**OCTOBER 31, 2017**
**REHABILITATION OF BRIDGE NOS. 03367 & 03368**
**I-84 OVER NEW PARK AVENUE, AMTRAK, CT FASTRAK, AND SR 504**
**FEDERAL AID PROJECT NO. 1063(146)**
**STATE PROJECT NO. 63-705**
**CITY OF HARTFORD**

# ADDENDUM NO. 2

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. 3, 4, 5, 6

## SPECIAL PROVISIONS

## NEW SPECIAL PROVISIONS

The following Special Provisions are hereby added to the Contract:

- NOTICE TO CONTRACTOR - RAILROAD SPECIFICATIONS (AMTRAK INSURANCE REQUIREMENTS)
- 0601016A – PRECAST APPROACH SLAB
- 0601107A – HIGH EARLY STRENGTH CONCRETE
- 0822005A – TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)
- 0822006A – RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)
- 0950043A – WETLAND GRASS ESTABLISHMENT
- 1806201A – TYPE D PORTABLE ATTENUATION SYSTEM

## REVISED SPECIAL PROVISION

The following Special Provision is hereby deleted in its entirety and replaced with the attached like-named Special Provision:

- SECTION 1.08 – PROSECUTION AND PROGRESS

## DELETED SPECIAL PROVISIONS

The following Special Provisions are hereby deleted in their:

- NOTICE TO CONTRACTOR – BRIDGE NO. 03368 EAST APPROACH CONDITION
- NOTICE TO CONTRACTOR – AMTRAK ROW RISTRICTED ACCESS

**CONTRACT ITEMS**

**NEW CONTRACT ITEMS**

| ITEM NO. | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|
| 0214100 | COMPACTED GRANULAR FILL | CY | 35 |
| 0402401 | SAWING AND SEALING JOINTS IN BITUMINOUS CONCRETE PAVEMENT | LF | 70 |
| 0601016A | PRECAST APPROACH SLAB | SY | 110 |
| 0601107A | HIGH EARLY STRENGTH CONCRETE | CY | 8 |
| 0755009 | GEOTEXTILE | SY | 1,240 |
| 0822005A | TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE) | LF | 50 |
| 0822006A | RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE) | LF | 200 |
| 0950043A | WETLAND GRASS ESTABLISHMENT | SF | 2,525 |

**REVISED CONTRACT ITEMS**

| ITEM NO. | DESCRIPTION | ORIGINAL QUANTITY | REVISED QUANTITY |
|---|---|---|---|
| 0202000 | EARTH EXCAVATION | 15 CY | 50 CY |
| 0406002A | TEMPORARY PAVEMENT | 1,228 SY | 1,453 SY |
| 0406159 | PMA S0.5 | 2,153 TON | 2,167 TON |
| 0406173 | HMA S0.25 | 66 TON | 73 TON |
| 0601201 | CLASS “F” CONCRETE | 25 CY | 4 CY |
| 0707031A | MEMBRANE WATERPROOFING (SHEET) (TORCH APPLIED) | 920 SY | 1,040 SY |
| 0822001 | TEMPORARY PRECAST CONCRETE BARRIER CURB | 260 LF | 310 LF |
| 0822002 | RELOCATED TEMPORARY PREAST CONCRETE BARRIER CURB | 150 LF | 350 LF |
| 0974001 | REMOVAL OF EXISTING MASONRY | 10 CY | 45 CY |
| 1806201A | TYPE D PORTABLE IMPACT ATTENUATION SYSTEM | 730 HR | 784 HR |

**PERMIT**

**NEW PERMIT**

The following Permit is hereby added to the Contract:

- TEMPORARY PERMITS TO ENTER UPON AMTRAK PROPERTY (PTE)

**PLANS**

**NEW PLANS**

The following Plan Sheets are hereby added to the Contract:

06.33.A2
06.34.A2
06.35.A2

**REVISED PLANS**

The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan sheets appended with A2:

02.01.A2
03.04.A2
05.05.A2
06.03.A2

The Detailed Estimate Sheets do not reflect these changes.

The Bid Proposal Form has been revised to 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.

# NOTICE TO CONTRACTOR - RAILROAD SPECIFICATIONS

The contractor is hereby notified that all railroad specifications contained elsewhere herein shall be made a part of this contract, and that the contractor shall be bound to comply with all requirements of such specifications. The requirements and conditions set forth in the subject specifications shall be binding on the contractor just as any other specification would be.

# EXHIBIT D

## INSURANCE REQUIREMENTS

**NATIONAL RAILROAD PASSENGER CORPORATION (AMTRAK)**
**CHICAGO UNION STATION COMPANY (CUSCO)**
**WASHINGTON TERMINAL COMPANY (WTC)**
**Revised as of March 14, 2013**

### DEFINITIONS

In these Insurance Requirements, "Railroad" or "Amtrak" shall mean National Railroad Passenger Corporation and, as appropriate, its subsidiaries Chicago Union Station Company ("CUSCO") and Washington Terminal Company ("WTC"). "Contractor" shall mean the party identified as "Permittee" in the Temporary Permit to Enter Upon Property Agreement or the party with whom Amtrak has contracted in another agreement (e.g., Preliminary Engineering Agreement, Design Phase Agreement, Construction Phase Agreement or Force Account Agreement), as well as its officers, employees, agents, servants, contractors, subcontractors, or any other person acting for or by permission of Contractor. "Operations" shall mean activities of or work performed by Contractor. "Agreement" shall mean the Temporary Permit to Enter Upon Property Agreement or other such agreement, as applicable.

### INSURANCE

Contractor shall procure and maintain, at its sole cost and expense, the types of insurance specified below. Contractor shall evidence such coverage by submitting to Amtrak the original Railroad Protective Liability Policy and certificates of insurance evidencing the other required insurance, prior to commencement of Operations. In addition, Contractor agrees to provide certified copies of the insurance policies for the required insurance within 30 days of Amtrak's written request. All insurance shall be procured from insurers authorized to do business in the jurisdiction(s) where the Operations are to be performed. Contractor shall require all subcontractors to carry the insurance required herein or Contractor may, at its option, provide the coverage for any or all subcontractors, provided the evidence of insurance submitted by Contractor to Amtrak so stipulates. The insurance shall provide for thirty (30) days prior written notice to Amtrak in the event coverage is substantially changed, canceled or non-renewed. All insurance shall remain in force until all Operations are satisfactorily completed (unless otherwise noted below), all Contractor personnel and equipment have been removed from Railroad property, and any work has been formally accepted. Contractor may provide for the insurance coverages with such deductibles or retained amounts as Amtrak may approve from time to time, except, however, that Contractor shall, at its sole expense, pay for all claims and damages which fall within such deductible or retained amount on the same basis as if there were full commercial insurance in force in compliance with these requirements. Contractor's failure to comply with the insurance requirements set forth herein shall constitute a violation of the Agreement.

1. **Workers' Compensation Insurance** complying with the requirements of the statutes of the jurisdiction(s) in which the Operations will be performed, covering all employees of Contractor.

Employer's Liability coverage with limits of not less than **$1** million each accident or illness shall be included.

In the event the Operations are to be performed on, over, or adjacent to navigable waterways, a U.S. Longshoremen and Harbor Workers' Compensation Act Endorsement and Outer Continental Lands Act Endorsement are required.

2. **Commercial General Liability (CGL) Insurance** covering liability of Contractor with respect to all operations to be performed and all obligations assumed by Contractor under the terms of the Agreement. Products-completed operations, independent contractors and contractual liability coverages are to be included, with the contractual exclusion related to construction/demolition activity within fifty (50) feet of the railroad deleted and no exclusions for Explosion/Collapse/ Underground (X-C-U) applicable or added.

   The policy shall name National Railroad Passenger Corporation and, as appropriate CUSCO or WTC, and all commuter agencies and railroads that operate over the property or tracks at issue as additional insureds with respect to the operations to be performed. In addition, the policy shall include an ISO endorsement Form CG 24 17 10 01 or its equivalent providing contractual liability coverage for railroads listed as additional insureds. Coverage for such additional insureds shall be primary and non-contributory with respect to any other insurance the additional insureds may carry.

