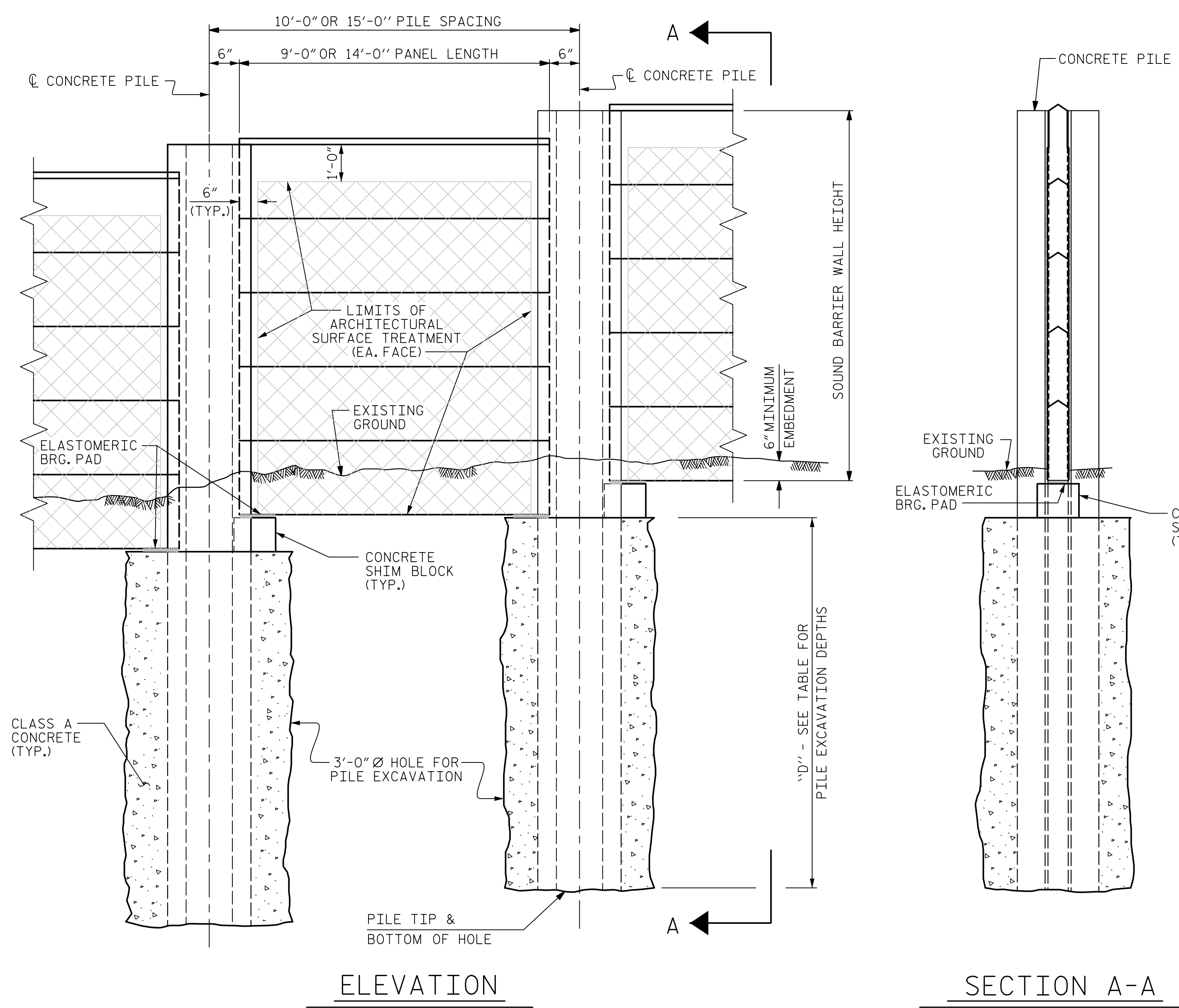


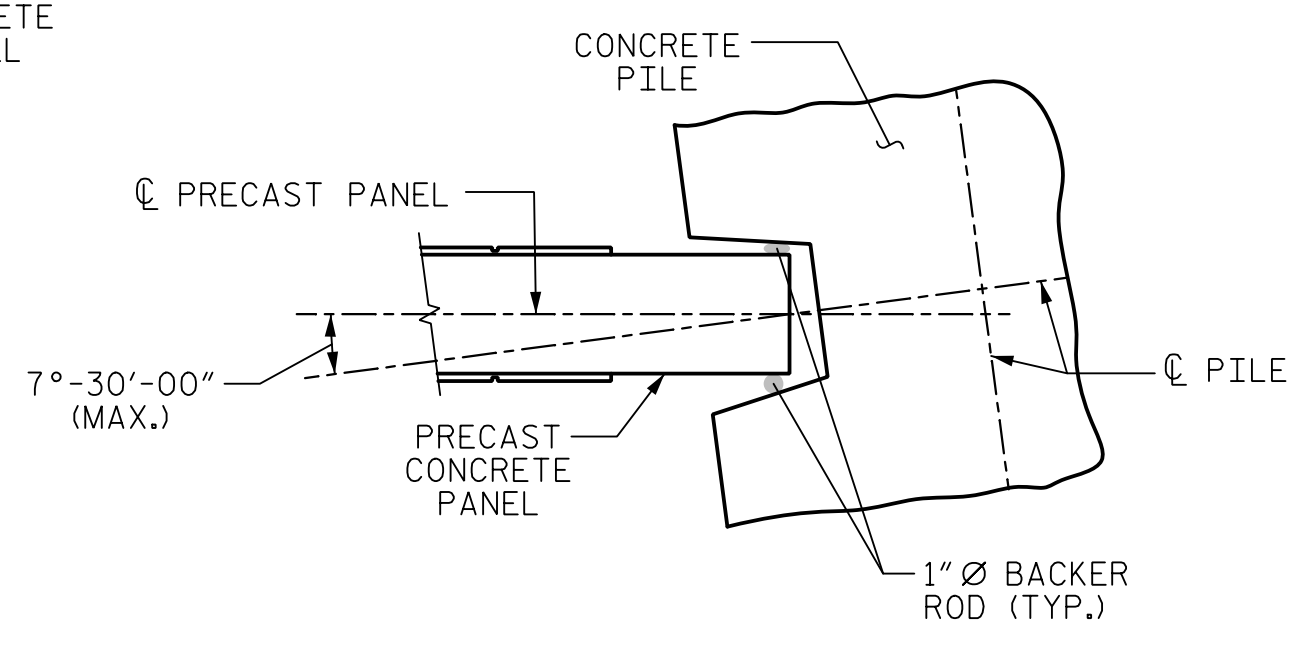
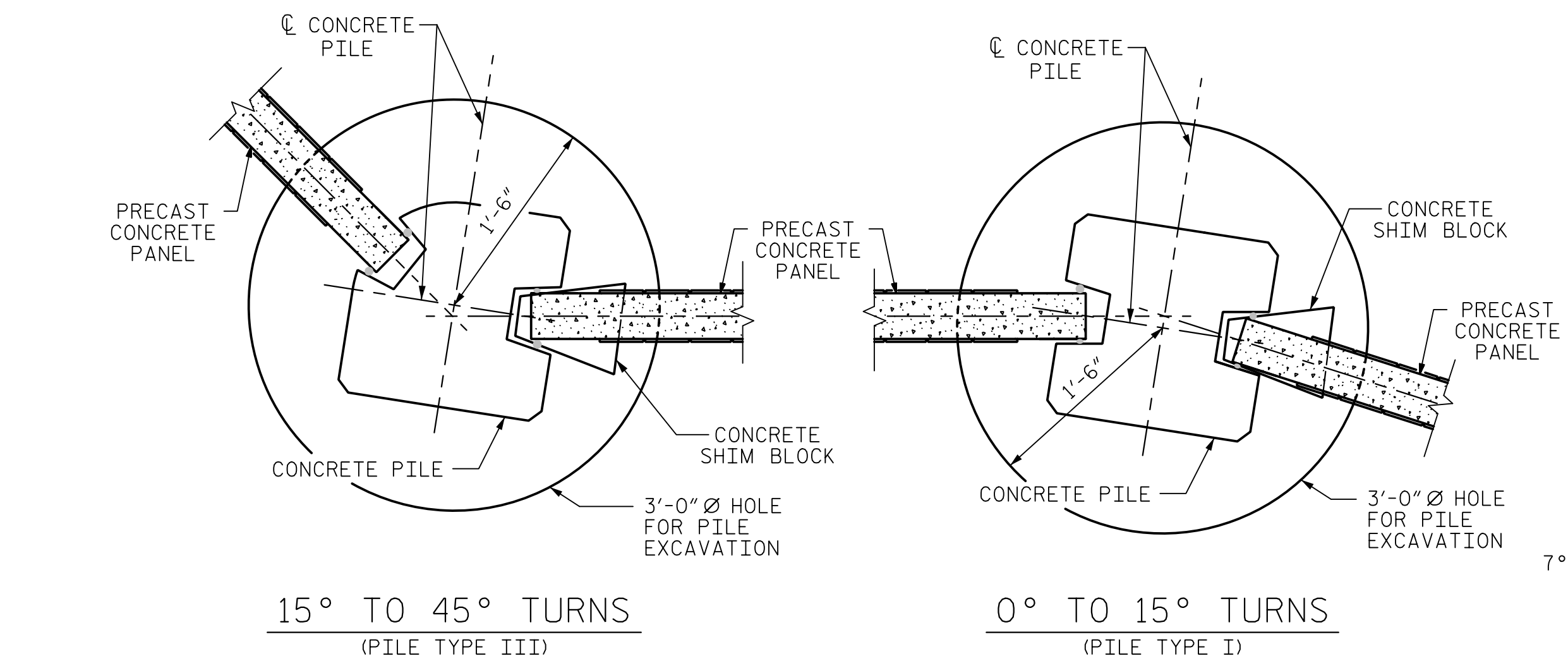
NOTES

- 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" OR 15'-0" PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10'-0" AND 15'-0" PILE SPACING.
- 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 "D"			
WALL #NW4 FROM : STA. 10+00.00 -NW4- TO : STA. 14+50.00 -NW4-			
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"
WALL #NW4 FROM : STA. 14+50.00 -NW4- TO : STA. 15+50.00 -NW4-			
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"
WALL #NW4 FROM : STA. 15+50.00 -NW4- TO : STA. 17+00.00 -NW4-			
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT	
		H ≤ 15'	15' < H ≤ 20'
		20' < H ≤ 25'	
10'-0"	7'-0"	9'-0"	10'-0"
15'-0"	8'-0"	10'-0"	12'-0"



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
	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



BILL OF MATERIAL	
SOUND BARRIER WALL	16,529 S.F.
ARCHITECTURAL SURFACE TREATMENT	26,880 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	GRAY (FS 36559)

PROJECT NO. U-5169
 GUILFORD COUNTY
 STATION: 18+26.54 -YRPB- = 10+00.00 -NW4-

SHEET 1 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SOUND BARRIER WALL
 No. -NW4-

ASSEMBLED BY : M. WRIGHT DATE : 6/18
 CHECKED BY : D. HAWKINS 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

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

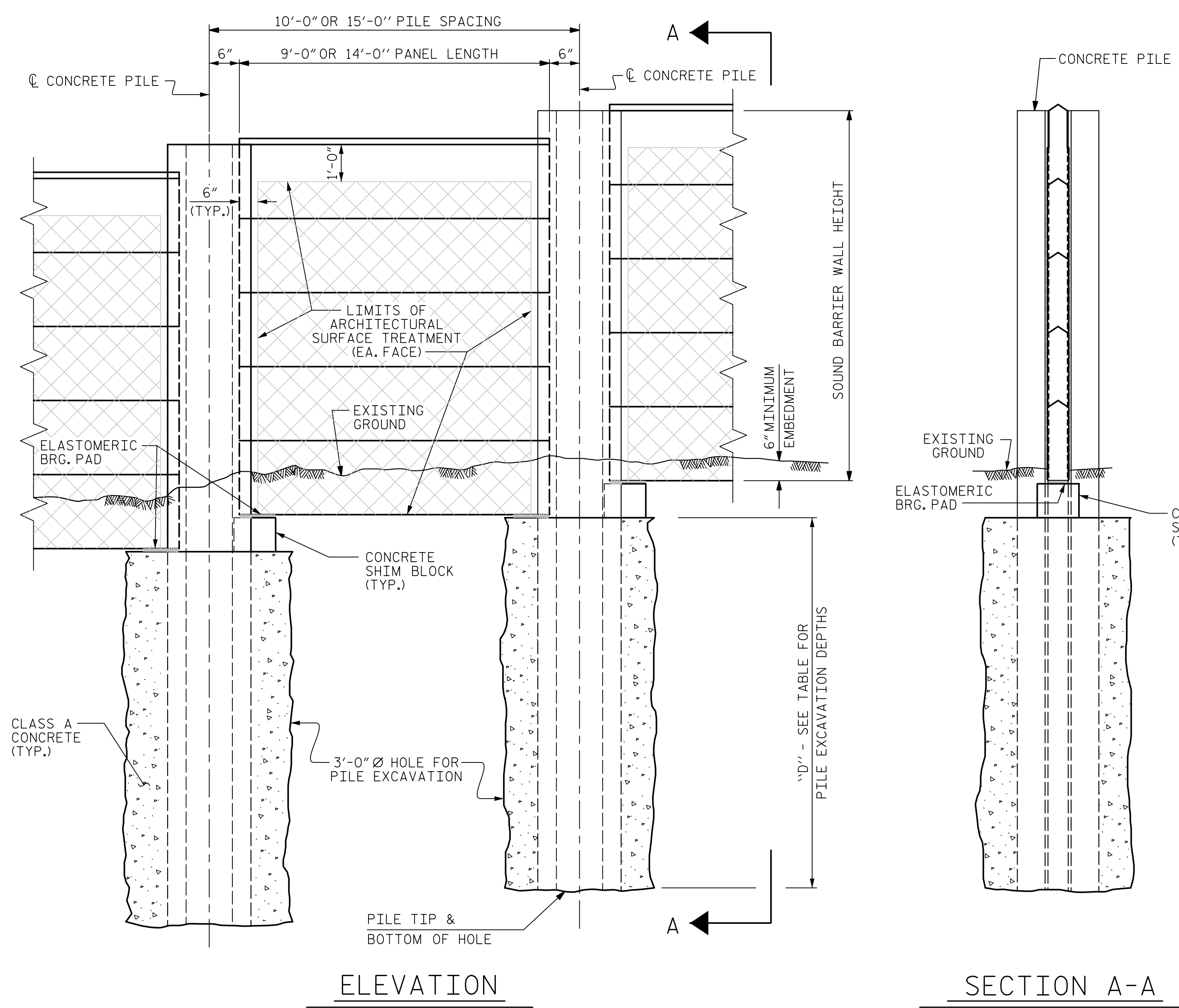
HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
 DRAWN BY : M. WRIGHT DATE : 6/18
 CHECKED BY : D. HAWKINS DATE : 6/18
 DESIGN ENGINEER OF RECORD : D. HAWKINS DATE : 6/18

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

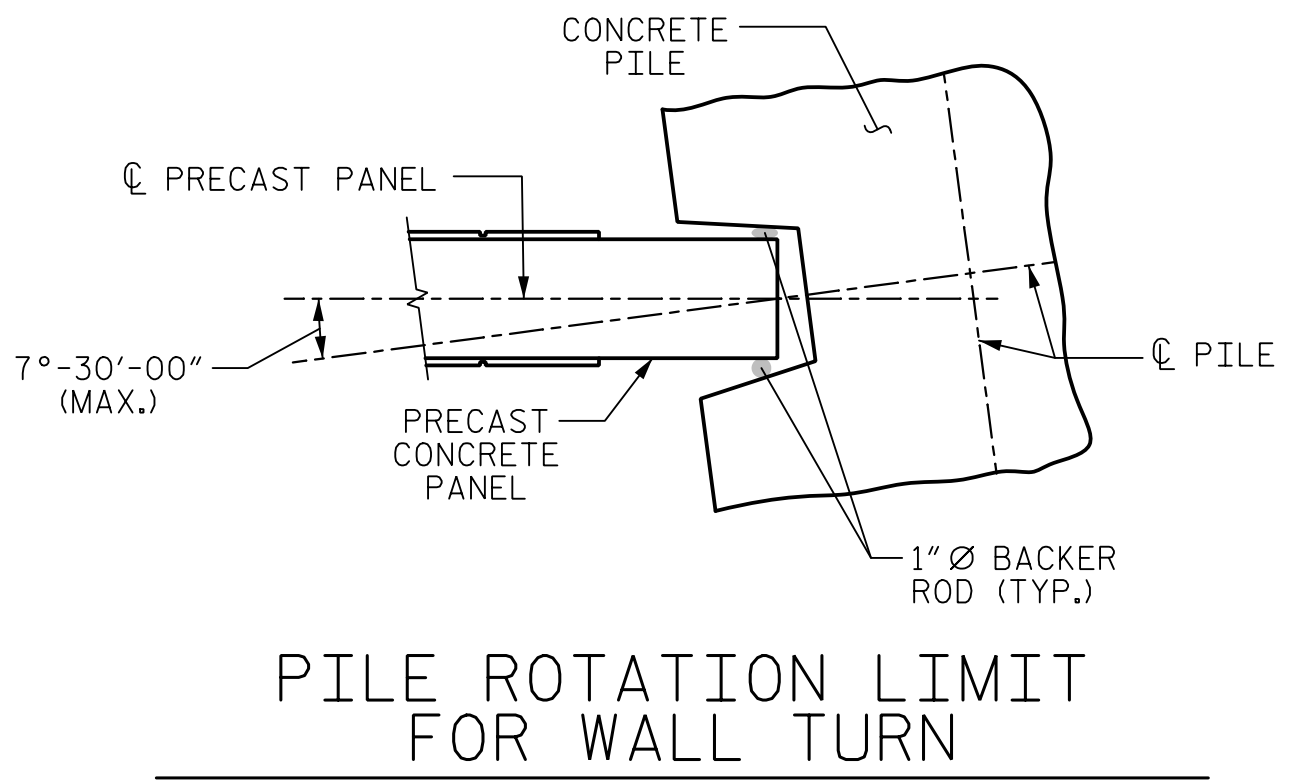
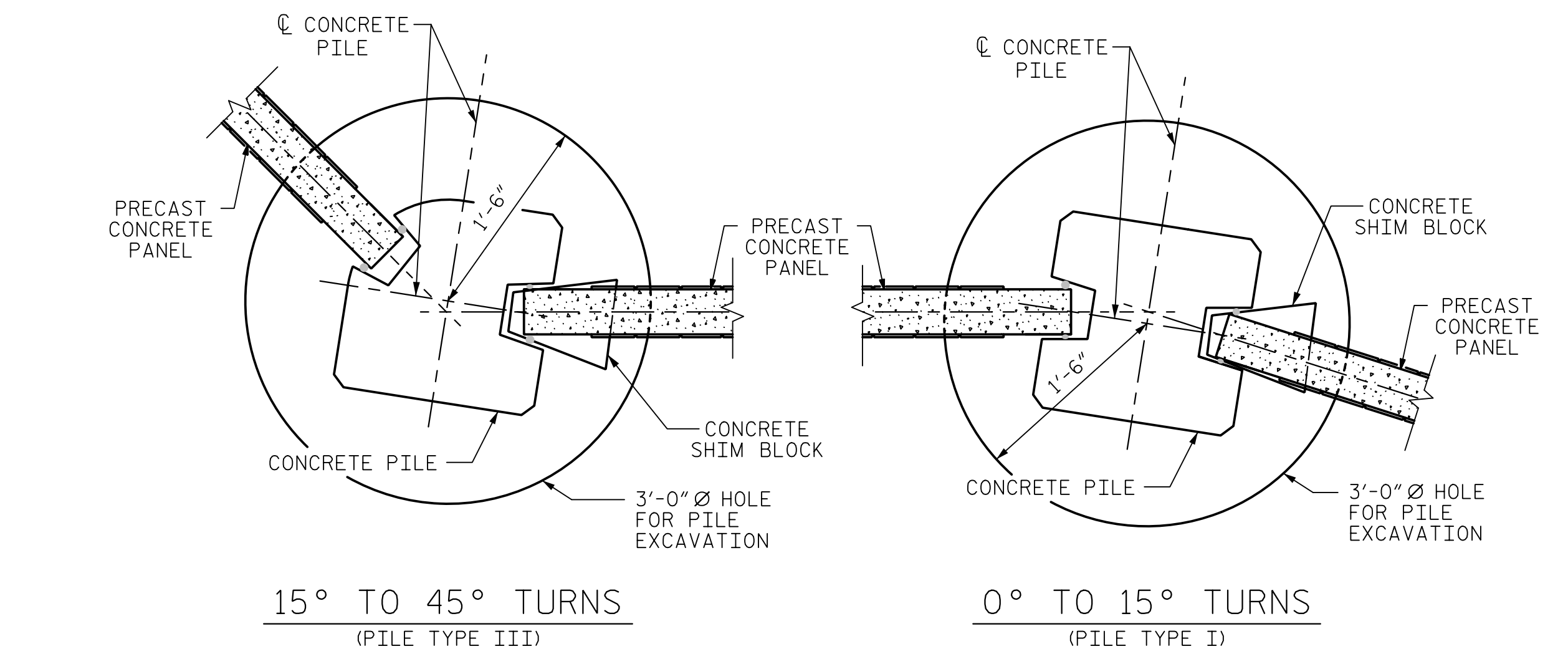
NOTES

- 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" OR 15'-0" PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10'-0" AND 15'-0" PILE SPACING.
- 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.

