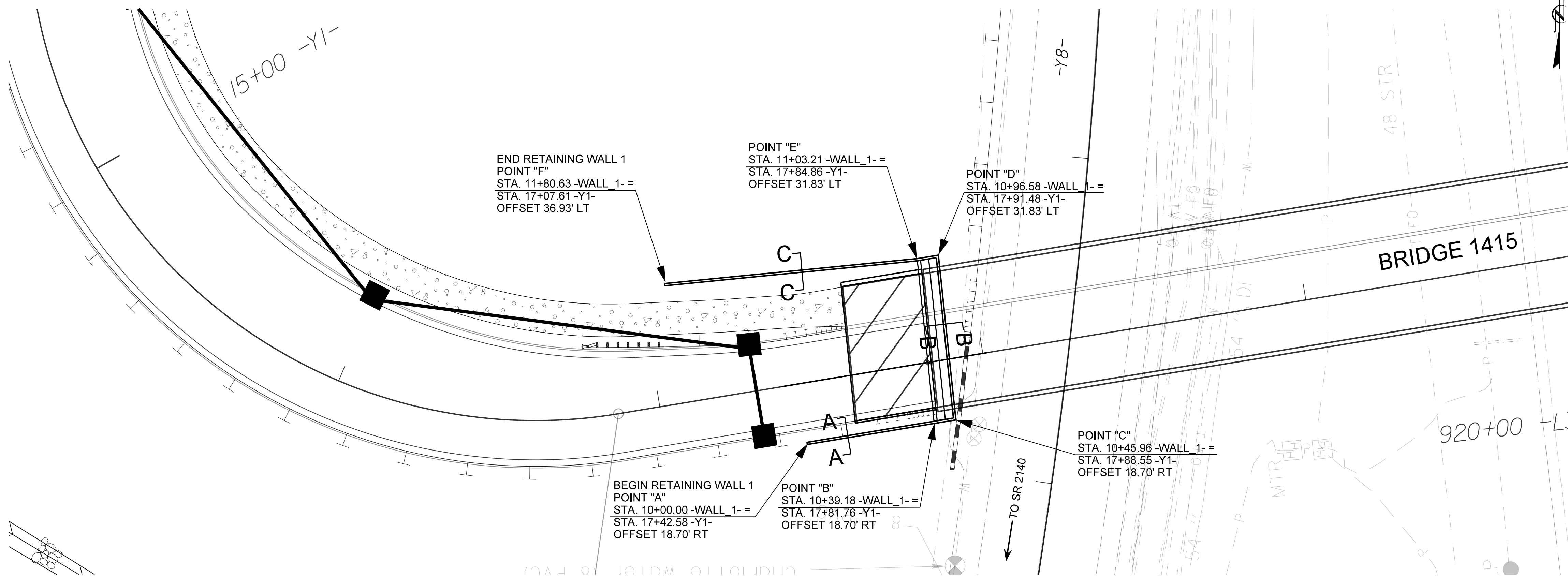


MSE RETAINING WALL NO.1 PLAN



PROJECT REFERENCE NO.
I-5715

SHEET NO.
W-1

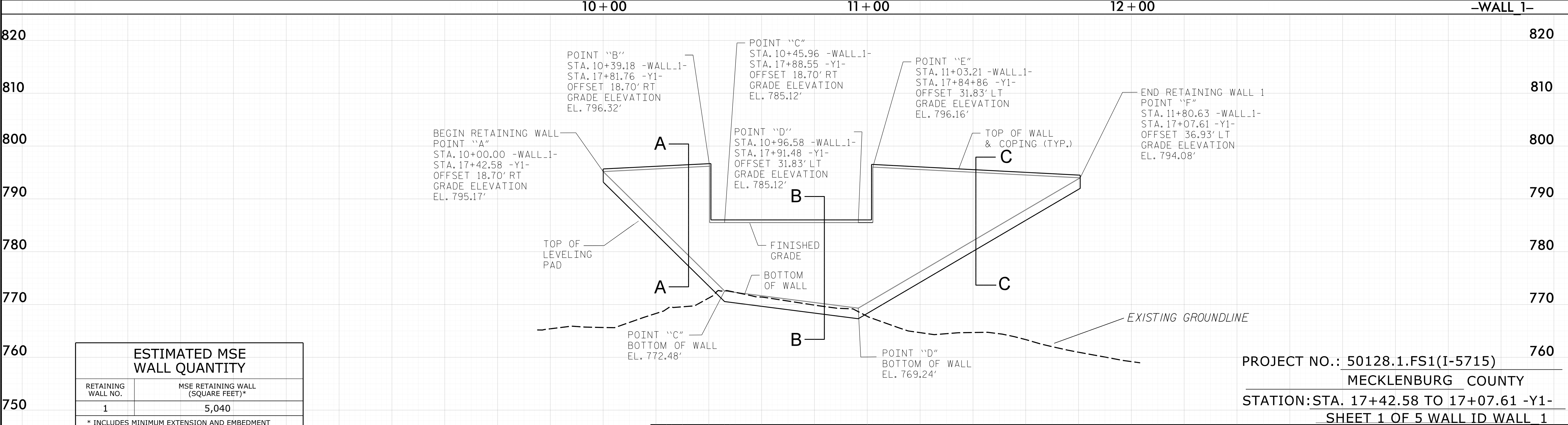
GEOTECHNICAL ENGINEER

Signed by
Thomas R. Wells 02/23/2026
F38C777458854EA
SIGNATURE DATE

ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MSE RETAINING WALL NO.1 ENVELOPE



PREPARED BY: T. WELLS
REVIEWED BY: D. CORLEY

DATE: 11/25
DATE: 11/25

Prepared in the Office of:

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: P-0869
NC REGISTERED GEOLOGIC FIRM: C-367

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.1
PLAN AND ENVELOPE

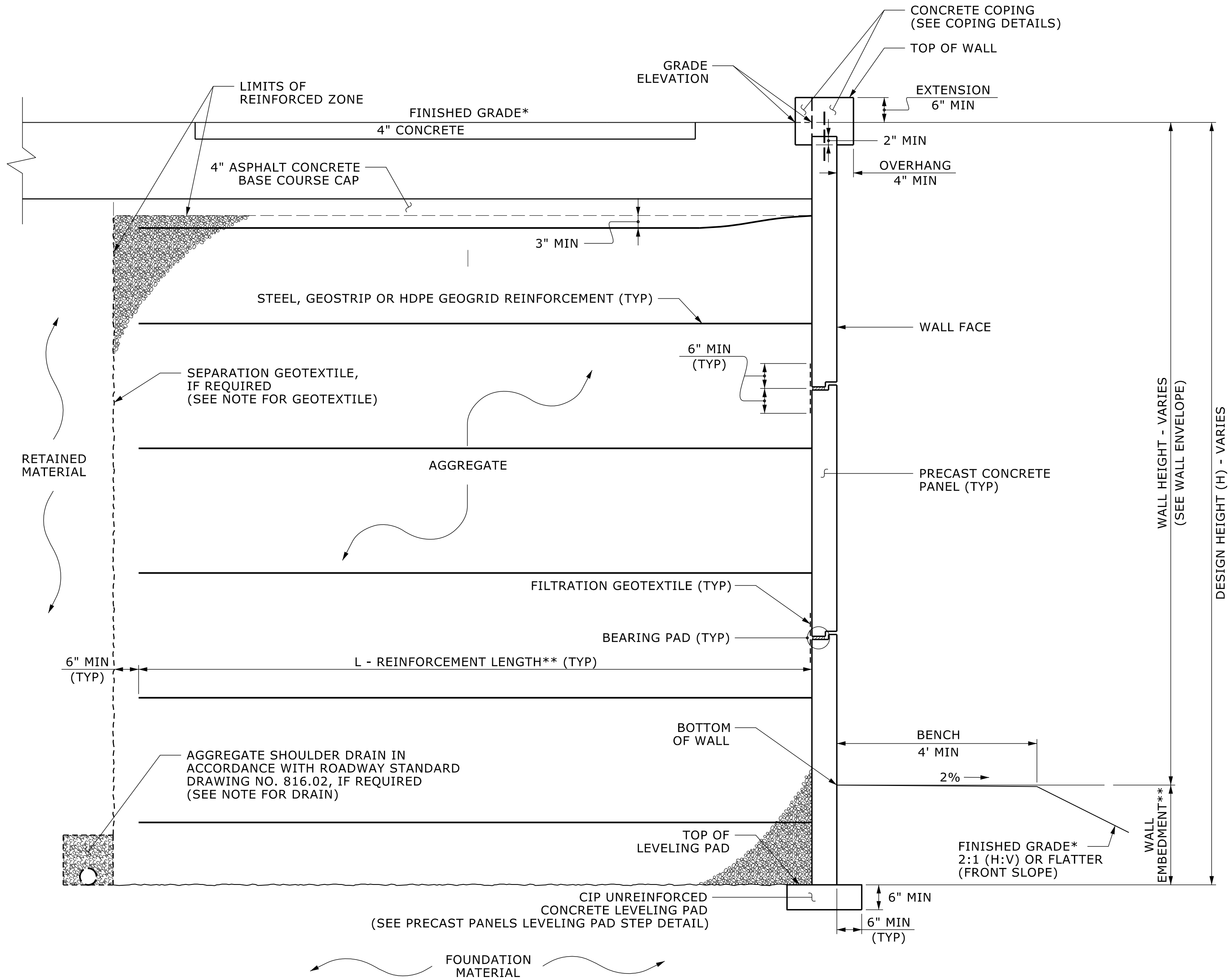
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
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SHEET NO.
W-1



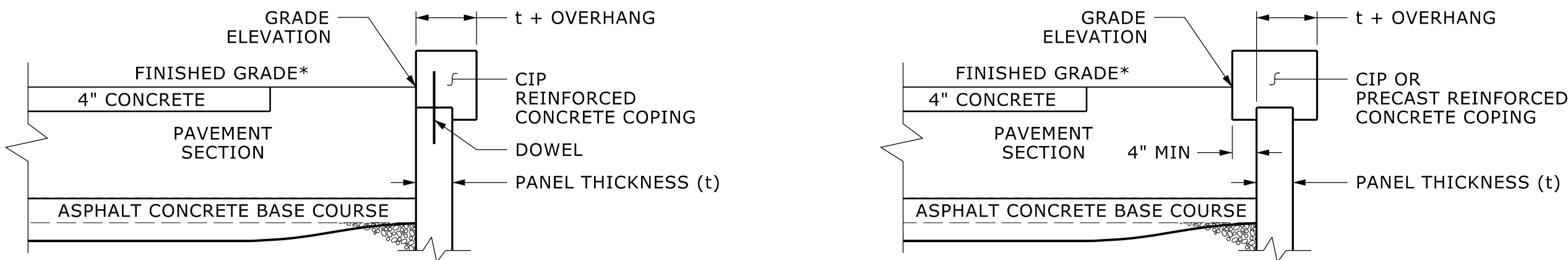
Signed by: Thomas R. Wells 02/23/2026
F38C77745854EA
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION A-A

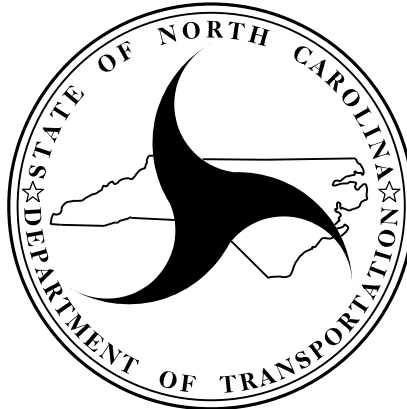
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL
NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



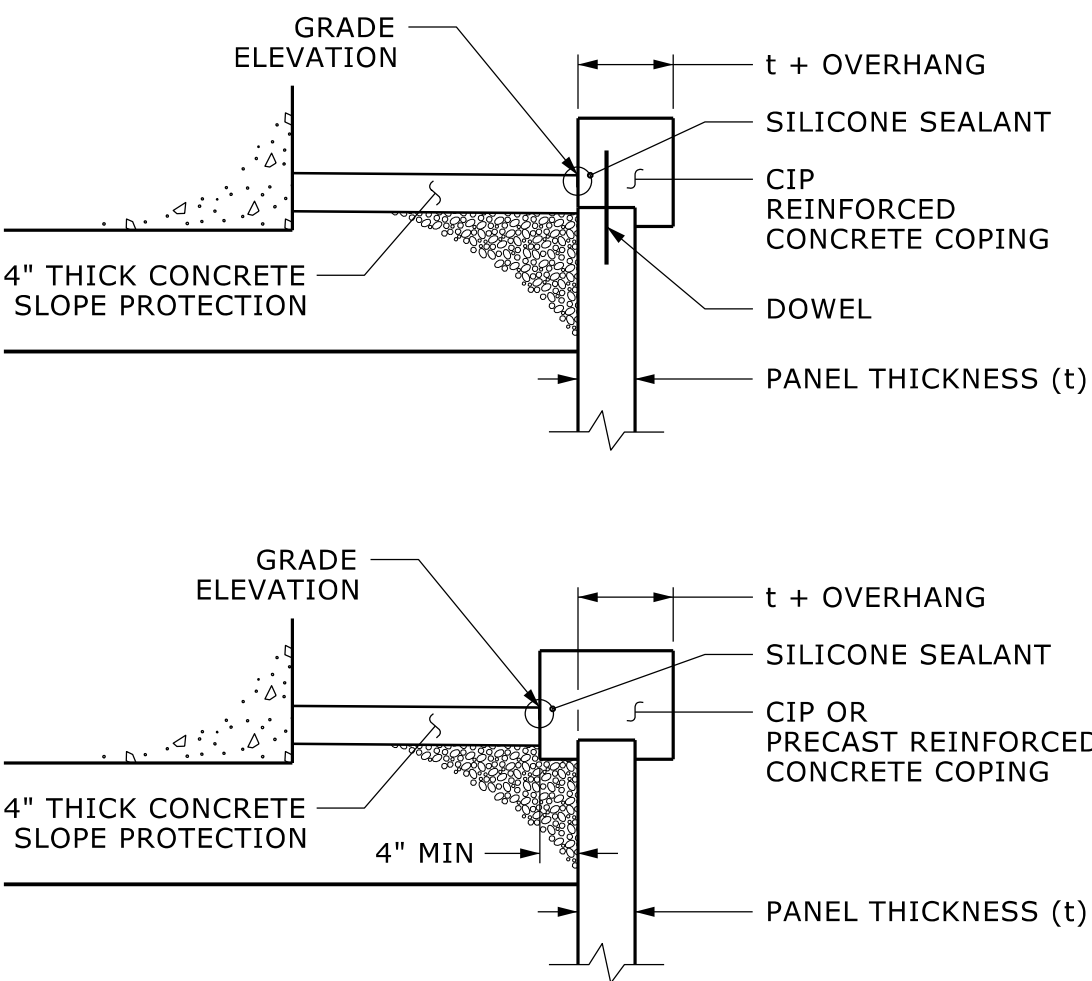
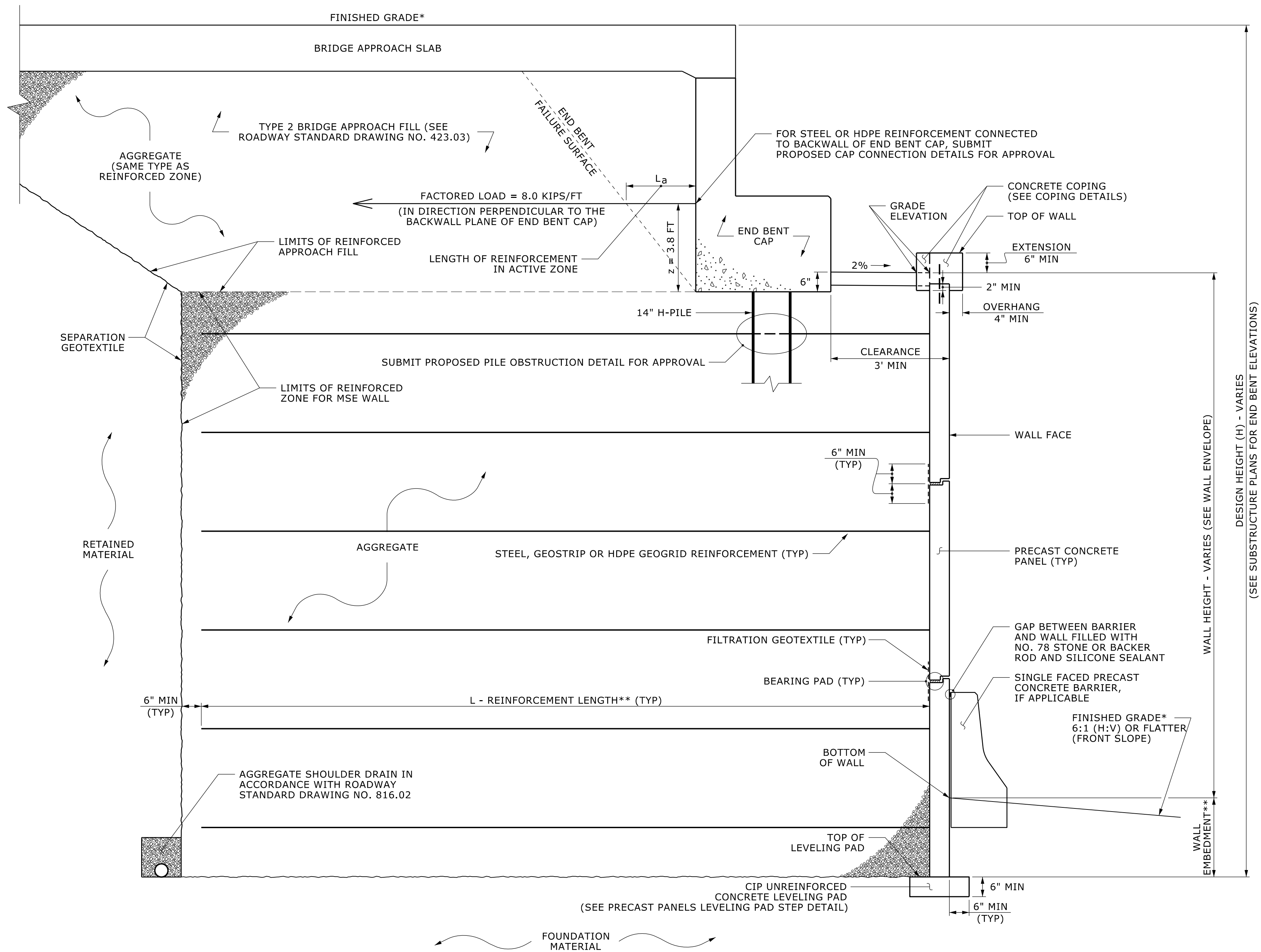
COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 17+42.58 TO 17+07.61 -Y1-
SHEET 2 OF 5 WALL ID WALL_1



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



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

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

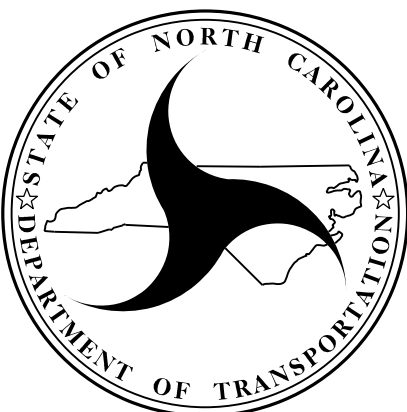
PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 17+42.58 TO 17+07.61 -Y1-
SHEET 3 OF 5 WALL ID WALL_1

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:



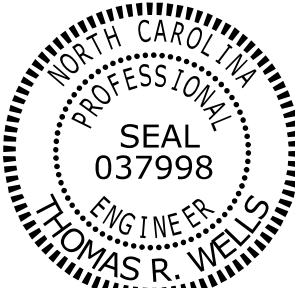
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

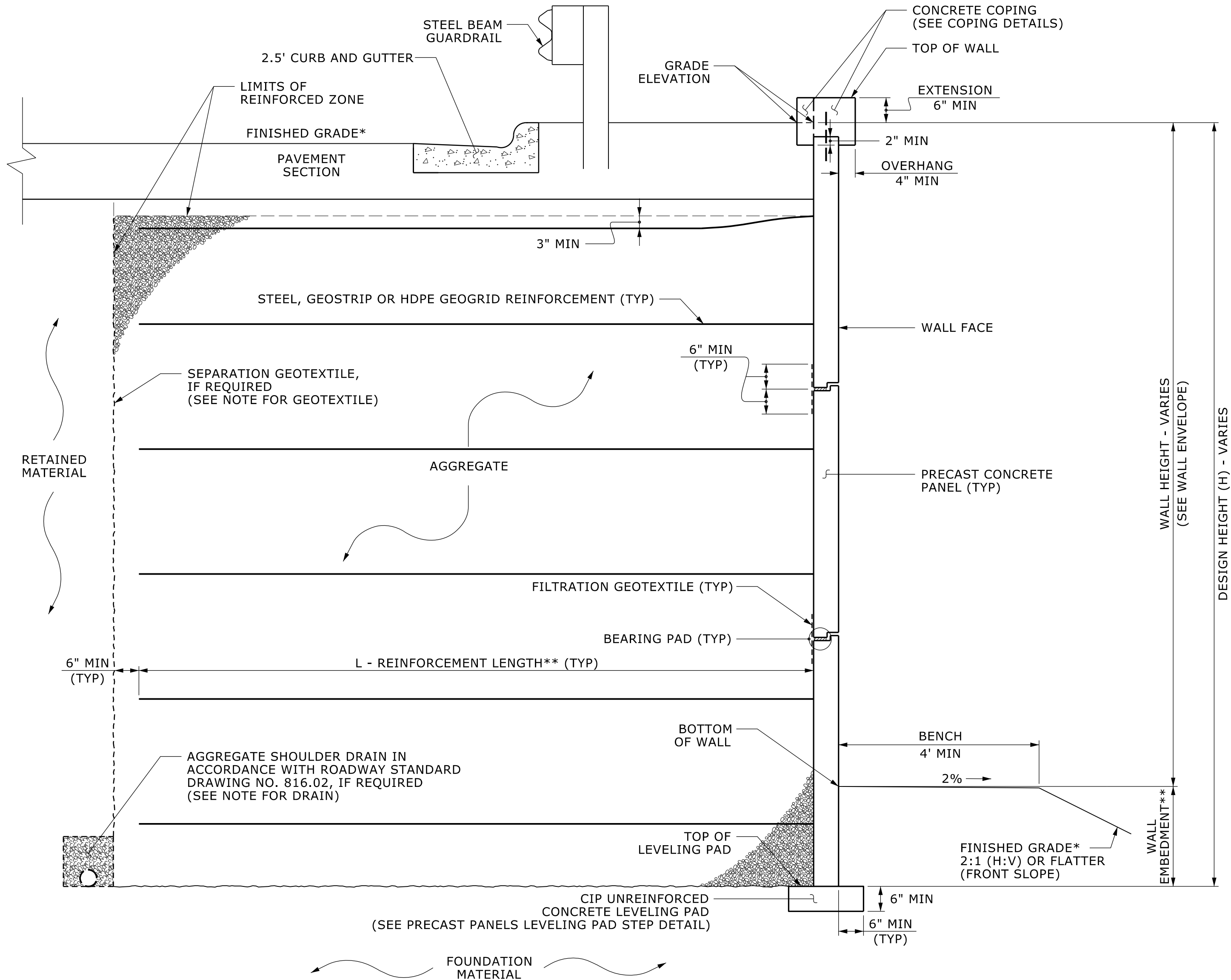
GEOTECHNICAL
ENGINEERING UNIT

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



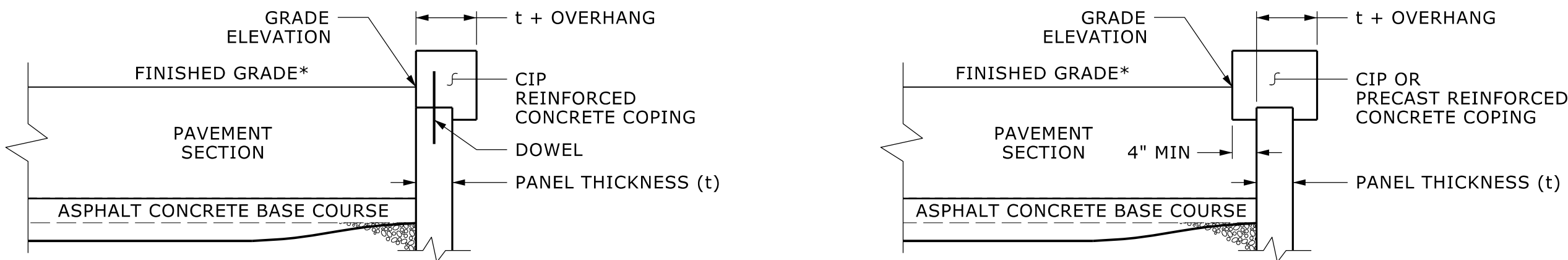
Signed by: Thomas R. Wells 02/23/2026
F38C77745864CA SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

*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.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 17+42.58 TO 17+07.61 -Y1-
SHEET 4 OF 5 WALL ID WALL_1

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.1
TYPICAL AND COPING DETAILS

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

PROJECT REFERENCE NO.

I-5715

SHEET NO.

W-5

GEOTECHNICAL

SEAL

037998

ENGINEER

THOMAS R. WELLS

Signed by:

Thomas R. Wells

02/23/2026

F38C77745854EA

SIGNATURE

DATE

ENGINEER

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

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

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.1.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.1.

BEFORE BEGINNING MSE 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.

DESIGN RETAINING WALL NO.1 FOR THE FOLLOWING:

1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT

2) DESIGN LIFE = 100 YEARS

3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,500 PSF

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER

5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER

6) REINFORCED ZONE AGGREGATE PARAMETERS:

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

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

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO.1 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.1 LOCATED AT STATION 17+82.99 -Y1-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.1 MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.1.

FOUNDATIONS FOR END BENT NO.1 LOCATED AT STATION 17+82.99 -Y1- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

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

INSTALL PILES AT END BENT NO. 1 PRIOR TO MSE WALL CONSTRUCTION.

