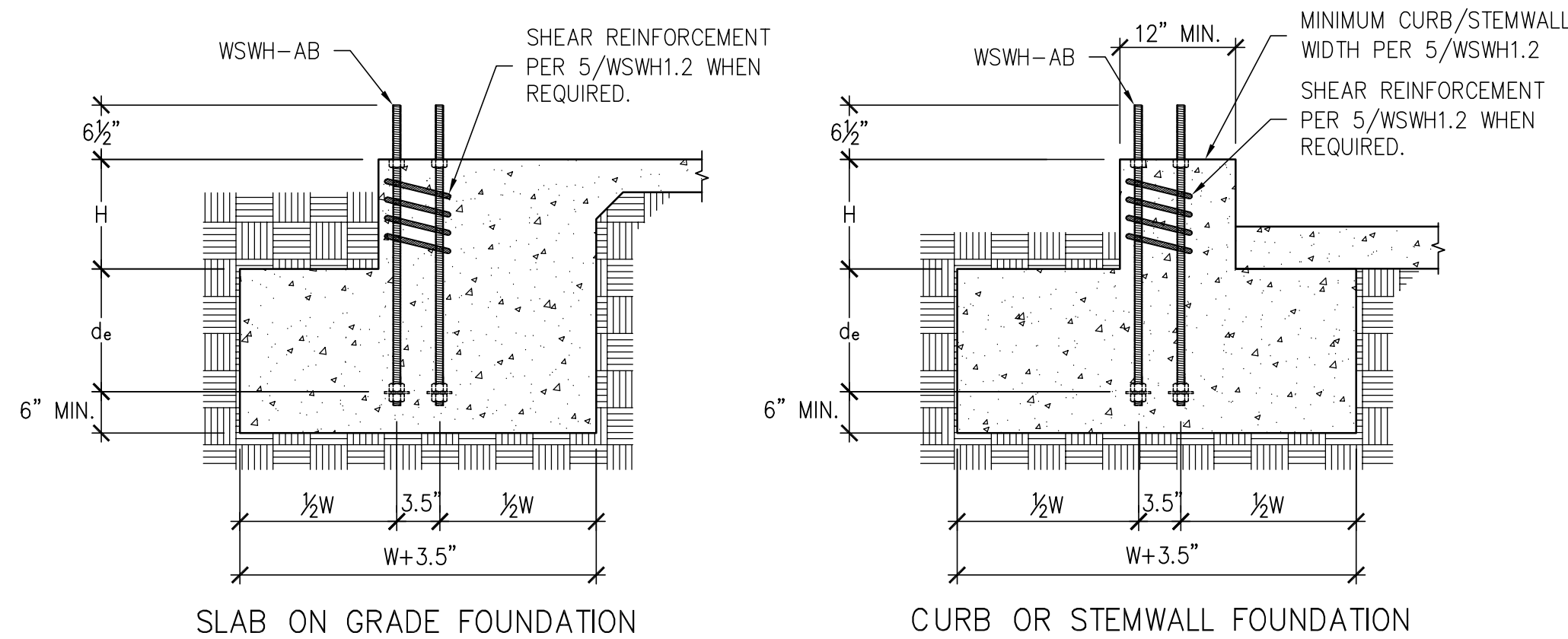
