

CONCRETE STRENGTH	F _c = 3000 PSI				F _c = 4000 PSI			
	CLASS 'A'		CLASS 'B'		CLASS 'A'		CLASS 'B'	
BAR CASE	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
CLASS	1A	1B	2A	2B	3A	3B	4A	4B
BAR SIZE	11-10"	11-8"	11-6"	11-4"	11-3"	11-2"	11-1"	11-T
14	2'-5"	1'-10"	3'-1"	2'-5"	1'-11"	1'-7"	2'-9"	2'-11"
16	3'-0"	2'-4"	3'-0"	3'-0"	2'-7"	2'-0"	3'-4"	2'-7"
18	3'-7"	2'-9"	4'-8"	3'-7"	3'-11"	2'-5"	4'-0"	3'-11"
20	5'-3"	4'-0"	6'-3"	5'-2"	4'-8"	3'-4"	5'-11"	4'-6"
22	6'-0"	4'-7"	7'-9"	5'-11"	5'-2"	4'-0"	6'-10"	5'-2"
24	6'-9"	5'-2"	8'-9"	6'-9"	5'-10"	4'-6"	7'-7"	5'-10"

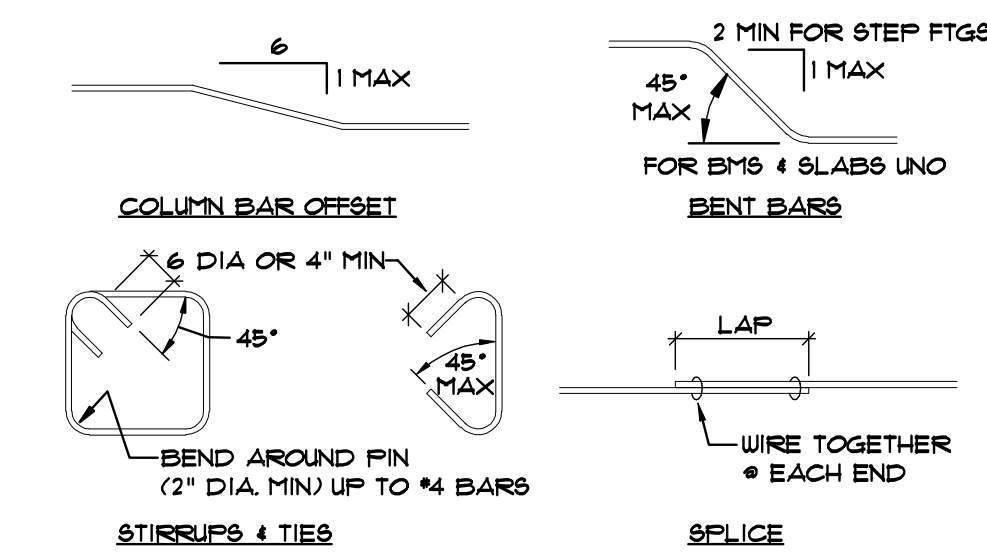
- NOTES:**
- UNLESS INDICATED OTHERWISE, USE THE CLASS 'B' LAP SPLICE LENGTHS, MULTIPLY BY THE APPLICABLE FACTOR(S) LISTED BELOW.
 - WHERE CLEAR SPACE BETWEEN BARS LAP SPLICED AT ANY SECTION IS LESS THAN 2 BAR DIAMETERS, OR WHERE THE BAR COVER IS LESS THAN OR EQUAL TO THE BAR DIAMETER, INCREASE THE LAP LENGTH BY 50%.
 - A CLASS 'A' SPLICE MAY BE USED ONLY WHERE NOTED ON THE DRAWINGS.
 - WHERE LIGHTWEIGHT AGGREGATE CONCRETE IS USED, INCREASE LAP SPLICE LENGTH BY 50%.
 - TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS.
 - SPLICES OF HORIZONTAL REINFORCEMENT IN WALLS SHALL BE STAGGERED.
 - SPLICES IN WALLS CONTAINING TWO CURTAINS OF REINFORCEMENT SHALL NOT OCCUR IN THE SAME LOCATION.
 - IN SHOTCRETE WALLS SPLICES IN REINFORCING BARS SHALL BE BY THE NON-CONTACT LAP SPLICE METHOD WITH AT LEAST 2" CLEARANCE BETWEEN BARS. THE BUILDING OFFICIAL MAY PERMIT THE USE OF CONTACT LAP SPLICES WHEN NECESSARY FOR THE SUPPORT OF THE REINFORCING PROVIDED IT CAN BE DEMONSTRATED BY MEANS OF PRE-CONSTRUCTION TESTING, THAT ADEQUATE ENGAGEMENT OF THE BARS AT THE SPLICE CAN BE ACHIEVED, AND PROVIDED THAT THE SPLICE ARE PLACED SO THAT A LINE THROUGH THE CENTER OF THE TWO SPLICED BARS IS PERPENDICULAR TO THE SURFACE OF THE SHOTCRETE WORK.

