Guide to Bridge Standard Drawings

February 2025

Bridge Division

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About this Guide

Purpose & Audience

This document provides quick-reference information to guide bridge designers who are working for the Texas Department of Transportation (TxDOT) in the use of bridge standard drawings, which are posted on the TxDOT web site: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm.

Document History

This Document is subject to revision as new guidelines are documented and as conditions, experience, and research data warrant. Revisions are summarized in the following table, and text that has been added or changed since the previous version in green.

Publication Date	Summary of Changes
June 2003	Initial release: Published guidelines for use of standard drawings for prestressed concrete slab beams.
November 2003	Revision adding information on cast-in-place concrete slab span bridge standard drawings.
August 2004	Revision updating existing information and adding information on steel beam bridge standard drawings.
January 2005	Revision adding information on prestressed concrete I-beam bridge standard drawings.
October 2005	Revision adding information on concrete slab and girder (pan form) span bridge standard drawings.
January 2006	Revision adding information on prestressed concrete double-T beam bridge standard drawings.
March 2007	Revision adding information for prestressed concrete box beams standard drawings.
April 2008	Revision adding information on decked slab beams.
September 2010	Revision adding information regarding I-girder bridge standard drawings.
June 2011	Revision adding information regarding X-beam bridge standard drawings.
August 2011	Revision deleting information for double-T beams and retiring standard drawings of same effective August 2011. Revision amending the Standard Drawing Features of the Concrete Slab and Girder (Pan Form) Bridge Standard Drawings. Revision

	amending the Description of Component of the Prestressed Concrete Slab Beam Bridge Standard Drawings.
September 2013	Revision to add new miscellaneous standard drawings. Revision adding restrictions on use.
October 2015	Revision retiring, I-Beam Standard drawings effective November 2014. Revision to I-Girder standard drawings increasing slab depth from 8 in. to 8 ½ in. Revision to Box Beams Standard to include removal of BBSDO, SBBO, BBRAO, BBPT & removal of ACP (Asphaltic Concrete pavement).
March 2016	Revision adding information to accommodate T221P, T224 and SSPC standard drawings.
April 2017	Revision adding information to accommodate Prestressed, Precast Bent Cap Option for round columns standard drawing (PPBC-RC) standard drawing.
August 2017	Revision to I-Girder Standard to add PCP(O) and PCP(O)-FAB.
April 2019	Revision to add information to accommodate SD-EBR standard drawing. Revision to updated joint types by adding SEJ-B and SEJ-M and removing SEJ-A. Revision to move joint information to Guidance for Bridge Expansion Joints.
July 2021	Revision to remove references to ODSR and update CIP.
November 2021	Updated steel beam section. Removed referenced to BPBW. Added load ratings to TxGirders, slab beams, and steel beams.
April 2023	Added 34’ Roadway Width to TxGirders. Added reference to NBIS. Deleted reference to PCP(O) and PCP(O)-FAB
January 2025	Retired decked slab beams. Added references to foundation notes and precast alternate sheets.
February 2025	Retired pan forms.

Feedback

Any questions or comments on the content contained in this document can be directed to the Bridge Standards Engineer of the Bridge Division, Texas Department of Transportation.

Pretensioned Concrete I-Beam Bridge Standard Drawings

Note	▪ All standard drawings for I-Beams are retired effective November 2014.

Pretensioned Concrete I-Girder Bridge Standard Drawings

Advantages/ Usefulness	▪ Pretensioned concrete I-Girders are useful for bridges with skewed substructure, when substructure depth is not restricted, and where future widening is anticipated. ▪ Pretensioned concrete I-Girder bridges cost less than all other standard bridge types.
Standard Drawing Location	▪ IG prefixes ▪ Website: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#IGirders
Standard Drawing Features	▪ Designed for HL93 live load in accordance with *AASHTO LRFD Bridge Design Specifications.* ▪ Drawings accommodate: – Tx28, Tx34, Tx40, Tx46, Tx54, and Tx62 – 24-, 28-, 30-, 32-, 34-, 38-, 40-, and 44-ft. roadway widths – 0-, 15-, 30-, and 45-degree skew angles. – Span lengths of 40 ft. through 135 ft. in 5 ft. increments. Not all girder types accommodate all span lengths. – Abutment header slopes of 2:1 and 3:1. – Most standard rail types. ▪ Roadway surface is a cast-in-place concrete slab with 8 ½ -in. depth. ▪ Details are provided to construct 2 or 3 span units with slabs continuous over interior bents. Using units reduces the number of expansion joints. ▪ Drawings support these foundation options: – Drilled shafts (36-and 42-in) – Multi-pile footings – Prestressed concrete piling (18-,20-,24-in) – Steel H-piling (HP 14x117 and HP 18x135) ▪ Drawings provide details for drilled shafts and multi-pile footings only for interior bents for Tx62 girders. ▪ Eight standard drawings are provided to use with customized bridge plans.
Standard Drawings Needed for Bridge Details	▪ IGSD – Roadway specific Prestressed Concrete I-Girder standard drawing (Inventory and operating load ratings for Strength I and Service III limit states are provided on the standard) ▪ AIG – Girder, roadway and skew specific Abutment standard drawings ▪ BIG – Girder, roadway and skew specific Interior Bent standard drawing or;

(Continued) Standard Drawings Needed for Bridge Details	▪ BTIG for interior Trestle Bent standard drawings ▪ SIG – Girder, roadway and skew specific span standard drawing ▪ IGCS – Continuous Slab details standard drawing (only if using multi-span units with slab continuous over interior bents). ▪ IGD – Prestressed Concrete I-Girder Details standard drawing. ▪ IGEB – Elastomeric Bearing and Girder End Details standard drawing. ▪ IGMS – Miscellaneous Slab Details standard drawing ▪ IGTS – Thickened Slab End details standard drawing ▪ MEBR(C) – Minimum Erection and Bracing Requirements standard drawing
Additional Drawings Needed to Complete Bridge Details	▪ Bridge Layout ▪ Summary of Estimated Quantities (if not shown on Bridge Layout) ▪ Drawing with bearing seat elevations (Recommended, see "Special Considerations") ▪ Bridge railing detail drawings ▪ Expansion joint detail drawings, if not using Type A joints ▪ BAS-A or BAS-C – Bridge Approach Slab, if applicable ▪ BD-3 – Bridge Deck Drain Details, if applicable. Details for drainage pipe are not provided and must be developed. ▪ BL – Bridge Lighting Details standard drawing, if applicable ▪ BMCS – Bridge Mounted Clearance Sign standard drawing, if applicable ▪ CP – Prestressed Concrete Piling standard drawing, if concrete piling is used for foundations. ▪ CRR – Concrete Riprap and Shoulder Drain standard drawing, if applicable ▪ CSAB – Cement Stabilized Abutment Backfill standard drawing, if applicable ▪ FD - Common Foundation Details standard drawing ▪ FDN – Foundation Notes ▪ IGFRP – GFRP Slab Top Mat Reinforcement, if applicable ▪ IGSK – I-Girder Shear Key standard drawing, if applicable ▪ NBIS - NBI Bridge Identification Sign Standard ▪ PCA-SUP and PCA-SUB – Precast Superstructure and Substructure Alternates ▪ PBC-RC or PBC-P – Precast Bent Cap Option standard drawing. (RC) for round columns and (P) for piles ▪ PCP & PCP-FAB – Prestressed Concrete Panel standard drawings ▪ PMDF – Permanent Metal Deck Form standard drawing ▪ PPBC-RC – Prestressed, Precast Bent Cap Option for round columns standard drawing ▪ SD-EBR – Shoulder Drains at End of Bridge Rail, if applicable ▪ SRR – Stone Riprap, if applicable ▪ SSPC – Steel Sheet Piling Corner Details standard drawing, if applicable

