A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: February 15, 2011
Date of Addendum: February 9, 2011

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
014	78-0061-114	Bridge and Approaches - Other	Pottawattamie	BRF-006-1(114)--38-78	15feb014.a02

Notice: Only the bid proposal holders receive this addendum and responsibility for notifying any potential subcontractors or suppliers remains with the proposal holder.

Make the following change to the PROPOSAL DETAILS, PAGE 2:

CHANGE the CONTRACT PERIOD for SITE NUMBER 01 as follows:

Approximate Start Date: from 09/06/11 to **08/22/11**

Working Days from 9 DAYS to **19 DAYS**

Make the following change to the PROPOSAL SPECIAL PROVISIONS LIST and the PROPOSAL SPECIAL PROVISIONS TEXT:

Replace SP-090112 with the attached **SP-090112a**

Make the following change to the SP-090109 SPECIAL PROVISIONS FOR CONCRETE APPROACH SLAB ELEMENTS:

Change section 090109.03 Construction, Article D, number 10 - minimum compressive strength of 14 ksi to **10 ksi**.

Change section 090109.03 Construction, Article E, number 1 - minimum compressive strength of 14 ksi to **10 ksi**.

Make the following change to the SP-090111 SPECIAL PROVISIONS FOR PREFABRICATED SUPERSTRUCTURE MODULES:

Change section 090111.03 Construction, Article D, number 12 - minimum compressive strength of 14 ksi to **10 ksi**.

Change section 090109.03 Construction, Article E, number 1 - minimum compressive strength of 14 ksi to **10 ksi**.

Replace sheets 11 of 22 through 22 of 22 of ADDENDUM.15FEB014.A01 with the attached final pre-bid meeting presentation.

Iowa Department of Transportation

SPECIAL PROVISIONS
FOR
ULTRA HIGH PERFORMANCE CONCRETE

Pottawattamie County
BRF-006-1(114)--38-78

Effective Date
February 15, 2011

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090112a.01 DESCRIPTION.

A. The Contractor shall furnish all materials, tools, and labor necessary for the performance of all work to form, cast, finish, and cure Ultra High Performance Concrete (UHPC) where required per plan. Before casting UHPC for actual construction, the contractor will cast mockups to demonstrate the ability to properly cast the UHPC for transverse, longitudinal, vertical and barrier closure pours.

All UHPC shall be produced using "DUCTAL" concrete materials manufactured by Lafarge North America. See plan sheets for UHPC placement locations.

B. Submittals.
The contractor shall submit his batching sequence, forming, placing, curing, and testing procedures to the District Materials Engineer for review 14 days prior to casting. The mixing sequence shall include the order and time of introduction of the materials, mixing time and QA/QC procedure for the verification of the mix uniformity.

090112a.02 MATERIALS.

A. DUCTAL ~~CS~~ JS 1000 Concrete.
Use the concrete mixture supplied by Lafarge North America with the following proportions of mix parameters based on the supplier's recommendations:

Premix	~~3698~~ 3700 lbs / cu. yd.
Water	~~218~~ 219 lbs / cu. yd.
Super Plasticizer Liquid	51 lbs / cu. yd.
Steel Fiber	263 lbs / cu. yd.

Qualification Testing: The contractor shall complete the qualification testing of the UHPC two months before placement of the joint. The minimum concrete compressive strength shall be 10

KSI at ~~48~~ 96 hours and ~~21~~ 15 KSI ~~at 28 days~~ for opening the bridge to traffic. ~~The minimum flexural strength at 28 days shall be 5 KSI.~~ The compressive strength shall be measured by ASTM C39. ~~Concrete flexural strength shall be according to ASTM C 78.~~ Only a concrete mix design that passes these tests may be used to form the joint. ~~The contractor shall submit a Time versus Strength curve for the first four days of the UHPC.~~ Testing to be performed by an approved testing lab.

Material supplier for DUCTAL concrete:

Lafarge North America
#1200, 10655 Southport RD SW
Calgary, Alberta T2W 4Y1
Phone (403) 225-5456
Fax (403) 278-7420

B. Water.
Potable or free from foreign materials in amounts harmful to concrete and embedded steel.

C. Admixtures.
Chryso Premia 150 (30% solid content)

D. Fiber Reinforcement.
Steel chord type “Bekaert OL 13 / 0.2 inches or equivalent– High carbon fibers with a minimum tensile strength ~~360,000 psi (2,500 MPa)~~ 300,000 psi (2,100 MPa).

