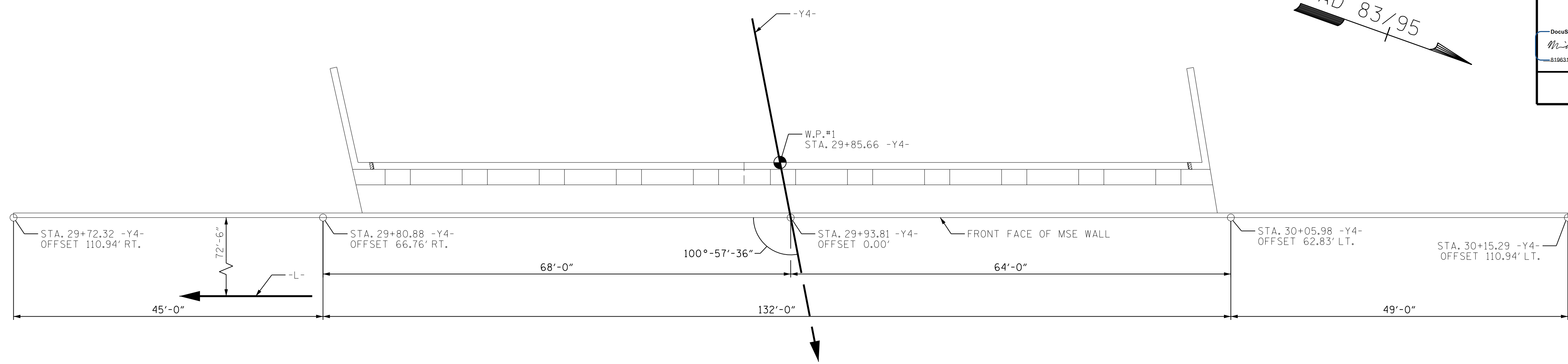


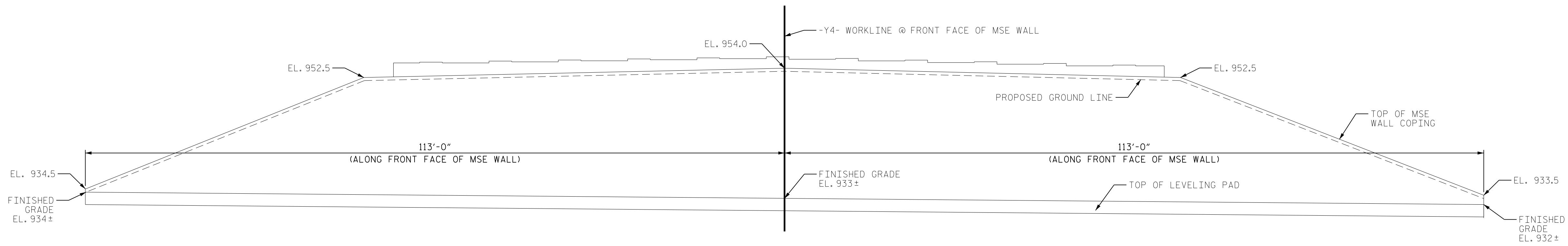
ENGINEER

DocuSigned by:  
Michael H. Stephens  
6/1/2021

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



PLAN @ END BENT 1



ELEVATION @ END BENT 1

(LOOKING BACKSTATION;  
BACKWALL AND WINGWALLS  
NOT SHOWN FOR CLARITY)

ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL AT STA 29+93.81 -Y4-	4,090 SF

\*MSE WALL AREA IS MEASURED FROM THE TOP OF COPING TO TOP OF LEVELING PAD.

PROJECT NO.: 34839.1.1 (U-2579AB)  
 FORSYTH COUNTY  
 STATION: 29+93.81 -Y4-  
 SHEET 1 OF 5 WALL ID RW - BRIDGE NO. 723

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

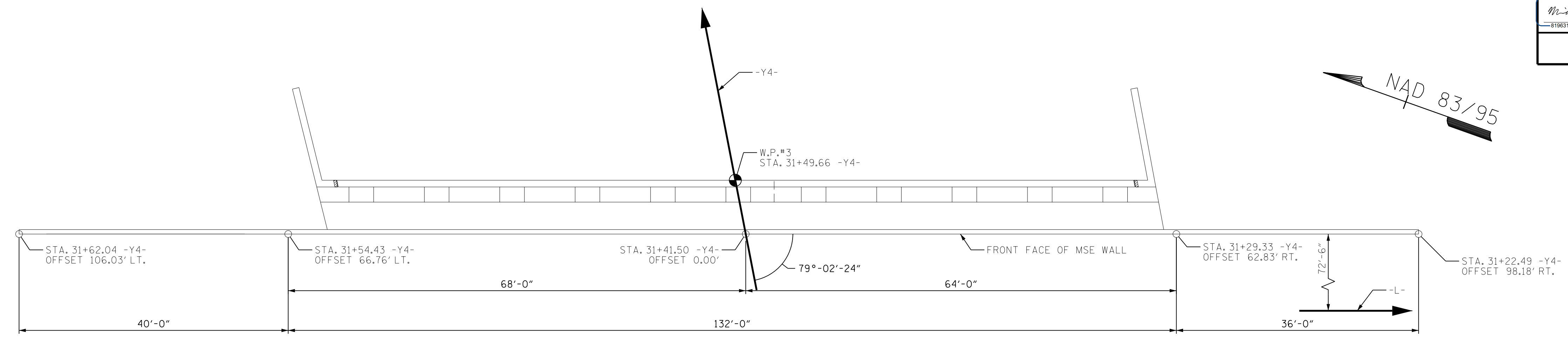
**GEOTECHNICAL  
ENGINEERING UNIT**

MSE RETAINING WALL BRIDGE NO. 723, END BENT 1 PLAN AND ELEVATION VIEWS					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

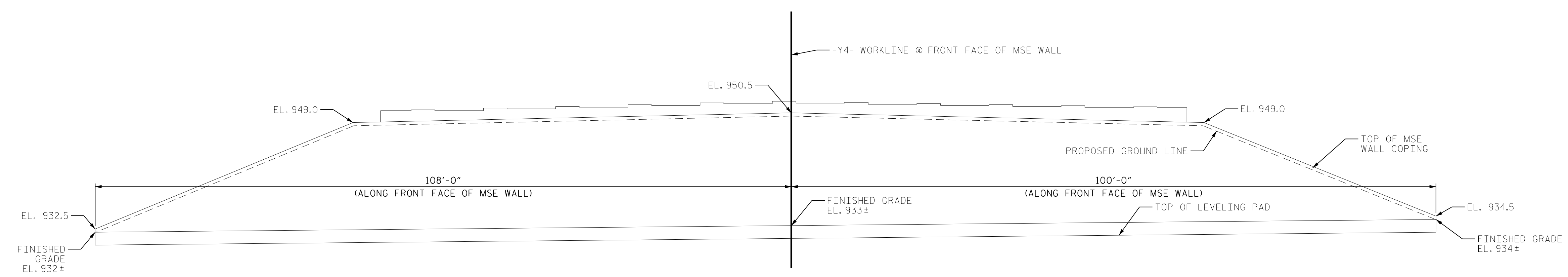
PREPARED BY: MHS	DATE: 6/1/21
REVIEWED BY: SCC	DATE: 6/1/21

SHEET NO.  
W-1

GEOTECHNICAL ENGINEER  
 ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 028893  
 MICHAEL H. STEPHENS  
 DocuSigned by: *M.H.S.* 6/1/2021  
 6196315630 SIGNATURE DATE SIGNATURE DATE  
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



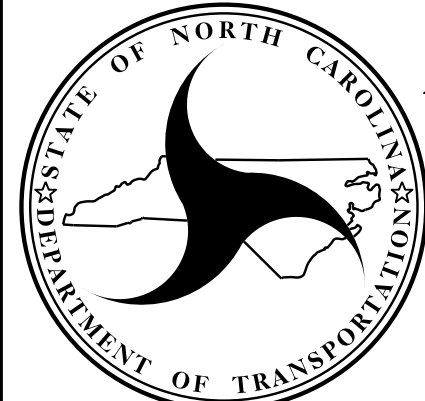
PLAN @ END BENT 2



ELEVATION @ END BENT 2  
 (LOOKING UPSTATION;  
 BACKWALL AND WINGWALLS  
 NOT SHOWN FOR CLARITY)

ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL AT STA 31+41.50 -Y4-	3,250 SF
<small>*MSE WALL AREA IS MEASURED FROM THE TOP OF COPING TO TOP OF LEVELING PAD.</small>	

PROJECT NO.: 34839.1.1 (U-2579AB)  
 FORSYTH COUNTY  
 STATION: 31+41.50 -Y4-  
 SHEET 2 OF 5 WALL ID RW - BRIDGE NO. 723

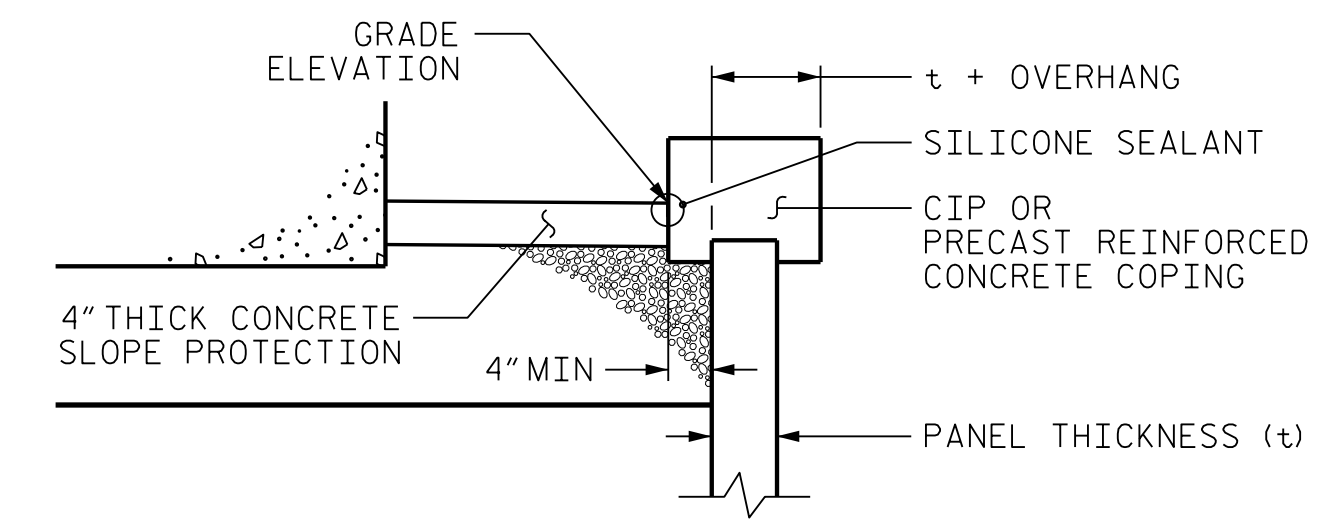
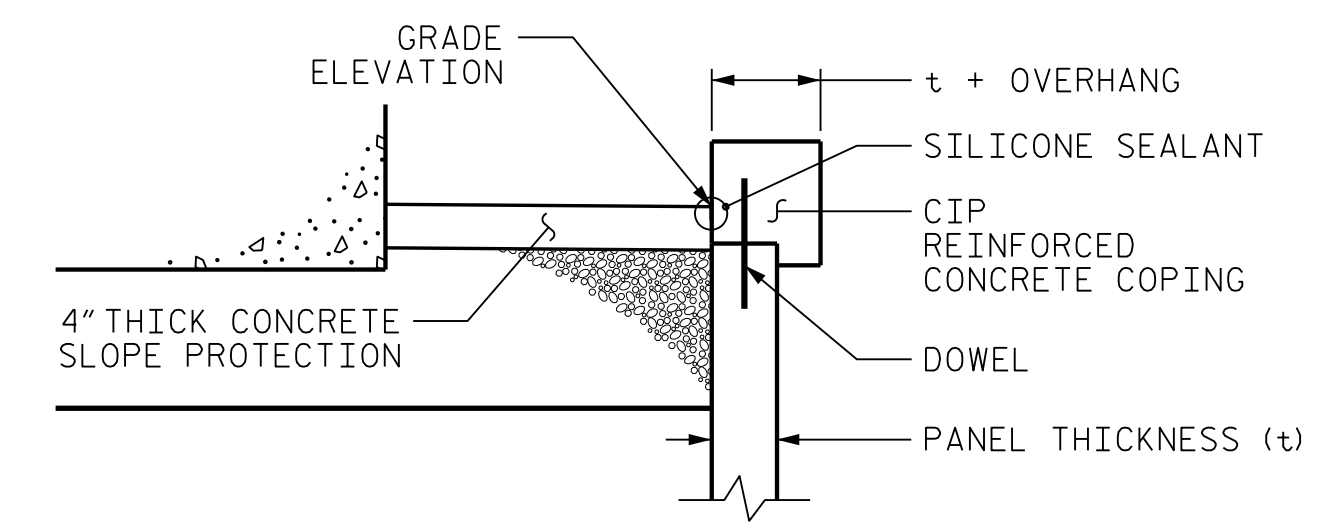
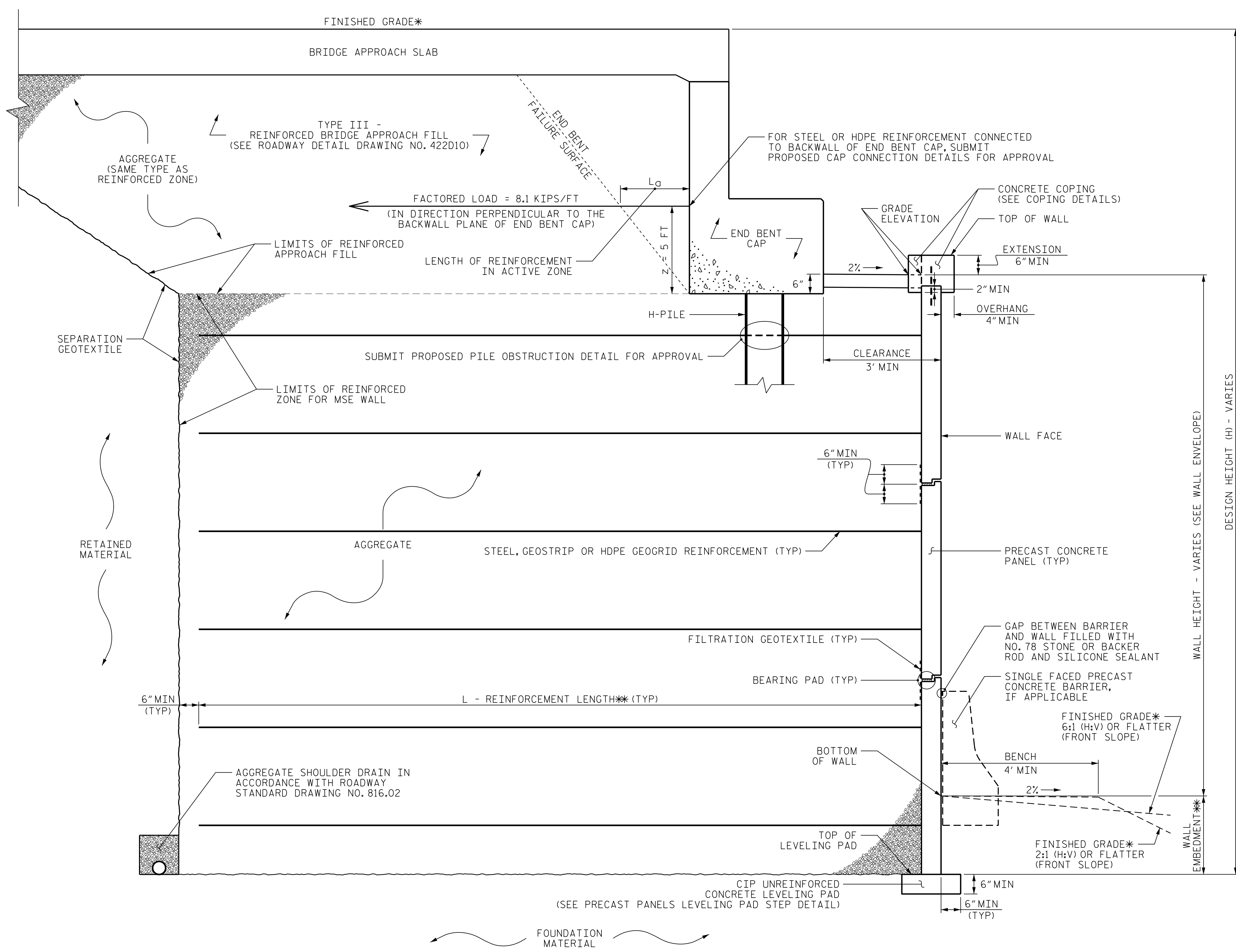

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

MSE RETAINING WALL BRIDGE NO. 723, END BENT 2 PLAN AND ELEVATION VIEWS					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PREPARED BY: MHS	DATE: 6/1/21
REVIEWED BY: SCC	DATE: 6/1/21

SHEET NO. W-2

GEOTECHNICAL ENGINEER  
 ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 028893  
 MICHAEL H. STEPHENS  
 DocuSigned by: *M. H. Stephens* 6/1/2021  
 SIGNATURE DATE SIGNATURE DATE  
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



**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 WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: 34839.1.1 (U-2579AB)  
 FORSYTH COUNTY  
 STATION: 29+93.81 -Y4- AND 31+41.50 -Y4-  
 SHEET 3 OF 5 WALL ID RW - BRIDGE NO. 723

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

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

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

PREPARED BY: MHS	DATE: 6/1/21
REVIEWED BY: SCC	DATE: 6/1/21



GEOTECHNICAL ENGINEER

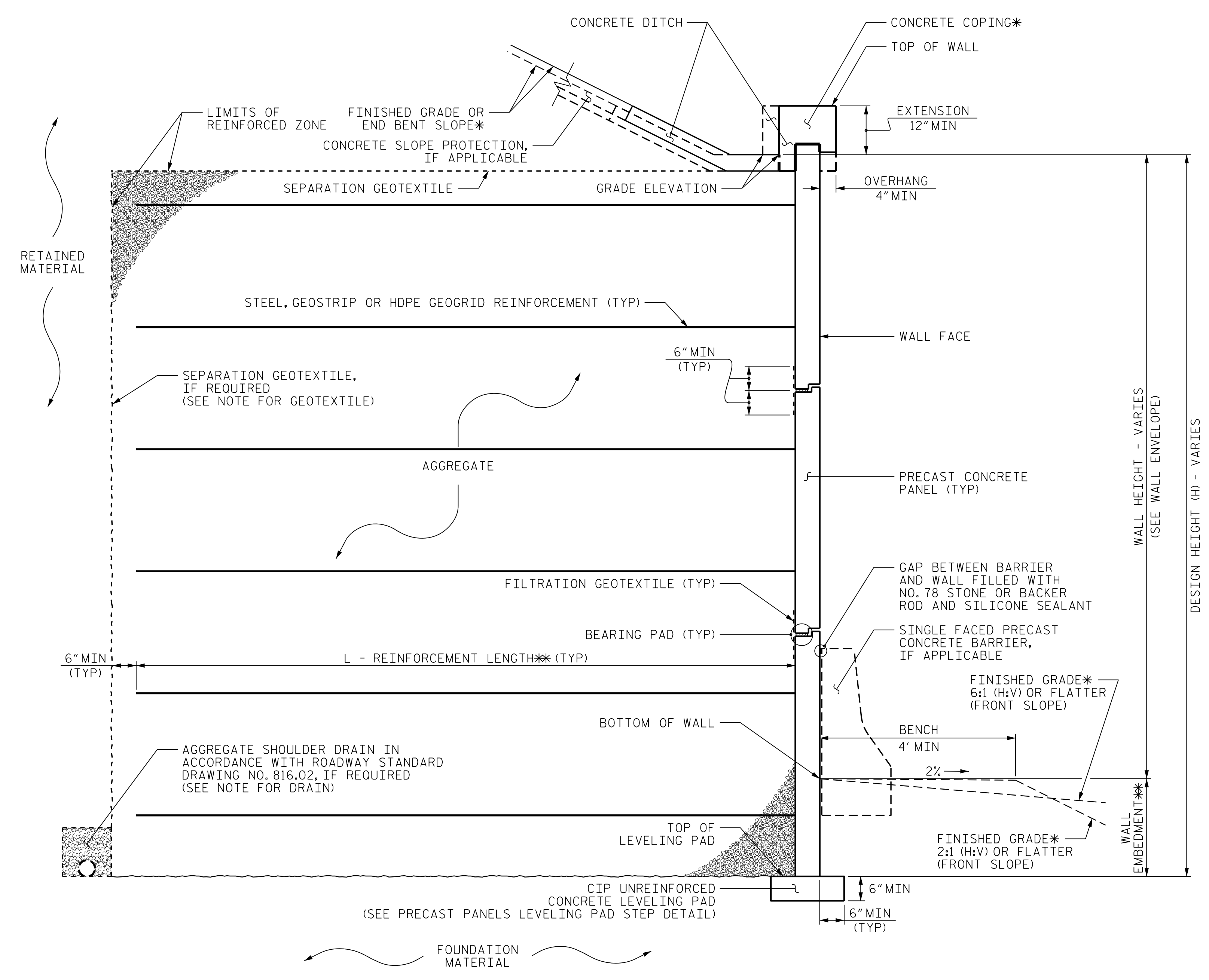
ENGINEER

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DocuSigned by: *M. Stephens* 6/1/2021

