

PRELIMINARY DESIGN CHECKLIST - BRIDGE

Date: 8-1-2020

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

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
- ___ For RR overpass provide heavy construction pier if center track to face column is less than 25'
- ___ Show fence if required

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- ___ Add note stating fence type (curved - sidewalk/trail or straight – shoulder only)
- ___ UP/BNSF RR bridge - use 3'-8 barrier rail above RR ROW which may transition to 2'-10 outside of RR ROW when applicable.
- ~~___ UP/BNSF RR bridge – assume 10:1 transition for barrier rail, as taller rail is required~~
- ___ UP/BNSF RR bridges - do not add fence on bridge barrier rail unless required
- ___ UP/BNSF RR bridge - include standard sheet 1067

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. ???
- ___ TL-? Bridge Railing Proposed
- ___ Pier Type – (Frame, T, Pile Bent, Diaphragm, etc.)
Note if pile bent is to be individually or fully encased.
- ___ 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 Construction Permit is required
- ___ 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.

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
- ___ Collision Force Design – use applicable note for road over road condition
 - o Pier(s) designed for vehicular collision force
 - o Pier(s) exempt from vehicular collision force design
- ___ 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

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- 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.
- Horizontal length stationing is measured from centerline to centerline abutment bearings and centerline to centerline spans. Label 'Horizontal Dimensions'.
- 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 pvtm 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:
 - 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.
 - Show clear opening dimension on bridge and insure that rail attached to barrier does not encroach on required width
 - Typically show 10" wide separation barrier across bridge
 - 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
 - If structure not part of project (paren) or a tied project, also add 'Not Part Of This Contract' (Use 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

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

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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.
- ___ 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.