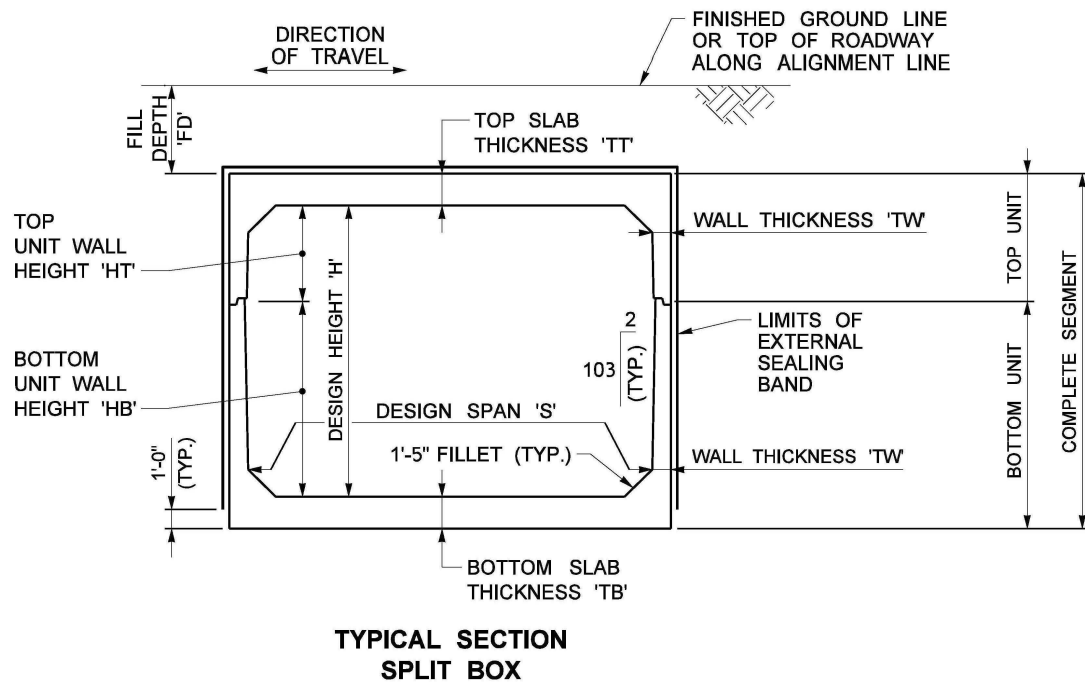
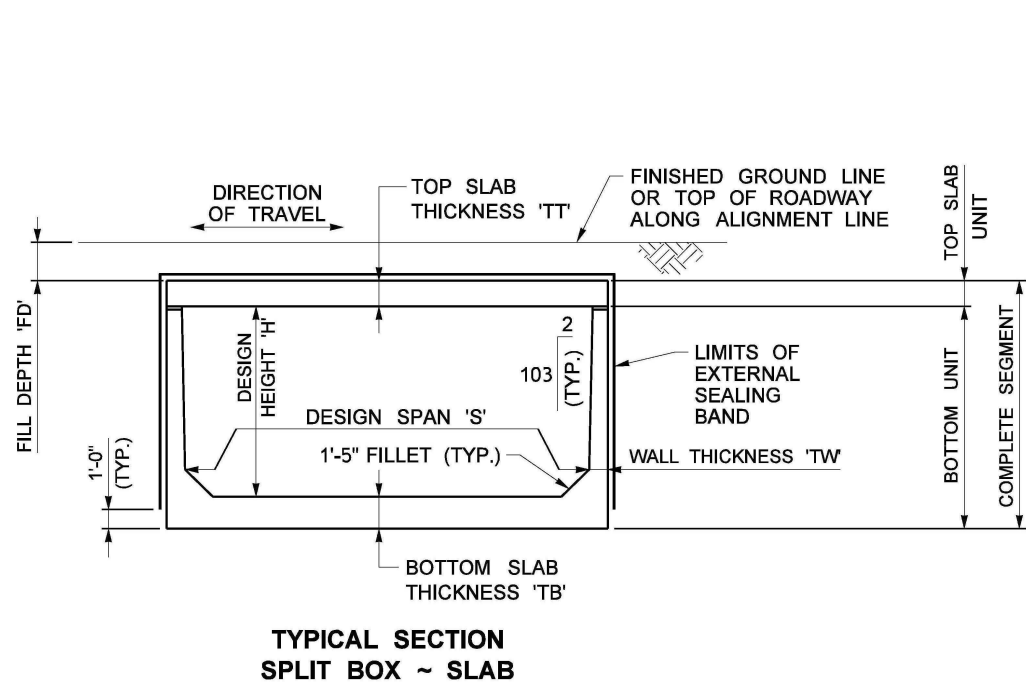


GENERAL NOTES

1. All materials and workmanship shall be in accordance with the requirements of the current edition of the **Standard Specifications**.
2. These Buried Structure Split Boxes have been designed in accordance with the requirements of the **AASHTO LRFD Bridge Design Specifications 9th Edition 2020** and the **WSDOT Bridge Design Manual (BDM) 2023**. The seismic design for Class 2 Split Boxes (top and bottom units) has been designed in accordance with the **AASHTO Technical Manual for Design and Construction of Road Tunnels, 2010**. The seismic design for Class 2 Split Box ~ Slabs (bottom unit with top slab unit) has been designed in accordance with the **AASHTO LRFD Bridge Design Specifications 9th Edition 2020**. Two seismic zones corresponding to Site Adjusted Peak Ground Acceleration ( $A_g$ ) values of 0.32g and 0.64g have been considered.
3. The Contractor shall be responsible for safely lifting, shipping, installing, and backfilling the precast Buried Structure units.
4. Precast unit lay widths, 'LW', shall be a minimum of 4 feet, except the shorter side ('LW1') of Skew Option 3 or Skew Option 4 end units, shown on Sheet 2, shall not be less than 3 feet. Lay width of top and bottom units, for a given complete segment, shall be the same width and joints shall align.
5. The native subgrade material shall have a minimum factored bearing resistance capable of resisting the Strength Limit State maximum bearing as specified in the Design Tables. Bedding and Leveling material shall be in accordance with **Standard Specifications Section 6-20.3(6)A**.
6. The backfill and/or any existing soil within the Zone of Influence shown on Sheet 2 shall be granular soil with a minimum Internal Angle of Friction of 34 degrees and a total unit weight within the range of 120 to 145 PCF.
7. Precast concrete shall be Class 7000. Headwalls and cast-in-place concrete shall be Class 4000. 5-inch min. concrete topping slabs shall be Class 4000D.

8. Reinforcing steel shall conform to **Standard Specifications Section 9-07.2. AASHTO M31 GR 60 (ASTM A615)** are permitted and when used shall not be welded. When required, epoxy-coating of steel reinforcing bars shall conform to **Standard Specification Section 9-07.3**. Galvanized reinforcing bars conforming to **ASTM A767 Class 1** or **ASTM A1094** may be substituted for epoxy-coated reinforcement. The Contractor may substitute deformed welded wire reinforcement (WWR) conforming to **Standard Specifications Section 9-07.7** provided any equivalent bar area reduction is limited to 15% of the original area and spacing is no greater than 2/3 of the dimension provided in the Design Tables. The specified minimum yield strength of the WWR shall be limited to a maximum of 75 ksi. Alternative proposed substitutions shall be submitted in accordance with **Standard Specifications Section 6-20.3(1)A2**.
9. Unless otherwise noted, concrete cover to reinforcing shall be 2 inches.
10. All steel plates and shapes shall be **ASTM A36** or **ASTM A572 GR 50**. All bolts, nuts, and washers, unless noted otherwise, shall conform to **Standard Specification Section 9-06.5(3)**. Resin Bonded Anchors Systems shall conform to **Standard Specifications Section 9-06.4**. All steel plates and shapes shall be galvanized in accordance with **AASHTO M111** after fabrication, unless noted otherwise. Galvanizing shall be removed at any field welded zones. Bolts and hardware shall be galvanized in accordance with **AASHTO M232** or **ASTM F2329**, as applicable. All galvanizing repairs shall be in accordance with ASTM A780. Galvanizing Repair Paint shall conform to **Standard Specifications Section 9-08.1(2)B**.
11. Resin Bonded Anchors shall conform to **Standard Specifications Section 6-02.3(18)A** and shall be installed in roto-drilled holes. The Contractor shall identify rebar free zones on the structure prior to drilling.
12. Unless otherwise noted all joints shall be sealed with Butyl Rubber Sealant and wrapped with External Sealing Bands in accordance with **Standard Specifications Section 6-20.3(8)A**.

13. Alternative Joint Types between precast units, other than those detailed herein, shall not be used unless submitted for acceptance by the Engineer in a Type 2 Working Drawing.
14. Worker, Pedestrian and Bicycle Fall Protection shall be provided in accordance with **Standard Specifications Section 6-20.3(1)F**.
15. These plans may be used in combination with the following Standard Plans, unless otherwise specified in the contract:
  - a. **A-40.50 Bridge Approach Slab**
  - b. **C-20.40 Beam Guardrail Type 31 Placement 12'-6", 18'-9", or 25'-0" Span**
  - c. **C-20.41 Box Culvert Embedded Anchor Guardrail Steel Post Type 31**
  - d. **C-20.43 Box Culvert Bolt-Thru Anchor Guardrail Steel Post Type 31**
  - e. **C-81.10 42" Single Slope Barrier on Structure (TL-4)**
  - f. **D-3.09 Permanent Geosynthetic (wingwall and headwalls)**
  - g. **D-20.10 Precast Reinforced Concrete Retaining Wall (wingwalls)**
  - h. **L-5.10 Bridge Railing Type Chain Link Pipe Rail (worker fall protection)**
  - i. **L-5.15 Cable Fence (worker fall protection)**
16. Provide surface treatment(s) as shown in this Plan unless noted otherwise in the Contract Documents. Alternate surface treatment(s) requires approval by the State Bridge and Structures Architect.
17. All Split Box ~ Slab structures with less than 2 feet of Fill Depth shall have seismic lateral force restrainers per one of the options provided on sheets 14, 16, or 17.
18. Elastomeric Bearing Pad shall conform to **Standard Specifications Section 6-02.3(19) and 9-31.8(1)**.
19. For Structure Free Zone, freeboard, and maintenance clearance, see Contract Documents.

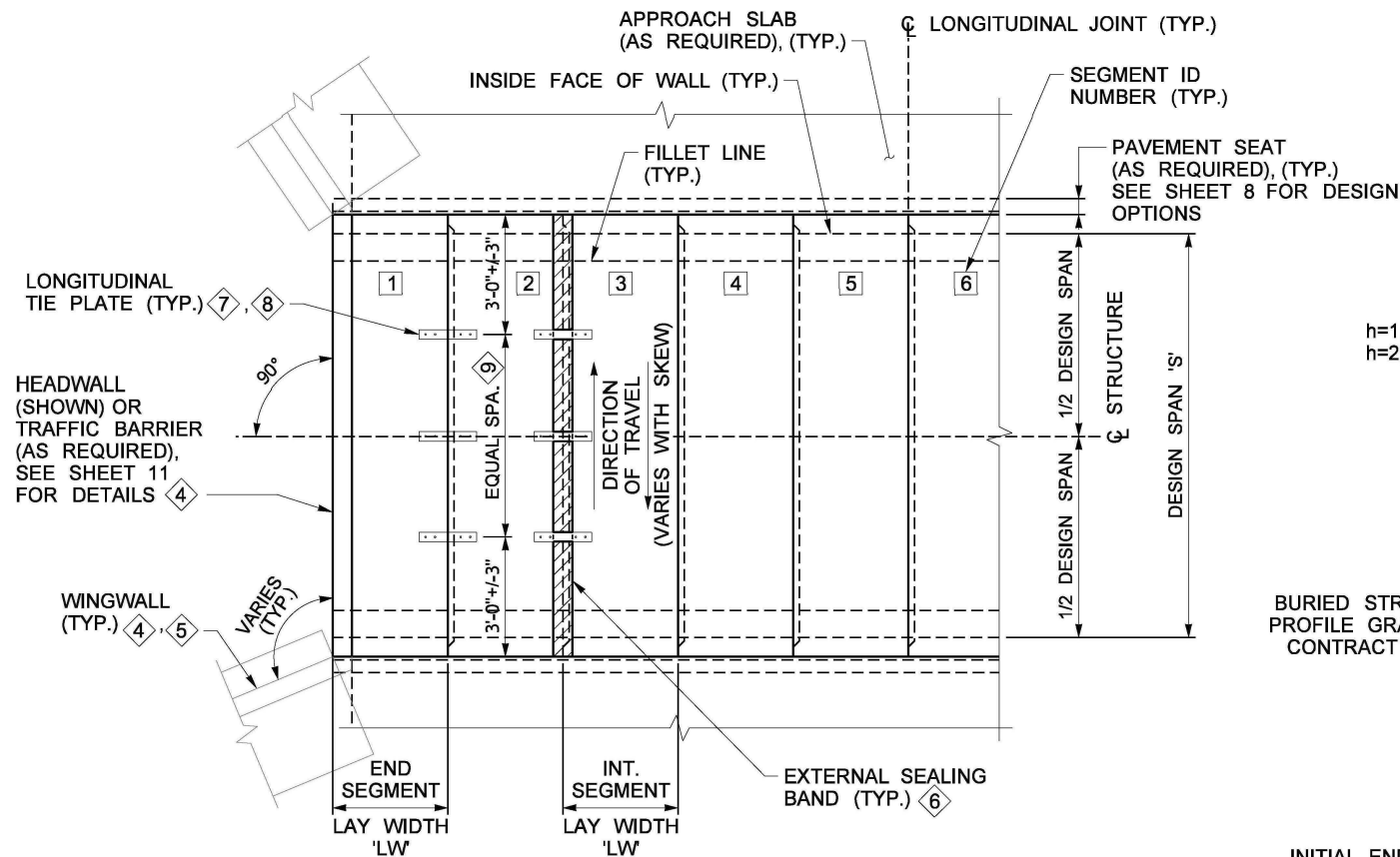


Sep 12, 2023

**BURIED STRUCTURE  
SPLIT BOX**  
**STANDARD PLAN E-20.10-00**  
SHEET 1 OF 17 SHEETS

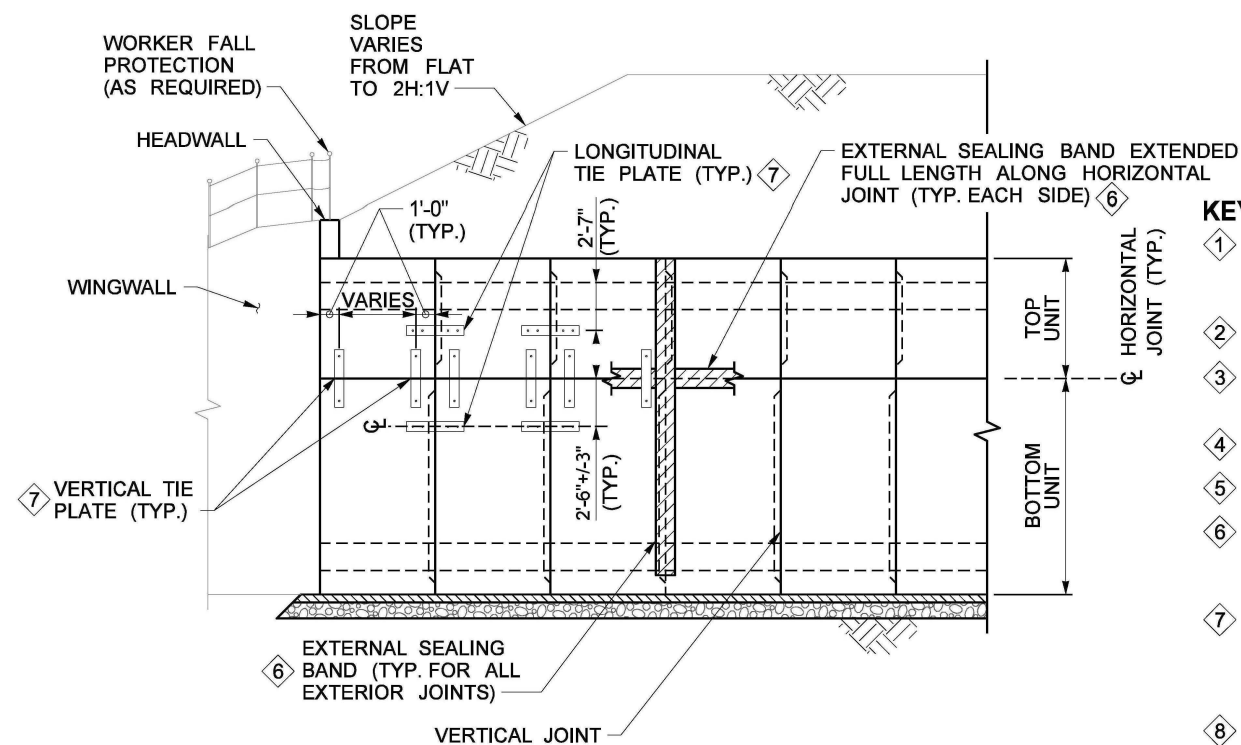
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*Mark A. Davies* Sep 12, 2023  
STATE DESIGN ENGINEER  
 Washington State Department of Transportation





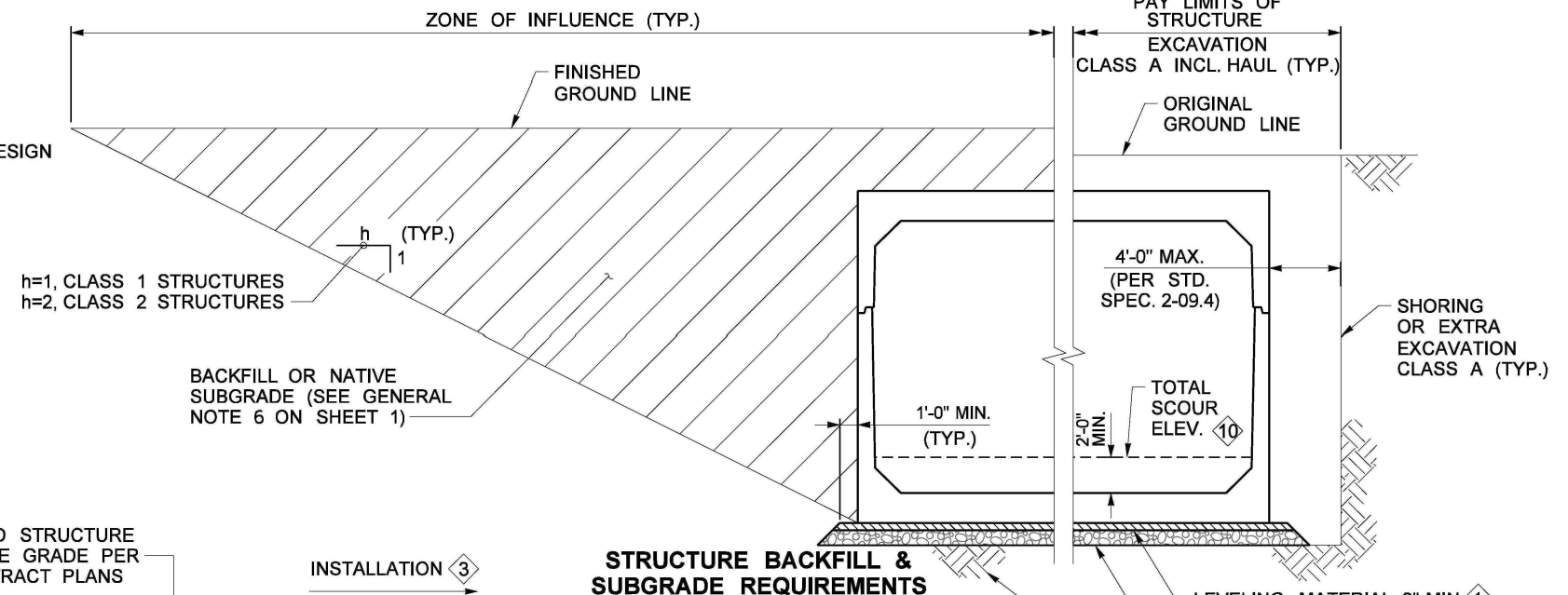
**PLAN  
SEGMENT LAYOUT**

NORMAL, SPLIT BOX LAYOUT SHOWN, SPLIT BOX ~ SLAB SIMILAR  
FOR SKEWED LAYOUT OPTIONS SEE SHEET 3

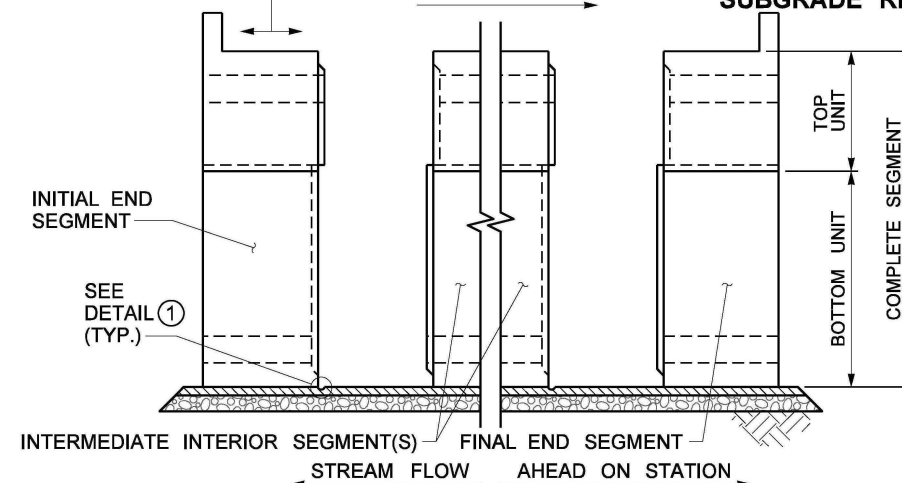


**ELEVATION  
SEGMENT LAYOUT**

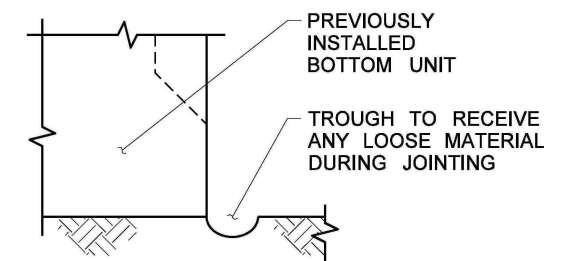
NORMAL, SPLIT BOX SHOWN, SPLIT BOX ~ SLAB SIMILAR  
FOR SKEWED LAYOUT OPTIONS SEE SHEET 3



BURIED STRUCTURE  
PROFILE GRADE PER  
CONTRACT PLANS



**SUGGESTED INSTALLATION PROCEDURE 2, 4**  
TIE PLATES NOT SHOWN FOR CLARITY



**DETAIL 1**  
SUGGESTED JOINTING  
PREPARATION

**KEY NOTES**

- 1 PREPARE BEDDING AND LEVELING MATERIALS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS 6-20.3(6). WHEN APPLICABLE, SEE CONTRACT DOCUMENTS FOR OVER-EXCAVATION AND QUARRY SPALL REQUIREMENTS.
- 2 PLACEMENT AND ASSEMBLY SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 6-20.3(8).
- 3 THE PRECAST UNITS SHOULD BE INSTALLED IN SEQUENCE AS SHOWN. THE BOTTOM UNITS SHOULD BE INSTALLED AT LEAST ONE UNIT AHEAD OF THE TOP UNITS.
- 4 WORKER FALL PROTECTION NOT SHOWN FOR CLARITY.
- 5 FOR WINGWALL AND HEADWALL DETAILS, SEE CONTRACT DOCUMENTS.
- 6 CONTINUOUS ALONG EXTERIOR FACES, CENTERED AT JOINT, OMIT 1'-0" FROM BASE OF BOTTOM UNIT(S). EXTERNAL SEALING BANDS SHALL PASS UNDER TIE PLATES (TYP.) SEE TYPICAL SECTION(S) ON SHEET 1 FOR GRAPHIC OF LIMITS.
- 7 TIE PLATES ARE REQUIRED FOR THE FIRST THREE SEGMENTS AT EACH END, OR FOR A MINIMUM OF 12.0 FT. INBOARD FROM EACH END WHICHEVER IS GREATER. OMIT UPPER LONGITUDINAL AND VERTICAL TIE PLATES ON WALL FOR SPLIT BOX ~ SLABS. SEE SHEET 12 FOR TIE PLATE DETAILS. ADJUST HORIZONTAL LOCATION AS NECESSARY WHEN RESTRAINERS ARE REQUIRED.
- 8 AS APPLICABLE, DEPENDING ON SITE ROADWAY SCENARIO, SEE SHEET 8.
- 9 TRANSVERSE SPACING BETWEEN TIE PLATES SHALL BE LIMITED TO 4'-0" WHEN BOTH, THE SITE PEAK GROUND ACCELERATION (A) VALUE EXCEEDS 0.55g AND THE BACKFILL SLOPE RETAINED BY THE HEADWALL IS STEEPER THAN 2.5H:1V. FOR ALL OTHER CONDITIONS SPACING SHALL BE LIMITED TO 6'-0".
- 10 DETERMINED BY THE TOTAL SCOUR RESULTING FROM THE WORST-CASE CONDITION BETWEEN THE SCOUR DESIGN FLOOD AND THE SCOUR CHECK FLOOD, IN ACCORDANCE WITH THE WSDOT HYDRAULICS MANUAL.



