

BM - 7 RR SPIKE SET IN BASE OF PINE TREE -BL- STA.112+37 108.00 RT.  
 EL. = 332.62' N 439,009 E 1,785,376

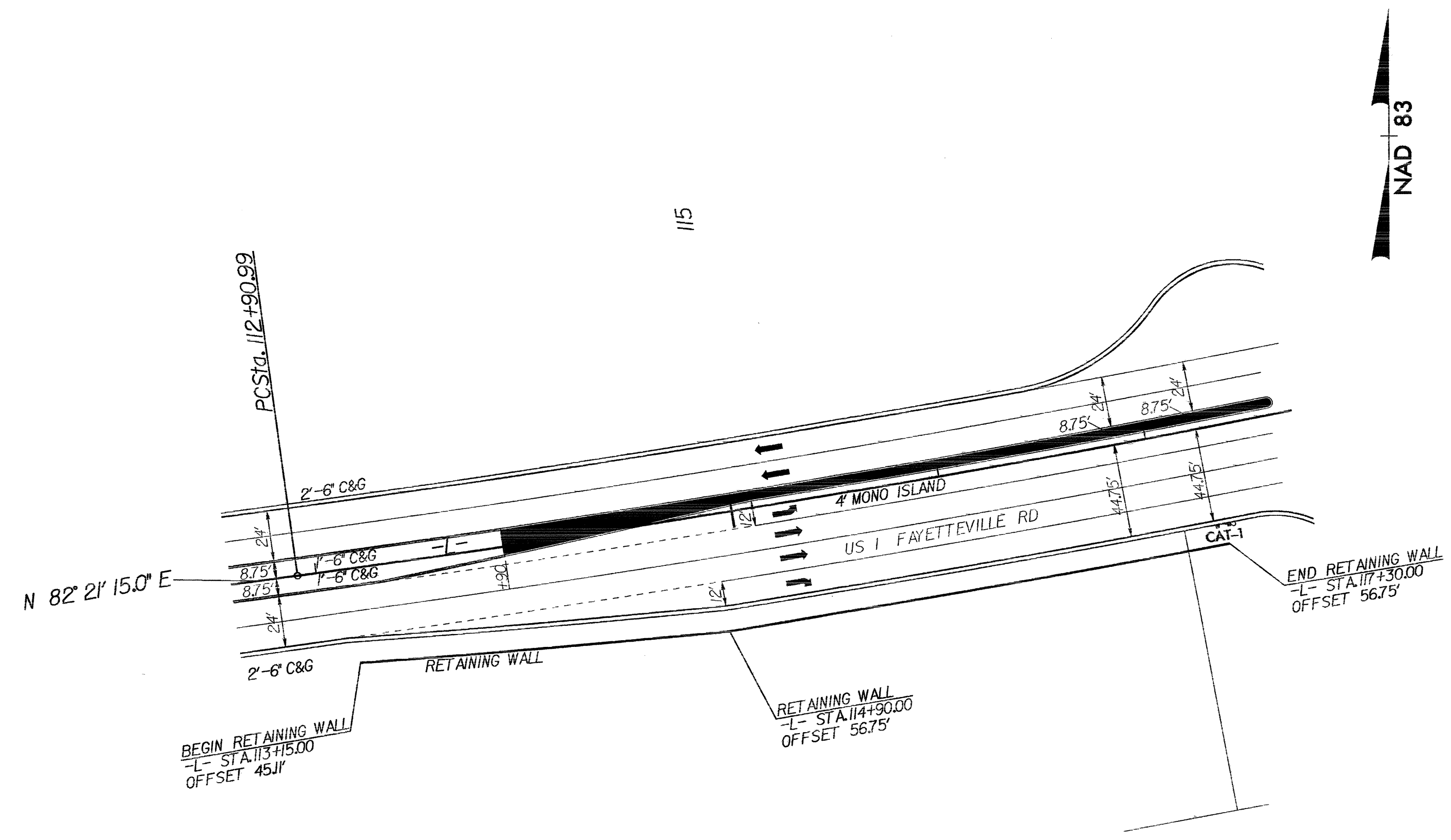
GEOTECHNICAL ENGINEER

ENGINEER

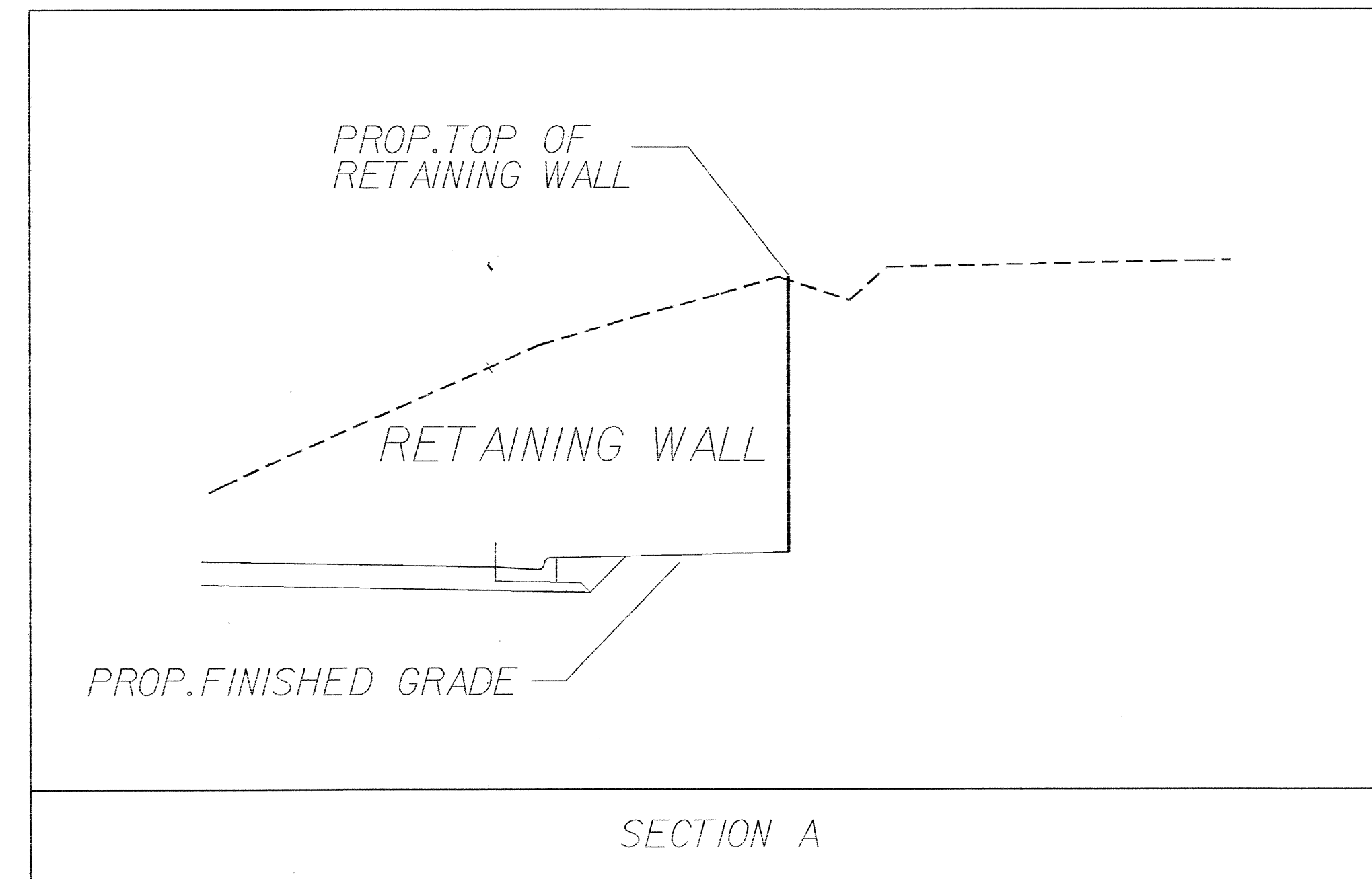
SEAL 29869

DATE 8/14/17

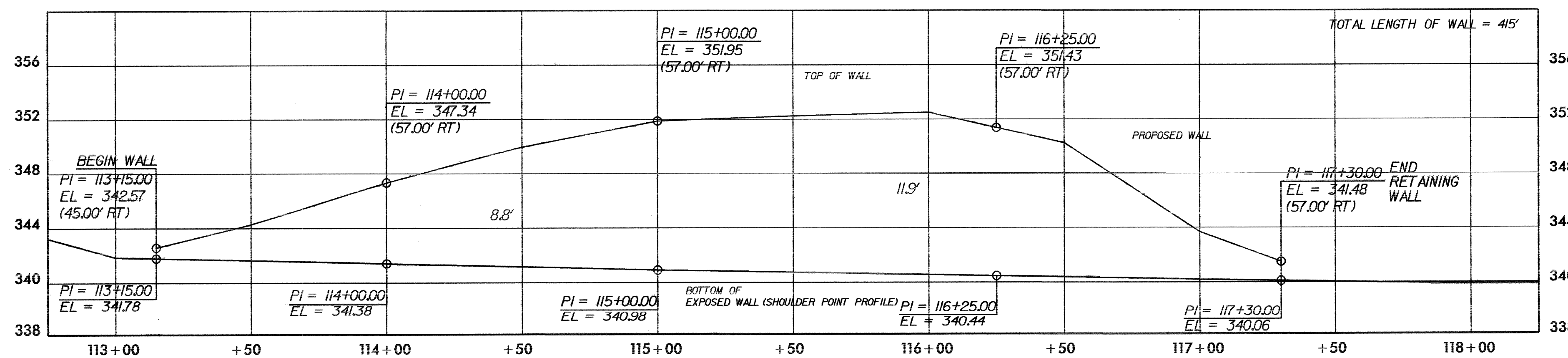
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LOCATION SKETCH



SECTION A



TOTAL STRUCTURE QUANTITIES	
TOTAL PANEL AREA	3653 SQ. FT.

PROJECT NO.: U-3456  