PRECAST CONCRETE PANEL (TYP)

REINFORCEMENT LAYER (TYP)

6" MIN

6" MIN

1:1 (H:V)

STEP TOP OF LEVELING PAD SO REINFORCEMENT LAYERS BETWEEN ADJACENT PRECAST PANELS ARE ALIGNED AS SHOWN

CIP UNREINFORCED CONCRETE LEVELING PAD

PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 17+42.58 TO 17+07.61 -Y1-

SHEET 5 OF 5 WALL ID WALL_1

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

SEAL

037998

ENGINEER

THOMAS R. WELLS

Signed by:

Thomas R. Wells

02/23/2026

F38C77745854EA

SIGNATURE

DATE

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.1
LEVELING PAD STEP
DETAIL AND NOTES

REVISIONS

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

SHEET NO.
W-5

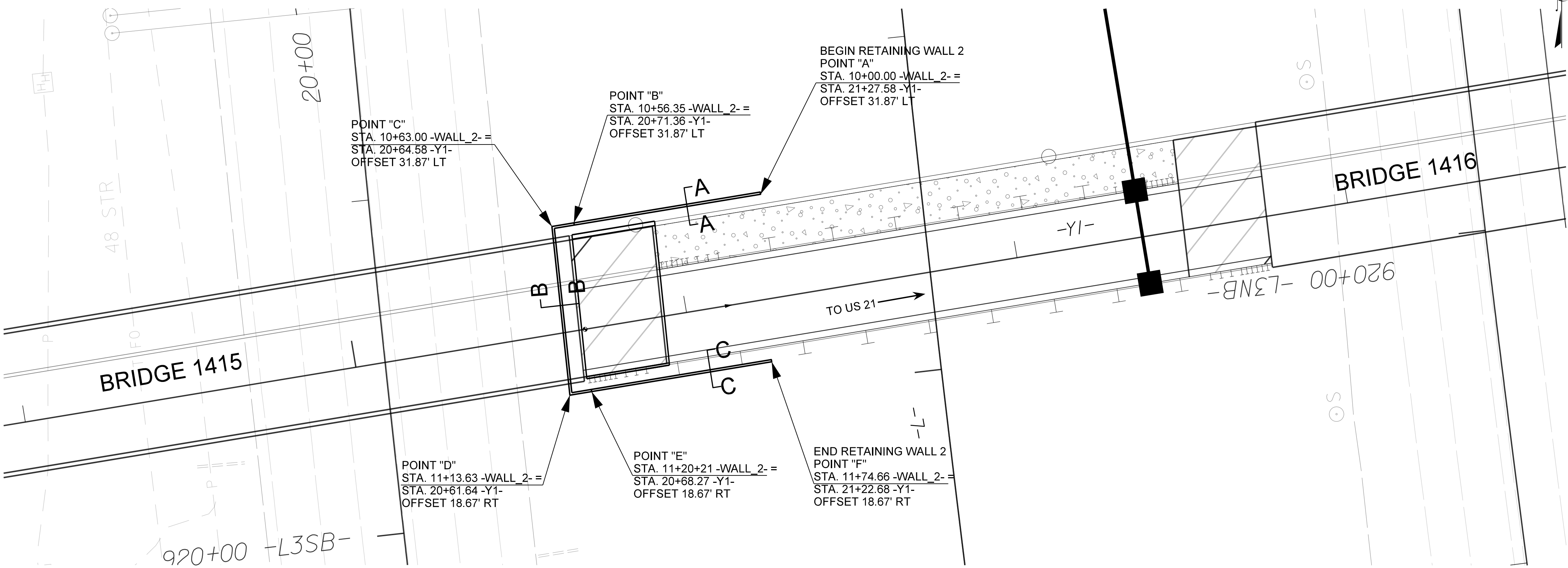
PREPARED BY: T. WELLS

DATE: 11/25

REVIEWED BY: D. CORLEY

DATE: 11/25

MSE RETAINING WALL NO.2 PLAN



PROJECT REFERENCE NO.
I-5715

SHEET NO.
W-6

GEOTECHNICAL ENGINEER

ENGINEER

Seal of Thomas R. Wells, Professional Engineer, No. 037998, State of North Carolina

Signed by: Thomas R. Wells 02/23/2026

SIGNATURE

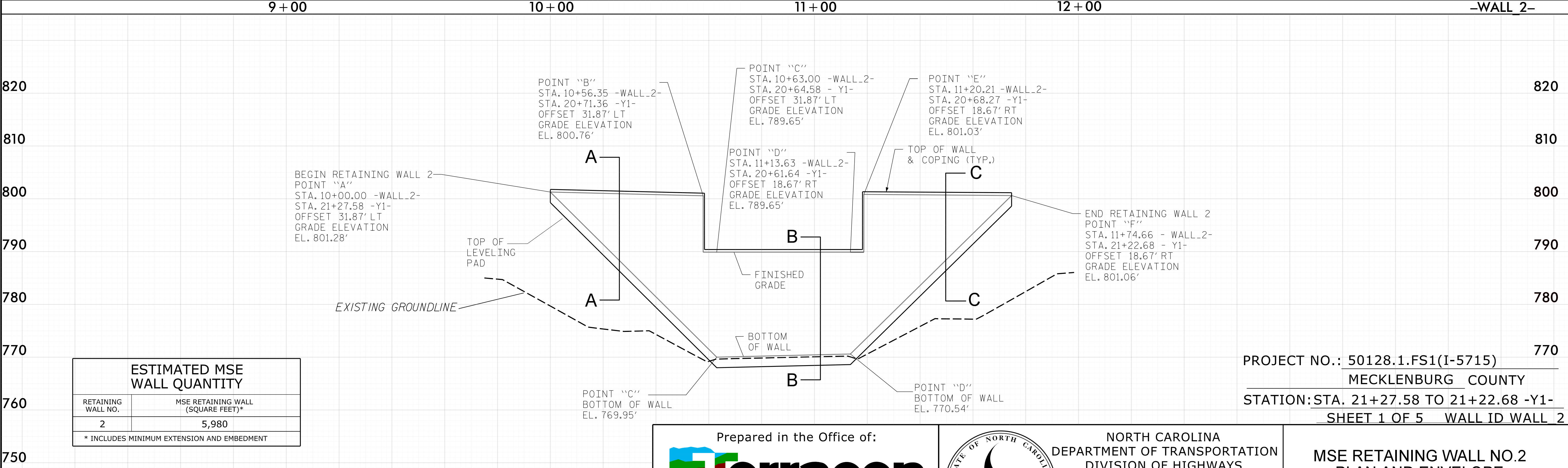
DATE

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MSE RETAINING WALL NO.2 ENVELOPE



ESTIMATED MSE WALL QUANTITY	
RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FEET)*
2	5,980
* INCLUDES MINIMUM EXTENSION AND EMBEDMENT	

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

Seal of the State of North Carolina

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

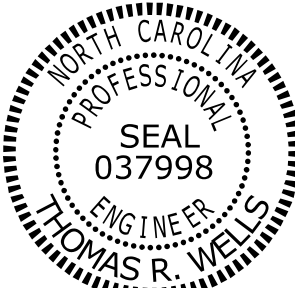
GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.2
PLAN AND ENVELOPE

REVISIONS

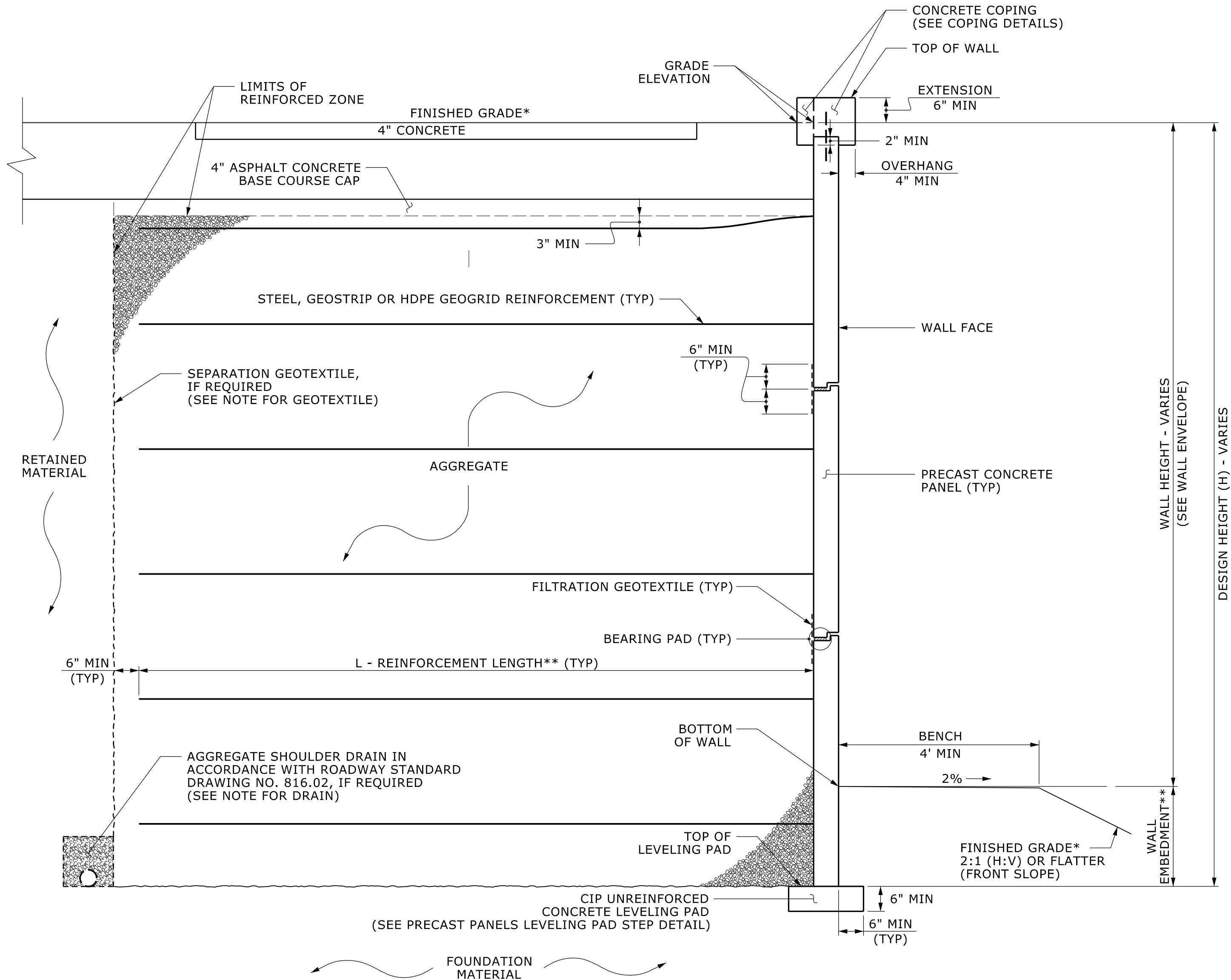
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SHEET NO.
W-6



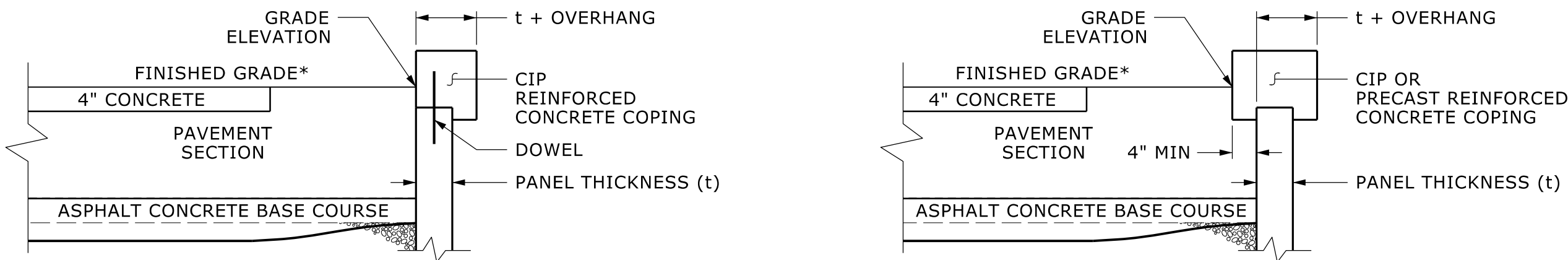
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

*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.



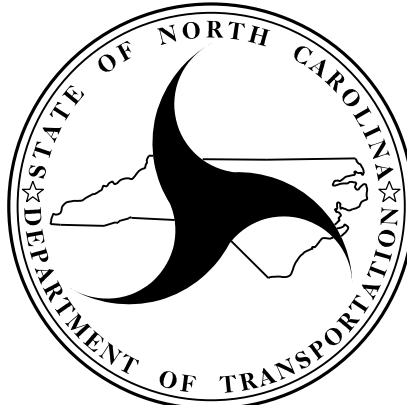
COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 21+27.58 TO 21+22.68 -Y1-
SHEET 4 OF 5 WALL ID WALL_2

PREPARED BY: T.WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



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

MSE RETAINING WALL NO.2
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-9
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PROJECT REFERENCE NO.

I-5715

SHEET NO.

W-10

GEOTECHNICAL ENGINEER

SEAL 037998

ENGINEER

THOMAS R. WELLS

Signed by:

Thomas R. Wells

02/23/2026

F38C777458854EA...

SIGNATURE

DATE

ENGINEER

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

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

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.2.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.2.

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

DESIGN RETAINING WALL NO.2 FOR THE FOLLOWING:

1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT

2) DESIGN LIFE = 100 YEARS

3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 7,200 PSF

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER

5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER

6) REINFORCED ZONE AGGREGATE PARAMETERS:

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

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

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	110	27	0

DESIGN RETAINING WALL NO.2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.2 LOCATED AT STATION 20+69.33 -Y1-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.2 MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.2.

FOUNDATIONS FOR END BENT NO.2 LOCATED AT STATION 20+69.33 -Y1- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

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

INSTALL PILES AT END BENT NO. 2 PRIOR TO MSE WALL CONSTRUCTION.

PRECAST CONCRETE PANEL (TYP)

REINFORCEMENT LAYER (TYP)

6" MIN

6" MIN

1:1 (H:V)

STEP TOP OF LEVELING PAD SO REINFORCEMENT LAYERS BETWEEN ADJACENT PRECAST PANELS ARE ALIGNED AS SHOWN

CIP UNREINFORCED CONCRETE LEVELING PAD

PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 21+27.58 TO 21+22.68 -Y1-

SHEET 5 OF 5 WALL ID WALL_2

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.2
LEVELING PAD STEP
DETAIL AND NOTES

REVISIONS

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

SHEET NO.
W-10

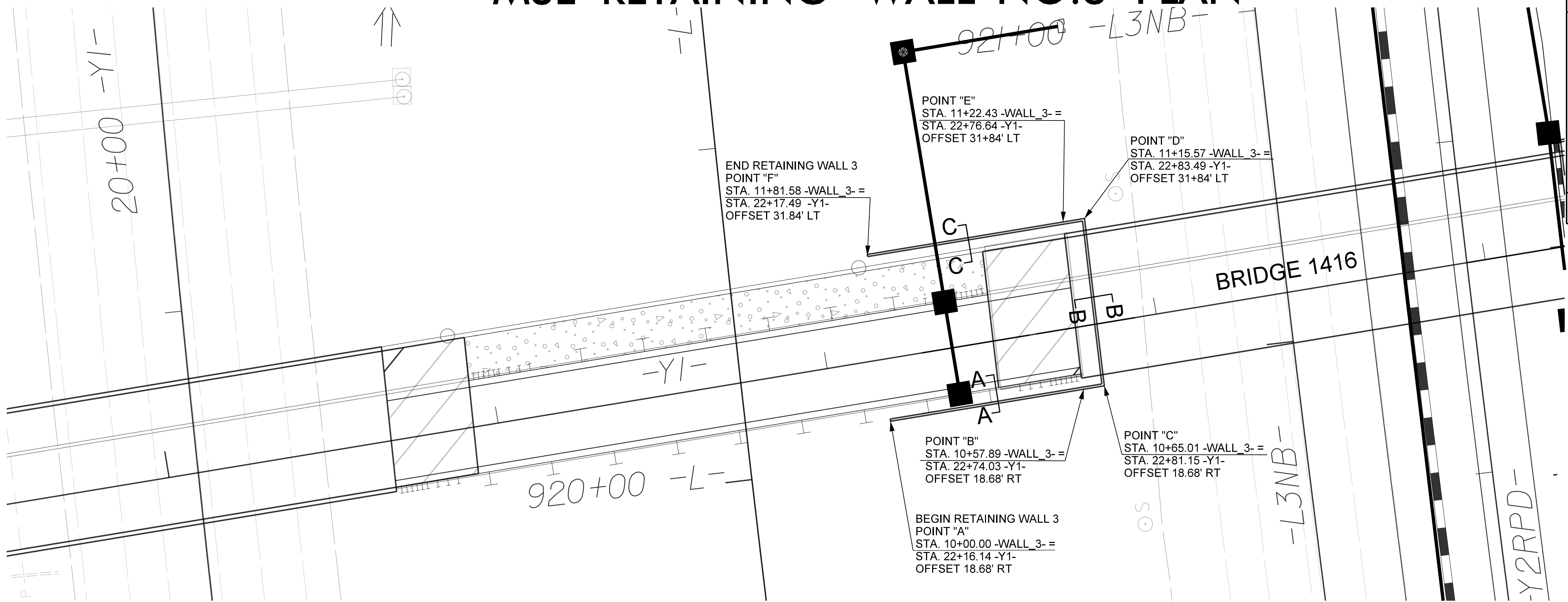
PREPARED BY: T. WELLS

DATE: 11/25

REVIEWED BY: D. CORLEY

DATE: 11/25

MSE RETAINING WALL NO.3 PLAN



PROJECT REFERENCE NO.
I-5715

SHEET NO.
W-11

GEOTECHNICAL ENGINEER

ENGINEER

SEAL
037998
ENGINEER
THOMAS R. WELLS

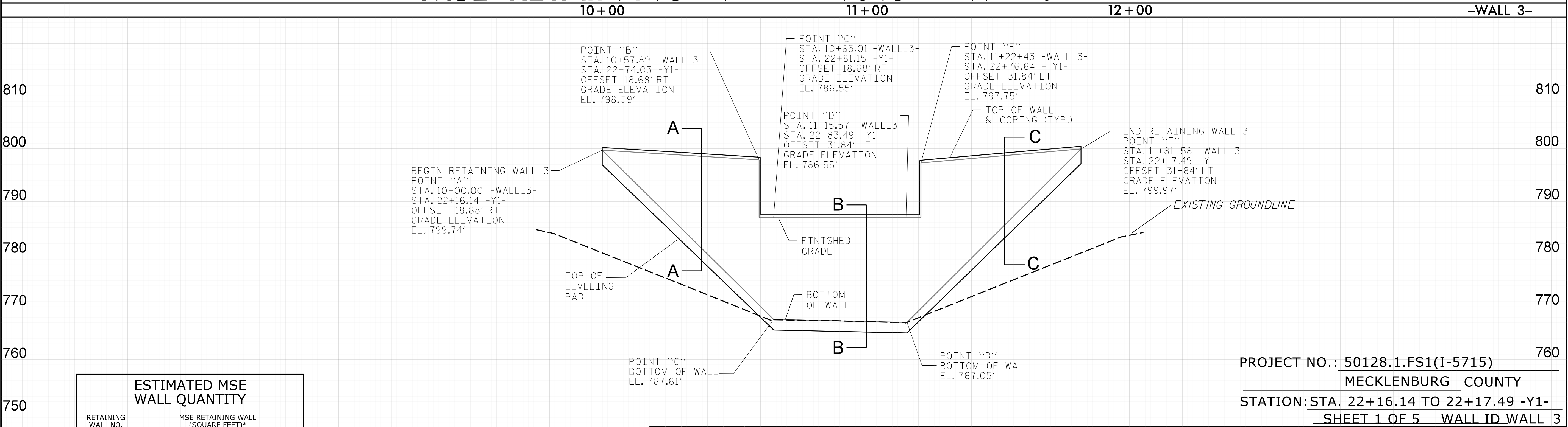
Thomas R. Wells
02/23/2026

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MSE RETAINING WALL NO.3 ENVELOPE



ESTIMATED MSE WALL QUANTITY	
RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FEET)*
3	6,152
* INCLUDES MINIMUM EXTENSION AND EMBEDMENT	

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: P-0869
NC REGISTERED GEOLOGIC FIRM: C-367

**DEPARTMENT OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

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

**GEOTECHNICAL
ENGINEERING UNIT**

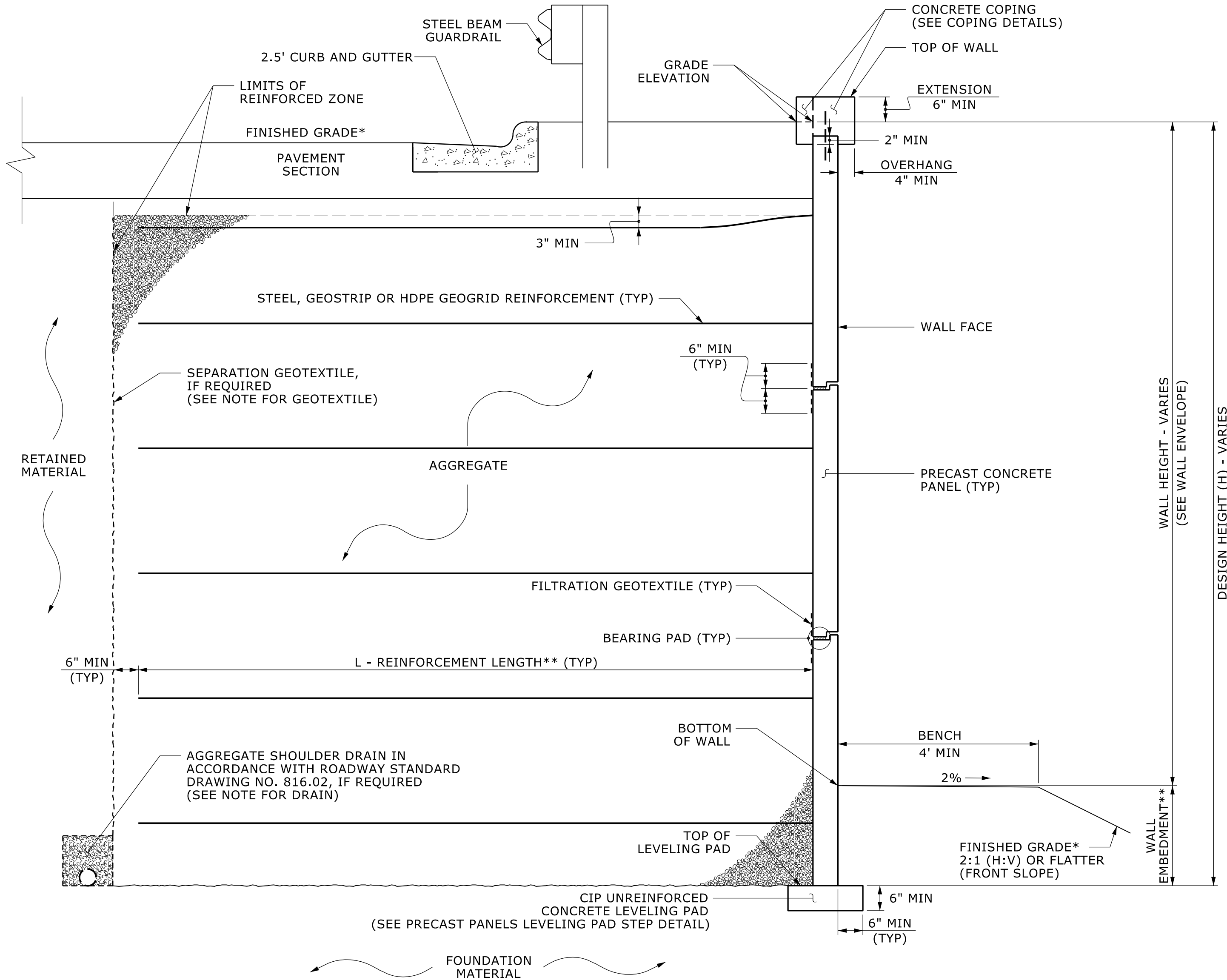
MSE RETAINING WALL NO.3
PLAN AND ENVELOPE

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



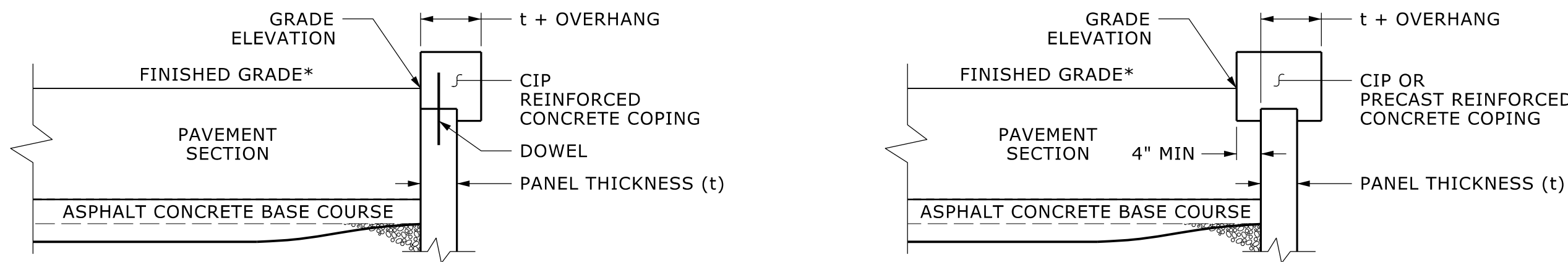
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION A-A

*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.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 22+16.14 TO 22+17.49 -Y1-
SHEET 2 OF 5 WALL ID WALL_3

PREPARED BY: T. WELLS DATE: 11/25
REVIEWED BY: D. CORLEY DATE: 11/25

Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

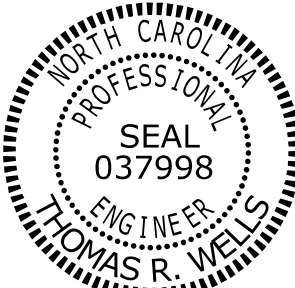


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

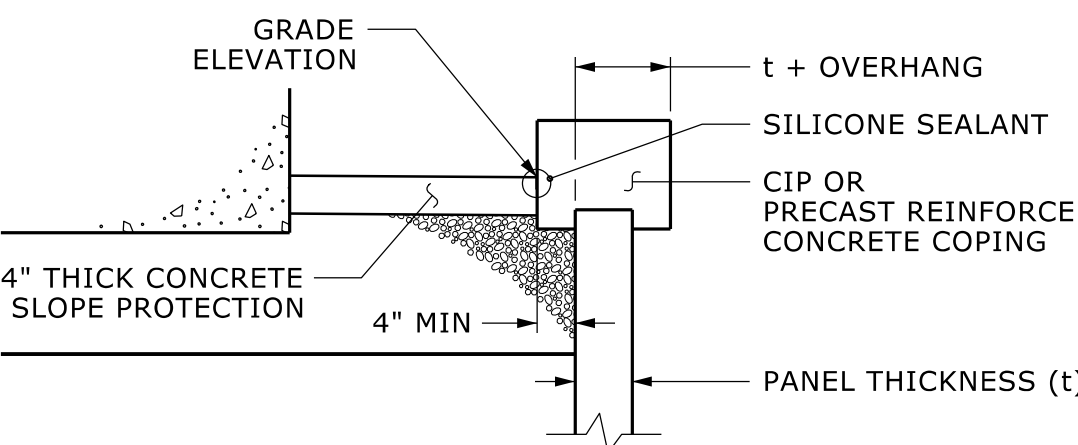
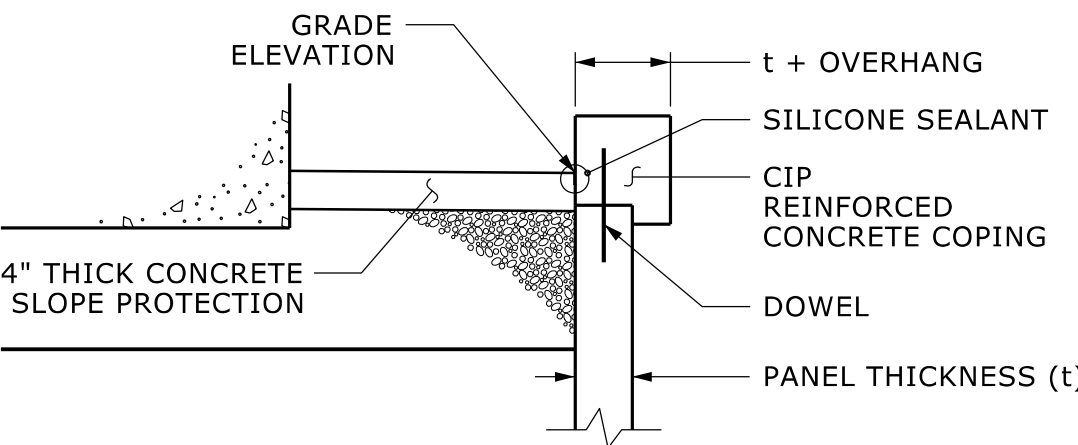
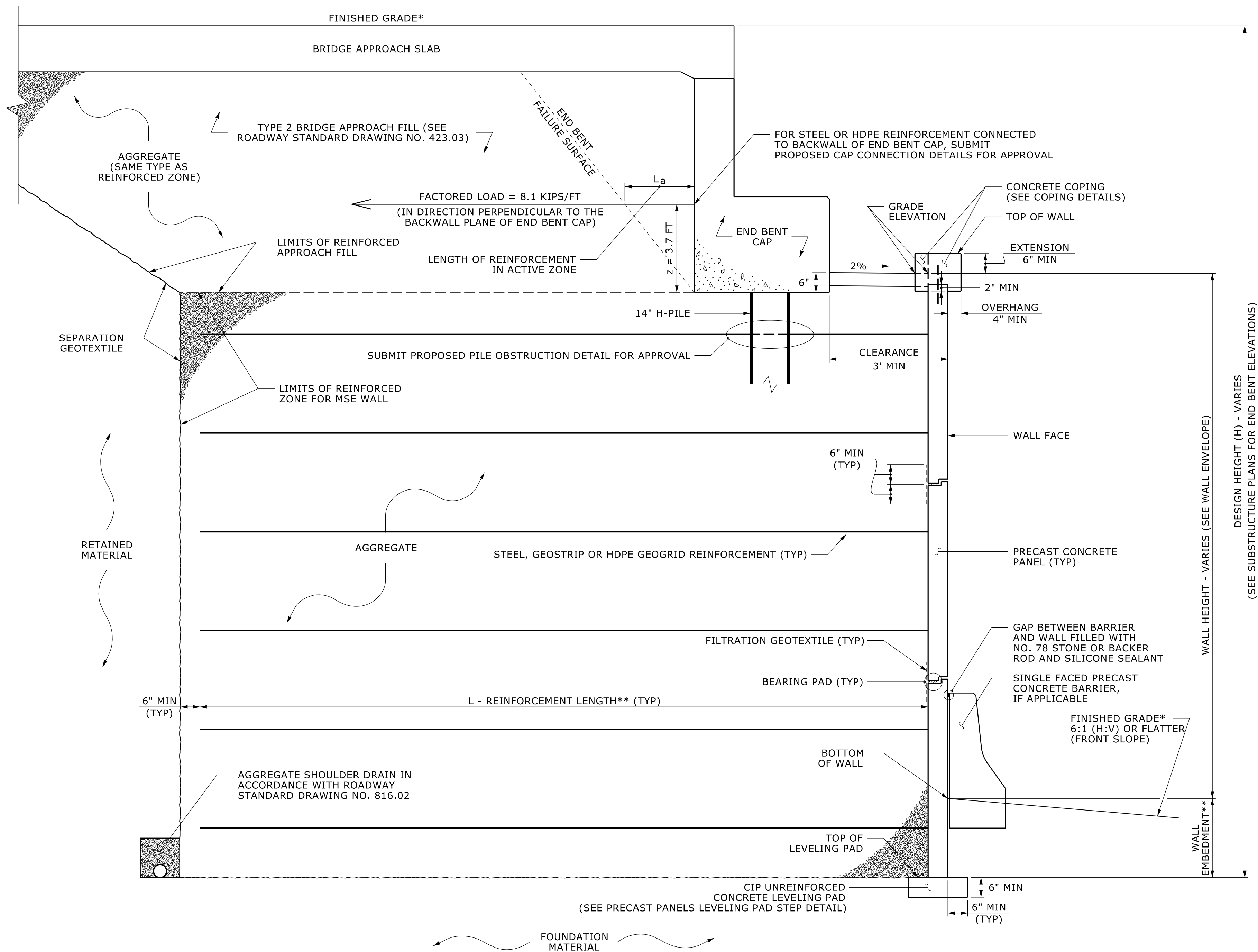
MSE RETAINING WALL NO.3
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-12
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