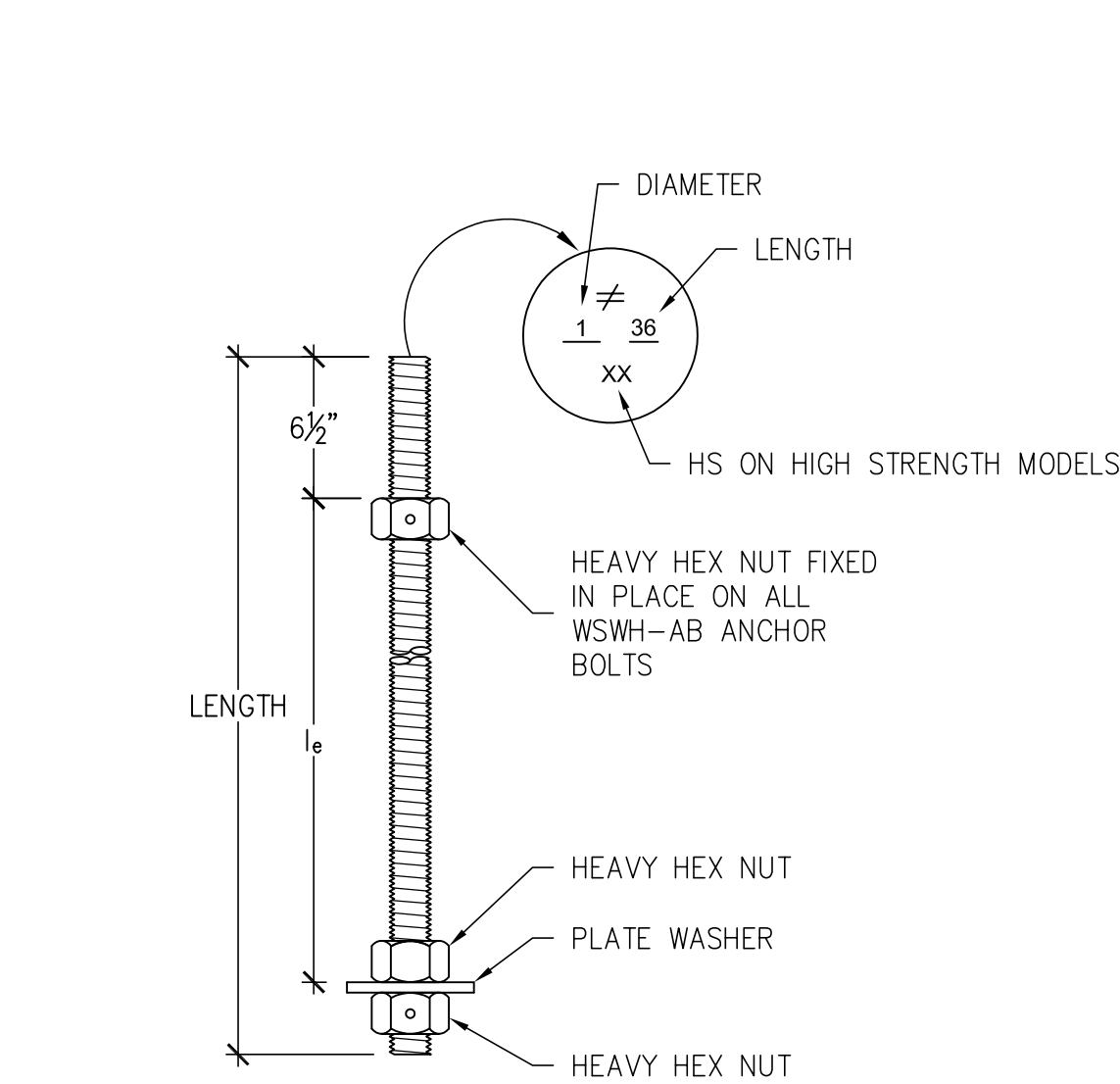