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**BURIED STRUCTURE  
SPLIT BOX  
STANDARD PLAN E-20.10-00**

SHEET 2 OF 17 SHEETS

APPROVED FOR PUBLICATION

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Sep 12, 2023

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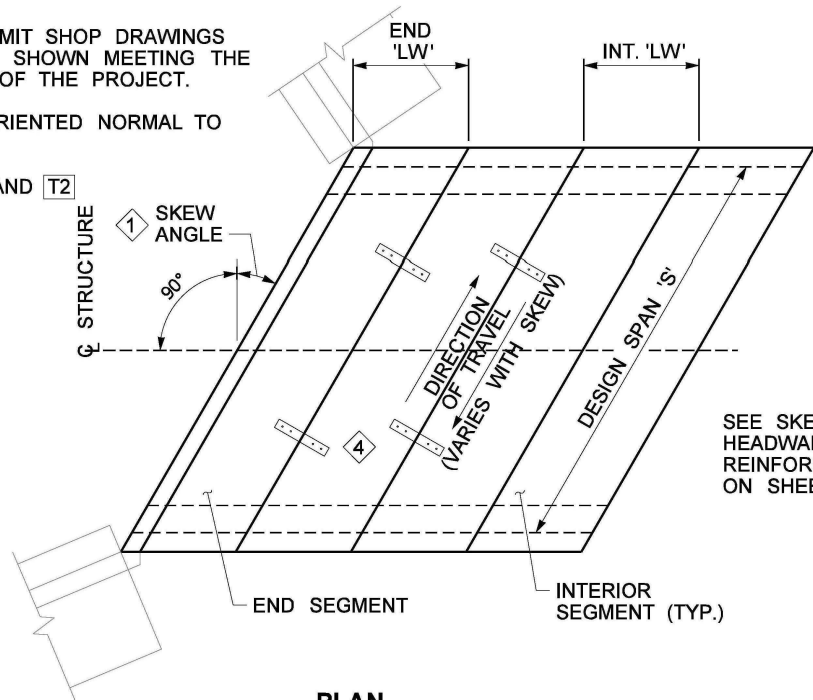


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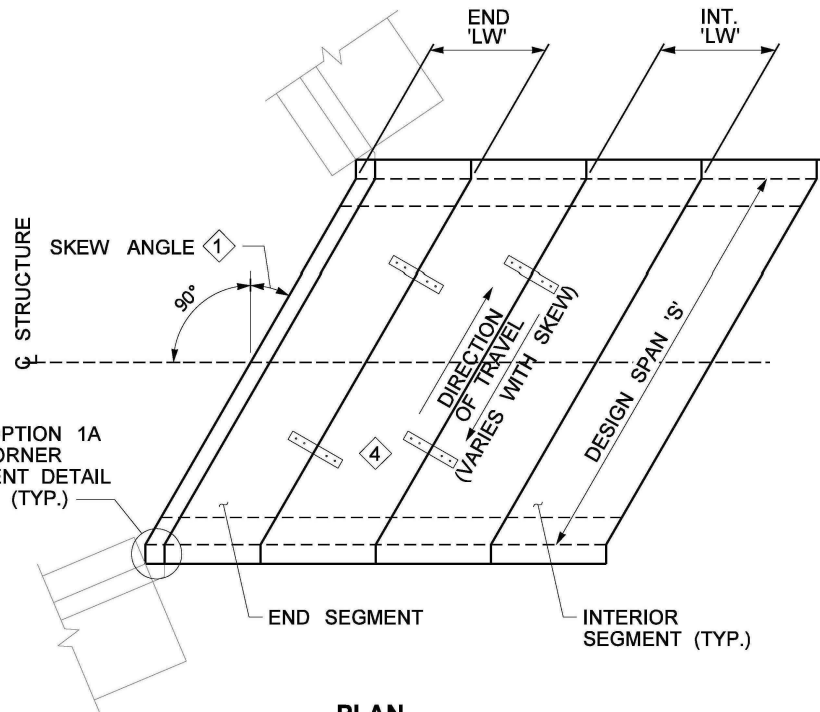


KEY NOTES

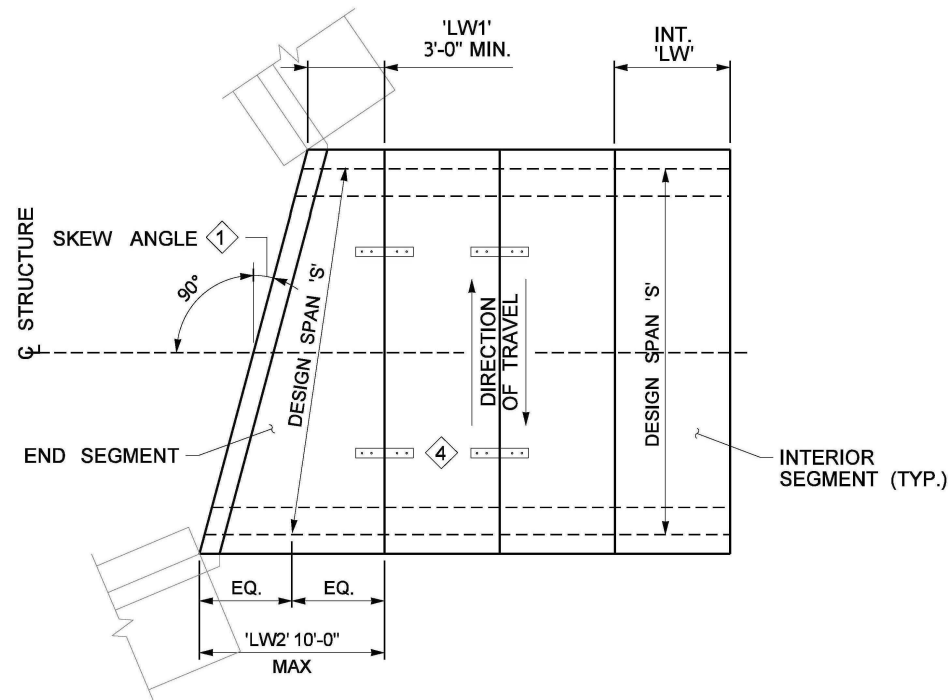
- 1 SKEW ANGLE SHALL NOT EXCEED 30 DEGREES.
- 2 FOR DETAILS NOT SHOWN SEE SEGMENT LAYOUT ON SHEET 2.
- 3 CONTRACTORS MAY SUBMIT SHOP DRAWINGS FOR ANY SKEW OPTION SHOWN MEETING THE DESIGN REQUIREMENTS OF THE PROJECT.
- 4 TIE PLATES, SHALL BE ORIENTED NORMAL TO JOINT (TYP.).
- 5 SLAB BARS: B1, B2, T1 AND T2 (SEE SHEET 4)
- 6 WALL BARS: B3, B4, B5, T3, T4 AND T5 (SEE SHEET 4)



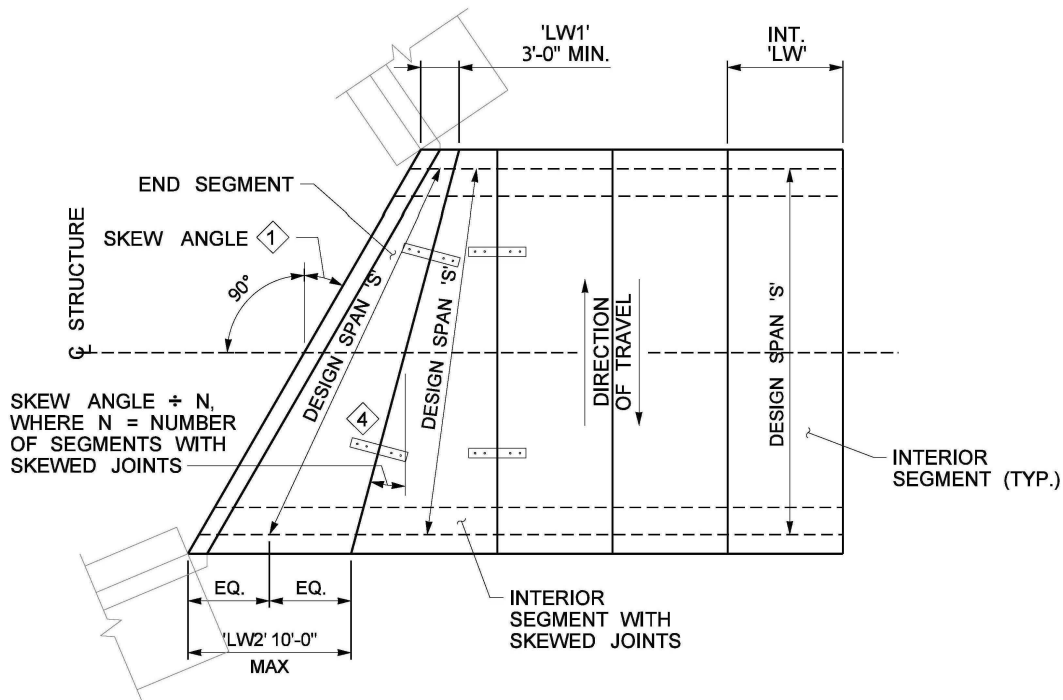
PLAN  
SKEW OPTION 1  
UNIFORM SKEW SEGMENT LAYOUT 2, 3



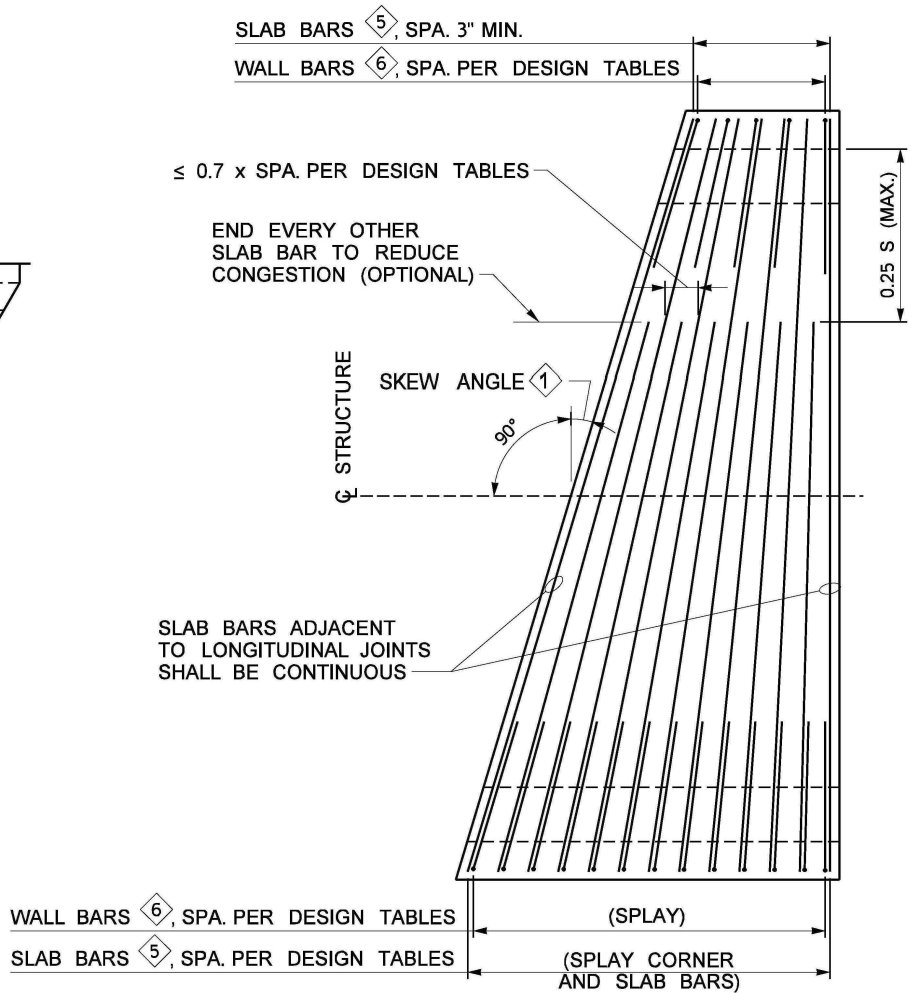
PLAN  
SKEW OPTION 2  
SKEWED SLAB, NORMAL WALL SEGMENT LAYOUT 2, 3



PLAN  
SKEW OPTION 3  
TRAPEZOIDAL END SEGMENT LAYOUT 2, 3



PLAN  
SKEW OPTION 4  
TRANSITIONING END SEGMENT LAYOUT 2, 3



PLAN  
SKEW OPTION 3/4  
REINFORCEMENT SPLAY DETAILS  
ONLY SELECTED REINFORCING SHOWN FOR CLARITY



Sep 12, 2023

BURIED STRUCTURE  
SPLIT BOX

STANDARD PLAN E-20.10-00

SHEET 3 OF 17 SHEETS

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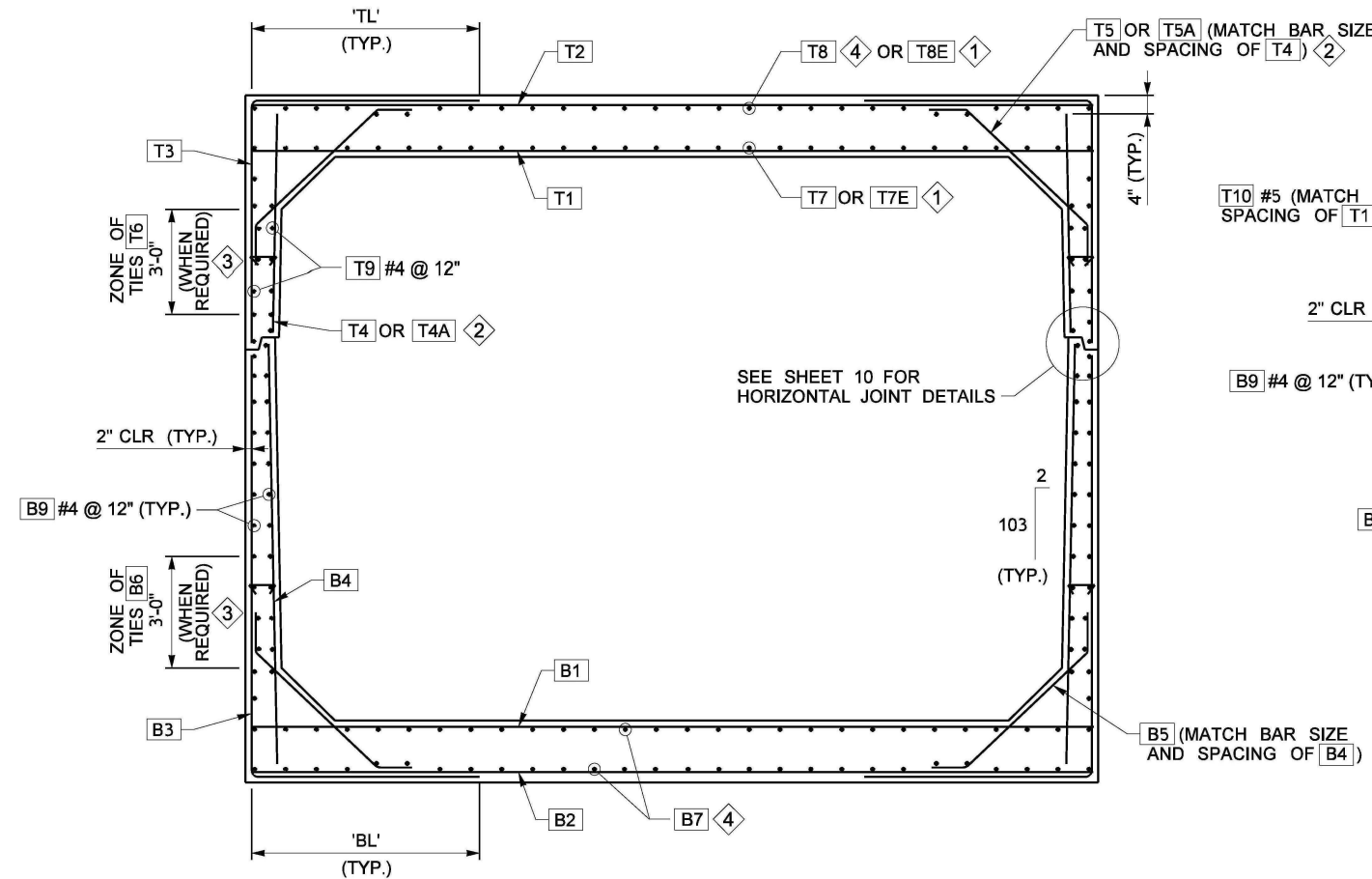
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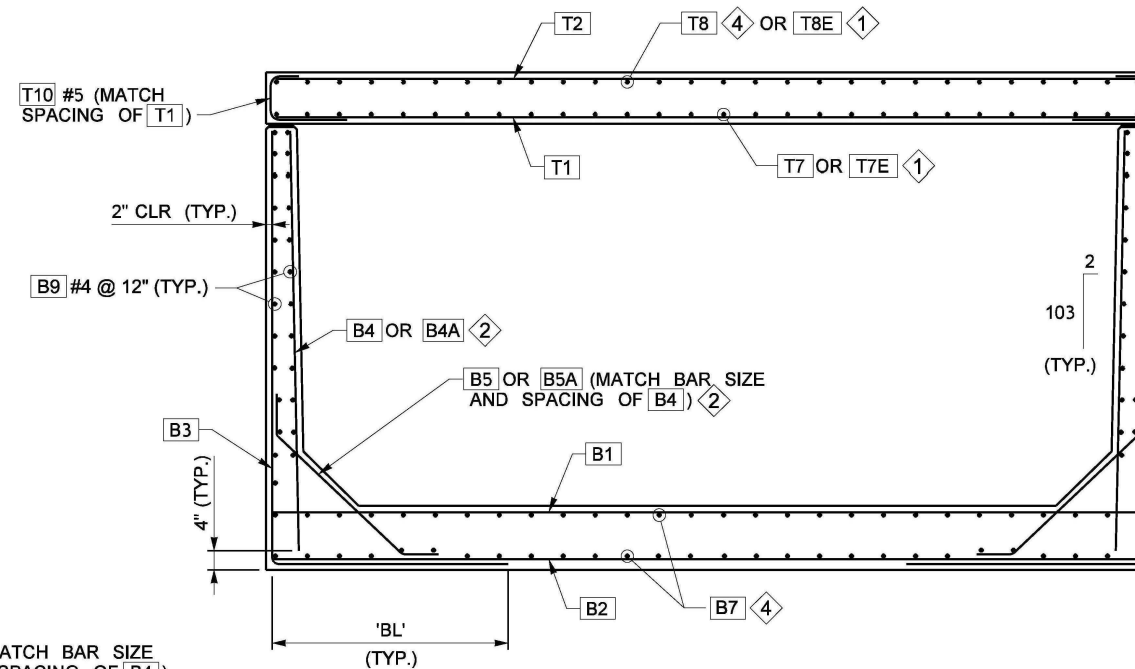


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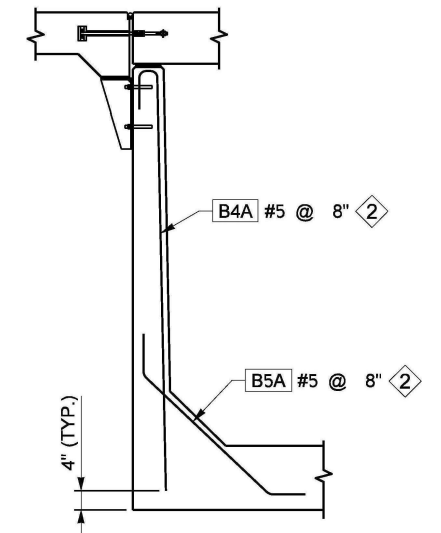




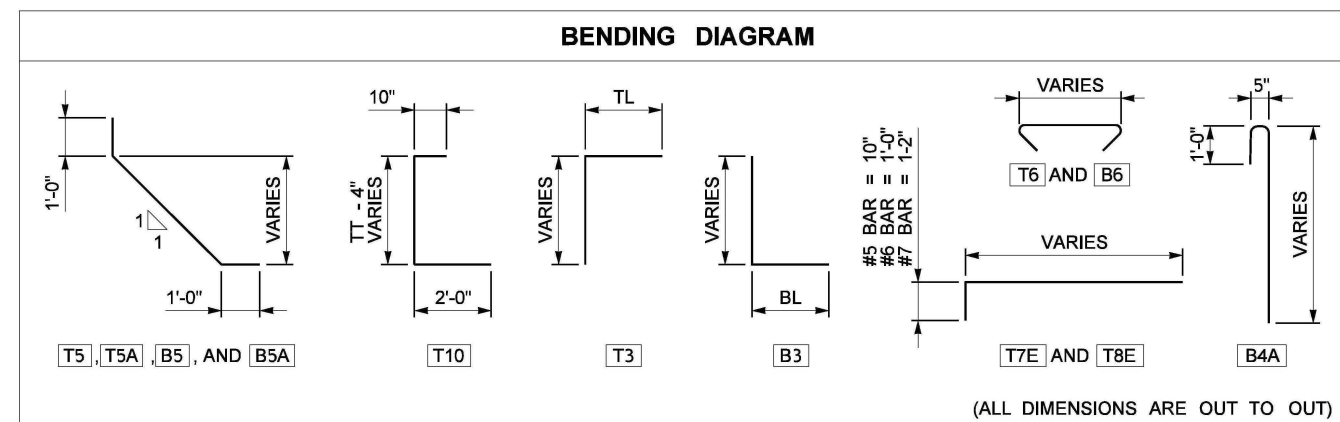
**TYPICAL SECTION  
SPLIT BOX REINFORCEMENT**



**TYPICAL SECTION  
SPLIT BOX ~ SLAB REINFORCEMENT**



**SPLIT BOX ~ SLAB ADDITIONAL  
REINFORCEMENT WHEN APPROACH  
SLAB SEAT IS PRESENT**



### KEY NOTES

1 BARS T7E AND T8E SHALL BE INSTALLED IN THE END SEGMENTS. ROTATE 90° HOOK AS NECESSARY TO PROVIDE THE SPECIFIED CLEARANCE.

SIZE AND SPACING OF BARS T7E SHALL MATCH T7.