090112a.03 CONSTUCTION.

A. Quality Assurance.

1. The contractor shall be pre-qualified by Lafarge North America that they have the capability to mix and place DUCTAL concrete. Proof of pre-qualification shall be submitted in writing from the contractor to the District Materials Engineer 14 days before any UHPC is cast.

2. The surface of the UHPC field joints shall be filled flush with the precast deck to within a tolerance of plus or minus 1/8 inch. Other tolerances shall be in compliance with PCI MNL – 116 or otherwise specified on plans.

B. Pre-Pour Meeting.
Prior to the initial placement of the DUCTAL, the contractor shall arrange for an onsite meeting with the Lafarge representative and District Materials Engineer. The contractor's staff shall attend the site meeting. The objective of the meeting will be to clearly outline the procedures for mixing, transporting, finishing and curing of the UHPC material. The contractor shall arrange for a representative of Lafarge to be on site during the placement of the UHPC. The Lafarge representative shall be knowledgeable in the supply, mixing, delivery, placement, and curing of the DUCTAL material. Mockup requirements will be performed per the recommendations of the Lafarge representative.

C. Storage.
The contractor shall assure the proper storage of DUCTAL premix including powder, fibers and additives, obtained from Lafarge North America, as required by the Lafarge specifications in order to protect materials against loss of physical and mechanical properties.

D. Forming, Batching, Placement, And Curing.
The contractor shall work together with Lafarge to ensure appropriate initial strength gains to meet the desired project schedule. An initial strength of 10 KSI can be achieved by adding

accelerators and by maintaining the ambient temperature above 60°F for 48 hours after placement.

Grinding of the UHPC surface can be performed when strength of 10 KSI has been achieved. If significant fiber pullout is observed during grinding operations, grinding shall be suspended and not resumed until approved by the Engineer.

The bridge can be opened to traffic when strength of 15 KSI has been achieved.

Construction loads applied to the bridge during UHPC placement and curing are the responsibility of the Contractor. Contractor shall submit the weight and placement of concrete buggies, grinding equipment or other significant construction loads to the Engineer for review prior to the pre-pour meeting described above.

Forming, batching, placing, and curing shall be in accordance with the procedures recommended by Lafarge and as submitted and accepted by the District Materials Engineer.

The design and fabrication of forms shall follow approved installation drawings and shall follow the recommendations of Lafarge. All the forms for UHPC shall be constructed from plywood.

Mockups of each UHPC pour shall be performed prior to actual UHPC construction and conducted per the requirements of this special provision and the recommendation of the Lafarge representative. Mockups of horizontal closure pours shall be four feet in length with all other dimensions to match those required by the plans. Mockups of vertical closure pours shall be two feet in length with all other dimensions to match those required by the plans. The mockup process shall be observed by the Lafarge representative.

Two portable batching units will be supplied by Lafarge to the contractor for mixing of the UHPC. The contractor shall follow the batching sequence as specified by Lafarge and approved by the District Materials Engineer.

Each UHPC placement shall be cast using one continuous pour. No cold joints are permitted.

The concrete in the form shall be cured according to manufacturer's recommendations at minimum temperature of 60°F to attain the design strength.

E. Testing.

The following tests shall be performed following casting of the mockup and for each day of UHPC placement:

1. **C**oncrete compressive strength test according to ASTM C 39. Use twelve specimens 3 inch diameter by 6 inches. Prior to contractor grinding UHPC, three specimens shall be tested to validate the achievement of 10 KSI compressive strength ~~at 48 hours by an approved testing lab~~. Three specimens shall be tested to validate the achievement of 15 KSI compressive strength prior to opening the bridge to traffic. Three final specimens shall be tested at 28 days to verify final strength. ~~Three specimens with ends ground to 1 degree planeness shall be tested at Lafarge North America and by an approved testing lab at 28 days.~~ The remaining three specimens shall be treated as reserves.

   All specimens shall be tested at Lafarge-North America or by an approved testing lab. Each specimen shall have ends ground to 1 degree planeness.