 RICHMOND COUNTY  
 STATION: 113+15.00 -L- TO 117+30.00 -L-  
 SHEET 1 OF 5

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE

WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

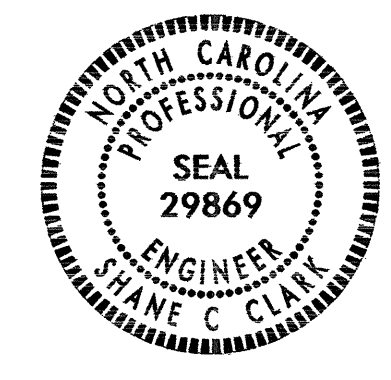
PILE PANEL  
 RETAINING WALL

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

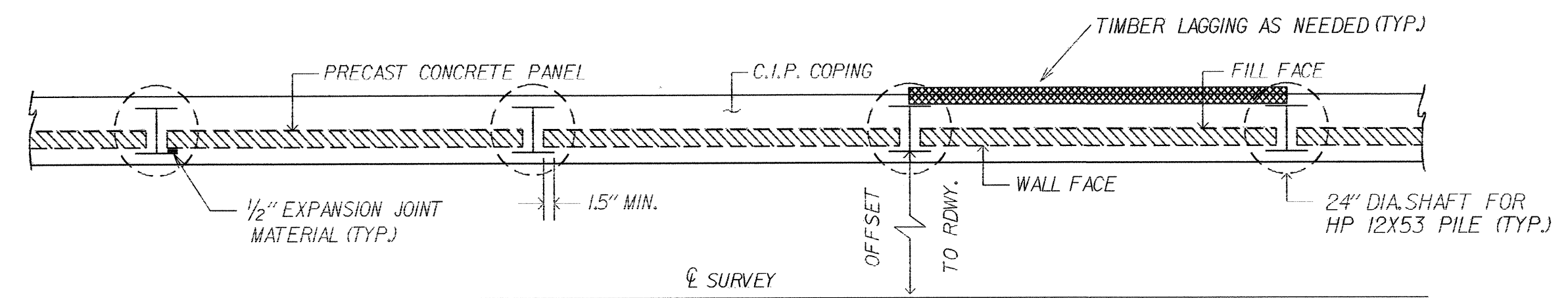
PREPARED BY: J.T. WILLIAMS DATE: 07/11/07  
 REVIEWED BY: S.C. CLARK DATE: 07/11/07