BARS T8E SHALL BE AS FOLLOWS:

END SEGMENT WITHOUT HEADWALL OR TRAFFIC BARRIER: #5 @ 12"  
END SEGMENT WITH UP TO 2'-0" HEADWALL: #6 @ 12"  
END SEGMENT WITH UP TO 4'-0" HEADWALL: #6 @ 6"  
END SEGMENT WITH TRAFFIC BARRIER: #7 @ 6"  
FOR ADDITIONAL END SEGMENT DETAILS SEE SHEET 11.

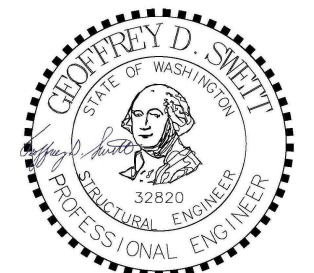
2 WHEN AN APPROACH SLAB SEAT IS PRESENT, ADDITIONAL REINFORCEMENT IS REQUIRED AS FOLLOWS:

FOR SPLIT BOX ~ SLAB STRUCTURES:  
ADD B4A #5 @ 8" AND B5A #5 @ 8". BUNDLE WITH TYPICAL B4 AND B5 RESPECTIVELY.

FOR SPLIT BOX STRUCTURES:  
ADD T4A #5 @ 8" AND T5A #5 @ 8". BUNDLE WITH TYPICAL T4 AND T5 RESPECTIVELY.

3 TIES T6 #4 AND B6 #4 SHALL BE SPACED AT 6" MAX. VERTICALLY AND AT 2'-0" MAX. HORIZONTALLY. EACH TIE SHALL BE HOOKED AROUND LONGITUDINAL BARS T9 OR B9. ADDITIONAL BARS T9 AND B9 MAY BE ADDED TO FACILITATE PLACEMENT OF TIES AS REQUIRED.

4 BARS B7 AND T8 SHALL BE #4 @ 12" WHEN CORRESPONDING SLAB THICKNESS ≤ 20 INCHES, AND #4 @ 9" FOR THICKER SLABS.



Sep 12, 2023

## BURIED STRUCTURE SPLIT BOX STANDARD PLAN E-20.10-00 SHEET 4 OF 17 SHEETS

APPROVED FOR PUBLICATION

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Sep 12, 2023

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DESIGN TABLE ~ CLASS I STRUCTURES ~ SPANS 12', 15' AND 18'

| DESIGN SPAN S<br>① | DESIGN HEIGHT |                  |                   | FILL DEPTH FD<br>② | MEMBER THICKNESS |             |              | TOP UNIT REINFORCEMENT ③ |      |                    |      |             |      |        |                    |      |                | BOTTOM UNIT REINFORCEMENT ③ |      |                    |      |                    |      |             |      |        |                    | MATERIAL QUANTITIES |                |               |                | STR. I BEARING DEMAND (PSF)<br>④ | REQ'D HORIZ JOINT TYPE<br>⑥ |               |   |
|--------------------|---------------|------------------|-------------------|--------------------|------------------|-------------|--------------|--------------------------|------|--------------------|------|-------------|------|--------|--------------------|------|----------------|-----------------------------|------|--------------------|------|--------------------|------|-------------|------|--------|--------------------|---------------------|----------------|---------------|----------------|----------------------------------|-----------------------------|---------------|---|
|                    | TOTAL H       | TOP UNIT WALL HT | BOT. UNIT WALL HB |                    | WALLS TW         | TOP SLAB TT | BOT. SLAB TB | T1 (SLAB INTERIOR)       |      | T2 (SLAB EXTERIOR) |      | T3 (CORNER) |      |        | T4 (WALL INTERIOR) |      | T6 (TIES)<br>⑦ | T7 (BOT.)                   |      | B1 (SLAB INTERIOR) |      | B2 (SLAB EXTERIOR) |      | B3 (CORNER) |      |        | B4 (WALL INTERIOR) |                     | B6 (TIES)<br>⑦ | TOP UNIT ⑧    |                |                                  |                             | BOTTOM UNIT ⑩ |   |
|                    |               |                  |                   |                    |                  |             |              | SIZE                     | SPA. | SIZE               | SPA. | SIZE        | SPA. | TL     | SIZE               | SPA. |                | SIZE                        | SPA. | SIZE               | SPA. | SIZE               | SPA. | BL          | SIZE | SPA.   | CONC. (CY/FT)      | STEEL (LBS/FT)      |                | CONC. (CY/FT) | STEEL (LBS/FT) |                                  |                             |               |   |
|                    |               |                  |                   |                    |                  |             |              |                          |      |                    |      |             |      |        |                    |      |                |                             |      |                    |      |                    |      |             |      |        |                    |                     |                |               |                |                                  |                             |               |   |
| 12'                | 10'           | N/A              | 10'               | 0' ≤ FD < 2'       | 10"              | 12"         | 10"          | #7                       | 6"   | #5                 | 12"  | N/A         |      |        | #4                 | 8"   | N/A            | #5                          | 10"  | #6                 | 6"   | #7                 | 5"   | #7          | 5"   | 3'-2"  | #4                 | 8"                  | N/A            | 0.58          | 106.1          | 1.06                             | 322.5                       | 2397          | 2 |
|                    |               |                  |                   | 2' ≤ FD ≤ 4'       | 10"              | 12"         | 10"          | #7                       | 6"   | #5                 | 12"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #6                 | 6"   | #7                 | 5"   | #7          | 5"   | 3'-2"  | #4                 | 8"                  |                | 0.58          | 98.4           | 1.06                             | 322.5                       | 2490          | 2 |
|                    |               |                  |                   | 4' < FD ≤ 6'       | 12"              | 12"         | 12"          | #8                       | 6"   | #5                 | 12"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #6                 | 6"   | #6                 | 5"   | #7          | 5"   | 4'-3"  | #4                 | 8"                  |                | 0.59          | 112.8          | 1.28                             | 318.9                       | 2901          | 2 |
|                    |               |                  |                   | 6' < FD ≤ 8'       | 12"              | 12"         | 12"          | #8                       | 6"   | #5                 | 12"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #6                 | 6"   | #7                 | 5"   | #7          | 5"   | 3'-4"  | #4                 | 8"                  |                | 0.59          | 112.8          | 1.28                             | 327.7                       | 3255          | 2 |
|                    |               |                  |                   | 8' < FD ≤ 10'      | 12"              | 12"         | 12"          | #9                       | 6"   | #5                 | 12"  |             |      |        | #4                 | 8"   |                | #6                          | 10"  | #7                 | 6"   | #7                 | 5"   | #8          | 5"   | 3'-8"  | #4                 | 8"                  |                | 0.59          | 150.3          | 1.28                             | 382.2                       | 3631          | 2 |
|                    |               |                  |                   |                    |                  |             |              |                          |      |                    |      |             |      |        |                    |      |                |                             |      |                    |      |                    |      |             |      |        |                    |                     |                |               |                |                                  |                             |               |   |
| 15'                | 10'           | N/A              | 10'               | 0' ≤ FD < 2'       | 10"              | 12"         | 10"          | #9                       | 6"   | #5                 | 12"  | N/A         |      |        | #4                 | 8"   | N/A            | #4                          | 12"  | #8                 | 6"   | #6                 | 5"   | #7          | 5"   | 3'-11" | #4                 | 8"                  | N/A            | 0.69          | 157.2          | 1.15                             | 361.0                       | 2269          | 2 |
|                    |               |                  |                   | 2' ≤ FD ≤ 4'       | 10"              | 12"         | 10"          | #8                       | 6"   | #5                 | 12"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #8                 | 6"   | #6                 | 5"   | #7          | 5"   | 5'-1"  | #4                 | 8"                  |                | 0.69          | 138.3          | 1.15                             | 378.8                       | 2313          | 2 |
|                    |               |                  |                   | 4' < FD ≤ 8'       | 12"              | 14"         | 12"          | #9                       | 6"   | #5                 | 10"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #6                 | 5"   | #7          | 5"   | 4'-1"  | #4                 | 8"                  |                | 0.81          | 163.6          | 1.39                             | 399.5                       | 3147          | 2 |
|                    |               |                  |                   | 8' < FD ≤ 10'      | 12"              | 16"         | 14"          | #9                       | 6"   | #6                 | 12"  |             |      |        | #4                 | 8"   |                | #5                          | 10"  | #8                 | 6"   | #6                 | 5"   | #8          | 5"   | 3'-7"  | #4                 | 8"                  |                | 0.91          | 183.0          | 1.50                             | 422.7                       | 3625          | 2 |
|                    |               |                  |                   |                    |                  |             |              |                          |      |                    |      |             |      |        |                    |      |                |                             |      |                    |      |                    |      |             |      |        |                    |                     |                |               |                |                                  |                             |               |   |
|                    | 12' TO 15'    | 5'               | 7' TO 10'         | 0' ≤ FD < 2'       | 10"              | 12"         | 10"          | #9                       | 6"   | #6                 | 7"   | #6          | 7"   | 3'-0"  | #4                 | 8"   | N/A            | #5                          | 9"   | #8                 | 6"   | #5                 | 10"  | #6          | 5"   | 4'-4"  | #4                 | 8"                  | N/A            | 0.99          | 272.1          | 1.15                             | 301.1                       | 2030          | 1 |
|                    |               |                  |                   | 2' ≤ FD ≤ 4'       | 10"              | 12"         | 10"          | #9                       | 6"   | #6                 | 7"   | #6          | 7"   | 3'-0"  | #4                 | 8"   |                | #4                          | 12"  | #8                 | 6"   | #5                 | 12"  | #6          | 6"   | 4'-9"  | #4                 | 8"                  |                | 0.99          | 260.1          | 1.15                             | 282.2                       | 1992          | 1 |
|                    |               |                  |                   | 4' < FD ≤ 8'       | 10"              | 14"         | 12"          | #9                       | 6"   | #5                 | 10"  | #5          | 5"   | 5'-2"  | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #5                 | 10"  | #6          | 5"   | 3'-9"  | #4                 | 8"                  |                | 1.09          | 244.9          | 1.26                             | 315.9                       | 2792          | 1 |
|                    |               |                  |                   | 8' < FD ≤ 12'      | 12"              | 16"         | 14"          | #10                      | 6"   | #6                 | 12"  | #5          | 6"   | 3'-10" | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #6                 | 12"  | #7          | 6"   | 3'-5"  | #4                 | 8"                  |                | 1.27          | 273.3          | 1.50                             | 342.9                       | 3739          | 1 |
|                    |               |                  |                   | 12' < FD ≤ 16'     | 12"              | 18"         | 16"          | #10                      | 6"   | #6                 | 12"  | #6          | 6"   | 3'-9"  | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #6                 | 10"  | #7          | 5"   | 3'-7"  | #4                 | 8"                  |                | 1.38          | 292.3          | 1.60                             | 375.3                       | 4436          | 1 |
|                    |               |                  |                   | 16' < FD ≤ 20'     | 12"              | 20"         | 18"          | #10                      | 6"   | #5                 | 6"   | #6          | 6"   | 3'-9"  | #4                 | 8"   |                | #4                          | 12"  | #10                | 6"   | #6                 | 12"  | #8          | 6"   | 3'-9"  | #4                 | 8"                  |                | 1.48          | 303.5          | 1.71                             | 417.2                       | 5372          | 1 |
|                    |               |                  |                   | 20' < FD ≤ 24'     | 12"              | 22"         | 22"          | #10                      | 6"   | #6                 | 10"  | #6          | 5"   | 3'-11" | #4                 | 8"   | Y              | #4                          | 12"  | #10                | 6"   | #6                 | 9"   | #8          | 6"   | 3'-11" | #4                 | 8"                  | Y              | 1.59          | 327.1          | 1.92                             | 443.4                       | 6342          | 1 |
|                    |               |                  |                   | 24' < FD ≤ 28'     | 12"              | 22"         | 22"          | #11                      | 6"   | #6                 | 10"  | #7          | 5"   | 3'-11" | #4                 | 8"   | Y              | #4                          | 12"  | #10                | 6"   | #6                 | 10"  | #8          | 5"   | 3'-11" | #4                 | 8"                  | Y              | 1.59          | 387.9          | 1.92                             | 473.0                       | 7209          | 1 |
|                    |               |                  |                   | 28' < FD ≤ 32'     | 12"              | 24"         | 24"          | #11                      | 6"   | #7                 | 10"  | #7          | 5"   | 4'-1"  | #4                 | 8"   | Y              | #4                          | 12"  | #11                | 6"   | #7                 | 10"  | #8          | 5"   | 4'-1"  | #4                 | 8"                  | Y              | 1.69          | 402.5          | 2.02                             | 522.3                       | 8145          | 1 |
| 32' < FD ≤ 38'     | 12"           | 24"              | 24"               | #11                | 5"               | #7          | 10"          | #8                       | 5"   | 4'-1"              | #4   | 8"          | Y    | #4     | 12"                | #11  | 6"             | #7                          | 10"  | #8                 | 5"   | 4'-1"              | #4   | 8"          | Y    | 1.69   | 470.2              | 2.02                | 522.3          | 9445          | 1              |                                  |                             |               |   |
| 18'                | 10'           | N/A              | 10'               | 0' ≤ FD < 2'       | 10"              | 16"         | 12"          | #8                       | 6"   | #6                 | 12"  | N/A         |      |        | #4                 | 8"   | N/A            | #4                          | 12"  | #9                 | 6"   | #6                 | 5"   | #7          | 5"   | 3'-2"  | #4                 | 8"                  | N/A            | 1.04          | 164.2          | 1.37                             | 422.3                       | 2259          | 2 |
|                    |               |                  |                   | 2' ≤ FD ≤ 4'       | 10"              | 14"         | 12"          | #9                       | 6"   | #5                 | 10"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #6                 | 5"   | #7          | 5"   | 3'-2"  | #4                 | 8"                  |                | 0.92          | 188.0          | 1.37                             | 420.7                       | 2348          | 2 |
|                    |               |                  |                   | 4' < FD ≤ 6'       | 12"              | 16"         | 14"          | #9                       | 6"   | #6                 | 12"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #10                | 6"   | #7                 | 10"  | #7          | 5"   | 4'-3"  | #4                 | 8"                  |                | 1.06          | 195.9          | 1.63                             | 449.0                       | 2731          | 2 |
|                    |               |                  |                   | 6' < FD ≤ 8'       | 12"              | 18"         | 16"          | #9                       | 6"   | #6                 | 12"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #7                 | 10"  | #7          | 5"   | 3'-10" | #4                 | 8"                  |                | 1.18          | 196.3          | 1.75                             | 412.6                       | 3165          | 2 |
|                    |               |                  |                   | 8' < FD ≤ 10'      | 12"              | 18"         | 16"          | #10                      | 6"   | #6                 | 12"  |             |      |        | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #6                 | 5"   | #8          | 5"   | 3'-6"  | #4                 | 8"                  |                | 1.18          | 196.3          | 1.75                             | 483.8                       | 3576          | 2 |
|                    | 12' TO 15'    | 5'               | 7' TO 10'         | 0' ≤ FD < 2'       | 10"              | 14"         | 12"          | #9                       | 6"   | #6                 | 9"   | #6          | 9"   | 3'-1"  | #4                 | 8"   | N/A            | #5                          | 8"   | #8                 | 6"   | #6                 | 10"  | #6          | 5"   | 3'-1"  | #4                 | 8"                  | N/A            | 1.22          | 290.0          | 1.37                             | 328.2                       | 1877          | 1 |
|                    |               |                  |                   | 2' ≤ FD ≤ 4'       | 10"              | 14"         | 12"          | #9                       | 6"   | #5                 | 8"   | #6          | 8"   | 4'-0"  | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #6                 | 10"  | #6          | 5"   | 3'-1"  | #4                 | 8"                  |                | 1.22          | 272.9          | 1.37                             | 356.4                       | 2001          | 1 |
|                    |               |                  |                   | 4' < FD ≤ 6'       | 10"              | 16"         | 14"          | #9                       | 6"   | #5                 | 9"   | #5          | 6"   | 3'-8"  | #4                 | 8"   |                | #4                          | 12"  | #9                 | 6"   | #5                 | 10"  | #7          | 5"   | 3'-6"  | #4                 | 8"                  |                | 1.34          | 261.4          | 1.49                             | 381.6                       | 2349          | 1 |
|                    |               |                  |                   | 6' < FD ≤ 10'      | 10"              | 18"         | 16"          | #10                      | 6"   | #6                 | 12"  | #6          | 6"   | 3'-5"  | #4                 | 8"   |                | #4                          | 12"  | #10                | 6"   | #6                 | 10"  | #7          | 5"   | 3'-5"  | #4                 | 8"                  |                | 1.47          | 316.1          | 1.61                             | 428.4                       | 3198          | 1 |
|                    |               |                  |                   | 10' < FD ≤ 14'     | 12"              | 20"         | 18"          | #11                      | 6"   | #5                 | 6"   | #5          | 6"   | 3'-9"  | #4                 | 8"   |                | #4                          | 12"  | #10                | 6"   | #6                 | 10"  | #7          | 5"   | 3'-9"  | #4                 | 8"                  |                | 1.67          | 360.8          | 1.87                             | 444.3                       | 3984          | 1 |
|                    |               |                  |                   | 14' < FD ≤ 18'     | 12"              | 22"         | 22"          | #11                      | 6"   | #5                 | 7"   | #6          | 7"   | 3'-11" | #4                 | 8"   | Y              | #4                          | 12"  | #10                | 6"   | #6                 | 10"  | #7          | 5"   | 3'-11" | #4                 | 8"                  | Y              | 1.79          | 380.4          | 2.12                             | 461.9                       | 4973          | 1 |
|                    |               |                  |                   | 18' < FD ≤ 22'     | 12"              | 22"         | 22"          | #11                      | 5"   | #6                 | 10"  | #6          | 5"   | 3'-11" | #4                 | 8"   | Y              | #4                          | 12"  | #11                | 6"   | #6                 | 10"  | #8          | 5"   | 3'-11" | #4                 | 8"                  | Y              | 1.79          | 443.9          | 2.12                             | 548.0                       | 5841          | 1 |
|                    |               |                  |                   | 22' < FD ≤ 30'     | 12"              | 24"         | 24"          | #10                      | 4"   | #7                 | 10"  | #6          | 5"   | 4'-1"  | #4                 | 8"   | Y              | #4                          | 12"  | #10                | 4"   | #7                 | 10"  | #8          | 5"   | 4'-1"  | #4                 | 8"                  | Y              | 1.92          | 462.7          | 2.24                             | 610.4                       | 7643          | 1 |
|                    |               |                  |                   |                    |                  |             |              |                          |      |                    |      |             |      |        |                    |      |                |                             |      |                    |      |                    |      |             |      |        |                    |                     |                |               |                |                                  |                             |               |   |



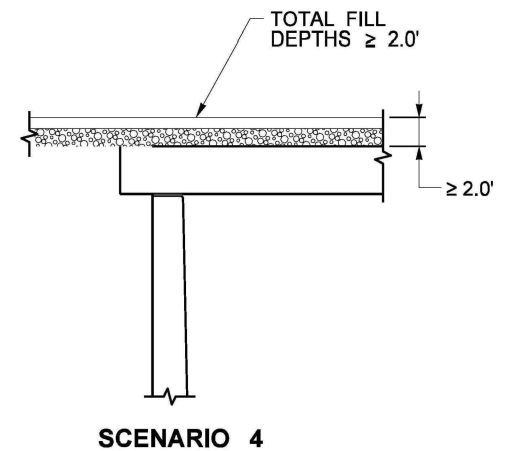
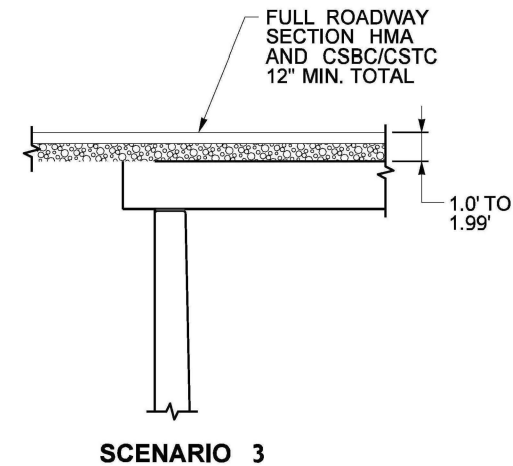
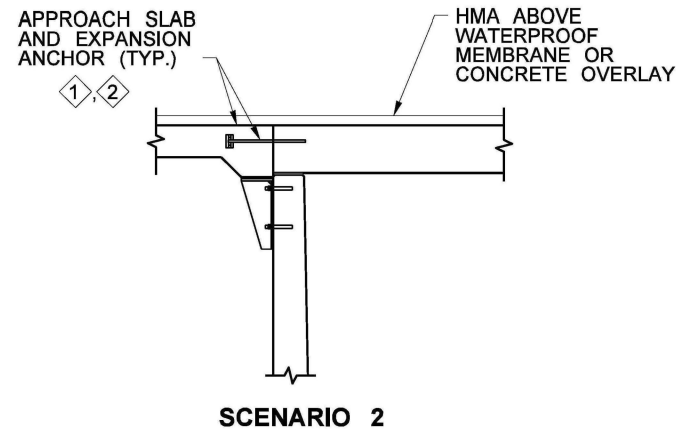
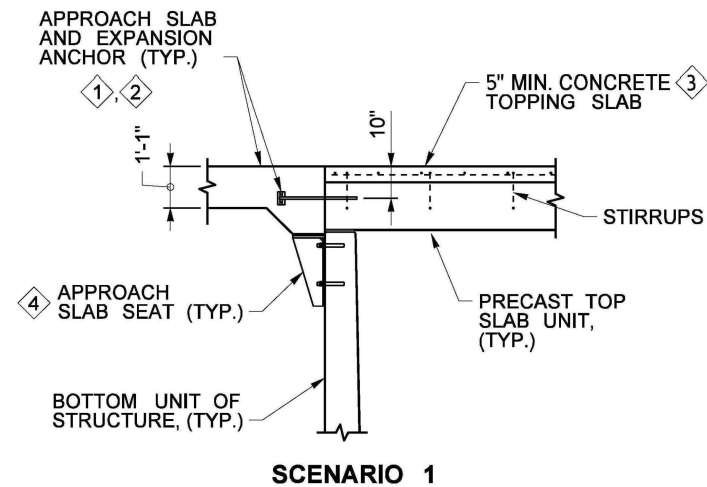
DESIGN TABLE ~ PGA = 0.32g ~ CLASS II STRUCTURES ~ SPANS 21', 24', 27' AND 30'

| DESIGN<br>SPAN<br>S<br><br>① | DESIGN HEIGHT |                           |                            | FILL<br>DEPTH<br>FD<br><br>② | MEMBER THICKNESS |                   |                    | TOP UNIT REINFORCEMENT ③ |      |                          |      |                |      |    |                          |      |              |              |      |                          |      | BOTTOM UNIT REINFORCEMENT ③ |      |                |                  |                   |                          |                   |              |               |  | MATERIAL QUANTITIES |  |   |                            | DESIGN VALUES |  | REQ'D<br>HORIZ.<br>JOINT<br>TYPE<br><br>⑥ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                              | TOTAL<br>H    | TOP<br>UNIT<br>WALL<br>HT | BOT.<br>UNIT<br>WALL<br>HB |                              | WALLS<br>TW      | TOP<br>SLAB<br>TT | BOT.<br>SLAB<br>TB | T1<br>(SLAB<br>INTERIOR) |      | T2<br>(SLAB<br>EXTERIOR) |      | T3<br>(CORNER) |      |    | T4<br>(WALL<br>INTERIOR) |      | T6<br>(TIES) | T7<br>(BOT.) |      | B1<br>(SLAB<br>INTERIOR) |      | B2<br>(SLAB<br>EXTERIOR)    |      | B3<br>(CORNER) |                  |                   | B4<br>(WALL<br>INTERIOR) |                   | B6<br>(TIES) | TOP UNIT<br>⑧ |  | BOTTOM UNIT<br>⑩    |  | STR. I<br>BEARING<br>DEMAND<br>(PSF)<br><br>④ | RACKING<br>DISPL.<br><br>⑤ |               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                              |               |                           |                            |                              |                  |                   |                    | SIZE                     | SPA. | SIZE                     | SPA. | SIZE           | SPA. | TL | SIZE                     | SPA. |              | SIZE         | SPA. | SIZE                     | SPA. | BL                          | SIZE | SPA.           | CONC.<br>(CY/FT) | STEEL<br>(LBS/FT) | CONC.<br>(CY/FT)         | STEEL<br>(LBS/FT) |              |               |  |                     |  |   |                            |               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                              |               |                           |                            |                              |                  |                   |                    |                          |      |                          |      |                |      |    |                          |      |              |              |      |                          |      |                             |      |                |                  |                   |                          |                   |              |               |  |                     |  |   |                            |               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                              |               |                           |                            |                              |                  |                   |                    |                          |      |                          |      |                |      |    |                          |      |              |              |      |                          |      |                             |      |                |                  |                   |                          |                   |              |               |  |                     |  |   |                            |               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