Restrictions on Use of Standard Drawings	▪ Do not change girder type (for example, Tx28 to Tx40) within a bridge; transition bent details are not provided. ▪ Maximum allowed column height, allowed exposed pile height, and maximum allowed pile loads are listed on bent details. ▪ Do not use rail types T66, T80HT, T80SS, C412, C66, or T224. Their width or weight precludes their use on standard roadway width spans. ▪ Do not change skew angle within a bridge. ▪ Use issued substructure details only with issued span details. ▪ The maximum number of spans per unit is three, and the maximum unit length cannot exceed the limits shown on standard drawing IGCS. ▪ Some unit lengths are too great to use sealed or open armor joints and Type A joints. ▪ Do not use single-sided crash cushions (see Design Division standard drawing SSCC-16) with abutment wingwalls lengths less than 7 ft. ▪ Drawings do not accommodate raised sidewalks and medians or rails not on edge of slab. If adding a raised sidewalk, median or rail, check standard drawing for additional loading. **NOTE**: Some restrictions may be overcome by modifying the standard drawings with appropriate additional details and information. Denote modified details as MOD in the title block, and clearly indicate which details were modified in the standard drawing sheet. All modified standard drawings must be signed, sealed, and dated by a registered Professional Engineer.
Special Considerations **(Continued) Special**	▪ If girder slope exceeds 5%, standard drawing IGEB requires beveled steel sole plates be used at bearings. Sole plates add 1-inch to the section depth which will need to be accounted for in bearing seat elevation calculations. Modify abutment standard for the extra section depth accordingly, if applicable. ▪ If Prestressed Concrete Panel for Overhangs (PCP(O) and PCP(O)-FAB) standard details are used, the minimum haunch is 1” at mid span which will need to be accounted for in bearing seat elevation calculations. Modify abutment standard for the extra section depth accordingly, if applicable. ▪ As a check to the Contractor’s calculated elevations, provide bearing seat elevations in the plan if a roadway vertical curve is located on the structure (recommended). If an adjustment is made to the section depth (to accommodate a sag vertical curve), note the section depth adjustment used along with the bearing seat elevations. ▪ Spreadsheet STD-BRG.xls, available from the Bridge Standards

Considerations	website, is a tool to help calculate and generate bearing seat elevations. It also generates girder slopes, which can be provided with the bearing elevations to aid the bearing pad fabricator. ▪ If the presence of a roadway vertical curve forces a haunch depth greater than 3 ½ in. at any point on a girder, reinforce the haunch as instructed by standard drawing IGMS. If Prestressed Concrete Panels are used as a forming option, find this haunch reinforcement on standard drawing PCP. ▪ Do not use open bridge rails – such as T223, T552, etc. – when frequent use of de-icing agents is anticipated. If deck drainage is desired and de-icing agent use is predicted, use the drain details shown on standard IGMS. Locate the drain locations on the Bridge Layout (no closer than 4 ft. from centerline of the substructure caps.) ▪ On substructure standard drawings, dowel bars D are noted to be excluded at ends of units. Therefore, if continuous slab units are indicated on the bridge layout and standard drawing IGCS is included in the plans, do not use dowels at unit end (expansion joint locations). ▪ If using interior trestle bents (standard drawing prefix BTIG), note limitations on pile load and exposed pile heights when selecting a pile type and size. ▪ Quantities provided for reinforcing steel weight are not bid items. They are provided for Contractor's information only. ▪ Adjust bent concrete quantities as needed for column heights shown on the Bridge Layout. Adjust abutment concrete quantities if not using approach slabs. See substructure standard drawings for guidance. ▪ The Prestressed, Precast Bent Cap Option for round columns (PPBC-RC) standard drawing only provides pedestal details for non-skewed bents and pedestals up to 18 inches tall. Provide details for pedestals on skewed bents. In addition, if shear keys are required, provide shear key details considering strand location, column location, and shear key reinforcement.
Specific Bridge Layout Requirements	▪ Label all girder ends with a "D" except when using multi-span units. With units, do not label girder ends "D" at expansion joint locations. ▪ List unit lengths if not locating expansion joints at each bent. For continuous slabs, see details and notes on span standard drawings and standard IGCS; two- or three-span units are conditionally permitted. ▪ Verify that column or exposed pile heights do not exceed values listed on bent standard drawings. These maximum heights must be evaluated by the Engineer in areas of soft soil or where scour is anticipated.

(Continued) Specific Bridge Layout Requirements	▪ Indicate abutment wingwall foundations if required. See Abutment standard drawings for wingwall foundation requirements based on girder type and header slope. ▪ For information relating to expansion joints, see the Guide for Bridge Expansion Joints.

Pretensioned Concrete Slab Beam Bridge Standard Drawings

Advantages/ Usefulness	▪ Pretensioned concrete slab beams are useful for bridges needing shallow superstructures and fast construction. ▪ Pretensioned concrete slab beam bridges cost more than pretensioned concrete I-Girder bridges and cost less than pretensioned concrete box beam bridges. ▪ Construction is similar to pretensioned concrete box beam bridges. ▪ Slab beams do not have shear keys therefore must be topped with a cast-in-place concrete slab to ensure that beams act in unison.
Standard Drawing Location	▪ PSB prefixes. ▪ Web site: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#SlabBeams
Standard Drawing Features	▪ Designed for HL93 live load in accordance with *AASHTO LRFD Bridge Design Specifications*. ▪ Drawings accommodate – 24-, 28-, and 30-ft. roadway widths. – 0-, 15-, and 30-degree skew angles. – With SB12 beams, drawings accommodate span lengths of 25 ft. through 40 ft. in 5-ft. increments. Maximum superstructure depth with SB12 beams is 18.5 in., which accounts for beam camber and dead-load deflection. – With SB15 beams, drawings accommodate span lengths of 25 ft. through 50 ft. in 5-ft. increments. Maximum superstructure depth with SB15 beams is 22 in., which accounts for beam camber and dead-load deflection. – Abutment header slopes of 2:1 and 3:1 – Most standard rail types ▪ Roadway surface is a cast-in-place concrete slab with a 5-in. minimum depth. ▪ Details are provided to construct 2 or 3 span units with slabs continuous over interior bents. Using units reduces the number of expansion joints. Drawings support these foundation options: – Drilled shafts (24-in) – Prestressed concrete piling (16- and 18-in.) – Steel H-piling (HP14x73 and HP14x117). ▪ Seven standard drawings are provided to use with customized bridge plans.

