

**AUGUST 22, 2018**

**REPLACEMENT OF BRIDGE NO. 00315 U.S. ROUTE 1 OVER NOROTON RIVER**

**FEDERAL AID PROJECT NO. 0001(347)**

**STATE PROJECT NO. 0135-0307**

**CITY OF STAMFORD AND TOWN OF DARIEN**

**ADDENDUM NO. 1**

This Addendum addresses the following questions and answers contained on the “CT DOT QUESTIONS AND ANSWERS WEBSITE FOR ADVERTISED CONSTRUCTION PROJECTS”:

Question and Answer Nos. 1, 5, 6, 7, 8, 11, 12, 13, 19, 20, 21, 24, 25, 26, 29, and 32.

**SPECIAL PROVISIONS**

**NEW SPECIAL PROVISIONS**

The following Special Provisions are hereby added to the Contract:

- ITEM #0201211A – REMOVE SIGN
- ITEM #0202452A – TEST PIT
- ITEM #0974001A – REMOVAL OF EXISTING MASONRY

**REVISED SPECIAL PROVISIONS**

The following Special Provisions are hereby deleted in their entirety and replaced with the attached like-named Special Provisions:

- ITEM #0502195A – TEMPORARY BRIDGE
- ITEM #0503001A – REMOVAL OF SUPERSTRUCTURE
- ITEM #0822005A – TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)
- ITEM #0822006A – RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)
- ITEM #0914040A – PEDESTRIAN RAILING

**CONTRACT ITEM**  
**NEW CONTRACT ITEM**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>
0201211A	REMOVE SIGN	EA.	1

**PLANS**  
**REVISED PLANS**

The following Plan Sheets is are hereby deleted and replaced with the like-numbered Plan Sheets: 02.01.A1, 03.07.A1, 03.08.A1, 04.03.A1, 04.04.A1, 05.02.A1, 05.12.A1, 05.16.A1, 05.22.A1, 05.26.A1, 05.34.A1, 05.35.A1, 05.39.A1, 05.40.A1, 06.03.A1, 06.04.A1, and 07.05.A1.

The Bid Proposal Form has been revised to reflect these changes.

The Detailed Estimate Sheets do not reflect these changes.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

**ITEM #0201211A –REMOVE SIGN**

**Description:** This item shall consist of the removal of existing business signs where indicated on the plans or as directed by the Engineer. The signs will be properly disposed of off-site by the Contractor. This item shall consist of all labor, material, and equipment necessary to complete the work.

**Construction Methods:** The sign, foundations and all other materials of the sign shall be removed and disposed of by the Contractor as directed by the Engineer.

**Method of Measurement:** Payment shall be at the contract sum price for each sign removed which shall include all removal of the sign and post and disposal as necessary, completed and accepted.

**Basis of Payment:** This work will be paid for at the contract sum price for each “Remove Sign”, completed, which price shall include all materials, equipment, tools and labor incidental thereto, and all disposal of surplus materials.

Pay Item  
Remove Sign

Pay Unit  
EA.

ITEM #0201211A  
ADDED BY ADDENDUM NO. 1

## **ITEM #0202452A – TEST PIT**

**Description:** Test pits are required to verify the location and depth of underground utilities located at the site. The Contractor shall submit documentation showing their proposed test pit locations to the Engineer for review and approval prior to commencing any test pit work.

This work shall consist of the removal and satisfactory disposal of all materials and backfilling, all in accordance with these specifications.

This work shall include coordination with the affected utility companies.

**Construction Methods:** The recommended method of performing the test pits is the use of a vacuum system to minimize the limits of disturbance. Coordinate the use of a vacuum system or excavation of test pits with the respective utility company, or other owners having facilities in the vicinity, one-week in advance of performing the test pits. Check with “Call Before You Dig” at 1-800-922-4455 prior to performing the test pits. Perform all work in conformance with the applicable safety codes.

The Contractor is to ensure the underground utilities or structures are not damaged. The Contractor shall excavate by hand methods where necessary to ensure that underground utilities or structures are not damaged. It shall be the Contractor’s sole responsibility for any damages incurred while performing the test pits and shall be repaired or replaced at the Contractor’s own expense.

If it is decided by the Contractor that the test pits be excavated, instead of using a vacuum system, the Contractor shall furnish and employ such shores, braces, pumps, etc., as may be necessary for the protection of property, proper completion of the work and the safety of the public and employees of the Contractor and the State. All bracing, etc., shall be removed when no longer required for the construction or safety of the work.

Wherever portions of the existing full-depth bituminous concrete pavement are to be removed in conjunction with the test pits, the limits shall be cut by a method approved by the Engineer.

The Contractor shall perform field surveys to establish the horizontal and vertical location and to document the type and size of the utilities at each test pit. The work shall be performed in accordance with the requirements of Section 9.80, Construction Staking. The Contractor shall furnish the Engineer copies of all test pit data. The Contractor shall notify the Engineer of any revealed conflicts which may require design revisions, relocations and/or adjustments as early as possible to avoid unnecessary delays. No work shall be started within areas of conflict until so authorized.

After the test pit is complete, the Contractor shall notify the Engineer and the test pit shall not be backfilled until directed by the Engineer. When backfilling is required, the material used shall be of a quality material satisfactory to the Engineer and shall be free from large or frozen lumps,

wood and other extraneous material. All backfill placed below subgrade shall be placed in layers of not more than 6 inches in depth after compaction and shall be thoroughly compacted. Unless otherwise ordered by the Engineer, the backfill shall be brought to the surface of the surrounding ground and subgrade and neatly graded.

