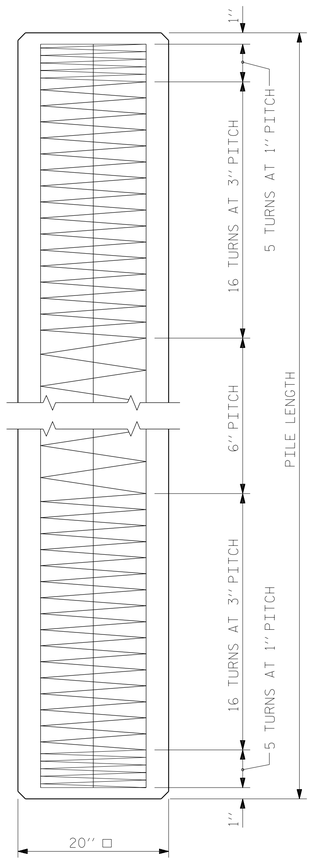
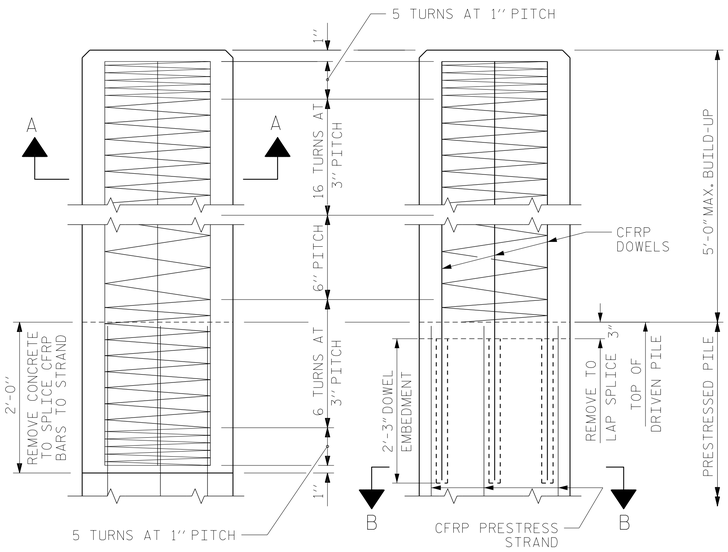
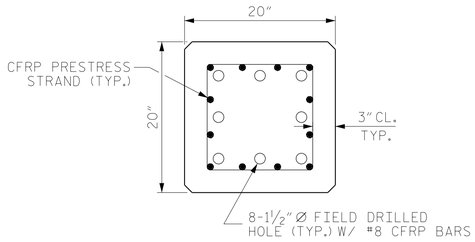


ELEVATION



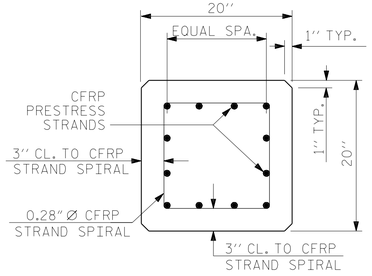
BUILD-UP AND CFRP SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH CFRP DOWELS

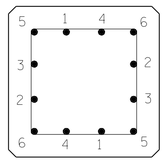


SECTION ''B-B''

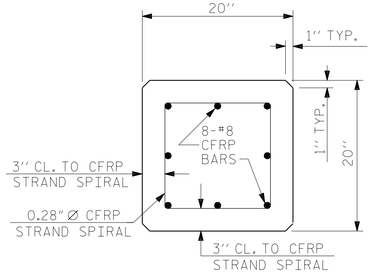
(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



TYPICAL SECTION



TYPICAL PATTERN FOR CUTTING STRANDS



SECTION A-A

0.6'' Ø CFRP STRANDS

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3'' OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING CFRP. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½'' CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

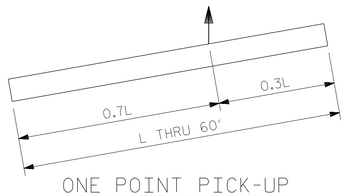
FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE 0.28'' Ø CFRP STRAND WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