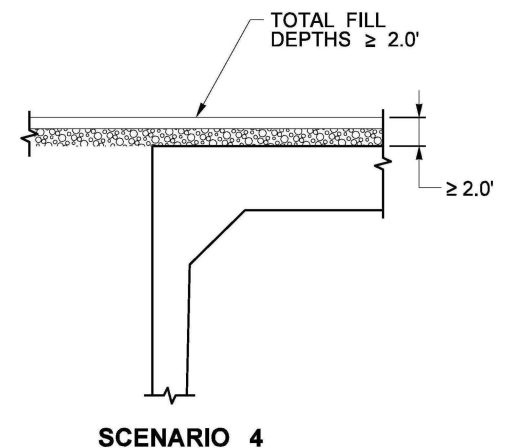
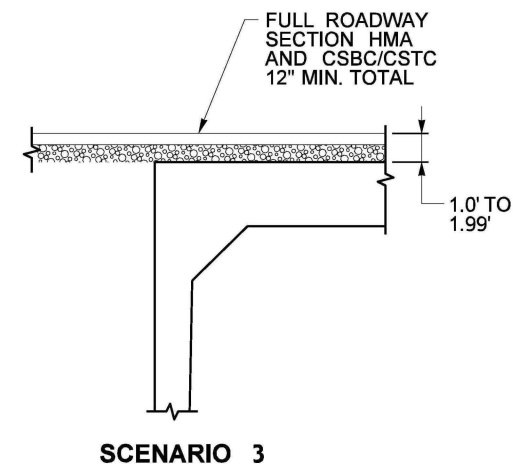
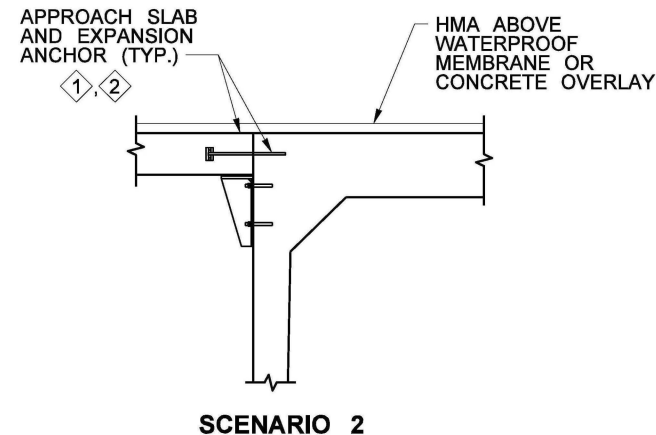
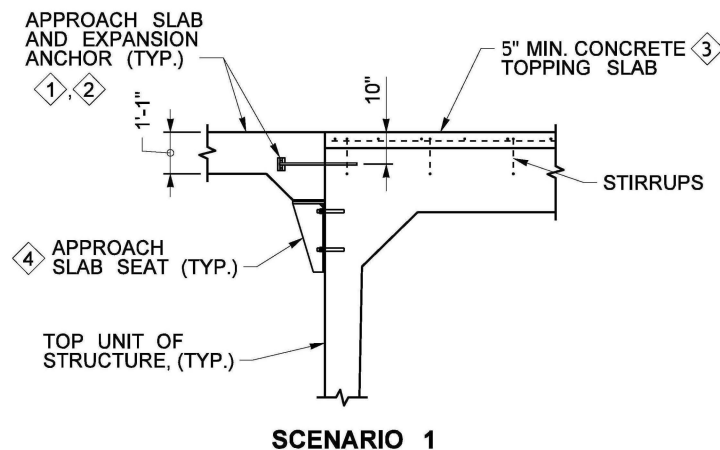


| DESIGN<br>SPAN<br>S<br><br>① | DESIGN HEIGHT |                           |                            | FILL<br>DEPTH<br>FD<br><br>② | MEMBER THICKNESS |                   |                    | TOP UNIT REINFORCEMENT ③ |      |                          |       |                |      |        |                          |      |              |              |      | BOTTOM UNIT REINFORCEMENT ③ |      |                          |       |                |      |        |                          |       |              |                  |                   | MATERIAL QUANTITIES |                   |   |                            | DESIGN VALUES |  | REQ'D<br>HORIZ<br>JOINT<br>TYPE<br><br>⑥ |
|------------------------------|---------------|---------------------------|----------------------------|------------------------------|------------------|-------------------|--------------------|--------------------------|------|--------------------------|-------|----------------|------|--------|--------------------------|------|--------------|--------------|------|-----------------------------|------|--------------------------|-------|----------------|------|--------|--------------------------|-------|--------------|------------------|-------------------|---------------------|-------------------|---|----------------------------|---------------|--|--|
|                              | TOTAL<br>H    | TOP<br>UNIT<br>WALL<br>HT | BOT.<br>UNIT<br>WALL<br>HB |                              | WALLS<br>TW      | TOP<br>SLAB<br>TT | BOT.<br>SLAB<br>TB | T1<br>(SLAB<br>INTERIOR) |      | T2<br>(SLAB<br>EXTERIOR) |       | T3<br>(CORNER) |      |        | T4<br>(WALL<br>INTERIOR) |      | T6<br>(TIES) | T7<br>(BOT.) |      | B1<br>(SLAB<br>INTERIOR)    |      | B2<br>(SLAB<br>EXTERIOR) |       | B3<br>(CORNER) |      |        | B4<br>(WALL<br>INTERIOR) |       | B6<br>(TIES) | TOP UNIT<br>⑧    |                   | BOTTOM UNIT<br>⑩    |                   | STR. I<br>BEARING<br>DEMAND<br>(PSF)<br><br>④ | RACKING<br>DISPL.<br><br>⑤ |               |  |  |
|                              |               |                           |                            |                              |                  |                   |                    | SIZE                     | SPA. | SIZE                     | SPA.  | SIZE           | SPA. | TL     | SIZE                     | SPA. |              | SIZE         | SPA. | SIZE                        | SPA. | SIZE                     | SPA.  | SIZE           | SPA. | BL     | SIZE                     | SPA.  |              | CONC.<br>(CY/FT) | STEEL<br>(LBS/FT) | CONC.<br>(CY/FT)    | STEEL<br>(LBS/FT) |   |                            |               |  |  |
|                              |               |                           |                            |                              |                  |                   |                    |                          |      |                          |       |                |      |        |                          |      |              |              |      |                             |      |                          |       |                |      |        |                          |       |              |                  |                   |                     |                   |   |                            |               |  |  |
| 21'                          | 10'           | N/A                       | 10'                        | 0' ≤ FD < 2'                 | 12"              | 16"               | 14"                | #9                       | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #6           | 12"  | #9                          | 6"   | #6                       | 6"    | #7             | 6"   | 4'-8"  | #4                       | 8"    | N/A          | 1.21             | 250.9             | 1.76                | 445.0             | 2177  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 16"               | 14"                | #9                       | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 12"  | #9                          | 6"   | #6                       | 5"    | #7             | 5"   | 3'-4"  | #4                       | 8"    | N/A          | 1.21             | 230.9             | 1.76                | 471.2             | 2365  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 4' < FD ≤ 6'                 | 12"              | 18"               | 16"                | #10                      | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 12"  | #10                         | 6"   | #7                       | 10"   | #7             | 5"   | 3'-5"  | #4                       | 8"    | N/A          | 1.35             | 272.2             | 1.90                | 488.9             | 2777  | N/A                        | 2             |  |  |
|                              | 12' TO 15'    | 5'                        | 7' TO 10'                  | 0' ≤ FD < 2'                 | 12"              | 14"               | 12"                | #10                      | 6"   | #6                       | 8"    | #5             | 8"   | 3'-4"  | #4                       | 8"   | N/A          | #6           | 9"   | #9                          | 6"   | #5                       | 6"    | #7             | 6"   | 3'-7"  | #4                       | 8"    | N/A          | 1.43             | 376.7             | 1.61                | 413.5             | 1762  | 0.5"                       | 1A            |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 16"               | 14"                | #10                      | 6"   | #6                       | 8"    | #5             | 8"   | 3'-5"  | #4                       | 8"   | N/A          | #4           | 12"  | #9                          | 6"   | #5                       | 6"    | #7             | 6"   | 3'-7"  | #4                       | 8"    | N/A          | 1.57             | 347.4             | 1.76                | 415.4             | 2015  | 0.56"                      | 1A            |  |  |
|                              |               |                           |                            | 4' < FD ≤ 8'                 | 12"              | 18"               | 16"                | #11                      | 6"   | #5                       | 7"    | #5             | 7"   | 3'-7"  | #4                       | 8"   | N/A          | #4           | 12"  | #10                         | 6"   | #7                       | 10"   | #7             | 5"   | 3'-7"  | #4                       | 8"    | N/A          | 1.71             | 388.5             | 1.90                | 490.6             | 2767  | 0.66"                      | 1             |  |  |
|                              |               |                           |                            | 8' < FD ≤ 12'                | 12"              | 20"               | 20"                | #11                      | 6"   | #5                       | 6"    | #5             | 6"   | 3'-9"  | #5                       | 9"   | Y            | #4           | 12"  | #11                         | 6"   | #6                       | 6"    | #8             | 6"   | 3'-9"  | #5                       | 9"    | Y            | 1.86             | 425.9             | 2.18                | 593.0             | 3660  | 0.77"                      | 1             |  |  |
|                              |               |                           |                            | 12' < FD ≤ 16'               | 12"              | 22"               | 22"                | #11                      | 5"   | #6                       | 10"   | #6             | 5"   | 3'-11" | #5                       | 8"   | Y            | #4           | 9"   | #11                         | 6"   | #6                       | 10"   | #8             | 5"   | 4'-0"  | #5                       | 8"    | Y            | 2.00             | 520.4             | 2.32                | 658.6             | 4455  | 0.85"                      | 1             |  |  |
|                              | 17' TO 20'    | 7' TO 10'                 | 10'                        | 0' ≤ FD ≤ 2'                 | 12"              | 14"               | 14"                | #9                       | 6"   | #6                       | 5"    | #8             | 5"   | 5'-0"  | #4                       | 8"   | N/A          | #6           | 12"  | #9                          | 6"   | #6                       | 5"    | #8             | 5"   | 4'-9"  | #4                       | 8"    | N/A          | 1.76             | 553.5             | 1.76                | 530.3             | 1830  | 0.84"                      | 1             |  |  |
| 24'                          | 10'           | N/A                       | 10'                        | 0' ≤ FD < 2'                 | 12"              | 18"               | 16"                | #9                       | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #6           | 12"  | #9                          | 6"   | #7                       | 10"   | #7             | 6"   | 3'-9"  | #4                       | 8"    | N/A          | 1.52             | 282.7             | 2.05                | 458.6             | 2137  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 18"               | 16"                | #10                      | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 12"  | #10                         | 6"   | #7                       | 10"   | #7             | 5"   | 3'-5"  | #4                       | 8"    | N/A          | 1.52             | 306.5             | 2.05                | 526.1             | 2350  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 4' < FD ≤ 6'                 | 12"              | 18"               | 18"                | #11                      | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 12"  | #10                         | 6"   | #7                       | 10"   | #7             | 5"   | 3'-7"  | #4                       | 8"    | N/A          | 1.52             | 358.4             | 2.21                | 528.2             | 2733  | N/A                        | 2             |  |  |
|                              | 12' TO 15'    | 5'                        | 7' TO 10'                  | 0' ≤ FD < 2'                 | 12"              | 18"               | 16"                | #10                      | 6"   | #6                       | 8"    | #5             | 8"   | 3'-7"  | #4                       | 8"   | N/A          | #6           | 10"  | #8                          | 6"   | #7                       | 10"   | #6             | 5"   | 3'-7"  | #4                       | 8"    | N/A          | 1.88             | 415.5             | 2.05                | 405.6             | 1773  | 0.51"                      | 1A            |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 18"               | 16"                | #10                      | 6"   | #6                       | 8"    | #5             | 8"   | 3'-7"  | #4                       | 8"   | N/A          | #4           | 12"  | #9                          | 6"   | #7                       | 10"   | #7             | 5"   | 3'-7"  | #4                       | 8"    | N/A          | 1.88             | 385.5             | 2.05                | 481.4             | 1984  | 0.57"                      | 1A            |  |  |
|                              |               |                           |                            | 4' < FD ≤ 8'                 | 12"              | 20"               | 18"                | #11                      | 6"   | #6                       | 8"    | #6             | 8"   | 3'-9"  | #4                       | 8"   | N/A          | #4           | 12"  | #10                         | 6"   | #5                       | 6"    | #8             | 6"   | 3'-10" | #4                       | 8"    | N/A          | 2.04             | 452.8             | 2.21                | 536.1             | 2776  | 0.66"                      | 1             |  |  |
|                              |               |                           |                            | 8' < FD ≤ 10'                | 12"              | 22"               | 22"                | #11                      | 6"   | #6                       | 8"    | #6             | 8"   | 3'-11" | #5                       | 9"   | Y            | #4           | 9"   | #11                         | 6"   | #7                       | 10"   | #7             | 5"   | 3'-11" | #5                       | 9"    | Y            | 2.20             | 493.9             | 2.53                | 666.2             | 3260  | 0.73"                      | 1             |  |  |
|                              |               |                           |                            | 10' < FD ≤ 14'               | 12"              | 24"               | 24"                | #10 ⑨                    | 4"   | #6                       | 7"    | #7             | 7"   | 4'-1"  | #5                       | 8"   | N/A          | #4           | 9"   | #10 ⑨                       | 4"   | #7                       | 10"   | #8             | 5"   | 4'-1"  | #5                       | 8"    | N/A          | 2.36             | 580.9             | 2.69                | 767.5             | 4150  | 0.84"                      | 1             |  |  |
|                              | 17' TO 20'    | 7' TO 10'                 | 10'                        | 0' ≤ FD < 2'                 | 12"              | 16"               | 16"                | #9                       | 6"   | #6                       | 5"    | #8             | 5"   | 3'-10" | #4                       | 8"   | N/A          | #6           | 12"  | #9                          | 6"   | #6                       | 5"    | #8             | 5"   | 3'-11" | #4                       | 8"    | N/A          | 2.05             | 578.9             | 2.05                | 557.4             | 1817  | 0.78"                      | 1             |  |  |
| 2' ≤ FD ≤ 4'                 | 12"           | 16"                       | 16"                        | #10                          | 6"               | #6                | 5"                 | #8                       | 5"   | 4'-3"                    | #4    | 8"             | N/A  | #4     | 12"                      | #10  | 6"           | #8           | 8"   | #8 ⑨                        | 4"   | 3'-7"                    | #4    | 8"             | N/A  | 2.05   | 608.0                    | 2.05  | 656.5        | 2028             | 0.92"             | 1                   |                   |   |                            |               |  |  |
| 27'                          | 10'           | N/A                       | 10'                        | 0' ≤ FD < 2'                 | 12"              | 18"               | 16"                | #10                      | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #6           | 10"  | #10                         | 6"   | #6                       | 6"    | #7             | 6"   | 3'-9"  | #4                       | 8"    | N/A          | 1.68             | 374.9             | 2.19                | 558.0             | 2107  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 18"               | 18"                | #11                      | 6"   | #6                       | 12"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 12"  | #10                         | 6"   | #6                       | 5"    | #7             | 5"   | 3'-9"  | #4                       | 8"    | N/A          | 1.68             | 391.9             | 2.37                | 600.1             | 2401  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 4' < FD ≤ 6'                 | 12"              | 22"               | 20"                | #11                      | 6"   | #6                       | 10"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 9"   | #11                         | 6"   | #7                       | 6"    | #8             | 6"   | 3'-9"  | #4                       | 8"    | N/A          | 2.04             | 408.1             | 2.55                | 688.8             | 2855  | N/A                        | 2             |  |  |
|                              | 12' TO 15'    | 5'                        | 7' TO 10'                  | 0' ≤ FD < 2'                 | 12"              | 18"               | 16"                | #10                      | 6"   | #7                       | 8"    | #5             | 8"   | 3'-7"  | #4                       | 8"   | N/A          | #6           | 10"  | #9                          | 6"   | #8                       | 10"   | #7             | 5"   | 3'-7"  | #4                       | 8"    | N/A          | 2.05             | 479.4             | 2.19                | 534.7             | 1679  | 0.52"                      | 1A            |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 20"               | 18"                | #11                      | 6"   | #7                       | 8"    | #6             | 8"   | 3'-9"  | #4                       | 8"   | N/A          | #4           | 12"  | #10                         | 6"   | #8                       | 10"   | #7             | 5"   | 3'-9"  | #4                       | 8"    | N/A          | 2.23             | 518.7             | 2.37                | 590.2             | 1974  | 0.58"                      | 1A            |  |  |
|                              |               |                           |                            | 4' < FD ≤ 6'                 | 12"              | 22"               | 20"                | #11                      | 6"   | #7                       | 8"    | #6             | 8"   | 3'-11" | #4                       | 8"   | N/A          | #4           | 9"   | #10                         | 6"   | #8                       | 10"   | #7             | 5"   | 3'-11" | #4                       | 8"    | N/A          | 2.40             | 538.0             | 2.55                | 594.0             | 2394  | 0.64"                      | 1             |  |  |
|                              |               |                           |                            | 6' < FD ≤ 10'                | 12"              | 24"               | 24"                | #10 ⑨                    | 4"   | #7                       | 9"    | #6             | 9"   | 4'-1"  | #4                       | 7"   | N/A          | #4           | 9"   | #11                         | 5"   | #8                       | 10"   | #8             | 5"   | 4'-1"  | #4                       | 7"    | N/A          | 2.58             | 594.0             | 2.91                | 822.9             | 3266  | 0.75"                      | 1             |  |  |
|                              | 17' TO 20'    | 7' TO 10'                 | 10'                        | 0' ≤ FD < 2'                 | 12"              | 18"               | 18"                | #10                      | 7"   | #8                       | 10"   | #8             | 5"   | 3'-8"  | #4                       | 8"   | N/A          | #6           | 12"  | #9                          | 6"   | #8                       | 10"   | #8             | 5"   | 3'-10" | #4                       | 8"    | N/A          | 2.37             | 622.1             | 2.37                | 582.7             | 1782  | 0.87"                      | 1             |  |  |
|                              | 2' < FD ≤ 4'  | 12"                       | 18"                        | 18"                          | #10              | 6"                | #8                 | 10"                      | #8   | 5"                       | 4'-0" | #4             | 8"   | N/A    | #4                       | 12"  | #10          | 6"           | #8   | 10"                         | #8   | 5"                       | 4'-0" | #4             | 8"   | N/A    | 2.37                     | 636.6 | 2.37         | 636.6            | 2009              | 0.94"               | 1                 |   |                            |               |  |  |
| 30'                          | 10'           | N/A                       | 10'                        | 0' ≤ FD < 2'                 | 12"              | 20"               | 18"                | #10                      | 6"   | #6                       | 11"   | N/A            |      |        | N/A                      |      | N/A          | #6           | 10"  | #11                         | 6"   | #7                       | 6"    | #8             | 5"   | 3'-9"  | #4                       | 8"    | N/A          | 2.05             | 416.4             | 2.54                | 751.6             | 2101  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 20"               | 18"                | #11                      | 6"   | #6                       | 11"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 12"  | #11                         | 6"   | #6                       | 5"    | #7             | 5"   | 3'-9"  | #4                       | 8"    | N/A          | 2.05             | 443.8             | 2.54                | 706.3             | 2322  | N/A                        | 2             |  |  |
|                              |               |                           |                            | 4' < FD ≤ 6'                 | 12"              | 22"               | 20"                | #11                      | 5"   | #6                       | 10"   | N/A            |      |        | N/A                      |      | N/A          | #4           | 9"   | #11                         | 5"   | #6                       | 5"    | #8             | 5"   | 4'-0"  | #4                       | 8"    | N/A          | 2.25             | 518.5             | 2.74                | 824.7             | 2737  | N/A                        | 2             |  |  |
|                              | 12' TO 15'    | 5'                        | 7' TO 10'                  | 0' ≤ FD < 2'                 | 12"              | 20"               | 18"                | #11                      | 6"   | #7                       | 7"    | #5             | 7"   | 3'-9"  | #4                       | 8"   | N/A          | #6           | 9"   | #10                         | 6"   | #6                       | 5"    | #7             | 5"   | 3'-9"  | #4                       | 8"    | N/A          | 2.41             | 610.8             | 2.54                | 642.3             | 1713  | 0.48"                      | 1A            |  |  |
|                              |               |                           |                            | 2' ≤ FD ≤ 4'                 | 12"              | 22"               | 20"                | #11                      | 6"   | #7                       | 7"    | #5             | 7"   | 3'-11" | #4                       | 8"   | N/A          | #4           | 9"   | #10                         | 6"   | #6                       | 5"    | #7             | 5"   | 3'-11" | #4                       | 8"    | N/A          | 2.61             | 588.7             | 2.74                | 646.1             | 1999  | 0.59"                      | 1             |  |  |
|                              |               |                           |                            | 4' < FD ≤ 6'                 | 12"              | 24"               | 22"                | #11                      | 5"   | #7                       | 7"    | #6             | 7"   | 4'-1"  | #4                       | 8"   | N/A          | #4           | 9"   | #11                         | 6"   | #6                       | 5"    | #8             | 5"   | 4'-1"  | #4                       | 8"    | N/A          | 2.81             | 667.9             | 2.93                | 817.7             | 2414  | 0.65"                      | 1             |  |  |
|                              |               |                           |                            | 6' < FD ≤ 8'                 | 12"              | 24"               | 24"                | #10 ⑨                    | 4"   | #7                       | 7"    | #6             | 7"   | 4'-1"  | #4                       | 8"   | N/A          | #4           | 9"   | #11                         | 5"   | #6                       | 5"    | #8             | 5"   | 4'-1"  | #4                       | 8"    | N/A          | 2.81             | 679.5             | 3.13                | 885.4             | 2821  | 0.71"                      | 1             |  |  |
|                              | 17' TO 20'    | 7' TO 10'                 | 10'                        | 0' ≤ FD < 2'                 | 12"              | 18"               | 18"                | #10                      | 6"   | #6                       | 6"    | #8             | 6"   | 4'-2"  | #4                       | 8"   | N/A          | #6           | 10"  | #10                         | 6"   | #6                       | 5"    | #8             | 5"   | 3'-9"  | #4                       | 8"    | N/A          | 2.54             | 675.6             | 2.54                | 685.5             | 1743  | 0.8"                       | 1             |  |  |
|                              | 2' ≤ FD ≤ 4'  | 12"                       | 20"                        | 20"                          | #11              | 6"                | #6                 | 5"                       | #8   | 5"                       | 3'-9" | #4             | 8"   | N/A    | #4                       | 12"  | #11          | 6"           | #6   | 5"                          | #8   | 5"                       | 3'-9" | #4             | 8"   | N/A    | 2.74                     | 752.1 | 2.74         | 752.1            | 2028              | 0.95"               | 1                 |   |                            |               |  |  |





