Bridge Design Details 1.1 January 2023

General Detailing

Structure Plans shall be detailed and arranged in such a manner that a contractor can quickly understand the scope of the work to be done, calculate quantities to estimate construction costs, and construct the project. Keep in mind that once a contract is awarded, the plans become an enforceable part of a contract from which a structure is built. Contractors and subcontractors have a very short timeline to prepare bids. A clear set of plans increases the probability of competitive and reasonable bids from contractors.

When detailing or reviewing plans:

- If DETAILS or SECTIONS are not shown on the sheet to which they pertain, a cross reference shall be noted on the plans. This note shall be placed on the appropriate sheet referring to the sheet where the SECTION is cut, or the DETAIL is located. SECTIONS and DETAILS shall always be referenced in both directions.
- Whole words are preferred over abbreviations. If abbreviations are used, make sure they are ones defined in the *Standard Plans* (A3A, A3B, A3C and B0-1), a collegiate dictionary, or are more familiar than the non-abbreviated version (e.g., PVC pipe).
- Dimensioning and detail call-outs should generally not appear in more than one place within a set of structure plans. Dimension duplication may create a problem if a dimension is changed on one detail and not on the other.
- Exact and proper names of all bid items shall be used throughout the plans. Refer to *Estimating Quantities* guide on the Structure Office Engineer website for further guidance.

Text Style and Size

Structure Plans shall use uppercase text for call-outs, dimensioning, and labeling. The use of uppercase text makes it easier to distinguish characters within the plans. For NOTES, a combination of upper and lowercase text shall be used since this is much easier to read than all uppercase text in sentence or paragraph form.

Sheet titles in the Title Blocks and Detail Titles shall be all uppercase text, except when using abbreviations in the cases that space is limited (e.g., St, Blvd, No., etc.).

For seldom used hand-drafted sheets, vertical single stroke Gothic or Reinhardt style text shall be used. Normal lettering height shall be $^{5}/_{32}$ inches minimum; text used for Title Block and Detail Titles shall be ¼ inch height.

For more commonly used CADD drafted sheets, use 0.14 inches for normal lettering height, 0.175 inches for Detail Subtitles, and 0.24 inches for Title Blocks and Detail Titles. Sheet Titles shall be 0.24 inches lettering height, font style BOLD43, and Weight 0. Refer to Figure 1.1.1 and the *CADD User's Manual*: 2.6 Text, for more information regarding text size, fonts, and weights.

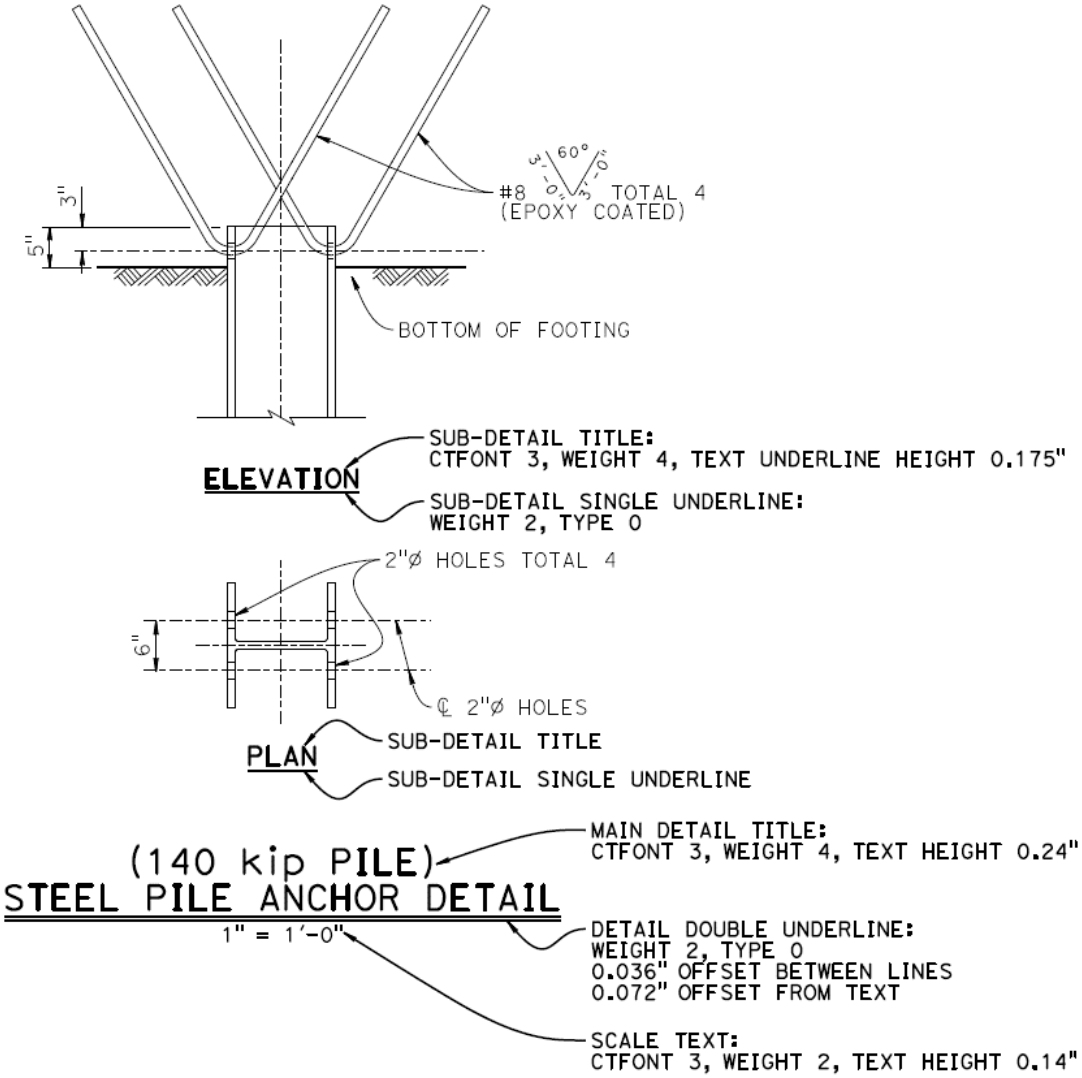


Figure 1.1.1 Text style, size and detail titles

Detail Titles and Sheet Call-outs

Notes and Titles referring to specific Detail(s) shall show the exact Detail Title in all uppercase text with quotation marks:

Examples: **“**SECTION C-C”
“TYPICAL SECTION”

Notes calling out details or notes found on a different sheet shall show the exact Detail and Sheet Names in all uppercase text with quotation marks:

Examples: See “SECTION C-C” on “ABUTMENT DETAILS No. 2” sheet.
For location of “SECTION A-A” and “SECTION B-B”, see “BENT LAYOUT” sheet.

Notes calling out details found on multiple sheets shall show all the exact Sheet Names in all uppercase text with quotation marks:

Examples: For locations of “SECTION C-C,” see “ABUTMENT 1 LAYOUT” and “ABUTMENT 2 LAYOUT” sheets.

Detail Layout, Sections, and Views

The following rules provide guidance on the proper layout of details within a set of plans. They are meant to establish a standard to be used for all details to allow easy reading of the plans.

- Stationing for a PLAN view is normally left to right.
- TYPICAL SECTION and other SECTION views show further details for a typical bridge component at a given location. TYPICAL SECTIONS are used to depict standard elements for the abutments, bents, retaining walls, etc. On sheets other than the GENERAL PLAN, it is preferred to show lettered sections which show the location and orientation of the SECTION.
- As additional SECTIONS are needed, define them with a lettered SECTION (e.g., SECTION A-A, SECTION B-B, etc.). Letters used for SECTIONS may repeat for each different bridge element within a set of plans. Avoid the use of double lettered SECTIONS (e.g. SECTION AA-AA).
- Do not associate SECTIONS to the component(s) they are detailing (e.g. ABUTMENT SECTION A-A); instead use lettered sections (e.g. SECTION A-A) for all components.

- All SECTION views shall be taken from a PLAN, ELEVATION, or other VIEW. Do not take a SECTION from another SECTION.
- A SECTION view shall show all intersecting lines that intersect the SECTION cut plane, whereas a VIEW is a projection. Unlike a VIEW, do not show hidden lines, reinforcement, or other items beyond the cut plane in a SECTION. For an example of a SECTION view, see Figure 1.1.2.

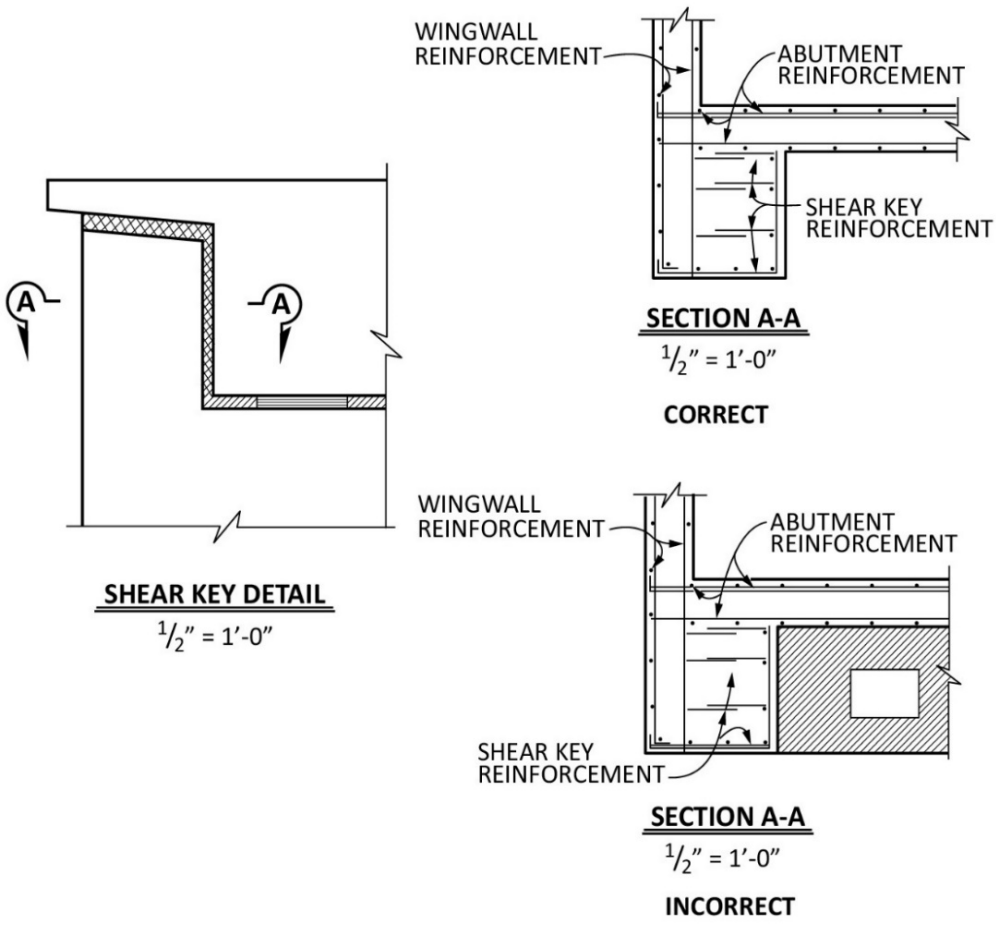


Figure 1.1.2 Section view

Elevation Views

ELEVATION views are usually projected from the right edge of the deck, face of the wall shown, or lower side of the structure shown in the PLAN view. The ELEVATION view may be mirrored, developed, or taken at a specific location as a VIEW.

When the work being done is only on the upper side of the PLAN view for a project such as a widening, barrier rail replacement, or retaining wall in roadway fills, a MIRRORED ELEVATION shall be used. In addition, MIRRORED ELEVATION should be used for retaining walls which are placed in roadway cuts, along the bottom of the PLAN view. The MIRRORED ELEVATION is the view as if reflected in a mirror, with the stationing shown from left to right.

A DEVELOPED ELEVATION is used when the radius or bend of a structure is such that a projected elevation would not show an accurate view of the structure. The DEVELOPED ELEVATION shows the true length of the structure as though it were on a straight line. Use a DEVELOPED ELEVATION view for Pedestrian Overcrossing (POC) structures, bridges, and retaining walls that are not straight.

For curved structures in which work is done on the upper side of the PLAN view, this elevation view shall be titled "DEVELOPED MIRRORED ELEVATION." This may also be used for retaining walls which are placed in roadway cuts, along the bottom of the PLAN view.

Scale Format

There are two types of scales used on Structure Plans, Architect and Engineer. These scales shall be expressed in the following formats:

- Architect scales are commonly used for DETAILS, SECTIONS, and VIEWS.

  Example: ¾” = 1’-0”

- Engineer scales are commonly used for PLAN and ELEVATION views.

  Example: 1" = 10'

Dimensioning and Notations

- Lengths and distances are given in feet, inches, and fractions of an inch:

  Example: 279'-3½” MEASURED ALONG RWLOL

- Where a dimension is one foot or greater, place a hyphen between the foot and inch values:

  Examples: 1'-0", 2'-3", or 1’- 0½”

- Where a dimension is less than one foot, do not use the foot designation or hyphen in advance of the inch value:

  Example: 6" not 0'-6"

- Where a dimension is less than one inch, do not add zero in advance of the fraction:

  Example: ½" not 0'-½"

- Spacing between girders or pile spacing is given in feet and inches:

  Example: 4 SPACES @ 6'-0" = 24'-0"

- Elevations for DATUM and structure benchmarks are given in decimal feet, without the foot symbol, rounded to the hundredths of a foot:

  Examples: BB Elev = 330.00 or DATUM Elev = 200.00

- Elevations given for piles, footings, and other foundation work are shown to a tenth of a foot; this includes the bottom of footing elevations shown on FOUNDATION PLANS:

  Example: 330.1

- Spacing of reinforcement is given in inches, without the inches symbol, and is always assumed in inches unless otherwise shown:

  Example: #5 @ 18 (#5 bars spaced at 18 inches apart)

- Length of reinforcement is given and separated by lower-case “x” when applicable:

  Examples: #5 x 6’-0” @ 12 (6’-0” long #5 bars spaced 12 inches apart)
  #5 x 5’-0”, Tot 4 (total of four 5’-0” long #5 bars)

- Dimension call outs shall NOT be "ASSOCIATED" with any details within a CADD file used to detail a set of structure plans; instead dimensions should be "DROPPED" or edited using the text edit tools to "LOCK IN" the values. This prevents dimensions from changing if scales are changed.

- Angles for bearings are given in degrees, minutes and seconds; bearings are rounded to the nearest second. Minutes and seconds are given in two-digit values.

  Examples: 9°05’09”
  30°15’38”

It is preferred that all text read horizontal from the bottom of the sheet and in the same direction; vertical text should read from the right side of the sheet. Mixing the orientation of dimensions and text on a given sheet and using circular dimensional text (shown below) should be avoided.

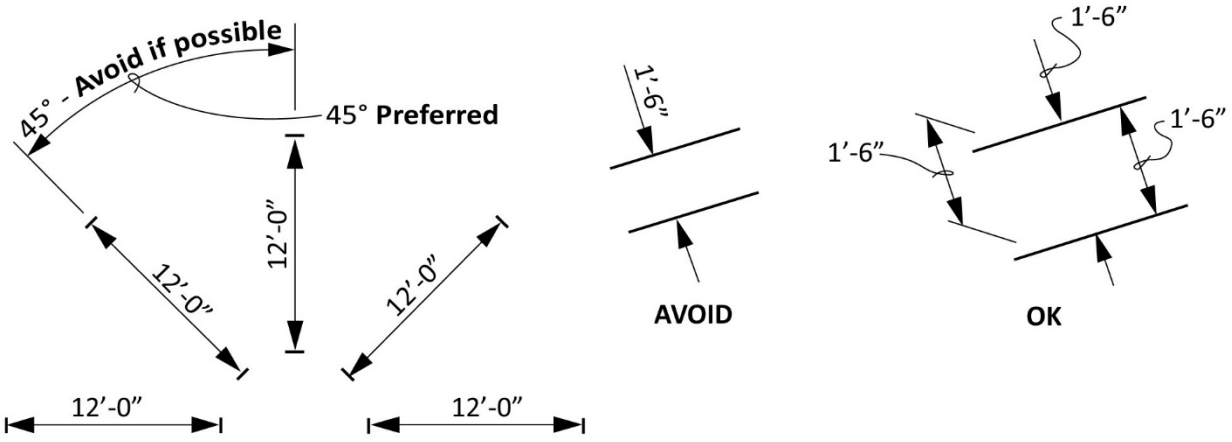


Figure 1.1.3 Orientation of dimensions

Radius call outs shall point to the inside of the curve. Text may be placed off the curve on small radii, but the leader arrow shall always point to the inside of the curve.

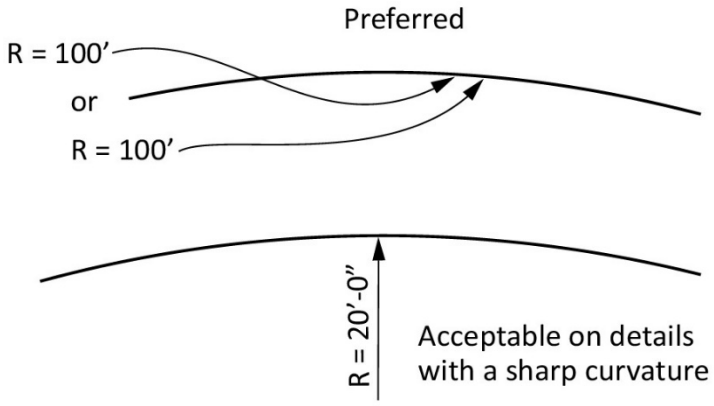


Figure 1.1.4 Radii designation

The default clearance specified in the *Standard Specifications* is 2 inches; therefore all 2-inch clearance locations shall not be shown on plans

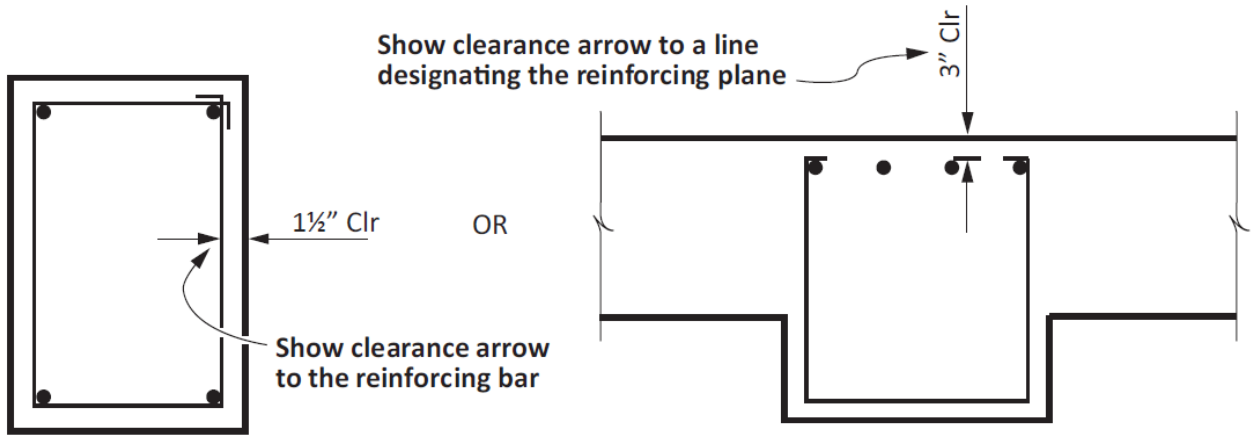


Figure 1.1.5 Reinforcing clearance dimension

It is generally clearer to show reinforcing in a SECTION view, rather than in an ELEVATION view. The total number of bars (e.g., #11 Tot 14) shall only be called out if you can count every bar in the SECTION.

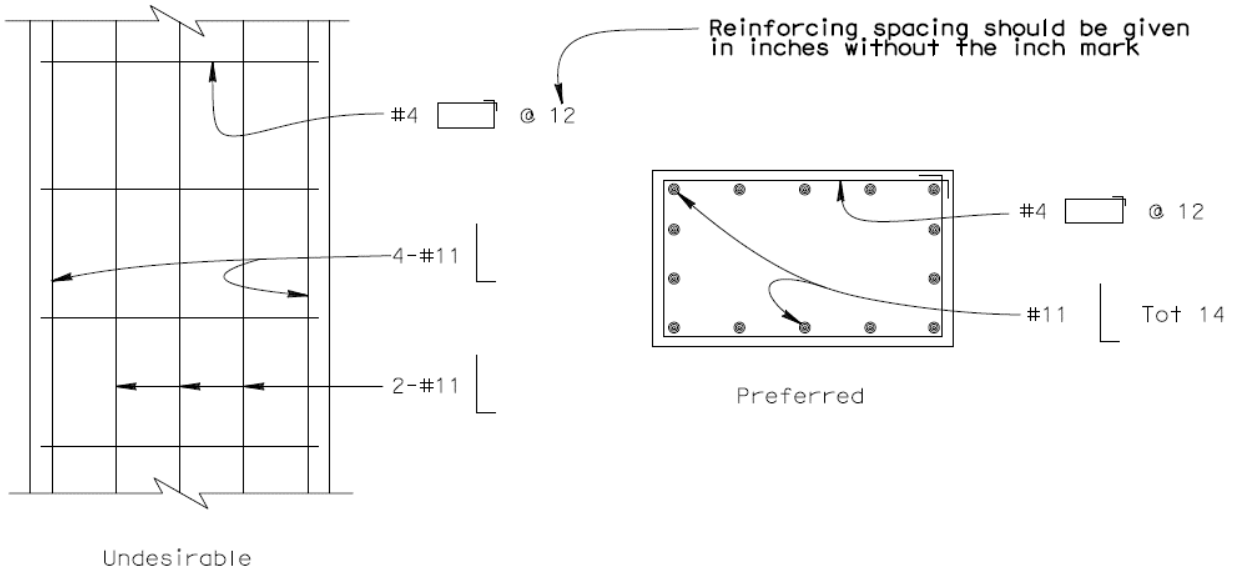


Figure 1.1.6 Reinforcement in vertical and horizontal planes

There are several ways to show multiple layers of reinforcement, including staggered and alternating layers.

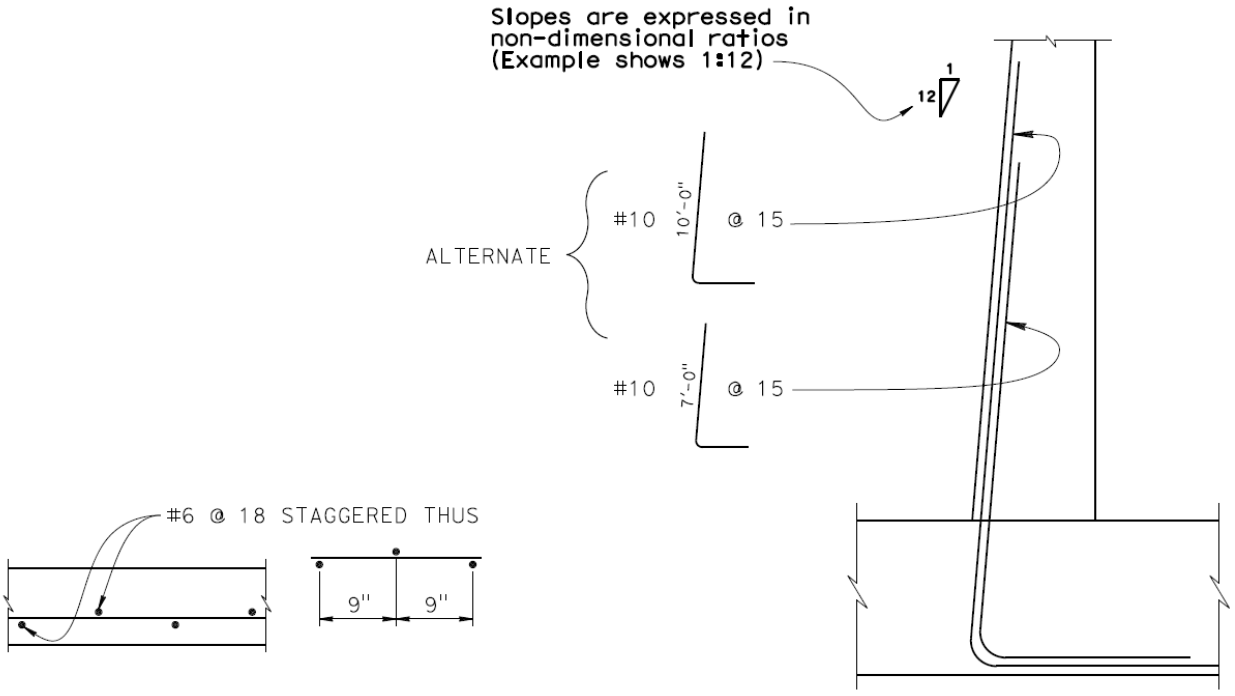


Figure 1.1.7 Staggered and alternate bars

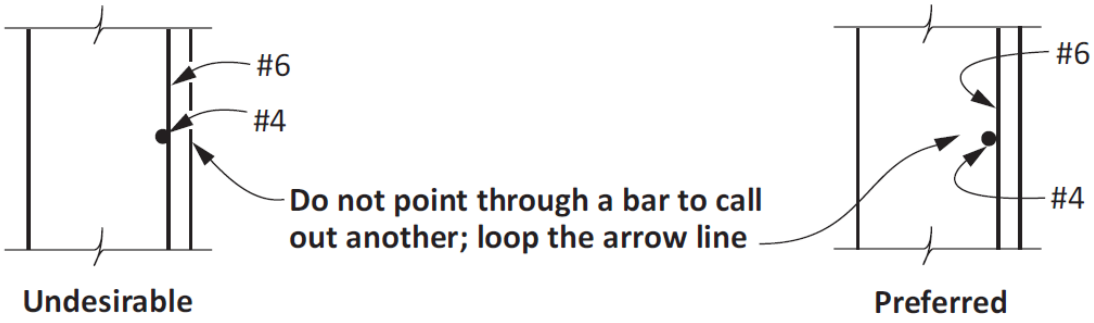


Figure 1.1.8 Multiple layers of reinforcement

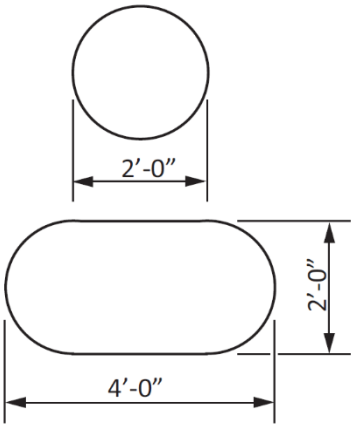


Figure 1.1.9 Circular sections

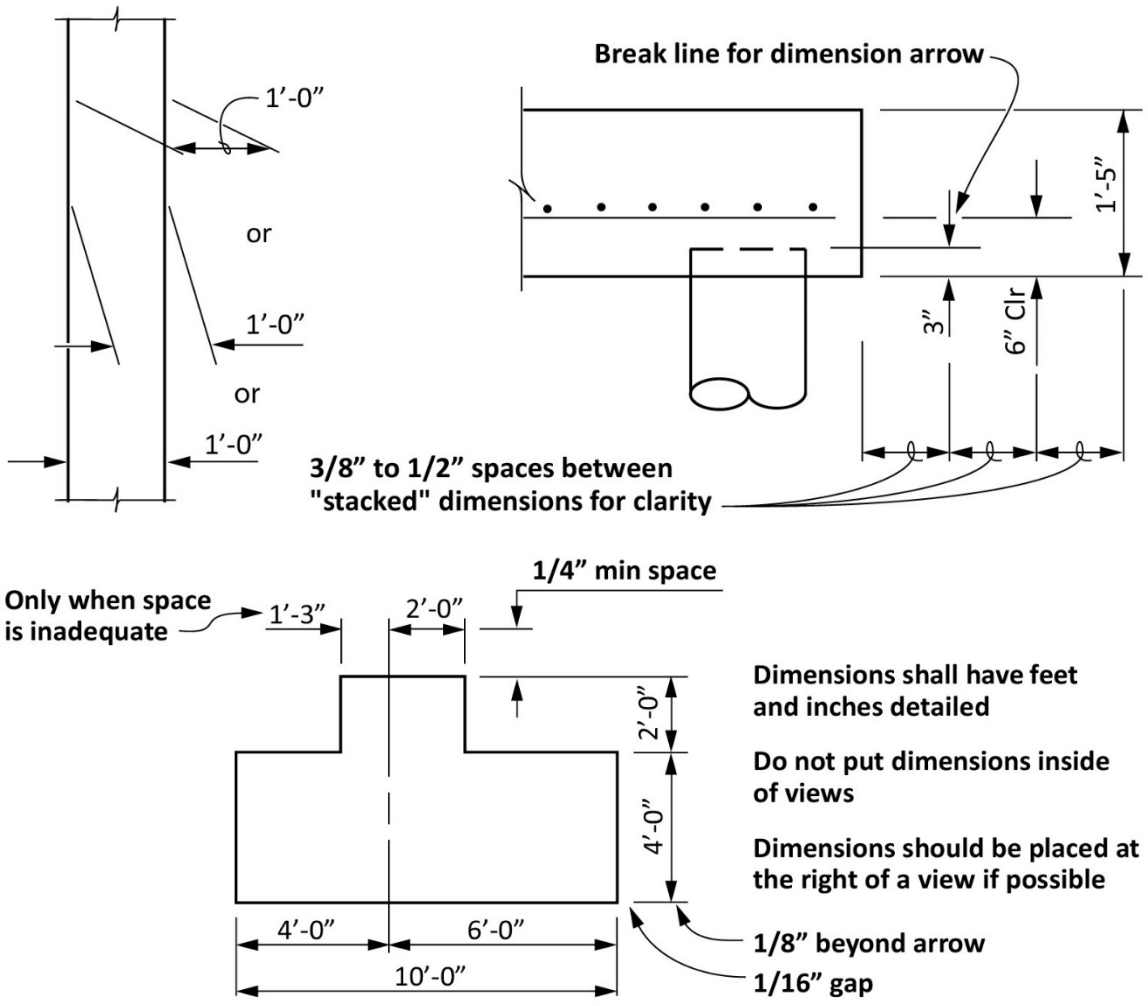
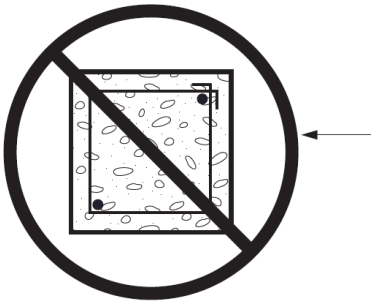


