

**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

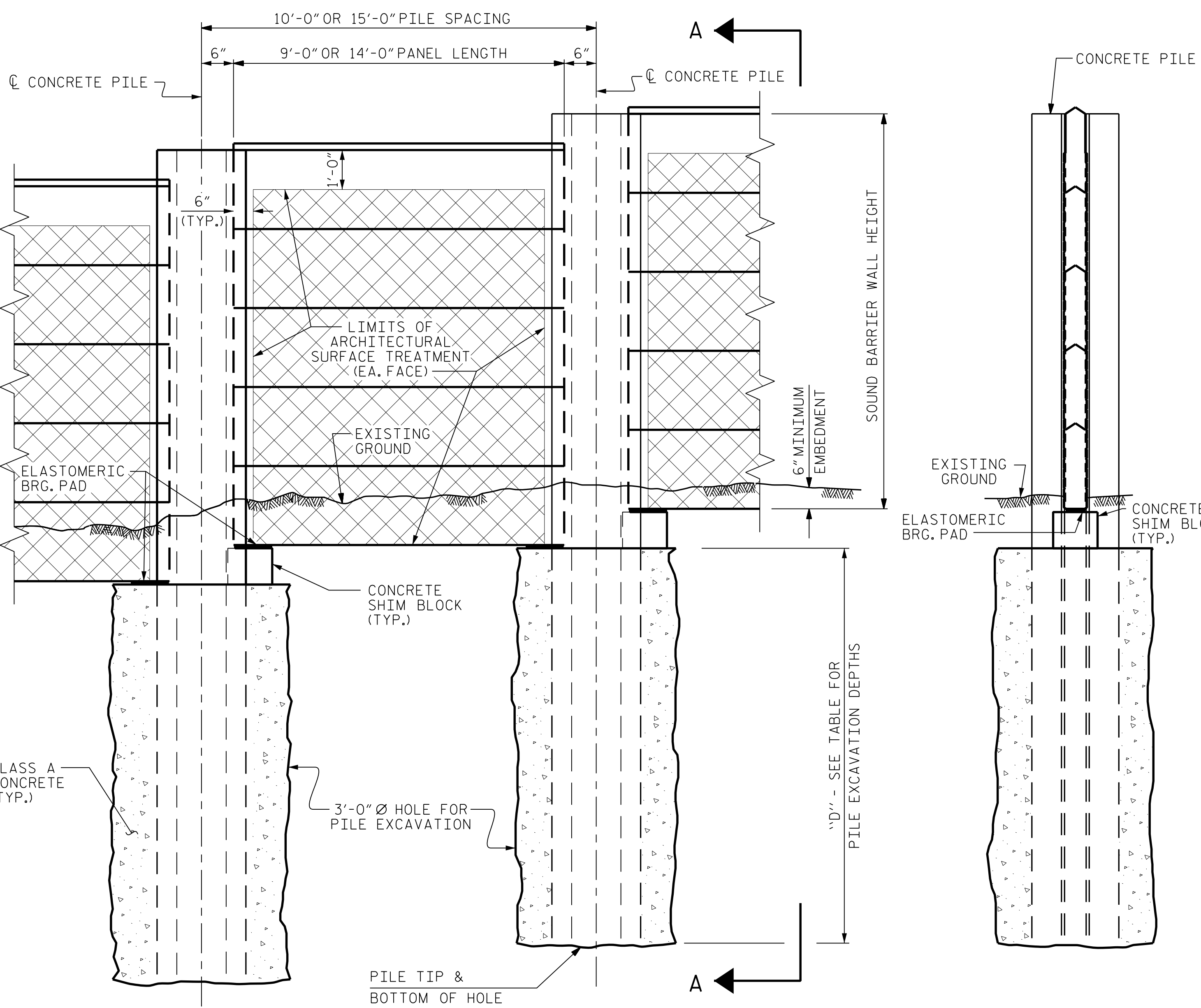
**The documents contained herein were originally issued  
and sealed by the individuals whose names and license  
numbers appear on each page, on the dates appearing  
with their signature on that page.**

**This file or an individual page  
shall not be considered a certified document.**

**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

**The documents contained herein were originally issued  
and sealed by the individuals whose names and license  
numbers appear on each page, on the dates appearing  
with their signature on that page.**

**This file or an individual page  
shall not be considered a certified document.**



ELEVATION

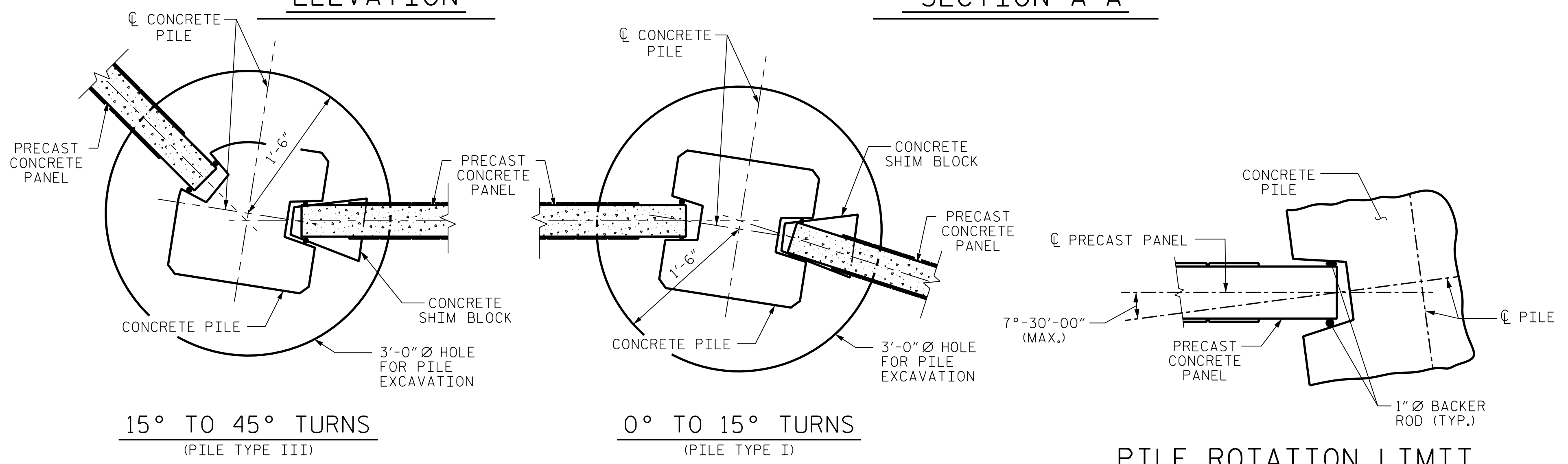
SECTION A-A

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.
- FOR BILL OF MATERIAL TABLES, SEE SHEET 2 OF 4.
- FOR PILE EXCAVATION DEPTHS "D", SEE TABLE ON SHEET 2 OF 4.

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'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
	20' < H ≤ 25'	4 - #10 EA. FACE	#3 @ 1'-4" CTS.		20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG 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'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
	20' < H ≤ 25'	4 - #7 EA. FACE	#3 @ 1'-4" CTS.		20' < H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE	#3 @ 1'-4" CTS.
PILE TYPE IV							
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES				
10'-0"	25' < H ≤ 30'	6 - #11 EA. FACE *	#3 @ 8" CTS.				
15'-0"	25' < H ≤ 30'	6 - #11 EA. FACE *	#3 @ 8" CTS.				

\* PROVIDE BUNDLED BARS, AS SHOWN ON SHEET 4 OF 4



TYPICAL WALL TURN DETAILS

PILE ROTATION LIMIT FOR WALL TURN

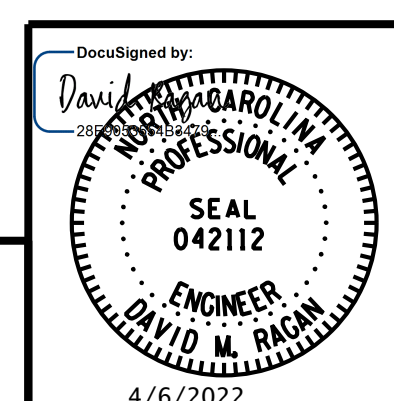
(ROTATE THE CONCRETE PILE ±7°-30'-00" TO ACCOMMODATE WALL TURN.)

PROJECT NO. U-2519BA  
CUMBERLAND COUNTY

STATION: \_\_\_\_\_

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD**  
 SOUND BARRIER WALLS  
 4B AND 5



**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 8601 SIX FORKS RD., FORUM 1 | SUITE 700  
 RALEIGH, NC 27615 (919) 878-9560  
 NC LICENSE NUMBER: F-0112

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

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

R:\Bridges\_Design\U-2519BA\Structures\DCN\NoiseWalls\U2519BA\_SBW\_01.dgn

4/6/2022  
 DRAWN BY : B. A. HAAG DATE : MAR 2022  
 CHECKED BY : D. M. RAGAN DATE : MAR 2022  
 DESIGN ENGINEER OF RECORD : D. M. RAGAN DATE : MAR 2022



R:\Bridges\_Design\U-2519BA\Structures\DCN\Noisewalls\U2519BA\_SBW\_02.dgn

### PILE EXCAVATION DEPTHS "D"

WALL 4B FROM : STA. 10+00.00 -NW4B- TO : STA. 13+90.00 -NW4B-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	25' < H ≤ 30'
		10'-0"	8' - 0"	10' - 0"	-
		15'-0"	8' - 0"	11' - 0"	-
		20'-0"	-	-	-
WALL 4B FROM : STA. 13+90.00 -NW4B- TO : STA. 18+40.00 -NW4B-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	25' < H ≤ 30'
		10'-0"	8' - 0"	9' - 0"	-
		15'-0"	8' - 0"	10' - 0"	-
		20'-0"	-	-	-
WALL 4B FROM : STA. 18+40.00 -NW4B- TO : STA. 18+70.00 -NW4B-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	25' < H ≤ 30'
		10'-0"	8' - 0"	-	-
		15'-0"	9' - 0"	-	-
		20'-0"	-	-	-
WALL 4B FROM : STA. 18+70.00 -NW4B- TO : STA. 25+30.00 -NW4B-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	25' < H ≤ 30'
		10'-0"	10' - 0"	10' - 0"	-
		15'-0"	11' - 0"	11' - 0"	-
		20'-0"	-	-	-
WALL 4B FROM : STA. 25+30.00 -NW4B- TO : STA. 31+60.00 -NW4B-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	25' < H ≤ 30'
		10'-0"	8' - 0"	10' - 0"	-
		15'-0"	9' - 0"	11' - 0"	-
		20'-0"	-	-	-
WALL 5 FROM : STA. 10+00.00 -NW5- TO : STA. 14+65.00 -NW5-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	25' < H ≤ 30'
		10'-0"	8' - 0"	10' - 0"	11' - 0"
		15'-0"	10' - 0"	12' - 0"	13' - 0"
		20'-0"	-	-	-
WALL 5 FROM : STA. 14+65.00 -NW5- TO : STA. 28+00.29 -NW5-					
3'-0" Ø HOLE	PILE SPACING	WALL HEIGHT			
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'	25' < H ≤ 30'
		10'-0"	9' - 0"	10' - 0"	10' - 0"
		15'-0"	11' - 0"	11' - 0"	11' - 0"
		20'-0"	-	-	-

