

**STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION**

State Proj. 126-170

**Commodore Hull Bridge Painting
and Steel Repairs**

Towns of Shelton / Derby

DRAFT SPECIAL PROVISIONS

April 14, 2016

Prepared by:

**AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067**

Table of Contents

NTC - Barge Restrictions and Limitations - rev 16-02-03	3
NTC - CAS_Requirement_1-20-16	4
NTC - Closure of Local Streets	5
NTC - Contract Duration	6
NTC - Flood Contingency Plan - rev 16-01-26	7
NTC - hazmat investigations	8
NTC - Liquidated Damages	10
NTC - Localized Paint Removal.....	12
NTC - Painting Requirements - rev 16-02-03.....	14
NTC - Pedestrian Access	15
NTC - Protection of Existing Utilities	16
NTC - Site Number References	17
NTC - Supplement to Best Management Practices.....	18
NTC - Use of State Police Officers.....	19
Section 1.08 - Prosecution and Progress.....	20
Section 1.04 - Scope of Work.....	26
Section 1.05 - Control of the Work.....	27
Section 1.07 - Legal Relations and Responsibility	30
1131002A - Remote Control Changeable Message Sign	35
0020765A - Guano Abatement 10-09-15	38
0020903A - Miscellaneous Exterior Tasks Lead Compliance 10-09-15.....	49
0020904A - Abrasive Blast Cleaning Lead Compliance 100915.....	66
0100426A-Water Transportation for Rescue Operations Rev.12-16-15	79
0100600A - Construction Access - rev 16-04-14	81
0201199A - Remove and Reset Fence.....	83
0503188A - Removal of Existing Steel Bents (Site No.xx)	84
0511003A - Clean Existing Scuppers	85
0512113A - 8 In Pipe for Bridge Drainage (Fiberglass).....	86
0520041A - Preformed Joint Seal.....	89
0522155A - Replace Bridge Bearings	92
0522158A - Keeper Assembly.....	97
0601070A - Class S Concrete	99
0601197A - Variable Depth Patch.....	104
0601954A - Epoxy Injection Crack Repair	107
0602911A - Drilling Holes and Grouting Anchor Bolts.....	115
0602972A – Bolt and Rivet Replacement	116
0603061A_StrucStl(SiteNo.1)_Rev_1-20-16.....	117
0603222A - Disposal of Lead Debris from Abrasive Blast Cleaning 100915	125
0603321A - Temporary Support System (Pier 11).....	133
0603366A - Walkway Modifications.....	136
0603563A - Class I Cont Coll Surf Prep Debris_Rev_1-20-16.....	138
0603923A_ABC&Field PntgStruc_Rev_1-20-16	143
00703100A - Scour Monitoring System	155
0904103A - Repair Metal Bridge Rail.....	162
0904205A - Reset Metal Bridge Rail.....	163
0969060A_-_066A_Construction_Field_Office_type_Rev01202016.....	164
0970006A & 0970007-Trafficperson (Municipal Police Officer & Uniformed Flagger).....	172

0971001A - Maintenance and Protection of Traffic	175
1008460A - 1in RMC PVC Coated - Surface.....	194
1008901A - Remove Conduit	195
1009300A - Steel Junction Box Cover	196
1018001A - Navigation Lights	197
1018101A - Remove Navigational Lights	199

NOTICE TO CONTRACTOR – BARGE USE, RESTRICTIONS AND LIMITATIONS

The Contractor may elect to use barges as part of its Construction Access plan. In so doing, the following requirements must be adhered to:

- Notice to Contractor – Painting Requirements
- Notice to Contractor – Flood Contingency Plan
- All environmental permits and regulations

The Contractor may elect to store coating removal debris on a barge while performing work on the spans over the waterway. If the Contractor does elect to do this, care shall be taken such that no materials shall be allowed to enter the waterway. The coating removal debris stored in secured, sealed storage containers on a barge will only be allowed for seven (7) days or less. After seven (7) days, the coating removal debris must be removed to an onshore secure storage area. The onshore secure storage area shall be located above the 500 year flood contour as shown on the plans.

Additional protection measures which also must be employed include, but are not limited to:

- equipment and materials on work barges shall be properly secured at all times
- work barges shall be equipped with physical guards or parapets around their perimeters to prevent any construction material or equipment from entering the waterway
- Work barges and all equipment and materials staged on the barges shall be addressed by the Flood Contingency Plan for major storm events.

**NOTICE TO CONTRACTOR – CAS CERTIFICATION FOR ABRASIVE
BLAST CLEANING AND COATING WORK**

This Contract requires abrasive blast cleaning and coating work be done with at least one (1) Coating Application Specialist per four (4) craft-workers. Coating Application Specialist (CAS) certification is available through the Society for Protective Coatings (SSPC). The CAS program is based on the requirements of SSPC ACS-1/NACE 13, a standard published jointly in 2008 by SSPC and NACE International (National Association of Corrosion Engineers). ACS-1 defines training and experience requirements that tradespersons must have in order to qualify to be assessed for certification. CAS QP-1 implementation requires that the CAS Level II certified applicator be on the job during abrasive blast cleaning and painting operations.

The firm proposed to perform abrasive field blast cleaning and coating on this Project must meet the requirements outlined in the special provisions under “Contractor - Subcontractor Qualifications.”

When applicable, the shop painting firm proposed to perform abrasive blast cleaning and shop painting on this Project must meet the requirements outlined in the special provisions under “Qualifications of Shop Painting Firm.”

NOTICE TO CONTRACTOR – CLOSURE OF LOCAL STREETS

To accommodate bridge painting operations the Contractor will be permitted to commence his work with the temporary closure of the following roadways:

Weekend Closure of Local Streets

The Contractor will be permitted to close Hull Ave. for weekend periods to erect the containment system and to paint the bridge span over each roadway. Minimum clearances, as depicted on the contract drawings, shall be maintained when the roadway is re-opened to traffic.

Weekday Closure of Local Streets

The Contractor will be permitted to close and Hull Ave. for weekday periods to erect the containment system and to paint the bridge span over each roadway. Minimum clearances, as depicted on the contract drawings, shall be maintained when the roadway is re-opened to traffic.

The closures shall only be permitted when actual work is being performed on the span over each roadway. When the work shift is over, the roadway shall be reopened to traffic.

The closures must occur between April 1 and November 30 of any year and shall not occur during any of the holiday weekends unless otherwise noted or approved as identified in Section 1.08 – Prosecution and Progress. The Contractor shall notify the Engineer at least 30 days in advance of any street closures and shall implement detour routes to direct traffic around the closed roadways. Detour routes shall be submitted in advance for approval by the Engineer.

NOTICE TO CONTRACTOR - CONTRACT DURATION

The Contractor is hereby notified that this is not to be considered an ordinary project by any means and that due to the inconvenience to the traveling public that it causes, extra manpower, equipment and workshifts may be required to complete the work in accordance within the specified contract time shown in the Notice to Contractor – Contract Time Liquidated Damages.

NOTICE TO CONTRACTOR – FLOOD CONTINGENCY PLAN

In accordance with the plans, specifications and permits, the Contractor shall develop a Flood Contingency Plan (FCP) and submit it to the Engineer for review and approval prior to beginning work on the Project.

The Contractor's FCP shall address Section 1.10.03, Best Management Practice No. 9, of Form 816 which states "...The Contractor shall make every effort to secure the work site before predicted major storms. A major storm shall be defined as a storm practiced by NOAA Weather Service with warnings of flooding, severe thunderstorms, or similarly severe weather conditions or effects." Therefore, the Contractor is required to coordinate with the NOAA Weather Service, throughout the duration of construction, for information pertaining to storm events.

The Contractor's FCP, shall include a plan for evacuating and securing the site within 24 hours. This plan shall address the removal or securing of materials and equipment, including, but not limited to, all barges, work platforms and floating walkways located within the 100-year floodplain. If not being removed, construction and service barges must be secured to dolphins or shore-based deadman anchors. The Contractor's FCP shall include reference to specified anticipated flood elevations that will trigger the evacuation plan.

NOTICE TO CONTRACTOR – HAZARDOUS MATERIALS INVESTIGATIONS

A limited hazardous materials site investigation has been conducted at Bridge No. 00571A, Route 8 over Housatonic River in Shelton, Connecticut. The scope of inspection was limited to the representative components projected for impact.

At Bridge No. 00571A the results of the investigation indicated the presence of lead based paint on the structural steel/metal bridge components that are projected for impact. No detectable amounts of lead were found on the painted surfaces of the concrete piers.

Results obtained from TCLP waste stream sampling and analysis for leachable lead associated with structural steel/metal bridge components at Bridge No. 00571A characterized the paint waste stream as **RCRA Hazardous waste (>5.0mg/l)**. Since no detectable amounts of lead were found on the painted surfaces of the concrete piers any paint waste stream generated from the removal of paint from the piers would be considered non-RCRA, non-hazardous waste.

All steel and metal generated from work tasks (painted or not) shall be segregated and recycled as scrap metal at a scrap metal recycling facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

Suspect materials in the form of jersey barrier expansion joint caulking, gaskets under guardrails, and caulking at base of fence of catwalk were sampled for asbestos content and were found to contain no asbestos.

Bird/pigeon guano accumulations were identified in accessible areas on and below Bridge No. 00571A.

The Contractor is hereby notified that these hazardous materials requiring special management or disposal procedures will be encountered during various construction activities conducted within the project limits. The Contractor will be required to implement appropriate health and safety measures for all construction activities impacting these materials. These measures shall include, but are not limited to, air monitoring, engineering controls, personal protective equipment and decontamination, equipment decontamination and personnel training. **WORKER HEALTH AND SAFETY PROTOCOLS WHICH ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.**

The Department, as Generator, will provide an authorized representative to sign all manifests and waste profile documentation required by disposal facilities for disposal of hazardous materials.

The Sections which shall be reviewed by the Contractor include, but are not limited to, the following:

- Item No. 0020904A – Lead Compliance for Abrasive Blast Cleaning
- Item No. 0603222A – Disposal of Lead Debris from Abrasive Blast Cleaning
- Item No. 0020903A – Lead Compliance for Miscellaneous Exterior Tasks
- Item No. 0020765A – Guano Abatement

The Contractor is alerted to the fact that a Department environmental consultant may be on site for abatement and related activities, to collect environmental samples (if necessary), and to observe site conditions for the State.

Information pertaining to the results of the limited hazardous materials investigation discussed can be found in the document listed below. This document shall be available for review at the Office of Contracts, 2800 Berlin Turnpike, Newington, Connecticut.

- HazMat Inspection Letter, Bridge No. 00571A, Rte. 8 over Housatonic River, Shelton, CT, TRC Environmental Corporation, October 9, 2015.

STATE PROJECT NO. 126-170

COMMODORE HULL BRIDGE PAINTING AND STEEL REPAIRS

Towns of Shelton and Derby

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, as revised by the Supplemental Specifications dated July 2014 (otherwise referred to collectively as "ConnDOT Form 816") is hereby made part of this contract, as modified by the Special Provisions contained herein. The State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), May 14, 2010 edition or latest issue, is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available upon request from the Transportation Manager of Contracts. The Special Provisions relate in particular to the Commodore Hull Bridge Painting and Steel Repairs in the Towns of Shelton and Derby.

CONTRACT TIME AND LIQUIDATED DAMAGES

In order to minimize the hazard, cost and inconvenience to the traveling public, pollution of the environment and the detriment to the business area, it is necessary to limit the time of construction work, which interferes with traffic as specified in Article 1.08.04 of the Special Provisions.

There will be two assessments for liquidated damages and they will be addressed in the following manner:

1. For this contract, an assessment per day for liquidated damages, at a rate of _____ Dollars per day shall be applied to each calendar day the work runs in excess of the _____ allowed calendar days for the contract.
2. For this contract, an assessment per hour for liquidated damages shall be applied to each hour, or any portion thereof, in which the Contractor interferes with normal traffic operations during the restricted hours given in Article 1.08.04 of the Special Provisions. The liquidated damages shall be as shown in the following tables entitled "Liquidated Damages Per Hour" for each hour, or any portion thereof, in which the Contractor interferes with normal traffic operations during the restricted hours.

For the purpose of administering this contract, normal traffic operations are considered interfered with when:

1. Any portion of the travel lanes or shoulders is occupied by any personnel, equipment, materials, or supplies including signs.
2. The transition between the planes of pavement surfaces is at a rate of one inch in less than fifteen feet longitudinally.

LIQUIDATED DAMAGES PER HOUR

Railroad Operations		
If Working Periods Extends Into	A.M. Track Outage	P.M. Track Outage
1st Hour of Restrictive Period	\$ xxx	\$ xxx
2 nd Hour of Restrictive Period	\$ xxx	\$ xxx
3rd Hour or any Subsequent Hour of Restrictive Period	\$ xxx	\$ xxx

Liquidated damages as shown for track outages apply for each hour, or part thereof, that the Contractor interferes with railroad operations during the non-allowable hours.

NOTICE TO CONTRACTOR - LOCALIZED PAINT REMOVAL

Description: The Contractor shall remove, and collect existing paint from localized areas of steel structures where the Contractor will be flame-cutting, arc gouging, or welding to accomplish other work items in the contract. The paint removal is required because of the presence of hazardous paint (e.g., containing lead or other hazardous metals). The paint removal is required to comply with OSHA and DEP regulations. Additional information on hazardous paint removal and definitions of the terms used within this special provision may be obtained from the latest edition of the "SSPC-GUIDE 6 Guide for Containing Debris Generated During Paint Removal Operations" (SSPC Guide 6).

Construction Methods: All Contractor activities associated with the work described and specified herein shall be conducted in accordance with all applicable Federal, State of Connecticut and local safety regulations and guidelines. In addition, the firm removing the paint must meet the requirements set forth in Section 4 of "SSPC Qualification Procedure No. QP4 Standard Procedure for Evaluating the Qualifications of Contractors Disturbing Hazardous Paint During Demolition and Repair Work."

1 - Locations of Paint Removal: Prior to applying the heat of welding equipment to localized areas of steel superstructures, the existing paint shall be removed to a minimum of 6" from wherever the heat will be applied, or as directed by the Engineer. The locations of the paint removal shall be reviewed and accepted by the Engineer prior to commencement of the work. Such acceptance by the Engineer does not relieve the Contractor of his responsibility for complying with applicable OSHA and DEP regulations.

2 - Paint Debris: The paint debris that results from the cleaning operations shall be collected. Open air abrasive blast cleaning as a method of paint removal is not permitted.

3 - Methods of Paint Removal: Where required, the existing paint shall be removed by chemical stripping, needle guns with vacuum attachments, or by any of the closed abrasive blast cleaning techniques described in SSPC Guide 6. Open abrasive blast cleaning will not be permitted.

The Contractor is advised that chemical paint strippers may require several days and multiple applications to completely remove the existing paint, especially in temperatures below 60° F.

The Contractor is also advised that chemical paint strippers may not be effective in removing some paints.

4 - Storage of Collected Debris: All of the debris resulting from the paint removal operations shall be collected. The debris, rust, and paint chips shall be stored in leak-proof storage containers at the project site. Debris storage shall be in accordance with Connecticut Hazardous Waste Management Regulations. The storage containers and storage locations shall be reviewed by the Engineer and shall be located in areas not subject to ponding. Storage containers shall be placed on

pallets and closed and covered with tarps at all time except during placement, sampling, and disposal of the debris.

The Contractor shall report any cracks in the structural steel to the Engineer so that the cracks may be examined before being painted.

The Contractor shall notify the Engineer when section loss is observed during the cleaning of structural steel. Significant section loss shall be noted and measured by the Engineer, who shall promptly notify the Office of Bridge Safety and Evaluation.

The Contractor is liable for any fines, costs, or remediation costs incurred as a result of his failure to be in compliance with this Notice and all federal, state, and local laws.

The work required under this Notice will not be paid for directly, but the cost of localized paint removal shall be considered included for payment in the applicable items where localized paint removal is required.

Disposal of collected paint debris and chemical stripper residue shall be paid for under item "Disposal of Lead Debris."

NOTICE TO CONTRACTOR – PAINTING REQUIREMENTS

All painting contractors and painting subcontractors to be used for lead paint removal, containment and collection, surface preparation, or coating of structural steel must have been certified by the Society for Protective Coatings (SSPC) Painting Contractor Certification Program (PCCP), QP-1 and QP-2, before the day of bid opening. This certification must be full and not interim. The painting contractors and painting subcontractors must remain so certified for the duration of the project. If a contractor's or subcontractor's certification expires, the painting firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. At the option of the Engineer, if such a delay continues for more than 60 calendar days, the Department may engage another SSPC certified contractor to perform the painting work at the prime contractor's expense.

All containment enclosures are required to be above the regulatory flood elevation of the Housatonic River for the 500 year flood event of Elevation 23.0. The onshore area selected to store coating removal debris shall be located above the 500 year flood contour of the Housatonic River as shown on the plans.

NOTICE TO CONTRACTOR – PEDESTRIAN ACCESS

The Contractor shall maintain the level of accessibility as currently exists during all the construction stages except as noted on the plans. Safe pedestrian access will be provided at all times throughout the construction by maintaining safe pedestrian passage on Howe Ave., Hull Ave., Canal St. and across the river on the bridge, providing temporary sidewalks or providing pedestrian detours as needed. At a minimum, pedestrian walkways will be provided on either side of Howe Ave., during non-working periods unless approved by the Engineer.

If sidewalks need to be closed due to work operations and or unsafe conditions, the Contractor shall erect “Sidewalk Closed” signs and provide clear detour route signage. All sidewalk closures and detour routes shall be submitted a minimum 48 hours prior to the anticipated sidewalk closure for review and approval by the Engineer

NOTICE TO CONTRACTOR – PROTECTION OF EXISTING UTILITIES

Existing utilities shall be maintained during construction except as specifically stated herein and/or noted on the plans and as coordinated with the utilities. The Contractor shall verify the location of underground, structure mounted and overhead utilities. Construction work within the vicinity of utilities shall be performed in accordance with current safety regulations.

The Contractor shall notify "Call Before You Dig", telephone 1-800-922-4455 for the location of public utility, in accordance with Section 16-345 of the Regulations of the Department of Utility Control.

Representatives of the various utility companies shall be provided access to the work, by the Contractor.

Contractors are cautioned that it is their responsibility to verify locations, conditions, and field dimensions of all existing features, as actual conditions may differ from the information shown on the plans or contained elsewhere in the specifications.

The Contractor shall notify the Engineer prior to the start of work and shall be responsible for all coordination with the Department. The Contractor shall allow the Engineer complete access to the work.

The Contractor shall be liable for all damages or claims received or sustained by any persons, corporations or property in consequence of damage to the existing utilities, their appurtenances, or other facilities caused directly or indirectly by the operations of the Contractor.

Any damage to any existing private and public utility, as a result of the Contractors operations, shall be repaired to the utilities and Engineer's satisfaction at no cost to the State or the Utilities, including all materials, labor, etc., required to complete the repairs.

The Contractor's attention is directed to the requirements of Section 1.07.13 – "Contractor's Responsibilities for Adjacent Property and Services".

Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e., water, sanitary, gas, electric ducts, communication ducts, etc., will be encountered and, if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined by careful probing or hand digging, and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation, as noted above.

NOTICE TO CONTRACTOR – STRUCTURE SITE NUMBERS

Structure site numbers are as follows:

<u>Site No.</u>	<u>Description</u>
Site No. 1	Bridge No. 00571A including steel bents at pier nos. 8 and 11.
Site No. 8	Steel Pier Bent at Pier 8
Site No. 11	Steel Pier Bent at Pier 11

NOTICE TO CONTRACTOR – SUPPLEMENT TO BEST MANAGEMENT PRACTICES

The contractor is hereby required to follow Best Management Practices as directed in the Connecticut Department of Transportation Form 816, Standard Specifications for Roads, Bridges and Incidental Construction §1.10 (2004 as revised).

1. A downstream suspended debris boom in conjunction with an absorbent boom should be installed to catch floating contaminants.
2. Erosion and sedimentation controls must be in place and properly maintained as necessary.
3. A responsible party (construction inspector) should be identified for maintenance, inspection, repair, and replacement and incorporation of new controls as may become necessary.
4. Servicing and refueling of machinery should be completed outside of the watershed area. If this is not possible, an appropriately designed impervious refueling area, with secondary containment, could be creased and located at least 100 feet away from a watercourse or wetland area.
5. Fuel and other hazardous material should not be stored within the watershed. Any fuel or hazardous materials that must be kept within the watershed during working hours should be stored in impervious surface utilizing secondary containment.
6. A fuel spill remediation kit should be stored on-site so that any spills may be contained and cleaned quickly.
7. There shall be no staging and storing of materials or equipment within the 100 year floodplain or floodway.
8. The Contractor shall make every effort to secure the work site before predicted major storms. See Form 816 §1.10.03 for the definition of major storms.
9. State Department of Transportation staff or representatives shall have unrestricted access to the site to inspect all Best Management Practices.

NOTICE TO CONTRACTOR – USE OF STATE POLICE OFFICERS

The Department will reimburse services of State Police Officers as a direct payment to the Department of Emergency Services and Public Protection. Payment for State Police Officers utilized by the Contractor for its convenience, not approved by the Engineer, is the responsibility of the Contractor. No separate payment item for State Police Officers is included in this contract.

Any costs associated with coordination and scheduling of State Police Officers will be included under the cost of Item No. 0971001A – Maintenance and Protection of Traffic.

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.01-Transfer of Work or Contract:

The first sentence of the first paragraph is hereby changed to read as follows:

The Contractor shall perform, with its own organization, Contract work with a value under the Contract of at least 30% of the original total Contract value.

Article 1.08.04 - Limitation of Operations - Add the following:

In order to provide for traffic operations as outlined in the Special Provision "Maintenance and Protection of Traffic," the Contractor will not be permitted to perform any work which will interfere with the described traffic operations on all project roadways as follows:

Route 8

On the following State observed Legal Holidays:

New Year's Day
Good Friday, Easter*
Memorial Day
Independence Day
Labor Day
Thanksgiving Day**
Christmas Day

The following restrictions also apply:

On the day before and the day after any of the above Legal Holidays.

On the Friday, Saturday, and Sunday immediately preceding any of the above Holidays celebrated on a Monday.

On the Saturday, Sunday, and Monday immediately following any of the above Holidays celebrated on a Friday.

* From 6:00 a.m. the Thursday before the Holiday to 8:00 p.m. the Monday after the Holiday.

** From 6:00 a.m. the Wednesday before the Holiday to 8:00 p.m. the Monday after the Holiday.

During all other times

The Contractor shall maintain and protect traffic as shown on the accompanying "Limitation of Operations" charts, which dictate the minimum number of lanes that must remain open for each day of the week.

The Contractor will be allowed to halt Route 8 traffic for a period not to exceed 10 minutes to perform necessary work for the erection and setting of structural steel, and for the removal of the existing bridge superstructure, as approved by the Engineer, between 12:01 a.m. and 5:00 a.m. on all non-Holiday days.

**Limitation of Operations Chart
Minimum Number of Lanes to Remain Open**

Route: 8 NB Location: Exit 14 - Shelton/Derby Number of Through Lanes: 2							
Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mid	1	1	1	1	1	1	1
1 AM	1	1	1	1	1	1	1
2 AM	1	1	1	1	1	1	1
3 AM	1	1	1	1	1	1	1
4 AM	1	1	1	1	1	1	1
5 AM	1	1	1	1	1	1	1
6 AM	E	E	E	E	E	1	1
7 AM	E	E	E	E	E	1	1
8 AM	E	E	E	E	E	1	1
9 AM	2	2	2	2	2	2	1
10 AM	2	2	2	2	2	2	1
11 AM	2	2	2	2	2	2	2
Noon	2	2	2	2	2	2	2
1 PM	2	2	2	2	2	2	2
2 PM	2	2	2	2	2	2	2
3 PM	E	E	E	E	E	2	2
4 PM	E	E	E	E	E	2	2
5 PM	E	E	E	E	E	2	2
6 PM	2	2	2	2	2	2	2
7 PM	2	2	2	2	2	2	2
8 PM	2	2	2	2	2	2	2
9 PM	1	2	2	2	2	2	1
10 PM	1	1	1	1	1	1	1

11 PM	1	1	1	1	1	1	1
-------	---	---	---	---	---	---	---

On Holidays and within Holiday Periods, all Hours shall be 'E.'

'E' = maintain existing traffic operations = all available travel lanes, including exit only lanes, climbing lanes and all available shoulder widths shall be open to traffic during this period.

Route: 8 SB							
Location: Exit 14 - Shelton/Derby							
Number of Through Lanes: 2							
Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mid	1	1	1	1	1	1	1
1 AM	1	1	1	1	1	1	1
2 AM	1	1	1	1	1	1	1
3 AM	1	1	1	1	1	1	1
4 AM	1	1	1	1	1	1	1
5 AM	1	1	1	1	1	1	1
6 AM	E	E	E	E	E	1	1
7 AM	E	E	E	E	E	2	1
8 AM	E	E	E	E	E	2	1
9 AM	2	2	2	2	2	2	2
10 AM	2	2	2	2	2	2	2
11 AM	2	2	2	2	2	2	2
Noon	2	2	2	2	2	2	2
1 PM	2	2	2	2	2	2	2
2 PM	2	2	2	2	2	2	2
3 PM	E	E	E	E	E	2	2
4 PM	E	E	E	E	E	2	2
5 PM	E	E	E	E	E	2	2
6 PM	2	2	2	2	2	2	2
7 PM	2	2	2	2	2	2	2
8 PM	1	1	1	1	2	1	1
9 PM	1	1	1	1	1	1	1
10 PM	1	1	1	1	1	1	1
11 PM	1	1	1	1	1	1	1

On Holidays and within Holiday Periods, all Hours shall be ‘E.’

‘E’ = maintain existing traffic operations = all available travel lanes, including exit only lanes, climbing lanes and all available shoulder widths shall be open to traffic during this period.

LIQUIDATED DAMAGES PER HOUR

Project # 126-170

Route 8 NORTHBOUND 2 Lane Section		
If Working Periods Extends Into	1 Lane AM Closure	1 Lane PM Closure
1st Hour of Restrictive Period	\$ 500	\$ 1,000
2nd Hour of Restrictive Period	\$ 500	\$ 10,000
3rd Hour or any Subsequent Hour of Restrictive Period	\$ 1,000	\$ 45,000
Route 8 NORTHBOUND 2 Lane Section		
If Working Periods Extends Into	1 Lane AM Closure	1 Lane PM Closure
1st Hour of Restrictive Period	\$ 9,000	\$ 1,000
2nd Hour of Restrictive Period	\$ 40,000	\$ 3,000
3rd Hour or any Subsequent Hour of Restrictive Period	\$ 60,000	\$ 6,000

The above liquidated damages apply to those hours shown on the Limitation of Operations charts designated with a “2” or “E”.

For each hour shown on the Limitation of Operations charts designated with a “1”, liquidated damages shown above for "1 Lane Closure" shall apply when only one lane is open to traffic.

For each hour shown on the Limitation of Operations charts designated with an “E”, liquidated damages of \$500 shall apply for each hour, or part thereof, if all available shoulder widths are not available to traffic.

Liquidated damages in the amount of \$500 shall apply for each hour, or part thereof, that the Contractor interferes with existing traffic operations on any ramps or turning roadways during the non-allowable hours.

Ramps and Turning Roadways

The on-ramp from Howe Avenue to Route 8 shall be closed and detoured as shown in the Detour plans and contained in the contract drawings.

All Other Roadways

Monday through Friday between 6:00 a.m. and 9:00 a.m. & between 3:00 p.m. and 6:00 p.m.
Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

Additional Lane Closure Restrictions

It is anticipated that work on adjacent projects will be ongoing simultaneously with this project. The Contractor shall be aware of those projects and anticipate that coordination will be required to maintain proper traffic flow at all times on all project roadways, in a manner consistent with these specifications and acceptable to the Engineer.

The Contractor will not be allowed to perform any work that will interfere with traffic operations on a roadway when traffic operations are being restricted on that same roadway, unless there is at least a one mile clear area length where the entire roadway is open to traffic or the closures have been coordinated and are acceptable to the Engineer. The one mile clear area length shall be measured from the end of the first work area to the beginning of the signing pattern for the next work area.

SECTION 1.04 – SCOPE OF WORK

Article 1.04.05 – Extra Work:

Add the following after the fourth sentence:

Bonding costs shall not be included in the Contractor's compensation request. However, if the Contractor incurs or will incur increased bonding costs related to the extra work, the Contractor shall request separate compensation for such costs. The Contractor's request shall be itemized and include a certified statement from the bonding company stating that the value of the work will require an increase in bonding coverage and detail the additional costs (within allowable contract amount limitations). If satisfactory substantiation is provided, a new item for increased bonding costs will be incorporated into the contract by means of a construction order.

SECTION 1.05 - CONTROL OF THE WORK

Article 1.05.02 - Plans, Working Drawings and Shop Drawings: Amend as follows:

Add the following:

Each submittal shall include the name and contact information for an individual familiar with the submittal and who will be available to answer questions should they arise during the review.

Sub-article 1.05.02 (2) – Working Drawings: is supplemented by the following:

Delete the first paragraph and add the following:

When required by the contract documents or when ordered by the Engineer, the Contractor shall prepare and submit in digital format complete set(s) of working drawings for review before fabrication. When working drawing submittals include materials, parts, fabrications, etc. supplied by others, any shop drawings, catalog cuts, assembly drawings, etc. for those materials, parts, fabrications, etc., shall be included for information only with the working drawing submission, to the following:

Mr. Domenic LaRosa, P.E.
Assistant District Engineer – District 3
Connecticut Department of Transportation
140 Pond Lily Avenue
New Haven, CT 06525

Sub-article 1.05.02 (3) – Shop Drawings: is supplemented by the following:

Delete the first paragraph and add the following:

When required by the contract documents or when ordered by the Engineer, the Contractor shall prepare and submit in digital format complete set(s) of shop drawings for review and approval before fabrication. When shop drawing submittals include materials, parts, fabrications, etc. supplied by others, any shop drawings, catalog cuts, assembly drawings, etc. for those materials, parts, fabrications, etc., shall be included for information only with the shop drawing submission, to the Engineer for review and approval before fabrication.

The Contractor shall submit one (1) copy of the transmittal only for all submittals of shop drawings, catalog cuts, data sheets and other descriptive literature to the following:

Mr. Domenic LaRosa, P.E.
Assistant District Engineer – District 3

Connecticut Department of Transportation
140 Pond Lily Avenue
New Haven, CT 06525

The Contractor shall submit the transmittal and all submittals of shop drawings, catalog cuts, data sheets and other descriptive literature to the following:

Mr. Donald R. Costello, P.E.
AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, Connecticut 06067
(860) 529-8882

Traffic Signals

When required by the contract documents or when ordered by the Engineer, The Contractor shall prepare and submit in digital format complete set(s) of shop drawings, catalog cuts, data sheets and other descriptive literature for all State owned traffic signal and illumination items to the Division of Traffic for approval before fabrication, to the following:

State Owned Traffic Signals:

Ms. Lisa N. Conroy, P.E.
Connecticut Department of Transportation
Division of Traffic Engineering - Electrical
2800 Berlin Turnpike
P.O. Box 317546
Newington, Connecticut 06131-7546
(860) 594-2985

Illumination

When required by the contract documents or when ordered by the Engineer, The Contractor shall prepare and submit in digital format complete set(s) of shop drawings, catalog cuts, data sheets and other descriptive literature for all State owned highway illumination items to the Division of Traffic for approval before fabrication, to the following:

State Owned Highway Illumination:

Mr. Jon Andrews
Bureau of Engineering and Construction
Connecticut Department of Transportation
2800 Berlin Turnpike
P.O. Box 317546
Newington, Connecticut 06131-7546

Delete the third and fourth paragraphs and add the following:

After review of such drawings, the Engineer will digitally stamp each drawing as "Approved," "Approved as Noted," or "Revise and Resubmit." Each drawing stamped as "Approved" or "Approved as Noted" will be returned in digital format to the Contractor for its use. No resubmission of a drawing stamped "Approved as Noted" is required, but the Engineer's notes must be appropriately taken into account and implemented by the Contractor.

The Contractor shall transmit three (3) copies of the "Approved" or "Approved as Noted" shop drawings, catalog cuts, data sheets and other descriptive literature to the following:

Mr. Domenic LaRosa, P.E.
Assistant District Engineer – District 3
Connecticut Department of Transportation
140 Pond Lily Avenue
New Haven, CT 06525

In the case of a drawing that is reviewed and stamped "Revise and Resubmit," the drawing will be returned in digital format to the Contractor, which shall take into account and implement all comments; the Contractor shall then resubmit in digital format the revised drawings for review and approval.

If the Contractor proposes a revision of a previously-submitted shop drawing that has been stamped "Approved" or "Approved as Noted," the Contractor shall submit in digital format the revised drawing incorporating any original Engineers notes for the Engineer's review. Any such resubmitted shop drawing shall clearly indicate, in a revision block, the date and precise nature of the revision, as well as its location on the revised drawing.

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Delete Article 1.07.07 in its entirety and replace it with the following:

1.07.07—Safety and Public Convenience: The Contractor shall conduct the Project work at all times in such a manner as to ensure the least possible obstruction to traffic. In a manner acceptable to the Engineer, the Contractor shall provide for the convenience and interests of the general public; the traveling public; parties residing along or adjacent to the highway or Project Site; and parties owning, occupying or using property adjacent to the Project Site, such as commuters, workers, tenants, lessors and operating agencies.

Notwithstanding any other Contract provision, the Contractor shall not close to normal pedestrian or vehicular traffic any section of road, access drive, parking lot, sidewalk, station platform, railroad track, bus stop, runway, taxiway, occupied space within a Site, or occupied space within a building, except with the written permission of the Engineer.

All equipment, materials, equipment or material storage areas, and work areas must be placed, located, and used in ways that do not create a hazard to people or property, especially in areas open to public pedestrian or vehicular traffic. All equipment and materials shall be placed or stored in such a way and in such locations as will not create a hazard to the traveling public or reduce sight lines. In an area unprotected by barriers or other means, equipment and materials must not be stored within 30 feet of any traveled way.

The Contractor must always erect barriers and warning signs between any of its work or storage areas and any area open to public, pedestrian, or vehicular traffic. Such barriers and signs must comply with all laws and regulations, including any applicable codes.

The Contractor must arrange for temporary lighting, snow and ice removal, security against vandalism and theft, and protection against excessive precipitation runoff within its Project work and storage areas, and within other areas specifically designated in the Contract.

In addition to meeting the requirements of Section 9.71, the Contractor shall take all precautions necessary and reasonable for the protection of all persons, including, but not limited to, employees of the Contractor or the Department, and for the protection of property, until the Engineer notifies the Contractor in writing that the Project or the pertinent portion of the Project has been completed to the Engineer's satisfaction.

The Contractor shall comply with the safety provisions of applicable laws, including building and construction codes and the latest edition of the CFR. The Contractor must make available for reference in its field office, throughout the duration of the Project, a copy of the latest edition and all supplements of the CFR pertaining to OSHA.

The Contractor shall make available to the Contractor's employees, subcontractors, the Engineer, and the public, all information pursuant to OSHA 29 CFR Part 1926.59 and The Hazard Communication Standard 29 CFR 1910.1200, and shall also maintain a file on each job site containing all MSDS for products in use at the Project. These MSDS shall be made available to the Engineer upon request.

The Contractor shall observe all rules and regulations of the Federal, State, and local health officials. Attention is directed to Federal, State, and local laws, rules, and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to the worker's health or safety.

Safety Plan: Before starting work on the Project, the Contractor shall submit to the Engineer a written Safety and Health Plan (hereinafter referred to as the "Plan"). The Plan shall meet or exceed the minimum requirements of this Subsection and any applicable State or Federal regulations.

The Plan shall apply to any work under the Contract whether such work is performed, by way of example and not limitation, by the Contractor's forces, subcontractors, suppliers, or fabricators.

The Plan shall be prepared by the Contractor and submitted to the Engineer for review before the actual start of work on the Project. Within ten (10) calendar days of receipt, the Engineer will determine whether or not the Plan meets the requirements of this Specification. If the Plan does not meet the requirements of this Specification, it will be returned for revision. Work on the Project may not proceed until the Engineer has accepted the Plan. Nothing herein shall be construed, however, to relieve the Contractor from responsibility for the prosecution of the Project.

The Plan shall conform to the following general format:

1. General Introduction.

- a. Description.** The general introduction of the Plan shall include a statement by the Contractor describing its commitment to maintain a safe work environment for its employees, Department representatives, and the public. Implementation procedures and company policies relative to safety shall be summarized or referenced in the Plan.
 - i. The Plan shall include the names, addresses, and telephone numbers of the Contractor's Project Manager, Project superintendent and/or its designee for safety oversight, all competent persons, and the traffic control coordinator. Any changes to the safety management and oversight for the Project shall be promptly communicated to all concerned.
 - ii. The Plan shall provide guidelines for protecting all personnel from hazards associated with Project operations and activities.

- iii. The Plan shall establish the policies and procedures that are necessary for the Project to be in compliance with the requirements of OSHA and other State and Federal regulatory agencies with jurisdiction, rules, regulations, standards, or guidelines in effect at the time the work is in progress.
- b. Responsibility, Identification of Personnel, and Certifications.** The Contractor is solely responsible for creating, implementing, and monitoring the Plan.
 - i. The Contractor shall identify and designate on-site supervisory level personnel who shall be responsible for implementing and monitoring the Plan at all times throughout the duration of the Project and shall have authority to take prompt corrective measures to eliminate hazards including the ability to stop work activities.
 - ii. Documentation of training provided to the on-site supervisory level personnel shall be included as part of the Plan.
 - iii. For any work activities wherein the Contractor has identified a competent person as defined by OSHA, that person shall be capable of identifying existing and predictable hazards and have the authority to take prompt corrective measures to eliminate the hazards, including the ability to stop work activities.
 - iv. Documentation of the qualifications of such competent persons identified, including any certifications received, shall be included as part of the Plan.
 - v. The Contractor shall further identify the qualified safety professional responsible for developing the Plan and shall provide that person's qualifications for developing the Plan which shall include, but not be limited to, education, training, certifications, and experience in developing this type of Plan.
 - vi. The Plan shall contain a certification executed by the qualified safety professional that developed the Plan, stating that the Plan complies with OSHA and other applicable State and Federal regulatory agencies with jurisdiction, rules, regulations, standards, or guidelines in effect at the time the work is in progress.

2. Elements of the Plan. The Plan shall address, but not be limited to, the following elements:

- a. Management Safety Policy and Implementation Statement.**
 - i. The Plan shall describe in detail the means by which the Contractor shall implement and monitor the Plan. Implementation and monitoring shall also mean that the Plan shall be a document with provision for change to update the Plan with new information on a yearly basis at a minimum and shall include new practices or procedures, changing site and environmental conditions, or other situations that could adversely affect site personnel. The Plan shall provide guidelines for protecting all personnel from hazards associated with Project operations and activities.
- b. Emergency Telephone Numbers.**
- c. Personnel Responsibilities.**
 - i. Management responsibilities
 - ii. Responsibilities of Supervisor(s)
 - iii. Site safety officer(s) responsibilities

- iv. Employee responsibilities
- v. Competent person(s) as defined by OSHA responsibilities
- d. Training.**
 - i. Regulatory
 - ii. Documentation
 - iii. Site hazard assessment -Daily employee awareness of site operations
- e. Safety Rules.**
 - i. General safety rules
 - ii. Personal protective equipment
 - iii. Housekeeping
- f. Safety Checklists.**
 - i. Project safety-planning checklist
 - ii. Emergency plans and procedures checklist
 - iii. Documentation checklist
 - iv. Protective materials and equipment checklist
- g. Traffic Control Coordinator Inspections.**
 - i. Responsible person
 - ii. Frequency
 - iii. Documentation of actions taken
- h. Record Keeping.**
 - i. OSHA 200 log
- i. Reporting.**
 - i. Accident(s)
 - ii. On site
 - iii. Legal notice requirement
 - iv. Public liability
 - v. Property damage
 - vi. Department of Labor
 - vii. Hazard Communications
- j. Additional Procedures for Project Specific Situations as Applicable.**
 - i. Compressed gas cylinders
 - ii. Confined spaces
 - iii. Cranes
 - iv. Crystalline silica (stone, masonry, concrete, and brick dust)
 - v. Electrical
 - vi. Equipment operators
 - vii. Fall protection
 - viii. Hand and power tools
 - ix. Hearing conservation
 - x. Highway safety
 - xi. Lead health and safety plan
 - xii. Lock out/tag out
 - xiii. Materials handling, storage, use, and disposal
 - xiv. Areas of environmental concern

- xv. Night work
- xvi. Personal protective equipment
- xvii. Project entry and exit
- xviii. Respiratory protection
- xix. Sanitation
- xx. Signs, signals, and barricades
- xxi. Subcontractors
- xxii. Trenching

3. Appendix for Environmental Health and Safety Plan (HASP). If environmental hazards are identified in the Contract, an Environmental HASP shall be included in an appendix to the Plan, or in a separate document. References to any Environmental HASP shall be included within the Plan, where appropriate.

The Plan shall be kept on the site and shall apply and be available to all workers and all other authorized persons entering the work site. Copies of all updates to the Plan shall be promptly supplied to the Engineer.

If at any time during the Project the Engineer determines that the Contractor is not complying with the requirements of this provision or the updated Plan, the Contractor shall correct such deficiencies immediately. Failure to remediate such deficiencies may result in suspension of the Contractor's operations until the deficiencies have been corrected. Suspensions ordered due to safety deficiencies will not be considered compensable or excusable delays.

The Contractor is responsible for implementation of the Plan. Pursuant to Article 1.07.10, the Contractor shall indemnify, and save harmless the State from any and all liability related to the Plan in proportion to the extent that the Contractor is held liable for same by an arbiter of competent jurisdiction.

The Contractor shall allow onto the Project site any inspector of OSHA or other legally responsible agency involved in safety and health administration upon presentation of proper credentials, without delay and without the presentation of an inspection warrant.

ITEM #1131002A - REMOTE CONTROLLED CHANGEABLE MESSAGE SIGN

Description: Work under this item shall include furnishing and maintaining a trailer-mounted, “Remote Controlled Changeable Message Sign” at the locations indicated on the plans or as directed by the Engineer.

Materials: The full matrix, internally illuminated variable message sign shall consist of a LED, fiber optic, lamp matrix, or hybrid magnetically operated matrix – LED message board; and a computer operated interface, all mounted on a towable, heavy duty trailer.