All suitable material removed in making the excavation shall be used for backfill if required. All surplus or unstable material shall be removed and disposed of as directed. Should additional material be required for backfilling, it may be obtained from the Project excavation or from borrow pits, gravel pits, or elsewhere as the Engineer may direct.

**Method of Measurement:** Test pits will be measured as each excavated, backfilled, surveyed, documented and accepted. There will be no separate measurement for mobilization and demobilization associated with this item.

**Basis of Payment:** Test Pits will be paid for at the contract unit price each complete in place and accepted, which price shall include all materials, equipment, tools, surveys, and labor incidental thereto.

The price shall also include backfilling, patching roadways and sidewalks in kind, restoration of the ground where required and the disposal of surplus material. No additional payment will be made for shoring, bracing, pumping, and bailing or for material or equipment necessary for the completion of the work.

Pay Item  
Test Pit

Pay Unit  
EA.

**ITEM #0974001A - REMOVAL OF EXISTING MASONRY**

Work under this item shall conform to the requirements of Section 9.74 of the Standard Specifications (Form 817) amended as follows:

**9.74.01 – Description:** Add the following:

This work shall also include the removal of any existing sheet piling adjacent to existing substructures to be removed as shown on the contract plans.

**9.74.04 – Method of Measurement:** Add the following:

There will be no direct measurement for removal of existing sheet-piling but the cost thereof shall be included in the contract unit price per cubic yard of the removal of existing masonry measured for payment.

**9.74.05 – Basis of Payment:** Add the following:

Removal of existing sheet piling will not be paid for separately but shall be included in the price per cubic yard of removal of existing masonry.

## **ITEM #0502195A – TEMPORARY BRIDGE**

**Description:** Work under this item shall consist of designing, furnishing, installing, maintaining and removing the superstructure and abutments of the temporary bridge used to carry vehicular traffic during construction.

**Design:** The following design requirements shall apply to all components of the temporary bridge:

1 – Design Computations: Contractor is fully responsible for the design, detailing and additional specifications required. The designer of each bridge component shall be a qualified Professional Engineer licensed in the State of Connecticut. The designer must have designed at least three similar superstructures within the last three years.

2 - Designer's Liability Insurance: Each designer shall secure and maintain at no direct cost to the Department, a Professional Liability Insurance Policy for errors and omissions in the minimum amount of One Million Dollars (\$1,000,000). The Designer may, at his election, obtain a policy containing a maximum Two Hundred Fifty Thousand Dollars (\$250,000) deductible clause, but if he should obtain a policy containing such a clause, the Designer shall be liable to the extent of the deductible amount. The Designer shall obtain the appropriate and proper endorsement to its Professional Liability Policy to cover the indemnification clause in this contract as the same relates to negligent acts, errors or omissions in the work performed by the Designer. The Designer shall continue this liability insurance coverage for the period of time in which the temporary bridge is in use, including erection, service, and removal, subject to the continued commercial availability of such insurance.

The Designer shall supply the certificate of this insurance to the Engineer prior to the start of construction of the temporary bridge. The designer's insurance company shall be licensed in the State of Connecticut.

### 3 – Preliminary Submissions:

Prior to the start of fabrication or construction, the Contractor shall submit to the Engineer a design package, which shall include, but not be limited to the following:

#### a) Detailed Plans:

- Plan sheets shall be approximately 24" x 36".
- Stamped by a licensed Professional Engineer (Connecticut), who shall also be available for consultation in interpreting his drawings, and in the resolution of any problems which may occur during the performance of work. Please note that each working drawing must be sealed.
- Full plan view of the component drawn to scale. The plan view must reflect the horizontal alignment and offset from the horizontal control line to the bridge component. Beginning and ending stations, all utilities, signs, lights, etc. that

affect the construction along with all property lines and easement lines adjacent to the bridge shall be shown.

- Full elevation view of the wall drawn to scale. Elevation views should indicate the elevation at the top and bottom of walls, horizontal and vertical break points, and the location of finished grade.
- Typical cross sections drawn to scale including all appurtenances. Detailed cross section should be provided at significant reinforcement transitions such as wall ends.
- Details of all wall components and their connections such as the length, size and type of reinforcement and where any changes occur; modular component and facing details including reinforcing steel and reinforcement connections; joint material including geotextile filter location and horizontal joint compression material, etc.
- Drainage details for embankment backfill including attachment to outlets shown on contract drawings (Abutment only).
- Details of any roadway drainage pipe projecting through the abutment, or any attachments to the abutment. Details of the treatment of drainage swales or ditches shown on the contract drawings (Abutment only).
- Design parameters used along with AASHTO references.
- Material designations for all materials to be used.
- Detailed construction methods including a quality control plan. Construction quality control plans should include monitoring and testing frequencies (e.g. for maintaining horizontal and vertical control). Construction restraints should also be listed in the details. Specific requirements for construction around obstructions should be included.
- Details of parapet attachments where required along with any lighting and/or signing requirements.
- Details of back wall where required.
- Details of Architectural Treatment where required.
- Details of Temporary Earth Retaining Systems where required.
- Details of wall treatment where the wall abuts other structures.
- Treatment of supported or underground utilities where required. Coordinate with bridge water main support system designed per Item #1301071A “Furnishing & Installing Temporary Water Main Crossing”.
- Details of any supported utilities projecting through abutment or back wall.

b) Design Computations:

- Prior to construction, the Contractor shall submit design computations for the temporary bridge superstructure and substructure components, to the Engineer for review in accordance with Article 1.05.02.
- Stamped by a licensed Professional Engineer (Connecticut), who shall also be available for consultation in interpreting his computations and drawings, and in the resolution of any problems which may occur during the performance of work.