### BILL OF MATERIAL - WALL 4B

SOUND BARRIER WALL	33,765 S.F.
ARCHITECTURAL SURFACE TREATMENT	54,782 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	FS 36270

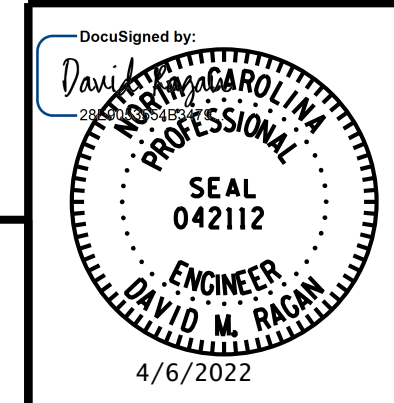
### BILL OF MATERIAL - WALL 5

SOUND BARRIER WALL	25,710 S.F.
ARCHITECTURAL SURFACE TREATMENT	41,444 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-2519BA  
CUMBERLAND COUNTY  
 STATION: \_\_\_\_\_

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD**  
 SOUND BARRIER WALLS  
 4B AND 5

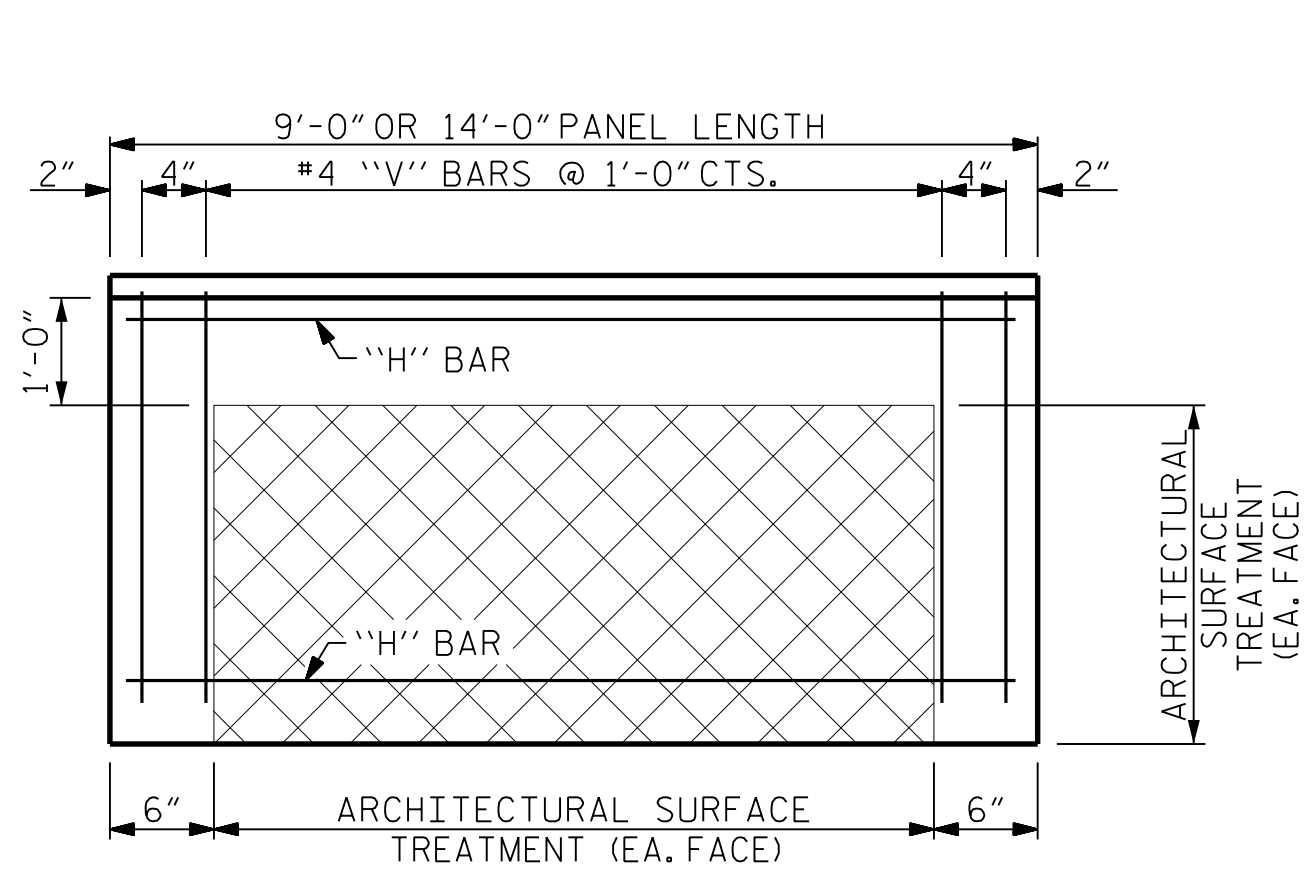


**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 8601 SIX FORKS RD., FORUM 1 | SUITE 700  
 RALEIGH, NC 27615 (919) 878-9560  
 NC LICENSE NUMBER: F-0112

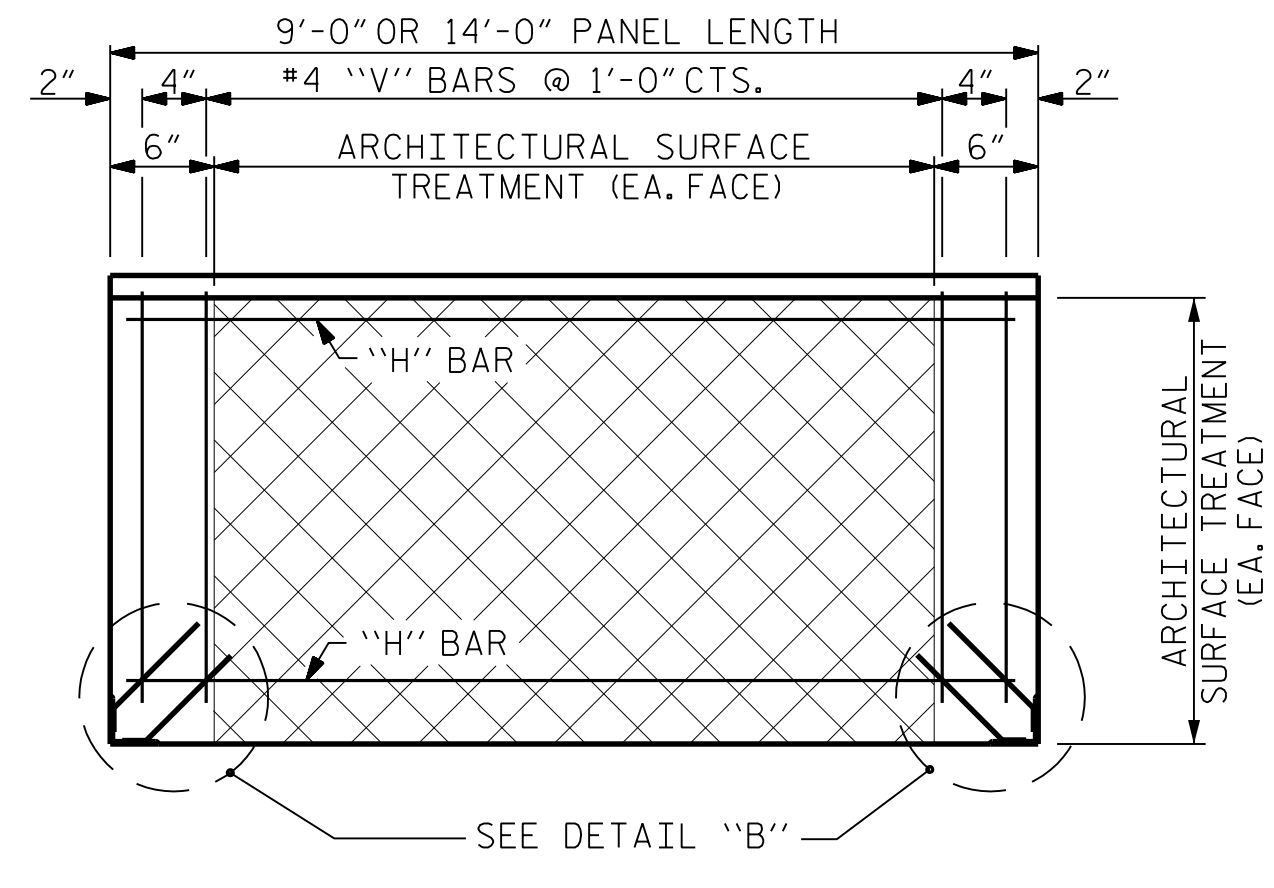
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SB-2
1			3			TOTAL SHEETS
2			4			4

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

DRAWN BY : B. A. HAAG DATE : MAR 2022  
 CHECKED BY : D. M. RAGAN DATE : MAR 2022  
 DESIGN ENGINEER OF RECORD : D. M. RAGAN DATE : MAR 2022