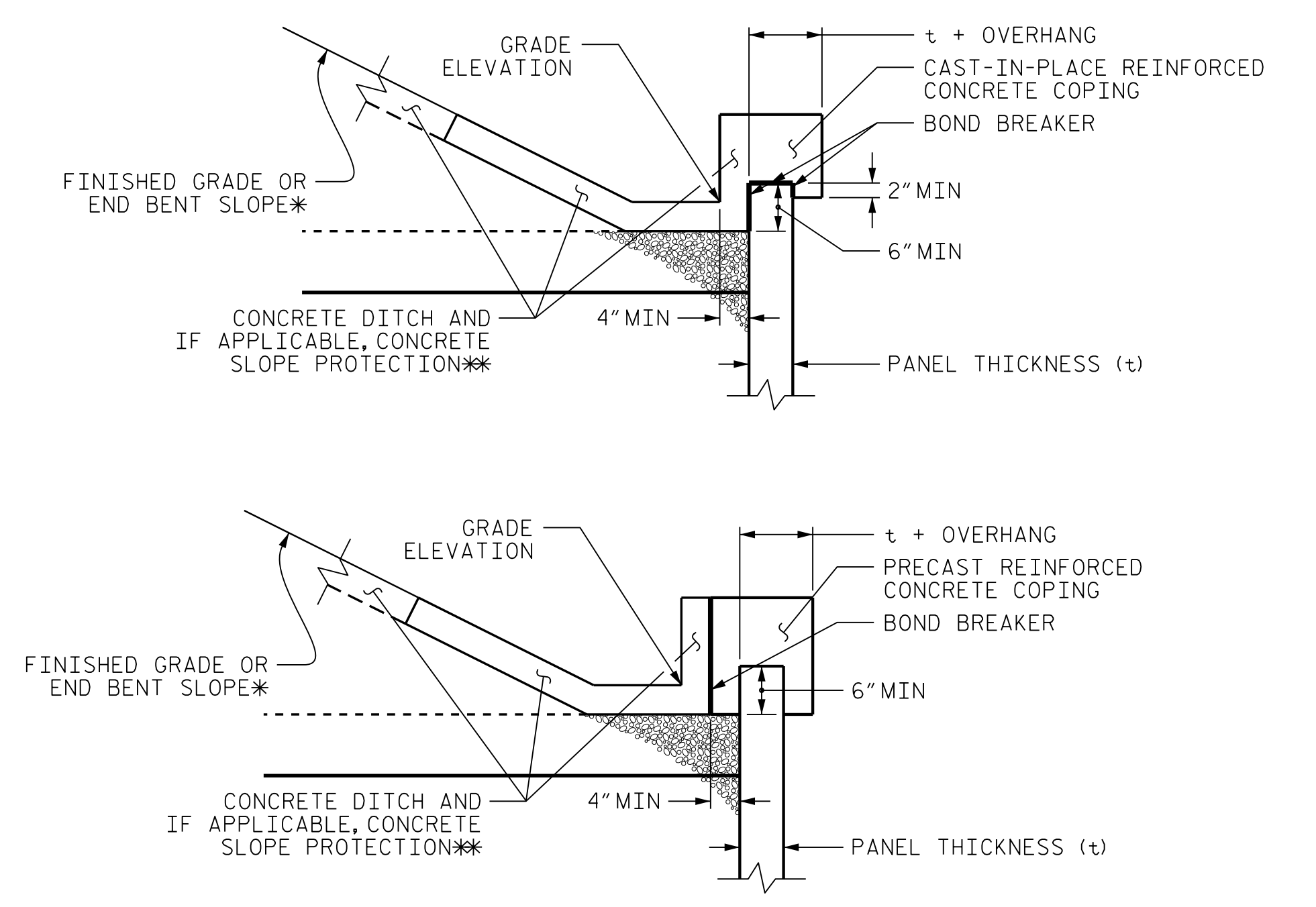
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**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



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

\*SEE COPING DETAILS AND PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.  
 \*\*SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



**COPING DETAILS**

\*SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.  
 \*\*SEE CONCRETE DITCH BEHIND WALL DETAILS.

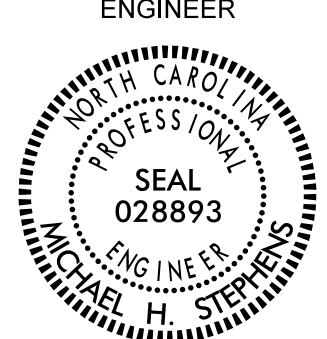
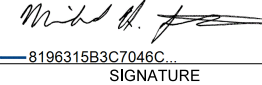
PROJECT NO.: 34839.1.1 (U-2579AB)  
 FORSYTH COUNTY  
 STATION: 29+93.81 -Y4- AND 31+41.50 -Y4-  
 SHEET 4 OF 5 WALL ID RW - BRIDGE NO. 723

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

**GEOTECHNICAL  
ENGINEERING UNIT**

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

PREPARED BY: MHS	DATE: 6/1/21
REVIEWED BY: SCC	DATE: 6/1/21

GEOTECHNICAL ENGINEER  SEAL 028893 ENGINEER MICHAEL H. STEPHENS	ENGINEER
DocuSigned by:  819631583CT946C SIGNATURE	6/1/2021 DATE
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

**NOTES:**

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR TYPE III REINFORCED BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALLS LOCATED AT STA 29+93.81 -Y4- AND 31+41.50 -Y4-.

A SEPARATION GEOTEXTILE IS REQUIRED LOCATED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALLS AT STA 29+93.81 -Y4- AND 31+41.50 -Y4-.

A DRAIN IS REQUIRED FOR RETAINING WALLS LOCATED AT STA 29+93.81 -Y4- AND 31+41.50 -Y4-.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALLS LOCATED AT STA 29+93.81 -Y4- AND 31+41.50 -Y4-, 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 LOCATED AT STA 29+93.81 -Y4- AND 31+41.50 -Y4- FOR THE FOLLOWING:

- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,400 PSF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7 H OR 6 FT, WHICHEVER IS LONGER
- 5) MINIMUM EMBEDMENT DEPTH = 2 FT
- 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT ( $\gamma$ ) PCF	FRICTION ANGLE ( $\phi$ ) 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 ( $\gamma$ ) PCF	FRICTION ANGLE ( $\phi$ ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	0

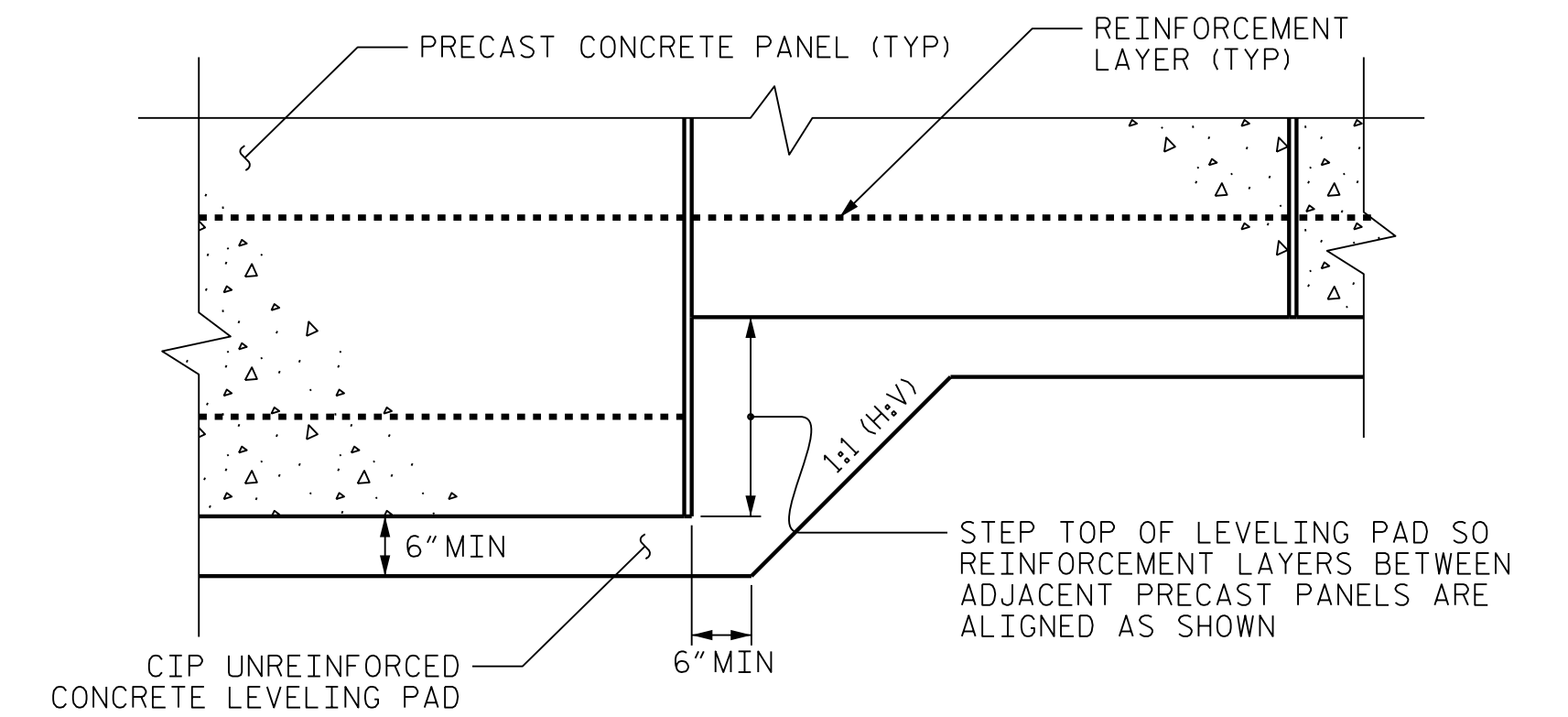
DESIGN RETAINING WALLS LOCATED AT STA 29+93.81 -Y4- AND 31+41.50 -Y4- FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE ( $L_a$ ) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.1 AT STATION 29+86.66 -Y4- AND END BENT NO.2 AT STATION 31+49.66 -Y4-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS PILES FOR END BENT NO.1 AT STATION 29+86.66 -Y4- AND END BENT NO.2 AT STATION 31+49.66 -Y4- WILL BE INSTALLED PRIOR TO THE CONSTRUCTION OF THE MSE RETAINING WALLS LOCATED AT STA 29+93.81 -Y4- AND 31+41.50 -Y4-. SEE STRUCTURE PLANS FOR PILE LOCATIONS AND INSTALLATION DEPTHS.


FOUNDATIONS FOR END BENT NO.1 AT STATION 29+86.66 -Y4- AND END BENT NO.2 AT STATION 31+49.66 -Y4- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS AT STA 29+93.81 -Y4- AND 31+41.50 -Y4-. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS AT STA 29+93.81 -Y4- AND 31+41.50 -Y4- UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



**PRECAST PANELS  
LEVELING PAD STEP DETAIL**

PROJECT NO.: 34839.1.1 (U-2579AB)  
 FORSYTH COUNTY  
 STATION: 29+93.81 -Y4- AND 31+41.50 -Y4-  
 SHEET 5 OF 5 WALL ID RW - BRIDGE NO. 723



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

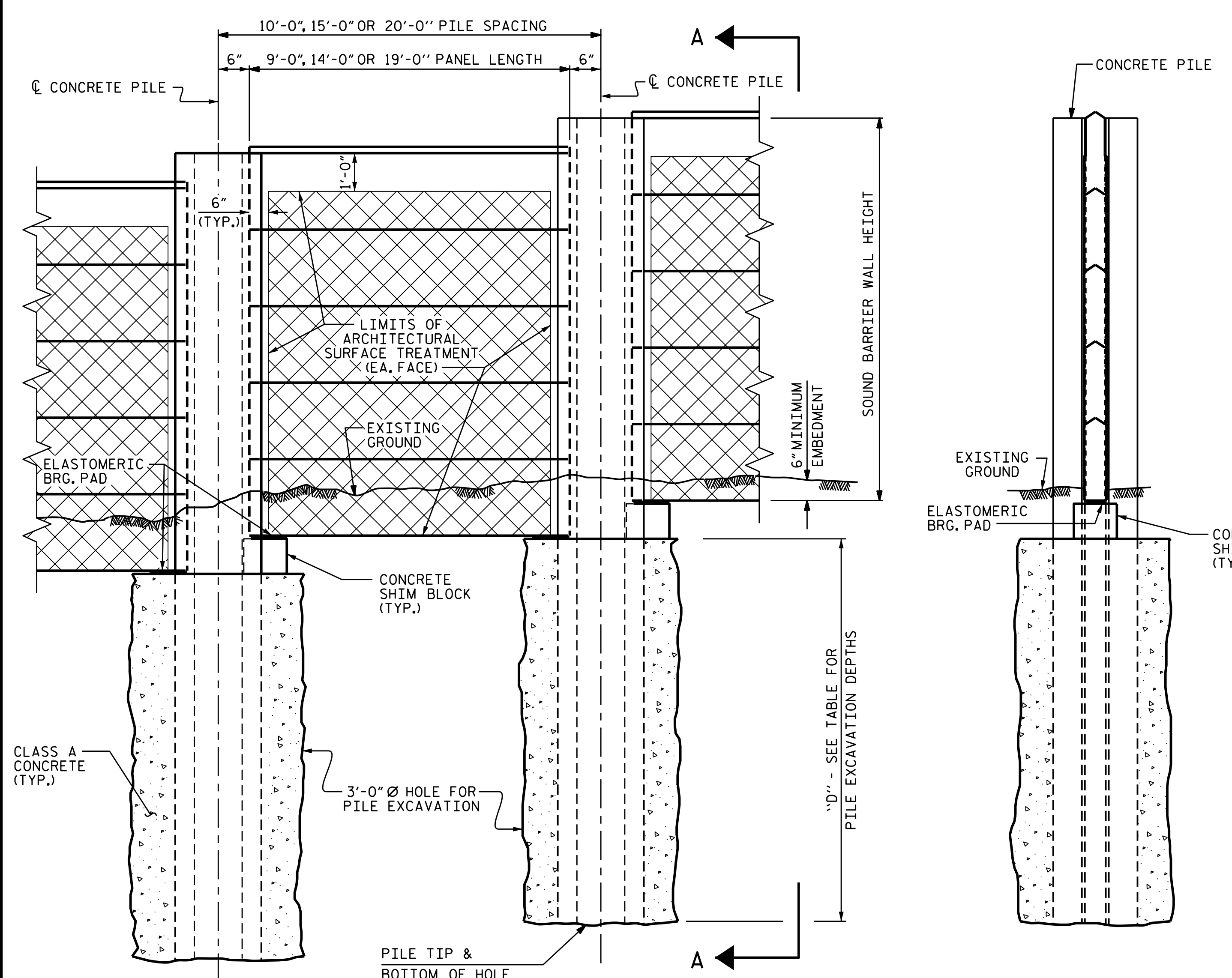
**GEOTECHNICAL  
ENGINEERING UNIT**

**MSE RETAINING WALL  
NOTES AND DETAILS**

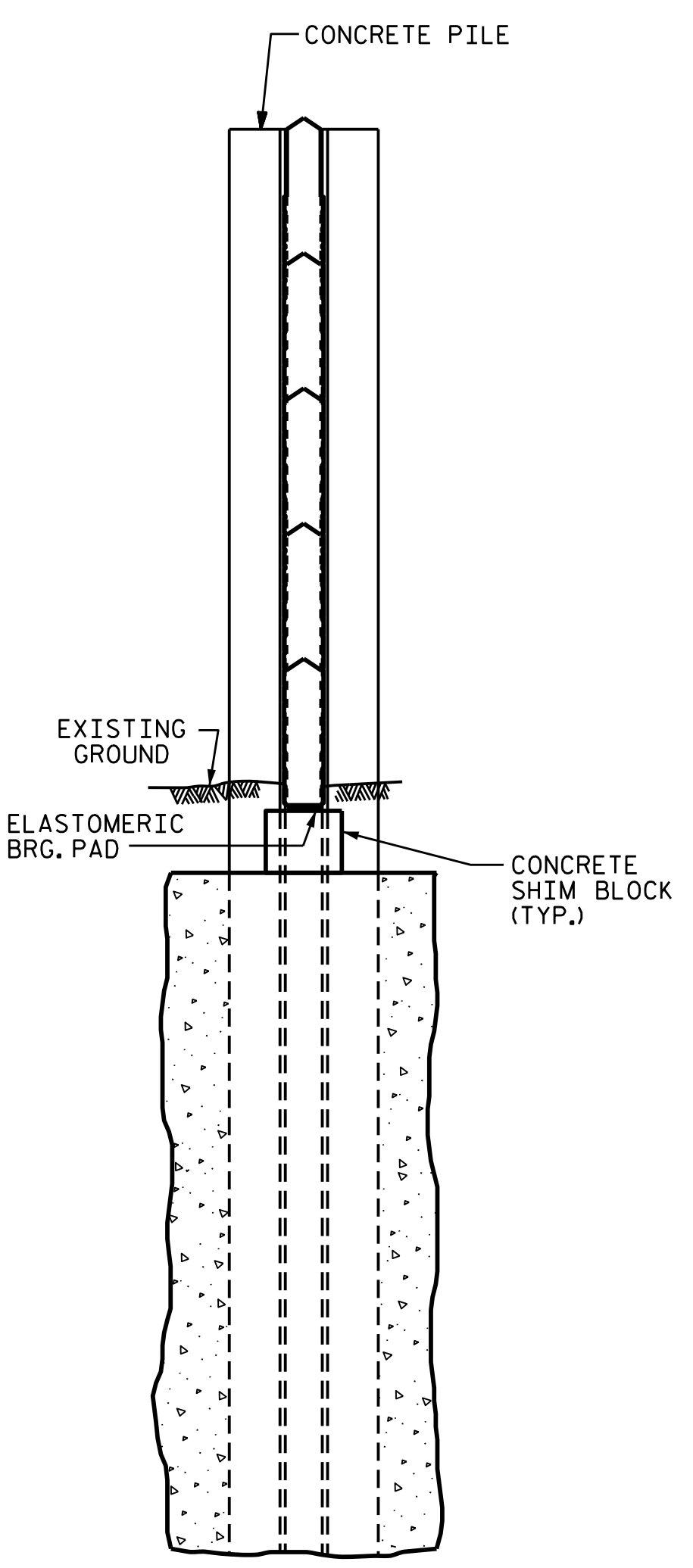
REVISIONS						SHEET NO. W-5
NO.	BY	DATE	NO.	BY	DATE	
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2			4			