   Testing by Lafarge shall be sent to their facilities as directed by Lafarge representatives.

~~**2.** Concrete flexural strength according to ASTM C 78. Use six specimens 1.6 inches by 1.6 inches by 6.3 inches. Three specimens shall be tested by an approved testing lab after 48 hours. Three specimens shall be tested by an approved testing lab at 28 days.~~

~~3~~ 2. Determination of flow according to ASTM C 109 performed on a flow table constructed according to ASTM C 230. The measured diameter of the concrete after 20 table drops shall be within the following limits: minimum 7 inches; maximum ~~8.5~~ 10 inches. The test shall be performed on every concrete batch.

~~**4.** Determination of the air content according to ASTM C 231 on the first concrete batch. The air content shall be limited to a maximum of 5%. Air content shall be verified before any concrete is placed.~~

Note: All specimens shall be exposed to the same process as the mockup and each UHPC placement and shipped to Lafarge North America and an approved testing lab accordingly for testing. A flow table may be obtained from Lafarge North America to conduct testing.

F. Contacts.
Material Supplier and Cylinder Testing:

Vic Perry
Lafarge-North America
#1200, 10655 Southport Road, SW
Calgary, Alberta T2W 4Y1
403-292-9423
vic.perry@lafarge-na.com

090112a.04 METHOD OF MEASUREMENT.
The concrete quantities shown on the plan, measured by the cubic yard, are for contractor's information only.

090112a.05 BASIS OF PAYMENT.
This item and all incidental items required to provide this item per contract documents including labor, materials, equipment and testing is subsidiary to other items and will not be paid for separately.

SHRP 2 - R04 Innovative Bridge Designs for Rapid Renewal

Pre-bid Meeting
Ames, IA

January 21, 2011

HNTB

SHRP 2 R04 Objective

…To develop standardized approaches…

…to designing, constructing, and rehabilitating…

…complete bridge systems that…

…address rapid renewal needs

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Incremental Innovation

Successful completed projects

\+ Integrating proven structural systems

Innovation

Incremental improvements in a number of specific bridge details to fully leverage previously successful work

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Team

R04 Team Members:

- HNTB - Prime Contractor
- Structural Engineering Associates
- Iowa State University
- Genesis Structures

HNTB

Iowa Department of Transportation
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

US 6 BRIDGE OVER KEG CREEK

POTTAWATTAMIE COUNTY

SHRP PROJECT R04

INNOVATIVE BRIDGE DESIGNS FOR RAPID RENEWAL

ABC DEMONSTRATION PROJECT

Project cost	**$?????**
Conventional construction	**6 months**
Duration for ABC	**2 weeks traffic disruption**

HNTB

Project Innovations

- Complete, precast bridge system
- Precast concrete approach pavement
- Superstructure units create a semi-integral abutment for rapid construction
- HPC
- Durable, moment-resisting joint between deck panels and approach slab panels.
- UHPC joints - first bridge in the US to use to provide a full, moment-resisting UHPC transverse joint at the piers

HNTB

Project Innovations

- No open deck joints
- Grouted couplers for column/capbeam connections
- Structural Health Monitoring System
- Barriers placed on superstructure module before erection
- SCC will be used to improve consolidation and increase the speed of construction for abutment piles.
- Use of fully-contained, flooded backfill

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Iowa ABC Demonstration Project

Two Week Closure

US Highway 6 Bridge over Keg Creek

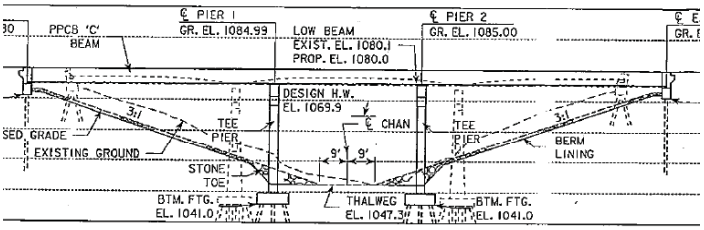
6 miles east of Council Bluffs, IA

Concrete haunched girder bridge

Built in 1953

HNTB

Initial Replacement Bridge Design



LONGITUDINAL SECTION ALONG ℄ ROADWAY

- Design by Iowa DOT
- Spans 81 ft – 48 ft – 81 ft PPCB
- SHRP R-04 team redesigned as an ABC system and will provide some onsite engineering and technical support for RCE