FRONT ELEVATION OF UPPER PRECAST PANEL



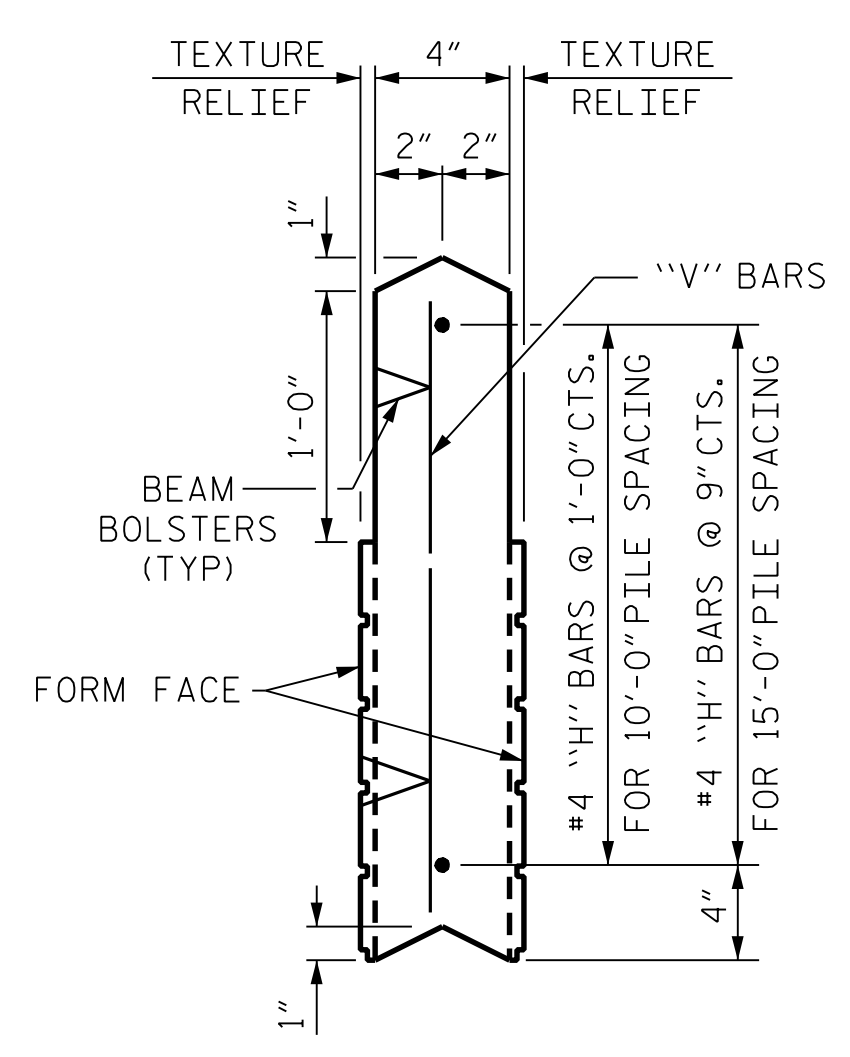
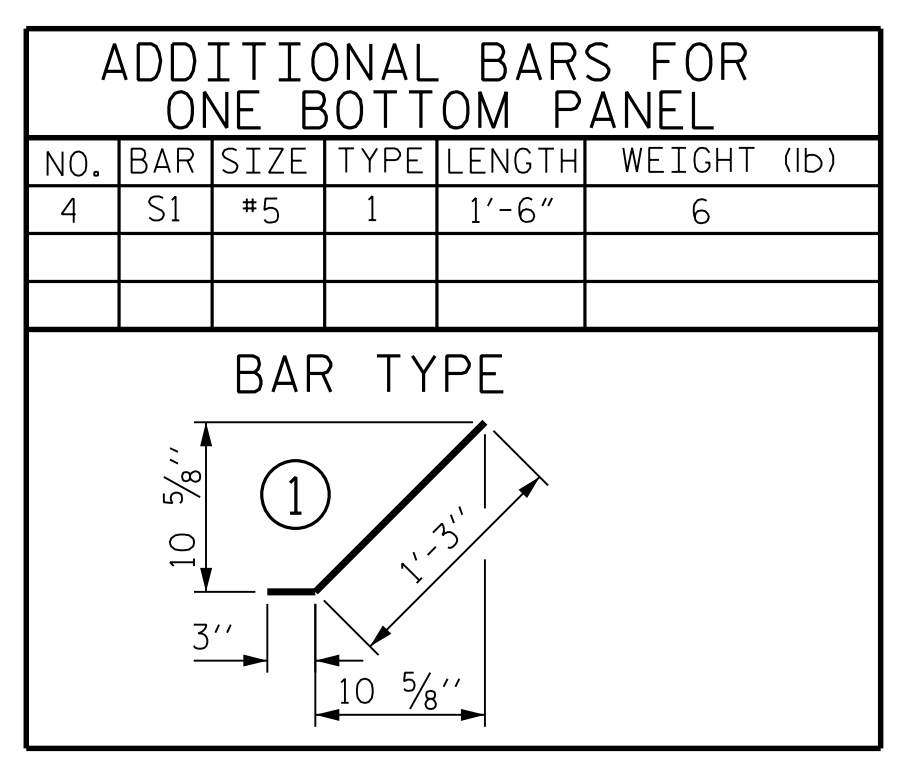
FRONT ELEVATION OF BOTTOM PRECAST PANEL

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

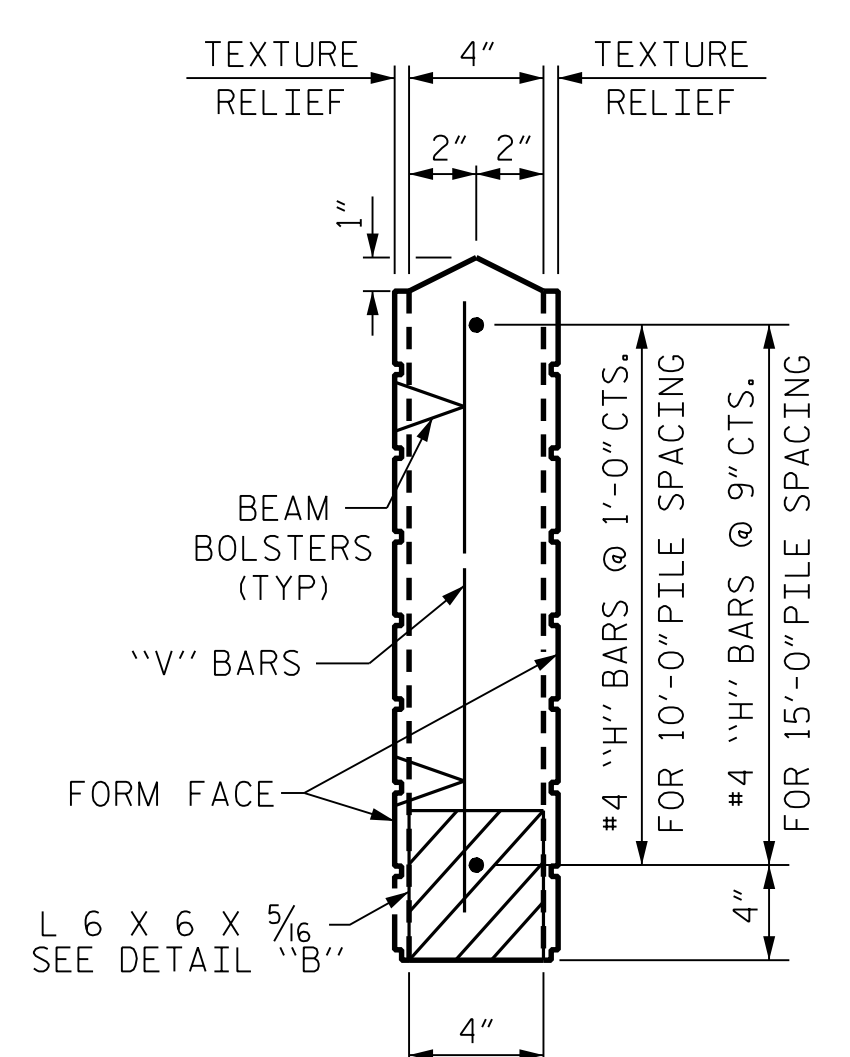
PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES											
		HORIZONTAL					VERTICAL						
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
2'-0"	0.22	3	H1	#4	STR	8'-8"	17	11	V1	#4	STR	1'-8"	12
3'-0"	0.33	4	H2	#4	STR	8'-8"	23	11	V2	#4	STR	2'-8"	20
4'-0"	0.44	5	H3	#4	STR	8'-8"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

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

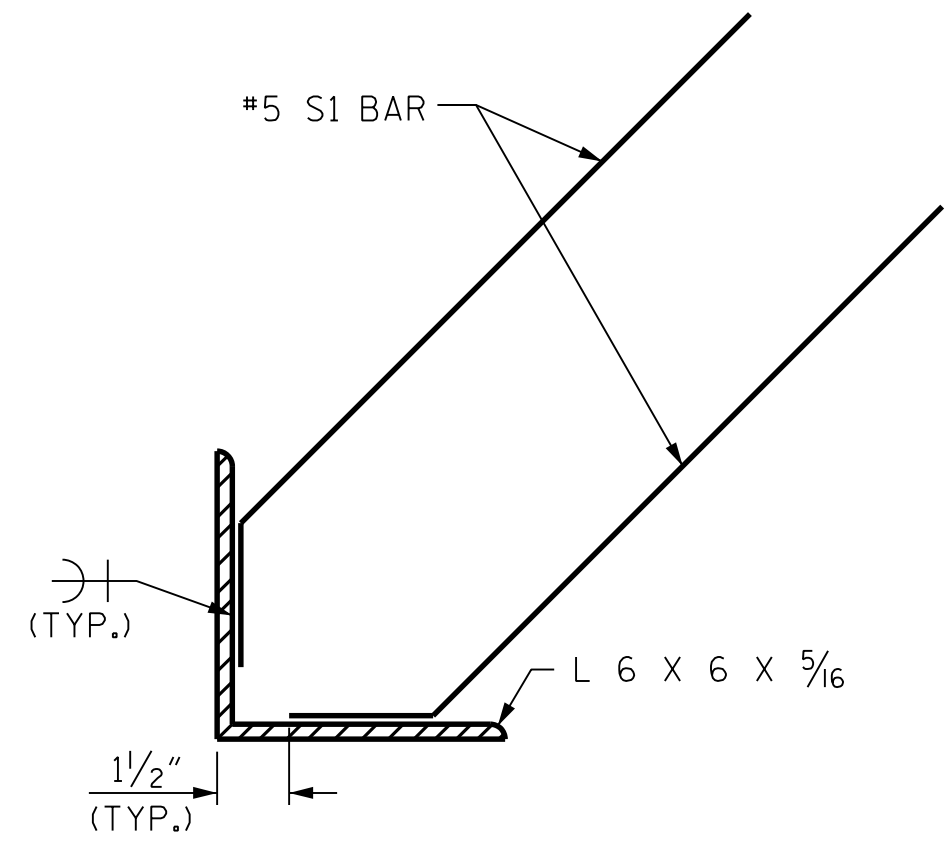
PANEL HEIGHT	CLASS AA CONCRETE C.Y.	BAR TYPES											
		HORIZONTAL					VERTICAL						
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
3'-0"	0.52	5	H1	#4	STR	13'-8"	46	16	V1	#4	STR	2'-8"	29
4'-0"	0.69	6	H2	#4	STR	13'-8"	55	16	V2	#4	STR	3'-8"	39
5'-0"	0.86	7	H3	#4	STR	13'-8"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