Signed by: Thomas R. Wells 02/23/2026
F38C777458654EA
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



COPING DETAILS

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

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

*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.: 50128.1.FS1(I-5715)

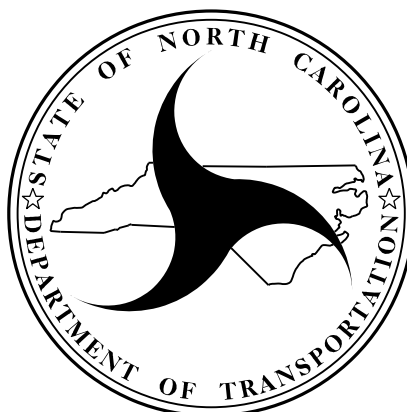
MECKLENBURG COUNTY

STATION: STA. 22+16.14 TO 22+17.49 -Y1-

SHEET 3 OF 5 WALL ID WALL_3

PREPARED BY: T. WELLS DATE: 11/25
REVIEWED BY: D. CORLEY DATE: 11/25

Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

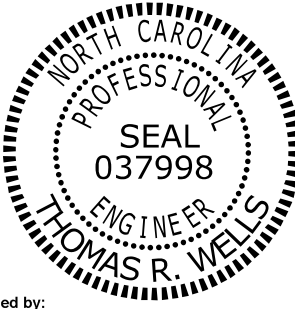


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

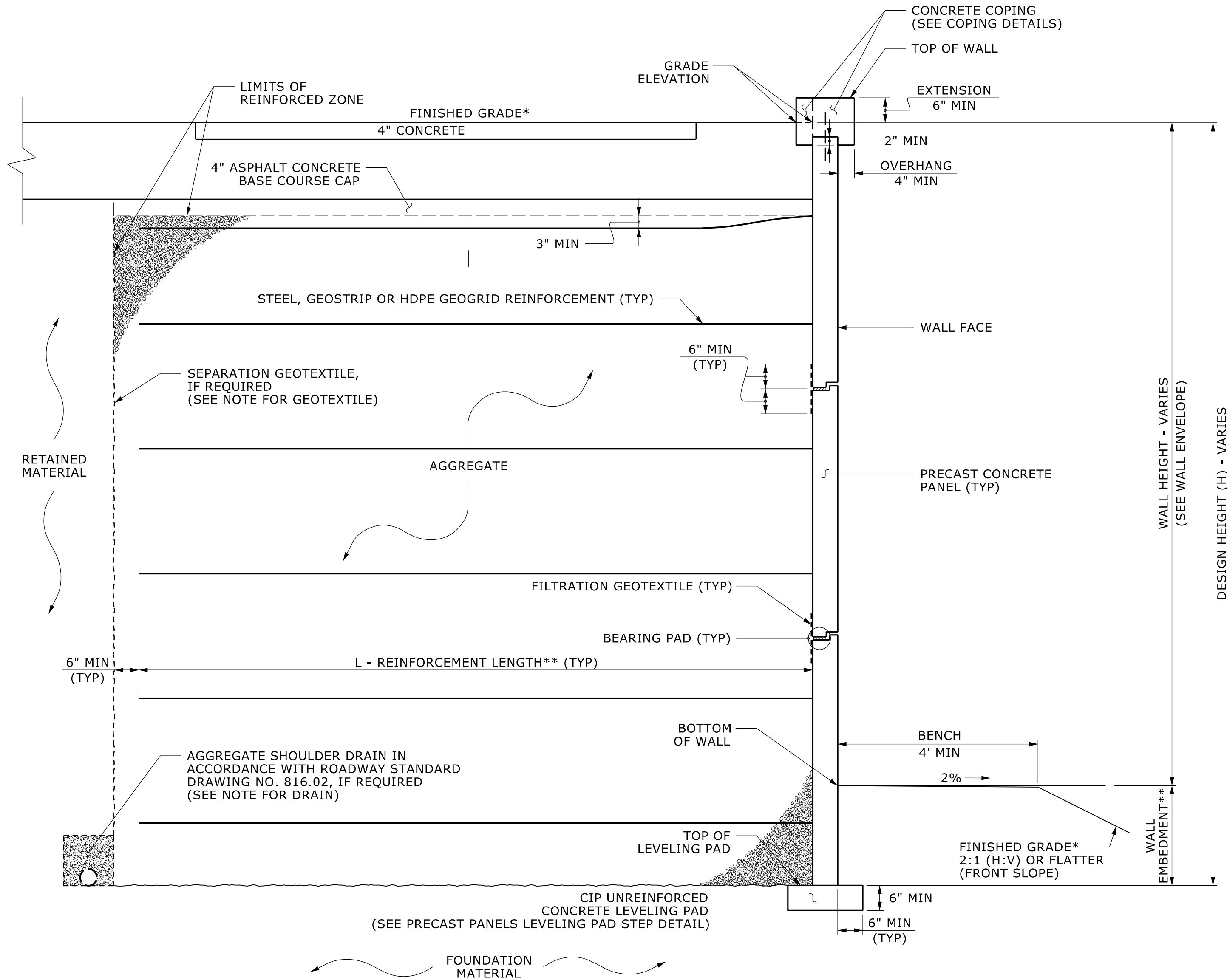
MSE RETAINING WALL NO.3
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-13
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



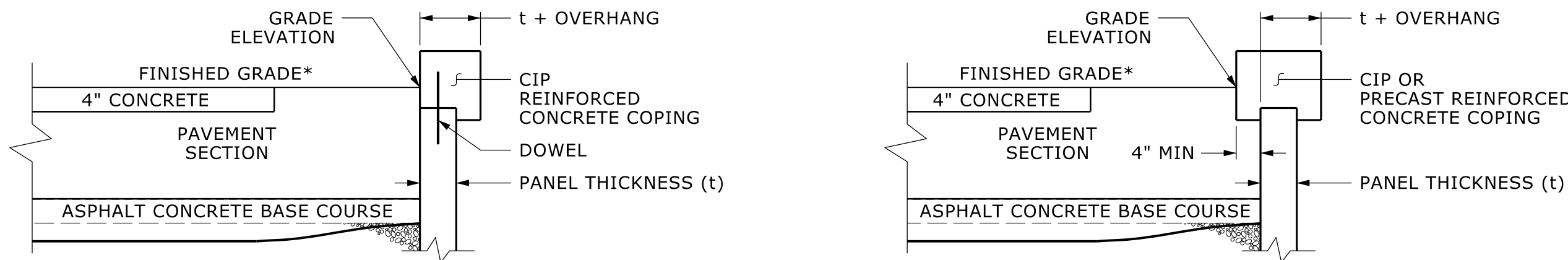
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

*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.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 22+16.14 TO 22+17.49 -Y1-
SHEET 4 OF 5 WALL ID WALL_3

PREPARED BY: T. WELLS DATE: 11/25
REVIEWED BY: D. CORLEY DATE: 11/25

Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.3
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-14
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PROJECT REFERENCE NO.	SHEET NO.
I-5715	W-15

ENGINEER



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

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.3.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.3.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.3, 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 WALL NO.3 FOR THE FOLLOWING:

- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 7,200 PSF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER
- 5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER
- 6) REINFORCED ZONE AGGREGATE PARAMETERS:

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

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

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (Φ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	110	29	0

DESIGN RETAINING WALL NO.3 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 LOCATED AT STATION 22+75.08 -Y1-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

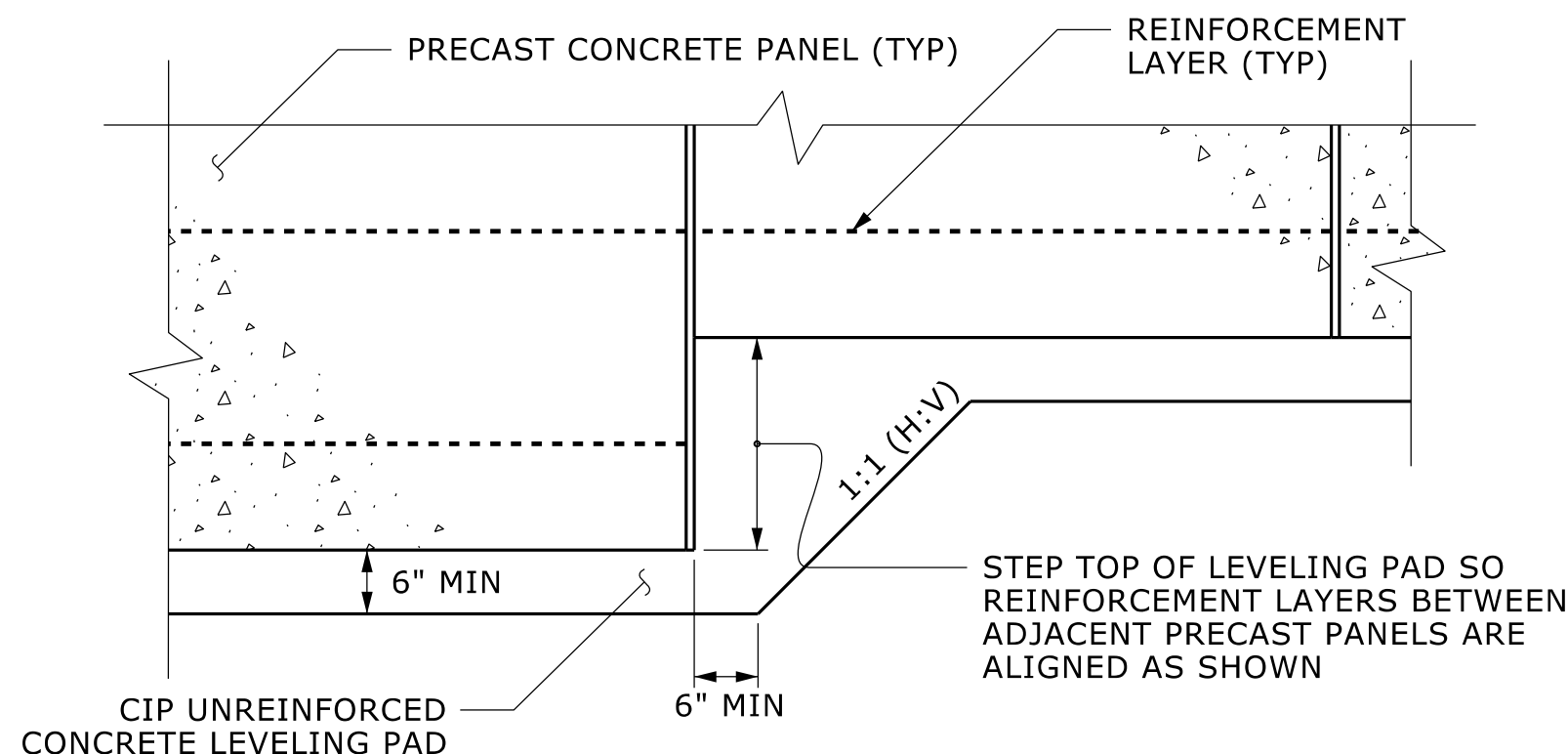
FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.3 MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.3.

FOUNDATIONS FOR END BENT NO.1 LOCATED AT STATION 22+75.08 -Y1- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.3. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO.3 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

INSTALL PILES AT END BENT NO. 1 PRIOR TO MSE WALL CONSTRUCTION.



PRECAST PANELS LEVELING PAD STEP DETAIL

MECKLENBURG COUNTY

SHEET 5 OF 5 WALL ID WALL 3

MSE RETAINING WALL NO.3 LEVELING PAD STEP DETAIL AND NOTES

REVISIONS						SHEET NO. W-15
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

Prepared in the Office of:



7327-G W. FRIENDLY AVE.,
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

BRIDGE 1416

POINT "C"
STA. 10+41.51 -WALL_4- =
STA. 24+32.77 -Y1-
OFFSET 31.84' LT

POINT "D"
STA. 10+48.32 -WALL_4- =
STA. 24+27+50 -Y1-
OFFSET 31.84' LT

POINT "E"
STA. 10+98.89 -WALL_4- =
STA. 24+25.11 -Y1-
OFFSET 18.67' RT

POINT "B"
STA. 10+21.95 -WALL_4- =
STA. 24+55.37 -Y1-
OFFSET 31.31' LT

BEGIN RETAINING WALL 4
POINT "A"
STA. 10+00.00 -WALL_4- =
STA. 24+78.75 -Y1-
OFFSET 33.10' LT

END RETAINING WALL 4
POINT "H"
STA. 11+44.66 -WALL_4- =
STA. 24+69.10 -Y1-
OFFSET 22.44' RT

POINT "G"
STA. 11+25.70 -WALL_4- =
STA. 24+58.18 -Y1-
OFFSET 19.08' RT

POINT "F"
STA. 11+05.48 -WALL_4- =
STA. 24+30.15 -Y1-
OFFSET 18.68' LT

YIRPD-

YB-

L3NB-

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UNLESS ALL SIGNATURES COMPLETED**

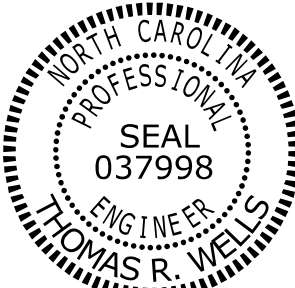
Technical drawing of a retaining wall cross-section showing dimensions, elevations, and stationing. The drawing includes a cross-section of a retaining wall with a sloped face and a vertical face. Key points are labeled: POINT 'A' (STA. 10+00.00, EL. 790.51), POINT 'B' (STA. 10+21.95, EL. 791.65), POINT 'C' (STA. 10+41.51, EL. 791.94), POINT 'D' (STA. 10+48.32, EL. 780.87), POINT 'E' (STA. 10+98.89, EL. 780.87), POINT 'F' (STA. 11+05.48, EL. 792.32), POINT 'G' (STA. 11+25.70, EL. 791.61), and POINT 'H' (STA. 11+44.66, EL. 790.78). The wall is labeled 'WALL 4' and 'WALL ID WALL_4'. The drawing also shows the 'EXISTING GROUNDLINE' and 'FINISHED GRADE'. A table titled 'ESTIMATED MSE WALL QUANTITY' shows a total of 4,005 square feet. The project is identified as 'PROJECT NO.: 50128.1.FS1(I-5715)' and 'MECKLENBURG COUNTY'.

ESTIMATED MSE WALL QUANTITY	
RETAINING WALL NO.	MSE RETAINING WALL (SQ. FEET)*
4	4,005
* INCLUDES MINIMUM EXTENSION AND EMBEDMENT	

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 24+78.75 TO 24+69.10 -Y1-
SHEET 1 OF 5 WALL ID WALL_4

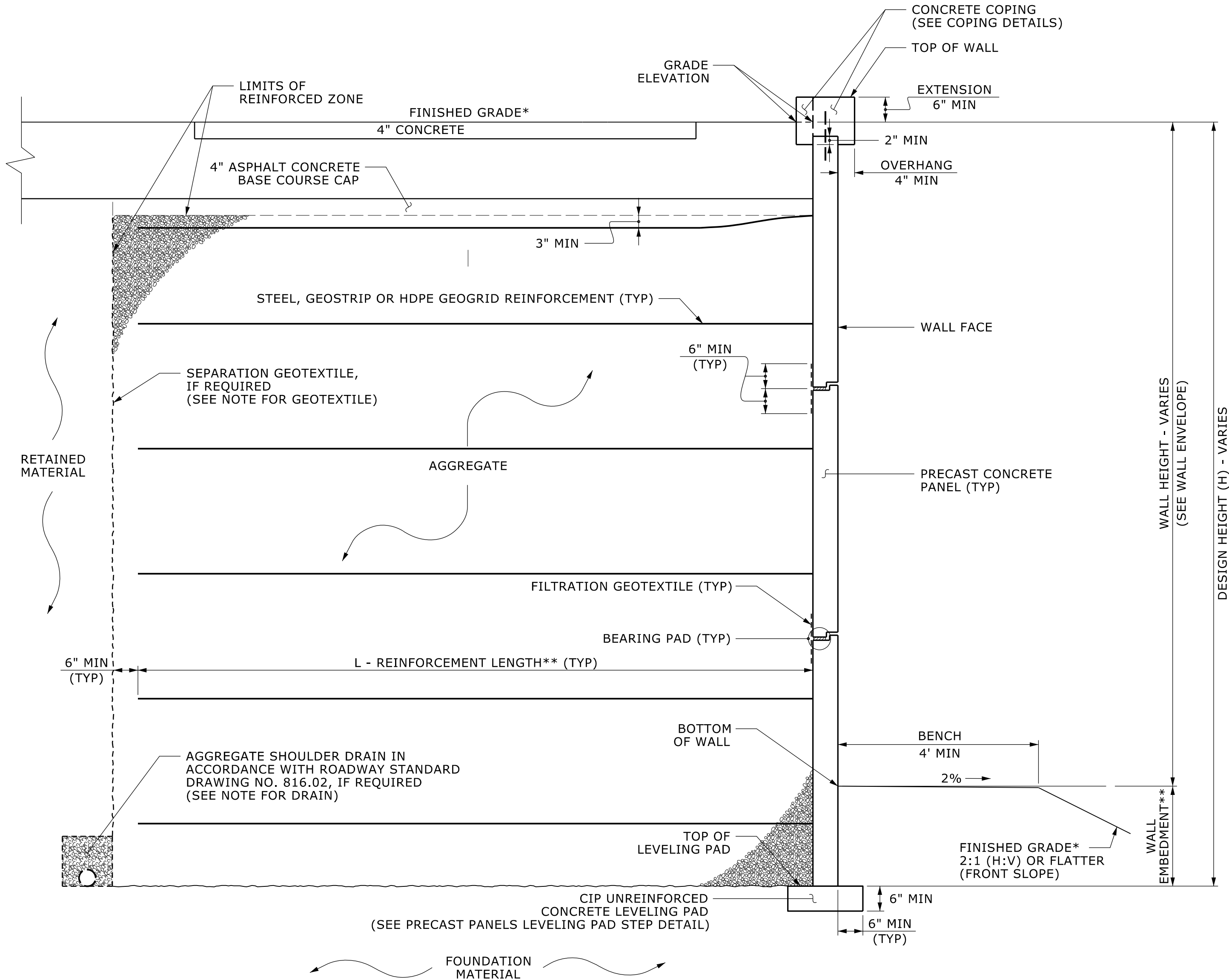
PROJECT NO.: 50128.1.FS1(I-5715) 760
MECKLENBURG COUNTY
STATION: STA. 24+78.75 TO 24+69.10 -Y1-
SHEET 1 OF 5 WALL ID WALL_4

REVISIONS						SHEET NO. W-16
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



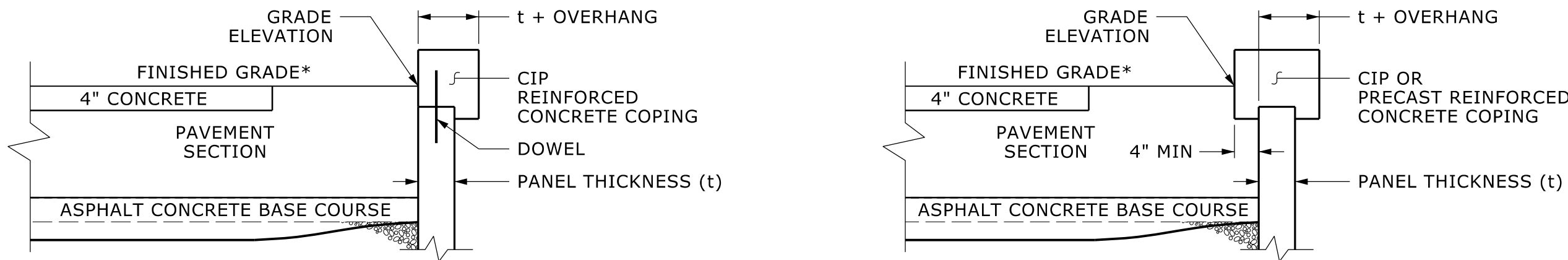
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
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MSE WALL WITH PRECAST PANELS - TYPICAL SECTION A-A

*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.



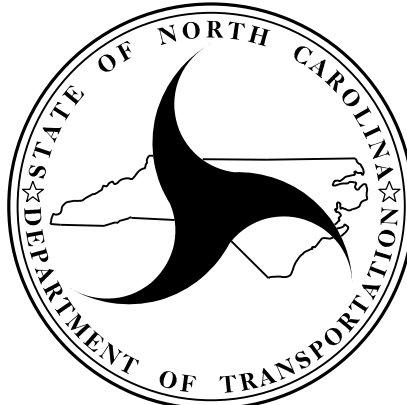
COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 24+78.75 TO 24+69.10 -Y1-
SHEET 2 OF 5 WALL ID WALL_4

PREPARED BY: T. WELLS DATE: 11/25
REVIEWED BY: D. CORLEY DATE: 11/25

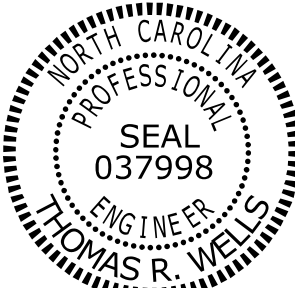
Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



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

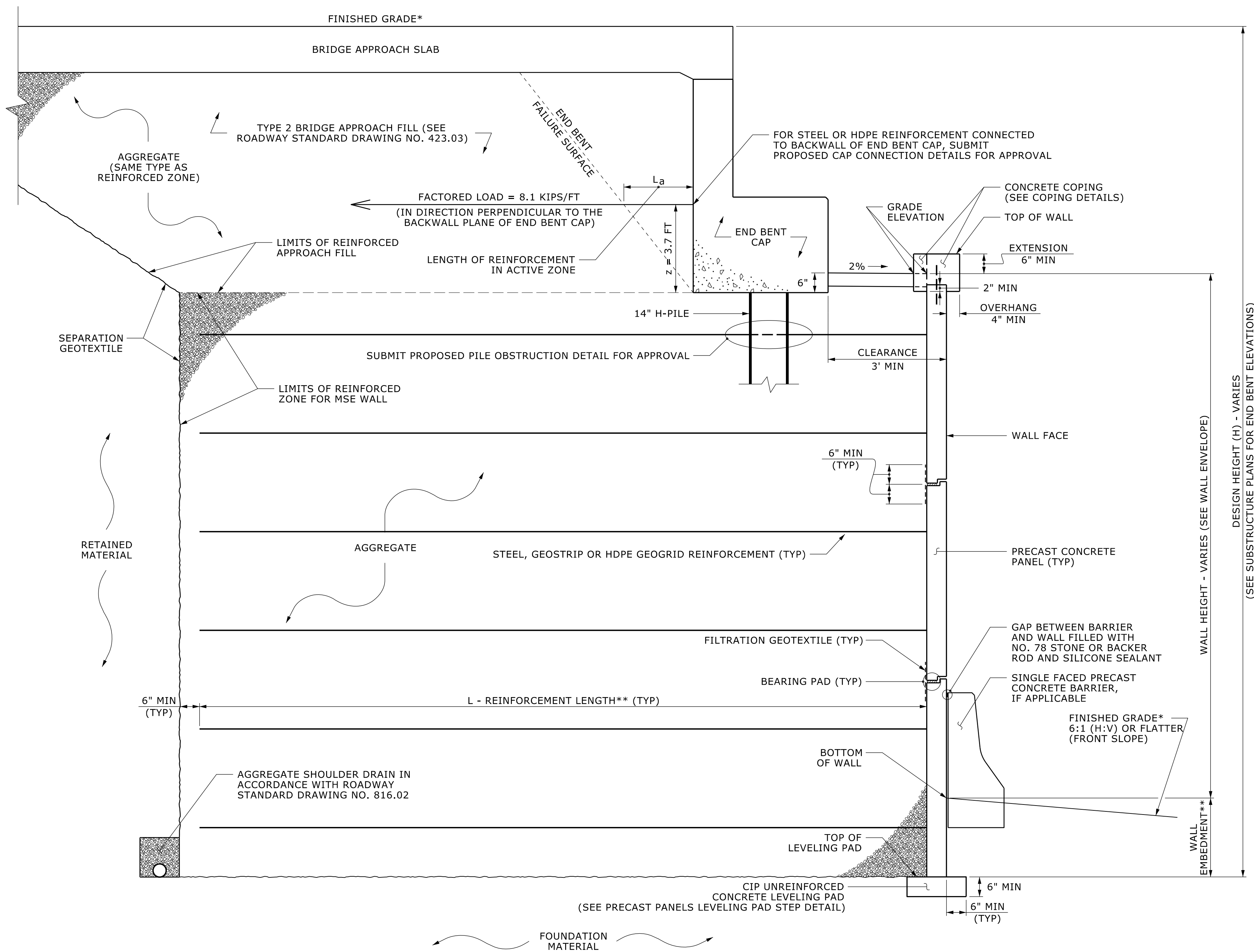
MSE RETAINING WALL NO.4
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-17
2			4			



Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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

*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.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

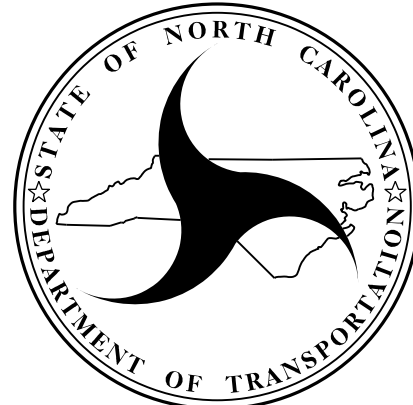
STATION: STA. 24+78.75 TO 24+69.10 -Y1-

SHEET 3 OF 5 WALL ID WALL_4

Prepared in the Office of:



7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

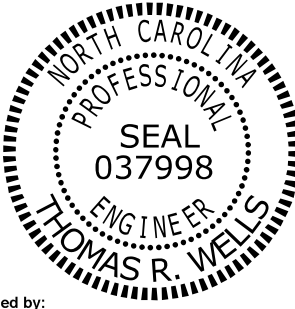
MSE RETAINING WALL NO.4
TYPICAL AND COPING DETAILS

REVISIONS

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

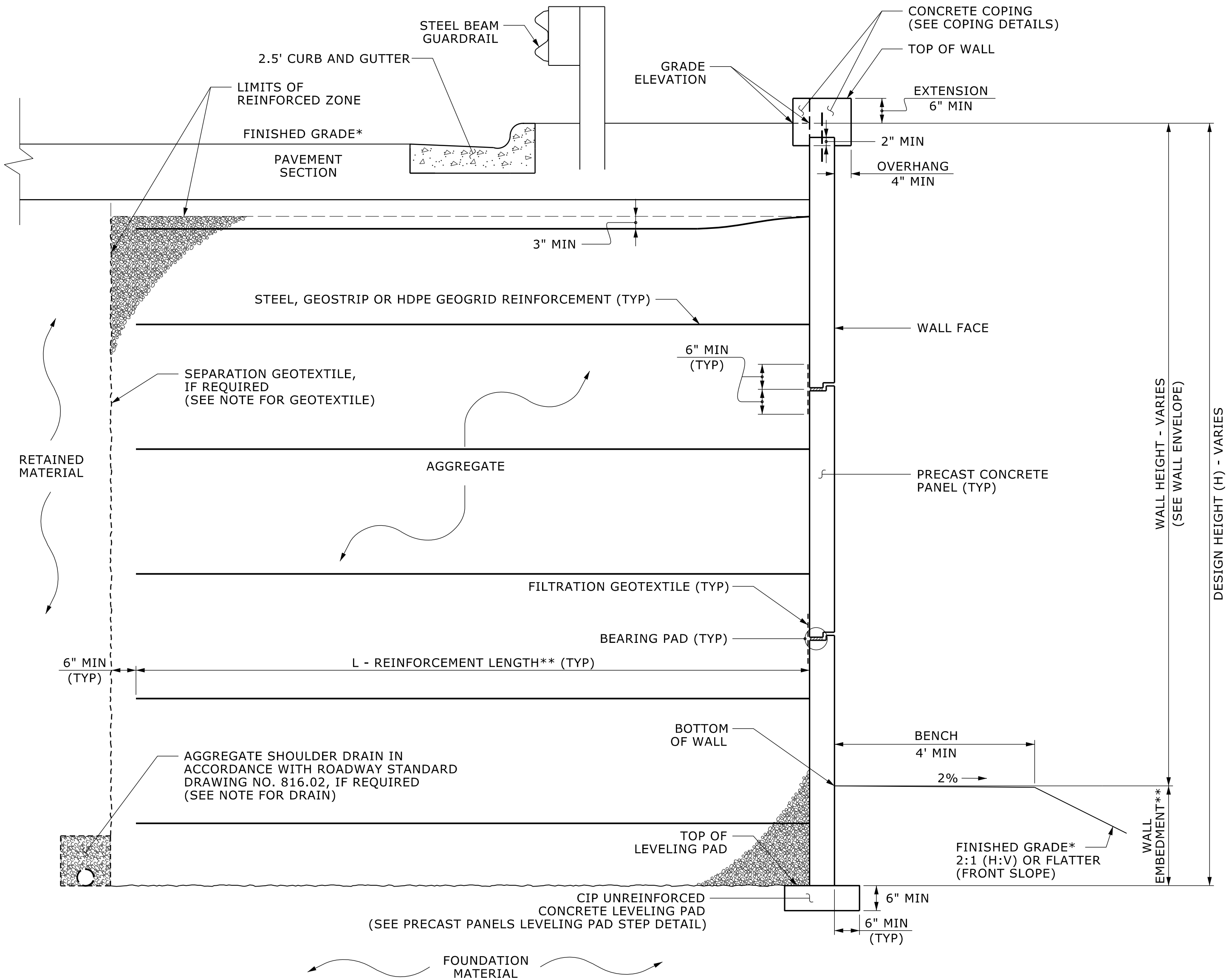
SHEET
NO.
W-18

PREPARED BY: T. WELLS DATE: 11/25
REVIEWED BY: D. CORLEY DATE: 11/25



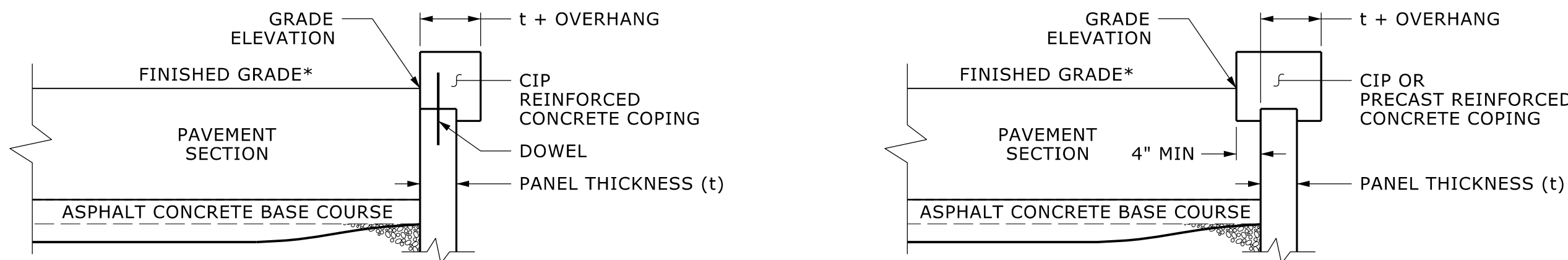
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

*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.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 24+78.75 TO 24+69.10 -Y1-
SHEET 4 OF 5 WALL ID WALL_4

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.4
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-19
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.4.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.4.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.4, 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 WALL NO.4 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) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER
6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	110	27	0

DESIGN RETAINING WALL NO.4 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.2 LOCATED AT STATION 24+32.58 -Y1-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

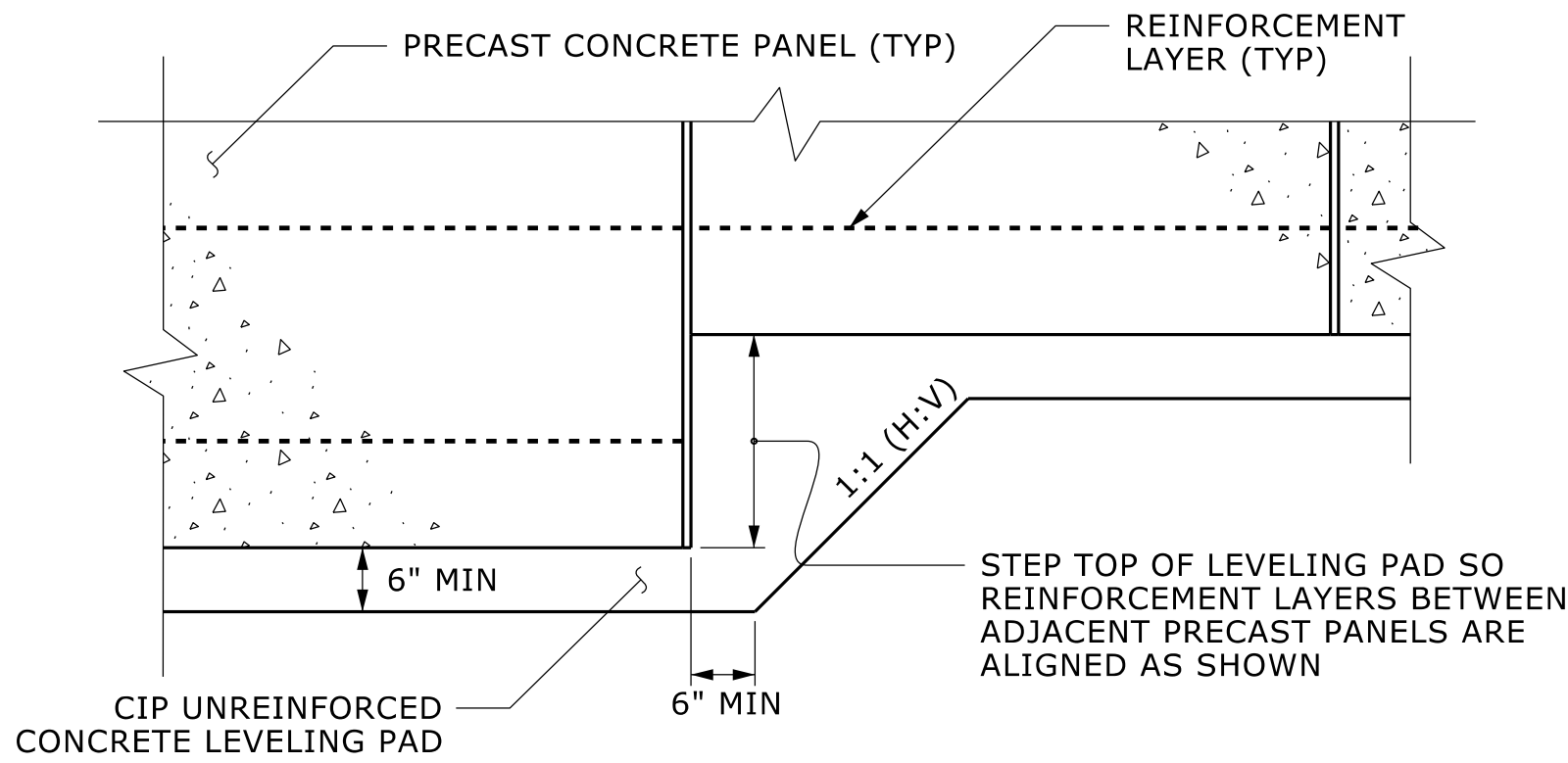
FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.4 MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.4.

FOUNDATIONS FOR END BENT NO.2 LOCATED AT STATION 24+32.58 -Y1- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.4. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO.4 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

INSTALL PILES AT END BENT NO. 2 PRIOR TO MSE WALL CONSTRUCTION.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

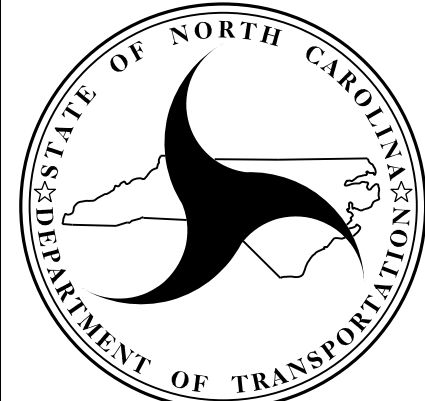
STATION: STA. 24+78.75 TO 24+69.10 -Y1-

SHEET 5 OF 5 WALL ID WALL_4

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

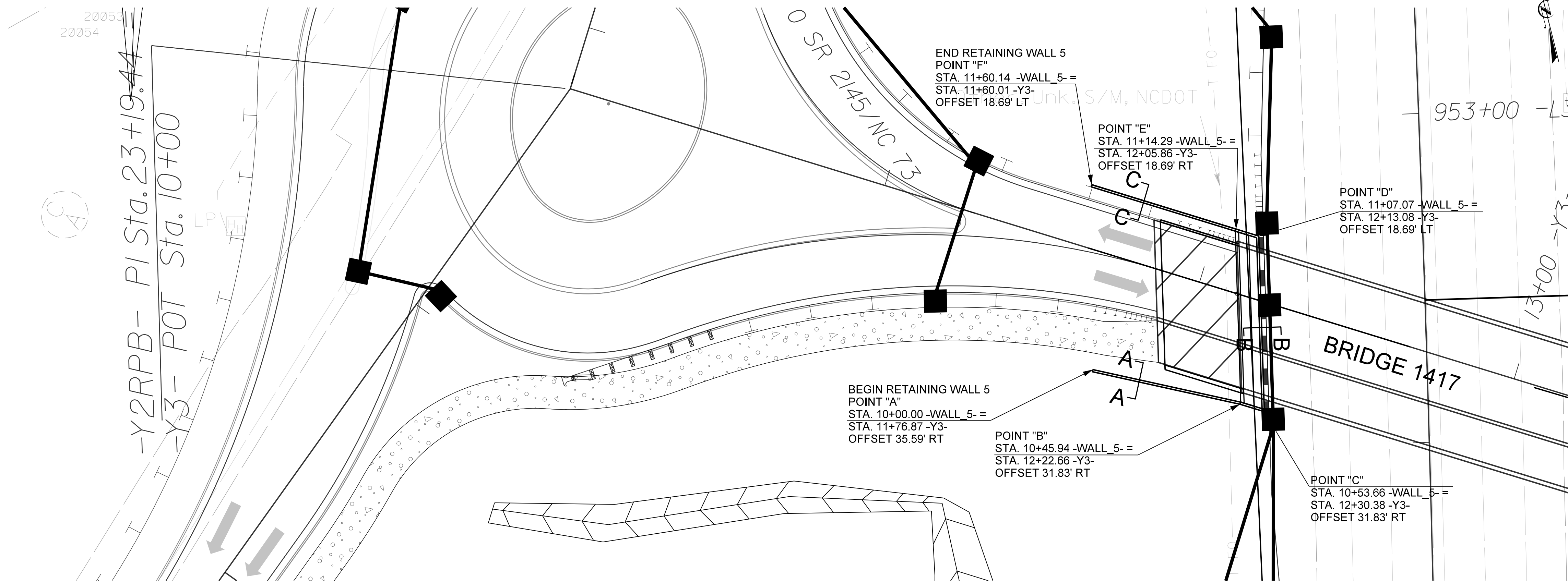
GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO.4
LEVELING PAD STEP
DETAIL AND NOTES

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

SHEET NO.
W-20

MSE RETAINING WALL NO.5 PLAN



PROJECT REFERENCE NO.
I-5715

SHEET NO.
W-21

GEOTECHNICAL ENGINEER

ENGINEER

Seal: NORTH CAROLINA PROFESSIONAL SEAL 037998 ENGINEER THOMAS R. WELLS

Signed by: Thomas R. Wells 02/23/2026 F39C777458804EA

SIGNATURE

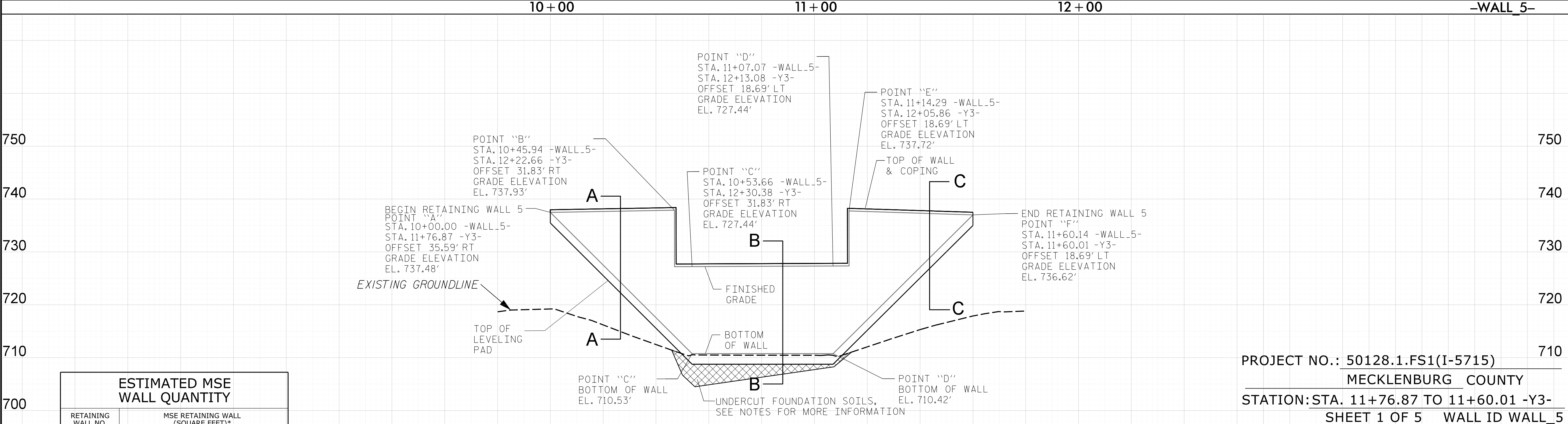
DATE

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MSE RETAINING WALL NO.5 ENVELOPE



ESTIMATED MSE WALL QUANTITY	
RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FEET)*
5	4,800
* INCLUDES MINIMUM EXTENSION AND EMBEDMENT	

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE., GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

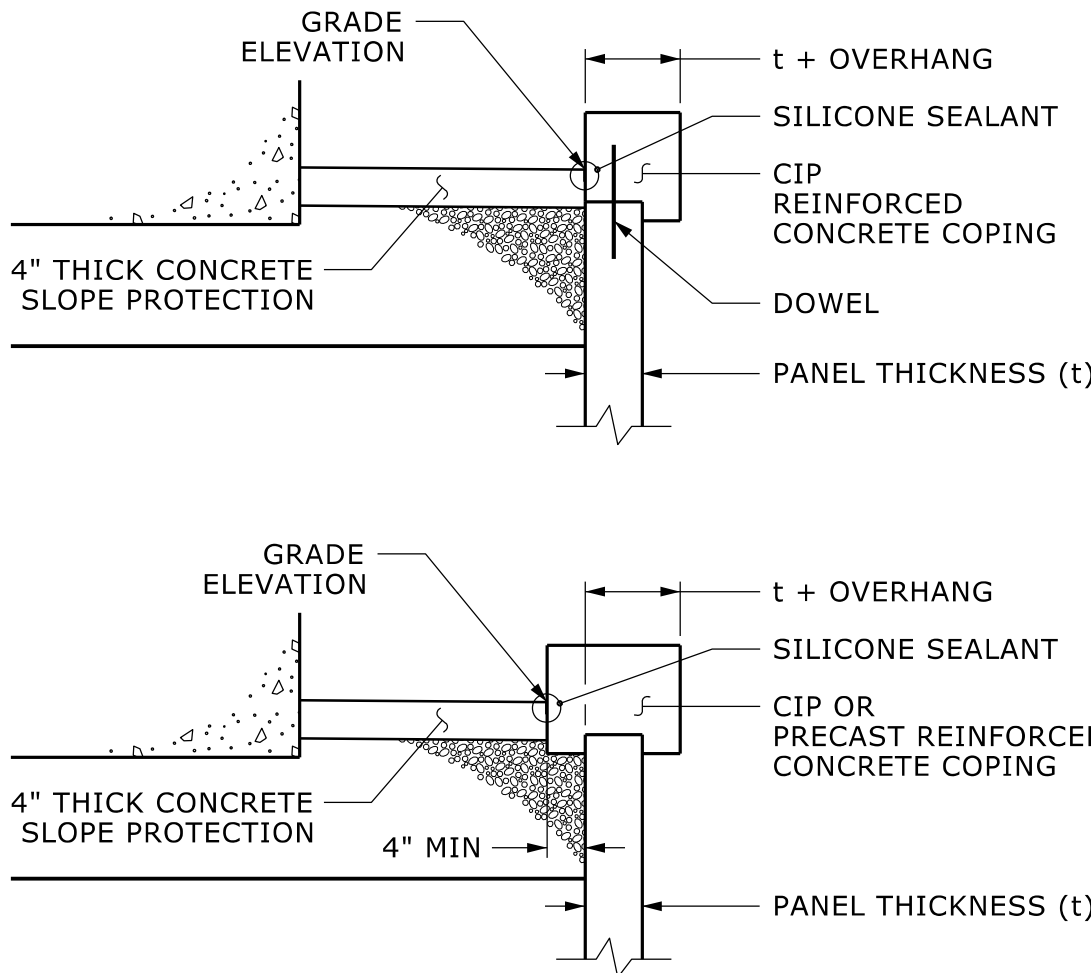
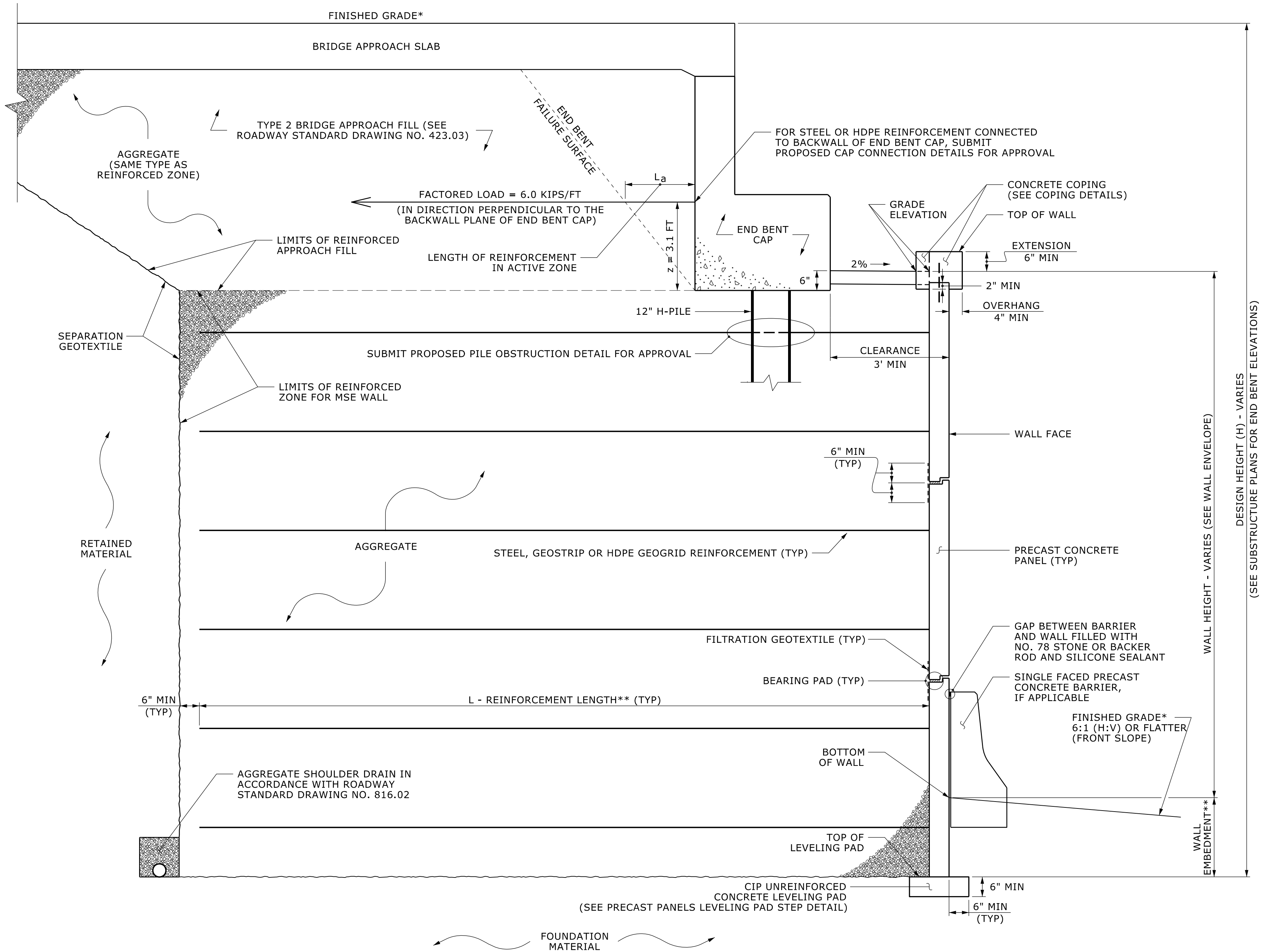
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

MSE RETAINING WALL NO.5
PLAN AND ENVELOPE

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

SHEET NO.
W-21



COPING DETAILS

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

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

*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.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 11+76.87 TO 11+60.01 -Y3-

SHEET 3 OF 5 WALL ID WALL-5

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:



7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



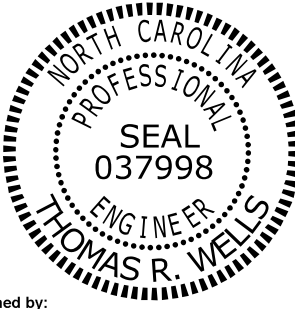
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

REVISIONS						SHEET NO. W-23
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

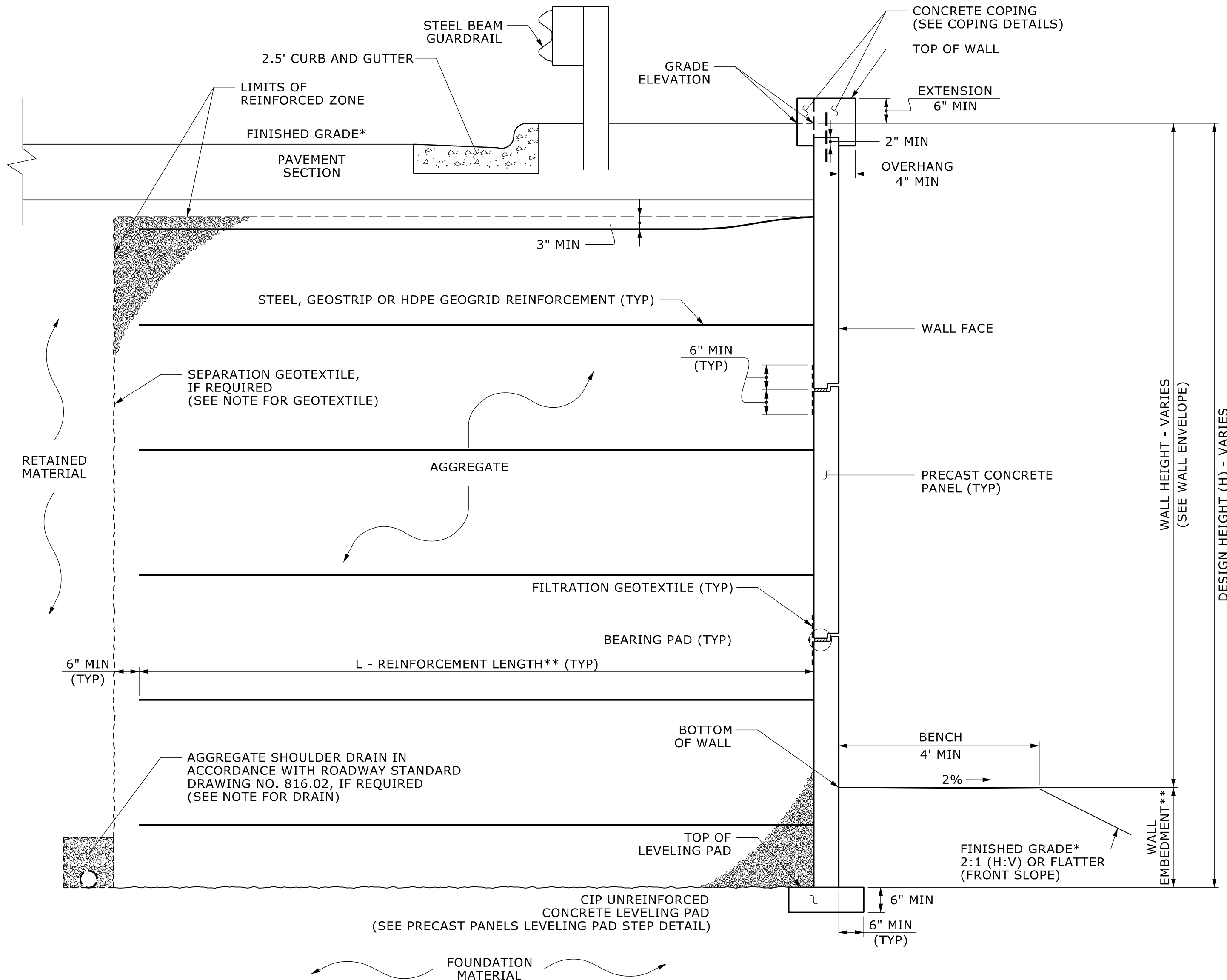
GEOTECHNICAL

ENGINEER



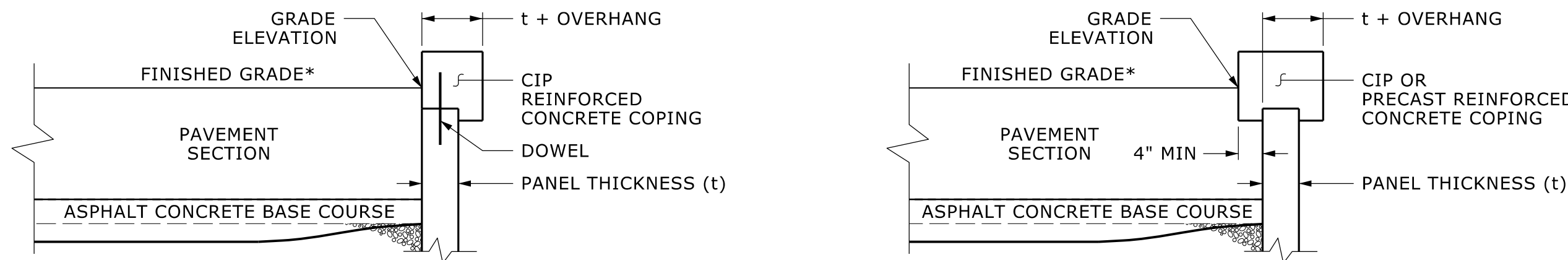
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

*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.