BAR SIZE	STANDARD HOOK LENGTHS			
	90°	180°	STIRRUP & TIE HOOKS	135°
14	4 1/2"	2 1/2"	3"	3"
16	6"	2 1/2"	3"	3"
18	1 1/2"	2 1/2"	3 3/4"	3 3/4"
20	9"	3"	9"	4 1/2"
22	10 1/2"	3 1/2"	10 1/2"	5 1/4"
24	12"	4"	12"	6"
26	13 1/2"	4 1/2"	-	-
28	15"	5"	-	-
30	16 1/2"	5 1/2"	-	-

DIAMETER OF BENDS	D1		D2	
	1 1/2" FOR 14 BARS	2" FOR 16 BARS	6d FOR 14 THRU 18 BARS	8d FOR 20, 22 & 24 BARS
D1	1 1/2"	2"	6d	8d
D2	1 1/2"	2"	6d	8d

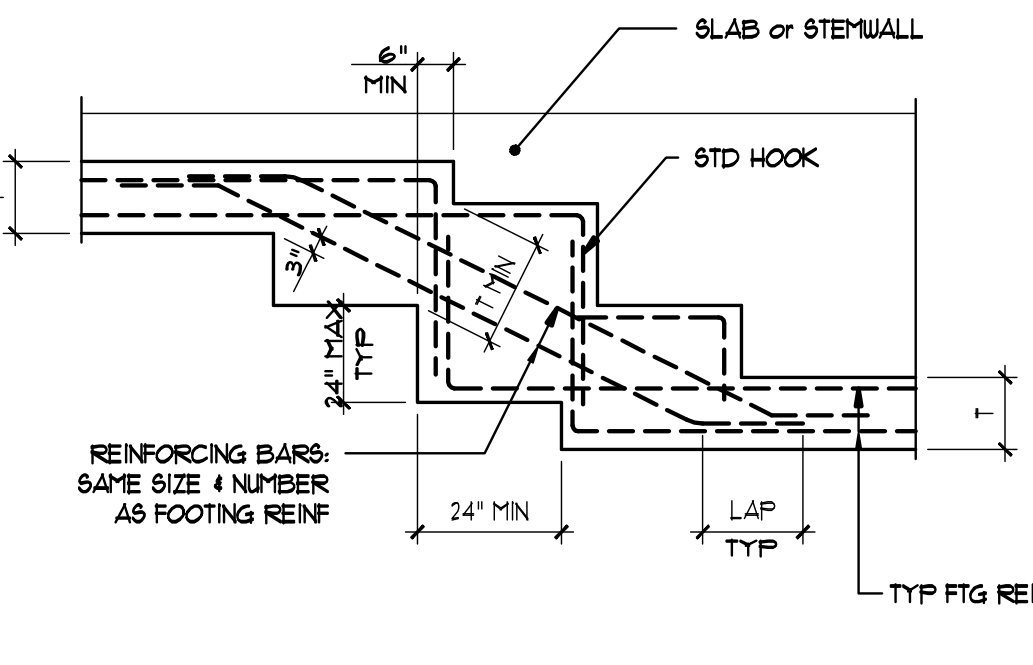
D1 - FOR STIRRUPS, TIES AND WALL REIN. AT OPENINGS
D2 - FOR ALL OTHERS
d - NOMINAL BAR DIAMETER