**SPLIT BOX ~ SLAB ROADWAY CONDITIONS**



**SPLIT BOX ROADWAY CONDITIONS**

| DESIGN OPTIONS                                   |             |
|--|-------------|
| APPROACH SLAB SEAT                               |             |
| <u>CONCRETE:</u>                                 |             |
| C.I.P.   | SHEET 15    |
| C.I.P. END DIAPHRAGM                             | SHEET 17    |
| <u>STEEL:</u>                                    |             |
| W/O RESTRAINER                                   | SHEET 13    |
| W/RESTRAINER                                     | SHEET 14    |
| SEISMIC RESTRAINERS                              |             |
| <u>LONGITUDINAL: (REQ'D FOR SPLIT BOX-SLABS)</u> |             |
| EXTENDED SEAT WIDTH                              | SHEET 10    |
| OR PROVIDE AN:                                   |             |
| APPROACH SLAB                                    | SHEET 13-15 |
| <u>TRANSVERSE:</u>                               |             |
| STEEL APPR. SEAT                                 | SHEET 14    |
| ACCEL. BRIDGE CONST.                             | SHEET 16    |
| C.I.P. END DIAPHRAGM                             | SHEET 17    |

| TOP UNIT LONGITUDINAL JOINT SELECTION CRITERIA 5                      |                              |                          |  |                                 |
|---|------------------------------|--------------------------|--|---------------------------------|
| ROADWAY CONDITION   | SCENARIO 1                   | SCENARIO 2               | SCENARIO 3                                   | SCENARIO 4                      |
| SCENARIO DESCRIPTION  | 5" MIN CONCRETE TOPPING SLAB | HMA OR CONCRETE OVERLAY  | 12" MIN. FULL ROADWAY SECTION (HMA & CSBC)   | ROADWAY SECTION AND/OR BACKFILL |
| FILL DEPTH 'FD'   | TOPPING SLAB                 | OVERLAY                  | 1' TO 1.99'                                  | ≥ 2.0'                          |
| VERTICAL SHEAR TRANSFER ACROSS JOINTS OF ADJACENT SEGMENTS            | NOT REQUIRED                 | REQUIRED                 | NOT REQUIRED                                 | NOT REQUIRED                    |
| ACCEPTABLE JOINT TYPE   | TYPE 2A                      | TYPES 3 & 4              | TYPES 1, 2 & 3                               | TYPES 1, 2 & 3                  |
| EPOXY COATED REINF. REQUIRED IN TOP SLAB                              | NO                           | YES                      | YES  | NO                              |
| CLEAR COVER TO TOP MAT OF REINF.                                      | 2"                           | HMA 2.5"                 | CONC. 2"                                     | 2"                              |
| LONG. CONNECTION AT TOP SLAB BETWEEN FIRST THREE SEGMENTS AT EACH END | NOT REQUIRED                 | WELD TIES (SEE SHEET 12) | LONGITUDINAL TIE PLATES (SEE SHEETS 2 AND 8) |                                 |

**KEY NOTES**

- ① PROVIDE APPROACH SLAB WHEN REQUIRED IN THE CONTRACT DOCUMENTS.
- ② APPROACH SLAB AND EXPANSION ANCHOR SHALL BE PER STANDARD PLAN A-40.50 AND PER ADDITIONAL DETAILS ON SHEET 13.
- ③ SEE SHEET 11 FOR 5" MIN. CONCRETE TOPPING SLAB DETAILS.
- ④ FOR APPROACH SLAB SEAT DETAILS SEE SHEETS 13, 14, 15, AND 17.
- ⑤ SEE SHEET 9 FOR TYPES AND DETAILS OF TOP SLAB LONGITUDINAL JOINTS.

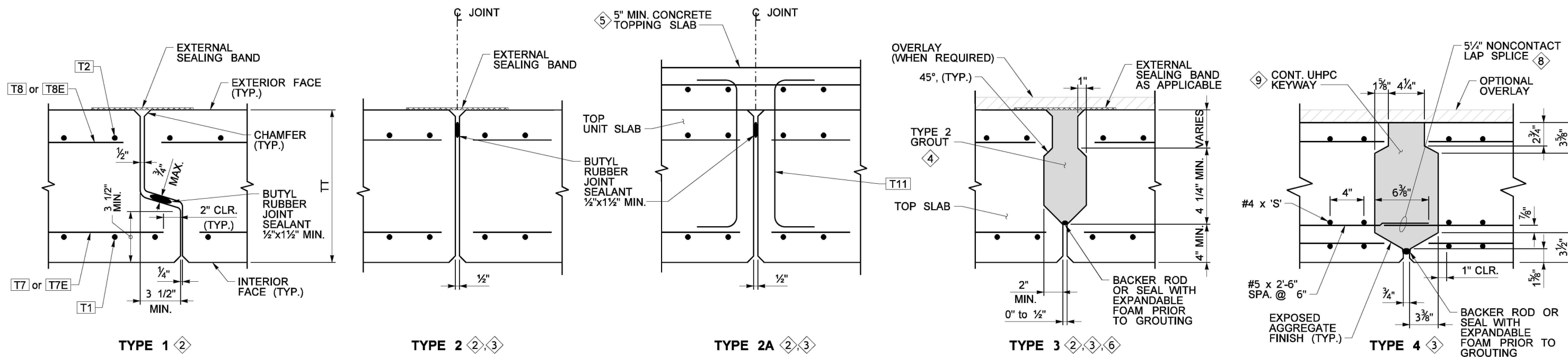


Sep 12, 2023

**BURIED STRUCTURE  
SPLIT BOX  
STANDARD PLAN E-20.10-00**  
SHEET 8 OF 17 SHEETS

APPROVED FOR PUBLICATION  
*Mark A. Davies* Sep 12, 2023  
STATE DESIGN ENGINEER  
Washington State Department of Transportation

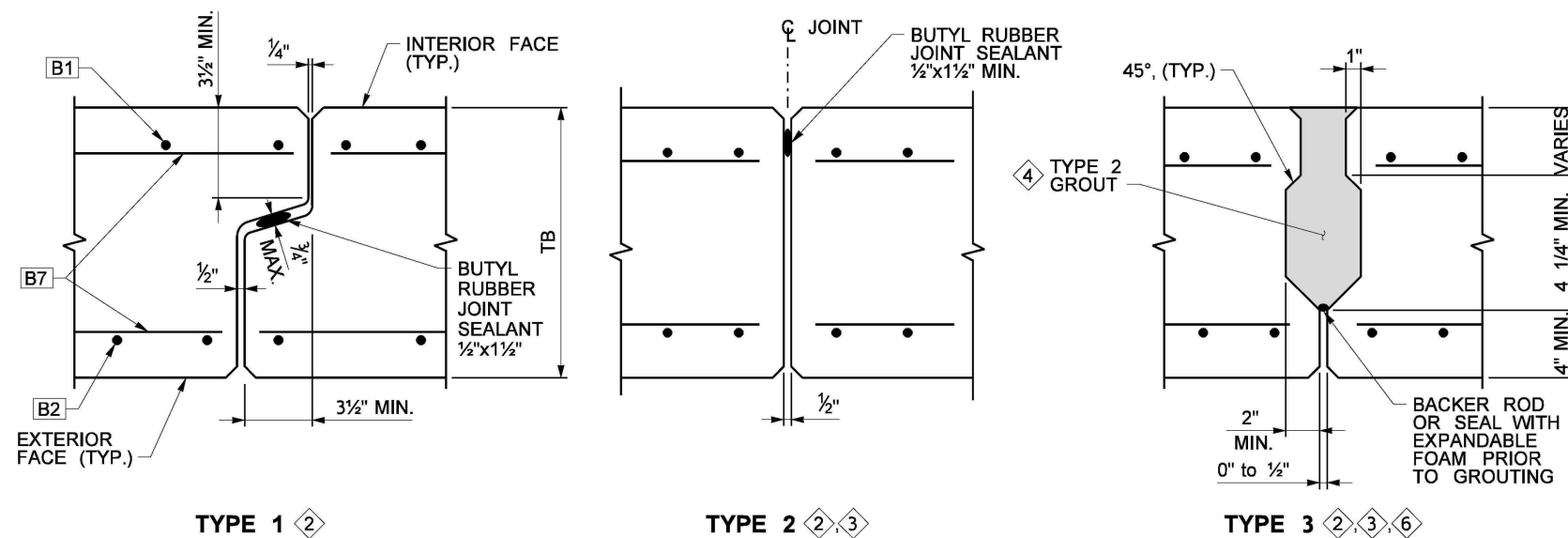




ELEVATION  
TOP SLAB LONGITUDINAL JOINTS ALTERNATIVES ①

#### KEY NOTES

- ① SEE SHEET 8 FOR JOINT TYPE SELECTION CRITERIA
- ② THIS JOINT CAN BE USED IN COMBINATION WITH WELD TIES. SEE SHEET 12 FOR DETAILS.
- ③ SEE JOINT TYPE 1 FOR TYPICAL REINFORCING AND DETAILS NOT SHOWN.
- ④ GROUT SHALL CONFORM TO STANDARD SPEC. 9.20.3(2) AND SHALL ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 2,500 PSI BEFORE BACKFILL PLACEMENT
- ⑤ SEE SHEET 11 FOR 5" MIN. CONCRETE TOPPING SLAB DETAILS.
- ⑥ MANUFACTURER VARIATIONS OR NOMINAL ADJUSTMENTS TO THE DETAILED JOINT GEOMETRICS SHALL BE SHOWN IN THE FABRICATION SHOP DRAWINGS.
- ⑦ BOTTOM SLAB LONGITUDINAL JOINT TYPE 1, TYPE 2 OR TYPE 3 ARE PERMISSIBLE. THE SAME JOINT TYPE SHALL BE USED FOR BOTH TOP AND BOTTOM UNITS FOR EACH STRUCTURE EXCEPT TYPE 4 IS ONLY REQUIRED FOR TOP JOINT. JOINT TYPE SHALL NOT BE INTERCHANGED WITHIN THE STRUCTURE.
- ⑧ STAGGER EXTENDED #5 BAR BETWEEN TOP UNIT SLABS TO PROVIDE 3" CENTER-TO-CENTER SPACING.
- ⑨ REFER TO SPECIAL PROVISIONS FOR UHPC REQUIREMENTS.



ELEVATION  
BOTTOM SLAB LONGITUDINAL JOINTS ALTERNATIVES ⑦



Sep 12, 2023

**BURIED STRUCTURE  
SPLIT BOX**  
**STANDARD PLAN E-20.10-00**

SHEET 9 OF 17 SHEETS

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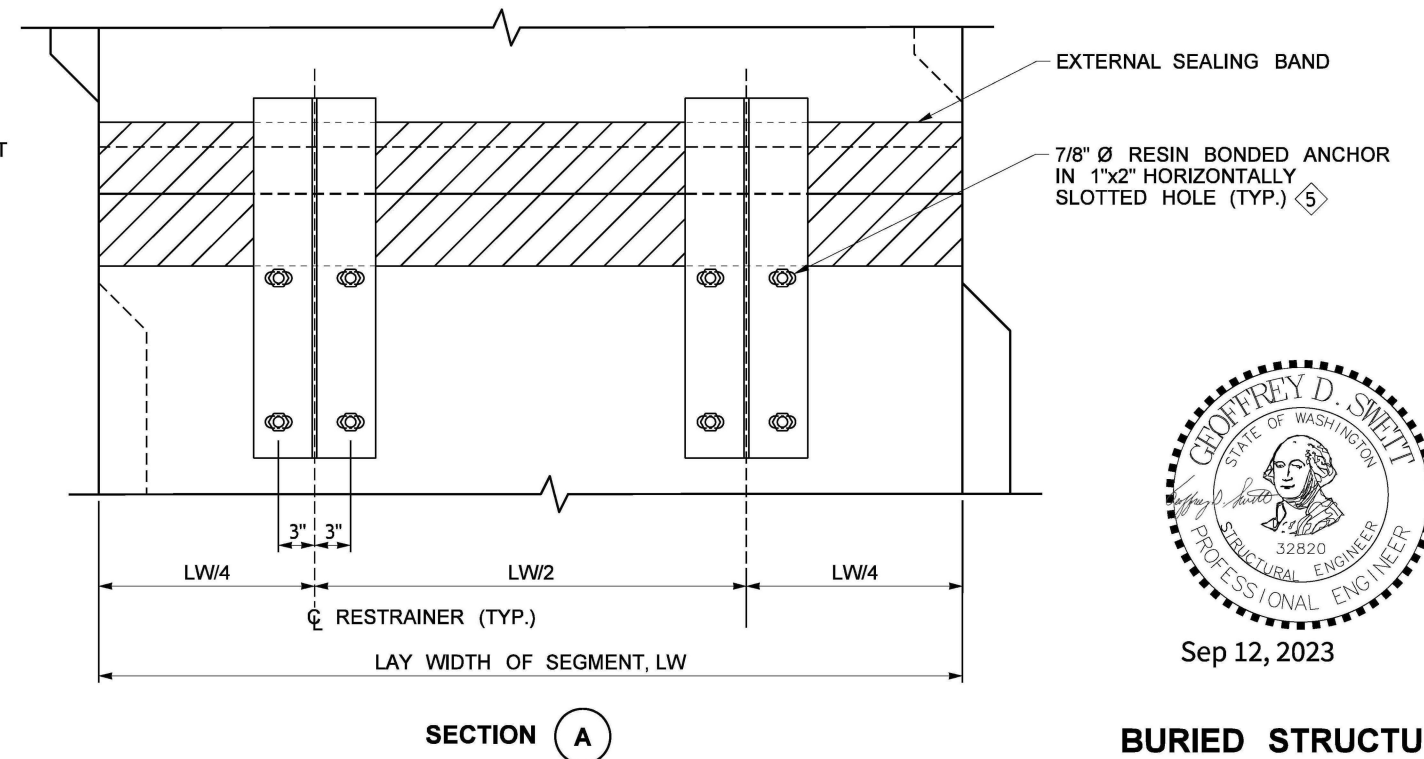
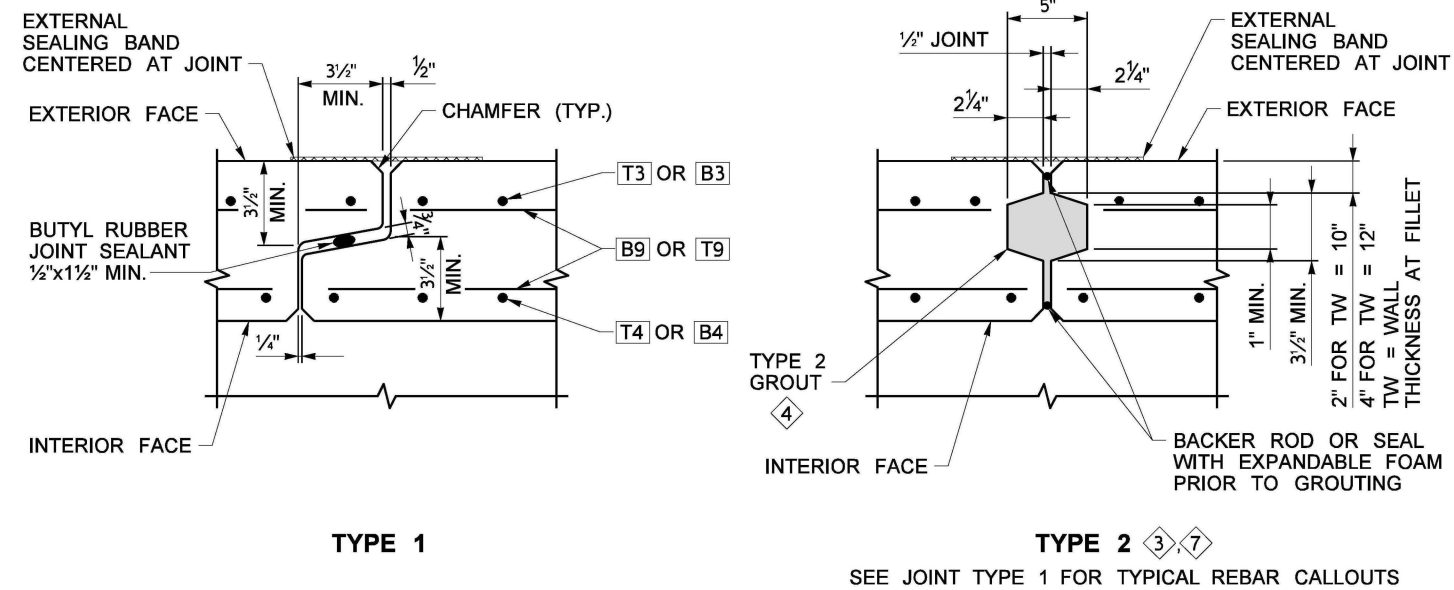
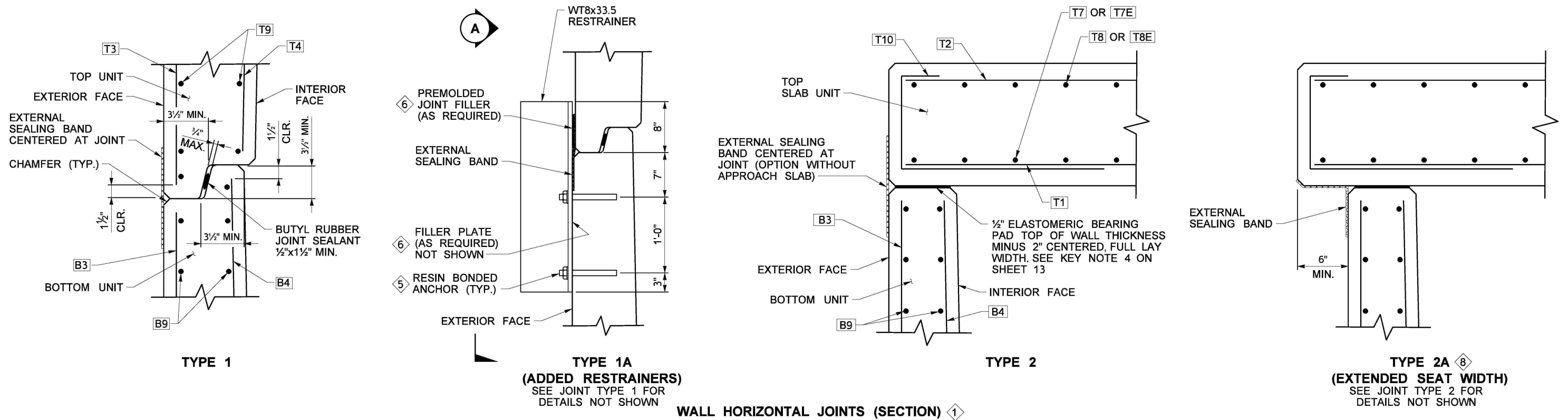
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#### KEY NOTES:

- 1 SEE DESIGN TABLES FOR APPLICABLE WALL HORIZONTAL JOINT TYPES.
- 2 EITHER VERTICAL WALL JOINT TYPE 1 OR TYPE 2 IS PERMISSIBLE.
- 3 MANUFACTURER VARIATIONS OR NOMINAL ADJUSTMENTS TO THE DETAILED JOINT GEOMETRICS SHALL BE SHOWN IN THE FABRICATION SHOP DRAWINGS.
- 4 THE CONTRACTOR SHALL PLACE THE GROUT BEFORE PLACING THE BACKFILL ON TOP OR AGAINST THE SIDES OF THE STRUCTURE. GROUT SHALL CONFORM TO STANDARD SPEC. 9.20.3(2) AND SHALL ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 2,500 PSI BEFORE BACKFILL PLACEMENT.
- 5 ANCHORS SHALL BE 7/8" DIA. SET IN 6" LONG HOLES. MANUFACTURER AND CONTRACTOR SHALL COORDINATE SPACING OF WALL REINFORCING BARS AND LOCATION OF RESIN BONDED ANCHORS TO AVOID CONFLICT DURING INSTALLATION.

- 6 IF EXTERIOR SURFACES OF TOP AND BOTTOM UNITS ARE MISALIGNED BY 1/4" OR GREATER, PLACE PREMOLDED JOINT FILLER (PMJF) IN THE GAP BETWEEN RESTRAINER AND TOP UNIT OR STEEL FILLER PLATE IN THE GAP AT THE BOTTOM UNIT. FILLER PLATE OR PMJF SHALL BE SIZED FOR THE FULL WIDTH AND HEIGHT OF CONTACT AREA WITH WT RESTRAINER.
- 7 THIS JOINT CAN BE USED IN COMBINATION WITH WELD TIES. ALTERNATIVELY, SHEAR KEY AND GROUT MAY BE ELIMINATED IF WELD TIES ARE UTILIZED. SEE SHEET 12 FOR WELD TIE DETAILS.
- 8 THIS JOINT SHALL BE USED FOR CLASS 2 STRUCTURES WITHOUT AN APPROACH SLAB.