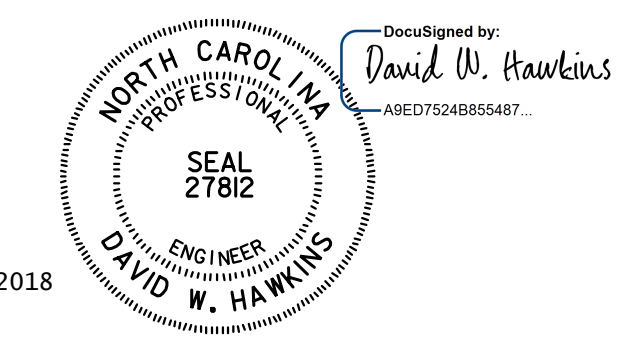
PILE EXCAVATION DEPTHS "D"				
WALL #NW4		FROM : STA. 17+00.00 -NW4- TO : STA. 17+50.00 -NW4-		
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT		
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'
	10'-0"	8'-0"	10'-0"	11'-0"
	15'-0"	9'-0"	11'-0"	13'-0"
WALL #NW4		FROM : STA. 17+50.00 -NW4- TO : STA. 19+00.00 -NW4-		
3'-0" 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"



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
	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



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



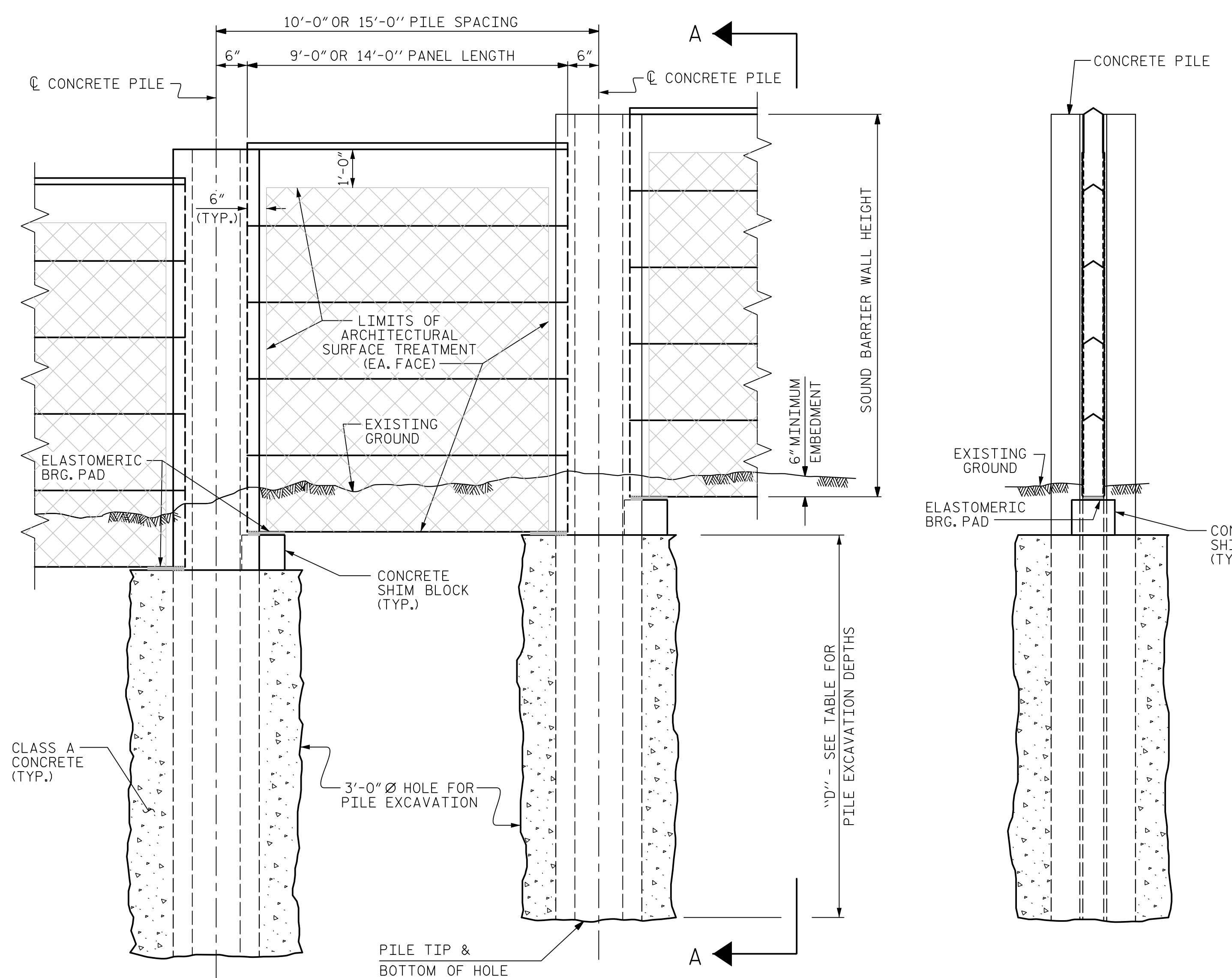
PROJECT NO. U-5169
GUILFORD COUNTY
 STATION: 18+26.54 -YRPB- =
10+00.00 -NW4-

SHEET 2 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SOUND BARRIER WALL
 No. -NW4-

ASSEMBLED BY : M. WRIGHT	DATE : 6/18
CHECKED BY : D. HAWKINS	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

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : M. WRIGHT	DATE : 6/18	DWG. NO. 2	
CHECKED BY : D. HAWKINS	DATE : 6/18		
DESIGN ENGINEER OF RECORD : D. HAWKINS	DATE : 6/18		

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



ELEVATION

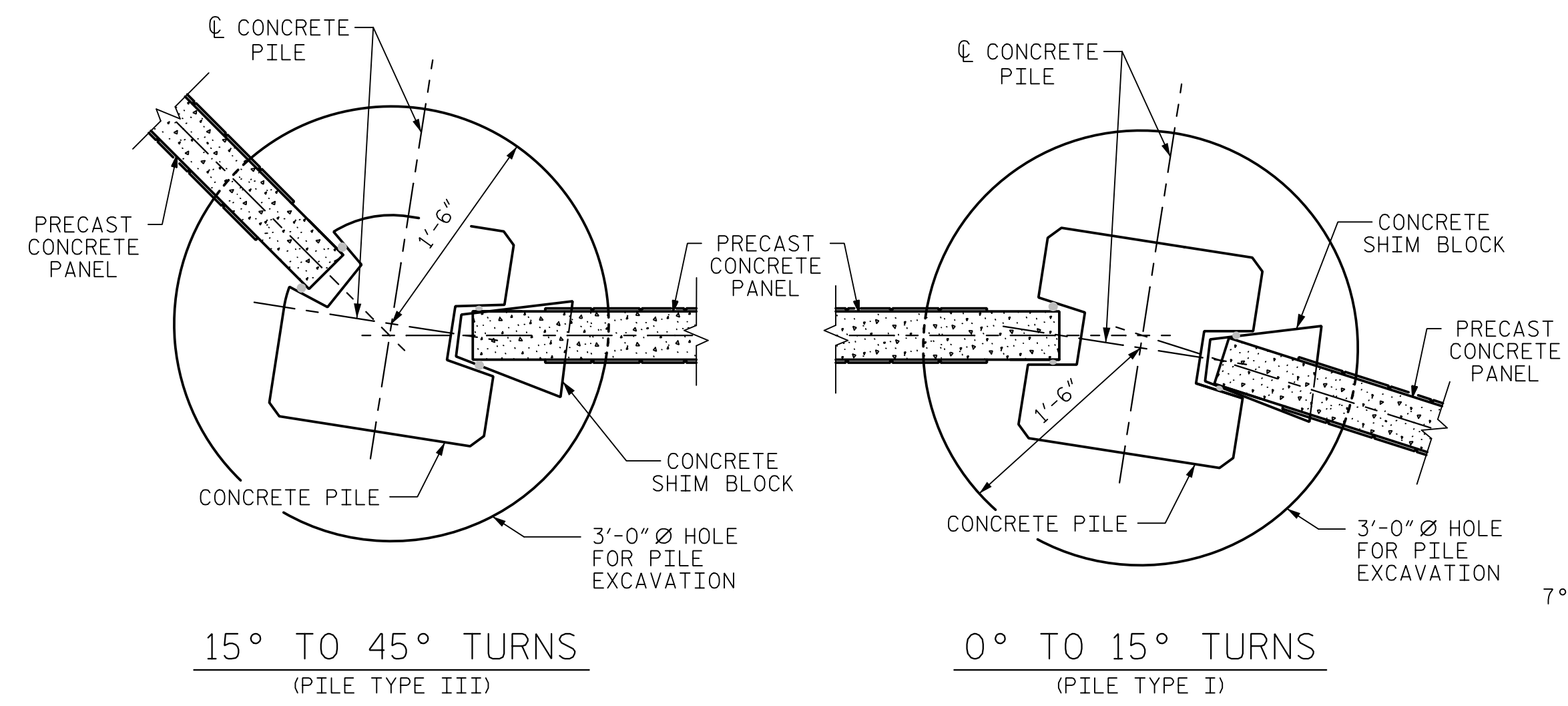
SECTION A-A

PILE EXCAVATION DEPTHS "D"					
WALL #NW7 FROM : STA. 10+00.00 -NW7- TO : STA. 12+25.00 -NW7-					
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"
WALL #NW7 FROM : STA. 12+25.00 -NW7- TO : STA. 16+75.00 -NW7- FROM : STA. 29+00.00 -NW7- TO : STA. 29+95.00 -NW7-					
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"
WALL #NW7 FROM : STA. 16+75.00 -NW7- TO : STA. 17+25.00 -NW7-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 26'			
		10'-0"	10'-0"		
		15'-0"	12'-0"		
WALL #NW7 FROM : STA. 17+25.00 -NW7- TO : STA. 19+00.00 -NW7-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 26'			
		10'-0"	17'-0"		
		15'-0"	17'-0"		

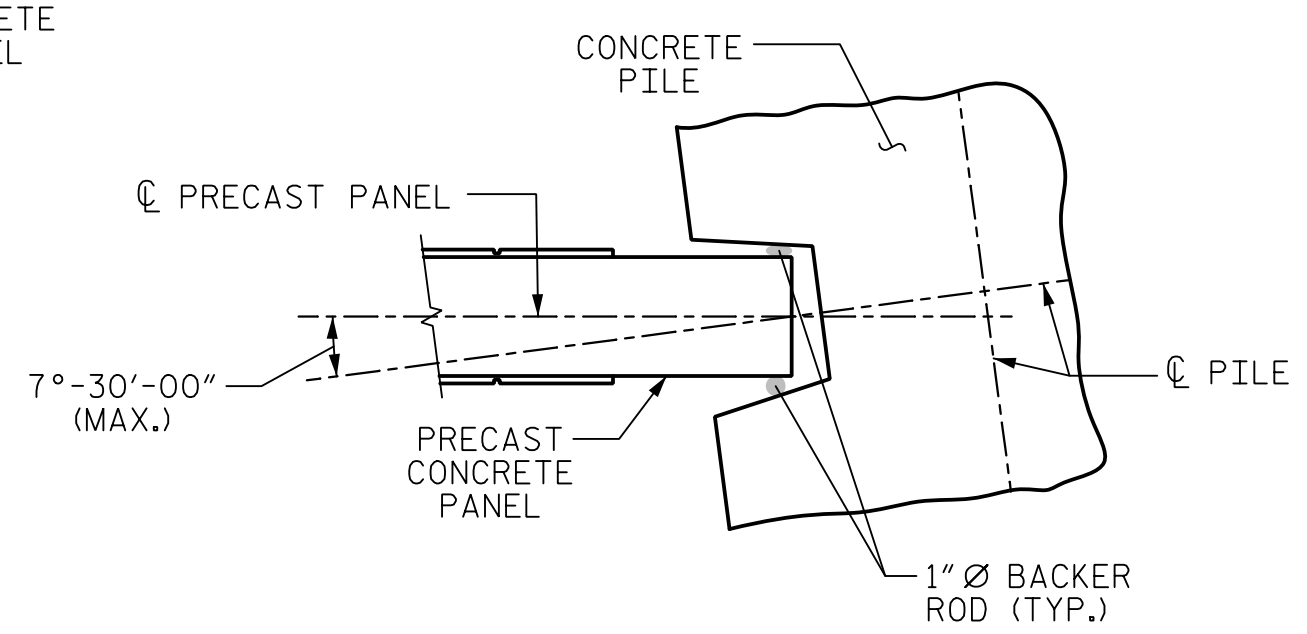
NOTES

- 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" OR 15'-0" PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10'-0" AND 15'-0" PILE SPACING.
- 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 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
	20' < H ≤ 25'	4 - #10 EA. FACE	#3 @ 1'-4" CTS.			20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 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 ≤ 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
	20' < H ≤ 25'	4 - #7 EA. FACE	#3 @ 1'-4" CTS.			20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 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	45,283 S.F.
ARCHITECTURAL SURFACE TREATMENT	74,628 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	GRAY (FS 36559)

PROJECT NO. U-5169
 GUILFORD COUNTY
 STATION: 17+91.67 -YRPD- = 10+00.00 -NW7-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SOUND BARRIER WALL
 No. -NW7-

ASSEMBLED BY : M. WRIGHT	DATE : 6/18
CHECKED BY : D. HAWKINS	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

HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY : M. WRIGHT	DATE : 6/18
CHECKED BY : D. HAWKINS	DATE : 6/18
DESIGN ENGINEER OF RECORD : D. HAWKINS	DATE : 6/18
DWG. NO. 3	