PREPARED BY: MHS	DATE: 6/1/21
REVIEWED BY: SCC	DATE: 6/1/21

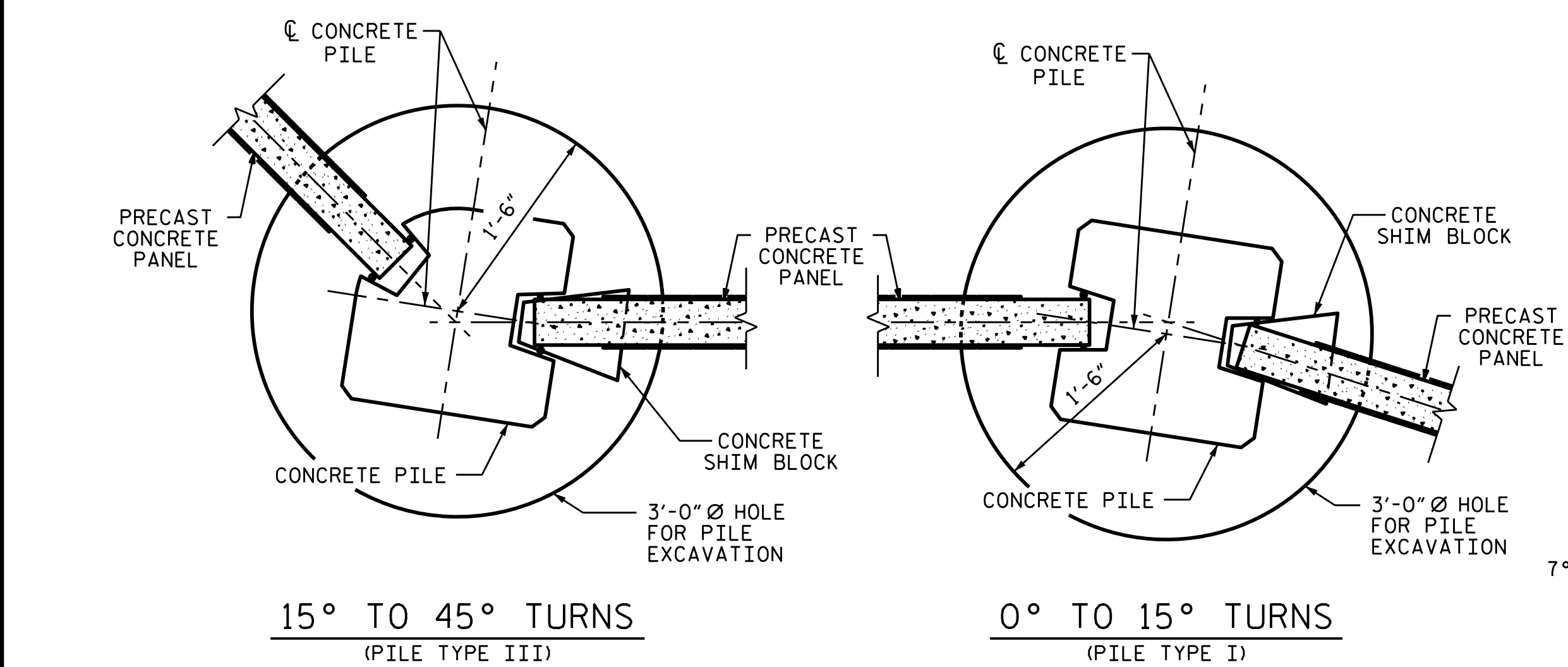




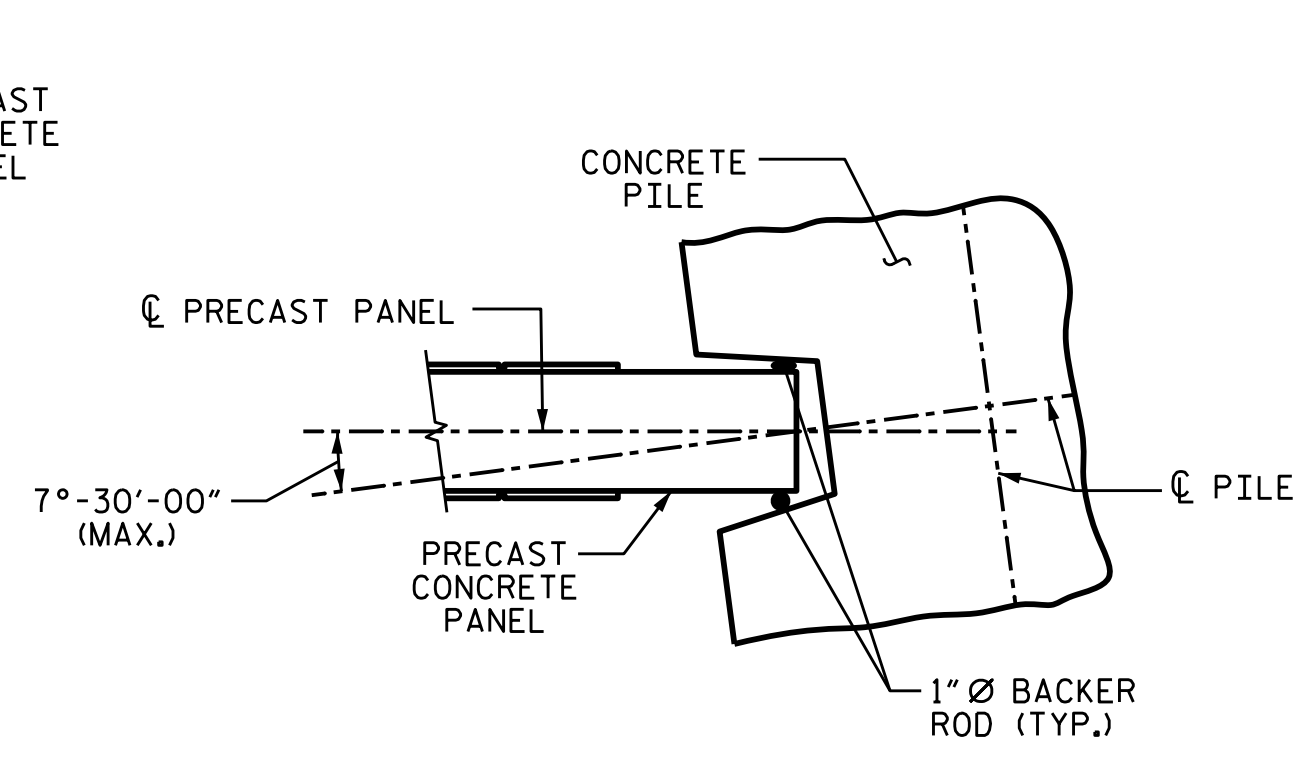
ELEVATION



SECTION A-A



TYPICAL WALL TURN DETAILS



PILE ROTATION LIMIT FOR WALL TURN

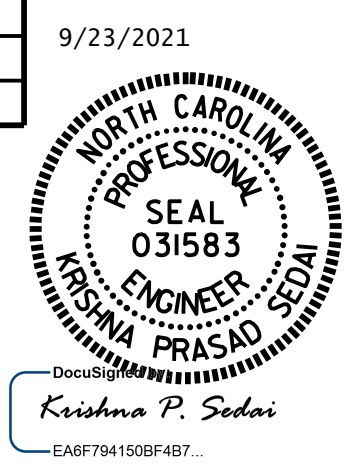
(ROTATE THE CONCRETE PILE ±7°-30'-00" TO ACCOMMODATE WALL TURN.)

PILE EXCAVATION DEPTHS "D"				
WALL # 1		FROM : STA. 10+00.00-NW11/13- TO : STA. 23+00.00-NW11/13-		
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. 23+00.00 -NW11/13- TO : STA. 41+20.00 -NW11/13-		
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT		
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'
	10'-0"	8'-0"	10'-0"	11'-0"
	15'-0"	9'-0"	11'-0"	13'-0"
20'-0"	10'-0"	13'-0"	15'-0"	

NOTE: FOR 30" DIA. HOLES, ADD 1 FT. TO D.

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.
	15'-0"	H ≤ 20'	4 - #8 EA. FACE		#3 @ 1'-4"CTS.	15'-0"	H ≤ 20'
	20' < H ≤ 25'	4 - #10 EA. FACE	#3 @ 1'-4"CTS.		20' < H ≤ 25'		3 - #11 SHORT FACE 4 - #11 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	#3 @ 1'-4"CTS.
	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.
	15'-0"	H ≤ 20'	4 - #6 EA. FACE		#3 @ 1'-4"CTS.	15'-0"	H ≤ 20'
	20' < H ≤ 25'	4 - #7 EA. FACE	#3 @ 1'-4"CTS.		20' < H ≤ 25'		3 - #11 SHORT FACE 4 - #11 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	#3 @ 1'-4"CTS.
	20' < H ≤ 25'	4 - #8 EA. FACE	#3 @ 1'-4"CTS.				

BILL OF MATERIAL	
SOUND BARRIER WALL	56,818 S.F.
ARCHITECTURAL SURFACE TREATMENT	93,077 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	UNSTAINED



NOTES

- FOR SOUND BARRIER WALL, SEE 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.
- ROCK AND/OR BOULDERS ARE EXPECTED ABOVE THE PILE EXCAVATION DEPTH IN THE FOLLOWING AREA:  
- FROM 11+00 TO 15+00 AND FROM 20+00 TO 21+50, -NW11/13-.

PROJECT NO. U-2579AB  
 FORSYTH COUNTY  
 STATION: 21+60.00-Y4RPC-

SHEET 1 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 SOUND BARRIER WALL 1  
 -NW11/13-

ASSEMBLED BY :	E. BAYISSA	DATE :	08/2021
CHECKED BY :	A. SORSENGINH	DATE :	08/2021
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.
NO.	BY:	DATE:	NO.	BY:	DATE:	1
1			3			TOTAL SHEETS
2			4			6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

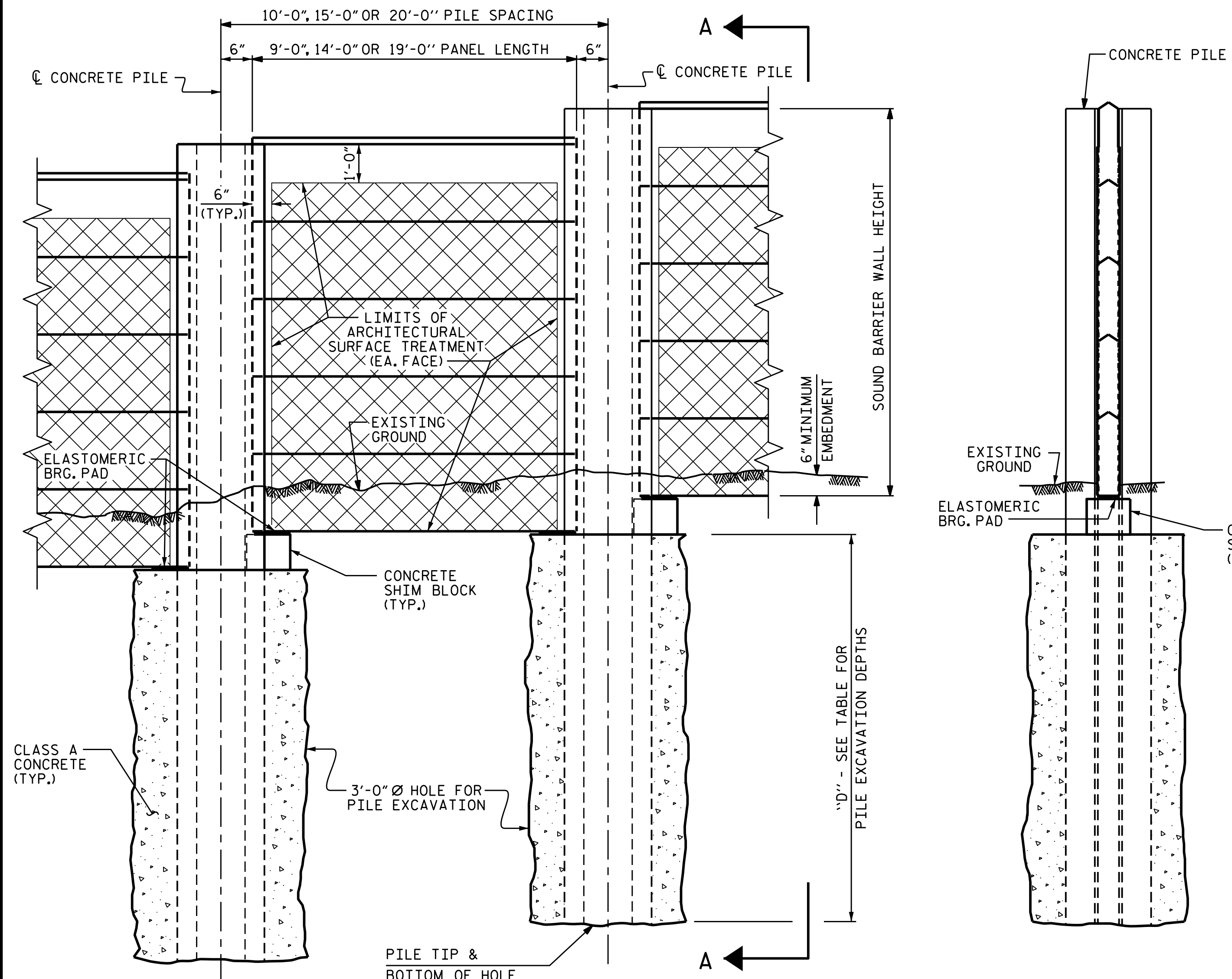


**NOTES**

- FOR SOUND BARRIER WALL, SEE 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.
- ROCK AND/OR BOULDERS ARE EXPECTED ABOVE THE PILE EXCAVATION DEPTH IN THE FOLLOWING AREA:
  - FROM 26+00 TO 29+00 AND FROM 42+00 TO 45+00, -NW15/16-.

PILE EXCAVATION DEPTHS "D"				
WALL # 2		FROM : STA. 34+00.00 -NW15/16- TO : STA. 34+95.00 -NW15/16-		
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 # 2		FROM : STA. 10+00.00 -NW15/16- TO : STA. 34+00.00 -NW15/16-		
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT		
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'
	10'-0"	8'-0"	10'-0"	11'-0"
	15'-0"	9'-0"	11'-0"	13'-0"
20'-0"	10'-0"	13'-0"	15'-0"	

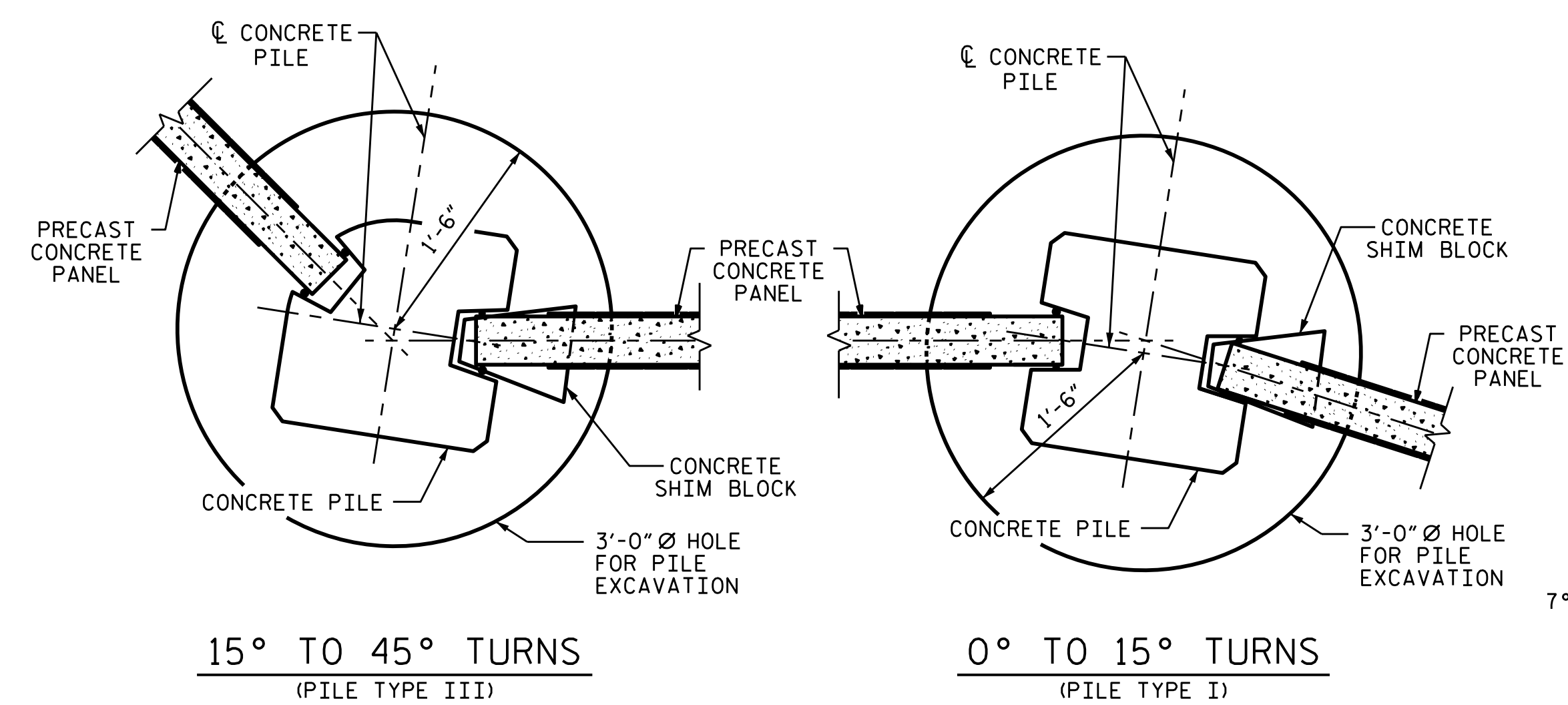
NOTE: FOR 30" DIA. HOLES, ADD 1 FT. TO D.



