

PROJECT SPECIAL PROVISIONS

Project 17BP.10.H.1

Mecklenburg & Anson Counties

SCOPE OF WORK

This work shall consist of furnishing all labor, equipment, and materials to rehabilitate elements of existing bridge structures and overlay existing bridge decks with latex modified concrete as directed in the plans. Work includes: portable lighting, existing deck surface preparation, removing deteriorated concrete using hydro-demolition methods and overlaying with latex modified concrete, milling of roadway approaches, disposal of waste material, installing foam joint seals, grooving bridge deck, substructure repairs using formed and poured concrete, shotcrete and epoxy injection, jacking spans and re-setting rocker bearings, painting structural steel, asphalt paving approaches, pavement markings, seeding and mulching all grassed areas disturbed; and all incidental items necessary to complete the project as specified and shown on the plans. No separate payment will be made for portable lighting as the cost of such is incidental to the work being performed.

Work will be performed on existing bridges at the following locations:

- 1.) Anson County Bridge #81 – US 74 WB over Pee Dee River (Latex Modified Concrete Overlay-Very Early Strength, Bearings, Substructure Concrete Repairs, Painting Weathering Steel)
- 2.) Mecklenburg County Bridge #88 – NC 49 over Norfolk Southern Rail Road (Latex Modified Concrete Overlay-Very Early Strength, Substructure Concrete Repairs, Painting Structural Steel)
- 3.) Mecklenburg County Bridge #54 – NC 160 over Norfolk Southern Rail Road (Latex Modified Concrete Overlay-Very Early Strength, Substructure Concrete Repairs, Painting Structural Steel)

Contractor shall provide all necessary access; provide all traffic control; provide all staging areas, material storage, waste disposal, provide environmental controls to limit loss of materials from collection of hydro-demolition water, jacking equipment, sawing equipment, and chipping equipment; and all else necessary to complete the work.

The contractor shall be responsible for fulfilling all requirements of the NCDOT Standard Specifications for Roads and Structures dated January 2012, except as otherwise specified herein.



COORDINATION WITH NORFOLK SOUTHERN RAILWAY

The Contractor shall be responsible for coordinating with the Norfolk Southern Railway Corporation, hereafter referred to as “RAILROAD”, for right-of-entry onto Railroad property or right-of-way. Coordination shall include but not be limited to the acquisition and handling of right-of-entry agreements. The Contractor shall be responsible for costs associated with all right-of-entry agreement fees.

The standard right-of-entry agreement for Norfolk Southern railroad may be obtained at the following link (Non-Environmental Rights-of-Entry within 50 Feet of a Railroad Track):

Preparation for Construction within the Existing Railroad Property or Right-of-Way

The Contractor shall be required to use the following guidelines and other guidelines as required by the Railroad.

- *Norfolk Southern Corporation Special Provisions for Protection of Railway Interest*
- *Federal Aid Policy Guide 23 CFR 140I*
- *Federal Aid Policy Guide 23 CFR 646*
- *NCDOT Standard Specifications for Roads and Structures Section 107-9 (Excluding Paragraph 2)*
- *North Carolina Administrative Code Section T19A: 02B, 0150 through 0158*

Arrangements for Protection and Adjustments to Existing and Proposed Railroad Crossing Surface and Roadbeds:

The Contractor shall make the necessary arrangements with the Railroad for any necessary railroad force account estimates which may include flagging, engineering, and plan review. Force account estimate should be forwarded to the office of the NCDOT State Structures Engineer. The Contractor shall not commence any work on the Railroad property or right-of-way until all agreements have been executed, insurance acquired and approved, and all construction plans for cleaning and painting have been approved by the Railroad Engineer. The Contractor shall make the necessary arrangements with the Railroad that are required to protect against property damage that may result in loss of service, expense, or loss of life. The Contractor shall be responsible for all damage to the Railroad resulting from their operations. The Railroad may issue a stop work order until all dangerous situations are remedied. The Contractor shall be responsible for providing Railroad Protective Liability Insurance for Bodily Injury Liability, Property Damage Liability, and Physical Damage to Property.. Other insurance requirements, including those for all subcontractors, are detailed in the “*Special Provision for Protection of Railroad Interest*”. The Contractor shall be required to use the Standard NCDOT Cost Agreement and Insurance Special Provisions forms, which will be supplied by the NCDOT State Railroad Agent upon request. The Contractor shall submit executed agreements, force account estimate and plans to NCDOT’s State Structures Engineer prior to the commencement of work in the railroad property or right-of-way and prior to authorization for the Railroad to proceed with force account work

Coordination with Norfolk Southern Corporation:

The contractor shall acquire the right-of-entry agreement through the appropriate Local Norfolk Southern Railroad Division Engineer.

The Contractor shall coordinate with J. N. Carter, Jr., Chief Engineer, Bridges and Structures, Norfolk Southern Corporation, , , (contact is Scott Overbey at telephone number 404-582-5588) to obtain plan approval. The Department will be responsible for payment of the Railroad Force Account work up to the indicated ICT; however, the Contractor shall reimburse the Department for Force Account Estimate overruns and other damages that exceed the ICT at the rate indicated.

The plan submittal to the Railroad shall include any working drawings for cleaning and painting girders. All submittals to Railroad shall be made electronically using the pdf format for documents and drawings unless otherwise directed by the Railroad Engineer.

TRAIN DATA

The train speed is 40 mph, there is one track, 10 trains and no passenger trains.

SPECIAL PROVISIONS FOR PROTECTION OF RAILWAY INTEREST

Under the terms of these provisions, the North Carolina Department of Transportation shall hereinafter be called "Department", and the Norfolk Southern Railway Company shall hereinafter be called "Railroad".

1. AUTHORITY OF RAILROAD ENGINEER AND DEPARTMENT ENGINEER:

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

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

2. NOTICE OF STARTING WORK:

A. The Contractor shall not commence any work on Railroad right of way until he has complied with the following conditions:

- (1) Give the Railroad written notice, with copy to the Department Engineer who is designated to be in charge of the work, at least ten (10) days in advance of the date he proposes to begin work on Railroad right of way to:

Office of Chief Engineer - Bridges & Structures
Norfolk Southern Corporation
1200 Peachtree Street NE
Internal Box 142
Atlanta, Georgia 30309

- (2) Obtain written approval from the Railroad of Railroad Protective Liability Insurance coverage as required by section 14 herein. The Railroad does not accept notation of Railroad protective insurance on a certificate of liability insurance form or Binders as Railroad must have the full original countersigned policy. The policy will be reviewed for compliance prior to written approval. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for Railroad to review.
- (3) Obtain Railroad's Flagging Services as required by section 7 herein.
- (4) Obtain written authorization from the Railroad to begin work on Railroad's right of way, such authorization to include an outline of specific conditions with which he must comply.
- (5) Furnish a schedule for all work within the Railroad right of way as required by section 7B1 herein.

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

3. INTERFERENCE WITH RAILROAD OPERATIONS:

- A. The Contractor shall so arrange and conduct his work that there will be no interference with Railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad or to poles, wires, and other facilities of tenants on the right of way of the Railroad. Whenever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor which requires flagging service or inspection service (watchman) shall be deferred by the Contractor until the flagging protection or inspection service required by the Railroad is available at the job site.
- B. Whenever work within Railroad's right of way is of such a nature that impediment to Railroad operations such as use of runaround tracks or necessity for reduced speed is unavoidable, the Contractor shall schedule and conduct his operations so that such impediment is reduced to the absolute minimum.
- C. Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of the Railroad, the Contractor shall make such provisions. If in the judgment of the Railroad Engineer, or in his absence, the Railroad's Division Engineer, such provision is insufficient, either may require or provide such provisions as he deems necessary. In any event, such unusual provisions shall be at the Contractor's expense and without cost to the Railroad or the Department.

4. TRACK CLEARANCES:

A. The minimum track clearances to be maintained by the Contractor during construction are as follows:

(1) Horizontal clearance measured from centerline of track to falsework:

13'-0" on tangent track

14'-0" on curved track

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

B. However, before undertaking any work within Railroad's right of way, or before placing any obstruction over any track, the Contractor shall:

(1) Notify the Railroad Engineer at least 72 hours in advance of the work.

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

(3) Receive permission from the Railroad Engineer to proceed with the work.

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

5. CONSTRUCTION PROCEDURES:

A. General:

Construction work and operations by the Contractor on Railroad's property shall be:

(1) Subject to the inspection and approval of the Railroad.

(2) In accord with the Railroad's written outline of specific conditions.

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

(4) In accord with these Special Provisions.

B. Work Plan:

A Work Plan detailing all aspects of the maintenance activities on and around railroad right-of-way must be submitted to the Railroad and approved in writing prior to entry to or any work beginning in the railroad right-of-way the Work Plan shall include a detailed construction schedule for the duration of the project clearly indicating the time periods for all work on and around the railroad right-of-way.

Provide a listing and location of the anticipated equipment to be used and ensure a contingency plan of action is in place should a primary piece of equipment malfunction. All work in the vicinity of railroad property that has the potential of affecting train operations must be submitted and approved by the Railroad prior to work being performed.

If a containment system is proposed over the track(s), the submittal must include a written installation and removal procedure and a plan showing the details of the system. This submittal is to include any work platforms with design loads and supporting calculations signed and sealed by a North Carolina registered Professional Engineer. The design of the system shall also be in accordance with OSHA and all applicable environmental standards. The containment system must provide 22'- 0" vertical clearance measured from the top of rail to the lowest point of the containment structure within 6'- 0" from the centerline of track. If the existing vertical clearance is less than 22'- 0", no reduction in vertical clearance is permissible. The containment system shall not encroach upon the horizontal clearance envelope of fourteen feet (14'- 0"). As measured perpendicularly from the centerline of the nearest track. Any proposed variances to the clearance requirements must be provided in writing and will require railroad approval, which may be withheld for any reason.

C. Maintenance of Railroad Facilities:

- (1) The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his operations and provide and maintain any erosion control measures as required. The Contractor will promptly repair eroded areas within Railroad's right of way and repair any other damage to the property of the Railroad or its tenants.
- (2) All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

D. Storage of Materials and Equipment:

Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the right of way of the Railroad without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.

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

E. Cleanup:

Upon completion of the work, the Contractor shall remove from within the limits of the Railroad's right of way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said right of way in a neat condition satisfactory to the Chief Engineer of the Railroad or his authorized representative.

6. DAMAGES:

- A. The Contractor shall assume all liability for any and all damages to his work, employees, servants, equipment and materials caused by Railroad traffic.
- B. Any cost incurred by the Railroad for repairing damages to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid directly to the Railroad by the Contractor.

7. FLAGGING SERVICES:

A. Requirements:

Flagging services will not be provided until the Contractor's insurance has been reviewed and approved by the Railroad.

Under the terms of the agreement between the Department and Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's men or equipment are, or are likely to be, working on the Railroad's right of way, or across, over, adjacent to or under a track, or when such work has disturbed or is likely to disturb a Railroad structure, Railroad roadbed, or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging.

Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three (3) flagmen may be required. However, if the Contractor works within distances that violate instructions given by the Railroad Engineer or performs work that has not been scheduled with the Railroad Engineer, a flagman or flagmen may be required full time until the project has been completed. Should such violations or unscheduled, unauthorized work by the Contractor result in full time flagging being required by the Railroad, the additional cost of such flagging above normal flagging cost shall be deducted from the final payment to the Contractor as provided in Article 109-9 of the Standard Specifications. Neither Department nor Railroad will be liable for damages resulting from unscheduled or unauthorized work.

B. Scheduling and Notification:

- (1) The Contractor's work requiring railroad flagging should be scheduled to limit the presence of a flagman at the site to a maximum of 50 hours per week. The

Contractor shall receive Railroad approval of work schedules requiring a flagman presence in excess of 40 hours per week.

- (2) No later than the time that approval is initially requested to begin work on Railroad right of way, the Contractor shall furnish to the Department and Railroad a schedule for all work required to complete the portion of the project within Railroad right of way and arrange for a job site meeting between the Contractor, Department, and Railroad. Flagman or flagmen may not be provided until the job site meeting has been conducted and the Contractor's work scheduled.
- (3) The Contractor will be required to give the Railroad Engineer at least 10 working days of advance written notice of intent to begin work within Railroad's right of way in accordance with this special provision. Once begun, when such work is then suspended at any time, or for any reason, the Contractor will be required to give the Railroad Engineer at least 3 working days of advance notice before resuming work on Railroad's right of way. Such notices shall include sufficient details of the proposed work to enable the Railroad Engineer to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Department Engineer a copy; if notice is given verbally, it shall be confirmed in writing with a copy to the Department Engineer.
- (4) If flagging is required, no work shall be undertaken until the flagman, or flagmen, is present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain from the Railroad. Due to labor agreements, it is necessary to give 5 working days notice before flagging service may be discontinued and responsibility for payment stopped.
- (5) If, after the flagman is assigned to the project site, emergencies arise which require the flagman's presence elsewhere, the Contractor shall delay work on Railroad right of way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the Department or Railroad.

C. Payment:

- (1) The Department will be responsible for paying the Railroad directly for any and all costs of flagging which may be required to accomplish the construction. The Contractor shall reimburse the Railroad for any costs of the flagging which is required for work for the benefit of the Contractor.
- (2) The estimated cost of flagging service is the current rate per day based on a 10-hour work day. This cost includes the base pay for each flagman, overhead, and a per diem charge for travel expenses, meals and lodging. The charge by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.

- (3) Work by a flagman in excess of 8 hours per day or 40 hours per week, but not more than 12 hours a day will result in overtime pay at 1½ times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime pay at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2½ times the normal rate.
- (4) Railroad work involved in preparing and handling bills will also be charged to the Department. Charges to the Department by the Railroad shall be in accordance with applicable provisions of the Federal-Aid Policy Guide, Title 23 Subchapter B, Part 140I and Subchapter G, Part 646B issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change. The above estimates of flagging costs are provided for information only and are not binding in any way.

D. Verification:

- (1) Railroad's flagman will electronically enter flagging time via Railroad's electronic billing system. Any complaints concerning flagman or flagmen must be resolved in a timely manner. If need for flagman or flagmen is questioned, please contact Railroad's System Engineer of Public Improvements at (404) 529-1641. All verbal complaints must be confirmed in writing by the Contractor within 5 working days with copy to the Department Engineer. Address all written correspondence to:

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

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

8. HAUL ACROSS RAILROADS:

- A. Where the plans show or imply that materials of any nature must be hauled across a Railroad, unless the plans clearly show that the Department has included arrangements for such haul in its agreement with the Railroad, the Contractor will be required to make all necessary arrangements with the Railroad regarding means of transporting such materials

across the Railroad. The Contractor will be required to bear all costs incidental, including flagging, to such crossings whether services are performed by his own forces or by Railroad personnel.

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

9. WORK FOR THE BENEFIT OF THE CONTRACTOR:

- A. All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans and included in the force account agreement between the Department and the Railroad; or will be covered by appropriate revisions to same which will be initiated and approved by the Department and/or Railroad.
- B. Should the Contractor desire any changes in addition to the above, then he shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.

10. COOPERATION AND DELAYS:

- A. It shall be the Contractor's responsibility to arrange a schedule with the Railroad for accomplishing stage construction involving work by the Railroad or tenants of the Railroad. In arranging his schedule he shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefore. The Contractor shall cooperate with others in the construction of the project to the end that all work may be accomplished to the best advantage.
- B. No charge or claims of the Contractor against either the Department or Railroad will be allowed for hindrance or delay on account of railroad traffic, any work done by the Railroad or other delay incident to or necessary for safe maintenance of railroad traffic or for any delays due to compliance with these special provisions.
- C. The Contractor's attention is called to the fact that neither the Department nor Railroad assumes any responsibility for any work performed by others in connection with the construction of the project, and the Contractor shall have no claim whatsoever against the Department, or Railroad for any inconvenience, delay, or additional cost incurred by him on account of such operations by others.