   Coverage under this policy shall have limits of liability of not less than **$5** million each occurrence, combined single limit, for bodily injury (including disease or death), personal injury and property damage (including loss of use) liability. Such coverage may be provided by a combination of a primary CGL policy and a following form excess or umbrella liability policy.

3. **Automobile Liability Insurance** covering the liability of Contractor arising out of the use of any vehicles which bear, or are required to bear, license plates according to the laws of the jurisdiction in which they are to be operated, and which are not covered under Contractor's CGL insurance. The policy shall name National Railroad Passenger Corporation and, as appropriate CUSCO or WTC, and all commuter agencies and railroads that operate over the property or tracks at issue as additional insureds with respect to the operations to be performed. Coverage under this policy shall have limits of liability of not less than **$1** million each occurrence, combined single limit, for bodily injury (including disease or death), personal injury and property damage (including loss of use) liability.

   In the event Contractor or any subcontractor will be transporting and/or disposing of any hazardous material or waste off of the jobsite, a MCS-90 Endorsement is to be added to this policy and the limits of liability are to be increased to **$5** million each occurrence.

4. **Railroad Protective Liability (RRP) Insurance** covering the Operations performed by Contractor or any subcontractor within fifty (50) feet vertically or horizontally of railroad tracks. The current ISO Occurrence Form (claims-made forms are unacceptable) in the name of National Railroad Passenger Corporation (and as appropriate CUSCO or WTC, and all commuter agencies and railroads that operate over the property or tracks at issue) shall have limits of liability of not less than **$5** million each occurrence, combined single limit, for Coverages A and B, for losses arising out of injury to or death of all persons, and for physical loss or damage to or destruction of property, including the loss of use thereof. A **$10** million annual aggregate shall apply. Additionally, Policy Endorsement CG 28 31 - Pollution Exclusion Amendment, is required to be

endorsed onto the policy. Further, "Physical Damage to Property" as defined in the policy is to be deleted and replaced by the following endorsement:

"It is agreed that 'Physical Damage to Property' means direct and accidental loss of or damage to all property owned by any named insured and all property in any named insured's care, custody and control."

The original RRP Liability Insurance Policy must be submitted to Amtrak prior to commencement of Operations.

5. **All Risk Property Insurance** covering damage to or loss of all remaining personal property of Contractor, its contractors and subcontractors used during Operations including, but not limited to, tools, equipment, construction trailers and their contents and temporary scaffolding at the project site, whether owned, leased, rented or borrowed for the full replacement cost value. Insurance policies of Contractor, its contractors and subcontractors, covering tools, equipment and other personal property will include a waiver of subrogation and any other rights of recovery in favor of Amtrak and Contractor.

6. **Contractor's Pollution Liability Insurance** covering the liability of Contractor arising out of any sudden and/or non-sudden pollution or impairment of the environment, including clean-up costs and defense, that arise from the Operations of Contractor, with National Railroad Passenger Corporation and, as appropriate CUSCO or WTC, and all commuter agencies and railroads that operate over the property or tracks at issue named as additional insureds. Coverage under this policy shall have limits of liability of not less than **$2** million each occurrence. The coverage shall be maintained during the term of the project, and for at least two (2) years following Amtrak's acceptance of the completion of all Operations to be performed.

7. **Pollution Legal Liability Insurance** is required if any hazardous material or waste is to be transported or disposed of off of the jobsite. Contractor, its subcontractor or transporter, as well as the disposal site operator, shall maintain this insurance. Contractor shall designate the disposal site, and must provide a certificate of insurance from the disposal facility to Amtrak. The policy shall name National Railroad Passenger Corporation and, as appropriate CUSCO or WTC, and all commuter agencies and railroads that operate over the property or tracks at issue as additional insureds, with limits of liability of not less than **$2** million per claim.

   Further, any additional insurance coverages, permits, licenses and other forms of documentation required by the United States Department of Transportation, the Environmental Protection Agency and/or related state and local laws, rules and regulations shall be obtained by Contractor.

8. **Professional Liability Insurance** covering the liability of Contractor for any and all errors or omissions committed by Contractor in the performance of the Operations, regardless of the type of damages. The coverage shall be maintained during the term of the Operations, and for at least three (3) years following completion thereof. The policy shall have a retroactive date that precedes any design work on the project and shall have limits of liability of not less than **$2** million per claim and **$2** million in the annual aggregate. . For a Project scopes which include under grade bridges (bridges which carry trains) the policy shall have limits of liability not less than **$10** million per claim and **$10** million in the annual aggregate.

   If Contractor is not performing professional design or engineering services, Contractor may elect to satisfy this requirement through the addition of endorsement CG2279 "Incidental Professional

Liability" to its CGL policy.

9. **Waiver of Subrogation** As to all insurance policies required herein, Contractor waives all rights of recovery, and its insurers must waive all rights of subrogation of damages against Amtrak and, as appropriate, CUSCO and WTC, and their agents, officers, directors, and employees. The waiver must be stated on the certificate of insurance.

10. **Punitive Damages** Unless prohibited by law, no liability insurance policies required above shall contain an exclusion for punitive or exemplary damages.

11. **Claims-Made Insurance** If any liability insurance specified above shall be provided on a claims-made basis then, in addition to coverage requirements above, such policy shall provide that:

    a. The retroactive date shall coincide with or precede Contractor's start of Operations (including subsequent policies purchased as renewals or replacements);

    b. The policy shall allow for the reporting of circumstances or incidents that might give rise to future claims;

    c. Contractor will use its best efforts to maintain similar insurance under the same terms and conditions that describe each type of policy listed above (e.g., CGL, Professional Liability) for at least three (3) years following completion of the Operations; and

    d. If insurance is terminated for any reason, Contractor will purchase an extended reporting provision of at least six (6) years to report claims arising from Operations.

12. **Evidence of Insurance** Contractor shall furnish evidence of insurance as specified above at least fifteen (15) days prior to commencing Operations. Prior to the cancellation, renewal, or expiration of any insurance policy specified above, Contractor shall furnish evidence of insurance replacing the cancelled or expired policies. THESE DOCUMENTS SHALL INCLUDE A DESCRIPTION OF THE PROJECT AND THE LOCATION ALONG THE RAILROAD RIGHT-OF-WAY (typically given by milepost designation) IN ORDER TO FACILITATE PROCESSING. The fifteen (15) day advance notice of coverage may be waived by Amtrak in situations where such waiver will benefit Amtrak, but under no circumstances will Contractor begin Operations without providing satisfactory evidence of insurance as approved by Amtrak. Such evidence of insurance coverage shall be sent to:

    Director I&C Projects
    National Railroad Passenger Corporation
    30th Street Station, Mail Box 64
    Philadelphia, PA 19104-2817

# SECTION 1.08 - PROSECUTION AND PROGRESS

**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 I-84**

On the following State observed Legal Holidays:
New Year's Day
Good Friday, Easter*
Memorial Day
Independence Day
Labor Day
Columbus 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 I-84 traffic for a period not to exceed 10 minutes to perform necessary work for the jacking of the structure, as approved by the Engineer, between 12:00 a.m. and 5:00 a.m. on all non-Holiday days.

**Exit 45 – New Park Avenue On Ramp to I-84 Eastbound**

The Contractor will be allowed to close Exit 45 to through traffic and detour traffic in accordance with the Detour Plan contained in the contract documents. The detour will be permitted daily between 9:00 p.m. and 6:00 a.m. for milling and paving operations as well as removal and replacement of existing bridge joints on I-84 Eastbound.

**Calendar Work Restrictions**

All roadway work that impacts traffic on I-84 eastbound, westbound, and associated ramps shall occur in 2018, the first season of construction. Adjacent projects have extended maintenance and protection plans that impact I-84 eastbound and westbound in 2019. Specifically, this work restriction coordinates construction with State Project No. 63-708, which has work that impacts traffic occurring in 2019.