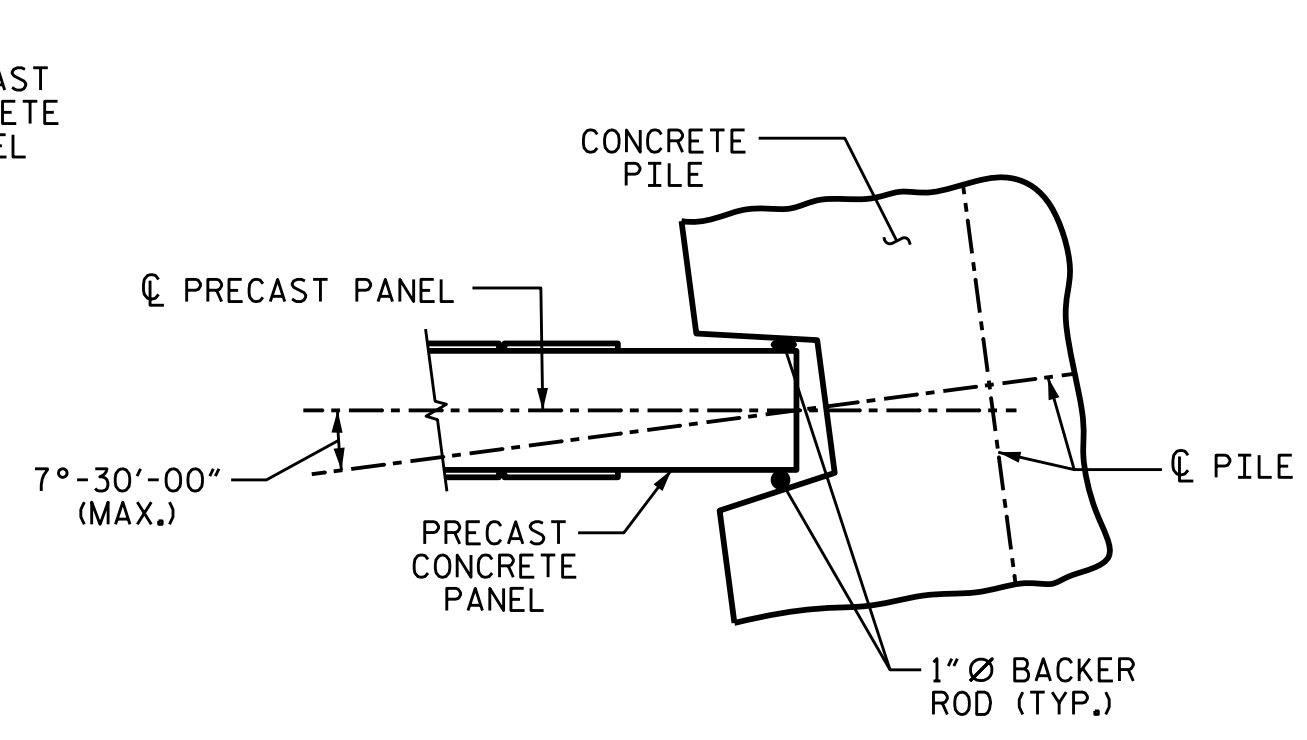
**ELEVATION**

**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.
	H ≤ 20'	4 - #8 EA. FACE	#3 @ 1'-4"CTS.		15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE
15'-0"	20' < H ≤ 25'	4 - #10 EA. FACE	#3 @ 1'-4"CTS.	15'-0"		20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE
	20'-0"	H ≤ 20'	4 - #9 EA. FACE		#3 @ 1'-4"CTS.	20'-0"	H ≤ 20'
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.
	H ≤ 20'	4 - #6 EA. FACE	#3 @ 1'-4"CTS.		15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE
15'-0"	20' < H ≤ 25'	4 - #7 EA. FACE	#3 @ 1'-4"CTS.	15'-0"		20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE
	20'-0"	H ≤ 20'	4 - #6 EA. FACE		#3 @ 1'-4"CTS.	20'-0"	H ≤ 20'
20' < H ≤ 25'		4 - #8 EA. FACE	#3 @ 1'-4"CTS.				



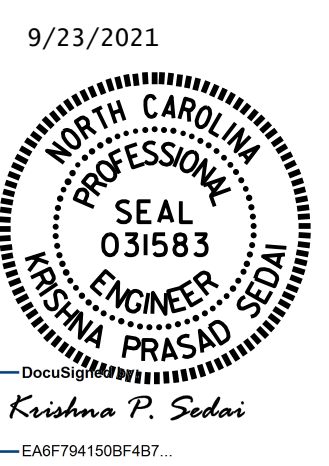
**TYPICAL WALL TURN DETAILS**



**PILE ROTATION LIMIT FOR WALL TURN**

(ROTATE THE CONCRETE PILE ±7°-30'-00" TO ACCOMMODATE WALL TURN.)

BILL OF MATERIAL	
SOUND BARRIER WALL	85,427 S.F.
ARCHITECTURAL SURFACE TREATMENT	140,295 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	UNSTAINED



PROJECT NO. U-2579AB  
 FORSYTH COUNTY  
 STATION: 19+40.00-Y15RPA-

SHEET 2 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 SOUND BARRIER WALL 2  
 -NW15/16-

ASSEMBLED BY : E. BAYISSA	DATE : 08/2021
CHECKED BY : A. SORSENGINH	DATE : 08/2021
DRAWN BY : MAA 6/11	MAA/TMG
CHECKED BY : GM 6/11	MAA/THC
	MAA/THC

REV. 9/26/14	MAA/TMG
REV. 10/17	MAA/THC
REV. 5/18	MAA/THC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	2
1			3			TOTAL SHEETS
2			4			6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

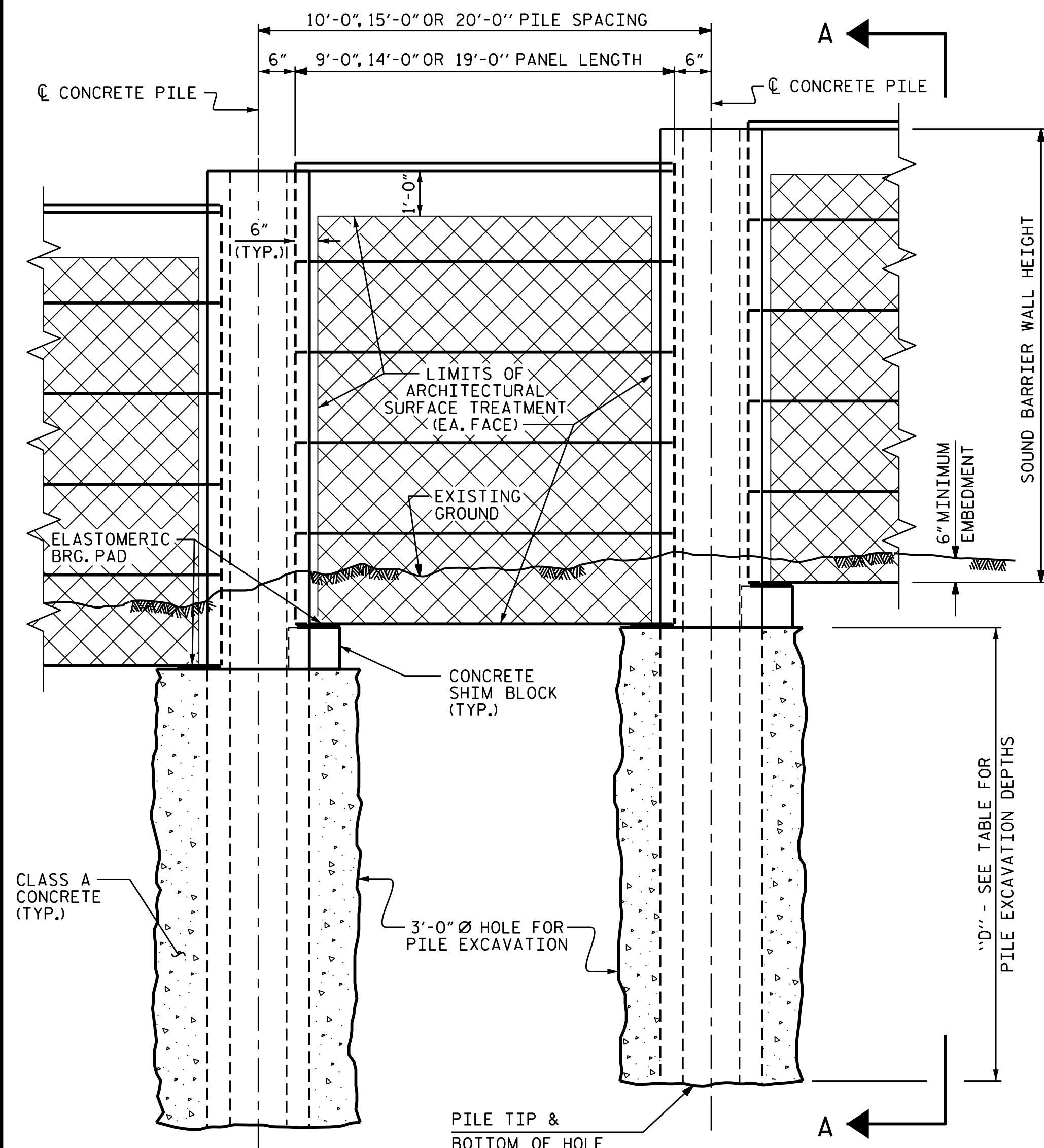


**NOTES**

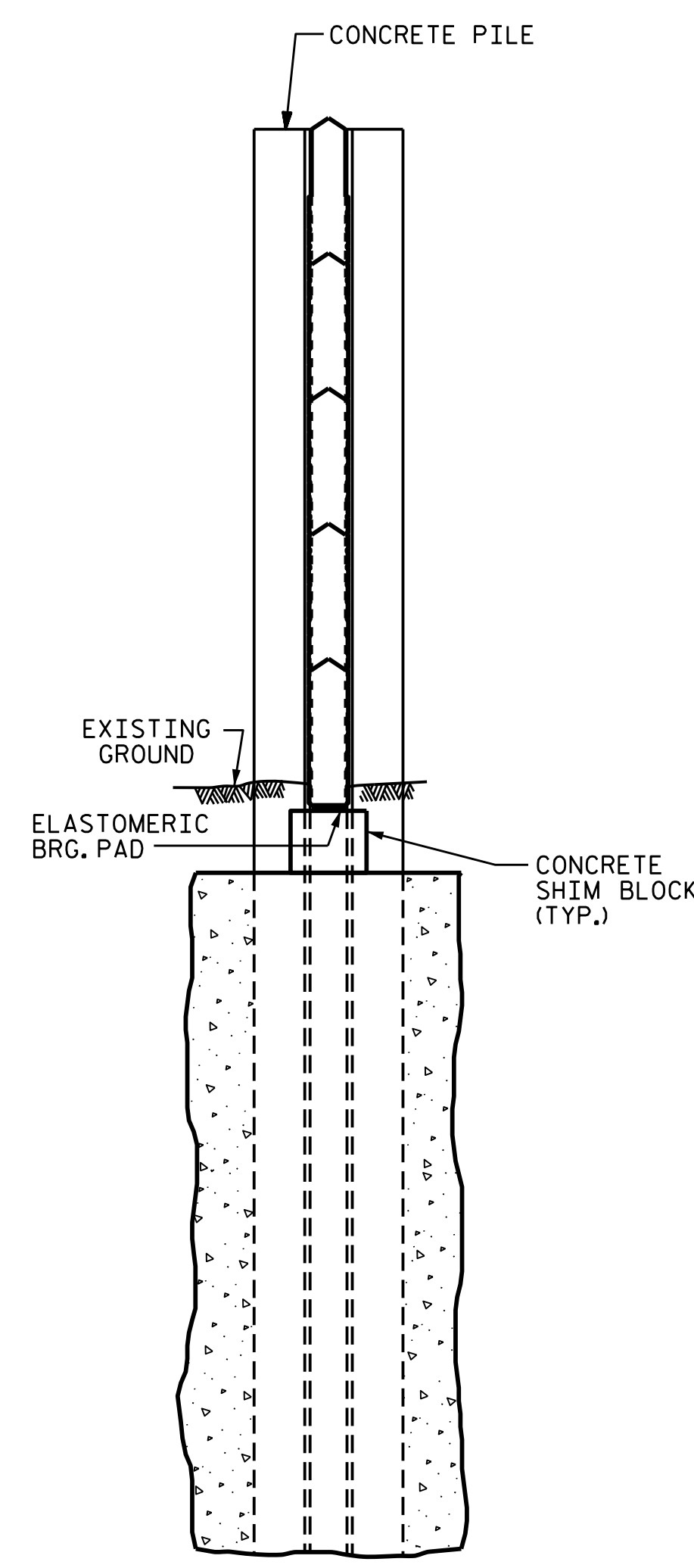
- FOR SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.
- CONSTRUCT SOUND BARRIER WALL TO LINES AND GRADES SHOWN ON THE ROADWAY PLANS.
- PROVIDE PANELS WITH A FLAT BOTTOM.
- VERIFY THE LOCATION OF UNDERGROUND UTILITIES BEFORE DRILLING HOLES TO ENSURE SUFFICIENT CLEARANCE IS AVAILABLE.
- ADJUST PILE EXCAVATION 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.
- ROCK AND BOULDERS ARE EXPECTED ABOVE THE PILE EXCAVATION DEPTH IN THE FOLLOWING AREA:
  - FROM 10+00 TO 37+50 AND FROM 56+50 TO 60+00, -NW17/18/19-

PILE EXCAVATION DEPTHS "D"				
WALL # 3		FROM : STA. 10+00.00 -NW17/18/19- TO : STA. 63+55.00 -NW17/18/19-		
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT		
			H ≤ 15'	15' < H ≤ 20'
	10'-0"	10'-0"	12'-0"	13'-0"
	15'-0"	11'-0"	13'-0"	16'-0"
	20'-0"	12'-0"	15'-0"	18'-0"

NOTE: FOR 30" DIA. HOLES, ADD 1 FT TO D.

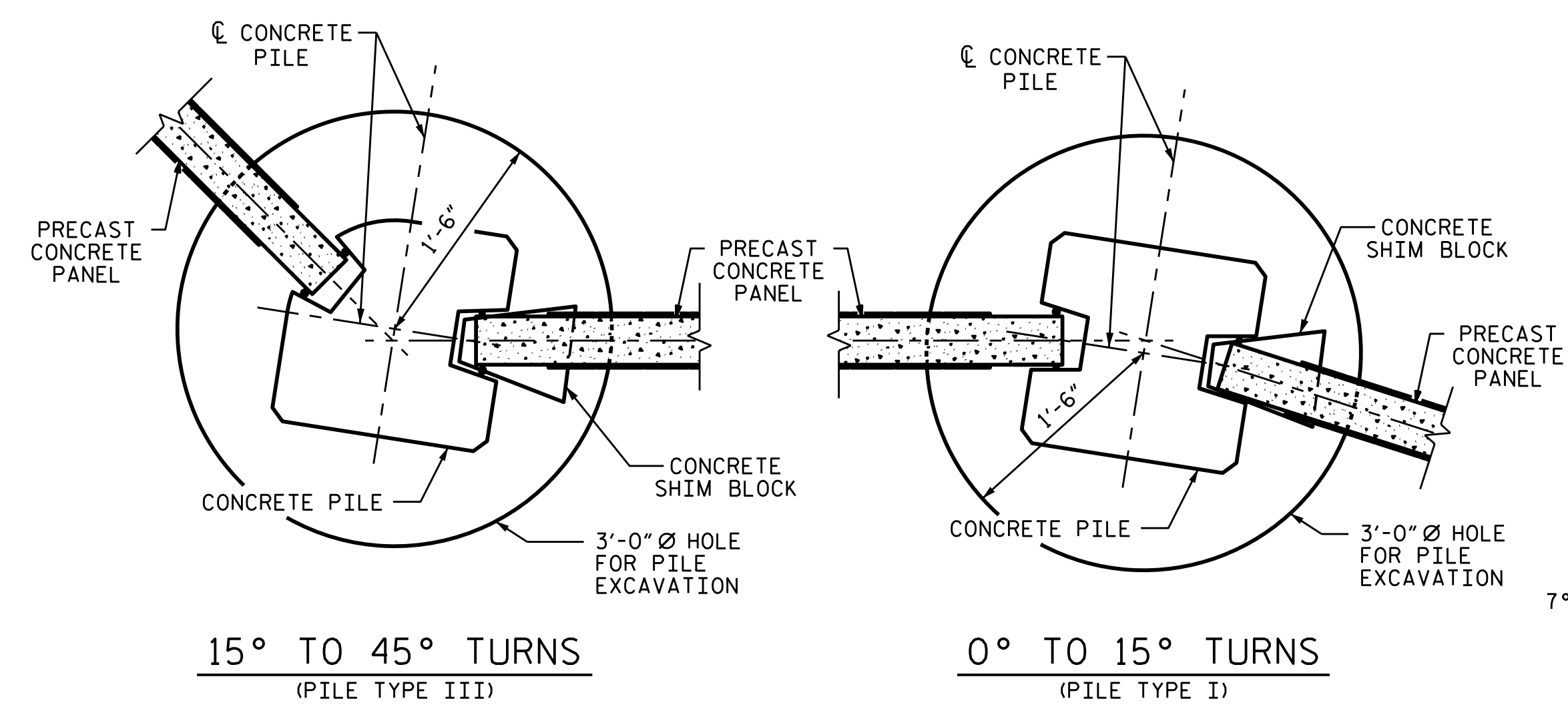


**ELEVATION**

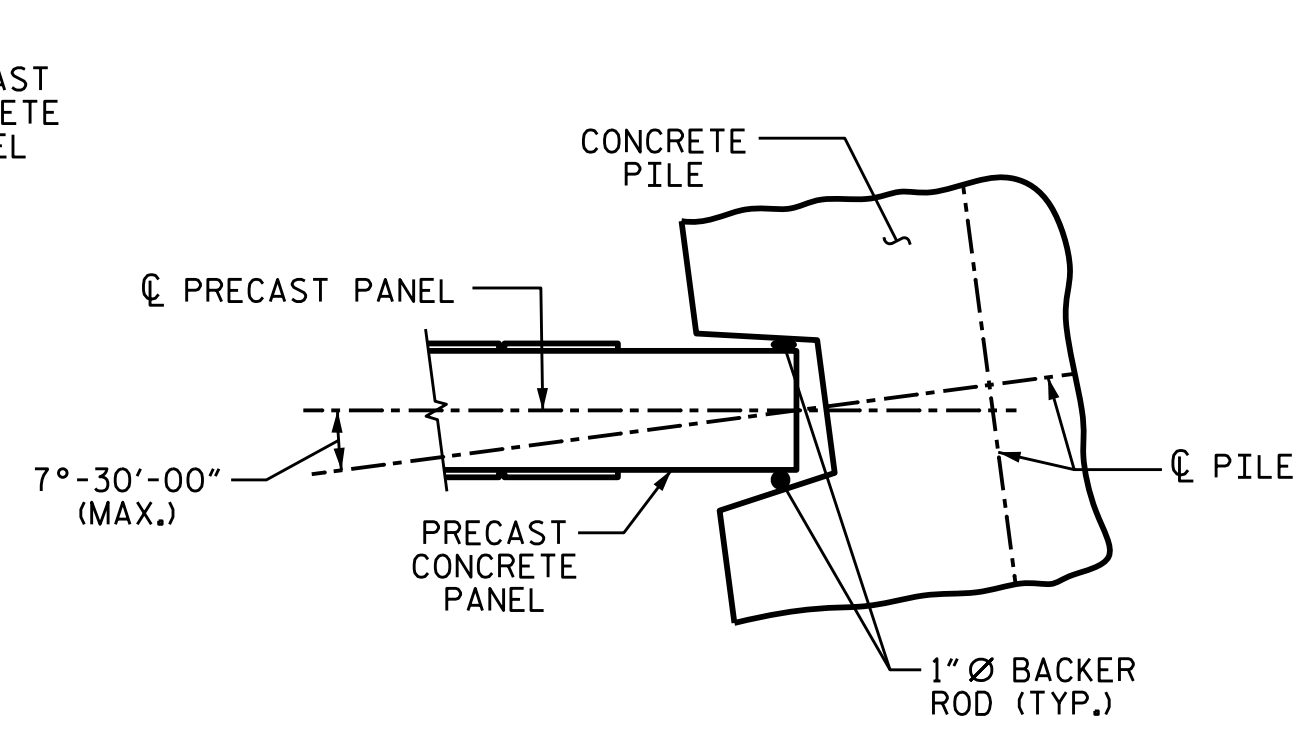


**SECTION A-A**

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.
	H ≤ 20'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.		15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE
15'-0"	20' < H ≤ 25'	4 - #10 EA. FACE	#3 @ 1'-4" CTS.	15'-0"		20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE
	H ≤ 20'	4 - #9 EA. FACE	#3 @ 1'-4" CTS.		20'-0"	H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE
20'-0"	20' < H ≤ 25'	4 - #11 EA. FACE	#3 @ 1'-4" CTS.	20'-0"		H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE



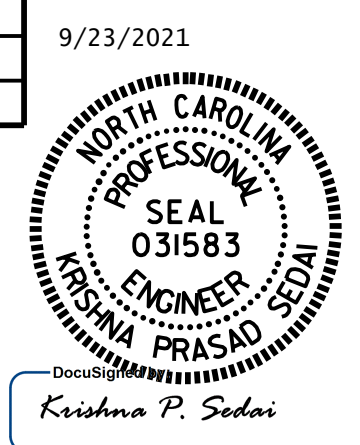
**TYPICAL WALL TURN DETAILS**



**PILE ROTATION LIMIT FOR WALL TURN**

(ROTATE THE CONCRETE PILE ±7°-30'-00" TO ACCOMMODATE WALL TURN.)

