NOTES

FOR GENERAL NOTES AND NOTES REGARDING MATERIALS AND CORROSION PROTECTION, SEE GENERAL DRAWINGS.

FOR CONCRETE SHEET PILE DESIGN PARAMETERS, SEE SHEET 5 OF 16.

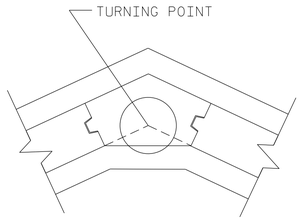
FOR CONCRETE SHEET PILE FOUNDATION NOTES, SEE SHEET 5 OF 16.

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO 1/2" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

TOP OF PILE ELEVATIONS SHOWN ARE THE MAXIMUM ALLOWABLE TOP OF PILE ELEVATION AND INCLUDE THE 3" ± TOLERANCE ALLOWED PER SECTION 452 OF THE STANDARD SPECIFICATIONS.

FOR CONCRETE SHEET PILE WALL, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



DETAIL "A"

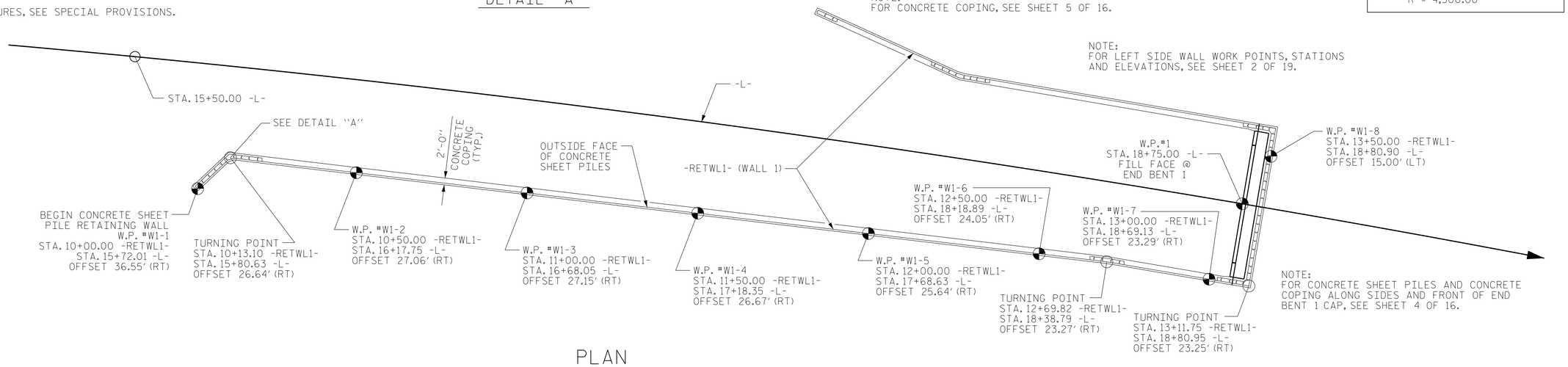
VERTICAL CURVE DATA -L-

(+)0.4950% △ (+)6.0000%

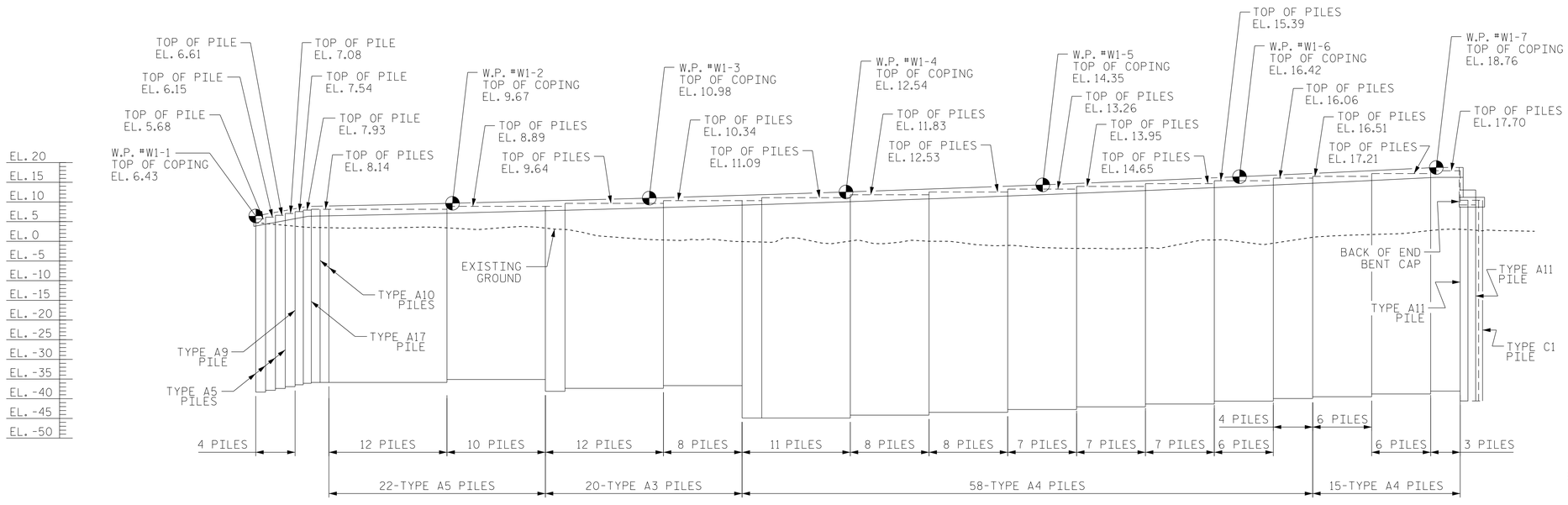
PI = 17+05.00 -L-
EL. = 7.93'
VC = 530'

HORIZ. CURVE DATA -L-

PI = 16+00.02 -L-
△ = 13°-24'-02.8" (RT.)
D = 1°-16'-23.7"
L = 1052.49'
T = 528.66'
R = 4,500.00'



PLAN



NOTE:
CAST-IN-PLACE CONCRETE COPING SHALL EXTEND 6" BEYOND FIRST PILE AT W.P. #W1-1.

NOTE:
INDIVIDUAL PILES WITHIN PILE GROUPS NOT SHOWN FOR CLARITY

-RETWL1- ELEVATION - RIGHT SIDE

TOTAL BILL OF MATERIAL

RETAINING WALL NO.	CONCRETE SHEET PILE RETAINING WALL
	LINEAR FT.
-RETWL1-	496.6
-RETWL2-	163.9
TOTAL LENGTH	660.5

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 1 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL -RETWL1- RIGHT SIDE

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6B61448...

3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-01
1			3			TOTAL SHEETS
2			4			24

DRAWN BY :	B. L. GREEN, P.E.	DATE : 3/19
CHECKED BY :	D. A. CANTRELL, P.E.	DATE : 6/19
DESIGN ENGINEER OF RECORD:	B. L. GREEN, P.E.	DATE : 7/19

06-MAR-2020 10:14
$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$
bgreen AT SD-298755

NOTES

FOR GENERAL NOTES AND NOTES REGARDING MATERIALS AND CORROSION PROTECTION, SEE GENERAL DRAWINGS.

FOR CONCRETE SHEET PILE DESIGN PARAMETERS, SEE SHEET 5 OF 16.

FOR CONCRETE SHEET PILE FOUNDATION NOTES, SEE SHEET 5 OF 16.

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO ½" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

TOP OF PILE ELEVATIONS SHOWN ARE THE MAXIMUM ALLOWABLE TOP OF PILE ELEVATION AND INCLUDE THE 3" ± TOLERANCE ALLOWED PER SECTION 452 OF THE STANDARD SPECIFICATIONS.

FOR CONCRETE SHEET PILE WALL, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

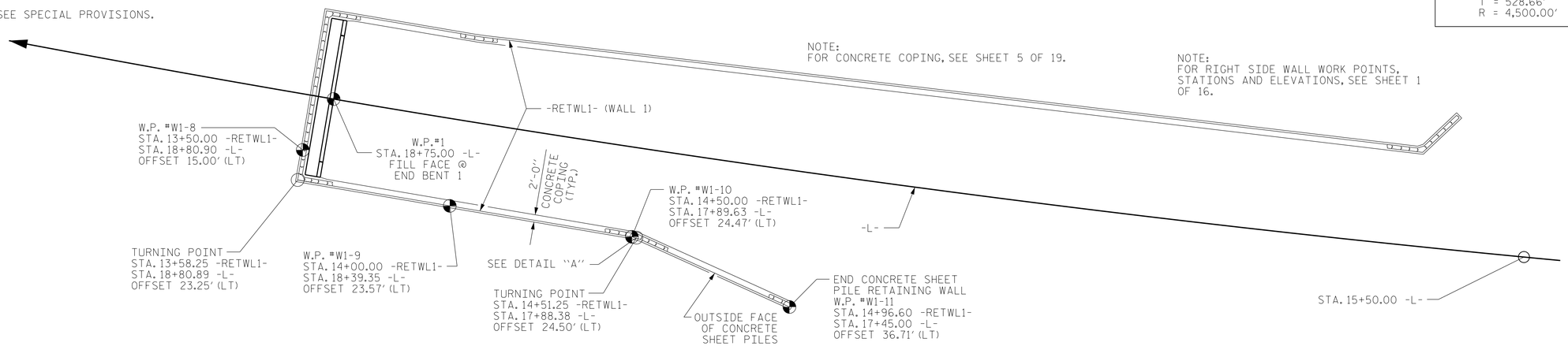
VERTICAL CURVE DATA -L-

(+)0.4950% △ (+)6.0000%

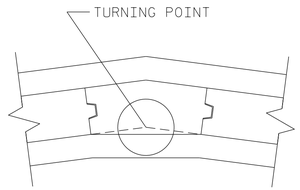
PI = 17+05.00 -L-
EL. = 7.93'
VC = 530'

HORIZ. CURVE DATA -L-

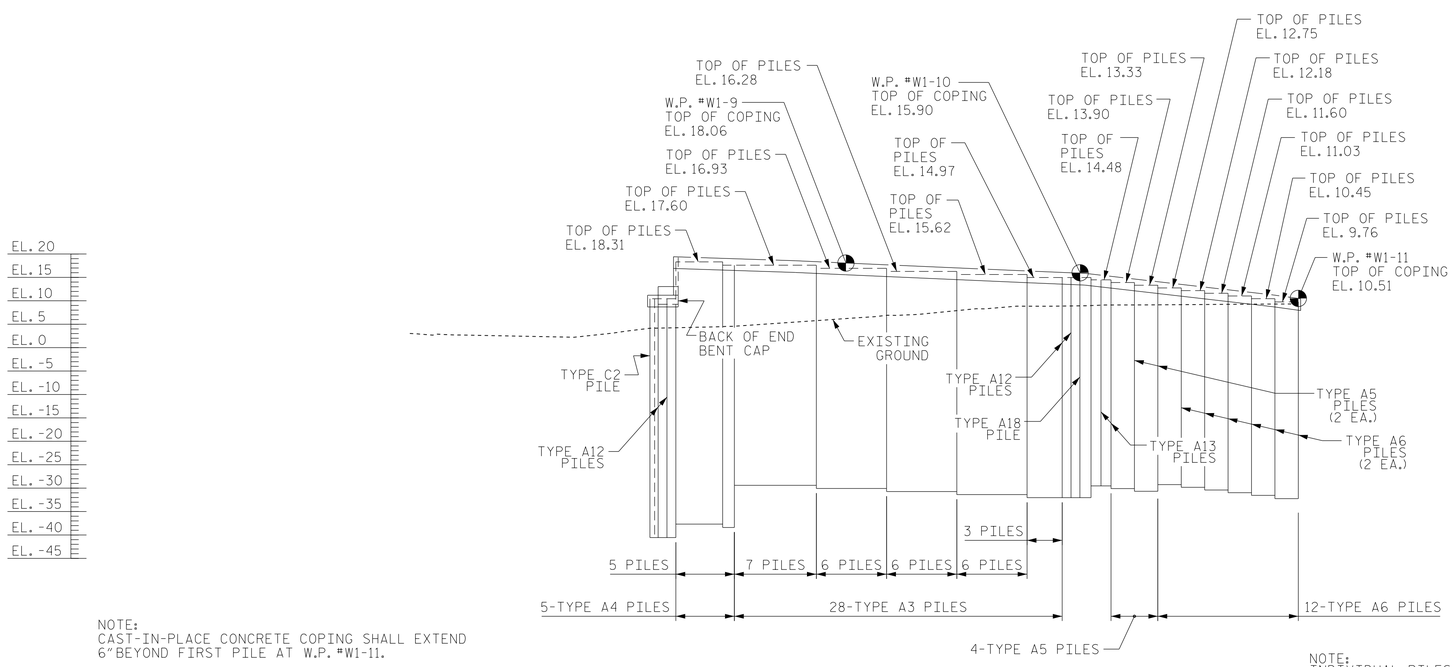
PI = 16+00.02 -L-
△ = 13°-24'-02.8" (RT.)
D = 1°-16'-23.7"
L = 1052.49'
T = 528.66'
R = 4,500.00'



PLAN



DETAIL "A"



NOTE:
CAST-IN-PLACE CONCRETE COPING SHALL EXTEND 6" BEYOND FIRST PILE AT W.P. #W1-11.

NOTE:
INDIVIDUAL PILES WITHIN PILE GROUPS NOT SHOWN FOR CLARITY

-RETWL1- ELEVATION - LEFT SIDE

PROJECT NO. B-4863
CARTERET COUNTY
STATION: 34+75.00 -L-

SHEET 2 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL -RETWL1- LEFT SIDE

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6BB61448...
3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-02
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:16
$$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
bgreen AT SD-298755

NOTES

FOR GENERAL NOTES AND NOTES REGARDING MATERIALS AND CORROSION PROTECTION, SEE GENERAL DRAWINGS.

FOR CONCRETE SHEET PILE DESIGN PARAMETERS, SEE SHEET 5 OF 16.

FOR CONCRETE SHEET PILE FOUNDATION NOTES, SEE SHEET 5 OF 16.

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO ½" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

TOP OF PILE ELEVATIONS SHOWN ARE THE MAXIMUM ALLOWABLE TOP OF PILE ELEVATION AND INCLUDE THE 3" ± TOLERANCE ALLOWED PER SECTION 452 OF THE STANDARD SPECIFICATIONS.

FOR CONCRETE SHEET PILE WALL, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

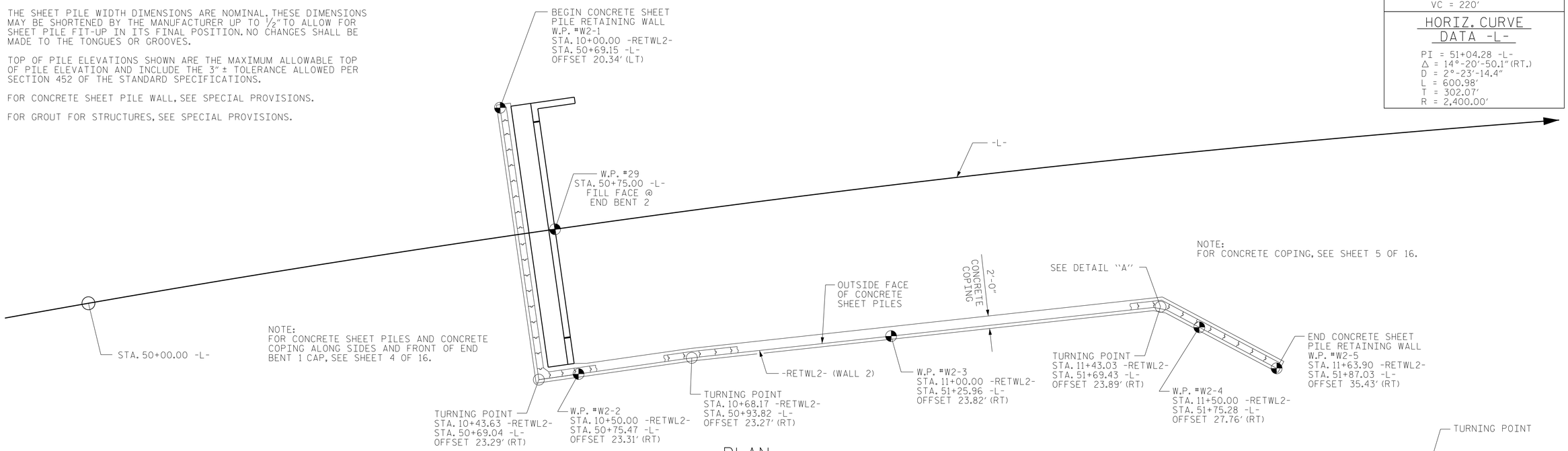
VERTICAL CURVE DATA -L-

(-)2.5792% △ (-)0.3088%

PI = 52+20.00 -L-
EL. = 6.88'
VC = 220'

HORIZ. CURVE DATA -L-

PI = 51+04.28 -L-
△ = 14°-20'-50.1" (RT.)
D = 2°-23'-14.4"
L = 600.98'
T = 302.07'
R = 2,400.00'