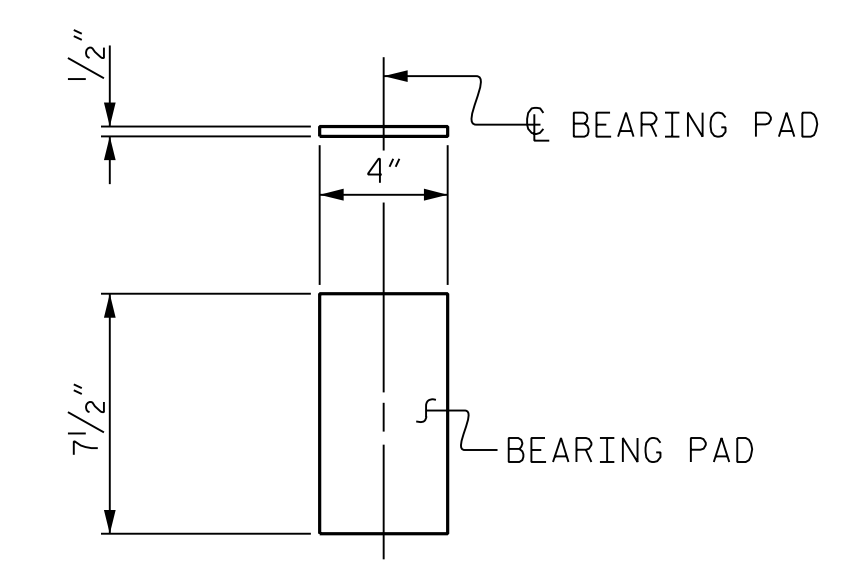
UPPER PANEL



BOTTOM PANEL

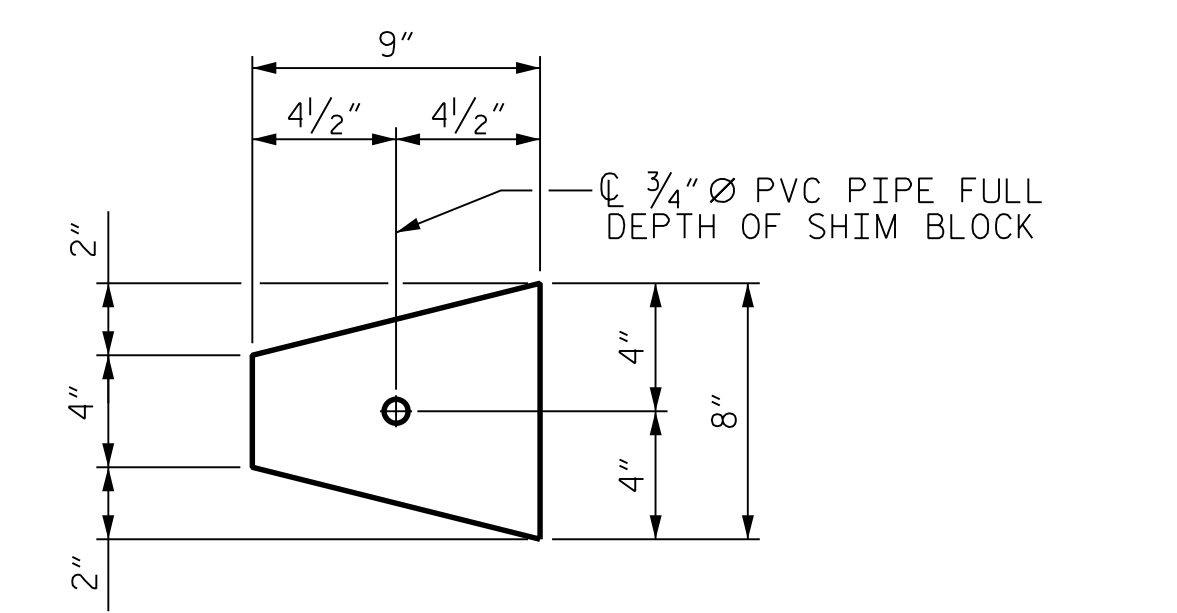


DETAIL "B"

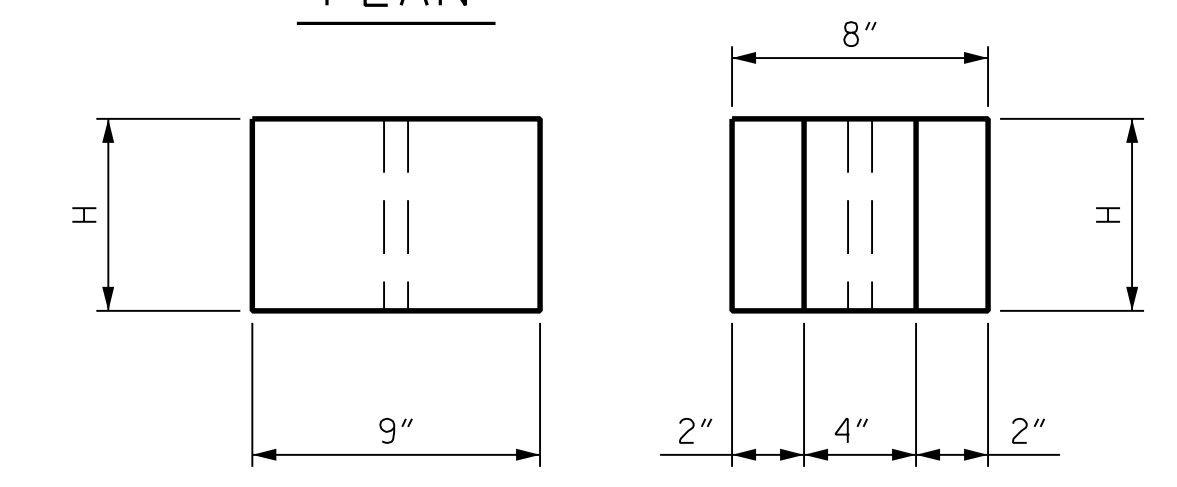


ELASTOMERIC BEARING DETAILS

ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.