BILL OF MATERIAL	
SOUND BARRIER WALL	87,297 S.F.
ARCHITECTURAL SURFACE TREATMENT	142,467 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	UNSTAINED



PROJECT NO. U-2579AB  
 FORSYTH COUNTY  
 STATION: 17+63.79 -Y15-

SHEET 3 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

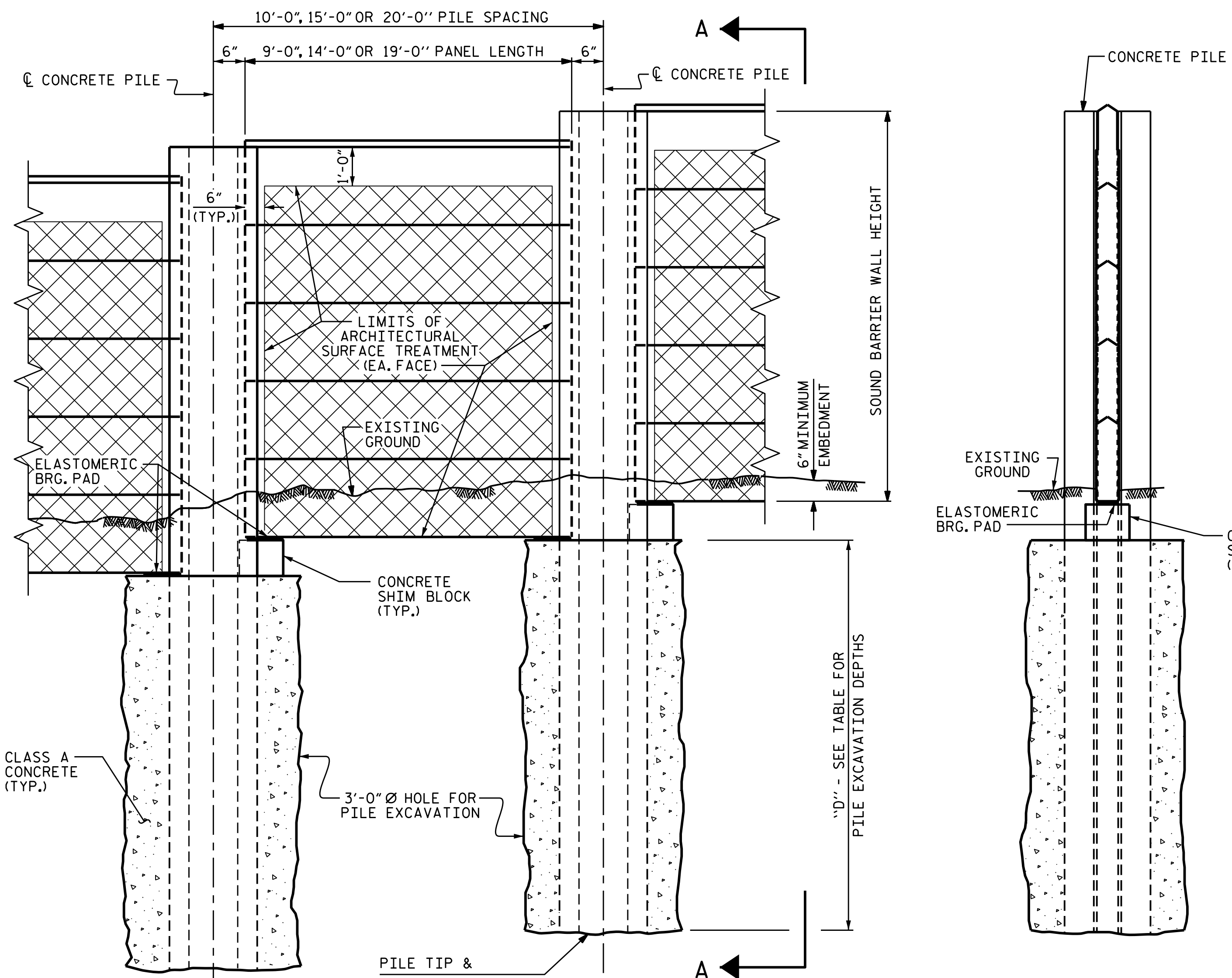
STANDARD  
 SOUND BARRIER WALL 3  
 -NW17/18/19-

ASSEMBLED BY : E. BAYISSA	DATE : 08/2021
CHECKED BY : A. SORSENGIN	DATE : 08/2021
DRAWN BY : MAA 6/11	REV. 9/26/14
CHECKED BY : GM 6/11	REV. 10/17
	REV. 5/18

REVISIONS						SHEET NO. 3
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 6
2			4			

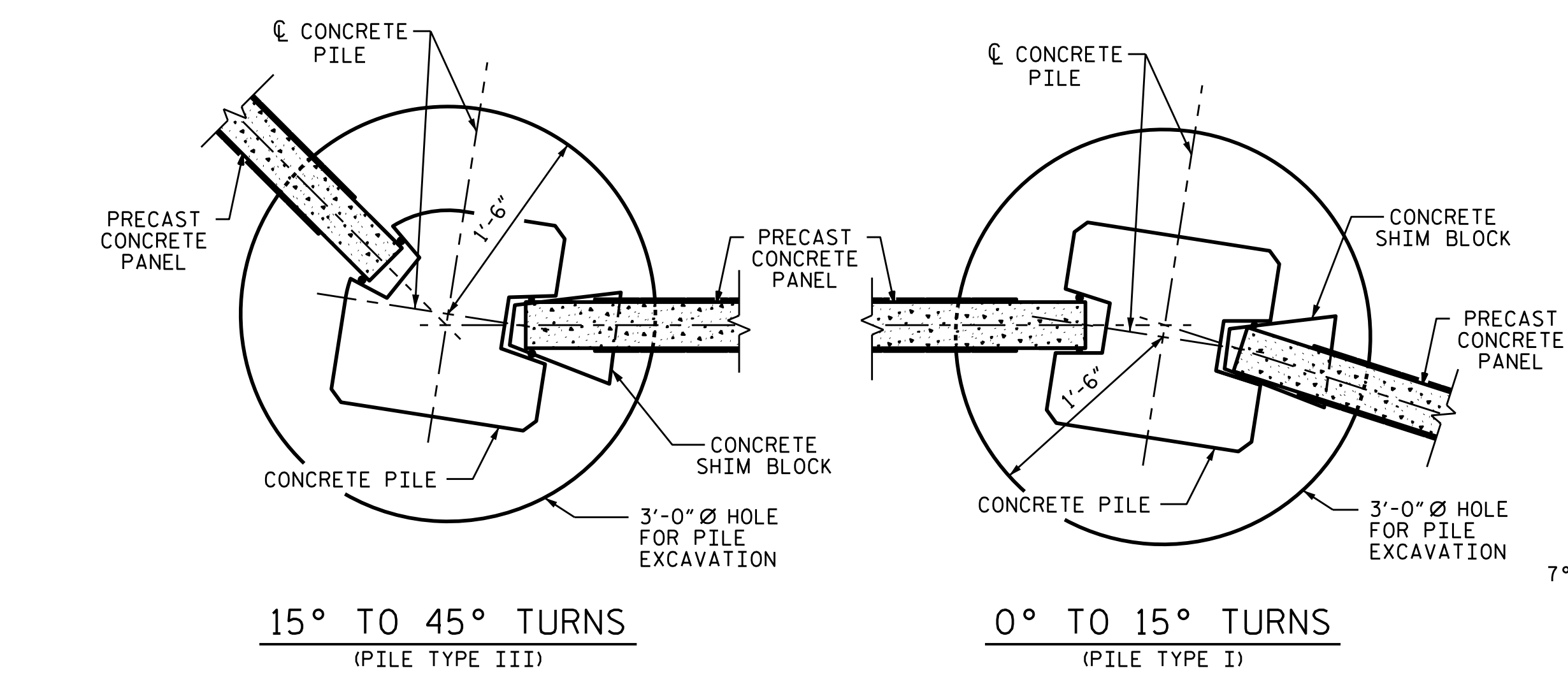
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



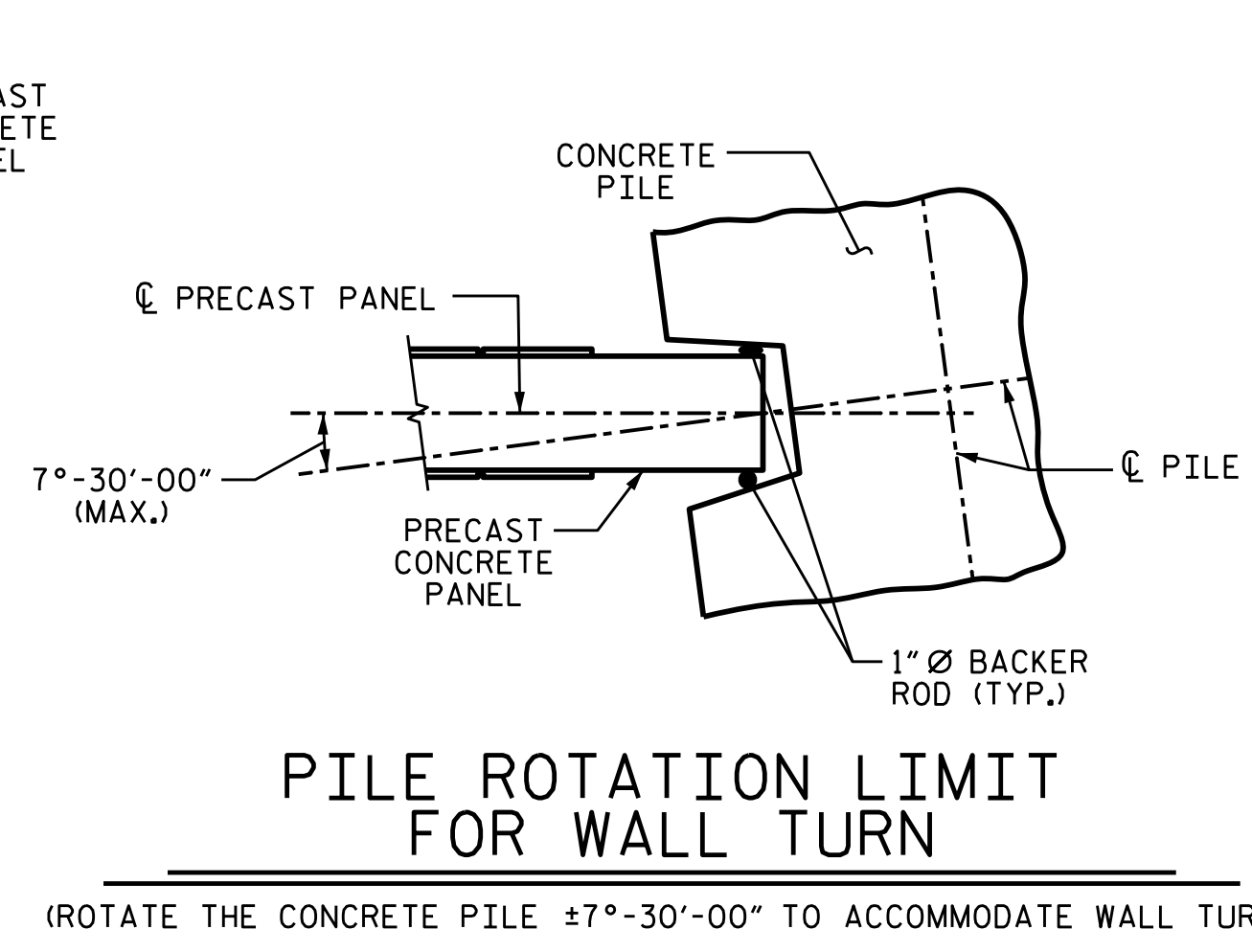


ELEVATION

SECTION A-A



TYPICAL WALL TURN DETAILS



PILE ROTATION LIMIT FOR WALL TURN

(ROTATE THE CONCRETE PILE ±7°-30'-00" TO ACCOMMODATE WALL TURN.)

ASSEMBLED BY : E. BAYISSA DATE : 08/2021  
 CHECKED BY : A. SORSENGINH DATE : 08/2021  
 DRAWN BY : MAA 6/11  
 CHECKED BY : GM 6/11

REV. 9/26/14 MAA/TMG  
 REV. 10/17 MAA/THC  
 REV. 5/18 MAA/THC

23-SEP-2021 14:02  
 W:\Structures\Plans\Noise Wall\Final Plans\U2579AB.SMU.SBW.dgn  
 ksedai

PILE EXCAVATION DEPTHS "D"						
WALL # 4		FROM : STA. 10+00.00 -NW24/25- TO : STA. 49+00.00 -NW24/25-				
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT				
		10'-0"	10'-0"	12'-0"	13'-0"	16'-0"
		15'-0"	11'-0"	13'-0"	16'-0"	19'-0"
		20'-0"	12'-0"	15'-0"	18'-0"	21'-0"
WALL # 4		FROM : STA. 49+00.00 -NW24/25- TO : STA. 54+55.00 -NW24/25-				
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT				
		10'-0"	8'-0"	10'-0"	11'-0"	
		15'-0"	9'-0"	11'-0"	13'-0"	
		20'-0"	10'-0"	13'-0"	15'-0"	

NOTE: FOR 30" DIA. HOLES, ADD 1 FT TO D.

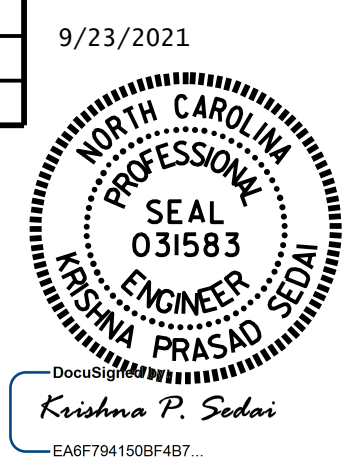
PILE REINFORCING STEEL  
 DESIGN WIND PRESSURE = 40 PSF

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 ≤ 27'	4 - #8 EA. FACE	#3 @ 1'-4"CTS.	10'-0"	H ≤ 27'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4"CTS.
	H ≤ 20'	4 - #8 EA. FACE	#3 @ 1'-4"CTS.		15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE
15'-0"	20' < H ≤ 27'	4 - #10 EA. FACE	#3 @ 1'-4"CTS.	15'-0"		20' < H ≤ 27'	3 - #11 SHORT FACE 4 - #11 LONG FACE
	H ≤ 20'	4 - #9 EA. FACE	#3 @ 1'-4"CTS.		20'-0"	H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE
20'-0"	20' < H ≤ 27'	4 - #11 EA. FACE	#3 @ 1'-4"CTS.	20'-0"		H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE

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 ≤ 27'	4 - #6 EA. FACE	#3 @ 1'-4"CTS.	10'-0"	H ≤ 27'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4"CTS.
	H ≤ 20'	4 - #6 EA. FACE	#3 @ 1'-4"CTS.		15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE
15'-0"	20' < H ≤ 27'	4 - #7 EA. FACE	#3 @ 1'-4"CTS.	15'-0"		20' < H ≤ 27'	3 - #11 SHORT FACE 4 - #11 LONG FACE
	H ≤ 20'	4 - #6 EA. FACE	#3 @ 1'-4"CTS.		20'-0"	H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE
20'-0"	20' < H ≤ 27'	4 - #9 EA. FACE	#3 @ 1'-4"CTS.	20'-0"		H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE

BILL OF MATERIAL	
SOUND BARRIER WALL	108,020 S.F.
ARCHITECTURAL SURFACE TREATMENT	179,529 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	UNSTAINED



PROJECT NO. U-2579AB  
 FORSYTH COUNTY  
 STATION: 70+01.05-Y15FLYBD

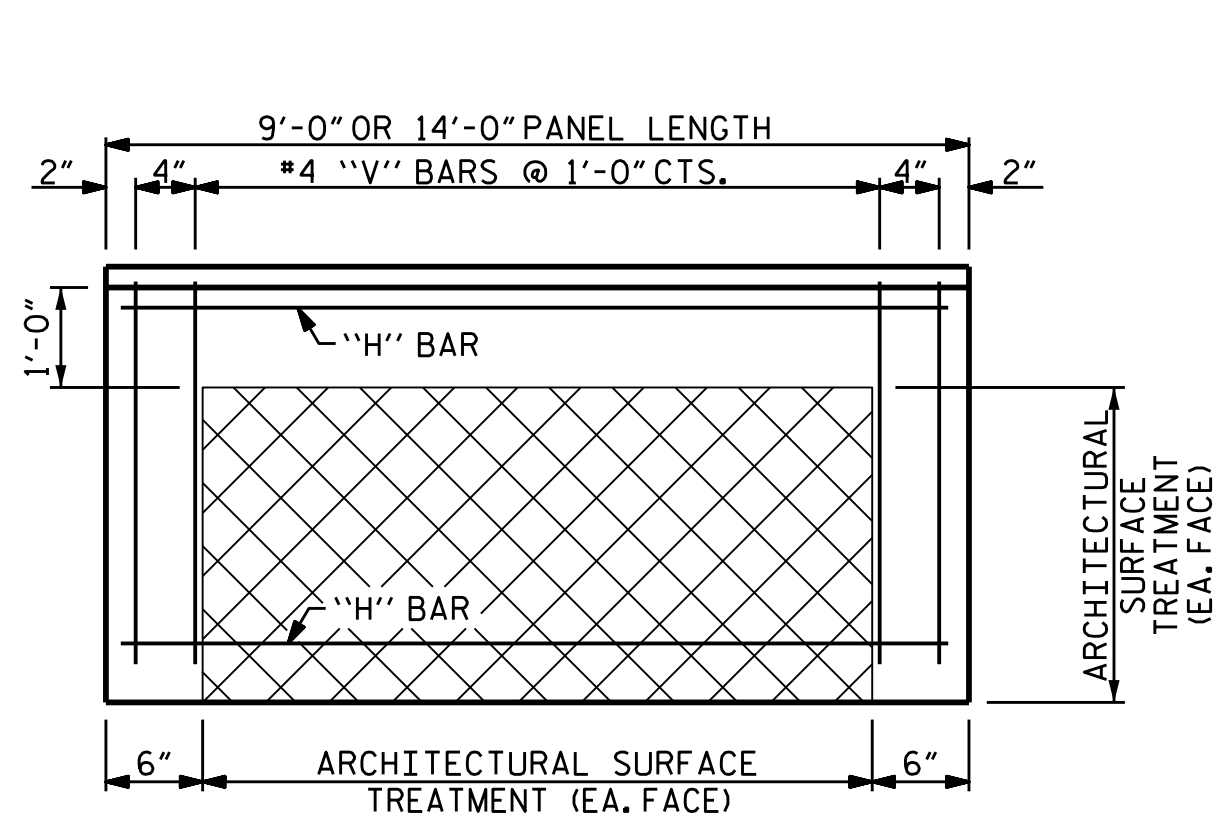
SHEET 4 OF 6  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 SOUND BARRIER WALL 4  
 -NW24/25-

REVISIONS						SHEET NO. 4
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 6
2			4			