GEOTECHNICAL ENGINEER

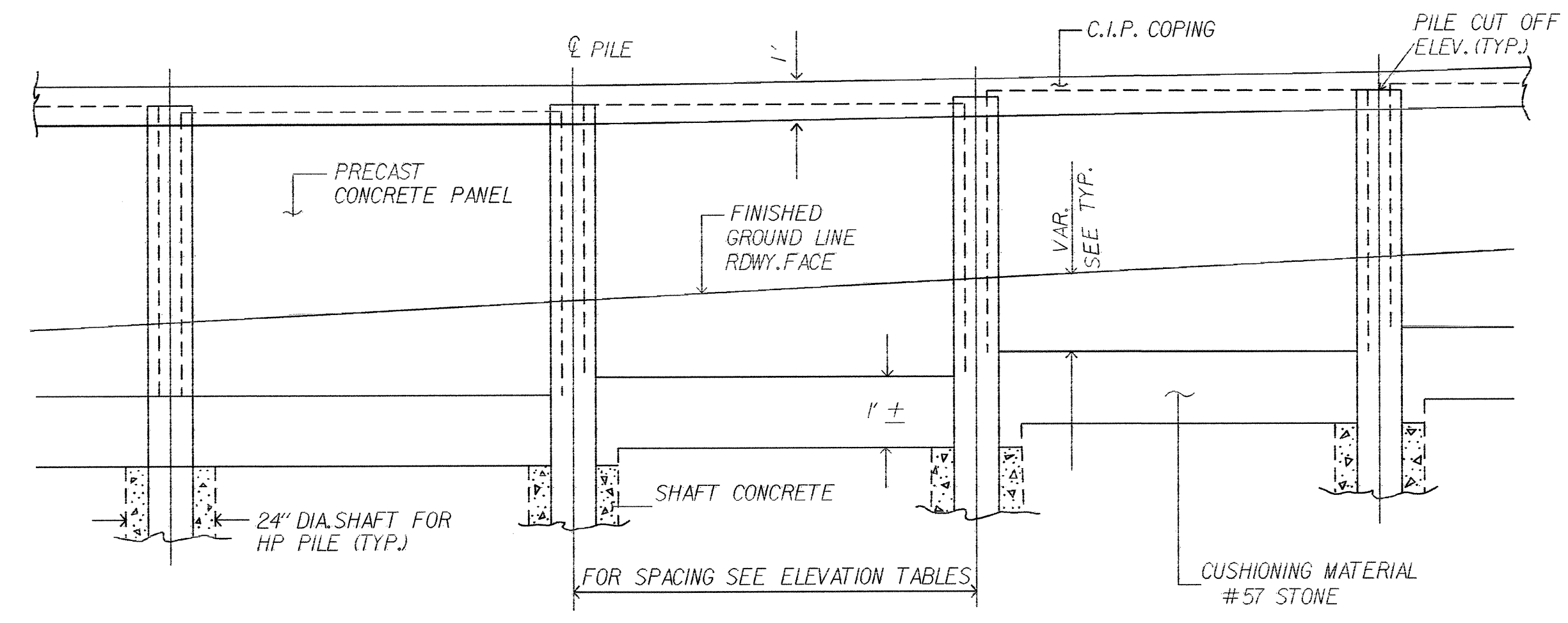
STRUCTURE DESIGN ENGINEER



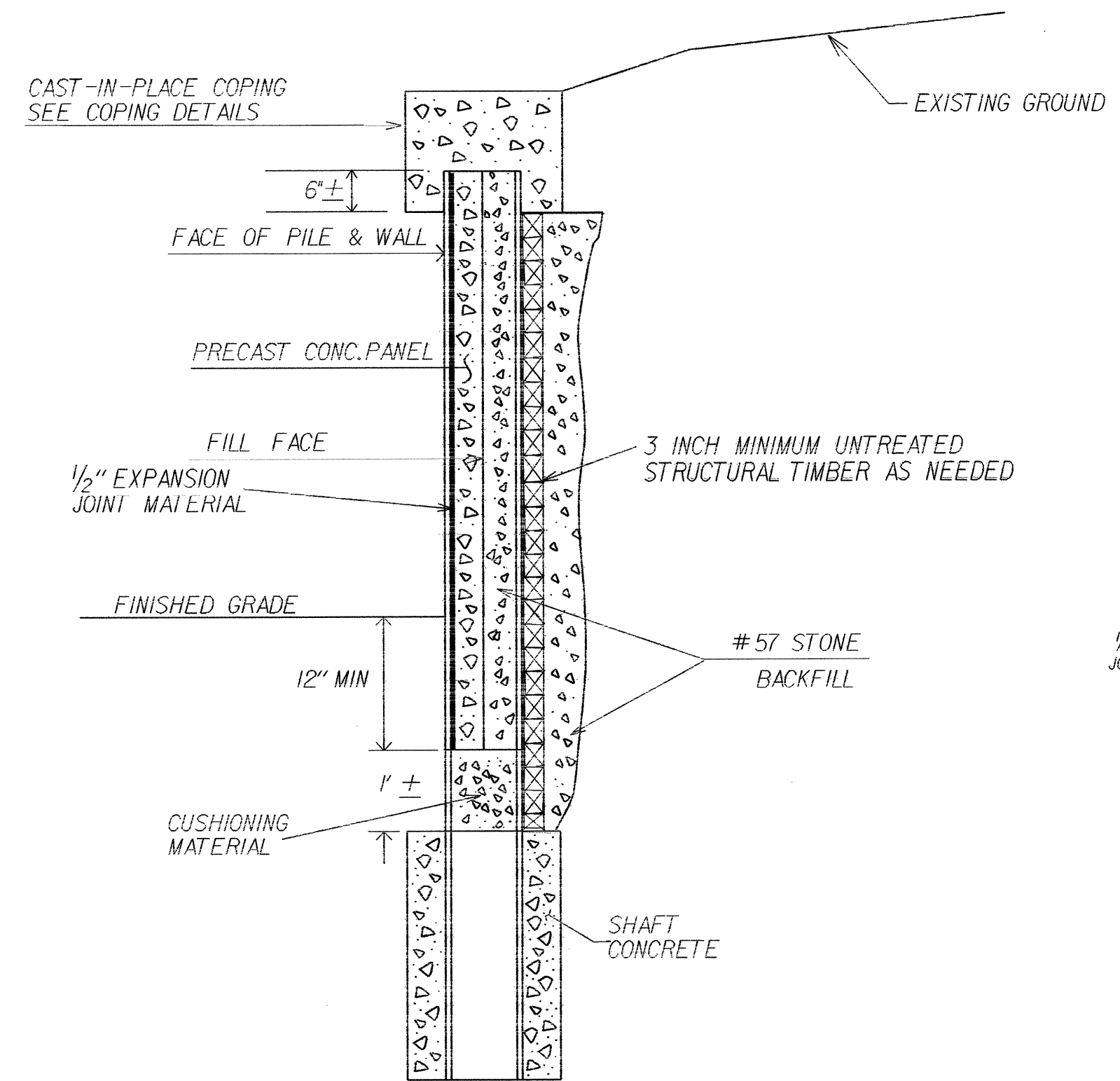
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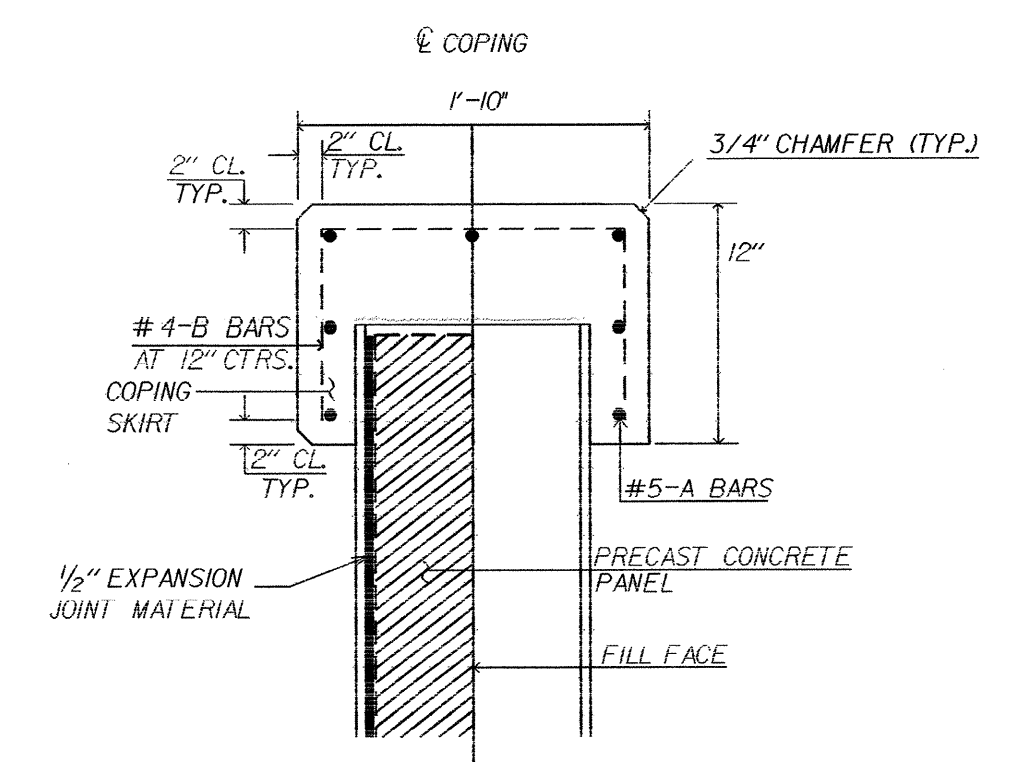
PLAN VIEW  
N.T.S.



ELEVATION VIEW  
N.T.S.



TYPICAL SECTION  
N.T.S.



FULL COPING DETAIL  
N.T.S.