**Ramps and Turning Roadways**

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

**CT*fastrak***

See the "Notice To Contractor – Coordination With CT*fastrak*" for Limitations of Operations

**New Park Avenue**

Monday through Friday between 6:00 a.m. and 8:00 p.m.
Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

**Amtrak**

Refer to "NTC-Work on Railroad Property" for limitations of operations for track outages, passenger train and freight train volumes, and speeds

**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.

**Permissible Deviation from Limitation of Operations Chart**

The Contractor shall be permitted extended hours of two lane service on I-84 to allow replacement of the approach slab for Bridge No. 03368 to the extents shown on the Contract Plans.

The Contractor will be permitted to reduce service as follows:

I-84 WB
Friday 9 pm to Saturday 9 am 12 hours
Saturday 9 pm to Sunday 10 am 13 hours

During these time periods, the Contractor will be permitted to reduce traffic to two lanes. In the event that the Limitation of Operations Charts indicate that the Contractor may further reduce traffic to a single lane, the Contractor is permitted at adjust the traffic pattern to do so, provided that two lane service is restored by the time identified in the Limitation of Operations Charts.

The Contractor shall provide a minimum 4 weeks advance notification prior to the planned extended work hours.

## Limitation of Operation Chart
## Minimum Number of Lanes to Remain Open

| Route: I-84 EB<br>Location: Hartford<br>Number of Through Lanes : 3 | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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 | 3 | 3 | 3 | 3 | 3 | 1 | 1 |
| 6 AM | E | E | E | E | E | 2 | 1 |
| 7 AM | E | E | E | E | E | 2 | 2 |
| 8 AM | E | E | E | E | E | 3 | 2 |
| 9 AM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 AM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 11 AM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Noon | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1 PM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2 PM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3 PM | E | E | E | E | E | 3 | 3 |
| 4 PM | E | E | E | E | E | 3 | 3 |
| 5 PM | E | E | E | E | E | 3 | 3 |
| 6 PM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 PM | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| 8 PM | 2 | 2 | 2 | 2 | 3 | 2 | 2 |
| 9 PM | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 10 PM | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 11 PM | 1 | 1 | 1 | 1 | 2 | 2 | 1 |

| Route: I-84 WB<br>Location: Hartford<br>Number of Through Lanes : 3 | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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 | 2 | 1 |
| 7 AM | E | E | E | E | E | 2 | 1 |
| 8 AM | E | E | E | E | E | 3 | 2 |
| 9 AM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 AM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 11 AM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Noon | 3 | 3 | 3 | 3 | E | 3 | 3 |
| 1 PM | 3 | 3 | 3 | 3 | E | 3 | 3 |
| 2 PM | 3 | 3 | 3 | 3 | E | 3 | 3 |
| 3 PM | E | E | E | E | E | 3 | 3 |
| 4 PM | E | E | E | E | E | 3 | 3 |
| 5 PM | E | E | E | E | E | 3 | 3 |
| 6 PM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 PM | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 8 PM | 2 | 2 | 2 | 3 | 3 | 2 | 2 |
| 9 PM | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 10 PM | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 11 PM | 1 | 1 | 1 | 1 | 2 | 2 | 2 |

**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**

# ITEM #0601016A – PRECAST APPROACH SLAB

**Description:** Work under this item shall include the fabrication, delivery, temporary bracing and installation of precast concrete approach slabs, including all necessary materials and equipment to complete the work, as shown on the plans. The substitution of cast-in-place concrete will not be allowed. Other work consists of dowel connecting the approach slab to the backwall seat and installing closed cell elastomer below the approach slab on the approach slab seat.

Due to the accelerated nature of this project, all approach slabs shall be manufactured and approved prior to the initiation of the full roadway closure at the site.

**Materials:** The materials for precast approach slabs shall conform to the following requirements:

Concrete shall meet the requirements of Article M.03.01 of Form 817, for Class "F" Concrete and shall have a minimum 28-day compressive strength of 4,400 psi. All cement shall meet the requirements of ASTM C 10 Type I. Air content shall be between 5% and 7%. The use of calcium chloride or an admixture containing calcium chloride will not be permitted.

Reinforcing steel shall be epoxy coated and conform to the requirements of Article M.06.01 of Form 817.

The adhesive bonding material shall be a resin compound specially formulated to anchor threaded bars in holes drilled into concrete. The adhesive bonding materials shall be selected from the Connecticut Department of Transportation Approved Product List.

Materials for leveling devices or non-metallic shims for setting the precast slabs to proper grade during installation shall comply with the applicable sections of Form 817, for the specific materials used.

Controlled density fill, if required for precast approach slab installation, shall be a self-compacting, flowable mixture of aggregate and cementitious material containing sufficient Portland cement to develop a 6 hour compressive strength of 100 psi. The contractor shall be responsible for producing a flowable mixture using these guidelines and adjusting the mixture design as called for by the circumstances or as directed by the Engineer. A mix design shall be submitted for this material, stating the percentage of each component to be utilized. The maximum aggregate size shall be 3/8". The amount of material passing a No. 200 sieve shall not exceed 12 percent. No plastic fines shall be present. The total calculated air content shall not exceed 30 percent. Substantive data that demonstrates the ability of the material to meet the specification requirements for controlled density fill shall be submitted with the proposed mix design at least two weeks prior to its use.

Closed cell elastomer shall conform to Article M.03 of Form 817.

**Construction Methods:** A Department Certified Precast Concrete Plant or a pre-qualified on-site precaster shall be used for the precast approach slabs.

1. **Shop Drawings:** The Contractor shall submit shop drawings in accordance with the requirements of Article 1.05.02 of Form 817. Approval of the shop drawings will be required prior to the ordering of the materials and the fabrication of the approach slabs. The width of each precast approach slab shall be determined by the Contractor.

   At a minimum, the Shop Drawings shall include the following information:

   a. The stamp of the registered Professional Engineer licensed in the State of Connecticut who has reviewed and certified the shop drawings.

   b. All lifting inserts, hardware, or devices and locations for Engineer's approval.

   c. Locations and details of the lifting devices, including supporting calculations, type, and amount of any additional reinforcing required for lifting. All lifting devices will be designed based on the no cracking criteria in Chapter 8 of the PCI Design Handbook (seventh edition).

   d. Dimensions from working points or working lines to prevent the accumulation of dimensional tolerances. The width of each individual slab along with the width of the closure pour shall be determined such that, when pieces are laid together, the approach slab sections shall satisfy the required approach slab total width and cross slopes shown on the plans.

   e. The minimum compressive strength attained prior to handling the approach slab.

   f. Details of leveling devices or vertical adjusting hardware.

   g. Reinforcement details in accordance with Subarticle 6.02.03-1 of Form 817.

   h. Locations/spacings of openings for flowable fill installation

2. **Assembly Plan:** The Assembly Plan is a document prepared by the Contractor and a qualified Engineer with specific knowledge of the Contractor's equipment and "means and methods" for constructing the precast elements required to complete the work on the project. The development of the Assembly Plan is closely linked to the schedule of operations and the interim material strengths necessary for the work to progress. The Contractor needs to be involved with any required modifications to the shop drawings so that he can incorporate these into the development of the Assembly Plan.

   The Assembly Plan will be reviewed by both the Engineer of Record and the District Construction personnel similar to a Working Drawing. The approved Assembly Plan will serve as the governing specification with respect to progressing with construction prior to components achieving the final required material strengths as stated in Form 817.

Approval of the Assembly Plan will be required prior to the start of the closure of the roadway.

Under no circumstances shall the fabrication of the precast concrete approach slabs commence prior to the approval of the Shop Drawings and the Assembly Plan unless written permission is given by the Engineer. The Department shall reject any components fabricated before receiving written approval or components that deviate from the approved drawings.

Any expenses incidental to the revision of materials furnished, in accordance with the Shop Drawings and order lists, to make them comply with the plans and specifications, including costs incurred due to faulty detailing or fabrication, shall be borne by the Contractor.