The sign shall have a minimum horizontal dimension of 115 inches and rotate a complete 360 degrees atop the lift mechanism.

In the raised position, the bottom of the sign shall be at least 7 feet above the roadway. The messages displayed shall be visible from a distance of 1/2 mile and be clearly legible from a distance of 900 feet during both the day and night.

The lighting system shall be controlled both manually and by a photocell for automatic sign dimming during nighttime use.

The sign shall be capable of storing a minimum of 100 preprogrammed messages and be able to display any one of those messages upon call from the trailer mounted terminal and/or through the cellular telephone hookup for the remote controlled sign.

The sign shall be a full matrix sign that is able to display messages composed of any combination of alphanumeric text, punctuation symbols, and graphic images (notwithstanding NTCIP limitations). The display shall be capable of producing arrow functions. Full- matrix displays shall allow the use of graphics, traffic safety symbols and various character heights.

Standard messages shall be displayed in a three-line message format with 8 characters per line. The letter height shall not be less than 18 inches.

The sign shall utilize yellow green for the display with a black background. Each matrix shall have a minimum size of 6 x 9 pixels. Each pixel shall utilize a minimum of four high output yellow green LEDs or equivalent light source. The LEDs or light source shall have a minimum 1.4 candela luminance intensity, 22 degrees viewing angle, and wavelength of 590 (+/- 3) nanometers.

For hybrid magnetically operated matrix – LED matrix, each pixel shall have one single shutter faced with yellow green retro-reflective sheeting with a minimum of four high output yellow green LEDs or equivalent light source. The hybrid magnetically operated matrix – LED matrix sign shall be capable of operating in three display modes; shutter only, LED only, and both LED and shutter. These modes shall be automatically controlled by a photocell for day and night conditions and also capable of being manually controlled through the software.

The sign shall be controlled by an on-board computer. The sign shall automatically change to a preselected default message upon failure. That default message shall remain on display until the problem is corrected.

The sign shall include all necessary controls, including, but not limited to, personal computer, keyboard or alphanumeric hand-held keyboard, and software. The sign shall interface with PCs, cellular phones, and radar speed detection devices as required.

Controls shall be furnished for raising and lowering the message board, aligning the message board and, for solar powered units, a read-out of the battery bank charge.

Power shall be provided by a self-contained solar maintained power source or a diesel engine driven generator. Hardware for connection to a 110-volt power source shall also be provided.

Solar powered signs shall display programmed messages with the solar panel disconnected, in full night conditions, for a minimum of 30 consecutive days.

Remote Controlled Changeable Message Signs shall include one (1) industrial-grade cellular telephone and be equipped with a modem to control the sign and a security system to prevent unauthorized access. The security system shall allow access only through use of a code or password unique to that sign. If the proper code or password is not entered within 60 seconds of initial telephone contact, the call will be terminated. Remote control for the Remote Controlled Changeable Message Sign shall be by cellular telephone and touch tone modem decoder.

Construction Methods: The Contractor shall furnish, place, operate, maintain and relocate the sign as required. When the sign is no longer required, it shall be removed and become the property of the Contractor. The cellular telephone required for the Remote Controlled Changeable Message Sign shall be provided to the Engineer for his use, and subsequently returned to the Contractor.

When the sign is not in use, it shall either be turned off with a blank display or turned from view.

Any signs that are missing, damaged, defaced or improperly functioning so that they are not effective, as determined by the Engineer and in accordance with the ATSSA guidelines contained in "Quality Standards for Work Zone Traffic Control Devices," shall be replaced by the Contractor at no cost to the State.

Method of Measurement: This work will be measured for payment for each "Remote Controlled Changeable Message Sign", whichever applies, furnished and installed, for the number of calendar days that the sign is in place and in operation, measured to the nearest day. When a sign is in operation for less than a day, such a period of time shall be considered to be a full day regardless of actual time in operation.

Basis of Payment: This work will be paid for at the Contract unit price per day for each “Remote Controlled Changeable Message Sign”, which price shall include placing, maintaining, relocating and removing the sign and its appurtenances and all material, labor, tools and equipment incidental thereto. Additionally, for the “Remote Controlled Changeable Message Sign”, the cellular telephone service and telephone charges shall be included.

<u>Pay Item</u>	<u>Pay Unit</u>
Remote Controlled Changeable Message Sign	Day

ITEM 0020765A GUANO ABATEMENT

Description:

Work under this item shall include the abatement of accumulations of pigeon, bat, bird or other rodent/animal guano and associated work by persons who are knowledgeable, qualified, and trained in the abatement of guano and the subsequent cleaning of the affected environment.

These Specifications govern all work activities that disturb guano. All activities shall be performed in accordance with, but not limited to, the current revision of the OSHA General Duty Clause 29 CFR 1910 Section 5(a)(1), OSHA Respiratory Protection Standard 29 CFR 1910.134, OSHA Construction Standards 29 CFR 1926 and applicable Industry Standards and Guidelines on Guano/Microbial Remediation, such as; ACGIH *Bioaerosols: Assessment and Control*, OSHA SHIB 03-10-10 *A Brief Guide to Mold in the Work Place*, and NIOSH Publication 97-146 *Histoplasmosis: Protecting Workers at Risk*.

The guano abatement work shall include the removal and disposal of all guano accumulations as identified on the Contract Plans and Specifications or as directed by the Engineer.

Deviations from these Specifications require the written approval of the Engineer.

Materials:

All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description.

No damaged or deteriorating materials shall be used. If material becomes contaminated with guano, the material shall be decontaminated or disposed of as guano waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.

Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating four (4) or six (6) mil thickness.

Six (6) mil polyethylene disposable bags.

Tape (or equivalent) capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.

Cleaning detergents, both non-toxic and biodegradable.

Spray equipment must be capable of mixing necessary chemical agents with water, generating sufficient pressure and volume; and equipped with adequate hose length to access all necessary work areas.

Sanders, grinders, wire brushes and needle-gun type removal equipment shall be equipped with a High Efficiency Particulate Air (HEPA) filtered vacuum dust collection system.

Containers for storage, transportation and disposal of guano waste material shall be impermeable and both air and watertight.

Any planking, bracing, shoring, barricades and/or temporary sheet piling, necessary to appropriately perform work activities shall conform to all applicable federal, state and local regulations.

Air filtration devices and vacuum units shall be equipped with HEPA filters.

Construction Methods:

(1) Pre-Abatement Submittals and Notices

- (a) Fifteen (15) working days prior to the commencement of guano abatement work, the Contractor shall submit to the Engineer for review and acceptance and/or acknowledgment of the following:
1. Documentation dated within the previous twelve (12) months, certifying that all employees have received hazard communication training and understand the use and limits of respiratory equipment to be used; on an initial and annual basis.
 2. Documentation dated within the previous twelve (12) months, from a physician certifying that all employees who may be exposed to airborne guano and mold spores in excess of background level have been provided with an opportunity to be medically monitored to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health affects. Employees shall also be informed of the specific types of respirators they shall be required to wear and the work he/she will be required to perform as well as special workplace conditions such as high temperature, high humidity and chemical contaminants to which he/she may be exposed.
 3. Documentation dated within the previous twelve (12) months, of respiratory fit testing for all employees who must don a tight-fitting face piece respirator in order to perform guano abatement activities. This fit testing shall be in accordance with qualitative procedures as detailed in 29 CFR 1910.134.
 4. Project time schedule for each phase of work.
 5. Name and qualifications of the OSHA Competent Person for the guano abatement activities, shall have a minimum of three years working experience as an environmental abatement site supervisor, shall be capable of identifying existing

guano hazards and shall have the authority to implement corrective measures to eliminate such hazards. The OSHA Competent Person shall be on-site at all times guano abatement is occurring, shall comply with applicable Federal, State and Local regulations which mandate work practices, and shall be capable of performing the work of this contract.

- (b) No abatement shall commence until a copy of all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal to, and receipt of, all required paperwork by the Engineer.

(2) Guano Abatement Provisions:

(a) General Requirements

The Abatement Contractor/Subcontractor shall have an OSHA Competent Person on site and in control on the job site at all times during abatement work.

All labor, materials, tools, equipment, services, testing, insurance (with specific coverage for work on guano/spores), and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications shall be provided by the Contractor. The Contractor shall be prepared to work all shifts and weekends throughout the course of this project as directed by the Engineer.

Prior to beginning work, the Contractor shall perform a visual survey of each work area and review conditions at the site for safety reasons. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.

The Contractor shall:

- Shutdown and isolate heating, cooling, and ventilating air systems to prevent contamination and spore dispersal to the other areas of the building.

- Shut down and lock out/tag out electrical power, including all receptacles and light fixtures, when feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.

- Coordinate all power and fire alarm isolation with the appropriate representatives.

- When necessary, provide temporary power and adequate lighting and ensure safe installation of electrical equipment, including ground fault protection and power cables, in compliance with applicable electrical codes and OSHA requirements. The Contractor is responsible for proper connection and installation of electrical wiring.

If sufficient electrical service is unavailable, the Contractor may need to supply electrical power to the site by fuel operated generator(s). Electrical power supply shall be sufficient for all equipment required for this project in operation throughout the duration of the project.

In each interior work area, negative pressure must be continuously maintained until the area achieves satisfactory reoccupancy criteria and is approved by the Project Monitor to be deregulated. If interior work phases cannot be subdivided into manageable work areas that can be completed within one shift, negative air pressure must be maintained twenty-four (24) hours per day and the Contractor shall establish temporary electrical service to the site, rather than utilize generators.

Water service may not be available at the site. Contractor shall supply sufficient water for each shift to operate the decontamination shower units as well as to maintain the work areas adequately wet.

Ladders and/or scaffolds shall be in compliance with OSHA requirements, and of adequate length, strength and sufficient quantity to support the scope of work. Use of ladders/scaffolds shall be in conformance with OSHA 29 CFR 1926 Subpart L and X requirements.

Work performed at heights exceeding six feet (6') shall be performed in accordance with the OSHA Fall Protection Standard 29 CFR 1926 Subpart M including the use of fall arrest systems as applicable.

Any data provided to the Contractor regarding guano accumulations identified throughout the structure(s) is for informational purposes only. Under no circumstances shall this information be the sole means used by the Contractor for determining the presence and location of all guano accumulations. Prior to commencement of work, the **Contractor shall verify all field conditions and quantities affecting performance/completion of the work** as described in these Specifications in accordance with OSHA, USEPA, USDOT, DEP standards. Compliance with the applicable requirements is solely the responsibility of the Contractor.

The Engineer will provide a Project Monitor to oversee the activities of the Contractor. No abatement work shall be performed until the Project Monitor is on-site. Environmental sampling may be conducted as deemed necessary by the Project Monitor.

Warning signs shall be posted at each entrance to the work area which clearly indicates the area has been regulated as a MICROBIAL REMEDIATION WORK AREA – AUTHORIZED PERSONNEL ONLY.

(b) Worker Decontamination Enclosure System

The Contractor shall establish contiguous to the Regulated Work Area, a Worker Decontamination Enclosure System consisting of Equipment Room and Clean Room in series, as detailed below. Access to the Regulated Area shall only be through this enclosure.

Access between rooms in the Worker Decontamination Enclosure System shall be through airlocks. Other effective designs are permissible. The Clean Room and Equipment Room located within the Worker Decontamination Enclosure, shall be contiguously connected with taped airtight edges, thus ensuring the sole source of airflow originates from outside the regulated areas, once a negative pressure differential within Interior Regulated Areas is established.

The Clean Room shall be adequately sized to accommodate workers and shall be equipped with a suitable number of hooks, lockers, shelves, etc., for workers to store personal articles and clothing. Changing areas of the Clean Room shall be suitably screened from areas occupied by the public.

The Equipment Room shall be of sufficient capacity to accommodate the number of workers. The Equipment Room shall be utilized by personnel to remove protective clothing, decontaminate through the use of HEPA vacuums and a wash facility, and clean off sealed waste containers ready for removal from the work area. No worker or other person shall leave a Regulated Area without decontaminating.

(c) Containment of Interior Work Areas

Pre-clean the work areas using HEPA filtered equipment (vacuum) and/or wet methods as appropriate, collecting and properly containing all dust and debris as guano contaminated waste. Vacuum units, of suitable size and capabilities for the project, shall have HEPA filters capable of trapping and retaining at least 99.97 percent of all monodispersed particles of three micrometers in diameter or larger. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.

After pre-cleaning, movable objects not designated for relocation by others shall be removed from the work areas with the utmost care to prevent damage of any kind and relocated to a temporary storage location coordinated with the Engineer. The Contractor is responsible for protecting all fixed objects that are permanent fixtures or are too large to remove and remain inside the Regulated Area. Fixed objects shall be enclosed with one layer of six (6) mil polyethylene sheeting sealed with tape.

Engineering controls must be implemented to ensure that debris is not dispersed outside of the work area during cleaning/removal process. Such controls involve source containment, limited critical barriers, full poly containment enclosures and/or negative pressure enclosures, based on the size and magnitude of contamination, as directed by the Engineer, and in accordance with Industry Standards and Guidelines.

Critical barriers consisting of a minimum of one (1) layer of six (6) mil polyethylene sheeting, secured at the edges with duct tape, shall be installed to seal off all windows, doorways, skylights, ducts, grilles, diffusers, vents, light fixtures, suspended ceiling tile systems and any other openings between the Regulated Work Areas and the surrounding uncontaminated areas, including the outside of the building. Complete isolation of the work area from adjacent areas

using a minimum of one (1) layer of six (6) mil polyethylene sheeting to create an enclosure and seal with duct tape. HVAC systems within the work area cannot be operating.

HEPA filtered negative air filtration units will be used with the intake in the general work area and exhaust outdoors during removal/cleaning of large or extensive contamination areas, and/or as directed by the Engineer, so as to provide local exhaust ventilation and create a negative pressure enclosure work area. Negative pressure must be maintained continuously in each work area until the area achieves satisfactory verification criteria and is approved by the Engineer for deregulation. A sufficient number of negative air filtration units shall be utilized in each work area to create a negative pressure differential in the range of 0.02 to 0.04 inches of water column between the Regulated Area and surrounding areas, and allow a sufficient flow of air through the area to provide four (4) air changes per hour. Negative air filtration units shall be equipped with four stages of filtration, with the final stage being High Efficiency Particulate Air (HEPA) filtration, and incorporate an automatic warning system to indicate pressure drop or unit failure. Negative pressure shall be measured in each work area by a recording manometer, during the entire project.

Following construction of the containment work area, the containment shall pass a pre-abatement visual inspection by the Competent Person and the Project Monitor prior to commencement of abatement work.

(d) Alternate work area containment requirements for exterior abatement procedures

In lieu of the establishment of a negative pressure enclosure (NPE) system as described above, guano accumulations will be removed from exterior work areas within an outdoor Regulated Area(s). The regulated work areas will be established by the use of appropriately labeled barrier tape and postings, as well as source containment, poly drop cloths and local HEPA exhaust ventilation. A remote personnel decontamination unit will also be required.

(e) Personnel Protection

The Contractor shall utilize all appropriate engineering controls and safety and protective equipment while performing the work in accordance with applicable standards and guidelines.

Abatement workers should have received hazard communication awareness training on safe work practices associated with guano/microbial abatement, and health effects of guano/microbial spore exposure, be medically approved to perform such work and have received fit testing for respirator use.

Abatement workers conducting the cleaning/removal and all personnel entering the work areas will be required to wear personal protective equipment including the following minimum. The Contractors Competent Person shall ultimately make the exposure/hazard assessment judgement on whether upgraded PPE is required.

1. Negative Pressure Respirators equipped with N-95 filter cartridges
2. Disposable coveralls with a hood

3. Eye protection
4. Appropriate gloves

Respiratory protection shall be provided and shall meet the requirements of OSHA as required in 29 CFR 1910.134. A formal respiratory protection program must be implemented in accordance with 29 CFR 1910.134. The Contractor shall provide respirators from among those approved as being acceptable for protection by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

All other necessary personnel protective equipment (i.e. hardhat, work boots, safety glasses, hearing protection, etc.) required to perform the abatement work activities, as deemed necessary by the Competent Person, shall conform to all applicable federal, state and local regulations.

All other qualified and authorized persons entering into a Regulated Area (i.e. Project Monitor, Regulatory Agency Representative) shall adhere to the requirements of personnel protection as stated in this section.

Contractor shall ensure that all workers and authorized persons who enter and leave the work area use a personnel decontamination system.

Contractor shall ensure HEPA filtered local exhaust ventilation is provided in all areas where extensive guano accumulations are to be cleaned/removed to reduce the potential for airborne exposure to spores.

Non-abatement workers shall be kept out of the immediate areas where abatement is ongoing.

(f) Removal and Cleaning Methods

The general cleaning/removal procedures specified herein are to be used as a guideline throughout the project. Deviations from specified methods of removal/cleaning must be approved in writing by the Engineer prior to their implementation.

The following details the extent of each phase of operation designated for this project. Phase areas may be combined or divided at the direction of the Engineer. Proceed through the sequencing of the work phases under the direction of the Engineer.

Bridge No. 00571A, Route 8 over Housatonic River, Shelton

Bridge Abutments/Piers/Trusses/Beams and Below Bridge

Using trained and appropriately protected staff, remove and dispose of all accumulations of guano, feathers, carcasses, etc. as directed by the Engineer. Clean the areas where removal occurs using biodegradable/non-toxic detergent solutions and HEPA vacuuming. Regulated area(s) shall be established at the perimeter of the work area(s), and access shall be controlled by the Contractor. Utilize dust suppression methods such as misting (not

soaking) materials prior to abatement. Poly drop cloths should be used as appropriate to protect objects in direct proximity to the work areas from contamination, and prevent the release of contamination/debris to outside areas. After cleaning the area(s) should be left dry and visibly free from contamination and debris. Utilize damp wiping and HEPA filtered vacuuming techniques for final area cleanup. A remote personnel decontamination unit shall also be utilized. Waste generated from the cleaning process should be removed from the work space in sealed plastic bags to prevent dispersal of spores to non-affected building/work spaces and disposed of as general bulky C&D waste debris. Removal shall be undertaken in accordance with Industry Guidelines. Care should be exercised during guano removal/cleaning to not disturb or release any underlying lead paint which may be present. *Contractor shall be responsible for the erection and safe maintenance of any and all necessary apparatus/equipment to gain access to the work areas and perform the required abatement.*

Contractor shall wet mist all materials/accumulations/surfaces scheduled for removal/cleaning prior to commencing work to minimize airborne dust/spore generation and use damp methods throughout the removal/cleanup process.

Contaminated materials, accumulations and debris that are to be removed must be removed with as little disturbance as possible.

The Contractor shall promptly place the removed material in disposal containers (six (6) mil polyethylene bags, fiber drums, etc.) as it is removed. Large components removed intact may be wrapped in two (2) layers of six (6) mil polyethylene sheeting secured with tape. As the disposal containers are filled, the Contractor shall promptly seal the containers and clean the containers before removal from the work area. Bags shall be securely sealed to prevent accidental opening and leakage by taping in gooseneck fashion. Materials with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) which could tear polyethylene bags and sheeting shall be placed in clean drums and sealed with locking ring tops. All waste containers shall be leak-tight, (typically consisting of two layers of 6 mil poly (or bags)). Containers shall be decontaminated by wet cleaning and HEPA vacuuming within the decontamination area prior to exiting the regulated area. On site storage of waste containers shall be as dictated and allowed by the Engineer within the extent of construction operations. On site storage of waste containers in public areas, outside of construction containment areas shall not be allowed.

Following material/accumulation removal, Contractor shall thoroughly clean the work area. Cleaning of surfaces and content items, shall utilize wet/damp wiping coupled with a non-toxic, biodegradable detergent wash. Following cleaning, the areas shall be dried and HEPA vacuumed to remove all associated dirt and debris.

The use of biocides, including chlorine bleach, is not recommended during guano/microbial abatement. Biocides are toxic to humans and may cause damage to underlying building substrates. Any use of biocides, fungicides, disinfectants or encapsulants can be done only with the written approval of the Engineer.

After cleaning, the Competent Person and Project Monitor shall perform a post remediation visual inspection of each work area to ensure remediation is complete, that no dust or debris remains on surfaces in the work areas as the result of removal/cleaning operations and the areas have been dried. All surfaces within the Regulated Work Areas, including but not limited to ledges, beams, and hidden locations shall be inspected for visible residue. Evidence of guano/microbial accumulations/contamination and/or debris identified during this inspection will necessitate further cleaning as heretofore specified. The area shall be re-cleaned at the Contractor's expense, until the standard of cleaning is achieved.

If at any time, the Project Monitor should suspect contamination of areas outside the Regulated Area, the Contractor shall immediately stop all abatement work and take steps to decontaminate these areas and eliminate causes of such contamination.

(g) Quality Assurance/Verification

At a minimum, the affected areas shall be free of visible guano accumulations and debris, free of moldy odors and be left dry.

Surface and airborne types and levels of microbial spores may be tested by the Project Monitor upon completion of the cleaning and sanitizing to assure that the affected areas have been returned to a level equivalent to non-affected/ambient areas. Where samples are collected, acceptable results shall be considered levels less than background (interior non-affected and/or ambient) areas for all microbial genera with similar microbial types and rank order and which do not indicate amplification. Any samples collected shall be analyzed at a laboratory accredited by the AIHA EMPAT program. When sampling is performed, it shall be conducted no less than 1 hour after abatement cleanup work has been completed.

The Engineers on-site Project Monitor will verify compliance with these specifications, conduct post-abatement work area inspections and/or collect post abatement samples, photographs, and/or videos of the cleaned surfaces/work areas as deemed necessary.

If any areas fail inspection/testing, the failed area shall be re-cleaned by the Contractor and retested at no cost to the Engineer.

(h) Post Abatement Work Area Deregulation

The Contractor shall remove all remaining polyethylene, including critical barriers, and Decontamination Enclosure Systems leaving negative air filtration devices in operation as long as feasible. HEPA vacuum and/or wet wipe any visible residue which is uncovered during this process. All waste generated during this disassembly process shall be discarded as abatement waste.

A final visual inspection of the work area shall be conducted by the Competent Person and the Project Monitor to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the abatement project remain.

The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the Engineer.

(i) Waste Disposal

Waste generated from the removal of guano, while an environmental health hazard, is not classified as a biological waste or hazardous waste. All waste materials generated during abatement shall be disposed of as bulky C&D waste in accordance with CTDEP Solid Waste Management requirements. Contractor shall supply to the Engineer completed shipping papers for each load of waste transported for disposal, indicating the solid waste landfill name and location and quantity of waste disposed of.

(3) Project Closeout Data:

The Contractor's site supervisor shall keep a logbook to document daily site activity. The log book shall document the preparation tasks, schedule, engineering controls utilized, abatement work conducted, daily lists of employees on site, exposure/hazard assessment judgements, negative pressure manometric measurement readings, PPE utilized, waste shipping papers, etc.

The Contractor will submit the original log book and any other related documentation to the Engineer within 30 days of completion of work.

Final payment to the Contractor shall not be approved without submission of the reporting materials.

Method of Measurement:

The quantity of guano abatement shall be the actual number of cubic feet removed for disposal, completed and accepted, within the lines of the work area as shown on the plans or as ordered by the Engineer.

Basis of Payment:

The work will be paid for at the contract unit price per cubic foot for "Guano Abatement", completed, which price shall include the specialty services of the Guano Removal Contractor including: labor, materials, equipment, insurance, submittals, personal protective equipment, temporary enclosures, apparatus/equipment necessary for work area access, utility costs, incidentals, fees and labor incidental to the removal, transport and disposal of guano, including close out documentation.

Final payment for guano abatement will not be made until all the project closeout data submittals have been completed and provided to the Engineer. Once the completed package has been received in its entirety, the Engineer will make the final payment to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
Guano Abatement	Cubic Foot

ITEM 0020903A – LEAD COMPLIANCE FOR MISCELLANEOUS EXTERIOR TASKS

Description:

Work under this item shall include the special handling measures and work practices required for miscellaneous exterior tasks that impact materials containing or covered by lead paint. Lead paint includes paint found to contain **any** detectable amount of lead by Atomic Absorption Spectrophotometry (AAS) or X-Ray Fluorescence (XRF). Examples of typical miscellaneous exterior tasks includes; work impacting signs, guiderails, minor bridge rehabilitation, catenary structures, canopy structures, spot/localized paint removal, etc.

All activities shall be performed in accordance with the OSHA Lead in Construction Regulations (29 CFR 1926.62), the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260 through 274), and the CTDEEP Hazardous Waste Regulations (RCSA 22a-209-1 and 22a-449(c)).

All activities shall be performed by individuals with appropriate levels of OSHA lead awareness and hazard communication training and shall supervised by the Contractors Competent Person on the job site at all times. The Contractors Competent Person 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 has authorization to take prompt corrective measures to eliminate them.

Deviations from these Specifications require the written approval of the Engineer.

Materials:

All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description, with MSDS sheets as applicable.

No damaged or deteriorating materials shall be used. If material becomes contaminated with lead, the material shall be decontaminated or disposed of as lead-containing waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.

The following material requirements are to be met if to be used during the work:

Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating minimum six (6) mil thickness.

Polyethylene disposable bags shall be minimum six (6) mils thick.

Tape (or equivalent) product capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.

Cleaning Agents and detergent shall be lead specific, such as TriSodium Phosphate (TSP).

Chemical strippers and chemical neutralizers shall be compatible with the substrate as well as with each other. Such chemical stripper shall contain less than 50% Volatile Organic Compounds (VOCs) by weight in accordance with RCSA 22a-174-40 Table 40-1.

Labels and warning signs shall conform to 29 CFR 1926.62, 40 CFR 260 through 274 and 49 CFR 172 as appropriate.

Air filtration devices and vacuum units shall be equipped with High-Efficiency Particulate Air (HEPA) filters.

Construction Methods:

(1) Pre-Abatement Submittals and Notices

A. Prior to the start of **any** work on a contiguous per site basis that will generate hazardous lead waste above conditionally exempt small quantities (greater than 100 kg/month or greater than 1000 kg at any time), the Contractor shall obtain from the Engineer on a contiguous per site basis a temporary EPA Hazardous Waste Generators ID number, unless otherwise directed by the Engineer.

B. Fifteen (15) working days prior to beginning work that impacts lead paint, the Contractor shall submit the following to the Engineer:

1. Work plan for work impacting lead paint including engineering controls, methods of containment of debris and work practices to be employed, as needed, to minimize employee exposure and prevent the spread of lead contamination outside the Regulated Area.
2. Copies of all employee certificates, dated within the previous twelve (12) months, relating to OSHA lead awareness and hazard communication training and training in the use of lead-safe work practices. SSPC training programs may be accepted as meeting these requirements if it can be demonstrated that such training addressed all required topics.

This information shall be updated and resubmitted annually, or as information changes, for the duration of the activities impacting lead to verify continued compliance.

3. Name and qualifications of Contractor's OSHA Competent Person under 29 CFR 1926.62.

4. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following:
 - a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.62;
 - b. biological monitoring within the previous six (6) months, as required in 29 CFR 1926.62;
 - c. respirator fit testing within the previous twelve (12) months, as required in 29 CFR 1910.134 (for those who don a tight-fitting face piece respirator)

This information shall be updated and resubmitted annually, or as information changes, for the duration of the activities impacting lead to verify continued compliance.

5. Names of the proposed non-hazardous construction and demolition (C&D) lead debris bulky waste disposal facility (CTDEEP-permitted Solid Waste landfill).
6. Names of the proposed scrap metal recycling facilities. The Contractor shall submit to the Engineer all documentation necessary to demonstrate the selected facility is able to accept lead-painted scrap metal.
7. Names of the proposed hazardous waste disposal facility (selected from the Department approved list provided herein), and copies of each facilities acceptance criteria and sampling frequency requirements.
8. Copies of the proposed hazardous waste transporters current USDOT Certificate of Registration for Hazardous Materials Transport, and the proposed transporters current Hazardous Waste Transporter Permits for the State of Connecticut and the waste destination State.
9. Negative exposure assessments conducted within the previous 12 months documenting that employee exposure to lead for each task is below the OSHA Action Level of $30 \mu\text{g}/\text{m}^3$. If a negative exposure assessment has not been conducted, the Contractor shall submit its air monitoring program for the work tasks as part of the Work Plan. Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized persons entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62.

No activity shall commence until all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal of acceptable documentation to, and review by, the Engineer.

Contractor shall provide the Engineer with a minimum of 48 hours notice in advance of scheduling, changing or canceling work activities.

(2) Lead Abatement Provisions

A. General Requirements:

All employees of the Contractor who perform work impacting lead paint shall be properly trained to perform such duties. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.

Contractor shall provide all labor, materials, tools, equipment, services, testing, and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications.

Prior to beginning work, the Engineer and Contractor shall perform a visual survey of each work area and review conditions.

As necessary, the Contractor shall:

Shut down and lock out electrical power, including all receptacles and light fixtures, where feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.

If adequate electrical supply is not available at the site, the Contractor shall supply temporary power. Such temporary power shall be sufficient to provide adequate lighting and power the Contractor's equipment. The Contractor is responsible for proper connection and installation of electrical wiring and shall ensure safe installation of electrical equipment in compliance with applicable electrical codes and OSHA requirements.

If water is not available at the site for the Contractor's use, the Contractor shall supply sufficient water for each shift to operate the wash facility/decontamination shower units in addition to the water needed at the work area.

The Engineer may provide a Project Monitor to monitor compliance of the Contractor and protect the interests of the Department. In such cases, no activity impacting lead paint shall be performed until the Project Monitor is on-site. Where no Project Monitor will be provided, Contractor shall proceed at the direction of the Engineer. Environmental sampling, including ambient air sampling, TCLP waste stream sampling, and dust wipe sampling, will be conducted by the State as it deems necessary throughout the project. Air monitoring to comply with the Contractor's obligations under OSHA remains solely responsibility of the Contractor.

If at any time, procedures for engineering, work practice, administrative controls or other topics are anticipated to deviate from those documented in the submitted and accepted Lead Work Plan,

the Contractor shall submit a modification of its existing plan for review and acceptance by the Engineer prior to implementing the change.

If air samples collected outside of the Regulated Area during activities impacting lead paint indicate airborne lead concentrations greater than original background levels or $30 \mu\text{g}/\text{m}^3$, whichever is larger, or if at any time visible emissions of lead paint extend out from the Regulated Area, an examination of the Regulated Area shall be conducted and the cause of such emissions corrected. Cleanup of surfaces outside the Regulated Area using HEPA vacuum equipment or wet cleaning techniques shall be done prior to resuming work.

Work outside the initial designated area(s) will not be paid for by the Engineer. The Contractor will be responsible for all costs incurred from these activities including repair of any damage.

B. Regulated Area

The Contractor shall establish a Regulated Area through the use of appropriate barrier tape or other means to control unauthorized access into the area where activities impacting lead paint are occurring. Warning signs meeting the requirements of 29 CFR 1926.62 shall be posted at all approaches to Regulated Areas. These signs shall read:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

The Contractor shall implement appropriate engineering controls such as poly drop cloths, local exhaust ventilation, wet dust suppression methods, etc. as necessary, and as approved by the Engineer, to prevent the spread of lead contamination beyond the Regulated Area in accordance with the Contractor's approved work plan. Should the previously submitted work plan prove to be insufficient to contain the contamination, the Contractor shall modify its plan and submit it for review by the Engineer.

C. Wash Facilities:

The Contractor shall provide handwash facilities in compliance with 29 CFR 1926.51(f) and 29 CFR 1926.62 regardless of airborne lead exposure.

If employee exposure to airborne lead exceeds the OSHA Permissible Exposure Limit of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), shower rooms must be provided. The Shower Room shall be of sufficient capacity to accommodate the number of workers. One shower stall shall be provided for each eight (8) workers. Showers shall be equipped with hot and cold or warm running water. Shower water shall be collected and filtered using best available technology and disposed of in accordance with all Federal, State and local laws, regulations and ordinances.

D. Personal Protection:

The Contractor shall initially determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of $30 \mu\text{g}/\text{m}^3$. Assessments shall be based on initial air monitoring results as well as other relevant information. The Contractor may rely on historical air monitoring data obtained within the past 12 months under workplace conditions closely resembling the process, type of material, control methods, work practices and environmental conditions used and prevailing in the Contractors current operations to satisfy the exposure assessment requirements. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.

Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized person entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings. Sufficient quantities shall be provided to last throughout the duration of the project.

Protective clothing provided by the Contractor and used during chemical removal operations shall be impervious to caustic materials. Gloves provided by the Contractor and used during chemical removal shall be of neoprene composition with glove extenders.

Respiratory protective equipment shall be provided and selection shall conform to 42 CFR Part 84, 29 CFR Part 1910.134, and 29 CFR Part 1926.62. A formal respiratory protection program must be implemented in accordance with 29 CFR Part 1926.62 and Part 1910.134.

E. Air Monitoring Requirements

The Contractor shall:

1. Provide air monitoring equipment including sample filter cassettes of the type and quantity required to properly monitor operations and personnel exposure surveillance throughout the duration of the project.
2. Conduct initial exposure monitoring to determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 micrograms per cubic meter. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.
3. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.62. Documentation of air sampling results must be recorded at the work site within twenty-four (24) hours and shall be available for review until the job is complete.

F. Lead Abatement Procedures

The Contractor's Competent Person shall be at the job site at all times during work impacting lead.

Work impacting lead paint shall not begin until authorized by the Engineer, following a pre-work visual inspection by the Project Monitor or Engineer to verify existing conditions.

Any activity impacting lead painted surfaces shall be performed in a manner which minimizes the spread of lead dust contamination and generation of airborne lead.

The Contractor shall conduct exposure assessments for all tasks which impact lead paint in accordance with 29 CFR 1926.62(d) and shall implement appropriate personal protective equipment until negative exposure assessments are developed.

All work impacting the materials identified below shall be conducted within an established Regulated Area with a remote wash facility/decontamination system in accordance with "C. Wash Facilities" and the OSHA Lead in Construction Standard. In accordance with 29 CFR 1926.62, engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the Regulated Area and limit the generation of airborne lead. All wastes containing lead paint shall be properly contained and secured for storage, transportation and disposal.

The Contractor shall ensure proper entry and exit procedures for workers and authorized persons who enter and leave the Regulated Area. All workers and authorized persons shall leave the Regulated Area and proceed directly to the wash or shower facilities where they will HEPA vacuum gross debris from work suit, remove and dispose of work suit, wash and dry face and hands, and vacuum clothes. Lead chips and dust must not be removed by blowing or shaking of clothing. Wash water shall be collected, filtered, and disposed of in accordance with Federal, State and local water discharge standards. Any permit required for such discharge shall be the responsibility of the Contractor.

No one shall eat, drink, smoke, chew gum or tobacco, or apply cosmetics while in the Regulated Area.

Data from the limited lead testing performed by the Engineer is documented in the reports listed in the "Notice to Contractor – Hazardous Materials Investigations" or is presented herein. Under no circumstances shall this information be the sole means used by the Contractor for determining the extent of lead painted materials. The Contractor shall be responsible for verification of all field conditions affecting performance of the work as described in these Specifications in accordance with OSHA, USEPA, USDOT and CTDEEP standards. Compliance with the applicable requirements is solely the responsibility of the Contractor.

The following details the extent of each phase of operation designated for this project. Phase areas may be combined or divided at the direction of the Engineer. Proceed through the sequencing of the work phases under the direction of the Engineer.

Bridge No. 00571A, Route 8 over Housatonic River, Shelton

- Ø **Lead paint was identified on the painted structural steel/metal bridge components of Bridge No. 00571A. XRF readings showed the paint to be lead based.**
- Ø **No lead paint was identified on the concrete abutments of Bridge No. 00571A. Lead paint chip analysis showed the paint to contain no detectable amounts of lead.**

Girders, Cross Beams, Beam Ends, Bearings, Rockers, Diaphragms, Connection plates, Railings, Trusses, Catwalk etc	Metal	Green	12.6-22.2 mg/cm²
Piers	Concrete	Tan/Beige	ND<0.10% by weight

- Ø **TCLP waste stream sampling/analysis of the paint associated with the structural steel/metal bridge component surfaces of the bridge characterized the paint waste as RCRA hazardous waste.**

Paint debris	460 mg/l
---------------------	-----------------

- Ø **No detectable amounts of lead were found on the painted surfaces of the concrete abutments, therefore any paint waste generated from the removal of paint from the pier would be considered non-RCRA, non-hazardous waste.**

While conducting work to replace the bridge, where it is necessary to impact the painted metal surfaces, the Contractor shall either:

- a. **Remove the paint to be impacted prior to impacting the metal in accordance with OSHA Lead in Construction Standard 29CFR 1926.62, or**
- b. **Impact the metal using mechanical means with the paint in place in accordance with OSHA Lead in Construction Standard 29CFR 1926.62.**

The Contractor shall submit a Work Plan to ConnDOT outlining the exact procedures that will be used to perform the work, contain the spread of lead debris and protect the employees performing the required renovation work impacting the lead paint. No work shall be started by the Contractor until the Work Plan is approved by the Engineer.

All work impacting the lead paint materials shall be conducted within an established Regulated Area with a remote wash facility/decontamination system in accordance with “C. Wash Facilities” and the OSHA Lead in Construction Standard. In accordance with 29 CFR 1926.62, engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the Regulated Area and limit the generation of airborne lead. All wastes containing lead paint shall be properly contained and secured for storage, transportation and disposal.

The Engineer has characterized the paint waste stream associated with the structural steel and metal bridge surfaces at Bridge No. 00571A as RCRA hazardous waste. If the paint is removed from the steel/metal surfaces, the paint shall be handled and disposed of in accordance with USEPA/CTDEEP Hazardous Waste Regulations as described under this Item 0020903A.

All steel and metal components generated from the miscellaneous exterior work tasks (painted or not) shall be segregated and recycled as scrap metal. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

Should lead contamination be discovered outside of the Regulated Area, the Contractor shall immediately stop all work in the Regulated Area, eliminate causes of such contamination and take steps to decontaminate non-work areas.

Special Requirements:

1. Demolition/Renovation:
 - a. Demolish/renovate in a manner which minimizes the spread of lead contamination and generation of lead dust.
 - b. Implement dust suppression controls, such as misters, local exhaust ventilation, etc. to minimize the generation of airborne lead dust.
 - c. Segregate work areas from non-work areas through the use of barrier tape, drop cloths, etc.
 - d. Clean up immediately after renovation/demolition has been completed
2. Chemical Removal:
 - a. Apply chemical stripper in quantities and for durations specified by manufacturer.
 - b. Where necessary, scrape lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment,

etc.). Use sanding, hand scraping, and dental picks to supplement chemical methods as necessary.

- c. Apply neutralizer compatible with substrate and chemical agent to substrate following removal in accordance with manufacturer's instructions.
 - d. Protect adjacent surfaces from damage from chemical removal.
 - e. Maintain a portable eyewash station in the work area.
 - f. Wear respirators that will protect workers from chemical vapors.
 - g. Do not apply caustic agents to aluminum surfaces.
3. Mechanical Paint Removal:
- a. Provide sanders, grinders, rotary wire brushes, or needle gun removers equipped with a HEPA filtered vacuum dust collection system. Cowling on the dust collection system for orbital-type tools must be capable of maintaining a continuous tight seal with the surface being abated. Cowling on the dust collection system for reciprocating-type tools shall promote an effective vacuum flow of loosened dust and debris. Inflexible cowlings may be used on flat surfaces only. Flexible contoured cowlings are required for curved or irregular surfaces.
 - b. Provide HEPA vacuums that are high performance designed to provide maximum static lift and maximum vacuum system flow at the actual operating vacuum condition with the shroud in use. The HEPA vacuum shall be equipped with a pivoting vacuum head.
 - c. Remove lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc.). Use chemical methods, hand scraping, and dental picks to supplement abrasive removal methods as necessary.
 - d. Protect adjacent surfaces from damage from abrasive removal techniques.
 - e. "Sandblasting" type removal techniques shall not be allowed.
4. Component Removal/Replacement:
- a. Wet down components which are to be removed to reduce the amount of dust generated during the removal process.

- b. Remove components utilizing hand tools, and follow appropriate safety procedures during removal. Remove the components by approved methods which will provide the least disturbance to the substrate material. Do not damage adjacent surfaces.
- c. Clean up immediately after component removals have been completed. Remove any dust located behind the component removed.

G. Prohibited Removal Methods:

The use of heat guns in excess of 700 degrees Fahrenheit to remove lead paint is prohibited.

The use of sand, steel grit, air, CO₂, baking soda, or any other blasting media to remove lead or lead paint without the use of a HEPA ventilated contained negative pressure enclosure is prohibited.

Power/pressure washing shall not be used to remove lead paint.

Compressed air shall not be utilized to remove lead paint.

Chemical strippers containing Methylene Chloride are prohibited. Any chemical stripping may be prohibited on a project by project basis.

Power tool assisted grinding, sanding, cutting, or wire brushing of lead paint without the use of cowled HEPA vacuum dust collection systems is prohibited.

Lead paint burning, busting of rivets painted with lead paint, welding of materials painted with lead paint, and torch cutting of materials painted with lead paint is prohibited. Where cutting, welding, busting, or torch cutting of materials is required, lead paint in the affected area must be removed first.

Chemical stripping of coatings from bridge components is generally prohibited unless specifically allowed on a project by project basis.

H. Clean-up and Visual Inspection:

The Contractor shall remove and containerize all lead waste material and visible accumulations of debris, paint chips and associated items.

During clean-up the Contractor shall utilize rags and sponges wetted with lead-specific detergent and water as well as HEPA filtered vacuum equipment.

The Engineer will conduct a visual inspection of the work areas in order to document that all surfaces have been maintained as free as practicable of accumulations of lead in accordance with 29 CFR 1926.62(h). If visible accumulations of waste, debris, lead paint chips or dust are found

in the work area, the Contractor shall repeat the cleaning, at the Contractor's expense, until the area is in compliance. The visual inspection will detect incomplete work, damage caused by the abatement activity, and inadequate clean up of the work site.

I. Post-Work Regulated Area Deregulation:

Following an acceptable visual inspection, any engineering controls implemented may be removed.

A final visual inspection of the work area shall be conducted by the Competent Person and the Project Monitor or Engineer to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the lead paint removal remain. If this final visual inspection is acceptable, the Contractor will reopen the Regulated Area and remove all signage.

The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the State.

