



2018 Northeastern Transportation & Wildlife Conference

Planning Bridge Replacement or Rehabilitation Projects

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Prior Process

- ▶ Scope of work prepared by Bridge Section staff (only)



- ▶ **Deliverable:** A 7 - 8 page document with description of existing bridge, including dimensions, listing of possible replacement types to be considered, listing of design submissions, and site photos.

Prior Process

BRIDGE SCOPE OF WORK FOR CONSULTANT DESIGN SERVICES January 2012

Town: PITTSFIELD
606706

Bridge No.: P-10-010 (5BC)

Carried/Under: WOODLAWN AVENUE over CSX RR

Project No.:

General: The scope of work for this assignment shall consist of preparing plans, special provisions and estimate for the proposed **Bridge Replacement** of Bridge No. P-10-010 (5BC) carrying Woodlawn Avenue over CSX railroad in the city of Pittsfield.

This scope of work is intended to define the project for the purpose of project development. The scope is not intended to limit the investigation of solutions appropriate to the site. It is expected that the consultant's experience and expertise shall be utilized in conjunction with the Department's *Bridge Manual* in order to determine the most appropriate solution. The design is expected to efficiently meet the particular constraints and demands of this project such as construction schedule, construction costs, environmental considerations, CSX RR requirements, aesthetics, the city, and traffic management. Special attention should be given to the use of accelerated construction techniques to minimize construction duration and impacts to traffic.

Existing Bridge: The original structure was constructed in the early 1900's. The existing three-span structure was the result of a reconstruction in 1974. The superstructure consists of adjacent precast prestressed concrete deck beams, topped with a bituminous concrete wearing surface. According to field measurements, the existing roadway width, curb-to-curb is approximately 24 feet with two 4.5 foot sidewalks. The out-to-out deck width is approximately 36 feet. The existing AL-3 bridge railings on both sides of the bridge are non-standard. The substructure consists of two granite block abutments and two piers that consist of steel bents with a concrete pier cap. The bridge length is approximately 138 feet. The structure supports a gas line along the east fascia that has been placed out of service for the bridge to be reconstructed. The east side of the bridge is the site of the closed General Electric (GE) facility. The bridge has a skew angle of 0 degrees. The bridge's eligibility for individual listing in the National Register of Historic Places is unlikely, but undetermined.

The bridge site is currently closed to traffic. There are New Jersey barriers preventing traffic from entering the approach roadway at both the south and north approaches. The north approach also has a gate to prevent traffic from entering. GE owned the bridge privately prior to the Pittsfield Economic Development Association (PEDA) acquiring the bridge. MassDOT is responsible for the replacement of the bridge. Because the bridge was a privately owned bridge, it is not included in the NBI. The bridge is posted at 20/24/26 tons.

Proposed Work: The existing bridge shall be replaced with an approximate 67 foot single span superstructure. The two approach spans are to be filled in and the center span replaced. The two piers are to be removed and replaced with new cantilever abutments located at least 18 feet from the centerline of the nearest active CSX railroad track. The proposed bridge shall have a curb-to-curb width of 50 feet (two 11 foot lanes and two 14 foot auxiliary lanes to accommodate 10 foot shoulders

and 4 feet for bicyclists) and two 6.5 foot sidewalks. The proposed bridge railings shall be Type S3-TL4, painted dark green. The consultant shall work with District 1 and the PEDA group to determine an acceptable bridge appearance. A sketch of a single span structure has been submitted to CSX for approval and is attached to this scope.

In addition to the bridge replacement, Woodlawn Avenue shall be reconstructed from East Street (Route 9) to the Tyler Street intersection, north of the bridge. The reconstruction shall consist of appropriate improvements to the intersections of Tyler Street at Woodlawn Avenue, Woodlawn Avenue at Kellogg Street, and East Street (Route 9) at Woodlawn Avenue. The existing alignment and profile shall be altered to accommodate safety improvements. The existing sidewalks on Woodlawn Avenue shall also be replaced.