- Computations shall clearly refer to the applicable AASHTO provisions as stated in the Notes on the Contract Drawings.
  - Documentation of computer programs including all design parameters and computation inputs.
  - The design shall conform to the criteria listed below.
- c) Construction Specifications:
- Construction methods specific to the bridge component. These specifications should include construction limitations including vertical clearance, right-of-way limits, etc. Submittal requirements for materials such as certification, quality, and acceptance/rejection criteria should be included. Details on connection of modular units and connection of reinforcements such that assurance of uniform stress transfer should be included.
  - Any requirements not stated herein.

The submissions for temporary bridge components shall be treated as working drawings in accordance with Section 1.05 amended as follows:

- a) 6 sets of each submission shall be supplied to the Department
- b) The Contractor shall allow 21 days for the review of each submission. If subsequent submissions are required as a result of the review process, 21 days shall be allowed for review of each submission. No extensions in contract time will be allowed for the review of these submissions.

#### 4 - Final Submissions

Once a temporary bridge component design has been reviewed and accepted by the Department, the Contractor shall submit the final plans. The final submission shall include one set of full size (approximately 24" x 36") mylar sheets and five sets of full size blue line copies.

The final submission shall be made within 14 days of acceptance by the Department. No work shall be performed on the component until the final submission has been received.

Acceptance of the final design shall not relieve the Contractor of his responsibility under the contract for the successful completion of the work.

The actual designer of the component is responsible for the review of any shop drawings prepared for the fabrication of the component. One set of full size blue line copies of all approved shop drawings shall be submitted to the Department's permanent records.

#### 5 - General Design Requirements

All designs for temporary bridge components shall conform to the latest edition of American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges including the latest Interims published except as noted otherwise herein.

#### 6 – Design Requirements for Prefabricated Modular Abutments

The general design of the wall shall be according to the AASHTO Specifications. The design shall consider the stability at each level of modules. The global stability of the structure, including slope stability, bearing capacity safety, and total and differential settlement is the responsibility of the Department. The substructure and abutments shall be designed to support the superstructure and retain the approaches.

a. Hydrostatic Forces: Unless specified otherwise, when a design high water surface is shown on the contract drawings at the face of the wall, the design stresses calculated from that elevation to the bottom of wall must include a three foot minimum differential head of saturated backfill. In addition, the buoyant weight of saturated soil shall be used in the calculation of pullout resistance.

b. Backfill: The friction angle of the pervious structure backfill shall be assumed to be 34 degrees if sufficient amounts of pervious backfill are used. The friction angle of the in-situ soils shall be assumed to be a maximum of 30 degrees unless otherwise shown on the Contract drawings.

c. Infill: The maximum assumed unit weight of infill material used for determining the factor of safety for overturning shall be 100 pounds per cubic foot. If Doublewal modules are to be filled with crushed stone, the maximum assumed unit weight of the infill shall be 80 pounds per cubic foot.

d. Safety Factors: The minimum factors of safety shall be as specified in the AASHTO Specifications amended as follows. The factor of safety for T-Wall shall be 1.5 for pullout of the concrete stem. Shear keys are not to be included in these computations. Only resisting forces developed beyond the theoretical failure plane may be used in these computations.

#### **Superstructure Design:**

- a) The bridge width shall not be less than the width shown on the plans measured between the inside faces of rails.
- b) The top of rail shall be a minimum of 2'-3" above the top of wearing surface for vehicular traffic only and designed in accordance with the *AASHTO LRFD Bridge Design Specifications*, latest edition.
- c) The top of rail shall be a minimum of 3'-6" above the top of wearing surface for pedestrian traffic and designed in accordance with the *AASHTO LRFD Bridge Design Specifications*, latest edition.

- d) The superstructure shall be designed in accordance with the *AASHTO LRFD Bridge Design Specifications*, latest edition and the *AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges*. The bridge shall be designed for two lanes of traffic.
- e) The 1" lift of HMA S0.25 on temporary bridge is measured above the top of the corrugated metal deck and this lift shall also include the filling of the corrugations.
- f) Dead Load (DL): Dead load used for the bridge structure design shall be actual dead load of the structure plus an allowance for the wearing surface.
- g) Vehicular Live Load (LL): Live load for the bridge structure design shall be HL-93 plus Dynamic Load Allowance. Average Daily Truck Traffic shall not be taken less than 636 trucks/day.
- h) Pedestrian Live Load (PL): Live load for the pedestrian walkway shall be 90 psf. Live load for the pedestrian railings shall be in accordance with Section 13.8.2 of the *AASHTO LRFD Bridge Design Specifications*.
- i) Wind Load (WS): The bridge shall be designed for a 50 pounds per square foot wind load applied horizontally against the height of the stringer plus the side dam.
- j) Fatigue Load (FL): The fatigue loading shall be as specified in *AASHTO LRFD Bridge Design Specifications*, latest edition.
- k) Vehicular Railing Loads (CT): Traffic rail shall be designed in accordance with *AASHTO LRFD Bridge Design Specifications*, current edition, Appendix A13.2. The traffic rail shall meet the force requirements for a TL-3 railing. Physical crash testing is not required for the rail system.