At a minimum, the Assembly Plan shall include the following information:

a. Details and/or cut sheets of all equipment that will be employed for the assembly of the approach slabs.

b. Details of all equipment to be used to lift approach slabs including cranes, excavators, lifting slings, sling hooks, and jacks. Crane locations, operating radii, and lifting calculations. The factors of safety for the lifting of slabs will be achieved by using 125% of the weight of the slab being lifted in the calculations.

c. A procedure for handling and erection including bracing requirements based on Chapter 8 of the PCI Design Handbook (seventh edition). Calculations shall be prepared for the lifting and handling in accordance with the no discernible cracking criteria and shall be submitted as part of the Assembly Plan. Lifting hook locations and hardware should be coordinated with the Fabricator.

d. A statement of compliance with all requirements of applicable environmental permits.

e. A work area plan, depicting all affected utilites, drainage, and protective measures that will be employed throughout the construction activities.

f. Full size 22”x34” sheets depicting the assembly procedures for the precast approach slabs.

g. A detailed schedule with a timeline for all operations. In development of the schedule the Contractor shall account for setting and cure time for concrete closure pours.

h. Methods of providing temporary support of the approach slabs. Include methods of adjusting and securing the slab after placement.

i. Procedures for controlling erection tolerances for both the horizontal and vertical direction.

j. Methods of forming closure pours.

k. Procedures for placement of flowable fill below approach slab

l. The Assembly Plan shall be bound into one complete document and shall be prepared and stamped by a registered Professional Engineer licensed in the State of Connecticut.

**3. Forms:** Forms shall be mortar tight and strong enough to prevent misalignment of approach slab edges. They shall be constructed to allow their removal without damage to the concrete. A positive means of supporting reinforcing cages in place during forming shall be required.

The forms shall not be removed until the concrete is strong enough to avoid possible injury from such removal. A minimum compressive strength of 500 psi shall be obtained prior to stripping the form. Forms shall not be removed without approval being granted by the Engineer. All forming materials used for casting cylindrical openings for lifting holes shall be removed. Do not place concrete in the forms until the Engineer has inspected the forms and approved all the materials in the precast slabs.

**4. Placing Concrete:** Provide to the Engineer a tentative casting schedule at least two weeks in advance to make inspection and testing arrangements. Concrete shall not be deposited in the forms until the Engineer has inspected the placing of the reinforcing steel, and other cast-in- place components, and has given his approval thereof.

The mix shall be proportioned and mixed in a batch mixer to produce homogeneous concrete. At no time will truck-mixed or transit-mixed concrete be allowed. The concrete temperature shall be 60° F to 90° F at the time of placement.

Concrete shall not be deposited into the forms when the ambient temperature is below 40° F or above 100° F, unless adequate heating or cooling procedures have been previously approved by the Engineer. Production during the winter season, from November 15 to March 15 inclusive, will be permitted only on beds located in a completely enclosed structure of suitable size and dimension that provides a controlled atmosphere for the protection of the casting operation and the product. Outside concreting operations will not be permitted during rainfall unless the operation is completely under cover.

Void forms shall be held in place against uplift or lateral displacement during the pouring and vibrating of the concrete by substantial wire ties or other satisfactory means as approved by the Engineer. The concrete shall be vibrated internally, or externally, or both, as ordered by the Engineer. The vibrating shall be done with care in such a manner as to avoid displacement of reinforcing steel, voids, forms, or other components. There shall be no interruption in the pouring of any of the sections. Concrete shall be carefully placed in the forms and vibrated sufficiently to produce a surface free from imperfections such as

honeycombing, segregation, cracking, or checking. Any deficiencies noted in the sections may be cause for rejection.

5. **Finishing:** Finish the precast slabs in accordance with Subarticle 6.01.03-9 of Form 817. Trowel-finish the top surface of all precast approach slabs. Formed surfaces shall not be finished in any specific manner except as noted below. All fins, runs, or mortar shall be removed from surfaces which will remain exposed. Form marks on exposed surfaces shall be smoothed by grinding.

6. **Test Cylinders:** During the casting of the sections, the Contractor shall make test cylinders under the supervision of a representative of the State. A minimum of 4 cylinders shall be taken during each production run or as ordered by the Engineer. The dimensions and type of cylinder mold shall be as specified by the Engineer. Cylinders shall be cured under the requirements of ASTM C31 and shall be used to determine the 28 day compressive strength requirements (f′c). Failure of any of the 28 day tests cylinders to meet 90% of the minimum compressive strength requirement may be cause for rejection. The Engineer also reserves the right to request and test core specimens from the sections to determine their adequacy.

7. **Curing:** The precast slabs will be continuously wet cured for 7-days, commencing immediately after final finishing with all exposed surfaces covered. The precast slabs will have minimum cure of 14 days prior to placement. Test data such as slump, air content, or unit weight for fresh concrete and compressive strengths for the hardened concrete after 7, 14, and 28 days, shall be submitted to the Engineer.

8. **Patching:** The Engineer shall evaluate the acceptability and the cause of the defects and the service condition of the precast approach slab section. No repairs shall be done by the Contractor unless permission has been granted by the Engineer. The Contractor shall submit to the Engineer for review, the proposed methods and materials to be used in the repair operation. All repairs shall be sound and properly finished and cured before the precast elements are delivered to the job site. The Contractor shall bear the costs of all repair work.

9. **Installation:** The installation of the precast approach slabs shall proceed as required by the approved Assembly Plan and in accordance with the special provisions “Prosecution and Progress” and “Maintenance and Protection of Traffic”. The approach slab sections shall be placed in a manner to best accommodate and facilitate the accelerated construction sequence. The approach slab sections shall be set to the grade indicated on the plans or as directed by the Engineer. The following is the general procedure for installing the approach slabs:

    a. Review the approved Assembly Plan. If changes are warranted due to varying site conditions, resubmit the plan for review and approval.

    b. Establish working points, working lines, and benchmark elevations prior to placement of all elements.

c. Lift approach slab segments using lifting devices as shown on the shop drawings.

d. Set approach slabs in the proper horizontal location in the sequence and according to the methods outlined in the Assembly Plan.

e. Check for proper alignment and grade within specified tolerances. Survey the top elevation of the approach slab. Adjust vertical leveling devices prior to full release of the approach slab from the crane. This will reduce the amount of torque required to turn the bolts in the leveling devices. Check for proper grade within specified tolerances.

f. Pour or pump controlled density fill under the approach slab as shown on the plans. Start from the center of the approach slab and proceed toward the outside edges.

g. All fixtures or holes cast into the sections for lifting, anchoring, or seating shall be neatly filled with non-shrink grout. The finished surface shall be flush and smooth with the adjacent concrete.

**10. Quality Control:** At a minimum, the following requirements shall be met:

a. All precast approach slabs shall be fabricated by a PCI certified fabricator that is approved by the Department with a minimum certification of "B1".

b. Cracking or damage of precast approach slabs will be prevented during handling and storage.

c. Defects and breakage of precast elements will be repaired or the slab replaced, as follows:

i. Members that sustain damage or surface defects during fabrication, handling, storage, hauling, or erection are subject to review or rejection.

ii. Approval shall be obtained before performing repairs.

iii. Repair work must re-establish the elements' structural integrity, durability, and aesthetics to the satisfaction of the Engineer.

iv. The cause will be determined when damage occurs and corrective action will be taken.

v. Failure to take corrective action, leading to similar repetitive damage, can be cause for rejection of the damaged element.

vi. Cracks that extend to the nearest reinforcement plane and fine surface cracks that do not extend to the nearest reinforcement plane but are numerous or extensive are subject to review and rejection.

vii. Full depth cracking and breakage greater than one foot are cause for rejection.

d. Precast elements will be constructed to tolerances shown on the plans. Where tolerances are not shown, follow tolerance limits in the PCI MNL116-99, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products, 4th Edition".

e. The plant will document all test results. The quality control file will contain at least the following information:

i. Element identification.

ii. Date and time of cast.Concrete cylinder test results.

iii. Quantity of concrete used and the batch printout.

iv. Form-stripping date and repairs if applicable.

v. Location/number of blockouts and lifting inserts.

vi. Temperature and moisture of curing period.

vii. Document lifting device details, requirements, and inserts.

f. The Contractor will be required to perform strength testing of materials prior to proceeding to the next stage of construction. The strength achieved at the time of testing will be required to meet the value in the approved Assembly Plan. The Contractor should not rely solely on cylinder breaks by Department personnel as the schedules for testing by the Department will not be changed. The Contractor will provide this testing at his/her own expense and shall take the required number of cylinders or cubes in the event that the material does not gain strength as anticipated.