The bridge alignment and bridge profile shall depend upon providing a minimum 21 foot vertical underclearance as well as transitioning the bridge to accommodate the PEDA Master Plan for the approach roadways. Alignment modification is recommended for improvement at the north and south approaches. The proposed profile shall be verified with the proposed superstructure depth and the 21 foot vertical underclearance.

A "Type Selection Worksheet" shall be used to verify the span length and the most appropriate superstructure and substructure types for the proposed bridge. When selecting the appropriate superstructure type, the superstructure depth shall accommodate a minimum CSX double stack vertical clearance of 21 feet. The underclearance and the railroad envelope shall be verified with CSX during the type selection phase of the project.

The consultant shall evaluate all feasible alternatives for the proposed structure, giving consideration to Context Sensitive Solutions, and the goals and objectives of the Department. Pre-fabricated and/or pre-cast elements shall be utilized to the maximum extent possible. In addition, construction techniques that allow for expedited construction shall be considered. Options to consider in the evaluation may include construction of the new superstructure and substructure utilizing precast and prefabricated elements. The Department's *Bridge Manual* details shall be considered and utilized as appropriate. However, if new details will serve the intended function but can be constructed with less time or effort, they shall be developed. The new structure shall be designed using the AASHTO LRFD Bridge Design Specifications and, where appropriate, the Division's 2009 LRFD *Bridge Manual*.

The consultant will be responsible for preparation of the Project Traffic Management and Work Safety Zone Protection Plan (TMP) if there is to be any impact to the East Street (ST 9) and/or Woodlawn Avenue (to the north) traffic. The plan, if applicable, shall be coordinated with the Department's District 1 office in Lenox and the city of Pittsfield.

Utilities in the area shall be investigated. The local utility companies shall be contacted early in the design concerning the possibility of future piping. The consultant will also be required, as a minimum, to attend a 25% Design Field Utility Meeting.

Prior Process

NHESP 2008 Priority Habitat of Rare Species & Estimated Habitat of Rare Wildlife is not noted at the bridge location. The soil in the vicinity of the approach roadways and the bridge abutments may be determined to have hazardous levels of contaminants. This could affect both excavation and back fill. At this time, the levels and extent of contamination are not clear. The Consultant shall work with the MassDOT Environmental Unit to verify and collect all data that will be required by the contractor to perform the proposed construction.

A Geotechnical Report and a Functional Design Report are required for this project and shall be provided by the consultant. Survey and Base Plans will be provided by the Department.

Bridge Plans, Bridge Rating Reports and Bridge Inspection Reports are available in the Bridge Section at 10 Park Plaza, Boston, MA as well as the District 1 office in Lenox, MA.

Upon notice to proceed by the Department, the consultant shall complete a "Type Selection Worksheet" as described in the *Bridge Manual*. This is to verify that this scope and the consultant's design will provide the most appropriate structure type for this site. Upon acceptance of this report by the Department, the consultant shall prepare six sets of sketch plans for submittal to the Bridge Department for review and comment plus two sets for each utility involved. After sketch plan approval, the consultant shall proceed with the final bridge design services. The final bridge design package shall include six sets of the Construction Drawing prints, one set of the design calculations along with one set of independent design check calculations, six sets of Special Provisions and six sets of Preliminary Estimate of Quantities. Upon approval of the final bridge design package by the Department, the consultant shall submit the final PS&E package for advertisement.

The consultant shall prepare 25% highway design documents and Preliminary Right-of-Way plans, which shall be submitted with the Bridge Sketch Plans and the Early Environmental Documents. An Early Environmental Coordination Checklist (EECC) needs to be submitted by the consultant. Note that the Early Environmental Submission will be rejected if not complete and in accordance with the checklist. Upon receipt and incorporation of comments, the consultant shall prepare and submit 75% Highway documents, including plans, special provisions, estimate, quantities, calculations, etc. The 75% Highway documents shall be coordinated with the Bridge documents and submitted with the Bridge submission. Upon receipt and incorporation of review comments, the consultant shall submit a final set of documents for review. It is expected that this review will only be for the Department to verify that comments have been incorporated. At this stage, the consultant will review all the environmental permits obtained earlier in the design process to confirm the information is still correct. If any revisions are required, the consultant shall notify the Department immediately, and submit the required revisions.