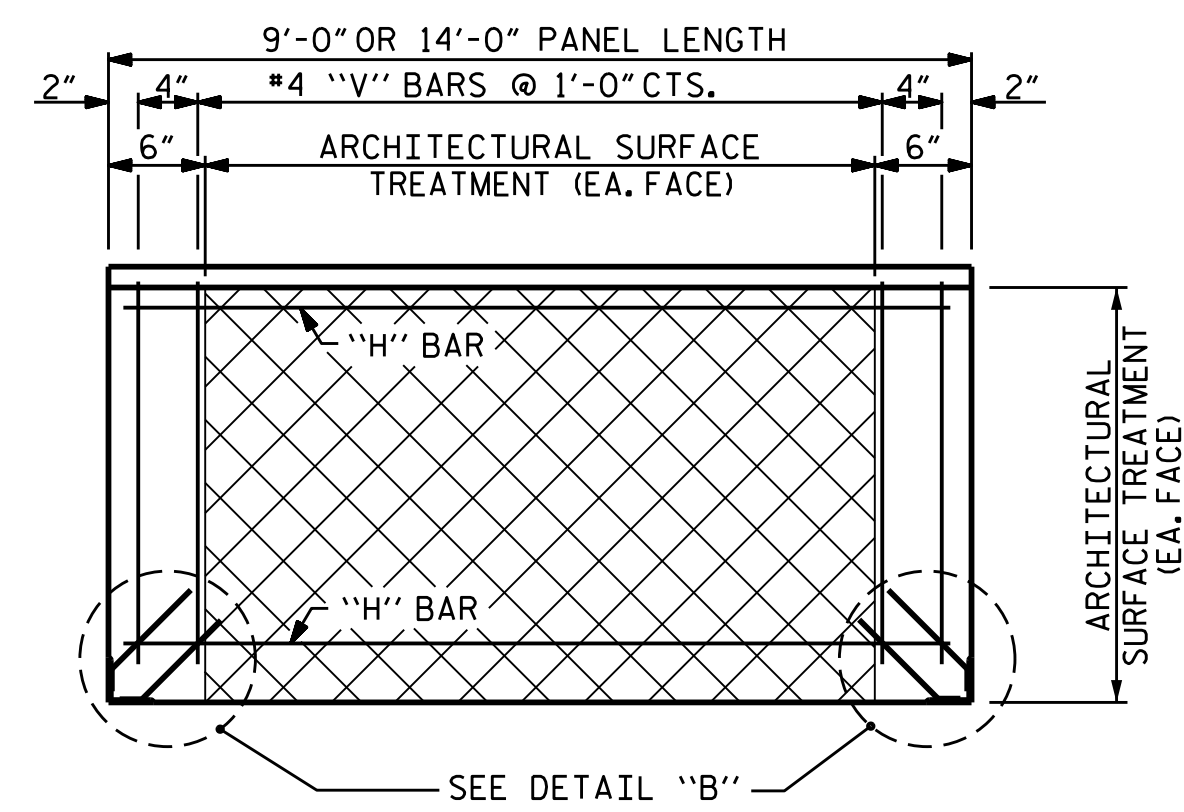
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. SBW1

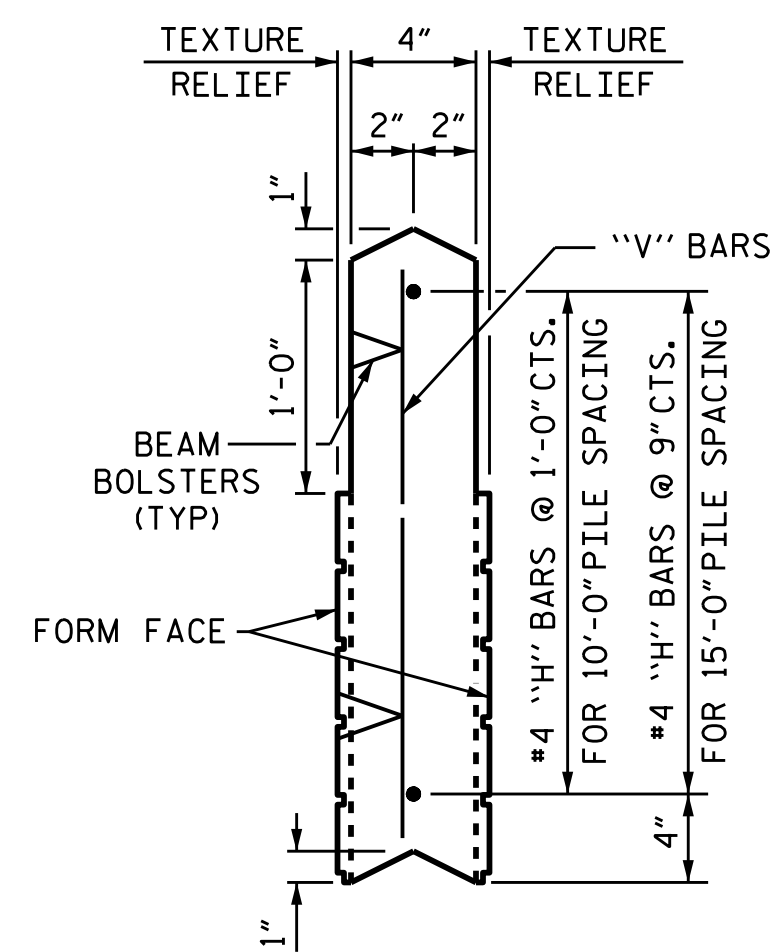




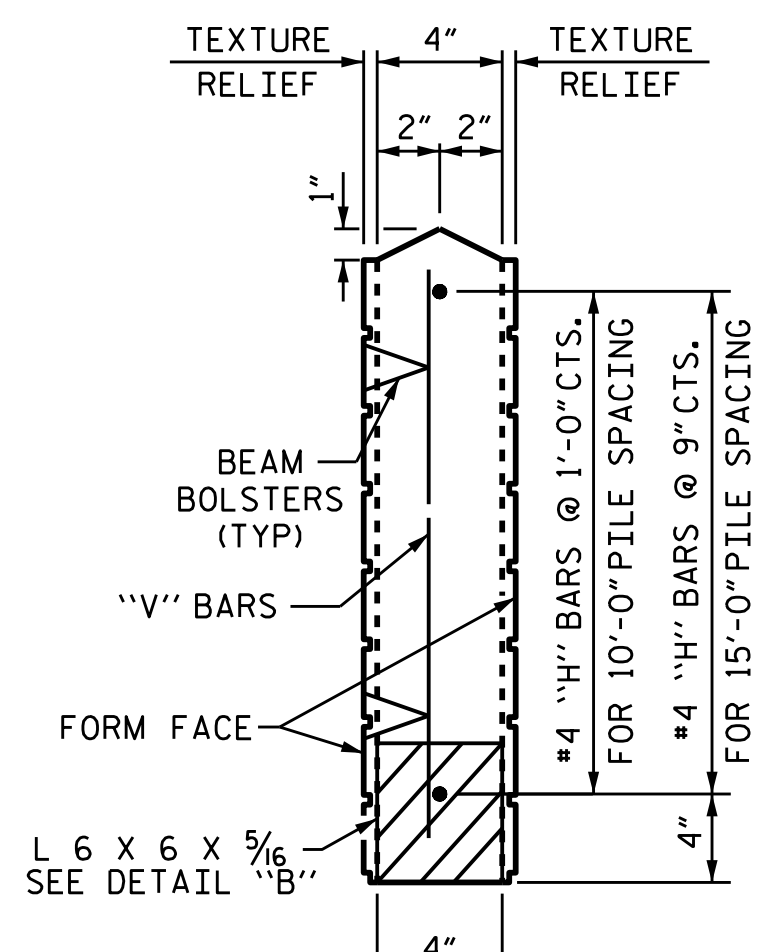
FRONT ELEVATION OF UPPER PRECAST PANEL



FRONT ELEVATION OF BOTTOM PRECAST PANEL

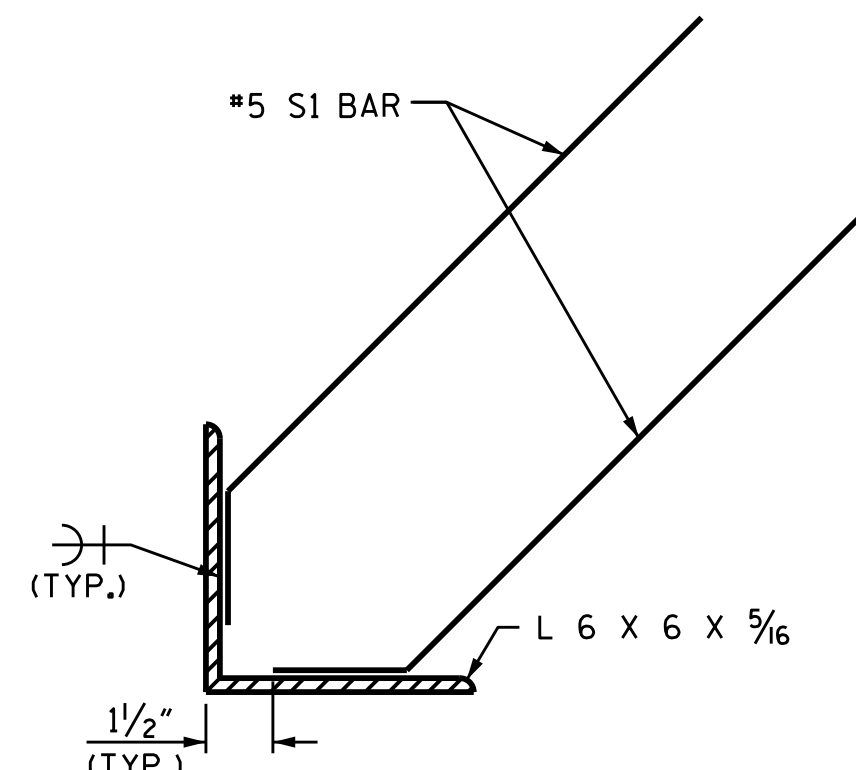


UPPER PANEL



BOTTOM PANEL

SECTION THROUGH PRECAST PANELS



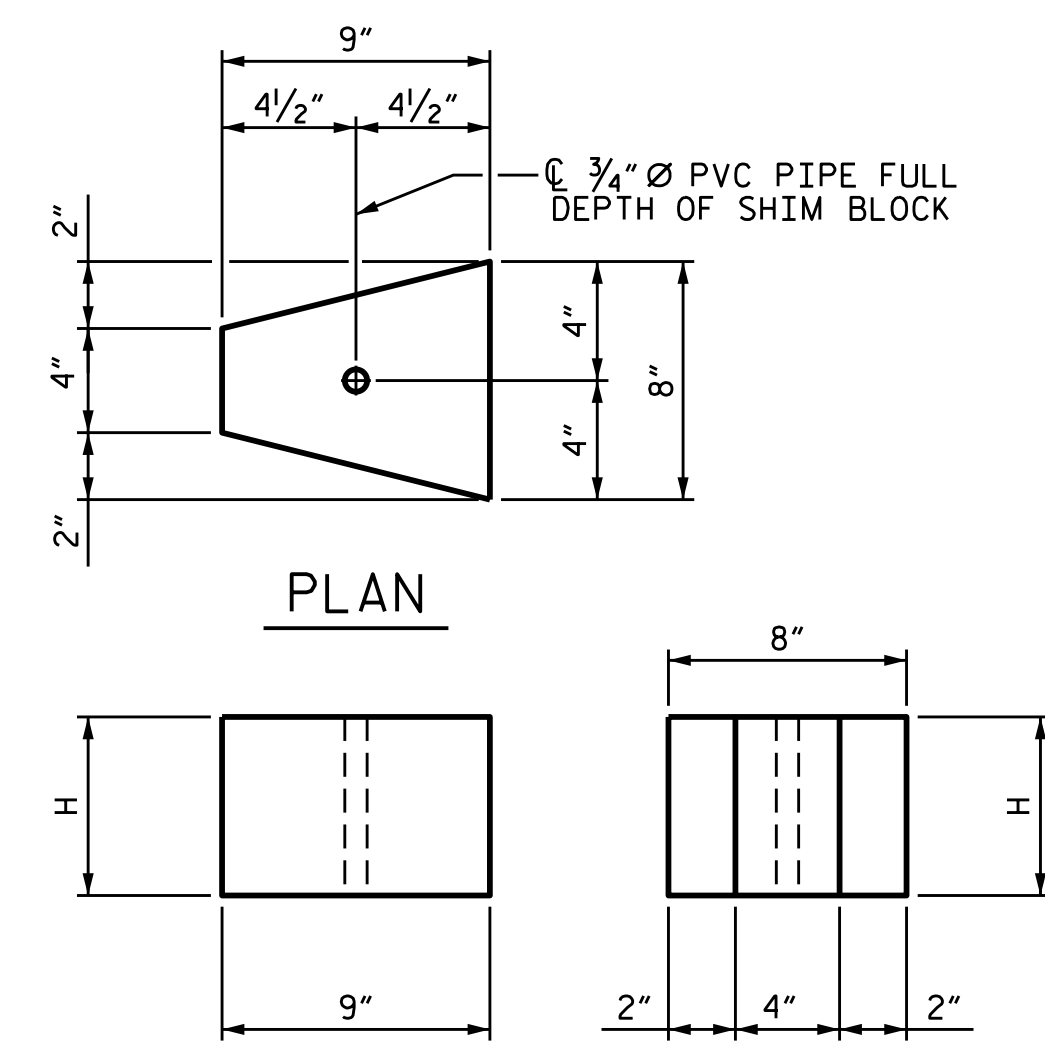
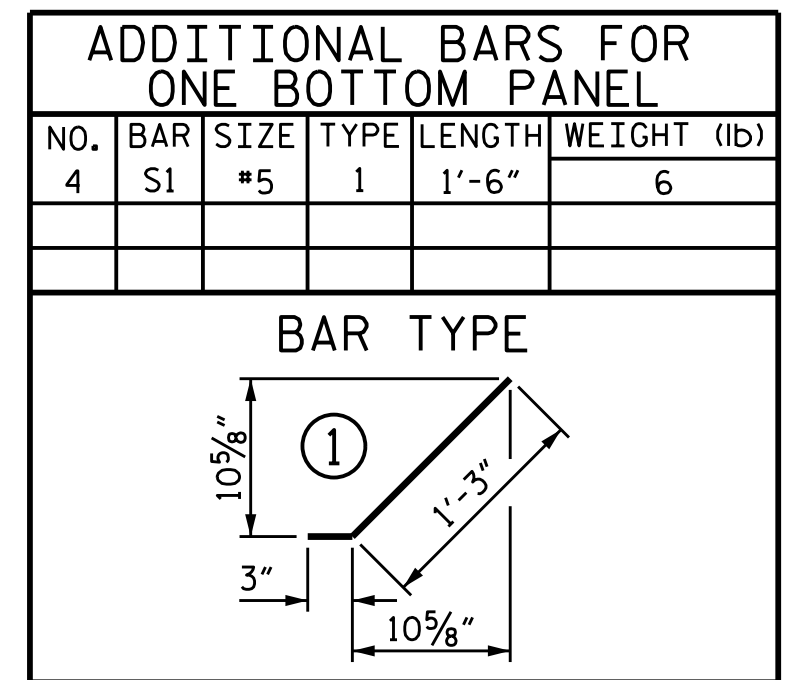
DETAIL "B"

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

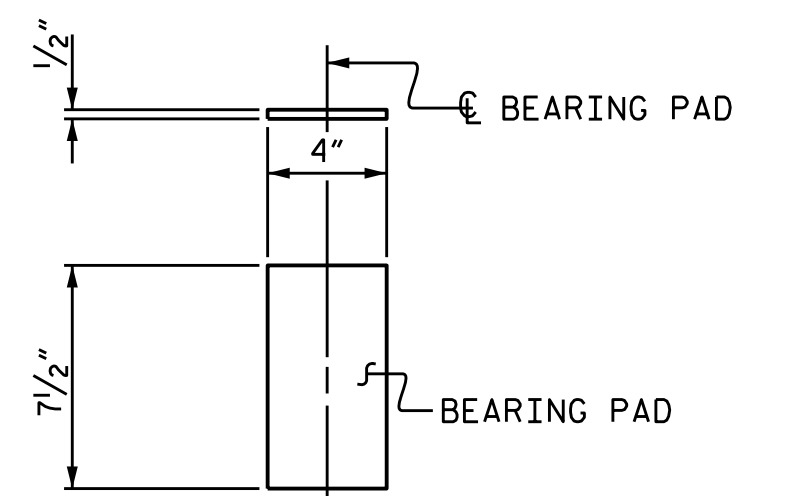
PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES											
		HORIZONTAL						VERTICAL					
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
2'-0"	0.22	3	H1	#4	STR	8'-8"	17	11	V1	#4	STR	1'-8"	12
3'-0"	0.33	4	H2	#4	STR	8'-8"	23	11	V2	#4	STR	2'-8"	20
4'-0"	0.44	5	H3	#4	STR	8'-8"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

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

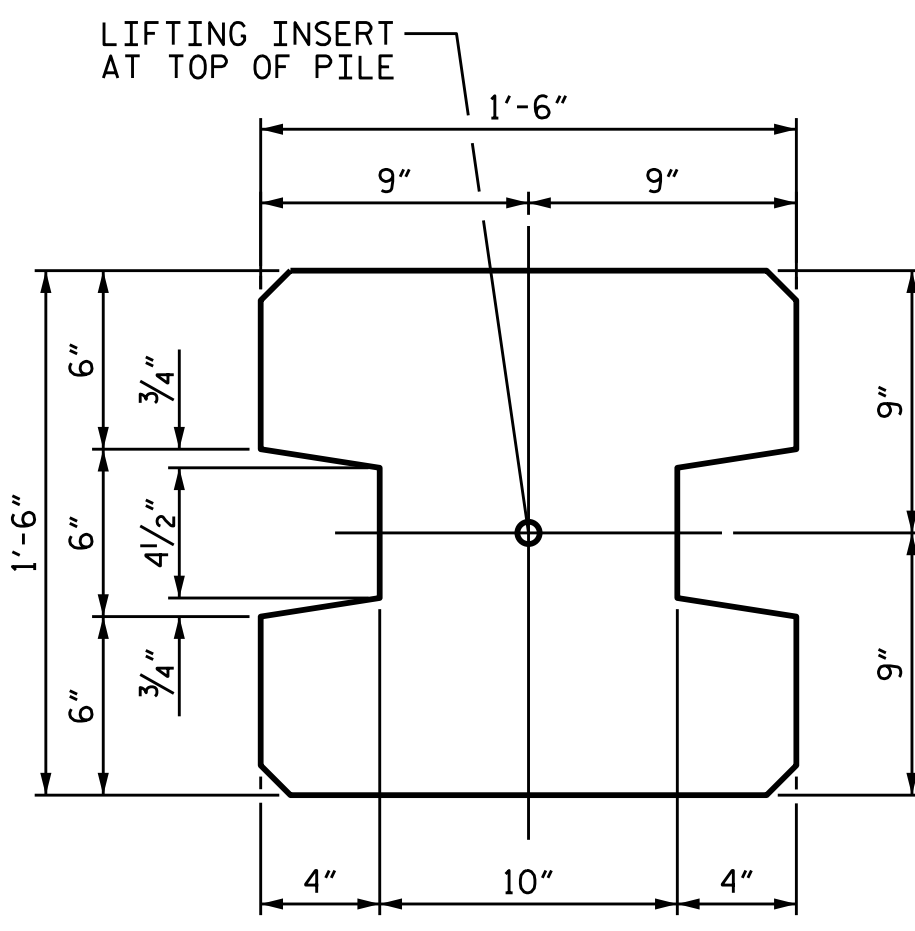
PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES											
		HORIZONTAL						VERTICAL					
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
3'-0"	0.52	5	H1	#4	STR	13'-8"	46	16	V1	#4	STR	2'-8"	29
4'-0"	0.69	6	H2	#4	STR	13'-8"	55	16	V2	#4	STR	3'-8"	39
5'-0"	0.86	7	H3	#4	STR	13'-8"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