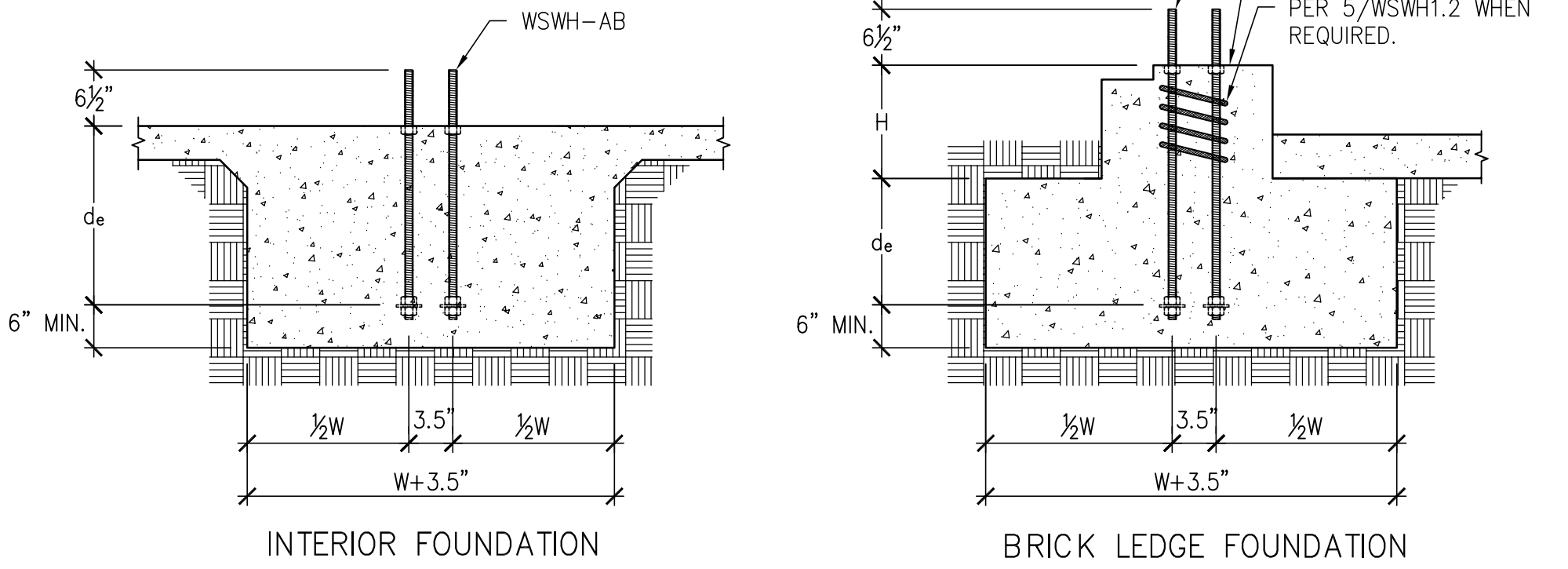