#### **Abutment Design:**

- a) The abutment design shall follow the dimensions of the abutment envelope shown in the contract drawings. The top of the leveling pad or reinforced concrete toe footing shall be located at or below the top of footing elevation shown on the contract drawings. If no footing elevation is shown, the minimum abutment embedment shall be four feet as measured to the top of the leveling pad or toe footing. If steps at the bottom of the abutment are required, they shall be kept at or below the footing elevation shown on the contract drawings. Steps in addition to those shown on the contract drawings will be permitted at no additional cost to the Department.
- b) The abutment shall be designed to be within all property lines and easement lines shown on the contract drawings. If additional work areas are necessary for the construction of the proprietary abutment, the Contractor shall be responsible for obtaining the rights from the affected property owners. Copies of these rights shall be forwarded to the Department.
- c) The top of the abutment shall be at the top of the abutment elevations shown on the contract drawings. Where coping or barrier is utilized, the abutment face panel shall extend up into the coping or barrier a minimum of two inches. The top of the face panels may be level or sloped to meet the top of the abutment line noted.

- d) Cast-in-place concrete will not be an acceptable replacement for areas noted by the abutment envelope, except for minor grouting of pipe penetrations and leveling required for coping or traffic barrier.
- e) The abutment shall be designed for a minimum live load surcharge equal to two feet of soil at a unit weight of 125 pounds per cubic foot. If there are specific live load surcharges acting on the abutment, they shall also be accounted for. The minimum equivalent fluid pressure used to design the abutment shall be 37.5 pounds per cubic foot per linear foot of abutment. If stated on the contract drawings, the abutment shall be designed for seismic forces according to the AASHTO Specifications.
- f) If the wall is detailed with a concrete parapet, the top two courses of prefabricated modular walls units shall be designed to support a transverse railing load of 10 kips. The 10 kip load may be distributed over the length of the parapet section between joints, but not exceeding 20 feet. Computations that verify the stability of the top two courses of the modular units shall be submitted to the Engineer.

The detailing and reinforcement in the parapet section above the gutterline or finished grade, including any light standard attachments, shall be as shown on the contract drawings.

- g) The abutment shall be designed to accommodate all roadway drainage and drainage structures as shown on the contract drawings.
- h) The maximum allowable bearing pressure of the soil shall be as shown on the contract drawings. The bearing pressure stated assumes a uniform pressure distribution. If additional soils information is required by the Contractor's designer, it must be obtained by the Contractor and will not be reimbursed by the Department.

### **Superstructure Materials:**

- a) Structural steel shall be ASTM A972, A572 Grade 50, or A588. Main members shall meet CVN testing values of 20 ft-lbs @ 40 degrees Fahrenheit.
- b) Steel bridge decking shall conform to ASTM A653, Grade 50, Class 1 with a minimum 2 oz. galvanized coating.
- c) The wearing surface shall consist of Hot Mix Asphalt (HMA) of the type and thickness shown on the plans.
- d) Structural bolts used for connections and field splices shall be ASTM A325 or A490. Washers shall be ASTM F436. Nuts shall be ASTM A563. Non-structural bolts shall be ASTM A307.
- e) Self-drilling fasteners shall be Zinc Plated Hex Washer Head Tek Screws or equal. Power actuated fasteners shall be Hilti X-ENP or equal.
- f) Bearings shall be elastomeric bearing pads conforming to Section 5.21 of the *Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 817*, and

designed in accordance with the AASHTO LRFD Bridge Design Specification, latest edition.

### **Superstructure Finish:**

- a) The two options for the structural steel blast cleaning and finish are as follows:
- i. Blast Cleaning - Exposed surfaces of structural steel to be wipe cleaned in accordance with the Steel Structures Painting Council (SSPC), Surface Preparation Specification No. 1, latest editions, (SSPC-SP1), Wipe-Off Clean. Exposed surfaces of steel shall be defined as those surfaces seen from the deck or from the outside and bottom of the structure.

Galvanized - After fabrication, all structural steel shall be hot-dipped galvanized in accordance with ASTM A153.

- ii. Blast Cleaning – All surfaces of structural steel shall be blast cleaned in accordance with the Steel Structures Painting Council (SSPC), Surface Preparation Specification No. 6, latest edition, (SSPC-SP6), Commercial Blast.

Paint System – Contractors and subcontractors doing this work are required to be certified by the American Institute of Steel Construction (AISC) Sophisticated Paint Endorsement (SPE) and/or the SSPC-QP 3 standard entitled “Shop Painting Certification Program”.

Painted structures require special fabrication details to ensure that all exposed surfaces receive the proper surface preparation and correct amount of paint. When overlapping steel surfaces occur, a space of 1.5” or greater must be maintained. If this space cannot be maintained, then steel spacers shall be inserted to eliminate the space. All overlapping steel surfaces with a space less than 1.5” shall be seal welded all around to prevent access by water. Caulking of overlapping surfaces shall not be allowed.

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.

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.

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.

**Abutment Materials:**

- a) Concrete: The concrete shall conform to the requirements of Section M.03 and as follows:

Concrete for all precast components shall be air-entrained composed of portland cement, fine and coarse aggregates, admixtures and water. The air-entraining feature may be obtained by the use of either air-entraining portland cement or an approved air-entraining admixture. The entrained-air content shall be not less than four percent or more than seven percent. The concrete utilized shall be a mix which will attain a minimum 28-day strength ( $f'_c$ ) of 4,500 pounds per square inch. The mix design shall be furnished to the Engineer.

Concrete for footings or unreinforced leveling pads shall be conform to the requirements of Class "A" Concrete. Class "F" Concrete shall be used for cast-in-place concrete copings.

Concrete Finish: Unless otherwise indicated on the contract drawings or elsewhere in the specifications, the concrete surface for the exposed face shall have an ordinary steel form finish. All non-exposed surfaces shall have a unformed finish which shall be free of open pockets of aggregate and surface distortions in excess of 1/4 inch.