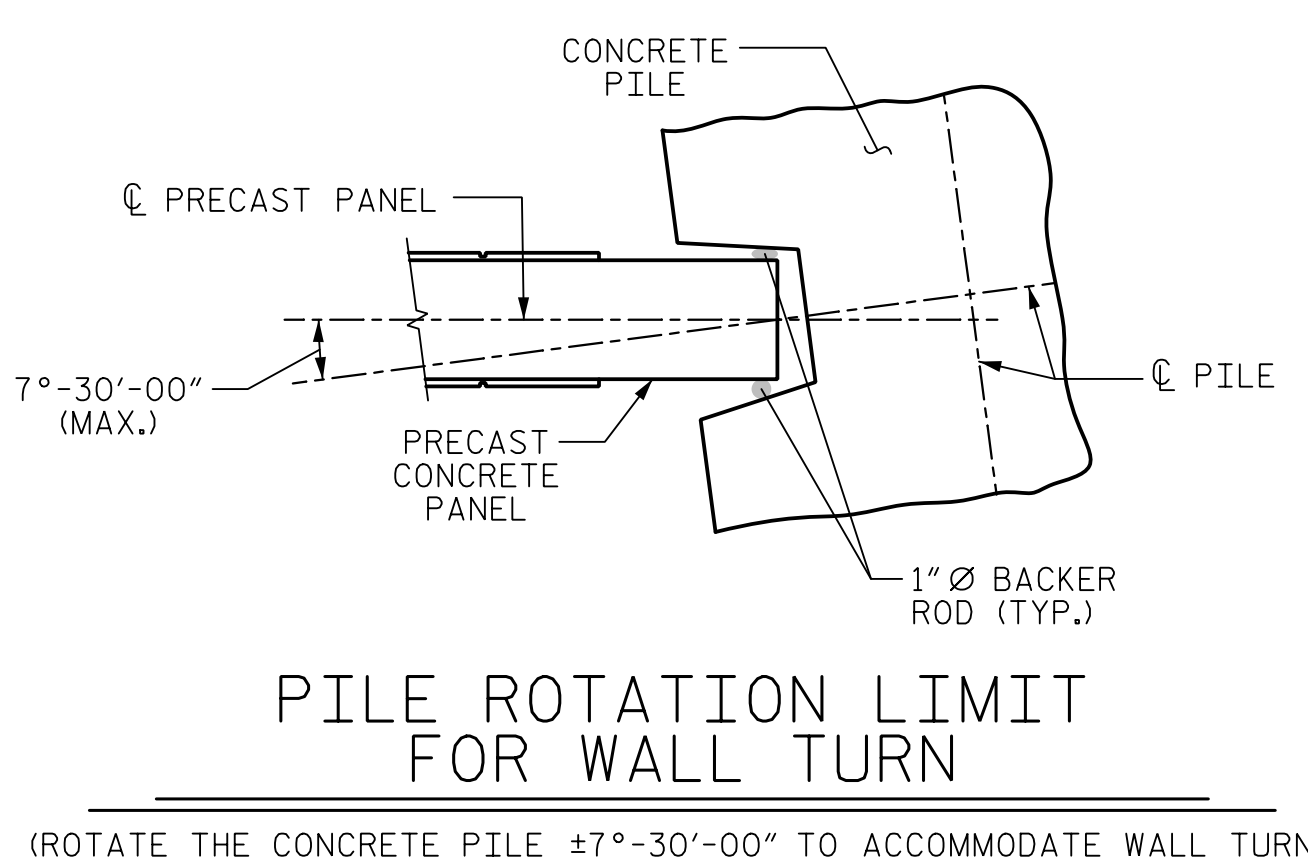
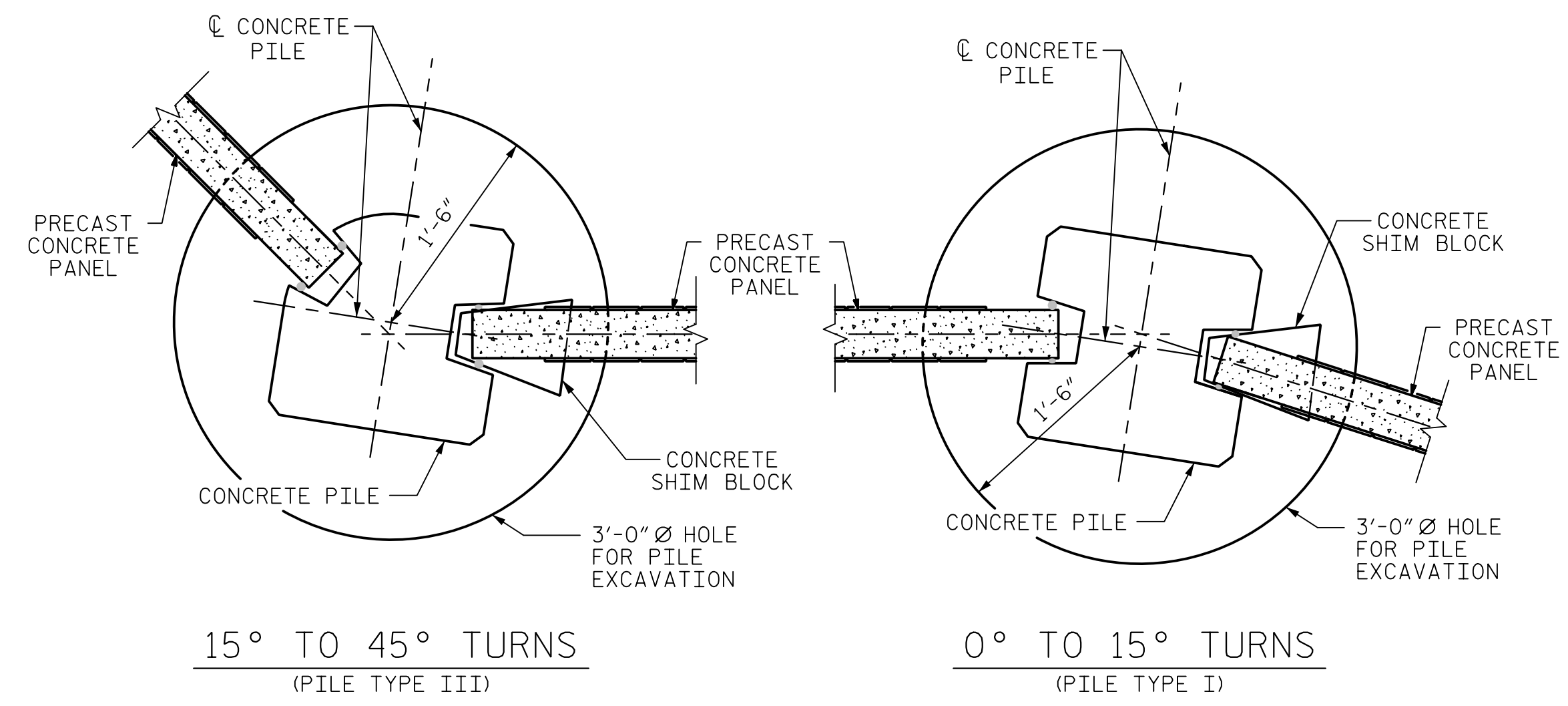
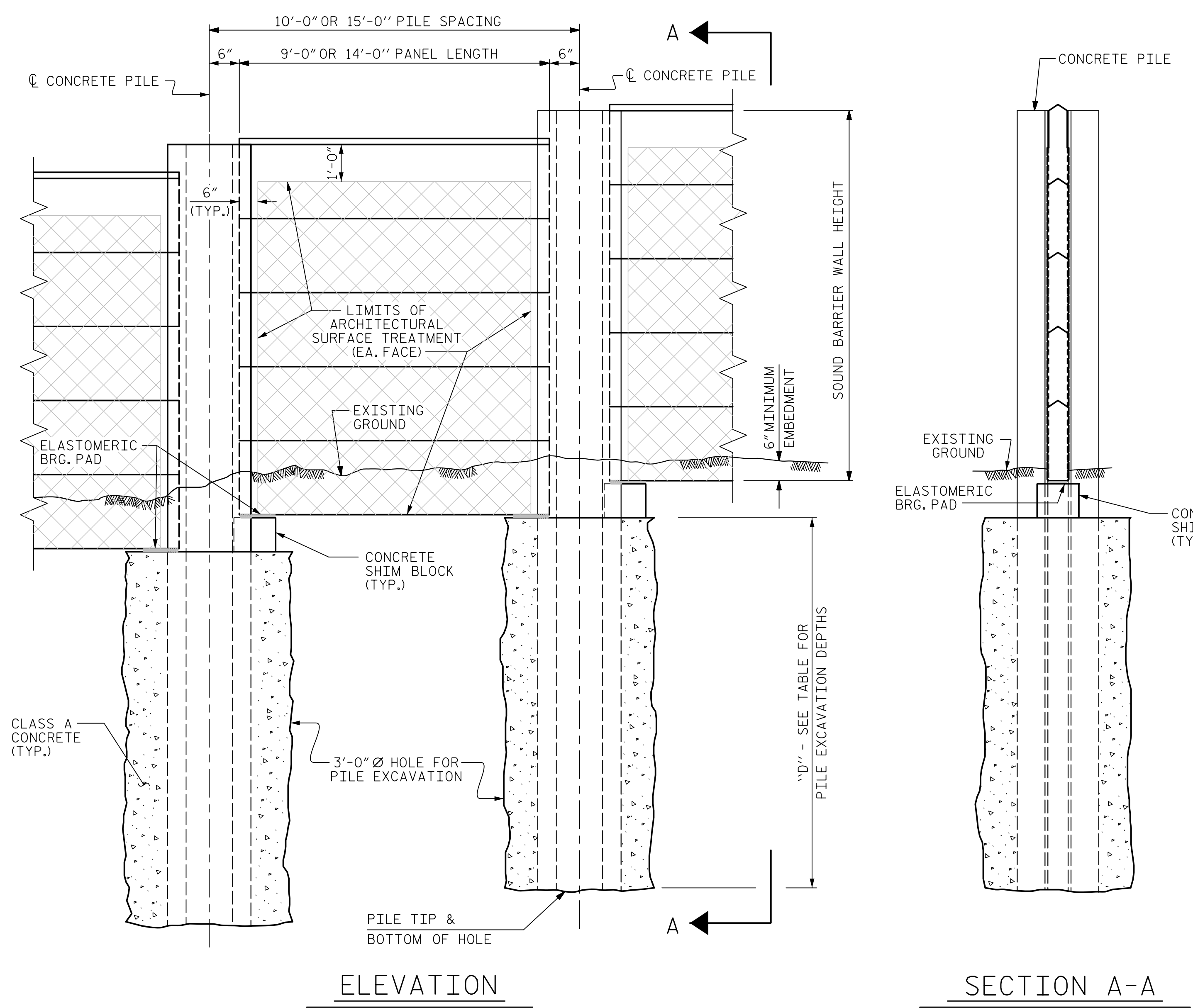
REVISIONS						SHEET NO. SW-3
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 6
2			4			

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" OR 15'-0" PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10'-0" AND 15'-0" PILE SPACING.
- 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 "D"		
WALL #NW7 FROM : STA. 19+00.00 -NW7- TO : STA. 20+50.00 -NW7-		
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT
	10'-0"	H ≤ 24'
	15'-0"	14'-0"
WALL #NW7 FROM : STA. 20+50.00 -NW7- TO : STA. 21+75.00 -NW7-		
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT
	10'-0"	H ≤ 25'
	15'-0"	15'-0"
WALL #NW7 FROM : STA. 21+75.00 -NW7- TO : STA. 29+00.00 -NW7-		
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT
	10'-0"	H ≤ 25'
	15'-0"	16'-0"

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
	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



DocuSigned by:
David W. Hawkins
6/11/2018

SEAL 27812
ENGINEER
DAVID W. HAWKINS

PROJECT NO. U-5169
GUILFORD COUNTY
STATION: 17+91.67 -YRPD- = 10+00.00 -NW7-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SOUND BARRIER WALL
No. -NW7-

ASSEMBLED BY : M. WRIGHT DATE : 6/18
CHECKED BY : D. HAWKINS 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

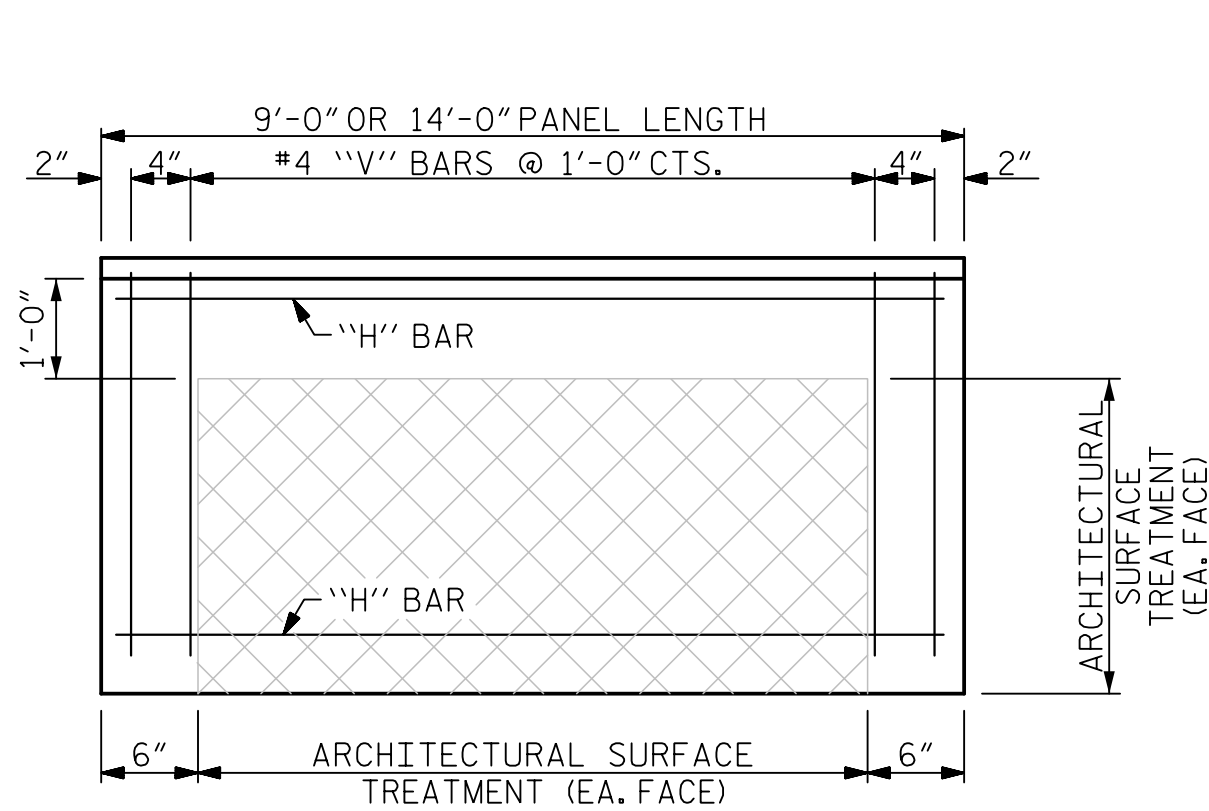
HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY : M. WRIGHT DATE : 6/18
CHECKED BY : D. HAWKINS DATE : 6/18
DESIGN ENGINEER OF RECORD : D. HAWKINS DATE : 6/18

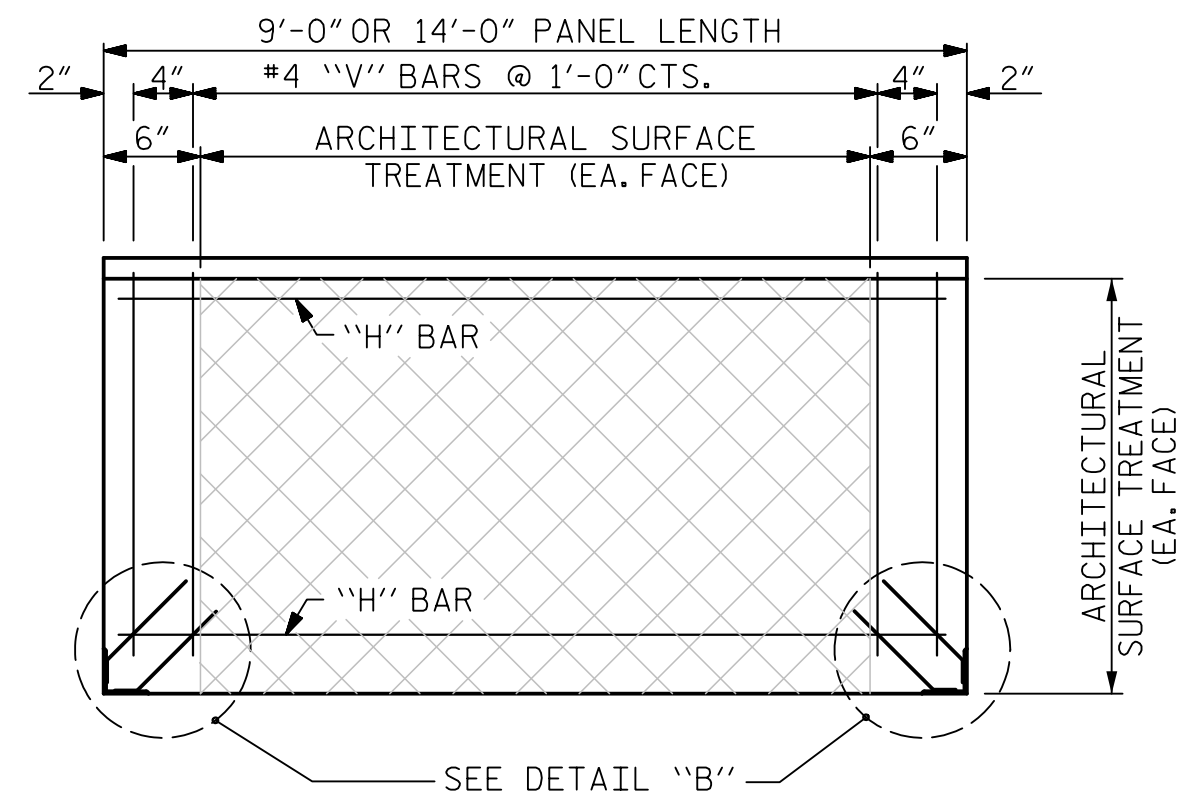
DWG. NO. 4

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

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



FRONT ELEVATION OF UPPER PRECAST PANEL



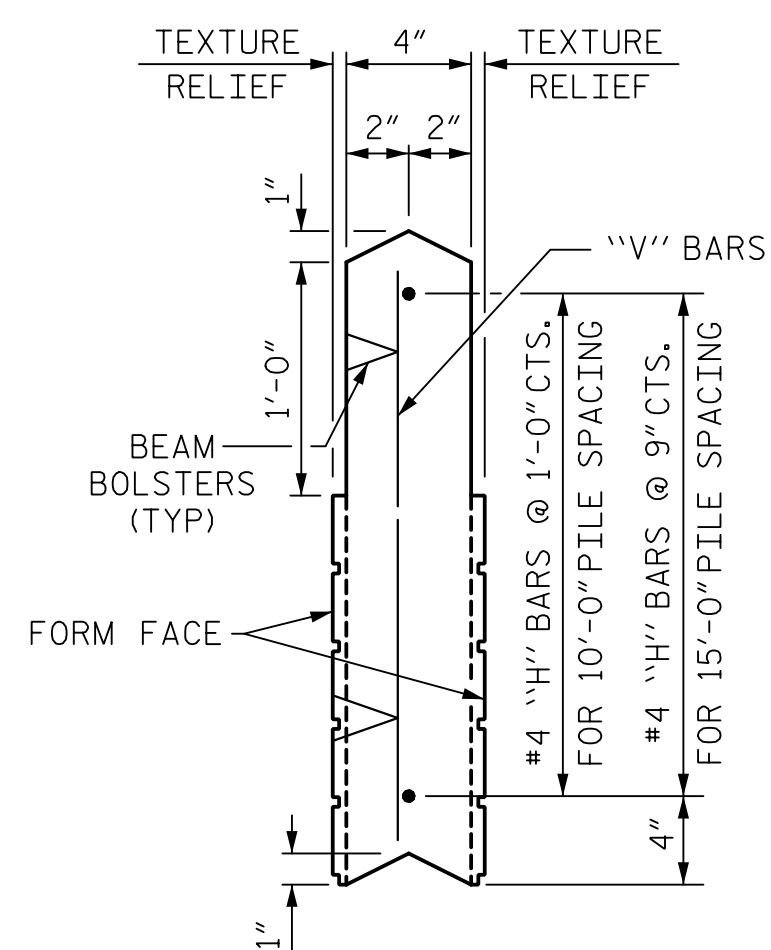
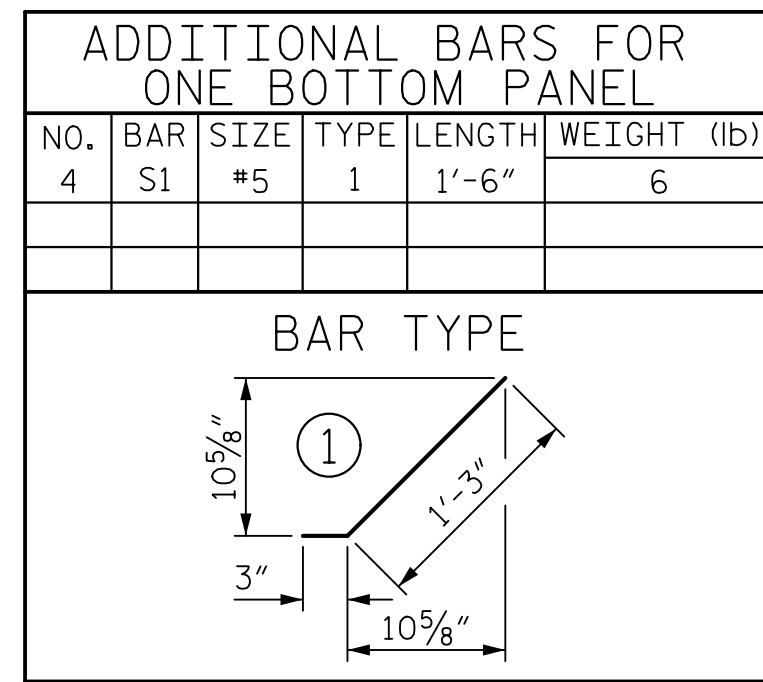
FRONT ELEVATION OF BOTTOM PRECAST PANEL