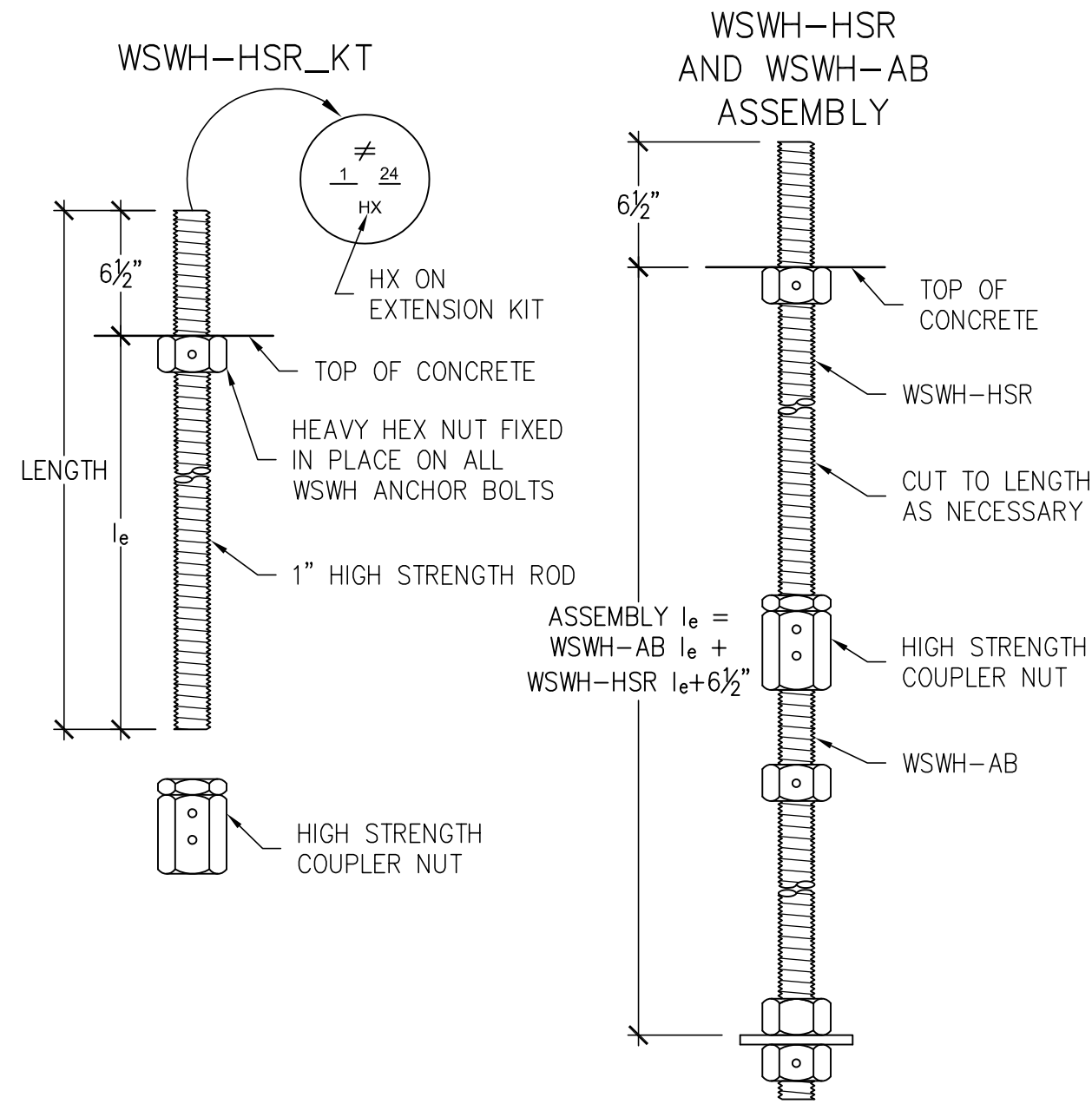


NOTES :  
1. SEE 2/WSWH1.2 FOR DIMENSIONS AND ADDITIONAL NOTES.  
2. SEE 5/WSWH1.2 FOR SHEAR REINFORCEMENT WHEN REQUIRED.  
3. MAXIMUM H =  $l_e - d_e$ . SEE 3/WSWH1.2 AND 4/WSWH1.2 FOR  $l_e$ .

DESIGNER IS PERMITTED TO MODIFY  
DETAILS FOR SPECIFIC CONDITIONS.



| WSWH<br>PANEL MODEL             | MODEL NO.     | DIAMETER | LENGTH | $l_e$   |
|---------------------------------|---------------|----------|--------|---------|
| WSWH12,<br>WSWH18 AND<br>WSWH24 | WSWH-AB1x24   | 1"       | 24"    | 15 1/2" |
|                                 | WSWH-AB1x24HS | 1"       | 24"    | 15 1/2" |
|                                 | WSWH-AB1x30   | 1"       | 30"    | 21 1/2" |
|                                 | WSWH-AB1x30HS | 1"       | 30"    | 21 1/2" |
|                                 | WSWH-AB1x36   | 1"       | 36"    | 27 1/2" |
|                                 | WSWH-AB1x36HS | 1"       | 36"    | 27 1/2" |



| WSWH PANEL<br>MODEL             | MODEL NO.      | DIAMETER | LENGTH | $l_e$   |
|---------------------------------|----------------|----------|--------|---------|
| WSWH12,<br>WSWH18 AND<br>WSWH24 | WSWH-HSR1x24KT | 1"       | 24"    | 17 1/2" |
|                                 | WSWH-HSR1x36KT | 1"       | 36"    | 29 1/2" |