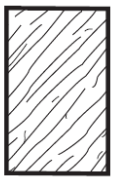
Figure 1.1.10 Rectangular views

Section Hatching

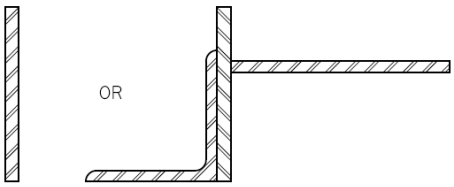


Do not show the sand and aggregate in any concrete section.

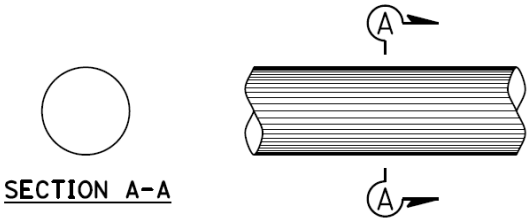
Section of timber or lumber



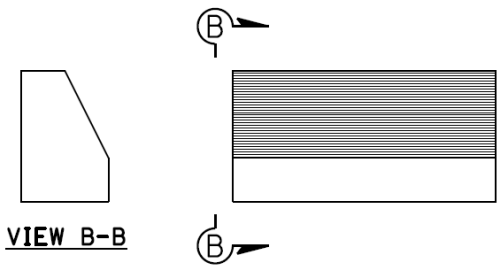
End view of timber or lumber



Cross hatch steel in large scale (½" = 1'-0" or greater) when two or more pieces are shown. Hatch alternate direction on pieces to clearly define limits.



Avoid shading lines on rounded or sloping surfaces. When needed to clarify detail, space the shading lines a minimum of 0.0625 inches apart.



A SECTION or VIEW defines the shape more clearly than shading.

Figure 1.1.11 Section hatching

Notes and Legend

- NOTES and LEGEND titles shall be capitalized.
- Use a colon and DO NOT underline NOTES and LEGEND titles.
- Use upper and lowercase text for NOTES and LEGEND.
- DO NOT identify NEW CONSTRUCTION in LEGEND or elsewhere in plans.
- Use the same standard line type for existing structures above and below grade.
- The LEGEND shall provide symbols used to describe the items on a sheet. DO NOT include symbols that are in the Standard Plans (A10A through A10E) in LEGEND.

Example:

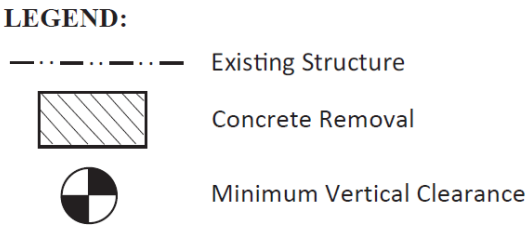


Figure 1.1.12 Example of Legend

- As a rule, placing a NOTE on a sheet can provide information relative to an entire sheet, or it can reference a location that provides more information for a specific detail elsewhere in the plans.
- NOTES that are given in complete sentences or statements shall end with a period.
- The use of extensive callouts should be avoided. Examples of when callouts are needed include existing bridge strengthening or retrofit projects, where locations of work should be clearly identified. Statements for locations of work do not always require punctuation.
- Do not use lettered callouts to avoid conflicts with other Standard Plan notations. All NOTES or callouts shall be denoted with either 1, 2, 3…or ①, ②, ③…
- NOTES shall be placed above callouts when listed together.

Example:

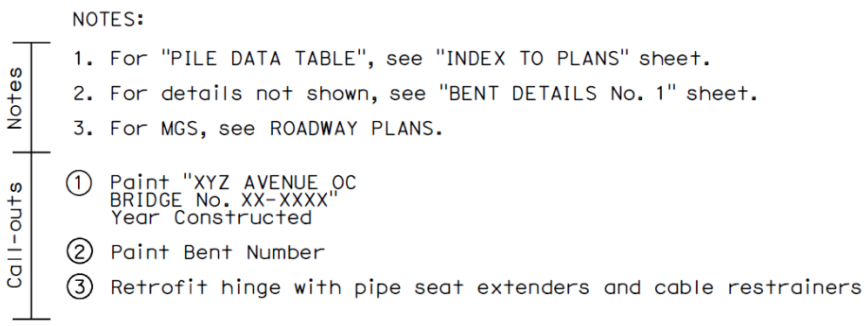


Figure 1.1.13 Example of Notes and Callouts

Structures North Arrow

A Structures North Arrow shall be placed on all PLAN views within a set of Structure Plans to identify the orientation of the PLAN view. The bottom of the arrow width shall be ⅜" wide and height $^{9}/_{16}$" tall on reduced plans. On full size plans these dimensions shall be ¾" x 1⅛" respectively.

Example:

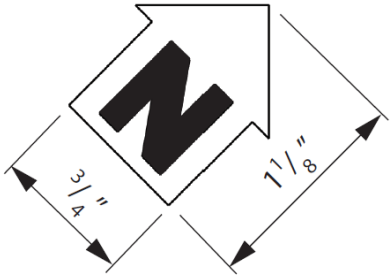


Figure 1.1.14 Standard structure detailing cell (North Arrow)

Existing Structures

The standard structure detailing cell shown below shall be placed in the lower left-hand corner of the GENERAL PLAN sheet and in the same location on any other sheet when new work is dependent on existing dimensions:

NOTE:
THE CONTRACTOR SHALL VERIFY ALL
CONTROLLING FIELD DIMENSIONS
BEFORE ORDERING OR FABRICATING
ANY MATERIAL.

Figure 1.1.15 Standard structure detailing cell (Existing Dimensions)

For example, when dimensioning a TYPICAL SECTION for a widening project, the overall roadway width is set by the Roadway Designer, while the existing roadway or structure dimensions is shown with a "±" and taken from AS-BUILT plans. Since the widening width is based on the actual dimension of the existing structure, it also warrants a "±"; however, the final dimension does not require a "±" because the overall widened width of the bridge is shown by dimensioning the new edge of deck from a new station line.

Dimensions including existing radii, bearing, or elevations on an existing structure shall always include a "±" to indicate that they are approximate. The dependent dimensions shown on the plans must be accurate enough to enable quantity calculations. The dimensions shown shall reflect the accuracy to which the dimensions of the existing structure are known, and contractors should not be required to field verify dimensions to prepare their bids.

Advanced Planning Study

At the request of the District, an Advance Planning Study (APS) is prepared by Structure Design. An APS shall be delivered on an 11 x 17 sheet with true scale shown. The scales and details shown on the APS shall assume to be full size on 11 x 17 sheet. *See Memo to Designers:* 1-8 Planning Studies, and *Bridge Design Details* 1.1: Advance Planning Study Detailing Examples Attachments 1A.B.1 through 1A.B.6 for more information and examples.

As a project goes through the APS (K or 0) phase, it is given a “Project EA” (e.g. 0A020). The phase associated with an APS will be either “K” or “0”. When the project goes to the design phase (1), the “Project EA” changes to the “Contract Number” (e.g. 01-0A0204).

Structure Plan Sheet Order

Except for the GENERAL PLAN, FOUNDATION PLAN(s), BRIDGE STANDARD DETAIL SHEETS (XS SHEETS), and LOG OF TEST BORING(s) all Structure Plans shall use a structure detail border. Do not use periods or parenthesis after sheet numbers in the INDEX TO PLANS.

Structure Plan sheets shall be placed in the following order:

SHEET No.	TITLE
1	GENERAL PLAN*
2	INDEX TO PLANS**
3	STAGE CONSTRUCTION***
4	STRUCTURE PLAN No. 1, 2, 3…****
5	DECK CONTOURS
6	FOUNDATION PLAN
7	ABUTMENT LAYOUTS
8	ABUTMENT DETAILS
9	BENT LAYOUT
10	BENT DETAILS
11	TYPICAL SECTION
12	GIRDER LAYOUT*****
13	GIRDER REINFORCEMENT
14	BRIDGE STANDARD DETAIL SHEETS (XS SHEETS)
15	LOG OF TEST BORING

* The GENERAL PLAN sheet typically shows a PLAN, ELEVATION, TYPICAL SECTION, and PROFILE GRADE for any given structure. No more than one GENERAL PLAN shall be used for a single structure. For long structures it may be necessary to add STRUCTURE PLAN sheets that show PLAN and ELEVATION, using as many sheets as necessary with a minimum scale of 1' = 20’.

A clear space shall be left on the GENERAL PLAN for the quantities decal that will be provided by the Structure Cost Estimating Branch. Quantity decals are typically 4" wide and 3" to 5" tall. Each quantity listed shall be given on one line. If the quantities decal cannot fit on the GENERAL PLAN sheet, it may be placed on another sheet near the front of the set of plans. If an INDEX TO PLANS sheet is used, this is the preferred alternate location. If the quantities decal is not on the GENERAL PLAN, place a note on the GENERAL PLAN referencing the location of the quantities decal.

** The INDEX TO PLANS sheet shall only be used if the INDEX TO PLANS will not fit on the GENERAL PLAN sheet. The INDEX TO PLANS shall show the exact name of each sheet in uppercase letters. The preferred location for the INDEX TO PLANS is on the GENERAL PLAN, otherwise an INDEX TO PLANS sheet may include the INDEX TO PLANS, GENERAL NOTES, PILE DATA TABLE, CONCRETE STRENGTH AND TYPE LIMITS diagram, and other information, as required. In some cases, there is only one sheet in a set of plans, in that case no INDEX TO PLANS is listed on the GENERAL PLAN.

*** STAGE CONSTRUCTION sheet shall be used when multiple stage construction details cannot fit on the GENERAL PLAN. Separating the staging details will allow for additional information to be shown and provide clarity. If a STAGE CONSTRUCTION sheet is used, information shall not be duplicated on TYPICAL SECTION shown on GENERAL PLAN.

**** STRUCTURE PLAN sheet(s) shall be used for large structures when the scale shown on the GENERAL PLAN sheet is too small to provide adequate details. When STRUCTURE PLAN sheets are used, the GENERAL PLAN sheet can be simplified with the PLAN, ELEVATION, and PROFILE GRADE shown at a scale that displays the entire structure.

The preferred location for the TYPICAL SECTION is on the GENERAL PLAN sheet; however, the TYPICAL SECTION may be shown on STRUCTURE PLAN sheets when appropriate. An exception to this is when there are ramps, or the structure width varies substantially enough that they are better displayed on a separate sheet.

In some cases, a STRUCTURE PLAN sheet for a retaining wall will not have a PLAN view; in this case, the ELEVATION view shall show all details including the spacing of ground anchors and piles.

***** CAMBER diagram/notes and PRESTRESSING NOTES shall be placed on the GIRDER LAYOUT sheet. If the detail or notes cannot fit on the GIRDER LAYOUT sheet, they should be placed on the GIRDER REINFORCEMENT or GIRDER DETAILS sheets.

Additional Structure Plan detail sheets and insertable *Bridge Standard Detail Sheets* (XS Sheets) are placed before the LOG OF TEST BORING sheet(s). See *Bridge Design Details*: 1.6 Use of Bridge Standard Detail Sheets (XS Sheets), for more information.

Overcrowding plan sheets shall be avoided. If additional sheets are needed for bridge components, number them sequentially.

Examples: ABUTMENT DETAILS No. 1
ABUTMENT DETAILS No. 2…

Avoid using the phrases "To be approved by the Engineer" or "as directed by the Engineer". If you must use these or similar phrases, discuss it with the Structure Specifications Branch or your Branch Chief.

Use ROADWAY PLANS when referring to the District portion of Project Plans within a set of Structure Plans. Do not use quotation marks.

Examples: Approx FG, SEE ROADWAY PLANS

NOTE:
1. For proposed utility layout details, see ROADWAY PLANS.

Table 1A.A.1 Decimals of a Foot Equivalents

Decimal of an inch	Fraction of an Inch	0”	1”	2”	3”	4”	5”	6”	7”	8”	9”	10”	11”	Fraction of an Inch	Decimal of an Inch
0	0	0	0.0833	0.1667	0.2500	0.3333	0.4167	0.5000	0.5833	0.6667	0.7500	0.8333	0.9167	0	0
0.0625	1/16	0.0052	0.0885	0.1719	0.2552	0.3385	0.4219	0.5052	0.5885	0.6719	0.7552	0.8385	0.9219	1/16	0.0625
0.1250	1/8	0.0104	0.0938	0.1771	0.2604	0.3438	0.4271	0.5104	0.5938	0.6771	0.7604	0.8438	0.9271	1/8	0.1250
0.1875	3/16	0.0156	0.0990	0.1823	0.2656	0.3490	0.4323	0.5156	0.5990	0.6823	0.7656	0.8490	0.9323	3/16	0.1875
0.2500	1/4	0.0208	0.1042	0.1875	0.2708	0.3542	0.4375	0.5208	0.6042	0.6875	0.7708	0.8542	0.9375	1/4	0.2500
0.3125	5/16	0.0260	0.1094	0.1927	0.2760	0.3594	0.4427	0.5260	0.6094	0.6927	0.7760	0.8594	0.9427	5/16	0.3125
0.3750	3/8	0.0313	0.1146	0.1979	0.2813	0.3646	0.4479	0.5313	0.6146	0.6979	0.7813	0.8646	0.9479	3/8	0.3750
0.4375	7/16	0.0365	0.1198	0.2031	0.2865	0.3698	0.4531	0.5365	0.6198	0.7031	0.7865	0.8698	0.9531	7/16	0.4375
0.5000	1/2	0.0417	0.1250	0.2083	0.2917	0.3750	0.4583	0.5417	0.6250	0.7083	0.7917	0.8750	0.9583	1/2	0.5000
0.5625	9/16	0.0469	0.1302	0.2135	0.2969	0.3802	0.4635	0.5469	0.6302	0.7135	0.7969	0.8802	0.9635	9/16	0.5625
0.6250	5/8	0.0521	0.1354	0.2188	0.3021	0.3854	0.4688	0.5521	0.6354	0.7188	0.8021	0.8854	0.9688	5/8	0.6250
0.6875	11/16	0.0573	0.1406	0.2240	0.3073	0.3906	0.4740	0.5573	0.6406	0.7240	0.8073	0.8906	0.9740	11/16	0.6875
0.7500	3/4	0.0625	0.1458	0.2292	0.3125	0.3958	0.4792	0.5625	0.6458	0.7292	0.8125	0.8958	0.9792	3/4	0.7500
0.8125	13/16	0.0677	0.1510	0.2344	0.3177	0.4010	0.4844	0.5677	0.6458	0.7344	0.8177	0.9010	0.9844	13/16	0.8125
0.8750	7/8	0.0729	0.1563	0.2396	0.3229	0.4063	0.4896	0.5729	0.6563	0.7396	0.8229	0.9063	0.9896	7/8	0.8750
0.9375	15/16	0.0781	0.1615	0.2448	0.3281	0.4115	0.4948	0.5781	0.6615	0.7448	0.8281	0.9115	0.9948	15/16	0.9375
1.000	1	0.0833	0.1667	0.2500	0.3333	0.4167	0.5000	0.5833	0.6667	0.7500	0.8333	0.9167	1.0000	1	1.000

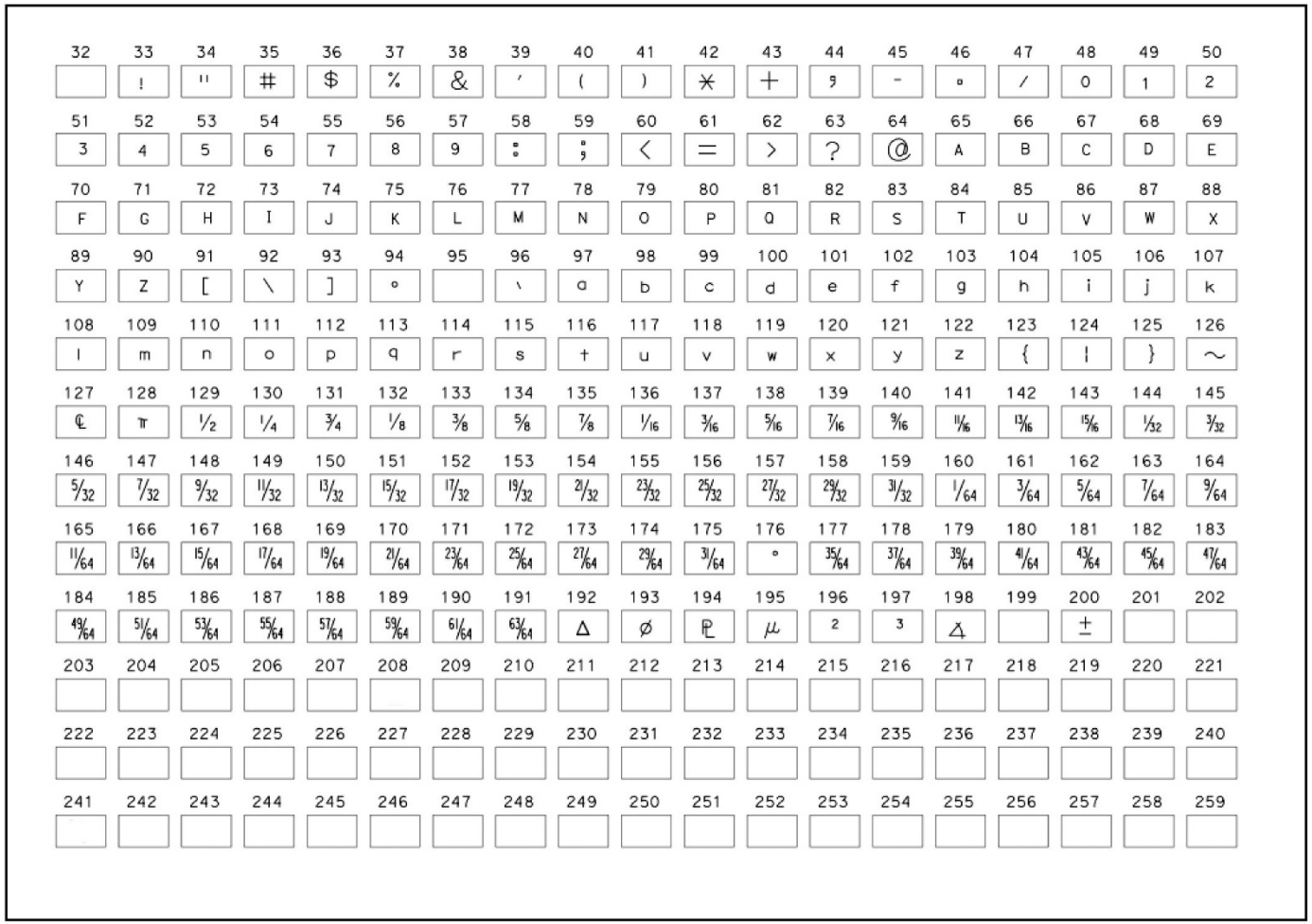
Batter	Angles from Horizontal DºM'S"	Angles from Vertical Decimal
½ : 12	2° 23' 09.40"	2.3859
⅝ : 12	2° 58' 53.26"	2.9815
¾ : 12	3° 34' 34.80"	3.5763
⅞ : 12	4° 10' 13.57"	4.1704
1 : 12	4° 45' 49.11"	4.7636
1 : 6	9° 27' 44.36"	9.4623
1 : 4	14° 02' 10.48"	14.0362
1 : 3	18° 26' 05.82"	18.4349

Slope English	Angles from Horizontal DºM'S"	Angles from Horizontal Decimal
½ : 1	63° 26' 05.82"	63.4349
1 : 1	45° 00' 00.00"	45.0000
1½ : 1	33° 41' 24.24"	33.6901
2 : 1	26° 33' 54.18"	26.5651
3 : 1	18° 26' 05.82"	18.4349
4 : 1	14° 02' 10.48"	14.0362

Grade	Angles from Horizontal DºM'S"	Angles from Horizontal Decimal
1%	0° 34' 22.58"	0.5729
1½%	0° 51' 33.74"	0.8594
2%	1° 08' 44.75"	1.1458
2½%	1° 25' 55.55"	1.4321
3%	1° 43' 06.09"	1.7184
4%	2° 17' 26.20"	2.2906
5%	2° 51' 44.56"	2.8624
6%	3° 26' 00.11"	3.4336
7%	4° 00' 15.02"	4.0042
8%	4° 34' 26.12"	4.5739
9%	5° 08' 33.95"	5.1428
10%	5° 24' 38.14"	5.7106
11%	6° 16' 38.27"	6.2773
12%	6° 50' 33.98"	6.8428
12½%	7° 07' 30.06"	7.1250
15%	8° 31' 50.76"	8.5308

Table 1A.A.2 Useful Angles

Figure 1A.A.3 CADD Short Cut Keys



To get the special character represented in the box you must type a back slash then the number above the character in the Microstation Text Editor window. Example\38 will show the & sign.