PLAN



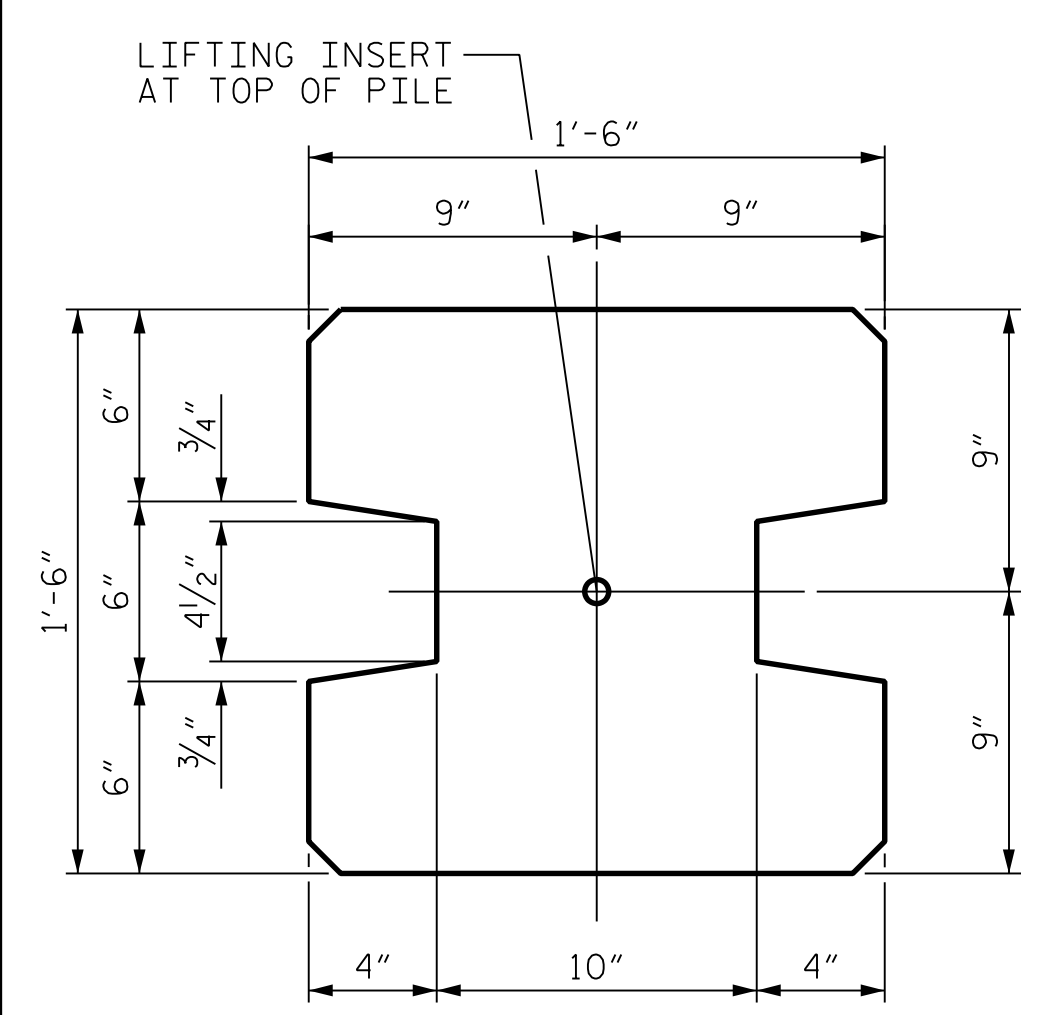
ELEVATION

END

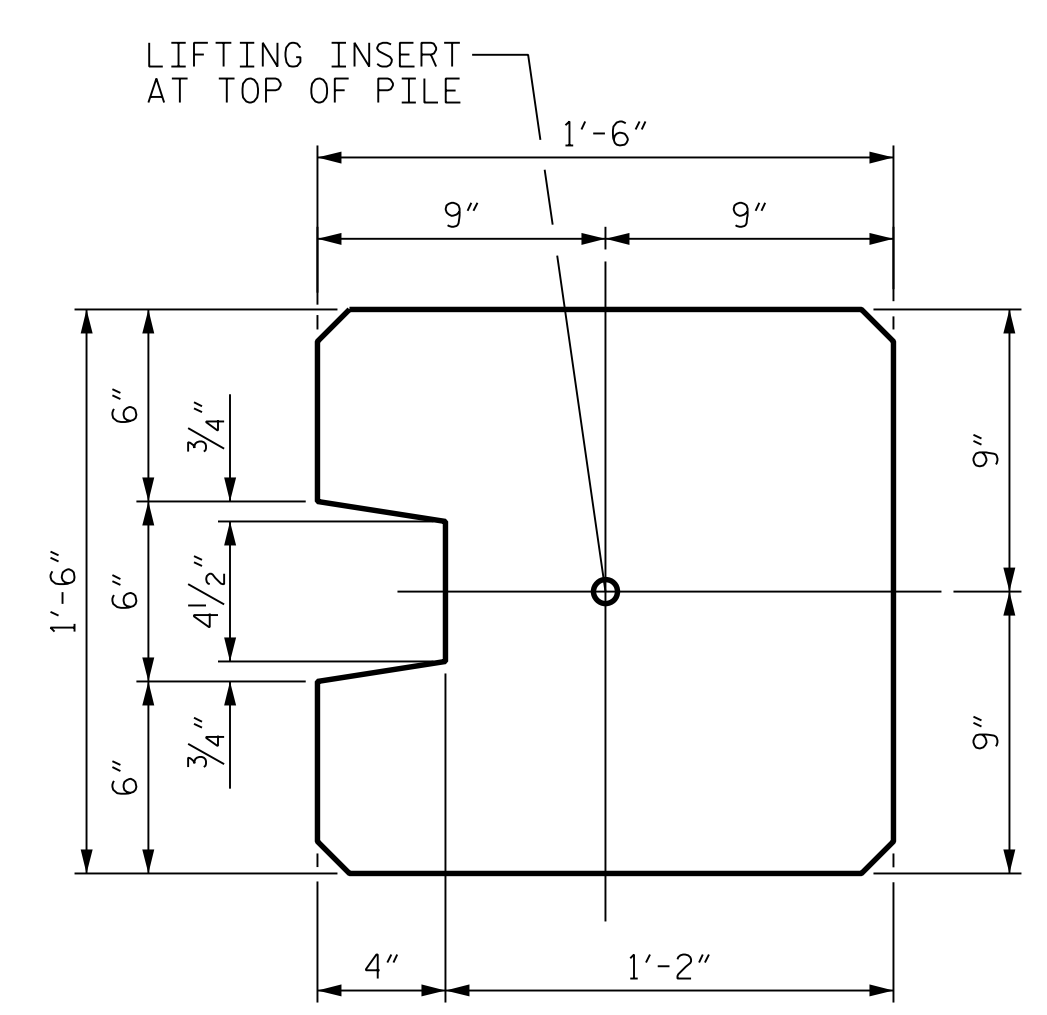
CONCRETE SHIM BLOCK

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

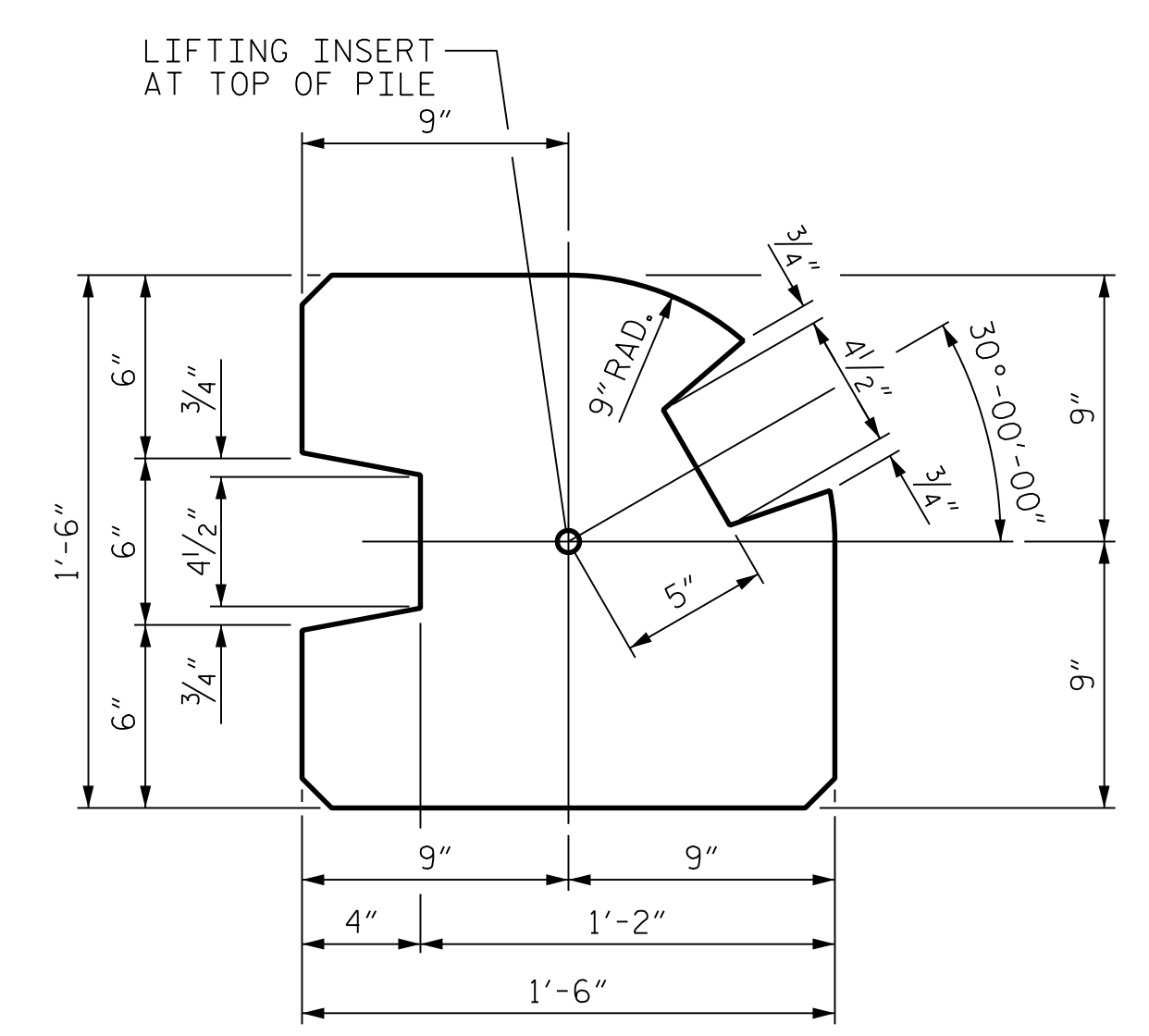
SECTION THROUGH PRECAST PANELS



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



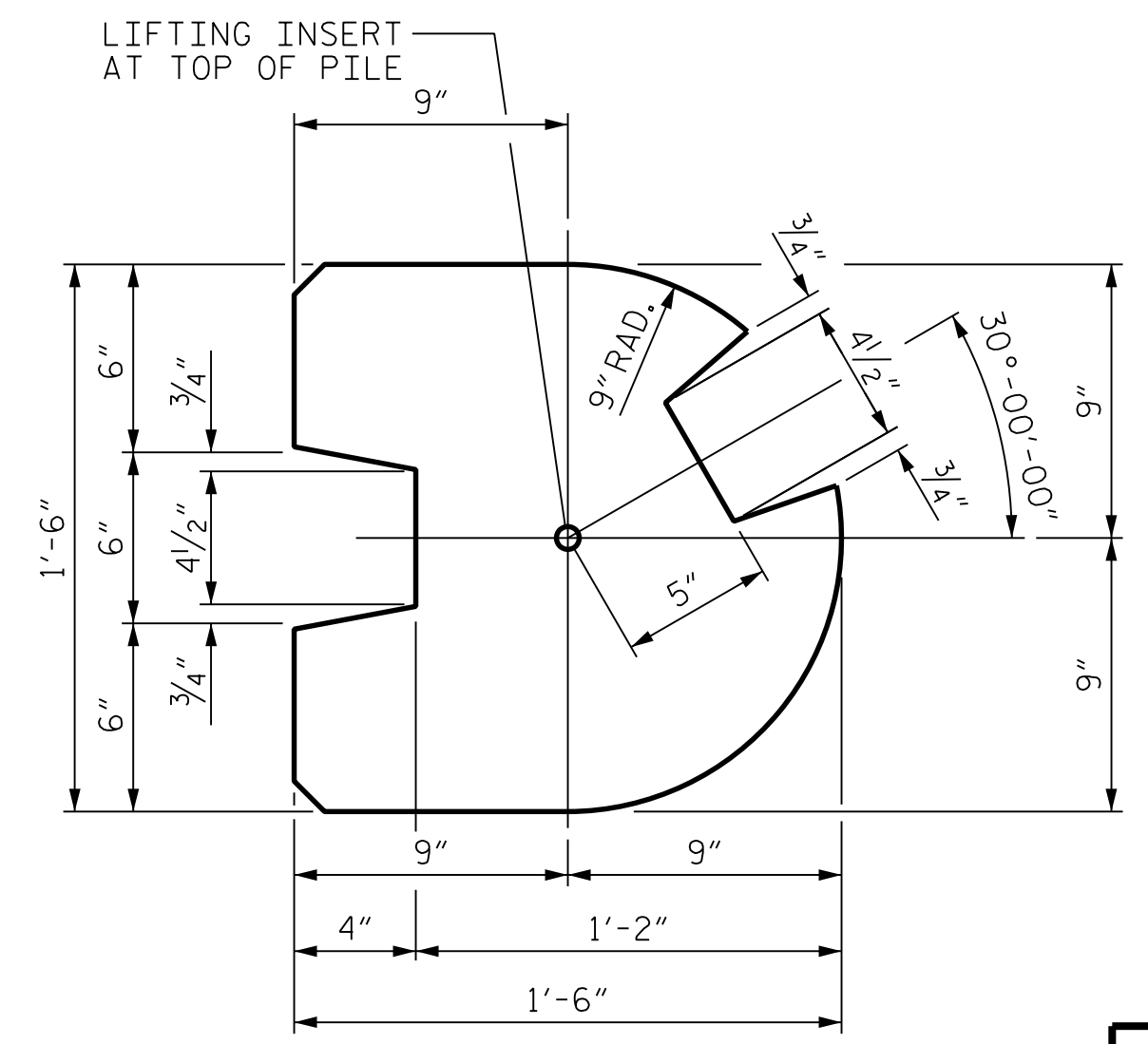
TYPE - II  
(AREA = 2.0903 SQ. FT.)