TBD

STRONG-WALL® WSWH BACK-TO-BACK ANCHORAGE – TYPICAL SECTIONS

1

WSWH BACK-TO-BACK ANCHOR BOLTS

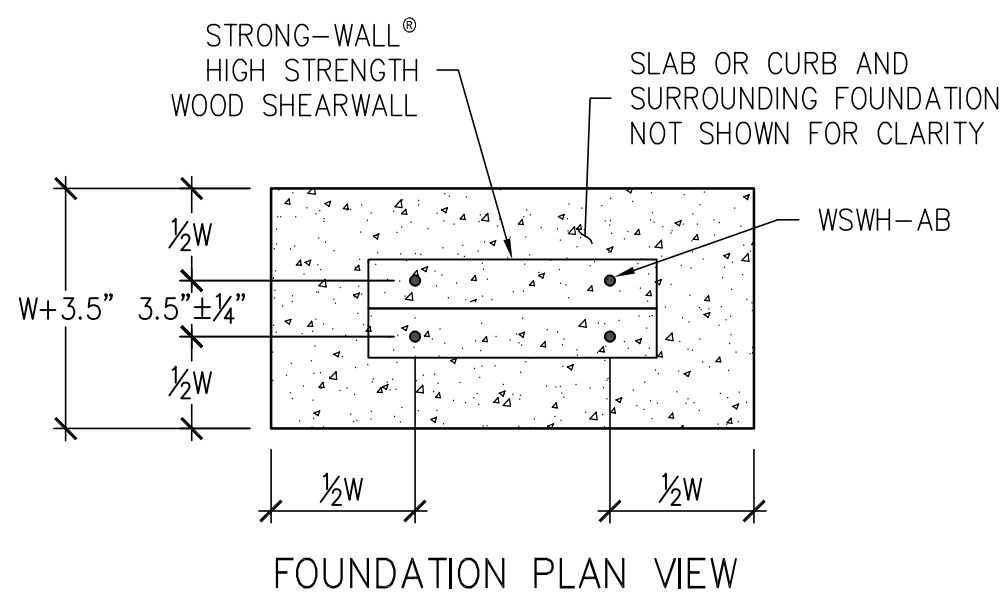
3

WSWH BACK-TO-BACK ANCHOR BOLT EXTENSION

4

WSWH BACK-TO-BACK ANCHOR BOLT TEMPLATES

6

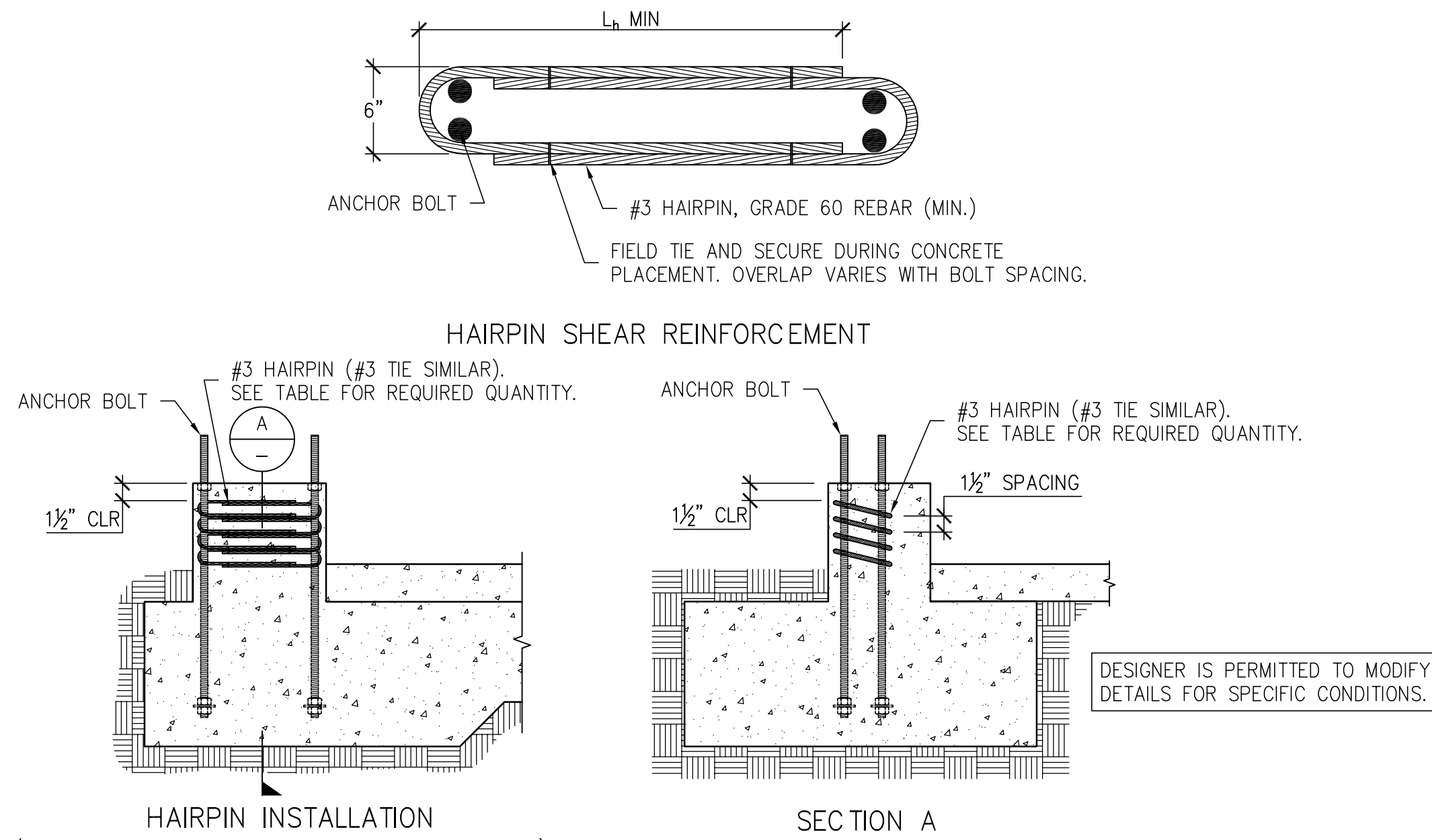


NOTES :  
1. ANCHORAGE DESIGNS CONFORM TO ACI 318-11 APPENDIX D, ACI 318-14 CHAPTER 17 AND ACI 318-19 CHAPTER 17 WITH NO SUPPLEMENTARY REINFORCEMENT FOR CRACKED OR UNCRACKED CONCRETE AS NOTED.  
2. ANCHOR STRENGTH INDICATES REQUIRED GRADE OF WSWH-AB ANCHOR BOLT. STANDARD (ASTM F1554 GRADE 36) OR HIGH STRENGTH (HS) (ASTM A193 GRADE B7).  
3. SEISMIC INDICATES SEISMIC DESIGN CATEGORY C-F. DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C MAY USE WIND ANCHORAGE SOLUTIONS. SEISMIC ANCHORAGE DESIGNS CONFORM TO ACI 318-11 SECTION D.3.3.4.3, ACI 318-14 SECTION 17.2.3.4.3, AND ACI 318-19 SECTION 17.10.5.3.  
4. WIND INCLUDES SEISMIC DESIGN CATEGORY A AND B AND DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C.  
5. SOLUTIONS ASSUME THAT BACK-TO-BACK PANEL ARE IN CONTACT WITH EACH OTHER.  
6. FOUNDATION DIMENSIONS ARE FOR ANCHORAGE ONLY. FOUNDATION DESIGN (SIZE AND REINFORCEMENT) BY OTHERS. THE DESIGNER MAY SPECIFY ALTERNATE EMBEDMENT, FOOTING SIZE OR ANCHOR BOLT.  
7. REFER TO 1/WSWH1.2 FOR  $d_e$ .

| WSWH BACK-TO-BACK ANCHORAGE SOLUTIONS FOR 2500 PSI CONCRETE |                    |                 |                            |        |            |
|-------------------------------------------------------------|--------------------|-----------------|----------------------------|--------|------------|
| DESIGN CRITERIA                                             | CONCRETE CONDITION | ANCHOR STRENGTH | WSWH-AB1 ANCHOR BOLT       |        |            |
|                                                             |                    |                 | ASD ALLOWABLE UPLIFT (lbs) | W (in) | $d_e$ (in) |
| SEISMIC                                                     | CRACKED            | STANDARD        | 34,200                     | 50     | 17         |
|                                                             |                    | HIGH STRENGTH   | 73,600                     | 90     | 30         |
|                                                             | UNCRACKED          | STANDARD        | 34,200                     | 44     | 15         |
|                                                             |                    | HIGH STRENGTH   | 73,600                     | 71     | 24         |
| WIND                                                        | CRACKED            | STANDARD        | 8,800                      | 18     | 6          |
|                                                             |                    |                 | 23,200                     | 36     | 12         |
|                                                             |                    |                 | 34,200                     | 46     | 16         |
|                                                             |                    |                 | 44,200                     | 54     | 18         |
|                                                             |                    | HIGH STRENGTH   | 52,400                     | 60     | 20         |
|                                                             |                    |                 | 61,100                     | 66     | 22         |
|                                                             |                    |                 | 73,600                     | 75     | 25         |
|                                                             |                    |                 | 11,100                     | 18     | 6          |
|                                                             | UNCRACKED          | STANDARD        | 22,200                     | 30     | 10         |
|                                                             |                    |                 | 34,200                     | 40     | 14         |
|                                                             |                    |                 | 45,800                     | 48     | 16         |
|                                                             |                    |                 | 55,300                     | 56     | 18         |
|                                                             |                    | HIGH STRENGTH   | 65,500                     | 60     | 20         |
|                                                             |                    |                 | 73,600                     | 65     | 22         |