J. Waste Disposal/Recycling:

Non-metallic building debris waste materials tested and found to be non-hazardous Construction and Demolition (C&D) bulky waste shall be disposed of properly at a CTDEEP approved Solid Waste landfill as described under this Item 0020903A.

Metallic debris shall be segregated and recycled as scrap metal at an approved metal recycling facility.

Concrete, brick, etc. coated with any amount of lead paint cannot be crushed, recycled or buried on-site to minimize waste disposal unless tested and found to meet the RSR GA/Residential standards.

Hazardous lead debris shall be disposed of as described under this Item 0020903A.

The Contractor shall comply with the latest requirements of the USEPA RCRA Hazardous Waste Regulations 40 CFR 260-274 and the DEEP Hazardous/Solid Waste Management Standards 22a-449(c).

Hazardous lead debris shall be transported from the Project by a licensed hazardous waste transporter approved by the Department and disposed of at an EPA-permitted and Department-approved hazardous waste landfill within 90 days from the date of generation.

The Contractor must use one or more of the following Department-approved disposal facilities for the disposal of hazardous waste:

Clean Earth of North Jersey, Inc., (CENJ) 115 Jacobus Avenue, South Kearny, NJ 07105 Phone: (973) 344-4004; Fax: (973) 344-8652	Clean Harbors Environmental Services, Inc. 2247 South Highway 71, Kimball, NE 69145 Phone: (308) 235-8212; Fax: (308) 235-4307
Clean Harbors of Braintree, Inc. 1 Hill Avenue, Braintree, MA 02184 Phone: (781) 380-7134; Fax: (781) 380-7193	Cycle Chem (General Chemical Corp.) 217 South First Street, Elizabeth, NJ 07206 Phone: (908) 355-5800; Fax (908) 355-0562
EnviroSafe Corporation Northeast (former Jones Environmental Services (NE), Inc.) 263 Howard Street, Lowell, MA 01852 Phone: (978) 453-7772; Fax: (978) 453-7775	Environmental Quality Detroit, Inc. 1923 Frederick Street, Detroit, MI 48211 Phone: (800) 495-6059; Fax: (313) 923-3375
Republic Environmental Systems 2869 Sandstone Drive, Hatfield, PA 19440 Phone: (215) 822-8995; Fax: (215) 997-1293	Northland Environmental, Inc. (PSC Environmental Systems) 275 Allens Avenue, Providence, RI 02905 Phone: (401) 781-6340; Fax: (401) 781-9710
Environmental Quality Company: Wayne Disposal Facility 49350 North I-94 Service Drive Belleville, MI 48111 Phone: (800) 592-5489; Fax: (800) 592-5329	

The apparent low bidder shall submit in writing, within fourteen days after Bid opening, (1) a letter listing the names of the hazardous waste disposal facilities (from the above list) that the bidder, if it is awarded the Contract, will use to receive hazardous material from this Project, and (2) a copy of each facility's acceptance criteria and sampling frequency requirements.

Any other Contractor which the Department may subsequently designate as the apparent low bidder shall make the aforementioned submissions within fourteen (14) days from the date on which the Department notifies the Contractor that it has become the apparent low bidder. If, however, the Department deems it is necessary for such a subsequent-designated Contractor to make said submissions within a shorter period of time, the Contractor shall make those submissions within the time designated by the Department.

Failure to comply with all of the above requirements may result in the rejection of the bid.

No facility may be substituted for the one(s) designated in the Contractor's submittal without the Engineer's prior approval. If the material cannot be accepted by any of the Contractor's designated facilities, the Department will supply the Contractor with the name(s) of other acceptable facilities.

Prior to the generation of any hazardous waste, the Contractor shall notify the Engineer of its selected hazardous waste transporter and disposal facility. The Contractor must submit to the Engineer (1) the transporter's current US DOT Certificate of Registration and (2) the transporter's current Hazardous Waste Transporter Permits for the State of Connecticut, the hazardous waste destination state and any other applicable states. The Engineer will then obtain

on a contiguous per site basis a temporary EPA Generators ID number for the site that he will forward to the Contractor. Any changes in transporter or facility shall be immediately forwarded to the Engineer for review.

Handling, storage, transportation and disposal of hazardous waste materials generated as a result of execution of this project shall comply with all Federal, State and Local regulations including the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260-271), the CTDEEP Hazardous Waste Regulations (22a-209 and 22a-449(c)), and the USDOT Hazardous Materials Regulations (49 CFR Part 171-180).

All debris shall be contained and collected daily or more frequently as directed by the Engineer, due to debris buildup. Debris shall be removed by HEPA vacuum collection. Such debris and paint chips shall be stored in leak-proof storage containers in the secured storage site, or as directed by the Engineer. The storage containers and storage locations shall be reviewed by the Engineer and shall be located in areas not subject to ponding. Storage containers shall be placed on pallets and closed and covered with tarps at all times except during placement, sampling and disposal of the debris.

Hazardous waste materials are to be properly packed and labeled for transport by the Contractor in accordance with EPA, CTDEEP and USDOT regulations. The disposal of debris characterized as hazardous waste shall be completed within 90 calendar days of the date on which it began to be accumulated in the lined containers. Storage of containers shall be in accordance with current DEEP/EPA procedures.

The Contractor shall label hazardous waste storage containers with a 6-inch square, yellow, weatherproof, Hazardous Waste sticker in accordance with USDOT regulations.

Materials other than direct paint related debris which are incidental to the paint removal work activities (tarps, poly, plywood, PPE, gloves, decontamination materials, etc.) which may be contaminated with lead, shall be stored separately from the direct paint debris, and shall be sampled by the Engineer for waste disposal characterization testing. Such materials characterized as hazardous shall be handled/disposed of as described herein, while materials characterized as non-hazardous shall be disposed of as non-hazardous CTDEEP Solid Waste.

Direct paint related debris materials not previously sampled and characterized for disposal, which may be originally presumed to be hazardous waste, shall also be stored separately and sampled by the Engineer for ultimate waste disposal characterization testing and handled/disposed of based on that testing.

Project construction waste materials unrelated to the paint removal operations shall NOT be combined/stored with paint debris waste and/or incidental paint removal materials as they are not lead contaminated and shall NOT be disposed of as hazardous waste. The Engineer's on-site Inspectors shall conduct inspections to verify materials remain segregated.

The Contractor shall obtain and complete all paperwork necessary to arrange for material disposal, including disposal facility waste profile sheets. It is solely the Contractor's responsibility to co-ordinate the disposal of hazardous materials with its selected treatment/recycling/disposal facility(s). Upon receipt of the final approval from the facility, the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the materials in accordance with all Federal and State regulations. **No claim will be considered based on the failure of the Contractor's disposal facility(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient facilities to meet its production rate.**

The Contractor shall process the hazardous waste such that the material conforms with the requirements of the selected treatment/disposal facility, including but not limited to specified size and dimension. Refusal on the part of the treatment/disposal facility to accept said material solely on the basis of non-conformance of the material to the facility's physical requirements is the responsibility of the Contractor and no claim for extra work shall be accepted for reprocessing of said materials to meet these requirements.

All DOT shipping documents, including the Uniform Hazardous Waste Manifests utilized to accompany the transportation of the hazardous waste material shall be prepared by the Contractor and reviewed/signed by an authorized agent representing ConnDOT, as Generator, for each load of hazardous material that is packed to leave the site. The Contractor shall not sign manifests on behalf of the State as Generator. The Contractor shall forward the appropriate original copies of all manifests to the Engineer the same day the material leaves the Project site.

Materials not related to lead paint removal and/or characterized as non-hazardous waste shall NOT be shipped for hazardous waste disposal in accordance with USEPA RCRA hazardous waste minimization requirements.

A load-specific certificate of disposal, signed by the authorized agent representing the waste disposal facility, shall be obtained by the Contractor and promptly delivered to the Engineer for each load.

In addition to all pertinent Federal, State and local laws or regulatory agency polices, the Contractor shall adhere to the following precautions during the transport of hazardous materials off-site:

- All vehicles departing the site are to be properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume, and contents of materials carried. Vehicles shall display the proper USDOT placards for the type and quantity of waste;
- No materials shall leave the site unless a disposal facility willing to accept all of the material being transported has agreed to accept the type and quantity of waste;
- Documentation must be maintained indicating that all applicable laws have been

satisfied and that the materials have been successfully transported and received at the disposal facility; and,

- The Contractor shall segregate the waste streams (i.e. concrete, wood, etc.) as directed by the receiving disposal facility.

Any spillage of debris during disposal operations during loading, transport and unloading shall be cleaned up in accordance with EPA 40 CFR 265 Subparts C & D, at the Contractor’s expense.

The Contractor is liable for any fines, costs or remediation costs incurred as a result of their failure to be in compliance with this Item and all Federal, State and Local laws.

K. Project Closeout Data:

Provide the Engineer, within thirty (30) days of completion of the project site work, a compliance package; which shall include, but not be limited to, the following:

1. Competent persons (supervisor) job log;
2. OSHA-compliant personnel air sampling data;
3. Completed waste shipment papers for non-hazardous lead construction and demolition (C&D) waste disposal or recycling and scrap metal recycling.
4. Copies of completed Hazardous Waste Manifests (signed by authorized disposal facility representative).

Method of Measurement:

The completed work shall be paid as a lump sum. This item will include all noted services, equipment, facilities, testing and other associated work for up to three (3) ConnDOT project representatives. Services provided to any ConnDOT project representatives in excess of three (3) representatives will be measured for payment in accordance with Article 1.09.04 – “Extra and Cost-Plus Work.”

Basis of Payment:

The lump sum price bid for this item shall include: services, materials, equipment, all permits, notifications, submittals, personal air sampling, personal protection equipment, temporary enclosures, incidentals, fees and labor incidental to activities impacting lead removal, treatment and handling of lead contaminated materials, and the transport and disposal of any hazardous and/or non-hazardous lead construction and demolition (C&D) bulky waste.

Final payment will not be made until all project closeout data submittals have been completed and provided to the Engineer. Once the completed package has been received in its entirety and accepted by the Engineer, final payment will be made to the Contractor.

Pay Item

Pay Unit

Rev. Date 10/09/15

Lead Compliance for
Miscellaneous Exterior Tasks

Lump Sum

END OF SECTION

ITEM 0020904A – LEAD COMPLIANCE FOR ABRASIVE BLAST CLEANING

Description:

Work under this item shall include the special handling measures and work practices required for abrasive blast cleaning activities, principally involved in bridge coating removal/painting operations, which impact materials containing or covered by lead paint. Lead paint includes paint found to contain **any** detectable amount of lead by Atomic Absorption Spectrophotometry (AAS) or X-Ray Fluorescence (XRF).

All activities shall be performed in accordance with the OSHA Lead in Construction Regulations (29 CFR 1926.62), the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260 through 274), the CTDEEP Hazardous Waste Regulations (RCSA 22a-209-1 and 22a-449(c)), and SSPC Guide 6 – Guide for Containing Debris Generated During Paint Removal Operations.

All activities shall be performed by individuals with appropriate levels of OSHA lead awareness and hazard communication training, supervised at all times by the Contractor's Competent Person, and periodically inspected by personnel working for an industrial hygiene firm (IH firm), retained by the Contractor, under the direct supervision of a Certified Industrial Hygienist (CIH). Periodic inspections shall be conducted at least weekly while work impacting lead is occurring, but shall be as frequent as necessary to maintain Contractor compliance with the OSHA Lead Construction Standards. The Contractor's Competent Person shall be on-site at all times that the work impacting lead is being performed and shall be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and has authorization to take prompt corrective measures to eliminate them.

Deviations from these Specifications require the written approval of the Engineer.

Materials:

All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description, with MSDS sheets as applicable.

No damaged or deteriorating materials shall be used. If material becomes contaminated with lead, the material shall be decontaminated or disposed of as lead-containing waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.

The following material requirements are to be met if to be used during the work:

Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating minimum six (6) mil thickness.

Polyethylene disposable bags shall be minimum six (6) mils thick.

Tape (or equivalent product) capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.

Cleaning Agents and detergent shall be lead specific, such as TriSodium Phosphate (TSP).

Labels and warning signs shall conform to 29 CFR 1926.62, 40 CFR 260 through 274 and 49 CFR 172 as appropriate.

Air filtration devices and vacuum units shall be equipped with High-Efficiency Particulate Air (HEPA) filters.

Construction Methods:

(1) Pre-Abatement Submittals and Notices

A. Prior to the start of **any** work that will generate hazardous lead waste above conditionally exempt small quantities (greater than 100 kg/month or greater than 1000 kg stored at any time), the Contractor shall obtain from the Engineer a temporary EPA Hazardous Waste Generators ID number, in accordance with Item 0603222A Disposal of Lead Debris from Abrasive Blast Cleaning, unless otherwise directed by the Engineer.

B. Fifteen (15) working days prior to beginning work that impacts lead paint, the Contractor shall submit four copies of each of the following to the Engineer:

1. A written site-specific Lead Compliance Plan, prepared and stamped by a Certified Industrial Hygienist (CIH), that covers all workers on the project (Contractor, Subcontractor and ConnDOT representatives). The Lead Compliance Plan shall be prepared in accordance with 29 CFR 1926.62(e), and shall include: descriptions of each activity impacting lead; procedures for engineering, work practice, and administrative controls to be employed; daily on-site job-site inspections by the Competent Person; periodic on-site inspections by IH firm personnel (describe frequency and inspection criteria); hazard communication/training; medical surveillance; biological monitoring; exposure assessment air monitoring; personal protective equipment (PPE); respiratory protection; housekeeping; decontamination; procedures for waste containment, storage, handling and disposal; contents of the job completion close-out report; and all other procedures that may be necessary to comply with 29 CFR 1926.62 and 40 CFR 260 – 274.
2. Copies of all employee certificates, dated within the previous twelve (12) months, relating to OSHA lead awareness and hazard communication training and training in the use of lead-safe work practices. SSPC training programs, such as SSPC C-5

Deleading of Industrial Structures may be accepted as meeting these requirements if it can be demonstrated that such training addressed all required OSHA topics.

This information shall be updated and resubmitted annually, or as information changes, for the duration of lead removal work in order to verify continued compliance.

3. Name and qualifications of Contractor's OSHA Competent Person, as defined under 29 CFR 1926.62, who will be on-site at all times that the work impacting lead paint is being performed.
4. Name and qualifications of IH firm personnel that will be performing the periodic on-site inspections. Such personnel shall work under the direct supervision of the CIH that stamped the Lead Compliance Plan and have training within the previous twelve (12) months for OSHA lead awareness and the use of lead-safe work practices or equivalent. Such personnel shall also have a minimum of two years work experience related to the OSHA Lead in Construction Standard and be capable of recognizing the hazards associated therewith.
5. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following, and are medically fit to perform the work impacting lead:
 - a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.62;
 - b. biological monitoring within the previous six (6) months, as required in 29 CFR 1926.62;
 - c. respirator fit testing within the previous twelve (12) months, as required in 29 CFR 1910.134 (for those who don a tight-fitting face piece respirator)

This information shall be updated and resubmitted every 6 months, or as information changes, for the duration of lead removal work in order to verify continued compliance.

6. Names of the proposed non-hazardous construction and demolition (C&D) lead debris bulky waste disposal facility (CTDEEP-permitted Solid Waste landfill).
7. Names of the proposed scrap metal recycling facilities. The Contractor shall submit to the Engineer all documentation necessary to demonstrate the selected facility is able to accept lead-painted metal.
8. Negative exposure assessments conducted within the previous 12 months documenting that employee exposure to lead for each task is below the OSHA Action Level of 30 $\mu\text{g}/\text{m}^3$. If a negative exposure assessment has not been conducted, the Contractor shall submit its air monitoring program for the work tasks as part of the

Lead Compliance Plan. Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized person entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62.

No activity shall commence until all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal of acceptable documentation to, and review by, the Engineer.

Contractor shall provide the Engineer with a minimum of 48 hours notice in advance of scheduling, changing or canceling work activities.

(2) Lead Abatement Provisions

A. General Requirements:

All employees of the Contractor who perform work impacting lead paint shall be properly trained to perform such duties. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.

Contractor shall provide all labor, materials, tools, equipment, services, testing, and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications.

Prior to beginning work, the Engineer and Contractor shall perform a visual survey of each work area and review conditions.

As necessary, the Contractor shall:

Shut down and lock out electrical power, including all receptacles and light fixtures, where feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.

Coordinate all power and fire alarm isolation with the appropriate representatives.

If adequate electrical supply is not available at the site, the Contractor shall supply temporary power. Such temporary power shall be sufficient to provide adequate lighting and power the Contractor's equipment. The Contractor is responsible for proper connection and installation of electrical wiring and shall ensure safe installation of electrical equipment in compliance with applicable electrical codes and OSHA requirements.

If water is not available at the site for the Contractor's use, the Contractor shall supply sufficient water for each shift to operate the wash facility/decontamination shower units in addition to the water needed at the work area.

The Engineer may provide a Project Monitor to monitor compliance of the Contractor and protect the interests of the Department. In such cases, no activity impacting lead paint shall be performed until the Project Monitor is on-site. Environmental sampling, including ambient air sampling, TCLP waste stream sampling, and dust wipe sampling, will be conducted by the State as it deems necessary throughout the project. Any Project Monitor provided by the Engineer is supplementary to the requirement for the Contractor to have periodic inspections performed at a frequency to ensure/document Contractor compliance with the regulations and the requirements of the Contractor's Lead Compliance Plan. Air monitoring to comply with the Contractor's obligations under OSHA remains solely responsibility of the Contractor.

If at any time, procedures for engineering, work practice, administrative controls or other topics are anticipated to deviate from those documented in the submitted and accepted Lead Compliance Plan, the Contractor shall submit a modification of its existing plan for review and acceptance by the Engineer prior to implementing the change.

If air samples collected outside of the Regulated Area during activities impacting lead paint indicate airborne lead concentrations greater than original background levels or 30 ug/m^3 , whichever is larger, or if at any time visible emissions of lead paint extend out from the Regulated Area, an examination of the Regulated Area shall be conducted and the cause of such emissions corrected. Cleanup of surfaces outside the Regulated Area using HEPA vacuum equipment or wet cleaning techniques shall be done prior to resuming work.

Work outside the initial designated area(s) will not be paid for by the Engineer. The Contractor will be responsible for all costs incurred from these activities including repair of any damage.

B. Regulated Area

The Contractor shall establish a Regulated Area through the use of appropriate barrier tape or other means to control unauthorized access into the area where activities impacting lead paint are occurring. Warning signs meeting the requirements of 29 CFR 1926.62 shall be posted at all approaches to Regulated Areas. These signs shall read:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

The Contractor shall also implement appropriate engineering controls including a full negative pressure enclosure, in accordance with Item 0603XX1A – Class I Containment & Collection of Surface Prep Debris, and wet dust suppression methods, etc. as necessary, and as approved by the Engineer, to prevent the spread of lead contamination beyond the Regulated Area in

accordance with the Contractor's approved Lead Compliance Plan. Should the previously submitted plan prove to be insufficient to contain the contamination, the Contractor shall modify its plan and submit it for review by the Engineer.

Any air exhausted from the containment enclosure, abrasive-recycling equipment or vacuum equipment shall be passed through a HEPA filtering system. The Contractor is responsible for the design, effectiveness and maintenance of this filtering system. No discharge of debris dust shall be allowed.

C. Wash Facilities:

The Contractor shall provide handwash facilities in compliance with 29 CFR 1926.51(f) and 29 CFR 1926.62 regardless of airborne lead exposure.

If employee exposure to airborne lead exceeds the OSHA Permissible Exposure Limit of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), shower rooms must be provided. The Shower Room shall be of sufficient capacity to accommodate the number of workers. One shower stall shall be provided for each eight (8) workers. Showers shall be equipped with hot and cold or warm running water. Shower water shall be collected and filtered using best available technology and disposed of in accordance with all Federal, State and local laws, regulations and ordinances.

D. Personal Protection:

The Contractor shall initially determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of $30 \mu\text{g}/\text{m}^3$. Assessments shall be based on initial air monitoring results as well as other relevant information. The Contractor may rely on historical air monitoring data obtained within the past 12 months under workplace conditions closely resembling the process, type of material, control methods, work practices and environmental conditions used and prevailing in the Contractor's current operations to satisfy the exposure assessment requirements. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.

Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized person entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings. Sufficient quantities shall be provided to last throughout the duration of the project.

Protective clothing provided by the Contractor and used during chemical removal operations shall be impervious to caustic materials. Gloves provided by the Contractor and used during chemical removal shall be of neoprene composition with glove extenders.

Respiratory protective equipment shall be provided and selection shall conform to 42 CFR Part 84, 29 CFR Part 1910.134, and 29 CFR Part 1926.62. A formal respiratory protection program must be implemented in accordance with 29 CFR Part 1926.62 and Part 1910.134.

E. Air Monitoring Requirements

The Contractor shall:

1. Provide air monitoring equipment including sample filter cassettes of the type and quantity required to properly monitor operations and personnel exposure surveillance throughout the duration of the project.
2. Conduct initial exposure monitoring to determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 micrograms per cubic meter. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.
3. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.62 or the approved Lead Compliance Plan. Documentation of air sampling results must be recorded at the work site within twenty-four (24) hours and shall be available for review until the job is complete.

F. Periodic Inspections

The Contractor shall retain the services of IH firm personnel, working under the direct supervision of the CIH that stamped the Lead Compliance Plan, to perform periodic inspections of the job site work practices and engineering controls, on a frequency to ensure/document Contractor compliance with the regulations. Periodic inspections shall be performed at least weekly while work impacting lead is occurring, but shall be at the frequency necessary to maintain Contractor compliance with the OSHA Lead in Construction Standard. Any exceptions to 29 CFR 1926.62 or the accepted Lead Compliance Plan shall be reported to the Contractor and the Engineer prior to the IH firm personnel leaving the site and corrected immediately.

All findings of such periodic inspections shall be documented in writing to the Engineer no later than 10 days following the site visit. At a minimum, the inspection report shall document the following:

1. Description of current work activities
2. Description of engineering controls being implemented
3. Description of PPE being utilized
4. Description of visual review of containment system effectiveness
5. Results of all air sampling received since date of last report
6. Narrative interpreting sample results and making recommendations as necessary
7. Description of waste management practices being utilized

8. Descriptions of exceptions noted and corrective action taken

The report shall include a signature from the IH firm employee that performed the site inspection verifying that the Contractor's work practices are in compliance with 29 CFR 1926.62 and the previously submitted and accepted Lead Compliance Plan. The CIH shall sign verifying their concurrence.

G. Lead Abatement Procedures

The Contractor's Competent Person shall be at the job site at all times during work impacting lead.

Work impacting lead paint shall not begin until authorized by the Engineer, following a pre-work visual inspection by the Project Monitor or Engineer to verify existing conditions.

Any activity impacting lead painted surfaces shall be performed in a manner which minimizes the spread of lead dust contamination and generation of airborne lead.

The Contractor shall conduct exposure assessments for all tasks which impact lead paint in accordance with 29 CFR 1926.62(d) and shall implement appropriate personal protective equipment until negative exposure assessments are developed.

All abrasive blast cleaning work impacting the lead containing/coated materials shall be conducted within an established Regulated Area with a remote wash facility/decontamination system in accordance with "C. Wash Facilities" and the OSHA Lead in Construction Standard. In accordance with 29 CFR 1926.62, engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the Regulated Area and limit the generation of airborne lead. Such engineering controls shall include the use of a full negative pressure enclosure (NPE) in accordance with SSPC Guide 6 and Item 0603XX1A. All wastes containing lead paint shall be properly contained and secured for storage, transportation and disposal.

The Contractor shall ensure proper entry and exit procedures for workers and authorized persons who enter and leave the Regulated Area. All workers and authorized persons shall leave the Regulated Area and proceed directly to the wash or shower facilities where they will HEPA vacuum gross debris from work suit, remove and dispose of work suit, wash and dry face and hands, and vacuum clothes. Lead chips and dust must not be removed by blowing or shaking of clothing. Wash water shall be collected, filtered, and disposed of in accordance with Federal, State and local water discharge standards. Any permit required for such discharge shall be the responsibility of the Contractor.

No one shall eat, drink, smoke, chew gum or tobacco, or apply cosmetics while in the Regulated Area.

Data from the limited lead testing performed by the Engineer is documented in the reports listed in the “Notice to Contractor – Hazardous Materials Investigations” or is presented herein. Under no circumstances shall this information be the sole means used by the Contractor for determining the extent of lead painted materials. The Contractor shall be responsible for verification of all field conditions affecting performance of the work as described in these Specifications in accordance with OSHA, USEPA, USDOT and CTDEP standards. Compliance with the applicable requirements is solely the responsibility of the Contractor.

Bridge No. 00571A, Route 8 over Housatonic River, Shelton

- Ø Lead paint was identified on the painted structural steel/metal bridge components of Bridge No. 00571A. XRF readings showed the paint to be lead based.

Girders, Cross Beams, Beam Ends, Bearings, Rockers, Diaphragms, Connection plates, Railings, Trusses, Catwalk etc.	Metal	Green	12.6-22.2 mg/cm ²
--	-------	-------	------------------------------

- Ø TCLP waste stream sampling/analysis of the paint associated with the structural steel/metal bridge component surfaces of the bridge characterized the paint waste as RCRA hazardous waste.

Paint debris	460 mg/l
--------------	----------

- Ø No detectable amounts of lead were found on the painted surfaces of the concrete abutments, therefore any paint waste generated from the removal of paint from the pier would be considered non-RCRA, non-hazardous waste.

Abrasive blast cleaning techniques which are utilized on surfaces coated with lead paint must be conducted in accordance with the OSHA worker protection and USEPA RCRA/CTDEEP waste disposal standards, and shall be conducted in accordance with Item # 0603XXXXA – Abrasive Blast Cleaning and Field Painting of Structure following SSPC-SP10 “Near White Blast Cleaning” procedures.

On Bridge No. 00571A, the Engineer has previously characterized the projected abrasive paint blast debris associated with the structural steel/metal bridge components as RCRA/CTDEEP Hazardous waste, which shall be handled and disposed of in accordance with USEPA/CTDEEP Hazardous Waste Regulations and 0603222A – Disposal of Lead Debris from Abrasive Blast Cleaning.

Any scrap metal components generated shall be segregated and recycled as scrap metal at the Contractor’s previously submitted scrap metal recycling facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

Should lead contamination be discovered outside of the Regulated Area, the Contractor shall immediately stop all work in the Regulated Area, eliminate causes of such contamination and take steps to decontaminate non-work areas.

H. Prohibited Removal Methods:

The use of sand, steel grit, air, CO₂, baking soda, or any other blasting media to remove lead or lead paint without the use of a HEPA ventilated contained negative pressure enclosure is prohibited.

Power/pressure washing shall not be used to remove lead paint.

Compressed air shall not be utilized to remove lead paint.

Power tool assisted grinding, sanding, cutting, or wire brushing of lead paint without the use of cowed HEPA vacuum dust collection systems is prohibited.

Lead paint burning, busting of rivets painted with lead paint, welding of materials painted with lead paint, and torch cutting of materials painted with lead paint is prohibited. Where cutting, welding, busting, or torch cutting of materials is required, lead paint in the affected area must be removed first.

Chemical stripping of coatings from bridge components is prohibited.

I. Clean-up and Visual Inspection:

The Contractor shall remove and containerize all lead waste material and visible accumulations of debris, paint chips and associated items.

During clean-up the Contractor shall utilize HEPA filtered vacuum equipment.

The Engineer will conduct a visual inspection of the work areas in order to document that all surfaces have been maintained as free as practicable of accumulations of lead in accordance with 29 CFR 1926.62(h). If visible accumulations of waste, debris, lead paint chips or dust are found in the work area, the Contractor shall repeat the cleaning, at the Contractor's expense, until the area is in compliance. The visual inspection will detect incomplete work, damage caused by the abatement activity, and inadequate clean up of the work site.

All debris shall be contained and vacuum collected daily or more frequently as directed by the Engineer, due to debris buildup. Such debris, abrasive blast residue, rust and paint chips shall be stored in leakproof storage containers in the secured storage site, or as directed by the Engineer. The storage containers and storage locations shall be reviewed by the Engineer and shall be located in areas not subject to ponding.

All storage containers (roll offs or drums) shall have a protective liner and removable lid. These containers shall not have any indentations or damage that would allow seepage of the contained material.

If 55 gallon barrels are used, staging is required: 55 gallon barrels shall be stored together in two rows of five. The Contractor shall maintain a minimum lane clearance of 36 inches between each (barrel lot of ten).

The Contractor shall maintain a secure storage site, which shall be large enough to handle all debris. The Contractor shall store debris only in the secured storage site. During abrasive blast cleaning operations, all surface preparation debris shall be vacuum collected from the containment enclosure and removed to the abrasive recycling reclaimer unit, and the coating debris shall be conveyed to the secured storage site at the conclusion of the work shift. The Contractor shall account for all coating debris conveyed to the secured storage site and all coating debris transported from the project for disposal.

The secure storage site shall consist of an 8-ft. high fenced-in area with a padlocked entrance. Storage containers shall not be used on the project until and unless they have been reviewed and approved by the Engineer. Storage containers and sites shall be located so as not to cause any traffic hazard. Container storage sites shall be in areas that are properly drained and runoff water shall not be allowed to pool and shall be out of the 100-year flood plain. The containers shall be placed on pallets or other approved material and not directly on the ground.

Storage containers shall be closed and covered with a waterproof tarpaulin at all times except during placement, sampling and disposal of debris.

J. Post-Work Regulated Area Deregulation:

Following an acceptable visual inspection, any engineering controls implemented may be removed.

A final visual inspection of the work area shall be conducted by the Competent Person and the Project Monitor or Engineer to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the lead paint removal remain. If this final visual inspection is acceptable, the Contractor will reopen the Regulated Area and remove all signage.

The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the State.

K. Waste Disposal/Recycling:

Non-metallic building debris waste materials tested and found to be non-hazardous Construction and Demolition (C&D) bulky waste shall be disposed of properly at a CTDEEP approved Solid

Waste landfill.

Metallic debris shall be segregated and recycled as scrap metal at an approved metal recycling facility.

Hazardous lead debris shall be disposed of in accordance with Item 0603222A, Disposal of Lead Debris from Abrasive Blast Cleaning.

L. Project Closeout Data:

Provide the Engineer, within thirty (30) days of completion of the project site work, a compliance package; which shall include, but not be limited to, the following:

1. Competent persons (supervisor) job log;
2. Certification that all requirements of the Lead Compliance Plan and OSHA Lead in Construction Standards, including training, medical surveillance, biological monitoring and medical removal protection, have been followed;
3. Copies of each periodic inspection report;
4. Report on regulatory compliance prepared by the CIH based on the periodic inspections performed.
5. OSHA-compliant personnel air sampling data;
6. Completed waste shipment papers for non-hazardous lead construction and demolition (C&D) waste disposal or recycling and scrap metal recycling.

M. Non Compliance:

Failure of the Contractor to implement the requirements of 29 CFR 1926.62, its Lead Compliance Plan, or any other requirement of this item shall, at the sole discretion of the Engineer, result in the suspension of all Contract work until such deficiencies are corrected.

Method of Measurement:

This item will include all noted services, equipment, facilities, testing and other associated work, including up to three (3) ConnDOT project representatives. Services provided to any ConnDOT project representatives in excess of three (3) representatives will be measured for payment in accordance with Article 1.09.04 – “Extra and Cost-Plus Work.”

1-Within thirty (30) calendar days of the award of the Contract, the Contractor shall submit to the Engineer for acceptance a breakdown of its lump sum bid price for this item detailing:

- (a) The development costs associated with preparing the Lead Compliance Plan in accordance with these Specifications.
- (b) The cost per month for the duration of the Project to implement the Lead Compliance Plan and provide the services of the CIH and IH firm.

2-If the lump sum bid price breakdown is unacceptable to the Engineer; substantiation showing that the submitted costs are reasonable shall be required.

3-Upon acceptance of the payment schedule by the Engineer, payments for work performed will be made as follows:

- (a) The lump sum development cost will be certified for payment.
- (b) The Contractor shall demonstrate to the Engineer monthly that the Lead Compliance Plan has been kept current and is being implemented and the monthly cost will be certified for payment.
- (c) Any month where the Lead Compliance Plan is found not to be current or is not being implemented, the monthly payment for the Lead Compliance for Abrasive Blast Cleaning Item shall be deferred to the next monthly payment estimate. If the Lead Compliance Plan is not current or being implemented for more than thirty calendar days, there will be no monthly payment.
- (d) Failure of the Contractor to implement the Lead Compliance Plan in accordance with this Specification shall result in the withholding of all Contract payments.

Basis of Payment:

The lump sum price bid for this item shall include: services, materials, equipment, all permits, notifications, submittals, personal air sampling, personal protection equipment, incidentals, fees and labor incidental to activities impacting lead removal, treatment and handling of lead contaminated materials, and the transport and disposal of any non-hazardous lead construction and demolition (C&D) bulky waste.

Final payment will not be made until all project closeout data submittals have been completed and provided to the Engineer. Once the completed package has been received in its entirety and accepted by the Engineer, final payment will be made to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
Lead Compliance for Abrasive Blast Cleaning	Lump Sum

END OF SECTION

ITEM #0100426A - WATER TRANSPORTATION FOR RESCUE OPERATIONS

Description: The Contractor shall provide a motor boat, staffed with two people (an operator, and a person trained in lifesaving techniques) when work, considered to be an occupational safety hazard, is in progress above or adjacent to the water. Their responsibility will be to patrol in the vicinity of the work and rescue anyone who may fall in the water, as well as to provide transportation for field inspectors when required. The boat shall be equipped with life preservers and any other equipment required by current OSHA regulations. The Contractor shall provide to the Engineer copies of all necessary permits, licenses, and registrations for the boat and its occupants and shall ensure the personnel are physically able to perform the required tasks.

Work under this item shall be performed in accordance with the following:

1. The boat shall be transported, placed in and out of the water, operated, and properly stored after use.
2. The boat shall be operable and available at all times. In the event of a breakdown, hazardous above-water work must be discontinued until the boat is repaired or a replacement boat is on station.
3. This item shall include maintenance, repairs, fuel, registration and insurance.
4. Also included in this item shall be the required safety equipment such as, but not limited to: life vests, protective clothing, oars, life line, anchor, OSHA approved emergency first aid kit, oxygen equipment, backboard, etc.
5. The boat shall be a stable bottom boat, designed specifically for the type of watercourse where it will operate and not less than twenty (20) feet (six meters) in length. The boat shall be equipped with a motor whose power is within the minimum and maximum horsepower requirements indicated by the manufacturer of the boat provided.
6. This item shall include radio communications equipment capable of providing communication between the boat and the work area on the bridge as well as the Contractor's field office and the Department's field office.
7. The person trained in lifesaving techniques must possess the following current certifications issued by the American Red Cross or equivalent certifications as determined by the Engineer:
 - a. Standard First Aid (includes CPR training)
 - b. Life Guard Training or Emergency Water SafetyNote: EMT or Paramedic certification from the Connecticut Office of Emergency Medical Services will be acceptable in lieu of the Red Cross "Standard First Aid" certification.

If the person trained in lifesaving techniques possesses certifications from a recognized certifying agency other than the American Red Cross, the Contractor shall provide the Engineer with documentation from the Agency indicating that the certification program meets or exceeds the Red Cross certification requirements of this specification. No alternate certification will be acceptable unless approved in writing by the Engineer.

Method of Measurement: This work will be measured for payment by the number of calendar days, regardless of the number of work shifts, that the boat is used on safety patrol and for the transportation of inspection personnel.

Basis of Payment: Payment for this item will be made at the Contract unit price per day for "Water Transportation for Rescue Operations" which shall be the actual number of days the boat and personnel are used during the Project.

ITEM #0100600A – CONSTRUCTION ACCESS

Description: The item “Construction Access” shall consist of the design, construction, maintenance and removal of temporary works that the Contractor elects to use in order to access the work in the Housatonic River and its shoreline, as shown on the plans and allowed by the permits which may include floating docks or walkways. This item also includes providing, use of, maintaining and removal of barges and associated spud piles, moorings or anchorages.

The information on the plans and in the special provisions pertaining to construction access, and sequence of construction procedures conveys the assumptions made by the Designer and is for information only. The Contractor shall be responsible for selecting the means and methods for construction, subject to the design parameters and environmental permit restrictions. The Contractor shall submit information in accordance with Article 1.05-02-2, and as noted below, and shall include design calculations, construction schematics, construction sequences and procedures to the Engineer for review.

The information depicted on the plans has been permitted by the governing local, State and Federal agencies. The Contractor shall be responsible for obtaining any revised permits due to changes or modifications to the permitted plans which affects environmental or navigational impacts from all governing local, State and Federal agencies.

The Contractor shall note that obtaining approvals from DEEP, ACOE, IWRD, OLISP and USCG may be a lengthy process and should be taken into consideration when selecting the means and methods for construction.

Construction Methods: The Contractor’s means and methods for construction shall meet all requirements established in the regulatory permits for the Project. At least 30 days prior to construction of temporary works or any work in the river, the Contractor shall submit detailed construction access working drawings and computations in accordance with Article 1.05.02. The working drawings and calculations must be prepared, stamped and signed by a Professional Engineer licensed in the State of Connecticut. These plans shall include, but shall not be limited to:

- 1) The limits, details and locations of barges, locations of floating docks, methods for mooring barges and a barge mooring analysis.
- 2) The sequence and methodology for blast cleaning, repair and painting of the structure, barge movements, barge locations, and all limitations of operations outlined in these specifications.
- 3) Any temporary and permanent impact area calculations and tables.

If the Contractor's means and methods for construction do not meet all requirements established in the regulatory permits for the Project, additional time to obtain revised permits and the Engineer's approval shall be shown in their construction schedule.

The furnishing of such plans, methods and calculations shall not serve to relieve the Contractor of its responsibility for the safety of the work and the successful completion of the Project. The Contractor's proposal must meet all requirements established in regulatory permits for the Project and must also meet the requirements of Section 1.10 and NTC - Flood Contingency Plan.

Access to the boat launch and use of the boat launch must remain unhindered. If the Contractor anticipates temporary interference with access to the boat launch or interference with use of the boat launch then the contractor must request approval by the Engineer. The Engineer will be required to provide a plan, duration of interference and circumstances showing no other alternative method that would not interfere with access and use of the boat launch to the Engineer. Upon review of the material provided, the Engineer will coordinate with the City of Derby Commissioner of Public Works Mr. Anthony DeFala and DEEP for approval of temporary interference.

Access to the public skate park in Shelton will require a temporary closure. Prior to closure of the public skate park area, the Contractor shall coordinate with the City of Shelton Engineer, Mr. Robert Kulacs. The Contractor will be required to provide a schedule outlining the anticipated date of closure and duration for closure. The Contractor shall be required to coordinate with the City of Shelton 14 days prior to the requested closure date.

Method of Measurement: All work for the design and construction of temporary works as well as providing the use of, and removal of barges and associated spud piles, moorings or anchorages as described herein, will not be measured for payment but shall be included in the lump sum cost of this item.

Basis of Payment: Construction Access will be paid for at the Contract lump sum price for "Construction Access" which price shall include the design, construction, maintenance and removal of temporary works, and all materials, tools, equipment, labor and work incidental thereto. This item also includes the use of and removal of barges and associated spud piles, moorings or anchorages.

Pay Item	Pay Unit
Construction Access	l.s.

ITEM # 0201199A – REMOVE AND RESET FENCE

Description: This work shall include the removal, proper temporary storage and resetting of existing fence where indicated on the plans and as directed by the Engineer. Material may be stockpiled on the existing site if site conditions allow, otherwise it shall be stored at an off-site location and returned to the site for installation.

Materials: The materials furnished and used for this work shall be existing and/or consistent with the existing fence.

Construction Methods: The contractor shall carefully dismantle a section of the existing fence in a manner such that the remaining section of fence is stable. All materials shall be marked and inventoried and carefully stored in a manner that will allow the contractor to reassemble the section of fence with undamaged original parts. If parts of the fence are damaged or lost, then the contractor will purchase new similar replacement parts.

Method of Measurement: This work will be measured per linear foot of fence and post removed and reset, measured along the top of fence.

Method of Payment: This work will be paid for at the contract unit price per linear foot of "Remove and Reset Fence" complete in place, which price shall include all materials, tools, equipment, and labor incidental thereto to including but not limited to all excavation, removal of fence, temporary support of existing fence to remain, temporary storing and resetting and disposal of surplus material necessary to complete the work.

<u>Pay Item</u>	<u>Pay Unit</u>
Remove and Reset Fence	LF

ITEM # 0503188A – REMOVAL OF EXISTING STEEL BENTS (SITE NO.8):

ITEM # 0503267A – REMOVAL OF EXISTING STEEL BENTS (SITE NO.11):{PRIVATE }

Description: This work shall consist of the removal and satisfactory disposal of segments of the existing steel trussed bent at Pier No. 8 & Pier No. 11 as shown on the plans or as directed by the Engineer. Items to be removed and disposed of shall include, but not be limited to, steel truss bents, steel bearings on top of bent, steel bearings under bottom bent, and any other items that may be attached thereto.

Construction Methods: All work shall proceed as directed by and to the satisfaction of the Engineer and in accordance with the details shown on the plans, or as approved by the Engineer. In addition, all work shall be in accordance with the requirements for the construction staging as shown on the plans.

The existing steel bents shall be dismantled in accordance with the methods proposed by the Contractor and approved by the Engineer. All debris shall be promptly cleaned up and removed from the site.

Existing steel bents removal shall not result in damage to any permanent construction (new or existing) or to adjoining property or river area. If damage does occur, it shall be repaired by the Contractor to the satisfaction of the Engineer at no additional expense to the State.

Prior to initiating work, the Contractor shall submit for review, plans, working drawings, computations, and written documentation describing his methods of removal and for false work and shielding required for the protection of traffic, environmentally sensitive areas, and adjoining property all in accordance with Subarticle 1.05.02(2). Acceptance of the Contractor’s plans shall not be considered as relieving the Contractor of any of his responsibility.

Salvage: No materials are designated to be salvaged under this item.

Method of Measurement: This work, being paid for on a lump sum basis, shall not be measured for payment.

Basis of Payment: This work shall be paid for at the contract lump sum price for “Removal of Existing Steel Bents (Site No.xx)”, which shall include all materials, equipment, tools, labor, and all work incidental to the removal of the existing steel bents including paint removal and disposal of waste materials.

Pay Item	Pay Unit
Removal of Existing Steel Bents (Site No.xx)	L.S.