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

PILE DETAIL

(ALL CORNERS TO BE CHAMFERED 1")



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

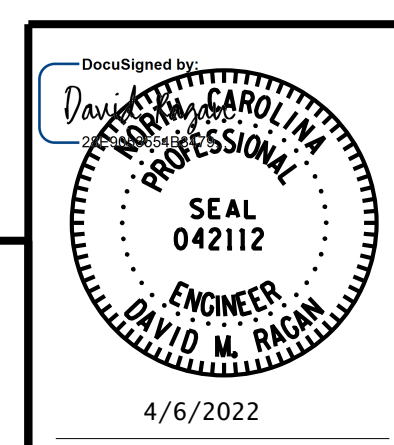
PROJECT NO. U-2519BA  
CUMBERLAND COUNTY

STATION: \_\_\_\_\_

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
SOUND BARRIER WALLS  
4B AND 5  
DETAILS



**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
8601 SIX FORKS RD., FORUM 1 | SUITE 700  
RALEIGH, NC 27615 (919) 878-9560  
NC LICENSE NUMBER: F-0112

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

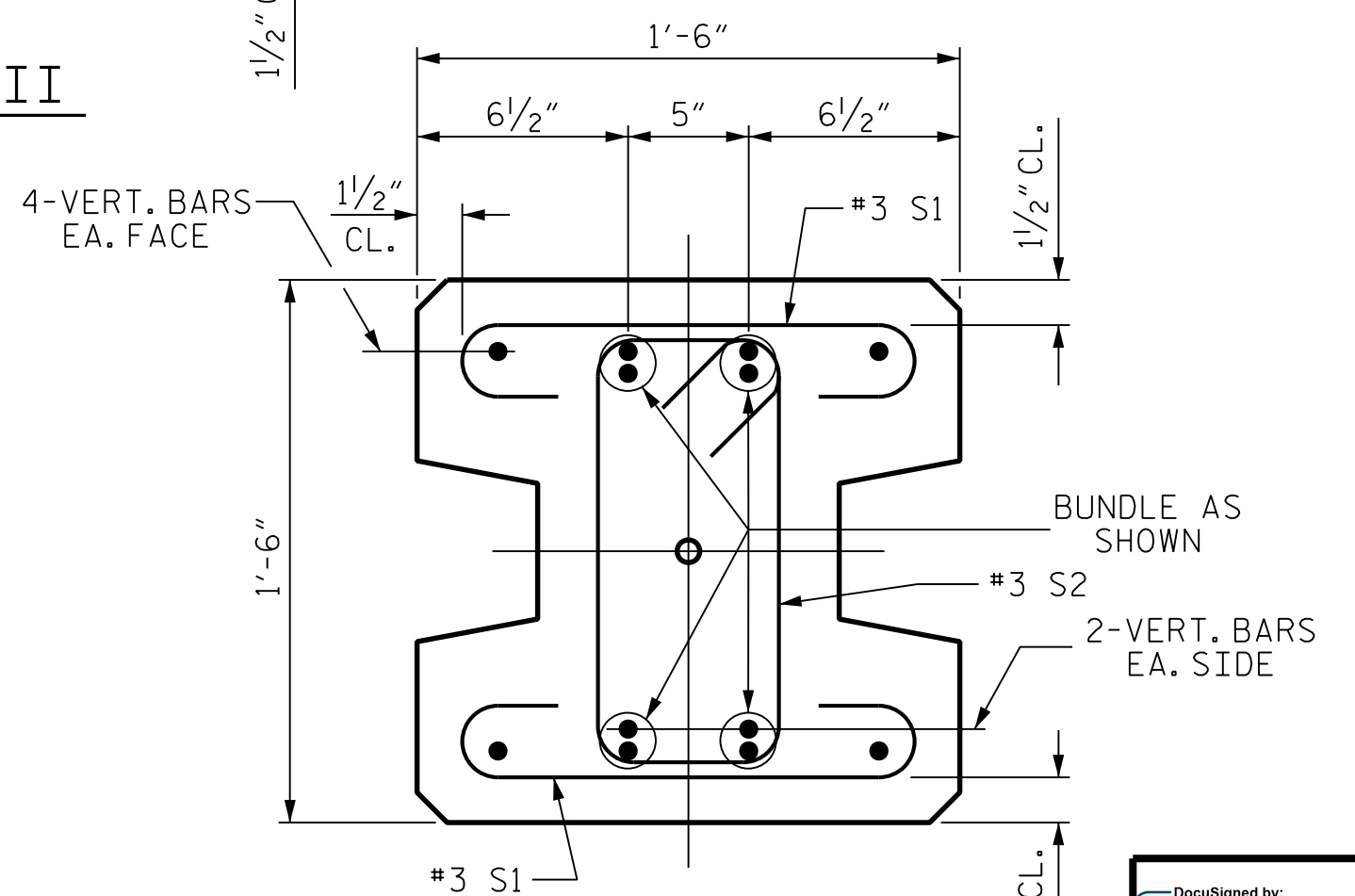
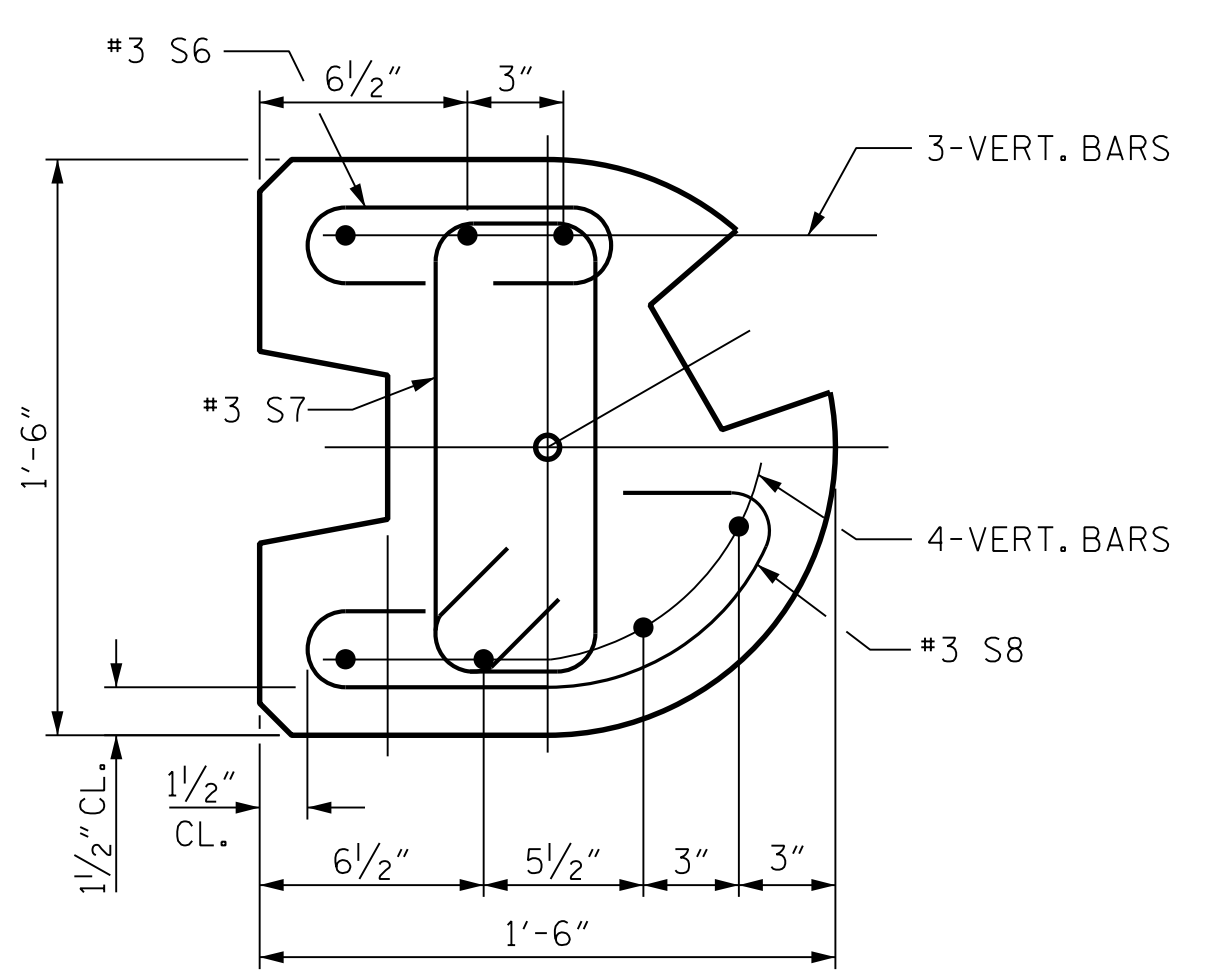
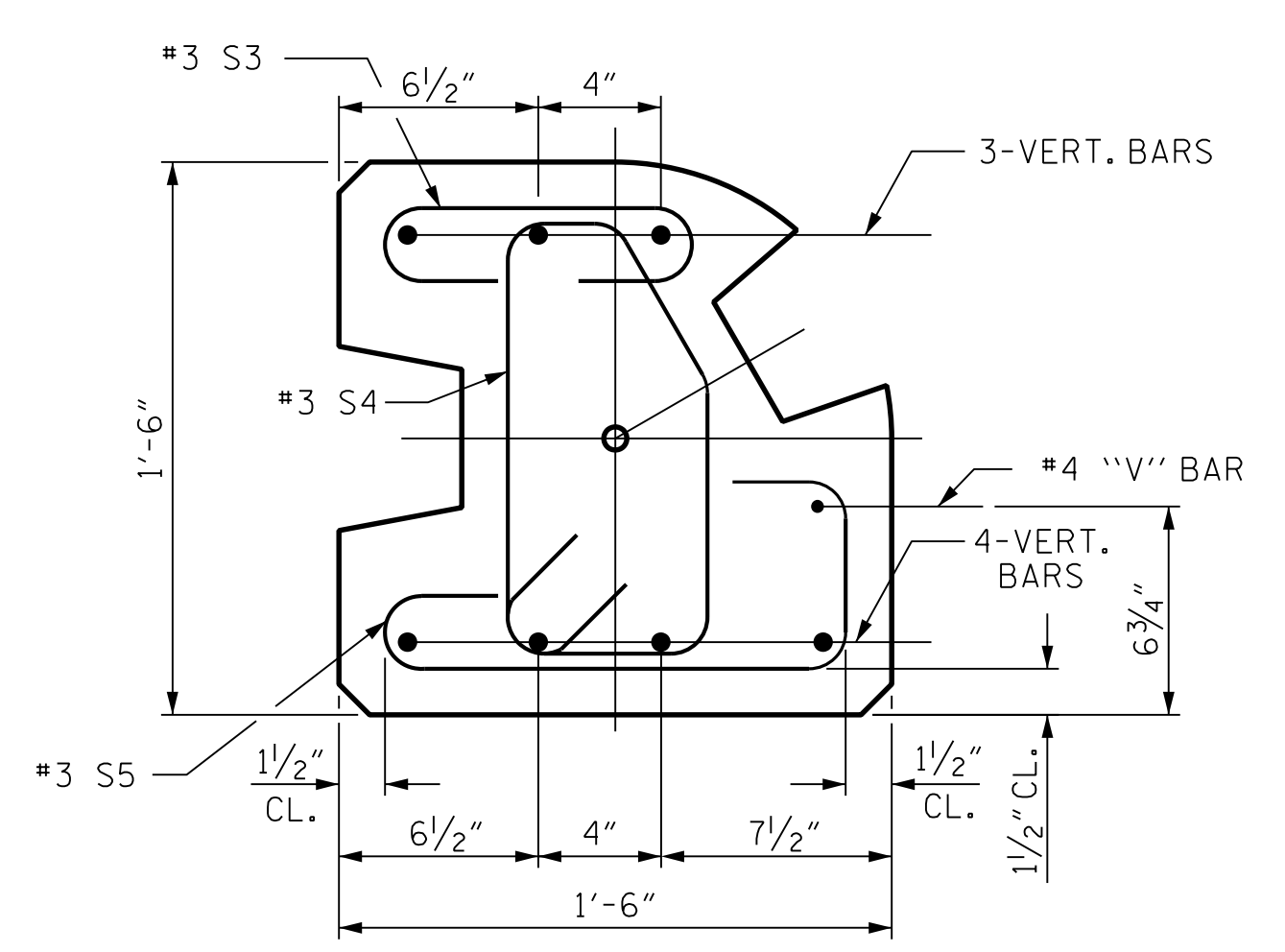
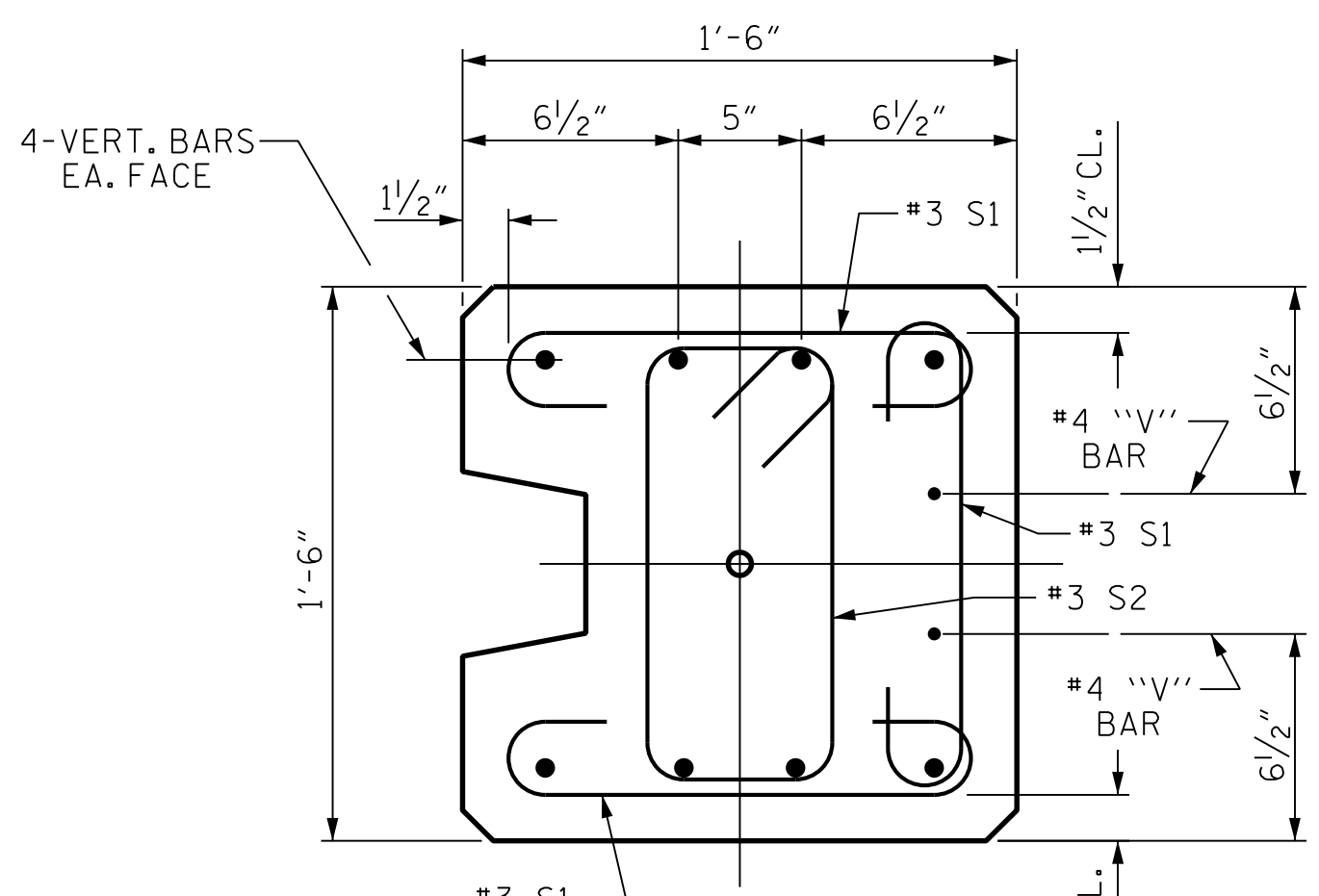
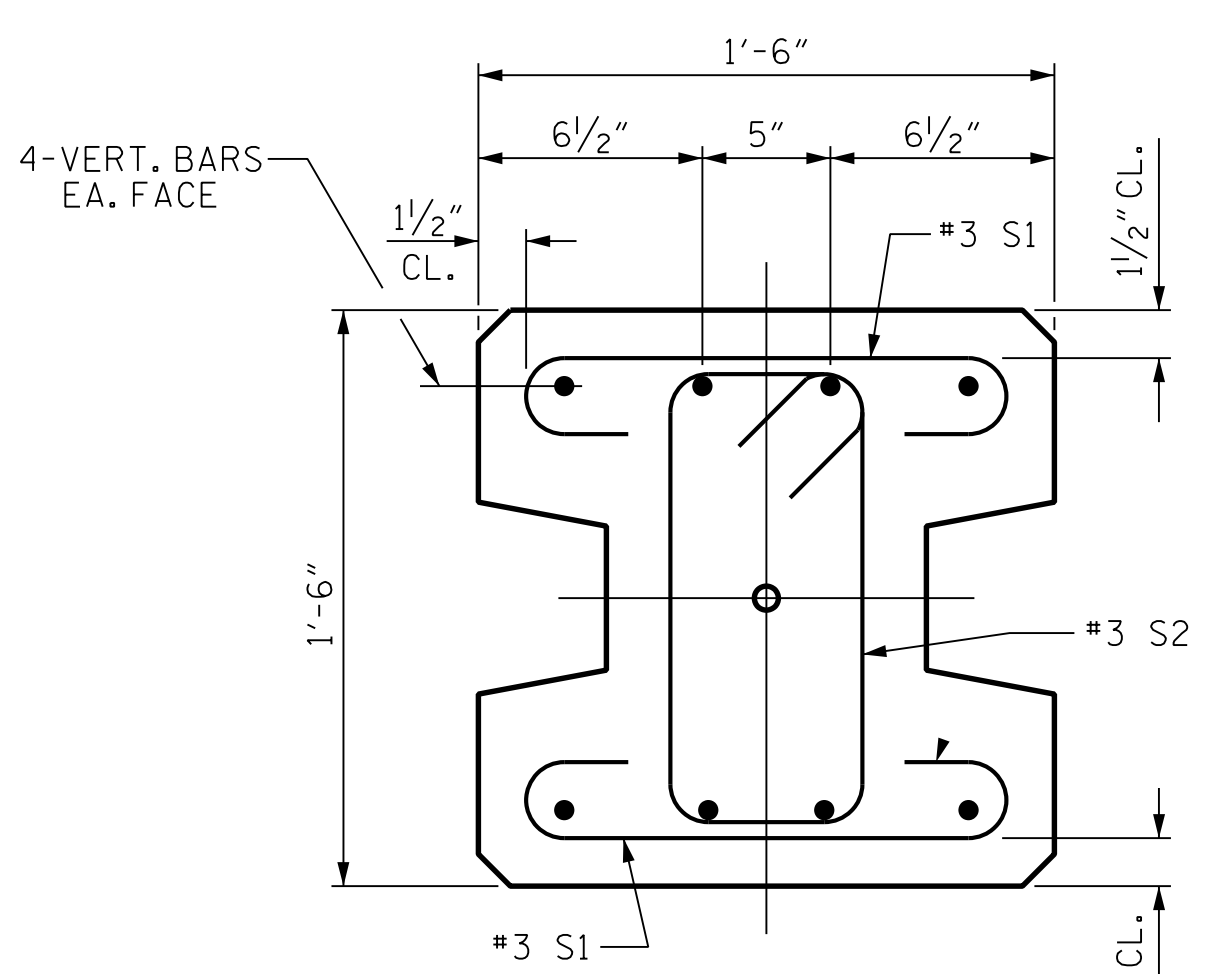
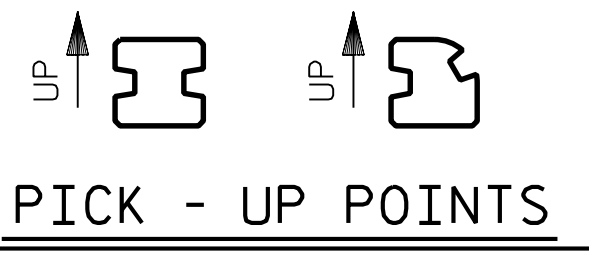
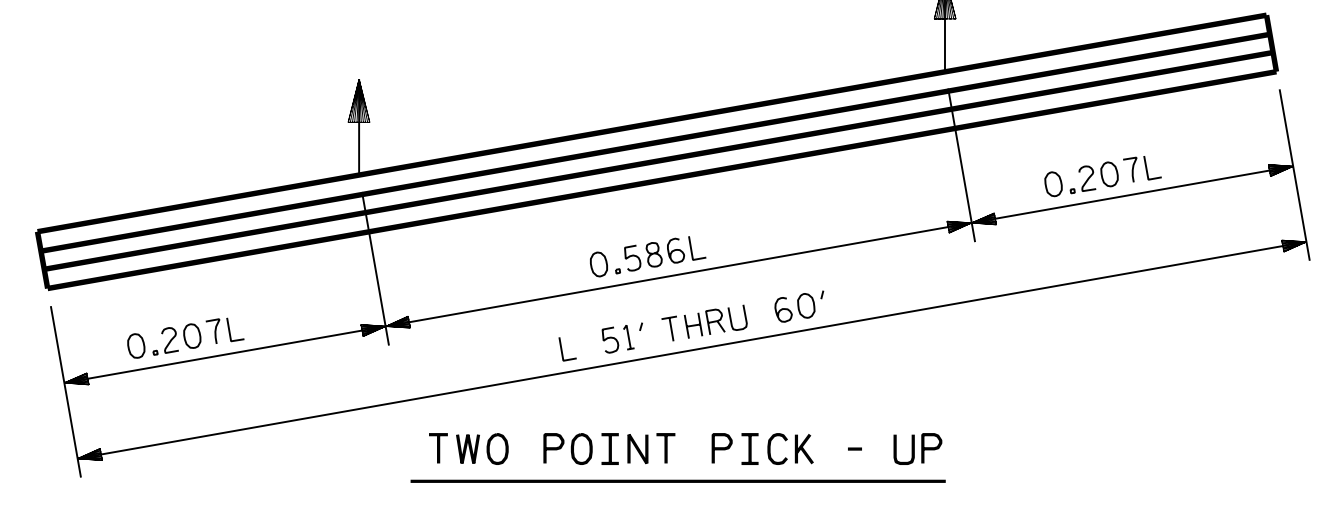
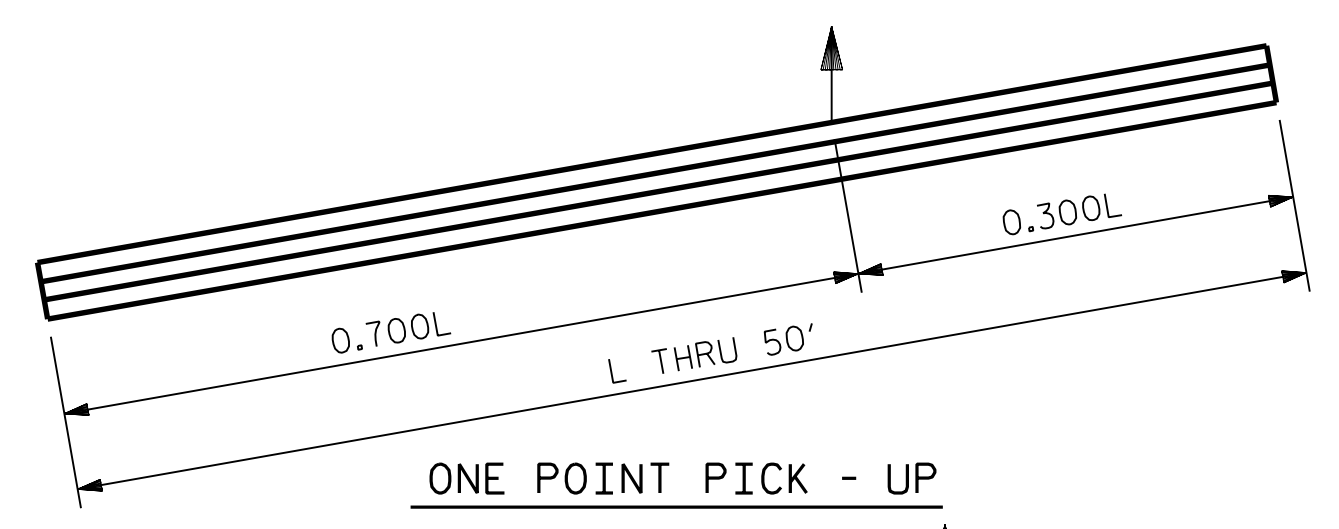
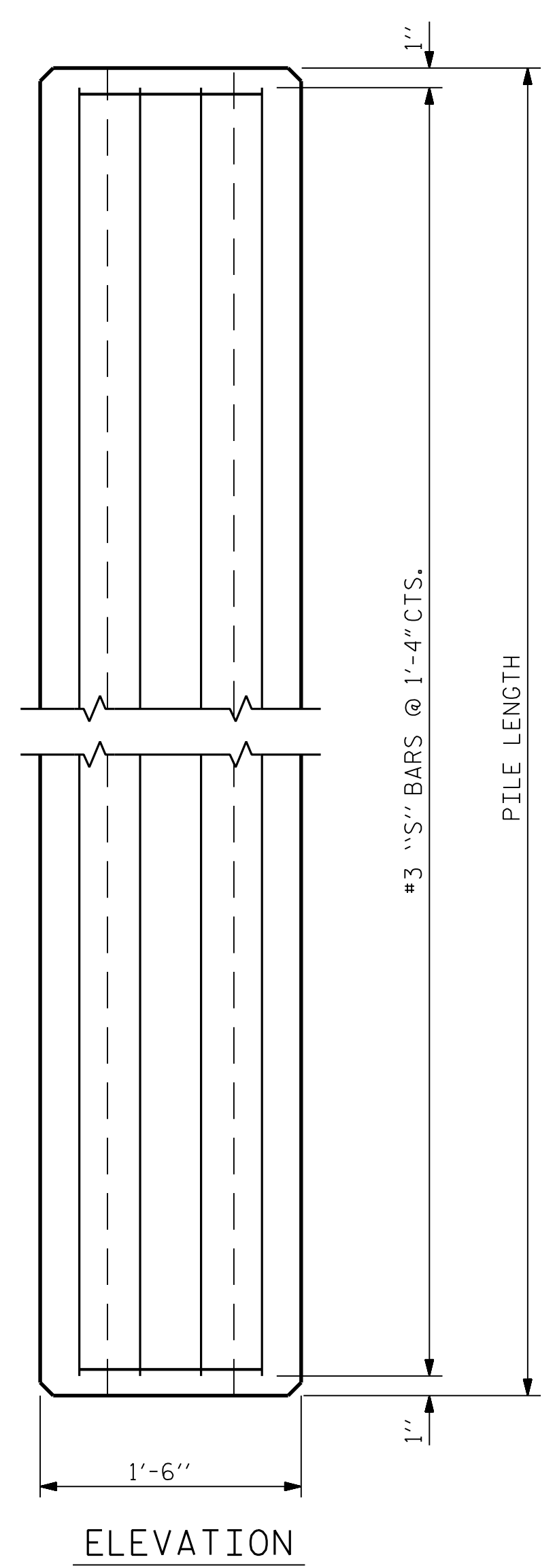
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 4