COPING BAR TYPES

ALL DIMENSIONS OUT TO OUT

BAR	COPING TYPE	PILE SIZE	DIMENSION a	DIMENSION b
B	FULL COPING	ALL PILES	8" 1'-5"	1'-6" 1'-4"

NOTES:

- PILES SHALL BE INSTALLED TO THE CUT OFF ELEVATIONS AND LENGTHS SHOWN ON THE PLANS BY PRE-AUGERING OR DRILLING. THE EXCAVATED HOLE SHALL BE 24 INCH MIN. DIAMETER (HP 12X53) OR 30 INCH MIN. (HP 14X73) AND BACKFILLED WITH CONCRETE TO THE BOTTOM OF THE CUSHIONING MATERIAL.
- PILES SHALL MEET THE REQUIREMENTS ACCORDING TO SECTION 1084 IN THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
- PILES SHALL BE PAINTED A COLOR MATCHING THE PRECAST PANELS FROM THE TOP OF THE PILE TO 15 FT BELOW FINISHED GRADE, OR AT THE DISCRETION OF THE ENGINEER.
- SPlicing OF PILES IS ONLY ALLOWED IN THE PORTION OF THE PILE PERMANENTLY BELOW GROUND.
- THE TOP OF THE INSTALLED PILES SHALL BE WITHIN 2 INCHES OF THEIR PLAN LOCATION IN ANY DIRECTION.
- CONCRETE PANELS SHALL HAVE A MINIMUM BEARING DISTANCE OF 15 INCHES ON THE PILE FLANGE. 1/2" THICK EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN THE CONCRETE PANELS AND PILE FLANGES FOR THE WIDTH OF THE BEARING SURFACE.
- THE CONCRETE PANELS SHALL HAVE A VERTICAL BROOMED FINISH FACE. SEE SPECIAL PROVISIONS FOR COLOR, TEXTURE AND AGGREGATE REQUIREMENTS.
- EXCAVATION TO INSTALL PANELS AND TIMBER LAGGING SHALL BE LIMITED TO 6 INCHES BEHIND THE PILES. ANY OVEREXCAVATION SHALL BE BACKFILLED WITH NO. 57 STONE.
- CONCRETE PANELS SHALL BE HELD SECURELY AGAINST PILES UNTIL BACKFILL IS PLACED.
- BOTH CUSHIONING MATERIAL AND BACKFILL MATERIAL BEHIND THE PANELS SHALL BE NO. 57 STONE AND COMPACTED AS REQUIRED BY THE ENGINEER. THE STONE SHALL BE RODDED AND SPREAD IN ORDER TO FILL ALL VOIDS AND INSURE MAXIMUM DENSITY. FLUSHING THE STONE WITH WATER TO AID COMPACTION WILL NOT BE ALLOWED.
- BACKFILLING SHALL BE COMPLETED PRIOR TO FORMING THE COPING.
- THE TOP OF COPING IS TO BE ADJUSTED BY THE ENGINEER TO GIVE A UNIFORM APPEARANCE.
- CONSTRUCTION JOINTS IN COPING ARE PERMITTED AT LOCATIONS WHERE COPING CHANGES SLOPE AND AT 90 FOOT CENTERS. EXPANSION JOINTS ARE NOT PERMITTED.
- THE CONTRACTOR SHALL VERIFY THE LOCATION OF DRAINAGE STRUCTURES AND UTILITIES PRIOR TO INSTALLING PILES.

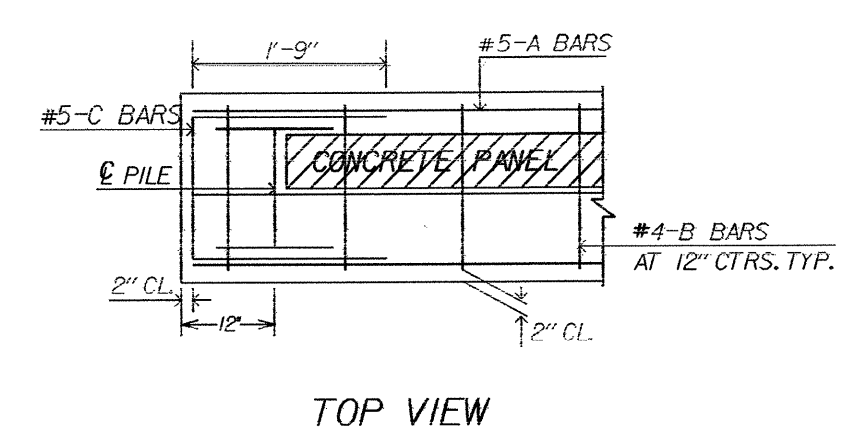
15. EXCAVATION SEQUENCE:

- DRILL MINIMUM 24 INCH DIA SHAFTS FOR 12 INCH PILES FROM NATURAL GROUND. INSTALL PILES AND BACKFILL WITH CONCRETE TO THE TOP OF SHAFT ELEVATIONS BEFORE EXCAVATING TO INSTALL PANELS OR TIMBER LAGGING.
- EXCAVATION TO INSTALL THE PANELS OR LAGGING SHALL BE VERTICAL, HAVE A MAXIMUM LIFT HEIGHT OF 4 FEET AND BE LIMITED IN EXTENT TO ONLY WHAT IS NECESSARY.
- TIMBER LAGGING IS NEEDED ONLY TO MEET OSHA REQUIREMENTS FOR SAFE EXCAVATION HEIGHTS. IF CUT IS LESS THAN 4 FEET HIGH, LAGGING IS NOT REQUIRED.
- THE LAGGING SHALL HAVE A MINIMUM BEARING DISTANCE OF 3 INCHES ON THE PILE FLANGE.
- UNTREATED STRUCTURAL TIMBERS SHALL BE A MINIMUM OF 3 INCHES THICK AND SHALL CONFORM TO THE APPLICABLE PARTS OF SECTIONS 445 AND 1082 OF THE STANDARD SPECIFICATIONS.
- PLACE BACKFILL BEHIND THE LAGGING IMMEDIATELY AFTER INSTALLATION.
- WHERE PRACTICAL, THE TOP FEW PIECES OF LAGGING SHALL BE REMOVED PRIOR TO BACKFILLING BEHIND PANELS. ALL OTHER LAGGING SHALL BE LEFT IN PLACE.
- THE CONTRACTOR MAY ELECT TO USE AN ALTERNATE METHOD OF PROVIDING A SAFE EXCAVATION. HOWEVER, THE ALTERNATE METHOD MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

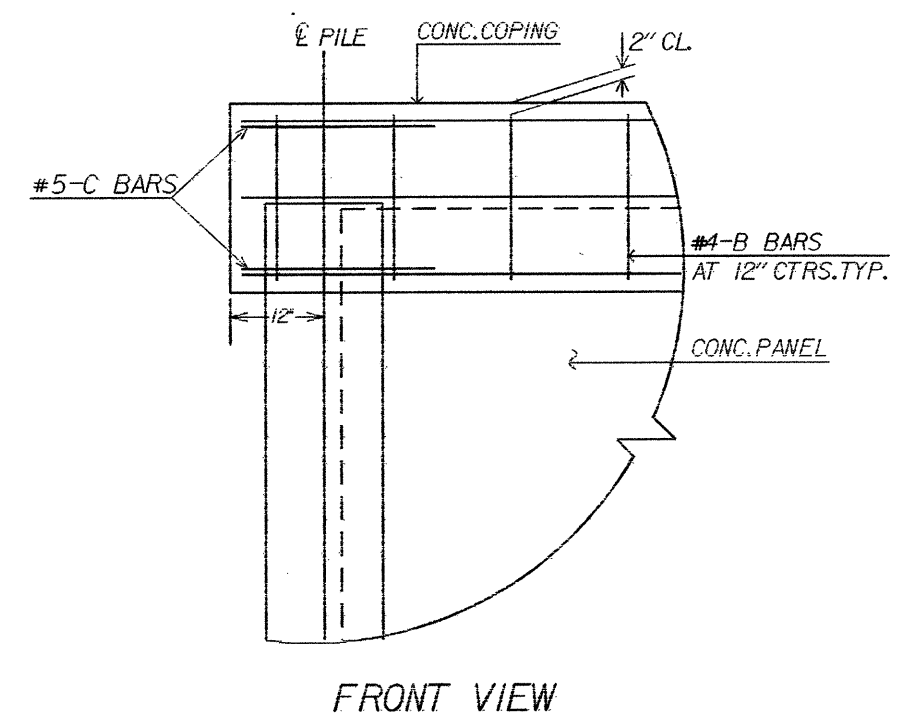
16. WHEN INSTALLING PILES OF DIFFERENT SIZES, HP 12 X 53 AND HP 14 X 73, THE EXPOSED FLANGES SHALL LINE UP TO CREATE A SMOOTH SURFACE FOR THE PANELS TO REST AGAINST.