ITEM #0511003A – CLEAN EXISTING SCUPPERS

DESCRIPTION: Work under this item shall consist of removing existing steel gratings covering bridge scuppers, cleaning the scuppers and drainage system, restoring functionality of the original bridge drainage system and resetting grates once work is complete. The work will be as directed by the Engineer, and in accordance with these specifications.

MATERIALS: None.

CONSTRUCTION METHODS: Selection of the equipment used for this work shall be based on the condition the drainage system at the time this work is to begin and shall be as approved by the Engineer.

The existing drainage shall be cleaned of all sludge, dirt, sand, gravel and other debris. The intent of this work is to restore the original drainage system of the bridge.

Scuppers shall have the surrounding bituminous concrete and overlying grates removed down to the original scupper, if applicable, and concrete deck surface. Existing grates shall be removed prior to cleaning. Any damage that is found to the drainage system shall be brought to Engineer’s attention immediately. After cleaning, the grates shall be reinstalled as directed by the Engineer.

This work shall be performed on all existing bridge scuppers, at the locations shown on the plans in accordance with the traffic requirements in the special provisions "Maintenance and Protection of Traffic" and "Prosecution and Progress".

Prior to traffic being allowed back on the adjacent roadway, the work for an individual scupper is to be completed, including removal of the overlying grating, cleaning, restoring the original frame and grating and tapering the bituminous wearing surface. The conditions should be acceptable to the Engineer.

METHOD OF MEASUREMENT: Cleaning existing scuppers will be measured as each scupper unit located at discreet locations throughout the bridge. There will be no measurement for removing bituminous concrete, removing and resetting existing grates.

BASIS OF PAYMENT: This work will be paid for at the contract unit price each for “Clean Existing Scuppers” complete in place, which price shall include all materials, equipment, tools, and labor incidental thereto. Any work that requires repairs and replacement in kind of damaged or missing components of the existing drainage system will be paid as extra work, as determined by the Engineer.

<u>Pay Item</u>	<u>Pay Unit</u>
Clean Existing Scuppers	ea.

ITEM #0512113A - 8" PIPE FOR BRIDGE DRAINAGE (FIBERGLASS)

Description: This item shall consist of furnishing and installing the fiberglass pipe, fittings including reducers, expansion joints, wyes, cleanouts, hangers, supports, inlets, slotted outlet covers, hoppers, protective shielding and appurtenances, for drainage of bridge deck to the lines and grades designated on the plans, or as directed by the Engineer.

Materials: All fiberglass components of the bridge drainage piping system shall be supplied by a single manufacturer with the exception of the fiberglass junction boxes.

The fiberglass pipe shall be Reinforced Thermosetting Resin Pipe (RTRP) which shall satisfy the requirements of ASTM Specification D 2996 RTRP-11AA-1111. The pipe shall qualify for a 10 ksi minimum short term rupture strength hoop tensile stress.

Pipe joints shall be bell-and-spigot or flanged as shown on the plans.

Fittings including wyes, cleanouts, reducers, and other types of manufactured elbows shall have a smooth interior with a minimum centerline radius of one and one half (1-1/2) times the pipe diameter. Cleanout end caps, inlets, and slotted outlet covers shall be fiberglass and shall attach to the cleanout pipe fitting using a flanged connection with a minimum of 4 bolts and a sealing gasket.

All fittings shall be static rated at 100 psi with a safety factor of three (3) times the static rating, in accordance with ASTM D1599.

The adhesive to be used for joining pipe segments shall consist of epoxy resin and a hardener curing agent having a minimum pot life of 15 minutes at 80°F which when fully cured develops the strength capacity of the pipe, in accordance with the manufacturer's recommendations.

The color of all fiberglass piping components shall be "concrete-gray". The Contractor shall submit a color sample to the Engineer for approval. A U.V. inhibitor shall be incorporated in the epoxy resin.

Pipe Supports

Structural steel for pipe support members, clamps, hangers, junction box supports, anchorage plates, and shims shall conform to the requirements of ASTM A709M, Grade 250 and shall be galvanized after fabrication to meet the requirements of ASTM A123M.

Threaded rods, anchor bolts, bolts and nuts shall conform to the requirements of ASTM A449M, A563M-Grade DH, A194M-Grade 2H or F436M as applicable. All hardware shall be hot dip galvanized in accordance with ASTM A153M or A123M as applicable.

Welding required for fabrication of the pipe supports shall be in accordance with the current AWS specifications.

Anchorage System

Pipe supports shall be connected to concrete with stainless steel anchors selected from the Connecticut Department of Transportation approved products list, and shall be installed per manufacturer's instructions and recommendations. Threaded concrete inserts shall be compatible with the galvanized steel threaded rods and designed to develop pullout and shear loads exceeding the required working loads as shown on the plans.

The Contractor may propose chemical anchor systems as a substitution for the concrete inserts. Anchoring systems are subject to the approval of the Engineer and shall exceed the working load requirements shown on the plans and shall be of non-corrosive materials suitable for the application. Chemical anchors and testing shall be in accordance with Section M.03.01-15 of the Standard Specifications.

Non shrink grout filler material shall be in accordance with Section M.03.01-12.

Neoprene pads, 1/8" thick shall be bonded to all surfaces of steel pipe supports or hangers in direct contact with the fiberglass pipe. The neoprene shall conform to the requirements of ASTM D4637, Type II, Class SR. The adhesive bonding agent for attaching the neoprene to the pipe support clamp surface shall be "Quick Gel Instant Adhesive" manufactured by Loctite Corporation, Rocky Hill, Connecticut, or an approved equal recommended by the manufacturer of the neoprene.

High Strength Bolts shall conform to the requirements of ASTM A325M.

Hex nuts shall conform to ASTM A563M, Grade DH or ASTM A194M, Grade 2H. Washers shall conform to ASTM F436M.

High strength bolts including hex nuts and washers shall be mechanically galvanized in conformance with ASTM B695M, Class 50.

The Contractor shall furnish a Certified Test Report and a Materials Certificate for the pipe joining adhesive, and all other fiberglass components of the piping system, in conformance with the requirements set forth in 1.06.07.

Construction Methods:

Shop Drawings:

Before fabricating any materials, the Contractor shall take all field measurements necessary to assure proper fit of the finished work, and shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02-3. These drawings shall include, but not be limited to the following information:

- A. A layout plan and elevation showing all lengths, elevations, fittings, supports, cleanouts, expansion devices if required, appurtenances and material designations.
- B. Commercial items shall be identified by manufacturer, trade name and catalog number and shall indicate sufficient details.
- C. Pipe supports and hangers and all other support devices shall be fully detailed.
- D. All field measurements shall be submitted for reference.

Installation: The pipe shall be installed to the lines and grades shown on the plans and shall be securely attached to the structure.

The adhesive for joining pipes shall be mixed and applied in strict accordance with directions included in the adhesive kit, or as directed by the representatives of the manufacturer. The surfaces of the joint shall be coated with the adhesive immediately before joining adjacent lengths of pipe. After properly joining two adjacent sections, the pipe supports and clamps shall be properly tightened to hold the pipe in place.

Method of Measurement: This work will be measured for payment by the actual number of linear feet of pipe for bridge drainage of the size specified, completed and accepted, measured in place along the axis of the pipe through all fittings from the pipe connector at the scupper pan to it terminus at or below grade.

Basis of Payment: This work will be paid for at the contract unit price per linear foot of “8” Pipe for Bridge Drainage (Fiberglass)”, complete in place, which price shall include all materials including fiberglass pipe, pipe supports, hangers, cleanouts, inlets, slotted outlet covers, hoppers, protective shielding and supports, including hardware, all equipment, tools and labor incidental thereto.

Structural steel members and appurtenances detailed to support the pipe shall be considered incidental to the cost of the fiberglass pipe.

Pay Item	Pay Unit
8” Pipe for Bridge Drainage (Fiberglass)	l.f.

ITEM #0520041A – PREFORMED JOINT SEAL

Description: Work under this item shall consist of furnishing and installing a preformed joint seal as shown on the plans and in conformance with these Specifications or as directed by the Engineer. Work shall also include a pre-installation survey for measurement of the existing joint opening width and preparation of the joint opening surfaces as needed to ensure proper performance of the preformed joint seal. The preformed joint seal shall seal the deck surface in accordance with the plans and prevent water from seeping through the joint area.

Materials: The preformed joint seal shall be one of the following:

1. Silicoflex:
RJ Watson, Inc -- Bridge and Structural Engineered Systems
78 John Glenn Drive
Amherst, New York 14228
Tel: (716) 691-3301 Fax: (716) 691-3305
Website: <http://www.rjwatson.com>

2. V-Seal:
D.S. Brown Company
300 East Cherry Street
North Baltimore, Ohio
Tel: (419) 257-3561
Website: <http://www.dsbrown.com>

3. Bridge Expansion Joint System (B.E.J.S.):
EMSEAL Joint Systems Ltd.
25 Bridle Lane,
Westborough, MA 01581
Tel: (508) 836-0280
Website: <http://www.emseal.com>

A Materials Certificate for all components of the selected preformed joint seal shall be submitted by the Contractor in accordance with the requirements of Article 1.06.07

Construction Methods: All work at each joint location shall be accomplished in conformance with the traffic requirements in the Special Provisions, “Maintenance and Protection of Traffic” and “Prosecution and Progress”.

At all joint locations, the Contractor shall perform a survey of the existing joint openings. This information shall include, but not be limited to:

- a) Joint opening width (taken at distances along the length of the joint not to exceed 6’)
- b) Temperature at time of measurement of joint opening width.
- c) Identification of sharp discontinuities in the joint alignment or its surfaces.

At least 30 days prior to start of the work, the Contractor shall submit a detailed Quality Control Plan to the Engineer for review and comment for the installation of the selected joint system. The submittal shall include:

- a) All information gathered during field survey.
- b) A list of all manufactured materials and their properties to be incorporated in the joint system, including, but not limited to the primer, bonding agent, sealant, and the sealing element.
- c) A detailed step by step installation procedure and a list of the specific equipment to be used for the installation.

The Quality Control Plan must fully comply with the specification's requirements and address all known and anticipated field conditions, including periods of inclement weather.

A technical representative of the selected joint system, approved by the manufacturer, shall be notified of the scheduled installation a minimum of 2 weeks in advance and be present to provide direction and assistance for the first joint installation and succeeding joint installations until the Contractor becomes proficient in the work and to the satisfaction of the Engineer.

Tools, equipment, and techniques used to prepare the joints and materials shall be approved by the Engineer and the manufacturer's technical representative prior to the start of construction.

The minimum temperature for installing any of the qualified preformed joint seals is 40 degrees Fahrenheit and rising, ambient air temperature. The joint surfaces shall be completely dry before installing any of the components of the selected joint seal. The selected joint seal cannot be installed immediately after precipitation or if precipitation is forecasted. Joint preparation and installation of the selected preformed joint seal must be done during the same day.

Any discontinuities, projections, divots or other anomalies in the joint opening surfaces that would negatively affect the performance of the preformed joint seal shall be remedied by the Contractor by methods recommended by the manufacturer and as approved by the Engineer.

All vertical faces adjacent to the joint opening shall be sandblasted prior to application of any of the joint seal components. All remnants of the prior existing joint sealing system (rubberized gland, silicone sealant, etc...) shall be removed from the existing headers to remain. Any discontinuities or sharp projections into the plane of the joint shall be ground smooth prior to sandblasting. Whenever abrasive blast cleaning is performed under this Specification, the Contractor shall take adequate measures to ensure that the abrasive blast cleaning will not cause damage to adjacent traffic or other facilities. Traffic will not be allowed to pass over the joint after sandblasting has occurred.

Following sandblasting, the joint's surfaces shall be wiped down or blown clean as recommended by the manufacturer.

The selected joint sealing system shall be installed continuously with no splices in the preformed seal in the roadway section, as recommended by the manufacture of the selected preformed joint seal.

When the sealing operations are completed, the joint opening shall be effectively sealed against infiltration of water. Any seal that does not effectively seal against water shall be removed and replaced at the Contractor's expense.

Treatment at gutterline and curbs/parapets:

At curbs, the preformed joint sealing element shall run continuously from the roadway section through the upturn at the curb and continue as shown on the plans.

At parapets or walls, the joint sealing element shall be upturned at the parapet/wall for a continuous seal through this transition. Use of a prefabricated piece (fabricated a minimum of 24 hours prior to use) to "make" the bend at the wall is allowed though field splicing of this prefabricated piece shall not be allowed in the roadway section (BEJS by EMSEAL excepted from this requirement). Parapets and walls shall be sealed for the entire vertical portion and across the top with the sealing element—bends and splices nine inches above the curbline and higher are allowed to be field fabricated.

Method of Measurement: This work will be measured for payment by the number of linear feet of preformed joint sealing system installed. The measurement will be made at the top surface and along the centerline of the joint and shall include all portions of the installation in the roadway, in the curbs and sidewalk(s), and within parapets and medians.

Basis of Payment: This work will be paid for at the Contract unit price per linear foot for "Preformed Joint Seal," complete in place, including all materials, equipment, tools, and labor incidental thereto.

Included in the contract unit price is the pre-installation survey of the existing joint opening and the cost of assistance from a technical representative of the selected joint system.

ITEM #0522155A – REPLACE BRIDGE BEARINGS

Descriptions: Work under this item shall consist of obtaining field measurements of existing bearing assemblies; cutting existing anchor bolts; removal of existing expansion steel bearing assemblies on truss bents at Pier 8 and Pier 11; refinishing concrete pads; furnishing and installing new expansion steel bearings as shown on the plans, as directed by the Engineer and in accordance with these specifications.

Work under this item shall also include furnishing and installing steel spreader plate for each expansion steel bearing on top of truss bent, beveled sole plate for each expansion steel bearing under existing girder.

Materials:

1. Steel Plates: Steel plates shall be AASHTO M270, Grade 50T2 and shall conform to the requirements of Article M.06.02.
2. Steel Pins: Steel pins shall be ASTM A-688 Class F and shall have a finished surface of an ANSI Standard Finish of 125.
3. Adhesive: The adhesive, for bonding the shims, shall be a long lasting, high strength, cold applied air cured, water and heat resistant material specifically formulated for bonding neoprene. Adhesive bonding shall conform to M.17.01-4 of the standard specifications form 816.
4. Non-Shrink Grout: Non-shrink grout shall conform to Article M.03.01-12.

Construction Methods:

Before submitting shop drawings, the Contractor shall obtain field measurements of the existing bearing assembly and spreader plate on top of truss bent in order to verify compatibility with the new bearings as detailed. The Contractor shall record the grade of each beam or beveled sole plate to accurately produce a new beveled sole plate. The Contractor shall also record the grade of truss bent top beam at pier 8 or spreader plate to accurately produce a new spreader plate. Field measurements shall be submitted with the shop drawings. See “Appendix – A: Bearing Assembly Field Measurements” of this special provision for a sample of the information to be submitted. The bearing assembly height is that height, measured prior to jacking operations, as measured along the centerline of bearing from the existing truss bent top beam to the underside of the girder bottom flange.

Bearing Assembly Height Adjustment: If a field measured bearing assembly height does not match the proposed bearing assembly height for any bearing, the difference in dimensions for the assembly shall be accounted for by the below noted methods. Any possible change in the concrete bearing pad height, due to an unsound pad which must be restored, must first be determined and include when calculating the final difference between the existing and proposed assembly heights.

1. If the proposed bearing assembly height is less than the existing assembly height: Increase the thickness of the proposed sole plate so the proposed bearing assembly matches the existing assembly height. The revised sole plate thickness, as measured along the centerline of bearing, shall be clearly noted within the shop drawing.
2. If the proposed bearing assembly height is greater than the existing assembly height: Reduce the thickness of the proposed sole plate so the proposed bearing assembly matches the existing assembly height. The revised sole plate thickness, as measured along the centerline of bearing, shall be clearly noted within the shop drawing and the Engineer shall be notified.

If difference between the field measured bearing assembly height and the proposed bearing assembly height can not be fully accounted for by the above methods, the Engineer shall be notified prior to the submission of shop drawings.

The Contractor shall submit shop drawings to the Engineer, for review and approval, in accordance with Subarticle 1.05.02. These drawings shall include, but not be limited to, the following information: Manufacturer's name, complete details of the bearings, material designations, nominal hardness of the elastomer, the quantity of bearings required, including test bearings, and the location of the bearing identification. The existing bearing assembly field measurements shall also be included.

A minimum of thirty (30) days prior to the installation of the elastomeric bearings the Contractor shall deliver to the job site the required number of bearings for installation plus the required number of test bearings. Bearings shall be packed in containers holding no more than ten (10) bearings. The bearings in one container shall be of the same type, size and shall be for one structure only. The containers shall be plainly marked with the project number, the bridge or structure number, the number of bearings, the name of the Manufacturer and the lot number.

Since lead paste may be present under the existing bearings, the use of flame cutting equipment to cut the swedge bolts is not allowed. The method of removal shall be by sawing of the bolts unless another method is approved by the Engineer. Remaining portions of welds after removal of existing sole plates, and where present, angled steel keeper plates welded to the flange, shall be ground smooth.

Tarps shall be used by the Contractor to prevent debris from the work operations from falling onto the ground. This debris shall be disposed of properly under the applicable contract items.

After removal of the assemblies, the Engineer will sound the concrete pads to determine structural sufficiency. If the pads are acceptable to the Engineer, they should then be inspected prior to the installations. Portions of protruding swedge bolts shall be cut off below the surface of the concrete and the holes filled in with non-shrink grout. All other cracks, spalls, or deterioration shall be repaired as order by the Engineer.

The concrete bearing pads shall have smooth, even, and level surfaces. They shall show no variations from a true plane greater than 1/16" over the entire area upon which the elastomeric bearings are to rest. The concrete shall be finished by grinding as required to achieve these requirements. The concrete bearing pads shall be cleaned of all debris just prior to installation of the elastomeric bearings.

The expansion steel bearings shall be installed as shown on the plans.

Weld details, procedures and testing methods shall conform to ANSI/AASHTO/AWS D1.5:2008 Bridge Welding Code, unless otherwise noted.

Welding with the elastomeric bearings in place will not be permitted unless there is more than 1½ inches of steel between the weld and the elastomer, measured along the centerline of bearing, unless approved by the Engineer. In no case shall the elastomer be exposed to temperatures greater than 4008 F. Temperature Indicating Crayons shall be used during field welding to assure that these temperature restrictions are not exceeded. Welding shall conform to the requirements of Subarticle 6.03.03-6.

Silicone based caulking material approved by the Engineer shall be used in transverse joints to seal between sole plate and bottom flange. The caulking material shall be compatible with the paint system used for field touch up painting.

The individual shims shall be bonded to the elastomer portion of the bearing with adhesive applied over the entire shim interface. The surface preparation, applications and curing of the adhesive shall be in accordance with the Manufacturer's recommendations. If shims in excess of 1/8 inch are required, multiple shims shall be bonded together. Shimming of areas that vary in thickness shall be done by stepping the shims.

The steel plates shall be painted with an approved NEPCOAT prime coat compatible with the coat system chosen in the special provision for "Field Touch-Up Painting".

Wherever existing sole plate removal or welding will be used, existing lead paint shall first be removed. See the Notice to Contractor - Localized Paint Removal for the description and construction methods.

Method of Measurement: This work shall be measured for payment by the actual number of expansion steel bearings installed and accepted.

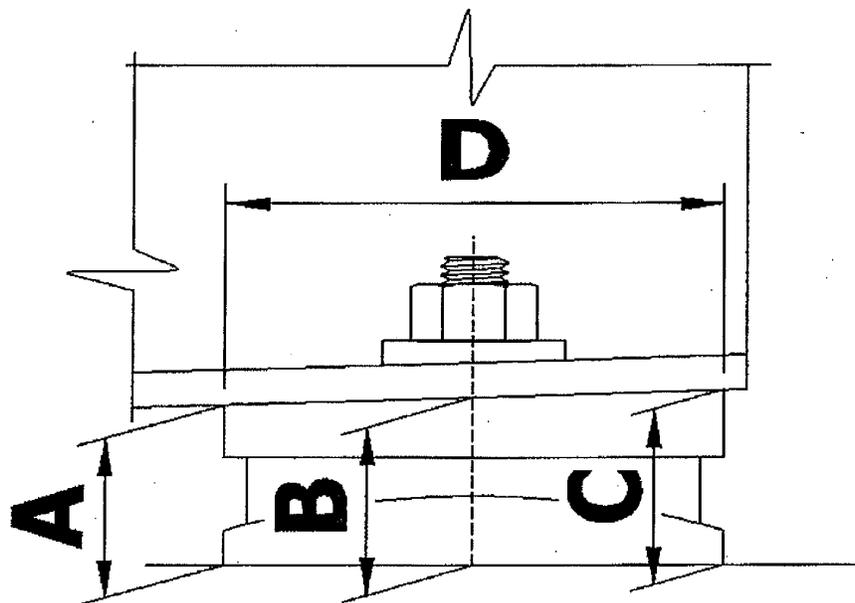
Basis of Payment: This work shall be paid for at the contract unit price each for "Replace Bridge Bearings" complete, in place and accepted, which price shall include obtaining field measurements of existing bearing assemblies, removal of existing bearing assemblies, disposal of the existing bearings, grinding of existing anchor bolts and refinishing concrete pads, non-shrink grout, all sole plates, shims, adhesive, furnishing and installing bridge bearings, and all materials, equipment, tools and labor incidental thereto. No additional payment shall be provided for adjustment of the bearing assembly height to account for a difference between the existing and proposed assemblies. The cost

of any localized paint removal required to install the new bearing shall also be included for payment under this item. The final application of paint for steel plate shall be paid for under “Field Touch-Up Painting”.

Pay Item:
Replace Bridge Bearings

Pay Unit
EA

APPENDIX – A: Bearing Assembly Field Measurements



Bridge No. _____ Abutment No. _____ Pier No. _____ Beam No. _____

Provide all dimensions in inches.

A	B	C	D

Dimension “B” along the centerline of bearing defines the “Bearing Assembly Height”.

Masonry Pad Information:

Transverse Dimension (Width) = _____

Longitudinal Dimension (Length) = _____

Page No. ____ of ____

ITEM #0522158A – KEEPER ASSEMBLY

Descriptions: Work under this item shall consist of obtaining field measurements of existing bearing bottom plate; grinding existing anchor bolts; furnishing and installing new keeper assembly as shown on the plans, as directed by the Engineer and in accordance with these specifications.

Materials: The materials for this work shall conform to the requirements of Section M.06.

Construction Methods:

Before submitting shop drawings, the Contractor shall obtain field measurements of the existing bearing bottom plate in order to verify compatibility with the new keeper assembly.

The Contractor shall submit shop drawings to the Engineer, for review and approval, in accordance with Subarticle 1.05.02.

The Contractor shall submit a detailed shop fabrication schedule to the Engineer for review within 30 days of the notice to proceed. At a minimum the schedule shall include the start date, milestone dates, and completion date.

Prior to start of fabrication, all weld procedures shall be submitted to the Engineer for review and approval.

Weld details, procedures and testing methods shall conform to ANSI/AASHTO/AWS D1.5:2008 Bridge Welding Code, unless otherwise noted.

The steel plates shall be painted with an approved NEPCOAT prime coat compatible with the coat system chosen in the special provision for “Field Touch-Up Painting”.

Wherever existing sole plate removal or welding will be used, existing lead paint shall first be removed. See the Notice to Contractor - Localized Paint Removal for the description and construction methods.

Method of Measurement: This work shall be measured for payment by the actual number of keeper assemblies installed and accepted.

Basis of Payment: This work shall be paid for at the contract unit price each for “Keeper Assembly” complete, in place and accepted, which price shall include obtaining field measurements of existing bearing bottom plate, grinding of existing anchor bolts, furnishing and installing keeper assembly, and all materials, equipment, tools and labor incidental thereto. The cost of any localized paint removal required to install the new keeper assembly shall also be included for payment under this item. The final application of paint for steel plate shall be paid for under “Field Touch-Up Painting”.

Pay Item:
Keeper Assembly

Pay Unit
EA

ITEM #0601070A – CLASS “S” CONCRETE

Work under this item shall conform to Section 6.01 of the Department Standard Specification, as supplemented and amended to provide for a Class “S” superplasticized concrete.

DESCRIPTION: Class “S” concrete may be used to fill and repair voids in surfaces of vertical concrete areas greater than four square feet (4 sq. ft.) and one inch (1”) deep or on horizontal surfaces requiring formwork (exclusive of pavements).

Work under this item shall consist of surveying the existing vertical faced concrete of structures to be repaired with this material; locating and removing loose concrete, deteriorated concrete, and concrete overlying hollow areas; patching these areas as well as spalled and scaled areas with Class “S” concrete formed to the original contour. The work shall also include sandblasting and cleaning areas to be patched and filled and any exposed reinforcing steel prior to placing the concrete.

The Contractor shall not perform any repair work without prior approval of the Engineer for location, limits and types of repairs.

MATERIALS: Materials shall conform to Section M.03 of the Department Standard Specification, as modified herein:

M.03.01 – General Composition of Concrete Mixes: is supplemented to include Class “S” superplasticized concrete.

Type	Proportions By Weight (Approx.)	Water Per Bag (Gallons), (Max.)	Cement Factor (Bags/Cu. Yd.)
Class “S”	1:2.16:2.20	5.7	7.0

1 - Coarse Aggregate: is supplemented with the following:

(c) **Grading:** Coarse aggregate for the Class “S” concrete shall meet the following gradation requirements:

For Class “S”: The required grading shall be obtained by using 100 percent No. 8 coarse aggregate.

3 - Cement: Add the following:

Type I or II Portland Cement shall be used for Class “S” concrete and shall conform to the requirements of AASHTO M85.

9 - Admixtures: is amended and supplemented as follows:

Delete Subarticle “(c) All other admixtures, ...” in its entirety and substitute with the following:

(c) - Superplasticizing Admixtures: The superplasticizer admixture shall be a high-range water reducer (HRWR) capable of increasing the slump of the mix from approximately 2.25" to 7" upon the addition of the amount recommended by the respective manufacturer. The HRWR shall conform to AASHTO M194, Type F or Type G and shall be approved by the Engineer. The use of this material shall be in strict accordance with the respective manufacturer's written instructions and procedures.

10 - Curing Materials: is amended and supplemented as follows:

(c) Liquid Membrane Forming Compound: add the following:
No liquid membrane forming compound shall be used for Class "S" concrete.

CONSTRUCTION METHODS: is supplemented with the following text. (Where this specification deviates from the Department Standard Specification, the intent of this text shall govern.)

5 - Composition: Add the following:

Class "S" concrete shall conform to the requirements as specified in Article M.03.01 as amended herein. Class "S" concrete shall contain not less than 6.5 percent and not more than 8.5 percent entrained air at the time of placement.

The Class "S" concrete shall have a minimum 3000 psi compressive strength at 28 days.

6 - Consistency: Add the following:

Class "S" concrete shall have a slump range of 2 to 4 inches prior to the addition of the HRWR and from 6 to 8 inch slump after the addition of the HRWR. The addition rates of the air entraining admixture and the HRWR will vary. Frequent field testing of the air content and slump prior to and after addition of the HRWR will be the determining factor of actual addition rates for each admixture.

7 - Mixing Concrete: Add the following:

For hand mixing of Class "S" concrete, the Contractor shall provide scale(s) approved by the Engineer in which cement and aggregate can be accurately weighed for the required mix proportions.

The Contractor shall also have measuring graduates marked in ounces for the proportioning of the A.E.A. and the HRWR. Do not mix the A.E.A. and the HRWR together before adding to the mix; the resultant solution will not work. Do not add the A.E.A. and the HRWR at the mixer simultaneously, these admixtures must be added separately in the mixing cycle. All manufactured materials shall be stored, mixed and used in strict accordance with the written recommendations of the respective manufacturers.

19 - Curing Concrete: Add the following:

Concrete shall be cured by leaving forms on for seven (7) days and wetting them frequently. Add the following subarticles:

25 - Material Storage: The Contractor shall store and maintain the A.E.A. and the HRWR materials in clean original containers as delivered by the manufacturer.

26 - Repair Procedure: A survey shall be undertaken by the Contractor of the vertical faces of concrete to be patched with this material, under the direction and to the satisfaction of the Engineer, to determine the exact limits and locations of all areas to be repaired under this item.

Loose and deteriorated concrete shall be chipped away back to sound concrete. The exposed surfaces shall be thoroughly sandblasted and vacuumed immediately prior to forming.

Hollow areas in the existing concrete shall be completely exposed by chipping away back to sound concrete and thoroughly sandblasted and vacuumed immediately prior to forming.

Spalled and scaled areas shall be cleaned of all loose deteriorated concrete. The exposed surfaces shall be thoroughly sandblasted and vacuumed immediately prior to forming.

Removal of unsound concrete material shall be such as to facilitate uniform placement of fresh concrete. All upper areas of excavated voids shall slope evenly out to within one inch (1") of the face of the concrete to preclude entrapping air and forming hollow spots in the freshly placed concrete. Within one inch (1") of the surface, the outline shall be essentially normal (perpendicular) to the surface.

All surfaces of exposed concrete and reinforcing steel shall be free of oil, solvent, grease, dirt, dust, bitumen, rust, loose particles and foreign matter. Prior to sandblasting of concrete and steel surfaces, all petroleum contamination on these surfaces shall be removed by appropriate solvent or detergent cleaning operations.

Extreme care shall be taken where reinforcing steel is uncovered not to damage the steel or its bond in the surrounding concrete. Pneumatic tools shall not be placed in direct contact with reinforcing steel. Maximum 30 pound size hammers shall be used for general chipping and removal, while maximum 15 pound size shall be used behind reinforcing steel. Exposed reinforcing shall remain in place except where specifically indicated for removal by direction of the Engineer. Exposed reinforcing steel shall be sandblasted in accordance with SSPCASPA6, Commercial Blast Cleaning, to remove all contaminants, rust and rust scale.

In areas where reinforcing steel is found to be surrounded by deteriorated concrete or has at least one-half of its surface area exposed or has less than 1" cover, the depth of removal shall be such as to include all deteriorated concrete but not less than 3/4" below or behind the reinforcing steel.

Where the existing reinforcing steel is severely corroded or damaged, it shall be cut out and replaced with new reinforcing steel of the same size and spacing. Where existing steel is determined

by the Engineer to have insufficient cover, it shall be either replaced or adjusted as directed. New steel shall be attached behind existing steel with a minimum lap of 15". Concrete shall be removed to a minimum depth of 3/4" behind the new steel.

When using sandblasting equipment, all work shall be shielded and contained for the protection of the public and the environment.

All excavated areas on vertical surfaces of concrete members shall be formed using forms coated with a plastic or similar film to preclude the use of form release agents. Forms and support systems shall be properly designed in accordance with Subarticle 6.01.03A3. Forms shall be so designed that placement access shall be allowed at the top of each respective formwork assembly for contiguous void areas.

No bonding materials shall be used before or during the placement of this concrete material. Concrete surfaces against which this material is to be placed shall be sound, tight, and thoroughly roughened by the removal and sandblasting procedures specified above. The exposed concrete surfaces shall be dampened with fresh water immediately prior to placement of the fresh concrete by "hosing" down the areas behind the forms as thoroughly as possible. Light rust formations on sandblasted reinforcing steel prior to concrete placement is normal and acceptable.

Prior to forming up vertical surfaces, 4 x 4, 6 gauge reinforcing steel wire fabric conforming to the requirements of M.06.01A3 shall be installed at the proper depth to those areas greater than six square feet (6 sq. ft.) and three inches (3") deep or as directed by the Engineer. The fabric shall be tied to any exposed reinforcing steel or anchored to sound concrete with 1/4" powder actuated anchors such as Hilti "Gunitite Clip", WA6 Threaded Stud and Eye-Coupling, or equivalent as approved by the Engineer.

Placement of the fresh concrete shall be in the maximum height lifts possible under the circumstances and all freshly placed concrete shall be consolidated during placement with adequately sized and effective vibrators.

Following curing and stripping, the exposed faces of new concrete shall be finished off with the use of the appropriate tools to blend in the physical appearance to the surrounding areas as much as possible.

Cured patches shall be sounded by the Engineer to detect the presence of any hollow spots. Such spots shall be removed and replaced by the Contractor at his cost.

METHOD OF MEASUREMENT:

Class "S" concrete shall be measured for payment by the actual volume in cubic yards of concrete placed and accepted by the Engineer. Wire fabric and reinforcing steel will not be measured for payment.

BASIS OF PAYMENT:

1 - Concrete: Add the following:

Class "S" concrete will be paid for at the contract unit price, per cubic yard, for "Class "S" Concrete", complete in place, which price shall include locating and removing unsound material, sandblasting, cleaning and forming, placing concrete, stripping formwork and finishing new concrete, and all materials, equipment, tools, labor and clean-up incidental thereto.

Add Separate Pay Item:

Class "S" Concrete

Pay Unit

C.Y.

ITEM #0601197A – VARIABLE DEPTH PATCH

DESCRIPTION: This item shall consist of surveying the existing concrete structure as directed by the Engineer. The Contractor, under the direction of the Engineer, shall locate and remove loose concrete, deteriorated concrete, and concrete overlaying hollow areas; patching these areas as well as spalled and scaled areas with variable depth patch to the original contour, in accordance with these specifications and to the satisfaction of the Engineer.

This work shall also include sandblasting and cleaning areas to be patched and any exposed reinforcing. Exposed reinforcing shall have a zinc primer applied prior to placing the patch material.

The Contractor shall not perform any repair work without prior approval of the Engineer for locations, limits and types of repairs.

MATERIALS: The Variable Depth Patch shall be one of the following packages Portland Cement based materials:

5 Star Structural Concrete V/O	Re-crete 20 Minute Set	Masterpatch 230VP
Manufactured by:	Manufactured by:	Manufactured by:
U.S. Grout Corp.	Dayton Superior Corporation	Masterbuilders, Inc.
Fairfield, CT 06430	3 Horne Drive	23700 Chagrin Blvd.
	Folcroft, PA 19032	Cleveland, OH 44122

The single component coating shall be one of the zinc rich primers listed in the latest Product Reference List noted in Section M.07.02.

A Materials Certificate and Certificate of Compliance will be required in accordance with Article 1.06.07, certifying the conformance of the materials to the requirements set forth in this specification.

CONSTRUCTION METHODS: A survey of the existing structure shall be performed by the Contractor, under the direction and to the satisfaction of the Engineer, to determine the exact limits and locations of all areas to be repaired under this item. The limits of application shall not exceed the requirements as specified herein.

The perimeter of each deteriorated area shall be delineated with a 1" deep sawcut or chiseled edge. When sawcutting the concrete, care shall be taken not to cut existing reinforcing. The patch shall not exceed approximately 4 square feet of surface area, unless otherwise directed by the Engineer.

On the prestressed beams, spalled areas shall be made free of all loose and deteriorated concrete.

Pneumatic and power tools shall not be used for this purpose. The Contractor shall take great care not to damage the underling reinforcing steel or tendons of the prestressed beams. If steel is encountered, the Engineer shall be notified before proceeding.

On the underside of the deck, spalled and scaled areas shall be made free of all loose and deteriorated concrete. Loose and deteriorated concrete shall be chipped away back to sound concrete. The exposed surfaces shall be thoroughly sandblasted and vacuumed immediately prior to applying the patch material.

Extreme care shall be taken where reinforcing steel is uncovered not to damage the steel or its bond in the surrounding concrete. Pneumatic tools shall not be placed in directed contact with reinforcing steel. Maximum 15 lb. size hammers shall be used for general chipping and removal. Exposed reinforcing shall remain in place except where specifically indicated for removal by direction of the Engineer. Exposed reinforcing steel shall be sandblasted in accordance with SSPC-SP-6, Commercial Blast Cleaning, to remove all contaminants, rust and rust scale.

All compressed air equipment used in cleaning shall have properly sized and designed oil separators, attached and functional, to assure the delivery of oil free air to the nozzle.

Where the existing reinforcing steel is severely corroded or damaged, it shall be cut out and replaced with new reinforcing steel of the same size with a minimum length for lap splices as required under the tension lap splice requirements set forth under the AASHTO Standard Specifications for Highway Bridges. If larger size bars are encountered, the Contractor shall notify the Engineer. When existing steel is determined by the Engineer to have insufficient cover, it shall be either replaced or adjusted as directed.

Concrete shall be removed to a minimum depth of 3/4" behind the existing steel. When using sandblasting equipment, all work shall be shielded for the protection of the public.

The surfaces to be patched, including exposed reinforcing, shall be free of oil, solvent, grease, dirt, dust, bitumin, rust, loose particles and foreign matter. If an air hose is used, care shall be taken to avoid deposit of oil by the air pump.

The exposed blast cleaned reinforcing steel shall be coated with the single component zinc primer by brush. All application of the zinc primer shall be in accordance with the manufacturer's printed instructions.

All mixing and application of the patch material shall be done in strict accordance with the printed instructions supplied by the manufacturer and as directed by the Engineer.

At the time of patch material application, the surfaces to be patched shall be damp (saturated surface dry) with no glistening water.

The minimum ambient and patch area surface temperatures shall be 77 degrees Fahrenheit and rising at the time of application.

The patched material shall be packed into the substrate, filling all pores and voids, then forced against the edges of the repair area working toward the center. After filling the voids, the patch material shall be compacted and the surfaces struck off with a steel trowel to match the adjacent surfaces.

A fine spray mist of water shall be used to aid the cure of the patches by preventing the surface from drying for a minimum of 2 hours.

Cured patches shall be sounded by the Engineer to detect the presence of any hollow spots. Such spots shall be removed and replaced by the Contractor at no additional cost to the State.

METHOD OF MEASUREMENT: This work will be measured for payment by the actual number of cubic feet used in the acceptable patches, except where the Engineer determines that the Contractor has unnecessarily removed sound concrete. Where sound concrete has been unnecessarily removed, the replacement concrete will not be measured for payment. New reinforcing steel will not be measured for payment.

BASIS OF PAYMENT: This work will be paid for at the contract unit price per cubic foot for "Variable Depth Patch", complete in place. The price shall include locating and removal of deteriorated concrete, any required sawing, sandblasting, cleaning and surface preparation of the patch areas, and zinc primer placed on reinforcing steel. It shall also include furnishing, placing, finishing and curing the concrete patch, including all equipment, tools, labor and incidentals necessary to complete the work including inspection and construction access.

There will be no direct payment for the cost of furnishing and placing new reinforcing steel, but the cost of this work shall be considered as included in the general cost of the work.

Pay Item:
Variable Depth Patch

Pay Unit
CF

ITEM #0601954A – EPOXY INJECTION CRACK REPAIR

Description: This item shall consist of rebonding cracked concrete structures with a two component modified epoxy resin system injected in to the crack under low pressure using continuous positive displacement metering and mixing equipment, as shown on the plans or as directed in accordance with these specifications.

The Contractor shall not perform any repair work without prior approval by the Engineer for locations, limits, and type of repairs.

Materials: The epoxy resin shall be a pre-qualified material (see attached Appendix A). A Material Certificate and a Certificate of Compliance in accordance with Article 1.06.07 shall accompany each batch or lot of the material delivered to the job site to verify the epoxy resin's conformance with the manufacturer supplied infrared spectroscopy test results. A sample of liquid epoxy resin Components A and B shall be taken and shall consist of one pint per batch of each component represented in each shipment. The samples shall be presented to the Laboratory a minimum of 14 calendar days before incorporation of any of the batch into the work. The Laboratory shall conduct the Infrared Spectroscopy Test on the samples (see attached Appendix A). Each test results shall be compared to the "Pre-qualification Procedures" test results on file with the Laboratory. Two materials are considered to be identical if all of the absorption points agree as to wave length and relative magnitude of the peaks in comparison with the other points of absorptions.

A batch of each component will be defined as that of material which has been subjected to the same unit chemical or physical mixing process intended to make the final product substantially uniform.

Each component shall be packaged in steel containers not larger than 5 gallons in volume. The containers shall have lug type crimp lids with ring seals, shall be new, shall not be less than 0.024-inch nominal thickness, and shall be well sealed to prevent leakage. If a lining is used in the containers, it shall be of such character as to resists any action by the components. Each container shall be clearly labeled with the description (Component A or B), the manufacturer's name, date of manufacture, batch number, and the following warning:

CAUTION: *This material will cause sever dermatitis if it is allowed to come in contact with the skin or eyes. Use gloves and protective creams on the hands. Should this material contact skin, wash thoroughly with soap and water. Do not attempt to remove this material from skin with solvents. If any gets in the eyes, flush for 10 minutes with water and secure immediate medical attention.*

Any material which shows evidence of crystallization or a permanent increase in viscosity or settling of pigments which cannot be readily redispersed with a paddle shall not be used.

Construction Methods: A survey shall be undertaken by the Engineer on the areas designated on the plans to determine the exact limits and location of the repair areas under this item. Cracks less than $\frac{1}{8}$ " in width need not be repaired under this item.

At the time of mixing, Components A and B and the substrate temperature shall be between 50°F and 85°F, unless the material has been prequalified at a temperature less than 77°F, in which case this lesser temperature shall govern the use of the material. Any heating of the adhesive components shall be done by application of the indirect heat. Immediately prior to filling the tanks of the mixing equipment, each component shall be thoroughly stirred with a paddle. Separate paddles shall be used to stir each component.

Prior to sealing, the crack shall be cleaned free of dust, silt and any other material which would impair bonding. Cleaning shall be done with oil-free compressed air jets or preferably by vacuum cleaning with an industrial vacuum cleaner.

Injection ports shall be inserted in the cracks at intervals recommended by the epoxy manufacturer. The Contractor may use either surface or insertable injection ports, whichever is recommended by the epoxy manufacturer. Spacing of the ports shall be such that the injected adhesive will substantially fill the crack without excessive waste. The spacing of the ports shall be adjusted as the injection process progresses in order to meet this requirement.

Drilling of the injection ports shall be done with a hollow drill bit to which vacuum is applied with an industrial vacuum cleaner. The Contractor shall avoid reinforcing steel during drilling operations. A pachometer may be used to locate and avoid reinforcing steel.

The surface of the crack between ports shall be sealed with tape and/or temporary surface sealant which is capable of retaining the epoxy adhesive in the crack during pressure injection and shall remain in place until the epoxy adhesive has hardened. Sealant tape and/or other temporary surface sealant shall be removed when no longer required and any spillage of epoxy shall be removed. No cleanup of surfaces not generally viewed by the public will be required unless the surface sealant will interfere with subsequent surface treatments.