| WSWH BACK-TO-BACK ANCHORAGE SOLUTIONS FOR 3000 PSI CONCRETE |                    |                 |                            |        |            |
|-------------------------------------------------------------|--------------------|-----------------|----------------------------|--------|------------|
| DESIGN CRITERIA                                             | CONCRETE CONDITION | ANCHOR STRENGTH | WSWH-AB1 ANCHOR BOLT       |        |            |
|                                                             |                    |                 | ASD ALLOWABLE UPLIFT (lbs) | W (in) | $d_e$ (in) |
| SEISMIC                                                     | CRACKED            | STANDARD        | 34,200                     | 48     | 16         |
|                                                             |                    | HIGH STRENGTH   | 73,600                     | 76     | 26         |
|                                                             | UNCRACKED          | STANDARD        | 34,200                     | 42     | 14         |
|                                                             |                    | HIGH STRENGTH   | 73,600                     | 67     | 23         |
| WIND                                                        | CRACKED            | STANDARD        | 9,700                      | 18     | 6          |
|                                                             |                    |                 | 19,500                     | 30     | 10         |
|                                                             |                    |                 | 34,200                     | 44     | 15         |
|                                                             |                    |                 | 48,500                     | 54     | 18         |
|                                                             |                    | HIGH STRENGTH   | 57,400                     | 60     | 20         |
|                                                             |                    |                 | 66,900                     | 66     | 22         |
|                                                             |                    |                 | 73,600                     | 70     | 24         |
|                                                             |                    |                 | 12,100                     | 18     | 6          |
|                                                             | UNCRACKED          | STANDARD        | 24,400                     | 30     | 10         |
|                                                             |                    |                 | 34,200                     | 38     | 13         |
|                                                             |                    |                 | 45,200                     | 45     | 15         |
|                                                             |                    |                 | 60,600                     | 54     | 18         |
|                                                             |                    | HIGH STRENGTH   | 71,800                     | 60     | 20         |
|                                                             |                    |                 | 73,600                     | 61     | 21         |

| WSWH BACK-TO-BACK ANCHORAGE SOLUTIONS FOR 4500 PSI CONCRETE |                    |                 |                            |        |            |
|-------------------------------------------------------------|--------------------|-----------------|----------------------------|--------|------------|
| DESIGN CRITERIA                                             | CONCRETE CONDITION | ANCHOR STRENGTH | WSWH-AB1 ANCHOR BOLT       |        |            |
|                                                             |                    |                 | ASD ALLOWABLE UPLIFT (lbs) | W (in) | $d_e$ (in) |
| SEISMIC                                                     | CRACKED            | STANDARD        | 34,200                     | 42     | 14         |
|                                                             |                    | HIGH STRENGTH   | 73,600                     | 68     | 23         |
|                                                             | UNCRACKED          | STANDARD        | 34,200                     | 37     | 13         |
|                                                             |                    | HIGH STRENGTH   | 73,600                     | 59     | 20         |
| WIND                                                        | CRACKED            | STANDARD        | 11,900                     | 18     | 6          |
|                                                             |                    |                 | 23,900                     | 30     | 10         |
|                                                             |                    |                 | 34,200                     | 39     | 13         |
|                                                             |                    |                 | 39,700                     | 42     | 14         |
|                                                             |                    | HIGH STRENGTH   | 49,100                     | 48     | 16         |
|                                                             |                    |                 | 64,700                     | 57     | 19         |
|                                                             |                    |                 | 73,600                     | 62     | 21         |
|                                                             |                    |                 | 14,800                     | 18     | 6          |
|                                                             | UNCRACKED          | STANDARD        | 25,800                     | 27     | 9          |
|                                                             |                    |                 | 34,200                     | 34     | 12         |
|                                                             |                    |                 | 44,100                     | 39     | 13         |
|                                                             |                    |                 | 55,400                     | 45     | 15         |
|                                                             |                    | HIGH STRENGTH   | 67,700                     | 51     | 17         |
|                                                             |                    |                 | 73,600                     | 54     | 18         |