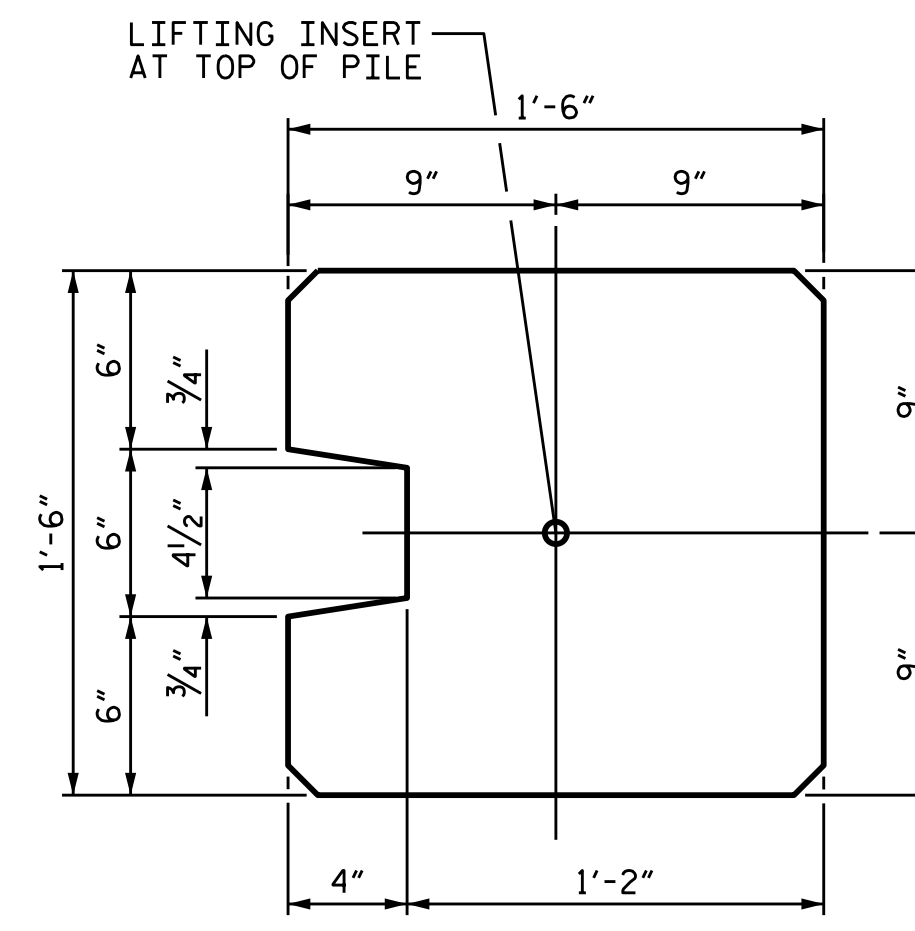
CONCRETE SHIM BLOCK  
H = 3', 6" or 1'-0"



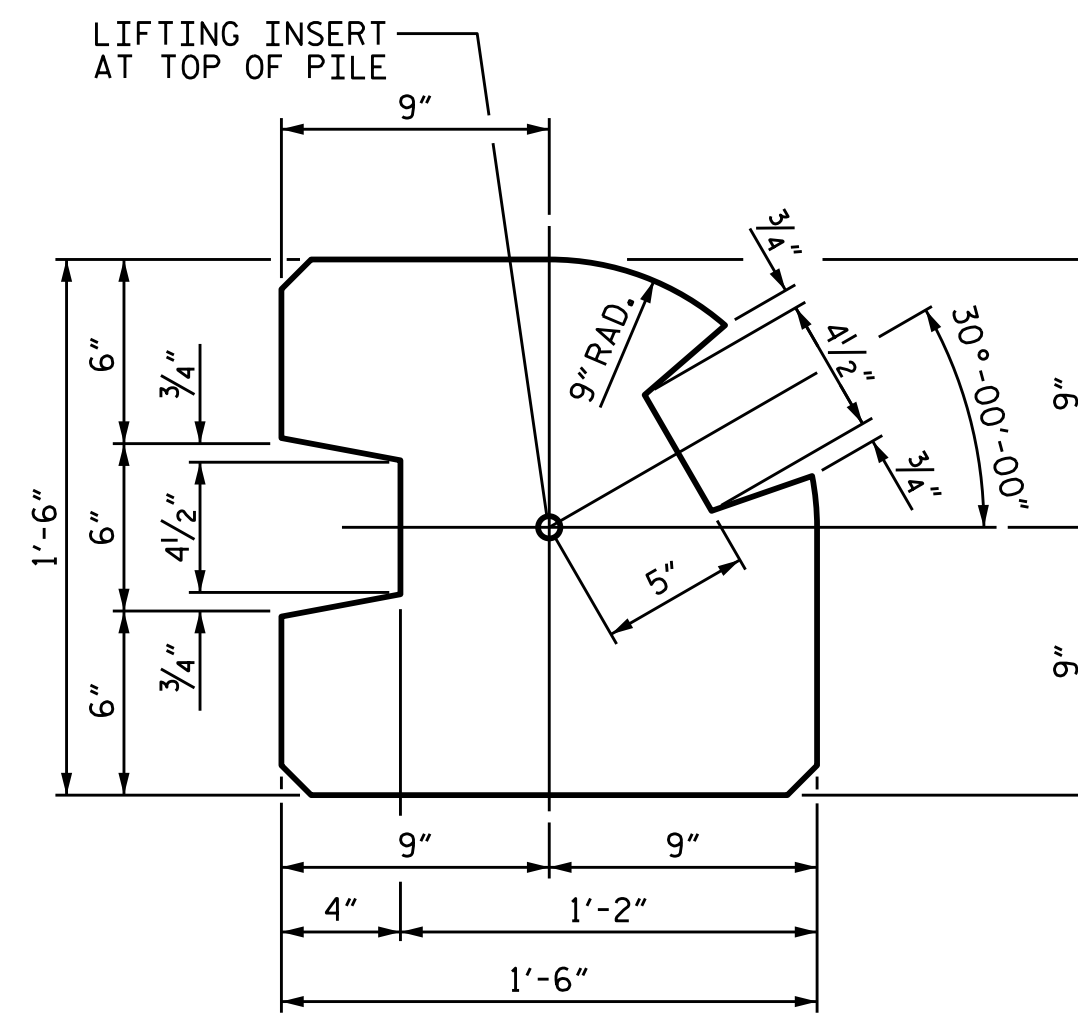
ELASTOMERIC BEARING DETAILS  
ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.



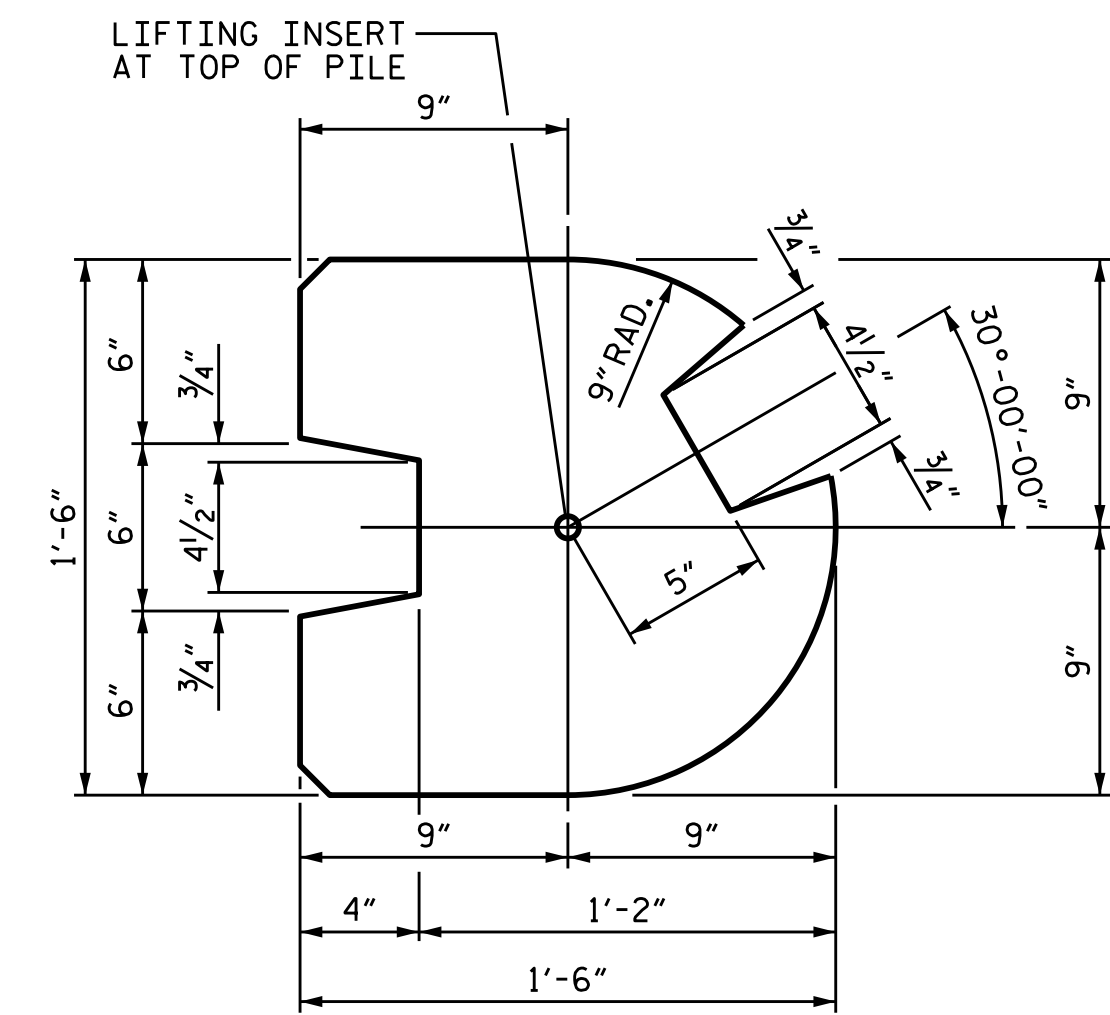
TYPE - I  
(AREA = 1.9444 SQ. FT.)



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



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

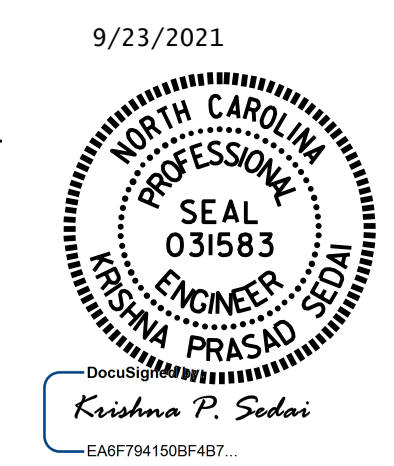


TYPE - III (ALT.)  
(AREA = 1.7163 SQ. FT.)

PILE DETAIL  
(ALL CORNERS TO BE CHAMFERED 1")

ASSEMBLED BY : E. BAYISSA DATE : 08/2021  
 CHECKED BY : A. SORSENGIN DATE : 08/2021  
 DRAWN BY : MAA 6/11 REV. 1/15/14 RWW/TMG  
 CHECKED BY : GM 6/11 REV. 10/17 MAA/THC  
 REV. 5/18 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

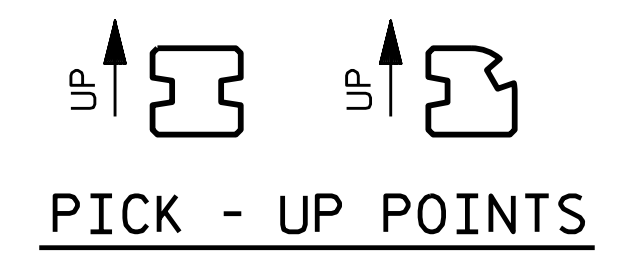
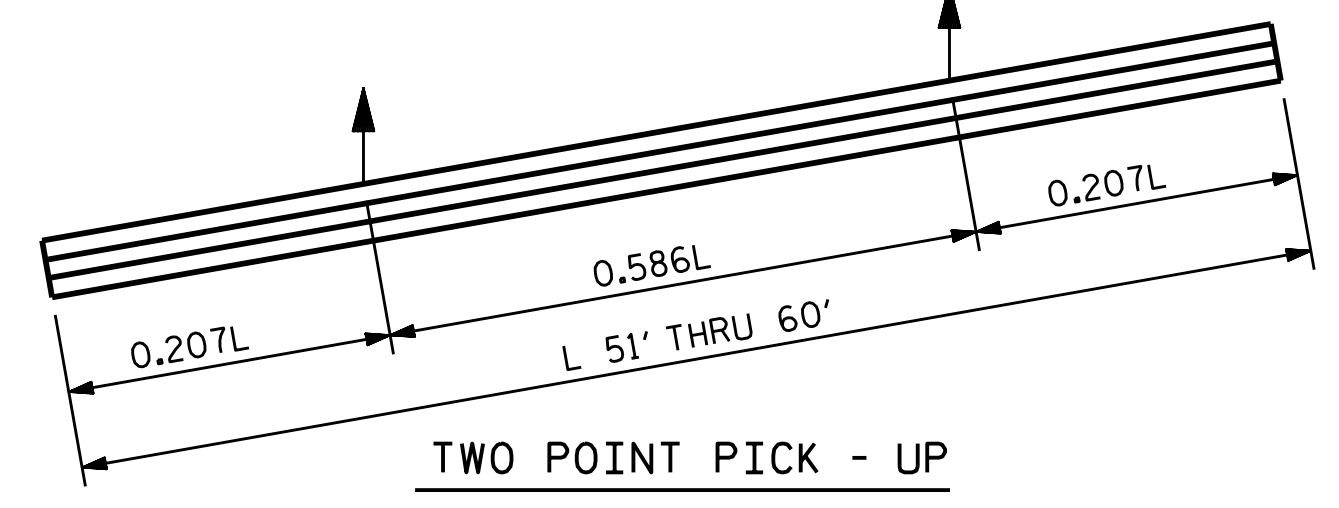
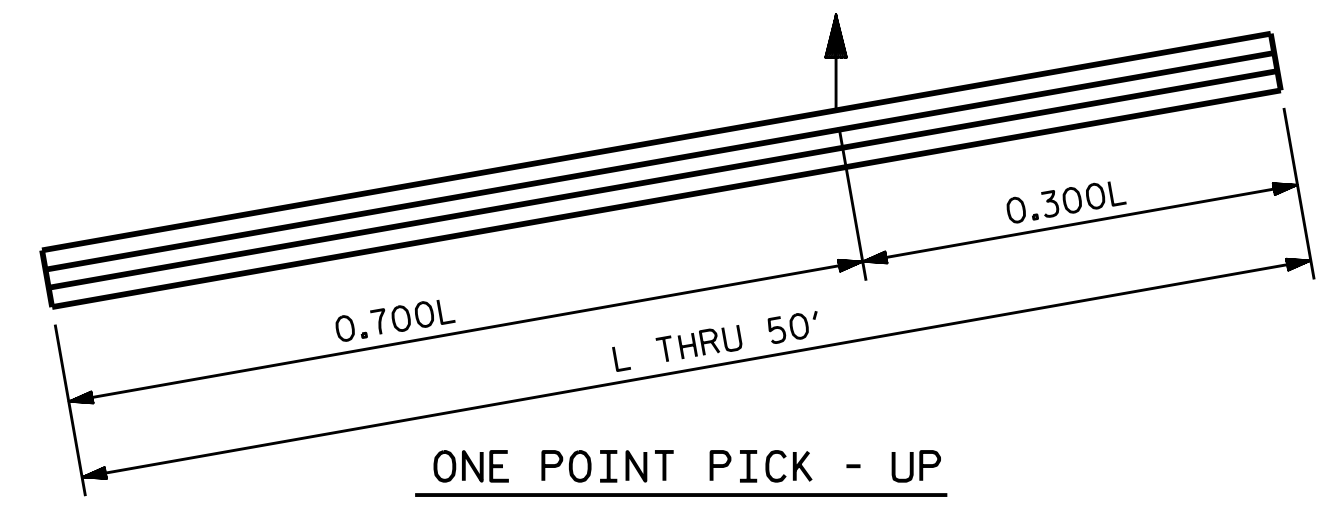
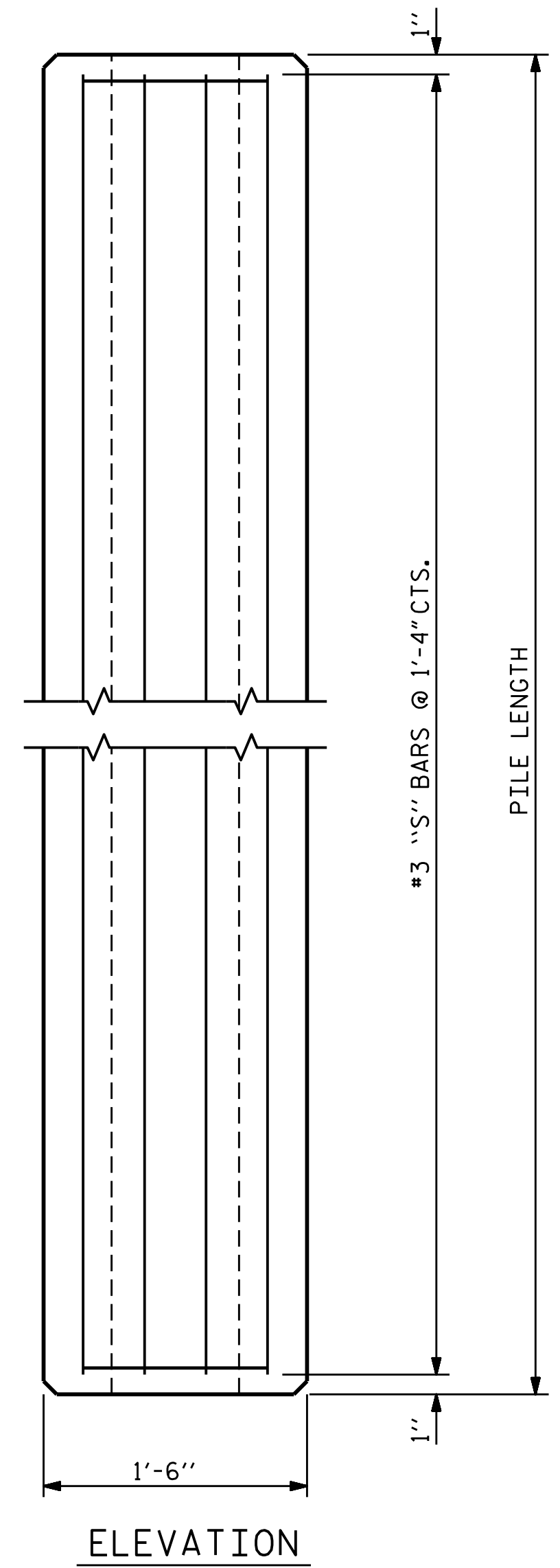


PROJECT NO. U-2579AB  
 FORSYTH COUNTY  
 STATION: SEE TABLE

SHEET 5 OF 6  
 DEPARTMENT OF TRANSPORTATION  
 STANDARD  
 SOUND BARRIER WALL DETAILS  
 -NW11/13-, -NW15/16-,  
 -NW17/18/19-, -NW24/25-

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5
1			3			TOTAL SHEETS
2			4			6