Epoxy adhesive shall be pumped into the cracks through the injection ports. The pump, hose, injection gun and appurtenances shall properly proportion and mix the epoxy and shall be capable of injecting the epoxy at a sufficient rate and pressure to completely fill all designated cracks. A suitable gasket shall be used on the head of the injection gun to prevent the adhesive from running down the face of the concrete. Pumping pressure shall be kept as low as practicable.

The temperature of the concrete shall not be less than 50°F at the time epoxy is injected, unless the epoxy has been prequalified at a lower temperature as hereinbefore provided, in which case the lower temperature shall govern.

For a crack with a uniform thickness, the epoxy adhesive shall be force into the first port at one end of the crack until adhesive runs in substantial quantity from the next adjacent port. The first port shall then be sealed and injection shall commence at the next port. Injection shall then continue from port to port in this manner until the crack is fully injected.

Cracks with varying thickness shall have the epoxy adhesive forced into the port at the widest gap in the crack until adhesive runs in substantial quantity from the two adjacent ports. The first port shall then be sealed and injection shall commence at the adjacent port corresponding to the shorter side of the crack. Injection shall then continue from port to port in this manner until the shorter side of the crack is fully injected. Similarly, injection shall continue from port to port on the longer side of the crack, beginning with the port that was filled with epoxy adhesive but not sealed, until the crack is fully injected.

For slanting or vertical cracks, pumping shall start at the lower end of the crack. Where approximately vertical and horizontal cracks intersect, the vertical crack below the intersection shall be injected first. The ports shall be sealed by removing the fitting, filling the void with epoxy and covering with tape or surface sealant.

Before starting injection work and at 2-hour intervals during injection work, whenever requested by the Engineer, a 3 fluid-ounce sample of mixed epoxy shall be taken from the injection gun. Should these samples show any evidence of improper proportioning or mixing, injection work shall be suspended until the equipment or procedure are corrected.

Samples obtained above shall be used directly, without further stirring, to make test pieces for the Slant Shear Strength on Dry Concrete. One test piece shall be made at the beginning, the middle and the end of daily operations. The samples shall be allowed to cure for 7 days in the "Concrete Cylinder Curing Box". On the 7th day, the samples shall be removed to the Laboratory and tested in accordance with the requirement for the Slant Shear Strength (see attached Appendix A).

Each sample shall be numbered consecutively and dated (with a waterproof marker) and shall note which sample represents which part of the structure.

Technical Advisor: The Contractor shall provide the Engineer with a notarized statement showing a specific record of epoxy injections actually made by the Contractor and/or a specific record of training of his employees in epoxy injection repairs taught by the epoxy manufacturer. If the statement is not produced or is deemed insufficient by the Engineer, the contractor shall obtain the services of a Technical Advisor who is employed by the epoxy manufacturer. The Technical Advisor shall assist the Engineer and the Contractor in the correct use of the injection resin. The Advisor shall be a qualified representative, approved by the Engineer, and shall be at the site of the work when the work begins in connections with the epoxy injection, and at such other times as the Engineer may request until completion of work under this item.

Methods of Measurements: This work will be measured for payment by the total length of all cracks, which have been designated by the Engineer to be injected and which were subsequently filled with epoxy, completed and accepted by the Engineer.

Where a crack designated for repair under this item extends around a corner of a concrete member, the length of crack on both faces will be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per linear foot for “Epoxy Injection Crack Repair”, complete in place, which price shall include cleaning and preparing cracks to be epoxy injected, all materials, equipment, tools, labor and clean up incidental thereto.

Pay Item

Epoxy Injection Crack Repair

Pay Unit

L.F.

APPENDIX A

Prequalification Procedure

The Prequalification Procedure shall consist of the following test procedures on the mixed epoxy resin at a temperature of 77°F, unless the Contractor desires to use the material at a lower temperature than 50°F, in which case the lower temperature shall be used to condition the material and test pieces.

Test: Viscosity

Requirement: 900 centipoise, maximum at 77°F (62°F)
4000 centipoise, maximum at any test temperature
Test Method: ASTM D2393

Test: Gel Time (Pot Life)

Requirement: 4 to 60 minutes
Test Method:

A. Apparatus:

1. Unwaxed paper cups, 8 oz, 2 inches 4 1/4" at base.
2. Wooden tongue depressor with ends cut square.
3. Stainless steel spatula with 6"x1" blade and with end cut square.
4. Stopwatch, 1 second or smaller divisions.
5. Balance, 0.1 gram divisions.

B. Test Procedure:

1. Condition both Components A and B to required temperature (62°F).
2. Measure proper volumes of well mixed Components A and B into an 8-oz. unwaxed cup to yield total mass of 60 (62.0) grams.
3. Start stopwatch immediately and mix components for 60 seconds, stirring with a wooden tongue depressor, taking care to scrape the sides and bottom of the cup periodically.
4. Place the sample at the required temperature (62°F) on a wooden bench top which is free of excessive drafts.
5. Probe the mixture with the tongue depressor once every 30 seconds starting 4 minutes from the time of mixing.
6. The time at which a soft stringy mass forms in the cup is the gel time.

Test: Slant Shear Strength on Wet Concrete

Requirement: 1700 psi, minimum after 7 days of cure in air at the required temperature (62°F).

Test: Slant Shear Strength on Dry Concrete

Requirement: 4500 psi, minimum after 7 days of cure in air at the required temperature (62°F).

Test: Slant Shear Strength

A. Materials

1. Ottawa sand, ASTM C109
2. Portland cement Type II
3. Water

B. Apparatus:

1. Suitable mold to make diagonal concrete mortar block with a square base of 2-inch sides, and having one 2"x4" diagonal face, starting about 3/4" above the base. The diagonal faces of two such blocks are bonded together producing a block of 2"x2"x5" dimensions.
2. Blocks are made from the following composition:
 - Ottawa sand, ASTM C109 30.1 lbs
 - Portland Cement Type II 12.1 lbs
 - Water 4.8 lbsCure blocks 28 days in a fog room. Dry and lightly sandblast diagonal faces.
3. Suitable test press.

C. Test Procedure:

Condition the components for 4 hours at the required temperature (62°F). Without entrapping air, stir the separate components for 30 seconds and place the proper volumes of each component on a plate and mix with a spatula for 60 seconds. Apply a coat approximately 0.010-inch thick to each diagonal surface. Place four 1/8" square pieces of shim stock 0.012" thick on one block to control final film thickness.

Before pressing the coated surface together, leave the blocks so that the coated surfaces are horizontal until the epoxy reacts slightly to prevent excessive flow. Press diagonal surfaces of each block together by hands and remove excess epoxy adhesive.

Align the blocks so that the ends and sides are square and form a 2"x2"x5" block. Use blocks of wood or metal against each 2"x2" end to keep the diagonal faces from slipping until epoxy hardens.

After the required cure time, apply a suitable capping compound to each of the 2"x2" suitable testing apparatus at the rate of 5000 lbs/min until failure.

Report results in pounds per square inch = 1/4 x (Load in Pounds)

For wet shear strength, soak another set of block in water for 24 hours at the require temperature (62°F). Remove and wipe off excessive water. Prepare, cure and test sample according to above test procedure.

Test: Tensile Strength

Requirement: 4500 psi, minimum

Test: Elongation

Requirement: 15% maximum

Test Method: Tensile Strength and Elongation

A. Apparatus:

1. Leveling table about 12"x8" with removable rim ¼" thick by ½" wide.
2. Mylar or similar plastic sheeting 0.004" thick.
3. Air circulation oven capable of maintaining 158°F (63°F).
4. Cutting die, Figure 1.
5. Thickness gauge, 1/8".
6. Release agent, non-silicone type.

B. Procedure:

1. Place mylar sheet on leveling table.
2. Coat inside edge and bottom of rim with release agent and secure table with screws.
3. Level the table.
4. Mix sufficient volume of well-mixed Component A and well-mixed Component B in the proper volumes so as to be able to form a layer 1/8" deep when placed inside of the ring on the leveling table.
5. Introduce as few bubbles as possible during mixing.
6. Flush surface of epoxy with a heat gun or Bunsen burner to remove air bubbles on surface. Repeat if necessary.
7. Allow the specimen to cure for 18 hours at the required temperature (62°F).
8. Remove specimen from table and strip off mylar sheet. Cure specimen at 158°F (63°F) for 5 hours
9. Allow specimen to cool to the required temperature and cut specimens using using cutting die shown on Figure 1.
10. Proceed as specified in ASTM d638 using 0.2 inch/minute test rating, and 1" gauge length.

Test: Infrared Curve

Requirement: Infrared Curved shall be obtained of Components A and B

Test method: Recording Spectrophotometer

A. Apparatus:

1. Perkin-Elmer Model 137-B Infracord Spectrophotometer, automatic recording system from 2.5 to 15 microns, with a two-speed recorder. Comparable results can be obtained by other double-beam recording spectrophotometers with similar resolution.
2. Disk holder for a 1"-diameter disk.
3. Two sodium chloride crystal disks, one inch in diameter.
4. Sorvall SS-3 Automatic Superspeed Centrifuge, or a comparable centrifuge, which is able to separate the liquid and solid phases of the epoxy components without previous dilution with solvents.

B. Procedure:

1. Place about 15 grams of Component A into a stainless centrifuge tube.
2. Counterbalance with Component B in a second centrifuge tube.
3. Centrifuge the two components at 17,000rpm until there is a supernatant liquid layer present in each tube. This takes 20 – 30 minutes.
4. Place a drop of Component A liquid layer on a sodium chloride disk.
5. Place another sodium chloride disk over the drop, rotate and press down until the liquid has flowed into a uniform layer of proper thickness between the two sodium chloride disks.
6. Place the disk in the holder and run an absorption curve with the infrared spectrophotometer.
7. More or less liquid may be used between the disks so as to produce a maximum absorption of 0.7 to 1.0 for the strongest absorption point on the above.
8. Clean disks with toluene and dry.
9. Repeat steps 4 through 8 with the liquid layer from Component B.
10. Record each curve in order that they may be used for comparison purposed to lots of material delivered to the job site.

ITEM #0602911A – DRILLING HOLES AND GROUTING ANCHOR BOLTS

Work under this item shall conform to the requirements of Section 6.02 amended as follows:

DESCRIPTION: This work shall include drilling and grouting of anchor bolts (rods) into the existing spandrel walls/counterforts as shown on the plans or as directed by the Engineer.

MATERIALS: The cementitious grout or chemical anchoring material shall be capable of resisting 125% of the yield strength of the anchor rod and shall be approved by the Engineer.

CONSTRUCTION METHODS: The drilling and grouting of the anchor bolts (rods) shall be done in accordance with the anchoring material manufacturer’s recommendations. The actual depth of the hole required varies between products but may not be less than the minimum depth specified on the plans.

The minimum anchor embedment provided in the contract document is based on the depth required to prevent failure of the existing concrete, not the requirements of the anchoring material. Minimum embedment specified is usually based on the assumptions that the existing concrete strength is not less than 3000 psi and that there is less than 1/2" of deteriorated concrete on the surface. If the concrete looks soft, poor, or there is significantly more than 1/2" of deteriorated concrete, check with the designer to make sure the conditions are accounted for.

A pachometer shall be used to locate existing steel. If existing reinforcing bars are encountered during the drilling operation, the hole shall be relocated as shown on the plans or as directed by the Engineer to clear the existing reinforcing bar(s). Uncompleted holes shall be filled with the anchoring material and finished smooth to the contour of the surrounding concrete surface.

METHOD OF MEASUREMENT: The drilling and grouting of an anchor bolt (rod) will be one unit each.

BASIS OF PAYMENT: This work will be paid for at the contract unit price per each “Drilling Holes and Grouting Anchor Bolts” complete in place, which price shall include all material, equipment, tools and labor incidental thereto.

Pay Item
Drilling Holes and Grouting Anchor Bolts

Pay Unit
ea.

ITEM #0602972A – BOLT AND RIVET REPLACEMENT

Description: Work under this item shall consist of the removal of existing rivets to be replaced with new high strength bolts for existing deteriorated rivets, reduced rivets, and new connections, as indicated on the plans and as directed by the Engineer.

Materials: As required.

Construction Methods: Rivets shall be removed by pneumatic or mechanical tools in a manner that will not damage the underlying, connected material. Flame cutting methods shall not be used without the approval of the Engineer. Upon removal of each rivet, the base metal around the hole shall be examined for surface irregularities and deterioration. All oxidized material shall be removed.

Bolts replacing rivets shall be high strength bolts conforming to Section 6.03 of the Standard Specifications. Where rivet diameters are increased by removal of oxidized materials or removal of corrosion, the tolerance of the resultant hole must be not more than 1/32-inch larger than the mating bolts; under these conditions, provide all high strength bolts in larger diameters as may be required. A hardened washer shall be provided under the turned element of each bolt.

Only one rivet at a time shall be removed for replacement with high strength bolts, unless otherwise authorized by the Engineer. The replacement bolt shall be properly tensioned prior to removal of a subsequent rivet. Bolt tensioning shall be by the "turn-of-nut" method in accordance with the provisions of the AISC "Specifications for Structural Joints" using ASTM A325 or A490 bolts.

Method of Measurement: This item shall be measured for payment by the number of rivets or bolts replaced.

Basis of Payment: This work will be paid for at the contract unit price each for "Bolt and Rivet Replacement", which price shall include all tools and labor incidental to the removal and disposal of the material from the site. Payment for new bolts will be included under this item.

Pay Item	Pay Unit
Bolt and Rivet Replacement	EA.

ITEM #0603801A – STRUCTURAL STEEL**ITEM #0603908A - STRUCTURAL STEEL (SITE NO. 8)****ITEM #0603931A – STRUCTURAL STEEL (SITE NO. 11)**

Section 6.03 *is supplemented and amended as follows:*

6.03.01 - Description: *After the third paragraph, add the following:*

“ This special provision provides additional requirements for the surface preparation, shop painting, and field touch-up painting of new structural steel.”

6.03.02 – Materials: *After the second paragraph, add the following:*

“ Painting materials for this work shall conform to the following:

- The Contractor shall select a three-coat system from the qualified product List A or B, issued by the Northeast Protective Coating Committee (NEPCOAT). The approved NEPCOAT listings may be found at the NEPCOAT website at <http://www.nepcoat.org/>
- Note: The List B Carboline Company system that specifies Carboguard 888 is not eligible for use under this special provision at this time.
- The system chosen shall have a prime coat that has achieved a Class ‘B’ slip coefficient for faying surfaces. Top coat paint color shall be as noted on the plans.
- Both the shop painted and field touchup applied coating systems shall be of the same three-coat system. A compatible organic zinc rich primer shall be used for any necessary field touch up.
- The same coating material manufacturer shall furnish all materials for the complete coating system. Intermixing of materials within and between coating systems will not be permitted.
- Thinning of paint shall conform to the manufacturer’s written instructions.”

6.03.03 – Construction Methods: *Revise Subarticle 4(f) “Field Erection - High Strength Bolted Connections” as follows:*

Replace the first sentence of the fourth paragraph “Surface Conditions: At the time of assembly ... other foreign material.” with the following:

“ Connection faying surfaces within portions of structural steel designated to be painted shall receive a single coat of primer in accordance with requirements stipulated elsewhere in this special provision.”

Delete the fifth paragraph of Subarticle 4(f) and the three bulleted paragraphs after it: “Paint is permitted on ... wire brushing is not permitted.”

After the last paragraph of Article 6.03.03, before Tables A through C, add the following:

“ The painting application shall be done in compliance with the following requirements:

Qualifications of Shop Painting Firm: All shop painting of structural steel must be performed by and in an enclosed shop that is certified by the SSPC Painting Contractor Certification Program QP-3, entitled “Standard Procedure for Evaluating Qualifications of Shop Painting Contractors” in the enclosed shop category or by a shop that holds an AISC Quality Certificate with a “Sophisticated Paint Endorsement” in the enclosed shop category. The firm shall be fully certified, including endorsements, for the duration of the surface preparation and coating application. A copy of the subject certification shall be provided to the Engineer prior to commencing any surface preparation or coating application.

The shop painting firm is required to have at least one (1) **Coating Application Specialist (CAS) (SSPC ACS/NACE No. 13)**-certified (Level II-Interim Status-Minimal) craft-worker. CAS-certified (Level II-Interim Status-Minimal) craft-worker(s) are required for all crews/craft-workers up to four (4) crew members. For each crew larger than four (4), an additional CAS-certified (Level II-Interim Status-Minimal) craft-worker shall be present on each painting/blasting crew during blast cleaning and spray application (Atmospheric and Immersion Service) operations. A crew-member is a person who is on the job performing hand-held nozzle blast cleaning and/or spray application of protective coatings on a steel structure. The certification(s) must be kept current for the duration of the Project work.

The complete coating system shall be applied in an enclosed shop except for field touch-up painting which shall be applied after all bolts are fully tensioned and deck formwork removed. The enclosed shop shall be a permanent facility with outside walls to grade and a roof where surface preparation and coating activities are normally conducted in an environment not subject to outdoor weather conditions or blowing dust.

Quality Control Inspection of Shop Painting: The firm performing shop painting of the structural steel shall have a written quality control (QC) program. A copy of the QC program and record keeping procedures shall be provided to the Engineer prior to commencing any surface preparation or coating application. The program shall contain, but not be limited to, the following:

1. Qualifications of QC staff.
2. Authority of QC staff. QC staff must have the authority to stop non-conforming work.
3. Procedure for QC staff to advise operation supervisor, in writing, of non-conforming work.
4. Sample copy of QC inspection reports that will document compliance with specifications.
5. Procedure for calibrating inspection equipment and recording calibration.
6. Procedure for repairing defective coating applications.

The Contractor or Shop shall provide at least one Quality Control Inspector for the duration of the shop application to provide Quality Control. The QC Inspector must be a National Association of Corrosion Engineers (NACE) Certified Coating Inspector Level 3 with Peer Review. The QC Inspector shall verbally inform the Engineer on a daily basis, of the progress and any corrective actions performed on the coating work. The QC Inspector shall be present during all cleaning and coating operations.

The Contractor or Shop shall be responsible for purchasing and providing the latest version of the NACE Coating Inspector Log Book(s) and all necessary inspection tools. The Contractor’s QC

Inspector shall stamp the front page of each inspector's log book used during painting operations. The stamped book(s) shall indicate the inspector's NACE certification number, certification expiration date and shall also be signed. All daily coating activity shall be recorded in the Log Book. Copies of the log entries shall be provided on a daily basis to the Department's Quality Assurance (QA) shop representative. Upon completion of the coating, the log book(s) shall then be furnished to the Department's QA shop representative.

Technical Advisor: The Contractor or Shop shall obtain the services of a technical advisor who is employed by the coating manufacturer to assist the Engineer and shop painting firm during this work. The technical advisor shall be a qualified representative and shall be made available at the Shop upon request by the QC Inspector or the Engineer.

Surface Preparation: The following steps shall be performed prior to abrasive blast cleaning of steel members:

1. All corners and edges shall be rounded to a 1/16-inch radius or chamfered to a 1/16-inch chamfer.
2. All fins, slivers and tears shall be removed and ground smooth.
3. All rough surfaces shall be ground smooth.
4. Flame cut edges shall be ground over their entire surface such that any hardened surface layer is removed, and subsequent abrasive blast cleaning produces the specified surface profile depth.

Immediately before abrasive blast cleaning all steel members shall be solvent cleaned in accordance with SSPC-SP1 - "Solvent Cleaning."

Abrasive blast cleaning shall be performed in accordance with SSPC-SP 10 - "Near White Blast Cleaning" using a production line shot and grit blast machine or by air blast. The abrasive working mix shall be maintained such that the final **surface profile** is within the range described herein.

The QC Inspector shall test the abrasive for oil, grease or dirt contamination in accordance with the requirements of ASTM D7393 and document the test results. Contaminated abrasive shall not be used to blast clean steel surfaces. The blast machine shall be cleared of all contaminated abrasive and then solvent cleaned thoroughly in accordance with SSPC-SP 1 "Solvent Cleaning." New uncontaminated abrasive shall be added. Abrasive shall be tested for contaminants in accordance with the requirements of ASTM D7393 prior to the start of blast cleaning operations and at least every four hours during the blast cleaning operations.

All compressed air sources shall have properly sized and designed oil and moisture separators, attached and functional, to allow air at the nozzle, either for blast cleaning, blow-off, painting or breathing, to be oil-free, and moisture-free. The equipment shall have sufficient pressure to accomplish the associated work efficiently and effectively.

The QC Inspector shall perform the blotter test and document the results at the start of each blasting shift and at least every four hours during the blasting operation to ensure that the compressed air is free of oil and moisture. The blotter test shall be performed in accordance with

the procedure outlined in ASTM D4285. For contaminated air sources, the oil and moisture separators shall be drained and the air retested.

No surface preparation or coating shall be done when the relative humidity is at or above 80 percent or when the surface temperature of the steel is less than five (5) degrees Fahrenheit above the dewpoint temperature as determined by a surface thermometer and an electric or sling psychrometer.

Surface Profile: The steel surface profile shall be 1 to 3 mils. Each girder or beam shall have the surface profile measured at a minimum of three locations in accordance with the test requirements of ASTM D4417, Method C. Smaller pieces such as diaphragms shall have the surface profile measured at a minimum of three locations on one piece at the beginning of abrasive blast operations and at least every four hours and at the end of abrasive blast cleaning operations. This measurement shall be performed with both coarse (0.8-2.0 mils) and extra coarse (1.5-4.5 mils) replica tape. During this measurement, special attention shall be given to areas that may have been shielded from the blast wheels, such as the corners of stiffeners and connection plates. The impressed tapes shall be filed in the NACE Coating Inspector's Log Book.

Application Methods: The coating system shall be applied by spray equipment of a type and size capable of applying each coat within the required thickness range. The applicator shall strictly adhere to the manufacturer's written recommendations for application methods, cure times, temperature and humidity restrictions and recoat times for each individual coat of the specified system. However, in no case shall coatings be applied in ambient conditions that exceed the relative humidity and dewpoint temperature control limits specified herein. Brushes shall be used in areas where spray application will not achieve acceptable results. Brushing technique shall be performed in a manner that will provide a uniform, blended finish.

Conventional spray equipment with mechanical agitators shall be used for prime coat application.

All storage, mixing, thinning, application and curing techniques and methods shall be accomplished in strict accordance with the printed material data sheets and application instructions published by the respective coating material manufacturer.

Surfaces shall be painted with the specified prime coat material before the end of the same work shift that they were blast cleaned and before any visible rust back occurs. Applied coatings shall not have runs, sags, holidays, pinholes or discontinuities.

The dry film thickness shall be within the range specified in the manufacturer's printed literature for the specified coating system. Dry film thickness shall be measured in accordance with SSPC-PA 2. The prime, intermediate and top coats shall be of contrasting colors as determined by the Engineer. There shall be no color variation in the topcoat as determined by comparison with Federal Standard 595.

Areas Requiring Special Treatment: All steel surfaces shall receive the three-coat shop applied system as specified except the following particular area types which shall be treated as follows:

1. Faying surfaces of connections shall receive a single application of primer. The dry film thickness shall be no greater than the thickness tested on the coating manufacturer's Certified Test Report for slip coefficient.
2. All steel surfaces within four (4) inches of field welds shall receive a single mist coating of primer at 0.5 - 1.5 mils dry film thickness.
3. Top surfaces of top flanges that will be in contact with concrete shall receive a single mist coating of primer at 0.5 - 1.5 mils dry film thickness.
4. Edges and shop welds shall be locally hand-stripped with a brush in the longitudinal direction with an additional coat of an appropriate zinc-rich primer prior to application of the full intermediate coat. The application of the striping materials shall be in accordance with the coatings manufacturer's written instructions. The striping material shall be a contrasting color to distinguish it from the primer and intermediate coats.
5. The interior surfaces of box girders, including bracing, shall be prepared in accordance with these specifications then coated with the first two coats of the three-coat system. The intermediate coat in these areas shall be white and match Federal Standard 595 Color Number 27925.

Adhesion: Adhesion strength of the fully coated assemblies shall be the more restrictive of the manufacturer's specified adhesion strength or at least 600 psi for systems with organic zinc primers and at least 250 psi for systems with inorganic zinc rich primers measured as per ASTM D4541 using apparatus under Annex A4. All adhesion test locations shall be recoated in accordance with this specification at no additional cost. The QC Inspector shall perform adhesion strength tests every 500 sf and shall document the adhesion strength test results.

If adhesion test results are less than the specified value, but equal to or greater than 80% of the specified value, four (4) additional adhesion tests shall be taken within the 500 sf area of the failed test. If any of the additional adhesion tests are less than the specified value, the coating shall be removed from the entire piece and re-applied at the Contractor's expense. If any adhesion tests are less than 80% of the specified value, the entire coating system shall be removed from the piece and re-applied at the Contractor's expense.

Smaller pieces such as diaphragms shall be analyzed in lots that have an overall coated surface area of approximately 500 sf.

Protection of Coated Structural Steel: All fully coated and cured assemblies shall be protected from handling and shipping damage with the prudent use of padded slings, dunnage, separators and tie downs. Loading procedures and sequences shall be designed to protect all coated surfaces. Erection marks for field identification of members and weight marks shall be affixed in such a manner as to facilitate removal upon final assembly without damage to the coating system.

Field Touch-Up Painting of Shop Applied Coating: Field touch-up painting shall be undertaken by the Contractor for the purpose of completing coating applications of masked-off areas at splices, connections, and for the repair of coated surfaces damaged during shipment or construction, as directed by the Engineer. The Aesthetics of any field painting is very important. Every effort must be made to perform any field painting in a professional manner that does not affect the appearance or aesthetic value of the structural steel in any way. Significant color

variations or texture changes between the shop painting and field painting will not be allowed. The Contractor will be required to perform any additional field painting work required to provide consistent color and texture throughout the structural steel. This is especially true for all Fascia surfaces and areas exposed to public view. The Engineer will be the sole judge on color variations and textures variations of the field painting.

The Painting Contractor shall submit for approval by the Engineer a complete coating application procedure for all touch-up painting and corrective work. .

The field applied coating for touch-up painting shall be the same system used in the shop applied application. The intermediate and topcoat material for field touch-up painting shall be from the same lot and batch used in the shop provided its shelf life has not expired. If the shelf life has expired, the same material of the same color from a different lot and batch shall be used.

Field application of coatings shall be in accordance with the manufacturer's written application guidelines and these specifications. All areas cleaned to bare metal must be coated with zinc-rich primer before any visible rusting occurs.

After all concrete is placed and the forms are removed, all rust, scale, dirt, grease, concrete splatter and other foreign material shall be completely removed from all painted surfaces. All surfaces to be field painted shall also be cleaned by solvent cleaning in accordance with SSPC-SP 1, hand tool cleaning SSPC-SP 2, and power tool cleaning SSPC-SP 3 and SSPC-SP 11. Areas cleaned to SSPC-SP 11 must have a 1-3 mil profile and must be primed prior to rusting. All debris generated from cleaning operations must be contained and properly disposed of by the Contractor.

Bolts, nuts, washers and surrounding areas shall receive brush applications of intermediate and topcoat after final tensioning. Careful attention shall be given to bolted connections to insure that all bolts, nuts and washers are fully coated and that no gaps are left unfilled and uncoated.

Damage to the coating system that extends to the steel surface (such as scratches, gouges or nicks), shall have the entire three-coat system locally reapplied after power tool cleaning to bare metal in **accordance with SSPC-SP 11. The coating system adjacent to the damage shall be feathered back to increase** the surface area for touch up painting. The area cleaned to SSPC-SP 11 shall be primed with a zinc-rich primer before rusting occurs.

Damage to the coating system that extends back only to the prime or intermediate coat, shall only have the topcoat applied. Application of the touch-up materials in these damaged areas shall be performed by brush only.

During any field painting the Contractor shall protect property, pedestrians, vehicular and other traffic upon, underneath, or in the vicinity of the bridge, and also all portions of the bridge superstructure and substructure against damage or disfigurement from errant coating materials.

Tarps shall be used to collect all surface preparation debris. The Contractor shall be responsible for disposing of all removed materials, including tarps.

Contractor – Subcontractor Qualifications: Contractors and subcontractors doing field touchup painting work are required to be certified by the SSPC Painting Contractor Certification Program (PCCP) to QP-1, entitled “Standard Procedure for Evaluating Qualifications of Painting Contractors (Field Application to Complex Structures)” at the time of field touchup coating application.

Contractors and subcontractors are required to have at least one (1) **Coating Application Specialist (CAS) (SSPC ACS/NACE No. 13)**-certified (Level II-Interim Status-Minimal) craft-worker. CAS-certified (Level II-Interim Status-Minimal) craft-worker(s) are required for all crews/craft-workers up to four (4) crew members. For each crew larger than four (4), an additional CAS-certified (Level II-Interim Status-Minimal) craft-worker shall be present on each painting/blasting crew during blast cleaning and spray application (Atmospheric and Immersion Service) operations. A crew member is a person who is on the job performing hand-held nozzle blast cleaning and/or spray application of protective coatings on a steel structure. The certification(s) must be full, not interim, and must be kept current for the duration of the Project work. If a Contractor’s, subcontractor’s or any craft-worker’s certification expires, the firm will not be allowed to do any work on this item until the certification is reissued.

Requests for extension of time for any delay to the completion of the Project due to an inactive certification will not be considered and liquidated damages will apply. At the option of the Engineer, if such a delay will adversely impact the successful and timely completion of the Project, the Department may require the Contractor to engage another SSPC certified contractor to do the painting work at the prime contractor’s expense.

Quality Control Inspection of Field Touchup Painting: The Contractor performing field touchup painting of the structural steel shall have a written quality control (QC) program. A copy of the QC program and record keeping procedures shall be provided to the Engineer prior to commencing any surface preparation or coating application. The program shall contain, but not be limited to, the following:

1. Qualifications of QC staff.
2. Authority of QC staff. QC staff must have the authority to stop non-conforming work.
3. Procedure for QC staff to advise operation supervisor, in writing, of non-conforming work.
4. Sample copy of QC inspection reports that will document compliance with specifications.
5. Procedure for calibrating inspection equipment and recording calibration.
6. Procedure for repairing defective coating applications.

The Contractor shall provide at least one (1) Coating Inspector who is a National Association of Corrosion Engineers (NACE) Certified Coating Inspector Level 3 with Peer Review for the duration of the field application to provide Quality Control. The QC Inspector shall verbally inform the Engineer on a daily basis, of the progress and any corrective actions performed on the coating work. The QC Inspector shall be present during all cleaning and coating operations.

The Contractor shall be responsible for purchasing and providing the latest version of the NACE Coating Inspector Log Book(s) and all necessary inspection tools. The Contractor’s QC Inspector shall stamp the front page of each inspector’s log book used during painting operations. The stamped book(s) shall indicate the inspector’s NACE certification number, certification expiration

date and shall also be signed. All daily coating activity shall be recorded in the Log Book. Copies of the log entries shall be provided on a daily basis to the Department's Quality Assurance (QA) field representative. Upon completion of the coating, the log book(s) shall then be furnished to the Department's QA field representative.

General: The word "PAINTED" followed by the month and year the painting of the structure is completed along with the ConnDOT Project Number and the manufacturer's abbreviations for each of the three coats, shall be stenciled on the inside of a fascia girder at mid-depth of the girder in three (3) inch high block letters located near the abutment, so as to be clearly visible from the ground below. Paint for stenciling information shall be of a contrasting color and be compatible with the topcoat."

6.03.05 – Basis of Payment: *Add the following at the end of the second paragraph:*

"Payment for either method for new structural steel, complete in place, shall also include shop painting, all field touch-up painting and corrective or repair field painting, QC Inspector(s), QC Log Book(s) and testing equipment, technical advisor, "Painted" stencil, equipment, tools and labor incidental thereto."

ITEM 0603222A – DISPOSAL OF LEAD DEBRIS FROM ABRASIVE BLAST CLEANING

Description:

Work under this item shall include the handling, loading, packing, storage, transportation and final off-site disposal of hazardous lead debris which has been generated in conjunction with work conducted under Item 0020904A – Lead Compliance For Abrasive Blast Cleaning.

The Engineer previously analyzed a representative sample of the lead debris prior to generation and found leachable lead above RCRA-hazardous levels. A summation of the analytical results is included here:

<u>Bridge No.</u>	<u>TCLP Results</u>
Bridge No. 00571A - Paint associated with the structural steel/metal bridge components	460 mg/l

The Contractor shall comply with the latest requirements of the USEPA RCRA Hazardous Waste Regulations 40 CFR 260-274 and the DEEP Hazardous Waste Management Standards 22a-449(c).

Hazardous lead debris shall be transported from the Project by a licensed hazardous waste transporter approved by the Department and disposed of at an EPA-permitted and Department-approved hazardous waste landfill within 90 days from the date of generation.

The Contractor must use one or more of the following Department-approved disposal facilities for the disposal of hazardous waste:

Clean Earth of North Jersey, Inc., (CENJ) 115 Jacobus Avenue, South Kearny, NJ 07105 Phone: (973) 344-4004; Fax: (973) 344-8652	Clean Harbors Environmental Services, Inc. 2247 South Highway 71, Kimball, NE 69145 Phone: (308) 235-8212; Fax: (308) 235-4307
Clean Harbors of Braintree, Inc. 1 Hill Avenue, Braintree, MA 02184 Phone: (781) 380-7134; Fax: (781) 380-7193	Cycle Chem (General Chemical Corp.) 217 South First Street, Elizabeth, NJ 07206 Phone: (908) 355-5800; Fax (908) 355-0562
EnviroSafe Corporation Northeast (former Jones Environmental Services (NE), Inc.) 263 Howard Street, Lowell, MA 01852 Phone: (978) 453-7772; Fax: (978) 453-7775	Environmental Quality Detroit, Inc. 1923 Frederick Street, Detroit, MI 48211 Phone: (800) 495-6059; Fax: (313) 923-3375
Republic Environmental Systems 2869 Sandstone Drive, Hatfield, PA 19440 Phone: (215) 822-8995; Fax: (215) 997-1293	Northland Environmental, Inc. (PSC Environmental Systems) 275 Allens Avenue, Providence, RI 02905 Phone: (401) 781-6340; Fax: (401) 781-9710

Environmental Quality Company:
Wayne Disposal Facility
49350 North I-94 Service Drive
Belleville, MI 48111
Phone: (800) 592-5489; Fax: (800) 592-5329

Construction Methods:

A. Submittals

The apparent low bidder shall submit in writing, within fourteen days after Bid opening, (1) a letter listing the names of the hazardous waste disposal facilities (from the above list) that the bidder, if it is awarded the Contract, will use to receive hazardous material from this Project, (2) a copy of the attached “Disposal Facility Material Acceptance Certification” form from each facility, which shall be signed by an authorized representative of each disposal facility, and (3) a copy of each facility’s acceptance criteria and sampling frequency requirements.

Any other Contractor which the Department may subsequently designate as the apparent low bidder shall make the aforementioned submissions within fourteen (14) days from the date on which the Department notifies the Contractor that it has become the apparent low bidder. If, however, the Department deems it is necessary for such a subsequent-designated Contractor to make said submissions within a shorter period of time, the Contractor shall make those submissions within the time designated by the Department.

Failure to comply with all of the above requirements may result in the rejection of the bid.

No facility may be substituted for the one(s) designated in the Contractor’s submittal without the Engineer’s prior approval. If the material cannot be accepted by any of the Contractor’s designated facilities, the Department will supply the Contractor with the name(s) of other acceptable facilities.

Disposal Facility Materials Acceptance Certification

Project Number _____

Project Location _____

Facility Name _____ Telephone _____

Facility Address _____ Fax _____

The Contractor has supplied the analytical data contained in the report concerning the site investigation performed by the Department. I have personally reviewed this data and intend to accept the following:

Hazardous materials as described in Item # 0603222A Disposal of Lead Debris from Abrasive Blast Cleaning for the subject Project at a cost of \$ _____ per ton for disposal and an additional \$ _____ per ton for transportation from the Project to the facility (if applicable).

This intent to accept the material will be subject to and dependent upon the facility's subsequent evaluation of the waste characterization documentation to be provided to the Contractor by the Engineer.

Authorized Facility Representative _____ / _____
Printed/Typed Name Title
_____/_____
Signature Date

Note: The facility shall attach the acceptance criteria and facility sampling frequency requirements to this document.

DO NOT ALTER FORM IN ANY WAY. FORM MUST BE COMPLETED IN ENTIRETY.

B. EPA ID Number:

Prior the generation any hazardous waste on a contiguous per site basis, the Contractor shall notify the Engineer of its selected hazardous waste transporter and disposal facility. The Contractor must submit to the Engineer (1) the transporter's current US DOT Certificate of Registration and (2) the transporter's current Hazardous Waste Transporter Permits for the State of Connecticut, the hazardous waste destination state and any other applicable states. The Engineer will then obtain on a contiguous per site basis a temporary EPA Generators ID number for the site that he will forward to the Contractor. Any changes in transporter or facility shall be immediately forwarded to the Engineer for review.

C. General:

Handling, storage, transportation and disposal of hazardous waste materials generated as a result of execution of this project shall comply with all Federal, State and Local regulations including the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260-271), the CTDEEP Hazardous Waste Regulations (22a-209 and 22a-449(c)), and the USDOT Hazardous Materials Regulations (49 CFR Part 171-180).

All debris shall be contained and collected daily or more frequently as directed by the Engineer, due to debris buildup. Debris shall be removed by HEPA vacuum collection. Such debris, abrasive blast residue, rust and paint chips shall be stored in leak-proof storage containers in the secured storage site, or as directed by the Engineer. The storage containers and storage locations shall be reviewed by the Engineer and shall be located in areas not subject to ponding.

All storage containers (roll offs or drums) shall have a protective liner and removable lid. These containers shall not have any indentations or damage that would allow seepage of the contained material.

If 55 gallon barrels are used, staging is required: 55 gallon barrels shall be stored together in two rows of five. The Contractor shall maintain a minimum lane clearance of 36 inches between each (barrel lot of ten).

The Contractor shall maintain a secure storage site, which shall be large enough to handle all debris. The Contractor shall store debris only in the secured storage site. All lead debris shall be conveyed to the secured storage site at the conclusion of the work shift. The Contractor shall account for all debris conveyed to the secured storage site and all debris transported from the project for disposal.

The secure storage site shall consist of an 8-ft. high fenced-in area with a padlocked entrance. Storage containers shall not be used on the project until and unless they have been reviewed and approved by the Engineer. Storage containers and sites shall be located so as not to cause any traffic hazard. Container storage sites shall be in areas that are properly drained and runoff water

shall not be allowed to pool and shall be out of the 100-year flood plain. The containers shall be placed on pallets or other approved material and not directly on the ground.

Storage containers shall be closed and covered with a waterproof tarpaulin at all times except during placement, sampling and disposal of debris.

The Engineer previously analyzed a representative sample of the lead debris prior to generation and found leachable lead above RCRA-hazardous levels. A copy of the analytical results can be supplied to the Contractor at the time of waste disposal upon request.

Materials other than direct paint related debris which are incidental to the paint removal work activities (tarps, poly, plywood, PPE, gloves, decontamination materials, etc) which may be contaminated with lead, shall be stored separately from the direct paint debris, and shall be sampled by the Engineer for waste disposal characterization testing. Such materials characterized as hazardous shall be handled/disposed of as described herein, while materials characterized as non-hazardous shall be disposed of as non-hazardous CTDEEP Solid Waste under Item 0020904A.

Project construction waste materials unrelated to the paint removal operations shall NOT be combined/stored with paint debris waste and/or incidental paint removal materials as they are not lead contaminated and shall NOT be disposed of as hazardous waste. The Engineer's on-site Inspectors shall conduct inspections to verify materials remain segregated.

Hazardous waste materials are to be properly packed and labeled for transport by the Contractor in accordance with EPA, CTDEEP and USDOT regulations. The disposal of debris characterized as hazardous waste shall be completed within 90 calendar days of the date on which it began to be accumulated in the lined containers. Storage of containers shall be in accordance with current DEEP/EPA procedures.

The Contractor shall label containers with a 6-inch square, yellow, weatherproof, Hazardous Waste sticker in accordance with USDOT regulations.

The Contractor shall obtain and complete all paperwork necessary to arrange for material disposal, including disposal facility waste profile sheets. It is solely the Contractor's responsibility to co-ordinate the disposal of hazardous materials with its selected treatment/recycling/disposal facility(s). Upon receipt of the final approval from the facility, the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the materials in accordance with all Federal and State regulations. **No claim will be considered based on the failure of the Contractor's disposal facility(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient facilities to meet its production rate.**

The Contractor shall process the hazardous waste such that the material conforms with the requirements of the selected treatment/disposal facility, including but not limited to specified size and dimension. Refusal on the part of the treatment/disposal facility to accept said material

solely on the basis of non-conformance of the material to the facility's physical requirements is the responsibility of the Contractor and no claim for extra work shall be accepted for reprocessing of said materials to meet these requirements.

All DOT shipping documents, including the Uniform Hazardous Waste Manifests utilized to accompany the transportation of the hazardous waste material shall be prepared by the Contractor and reviewed/signed by an authorized agent representing ConnDOT, as Generator, for each load of hazardous material that is packed to leave the site. The Contractor shall not sign manifests on behalf of the State as Generator. The Contractor shall forward the appropriate original copies of all manifests to the Engineer the same day the material leaves the Project site.

Materials not related to lead paint removal and/or characterized as non-hazardous waste shall NOT be shipped for hazardous waste disposal in accordance with USEPA RCRA hazardous waste minimization requirements.

A load-specific certificate of disposal, signed by the authorized agent representing the waste disposal facility, shall be obtained by the Contractor and promptly delivered to the Engineer for each load.

D. Material Transportation

Materials determined to be hazardous shall be transported in compliance with the applicable federal/state regulations. Transport vehicles shall have a protective liner and removable lid, shall not have any indentations or damage and must be free from leaks, and discharge openings must be securely closed during transportation.

In addition to all pertinent Federal, State and local laws or regulatory agency polices, the Contractor shall adhere to the following precautions during the transport of hazardous materials off-site:

- All vehicles departing the site are to be properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume, and contents of materials carried. Vehicles shall display the proper USDOT placards for the type and quantity of waste;
- No materials shall leave the site unless a disposal facility willing to accept all of the material being transported has agreed to accept the type and quantity of waste;
- Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the disposal facility; and,
- The Contractor shall segregate the waste streams (i.e. concrete, wood, etc.) as directed by the receiving disposal facility.