**11. Marking:** Permanently mark each precast approach slab with the date of casting and supplier identification. Stamp markings in fresh concrete.

**12. Special Considerations:** Dry fit adjacent elements in the shop, including approach slabs and Precast Bridge Units (PBUs).

**13. Handling and Storage:** Care shall be taken during storage, transporting, hoisting and handling of all precast sections to prevent damage. Sections damaged by improper storing, transporting or handling shall be repaired or replaced by the Contractor, as directed by the Engineer and at no cost to the State. All storage and handling operations shall be as directed by the Engineer.

The precast sections shall not be removed from their casting beds until the concrete has attained the minimum compressive strength determined by the Contractor and approved by the Engineer. Precast sections shall not be shipped to the job site until the 28 day strength (f'c) has been attained. Provide to the Engineer a delivery schedule at least two weeks in advance of the shipment of precast slabs to the job site.

**Method of Measurement:** This work will be measured for payment as the actual area of precast concrete approach slabs fabricated, cured and accepted. Measurements will be made across the top surface of the slabs.

**Basis of Payment:** This work will be paid for at the contract unit price per square yard for "Precast Approach Slab", complete and in place, which price shall include all materials, equipment, tools, labor and work incidental to the fabrication, transport and installation. There shall be no separate payment for: projecting reinforcing steel in closure pours, forms, polyethylene sheets, leveling devices, shims, roofing felt, controlled density fill, closed cell elastomer or any other component or material used for the work, as they are to be included in the contract unit price. Concrete for the closure pours shall be paid for under the item "High Early Strength Concrete".

| Pay Item | Pay Unit |
|---|---|
| Precast Approach Slab | SY |

# ITEM 0601107A – HIGH EARLY STRENGTH CONCRETE

Work under this item shall conform to Section 6.01 Concrete for Structures as supplemented and amended herein to provide for High Early Strength Concrete.

**6.01.01 – Description:** Add the following

High early strength concrete shall be used to accelerate the construction of the bridge. The goal of this work is:

- Meet the required minimum compressive strength in an accelerated manner.
- Reduce the cure time for the concrete
- Provide durable (low permeability) concrete
- Provide low shrinkage properties to reduce cracking in the field

The Contractor shall develop a high early strength concrete mix design for use in closure pours as shown in the plans.

**6.01.02 – Materials:** Add the following:

The high early strength concrete shall conform to the requirements of M.03.01 and the following criteria:

1. Portland cement shall be Type II, IIA or III conforming to AASHTO M85 or M240, as appropriate.
2. All cement used in the manufacture of the members shall be the same brand, type and color, unless otherwise permitted.
3. Use Portland cement conforming to AASHTO M85 with compatible admixtures and air entraining agent.
4. Water-cementitious material ratio shall not exceed 0.4 by weight, including water in the admixture solution and based on saturated surface dry condition of aggregates.
5. Use a maximum size coarse aggregate of ¾".
6. The amount of entrained air shall be 6.0 +/- 1.5%.
7. High early strength concrete shall achieve the early minimum compressive strength indicated on the plans, by the time that the bridge is opened to traffic.
8. The early strength characteristics of the concrete shall be commensurate with the intended construction procedure that is developed by the Contractor in the PBU and Approach Slab Assembly Plans.
9. The minimum final design (28 day) compressive strength shall not be less than 4400 psi.
10. A shrinkage reducing admixture shall be added to the concrete mix according to the manufacturer's recommendation such that there will be no cracks at 14 days in the sample tested in AASHTO T334 (see below). A shrinkage reducing admixture shall be tested by an approved testing lab and meet the requirements of ASTM C494-10 Type S, except that in Table 1 length change shall be measured as: Length Change (percent of control) shall be a minimum of 35% less than that of the control. Table 1 Length Change (increase over control) shall not apply. Shrinkage reducing admixtures shall not contain expansive metallic materials.

11. The maximum allowable total chloride content in concrete shall not exceed 0.1% by weight of cement.

*Mix Design Requirements*
Concrete shall be controlled, mixed, and handled as specified in the pertinent portions of Section 6.01 Concrete for Structures, Supplemental Specifications and as indicated below:

The Contractor shall design and submit for approval the proportions and test results for a concrete mix which shall attain the minimum final design compressive strength and the early compressive strength as defined by the approved Assembly Plan and consistent with the approved Quality Control Plan.

The concrete mix design shall have a rapid chloride ion permeability of 2000 Coulombs at not more than 28 days using AASHTO T 277 and the air entrainment shall be targeted at a value of 6.5 percent +/-1.5 percent. Contractor may opt to take multiple tests prior to 28 days which will be considered accepted once the target value of 2,000 coulombs is reached. Testing shall be in accordance with AASHTO T 119 and T 152. Multiple samples should be tested using the intended curing methods in order to establish the required cure times for the mix.

Should a change in sources of material be made, a new mix design shall be established and approved prior to incorporating the new material. When unsatisfactory results or other conditions make it necessary, the Department will require a new mix design.

The concrete mix design shall be submitted to the Department for review and approval. The Department shall be notified at least 48 hours prior to the test batching and shall be present to witness the testing.

All tests necessary to demonstrate the adequacy of the concrete mix shall be performed by the Contractor, witnessed by the Department, including, but not limited to: slump, air content, temperature, initial set and final set (AASHTO T197). Compressive strength tests shall be determined on field cured cylinders (6” X 12” cylinders) at intervals as needed to show that the concrete has reached the required strength to open the bridge to traffic. Standard cured cylinders shall also be tested at 7 days and 28 days. Additionally, a confined shrinkage test as outlined in the AASHTO T334 - Practice for Estimating the Crack Tendency of Concrete shall be performed by an AASHTO accredited laboratory. The results of these tests (documenting zero cracks at 14 days) shall be submitted to the Department.

*Field Trial Placement*
In addition, a trial placement shall be done a minimum of (90) ninety days before the intended date of the initial closure pour placement. The Contractor will be required to demonstrate proper mix design, batching, placement, finishing and curing of the high early strength concrete. The trial placement shall simulate the actual job conditions in all respects including plant conditions, transit equipment, travel conditions, admixtures, forming, the use of bonding compounds, restraint of adjacent concrete, placement equipment, and personnel.

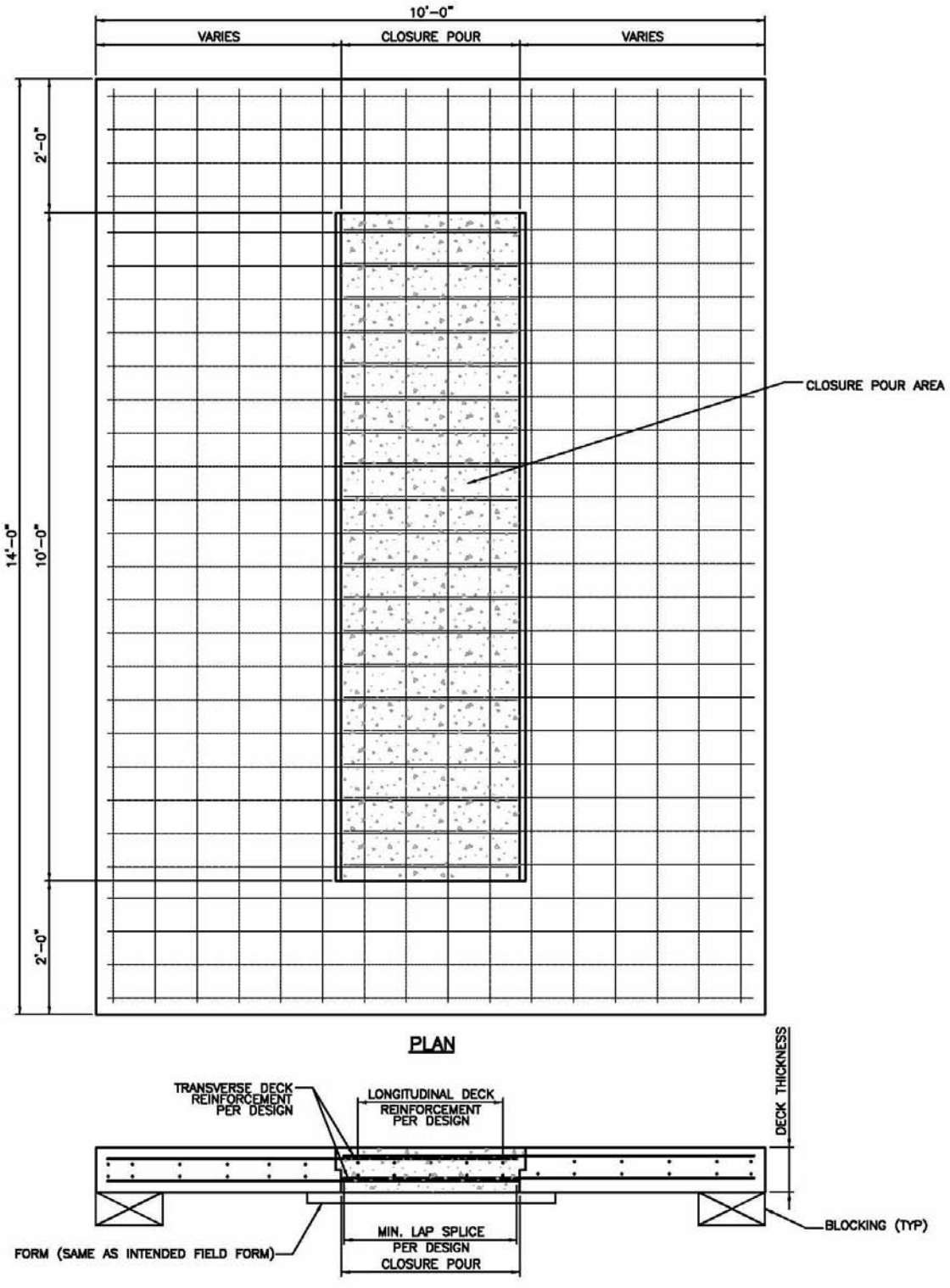
The trial shall also demonstrate the ability of the concrete to accept the installation of the membrane waterproofing system that is to be used. A representative portion of the trial concrete shall be coated with the membrane waterproofing in accordance with the specifications for the waterproofing. The timing of the installation of the waterproofing on the trial concrete shall be commensurate with the intended construction procedure and schedule that is developed by the Contractor. The Contractor shall demonstrate that the waterproofing meets all the requirements of the specifications.

The details for the trial placement configuration are shown in Figure 1. Acceptance criteria for the trial placement shall be as follows:

- The trial placement concrete shall not exhibit cracking or separation from the test panel in excess of 0.016 inches wide
- There shall be no more than one transverse crack in excess of 0.010 inches wide in the 10 foot long pour.
- The evaluation of the trial placement shall take place 14 days after placement.

If the trial placement fails these criteria, the Contractor will be required to submit a corrective action plan on how repairs of these crack sizes will be performed. The Department may require the Contractor to conduct more trial batches and trial placements. The costs of trial batches, trial placements and the removal of trial placement concrete from the job site is incidental to the work and will not be measured for payment. The requirement for multiple test placements shall not be cause for a time extension.

The final accepted trial placement testing shall be used to establish the final acceptance testing protocol for the field placements.




TYPICAL SECTION

FIGURE 1 – TRIAL PLACEMENT TEST SET–UP

**6.01.03 Construction Methods:** Add the following:

The Contractor shall engage an AASHTO accredited laboratory to provide testing facilities which are qualified laboratories under the NETTCP program to perform all Quality Control field testing. All personnel performing tests shall be qualified NETTCP Concrete Technicians and certified ACI Laboratory and Concrete Strength Technicians. Anytime the Contractor moves the laboratory, all associated equipment shall be recalibrated. This requirement is intended to minimize the movement of test cylinders.

The Contractor is required to perform initial set and final set tests (AASHTO T197) in addition to slump, air content and temperature on concrete from each concrete truck used in the placing of this High Early Strength Concrete. Field cured cylinders (6" X 12" cylinders) will be made from the first and last concrete trucks. A set of three (3) field- cured cylinders shall be made for each informational test associated with early structural loading. The Contractor is advised to fabricate adequate sets of cylinders to allow multiple tests to verify field concrete strength. The Department shall be allowed to witness the test and comment on all the tests performed by the Contractor. The Contractor shall not open the roadway to traffic until the minimum compressive strength has been met and when the Department has directed that the roadway can be opened to traffic.

All testing and equipment shall conform to AASHTO T-22, and the making and curing of concrete cylinders shall conform to AASHTO T23. All costs associated with the on-site mobile testing facilities, personnel and field testing, equipment calibration and verification to demonstrate the field concrete strength shall be incidental to the work.

Acceptance tests will be performed by the Department on standard cured cylinders at 7 days and 28 days. Cylinder breaks at 7 days must be at least 10% above the approved trial batch results. The Contractor will be notified of any verification tests that do not meet these requirements and will be required to develop a contingency corrective action plan incase final strength is not achieved. Concrete will be accepted based on meeting the 28-day strength requirement of 4400 psi.

*Curing Methods*
The concrete curing methods shall be developed by the Contractor as part of the Quality Control Plan. The curing method shall allow for the application of traffic on the concrete prior to full curing without compromising the desired final properties and the durability of the finished product.The curing methods used in the production placements shall be the same as the curing methods used for the trial placement.

*High Early Strength Concrete Crack Inspection*
The Contractor shall inspect the finished high early strength concrete surface for cracks. Inspection of the deck for cracking shall be completed prior to the preparation of the deck for placement of the membrane waterproofing system.

The Contractor shall document the location and frequency of cracks on the closure pours (number of cracks per square foot). Cracks greater than 0.016 inches in width shall be repaired as required by the membrane waterproofing manufacturer

**Basis of Payment:** Add the following

The work completed under this Item will be paid for at the contract price per actual number of cubic yards of high early strength concrete that is measured complete in place. Payment under this Item includes full compensation for all testing and approval of the mix design.

| Pay Item | Pay Unit |
|---|---|
| High Early Strength Concrete | C.Y. |

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

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

**Description:** Work under this item shall consist of furnishing, installing, and removing temporary concrete barrier for use on structures as shown on the plans.

If called for on the plans, the temporary concrete barrier shall also be relocated as necessary to accommodate stage construction conditions. Relocation of the TPCBC to the storage area will not be measured for payment.

**Materials:**

1. The barrier shall be precast concrete conforming to Article 8.21.02-1.

2. Manufacturer identification and casting date shall be permanently marked on each barrier unit by means of a non-corrosive metal or plastic tag in the location shown on the plan. When used barrier is furnished, the Contractor shall provide documentation stating from where the material came, what project it will be used on, the casting dates, and certification that the barrier conforms to all State requirements.

3. Reinforcing steel shall conform to the requirements of ASTM A615M, Grade 60.

4. Lifting hooks, keys, bolts, devices and attachments shall be of the size indicated on the plans or of a design satisfactory for the purpose intended as approved by the Engineer.

