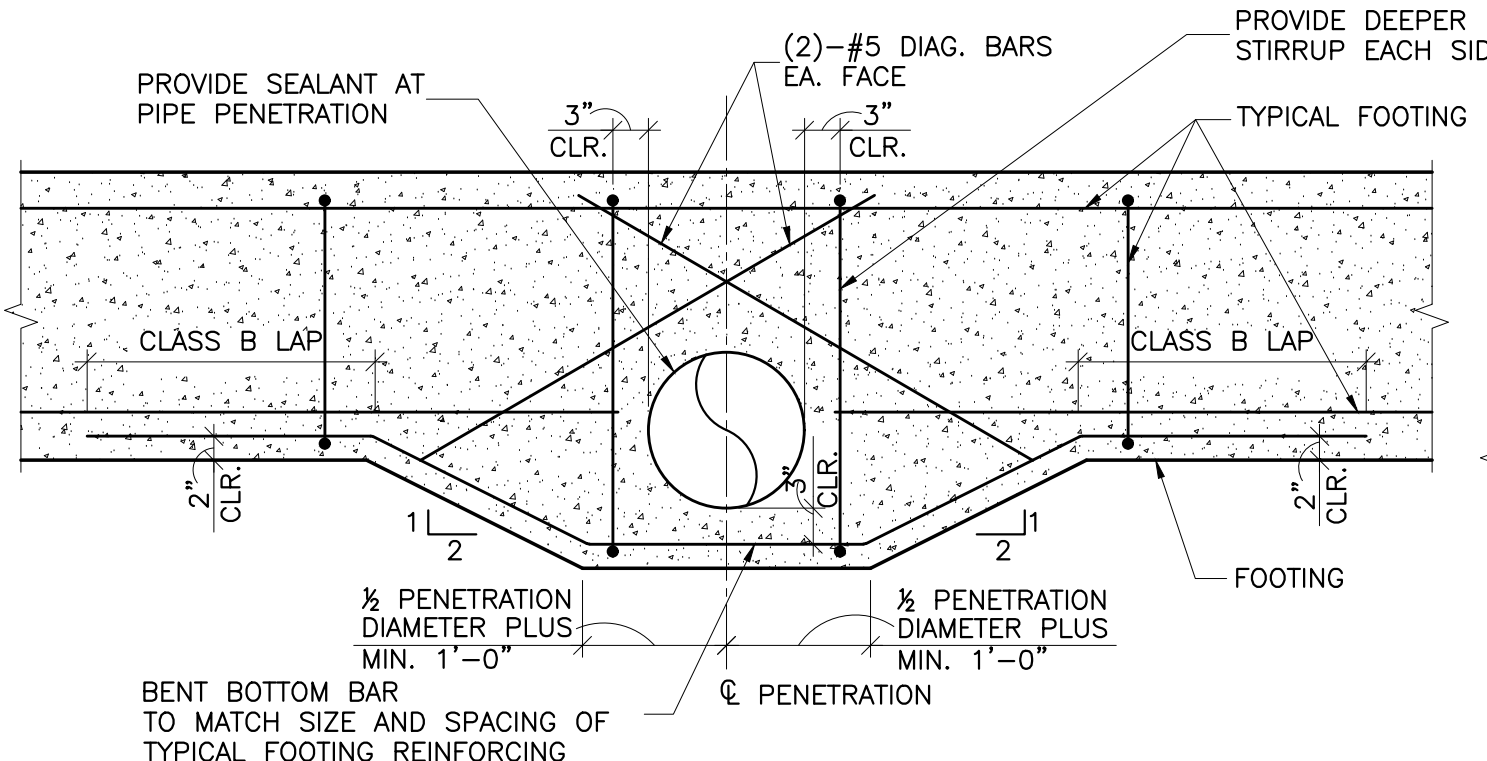
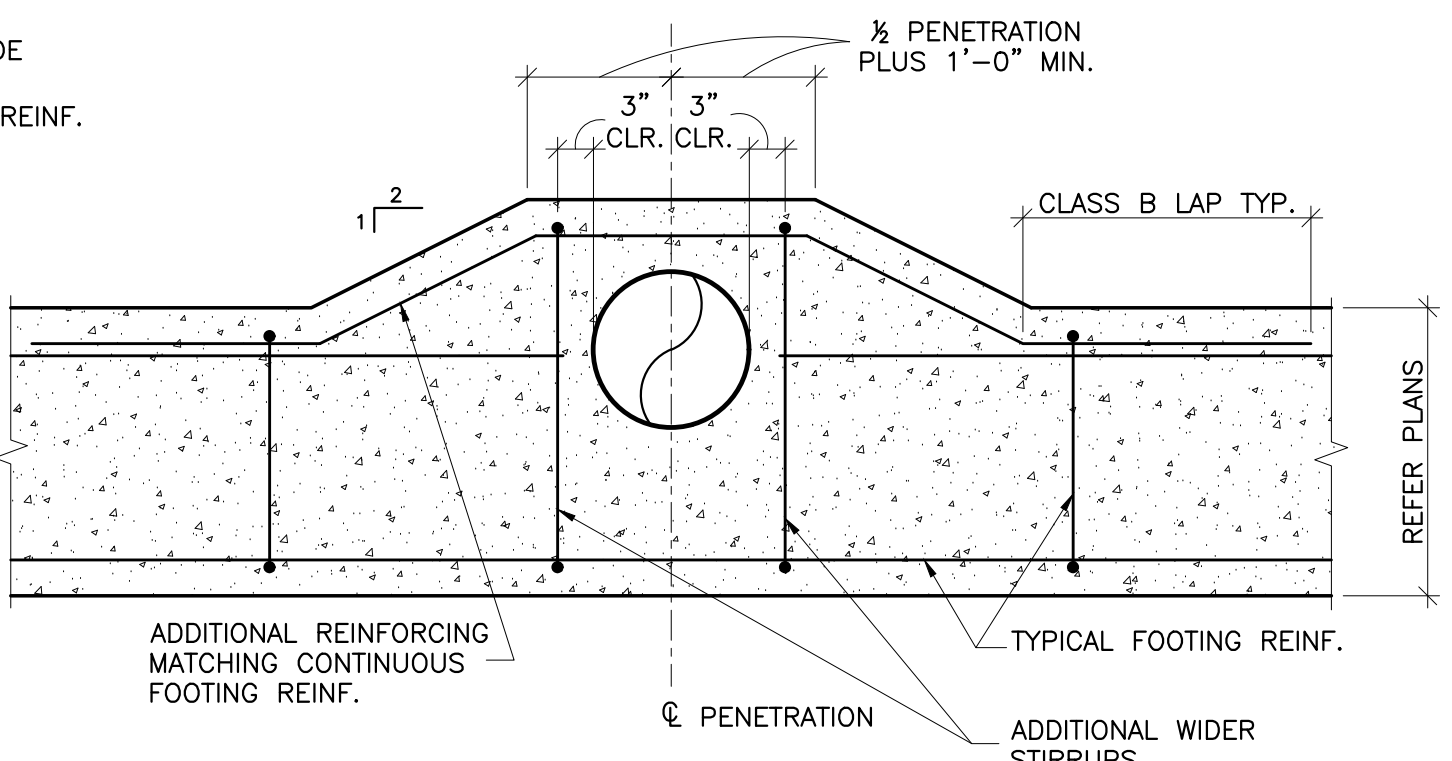


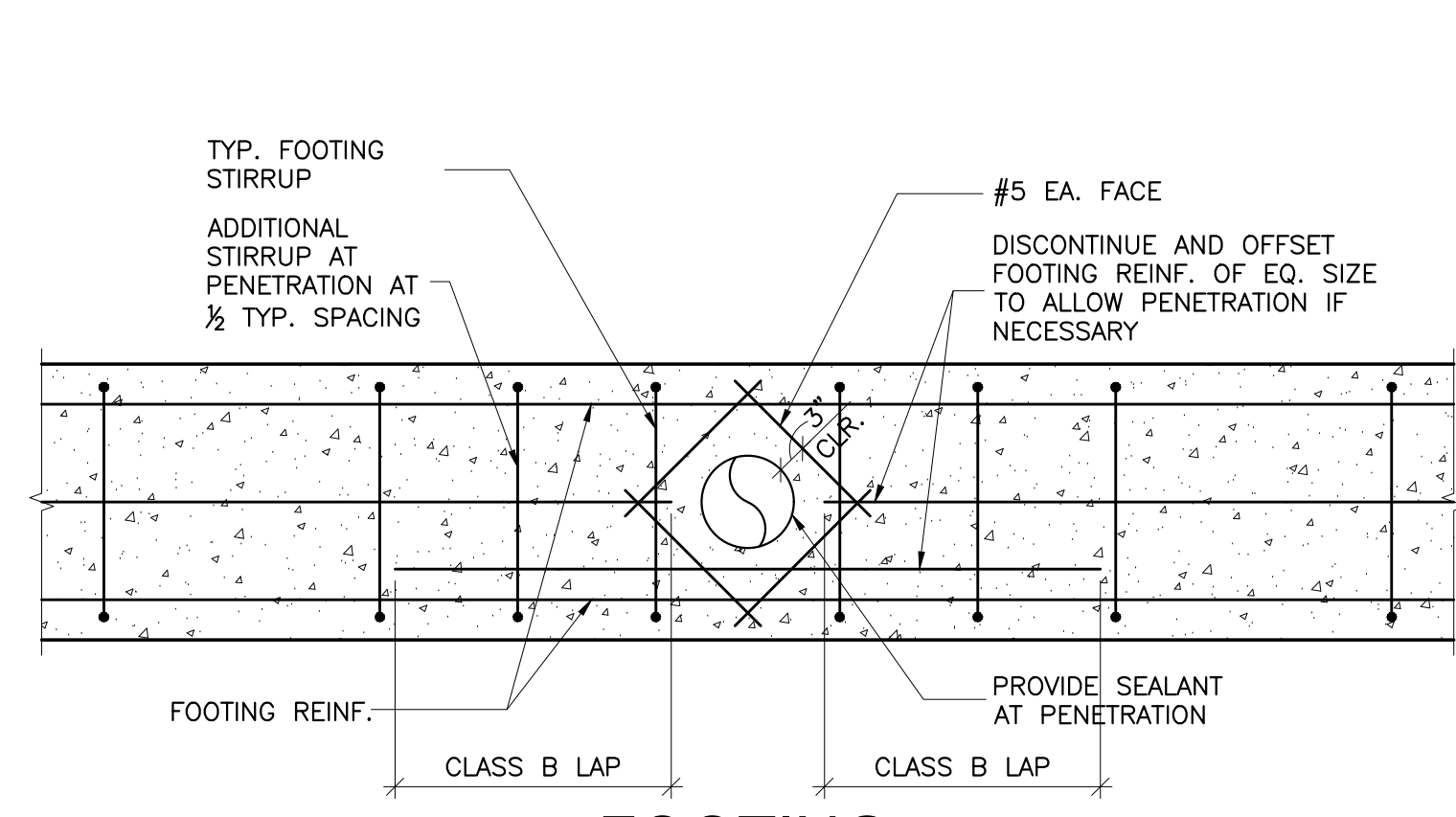
1 TYP. FOOTING CORNER REINF.
SCALE: NONE



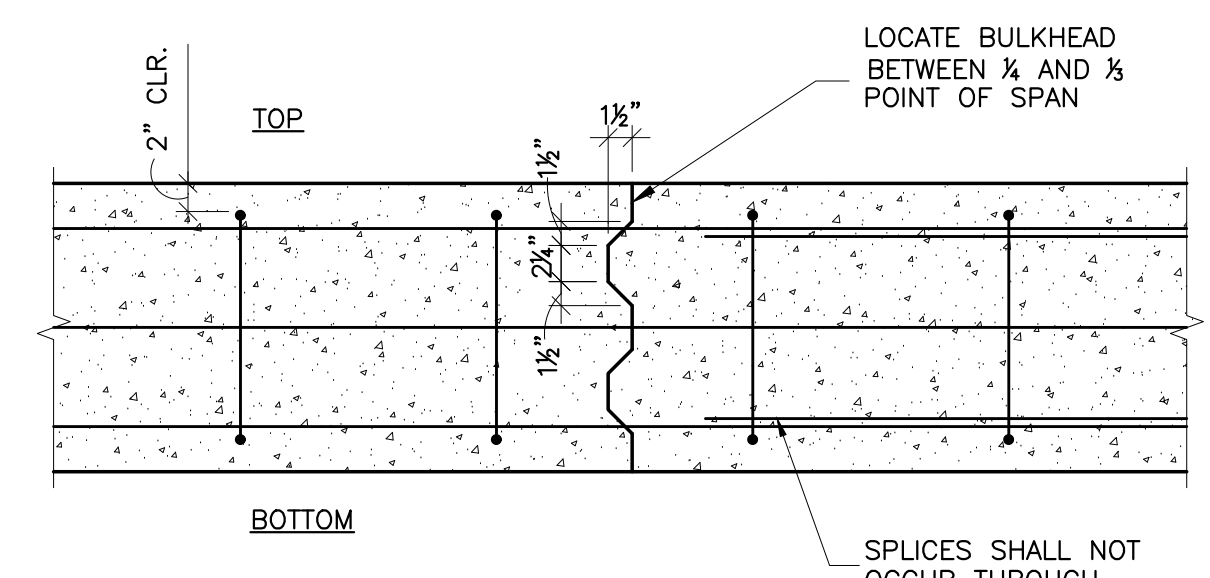
2 TYP. FOOTING PENETRATION
SCALE: NONE



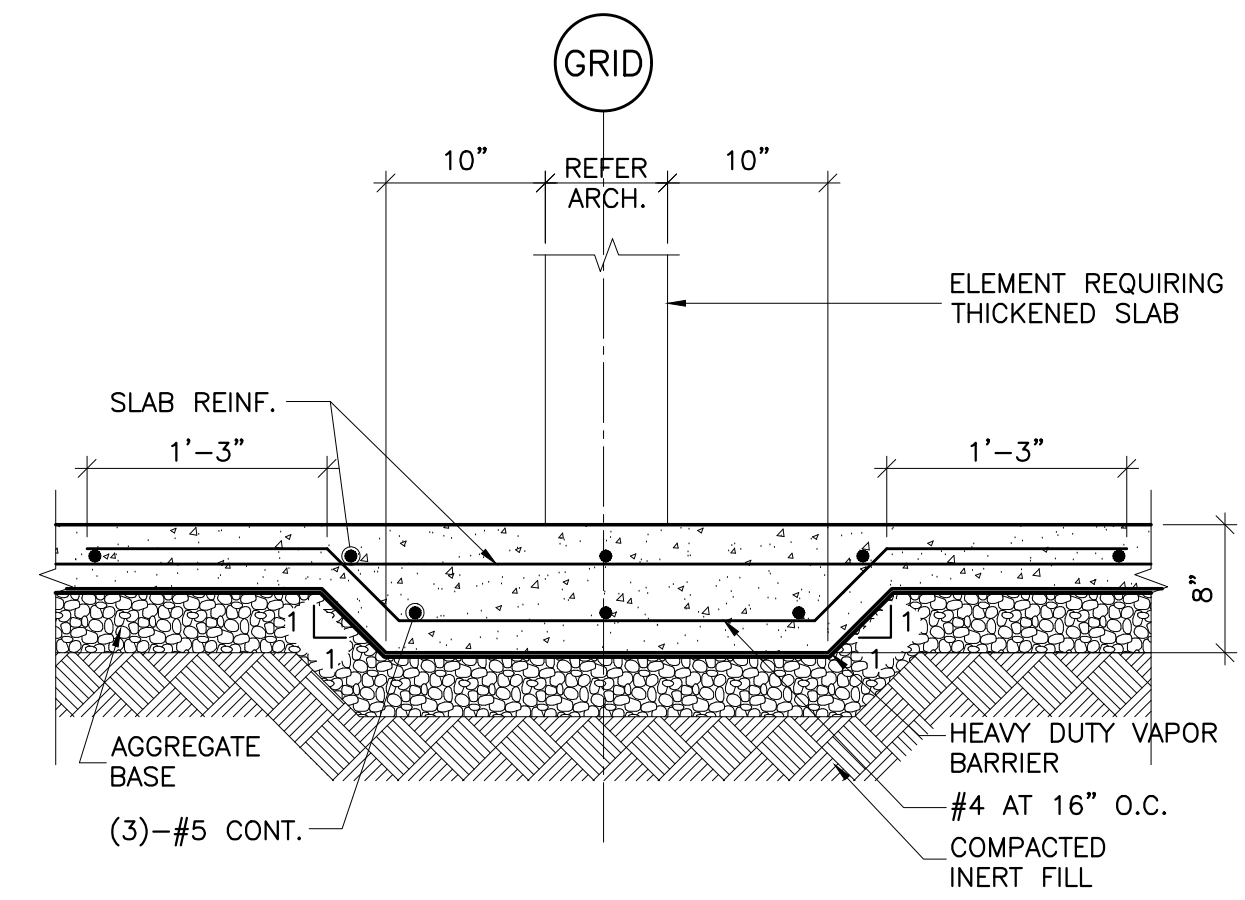
3 PLAN SECTION AT TYPICAL VERTICAL PENETRATION
SCALE: NONE



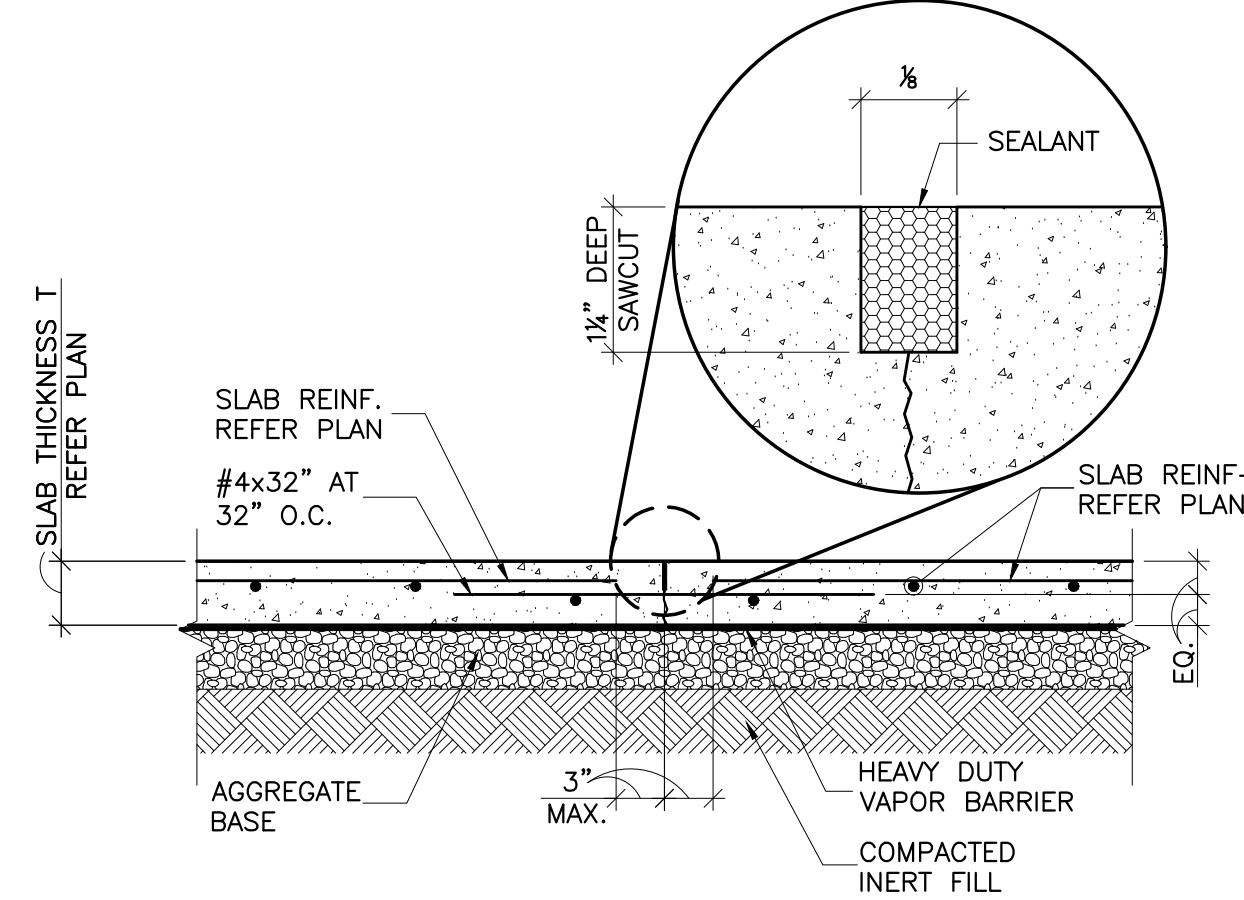
4 FOOTING PENETRATION
SCALE: NONE



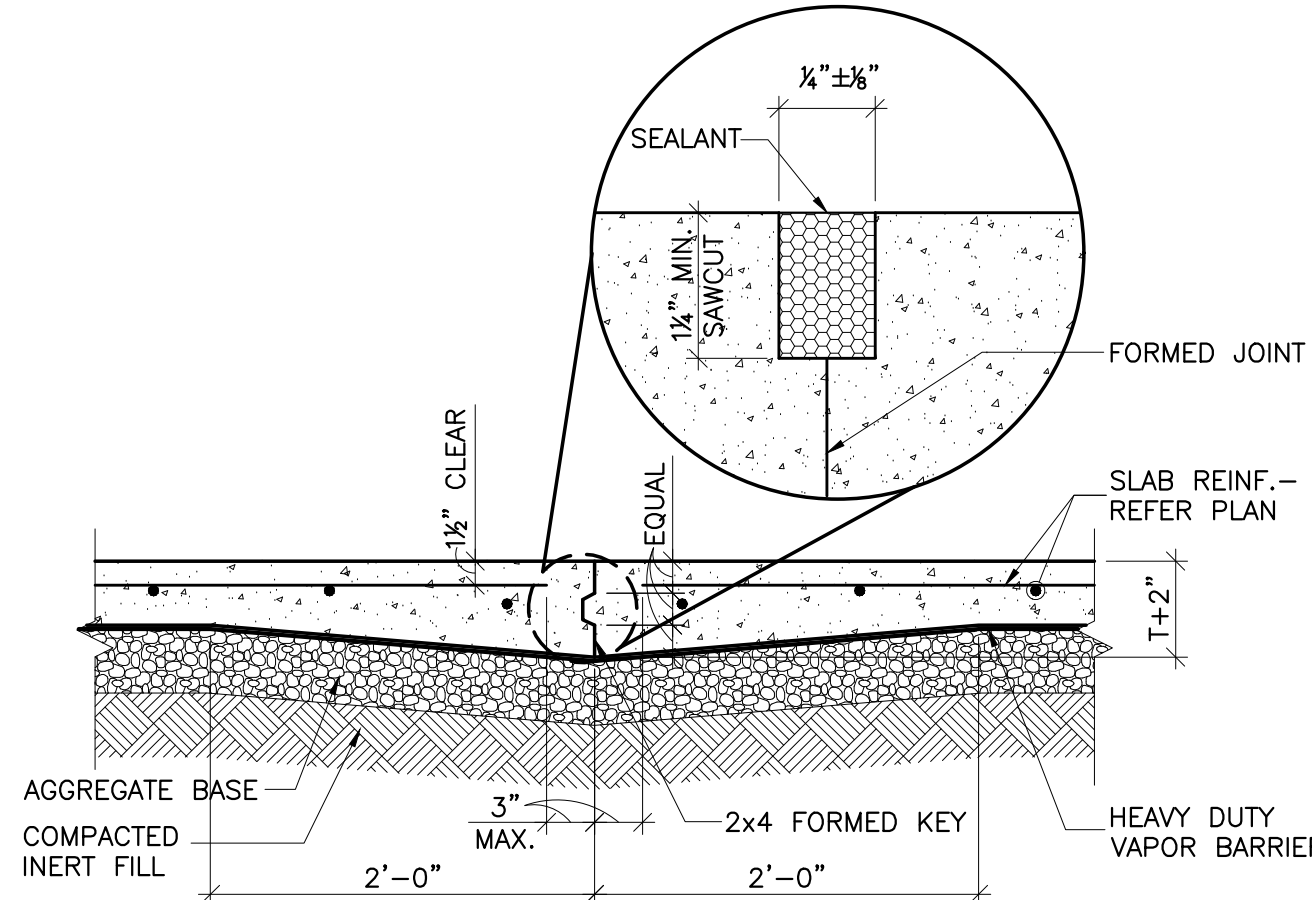
5 CJ THROUGH FOOTING
SCALE: NONE



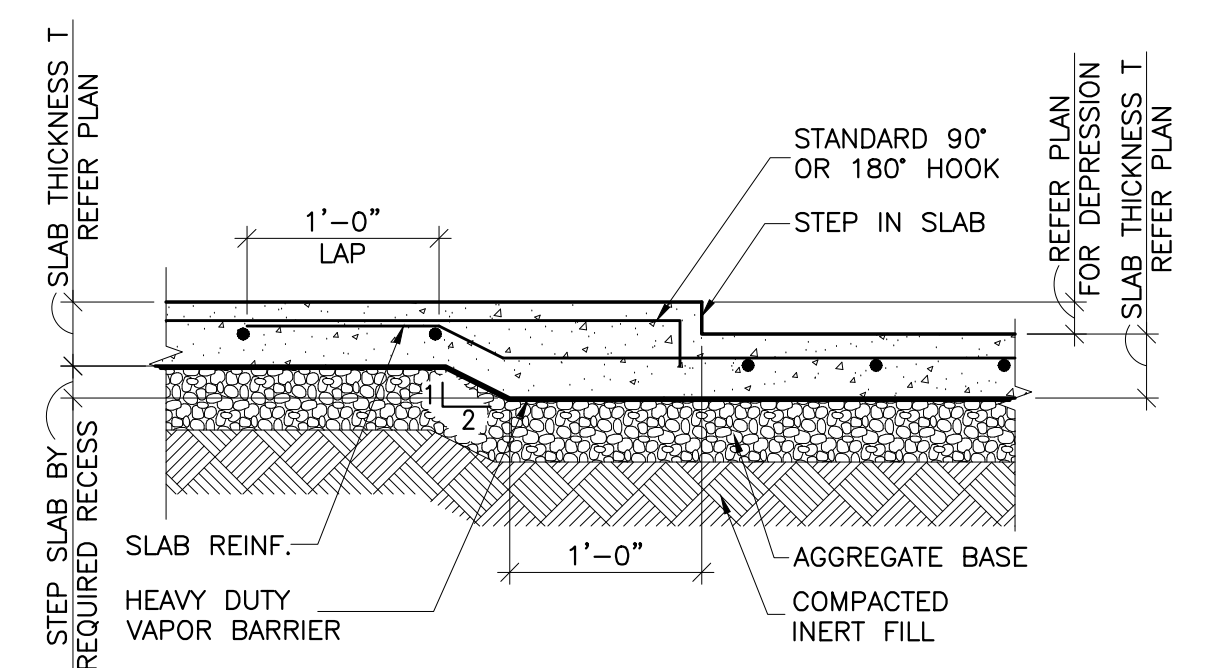
6 TYP. THICKENED SLAB
SCALE: NONE



7 TYP. SAWED JOINT (SJ)
SCALE: NONE



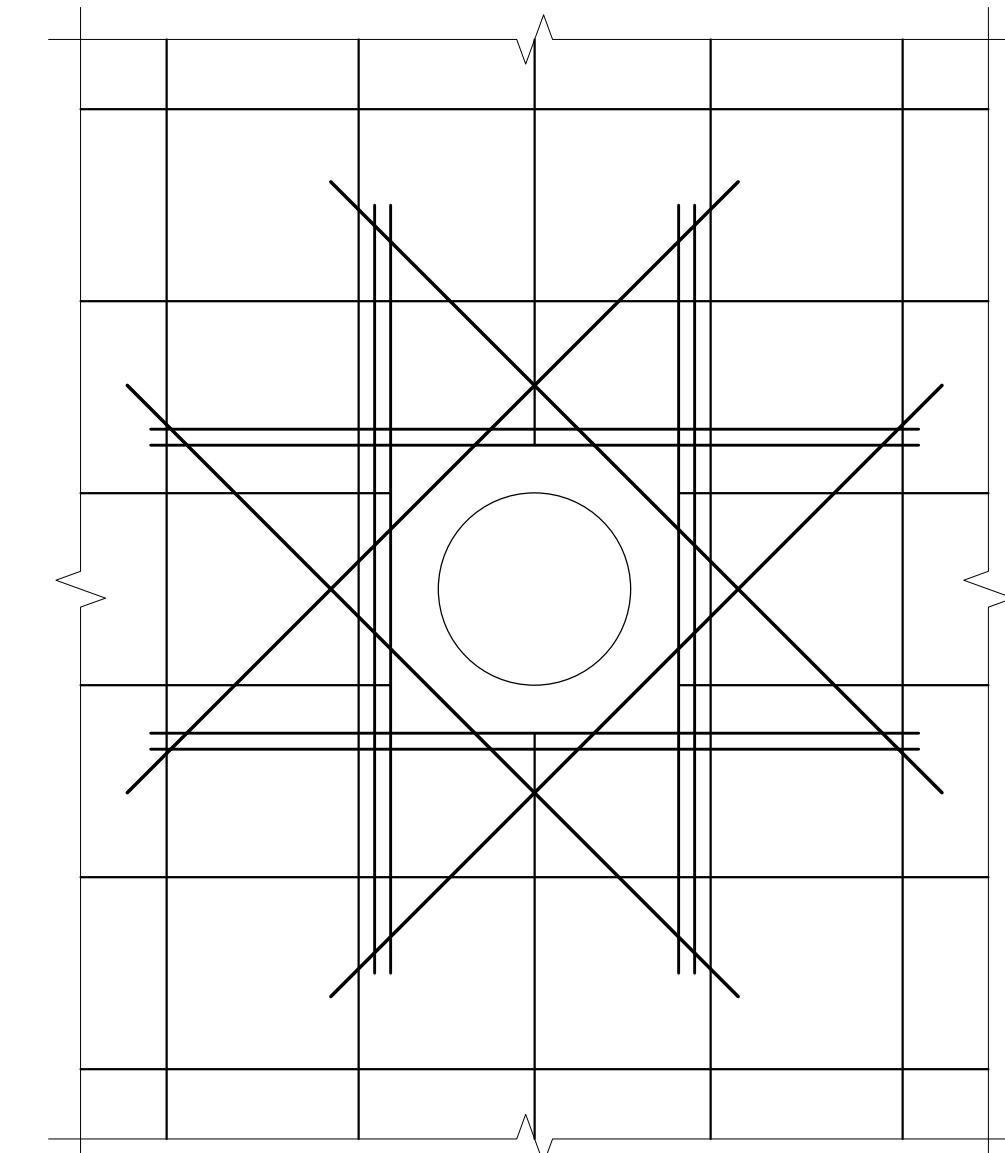
8 TYP. CONSTRUCTION JOINT (CJ)
SCALE: NONE



9 TYP. SLAB STEP
SCALE: NONE

CONCRETE EXPOSURE	MEMBER	REINFORCEMENTS	SPECIFIED COVER, IN.
CAST AGAINST AND PERMANENTLY IN CONTACT WITH GROUND	ALL	ALL	3
EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	ALL	NO. 6 THROUGH NO. 18 BAR	2
		NO. 5 BAR, W31 OR D31 WIRE, AND SMALLER	1-1/2
NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	SLAB, JOISTS, AND WALLS	NO. 14 AND NO. 18 AND SMALLER	1-1/2
		BEAMS, COLUMNS, PEDESTALS, AND TENSION TIES	3/4
		PRIMARY REINFORCEMENT, STIRRUPS, TIES, SPIRALS, AND HOOPS	1-1/2

10 TYP. MIN. CONCRETE COVER
SCALE: NONE



11 TYP. PENETRATION THRU CONC. SLAB OR WALL
SCALE: NONE

TENSION DEVELOPMENT AND LAP-SPLICE LENGTHS FOR UNCOATED REINFORCING BARS

$f'_c=3500$ psi (NORMAL WEIGHT)