Acceptance Criteria for Precast Components: Precast components shall be accepted for use in abutment construction provided the concrete strength meets or exceeds the minimum compressive strength requirement, the soil reinforcement connection devices and the panel or module dimensions are within the manufacture's allowable tolerances and any chipping, cracks, honeycomb or other defects are within acceptable standards for precast concrete or repaired as determined by the Engineer.

It is recognized that certain cracks and surface defects are not detrimental to the structural integrity of the precast components if properly repaired. The Engineer shall determine the need for and proper method of such repair. All repairs shall be approved by the Engineer prior to acceptance of the precast component for use in abutment construction.

Marking: The date of manufacture, the production lot number, and the piece-mark shall be clearly marked on the side of each panel or module.

- b) Reinforcing Steel: Reinforcing steel shall conform to the requirements of ASTM A615, Grade 60.

- c) Attachment Devices: All structural connectors shall be hot dipped galvanized according to the requirements of ASTM A123 (AASHTO M-111). The minimum thickness of the galvanizing shall be based on the service life requirements in the AASHTO Specifications.
- d) Joint Materials: All horizontal and vertical joints between panels shall be covered by a geotextile (separation-high survivability) conforming to the requirements of Article M.08.02-26. The minimum width and lap shall be twelve inches. Details of installation including connection of the geotextile to coping shall be provided.
- e) Backfill: Backfill shall be pervious structure backfill conforming to the requirements of Articles M.02.05 and M.02.06.

### **Superstructure Construction Methods:**

- a) Welding: Welding procedures and weld qualification test procedures shall conform to the provisions of AWS D1.5, Bridge Welding Code, latest edition. Filler metal shall be in accordance with the applicable AWS Filler Metal Specification, and shall match the corrosion properties of the base metal.
- b) Welders: Welders shall be qualified for each process and position used while fabricating the bridge. Qualification tests shall be in accordance with AWS D1.1. All weld qualifications and records shall be kept in accordance with the Fabricator's Quality Assurance Manual which has been approved by AISC.
- c) Bolted Splices: For shipping purposes, the bridge may be fabricated in sections. Sections shall be field assembled using bolted connections and or field welding as indicated on the drawings. Tightening of all structural bolts shall be by Turn-of-the-Nut Method.
- d) AISC Certification: The bridge shall be fabricated in a shop owned by the Bridge Manufacturer. This facility shall have up to date certification by AISC as a Certified Bridge Fabrication - Intermediate (Major) with Fracture Critical Endorsement.
- e) Certified Weld Inspector: The bridge manufacturer shall employ a Certified Weld Inspector (CWI), with endorsement by AWS QC1. This CWI shall be present during the complete fabrication of the bridge. The CWI shall provide written documentation that the bridge has been fabricated in accordance with these specifications and the approved design drawings.
- f) Documentation: Material Certifications shall be available for review for all materials within the bridge. Traceability of heat numbers is required for all steel. Documentation showing the performance of all critical quality checks shall also be made available for review by the Engineer or Owner.
- g) Non-destructive Testing: All welds within the structure shall be visually inspected for conformance to size, under cut, profile and finish.
- h) Installation and Lifting Procedures: The Bridge Manufacturer will provide a standard typical written procedures for lifting and splicing the bridge. All actual methods, equipment and sequence of erection used are the responsibility of the Contractor. Each section shall be lifted from the four lifting lugs provided. Attach rigging to lifting lugs with adequately sized rigging hardware. Rigging materials and methods are the

responsibility of the Installer. Capacity of the lifting lug is 24,000 pounds at a 45-degree lift angle.

### **Abutment Construction Methods:**

All construction methods for items not listed below shall be in accordance with the detailed requirements prescribed for the construction of the appropriate items as specified in the Standard Specifications for Roads, Bridges, and Incidental Construction.

- a) Special Surface Treatment: If a special surface finish is proposed for the abutment, before proceeding with production, a model modular unit shall be provided by the fabricator for the Engineer's approval to establish a guide and standard for the type of finish to be furnished on the exposed face. This model shall be kept at the fabricator's plant to be used for comparison purposes during production. Formed surfaces other than the exposed face shall not require a special finish.
- b) Inspection and Rejection: The quality of materials, the process of manufacture, and the finished units shall be subject to inspection by the Engineer prior to shipment. Modular units which have imperfect molding, honeycomb, open texture concrete, or broken corners shall be repaired to the satisfaction of the Engineer or shall be rejected. Insufficient compressive strength shall also be cause for rejection. Modular units with special surface treatments shall be rejected if there are variations in the exposed face that deviate from the approved model as to color or texture in accordance with precast concrete industry standards.
- c) Marking: The date of manufacture shall be clearly scribed on an inside surface of each modular unit.
- d) On Site Representative: A qualified and experienced representative from the abutment supplier shall be at the site at the initiation of the abutment construction to assist the Contractor and the Engineer. If there is no more than one abutment on a project then this criteria will apply to construction of the initial abutment only. The representative shall also be available on as needed basis, as requested by the Engineer.
- e) Installation: The modular units shall be installed in accordance with manufacturer's recommendations. Special care shall be taken in setting the bottom course of units to true line and grade.

The vertical joint opening on the front face of the abutment shall not exceed 3/4 inch. Vertical tolerances and horizontal alignment tolerances measured from the face line shown on the contract drawings shall not exceed 3/4 inch when measured along an eight straightedge. The overall tolerance of the abutment from top to bottom shall not exceed 1/2 inch per eight feet of abutment height or one inch total, whichever is the lesser, measured from the face line shown on the contract drawings. A strip of geotextile shall be installed at all vertical joints.