17. BEFORE CASTING THE WALL PANELS, SURVEY ALL EXISTING GROUND ELEVATIONS SHOWN ON THE PLANS AND SUBMIT A REVISED ALL ENVELOPE FOR REVIEW. DO NOT BEGIN CASTING UNTIL THIS ENVELOPE IS ACCEPTED.

17. NOTE: THE ELEVATION VIEW SHOWN IS THE SHOWN FROM THE BACK OF THE WALL.



TOP VIEW



FRONT VIEW

END OF COPING DETAILS  
N.T.S.

PROJECT NO.: U-3456  
 RICHMOND COUNTY  
 STATION: 113+15.00 -L- TO 117+30.00 -L-  
 SHEET 2 OF 5

**GEOTECHNICAL ENGINEERING UNIT**

EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE

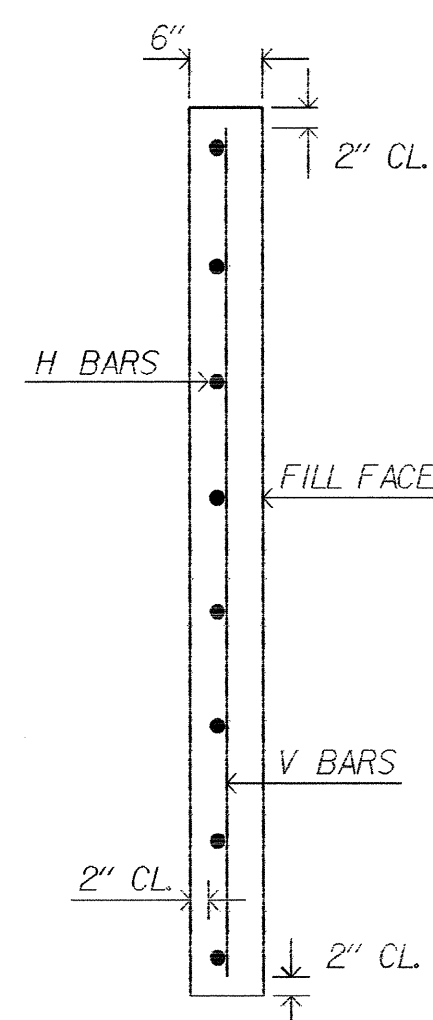
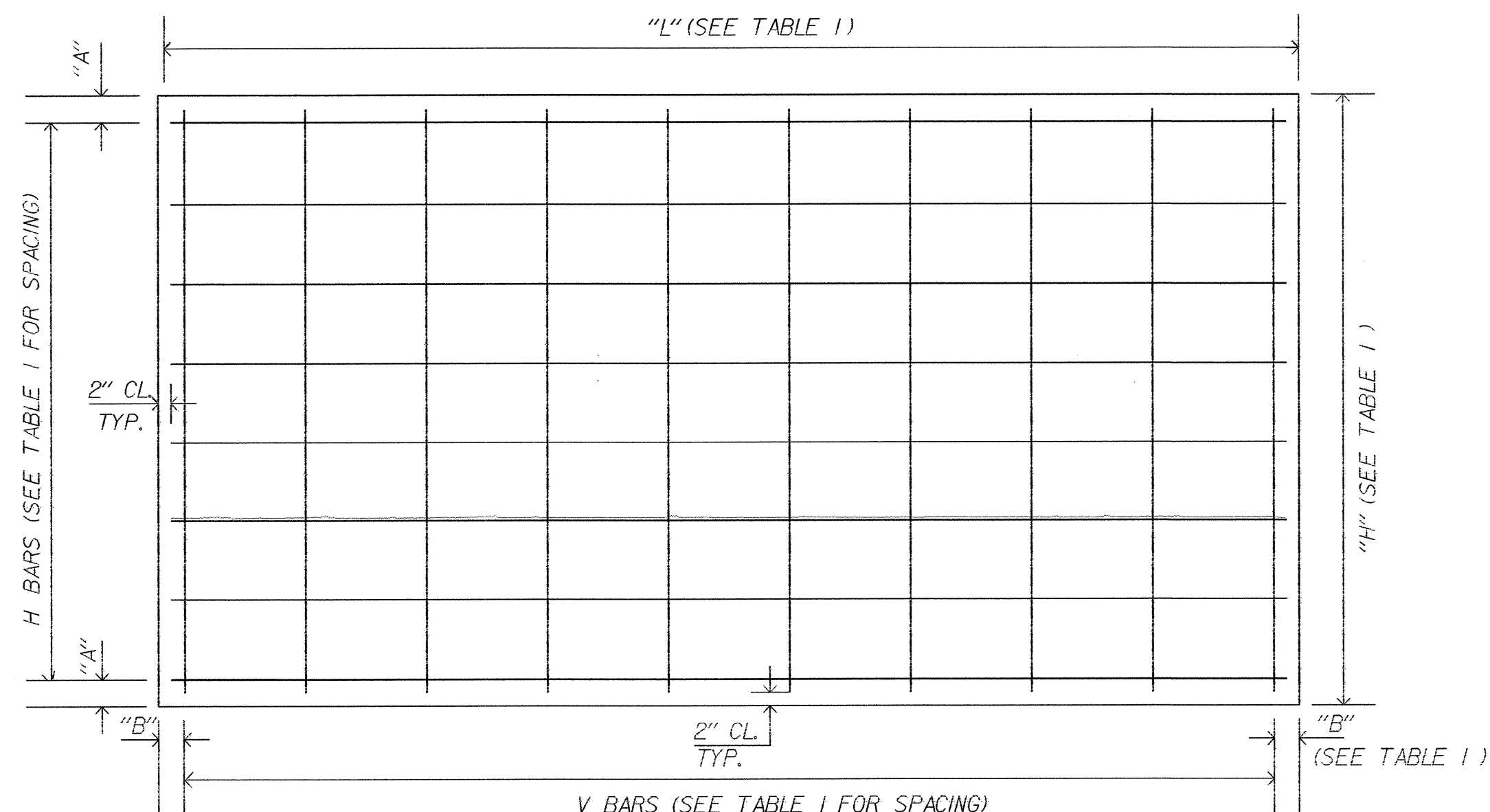
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**PILE PANEL WALL  
RICHMOND COUNTY**

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

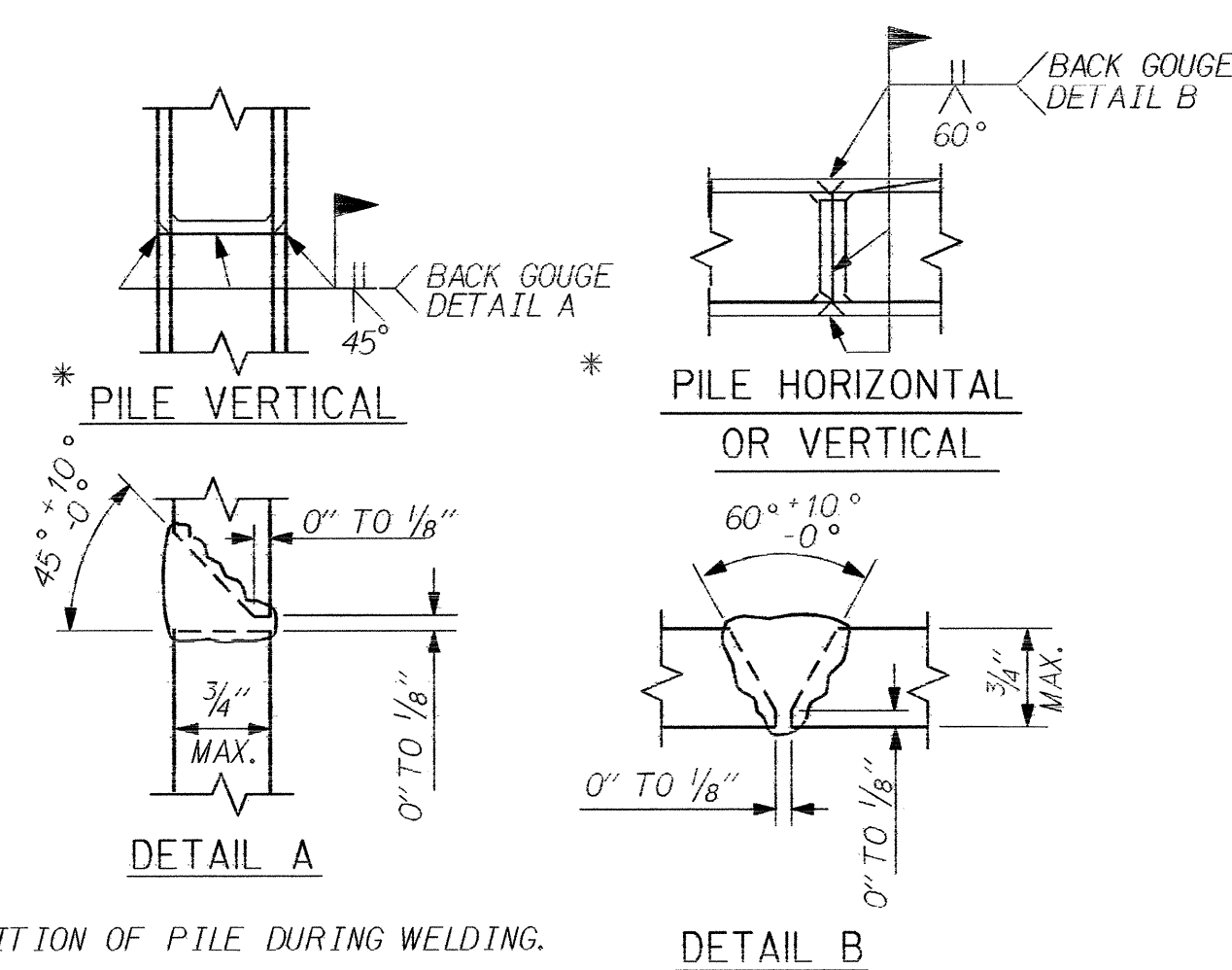


Signature: *SL Clark* Date: 01/07



PRECAST PANEL DETAIL  
N.T.S.

PANEL TYPE	NO. REQ'D	"H"	"L"	BAR TYPES				"A"	"B"	CONC. CY. PER PANEL
				HORIZONTAL		VERTICAL				
				NO. PER PANEL	c-c SPACING	NO. PER PANEL	c-c SPACING			
A2	2	3'	7'-0"	6-H2	6"	14-V1	6"	3.00'	3.00'	0.39
A3	2	3'	4'-6"	6-H1	6"	9-V1	6"	3.00'	3.00'	0.25
B2	4	4'	7'-0"	8-H2	6"	14-V2	6"	3.00'	3.00'	0.52
C2	4	5'	7'-0"	10-H2	6"	14-V3	6"	3.00'	3.00'	0.65
D2	3	6'	7'-0"	12-H2	6"	14-V4	6"	3.00'	3.00'	0.78
E2	3	7'	7'-0"	14-H2	6"	14-V5	6"	3.00'	3.00'	0.91
F2	3	8'	7'-0"	16-H2	6"	14-V6	6"	3.00'	3.00'	1.03
G2	4	9'	7'-0"	18-H2	6"	14-V7	6"	3.00'	3.00'	1.17
H2	3	10'	7'-0"	24-H2	5"	14-V8	6"	3.00'	3.00'	1.30
J2	5	11'	7'-0"	26-H2	5"	14-V9	6"	3.50'	3.00'	1.43
K2	7	12'	7'-0"	30-H2	4.75"	14-V10	6"	3.00'	3.00'	1.56
L2	16	13'	7'-0"	34-H2	4.50"	14-V11	6"	3.75'	3.00'	1.69



PILE SPLICE DETAILS  
N.T.S.

BILL OF MATERIALS FOR RETAINING WALL

PRECAST CONCRETE PANELS					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS)
H1	12	#4	STR	4'-2"	33
H2	1238	#4	STR	6'-8"	4667
V1	46	#4	STR	2'-8"	82
V2	56	#4	STR	3'-8"	138
V3	56	#4	STR	4'-8"	175
V4	42	#4	STR	5'-8"	159
V5	42	#4	STR	6'-8"	187
V6	42	#4	STR	7'-8"	215
V7	56	#4	STR	8'-8"	324
V8	42	#4	STR	9'-8"	271
V9	70	#4	STR	10'-8"	499
V10	98	#4	STR	11'-8"	764
V11	224	#4	STR	12'-8"	1895

REINFORCING STEEL (PANELS) LBS 9409  
CLASS 'AA' CONCRETE (PANELS) CU YDS 68

CAST-IN-PLACE (C.I.P.) COPING					
NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS)	CU YDS
A	105	#5	STR	30'-0"	3286
B	417	#4	1	2'-10"	789
C	4	#5	2	4'-10"	97

REINFORCING STEEL (COPING) LBS 4172  
CLASS 'A' CONCRETE (COPING) CU YDS 29

ESTIMATED QUANTITIES			
PRECAST CONCRETE PANEL TYPE	NO.	WEIGHT (LBS)	CU YDS
A2	2	132	0.39
A3	2	102	0.25
B2	4	208	0.52
C2	4	260	0.65
D2	3	312	0.78
E2	3	364	0.91
F2	3	416	1.03
G2	4	478	1.17
H2	3	540	1.30
J2	5	602	1.43
K2	7	664	1.56
L2	16	1316	1.69

HP12X53 STEEL PILES	NO. = 25	LF = 388
HP14X73 STEEL PILES	NO. = 32	LF = 935
C.I.P. COPING		LF = 416
NO. 57 STONE		CU YDS = 400
SHAFT EXCAVATION		LF = 652
SHAFT CONCRETE, CLASS 'AA'		CU YDS = 76