The consultant shall prepare and submit all information and data for the required permits. The consultant is responsible for furnishing and preparing all necessary documents and displays at all public information meetings and the public hearing. Attendance at these public information meetings and public hearing is required.

The consultant is responsible for right of way efforts. Layout plans, descriptions and orders of taking will be required in order to establish highway right of way should the project involve land acquisitions or easements.

After award of the construction contract, the consultant shall be responsible for attendance at the pre-construction meeting, attendance at bi-weekly job site meetings, review of all shop drawings, and provide advice during construction. If directed by MassDOT, the consultant will report to the field to investigate problems arising during construction or to investigate the quality of construction as it relates to maintaining design integrity.

A Bridge Rating Report of the "as-built" structure will be prepared in conformance with the *Bridge Manual*, Chapter 7, by the consultant after the bridge is constructed, open to traffic, and inspected by the Bridge Section. This is to be submitted as part of the "Construction Services" phase of the project.



Prior Process



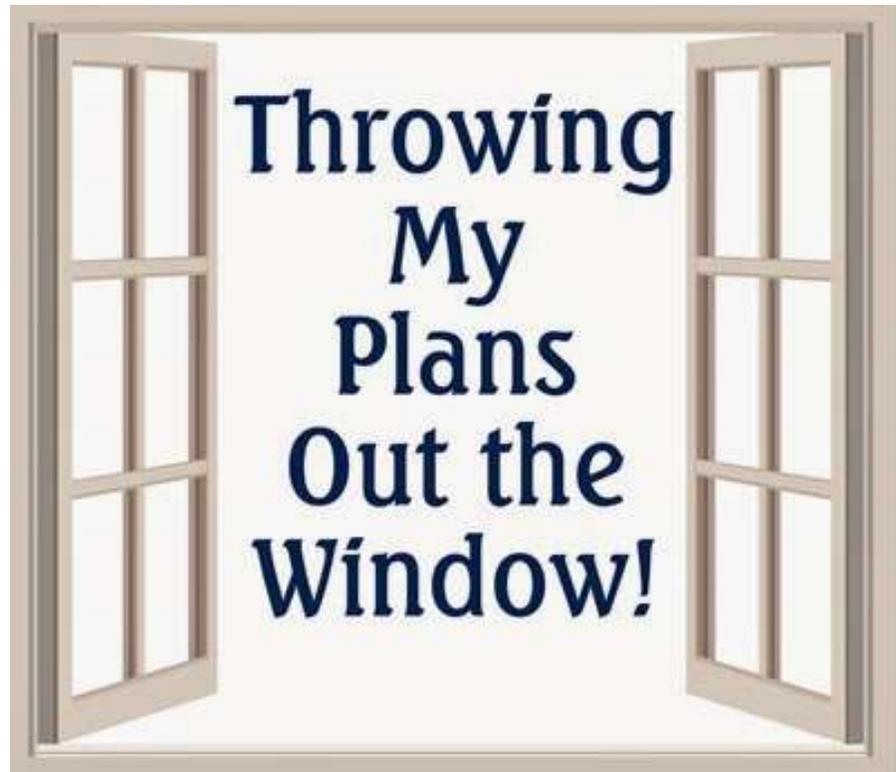
Prior Process - PROBLEM

- ▶ Since no other disciplines were involved in preparing the scope, the project would be advanced to the 25% design level, and submitted for review
- ▶ Various (non-bridge) reviewers would then provide comments, often changing/expanding the scope



Prior Process - PROBLEM

- ▶ The design process was sent back to the beginning.
- ▶ This caused project delays - out of scope work; additional data required (RSA, more survey, etc.); revised design.



Typical Bridge Project



What a Bridge Engineer Sees



What Should Be Considered in the Project



Current Process

- Conduct a Scoping Site Visit
 - Participants include:
 - Project Manager
 - HQ Bridge Staff
 - Complete Streets Engineer
 - AAB Coordinator
 - District Staff
 - Project Development Engineer
 - Bridge Engineer
 - DUCE
 - Bike/Ped coordinator
 - Environmental Staff
 - ROW Staff
 - Designer
 - Municipality



Current Process

BRIDGE SCOPING CHECKLIST

Projects will be developed to 25% design using this checklist

Project File No.:

Date:

Bridge No.:

Total Programmed Funds:

Project Description:

BRIDGE

1 Examine Potential Project Types (Preservation; Superstructure Replacement; Full Replacement)

- Candidate for Preservation? (Check box if "Yes")
 If not preservation, are substructure elements worthy of analysis for re-use?
- Candidate for Superstructure Replacement? (Check box if Yes)
- Candidate for Full Replacement? (Check box if "Yes")

Comments:

2 Studies, Analysis & Reports Required

- Preliminary Structures Report (Check this box if project is a candidate to retain any portion of the existing structure)
- Boring / Probe Layout Plan
- Geotechnical Report
- Hydraulic Report
- Bridge Type Selection Worksheet
- Sketch Plans
- Additional Studies (describe in Comments box)

Comments:

3 Determine Required Clearance and Bridge Geometry

Determine Required Horizontal Clearance (specify no. feet clearance and from what controlling element)
 (Controlling Elements may be face of abutment or pier; edge of travelled way; etc.)

If over a railroad, indicate the Line; Segment; MP in the comments box.

If over a railroad, is this a Chapter 634 bridge? (Check box if "Yes")

If over a railroad, and NOT a Chapter 634 bridge, indicate required minimum horizontal clearance

Increase Channel Width for Hydraulic or Environmental Purposes (Check box if "Yes")

Determine Required Vertical Clearance (specify no. feet clearance and from what controlling element)
 (Controlling Elements may be roadway shoulder; top of rail; design year flood; etc.)

If over a railroad, and NOT a Chapter 634 bridge, indicate required minimum vertical clearance

Determine Bridge Geometry (Span Length; Skew; Structure Depth; etc. Describe in Comments box)

Comments:

ROADWAY

1 Functional Classification

Describe (Urban Arterial; Rural minor collector, etc.)

Comments:

Current Process

2 Determine Roadway Cross-Section

Number of Travel Lanes - EXISTING

Number of Travel Lanes - PROPOSED

Width of Travel Lanes - EXISTING

Width of Travel Lanes - PROPOSED (If less than PDDG Exhibit 5-14 or E-14-001, will require DER)

Width of Shoulders - EXISTING (use both lines if different widths)

Width of Shoulders - PROP. (If less than PDDG Exhibit 5-14 or E-14-001, will require DER).

Width of Sidewalks - EXISTING

Width of Sidewalks - PROPOSED (If less than 5.5', will require DER)

On NHS System (Check box if "Yes")

Candidate for Cycle Track (Check box if "Yes")

Any existing off road bicycle/pedestrian facilities (Check box if "Yes" and describe in Comments)

Comments:

3 Determine Roadway Profile

Does Existing Profile Appear to be AAB Compliant? (Check box if "Yes" - note to verify during preliminary design)

Maintain/Optimize Existing Profile

Improve Profile (describe in Comments box)

Comments:

4 Determine Horizontal Alignment

Does Existing Alignment Appear to be Code Compliant? (Check box if "Yes" - note to verify during preliminary design)

Maintain/Optimize Existing Alignment

Improve Alignment (describe in Comments box)

Comments:

5 Determine Design Speed

Existing Posted Speed Limit

Proposed Design Speed (should not be less than posted speed)

Comments:

6 Determine Project Limits

Any High Crash Locations in Project Area? (Check box if "Yes", and include in project limits)

No. Feet Beyond the Abutment
in this direction

No. Feet Beyond the Abutment
in this direction

To the Intersection with: (describe below)

To the Intersection with: (describe below)

Comments:

Current Process

7 Other Roadway Design Issues

- Address Drainage Issues
- Address Accessible Ramps at Intersection(s) (describe in Comments box below)
- Address Lighting
- Address Existing Traffic Signals within Project Limits

Comments:

8 Studies, Analysis & Reports Required

- Functional Design Report
- Design Exception Report (including exceptions to Healthy Transportation Policy Directive)
- Roadway Safety Audit
- Horizontal Alignment Report
- Traffic & Safety Check List
- Pre-25% OTS Review Meeting
- 25% Design Submission
- Additional Studies (describe in Comments box)

Comments:

CONSTRUCTABILITY

- Candidate for Full Road Closure and Detour? (Check box if Yes. Describe possible detour route in Comments box)
- Candidate for Accelerated Construction Techniques? (Complete Preliminary Decision Value calculation per Bridge Manual 2.1.4)
- Candidate for Stage Construction (Check box if Yes)
- Candidate for Altering One-Way Traffic (Check box if Yes)

Comments:

ENVIRONMENTAL

1 Studies, Analysis & Reports Required

- Early Environmental Checklist
- Determine National Register of Historic Places status of structure - eligible or listed?
(If not known during site visit, make a note in the comments box to research it back in the office)

Comments:

2 Field Reconnaissance

Provide details in the comments box. Provide photographs that clearly illustrate existing site conditions such as local land use and context (urban, suburban, rural, etc.)

- Wetlands/waterways present (Check box if Yes)
- Does the bridge appear to restrict the natural flow regime of the waterway? (Check box if Yes)
- Are buildings or public open spaces in close proximity to the site? (Check box if Yes)
- If over waterway, is it navigable? (Check box if "Yes")

Comments:

RIGHT OF WAY

1 Studies, Analysis & Reports Required

- Preliminary Right of Way Plans

Comments:

Current Process

UTILITIES	
1 Describe Existing Utilities	
Overhead:	<input type="text"/>
Carried on Bridge:	<input type="text"/>
Under Bridge:	<input type="text"/>
2 Considerations for Utility Design	
<input type="text"/>	
OTHER	
1 Studies, Analysis & Reports Required	
<input type="checkbox"/>	Design Public Hearing
<input type="checkbox"/>	Pavement Design Report
<input type="checkbox"/>	Incentive/Disincentive
<input type="checkbox"/>	Specifications
<input type="checkbox"/>	Estimate
<input type="checkbox"/>	Initial Contract Time Determination
<input type="checkbox"/>	Other (Describe in Comments box)
Comments:	<input type="text"/>

2 Services to be Provided by Consultant	
<input type="checkbox"/>	Survey
<input type="checkbox"/>	Pavement Cores
<input type="checkbox"/>	Borings/Probes/Test Pits - Plans and Field Inspection
<input type="checkbox"/>	Hydraulic Report
<input type="checkbox"/>	Utility Coordination
3 Services to be Provided by MassDOT	
<input type="checkbox"/>	Survey
<input type="checkbox"/>	Borings/Probes/Test Pits (via MassDOT open ended contract)
<input type="checkbox"/>	Hydraulic Report

Current Process

- Scoping Checklist is completed during the scoping site visit.
- Following the site visit, the checklist is sent to the participants (and supervisors who may not have been on site) for comment.
- The checklist is then finalized and given to the designer to prepare a proposal to bring the design to 25%/ Design Public Hearing.
- Once approved, the NTP is issued and design commences.



Current Process

- The design assignment is completed in three phases
 - Through 25% submission and Design Public Hearing.
 - From 25% through PS&E, including advertising, bid opening & Board approval (if applicable).
 - Construction Phase Services.



Thank you!

Contact Information:

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