Any spillage of debris during disposal operations during loading, transport and unloading shall be cleaned up in accordance with EPA 40 CFR 265 Subparts C & D, at the Contractors expense.

The Contractor is liable for any fines, costs or remediation costs incurred as a result of their failure to be in compliance with this Item and all Federal, State and Local laws.

D. Equipment Decontamination:

All equipment shall be provided to the work site free of gross contamination. The Engineer may prohibit from the site any equipment that in his opinion has not been thoroughly decontaminated prior to arrival. Any decontamination of the Contractor's equipment prior to arrival at the site shall be at the expense of the Contractor. The Contractor is prohibited from decontaminating equipment on the Project that has not been thoroughly decontaminated prior to arrival.

The Contractor shall furnish labor, materials, tools and equipment for decontamination of all equipment and supplies that are used to handle Hazardous Materials. Decontamination shall be conducted at an area designated by the Engineer and shall be required prior to equipment and supplies leaving the Project, between stages of the work.

The Contractor shall use dry decontamination procedures. Residuals from dry decontamination activities shall be collected and managed as Hazardous Materials. If the results from dry methods are unsatisfactory to the Engineer, the Contractor shall modify decontamination procedures as required.

The Contractor shall be responsible for the collection and treatment/recycling/disposal of any liquid wastes that may be generated by its decontamination activities in accordance with applicable regulations.

E. Project Closeout Documents:

The Contractor shall provide the Engineer, within 30 days of completion of the work, a compliance package; which shall include, but not be limited to, the following:

1. Copies of completed Hazardous Waste Manifests (signed by authorized disposal facility representative)
2. Completed Waste Shipment Records/Bills of Lading (signed by authorized disposal facility representative)
3. Completed Weigh Bills (indicating each loads net weight).

Method of Measurement:

The work of "DISPOSAL OF LEAD DEBRIS FROM ABRASIVE BLAST CLEANING" shall be measured for payment as the actual net weight in tons delivered to the treatment/disposal facility. Such determinations shall be made by measuring each hauling vehicle on the permanent

scales at the treatment/disposal facility. Total weight shall be the summation of weigh bills issued by the facility specific to this project and waste stream.

The disposal of any lead painted debris, originally anticipated to be hazardous, but determined by characterization sampling not to contain hazardous concentrations of lead will not be measured for payment under this Item. Disposal of these materials will be handled in accordance with the provisions of Item 0020904A.

The collection and treatment/disposal of materials and liquids generated during equipment decontamination activities and cleaning/disposal of personal protective equipment (PPE) shall be considered incidental to work under this Item and will not be measured for separate payment. Materials incidental to the construction, which become contaminated due to the lead debris removal, such as but not limited to, gloves, coveralls, tarps and filters shall be disposed of in accordance with this specification. These incidental materials shall be kept separate from the debris. These materials will not be measured for payment, but will be included in the general cost of the work.

Basis of Payment:

This work shall be paid for at the contract unit price per ton, which shall include the processing, loading, storage (including containers) and transportation of said materials from the temporary storage area to the final to the treatment/disposal facility; the treatment/disposal or recycling of said materials; the preparation of all related paperwork including manifests; fees; and all equipment, materials, tools, labor and work incidental to loading, transporting, treating/recycling and disposal of materials.

No separate payment shall be made under this Item for the on-site processing, transportation and treatment/disposal of materials not found to be hazardous based upon characterization sampling results.

No separate payment shall be made for the disposal of wastes generated in conjunction with equipment decontamination or the disposal of personal protective equipment (PPE). The cost of such disposal shall be considered incidental to the work under this Item.

Final payment will not be approved until completed copies of all Manifest(s) and Bills of Lading signed by an authorized disposal facility representative and all associated weight bills indicating each loads net weight have been provided to the Engineer. Once completed and facility-signed copies of all Manifest(s), Bills of Lading and associated weigh bills have been received in their entirety, the Engineer will review and approve the release of final payment to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
Disposal of Lead Debris from Abrasive Blast Cleaning	Ton

ITEM # 0603321A – TEMPORARY SUPPORT SYSTEM (PIER 11):

Description: Work under this item shall consist of furnishing, installing, and removing temporary support systems required at Pier No. 11 to support existing bridge during steel trussed bent replacement, as shown on the plans and as ordered by the Engineer. The work shall be performed in accordance with these specifications.

Materials:

General:

The materials for this work shall meet the requirements of Sections M.03 and M.06, as applicable, and shall be of satisfactory quality for the purpose intended. All material proposed for use that has been salvaged shall be subject to inspection by the Engineer. Material deemed to be damaged or otherwise unsuitable for use shall be removed from the site by the Contractor.

Drilling Holes and Grouting Reinforcing Bars and Anchor Bolts:

The chemical anchoring material shall conform to Subarticle M.03.01-15.
The grout shall be a non-shrink grout conforming to Subarticle M.03.01-12.

Construction Methods:

General:

The temporary support systems as detailed on the plans have been designed to accommodate applicable load combinations in accordance with the “Standard Specifications for Highway Bridges” AASHTO 17th Edition. The Contractor shall make all field measurements necessary to completely detail the support systems and shall submit working drawings of the support systems in accordance with the requirements of Article 1.05.02, including copies of all field measurements for review by the Engineer.

The Contractor shall fabricate and construct the temporary support systems in general conformance with the plans and these specifications in a workman like manner. The support system shall be installed prior to the removal of steel bent and, as applicable, shall be installed with a tight fit to ensure the existing bridge girders do not deflect prior to transferring load to the support system. Details on the Contractor’s proposed method for satisfying this requirement shall be included in the working drawing submission.

The Contractor may elect to submit alternate support systems for approval. Submissions for alternate systems shall include working drawings and calculations performed by an engineer, licensed in the State of Connecticut, demonstrating the system accommodates the applicable load combinations and satisfies the requirements of the “Standard Specifications for Highway Bridges” AASHTO 17th Edition.

Drilling Holes and Grouting Reinforcing Bars and Anchor Bolts:

Before fabricating any materials, the Contractor shall submit manufacturer's specifications and installation requirements for the chemical anchoring material to the Engineer for review in accordance with Article 1.05.02.

Holes for the reinforcement and anchor bolts shall be drilled or cored, and shall be located as determined by the Contractor. The holes shall clear the existing reinforcement and provide the minimum cover as shown on the plans. A pachometer shall be used to locate existing reinforcing steel. If existing reinforcing is encountered during the drilling operation, the holes shall be relocated and the uncompleted holes shall be filled with the chemical anchoring material or grout and finished smooth and flush with the adjacent surface, if required.

The depth and diameter of the holes shall conform to the manufacturer's recommendations for the diameter of the rebar and anchor bolt being anchored, such that the grouted rebar and anchor bolt will be able to develop in tension 100 percent of its specified yield strength.

Hole drilling methods shall not cause spalling, cracking, or other damage to the existing concrete. The weight of the drill shall not exceed 9 kg. Those areas damaged by the Contractor shall be repaired by him in a manner suitable to the Engineer and at no expense to the State.

Prior to placing the chemical anchoring material in the holes, the holes shall be cleaned of all dirt, moisture, concrete dust and other foreign material. The reinforcing bars and the chemical anchoring material or grout shall be installed in the holes in accordance with the chemical anchoring material or grout manufacturer's recommendations. When grouting, each hole shall be blown clean with an air jet and then flushed with a jet of clean water. In the water-flushing operation, the pressure hose shall be extended to the bottom of the hole several times and withdrawn gradually each time. After flushing, the vertical holes shall be left full of clean water for a period of 6 hours. Immediately prior to grouting all water shall be removed and the free water shall be removed with an air jet.

The Contractor, as directed by the Engineer, shall take adequate precautions to prevent any materials from dropping to the area below, which may result in damage to any existing construction or to adjoining property. Should any damage occur to the structure as a result of the Contractor's operations, the Contractor shall make repairs at his own expense. The repair work shall be approved in advance and shall be of a quality acceptable to the Engineer.

Method of Measurement: This work, being paid for on a lump sum basis, shall not be measured for payment.

Basis of Payment: This work will be paid for at the contract lump sum price for "Temporary Support System (Pier 11)", which price shall include furnishing, installing, maintaining, and removing supports at the locations shown on the plans, and all materials, equipment, tools, and labor incidental thereto.

Pay Item

Pay Unit

Temporary Support System (Pier 11)

L.S.

ITEM #0603366A – WALKWAY MODIFICATIONS

DESCRIPTION: Work under this item shall consist of all required modifications to the inspection walkway modifications as detailed on the plans. In general, furnishing, fabricating (including surface preparation), transporting, erecting and installing, steel pipe rail and channel of the size designated, in conformity with the requirements of the plans or as ordered by the Engineer. Work under this item shall also include the partial removal of the inspection walkway, disposal of existing walkway, localized paint removal and field painting of remained channel.

MATERIALS: The materials for this work shall conform to the requirements of Section M.06 and Section M.07 and shall be hot dip galvanized to conform to the requirements of ASTM A123.

All new steel shall be AASHTO M270, Grade 50T2. High strength bolts shall be ASTM A325 with suitable nuts and washers. All new steel materials shall be galvanized.

All pipe rails shall be ASTM A53 Grade B for standard weight pipe (Schedule 40).

A Materials Certificate, a Certified Test Report and a Certificate of Compliance will be required in accordance with Article 1.06.07.

Inspection walkway components damaged during or as a result of removal or handling shall be replaced at no cost to the State with materials or hardware of like construction or manufacture.

CONSTRUCTION METHODS: Remove existing steel railing components and toe plate. Localized paint removal and field painting of remained channel. Install new galvanized steel pipe rail and channel as shown on the plans. Dispose of debris, existing railing components and toe plate in accordance with federal, state, and local regulations.

Inspection walkway components damaged during or as a result of installation of the new steel pipe rail and channel shall be replaced at no cost to the State with materials or hardware of like construction or manufacture.

Localized paint removal and field painting of remained channel. See the special provision for “NTC - Localized Paint Removal” and “Field Touchup Painting”

METHOD OF MEASUREMENT: The quantity of metal bridge rail resetting will be measured for payment by linear foot.

BASIS OF PAYMENT: This work will be paid for at the contract unit price per linear foot for "Walkway Modifications", which price shall include the partial removal of inspection walkway, disposal of existing walkway, furnishing and installing steel pipe rail and channel, and all materials, equipment, tools, and labor incidental thereto. The application of field painting for remained channel shall be paid for under “Field Touchup Painting”.

Pay Item:
Walkway Modification

Pay Unit
LF

ITEM #0603563A - CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 1)

Description: Work under this item shall consist of furnishing and erecting SSPC Guide 6 Class 1 containment enclosures with negative air pressure as required to contain and collect debris resulting from the removal of coatings in the preparation of steel surfaces for painting. Also included are the vacuum collection and the storage of debris in suitable containers.

The containment and collection of debris shall be done in strict conformance with current Federal Environmental Protection Agency (EPA) and Connecticut Department of Energy and Environmental Protection (DEEP) regulations.

Materials: Materials and equipment shall be of satisfactory quality to perform the work and shall not be used on the Project until and unless they have been reviewed and approved by the Engineer.

Rigid walls for the containment enclosure shall be comprised of plywood panels or corrugated panels of steel, aluminum or reinforced fiberglass. Flexible containment walls constructed of fire retardant tarpaulin material shall be impermeable to air and water.

Fifty Five (55) gallon barrels with resealable lids, or lined storage containers sized for the job shall be leakproof; shall conform to the Code of Federal Regulations Title 49, Chapter 1, Paragraph 173.510A (1), (5), and Paragraph 178.118; and shall not be used on the Project until and unless they have been reviewed and approved by the Engineer.

In meeting the requirements of these specifications, the Contractor shall supply portable battery-operated manometers with a pressure range of -1.00 to 10.00 in increments of 0.01 inches of water and a velocity range of 50 to 9990 feet per minute; and one or more portable lightmeters with a scale of 0.0-50.0 foot candles.

Construction Methods: The Contractor shall proceed with one of the following containment methods:

- A. Containment enclosure with a suspended platform, or
- B. Containment enclosure without a suspended platform.

A. Containment enclosures with a suspended platform:

At least two (2) months prior to any abrasive blast cleaning activities, the Contractor shall submit to the Department ten (10) complete copies of detailed working drawings and calculations prepared and stamped by a Professional Engineer (Mechanical and Civil) licensed in Connecticut, which drawings shall detail as described below, the proposed methods for such activities. The Contractor shall not commence with containment enclosure erection and abrasive blast cleaning until and unless the working drawings have been reviewed and approved by the Engineer, and shall proceed with such work only within approved containment enclosures.

The working drawings shall include the following:

1. A construction plan and drawings detailing proposed coating removal operations, abrasive debris classification and separation, removal and transport of waste to a secure storage site.
2. A plan and drawings detailing the proposed containment enclosure, including details of the following:
 - A. Rigid, solid floor or platform.
 - B. Containment walls with rigid and flexible materials.
 - C. Rigid supports and bracing for the floor and wall panels, rigid or flexible supports and bracing for flexible walls.
 - D. Calculations including localized overstress conditions, member stresses, H.S. load rating and maximum dead and live load imposed on the bridge by the containment enclosure, grit blasting/recycling equipment and HVAC equipment.
 - E. Maximum allowable load for the floor/platform.
 - F. Wind load and wind stresses imposed on the bridge by the containment enclosure shall be calculated and submitted.
 - G. Airflow and air re-circulation within the enclosure including a minimum negative pressure of 0.03 in. of water column (W.C.) relative to external ambient air and calculations. Airflow shall meet the SSPC Guide 6 requirements of 100 ft/min cross draft and 50 ft/min downdraft and the OSHA Ventilation Standards. The maximum cross sectional area for airflow within the enclosure shall be 400 square feet.
 - H. Connections to the bridge, i.e., clamps, rollers. (Note: Welding and bolting is not allowed.) Each connection to the bridge shall have a tension load cell attached. A multi-channel digital load indicator shall be connected to all the bridge connection load cells and located in an area accessible to the Engineer. The load indicator shall be capable of storing peak load readings.
 - I. Auxiliary stationary source lighting.
 - J. Dust collection and filtration equipment, including the equipment data sheets and airflow capacity.
 - K. Air intake points including filters, louvers, baffles, etc.
 - L. Entrance/Exit compartment completely sealed with airlocks.
 - M. Location of equipment and impact on traffic.
 - N. Elevation view of the containment enclosure with indications of any encroachments on the surroundings. The bridge vertical clearance shall be maintained throughout the project.

NOTE: The structure loading for containment design shall be in accordance with AASHTO using HS-20 loads. The allowable overstress for all conditions shall not exceed 20%. Temporary loads from the containment shall not exceed 15 psf for dead load of the containment and shall not exceed 50 psf for live load on the work platforms.

B. Containment enclosures without a suspended platform:

At least two (2) months prior to any abrasive blast cleaning activities, the Contractor shall submit to the Department ten (10) complete copies of detailed working drawings and calculations prepared and stamped by a Professional Engineer (Mechanical and Civil) licensed in Connecticut, which drawings shall detail, as described below, the proposed methods for such activities. The Contractor shall not commence with containment enclosure erection and abrasive blast cleaning until and

unless the working drawings have been reviewed and approved by the Engineer, and shall proceed with such work only within approved containment enclosures.

The working drawings shall include the following:

1. A construction plan and drawings detailing proposed coating removal operations, abrasive debris classification and separation, removal and transport of waste to a secure storage site.
2. A plan and drawings detailing the proposed containment enclosure, including details of the following:
 - A. Containment walls with rigid and flexible materials.
 - B. Rigid supports and bracing for the floor and wall panels, rigid or flexible supports and bracing for flexible walls.
 - C. Airflow and air re-circulation within the enclosure including a minimum negative pressure of 0.03 in of water column (W.C.) relative to external ambient air and calculations. Airflow shall meet the SSPC Guide 6 requirements of 100 ft/min cross draft and 50 ft/min downdraft and the OSHA Ventilation Standards. The maximum cross sectional area for airflow within the enclosure shall be 400 square feet.
 - D. Connections to the bridge, i.e., clamps, rollers. (Note: Welding and bolting is not allowed.)
 - E. Auxiliary stationary source lighting.
 - F. Dust collection and filtration equipment, including the equipment data sheets and airflow capacity.
 - G. Air intake points including filters, louvers, baffles, etc.
 - H. Entrance/Exit compartment completely sealed with airlocks.
 - I. Location of equipment and impact on traffic.
 - J. Elevation view of the containment enclosure with indications of any encroachments on the surroundings. The bridge vertical clearance shall be maintained throughout the project.

In addition, if the bridge vertical clearance is greater than 30 feet, the wind load and wind stresses imposed on the bridge by the containment enclosure shall be calculated and submitted.

Reference information on enclosures can be obtained from the following sources:

- SSPC Guide 6
- Steel Structures Painting Manual, Volume 1
- NCHRP Report 265

The containment enclosure shall be sealed across the bridge deck underside between the girders with a rigid material. The floor shall be covered with a waterproof tarpaulin attached and sealed to the enclosure wall and floor around the entire enclosure perimeter. All edges of tarpaulins shall have a 2-foot flap that clamps over the connected edges around the entire perimeter. These flaps shall be completely fastened 12 in on center for both edges and sealed completely with the tarpaulin manufacturer's recommended tape and caulk.

All equipment placement and work shall be in strict conformance with the Contract special provisions "Prosecution and Progress" and "Maintenance and Protection of Traffic." The

Contractor shall perform all work in accordance with the requirements of any permits for this Project.

During abrasive blast cleaning, if the containment enclosure is allowing debris to escape, the Contractor shall immediately stop such work until the enclosure is repaired. Any debris released from the enclosure shall be cleaned up by the Contractor immediately.

The containment enclosure shall be disassembled if the wind velocity is greater than 40 miles per hour, if it is forecast to be higher or when directed by the Engineer. However, if the wind velocity is below 40 MPH, but high enough to cause the containment enclosure to billow and emit dust, the Contractor shall immediately cease abrasive blast cleaning and, after cleaning up all the debris, disassemble the enclosure.

All debris resulting from surface preparation shall be contained and vacuum collected daily or more frequently as directed by the Engineer, due to debris buildup. Such debris, abrasive blast residue and paint chips removed by hand or power tool cleaning, shall be stored in leakproof storage containers in the secured storage site, or as directed by the Engineer. Debris storage shall be in accordance with Connecticut Hazardous Waste Management Regulations.

If 55 gallon barrels are used, staging is required: 55 gallon barrels shall be stored together in 2 rows of 5. The Contractor shall maintain a minimum lane clearance of 36 inches between each lot (10 barrels per lot).

The Contractor shall maintain a secure storage site, which shall be large enough to handle all coating debris that is collected and stored on the Project Site at any time. The Contractor shall store coating debris only in the secured storage site. During abrasive blast cleaning operations, all surface preparation debris shall be vacuum collected from the containment enclosure and removed to the abrasive recycling reclaimer unit, and the coating debris shall be conveyed to the secured storage site at the conclusion of the work shift. The Contractor shall account for all coating debris conveyed to the secured storage site and all coating debris transported from the Project to the hazardous waste treatment/disposal facility. The Contractor is responsible for the proper handling of the surface preparation debris and coating debris. All spillage shall be cleaned up immediately.

The secure storage site shall consist of an 8-ft high fenced-in area with a padlocked entrance. Storage containers shall not be used on the Project until and unless they have been reviewed and approved by the Engineer. Storage containers and sites shall be located so as not to cause any traffic hazard. Container storage sites shall be in areas that are properly drained and runoff water shall not be allowed to pond. The containers shall be placed on pallets or other approved material and not directly on the ground.

Storage containers shall be closed and covered with a waterproof tarpaulin at all times except during placement, sampling, and disposal of the debris.

The Contractor shall furnish the inspector with two (2) new portable battery-operated manometers and light meters, per containment enclosure. Negative pressure verification with the portable

manometers shall be done by the Engineer before and during abrasive blast cleaning and during vacuum collection of all surface preparation debris. The supplied instruments will become the property of the State upon Project completion.

Light at the steel surface within the enclosure shall be maintained by the Contractor at a minimum of 50 foot-candles as measured by a light meter. Such lighting shall be maintained throughout the surface preparation, painting, and inspection activities.

Equipment noise in excess of 90 decibels as measured at the closest residential, commercial or recreational areas, shall be lowered by the Contractor to a maximum of 90 decibels by the use of mufflers or other equipment approved by the Engineer prior to its use for this purpose.

Any air exhausted from the containment enclosure, abrasive-recycling equipment or vacuum equipment shall be passed through a filtering system. The Contractor is responsible for the design, effectiveness and maintenance of this filtering system. No discharge of debris dust shall be allowed.

The Contractor is liable for any fines, costs, or remediation costs incurred as a result of their failure to be in compliance with this special provision and all Federal, State, and local laws.

Method of Measurement: Work under this item will not be measured for payment, but will be paid for at the Contract lump sum price for each site. A site shall consist of an entire bridge structure, unless otherwise noted on the plans.

Basis of Payment: This work will be paid for at the Contract lump sum price for "Class 1 Containment and Collection of Surface Preparation Debris (Site No. 1)," at the site designated. The price shall include all materials, equipment, tools, labor and work incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Class 1 Containment and Collection of Surface Preparation Debris (Site No. 1)	L.S.

ITEM #0603923A - ABRASIVE BLAST CLEANING AND FIELD PAINTING OF STRUCTURE (SITE NO. 1)

Description: Work under this item shall consist of surface preparation and field painting of the steel components of structures as shown on the plans and as directed by the Engineer.

All structural steel, except those specific components listed below or on the plans, shall be abrasive blast cleaned and painted with a 3-coat system.

Components to be painted are as shown on the plans and may include but not be limited to the following: beams and girders, diaphragms and cross frames, steel bearings, the inside surfaces of box girders, scuppers, drainage pipes and troughs, State-owned utility conduits, structural steel utility supports, non-galvanized structure mounted sign supports, steel grid decks, and all other metal components that are an integral part of the bridge system.

Privately-owned utilities, bridge rails, stay-in-place forms, fences, elastomeric bearing pads and bronze components shall be protected from damage by surface preparation and painting operations and shall not be painted.

Tabulated data for the structure(s), including the Federal Standard 595 Color Number for the top coat, are listed in tables on the plans. The estimated surface area of structural steel to be painted on each structure is given as a guide only, and is not guaranteed to be accurate. Bidders shall examine the listed structures and shall make their own determinations as to the work involved and conditions to be encountered.

Submittals: A minimum of 20 calendar days before starting any surface preparation and coating application work, the painting firm shall submit the following to the Engineer for acceptance:

1. A copy of the firm's written Quality Control Program used to control the quality of surface preparation and coating application including, but not limited to, ambient conditions, surface cleanliness and profile, coating mixing, dry film thickness, and final film continuity.
2. A copy of the firm's written surface preparation and application procedures. This written program must contain a description of the equipment that will be used for removal of laminar and stratified rust, for surface preparation, including the remediation of soluble salts, and for paint mixing and application, including stripe coating. Coating repair procedures shall be included.
3. The qualifications, references and documentation of the personnel managing and performing the Quality Control Program, including a detailed description of the firm's enforcement procedures and the authority of personnel.
4. Containment plans (paint removal/collection of debris, surface preparation, coating applications with heat)
5. If the application of heat is proposed for coating application purposes, provide information on the heat containment and procedures that will be used, with data sheets for the equipment.

Note: If heat is used for coating operations, the heat and containment must be maintained to provide the required temperatures for the duration of the cure period.

6. Proof of SSPC-QP1 qualifications, CAS-certification(s) and QP2 qualifications, as applicable.
7. Proof that the finish coat complies with the color and gloss retention performance criteria of SSPC Paint 36, Level 3, for accelerated weathering.
8. Coating product information, including coating manufacturer, product name, application instructions, technical data, MSDS and color chips.
9. Abrasive product information, including abrasive manufacturer, product name, technical data, and MSDS.
10. Touch-up and repair procedures, including methods and materials.

The Contractor shall not begin any paint removal Work until the Engineer has accepted the submittals. The Contractor shall not construe Engineer acceptance of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Acceptance of the programs does not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal, State, or local regulations, this specification, or to adequately protect the health and safety of all workers involved in the Project and any members of the public who may be affected by the Project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

Materials: The materials for the coating system for this work shall meet the requirements of Section M07.02 and the following:

The coating system shall be a **3-coat system** selected by the Contractor and accepted by the Engineer. The system shall be on the NEPCOAT Qualified Products List A (Inorganic Zinc Rich Primer / Epoxy or Urethane Intermediate / Aliphatic Urethane Finish) or List B (Organic Zinc Rich Primer / Epoxy or Urethane Intermediate / Aliphatic Urethane Finish) for Protective Coatings for New and 100% Bare Existing Steel for Bridges.

Note: The List B Carboline Company system that specifies Carboguard 888 is not eligible for use under this special provision at this time.

All materials for the complete coating system shall be furnished by the same coating material manufacturer with no subcontracted manufacturing allowed. Intermixing of materials within and between coating systems will not be permitted. Thinning of paint shall conform to the manufacturer's written recommendations. All components of the coating system and the mixed paint shall comply with the Emission Standards for Volatile Organic Compounds (VOC) stated in the Connecticut Department of Energy and Environmental Protection's Administration Regulation for the Abatement of Air Pollution, Section 22a-174-20(s).

The top coat shall meet the color and gloss retention performance criteria of SSPC Paint 36, Level 3, for accelerated weathering. After 2000 hours of accelerated weathering in accordance with ASTM D4587, the color change (ASTM D 2244) shall be less than 2.0 DE* with a loss of gloss (ASTM D 523) less than 30. With the submittals, the Contractor shall provide the

Engineer with proof that the finish coat complies with the above criteria.

The abrasive media for blast cleaning shall be recyclable steel grit.

Control of Materials: A Materials Certificate will be required for the selected paint system in accordance with Article 1.06.07, confirming the conformance of the paint to the requirements set forth in these specifications.

Note: If any of the above or following stipulated Contract specifications differ from those of the manufacturer's recommended procedures or ranges, the more restrictive of the requirements shall be adhered to unless directed by the Engineer in writing.

Construction Methods:

Contractor - Subcontractor Qualifications:

Contractors and subcontractors doing this work are required to be certified by the SSPC Painting Contractor Certification Program (PCCP) to QP-1 entitled "Standard Procedure for Evaluating Qualifications of Painting Contractors: Field Application to Complex Structures." When the work involves the disturbance of lead-containing paint, the Contractor and subcontractor are also required to be certified to SSPC QP-2 "Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint."

Contractors and subcontractors are required to have at least one (1) **Coating Application Specialist (CAS) (SSPC ACS/NACE No. 13)**-certified (Level II-Interim Status-Minimal) craft-worker. CAS-certified (Level II-Interim Status-Minimal) craft-worker(s) are required for all crews/craft-workers up to four (4) crew members. For each crew larger than four (4), an additional CAS-certified (Level II-Interim Status-Minimal) craft-worker shall be present on each painting/blasting crew during blast cleaning and spray application (Atmospheric and Immersion Service) operations. A crew-member is a person who is on the job performing hand-held nozzle blast cleaning and/or spray application of protective coatings on a steel structure. The certification(s) must be kept current for the duration of the Project work. If a Contractor's, subcontractor's or any craft-worker's certification expires, the firm will not be allowed to do any work on this item until the certification is reissued.

Requests for extension of time for any delay to the completion of the Project due to an inactive certification will not be considered, and liquidated damages will apply. In addition, if any recoat times are exceeded, the affected areas shall be abrasive blast cleaned to SSPC-SP 10 and coatings reapplied in accordance with these specifications at no additional cost to the State. At the option of the Engineer, if such a delay will adversely impact the successful and timely completion of the Project, the Department may require the Contractor to engage another SSPC-certified firm to do the painting work at the Contractor's expense.

Quality Control Inspections: The Contractor shall perform first line, in-process Quality Control (QC) inspections. The Contractor shall implement a Quality Control Program accepted by the

Engineer, including written daily reports, that ensures that the work accomplished complies with these specifications. Copies of these reports shall be provided daily to the Engineer. Contractor QC inspections shall include, but not be limited to the following:

- Suitability of protective coverings and containments
- Ambient conditions
- Surface preparation (solvent cleaning, hand/power tool or abrasive blast cleaning)
- Coating application (mixing, thinning, and wet/dry film thickness)
- Recoat times and cleanliness between coats
- Coating continuity (freedom from runs, sags, overspray, dryspray, pinholes, shadow-through, skips, misses)
- Final film acceptance

The personnel managing and performing the quality control program shall be NACE Certified Coating Inspector(s) (successfully completed Sessions I, II, III and Peer Review) or shall provide evidence of successful inspection of 3 projects of similar size and scope that have been completed in the last 2 years. References shall include the name, address, and telephone number of a contact person employed by the bridge owner. The personnel performing the quality control tests shall be trained in the use of the quality control instruments. Documentation of training shall be provided. These personnel shall not perform surface preparation and painting.

Test Equipment and Materials: The Contractor shall furnish the following new test equipment and materials for use by the QC Inspector:

1. Two (2) PTC Surface Temperature Thermometers
2. Psychron 566 Psychrometer (Battery Operated) with two (2) sets of batteries or a Bacharach Sling Psychrometer
3. U.S. Weather Bureau Psychrometric Tables
4. Hypodermic Needle Pressure Gage for nozzle pressure tests.
5. SSPC Visual Standards VIS 1, VIS 3, and/or VIS 4, as applicable.
6. Testex Spring Micrometer
7. Testex Press-O-Film Replica Tape, one (1) roll, 100 pieces each, of coarse and extra-coarse per bridge span, or as specified by the Engineer.
8. Wet film thickness gage
9. PosiTest, Mikrotest or Elcometer Dry Film Thickness Gauge (FM)
10. SSPC Type 2 Dry Film Thickness Gauge per PA2
11. NIST (NBS) Calibration Standards Range: 0 – 39 mils

Quality Assurance Inspections: The Engineer may conduct Quality Assurance (QA) observations of any or all phases of the work. The presence or activity of Engineer inspections in no way relieves the Contractor of the responsibility to provide all necessary daily Quality Control inspections of its own and to comply with all requirements of this Specification.

The Contractor shall facilitate the Engineer's inspections as required, including allowing ample time for the inspections and providing suitable lighting (50 foot candles minimum at the surface as defined later in this specification). The Contractor shall furnish, erect and move scaffolding

or other mechanical equipment to permit inspection and close observation of all surfaces to be cleaned and painted. This equipment shall be provided during all phases of the work. The Contractor shall notify the Engineer in advance of plans to remove staging used in cleaning and painting operations in order to allow for inspection. The QA inspection will be performed with the QA inspector's equipment when verifying the Contractor's test results in the field.

Safety: All Contractor activities associated with the coating work described and specified herein shall be conducted in accordance with all applicable Federal (OSHA) and State of Connecticut safety regulations, and SSPC-PA Guide 3 entitled "A Guide to Safety in Paint Application."

Ambient Conditions: Surface preparation and coating application work shall only be done inside a containment enclosure as specified herein. Surface preparation or coating work shall be performed inside the containment enclosure meeting the following: :

- The relative humidity is at or below 90%.
- The substrate is not damp, or covered by frost or ice.
- The surface temperature and air temperature are between 50° F and 100° F.
- The surface temperatures of the steel and air are more than 5° F above the dewpoint temperature, as determined by a surface temperature thermometer and electric or sling psychrometer.

If the requirements of the coating manufacturer differ from the ranges provided above, comply with the most restrictive requirements unless directed otherwise by the Engineer in writing.

Protective Coverings: The Contractor shall protect property, pedestrians, vehicular, and other traffic upon, underneath, or near the bridge, and all portions of the bridge superstructure and substructure against abrasive blast cleaning damage or disfigurement from splatters, splashes, or spray of paint or paint materials. All coating overspray, drips and spills shall be contained. Maintain the integrity and security of all protective coverings and containment materials throughout the entire Project.

Any paint chips, paint removal media (e.g., abrasives), coating or solvent that has escaped the Contractor's containment enclosure shall be cleaned up immediately. For bridges over water, the Contractor shall have on Site a sufficient quantity of spill containment boom and pads to contain a spill. The length of containment boom on site shall be at least equal to twice the length of the active work Site over the water.

Observed Steel Defects: If significant deficiencies, such as cracks or section losses, are found during cleaning or coating operations, the Contractor shall immediately notify the Engineer as to their extent. Significant deficiencies include the following:

- a) Cracks in any part of the superstructure
- b) Section loss more than 1/8 inch or section loss equal to or greater than 5% of flange thickness in the maximum moment areas (i.e. Section loss in the middle 1/2 of a

- single span structure.)
- c) Section loss more than 1/4 inch or section loss equal to or greater than 25% of the flange thickness in other than the maximum moment areas (i.e. Section loss up to 1/4 points of the middle 1/2 of a single span structure.)
 - d) Section loss more than 1/8 inch or section loss equal to or greater than 15% of web thickness in the maximum shear areas (i.e. Section loss within 5 feet of the bearing center line.)
 - e) Section loss more than 1/8 inch or section loss equal to or greater than 25% of web thickness in other than the maximum shear areas (i.e. Section loss found a minimum of 5 feet beyond the bearing center line.)

Heating Devices: The Contractor may use heating devices to obtain and maintain a condition within the containment enclosure that is suitable for surface preparation and painting application. For painting applications, the required conditions must be maintained for the duration of the cure period. Heating devices shall be limited to gas- or oil-fired indirect air heaters in which the combustion products are discharged separately from the forced airstream to an area outside the containment enclosure. The heating devices must be configured so as not to form condensation on cold surfaces or cause rust-back and must be automatically controlled. Information describing the proposed heating devices and the proposed heating procedures shall be provided a minimum of 20 days in advance for Engineer acceptance.

Lighting Requirements: A minimum illumination level of 20 foot-candles shall be provided throughout the inside of the containment enclosure during surface preparation and coating application work. A minimum illumination level of 50 foot-candles shall be provided at the location of the specific work task and for inspection. All lighting fixtures and related connectors located inside the containment enclosure must be explosion proof and shall be UL listed.

Material Storage: The Contractor shall provide a suitable facility for the storage of paint that complies with all Federal and State laws and regulations.

This facility shall provide protection from the elements and ensure that the paint is stored at temperatures within the more stringent of (1) the manufacturer's written recommended temperatures, or (2) between 40° F and 100° F. If paint application takes place in conditions that require heating of the containment, then the temperature of the stored paint shall be maintained at a similar temperature. Storage of paint shall be in reasonable proximity to the painting locations. The Engineer shall be provided access to the stored paint for inspection and to witness removal of the materials. The Contractor's facility for the storage of paint shall be subject to the approval of the Engineer.

Equipment: All equipment used in surface preparation and removal of debris, such as hoses, hoppers, recycling and vacuum machines that the Contractor brings to the Site, shall be clean and free of any prior debris.

Spray equipment, brushes and rollers used in application of coatings shall be sized sufficiently and be in proper working order to accomplish the work according to the manufacturer's written recommendations.

Compressed Air: All compressed air sources shall have oil and moisture separators, attached and functional, and properly designed and sized. The compressed air sources shall deliver air to the blast nozzle, for blowing down the surfaces, or for conventional spray application that is free of oil and moisture and of sufficient pressure to accomplish the associated work efficiently and effectively. The tanks on the air compressor and moisture separator shall be drained at the end of each workday. The compressed air source shall produce a minimum pressure of 90 psi at the nozzle during abrasive blast cleaning.

The Contractor shall verify that the compressed air is free of moisture and oil contamination in accordance with the requirements of ASTM D4285. The tests shall be conducted at least once every 4 hours for each compressor system in operation. Sufficient freedom from oil and moisture is confirmed if soiling or discoloration is not visible on the paper. If air contamination is evidenced, the Contractor shall change filters, clean traps, add moisture separations or filters, or make other adjustments as necessary to achieve clean, dry, air.

Test Sections: Prior to surface preparation, the Contractor shall prepare a test section(s) on each structure to be painted in a location(s) that the Engineer considers to be representative of the existing surface condition and steel type for the structure as a whole. The test section(s) shall be prepared using the same equipment, materials and procedures as the production operations. The Contractor shall prepare the test section(s) to the specified level according to the appropriate SSPC written specifications and visual standards. The written requirements of the specification prevail in the event of a conflict with the SSPC visual standards. Only after a test section area has been approved shall the Contractor proceed with surface preparation operations. The test section(s) shall cover approximately 10 square feet each. Additional compensation will not be allowed the Contractor for preparation of test sections.

For the production cleaning operations, the specifications and written definitions, the test section(s), and the SSPC visual standards shall be used in that order for determining compliance with the Contract requirements.

Surface Preparation:

1 – Laminar and Stratified Rust: All laminar and stratified rust or corrosion products that have formed on any area of the existing steel surfaces and accessible rust formed along edges of connected plates or shapes of structural steel shall be removed. The tools used to remove these corrosion products shall be identified in the submittals and accepted by the Engineer. If the surface preparation or removal of rust results in nicks or gouges, the work will be suspended. The Contractor shall demonstrate that the necessary adjustments have been made to prevent a reoccurrence of the damage prior to resuming work.

2 – Near White Metal Blast Cleaning (SSPC-SP10): Steel surfaces shall be cleaned by the specified methods described in the SSPC Steel Structures Painting Manual, Volume 2 - Systems and Specifications, latest edition. The structural steel shall be abrasive blast cleaned according to SSPC-SP 10 “Near White Blast Cleaning.” Before and after blast cleaning, all dissolvable foreign matter, such as oil, grease, and dust shall be removed by wiping or scrubbing the surface with rags or brushes wetted with solvent in accordance with the provisions of SSPC-SP 1 “Solvent Cleaning.” Clean solvent and clean rags or brushes shall be used for the final wiping.

All foreign materials such as dirt, dust, rust scale, sand, bird droppings, and all materials loosened by abrasive blasting operations shall be completely removed by vacuuming before any painting operations are begun.

The cleaned surface shall be accepted by the Engineer before any painting. If the surface is determined to meet the requirements of SSPC-SP 10, painting operations can commence. The prime coat shall be applied to the steel before the end of the day that preparation was performed and before the formation of any flash rusting or rerusting of the steel. Flash rusting or rerusting of the surface is unacceptable and requires additional blast cleaning prior to painting.

Failure of the Contractor to prepare and clean the surfaces to be painted according to these specifications shall be cause for rejection by the Engineer. All surfaces that are rejected shall be recleaned to the satisfaction of the Engineer in accordance with these specifications, at no additional cost to the State.

3 – Steel Grit Abrasive Mix: The recyclable steel grit abrasive mix shall be maintained and monitored such that the final surface profile is within the range specified elsewhere in these specifications.

Before each reuse, the recyclable steel grit abrasive shall be cleaned of millscale, rust, paint, and other contaminants by an abrasive reclaimer.

On a weekly basis during blast cleaning operations, the Contractor shall verify that the recycled steel grit abrasives meet the requirements of SSPC-AB2. If the abrasive fails the testing, all abrasive blast cleaning operations shall be suspended. The abrasive reclaimer shall be repaired and another abrasive sample will be required for testing after grit recovery and reclassification. For test results within the acceptable limits, abrasive blast cleaning may resume. Test results outside of the acceptable limits will require additional equipment repairs or replacement at no cost to the State. If additional repairs were performed, another sample will be required for testing after grit recovery and reclassification. If the test results continue to remain outside of the acceptable limits, the Contractor shall replace the abrasive reclaimer at no cost to the State.

4 - Surface Profile: The specified height of the steel surface profile is 1-3 mils and shall be uniform. Verification of the profile height will be done with Testex Replica Tape. A surface profile correction factor will be measured according to SSPC-PA 2, Section 2.2.4 with the dry film thickness gauge.

Note: Chemical Stripping will not be permitted.

Painting Operation:

1 - General: All coatings shall be supplied in sealed containers bearing the manufacturers name, product designation, batch number and mixing/thinning instructions. Leaking containers shall not be used. Storage, opening, mixing, thinning and application of coating materials shall be accomplished in strict accordance with the written requirements and procedures published by the respective coating material manufacturer and supplier. In the event of a conflict, the Contractor shall notify the Engineer in writing, and unless directed otherwise in writing, the requirements of this specification shall prevail. The Contractor shall always have, at the Project Site, the current copies of all material safety data sheets (MSDS), technical data, recommendations and procedures published by the coating manufacturer for the coating materials.

2 - Paint Mixing and Thinning: Thinning shall be performed only to the extent allowed by the manufacturer's written instructions, and only with the manufacturer's approved thinner. In no case shall thinning be permitted that would cause the coating to exceed the local VOC restrictions. For multiple component paints, only complete kits shall be mixed and used. Partial mixing is not allowed.

The ingredients in the containers of paint shall be thoroughly mixed by mechanical power mixers in the original containers, or as directed by the manufacturer, before use or mixing with other containers of paint. The paint shall be mixed in a manner that will break up all lumps, completely disperse pigment and result in a uniform composition. Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container. Excessive skinning or partial hardening due to improper or prolonged storage will be cause for rejection of the paint, even though it may have been previously inspected and accepted.

Multiple component coatings shall be discarded after the expiration of the pot life. Single component paint shall not remain in spray pots, painter's buckets, or similar containers overnight. It shall be stored in a covered container and remixed before use.

The Engineer reserves the right to sample field paint (individual components or the mixed material) and have it analyzed. If the paint does not meet the product requirements due to excessive thinning or because of other field problems, the coating shall be removed from that section of the structure and replaced as directed by the Engineer.

3 – Methods of Application: All applicators of the specified coating material shall show proficiency on a test panel, or a portion of the structure as selected by the Engineer, to the satisfaction of the Engineer before commencing full-scale application.

The preferred method for coating application shall be by airless spray equipment. For stripping and for application in areas where complex shapes or tight clearances will not allow spray application, the Contractor shall apply the coating material by appropriately designed and

constructed rollers and brushes.

4 – Recoat Times: The recoat time of the primer, intermediate and top coat shall not deviate from the written recommendation of the manufacturer or the times specified in these specifications, complying with the most restrictive requirements unless directed otherwise by the Engineer in writing. If any individual time is exceeded, the affected areas shall be abrasive blast cleaned to SSPC-SP 10 and coatings reapplied in accordance with these specifications at no additional cost to the State.

5 – Film Continuity: All applied coatings shall exhibit no running, streaking, sagging, wrinkling, holidays, pinholes, top coat color or gloss variation, or other film defects. Failure of the Contractor to apply coatings that are free of film defects shall be cause for rejection by the Engineer. All coatings rejected shall be repaired to the satisfaction of the Engineer, at no additional cost to the State. Before doing any coating repair work, the Contractor shall submit to the Engineer for approval the procedures that will be used to repair the coating.