Figure 1A.B.1 Advance Planning Study Detailing Example 1

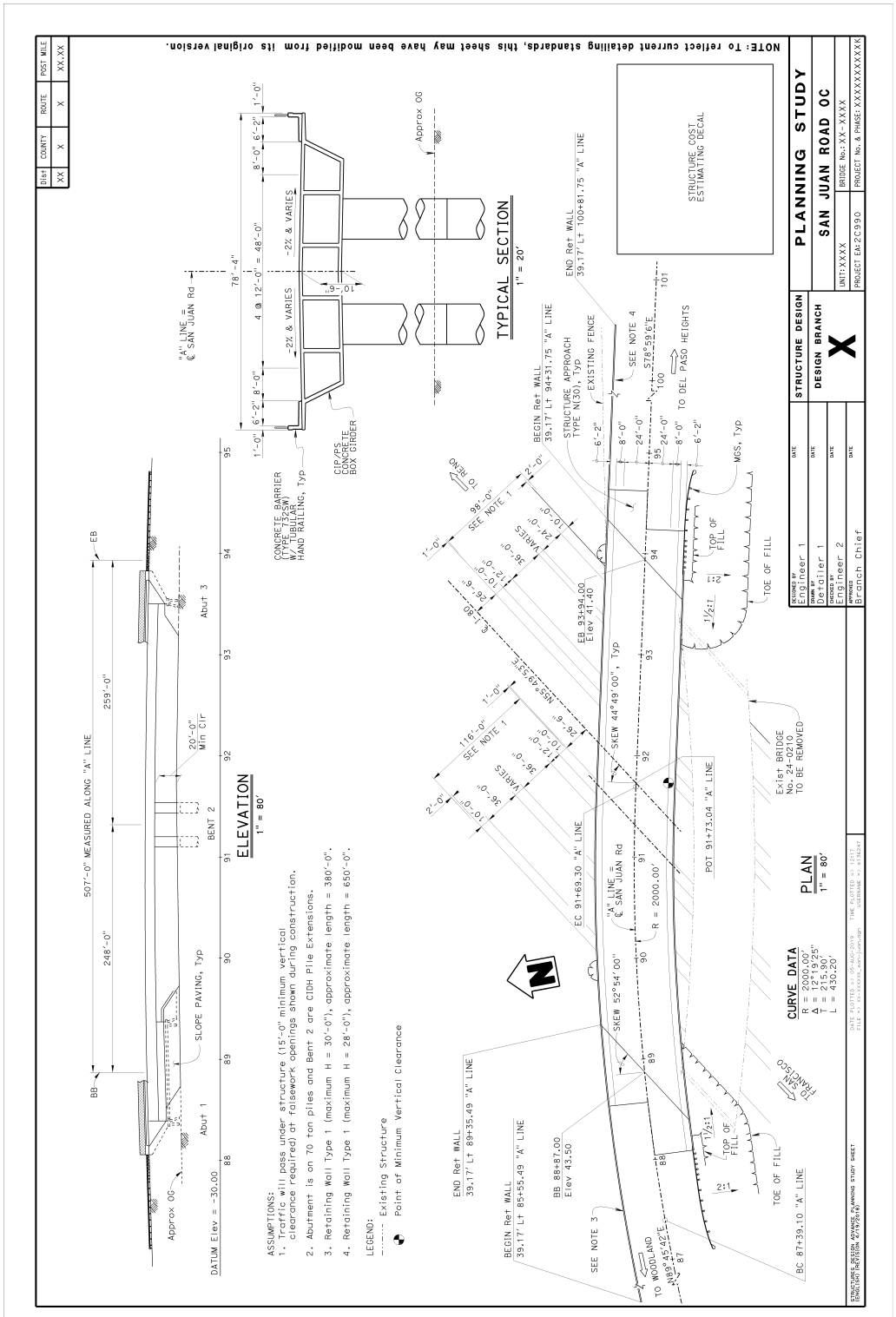


Figure 1A.B.2 Advance Planning Study Detailing Example 2

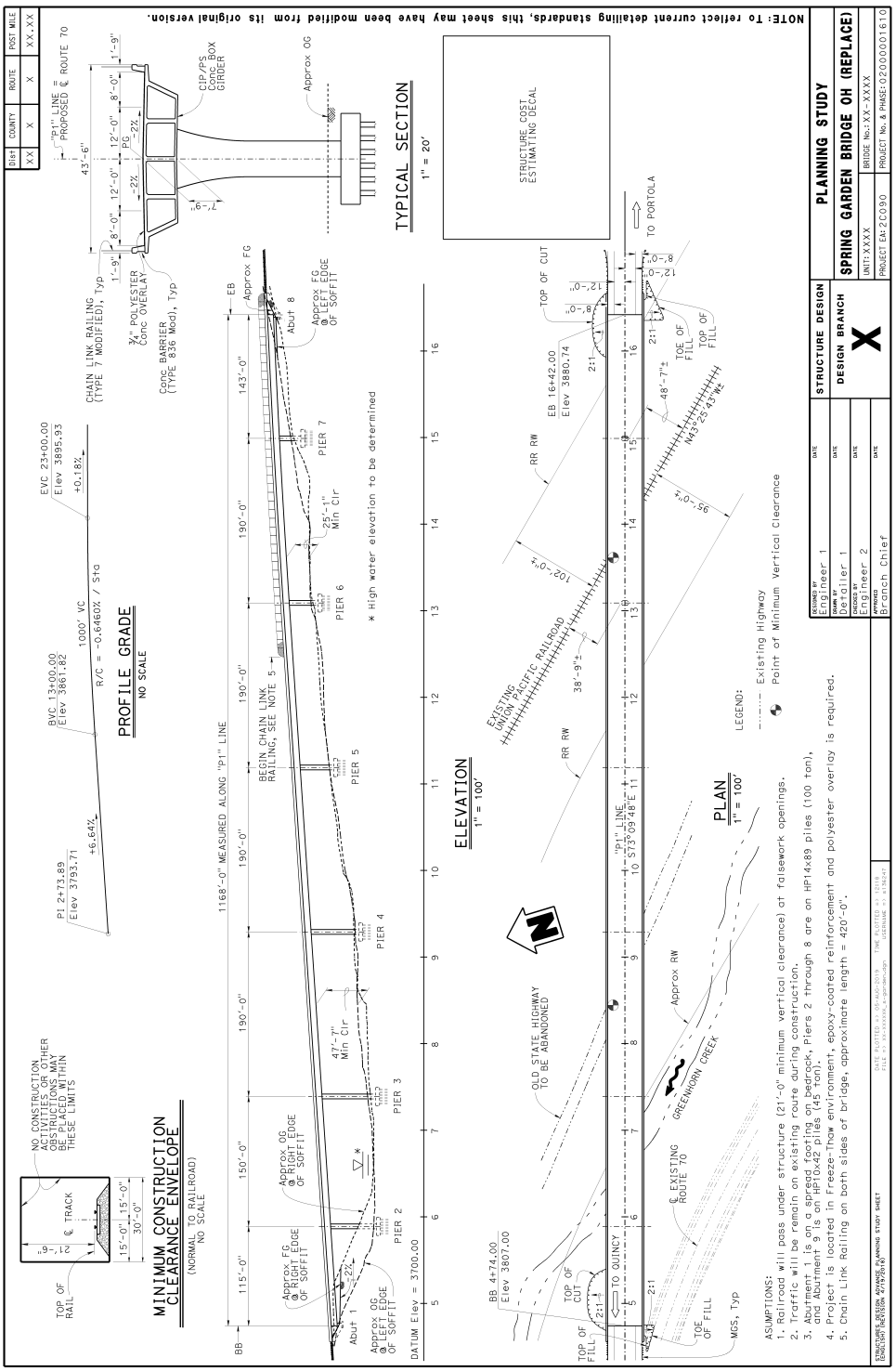


Figure 1A.B.3 Advance Planning Study Detailing Example 3

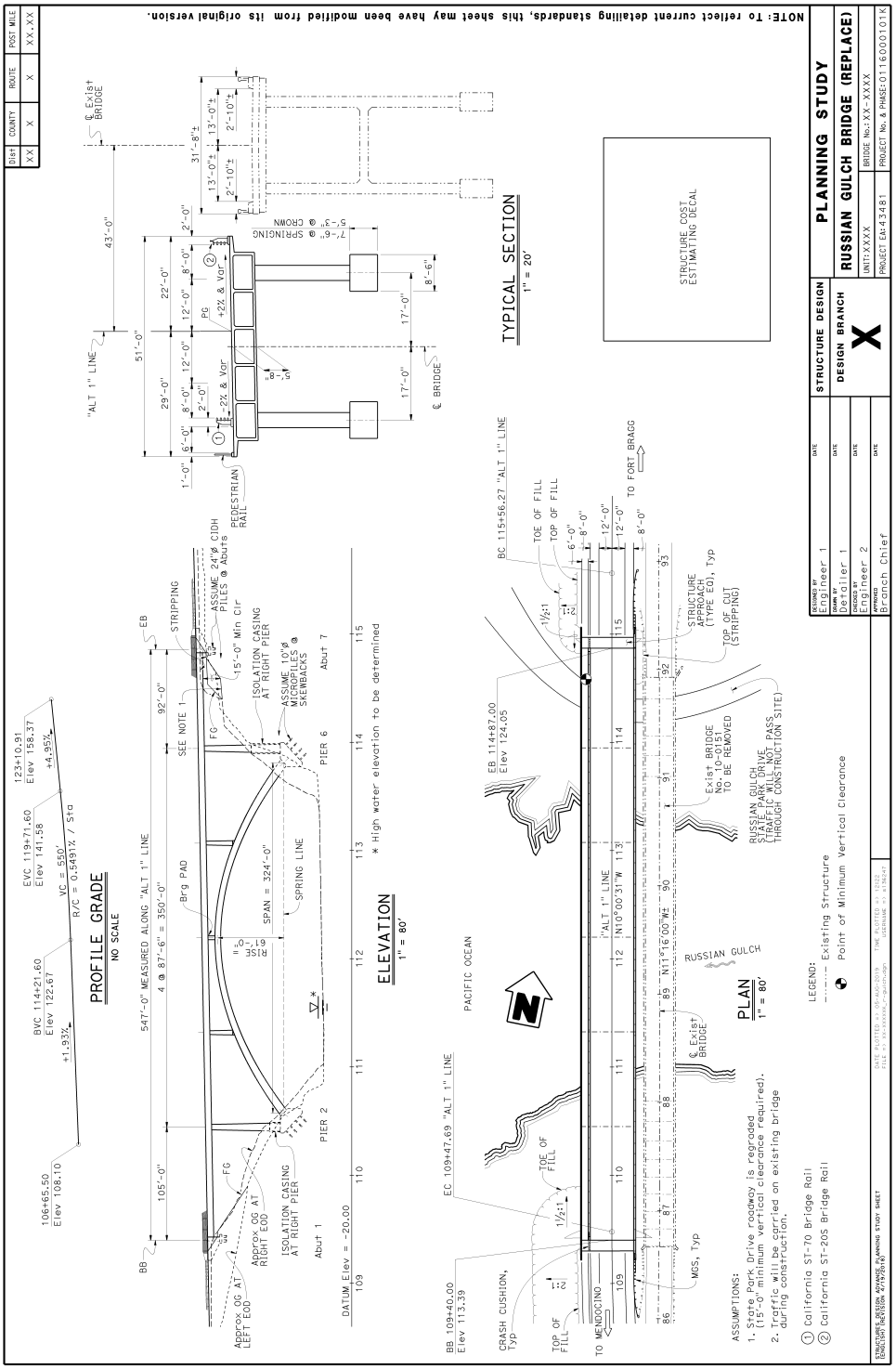


Figure 1A.B.4 Advance Planning Study Detailing Example 4

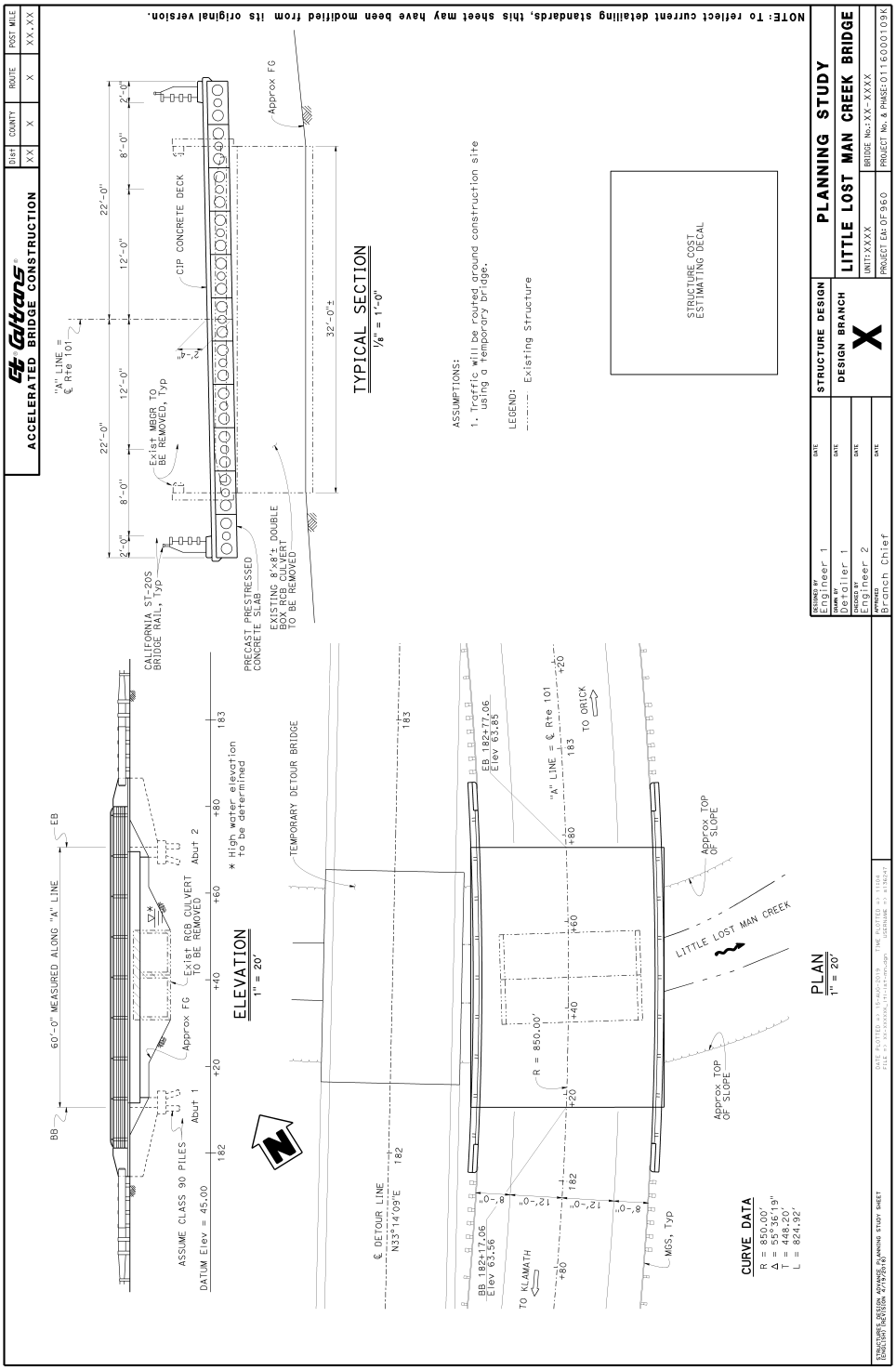


Figure 1A.B.5 Advance Planning Study Detailing Example 5

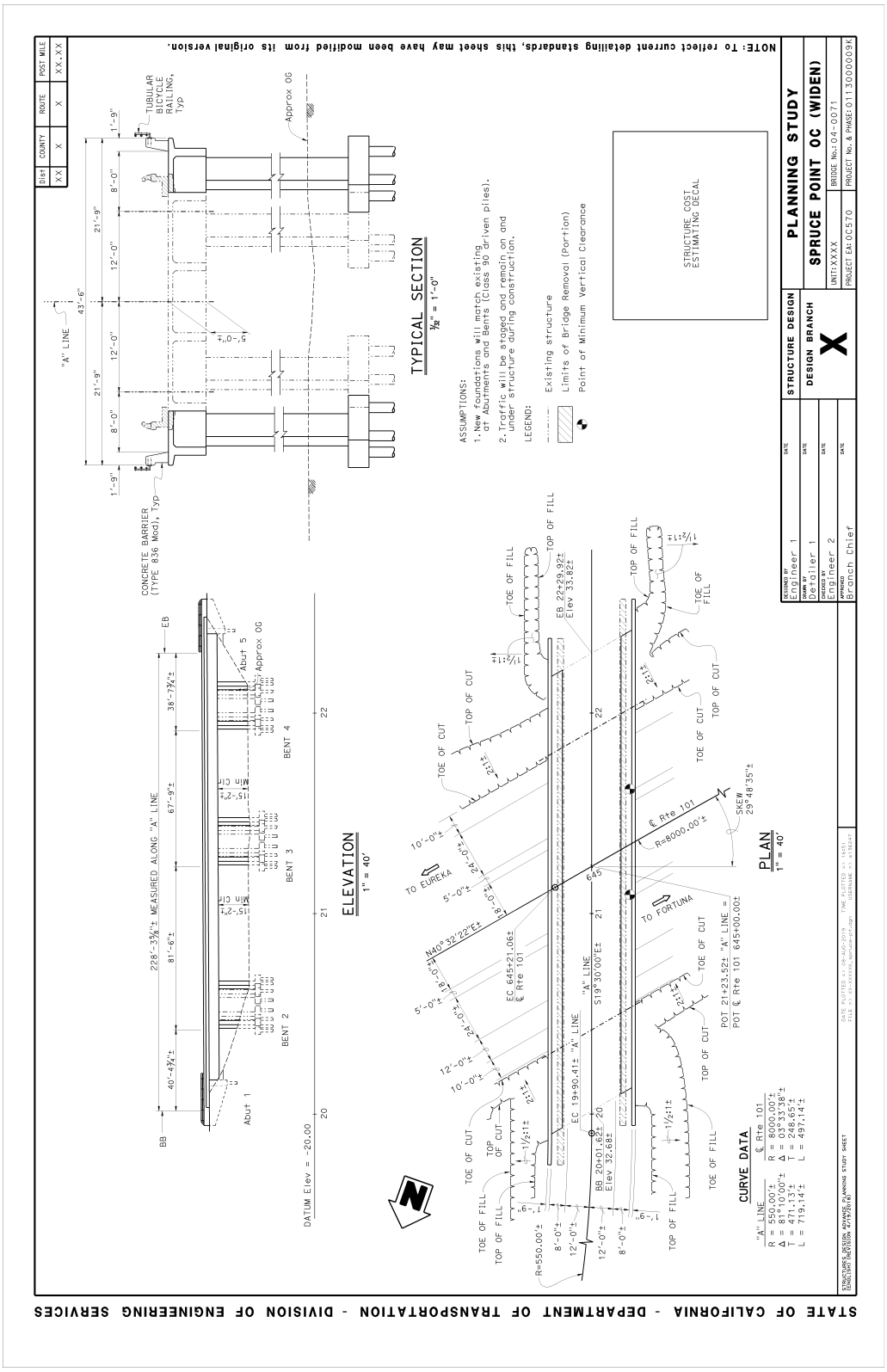
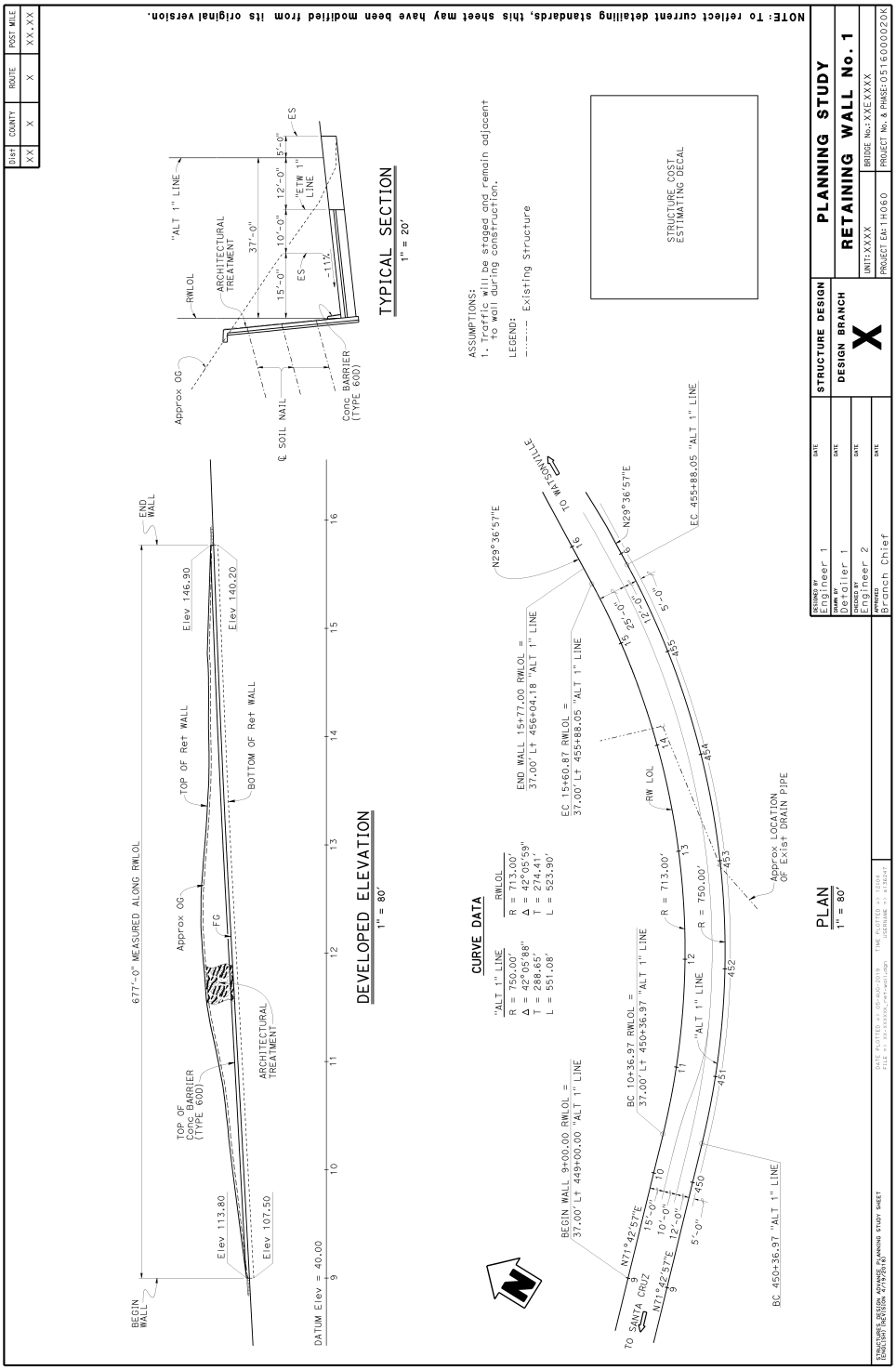


Figure 1A.B.6 Advance Planning Study Detailing Example 6



Bridge Design Details 1.2 January 2023

Abbreviations

Abbreviations should not be used where the meaning may be in doubt. In case of doubt, it is best to spell out the word. In general, it is considered best not to use conventional signs (#, /, >, etc.) in the text of NOTES.

Example: use “6 LB”, rather than “6#”

Modified standard bridge items shall be noted as such. These modified items may include barriers, girder types, or any other non-standard item.

Examples: CHAIN LINK RAILING (TYPE 7 Mod)
PC/PS CONCRETE GIRDER (BULB TEE Mod)
CALIFORNIA ST-75 Mod BRIDGE RAIL

Multiple modifications to a similar item shall be numbered sequentially.

Examples: CONCRETE BARRIER (TYPE 842 Mod 1)
CONCRETE BARRIER (TYPE 842 Mod 2)

Modified Bridge Standard Detail Sheets (XS Sheets) may use the abbreviation “Mod” within the Sheet Title. For an example, see *Bridge Design Details*: 1.6 Modified Bridge XS Sheet Detailing Example, Attachment 1A.E.1.

Omission of Periods

The omission of periods after abbreviations is recommended by the International Committee on Weights and Measures for English Units and is advocated by the *American Standards Association Sectional Committee* on scientific symbols and abbreviations. *The American Society of Civil Engineers* (ASCE) also follows this practice while many other publications do not.

Example: use “5 oz” rather than “5 oz.”

Only abbreviations that are also considered complete English words should have periods.

Examples: in. (inch)
Fig. (figure)
No. (number)

Some complete English words that are provided as abbreviations in the *Standard Plans* (A3A, A3B, A3C and B0-1), do not include periods.

Examples: Tot (total)
Hex (hexagonal)

Phrases Describing Work or Materials

When abbreviating a phrase describing work or material, the noun following the abbreviated words should be spelled out in full. Exceptions are very common names such as PCC, for Portland Cement Concrete.

Examples: CIDH CONCRETE PILES
CIP/PS CONCRETE BOX GIRDER
AC DIKE
CL RAILING (TYPE 6)

Do not end a sentence with an abbreviation, in this case spell out the word.

Bridge Design Details 1.3 August 2022

Titles and Borders

All words in Sheet Titles (e.g., GENERAL PLAN, TYPICAL SECTION, etc.) shall be spelled out completely.

Figure 1.3.1 Sheet titles

Abbreviations for Structure Names are acceptable when space is limited (e.g., OC, St, Ave, No., etc). The Structure Name should fit in one box and be the same on every sheet. The main characteristic of a project shall be identified in the Structure Name (e.g., REPLACE, RETROFIT, WIDEN, etc.); if more than one characteristic fits, use "MODIFY."

Figure 1.3.2 Structure names

For adjacent structures shown on the same set of plans, such as bridge widenings, joint seal and approach slab replacements, or other similar work, Bridge Numbers shall be given as "XX-XXXXL/R". Refer to Bridge Design Details: 3.1 General Plan Detailing Examples, Attachment 3A.A.10.

Names on Structure Plan Sheets

Names shown on Structure Plan sheets should be placed as each component of the work is completed. The check of both the design and details is performed by the Engineer assigned to be the “Checker”. The Engineer who initiates the engineering design is the “Designer” and is never listed as the “Checker”. The “Designer” and “Checker” are both responsible for a complete review of all the details and ensure they meet the intent of the design. Names should be printed using upper and lowercase text.

Please note that on the GENERAL PLAN sheet, additional names are placed in the border. In the lower left corner, the Design Branch Chief’s name at the time the work was completed is given (see Figure 1.3.5), the Engineers responsible for “Layout” are recorded and the name of the Specifications Engineer is listed for both of the “Specifications” and “Plans and Specs Compared” cells. If the specifications are prepared by a non-registered Engineer, the name of non-registered Specification Engineer is listed in the "Specifications" cell and the name of registered Specifications Reviewer is listed in the "Plans and Specs Compared" cell. In some cases, the names for the seismic analysis will be the same as the designer and checker, while in other cases they may be from another Branch. If seismic analysis is not done on the structure, “N/A” shall be placed in the name boxes.

The Design Branch number is also provided on all Structure Plan sheets.

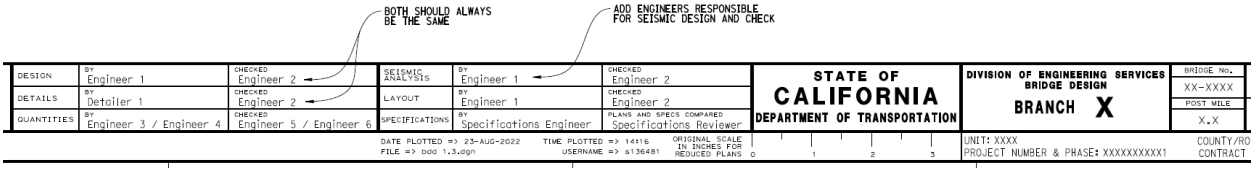


Figure 1.3.3 Names on General Plan Sheet

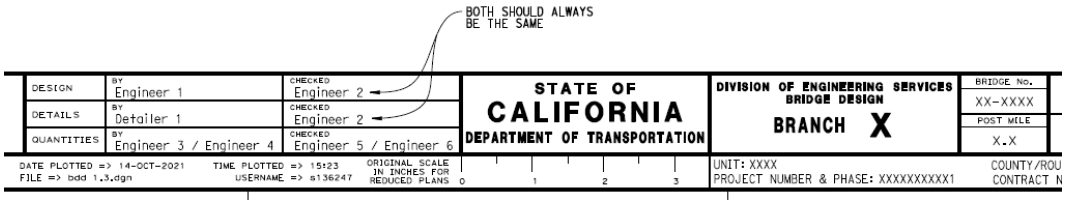
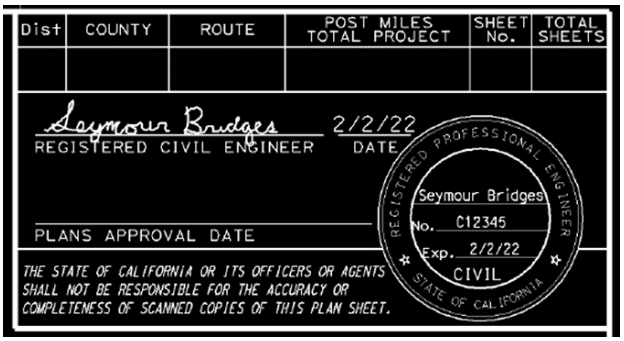


Figure 1.3.4 Names on Structure Plan Sheets

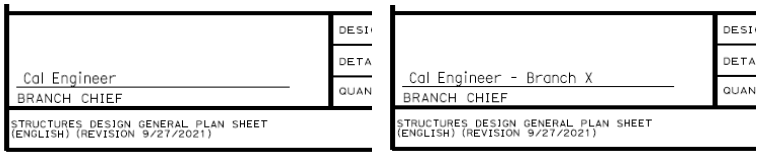
Sheet Title and Signature Block



Typical Index Block includes the signature and seal of registered Project Engineer with name, license number and expiration date. Index Blocks are used on GENERAL PLAN (GP), Detail Sheet(s) and Bridge Standard Detail Sheets (XS Sheets).

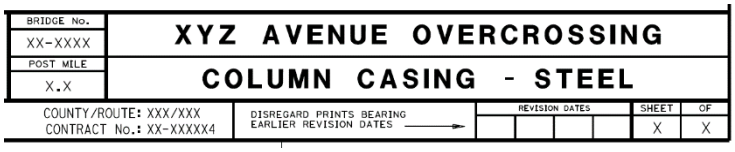
NOTE: Do not change the District placeholder cells (District, County, Route, Post Miles Total Project, Sheet No. or Total Sheets). These placeholders and signatures are placed electronically with date of authorization during the Expedite phase of a project.

Typical Sheet Title Block for Structure Plan Sheets.

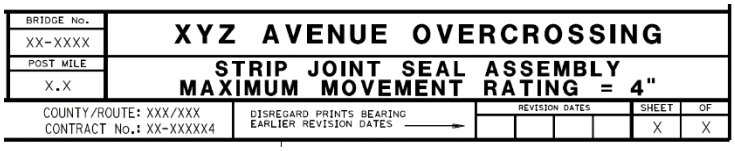


Branch Chief Block on GP sheet.

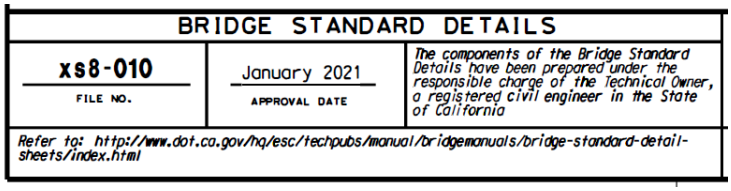
NOTE: Branch Chief name should be printed using upper and lowercase text. Plans created by Consultant for Division of Engineering Services should include the Branch Chief name and number.



Typical Sheet Title Block for Bridge Standard Detail Sheets (XS Sheets).



Typical Sheet Title Block for Bridge Standard Detail Sheets (XS Sheets) with long name.



Typical Signature Block for Bridge Standard Detail Sheets (XS Sheets).

Figure 1.3.5 Sheet titles and signature blocks

Level for Engineer's Signatures

When creating new design sheets, Engineers' signatures and their corresponding expiration dates shall be placed on Level *str_Border_PSE_Signature-A*. This level is dedicated solely to these signatures in order to facilitate easy removal.

Note that this level shall also be utilized for the Project Engineer's signature and date that is recorded in a Change Order (CO) decal.

PE Registration Date

Once a Structure Project Engineer has signed the form for use of electronic signatures and the Structure Design Technician has placed the digitized signature on the sheet, his/her seal information and expiration date remains valid in perpetuity as long as the information on the sheet is unmodified. Any changes made to the sheet will require a new seal and date, or a supplemental seal typically furnished for change orders. This policy applies to all contract plan sheets.

Unit, Phase and Contract Number

The Unit Number on Contract Plan sheet(s) is the four digit cost center number of the Design Branch assigned to do the work. The Project Number is the District assigned Enterprise Financial Infrastructure System (EFIS) number ending with a 1, which identifies Phase 1 design stage of the Plans, Specifications and Estimate (PS&E). The Contract Number is the six digit District Project Expenditure Authorization (EA) number ending with a 4. During the planning phase of projects, the Project EA number is listed as the five digit number preceding the number 4; the project EA only becomes a contract when plans are delivered to construction.

The Project Number & Phase and Contract Number on all Structure Plan sheets must match the number on Roadway Plans and Special Provisions.

Figure 1.3.6 Unit, phase, and contract number

Revision Date Blocks

A) The date in the first box is the date that the CADD file is created (e.g., 09-02-18) This date does not change throughout the life of the sheet

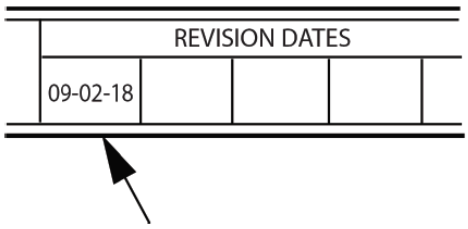


Figure 1.3.7 First date block

B) The next three revision dates follow in the next three boxes (e.g.,10-04-18, 10-06-18, 10-09-18), with the previous revision dates crossed out.

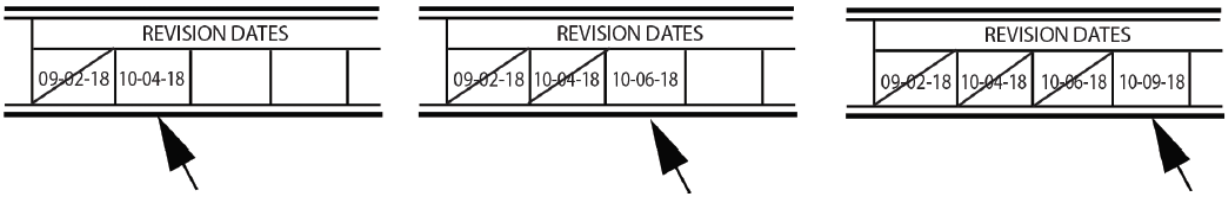


Figure 1.3.8 Revision date blocks

C) If there are more revisions, delete (blank out) the date in the second box. The next revision date (e.g., 10-11-18) will go in the third box. From this point on, alternate dates between the third and fourth boxes only, leaving the creation date in the first box crossed out and the second box empty.

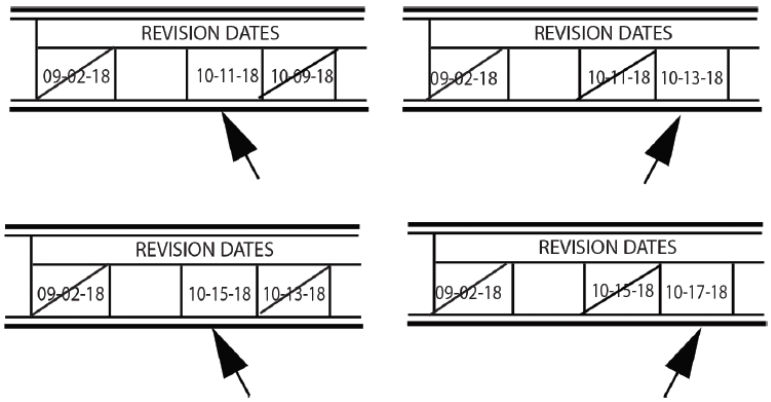


Figure 1.3.9 Additional revision date blocks

Bridge Design Details 1.4 August 2019

Log of Test Boring Modifications

Typically, once the Log of Test Borings (LOTB) sheets have been signed by the Professional Geologist, no modifications shall be made to the plan sheet, except for sheet numbering.

Other modifications to the LOTB sheet(s) may be necessary including adding final alignments after early drilling has been done and final support locations to help with the identification of the location of LOTBs.

If significant changes are required, the following procedure shall be implemented:

- The Project Engineer will send a request for changes to the Professional Geologist whose stamp is on the sheet.
- The Professional Geologist will concur with the proposed changes and the Geotechnical Services staff will make the revisions.
- The revised LOTB sheet(s) CADD file(s) will then be placed into a directory and an email sent to the requesting engineer notifying him/her of the completed LOTB and its location. A new signature authorization form shall be provided with the revised LOTB sheet(s).

For an example of a LOTB sheet, see *Bridge Design Details:* 1.4 Log of Test Boring Detailing Examples, Attachment 1A.C.1.

Log of Test Boring from Image of As-Built Plans

If AS-BUILT LOTB sheet(s) from an existing structure are referenced or used during the foundation investigations, the Professional Geologist may elect to include them in the new contract plans. If included, the Professional Geologist will send a copy of the As-Built LOTB sheet(s) to be used to the Project Engineer.

When As-Built(s) are used for contract plans such as LOTB(s), the following procedures shall be followed:

- As-Built LOTB sheet(s) used for information only shall have a statement to that effect. This NOTE should be added using the standard decal.

For an example of an As-Built LOTB sheet, see *Bridge Design Details:* 1.4 Log of Test Boring Detailing Examples, Attachment 1A.C.2.

Figure 1A.C.1 Log of Test Borings Detailing Example 1

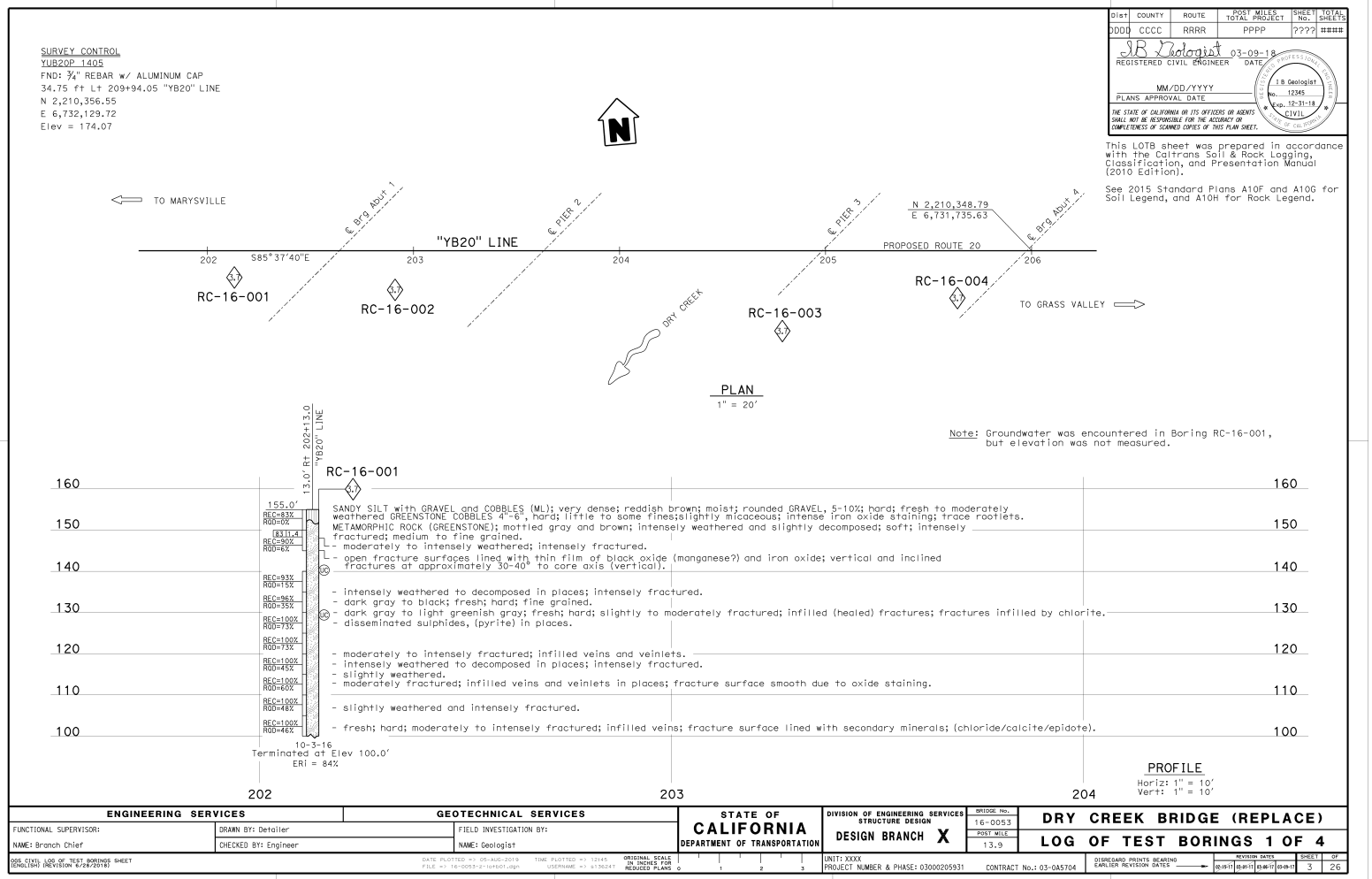
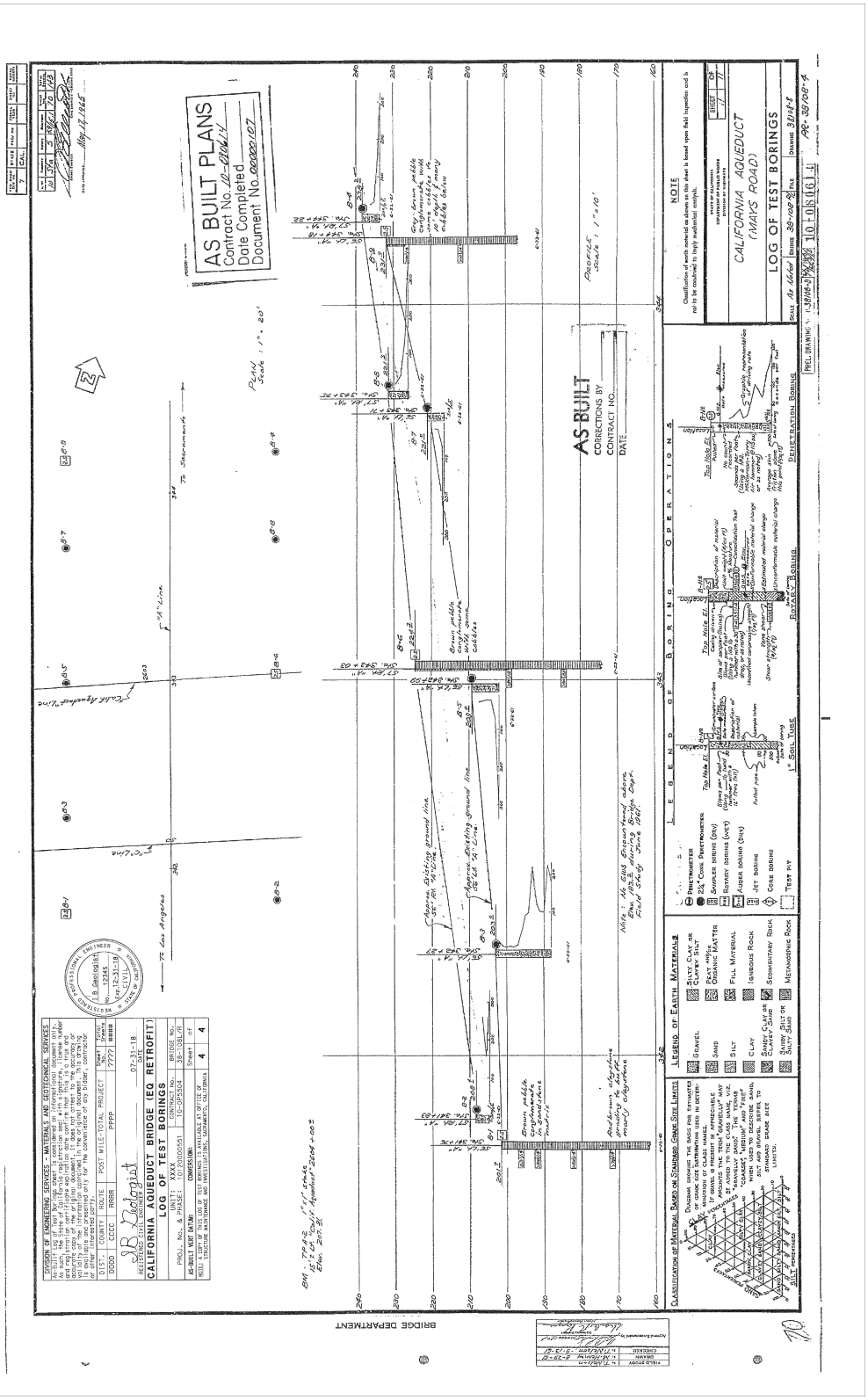


Figure 1A.C.2 Log of Test Borings Detailing Example 2



Bridge Design Details 1.5 January 2023

Use of Standard Plans

The California Department of Transportation issues a book of Standard Plans, which includes Roadway and Bridge Standard Plans. This book is an official part of the contract for all projects.

Typical Standard Plans

Structure Plans shall include a standard plan bubble that refers to the standard detail used for a given design. For a complete list of applicable Standard Plans for structure work, see *Bridge Design Details:* 1.5 List of Standard Plans, Attachment 1A.D.1.

If a Standard Plan sheet has been revised since its original release date, Revised Standard Plans (RSPs) will be provided in the Special Provisions but are not listed in the plans. Structure Project Engineers will provide Standard Plans List Transmittal form to Structure Office Engineer (SOE) at P&Q and Expedite Step 1, see *Bridge Design Details:* 1.5 List of Standard Plans, Attachment 1A.D.1.

Standard Plans that are referenced within the notes or elsewhere on a Standard Plan do not need to be included in the list to SOE. However, if these nested Standard Plans or others used for the design or detailing are revised, the RSP should be provided in the District Roadway Plans placed before the Structure Plans. It is the Project Engineer's and Specification Engineer's responsibility to make sure all the RSPs are included in the structure specifications which will list the RSPs to be included in the final advertised plan set.

Modifying Standard Plan Details

If a detail shown on a Standard Plan sheet is to be modified or replaced for a specific project, a new detail shall be drawn on a structure plan sheet with the modifications required. Once modified, a reference should be made to the associated Standard Plan details used so additional details may be found, if necessary.

Only modifications to Standard Plans need to be shown. Per Standard Specifications (5-1.02), if discrepancy exists the project plans govern over Standard Plans.

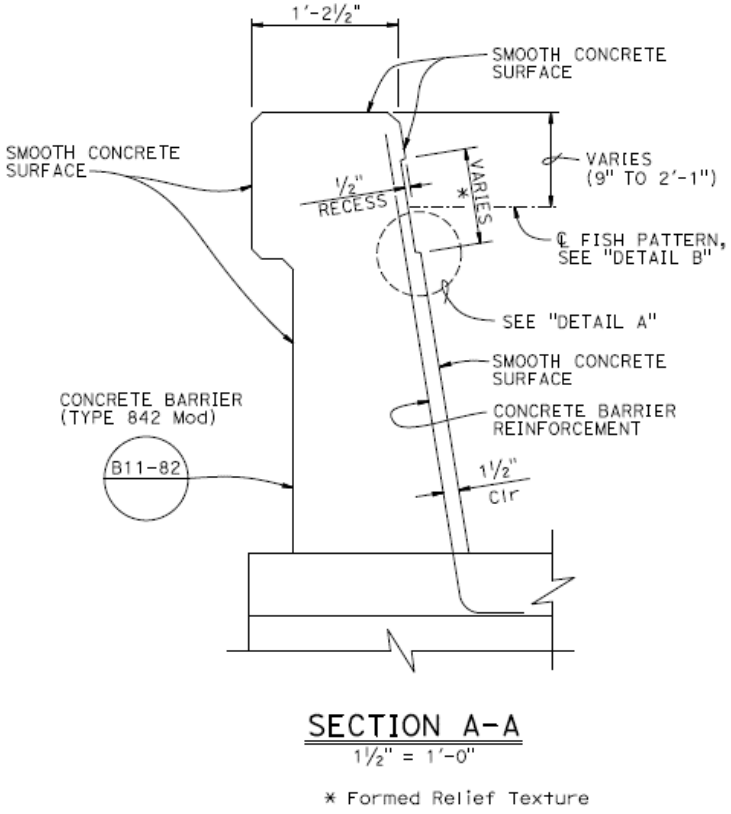


Figure 1.5.1 Example of modified barrier

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES

STRUCTURE STANDARD PLAN LIST TRANSMITTAL

BD-0354 (REV 12/05/2022)

BRIDGE DESIGN

Project ID:	EA:	Project Name:	Date:

- ☐ A3A Abbreviations (Sheet 1 of 3)
- ☐ A3B Abbreviations (Sheet 2 of 3)
- ☐ A3C Abbreviations (Sheet 3 of 3)
- ☐ A10A Legend - Lines & Symbols (Sheet 1 of 5)
- ☐ A10B Legend - Lines & Symbols (Sheet 2 of 5)
- ☐ A10C Legend - Lines & Symbols (Sheet 3 of 5)
- ☐ A10D Legend - Lines & Symbols (Sheet 4 of 5)
- ☐ A10E Legend - Lines & Symbols (Sheet 5 of 5)
- ☐ A10F Legend - Soil (Sheet 1 of 2) *
- ☐ A10G Legend - Soil (Sheet 1 of 2) *
- ☐ A10H Legend – Rock *
- ☐ A62A Excavation & Backfill - Miscellaneous Details
- ☐ A62B Limits of Payment for Excavation & Backfill – Bridge Surcharge and Wall
- ☐ A62C Limits of Payment for Excavation & Backfill – Bridge
- ☐ B0-1 Bridge Details
- ☐ B0-3 Bridge Details
- ☐ B0-5 Bridge Details
- ☐ B0-13 Bridge Details
- ☐ B2-3 16" and 24" Cast-in-Drilled-Hole Concrete Pile
- ☐ B2-5 Pile Details - Class 90 and Class 140 *
- ☐ B2-8 Pile Details - Class 200 *
- ☐ B2-9 Load Pile Details (1)
- ☐ B2-10 Load Pile Details (2)
- ☐ B2-11 Load Pile Details (3)
- ☐ B3-1A Retaining Wall Type 1 (Case 1)
- ☐ B3-1B Retaining Wall Type 1 (Case 2)
- ☐ B3-1C Retaining Wall Type 1 (Case 3)
- ☐ B3-3A Retaining Wall Type 1A (Case 1)
- ☐ B3-3B Retaining Wall Type 1A (Case 2)
- ☐ B3-4A Retaining Wall Type 5 (Case 1) *
- ☐ B3-4B Retaining Wall Type 5 (Case 2) *
- ☐ B3-4C Retaining Wall Type 5 (Case 3) *
- ☐ B3-5 Retaining Wall Details No.1
- ☐ B3-6 Retaining Wall Details No.2
- ☐ B3-7A Retaining Wall Type 6 (Case 1) *
- ☐ B3-7B Retaining Wall Type 6 (Case 2) *
- ☐ B3-7C Retaining Wall Type 6 Details
- ☐ B6-1 T-Beam Details
- ☐ B6-10 Utility Openings - T-Beam
- ☐ B6-21 Joint Seals (Maximum Movement Rating = 2")
- ☐ B7-1 Box Girder Details
- ☐ B7-5 Deck Drains
- ☐ B7-6 Deck Drains - Type D-1 & D-2
- ☐ B7-7 Deck Drain Type D-3
- ☐ B7-8 Deck Drainage Details
- ☐ B7-10 Utility Opening - Box Girder
- ☐ B7-11 Utility Details
- ☐ B8-5 Cast-in-Place Post Tensioned Girder Details
- ☐ B9-1 Structure Approach - Type N (30)
- ☐ B9-2 Structure Approach - Type R (30)
- ☐ B9-3 Structure Approach - Type R (10)
- ☐ B9-4 Structure Approach - Type EQ (10)
- ☐ B9-5 Structure Approach - Slab Details
- ☐ B9-6 Structure Approach - Drainage Details
- ☐ B11-7 Chain Link Railing
- ☐ B11-47 Cable Railing
- ☐ B11-51 Tubular Hand Railing
- ☐ B11-52 Chain Link Railing Type 7
- ☐ B11-58 Concrete Barrier - Type 732SW (Sheet 1 of 2)
- ☐ B11-59 Concrete Barrier - Type 732 SW (Sheet 2 of 2)
- ☐ B11-71 California ST-20S Bridge Rail (Sheet 1 of 4)
- ☐ B11-72 California ST-20S Bridge Rail (Sheet 2 of 4)
- ☐ B11-73 California ST-20S Bridge Rail (Sheet 3 of 4)
- ☐ B11-74 California ST-20S Bridge Rail (Sheet 4 of 4)
- ☐ B11-75 California ST-70 Bridge Rail (Sheet 1 of 4)
- ☐ B11-76 California ST-70 Bridge Rail (Sheet 2 of 4)
- ☐ B11-77 California ST-70 Bridge Rail (Sheet 3 of 4)
- ☐ B11-78 California ST-70 Bridge Rail (Sheet 4 of 4)
- ☐ B11-79 Concrete Barrier Type 836 Details No. 1 *
- ☐ B11-80 Concrete Barrier Type 836 Details No. 2 *
- ☐ B11-81 Concrete Barrier Type 842 Details No. 1 *
- ☐ B11-82 Concrete Barrier Type 842 Details No. 2 *
- ☐ B11-83 Concrete Barrier Type 85 Details No. 1
- ☐ B11-84 Concrete Barrier Type 85 Details No. 2
- ☐ B11-85 Concrete Barrier Type 85 Details No. 3
- ☐ B14-1 Structural Steel Plate Vehicular Undercrossing
- ☐ B14-3 Communication and Sprinkler Control Conduits (Conduits < 4")
- ☐ B14-4 Water Supply Line (Bridge) (Pipe Sizes Less than 4")
- ☐ B14-5 Water Supply Line (Details) (Pipes Size Less than 4")
- ☐ B15-1 SW Masonry Block on Footing Detail 1
- ☐ B15-2 SW Masonry Block on Footing Detail 2 *
- ☐ B15-3 SW Masonry Block on Pile Cap Detail (1)
- ☐ B15-4 SW Masonry Block on Pile Cap Detail (2)
- ☐ B15-5 SW Masonry Block on Pile Cap Detail (3)
- ☐ B15-6 SW Masonry Block on Type 736S/SV Barrier Details (1)
- ☐ B15-7 SW Masonry Block on Type 736S/SV Barrier Details (2)
- ☐ B15-8 SW Masonry Block on Type 736S/SV Barrier Details (3)
- ☐ B15-9 SW Masonry Block Miscellaneous Details Plans
- ☐ B15-10 SW Masonry Block on Footing/Pile Cap - 5' Access Gate Details (1)
- ☐ B15-11 SW Masonry Block on Footing/Pile Cap - 5' Access Gate Details (2)
- ☐ B15-12 SW Masonry Block on Barrier - 5' Access Gate Details (1)
- ☐ B15-13 SW Masonry Block on Barrier - 5' Access Gate Details (2)
- ☐ B15-14 SW Masonry Block Access Gate Locking Details
- ☐ B15-15 SW Masonry Block on Type 736S/SV Barrier on Pile Footing for Spanning Utilities

OTHER(s):

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

*Updated as of November 18, 2022.

Bridge Design Details 1.6 October 2021

Use of Bridge Standard Detail Sheets (XS Sheets)

Bridge Standard Details (XS SHEETS) contain pre-engineered details for a variety of structural components, such as earth retaining systems, sound walls, joint seal assemblies, bridge railings, and underground structures. The use of XS SHEETS provides an efficient means of reducing engineering and detailing efforts for a specific project.

XS SHEETS may be incorporated into the project “as is” (unmodified) or with modifications. XS SHEETS inserted into the plans as detail sheets shall contain details and dimensions specific to a set of Structure Plans or District Roadway Plans. XS SHEETS are to be signed by the Project Engineer who is responsible for the selection and proper application of the component design and any modifications shown. Individual XS SHEET User Guides generated by Technical Owners are posted online with specific information for each XS SHEET.

Eventually, XS SHEETS posted on-line may become Standard Plans. By becoming Standard Plans, the number of Structure Plan sheets may be reduced in the future and the details will be available for all contracts.

Modifying Bridge Standard Detail Sheets

Modifications to an XS SHEET shall be denoted as follows:

- Modifications shall be indicated by a pentagon shaped symbol (⬠) placed near the revised portion of the detail. A modification number shall be placed inside the pentagon (e.g.,⬠2). Consecutively numbered pentagons shall be used to indicate multiple changes.
- Corresponding symbols and brief explanations shall be placed in the border at bottom left-center.
- Details and notes that do not apply shall be crossed out. Any details or notes that are removed or replaced shall be indicated as a modification.
- The text “SPECIAL DETAILS” shall be added directly above the title block of the XS SHEET.
- If more than one modified XS SHEET is needed for a project or structure, the modification numbers (e.g.,⬠1,⬠2) shall start over with each modified XS SHEET.

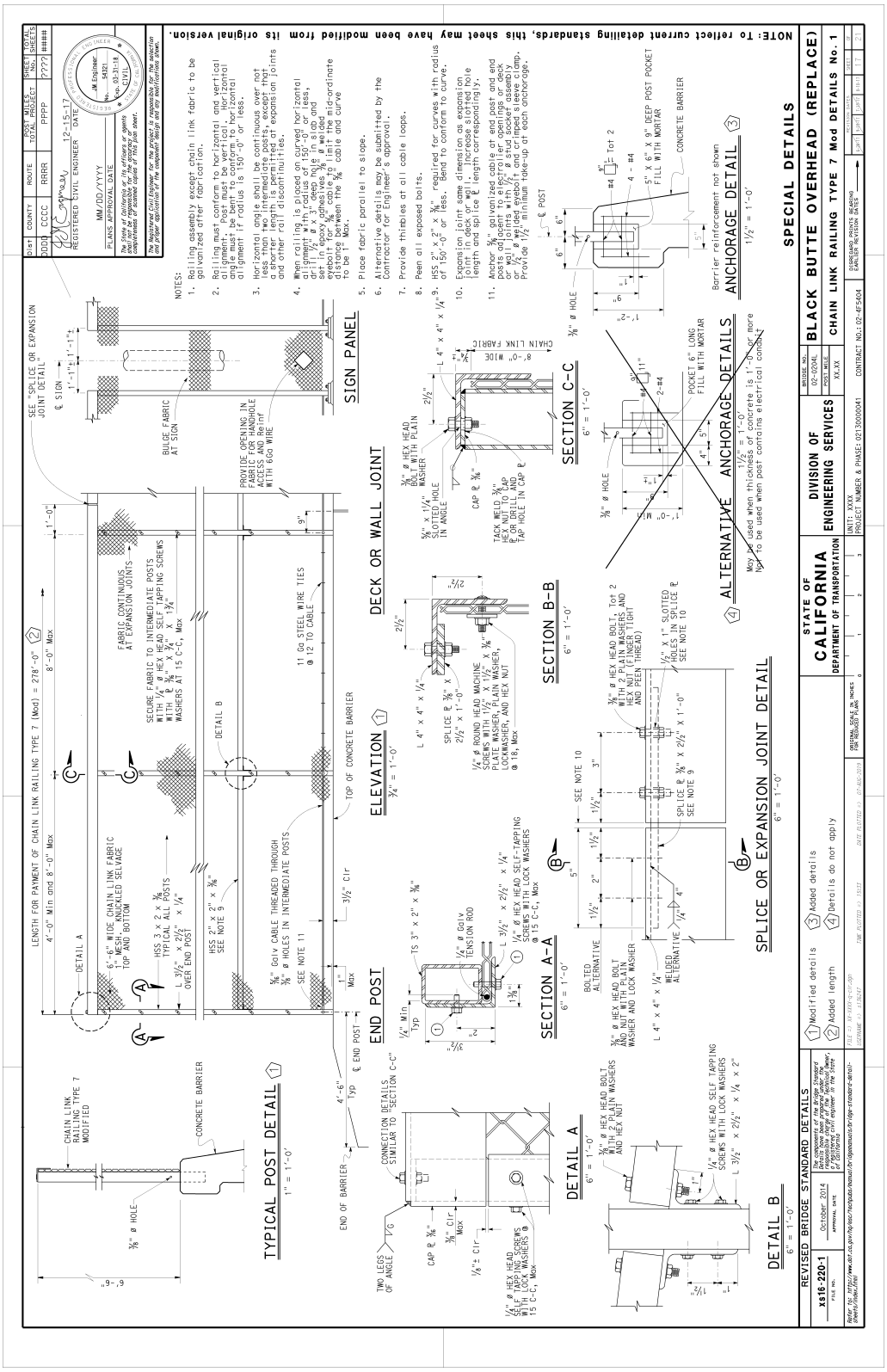
- When directed by the Specifications Engineer, “(Mod)” shall be added after the XS SHEET title to indicate that the modifications in the XS SHEET impact the bid item of the structural component and the standard bid item designation no longer applies.

If significant modifications to the XS SHEETS are required, the Project Engineer may place the modified details and notes on a new Structure Design Detail sheet in a structures detail border. The Project Engineer shall consult with the Technical Owner of the XS SHEET to fully discuss the design methodology and the impacts of the changes. If a new sheet is used, the details shall be designed, detailed, and checked as a new structural component by the project design team. To avoid confusion, the new Sheet Title shall conform to the given set of plans and be different from the XS SHEETS from which the details are derived.

The latest XS SHEETS and associated Technical Owners can be found on-line.

See *Bridge Design Details:* 1.6 Modified Bridge Standard Detailing Example, Attachment 1A.E.1 for an example of a modified XS SHEET.

Figure 1A.E.1 Modified Bridge Standard Detail Sheet Detailing Example



Bridge Design Details 1.7 August 2019

Use of CADD Cells or Components

Addition, modification or deletion of standard structural cells or components should be coordinated through the Bridge Design Detailing Technical Committee. Once approved, the changes are submitted to the Structures CADD Software Support Unit for implementation.

It is good practice to routinely update CADD structure cell libraries, as cells are constantly being improved. To update the CADD structure cell library, run the “BATCH FILE UPDATE” tool.

Bridge Design Details 1.19 August 2022

Transmitting Late Plan Changes (Prior to RTL)

It may be necessary to revise the structure plans after they have been sent to the District Office Engineer (DOE), but before they have been advertised. If this situation occurs, the Structure Office Engineer (SOE) and the DOE shall be alerted that new plan sheets are to be updated by the Design Branch. The Structure Design Branch then fills out the file request form, *REQUEST FOR ELECTRONIC CONTRACT DRAWINGS* illustrated in *Bridge Design Details*: 1.20.6, as *revisions* and submits it to Structures CADD Software Support (SCSS). SCSS will contact DOE to retrieve the most up-to-date files and place them in a folder on the *S:\pickup* directory.

Addendum detail changes on the plans shall not be crossed out as the entire plan sheet is either REPLACED or ADDED showing the modified details. For addendums that require quantity decal changes, the quantity shall be crossed out to match the SOE Bid Item List in the project specifications. Once the revised plan sheets are complete, they shall be reviewed by the SOE Cost Estimator again to determine if re-certification of the estimate is required. Only then may the Design Branch re-submit the files to SCSS using the form *AADD CADD SUBMITTAL*, “Revised” option shall be selected.

Refer to the *Procedures for Processing Electronic Structure Plans* manual for more information.

Revision: Changes After RTL and Before Advertising

No changes shall be made to project plan sheets after they have been forwarded to DOE as part of the PS&E package without the *approval* of the Project Engineer from the Design Branch involved. To ensure that no unauthorized changes are made, DOE personnel in charge of project plans will not allow anyone access to the project plans without this approval.

When changes are made to the project plans, notify SOE so the specifications engineer, and cost estimator can meet his/her responsibility by making the Special Provisions and Engineer’s Estimate consistent with the structure plans.

Addendum: Changes After Advertising and Before Bid Opening

To be sure that all bidders have the same contract plan sheets, no revisions shall be made on project plans between the time the prints are made for advertising and the bid opening, *except* when a formal addendum is issued. An addendum is coordinated with the DOE and SOE.

During this period, requests to obtain the original project plans shall include authorization from SOE. The structure plan files shall be retrieved from DOE using the *REQUEST FOR ELECTRONIC CONTRACT DRAWINGS* form.

DOE will handle placement of the Addendum Number and revision of the sheet numbers, if necessary, for all projects. Projects that have an addendum will be handled by the submitting Design Branch as denoted below.

- If the addendum sheet is *replacing* a previously advertised sheet, the note will read:

  The replacement sheet number will be the same as the sheet being replaced (without an “R”) so that the addendum is not confused with possible future change orders. If revisions are too numerous to show with triangles, the entire sheet can be replaced with one triangle added to the top right of the sheet near the Project Engineer seal. For examples of addendum sheet replacements, see *Bridge Design Details:* 1.19 Addendum Detailing Examples, Attachments 1A.F.1 through 1A.F.5.

- If a new sheet is being *inserted* as part of the addenda, then the note will read:

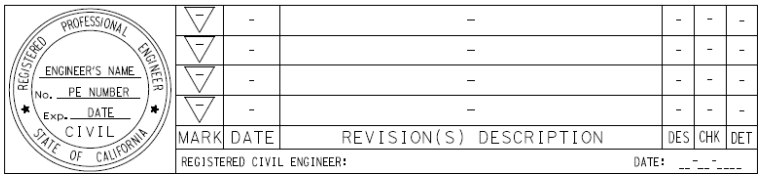
  

  The sheet number used for the new addendum sheet will be in accordance with the sequence of sheets to which it is being inserted (e.g., if sheet number 245 went out for advertisement and a new sheet is being inserted that belongs to that series of sheets, the addendum sheets need to be sequenced behind sheet number 245 following the logic of the job. The numbers will be 245A, 245B, 245C, etc.). The total number of sheets for a set of plans should not be changed. One triangle shall be added to the top right of the sheet near the Project Engineer seal. For an example of added addendum sheet, see *Bridge Design Details:* 1.19 Addendum Detailing Example, Attachments 1A.F.6 through 1A.F.7.

Addendum: Changes to Project Engineer Before Bid Opening

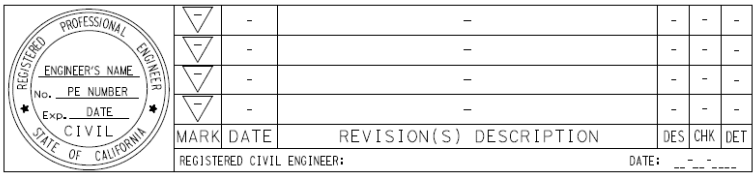
If the project Engineer is no longer available to process Addendum or with the state, the addendum sheet shall be prepared by a new licensed Engineer. The new Project Engineer will take responsibility for only the revisions associated with the addendum. For examples of addendum sheet replacements, see *Bridge Design Details:* 1.19 Addendum Detailing Example, Attachment 1A.F.8. Projects that have an addendum with new Engineer will be handled by the submitting Design Branch as denoted below.

- If the addendum sheet is replacing a previously advertised sheet, the Addendum revision block and note will be added. A number is placed within the triangle that refers to the revision specified in the Addendum revision block:



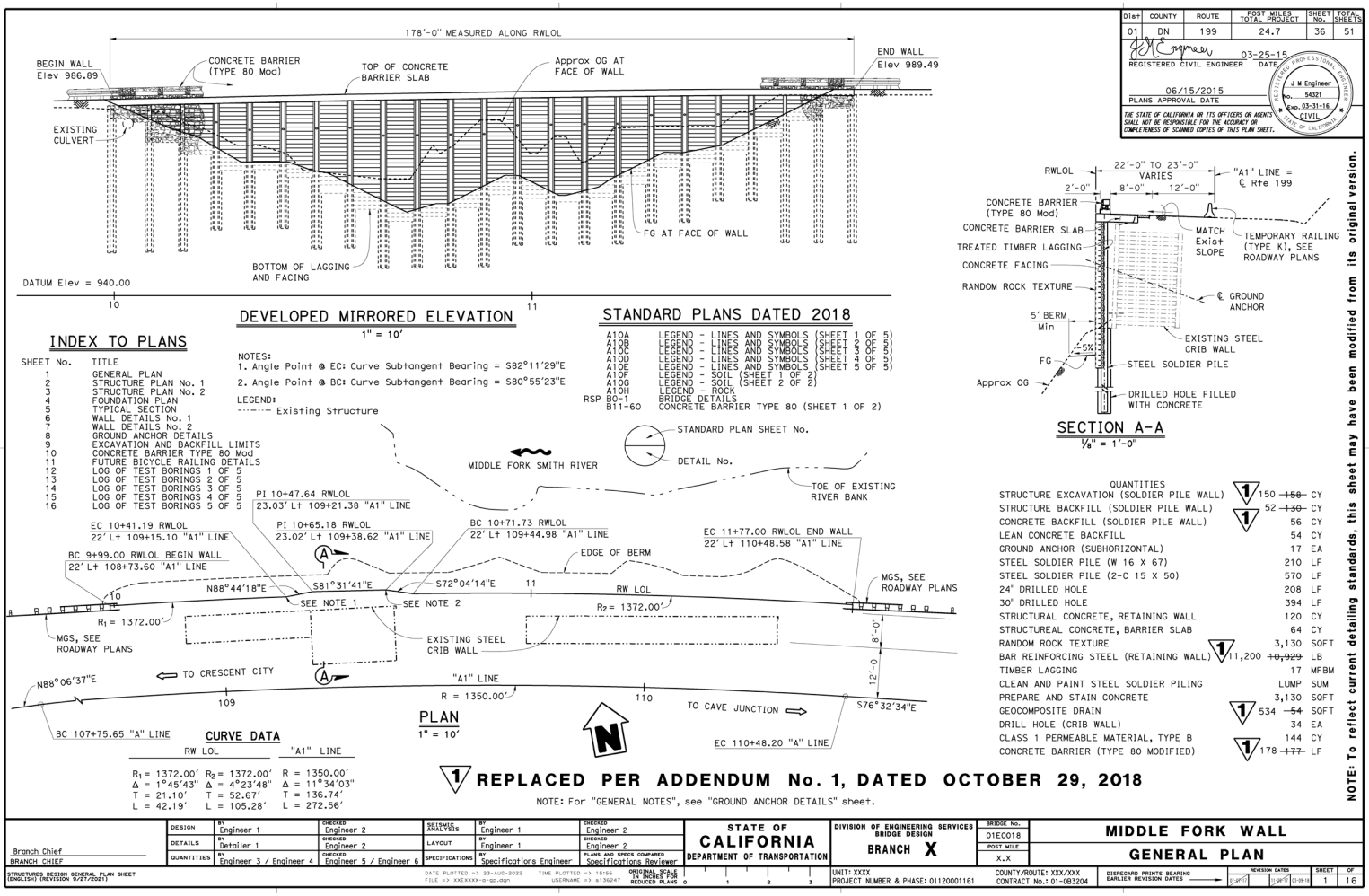
REPLACED PER ADDENDUM No. X, DATED MONTH X, 20XX

- If a new sheet is being inserted as part of the addenda, then the note will read:



ADDED PER ADDENDUM No. X, DATED MONTH X, 20XX

Figure 1A.F.1 Addendum Detailing Example 1



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	DN	199	24.7	36	51

J M Engineer 03-25-15
REGISTERED CIVIL ENGINEER DATE

06/15/2015
PLANS APPROVAL DATE

J M Engineer No. 54321 Exp. 03-31-16 CIVIL

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

QUANTITIES		
STRUCTURE EXCAVATION (SOLDIER PILE WALL)	1 150 ~~158~~	CY
STRUCTURE BACKFILL (SOLDIER PILE WALL)	1 52 ~~130~~	CY
CONCRETE BACKFILL (SOLDIER PILE WALL)		56 CY
LEAN CONCRETE BACKFILL		54 CY
GROUND ANCHOR (SUBHORIZONTAL)		17 EA
STEEL SOLDIER PILE (W 16 X 67)		210 LF
STEEL SOLDIER PILE (2-C 15 X 50)		570 LF
24" DRILLED HOLE		208 LF
30" DRILLED HOLE		394 LF
STRUCTURAL CONCRETE, RETAINING WALL		120 CY
STRUCTUREAL CONCRETE, BARRIER SLAB		64 CY
RANDOM ROCK TEXTURE	1 3,130	SQFT
BAR REINFORCING STEEL (RETAINING WALL)	1 11,200 ~~10,929~~	LB
TIMBER LAGGING		17 MFBM
CLEAN AND PAINT STEEL SOLDIER PILING		LUMP SUM
PREPARE AND STAIN CONCRETE		3,130 SQFT
GEOCOMPOSITE DRAIN	1 534 ~~54~~	SQFT
DRILL HOLE (CRIB WALL)		34 EA
CLASS 1 PERMEABLE MATERIAL, TYPE B		144 CY
CONCRETE BARRIER (TYPE 80 MODIFIED)	1 178 ~~177~~	LF

NOTE: To reflect current detailing standards, this sheet may have been modified from its original version.

1 REPLACED PER ADDENDUM No. 1, DATED OCTOBER 29, 2018

NOTE: For "GENERAL NOTES", see "GROUND ANCHOR DETAILS" sheet.

DESIGN	BY Engineer 1	CHECKED Engineer 2	SEISMIC ANALYSIS	BY Engineer 1	CHECKED Engineer 2
DETAILS	BY Detailer 1	CHECKED Engineer 2	LAYOUT	BY Engineer 1	CHECKED Engineer 2
QUANTITIES	BY Engineer 3 / Engineer 4	CHECKED Engineer 5 / Engineer 6	SPECIFICATIONS	BY Specifications Engineer	PLANS AND SPECS COMPARED Specifications Reviewer

Branch Chief
BRANCH CHIEF

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 01E0018
POST MILE X.X

MIDDLE FORK WALL
GENERAL PLAN

STRUCTURES DESIGN GENERAL PLAN SHEET (ENGLISH) (REVISION 9/27/2021)

DATE PLOTTED => 23-AUG-2022 TIME PLOTTED => 15:56
FILE => XXEXXXX-a-gp.dgn USERNAME => e136247

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: XXXX
PROJECT NUMBER & PHASE: 01120001161

COUNTY/ROUTE: XXX/XXX
CONTRACT No.: 01-0B3204

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 01-APR-22 10-09-18

SHEET 1 OF 16

Figure 1A.F.2 Addendum Detailing Example 2

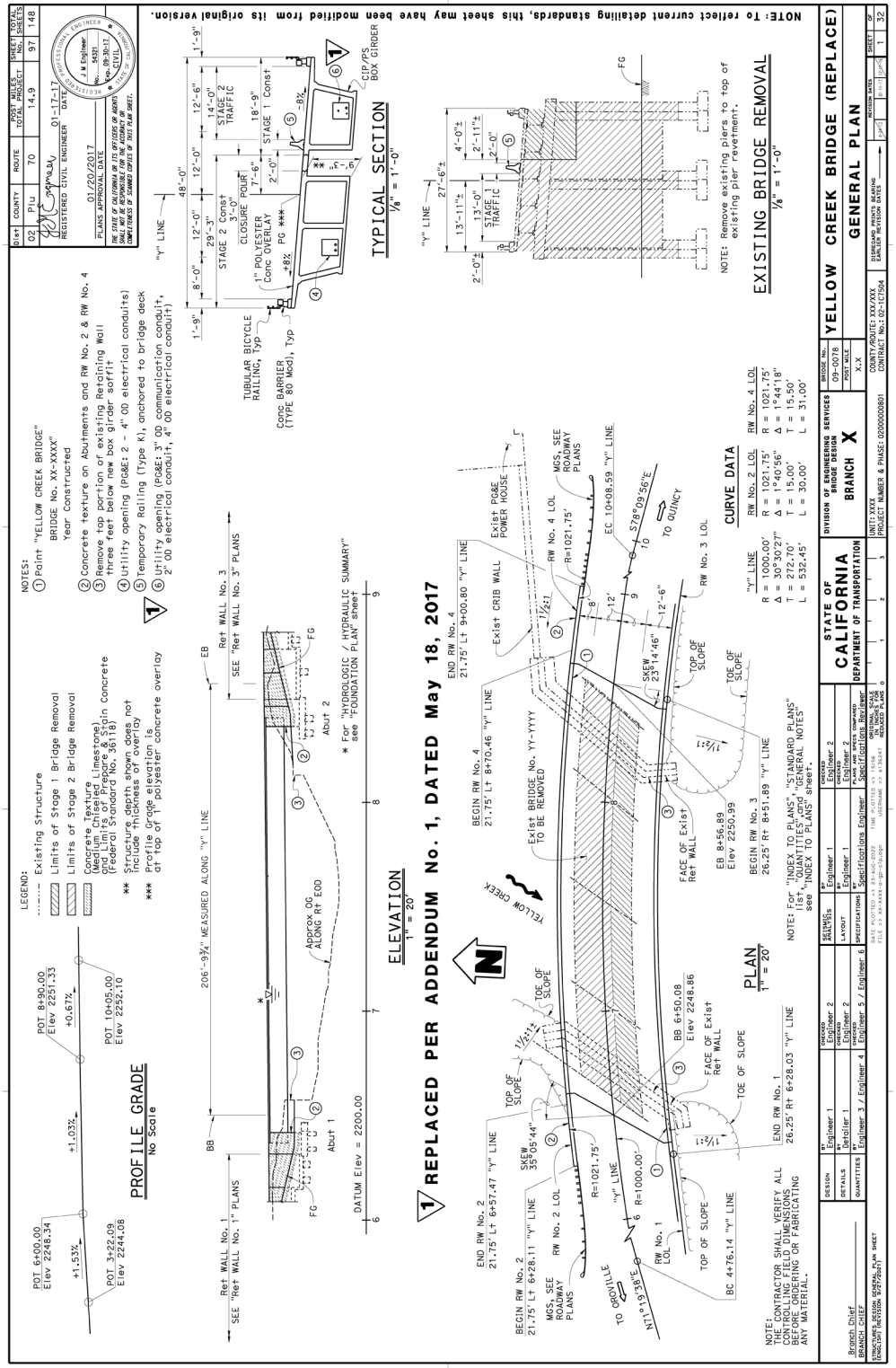


Figure 1A.F.3 Addendum Detailing Example 3

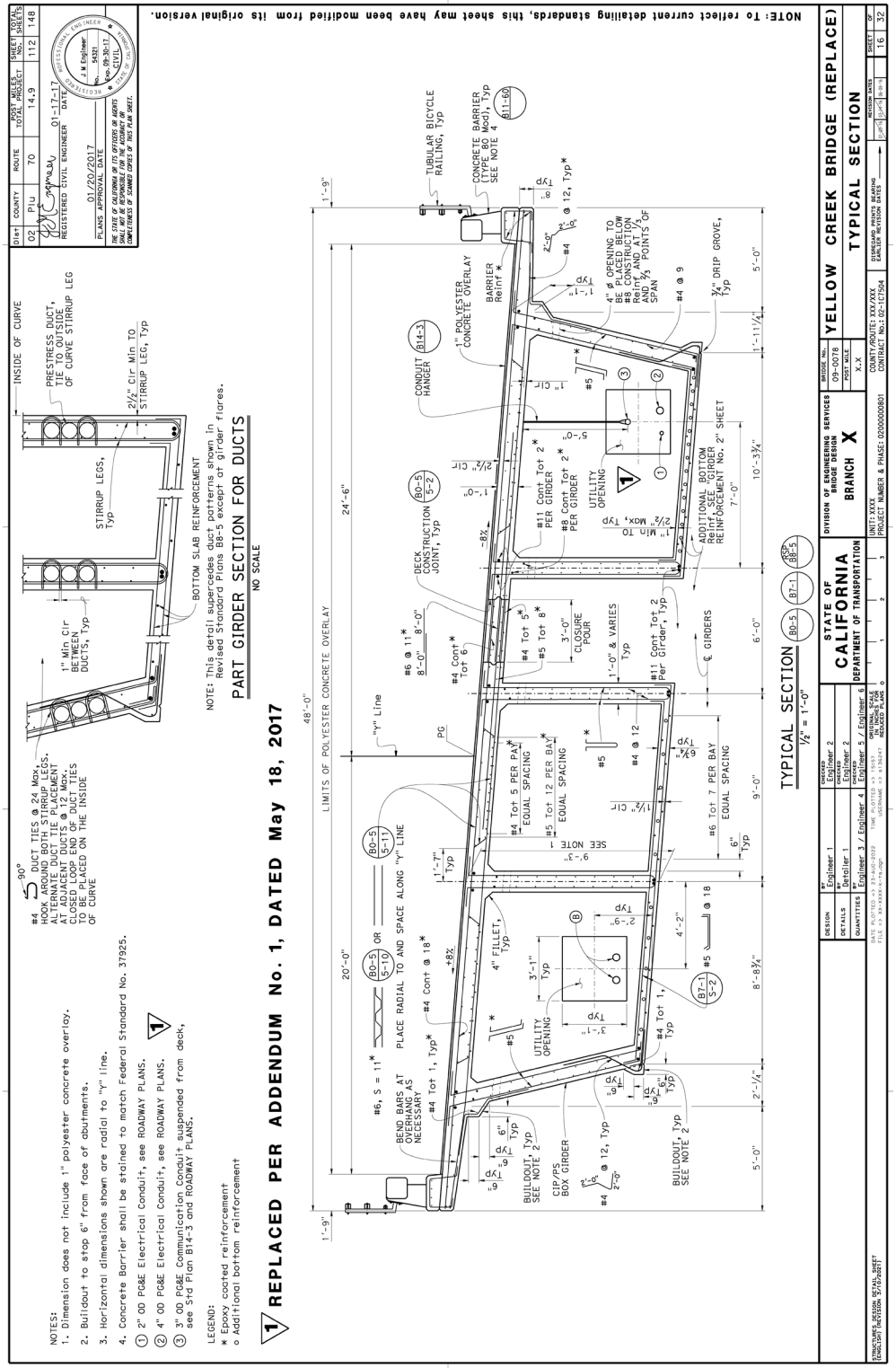


Figure 1A.F.4 Addendum Detailing Example 4

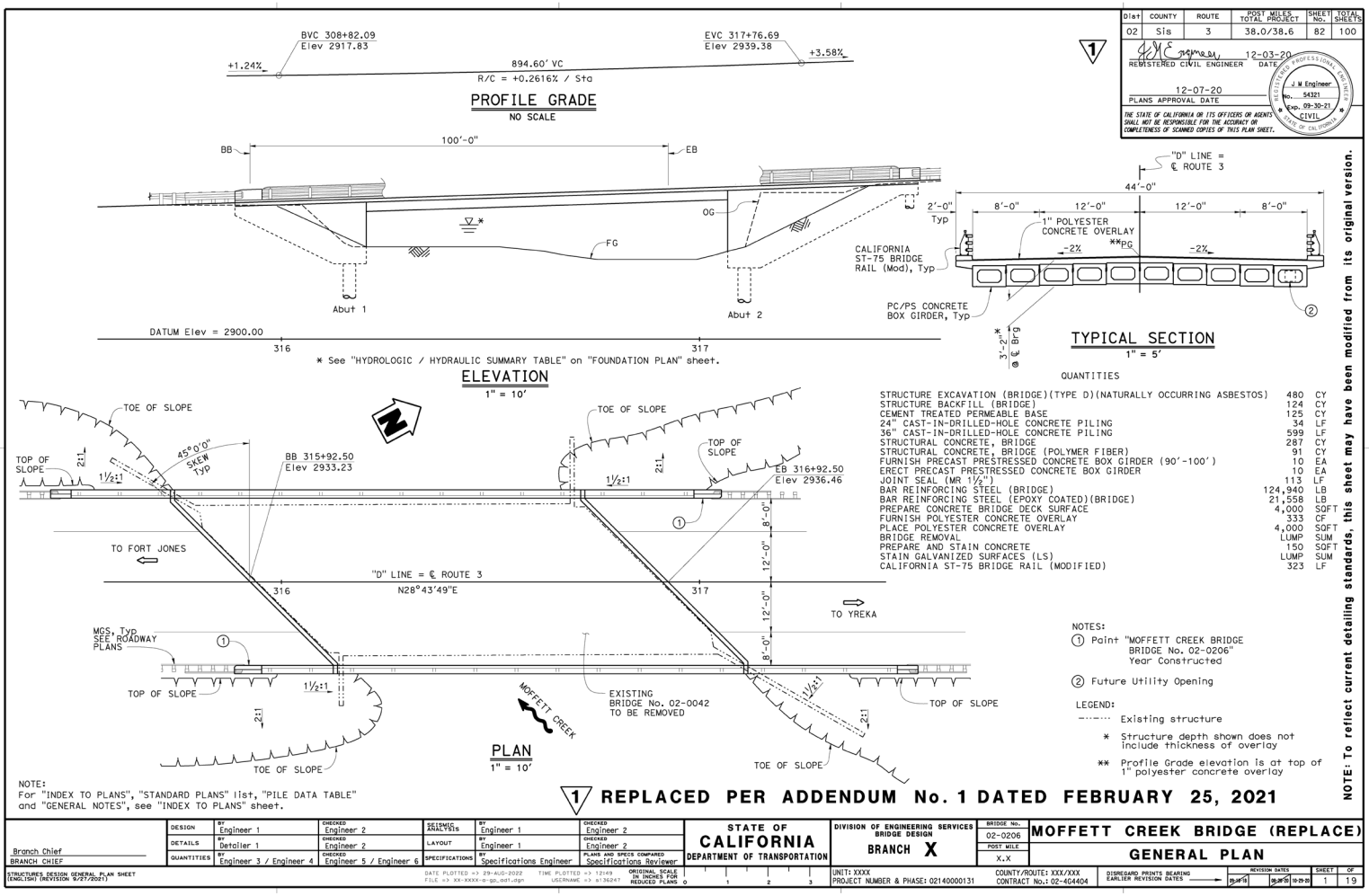


Figure 1A.F.5 Addendum Detailing Example 5

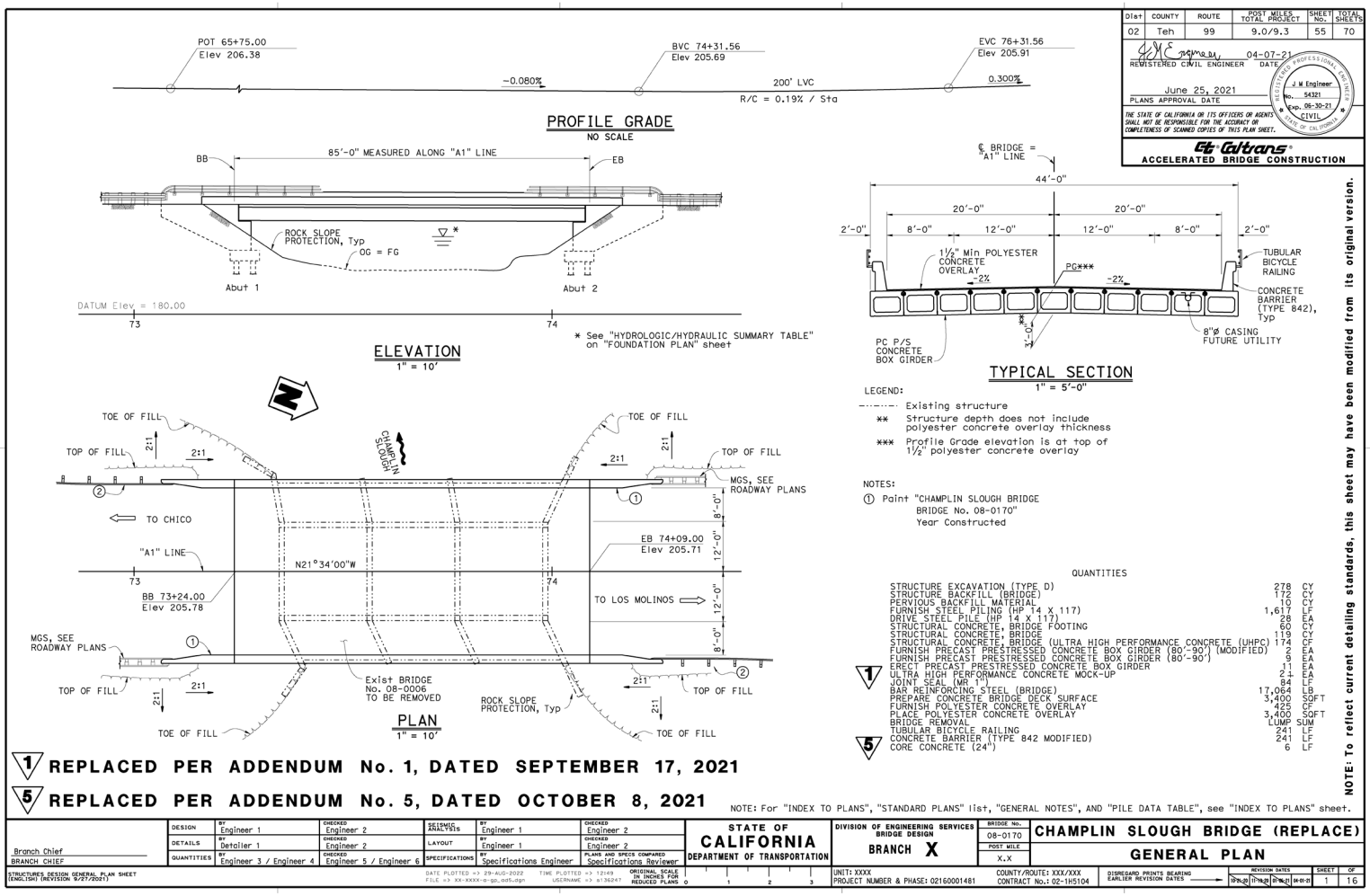


Figure 1A.F.6 Addendum Detailing Example 6

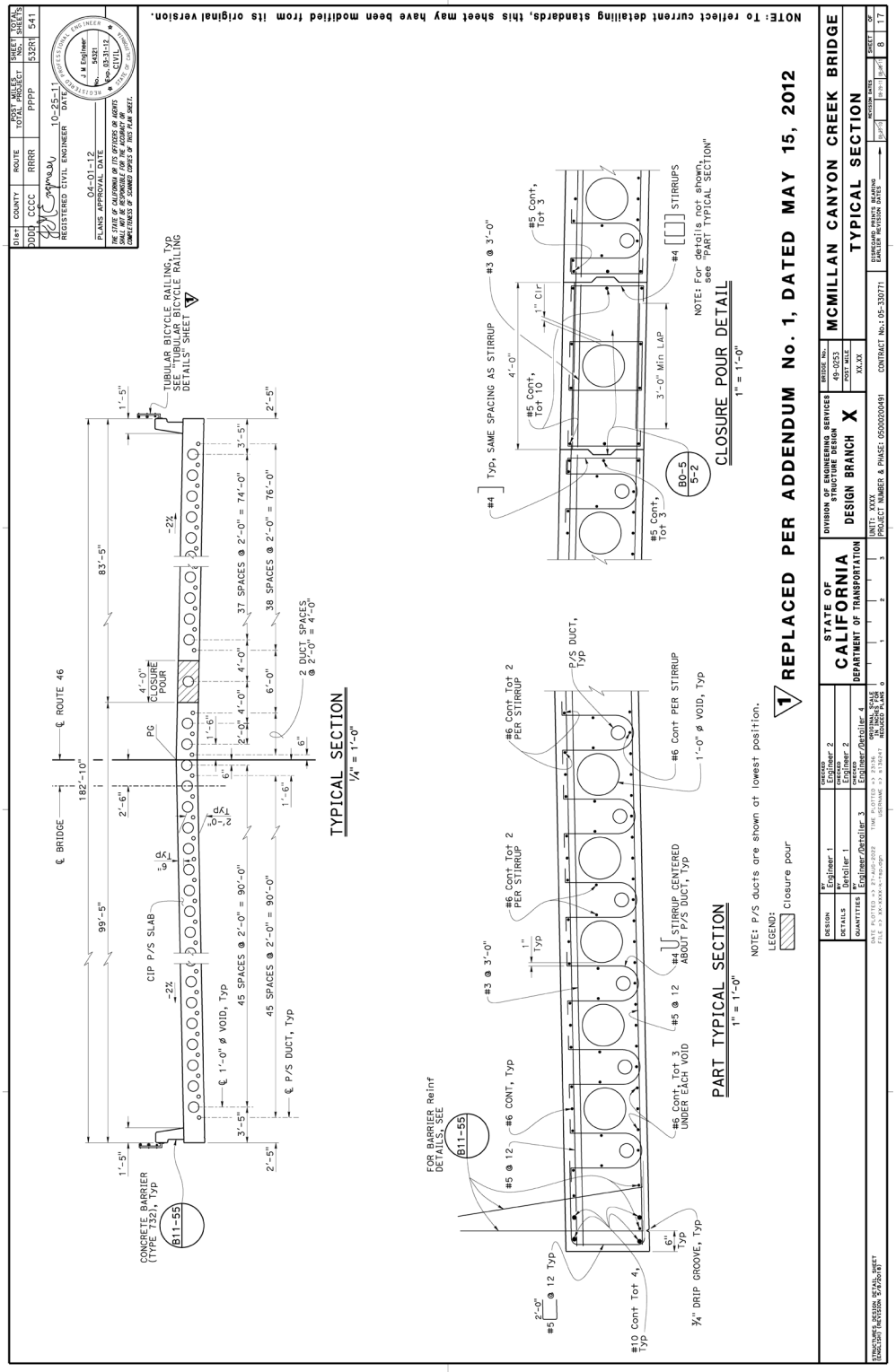


Figure 1A.F.7 Addendum Detailing Example 7

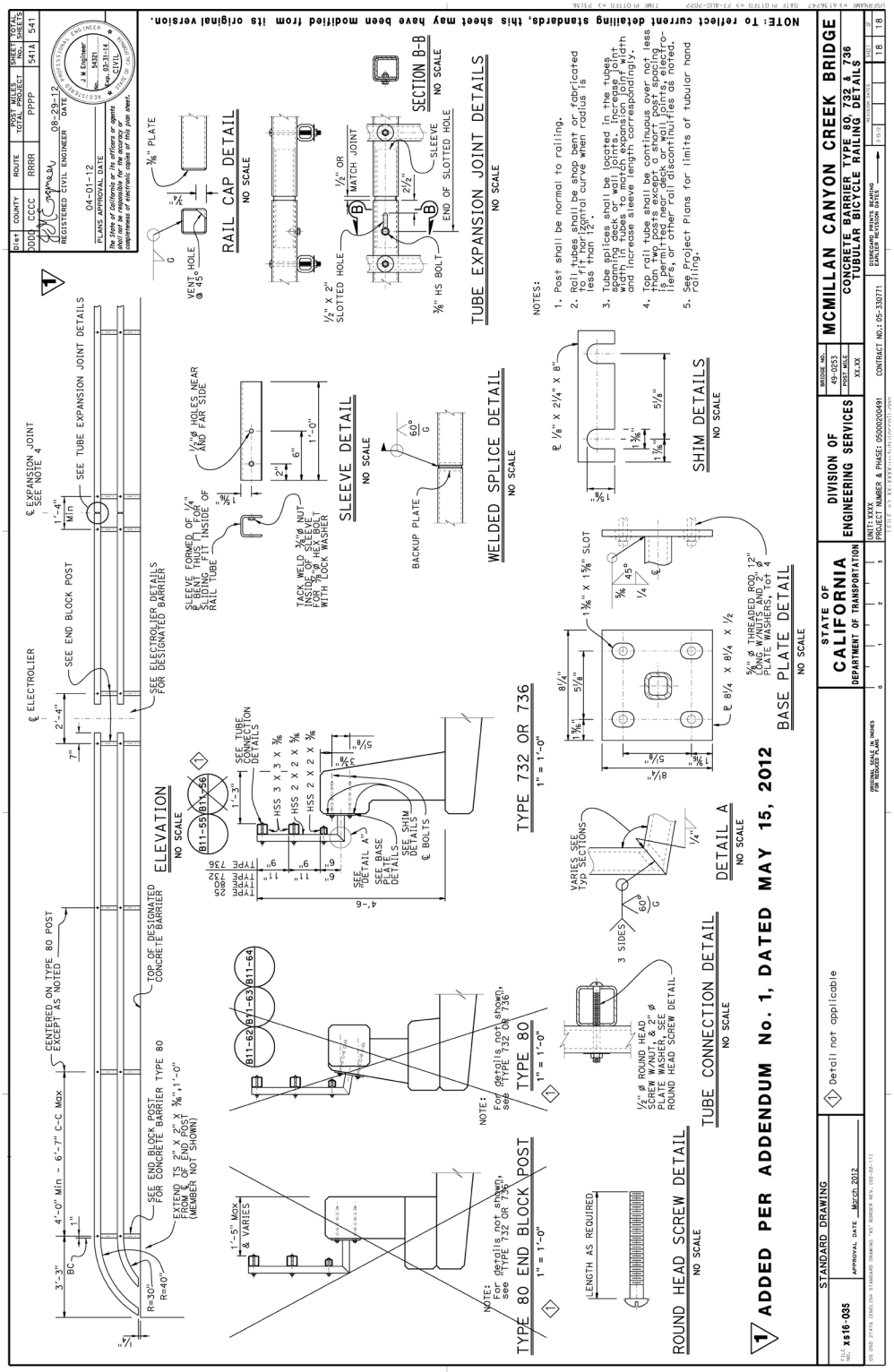
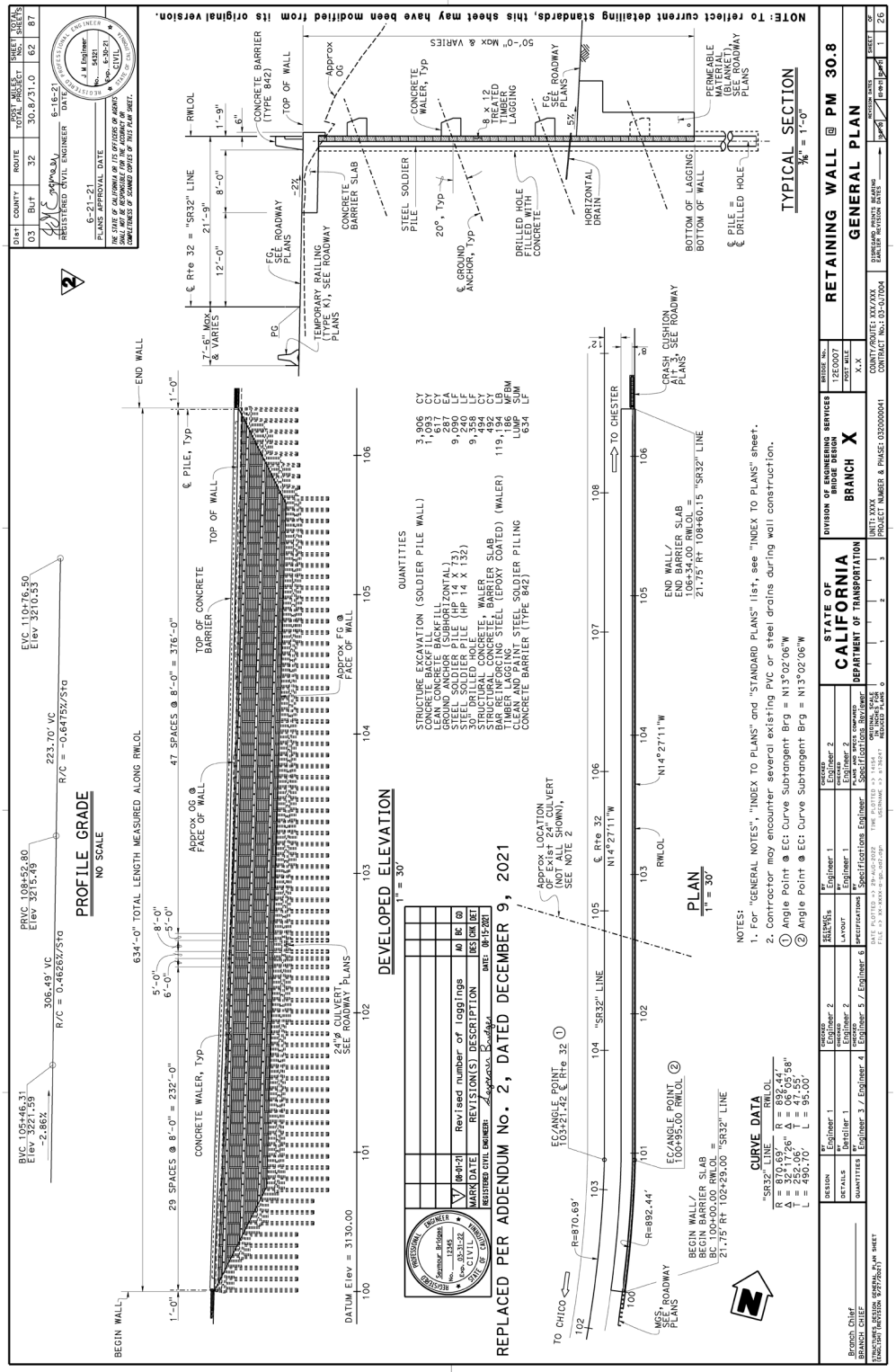


Figure 1A.F.8 Addendum Detailing Example 8



Bridge Design Details 1.20 January 2023

Revisions to Contract Plans by Change Order

The original contract plan files may NOT be retrieved after Bid Opening until the contract is *approved*.

After Contract Approval, all sheets needing revisions shall be retrieved by the Structures CADD Software Support (SCSS) Unit using the *REQUEST FOR ELECTRONIC CONTRACT DRAWINGS* and submitted back to SCSS using the CCO/As-Built TRANSMITTAL form, illustrated in Figure 1.20.2 and Figure 1.20.3. Refer to the *Procedures for Processing Electronic Structure Plans* manual for more information.

After Award Revisions

Once a contract is *approved* or has reached "After Awarded" status, contract plan sheet(s) can be added, supplemented, revised or deleted through a Change Order (CO) as follows:

1. Revisions:
   (a) Partial revisions (e.g., *adding*, *deleting*, or *revising* existing details, text, etc.) or,
   (b) Total *replacement* of the original contract plan sheets.
2. Supplemental sheets (e.g., additional information to *supplement* existing plans).
3. Additional sheets (e.g., new project plan sheet covering *additional* information not in the scope of the original contract plans).
4. Deleted sheets (e.g., entire sheet from original contract plans is *deleted*).

When sheet revisions, supplemental, or additional sheets apply to more than one bridge, each bridge shall have its own CO sheet.

Partial Revisions

Partial revisions to the original contract plan sheets should be made as illustrated in *Bridge Design Details:* 1.20 Change Order Detailing Examples, Attachments 1A.G.1 through 1A.G.3. Do not cross out existing details that require revisions; instead redraw details that need to be revised. Each revision to the original plan sheet shall be clearly marked by an equilateral triangle placed near the revision (e.g., ). A number is placed within the triangle that refers to the revision specified in the CO revision block.

Similar revisions in different places on the same sheet shall bear the same number; dissimilar revisions shall be numbered consecutively (e.g., △1, △2, etc.). The CO revision block cell is located in the CADD structures cell library. The revision numbers shall reset for each page, numbers should not continue or be tied to other sheets in the plan set.

The preferred placement of the CO revision block is in the lower right-hand corner of the plan sheet. The CO revision block shall include: an identifying number, short description of the revision, the initials of the person making, checking, and detailing the change, the date the CO is to be transmitted to Structure Construction, and the Project Engineer's signature/stamp. The block may be manipulated if necessary to record subsequent revisions. Do not reduce the size of the Engineer's Seal.

Add the letter "R" and a revision number after the sheet number in the upper right-hand title block (e.g., the first revision to sheet 68 is entitled 68R1). When a sheet (e.g., 68R1) is revised, it shall be treated in the same manner as the original sheet, revising the sheet number (e.g., 68R2). The numbers following "R" do not necessarily correspond with the numbers in the triangles because it is quite possible for two or more revisions to be made on any given CO. See examples illustrated in Figure 1.20.1.

Do not change the *Total Sheets* number at the top of the revised sheet; this is handled by District Office Engineer.

Insert the cell for the CO number as near as possible to the CO revision block. Do not fill in the blanks for the CO number or sheet numbers as they will be added by Structure Construction when the CO is prepared.

Do not revise the Plans Approval Date, Registered Civil Engineer Signature, or Plans Approval Date in the upper right-hand corner of the sheet.

The *AUTHORIZATION FOR ELECTRONIC SIGNATURE SHEET* form shall be filled out and kept in the Project Engineer's records.

Total Replacement of Contract Plan Sheets

Replacing plan sheets places an additional burden on the Contractor and Structure Representative to identify the changes; therefore, *total replacement* should be avoided unless the original plan sheet needs extensive revisions to warrant the replacement.

A sheet replacing a contract plan sheet shall be prepared in the same manner as described above. A note identifying the sheet it replaces should be placed as shown in *Bridge Design Details:* 1.20 Change Order Detailing Example, Attachment 1A.G.4. Number the sheets to

match the original sheet being replaced and add the Project Engineer's seal information in the same manner as for partial revisions (upper right-hand corner).

Add the District, County, Route, Post Miles, and sheet numbers in the Index Block at the top of the sheet. In the preparation of typical plans, this data is left partially incomplete to be filled in by Office Engineer; however, replacement sheets do not follow this same procedure. Failing to completely fill in this area may cause confusion and lost time during routine handling after the package leaves the Division of Engineering Services.

Place the cell for the CO number as closely as possible to the sheet title block. Do not fill in the blanks for the CO number or sheet numbers; they will be added by Structure Construction when the CO is prepared.

The identifying data from the original sheet shall be completely filled in on the replacement sheet. This will enable everyone concerned to readily identify the project to which the sheet belongs.

Supplemental Sheets

When CO(s) are needed for a specific sheet, but those changes do not fit on the sheet describing the Detail(s) to be revised, a *supplemental* sheet is required. Supplemental sheets shall be prepared in the same manner as previously described for partial revisions and shall follow the detail sheet in which the supplemental details are required. The sheet number of the sheet being supplemented shall be placed in the Project Information block located in the upper right-hand corner. This number shall be suffixed with the letter "S," (e.g., 68S). The Seal, Signature Block, and Title Block shall be prepared in the same manner as a typical contract plan sheet. Place "SUPPLEMENTAL SHEET" in the lower right-hand corner, immediately above the sheet title. Use CTFONT1, text height 0.02' and line weight 4. *See Bridge Design Details:* 1.20 Change Order Detailing Examples, Attachments 1A.G.5 and 1A.G.6.

Subsequent revisions to supplemental sheets shall be made in the same manner as partial revisions to original sheets. After making a revision to supplemental sheet (e.g., 68S1, the sheet number would then become 68S1R1). See examples illustrated in Figure 1.20.1.

All identifying sheet data, including the CO number cell and plan approval dates shall be handled in the same manner as a total replacement CO, except as noted above.

The INDEX TO PLANS list does not need to be modified when supplemental sheets are added to a set of plans.

Additional Sheets

Additional sheets shall be handled in the same manner as supplemental sheets, except that they shall follow the last sheet of the applicable structure plans and carry the same sheet number as the sheet they follow with suffix of a letter for each structure. The difference between an Additional Sheet and a Supplemental Sheet is that an additional sheet covers details not tied to a specific bridge element or detail shown on the original plan set. Normally, the additional sheet will cover details added at the later stages of a project, such as barrier rail attachments or even additional LOG OF TEST BORING sheets. The Structure Design Technician and the Project Engineer shall make sure all Structure Plan sheets, including additional sheets, are listed under the INDEX TO PLANS. Unlike Supplemental Sheet(s), Additional Sheet(s) are added to the INDEX TO PLANS list. Place “ADDITIONAL SHEET” in the lower right-hand corner, immediately above the sheet title. Use CTFONT1, text height 0.02' and line weight 4. See *Bridge Design Details:* 1.20 Change Order Detailing Examples, Attachments 1A.G.7 and 1A.G.8.

The additional sheet(s) are added to the structure plan(s) set and numbered in the lower right corner of sheet to match the INDEX TO PLANS. In the upper right corner of the sheet, the first additional sheet of the first structure in a project will be numbered “A1”; the second “A2,” etc. (e.g., 68A1, 68A2). The second structure’s first additional sheet will be “B1”; the second “B2,” etc. (e.g., 68B1, 68B2); and so on for additional structures. To avoid confusion with revision and supplemental sheets, do not use the letters “R” and “S”. Revisions to added sheets will be handled in a manner similar to supplemental sheets. See examples illustrated in Figure 1.20.1.

Deleted Sheets

Sheets shall be *deleted* from a contract plan set by crossing out every detail on the sheet and adding “Entire sheet removed per Change Order No. __”, near the original signature block. Use CTFONT1, text height 0.02' and line weight 4. In most cases, deleted sheets are associated with *additional* or *supplemental* change order sheets.

Revision Box/PE Stamp for Change Orders

1. For CO(s) requiring replacement sheets, supplemental sheets, or additional sheets; these sheets require the Project Engineer's stamp. The upper right-hand corner seal and signature block shall be utilized for the Engineer's seal and signature. The signature date shall correspond to the CO date.
2. For revisions to an existing sheet, the original signature block shall be maintained, regardless of whether the Engineer who signed these original plans is also preparing the CO. The date on the original signature block represents the signature date of the original sheet. Revisions to this sheet will be indicated in the CO revision block, and the revisions shall be sealed. The date of the signature for these revisions shall correlate with the date of the CO.

The diameter of the Engineer's seal used in the CO revision block is 2" when printed on the full-size sheet (1" on a half-scale sheet). The size of the Engineer's seal shall not be reduced as these sizes meet the Board of Registration's design requirements.

The revisions shall be numbered sequentially from the bottom line of the CO revision block up. If there are more than four revisions, additional horizontal lines may be added to the standard cell. Extra triangles and placeholders should be removed.

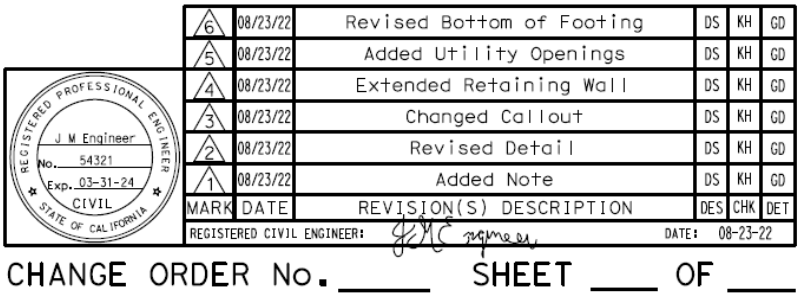
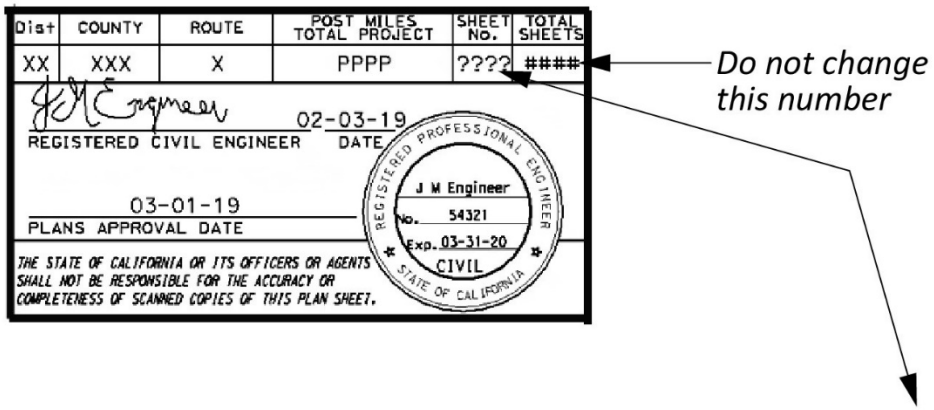


Figure 1.20.4 Change Order cell

If space is limited and multiple change orders are required to the same sheet the CO revision block maybe be combined, see *Bridge Design Details*: 1.20 Change Order Detailing Example, Attachment 1A.G.2. Otherwise, when the responsible charge PE changes for the work or additional CO(s) are made to the same sheet, multiple CO revision blocks should be used, see *Bridge Design Details*: 1.20 Change Order Detailing Example, Attachment 1A.G.3.



1. REVISIONS
   a) Revision to original contract plan sheet 68R1
      Subsequent revisions to contract plan sheets . . . . . 68R2, etc.
   b) Total replacement of a contract plan sheet 68R1

      - Add this note at top of sheets using CTFONT1, text height 0.015' and line weight 2:

        “THIS SHEET REPLACES SHEET No. XX of XX OF PLANS APPROVED XXXX XX, 20XX”

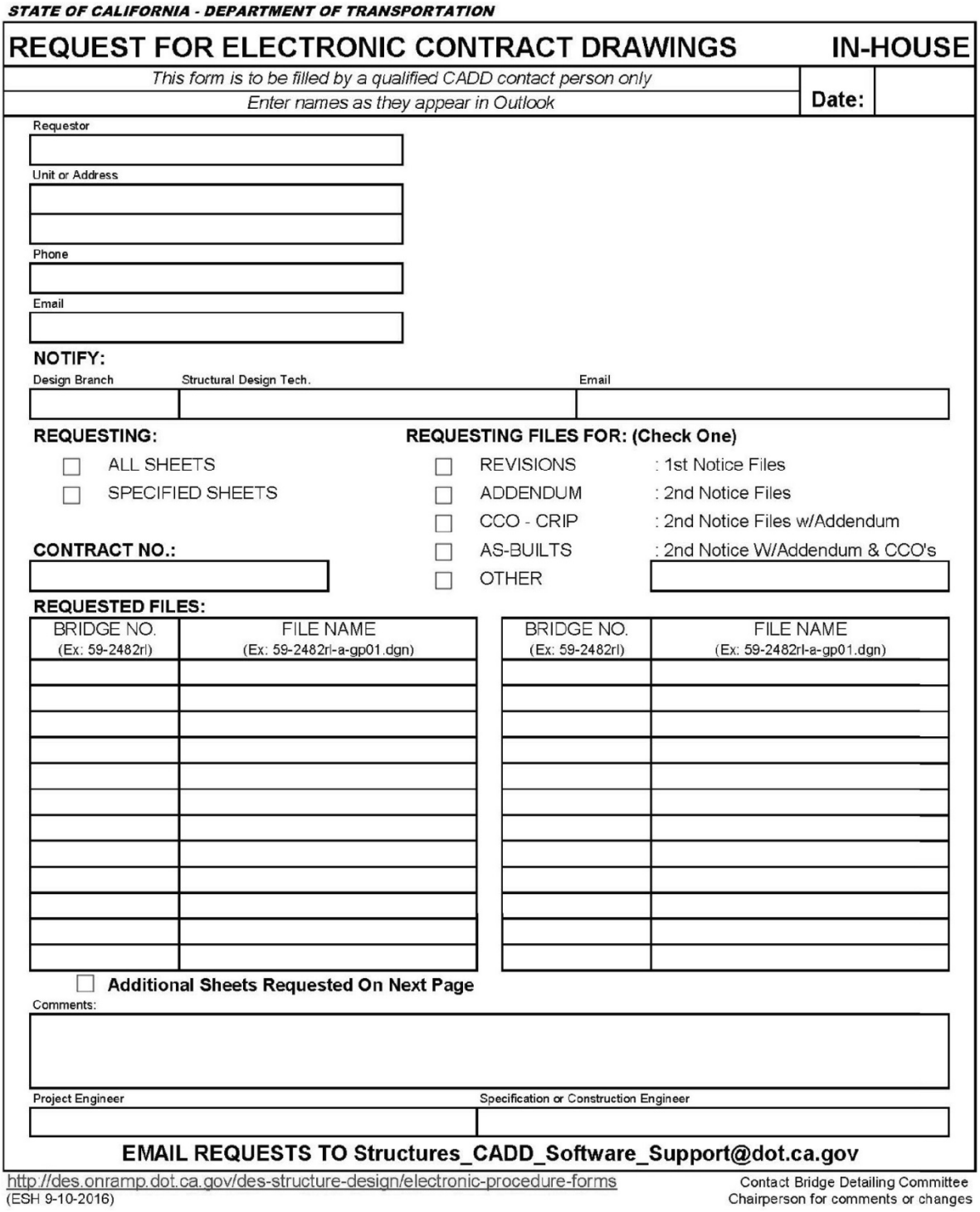
2. SUPPLEMENTAL SHEETS
   a) Addition of supplemental sheet 68S1
   b) Subsequent Supplemental Sheets to contract plan sheets . . . . 68S2, etc.
      Revision of a supplemental sheet . . . . . 68S1R1, etc.

      - Add “SUPPLEMENTAL SHEET” above the lower right-hand title block using CTFONT1, text height .02' and line weight 4.

3. ADDITIONAL SHEETS
   a) Additional sheet XXA1
      Subsequent additional sheets to first structure in contract plans XXA2
      Subsequent additional sheets to different structures in contract plans . XXB1
   b) Revisions to additional sheets XXA1R1

      - Add “ADDITIONAL SHEET” above the lower right-hand title block using CTFONT1, text height .02' and line weight 4.

Figure 1.20.1 Seal signature and block



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

REQUEST FOR ELECTRONIC CONTRACT DRAWINGS — IN-HOUSE

This form is to be filled by a qualified CADD contact person only

Enter names as they appear in Outlook

Date:

Requestor

Unit or Address

Phone

Email

NOTIFY:

Design Branch | Structural Design Tech. | Email

REQUESTING:

☐ ALL SHEETS

☐ SPECIFIED SHEETS

REQUESTING FILES FOR: (Check One)

☐ REVISIONS : 1st Notice Files

☐ ADDENDUM : 2nd Notice Files

☐ CCO - CRIP : 2nd Notice Files w/Addendum

☐ AS-BUILTS : 2nd Notice W/Addendum & CCO's

☐ OTHER

CONTRACT NO.:

REQUESTED FILES:

BRIDGE NO. (Ex: 59-2482rl)	FILE NAME (Ex: 59-2482rl-a-gp01.dgn)	BRIDGE NO. (Ex: 59-2482rl)	FILE NAME (Ex: 59-2482rl-a-gp01.dgn)

☐ **Additional Sheets Requested On Next Page**

Comments:

Project Engineer | Specification or Construction Engineer

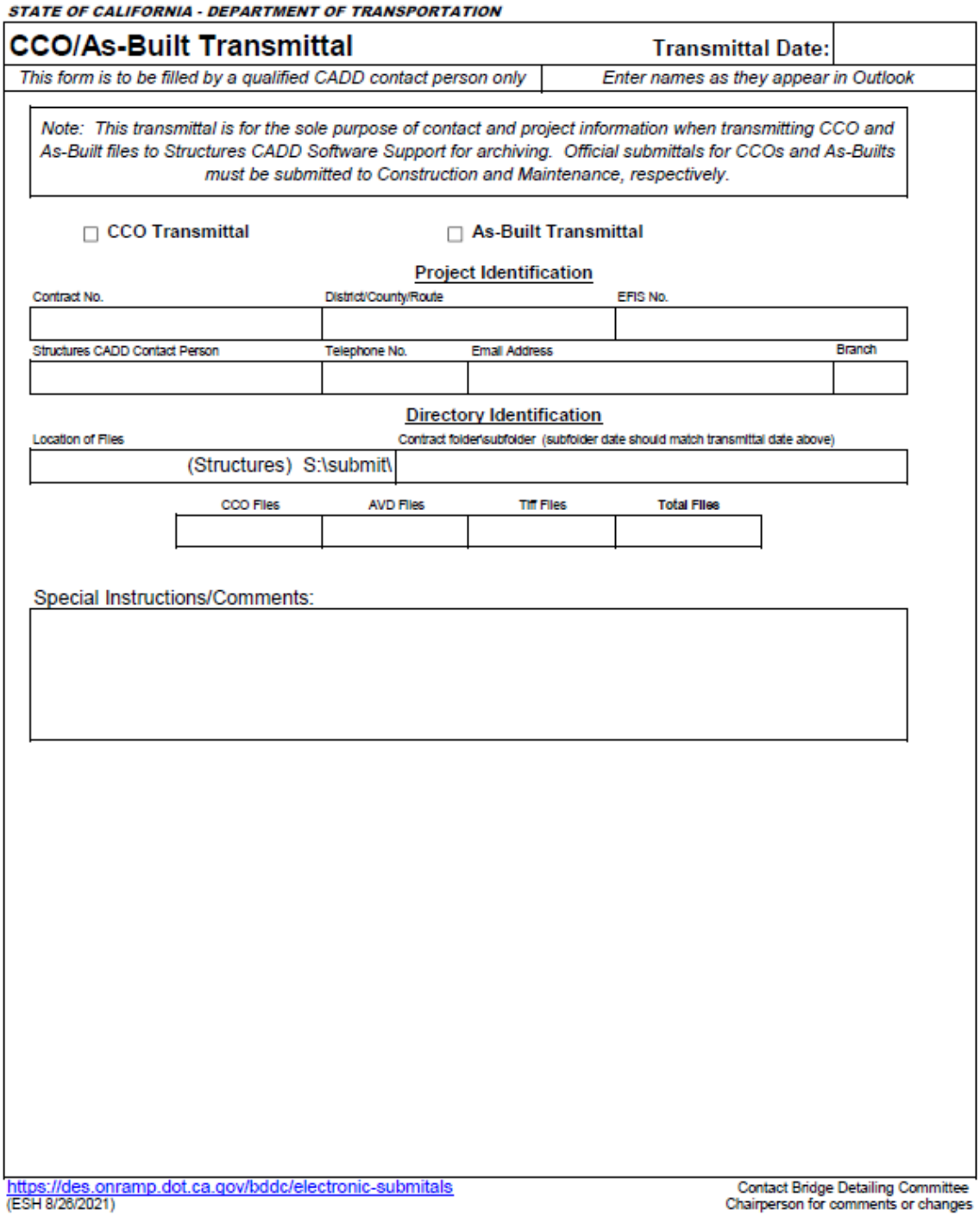
EMAIL REQUESTS TO Structures_CADD_Software_Support@dot.ca.gov

http://des.onramp.dot.ca.gov/des-structure-design/electronic-procedure-forms

(ESH 9-10-2016)

Contact Bridge Detailing Committee Chairperson for comments or changes

Figure 1.20.2 Request for electronic contract drawings



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CCO/As-Built Transmittal Transmittal Date:

This form is to be filled by a qualified CADD contact person only | *Enter names as they appear in Outlook*

Note: This transmittal is for the sole purpose of contact and project information when transmitting CCO and As-Built files to Structures CADD Software Support for archiving. Official submittals for CCOs and As-Builts must be submitted to Construction and Maintenance, respectively.

☐ CCO Transmittal ☐ As-Built Transmittal

Project Identification

Contract No.	District/County/Route	EFIS No.

Structures CADD Contact Person	Telephone No.	Email Address	Branch

Directory Identification

Location of Files	Contract folder\subfolder (subfolder date should match transmittal date above)
(Structures) S:\submit\	

CCO Files	AVD Files	Tiff Files	Total Files

Special Instructions/Comments:

https://des.onramp.dot.ca.gov/bddc/electronic-submitals
(ESH 8/26/2021)

Contact Bridge Detailing Committee Chairperson for comments or changes

Figure 1.20.3 Change Order/As-Built Transmittal form

Figure 1A.G.1 Partial Revision Change Order Detailing Example 1

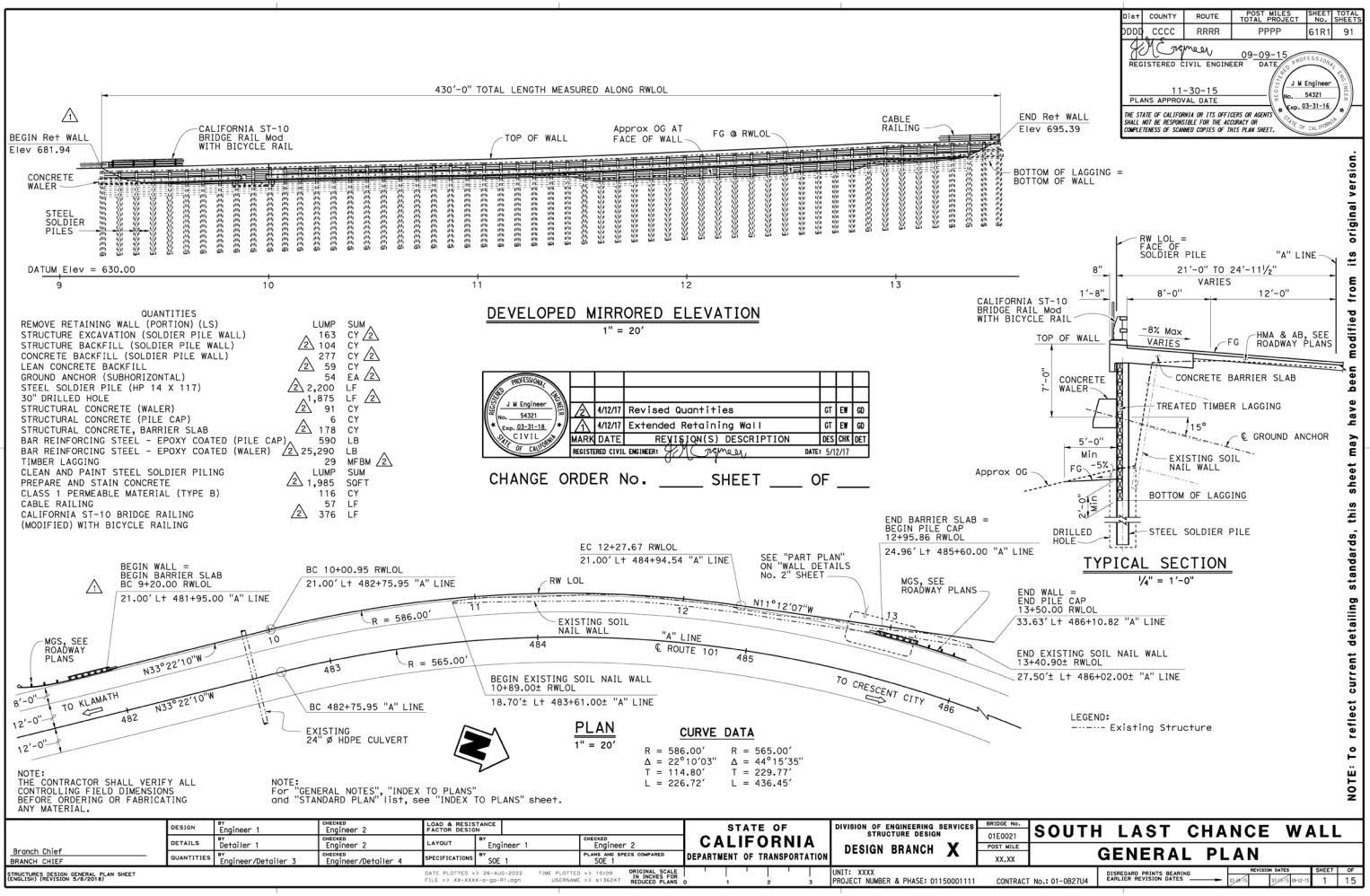


Figure 1A.G.2 Partial Revision Change Order Detailing Example 2

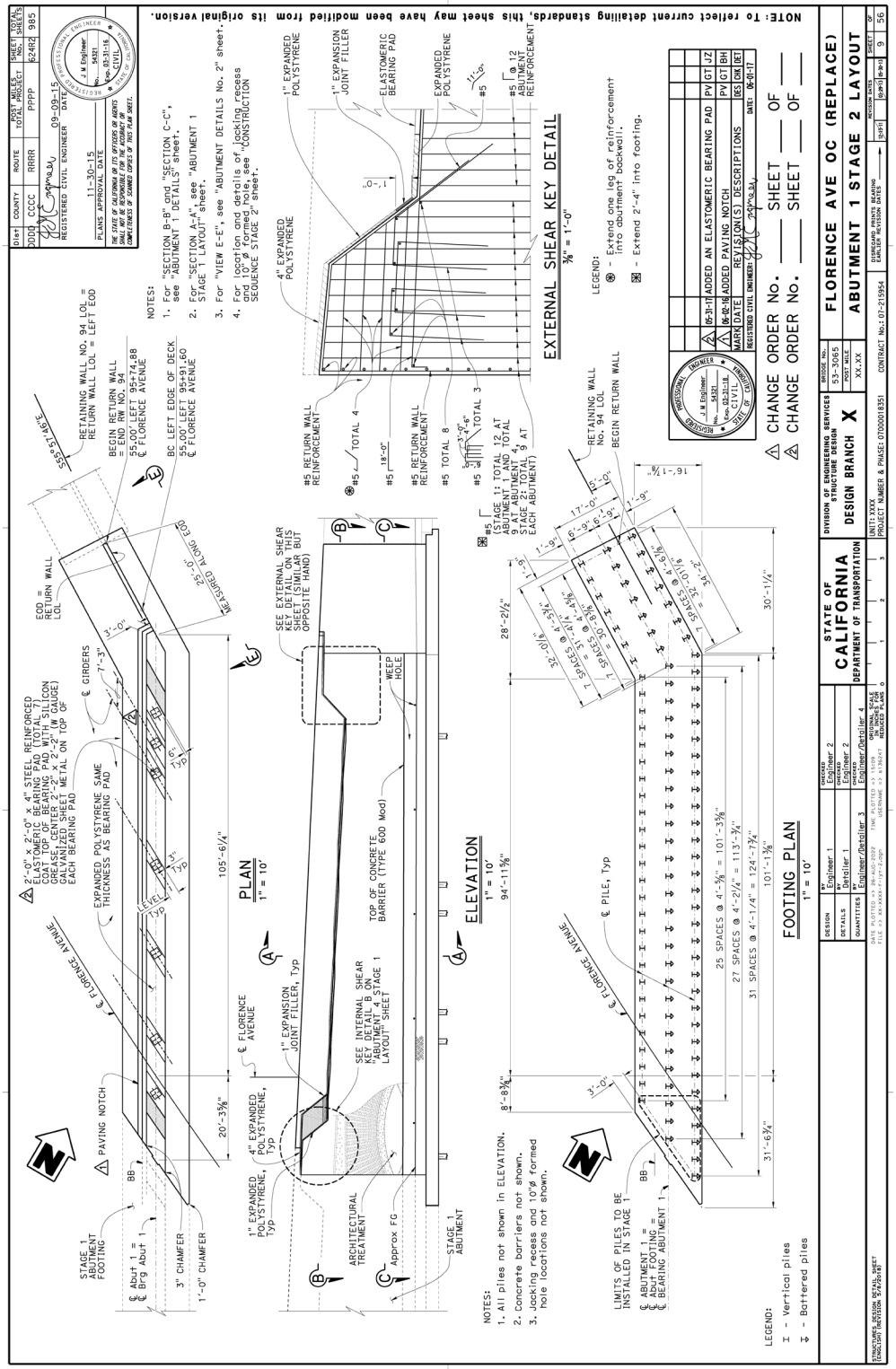


Figure 1A.G.3 Partial Revision Change Order Detailing Example 3

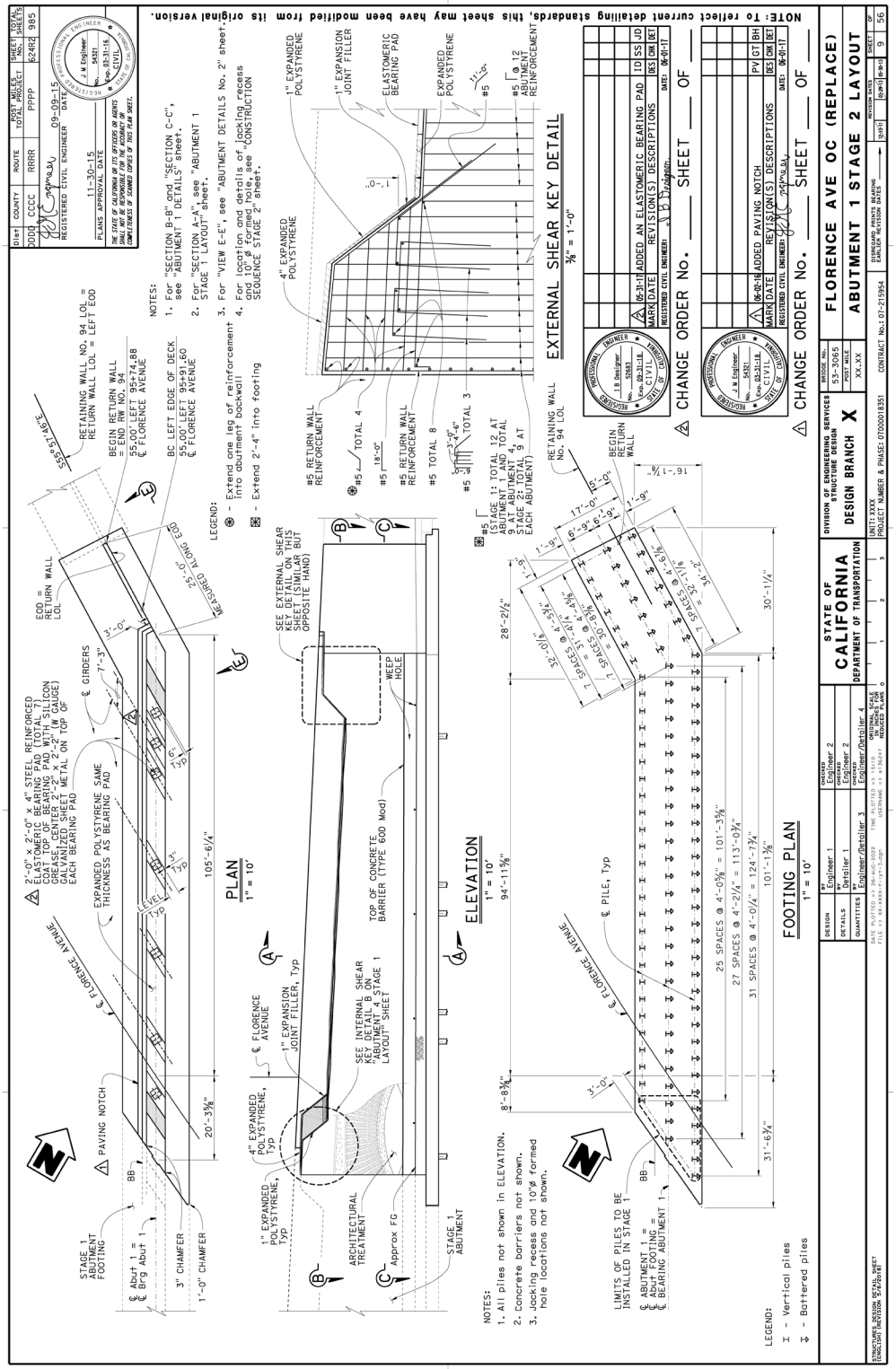


Figure 1A.G.4 Total Replacement Change Order Detailing Example 1

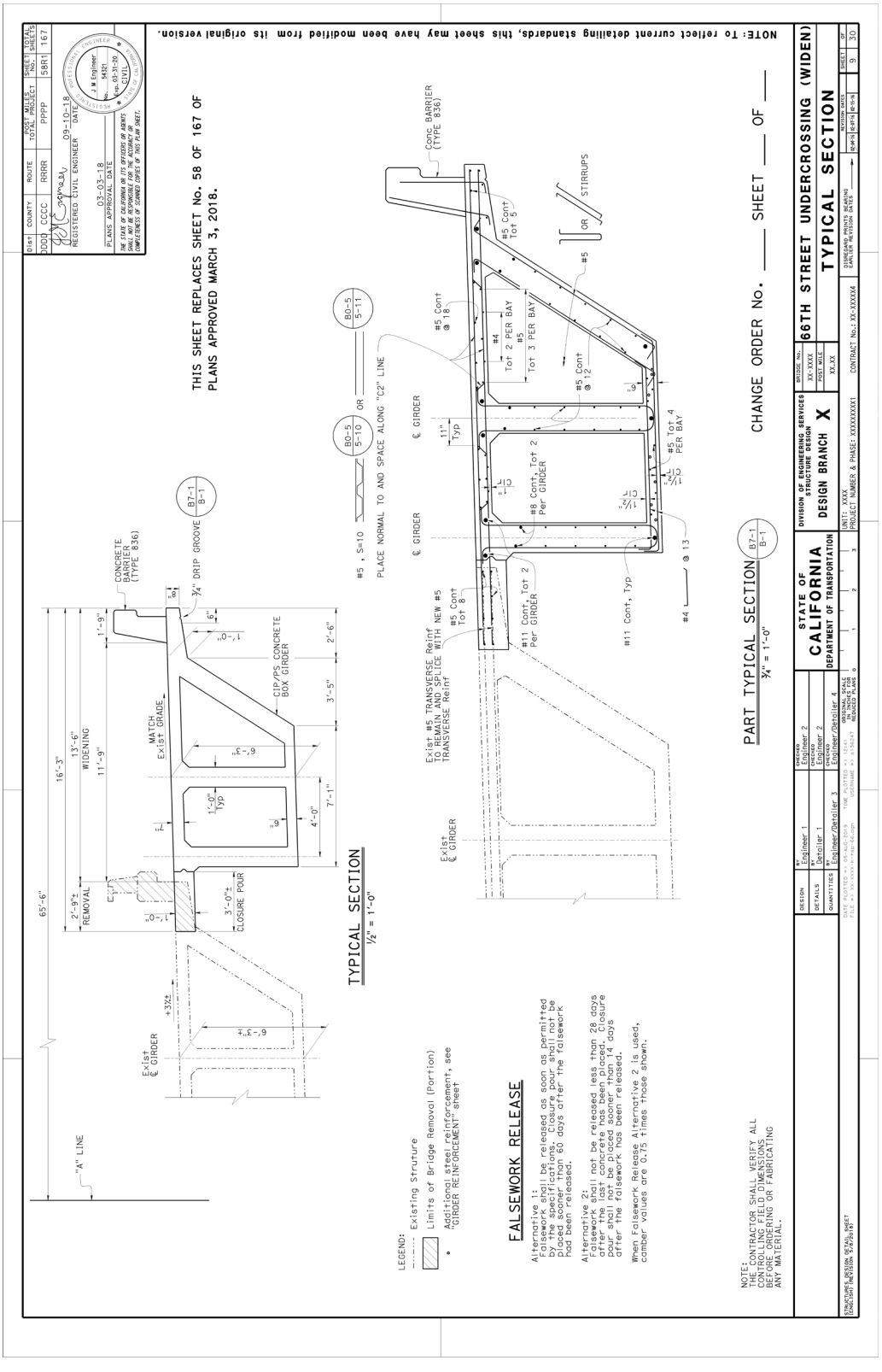


Figure 1A.G.5 Supplemental Change Order Detailing Example 1

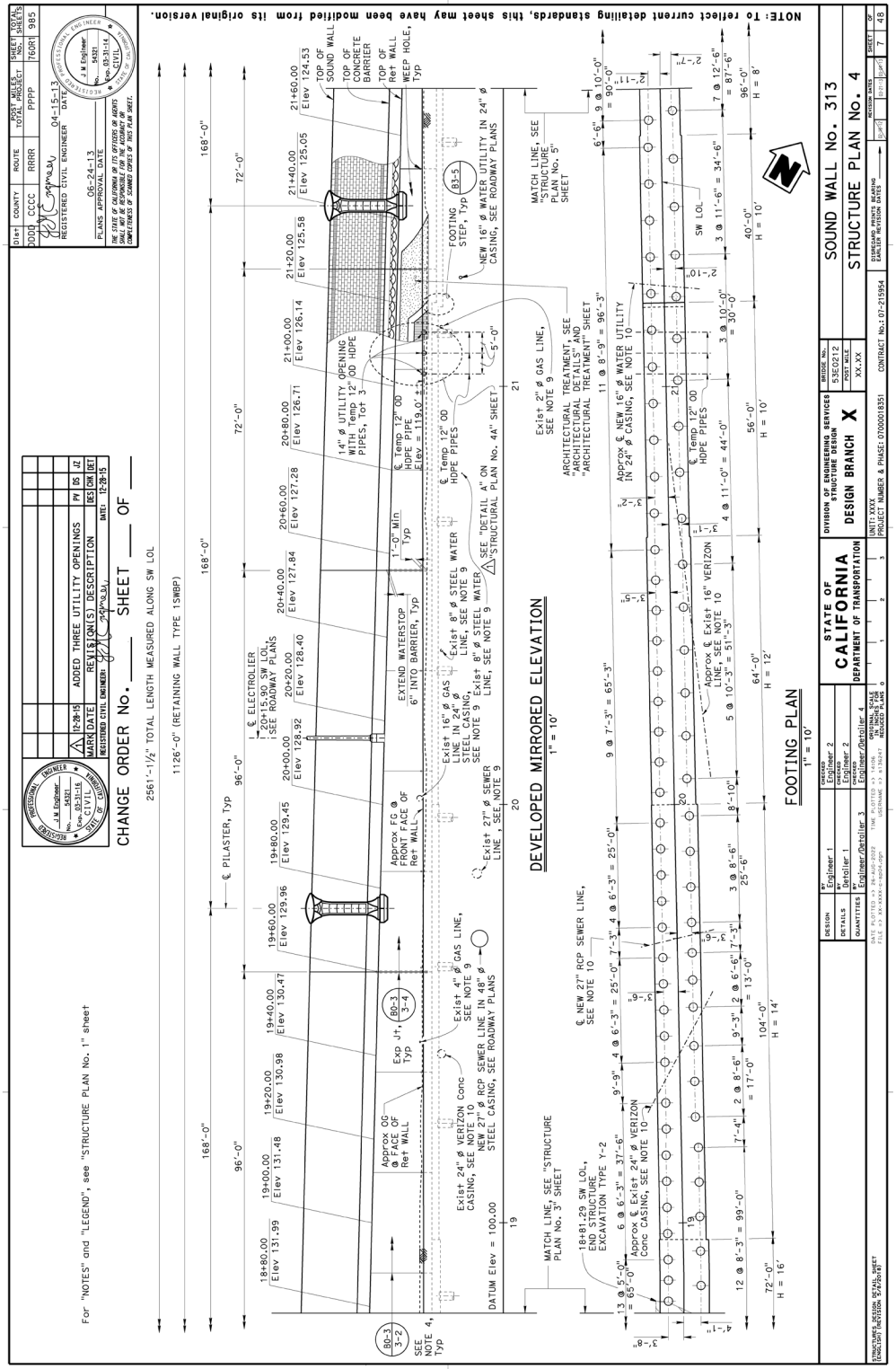


Figure 1A.G.6 Supplemental Change Order Detailing Example 1 (Continued)

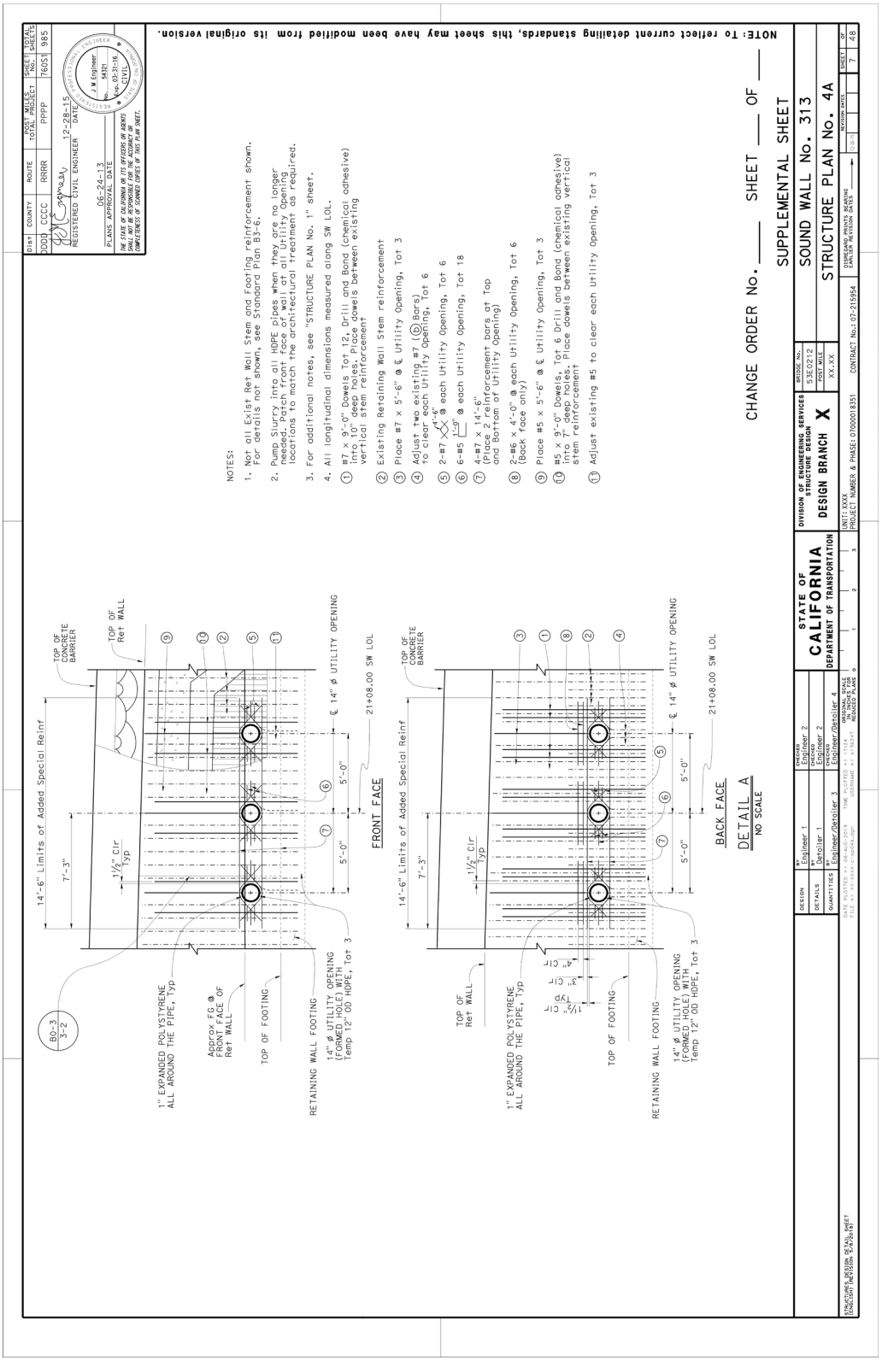


Figure 1A.G.7 Additional Change Order Detailing Example 1

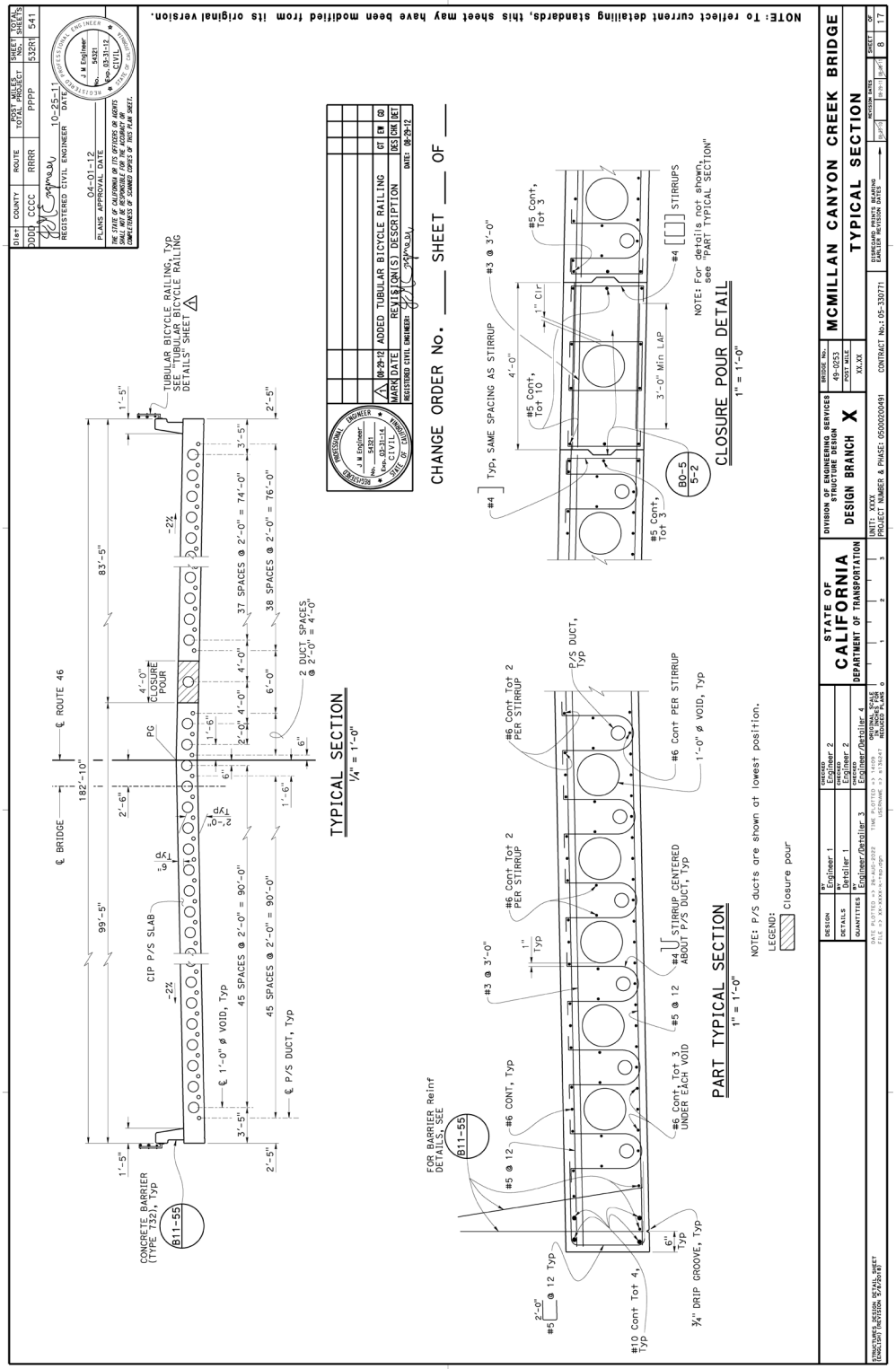
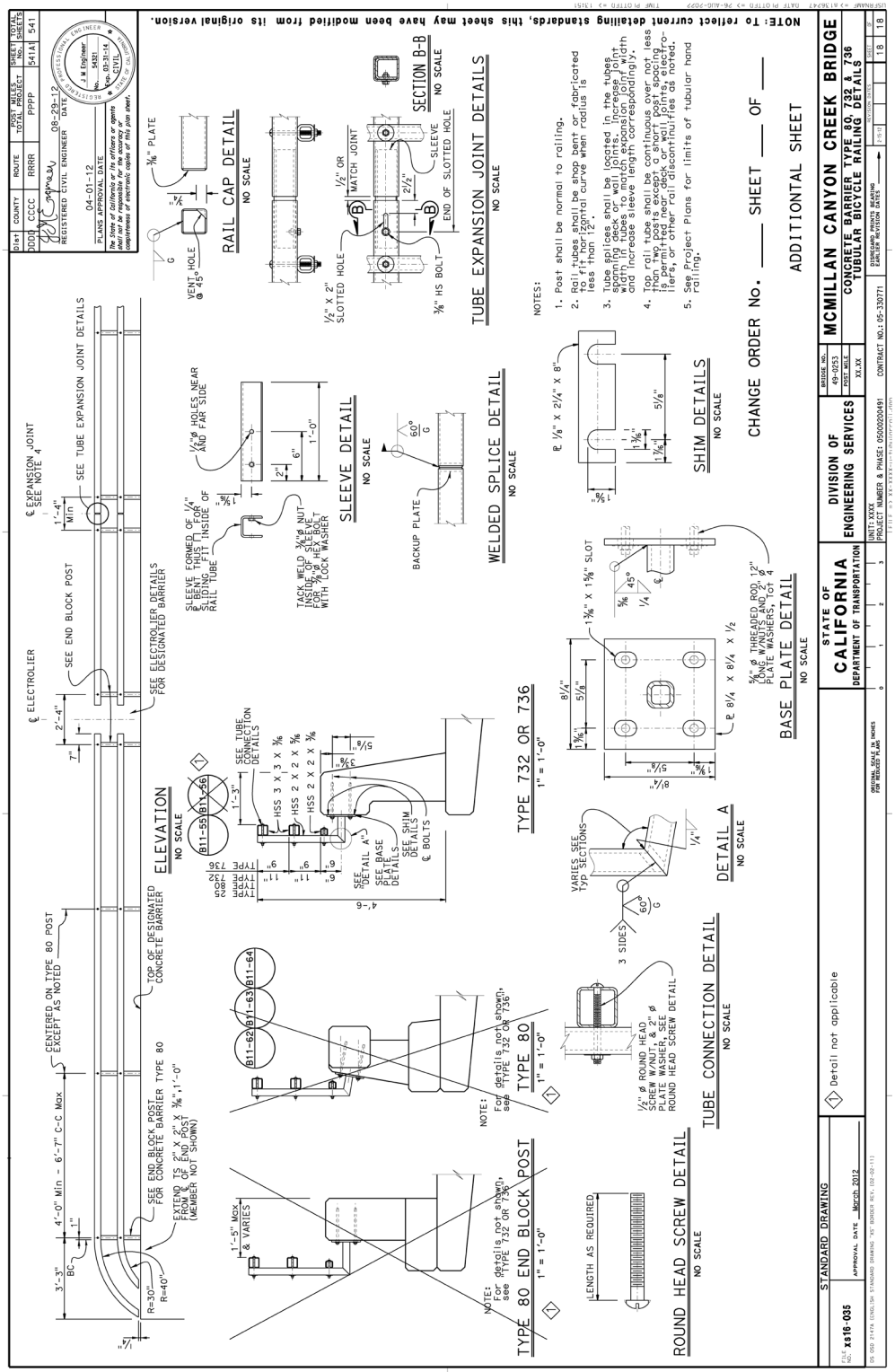


Figure 1A.G.8 Additional Change Order Detailing Example 1 (Continued)



Bridge Design Details 1.21 January 2023

Preparation of As-Built Corrections by Structure Construction Representative

After a project has been completed in the field, the Structure Representative shall prepare and submit the “AS-BUILT” corrections of the structure plans to Structure Construction Office Associates. Structure Construction Associates shall forward the As-Builts to the Design Branch to process corrections.

Guidelines for preparing the field corrections are addressed in the Bridge Construction *Records and Procedures Manual*: 9-1.0 As-Built Plans; briefly, the As-Built corrections of all on-the-job changes that were made during construction should be:

- Printed on reduced size (11” X 17”) plans. Full-size plans may be used if changes are extensive.
- Changes should be marked in red on each hardcopy structure plan sheet. New or revised details shall be legible with additional notes to clarify details if needed.
- Each structure plan shall be stamped with an As-Built stamp. Each sheet shall be stamped whether or not there are changes to the sheet. The stamps shall be similar to and contain the information shown, in the As-Built stamp in Figure 1.21.1:

AS-BUILT PLANS	
CONTRACT #:	DATE:
◯ AS-BUILTS WITH REV.	◯ NO CHANGES
PREPARED BY (PRINT NAME):	
PREPARED BY (SIGNATURE):	

Figure 1.21.1 As-Built stamp

- If no changes are made to the sheet, mark in red “NO AS-BUILT CHANGES” above the As-Built stamp shown in Figure 1.21.1.

Preparations of As-Built Corrections by Design Branch

The Design Branch shall make the As-Built changes to the official “AS-BUILT” Plans, which include “As-Awarded” plans, Addendums and Change Orders.

Changes shall be made electronically on the “Archived Contract Plans” CADD files when they are available. If these CADD files are not available, changes shall be made by hand using an “F” or softer lead pencil on “Archived Contract Plans” hardcopy plans. Refer to *the Practice and Procedures Manual*: 3C-70 and to *Procedures for Processing Electronic Structures Contract Plans Manual* for requirements to retrieve “Archived Contract Plans,” CADD files, and other procedures regarding As-Built plans. All sheets shall be retrieved by the Structures CADD Software Support (SCSS) Unit using the REQUEST FOR ELECTRONIC DRAWINGS form and submitted back to SCSS using the CCO/As-Built TRANSMITTAL form.

In making changes to the “Archived Contract Plans”, the plan sheets, details, and notes shall not be deleted. Instead, draw a line through the item in such a manner that it will not be obliterated.

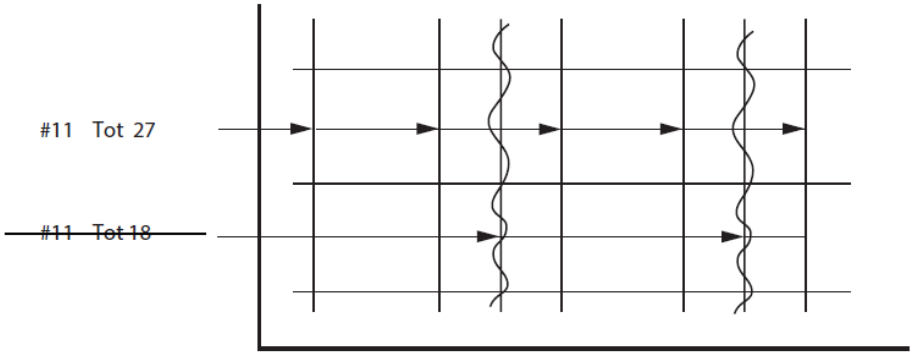


Figure 1.21.2 Example of As-Built corrections

When the maximum, minimum, and average pile tip elevations appear on the LOG OF TEST BORINGS sheet(s), this information shall be transferred to the GENERAL PLAN sheet by the Design Branch. Another location in the ASBUILT plans to show pile tip elevation changes is on the FOOTING LAYOUT detail.

Permanent reference elevation points are provided along new barriers. These elevations appear on the GENERAL PLAN sheet(s) for new bridges, widenings and barrier replacements and should be included in ASBUILT corrections. These reference elevation points should be indicated as “ASBUILT CHANGES”.

No As-Built changes shall ever be made by anyone other than the Professional Geologist on the LOG OF TEST BORINGS sheet(s). If “Red Line” changes are required on the LOG OF TEST BORINGS sheet(s), the Structure Project Engineer should contact the Geotechnical Engineer who signed the LOG OF TEST BORINGS sheet(s). The latest version of the LOG OF TEST BORINGS sheet(s) are requested by the Design Branch. Then a scanned color .pdf of the red line changes is sent to the Professional Geologist who makes the changes and places the As-Built Stamp cell on the LOG OF TEST BORINGS sheet(s) and fills out the appropriate fields. The .dgn is sent back to the Design Branch for completion of the process.

Stamping Final As-Built Plans CADD Files

After changes are made to CADD files, one of the following As-Built CADD cells shall be placed on the left edge of the border of each sheet and filled out as follows:

A) If “AS-BUILT” corrections are not received:

AS DESIGNED
AS-BUILTS NOT RECOVERABLE
Contract No.: xx-yyyyyy Date: aa/bb/cccc
Structure Rep: Structure Rep Name

B) If the “AS-BUILT” corrections are received, and no corrections are needed:

NO AS-BUILT CORRECTIONS
Corrections Transferred by: Detailer Initials Transfer Date: aa/bb/cccc
Field Corrections by: Field Persons Name Field Corrections Date: aa/bb/cccc
Contract No.: xx-yyyyyy

C) If “AS-BUILT” corrections are received, and corrections are needed:

AS-BUILT CORRECTIONS
Corrections Transferred by: Detailer Initials Transfer Date: aa/bb/cccc
Field Corrections by: Field Persons Name Field Corrections Date: aa/bb/cccc
Contract No.: xx-yyyyyy

Stamping Final As-Built Plans Hardcopy

For changes made on hardcopy plans, a stamp or decal with the information shown in the above CADD cell shall be placed on each sheet. Make sure the information is legible.

As-Built Stamp When As-Built Corrections are Lost

When processing drawings where the As-Built corrections have become lost, the structure and missing “AS-BUILT” Plans shall be jointly discussed with DES Structure Construction and the Project Engineer. In this case, the As-Built stamp shall indicate that the drawings to be archived are As-Designed. The contract number, the Structure Representative’s name, and the date of processing the As-Designed 2nd Notice plans are included in the contents of the stamp.

The following stamp designs shall be used:

Stamp for Hard Copy Drawings

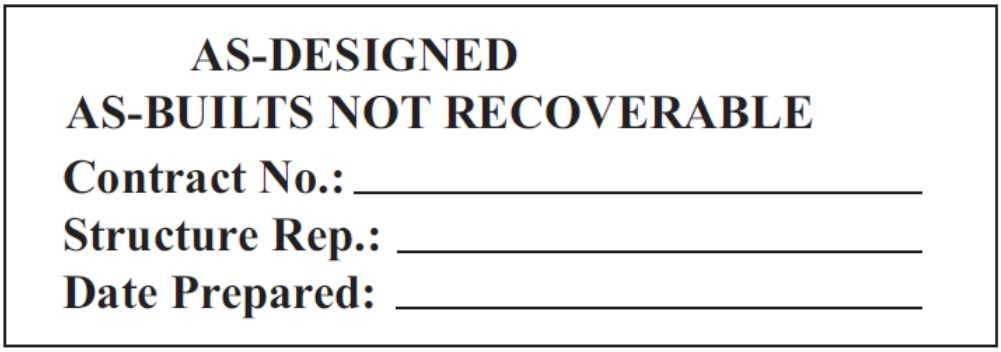


Figure 1.21.3 As-Built stamp for hard copies

Stamp (cell) for Electronic Drawings

Figure 1.21.4 As-Built stamp for electronic drawings