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

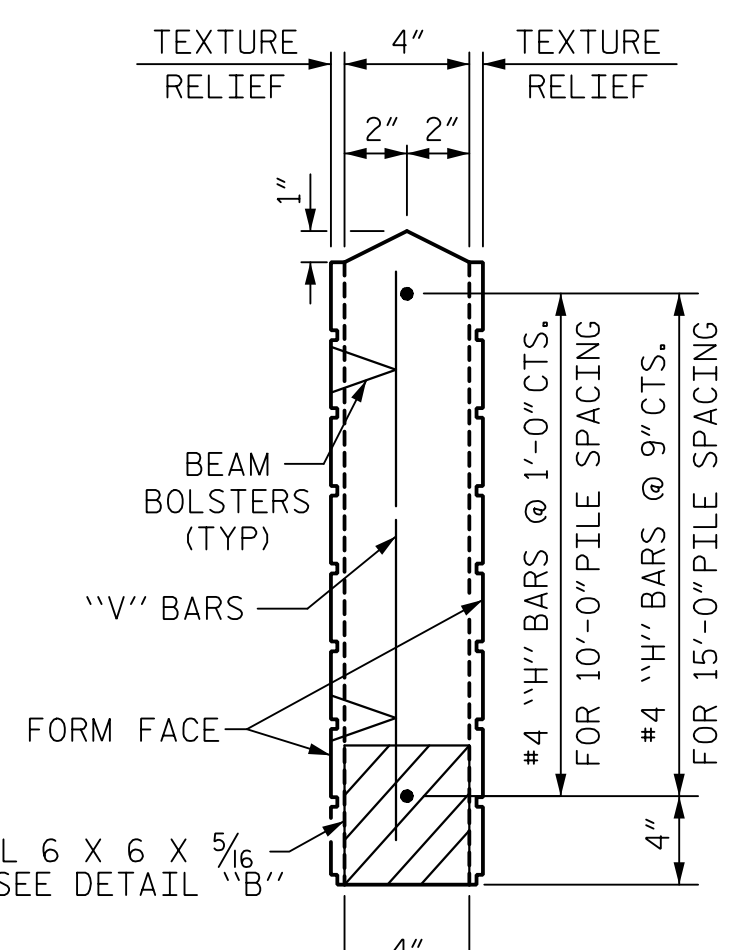
PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES									
		HORIZONTAL					VERTICAL				
		NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)
2'-0"	0.22	3	H1 #4	STR	8'-8"	17	11	V1 #4	STR	1'-8"	12
3'-0"	0.33	4	H2 #4	STR	8'-8"	23	11	V2 #4	STR	2'-8"	20
4'-0"	0.44	5	H3 #4	STR	8'-8"	29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

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

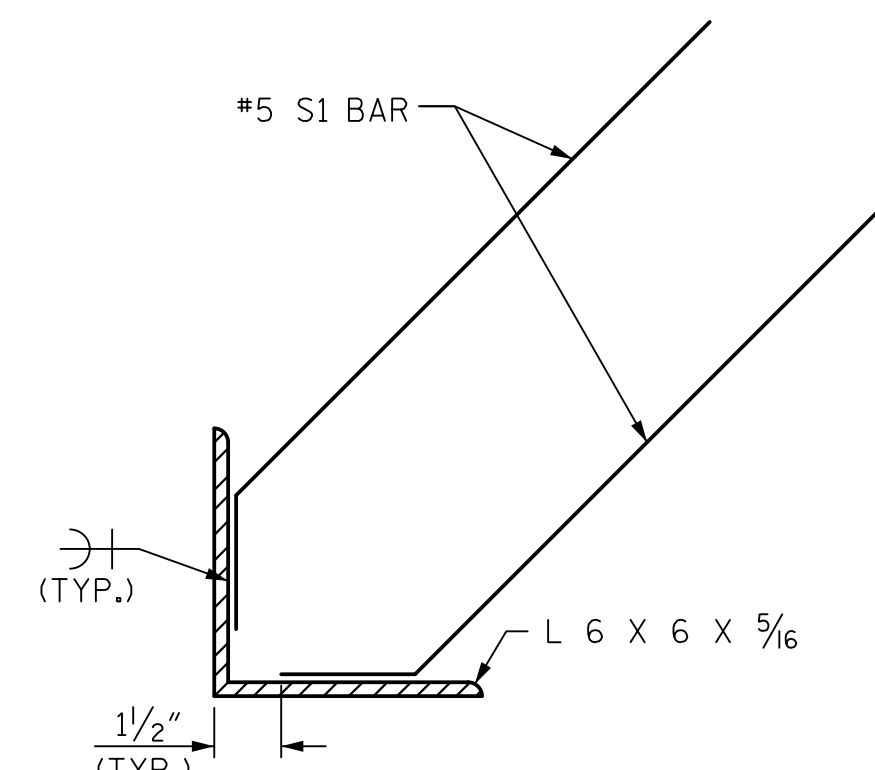
PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES									
		HORIZONTAL					VERTICAL				
		NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)
3'-0"	0.52	5	H1 #4	STR	13'-8"	46	16	V1 #4	STR	2'-8"	29
4'-0"	0.69	6	H2 #4	STR	13'-8"	55	16	V2 #4	STR	3'-8"	39
5'-0"	0.86	7	H3 #4	STR	13'-8"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



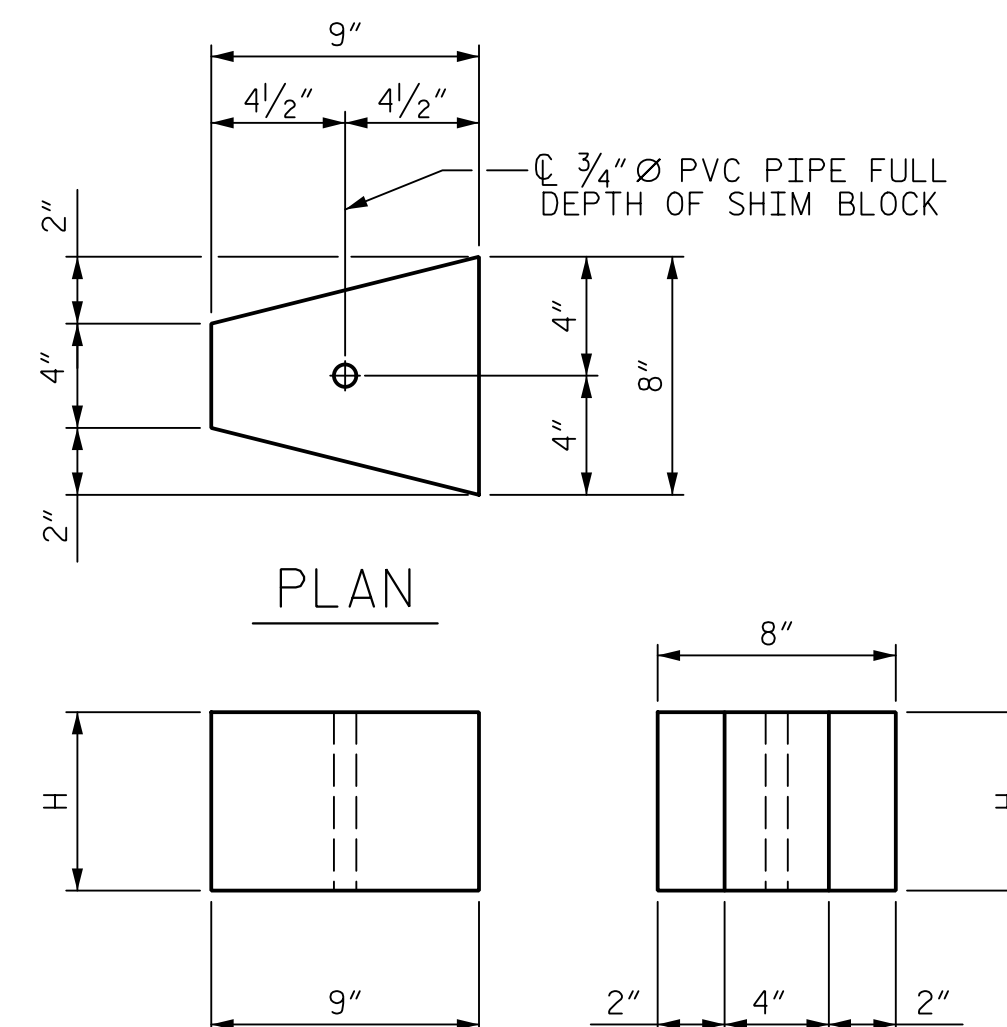
UPPER PANEL



BOTTOM PANEL



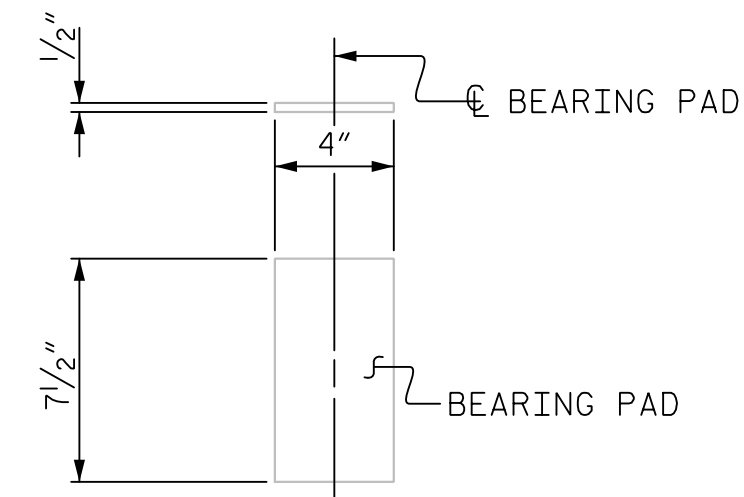
DETAIL "B"



ELEVATION END

CONCRETE SHIM BLOCK

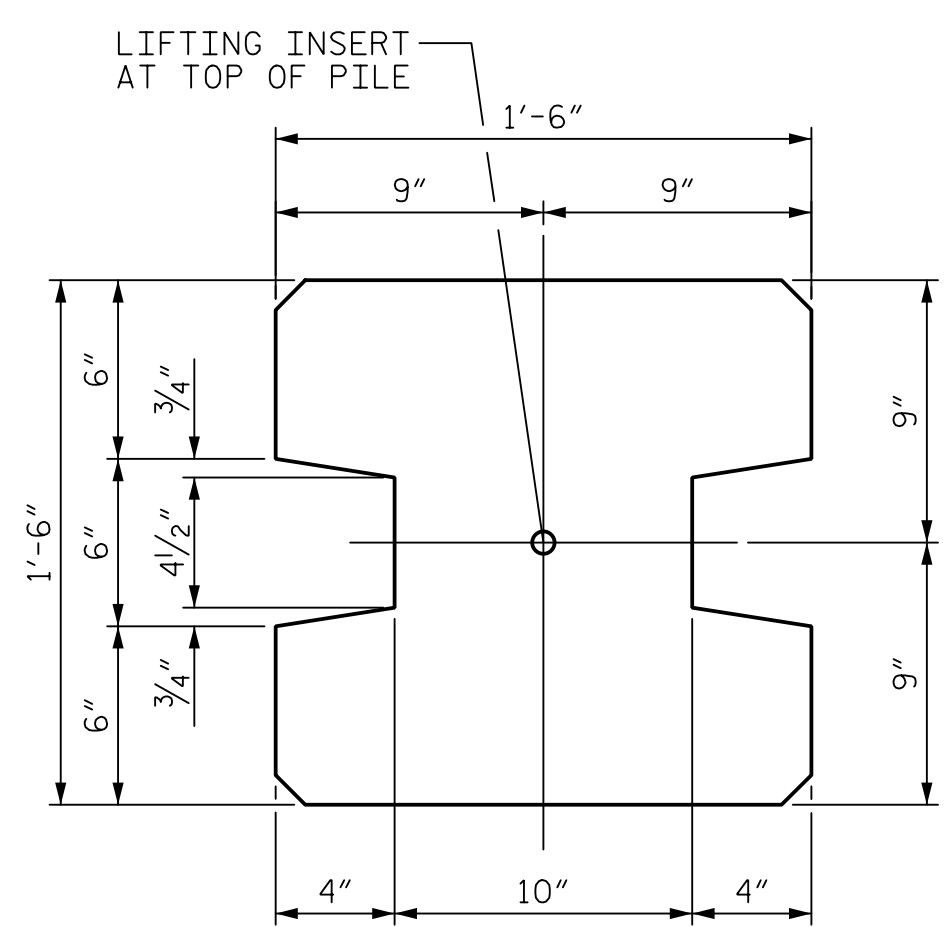
H = 3", 6" or 1'-0"



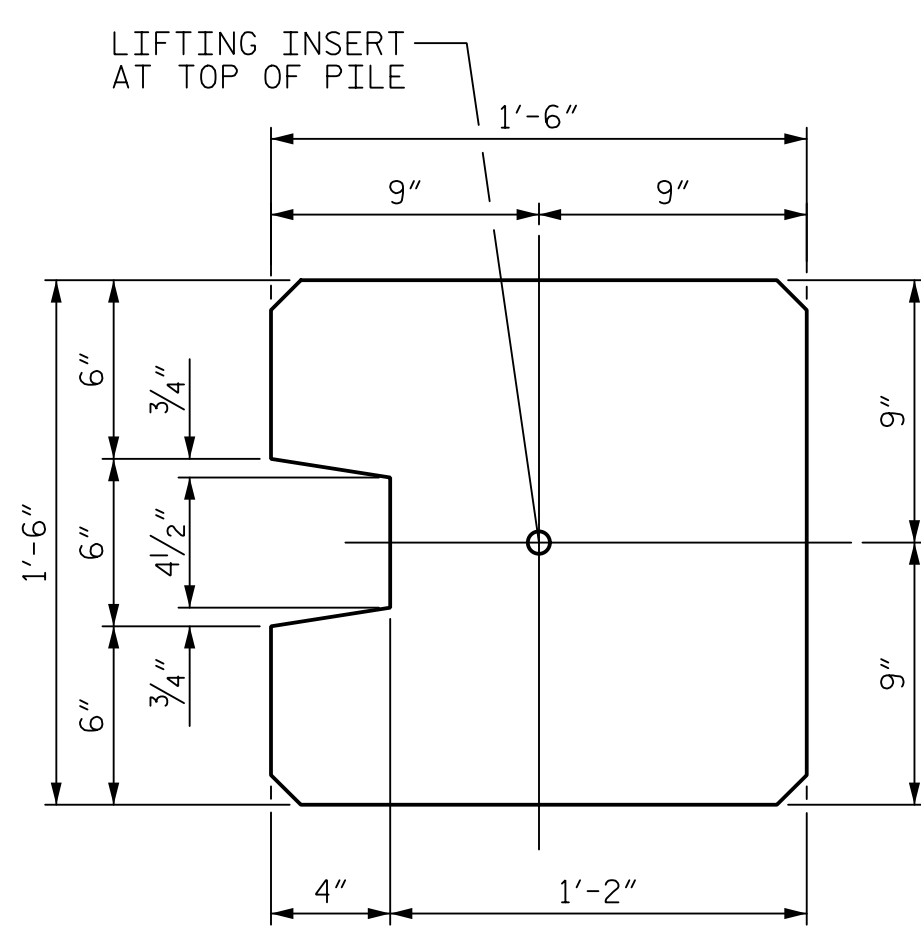
ELASTOMERIC BEARING DETAILS

ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.