6 - Technical Advisor: It is mandatory that the Contractor obtain the services of a qualified technical advisor employed by the coating manufacturer. This advisor shall be familiar with the technical properties of the coating products and proper application methods. The technical advisor shall assist the Engineer and the Contractor in establishing correct application methods for the complete coating system. He/she shall be present at the work Site before the opening of the material containers and shall remain at the Site until the Engineer is satisfied that the Contractor's personnel have mastered the proper handling, mixing and application of the material. The Engineer may call the technical advisor back to the Site if there are concerns that the Contractor is not handling, mixing or applying the material correctly.

7 - Containment Plan: For each individual Site, the Contractor shall submit a plan of containment to the Engineer for acceptance. The plan, as outlined in other Contract item special provisions, shall be submitted 20 days before commencing painting operations. The prime coat shall be applied within the same containment used for abrasive blast cleaning. After prime coat application, the minimum containment enclosure for the intermediate and top coat shall conform to the requirements of SSPC Guide 6, Class 3A and the following:

- Components of the containment system must be made from flame retardant materials.
- Tarpaulin material shall be clean and impermeable to air and water.
- Joints shall be fully sealed except for entryways.
- Entryways shall use multiple flap overlapping door tarps to minimize dust escape through the entryway.
- All mists or dust shall be filtered with collection equipment.
- For truss bridges, a ceiling shall also be included.

8 - Prime Coat Application: All prepared surfaces shall be cleaned by vacuuming to remove dust, remaining debris, and other surface contaminants before coating. Such surfaces shall then be sprayed, brushed or rolled within the specified abrasive blast cleaning containment enclosure with the specified primer material before the end of the day or before any visible rust-back

occurs. If rust-back occurs, affected surfaces shall be re-cleaned to the satisfaction of the Engineer in accordance with these specifications, at no additional cost to the State.

All plate and shape edges, plate seams, back to back angle seams, pitted steel, and other sharp discontinuities shall be hand-stripped with a brush in the longitudinal direction with the primer. Bolted connections shall also have all bolt heads and nuts hand-stripped in a circular brush motion with the primer material. Stripe coats shall be applied before or after the full prime coat application. The prime coat material used for hand-stripping shall be tinted to distinguish it from material used for full prime coat application.

The zinc rich primer shall be applied to dry surfaces within the more restrictive temperature range (both steel and air) as specified in the manufacturer's written application instructions or between 50° F and 100° F, unless directed otherwise by the Engineer in writing. The dry film thickness shall be according to the manufacturer's written instructions in effect at the time that the product was tested for NEPCOAT. The dry film thickness will be checked for compliance by measuring above the peaks of the substrate profile per the guidelines of SSPC-PA 2.

The dry primer shall be free of all surface and embedded contamination and dry spray.

9 - Intermediate Coat Application: When the primer has cured per the manufacturer's recommendations (not to exceed 30 days), all previously coated surfaces shall receive the intermediate coat. The cured and dry primer coat shall be clean and free of all surface and embedded contamination and dry-spray. If it is not clean and free of all contamination, and dry-spray, the surfaces shall be cleaned by using clean rags or brushes to water wipe, solvent wipe, or detergent wash and rinse. Power washing is not allowed. Temperature ranges (both steel and air) shall be the more restrictive of that specified in the manufacturer's written application instructions or between 50° F and 100° F, unless directed otherwise by the Engineer in writing. The dry film thickness shall be according to the manufacturer's written instructions in effect at the time that the product was tested for NEPCOAT. The intermediate coat shall be of a contrasting color to the prime and topcoat colors. The dry film thickness will be checked for compliance per the guidelines of SSPC-PA 2.

10 - Top Coat Application: When the intermediate coat has cured per the manufacturer's written recommendations (not to exceed 10 days), all previously coated surfaces shall receive the top coat. The cured and dry intermediate coat shall be clean and free of all surface and embedded contamination and dry-spray. If it is not clean and free of all contamination, and dry-spray, the surfaces shall be cleaned by using clean rags or brushes to water wipe, solvent wipe, or detergent wash and rinse. Power washing is not allowed. Temperature ranges (both steel and air) shall be the more restrictive of that specified in the manufacturer's written application instructions or between 50° F and 100° F, unless directed otherwise by the Engineer in writing. The dry film thickness shall be according to the manufacturer's written instructions in effect at the time that the product was tested for NEPCOAT.

11 - Date of Completion: The word "PAINTED" followed by the month and year the painting of each structure was completed, along with the manufacturer's abbreviations for each of the 3 coats, shall be stenciled on the inside of a fascia girder at mid-depth of the girder in three (3) inch

high block letters near each abutment, to be clearly visible from the ground below. In order to ensure uniformity, abbreviations shall be approved by the Engineer prior to application of the stenciled information.

Method of Measurement: This item, being paid for on a lump sum basis for each site number, will not be measured for payment.

Basis of Payment: This work will be paid for at the Contract lump sum price for “Abrasive Blast Cleaning and Field Painting of Structure (Site No. X),” which price shall include all materials, equipment, painting overspray containment enclosure, heating devices, tools, labor, and services of the technical advisor. No direct payment will be made for the cost of storage or hauling the paint and other materials to and from the bridge site(s), but the cost thereof shall be included in the lump sum price as noted above.

<u>Pay Item</u>	<u>Pay Unit</u>
Abrasive Blast Cleaning and Field Painting of Structure (Site No. X)	l.s.

ITEM #0703100A – SCOUR MONITORING SYSTEM

DESCRIPTION: The work shall consist of furnishing, installing, and placing in satisfactory operating condition the electrical equipment as indicated on the Plans and/or as called for in these Specifications. Under this Item the Contractor shall furnish and install one scour monitoring system as shown on the Plans.

The system to be provided shall be capable of total scour monitoring including: maximum depth of scour, backfill of previous scour, movement of the piers and present scour activity. The system shall incorporate two active sonar transducers and one tilt meter at each specified pier as shown on the Plans, providing a sounding measurement of the streambed with a resolution of 1.2 inches, cabling, structural housing, and weatherproof enclosure housing the visual display unit, battery and other electrical components. One data acquisition system shall be provided at one pier, as shown on the Plans. This system shall monitor and record the measurements taken by the sonar scour units and tilt meters to be installed at the designated piers. One water stage sensor shall also be provided and integrated into the data acquisition system as shown on the Plans. Surge suppressors shall be provided.

The Contractor shall furnish and install the electronic equipment packages, the sonar transducers, tilt sensors and the water stage sensor for the scour monitoring system including the housing, brackets and supports, the solar panel/wireless datalink antenna mast assemblies, cables for the antennas, communication modules, sonar transducers, tilt sensors and water stage sensors, PVC coated conduit and fittings, masonry anchors, materials, and all other parts and materials required to complete the work. The Contractor shall also provide installation supervision and test the systems to ensure they are operational.

It is the intent and purpose of these Specifications to cover and include all apparatus and appliances to properly install, wire, connect, equip, test, adjust, and put into approved working order the complete scour monitoring system herein specified and as shown on the Plans.

MATERIALS: Each piece of electrical equipment and apparatus shall have a phenolic nameplate on which is stamped the name of the manufacturer, model or part number, and the rating or capacity of the equipment or apparatus.

All metal parts of the installation, except structural steel or unless noted, shall be of corrosion resisting material such as bronze or stainless steel. Cast-iron, malleable iron, or steel with a hot-dip galvanized finish shall be used where specified herein or permitted by the Engineer. All parts to be located below the elevation of 3 ft above MHW shall be stainless steel, Type 316. Materials will be specified where they appear in the following Sections of these Specifications. All materials placed below the elevation of 3 ft above MHW shall be of the type suitable for underwater application. Nuts shall be installed on each side of the connected part, as necessary, in order to insure a plumb mount for all the enclosures. Minimum bolt embedment lengths shall be measured in concrete only.

Electrical materials and workmanship not specifically described under these Specifications shall be as specified under CTDOT Specifications, Section XXX for Highway Lighting Systems.

CONSTRUCTION METHODS:

Working Drawings and Samples

The Contractor shall prepare and submit for review the following working drawings executed in accordance with the provisions of the Contract:

- (a) Certified dimension prints of all electrical equipment installed as part of the monitoring system.
- (b) A schematic wiring diagram of the monitoring system.
- (c) A complete set of layout and installation drawings for the scour monitoring system showing the location and installation, including support and mounting details, of all apparatus and equipment and the elevation of the sonar transducer.
- (d) Construction drawings of all new multiconductor cables, including the sizes of conductors, type and thickness of insulation, jackets and other components, and giving the outer diameter of each finished cable.
- (e) Any other drawing which may, in the opinion of the Engineer, be necessary to show the electrical work.

Certified dimension prints of the apparatus shall state in the certification the name of the job, the application of the apparatus, device designation, number required, right-hand or left-hand assembly, electrical rating, number of poles or contacts, material, finish, and any other pertinent data to show that the apparatus meets the specified requirements.

Upon completion of the work, the Contractor shall correct all electrical shop or working drawings to show the work as constructed and provide one (1) set of reproducible, along with an operations and maintenance manual (the "O&M manual"). The O&M manual will provide, at minimum, a complete description of operation, catalog cuts of all major components, maintenance instructions, instructions for programming and retrieving data using operating software, and any other nonproprietary information needed by the State. The as-builts and O&M manual will be submitted to the Engineer for review.

The Contractor shall submit for inspection and test, if directed by the Engineer, samples of any apparatus or device which he proposes to use as a part of the electrical installation.

Monitoring System Vendor

Except as otherwise noted, all apparatus and equipment comprising the scour monitoring system, including, but not limited to the remote transducer units, the tilt meters, the data acquisition systems, data loggers, communications modules, power systems, electronics equipment enclosures, the acoustic water stage sensors, surge suppressers, all interconnection cabling, device programming, and other apparatus required to provide the complete functioning system, shall be assembled and integrated by a single qualified Monitoring System Vendor. The system shall be manufactured by ETI Instrument Systems, Fort Collins, Colorado, or approved equal.

The Monitoring System Vendor shall have experience in providing scour monitoring systems for various structures. Such experience shall be demonstrated by identifying a minimum of three installations for

which the system vendor has provided complete monitoring systems within the past 5 years. The Monitoring System Vendor shall report to and be directed by the Contractor. The Monitoring System Vendor shall have their qualifications submitted to the Engineer for approval prior to the beginning of work.

The water stage sensor shall be a Campbell Scientific Non-Contact Water Level Monitoring, Model Nos. CS475 or CS476, or equivalent. The water stage sensor shall be located and installed per the system supplier's recommendations.

The Monitoring System Vendor shall assume complete system responsibility for the integrated functioning of all components to provide a satisfactorily assembled scour monitoring systems operating in accordance with specified requirements. The Vendor shall be responsible for the detailed schematics, fabrication, and software development of the total monitoring system to ensure compatibility of equipment and suitability for the scour monitoring system. The Monitoring System Vendor shall also review all contractor shop drawings to be used under this Item prior to submission to the Engineer.

The Monitoring System Vendor shall provide an on-site staff to ensure proper final field terminations within remote and master electronic enclosures, and to provide system programming and final adjustments. Upon final acceptance, the System Vendor's staff shall provide on-call warranty service for a period of one year. Field staff shall be capable of responding to an emergency within 24 hours.

Field Testing

The Contractor shall arrange and provide for all the necessary field tests, as directed by the Engineer, to demonstrate that the scour monitoring system is in proper working order and in accordance with the Plans and Specifications.

The Contractor shall prepare and submit to the Engineer for approval a written checklist and procedure for testing the entire system after the new sonar transducer and tilt meter units have been installed.

All conduits shall carefully be tested and cleaned after installation. The Contractor shall test for clear bore and clean each stainless steel conduit by snaking each run with a steel band, to which shall be attached an approved tube cleaner equipped with a wire brush of the same diameter as the conduit. The Contractor shall test for clear bore and clean each rigid galvanized steel PVC coated conduit by snaking each run with a steel band, to which shall be attached an approved tube cleaner equipped with a wire brush of the same diameter as the conduit and a mandrel assembly and shall in no way damage the urethane-lined conduit interior of PVC coated conduits. Any conduit which rejects the mandrel shall be cleared or replaced by the Contractor at no additional cost to the State.

Should such testing demonstrate that any piece of equipment, cable or wiring connection is defective or functions improperly in the judgment of the Engineer, adjustments and/or replacements shall be made by the Contractor as to make the installation satisfactory to the Engineer, and at no additional cost to the State.

Grounding

All metal conduits, equipment enclosures, frames, housings, and all other metal parts of electrical systems installed or connected under this Item in the proximity of current-carrying conductors or equipment shall be bonded to the existing equipment ground conductor per the National Electrical Code.

Grounding system terminals shall be solderless type and shall be secured by means of hexagonal-head, copper plated, steel machine bolts with lock washers or lock nuts. Ground system conductors shall be continuous unspliced connections between terminal lugs. Paint, rust, and scale shall be removed over the contact area. All connections shall be made up tightly as possible, and any bare metal or paint undercoat remaining exposed shall be spot painted to restore the surface with the same coating and number of coats as applied to the adjacent metal.

The Contractor shall install West Marine Streamlined Zinc Collar Anodes (Model # XXXX) with a shaft diameter of 2 3/8 in. or approved equivalent at each sonar mounting bracket as shown on the Plans. The zinc anodes shall act as the sacrificial metal to reduce corrosion of the stainless steel by the harsh marine environment.

Conduit and Fittings

All conduits unless otherwise noted on the Plans shall be new. All rigid galvanized steel conduits shall be standard weight, threaded, rigid steel conduit conforming to the requirements of ANSI Standard C80.1. All rigid galvanized steel conduits shall be hot-dip galvanized, inside and out, to meet the requirements of the above standard for protective coating. Conduit couplings and fittings used in conjunction with rigid galvanized steel conduits shall be made of malleable iron or steel, hot-dip galvanized.

All conduits to be installed in outdoor locations above water and/or corrosive environments shall be plastic coated rigid galvanized steel conduit as hereinafter specified. Conduits installed below water and below the elevation 3 ft above MHW shall be stainless steel ASTM Type 316.

Conduit fittings, including couplings, unions, elbows, expansion and deflection fittings, and other items, shall be either plastic coated for above water application or stainless steel for underwater applications. Conduits and fittings, which are to be plastic coated, shall be provided with a factory applied polyvinyl-chloride (PVC) coating in the following manner. The exterior of the galvanized rigid steel conduit or fitting shall be coated with an epoxy acrylic, heat-polymerizing adhesive not to exceed 0.005 in. A PVC plastic coating, 0.035 to 0.045 in. thick, shall be bonded to the outside metal surface the full length of the pipe, except for the threads. The plastic coating shall have an 85+ Shore A Durometer rating and conform to NEMA RNI 1986 (Type A), ASTM D746, and Federal Specifications LP406b, Method 2051, Amendment 1 of 25 September 1952. A two-part red urethane, chemically cured coat shall be applied to the interior of all conduit and fittings. This internal coating shall be at the nominal 0.002 in. thickness and shall be sufficiently flexible so as to permit field bending without cracking or flaking. The Plasti-bond, PVC coated, hot-dip galvanized steel conduit shall be UL labeled and listed.

All hollow conduit and fittings, which serve as part of the raceway, shall be coated with the same exterior PVC coating and red interior urethane coating. The plastic exterior coating and the red interior urethane coating shall be factory applied by the same manufacturer who produces the hot-dip galvanized conduit. PVC coated conduit shall be installed in accordance with the manufacturer's installation manual.

Unions to connect sections of conduit that cannot be joined to each other or to boxes in the regular manner shall be of malleable iron or steel, hot-dip galvanized, PVC coated for above water applications or stainless steel for underwater applications.

Conduits shall not be less than 1 in. in diameter. The interior surfaces shall have a smooth finish and be free of burrs or projections, which might cause injury to the cables. All conduits shall be free from

blisters, cracks, or injurious defects and shall be reamed at each end after being threaded. Sections shall be connected to each other with screw couplings made up so that the ends of both conduits will butt squarely against each other inside of the coupling. Conduits shall be installed to be continuous and watertight between boxes or equipment. Conduits shall be protected at all times from the entrance of water or other foreign matter by being well-plugged overnight or when the work is temporarily suspended.

The conduit clamps, in general, shall consist of U-bolts attached to structural steel supports bolted to the members. The minimum thickness of the structural supports shall be 0.4 in.

All U-bolts and bracket hangers shall be provided with medium-series lock washers and hexagonal nuts. The bolts, nuts, and washers shall be stainless steel conforming to the requirements of ASTM A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes, Type 316.

The minimum stock size for the bent steel plate supports shall be 0.4 in. thick by 2 in. wide. Back plates shall be of 0.4 in. thick steel. Supports and spacers shall be hot-dip galvanized. Bolts shall be not less than 0.5 in. in diameter and shall be of stainless steel conforming to the requirements specified for U-bolts.

Watertight conduit hubs shall be provided at the ends of all conduits entering boxes and enclosures furnished with slip holes. Hubs shall be stainless steel when used in conjunction with stainless steel enclosures.

The ends of all conduits projecting into boxes and equipment enclosures shall be provided with bronze insulated grounding bushings. The insulated portion shall be of molded phenolic compound, and each fitting shall have a screw type combination lug for bonding. Insulated bushings shall be the O.Z./Gedney Type RBLG, Spring City Type GB, or Appleton Type GIB or approved equal. All bushings in any box or enclosure shall be bonded together with No. 8 AWG bare copper wire. Both ends of each conduit run shall be provided with a brass tag having the same number stamped thereon in accordance with the conduit diagrams, and these tags shall be securely fastened to the conduit ends with No. 20 AWG brass wire.

Junction and Terminal Boxes

All junction and terminal boxes and cabinets shall be NEMA 4X, 14-gauge, stainless steel enclosures with hinged, 14-gauge, stainless steel doors supported by a continuous stainless steel hinge with removable pin. Seams shall be continuously welded and ground smooth. Each enclosure shall be provided with stainless steel fast operating door clamp assemblies and oil-resistant gasket to insure a watertight seal. Boxes and cabinets shall be Bulletin A51S and A4S with clamp assemblies A-L23SS as manufactured by Hoffman Engineering Company, equivalent manufactured by Henessey or Wiegmann or approved equal.

Surface mounted interior and exterior boxes shall be provided with external mounting lugs. No box shall be drilled for more conduits or cables than actually enter it. Exterior boxes shall be provided with 0.5 in. combination drain and breather fittings.

Terminal boxes shall be of sufficient size to provide ample room for the terminal blocks and interior wiring, and for the installation of conduit terminations and multi-conductor cable fittings. Interior mounting buttons with tapped holes shall be provided for mounting the terminal blocks. Terminal blocks shall be provided in each terminal box for the connection of all conductors including spare conductors

entering the box plus at least twenty percent spare terminals for conductors. All terminal blocks and boards shall be mounted on suitable straps or structural steel brackets in such a manner as to permit routing the conductors behind the terminal blocks. Terminal blocks shall be one-piece blocks suitable for use in highly corrosive atmospheres and shall conform to the requirements hereinbefore specified.

The interior of all boxes shall be provided with insulated supports from which bundled cables may be supported.

Hardware and Supports

Mounting bolts, nuts, washers and other detail parts used for fastening boxes, conduit clamps, cable supports, brackets and other electrical equipment shall be of stainless steel conforming to the requirements of ASTM A276, Type 316. Bolt heads and nuts shall be hexagonal, and shall be provided with medium series lock washers. Bolts smaller than 0.5 in. in diameter shall not be used except as may be necessary to fit the mounting holes in small limit switches, boxes and similar standard devices.

Unless fabricated from Type 316 stainless steel, which has a minimum thickness of 0.24 in. supports for conduits, cables, boxes, cabinets, and other separately mounted items of electrical equipment shall be fabricated from structural steel not less than 0.24 in. in thickness. Channels, angles, bent plates, clip angles, other structural steel supporting members, hardware and gaskets for supporting electrical equipment shall be paid for under this Item. Structural steel supporting members detailed under this Item shall conform to the requirements specified elsewhere in this Contract.

Structural steel brackets, boxes and other equipment mounted on concrete surfaces shall be provided with a full neoprene gasket not less than 0.12 in. thick, between the equipment and the surface of the concrete.

Anchors for fastening equipment or brackets to concrete surfaces shall be stainless steel expansion bolts Type 316 Rawl Power Fasteners category 7626 and 7636 or equivalent. Minimum embedment shall be as recommended by the manufacturer or as shown on the Plans.

Remote Transducer Unit

Each of the pier locations to be monitored shall be provided with stainless steel supports and two active electronic remote transducer units. Each unit shall consist of an 8 degree cone angle transducer, complete with supports and brackets as shown on the Plans. Each transducer shall be wired to a sonar electronic board controlled by an interface "smart" card. Tilt meter inclinometers will be installed in stainless steel enclosures as shown on the Plans and directed by the Engineer. One pier will be equipped with a remote unit which will be provided with a wireless datalink transceiver to transmit sonar and inclinometer readings to the master data acquisition unit at the second pier, as shown on the Plans. The remote unit will be provided with a solar panel to maintain the battery. The equipment shall be wired using wire and cable recommended by the manufacturer of the scour monitoring system. All electronics equipment will be housed in NEMA 4X stainless steel enclosures equal to Weigmann Type SSN4 with locks. The housings will be fastened with ½ inch stainless steel hardware as shown on the Plans, and in locations specified by the Engineer.

The active sonar transducer shall transmit a pulse of sound to the streambed and measure the time required for the echo to return. These readings shall be recorded such that the changing elevations of the streambed are stored by the master data data acquisition system. The tilt meters will measure movement of the piers in two directions and transmit this data to the master station.

Data Acquisition System

The pier mounted remote transducer units, tilt meters and the water stage sensor shall be monitored by a data acquisition system. This system shall be installed at one pier as shown on the Plans and as directed by the Engineer. The system shall be capable of on-site non-volatile memory data storage. The data may be retrieved by two methods: (1) the system will be programmed to automatically download data to CTDOT's BridgeWatch system, and (2) from the data acquisition system using a remote computer. The data may be retrieved via a computer through a standard serial or parallel port connection. All electronics equipment for the data acquisition system shall be housed in NEMA 4X stainless steel enclosures equal to Weigmann Type SSN4 with locks. The housing will be fastened with ½ inch stainless steel hardware as shown on the Plans, and in a location specified by the Engineer.

Data Retrieval System

The data stored by the data acquisition systems shall be capable of being retrieved from a remote location via telephone. The data acquisition systems shall be provided with a modem with suitable interface and operating software. Communications shall be provided by digital cellular modems.

The master station will receive and post the bridge scour data on the CTDOT BridgeWatch system. Power supply shall be by batteries and solar panels.

Miscellaneous Materials

Conduit, boxes, hardware and supports, wire and cable furnished and installed under this work shall be as specified by CTDOT unless otherwise required by the manufacturer of the equipment.

Spare Parts

The following spare parts shall be provided:

- One data logger for the master station
- Two batteries
- Three CDs with complete configuration software for all the data loggers

Spare parts shall be packed in substantial cartons clearly labeled with the contents and delivered to the CTDOT as directed by the Engineer.

METHOD OF MEASUREMENT: Payment for the Scour Monitoring System will be made on a lump sum basis.

BASIS OF PAYMENT: The lump sum price paid for the Scour Monitoring System shall be full compensation for furnishing and installing all materials and tools, and for all labor, equipment, and incidentals necessary for the work hereinbefore specified. The cost of furnishing, maintaining and removing any temporary facilities which may be required for the installation of the system, shall be included in the lump sum bid.

ITEM #0904103A – REPAIR METAL BRIDGE RAIL

DESCRIPTION: Work under this item shall consist of the repair of the metal bridge rail – protective fence (5’ high) combination as shown on the plans or as directed by the Engineer.

MATERIALS: Furnish materials in accordance with Article M.10.02 and details shown on the plans.

CONSTRUCTION METHODS: Remove damaged steel or aluminum rail, protective fence and repair to match the original or details shown on the plans. Repair damaged components, anchors, etc. with new components, as necessary to ensure the final installation functions as originally constructed. Drill anchor holes and install new bolts or weld new anchor bolts to existing bolts as directed. Repair railing removed for repair during the same workday unless otherwise approved. Dispose of debris and damaged components in accordance with federal, state, and local regulations.

METHOD OF MEASUREMENT: This item, being paid for on a lump sum basis, shall not be measured for payment.

BASIS OF PAYMENT: This work will be paid for at the contract Lump Sum price for "Repair Metal Bridge Rail", which price shall include removal of damaged metal bridge rail, disposal of existing metal bridge rail, furnishing and installing metal bridge rail, and all materials, equipment, tools, and labor incidental thereto.

Pay Item:
Repair Metal Bridge Rail

Pay Unit
L.S.

ITEM #0904205A – RESET METAL BRIDGE RAIL

DESCRIPTION: Work under this item shall consist of the reset of the metal bridge rail – protective fence (5’ high) combination as shown on the plans or as directed by the Engineer.

MATERIALS: Furnish materials in accordance with Article M.10.02 and details shown on the plans.

CONSTRUCTION METHODS: Remove existing rail, support angle and protective fence. Install new rail and support angle as shown on the plans. Reuse and install existing protective fence as show on the plans. Dispose of debris, existing rails and support angles in accordance with federal, state, and local regulations.

Metal bridge rail components damaged during or as a result of removal handling, storage or resetting shall be replaced at no cost to the State with materials or hardware of like construction or manufacture.

METHOD OF MEASUREMENT: The quantity of metal bridge rail resetting will be measured for payment by linear foot.

BASIS OF PAYMENT: This work will be paid for at the contract unit price per linear foot for "Reset Metal Bridge Rail", which price shall include removal of metal bridge rail, disposal of existing rail and support angle, furnishing rail and support angle, repair damaged protective fence, installing and resetting metal bridge rail, and all materials, equipment, tools, and labor incidental thereto.

Pay Item:
Reset Metal Bridge Rail

Pay Unit
LF

ITEM #0969060A - CONSTRUCTION FIELD OFFICE, SMALL
ITEM #0969062A - CONSTRUCTION FIELD OFFICE, MEDIUM
ITEM #0969064A - CONSTRUCTION FIELD OFFICE, LARGE
ITEM #0969066A - CONSTRUCTION FIELD OFFICE, EXTRA LARGE

Description: Under the item included in the bid document, adequate weatherproof office quarters with related furnishings, materials, equipment and other services, shall be provided by the Contractor for the duration of the work, and if necessary, for a close-out period determined by the Engineer. The office, furnishings, materials, equipment, and services are for the exclusive use of CTDOT forces and others who may be engaged to augment CTDOT forces with relation to the Contract. The office quarters shall be located convenient to the work site and installed in accordance with Article 1.08.02. This office shall be separated from any office occupied by the Contractor. Ownership and liability of the office quarters shall remain with the Contractor.

Furnishings/Materials/Supplies/Equipment: All furnishings, materials, equipment and supplies shall be in like new condition for the purpose intended and require approval of the Engineer.

Office Requirements: The Contractor shall furnish the office quarters and equipment as described below:

Description \ Office Size	Small	Med.	Large	Extra Large
Minimum Sq. Ft. of floor space with a minimum ceiling height of 7 ft.	400	400	1000	2000
Minimum number of exterior entrances.	2	2	2	2
Minimum number of parking spaces.	7	7	10	15

Office Layout: The office shall have a minimum square footage as indicated in the table above, and shall be partitioned as shown on the building floor plan as provided by the Engineer.

Tie-downs and Skirting: Modular offices shall be tied-down and fully skirted to ground level.

Lavatory Facilities: For field offices sizes Small and Medium the Contractor shall furnish a toilet facility at a location convenient to the field office for use by Department personnel and such assistants as they may engage; and for field offices sizes Large and Extra Large the Contractor shall furnish two (2) separate lavatories with toilet (men and women), in separately enclosed rooms that are properly ventilated and comply with applicable sanitary codes. Each lavatory shall have hot and cold running water and flush-type toilets. For all facilities the Contractor shall supply lavatory and sanitary supplies as required.

Windows and Entrances: The windows shall be of a type that will open and close conveniently, shall be sufficient in number and size to provide adequate light and ventilation, and shall be fitted with locking devices, blinds and screens. The entrances shall be secure, screened, and fitted with a lock for which four keys shall be furnished. All keys to the construction field office shall be furnished to the Department and will be kept in their possession while State personnel are using the

office. Any access to the entrance ways shall meet applicable building codes, with appropriate handrails. Stairways shall be ADA/ABA compliant and have non-skid tread surfaces. An ADA/ABA compliant ramp with non-skid surface shall be provided with the Extra-Large field office.

Lighting: The Contractor shall equip the office interior with electric lighting that provides a minimum illumination level of 100 foot-candles at desk level height, and electric outlets for each desk and drafting table. The Contractor shall also provide exterior lighting that provides a minimum illumination level of 2 foot-candles throughout the parking area and for a minimum distance of 10 ft. on each side of the field office.

Parking Facility: The Contractor shall provide a parking area, adjacent to the field office, of sufficient size to accommodate the number of vehicles indicated in the table above. If a paved parking area is not readily available, the Contractor shall construct a parking area and driveway consisting of a minimum of 6 inches of processed aggregate base graded to drain. The base material will be extended to the office entrance.

Field Office Security: Physical Barrier Devices - This shall consist of physical means to prevent entry, such as: 1) All windows shall be barred or security screens installed; 2) All field office doors shall be equipped with dead bolt locks and regular day operated door locks; and 3) Other devices as directed by the Engineer to suit existing conditions.

Electric Service: The field office shall be equipped with an electric service panel to serve the electrical requirements of the field office, including: lighting, general outlets, computer outlets, calculators etc., and meet the following minimum specifications:

- A. 120/240 volt, 1 phase, 3 wire
- B. Ampacity necessary to serve all equipment. Service shall be a minimum 100 amp dedicated to the construction field office.
- C. The electrical panel shall include a main circuit breaker and branch circuit breakers of the size and quantity required.
- D. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed at each computer workstation location.
- E. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed, for use by the Telephone Company.
- F. Additional 120-volt circuits and duplex outlets as required meeting National Electric Code requirements.
- G. One exterior (outside) wall mounted GFI receptacle, duplex, isolated ground, 120 volt, straight blade.
- H. After work is complete and prior to energizing, the State's CTDOT electrical inspector, must be contacted at 860-594-2240. (Do Not Call Local Town Officials)
- I. Prior to field office removal, the CTDOT Office of Information Systems (CTDOT OIS) must be notified to deactivate the communications equipment.

Heating, Ventilation and Air Conditioning (HVAC): The field office shall be equipped with sufficient heating, air conditioning and ventilation equipment to maintain a temperature range of 68°-80° Fahrenheit within the field office.

Telephone Service: The Contractor shall provide telephone service with unlimited nation-wide calling plan. For a Small, Medium and Large field office this shall consist of the installation of two (2) telephone lines: one (1) line for phone/voice service and one (1) line dedicated for the facsimile machine. For an Extra-Large field office this shall consist of four (4) telephone lines: three (3) lines for phone/voice service and one (1) line dedicated for facsimile machine. The Contractor shall pay all charges.

Data Communications Facility Wiring: Contractor shall install a Category 6 568B patch panel in a central wiring location and Cat 6 cable from the patch panel to each PC station, Smart Board location, Multifunction Laser Printer/Copier/Scanner/Fax, terminating in a (Category 6 568B) wall or surface mount data jack. The central wiring location shall also house either the data circuit with appropriate power requirements or a category 5 cable run to the location of the installed data circuit. The central wiring location will be determined by the CTDOT OIS staff in coordination with the designated field office personnel as soon as the facility is in place.

For Small, Medium and Large field offices the Contractor shall run a CAT 6 LAN cable a minimum length of 25 feet for each computer to LAN switch area leaving an additional 10 feet of cable length on each side with terminated RJ45 connectors. For an Extra-Large field office the Contractor shall run CAT 6 LAN cables from workstations, install patch panel in data circuit demark area and terminate runs with RJ45 jacks at each computer location. Terminate runs to patch panel in LAN switch area. Each run / jack shall be clearly labeled with an identifying Jack Number.

The Contractor shall supply cables to connect the Wi-Fi printer to the Contractor supplied internet router and to workstations as needed. These cables shall be separate from the LAN cables and data Jacks detailed above for the Department network.

The installation of a data communication circuit between the field office and the CTDOT OIS in Newington will be coordinated between the CTDOT District staff, CTDOT OIS staff and the local utility company once the Contractor supplies the field office phone numbers and anticipated installation date. The Contractor shall provide the field office telephone number(s) to the CTDOT Project Engineer within 10 calendar days after the signing of the Contract as required by Article 1.08.02. This is required to facilitate data line and computer installations.

Additional Equipment, Facilities and Services: The Contractor shall provide at the field Office at least the following to the satisfaction of the Engineer:

Furnishing Description	Office Size			
	Small	Med.	Large	Extra Large
	Quantity			
Office desk (2.5 ft x 5 ft) with drawers, locks, and matching desk chair that have pneumatic seat height adjustment and dual wheel casters on the base.	1	3	5	8
Standard secretarial type desk and matching desk chair that has pneumatic seat height adjustment and dual wheel casters on the base.	-	-	-	1
Personal computer tables (4 ft x 2.5 ft).	2	3	5	8
Drafting type tables (3 ft x 6 ft) and supported by wall brackets and legs; and matching drafters stool that have pneumatic seat height adjustment, seat back and dual wheel casters on the base.	1	1	1	2
Conference table, 3 ft x 12 ft.	-	-	-	1
Table – 3 ft x 6 ft.	-	-	-	1
Office Chairs.	2	4	8	20
Mail slot bin – legal size.	-	-	1	1
Non-fire resistant cabinet.	-	-	2	4
Fire resistant cabinet (legal size/4 drawer), locking.	1	1	2	3
Storage racks to hold 3 ft x 5 ft display charts.	-	-	1	2
Vertical plan racks for 2 sets of 2 ft x 3 ft plans for each rack.	1	1	2	2
Double door supply cabinet with 4 shelves and a lock – 6 ft x 4 ft.	-	-	1	2
Case of cardboard banker boxes (Min 10 boxes/case)	1	1	2	3
Open bookcase – 3 shelves – 3 ft long.	-	-	2	2
White Dry-Erase Board, 36” x 48”min. with markers and eraser.	1	1	1	1
Interior partitions – 6 ft x 6 ft, soundproof type, portable and freestanding.	-	-	6	6
Coat rack with 20 coat capacity.	-	-	-	1
Wastebaskets - 30 gal., including plastic waste bags.	1	1	1	2
Wastebaskets - 5 gal., including plastic waste bags.	1	3	6	10
Electric wall clock.	-	-	-	2
Telephone.	1	1	1	-
Full size stapler 20 (sheet capacity, with staples)	1	2	5	8
Desktop tape dispensers (with Tape)	1	2	5	8
Rain Gauge	1	1	1	1

Business telephone system for three lines with ten handsets, intercom capability, and one speaker phone for conference table.	-	-	-	1
Mini refrigerator - 3.2 c.f. min.	1	1	1	1
Hot and cold water dispensing unit. Disposable cups and bottled water shall be supplied by the Contractor for the duration of the project.	1	1	1	1
Microwave, 1.2 c.f. , 1000W min.	1	1	1	1
Fire extinguishers - provide and install type and *number to meet applicable State and local codes for size of office indicated, including a fire extinguisher suitable for use on a computer terminal fire.	*	*	*	*
Electric pencil sharpeners.	1	2	2	2
Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.	1	1	2	4
Small Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Hardware and Software</u> .	1	1		
Large Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Hardware and Software</u> .			1	1
Field Office Wi-Fi Connection as specified below under <u>Computer Hardware and Software</u>	1	1	1	1
Wi-Fi Printer as specified below under <u>Computer Hardware and Software</u> .	1	1	1	1
Digital Camera as specified below under <u>Computer Hardware and Software</u> .	1	1	3	3
Video Projector as specified below under <u>Computer Hardware and Software</u> .	-	-	-	1
Smart Board as specified below under <u>Computer Hardware and Software</u> .	-	-	-	1
Infrared Thermometer, including annual third party certified calibration, case, and cleaning wipes.	1	1	1	2
Concrete Curing Box as specified below under Concrete Testing Equipment.	1	1	1	1
Concrete Air Meter and accessories as specified below under Concrete Testing Equipment as specified below. Contractor shall provide third party calibration on a quarterly basis.	1	1	1	1
Concrete Slump Cone and accessories as specified below under Concrete Testing Equipment.	1	1	1	1
First Aid Kit	1	1	1	1

Flip Phones as specified under <u>Computer Hardware and Software</u> .	-	-	-	-
Smart Phones as specified under <u>Computer Hardware and Software</u> .	-	-	-	-

The furnishings and equipment required herein shall remain the property of the Contractor. Any supplies required to maintain or operate the above listed equipment or furnishings shall be provided by the Contractor for the duration of the project.

Computer Hardware and Software: Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors, and Smart Board(s) as well as associated hardware and software, must meet the requirements of this specification as well as the latest minimum specifications posted, as of the project advertising date, at Departments web site <http://www.ct.gov/dot/cwp/view.asp?a=1410&q=563904>

Within 10 calendar days after the signing of the Contract but before ordering/purchasing the Wi-Fi Printer (separate from the Multifunction Laser Printer/Copier/Scanner/Fax), Field Office Wi-Fi, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projector(s) and Smart Board(s) as well as associated hardware, the Contractor must submit a copy of their proposed order(s) with catalog cuts and specifications to the Administering CTDOT District for review and approval. The Wi-Fi Printer, Wi-Fi Router, Flip Phones, Smart Phones, digital cameras, Projector(s) and Smart Board(s) will be reviewed by CTDOT District personnel. The Multifunction Laser Printer/Copier/Scanner/Fax will be reviewed by the CTDOT OIS. The Contractor shall not purchase the hardware, software, or services until the Administering CTDOT District informs them that the proposed equipment, software, and services are approved. The Contractor will be solely responsible for the costs of any hardware, software, or services purchased without approval.

The Contractor and/or their internet service provider shall be responsible for the installation and setup of the field office Wi-Fi, Wi-Fi printer, and the configuration of the wireless router as directed by the Department. Installation will be coordinated with CTDOT District and Project personnel.

After the approval of the hardware and software, the Contractor shall contact the designated representatives of the CTDOT administering District, a minimum of 2 working days in advance of the proposed delivery or installation of the Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax,

Video Projectors and Smart Board(s), as well as associated hardware, software, supplies, and support documentation.

The Contractor shall provide all supplies, paper, maintenance, service and repairs (including labor and parts) for the Wi-Fi printers, copiers, field office Wi-Fi, fax machines and other equipment and facilities required by this specification for the duration of the Contract. All repairs must be performed with-in 48 hours. If the repairs require more than a 48 hours then an equal or better replacement must be provided.

Once the Contract has been completed, the hardware and software will remain the property of the Contractor.

First Aid Kit: The Contractor shall supply a first aid kit adequate for the number of personnel expected based on the size of the field office specified and shall keep the first aid kit stocked for the duration that the field office is in service.

Rain Gauge: The Contractor shall supply install and maintain a rain gauge for the duration of the project, meeting these minimum requirements. The rain gauge shall be installed on the top of a post such that the opening of the rain gauge is above the top of the post an adequate distance to avoid splashing of rain water from the top of the post into the rain gauge. The Location of the rain gauge and post shall be approved by the Engineer. The rain gauge shall be made of a durable material and have graduations of 0.1 inches or less with a minimum total column height of 5 inches. If the rain gauge is damaged the Contractor shall replace it prior to the next forecasted storm event at no additional cost.

Concrete Testing Equipment: If the Contract includes items that require compressive strength cylinders for concrete, in accordance with the Schedule of Minimum Testing Requirements for Sampling Materials for Test, the Contractor shall provide the following equipment.

- A) Concrete Cylinder Curing Box – meeting the requirements of Section 6.12 of the Standard Specifications.
- B) Air Meter – The air meter provided shall be in good working order and meet the requirements of AASHTO T 152.
- C) Slump Cone Mold – Slump cone, base plate, and tamping rod shall be provided in like-new condition and meet the requirements of AASHTO T119, Standard Test Method for Slump of Hydraulic-Cement Concrete.

All testing equipment will remain the property of the Contractor at the completion of the project.

Insurance Policy: The Contractor shall provide a separate insurance policy, with no deductible, in the minimum amount of five thousand dollars (\$5,000) in order to insure all State-owned data equipment and supplies used in the office against all losses. The Contractor shall be named insured on that policy, and the Department shall be an additional named insured on the policy. These losses

shall include, but not be limited to: theft, fire, and physical damage. The Department will be responsible for all maintenance costs of Department owned computer hardware. In the event of loss, the Contractor shall provide replacement equipment in accordance with current Department equipment specifications, within seven days of notice of the loss. If the Contractor is unable to provide the required replacement equipment within seven days, the Department may provide replacement equipment and deduct the cost of the equipment from monies due or which may become due the Contractor under the Contract or under any other contract. The Contractor's financial liability under this paragraph shall be limited to the amount of the insurance coverage required by this paragraph. If the cost of equipment replacement required by this paragraph should exceed the required amount of the insurance coverage, the Department will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

Maintenance: During the occupancy by the Department, the Contractor shall maintain all facilities and furnishings provided under the above requirements, and shall maintain and keep the office quarters clean through the use of weekly professional cleaning to include, but not limited to, washing & waxing floors, cleaning restrooms, removal of trash, etc. Exterior areas shall be mowed and clean of debris. A trash receptacle (dumpster) with weekly pickup (trash removal) shall be provided. Snow removal, sanding and salting of all parking, walkway, and entrance ways areas shall be accomplished during a storm if on a workday during work hours, immediately after a storm and prior to the start of a workday. If snow removal, salting and sanding are not completed by the specified time, the State will provide the service and all costs incurred will be deducted from the next payment estimate.

Method of Measurement: The furnishing and maintenance of the construction field office will be measured for payment by the number of calendar months that the office is in place and in operation, rounded up to the nearest month.

There will not be any price adjustment due to any change in the minimum computer hardware and software requirements.

Basis of Payment: The furnishing and maintenance of the Construction Field Office will be paid for at the Contract unit price per month for "Construction Field Office, (Type)," which price shall include all material, equipment, labor, service contracts, licenses, software, repair or replacement of hardware and software, related supplies, utility services, parking area, external illumination, trash removal, snow and ice removal, and work incidental thereto, as well as any other costs to provide requirements of this specified this specification.