PILE ELEVATIONS AND PANEL TYPES FOR RETAINING WALL

PILE STATION BEGIN WALL	PILE SIZE	PILE SPACE	PILE LENGTH	TOP SHAFT CONC ELEV (FT)	CUTOFF ELEV (FT)
113+15.00	HP 12X53	5.0	10.0	339.66	343.66
113+20.00	HP 12X53	7.5	10.0	339.66	343.66
113+27.50	HP 12X53	7.5	10.0	339.66	343.66
113+35.00	HP 12X53	7.5	10.0	339.66	344.66
113+42.50	HP 12X53	7.5	10.0	339.66	344.66
113+50.00	HP 12X53	7.5	14.0	339.45	345.45
113+57.50	HP 12X53	7.5	14.0	339.45	345.45
113+65.00	HP 12X53	7.5	14.0	339.45	346.45
113+72.50	HP 12X53	7.5	14.0	339.45	346.45
113+80.00	HP 12X53	7.5	19.0	339.45	347.45
113+87.50	HP 12X53	7.5	19.0	339.45	347.45
113+95.00	HP 12X53	7.5	19.0	339.20	348.20
114+02.50	HP 12X53	7.5	19.0	339.20	348.20
114+10.00	HP 12X53	7.5	24.0	339.20	349.20
114+17.50	HP 12X53	7.5	24.0	339.20	349.20
114+25.00	HP 12X53	7.5	24.0	339.20	349.20
114+32.50	HP 14X73	7.5	24.0	339.20	350.20
114+40.00	HP 14X73	7.5	24.0	339.20	350.20
114+47.50	HP 14X73	7.5	28.0	338.95	350.95
114+55.00	HP 14X73	7.5	28.0	338.95	350.95
114+62.50	HP 14X73	7.5	28.0	338.95	350.95
114+70.00	HP 14X73	7.5	28.0	338.95	351.95
114+77.50	HP 14X73	7.5	28.0	338.95	351.95
114+85.00	HP 14X73	7.5	28.0	338.95	351.95
114+92.50	HP 14X73	7.5	28.0	338.95	351.95
115+00.00	HP 14X73	7.5	31.0	338.59	352.59
115+07.50	HP 14X73	7.5	31.0	338.59	352.59
115+15.00	HP 14X73	7.5	31.0	338.59	352.59
115+22.50	HP 14X73	7.5	31.0	338.59	352.59
115+30.00	HP 14X73	7.5	31.0	338.59	352.59
115+37.50	HP 14X73	7.5	31.0	338.59	352.59
115+45.00	HP 14X73	7.5	31.0	338.59	352.59
115+52.50	HP 14X73	7.5	31.0	338.59	352.59
115+60.00	HP 14X73	7.5	31.0	338.59	352.59
115+67.50	HP 14X73	7.5	31.0	338.59	352.59
115+75.00	HP 14X73	7.5	31.0	338.59	352.59
115+82.50	HP 14X73	7.5	31.0	338.59	352.59
115+90.00	HP 14X73	7.5	31.0	338.59	352.59
115+97.50	HP 14X73	7.5	31.0	338.25	352.25
116+05.00	HP 14X73	7.5	31.0	338.25	352.25
116+12.50	HP 14X73	7.5	31.0	338.25	352.25
116+20.00	HP 14X73	7.5	31.0	338.25	352.25
116+27.50	HP 14X73	7.5	28.0	338.25	351.25
116+35.00	HP 14X73	7.5	28.0	338.25	351.25
116+42.50	HP 14X73	7.5	28.0	338.25	351.25
116+50.00	HP 14X73	7.5	28.0	338.25	350.25
116+57.50	HP 14X73	7.5	28.0	338.25	350.25
116+65.00	HP 14X73	7.5	24.0	338.25	349.25
116+72.50	HP 12X53	7.5	24.0	338.25	348.25
116+80.00	HP 12X53	7.5	19.0	338.25	347.25
116+87.50	HP 12X53	7.5	19.0	338.25	346.25
116+95.00	HP 12X53	7.5	14.0	338.10	345.10
117+02.50	HP 12X53	7.5	14.0	338.10	344.10
117+10.00	HP 12X53	7.5	14.0	338.10	344.10
117+17.50	HP 12X53	7.5	10.0	338.10	343.10
116+25.00	HP 12X53	7.5	10.0	338.10	343.10
117+30.00	HP 12X53	5.0	10.0	338.10	342.10

ALL STEEL PILES ARE ASTM GRADE 50 STEEL

PROJECT U-3456  
RICHMOND COUNTY  
STATION 113+15 -L- to 117+30 -L-

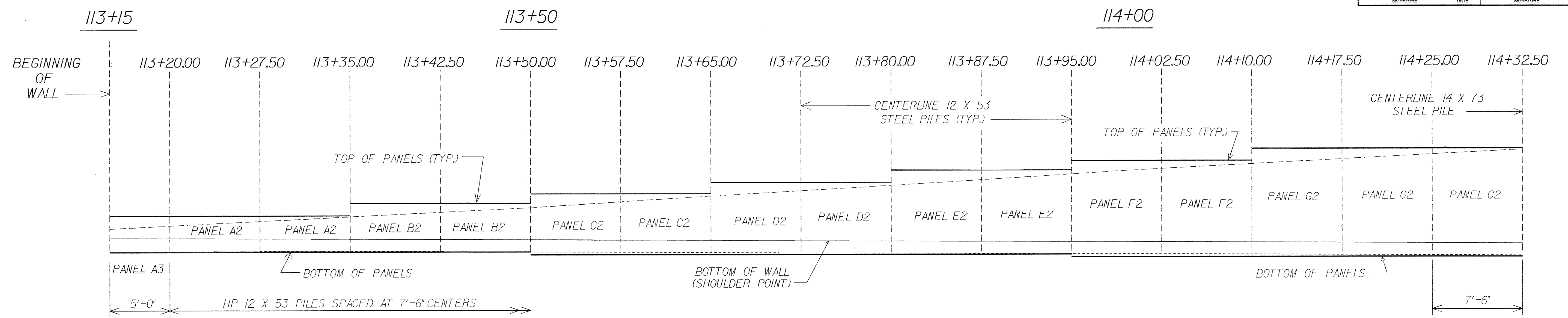
PILE PANEL WALL  
RICHMOND COUNTY

REVISIONS

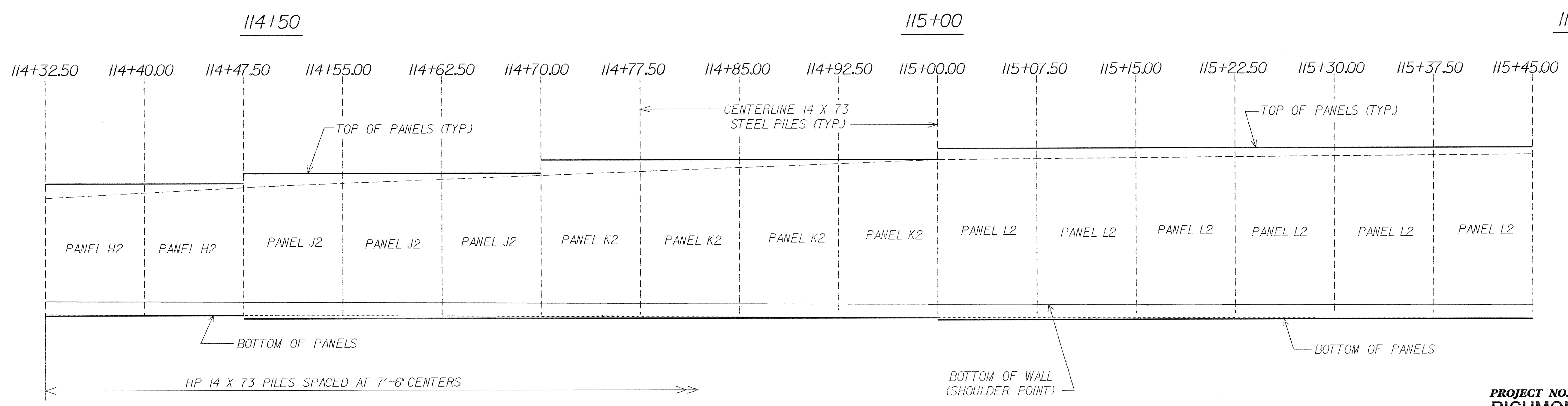
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GEOTECHNICAL ENGINEERING UNIT  
 EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