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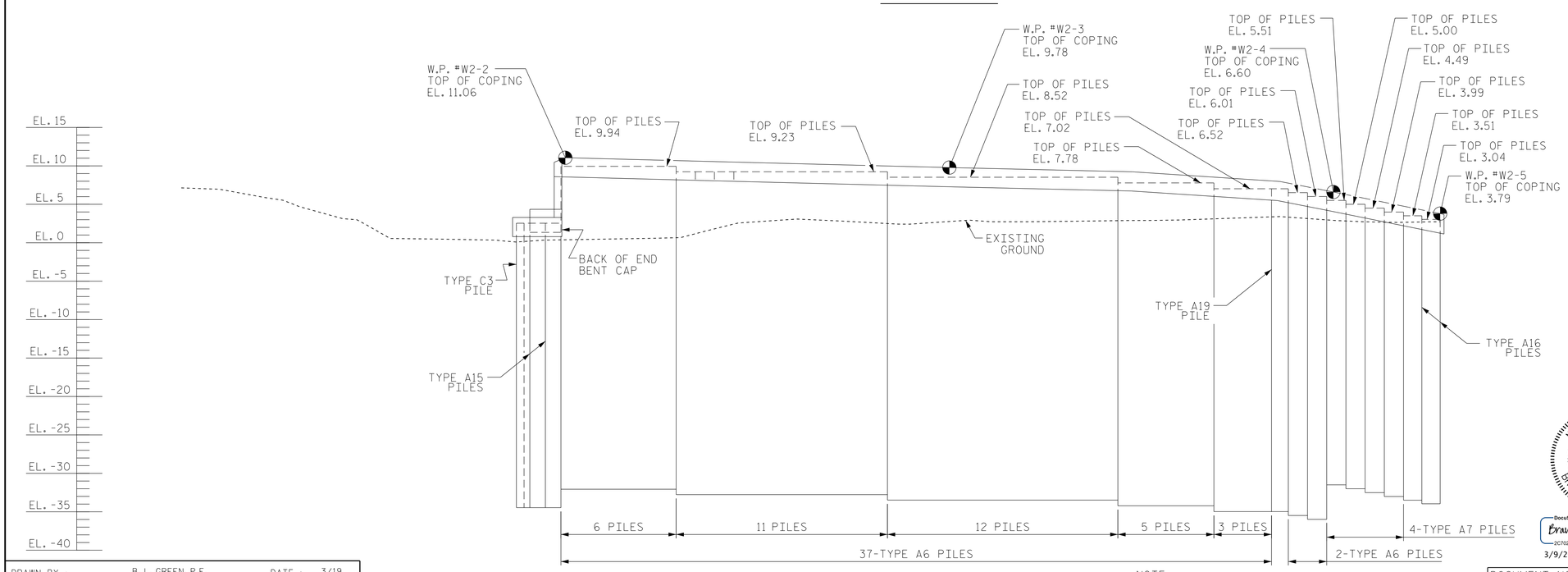
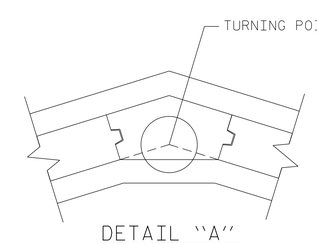


-RETWL2- ELEVATION

NOTE: INDIVIDUAL PILES WITHIN PILE GROUPS NOT SHOWN FOR CLARITY

NOTE: CAST-IN-PLACE CONCRETE COPING SHALL EXTEND 6" BEYOND FIRST PILE AT W.P. #W2-1 & W.P. #W2-5.



DETAIL "A"

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6B61448...
3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4863
CARTERET COUNTY
STATION: 34+75.00 -L-

SHEET 3 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL -RETWL2-

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-03
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:17
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bgreen AT SD-298755

NOTES

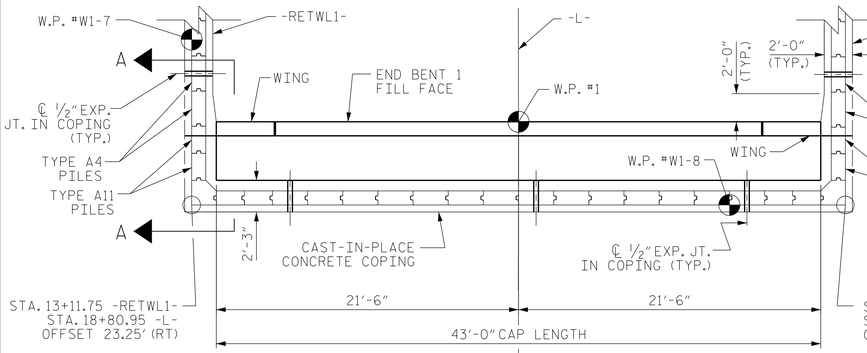
A ½″EXPANSION JOINT SHALL BE LOCATED IN THE COPING AT THE CENTERLINE OF PILES AS SHOWN. ADDITIONAL ½″EXPANSION JOINTS SHALL BE LOCATED ALONG THE LENGTH OF THE COPING FOR EACH WALL AT 30′-0″MAXIMUM CENTERS. SEE ``PLAN OF EXPANSION JOINTS IN COPING'', SHEET 5 OF 16.

GROOVED CONTRACTION JOINTS, ½″IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE COPING AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN COPING EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF COPING SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

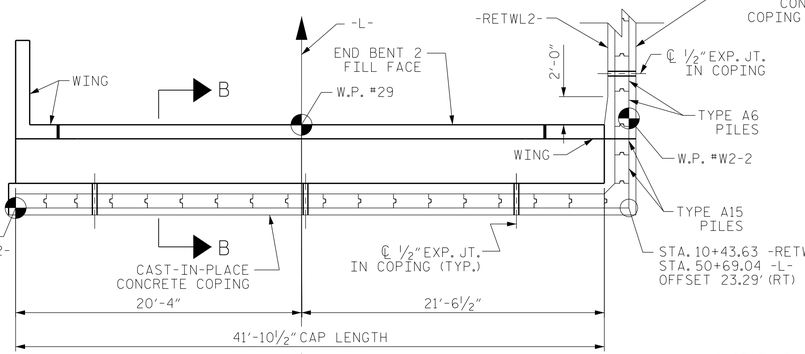
THE PRESTRESSED CONCRETE SHEET PILES SHALL BE DRIVEN PRIOR TO PLACEMENT OF THE END BENT CAPS. THE CAST-IN-PLACE CONCRETE FOR THE COPING SHALL NOT BE POURED UNTIL THE END BENT CAPS HAVE BEEN CONSTRUCTED.

TWO LAYERS OF 30 LB. ROOFING FELT SHALL BE PROVIDED BETWEEN WINGS AND ADJACENT COPING TO PREVENT BONDING.

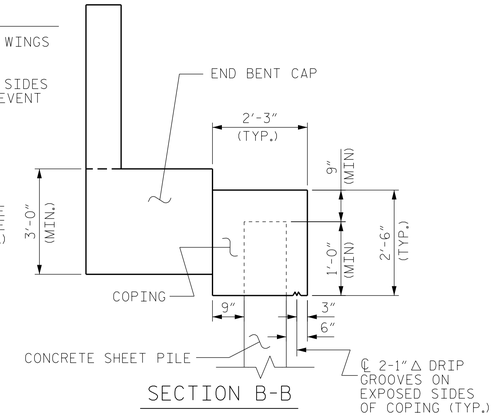
TWO LAYERS OF 30 LB. ROOFING FELT SHALL BE PROVIDED BETWEEN SIDES AND FRONT FACES OF END BENT CAPS AND ADJACENT COPING TO PREVENT BONDING.



END BENT 1 PLAN

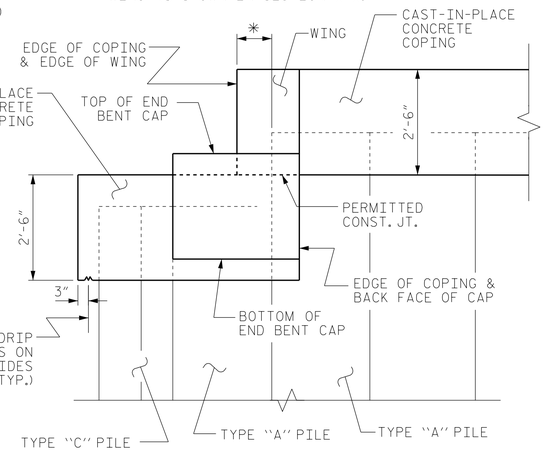


END BENT 2 PLAN

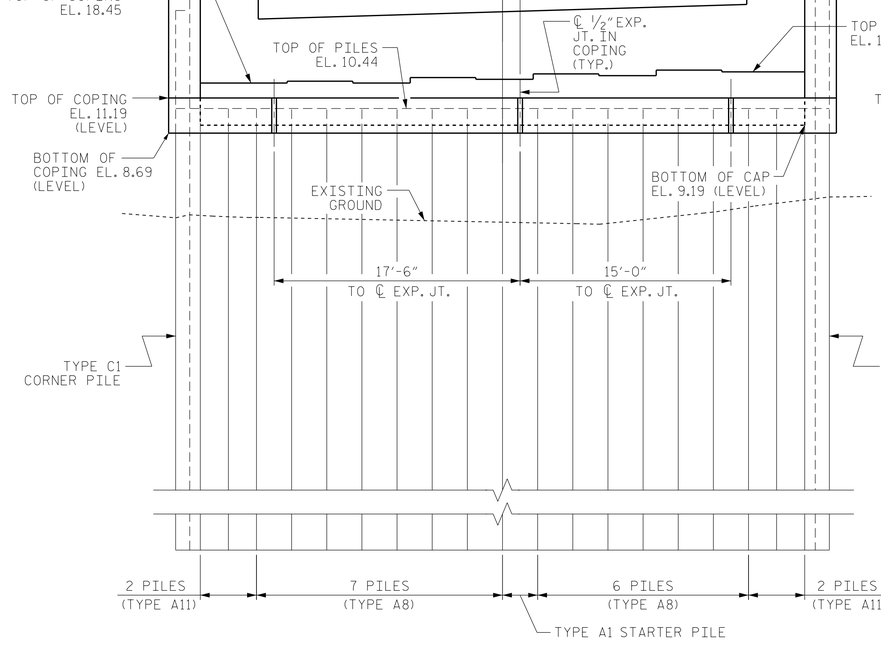


SECTION B-B

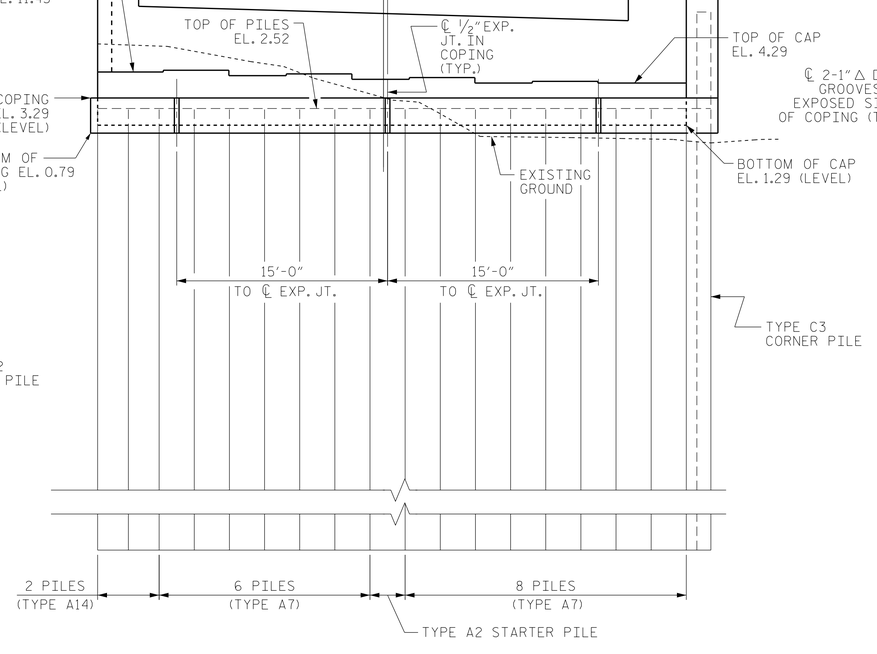
✳ NOTE:
THE EDGE OF CAST-IN-PLACE CONCRETE COPING SHALL MATCH THE EDGE OF WING AS SHOWN IN SECTION A-A.



SECTION A-A



END BENT 1 ELEVATION
(LOOKING TOWARD FRONT FACE OF CAP)



END BENT 2 ELEVATION
(LOOKING TOWARD FRONT FACE OF CAP)

NOTE:
SEE ``CONCRETE SHEET PILE RETAINING WALL, SHEET PILE DETAILS'', SHEETS 6 THRU 19 OF 19, FOR PILE TYPES.

PROJECT NO. B-4863
CARTERET COUNTY
STATION: 34+75.00 -L-

SHEET 4 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL WALL AND COPING DETAILS AT END BENTS

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 3/9/2020
2C702B86BB61448...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. W-04
TOTAL SHEETS 24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:18
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bgreen AT SD-298755

CONCRETE SHEET PILE DATA				
PILE TYPE	TOTAL NO. REQUIRED	L (FT.)	X (FT.)	TOTAL LIN. FT.
A1	1	51'-0"	10'-0"	51
A2	1	37'-0"	5'-0"	37
A3	48	47'-0"	15'-0"	2,256
A4	78	56'-0"	18'-6"	4,368
A5	30	44'-0"	8'-0"	1,320
A6	51	42'-0"	11'-6"	2,142
A7	18	37'-0"	5'-0"	666
A8	13	51'-0"	10'-0"	663
A9	1	44'-0"	6'-0"	44
A10	2	44'-0"	6'-6"	88
A11	6	51'-0"	9'-6"	306
A12	4	51'-0"	8'-0"	204
A13	2	44'-0"	7'-6"	88
A14	2	37'-0"	5'-0"	74
A15	2	37'-0"	5'-0"	74
A16	2	37'-0"	5'-0"	74
A17	1	44'-0"	6'-6"	44
A18	1	47'-0"	8'-0"	47
A19	1	42'-0"	5'-6"	42
C1	1	51'-0"	9'-6"	51
C2	1	51'-0"	9'-6"	51
C3	1	37'-0"	5'-0"	37

SEE "CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS", SHEETS 6 THRU 16 OF 16, FOR PILE TYPES.

DESIGN PARAMETERS

CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS:
8000 PSI (MIN.)

CONCRETE COMPRESSIVE STRENGTH AT RELEASE OF PRESTRESSING:
5600 PSI (MIN.)

UNIFORM COMPRESSION AFTER PRESTRESSED LOSSES:
1000 PSI (MIN.)

PICK-UP, STORAGE, AND TRANSPORTATION:
0.0 PSI TENSION WITH 1.5 TIMES SELF WEIGHT

ALL PRESTRESSING STRANDS SHALL BE 0.6"DIA, 7-WIRE LOW RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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.

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

ALL CORNERS TO BE CHAMFERED ¾"UNLESS OTHERWISE NOTED.

PICK-UP OF PILE MAY BE EITHER A SINGLE POINT PICK-UP OR A TWO POINT PICK-UP AS SHOWN.

FOUNDATION NOTES

CONSTRUCT CONCRETE SHEET PILE RETAINING WALLS IN ACCORDANCE WITH SECTION 452 OF THE STANDARD SPECIFICATIONS EXCEPT USE CONCRETE SHEET PILES IN LIEU OF STEEL SHEET PILES.

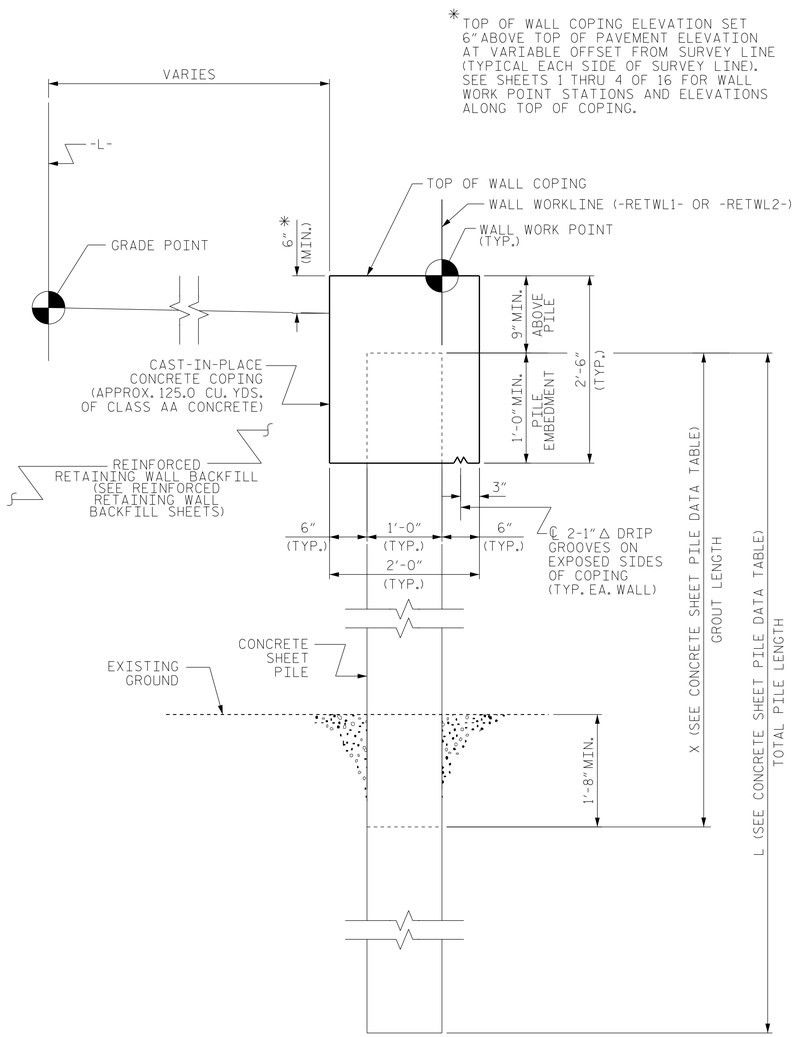
INSTALL CONCRETE SHEET PILES TO TIP ELEVATIONS NO HIGHER THAN AS SHOWN ON THE PLANS.

