QUALITY ASSURANCE & QUALITY CONTROL

STATE I.D. 6340-00-32
WISCONSIN RAPIDS - MARSHFIELD
WIS 13 & 80 BRIDGES B-71-62,79
VARIOUS HIGHWAYS
WOOD COUNTY

STRUCTURES B-71-62 & B-71-79

Febuary 21, 2019

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Structure Survey Report

The Project Engineer shall consult with the Project Director for guidance and review of the selection and sizing of the proposed bridge structure. The follow criteria shall be the baseline for structure selection and sizing. The selected structure and sizing shall be approved by the Project Director.

The following criteria are used for the preparation of preliminary plans.

1. Selection of Structure Type. Refer to Chapter 17, Superstructure-General, for a discussion of structure types.

2. Span Arrangements. For stream crossings the desired minimum vertical clearance from high water to low steel is given in Chapter 8.0-Hydraulics. Span lengths for multiple span stream crossings are in most cases a matter of economics and the provision for an opening that adequately passes ice and debris. For structures over navigable streams, the vertical and horizontal clearance of the navigable span are determined by the U.S. Coast Guard after considering the interests of both highway and waterway transportation users.

For most of the ordinary grade separation structures the requirements for horizontal clearance determine the span arrangements. Refer to Chapter 17.0-Superstructure-General for span length criteria.

3. Economics.

Economy is a primary consideration in determining the type of structure to be used. Refer to Chapter 5.0-Economics and Costs, for cost data.

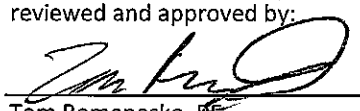
At some stream crossings where the grade line permits considerable head room, investigate the economy of a concrete box culvert versus a bridge type structure. When economy is not a factor, the box culvert is the preferred type from the standpoint of mainten Show Design Specifications as: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS and provision of a facility without roadway width restrictions.

4. Aesthetics. Recognition of aesthetics as an integral part of a structure is essential if bridges are to be designed in harmony with adjacent land use and development. Refer to Chapter 4.0-Aesthetics.

The Structure type and sizing has been prepared by:

Robert Hanold

The Structure type and sizing have been reviewed and approved by:



Tom Romenesko, PE
Project Director

5. Hydraulic Consideration. Stream crossing structures are influenced by stream flow, drift, scour, channel conditions, ice, navigation, and conservation requirements. This information is submitted as part of the Structure Survey Report. Refer to Chapter 8 for Hydraulic considerations and Section 8.1.5 for Temporary Structure Criteria.

6. Geometrics of Design. The vertical and horizontal clearance roadway widths, design live loading, alignment, and other pertinent geometric requirements are given in Chapter 3.

7. Maintenance. All bridge types require structural maintenance during their service life. Maintenance of approaches, embankments, drainage, substructure, concrete deck, and minor facilities is the same for the various types of bridges. A minimum draining grade of 0.5% across the bridge is desirable to eliminate small ponds on the deck except for open railings where the cross slope is adequate.

Epoxy coated bar steel is required in all new decks and slabs.

Steel girders require periodic painting unless a type of weathering steel is used. Even this steel may require painting near the joints. It is more difficult to repaint steel girders that span busy highways.

Reinforced concrete box girders and voided slabs have a poor experience in Wisconsin. They should not be used on new structures.

Deck expansion joints have proved to be a source of maintenance problems. Bridges designed with a limited number of watertight expansion devices are recommended.

8. Construction. Occasionally a structure is proposed over an existing highway on which traffic must be maintained. If the roadway underneath carries high volumes of traffic, any obstruction such as falsework would be hazardous as well as placing undesirable vertical clearance restrictions on the traveled way. This is also true for structures over a railroad.

For structures over most high-volume roadways construction time, future maintenance requirements, and provision for future expansion of the roadway width, have considerable influence on the selection of the final product.

9. Foundations. Poor foundation conditions may influence the structure geometry. It may be more economical to use longer spans and fewer substructure units or a longer structure to avoid high approach fills.