Standard Drawings Needed for Bridge Details	▪ APSB - Roadway and skew-specific Abutment standard drawing. Some skewed abutment standard drawings are foundation-specific (for example, drilled shafts and pilings). ▪ BPSB – Roadway and skew-specific Interior Bent Standard drawing ▪ SPSB – Roadway and skew-specific span standard drawing ▪ PSB – Appropriate Prestressed Concrete Slab Beam standard drawing ▪ PSBEB – Elastomeric Bearing standard drawing ▪ PSBRA – Rail Anchorage standard drawing ▪ PSBSD – Prestressed Concrete Slab Beam Standard Design standard drawing (Inventory and operating load ratings for Strength I and Service III limit states are provided on the standard)
Additional Drawings Needed to Complete Bridge Details	▪ Bridge Layout ▪ Summary of Estimated Quantities (if not shown on the Bridge Layout) ▪ Bridge railing detail drawings ▪ Expansion joint detail drawings, if not using Type A joints ▪ BAS-A or BAS-C – Bridge Approach Slab standard drawing, if applicable ▪ BMCS – Bridge Mounted Clearance Sign standard drawing, if applicable ▪ CP – Prestressed Concrete Piling standard drawing if concrete piling is the foundation type ▪ CRR – Concrete Riprap and Should Drains standard drawing, if applicable ▪ CSAB – Cement Stabilized Abutment Backfill standard drawing, if applicable ▪ FD – Common Foundation Details standard drawing ▪ FDN – Foundation Notes ▪ NBIS - NBI Bridge Identification Sign Standard ▪ PCA-SUP and PCA-SUB – Precast Superstructure and Substructure Alternates ▪ PBC-RC or PBC-P – Precast Bent Cap Option standard drawing. (RC) for round columns or (P) for piles ▪ PPBC-RC – Prestressed, Precast Bent Cap Option for round columns standard drawing ▪ SD-EBR – Shoulder Drains at End of Bridge Rail, if applicable ▪ SRR – Stone Riprap, if applicable ▪ SSPC – Steel Sheet Piling Corner Details standard drawing, if applicable
Restrictions on Use of Standard Drawings	▪ Do not change roadway cross slope on bridges. Roadway vertical curves may not be used on bridges with skewed supports. These conditions are beyond the scope of these drawings and require calculations for determining top-of-cap elevations and bearing pad dimensions. Roadway vertical curves are allowed on bridges without skewed supports. ▪ Skew angle is limited to 30 degrees.

(Continued) Restriction on Use of Standard Drawings	▪ Do not change beam type (such as SB12 to SB15) within a bridge; transition bent details are not provided. ▪ Maximum allowed column height, allowed exposed pile heights, and maximum allowed pile loads are listed on bent details. ▪ Do not use a rail type that is not listed on the PSBRA standard drawing. ▪ Rail anchorage details for rails not located at bridge edges are not provided. ▪ T411 and C411 rail types may not be used with supports skewed 30 degrees. The end post (adjacent to the abutment) may be too narrow. ▪ Do not use multi-pile footings shown on standard drawing FD. ▪ Do not use standard drawing BL ▪ Do not change skew angle within a bridge. ▪ Use issued substructure details only with issued span details. ▪ The maximum number of spans per unit is three. ▪ Bearing pads shown on standard drawing PSBEB are restricted to one-, two-, and three-span units with 25-ft. minimum, 50-ft. maximum span lengths. ▪ Do not use single-sided crash cushions (see Design Division standard drawing SSCC-03A) with abutment wingwall lengths less than 7 ft. ▪ Do not use rail types T66, T80HT, T80SS, C412, C66, T221P, or T224. Their width or weight precludes their use on standard roadway spans. ▪ Drawings do not accommodate raised sidewalks and medians or rails not on edge of slab. If adding a raised sidewalk, median or rail, check standard drawing for additional loading. **NOTE:** Some restrictions may be overcome by modifying the standard drawings with appropriate additional details and information. Denote modified details as MOD in the title block, and clearly indicate which details were modified in the standard drawing sheet. All modified standard drawings must be signed, sealed, and dated by a registered Professional Engineer.
Special Considerations	▪ If a roadway vertical curve is used, adjust section depths listed on span details as noted on non-skewed span standard drawings. Section depth adjustment does not justify standard drawing modification. ▪ Beveling bearing pads to match beam slope will result in non-parallel pad and beam surfaces for skewed bridges. Bearing pads beveled in both directions are necessary to provide parallel pad and beam surfaces with skewed bridges. However, fabrication of such pads is impractical. Given the small area of the pads and the nearly parallel surfaces, pads beveled to match beam slope should accommodate small mismatches. ▪ Bearing seats are not used on slab beam bridges; the pads sit directly on the top of the bent cap. Top of cap elevations must be provided at the points coinciding with the outer edge of exterior beams at centerline of bearing and at all intermediate points where a change in cap slope occurs.

(Continued) Special Considerations	▪ Spreadsheet STD-BRG.xls, available from the Bridge Standards website, is a tool to help calculate and generate top of cap elevations and bearing pad tapers. ▪ Quantities provided for reinforcing steel weight are not bid items. They are provided for Contractor's information only. ▪ Adjust bent concrete quantities as needed for column heights shown on the Bridge Layout. Adjust abutment concrete quantities if not using approach slabs. See substructure standard drawings for guidance. ▪ Earwalls are incorporated into abutments and interior bents for lateral restraint of the superstructure: exterior beams bear against the earwalls with a ½-inch layer of preformed bituminous fiber material between beam and earwall. It may be difficult to ensure that beams fit within the earwalls or bear against them due to fabrication and construction tolerances and lateral translation of beams on neoprene bearings resulting from roadway cross-slope. Therefore, substructure details provide a permissible construction joint so that earwalls can be cast after beams are set, using the beams as a form. If earwalls are cast prior to beam placement, their inside face must be cast perpendicular to the top of cap to ensure parallelism with beams. ▪ The Prestressed, Precast Bent Cap Option for round columns (PPBC-RC) standard drawing does not provide details for ear walls. See the bent details for earwall details. ▪ To limit negative effects of pad lateral deflection due to beam dead load, erect first the beams adjacent to crown point or at high side of single cross slope. ▪ Do not use Asphalt Concrete Pavement (ACP) topping for slab beams in lieu of a 5-inch concrete slab because of the discrete, open joints between beams. ▪ A 5-inch minimum depth concrete slab for the beams is required to provide adequate rail anchorage and expansion joint hardware. Foam backer rods may be placed between beams to act as a form for the slab. Backer rod diameter should be 125% of the joint opening. ▪ T631 and T631LS cast-in-place anchorage details provided on standard drawing PSBRA are based on the maximum "X" dimension (slab thickness at CL of bearing) listed on standard span drawings, 7 in. If slab thickness exceeds 7 in. at any point along the beam, modify length of anchor bolt accordingly. ▪ Beam ends located at expansion joints (other than Type A joints) must have a blockout to provide room for expansion joint anchors. See standard drawings with a PSB prefix for blockout details. ▪ Slab forms may not rest on tops of beams (see Detail A on span standard drawings). Sheet metal, for example, would act as a bond breaker and could result in reflective cracking. ▪ Do not use open bridge rails—such as T223, T552, etc.—when frequent use of de-icing agents is anticipated.

