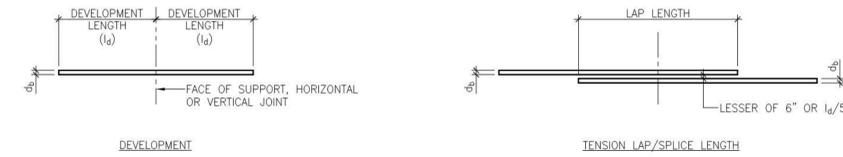
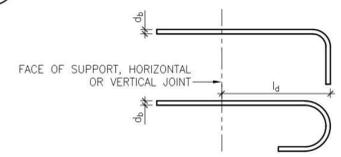


BAR SIZE	TENSION DEVELOPMENT LENGTH						COMPRESSION DEVELOPMENT LENGTH			TENSION LAP/SPLICE LENGTH						COMPRESSION LAP/SPLICE LENGTH		
	TOP BARS			OTHER BARS			ALL BARS			TOP BARS		OTHER BARS		ALL BARS		ALL BARS		
	3000 PSI	4000 PSI	5000 PSI	3000 PSI	4000 PSI	5000 PSI	3000 PSI	4000 PSI	5000 PSI	3000 PSI	4000 PSI	5000 PSI	3000 PSI	4000 PSI	5000 PSI	3000 PSI	4000 PSI	5000 PSI
#3	22	19	17	17	15	13	9	8	8	29	20	23	23	20	17	12	12	12
#4	29	25	23	22	19	17	11	10	9	38	33	30	29	25	23	15	15	15
#5	36	31	28	28	24	22	14	12	12	47	41	37	37	32	29	19	19	19
#6	43	37	34	33	29	26	17	15	14	56	49	45	43	38	34	23	23	23
#7	63	54	49	48	42	38	20	17	16	82	71	64	63	55	50	27	27	27
#8	72	62	56	55	48	43	22	19	18	94	81	73	72	63	56	30	30	30
#9	81	70	63	62	54	48	25	22	21	106	91	82	81	71	63	34	34	34
#10	91	79	71	70	61	54	28	24	23	119	103	93	91	80	71	38	38	38
#11	101	87	78	78	67	60	31	27	25	132	114	102	102	88	78	42	42	42



1 STRAIGHT REINFORCEMENT DEVELOPMENT AND SPLICE LENGTH SCHEDULE

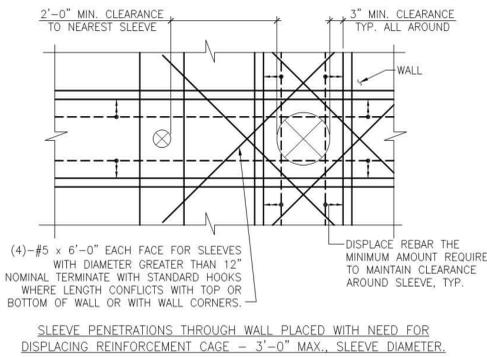
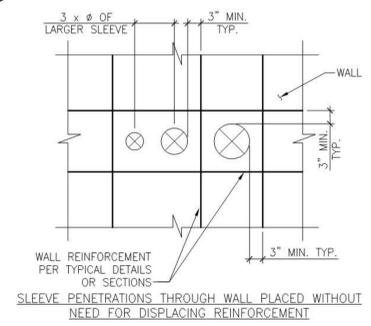


BAR SIZE	TENSION DEVELOPMENT LENGTH (ld) INCHES	
	4000 PSI	5000 PSI
#3	8	7
#4	10	9
#5	12	11
#6	15	13
#7	17	15
#8	19	17
#9	22	20
#10	24	22
#11	27	24

- NOTES:
- SEE TYPICAL TIE AND STIRRUP HOOKS DETAIL FOR ADDITIONAL INFORMATION.
 - TABULATED DEVELOPMENT LENGTHS ARE BASED ON REINFORCING STEEL YIELD STRENGTH $F_y = 60$ KSI AND NORMAL WEIGHT CONCRETE.
 - ALL TABULATED VALUES ARE MINIMUM LENGTHS. IN CASE OF CONFLICT WITH THE PLANS, SECTIONS, OR DETAILS, USE THE LONGER LENGTH.
 - d_b = BAR DIAMETER
 - l_d = DEVELOPMENT LENGTH
 - ADJUST TABULATED LENGTHS BY THE FOLLOWING FACTORS WHERE APPLICABLE. NOTE THAT THE FACTORS ARE CUMULATIVE:

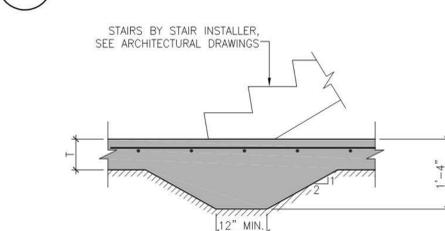
A. REINFORCING BAR STRENGTH OTHER THAN 60 KSI:	$(F_y/60,000)$
B. LIGHT WEIGHT CONCRETE:	1.3
C. EPOXY COATED BARS:	1.2

4 HOOKED REINFORCEMENT TENSION DEVELOPMENT LENGTH SCHEDULE



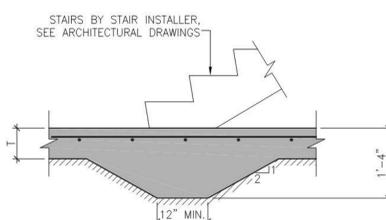
7 TYPICAL REINFORCEMENT AROUND PIPE SLEEVES

8 PIPE SLEEVE DETAIL THROUGH WALL

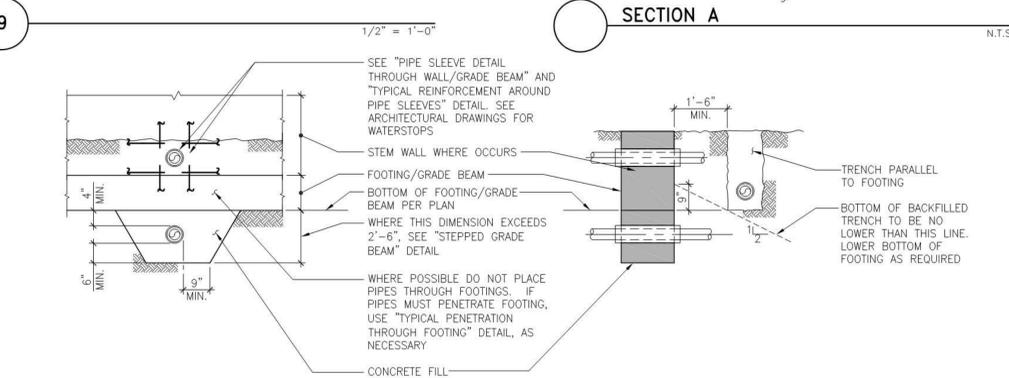


- NOTES:
- REVIEW WITH ARCHITECT AND ENGINEER ALTERNATE SCHEMES FOR WATERPROOFING SLEEVES.
 - COORDINATE SIZE AND LOCATION OF SLEEVE WITH MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS.

10 THICKENED SLAB-ON-GRADE AT CMU WALLS AND STAIR LANDINGS ON SLAB-ON-GRADE

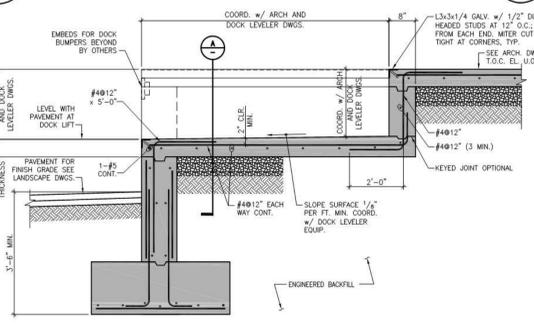


11 TYPICAL CONDITIONS FOR PIPES BELOW GRADE

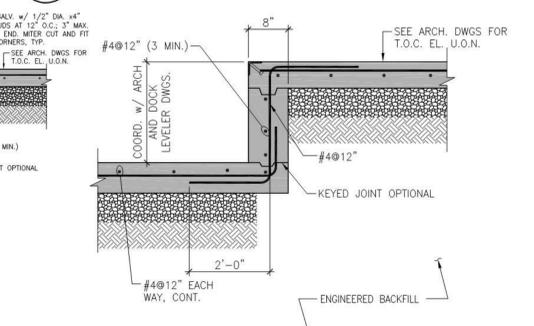


9 VERTICAL CONSTRUCTION JOINT IN WALL

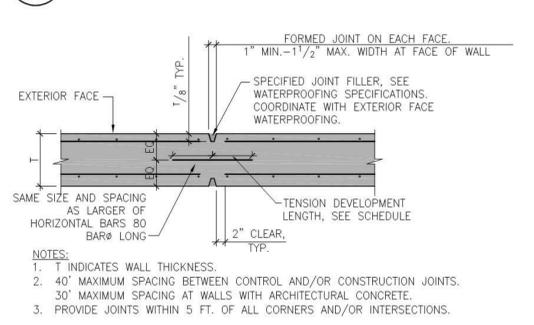
5 VERTICAL CONSTRUCTION JOINT IN WALL



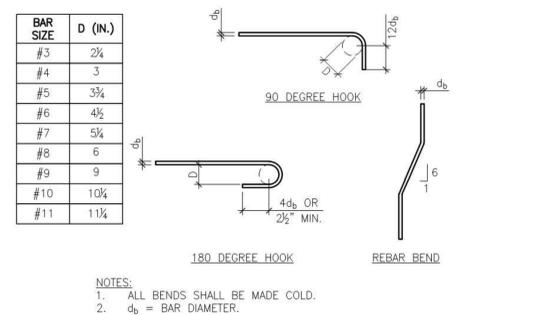
6 VERTICAL CONTROL JOINT IN WALL



3 TYPICAL REINFORCEMENT BENDS



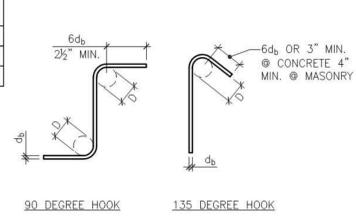
2 TYPICAL TIE AND STIRRUP HOOKS



- NOTES:
- REFER TO "HOOKED TENSION DEVELOPMENT LENGTH SCHEDULE" WHEN THE STRAIGHT DEVELOPMENT LENGTH IN TENSION CANNOT BE ACCOMMODATED IN THE CONCRETE SECTION.
 - ALWAYS USE TENSION DEVELOPMENT LENGTH AND TENSION LAP SPLICE LENGTH VALUES, UNLESS THE PLANS OR DETAILS NOTE SPECIFICALLY COMPRESSION LENGTH IS ALLOWED.
 - TABULATED DEVELOPMENT AND LAP SPLICE LENGTHS ARE BASED ON REINFORCING STEEL YIELD STRENGTH $F_y=60$ KSI, NORMAL WEIGHT CONCRETE, AND CLASS B LAPS.
 - TOP BARS ARE DEFINED AS HORIZONTAL BARS WITH MORE THAN 12 INCHES OF FRESH CONCRETE CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE. TOP BAR FACTOR DOES NOT APPLY TO BARS IN WALLS.
 - WHEN DIFFERENT BAR DIAMETERS ARE SPLICED, USE LARGER BAR LAP SPLICE LENGTH.
 - ALL TABULATED VALUES ARE MINIMUM LENGTHS. IN CASE OF CONFLICT WITH PLANS, SECTIONS, OR DETAILS USE THE LONGER LENGTH.
 - d_b = BAR DIAMETER.
 - l_d = DEVELOPMENT, LAP OR SPLICE LENGTH.
 - ADJUST TABULATED LENGTHS BY THE FOLLOWING FACTORS WHERE APPLICABLE. NOTE THAT FACTORS ARE CUMULATIVE: (E.G. $1.30 \times 1.50 = 1.95$)

A. LIGHT WEIGHT CONCRETE:	1.30
B. 3 OR LESS BUNDLED BARS:	1.20
C. 4 OR MORE BUNDLED BARS:	1.33
D. CLEAR SPACING LESS THAN $2d_b$ AND CLEAR COVER LESS THAN d_b	1.50
E. CLASS A LAP SPLICE	0.77
F. EPOXY COATED BARS	1.50
 - WELDED AND/OR MECHANICAL SPLICES MAY BE USED AT THE GENERAL CONTRACTOR'S OPTION PROVIDED THAT THE SPLICE IS CAPABLE OF DEVELOPING AT LEAST 125% OF THE YIELD STRENGTH OF THE LARGER BAR IN TENSION. WHERE WELDED AND/OR MECHANICAL SPLICES ARE TO BE USED, THE GENERAL CONTRACTOR SHALL SUBMIT FULL DATA ON THE PROPOSED MATERIAL, PROCEDURES, AND INSTALLATION INSTRUCTIONS TO THE ENGINEER FOR REVIEW AS A SHOP DRAWING SUBMISSION.
 - USE MECHANICAL COUPLERS FOR #14 AND LARGER BARS.
 - LAP SPLICES IN CONCRETE MASONRY SHALL BE AS SPECIFIED IN "TYP. LAP SPLICE SCHEDULE - MASONRY".
 - USE MECHANICAL COUPLERS FOR #14 AND LARGER BARS.

BAR SIZE	D (IN.)
#3	1 1/2
#4	2
#5	2 1/2



- NOTES:
- ALL BENDS SHALL BE MADE COLD.
 - d_b = BAR DIAMETER.

- NOTES:
- ALL BENDS SHALL BE MADE COLD.
 - d_b = BAR DIAMETER.

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KEY PLAN

DATE: 10/19/2015
 SCALE: _____
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 PROJECT NUMBER: SAR15A.00
 DRAWING TITLE: CONCRETE TYPICAL DETAILS (2 OF 2)
 DRAWING NUMBER: **S-011**