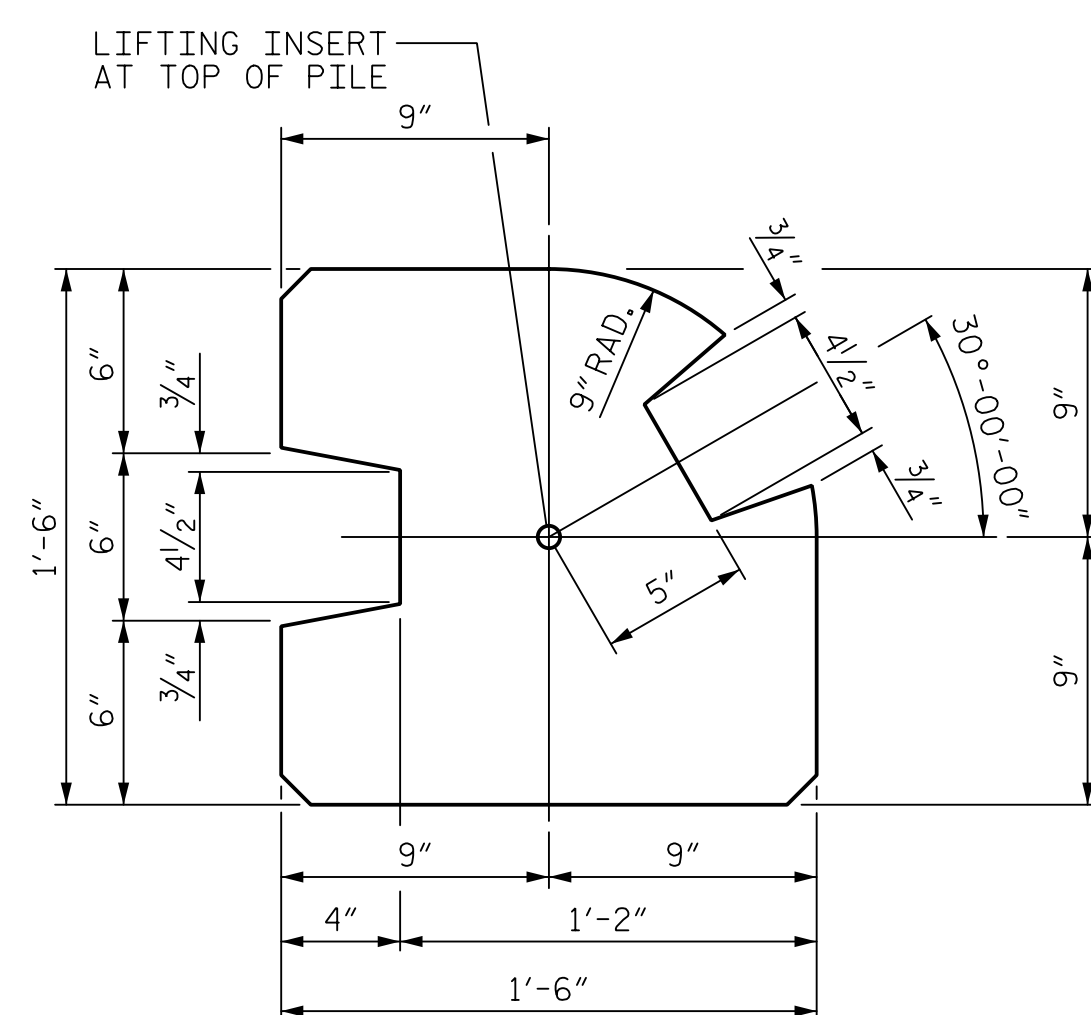
SECTION THROUGH PRECAST PANELS



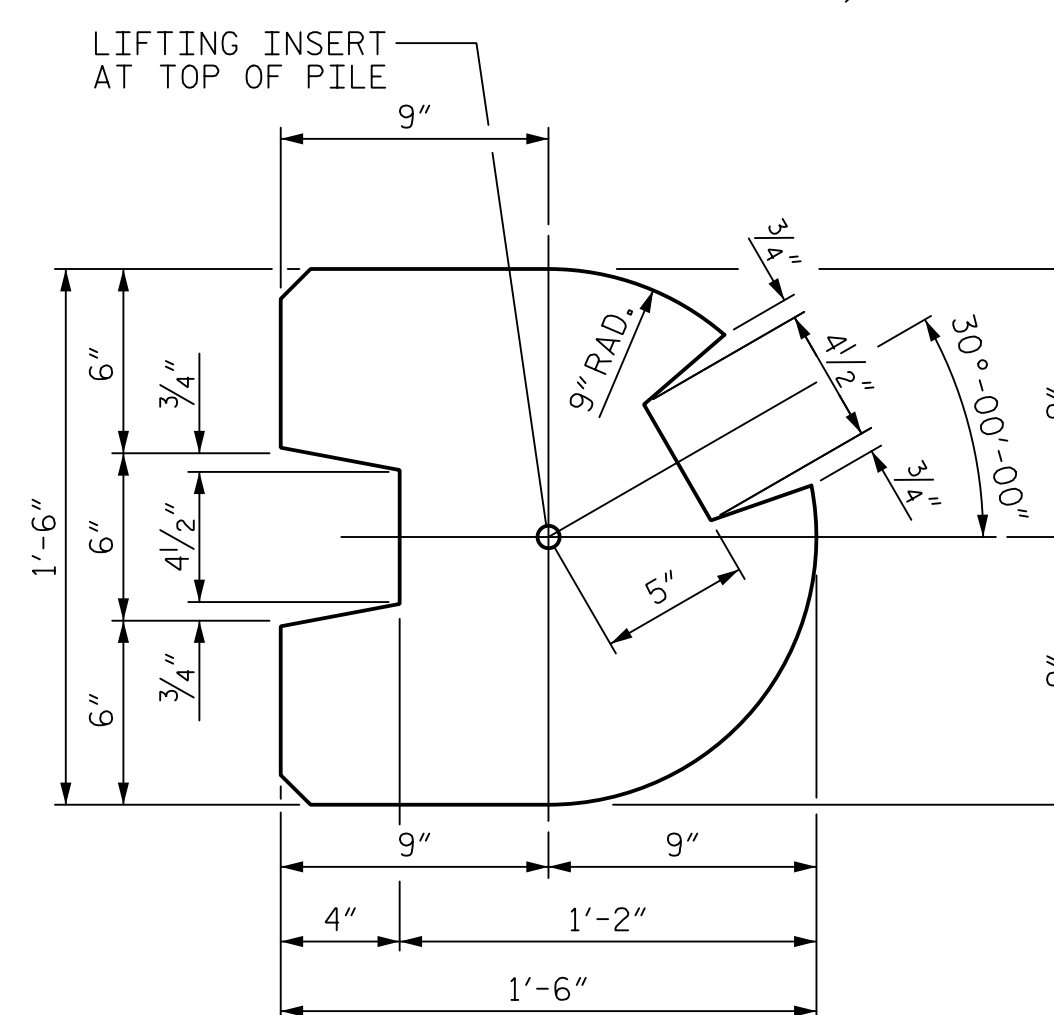
TYPE - I (AREA = 1.9444 SQ. FT.)



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



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



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

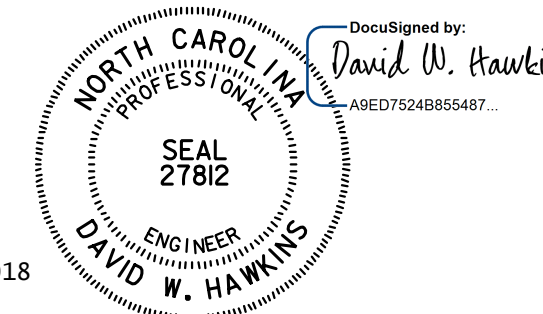
PILE DETAIL

(ALL CORNERS TO BE CHAMFERED 1")

PROJECT NO. U-5169
 GUILFORD COUNTY
 STATION: VARIES

SHEET 1 OF 2

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



6/11/2018

ASSEMBLED BY : M. WRIGHT	DATE : 6/18
CHECKED BY : D. HAWKINS	DATE : 6/18
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

HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY : M. WRIGHT	DATE : 6/18
CHECKED BY : D. HAWKINS	DATE : 6/18
DESIGN ENGINEER OF RECORD : D. HAWKINS	DATE : 6/18

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 UNLESS ALL SIGNATURES COMPLETED

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

SW-5
 TOTAL SHEETS 6

STD. NO. SBW2

GEOTECHNICAL ENGINEER

ENGINEER

DocuSigned by:
Scott A. Hidden 4/2/2018

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

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.

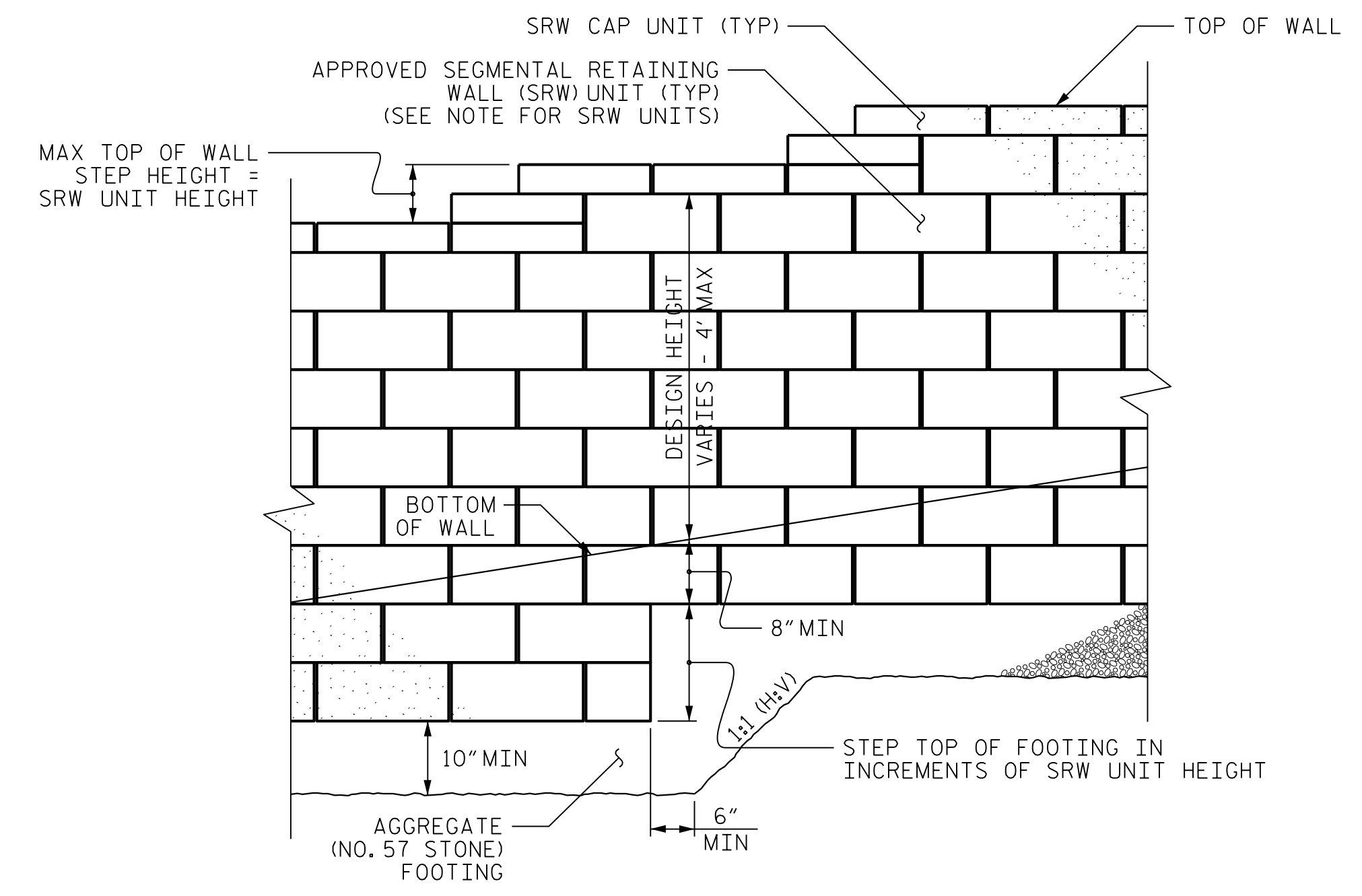
SEGMENTAL RETAINING WALL (SRW) UNITS ARE APPROVED FOR EITHER 2' OR 4' MAXIMUM DESIGN HEIGHTS. FOR DETAILS AND DIMENSIONS OF APPROVED SRW UNITS AND MAXIMUM DESIGN HEIGHTS, SEE connect.ncdot.gov/resources/Geological/Pages/Products.aspx

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.

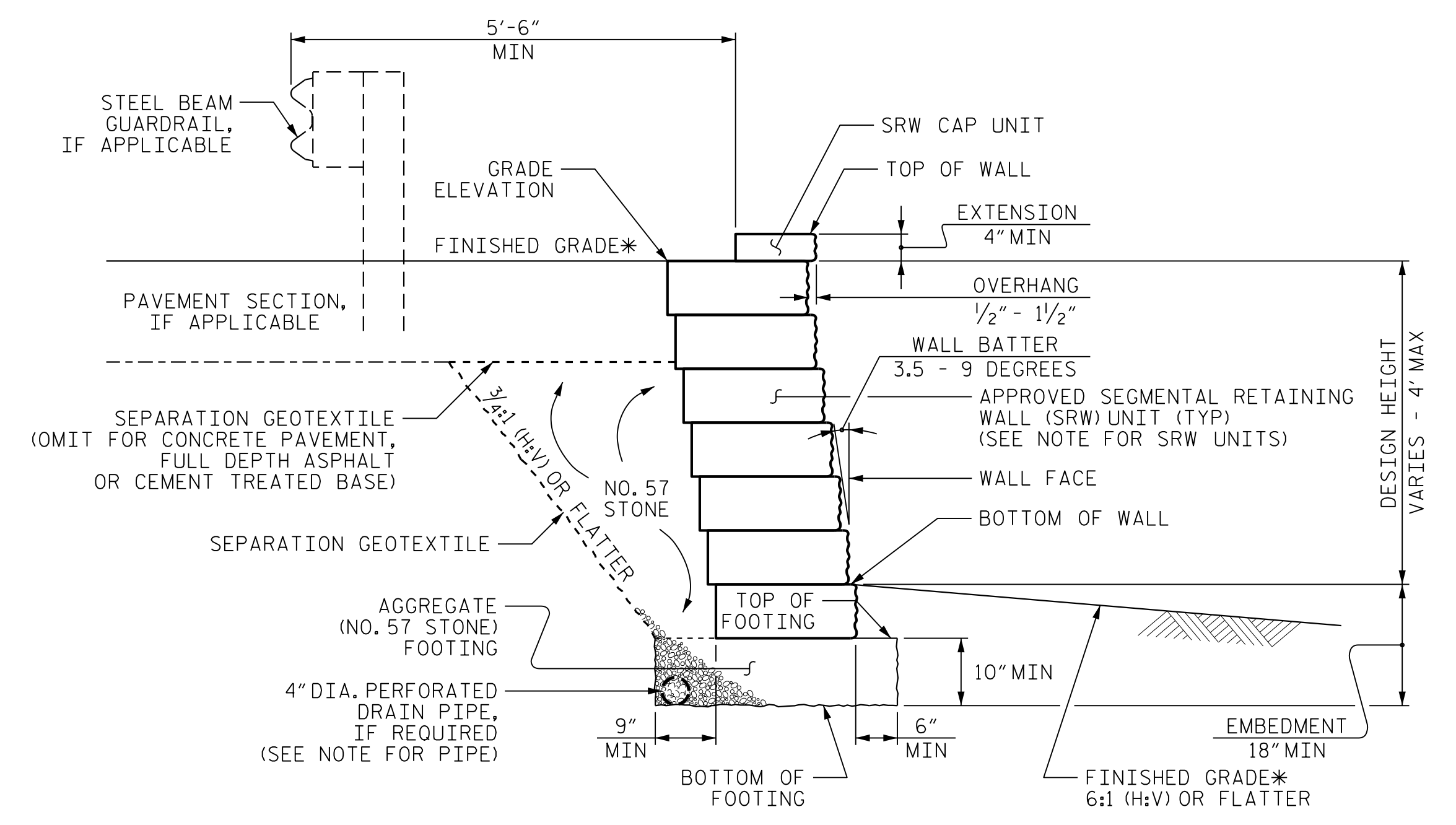
BEFORE BEGINNING STANDARD SEGMENTAL GRAVITY WALL CONSTRUCTION, SURVEY WALL LOCATIONS AND SUBMIT WALL PROFILE VIEWS (WALL ENVELOPES) FOR REVIEW. FOR WALL ENVELOPES, INCLUDE BOTTOM OF WALL, EXISTING GROUND AND GRADE ELEVATIONS AND OTHER ELEVATIONS AS NEEDED AT INTERVALS OF 25' OR LESS ALONG WALLS. DO NOT 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.