10 TYPICAL REINFORCING DETAILS



- ALL BARS SHALL END IN A STANDARD 90° OR 180° HOOK UNLESS DETAILED OTHERWISE
- CONCRETE COVER FOR REINFORCING STEEL _____ CLEARANCE
- CAST AGAINST GRADE _____ 3"
- FORMED - EXPOSED TO EARTH OR WEATHER _____ 1 1/2"
#4 & SMALLER _____ 2"
- FORMED - NOT EXPOSED TO EARTH OR WEATHER _____ 1"
- SLAB - FROM TOP OF CONC _____ 2"

6 MANDATORY FORMWORK @ FOOTINGS



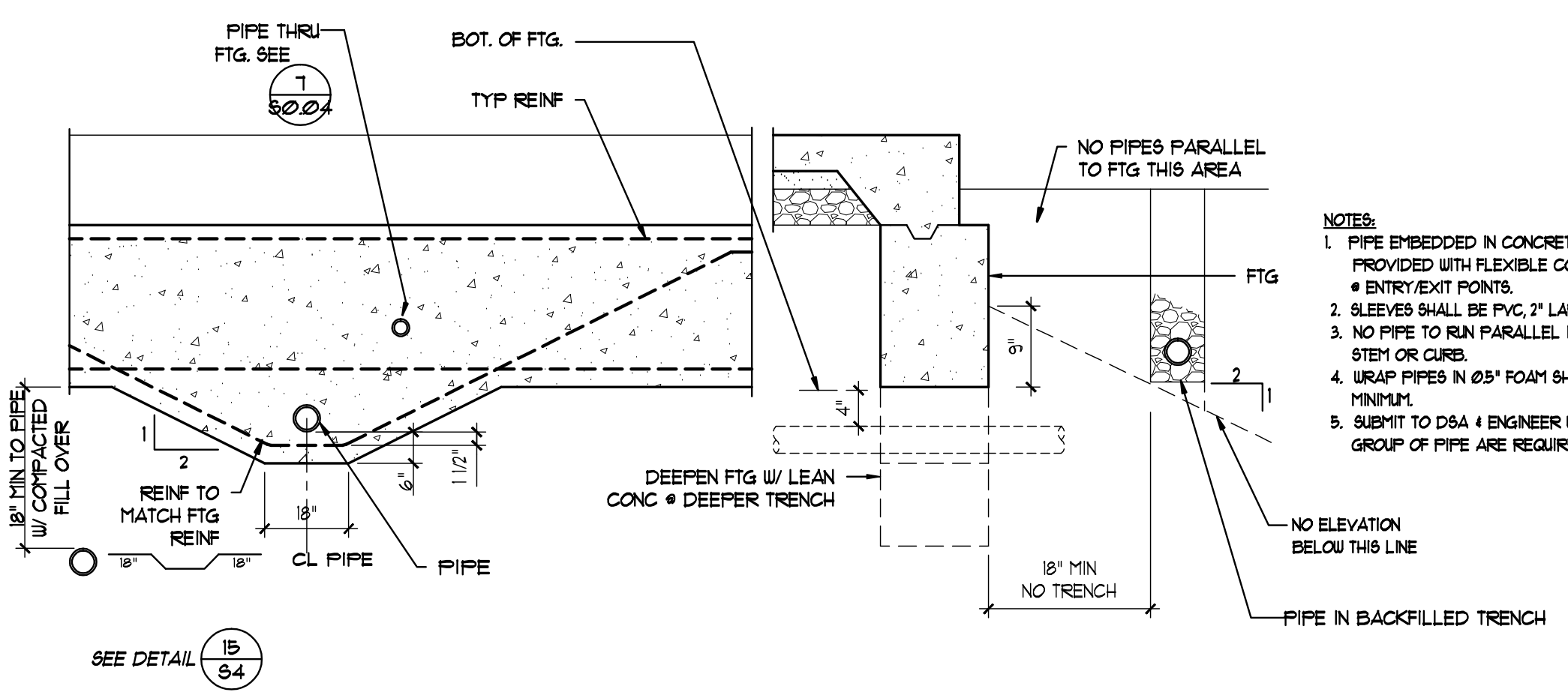
7 STEPPED FOOTING DETAIL

ACCEPTABLE EXPANSION ANCHORS:
ITU NUBSET TRUBOLT, ICSO 1912
HILTI WEDGE ANCHOR BOLT II, ICSO 14621

BOLT DIAMETER	MINIMUM EMBED	INSTALLATION TORQUE (FT LB)	TENSION TEST LOAD		ALLOWABLE DESIGN TENSION*	