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### BURIED STRUCTURE SPLIT BOX STANDARD PLAN E-20.10-00

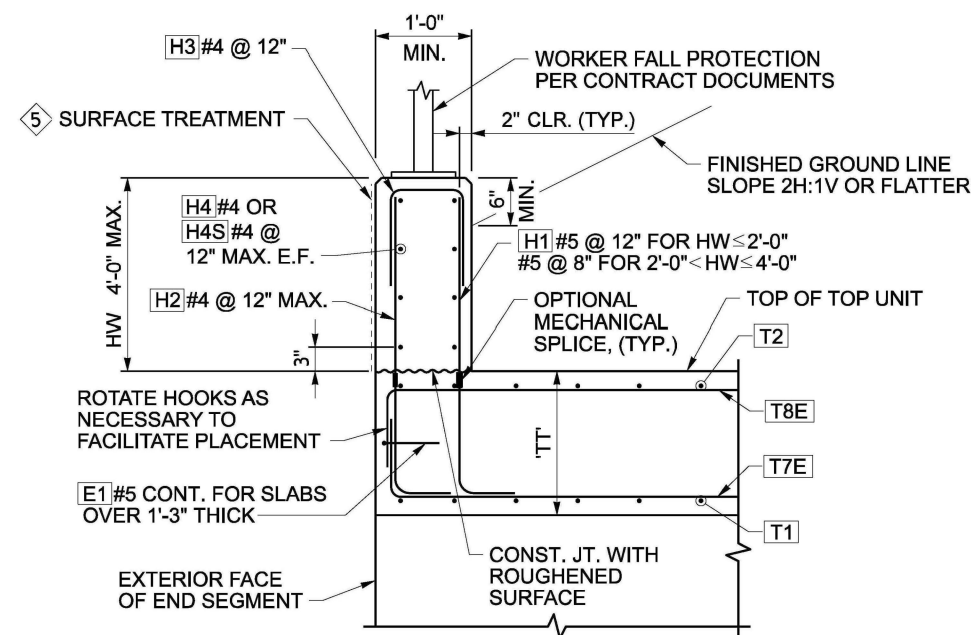
SHEET 10 OF 17 SHEETS

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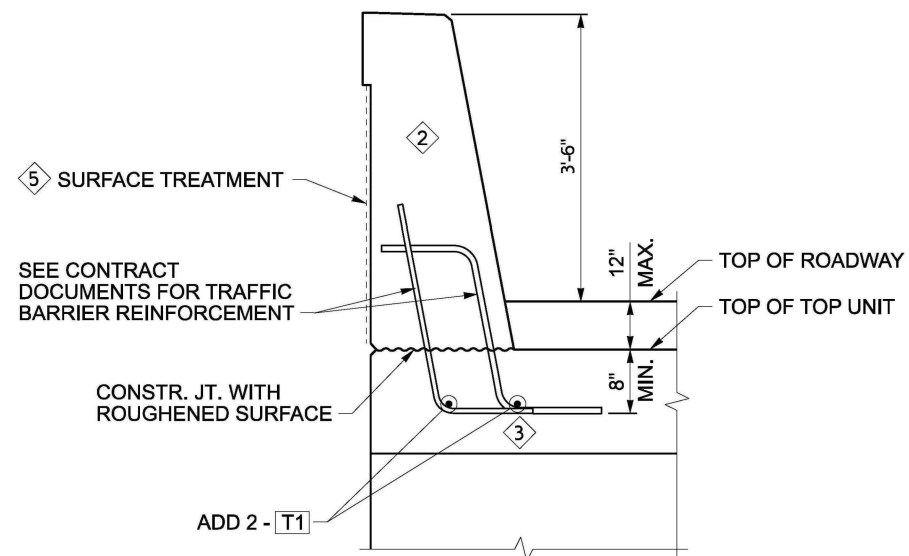
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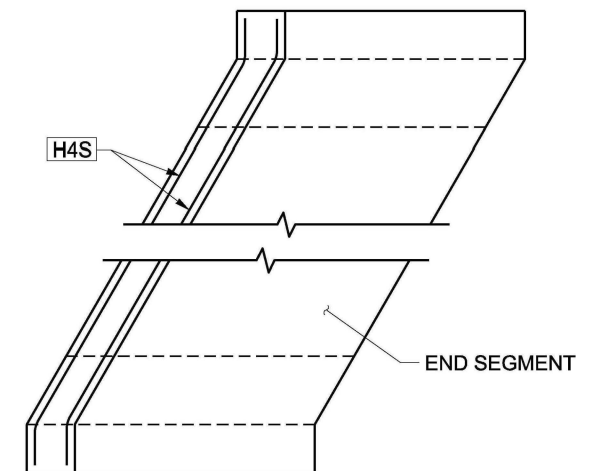




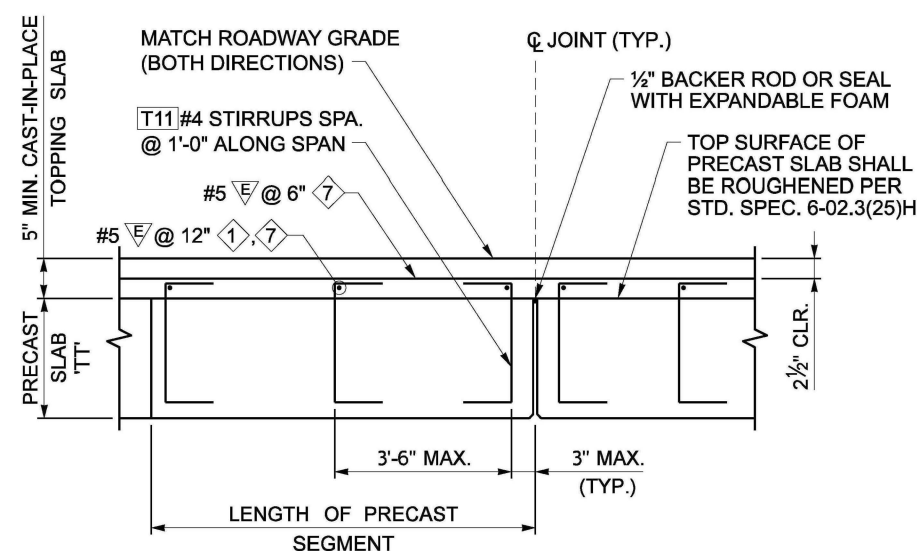
**HEADWALL DETAIL (AS REQUIRED)**



**TRAFFIC BARRIER DETAIL (AS REQUIRED)**



**SKEW OPTION 1A HEADWALL CORNER REINFORCEMENT DETAIL**

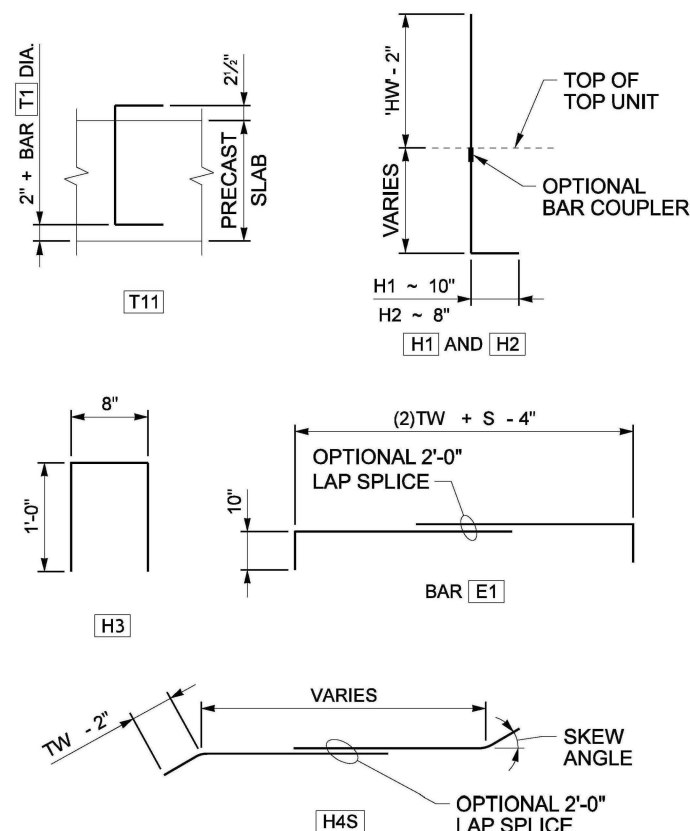


**5' MINIMUM CONCRETE TOPPING SLAB DETAIL (AS REQUIRED)**

CONSTRUCTION AIDS (E.G. WELD TABS) CAN BE PROVIDED AT CONTRACTOR'S DISCRETION.

IF TOPPING SLAB THICKNESS EXCEEDS 7", ADD SECOND MAT OF #5 REINFORCEMENT

### BENDING DIAGRAM



$\nabla$  E = EPOXY COATED REINFORCEMENT

(ALL DIMENSIONS ARE OUT TO OUT)

### KEY NOTES

- 1 RUN PARALLEL TO SKEW FOR SKEWED SEGMENTS
- 2 FOR TRAFFIC BARRIER DETAILS SEE CONTRACT DOCUMENTS
- 3 TOP UNIT REINFORCEMENT IS NOT SHOWN. SEE HEADWALL DETAIL THIS SHEET FOR TYPICAL REINFORCING IN TOP SLAB OF END UNIT.
- 4 TOP SLAB DESIGN IS BASED ON A SINGLE SLOPE 42" TRAFFIC BARRIER (TL4) WITH MAX 12" FILL OR ROADWAY ON SLAB.
- 5 SURFACE TREATMENT(S) SHALL BE PROVIDED AS FOLLOWS; TRAFFIC BARRIER SHALL BE FRACTURED FIN, HEADWALLS, WINGWALLS, AND STRUCTURES SHALL BE IN ACCORDANCE WITH STD. SPEC. 6-02.3(14). UNLESS OTHERWISE SHOWN IN THE CONTRACT DOCUMENTS.
- 6 A PERMANENT GEOSYNTHETIC WALL MAY BE EMPLOYED AS A HEADWALL (SEE STANDARD PLAN D-3.09 FOR DETAILS).
- 7 2'-0" MIN. LAP SPLICE. ALTERNATE LAP SPLICE LOCATION ON ADJACENT REINFORCEMENT SO THAT NO MORE THAN 50% OF REINFORCEMENT IS SPLICED IN THE SAME LOCATION.



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## BURIED STRUCTURE SPLIT BOX STANDARD PLAN E-20.10-00

SHEET 11 OF 17 SHEETS

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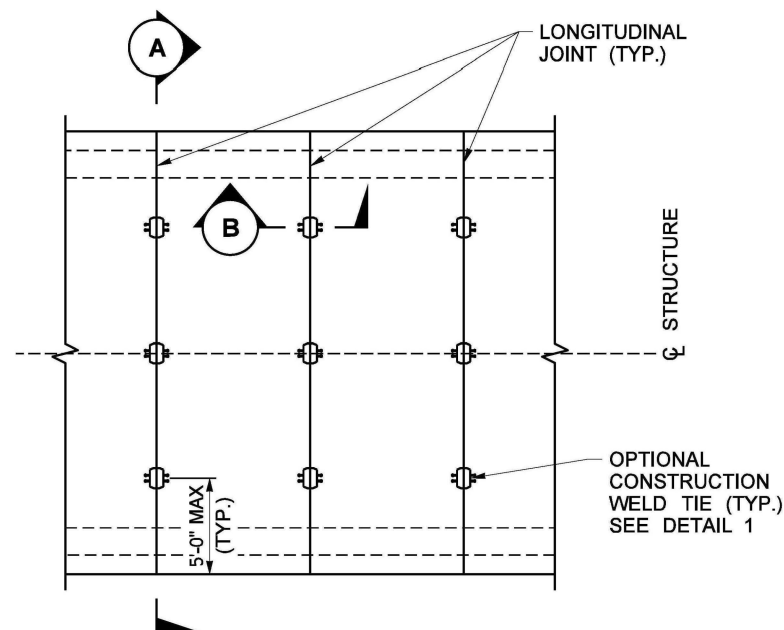
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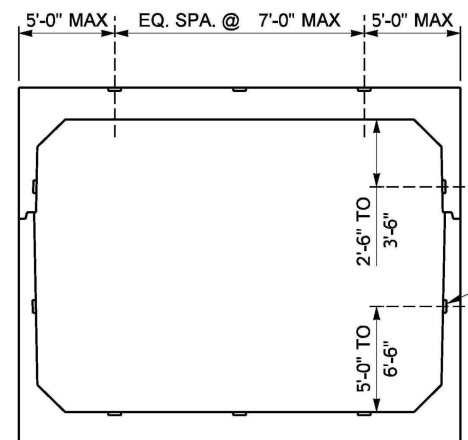


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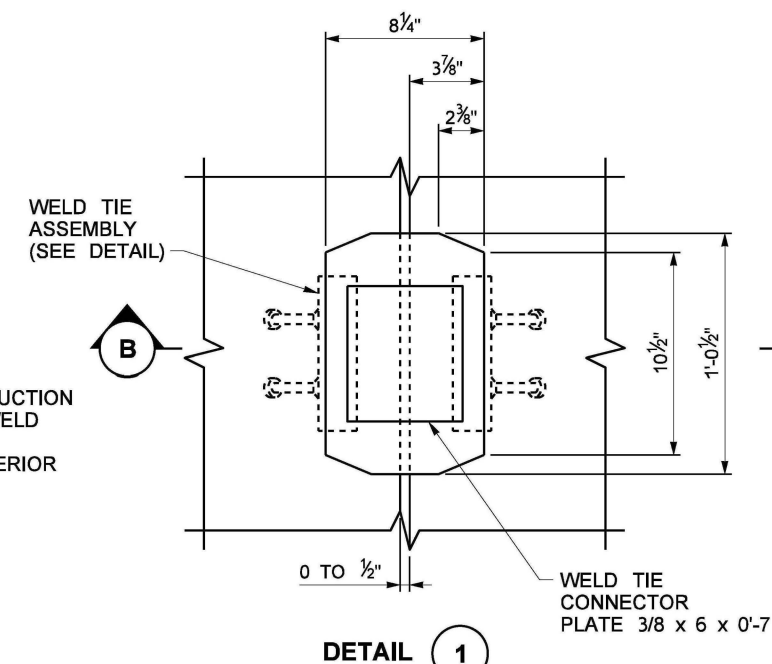




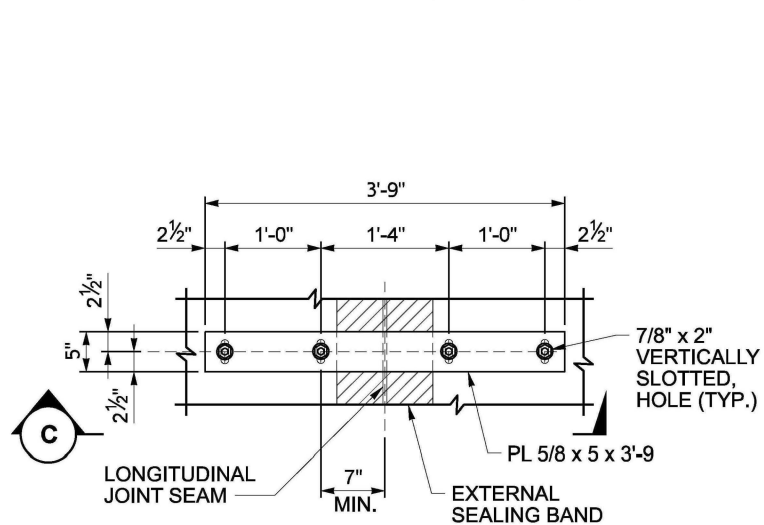
PLAN  
TOP SLAB WELD TIE LAYOUT



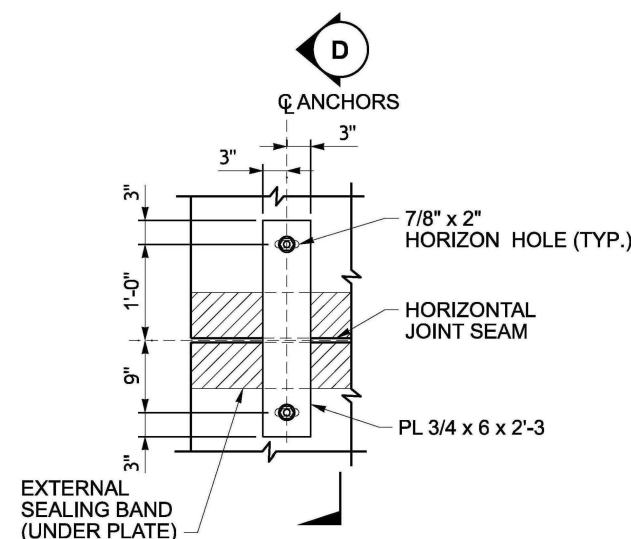
SECTION A  
AT LONGITUDINAL JOINT



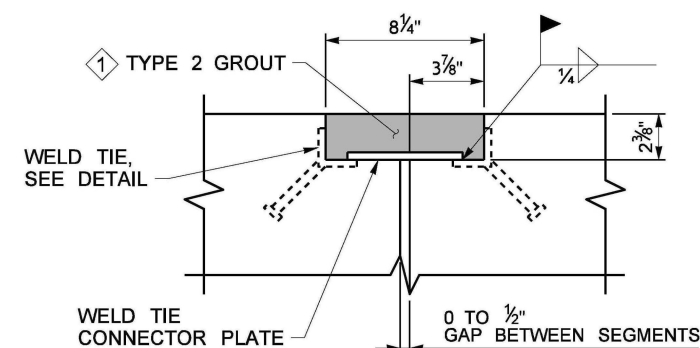
DETAIL 1



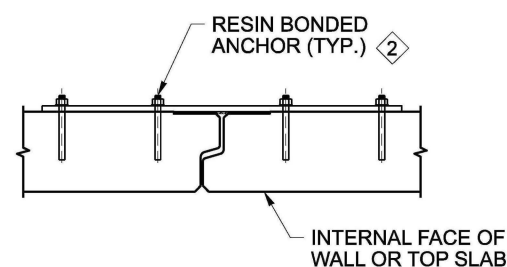
LONGITUDINAL TIE DETAIL 3



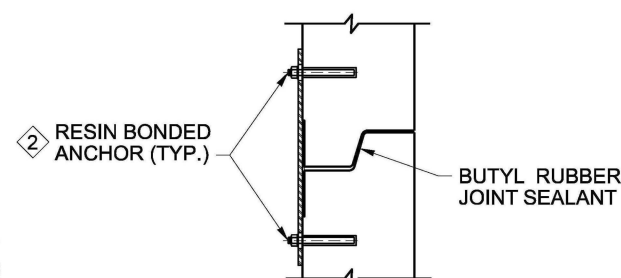
VERTICAL TIE DETAIL 3



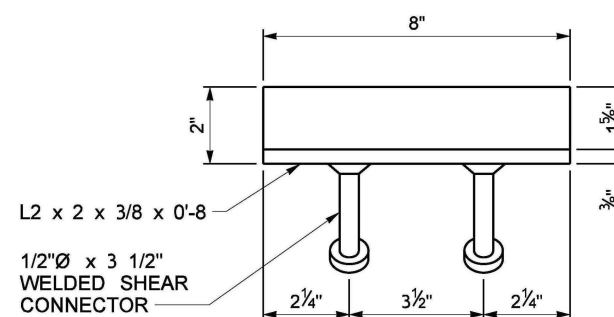
SECTION B



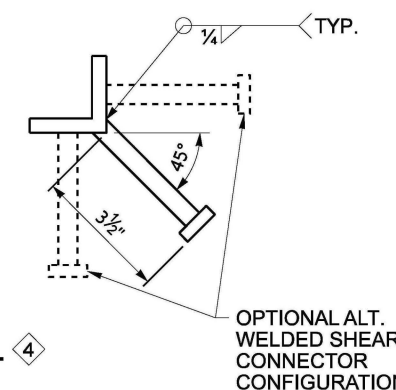
SECTION C



SECTION D



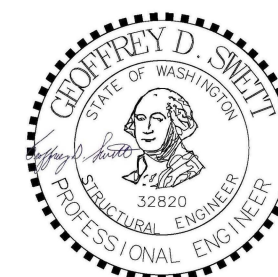
WELD TIE DETAIL 4



OPTIONAL ALT.  
WELDED SHEAR  
CONNECTOR  
CONFIGURATION

#### KEY NOTES

- 1 THE CONTRACTOR SHALL PLACE THE GROUT BEFORE PLACING THE BACKFILL AGAINST THE STRUCTURE. GROUT SHALL CONFORM TO STANDARD SPEC. 9-20.3(2) AND SHALL ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 2,500 PSI BEFORE BACKFILL PLACEMENT.
- 2 ANCHORS SHALL BE 1/2" DIA. SET IN 6" LONG HOLES. MANUFACTURER AND CONTRACTOR SHALL COORDINATE SPACING OF WALL REINFORCING BARS AND LOCATION OF RESIN BONDED ANCHORS TO AVOID CONFLICT DURING INSTALLATION.
- 3 WELD TIES CAN BE SUBSTITUTED FOR TIE PLATES PROVIDED THE SAME SPACING IS MAINTAINED.
- 4 WELD TIES AND ANGLES MAY BE INSTALLED UNCOATED AND COATED WITH ZINC RICH PRIMER AFTER INSTALLATION AND WELDING.



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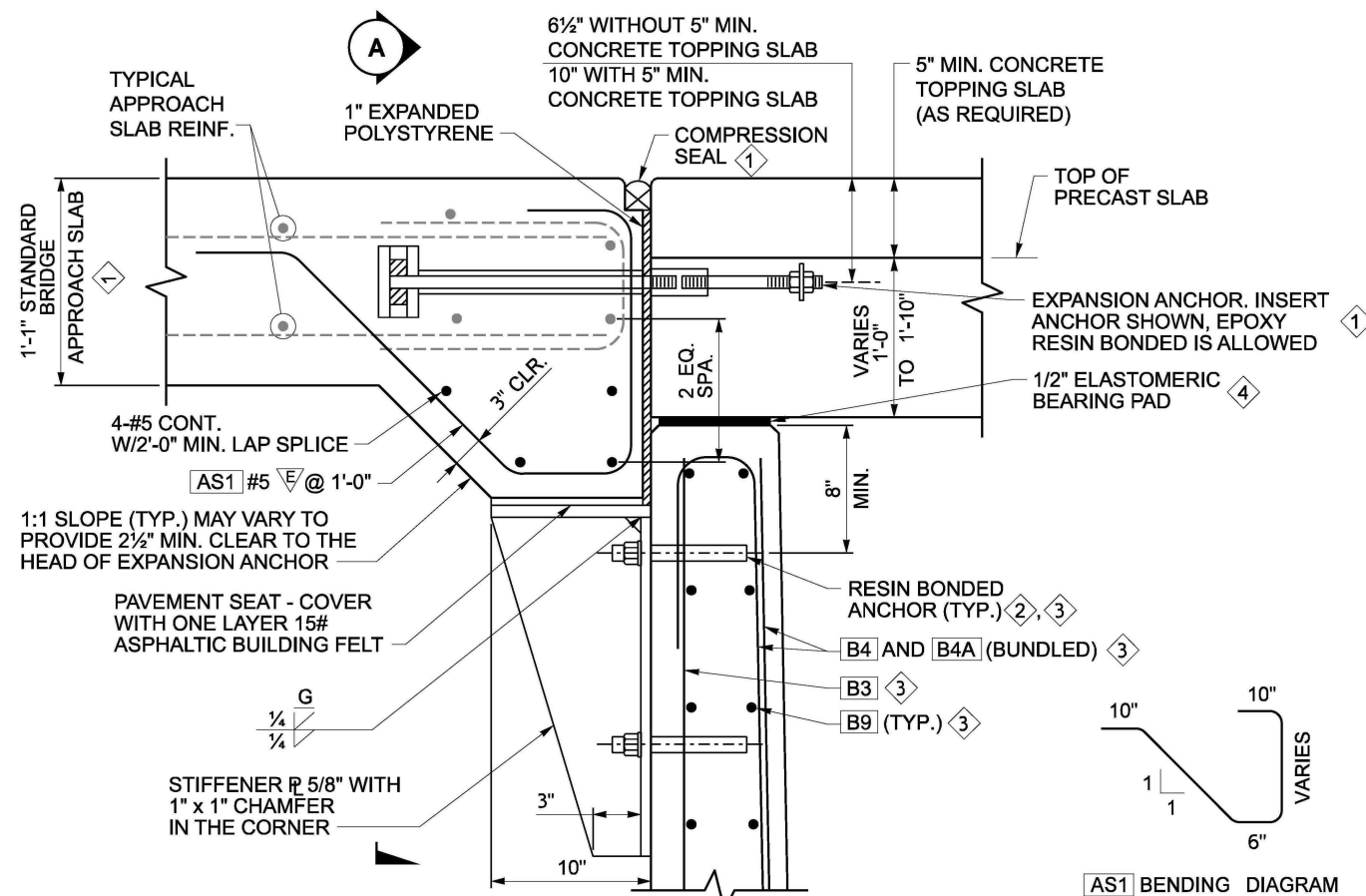
### BURIED STRUCTURE SPLIT BOX STANDARD PLAN E-20.10-00

SHEET 12 OF 17 SHEETS

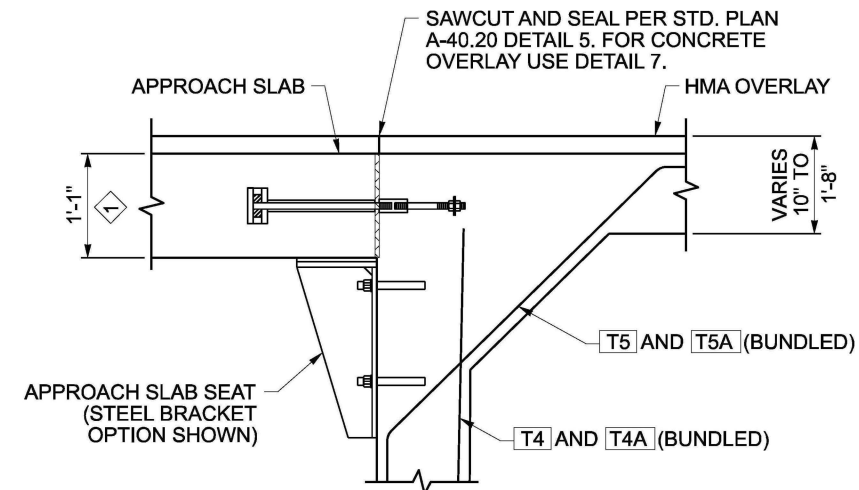
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**APPROACH SLAB SEAT: STEEL OPTION DETAIL 5, 6**  
**SPLIT BOX ~ SLAB STRUCTURE**  
(SPLIT BOX DETAILS SIMILAR)



**APPROACH SLAB SEAT: STEEL OPTION DETAIL 5, 6**  
**SPLIT BOX STRUCTURE**

FOR DETAILS NOT SHOWN SEE APPROACH SLAB SEAT: STEEL OPTION DETAIL SPLIT BOX ~ SLAB STRUCTURE THIS SHEET.  
FOR REINFORCEMENT NOT SHOWN SEE TYPICAL SECTION ON SHEET 4.