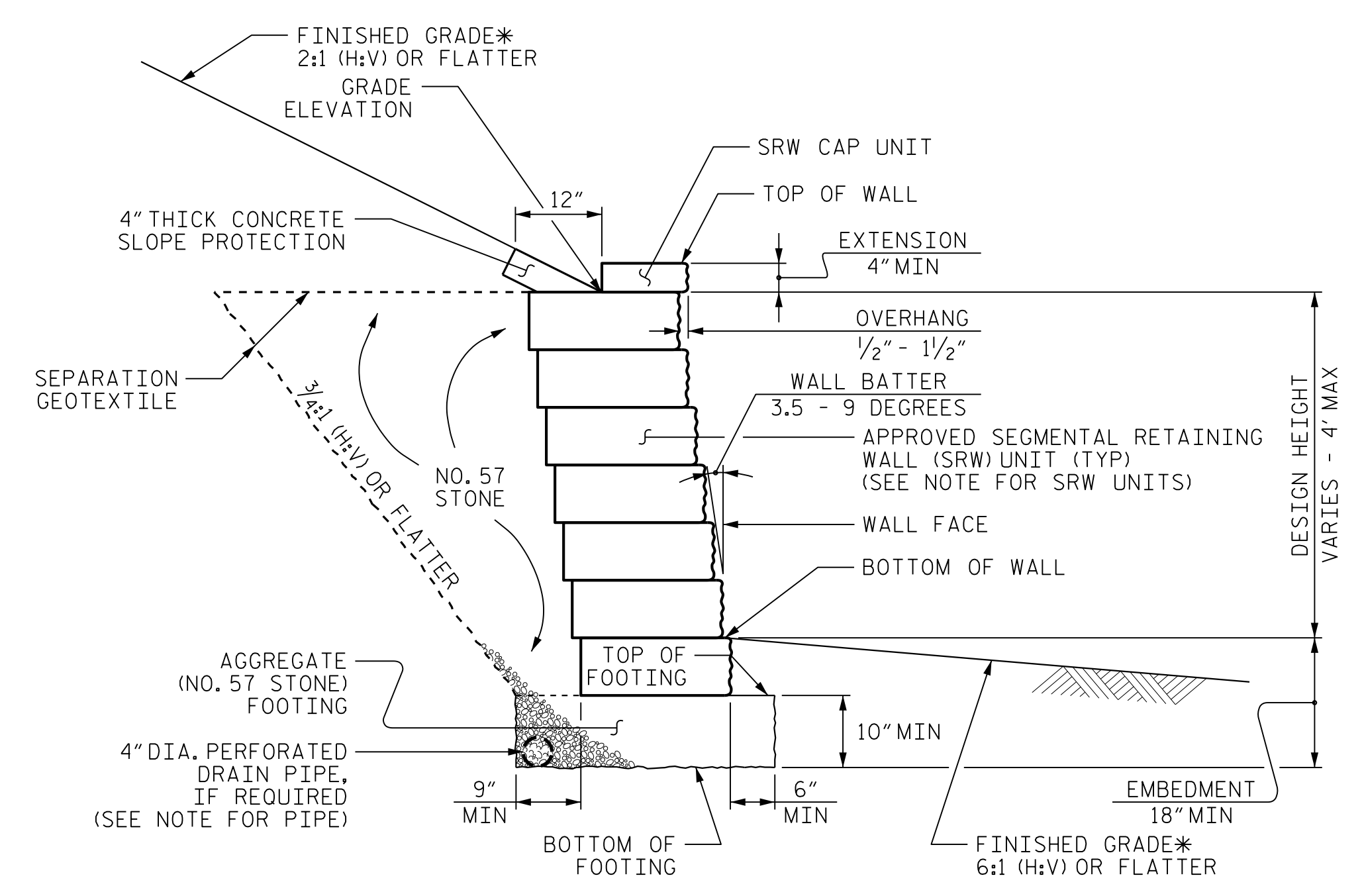


STANDARD SEGMENTAL GRAVITY WALL - PARTIAL ELEVATION



STANDARD SEGMENTAL GRAVITY WALL WITHOUT SLOPE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



STANDARD SEGMENTAL GRAVITY WALL WITH SLOPE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: U-5169

GUILFORD COUNTY

STATION: 49+50 -Y- TO 50+25 -Y-
54+10 -Y- TO 54+60 -Y-

SHEET 1 OF 1

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

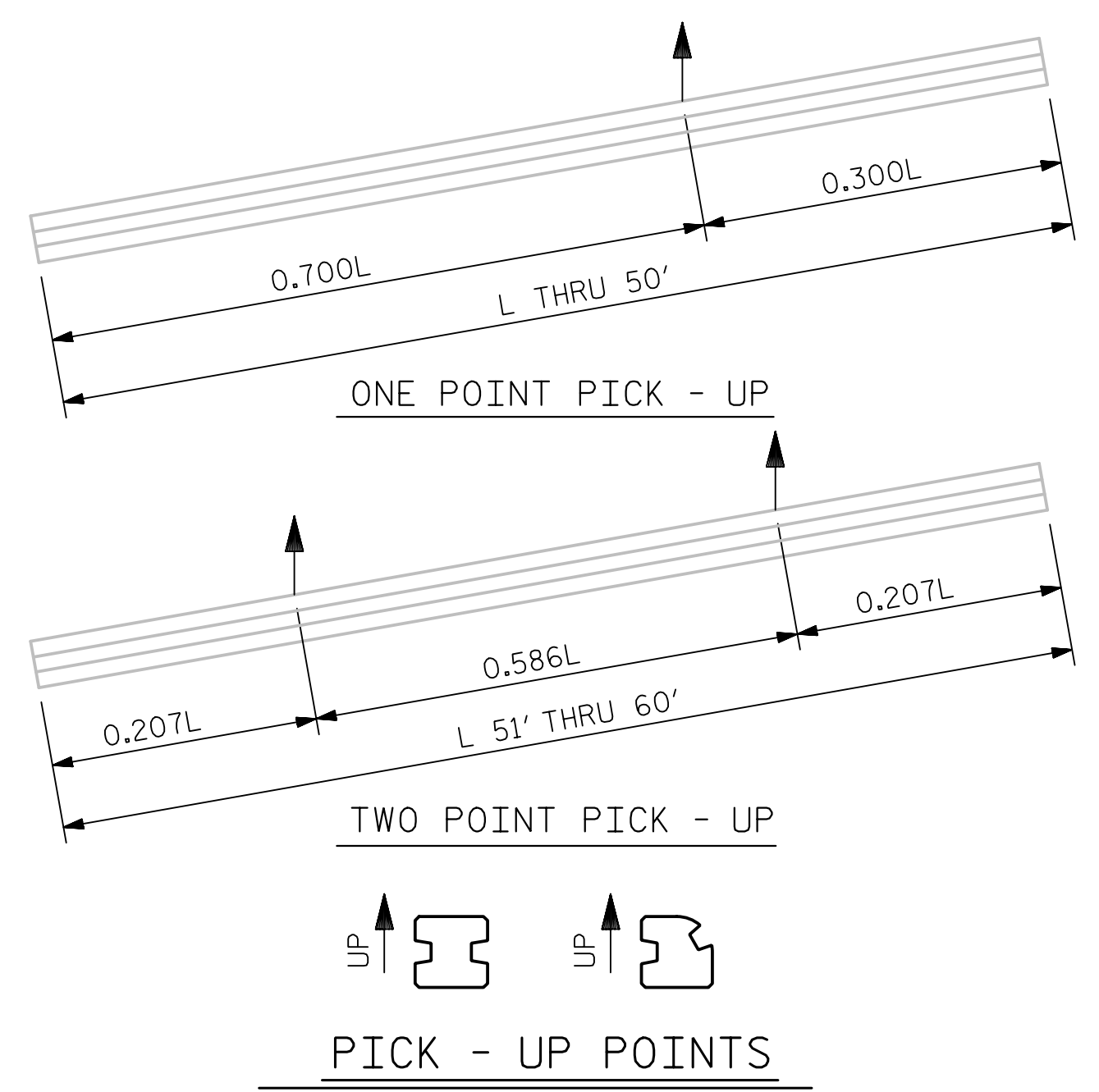
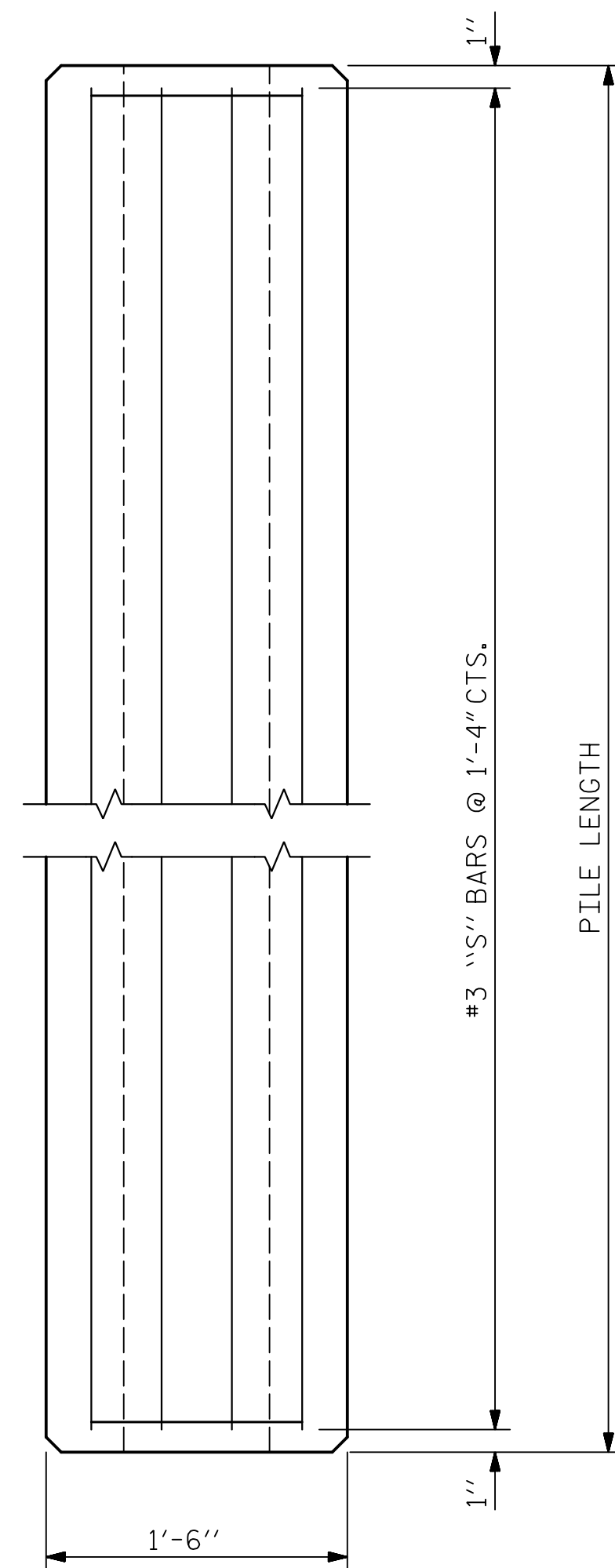
**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 454.01

**STANDARD
SEGMENTAL GRAVITY
RETAINING WALL**

SHEET NO.
W-1

DATE: 1-16-18



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.

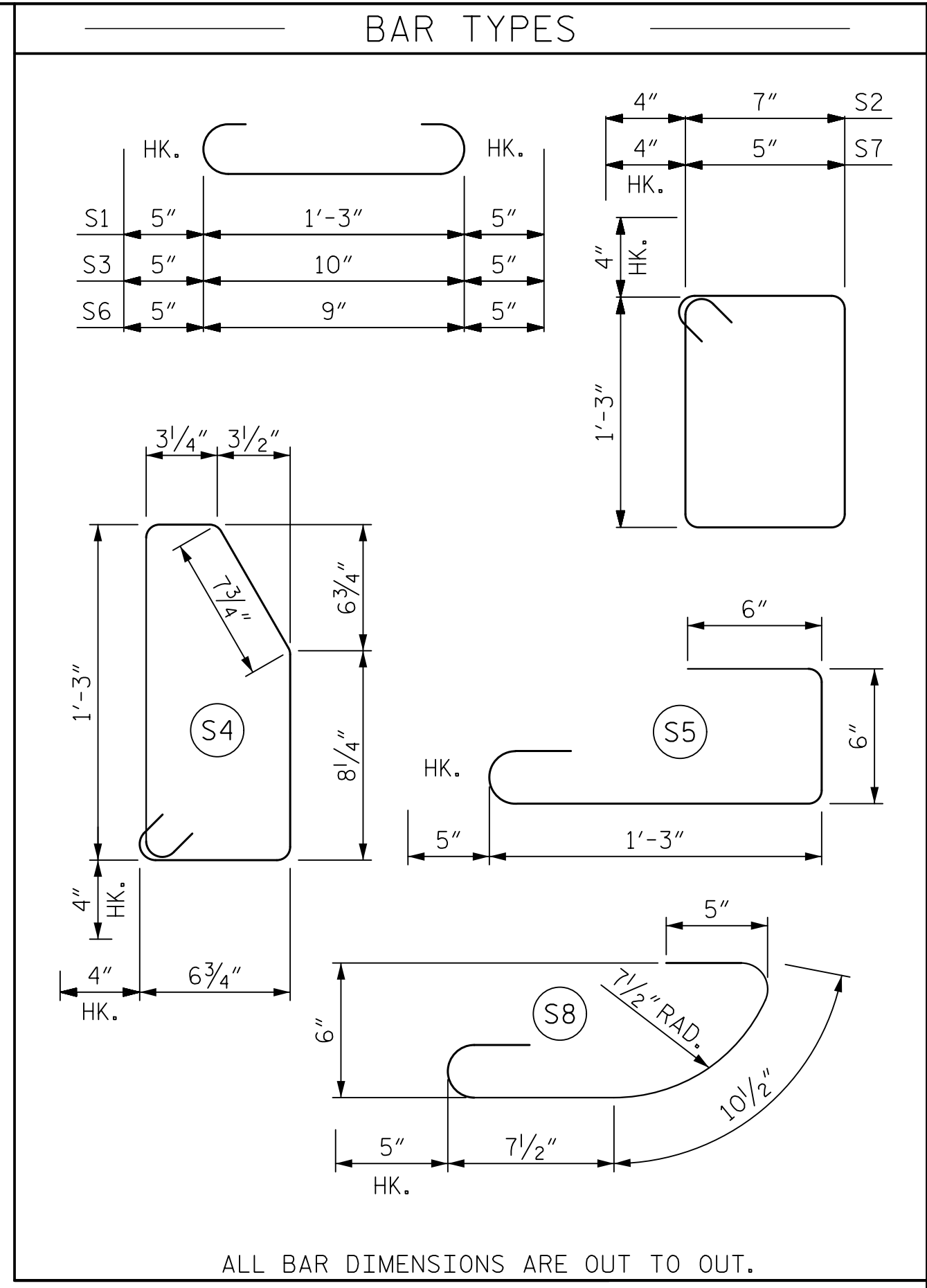
WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

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

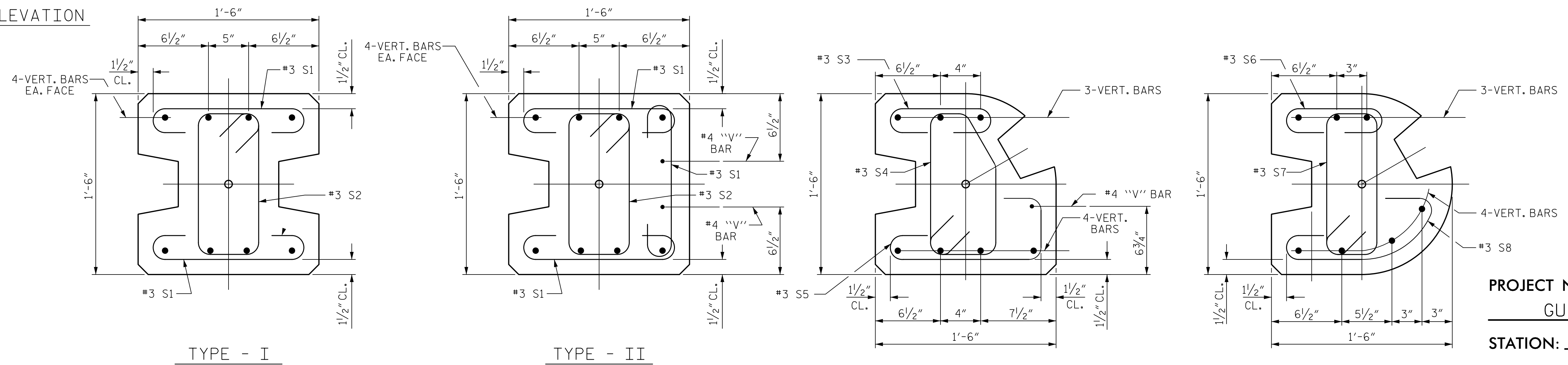
ALL CORNERS TO BE CHAMFERED 1".

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"



ELEVATION



PILE DETAIL

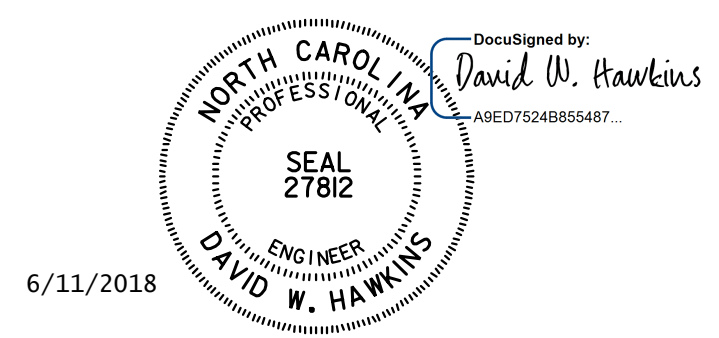
FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 3

PROJECT NO. U-5169
GUILFORD COUNTY
 STATION: VARIES

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 SOUND BARRIER WALL
 DETAILS



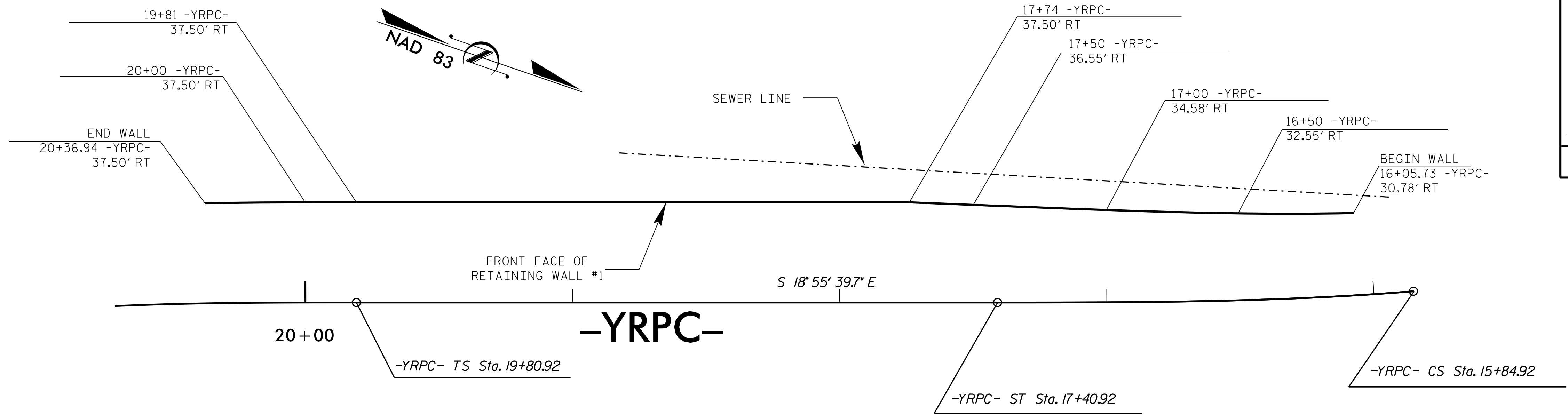
ASSEMBLED BY : M. WRIGHT	DATE : 6/18
CHECKED BY : D. HAWKINS	DATE : 6/18
DRAWN BY : MAA 6/11	REV. 1/15/14 RWW/TMG
CHECKED BY : GM 6/11	REV. 12/17 MAA/THC

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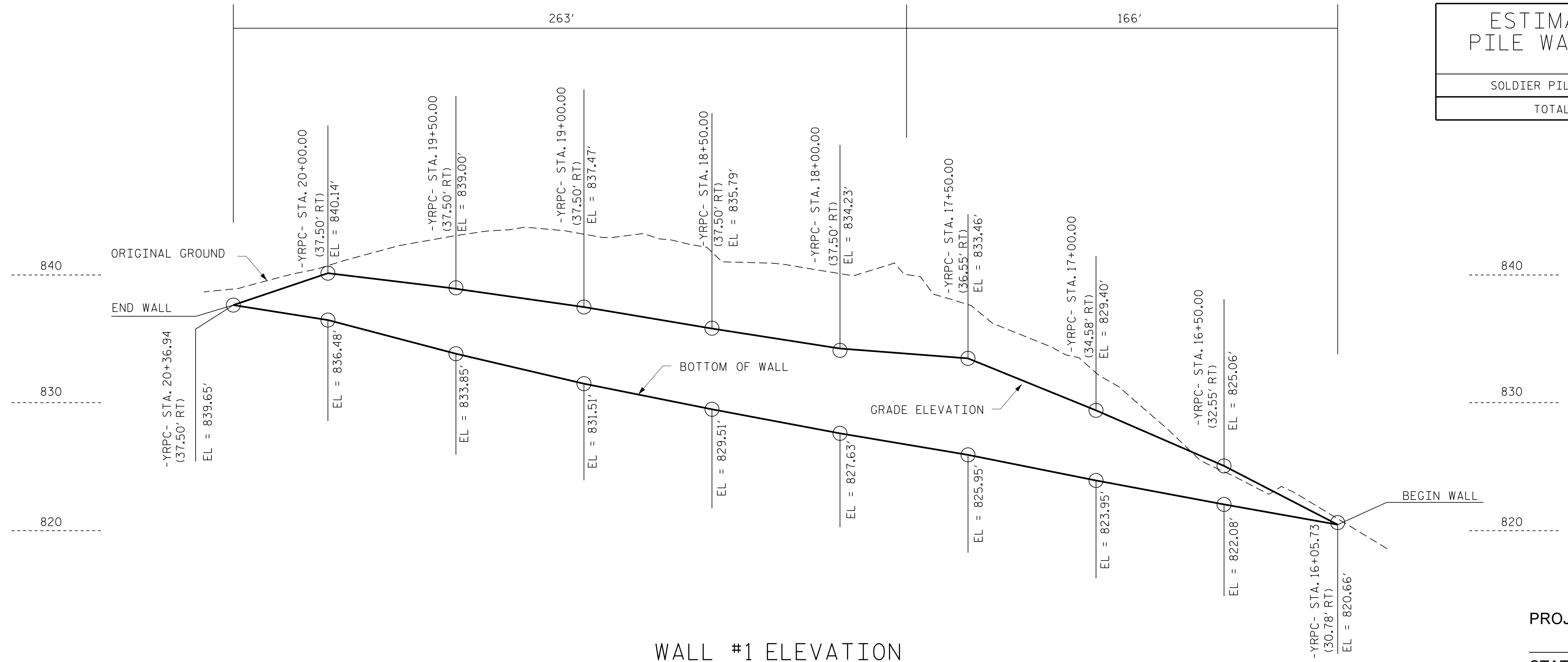
DRAWN BY: M. WRIGHT DATE: 6/18
 CHECKED BY: D. HAWKINS DATE: 6/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 6/18

DWG. NO. 6

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



WALL #1 PLAN



WALL #1 ELEVATION

(LOOKING AT EXPOSED FRONT FACE OF SOLDIER PILE WALL)