BAR SIZE	LAP CLASS	LENGTHS (IN.) PER CONCRETE STRENGTH			
		TOP BARS		OTHER BARS	
		CASE 1	CASE 2	CASE 1	CASE 2
#3	A	20	30	16	23
	B	26	39	20	30
#4	A	27	40	21	31
	B	35	52	27	40
#5	A	33	50	26	39
	B	43	65	33	50
#6	A	40	60	31	46
	B	52	78	40	60
#7	A	58	87	51	67
	B	75	113	58	87
#8	A	66	99	51	77
	B	86	129	66	99
#9	A	75	112	58	86
	B	97	145	75	112
#10	A	84	126	65	97
	B	109	164	84	126
#11	A	93	140	72	108
	B	121	182	93	140
#14	N/A	112	168	86	129
	N/A	149	224	115	172

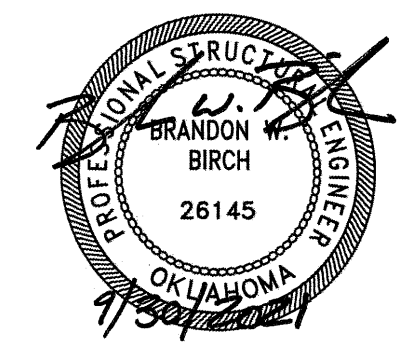
NOTES: 1 in.=25.4 mm.
 1. TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL WEIGHT CONCRETE. LENGTHS ARE IN INCHES.
 2. TENSION DEVELOPMENT LENGTHS AND TENSION LAP-SPLICE LENGTHS ARE CALCULATED PER ACI 318, SECTIONS 25.4.2.2 AND 25.5.2.1, RESPECTIVELY. TABULATED VALUES FOR BEAMS OR COLUMNS ARE BASED ON TRANSVERSE REINFORCEMENT AND CONCRETE COVER MEETING MINIMUM CODE REQUIREMENTS.
 3. CASES 1 AND 2, WHICH DEPEND ON THE TYPE OF STRUCTURAL ELEMENT, CONCRETE COVER, AND CENTER-TO-CENTER SPACING OF THE BARS, ARE DEFINED AS: BEAMS OR COLUMNS: CASE 1-COVER AT LEAST $1.0d_c$ AND CENTER-TO-CENTER SPACING AT LEAST $2.0d_c$; AND CASE 2-COVER LESS THAN $1.0d_c$ OR CENTER-TO-CENTER SPACING LESS THAN $2.0d_c$. ALL OTHERS: CASE 1-COVER AT LEAST $1.0d_c$ AND CENTER-TO-CENTER SPACING AT LEAST $3.0d_c$. CASE 2-COVER LESS THAN $1.0d_c$ OR CENTER-TO-CENTER SPACING LESS THAN $3.0d_c$.
 4. LAP SPLICE LENGTHS ARE MULTIPLES OF TENSION DEVELOPMENT LENGTHS; CLASS A= $1.0d_c$ AND CLASS B= $1.3d_c$ (ACI 318, SECTION 25.5.2.1).
 5. ACI 318 DOES NOT ALLOW TENSION LAP SPLICES OF #14 OR #18 BARS. THE TABULATED VALUES FOR THOSE BAR SIZES ARE THE TENSION DEVELOPMENT LENGTHS.
 6. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 IN. OF CONCRETE CAST BELOW THE BARS.
 7. FOR LIGHTWEIGHT-AGGREGATE CONCRETE, MULTIPLY THE TABULATED VALUES BY 1.3.

TENSION DEVELOPMENT AND LAP-SPLICE LENGTHS FOR UNCOATED REINFORCING BARS

$f'_c=4000$ psi (NORMAL WEIGHT)

BAR SIZE	LAP CLASS	LENGTHS (IN.) PER CONCRETE STRENGTH			
		TOP BARS		OTHER BARS	
		CASE 1	CASE 2	CASE 1	CASE 2
#3	A	19	28	15	22
	B	24	36	19	28
#4	A	25	37	19	29
	B	32	48	25	37
#5	A	31	47	24	36
	B	40	60	31	47
#6	A	37	56	29	43
	B	48	72	37	56
#7	A	54	81	42	63
	B	70	106	54	81
#8	A	62	93	48	71
	B	80	121	62	93
#9	A	70	105	54	81
	B	91	136	70	105
#10	A	79	118	61	91
	B	102	153	79	118
#11	A	87	131	67	101
	B	113	170	87	131
#14	N/A	105	157	81	121
	N/A	139	209	107	161

12 REINFORCING LAP LENGTHS
SCALE: NONE



CJC
drawn by
BIWB
checked by
SEPTEMBER 2021
date
revisions



sheet no.

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