11. TRAINMAN'S WALKWAYS:

Along the outer side of each exterior track of multiple operated tracks, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 10' from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments

or obstructions allowed during work hours while Railroad's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with 10'-0" minimum clearance from centerline of track shall be placed.

12. GUIDELINES FOR PERSONNEL ON RAILROAD'S RIGHT OF WAY:

- A. All persons shall wear hard hats. Appropriate eye and hearing protection must be used. Working in shorts is prohibited. Shirts must cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots is prohibited. Hard-sole, lace-up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle are adequate. Wearing Safety boots is strongly recommended. In the vicinity of at-grade crossings, it is strongly recommended to wear reflective vests.
- B. No one is allowed within 25' of the centerline of track without specific authorization from the flagman.
- C. All persons working near track while train is passing are to lookout for dragging bands, chains and protruding or shifted cargo.
- D. No one is allowed to cross tracks without specific authorization from the flagman.
- E. All welders and cutting torches working within 25' of track must stop when train is passing.
- F. No steel tape or chain will be allowed to cross or touch rails without permission.

13. GUIDELINES FOR EQUIPMENT ON RAILROAD'S RIGHT OF WAY:

- A. No crane or boom equipment will be allowed to set up to work or park within boom distance plus 15 ft. of centerline of track without specific permission from Railroad Engineer and flagman.
- B. No crane or boom equipment will be allowed to foul track or lift a load over the track without flag protection and track time.
- C. All employees will stay with their machines when crane or boom equipment is pointed toward track.
- D. All cranes and boom equipment under load will stop work while train is passing (including pile driving).
- E. Swinging loads must be secured to prevent movement while train is passing.
- F. No loads will be suspended above a moving train.

- G. No equipment will be allowed within 25' of centerline of track without specific authorization of the flagman.
 - H. Trucks, tractors or any equipment will not touch ballast line without specific permission from railroad official and flagman.
 - I. No equipment or load movement within 25' or above a standing train or railroad equipment without specific authorization of the flagman.
 - J. All operating equipment within 25' of track must halt operations when a train is passing. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.
 - K. All equipment, loads and cables are prohibited from touching rails.
 - L. While clearing and grubbing, no vegetation will be removed from Railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.
 - M. No equipment or materials will be parked or stored on Railroad's property unless specific authorization is granted from the Railroad Engineer.
 - N. All unattended equipment that is left parked on Railroad's property shall be effectively immobilized so that it cannot be moved by unauthorized persons.
 - O. All cranes and boom equipment will be turned away from track after each work day or whenever unattended by an operator.
14. INSURANCE:
- A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to provide coverage conforming to the requirements of the Federal-Aid Policy Guide outlined under Title 23 Subchapter G, Part 646A for all work to be performed on Railroad's right of way by carrying insurance of the following kinds and amounts:
 - (1) Commercial General Liability Insurance having a combined single limit of not less than \$2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, shall be endorsed to name Railroad specified in section 14A2(c) below both as the certificate holder and as an additional insured, and shall include a severability of interests provision.
 - (2) Railroad Protective Liability Insurance having a combined single limit of not less than \$2,000,000 each occurrence and \$6,000,000 in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit

of \$5,000,000 each occurrence and \$10,000,000 in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.

The standards for the Railroad Protective Liability Insurance are as follows:

- (a) The insurer must be rated A- or better by A.M. Best Company, Inc.
- (b) The policy must be written using one of the following combinations of Insurance Services Office (“ISO”) Railroad Protective Liability Insurance Form Numbers:
 - (1) CG 00 35 01 96 and CG 28 31 10 93; or
 - (2) CG 00 35 07 98 and CG 28 31 07 98; or
 - (3) CG 00 35 10 01; or
 - (4) CG 00 35 12 04

(c) The named insured shall read:

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

(d) The description of operations must appear on the Declarations, must match the project description in this agreement, and must include the appropriate Department project and contract identification numbers.

The Description and Designation shall read:

Description and Designation: Deck overlay, substructure repairs and cleaning and painting existing bridge girders of Bridge No. 54 on NC 160 and Bridge No. 81 on US 74 over Norfolk Southern Railway, in Mecklenburg County, North Carolina identified as State Project 17.BP.10.H.1

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

NOTE: Do not include any references to milepost on the insurance policy.

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

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

(h) Other endorsements/forms that will be accepted are:

Broad Form Nuclear Exclusion – Form IL 00 21
30-day Advance Notice of Non-renewal or cancellation
60-day written notice to the Department prior to cancellation or change
Quick Reference or Index Form CL/IL 240

(i) Endorsements/forms that are **NOT** acceptable are:

- (1) Any Pollution Exclusion Endorsement except CG 28 31
- (2) Any Punitive or Exemplary Damages Exclusion
- (3) Known injury or Damage Exclusion form CG 00 59
- (4) Any Common Policy Conditions form
- (5) Any other endorsement/form not specifically authorized in section 14A2 above.

- B. If any part of the work is sublet, similar insurance, and evidence thereof as specified in section 14A1 above, shall be provided by or on behalf of the subcontractor to cover its operations on Railroad's right of way. As an alternative, the Prime Contractor may provide insurance for the subcontractor by means of separate and individual policies.
- C. Prior to entry on Railroad's right of way, the original and one duplicate copy of the Railroad Protective Liability Insurance Policy shall be submitted by the Prime Contractor to the Department at the address below for its review and transmittal to the Railroad. In addition, certificates of insurance evidencing the Prime Contractor's and any subcontractors' Commercial General Liability Insurance shall be issued to the Department and Railroad at the addresses below, and one certified copy of the Prime Contractor and any Subcontractors policy is to be forwarded to the Department for its review and transmittal to the Railroad. All policies and certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to the Department and Railroad. The Railroad will not permit any work on its right of way until it has reviewed and approved the evidence of insurance required herein.

DEPARTMENT:

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

RAILROAD:

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

- D. The insurance required herein shall in no way serve to limit the liability of Department or its Contractors under the terms of this agreement.
- E. The insurance amounts specified are minimum amounts and the Contractor may carry insurance in larger amounts if he so desires. As to "aggregate limits", if the insurer establishes loss reserves equal to or in excess of the aggregate limit specified in any of the required insurance policies, the Contractor shall immediately notify the Department and shall cease all operations until the aggregate limit is reinstated. If the insurer establishes loss reserves equal to or in excess of one/half of the aggregate limit, the Contractor shall arrange to restore the aggregate limit to at least the minimum amount stated in these requirements. Any insurance policies and certificates taken out and furnished due to these requirements shall be approved by the Department and Railroad as to form and amount prior to beginning work on Railroad's right of way.

F. All insurance herein before specified shall be carried until the final inspection and acceptance of the project by the Department and Railroad, or acceptance of that portion of the project within Railroad's right of way. At this point, no work or any other activities by the Contractor shall take place in Railroad's right of way without written permission from both the Department and Railroad.

15. FAILURE TO COMPLY:

A. In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:

- (1) The Railroad Engineer may require that the Contractor vacate Railroad's property.
- (2) The Department Engineer may withhold all monies due the Contractor on monthly statements.

Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Department Engineer and the Railroad Engineer.

16. PAYMENT FOR COST OF COMPLIANCE:

No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such cost shall be included in the various prices bid to perform the work.

17. COMPLETION AND ACCEPTANCE:

Upon completion of the work, the Contractor shall remove from within the limits of the Railroad's right of way completed in a satisfactory manner acceptable to the Department and Railroad, the Department will be notified of the Railroad's acceptance in writing by the Railroad's Chief Engineer or his authorized representative within ten (10) days or as soon thereafter as practicable.

HYDRO-DEMOLITION OF BRIDGE DECK

SPECIAL

1.0 DESCRIPTION

Hydro-demolition shall consist of the removal of the deck surface by means of high pressure water blasting which will remove concrete, asphalt, oil, dirt, concrete laitance and rust from the exposed reinforcing bars by direct impact, pressurization of micro and macro cracks and cavitation produced by jet instability. If reinforcing bars or bridge drainage devices are pulled up or snagged during scarification milling operations, the Contractor shall cease operations and consult with the Engineer to determine what adjustments, if any, need to be made to the roto-milling operations.

The Contractor shall submit for approval prior to beginning work, his Hydro-demolition Management Plan. This plan shall include how the Contractor shall provide for the collection, treatment, and disposal of all run-off water generated by the scarification and hydro-demolition processes. This Water Management Plan shall be prepared in accordance

the NCDOT Guidelines for Managing Hydro-demolition Water. The contractor shall comply with applicable regulation concerning such water disposal.

2.0 EQUIPMENT

Use the following surface preparation equipment:

- Hydro-demolition machine, self-propelled with min. 17,000 psi orifice pressure.
- Sawing equipment capable of sawing concrete to the specified depth.
- Scarifying equipment that is a power-operated, mechanical scarifier or grinder capable of removing at least 1/4 inch (6 mm) for each pass.
- Hand-held high velocity (7,500 psi minimum) water-jet equipment capable of removing rust scale from reinforcing steel, or removing small chips of concrete partially loosened by the scarifying or chipping operation, and of removing rehydrated dust left from scarification.
- Power driven hand tools for removal of unsound concrete are required that meet the following requirements:
 - Pneumatic hammers weighing a nominal 35 lb (16 kg) or less.
 - Pneumatic hammer chisel-type bits that do not exceed the diameter of the shaft in width.
 - Hand tools such as hammers and chisels for removal of final particles of unsound concrete.
 - Vibratory screed for overlays, except as noted herein.

The hydro-demolition machine shall be self-propelled and capable of producing a water-jet through an orifice at a pressure of at least 17,000 PSI. The machine shall move the jet transversely across the area and forward and backward so that the entire deck is covered with the water-jet and operated at a pressure sufficient to remove the unsound concrete.

The machine shall have sufficient means to control and vary the following functions:

- Water pressure.
- Angle and distance of the orifice in relation to the surface to be blasted.
- Limits of transverse and longitudinal movement of the orifice.
- Speed of the orifice in the transverse and longitudinal direction.

The high pressure pump (or pumps) shall be equipped with over-pressurization relief valves and rupture disc systems. All high pressure components shall be rated at full working pressure of the hydro-demolition system. The complete hydro-demolition system must be capable of depressurization from a single point.

The equipment must operate at a noise level of less than 90 decibels at a distance of 50 feet.

3.0 CONSTRUCTION METHODS

Remove all existing asphalt overlays and all loose, disintegrated, unsound or contaminated concrete from the bridge deck in accordance with the following surface preparation classifications shown below:

Seal all expansion joints subjected to run-off water from the hydro-demolition process with material approved by the Engineer, prior to beginning the Class I Surface Preparation. The expansion joints shall remain sealed until water from the hydro-demolition process no longer passes over them. The contractor shall take all steps necessary to eliminate the flow of water through the expansion joints, and any other locations water could leak from the deck.

All deck drains in the immediate work area and the other sections of the bridge affected by the work being performed in the immediate work area shall be sealed prior to beginning the Deck Scarification. They shall remain sealed until it has been determined that materials from the hydro-demolition and concrete overlay operations cannot be discharged through them any longer.

A. Scarifying Bridge Deck

Removal of any asphalt wearing surface from the bridge deck or if applicable, the approach roadway pavement, and scarification of the concrete deck to remove the entire concrete surface of the deck to a uniform depth of 1 ½" inch, but not less than 1/2 inch above the top mat of reinforcing steel. Estimated average cover to top mat:

Mecklenburg Co. Bridge # 54: 1 1/2"

Mecklenburg Co. Bridge # 88: 1"

Anson Co. Bridge # 81: 1 3/4"

Remove and dispose of all concrete and asphalt, and thoroughly clean the scarified surface. In areas where reinforcing steel is located in the depth to be scarified, use another method with the Engineer's approval. If reinforcing bars or bridge drainage devices are pulled up or snagged during scarification milling operations, the Contractor shall cease operations and consult with the Engineer to determine what adjustments, if any, need to be made.

B. Class I Surface Preparation (Partial Depth)

Remove by hydro-demolition and by chipping with hand tools all loose, unsound and contaminated deck concrete and in areas where reinforcing steel is exposed by removing deck to an average depth of ½ inch below the top mat of reinforcing steel. Dispose of the removed concrete, clean, repair or replace rusted or loose reinforcing steel, and thoroughly clean the newly exposed surface.

Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel.

C. Class II Surface Preparation (Partial Depth)

Remove by hydro-demolition and by chipping with hand tools all loose, unsound and contaminated deck concrete to an average depth of approximately one-half the deck thickness, but no less than 3/4 inch below the top mat of steel. In areas where the entire perimeter of the reinforcing steel bar is exposed, chip or use hand-held high velocity water-jet equipment to provide a minimum depth of 3/4 inch below the bar. Dispose of the removed concrete, clean, repair or replace rusted or loose reinforcing steel, and thoroughly clean the newly exposed surface.

Care shall be taken not to cut, stretch, or damage any exposed reinforcing steel.

In overhangs, removing concrete areas of less than 0.60 ft²/ft length of bridge without overhang support is permitted unless the Engineer directs otherwise. Overhang support is required for areas removed greater than 0.60 ft²/ft length of bridge. Submit details of overhang support to the Engineer for approval prior to beginning the work.

D. Class III Surface Preparation (Full Depth)

Remove by hydro-demolition, and chipping with hand tools all loose, unsound and contaminated deck concrete to the full slab depth. Thoroughly clean the routed out areas and dispose of concrete removed and clean, repair, or replace reinforcing bars.

For areas of less than 3 ft² suspending forms from existing reinforcing steel using wire ties is permitted. For larger areas, support forms by blocking from the beam flanges, or other approved method.

Overhang support is required for full depth removal adjacent to bridge rails. Submit details of overhang support to the Engineer for approval prior to beginning the work.

E. Under Deck Containment

Under deck containment shall be installed under areas of the bridge deck where Class III surface preparation occurs. The containment shall be installed prior to hydro-demolition in the areas indicated on the plans and in any other areas where blow thru or full depth removal occurs during surface preparation.

Submit for approval detailed plans for under deck containment. Detail how waste, debris, and wastewater are kept from falling below.

F. Class AA Concrete

Fill the Class III surface preparation areas with Class AA or latex modified concrete up to the bottom of the proposed concrete overlay in accordance with the methods described below:

Refill areas where concrete was removed with Class AA concrete up to the bottom of the proposed concrete overlay in accordance with Section 420 of the Standard Specifications.

Any of the methods for curing Class AA concrete as stated in the Standard Specifications are permitted except the membrane curing compound method.

Provide a raked finish to the surface of the Class AA concrete to provide a minimum relief of 1/16" and a maximum relief of 1/4". Place the overlay course only after the Class AA concrete has attained 2500 psi (17.2 MPa) as measured by an approved, non-destructive test method.

Refilling the areas from which concrete has been removed with latex modified concrete during the Class III repair is permitted if any of the following conditions are met:

- The reinforcing steel cover is 1½ inches or less for the top mat of steel.
- The area being repaired is less than 1 yd².
- The Engineer directs the fill.

For areas of less than 3 ft² suspending forms from existing reinforcing steel using wire ties is permitted. For larger areas, support forms by blocking from the beam flanges, or other approved method.

4.0 SURFACE PREPARATION

Two trial areas shall be designated by the Engineer to demonstrate that the equipment, personnel, and methods of operation are capable of producing results to the satisfaction of the owner's Engineer. The first trial area shall consist of approximately 50 square feet of sound concrete as determined by the Engineer. The equipment shall be calibrated to remove the sound concrete from the scarified surface to the depth required to achieve the plan overlay thickness. After completion of this test area, the equipment shall be moved to the second area consisting of deteriorated or defective concrete, to determine whether this unsound concrete will be completely removed with the previous calibration and to establish a baseline for requiring the contractor to place under-deck containment in areas subject to full depth removal, before beginning the hydro-demolition process in a span. Should it be determined that not all defective concrete has been removed, the hydro-demolition system shall be recalibrated to remove an additional 1/4 inch of sound concrete, then re-test on deteriorated concrete.