Assembly of the various components shall be performed in such a manner that no undue strain or stress is placed on any of the members that constitute the completed structure.

f) Backfilling:

Doublewal:

Infill for modular units shall be placed, one course at a time, in lifts not exceeding two feet in thickness. The dry density of each lift of pervious structure backfill placed inside the modular units, after compaction, shall not be less than 90 percent of the dry density for that material when tested in accordance with AASHTO T-180, Method D. Each lift shall be thoroughly compacted with a vibratory tamping device.

Placement of the pervious structure backfill behind the abutment shall closely follow erection of successive courses of modular units. At no time shall the difference in backfill elevation between the interior and exterior of the abutment exceed six feet.

The units may be backfilled with crushed stone, provided that the design of the abutment was based on a density of 80 pounds per cubic foot.

All pervious structure backfill placed outside of the modular units shall be placed in accordance with the requirements of Article 2.16.03.

T-Wall:

Backfill placement shall closely follow erection of each course of modules. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the abutment materials or misalignment of the modules. Any abutment materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Engineer. Any backfill material placed within the abutment envelope which does not meet the requirements of this specification shall be corrected or removed and replaced at the Contractor's expense.

Backfill shall be compacted to 95 percent of the maximum density as determined by AASHTO T-99, Method C or D (with oversize correction, as outlined in Note 7).

The moisture content of the backfill material prior to and during compaction shall be uniform throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with AASHTO T-99, Method C or D (with oversize correction, as outlined in Note 7).

If 30 percent or more of the backfill material is greater than 3/4 inch in size, AASHTO T-99 is not applicable. For such a material, the acceptance criterion for control

of compaction shall be either a minimum of 70 percent of the relative density of the material as determined by a method specification provided by the abutment supplier, based on a test compaction section, which defines the type of equipment, lift thickness, number of passes of the specified equipment, and placement moisture content.

The maximum lift thickness after compaction shall not exceed ten inches. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

Compaction within three feet of the face of the modules shall be achieved by at least three passes of a lightweight mechanical tamper, roller or vibratory system. The specified lift thickness shall be adjusted as warranted by the type of compaction equipment actually used. Care shall be exercised in the compaction process to avoid misalignment or damage to the module. Heavy compaction equipment shall not be used to compact backfill within three feet of the abutment face.

At the end of each day's operation, the Contractor shall slope the last level of backfill away from the abutment facing to direct runoff of rainwater away from the abutment face. The Contractor shall control and divert runoff at the ends of the abutment such that erosion or washout of the abutment section does not occur. In addition, the Contractor shall not allow surface runoff from adjacent areas to enter the abutment construction site.

**Maintenance Responsibilities:** In addition to the construction of the temporary bridge, the Contractor is responsible for ensuring the safe and efficient operation of the temporary bridge while it is in use. These responsibilities include but are not limited to:

- Prior to opening the temporary bridge to traffic, the Contractor shall perform an initial inspection of the bridge.
- After opening the temporary bridge to traffic, the Contractor shall perform routine inspections of the bridge at 3-month intervals. The initial and subsequent inspections shall be performed and documented by qualified personnel in accordance with the current Department's "Bridge Inspection Manual". All forms and supporting documents shall be forwarded to the Department's Bridge Safety and Evaluation Section.
- Repairs to the temporary bridge following vehicle impact or other damage-causing event which causes the temporary to be unsafe;
- Inspection of the substructure for scour following a significant storm, as directed by the Engineer;
- Repair of scour as directed by the Engineer

Any repairs that are required based on inspection will be considered Extra Work and will paid for as described in Section 1.09.04

**Method of Measurement:** Payment under this item will be at the contract lump sum price and no measurement will be made for this item.

**Basis of Payment:** This work will be paid for at the contract price for “Temporary Bridge” which price shall include all work shown within the pay limits shown on the contract drawings for the temporary bridge including but not limited to the following:

1. Design and construction of the temporary bridge components.
2. Excavation required for the construction of the temporary bridge components.
3. Design and construction of temporary earth retaining systems to retain the existing facilities during construction.
4. The furnishing, placing and compacting of pervious structure backfill within the payment lines.
5. The furnishing and placing of backfill drainage systems for the wall.
6. The furnishing and placing of rigid metal conduit, junction boxes, light standard anchorages, and other electrical appurtenances located within the wall proper.
7. Services of the On-Site Representative.
8. Inspection of temporary bridge.
9. Removal of the temporary bridge components.
10. Any other work and materials shown on the plans for the temporary bridge components.

The price shall also include all materials, equipment, tools and labor incidental thereto.

When construction at the site begins for the temporary bridge substructure, 25% of the contract lump sum price for this item will be certified for payment.

When the temporary bridge is constructed, accepted and opened to traffic, 50% of the contract lump sum price for this item will be certified for payment.

When the temporary bridge has been removed from the site and the approach areas regraded and restored to the satisfaction of the Engineer, the remaining 25% of the contract lump sum price for this item will be certified for payment.

If bedrock or boulders in excess of one cubic yard are encountered in the excavation, it shall be paid for under the item "Structure Excavation - Rock".

Pay Item  
Temporary Bridge

Pay Unit  
L.S.

## **ITEM #0503001A – REMOVAL OF SUPERSTRUCTURE**

Work under this item shall conform to the requirements of Section 5.03 of the Standard Specifications (Form 817) amended as follows:

**5.03.01 - Description:** Replace the first sentence with the following:

This work shall consist of the removal and satisfactory disposal of the superstructure as shown on the plans. Items to be removed shall be the concrete beams and deck units, concrete-encased steel beams, concrete deck, overburden fill, sidewalk, parapets, barrier curb, bituminous wearing surface, metal bridge rail and any other items that may be attached thereto. Removal of the abutments, arches, piers and wingwalls, or portions thereof, is not included in this Item and shall be paid for under Item No. 0974001A - Removal of Existing Masonry.