ESTIMATED SOLDIER PILE WALL QUANTITIES (SQUARE FEET)	
SOLDIER PILE WALL	2200
TOTAL	2200

16+05.73

GEOTECHNICAL ENGINEER

ENGINEER

SEAL 028669

SCOTT WEBB

4/6/2018

DATE

SIGNATURE

DATE

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PROJECT NO.: U-5169

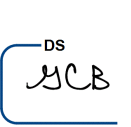
GUILFORD COUNTY

STATION: 16+05.73 YRPC TO 20+36.94 YRPC

SHEET 1 OF 2

PREPARED BY: R. WEBB DATE: 4-18

REVIEWED BY: G. BODENHEIMER DATE: 4-18



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

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

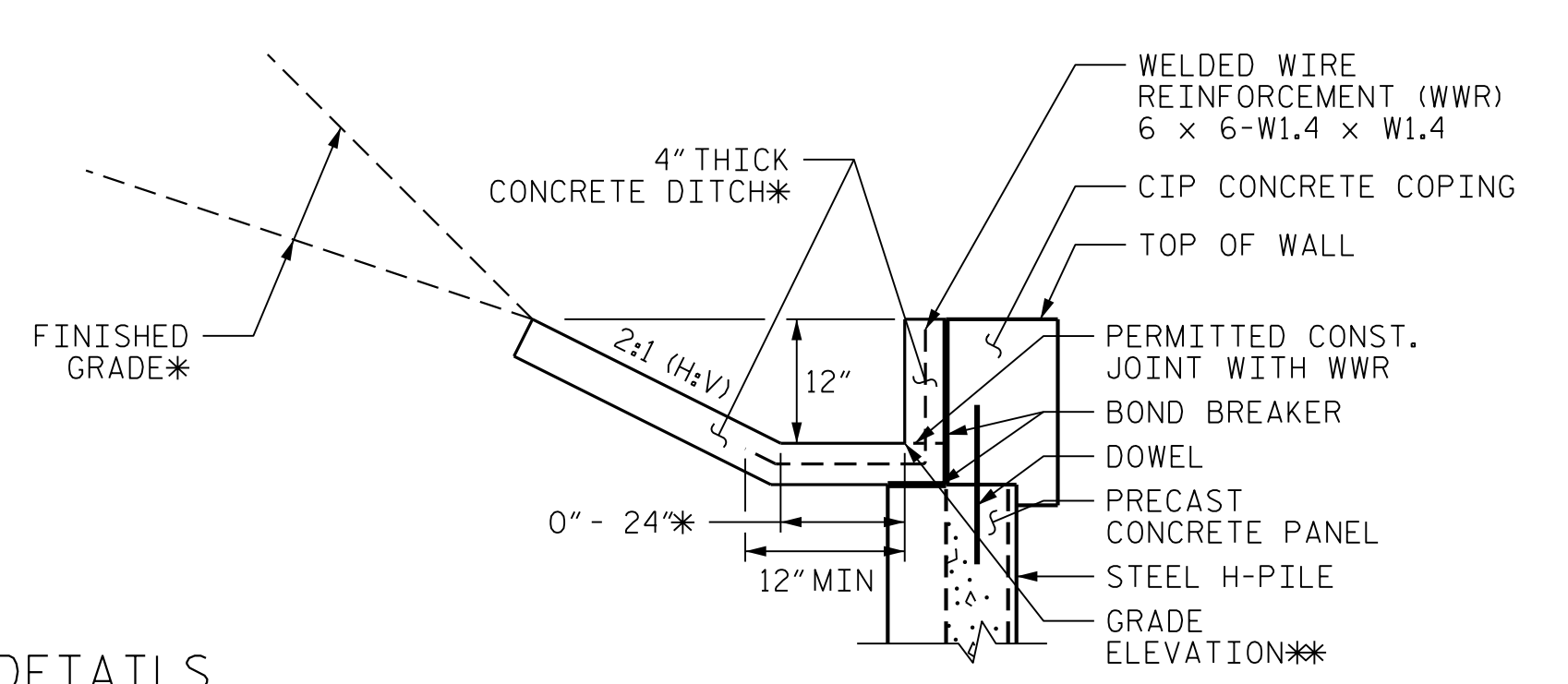
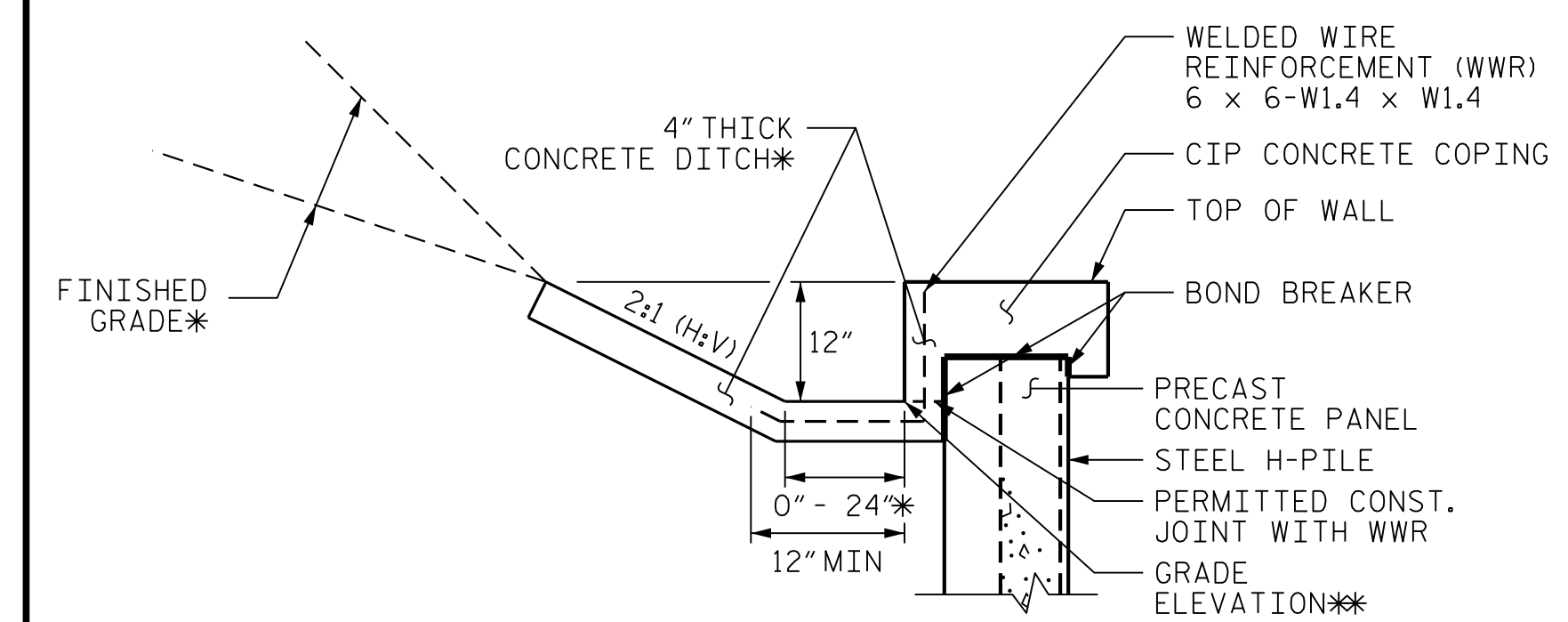
GEOTECHNICAL ENGINEER

ENGINEER

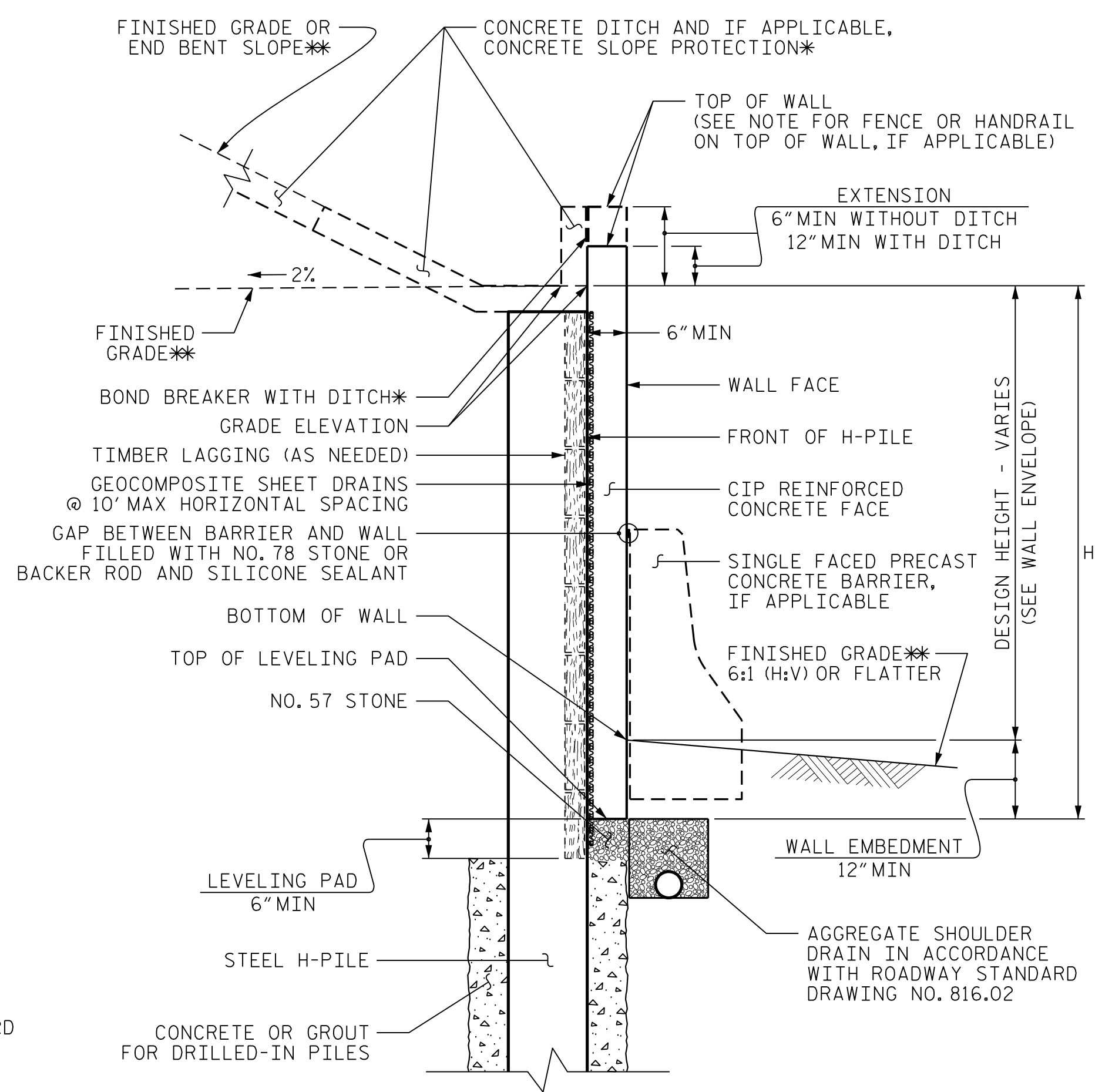
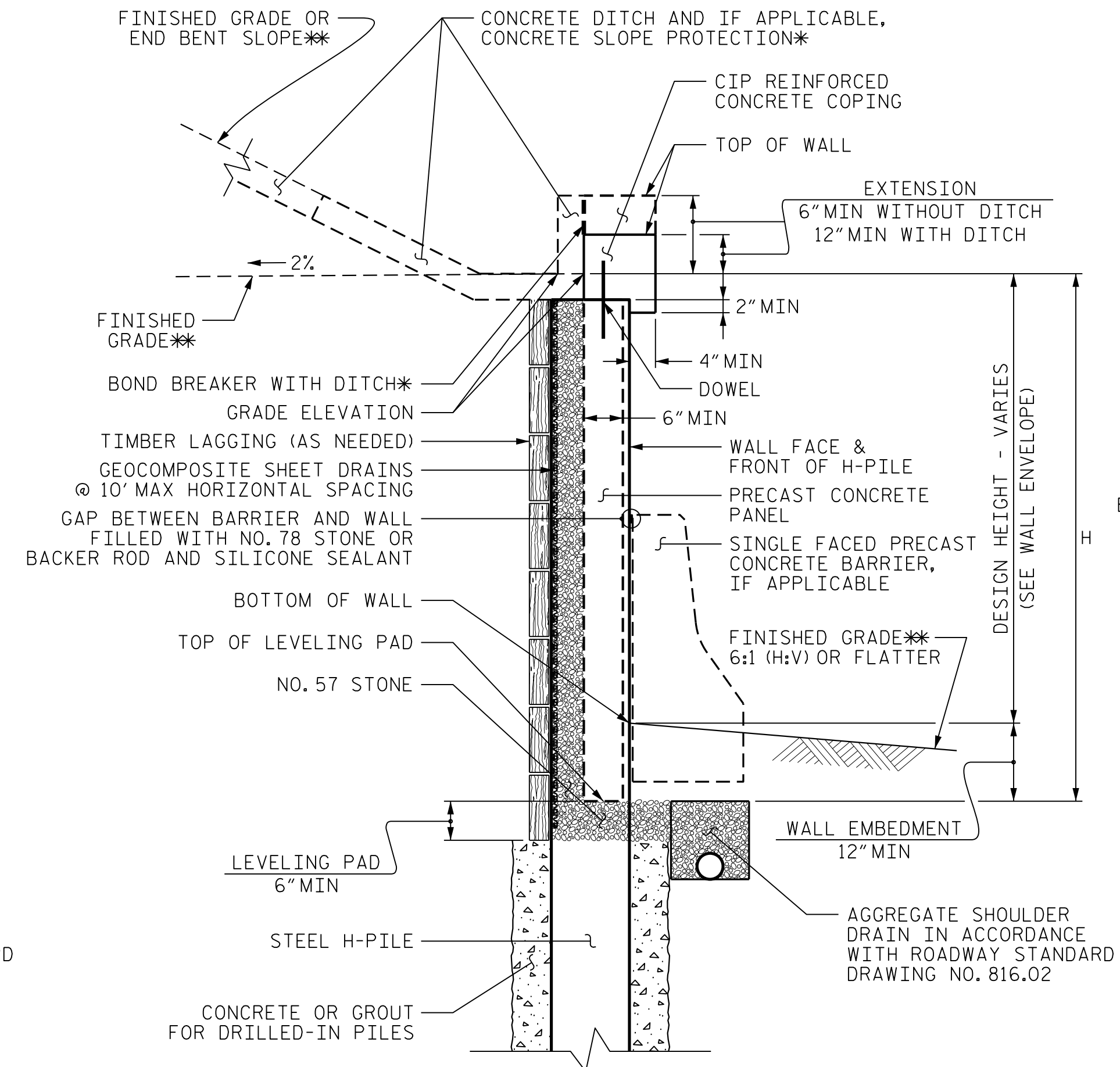
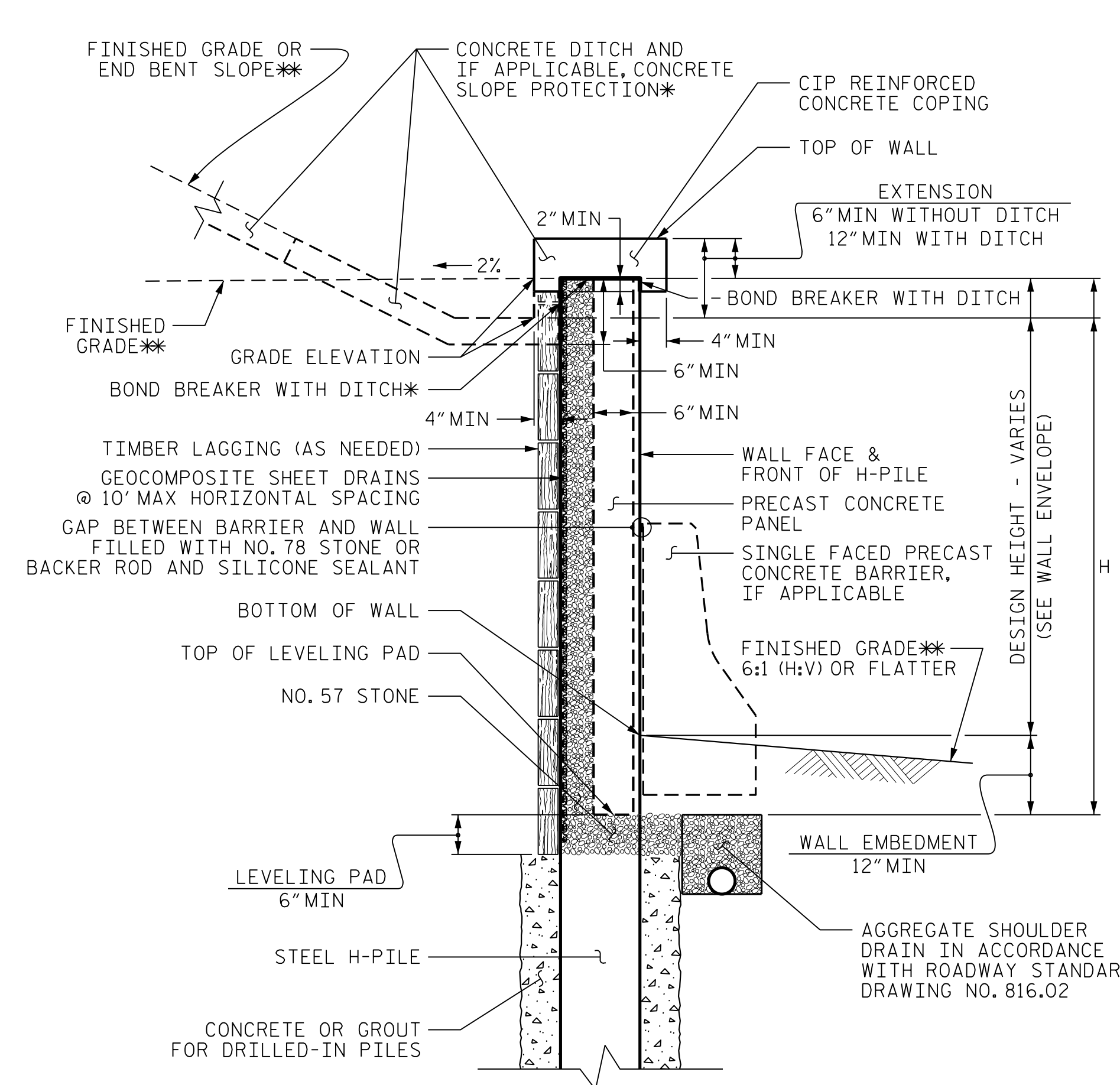
DocuSigned by:
Scott Webb 4/6/2018

DATE SIGNATURE DATE

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DITCH DETAILS



**SOLDIER PILE WALL WITH
PRECAST PANEL - TYPICAL SECTIONS**

**SOLDIER PILE WALL WITH
CIP FACE - TYPICAL SECTION**

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS AND PILES.
*SEE CONCRETE DITCH BEHIND WALL DETAILS.
*SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.

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

NOTES:

- FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.
- BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL NO. 1, 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.
- FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.
- PRECAST CONCRETE PANELS MUST MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 1.
- DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALL NO. 1.

DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 75 YEARS
3) IN-SITU ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF

MAINTAIN AT LEAST TWO FEET OF CLEARANCE WITH THE PROPOSED SEWER LINE BEHIND THE WALL. SEE UTILITIES PLAN FOR SEWER LOCATION. VERIFY LOCATION OF SEWER WITH THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, STANDARD CAST-IN-PLACE GRAVITY RETAINING WALL (STD 453-01) MAY BE USED INSTEAD OF SOLDIER PILE WALL.

AT THE CONTRACTOR'S OPTION, USE A TEMPORARY SLOPE INSTEAD OF TEMPORARY SUPPORT OF EXCAVATIONS FOR RETAINING WALL NO. 1.