			SHEAR ¹	TENSION ²	SHEAR ¹	TENSION ²
1/4" DIA	2"	10	132*	184	36.6	
3/8" DIA	2 1/2"	25	1476*	456	738	
1/2" DIA	3 1/2"	50	2332*	1282	116.6	
5/8" DIA	4"	80	3066*	1685	153.0	
3/4" DIA	4 3/4"	150	3780*			

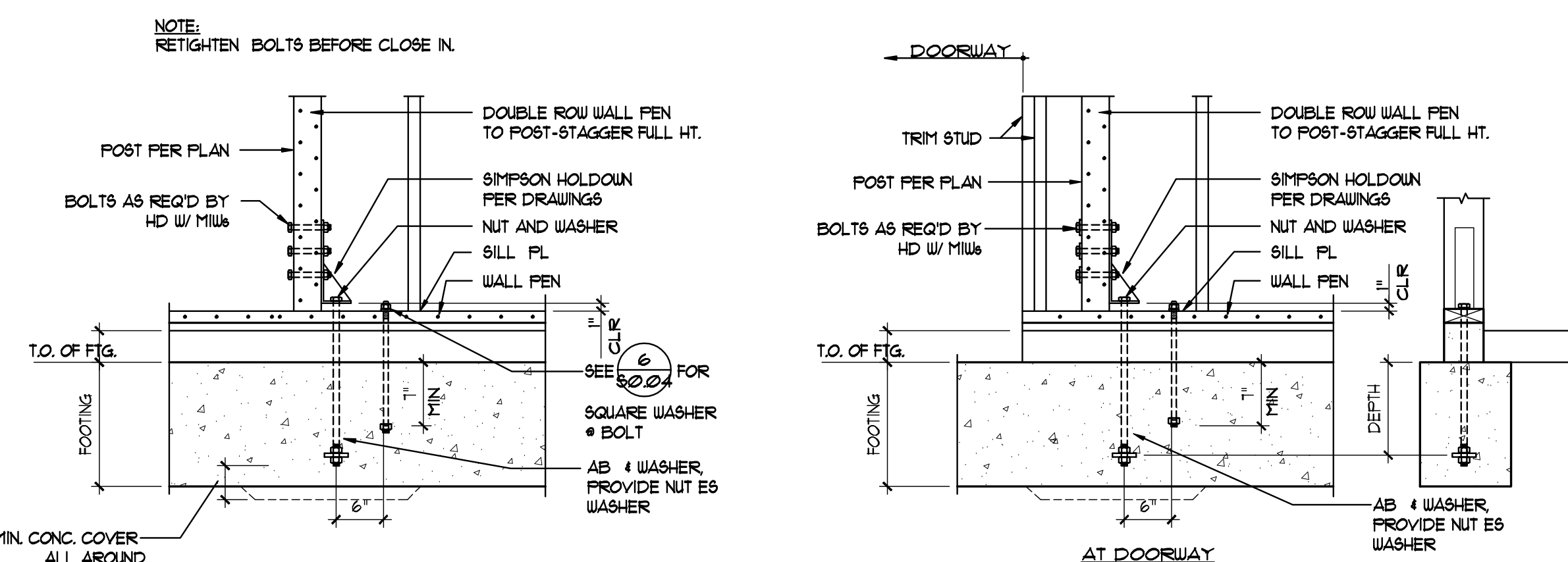
- NOTES:**
- INSTALL DRILLED EXPANSION ANCHORS PER MANUFACTURER'S INSTRUCTIONS. TESTING LAB. TO TEST PER TITLE 24, SECTION 1923A3.9. IF ONE FAILS TEST ALL.
 - AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN A MINIMUM CLEARANCE OF ONE INCH BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR.
 - INSPECTOR VERIFIED INSTALLATION TORQUE OF ALL ANCHORS IS AN ACCEPTABLE ALTERNATE TO TESTING PER NOTE #1.