Specific Bridge Layout Requirements	▪ Indicate beam type (SB12 or SB15). ▪ List unit lengths if not locating expansion joints at each bent. For continuous slabs, see details and notes on span standard drawings; two- or three-span units are permitted. ▪ Verify that column or exposed pile heights do not exceed values listed on the bent standard drawings. These maximum heights must be evaluated by the Engineer in areas of soft soil or where scour is anticipated. ▪ For information relating to expansion joints, see the Guide for Bridge Expansion Joints. ▪ Provide information on the layout about pad arrangements other than those shown on the PSBEB standard drawing. ▪ Note roadway width as nominal in Plan View and Typical Section for 28- and 30-ft. roadway structures. Overall width in Plan View and Typical Section must be shown as actual overall width—for example, 32.125 ft. for 30-ft. roadway structures.

Pretensioned Concrete Decked Slab Beam Bridge Standard Drawings

Note	▪ All standard drawings for Decked Slab Beams are retired effective January 2025.

Pretensioned Concrete Box Beam Bridge Standard Drawings

Advantages/ Usefulness	▪ Pretensioned concrete box beams are useful for bridges requiring shallow superstructure and fast construction. ▪ Because pretensioned concrete box beams are adjacently placed, they cannot be used for bridges with horizontal curves or flares. ▪ Pretensioned concrete box beams are topped with 5-in. cast-in-place slab. ▪ Pretensioned concrete box beams are typically higher in cost than other beams because of the complexity of fabrication.
Standard Drawing Location	▪ BB prefixes. ▪ Web site: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#BoxBeams
Standard Drawing Features	▪ Designed for HL93 live load in accordance with *AASHTO LRFD Bridge Design Specifications.* ▪ Drawings Accommodate: – Four beam depths (20-, 28-, 34-, and 40-in.) each in two nominal widths (4-ft. and 5-ft.). The standard 24- and 30-ft. roadways use both 4- and 5-ft. wide beams. – 24-, 28-, and 30-ft. roadway widths – Span lengths of 30 ft. through 100 ft., in 5 ft. increments. Not all beam types accommodate all span lengths. – Abutment header slopes of 2:1 and 3:1 – Most standard rail types. ▪ Roadway surface is a cast-in-place concrete slab with a 5-in. minimum depth. ▪ Details are provided to construct 2 or 3 span units with slabs continuous over interior bents. Using units reduces the number of expansion joints. ▪ Drawings support these foundation options: – Drilled shafts (30-in) – Prestressed Concrete Piling (16-, 18-, 20-in.) – Steel H-piling (HP14x73, HP14x117, and HP18X135) ▪ Seven standard drawings are provided to use with customized bridge plans.
Standard Drawings Needed for	▪ BBSDS – Beam and roadway-specific Box Beam Standard Designs standard drawing

Bridge Details (Continued) Standard Drawings Needed for Bridge Details	▪ ABB – Roadway-specific Abutment standard drawings ▪ BBB – Roadway specific Interior Bent standard drawing ▪ SBBS – Beam and roadway-specific span standard drawings ▪ BB – Appropriate Box Beam details standard drawings ▪ BBEB – Elastomeric Bearing standard drawing ▪ BBRAS – Rail anchorage standard drawing
Additional Drawings Needed to Complete Bridge Details	▪ Bridge Layout ▪ Summary of Estimated Quantities (if not show on the Bridge Layout) ▪ Bridge railing details drawings ▪ Expansion joint detail drawings, if not using Type A joints ▪ BAS-A or BAS-C – Bridge Approach Slab standard drawings, if applicable ▪ BMCS – Bridge Mounted Clearance Sign Standard drawing, if applicable ▪ CP – Prestressed Concrete Piling standard drawing, if concrete pilling is used for foundations ▪ CRR – Concrete Riprap and Should Drains standard drawing, if applicable ▪ CSAB – Cement Stabilized Abutment Backfill standard drawing, if applicable ▪ FD – Common Foundation Details standard drawing ▪ FDN – Foundation Notes ▪ NBIS - NBI Bridge Identification Sign Standard ▪ PCA-SUP and PCA-SUB – Precast Superstructure and Substructure Alternates ▪ PBC-RC or PBC-P – Precast Bent Cap Option standard drawing. (RC) for round columns or (P) for piles ▪ PPBC-RC – Prestressed, Precast Bent Cap Option for round columns standard drawing ▪ SD-EBR – Shoulder Drains at End of Bridge Rail, if applicable ▪ SRR – Stone Riprap, if applicable ▪ SSPC – Steel Sheet Piling Corner Details standard drawing, if applicable
Restrictions on Use of Standard Drawings	▪ Use drawings only for bridges without skews. ▪ Do not change roadway cross slope on bridges. ▪ Use issued substructure details only with issued span details. ▪ Do not change beam depths within a bridge (for example, a 5B28 to a 5B34); transition bent details are not provided. ▪ Do not change skew angle within a bridge. ▪ Maximum allowed column height, allowed exposed pile heights, and maximum allowed pile loads are listed on bent details. ▪ Do not use a rail type that is not listed on the rail anchorage standard drawing, BBRAS.