**5.03.03 - Construction Methods:** Replace the entire Article with the following:

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.

The 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.

In addition, the Contractor shall submit for approval, plans and written documentation describing contingency plan if damage to existing superstructure or substructure renders these unusable for traffic during any stage of construction.

Prior to initiating work, the Contractor shall submit for approval, plans and written documentation describing his methods of removal and for falsework and shielding required for the protection of traffic (if any), environmentally sensitive areas (if any), and adjoining property. Approval of the Contractor's plans shall not be considered as relieving the Contractor of any of his responsibility. Working drawings and design computations showing the Contractor's means for full shielding shall be submitted to the Engineer in accordance with Section 1.05.02(2).

**5.03.04 – Method of Measurement:** Replace this section with the following:

Payment for this item is based on a lump sum basis and therefore will not be measured for payment.

**5.03.05 - Basis of Payment:** Replace the first paragraph with the following:

This work will be paid for at the contract lump sum price for "Removal of Superstructure," which price shall include all materials, equipment, tools, labor, and all work incidental to the removal of the superstructure including furnishing, erecting, and removing the full shielding. It shall also include the satisfactory removal and disposal of all waste materials.

When Stage 2 has been completed and accepted, 25% of the contract lump sum price for this item will be certified for payment.

When Stage 3 has been completed and accepted, 50% of the contract lump sum price for this item will be certified for payment.

When Stage 4 has been completed and accepted, 25% of the contract lump sum price for this item will be certified for payment.

Pay Item

Pay Unit

Removal of Superstructure

L.S.

**ITEM #0822005A – TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)**

**ITEM #0822006A – RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)**

Work under this item shall conform to the requirements of Section 8.22 of the Standard Specifications (Form 817) amended as follows:

**8.22.01 - Description:** Delete this section in its entirety and replace with the following:

Work under this item shall consist of furnishing, installing, relocating, and removing temporary precast concrete barrier curb which is anchored to a concrete structure as shown on the plans or as directed by the Engineer. This work shall also include the removal of the barrier curb and anchor bolts and subsequent grouting and sealing of anchor bolt holes.

**8.22.02 - Materials:** Add the following:

Anchor rods and anchor bolts shall conform to ASTM F1554. Anchor bolts denoted on the plans as “Removable” shall be KELIANCHORS™ and shall be coated with KELISLIP™ as manufactured by Kelken-Gold, Inc. or approved equal.

Anchor bolts, nuts, and plate washers shall be hot-dipped galvanized in conformance with the requirements of ASTM A 153.

Grout used in patching the remaining holes in the concrete deck after the removal of the temporary barrier shall be non-shrink grout conforming to Article M.03.01-12.

Pourable sealant used in patching the remaining holes in the overlay after the removal of the temporary barrier shall be a cold-applied bituminous sealer conforming to the requirements of Article M.08.01-18.

**8.22.03 - Construction Methods:** Delete Subarticle 8.22.03.2 “Installation” in its entirety and replace with the following:

**2. Installation:**

Temporary precast concrete barrier units shall be placed as shown on the plans or as directed by the Engineer, on a firm even surface so as to produce a smooth continuous barrier curb.

The Contractor shall maintain the temporary concrete barrier during all stages of construction. Any damaged material shall be removed and replaced by the Contractor at his expense.

The Contractor shall relocate the concrete barrier and its appurtenances to locations within the project limits as shown on the plans or as ordered by the Engineer. When the temporary barrier is no longer required, it shall be removed completely from the project and shall remain the property of the Contractor.

Anchor bolts shall be installed in conformance with the following requirements:

Existing Structures: Anchor bolts shall be installed in properly drilled holes of the size and depth shown on the plans in strict accordance with the manufacturer's directions. Care shall be taken not to drill holes into or through existing structural steel.

The Contractor shall submit the following to the Engineer for approval: type of drill, diameter of bit, method of cleaning holes, and method of placement of adhesive bonding material. Specifications and recommendations for the aforementioned may be obtained from the manufacturer of the adhesive bonding material. The weight of the drill shall not exceed 9 lbs.

Drilling methods shall not cause spalling, cracking, or other damage to the concrete. 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.

The Contractor shall take necessary precautions to prevent any materials from falling into the roadway or waterway below.

For the adhesive bonding material, a Certified Test Report and a Materials Certificate will be required in accordance with Article 1.06-07, confirming the conformance of the adhesive bonding material to the requirements set forth in these specifications.

New Concrete Structures: Anchor bolts shall be installed in preset threaded inserts cast into the concrete surface as shown on the plans or directed by the Engineer. Threaded inserts shall remain within the limits of the cast-in-place deck. After removal of the Temporary Precast Concrete Barrier Curb (Structure), holes in permanent concrete shall be filled with non-shrink grout, and the overlay patched with cold-applied bituminous sealer flush with the surrounding overlay surface.

**8.22.05 - Basis of Payment:** Delete this section in its entirety and replace with the following:

This work will be paid for at the contract unit price per linear foot for "Temporary Precast Concrete Barrier Curb (Structure)" complete in place, which price shall include all furnishing, transportation, initial installation, relocation(s), final removal, storage, materials, hardware and incidental materials, equipment, tools, and labor incidental thereto. Any temporary barriers that become lost, damaged or defaced shall be replaced by the Contractor at no cost to the State.