5. Anchor bolts shall conform to ASTM A307. Heavy hex nuts shall conform to AASHTO M291. The plate washers shall conform to AASHTO M232M, Grade 50. The anchor bolts, nuts, and plate washers shall be hot-dipped galvanized in accordance with AASHTO M232 and M111 as applicable.

6. Loop bars shall be bent from smooth bar steel conforming to AISI 1018 (hot rolled). Ends shall be hot-dipped galvanized in accordance with AASHTO M111.

7. Threaded connection rods shall be steel conforming to AASHTO M314 (ASTM F1554) Grade 55 except that threads and nominal diameters shall conform to ANSI B1.13M for Class 6g threads. The rod shall be threaded for a minimum of 4 inch at each end. Plain steel washers shall be manufactured in accordance with ANSI B18.22M. Heavy hex nuts shall conform to AASHTO M 291M for Class

10S and shall conform to the geometry defined in ANSI B18.2.4.6M. The threaded connection rods, washers, and nuts shall be hot-dipped galvanized after fabrication in accordance with the requirements of Class C of AASHTO M232.

8. The chemical anchor material shall be a resin compound specially formulated to secure bolts in concrete against tension pull-out. The Contractor shall select the chemical anchor material in accordance with Article M.03.01-15.

9. Non-shrink grout shall conform to subarticle M.03.01-12.

10. Barrier shall be accepted on the basis of the manufacturer's certification, as defined on Article M.08.02-4.

11. Sealant for patching holes in bituminous overlays shall be a cold-applied bituminous sealer conforming to M.08.01-15.

12. Anchor Bolts/Threaded Connection Rods-Certified Test Reports: The Contractor shall submit a Certified Test Report and a Materials Certificate in conformance with Article 1.06.07 and a sample of all anchor bolts, threaded connection rods, nuts, and washers for testing prior to their installation. The Contractor shall not install any anchor bolts or threaded connection rods, prior to receipt of the approved test results and approval by the Engineer.

13. Delineators shall conform to Article 8.22.02.

**Construction Methods:**

1. Fabrication: The barrier shall be precast concrete in conformance with the pertinent requirements of Article 8.21.03 and the plans, except that penetrating sealer protective compound is not required.

2. Installation: The barrier shall be placed as shown on the plans or as directed by the Engineer.

   The barriers shall be anchored to the concrete deck slab in accordance with the plans and the following:

   a. Prestressed Deck Units: Threaded inserts with matching anchor bolts shall be used for securing the barrier to prestressed deck units. The threaded inserts shall be cast into the deck units during fabrication as necessary to accommodate stage construction.

   b. Chemical Anchoring: This consists of drilling holes in concrete deck slabs, placing anchor bolts in the holes, and securing the bolts with a pre-approved chemical anchor material.

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 chemical anchor material. Specifications and recommendations for the aforementioned may be obtained from the manufacturer of the chemical anchor material.

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.

Care shall be taken not to drill holes into or through structural steel.
The Contractor shall take the necessary precautions to prevent materials from falling onto the roadway below.

When reinforcing steel is encountered during the drilling of the holes, the Contractor shall attempt to angle the hole to by-pass the bar.

The anchor bolts shall extend to the bottom of the holes and be hammer taped to insure full penetration. The chemical anchor material shall be installed in accordance with the written directions supplied by manufacturer of the chemical anchor material.

The barrier shall be anchored down by torquing the bolts "snug tight", which is defined as the tightness attained after several impacts from an impact wrench. No part of the bolt head shall project above the outer surface of the barrier.

b. Through-Bolting: This consists of drilling completely through the deck slab and securing anchor bolts on the underside with plate washers and nuts. Through-Bolting is not permitted on new construction or prestressed concrete. Measures shall be taken to insure that no damage occurs to property below the bridge.

c. Care shall be taken not to drill holes into or through structural steel.
The barrier shall be anchored down by torquing the bolts 'snug tight", which is defined as the tightness attained after several impacts from an impact wrench. No part of the bolt head shall project above the outer surface of the barrier.

3. Connection of Barrier Units: The barrier shall be joined together with threaded connection rods, and heavy hex nuts in accordance with the plans.

4. Cutting of Anchor Bolts: Where ordered by the Engineer, protruding anchor bolts shall be cut off flush with the surface of the concrete deck. The bolts shall

then be ground down below the surface of the deck and the space filled in with non-shrink grout.

5. Patching with Non-Shrink Grout: After removal of the barrier, holes in newly constructed concrete decks and threaded inserts shall be blown clean with an air jet and filled in with non-shrink grout. The non-shrink grout shall be mixed and placed in strict accordance with the manufacturer's directions. The non-shrink grout shall be finished flush with the deck surface. Allow grout to cure a minimum of 24 hours before placing sealant in any remaining hole in the bituminous wearing surface.

6. Delineators: Delineators shall be installed on top of the barrier in accordance with Article 8.22.03-3 and the plans.

7. General: The barrier shall be kept in good condition at all times by the Contractor during all stages of construction. Any damaged material shall be replaced by the Contractor at his expense.

   When the barrier is no longer required, it shall be removed from the work site and become the property of the Contractor.

8. Relocation of Barrier: If called for on the plans, the Contractor shall relocate the barrier and its appurtenances to locations within the project limits as shown on the plans or as ordered by the Engineer.

**Method of Measurement**: Temporary structure barrier will be measured for payment along the centerline at the top of the barrier and will be the actual number of feet of temporary structure barrier furnished, installed, and accepted.

Relocated temporary structure barrier will be measured for payment along the centerline at the top of the barrier each time the barrier has been satisfactorily relocated and anchored as indicated on the plans. Relocation of the barrier to the storage area will not be measured for payment.

Relocation of barrier for contractor’s convenience or access to the work zone will not be measured for payment but considered to be included in general cost of the work.

**Basis of Payment**: This work will be paid for at the contract unit price per foot for "Temporary Precast Concrete Barrier Curb (Structure)", complete in place, which price shall include all furnishing, transportation, initial installation, final removal, storage, materials, reinforcing steel, connection rods, and all equipment, tools, and labor incidental thereto. The cost of furnishing, installing, and cutting of anchor bolts shall also be included for payment under this item. Each temporary structure barrier will be paid for once regardless of the number of times it is used on the project. Any barrier

units that become lost, damaged or defaced shall be replaced by the Contractor at no cost to the State.

The relocation of the temporary structure barrier will be paid for at the contract unit price per foot for "Relocated Temporary Precast Concrete Barrier Curb (Structure)", which price shall include removing, transporting and re-anchoring the barrier units, and all other materials, equipment, tools, and labor incidental thereto.

Delineators will be paid for in accordance with Article 12.05.05.

| **Pay Item:** | **Pay Unit:** |
|---|---|
| Temporary Precast Concrete Barrier Curb (Structure) | L.F. |
| Relocated Temporary Precast Concrete Barrier Curb (Structure) | L.F. |

# ITEM #0950043A - WETLAND GRASS ESTABLISHMENT

**Description:** The work included in this item shall consist of providing an accepted stand of established wetland grasses by furnishing and placing seed as shown on the plans, permits, or as directed by the Environmental Scientist from the Connecticut Department of Transportation's Office of Environmental Planning within the Wetland Mitigation Areas or other areas when required.

**Materials:** All approved seed mixtures shall be obtained in sufficient quantities to meet the pure live seed (PLS) application rates as determined by the seed analysis of the mixture. Application of fertilizer will be directed by the Environmental Scientist based on a soil analysis of the wetland area to be seeded. The following mixes shall be used for this item.

Wetland Seed Mixes: In order to preserve and enhance the diversity of native wetland species, it is necessary that the source for wetland seed mixtures for use in wetland mitigation areas shall be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland. Three approved seed mixtures are detailed below. Other proposed mixtures must be submitted and approved by the Environmental Scientist prior to use. The materials certification for any proposed mixture that is different from that described below must be submitted a minimum of ten (10) days prior to delivery on site. This certification must match both the previously approved substitute mixture and the seed tags on the bags that are to be removed upon delivery. No seeding shall occur if all three items do not match.