COPING DETAILS

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

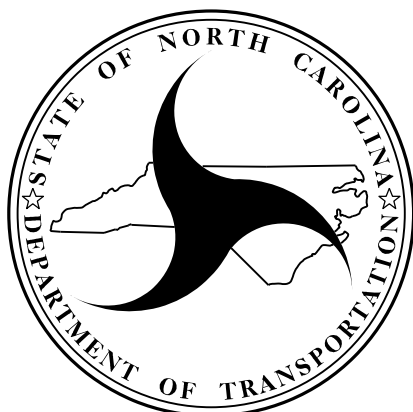
PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 11+76.87 TO 11+60.01 -Y3-
SHEET 4 OF 5 WALL ID WALL-5

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

MSE RETAINING WALL NO.5
AND COPING DETAILS

REVISIONS						SHEET NO. W-24
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

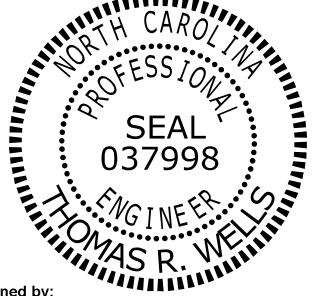
PROJECT REFERENCE NO.

I-5715

SHEET NO.

W-25

GEOTECHNICAL



Signed by:

Thomas R. Wells

02/23/2026

F38C777458854EA.

SIGNATURE

DATE

ENGINEER

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

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

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.5.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.5.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.5, 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 WALL NO.5 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) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER

5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER

6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

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

DESIGN RETAINING WALL NO.5 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.1 LOCATED AT STATION 12+12.01 -Y3-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.5 MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.5.

FOUNDATIONS FOR END BENT NO.1 LOCATED AT STATION 12+12.01 -Y3- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.5. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO.5 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

UNDERCUT FOUNDATION SOILS AS SHOWN ON THE RETAINING WALL PROFILE AND BACKFILL WITH COMMON BORROW FOR EMBANKMENT CONSTRUCTION TO SUBGRADE SHALL MEET PIEDMONT AND WESTERN AREA CRITERIA AS DESCRIBED IN SECTION 1018-2(A) OF THE STANDARD SPECIFICATIONS.

INSTALL PILES AT END BENT NO. 1 PRIOR TO MSE WALL CONSTRUCTION.

PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 11+76.87 TO 11+60.01 -Y3-

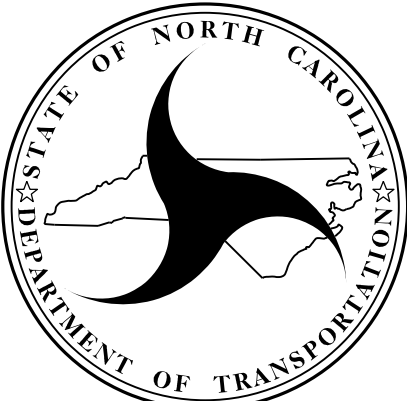
SHEET 5 OF 5 WALL ID WALL_5

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:



7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

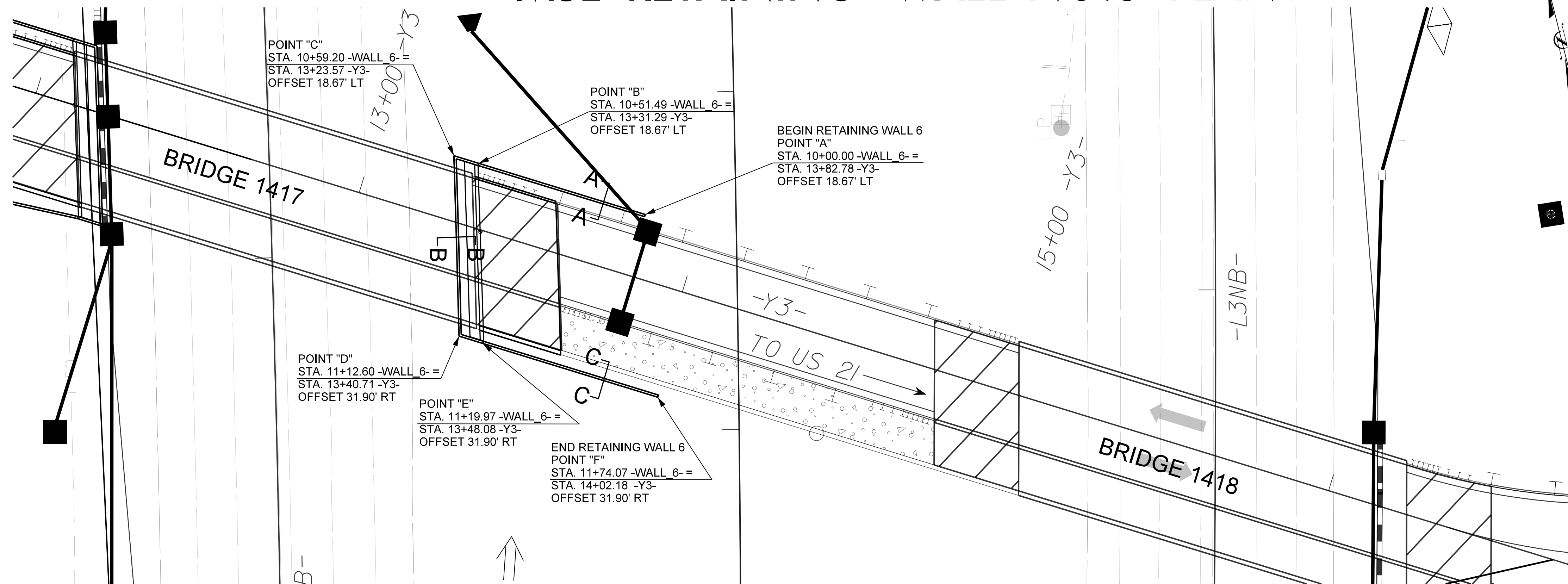
MSE RETAINING WALL NO.5
LEVELING PAD STEP
DETAIL AND NOTES

REVISIONS

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

SHEET NO.
W-25

PROJECT REFERENCE NO.		SHEET NO.	
I-5715		W-26	
GEOTECHNICAL ENGINEER 		ENGINEER	
Signed by: 02/23/2026 F38C777458854EA		_____ DATE	
SIGNATURE		DATE	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



Technical drawing of a retaining wall (WALL 6) showing elevation, stationing, and estimated MSE wall quantity.

EXISTING GROUNDLINE

TOP OF LEVELING PAD

FINISHED GRADE

BOTTOM OF WALL

POINT "A"
STA. 10+00.00 -WALL_6-
STA. 13+82.78 -Y3-
OFFSET 18.67' LT
GRADE ELEVATION EL. 743.00'

POINT "B"
STA. 10+51.49 -WALL_6-
STA. 13+31.29 -Y3-
OFFSET 18.67' LT
GRADE ELEVATION EL. 741.22'

POINT "C"
STA. 10+59.20 -WALL_6-
STA. 13+23.57 -Y3-
OFFSET 18.67' LT
GRADE ELEVATION EL. 730.83'

POINT "D"
STA. 11+12.60 -WALL_6-
STA. 13+40.71 -Y3-
OFFSET 31.90' RT
GRADE ELEVATION EL. 730.83'

POINT "E"
STA. 11+19.97 -WALL_6-
STA. 13+48.08 -Y3-
OFFSET 31.90' RT
GRADE ELEVATION EL. 741.43'

POINT "F"
STA. 11+74.07 -WALL_6-
STA. 14+02.18 -Y3-
OFFSET 31.90' RT
GRADE ELEVATION EL. 743.81'

ESTIMATED MSE WALL QUANTITY

RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FEET)*
6	5,315

* INCLUDES MINIMUM EXTENSION AND EMBEDMENT

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 13+82.78 TO 14+02.18 -Y3-

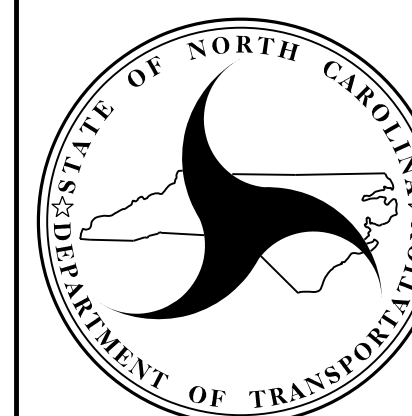
SHEET 2 OF 5 WALL ID WALL 6

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

 **Terracon**

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM E-0869
NC REGISTERED FIRM E-267

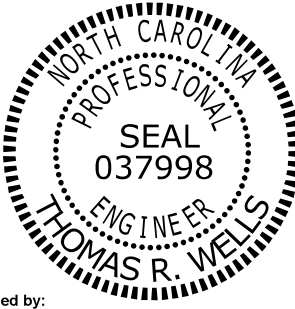


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

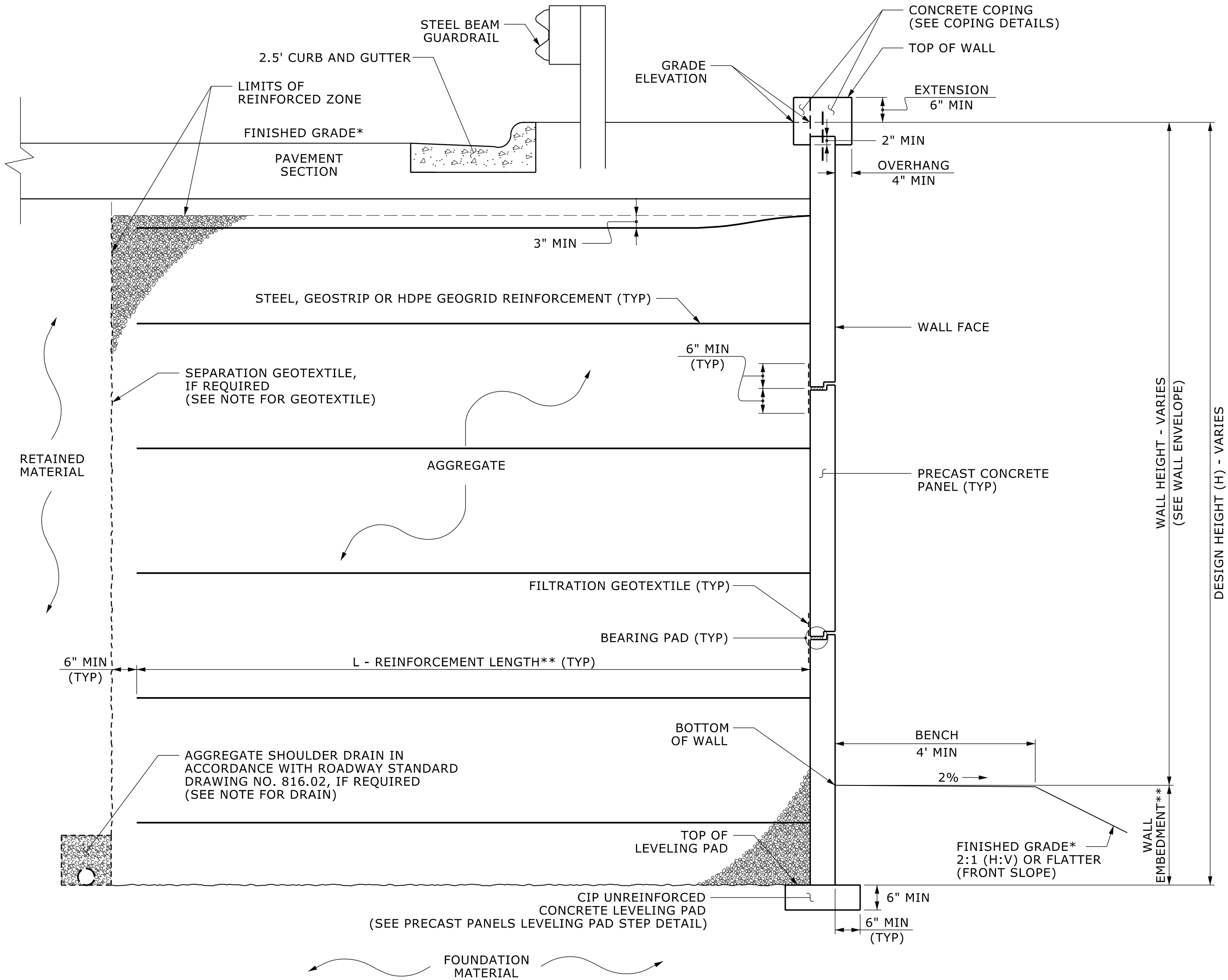
MSE RETAINING WALL NO.6 PLAN AND ENVELOPE

REVISIONS						SHEET NO. W-26
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



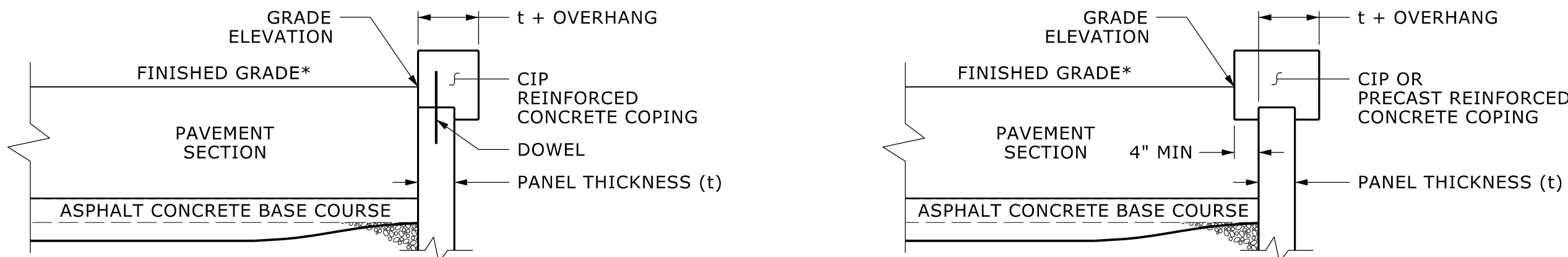
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA...
SIGNATURE DATE

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UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION A-A

*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.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 13+82.78 TO 14+02.18 -Y3-
SHEET 2 OF 5 WALL ID WALL_6

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

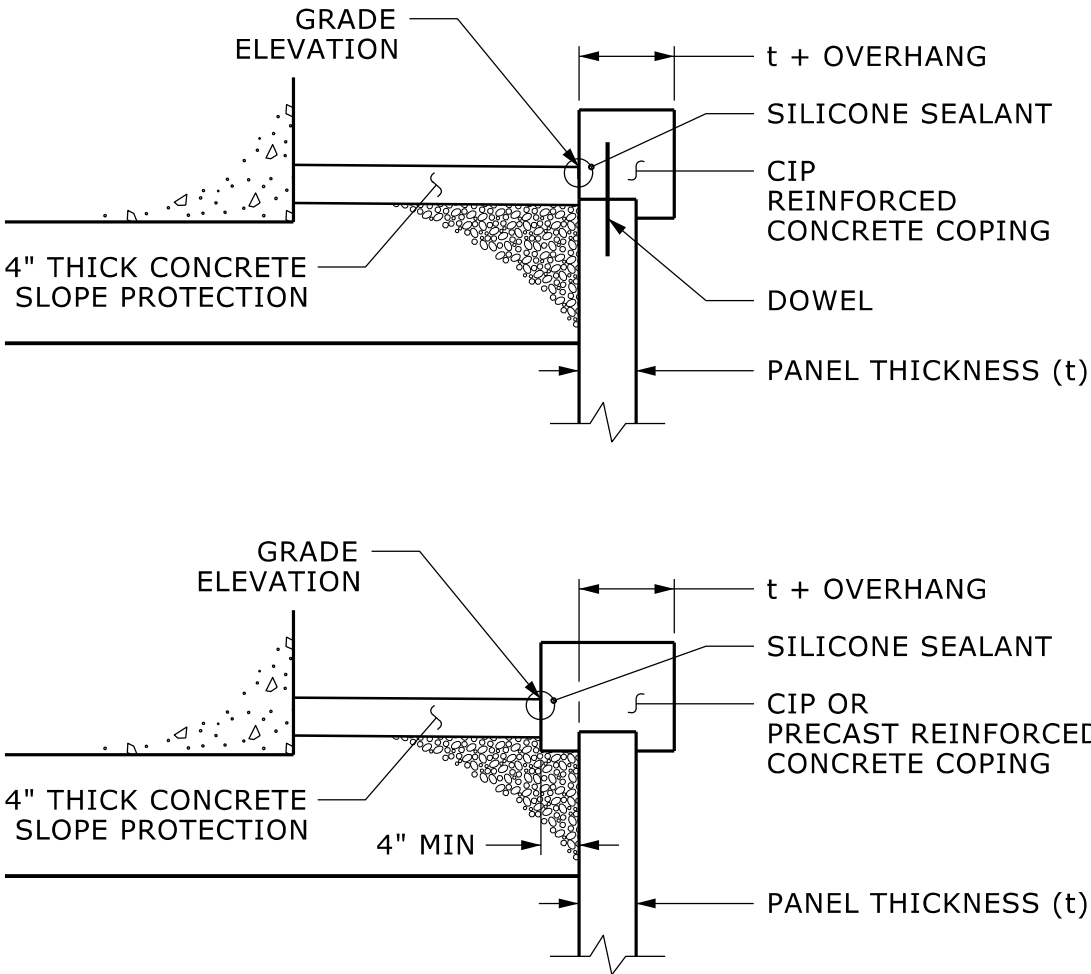
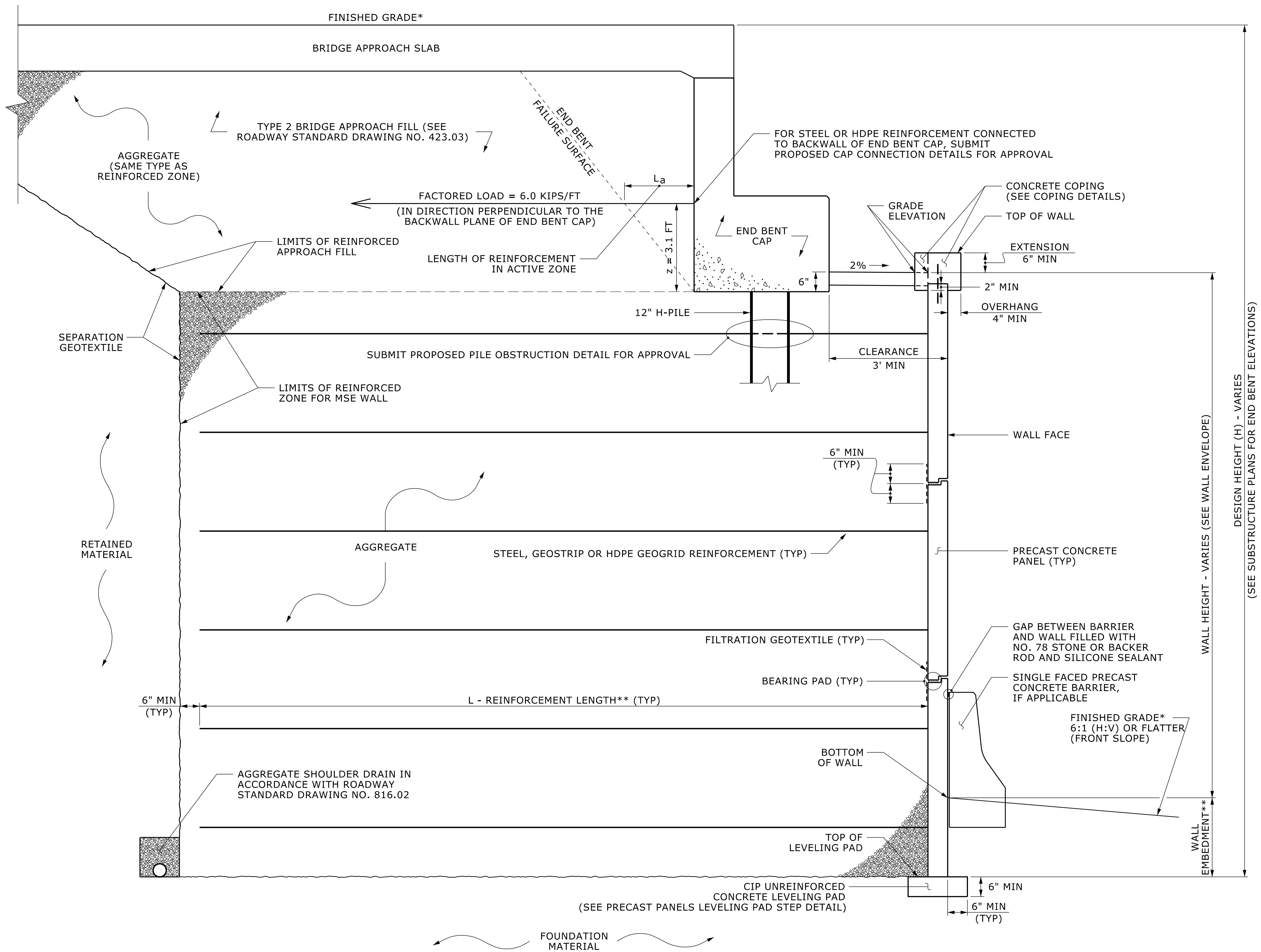


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

MSE RETAINING WALL NO.6
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-27
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



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

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

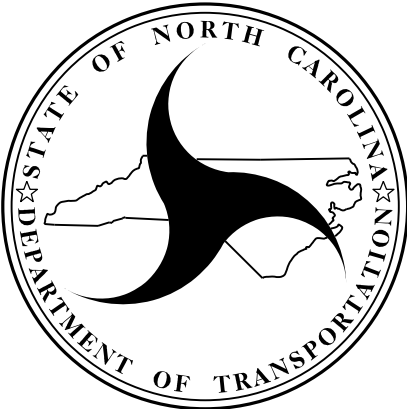
PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 13+82.78 TO 14+02.18 -Y3-
SHEET 3 OF 5 WALL ID RW-6-

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:



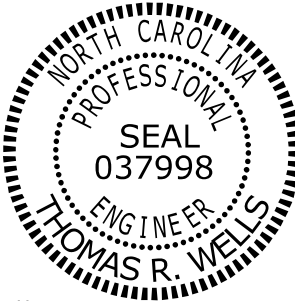
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

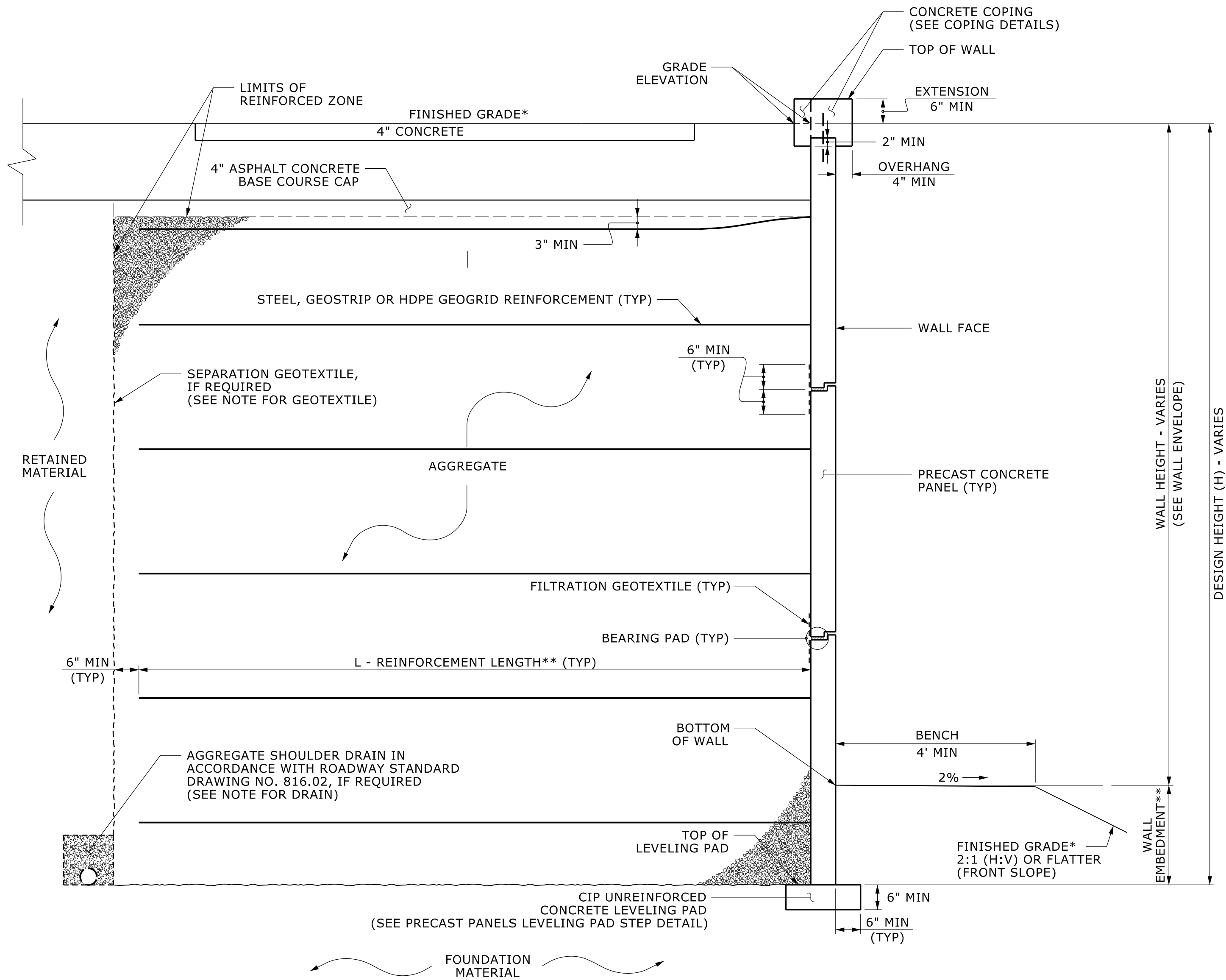
GEOTECHNICAL
ENGINEERING UNIT

REVISIONS						SHEET NO. W-28
NO.	BY	DATE	NO.	BY	DATE	
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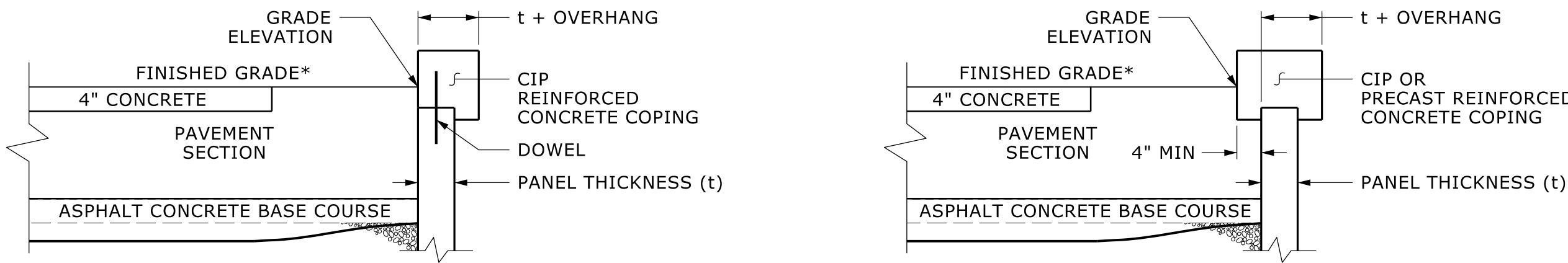
Signed by: Thomas R. Wells 02/23/2026
F38C777458854E.A. SIGNATURE DATE

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UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

*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.



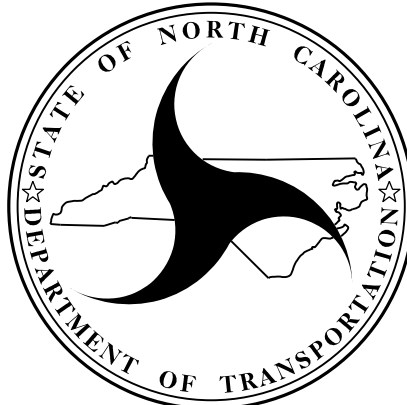
COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 13+82.78 TO 14+02.18 -Y3-
SHEET 4 OF 5 WALL ID WALL_6

PREPARED BY: T. WELLS DATE: 11/25
REVIEWED BY: D. CORLEY DATE: 11/25

Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



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

MSE RETAINING WALL NO.6
AND COPING DETAILS

REVISIONS						SHEET NO. W-29
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PROJECT REFERENCE NO.

I-5715

SHEET NO.

W-30

GEOTECHNICAL ENGINEER

THOMAS R. WELLS

ENGINEER

SEAL 037998

NORTH CAROLINA PROFESSIONAL

Signed by:

Thomas R. Wells

02/23/2026

F38C777458854EA...