(Continued) Restrictions on Use of Standard Drawings	▪ Rail anchorage details for rails not located at bridge edges are not provided. ▪ Do not use multi-pile footings shown on standard drawing FD. ▪ The maximum number of spans per unit is three. ▪ Some unit lengths are too great to use sealed or open armor joints and Type A joints. ▪ Drawings do not accommodate raised sidewalks and medians or rails not on edge of slab. If adding a raised sidewalk, median or rail, check standard drawing for additional loading. ▪ Do not use rail types T66, T80HT, T80SS, C412, C66, T221P, or T224. Their width or weight precludes their use on standard roadway width spans. ▪ Do not use single-sided crash cushions (see Design Division standard drawing SSCC-03A) with abutment wingwall lengths less than 7 ft. **NOTE**: Some restrictions may be overcome by modifying the standard drawings with appropriate additional details and information. Denote modified details as MOD in the title block, and clearly indicate which details were modified in the standard drawing sheet. All modified standard drawings must be signed, sealed, and dated by a registered Professional Engineer.
Special Considerations	▪ Quantities provided for reinforcing steel weight are not bid items. They are provided for Contractor's information only. ▪ If roadway vertical curve is used, adjust section depths listed on span details. Section depth adjustment does not justify standard drawing modification. ▪ Bearing seats are not used on box beam bridges; the pads sit directly on the top of the cap. Top of cap elevations must be provided at the points coinciding with the outer edge of exterior boxes at centerline of bearing and at all intermediate points where a change in cap slope occurs. ▪ Spreadsheet STD-BRG.xls, available from the Bridge Standards website, is a tool to help calculate and generate top of cap elevations and bearing pad tapers. ▪ Adjust bent concrete quantities as needed for column heights shown on the Bridge Layout. Adjust abutment concrete quantities if not using approach slabs. See substructure standard drawings for guidance. ▪ Earwalls are incorporated into abutments and interior bents for lateral restraint of the superstructure: exterior beams bear against the earwalls with a ½-inch layer of preformed bituminous fiber material between beam and earwall. It may be difficult to ensure that beams fit within the earwalls or bear against them due to fabrication and construction tolerances and lateral translation of beams on neoprene bearings resulting from roadway cross-slope. Therefore, substructure details require earwalls be cast after beams are set, using the beams as a form.

(Continued) Special Considerations	▪ The Prestessed, Precast Bent Cap Option for round columns (PPBC-RC) standard drawing does not provide details for ear walls. See the bent details for earwall details. ▪ To limit negative effects of pad lateral deflection due to beam dead load, erect first the beams adjacent to crown point or at high side of single cross slope. ▪ Beam ends located at expansion joints (other than Type A joints) must have a blockout to provide room for expansion joint anchors. See standard drawings with a BB prefix for blockout details. ▪ T631 and T631LS cast-in-place anchorage details provided on standard drawing BBRAS are based on the maximum "X" dimension (slab thickness at CL of bearing) of 10 in. If slab thickness exceeds 10 in. at any point along the beam, modify length of anchor bolt accordingly. ▪ Do not use open bridge rails—such as T223, T552, etc.—when frequent use of de-icing agents is anticipated.
Specific Bridge Layout Requirements	▪ List unit lengths if not locating expansion joints at each bent. See span details for limits on unit length. ▪ Verify that column or exposed pile heights do not exceed values listed on bent standard drawings. These maximum heights must be evaluated by the Engineer in areas of soft soil or where scour is anticipated. ▪ For information relating to expansion joints, see the Guide for Bridge Expansion Joints. ▪ Note roadway width as nominal in Plan view and Typical Section for 24-, 28-, and 30-ft. roadway structures. Overall width in Plan View and Typical Section must be shown as actual overall width – for example, 32.334 ft. for 30-ft. roadway structures.

Pretensioned Concrete Spread Box Beams (X-Beams) Bridge Standard Drawings

Advantages/ Usefulness	▪ Pretensioned concrete X-beams are useful for bridges requiring shallow superstructures and where future widening is anticipated. ▪ Pretensioned concrete X-beam bridges are predicted to cost more than pretensioned concrete I-Girder bridges but less than conventional pretensioned concrete box beam bridges. ▪ Construction is similar to pretensioned concrete I-Girder bridges.
Standard Drawing Location	▪ XB prefixes. ▪ Web site: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#XBeams
Standard Drawing Features	▪ Designed for HL93 live load in accordance with *AASHTO LRFD Bridge Design Specifications.* ▪ Drawings Accommodate: – Four beam depths (20-, 28-, 34-, and 40-in.), each in two nominal widths (4-ft. and 5-ft.). Only 5-ft. wide beams are used with the standard roadway widths. – 32-, 38-, 40-, and 44-ft. roadway widths – 0-, 15-, and 30-degree skew angles. – Span lengths of 40-ft. through 110-ft., in 5-ft. increments. Not all beam types accommodate all span lengths. – Abutment header slopes of 2:1 and 3:1. – Most standard rail types. ▪ Roadway surface is a cast-in-place concrete slab with 8-inch depth. ▪ Details are provided to construct 2- or 3-span units with slabs continuous over interior bents. Using units reduces the number of expansion joints. ▪ Drawings support these foundation options: – Drilled shafts (36-in) – Multi-pile footings – Prestressed concrete piling (16-, 18-, 20-,24-in) – Steel H-piling (14x73, 14x117, 18x135) ▪ Nine standard drawings are provided to use with customized bridge plans.
Standard Drawings Needed for Bridge Details	▪ XBSD – Roadway-specific Prestressed Concrete X-Beam Standard Design standard drawing

(Continued) Standard Drawings Needed for Bridge Details	▪ AXB – Roadway and skew-specific Abutment standard drawing ▪ BXB or BTXB – Roadway and skew-specific Interior Bent standard drawing or for Interior Trestle Bents ▪ SXB – Roadway and skew-specific span standard drawing ▪ XB - Appropriate X Beam details standard drawings ▪ XBBR-MS – Minimum Erection Bracing Requirements with Miscellaneous Slab Details standard drawing ▪ XBCS – X-Beam Continuous Slab Details standard drawing. (Only if using multi-span unit with slab continuous over interior bents) ▪ XBEB – X-Beam Elastomeric Bearing Details standard drawing ▪ XBTS – X-Beam Thickened Slab End Details standard drawing
Additional Drawings Needed to Complete Bridge Details	▪ Bridge Layout ▪ Summary of Estimated Quantities (if not shown on Bridge layout) ▪ Drawing with bearing seat elevations. (Recommended, see "Special Considerations") ▪ Expansion joint detail drawings ▪ Bridge railing detail drawings ▪ BAS-A or BAS-C – Bridge Approach Slab Standard drawing, if applicable ▪ BMCS – Bridge Mounted Clearance Sign standard drawing, if applicable ▪ BL – Bridge Lighting standard drawing, if applicable ▪ CP – Prestressed Concrete Piling standard, if concrete piling is used for foundations ▪ CRR – Concrete Riprap and Shoulder Drain standard drawing, if applicable ▪ CSAB – Cement Stabilized Abutment Backfill standard drawing, if applicable ▪ FD – Common Foundation Details standard drawing ▪ FDN – Foundation Notes ▪ NBIS - NBI Bridge Identification Sign Standard ▪ PCA-SUP and PCA-SUB – Precast Superstructure and Substructure Alternates ▪ PBC-RC or PBC-P – Precast Bent Cap Option standard drawing. Use (RC) for round columns and (P) for piles ▪ PCP and PCP-FAB – Prestressed Concrete Panel standard drawings ▪ PMDF – Permanent Metal Deck Form standard drawing ▪ PPBC-RC – Prestressed, Precast Bent Cap Option for round columns standard drawing ▪ SD-EBR – Shoulder Drains at End of Bridge Rail, if applicable ▪ SRR – Stone Riprap, if applicable ▪ XBSK - X-Beam Shear Key standard drawing, if applicable ▪ SSPC – Steel Sheet Piling Corner Details standard drawing, if applicable