R:\Bridges\_Design\U-2519BA\Structures\DCN\NoiseWalls\U2519BA\_SBW\_03.dgn

DRAWN BY: B. A. HAAG DATE: MAR 2022  
CHECKED BY: D. M. RAGAN DATE: MAR 2022  
DESIGN ENGINEER OF RECORD: D. M. RAGAN DATE: MAR 2022





**NOTES**

CONCRETE DESIGN DATA : f<sub>c</sub> = 5,000 PSI (U.N.O.)  
f<sub>c</sub> = 6,500 PSI (PILE TYPE IV)

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.

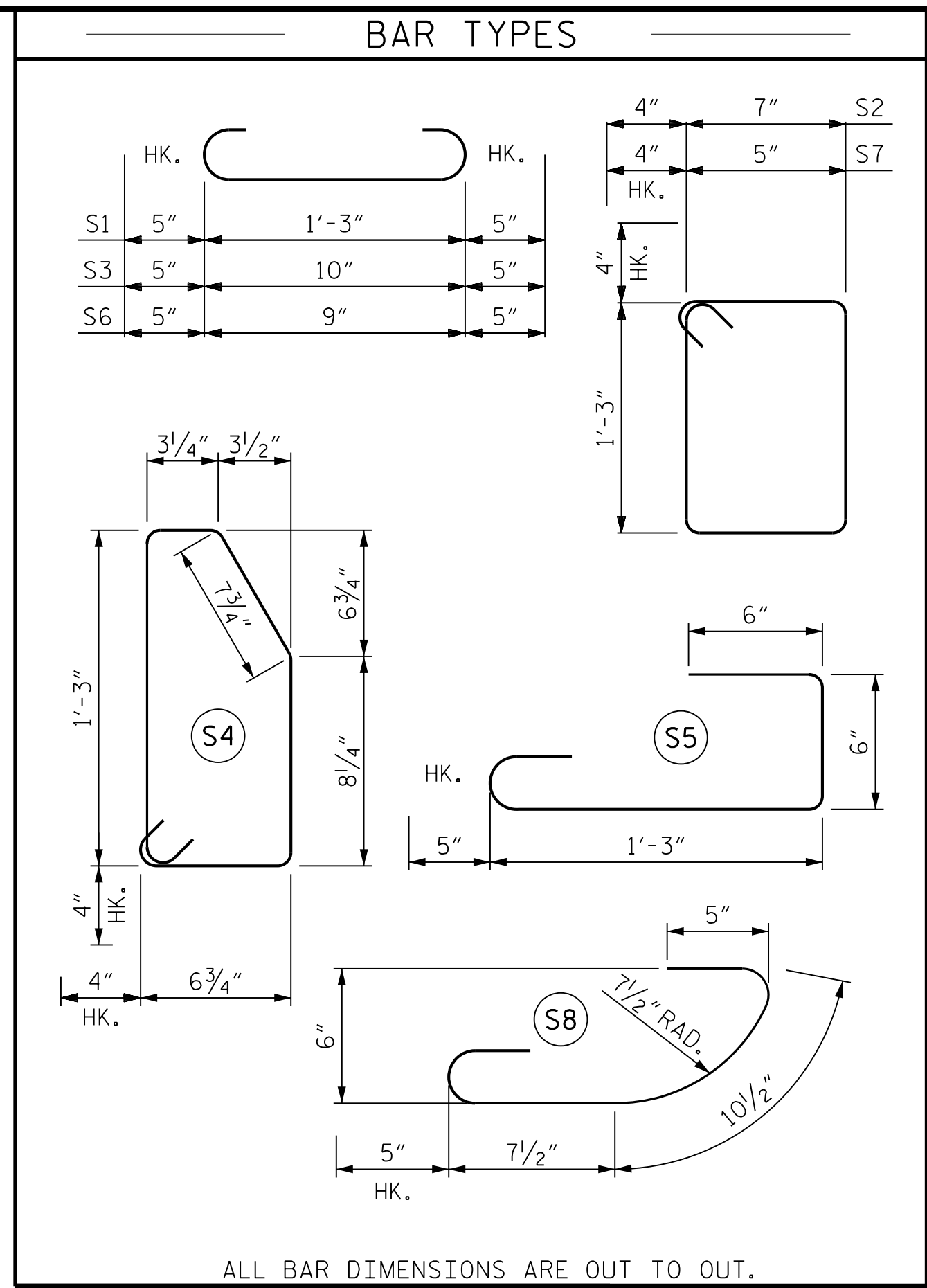
WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

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"

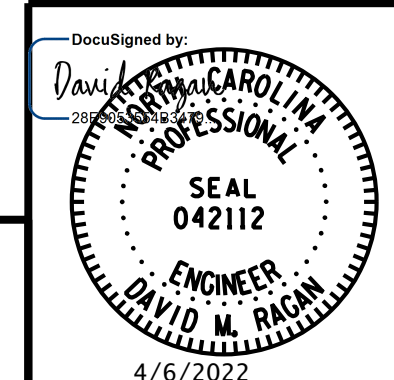


PROJECT NO. U-2519BA  
CUMBERLAND COUNTY

STATION: \_\_\_\_\_  
SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**STANDARD**  
SOUND BARRIER WALLS  
4B AND 5  
DETAILS



**RK&K**  
RUMMEL, KLEPPER & KAHL, LLP  
8601 SIX FORKS RD., FORUM 1 | SUITE 700  
RALEIGH, NC 27615 (919) 878-9560  
NC LICENSE NUMBER: F-0112

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

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

R:\Bridge\_Design\U-2519BA\Structures\DCN\NoiseWalls\U2519BA\_SBW\_04.dgn

4/6/2022  
DRAWN BY : B. A. HAAG DATE : MAR 2022  
CHECKED BY : D. M. RAGAN DATE : MAR 2022  
DESIGN ENGINEER OF RECORD : D. M. RAGAN DATE : MAR 2022

**PILE DETAIL**  
FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 4