFIDAVIT.

In compliance with Section 112(c) of title 23 USC, and current regulations of the Department, each and every Proposer will be required to furnish the Department with an affidavit certifying that the Proposer has not entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with his Price Proposal on the project. The affidavit shall also conclusively indicate that the Proposer intends to do the work with its own bonafide employees or subDesign-Builders and is not bidding for the benefit of another Design-Builder.

Affidavit forms will be included in the Design-Build Package as part of the signature sheets. Execution of the signature sheets will also constitute execution of the non-collusion affidavit. The signature sheets shall be notarized.

## 102-11 BID BOND OR BID DEPOSIT.

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

Withdrawal of a Price proposal due to a mistake made in the preparation of the Price proposal, where permitted by Article 103-3, shall not constitute withdrawal of a Price proposal as cause for payment of the bid bond or forfeiture of the bid deposit.

When a Price proposal is secured by a bid bond, the bid bond shall be on the form furnished by the Department. The bid bond shall be executed by both the Proposer and a Corporate Surety licensed under the laws of North Carolina to write such bonds. The execution by the Proposer shall be in the same manner as required by Article 102-8 for the proper execution of the Price proposal. The execution by the Corporate Surety shall be the same as is provided for by Article 102-8, Item 7b, for the execution of the Price proposal by a corporation. The seal of the Corporate Surety shall be affixed to the bid bond. The bid bond form furnished is for execution of the Corporate Surety by a General Agent or Attorney in Fact. A certified copy of the Power of Attorney shall be attached if the bid bond is executed by a General Agent or Attorney in Fact. The Power of Attorney shall contain a certification that the Power of Attorney is still in full force and effect as of the date of the execution of the bid bond by the General Agent or Attorney in Fact. If the bid bond is executed by the Corporate Surety by the President, Vice President, or Assistant Vice President, and attested to by the Secretary or Assistant Secretary, then the bid bond form furnished shall be modified for such execution, instead of execution by the Attorney in Fact or the General Agent.

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

If the Proposer has failed to meet all conditions of the bid bond but the Department has not received the amount due under the bid bond, the Proposer may be disqualified from further bidding as provided in Article 102-16.

## 102-12 DELIVERY OF PROPOSALS.

All Price Proposals shall be placed in a sealed envelope having the name and address of the Proposer, and the statement " Price Proposal for the Design/Build of State Highway Project No. _____in_____county(s)" on the outside of the envelope. If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Design-Build Package. The outer envelope shall also bear the statement " Price Proposal for the Design/Build of State Highway Project No. _____". All Technical Proposals shall be placed in a sealed envelope having the name and address of the Proposer, and the statement " Technical Proposal for the Design/Build of State Highway Project No. _____in_____county(s)" on the outside of the envelope. If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Design-Build Package. The outer envelope shall also bear the statement " Technical Proposal for the Design/Build of State Highway Project No. _____". If delivered in person on or before the due date, the sealed envelope shall be delivered to the office of the Contract Officer as indicated in the Design-Build Package. Price Proposals and Technical Proposals shall be submitted in accordance with the project special provision "Submittal of Proposals" contained elsewhere in this Design Build package.

All Price Proposals and Technical Proposals shall be delivered prior to the time specified in the Design-Build Package. Price proposals and Technical Proposals received after such time will not be accepted and will be returned to the Proposer unopened.

## 102-13 WITHDRAWAL OR REVISION OF PROPOSALS.

A Design-Build proposer will not be permitted to withdraw its Technical and Price proposals after they have been submitted to the Department.

## 102-14 RECEIPT AND OPENING OF PROPOSALS.

Price Proposals will be opened and read publicly at the time and place indicated in the Design-Build Package. The scores of the previously conducted evaluation of the Technical Proposals will also be read publicly at this time. Proposers, their authorized agents, and other interested parties are invited to be present.

## 102-15 REJECTION OF PRICE PROPOSALS.

Any Price proposal submitted which fails to comply with any of the requirements of Article 102-8, 102-11, or with the requirements of the project scope and functional specifications shall be considered irregular and may be rejected.

Irregularities due to apparent clerical errors and omissions may be waived in accordance with Article 103-2.

Any Price proposal including any unit or lump sum bid price which is significantly unbalanced to the potential detriment of the Department will be considered irregular and may be rejected. In the event the Board determines it is in the best public interest to accept such irregular Price proposal, it may award the contract based on such Price proposal subject to the provisions of Subarticle 109-4(B).

A Price proposal which does not contain costs for all proposal items shall be considered irregular and may be rejected.

In addition to the above, any Price proposals for contracts not funded with any Federal funds which are submitted by any Proposer who has failed to obtain the appropriate General Contractor's license, as required by Chapter 87 of the General Statutes of North Carolina, shall be considered irregular and will not be considered for award.

The right to reject any and all Proposals shall be reserved to the Board.

## 102-16 DISQUALIFICATION OF PROPOSERS.

Any one of the following causes may be justification for disqualifying a Proposer from further bidding until he has applied for and has been requalified in accordance with Article 102-2:

1. Unsatisfactory progress in accordance with Article 108-8.
2. Being declared in default in accordance with Article 108-9.
3. Uncompleted contracts which, in the judgment of the Chief Engineer, might hinder or prevent the timely completion of additional work if awarded.
4. Failure to comply with prequalification requirements.
5. The submission of more than one Price proposal for the same contract by an individual, partnership, joint venture, or corporation prequalified under the same prequalification number.
6. Evidence of collusion among Proposers. Each participant in such collusion will be disqualified.
7. Failure to furnish a non-collusion affidavit upon request.
8. Failure to comply with Article 108-6.
9. Failure to comply with a written order of the Engineer as provided in Article 105-1 if in the judgment of the Chief Engineer such failure is of sufficient magnitude to warrant disqualification.

10. Failure to satisfy the Disadvantaged Business Enterprise requirements of the project special provisions.
11. The Department has not received the amount due under a forfeited bid bond or under the terms of a performance bond.
12. Failure to submit within 60 days after being requested by the Engineer, or the submission of false information in, the documents required by Article 109-9.
13. Failure to return overpayments as directed by the Engineer.
14. Recruitment of Department employees as prohibited by Article 108-5.
15. Failure to maintain a satisfactory safety index as required by Article 102-2.

Upon a determination that a Proposer should be disqualified for one or more of the reasons listed above, the Department may, at its discretion, remove all entities prequalified under the same Prequalification Number.

**4-27-01 Version**

# SECTION 103
# AWARD AND EXECUTION OF CONTRACT

## 103-1 CONSIDERATION OF PRICE PROPOSALS.

After the Price proposals are opened and read, they will be tabulated. The Price proposal and score of the technical proposal will be made available to the public. In the event of errors, omissions, or discrepancies in the costs, corrections to the Price proposal will be made in accordance with the provisions of Article 103-2. Such corrected costs will be used to determine the lowest adjusted price.

After the reading of the Price proposals and technical scores, the Department will calculate the lowest adjusted price as described in the "Special Provision for Instructions to Proposers".

The right is reserved to reject any or all Price proposals, to waive technicalities, to request the Proposer with the lowest adjusted price to submit an up-to-date financial and operating statement, to advertise for new proposals, or to proceed to do the work otherwise, if in the judgment of the Board, the best interests of the State will be promoted thereby.

## 103-2 CORRECTION OF PRICE PROPOSAL ERRORS.

**(A) General:**

The provisions of this article shall apply in waiving irregularities and correcting apparent clerical errors and omissions in the "amount bid" and "total amount bid" for bid items.

**(B) Discrepancy in the "Total Amount Bid" and the addition of the "Amount Bid" for each line Item.**

In the case of the Total Amount Bid does not equal the summation of each Amount Bid for the line items , the Total Amount Bid shall be deemed to be the correct total for the entire project.

**(C)Omitted Total Amount Bid –Amount Bid Completed**

**If the Total Amount Bid is not completed and the Amount Bid for all line items is completed the Total Amount Bid shall be the summation of the Amount Bid for all line items.**

## 103-3 WITHDRAWAL OF PRICE PROPOSAL -MISTAKE.

### (A) Criteria for Withdrawal of Price Proposal:

The Department of Transportation may allow a Proposer submitting a Price proposal to withdraw his Price proposal after the scheduled time of Price proposal opening upon a determination that:

1. A mistake was in fact made in the preparation of the Price proposal.
2. The mistake in the Price proposal is of a clerical or mathematical nature and not one of bad judgment, carelessness in inspecting the work site, or in interpreting the functional requirements.
3. The mistake is found to be made in good faith and was not deliberate or by reason of gross negligence.
4. The amount of the error or mistake is equal to or greater than 3 percent of the total amount of Price proposal.
5. The Proposers notice of his mistake and request for withdrawal of the Price proposal by reason of the mistake was promptly communicated to the Chief Engineer and in no instance longer than 48 hours after the scheduled time of Price proposal opening. If the Proposer notifies the Chief Engineer verbally, written notice of mistake must be submitted within 48 hours to the Chief Engineer accompanied by copies of Price proposal preparation information.
6. The Department of Transportation will not be prejudiced or damaged except for the loss of the Price proposal.

### (B) Hearing by Chief Engineer:

If a files a notice of mistake along with a request to withdraw his Price proposal, the Chief Engineer (or his designee) will promptly hold a hearing thereon. The Chief Engineer will give to the requesting Proposer reasonable notice of the time and place of any such hearing. The Proposer may appear at the hearing and present the original working papers, documents, or materials used in the preparation of the Price proposal sought to be withdrawn, together with other facts and arguments in support of his request to withdraw his Price proposal. The Proposer will be required to present a written affidavit that the documents presented are the original, unaltered documents used in the preparation of the Price proposal.

### (C) Action by State Highway Administrator:

A determination may be made by the Administrator that the Proposer meets the criteria for withdrawal of the Price proposal as set forth in Subarticle 103-3(A) upon presentation of clear and convincing evidence by the Proposer. The Chief Engineer will present his findings to the State Highway Administrator for action on the Proposer's request. The Chief Engineer will advise the Proposer of the Administrator's decision prior to the Board of Transportation's consideration of award.

**(D) Bid Bond:**

If a bid mistake is made and a request to withdraw the Price proposal is made, the bid bond shall continue in full force and effect until there is a determination by the Administrator that the conditions in Subarticle 103-3(A) have been met. The effect of the refusal of the Proposer to give payment and performance bonds within 14 calendar days after the notice of award is received by him, if award has been made by the Board of Transportation after consideration and denial of the Proposer's request to withdraw his Price proposal, shall be governed by the terms and conditions of the bid bond.

## 103-4 AWARD OF CONTRACT.

**(A) General:**

The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252) and the Regulations of the Department of Transportation (49 CFR, Part 21), issued pursuant to such act, hereby notifies all proposers that it will affirmatively insure that contracts entered in pursuant to this Request for Proposals, if awarded, will be made by the Board of Transportation to the Proposer with the lowest adjusted price as outlined in the Design-Build package without discrimination on the grounds of race, color, or national origin. The Proposer with the lowest adjusted price will be notified by letter that his proposal has been accepted and that he has been awarded the contract. This letter shall constitute the notice of award. The notice of award, if the award be made, will be issued within 60 days after the opening of Price proposals, except that with the consent of the Proposer with the lowest adjusted price the decision to award the contract to such Proposer may be delayed for as long a time as may be agreed upon by the Department and such Proposer. In the absence of such agreement, the Proposer with the lowest adjusted price may withdraw his proposal at the expiration of the 60 days without penalty if no notice of award has been issued.

Award of a contract involving any unbalanced bid price(s) may be made in accordance with the provisions of Article 102-15.

## 103-5 CANCELLATION OF AWARD.

The Board of Transportation reserves the right to rescind the award of any contract at any time before the receipt of the properly executed contract bonds from the successful Proposer.

## 103-6 RETURN OF BID BOND OR BID DEPOSIT.

All bid bonds will be retained by the Department until the contract bonds are furnished by the successful Proposer, after which all such bid bonds will be destroyed unless the individual bid bond form contains a note requesting that it be returned to the Proposer or the Surety.

Checks which have been furnished as a bid deposit will be retained until after the contract bonds have been furnished by the successful Proposer, at which time Department of Transportation warrants in the equivalent amount of checks which were furnished as a bid deposit will be issued .

## 103-7 CONTRACT BONDS.

The successful Proposer, within 14 calendar days after the notice of award is received by him, shall provide the Department with a contract payment bond and a contract performance bond each in an amount equal to 100 percent of the amount of the contract. All bonds shall be in conformance with G.S. 44A-33. The corporate surety furnishing the bonds shall be authorized to do business in the State

## 103-8 EXECUTION OF CONTRACT.

As soon as possible following receipt of the properly executed contract bonds, the Department will complete the execution of the contract, retain the original contract, and return one certified copy of the contract to the Proposer .

## 103-9 FAILURE TO FURNISH CONTRACT BONDS.

The successful Proposer's failure to file acceptable bonds within 14 calendar days after the notice of award is received by him shall be just cause for the forfeiture of the bid bond or bid deposit and rescinding the award of the contract. Award may then be made to the Proposer with the next lowest adjusted price Proposer or the work may be readvertised and constructed under contract or otherwise, as the Board of Transportation may decide.

# SECTION 104
# SCOPE OF WORK

## 104-1 INTENT OF CONTRACT.

The intent of the contract is to prescribe the work or improvements which the Design-Builder undertakes to perform, in full compliance with the contract. In case the method or character of any part of the work is not covered by the contract, this section shall apply. The Design-Builder shall perform all work in accordance with the contract or as may be modified by written orders, and shall do such special, additional, extra, and incidental work as may be considered necessary to complete the work to the full intent of the contract. Unless otherwise provided elsewhere in the contract, the Design-Builder shall furnish all implements, machinery, equipment, tools, materials, supplies, transportation, and labor necessary for the design, prosecution and completion of the work.

## 104-2 SUPPLEMENTAL AGREEMENTS.

Whenever it is necessary to make amendments to the contract to satisfactorily complete the proposed design and construction and/or to provide authorized time extensions, the Engineer shall have the authority to enter into a supplemental agreement covering such amendments.

Supplemental agreements shall become a part of the contract when executed by the Engineer and an authorized representative of the Design-Builder. The Design-Builder shall file with the Engineer a copy of the name or names of his representatives who are authorized to sign supplemental agreements.

## 104-3 ALTERATIONS OF CONTRACT

The Engineer reserves the right to make, at any time during the progress of the work, such alterations in the contract as may be found necessary or desirable. Under no circumstances will an alteration involve work beyond the termini of the proposed construction except as may be necessary to satisfactorily complete the project. Such alterations shall not invalidate the contract nor release the Surety, and the Design-Builder agrees to perform the work as altered at his contract unit or lump sum prices the same as if it had been a part of the original contract except as otherwise herein provided.

An adjustment in the affected contract unit or lump sum prices due to alterations in the contract that materially change the character of the work and the cost of performing the work will be made by the Engineer only as provided in this article.

If the Engineer makes an alteration in the contract that he determines will materially change the character of the work and the cost of performing the work, an adjustment will be made and the contract modified in writing accordingly. The Design-Builder will be paid for performing the affected work in accordance with Subarticle 104-8(A).

When the Design-Builder is required to perform work, which is, in his opinion, an alteration in the contract that materially changes the character of the work and the cost of performing the work, he shall notify the Engineer in writing prior to performing such work. The Engineer will investigate and, based upon his determination, one of the following will occur:

1. If the Engineer determines that the affected work is an alteration of the plans or details of construction that materially changes the character of contract, the Design-Builder will be notified in writing by the Engineer and compensation will be made in accordance with Subarticle 104-8(A).
2. If the Engineer determines that the work is not such an alteration in the contract that materially changes the character of the work and the cost of performing the work, he will notify the Design-Builder in writing of his determination. If the Design-Builder, upon receipt of the Engineer's written determination, still intends to file a claim for additional compensation by reason of such alteration, he shall notify the Engineer in writing of such intent prior to beginning any of the alleged altered work and the provisions of Subarticle 104-8(B) shall be strictly adhered to.

No contract adjustment will be allowed under this article for any effects caused on unaltered work.

## 104-4 SUSPENSIONS OF WORK ORDERED BY THE ENGINEER.

### (A) Suspensions of the Work Ordered by the Engineer:

When the Engineer suspends in writing the performance of all or any portion of the work for a period of time not originally anticipated, customary, or inherent to the construction industry and the Design-Builder believes that additional compensation for idle equipment and/or labor is justifiably due as a result of such suspension, the Design-Builder shall notify the Engineer in writing of his intent to file a claim for additional compensation within 7 days after the Engineer suspends the performances of the work and the provisions of Subarticle 104-8 (C) shall be strictly adhered to.

Within 14 calendar days of receipt by the Design-Builder of the notice to resume work, the Design-Builder shall submit his claim to the Engineer in writing. Such claim shall set forth the reasons and support for such adjustment in compensation, including cost records, and any other supporting justification in accordance with Subarticle 104-8(C).

### (B) Alleged Suspension:

If the Design-Builder contends he has been prevented from performing all or any portion of the work for a period of time not originally anticipated, customary, or inherent to the construction industry because of conditions beyond the control of and not the fault of the Design-Builder, its suppliers, or subcontractors at any tier, and not caused by weather, but the Engineer has not suspended the work in writing, the Design-Builder shall submit in writing to the Engineer a notice of intent to file a claim for additional compensation by reason of such alleged suspension. No adjustment in compensation will be allowed for idle equipment and/or labor prior to the time of the submission of the written notice of intent to

file a claim for additional compensation by reason of such alleged suspension. Upon receipt, the Engineer will evaluate the Design-Builder's notice of intent to file a claim for additional compensation. If the Engineer agrees with the Design-Builder's contention, the Engineer will suspend in writing the performance of all or any portion of the work and the provisions of Subarticle 104-8(C) shall be strictly adhered to.

If the Engineer does not agree with the Design-Builder's contention as described above and determines that no portion of the work should be suspended, he will notify the Design-Builder in writing of his determination. If the Design-Builder does not agree with the Engineer's determination, the provisions of Subarticle 104-8(C) shall be strictly adhered to. Within 14 calendar days after the last day of the alleged-suspension, the Design-Builder shall submit his claim to the Engineer in writing. Such claim shall set forth the reasons and support for such adjustment in compensation, including cost records, and any other supporting justification in accordance with Subarticle 104-8(C).

**(C) Conditions:**

No adjustment in compensation will be allowed under Subarticles 104-4(A) and 104-4(B) for any reason whatsoever for each occurrence of idle equipment and/or idle labor which has a duration of twenty-four hours or less.

No adjustment in compensation will be allowed under Subarticles 104-4(A) and 104-4(B) to the extent that performance would have been suspended by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this contract.

No adjustment in compensation will be allowed under Subarticles 104-4(A) and 104-4(B) for any effects caused on unchanged work. No adjustment in compensation will be allowed under Subarticles 104-4(A) and 104-4(B) except for idle equipment and/or idle labor resulting solely from the suspension of work in writing by the Engineer.

No adjustment in compensation will be allowed under Subarticles 104-4(A) and 104-4(B) where temporary suspensions of the work have been ordered by the Engineer in accordance with Article 108-7 and the temporary suspensions are a result of the fault or negligence of the Design-Builder.

## 104-7 EXTRA WORK.

The Design-Builder shall perform extra work whenever it is deemed necessary or desirable to complete fully the work as contemplated. Extra work shall be performed in accordance with the specifications and as directed by the Engineer. No extra work shall be commenced prior to specific authorization for the performance of such extra work being given by the Engineer.

Extra work which is specifically authorized by the Engineer will be paid for in accordance with Subarticle 104-8(A).

When the Design-Builder is required to perform work which is in his opinion extra work, he shall notify the Engineer in writing prior to performing such work. The Engineer will investigate and, based upon his determination, one of the following will occur.

1. If the Engineer determines that the affected work is extra work, the Design-Builder will be notified in writing by the Engineer and compensation will be made in accordance with Subarticle 104-8(A).
3. If the Engineer determines that the work is not extra work, he will notify the Design-Builder in writing of his determination. If the Design-Builder upon receipt of the Engineer's written determination intends to file a claim for additional compensation by reason of such work, he shall notify the Engineer in writing of such intent prior to beginning any of the alleged extra work and the provisions of Subarticle 104-8(B) shall be strictly adhered to.

## 104-8 COMPENSATION AND RECORD KEEPING.

### (A) Compensation--Article 104-3 and Article 104-7:

When the Engineer and Design-Builder agree that compensation is due under the provisions of Articles 104-3 or 104-7, payment will be made in accordance with one of the following:

1. When the Engineer and the Design-Builder agree to the prices to be paid, the agreement will be set forth in a supplemental agreement. If the estimated total cost of the affected work is equal to or less than $15,000.00 and the prices for performing the work have been mutually agreed to, the Design-Builder may begin work before executing the supplemental agreement. If the estimated total cost of the affected work is more than $15,000.00; the Design-Builder shall not begin the affected work until the supplemental agreement is executed.
2. When the Engineer and the Design-Builder cannot agree to the prices to be paid for the affected work, the Engineer will issue a force account notice prior to the Design-Builder beginning work. In this instance the affected work shall be performed as directed by the Engineer and paid for in accordance with the provisions of Article 109-3.