Restrictions on Use of Standard Drawings	▪ Do not change roadway cross slope on bridges. Roadway vertical curves may not be used on bridges with skewed supports. These conditions are beyond the scope of these drawings and require calculations for determining top-of-cap elevations and bearing pad dimensions. Roadway vertical curves are allowed on bridges without skewed supports. ▪ Skew angle is limited to 30 degrees. ▪ Do not change beam type (for example, Type 5XB20 to 5XB34) within a bridge; transition bent details are not provided. ▪ Maximum allowed column height, allowed exposed pile heights, and maximum allowed pile loads are listed on bent details. ▪ Do not use rail types T66, T80HT, T80SS, C412, C66, or T224. Their width or weight precludes their use on standard roadway width spans. ▪ Use issued substructure details only with issued span details. ▪ The maximum number of spans per unit is three. The maximum unit length cannot exceed the limits shown on standard drawing XBCS. ▪ Some unit lengths are too great to use sealed or open armor joints and Type A joints. ▪ Do not change skew angle within a bridge. ▪ Do not use single-sided crash cushions (see Design Division standard drawing SSCC-03A) with abutment wingwall lengths less than 7 ft. ▪ Drawings do not accommodate raised sidewalks and medians or rails not on edge of slab. If adding a raised sidewalk, median or rail, check standard drawing for additional loading. **Note:** Some restrictions may be overcome by modifying the standard drawings with appropriate additional details and information. Denote modified details as MOD in the title block, and clearly indicate which details were modified in the standard drawing sheet. All modified standard drawings must be signed, sealed, and dated by a registered Professional Engineer.
Special Considerations	▪ Provide bearing seat elevations in the plans. The bearing seats are sloped with the roadway cross-slope along the bent, not level, and two elevations—left side and right side—need to be provided for each bearing seat. If an adjustment is made to the section depth (to accommodate a sag vertical curve, for example), it is recommended to note the section depth adjustment used along with the bearing seat elevations. ▪ Spreadsheet STD-BRG.xls, available from the Bridge Standards website, is a tool to help calculate and generate bearing seat elevations and bearing pad tapers. ▪ If the presence of a roadway vertical curve forces a haunch depth greater than 3.5-in at any point on a beam, standard drawing XBBR-MS instructs the contractor to reinforce the haunch. If prestressed concrete panels are used as a forming option, this haunch reinforcement is shown on standard drawing PCP.

(Continued) Special Considerations	▪ Do not use open bridge rails--such as T223, T552, etc.—when frequent use of de-icing agents is anticipated. If deck drainage is desired and de-icing agent use is predicted, use the drain details shown on standard drawing XBBR-MS. Locate the drain locations on the Bridge Layout (no closer than 4 ft. from centerline of substructure caps). ▪ Adjust bent concrete quantities as needed for column heights shown on the Bridge Layout. Adjust abutment concrete quantities if not using approach slabs. See substructure standard drawings for guidance. ▪ On substructure standard drawings, dowel bars D are noted to be excluded at ends of units. Therefore, if continuous slab units are indicated on the Bridge Layout and standard drawing XBCS is included in the plans, do not use dowels at unit ends (expansion joint locations). ▪ Quantities provided for reinforcing steel weight and slab concrete volume are not bid items. They are provided for Contractor's information only. ▪ The Prestressed, Precast Bent Cap Option for round columns (PPBC-RC) standard drawing only provides pedestal details for non-skewed bents and pedestals up to 18 inches tall. Provide details for pedestals on skewed bents. In addition, if shear keys are required, provide shear key details considering strand location, column location, and shear key reinforcement.
Specific Bridge Layout Requirements	▪ Label all beam ends with a "D", except when using multi-span units. With units, do not label beam ends "D" at expansion joint locations. ▪ List unit lengths, if not locating expansion joints at each bent. For continuous slabs, see details and notes on span standard drawings and standard XBCS; two- or three-span units are conditionally permitted. ▪ Verify that column heights do not exceed values listed on bent standard drawings. These maximum heights must be evaluated by the Engineer in areas of soft soil or where scour is anticipated. ▪ Indicate abutment wingwall foundations, if required. See Abutment standard drawings for wingwall foundation requirements, based on beam type and header slope. ▪ For information relating to expansion joints, see the Guide for Bridge Expansion Joints.

Cast-in-Place Concrete Slab and Girder (Pan Form) Bridge Standard Drawings

Note	▪ All standard drawings for cast-in-place concrete slab and girder (pan form) bridge standard drawings are retired effective February 2025.
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Cast-in-Place Concrete Slab Span Bridge Standard Drawings

Advantages/ Usefulness	▪ Cast-in-place concrete slab span bridges have shallower superstructures than any other bridge for which TxDOT standard drawings exist. ▪ Cast-in-place concrete slab span bridges have short span lengths. ▪ Cast-in-place concrete slab span bridges have comparable cost to concrete slab and girder (pan form) bridges.
Standard Drawing Location	▪ CS prefixes. ▪ Web site: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#CAST-IN-PLACECONCRETESLABSPANS
Standard Drawing Features	▪ Designed for HL93 live load in accordance with *AASHTO LRFD Bridge Design Specifications.* ▪ Drawings accommodate – 24-, 28-, 30-, 38-, and 44-ft. roadway widths. – 0-, 15-, and 30-degree skew angles – Drawings provide a 14-in slab depth with a two-span (each 25ft) unit and with three-span (each 25 ft.) unit. – Drawings provide a 16-in.slab depth with a simple span (25ft) and with a three-span (25 ft., 30ft., and 25 ft.) unit. – Abutment header slopes of 2:1 and 3:1 – Most standard rail types. ▪ Drawings support these foundation options: – Drilled shafts (24-in) – Prestressed concrete piling (16-and 18-in.) – Steel H-piling (HP14x73 and HP14x117)
Standard Drawings Needed for Bridge Details	▪ ACS – Roadway and skew-specific Abutment standard drawing. Some skewed abutment standard drawings are foundation-specific (for example, for drilled shafts and pilings). ▪ BCS - Roadway and skew-specific Interior Bent standard drawing ▪ CS – Roadway and skew-specific Span or Unit standard drawing ▪ CS-MD – Miscellaneous Details for Cast-in-Place Concrete Slab Span standard drawing.
Additional Drawings Needed to Complete Bridge Details	▪ Bridge Layout ▪ Summary of Estimated Quantities (if not shown on the Bridge Layout) ▪ Bridge railing detail drawings ▪ BAS-A or BAS-C – Bridge Approach Slab standard drawing, if applicable