ENGINEER

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

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

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.6.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.6.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.6, 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 WALL NO.6 FOR THE FOLLOWING:

1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT

2) DESIGN LIFE = 100 YEARS

3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,500 PSF

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER

5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER

6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO.6 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.2 LOCATED AT STATION 13+37.43 -Y3-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

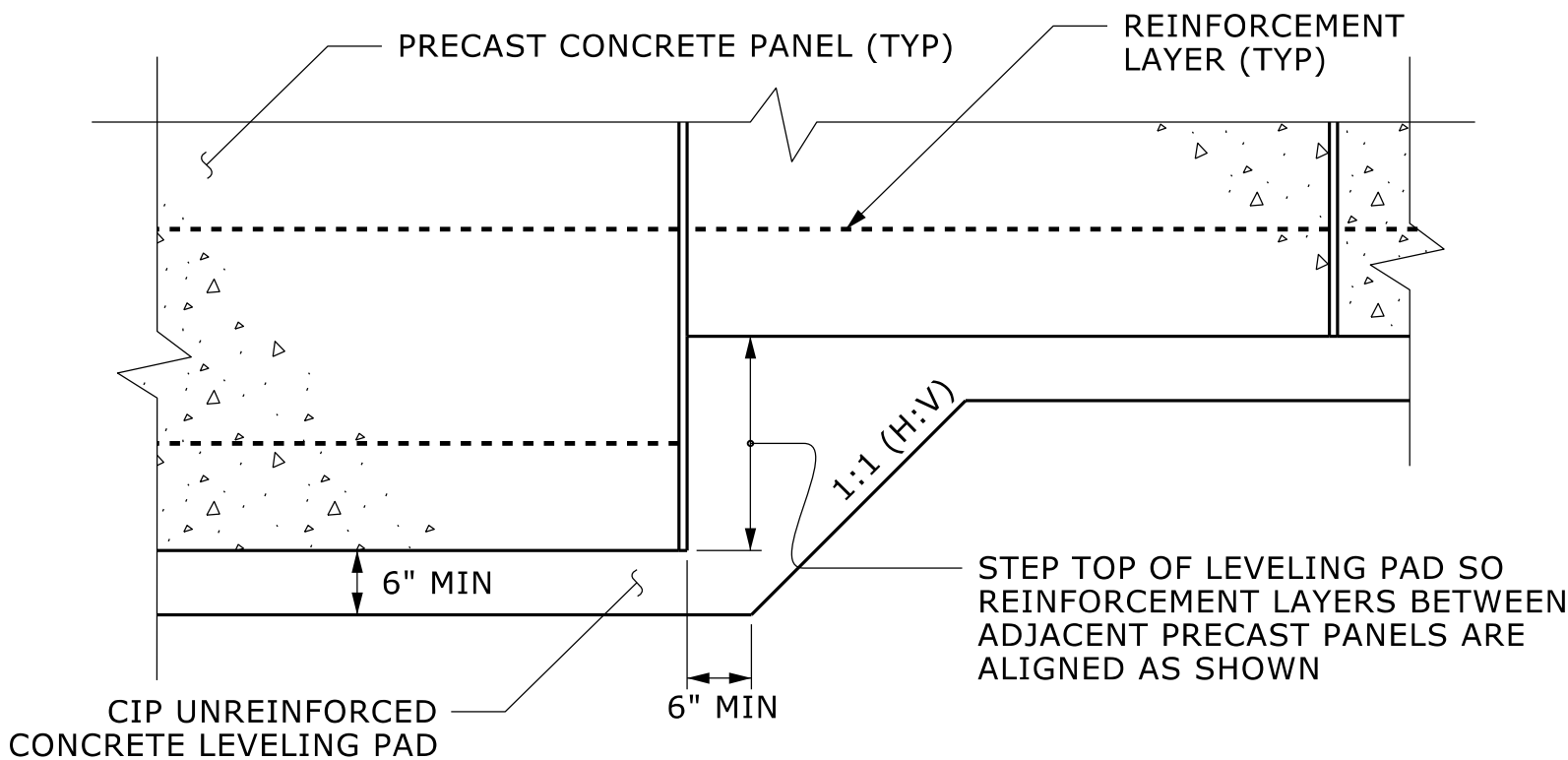
FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.6 AND MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.6.

FOUNDATIONS FOR END BENT NO.2 LOCATED AT STATION 13+37.43 -Y3- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.6. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO.6 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

INSTALL PILES AT END BENT NO. 2 PRIOR TO MSE WALL CONSTRUCTION.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 13+82.78 TO 14+02.18 -Y3-

SHEET 5 OF 5 WALL ID WALL_6

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA

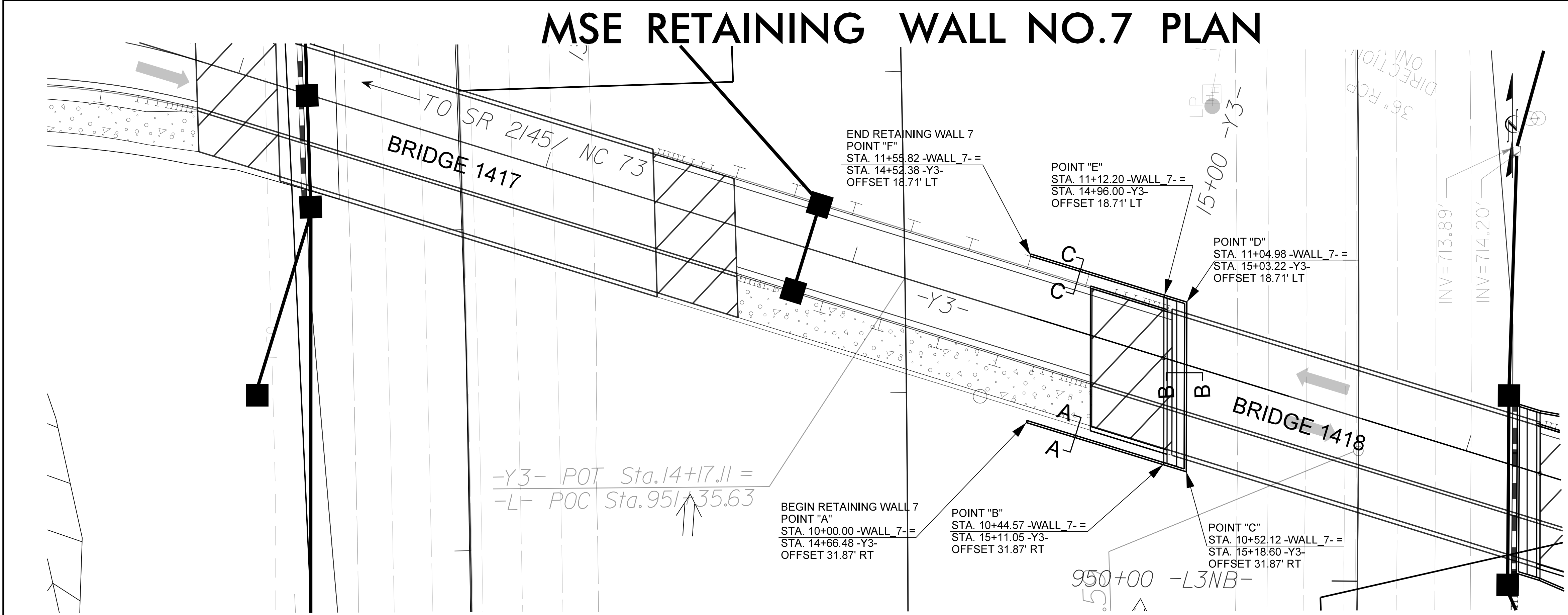
DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

REVISIONS						SHEET NO. W-30
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



PROJECT REFERENCE NO.
I-5715

SHEET NO.
W-31

GEOTECHNICAL ENGINEER

ENGINEER

Seal of Thomas R. Wells, North Carolina Professional Engineer, No. 037998

Signed by: Thomas R. Wells 02/23/2026
F39C7774585546A

SIGNATURE

DATE

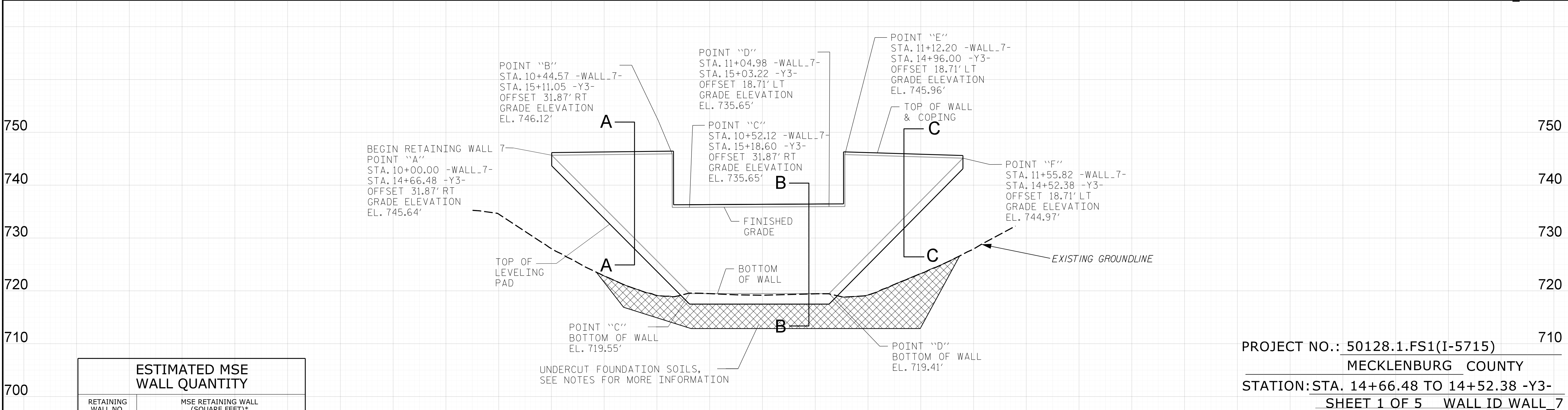
SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MSE RETAINING WALL NO.7 ENVELOPE

9+0010+0011+0012+00-WALL_7-



ESTIMATED MSE WALL QUANTITY	
RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FEET)*
7	4,590
* INCLUDES MINIMUM EXTENSION AND EMBEDMENT	

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: P-0869
NC REGISTERED GEOLOGIC FIRM: C-367

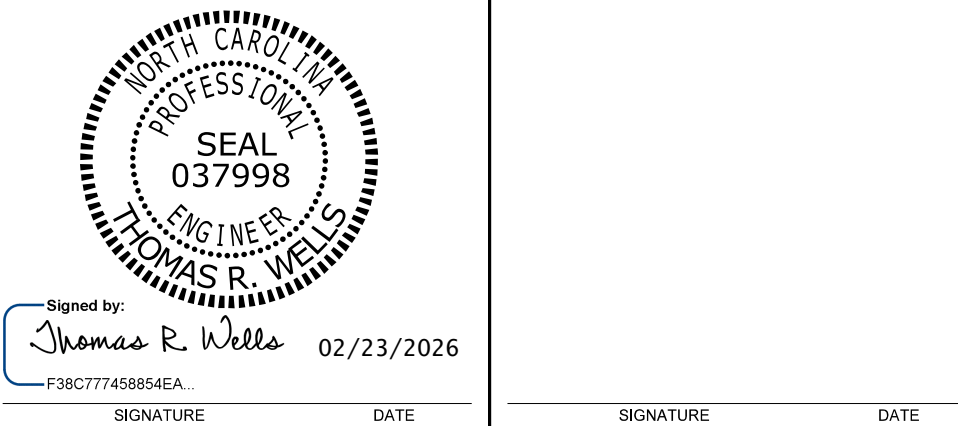
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

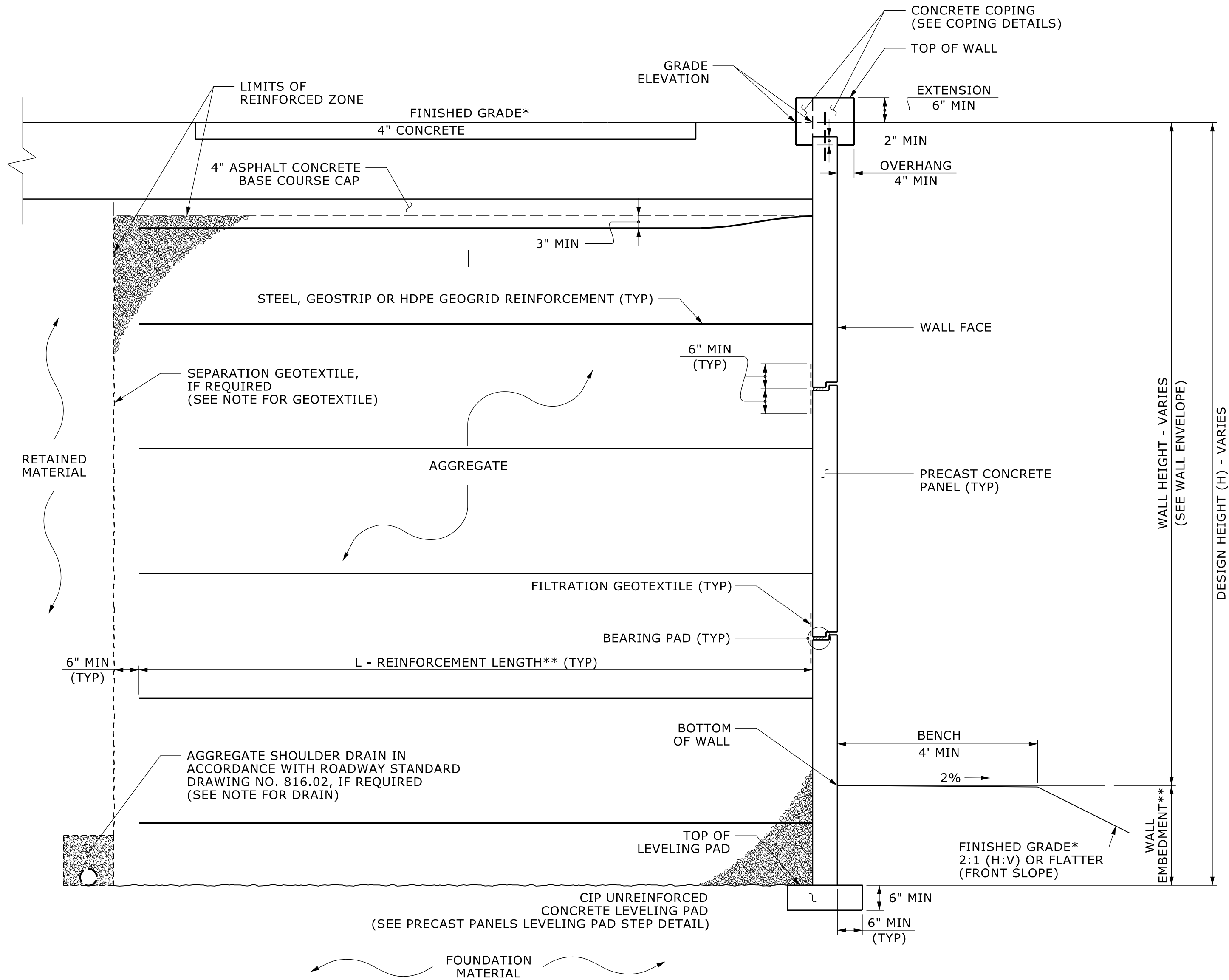
MSE RETAINING WALL NO. 7
PLAN AND ENVELOPE

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

SHEET NO.
W-31

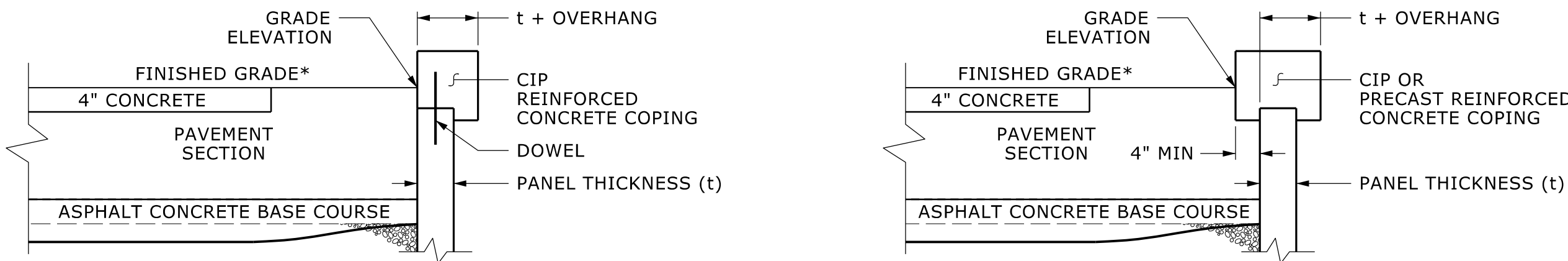


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UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION A-A

*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.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 14+66.48 TO 14+52.38 -Y3-
SHEET 2 OF 5 WALL ID WALL_7

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO. 7
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-32
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

GEOTECHNICAL

SEAL

037998

ENGINEER

THOMAS R. WELLS

Signed by:

Thomas R. Wells

02/23/2026

F38C777458854EA...

ENGINEER

SIGNATURE

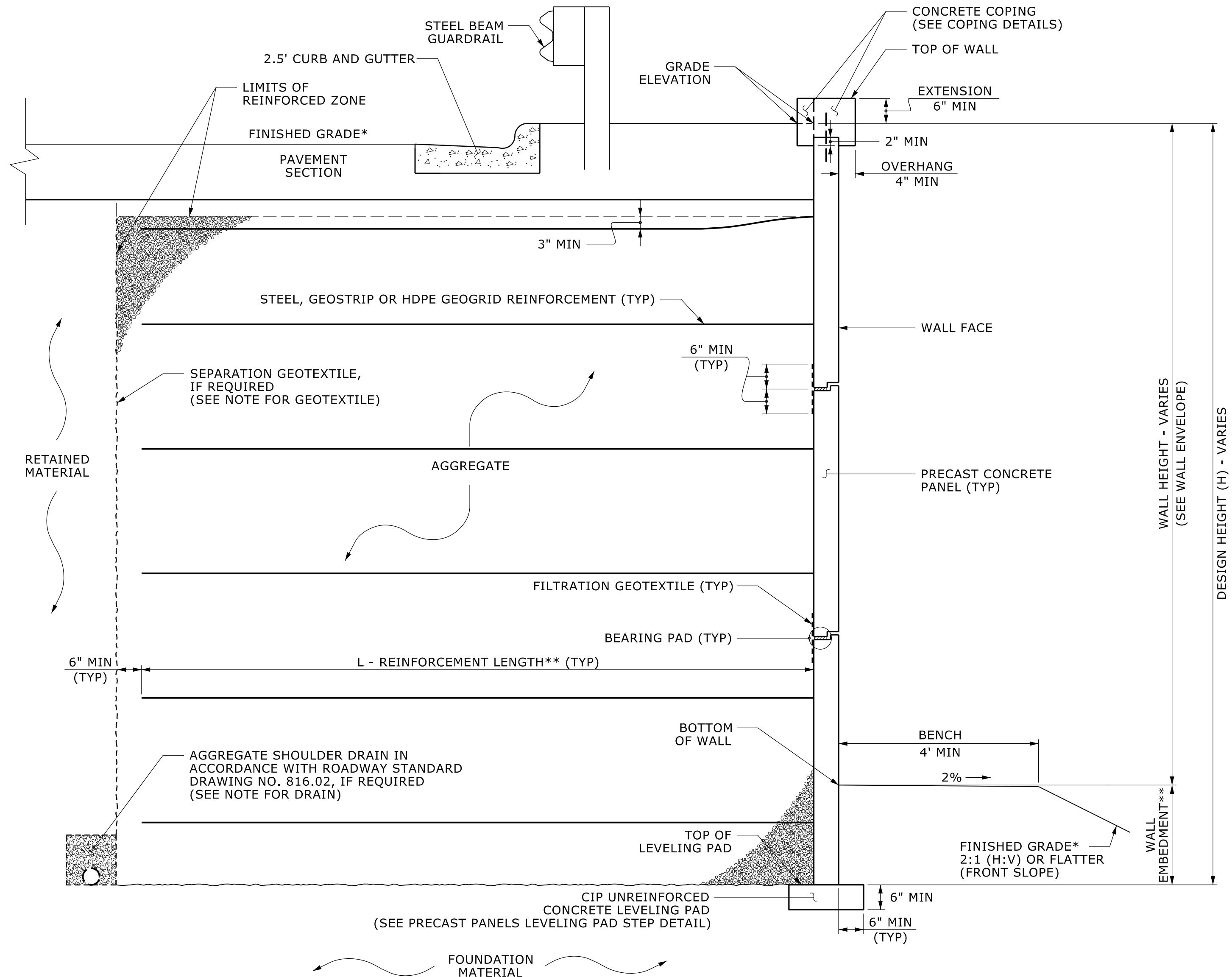
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SIGNATURE

DATE

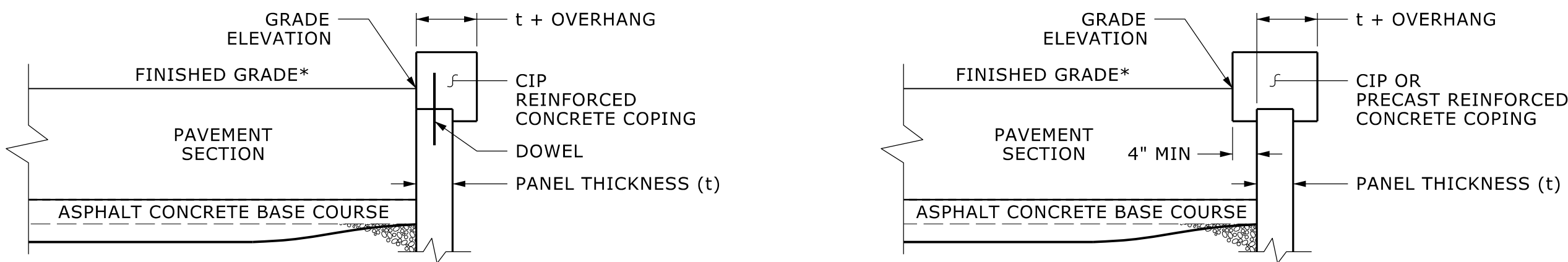
DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

*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.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 14+66.48 TO 14+52.38 -Y3-
SHEET 4 OF 5 WALL ID WALL_7

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL

ENGINEERING UNIT

REVISIONS						SHEET NO. W-34
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PROJECT REFERENCE NO.

I-5715

SHEET NO.

W-35

GEOTECHNICAL

SEAL

037998

ENGINEER

THOMAS R. WELLS

Signed by:

Thomas R. Wells

02/23/2026

F38C777458854EA

SIGNATURE

DATE

ENGINEER

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

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

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO.7. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.7.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.7.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.7, 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 WALL NO.7 FOR THE FOLLOWING:

1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT

2) DESIGN LIFE = 100 YEARS

3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,200 PSF

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER

5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER

6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO.7 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.1 LOCATED AT STATION 15+01.51 -Y3- MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR SIGNS, LIGHTING OR SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.7 MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.7.

FOUNDATIONS FOR END BENT NO.1 LOCATED AT STATION 15+01.51 -Y3- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.7. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO.7 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

UNDERCUT FOUNDATION SOILS AS SHOWN ON THE RETAINING WALL PROFILE AND BACKFILL WITH COMMON BORROW FOR EMBANKMENT CONSTRUCTION TO SUBGRADE SHALL MEET PIEDMONT AND WESTERN AREA CRITERIA AS DESCRIBED IN SECTION 1018-2(A) OF THE STANDARD SPECIFICATIONS.

INSTALL PILES AT END BENT NO. 1 PRIOR TO MSE WALL CONSTRUCTION.

PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 14+66.48 TO 14+52.38 -Y3-

SHEET 5 OF 5 WALL ID WALL_7

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:

Terracon

7327-G W. FRIENDLY AVE.

GREENSBORO, NORTH CAROLINA 27410

NC REGISTERED ENGINEERING FIRM: F-0869

NC REGISTERED GEOLOGIC FIRM: C-367

DEPARTMENT OF TRANSPORTATION

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA

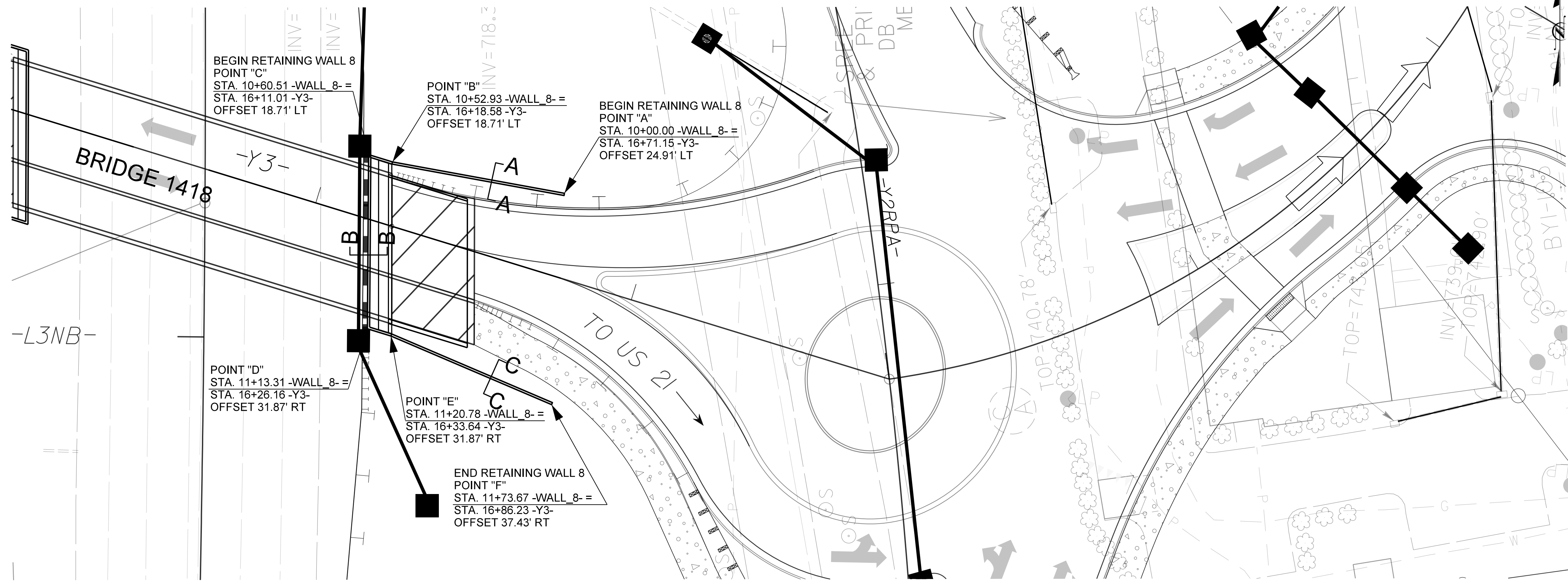
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

REVISIONS						SHEET NO. W-35
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

MSE RETAINING WALL NO. 7
LEVELING PAD STEP
DETAIL AND NOTES

MSE RETAINING WALL NO.8 PLAN



PROJECT REFERENCE NO.
I-5715

SHEET NO.
W-36

GEOTECHNICAL ENGINEER

ENGINEER

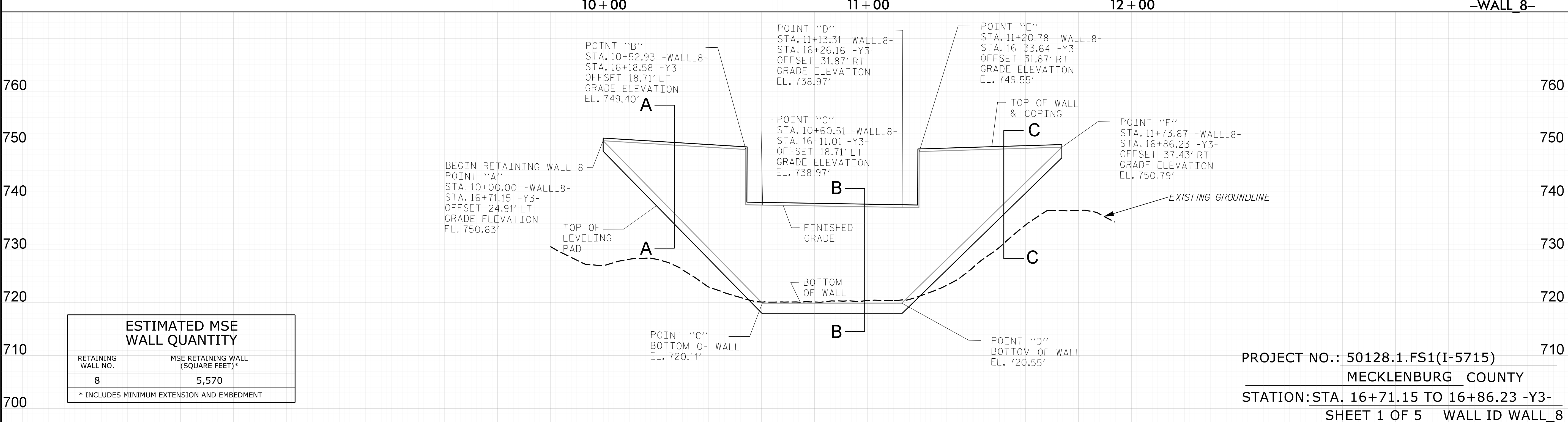
Seal of Thomas R. Wells, Professional Engineer, No. 037998, State of North Carolina.

Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA
SIGNATURE DATE

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MSE RETAINING WALL NO.8 ENVELOPE



ESTIMATED MSE WALL QUANTITY	
RETAINING WALL NO.	MSE RETAINING WALL (SQUARE FEET)*
8	5,570
* INCLUDES MINIMUM EXTENSION AND EMBEDMENT	

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: P-0869
NC REGISTERED GEOLOGIC FIRM: C-367

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

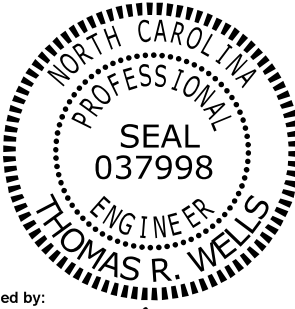
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO. 8
PLAN AND ENVELOPE

REVISIONS

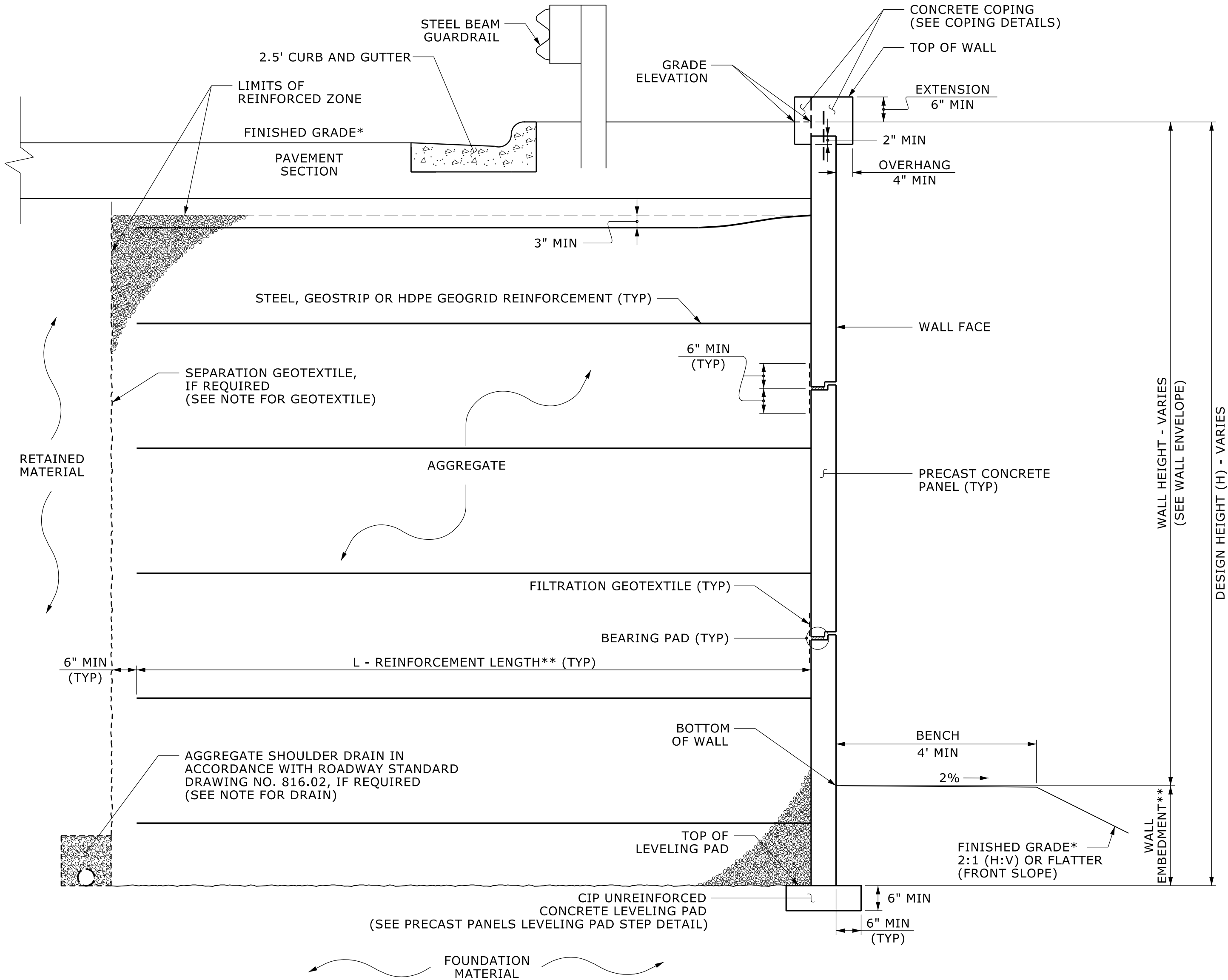
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SHEET NO.
W-36



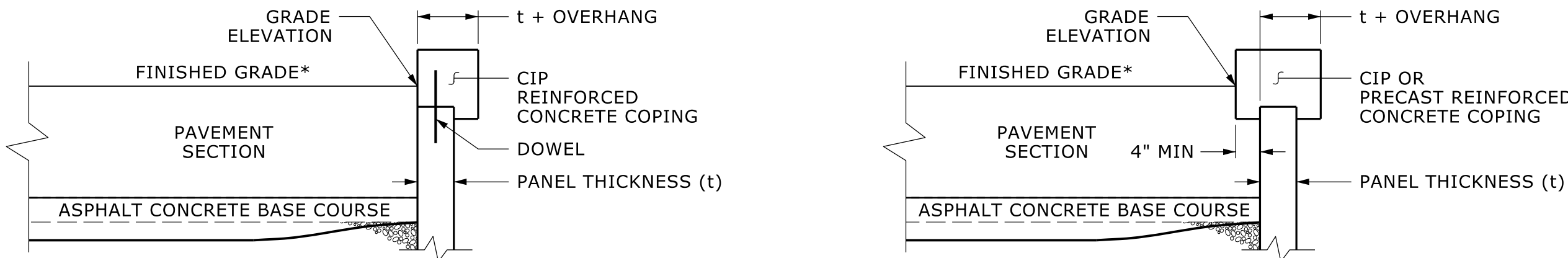
Signed by: Thomas R. Wells 02/23/2026
F38C777458854EA...
SIGNATURE DATE

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UNLESS ALL SIGNATURES COMPLETED



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION A-A

*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.



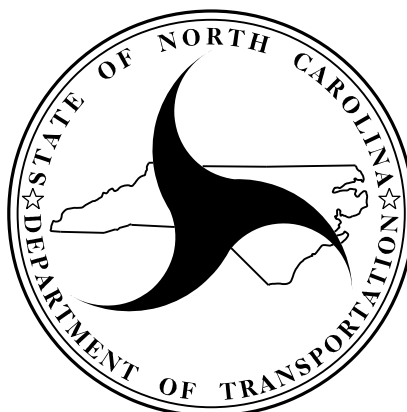
COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 16+71.15 TO 16+86.23 -Y3-
SHEET 2 OF 5 WALL ID WALL_8

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

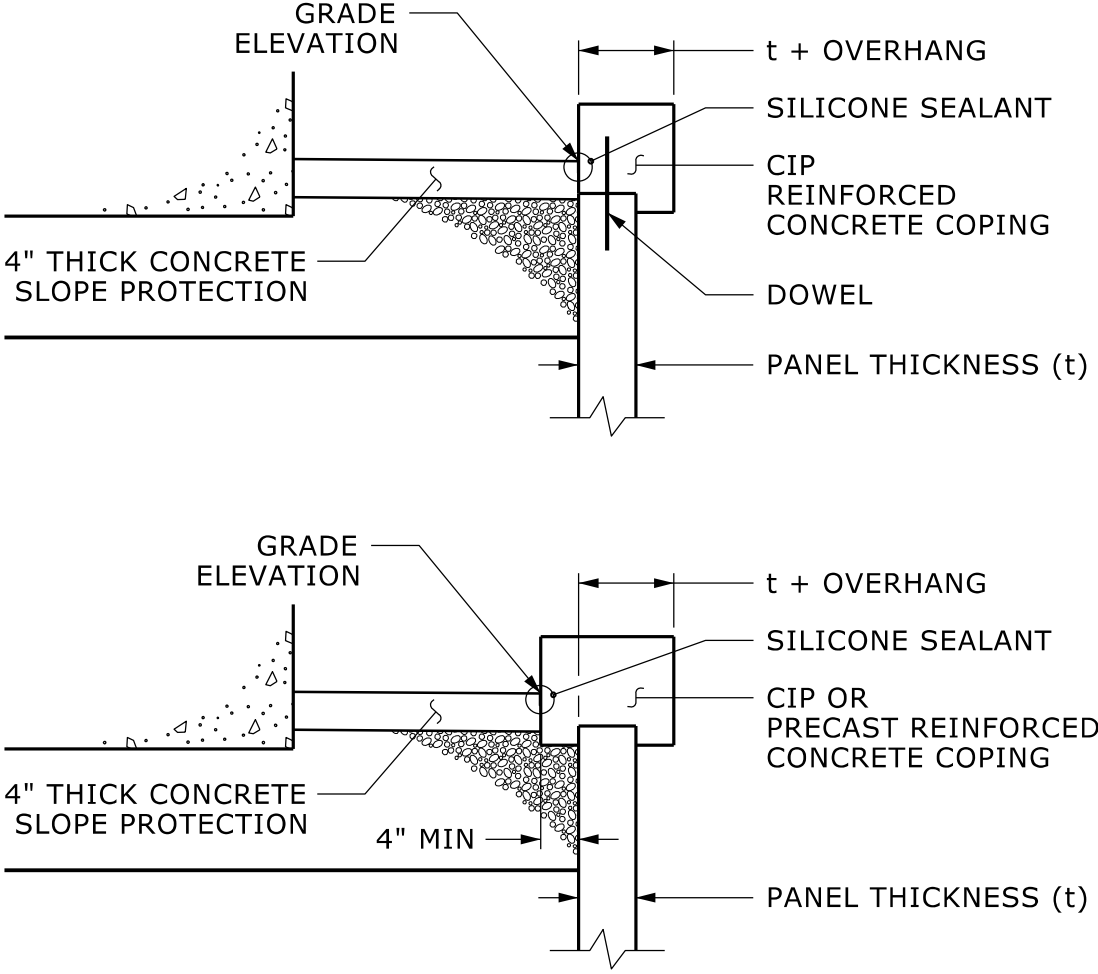
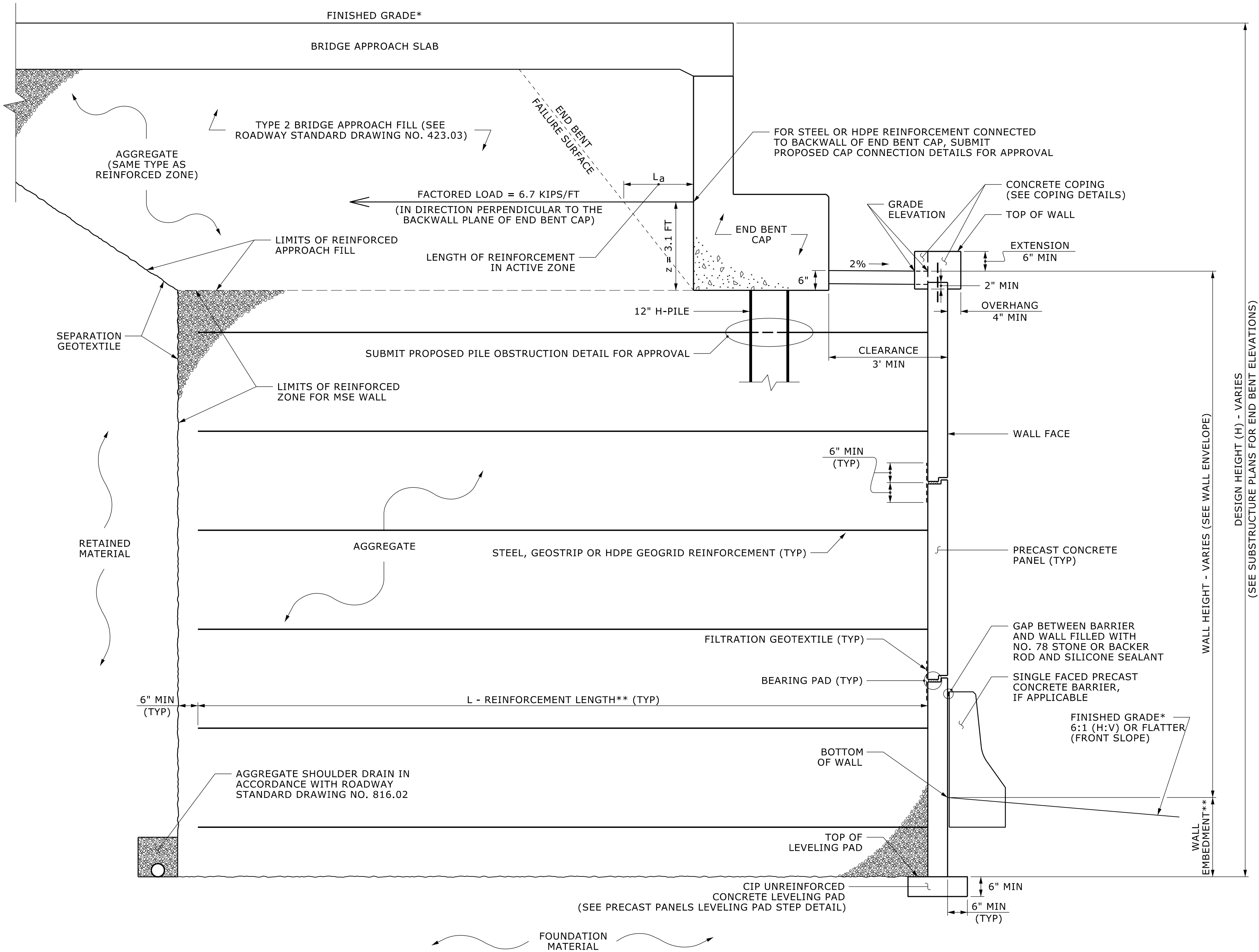
Prepared in the Office of:
Terracon
7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



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

MSE RETAINING WALL NO. 8
TYPICAL AND COPING DETAILS

REVISIONS						SHEET NO. W-37
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



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

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

*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.

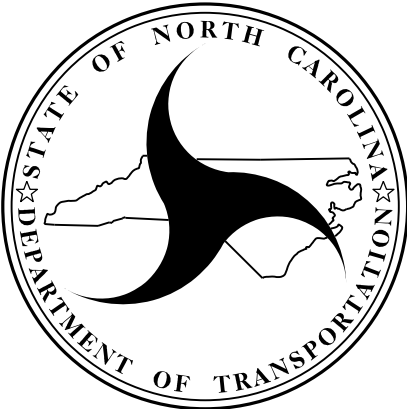
PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 16+71.15 TO 16+86.23 -Y3-
SHEET 3 OF 5 WALL ID WALL_8

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:



7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

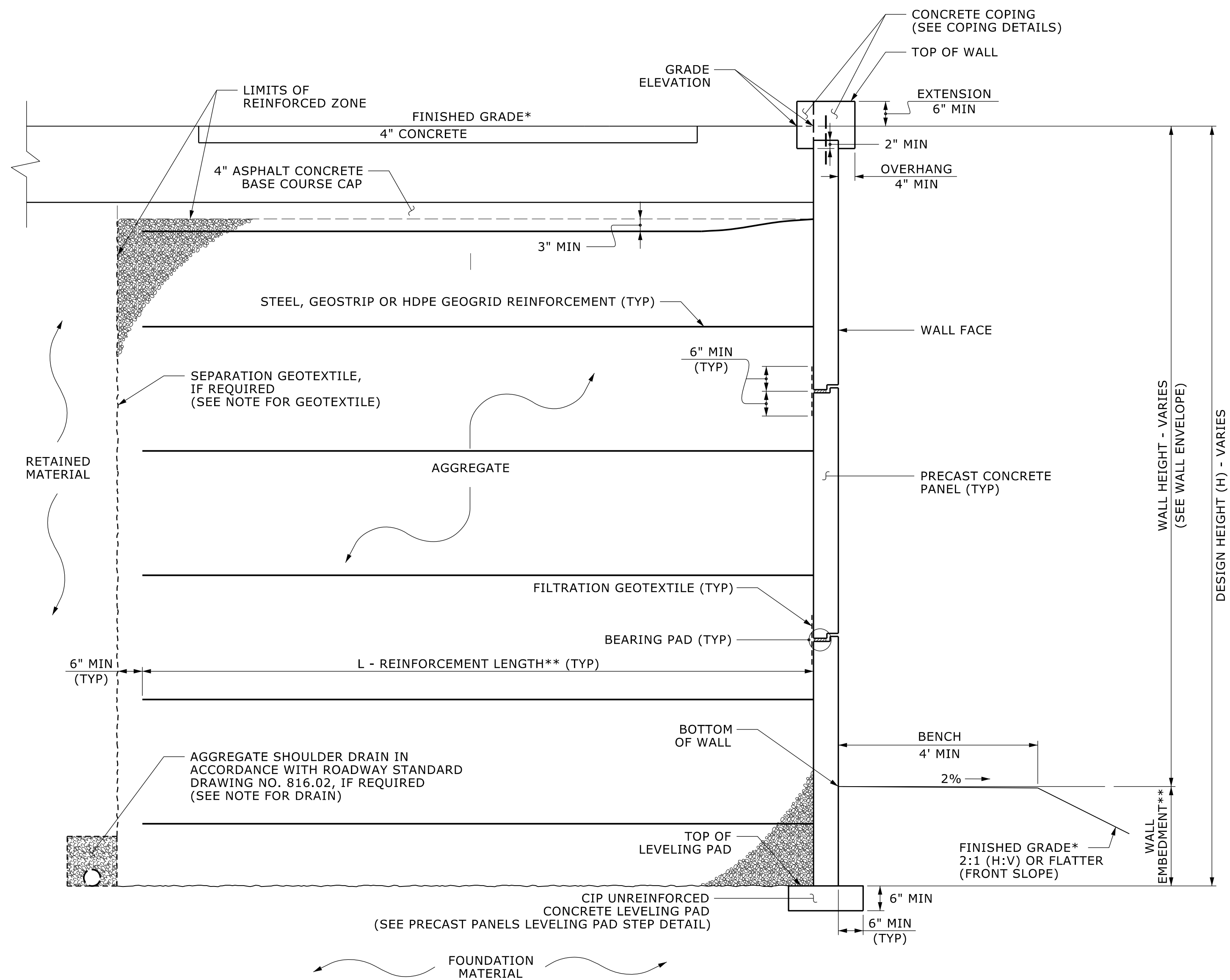


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

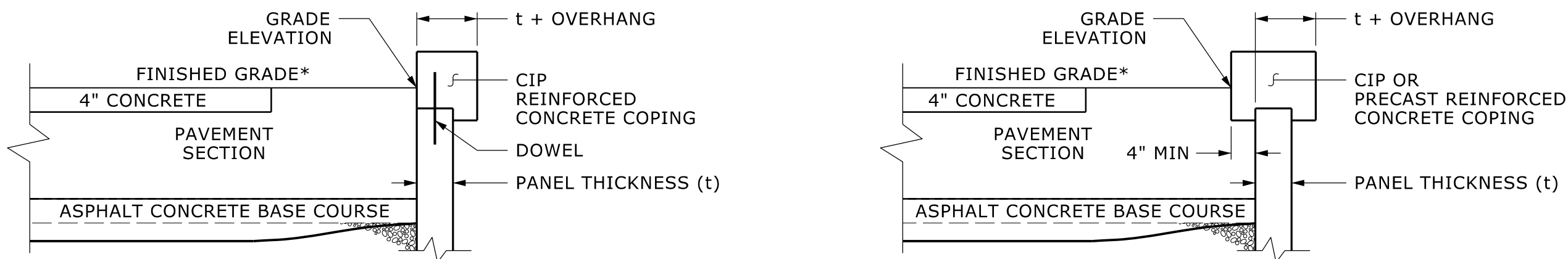
**MSE RETAINING WALL NO. 8
TYPICAL AND COPING DETAILS**

REVISIONS						SHEET NO. W-38
NO.	BY	DATE	NO.	BY	DATE	
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2			4			



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION C-C

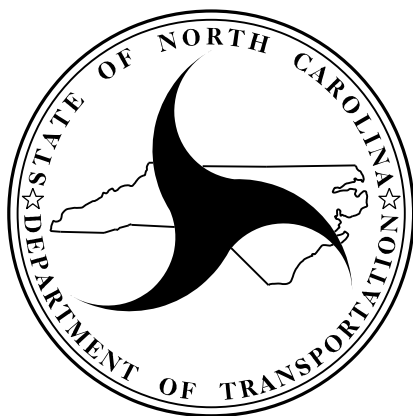
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

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

PROJECT NO.: 50128.1.FS1(I-5715)
MECKLENBURG COUNTY
STATION: STA. 16+71.15 TO 16+86.23 -Y3-
SHEET 4 OF 5 WALL ID WALL_8



REVISIONS						SHEET NO. W-39
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PROJECT REFERENCE NO.		SHEET NO.	
I-5715		W-40	
GEOTECHNICAL ENGINEER  Signed by: Thomas R. Wells F38C777458654EA. 02/23/2026 SIGNATURE DATE		ENGINEER SIGNATURE DATE	
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NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

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

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO.8. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.8.

A DRAIN IS REQUIRED FOR RETAINING WALL NO.8.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.8, 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 WALL NO.8 FOR THE FOLLOWING:

1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT

2) DESIGN LIFE = 100 YEARS

3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 6,600 PSF

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6.0 FT, WHICHEVER IS LONGER

5) MINIMUM EMBEDMENT ELEVATION = H/10 OR 2.0 FT, WHICHEVER IS GREATER

6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110		0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

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

DESIGN RETAINING WALL NO.8 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (La) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.2 LOCATED AT STATION 16+24.09 -Y3-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

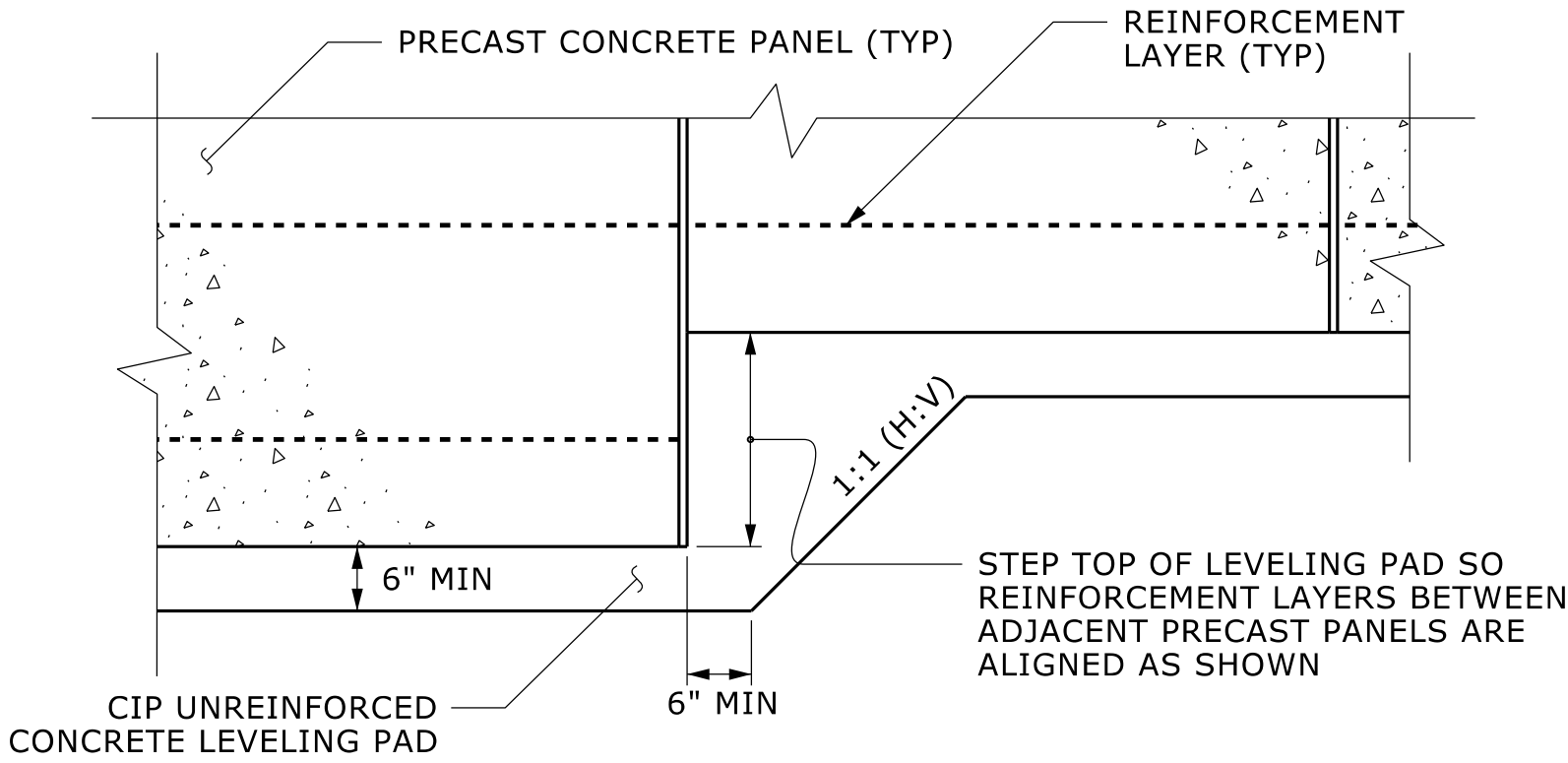
FOUNDATIONS FOR SIGNS, LIGHTING OR SIGNALS MAY BE LOCATED BEHIND RETAINING WALL NO.8 MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.8.