If additional defective concrete is found, the depth of cut will increase in 1/4 inch increments until only sound concrete is found remaining.

When satisfactory results are obtained, the machine parameters shall be used for production removal. The contractor shall make adjustments to the operating parameters, as required, to perform concrete removal as indicated on the drawings and to adjust to the variance in the compressive strength of the concrete.

Hand held water blasting equipment, pneumatic hammers, and hand tools may be substituted for the hydro-demolition unit in areas inaccessible (such as adjacent to the curb) or inconvenient (such as small patch areas).

The Engineer will re-inspect after each removal and require additional removals until compliance with plans and specifications are met.

Regardless of the method of removal, the removal operation shall be stopped if it is determined that sound concrete is being removed. Appropriate recalibration, or change in equipment and methods shall be performed prior to resuming the removal operation.

The Contractor shall take all steps necessary to prevent cutting or otherwise damaging existing steel designated to remain in place. Any such bars damaged (nicks deeper than 20% of the bar diameter) by the Contractor's operation shall be repaired or replaced. Defects in embedded reinforcing steel due to corrosion, which has reduced the cross sectional area of the steel by 25% or greater, shall have new reinforcing steel of similar cross section area lap-spliced to each side of the damaged area. Reinforcing bars shall be Grade 60 and meet the material requirements of Section 1070 of the Standard Specifications. Replacement bars shall be spliced to existing bars using either minimum 30 bar diameter lap splices or approved mechanical connectors.

The Contractor shall support and protect the exposed reinforcing steel, which is left unsupported by the hydro-demolition process, against displacement and damage from loads such as those caused by removal equipment and delivery buggies. All reinforcing steel damaged or dislodged by these operations shall be replaced with bars of the same size at the contractor's expense.

Rebar exposed and cleaned by hydro-demolition shall not require re-cleaning if encased in concrete within seven (7) days. Rebar exposed for more than seven (7) days shall be cleaned by high velocity water jets (4,000 PSI minimum) prior to placement of the new concrete.

When large areas of the deck on composite bridges are removed resulting in the debonding of the main stress carrying transverse reinforcing bars, the removal shall be performed in stages to comply with the construction sequence shown on the plans or as directed by the Engineer. Heavy equipment and materials will not be permitted in bridge sections where class I or class II surface preparation has been performed.

The Contractor shall shield his operations to prevent injury or damage from flying or falling debris. The Contractor shall provide a method of handling expected and unexpected blow-through of the deck where shown on the plans and as directed by the Engineer. This method shall provide for the containment of the runoff water and debris, and the protection of the area under the bridge deck. The Contractor shall be responsible for any injury or damage caused by his operations. The containment shall remain in-place until the latex modified concrete has been cast and reach minimum strength.

The removal area shall be thoroughly cleaned of all dirt, foreign materials and loose concrete to the extent necessary to produce a firm solid surface for adherence of new concrete.

Removal of concrete debris shall be accomplished either by hand or by mechanical means capable of removing wet debris and water all in the same pass and directly follow the hydro-demolition process to prevent the debris from re-setting or re-adhering to the surface of the remaining sound concrete. All concrete debris shall become the property of the Contractor

and shall be legally disposed of at the contractor's expense. The contractor shall be responsible for disposing of all debris generated by the scarification operations.

Any debris which is allowed to re-settle or re-adhere to the surface of the sound concrete shall be carefully removed by the Contractor (at no additional cost), and the Contractor shall exercise care to avoid any damage to the remaining sound concrete or exposed reinforcement. Following the removal of the debris and prior to the placement of the overlay, the entire surface shall be blasted clean with high pressure water to remove any bond-breaking residue, loose material from the concrete surface, and/or rust from the reinforcing steel. This residue shall be collected and disposed of by the contractor. The Contractor will not be permitted to allow material to fall from the deck.

All water used for hydro-demolition shall be potable. The Contractor is responsible for furnishing all of the water required for the project.

Any areas of the prepared surface contaminated by oil or other materials detrimental to good bond as a result of the contractor's operations shall be removed to such depth as may be required at the contractor's expense.

The Contractor shall provide adequate lighting as required to allow for the safe conduct of nighttime removal operation if he elects to do hydro-demolition at night. Submit a lighting plan to the Engineer for approval prior to beginning work.

5.0 MEASUREMENT AND PAYMENT

Scarifying Bridge Deck will be measured and paid for by the contract unit price per square yard and shall be full compensation for the milling of any existing asphalt wearing surface from the bridge deck or approaches, milling of the entire concrete bridge deck, repairing or replacing any damaged reinforcing steel, and the cleaning and disposal of all waste material generated.

Hydro-demolition of Bridge Deck will be measured and paid for by the contract unit price per square yard and shall be full compensation for Classes I, II, and III deck preparation, removal and disposal of unsound and contaminated concrete, cleaning, repairing or replacing of reinforcing steel, under deck containment, Class AA concrete, and for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Scarifying Bridge Deck	Square Yard
Hydro-Demolition of Bridge Deck	Square Yard

MANAGING HYDRO-DEMOLITION WATER

SPECIAL

1.0 DESCRIPTION

Collect and properly dispose of hydro-demolition water from bridge decks.

2.0 CONSTRUCTION METHODS

- A. Prepare a written hydro-demolition water management plan in accordance with the Guidelines for Managing Hydro-demolition Water available at <http://www.ncdot.gov/projects/ncbridges/#stats>. Submit plan and obtain approval from the Engineer prior to beginning of the hydro-demolition operation.
- B. Prior to final payment, submit a paper copy of all completed records pertaining to disposal of hydro-demolition water.

3.0 MEASUREMENT AND PAYMENT

Payment for collecting, sampling, testing, pH adjustment, monitoring, handling, discharging, hauling, disposing of the hydro-demolition water, documentation, record keeping, and obtaining permits if applicable, shall be included in the payment for other items.

LATEX MODIFIED CONCRETE - VERY EARLY STRENGTH

SPECIAL

1.0 DESCRIPTION

This work consists of furnishing and placing an overlay of latex modified concrete-very early strength (LMC-VES) over conventional existing concrete or repair concrete on bridge decks. Unless otherwise indicated on the plans, groove the bridge floor in accordance with Article 420-14(B) of the *Standard Specifications*.

2.0 MATERIALS

For equipment, proportioning and mixing of modified compositions, see Section 1000-8 of the *Standard Specifications*. Prior to beginning any work, obtain approval for all equipment to be used for deck preparation, mixing, placing, finishing, and curing the latex modified concrete.

For material of modified compositions, see Section 1000-8 of the *Standard Specifications* with the following modifications:

A. Page 10-10, Section 1000-8(A), add the following:

- 1. Cement – For latex modified concrete-very early strength, Cement shall be approximately 1/3 calcium sulfoaluminate (C4A3S) and 2/3 dicalcium silicate (C2S) or other hydraulic cement that will provide a Latex-Modified Concrete that meets the physical requirements for Latex-Modified Concrete as indicated in this special provision.

B. Page 10-11, Table beginning in paragraph 4, add the following:

- 1. Minimum compressive strength, normal setting concrete, 3000 psi at 7 days; very early strength concrete, 3000 psi at 3 hours.

2. Water-Cement Ratio by weight, normal setting concrete, maximum 0.40; very early strength concrete, maximum 0.42
- C. Page 10-11, last paragraph of 1000-8, add the following:
1. Submit the latex modified concrete mix design, including laboratory compressive strength data for a minimum of six 4-inch by 8-inch cylinders at the appropriate age (7 days for normal setting concrete; 3 hours for very early strength concrete) to the Engineer for review. Include test results for the slump and air content of the laboratory mix. Perform tests in accordance with AASHTO T 22, T 119 and T 152.

3.0 SYSTEM QUALITY SUBMITTALS

A. Past Performance Submittal

At the preconstruction conference, the latex modified concrete overlay Contractor shall submit verifiable records demonstrating that he or his approved subcontractor has performed satisfactorily, or that he has had direct supervision of such satisfactory performance of a subcontractor constructing contracts using very early strength latex modified concrete. At least 5 bridges with similar scope of work in any state shall be the minimum number demonstrated.

4.0 CONSTRUCTION METHODS

A. Preparation of Surface

Completely clean all surfaces within the 48 hours prior to placing the overlay unless otherwise approved.

Thoroughly soak the clean surface for at least 2 hours immediately prior to placing the latex modified concrete. After soaking the surface for at least 2 hours, cover it with a layer of white opaque polyethylene film that is at least 4 mils (0.100 mm) thick. Immediately prior to placing the latex modified concrete, remove standing water from the surface.

B. Placing and Finishing

Prior to placing modified material, install a bulkhead of easily compressible material at expansion joints to the required grade and profile. Placing material across expansion joints and sawing it later is not permitted.

Place and fasten screed rails in position to ensure finishing the new surface to the required profile. Do not treat screed rails with parting compound to facilitate their removal. Prior to placing the overlay, attach a 2 inch filler block to the bottom of the screed and pass it over the area to be repaired to check the thickness. Remove all concrete that the block does not clear.

Separate screed rails or construction dams from the newly placed material by passing a pointing trowel along their inside face. Carefully make this trowel cut for the entire depth

and length of rails or dams after the modified composition has sufficiently stiffened and cannot flow back.

Brush a latex cement mixture onto the wetted, prepared surface. Carefully give all vertical and horizontal surfaces a thorough, even coating and do not let the brushed material dry before it is covered with the additional material required for the final grade. Remove all loose aggregate from the latex cement brushed surface prior to latex concrete placement (NOTE: Not required for surfaces prepared with hydro-demolition).

Place the latex modified concrete in one operation.

Provide a minimum overlay thickness of as shown in the plans and a final surface that is approximately the same as the original deck surface.

Construction joints other than those shown on the plans will be submitted to the Engineer for approval.

When a tight, uniform surface is achieved and before the concrete becomes non-plastic, further finish the surface of the floor by burlap dragging or another acceptable method that produces an acceptable uniform surface texture.

Promptly cover the surface with a single layer of clean, wet burlap as soon as the surface will support it without deformation. Wet cure only the surface for minimum 3 hours and until a compressive strength of 3000 psi is reached. Keep the curing material saturated during the wet cure period.

Do not place the latex modified concrete before the burlap is saturated and approved by the Engineer. Drain excess water from the wet burlap before placement.

As soon as practical, after the concrete has hardened sufficiently, test the finished surface with an approved rolling straightedge that is designed, constructed, and adjusted so that it will accurately indicate or mark all floor areas which deviate from a plane surface by more than 1/8 inch in 10 feet (3 mm in 3 m). Remove all high areas in the hardened surface in excess of 1/8 inch in 10 feet (3 mm in 3 m) with an approved grinding or cutting machine. Where variations are such that the corrections extend below the limits of the top layer of grout, seal the corrected surface with an approved sealing agent if required by the Engineer. If approved by the Engineer, correct low areas in an acceptable manner.

Vehicular traffic may travel across an un-grooved deck, however, complete the transverse sawed grooves across the entire deck area after the latex modified concrete achieves design strength and no later than seven days after placing the latex modified concrete.

Field Testing Latex Modified Concrete-Very Early Strength

For projects with multiple bridges using the same mix design, or bridge decks with time constraints that require more than one night for placement, a relationship between the compressive strength and rebound hammer readings may be developed and used to obtain the three hour cylinder strength, in lieu of compressive strength testing. For the correct procedure, reference Document: PL11-LMC Rapid Set Overlays. Contact your local M&T representative for a copy of this document or see the following link: [under](#)

Physical Lab. Seven day concrete compressive strength sampling and testing is required in addition to the use of this method.

C. Limitations of Operations

The mixer will not be permitted on the bridge deck unless otherwise approved.

No traffic is permitted on the finished latex modified concrete surface until the total specified curing time is completed and until the concrete reaches the minimum specified compressive strength.

Do not place latex modified concrete if the temperature of the concrete surface on which the overlay is to be placed is below 40°F (4°C) or above 85°F (29°C). Measure the surface temperature by placing a thermometer under the insulation against the surface.

Prior to placing latex modified concrete, the Engineer determines the air temperature and wind speed. Do not place latex modified concrete if the ambient air temperature is below 45°F (7°C) or above 85°F (29°C), or if the wind velocity is in excess of 10 mph (16 km/h). If working at night, provide approved lighting. Provide aggregates for use in the latex modified concrete that are free from ice, frost and frozen particles when introduced into the mixer.

Do not place latex modified concrete when the temperature of the latex modified concrete is below 45°F (7°C) or above 85°F (29°C).

If the rate of evaporation of surface moisture from the latex modified concrete exceeds 0.05 pounds per square foot per hour during placement, measures shall be taken to reduce the rate of evaporation. The evaporation rate is calculated using the following formula:

$$E = (T_c^{2.5} - rT_a^{2.5})(1 + 0.4V)(10^{-6}) \text{ where,}$$

E=Evaporation Rate, T_c=Concrete Temp (°F), r=Relative Humidity (%/100)
T_a=Air Temp (°F), V=Wind Velocity (mph)

Stop all placement operations during periods of precipitation. Take adequate precautions to protect freshly placed latex modified concrete from sudden or unexpected precipitation. Keep an adequate quantity of protective coverings at the worksite to protect the freshly placed pavement from precipitation.

5.0 MEASUREMENT AND PAYMENT

Latex Modified Concrete Overlay-Very Early Strength will be measured and paid for in cubic yards of latex modified concrete satisfactorily placed in the completed deck..

Placing and Finishing of Latex Modified Concrete Overlay-Very Early Strength will be paid for at the contract unit price bid per square yard which price will be full compensation for furnishing all labor, materials, tools, equipment and incidentals required to complete the work in accordance with the contract documents.

Grooving Bridge Floors will be measured and paid for in accordance with Section 420 of the *Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Latex Modified Concrete Overlay – Very Early Strength	Cubic Yard
Placing and Finishing Latex Modified Concrete Overlay Very Early Strength	Square Yard

EPOXY RESIN INJECTION

(9-30-11)

1.0 GENERAL

For repairing cracks, an approved applicator is required to perform the epoxy resin injection. Make certain the supervisor and the workmen have completed an instruction program in the methods of restoring concrete structures utilizing the epoxy injection process and have a record of satisfactory performance on similar projects.

The applicator furnishes all materials, tools, equipment, appliances, labor and supervision required when repairing cracks with the injection of an epoxy resin adhesive.

2.0 SCOPE OF WORK

Using Epoxy Resin Injection, repair cracks 25 mils wide and greater in the interior bent columns and caps. The Engineer will ultimately be responsible for determining the areas that require repair.

Repair the column cracks to one foot below existing grade. Make the underwater repairs when water surface elevation is low and the water is still. For underwater repairs, use manufacturer recommended materials.

Repair any crack, void, honeycomb or spall area unsuitable for repair by injection will be repaired according the Engineer.

3.0 COOPERATION

Cooperate and coordinate with the Technical Representative of the epoxy resin manufacturer for satisfactory performance of the work.

Have the Technical Representative present when the job begins and until the Engineer is assured that his service is no longer needed.

The expense of having this representative on the job is the Contractor’s responsibility and no direct payment will be made for this expense.

4.0 TESTING

The North Carolina Department of Transportation Material and Tests Unit obtains test cores from the repaired concrete. If the failure plane is located at the repaired crack, a minimum compressive strength of 3000 psi is required of these cores.

5.0 MATERIAL PROPERTIES

Provide a two-component structural epoxy adhesive for injection into cracks or other voids. Provide modified epoxy resin (Component "A") that conforms to the following requirements:

	TEST METHOD	SPECIFICATION REQUIREMENTS
Viscosity @ 40 ± 3°F, cps	Brookfield RVT Spindle No. 4 @ 20 rpm	6000 - 8000
Viscosity @ 77 ± 3°F, cps	Brookfield RVT Spindle No. 2 @ 20 rpm	400 - 700
Epoxide Equivalent Weight	ASTM D1652	152 - 168
Ash Content, %	ASTM D482	1 max.