10. Environmental Considerations. In addition to the criteria listed above all highway structures must blend with the existing site conditions in a manner that is not detrimental to environmental factors. Preservation of fish and wildlife, pollution of waters, and the effects on surrounding property are of primary concern in protecting the environment. The design of structures and the treatment of embankments must consider these factors.

11. Safety. Safety is a prime consideration for all aspects of the structure design and layout. Bridge railings are approved through actual vehicle crash testing.

The SSR shall have the following information included for submittal.

Completed SSR form DT1698 for appropriate structure being designed.
In addition the following information shall be supplied.

1. Small County Map on which the location of proposed structure is shown in red and highway relocation, if any, in green.
2. Plan and Profile Sheet on proposed reference line of highway showing the following:
   - (a) Ground line
   - (b) Finished grade line
   - (c) Profile grade line elevations at least every 100 feet for 1,000 feet each side of the structure
   - (d) Vertical curve control points
   - (e) Horizontal curve control points
   - (f) Curve data, including full ~~SE and runoff distance.~~
3. Contour Map of the site drawn to a scale of not less than 1" = 20 feet with one-foot contours and showing the following:
   - (a) Existing highway and structure
   - (b) Proposed highway alignment and R/W
   - (c) Station numbers
   - (d) North arrow
   - (e) Buildings
   - (f) Underground facilities
   - (g) Other features which influence the design
   - (h) Recommended channel change
   - (i) Direction of stream flow
   - (j) Stations at end of existing structure
   - (k) Proposed structure and extent of riprap for consultant designed structures.

DESIGNER	CHECKER	ENGINEER OF RECORD
RBM	RB	RBM
RBM	RB	RBM
RBM	RB	RBM
RBM	RB	RBM
RBM	RB	RBM
RBM	RB	RBM
RBM	RB	RBM
NOT REQ'D	REQ'D / NOT REQ'D	NOT REQ'D
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4. Typical Roadway Cross Section of proposed approaches showing the following:
   - (a) Dimensions
   - (b) Slopes
   - (c) Type and width of surfacing or pavement
   - (d) Sidewalk, curb and gutter
   - (e) Subgrade and pavement thickness
   - (f) Clear zone width.
5. Stream Cross Section at upstream and downstream face of existing bridge and at one bridge length upstream and downstream. Surface water elevations at 1500 feet upstream and downstream of existing bridge.
6. Original Photographs of:
   - (a) Existing structure
   - (b) Upstream and downstream structures
   - (c) Buildings within 100 feet of the proposed structure
   - (d) Unobstructed panoramic view looking upstream and downstream from proposed structure
   - (e) Air photo mosaics if available
7. Proposed Location Map showing structure location and number, ~~one per structure when there are multiple structures on the project.~~
8. Attach a copy of the regulatory flood plain map (FEMA map) depicting the site.
9. For consultant designed structures - Hydraulic Report which may contain the following:
   - (a) USGS quadrangle sheet showing proposed location, highway alignment and reach of river
   - (b) All available flood history, high water marks with date of occurrence, nature of flooding, damages and scour information
   - (c) Factors affecting water stages
   - (d) Navigation Clearance, for guidance in making report, see Chapter 8 of Bridge Design Manual
   - (e) Discussion of alternatives considered, factors influencing selection
10. Attach a copy of DNR initial concurrence letter.

DESIGNER	CHECKER	ENGINEER OF RECORD
RBH	TJS	RBH
RBH	TJS	RBH
RBH	TJS	RBH
RBH	TJS	RBH
RBH	TJS	RBH
RBH	N/A BEARINGS	RBH
N/A	NOT REQ'D	N/A
RBH	TJS	RBH
N/A	NOT REQ'D	N/A
N/A	N/A	N/A
N/A	NOT REQ'D	N/A
N/A	NOT REQ'D	N/A
RBH	TJS	RBH
NOT REQ'D	NOT REQ'D	N/A
	TJS/ NOT REQ'D	N/A
N/A	N/A	

GENERAL PLAN

Drawing Size

1 Sheets are 11 inches tall and 17 inches wide.
2 Verify the latest approved DOT boarder is being used.
3 Verify title sheet information is correct on first drawing sheet.
4 Dimensions along the reference line except for structures on a curve in which case they are along a tangent to the curve. Sufficient dimensions to layout structure in the field.
5 Stations are required at centerline of piers, centerline of bearing at abutments, and end of deck or slab.
6 Stations at intersection with reference line of roadway underneath for grade separation structures.
7 Direction of stationing increase for highway or railroad beneath a structure.
8 Detail the extent of slope paving or riprap.
9 Direction of stream flow and name if a stream crossing.
10 Highway number and direction and number of traffic lanes.
11 Horizontal clearance dimensions, pavement, shoulder, sidewalk, and structure roadway widths.
12 Median width if dual highway.
13 Skew angles and angles of intersection with other highways, streets or railroads.
14 Horizontal curve data if within the limits of the structure showing station of P.C., P.T., and P.I. Complete curve data of all horizontal curves which may influence layout of structure.
15 Location of and vertical clearance at point of critical vertical clearance if highway or railroad separation. (For both roadway directions on divided highways).
16 If floor drains are proposed the type, approximate spacing, and whether downspouts are to be used.
17 Existing structure description, number, station at each end, buildings, underground utilities and pole lines giving owner's name and whether to remain in place, be relocated or abandoned.
18 Indicate which wingwalls have beam guard rail attached if any and wing lengths.
19 Structure numbers on plan.
20 North Arrow.
21 Excavation protection for railroads.
22 Location of deck lighting or utilities if any.
23 Name Plate location. Locate the structure name plate on the roadway side of the first right wing traveling in the highway cardinal directions of North or East.
24 Bench Mark Cap Location
25 Locations of surface drains on approach pavement.
26 Tangent Offsets between reference line and tangent line along CL substructure unit.
27 Describe the structure with a simple note such as: Four span continuous steel girder structure.
28 Station at end of deck on each end of bridge.
29 On Structure Replacements-Show existing structure in dashed-lines on Plan View.

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RBM	TJS	RBM
RBM	TJS	RBM
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RBM	TJS	RBM
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
RBM	TJS	RBM
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RBM	TJS	RBM
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N/A	N/A	N/A
N/A	N/A	N/A
N/A	TJS	RBM
RBM	TJS	RBM
RBM	TJS	RBM
RBM	TJS	RBM
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
RBM	TJS	RBM
N/A	N/A	N/A
RBM	TJS	RBM
RBM	TJS	RBM
N/A	N/A	N/A

Review of Quality Control by Project Director
Stating Checklist Items Conform to Project Plan.

Date: 2/27/19

Elevation View

The elevation view is preferably placed below the plan view. If the structure is not skewed the substructure units are to be a straight projection from the plan view. If skewed, the elevation is a view normal to substructure units. The view shows the following basic information:

1 Profile of existing groundline or streambed.
2 Cross-section of highway or channel below showing back slopes at abutments.
3 Elevation of top of berm and rate of back slope used in figuring length of structure.
4 Type and extent of slope paving or riprap on back slopes.
5 Proposed elevations of bottom of footings and type/length of piling if required.
6 Depth of footings for piers of stream crossing and if a seal is required, show and indicate by a note.
7 Location and amount of minimum vertical clearance.
8 Streambed, observed and high water elevations for stream crossings.
9 Location of underground utilities, with size, kind of material and elevation indicated.
10 Location of fixed and expansion bearings.
11 Location and type of expansion devices.
12 Use a scale of 1" = 10' whenever possible.

DESIGNER	CHECKER	ENGINEER OF RECORD
N/A	N/A	N/A
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Cross-Section View

The cross-section view need only be a half section if symmetrical about a reference line, otherwise it is a full section taken normal to reference line. Use a scale of (1" = 4') whenever possible. A view of a typical pier is shown as a part of the cross-section. The view shows the following general information:

1 a Slab thickness, curb height and width, type of railing.
2 Horizontal dimensions tied into a reference line or centerline of roadway.
3 Steel beam or girder spacing with beam/girder depth.
4 For prestressed girders approximate position of exterior girders.
5 Direction and amount of crown or superelevation.
6 Point referred to on profile grade.
7 Type of pier with size and number of columns proposed.
8 For solid, hammerhead or other type pier approximate size to scale.
9 If length of concrete pier cap between outer pier columns exceeds approximately 60 feet, provide an opening in the cross girder for temperature changes and concrete shrinkage, or design the pier cap for temperature and shrinkage to eliminate the opening.
10 Dimension minimum depth of bottom of footings below ditch or finished ground line or if railroad crossing below top of rail.
11 Location for public and private utilities to be carried in the superstructure. Label owner's name of utilities.
12 Location of lighting on the deck or under the deck if any.

DESIGNER	CHECKER	ENGINEER OF RECORD
RBH	TB	RBH
RBH	TB	RBH
N/A	TB	RBH
RBH	TB	RBH
RBH	TB	RBH
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N/A	N/A	N/A
N/A	—	—
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

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Other Requirements

1 Profile grade line across structure showing tangent grades and length of vertical curve. Station and elevation of P.C., P.I., P.T., and centerline of all substructure units. Profile grade line of highway beneath structure if highway separation or of top rail if railroad separation. Stations along top of rail are to be tied into actual stationing as established by railroad company.
2 Channel change section if applicable. Approximate stream bed elevation at low point.
3 Any other view or detail which may influence the bridge type, length or clearance.
4 List design data including:

DESIGNER	CHECKER	ENGINEER OF RECORD
N/A	REVIEWED N/A	N/A
N/A	N/A	N/A
—	—	—
RBH	TB	RBH
RBH	TB	RBH
RBH	TB	RBH
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
RBH	TB	RBH
RBH	TB	RBH
RBH	TB	RBH
RBH	TB	RBH
—	—	—
N/A	REVIEWED N/A	N/A

Ultimate Stresses for Materials:
- Concrete ~~Superstructure~~ DECK
- Concrete Substructure
- Bar Steel Reinforcement
- Structural Steel
- Prestressed Concrete
- Prestressing Steel

Foundations
- Soil Bearing Pressure
- Pile Type and Capacity (see bridge manual 6.3.2.1)
- Factored Resistance Note

Ratings- Live Load:
Design Loading: ~~HL-93~~ HS-20
Inventory Rating Factor: RF = X.XX
Operating Rating Factor: RF = X.XX
Wisconsin Standard Permit Vehicle (Wis-SPV)
(See bridge manual Chapter 45 – Bridge Rating (45.8.2) for additional information)

Hydraulic Data
Base Flood
- 100 Year Discharge
- Stream Velocity
- 100 Year Highwater Elevation
- Q2 & Q2 Elevation (Based on new structure opening)
- Waterway Area
- Drainage Area
- Scour Critical

Overtopping Flood OR (Overtopping N/A, for Floods > the 100 Year Flood)

- Overtopping Frequency
- Overtopping Elevation
- Overtopping Discharge

5 Show traffic data. Give traffic count, data and highway for each highway on grade separation or interchange structure.

6 Approved Abbreviations- see bridge manual Table 6.3-1

7 Utilities

In urban areas, public and private utilities generally have their facilities such as sewers, water cables, pipes, ducts, etc., underground, or at river crossings, in the streambed.
If these facilities cannot be relocated, they may interfere with the most economical span arrangement. The preferred location of light poles is at the abutments or piers.
Overhead power lines may cause construction problems or maintenance inspection problems. Verify if they exist and notify Utilities & Access Management Unit (Bureau of Tech. Services) to have them removed.
It is the general policy to not place utilities on the structure. The Utilities & Access Management Unit approves all utility applications and determines whether utilities are placed on the structures or can be accommodated some other way. Refer all requests to them. Also see Chapter 18 of the FDM and Chapter 4 of "WisDOT Guide to Utility Coordination".

DESIGNER	CHECKER	ENGINEER OF RECORD
N/A	RBH (NOTED)	N/A
N/A		N/A
N/A	"	N/A
RBH	TJB	RBH
RBH	TJB	RBH
N/A	SIK	N/A.

Review of Quality Control by Project Director
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