PROJECT NO.: U-5169

GUILFORD COUNTY

STATION: 16+05.73 YRPC TO 20+36.94 YRPC

SHEET 2 OF 2

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

**GEOTECHNICAL
ENGINEERING UNIT**

**SOLDIER PILE WALL
TYPICAL SECTION
AND DETAILS**

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

PREPARED BY: R. WEBB	DATE: 4-18
REVIEWED BY: G. BODENHEIMER	DATE: 4-18

DS
UCB

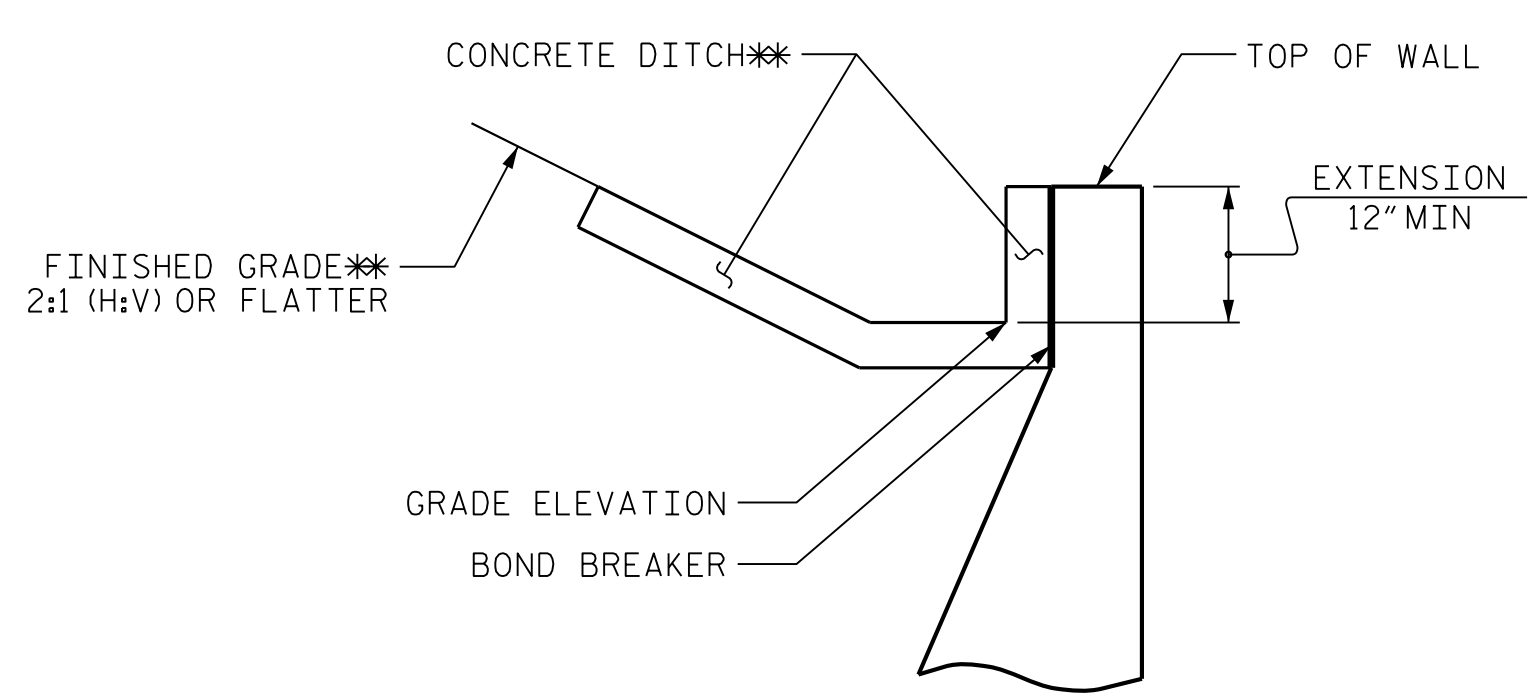
GEOTECHNICAL ENGINEER

ENGINEER

DocuSigned by:
Scott A. Hidden 4/10/2018

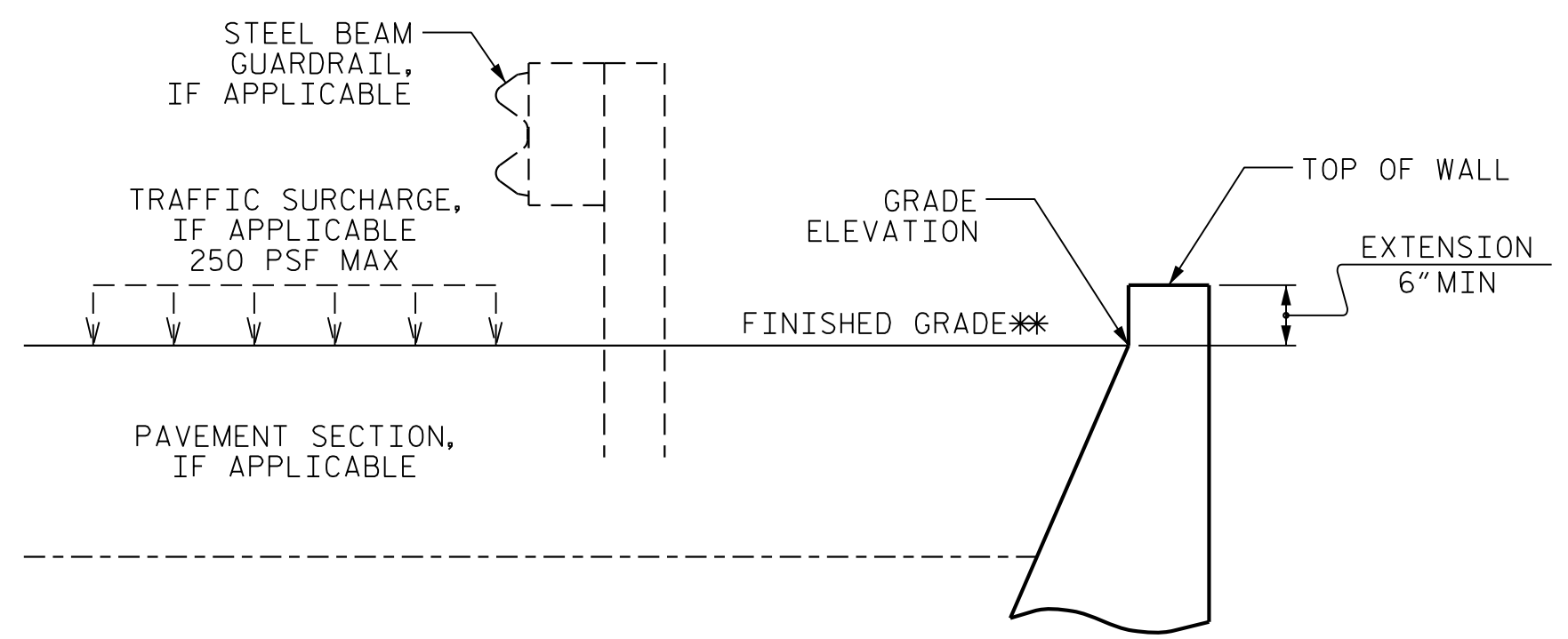
DATE SIGNATURE DATE

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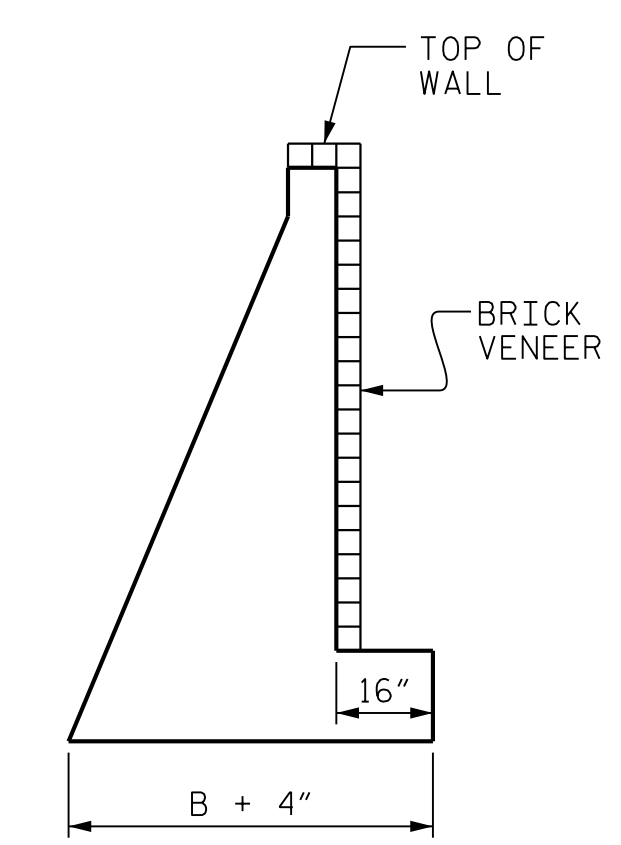
SLOPE CASE

**SEE ROADWAY PLANS FOR CONCRETE DITCH AND FINISHED GRADE DETAILS.



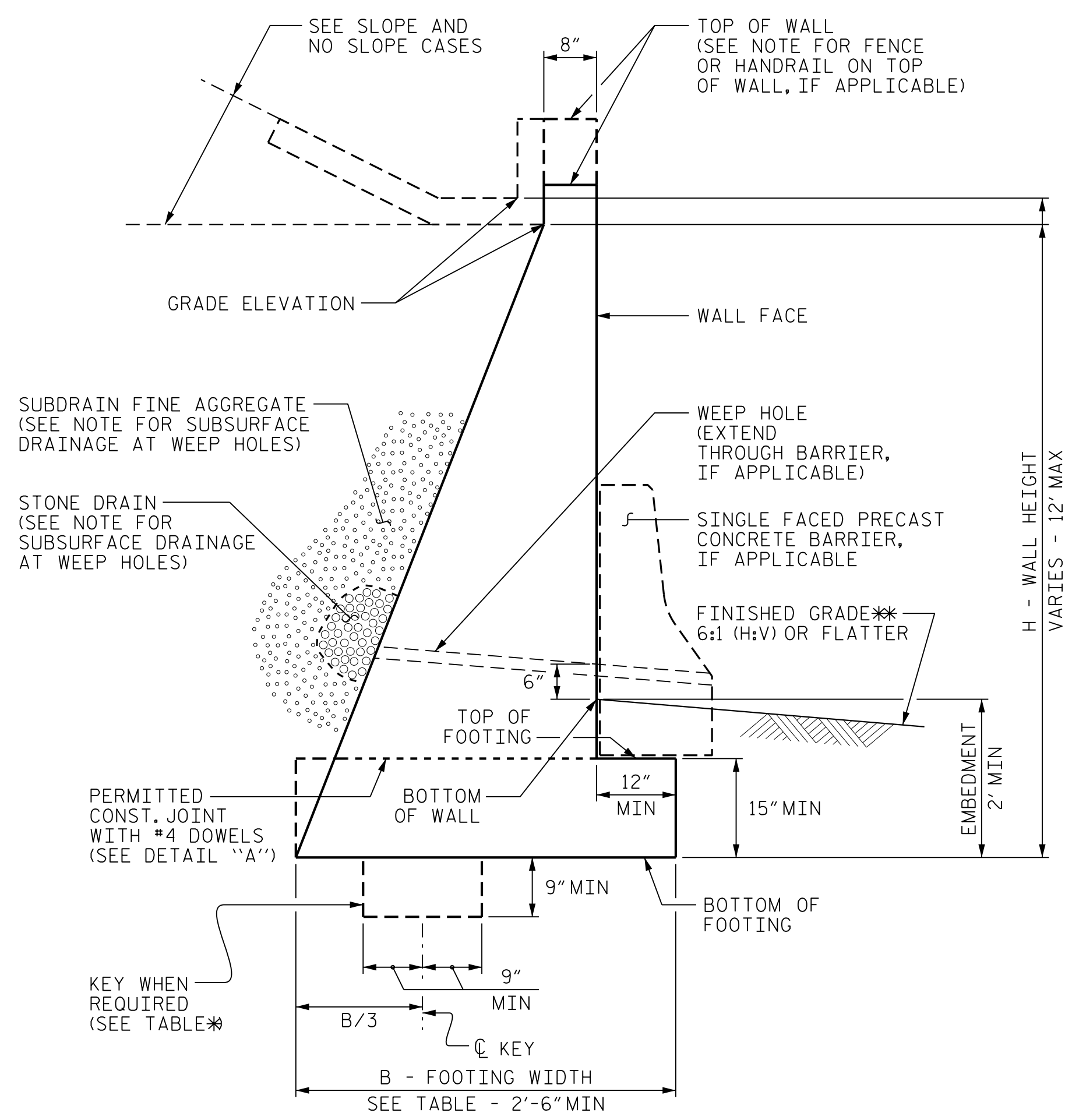
NO SLOPE CASE

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



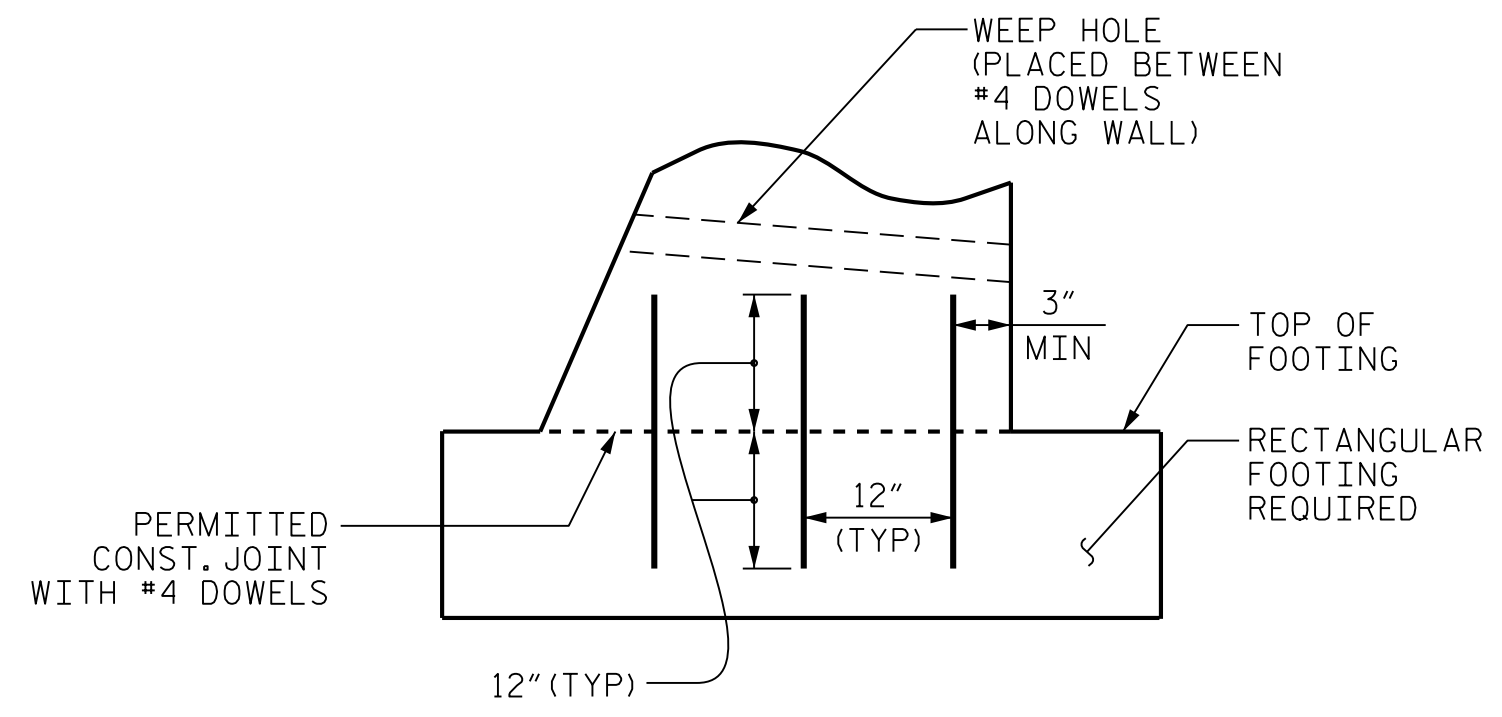
BRICK VENEER DETAIL

(WHEN APPLICABLE)



STANDARD CIP GRAVITY WALL

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



DETAIL "A"

H (FT)	3 - < 6	6 - 9	> 9 - 12
SLOPE CASE	.66	.70*	.75*
NO SLOPE CASE WITH TRAFFIC SURCHARGE	.80	.75*	.70*
NO SLOPE CASE WITHOUT TRAFFIC SURCHARGE	.60	.60	.60

B/H RATIO (B = 2'-6" MIN)

*KEY IS REQUIRED FOR "SLOPE CASE" OR "NO SLOPE CASE WITH TRAFFIC SURCHARGE" WHEN H IS 6' OR GREATER.

NOTES:

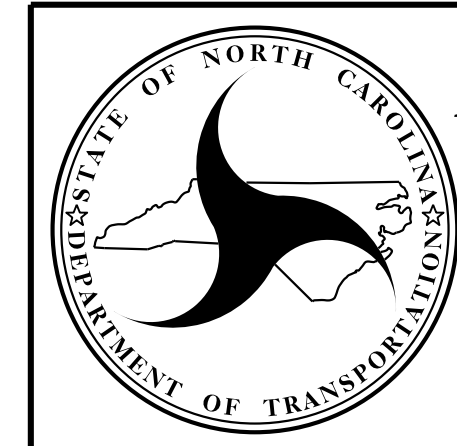
- FOR STANDARD CIP GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.
- FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.
- FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.
- FOR FENCES OR HANDRAILS ON TOP OF WALLS, SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
- FOR SUBSURFACE DRAINAGE AT WEEP HOLES, SEE ARTICLE 414-8 OF THE STANDARD SPECIFICATIONS.
- STANDARD CIP GRAVITY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
 UNIT WEIGHT, $\gamma = 120$ PCF
 FRICTION ANGLE, $\phi = 35$ DEGREES (GROUNDWATER WITHIN 7' OF BOTTOM OF FOOTING)
 FRICTION ANGLE, $\phi = 30$ DEGREES (GROUNDWATER MORE THAN 7' BELOW BOTTOM OF FOOTING)
 COHESION, $c = 0$ PSF
- DO NOT USE STANDARD CIP GRAVITY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE BOTTOM OF FOOTING.
- DO NOT USE STANDARD CIP GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW WALLS.
- BEFORE BEGINNING STANDARD CIP 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.
- FOR BRICK VENEERS, SUBMIT BRICK SAMPLES FOR APPROVAL BEFORE BEGINNING STANDARD CIP GRAVITY WALL CONSTRUCTION.
- DO NOT PLACE CONCRETE FOR FOOTINGS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- WHEN CONSTRUCTING STANDARD CIP GRAVITY WALLS WITH A CONSTRUCTION JOINT AS SHOWN IN DETAIL "A", PROVIDE A MINIMUM OF 3 EQUALLY SPACED #4 DOWELS AT INTERVALS OF 1'-6" ALONG WALLS.

PROJECT NO.: U-5169

GUILFORD COUNTY

STATION: 16+05.73 YRPC to 20+36.94 YRPC

SHEET 1 OF 1



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

**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 453.01

**STANDARD
CAST-IN-PLACE (CIP)
GRAVITY RETAINING WALL**

SHEET NO. W-4

DATE: 1-16-18