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ABC Stages

Stage 1 work (Prior to bridge closure)

- Construct drilled shafts to ground level
- Close bridge / Demolish existing bridge

Stage 2 work (14-day "ABC" period)

- Construct wingwalls on piles
- Assemble precast piers
- Assemble semi-integral abutments

Stage 3 work (14-day "ABC" period)

- Assemble modular superstructure
- Assemble precast approach slabs
- Cast UHPC closure joints and grind deck
- CIP pavement, shoulder and guardrail
- Re-open bridge to traffic – end ABC period

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Stage 1

Stage 1 –
Work Outside Existing Footprint

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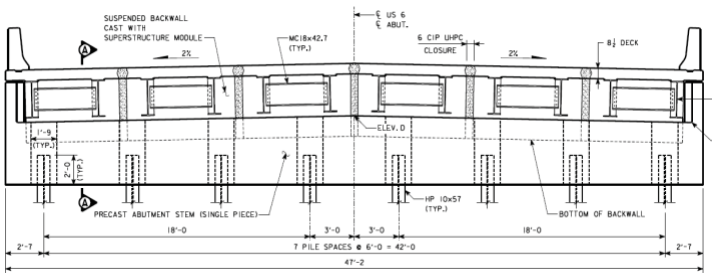
Abutment Details



Precast Abutment Construction

- SCC to fill pile pockets
- Temporary support of backwall until SCC reaches 3000 psi

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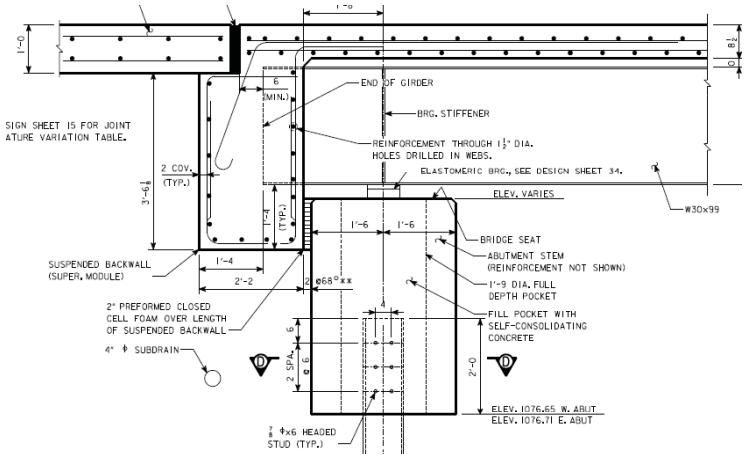
Semi-Integral Abutment



SUSPENDED BACKWALL DETAIL

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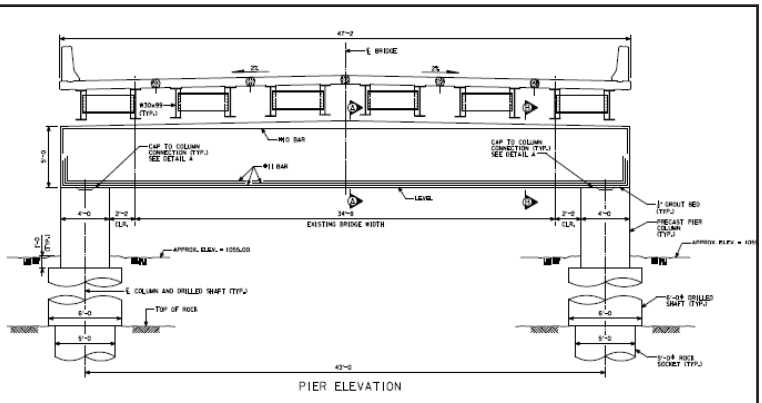
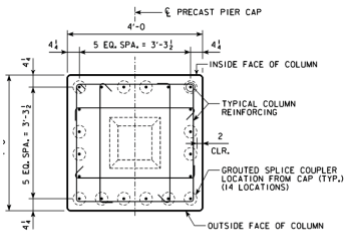
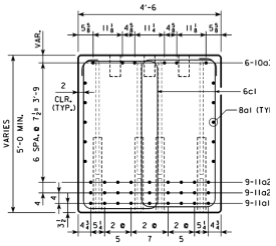
Precast Piers





