

# PRELIMINARY DESIGN CHECKLIST - BRIDGE

Date: 8-1-2021

County: \_\_\_\_\_ Design No.: \_\_\_\_\_ Check By: \_\_\_\_\_ Date: \_\_\_\_\_

Project Location: \_\_\_\_\_ Consultant: \_\_\_\_\_

## GENERAL

### Abbreviations

\_\_\_ Use as needed. Reference [BDM 13.1.4]

### Title Block

- \_\_\_ "Design for (xx Skew) (RA)(LA)"
- \_\_\_ Structure Type and Size and Beam Type (e.g. "304'-0 x 40'-0 Pretensioned Prestressed Concrete Beam Bridge")
- \_\_\_ For bridge with multi-project staging, the structure width listed should be the width of the current stage plus all previously completed stages. (e.g. if stage 1 construction is 20 ft. and stage 2 construction is 30 ft., the first project title block should show 20 ft. and the second project title block should show 50 ft.) Show text: Stage 1, Stage 2 as-needed
- \_\_\_ Span Description (e.g. "101'-0 End Spans", "102'-0 Center Span")
- \_\_\_ For bridge on horizontal curve, show 'Radius = xxxx'
- \_\_\_ Station of bridge at center of bridge (offset needed for duals). Include roadway (e.g. "US 30 – Ramp D")
- \_\_\_ Current TSL Date (e.g. "December 2010")
- \_\_\_ County
- \_\_\_ "Iowa Department of Transportation—~~Highway~~ **Division**"
- \_\_\_ "Design Sht. No. x of x", "File No.", "Design No."
- \_\_\_ Situation Plan

### Location

- \_\_\_ Location: Road over road/stream
- \_\_\_ Township/Range (e.g. "T-86/87N", "R-2/3W")
- \_\_\_ Section (e.g. "35/36")
- \_\_\_ Township Name
- \_\_\_ County
- \_\_\_ City of \_\_\_\_\_ (if needed)
- \_\_\_ Railroad Crossing: For replacement RR bridges use existing Federal Railroad Administration No. (FRA). For new bridges FRA will be assigned later. The Iowa Crossing Number is no longer being used.
- \_\_\_ Bridge Maintenance Number – Show if known
- \_\_\_ FHWA No.: New number shall be provided and shown
- \_\_\_ Latitude/Longitude (6 decimal) at station of bridge at center of bridge (e.g. "12.345678/-12.345678")

### Traffic Estimate

- \_\_\_ Traffic Data as shown in Road Plans – see CADD cell

### Vertical Profile Data

- \_\_\_ Vertical curve data – include sta/elev of g1/g2 end points

### Horizontal Profile Data

- \_\_\_ Horizontal curve data

### Vertical Clearance Table

- \_\_\_ Include station/offsets/elevation (overhead/underpass), deck thickness, haunch, beam depth, vertical clearance. Submit data if on super elevation. If needed, provide separate Staging Vertical Clearance Table.

### Utilities List Block

- \_\_\_ Utilities - add legend table and label each for all utilities shown on plan sheet

### Recoverable Berm Location Table

- \_\_\_ Recoverable berm location table - show if necessary

### Berm Slope Location Table

- \_\_\_ Berm slope location table

### Hydrology & Hydraulic Data

- \_\_\_ Hydraulic data table – see data cell for appropriate application
- \_\_\_ For drainage areas greater than 10 sq.mi. a Riverine Infrastructure Database (RIDB) dataset is to be developed. The preliminary reviewer is to verify the stream ID and river mile. [BDM 3.2.2.8]

### Berm Slope Armoring

- \_\_\_ For stream projects, provide typical section showing embedded vs. non-embedded grading surface (e.g. "2'-0 Class E Revetment (Embedded)"). Show Revetment Quantities Table for bridge over waterway – see CADD cell for details. Show and label grading surface (e.g. "Grading Surface")

### Ground Control Grading

- \_\_\_ Provide coordinates and elevations if applicable

### Signature Block

- \_\_\_ Consultant PE signature for Hydrology & Hydraulics – bridge over water/new RCB (does not include extensions)

### Staging

- \_\_\_ Staging sequence details if required

### Railroad Bridges

- \_\_\_ Show macadam stone slope protection
- \_\_\_ Minimum horizontal clearance dimension to pier

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- \_\_\_ For RR overpass provide heavy construction pier if center track to face column is less than 25'
- \_\_\_ Show fence if required
- \_\_\_ Add note stating fence type (curved - sidewalk/trail or straight – shoulder only)
- \_\_\_ UP/BNSF/CN/CP RR bridge - use 3'-8 barrier rail above RR ROW which may transition to 2'-10 outside of RR ROW when applicable,
- \_\_\_ UP/BNSF/CN/CP RR bridges - do not add fence on bridge barrier rail unless required
- \_\_\_ UP/BNSF/CN/CP RR bridge - include standard sheet 1067

## Temporary Bridges

- \_\_\_ If the bridge will be temporary, complete this checklist along with the Preliminary Design – Temporary Bridge checklist.

## General Notes

General Notes shown on the TS&L are to be incorporated into the General Notes of the final plan set. The final designer shall delete these notes from the final TS&L.

Example notes:

- \_\_\_ THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 240' X 26' CONTINUOUS I-BEAM BRIDGE, MONONA DESIGN NO. 1654, FHWA NO. 037080, MAINT. NO. 6727.6S175.
- \_\_\_ WORK UNDER THIS DESIGN SHALL INCLUDE REMOVAL OF REMNANTS OF MONONA DESIGN NO. 1530. INCLUDES REMOVAL OF SUBSTRUCTURE UNITS AND THE REMOVAL OF THE 42' X 20' I-BEAM APPROACH SPAN FROM THE DOWNSTREAM CHANNEL.
- \_\_\_ THE PROJECT WILL IMPACT UNITED STATES GEOLOGICAL SURVEY (USGS) STREAM GAGE 06607200, MAPLE RIVER AT MAPLETON IA. CONTACT THE USGS 30 DAYS PRIOR TO CONSTRUCTION THAT WILL IMPACT THE GAGE. USGS CONTACT: ?

## Design Notes

Design Notes shown on the TS&L are intended to inform the final bridge designer of design decisions and other requirements. The final designer shall delete these notes from the final TS&L. Example notes:

- \_\_\_ NON-STANDARD ABUTMENT WING WALL
- \_\_\_ STANDARD BRIDGE INDEX NO. ??? (E.G. J40, J44, H40, H44, ETC.)
- \_\_\_ TL-? BRIDGE RAILING PROPOSED
- \_\_\_ PIER TYPE – (FRAME, T, PILE BENT, DIAPHRAGM, ETC.) NOTE IF PILE BENT IS TO BE INDIVIDUALLY OR FULLY ENCASED.

FOR GRADE SEPARATION BRIDGES WITH WIDTH 30 FEET OR LESS, INCLUDE A NOTE STATING THAT THE PIER TYPE MAY BE CHANGED IN FINAL DESIGN

- \_\_\_ BEAM TYPE – (BTB, ETC.) (AASHTO A, B, ETC.) (WPG – INCLUDE DEPTH)
  - \_\_\_ PROVIDE VENT HOLE IN BEAM
  - \_\_\_ AS THIS PROJECT REQUIRES A SOVEREIGN LANDS PERMIT, BID ITEM REFERENCE NOTES SHALL RESTRICT BROKEN CONCRETE AS A SUBSTITUTE FOR REVETMENT. [BDM 3.2.7.3.5]
  - \_\_\_ BRIDGE AESTHETICS TO BE INCORPORATED DURING FINAL DESIGN
  - \_\_\_ AN IOWA DNR FLOOD PLAIN PERMIT IS REQUIRED. PRELIMINARY DESIGN WILL SUBMIT THE APPLICATION AND PLACE THE PERMIT IN THE PW REGULATORY\_PERMITS SUBDIRECTORY FOLDER UPON RECEIPT.
  - \_\_\_ AN IOWA DNR SOVEREIGN LANDS PERMIT IS REQUIRED
  - \_\_\_ BERM SLOPES TO BE CONFIRMED DURING FINAL DESIGN
  - \_\_\_ THE PROPOSED BRIDGE WILL BE CONSTRUCTED USING ACCELERATED BRIDGE CONSTRUCTION (ABC) METHODS. THE ?? METHOD HAS BEEN CHOSEN AS THE PREFERRED METHOD WITH A SELECTED CLOSURE DURATION OF ?? DAYS.
- REQUIREMENTS FOR A STATE WATER TRAIL OR PADDLING ROUTE ARE APPLICABLE. SIGNAGE, PLAN NOTES, AND BID ITEMS SHALL BE ADDRESSED BY THE DESIGN BUREAU AND INCLUDED IN THE ROAD PLANS.
- VEHICLE COLLISION FORCE [BDM 3.7.4] – USE APPROPRIATE NOTE: PIER #? IS LOCATED WITHIN THE ACCEPTABLE CLEAR ZONE OF ?? FEET.

- COLLISION REQUIREMENTS SHALL BE EVALUATED DURING FINAL DESIGN.
- THE PIER IS EXEMPT FROM COLLISION FORCE REQUIREMENTS DUE TO SITE CONDITIONS AS APPROVED BY THE BRIDGE PROJECT DEVELOPMENT ENGINEER. (EX. URBAN LOW SPEED BETWEEN TRAFFIC SIGNALS)
- THE PIER IS EXEMPT FROM COLLISION FORCE REQUIREMENTS DUE TO REDIRECTION OR ABSORPTION OF THE COLLISION LOAD (VERIFY DURING FINAL DESIGN).
- THE PIER SHALL BE DESIGNED FOR STRUCTURAL RESISTANCE TO VEHICULAR COLLISION FORCES (EX. DIRECTLY BEHIND A ROADWAY MEDIAN BARRIER THAT IS NOT STRUCTURALLY INDEPENDENT)

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## Plan Notes

Plan Notes should remain on the final TS&L. Example notes:

- \_\_\_ 2-SPAN GRADING SHOWN (SEE EW 203/204 - 5' OFFSET)
- \_\_\_ TOP OF BRIDGE DECK AT CENTERLINE ROADWAY IS '?' ABOVE (OR BELOW) THE PROFILE GRADE TO ACCOUNT FOR DECK CROSS SLOPE AND PARABOLIC CROWN
- \_\_\_ CLASS (B, E, ETC.) REVETMENT STONE IS (EMBEDDED OR NON-EMBEDDED)
- \_\_\_ THE BRIDGE WILL BE DESIGNED TO WITHSTAND THE APPLICABLE EFFECTS OF ICE AND THE HORIZONTAL STREAM LOADS AND UPLIFT FORCES ASSOCIATED WITH THE Q100 [BDM 3.2.2.4]

## Miscellaneous

- \_\_\_ North arrow
- \_\_\_ Scale bar
- \_\_\_ Bench Mark – Use coordinates/description per plan set
- \_\_\_ Border: "County", "Project No.", Sht. No. x of x"
- \_\_\_ Situation Plan Sheets – See Guideline details for Situation, Site and Misc. Plan. For dual bridges, Site and Misc. Plan for each bridge to reflect unique information, notes and leveling.
- \_\_\_ Show bridge cross section – fully dimension, show lanes, shoulders, deck cross slopes and rails.
- \_\_\_ Bridge deck cross slopes to match through lane cross slopes. Shoulder slope to match adjacent lane slope.
- \_\_\_ Zone of Intrusion – verify dimensions/details when this situation applies

## PLAN VIEW

- \_\_\_ Bridge Dimensions
  - o Show 'Face to Face of Paving Notches' dimension
  - o Show 'Centerline to Centerline Abutment Bearings' dimension
  - o Show 'Span #' and each span dimension
  - o Show proposed stations along centerline of approach roadway or baseline approach roadway at piers/abutments
- \_\_\_ Dimensions adjusted for horizontal and grade length within spans differing greater than 1/2 inch for PPCB bridges.
  - o Horizontal length stationing is measured from centerline to centerline abutment bearings and centerline to centerline spans. Label 'Horizontal Dimensions'.