IF USING IMPACT HAMMERS FOR CONCRETE SHEET PILE INSTALLATION, SUBMIT DRIVING EQUIPMENT AS OUTLINED IN SECTION 450-3 OF THE STANDARD SPCIFICATIONS.

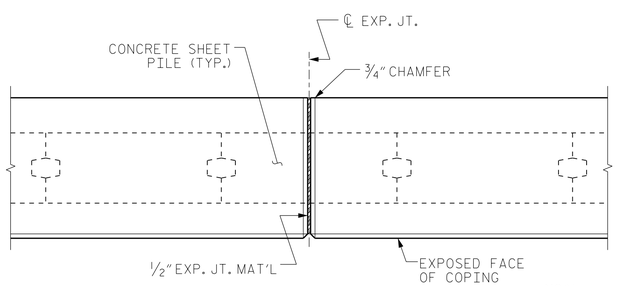
FOR CONCRETE SHEET PILE RETAINING WALLS AND BRIDGE END BENT CONSTRUCTION SEQUENCE, SEE BRIDGE FOUNDATION NOTES ON PLANS.

THE SCOUR CRITICAL ELEVATION FOR WALL NO. 1 FROM STATION 10+00 TO 10+75 IS -5.0 FT. FROM STATION 10+75 TO 11+25 IS -8.0 FT. FROM STATION 11+25 TO 12+75 IS -9.0 FT. FROM STATION 12+75 TO 13+75 IS -6.0 FT. FROM STATION 13+75 TO 14+96 IS -3.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR WALL NO. 2 IS -7.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

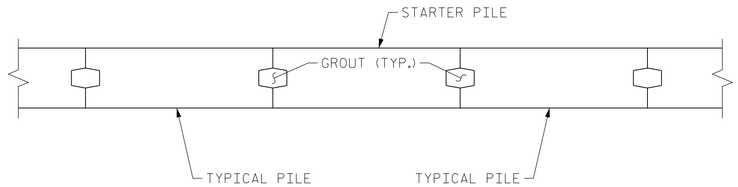


TYPICAL SECTION



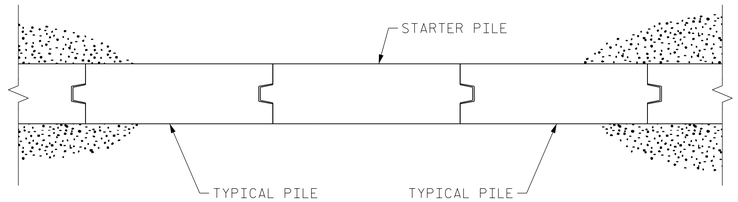
PLAN OF EXPANSION JOINTS IN COPING

NOTE:
JOINT LOCATION IN COPING MAY BE SHIFTED TO AVOID PLACING COPING JOINT IN THE SAME LOCATION AS A JOINT BETWEEN ADJACENT CONCRETE SHEET PILES.

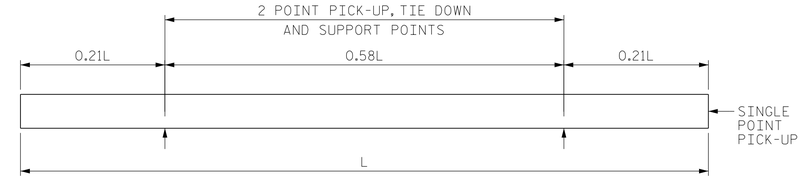


SECTION TAKEN ABOVE DIMENSION "X"

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



SECTION TAKEN BELOW DIMENSION "X"



PILE STORAGE AND TRANSPORTATION SUPPORT DETAILS

PROJECT NO. B-4863
CARTERET COUNTY
STATION: 34+75.00 -L-

SHEET 5 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L GREEN

DocuSigned by: Brandon Green 2C702B86BB61448... 3/10/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. W-05
TOTAL SHEETS 24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

10-MAR-2020 12:29
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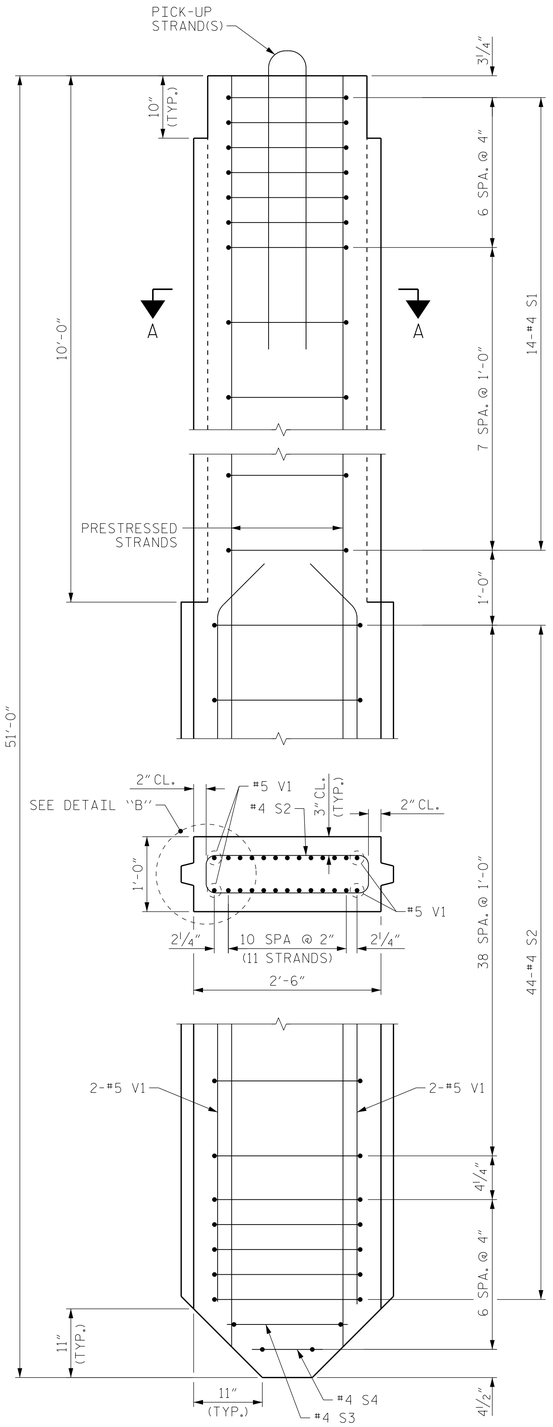
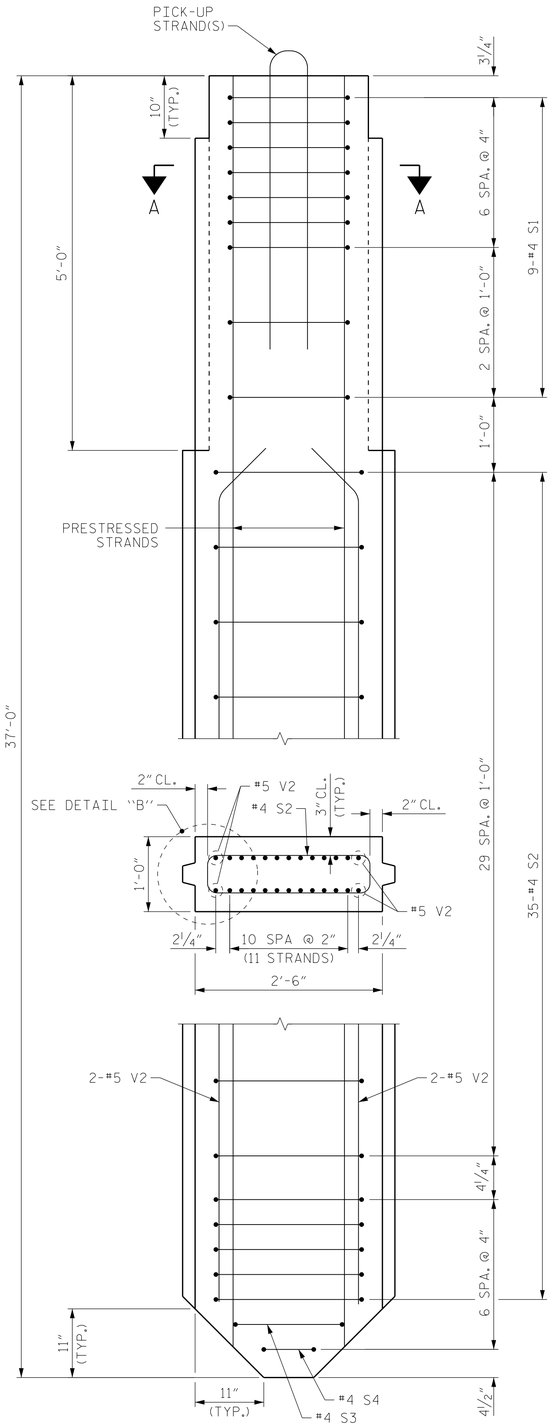
bgreen AT SD-298755

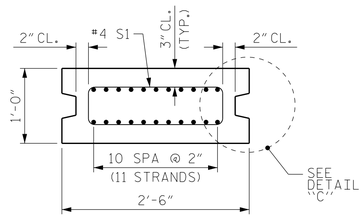


PILE TYPE A1 (STARTER PILE)



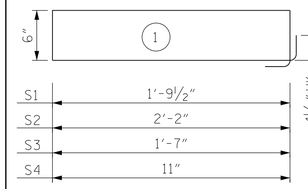
PILE TYPE A2 (STARTER PILE)

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONING ARE OUT-TO-OUT

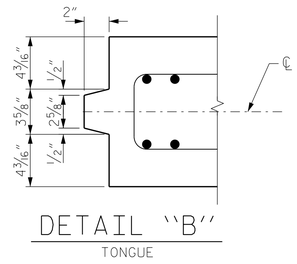
BILL OF MATERIAL

A1 (STARTER PILE)

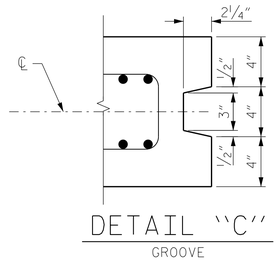
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	14	#4	1	5'-4"	50
S2	44	#4	1	6'-1"	179
S3	1	#4	1	4'-11"	4
S4	1	#4	1	3'-7"	3
V1	4	#5	2	40'-10"	171

A2 (STARTER PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	9	#4	1	5'-4"	33
S2	35	#4	1	6'-1"	143
S3	1	#4	1	4'-11"	4
S4	1	#4	1	3'-7"	3
V2	4	#5	2	31'-10"	133



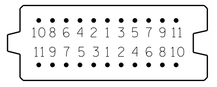
DETAIL "B"
TONGUE



DETAIL "C"
GROOVE

QUANTITIES FOR ONE PILE

PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
A1 (STARTER PILE)	407	4.7	22
A2 (STARTER PILE)	316	3.4	22



PATTERN FOR BURNING

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO ½" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6BB61448... 3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 6 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-06
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:20
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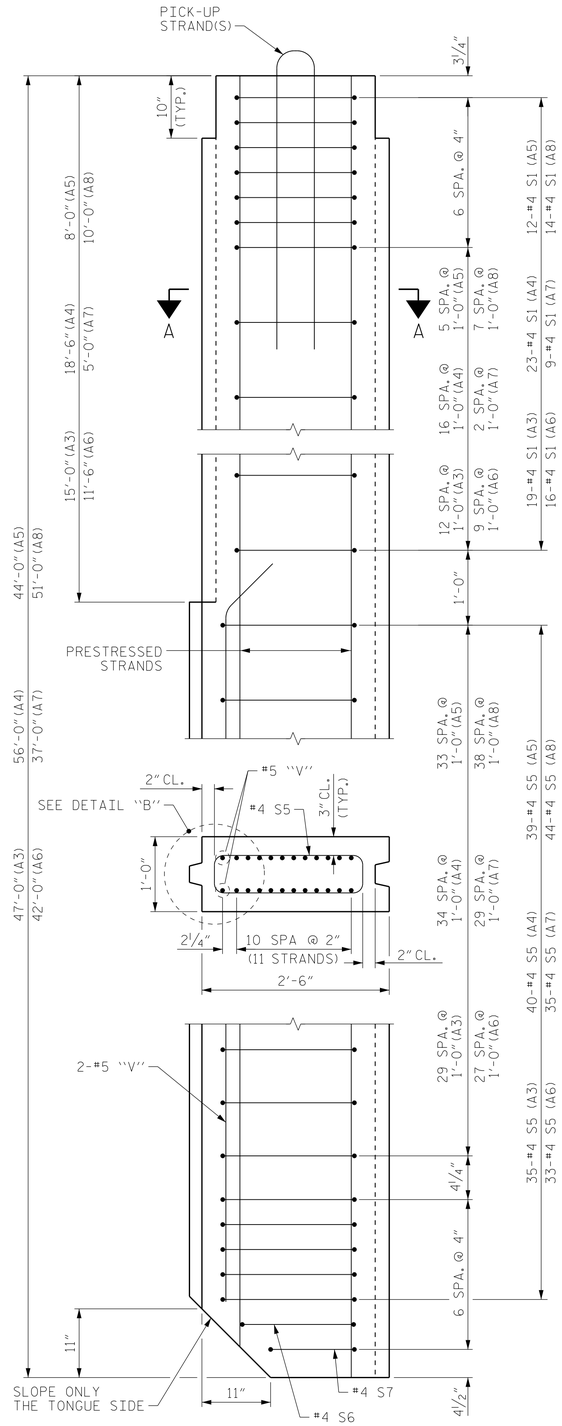
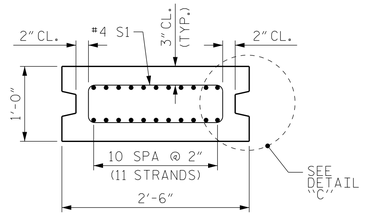
bgreen AT SD-298755

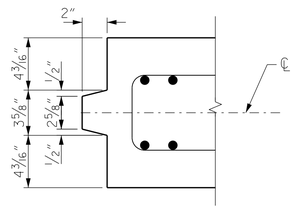


PILE TYPES
A3, A4, A5,
A6, A7 & A8
(TYPICAL PILES)

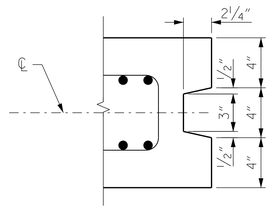
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950



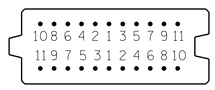
SECTION A-A



DETAIL "B"
TONGUE

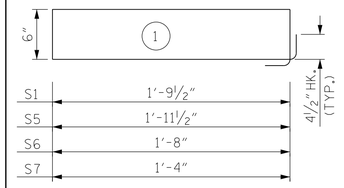


DETAIL "C"
GROOVE



PATTERN FOR BURNING

BAR TYPES



ALL BAR DIMENSIONING ARE OUT-TO-OUT

BILL OF MATERIAL

A3 (TYPICAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	19	#4	1	5'-4"	68
S5	35	#4	1	5'-8"	133
S6	1	#4	1	5'-1"	4
S7	1	#4	1	4'-5"	3
V2	2	#5	2	31'-10"	67

A4 (TYPICAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	23	#4	1	5'-4"	82
S5	40	#4	1	5'-8"	152
S6	1	#4	1	5'-1"	4
S7	1	#4	1	4'-5"	3
V3	2	#5	2	37'-4"	78

A5 (TYPICAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	12	#4	1	5'-4"	43
S5	39	#4	1	5'-8"	148
S6	1	#4	1	5'-1"	4
S7	1	#4	1	4'-5"	3
V9	2	#5	2	35'-10"	75

A6 (TYPICAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	16	#4	1	5'-4"	58
S5	33	#4	1	5'-8"	125
S6	1	#4	1	5'-1"	4
S7	1	#4	1	4'-5"	3
V4	2	#5	2	30'-4"	64

A7 (TYPICAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	9	#4	1	5'-4"	33
S5	35	#4	1	5'-8"	133
S6	1	#4	1	5'-1"	4
S7	1	#4	1	4'-5"	3
V2	2	#5	2	31'-10"	67

A8 (TYPICAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	14	#4	1	5'-4"	50
S5	44	#4	1	5'-8"	167
S6	1	#4	1	5'-1"	4
S7	1	#4	1	4'-5"	3
V1	2	#5	2	40'-10"	86