#### KEY NOTES

- 1 FOR APPROACH SLAB DETAILS INCLUDING REINFORCING, EXPANSION ANCHOR, COMPRESSION SEAL, AND OTHER, SEE STANDARD PLAN A-40.50.
- 2 ANCHORS SHALL BE 7/8" DIA. SET IN 6-INCH LONG HOLES.
- 3 MANUFACTURER AND CONTRACTOR SHALL COORDINATE SPACING OF WALL REINFORCING BARS AND LOCATION OF RESIN BONDED ANCHORS TO AVOID CONFLICT DURING INSTALLATION.
- 4 THE CONTRACTOR MAY ADD A 1" MINIMUM THICK GROUT PAD FOR LEVELING TOP OF BOTTOM UNIT PRIOR TO SETTING BEARING PAD. ADJUST FINAL ELEVATIONS AS NEEDED. THE CONTRACTOR MAY SUBMIT ALTERNATE METHODS OF VERTICAL ADJUSTMENT TO THE ENGINEER FOR ACCEPTANCE.
- 5 ADDITIONAL REINFORCEMENT IS REQUIRED FOR TOP AND BOTTOM UNITS, SEE SHEET 4 FOR DETAILS.
- 6 FOR DETAILS OF STEEL APPROACH SLAB SEAT OPTION WITH SEISMIC RESTRAINER SEE SHEET 14. FOR DETAILS OF C.I.P. APPROACH SLAB SEAT OPTION SEE SHEET 15.



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### BURIED STRUCTURE SPLIT BOX STANDARD PLAN E-20.10-00

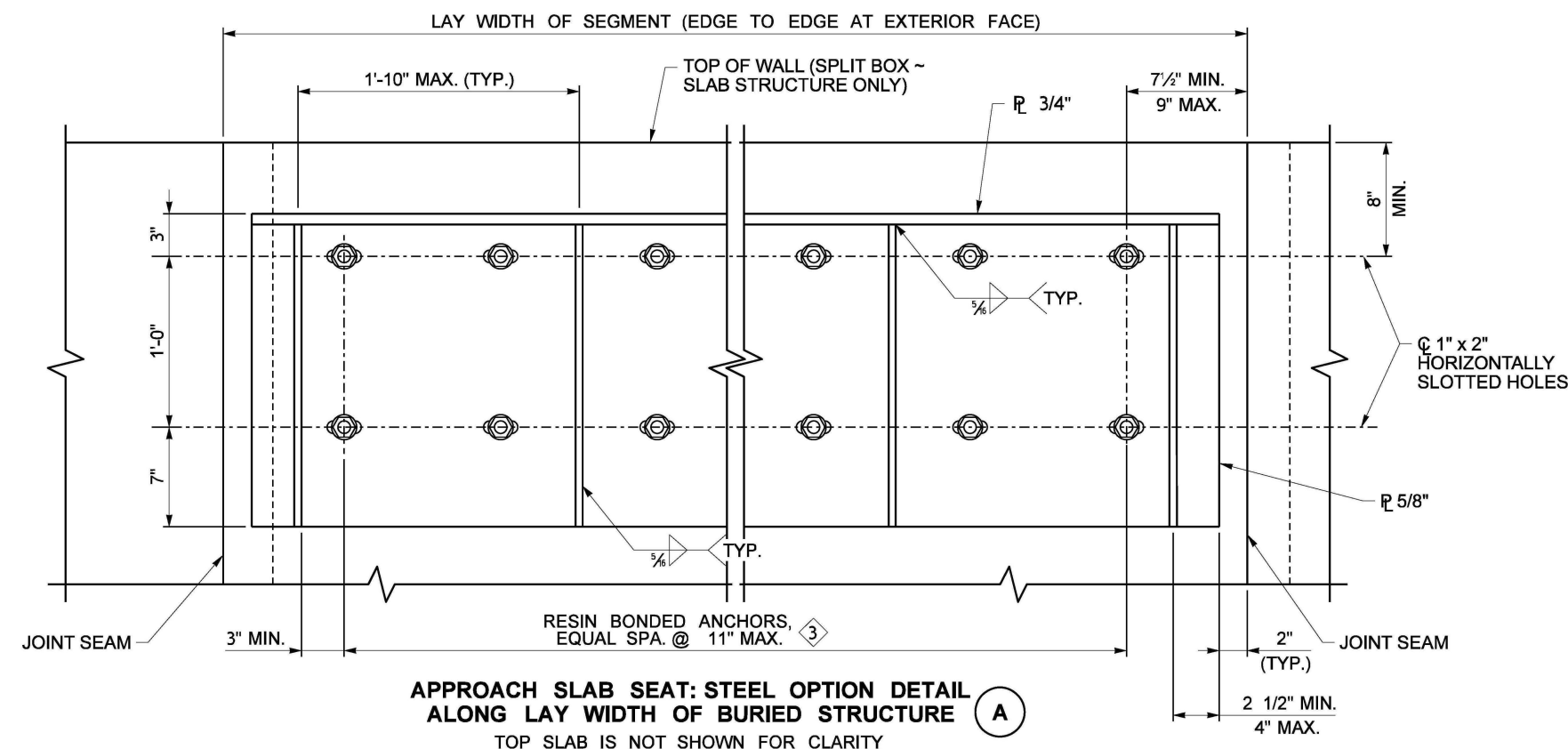
SHEET 13 OF 17 SHEETS

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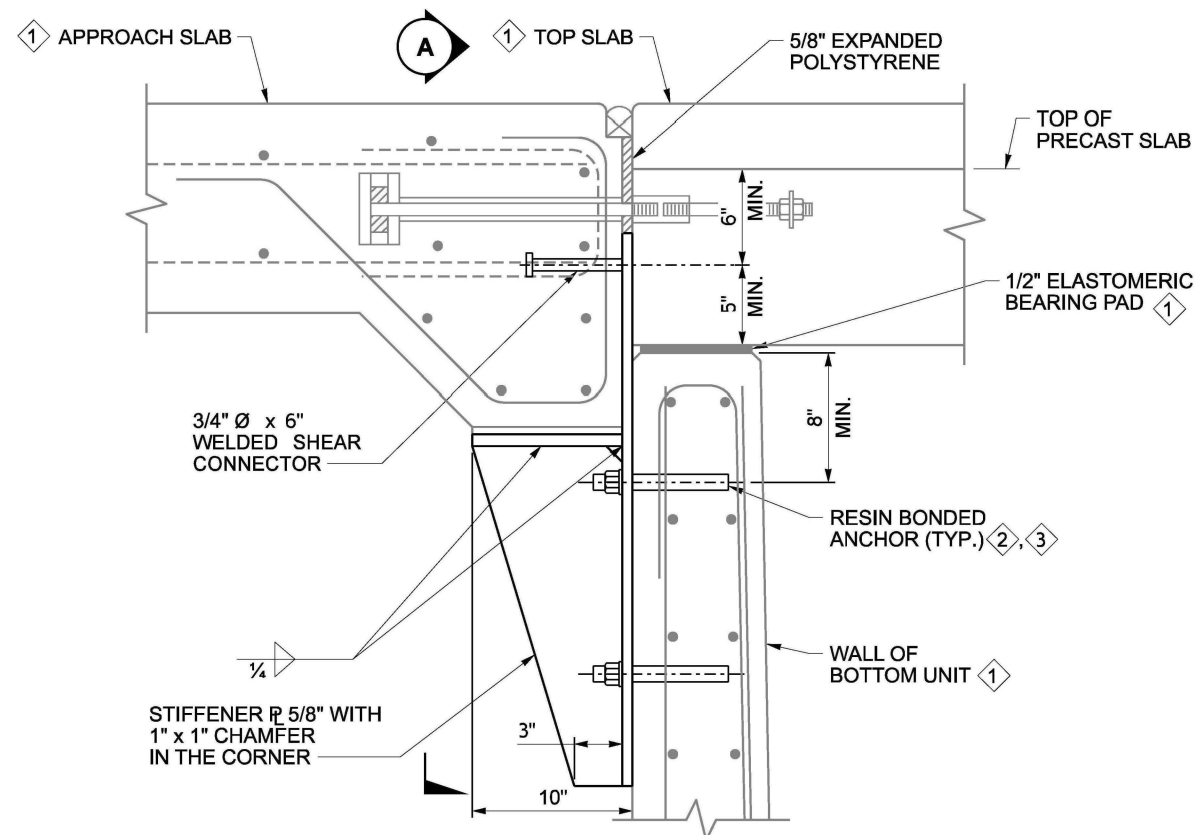
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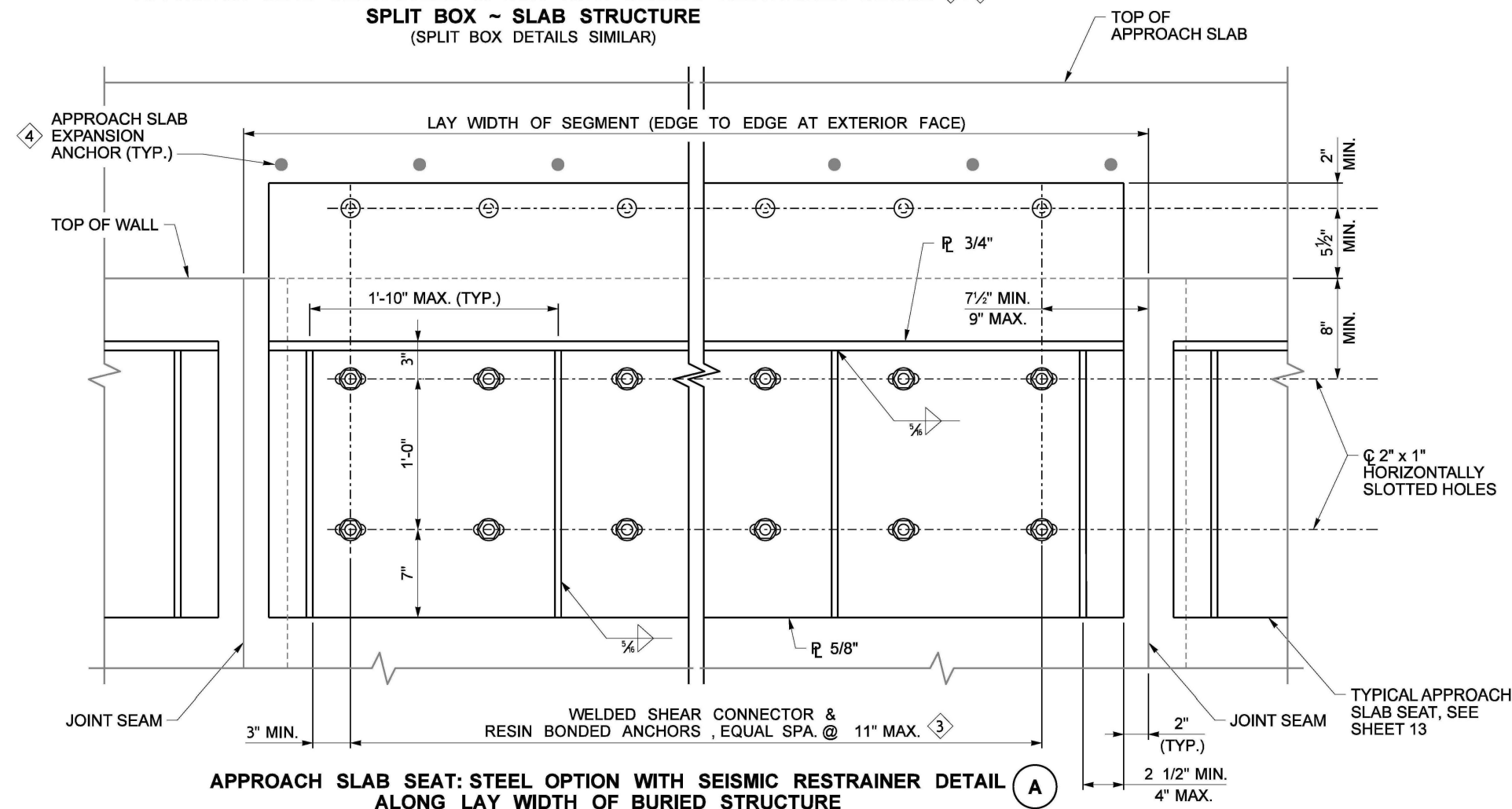


**APPROACH SLAB SEAT: STEEL OPTION DETAIL**  
**ALONG LAY WIDTH OF BURIED STRUCTURE**  
TOP SLAB IS NOT SHOWN FOR CLARITY





**APPROACH SLAB SEAT: STEEL OPTION WITH SEISMIC RESTRAINER DETAIL** 5, 6  
**SPLIT BOX ~ SLAB STRUCTURE**  
 (SPLIT BOX DETAILS SIMILAR)



**APPROACH SLAB SEAT: STEEL OPTION WITH SEISMIC RESTRAINER DETAIL** A  
**ALONG LAY WIDTH OF BURIED STRUCTURE**

## SEISMIC LATERAL FORCE RESTRAINER SELECTION CRITERIA

- Seismic lateral force restraint is required for Split Box ~ Slab structures with less than 2 feet of Fill Depth. Options for Lateral Seismic Restraint are as follows:
  - Steel Option with Seismic Restrainer. See details this Sheet.
  - Accelerated Bridge Construction (ABC) Option. See details on Sheet 16.
  - C.I.P. End Diaphragm with Girder Stop Option. See Sheet 17.
- Seats with lateral restrainers shall be installed symmetrically in both walls of the segment. Minimum two segments with lateral restrainers are required along the length of buried structure. The total length (feet) of seats with lateral restrainers along each wall shall not be less than  $LR = w L PGA(2R)$ , where:

$w$  (kip/ft) - Weight per linear foot of structure and roadway above the walls

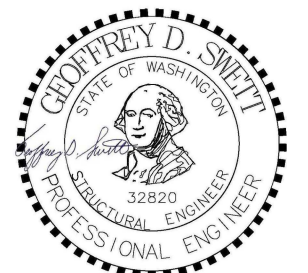
$L$  (ft) - Total length of structure

$PGA$  - Effective Site Peak Ground Acceleration Coefficient

$R = 10$  kip/ft - Average shear resistance of anchors in the approach slab per foot length of bracket

## KEY NOTES

- FOR DETAILS AND NOTATIONS NOT SHOWN SEE SHEET 13.
- ANCHORS SHALL BE 7/8" DIA. SET IN 6-INCH LONG HOLES.
- MANUFACTURER AND CONTRACTOR SHALL COORDINATE SPACING OF WALL REINFORCING BARS AND LOCATION OF RESIN BONDED ANCHORS TO AVOID CONFLICT DURING INSTALLATION.
- ARRANGE SPACING OF APPROACH SLAB EXPANSION ANCHORS AND WELDED SHEAR CONNECTORS TO PROVIDE MINIMUM 3 INCH DISTANCE BETWEEN.
- ADDITIONAL REINFORCEMENT IS REQUIRED FOR TOP AND BOTTOM UNITS, SEE SHEET 4 FOR DETAILS.
- FOR DETAILS OF STEEL APPROACH SLAB SEAT OPTION WITHOUT SEISMIC RESTRAINER SEE SHEET 13. FOR DETAILS OF C.I.P. APPROACH SLAB SEAT OPTION SEE SHEET 15.



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**BURIED STRUCTURE  
 SPLIT BOX**  
**STANDARD PLAN E-20.10-00**  
 SHEET 14 OF 17 SHEETS

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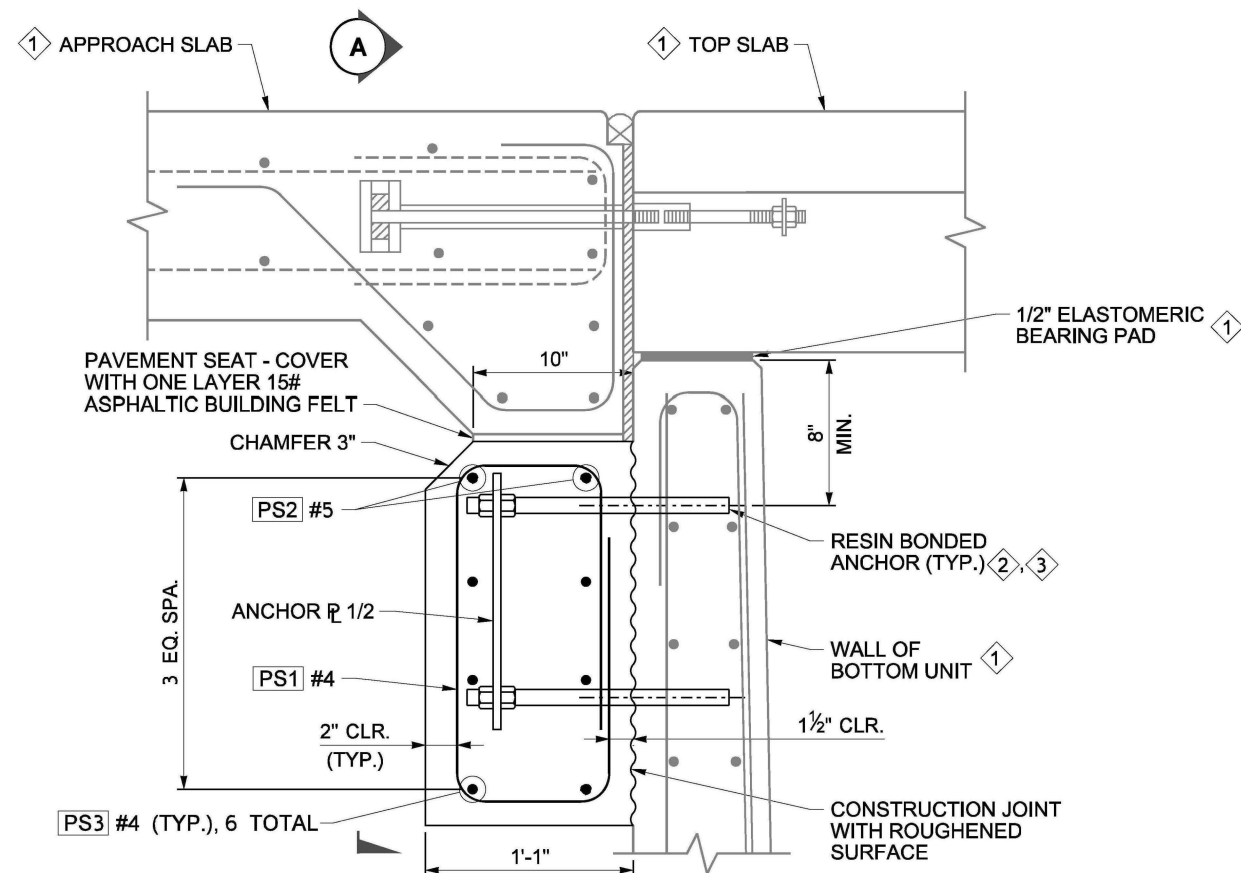
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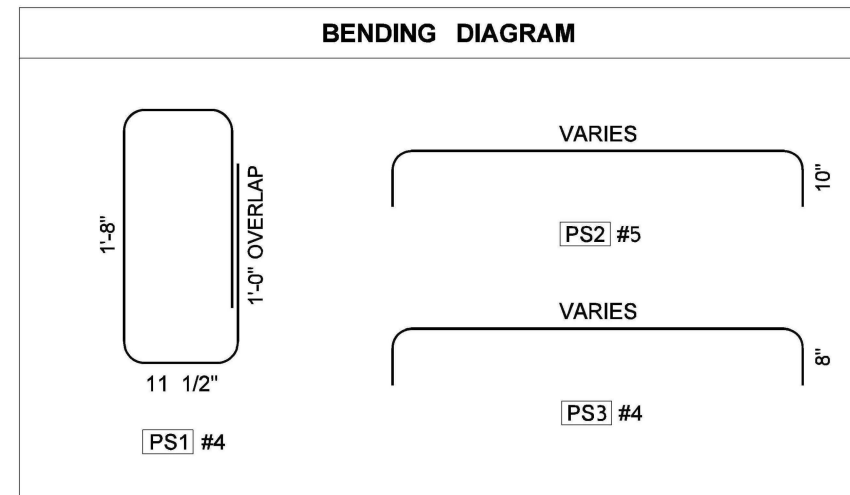
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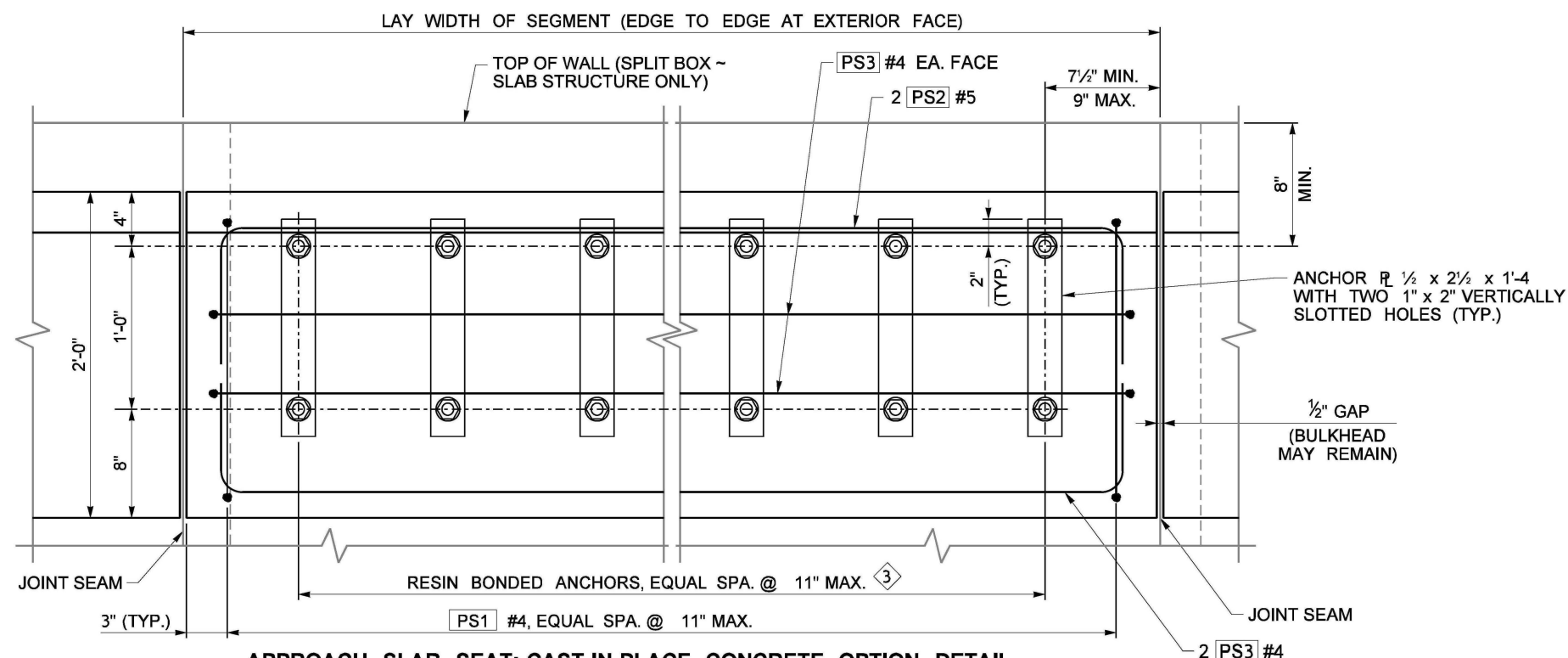


**APPROACH SLAB SEAT: CAST-IN-PLACE CONCRETE OPTION DETAIL 4, 5**  
**SPLIT BOX ~ SLAB STRUCTURE**  
 (SPLIT BOX DETAILS SIMILAR)

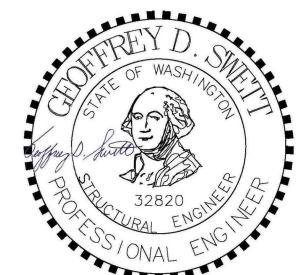


# **KEY NOTES**

- 1 FOR DETAILS AND NOTATIONS NOT SHOWN SEE SHEET 13.
- 2 ANCHORS SHALL BE 7/8" DIA. SET IN 6-INCH LONG HOLES.
- 3 MANUFACTURER AND CONTRACTOR SHALL COORDINATE SPACING OF WALL REINFORCING BARS AND LOCATION OF RESIN BONDED ANCHORS TO AVOID CONFLICT DURING INSTALLATION.
- 4 ADDITIONAL REINFORCEMENT IS REQUIRED FOR TOP AND BOTTOM UNITS, SEE SHEET 4 FOR DETAILS.
- 5 FOR DETAILS OF STEEL APPROACH SLAB SEAT OPTION WITHOUT SEISMIC RESTRAINER SEE SHEET 13. FOR DETAILS OF STEEL APPROACH SLAB SEAT OPTION WITH SEISMIC RESTRAINER SEE SHEET 14.



