

Bridge Design Checklist

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❖ **PROJECT INFORMATION**

- ♦ Project Name: _____
- ♦ Bridge Name: _____
- ♦ Highway No.: _____
- ♦ Milepoint: _____

- ♦ Designer: _____
- ♦ Checker: _____
- ♦ Drafter: _____
- ♦ Reviewer: _____

• NOTE: Each Task, when applicable & completed, is Checked (Y, N, N/A), Dated and Initialed by the Designer, Checker and Reviewer.

TS&L Tasks	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
Preliminary Data Collection									
• <i>Project Prospectus</i>									
• <i>Vicinity Map or Data</i>									
• <i>Foundation Report</i>									
• <i>Hydraulic Report</i>									
• <i>Grades & Alignments</i>									
• <i>Location Narrative</i>									
Plan & Elevation Drawing(s)									
• <i>Alignment Data</i>									
• <i>Roadway Width</i>									
• <i>Intersection Stations & Angles</i>									
• <i>Span Lengths & Numbers</i>									
• <i>Angles between Bents & Centerline</i>									
• <i>Existing Structures</i>									
• <i>Right-of-Way lines</i>									
• <i>Detours / Traffic Staging</i>									
• <i>Demolitions</i>									
• <i>Utilities</i>									
• <i>North Arrow</i>									
• <i>Location map (w/North Arrow, Project Location Arrow and Nearest Town)</i>									
• <i>Live Load Loading (Sketch and note)</i>									
• <i>Type of bridge Rail</i>									
• <i>Expansion & Fixed joints</i>									
• <i>Elevation Datum</i>									
• <i>Existing Ground Line</i>									
• <i>High Water, O.H.W., Scour Elevations</i>									
• <i>Proposed Ground Line</i>									
• <i>End Slope & Protection</i>									
• <i>Hydraulic Data</i>									
• <i>Grade Lines</i>									
• <i>Typical Bent Section</i>									
• <i>Roadway Clearances</i>									
• <i>Railroad final and Construction Clearance</i>									
• <i>Guardrail Transitions</i>									
• <i>Footing Elevations & Pile Types</i>									
• <i>Datum Elevation</i>									

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TS&L Tasks - Continued	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
TS&L Estimate									
<ul style="list-style-type: none"> • <i>Title Block w/MP location, bridge number</i> • <i>Based on rough calcs per square foot</i> • <i>Account for tall abutments using projected quantities</i> 									
TS&L Narrative Report									
<ul style="list-style-type: none"> • <i>General Background:</i> <ul style="list-style-type: none"> ○ Project Development & justification ○ Right-of- way restrictions ○ Permits and restrictions ○ Utility conflicts or restrictions ○ Railroad Clearances & Restrictions • <i>Geometry and Lay-out:</i> <ul style="list-style-type: none"> ○ Roadway Width, ADT, Grades & Alignment (exception for AASHTO as necessary) ○ Sidewalks, bridge rails & protective screening • <i>Hydraulics:</i> <ul style="list-style-type: none"> ○ Waterway openings, High water & Scour elevations, and Clearances ○ Embankment or bent protection ○ Floodway information, when appropriate • <i>Foundations:</i> <ul style="list-style-type: none"> ○ Piling, drilled shafts, spread footings ○ Fills, surcharges ○ Settlement ○ Lateral Earth, Seismic loads ○ Liquefaction Potential • <i>Structure Features (discussion items):</i> <ul style="list-style-type: none"> ○ Span length & span arrangements ○ Type of superstructure ○ Type of bents & location ○ Alternate structure types considered and estimated costs ○ Stage construction & detour requirements. • <i>Design Concepts (decision/assumptions):</i> <ul style="list-style-type: none"> ○ Building a new bridge vs. widening existing one ○ Use a bridge vs. culvert ○ Foundation support assumptions ○ Assumed pile or drilled shaft bearing capacity loads 									

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TS&L Narrative Report - Continued									
○ Assumed lateral soil pressure against end bent									
○ Seismic load assumptions									
• <i>Biological Assessment</i> Considerations (applies to many bridge replacements):									
○ Project timing and chronology									
○ In-Water Work Period									
○ Bird Nesting									
○ Bat Habitat									
○ Alignment and size of the new bridge in relation to the existing (i.e., no. of spans, length)									
○ Quantity of impervious bridge surface, existing vs. new									
○ Type of new deck and construction methods									
○ Type of new bridge railing and construction methods									
○ Proposed treatment of the runoff									
○ Number & sizes of bents/footings added for new bridge w/in OHWM and the wetted channel. Discuss construction of new footings, bents & piles.									
○ Type of isolation methods used during construction (i.e., coffer dam)									
○ If a detour bridge, working bridge or Falsework are required, discuss how many bents & types of temporary supports that may be within the OHWM and wetted channel. Discuss the construction & removal methods that might be used.									
○ Extent and duration of in-water work (i.e., heavy machinery in wetted channel)									
○ Amount or extend of fill or rip-rap									