8 EXPANSION ANCHOR IN CONCRETE

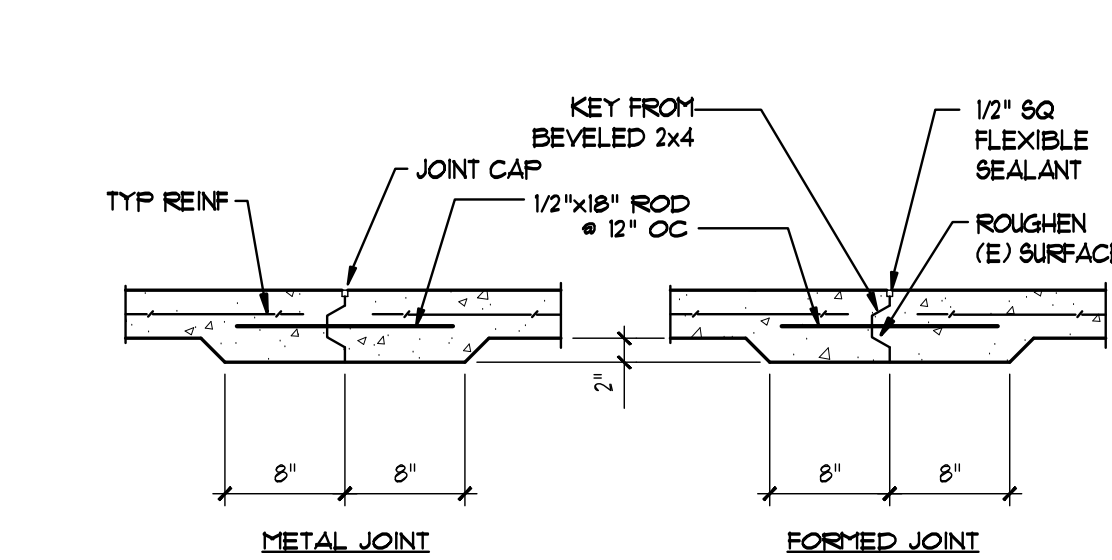


9 TYPICAL PIPE THRU NEW FOOTING DETAILS

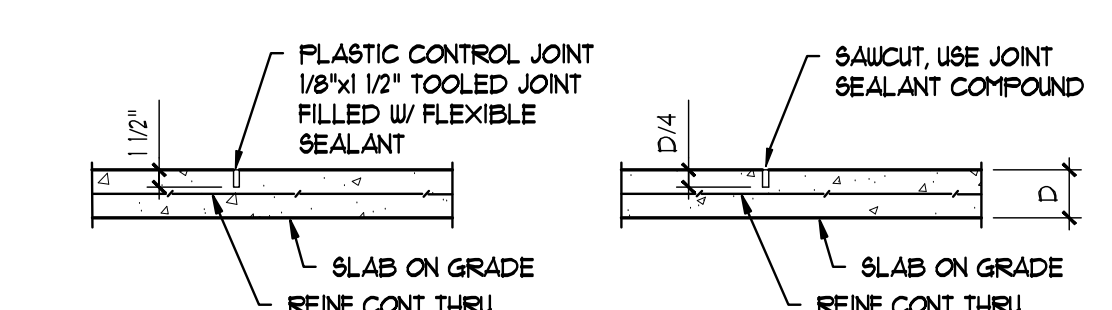
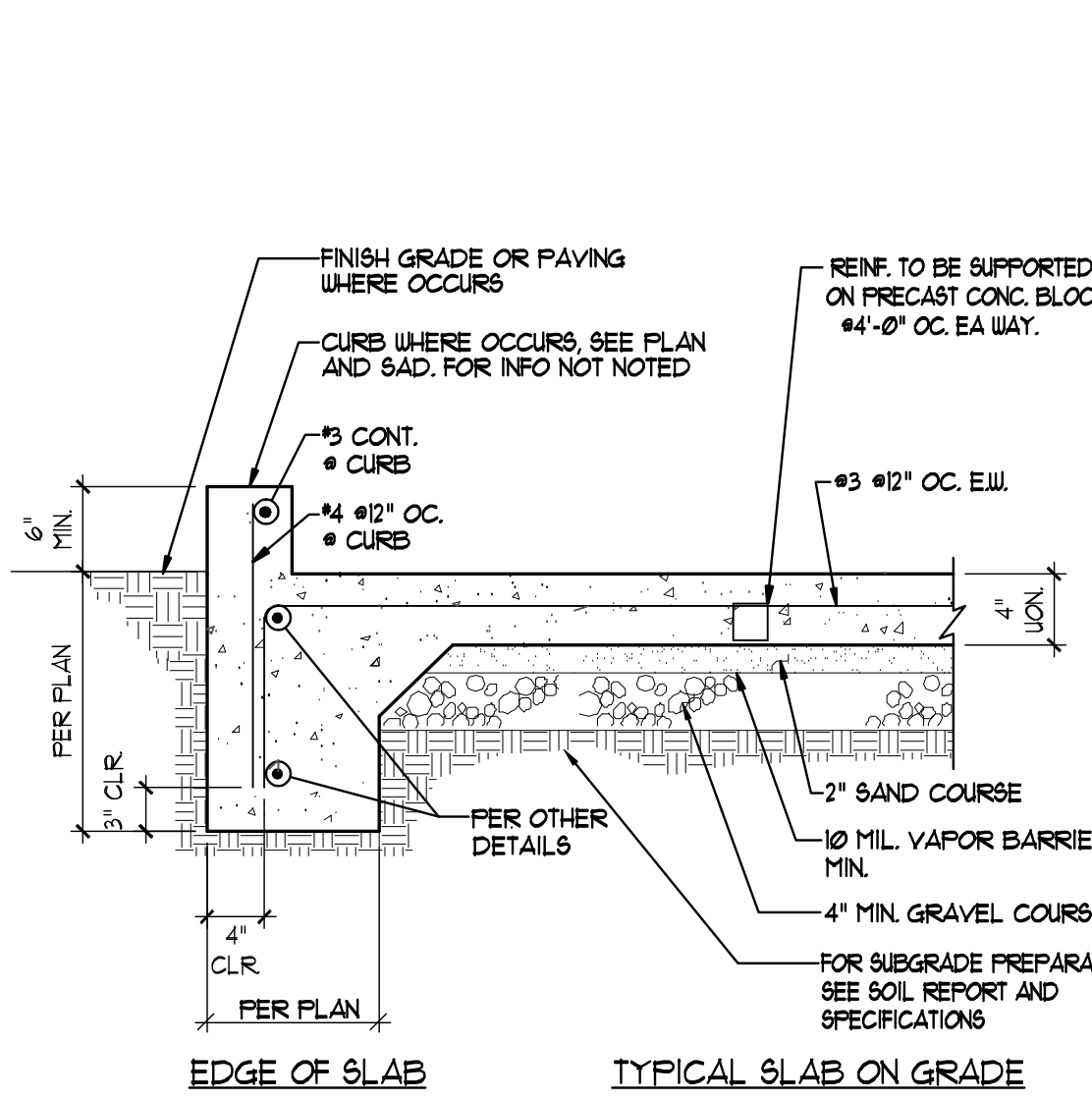
HOLDOWN	THREADED ROD BOLT DIA.	WASHER	DEPTH
HD2A	5/8" MB	1/4" x 2" SQ	12"
HD3A	3/4" MB	3/8" x 2" SQ	12"
HD4A	7/8" MB	1/2" x 2" SQ	15"
HD5A	1" MB	1/2" x 2" SQ	15"
HD6A	1 1/8" MB	1/2" x 2" SQ	15"