(Continued) Additional Drawings Needed to Complete Bridge Details	▪ CP - Prestressed Concrete Piling standard drawing if pilling is the foundation type ▪ CRR - Concrete Riprap and Shoulder Drains standard drawing, if applicable ▪ CSAB – Cement Stabilized Abutment Backfill standard drawing, if applicable ▪ FD – Common Foundation Details standard drawing ▪ FDN – Foundation Notes ▪ NBIS - NBI Bridge Identification Sign Standard ▪ PCA-SUB – Precast Substructure Alternates ▪ SD-EBR – Shoulder Drains at End of Bridge Rail, if applicable ▪ SRR – Stone Riprap, if applicable ▪ SSPC – Steel Sheet Piling Corner Details standard drawing, if applicable
Restrictions on Use of Standard Drawings	▪ Do not change slab depth (for example, 14-in. to 16 in) within bridges; transition bent details are not provided. ▪ Skew angle is limited to 30 degrees. ▪ Do not change skew angle within a bridge. ▪ Maximum allowed column height, allowed exposed pile heights, and maximum allowed pile loads are listed on bent details. ▪ Do not use rail types T66, T80HT, T80SS, C412, C66, or T224. Their width or weight precludes their use on standard roadway width spans. ▪ Do not use multi-pile footings shown on standard drawing FD. ▪ Use issued substructure standard drawings only with issued span standard drawings. ▪ Do not use open armor joints; no mechanism for draining silt and other debris from joints when substructure caps exists with armor joints or any other open joint. ▪ Do not use single-sided cushions (see Design Division standard drawing SSCC-03A) with abutment wingwall lengths less than 7 ft. ▪ Drawings do not accommodate raised sidewalks and medians or rails not on edge of slab. If adding a raised sidewalk, median or rail, check standard drawing for additional loading. **NOTE:** Some restrictions may be overcome by modifying the standard drawings with appropriate additional details and information. Denote modified details as MOD in the title block, and clearly indicate which details were modified in the standard drawing sheet. All modified standard drawings must be signed, sealed, and dated by a registered Professional Engineer.
Special Considerations	▪ Use 16-in. deep slab span details for only a one-span bridge or a bridge needing a 30-ft. span as part of a three-span (25-ft., 30-ft., and 25-ft.) unit. Otherwise, the drawings accommodate any number of spans greater than one with span details for a 14-in. deep slab.

(Continued) Special Considerations	▪ Adjust bent concrete quantities as needed for column heights shown on the Bridge Layout. Adjust abutment concrete quantities if not using approach slabs. See substructure standard drawings for guidance. ▪ Slab concrete is paid by the cubic yard of Class S Concrete (Slab). ▪ Actual span lengths for spans on supports skewed 30 degrees are 0.5 ft. longer than nominal span length. This allows the same length bar joist to support slab formwork regardless of skew. Bent stations and span lengths shown on bridge layouts should reflect actual span lengths. ▪ Spreadsheet STD-BRG.xls, available from the Bridge Standards website, is a tool to help calculate and generate top of cap elevations. ▪ Skewed substructure caps are deeper than non-skewed caps to accommodate shear keys formed into the tops of skewed caps. ▪ A bent with a Fixed (F) expansion condition may support two simple spans. Standard drawing CS-MD provides guidance and quantity adjustments for use of this condition. Only one of these spans may be anchored to the bent with Dowels Q (shown on this standard drawing and bent standard drawings) to prevent spalling of cap concrete. ▪ To prevent spalling of cap concrete due to span rotation, deflection, and expansion, 4-in. by 1/4-in. preformed bituminous fiber material is placed on the top corners of all substructure caps. See standard drawing CS-MD for details. ▪ Standard drawing CS-MD provides a detail allowing approach slabs to be cast to the top of abutment caps. ▪ Type A expansion joints are the only expansion joints supported for these standard drawings. The small thermal movements expected from cast-in-place slab construction do not justify the cost of using sealed expansion joints. ▪ Do not use open bridge rails—such as T223, T552, etc.—when frequent use of de-icing agents is anticipated
Specific Bridge Layout Requirements	▪ In the Elevation view, indicate fixity at each bent (E or F). Use standard drawing CS-MD for assistance. ▪ In the Plan view, indicate Type A expansion joint at each bent labelled E in the Elevation view. ▪ Verify that column or exposed pile heights do not exceed values listed on bent standard drawings. These maximum heights must be evaluated by the Engineer in areas of soft soil or where scour is anticipated.

Steel Beam Bridge Standard Drawings

Advantages/ Usefulness	▪ Steel beams are useful for bridges requiring shallow superstructures, bridges where future widening is anticipated, and bridges where crane weight, capacity, and location are issues. ▪ Steel beam bridges are cost comparable to pretensioned concrete box beam bridges. ▪ Construction is similar to pretensioned concrete I-Girder bridge construction.
Standard Drawing Location	▪ SB prefixes. ▪ Web site: http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#SteelBeams
Standard Drawing Features	▪ Designed for HL93 live load in accordance with *AASHTO LRFD Bridge Design Specifications.* ▪ Drawings accommodate – 24-, 28-, and 30-ft. roadway widths. – 0-, 15-, and 30-degree skew angles. – Eight rolled beam types (W18, W21, W24, W27, W30, W33, W36, and W40). – Optional plate girders for each rolled beam – Weathering and painted steel – Span lengths of 30 ft. through 120 ft., in 5 ft. increments. Not all beam types accommodate all span lengths. – Abutment header slopes of 2:1 and 3:1. – Most standard rail types. ▪ Roadway surface is a cast-in-place concrete slab with 8 ½ -in. depth. ▪ Details are provided to construct 2- or 3-span units with slabs continuous over interior bents. Using units reduces the number of expansion joints. ▪ Drawings support these foundation options: – Drilled shafts (30-in) – Prestressed concrete piling (16-, 18-, and 20-in.) – Steel H-piling (HP14x73, HP14x117, and HP18x135). – Pile bents are not available for all span and roadway combinations. ▪ Standard drawings are not provided for use with customized bridge plans.
Standard Drawings Needed for Bridge Details	▪ SBSD – Roadway specific Steel Beam Standard Design standard drawing (Inventory and operating load ratings for Strength I and Service II limit states are provided on the standard)