**APPROACH SLAB SEAT: CAST-IN-PLACE CONCRETE OPTION DETAIL A**  
**ALONG LAY WIDTH OF BURIED STRUCTURE**  
 DETAILED FOR SPLIT BOX ~ SLAB STRUCTURE,  
 SPLIT BOX STRUCTURE SIMILAR.  
 TOP SLAB IS NOT SHOWN FOR CLARITY

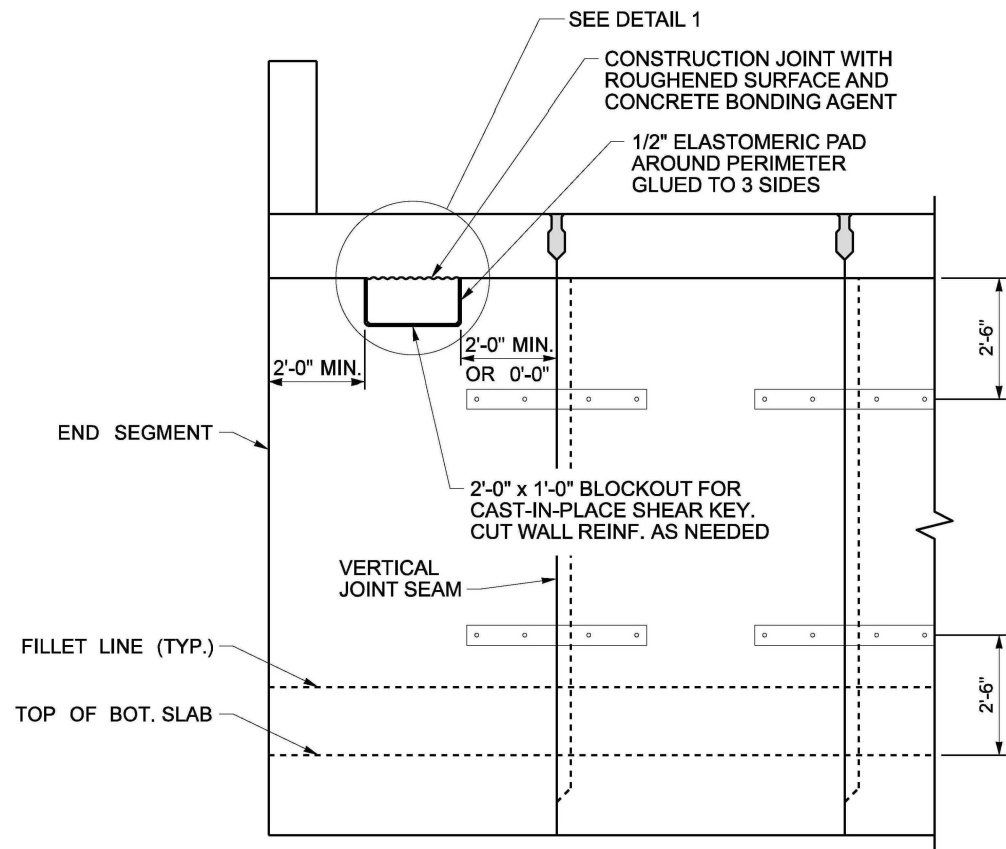


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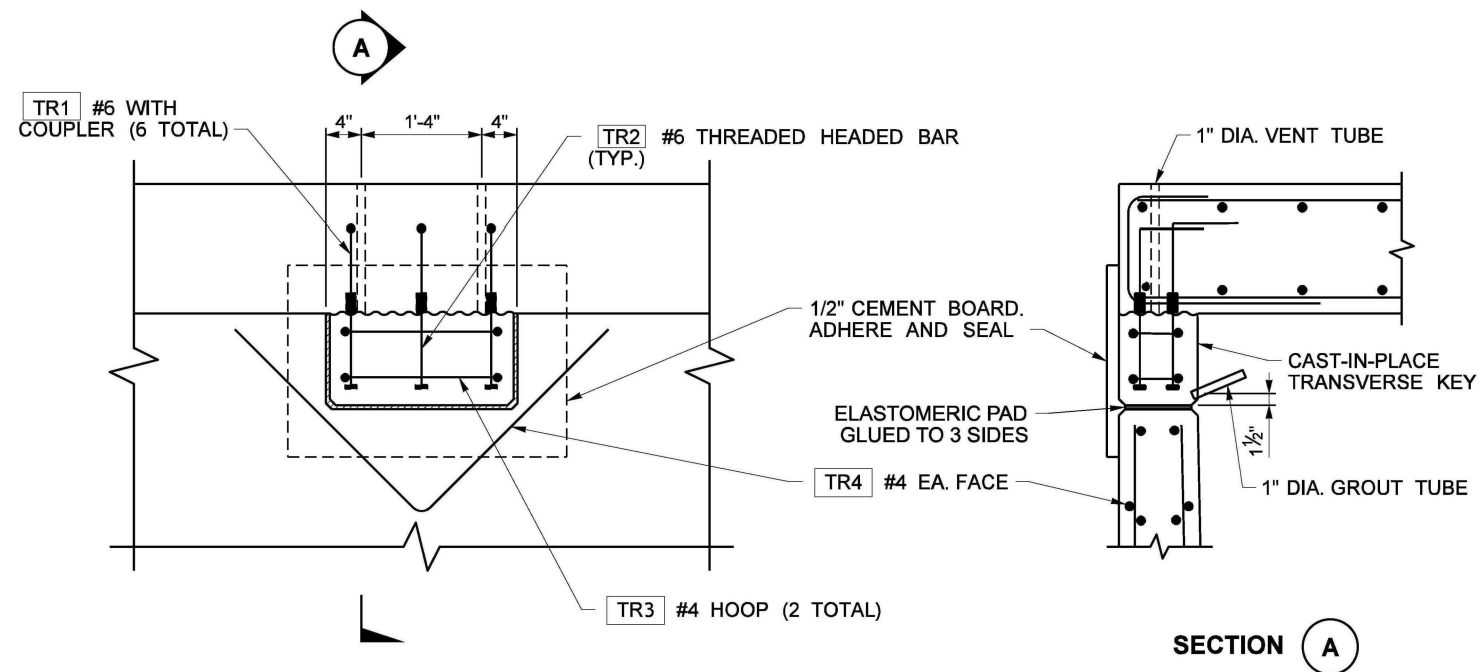
**BURIED STRUCTURE  
 SPLIT BOX**  
**STANDARD PLAN E-20.10-00**  
 SHEET 15 OF 17 SHEETS

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**SEISMIC LATERAL FORCE RESTRAINER  
ACCELERATED BRIDGE CONSTRUCTION (ABC) OPTION  
SPLIT BOX ~ SLAB STRUCTURE**



**DETAIL 1**

**SECTION A**

**SEISMIC LATERAL FORCE RESTRAINER SELECTION CRITERIA:**

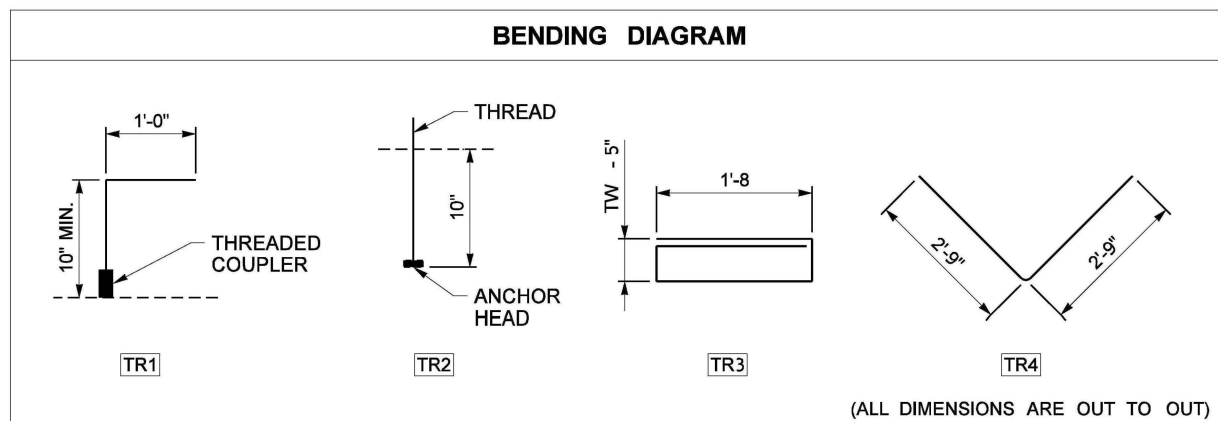
- Seismic lateral force restraint is required for Split Box ~ Slab structures with less than 2 feet of Fill Depth. Options for Lateral Seismic Restraint are as follows:
  - Accelerated Bridge Construction (ABC) Option. See details this Sheet.
  - Steel Option with Seismic Restrainer. See details on Sheet 14.
  - C.I.P. End Diaphragm with Girder Stop Option. See Sheet 17.
- Two lateral restrainers shall be installed symmetrically in both walls of the segment. Minimum two segments with lateral restrainers are required along the length of buried structure. The number of segments with lateral restrainers can be calculated using formula:  $N = w L PGA / (2R)$  (rounded up to integer), where:
 

$w$  (kip/ft) - Weight per linear foot of structure and roadway above the walls

$L$  (ft) - Total length of structure

$PGA$  - Effective Site Peak Ground Acceleration Coefficient

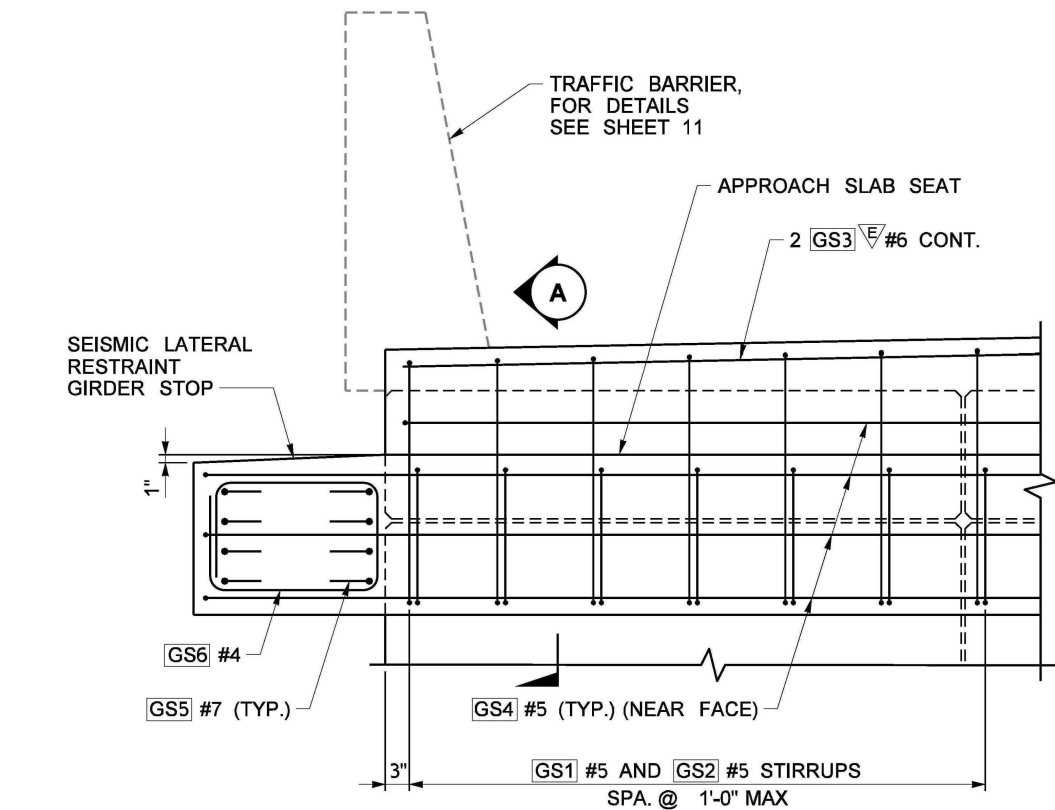
$R = 100$  kips, shear key lateral resistance
- The lateral restrainers shall be installed in the end segments and spaced equally along the length of the structure.
- Shear key material shall be self-consolidating concrete placed using a 'bird feeder' technique, or a Type 2 Grout for Nonshrink Applications in accordance with Std. Spec. 9-20.3(2), placed via grout tubes.
- Shear keys can be installed after backfilling and open to traffic when applicable.
- This option not applicable with approach slabs.



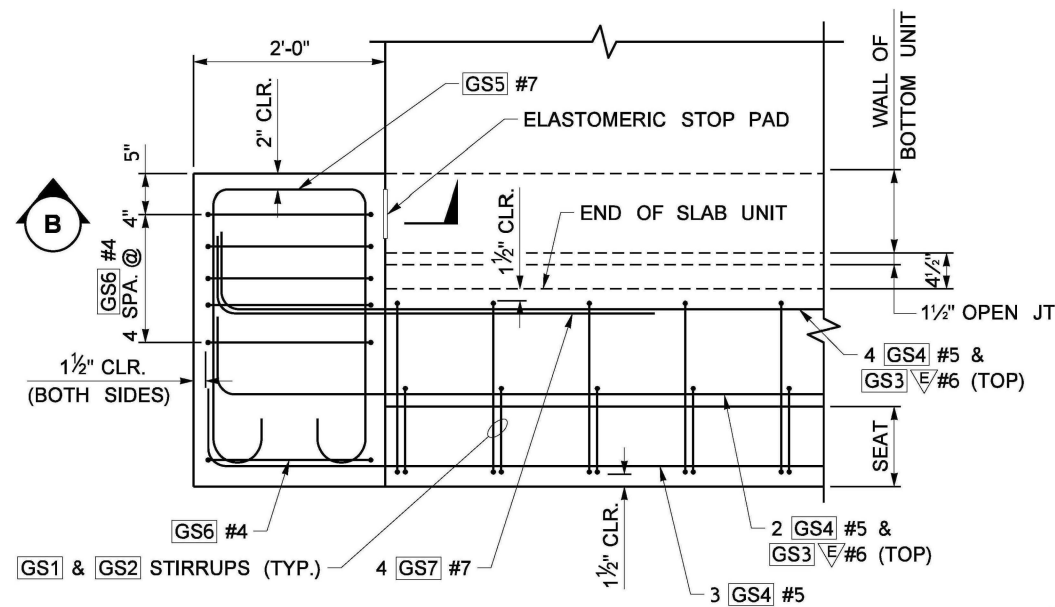
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**BURIED STRUCTURE  
SPLIT BOX  
STANDARD PLAN E-20.10-00**  
SHEET 16 OF 17 SHEETS

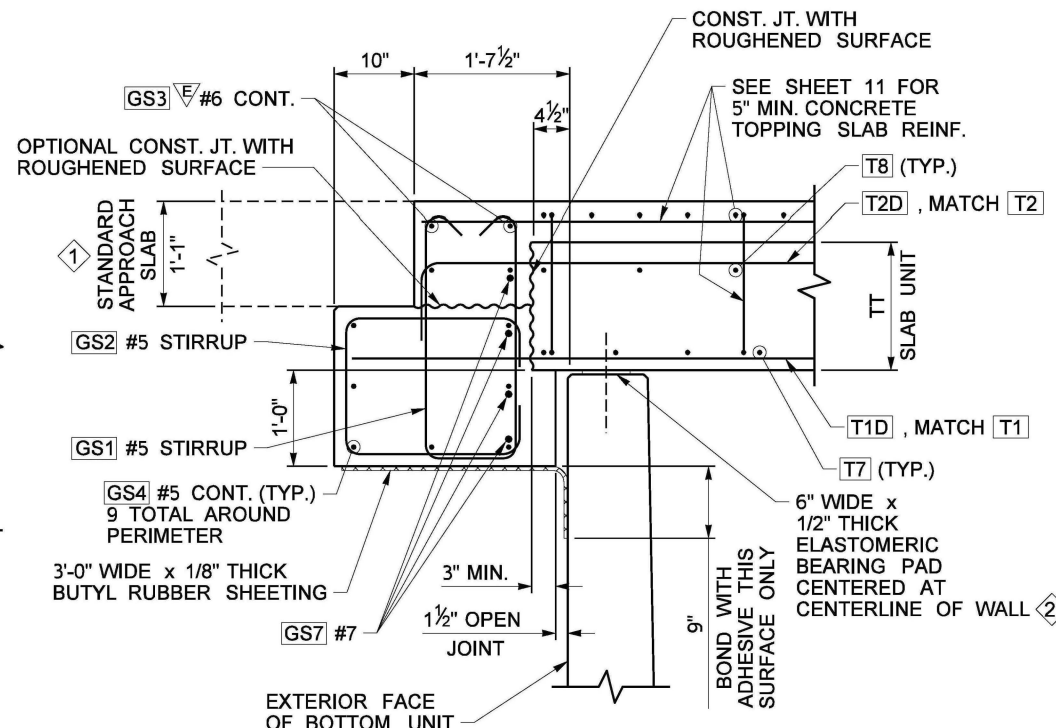
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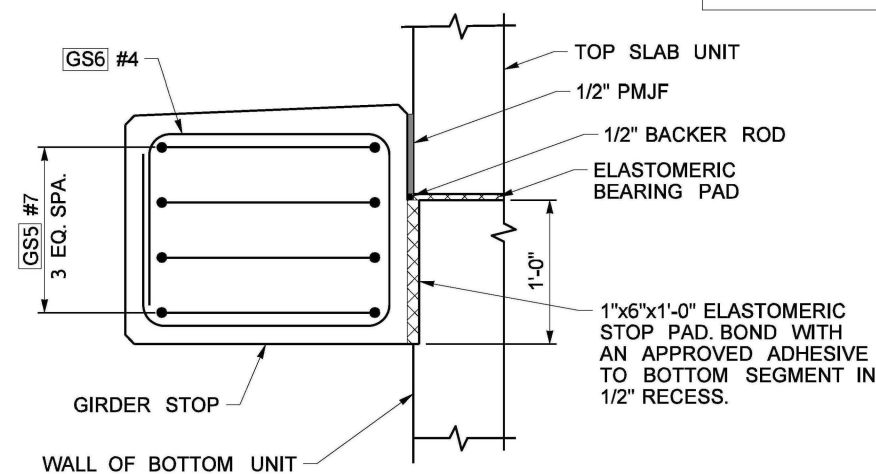
**ELEVATION**  
**SEISMIC LATERAL FORCE RESTRAINER**  
**C.I.P. END DIAPHRAGM WITH GIRDER STOP OPTION DETAIL**  
**SPLIT BOX ~ SLAB STRUCTURE**



**PLAN**  
**SEISMIC LATERAL FORCE RESTRAINER**  
**C.I.P. END DIAPHRAGM WITH GIRDER STOP OPTION DETAIL**  
**SPLIT BOX ~ SLAB STRUCTURE**  
 5" MIN. CONCRETE TOPPING SLAB  
 REINFORCING NOT SHOWN FOR CLARITY



**SECTION A**



**SECTION B**

#### KEY NOTES

1. FOR APPROACH SLAB DETAILS INCLUDING REINFORCING, EXPANSION ANCHOR, COMPRESSION SEAL, AND OTHER, SEE STANDARD PLAN A-40.50.
2. THE CONTRACTOR MAY ADD A 1" MINIMUM THICK GROUT PAD FOR LEVELING TOP OF BOTTOM UNIT PRIOR TO SETTING BEARING PAD. ADJUST FINAL ELEVATIONS AS NEEDED. THE CONTRACTOR MAY SUBMIT ALTERNATIVE METHODS OF VERTICAL ADJUSTMENT TO THE ENGINEER FOR ACCEPTANCE.

#### SEISMIC LATERAL FORCE RESTRAINER SELECTION CRITERIA

1. Seismic lateral force restraint is required for Split Box ~ Slab structures with less than 2 feet of Fill Depth. C.I.P. End Diaphragm with Girder Stop details may be used for Split Box ~ Slab structures with 5" min. concrete topping slab and approach slab. Options for Lateral Seismic Restraint are as follows:

- a. C.I.P. End Diaphragm with Girder Stop Option. See details this Sheet.
- b. Steel Option with Seismic Restrainer. See details on Sheet 14.
- c. Accelerated Bridge Construction (ABC) Option. See Sheet 16.

2. Partial length of the structure is shown. End Diaphragm must be installed along a full length of both walls. Four girder stops shall be installed (two at each end of the structure).
3. Lateral resistance of each girder stop,  $R=80$  kips. Earthquake force per one girder stop shall not exceed its resistance. Earthquake force can be calculated using formula:

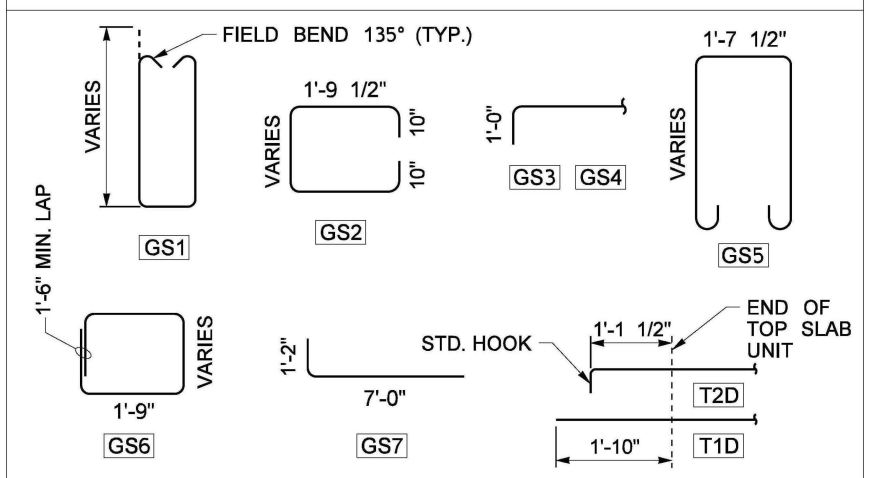
$$V = 0.5 w L \text{ PGA, where:}$$

$w$  (kip/ft) - Weight per linear foot of structure and roadway above the wall

$L$  (ft) - Total length of structure

PGA - Effective Site Peak Ground Acceleration Coefficient

#### BENDING DIAGRAM



Sep 12, 2023

#### BURIED STRUCTURE SPLIT BOX STANDARD PLAN E-20.10-00

SHEET 17 OF 17 SHEETS

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| MINIMUM LAP<br>SPLICE LENGTH |       |
|------------------------------|-------|
| #4                           | 2'-1" |
| #5                           | 2'-7" |
| #6                           | 3'-1" |
| #6 $\nabla$ E                | 3'-8" |
| #7                           | 3'-7" |