### (B) Claim for Additional Compensation--Article 104-3 and Article 104-7:

The Design-Builder's notice of intent to file a claim for additional compensation under the provisions of Articles 104-3 and 104-7 shall be given to the Engineer in writing. The Design-Builder shall keep accurate and detailed cost records in accordance with the provisions of Article 109-3. The Design-Builder's cost records and supporting data shall be complete in every respect and in such form that the Engineer may check them. The Design-Builder's cost records and supporting data shall clearly indicate the cost of performing the work in dispute and shall separate the cost of any work for which payment has been made. The Design-Builder's cost records shall be kept up to date and the Engineer shall be given the opportunity to review the methods by which the records are being maintained. The cost records shall be prepared on a weekly basis for each occurrence for which notice of intent to file a claim has been given and submitted to the Engineer within 7 days after the end of a given weekly period.

If the Design-Builder chooses to pursue the claim after the disputed work is complete, he shall submit a written claim to the Engineer for an adjustment in compensation based upon his cost records within 120 calendar days after completion of the disputed work. This claim shall summarize previously submitted cost records and clearly describe the Design-Builder's justification for an adjustment in compensation under the terms of the contract.

Upon receipt, the Engineer will review the Design-Builder's request and supporting documentation.

If the Engineer determines that the work covered by the claim is in fact compensable under the terms of the contract, an adjustment in compensation will be made based upon the documentation presented and his engineering judgment. The adjustment will be made on the next partial pay estimate and reflected on the final estimate. The compensation allowed shall be limited to the amount that would be paid if the work were performed in accordance with Article 109-3.

If the Engineer determines that the work covered by the claim is not compensable under the terms of the contract, the claim will be denied.

The Engineer will notify the Design-Builder of his determination whether or not an adjustment of the contract is warranted within 120 calendar days after receipt of the complete request, all necessary supporting justification, and cost records.

The failure on the part of the Design-Builder to perform any of the following shall be a bar to recovery under the provisions of Articles 104-3 or 104-7:

1. The failure of the Design-Builder to notify the Engineer in writing prior to performing the work in dispute that he intends to file a claim.
2. The failure of the Design-Builder to keep records in accordance with the provisions of Article 109-3.
3. The failure of the Design-Builder to give the Engineer the opportunity to monitor the methods by which records are being maintained.
4. The failure of the Design-Builder to submit additional documentation requested by the Engineer provided documentation requested is available within the Design-Builder's records.
5. The failure of the Design-Builder to submit cost records on a weekly basis.
6. The failure of the Design-Builder to submit the written request for an adjustment in compensation with cost records and supporting information within 120 calendar days of completion of the affected work.

**(C) Compensation--Article 104-4:**

The Design-Builder's notice of intent to file a claim for additional compensation under the provisions of Subarticle 104-4(A) shall be given to the Engineer in writing within 7 days after the Engineer suspends the performance of the work. For an alleged suspension, the Design-Builder's notice of intent to file a claim for additional compensation under the provisions of Subarticle 104-4(B) shall be given to the Engineer in writing. The Design-Builder shall keep accurate and detailed records of the equipment and labor alleged to be

idle. The Design-Builder's cost records, supporting data, and supporting information shall be complete in every respect and in such form that the Engineer may check them. The Design-Builder's cost records, supporting data, and supporting information for equipment idled due to the suspension or alleged suspension shall specifically identify each individual piece of equipment, its involvement in the work, its location on the project, the requested rental rate and justification as to why the equipment cannot be absorbed into unaffected work on the project during the period of suspension or alleged suspension. The Design-Builder's cost records, supporting data, and supporting information for idle labor shall include the specific employees, classification, dates and time idled, hourly rate of pay, their involvement in the project, and justification as to why they cannot be absorbed into the unaffected work on the project or other projects during the period of suspension or alleged suspension. The Design-Builder's cost records, supporting data, and supporting information shall be kept up-to-date and the Engineer shall be given the opportunity to review the methods by which the records, data, and information are being maintained. The cost records, supporting data, and supporting information shall be prepared on a weekly basis for each occurrence for which notice of intent to file a claim has been given and submitted to the Engineer within 7 days after the end of a given weekly period.

If the Design-Builder choose to pursue the claim after the suspension or alleged suspension period has ended, he shall submit a written claim to the Engineer for an adjustment in compensation based upon his cost records due to idle equipment and/or idle labor within 14 calendar days or receipt of the notice to resume work or within 14 calendar days of expiration of the alleged suspension period. This request shall summarize previously submitted cost records and clearly describe the Design-Builder's justification for an adjustment in compensation under the terms of the contract.

Upon receipt, the Engineer will evaluate the Design-Builder's request. If the Engineer agrees that the cost of the work directly associated with the suspension or alleged suspension has increased as a result of such suspension or alleged suspension and the suspension or alleged suspension was caused by conditions beyond the control of and not the fault of the Design-Builder, its suppliers, or subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment, excluding profit, and modify the contract in writing accordingly. The Design-Builder will be paid for the verified actual cost of the idle equipment and idle labor. The compensation allowed shall be limited to the equipment, labor, bond, insurance, and tax costs, excluding profits, computed in accordance with Article 109-3.

If the Engineer determines that the suspensions of the work by the Engineer or alleged suspensions do not warrant an adjustment in compensation, he will notify the Design-Builder in writing of his determination.

The Engineer will notify the Design-Builder of his determination of whether or not an adjustment in compensation is warranted within 120 calendar days after receipt of the complete request, all necessary supporting justification, and cost records.

The failure on the part of the Design-Builder to perform any of the following shall be a bar to recovery under the provisions of Article 104-4:

1. The failure to notify the Engineer in writing within 7 days after the Engineer suspends in writing the performance of all or any portion of the work.
2. The failure to notify the Engineer in writing that he intends to file a claim by reason of alleged suspension.
3. The failure of the Design-Builder to keep records in accordance with the details of Article 109-3.
4. The failure of the Design-Builder to give the Engineer the opportunity to monitor the methods by which records are being maintained.
5. The failure of the Design-Builder to submit additional documentation requested by the Engineer provided documentation requested is available within the Design-Builder's records.
6. The failure of the Design-Builder to submit cost records on a weekly basis.
7. The failure of the Design-Builder to submit the written request for an adjustment in compensation with cost records, supporting data, and supporting information within 14 calendar days of receipt of the notice to resume work.
8. The failure of the Design-Builder to submit the written request for an adjustment in compensation with cost records, supporting data, and supporting information within 14 calendar days after the last day of the period during which the Design-Builder contends he has been prevented from performing all or any portion of the work for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) because of conditions beyond the control of and not the fault of the Design-Builder, its suppliers, or subcontractors at any approved tier, and not caused by weather.

**(D) Notification of Determination:**

The failure on the part of the Engineer to notify the Design-Builder of his determination on the requested adjustment in compensation within 120 calendar days after receipt of the complete request, all supporting justification, and cost records will result in payment of interest on any monies determined to be due from the requested adjustment in compensation. Interest, at the average rate earned by the State Treasurer on the investment within the State's Short Term Fixed Income Investment Fund during the month preceding the date interest becomes payable, will be paid the Design-Builder on the next partial pay estimate and reflected on the final estimate for the period beginning on the 121st day after receipt of the complete request, all supporting justification, and cost records, and extending to the date the Engineer makes his determination on the disputed work.

If the Design-Builder fails to receive such adjustment in compensation for the disputed work as he claims to be entitled to under the terms of the contract, the Design-Builder may resubmit the written request for an adjustment in compensation to the Engineer as a part of the final claim after the project is complete. The Design-Builder will only be allowed to submit the request for an adjustment in compensation one time during the construction of the project.

## 104-9 DISPOSITION OF SURPLUS PROPERTY.

All property that is surplus to the needs of the project will remain or become the property of the Design-Builder, unless otherwise stated in the plans or special provisions, with the following exceptions:

1. Materials which are the property of utility companies providing service to buildings which are to be demolished or removed in accordance with Sections 210 and 215.
2. Materials resulting from the removal of existing pavement in accordance with Section 250 which are to be stockpiled for the use of the Department.
3. Materials resulting from the removal of existing structures in accordance with Section 402 where the plans or special provisions indicate that the material will remain the property of the Department.
4. Aggregate base course where the Special Provisions require that this material become the property of the Department.
5. Left over materials for which the Department has reimbursed the Design-Builder as provided in Article 109-6.
6. Materials that have been furnished by the Department for use on the project.

Property shall include but not be limited to materials furnished by the Design-Builder or the Department for either temporary or permanent use on the project, salvaged materials which were part of the existing facility on the date of availability for the project, and all implements, machinery, equipment, tools, supplies, laboratories, field offices, and watercraft which are necessary for the satisfactory completion of the project.

All property of the Design-Builder shall be removed from the project by the Design-Builder prior to final acceptance.

## 104-10 MAINTENANCE OF THE PROJECT.

The Design-Builder shall maintain the project from the date of beginning construction until the project is finally accepted. This maintenance shall be continuous and effective and shall be prosecuted with adequate equipment and forces to the end that all work covered by the contract is kept in satisfactory and acceptable condition at all times.

The Design-Builder shall maintain all existing drainage facilities, except where the work consists of resurfacing only, such that they are in the same condition upon acceptance of the project as they were when the project was made available.

In the event that the Design-Builder's work is suspended for any reason, he shall maintain the work covered by the contract, as provided herein.

When a portion of the project is accepted as provided in Article 105-17, immediately after such acceptance the Design-Builder will not be required to maintain the accepted portions. Should latent defects be discovered or become evident in an accepted portion of the project, such defective work shall be repaired or replaced at no cost to the Department.

Where an observation period(s) is required that extends beyond the final acceptance date, the Design-Builder shall perform any work required by the observation period until

satisfactory completion of the observation period. The Design-Builder will not be directly compensated for any maintenance operations necessary, as this work will be considered incidental to the work covered by the various contract items.

## 104-11 FINAL CLEANING UP.

Before acceptance of the work for maintenance, the highway, borrow sources, waste areas, and all ground occupied by the Design-Builder within the project limits in connection with the work shall be cleaned of all rubbish, excess materials, temporary structures, and equipment; and all parts of the work shall be left in an acceptable condition.

The Design-Builder will not be directly compensated for the work of final cleaning up, as this work will be considered incidental to the work covered by the various contract items.

## 104-12 VALUE ENGINEERING PROPOSAL

This value engineering specification is to provide an incentive to the Design-Builder to initiate, develop, and present to the Department of Transportation for consideration, any cost reduction proposals conceived by him involving changes in the drawings, designs, specifications, or other requirements of the contract. This specification does not apply unless the proposal submitted is specifically identified by the Design-Builder as being presented for consideration as a Value Engineering Proposal. Submittals that propose material substitutions of permanent features such as changes from rigid to flexible or flexible to rigid pavements, concrete to steel or steel to concrete bridges will not be considered acceptable Value Engineering Proposals. Depending on complexity of evaluation and implementation, Value Engineering Proposals that provide for total savings prior to distribution of less than the thousand dollars ($10,000.00) will not generally be considered.

Value Engineering Proposals contemplated are those that would result in a net savings to the Department by providing a decrease in the total cost of construction or reduce the construction time without increasing the cost to construct the project. The effects the Proposal may have on the following items, but not limited to these items, will be considered by the Department when evaluating the proposal:

1) Service Life
2) Safety
3) Reliability
4) Economy of Operation
5) Ease of Maintenance
6) Desired Aesthetics
7) Design
8) Standardized Features
9) Environmental Impact

The Department reserves the right to reject the Proposal or deduct from the savings identified in the Proposal to compensate for any adverse effects to these items which may result from implementation of the Proposal.

The Department reserves the right to reject at its discretion any Value Engineering Proposal submitted which would require additional right of way. Substitution of another design alternate, which is detailed in the design-build package, for the one on which the Design-Builder proposed, will not be allowed. Plan errors which are identified by the

Design-Builder and which result in a cost reduction will not qualify for submittal as a Value Engineering Proposal. Pending execution of a formal supplemental agreement, implementing an approved Value Engineering Proposal, the Design-Builder shall remain obligated to perform in accordance with the terms of the existing contract. No time extension will be granted due to the time required to review a Value Engineering Proposal.

The Design-Builder is encouraged to include this specification in contracts with subcontractors. The Design-Builder shall encourage submissions of Value Engineering Proposals from subcontractors, however, it is not mandatory that the Design-Builder accept or transmit to the Department Value Engineering Proposals proposed by his subcontractors. The Design-Builder may choose any arrangement for the subcontractor value engineering payments, provided that these payments shall not reduce the Department's share of the savings resulting from the Value Engineering Proposal.

Should the Design-Builder desire a preliminary review of a possible Value Engineering Proposal, prior to expending considerable time and expense in full development, a copy of the preliminary proposal shall be submitted to the Resident Engineer and the Value Engineering Office. The submittal shall state, Preliminary Value Engineering Proposal Review Request and must contain sufficient drawings, cost estimates and written information that can be clearly understood and interpreted. Also include the identity of any Private Engineering Firms proposed by the Design-Builder to prepare designs or revisions to designs. The Department will review the preliminary submittal only to the extent necessary to determine if it has possible merit as a Value Engineering Proposal. This review does not obligate the Department to approve the final proposal should a preliminary review indicate the proposal has possible merit. The Department is under no obligation to consider any Value Engineering Proposal (Preliminary or Final) that is submitted.

A copy of the Final Value Engineering Proposal shall be submitted by the Design-Builder to the Resident Engineer and the Value Engineering Office. The proposal shall contain, as a minimum, the following:

(1) A statement that the request for the modification is being made as a Value Engineering Proposal.

(2) A description of the difference between the existing contract requirements and the proposed modifications, with the comparative advantages and disadvantages of each.

(3) If applicable, a complete drawing of the details covering the proposed modifications and supporting design computations shall be included in the final submittal. The preparation of new designs or drawings shall be accomplished and sealed by a Professional Engineer registered in the State of North Carolina. Further, the Department may require a review, and possibly the redesign, be accomplished by the project's original designer, or an approved equal. The Department may contract with private engineering firms, when needed, for reviews requested by the Department. The contractor shall contract with the original project designer, or an approved equal, when required by the Department, for any design work needed to completely and accurately prepare contract drawings. The Department may waive the requirements to have the preparation of contract drawings accomplished by a Professional Engineer

or the project's original design based on the extent, detail, and complexity of the design needed to implement the value engineering proposal.

(4) An itemized list of the contract requirements that would be modified and a recommendation of how to make each modification.

(5) A detailed estimate of the cost of performing the work under the proposed modification.

(6) A statement of the time by which approval of the Value Engineering Proposal must be issued by the Department to obtain the total estimate cost reduction during the remainder of the contract, noting any effect on the contract completion or delivery schedule.

To facilitate the preparation of revisions to contract drawings, the contractor may purchase reproducible copies of drawings for his use through the Department's Value Engineering Office. The preparation of new design drawings by or for the Design-Builder shall be coordinated with appropriate Department Branch through the Value Engineering Office. The contractor shall provide, at no charge to the Department, one set of reproducible drawings of the approved design needed to implement the value engineering proposal.

The Engineer, as defined in Article 101-34 of the Standard Specifications, will be the sole judge of the acceptability of a Value Engineering Proposal requested in accordance with these provisions and of the estimated net savings resulting from the approval of all or any part of the Proposal. The Design-Builder has the right to withdraw, in whole or in part, any Value Engineering Proposal not accepted by the Department within the period to be specified in the Proposal per Item (6) of the preceding paragraph.

If a Value Engineering Proposal is approved, the necessary changes will be effected by Supplemental Agreement. Included as a part of the Supplemental Agreement will be provisions for price adjustment giving the Design-Builder 50 percent of the net savings to the project resulting from the modifications.

The Department reserves the right to include in the Supplemental Agreement any conditions it deems appropriate for consideration, approval, and implementation of the proposal. Acceptance of the Supplemental Agreement by the Design-Builder shall constitute acceptance of such conditions.

The final net savings to be distributed will be the difference in cost between the existing contract cost for the involved unit bid items and actual final cost occurring as a result of the modification. Only those unit bid items directly affected by the Supplemental Agreement will be considered in making the final determination of net savings. In determining the estimate net savings, the Department reserves the right to disregard the contract prices if, in the judgement of the Department, such prices do not represent a fair measure of the value of the work to be performed or to be deleted. Subsequent change documents affecting the modified unit bid items but not related to the Value Engineering Proposal will be excluded from such determination. The Department's review and administrative costs for value engineering proposals will be borne by the Department. The Design-Builder's costs for

designs and/or revisions to designs and the preparation of design drawings will be borne by the Design-Builder. The costs to either party will not be considered in determining the net savings obtained by implementing the value engineering proposal. The Design-Builder's portion of the net savings shall constitute full compensation to him for effecting all changes pursuant to the agreement. The net savings will be prorated, 50 percent for the Design-Builder and 50 percent for the Department, for all accepted Value Engineering Proposals.

Upon execution of the Supplemental Agreement, the Department will thereafter have the right to use, duplicate or disclose in whole or in part any data necessary for utilization of the modification on other projects without obligation or compensation of any kind to the Design-Builder. Restrictions or conditions imposed by the Design-Builder for use of the proposal on other projects shall not be valid.

Except as may be otherwise precluded by this specification, the Design-Builder may submit a previously approved value engineering proposal on another project.

Unless and until a Supplemental Agreement is executed and issued by the Department, the Design-Builder shall remain obligated to perform the work in accordance with the terms of the existing contract.

Acceptance of the modification and its implementation will not modify the completion date of the contract unless specifically provided for in the Supplemental Agreement.

The Design-Builder shall not be entitled to additional compensation under Section 104 of the Standard Specifications for alterations in the plans or in the details of construction pursuant to the Value Engineering Proposal.

The Department will not be liable to the Design-Builder for failure to accept or act upon any Value Engineering Proposal submitted pursuant to this provision nor for any delays to the work attributable to any such proposal.

The Department reserves the right to negotiate desired changes with the Design-Builder under the provisions of the contract even though the changes are the result of a Value Engineering Proposal submitted on another contract. In this instance the savings will be prorated in accordance with the terms of the negotiated agreement.

## SECTION 105
# CONTROL OF WORK

### 105-1 AUTHORITY OF THE ENGINEER.

The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of progress of the work; all questions which may arise as to the interpretation of the contract; and all questions as to the acceptable fulfillment of the contract on the part of the Design-Builder. His decision shall be final and he shall have executive authority to enforce and make effective such decisions and orders as the Design-Builder fails to carry out promptly.

The Engineer shall have the authority to issue any written order to the Design-Builder which he considers necessary to the prosecution of the work, and shall have executive authority to enforce such written orders as the Design-Builder fails to carry out promptly. Failure on the part of the Design-Builder to comply with any written order issued by the Engineer may be justification for disqualifying the Design-Builder from further bidding in accordance with Article 102-16.

### 105-2 PLANS AND WORKING DRAWINGS.

See Scope of Work:

### 105-3 CONFORMITY WITH PLANS AND SPECIFICATIONS.

All work performed and all materials furnished shall be in reasonably close conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on the plans, or indicated in the specifications.

In the event the Engineer finds the materials or the finished product in which the materials are used not within reasonably close conformity with the plans and specifications but that reasonably acceptable work has been produced, he will then make a determination if the work is to be accepted and remain in place. If the Engineer determines that the work is to be accepted, he will have the authority to make such adjustment in contract price as he deems warranted based upon his engineering judgment and the final estimate will be paid accordingly.

In the event the Engineer finds the materials or the finished product in which the materials are used or the work performed are not in reasonably close conformity with the plans and specifications and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected by the contractor at no cost to the Department.

The Design-Builder shall bear all the costs of providing the burden of proof that the nonconforming work is reasonable and adequately addresses the design

purpose. The Design-Builder shall bear all risk for continuing with nonconforming work in question until it is accepted.

The Engineer may impose conditions for acceptance of the nonconforming work. The Design-Builder shall bear all costs for fulfilling the conditions.

The decisions whether the product satisfies the design purpose, whether the nonconforming work is reasonably acceptable, and the conditions for acceptance are within the sole discretion of the Engineer.

## 105-4 COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS, AND SPECIAL PROVISIONS.

The Design-Build Package, the Plans, the Standard Specifications, and all supplementary documents are essential parts of the contract and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work.

In case of discrepancy or conflict, the order in which they govern shall be as follows:

(A) Design-Build Package

(B) Technical Proposal

(C) Accepted Construction Plans

(D) Standard Drawings

(E) Standard Specifications

Where dimensions on the plans are given or can be computed from other given dimensions they shall govern over scaled dimensions.

The Design-Builder shall take no advantage of any error or omission in the plans, estimated quantities, or specifications. In the event the Design-Builder discovers an error or omission, he shall immediately notify the Engineer.

## 105-5 COOPERATION BY DESIGN-BUILDER.

The Design-Builder shall cooperate with the Engineer, his inspectors, and other contractors in every way possible, and shall give the work the constant attention necessary to facilitate the progress and satisfactory performance thereof. The Design-Builder shall notify the Engineer in writing at least 7 days prior to beginning work on the project. He shall notify the Engineer at least 1 day in advance when work is to be suspended and at least 2 days in advance when work is to be resumed.

The Design-Builder shall keep available on the project site at all times the contract assembly including special provisions, standard specifications, and plans.

## 105-6 SUPERVISION BY DESIGN-BUILDER.

### (A) On Site Personnel:

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

### (B) On Call Personnel:

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

### (C) Exceptions:

If the Design-Builder elects to have the employee described under (B) above constantly available in person on the project, then the presence of this employee will be considered as also meeting the requirements of (A) above. However, whenever such employee is absent from the project then an authorized individual meeting the requirements of (A) above shall be present on the project.

## 105-7 COOPERATION BETWEEN CONTRACTORS OR DESIGN-BUILDERS.

The Department reserves the right at any time to contract for and perform other or additional work on or near the work covered by the contract.

When separate or additional contracts are let within the limits of any one project, each Contractor or Design-Builder shall conduct his work so as not to interfere with or hinder the progress or completion of the work being performed by other Contractors or Design-Builders. Contractors or Design-Builders working within the limits of the same project shall cooperate with each other.

Each Contractor or Design-Builder shall conduct his operations in such a manner as to avoid damaging any work being performed by others or which has been completed by others.

The Department will under no circumstances be liable for any claim for additional compensation due to acts of one Contractor or Design-Builder holding up the work of another.

The Department will under no circumstances be liable for any damages experienced by one Contractor or Design-Builder as a result of the presence and operations of other Contractors or Design-Builders working within the limits of the same project.

## 105-8 COOPERATION WITH UTILITY OWNERS

Prior to the beginning of construction, the Department or Design-Builder will notify all utility owners known to have facilities affected by the construction of the project and will make arrangements for the necessary adjustments of all affected public or private utility facilities. The utility adjustments may be made either before or after the beginning of construction of the project. The adjustments will be made by the utility owner or his representative, or by the Design-Builder when such adjustments are part of the work covered by his contract.

The Design-Builder shall use special care in working around and near all existing utilities that are encountered during construction, protecting them where necessary so that they will give uninterrupted service.

The Design-Builder shall cooperate with the utility owner, and/or the owner's representative in the adjustment or placement of utility facilities when such adjustment or placement is made necessary by the construction of the project or has been authorized by the Department.

In the event that utility services are interrupted by the Design-Builder, the Design-Builder shall promptly notify the owners and shall cooperate with the owners and/or the owner's representative in the restoration of service in the shortest time possible.

Existing fire hydrants shall be kept accessible to fire departments at all times.

The Design-Builder shall make his own determination as to the nature and extent of the utility facilities, including proposed adjustments, new facilities, or temporary work to be performed by the utility owner or his representative; and as to whether or not any utility work is planned by the owner in conjunction with the project construction. The Design-Builder shall consider all of the permanent and temporary utility facilities in their present or relocated positions. It will be the Design-Builder's responsibility to anticipate any additional costs to him resulting from such utility work and to reflect these costs in his bid for the various items in the contract.

Where changes to utility facilities are to be made solely for the convenience of the Design-Builder, it shall be the Design-Builder's responsibility to arrange for such changes and the Design-Builder shall bear all costs of such changes.

## 105-9 CONSTRUCTION STAKES, LINES, AND GRADES.

The Design-Builder shall be responsible for any surveying, construction staking and layout required in the performance of the work. He will be responsible for the accuracy of lines, slopes, grades and other engineering work which he provides under this contract. Unless otherwise specified in the Request for Proposal, no

measurement or direct payment will be made for this work. The cost shall be considered as included in other contract items.

## 105-10 AUTHORITY AND DUTIES OF THE INSPECTOR.

Inspectors employed by the Department are authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. The inspector is not authorized to alter or waive the provisions of the contract. The inspector is not authorized to issue instructions contrary to the plans and specifications, or to act as foreman for the Contractor; however, he has the authority to reject work or materials until any questions at issue can be referred to and decided by the Engineer. The inspector is not authorized to make any final acceptance of the work.

## 105-11 INSPECTION OF WORK.

All materials and each part or detail of the work shall be subject to inspection by the Engineer. The Design-Builder shall allow and provide a reasonable access to all parts of the work to the Engineer or his authorized representative. The Design-Builder shall also furnish such information and assistance as is required to make a complete and detailed inspection. Such access shall meet the approval of the Engineer.

The presence of the Engineer at the work site shall in no way lessen the Design-Builder's responsibility for conformity with the plans and specifications. Should the Engineer, prior to or during construction, fail to point out or reject materials or work that does not conform with plans and specifications, whether from lack of discovery or for any other reason, it shall in no way prevent later rejection or corrections to the unsatisfactory materials or work when discovered. The Design-Builder shall have no claim for losses suffered due to any necessary removals or repairs resulting from the unsatisfactory work.

If the Engineer requests it, the Design-Builder, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Design-Builder shall restore said portions of the work to the standard required by the specifications. The Design-Builder shall keep cost records of the work performed and if the uncovered work is found to be acceptable, the Department will pay the Design-Builder on a force account basis in accordance with Article 109-3 for the cost of uncovering, or removing, and the replacing of the covering or making good of the parts removed; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed, shall be at no cost to the Department.

When any other unit of government or political subdivision is to pay a portion of the cost of the work covered by the contract, its respective representatives shall have the right to inspect the work. When work is to be performed on the right of way of any railroad corporation or in proximity to other public utilities, the representatives of the railroad corporation and/or the public utilities shall have the right to inspect the work. Such inspection shall in no sense make any unit of government or political subdivision or any

railroad corporation or public utility a party to the contract, and shall in no way interfere with the rights of either party thereunder.

## 105-12 UNAUTHORIZED WORK.

No work shall be performed without established lines and grades except as otherwise permitted by the Engineer. Work performed contrary to the instructions of the Engineer or contrary to any approvals granted by the Engineer will be considered as unauthorized and will not be paid for under the provisions of the contract. Work performed beyond the lines shown on the plans or as given, except as herein specified, or any extra work performed without authority will be considered as unauthorized and will not be paid for under the provisions of the contract. Any of the above work so performed may be ordered removed, replaced, or repaired at no cost to the Department.

Upon failure on the part of the Design-Builder to comply forthwith with any order of the Engineer made under the provisions of this article, the Engineer will have the authority to cause such unauthorized work to be removed and/or adjusted to conform to the provisions of the contract and to deduct the cost of removal and/or adjustment from any monies due or to become due the Design-Builder.

## 105-13 LIMITATIONS OF OPERATIONS.

At any time when, in the opinion of the Engineer, the Design-Builder has obstructed, closed, or is conducting operations on, a greater portion of the work than is necessary for the prosecution of the work so as to constitute a hazard to the general public or impair the function of the facility being constructed where traffic must be maintained, the Engineer may require the Design-Builder to finish the portions on which work is in progress before starting work on additional portions of the work.

## 105-14 NIGHT WORK.

Whenever the Design-Builder's operations are being conducted at night, the Design-Builder shall provide such artificial lighting as may be necessary to provide for safe and proper construction and to provide for adequate inspection of the work as described in Section 1412.

## 105-15 RESTRICTION OF LOAD LIMITS.

The Design-Builder shall comply with all legal load restrictions in hauling equipment and materials on roads under the jurisdiction of the Department.

The Department has the right to place load limit restrictions on the load a Design-Builder may haul on any road or bridge in the vicinity of his contract. The Design-Builder, prior to bidding on a project, will be responsible for making his own investigations to determine beforehand the possibility of load limit restrictions being placed on any of the highways he plans to use for hauling purposes. The Design-Builder shall not be entitled to an extension of time or to compensation for any costs, inconvenience, delay, or any other adversity to the Design-Builder as the result of any reduction by the Department in load limit, or as the result of a refusal by the Department to raise load limits as hereinafter provided or under any

other conditions, and any such reduction in load limit or refusal to raise load limits shall not constitute a basis for a claim for additional compensation.

Wherever load limit restrictions below the statutory legal load limit have been posted on any roads and/or bridges on the project or within the vicinity of the project, the Department may remove the load limit restrictions from such roads and/or bridges upon written request from the Design-Builder; and the Design-Builder thereafter will be allowed to haul up to the statutory legal limits over such roads and/or bridges, provided the Design-Builder enters into an agreement with the Department providing for:

1. Maintenance by the Design-Builder of such roads in a condition satisfactory to the Engineer during the haul period.
2. Repair by the Design-Builder of all damages to such roads after haul is completed to place them in a condition as good as they were prior to removal of the load limits.
3. Furnishing bond by the Design-Builder in an amount determined by the Engineer for the roads. Furnishing a bond for the roads does not entitle the Design-Builder to exceed the posted load limits of any bridge.
4. Assumption by the Design-Builder of all costs of strengthening any bridges which may be necessary in order to safely haul loads up to statutory legal limits. The Department will, upon request by the Design-Builder, make a determination as to the method and extent of strengthening required for the bridges and will advise the Design-Builder as to the amount of work to be done or an estimate of the charges for the work if performed by Department forces. When Department forces perform the work, the Design-Builder shall reimburse the Department in the amount of the actual charges for said work. When Design-Builder's forces perform the work, it shall be done in accordance with plans approved by the engineer and under his inspection.
5. Indemnification of the Department against any and all claims from third persons arising out of or resulting from the hauling operation or the maintenance, or lack of maintenance, of haul roads. Haul roads shall be maintained not only for the Design-Builder's hauling operations, but for the use of the general public.

Equipment operated on proposed bridges shall comply with the following load restrictions.

Maximum axle load (lbs.) ..... 36,000
Maximum axle load on tandem axles (lbs.) ..... 30,000
Maximum gross load (lbs.) ..... 90,000

The Design-Builder shall keep the bridge floor clean to reduce impact forces and place approved temporary guides on the bridge floor to position the wheel loads as nearly as possible over the bridge girders. Only one earth moving vehicle shall be on a bridge at any time. Upon completion of hauling over each bridge, the Design-Builder shall clean the bridge floor, curbs and rails.

Regulations pertaining to size and weight will not apply to equipment used on the project provided the vehicles involved are not operated on pavement, completed base course, or structures.

## 105-16 FAILURE TO MAINTAIN THE PROJECT OR PERFORM EROSION CONTROL WORK.

Failure on the part of the Design-Builder to comply with the provisions of Article 104-10 or to perform erosion control work as directed will result in the Engineer notifying the Design-Builder to comply with these provisions. In the event that the Design-Builder fails to begin such remedial action or fails to begin erosion control work within 24 hours after receipt of such notice with adequate forces and equipment, the Engineer may proceed to have the work performed with other forces. No payment will be made to the Design-Builder for work performed by others. Any costs incurred by the Department for work performed by others as provided above in excess of the costs that would have been incurred had the work been performed by the Design-Builder will be deducted from monies due the Design-Builder on his contract.

## 105-17 INSPECTION AND ACCEPTANCE.

Upon apparent completion of the entire project, the Engineer will make an inspection of the project for final acceptance. If all construction provided for and contemplated by the contract is found to be satisfactorily completed, the project will be accepted. The acceptance of projects in their entirely will not be altered except as listed below:

1. When any continuous project is equal to or in excess of 5 miles in length, the Department will accept the project in 2 increments with the first increment equaling at least 50 percent of the total length of the project.
2. When it is considered to be in the best interest of the Department, other increments or parts of projects may be considered for acceptance.
3. When the contract contains an intermediate completion date requiring the completion of a portion of the work in its entirety, such portion of the work may be accepted if requested in writing by the Design-Builder.
4. Bridge decks and rails that have been constructed or rehabilitated at such time as they are open to public traffic.
5. Permanent sign panels, including hardware and retroreflective sheeting, that are required prior to the final acceptance of the project by the Traffic Control Plans or by the Engineer when the roadway where the signs are located is open to public traffic.

Acceptance of any increment or part of a project shall not operate to waive the assessment of all or any portion of liquidated damages assessable under the terms of the contract.

When the inspection discloses any work, in whole or in part, as being unsatisfactory or incomplete, the Engineer will advise the Design-Builder of such unsatisfactory or incomplete work, and the Design-Builder shall immediately correct, repair, or complete such work. The project will not be accepted and the Design-Builder shall be responsible for the maintenance of the project and maintenance of traffic until all of the recommendations made at the time of the inspection have been satisfactorily completed.

The Engineer will notify the Design-Builder in writing that the project has been accepted as soon as practicable after the completion of the project.

# SECTION 106
# CONTROL OF MATERIAL

## 106-1 GENERAL REQUIREMENTS.

The materials used on the work shall meet all requirements of the contract and shall be subject to inspection, test, or rejection by the Engineer at any time. Materials used in the work shall be new or recycled as permitted by the Specifications.

It is the Departments intent to expand the use of recovered materials in its construction programs. The Design-Builder is encouraged to find innovative and alternative ways for beneficial use of recyclable materials that are currently a part of the solid waste stream and that contribute to problems of declining space in landfills.

The Design-Builder shall make his own determination of the various kinds and quantities of materials that are necessary for the acceptable performance and timely completion of the work. It will be the Design-Builder's responsibility to obtain materials which will meet the requirements of the contract. The Design-Builder shall be responsible for the acceptability of all materials used in the work and for the timely delivery of materials to the project so that adequate time will be available for the safe and proper performance of the work.

The Design-Builder shall provide access, means, and assistance in the verification of all testing equipment, scales, measures, and other devices operated by him in connection with the testing of the materials.

If the Design-Builder desires or is required to furnish materials from local deposits, other than those, if any, described in the contract he shall assume full responsibility for the sampling of the sources and the acceptability of the material in accordance with these specifications. He shall furnish without charge such preliminary samples as may be required; except that, if requested in writing, the Engineer may allow Department forces to take samples as requested by the Design-Builder. In the latter case, the Design-Builder shall reimburse the Department for the total expense of the sampling as determined by the Engineer. Tests will be made and reports rendered, but it is understood that such tests shall in no way be construed as a guarantee of acceptance of any material which may be delivered later for incorporation in the work. The Design-Builder shall assume full responsibility for the production of uniform and satisfactory materials from such local deposits, and shall indemnify and save harmless the Department from any and all claims for loss or damages resulting from the opening and operation thereof, or from the failure of the deposit after development to produce materials acceptable to the Engineer, in either quality or quantity.

## 106-2 SAMPLES, TESTS, AND CITED SPECIFICATIONS.

The Design-Builder shall perform Quality Control (QC) and acceptance testing at the frequencies described in the Minimum Sampling Guide. Quality Assurance (QA), verification and Independent Assurance (IA) will be performed by the Department. Laboratory testing performed by the Design-Builder shall be performed by an AASHTO

Accredited facility and participate in the AMRL/CCRL proficiency testing program for the tests being performed. Technicians performing sampling and testing shall be qualified in accordance with the Department's training and certification requirements for the specific materials, or in accordance with AMRL/CCRL accreditation requirements.

Prior to beginning construction, the Design-Builder shall provide a "Table of Values" as described in Section 101-102 Definitions of Terms.

All tests will be made in accordance with the most recent standard or interim methods of the AASHTO in force on the date of advertisement. Should no AASHTO method of test exist for a material, the most recent standard or tentative method of ASTM or other methods adopted by the Department will be used.

All reference made to a specification published by AASHTO, ASTM, or any other organization other than the Department, which does not indicate the date of publication, will be understood to mean the specification current on the date of Request for Proposals for the project. When a more current specification is published during the life of the project, and when it is mutually agreed by the Design-Builder and the Engineer and such agreement is documented by a supplemental agreement, the Department may accept materials meeting the requirements of the latest publication.

## 106-3 DESIGN-BUILDER FURNISHED CERTIFICATION.

The Design-Builder shall maintain material certifications obtained from the producer, supplier, or an approved independent testing laboratory for the following types of materials, unless otherwise directed by the Engineer

1. Materials required to meet criteria documented by tests which are normally performed during the production process.
2. Materials which are required to meet specifications other than those published by AASHTO, ASTM, or the Division of Highways.
3. Materials produced at locations which are not within routine travel distance for Department representatives.
4. Materials required to meet criteria documented by tests involving special equipment not readily available to Department representatives.
5. Any other special material when so directed by the Engineer.

Material certifications of one of the following types shall be furnished for pre-tested materials. The specific type of material certification for each material shall be in accordance with the Department's Minimum Sampling Guide.

**Type 1 --- Certified Mill Test Report:**

A certified mill test report shall be a certified report of tests conducted by the manufacturer on samples taken from the same heat or lot number as the material actually shipped to the project. The report shall identify the heat or lot number.

**Type 2 --- Typical Certified Mill Test Report:**

A typical certified mill test report shall be a certified report of tests conducted by the manufacturer on samples taken from a lot which is typical of the material actually shipped to the project, but which may or may not be from the lot shipped.

**Type 3 --- Manufacturer's Certification:**

A manufacturer's certification shall be a certified statement that the material actually shipped to the project was manufactured by production processes which are periodically and routinely inspected to assure conformance to specification requirements.

**Type 4 --- Certified Test Reports:**

A certified test report shall be a certified report of test conducted by an approved independent testing laboratory on samples taken from same heat or lot number as the material actually shipped to the project. The report shall identify the heat or lot number.

**Type 5 --- Typical Certified Test Reports:**

A certified test report shall be a certified report of tests conducted by an approved independent testing laboratory on samples taken from a lot which is typical of the material actually shipped to the project, but which may or may not be from the lot shipped.

**Type 6 --- Supplier's Certification:**

A supplier's certification is a signed statement by the supplier that the material described in the certification is of the specification grade required and that the supplier has on hand Type 1, Type 2, or Type 3 material certifications to cover the material which is included in the Type 6 supplier's certification.

**Type 7 --- Design-Builder's Certification:**

Design-Builder's certification is a signed statement by a contractor that the used material described in the certification meets the requirements of the current specifications to the best of contractor's knowledge and that the contractor had in his possession at the time of purchase a Type 1, 2 or 3 materials certification to cover the material which is included in the Type 7 contractor's certification.

**Final Material Certificate:**

The Design-Builder shall, upon completion of the project, certify that all certifications were received and the materials were found in compliance with the specification requirements and list all exceptions to the plans and specifications. This certification shall be in the following format:

"This is to certify that the results of the tests on Acceptance and QC/QA samples indicate that the materials incorporated in the construction work and the construction operations controlled by sampling and testing, were in

conformity with the approved plans and specifications. Such results compare favorably with the results of the independent assurance sampling and testing. Exceptions to the plans and specifications are noted below:"

Upon final acceptance of the Project, the Design-Builder shall submit all certifications to the Engineer.

## 106-4 DELIVERY AND HANDLING OF MATERIALS.

All materials shall be handled carefully and in such manner as to preserve their quality and fitness for the work. Materials damaged during delivery or handling shall not be used without approval of the Engineer.

## 106-5 STORAGE OF MATERIALS.

Materials shall be stored so as to insure the preservation of their quality and fitness for the work. Stored materials, which may have been approved before storage, shall be subject to inspection at any time, and shall meet the requirements of the specifications at the time they are put into use. Stored materials shall be so located as to facilitate their inspection. Subject to the approval of the Engineer, that portion of the right of way not required for public travel may be used for storage purposes and for the Design-Builder's plant and equipment, but any additional space required therefor shall be provided by the Design-Builder at no expense to the Department. All storage sites located within the right of way shall be restored to their original condition by the Design-Builder at no expense to the Department, except where the materials stored are or are to become the property of the Department.

## 106-6 INSPECTION AT SOURCE.

The Engineer may undertake the inspection of materials at the source of supply. This inspection will be performed by Department personnel or private organizations retained by the Department. Where approved by the Engineer, the results of tests performed by private laboratories or producer's or manufacturer's laboratories may be used in determining compliance of a material or product with the contract.

The Department assumes no obligation to inspect materials at the source of supply and such inspection will be undertaken only upon condition that:

1. The cooperation and assistance of the Design-Builder and the producer with whom he has contracted for materials is assured.
2. The representative of the Engineer will have full entry at all times to such parts of the plant as may concern the manufacture or production of the materials.
3. Laboratory facilities shall be provided when required by the Engineer.

Where the Department agrees to inspect or test materials during their production or at the source of supply, the Design-Builder shall bear the cost of testing performed on materials ordered by him but not incorporated into the project. For items normally pretested by the Department, the Design-Builder shall provide a minimum of 30 days notice prior to the

beginning of production of the items for this project along with final approved shop drawings.

The Department reserves the right to retest all materials which have been tested and accepted at the source of supply after the same have been delivered, and to reject all materials which, when retested, do not meet the requirements of the specifications.

## 106-7 SCALES AND PUBLIC WEIGHMASTER.

This article is deleted for this project.

## 106-8 DEPARTMENT FURNISHED MATERIAL.

The Design-Builder shall furnish all materials necessary to complete the work, except those materials specified in the Design-Build Package to be furnished by the Department. Payment at the contract price for the item which includes the use of Department furnished material will be full compensation for all costs of handling and placing such materials after they are delivered or made available to the Design-Builder.

The Design-Builder will be held responsible for all material furnished him, and deductions will be made from any money due him to make good any shortage and deficiencies from any cause whatsoever and for any damage which may occur after Department furnished material has been made available.

## 106-9 DEFECTIVE MATERIAL

All materials which are not in reasonably close conformity to the requirements of the specifications shall be considered as defective and such materials, whether in place or not, shall be rejected and are to be removed from the site of the work unless otherwise permitted by the Engineer in accordance with Article 105-3. No rejected material, the defects of which may have been substantially corrected, may be used until approval has been given by the Engineer.

## 106-10 DENSITY DETERMINATION BY NUCLEAR METHODS.

The Engineer may, at his option, utilize nuclear methods as described in Article 520-10 and 610-11C to determine the density of selected pavement materials. The use of nuclear methods will include the establishment of the required density through the use of control strips constructed from materials actually being used on the project, and the determination of the density being obtained in test sections located throughout the project.

# SECTION 107
# LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

## 107-1 LAWS TO BE OBSERVED.

The Design-Builder shall keep himself fully informed of all Federal and State laws, all local laws, ordinances, and regulations, and all orders and decrees of bodies or tribunals having any jurisdiction or authority which may in any manner affect those engaged or employed in the work, or which in any way affect the conduct of the work. He shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall indemnify and hold harmless the Board of Transportation and the Department of Transportation and their agents and employees from any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, by the Design-Builder or by his agents and employees.

## 107-2 ASSIGNMENT OF CLAIMS VOID.

In accordance with G.S. 143-3.3, the Department will not recognize any assignment of claims by any Design-Builder.

## 107-3 PERMITS AND LICENSES.

The Design-Builder shall procure all permits and licenses except as otherwise specified; pay all charges, fees, and taxes; and give all notices necessary and incident to the due and lawful prosecution of the work.

## 107-4 PATENTED DEVICES, MATERIALS, AND PROCESSES.

If the Design-Builder employs any design, device, material, or process covered by letters of patent or copyright, he shall provide for such use by suitable legal agreement with the patentee or owner. The Design-Builder and his surety shall indemnify and save harmless the Department from any and all claims for infringement by reason of the use of such patented design, device, material, process, trademark, or copyright, and shall indemnify and save harmless the Department from any costs, expenses, and damages which it may be obligated to pay at any time during the prosecution or after the completion of the work by reason of any infringement.

## 107-5 ENCROACHMENT ON RIGHT OF WAY.

Any individual, firm, or corporation wishing to encroach on highway right of way shall secure a written permit from the Department. The Design-Builder is not authorized to allow any individual, firm, or corporation to perform any work within the limits of the project unless such work has been authorized in writing by the Engineer.

When so directed by the Engineer, the Design-Builder shall make any repairs necessary due to such encroachments and such work will be paid for as extra work.

## 107-6 FEDERAL PARTICIPATION.

When the United States Government pays all or any portion of the cost of the work, the Federal laws authorizing such participation and the rules and regulations made pursuant to such laws shall be observed by the Design-Builder. The work will be subject to the inspection of the representative of such Federal agencies as are created for the administration of these laws. The Design-Builder shall have no right to make the Federal Government a party to any court action solely by reason of its participation in the cost of the work or by reason of its inspection of the work.

## 107-7 SANITARY PROVISIONS.

The Design-Builder shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the requirements of the State and local Board of Health, or of other bodies or tribunals having jurisdiction.

## 107-8 PUBLIC CONVENIENCE AND SAFETY.

The Design-Builder shall at all times so conduct his work as to insure the least possible obstruction to traffic. The safety and convenience of the general public and the residents along the highway, and the protection of persons and property, shall be provided for by the Design-Builder as specified in Section 150.

## 107-9 COORDINATION WITH RAILWAY.

All work to be performed by the Design-Builder on railway right of way shall be done in a manner satisfactory to the railway company, and shall be performed at such times and in such manner as not to unnecessarily interfere with the movement of traffic upon the track of the railway company. The Design-Builder shall use all care and precautions in order to avoid accidents, damage, or unnecessary delays or interference with the railway company's traffic or other property. The Design-Builder shall carry such railroad protective insurance and public liability and property damage insurance as may be stipulated in the special provisions.

When the Design-Builder is required by the plans or special provisions to transport materials or equipment across the tracks of any railway or to perform work on railway right of way, the Design-Buildder will obtain any necessary written authority from the railway company for the establishment of a railway crossing or for the performance of work on railway right of way. The Design-Builder will be required to bear the cost of any watchman service or flagging protection necessary due to such operations, as the railway company will be reimbursed directly by the Design-Builder for the cost of such work.

In case the Design-Builder elects or finds it necessary to transport materials or equipment across the tracks of any railway at any point where a crossing is not required by the plans or special provisions, or at any point other than an existing public crossing, he shall obtain specific written authority from the railway company for the establishment of a private railway crossing and shall bear all costs in connection with such crossing, including

installation, drainage, maintenance, any necessary insurance, watchman service, flagging protection, and removal of such private railway crossing.

## 107-10 WORK IN, OVER, OR ADJACENT TO NAVIGABLE WATERS.

All work in or over navigable waters shall be in accordance with conditions contained in the permit obtained by the Department from the authority granting the permit. These conditions will be included in the project special provisions. The work shall be performed in such manner so as not to interfere with navigation of the waterway unless approval therefor is obtained from the authority granting the permit.

The Design-Builder shall prepare drawings necessary to obtain any addendums which may be required for his operations which are not included in the Department's permit. He shall coordinate their submission with the Engineer.

## 107-11 USE OF EXPLOSIVES.

When the use of explosives is necessary for the prosecution of the work, the Design-Builder shall exercise the utmost care not to endanger life or property. The Design-Builder shall be responsible for any and all damage or injury to persons or property resulting from the use of explosives. Such responsibility shall include, but shall in no way be limited to all damages arising from all forms of trespass to adjacent property as a result of blasting by the Design-Builder. Provided that in cases of damage or interruption to underground water supply or veins to adjacent landowners, the Design-Builder shall not be held responsible where the Design-Builder has used reasonable care and has taken reasonable precautions to prevent such damage.

All explosives shall be stored in a secure manner, in compliance with all laws, and all such storage places shall be marked clearly "DANGEROUS EXPLOSIVES."

The Design-Builder shall notify each public utility company having facilities in close proximity to the site of the work of his intention to use explosives. This notice shall be given sufficiently in advance to enable the utility companies to take whatever steps they may consider necessary to protect their property from injury. The Design-Builder shall also give the Engineer, all occupants of adjacent property, and all other Contractors working in or near the project notice of his intention to use explosives. Motorists shall be notified in accordance with Article 1101-10.

The Design-Builder shall submit a blasting plan to the Engineer within 24 hours after each shot. The blasting plan shall contain the full details of the drilling and blasting patterns unless otherwise approved by the Engineer, and shall contain the following information: (1) station limits of shot, (2) plan of drill hole pattern, blast hole spacing, blast hole diameters and free face, (3) initiation sequence of blastholes including delay timer and delay system, (4) manufacturers data sheet for all explosives, primers, and initiators employed, (5) loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming. The blasting plan submitted is for quality control and record keeping purposes. Review by the Engineer shall not relieve the Design-Builder of his responsibilities as provided in Article 107-12.

## 107-12 PROTECTION AND RESTORATION OF PROPERTY.

The Design-Builder shall be responsible for the protection from his activities of all public and private property on and adjacent to the work and shall use every reasonable precaution necessary to prevent damage or injury thereto. He shall use suitable precautions to prevent damage to pipes, conduits, and other underground structures, and to poles, wires, cables, and other overhead structures.

The Design-Builder shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer has witnessed or otherwise referenced their location and shall not remove them until directed.

The Design-Builder shall be responsible for the removal, preservation, and resetting of all mail boxes disturbed by the construction operations. The mail boxes and their supports, when reset, shall be left in as good a condition as they were before removal. The Design-Builder will not be required to furnish new material except as required to repair damage resulting from construction operations.

The Design-Builder will be held responsible for all damage or injury to property of any character resulting from any act, omission, negligence, or misconduct in the prosecution of the work. When any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, negligence, or misconduct in the execution of the work, he shall either restore at his own expense such property to a condition similar or equal to that existing before such damage or injury was done, or shall make good such damage or injury in a manner acceptable to the owner of the damaged property and to the Department. In case of failure on the part of the Design-Builder to restore such property or make good such damage or injury the Department may at the Design-Builder's expense repair, rebuild, or otherwise restore such property in such manner as the Engineer may consider necessary.

## 107-13 CONTROL OF EROSION, SILTATION, AND POLLUTION.

### (A) General:

The Design-Builder shall take whatever measures are necessary to minimize soil erosion and siltation, water pollution, and air pollution caused by his operations. The Design-Builder shall also comply with the applicable regulations of all legally constituted authorities relating to pollution prevention and control. The Design-Builder shall keep himself fully informed of all such regulations which in any way affect the conduct of the work, and shall at all times observe and comply with all such regulations. In the event of conflict between such regulations and the requirements of the specifications, the more restrictive requirements shall apply.

The Engineer will limit the area over which clearing and grubbing, excavation, borrow, and embankment operations are performed whenever the Design-Builder's operations do not make effective use of construction practices and temporary measures which will minimize erosion, or whenever construction operations have not been coordinated to effectively minimize erosion, or whenever permanent erosion control features are not being completed as soon as permitted by construction operations.

Following completion of any construction phase or operation, on any area greater than one acre, the Design-Builder shall provide ground cover sufficient to restrain erosion within 30 calendar days. When the construction is within a high quality water zone, as indicated in the plans, ground cover sufficient to restrain erosion shall be provided within 15 calendar days. The ground cover shall be either temporary or permanent and the type specified in the special provisions.

**(B) Erosion and Siltation Control:**

The Design-Builder shall exercise every reasonable precaution throughout the life of the project to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces, or other property.

Prior to suspension of operations on the project or any portion thereof, the Design-Builder shall take all necessary measures to protect the construction area, including but not limited to borrow sources, soil type base course sources, and waste areas, from erosion during the period of suspension.

Excavated materials shall not be deposited, nor shall earth dikes or other temporary earth structures be constructed, in rivers, streams, or impoundments. As an exception to the above, confined earth materials will be permitted when approved in writing by the Engineer.

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**(C) Coordination of Erosion Control Operations:**

Temporary and permanent erosion control measures shall be provided as shown on the plans or as directed by the Engineer. All permanent erosion control work shall be incorporated into the project at the earliest practicable time. Temporary erosion control measures shall be coordinated with permanent erosion control measures and all other work on the project to assure economical, effective, and continuous erosion control throughout the construction and post construction period and to minimize siltation of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces, or other property.

Temporary erosion control measures shall include but not be limited to the use of temporary berms, dikes, dams, drainage ditches, silt basins, silt ditches, slope drains, structures, vegetation, mulches, mats, netting, gravel, or any other methods or devices that are necessary. Temporary erosion control measures may include work outside the right of way or construction limits where such work is necessary as a result of construction such as borrow operations, haul roads, plant sites, equipment storage sites, and disposal of waste or debris. The Design-Builder shall be liable for all damages to public or private property caused by silting or slides originating in waste areas furnished by the Design-Builder.

Materials for temporary erosion control measures shall have been approved by the Engineer before being used or shall be as directed by the Engineer.

Erosion control measures installed by the Design-Builder shall be acceptably maintained by the Design-Builder.

**(D) Water and Air Pollution:**

The Design-Builder shall exercise every reasonable precaution throughout the life of the project to prevent pollution of rivers, streams, and water impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful waste shall not be discharged into or alongside of rivers, streams, or impoundments, or into natural or manmade channels leading thereto.

The Design-Builder shall comply with all State or local air pollution regulations throughout the life of the project.

**(E) Dust Control:**

The Design-Builder shall control dust throughout the life of the project within the project area and at all other areas affected by the construction of the project, including, but not specifically limited to, unpaved secondary roads, haul roads, access roads, disposal sites, borrow and material sources, and production sites. Dust control shall not be considered effective where the amount of dust creates a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property.

The Design-Builder will not be directly compensated for any dust control measures necessary, as this work will be considered incidental to the work covered by the various contract items.

**(F) Application of Specifications:**

The provisions of this article shall apply to all construction operations. Further references and detailed requirements concerning erosion, siltation, and pollution prevention and control are given in other sections of the specifications as supplements to the general requirements of this article.

**(G) Sanctions:**

In the event that temporary erosion and pollution control measures become necessary due to the Design-Builder's negligence, carelessness, or failure to incorporate permanent erosion control measures into the project at the earliest practicable time, such measures shall be performed by the Design-Builder as directed by the Engineer at no cost to the Department. If the Design-Builder fails to perform such measures as directed, the Engineer may have the work performed in accordance with Article 105-16.

Failure of the Design-Builder to fulfill any of the requirements of this article may result in the Engineer ordering the stopping of construction operations in accordance with Article 108-7 until such failure has been corrected. Such suspension of operations will not justify an extension of contract time.

Failure on the part of the Design-Builder to perform the necessary measures to control erosion, siltation, and pollution will result in the Engineer notifying the Design-Builder to take such measures. In the event that the Design-Builder fails to perform such measures within 24 hours after receipt of such notice with adequate forces and equipment, the Engineer may suspend the work as provided above, or may proceed to have such measures performed with other forces and equipment, or both. No payment will be made to the

Design-Builder for the performance of this work and the cost of such work so performed will be deducted from monies due the Design-Builder on his contract.

## 107-14 PROTECTION OF PUBLIC LANDS.

In the execution of any work within or adjacent to any State or National forest, park, or other public lands, the Design-Builder shall comply with all regulations of all authorities having jurisdiction over such forest, park, or lands, governing the protection of public lands and the carrying out of work within public lands, and shall observe all sanitary laws and regulations with respect to the performance of work in public lands. He shall keep the areas in an orderly condition, dispose of all refuse, and obtain permits for the construction and maintenance of all construction camps, stores, warehouses, residences, latrines, cesspools, septic tanks, and other structures in accordance with the requirements of the appropriate authorities.

The Design-Builder shall take all reasonable precaution to prevent and suppress forest fires and shall require his employees and subcontractors, both independently and at the request of forest officials, to do all reasonable within their power to prevent and suppress and to assist in preventing and suppressing forest fires and to make every possible effort to notify a forest official at the earliest possible moment of the location and extent of any fire seen by them.

The Design-Builder shall obtain any construction permits which may be required for his operations, which are not a part of the project, in accordance with the requirements of the regulations of the appropriate authorities.

## 107-15 RESPONSIBILITY FOR DAMAGE CLAIMS.

The Design-Builder shall indemnify and save harmless the Board of Transportation and its members and the Department of Transportation and its officers, agents, and employees from all suits, actions, or claims of any character brought for any injury or damages received or sustained by any person, persons, or property by reason of any act of the Design-Builder, Subcontractor, its agents or employees, in the performance of the contract. The Design-Builder's liability to save harmless and indemnify shall include, but not by way of limitation, the following: (1) damages or claims for the failure of the Design-Builder to safeguard the work; (2) damages or claims by reason of the failure of the Design-Builder to erect adequate barricades and post adequate warnings to the public of such barricades; (3) any damage or claims caused through the Design-Builder's use of defective materials or by the performance of defective work; (4) any claims by reason of the Design-Builder's infringement of patent, trademark, or copyright; (5) any amounts paid by the Department by reason of the Design-Builder's failure to comply with or for violations of laws, ordinances, orders, or decrees; (6) any damages or claims caused by blasting operations of the Design-Builder with or without proof of negligence on the part of the Design-Builder; (7) damages or claims caused by the failure of the Design-Builder to protect private or public property pursuant to Article 107-12, including damages to public and private property caused by silting and slides from waste areas furnished by the Design-Builder, without proof of negligence; (8) damages caused by

the failure of the Design-Builder to control erosion in accordance with the plans and specifications.

In addition to any remedy authorized by law, the Department shall have a right to retain from moneys due the Design-Builder as the Department considers necessary until final disposition has been made of the following suits or claims: (1) For all claims against the Department involving claims or damages which are the Design-Builder's responsibility under Section 107 of the specifications. The Design-Builder and the Surety shall remain responsible until such suits or claims against the Department have been settled and until the Department has been indemnified and saved harmless. (2) In case of claims by the third parties against the Design-Builder involving tort liability for which the Department might be held liable for as a taking of property, or as a tort before the Industrial Commission. However, moneys due the Design-Builder will not be retained provided the Design-Builder produces satisfactory evidence to the Department that he is adequately protected from such tort liability by public liability and property damage insurance. In all other cases involving claims or suits by third parties against the Design-Builder, amounts due the Design-Builder will not be withheld provided that the consent of the Surety is furnished and the Surety guarantees payment of any amounts for which the Design-Builder may be determined to be legally liable for. (3) In cases of damage to property of the Department, such amounts necessary to pay for such damage.

In cases where claims are made or suits filed against employees, agents, or officers of the Department of Transportation or members of the Board of Transportation, the Department of Transportation may retain from moneys due the Design-Builder sufficient to indemnify such employee, agent, or officer of the Department of Transportation or member of the Board of Transportation for any amounts which they may be held liable for but for which the Design-Builder is responsible under the provisions of Section 107 of these specifications. In the event that there is not sufficient money retained or the final estimate is paid, the Department of Transportation may collect from the Design-Builder or its Surety amounts sufficient to indemnify such employee, agent, or officer of the Department of Transportation or member of the Board of Transportation for such damages incurred.

## 107-16 LIABILITY INSURANCE.

When required by the special provisions the Design-Builder shall carry insurance of the kinds and in the amounts specified therein in addition to any other forms of insurance or bonds required under the terms of the contract, or any other insurance carried by the Design-Builder.

## 107-17 OPENING SECTIONS OF PROJECT TO TRAFFIC.

If it is determined by the Engineer that the Design-Builder will not complete the work by the completion date, intermediate completion date, or intermediate completion time, the Engineer may notify the Design-Builder in writing that upon expiration of contract time or intermediate contract time the project or any portion thereof will be open to traffic. On such sections which are opened, the Design-Builder shall conduct the remainder of his operations so as to cause the least obstruction to traffic. The Design-Builder shall not be relieved of his

liability or responsibility, shall not receive any additional compensation due to the added cost of the work, nor shall he receive any extension of the completion date, intermediate completion date, or intermediate completion time, by reason of such openings.

## 107-18 DESIGN-BUILDER'S RESPONSIBILITY FOR WORK.

Until final acceptance of the work by the Engineer, as evidenced in writing, the Design-Builder shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements, or from any other cause, whether arising from the execution or from the nonexecution of the work. The Design-Builder shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof, except as provided in other sections of the specifications. The Department will reimburse the Design-Builder for the repair of the work due to actions of the elements of such exceptional nature as to be legally classified as Acts of God.

In case of suspension of work from any cause whatever, the Design-Builder shall be responsible for all materials, and shall properly store them, if necessary, and shall provide suitable drainage of the roadway and erect necessary temporary structures at no cost to the Department.

## 107-19 FURNISHING RIGHT OF WAY.

The Department will be responsible for the securing of all necessary rights of way in advance of construction.

## 107-20 PERSONAL LIABILITY OF PUBLIC OFFICIALS.

Employees, agents, officers, and members of the Board of Transportation or the Department of Transportation shall not be held personally liable for any damages connected with the work, it being specifically understood in all such matters that they act solely as agents and representatives of the Board of Transportation or the Department of Transportation.

## 107-21 WAIVER OF LEGAL RIGHTS BY THE DEPARTMENT.

Upon completion of the work, the Department will expeditiously make an inspection and notify the Design-Builder of acceptance. Such final acceptance and processing of the final estimate, however, shall not preclude or stop the Department from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Department be precluded or stopped from recovering from the Design-Builder or his Surety, or both, such overpayment as it may sustain, or by failure on the part of the Design-Builder to fulfill his obligations under the contract. A waiver on the part of the Department of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Design-Builder, without prejudice to the terms of the contract, shall be liable to the Department for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Department's rights under any warranty or guaranty.

## 107-22 SAFETY AND ACCIDENT PROTECTION.

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

## 107-23 WAGES AND CONDITIONS OF EMPLOYMENT.

The Design-Builder's attention is directed to the provisions and requirements of any and all public statutes which regulate hours or conditions of employment on public work. Such provisions and requirements that are appropriate, in accordance with the intent of the particular law, act, or statute, will be applicable to all work performed by the Design-Builder with his own organization and with the assistance of workmen under his immediate superintendence, and to all work performed by subcontract. It will be the responsibility of the Design-Builder to ascertain the appropriate application of such provisions and requirements to the work.

In addition to the general requirements of the various regulations referred to above, certain additional regulations and restrictions may be imposed that are peculiar to the particular work under the contract. In such cases, these regulations and restrictions will be included in the special provisions for the particular project involved.

For projects that are financed wholly or in part with Federal funds, the minimum wage rates to be paid to all mechanics and laborers employed on the project will be determined by the U.S. Secretary of Labor. A schedule of such wage rates will be inserted in the Request for Propsals for such projects. The Design-Builder shall provide at the job site at no cost to the Department a weatherproof bulletin board covered with glass or rigid transparent plastic and shall display thereon at all times legible copies of such schedule of wage rates and of the wage rate information poster that will be furnished to him. The bulletin board shall be located in a conspicuous place easily accessible to all employees.

In the event that changes should occur in any of the regulations referred to in this article, or in any application thereof to the work under contract, no additional compensation will be allowed the Design-Builder as a result of such changes.

## 107-24 LIABILITY TO THIRD PARTIES.

It is not intended by any of the provisions of any part of these specifications to make the public or any member thereof a third party beneficiary hereunder, or to authorize anyone who is not a party to a contract entered into pursuant to these specifications to maintain a suit for personal injury or property damage otherwise than as authorized and provided by law.

## 107-25 RIGHT OF THE DESIGN-BUILDER TO FILE VERIFIED CLAIM.

If the Design-Builder fails to receive such settlement as he claims to be entitled to under the terms and provisions of the contract, the Design-Builder may submit a written and verified claim for such amounts he deems himself or his subcontractor(s) entitled to under the terms and provisions of the contract provided he has complied with the applicable provisions of the contract including, but not limited to, giving written notice of intent to file a claim, keeping and submission of cost records, and the initial submission of a written claim within the specified time period. The claim shall be submitted to the State Highway Administrator within 60 days from the time the Design-Builder receives the final estimate as defined by Article 101-38 and shall be submitted in accordance with G.S. 136-29.

## 107-26 HAZARDOUS, CONTAMINATED, AND/OR TOXIC MATERIAL.

When the Design-Builder's operations encounter or expose any abnormal condition which may indicate the presence of a hazardous, contaminated, and/or toxic material, such operations shall be discontinued in the vicinity of the abnormal condition and the Engineer shall be notified immediately. Upon notification by the Design-Builder, the Engineer will investigate the work and, if necessary, suspend the work in accordance with Article 108-7. The presence of barrels; old or abandoned underground storage tanks; and discolored earth, metal, wood, etc.; visible fumes; abnormal odors; excessively hot earth; smoke; or anything else which appears abnormal may be indicators of hazardous, contaminated, and/or toxic materials and shall be treated with extraordinary caution as they are evidence of abnormal conditions.

The Design-Builder's operations shall not resume until so directed by the Engineer.

Disposition of the hazardous, contaminated, and/or toxic material will be made in accordance with the requirements and regulations of the Department of Human Resources and the Department of Environment, Health & Natural Resources. Where the Design-Builder performs work necessary to dispose of hazardous, contaminated, and/or toxic material, payment will be made at the unit prices for pay items included in the contract which are applicable to such work or, where the contract does not include such pay items, payment will be made as provided in Article 104-7 for extra work. Where the contract does not include pay items for the work necessary to dispose of hazardous, contaminated, and/or toxic material, the Engineer may have the work performed by others.

# SECTION 108
# PROSECUTION AND PROGRESS

## 108-1 GENERAL.

It is the intent of these specifications that the Design-Builder shall commence work on the date of availability shown in the Request for Proposals or as soon thereafter as practicable, but not before the contract has been executed by both the Design-Builder and the Department. The Design-Builder shall not begin work prior to the date of availability without written approval of the Engineer. If such approval is given and the Design-Builder does begin work prior to the date of availability the Department will assume no responsibility for any delays caused prior to the date of availability by any reason whatsoever, and such delays, if any, will not constitute a valid reason for extending the completion date.

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

## 108-2 PROGRESS SCHEDULE.

**This section is replaced by the Project Special Provision entitled " PROGRESS SCHEDULE" contained elsewhere in this Design-Build Package.**

## 108-3 PREDESIGN CONFERENCE / PRECONSTRUCTION CONFERENCE.

The selected Design-Builder shall meet with the Engineer for a predesign conference concerning the design phase of the work. This conference shall be held prior to the commencement of work, as it is determined according to Article 108-1, and will be scheduled by the Engineer. At the predesign conference, the Design-Builder shall furnish authorized signature forms and a list of any proposed subcontractors and major material suppliers associated with the design of the project.

A preconstruction conference shall be held at least 10 working days before construction activity begins. This second conference, concerning the construction phase, shall also be scheduled by the Engineer. The Design Builder shall give the Engineer a minimum of 45 days notice before he plans to begin construction activities. This will allow the Engineer time for any environmental agency representatives involved in the permitting process, as well as any other pertinent entities, to be scheduled to attend the preconstruction conference. If the Design-Builder is responsible for utilities in accordance with Article 105-8, he shall be responsible for coordinating with the Engineer in scheduling their attendance and for notifying them. The Design-Builder shall also be responsible for coordinating with the

Engineer in scheduling the attendance of subcontractors and others deemed appropriate, and for notifying them.

At the preconstruction conference, a list of any proposed subcontractors and major. material suppliers associated with the construction of the project will be submitted.

If the contract has a DBE requirement, the Design-Builder shall submit copies of completed and signed DBE subcontracts, purchase orders, or invoices to the Department.

The Design-Builder shall submit a traffic control plan in accordance with Article 1101-5. The Design-Builder shall designate an employee who is competent and experienced in traffic control to implement and monitor the traffic control plan. The qualifications of the designated employee must be satisfactory to the Engineer.

The Design-Builder shall submit a safety plan and designate an employee as Safety Supervisor.

Both plans shall be submitted at the preconstruction conference and must be satisfactory to the Engineer. Should the design plan include activities that would place personnel on the work site, traffic control and safety plans for those activities would be submitted at the predesign conference.

During the preconstruction conference, the Engineer will designate a Department employee or employees who will be responsible to see that the traffic control plans and any alterations thereto are implemented and monitored to the end that traffic is carried through the work in an effective manner. If approved by the Engineer, the Design-Builder may designate one employee to be responsible for both the traffic control and safety plans. The Design-Builder shall not designate its superintendent as the responsible person for either the traffic control plan or the safety plan, unless approved by the Engineer.

If the project requires that Design-Builder or State personnel work from falsework, within shoring, or in any other hazardous area the Design-Builder shall submit, as part of the Design-Builder's safety plan, specific measures it will use to ensure worker safety.

The Design-Builder shall also submit a program for erosion control and pollution prevention on all projects involving clearing and grubbing, earthwork, structural work, or other construction, when such work is likely to create erosion or pollution problems.

If the Design-Builder fails to provide the required submissions, the Engineer may order the preconstruction conference suspended until such time as they are furnished. Work shall not begin until the preconstruction conference has been concluded and the safety plan has been approved, unless authorized by the Engineer. The Design-Builder shall not be entitled to additional compensation or an extension of contract time resulting from any delays due to such a suspension.

The Design-Builder shall designate a qualified employee as Quality Control Manager. The Quality Control Manager shall be responsible for the implementing and monitoring of the quality control requirements of the project.

## 108-4 CONSTRUCTION CONFERENCES.

After work on the project has begun, construction conferences are to be held no less than once per month. The construction conferences are to be scheduled at times which are mutually agreeable to both the Design-Builder and the Department. It shall be the Design-Builder's responsibility to attend and record the proceedings of these conferences.

## 108-5 CHARACTER OF WORKMEN, METHODS, AND EQUIPMENT.

The Design-Builder shall at all times employ sufficient labor and equipment for prosecuting the several classes of work to full completion in the manner and time required by these specifications.

"The Design-Builder cannot recruit Department employees for employment. Additionally, Department employees who elect to become employed by a Design-Builder may not perform any function on a project which they have been involved in during employment with the Department without written consent of the State. Any person employed by the Design-Builder and assigned to a project who has previously been involved in the project as a Department employee shall be, at the written direction of the Engineer, removed from the project. An exception to these terms may be granted when recommended by the Secretary and approved by the Board of Transportation.

Failure of the Design-Builder to comply may be justification for disqualifying the Design-Builder from further bidding in accordance with the provisions of Article 102-16 and shall be grounds for termination of this contract.

No person shall be employed by the Design-Builder or by any Subcontractor who has been determined by the Engineer to have engaged in fraudulent activities in connection with any work for the Department of Transportation.

Any person employed by the Design-Builder or by any Subcontractor who, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is disrespectful, intemperate, or disorderly or who has been determined by the Engineer to have engaged in fraudulent activities in connection with any work for the Department of Transportation shall be, at the written request of the Engineer, removed forthwith by the Design-Builder or Subcontractor employing such person, and shall not be employed again in any portion of the work without the approval of the Engineer.

Should the Design-Builder fail to remove such person or persons as required above, the Engineer may suspend the work in accordance with the provisions of Article 108-7 until such orders are complied with.

All equipment which is proposed to be used on the work is to be of sufficient size and in such mechanical condition as to meet the requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the project shall be such that no injury to the roadway, adjacent property, or other highways will result from its use. The Engineer may order in writing the removal and replacement of any unsatisfactory equipment.

When the methods and equipment to be used by the Design-Builder in accomplishing the construction are not prescribed in the contract, the Design-Builder is free to use any methods or equipment that he demonstrates to the satisfaction of the Engineer will accomplish the contract work in conformity with the requirements of the contract.

When the contract specifies that the construction be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If the Design-Builder desires to use a method or type of equipment other than those specified in the contract, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given it will be on the condition that the Design-Builder will be fully responsible for producing construction work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet contract requirements, the Design-Builder shall discontinue the use of the substitute method or equipment and shall complete the remaining construction with the specified methods and equipment. The Design-Builder shall remove the unsatisfactory work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of payment for the construction items involved nor in the completion date as a result of authorizing a change in methods or equipment under these provisions.

## 108-6 SUBLETTING OF CONTRACT.

The Design-Builder shall not sublet, sell, transfer, assign, or otherwise dispose of the contract or any portion thereof; or of his right, title, or interest therein; without written consent of the Engineer. In case such consent is given, the sublet work shall be performed by the Subcontractor unless otherwise approved in writing by the Engineer. Failure of the Design-Builder to comply with these provisions will be just cause for the work to be considered unauthorized in accordance with Article 105-12. A firm which has been disqualified due to its failure to maintain satisfactory progress under the provisions of Article 108-8 will not be approved as a subcontractor until the firm demonstrates the ability to perform the work in a satisfactory manner. When directed by the Engineer, the Design-Builder shall submit a certified copy of the actual subcontract agreement executed between the Design-Builder and Subcontractor prior to written consent being issued by the Engineer. In case such consent is given, the Design-Builder will be permitted to sublet a portion thereof, but shall perform with his own organization, work amounting to not less than 30 percent of the total original contract amount, except:

1. Any items sublet to Disadvantaged Business Enterprise (DBE), Minority Business (MB) or Women's Business (WB), up to the value of the contract DBE, MB or WB goal, will be deducted from the total original contract amount before computing the amount of work required to be performed by the Design-Builder with his own organization.

Extra work performed in accordance with Article 104-7 will not be considered in the computation of work required to be performed by the Design-Builder.

An assignment by operations of law or assignment for the benefit of creditors, or the bankruptcy of the Design-Builder, shall not vest any right in this contract in the Trustee in bankruptcy, the Design-Builder's creditors, or the agent of the creditors.

A Subcontractor shall not sublet, sell, transfer, assign, or otherwise dispose of his contract with a Design-Builder or any portion thereof; or of his right, title, or interest therein; without written consent of the Engineer. When directed by the Engineer, the Design-Builder shall submit a certified copy of the actual subcontract agreement executed between the Subcontractor and the Second Tier Subcontractor. In the event of an assignment by operations of law or the bankruptcy of the Subcontractor, the Design-Builder shall have the right, power, and authority, in its discretion, without violating the contract or releasing the Surety, to terminate the subcontract. An assignment by operations of law or assignment for the benefit of creditors or the bankruptcy of the Subcontractor shall not vest any right in this contract in the Trustee in bankruptcy, nor the Subcontractor's creditors or agents of the creditors.

Neither the Design-Builder, nor any Subcontractor, shall enter into any written or oral equipment lease or rental agreement, materials purchase agreement, and/or labor agreement which circumvents the provisions of this article.

If the Design-Builder or a Subcontractor enters into a lease or rental agreement for equipment based upon payment for a unit of work, such agreement will be considered subletting of the contract unless the lease or rental agreement is with a commercial equipment company, manufacturer, and/or commercial leasing agency and such firm has been approved by the Engineer. An equipment lease or rental agreement which is based upon unit prices per unit of time will not be considered subletting of the contract.

The approval of any subcontract will not release the Design-Builder of his liability under the contract and bonds, nor will the Subcontractor or the second tier Subcontractor have any claim against the Department of Transportation by reason of the approval of the subcontract. The State Highway Administrator will review and consider Subcontractor claims for additional time or compensation provided such claims are submitted by the contractor in accordance with Article 107-25 and General Statute 136-29.

Failure of the Design-Builder to comply with any of the provisions of this article may be justification for disqualifying the Design-Builder from further bidding in accordance with the provisions of Article 102-16.

## 108-7 TEMPORARY SUSPENSION OF THE WORK.

The Engineer will have the authority to suspend the work wholly or in part by written order for such periods as he may deem necessary for any of the following reasons:

1. Conditions considered unfavorable for the suitable prosecution of the work, or
2. The Design-Builder's failure to correct conditions unsafe for workmen or the general public, or
3. The Design-Builder has not carried out orders given to him by the Engineer, or

4. The Design-Builder's failure to perform any provisions of the contract.

No extension of the completion date will be allowed for the above suspensions except as may be provided for in Article 108-10.

## 108-8 FAILURE TO MAINTAIN SATISFACTORY PROGRESS.

The Engineer will check the Design-Builder's progress at the time each partial pay request is received. The Design-Builder's progress may be considered as unsatisfactory if, according to the CPM of Record, the projected finish date for all work exceeds the scheduled finish date by greater than 10%.

When the Design-Builder's progress is found to be unsatisfactory as described above, the Engineer may make written demand of the Design-Builder to state in writing the reason for the unsatisfactory progress and produce such supporting data as the Engineer may require or the Design-Builder may desire to submit. The Engineer will consider the justifications submitted by the Design-Builder and extensions of the completion date that have or may be allowed in accordance with Article 108-10(B).

When the Design-Builder cannot satisfactorily justify the unsatisfactory progress the Engineer may invoke one or more of the following sanctions:

1. Withhold anticipated liquidated damages from amounts currently due or which become due.
2. Remove the Design-Builder and all firms prequalified under the Design-Builder's Prequalification Number from the Department's list of qualified bidders.

When any of the above sanctions have been invoked, they shall remain in effect until rescinded by the Engineer.

## 108-9 DEFAULT OF CONTRACT.

### (A) Declaration of Default:

The Department shall have the right to declare a default of the contract for breach by the Design-Builder of any material term or condition of the contract or specifications. Material breach by the Design-Builder shall include, but specifically shall not be limited to failure to begin work under the contract within the time specified; failure to provide workmen, equipment, or materials adequate to perform the work in conformity with the plans and specifications by the completion date; unsatisfactory performance of the work; refusal or failure to replace defective work; failure to maintain satisfactory work progress; failure to comply with equal employment opportunity contract requirements; insolvency or bankruptcy, or any act of insolvency or bankruptcy; failure to satisfy any final judgment within 10 days after entry thereof; and making an assignment for benefit of creditors.

### (B) Sanctions:

In the event of a breach of the contract by the Design-Builder, the Department shall have the right, power, and authority, in its sole discretion, without violating the contract or

releasing the surety: to assume full control of the prosecution of the contract in the place and stead of the Design-Builder in directing Design-Builder's agents, employees, and Subcontractors in the performance of the work and in utilizing all materials, tools, machinery, equipment, and structures located on the project; to perform the work or any part thereof with Department personnel and equipment or to utilize any or all materials and equipment located on the project that are suitable and acceptable; to relet the work upon such terms and conditions as the Department shall deem appropriate; to employ any other methods that it may determine are required for completion of the contract in an acceptable manner; and to withhold any sums due the Design-Builder under the contract without penalty or interest until the work is completed and accepted by the Department.

**(C) Notice:**

Before invoking any of the sanctions provided for herein, the Department, acting through the Engineer, will give the Design-Builder at least 7 days written notice with a copy to the Surety, which will set forth the breach of contract involved and the sanctions to be imposed. The Department, in its discretion, may grant the Design-Builder time in excess of 7 days within which to comply with the contract terms and specifications, and the time allowed will be set forth in writing. If the Department determines during such period that the Design-Builder is not proceeding satisfactorily to compliance, it may impose the sanctions after 24 hours notice to the Design-Builder. If the Department determines that the Design-Builder is not in compliance at the end of the time allowed, it may immediately impose any of the sanctions set forth herein and will advise the Design-Builder, in writing, with a copy to the Surety of the sanctions imposed.

**(D) Payment:**

After declaration of default has been made final, the Design-Builder will be entitled to receive payment for work satisfactorily completed or portions of work satisfactorily completed, less any sums that may be due the Department from the Design-Builder but in no event shall payment exceed the contract unit or lump sum price for such work. The Department, at its election, may retain the sum due the Design-Builder, or any portion thereof, without interest or penalty, until the contract work is completed; or it may make payment to the Design-Builder upon declaration of default for work satisfactorily completed to the date that notice of default is received by the Design-Builder. The Design-Builder may be required by the Engineer, however, to carry to a stage of completion satisfactory to the Engineer any work in progress, the value of which otherwise would be lost by immediate cessation of work. Payment for such work will be made upon the basis hereinafter set out.

In the event that the Design-Builder's employees, equipment, or materials are used in prosecution of the work, or any part thereof, after default is declared, payment to the Design-Builder may be by contract unit or lump sum prices for the work performed, or, if the Engineer determines that such prices do not represent the value of the work performed, payment for the type of work or services performed will be made on a force account basis, as set forth in Article 109-3, less any sums that may be due the Department; but in no event shall payment exceed the contract unit or lump sum price for such work or services.

Determination of the method of payment shall be in the sole discretion of the Engineer, and he will advise the Design-Builder, in writing, of his determination with reference to the specific type of work or service to be performed.

If all costs and expenses incurred by the Department arising out of the breach and imposition of sanctions, together with the total cost to the Department of securing the performance of the work set forth in the contract, exceed the sum that would have been payable under the contract, the Design-Builder and the Surety shall be liable to the Department for such excess and shall pay such amount to the Department.

**(E) Authority of Engineer:**

The Engineer will exercise the powers and discretion vested in him by the specifications and other contract conditions in carrying out the terms of this article. He will have full power and authority to carry out any orders, directives, or resolutions issued by the Department in connection with a declaration of default. In the event that the Department fails to specify the sanctions to be imposed, the notice to be given, or the method of completing the work, the Engineer, may, in his discretion, impose such sanctions, give such notice, and select such methods of completing the work, as are authorized by this article; and such actions shall have the same effect and validity as if taken pursuant to an express order, directive, or resolution of the Department.

**(F) Obligation of Design-Builder and Surety:**

No term or terms of this article and no action taken pursuant hereto by the Department of Transportation, its agents, or employees, will be construed to release or discharge the Design-Builder or the Surety upon the obligation set forth in the contract bonds, and the Design-Builder and the Surety shall remain bound thereon unto the Department until the work set forth in the contract has been completed and accepted by the Department and all obligations of the Design-Builder and the Surety arising under the contract and contract bond have been discharged.

**(G) Provision Not Exclusive:**

The provisions shall be in addition to, and not in place of, any other provisions relating to default, breach of contract, and sanctions to be imposed in connection therewith appearing in the contract.

## 108-10 CONTRACT TIME; INTERMEDIATE CONTRACT TIME.

**(A) General:**

The contract time will be as defined in Article 101-24. No extensions to the completion date will be authorized except as allowed by this article. No modifications in the date of availability will be made for any reason whatsoever.

Intermediate contract time, as defined in Articles 101-47 and 101-48, will be that as allowed in the special provisions to complete a part, portion, or phase of the total work covered in the contract. Intermediate completion dates and intermediate completion times set forth in the special provisions may be extended on the same basis as completion dates and as described in this article.

When the liquidated damages stipulated in the project special provisions are to be on an hourly basis, extensions as described in this article will be considered on an hourly basis.

**(B) Completion Date, Intermediate Completion Date, and Intermediate Completion Time Extensions:**

No extension of the completion date, intermediate completion date, or intermediate completion time will be allowed for any reason except as provided for below:

1. If supplemental agreements covering the performance of extra work include provisions for an extension of the completion date, intermediate completion date, or intermediate completion time, and the final dollar value of the extra work exceeds the estimated dollar value, the number of days or the number of hours by which the completion date, intermediate completion date, or intermediate completion time was extended will be increased by the percentage which the final dollar value exceeds the estimated value.
2. If the Design-Builder's current controlling operation(s) are delayed by circumstances originating from work required under the contract and beyond his control and without his fault or negligence, he may, at any time prior to the final payment make a written request to the Engineer for an extension of the completion date, intermediate completion date, or intermediate completion time. This request shall include: (a) the circumstances resulting in the alleged delay and documentation of said circumstances as may be required by the Engineer, (b) the controlling operation(s) alleged to have been delayed, (c) the calendar dates or calendar dates and times on which the controlling operation(s) were delayed and (d) the number of calendar days or hours by which he is requesting the completion date, intermediate completion date, or intermediate completion time to be extended.

   If the Engineer determines that the controlling operation(s) were delayed because of circumstances beyond the control of and without the fault or negligence of the Design-Builder, and that the Design-Builder has pursued the work in accordance with Article 108-1, he will extend the completion date, intermediate completion date, or intermediate completion time unless otherwise precluded by other provisions of the contract. No extension of the completion date, intermediate completion date, or intermediate completion time will be allowed for delays caused by restrictions, limitations or provisions contained in the contract.
3. If changes in the work from that originally contemplated in the Design-Build Package are ordered by the Engineer and these changes result in additional work and/or extra work, the Engineer will allow an extension in the completion date, intermediate

completion date, or intermediate completion time as he may deem warranted by such changes. It is, however, the Design-Builder's responsibility to show just cause for an extension in the completion date, intermediate completion date, or intermediate completion time due to the aforesaid conditions.

Submit all requests for extensions of Contract time in writing. Only delays to activities which affect the Contract completion date will be considered for an extension of contract time. No time extensions will be granted until a delay occurs which impacts the project's critical path, consumes all available float, and extends the work beyond the contract completion date. Include in the request a written narrative describing the events which would require an extension of contract time.

Any extension to the Contract completion date will be based on the number of calendar days the Contract completion date is impacted as determined by the Engineer's analysis.

The Design-Builder's plea that insufficient contract time (days), intermediate contract time (days), or intermediate contract time (hours) was specified in the contract will not be considered as a valid reason for an extension in the completion date, intermediate completion date, or intermediate completion time.

## 108-11 LIQUIDATED DAMAGES.

It is mutually recognized that time is an essential element of the contract, and that delay in completing the work will result in damages due to public inconvenience, obstruction to traffic, interference with business, and the increasing of engineering and administrative costs to the Department. It is therefore agreed that in view of the difficulty of making a precise determination of such damages, a sum of money in the amount stipulated in the special provisions will be charged against the Design-Builder for each calendar day, each hour, or portion thereof that the work, or any portion of the work as described in the special provisions, remains uncompleted after the expiration of the completion date, intermediate completion date, or intermediate completion time shown in the special provisions, not as a penalty but as liquidated damages.

Should the Design-Builder or, in case of default, the Surety fail to complete the work or any portion of the work by any of the applicable completion dates, intermediate completion dates, or intermediate completion times shown in the special provisions, a deduction of the amount stipulated in the special provisions as liquidated damages will be made for each and every calendar day, for each and every hour, or portion thereof that the work or any portion of the work remains uncompleted after the expiration of any completion date, intermediate completion date, or intermediate completion time applicable to the uncompleted work. This amount will be deducted from any money due the Design-Builder or his Surety under the contract, and the Design-Builder and his Surety will be liable for any liquidated damages in excess of the amount due.

In the event that the special provisions establish one or more intermediate completion dates and/or one or more intermediate completion times in addition to the completion date, each of the liquidated damages stipulated will be considered to be cumulative to any other liquidated damages stipulated.

In case of default of the contract and the completion of the work by the Department, the Design-Builder and his Surety will be liable for the liquidated damages under the contract, but no liquidated damages will be chargeable for any delay in the final completion of the work by the Department due to any action, negligence, omission, or delay of the Department.

In any suit for the collection of or involving the assessment of liquidated damages, the reasonableness of the amount stipulated in the contract will be presumed. The liquidated damages referred to herein are intended to be and are cumulative, and will be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the contract.

Permitting the Design-Builder to continue and finish the work or any part thereof after the expiration of the completion date, intermediate completion date, or intermediate completion time shall in no way operate as a waiver on the part of the Department of any of its rights under this contract.

## 108-12 EXTENSION OF CONTRACT TIME AND APPORTIONMENT OF LIQUIDATED DAMAGES.

It is the intent of Articles 108-10 and 108-11 of these specifications that when a contract is not completed by the completion date, intermediate completion date, or intermediate completion time the Design-Builder shall be entitled to an extension of the completion date, intermediate completion date, or intermediate completion time and apportionment and remittance of liquidated damages to the extent that the failure to complete was due to the conditions set forth in Article 108-10. The Design-Builder, however, shall be entitled to an extension of the completion date, intermediate completion date, or intermediate completion time, or an apportionment and remittance of liquidated damages only to the extent and in the proportion that such delays were caused by the conditions set forth in Article 108-10, and it is understood that any extension granted shall not operate to waive any liquidated damages or any claim which the Department has or may have against the Design-Builder by reason of failure of the Design-Builder to complete the said contract by the completion date, intermediate completion date, or intermediate completion time specified therein or as revised by authorized extensions.

## 108-13 TERMINATION OF CONTRACT.

The Board may terminate the contract in accordance with the following provisions:

1. Consideration will be given to termination of the contract if any of the following circumstances exist:
   a. If it is impossible for the Design-Builder to obtain critical materials for completion of the contract within a practical time limit, or

b. If it is impossible for the Design-Builder to complete the work in accordance with the contract by reason of unanticipated conditions at the site, including slides and unstable subsoil, without a major change in the design of the project and the Design-Builder will be unduly delayed in completing the project by reason of such unanticipated conditions and changes in design, or

c. If the Design-Builder is prevented from proceeding with the contract as a direct result of an Executive Order of the President with respect to the prosecution of war or in the interest of national defense, or

d. If the Design-Builder is prevented from proceeding with the work required by the contract as a direct result of a restraining order, or other court order, or by reason of a permit requirement, and the Design-Builder will be unduly delayed in completing the project by reason of such order or requirement, or

e. If the Design-Builder is prevented from proceeding with the work due to the unavailability of the site.

2. The Design-Builder shall determine that the circumstances in item 1 exist and are beyond his control, and shall notify the Department in writing of his determination and include adequate documentation of these circumstances along with such notification.

3. The Contract will be terminated under this article if:

   a. Request by Design-Builder:

      i. The Board concurs in the determination by the Design-Builder of the circumstances or makes an independent determination that such circumstances hereinabove indicated exist, and

      ii. The Board determines that such circumstances are beyond the control of the Design-Builder, and the Design-Builder was not at fault in creating the circumstances, and

      iii. The Board determines that a termination of the contract is in the best public interest, or

   b. Authority of the Board:

      The Board determines that a termination of the contract is in the best public interest.

4. The Design-Builder will be notified in writing by the State Highway Administrator of the action of the Board.

5. After a contract is terminated in accordance with this termination provision, the following provisions shall be applicable:

   a. When the contract is terminated before completion of all items of work in the contract, payment will be made for the actual number of acceptably completed items of work or acceptably completed portions thereof at the contract unit or lump sum prices. When the contract is terminated before completion of all items

of work in the contract and items of work are partially completed or not begun, payment will be made in accordance with Article 104-6.

b. Upon request from the Design-Builder, materials meeting the requirements of the contract which were to have been incorporated into the work or were to remain the property of the Department but are not used in the work will be paid for in accordance with Article 109-6.

c. No claim for loss of anticipated profits will be considered and no payment will be made for loss of anticipated profits.

d. Termination of a contract shall not relieve the Design-Builder of his responsibilities for any completed portion of the work nor shall it relieve his Surety, of its obligation for and concerning any just claims arising out of the work performed.

## 108-14 TERMINATION OF CONTRACTOR'S RESPONSIBILITY.

After the project has been completed and accepted, as provided for in Article 105-17, the Design-Builder's responsibility will cease except as provided in Article 107-21 and as set forth in his contract bonds.

# SECTION 109
# MEASUREMENT AND PAYMENT

## 109-1 MEASUREMENT OF QUANTITIES.

All work completed under the contract will be measured by the Engineer according to United States standard measures unless otherwise stated in the contract.

The method of measurement and computations used in the determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to accepted engineering practice.

The terms "gage" and "thickness", when used in connection with the measurement of plates, sheets, and steel wire, shall be applied as follows:

Uncoated Steel Sheets and Light Plates ..... United States Standard Gage
Galvanized Sheets ..... AASHTO M218 or M167
**Aluminum Sheets AASHTO M196 or M197**

Steel Wire .....AASHTO M32

The term ton will mean short ton consisting of 2,000 pounds avoirdupois.

Cement will be measured by the barrel unless otherwise indicated elsewhere in the Specifications. The term barrel will mean 376 pounds of cement.

Trucks used to haul material being paid for by weight will be either weighed empty prior to each loading or weighed empty on a daily basis. When trucks are weighed empty on a daily basis, each truck shall be weighed prior to hauling its first load of the day and shall bear a legible identification mark.

Where aggregates that are to be paid for by weight have been stockpiled after being produced, measurement for purposes of payment will be made after the aggregates have been loaded on trucks for direct delivery to the project.

When a complete structure or structural unit, as may be indicated by the unit "lump sum" or "each", is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When standard manufactured items are specified, and these items are identified by gage, unit weight, section dimensions, and/or other dimensions, such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

## 109-2 SCOPE OF PAYMENT.

The Design-Builder shall receive and accept compensation provided for in the contract as full payment for furnishing all materials and performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof, subject to the

provisions of Article 107-21. Payment to the Design-Builder will be made only for the work completed and accepted in accordance with the terms of the contract.

If the "Basis of Payment" or "Compensation" clause in the specifications relating to any unit price or lump sum price in the bid schedule requires that the said unit price or lump sum price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the specifications.

## 109-3 FORCE ACCOUNT WORK.

**(A)Design:**

The actual costs for labor incurred times the multiplier of 2.8 will be paid.

**(B) Construction:**

All force account work shall be performed as directed by the Engineer including the numbers and types of equipment, the numbers and classifications of labor and foremen, and material requirements.

All work to be paid for on a force account basis will be paid for in the following manner:

1. Labor. For all authorized labor and foremen in direct charge of the specific operations, the Design-Builder will receive the rate of base wages (or scale) actually being paid by the Design-Builder for each hour that the labor and foremen are actually engaged in the work. Prior to beginning the work the Design-Builder shall submit in writing for the Engineer's approval a list of all wage rates applicable to the work. Approval will not be granted where these wage rates are not actually representative of wages being paid elsewhere on the project for comparable classes of labor performing similar work. Payment for overtime will be allowed when approved by the Engineer prior to performing the work. An amount equal to 35 percent of the total base wages paid for labor and foremen will be added to the total base wages paid to the Design-Builder.

   The percentage additive will be full compensation for overhead, profit, benefits, and contingencies.

2. Bond, Insurance, and Tax. For property damage, liability, and worker's compensation insurance premiums, unemployment insurance contributions, bond premiums, and social security taxes on the force account work, the Design-Builder will receive the actual cost to which cost 6 percent will be added. The Design-Builder shall furnish satisfactory evidence to the Engineer of the rate or rates paid for such bond, insurance, and tax.

   An annualized composite percentage of the direct cost for labor and foremen may be used to determine the cost for bond, insurance, and tax to which cost 6 percent will be added. The Design-Builder shall furnish satisfactory evidence to the Engineer of the annualized composite percentage for the bond, insurance, and tax.

   The percentage additive will be full compensation for overhead, profit, and contingencies.

3. Materials. For materials authorized and accepted by the Engineer and used, the Design-Builder will receive the actual cost of such materials, including transportation charges paid by him (exclusive of equipment rentals as hereinafter set forth), to which cost 15 percent will be added. The Design-Builder shall furnish records to the Engineer to verify the quantities of materials used in the work, prices of the materials, and costs of transportation for the materials.

   If materials used in the force account work are not specifically purchased for such work but are taken from the Design-Builder's stock, the Design-Builder shall furnish an affidavit certifying that such materials were taken from his stock, the quantity was actually used in the work, and the price and transportation cost claimed represent the actual cost to the Design-Builder.

   The percentage additive will be full compensation for overhead, profit, and contingencies.

4. Equipment. For all equipment authorized by the Engineer to be used on the force account work the Design-Builder will receive rental payment.

   Hourly rental rates paid for equipment in use which is Design-Builder owned or rented from another Contractor will not exceed 1/176th of the monthly rate listed in the "Rental Rate Blue Book for Construction Equipment", as published by Dataquest, Incorporated, which is current at the time the force account work is performed.

   In determining the hourly rate, the regional adjustment factor and the rate adjustment factor for equipment age, as set forth in the current Blue Book, will both be applied to the basic rate. An additive payment equal to 70 percent of the Blue Book estimated operating cost per hour will also be paid for the time equipment is in use. This additive payment will be full compensation for fuel, lubricants, repairs, servicing (greasing, fueling, and oiling), small tools, and other incidentals.

   If rental rates for the equipment actually being used in the work are not listed in the Blue Book, the Design-Builder will receive the prevailing rental rates being paid for such equipment in the area where the project is located. An additive payment equal to 15 percent of the prevailing rental rate will also be paid for the time equipment is in use. This additive payment will be full compensation for fuel, lubricants, repairs, servicing (greasing, fueling, and oiling), small tools, and other incidentals.

   Hourly rental rates for equipment held in ready as directed by the Engineer will be 50 percent of the rate paid for equipment in use. An additive payment will not be made for equipment held in ready. When equipment is in use less than 40 hours for any given week and is held in ready as directed by the Engineer, payment for held in ready time will be allowed for up to 40 hours, less time in use. When payment is made for equipment held in ready as directed by the Engineer, the payment for held in ready time will be allowed for up to 8 hours in a day less time in use.

   Hourly rental rates for idle equipment held in ready in accordance with Article 104-4 will be 50 percent of the rate paid for equipment in use. Hourly rental rates for idle equipment held in ready in accordance with Article 104-4 which is rented from a commercial rental agency will be paid for in accordance with the invoice rate for the

equipment. An additive payment will not be made for idle equipment. When equipment is in use less than 40 hours for any given week and is held in ready as idle equipment in accordance with Article 104-4, payment for idle equipment time will be allowed for up to 40 hours, less time in use. When payment is made for idle equipment held in ready in accordance with Article 104-4, the payment for idle equipment time held in ready will be allowed for up to 8 hours in a day less time in use.

In the event the Design-Builder does not possess or have readily available such equipment necessary for the performance of the work and such equipment is rented from a commercial rental agency, the Design-Builder will receive payment based on the approved invoice rate for the equipment. An additive payment equal to 15 percent of the calculated hourly invoice rate will also be paid for the time equipment is in use. This additive payment will be full compensation for fuel, lubricants, repairs, servicing (greasing, fueling and oiling), small tools, and other incidentals. The commercial rental agency cannot be the Design-Builder or an affiliate of the Design-Builder.

No compensation will be made for the use of equipment not authorized by the Engineer.

The Design-Builder will be reimbursed for the actual transportation costs for equipment which the Design-Builder is directed to furnish. Such payment will be limited to transportation costs from the nearest source of available equipment. If equipment is not returned to the point of origin, but is transported to another location, transportation costs will not exceed the cost of return to the point of origin. Rental for such equipment will not be paid when the equipment is being transported. The Design-Builder shall furnish records to the Engineer to verify the actual transportation costs for equipment.

The Design-Builder shall provide to the Engineer for approval a listing of all equipment and attachments to be utilized in the prosecution of the work. The list shall include the manufacturer's name, type, model, serial number, and year of manufacture. The list shall also include the invoice rate for equipment rented from a commercial rental agency. It shall be the Design-Builder's responsibility to verify the age of the equipment in a manner acceptable to the Engineer. Where such verification is not available, the rate adjustment factor used will be for the oldest equipment listed in the Blue Book.

The above prices and payments will be full compensation for fuel, lubricants, cutting edges, all repairs, and all other operating and maintenance costs other than operator's wages.

5. Miscellaneous. No additional allowance will be made for general superintendence, the use of manually powered tools, or other costs for which no specific allowance is herein provided.

6. Subcontracting. For administrative costs of the Design-Builder in connection with

approved subcontract work, the Design-Builder will receive an amount in accordance with the rate schedule shown below of the total cost of such subcontracted work. The total cost will include labor; bond, insurance, and tax; materials; and equipment costs incurred by the subcontractor and computed in accordance with Items 1, 2, 3, and 4 above.

| Total Cost of Subcontract Work | Rate Schedule |
|---|---|
| $0 - $10,000 | 10% |
| Above $10,000 | $1,000 + 5% Above $10,000 |

7. General. The Engineer will maintain the payment records of work performed on a force account basis. The Design-Builder shall compare records of work with the Engineer at the end of each day on which such work is in progress.

Any contention the Design-Builder may have for an extension in the completion date, intermediate completion date, or intermediate completion time, due to performance of force account work will be considered as provided in Article 108-10.

## 109-4 PARTIAL PAYMENTS.

### (A) General:

Partial payments will be based upon progress estimates prepared by the Engineer at least once each month on the date established by the Engineer. Partial payments may be made twice each month if in the judgment of the Engineer the amount of work performed is sufficient to warrant such payment. No partial payment will be made when the total value of work performed since the last partial payment amounts to less than $10,000.00. Partial payments will be approximate only and will be subject to correction in the final estimate and payment.

Partial payments for the lump sum design-build price shall be based on a Schedule of Payments submitted by the successful Design-Build proposer and approved by the Engineer. The Schedule of Payments shall be submitted not less than 30 calendar days after the date of award. Each item on the Schedule of Payments shall be assigned a cost and quantity and shall be identified as an activity on the project schedule. A revised Schedule of Payments shall be submitted with each update of the CPM of Record as described in Article 108-2 or when requested by the Engineer.
The Engineer will withhold an amount sufficient to cover anticipated liquidated damages as determined by the Engineer.

## 109-5 PAYMENT FOR MATERIAL TO BE USED IN THE WORK.

No partial payments will be made for materials to be incorporated in the work unless elsewhere provided.

## 109-6 PAYMENT FOR LEFTOVER MATERIALS.

Payment will be made to the Design-Builder for materials meeting the requirements of the contract which were to have been permanently incorporated into the work or were to

remain the property of the Department but due to revisions or elimination of items of work by the Engineer, due to changes in the scope, or due to termination of the contract are not used in the work. The Design-Builder upon request will be reimbursed for the verified actual cost of such material delivered to a site designated by the Engineer, including any handling charges less any discount, but in no event shall payment exceed that which would have been made at the contract unit or lump sum price for the completed work.

The Design-Builder shall furnish invoices and cost records to the Engineer to verify the actual cost of materials, handling charges, discounts which were taken, and transportation charges. No percentage additive will be added to the verified cost of such material.

No payment will be made for loss of anticipated profits and no other payment will be made for leftover materials except as listed above.

## 109-7 COMPENSATION PAID AT CONTRACT PRICES.

Except as provided for by this article, payment for work performed will be made at the contract unit price or the contract lump sum price, as the case may be. Payment shall be made at the adjusted contract unit or lump sum price, as applicable, when a price adjustment or pay factor is provided for by the Specifications or as determined by the Engineer in accordance with Article 105-3. The Design-Builder shall not be paid for any work performed for which there is not a contract price, nor shall the Design-Builder receive additional compensation over and above the contract price for work performed or for extra work performed, except for work performed pursuant to an executed supplemental agreement or work performed in accordance with the applicable provisions of Section 104.

## 109-8 FUEL PRICE ADJUSTMENTS.

No fuel price adjustments will be made.

## 109-9 FINAL PAYMENT.

The Engineer will notify the Design-Builder giving the apparent liquidated damages, if any assessed. After the Design-Builder submits the documents listed in Article 109-10, the entire sum found to be due after deducting all previous payments and all amounts to be retained or deducted under the provisions of the contract will be paid the Design-Builder.

## 109-10 DOCUMENTS REQUIRED FOR THE PROCESSING OF THE FINAL ESTIMATE.

Prior to the processing of the final estimate, the following documents shall have been submitted to and accepted by the Engineer.

1. Statement of Consent of Surety on the contract bonds for payment of money due the Design-Builder.
2. Affidavit of the Design-Builder that all obligations and debts arising out of the construction have been satisfied, or affidavit which shall include a list of obligations not satisfied.

3. Written notice that the Design-Builder has no request for any extension in the completion date or any adjustment in compensation from that shown in the final estimate or in lieu thereof written notice presenting all request for adjustment of the final estimate setting forth full justification for such requests.
4. Any other documents that are required by the contract such as completed Form PR-47 and all reports, statements, and other information necessary for compliance with applicable labor regulations of the Federal Highway Administration.
5. As-constructed plans.
6. Final Material Certificate

Submission of false information in the documents required by this section shall be a basis for disqualifying the Design-Builder from further bidding in accordance with Article 102-16.

## 109-11 INTEREST ON FINAL PAYMENT.

Should final payment on a project not be made within 120 calendar days after the project final acceptance date, interest, at the average rate earned by the State Treasurer on the investment within the State's Short Term Fixed Income Investment Fund during the month preceding the date interest becomes payable, will be paid the Design-Builder on the final payment for the period beginning on the 121st day after final acceptance and extending to the date the final estimate is paid, provided that the documents required by Article 109-10 have been submitted within 30 days of the mailing of the notification outlined in Article 109-9. In the event the Design-Builder fails to submit the required documents within the stipulated 30 day period, and the final estimate is not paid until 120 calendar days following final acceptance of the project, the number of days on which interest accrues will be reduced by the number of days in excess of 30 that the Design-Builder requires to submit the document(s).

# SECTION 150
# MAINTENANCE OF TRAFFIC

## 150-1 GENERAL.

The Design-Builder will be required to maintain traffic within the limits of the project, including all existing roadways which cross or intersect the project, unless otherwise provided in the contract or approved by the Engineer. Traffic shall be maintained from the time the Design-Builder begins work on the project site until acceptance of the project, including any periods during which the Design-Builder's operations are suspended, unless otherwise provided for in the contract or approved by the Engineer. The Design-Builder shall conduct his work in a safe manner which will create a minimum amount of inconvenience to traffic.

The Design-Builder shall be responsible for maintaining in a safe, passable, and convenient condition, such part or parts of existing roads as are being used by him to maintain traffic within the limits of the project from the time the Design-Builder begins work on the project until acceptance of the project. As an exception to the above, the Department will be responsible for the removal of ice and snow from all portions of the project open to traffic.

Whenever it is necessary to utilize traffic control devices as shown in the contract, as determined by the Engineer, or in order to conform to the provisions of this section, the work of furnishing, erecting, operating, maintaining, covering, relocating, and removing traffic control devices shall be in accordance with the provisions of Division 11 & 12.

## STANDARD SPECIAL PROVISION

## AVAILABILITY OF FUNDS - TERMINATION OF CONTRACTS

In accordance with G.S. 143-28.1 (6), Subsection (5) of G.S. 143-28.1 is hereby incorporated verbatim in this contract. G.S. 143-28.1(5) is as follows:

"(5). Amounts Obligated - Payments subject to the Availability of Funds - Termination of Contracts. Highway maintenance and construction appropriations may be obligated in the amount of allotments made to the Department of Transportation by the Office of State Budget and Management for the estimated payments for maintenance and construction contract work to be performed in the appropriation fiscal year. The allotments shall be multi-year allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in subdivision (2) above. Payment for highway maintenance and construction work performed pursuant to contract in any fiscal year other than the current fiscal year will be subject to appropriations by the General Assembly. Highway maintenance and construction contracts shall contain a schedule of estimated completion progress and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any highway maintenance or construction contract and any highway maintenance or construction contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of schedule work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications".

Payment will be made on any contract terminated pursuant to the special provision in accordance with Article 108-13, Item 5, of the North Carolina Department of Transportation Standard Specifications for Roads and Structures, dated July 1, 1995.

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# STANDARD SPECIAL PROVISIONS
# (ENGLISH AND METRIC)
# NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any relabeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

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

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

Further specifications for each seed group are give below:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet - Strain R
Centipedegrass
Clover - Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)

Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Crownvetch
Pensacola Bahiagrass
Japanese Millet
Switchgrass
Reed Canary Grass

# STANDARD SPECIAL PROVISIONS
# (ENGLISH)
# ERRATA

The 1995 Standard Specifications shall be corrected as follows:

Page 23, Subarticle 103-4(B)

In the second line of the last paragraph, change the phrase “on one of more projects” to read “on one or more projects”.

Page 221, Article 452-4

Change the word “for” to read “from”.

Page 247, Subarticle 520-6(B)

In the third line of the last paragraph, change the number “5” to “6”.

Page 248, Subarticle 520-6(C)(2)

In the fourth line of the fourth paragraph, change “5 inches” to read “6 inches”.

Page 272, Article 542-3

In the fifth line of the first paragraph, change the number “6” to “7”.

Page 267, Article 540-11

In the third line of the first paragraph, change the word “not” to “no”.

Page 300, Subarticle 609-9(C)

In the ninth line of the second paragraph, change “or Subarticle 610-11(C)” to “or Subarticle 610-11(D)”.

Page 332, Article 622-2

In the second line, change “Article 1020-9” to “Article 1020-8”.

Page 334, Section 630, Table 630
In the tenth line of the table in the No. 200 sieve size, change the percent from “1.0-6.0” to “1.0-7.0”.

In the line “Voids in Total Mix, VTM, (%)”, change “3-5” to read “4-6”.

Page 339, Table 640

In the last line of this table, insert “75” under Type H and “75” under Type HDB”.

Page 362, Article 700-10

In the fifth line of the paragraph, change “completed” to “composed”.

Page 367, Subarticle 700-15(E)(2)

In the ninth line of this paragraph, change the wording “Subarticle 710-12(C)” to “Subarticle 710-11(C)”.

Page 377, Subarticle 720-11(C)

In the fifth line of the first paragraph, change the word “or” to “for”.

Page 417, Subarticle 846-3(A)

In the first line of the third paragraph, change the word “Bituminous” to read “Asphalt”.

Page 524, Subarticle 1020-9(A)

Change “AASHTO M116” to read “ASTM D-41”.

Page 524, Subarticle 1020-9(D)

Change “AASHTO D490” to read “ASTM D490”.

Page 643, Article 1080-13

In Subarticle 3.2 pigments, change both the percentages in (a) from “5%” to “0%”; In (b), change “59%” to “5%” and “85%” to “5%”, in (c), change “70%” to “70% min.” and add “85% min.” in the second column.

Page 733, Article 1205-6

Change the heading of this article from **“Description”** to **“Basis of Payment”.**

Page 788, Article 1510-7

In the Pay Item List, change the eighth item by inserting the word “water” between “iron” and “pipe”.

# STANDARD SPECIAL PROVISION
# VALUE ENGINEERING
# (ENGLISH AND METRIC)

The 1995 Standard Specifications shall be revised as follows:

Page 35, Article 104-12

Add the following sentence at the end of the last sentence in the first paragraph:

"Submittals which propose material substitutions of permanent features such as changes from rigid to flexible or flexible to rigid pavements, concrete to steel or steel to concrete bridges will not be considered acceptable Value Engineering Proposals. Depending on complexity of evaluation and implementations, Value Engineering Proposals which provide for a total savings prior to distribution of less than ten thousand ($10,000) dollars will not generally be considered."

Page 36, Article 104-12

At the end of the first paragraph, after Item 8, add Item 9 as follows:

"9) Environmental Impact"

Page 37, Article 104-12

In the last paragraph, the last sentence, change "60 percent" to read "50 percent".

Page 38, Article 104-12

In the second paragraph, the last sentence, change "60 percent" to read "50 percent" and change "40 percent" to read "50 percent".

8.1674402

**January 21, 1997**

**STANDARD SPECIAL PROVISION**
**BORROW EXCAVATION**
**(ENGLISH AND METRIC)**

The 1995 Standard Specifications shall be revised as follows:

Page 111, Subarticle 230-4(C)

Add the following paragraph after the first paragraph:

"Borrow sources will not be allowed in any area under the Corps of Engineers regulatory jurisdiction until the Design-Builder has obtained a permit for such borrow sources from the Corps District Engineer having jurisdiction and has furnished a copy of this permit to the Resident Engineer."

**STANDARD SPECIAL PROVISION**

**(ENGLISH AND METRIC)**

**BEARING PILES**

The 1995 Standard Specifications shall be revised as follows:

Page 215, Article 450-6

In the last line of the second paragraph, change “4 weeks” to read “40 working days”.

8.1674402 **APRIL 15, 1997**

**STANDARD SPECIAL PROVISION**
**ASPHALT**
**(ENGLISH AND METRIC)**

The 1995 Standard Specifications shall be revised as follows:

Page 283, Article 600-1

Delete the second paragraph in this Article.

Page 285, Article 605-2

In the first paragraph, in the second line, change "Grade AC-20" to read "Grade PG 64-22".

Page 286, Table 605-1

In the first line of the table, change "Grade AC-20" to read "Grade PG 64-22".

Page 321, Subarticle 611-2(C)

In the first paragraph, the third line, delete the word "viscosity".

Page 321, Article 611-3

Delete the entire article and insert the following:

**611-3 COMPOSITION OF RECYCLED MIXTURES (JOB MIX FORMULA)**

The recycled mixture shall be a uniform mixture composed of reclaimed asphalt pavement (RAP), new aggregates, asphalt binder, and additives combined in the proportions established by a job mix formula in accordance with Article 610-3. Materials which will not produce a mixture meeting the requirements of the appropriate section of the Specifications will be rejected, unless otherwise approved by the CEI Firm and the Engineer.

At least 3 weeks prior to the beginning of production, the Design-Builder shall submit to the Department's Materials and Tests Unit his proposed blend of RAP/virgin materials, the proposed grade of additional asphalt binder, and representative samples of all materials to be used in the recycled mixture.

Reclaimed asphalt pavement shall constitute not more than 60 percent of the total material used in the recycled mixture. When the percentage of asphalt binder contributed by the RAP is not more than 15 percent of the total asphalt binder in the completed mix, or the percentage of RAP is not more than 15 percent of the total mixture, Asphalt Binder, Grade PG 64-22 may be used. When the percentage of asphalt binder contributed by the RAP is greater than 15 percent of the total asphalt binder in the completed mix, and the percentage of RAP is greater than 15 but not more than 25 percent of the total mixture, Asphalt Binder, Grade PG 58-22 (not meeting PG 64-22) shall be used. When the percentage of RAP is greater than 25 percent of the total mixture, the Asphalt Binder Grade shall be approved in writing by the Engineer. Approval by the CEI Firm will not nullify the authority of the CEI Firm to require the Design-Builder to adjust the mixture as provided in the last paragraph of this article.

When directed by the Engineer, the additional asphalt binder shall contain an approved non-strip additive in accordance with the requirements of Section 622. The percentage of non-strip additive shall be as approved by the Engineer.

The job mix formula with the allowable tolerances shall be within the design limits specified for the particular type mixture to be produced. The job mix formula will establish the percentage of reclaimed aggregate, the percentage of each additional aggregate required, a single percentage of aggregate passing each sieve size, the total percentage of asphalt binder in the mixture, a single percentage of additional asphalt binder to be added, the percentage of non-strip additive to be added to the additional asphalt binder, a single temperature at which the mixture is to be discharged from the plant, and the required field density.

Should a change in the source of RAP be made, a new mix design and/or job mix formula may be required in accordance with the requirements in Article 611-4.

The job mix formula for the mixture shall be in effect until modified in writing by the Engineer. All mixtures furnished for the work shall conform to the job mix formula within the tolerance ranges as specified. When unsatisfactory result or other conditions warrant, the CEI Firmmay establish a new job mix formula.

Samples of the completed recycled asphalt mixture may be taken by the Department on a random basis to determine the PG grading on the recovered asphalt binder in accordance with AASHTO MP1. If the grade is determined to be a value other than specified, the CEI Firmmay require the Design-Builder to adjust the additional asphalt binder formulation and/or blend of reclaimed material to bring the grade to the specified value.

Page 330, Article 620-2

Delete the entire article and insert the following:

**620-2 MATERIALS.**

All materials shall meet the grading requirements of AASTO MP1 for the specified grade.

The asphalt binder for the mixture will be accepted at the source subject to the provisions of Article 1020-1. Silicone shall be added to all asphalt binder used in surface courses and open-graded asphalt friction course, Type J-1, unless otherwise directed by the Engineer. The amount of silicone added shall range from 1 oz. per 2,000 gallons (4 milliliters per 1,000 liters) of asphalt binder to 1 oz. per 2,500 gallons (4 milliliters per 1,250 liters). The addition of the silicone to the asphalt binder shall be in the presence of the CEI Firm unless it is added at the source and it is so noted on the delivery ticket. The brand of silicone used shall be from the list published by the Materials and Tests Unit. A Design-Builder proposing to use a brand not on the approved list shall submit a sample and manufactor's data to the CEI Firm for approval prior to use.

Page 331, Article 620-5

In the fifth paragraph, last line change "Grade AC-20" to read "Grade PG 64-22".

Revised all the following:

| PAGES | ARTICLE |
|---|---|
| 333 | 630-2 |
| 336 | 635-2 |
| 338 | 640-2 |
| 341 | 645-2 |
| 344 | 650-2 |
| 346 | 652-2 |

In the above materials articles, delete the wording "Grade AC-20" and insert the wording "Grade PG 64-22".

Page 522, Article 1020-2

Delete the entire article and insert the following:

**1020-2 ASPHALT BINDER.**

Performance graded asphalt binder shall meet the requirements of AASHTO MP1.

Page 524, Subarticle 1020-9(B)

Change "Grade AC-20" to read "Grade PG 64-22".

**8.1674402** **JANUARY 21, 1997**

**STANDARD SPECIAL PROVISION**
**BORROW MATERIAL**
**(ENGLISH AND METRIC)**

The 1995 Standard Specifications shall be revised as follows:

Page 521, Article 1018-2

Delete the Paragraph in Criteria No. III

**8.1674402** **JANUARY 21, 1997**
(APRIL 12, 1996)

## STANDARD SPECIAL PROVISION

## PRECAST CONCRETE UNITS
## (ENGLISH & METRIC)

The 1995 Standard Specifications shall be revised as follows:

Page 608, Article 1077-2

Delete this Article and insert the following:

"The plans for precast units shall be, standard drawings or details shown in the project plans, furnished by the Department.

When the Department does not make precast plans available and the Design-Builder chooses to precast he shall submit drawings, to the Engineer for the items he proposes to precast. One complete set of drawings shall be submitted for review, at least 40 calendar days prior to precasting. After acceptance by the Department, the Design-Builder shall submit 7 complete sets of drawings. Acceptance, by the Engineer of Design-Builder drawings, shall not be considered as relieving the Design-Builder of any responsibility for precast units. When precast units are load bearing and require structural design, the plans shall be prepared and certified by a North Carolina Registered Professional Engineer. Design-Builder furnished drawings shall show complete design, installation and construction information in such detail as to enable the engineer to determine the adequacy of the proposed units for the intended use. Design-Builder drawings shall include details of steel reinforcement size and placement and a schedule which will list the size and type of precast units at each location where the precast units are to be used. Precast units shall be produced in accordance with the approved drawings."

Page 610, Subarticle 1077-5(A)

In the second paragraph, replace the first sentence with the following:

"All concrete shall develop a minimum compressive strength as shown in Table 1077-1 unless other strengths are designated on the approved drawings."

After the last paragraph in this Subarticle, insert Table 1077-1 as follows:

## TABLE 1077-1

## PRECAST CONCRETE STRENGTH REQUIREMENTS
## (AT AN AGE OF 28 DAYS)

| PRECAST UNIT | MINIMUM COMPRESSIVE STRENGTH p.s.i. | (MPa) | SPECIFICATION REFERENCE |
|---|---|---|---|
| **BARRIER** - USED PORTABLE | 3500 | (24.1) | SECT. 1090 & 1170 |
| NEW PORTABLE | 4500 | (31.0) | SECT. 854, 1090, & 1170 |
| PERMANENT | 4500 | (31.0) | SECT. 854, 857 & 1090 |
| **CULVERTS** - CIRCULAR PIPE | 4000 | (27.6)** | SECT. 310, 1032, 1034, 1520 & AASHTO M 170 |
| SINGLE CELL BOX SECTIONS | 5000 | (34.5) | SP - AASHTO M 259 |
| FLARED END SECTION | 3500 | (24.1) | SECT. 310, 1032 |
| PIPE TEES | 4000 | (27.6) | SECT. 310, 1032 & AASHTO M 170 |
| PIPE ELBOWS | 4000 | (27.6) | SECT. 310, 1032 & AASHTO M 170 |
| **CROSS & PARALLEL SPECIAL END SECT.** | 3500 | (24.1) | SECT. 310, 1032 |
| **DRAIN. STRUCTURES** - REC. BOXES (SOLID & WAFFLE) | 4000 | (27.6) | SECT. 840 & ASTM C 913 |
| **CIRCULAR MANHOLES** - BASE | 4000 | (27.6) | SECT. 1525 - AASHTO M 199, ASTM C-478 |
| RISER SECTION | 4000 | (27.6) | SECT. 1525 - AASHTO M 199, ASTM C-478 |
| TOP SECTION | 4000 | (27.6) | SECT. 1525 - AASHTO M 199, ASTM C-478 |
| GRADE RING | 4000 | (27.6) | SECT. 858 - AASHTO M 199 |
| HEAD & ENDWALLS | 4000 | (27.6) | ASTM C-478 |
| CONCRETE PADS FOR OUTLET PIPE | 2500 | (17.2) | SECT. 815, 816 & 825 |
| RIGHT OF WAY MARKER | 2500 | (17.2) | SECT. 806 & 1054 |
| MISC. ITEMS | | | |
| PICNIC TABLES | 2500 | (17.2) | SP |
| WASTE CONTAINERS | 2500 | (17.2) | SP |

** Strength varies by class.

Page 611, Subarticle 1077-5(B)

In the fifth line of the first paragraph, revise the clause “of at least 5000 psi (34.5 MPa)” to read “as shown in Table 1077-1”.

**STANDARD SPECIAL PROVISION**
**PAVEMENT MARKERS**
**(ENGLISH AND METRIC)**

The 1995 Standard Specifications shall be revised as follows:

Page 661, Subarticle 1086(3)(B)(2)

At the end of the sentence in this article, delete the words "Grade 80-55-06".

**STANDARD SPECIAL PROVISION**
**(ENGLISH AND METRIC)**
**PAVEMENT MARKERS**

The 1995 Standard Specifications shall be revised as follows:

Page 660, Subarticle 1086-2(A)

In the first line of the first paragraph, insert the words “or plastic” between “glass” and “face”.

**STANDARD SPECIAL PROVISION**
**PAVEMENT MARKING GENERAL REQUIREMENTS**
**(ENGLISH AND METRIC)**

The 1995 Standard Specifications shall be revised as follows:

Page 726, Subarticle 1205-3(C)(3)

Delete the Subarticle in its entirety and insert the following:

**(3) Thermoplastic:**

Thermoplastic pavement markings shall not be applied on existing or new pavements unless the ambient air temperature and the temperature of the pavement is 50°F (10° C) or higher.

Thermoplastic pavement markings shall not be applied between the dates specified below:

| | |
|---|---|
| Divisions 1, 2, 3, 4 and 6<br>(includes all counties east of those listed below) | December 15 and the following March 16 |
| Divisions 5, 7, 8, 9, 10 and 12<br>(includes all counties listed below) | November 30 and the following April 1 |
| Divisions 11, 13 and 14<br>(includes all counties west of those listed below) | November 15 and the following April 16 |

| | | | |
|---|---|---|---|
| Alamance | Davie | Lincoln | Rockingham |
| Anson | Durham | Lee | Rowan |
| Alexander | Forsyth | Mecklenburg | Scotland |
| Cabarrus | Franklin | Montgomery | Stanly |
| Catawba | Gaston | Moore | Stokes |
| Caswell | Granvile | Orange | Union |
| Chatham | Guilford | Person | Vance |
| Cleveland | Hoke | Randolph | Wake |
| Davidson | Iredell | Richmond | Warren |

Page 729, Subarticle 1205-3(G)(5)

After the eighth paragraph on this page, insert the following paragraph:

As an exception to the above, when traffic is to be maintained on a portion of roadway and thermoplastic pavement marking will not be placed within 30 calendar days due to seasonal limitations, the Design-Builder shall place pavement marking paint and beads in accordance with Article 1205(3)(G)(3).

8.1674402 **APRIL 15, 1997**

**STANDARD SPECIAL PROVISION**
**TRUCK MOUNTED IMPACT ATTENUATOR**
**(ENGLISH AND METRIC)**

The 1995 Standard Specifications shall be revised as follows:

Page 681, Subarticle 1089-8(C)3

Delete the second paragraph in this subarticle.

Page 715, Article 1165-1

Delete the words "and furnishing, stockpiling and removing repair packages".

Page 715, Subarticle 1165-3(A)

Add the following sentence to the end of the second paragraph:

"Impact attenuators used on travelways with a posted speed limit greater than 45 mph in moving operations for the placement of pavement markings and pavement markers shall pass the NCHRP 230 60 MPH crash test".

Page 716, Subarticle 1165-3(B)

Delete this subarticle.

Page 716, Article 1165-4

Delete the second sentence and insert the following:

Any truck mounted impact attenuator that becomes crushed or otherwise damaged so that it will not perform its intended purpose shall be immediately repaired or replaced by the Design-Builder within 24 hours after the damage occurs or the CEI Firm may suspend all construction activities until the truck mounted impact attenuator is repaired or replaced.

During the process of repairing the truck mounted impact attenuator, the Design-Builder shall furnish adequate means acceptable to the CEI Firm to provide for the safe control of traffic through

the construction area or shall suspend all construction activities requiring the use of the attenuator until the damaged impact attenuator is restored to operation.
Page 716, Article 1165-5

Delete the second paragraph of this article.

Page 716, Article 1165-6

Delete the second paragraph of this article.

Delete the pay item "Truck Mounted Impact Attenuator Repair Package".

# STANDARD SPECIAL PROVISION

# AWARD OF CONTRACT

"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252) and the Regulations of the Department of Transportation (49 C.F.R., Part 21), issued pursuant to such act, hereby notifies all bidders that it will affirmatively insure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the ground of race, color, or national origin".

## 8.1674402

MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS

NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE NUMBER 11246)

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female participation".

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its effort to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project or the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

2. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the cover sheet of the proposal form and contract.

EMPLOYMENT GOALS FOR MINORITY
AND FEMALE PARTICIPATION

Economic Areas

Area 023 29.7%

Bertie County
Camden County
Chowan County
Gates County
Hertford County
Pasquotank County
Perquimans County

Area 024 31.7%

Beaufort County
Carteret County
Craven County
Dare County
Edgecombe County
Green County
Halifax County
Hyde County
Jones County
Lenoir County
Martin County
Nash County
Northampton County
Pamlico County
Pitt County
Tyrrell County
Washington County
Wayne County
Wilson County

Area 025 23.5%

Columbus County
Duplin County
Onslow County
Pender County

Area 026 33.5%

Bladen County
Hoke County
Richmond County
Robeson County
Sampson County
Scotland County

Area 027 24.7%

Chatham County
Franklin County
Granville County
Harnett County
Johnston County
Lee County
Person County
Vance County
Warren County

Area 028 15.5%

Alleghany County
Ashe County
Caswell County
Davie County
Montgomery County
Moore County
Rockingham County
Surry County
Watauga County
Wilkes County

Area 029 15.7%

Alexander County
Anson County
Burke County
Cabarrus County
Caldwell County
Catawba County
Cleveland County
Iredell County
Lincoln County
Polk County
Rowan County
Rutherford County
Stanly County

Area 0480 8.5%

Buncombe County
Madison County

Area 030 6.3%

Avery County
Cherokee County
Clay County
Graham County
Haywood County
Henderson County
Jackson County
McDowell County
Macon County
Mitchell County
Swain County
Transylvania County
Yancey County

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SMSA Areas

Area 5720 26.6%

Currituck County

Area 9200 20.7%

Brunswick County
New Hanover County

Area 2560 24.2%

Cumberland County

Area 6640 22.8%

Durham County
Orange County
Wake County

Area 1300 16.2%

Alamance County

Area 3120 16.4%

Davidson County
Forsyth County
Guiford County
Randolph County
Stokes County
Yadkin County

Area 1520 18.3%

Gaston County
Mecklenburg County
Union County

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Goals For Female

Participation in Each Trade

(Statewide) 6.9%

# REQUIRED CONTRACT PROVISIONS
# FEDERAL-AID CONSTRUCTION CONTRACTS

Page



## I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

## II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's

EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the

job training is being required by special provision, the contractor will be required to collect and report training data.

**III. NONSEGREGATED FACILITIES**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

**IV. PAYMENT OF PREDETERMINED MINIMUM WAGE**

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. **General:**

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. **Classification:**

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. **Payment of Fringe Benefits:**

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. **Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. **Apprentices and Trainees (Programs of the U.S. DOT):**

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. **Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. **Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. **Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. **Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

**V. STATEMENTS AND PAYROLLS**

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. **Compliance with Copeland Regulations (29 CFR 3):**

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. **Payrolls and Payroll Records:**

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the

Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

**VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR**

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

**VII. SUBLETTING OR ASSIGNING THE CONTRACT**

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

**VIII. SAFETY: ACCIDENT PREVENTION**

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

**IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

**NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS**

18 U.S.C. 1020 reads as follows:

*"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or*

*Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or*

*Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;*

*Shall be fined not more that $10,000 or imprisoned not more than 5 years or both."*

**X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

**XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

1. **Instructions for Certification - Primary Covered Transactions:**

(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

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

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Primary Covered Transactions**

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

2. **Instructions for Certification - Lower Tier Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

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

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

**XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

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

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

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

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

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

8.1674402

**Training Special Provisions**

This project special provision will not be applicable to those Design-Builders who have elected to participate in the Department's *Alternative On-The-Job Training Program.* In the event the Design-Builder is participating in the Department's *Alternative On-The-Job Training Program*, the Civil Rights and Business Development Section of the Contractual Services Unit will certify that participation to the appropriate Highway Division and Resident Engineers.

This Training Special Provision supersedes subparagraph 7b of the Special Provision entitled "*Specific Equal Employment Opportunity Responsibilities,"* (Attachment 1), and is in implementation of 23 USC 140(a). As a part of the Design-Builder's equal opportunity affirmative action program, training shall be provided as follows:

The Design-Builder shall provide on-the-job training aimed at developing full journey workers in the type of trade or classification involved. Preference shall be given to providing training in the following skilled work classifications:

| | |
|---|---|
| Equipment Operators | Office Engineers |
| Truck Drivers | Estimators |
| Carpenters | Iron / Reinforcing Steel Workers |
| Concrete Finishers | Mechanics |
| Pipe Layers | Welders |

The number of trainees to be trained under this contract will be as specified in the project special provisions included else where in the proposal form.

In the event that a Design-Builder subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subDesign-Builder, provided, however, the Design-Builder shall maintain the

primary responsibility for meeting the training requirements imposed by this special provision and the subDesign-Builder has an approved on-the-job training program. The Design-Builder shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the skilled work classifications on the basis of the Design-Builder's needs and the availability of journey workers in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the Design-Builder shall submit to the Department for approval the number of trainees to be trained in each selected classification and the training program to be used. Furthermore, the Design-Builder shall specify the starting time for training in each of the classifications on the form provided by the Department. That form shall be submitted by the Design-Builder to the Department on or before the date of the pre-construction conference. The Design-Builder will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 10 percent of the specific program requirement.

Training and upgrading of minorities and women toward journey worker status is a primary objective of this Training Special Provision. Accordingly, the Design-Builder shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private resources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The Design-Builder will be responsible for demonstrating the steps he has taken in the pursuance thereof, prior to a determination as to whether the Design-Builder is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journey worker status or in which he has been employed as a journey worker. The Design-Builder

should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Design-Builder's records should document the finding in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Design-Builder and approved by the Department. The Department shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Design-Builder and to qualify the average trainee for journey worker status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the US Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the US Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training, shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-Aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the Department prior to commencing work on the classification covered by the program. It is the intention of these provisions that training be provided in the construction crafts rather than clerk-typist or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is provided and approved by the Department and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

It is normally expected that a trainee will begin his training on the project as soon as feasible after the start of work utilizing the skill involved and remain on the project as long as training opportunities exist in the work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A Design-Builder will have fulfilled his responsibilities under this training special provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the Design-Builder for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journey worker's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Design-Builder shall furnish the trainee a copy of the program he will be following providing the training. The Design-Builder shall provide each trainee with a with a certificate showing the type and length of training satisfactorily completed.

The Design-Builder will provide for maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

GENERAL DECISION NC000011 03/02/01 NC11
General Decision Number NC010011

Superseded General Decision No. NC000011

**State: North Carolina**

Construction Type:
**HIGHWAY**

County(ies):

| | | |
|---|---|---|
| ALAMANCE | DURHAM | ORANGE |
| ALEXANDER | FORSYTH | RANDOLPH |
| BUNCOMBE | FRANKLIN | ROWAN |
| BURKE | GASTON | STOKES |
| CABARRUS | GUILFORD | UNION |
| CATAWBA | LINCOLN | WAKE |
| CUMBERLAND | MECKLENBURG | YADKIN |
| DAVIDSON | NEW HANOVER | |
| DAVIE | ONSLOW | |

**HIGHWAY** CONSTRUCTION PROJECTS (does not include tunnels,building structures in rest area projects, railroad construction, and bascule, suspension and spandrel arch bridges, bridges designed for commercial navigation, and bridges involving marine construction, and other major bridges).

| Modification Number | Publication Date |
|---|---|
| 0 | 03/02/2001 |

COUNTY(ies):

| | | |
|---|---|---|
| ALAMANCE | DURHAM | ORANGE |
| ALEXANDER | FORSYTH | RANDOLPH |
| BUNCOMBE | FRANKLIN | ROWAN |
| BURKE | GASTON | STOKES |
| CABARRUS | GUILFORD | UNION |
| CATAWBA | LINCOLN | WAKE |
| CUMBERLAND | MECKLENBURG | YADKIN |
| DAVIDSON | NEW HANOVER | |
| DAVIE | ONSLOW | |

SUNC3002A 02/12/1990

| | Rates | Fringes |
|---|---|---|
| CARPENTER | 7.63 | |
| CONCRETE FINISHER | 7.52 | |
| ELECTRICIAN | 10.26 | |
| IRONWORKERS (Reinforcing) | 9.76 | |
| LABORER | | |
| Comman | 5.33 | |
| Asphalt Lay Down Man | 5.60 | |
| Asphalt Raker | 6.14 | |
| Form Setter (Road) | 8.57 | |
| Mason (Brick, Block, Stone) | 7.44 | |
| Pipe Layer | 6.23 | |
| Power Tool Operator | 8.28 | |

POWER EQUIPMENT OPERATORS:

| | |
|---|---|
| Asphalt Distributor | 6.78 |
| Asphalt Paver | 7.47 |
| Bulldozer | 7.33 |
| Bulldozer (utility) | 6.72 |
| Concrete Curb Machine | 7.09 |
| Concrete Finishing Machine | 7.85 |
| Concrete Paver | 6.90 |
| Crane, Backhoe, Shovel, & Draglne (over 1 yd.) | 8.16 |
| Crane, Backhoe, Shovel, & Dragline (1 yd. & under) | 6.95 |
| Drill Operator | 7.34 |
| Grade Checker | 5.45 |
| Gradeall | 8.38 |
| Greaseman | 6.49 |
| Loader | 7.09 |
| Mechanic | 8.47 |
| Motor Grader (Fine Grade) | 8.04 |
| Motor Grader (Rough Grade) | 7.68 |
| Oiler | 5.88 |
| Roller (Finisher) | 6.70 |
| Roller (Rough) | 5.65 |
| Scraper | 6.63 |
| Screed Asphalt | 7.09 |
| Stone Spreader | 6.02 |
| Stripping Machine Operator | 6.00 |
| Subgrade Machine | 7.13 |
| Sweeper | 5.80 |
| Tractor (Utility) | 5.47 |

TRUCK DRIVERS:

| | |
|---|---|
| Trucks - Single Rear Axle | 5.42 |
| Trucks - Multi Rear Axle | 6.08 |
| Trucks - Heavy Duty | 9.47 |

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

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In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination

* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal

process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

ITEMIZED PROPOSAL FOR CONTRACT NO. C200231



County : MECKLENBURG

| Line # | Item Number | Sec # | Description | Quantity | Unit Cost | Amount |
|---|---|---|---|---|---|---|
| | | | **ROADWAY ITEMS** | | | |
| 0001 | 0000900000-N | SP | GENERIC MISCELLANEOUS ITEM DESIGN, CONSTRUCTION & INSPEC-TION | Lump Sum | L.S. | |

**0758/Sep04/Q 1.0/D900000/E1** **Total Amount Of Bid For Entire Project :**

## PROJECT SPECIAL PROVISIONS
## PERMITS

The Design-Builder's attention is directed to the following permits which have been applied for by the Department of Transportation to the authority granting the permits. Copies of these permits will be furnished to the prospective Design-Builder's when received by the Department.

| PERMIT | AUTHORITY GRANTING THE PERMIT |
|---|---|
| Dredge and Fill and/or<br>Work in Navigable Waters | U. S. Army Corps of Engineers |
| Water Quality | Division of Environmental Management, DEHNR<br>State of North Carolina |

The Design-Builder shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the department and the Design-Builder has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Design-Builder's attention is also directed to Articles 107-10 and 107-14 of the Standard Specifications and the following:

Should the Design-Builder propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Design-Builder's responsibility to coordinate with the appropriate permit agency to determine what, if any, additional permit action is required. The Design-Builder shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Design-Builder shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Design-Builder's request for approval of construction methods not specifically identified in the permit.

**Where construction moratoriums are contained in a permit condition which restricts the Design-Builder's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the waters or wetlands provided that activities outside those areas is done in such a manner as to not affect the waters or wetlands.**

12/19/89

## *AWARD LIMITS ON MULTIPLE PROJECTS

It is the desire of the Bidder to be awarded contracts, the value of

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

| _____ | _____ |
|---|---|
| (Project Number) | (County) |
| _____ | _____ |
| (Project Number) | (County) |
| _____ | _____ |
| (Project Number) | (County) |
| _____ | _____ |
| (Project Number) | (County) |

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

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

_____
**Signature of Authorized Person

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

# LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

| FIRM NAME AND ADDRESS | | ITEM DESCRIPTION | (*) AGREED UPON UNIT PRICE | DOLLAR VOLUME OF SUBLET ITEM |
|---|---|---|---|---|
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**PROJECT NO.**_____ **COUNTY**_____ **FIRM**_____

THIS FORM MUST BE COMPLETED IN ORDER FOR THE BID TO BE CONSIDERED RESPONSIVE AND BE PUBLICLY READ.
BIDDERS WITH NO DBE PARTICIPATION MUST SO INDICATE THIS ON THE FORM BY ENTERING THE WORD OR NUMBER ZERO.

# LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

| FIRM NAME AND ADDRESS | | ITEM DESCRIPTION | (*) AGREED UPON UNIT PRICE | DOLLAR VOLUME OF SUBLET ITEM |
|---|---|---|---|---|
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**PROJECT NO.**_____ **COUNTY**_____ **FIRM**_____

# LISTING OF DBE SUBCONTRACTORS

Sheet ____ of ____

| FIRM NAME AND ADDRESS | | ITEM DESCRIPTION | (*) AGREED UPON UNIT PRICE | DOLLAR VOLUME OF SUBLET ITEM |
|---|---|---|---|---|
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**PROJECT NO.**_____ **COUNTY**_____ **FIRM**_____

# LISTING OF DBE SUBCONTRACTORS

Sheet ____ of ____

| FIRM NAME AND ADDRESS | | ITEM DESCRIPTION | (*) AGREED UPON UNIT PRICE | DOLLAR VOLUME OF SUBLET ITEM |
|---|---|---|---|---|
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**PROJECT NO.**_____ **COUNTY**_____ **FIRM**_____

(*) The Dollar Volume Shown In This Column Shall be Actual Price Agreed Upon by the Prime Contractor and the DBE Subcontractor, and These Prices Will Be Used to Determine The Percentage of the DBE Participation in this Contract.

**Dollar Volume of DBE Subcontractor..... $ _____

Percentage of Total Contract Bid Price

_____%

**MUST HAVE ENTRY EVEN IF FIGURE TO BE ENTERED IS ZERO.

12/21/99

EXECUTION OF PRICE PROPOSAL, NONCOLLUSION AFFIDAVIT, AND DEBARMENT CERTIFICATION

The person executing the Price Proposal, on behalf of the Design-Builder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Design-Builder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Price Proposal, and that the Design-Builder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this Price Proposal in the proper manner also constitutes the Design-Builder's certification of "Status" under penalty of perjury under the laws of the United States in accordance with the Debarment Certification included elsewhere in the proposal form, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

SIGNATURE OF DESIGN-BUILDER
(If a corporation uses this sheet)

_____
(Print full name of corporation)

_____
(Address as Prequalified)

Attest_____ By_____
(Secretary) (Assistant Secretary) (President) (Vice President)
Delete inappropriate title (Asst. Vice President)
Delete inappropriate title

_____ _____
Print Signer's Name Print Signer's Name

CORPORATE SEAL

NOTE - AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

_____ day of _____, 20___.

_____
(Signature of Notary Public) NOTARY SEAL:

of _____County.

State of _____.

My Commission Expires: _____

Signature Sheet 1 (Price Proposal) - Corporation

EXECUTION OF PRICE PROPOSAL, NONCOLLUSION AFFIDAVIT, AND DEBARMENT CERTIFICATION

The person executing the Price Proposal, on behalf of the Design-Builder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Design-Builder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Price Proposal, and that the Design-Builder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this Price Proposal in the proper manner also constitutes the Design-Builder's certification of "Status" under penalty of perjury under the laws of the United States in accordance with the Debarment Certification included elsewhere in the proposal form, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

SIGNATURE OF DESIGN-BUILDER
(If a joint venture, use this sheet)

Instructions to Bidders: On Line (1), print the name of each contractor. On Line (2), print the name of one of the joint venturers and execute below in the appropriate manner and furnish in the following lines all information required by Article 102-8 of the Specifications. On Line (3), print the name of the other joint venturer and execute below in the appropriate manner and furnish all information required by said article of the Specifications. For correct form of execution and information required for execution of this sheet by an individual, see Signature Sheets 3 and 4; for a corporation, see Signature Sheet 1; and for a partnership, see Signature Sheet 5.

(1)_____ and _____
A Joint Venture

(2)_____(Seal)
(Name of Design-Builder)

_____

_____ By_____
Witness or Attest

_____ _____
Print Signer's Name Print Signer's Name
If a corporation, affix corporate seal:

and

(3)_____(Seal)
(Name of Design-Builder)

_____
(Address as Prequalified)

_____ By_____
Witness or Attest

_____ _____
Print Signer's Name Print Signer's Name
If a corporation, affix corporate seal:

NOTE - AFFIDAVIT MUST BE NOTARIZED For Line (2)

Subscribed and sworn to before me

this the _____day of _____, 20____.

_____
(Signature of Notary Public & Seal)

of _____County.

State of _____.

My Commission Expires:_____.

NOTE - AFFIDAVIT MUST BE NOTARIZED For Line (3)

Subscribed and sworn to before me

this the ____ day of _____, 20___.

_____
(Signature of Notary Public & Seal)

of _____County.

State of _____.

My Commission Expires_____.

EXECUTION OF PRICE PROPOSAL, NONCOLLUSION AFFIDAVIT, AND DEBARMENT CERTIFICATION

The person executing the Price Proposal, on behalf of the Design-Builder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Design-Builder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Price Proposal, and that the Design-Builder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this Price Proposal in the proper manner also constitutes the Design-Builder's certification of "Status" under penalty of perjury under the laws of the United States in accordance with the Debarment Certification included elsewhere in the proposal form, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

SIGNATURE OF DESIGN-BUILDER
(If an individual doing business under a
firm name, use this sheet)

Name of Design-Builder_____trading
(Print individual name)

_____
Witness

_____ and doing business as _____
Print signer's name (Print firm name)

_____
(Address as Prequalified)

Signature of Design-Builder_____
(Individually)

_____
Print signer's name

NOTE - AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the NOTARY SEAL

_____ day of _____, 20___.

_____
(Signature of Notary Public)

of _____County.

State of _____.

My Commission Expires:_____

Signature Sheet 3 (Price Proposal) - INDIVIDUAL WITH FIRM NAME

12/21/99

EXECUTION OF PRICE PROPOSAL, NONCOLLUSION AFFIDAVIT, AND DEBARMENT CERTIFICATION

The person executing the Price Proposal, on behalf of the Design-Builder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Design-Builder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Price Proposal, and that the Design-Builder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this Price Proposal in the proper manner also constitutes the Design-Builder's certification of "Status" under penalty of perjury under the laws of the United States in accordance with the Debarment Certification included elsewhere in the proposal form, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

SIGNATURE OF DESIGN-BUILDER
(If an individual doing business in
his own name, use this sheet)

Name of Design-Builder_____
(Print)

_____
(Address as Prequalified)

_____ Signature of Design-Builder_____
Witness (Individually)

_____ _____
Print Signer's Name Print Signer's Name

NOTE - AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the NOTARY SEAL

_____ day of _____, 20___.

_____
(Signature of Notary Public)

of _____County.

State of _____.

My Commission Expires:_____

Signature Sheet 4 (Price Proposal) - Individual Name

12/21/99

EXECUTION OF PRICE PROPOSAL, NONCOLLUSION AFFIDAVIT, AND DEBARMENT CERTIFICATION

The person executing the Price Proposal, on behalf of the Design-Builder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Design-Builder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Price Proposal, and that the Design-Builder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this Price Proposal in the proper manner also constitutes the Design-Builder's certification of "Status" under penalty of perjury under the laws of the United States in accordance with the Debarment Certification included elsewhere in the proposal form, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

SIGNATURE OF DESIGN-BUILDER
(If a partnership, use this sheet)

_____
(Print Name of Partnership)

_____
(Address as Prequalified)

_____ By_____
Witness Partner

_____ _____
Print Signer's Name Print Signer's Name

NOTE - AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the NOTARY SEAL

_____ day of _____, 20___.

_____
(Signature of Notary Public)

of _____County.

State of _____.

My Commission Expires:_____

Signature Sheet 5 (Price Proposal) - Partnership

12/21/99

EXECUTION OF PRICE PROPOSAL, NONCOLLUSION AFFIDAVIT, AND DEBARMENT CERTIFICATION

The person executing the Price Proposal, on behalf of the Design-Builder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the Design-Builder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Price Proposal, and that the Design-Builder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this Price Proposal in the proper manner also constitutes the Design-Builder's certification of "Status" under penalty of perjury under the laws of the United States in accordance with the Debarment Certification included elsewhere in the proposal form, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

SIGNATURE OF DESIGN-BUILDER
(Limited Liability Company, use this sheet)

Name of Design-Builder_____
(Print firm name)

_____
(Address as Prequalified)

Signature of Manager_____
(Individually)

_____
Print Signer's Name

NOTE - AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

_____ day of _____, 20___.  NOTARY SEAL

_____
(Signature of Notary Public)

of _____County.

State of _____.

My Commission Expires:_____

Signature Sheet 6 (Price Proposal) - LIMITED LIABILITY COMPANY

2/16/99

Project No.:8.1674402

County: MECKLENBURG

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

_____
Contract Officer

_____
Date

Execution of Contract and Bonds
Approved as to Form:

_____
Attorney General

Signature Sheet 7 (Bid - Acceptance by Department)

7/17/90

# DEBARMENT CERTIFICATION OF BIDDERS

Instructions & conditions for certification

1. By signing and submitting this proposal, the Design-Builder is providing the certification set out below.

2. The inability of a Design-Builder of provide the certification required below will not necessarily result in denial of participation in this contract. If the certification is not provided, the Design-Builder must submit an explanation (exception) of why it cannot provide the certification set out below. The certification or explanation (exception) will be considered in connection with the Department's determination whether to award the contract. However, failure of the prospective Design-Builder to furnish a certification or an explanation (exception) may be grounds for rejection of the Price Proposal.

3. The certification in this provision is a material representation of fact upon which reliance is placed when the Department determines whether or not to award the contract. If it is later determined that the Design-Builder knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the Department may terminate this contract for cause of default.

4. The prospective Design-Builder shall provide immediate written notice to the Department if at any time the Design-Builder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12540. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

6. The Design-Builder agrees by submitting this Price Proposal that, should the contract be awarded, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this contract, unless authorized by the Department.

7. The prospective Design-Builder further agrees by submitting this proposal that it will include the Federal-Aid Provision titled "Required Contract Provisions Federal-Aid Construction Contract" (Form FHWA PR 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

8. The prospective Design-Builder may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals.

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

10. Except for transactions authorized under paragraph 6 of these instructions, if the successful Design-Builder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the Department may terminate this transaction for cause of default.

3

DEBARMENT CERTIFICATION

The Design-Builder certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

Where the prospective Design-Builder is unable to certify to any of the statements in this certification, it shall attach an explanation to this proposal.

**********

IF AN EXPLANATION, AS PROVIDED IN THE ABOVE DEBARMENT CERTIFICATION, HAS BEEN ATTACHED TO THE PROPOSAL, PLEASE CHECK THE BOX SHOWN BELOW:

☐ An explanation has been attached to the proposal.