Provide the amine curing agent (Component "B") used with the epoxy resin that meets the following requirements:

	TEST METHOD	SPECIFICATION REQUIREMENTS
Viscosity @ 40 ± 3°F, cps	Brookfield RVT Spindle No. 2 @ 20 rpm	700 - 1400
Viscosity @ 77 ± 3°F, cps	Brookfield RVT Spindle No. 2 @ 20 rpm	105 - 240
Amine Value, mg KOH/g	ASTM D664*	490 - 560
Ash Content, %	ASTM D482	1 max.
*Method modified to use perchloric acid in acetic acid.		

Certify that the Uncured Adhesive, when mixed in the mix ratio that the material supplier specifies, has the following properties:

Pot Life (60 gram mass)

@ 77 ± 3°F - 15 minutes minimum

@ 100 ± 3°F - 5 minutes minimum

Certify that the Adhesive, when cured for 7 days at $77 \pm 3^\circ\text{F}$ unless otherwise specified, has the following properties:

	TEST METHOD	SPECIFICATION REQUIREMENTS
Ultimate Tensile Strength	ASTM D638	7000 psi (min.)
Tensile Elongation at Break	ASTM D638	4% max.
Flexural Strength	ASTM D790	10,000 psi (min.)
Flexural Modulus	ASTM D790	3.5×10^5 psi
Compressive Yield Strength	ASTM D695	11,000 psi (min.)
Compressive Modulus	ASTM D695	$2.0 - 3.5 \times 10^5$ psi
Heat Deflection Temperature Cured 28 days @ $77 \pm 3^\circ\text{F}$	ASTM D648*	125°F min. 135°F min.
Slant Shear Strength, 5000 psi (34.5 MPa) compressive strength concrete	AASHTO T237	
	Cured 3 days @ 40°F wet concrete	3500 psi (min.)
	Cured 7 days @ 40°F wet concrete	4000 psi (min.)
	Cured 1 day @ 77°F dry concrete	5000 psi (min.)
Cure test specimens so that the peak exothermic temperature of the adhesive does not exceed 77°F.		

Use an epoxy bonding agent, as specified for epoxy mortar, as the surface seal (used to confine the epoxy resin during injection).

6.0 EQUIPMENT FOR INJECTION

Use portable positive displacement type pumps with interlock to provide positive ratio control of exact proportions of the two components at the nozzle to meter and mix the two injection adhesive components and inject the mixed adhesive into the crack. Use electric or air powered pumps that provide in-line metering and mixing.

Use injection equipment with automatic pressure control capable of discharging the mixed adhesive at any pre-set pressure up to 200 ± 5 psi and equipped with a manual pressure control override.

Use equipment capable of maintaining the volume ratio for the injection adhesive as prescribed by the manufacturer. A tolerance of 5% by volume at any discharge pressure up to 200 psi is permitted.

Provide injection equipment with sensors on both the Component A and B reservoirs that automatically stop the machine when only one component is being pumped to the mixing head.

7.0 PREPARATION

Follow these steps prior to injecting the epoxy resin:

- Remove all dirt, dust, grease, oil, efflorescence and other foreign matter detrimental to the bond of the epoxy injection surface seal system from the surfaces adjacent to the cracks or other areas of application. Acids and corrosives are not permitted.
- Provide entry ports along the crack at intervals not less than the thickness of the concrete at that location.
- Apply surface seal material to the face of the crack between the entry ports. For through cracks, apply surface seal to both faces.
- Allow enough time for the surface seal material to gain adequate strength before proceeding with the injection.

8.0 EPOXY INJECTION

Begin epoxy adhesive injection in vertical cracks at the lower entry port and continue until the epoxy adhesive appears at the next higher entry port adjacent to the entry port being pumped.

Begin epoxy adhesive injection in horizontal cracks at one end of the crack and continue as long as the injection equipment meter indicates adhesive is being dispensed or until adhesive shows at the next entry port.

When epoxy adhesive appears at the next adjacent port, stop the current injection and transfer the epoxy injection to the next adjacent port where epoxy adhesive appeared.

Perform epoxy adhesive injection continuously until cracks are completely filled.

If port to port travel of epoxy adhesive is not indicated, immediately stop the work and notify the Engineer.

9.0 FINISHING

When cracks are completely filled, allow the epoxy adhesive to cure for sufficient time to allow the removal of the surface seal without any draining or runback of epoxy material from the cracks.

Remove the surface seal material and injection adhesive runs or spills from concrete surfaces. Finish the face of the crack flush to the adjacent concrete, removing any indentations or protrusions caused by the placement of entry ports.

10.0 BASIS OF PAYMENT

Payment for epoxy resin injection will be at the contract unit price per linear foot for "Epoxy Resin Injection". Such payment will be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work.

CONCRETE REPAIRS

(9-30-11)

1.0 DESCRIPTION

Work includes removal of concrete in spalled, delaminated and/or cracked areas of the existing caps and columns in reasonably close conformity with the lines, depth, and details shown on the plans, described herein and as established by the Engineer. This work also includes straightening, cleaning, and replacement of reinforcing steel, dowelling new reinforcing steel, removing all loose materials, removing and disposing of debris, formwork, applying repair material, and protecting adjacent areas of the bridge and environment from material leakage. The repair material shall be one of the below described materials unless otherwise noted in the plans or provisions.

The location and extent of repairs shown on the plans described herein are general in nature. The Engineer determines the exact extent of removal in the field based on an evaluation of the condition of the exposed surfaces. The Contractor shall coordinate with the Engineer for removal operations such that repairs will not be implemented on more than one face of the concrete element without the approval of the engineer.

Repair, to the Engineer's satisfaction, any portion of the structure that is damaged from construction operations. No extra payment is provided for these repairs.

2.0 REPAIR MATERIAL OPTIONS

A. Polymer Modified Concrete Repair Material

Repair material shall be polymer modified cement mortar for vertical or overhead applications and shall be suitable for applications in marine environments. Material shall be approved for use by NCDOT. Submit repair material to the Engineer for review and approval prior to beginning the work. Color of repair material shall be concrete gray.

Prior to the application of repair mortar, square up edges in repair areas, thoroughly clean surfaces to be repaired and remove all loose materials. Remove grease, wax, salt, and oil contaminants by scrubbing with an industrial grade detergent or degreasing compound followed by a mechanical cleaning. Remove weak or deteriorated concrete to sound concrete by bush hammering, gritblasting, scarifying, waterblasting, or other approved methods. Remove dirt, dust, laitance and curing compounds by gritblasting, sanding, or etching with 15% hydrochloric acid. Only acid etch if approved and follow it by scrubbing and flushing with copious amounts of clean water. Check the cleaning using moist pH paper. Water cleaning is complete when the paper reads 10 or higher. Follow all mechanical cleaning with vacuum cleaning.

When surface preparation is completed, mix and apply repair mortar in accordance with manufacturer's recommendations. Use aggregate that is washed, kiln-dried, and bagged. Apply bonding agent to all repair areas immediately prior to placing repair mortar. Repair areas shall be formed unless otherwise approved by the Engineer. Form areas to establish the original neat lines of the member being repaired.

Apply repair mortar to damp surfaces only when approved. In such instances, remove all free water by air-blasting. After applying the repair mortar, remove excessive material and provide a smooth, flush surface.

B. Class A Concrete Repair Material

Repair material shall be Class A Portland Cement Concrete as described in Section 1000 of the Standard Specifications.

Prior to the application of Class A concrete, square up edges in repair areas, thoroughly clean surfaces to be repaired and remove all loose materials. Remove grease, wax, salt, and oil contaminants by scrubbing with an industrial grade detergent or degreasing compound followed by a mechanical cleaning. Remove weak or deteriorated concrete to sound concrete by bush hammering, gritblasting, scarifying, waterblasting, or other approved methods. Remove dirt, dust, laitance and curing compounds by gritblasting, sanding, or etching with 15% hydrochloric acid. Only acid etch if approved and follow it by scrubbing and flushing with copious amounts of clean water. Check the cleaning using moist pH paper. Water cleaning is complete when the paper reads 10 or higher. Follow all mechanical cleaning with vacuum cleaning.

When surface preparation is completed, mix and apply concrete in accordance with Standard Specifications and/or manufacturer's recommendations. Use aggregate that is washed, kiln-dried, and bagged. Apply bonding agent to all repair areas immediately prior to placing repair mortar. Repair areas shall be formed unless otherwise approved by the Engineer. Form areas to establish the original neat lines of the member being repaired.

Apply concrete to damp surfaces only when approved. In such instances, remove all free water by air-blasting. After applying the repair mortar, remove excessive material and provide a smooth, flush surface.

3.0 TEMPORARY WORK PLATFORM

Prior to beginning any repair work, provide details for a sufficiently sized temporary work platform at each repair location. Design steel members to meet the requirements of the American Institute of Steel Construction Manual. Design timber members in accordance with the "National Design Specification for Stress-Grade Lumber and Its Fastenings" of the National Forest Products Association. Submit the platform design and plans for review and approval. The design and plans shall be sealed and signed by a North Carolina registered Professional Engineer. Do not install the platform until the design and plans are approved. Drilling holes in the superstructure for the purpose of attaching the platform is prohibited.

Upon completion of work, remove all anchorages in the substructure and repair the substructure at no additional cost to the Department.

4.0 MEASUREMENT AND PAYMENT

Concrete Repairs will be measured and paid for at the contract unit price bid per cubic foot and will be full compensation for removal, containment and disposal off-site of unsound concrete including the cost of materials, reinforcing steel, labor, tools, equipment and incidentals necessary to accomplish removal. Depth will be measured from a place at the original outside concrete face. The Contractor and Engineer will measure repair quantities after removal of unsound concrete and before application of repair material. Such payment will also include the cost of sandblasting, surface cleaning and preparation, cleaning of reinforcing steel, placement of new reinforcing steel, cost of temporary work platform, testing of the soundness of the exposed concrete surface, furnishing and installation of repair mortar material, curing and sampling of concrete, and protection/cleaning of adjacent areas from splatter or leakage.

Reinforcing Steel that is required for the repairs will be in accordance with Section 425 of the Standard Specifications.

Payment will be made under:

Pay Item	Pay Unit
Concrete Repairs	Cubic Feet

CLEANING AND PAINTING EXISTING BEARING PLATES (9-30-11)

Thoroughly clean the exposed surfaces of all bearing plates, anchor bolts, nuts and washers in the existing structure in accordance with the Article 442-7(B) of the Standard Specifications. Have the Engineer approve the cleaning of each unit before beginning painting.

After cleaning, apply a touch up coat of natural color organic zinc repair paint to the steel followed by a complete coat of the same paint.

Payment at the contract unit prices for the various pay items will be full compensation for the above work required for cleaning and painting existing bearing plates.

THERMAL SPRAYED COATINGS (METALLIZATION) (9-30-11)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces as specified herein when called for on the plans or by other Special Provisions, or when otherwise approved by the Engineer in accordance with the SSPC-CS 23.00/AWS C2.23/NACE No. 12 Specification. Only Arc Sprayed application methods are used to apply TSC coatings, the Engineer must approve other methods of application.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the following requirements:

- The capability of blast cleaning steel surfaces to SSPC SP-5 and SP-10 Finishes.
- Employ Spray Operator(s) qualified in accordance with AWS C.16/C2.16M2002 and Quality Control Inspector(s) who have documented training in the applicable test procedures of ASTM D-3276 and SSPC-CS 23.00.

A summary of the contractor's related work experience and the documents verifying each Spray Operator's and Quality Control Inspector's qualifications are submitted to the Engineer before any work is performed.

3.0 MATERIALS

Provide wire in accordance with the metallizing equipment manufacturer's recommendations. Use the wire alloy specified on the plans which meets the requirements in Annex C of the SSPC-CS 23.00 Specification. Have the contractor provide a certified analysis (NCDOT Type 2 Certification) for each lot of wire material.

Apply an approved sealer to all metallized surfaces in accordance with Section 9 of SSPC-CS 23. The sealer must either meet SSPC Paint 27 or is an alternate approved by the Engineer.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Grind flame cut edges to remove the carbonized surface prior to blasting. Bevel all flame cut edges in accordance with Article 442-10(D) regardless of included angle. Blast clean surfaces to be metallized with grit or mineral abrasive in accordance with Steel Structures Painting Council SSPC SP-5/10(as specified) to impart an angular surface profile of 2.5 - 4.0 mils. Surface preparation hold times are in accordance with Section 7.32 of SSPC-CS 23. If flash rusting occurs prior to metallizing, blast clean the metal surface again. Apply the thermal sprayed coating only when the surface temperature of the steel is at least 5°F above the dew point.

At the beginning of each work period or shift, conduct bend tests in accordance with Section 6.5 of SSPC-CS 23.00. Any disbonding or delamination of the coating that exposes the substrate requires corrective action, additional testing, and the Engineer's approval before resuming the metallizing process.

Apply TSC with the alloy to the thickness specified on the plans or as provided in the table below. All spot results (the average of 3 to 5 readings) must meet the minimum requirement. No additional tolerance (as allowed by SSPC PA-2) is permitted. (For Steel Beams: For pieces with less than 200 ft² measure 2 spots/surface per piece and for pieces greater than 200 ft² add 1 additional spots/surface for each 500 ft²).

APPLICATION	THICKNESS	ALLOY	SEAL COAT
Pot Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Armored Joint Angles	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Modular Joints	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Expansion Joint Seals	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Optional Disc Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil

When noted on the plans or as specified in the above chart, apply the sealer to all metallized surfaces in accordance with the manufacturer's recommendations and these provisions. Apply the seal coat only when the air temperature is above 40°F and the surface temperature of the steel is at least 5°F above the dew point. If the sealer is not applied within eight hours after the final application of TSC, the applicator verifies acceptable TSC surfaces and obtains approval from the Engineer before applying the sealer.

5.0 INSPECTION FREQUENCY

The TSC Contractor must conduct the following tests at the specified frequency and the results documented in a format approved by the Engineer.

TEST/STANDARD	LOCATION	FREQUENCY	SPECIFICATION
Ambient Conditions	Site	Each Process	5°F above the dew point
Abrasive Properties	Site	Each Day	Size, angularity, cleanliness
Surface Cleanliness SSPC Vis 1	All Surfaces	Visual All Surfaces	SSPC-SP-10 Atmospheric Service SSPC-SP - 5 Immersion Service
Surface Profile ASTM D-4417 Method C	Random Surfaces	3 per 500 ft ²	2.5 - 4.0 mils
Bend Test SSPC-CS 23.00	Site	5 per shift	Pass Visual
Thickness SSPC PA-2R SSPC-CS 23.00	Each Surface	Use the method in PA-2 Appendix 3 for Girders and Appendix 4 for frames and miscellaneous steel. See Note 1.	Zn - 8 mils minimum Al - 8 mils minimum Zn Al - 8 mils minimum Areas with more than twice the minimum thickness are inspected for compliance to the adhesion and cut testing requirements of this specification.
Adhesion ASTM 4541	Random Surfaces Splice Areas	1 set of 3 per 500 ft ²	Zn > 500 psi Al > 1000 psi Zn Al > 750 psi
Cut Test - SSPC-CS 23.00	Random Surfaces	3 sets of 3 per 500 ft ²	No peeling or delamination
Job Reference Std. SSPC-CS 23.00	Site	1 per job	Meets all the above requirements

6.0 REPAIRS

All Repairs are to be performed in accordance with the procedures below, depending on whether the repair surface is hidden or exposed. As an exception to the following, field welded splices on joint angles and field welding bearing plates to girders may be repaired in accordance with the procedures for hidden surfaces.