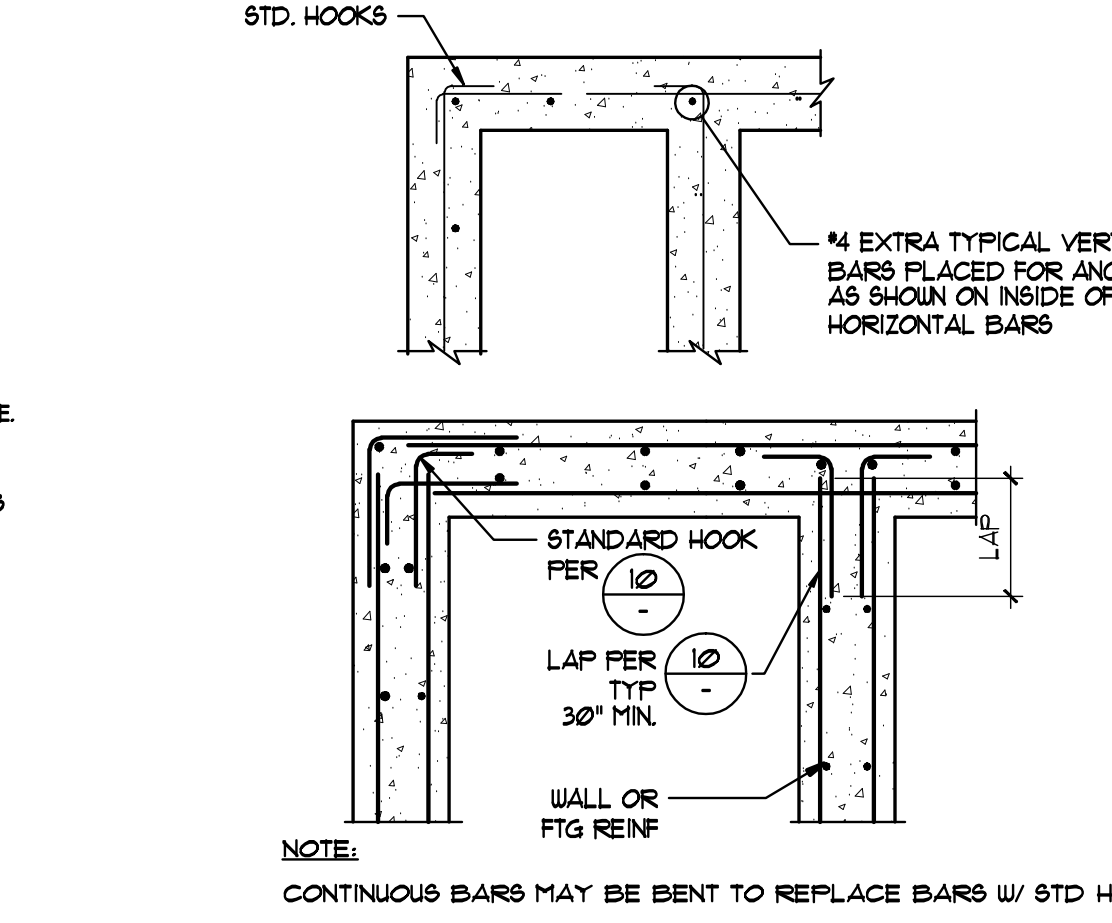
11 HOLDOWN



1 SLAB ON GRADE - DOWEL JOINT



2 SLAB ON GRADE - CONTROL JOINT



4 CONCRETE REIN - PLAN VIEW

5 CONDUIT IN SLAB

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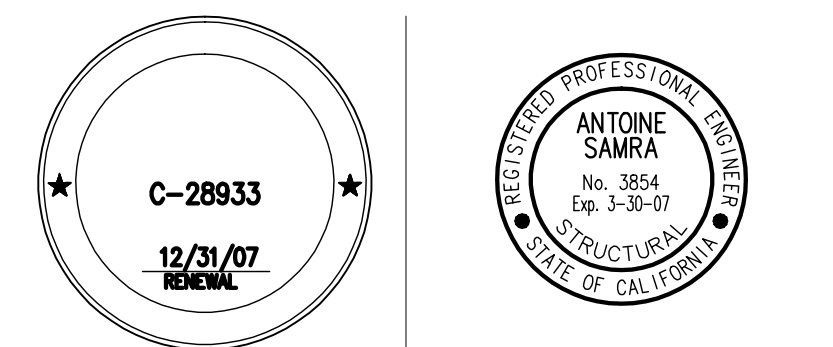
TYPICAL DETAILS

ISSUE:	DATE:	DESCRIPTION:
	10/23/08	DSA
	01/22/07	REVISED
	03/07/07	REVISED

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REVIEWED BY: TS
APPROVED BY: TS

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