QUANTITIES FOR ONE PILE

PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
A3 (TYPICAL PILE)	275	4.4	22
A4 (TYPICAL PILE)	319	5.2	22
A5 (TYPICAL PILE)	273	4.1	22
A6 (TYPICAL PILE)	254	3.9	22
A7 (TYPICAL PILE)	240	3.4	22
A8 (TYPICAL PILE)	310	4.7	22

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO ½" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6B861448... 3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:20
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bgreen AT SD-298755

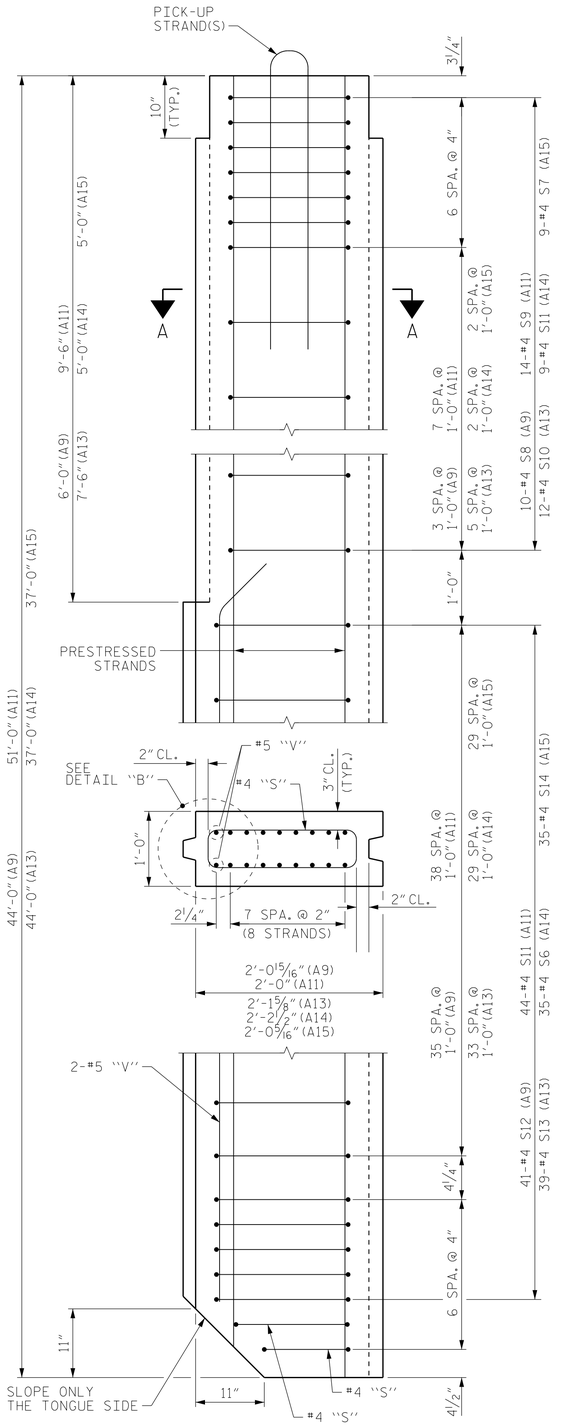
PROJECT NO. B-4863
CARTERET COUNTY
STATION: 34+75.00 -L-

SHEET 7 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

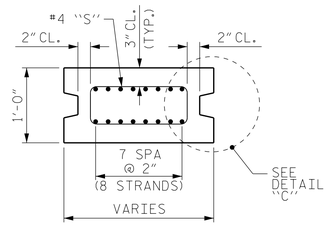
CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-07
1			3			TOTAL SHEETS
2			4			24

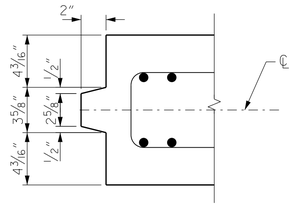


PILE TYPES
A9, A11, A13,
A14 & A15
(SPECIAL PILES)

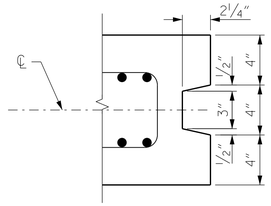
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950



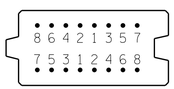
SECTION A-A



DETAIL "B"
TONGUE



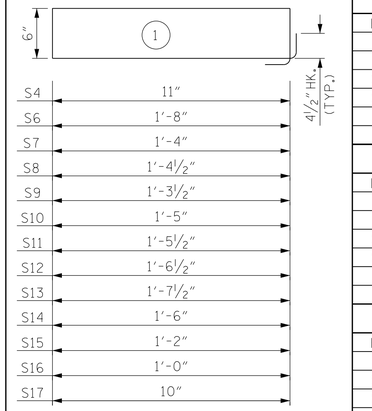
DETAIL "C"
GROOVE



PATTERN FOR BURNING

QUANTITIES FOR ONE PILE			
PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
A9 (SPECIAL PILE)	249	3.4	16
A11 (SPECIAL PILE)	272	3.8	16
A13 (SPECIAL PILE)	250	3.5	16
A14 (SPECIAL PILE)	221	3.0	16
A15 (SPECIAL PILE)	212	2.8	16

BAR TYPES



ALL BAR DIMENSIONING ARE OUT-TO-OUT

BILL OF MATERIAL

A9 (SPECIAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S4	1	#4	1	3'-7"	3
S8	10	#4	1	4'-6"	31
S12	41	#4	1	4'-10"	133
S15	1	#4	1	4'-3"	3
V5	2	#5	2	37'-10"	79

A11 (SPECIAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S9	14	#4	1	4'-4"	41
S11	44	#4	1	4'-8"	138
S15	1	#4	1	4'-1"	3
S17	1	#4	1	3'-5"	3
V6	2	#5	2	41'-4"	87

A13 (SPECIAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S7	1	#4	1	4'-5"	3
S10	12	#4	1	4'-7"	37
S13	39	#4	1	5'-0"	131
S16	1	#4	1	3'-9"	3
V7	2	#5	2	36'-4"	76

A14 (SPECIAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S6	35	#4	1	5'-1"	119
S7	1	#4	1	4'-5"	3
S11	9	#4	1	4'-8"	29
S16	1	#4	1	3'-9"	3
V2	2	#5	2	31'-10"	67

A15 (SPECIAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S7	9	#4	1	4'-5"	27
S14	35	#4	1	4'-9"	112
S15	1	#4	1	4'-1"	3
S17	1	#4	1	3'-5"	3
V2	2	#5	2	31'-10"	67

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO ½" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7029B6BB61448...

3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 8 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-08
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:20
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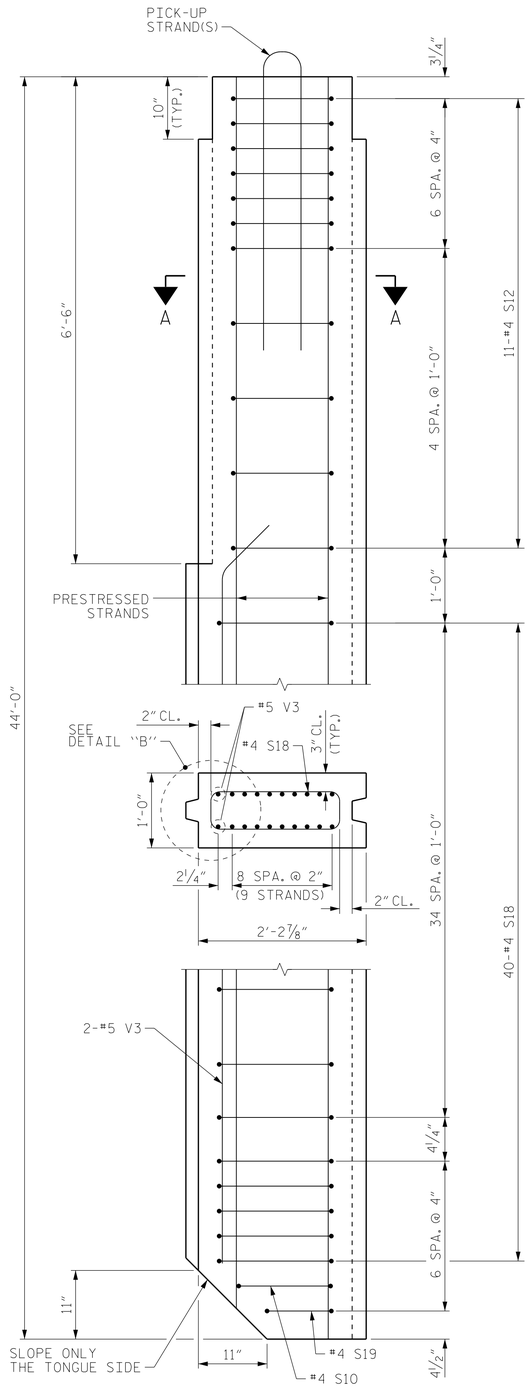
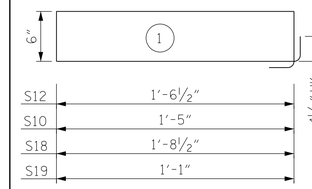
bgreen AT SD-298755



PILE TYPE A10
(SPECIAL PILE)

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

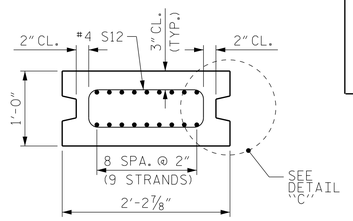
BAR TYPES



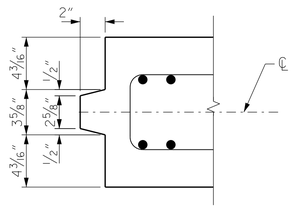
ALL BAR DIMENSIONING ARE OUT-TO-OUT

BILL OF MATERIAL
A10 (SPECIAL PILE)

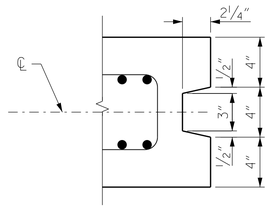
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S12	11	#4	1	4'-10"	36
S10	1	#4	1	4'-7"	4
S18	40	#4	1	5'-2"	139
S19	1	#4	1	3'-11"	3
V3	2	#5	2	37'-4"	78



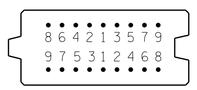
SECTION A-A



DETAIL "B"
TONGUE



DETAIL "C"
GROOVE



PATTERN FOR BURNING

QUANTITIES FOR ONE PILE

PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
A10 (SPECIAL PILE)	260	3.7	18

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO 1/2" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C702B86B861448... 3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 9 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-09
1			3			TOTAL SHEETS
2			4			24

DRAWN BY :	B. L. GREEN, P.E.	DATE : 3/19
CHECKED BY :	D. A. CANTRELL, P.E.	DATE : 6/19
DESIGN ENGINEER OF RECORD:	B. L. GREEN, P.E.	DATE : 7/19

06-MAR-2020 10:23
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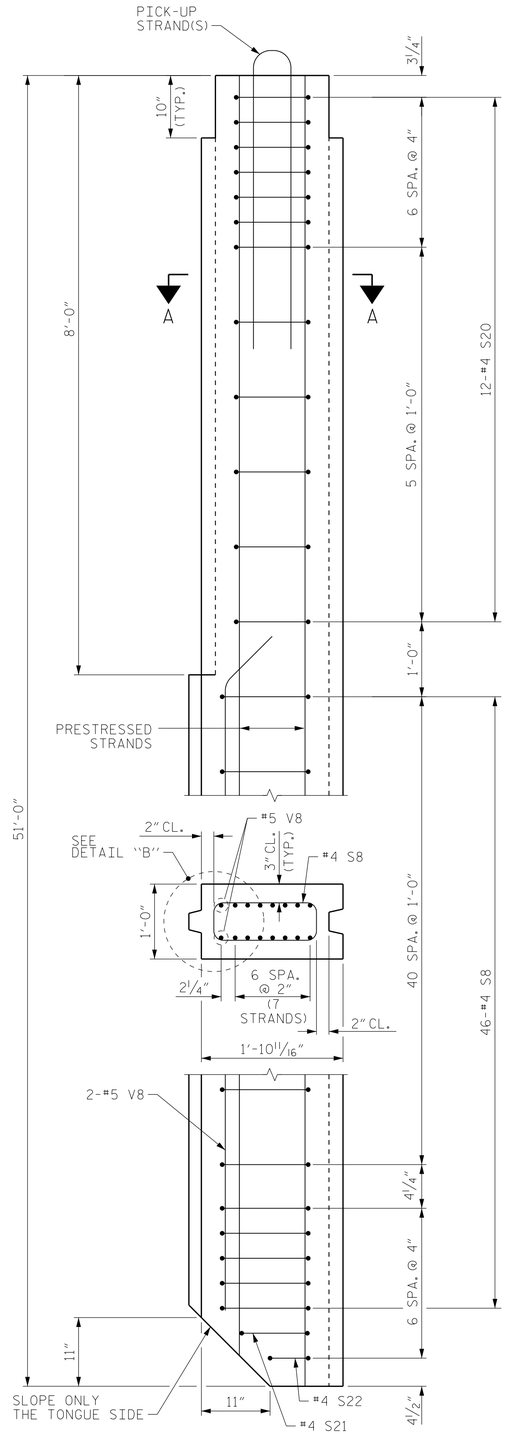
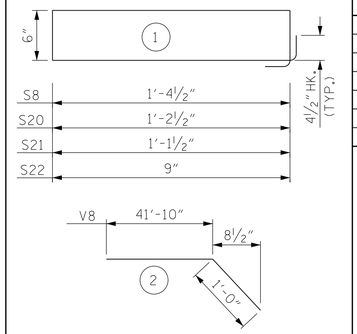
bgreen AT SD-298755



PILE TYPE A12
(SPECIAL PILE)

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

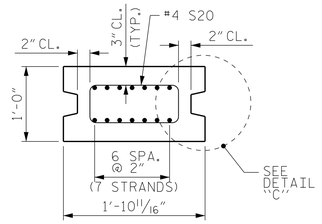
BAR TYPES



ALL BAR DIMENSIONING ARE OUT-TO-OUT

BILL OF MATERIAL
A12 (SPECIAL PILE)

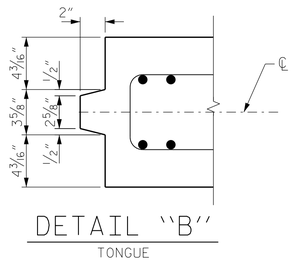
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S8	46	#4	1	4'-6"	139
S20	12	#4	1	4'-2"	34
S21	1	#4	1	4'-0"	3
S22	1	#4	1	3'-3"	3
V8	2	#5	2	42'-10"	90



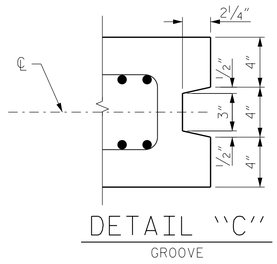
SECTION A-A

QUANTITIES FOR ONE PILE

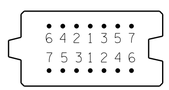
PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
A12 (SPECIAL PILE)	269	3.6	14



DETAIL "B"
TONGUE



DETAIL "C"
GROOVE



PATTERN FOR BURNING

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO 1/2" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6B61448... 3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4863
CARTERET COUNTY
STATION: 34+75.00 -L-

SHEET 10 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-10
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:24
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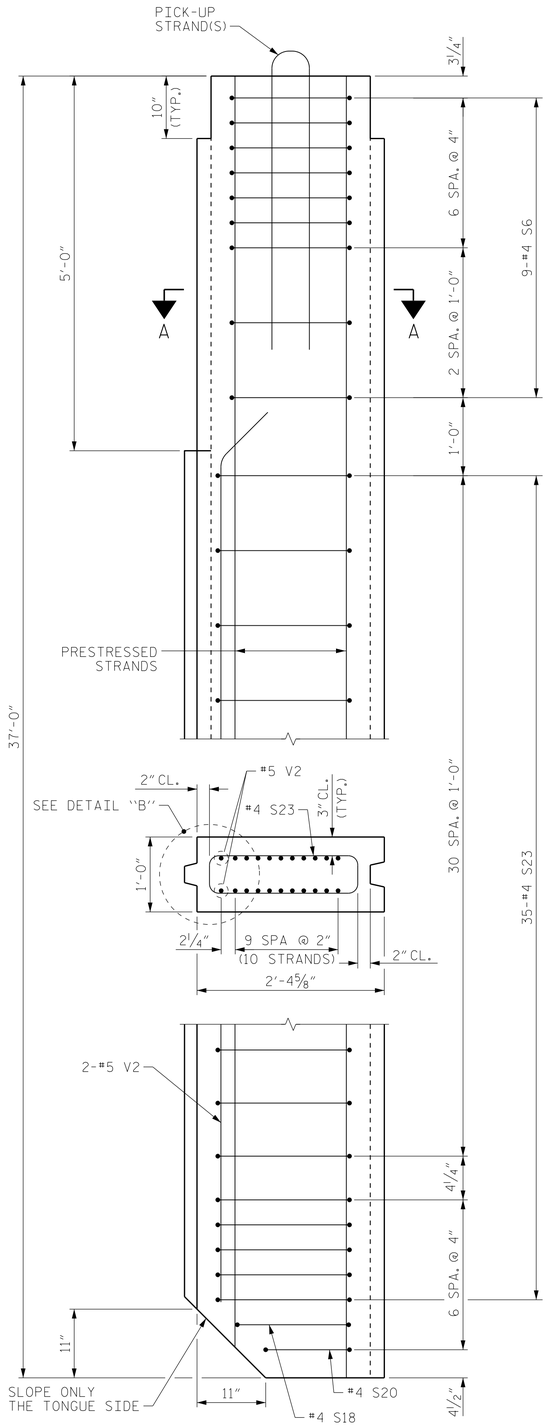
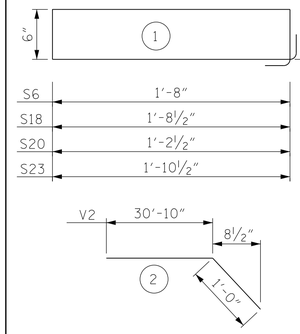
bgreen AT SD-298755