| STRONG-WALL® WSWH BACK-TO-BACK SHEAR ANCHORAGE |                      |                                |                                |                              |                                |
|------------------------------------------------|----------------------|--------------------------------|--------------------------------|------------------------------|--------------------------------|
| MODEL                                          | SEISMIC <sup>3</sup> |                                |                                | WIND <sup>4</sup>            |                                |
|                                                | $l_n$ (in.)          | SHEAR REINFORCEMENT            | MIN. CURB/STEMWALL WIDTH (in.) | SHEAR REINFORCEMENT          | MIN. CURB/STEMWALL WIDTH (in.) |
| (2) WSWH12                                     | 10 1/4               | (1) #3 HAIRPIN                 | 12                             | (1) #3 HAIRPIN               | 12                             |
| (2) WSWH18                                     | 15                   | (3) #3 HAIRPINS <sup>6,7</sup> | 12                             | (2) #3 HAIRPINS              | 12                             |
| (2) WSWH24                                     | 19                   | (4) #3 HAIRPINS <sup>6,7</sup> | 12                             | (3) #3 HAIRPINS <sup>6</sup> | 12                             |

NOTES :  
1. SHEAR ANCHORAGE DESIGNS CONFORM TO ACI 318-11, ACI 318-14 AND ACI 318-19 AND ASSUME MINIMUM 2,500 PSI CONCRETE.  
2. SHEAR REINFORCEMENT IS NOT REQUIRED FOR INTERIOR FOUNDATION APPLICATIONS (PANEL INSTALLED AWAY FROM EDGE OF CONCRETE), OR BRACED WALL PANEL APPLICATIONS.  
3. SEISMIC INDICATES SEISMIC DESIGN CATEGORY C THROUGH F. DETACHED 1 AND 2 FAMILY DWELLINGS IN SDC C MAY USE WIND ANCHORAGE SOLUTIONS. SEISMIC SHEAR REINFORCEMENT DESIGNS CONFORM TO ACI 318-19, SECTION 17.10.6.3 AND ACI 318-14, SECTION 17.2.3.5.3.  
4. WIND INCLUDES SEISMIC DESIGN CATEGORY A AND B.  
5. HIGH STRENGTH ANCHORAGE IS ASSUMED IN TABLE.  
6. ADDITIONAL TIES MAY BE REQUIRED AT GARAGE CURB OR STEMWALL INSTALLATIONS BELOW ANCHOR REINFORCEMENT PER DESIGNER.  
7. USE (2) #3 HAIRPINS FOR WSWH18 AND WSWH24 WHEN STANDARD STRENGTH ANCHORAGE IS USED.  
8. #4 GRADE 40 SHEAR REINFORCEMENT MAY BE SUBSTITUTED FOR WSWH SHEAR ANCHORAGE SOLUTIONS.  
9. CONCRETE EDGE DISTANCE FOR ANCHORS MUST COMPLY WITH ACI 318-19 SECTION 17.9.2, ACI 318-14 SECTION 17.7.2 AND ACI 318-11 SECTION D.8.2.  
10. THE DESIGNER MAY SPECIFY ALTERNATE SHEAR ANCHORAGE.

STRONG-WALL® WSWH BACK-TO-BACK TENSION ANCHORAGE SCHEDULE 2,500, 3,000 AND 4,500 PSI

2

STRONG-WALL® WSWH BACK-TO-BACK SHEAR ANCHORAGE SCHEDULE AND DETAILS

5

| REVIEWS                  |  | DATE       | NO. |
|--------------------------|--|------------|-----|
| FIRST RELEASE - 2018 IBC |  | 10-12-2020 | 0   |
| 2021 IBC REVISIONS       |  | 03-16-2021 | 1   |

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• 9956 W. Las Positas Blvd.  
Pleasanton, CA 94588  
• Tel: (800) 999-5099  
• Website: www.strongtie.com



STRONG-WALL® WSWH  
BACK-TO-BACK ANCHORAGE DETAILS  
ENGINEERED DESIGNS



|           |            |
|-----------|------------|
| NAME      |            |
| DATE      | 03-16-2021 |
| SCALE     | N.T.S.     |
| CHECKED   |            |
| SHEET     |            |
| WSWH1.2   |            |
| OF SHEETS |            |
| JOB NO.   |            |