SECTION C-C
PRECAST COLUMN



SECTION B-B
PRECAST PIER CAP

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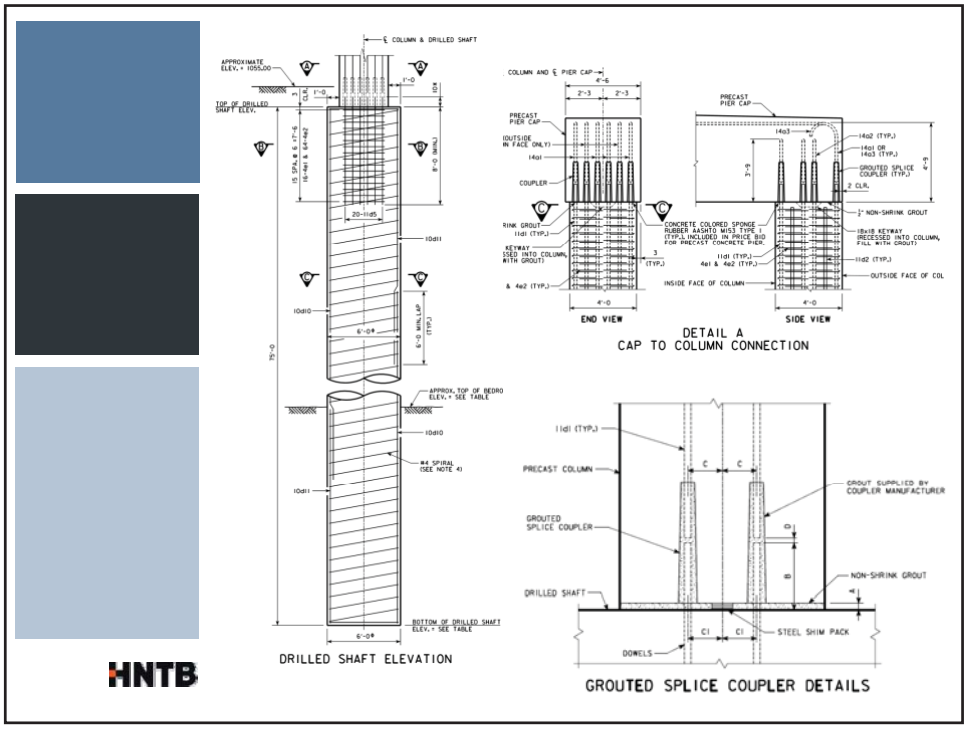
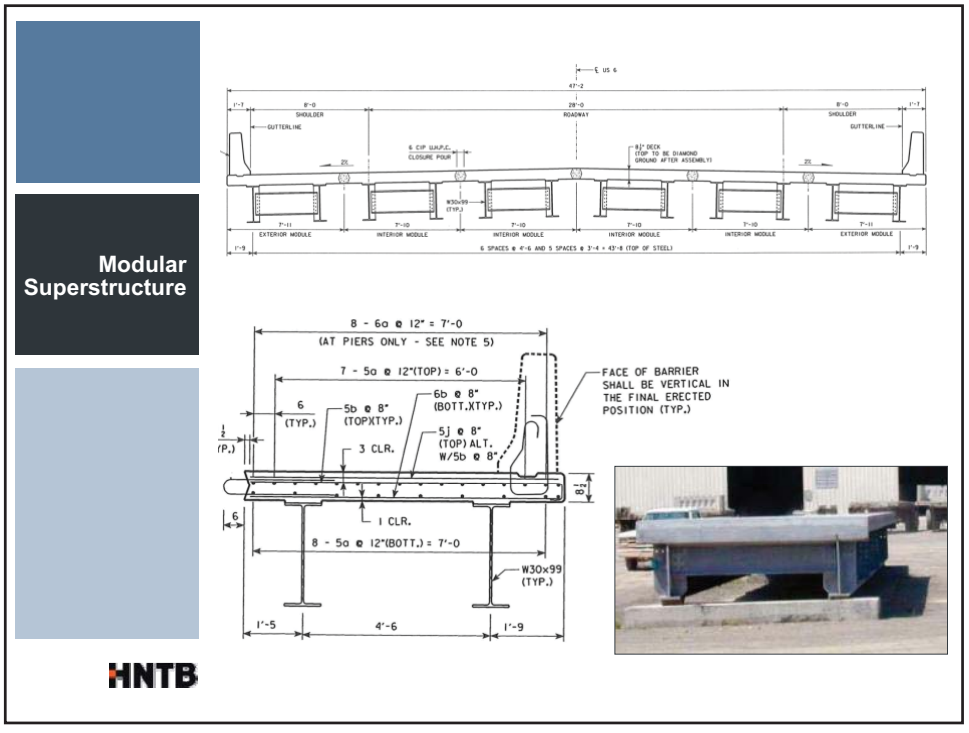
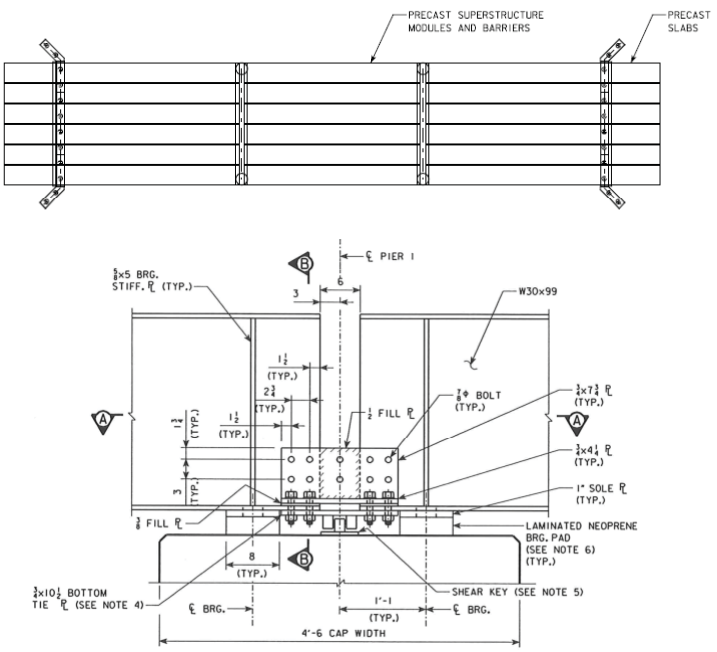