PILE TYPE A16
(SPECIAL PILE)

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

BAR TYPES

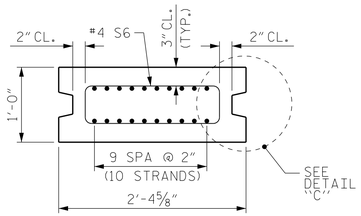


ALL BAR DIMENSIONING ARE OUT-TO-OUT

BILL OF MATERIAL

A16 (SPECIAL PILE)

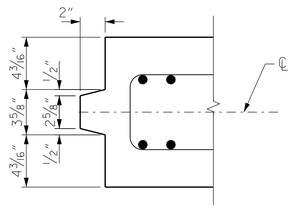
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S6	9	#4	1	5'-1"	31
S18	1	#4	1	5'-2"	4
S20	1	#4	1	4'-2"	3
S23	35	#4	1	5'-6"	129
V2	2	#5	2	31'-10"	67



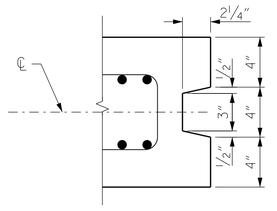
SECTION A-A

QUANTITIES FOR ONE PILE

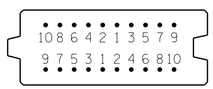
PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
A16 (SPECIAL PILE)	234	3.3	20



DETAIL "B"
TONGUE



DETAIL "C"
GROOVE



PATTERN FOR BURNING

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO 1/2" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6BB61448... 3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 11 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-11
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:24
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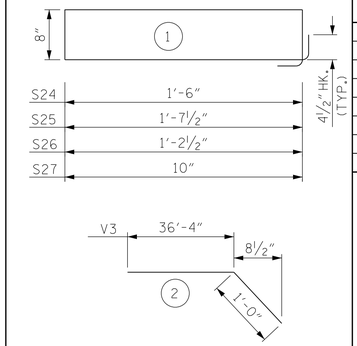
bgreen AT SD-298755

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

BAR TYPES

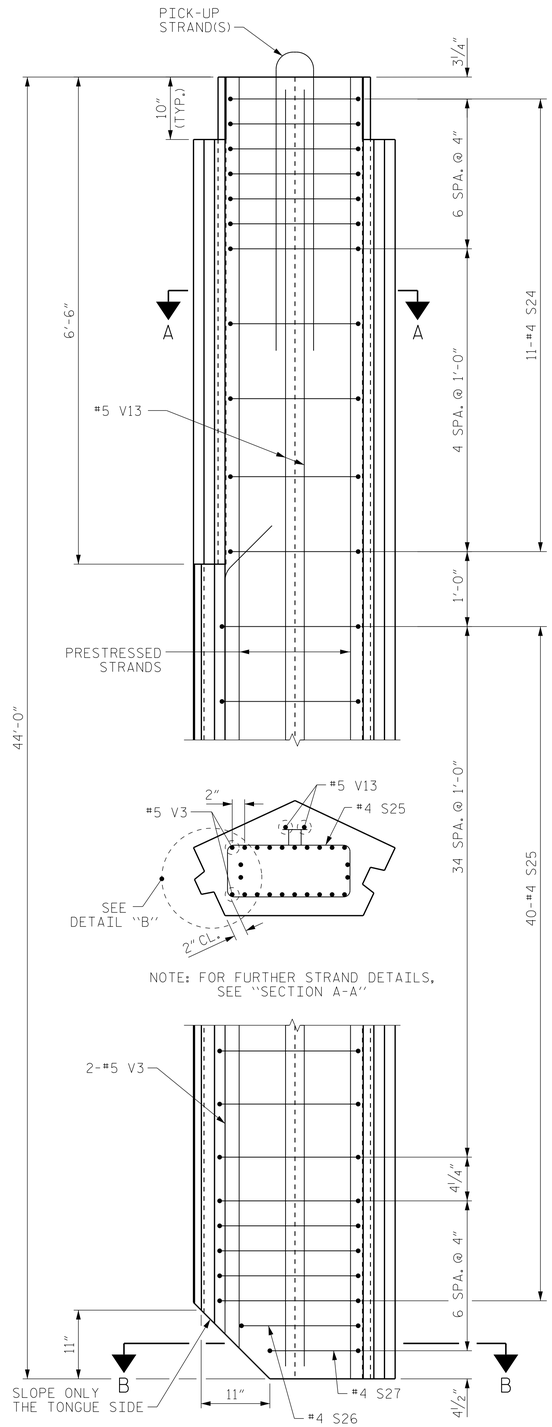


ALL BAR DIMENSIONING ARE OUT-TO-OUT

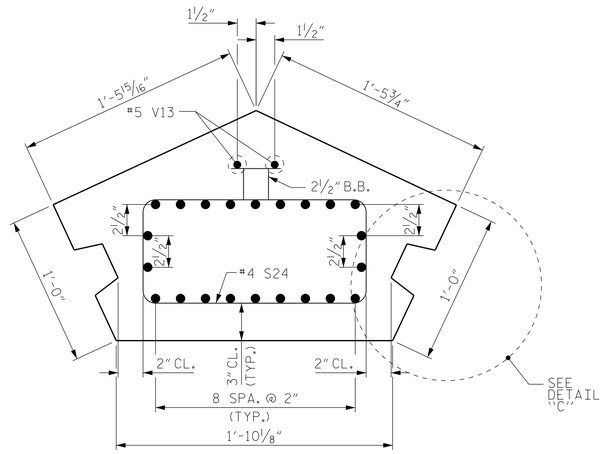
BILL OF MATERIAL

A17 (SPECIAL PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S24	11	#4	1	5'-1"	37
S25	40	#4	1	5'-4"	143
S26	1	#4	1	4'-6"	3
S27	1	#4	1	3'-9"	3
V3	2	#5	2	37'-4"	78
V13	2	#5	STR.	43'-6"	91

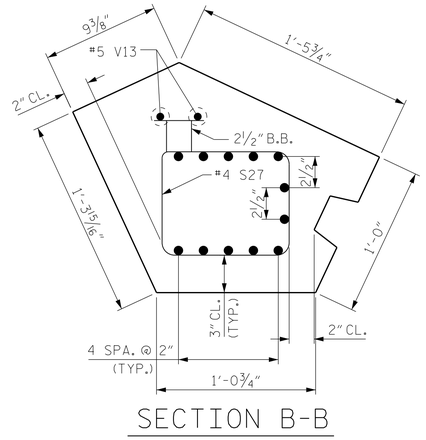


PILE TYPE A17 (SPECIAL PILE)

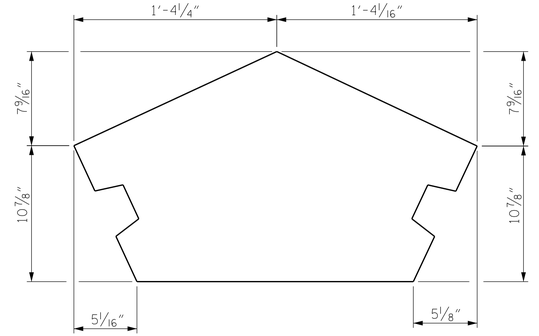


SECTION A-A

(22 TOTAL STRANDS)

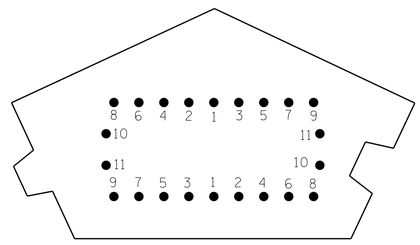


SECTION B-B

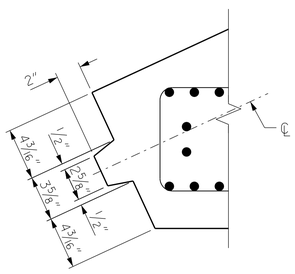


SECTION THRU PILE

REINFORCING NOT SHOWN

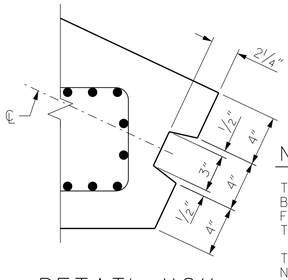


PATTERN FOR BURNING



DETAIL "B"

TONGUE



DETAIL "C"

GROOVE

QUANTITIES FOR ONE PILE

PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
A17 (SPECIAL PILE)	355	4.9	22

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO ½" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 3/9/2020 2C7028B6BB61448

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 12 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-12
1			3			TOTAL SHEETS
2			4			24

DRAWN BY :	B. L. GREEN, P.E.	DATE : 3/19
CHECKED BY :	D. A. CANTRELL, P.E.	DATE : 6/19
DESIGN ENGINEER OF RECORD:	B. L. GREEN, P.E.	DATE : 7/19

06-MAR-2020 10:25
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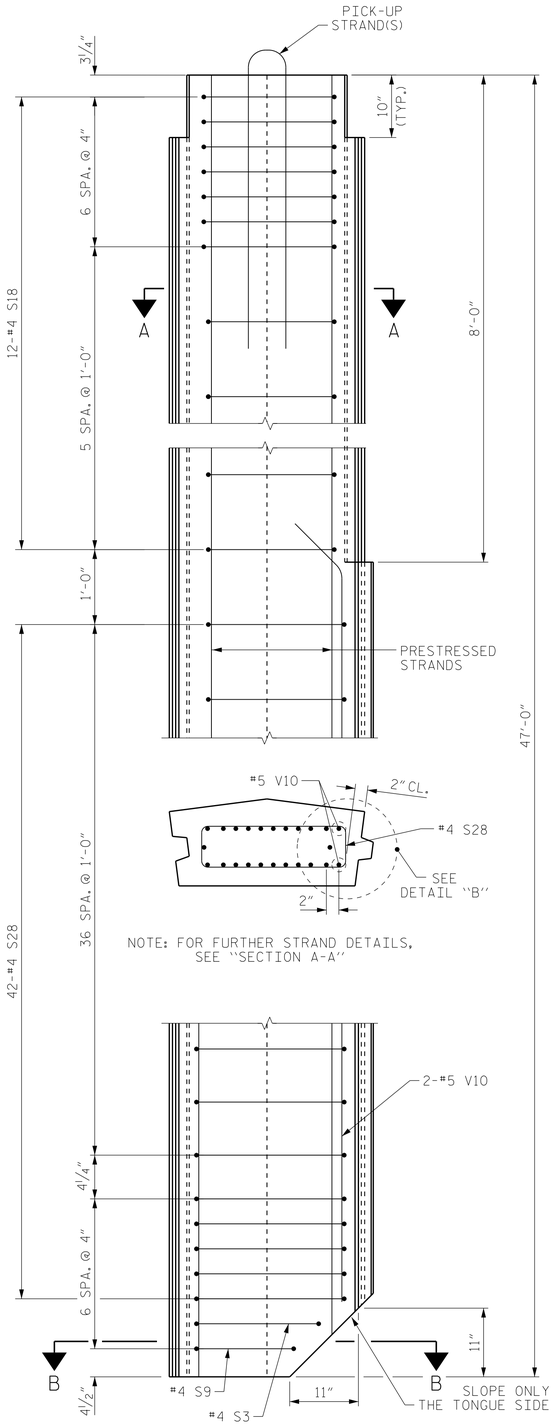
bgreen AT SD-298755

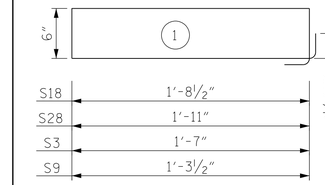


NOTE: FOR FURTHER STRAND DETAILS, SEE "SECTION A-A"

PILE TYPE A18 (SPECIAL PILE)

0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

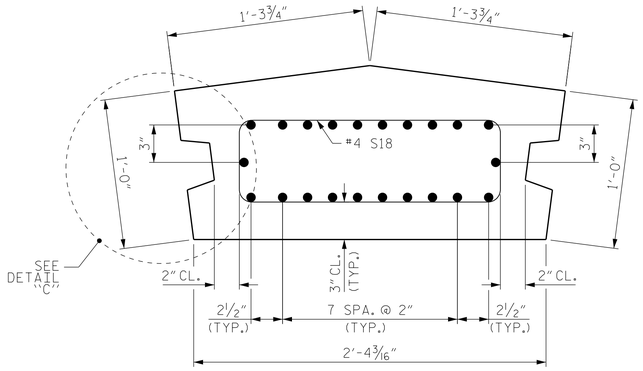
BAR TYPES



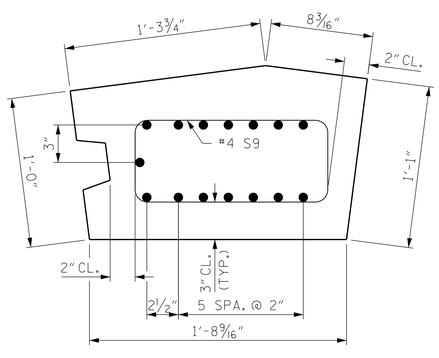
ALL BAR DIMENSIONING ARE OUT-TO-OUT

BILL OF MATERIAL
A18 (SPECIAL PILE)

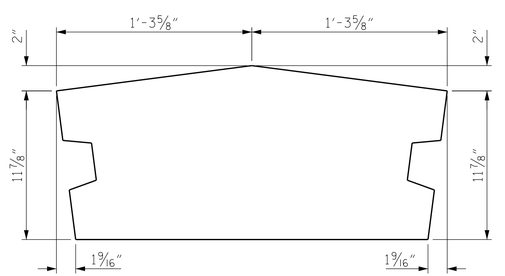
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S18	12	#4	1	5'-2"	41
S28	42	#4	1	5'-7"	157
S3	1	#4	1	4'-11"	3
S9	1	#4	1	4'-4"	3
V10	2	#5	2	38'-10"	81



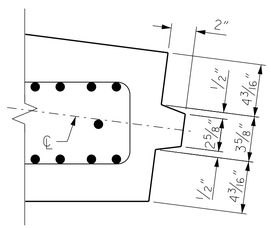
SECTION A-A
(22 TOTAL STRANDS)



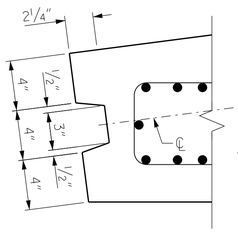
SECTION B-B



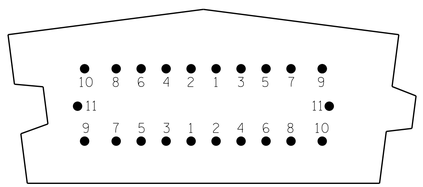
SECTION THRU PILE
REINFORCING NOT SHOWN



DETAIL "B"
TONGUE



DETAIL "C"
GROOVE



PATTERN FOR BURNING

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO 1/2" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

QUANTITIES FOR ONE PILE

PILE	REINFORCING STEEL (LB.)	8,000 PSI CONCRETE (C.Y.)	0.6" Ø L.R. STRANDS (No.)
A18 (SPECIAL PILE)	285	4.6	22

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 13 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C702B86B861448... 3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

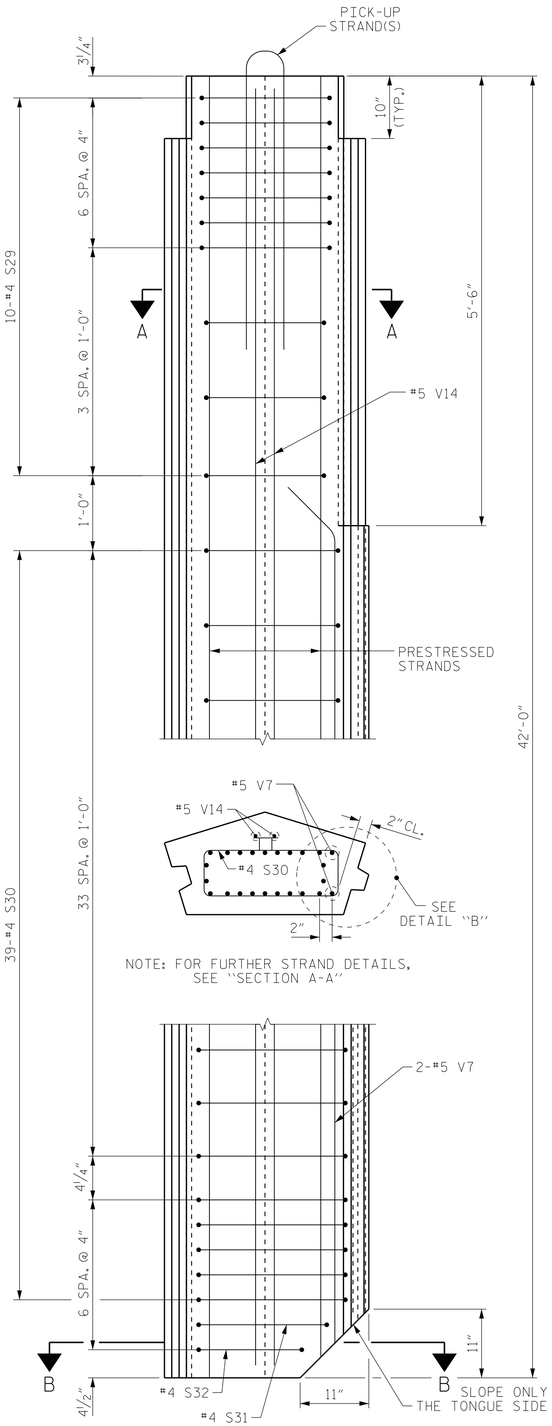
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. W-13

TOTAL SHEETS 24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

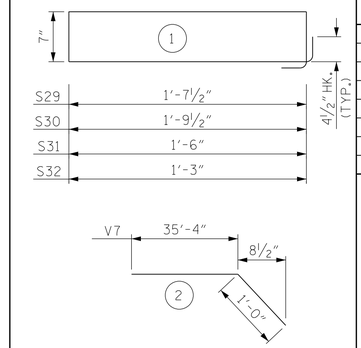
06-MAR-2020 10:25
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
bgreen AT SD-298755



PILE TYPE A19 (SPECIAL PILE)

0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

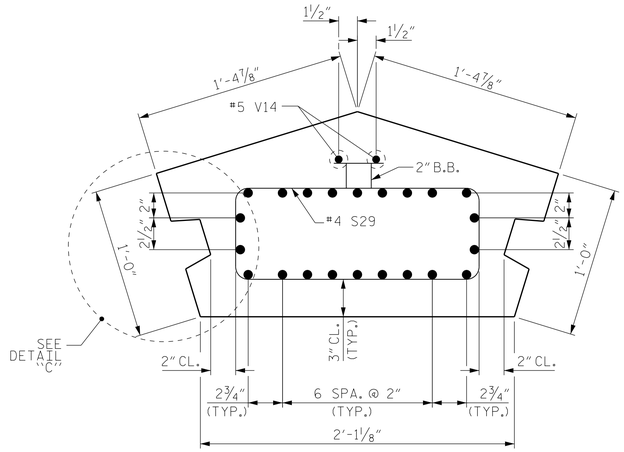
BAR TYPES



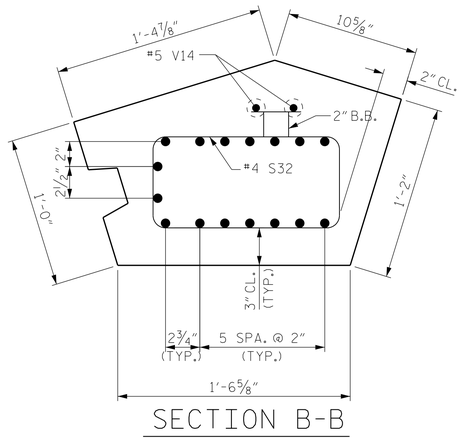
ALL BAR DIMENSIONING ARE OUT-TO-OUT

BILL OF MATERIAL
A19 (SPECIAL PILE)

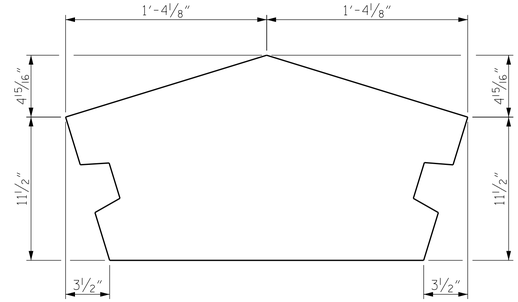
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S29	10	#4	1	5'-2"	35
S30	39	#4	1	5'-6"	143
S31	1	#4	1	4'-11"	3
S32	1	#4	1	4'-5"	3
V7	2	#5	2	36'-4"	76
V14	2	#5	STR.	41'-6"	87



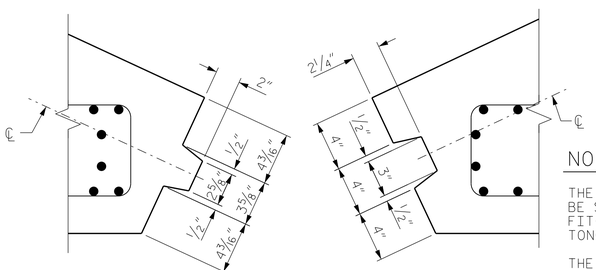
SECTION A-A
(22 TOTAL STRANDS)



SECTION B-B

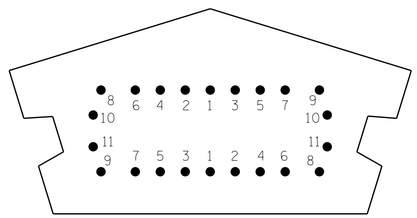


SECTION THRU PILE
REINFORCING NOT SHOWN



DETAIL "B"
TONGUE

DETAIL "C"
GROOVE



PATTERN FOR BURNING

NOTES

THE SHEET PILE WIDTH DIMENSIONS ARE NOMINAL. THESE DIMENSIONS MAY BE SHORTENED BY THE MANUFACTURER UP TO 1/2" TO ALLOW FOR SHEET PILE FIT-UP IN ITS FINAL POSITION. NO CHANGES SHALL BE MADE TO THE TONGUES OR GROOVES.

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

PRESTRESSED CONCRETE SHEET PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE INHIBITOR SHALL BE APPLIED AT A RATE OF 4.0 GALLONS PER CUBIC YARD. NO SEPARATE PAYMENT WILL BE MADE FOR THE ADDITION OF CALCIUM NITRITE, AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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

QUANTITIES FOR ONE PILE

PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
A19 (SPECIAL PILE)	347	4.4	22

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 14 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B68B61448... 3/9/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-14
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

06-MAR-2020 10:26
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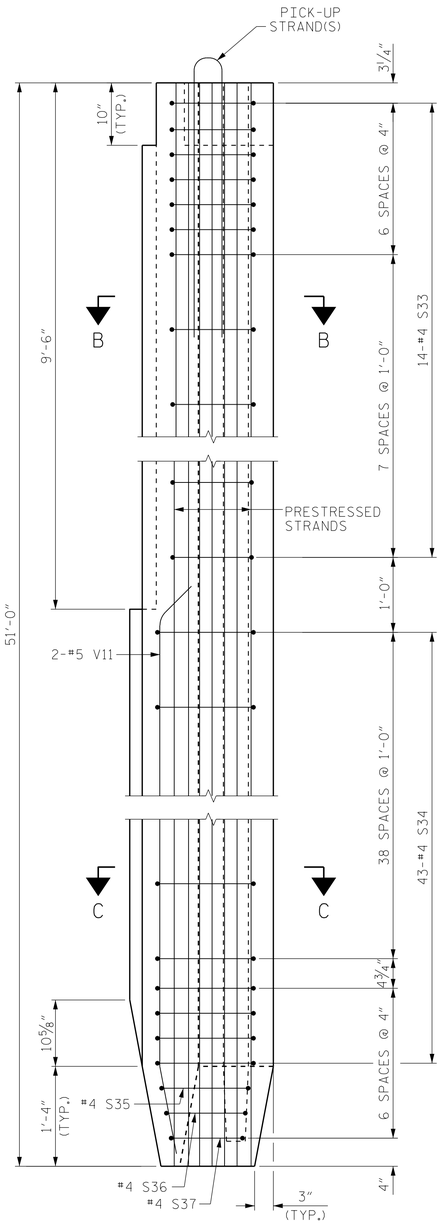
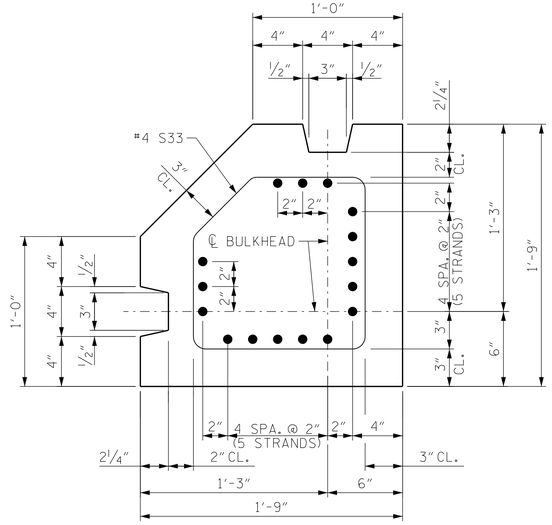
bgreen AT SD-298755

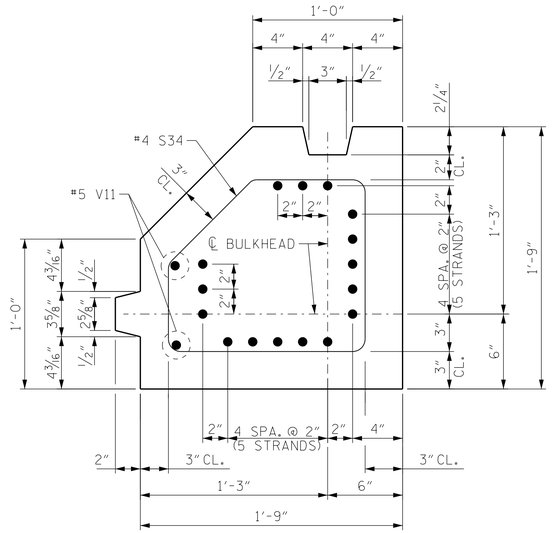


ELEVATION

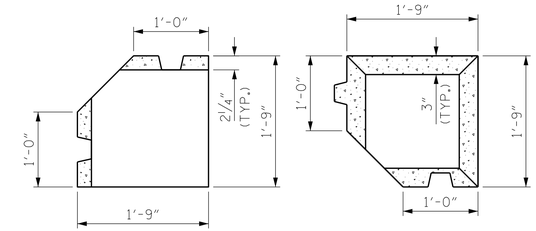
PILE TYPE C1
(CORNER PILE)



SECTION B-B

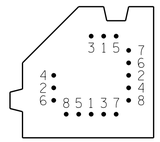


SECTION C-C



TOP VIEW BOTTOM VIEW

C1 & CORNER PILE
(1 REQ'D)



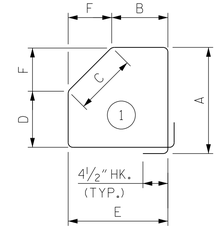
PATTERN FOR BURNING

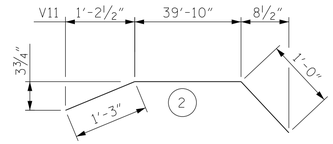
0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

BILL OF MATERIAL
C1 (CORNER PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S33	14	#4	1	5'-1"	48
S34	43	#4	1	5'-3"	151
S35	1	#4	1	4'-10"	4
S36	1	#4	1	4'-7"	4
S37	1	#4	1	4'-2"	3
V11	2	#5	2	42'-1"	88

BAR TYPES





ALL BAR DIMENSIONING ARE OUT-TO-OUT

CORNER PILE BAR TYPE 1 DIMENSIONS

BAR	A	B	C	D	E	F
S33	1'-1¾"	8¾"	7"	8¾"	1'-1¾"	5"
S34	1'-1¾"	9"	8½"	7¾"	1'-3"	6"
S35	1'-1"	7¾"	7½"	7¾"	1'-1"	5¼"
S36	1'-0¼"	7½"	6½"	7¾"	1'-0"	4½"
S37	11"	7"	5"	7½"	10½"	3½"

QUANTITIES FOR ONE PILE			
PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
C1 (CORNER PILE)	298	5.2	16

SEE CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS, SHEET 6 OF 16, FOR NOTES.

PROJECT NO. B-4863
CARTERET COUNTY
STATION: 34+75.00 -L-

SHEET 15 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6BB61448... 3/9/2020

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-15
1			3			TOTAL SHEETS
2			4			24

06-MAR-2020 10:26
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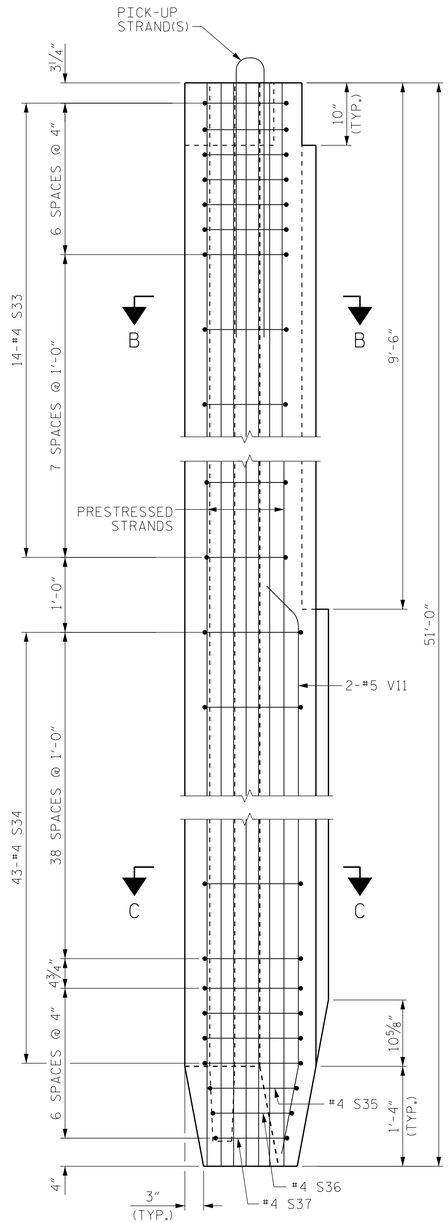
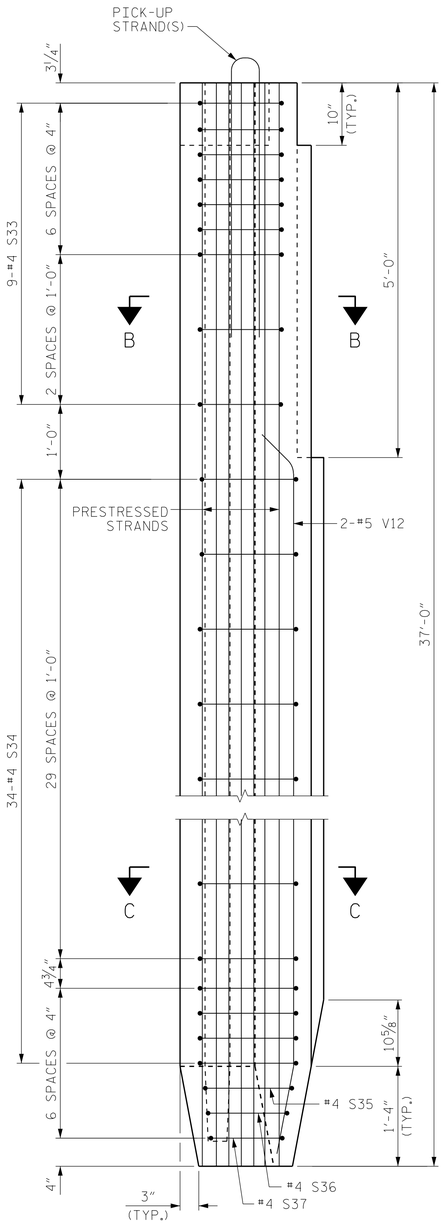
bgreen AT SD-298755



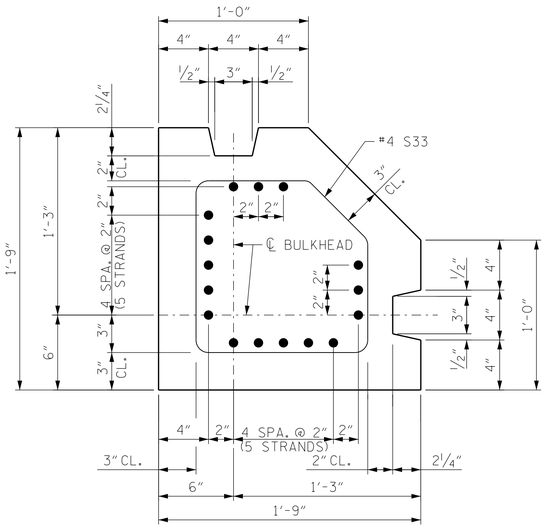
ELEVATION

PILE TYPE C2
(CORNER PILE)

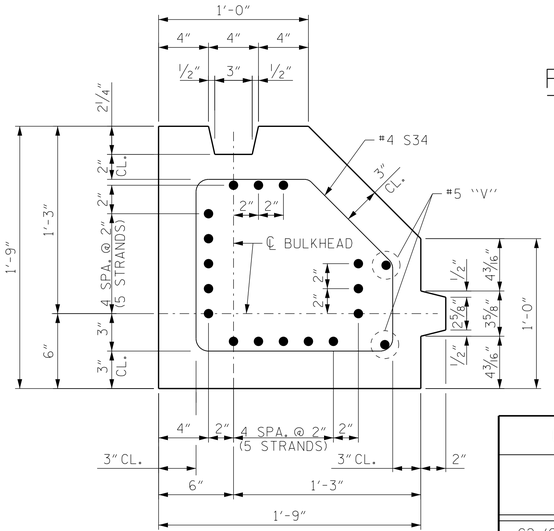


ELEVATION

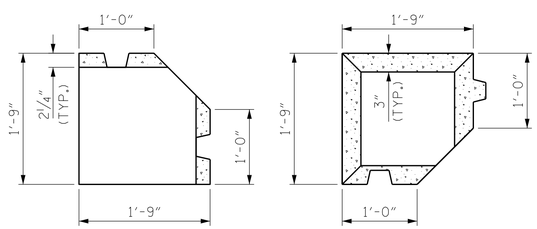
PILE TYPE C3
(CORNER PILE)



SECTION B-B

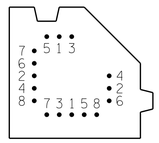


SECTION C-C



TOP VIEW BOTTOM VIEW

C2 & C3 CORNER PILES
(1 REQ'D EA.)



PATTERN FOR BURNING

0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

BILL OF MATERIAL

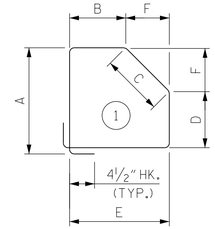
C2 (CORNER PILE)

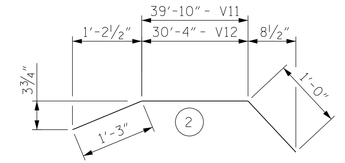
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S33	14	#4	1	5'-1"	48
S34	43	#4	1	5'-3"	151
S35	1	#4	1	4'-10"	4
S36	1	#4	1	4'-7"	4
S37	1	#4	1	4'-2"	3
V11	2	#5	2	42'-1"	88

C3 (CORNER PILE)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S33	9	#4	1	5'-1"	31
S34	34	#4	1	5'-3"	120
S35	1	#4	1	4'-10"	4
S36	1	#4	1	4'-7"	4
S37	1	#4	1	4'-2"	3
V12	2	#5	2	32'-7"	68

BAR TYPES





ALL BAR DIMENSIONING ARE OUT-TO-OUT

CORNER PILE BAR TYPE 1 DIMENSIONS

BAR	A	B	C	D	E	F
S33	1'-1¾"	8¾"	7"	8¾"	1'-1¾"	5"
S34	1'-1¾"	9"	8½"	7¾"	1'-3"	6"
S35	1'-1"	7¾"	7½"	7¾"	1'-1"	5¼"
S36	1'-0¼"	7½"	6½"	7¾"	1'-0"	4½"
S37	11"	7"	5"	7½"	10½"	3½"

QUANTITIES FOR ONE PILE

PILE	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
C2 (CORNER PILE)	298	5.2	16
C3 (CORNER PILE)	230	3.8	16

SEE CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS, SHEET 6 OF 16, FOR NOTES.

PROJECT NO. B-4863

CARTERET COUNTY

STATION: 34+75.00 -L-

SHEET 16 OF 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SHEET PILE RETAINING WALL SHEET PILE DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037403 ENGINEER BRANDON L. GREEN

DocuSigned by: Brandon Green 2C7028B6BB61448... 3/9/2020

DRAWN BY : B. L. GREEN, P.E. DATE : 3/19
CHECKED BY : D. A. CANTRELL, P.E. DATE : 6/19
DESIGN ENGINEER OF RECORD: B. L. GREEN, P.E. DATE : 7/19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-16
1			3			TOTAL SHEETS
2			4			24

06-MAR-2020 10:26
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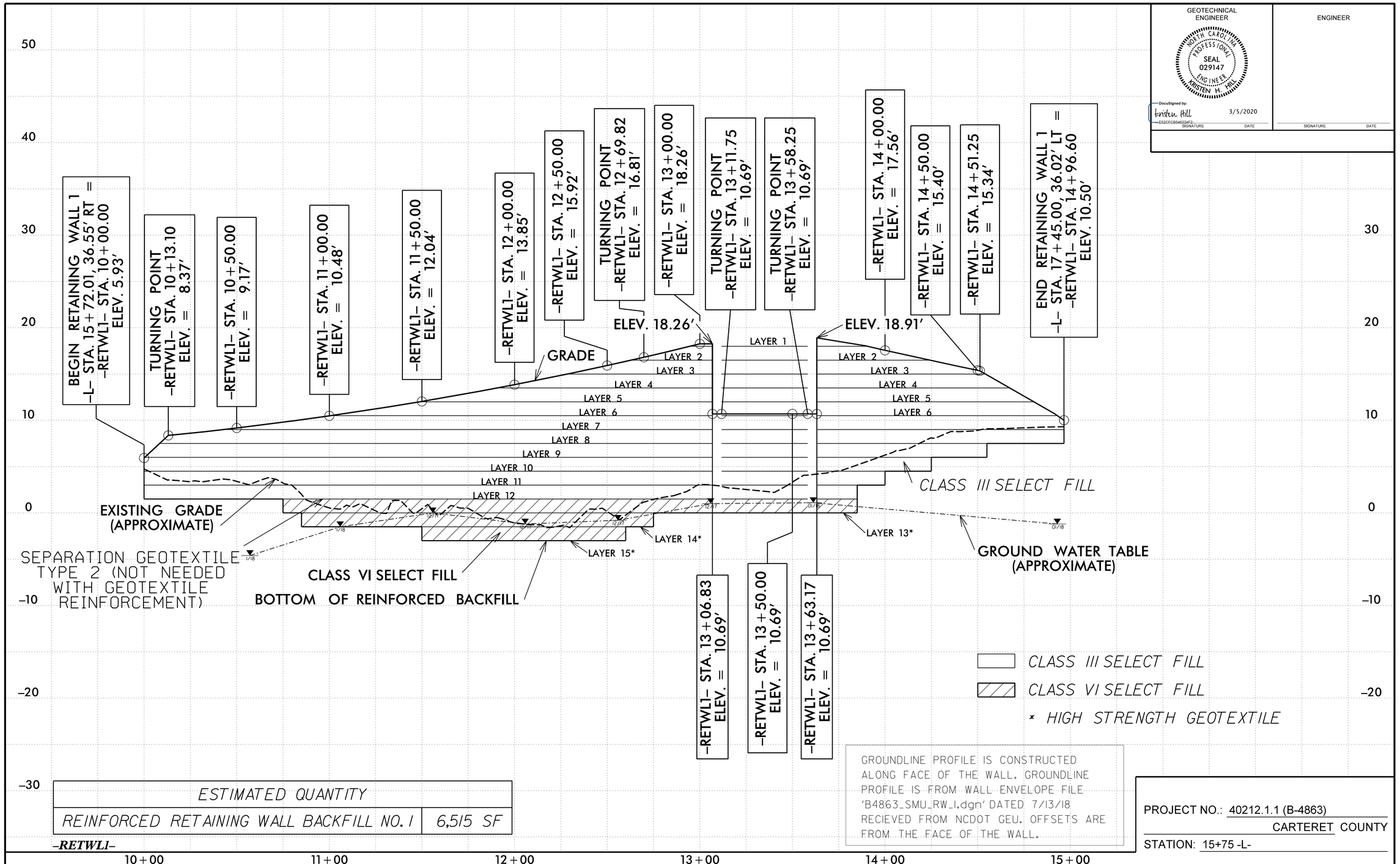
bgreen AT SD-298755



ESTIMATED QUANTITY	
REINFORCED RETAINING WALL BACKFILL NO. 1	6,515 SF

–RETWL1–

GROUNDLINE PROFILE IS CONSTRUCTED ALONG FACE OF THE WALL. GROUNDLINE PROFILE IS FROM WALL ENVELOPE FILE 'B4863_SMU_RW_1.dgn' DATED 7/13/18 RECIEVED FROM NCDOT GEU. OFFSETS ARE FROM THE FACE OF THE WALL.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: Kristen Hill E52CFCB546234F2 SIGNATURE 3/5/2020 DATE

ENGINEER SIGNATURE DATE

PROJECT NO.: 40212.1.1 (B-4863)

CARTERET COUNTY

STATION: 15+75 -L-

0 50 100

FEET

VE = 5

PREPARED BY: K.H.H.	DATE: 03/2020
REVIEWED BY: A.Y.A.	DATE: 03/2020

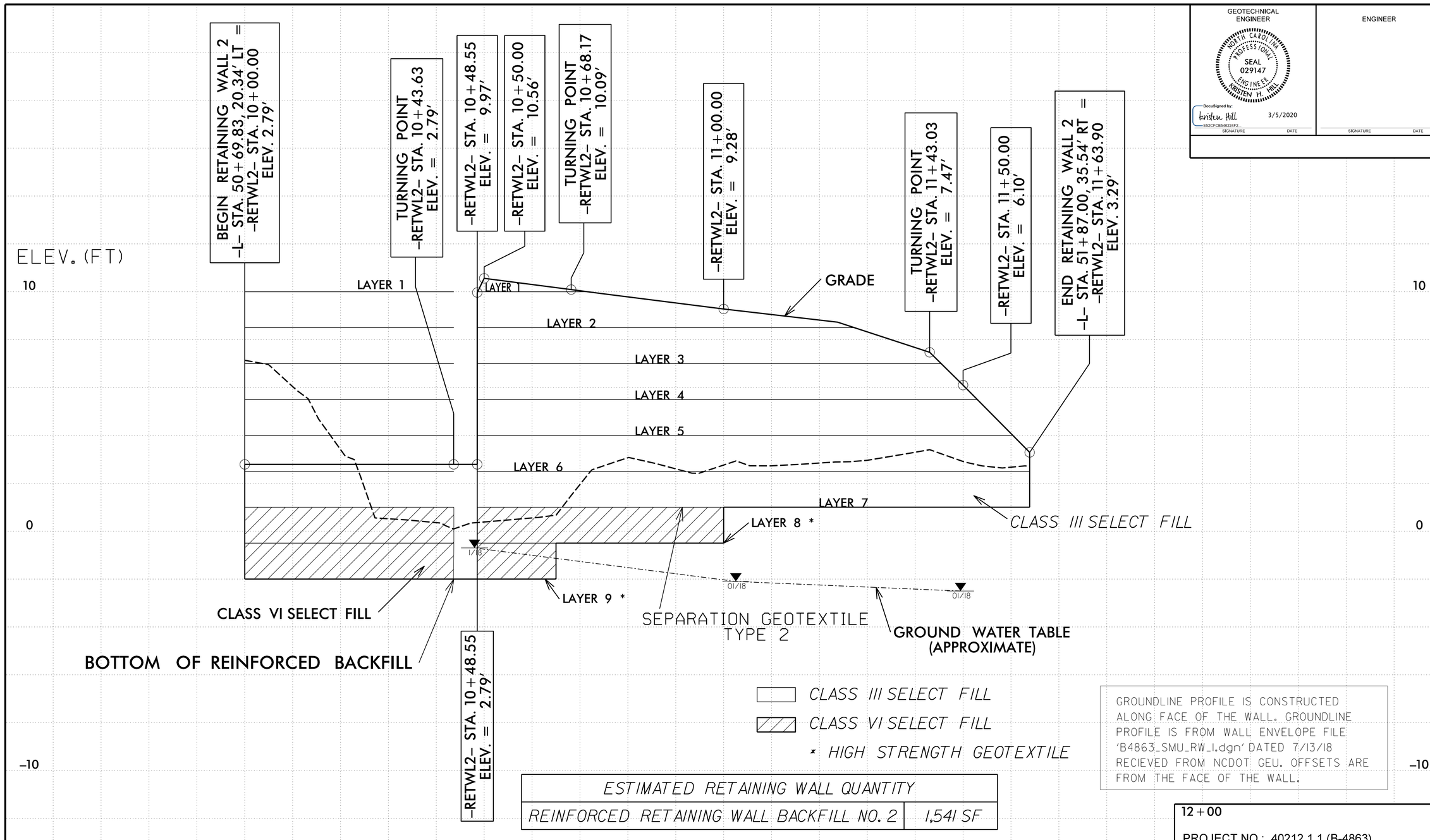
9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

WALL 1 REINFORCED RETAINING WALL BACKFILL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-17
1			3			
2			4			



GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill ES2CFCB546224F2...

3/5/2020

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

ESTIMATED RETAINING WALL QUANTITY	
REINFORCED RETAINING WALL BACKFILL NO. 2	1,541 SF

GROUNDLINE PROFILE IS CONSTRUCTED ALONG FACE OF THE WALL. GROUNDLINE PROFILE IS FROM WALL ENVELOPE FILE 'B4863_SMU_RW_1.dgn' DATED 7/13/18 RECIEVED FROM NCDOT GEU. OFFSETS ARE FROM THE FACE OF THE WALL.

12+00

PROJECT NO.: 40212.1.1 (B-4863)

CARTERET COUNTY

STATION: 50+70 -L-

PREPARED BY: K.H.H.	DATE: 03/2020
REVIEWED BY: A.Y.A.	DATE: 03/2020

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

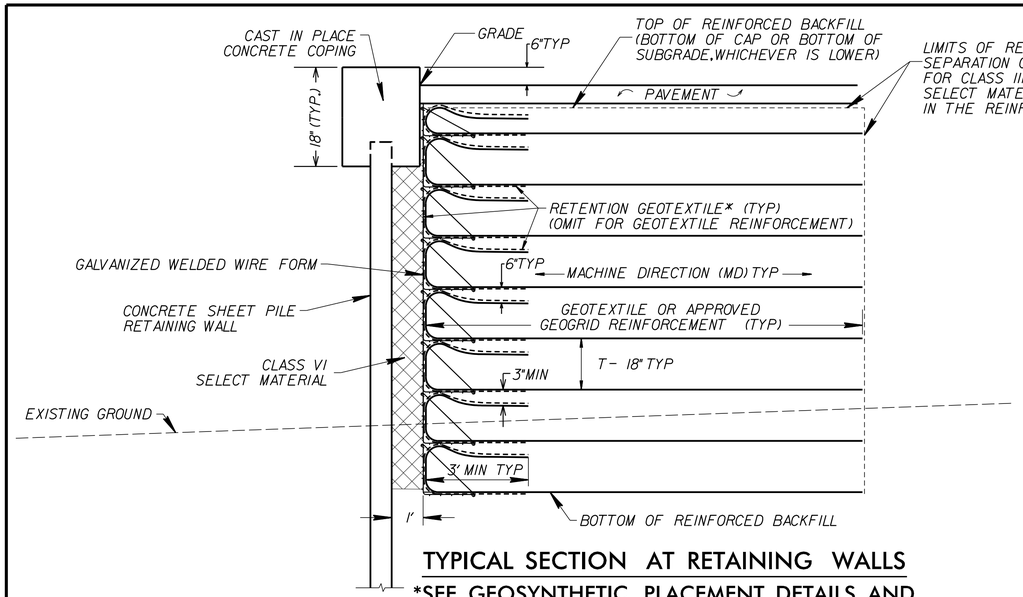
GEOTECHNICAL ENGINEERING UNIT

WALL 2 REINFORCED RETAINING WALL BACKFILL

REVISIONS

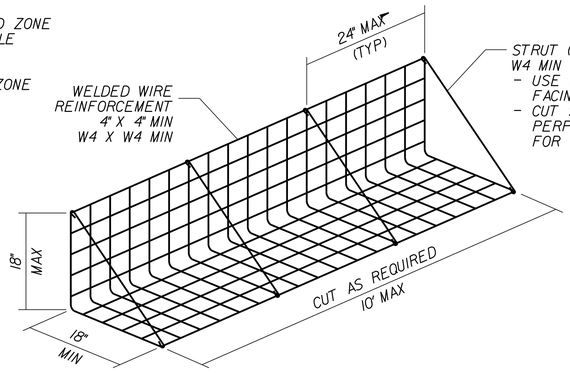
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-18

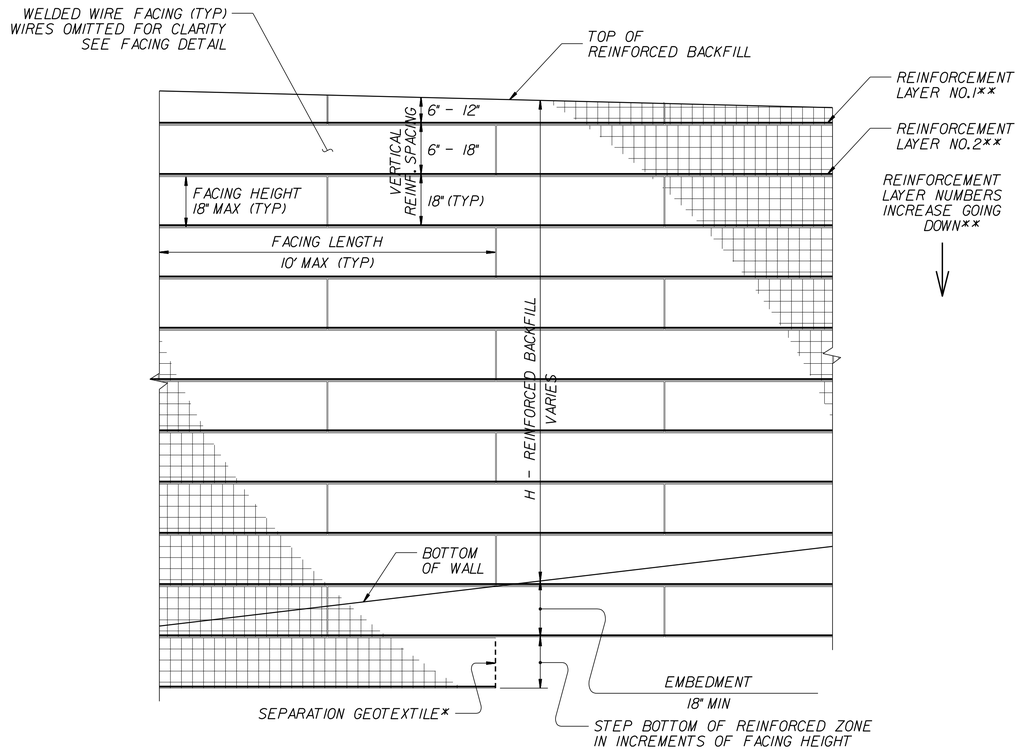


TYPICAL SECTION AT RETAINING WALLS

*SEE GEOSYNTHETIC PLACEMENT DETAILS AND REINFORCEMENT TABLES ON SHEETS W-17, W-18, AND W-20.



FACING DETAIL



REINFORCED APPROACH FILLS – PARTIAL ELEVATION

*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEETS W-17 & W-18.
**SEE REINFORCEMENT TABLES ON SHEET W-20.

TYPICAL SECTION AT BRIDGE ABUTMENTS

*SEE GEOSYNTHETIC PLACEMENT DETAILS AND REINFORCEMENT TABLES ON SHEETS W-17, W-18 & W-20.

PREPARED BY: K.H.H.	DATE: 03/2020
REVIEWED BY: A.Y.A.	DATE: 03/2020

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GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill 3/5/2020
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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PROJECT NO.: 40212.1.1 (B-4863)

CARTERET COUNTY

STATION: 15+75 & 50+70 -L-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

REINFORCED RETAINING WALL BACKFILL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-19
2			4			

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL DocuSigned by: kristen Hill 3/5/2020 E52CFCB546224F2...	
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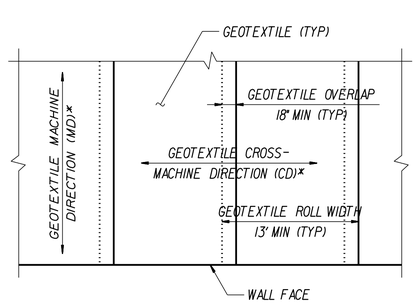
WALL	LAYER NO.*	APPROX. WALL ALIGNMENT STATIONING TO		FROM	LAYER ELEVATION (FT)	MINIMUM REINFORCEMENT STRENGTH IN MD: GEOTEXTILE LONG-TERM DESIGN TENSILE STRENGTH (LB/FT)	MINIMUM REINFORCEMENT STRENGTH IN MD: GEOGRID LONG-TERM DESIGN TENSILE STRENGTH (LB/FT)	CLASS VI BACKFILL REQUIRED FOR LAYERS***	BOTTOM LAYER*** APPROX. EXCAVATION DEPTH (FT)
1	1	12+90	to	13+90	18	2,640	1,875	–	–
	2	12+60	to	14+25	16.5	2,640	1,875	–	–
	3	12+30	to	14+50	15	2,640	1,875	–	–
	4	11+90	to	14+65	13.5	2,640	1,875	–	–
	5	11+50	to	14+80	12	4,800	3,600	–	–
	6	11+10	to	14+90	10.5	4,800	3,600	–	–
	7	10+50	to	14+96	9	4,800	3,600	–	–
	8	10+10	to	14+96	7.5	4,800	3,600	–	1.8 to 2
	9	10+00	to	14+55	6	7,200	5,000	–	2.5 to 3
	10	10+00	to	14+35	4.5	7,200	5,000	–	3.5 to 4.5
	11	10+00	to	14+25	3	7,200	5,000	–	3 to 5
	12	10+00	to	14+00	1.5	7,200	5,000	–	2 to 5
	13	10+75	to	13+85	0	10,000 **	–	X	1.8 to 5.5
	14	10+85	to	12+75	-1.5	10,000	–	X	1.8 to 3
	15	11+50	to	12+60	-3	10,000	–	X	1.8 to 3
2	1	10+00	to	10+70	10	2,640	1,875	–	–
	2	10+00	to	11+25	8.5	2,640	1,875	–	–
	3	10+00	to	11+45	7	2,640	1,875	–	–
	4	10+00	to	11+55	5.5	4,800	1,875	–	–
	5	10+00	to	11+60	4	4,800	3,600	–	–
	6	10+00	to	11+64	2.5	7,200	3,600	–	–
	7	10+00	to	11+64	1	7,200	3,600	–	1.8 to 2.5
	8	10+00	to	11+00	-0.5	7,200	–	X	1.8 to 3.5
	9	10+00	to	10+65	-2	7,200	–	X	2 to 9

* SEE PARTIAL ELEVATION ON SHEETS W-17 & W-18 FOR REINFORCEMENT LAYER NUMBERING

** FROM APPROXIMATELY STATION 10+75 TO 13+85, PLACE HIGH STRENGTH GEOTEXTILE. SEE SHEETS W-17 ,W-18 AND W-21 FOR PLAN AND ELEVATION VIEWS OF HIGH STRENGTH GEOTEXTILE EXTENTS.

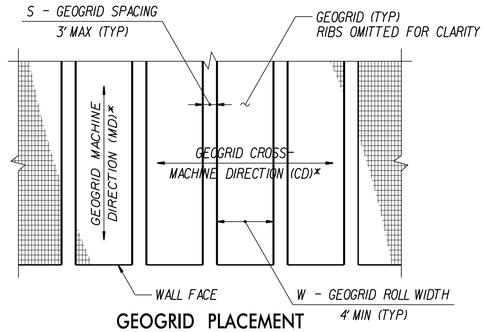
**** SEE PROFILE VIEW ON SHEETS W-17 & W-18 FOR FURTHER DETAIL.

MINIMUM REQUIRED REINFORCEMENT LENGTH		
WALL	WALL ALIGN. STATIONS	LENGTH
1	10+00 to 13+11.75	17
1	13+11.75 to 13+58.25	15
1	13+58.25 to 14+96.6	17
2	10+00 to 10+43.63	12
2	10+43.63 to 11+63.90	10



GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT – $\frac{W}{W+S} \times 100 \geq 80\%$

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)

PROJECT NO.: 40212.1.1 (B-4863)

CARTERET COUNTY

STATION: 15+75 & 50+70 -L-

9751 SOUTHERN PINE BLVD
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

REINFORCED RETAINING WALL BACKFILL

PREPARED BY: K.H.H.	DATE: 03/2020
REVIEWED BY: A.Y.A.	DATE: 03/2020

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-20
1			3			
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

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CONSTRUCTION SEQUENCE FOR REINFORCED RETAINING WALL BACKFILL

1. INSTALL CONCRETE SHEET PILES AND END BENT PILES PRIOR TO CONSTRUCTING REINFORCED RETAINING WALL BACKFILL.
2. CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF REINFORCED RETAINING WALL BACKFILL.
3. COLLECT AND DIRECT RUNOFF AWAY FROM REINFORCED RETAINING WALL BACKFILL.
4. EXCAVATE AS NECESSARY TO CONSTRUCT BOTTOM OF REINFORCED RETAINING WALL BACKFILL TO THE ELEVATION SHOWN ON THE PLANS.
5. PLACE GEOTEXTILE OR GEOGRID REINFORCEMENT AT LOCATIONS AND ELEVATIONS SHOWN ON SHEET W-17 & W-18 AND IN SLIGHT TENSION FREE KINKS,FOLDS,WRINKLES OR CREASES.
6. ERECT WELDED WIRE FORMS AS SHOWN ON THE PLANS.
7. STAGGER VERTICAL JOINTS OF WELDED WIRE FORMS TO CREATE A RUNNING BOND.
8. PLACE WELDED WIRE FORMS AS NEAR TO VERTICAL AS POSSIBLE WITH NO NEGATIVE BATTER. CONSTRUCT REINFORCED APPROACH FILLS WITH A MAXIMUM VERTICAL AND HORIZONTAL TOLOERANCE OF 3" WHEN MEASURED WITH A 10'-0" STRAIGHT EDGE AND AN OVERALL PLUMBNESS (BATTER) AND HORIZONTAL ALIGNMENT OF LESS THAN 6".
9. DO NOT SPLICE OR OVERLAP GEOTEXTILE REINFORCEMENT IN THE MACHINE DIRECTION (MD),i.e., PERPENDICULAR TO THE REINFORCED RETAINING WALL BACKFILL FACE. OVERLAPS ONLY ARE ALLOWED IN THE CROSS-MACHINE DIRECTIONS (CMD).
10. PLACE BACKFILL WITHIN REINFORCED RETAINING WALL BACKFILLS IN 8" TO 10" THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-3(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3'-0" OF THE REINFORCED RETAINING WALL BACKFILL FACE.
11. RETENTION GEOTEXTILE SHALL BE USED AT THE BOTTOM OF THE CLASS III SELECT MATERIAL TO SEPARATE THE BACKFILL FROM THE CLASS VI SELECT MATERIAL.
12. WRAP GEOTEXTILE OR GEOGRID REINFORCEMENT AT VERTICAL CORNERS AS DIRECTED BY THE ENGINEER.
13. DO NOT DAMAGE GEOTEXTILE OR GEOGRID REINFORCEMENT OR WELDED WIRE FORMS WHEN PLACING AND COMPACTING BACKFILL. DO NOT OPERATE HEAVY EQUIPMENTON ON GEOTEXTILE REINFORCEMENT FABRIC OR GEOGRID UNTIL IT IS COVERED WITH AS LEAST 8" OF BACKFILL. DO NOT USE SHEEPSFOOT,GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.
14. CONSTRUCT REINFORCED RETAINING WALL BACKFILL TO BOTTOM OF COPING OR BOTTOM OF SUBGRADE WHICH EVER IS LOWER AND BOTTOM OF END BENT CAP ELEVATIONS AND ALLOW THEM TO SIT IDLE FOR A MINIMUM OF 30 DAYS PRIOR TO FILLING SPACE BETWEEN FACE OF REINFORCED RETAINING WALL BACKFILL AND BACK OF CONCRETE SHEET PILING WITH CLASS VI SELECT MATERIAL.
15. BACKFILL SPACE WITH CLASS VI SELECT MATERIAL BETWEEN FACE OF REINFORCED RETAINING WALL BACKFILL AND BACK OF CONCRETE SHEET PILING PRIOR TO PLACING FINAL LIFTS OF REINFORCEMENT AS SHOWN IN DETAILS.
16. CONSTRUCT RETAINING WALL COPINGS AND END BENT CAPS PRIOR TO PLACING FINAL LIFTS OF REINFORCEMENT WHICH SHALL BE INSTALLED DIRECTLY AGAINST IN-PLACE RETAINING WALL.COPINGS AND END BENT CAPS WITHOUT USING WELDED WIRE FORMS.

REINFORCED RETAINING WALL BACKFILL NOTES:

1. FOR REINFORCED RETAINING WALL BACKFILLS,SEE REINFORCED RETAINING WALL BACKFILL SPECIAL PROVISION.
2. REINFORCED RETAINING WALL BACKFILL ARE DESIGNED FOR MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 3800 PSF.
3. USE GROUNDWATER ELEVATION NOTED IN THE PLANS,IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE.
4. USE CLASS III AND VI FOR REINFORCED RETAINING WALL BACKFILL AS SHOWN ON PLANS.
5. RETENTION GEOTEXTILE FABRIC SHALL MEET THE REQUIREMENTS OF TYPE 2 GEOTEXTILE AS SHOWN IN TABLE 1056-1 OF THE STANDARD SPECIFICATIONS.
6. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE,STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN REINFORCEMENT LAYER BELOW.
7. AT THE CONTRACTOR'S OPTION,REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
   a. W (REINFORCEMENT ROLL WIDTH) = (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' &
   b. REINFORCEMENT STRENGTH IN CD = MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
8. SUBMIT A WELDED WIRE BASKET WALL SELECTION FORM AT LEAST 7 DAYS BEFORE STARTING WALL CONSTRUCTION. SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
9. DO NOT PLACE BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
10. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
11. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS,PAVEMENTS,PIPES,INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
12. FOR WELDED WIRE BASKET WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES,WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.

PROJECT NO.: 40212.1.1 (B-4863)
CARTERET COUNTY
STATION: 15+75 & 50+70 -L-

PREPARED BY: K.H.H.	DATE: 03/2020
REVIEWED BY: A.Y.A.	DATE: 03/2020

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

REINFORCED RETAINING WALL BACKFILL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-21
1			3			
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen hill 3/5/2020
E52CFCB546324F2...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NAD 83

15+00

GR. PUBLIC BEACH ACCESS

-DRIVE-

END CONSTRUCTION
-RETWL1- Sta. 14+96.60 =
-L- Sta. 17+45.00, 36.02' LT

GR. TO THE STRAITS

TO HARKERS ISLAND

GR.

TURNING POINT
-RETWL1- Sta. 14+51.25

GR.

13+85

-17' MD

TURNING POINT
-RETWL1- Sta. 13+58.25

GR.

20+00

10+75

17' MD

-RETWL1-

-15' MD

BEGIN CONSTRUCTION
-RETWL1- Sta. 10+00.00 =
-L- Sta. 15+72.01, 36.55' RT

TURNING POINT
-RETWL1- Sta. 10+13.10

SPARKS RD. 9' GR.

TURNING POINT
-RETWL1- Sta. 13+11.75

TURNING POINT
-RETWL1- Sta. 12+69.82

HIGH STRENGTH GEOTEXTILE EXTENT

xx' MD LENGTH OF GEOTEXTILE MACHINE DIRECTION

0 40 80
FEET

PROJECT NO.: 40212.1.1 (B-4863)

CARTERET COUNTY

STATION: 15+75 & 50+70 -L-

PREPARED BY: K.H.H.	DATE: 03/2020
REVIEWED BY: A.Y.A.	DATE: 03/2020

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

HIGH STRENGTH GEOTEXTILE EXTENT SITE PLAN

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	–	–	3	–	–
2	–	–	4	–	–

SHEET NO. W-22

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL

DocuSigned by: kristen Hill E52CFCB546224F2... 3/5/2020

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NAD 83

15+00

GR. PUBLIC BEACH ACCESS

-DRIVE-

END CONSTRUCTION
-RETWL1- Sta. 14+96.60 =
-L- Sta. 17+45.00, 36.02' LT

TO HARKERS ISLAND

GR.

GR. TO THE STRAITS

TURNING POINT
-RETWL1- Sta. 14+51.25

GR.

GR.

TURNING POINT
-RETWL1- Sta. 13+58.25

20+00

BEGIN CONSTRUCTION
-RETWL1- Sta. 10+00.00 =
-L- Sta. 15+72.01, 36.55' RT

TURNING POINT
-RETWL1- Sta. 10+13.10

-RETWL1-

TURNING POINT
-RETWL1- Sta. 12+69.82

TURNING POINT
-RETWL1- Sta. 13+11.75

SPARKS RD. 9' GR.

REINFORCED RETAINING WALL BACKFILL

0 40 80
FEET

PROJECT NO.: 40212.1.1 (B-4863)

CARTERET COUNTY

STATION: 15+75 & 50+70 -L-

PREPARED BY: K.H.H. DATE: 03/2020

REVIEWED BY: A.Y.A. DATE: 03/2020

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REINFORCED RETAINING WALL BACKFILL SITE PLAN

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-23
2			4			

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029147 ENGINEER KRISTEN H. HILL	
DocuSigned by: kristen Hill E62CFC8B4892425... 3/5/2020	
SIGNATURE DATE	SIGNATURE DATE

-PARK-

50+00

BEGIN CONSTRUCTION
-RETWL2- Sta. 10+00.00 =
-L- Sta. 50+69.83, 20.34' LT

TO HARKERS ISLAND

TO THE STRAITS

-L-

-RETWL2-

TURNING POINT
-RETWL2- Sta. 10+43.63

TURNING POINT
-RETWL2- Sta. 10+68.17

TURNING POINT
-RETWL2- Sta. 11+43.03

END CONSTRUCTION
-RETWL2- Sta. 11+63.90 =
-L- Sta. 51+87.00, 35.54' RT

NAD 83

REINFORCED RETAINING WALL BACKFILL

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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

REINFORCED RETAINING WALL BACKFILL SITE PLAN

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-24