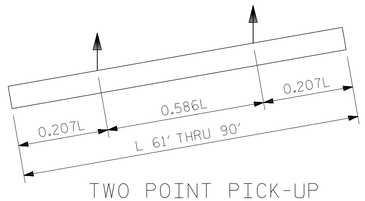
THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

QUANTITIES FOR ONE 20'' SQUARE PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.3L	ONE POINT PICK-UP 0.7L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L
25'-0''	2.56	5.18	7'-6''	17'-6''		
30'-0''	3.07	6.22	9'-0''	21'-0''		
35'-0''	3.58	7.26	10'-6''	24'-6''		
40'-0''	4.09	8.29	12'-0''	28'-0''		
45'-0''	4.61	9.33	13'-6''	31'-6''		
50'-0''	5.12	10.36	15'-0''	35'-0''		
55'-0''	5.63	11.40	16'-6''	38'-6''		
60'-0''	6.14	12.44	18'-0''	42'-0''		
65'-0''	6.65	13.47			13'-5½''	38'-1''
70'-0''	7.17	14.51			14'-6''	41'-0''
75'-0''	7.68	15.55			15'-6½''	43'-11''
80'-0''	8.19	16.58			16'-6½''	46'-11''
85'-0''	8.70	17.62			17'-7''	49'-10''
90'-0''	9.21	18.66			18'-7½''	52'-9''

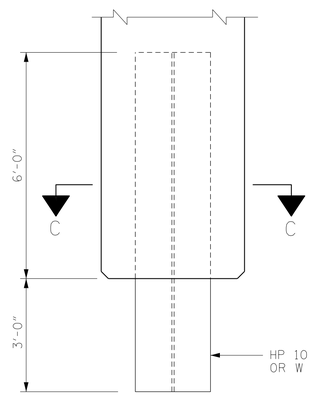


ONE POINT PICK-UP



TWO POINT PICK-UP

PICK-UP POINTS



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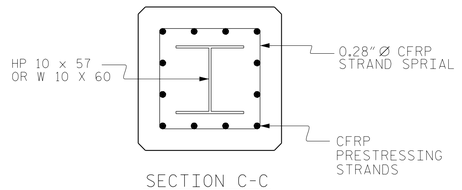

SECTION C-C

PILE TIP DETAILS

FOR 20'' SQUARE PRESTRESSED CONCRETE PILE

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 10,000 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 10,000 PSI

STRAND DATA:

SIZE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
0.6''	0.179	60,749# PER STRAND	42,524# PER STRAND

ALL PRESTRESSING AND SPIRAL STRANDS SHALL BE CFRP STRANDS CONFORMING TO THE SPECIAL PROVISIONS. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

FOR 20'' CFRP PRESTRESSED CONCRETE PILES, SEE SPECIAL PROVISIONS.

FOR CARBON FIBER REINFORCED POLYMER (CFRP) STRAND, SEE SPECIAL PROVISIONS.

FOR CARBON FIBER REINFORCED POLYMER (CFRP) BAR, SEE SPECIAL PROVISIONS.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI.

STRAND STRESS SHALL BE RELIEVED BY CUTTING OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, CUT IN OPPOSITE PAIRS AND SYMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES, STRANDS 1-1 SHALL BE CUT BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 5-5 AND 6-6, MAY BE CUT AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE CUT AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2'' WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 7,500 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

THE CONCRETE IN THE PRESTRESSED CONCRETE PILES SHALL CONTAIN A MINIMUM OF 25% FLY ASH CLASS F OR A MINIMUM OF 40% GROUND GRANULATED BLAST FURNANCE SLAG. ADDITIONALLY, SILICA FUME SHALL BE SUBSTITUTED FOR A MINIMUM 5% OF THE PORTLAND CEMENT BY WEIGHT. MINERAL ADMIXTURES SHALL REPLACE THE CEMENT CONTENT AT 1:1 RATIO BY WEIGHT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

PROJECT NO. BR-0160

BRUNSWICK COUNTY

STATION: 21+77.50 -L-

DRAWN BY : MRA DATE : 09/2022
CHECKED BY : MKO DATE : 01/2023
DESIGN ENGINEER OF RECORD: RLB DATE : 03/2023

3/28/2023
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18442 RICHARD LEON BOLLINGER JR
3/28/2023

RS&H

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

20'' CFRP PRESTRESSED CONCRETE PILE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			42