




Bridge Design Details 3.1 August 2022

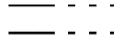
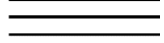

General Plan

The GENERAL PLAN sheet provides an overall description of the scope of work for a given structure. This sheet is subject to review and approval by others, so it is important to keep it neat and clear. It should be thoroughly checked prior to the Type Selection meeting and again before GENERAL PLAN distribution.

Plan

1. The PLAN view is placed on the lower-left side of the sheet.
2. The preferred scale is 1" = 20' (or 1" = 30' in some cases); avoid smaller scales as they result in a crowded sheet. For small structures it is acceptable to use 1" = 10'. For large structures, viaducts, or interchanges, use a GENERAL PLAN sheet with STRUCTURE PLAN sheet(s); for more information regarding Structure Plans refer to *Bridge Design Details: 3.4 Structure Plans*.
3. There should be a layout or reference line for each structure. The line should preferably be one of the following:
 - a) District alignment line
 - b) Inside or outside edge of traveled way line
 - c) Centerline of roadway, bridge, or construction layout line
4. The bridge should be drawn such that stationing runs left to right. Structures in a group, such as interchanges and retaining walls, should all be oriented in the same direction for uniformity. Consider District or other existing structures when orienting new alignments and structures.
5. Show the traveled way, shoulders, and median widths of the approach roadways.
6. Show the top and toe of approach fill or cuts; designate both lines with () line pattern.
7. Show perpendicular horizontal distances under the structure from the toe of slopes to all roadways and railroad alignments, including future alignments. Include distances to columns and abutments when adjacent to roadways or railroads.



8. Show the name and direction of creek, stream, or river flows. Designate Ordinary High-Water Mark (OHWM) or typical water edges with (— - - —) line pattern. Large rivers and oceans may be designated with a double line pattern () or graduated line weight pattern ().
9. Show North arrow.
10. Show all alignment data including bearings, radii, and curve data. Verify the alignment geometry shown matches the district ROADWAY PLANS and FOUNDATION PLAN provided by the Structure Design Preliminary Investigations Branch (PI).
11. Show the names and directions to nearest towns or cities. Towns or city names should match what is shown on the District Title Plan sheet and Bridge Site Submittal.
12. Show the centerline of all piers or bents. Designate with Line Code 7 (-----).
13. Show the skew angle at the center line of all supports.
14. Show all locations of Minimum Vertical Clearance within the traveled way using () symbol.
15. Identify the type and locations of deck drains, manholes, deck drainage, or future access to utilities from the deck.
16. Show the locations where painting of structure name, bridge number, year constructed, and support numbering as required; see *Bridge Design Details: 3.30 Structure Identification*.
17. Show Beginning of Bridge (BB) and End of Bridge (EB) stations and elevations.
18. Show guard railing at ends of bridge (typically MGS on new structures), temporary railings, approach curbs, and sidewalks.
19. Show bank protection and slope paving.
20. Show structure mounted signs.
21. Show approach slabs.
22. Show a structure surveying Benchmark (if no FOUNDATION PLAN or LOG OF TEST BORING sheet is provided).



Elevation

1. The ELEVATION view is a vertical projection from the lower side of the PLAN view.
2. Use the same scale as the PLAN view.
3. For widening projects between two structures, identify the location of the ELEVATION using letters on the PLAN view. When the opposite ELEVATION of a structure is materially different, both can be drawn on the GENERAL PLAN or on a STRUCTURE PLAN sheet(s). In these cases, identify both ELEVATIONS by different letters.
4. Use a DEVELOPED ELEVATION for curved structures. LONGITUDINAL SECTIONS may be used for culvert type structures. A MIRRORED ELEVATION shall be used for work to be done on the upper side of the PLAN view, such as retaining walls, widenings, or barrier rail replacements.
5. Show all supports. Use dashed Line Code 2 (-----) for portion of structure below grade. Label names and numbers (abutments, bents, and piers).
6. Show the Datum line with elevation and stations.
7. Show the original ground line at the bridge centerline, along the LONGITUDINAL SECTION, or as noted. The standard Line Code for showing the original ground line is Line Code 2 (-----); when two original ground lines are shown use Line Code 3 (-----) for the second line.
8. Show the total length of bridge (BB to EB). For structures and retaining walls on horizontal curves or that have multiple layout lines shown, identify length as:
Example: 100'-6" MEASURED ALONG "A" LINE
9. Show all span lengths (BB or EB to centerline of piers or bents and between centerline of piers or bents).
10. For retaining walls, label the beginning, end, and top of wall, as well as the original and finished grade at the face of wall or layout line.
11. Show the dimension(s) of all Minimum Vertical Clearance locations, rounded down to nearest 1-inch.
12. Show all the locations where the painting of structure name, bridge number, year constructed, and support numbering are required; see *Bridge Design Details*: 3.30 Structure Identification.



13. Show the controlling High-Water Elevation using (∇) symbol. Provide a reference note to the location of the “HYDROLOGIC SUMMARY TABLE” and reference the sheet in which it resides.
14. Show the bank protection or slope paving.
15. Show a portion of the retaining wall concrete surface texture and include a description in the notes.
16. Show all nearby structures and obstructions by referencing the structure name and bridge number of the adjoining structure.

Profile Grade

1. Place the PROFILE GRADE above the ELEVATION view.
2. Show the PROFILE GRADE with no scale; scale should be exaggerated both horizontally and vertically.
3. Do not show a PROFILE GRADE for widenings. Grades will conform to the existing structure.
4. Show slopes with direction arrow, elevations, stations, length of vertical curve, and rate of change (% / station) along the PROFILE GRADE.
5. Do not show the SUPERELEVATION DIAGRAM on the GENERAL PLAN sheet. If required, it is preferable to show this diagram on the DECK CONTOUR or INDEX TO PLANS sheet instead.

Typical Section


1. Place the TYPICAL SECTION in the upper right-hand portion of the sheet.
2. The preferred scale is from $\frac{1}{4}'' = 1'-0''$ to $1'' = 10'$. Try not to exceed $2\frac{1}{2}$ times the PLAN scale.
3. Take the section looking ahead on stationing. Identify with section letters and stationing limits if the section varies or the stationed layout lines are not continuous across the structure.
4. Show the section at a typical bent or pier for multi-span bridges. Do not show abutments. Use solid lines for portions of structures below grade.



5. Dimension the overall structure width, roadbed width, traveled way, shoulders, median, barriers, and sidewalks.
6. For retaining walls, show the original grade, finished grade, top of wall, and concrete texture.
7. Show the barrier, fence, and cable railing types.
8. Show the location of the PROFILE GRADE and layout line.
9. Show the superstructure depth from the top of the deck to the bottom of the girder or soffit. For precast or steel girders, show the typical structure depth at the centerline of bearing at the support.
10. Indicate the type of structure (e.g., Composite Welded Steel Girder, Concrete Slab, PC/PS Concrete Girder (Wide Flange), CIP/PS Concrete Box Girder, Concrete Girder (T-Beam), Retaining Wall (Type 1), etc.).
11. Show the overlay thickness or deck seal. Add a note stating that the structure depth shown does not include the overlay thickness.
12. Show crown or maximum cross slope as well as the cross-slope direction relative to the location of the PROFILE GRADE for a new structure. Show percent slope in fractions (e.g., 1½ %, not 1.50%). For varying cross slopes, show the slope as "MAX SLOPE AND VARIES".
13. For widenings, show cross slope with "± " and add note: "MATCH EXISTING GRADE AND CROSS SLOPE." Identify the location and limits of closure pour(s).
14. Show and label all existing, proposed, and future utility openings; see *Memo to Designers*: 18-2 Utilities and Openings for Future Utilities in Bridge.
15. Show the construction stages and identify the widths of stage construction and traffic during construction. For clarity, staging information can be placed on STAGE CONSTRUCTION sheet, leaving the TYPICAL SECTION on the GENERAL PLAN easier to read.
16. Show Temporary Railing (Type K) and offset from the layout line; see *Memo to Designers*: 9-3 Widening Existing Bridges, 14-19 Temporary Railing, and 21-19 Guidelines for Clearance to Construction Operations. Temporary Railings details and cost are normally covered by the District; therefore, add a reference to the ROADWAY PLANS.



Miscellaneous

1. Never use more than one GENERAL PLAN for a project with a single structure; instead, use STRUCTURE PLAN or STAGE CONSTRUCTION sheet(s) to show additional information at a larger scale. Maintenance or other projects with more than one structure, such as a large corridor retrofit projects, approach slab replacements, joint seal rehabs, or deck overlay work may combine structure details into one plan set. A summary GENERAL PLAN may be created that shows the location of each structure and general work to be done followed by BRIDGE DETAILS and MISCELLANEOUS DETAIL sheets.
2. Show all dimensions in feet and inches. Do not use decimals of a foot or inch.
3. Run spell check and ensure only proper abbreviations are used.
4. Do not use Standard Plan "bubbles" () on the GENERAL PLAN sheet.
5. Show important notations such as line types, symbols indicating electroliers, deck drains, or points of minimum vertical clearance in a LEGEND.
6. Give the location of the GENERAL NOTES, INDEX TO PLANS, STANDARD PLAN list and PILE DATA TABLE, if not shown on the GENERAL PLAN. For the GENERAL NOTES format and content, use standard detailing cell.
7. Leave a clear 6" x 6" space to list the QUANTITIES submitted by Structure Office Engineer Estimating Branch. If the QUANTITIES are not shown on the GENERAL PLAN sheet, note their location in plan set.
8. Avoid detailed descriptions of all the details shown on the GENERAL PLAN sheet. For retrofits, girder strengthening, joint seal replacement, approach slab, or other projects only reference the location of the work to be done. Place specific details on other sheets.
9. Place the completed "Falsework Requirements and Traffic Decal" on the GENERAL PLAN, which identifies all the traffic handling and falsework opening requirements for the structure. This decal is added prior to the Type Selection and General Plan Distribution milestones, however, should be removed before the P&Q milestone; see *Bridge Design Details* 3.5: Falsework Requirements.



10. Show existing bridges and other structures on the GENERAL PLAN; designate existing structures with Line Code 6 (— · · — · · —) line style in the LEGEND. For existing bridges or structures to be replaced on the same alignment, only show the existing structure in PLAN VIEW; do not show in ELEVATION or TYPICAL SECTION.
11. When removing an entire structure, do not hatch existing bridge removal limits on the GENERAL PLAN sheet. Large areas of cross hatching make details difficult to read. Hatching is acceptable when portions of a structure are being removed, or removal is done in stages; in this case identify limits and area(s) to be removed within LEGEND as "Bridge Removal (Portion)". A separate GENERAL PLAN (removal) is only required when existing bridge removal details cannot be determined from other plan sheets.
12. For widening or retrofit projects, show the dependent dimensions and standard verification note to Contractor; see *Bridge Design Details: 1.1.13 General Detailing*.