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FINAL DESIGN Tasks	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
Plans									
• <i>Plan & Elevation Drawings</i>									
○ Footing Plan shown									
○ Alignment & Bearing shown									
○ Skew angles shown									
○ Bent Fixity (free, exp., hinge, etc.) shown									
○ Slope Paving shown									
○ Footing Elevations									
○ Pile Bearing or min. Tip Elevation shown									
○ Drainage provided for									
○ Military Loading noted and shown									
○ Stationing shown									
○ Clearances shown									
♦ Railroad									
♦ Navigation									
♦ Highway									
○ Minimum Construction Clearances shown									
○ Bridge Rail Ends shown									
○ Location Map shown									
○ Detour shown									
○ Existing Structure shown									
○ Utilities shown & located									
○ Grade Line Diagram shown									
○ Elevation Datum shown									
○ General Notes complete									
○ Accompanying Drawings shown correctly									
○ North Arrow shown									
○ Hydraulic Data, High Water & Scour Elevations shown									
○ Bridge ID Paddles Located									
• <i>Superstructure Details:</i>									
○ Deck Elevations – Shown									
○ Bearing Devices – Shown & Detailed									
○ No. of Bearing Devices – Given									
○ Expansion Allowances – Shown									
○ Camber Diagram – Shown									
○ Joints – Shown & Detailed									
○ Stage Construction – Detailed									
○ Pour Schedule – Shown									
○ Concrete Finish Sketch – Shown									
○ Skew Deck / Bot. Slab Transverse Bar Orientation - Shown or Noted									
• <i>Beam Details:</i>									
○ Beams Located & Dimensioned									
○ Beam Cross Sections – Shown									
○ Prestressed Beam Details – Shown									

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	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
Plans - Continued									
<ul style="list-style-type: none"> • Beam Details - Continued: <ul style="list-style-type: none"> ○ Interim Bars – Shown @ Top of Stem ○ Bar Extensions – Adequate ○ End Anchorages of Longitudinal Bars – Sufficient ○ Post-tensioning Details/Data – Included • Bent Details: <ul style="list-style-type: none"> ○ Column Steel - properly dim. w/splices ○ Neg. moment at X-Beam - Reinforced ○ Footing Elevations – Shown ○ Skew Angles – Shown ○ Utility Holes – Shown & Noted ○ Hinges – Shown & Detailed ○ Seismic Restraints – Shown & Noted ○ Guardrail Connections at end bents ○ Concrete finish - Shown 									
	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
Specifications									
<ul style="list-style-type: none"> • Prepare & assembly: <ul style="list-style-type: none"> ○ Specifications ○ Supplemental Specifications ○ Special Provisions <ul style="list-style-type: none"> ◆ Bid Let Item Names Check ◆ Bid Let Item Quantities Check ◆ Specials Verify & Review 									
	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
Estimates									
<ul style="list-style-type: none"> • Calculate quantities for all materials • Construction Time Estimate <ul style="list-style-type: none"> ○ Graph format ○ Critical stages shown • Cost for construction assistance 									
	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
Calculation Books - Design									
<ul style="list-style-type: none"> • Analysis & Design of bridge's structural components • Documentation of work with <ul style="list-style-type: none"> ○ Hand calculations ○ Computer output ○ Detailed notes 									

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DESIGN CHECKS	Y	N	N/A	Designer	DATE	Checker	DATE	Reviewer	DATE
Class I Check									
<ul style="list-style-type: none"> • <i>Class I Check is a comprehensive design review covering all aspects of the project. It'll be done primarily for:</i> <ul style="list-style-type: none"> ○ Major Complex Structures ○ Steel and post-tensioned bridges ○ Structures designed by an inexperienced Designer ○ Structures checked by an inexperienced Checker • <i>Checker's responsibilities:</i> <ul style="list-style-type: none"> ○ Review of location data and correspondence files ○ Review of construction time and seasonal requirements, permit applications, work-in-stream restrictions, and utility installations and conflicts ○ Review foundation and hydraulic requirements ○ Check of consistency of alignment and details with roadway plans ○ Thorough check of geometry, alignment, grades, clearances, and construction details ○ Verification of structure length, roadway width, structure type selection, aesthetic treatment, span arrangement, bent type and configuration, and bridge rail type ○ Complete independent structural analysis according to design specifications and current design practices ○ Make a quick long hand check of the most important structural elements before beginning a computer analysis of the design ○ Independent check of Final Estimate quantities & reconciliation of figures with Designer ○ ○ 									

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Class II Check									
<ul style="list-style-type: none"> • <i>Class II Check is a review of design concepts and construction details & does not necessarily include structural analysis. It will be done primarily for:</i> <ul style="list-style-type: none"> ○ Minor Bridges designed by an experienced designer • <i>Checker's Responsibilities:</i> <ul style="list-style-type: none"> ○ Review of correspondence, job files and design calculations ○ Confirmation that foundation and hydraulic requirements are met ○ Verification of geometry, alignment and structure type selection ○ Confirmation with Designer that structural critical elements have been analyzed during final design ○ Completeness of plans ○ Check of construction details and Final Estimate quantities ○ ○ 									