PREPARED BY: E. J. SALVO DATE: 05/07  
REVIEWED BY: S.C.C. DATE: 07/07



**ELEVATION OF WALL**  
STA. 113+15 TO STA. 114+32.50

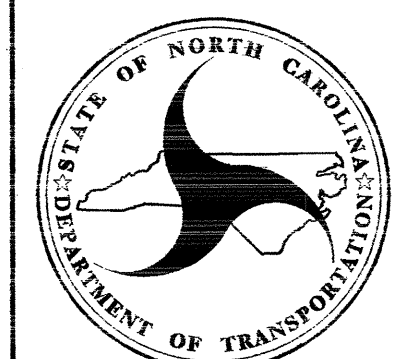


**ELEVATION OF WALL**  
STA. 114+32.50 TO STA. 115+45

**PROJECT NO.:** U-3456  
**RICHMOND COUNTY**  
**STATION:** 113+15.00 -L- TO 117+30.00 -L-  
SHEET 4 OF 5

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**DEPARTMENT OF TRANSPORTATION**  
**RALEIGH**

**PILE PANEL WALL**  
**RICHMOND COUNTY**

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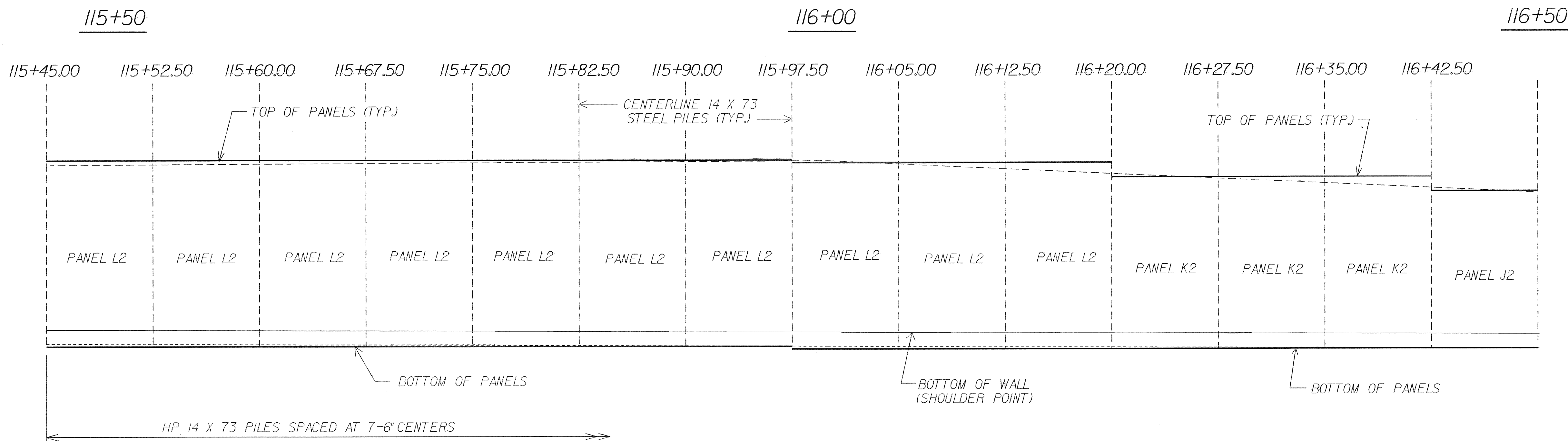
NOTES: FOR TOP OF SHAFT CONCRETE ELEVATION, SEE PILE / PANEL WALL DETAILS SHEET.  
FOR TOP OF HP 12 X 53 PILE CUTOFF ELEVATION, SEE PILE / PANEL WALL DETAILS SHEET.

PREPARED BY: E.J. SALVO	DATE: 01/05
REVIEWED BY: S. CLARK	DATE: 07/07



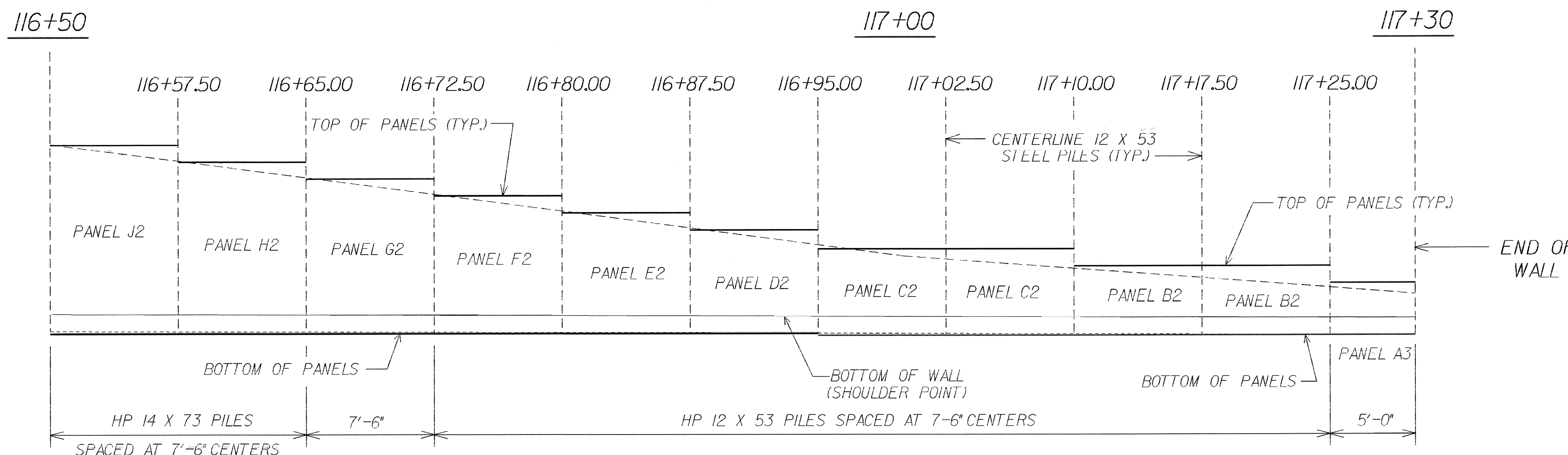
S. Clark Blah

SIGNATURE DATE



ELEVATION OF WALL

STA. 115+45 TO STA. 116+50



ELEVATION OF WALL

STA. 116+50 TO STA. 117+30

NOTES: FOR TOP OF SHAFT CONCRETE ELEVATION, SEE PILE / PANEL WALL DETAILS SHEET.  
FOR TOP OF PILE CUTOFF ELEVATIONS, SEE PILE / PANEL WALL DETAILS SHEET.

PROJECT NO.: U-3456  
RICHMOND COUNTY  
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SHEET 5 OF 5

PREPARED BY: E.J. SALVO DATE: 01/05  
REVIEWED BY: S. CLARK DATE: 07/07

**GEOTECHNICAL ENGINEERING UNIT**  
 EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE

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PILE PANEL WALL  
RICHMOND COUNTY

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