NOTES

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

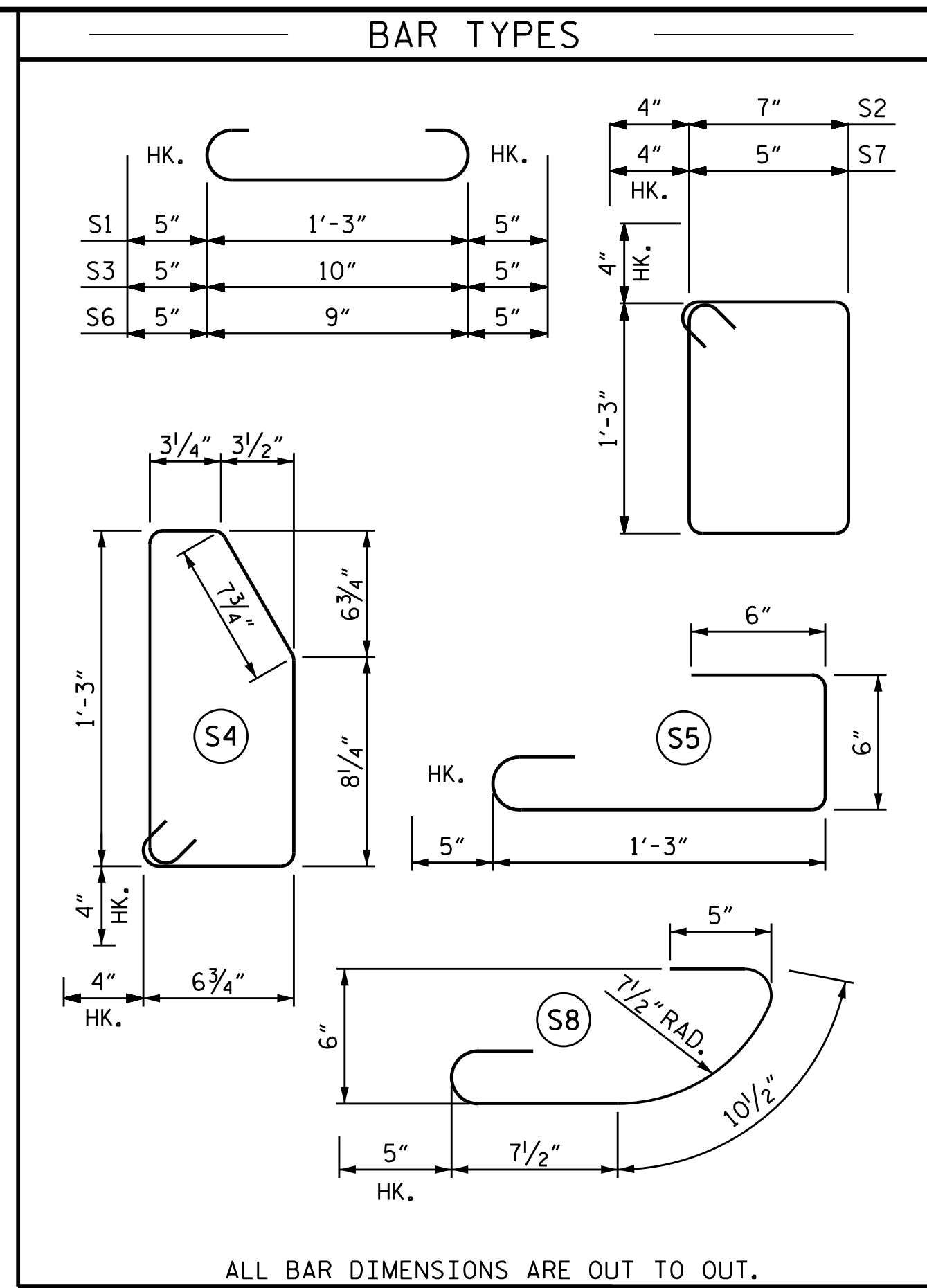
PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

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

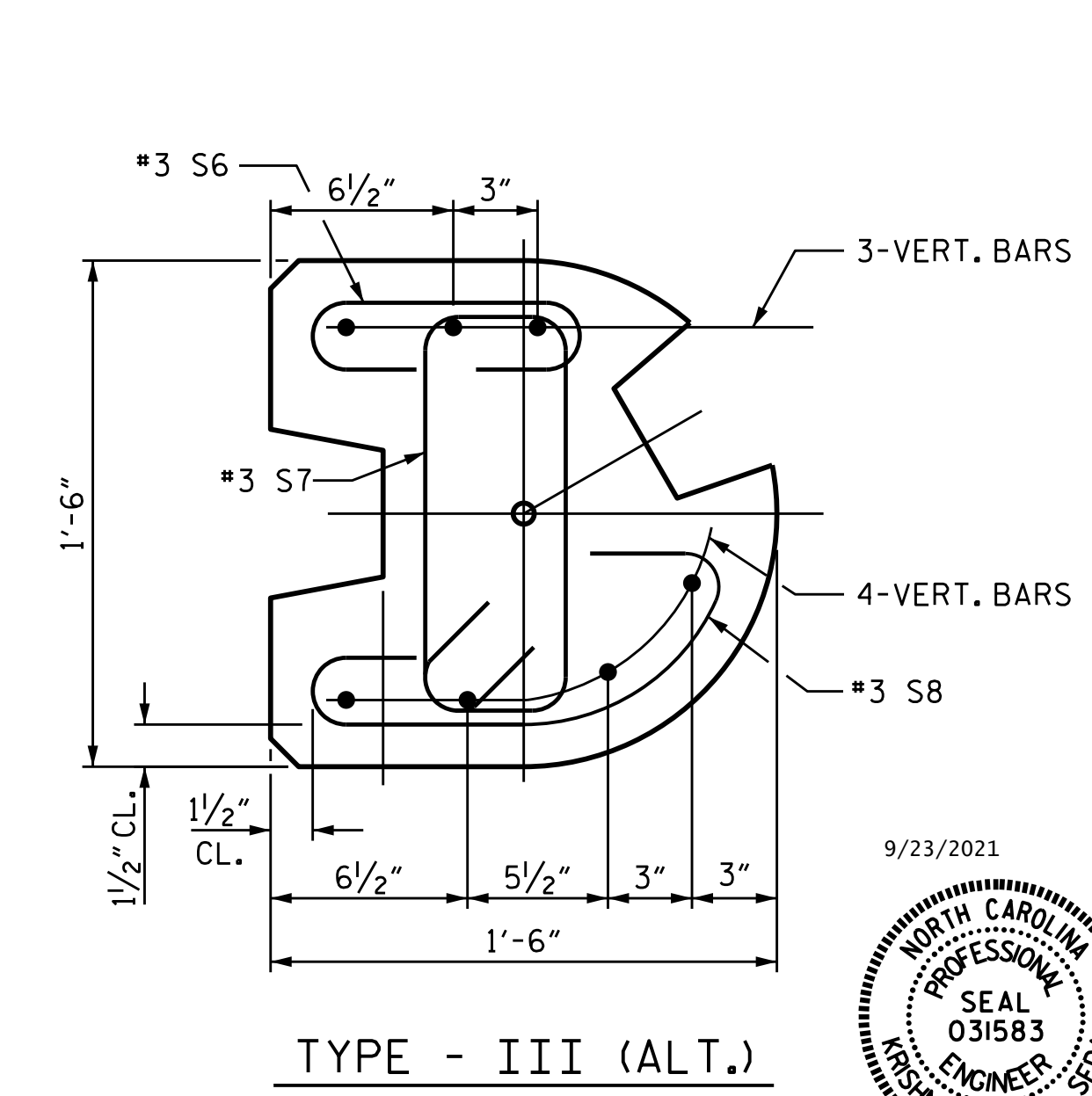
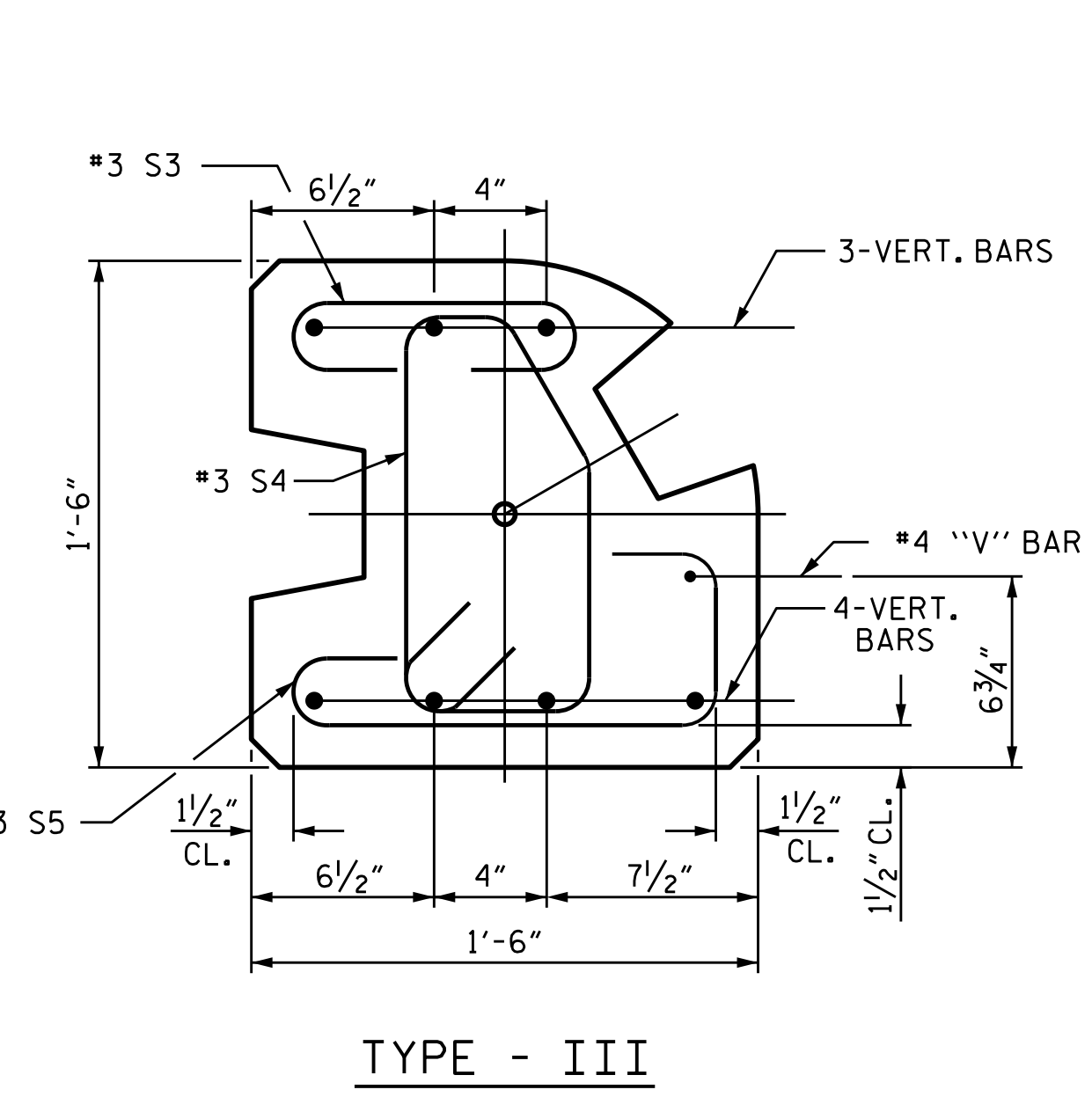
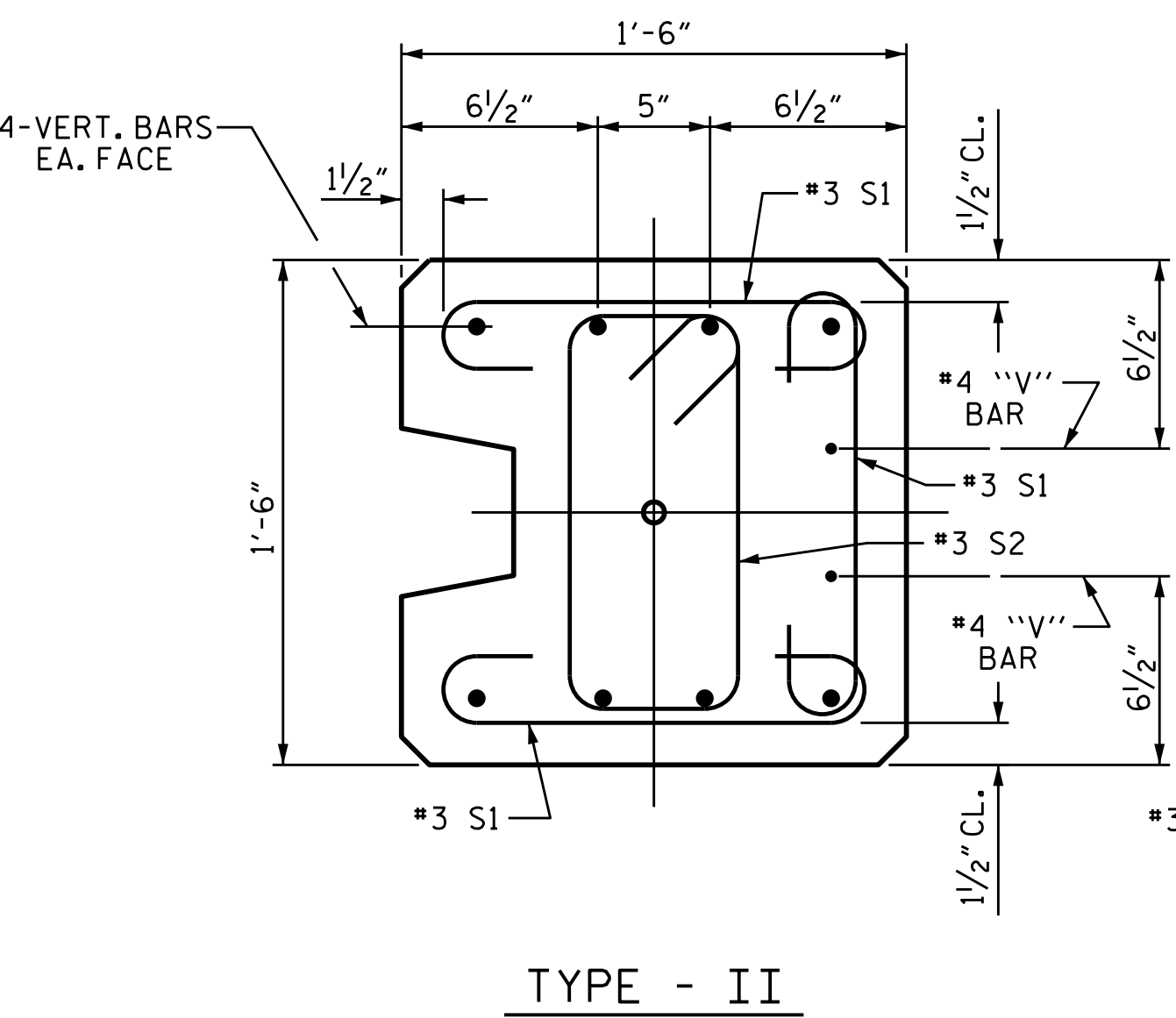
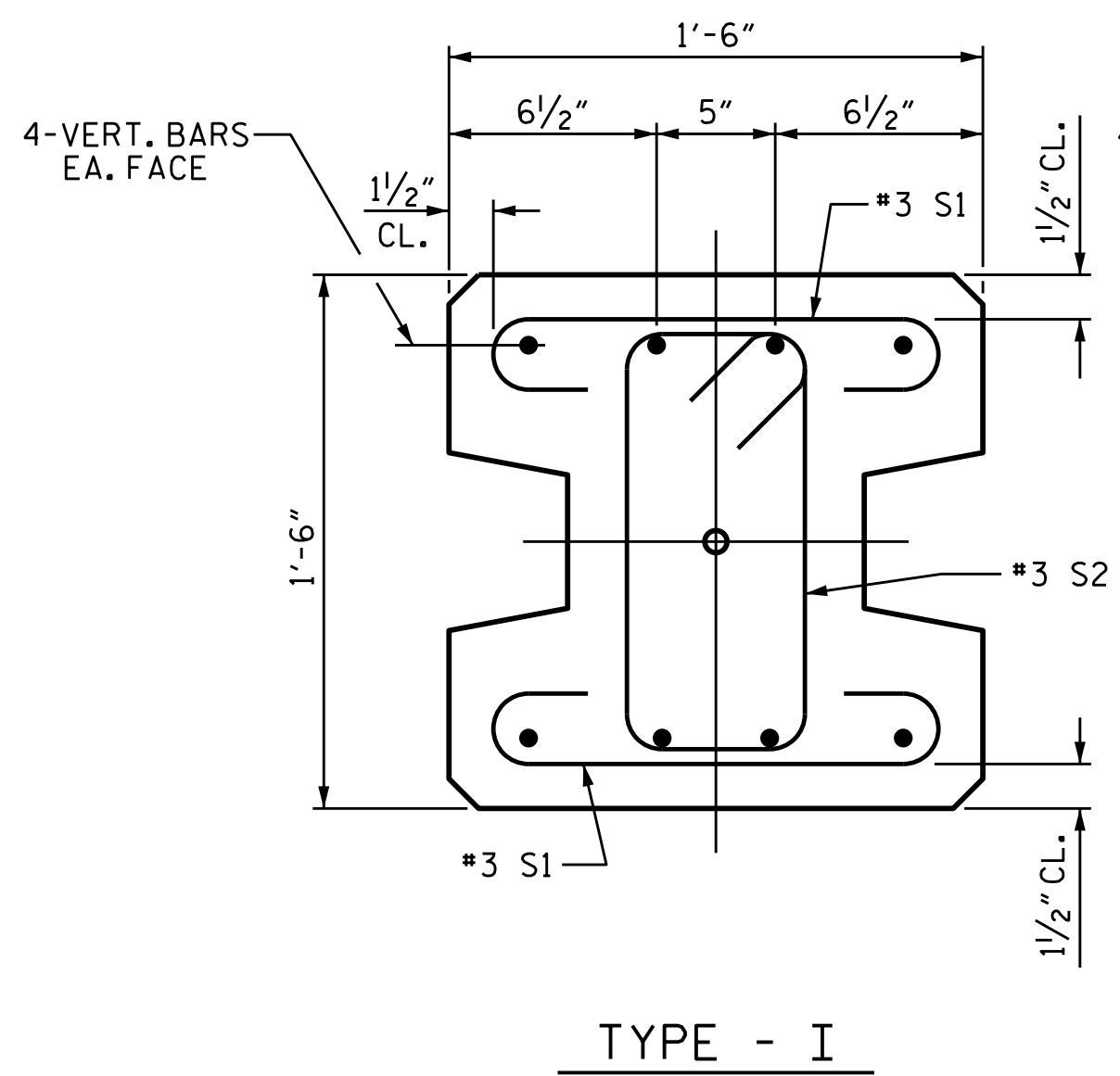
THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

ALL CORNERS TO BE CHAMFERED 1".

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"



ALL BAR DIMENSIONS ARE OUT TO OUT.

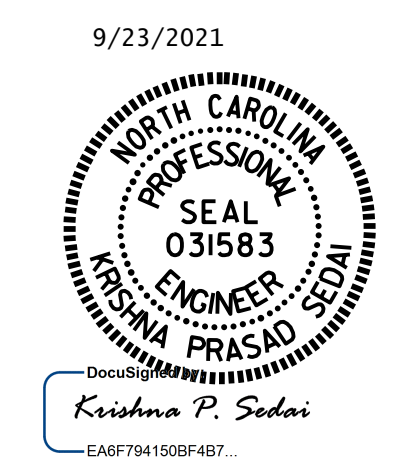


PILE DETAIL

FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 TO 4

PROJECT NO. U-2579AB  
 FORSYTH COUNTY  
 STATION: SEE TABLE

SHEET 6 OF 6



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 SOUND BARRIER WALL  
 DETAILS  
 -NW11/13-, -NW15/16-,  
 -NW17/18/19-, -NW24/25-

ASSEMBLED BY : E. BAYISSA DATE : 08/2021  
 CHECKED BY : A. SORSENGINH DATE : 08/2021  
 DRAWN BY : MAA 6/11 REV. 1/15/14 RWW/TMG  
 CHECKED BY : GM 6/11 REV. 12/17 MAA/THC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	6
1			3			TOTAL SHEETS
2			4			6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED