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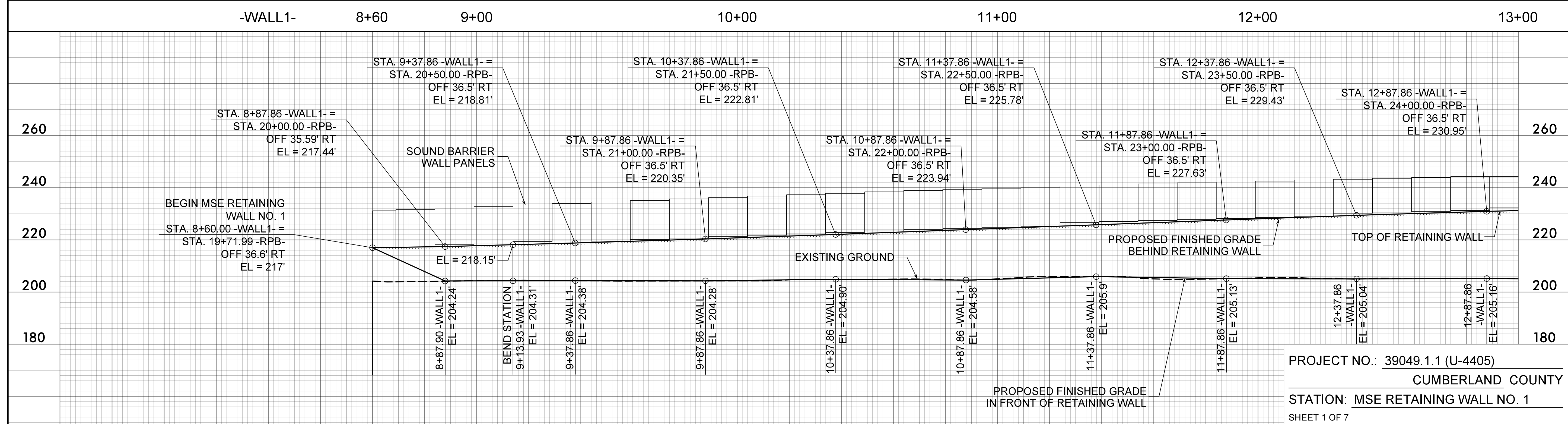
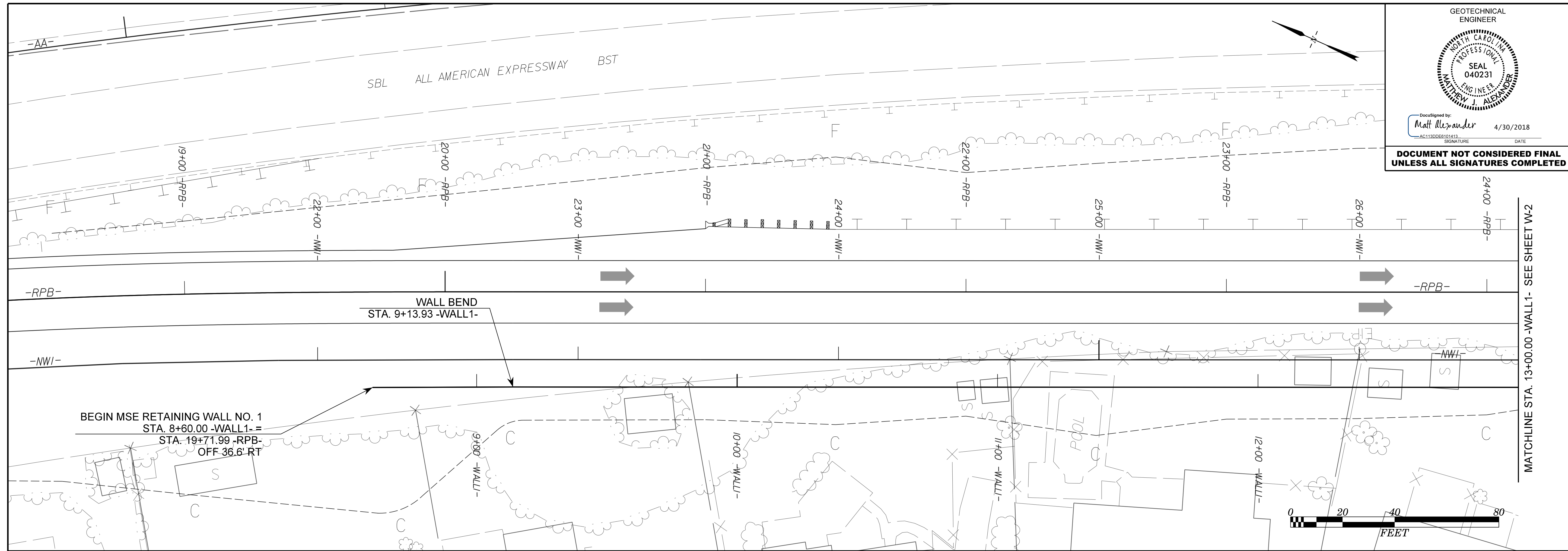
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GEOTECHNICAL ENGINEER

DocuSigned by:  
**Matthew J. Alexander**  
 AC1130000101413  
 SIGNATURE DATE 4/30/2018

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NOTE: SOUND BARRIER WALL FOUNDATIONS NOT SHOWN.

PREPARED BY: ALEXANDER, M. J. DATE: 4/11/18  
 REVIEWED BY: NASH, A. A. DATE: 4/11/18

ENVELOPE HORIZONTAL / VERTICAL SCALE

0 20 40 80 FEET

Prepared in the Office of:

**Terracon**  
 Consulting Engineers and Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 NC REGISTERED ENGINEERING FIRM: F-0869  
 NC REGISTERED GEOLOGIC FIRM: C-367

MSE RETAINING WALL NO. 1  
 PLAN AND ENVELOPE  
 SHEET 1 OF 2

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

SHEET NO. W-1



SBL ALL AMERICAN EXPRESSWAY BST

END MSE  
RETAINING WALL NO. 1  
STA. 16+20.43 -WALL1- =  
STA. 26+91.03 -RPB-  
OFF 54' LT

END SOUND BARRIER WALL 1  
STA. 28+30.00 -NW1- =  
STA. 14+68.94 -WALL1-  
OFF 10.5' LT

MATCHLINE STA. 13+00.00 -WALL1- SEE SHEET WL-1

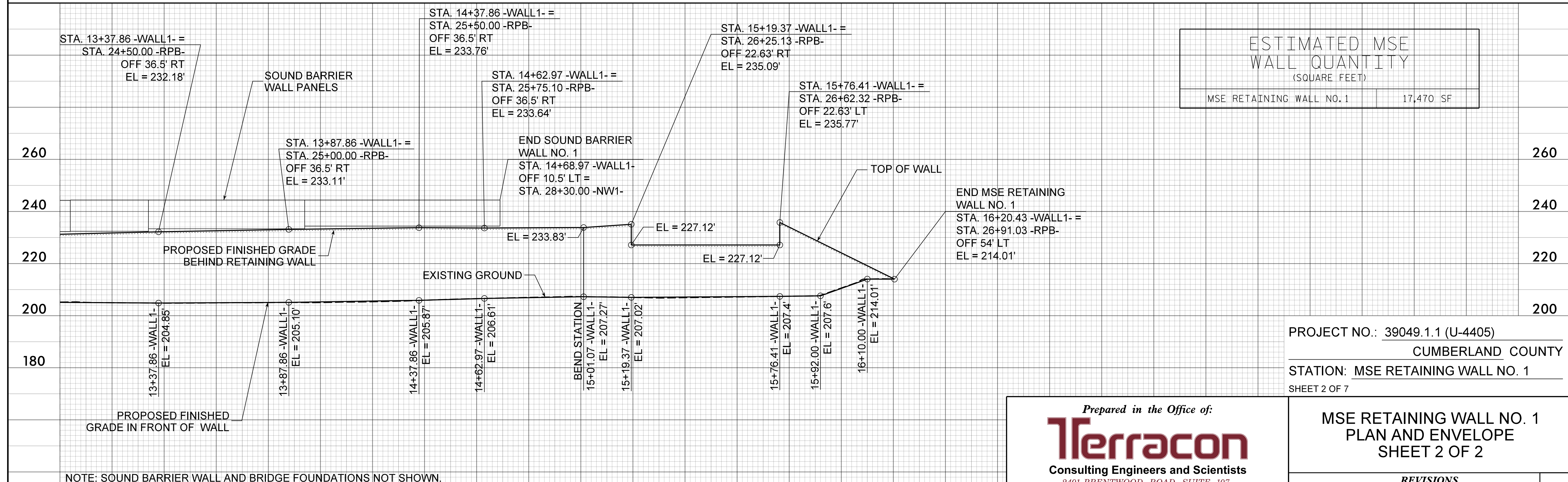
13+00 14+00 15+00 16+00 -WALL1-

GEOTECHNICAL ENGINEER

DocuSigned by:  
**Matthew J. Alexander**  
4/30/2018

DATE

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ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 1	17,470 SF

PROJECT NO.: 39049.1.1 (U-4405)  
CUMBERLAND COUNTY  
STATION: MSE RETAINING WALL NO. 1  
SHEET 2 OF 7

PREPARED BY: ALEXANDER, M. J. DATE: 4/11/18  
REVIEWED BY: NASH, A. A. DATE: 4/11/18

ENVELOPE HORIZONTAL / VERTICAL SCALE



Prepared in the Office of:

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Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367

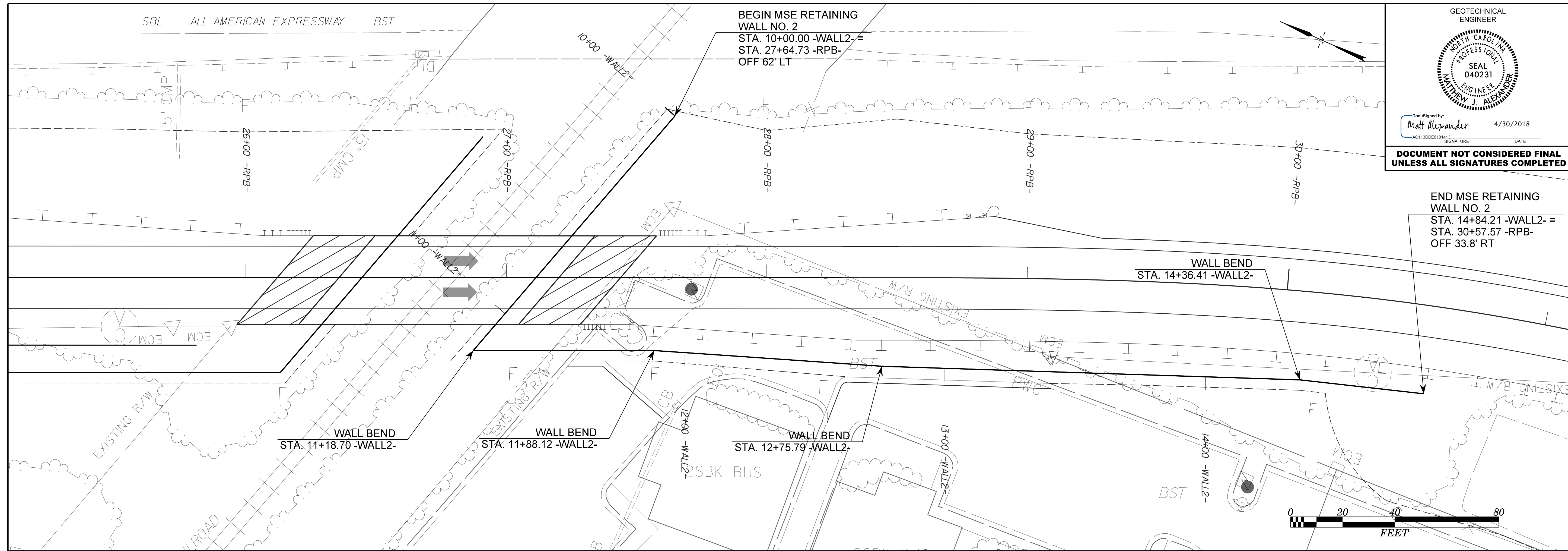
MSE RETAINING WALL NO. 1  
PLAN AND ENVELOPE  
SHEET 2 OF 2

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

SHEET NO. W-2

NOTE: SOUND BARRIER WALL AND BRIDGE FOUNDATIONS NOT SHOWN.

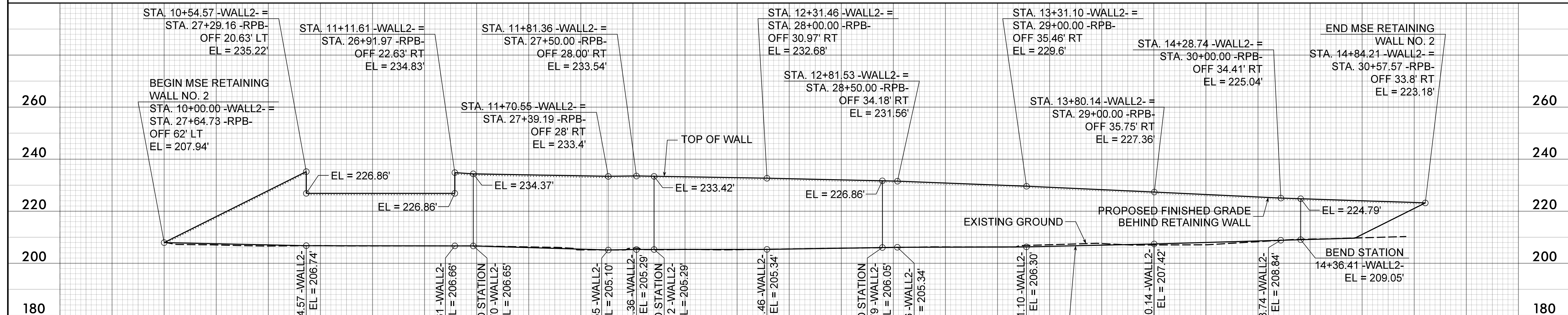




GEOTECHNICAL ENGINEER  
 SEAL 040231  
 MATT ALEXANDER  
 DATE: 4/30/2018  
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-WALL2- 10+00 11+00 12+00 13+00 14+00 -WALL2-



ESTIMATED MSE WALL QUANTITY (SQUARE FEET)	
MSE RETAINING WALL NO. 2	11,360 SF

PROJECT NO.: 39049.1.1 (U-4405)  
 CUMBERLAND COUNTY  
 STATION: MSE RETAINING WALL NO. 2  
 SHEET 3 OF 7

Prepared in the Office of:

# Terracon

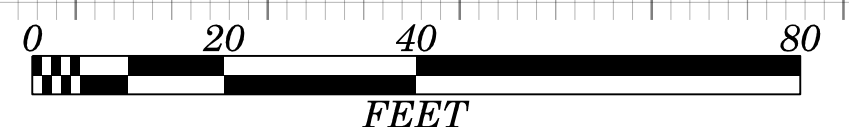
Consulting Engineers and Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 NC REGISTERED ENGINEERING FIRM: F-0869  
 NC REGISTERED GEOLOGIC FIRM: C-367

REVISIONS					
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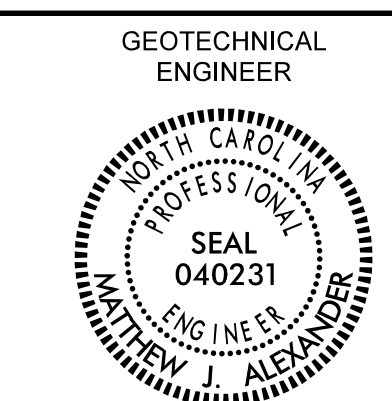
SHEET NO. W-3

PREPARED BY: ALEXANDER, M. J. DATE: 4/24/18  
 REVIEWED BY: NASH, A. A. DATE: 4/24/18

ENVELOPE HORIZONTAL / VERTICAL SCALE

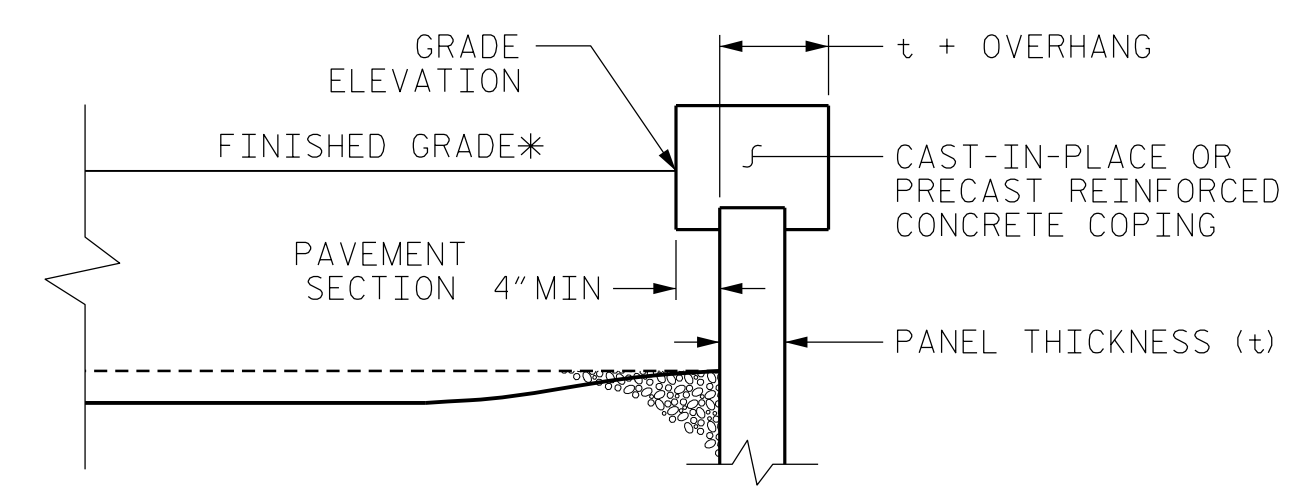
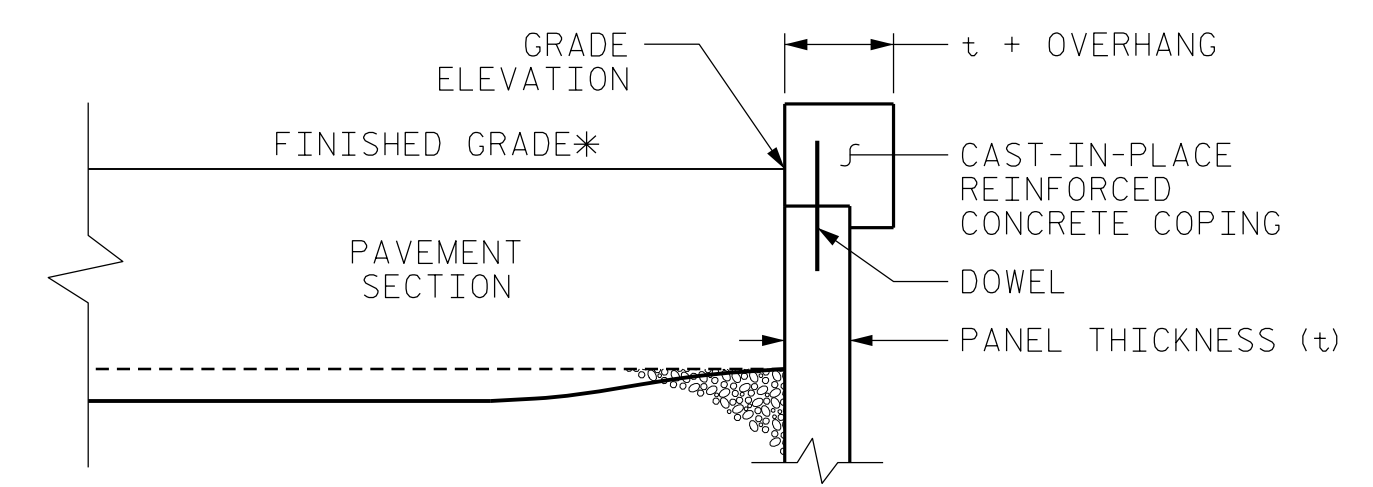
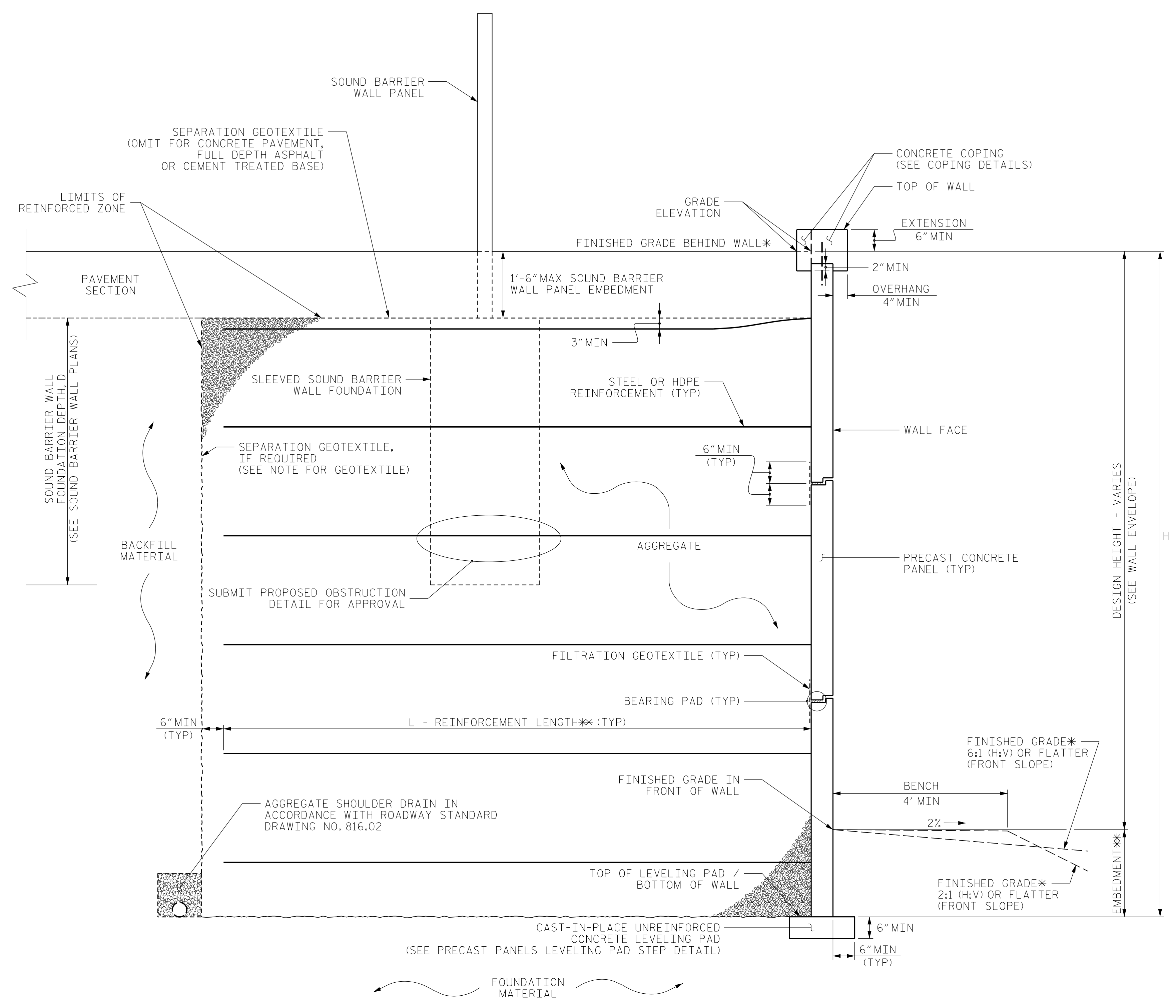






DocuSigned by:  
 Matt Alexander  
 4/30/2018  
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**COPING DETAILS**

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS. \*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

**MSE WALL WITH PRECAST PANELS AND SOUND BARRIER WALL FOUNDATIONS IN REINFORCED ZONE - TYPICAL SECTION**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: 39049.1.1 (U-4405)  
 CUMBERLAND COUNTY  
 STATION: MSE RETAINING WALL NO. 1  
 SHEET 4 OF 7

PREPARED BY: ALEXANDER, M. J.	DATE: 4/4/18
REVIEWED BY: NASH, A. A.	DATE: 4/5/18

Prepared in the Office of:  
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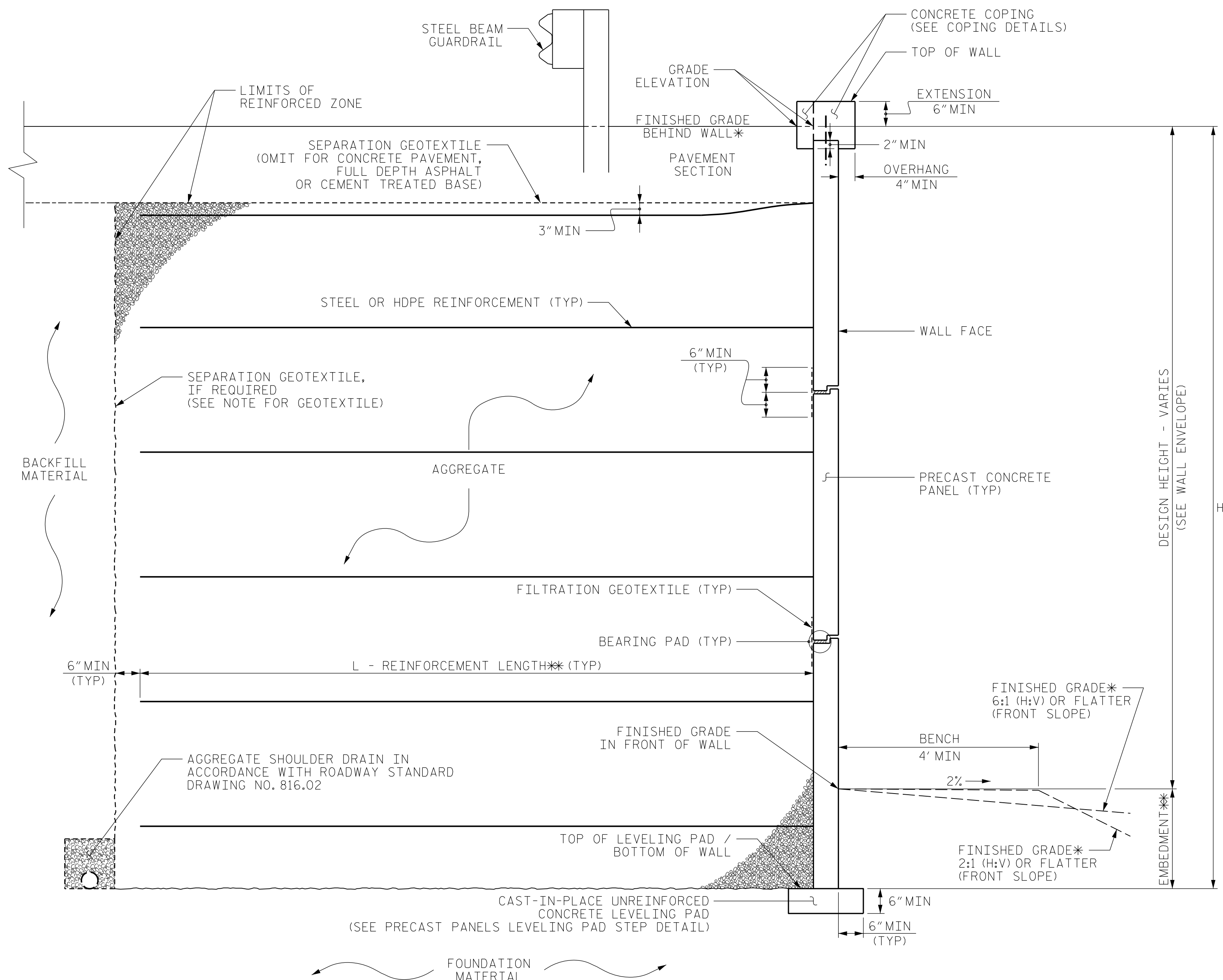
**NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS**

**GEOTECHNICAL  
 ENGINEERING UNIT**

**MSE RETAINING WALL NO. 1  
 TYPICAL SECTION WITH SOUND  
 BARRIER WALL FOUNDATIONS**

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

SHEET NO. W-4



**MSE WALL WITH PRECAST PANELS - TYPICAL SECTION**

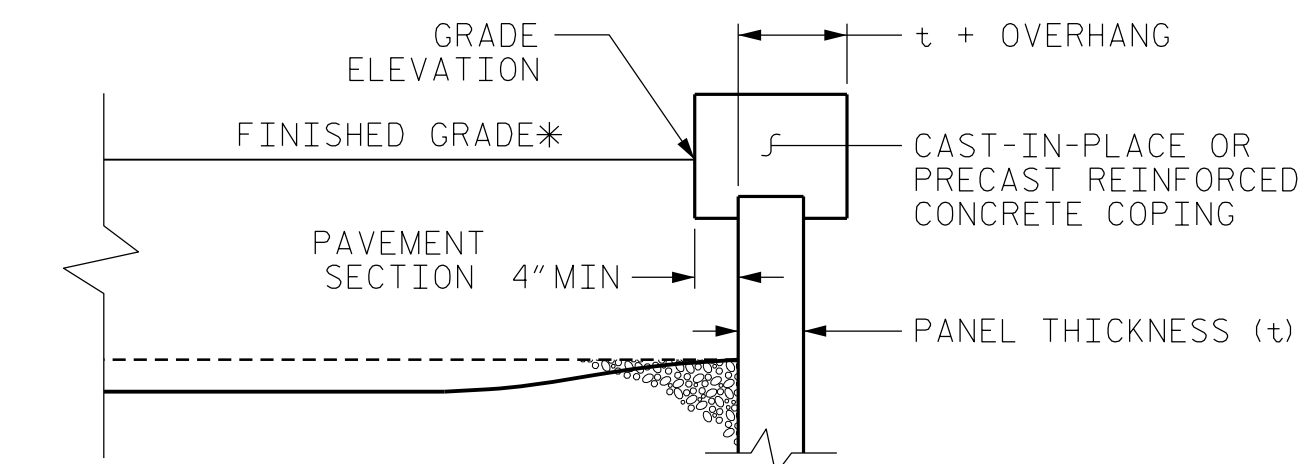
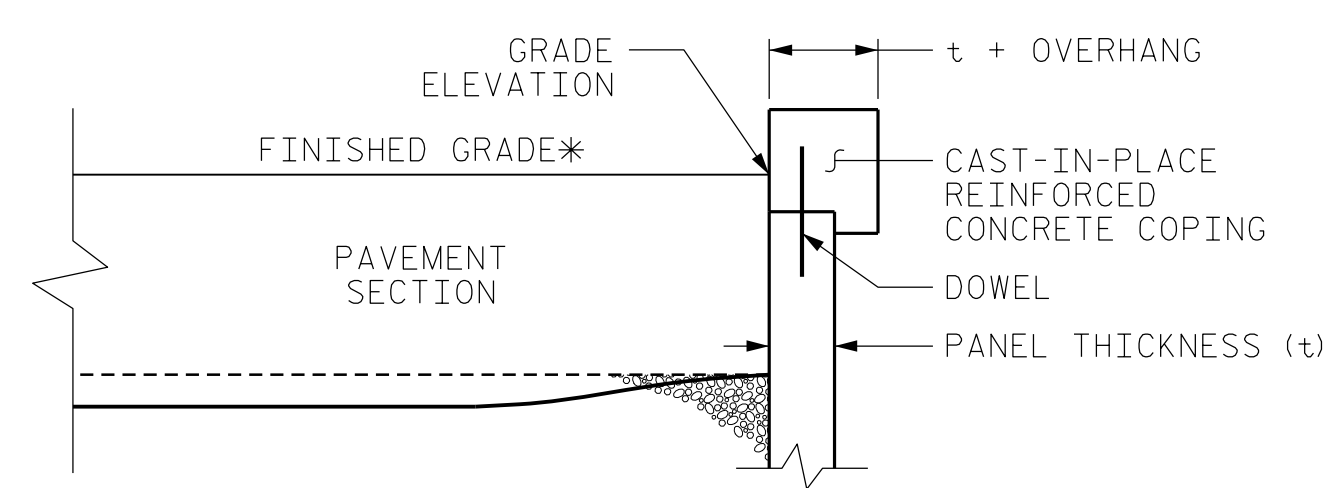
\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

GEOTECHNICAL ENGINEER

DocuSigned by:  
 Matt Alexander 4/30/2018

DATE: 4/30/2018

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**COPING DETAILS**

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.  
 \*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PREPARED BY: ALEXANDER, M. J.	DATE: 4/4/18
REVIEWED BY: NASH, A. A.	DATE: 4/5/18

Prepared in the Office of:

**Terracon**  
 Consulting Engineers and Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 NC REGISTERED ENGINEERING FIRM: F-0869  
 NC REGISTERED GEOLOGIC FIRM: C-367

**NORTH CAROLINA**  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS

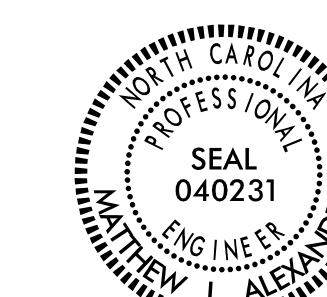
**GEOTECHNICAL ENGINEERING UNIT**

PROJECT NO.: 39049.1.1 (U-4405)  
 CUMBERLAND COUNTY  
 STATION: MSE RETAINING WALLS NO. 1 & 2  
 SHEET 5 OF 7

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-5
2			4			

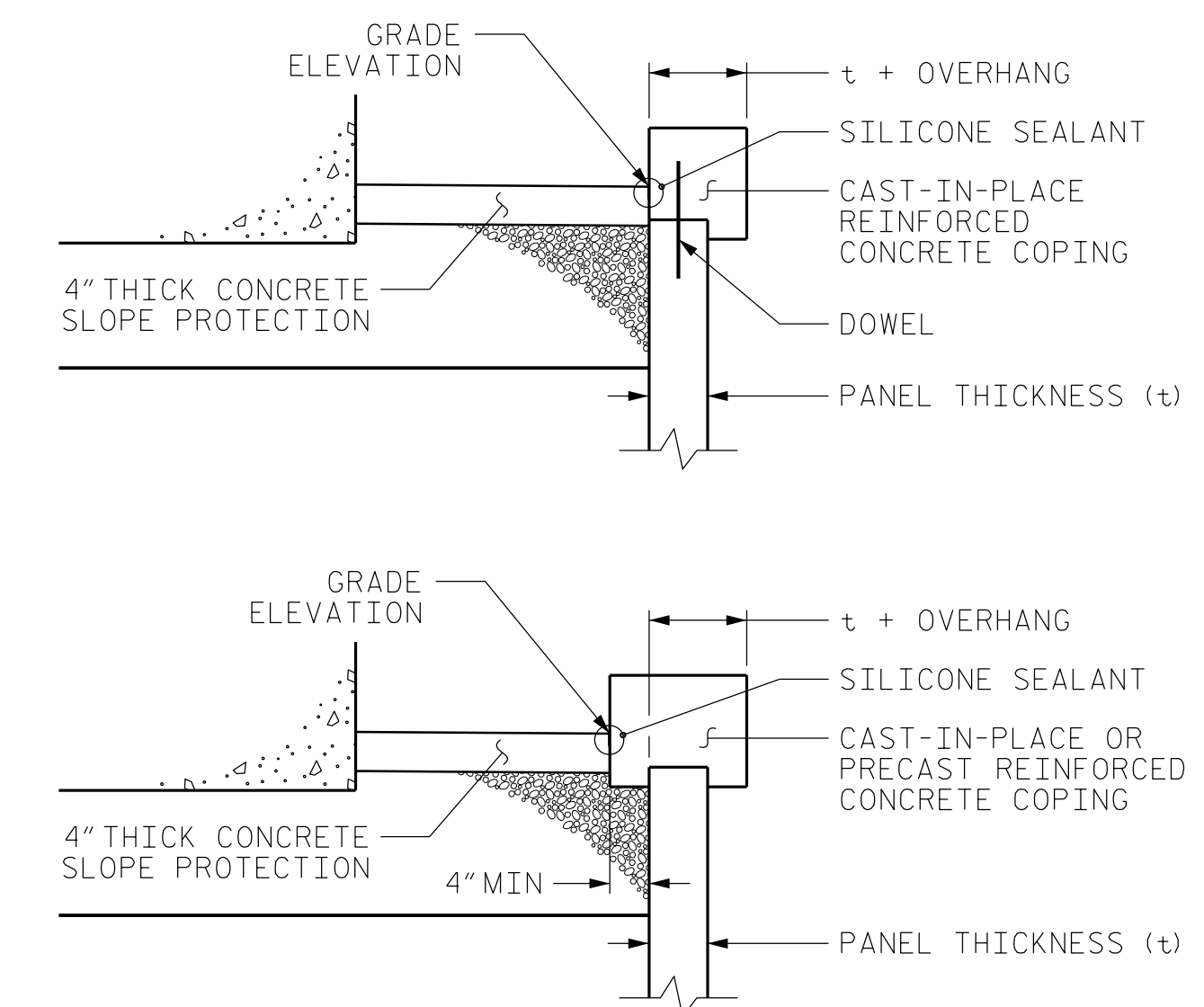
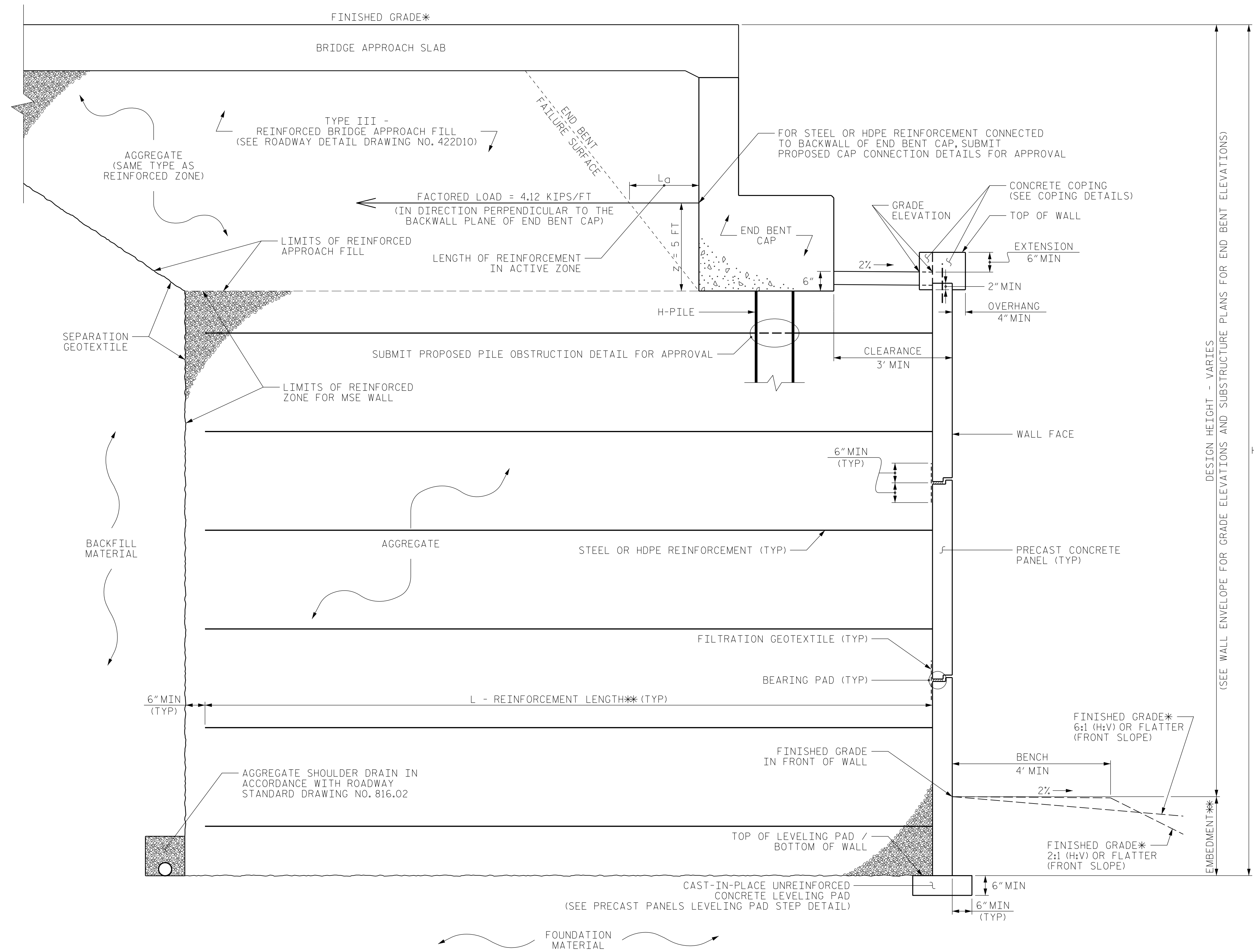


GEOTECHNICAL ENGINEER



DocuSigned by: **Matthew J. Alexander** 4/30/2018

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**COPING DETAILS**

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

**MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
\*\*SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: 39049.1.1 (U-4405)  
CUMBERLAND COUNTY  
STATION: MSE RETAINING WALLS NO. 1 & 2  
SHEET 6 OF 7

PREPARED BY: ALEXANDER, M. J. DATE: 4/18/18  
REVIEWED BY: NASH, A. A. DATE: 4/18/18

Prepared in the Office of:

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Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367

**NORTH CAROLINA**  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
**GEOTECHNICAL ENGINEERING UNIT**

**MSE RETAINING WALLS NO. 1 AND 2 TYPICAL SECTION WITH BRIDGE FOUNDATION**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-6
2			4			

GEOTECHNICAL ENGINEER



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Matthew J. Alexander  
4/30/2018  
AC1130DE6101413  
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**NOTES:**

- FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS SPECIAL PROVISION.
- FOR TYPE III REINFORCED BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.
- FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.
- AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF MSE RETAINING WALLS NO.1 AND 2.
- A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALLS NO.1 AND 2.
- A DRAIN IS REQUIRED FOR RETAINING WALLS NO.1 AND 2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALLS NO.1 AND 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

- DESIGN RETAINING WALLS NO.1 AND 2 FOR THE FOLLOWING:
- 1) H = DESIGN HEIGHT + EMBEDMENT
  - 2) DESIGN LIFE = 100 YEARS
  - 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,283 PSF (RW1) AND 6,475 PSF (RW2)
  - 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H OR 6 FT, WHICHEVER IS LONGER
  - 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0

\*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	110	16	1500

DESIGN RETAINING WALLS NO.1 AND 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.  
DESIGN RETAINING WALL NO.1 FOR A FACTORED LATERAL LOAD FROM FOUNDATIONS OF THE SOUND BARRIER WALL LOCATED BEHIND THE RETAINING WALL APPLIED AS A FACTORED UNIFORM PRESSURE TO THE BACK OF MSE RETAINING WALL PANELS.

SOUND BARRIER WALL FOUNDATION SPACING	FACTORED LATERAL LOAD BEHIND RETAINING WALL NO.1 (PSF)
10 FT.	320 PSF
15 FT.	420 PSF

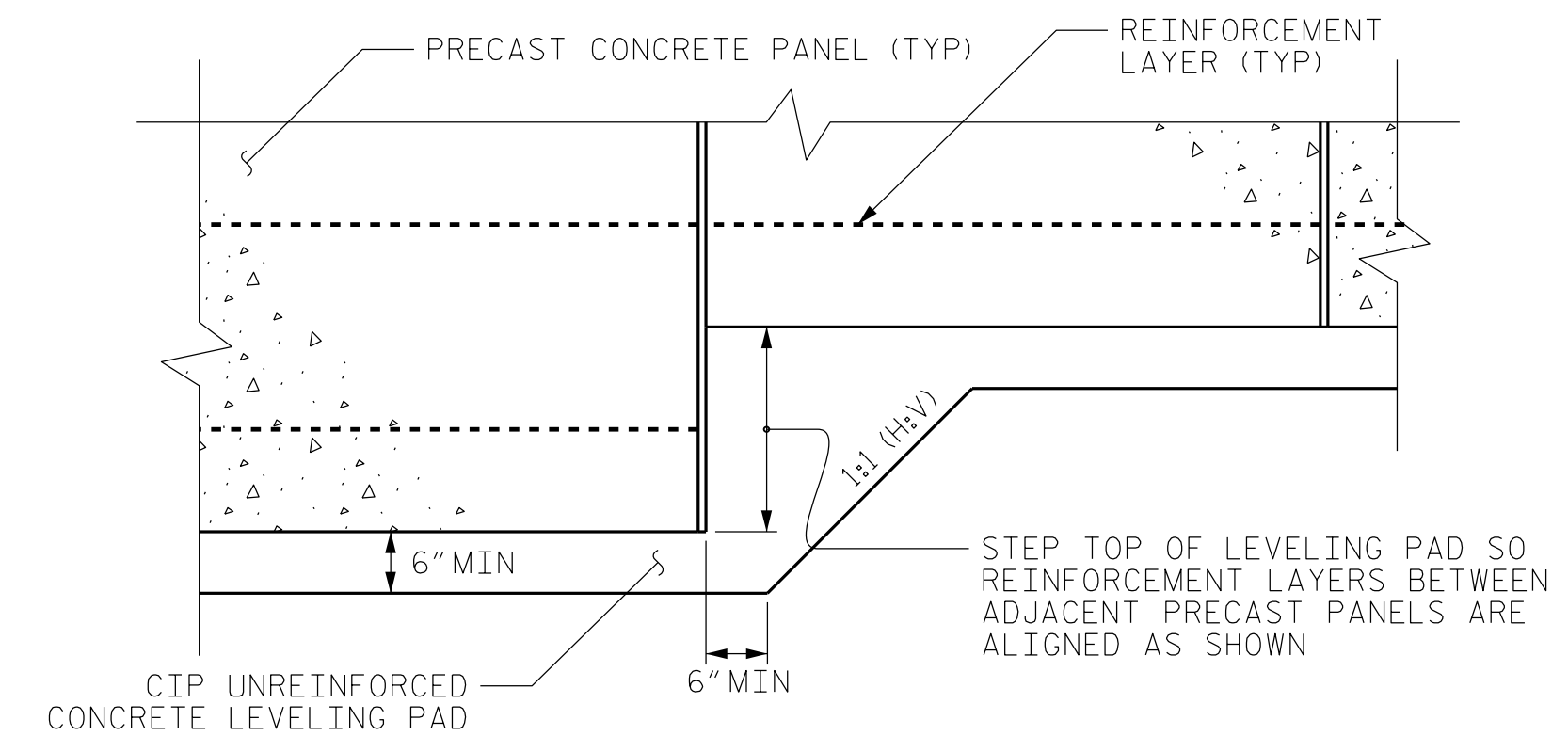
DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR THE FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L<sub>a</sub>) SHOWN, CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENTS NO.1 AND 2 LOCATED AT STATION 26+35.80 -RPB- AND STATION 27+20.21 -RPB-, RESPECTIVELY. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR SOUND BARRIER WALLS WILL BE LOCATED BEHIND RETAINING WALL NO.1 AND WILL INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

FOUNDATIONS FOR END BENTS NO.1 AND 2 LOCATED AT STATION 26+35.80 -RPB- AND STATION 27+20.21 -RPB-, RESPECTIVELY, WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS NO.1 AND 2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS NO.1 AND 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

AT THE CONTRACTOR'S OPTION, "TEMPORARY SHORING FOR WALL CONSTRUCTION" MAY BE USED TO CONSTRUCT RETAINING WALLS NO.1 AND 2. SEE MSE RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.



**PRECAST PANELS  
LEVELING PAD STEP DETAIL**

PROJECT NO.: 39049.1.1 (U-4405)  
CUMBERLAND COUNTY  
STATION: MSE RETAINING WALLS NO. 1 & 2  
SHEET 7 OF 7

PREPARED BY: ALEXANDER, M. J.	DATE: 4/18/18
REVIEWED BY: NASH, A. A.	DATE: 4/18/18

Prepared in the Office of:

**Terracon**  
Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367

**NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS**

**GEOTECHNICAL  
ENGINEERING UNIT**

**MSE RETAINING WALLS  
NO. 1 AND 2  
NOTES AND DETAILS**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-7
2			4			

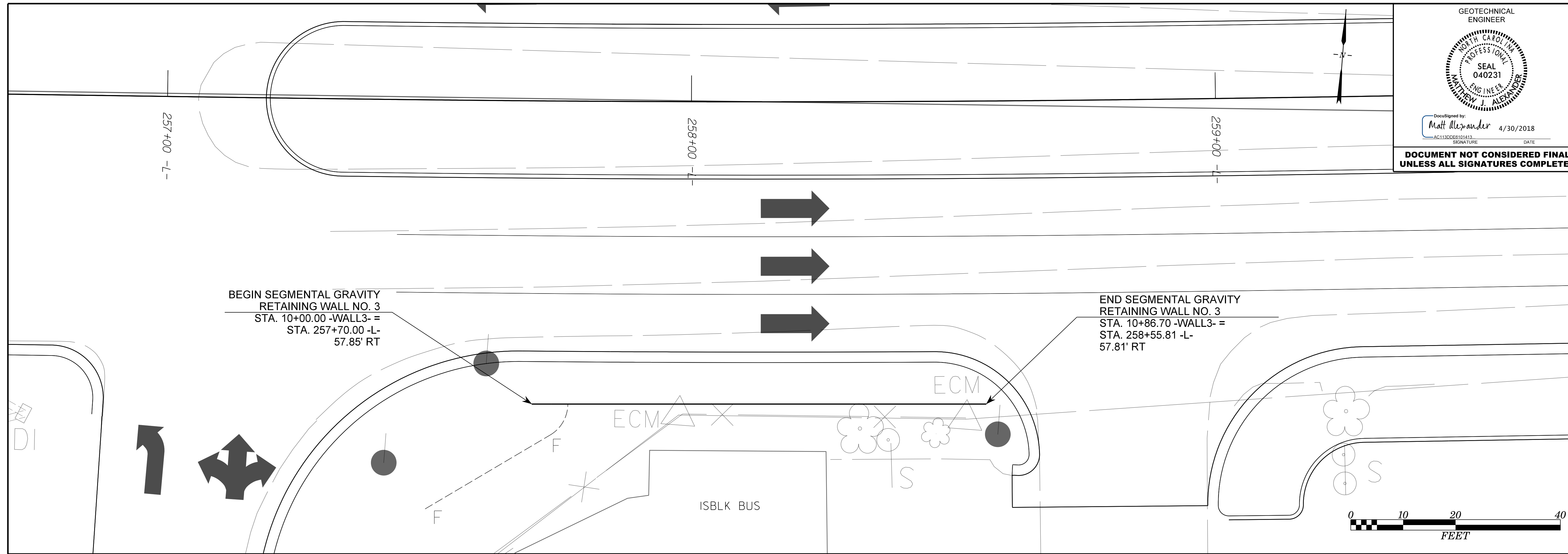


GEOTECHNICAL ENGINEER



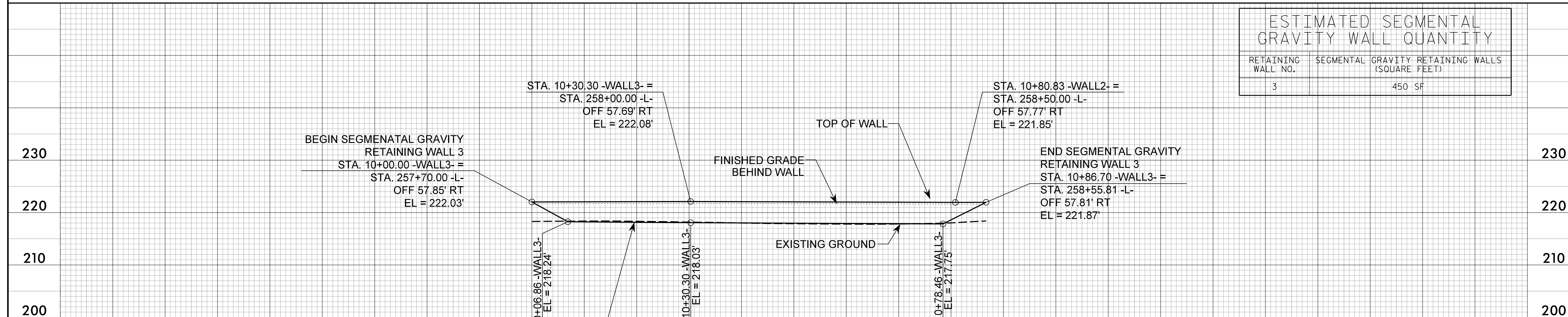
DocuSigned by: *Matthew J. Alexander* 4/30/2018

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-WALL3- 10+00 10+50 11+00 -WALL3-

ESTIMATED SEGMENTAL GRAVITY WALL QUANTITY		
RETAINING WALL NO.	SEGMENTAL GRAVITY RETAINING WALLS	(SQUARE FEET)
3	450 SF	



PROJECT NO.: 39049.1.1 (U-4405)  
CUMBERLAND COUNTY  
STATION: 258+12.91 -L-  
SHEET 1 OF 2

Prepared in the Office of:

# Terracon

Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-8
2			4			

PREPARED BY: ALEXANDER, M. J. DATE: 4/11/18  
REVIEWED BY: NASH, A. A. DATE: 4/11/18

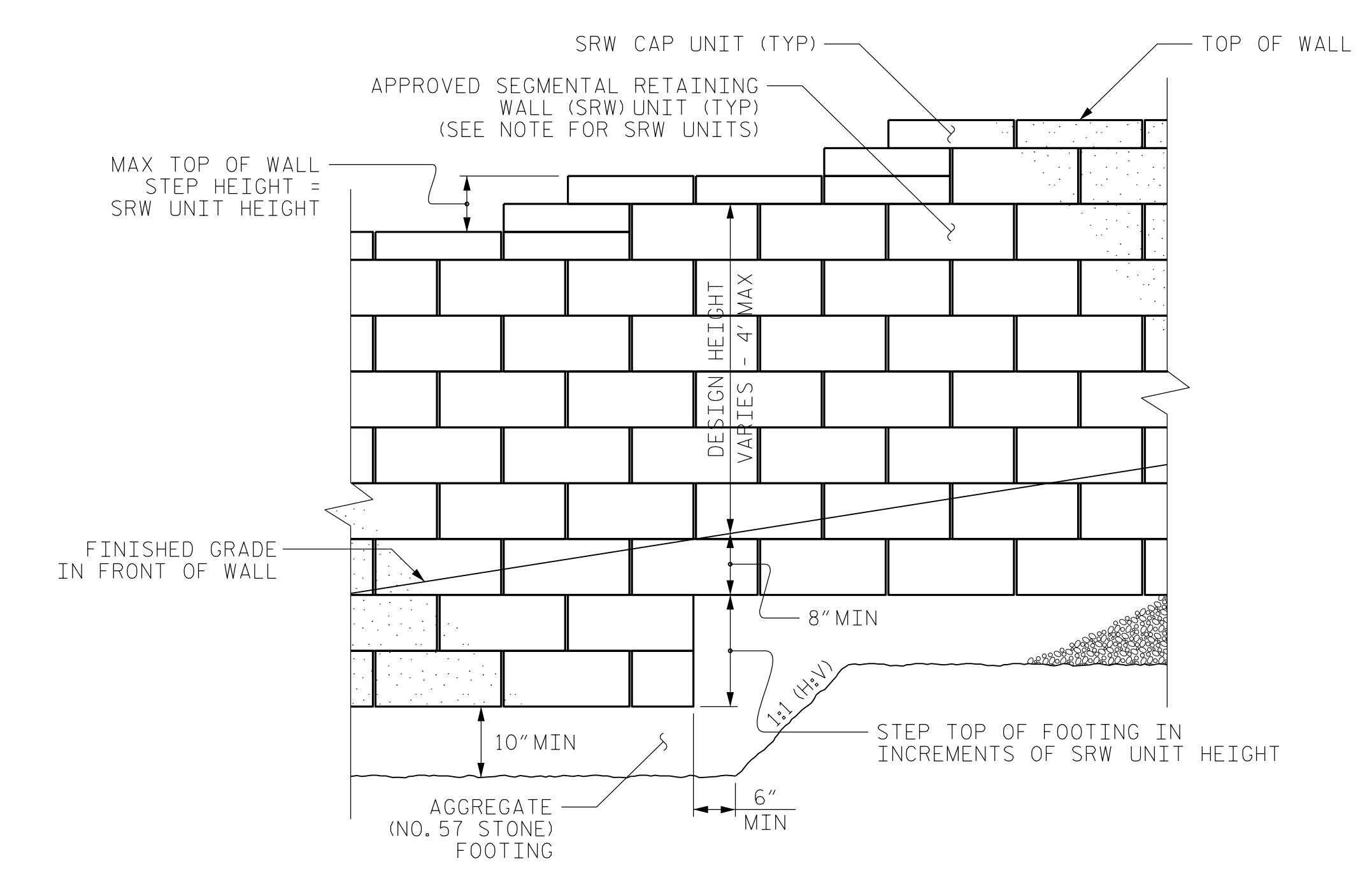
ENVELOPE HORIZONTAL / VERTICAL SCALE





Designed by: Matthew J. Alexander 4/30/2018  
 AC1130068162441  
 SIGNATURE DATE

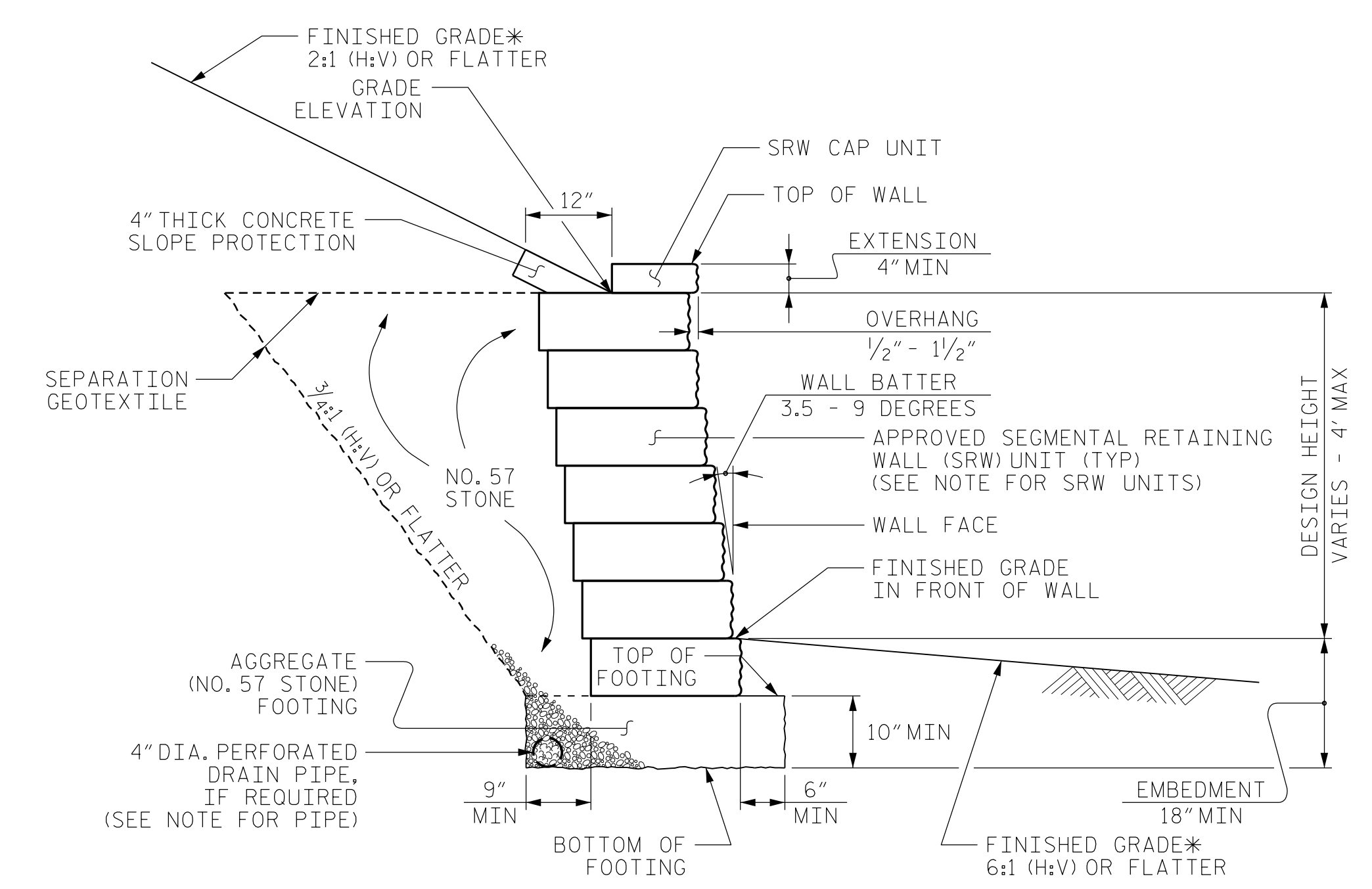
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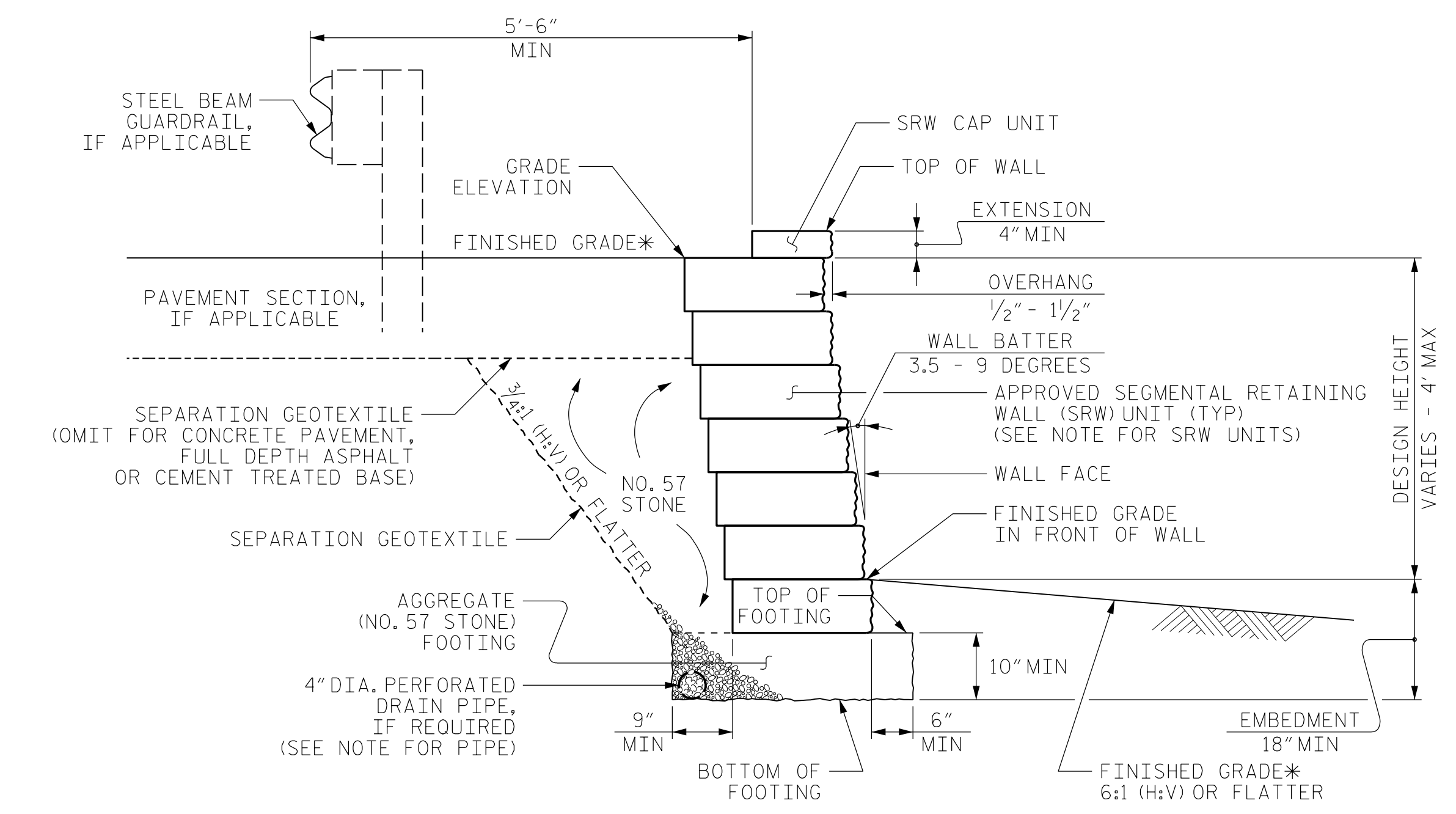
**STANDARD SEGMENTAL GRAVITY WALL - PARTIAL ELEVATION**

**NOTES:**

- FOR STANDARD SEGMENTAL GRAVITY RETAINING WALLS, SEE SECTION 454 OF THE STANDARD SPECIFICATIONS.
- FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.
- DO NOT ATTACH FENCES OR HANDRAILS TO STANDARD SEGMENTAL GRAVITY WALLS.
- DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS FOR INTERSTATE HIGHWAY OR RAILROAD PROJECTS.
- DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN SURCHARGE LOADS WILL BE WITHIN 5'-6" OF THE BACK OF SRW CAP UNITS.
- DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW WALLS.
- SEGMENTAL RETAINING WALL (SRW) UNITS ARE APPROVED FOR EITHER 2' OR 4' MAXIMUM DESIGN HEIGHTS. FOR DETAILS AND DIMENSIONS OF APPROVED SRW UNITS AND MAXIMUM DESIGN HEIGHTS, SEE [connect.ncdot.gov/resources/Geological/Pages/Products.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Products.aspx)
- DO NOT MIX APPROVED SRW UNITS FROM DIFFERENT VENDORS ON THE SAME STANDARD SEGMENTAL GRAVITY WALL. USE THE SAME SIZE APPROVED SRW UNITS FOR EACH WALL SECTION.
- BEFORE BEGINNING STANDARD SEGMENTAL GRAVITY WALL CONSTRUCTION, SURVEY WALL LOCATIONS AND SUBMIT WALL PROFILE VIEWS (WALL ENVELOPES) FOR REVIEW. FOR WALL ENVELOPES, INCLUDE BOTTOM OF WALL, EXISTING GROUND AND GRADE ELEVATIONS AND OTHER ELEVATIONS AS NEEDED AT INTERVALS OF 25' OR LESS ALONG WALLS. DO NOT START WALL CONSTRUCTION UNTIL WALL ENVELOPES ARE ACCEPTED.
- A DRAIN PIPE IS REQUIRED IF GROUNDWATER IS ABOVE BOTTOM OF FOOTINGS.
- DO NOT PLACE NO. 57 STONE FOR FOOTINGS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

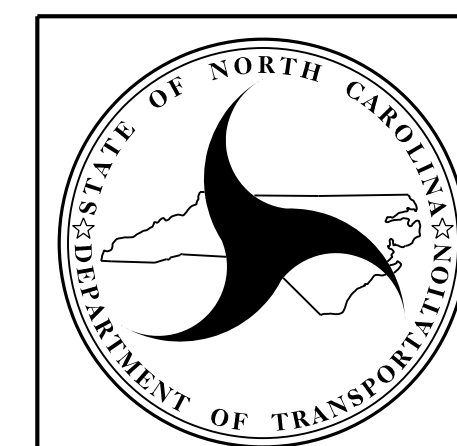


**STANDARD SEGMENTAL GRAVITY WALL WITH SLOPE**  
 \*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



**STANDARD SEGMENTAL GRAVITY WALL WITHOUT SLOPE**  
 \*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: 39049.1.1 (U-4405)  
 CUMBERLAND COUNTY  
 STATION: 258+12.91 -L-  
 SHEET 2 OF 2



**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

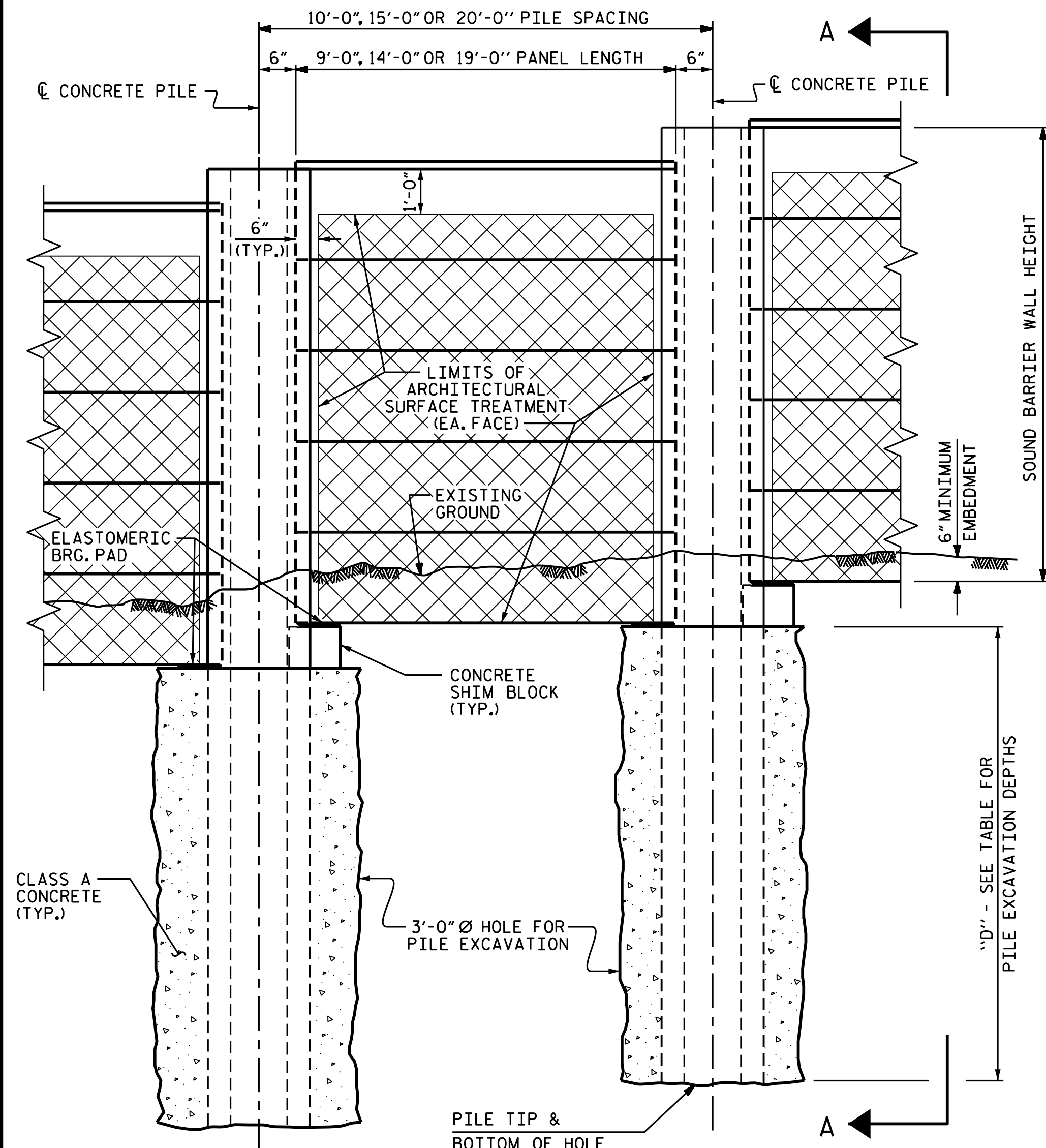
**STANDARD DETAIL NO. 454.01**  
**STANDARD SEGMENTAL GRAVITY RETAINING WALL**



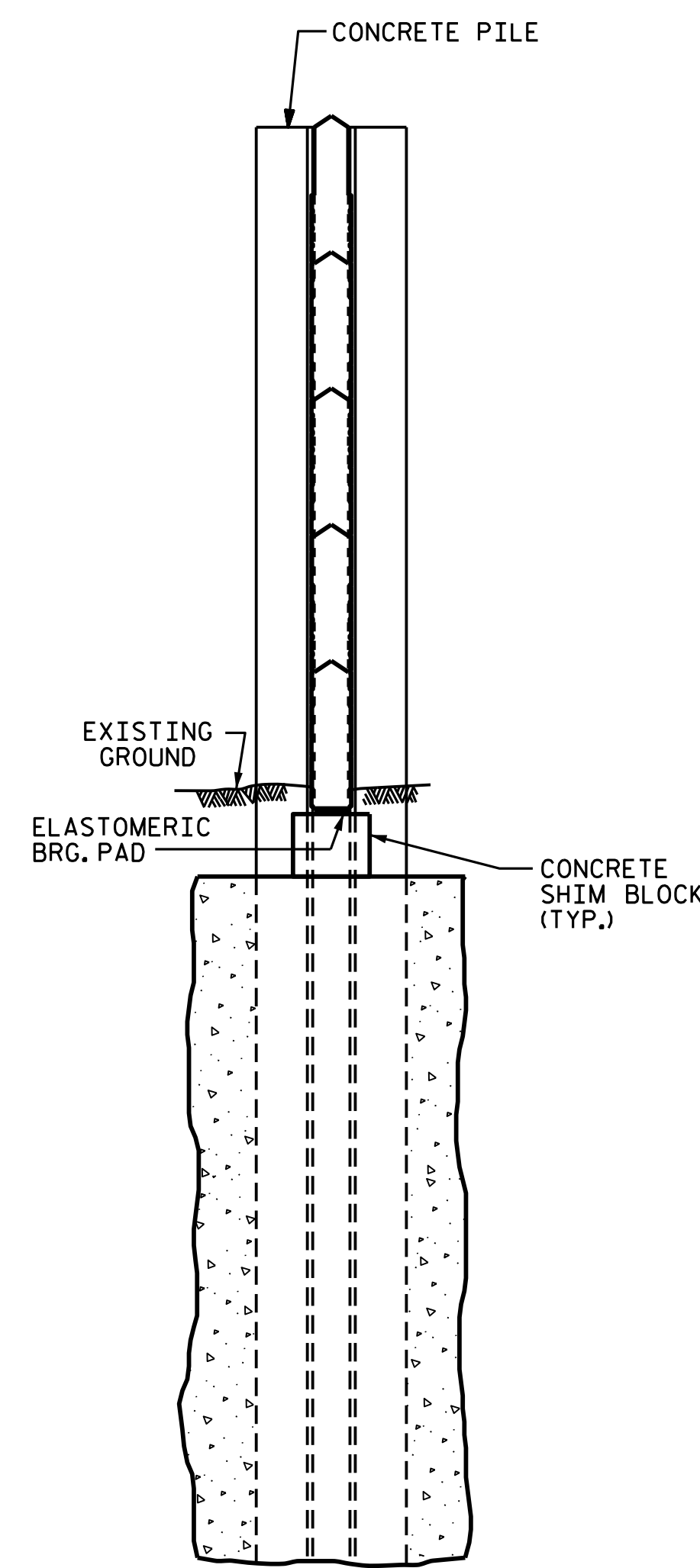
**NOTES**

- FOR SOUND BARRIER WALL, SEE GEOTECHNICAL SPECIAL PROVISIONS.
- CONSTRUCT SOUND BARRIER WALL TO LINES AND GRADES SHOWN ON THE ROADWAY PLANS.
- PROVIDE PANELS WITH A FLAT BOTTOM.
- VERIFY THE LOCATION OF UNDERGROUND UTILITIES BEFORE DRILLING HOLES TO ENSURE SUFFICIENT CLEARANCE IS AVAILABLE.
- ADJUST PILE EXCAVATION ELEVATIONS TO MAINTAIN 6" MINIMUM EMBEDMENT OF THE BOTTOM PANEL.
- USE CLASS AA FOR PANELS AND CLASS A CONCRETE PILE EXCAVATION BACKFILL, IN ACCORDANCE WITH ARTICLE 1000-4 OF THE STANDARD SPECIFICATIONS.
- AT THE CONTRACTOR'S OPTION, USE 10'-0", 15'-0", OR 20'-0" PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10'-0" AND 15'-0" PILE SPACING. FOR 20'-0" PILE SPACING, PANELS DESIGNED AND MANUFACTURED BY A THIRD PARTY VENDOR SHALL BE USED.
- FOR SOUND BARRIER WALL STATIONS, OFFSETS, AND WALL ENVELOPE, SEE ROADWAY PLANS.
- PLACE 1" Ø BACKER RODS FULL HEIGHT ON EACH SIDE OF THE PRECAST PANELS. SET AND SEAL THE BACKER ROD IN PLACE WITH SEALANT THAT CONFORMS WITH ARTICLE 1028-3 OF THE STANDARD SPECIFICATIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- PILE EXCAVATION DEPTHS ARE BASED ON 36-INCH DIAMETER HOLES. FOR 30-INCH DIAMETER HOLES, ADD 1 FOOT TO THE PILE EXCAVATION DEPTHS SHOWN.
- SOUND BARRIER WALL 1 PILE LOCATIONS SHALL BE SLEEVED DURING CONSTRUCTION OF MSE RETAINING WALL 1. SLEEVES FOR SOUND BARRIER WALL FOUNDATIONS SHALL BE CONSIDERED INCIDENTAL TO MSE RETAINING WALL 1. SEE MSE WALL PLANS AND GEOTECHNICAL SPECIAL PROVISIONS.

PILE EXCAVATION DEPTHS "D"					
WALL #1		FROM : STA. 10+00.00 -NW1- TO : STA. 22+21.00 -NW1-			
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	
		10'-0"	10'-0"	12'-0"	13'-0"
		15'-0"	11'-0"	13'-0"	16'-0"
20'-0"	12'-0"	15'-0"	18'-0"		
WALL #1		FROM : STA. 22+21.00 -NW1- TO : STA. 28+30.00 -NW1-			
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	
		10'-0"	9'-0"	11'-0"	12'-0"
		15'-0"	10'-0"	12'-0"	14'-0"
20'-0"	11'-0"	13'-0"	16'-0"		

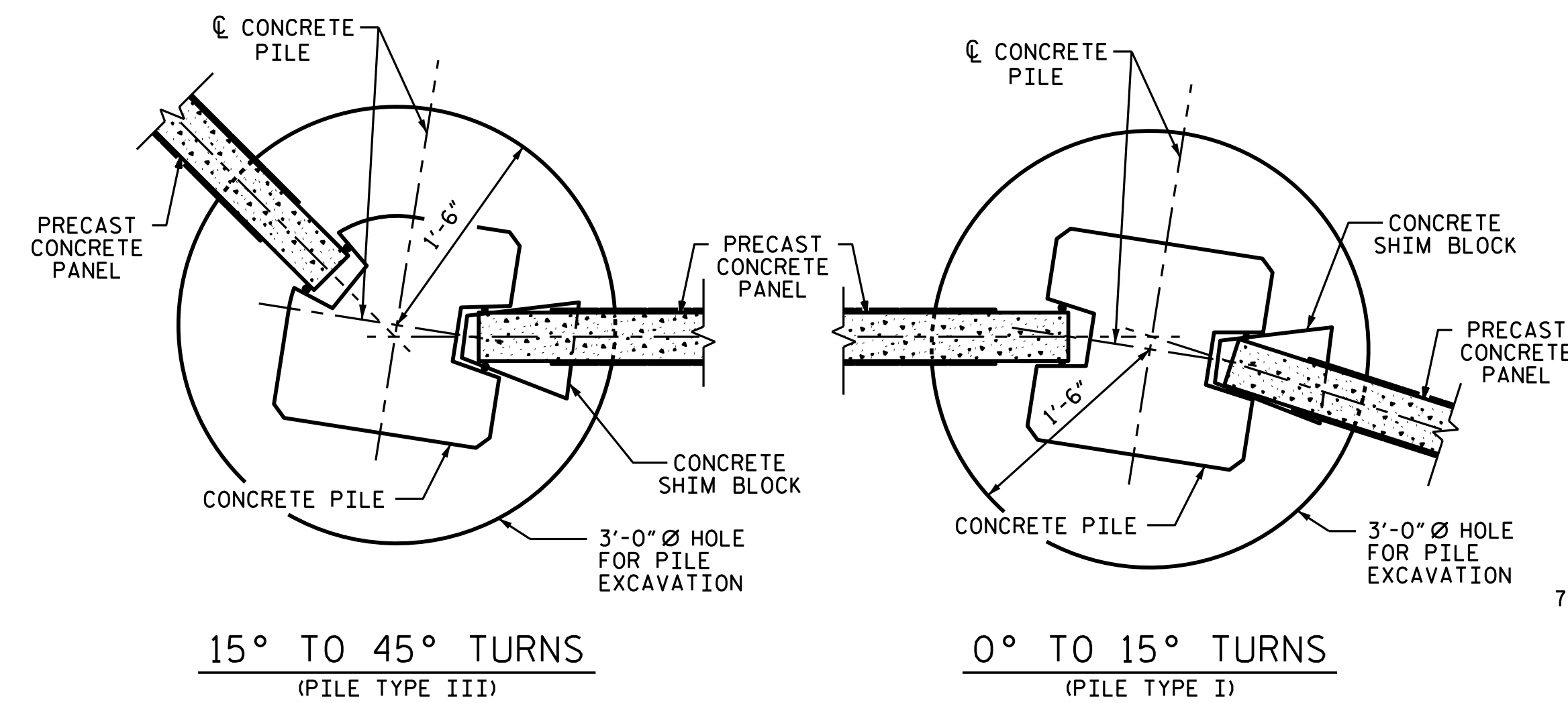


**ELEVATION**

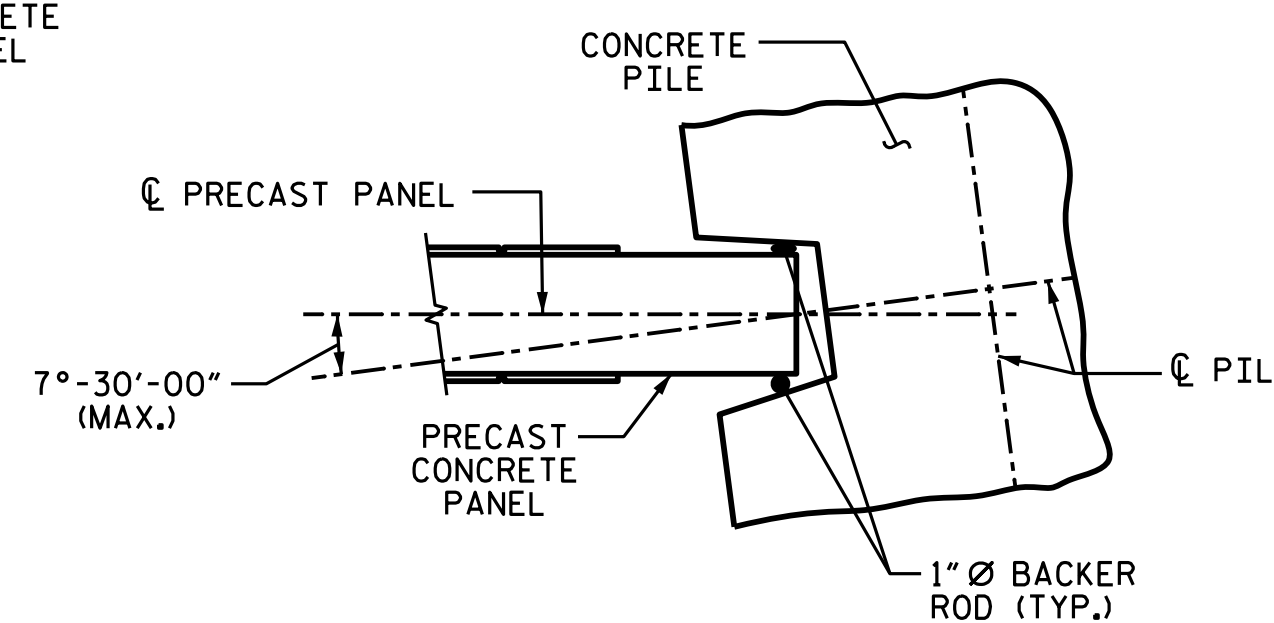


**SECTION A-A**

PILE REINFORCING STEEL DESIGN WIND PRESSURE = 40 PSF							
PILE TYPE I				PILE TYPE III			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	H ≤ 25'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.	10'-0"	H ≤ 25'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
	20' < H ≤ 25'	4 - #10 EA. FACE	#3 @ 1'-4" CTS.		15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE
15'-0"	H ≤ 20'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.	15'-0"		20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE
	20' < H ≤ 25'	4 - #9 EA. FACE	#3 @ 1'-4" CTS.		20'-0"	H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE
20'-0"	H ≤ 20'	4 - #9 EA. FACE	#3 @ 1'-4" CTS.	20'-0"		H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE
	20' < H ≤ 25'	4 - #11 EA. FACE	#3 @ 1'-4" CTS.				
PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	H ≤ 25'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	10'-0"	H ≤ 25'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
	20' < H ≤ 25'	4 - #7 EA. FACE	#3 @ 1'-4" CTS.		15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE
15'-0"	H ≤ 20'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	15'-0"		20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE
	20' < H ≤ 25'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.		20'-0"	H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE
20'-0"	H ≤ 20'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	20'-0"		H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE
	20' < H ≤ 25'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.				



**TYPICAL WALL TURN DETAILS**



**PILE ROTATION LIMIT FOR WALL TURN**

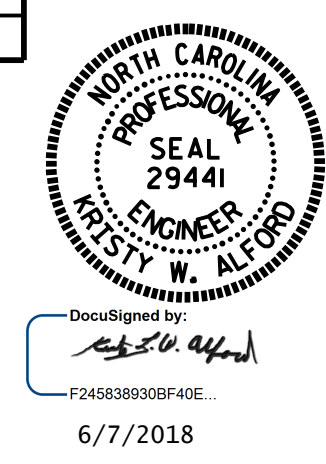
BILL OF MATERIAL	
SOUND BARRIER WALL	27855 S.F.
ARCHITECTURAL SURFACE TREATMENT	45110 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	FS 36270

PROJECT NO. U-4405  
CUMBERLAND COUNTY  
 STATION: 10+00.00 -NW1-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 SOUND BARRIER WALL

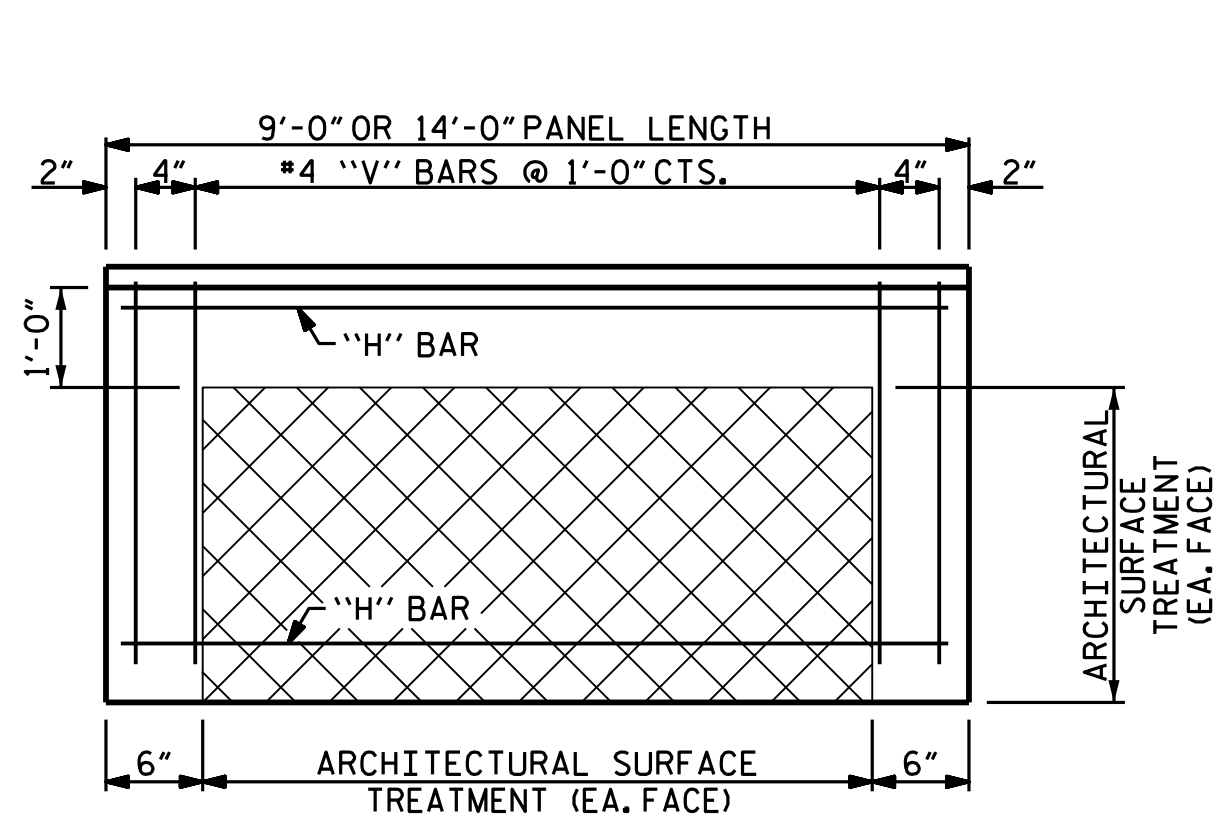


ASSEMBLED BY : K.W. ALFORD	DATE : 6/18
CHECKED BY : G.W. DICKEY	DATE : 6/18
DRAWN BY : MAA 6/11	REV. 9/26/14 MAA/TMG
CHECKED BY : GM 6/11	REV. 10/17 MAA/THC
	REV. 5/18 MAA/THC

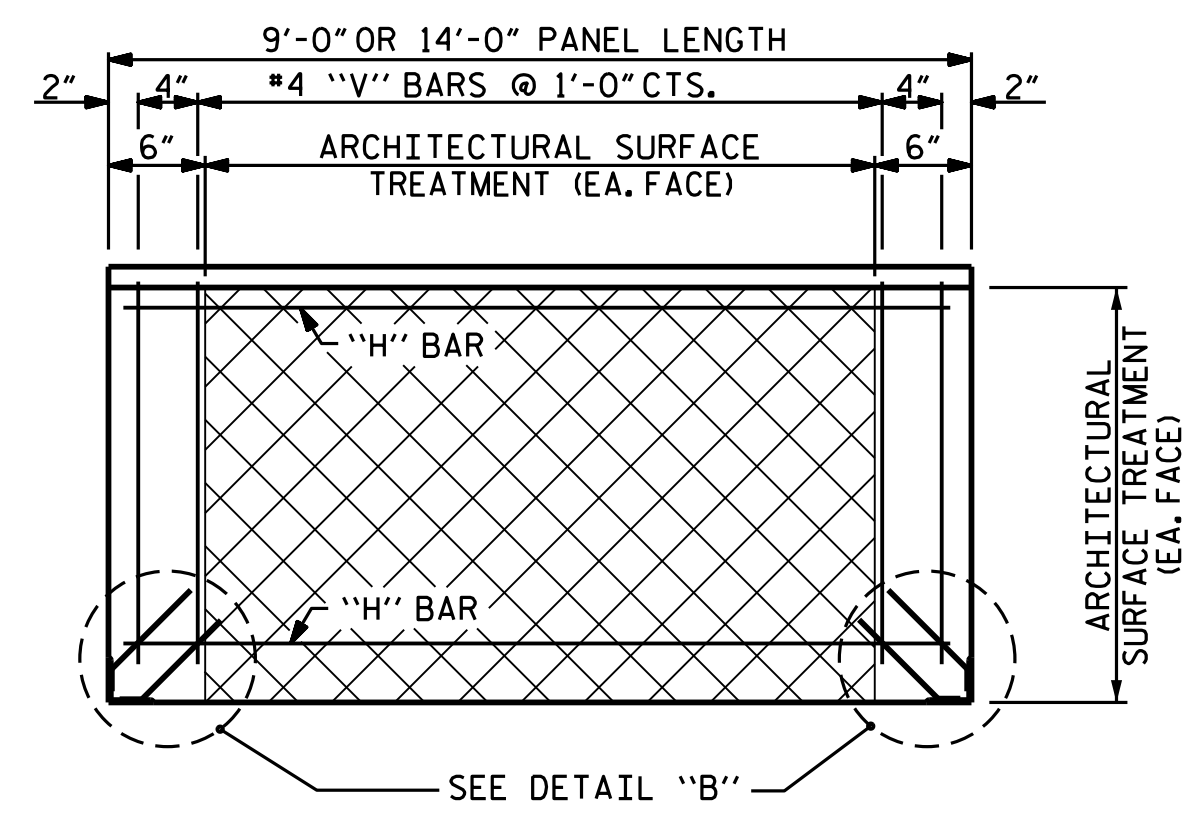
REVISIONS						SHEET NO. SBW-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 3
2			4			

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FRONT ELEVATION OF UPPER PRECAST PANEL



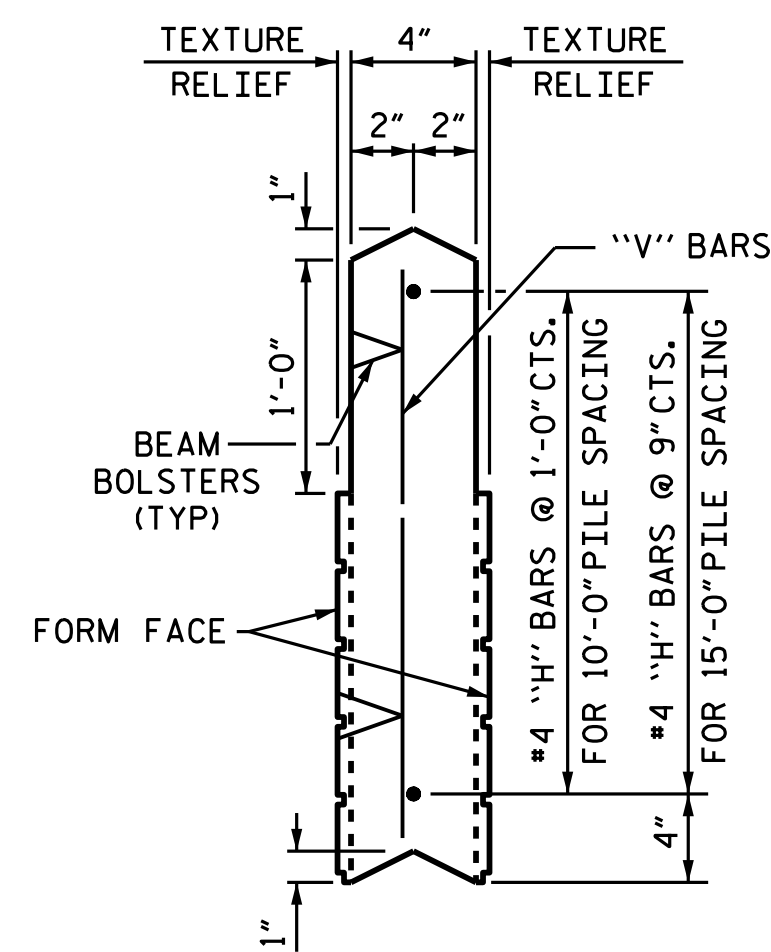
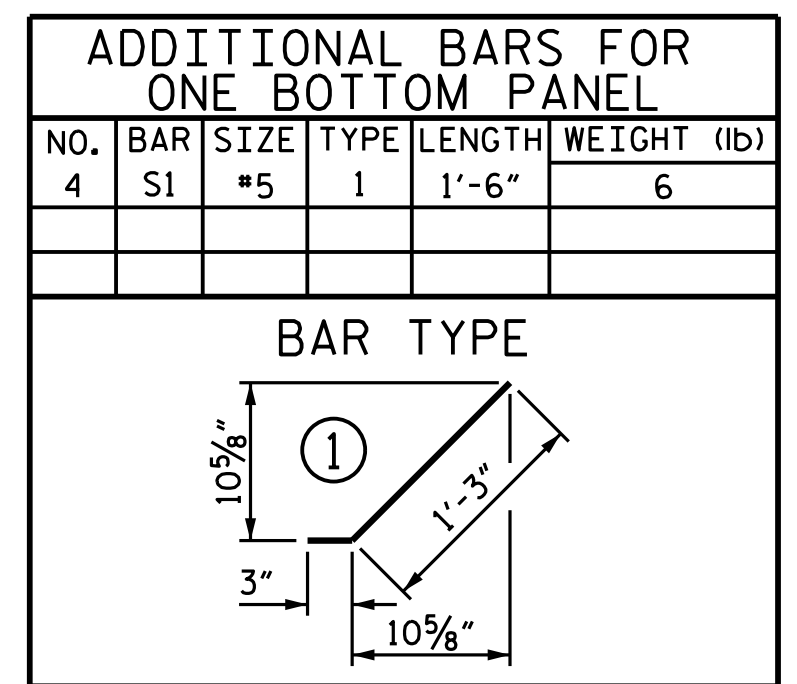
FRONT ELEVATION OF BOTTOM PRECAST PANEL

QUANTITIES FOR ONE PRECAST PANEL (FOR 10'-0" PILE SPACING)

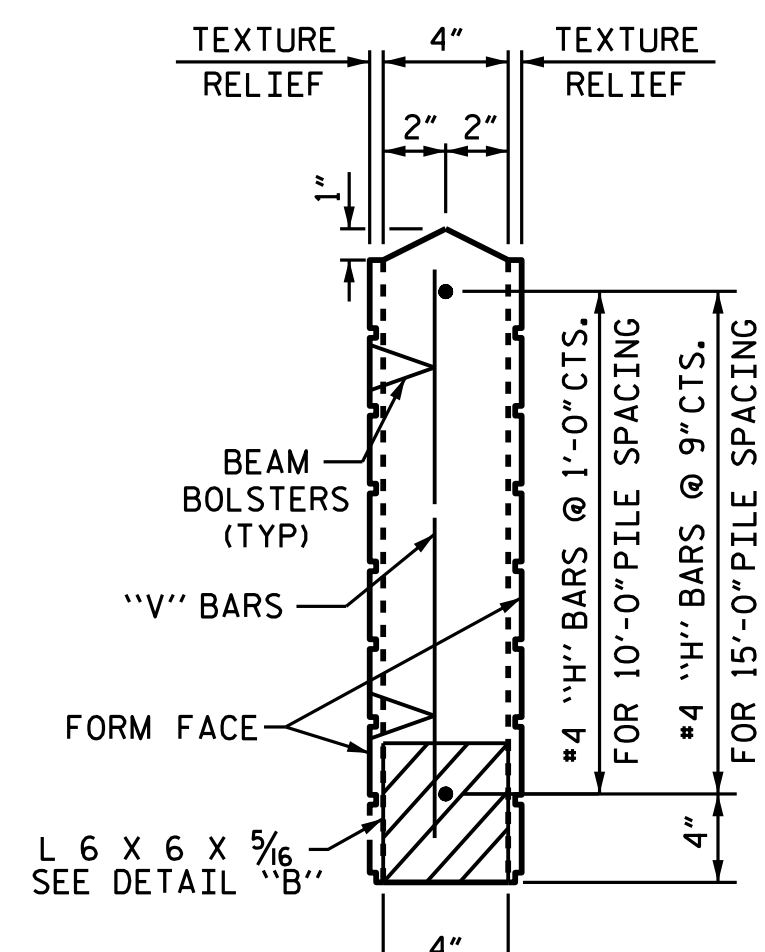
PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES											
		HORIZONTAL						VERTICAL					
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
2'-0"	0.22	3	H1	#4	STR	8'-8"	17	11	V1	#4	STR	1'-8"	12
3'-0"	0.33	4	H2	#4	STR	8'-8"	23	11	V2	#4	STR	2'-8"	20
4'-0"	0.44	5	H3	#4	STR	8'-8"	29	11	V3	#4	STR	3'-8"	27

QUANTITIES FOR ONE PRECAST PANEL (FOR 15'-0" PILE SPACING)

PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES											
		HORIZONTAL						VERTICAL					
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
3'-0"	0.52	5	H1	#4	STR	13'-8"	46	16	V1	#4	STR	2'-8"	29
4'-0"	0.69	6	H2	#4	STR	13'-8"	55	16	V2	#4	STR	3'-8"	39
5'-0"	0.86	7	H3	#4	STR	13'-8"	64	16	V3	#4	STR	4'-8"	50
6'-0"	1.04	8	H4	#4	STR	13'-8"	73	16	V4	#4	STR	5'-8"	61

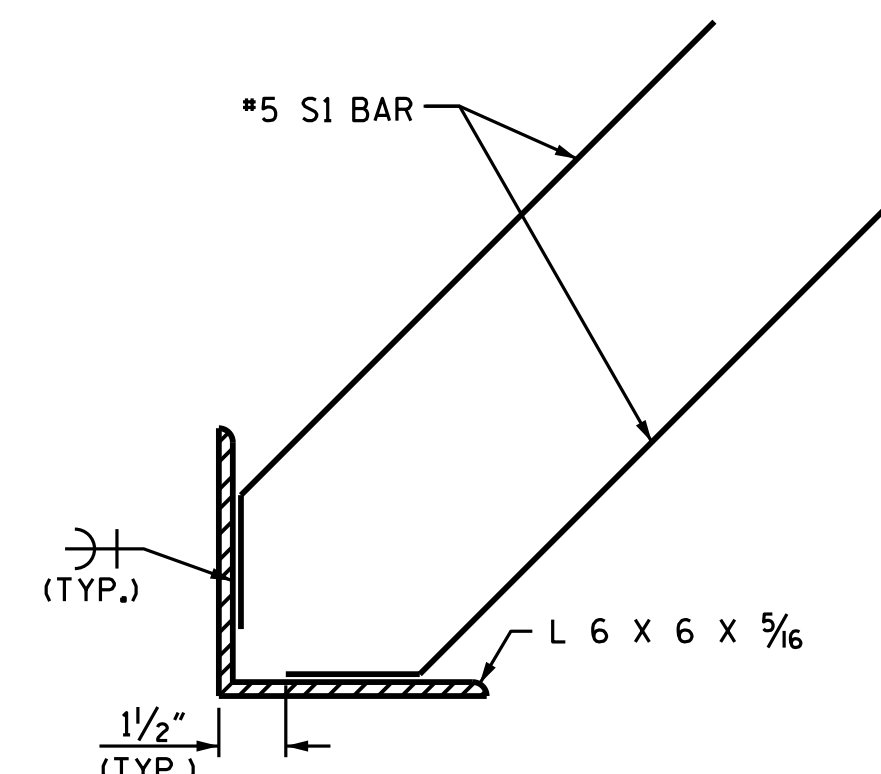


UPPER PANEL

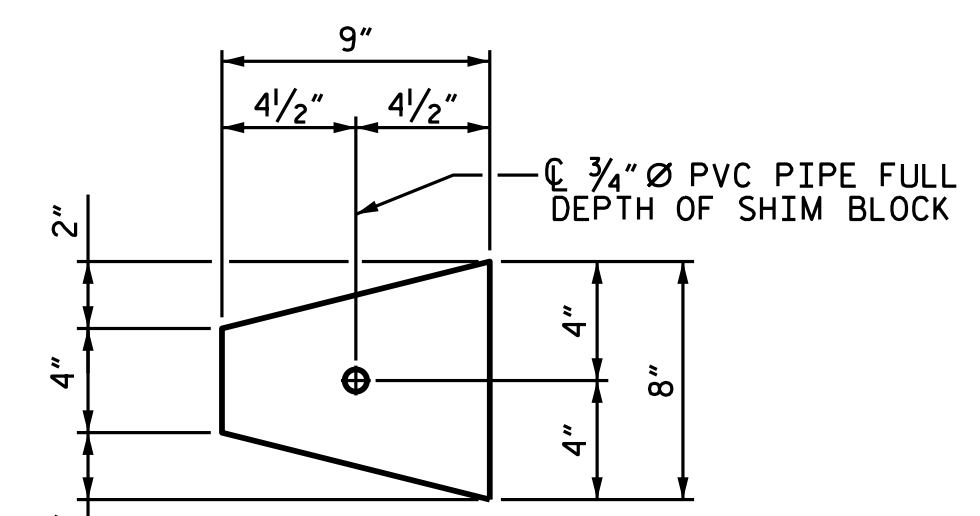


BOTTOM PANEL

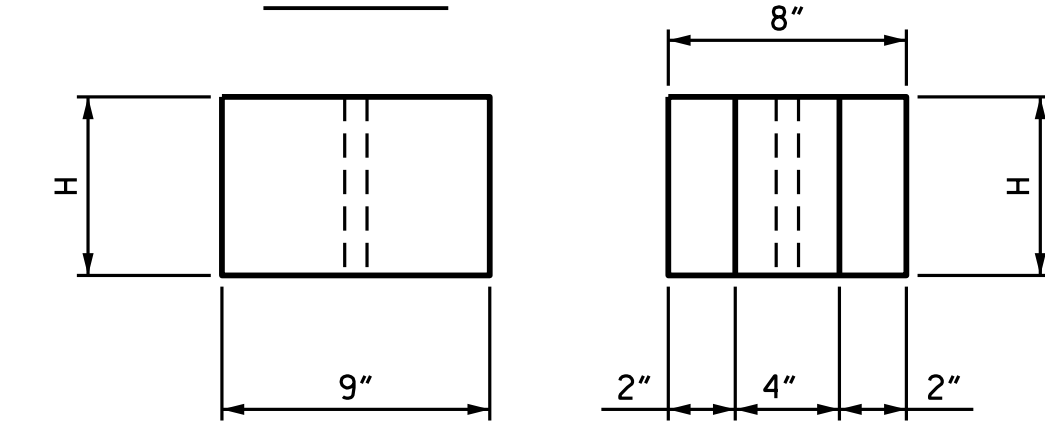
SECTION THROUGH PRECAST PANELS



DETAIL "B"



PLAN

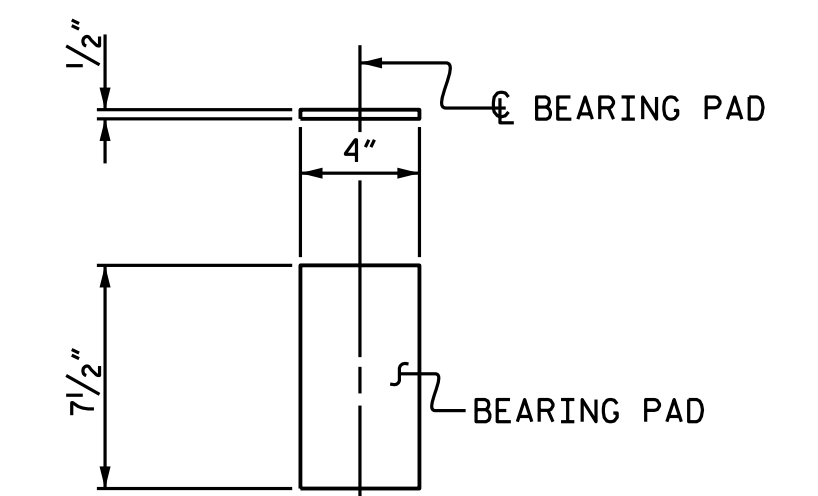


ELEVATION

END

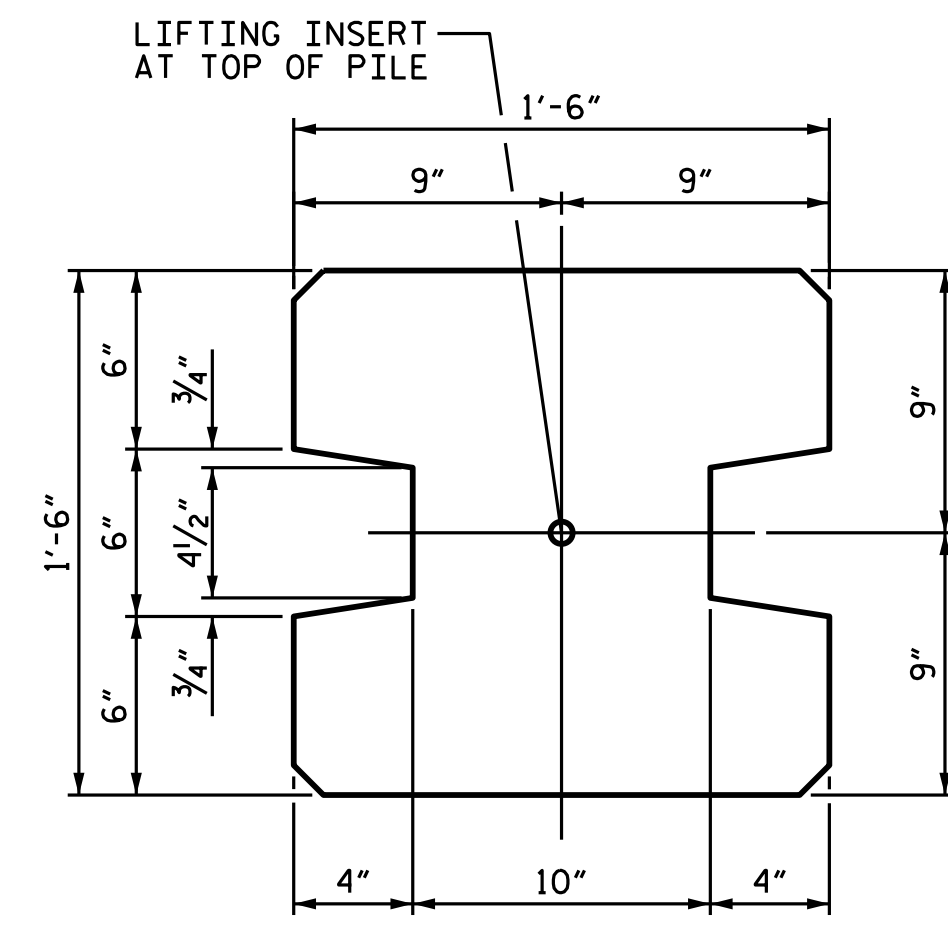
CONCRETE SHIM BLOCK

H = 3', 6" or 1'-0"

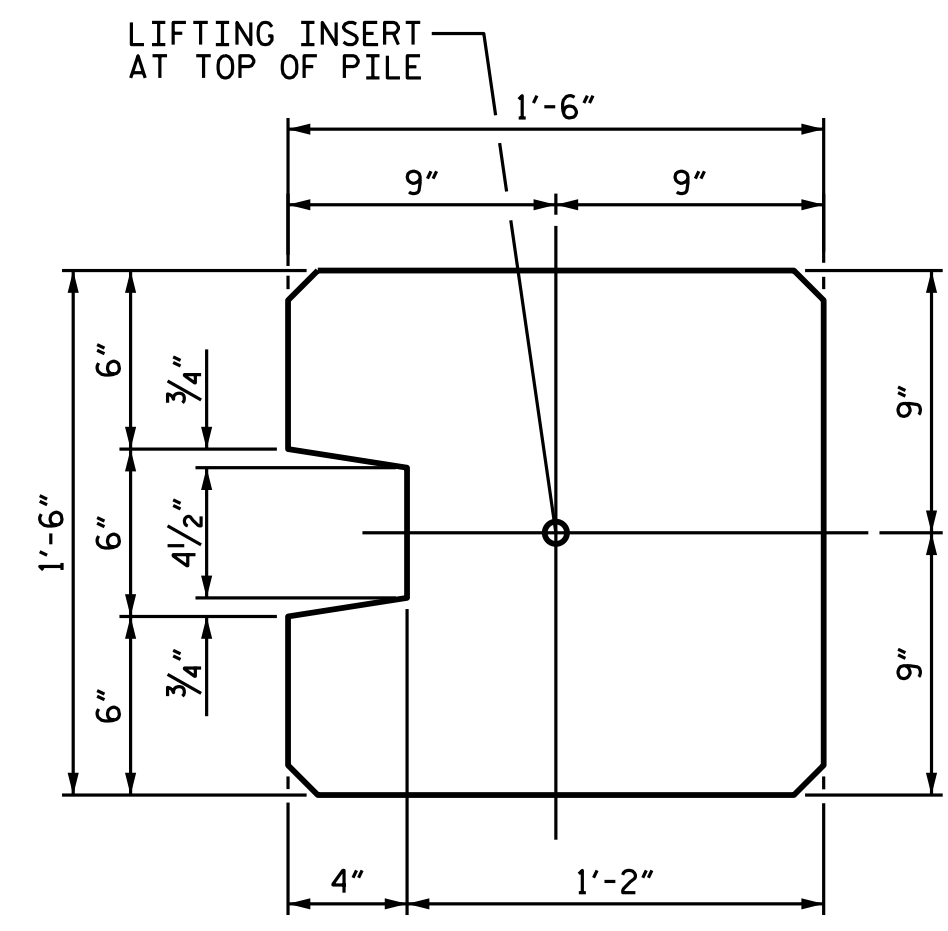


ELASTOMERIC BEARING DETAILS

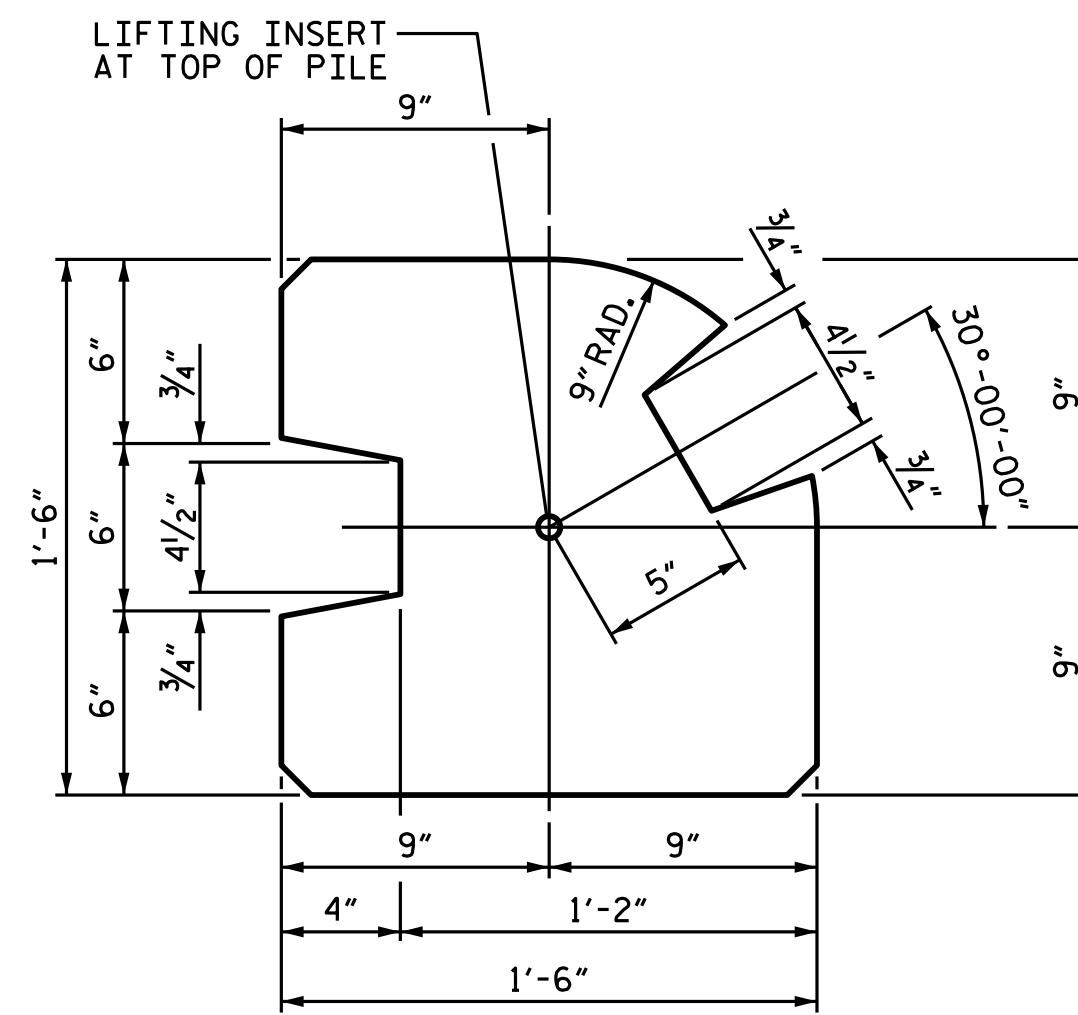
ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.



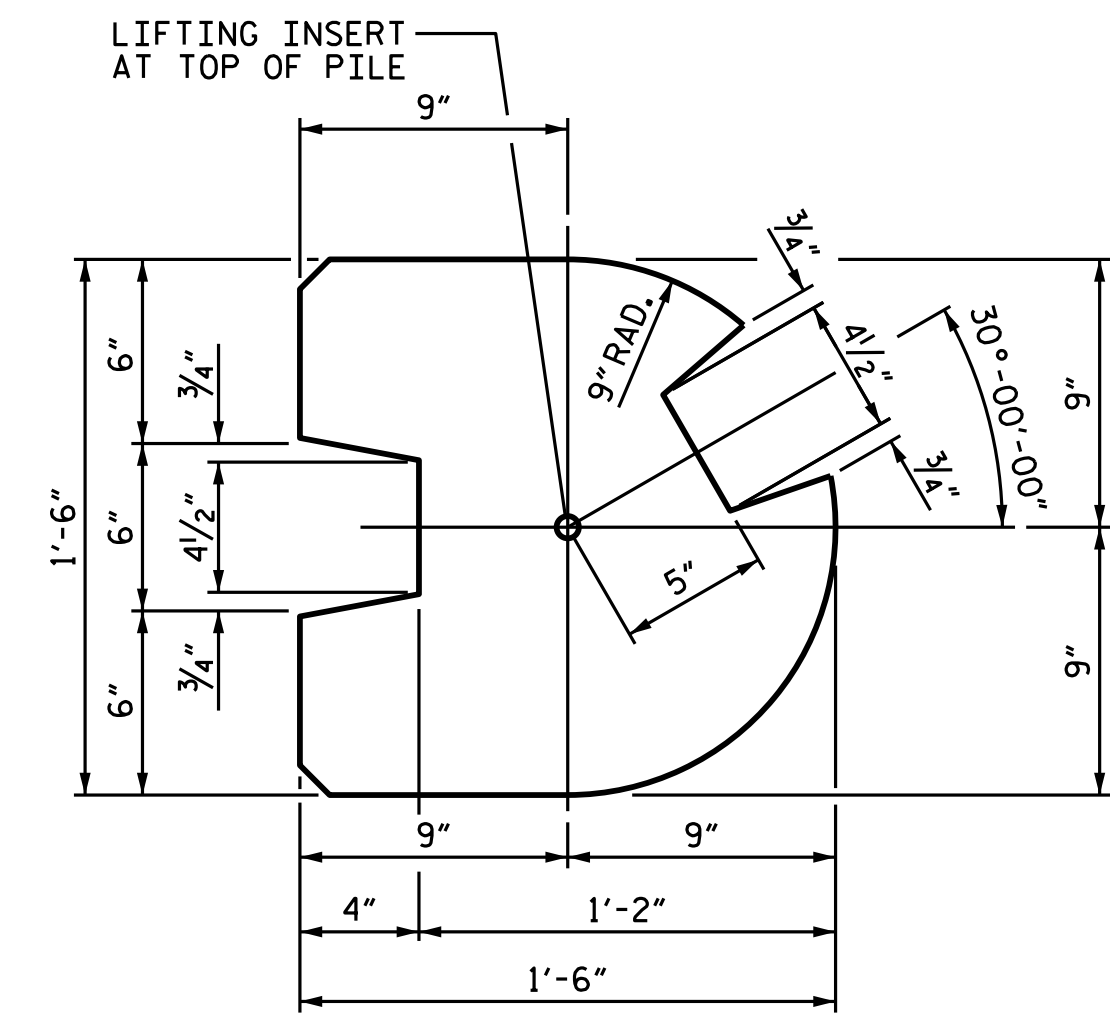
TYPE - I (AREA = 1.9444 SQ. FT.)



TYPE - II (AREA = 2.0903 SQ. FT.)



TYPE - III (AREA = 1.8336 SQ. FT.)

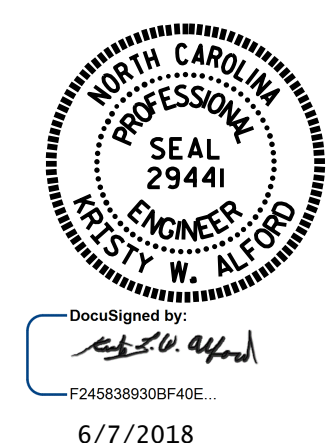


TYPE - III (ALT.) (AREA = 1.7163 SQ. FT.)

PILE DETAIL (ALL CORNERS TO BE CHAMFERED 1")

ASSEMBLED BY : K.W. ALFORD DATE : 6/18  
 CHECKED BY : G.W. DICKEY DATE : 6/18  
 DRAWN BY : MAA 6/11 REV. 1/15/14 RWW/TMG  
 CHECKED BY : CM 6/11 REV. 10/17 MAA/THC  
 REV. 5/18 MAA/THC

07-JUN-2018 07:41  
 A:\Structures\Plans\U4405.SMU.SBW.dgn  
 kalford



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PROJECT NO. U-4405  
 CUMBERLAND COUNTY  
 STATION: 10+00.00 -NW1-

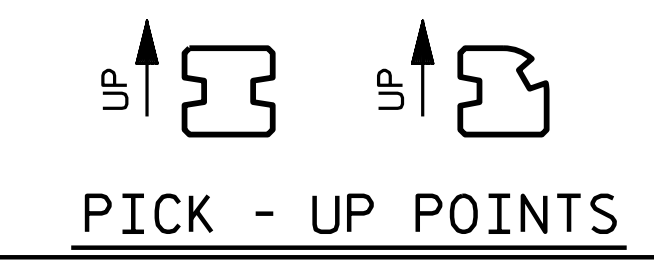
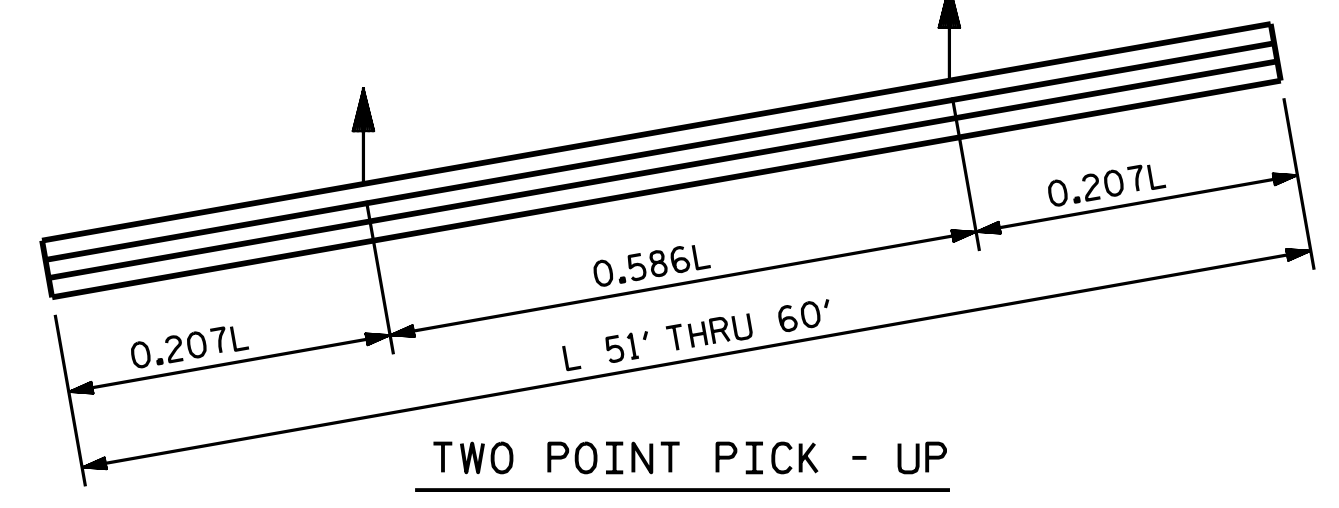
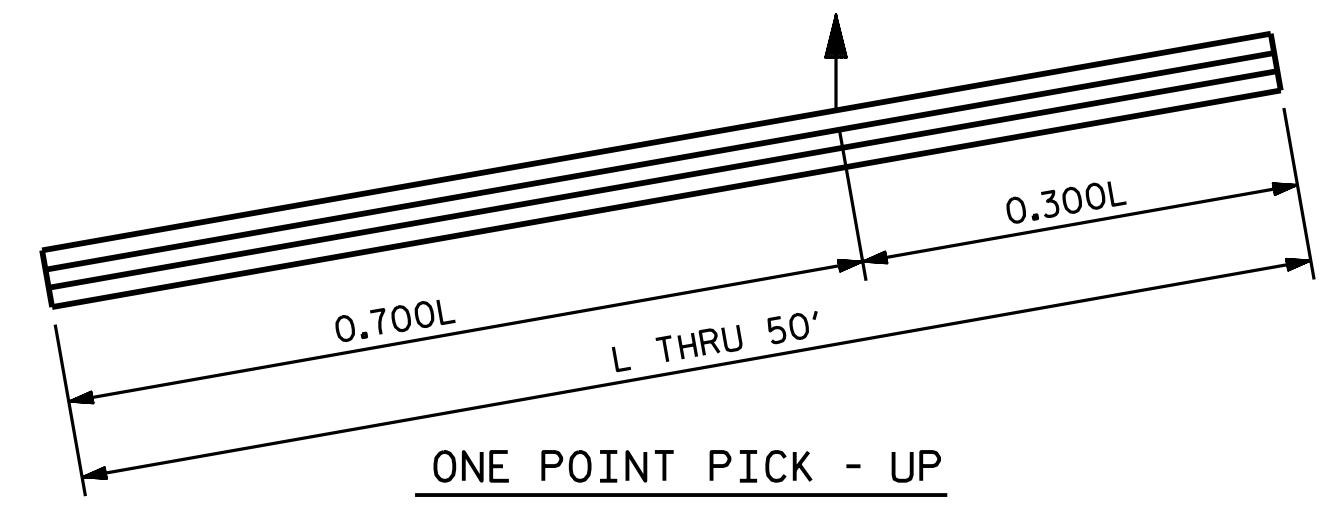
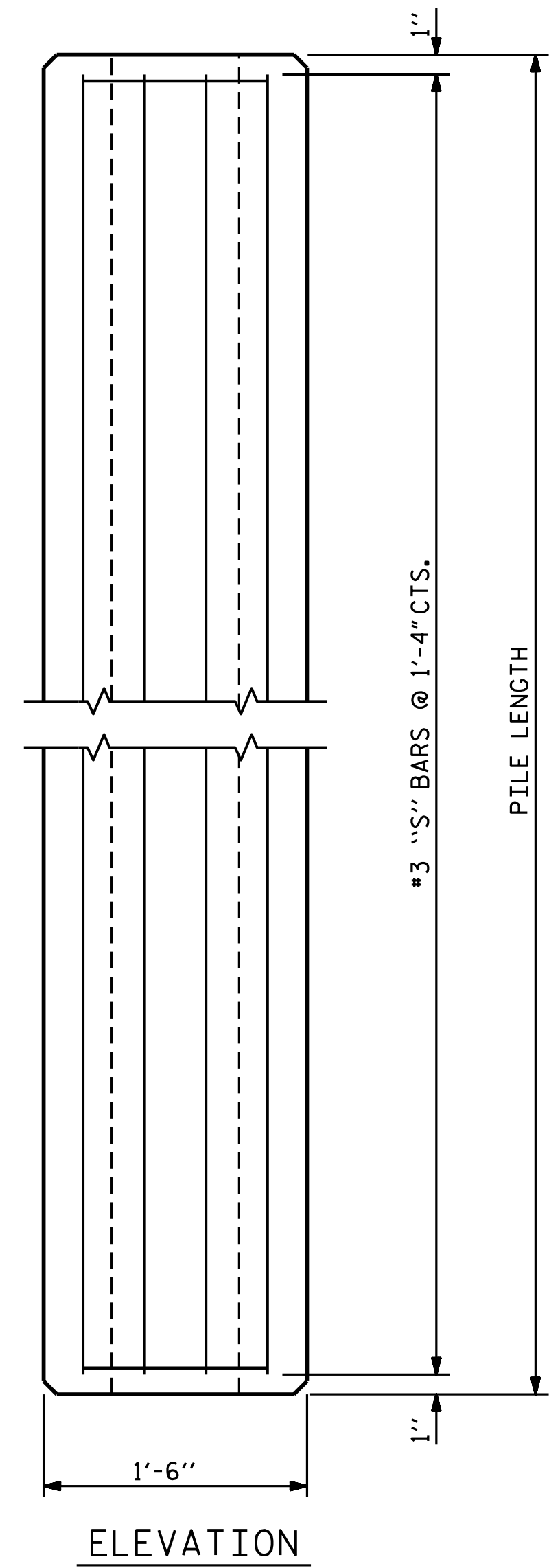
SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 SOUND BARRIER WALL  
 DETAILS

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

STD. NO. SBW2





NOTES

CONCRETE DESIGN DATA :  $f'_c = 5,000$  PSI

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

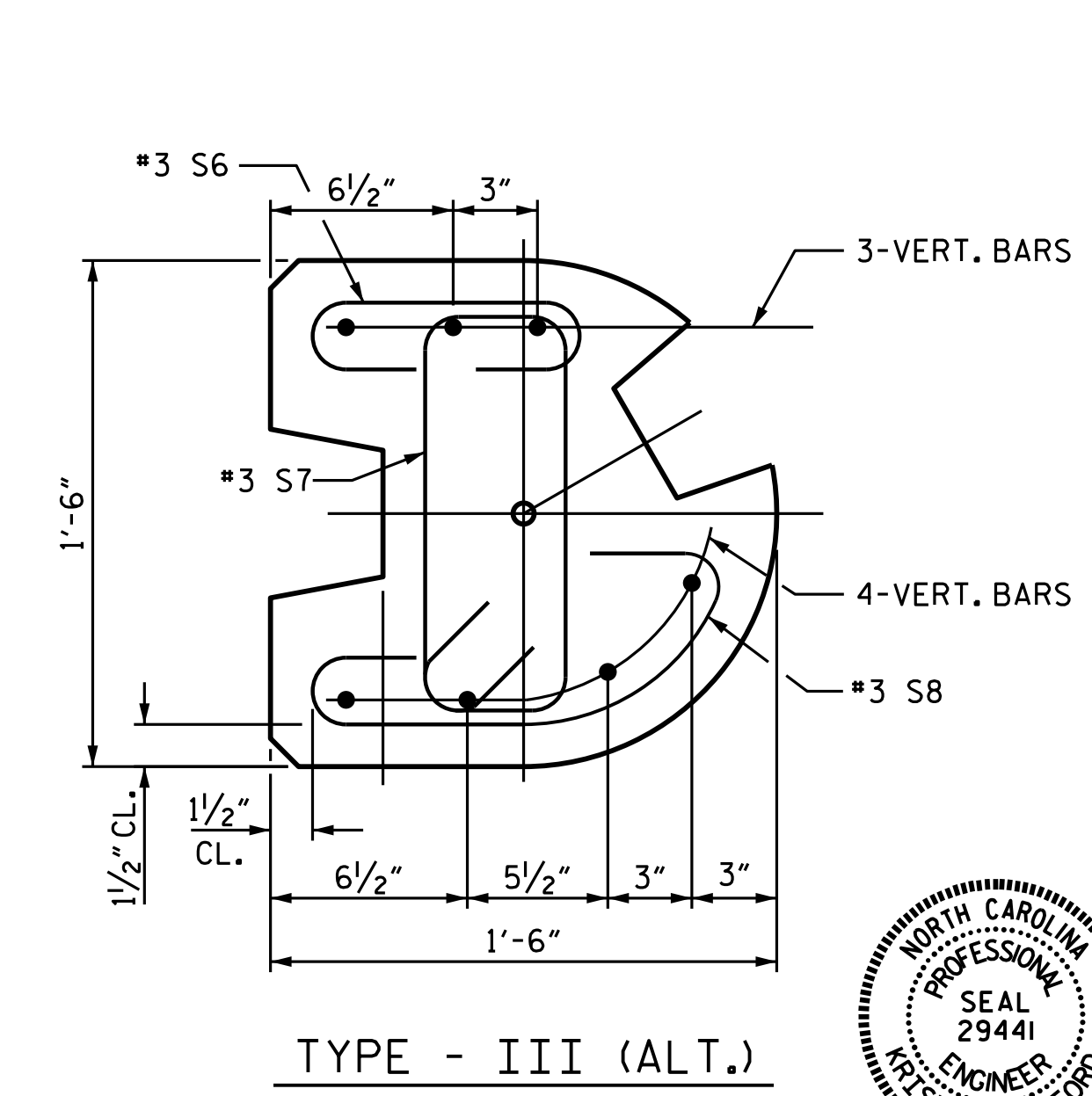
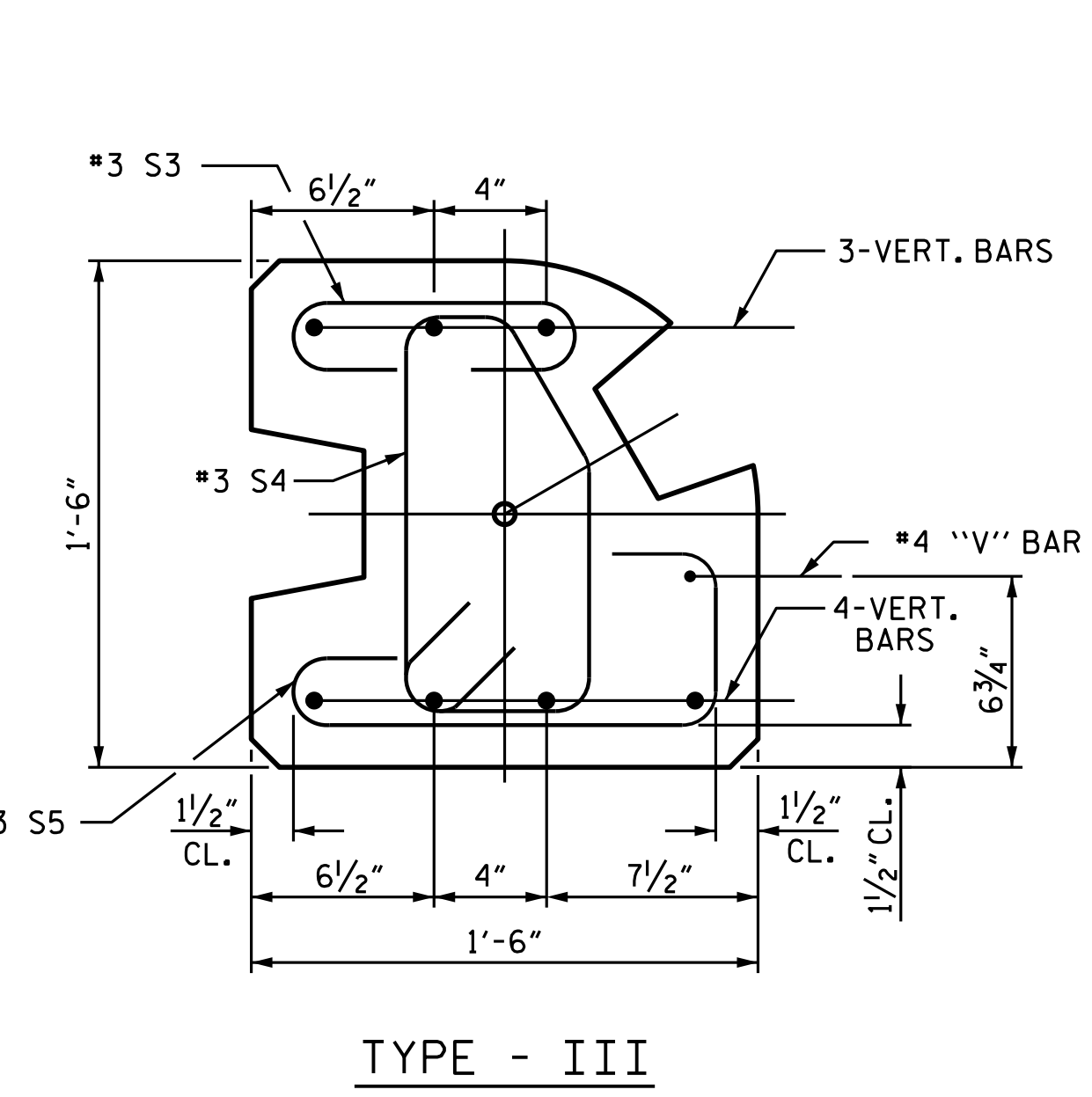
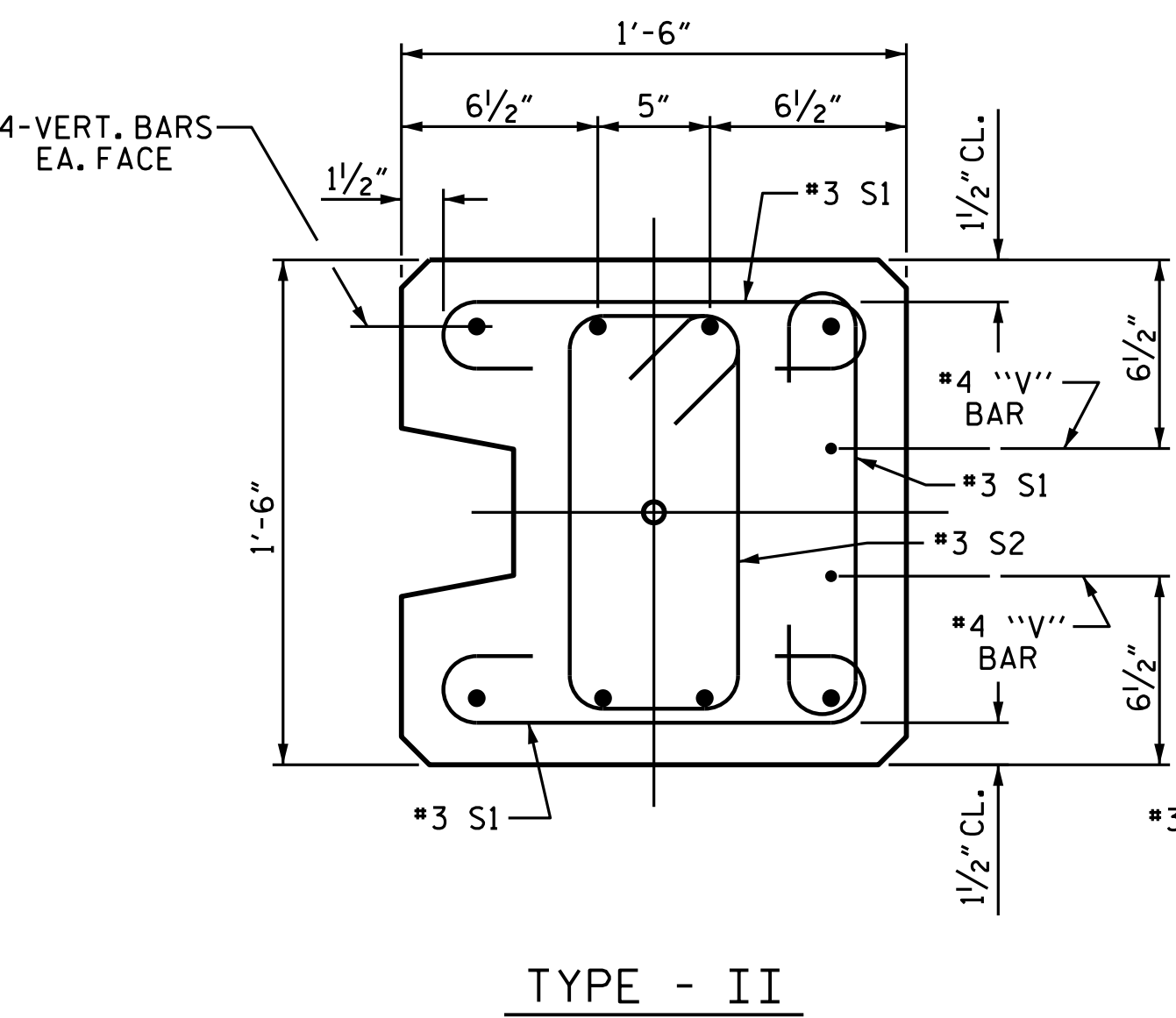
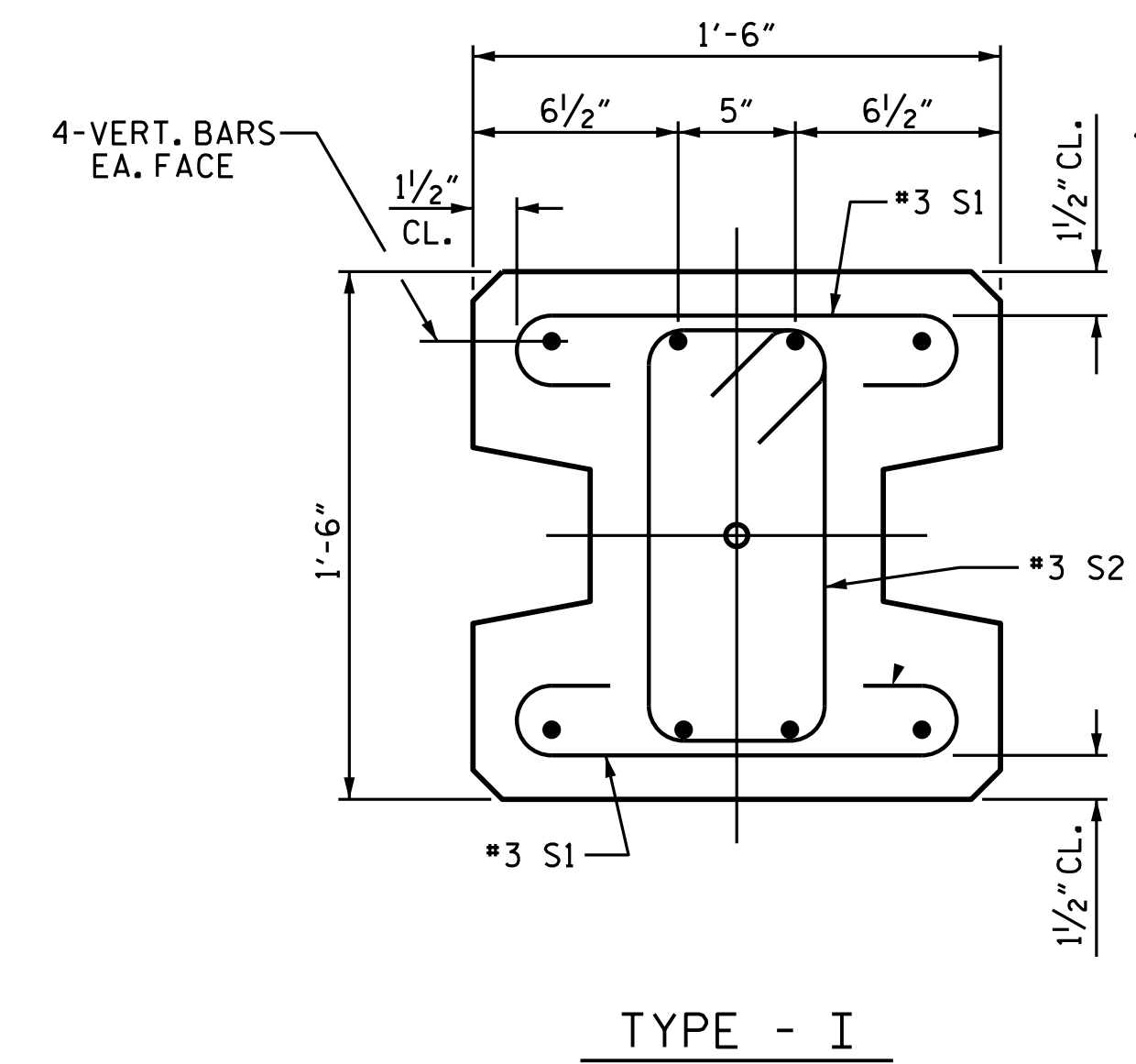
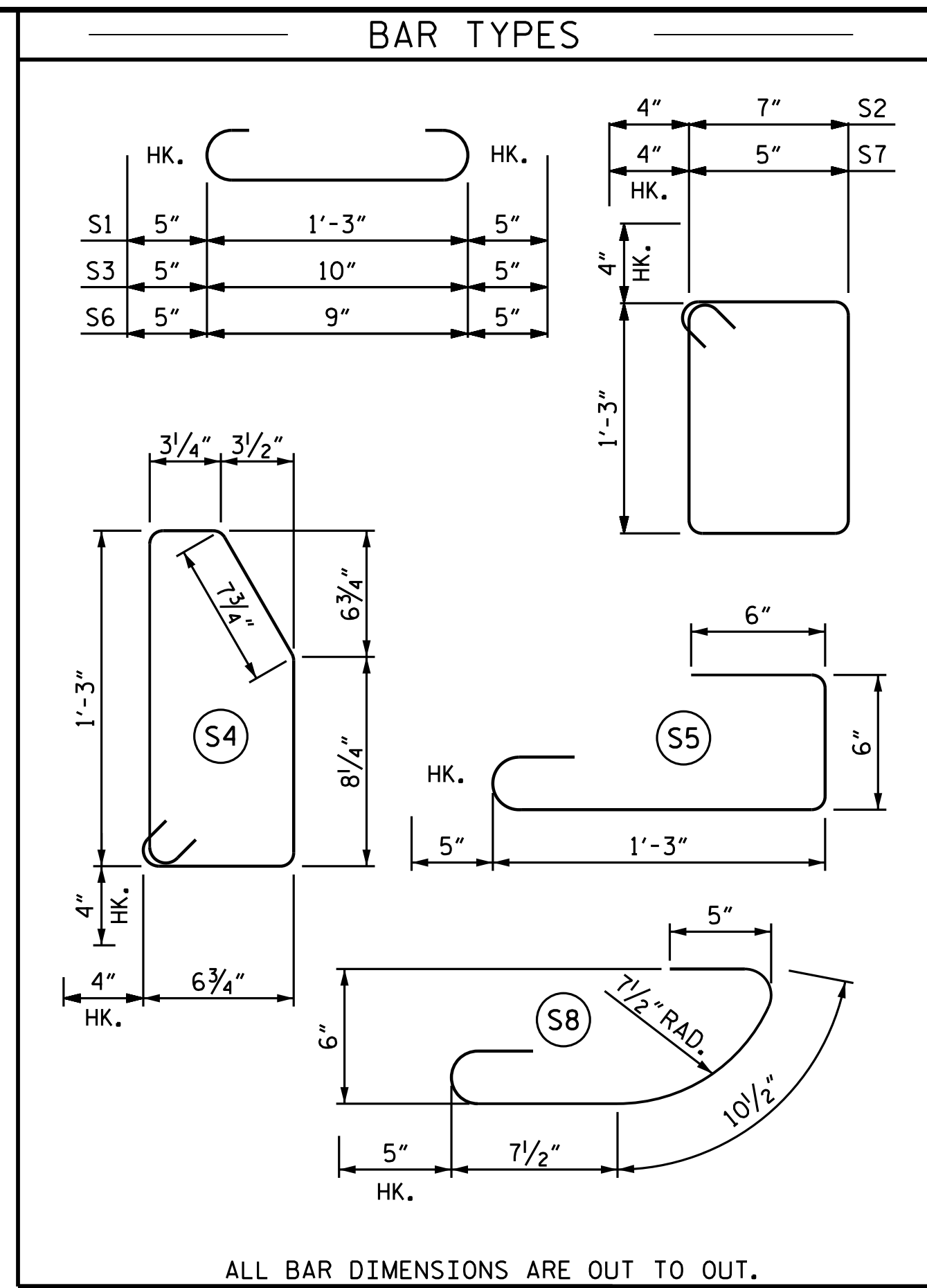
WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

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

ALL CORNERS TO BE CHAMFERED 1".

QUANTITIES FOR ONE PRECAST CONCRETE PILE

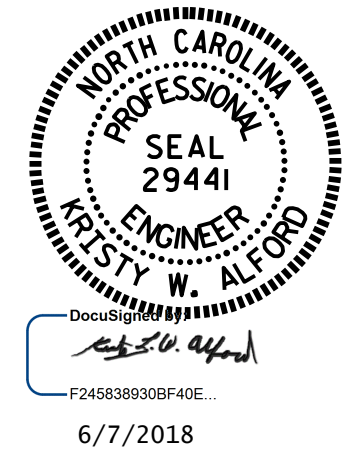
LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINT	
		0.300L	0.700L	0.207L	0.586L
10'-0"	1.56	3'-0"	7'-0"		
15'-0"	2.35	4'-6"	10'-6"		
20'-0"	3.14	6'-0"	14'-0"		
25'-0"	3.93	7'-6"	17'-6"		
30'-0"	4.70	9'-0"	21'-0"		
35'-0"	5.49	10'-6"	24'-6"		
40'-0"	6.28	12'-0"	28'-0"		
45'-0"	7.05	13'-6"	31'-6"		
50'-0"	7.84	15'-0"	35'-0"		
55'-0"	8.63			11'-4 1/2"	32'-3"
60'-0"	9.42			12'-5"	35'-2"



PILE DETAIL

FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 3

PROJECT NO. U-4405  
 CUMBERLAND COUNTY  
 STATION: 10+00.00 -NW1-  
 SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 SOUND BARRIER WALL  
 DETAILS

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

ASSEMBLED BY : K.W. ALFORD DATE : 6/18  
 CHECKED BY : G.W. DICKEY DATE : 6/18  
 DRAWN BY : MAA 6/11 REV. 1/15/14 RWW/TMG  
 CHECKED BY : GM 6/11 REV. 12/17 MAA/THC

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 SIGNATURES COMPLETED