The relocation of the temporary precast concrete barrier curb will be paid for at the contract unit price per linear foot for "Relocated Temporary Precast Concrete Barrier Curb," which price shall include all transportation, materials, equipment, tools and labor incidental thereto.



Delineators will be paid for in accordance with Article 12.05.05.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Precast Concrete Barrier Curb (Structure)	L.F.
Relocated Temporary Precast Concrete Barrier Curb (Structure)	L.F.

## **ITEM #0914040A - PEDESTRIAN RAILING**

**Description:** Work under this specification shall consist of fabricating and installing a pedestrian railing as shown on the plans. This item shall consist of all labor, material, and equipment necessary to complete the work.

The railing system, including preset anchorage into top of wall, shall be designed in accordance with *AASHTO LRFD Bridge Design Specifications*, latest edition and *ACI 318: Building Code Requirements for Structural Concrete and Commentary*, latest edition.

Shop drawings and design calculations for all structural items shall be submitted to the Engineer for approval. Shop drawings and all design calculations shall be prepared, signed, and sealed by a Professional Engineer, licensed in the State of Connecticut.

Shop drawings shall be submitted with the layout of the rail with dimensions, details and connection details. Manufacturer's catalog cuts indicating material compliance, finishes of components and accessories. If requested, samples of materials and polymer finishes. Only a qualified manufacturer with a minimum of 5 year experience manufacturing ornamental picket fencing will be acceptable. The railing system shall have a 15 year limited warranty.

**Design:** The following design requirements shall apply to all components of the metal pedestrian railing:

### 1. Products

The pickets shall be ¾" square solid bar, ASTM A36, hot rolled structural quality steel, 60,000 psi tensile strength; 36,000 psi yield strength. Pickets attached to each rail with ¼" industrial drive rivets.

The rails shall be 1 ¼" x 1 ¼" galvanized steel per ASTM A653 or ASTM A607, having a 50,000 psi yield strength and G90 zinc coating (inside & outside). Punch rails to receive pickets and rivets and attach rail to rail brackets with 2 each, ¼" industrial drive rivets. Steel produced for rail produced under ASTM A446.

The posts shall be galvanized 2" square steel tubular members manufactured per ASTM A787 having a 45,000 psi yield strength and G90 zinc coating (inside & outside).

All pickets, rail posts, channels, fittings and accessories shall be polyester coated individually after drilling and layout, to ensure maximum corrosion protection. (Coating of assembled sections is unacceptable). All components are given a 4 stage "Power Wash" pre-treatment process that cleans and prepares the galvanized surface to assure complete adhesion of the finish coat. All metal is then given a polyester resin based power coating applied by the electrostatic spray process, to a thickness 2.5 mils. The finish is then baked in a 450 degree F oven for 20 minutes. Final color shall be black.

Industrial rive rivets shall be of sufficient length to attach items in a secure nonrattling position. Rivet to have a minimum of 1100 lbs. Holding power and a shear strength of 1500 lbs.

All ferrous metal accessories including all bolts, threaded rods, locknuts, nuts, cap screws and washers shall be galvanized in accordance with ASTM B695 and finish to match framing.

The post caps shall be ball style and shall be formed steel, cast of malleable iron or aluminum alloy, weathertight closure cap.

Threaded anchor rods, heavy hex nuts, hex jamb nuts and washers shall conform to the requirements of ASTM A449.

Button head and domed hex head bolts, deflected thread type locknuts, beveled washers and flat washers shall conform to the requirements of ASTM A307.

Bolts, deflected thread type locknuts and flat washers for splices shall conform to the requirements of ASTM A307.

## 2. General Design Requirements

- a. Where Form 817 is referred to, it means "State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 817, 2016" and including all Supplemental Specifications to January 2017.

## 3. Submittals

- a. Submit shop drawing to the Engineer for approval. The shop drawings shall include at a minimum the following: metal pedestrian rail plan view layout, component member details, material designations, post anchorage details.
- b. Computations for post anchorage into top of wall stamped by a licensed Professional Engineer (Connecticut).
- c. Submit material certificates for all pedestrian rail system components.

## **Construction:**

- a. Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02-2. These drawings shall include but not be limited to the following information: a layout plan showing post spacing, post to baseplate connection, rail to post connections, anchorage details, expansion joint locations, material designations and the name and telephone number of a person to contact who can answer questions about the shop drawings.

- b. Welding details and procedures shall conform to AWS D1.1 - Structural Welding Code – Steel.
- c. Posts shall not be located closer than 1'-3" to an expansion joint or end of a deck and shall be spaced no more than 6'-3" apart. Top of fence shall be at least 42 inches above the top of sidewalk.
- d. The anchorage assemblies shall be installed perpendicular to the grade of the gutterline. The anchorages shall be firmly and accurately held in position prior to and during the placing of concrete.
- e. The rails shall be carefully adjusted prior to fixing in place to insure proper matching at abutting joints and correct alignment and curvature throughout their length.
- f. Rail splice expansion joint shall be provided between any two posts which span an expansion joint. Bolts located at the expansion joints shall be provided with lock nuts and shall be tightened only to a point that will allow rail movement.
- g. After installation, all rails and posts shall be free of burrs, sharp edges and irregularities.
- h. The railing shall be installed in accordance with the manufacturer’s instructions.

**Method of Measurement:** The work will be measured for payment by each linear foot installed and accepted by the Engineer.

**Basis of Payment:** This work will be paid for at the contract price for “Pedestrian Railing” which price shall include materials, equipment, tools, labor and all incidentals thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Pedestrian Railing	L.F.