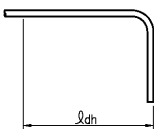
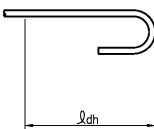


DEVELOPMENT LENGTH OF STANDARD HOOKS FOR BARS IN TENSION		
BAR SIZE	DEVELOPMENT LENGTH, $l_{dh}$	
	BASIC	W/ CONC COVER *
#3	8"	6"
#4	10"	7"
#5	1'-0"	9"
#6	1'-3"	11"
#7	1'-5"	1'-0"
#8	1'-7"	1'-2"
#9	1'-10"	1'-4"
#10	2'-1"	1'-6"
#11	2'-3"	1'-7"

\* SIDE COVER NORMAL TO PLANE OF HOOK  
AT LEAST 2 1/2" ; AND FOR 90° HOOK  
END COVER BEYOND OUTSIDE END OF  
HOOK AT LEAST 2".

BASIC DEVELOPMENT LENGTH AND SPLICE LENGTH				
FOR BARS IN COMPRESSION				
fy = 60,000 psi		fc' = 4000 psi OR GREATER		
BASIC DEVELOPMENT LENGTH		BAR SIZE	SPLICE LENGTH	
BASIC	CONFINEMENT *		BASIC	CONFINEMENT *
8"	8"	# 3	12"	12"
10"	8"	# 4	1'-3"	12"
1'-0"	9"	# 5	1'-7"	1'-3"
1'-3"	1'-0"	# 6	1'-11"	1'-6"
1'-5"	1'-4"	# 7	2'-3"	1'-9"
1'-7"	1'-3"	# 8	2'-6"	1'-11"
1'-10"	1'-4"	# 9	2'-10"	2'-2"
2'-1"	1'-7"	# 10	3'-3"	2'-6"
2'-3"	1'-8"	# 11	3'-7"	2'-9"

\* BAR ENCLOSED WITHIN SPIRALS OF NOT LESS THAN 1/4 INCH DIAMETER AND NOT MORE THAN 4 INCH PITCH OR WITHIN #4 TIES IN CONFORMANCE WITH ACI 318. SECTION 7.10.5 AT NOT MORE THAN 4 INCHES ON CENTER, FACTOR 0.75 USED.

BASIC DEVELOPMENT LENGTH AND SPLICE LENGTH										
FOR BARS IN TENSION										
fy = 60,000 psi      f'c = 4000 psi OR GREATER, NORMAL WEIGHT CONCRETE										
BASIC DEVELOPMENT LENGTH **					CLASS B SPLICE LENGTH **					
ld					BAR SIZE	1.3 xld				
CLEAR SPACING ≥ 3"		CLEAR SPACING < 3"				CLEAR SPACING ≥ 3"		CLEAR SPACING < 3"		
BASIC	TOP *	BASIC	TOP *			BASIC	TOP *	BASIC	TOP *	
1'-0"	1'-0"	1'-0"	1'-4"	# 3	1'-0"	1'-3"	1'-4"	1'-8"		
1'-0"	1'-3"	1'-7"	2'-1"	# 4	1'-3"	1'-8"	2'-1"	2'-8"		
1'-3"	1'-7"	2'-4"	3'-0"	# 5	1'-7"	2'-0"	3'-0"	3'-11"		
1'-5"	1'-11"	3'-1"	4'-0"	# 6	1'-11"	2'-5"	4'-0"	5'-2"		
2'-5"	3'-1"	4'-11"	6'-4"	# 7	3'-1"	4'-0"	6'-4"	8'-3"		
3'-0"	3'-11"	6'-0"	7'-9"	# 8	3'-11"	5'-1"	7'-9"	10'-1"		
3'-8"	4'-9"	6'-8"	8'-8"	# 9	4'-9"	6'-2"	8'-8"	11'-4"		
4'-5"	5'-8"	7'-5"	9'-8"	# 10	5'-8"	7'-5"	9'-8"	12'-7"		
5'-2"	6'-8"	8'-2"	10'-8"	# 11	6'-8"	8'-8"	10'-8"	13'-10"		

\* TOP REINFORCEMENT IS HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

\*\* LENGTHS SHOWN IN CHART SHALL BE MODIFIED WHERE REQUIRED TO CONFORM TO THE PROVISIONS OF ACI 318, SECTION 12.2.

				DESIGNED	H & S
				DRAWN	H & S
				CHECKED	
3	AS BUILT	OCT 2007	RLT	PROJ. ENGR.	H & S
2	CONSTRUCTION	MAR 2004	RLT		
1	REGULATORY APPROVAL	NOV 2003	RLT		
NO.	ISSUED FOR	DATE	BY	APPROVED	

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**CITY OF ROANOKE**  
**VIRGINIA**

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**REGIONAL WATER POLLUTION CONTROL PLANT**  
**PROCESS TRAIN IMPROVEMENTS**

## MISCELLANEOUS STANDARD DETAILS

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING. 	DATE      MARCH 2004	
	H & S JOB NUMBER	30788B
	CONTRACT NUMBER  B	DRAWING NUMBER  D8