(Continued) Standard Drawings Needed for Bridge Details	▪ ASB – Roadway and skew-specific Abutment standard drawing ▪ BSB – Roadway and skew specific Interior Bent standard drawing ▪ SSB – Roadway and skew specific span standard drawing ▪ SBBR – Standard Erection and Bracing Requirements standard drawing ▪ SBCS –Continuous Slab details standard drawing (only if using multi-span units with slab continuous over interior bents) ▪ SBEB – Elastomeric Bearing standard drawing ▪ SBMD – Steel Beam Miscellaneous Details standard drawing ▪ SBMS – Steel Beam Miscellaneous Slab Details standard drawing ▪ SBTS – Steel Beam Thickened Slab End Details standard drawing
Additional Drawings Needed to Complete Bridge Details	▪ Bridge Layout ▪ Summary of Estimated Quantities (if not shown on Bridge Layout) ▪ Drawing with bearing seat elevations (Recommended, see “Special Considerations”) ▪ Bridge railing detail drawings ▪ Expansion joint detail drawings ▪ General notes that specify whether the steel is to be painted ▪ BAS-A or BAS-C – Bridge Approach Slab standard drawing, if applicable ▪ BL – Bridge Lightning standard drawing, if applicable ▪ BMCS – Bridge Mounted Clearance Sign standard drawing, if applicable ▪ CP –Prestressed Concrete Piling standard drawing ▪ CRR – Concrete Riprap and Shoulder Drain standard drawing, if applicable ▪ CSAB – Cement Stabilized Abutment Backfill standard drawing, if applicable ▪ FD – Common Foundation Details ▪ FDN – Foundation Notes ▪ PCA-SUB – Precast Substructure Alternates ▪ PBC-RC or PBC-P – Precast Bent Cap Option standard drawing. (RC) for round columns or (P) for piles ▪ PCP & PCP-FAB – Prestressed Concrete Panel standard drawings ▪ PMDF – Permanent Metal Deck Form standard drawing ▪ NBIS - NBI Bridge Identification Sign Standard ▪ SD-EBR – Shoulder Drains at End of Bridge Rail, if applicable ▪ SRR – Stone Riprap, if applicable ▪ SSPC – Steel Sheet Piling Corner Details standard drawing, if applicable
Restrictions on Use of Standard Drawings	▪ Do not change beam type (such as W18 to W21) within a bridge; transition bent details are not provided. ▪ Do not change skew angle within a bridge. ▪ Maximum allowed column height, allowed exposed pile heights, and maximum allowed pile loads are listed on bent details.

(Continued) Restrictions on Use of Standard Drawings	▪ Do not use rail types T66, T80HT, T80SS, C412, C66, or T224. Their width or weight precludes their use on standard roadway width spans. ▪ Do not use multi-pile footings shown on standard drawing FD. ▪ Use issued substructure details only with issued span details. ▪ The maximum number of spans per unit is three, and maximum unit length must not exceed three times the length of the shortest end span. For example, a two-span unit with span lengths of 30 ft. and 60 ft. is acceptable, but a two-span unit with span lengths of 50 ft. and 115 ft. is not. ▪ Do not use single-sided crash cushions (see Design Division standard drawing SSCC-03A) with abutment wingwall lengths less than 7 ft. ▪ Drawings do not accommodate raised sidewalks and medians or rails not on edge of slab. If adding a raised sidewalk, median or rail, check standard drawing for additional loading. **NOTE:** Some restrictions may be overcome by modifying the standard drawings with appropriate additional details and information. Denote modified details as MOD in the title block, and clearly indicate which details were modified in the standard drawing sheet. All modified standard drawings must be signed, sealed, and dated by a registered Professional Engineer.
Special Considerations	▪ When selecting a beam type for a bridge, find the bridge's maximum span length on the roadway-specific SBSD standard drawing, which lists beam types along with their weight per linear foot; for example, W18x130 is a W18 beam with a weight of 130 plf. In most cases, multiple beam types are available for a given span length. If vertical clearance or hydraulic demands are not an issue, prepare the layout with the lightest beam type instead of the beam with least section depth to minimize bridge cost. Consider the whole bridge when comparing steel weights. ▪ Specify unpainted weathering steel in the plan's general notes for the least cost structure. However, avoid weathering steel if any of the following conditions exist: low steel is less than 8 ft. above normal water elevation, open armor joints are used, frequent use of de-icing agents is anticipated, or staining of riprap at embankments would be objectionable. ▪ Do not use open bridge rails—such as T223 and T552—when frequent use of de-icing agents is anticipated. If deck drainage is desired and de-icing agents use is predicted, use the drain details shown on standard drawing SBMS. Locate these drains on the Bridge Layout (no closer than 4 ft. from centerline of substructure caps). ▪ Refer to the Table of Maximum Allowable Exposed Pile Heights and Pile Loads and the Table of Foundation Loads on the Interior Bents standard drawing when sizing piles for the Bridge Layout. Some roadway/span combinations cannot use pile bents.

(Continued) Special Considerations	▪ All beams and optional plate girders are specified to be cambered for total dead load deflection. Optional plate girders are specified to have additional camber for any crest roadway vertical curve. If a sag roadway vertical curve is located on the span, the top-of-slab to top-of-beam dimension at centerline of bearings may need adjustment. To accommodate a sag vertical curve, once beyond the thickened slab ends reduce the 2-in. haunch on top of the beam to 0.5 in. with prestressed panels and to 0.0 in. with permanent metal deck forms. ▪ Bearings for exterior beams have anchor bolts located on the fascia side of the beam for restraint of lateral and uplift forces. Each span has four anchor bolts. Anchor bolts use an epoxy anchorage system; they are not cast-in-place. It is acceptable to cut through substructure reinforcement when coring holes for the anchor bolts as structural demands on this reinforcement are limited at anchor bolt locations. ▪ A slab thickness tolerance of +1 in., –0 in. is specified. Dead load deflections for steel beams are more sensitive to fluctuation in slab thickness than for prestressed concrete beams. ▪ Quantities provided for reinforcing steel weight and slab concrete volume are not bid items. They are provided for Contractor's information only. ▪ Bearing seat elevations should be provided in the plans. Although not required, bearing seat elevations facilitate shop drawing review as beam slopes can be readily obtained from bearing seat elevations. If an adjustment is made to the section depth to accommodate a sag vertical curve, note the section depth adjustment along with the bearing seat elevations to prevent modification of the span standard drawings. ▪ Spreadsheet STD-BRG.xls, available from the Bridge Standards website, is a tool to help calculate and generate bearing seat elevations. It also generates girder slopes, which can be provided with the bearing seat elevations to aid the bearing pad fabricator. ▪ Adjust bent concrete quantities as needed for columns heights shown on the Bridge Layout. Adjust abutment concrete quantities if not using approach slabs. See substructure standard drawings for guidance.
Specific Bridge Layout Requirements	▪ Indicate beam type, for example, W18 or W21. Use only one beam type for a bridge. See "Special Considerations" for help in selecting a beam type. ▪ List unit lengths if not locating expansion joints at each bent. For continuous slabs, see details and notes on span standard drawings and standard SBCS; two- or three-span units are permitted. ▪ Indicate abutment wingwall foundations, if required. See Abutment standard drawings for wingwall foundation requirements, based on beam type and header slope. ▪ Verify that column or exposed pile heights do not exceed values listed on bent standard drawings. These maximum heights must be evaluated by the Engineer in areas of soft soil or where scour is anticipated.

(Continued) **Specific Bridge Layout Requirements**	▪ Open armor joints are not recommended. Do not place sealed armor joints more than 150 ft. apart for proper joint performance. ▪ For more information relating to expansion joints, see the Guide for Bridge Expansion Joints in the Bridge Design Guide.