**Wetland Seed Mixture: (NEWP) New England Wet Mix**, New England Wetland Plants, Inc. 800 Main Street Amherst, MA 01002, or equal. Rate shall be 1 pound PLS per 2500 sq. ft.

| ***scientific name*** | **common name** |
|---|---|
| *Asclepias incarnata* | Swamp Milkweed |
| *Aster puniceus* | Swamp Aster |
| *Bidens aristosa* | Tickseed Sunflower/Bur Marigold |
| *Carex crinita* | Fringed Sedge |
| *Carex lupulina* | Hop Sedge |
| *Carex lurida* | Lurid Sedge |
| *Carex scoparia* | Blunt Broom Sedge |
| *Carex vulpinoides* | Fox Sedge |
| *Deschampsia cespitosa* | Tufted Hairgrass |
| *Eleocharis palustris* | Creeping Spike Rush |
| *Eupatorium perfoliatum* | Boneset |
| *Glyceria canadensis* | Rattlesnake Grass |
| *Helenium autumnale* | Common Sneezeweed |
| *Juncus effusus* | Soft Rush |
| *Mimulus ringens* | Monkey Flower |
| *Panicum rigidulum* | Redtop Panic Grass |

| | |
|---|---|
| *Penthorum sedoides* | Ditch Stonecrop |
| *Poa palustris* | Fowl Bluegrass |
| | |
| *Scirpus atrovirens* | Green Bulrush |
| *Symphyotrichum novae-angliae* | New England |
| Aster *Verbena hastata* | Blue Vervain |

**Wetland Seed Mixture: OBL Wetland Seed Mixture**: Ernst Conservation Seeds Inc. 8884 Mercer Pike, Meadville, PA, 16335, or equal. Rate shall be 1 pound PLS per 2,000 sq. ft.

| ***scientific name*** | **common name** |
|---|---|
| *Alisma plantago-aquatica* | Water Plantain |
| *Asclepias incarnata* | Swamp Milkweed |
| *Bidens cernua* | Nodding Bur Marigold |
| *Carex crinita* | Fringed Sedge |
| *Carex lupulina* | Hop Sedge |
| *Carex lurida* | Lurid Sedge |
| *Carex scoparia* | Blunt Broom Sedge |
| *Carex vulpinoidea* | Fox Sedge |
| *Deschampsia cespitosa* | Tufted Hairgrass |
| *Eupatorium fistulosum* | Joe Pye Weed |
| *Eupatorium perfoliatum* | Boneset |
| *Glyceria canadensis* | Rattlesnake Grass |
| *Glyceria grandis* | American Manna Grass |
| *Iris versicolor* | Blue flag iris |
| *Juncus effusus* | Soft Rush |
| *Ludwigia alernifolia* | Seedbox |
| *Mimulus ringens* | Monkey Flower |
| *Onoclea sensibilis* | Sensitive Fern |
| *Panicum rigidulum* | Redtop Panic Grass |
| *Penthorum sedoides* | Ditch Stonecrop |
| *Scirpus atrovirens* | Green Bulrush |
| *Scirpus cyperinus* | Wool Grass |
| *Scirpus validus* | Soft-stem Bulrush |
| *Solidago patula* | Roughleaf Goldenrod |
| *Sparganium americanum* | Eastern Bur Reed |
| *Sparganium eurycarpum* | Gaint Bur Reed |
| *Symphyotrichum novae-angliae* | New England |
| Aster *Verbena hastata* | Blue Vervain |

**Wetland Seed Mixture: Wet Meadow/ Detention Basin**, Vermont Wetland Plant Supply, LLC, P.O. Box 153, Orwell, VT, 05760, or equal. Rate shall be 1 pound PLS per 1200 sq. ft.

| ***scientific name*** | **common name** |
|---|---|
| *Panicum virgatum* | Wand Panic Grass |
| *Elymus virginicus* | Virginia Wild Rye |
| *Festuca rubra* | Red Fescue |
| *Carex vulpinoidea* | Fox Sedge |
| *Carex scoparia* | Broom Sedge |
| *Scirpus cyperinus* | Wool Grass |
| *Scirpus atrovirens* | Green Bulrush |
| *Bidens cernua* | Nodding Bur Marigold |
| *Eupatorium perfoliatum* | Boneset |
| *Eupatoriadelphus maculatus* | Joe Pye |
| Weed *Juncus effuses* | Soft Rush |
| *Onoclea sensibilis* | Sensitive Fern |
| *Verbena hastate* | Blue Vervain |
| *Symphyotrichum nova-angliaea* | New England American Aster |

**Construction Methods:** Construction methods shall be those established as agronomically acceptable and feasible and which the Environmental Scientist approves. Seeding shall occur during the fall season immediately following construction of the wetland site. Fall seeding must occur from August 15th to October 15th. Seeding shall be applied to all areas that will not be continuously inundated constructed wetland areas. If seed is purchased in bulk rather than by PLS, the rate of application must be adjusted to meet the required PLS seeding rate. This seeding rate shall be increased by the appropriate percentage as determined by the following formula based off of the information provided on the seed tags at delivery. (Germination Percentage X Purity Percentage)/ 100 = Percentage PLS

The Engineer shall verify that the seed is applied at a rate that will allow for 100 percent PLS.

**Method of Measurement:** This work will be measured for payment by the number of square feet of surface area of accepted established wetland plants as specified or by the number of square feet surface area of seeding actually covered as specified.

**Basis of Payment:** This work will be paid for at the contract unit price per square foot for "Wetland Grass Establishment," which price shall include all materials maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 50% may be made for work completed, but not accepted. Full payment shall not be made until the area has been accepted by the Environmental Scientist.

| Pay Item | Pay Unit |
|---|---|
| Wetland Grass Establishment | sq. ft. |

## ITEM #1806201A - TYPE D PORTABLE IMPACT ATTENUATION SYSTEM

Type D portable impact attenuation systems shall be furnished and used in accordance with Section 18.06, supplemented as follows:

**Article 18.06.02 – Materials:** is amended as follows:

Change "Prior to using a new TMA," to read "Prior to using a TMA," in the first sentence.

Delete the second paragraph.

**Article 18.06.04** – **Method of Measurement**: Change "Type D Portable Impact-Attenuation System" to read "Type D Portable Impact Attenuation System" in the first sentence.

**National Railroad Passenger Corporation**
**30th Street Station, Mail Box 64**
**2955 Market Street**
**Philadelphia, PA 19104**

## Temporary Permits to Enter Upon Amtrak Property (PTE)

Requests for Temporary Permits to Enter Upon Amtrak Property (PTE) must be submitted to Amtrak in writing and include the following information:

1. Name of company requesting the permit (include address and telephone number)
2. Who's attention the permit should be addressed to
3. Permittee's e-mail address
4. Exact location of work (including railroad milepost, if known)
5. Specific work activity being performed on railroad property (please provide dollar value of the contract if work being performed is other than surveys or bridge inspections)
6. Projected duration of work being performed on railroad property
7. Contact, phone and address where invoices should be sent for payment by Permittee.

**Due to the heavy volume of requests for Temporary Permits to Enter Upon Amtrak Property, the processing time for initial Permit requests is approximately 30 business days.**

***Note:*** ***Temporary Permits for performing any environmental or geotechnical tests or studies (e.g., air, soil or water sampling) may be issued subsequent to completion of Amtrak's environmental review and approval process. Requests are reviewed on a case-by-case basis. Depending on the site specific circumstances, a separate Site Access Agreement that addresses environmental liability issues may be required prior to any Temporary Permit.***

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**All PTE Requests must be submitted to the Amtrak Engineering Construction Department e-mail or mail as noted below:**

- Email to mcgratm@amtrak.com or mailed to:

  Senior Manager Engineering
  National Railroad Passenger Corporation
  30th Street Station, Mail Box 64
  2955 Market Street
  Philadelphia, PA 19104

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