For hidden surfaces (including but not limited to interior girders, interior faces of exterior girders, and below-grade sections of piles):

- A. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallizing at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.
- B. Minor areas less than or equal to 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."
- C. Large areas greater than 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00.
- D. Damaged (burnished) areas not exposing the substrate with less than the specified coating thickness are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."
- E. Damaged (burnished) areas not exposing the substrate with more than the specified coating thickness are not repaired.
- F. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

For Exposed Surfaces (including but not limited to exterior faces of exterior girders and above-grade sections of piles):

- A. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallization at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.
- B. All areas exposing the substrate are metallized in accordance with SSPC CS 23.00
- C. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

7.0 TWELVE MONTH OBSERVATION PERIOD

The contractor maintains responsibility for the coating system for a twelve (12) month observation period beginning upon the satisfactory completion of all the work required in the plans or as directed by the engineer. The contractor must guarantee the coating system under the payment and performance bond (refer to Article 109-10). To successfully complete the observation period, the coating system must meet the following requirements after twelve (12) months service:

- No visible rust, contamination or application defect is observed in any coated area.
- Painted surfaces have a uniform color and gloss.
- Surfaces have an adhesion of no less than 500 psi when tested in accordance with ASTM D-4541.

8.0 BASIS OF PAYMENT

The contract price bid for the bridge component to which the coating is applied will be full compensation for the thermal sprayed coating.

ELASTOMERIC CONCRETE

(9-30-11)

1.0 DESCRIPTION

Elastomeric concrete is a mixture of a two-part polymer consisting of polyurethane and/or epoxy and kiln-dried aggregate. Provide an elastomeric concrete and binder system that is preapproved. Use the concrete in the blocked out areas on both sides of the bridge deck joints as indicated on the plans.

2.0 MATERIALS

Provide materials that comply with the following minimum requirements at 14 days (or at the end of the specified curing time).

ELASTOMERIC CONCRETE PROPERTIES	TEST METHOD	MINIMUM REQUIREMENT
Compressive Strength, psi (MPa)	ASTM D695	2000 (13.8)
5% Deflection Resilience	ASTM D695	95
Splitting Tensile Strength	ASTM D3967	625 (4.31)
Bond Strength to Concrete, psi (MPa)	ASTM C882 (C882M)	450 (3.10)
Durometer Hardness	ASTM D2240	50

BINDER PROPERTIES (WITHOUT AGGREGATE)	TEST METHOD	MINIMUM REQUIREMENT
Tensile Strength, psi (MPa)	ASTM D638	1000 (6.89)
Ultimate Elongation	ASTM D638	150%
Tear Resistance, Lb/In (Kn/M)	ASTM D624	200 (34.9)

In addition to the requirements above, the elastomeric concrete must be resistant to water, chemical, UV and ozone exposure and withstand temperature extremes. Elastomeric concrete systems requiring preheated aggregates are not allowed.

3.0 PREQUALIFICATION

Manufacturers of elastomeric concrete materials shall submit samples (including aggregate, primer and binder materials) and a Type 4 certification in accordance with article 106-3 (F) of the Standard Specifications for prequalification to:

North Carolina Department of Transportation
Materials and Tests Unit
1801 Blue Ridge Road
Raleigh, NC 27607

Prequalification will be determined for the system. Individual components will not be evaluated, nor will individual components of previously evaluated systems be deemed prequalified for use.

The submitted binder (a minimum volume of 1 gallon) and corresponding aggregate samples will be evaluated for compliance with the Materials requirements specified above. Systems satisfying all of the Materials requirements will be prequalified for a one year period. Before the end of this period new product samples shall be resubmitted for prequalification evaluation.

If, at any time, any formulation or component modifications are made to a prequalified system that system will no longer be approved for use.

4.0 MATERIAL CERTIFICATION AND INSTALLATION

Provide a Type 5 certification in accordance with article 106-3 (F) of the Standard Specifications, verifying that the materials satisfy the above requirements and proof of NCDOT prequalification.

Prior to placing the elastomeric concrete, thoroughly clean and dry all concrete surfaces. Sandblast the concrete surface in the blockout and clear the surface of all loose debris.

Provide a manufacturer's representative at the bridge site during the installation of the elastomeric concrete to ensure that all steps being performed comply with all manufacturer installation requirements including, but not limited to weather conditions (ambient

temperature, relative humidity, precipitation, wind, etc), concrete deck surface preparation, binder and aggregate mixing, primer application, elastomeric concrete placement, curing conditions and minimum curing time before joint exposure to traffic.

5.0 FIELD SAMPLING

Provide additional production material to allow freshly mixed elastomeric concrete to be sampled for acceptance. A minimum of six 2 inch cube molds and two 3x6 inch cylinders will be taken by the Department for each day's production. Compression, splitting tensile, and durometer hardness testing will be performed by the Department to determine acceptance. Materials failing to meet the requirements listed above are subject to removal and replacement at no cost to the Department.

6.0 BASIS OF PAYMENT

No separate payment will be made for elastomeric concrete. The lump sum contract price bid for "Foam Joint Seals" will be full compensation for furnishing and placing the Elastomeric Concrete.

FOAM JOINT SEALS

(9-30-11)

1.0 SEALS

Use preformed seals compatible with concrete and resistant to abrasion, oxidation, oils, gasoline, salt and other materials that are spilled on or applied to the surface. Use a resilient, UV stable, preformed, impermeable, flexible, expansion joint seal. The joint seal shall consist of low-density, closed cell, cross-linked polyethylene non-extrudable, foam. The joint seal shall contain no EVA (Ethylene Vinyl Acetate). Cell generation shall be achieved by being physically blown using nitrogen. No chemical blowing agents shall be used in the cell generation process.

Use seals manufactured with grooves $1/8'' \pm$ wide by $1/8'' \pm$ deep and spaced between $1/4''$ and $1/2''$ apart along the bond surface running the length of the joint. Use seals with a depth that meets the manufacturer's recommendation, but is not less than 70% of the uncompressed width. Provide a seal designed so that, when compressed, the center portion of the top does not extend upward above the original height of the seal by more than $1/4''$. Provide a seal that has a working range of 30% tension and 60% compression and meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D3575-08, Suffix T	110 – 130 psi
Compression Set	ASTM D1056, Suffix B, 2 hr recovery	10% - 16%
Water Absorption	ASTM D3575	< 0.03 lb/ft ²
Elongation at Break	ASTM D3575	180% - 210%
Tear Strength	ASTM D624 (D3575-08, Suffix G)	14 – 20 pli
Density	ASTM D3575-08, Suffix W, Method A	1.8 – 2.2 lb/ft ³
Toxicity	ISO-10993.5	Pass (not cytotoxic)

Have the top of the joint seal clearly shop marked. Inspect the joint seals upon receipt to ensure that the marks are clearly visible before installation.

2.0 BONDING ADHESIVE

Use a two component, 100% solid, modified epoxy adhesive supplied by the joint seal manufacturer that meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D638	3000 psi (min.)
Compressive strength	ASTM D695	7000 psi (min.)
Hardness	Shore D Scale	75-85 psi
Water Absorption	ASTM D570	0.25% by weight max.
Elongation to Break	ASTM D638	5% (max.)
Bond Strength	ASTM C882	2000 psi (min.)

Use an adhesive that is workable to 40°F. When installing in ambient air or surface temperatures below 40°F or for application on moist, difficult to dry concrete surfaces, use an adhesive specified by the manufacturer of the joint seal.

3.0 ELASTOMERIC CONCRETE

The elastomeric concrete shall not be placed until the reinforced concrete deck slab has cured for seven full days and reached a minimum strength of 3000 psi.

Prepare the concrete surface within 48 hours prior to placing the elastomeric concrete. Before placing the elastomeric concrete, all concrete surfaces shall be thoroughly cleaned and dry. Sandblast the concrete surface in the blockout and clear the surface of all loose debris. Do not place the elastomeric concrete until the surface preparation is completed and approved.

A manufacturer's representative shall be present when placing elastomeric concrete. Do not place elastomeric concrete if the ambient air or surface temperature is below 45°F.

Prepare and apply a primer, as per manufacturer's recommendations, to all vertical concrete faces to be in contact with elastomeric concrete, and to areas specified by the manufacturer.

Prepare, batch, and place the elastomeric concrete in accordance with the manufacturer's instructions. Place the elastomeric concrete in the areas specified on the plans while the primer is still tacky and within 2 hours after applying the primer. Trowel the elastomeric concrete to a smooth finish.

4.0 SAWING THE JOINT

The joint opening shall be initially formed to the width shown on the plans including the blockout for the elastomeric concrete.

The elastomeric concrete shall cure a minimum of 2 days prior to sawing the elastomeric concrete to the final width and depth as specified in the plans.

When sawing the joint to receive the foam seal, always use a rigid guide to control the saw in the desired direction. To control the saw and to produce a straight line as indicated on the plans, anchor and positively connect a template or a track to the bridge deck. Do not saw the joint by visual means such as a chalk line. Fill the holes used for holding the template or track to the deck with an approved, flowable non-shrink, non-metallic grout.

Saw cut to the desired width and depth in one or two passes of the saw by placing and spacing two metal blades on the saw shaft to the desired width for the joint opening.

The desired depth is the depth of the seal plus 1/4" above the top of the seal plus approximately 1" below the bottom of the seal. An irregular bottom of sawed joint is permitted as indicated on the plans. Grind exposed corners on saw cut edges to a 1/4" chamfer.

Saw cut a straight joint, centered over the formed opening and to the desired width specified in the plans. Prevent any chipping or damage to the sawed edges of the joint.

Remove any staining or deposited material resulting from sawing with a wet blade to the satisfaction of the Engineer.

5.0 PREPARATION OF SAWED JOINT FOR SEAL INSTALLATION

After sawing the joint, the Engineer will thoroughly inspect the sawed joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Contractor prior to blast cleaning and installing the seal.

Clean the joints by sandblasting with clean dry sand immediately before placing the bonding agent. Sandblast the joint opening to provide a firm, clean joint surface free of curing compound, loose material and any foreign matter. Sandblast the joint opening without causing pitting or uneven surfaces. The aggregate in the elastomeric concrete may be exposed after sandblasting.

After blasting, either brush the surface with clean brushes made of hair, bristle or fiber, blow the surface with compressed air, or vacuum the surface until all traces of blast products and abrasives are removed from the surface, pockets, and corners.

If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

Examine the blast cleaned surface and remove any traces of oil, grease or smudge deposited in the cleaning operations.

Bond the seal to the blast cleaned surface on the same day the surface is blast cleaned.

6.0 SEAL INSTALLATION

Install the joint seal according to the manufacturer's procedures and recommendations and as recommended below. Do not install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project.

Before installing the joint seal, check the uninstalled seal length to insure the seal is the same length as the deck opening. When the joint seal requires splicing, use the heat welding method by placing the joint material ends against a teflon heating iron of 425-475°F for 7 - 10 seconds, then pressing the ends together tightly. Do not test the welding until the material has completely cooled.

Begin installation by protecting the top edges of the concrete deck adjacent to the vertical walls of the joint as a means to minimize clean up. After opening both cans of the bonding agent, stir each can using separate stirring rods for each component to prevent premature curing of the bonding agent. Pour the two components, at the specified mixing ratio, into a clean mixing bucket. Mix the components with a low speed drill (400 rpm max.) until a uniform gray color is achieved without visible marbling. Apply bonding agent to both sides of the elastomeric concrete as well as both sides of the joint seal, making certain to completely fill the grooves with epoxy. With gloved hands, compress the joint seal and with the help of a blunt probe, push the seal into the joint opening until the seal is recessed approximately 1/4" below the surface. When pushing down on the joint seal, apply pressure only in a downward direction. Do not push the joint seal into the joint opening at an angle that would stretch the material. Seals that are stretched during installation shall be removed and rejected. Once work on placing a seal begins, do not stop until it is completed. Clean the excess epoxy from the top of the joint seal immediately with a trowel. Do not use solvents or any cleaners to remove the excess epoxy from the top of the seal. Remove the protective cover at the joint edges and check for any excess epoxy on the surface. Remove excess epoxy with a trowel, the use of solvents or any cleaners will not be allowed.

The installed system shall be watertight and will be monitored until final inspection and approval. Do not place pavement markings on top of foam joint seals.

7.0 BASIS OF PAYMENT

Payment for all foam joint seals will be at the lump sum contract price bid for "Foam Joint Seals". Prices and payment will be full compensation for furnishing all material, including elastomeric concrete, labor, tools and equipment necessary for installing these units in place and accepted.

RUBBER EXPANSION JOINT SEALS**(SPECIAL)****SCOPE OF WORK**

Replace existing open joints at Bents 10 and 13 as directed in the plans and install a seal device compatible with reconstructed joint openings and in accordance with this special provision.

Joint areas shall be prepared as shown in the plans and as specified in the special provision entitled "Partial Removal of Existing Structure".

Joint seals shall be installed in sawed openings. Joints shall be sawed after Latex Modified Concrete placed adjacent to the joint has attained a minimum compressive strength of 3000 psi.

Joint seals shall be continuous across the width of the bridge and shall be water tight.

SEALS

Use an inverted "V" shaped , preformed extruded ethylene propylene diene monomer (M-class) rubber (EPDM), or silicone rubber seal compatible with concrete and resistant to abrasion, oxidation, oils, gasoline, salt and other materials that are spilled on or applied to the surface. Seal shall be secured to concrete surfaces with a single component silicone locking adhesive and a primer, or with a quick setting epoxy adhesive.

Use seals set in a sawed joint opening with a depth that meets the manufacturer's recommendation, and is not less than ½" below the top of the deck slab at the opening's minimum width specified in the plans. Seal edges shall be set on the bottom of the sawed joint opening that is at least 1/8" wide. Provide a seal that has a working temperature range of 0°F to 120°F and meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile Strength	ASTM D412	1,000 psi (min.)
Elongation at Break	ASTM D412	300% (min.)
Tear Strength	ASTM D624	100 ppi (min.)
Compression Set 212 °F @ 70 hrs.	ASTM D395	30% (max.)
Water Resistance	ASTM D471	70 hrs. @ 212 °F
Durometer (Shore A)	ASTM D2240	55-65 +/-5

Have the top of the joint seal clearly shop marked. Inspect the joint seals upon receipt to ensure that the marks are clearly visible before installation.

BONDING ADHESIVE

For silicone adhesive, use a single component, 100% solid, silicone locking adhesive supplied by the joint seal manufacturer that meets the following requirements:

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D412	200 psi (min.)
Tack Free Time	ASTM C679	20 minutes (max.)
Cure Time (1/4" Bead)	ASTM C679	24 hours (max.)
Resistance to UV	ASTM C793	No cracking, ozone chalking, or degradation
Elongation to Break	ASTM D412	450% (min.)

For epoxy adhesive, use a quick setting two-component thixotropic paste that is mixed in strict conformance to the manufacturer's instructions. Epoxy adhesive shall be supplied by the joint seal manufacturer and shall meet the following requirements:

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D638	7000 psi (min.)
Bond Strength to Concrete	ASTM C881	1000 psi (min.)
Peel Adhesion	ASTM C794	50 pli
Gel Time		8 minutes
Pot Life		45 minutes
Cure Time		24 hours (max.)

Use an adhesive that is workable to 45°F. When installing in ambient air or surface temperatures below 45°F or for application on moist, difficult to dry concrete surfaces, use an adhesive specified by the manufacturer of the joint seal.

ELASTOMERIC CONCRETE

When specified in the plans, the elastomeric concrete shall not be placed until the reinforced concrete deck slab has cured for seven full days and reached a minimum strength of 3000 psi. In bridge deck rehabilitation applications, latex modified concrete overlay adjacent to joint construction shall have attained a minimum compressive strength of 3000 psi before installation of elastomeric concrete may begin.

Prepare the concrete surface within 48 hours prior to placing the elastomeric concrete. Before placing the elastomeric concrete, all concrete surfaces shall be thoroughly cleaned and dry. Sandblast the concrete surface in the blockout and clear the surface of all loose debris. Do not place the elastomeric concrete until the surface preparation is completed and approved.

A manufacturer's representative shall be present when placing elastomeric concrete. Do not place elastomeric concrete if the ambient air or surface temperature is below 45°F.

Prepare and apply a primer, as per manufacturer's recommendations, to all vertical concrete faces to be in contact with elastomeric concrete, and to areas specified by the manufacturer.

Prepare, batch, and place the elastomeric concrete in accordance with the manufacturer's instructions. Place the elastomeric concrete in the areas specified on the plans while the primer is still tacky and within 2 hours after applying the primer. Trowel the elastomeric concrete to a smooth finish.

SAWING THE JOINT

The joint opening shall be initially formed to the width shown on the plans including the blockout for the elastomeric concrete.

The elastomeric concrete shall cure a minimum of 2 days prior to sawing the elastomeric concrete to the final width and depth as specified in the plans.

When sawing the joint to receive the joint seal, always use a rigid guide to control the saw in the desired direction. To control the saw and to produce a straight line as indicated on the plans, anchor and positively connect a template or a track to the bridge deck. Do not saw the joint by visual means such as a chalk line. Fill the holes used for holding the template or track to the deck with an approved, flowable non-shrink, non-metallic grout.

Saw cut to the desired width and depth in one or two passes of the saw by placing and spacing two metal blades on the saw shaft to the desired width for the joint opening.

The desired depth of the saw cut is the depth of the seal plus 1/2" minimum above the top of the seal at the minimum sawed joint width. An irregular bottom of sawed joint is permitted as indicated on the plans. Maximum surface amplitude at the bottom of the saw cut joint is 1/8". Grind exposed corners on saw cut edges to a 1/4" chamfer.

Saw cut a straight joint, centered over the formed opening and to the desired width specified in the plans. Prevent any chipping or damage to the sawed edges of the joint.

Remove any staining or deposited material resulting from sawing with a wet blade to the satisfaction of the Engineer.

PREPARATION OF SAWED JOINT FOR SEAL INSTALLATION

After sawing the joint, the Engineer will thoroughly inspect the sawed joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Contractor prior to blast cleaning and installing the seal. Seals shall be secured to substrate that is clean and sound.

Clean the joints by sandblasting with clean dry sand immediately before placing the bonding agent. Sandblast the joint opening to provide a firm, clean joint surface free of curing compound, loose material and any foreign matter. Sandblast the joint opening without causing pitting or uneven surfaces. The aggregate in the elastomeric concrete may be exposed after sandblasting.

After blasting, either brush the surface with clean brushes made of hair, bristle or fiber, blow the surface with compressed air, or vacuum the surface until all traces of blast products and abrasives are removed from the surface, pockets, and corners.

If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

Examine the blast cleaned surface and remove any traces of oil, grease or smudge deposited in the cleaning operations.

Bond the seal to the blast cleaned surface on the same day the surface is blast cleaned.

SEAL INSTALLATION

Install the joint seal according to the manufacturer's procedures and recommendations and as recommended herein. Do not install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project.

Before installing the joint seal, check the uninstalled seal length to insure the seal is the same length as the required seal length shown in the plans. Splices in joint seals will not be permitted.

Begin installation by protecting the top edges of the concrete deck adjacent to the vertical walls of the joint as a means to minimize clean up. The joint seal shall be installed to strict conformance with the manufacturer's requirements for atmospheric conditions, concrete surface preparation, mixing and application of adhesive, seal material installation procedure, minimum cure time prior to exposure to traffic, as well as worker health and safety. Once work on placing a seal begins, do not stop until it is completed. Clean any excess adhesive from the top of the joint seal immediately with a trowel. Do not use solvents or any cleaners to remove the excess adhesive from the top of the seal. Remove the protective cover at the joint edges and check for any adhesive on concrete surfaces. Remove excess adhesive with a trowel, the use of solvents or any cleaners will not be allowed.

The installed system shall be watertight and will be monitored until final inspection and approval. Do not place pavement markings on top of synthetic rubber joint seals.

BASIS OF PAYMENT

Payment for all expansion joint seals will be at the lump sum contract price bid for "Rubber Expansion Joint Seals". Prices and payment will be full compensation for furnishing all material, including elastomeric concrete, labor, tools and equipment necessary for installing these units in place and accepted.

THE FALSEWORK AND FORMWORK

(9-30-11)

1.0 DESCRIPTION

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term "temporary works" is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS**A. Working Drawings**

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO Guide Design Specifications for Bridge Temporary Works except as noted herein.

1. Wind Loads

Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph (177 km/hr). In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet (m) above ground	Pressure, lb/ft ² (kPa) for Indicated Wind Velocity, mph (km/hr)				
	70 (112.7)	80 (128.7)	90 (144.8)	100 (160.9)	110 (177.0)
0 to 30 (0 to 9.1)	15 (0.72)	20 (0.96)	25 (1.20)	30 (1.44)	35 (1.68)
30 to 50 (9.1 to 15.2)	20 (0.96)	25 (1.20)	30 (1.44)	35 (1.68)	40 (1.92)
50 to 100 (15.2 to 30.5)	25 (1.20)	30 (1.44)	35 (1.68)	40 (1.92)	45 (2.15)
over 100 (30.5)	30 (1.44)	35 (1.68)	40 (1.92)	45 (2.15)	50 (2.39)

2. Time of Removal

The following requirements replace those of Article 3.4.8.2. Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (MPH) (KM/HR)	COUNTY	25 YR (MPH) (KM/HR)	COUNTY	25 YR (MPH) (KM/HR)
Alamance	70 (112.7)	Franklin	70 (112.7)	Pamlico	100 (160.9)
Alexander	70 (112.7)	Gaston	70 (112.7)	Pasquotank	100 (160.9)
Alleghany	70 (112.7)	Gates	90 (144.8)	Pender	100 (160.9)
Anson	70 (112.7)	Graham	80 (128.7)	Perquimans	100 (160.9)
Ashe	70 (112.7)	Granville	70 (112.7)	Person	70 (112.7)
Avery	70 (112.7)	Greene	80 (128.7)	Pitt	90 (144.8)
Beaufort	100 (160.9)	Guilford	70 (112.7)	Polk	80 (128.7)
Bertie	90 (144.8)	Halifax	80 (128.7)	Randolph	70 (112.7)
Bladen	90 (144.8)	Harnett	70 (112.7)	Richmond	70 (112.7)
Brunswick	100 (160.9)	Haywood	80 (128.7)	Robeson	80 (128.7)
Buncombe	80 (128.7)	Henderson	80 (128.7)	Rockingham	70 (112.7)
Burke	70 (112.7)	Hertford	90 (144.8)	Rowan	70 (112.7)
Cabarrus	70 (112.7)	Hoke	70 (112.7)	Rutherford	70 (112.7)
Caldwell	70 (112.7)	Hyde	110 (177.0)	Sampson	90 (144.8)

Camden	100 (160.9)	Iredell	70 (112.7)	Scotland	70 (112.7)
Carteret	110 (177.0)	Jackson	80 (128.7)	Stanley	70 (112.7)
Caswell	70 (112.7)	Johnston	80 (128.7)	Stokes	70 (112.7)
Catawba	70 (112.7)	Jones	100 (160.9)	Surry	70 (112.7)
Cherokee	80 (128.7)	Lee	70 (112.7)	Swain	80 (128.7)
Chatham	70 (112.7)	Lenoir	90 (144.8)	Transylvania	80 (128.7)
Chowan	90 (144.8)	Lincoln	70 (112.7)	Tyrell	100 (160.9)
Clay	80 (128.7)	Macon	80 (128.7)	Union	70 (112.7)
Cleveland	70 (112.7)	Madison	80 (128.7)	Vance	70 (112.7)
Columbus	90 (144.8)	Martin	90 (144.8)	Wake	70 (112.7)
Craven	100 (160.9)	McDowell	70 (112.7)	Warren	70 (112.7)
Cumberland	80 (128.7)	Mecklenburg	70 (112.7)	Washington	100 (160.9)
Currituck	100 (160.9)	Mitchell	70 (112.7)	Watauga	70 (112.7)
Dare	110 (177.0)	Montgomery	70 (112.7)	Wayne	80 (128.7)
Davidson	70 (112.7)	Moore	70 (112.7)	Wilkes	70 (112.7)
Davie	70 (112.7)	Nash	80 (128.7)	Wilson	80 (128.7)
Duplin	90 (144.8)	New Hanover	100 (160.9)	Yadkin	70 (112.7)
Durham	70 (112.7)	Northampton	80 (128.7)	Yancey	70 (112.7)
Edgecombe	80 (128.7)	Onslow	100 (160.9)		
Forsyth	70 (112.7)	Orange	70 (112.7)		

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize, metalize or otherwise protect these devices as directed by the Engineer. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

4.0 REVIEW AND APPROVAL

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work.

Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders. Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Uses of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

5.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch (25 mm). For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations. The Engineer reviews and approves the proposed pile and soil bearing capacities.

6.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

7.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

8.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

SUBMITTAL OF WORKING DRAWINGS

(9-30-11)

8.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Resident Engineer. Either the Structure Design Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Resident Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Resident Engineer, Structure Design Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

9.0 ADDRESSES AND CONTACTS

For submittals to the Structure Design Unit, use the following addresses:

Via US mail:

Mr. G. R. Perfetti, P. E.
State Bridge Design Engineer
North Carolina Department
of Transportation
Structure Design Unit
1581 Mail Service Center
Raleigh, NC 27699-1581
Attention: Mr. P. D. Lambert, P. E.

Via other delivery service:

Mr. G. R. Perfetti, P. E.
State Bridge Design Engineer
North Carolina Department
of Transportation
Structure Design Unit
1000 Birch Ridge Drive
Raleigh, NC 27610
Attention: Mr. P. D. Lambert, P. E.

Submittals may also be made via email.

Send submittals to: plambert@ncdot.gov (Paul Lambert)

Send an additional e-copy of the submittal to the following address: jgaither@ncdot.gov
(James Gaither)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail:

Mr. John Pilipchuk, L. G., P. E.
Western Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via other delivery service:

Mr. John Pilipchuk, L. G., P. E.
Western Region Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

The status of the review of structure-related submittals sent to the Structure Design Unit can be viewed from the Unit's web site, via the "Contractor Submittal" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact:

Paul Lambert
(919) 707 – 6407
(919) 250 – 4082 facsimile
plambert@ncdot.gov

Secondary Structures Contacts:

James Gaither
(919) 707 – 6409

Eastern Regional Geotechnical Contact (Divisions 1-7):

K. J. Kim
(919) 662 – 4710
(919) 662 – 3095 facsimile
kkim@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):

John Pilipchuk
(704) 455 – 8902
(704) 455 – 8912 facsimile
jpilipchuk@ncdot.gov

10.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Resident Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structure Design Unit and/or the Geotechnical Engineering Unit.

The first table below covers "Structure Submittals". The Resident Engineer will receive review comments and drawing markups for these submittals from the Structure Design Unit. The second table in this section covers "Geotechnical Submittals". The Resident Engineer

will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structure Design Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

STRUCTURE SUBMITTALS			
Submittal	Copies Required by Structure Design Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Cofferdams	6	2	Article 410-4
Foam Joint Seals ⁶	9	0	"Foam Joint Seals"
Expansion Joint Seals (hold down plate type with base angle)	9	0	"Expansion Joint Seals"
Expansion Joint Seals (modular)	2, then 9	0	"Modular Expansion Joint Seals"
Expansion Joint Seals (strip seals)	9	0	"Strip Seals"
Falsework & Forms ² (substructure)	8	0	Article 420-3 & "Falsework and Formwork"
Falsework & Forms (superstructure)	8	0	Article 420-3 & "Falsework and Formwork"
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	"Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____"
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	7	0	Article 1072-8
Miscellaneous Metalwork ^{4,5}	7	0	Article 1072-8
Optional Disc Bearings ⁴	8	0	"Optional Disc Bearings"

Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Pot Bearings ⁴	8	0	“Pot Bearings”
Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) ³	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & “Sound Barrier Wall”
Structural Steel ⁴	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station ____”
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structure Design Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18" or greater.

<u>GEOTECHNICAL SUBMITTALS</u>			
Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structure Design Unit	Contract Reference Requiring Submittal ¹
Drilled Pier Construction Plans ²	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports ²	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms ^{2,3}	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports ²	1	0	Subarticle 450-3(F)(3)
Retaining Walls ⁴	8 drawings, 2 calculations	2 drawings	Applicable Provisions
Temporary Shoring ⁴	5 drawings, 2 calculations	2 drawings	"Temporary Shoring" & "Temporary Soil Nail Walls"

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.

2. Submit one hard copy of submittal to the Resident or Bridge Maintenance Engineer. Submit a second copy of submittal electronically (PDF via email) or by facsimile, US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.
3. The Pile Driving Equipment Data Form is available from:
www.ncdot.org/doh/preconstruct/highway/geotech/formdet/
 See second page of form for submittal instructions.
4. Electronic copy of submittal is required. See referenced provision.

PAINTING EXISTING STRUCTURES

REV 9/2011

Specialty Items

Description of Work - This work shall consist of furnishing all labor, equipment, and materials to clean and paint the structural steel of the existing bridges. Work includes: removing, containment and disposal of the existing paint system; preparation of the surface to be painted and applying the new paint system; painting the ends of weathering steel girders at all expansion bents to a distance of 7' from the end of the girder, traffic control, marking & delineation; portable lighting; erosion and sediment control; seeding and mulching all grassed areas disturbed; and all incidental items necessary to complete the project as specified and shown on the plans.

The contractor shall be responsible for fulfilling all requirements of the NCDOT Standard Specifications for Roads and Structures dated January 2012, except as otherwise specified herein.

Work Schedule – Prior to the pre-construction meeting, the Contractor shall submit his work schedule to the Engineer. Schedule shall be kept up to date, with a copy of the revised schedule being provided to the Engineer in a timely manner (as determined by the Engineer).

SSPC QP-2 Certification - The existing paint systems include toxic substances such as red lead oxide, which are considered hazardous if improperly removed. Only contractors who are currently SSPC QP-2, Category A certified, and have successfully¹ completed lead paint removal on all similar structures within 18 months prior to this bid, may bid on and perform this work. **The apparent low bidder shall submit a list of projects for which QP2 work was performed within the last 18 months including owner contact information and submit to the Assistant State Bridge Management Engineer a “Lead Abatement Affidavit” by 12:00 noon of the third day following the opening of bids. This form may be downloaded from:**

<http://www.ncdot.gov/projects/ncbridges/#stats>

¹ Successfully: All lead abatement work completed in accordance with contract specifications, free of citation from safety or environmental agencies. Lead abatement work shall include but not be limited to: abrasive blasting; waste handling, storage and disposal; worker safety during lead abatement activities (fall protection, PPE, etc.); and containment. This requirement is in addition to the contractor pre-qualification requirements covered by NCDOT Std. Specification, Section 102-2.

Twelve-month Observation Period - The Contractor maintains responsibility for the coating system for a twelve (12) month observation period beginning upon the satisfactory completion of all the work required in the plans or as directed by the Engineer. The Contractor must guarantee the coating system under the payment and performance bond (refer to Article 109-10). To successfully complete the observation period, the coating system must meet the following requirements after twelve (12) months service:

- No visible rust, contamination or application defect is observed in any coated area.
- Painted surfaces have a uniform color and gloss.
- Painted surfaces have an adhesion that meets an ASTM D-3359, 3A rating.

Final acceptance is made only after the paint system meets the above requirements.

Submittals - All submittals must be submitted to the Engineer for review and approval prior to the pre-construction meeting:

- Containment Drawings sealed by NC Professional Engineer
- Bridge Wash Water Sampling & Disposal Plan
- Sub- Contractor identification
- Lighting Plan for night work in accordance with NCDOT *Standard Specifications* Section 1413.
- Traffic Control Plan
 - a) NCDOT certified supervisors, flaggers and traffic control devices
- Health & safety Plan²
 - a) ²Plan must address the minimum required topics as specified by the SSPC QP-1 and QP-2 program to also include hazard communication, respiratory health, emergency procedures, and local hospital and treatment facilities to include directions and phone numbers, disciplinary criteria for workers who violate the plan and accident investigation.
 - b) Contractor shall provide the Engineer a letter of certification that all employees performing work on the project have blood lead levels that are below the OSHA action level.
 - c) Competent Person qualifications and summary of work experience.
- Environmental Compliance Plan
- Quality Control Plan (Project Specific)
 - a) Quality control qualifications and summary of work experience
- Bridge and Public Protection Plan (Overspray, Utilities, etc. - Project/Task Specific)
- Abrasive Blast Media
 - a) Product Data Sheet
 - b) Blast Media Test Reports in accordance with NCDOT *Standard Specification* Section 1080-15.

² SSPC QP-1 required minimum: Hazardous Materials, Personal Protective Equipment, General Health and Safety, Occupational Health and Environmental

Controls, Personal Protective Equipment, Fire Protection and Prevention, Signs Signals, and Barricades, Materials Handling, Storage, Use, and Disposal, Hand and Power Tools, Welding and Cutting, Electrical, Scaffolds, Fall Protection, Cranes, Derricks, Hoists, Elevators, and Conveyors, Ladders, Toxic and Hazardous Substances, Airless Injection and HPWJ.

- Coating Material
 - a) NCDOT HICAMS Test Reports (testing performed by NCDOT Materials & tests Unit).
 - b) Product Data Sheets
 - c) Material Safety Data Sheets
 - d) Product Specific Repair Procedures
 - e) Acceptance letters from paint manufacturer's for work practices that conflict with Project Special Provisions and or paint manufactures product data sheets.

Pre-Construction Meeting – Submittals shall be reviewed and be approved by the engineer prior to scheduling the Pre-Construction Meeting. The Contractor shall allow for a review process of no less than two (2) weeks.

When requesting a pre-construction meeting the Contractor must contact the Engineer at least 7 working days in advance of the desired pre-construction date. The contractor's project supervisor, competent person, quality control personnel and certified traffic control supervisor shall be in attendance for the Pre-Construction meeting in order for the Contractor and DOT team to establish roles responsibilities for various personnel during project duration and to establish realistic timeframes for problem escalation.

Containment Plan for Weathering Steel - The containment plan must meet or exceed the requirements of Class 3A containment in accordance with SSPC Guide 6. Enclosure drawings and loads supported by the structure must be prepared, signed and sealed by a Registered North Carolina Professional Engineer.

Containment Plan for Non-Weathering Steel- No work begins until the Contractor furnishes the Engineer with a containment plan for surface preparation and coating operations and the Engineer reviews and responds in writing about the acceptability of said plan. Allow a minimum of two weeks for review of the plan. Such plan must meet or exceed the requirements of Class 2A containment in accordance with SSPC Guide 6. Enclosure drawings and loads supported by the structure must be prepared, signed and sealed by a Registered North Carolina Professional Engineer.

In the containment plan describe how debris is contained and collected. Describe the type of tarpaulin and bracing materials and the maximum designed wind load. Describe the dust collection system and how a negative pressure of 0.03 inches of water column is maintained inside the enclosure while blasting operations are being conducted. Describe how the airflow inside the containment structure is designed to meet all applicable OSHA Standards. Describe how water run-off from rain will be routed by or through the enclosure. Describe how wash water will be contained and paint chips separated. Describe what physical containment will be provided during painting application to protect the public and areas not to be painted. Protect non-metallic parts of bearings from blasting and painting (ie: Pot Bearings, Elastomeric Pads, Disc Bearings).

Wash water Sampling and Disposal Plan - No work begins until the Contractor furnishes the Engineer with a containment plan for surface preparation and coating operations and the Engineer reviews and approves in writing said plan. All wash water shall be collected and sampled prior to disposal. Representative sampling and testing methodology shall conform to 15A NCAC 02B.0103, "Analytical Procedures". Wash water shall be tested for pollutants listed

in 15A NCAC 02B.0211 (3), 15A NCAC 02T.0505 (b) (1) and 15A NCAC 2T.0905 (h) (See link below for NCDOT Guidelines for Managing Bridge Wash Water). Depending on the test results, wash water disposal methods shall be described in the disposal plan. Wash water shall be disposed of in accordance with all current state and federal regulations.

Waste Handling of Paint and Abrasives – The Contractor will comply with the Resource Conservation and Recovery Act (RCRA – 40 CFR 261 - 265) and the Occupational Safety and Health Act (OSHA - 29 CFR 1910 - 1926) regulations for employee training, and for the handling, storage, labeling, recordkeeping, reporting, inspections and disposal of all hazardous waste generated during paint removal.

A summary of Generator Requirements is available at the above NCDOT web link which cites the specific regulations for each Generator category. Quantities of waste by weight and dates of waste generation must be recorded. Waste stored at the project site must be properly labeled.

The North Carolina Department of Environment and Natural Resources (NCDENR) have adopted RCRA as the North Carolina Hazardous Waste Management Rules and are responsible for enforcement. The “Hazardous Waste Compliance Manual for Generators of Hazardous Waste” is published by the Compliance Branch of the Division of Waste Management of NCDENR, and can be found at:

<http://portal.ncdenr.org/web/wm/hw/rules>.

The Contractor is required to maintain compliance with all federal, state and local regulations. Failure to comply with the regulations could result in fines and loss of qualified status with NCDOT.

Use a company from the below list of approved waste management companies or an approved equal. Immediately after award of the contract, the Contractor arranges for waste containers, sampling and testing, transportation and disposal of all waste. No work begins until the Contractor furnishes the Engineer with a written waste disposal plan. Any alternative method for handling waste must be pre-approved by the Engineer.

Southern Logistics, Inc. – 312 Orville Wright Drive, Greensboro, NC 27409 (Ph. 336-662-0292)
 A&D Environmental – PO Box 484, High Point, NC 27261 (Ph. 336-434-7750)
 Poseidon Environmental Services, Inc. – 837 Boardman-Canfield Rd #209, Youngstown, OH (Ph. 330-726-1560)
 Clean Harbors Reidsville, LLC – 208 Watlington Industrial Drive, Reidsville, NC 27320 (Ph. 336-342-6106)

Waste and Wash Water Sampling

All removed paint and spent abrasive media shall be tested for lead following the SW-846 TCLP Method 1311 Extraction, as required in 40 CFR 261, Appendix 11, to determine whether it must be disposed of as hazardous waste. The Contractor shall furnish the Engineer certified test reports showing TCLP results and Iron analysis of the paint chips stored on site, with disposal being in accordance with “Flowchart on Lead Waste Identification and Disposal” at:

http://portal.ncdenr.org/c/document_library/get_file?p_l_id=38491&folderId=328599&name=DLFE-9855.pdf

The Competent Person shall obtain composite samples from each barrel of the wash water and waste generated by collecting two or more portions taken at regularly spaced intervals during accumulation. Composite the portions into one sample for testing purposes. Do not obtain portions of the composite sample from the very first or last part of the accumulation process. The sample(s) should be acquired after 10 percent or before 90 percent of the barrel has accumulated. Due to the difficulty of acquiring samples the intent is to provide samples that are representative of widely separated portions, but not the beginning and end of wash water or waste accumulation.

Perform sampling by passing a receptacle completely through the discharge stream, or by completely diverting the discharge into a sample container. If discharge of the wash water or waste is too rapid to divert the complete discharge stream, discharge into a container or transportation unit sufficiently large to accommodate and then accomplish the sampling in the same manner as given above.

Until test results are received, all waste shall be stored and labeled as “NCDOT Bridge Paint Removal Waste-Pending Analysis” and include the date generated and contact information for the Division HazMat Manager or Project Engineer. Waste containers shall be stored in an enclosed, sealed and secured storage container protected from traffic from all directions. A protection plan for these containers must be approved by the Engineer. If adequate protection cannot be obtained by use of existing guardrail, the contractor will be required to provide adequate protection. Once test results are received and characterized, waste shall be labeled as either “Hazardous Waste-Pending Disposal” or “Paint Waste-Pending Disposal”.

Once the waste has been collected, and the quantity determined, the Contractor prepares the appropriate shipping documents and manifests and presents them to the Engineer. The Engineer will verify the type and quantity of waste and obtain a Provisional EPA ID number from the

NC Hazardous Waste Section
North Carolina Department of Environment & Natural Resources
1646 Mail Service Center
Raleigh, NC 27699
Phone (919) 508-8400 Fax (919) 715-4061

At the time of shipping the Engineer will sign, date and add the ID number in the appropriate section on the manifest. The maximum on-site storage time for collected waste shall be 90 days.

All waste whether hazardous or non-hazardous will require numbered shipping manifests. The cost for waste disposal (including lab and Provisional EPA ID number) is included in the bid price for this contract. Note NC Hazardous Waste Management Rules (15A NCAC 13A) for more information. Provisional EPA ID numbers may be obtained at this link:

<http://portal.ncdenr.org/web/wm/provisional-hw-notification-page>.

Testing labs shall be certified in accordance with North Carolina State Laboratory Public Health Environmental Sciences. List of certified laboratories may be obtained at this link:

<http://slphreporting.ncpublichealth.com/EnvironmentalSciences/Certification/CertifiedLaboratory.asp>.

All test results shall be documented on the lab analysis as follows:

1. For leachable lead
 - a. Soils/Solid/Liquid- EPA 1311/200.7/6010

All sampling shall be done in presence of the Engineer's representative.

Equipment Mobilization - The equipment used in any travel lanes and paved shoulder must be mobile equipment on wheels that has the ability to move on/off the roadway in less than 30 minutes. All work conducted in travel lanes must be from truck or trailer supported platforms and all equipment must be self propelled or attached to a tow vehicle at all times.

QUALITY CONTROL INSPECTOR – The Contractor provides a quality control inspector in accordance with the SSPC QP guidelines to ensure that all processes, preparation, blasting and coating application are in accordance with the requirements of the contract. The inspector shall have written authority to perform QC duties to include continuous improvement of all QC internal procedures. The presence of the engineer or inspector at the work site shall in no way lessen the contractor's responsibility for conformity with the contract

QUALITY ASSURANCE INSPECTOR- The quality assurance inspector which may be a Department employee or a designated representative of the Department shall observe, document, assess and report that the Contractor is complying with all of the requirements of the contract. Inspectors employed by the Department are authorized to inspect all work performed 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 requirements of the contract. Each stage in preparing the structure to be coated which includes but not limited to washing, blasting, coating testing and inspection shall be inspected and approved by the Engineer or his authorized representative.

SUBLETTING OF CONTRACT:

Only contractors certified to meet SSPC QP-2, Category A, and have successfully completed lead paint removal on all similar structures within 18 months prior to this bid are qualified for this work. Work is only sublet by approval of the Engineer.

SPECIFICATIONS:

The North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures dated January 2012; together with these Special Provisions apply to this project. Surface preparation and painting are performed in accordance with Section 442 except where otherwise noted in these Special Provisions. The Paint materials must meet the applicable materials specifications under Section 1080. Materials approvals are in accordance with 3.0 Materials of this Special Provision.

1.0 PREPARATION OF SURFACES:

- 1.1 Power washing – Before any other surface preparation are conducted, all surfaces shall be power washed to remove dust, salts, dirt and other contaminants. All wash water shall be contained, collected and tested in accordance with the requirements of NCDOT Managing Bridge Wash Water specification. Under no circumstances will surface preparation or painting activities be started over cleaned surfaces until all surfaces are free of standing water and dry to the touch, and then only after approval by the Engineer.
- 1.2 Blasting is done with recyclable steel grit meeting the requirements of Section 1080-15. The profile must be between 1.0 and 3.0 mils when measured on a smooth steel surface. A minimum of two tests per beam/girder and two tests per span of diaphragms/cross bracing shall be conducted and documented.
- 1.3 Tarpaulins are spread over all pavements and surfaces underneath equipment utilized for abrasive recycling and other lead handling equipment or containers. This requirement shall be enforced during activity and inactivity of equipment.
- 1.4 Before the contractor departs from the work site at the end of the work day, all debris generated during surface preparation and all dust collector hoses, tarps, or other appurtenances containing blasting residue are collected in approved containers.
- 1.5 The Contractor cleans a three inch by three inch area at each structure to demonstrate the specified finish and the inspector preserves this area by covering it with tape, plastic or some other suitable means so that it can be retained as the DFT gage adjustment standard. An acceptable alternative is for the Contractor to provide a steel plate with similar properties and geometry as the substrate to be measured.
- 1.6 The contractor and or quality assurance representative shall notify the Engineer of any area of corroded steel which has lost more than 50% of its original thickness.
- 1.7 All parts of the bridges not to be painted, and the travelling public, shall be protected from overspray. The Contractor shall submit a plan to protect all parts of bridge that are not required to be painted, in addition to a plan to protect the traveling public and surrounding environment while applying all coats of paint to a structure.
- 1.8 Contractor must insure that chloride levels on the surfaces are 7 ug/cm^2 or lower using an acceptable sample method in accordance with SSPC Guide 15. The frequency of testing shall be as follows:

- A. **Non-Weathering Steel** - 2 tests per span after all surface preparation has been completed and immediately prior to painting.
- B. **Weathering Steel** - 4 tests per pier, and/ or 2 tests per abutment on separate main members (girder/beam).

Test areas selected shall represent the greatest amount of corrosion in the span as determined by the Engineers' representative.

- 1.9 All weld splatter, slag or other surface defects resulting in a raised surface above the final paint layer shall be removed prior to application of primer coat.

2.0 PAINTING OF STEEL:

Paint System 1, Non-Weathering Steel as specified in these special provisions and Section 442 of NCDOT's *Standard Specifications*, is to be used for this work. System 1 is an inorganic zinc primer, two coats acrylic paint and one stripe coat of acrylic paint over blast cleaned surfaces in accordance with SSPC-SP-10 (Near White Blast).

Paint System 4, Weathering Steel as specified in these special provisions and Section 442 of NCDOT's *Standard Specifications*, is to be used for this work. System 1 is an acrylic primer and acrylic topcoats used over blast cleaned surfaces in accordance with SSPC-SP-6. Provide a curing period for the first primer coat of paint of at least 24 hours prior to applying successive layers of paint. Paint terminations shall be finished as to provide a neat and straight line appearance.

Perform all mixing operations over an impervious surface with provisions to prevent runoff to grade of any spilled material. The contractor is responsible for reporting quantities of thinner purchased as well the amounts used. No container with thinner shall be left uncovered, when not in use.

Apply two inch (2") stripe coat by **BRUSH OR ROLLER ONLY** to all exposed edges of steel including fasteners before applying the finish coat. Locate the edge or corner in the approximate center of the paint stripe.

Any area where newly applied paint fails to meet the specifications must be repaired or replaced by the Contractor. The Engineer approves all repair processes before the repair is made. Repaired areas must meet the specifications. The Contractor applies an additional finish coat of paint to areas where the tape adhesion test is conducted.

3.0 MATERIALS:

Only paint suppliers that have a NCDOT qualified inorganic zinc primer may furnish paints for this project. All paints applied to a structure must be from the same supplier. Before any paints are applied the Contractor provides the Engineer a manufacturer's certification that each batch of paint meets the requirements of the applicable Section 1080 of the *Standard Specifications*.

The inspector randomly collects a one pint sample of each paint product used on the project. Additional samples may be collected as needed to verify compliance to the specifications.

Do not expose paint materials to rain, excessive condensation, long periods of direct sunlight, or temperatures above 110F or below 40F. In addition, the Contractor shall place a device which records the high, low and current temperatures inside the storage location. Follow the manufacturer's storage requirements if more restrictive than the above requirements.

4.0 INSPECTION:

Surface Preparation for System 1 shall be in accordance with SSPC SP-10. Any area(s) not meeting the requirements of SSPC SP 10 shall be remediated prior to application of coating. Surface inspection is considered ready for inspection when all blast abrasive, residue and dust is removed from surfaces to be coated.

Surface Preparation for System 4 shall be in accordance with SSPC SP-6. Any area(s) not meeting the requirements of SSPC SP 6 shall be remediated prior to application of coating. Surface inspection is considered ready for inspection when all blast abrasive is removed from surfaces to be coated.