<u>Pay Item</u>	<u>Pay Unit</u>
Construction Field Office, (Type)	Month

ITEM #0970006A - TRAFFICPERSON (MUNICIPAL POLICE OFFICER)
ITEM #0970007A - TRAFFICPERSON (UNIFORMED FLAGGER)

9.70.01—Description: Under this item the Contractor shall provide the services of Trafficpersons of the type and number, and for such periods, as the Engineer approves for the control and direction of vehicular traffic and pedestrians. Traffic persons requested solely for the contractor's operational needs will not be approved for payment.

9.70.03—Construction Methods: Prior to the start of operations on the project requiring the use of Trafficpersons, a meeting will be held with the Contractor, Trafficperson agency or firm, Engineer, and State Police, if applicable, to review the Trafficperson operations, lines of responsibility, and operating guidelines which will be used on the project. A copy of the municipality's billing rates for Municipal Police Officers and vehicles, if applicable, will be provided to the Engineer prior to start of work.

On a weekly basis, the Contractor shall inform the Engineer of their scheduled operations for the following week and the number of Trafficpersons requested. The Engineer shall review this schedule and approve the type and number of Trafficpersons required. In the event of an unplanned, emergency, or short term operation, the Engineer may approve the temporary use of properly clothed persons for traffic control until such time as an authorized Trafficperson may be obtained. In no case shall this temporary use exceed 8 hours for any particular operation.

If the Contractor changes or cancels any scheduled operations without prior notice of same as required by the agency providing the Trafficpersons, and such that Trafficperson services are no longer required, the Contractor will be responsible for payment at no cost to the Department of any show-up cost for any Trafficperson not used because of the change. Exceptions, as approved by the Engineer, may be granted for adverse weather conditions and unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

Trafficpersons assigned to a work site are to only take direction from the Engineer.

Trafficpersons shall wear a high visibility safety garment that complies with OSHA, MUTCD, ASTM Standards and the safety garment shall have the words "Traffic Control" clearly visible on the front and rear panels (minimum letter size 2 inches (50 millimeters)). Worn/faded safety garments that are no longer highly visible shall not be used. The Engineer shall direct the replacement of any worn/faded garment at no cost to the State.

A Trafficperson shall assist in implementing the traffic control specified in the Maintenance and Protection of Traffic contained elsewhere in these specifications or as directed by the Engineer. Any situation requiring a Trafficperson to operate in a manner contrary to the Maintenance and Protection of Traffic specification shall be authorized in writing by the Engineer.

Trafficpersons shall consist of the following types:

1. Uniformed Law Enforcement Personnel: Law enforcement personnel shall wear the high visibility safety garment provided by their law enforcement agency. If no high visibility safety garment is provided, the Contractor shall provide the law enforcement personnel with a garment meeting the requirements stated for the Uniformed Flaggers' garment.

Law Enforcement Personnel may be also be used to conduct motor vehicle enforcement operations in and around work areas as directed and approved by the Engineer.

Municipal Police Officers: Uniformed Municipal Police Officers shall be sworn Municipal Police Officers or Uniformed Constables who perform criminal law enforcement duties from the Municipality in which the project is located. Their services will also include an official Municipal Police vehicle when requested by the Engineer. Uniformed Municipal Police Officers will be used on non-limited access highways. If Uniformed Municipal Police Officers are unavailable, other Trafficpersons may be used when authorized in writing by the Engineer. Uniformed Municipal Police Officers and requested Municipal Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites.

2. Uniformed Flagger: Uniformed Flaggers shall be persons who have successfully completed flagger training by the American Traffic Safety Services Association (ATSSA), National Safety Council (NSC) or other programs approved by the Engineer. A copy of the Flagger's training certificate shall be provided to the Engineer before the Flagger performs any work on the project. Uniformed Flaggers shall conform to Chapter 6E, Flagger Control, in the Manual of Uniformed Traffic Control Devices (MUTCD) and shall wear high-visibility safety apparel, use a STOP/SLOW paddle that is at least 18 inches (450 millimeters) in width with letters at least 6 inches (150 millimeters) high. The paddle shall be mounted on a pole of sufficient length to be 6 feet (1.8 meters) above the ground as measured from the bottom of the sign.

Uniformed Flaggers will only be used on non-limited access highways to control traffic operations when authorized in writing by the Engineer.

9.70.04—Method of Measurement: Services of Trafficpersons will be measured for payment by the actual number of hours for each person rendering services approved by the Engineer. These services shall include, however, only such trafficpersons as are employed within the limits of construction, project right of way of the project or along detours authorized by the Engineer to assist the motoring public through the construction work zone. Services for continued use of a detour or bypass beyond the limitations approved by the Engineer, for movement of construction vehicles and equipment, or at locations where traffic is unnecessarily restricted by the Contractor's method of operation, will not be measured for payment.

Trafficpersons shall not work more than twelve hours in any one 24 hour period. In case such services are required for more than twelve hours, additional Trafficpersons shall be furnished and measured for payment. In cases where the Trafficperson is an employee on the Contractor's payroll, payment under the item "Trafficperson (Uniformed Flagger)" will be made only for those hours when the Contractor's employee is performing Trafficperson services.

Travel time will not be measured for payment for services provided by Uniformed Municipal Police Officers or Uniformed Flaggers.

Mileage fees associated with Trafficperson services will not be measured for payment.

Safety garments and STOP/SLOW paddles will not be measured for payment.

9.70.05—Basis of Payment: Trafficpersons will be paid in accordance with the schedule described herein.

There will be no direct payment for safety garments or STOP/SLOW paddles. All costs associated with furnishing safety garments and STOP/SLOW paddles shall be considered included in the general cost of the item.

1. Uniformed Law Enforcement Personnel: The sum of money shown on the Estimate and in the itemized proposal as "Estimated Cost" for this work will be considered the bid price even though payment will be made as described below. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount for the contract.

The Department will pay the Contractor its actual costs for "Trafficperson (Municipal Police Officer)" plus an additional 5% as reimbursement for the Contractor's administrative expense in connection with the services provided. The 5% markup will be paid when the Engineer receives cancelled check(s) or receipted invoice(s) as proof of payment from the Contractor.

The invoice must include a breakdown of each officer's actual hours of work and actual rate applied. Mileage fees associated with Trafficperson services are not reimbursable expenses and are not to be included in the billing invoice. The use of a municipal police vehicle authorized by the Engineer will be paid at the actual rate charged by the municipality. Upon receipt of the invoice from the municipality, the Contractor shall forward a copy to the Engineer. The invoice will be reviewed and approved by the Engineer prior to any payments. *Eighty (80%) of the invoice will be paid upon completion of review and approval. The balance (20%) will be paid upon receipt of cancelled check or receipted invoice, as proof of payment.* The rate charged by the municipality for use of a uniformed municipal police officer and/or a municipal police vehicle shall not be greater than the rate it normally charges others for similar services.

2. Uniformed Flagger: Uniformed flaggers will be paid for at the contract unit price per hour for "Trafficperson (Uniformed Flagger)", which price shall include all compensation, insurance benefits and any other cost or liability incidental to the furnishing of the trafficpersons ordered.

Pay Item	Pay Unit
Trafficperson (Municipal Police Officer)	est.
Trafficperson (Uniformed Flagger)	Hr.

ITEM NO. 0971001A – MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01 – Description is supplemented by the following:

The Contractor shall maintain and protect traffic as described by the following and as limited in the Special Provision "Prosecution and Progress":

Route 8

The Contractor shall maintain and protect the minimum number of through lanes and shoulders as dictated in the Special Provision for Section 1.08 - Prosecution and Progress "Limitations of Operations - Minimum Number of Lanes to Remain Open" Chart, on a paved travel path not less than 12 feet in width per lane.

The Contractor will be allowed to halt Route 8 traffic for a period not to exceed 10 minutes to perform necessary work for the erection and setting of structural steel, and for the removal of the existing bridge superstructure, as approved by the Engineer, between 12:01 a.m. and 5:00 a.m. on all non-Holiday days. If more than one 10-minute period is required, the Contractor shall allow all stored vehicles to proceed through the work area prior to the next stoppage.

Ramps and Turning Roadways

The Contractor shall maintain and protect existing traffic operations.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall be allowed to maintain and protect a minimum of one lane of traffic, on a paved travel path not less than 12 feet in width.

All Other Roadways

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Commercial and Residential Driveways

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed, unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure.

Article 9.71.03 - Construction Method is supplemented as follows:

General

Unpaved travel paths will only be permitted for areas requiring full depth and full width reconstruction, in which case, the Contractor will be allowed to maintain traffic on processed aggregate for a duration not to exceed 10 calendar days. The unpaved section shall be the full width of the road and perpendicular to the travel lanes. Opposing traffic lane dividers shall be used as a centerline.

The Contractor is required to delineate any raised structures within the travel lanes, so that the structures are visible day and night, unless there are specific contract plans and provisions to temporarily lower these structures prior to the completion of work.

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway (bridge) section by the end of a workday (work night), or as directed by the Engineer.

When the installation of all intermediate courses of bituminous concrete pavement is completed for the entire roadway, the Contractor shall install the final course of bituminous concrete pavement.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 50 feet. At the end of the workday, if the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary traversable slope of 4:1 or flatter that is acceptable to the Engineer.

The Contractor, during the course of active construction work on overhead signs and structures, shall close the lanes directly below the work area for the entire length of time overhead work is being undertaken. At no time shall an overhead sign be left partially removed or installed.

If applicable, when an existing sign is removed, it shall be either relocated or replaced by a new sign during the same working day.

The Contractor shall not store any material on-site which would present a safety hazard to motorists or pedestrians (e.g. fixed object or obstruct sight lines).

The field installation of a signing pattern shall constitute interference with existing traffic operations and shall not be allowed, except during the allowable periods.

Construction vehicles entering travel lanes at speeds less than the posted speed are interfering with traffic, and shall not be allowed without a lane closure. The lane closure shall be of sufficient length to allow vehicles to enter or exit the work area at posted speeds, in order to merge with existing traffic.

Existing Signing

The Contractor shall maintain all existing overhead and side-mounted signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary, and install temporary sign supports if necessary and as directed by the Engineer.

Requirements for Winter

The Contractor shall schedule a meeting with representatives from the Department including the offices of Maintenance and Traffic, and the Town/City to determine what interim traffic control measures the Contractor shall accomplish for the winter to provide safety to the motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

Signing Patterns

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

Pavement Markings - Limited Access Highways, Turning Roadways and Ramps

During construction, the Contractor shall maintain all pavement markings throughout the limits of the project.

Interim Pavement Markings

The Contractor shall install painted pavement markings, which shall include lane lines (broken lines), shoulder edge lines, stop bars, lane-use arrows and gore markings, on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. All painted pavement markings will be paid under the appropriate items.

If the Contractor does not install permanent Epoxy Resin Pavement Markings by the end of the work day/night on exit ramps where the final course of bituminous concrete pavement has been installed, the Contractor shall install temporary 12 inch wide white stop bars. The temporary stop bars shall consist of Temporary Plastic Pavement Marking Tape and shall be installed by the end of the work day/night. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of these markings when the permanent Epoxy Resin Pavement Markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

Final Pavement Markings

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends" after such time as determined by the Engineer.

TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

TRAFFIC CONTROL PATTERNS

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

- Speed and volume of traffic
- Duration of operation
- Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 19 through 25 may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

PLACEMENT OF SIGNS

Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

ALLOWABLE ADJUSTMENT OF SIGNS AND DEVICES SHOWN ON THE TRAFFIC CONTROL PLANS

The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists,

abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

TABLE I – MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

SECTION 1. WORK ZONE SAFETY MEETINGS

- 1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the project. Other work zone safety meetings during the course of the project should be scheduled as needed.
- 1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can't be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda should include:
 - Review Project scope of work and time
 - Review Section 1.08, Prosecution and Progress
 - Review Section 9.70, Trafficpersons
 - Review Section 9.71, Maintenance and Protection of Traffic
 - Review Contractor's schedule and method of operations.
 - Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
 - Open discussion of work zone questions and issues
 - Discussion of review and approval process for changes in contract requirements as they relate to work zone areas

SECTION 2. GENERAL

- 2.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available; the traffic control pattern shall not be installed.
- 2.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.
- 2.c) Failure of the Contractor to have the required minimum number of signs, personnel and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for loss time.
- 2.d) In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to

the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

SECTION 3. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

- 3.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.
- 3.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.
- 3.c) Stopping traffic may be allowed:
 - As per the contract for such activities as blasting, steel erection, etc.
 - During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
 - To move slow moving equipment across live traffic lanes into the work area.
- 3.d) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, traffic slowing techniques may be used and shall include the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed/removed, the TMAs and sign crew shall continue to install/remove the pattern as described in Section 4c and traffic shall be allowed to resume their normal travel.
- 3.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- 3.f) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.g) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

- 3.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

SECTION 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

- 4.a) On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).
- 4.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.
- 4.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.
- 4.d) The Flashing Arrow board display shall be in the “arrow” mode for lane closure tapers and in the “caution” mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the “caution” mode when it is positioned in the closed lane.
- 4.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

SECTION 5. USE OF TRUCK MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)

- 5.a) For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.
- 5.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.
- 5.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the “flashing arrow” mode when taking the lane. The sign truck and workers should be immediately ahead of

the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the “caution” mode when traveling in the closed lane.

- 5.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the “caution” mode when in the closed lane.
- 5.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled “Type ‘D’ Portable Impact Attenuation System”. Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.
- 5.f) TMAs should be paid in accordance with how the unit is utilized. When it is used as a TMA and is in the proper location as specified, and then it should be paid at the specified hourly rate for “Type ‘D’ Portable Impact Attenuation System”. When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for “High Mounted Internally Illuminated Flashing Arrow”. If a TMA is used to install and remove a pattern and then is used as a Flashing Arrow, the unit should be paid as a “Type ‘D’ Portable Impact Attenuation System” for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a “High Mounted Internally Illuminated Flashing Arrow”.

SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

- 6.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.
- 6.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.
- 6.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.
- 6.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

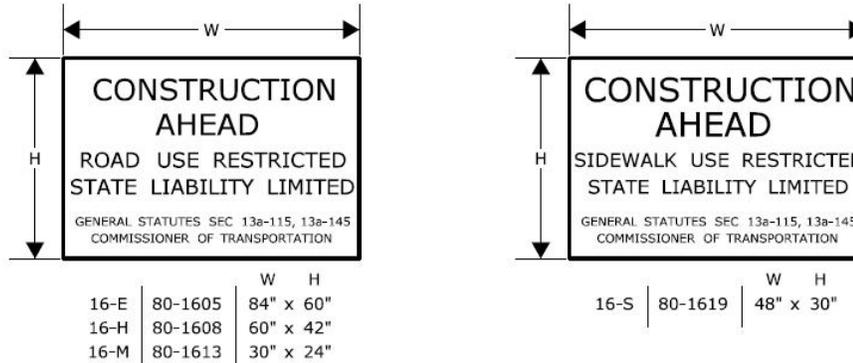
SECTION 7. USE OF (REMOTE CONTROLLED) CHANGEABLE MESSAGE SIGNS (CMS)

- 7.a) For lane closures on limited access roadways, one CMS shall be used in advance of the traffic control pattern. Prior to installing the pattern, the CMS shall be installed and in operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The CMS shall be positioned ½ - 1 mile ahead of the lane closure taper. If the nearest Exit ramp is greater than the specified ½ - 1 mile distance, than an additional CMS shall be positioned a sufficient distance ahead of the Exit ramp to alert motorists to the work and therefore offer them an opportunity to take the exit.
- 7.b) CMS should not be installed within 1000 feet of an existing CMS.
- 7.c) On non-limited access roadways, the use of CMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the CMS.
- 7.d) The advance CMS is typically placed off the right shoulder, 5 feet from the edge of pavement. In areas where the CMS cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position. The advance CMS shall be adequately protected if it is used for a continuous duration of 36 hours or more.
- 7.e) When the CMS are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90° away from the roadway.
- 7.f) The CMS generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).
- 7.g) The CMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).
- 7.h) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.
- 7.i) The messages that are allowed on the CMS are as follows:

<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>	<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	WORKERS ON ROAD	REDUCE SPEED
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	WORKERS ON ROAD	SLOW DOWN
5	RIGHT LANE CLOSED	MERGE LEFT	13	EXIT XX CLOSED	USE EXIT YY
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	EXIT XX CLOSED USE YY	FOLLOW DETOUR
7	RIGHT LANE CLOSED	REDUCE SPEED	15	2 LANES SHIFT AHEAD	USE CAUTION
8	2 RIGHT LANES CLOSED	REDUCE SPEED	16	3 LANES SHIFT AHEAD	USE CAUTION

For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

SERIES 16 SIGNS



THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE, SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

THE LOCATION OF SERIES 16 SIGNS CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS, AND MAJOR TOWN/CITY ROADWAYS.

SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

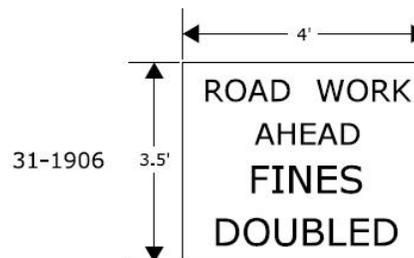
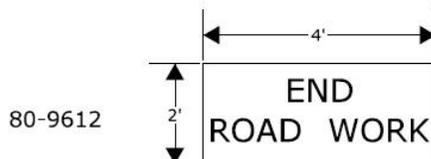
REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT WHERE THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.

"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN MUST BE THE "END ROAD WORK" SIGN.



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
REQUIRED SIGNS

NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.
6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.
7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
10. SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT (MILES PER HOUR)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE
30 OR LESS	180' (55m)
35	250' (75m)
40	320' (100m)
45	540' (165m)
50	600' (180m)
55	660' (200m)
65	780' (240m)

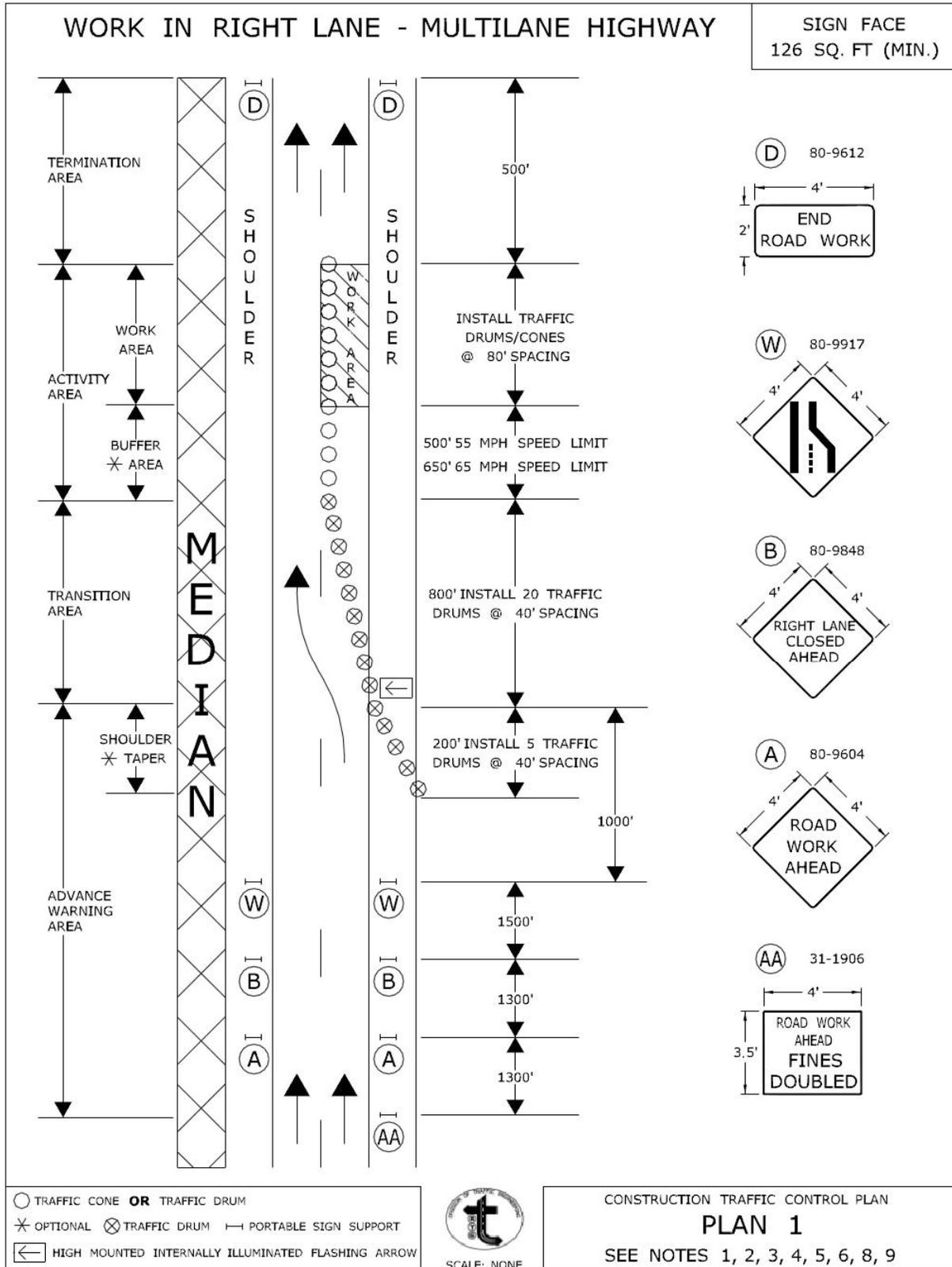
METRIC CONVERSION CHART (1" = 25mm)

ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC
12"	300mm	42"	1050mm	72"	1800mm
18"	450mm	48"	1200mm	78"	1950mm
24"	600mm	54"	1350mm	84"	2100mm
30"	750mm	60"	1500mm	90"	2250mm
36"	900mm	66"	1650mm	96"	2400mm



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN NOTES

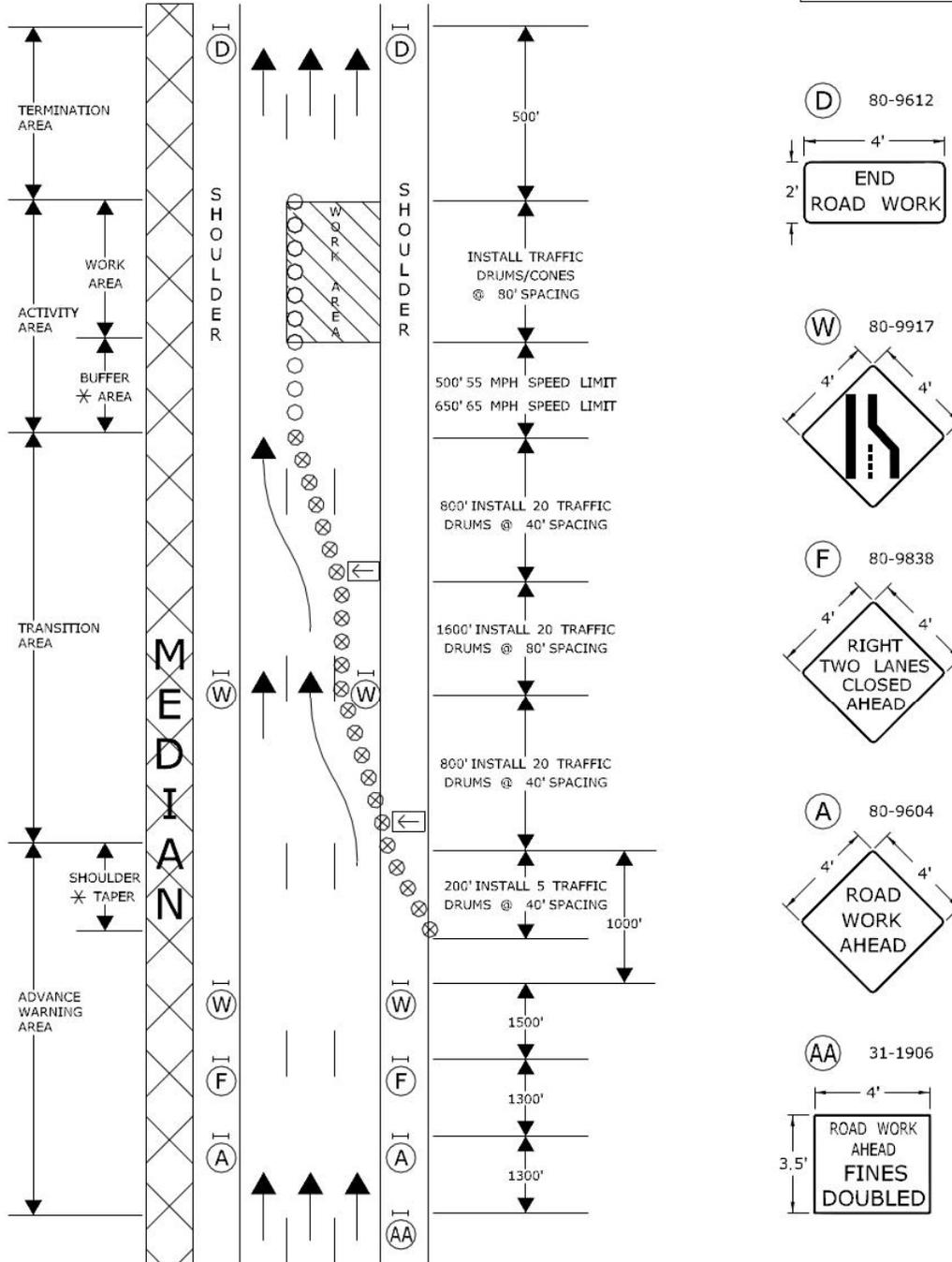


CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:51:00-0400'

WORK IN RIGHT TWO LANES - MULTILANE HIGHWAY

SIGN FACE
158 SQ. FT (MIN.)



- TRAFFIC CONE OR TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

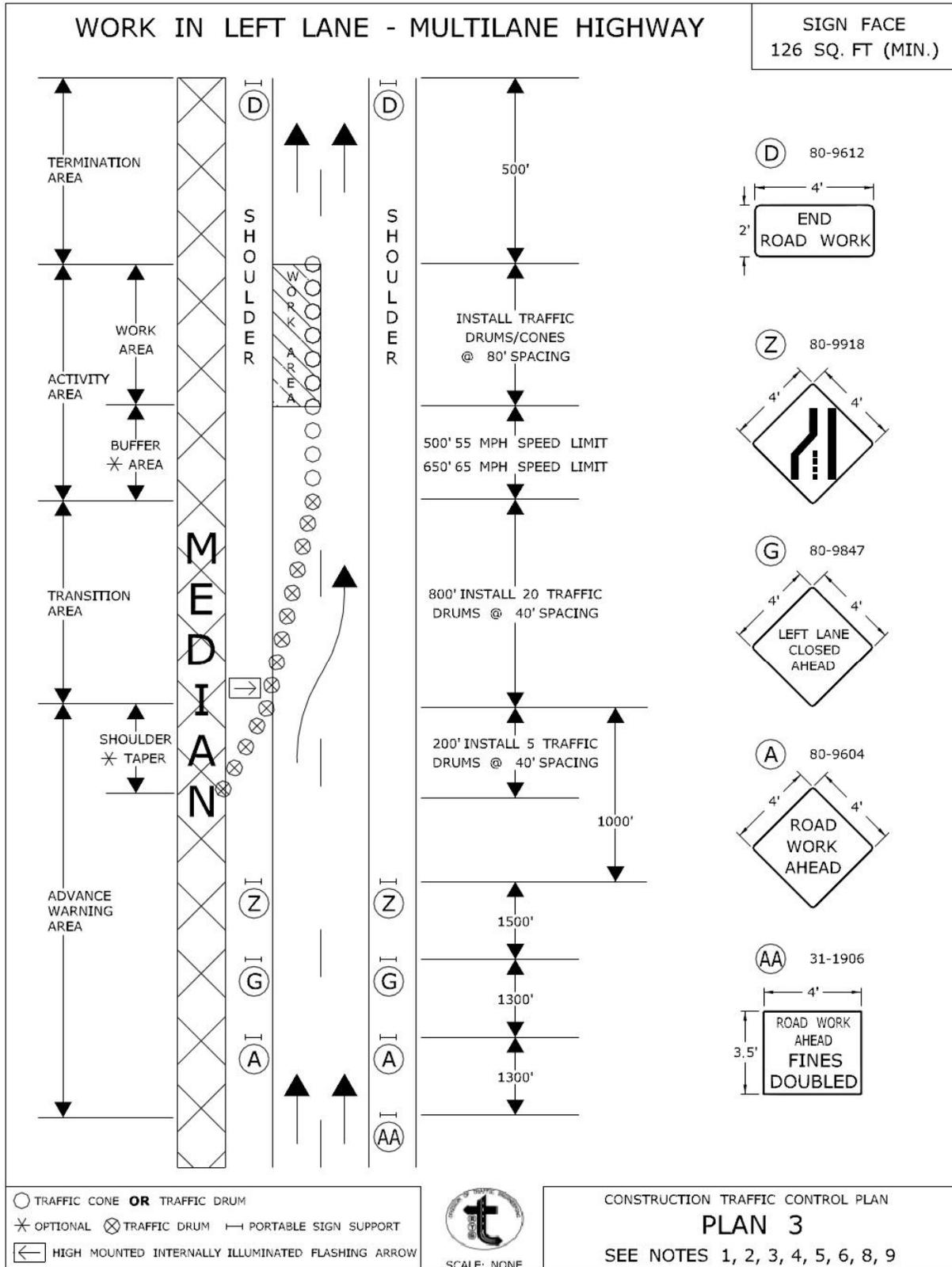


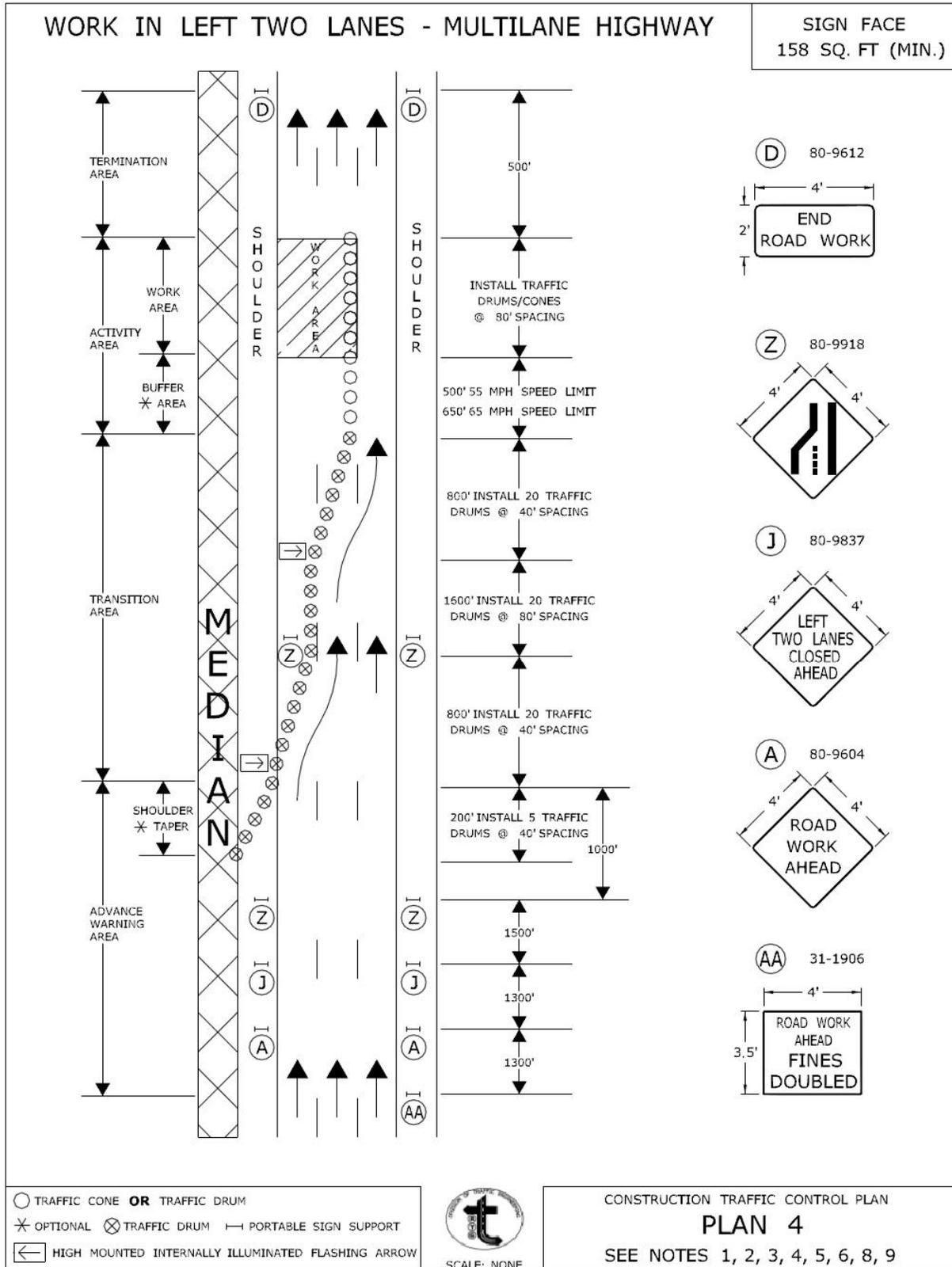
SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 2
SEE NOTES 1, 2, 3, 4, 5, 6, 8, 9

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:51:23-04'00"





CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
 Charles S. Harlow
 2012.06.05 15:52:10-0400
 PRINCIPAL ENGINEER

Article 9.71.05 – Basis of Payment is supplemented by the following:

The temporary relocation of signs and supports, and the furnishing, installation and removal of any temporary supports shall be paid for under the item “Maintenance and Protection of Traffic”. Temporary overhead sign supports and foundations shall be paid for under the appropriate item(s).

The cost of furnishing, installing, and removing the material for the 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic.”

ITEM #1008460A – 1” RMC PVC COATED - SURFACE

DESCRIPTION: Work under this item shall consist of the installation of PVC coated rigid metal conduit of the size specified. The PVC coated rigid metal conduit shall be surface mounted to the bridge structure at the locations as indicated on the plans.

MATERIALS: PVC coated rigid metal conduit and fittings shall be UL/CUL listed in accordance with UL6 and ANSI C80.1 standards and shall be ETL PVC-001 verified. The conduit shall be hot dip galvanized inside and out with hot dip galvanized threads. The conduit and couplings shall feature a 40 mil thick PVC coating on the outside surface and a 2 mil thick urethane coating consistently applied to the interior surfaces. PVC coating shall be gray in color. All male and female threads on conduit and fittings shall be protected by a urethane coating. All fittings, couplings, conduit bodies, junction boxes (Unless otherwise noted on plans) shall also be PVC coated. All conduit bends shall consist of factory made standard conduit elbows.

CONSTRUCTION METHODS: Work under this item consist of the installation of PVC coated rigid metal conduit of the size specified surface mounted at the locations as indicated on the plan, Conduit and fittings shall be installed in conformance with Section 10.08.01-1.

METHOD OF MEASUREMENT: Shall be in accordance with Section 10.08.04.

BASIS OF PAYMENT: This work will be paid for at the contract unit price per linear foot for "1” R.M.C. PVC Coated - Surface" complete, which price shall include conduit, connections. Couplings, fittings, conduit bodies, expansion fittings, clamps, brackets, installation, drilling, hardware, mounting, and all materials, tools, equipment, labor and work incidental thereto.

ITEM #1008901A REMOVE CONDUIT

DESCRIPTION: This item shall consist of removing lighting circuit conduits complete, as shown on the plans or as ordered and in accordance with these specifications. Cable located within the conduit which will be pulled back and removed shall be included in this item. The removed cable and conduit shall remain the property of the Contractor.

CONSTRUCTION METHOD: The Contractor shall remove conduit and cable where required. The removed conduit and cable shall be disposed of by the Contractor.

METHOD OF MEASUREMENT: The quantity of surface mounted conduit and incidental cable removed will be measured for payment by linear foot measured from each terminus at a fixture or junction box.

BASIS OF PAYMENT: This work will be paid for at the contract unit price per linear foot for "REMOVE CONDUIT" as adjusted in accordance with the provision above, which price shall include all equipment, labor and work incidental thereto.

ITEM #1009300A - STEEL JUNCTION BOX COVER

DESCRIPTION: This work shall consist of replacing a missing or damaged steel junction box cover on a bridge parapet/wingwall or retaining wall, with a new galvanized steel cover (with gasket and cover bolts) in accordance with this special provision.

MATERIALS: The steel junction box cover shall be a minimum ¼” steel conforming to the requirements of ASTM - A36 and shall be hot-dip galvanized conforming to the requirements of ASTM - A123. The dimensions of the cover shall be applicable to the existing junction box on which it is to be installed. The cover shall properly fit within the recessed front opening of the existing junction box.

The cover shall be attached with stainless steel socket cap bolts of the size and dimension required to match the existing threaded bolt holes in the existing cast iron junction boxes.

Replacement gaskets shall be neoprene.

CONSTRUCTION METHODS: The Contractor shall replace a missing or damaged steel junction box cover on a bridge parapet/wingwall or retaining wall, with a new galvanized steel cover with gasket and cover bolts.

All existing bolt holes shall be properly cleaned prior to installing the new cover bolts. If an existing cover bolt is broken off in the bolt hole the Contractor may omit the installation of a new bolt in this bolt hole provided the overall quantity of bolts installed is at least equal to 50% of the bolt holes in the junction box, and provided there will be at least one bolt installed in each side of the cover plate.

If necessary, the Contractor shall extract/drill-out a broken cover bolt and re-tap the threads in the bolt hole so that the new cover bolt can be properly installed. Anti-seize compound shall be applied to all installed cover bolts.

The removed covers shall be disposed of by the Contractor.

METHOD OF MEASUREMENT: This work will be measured for payment by the number of steel junction box covers replaced, complete and accepted in place.

BASIS OF PAYMENT: This work will be paid for at the contract unit price each for "Steel Junction Box Cover" of the size required complete and accepted in place, which price shall include cover, gasket, screws, removal and disposal of existing cover, drilling and tapping, anti-seize compound, and all materials, tools, equipment and labor incidental thereto.

ITEM #1018001A - NAVIGATION LIGHTS

Description: This work shall consist of furnishing and installing new navigation lights with all necessary components, as shown on the plans or as directed and in accordance with these specifications.

Materials: The navigation lights shall be of a type approved by the United States Coast Guard and shall be in accordance with their regulations for lighting bridges.

All navigation lights shall be made with bronze castings and be entirely weatherproof. They shall be ventilated to prevent sweating of the lens, and the vents shall be screened to prevent entry of bugs and insects. The lens shall be permanent, rigid, heat resistant glass, 8" (205mm) standard marine fresnel type. Lens shall be 360 degree green or 180 degree red as called for on the plans. Each lens assembly shall be equipped with a single medium base porcelain lamp receptacle rated at 250 volt and 660 watt.

Pendent mounted navigation lights shall be supplied with an automatic lock and stainless steel service chain for locking in the up position during servicing and in the down position during normal use. All joints shall be sealed with weatherproof gaskets. The mounting bracket and hanger housing shall be cast silicon bronze with stainless steel pivot. "O" rings shall provide a watertight seal. The bearings shall be factory lubricated and shall not need maintenance. All miscellaneous hardware shall be stainless steel. A watertight cable entrance fitting shall be provided. The hanger stem shall be 40mm stainless steel pipe. Counterweights and a stainless steel 40mm counterweight stem shall be provided. Length of the hanger stem, and counter weight stem, shall be field determined to allow the navigation light to hang down as indicated on the plan details.

The lamp shall be LED rated for a minimum of 100,000 hours (assuming a burn time of 12 hours per day). LED lamps shall be color matched to the luminaire lens color and shall operate at 120 volts. Energy consumption shall be approximately 8 watts. The minimum light output of the LED lamp shall be equivalent to the light output of a 75 watt incandescent lamp.

Flexible cords shall be type S.O., three conductor #14 AWG, rated at 600 volts.

Anchor bolts (4) shall be stainless steel, ½" (M12) in diameter, and shall be cast into the parapet. The location of the anchorages shall position the new navigation lights at the same locations as the existing navigation lights for both channel margin and channel center locations.

Construction Methods: The work for this item shall conform to the requirements of Section 10.18.03. Navigation lights shall be installed at the locations, and in the manner, as indicated on the plans.

Method of Measurement: This work will be measured for payment by the number of Navigation lights furnished, installed, and accepted in place.

Basis of Payment: This work will be paid for at the contract unit price each for "Navigation Lights" complete and accepted in place, which price shall include all materials including navigation light, lamp, conduit, swivel mounting bracket, stainless steel chain, conductors, mounting stem, counterweights, lens, anchor bolts, hardware, attaching, and all equipment, tools, labor, and work incidental thereto.

ITEM #1018101A – REMOVE NAVIGATION LIGHTS

DESCRIPTION: Under this item the Contractor shall remove existing navigation lights where shown on the plans or as directed by the Engineer. The removed navigation lights and associated hardware shall be properly disposed of by the Contractor.

CONSTRUCTION METHODS: The Contractor shall remove pendant type navigation lights with transformers and control wiring where shown on the plans or as directed by the Engineer. Each removed navigation light consisting of the luminaire, conduit stems, swivel (hanger) housing, counter weights and service chain shall be disposed of by the Contractor. The step-down transformers shall also be disposed of by the contractor. Conductors shall be disposed of by the Contractor. Navigation lights shall be properly removed by unbolting the swivel housing from the anchor bolts.

No existing navigation light shall be removed until a new navigation light or temporary navigation light has been installed as a replacement and made operational. New navigation lights and temporary navigation lights shall be paid for under separate bid items. Nighttime navigation lighting of the maritime channel shall be maintained throughout all stages of construction.

Prior to the removal of any existing navigation light the Contractor shall establish the GPS location of the light and note this location for use in installing temporary or permanent replacement lights.

METHOD OF MEASUREMENT: This work will be measured for the removal of each complete existing navigation light system consisting of pendant type navigation lights and associated materials, complete and accepted.

BASIS OF PAYMENT: This work will be paid for at the contract unit price each for "Remove Navigation Lights", which price shall include all materials, equipment and work incidental thereto including GPS location determination, removal, disconnection, and proper disposal of the navigation lights, transformers, and associated components.