Modular Superstructure



Pier Joint Detail



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Leveling Procedure for Adjacent Modules

- Adjust for Differential Camber
- Fill Joints with UHPC
- Curing until UHPC reaches 14 ksi
- Diamond grind top ½”
- Open to traffic

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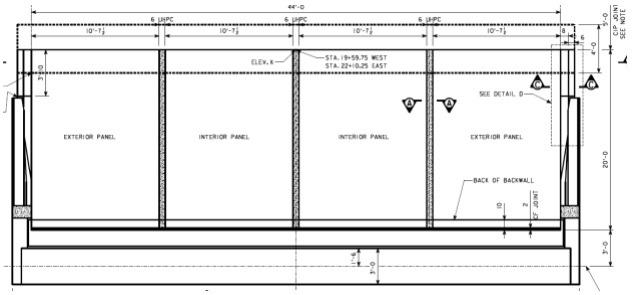
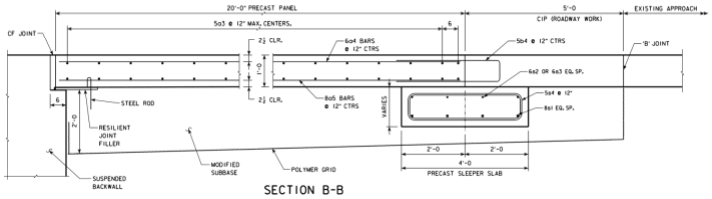
Precast Approach Slabs





SECTION B-B

HNTB

Non-bridge Work Prior to Opening

- Approach grading
- Cast-in-place paving
- Shoulder paving
- Guardrail
- Open to Traffic

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ABC SPECIAL PROVISIONS

Special Provisions

- Precast Concrete Substructure Elements
- Prefabricated Superstructure Modules
- Precast Concrete Approach Slab Elements
- Ultra High Performance Concrete

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SHRP 2 - R04 Innovative Bridge Designs for Rapid Renewal

Questions?

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