Quality Assurance Inspection - The Contractor furnishes all necessary OSHA approved apparatus such as ladders, scaffolds and platforms as required for the inspector to have reasonable and safe access to all parts of the work. The contractor illuminates the surfaces to be inspected to a minimum of 50-foot candles of light. All access points shall be illuminated to a minimum of 20-foot candles of light.

NCDOT reserves the right for ongoing QA (Quality Assurance) inspection to include but not limited to surface contamination testing, adhesion pull testing and DFT readings as necessary to assure quality.

The Contractor informs the Engineer and the Division Safety Engineer of all scheduled and unannounced inspections from SSPC, OSHA, EPA and/or others that come on site and furnishes the Engineer a copy of all inspection reports except for reports performed by a third party and or consultant on behalf of the contractor.

Inspection Instruments - The Contractor furnishes at least the following calibrated instruments at site and conducts the quality control testing:

- Sling Psychrometer - ASTM E-337 – bulb type
- Surface Temperature Thermometer
- Wind Speed Indicator
- Tape Profile Tester – ASTM D-4417 Method C
- Surface Condition Standards – SSPC VIS-1 and VIS-3
- Wet Film Thickness Gage – ASTM D-4414
- Dry Film Thickness Gage – SSPC-PA2 Modified
- Solvent Rub Test Kit – ASTM D-4752
- Adhesion Test Kit – ASTM D-3359 Method A (Tape Test)
- Adhesion Pull test – ASTM D-4541
- Surface Contamination Analysis Kit or (Chloride Level Test Kit)

The contractor maintains a daily quality control record in accordance with Section 442-12 and such records must be available at the job site for review by the inspector and be submitted to the Engineer as directed. In addition to the information required on M&T-610, the Contractor shall submit all DFT readings as required by these Special Provisions on a form equivalent to M&T-611.

The dry film thickness is measured at each spot as indicated on the attached diagram at no less than specified for each paint system as listed below:

Dry film thickness is measured at each spot on the attached diagram and at the required number of locations as specified below:

1. For span members less than 45 feet; three random locations along each girder in each span.
2. For span members greater than 45 feet; add 1 additional location for each additional 10 feet in span length.

DFT measurements for the prime coat shall not be taken for record until the zinc primer has cured in accordance with ASTM D-4752 (MEK Rub Test) with no less than a four resistance rating.

Stiffeners and other attachments to beams and or plate girders shall be measured at no less than five random spots per span. Also dry film thickness is measured at no less than six random spots per span on diaphragms/"K" frames.

Each spot is an average of three to five individual gage readings as defined in SSPC PA-2. No spot average shall be less than 80% of minimum DFT for each layer applied; this does not apply to stripe coat application. Spot readings that are non-conforming shall be re-accessed by performing additional spot measurements not to exceed one foot intervals on both sides of the low areas until acceptable spot averages are obtained. These non-conforming areas shall be corrected by the contractor prior to applying successive coats.

- A. Paint System 1- Two random adhesion tests (1 test=3 dollies) per span are conducted on interior surfaces in accordance with ASTM D-4541 (Adhesion Pull Test) after the prime coat has been properly cured in accordance with ASTM D-4752 (MEK Rub Test) with no less than a 4 resistance rating, and will be touched up by the Contractor. The required minimum average adhesion is 400 psi.

Paint System 4 - Provide a curing period for the first primer coat of paint of at least 24 hours prior to applying successive layers of paint and all primed areas are cured by utilizing the thumb test prior to the application of any successive layers of paint.

- B Cure of the intermediate and stripe coats shall be accessed by utilizing the thumb test in accordance with ASTM D-1640 (Curing Formation Test) prior to the application of any successive layers of paint.

- C. One random Cut Tape adhesion test per span is conducted in accordance with ASTM D-3359 (X-Cut Tape Test) on interior surface after the finish coat is cured. Repair areas shall be properly tapered and touched up by the Contractor.

5.0 SAFETY AND ENVIRONMENTAL COMPLIANCE PLANS:

Personnel access boundaries are delineated for each work site using signs, tape, cones or other approved means. Submit copies of safety and environmental compliance plans that comply with SSPC QP-2 Certification requirements.

6.0 ENVIRONMENTAL MONITORING:

Comply with Section 442–13(B) of NCDOT’s Standard Specifications.

A “Competent Person³” is on site during all surface preparation activities and monitors the effectiveness of containment, dust collection systems and waste sampling. Before any work begins the Contractor provides a written summary of the responsible person’s safety training.

Area sampling will be performed for the first two (2) days at each bridge location. The area sample will be located within five feet of the containment and where the highest probability of leakage will occur (access door, etc.). Results from the area sampling will be given to the Engineer within seventy-two (72) hours of sampling (excluding weekends) If the results of the samples exceed 20 ug/m³ corrective measures must be taken and monitoring will be continued until two consecutive samples come back less than 20 ug/m³.

Any visible emissions outside the containment enclosure or pump monitoring results exceeding the level of 30 µg/m³ TWA is justification to suspend the work.

Where schools, housing and/or buildings are within five hundred (500) feet of the containment, the Contractor shall perform initial TSP-Lead monitoring for the first ten (10) days of the project; during abrasive blasting, vacuuming and containment removal. Additional monitoring will be required during abrasive blasting two days per month thereafter. Results of the TSP monitoring at any location shall not exceed 1.5 ug/m³.

This project may involve lead and other toxic metals such as arsenic, cadmium and hexavalent chromium. It is the contractor’s responsibility to test for toxic metals and if found, comply with the OSHA regulations, which may include medical testing.

7.0 HEALTH AND SAFETY RESPONSIBILITY:

Comply with Section 442-13(C) of NCDOT’s Standard Specifications. Insure employee blood sampling test results are less than 50 micrograms per deciliter. Remove employees with a blood sampling test of 50 or more micrograms per deciliter from work activities involving any lead exposure.

³ **Competent Person** as defined in OSHA 29 CFR 1926.62 is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who have authorization to take prompt corrective measures to eliminate them.

An employee who has been removed with a blood level of 50 micrograms per deciliter or more shall have two consecutive blood sampling tests spaced one week apart indicating that the employee's blood lead level is at or below 40 micrograms per deciliter before returning to work activities involving any lead exposure.

Prior to blasting operations the Contractor shall have an operational OSHA approved hand wash station at each bridge location and a decontamination trailer at each bridge or between bridges unless the work is on the roadway, or the contractor can show reason why it is not feasible to do so in which the Contractor will provide an alternative site as approved by the Engineer. The contractor shall assure that all employees whose airborne exposure to lead is above the PEL shall shower at the end of their work shift.

All OSHA recordable accidents that occur during the project duration are to be reported to the Engineer within twenty four (24) hours of occurrence. In addition, for accidents that involve civilians and or property damage that occur within the work zone the Division Safety Engineer shall be notified immediately.

8.0 STORAGE OF PAINT AND EQUIPMENT:

The Prime Contractor provides a location for materials, equipment and waste storage. Tarpaulins are spread over all pavements and surfaces underneath equipment utilized for abrasive recycling and other lead handling equipment or containers. All land and or lease agreements that involve private property shall disclose to the property owner that lead and other heavy metals may be present on the Contractor's equipment. Prior to storing the Contractor's equipment on private property the Engineer shall receive a notarized written consent signed by the land owner submitted at least forty-eight (48) prior to using property. All storage of paint, solvents and other materials applied to structures shall be stored in accordance with Section 442 of the Specifications or manufacturers' requirements. The more restrictive requirements will apply.

9.0 UTILITIES:

The Contractor protects all utility lines or mains which may be supported on, under, or adjacent to bridge work sites from damage and paint over-spray.

10.0 PAYMENT:

The cost of inspection, surface preparation and repainting the existing structure is included in the lump sum price bid for *Cleaning and Repainting of Bridge #___*. This price is full compensation for furnishing all inspection equipment, all paint, cleaning abrasives, cleaning solvents and all other materials; preparing and cleaning surfaces to be painted; applying paint in the field; protecting work, traffic and property; and furnishing blast cleaning equipment, paint spraying equipment, brushes, rollers and any other hand or power tools and any other equipment; containment, handling and disposal of debris and wash water, all personal protective equipment, and all personal hygiene requirements.

Pollution Control will be paid for at the contract lump sum price which price will be full compensation for all collection, handling, storage, air monitoring, and disposal of debris and wash water, all personal protective equipment, and all personal hygiene requirements, and all equipment, material and labor necessary to fully contain the blast debris; daily collection of the blast debris into specified containers; and any measures necessary to ensure conformance to all safety and environments regulations as directed by the Engineer.

Payment will be made under:

Pay Item	Pay Unit
Cleaning and Repainting of Bridge # ____	Lump Sum
Pollution Control	Lump Sum

DESCRIPTION OF BRIDGES

Bridge #54 Mecklenburg County: The existing bridge was originally built in 1956, widened in 1969 and carries NC 160 over Norfolk Southern R.R. The superstructure consists of 3 spans of 17 lines of W21 I-beams with girders spaced between 3’-6” and 6’-0”. The bridge is 135’-6” in length with a cast-in-place concrete deck 64’-9” wide (out to out) with sidewalks and 3 bar metal rail on either side of the structure. The existing paint system is assumed to be aluminum oxide over red lead, and the estimated area to be cleaned and painted is 9,620 sq. ft.

Bridge #88 Mecklenburg County: The existing bridge was originally built in 1956, widened in 1965 and carries NC 49 over Norfolk Southern R.R. The superstructure consists of 3 spans of 11 lines of W18 I-beams with girders spaced between 3’-3” and 6’-3”. The bridge is 125’-8” in length with a cast-in-place concrete deck 73’-5” wide (out to out) with concrete rail on either side of the structure. The existing paint system is assumed to be aluminum oxide over red lead, and the estimated area to be cleaned and painted is 13,300 sq. ft.

Bridge #81 Anson County: The existing bridge was originally built in 1980 and carries US 74 WBL over the Pee Dee River. The superstructure consists of 3 spans of 6 lines of plate girders with girders spaced at 7’-6”. The bridge is 1601’-6” in length with a cast-in-place concrete deck 42’-10” wide (out to out) with concrete barrier rail on either side of the structure. The existing girders are weathering steel and are not painted. The estimated area to be cleaned and painted is 16,700 sq. ft.

CRANE SAFETY

(8-15-05)

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration regulations (OSHA).

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer’s crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

1.0 CRANE SAFETY SUBMITTAL LIST

Competent Person: Provide the name and qualifications of the “Competent Person” responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.

Riggers: Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.

Crane Inspections: Inspection records for all cranes shall be current and readily accessible for review upon request.

Certifications: By July 1, 2006, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC’s Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES

(9-30-11)

1.0 DESCRIPTION

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, or decks. Mix and place grout in accordance with the manufacturer’s recommendations, the applicable sections of the Standard Specifications and this provision.

2.0 MATERIAL REQUIREMENTS

Use a Department approved pre-packaged, non-shrink, non-metallic grout. Contact the Materials and Tests Unit for a list of approved pre-packaged grouts and consult the manufacturer to determine if the pre-packaged grout selected is suitable for the required application.

When using an approved pre-packaged grout, a grout mix design submittal is not required.

The grout shall be free of soluble chlorides and contain less than one percent soluble sulfate. Supply water in compliance with Article 1024-4 of the Standard Specifications.

Aggregate may be added to the mix only where recommended or permitted by the manufacturer and Engineer. The quantity and gradation of the aggregate shall be in accordance with the manufacturer’s recommendations.

Admixtures, if approved by the Department, shall be used in accordance with the manufacturer's recommendations. The manufacture date shall be clearly stamped on each container. Admixtures with an expired shelf life shall not be used.

The Engineer reserves the right to reject material based on unsatisfactory performance.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Test the expansion and shrinkage of the grout in accordance with ASTM C1090. The grout shall expand no more than 0.2% and shall exhibit no shrinkage. Furnish a Type 4 material certification showing results of tests conducted to determine the properties listed in the Standard Specifications and to assure the material is non-shrink.

Unless required elsewhere in the contract the compressive strength at 3 days shall be at least 5000 psi. Compressive strength in the laboratory shall be determined in accordance with ASTM C109 except the test mix shall contain only water and the dry manufactured material. Compressive strength in the field will be determined by molding and testing 4" x 8" cylinders in accordance with AASHTO T22. Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

When tested in accordance with ASTM C666, Procedure A, the durability factor of the grout shall not be less than 80.

3.0 SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

Do not place grout if the grout temperature is less than 50°F or more than 90°F or if the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 45°F.

Provide grout at a rate that permits proper handling, placing and finishing in accordance with the manufacturer's recommendations unless directed otherwise by the Engineer. Use grout free of any lumps and undispersed cement. Agitate grout continuously before placement.

Control grout delivery so the interval between placing batches in the same component does not exceed 20 minutes.

The Engineer will determine the locations to sample grout and the number and type of samples collected for field and laboratory testing. The compressive strength of the grout will be considered the average compressive strength test results of 3 cube or 2 cylinder specimens at 28 days.

4.0 BASIS OF PAYMENT

No separate payment will be made for “Grout for Structures”. The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

BRIDGE JACKING

SPECIAL

1.0 GENERAL

Bridge jacking is to facilitate repairs to the bent cap under the bearing plates or the bearing assemblies. Any repairs that extend under a bearing plate shall require bridge jacking unless directed otherwise by the Engineer. Jacking will be performed to support the girder above the subject masonry plate and repair area during the repair process. Prior to bridge jacking, complete any diaphragm modifications at the pier being jacked. Additionally, the Contractor shall submit a jacking plan and sequence to the Engineer for approval prior to bridge jacking. The Contractor’s jacking plan shall be prepared and sealed by a Professional Engineer licensed in the state of North Carolina.

2.0 SCOPE OF WORK

Work for bridge jacking includes setting blocking and jacks, jacking bridge girders, mechanically locking jacks and lowering bridge girders onto bearing assemblies. The intent of the bridge jacking is to remove load from the repair area and is not intended to lift the span from its bearing.

The contractor is cautioned that the jacking plan shown on the contract plans is conceptual and may not work for all structures at all jacking locations. The contractor shall be responsible for determining a workable jacking plan and making any modifications to the structure to implement the jacking plan. Any alterations to the jacking plan show in the contract document or to the structure will be considered incidental to “Bridge Jacking”.

It is anticipated that girders directly adjacent to the girder jacking location shown on the plans will require jacking. These subsequent jacking locations, to alleviate differential loading, will be considered incidental to the lump sum pay item, “Bridge Jacking”.

3.0 OPERATIONS

Contractor shall ensure that no damage to the anchor bolts occurs during the nut removal process. The Contractor shall submit a removal method to the Engineer for approval prior to nut removal and subsequent bridge jacking.

The Contractor shall ensure that the jacks are secured from dislodgement during all phases of the bridge jacking. Mechanical restraints/blocking are required during the bent cap repairs such that the failure of the hydraulic system will not apply load to the repair area.

4.0 BASIS OF PAYMENT

Payment will be made at the lump sum price bid for Bridge Jacking. Such lump sum price will be full compensation for all materials, equipment, tools, labor, plan preparation and incidentals necessary to complete the work.

RESET ROCKER BEARING**SPECIAL****1.0 GENERAL**

Reset girder Rocker Bearings as noted on the plans at Bridge 81 according to the steel girder temperature. At 60°F the Rocker Bearings shall be set at a zero (0) inclination to the vertical, for temperatures other than 60°F the Rocker Bearings will be set according to the plans. Measure the rotation after resetting and prior to releasing temporary jacking system. Record temperatures and rotations and report on the table provided on the plan set. Replacing anchor bolts shall immediately follow this work if required on the plans.

2.0 BASIS OF PAYMENT

Payment will be made at the lump sum price bid for "Reset Rocker Bearing". Such lump sum price will be full compensation for all materials, equipment, tools, labor, and incidentals necessary to complete the work.