- o Grade length is measured for individual spans and bridge length along the grade from centerline to centerline abutment bearings and face to face paving notch (normal to grade). Label 'Along Grade Dimensions'. [LRFD BDM 1.7.2 and Figures]
- \_\_\_ Show face of paving notch (where approach pvmnt adjoins bridge) as color number 15 in CAD Structures Model
- \_\_\_ Roadway designation(s)
- \_\_\_ Typical Approach Roadway Section - dimension lane/shoulder widths and show cross slopes
- \_\_\_ Trail/Sidewalk on Bridge Deck:
  - o To control water runoff on the bridge, verify whether a raised grade or on-grade trail/sidewalk is required based on an urban vs rural approach section and roadway vs stream crossing.
  - o Show clear opening dimension on bridge and insure that rail attached to barrier does not encroach on required width
  - o Typically show 1'-0 wide separation barrier across bridge, with additional 4 inches for back mounted bicycle railing.
  - o Show appropriate parapet/fencing
- \_\_\_ Berm slope armoring - Show station/offset limits
- \_\_\_ POT stationing of mainline roadway construction centerline and side-road intersection
- \_\_\_ Skew angle – show actual in plan view and design skew in Title Block to nearest degree
- \_\_\_ Minimum vertical clearance location
- \_\_\_ Minimum horizontal clearance dimension to pier
- \_\_\_ Show assumed pier width (roadway vs grade separation)
- \_\_\_ Label guardrail – "Guardrail"
- \_\_\_ Arrows for direction of traffic
- \_\_\_ Dimension variable width bridges at abutments
- \_\_\_ Bridge abutment wing wall dimension shown if non-standard length used
- \_\_\_ Structures with no side piers – dimension berm toe offset
- \_\_\_ Ground elevations preferred for bridges, label contours if used
- \_\_\_ Existing utilities (fence-lines, tiles); label - fiber optic/gas line/etc.
- \_\_\_ Existing structures (bridge, culverts); label - type/size/station and design number
- \_\_\_ Other proposed structures (bridge, culverts) shown on TSL sheets; label - type/size/station and design number
  - o If structure not part of project (paren) or a tied project, also add 'Not Part Of This Contract' (Use

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- this option for dual bridges, staged bridges unless let together or tied)
- If structure part of project (paren) or a tied project with different design number, also add 'See Design ????'
- Dimension side road lane and shoulder widths
- Show proposed roadway embankment and ditch grading. Verify with Road Design.
- Show proposed berm and channel shaping
- Label all centerlines and profile grade lines
- Label stationing on at least two "tic" marks in the plan view
- Stream name and direction of flow
- Check text/dimensioning legible and not placed on top of other details

- Correct ProjectWise folder structure is being used.
- The B1\_Submittal folder contains the finalized pdf TS&L files.
- The finalized STR .dgn file resides in the BRPrelim root folder and marked as Final Status.
- The correct STR .dgn file naming convention is used.
- The correct model naming conventions are being followed.
- The proposed bridge is drawn accurately in the STR\_PRELIM\_DESIGNS model.
- The correct level and element symbology are being followed. Use brg levels with ByLevel symbology where possible.
- The PLANBASE and STR\_PRELIM models are being used as described in the Electronic Deliverables document.

## LONGITUDINAL SECTION

- Bottom of footing elevation
- Slope protection: label type, thickness
- Existing ground line and proposed grade line shown/labeled
- Existing structure – substructure, piling (from as-built plans)
- Berm slope labeled (2.5:1 max, Normal)
- Show Proposed and Staging (if needed) Vertical Clearance – show actual locations and dimensions
- Top of berm elevation at abutments
- Stream bed elevation
- Q 'Design' water surface elevation as per H&H Data information
- Abutment/pier deck elevations along the centerline of approach roadway
- Regulatory and Operational Low Beam – see definitions. CADD - Point to elevation locations and label 'Regulatory Low Beam' and 'Operational Low Beam' but do not include elevation.
- Prebore Holes - Integral Abutments: show prebore holes 10'-0 deep from bottom of footing and 1'-4 diameter along centerline of abutment footing for bridge lengths greater than 130 feet. Dimension diameter and bottom of prebore hole elevation. Stub Abutments: not required.

## CADD Checklist

Refer to: [Preliminary Bridge - Electronic Deliverables](#)

- Verify Iowa Regional Coordinate System is correct for the project site.