FOUNDATIONS FOR END BENT NO.2 LOCATED AT STATION 16+24.09 -Y3- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.8. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO.8 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

INSTALL PILES AT END BENT NO. 2 PRIOR TO MSE WALL CONSTRUCTION.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: 50128.1.FS1(I-5715)

MECKLENBURG COUNTY

STATION: STA. 16+71.15 TO 16+86.23 -Y3-

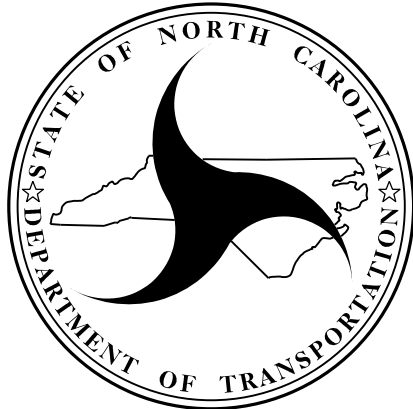
SHEET 5 OF 5 WALL ID WALL_8

PREPARED BY: T. WELLS	DATE: 11/25
REVIEWED BY: D. CORLEY	DATE: 11/25

Prepared in the Office of:



7327-G W. FRIENDLY AVE.
GREENSBORO, NORTH CAROLINA 27410
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

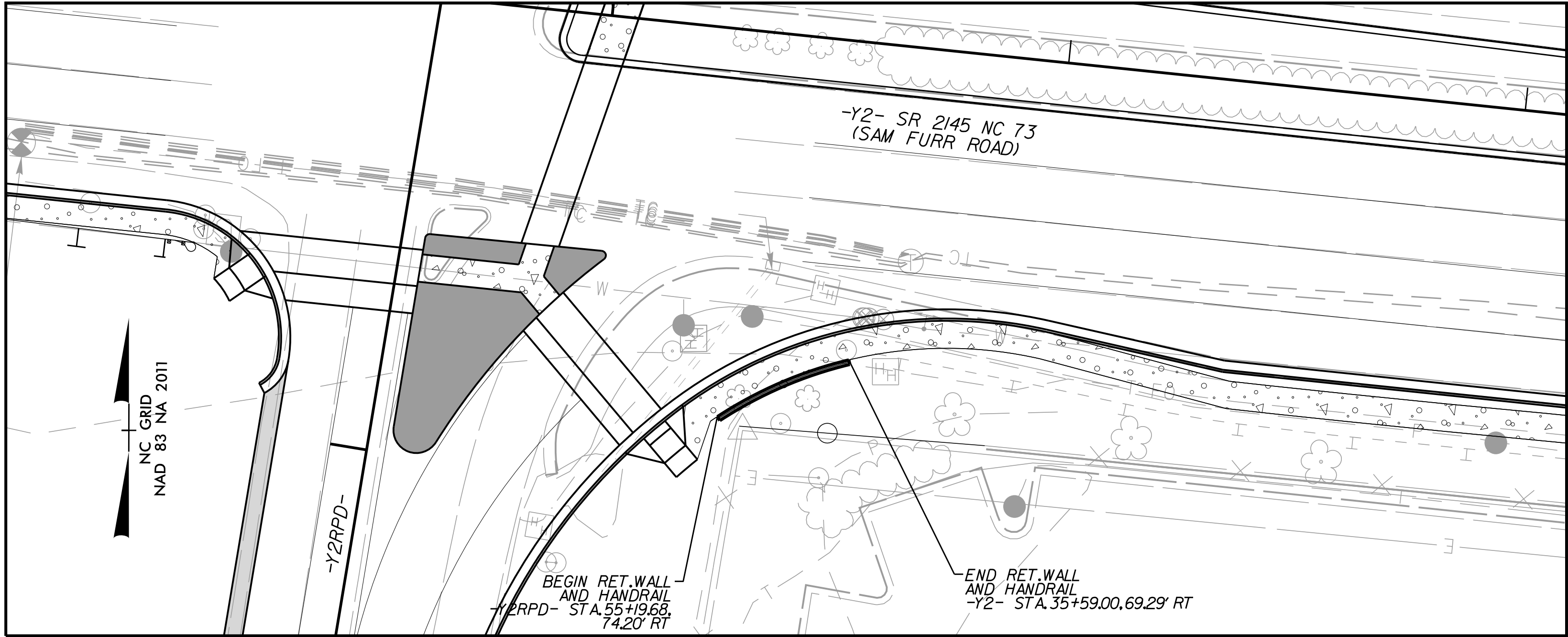


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

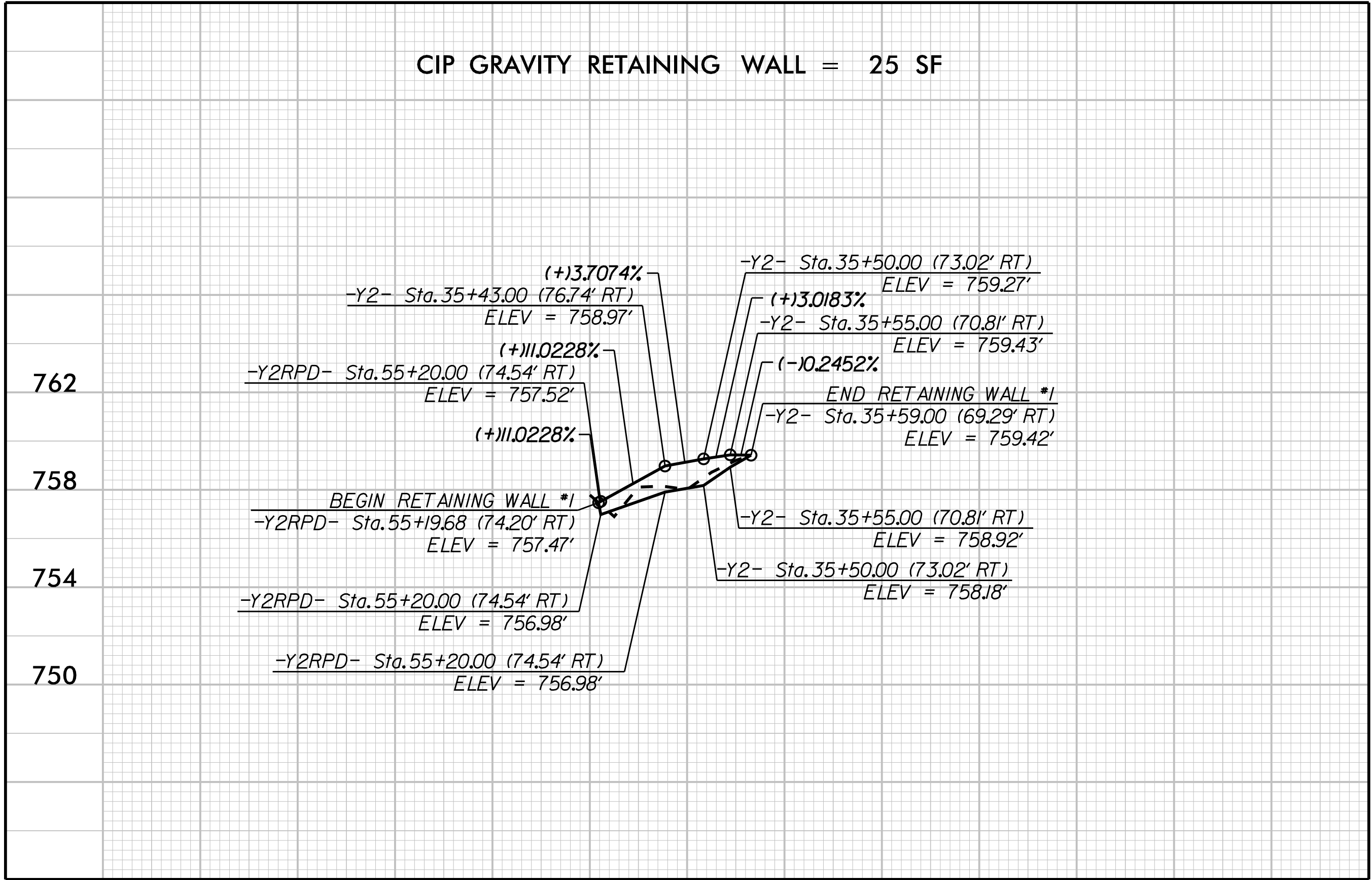
GEOTECHNICAL
ENGINEERING UNIT

MSE RETAINING WALL NO. 8 LEVELING PAD STEP DETAIL AND NOTES					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

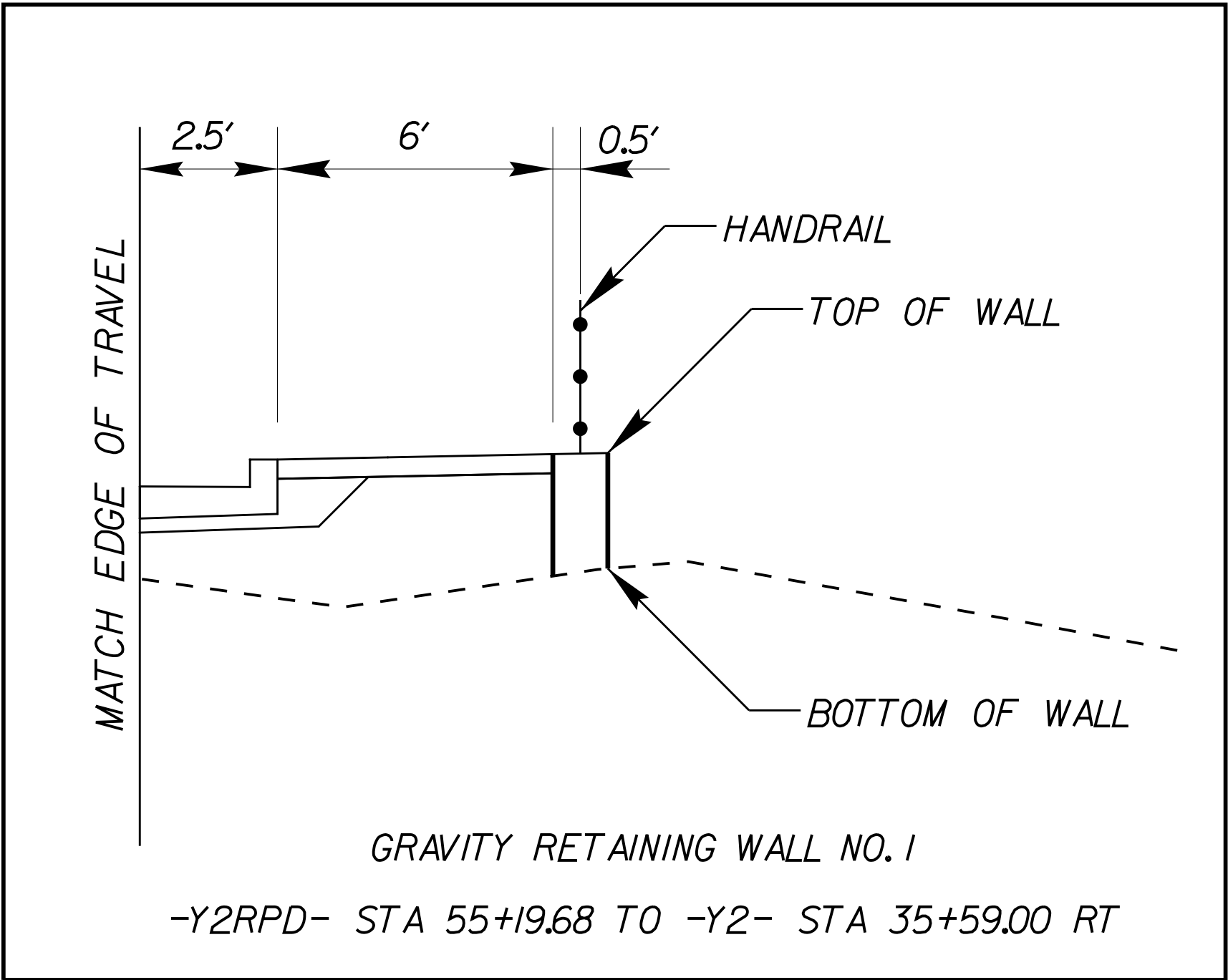
SHEET NO. W-40



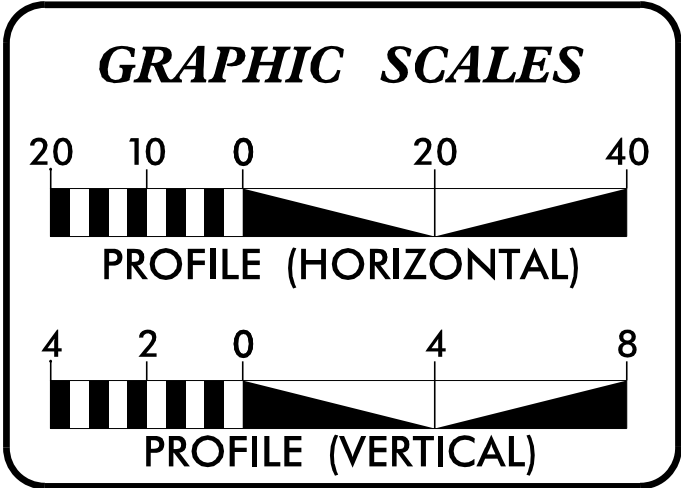
RETAINING WALL NO. 1 PLAN



RETAINING WALL NO. 1 ELEVATION



TYPICAL SECTION



PROJECT NO.: I-5715
MECKLENBURG COUNTY
STATION: -Y2RPD- STA. 55+19.68 (RT) TO -Y2- STA. 35+59.00 (RT)

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NC LICENSE #F-0102
200 SOUTH TRYON, SUITE 200
CHARLOTTE, N.C. 28202

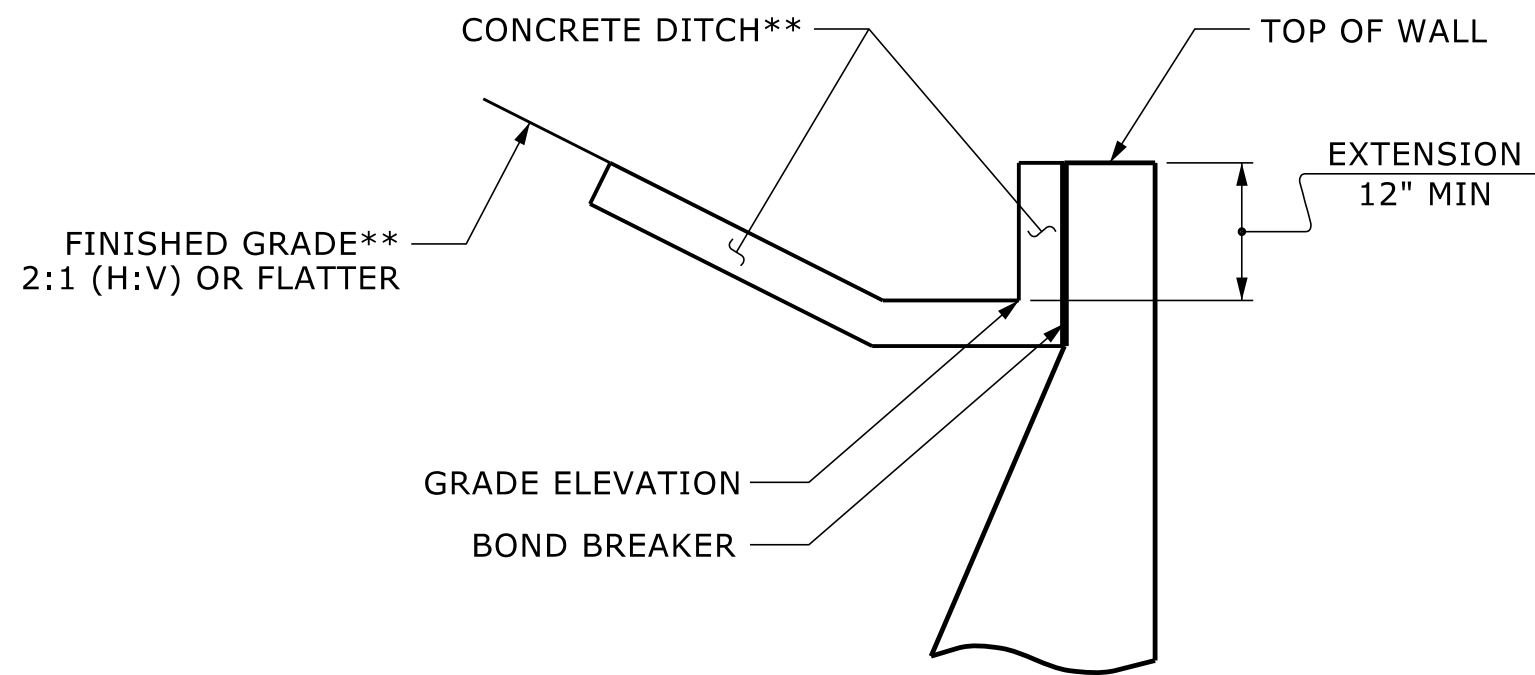


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

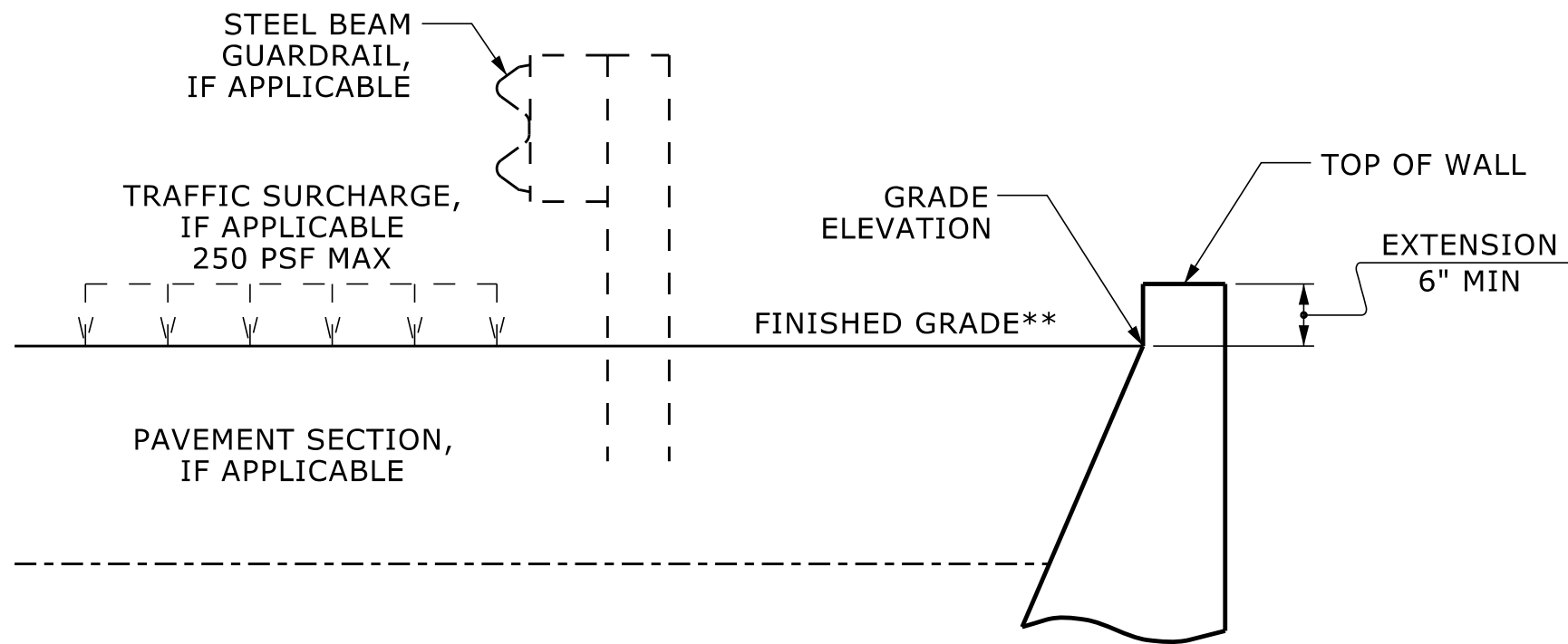
CIP GRAVITY
RETAINING WALL

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



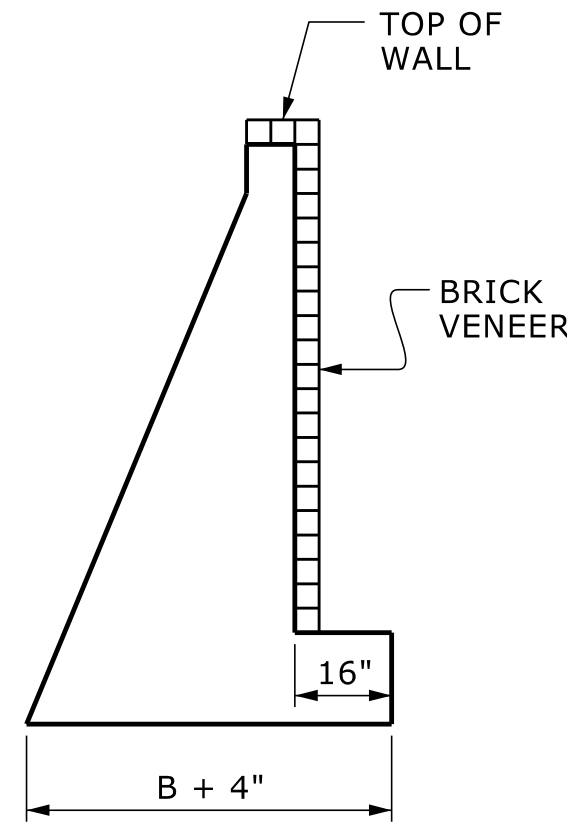
SLOPE CASE

**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)

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, γ = 120 PCF
FRICTION ANGLE, ϕ = 35 DEGREES (GROUNDWATER WITHIN 7' OF BOTTOM OF FOOTING)
FRICTION ANGLE, ϕ = 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.

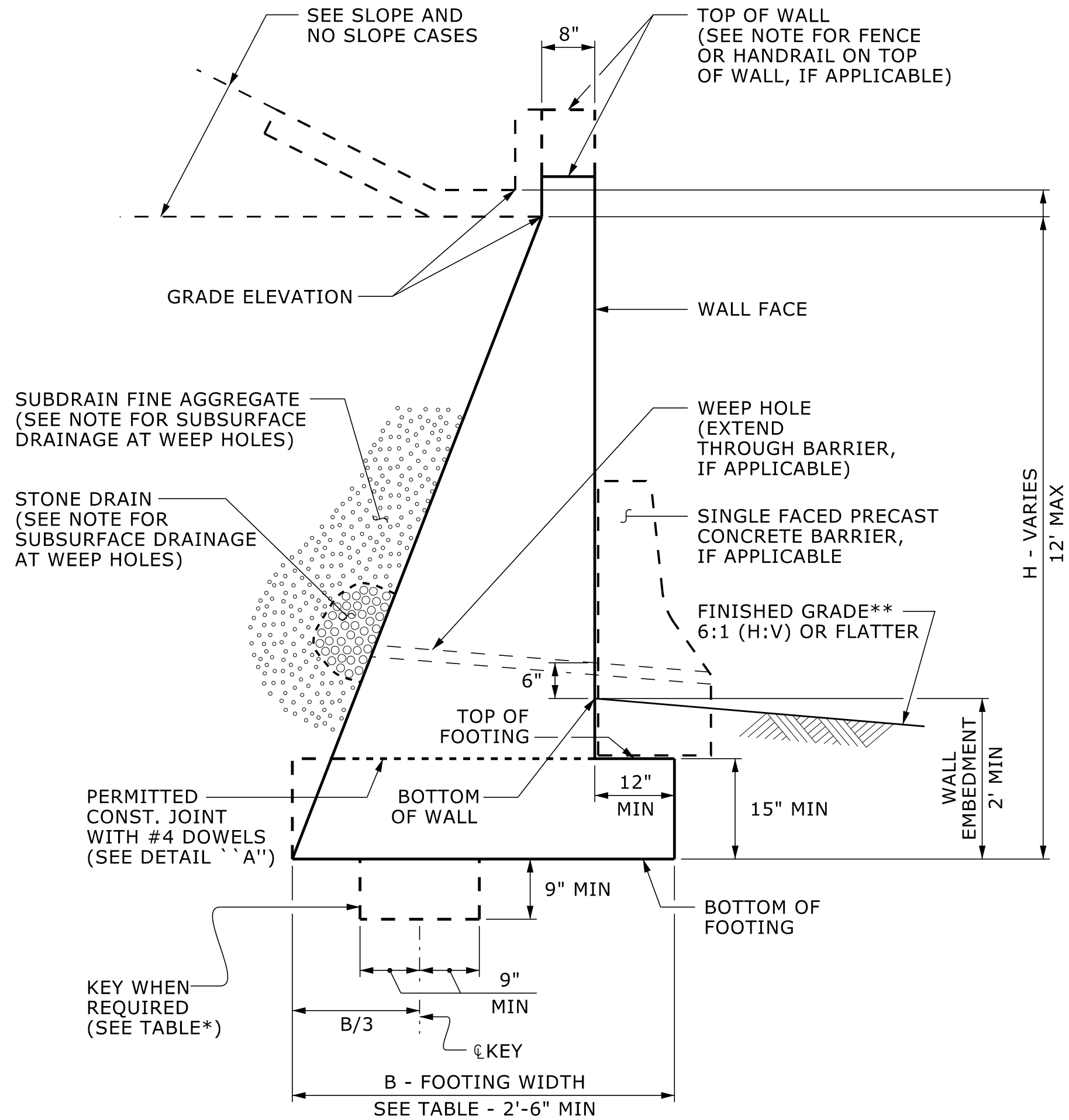
DO NOT USE STANDARD CIP GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW WALLS.

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.

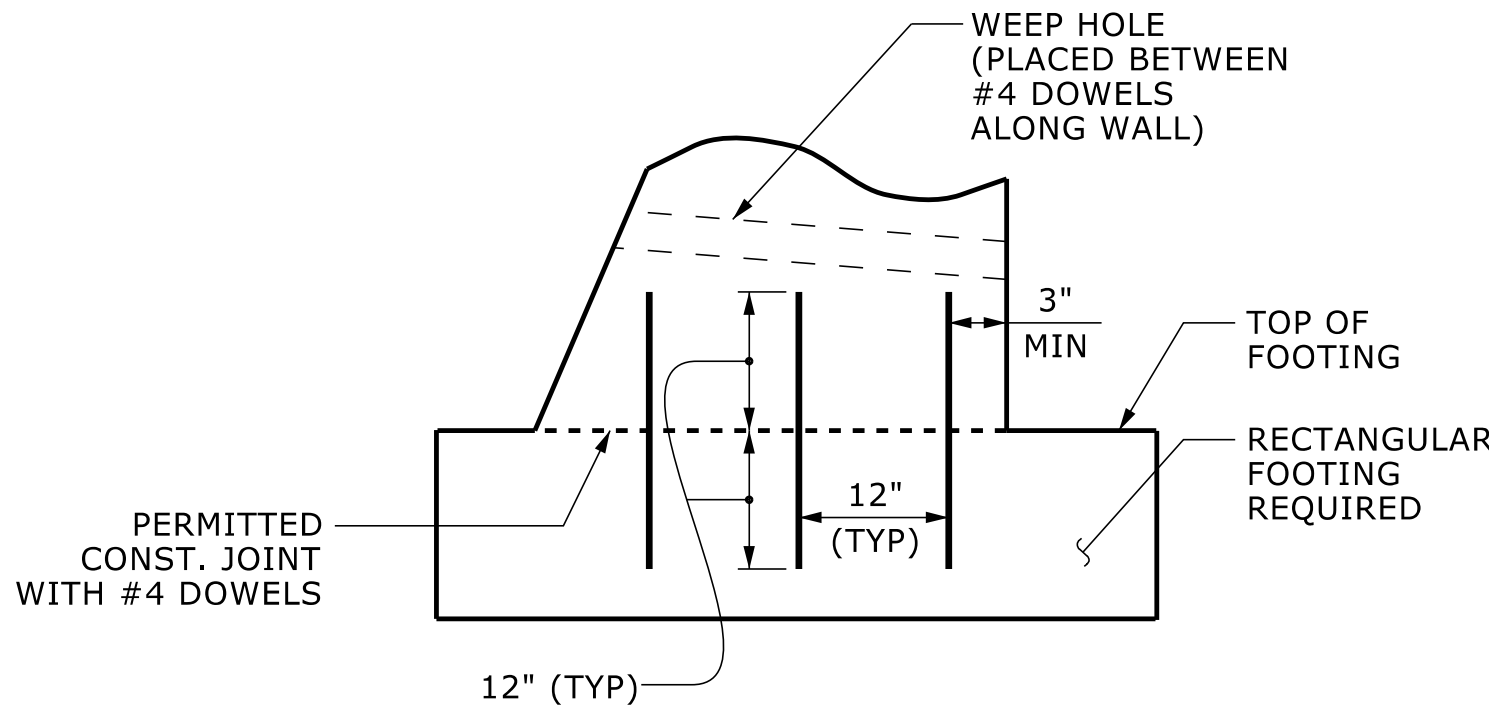
DO NOT PLACE CONCRETE FOR FOOTINGS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

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.



STANDARD CIP GRAVITY WALL

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



DETAIL "A"

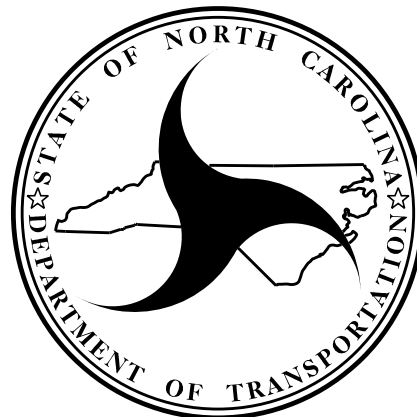
H (FT)	3 - < 6	6 - 9	> 9 - 12
SLOPE CASE	.66	.70*	.75*
NO SLOPE CASE WITH TRAFFIC SURCHARGE	.80	.75*	.70*
NO SLOPE CASE WITHOUT TRAFFIC SURCHARGE	.60	.60	.60

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.

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CHARLOTTE, N.C. 28202



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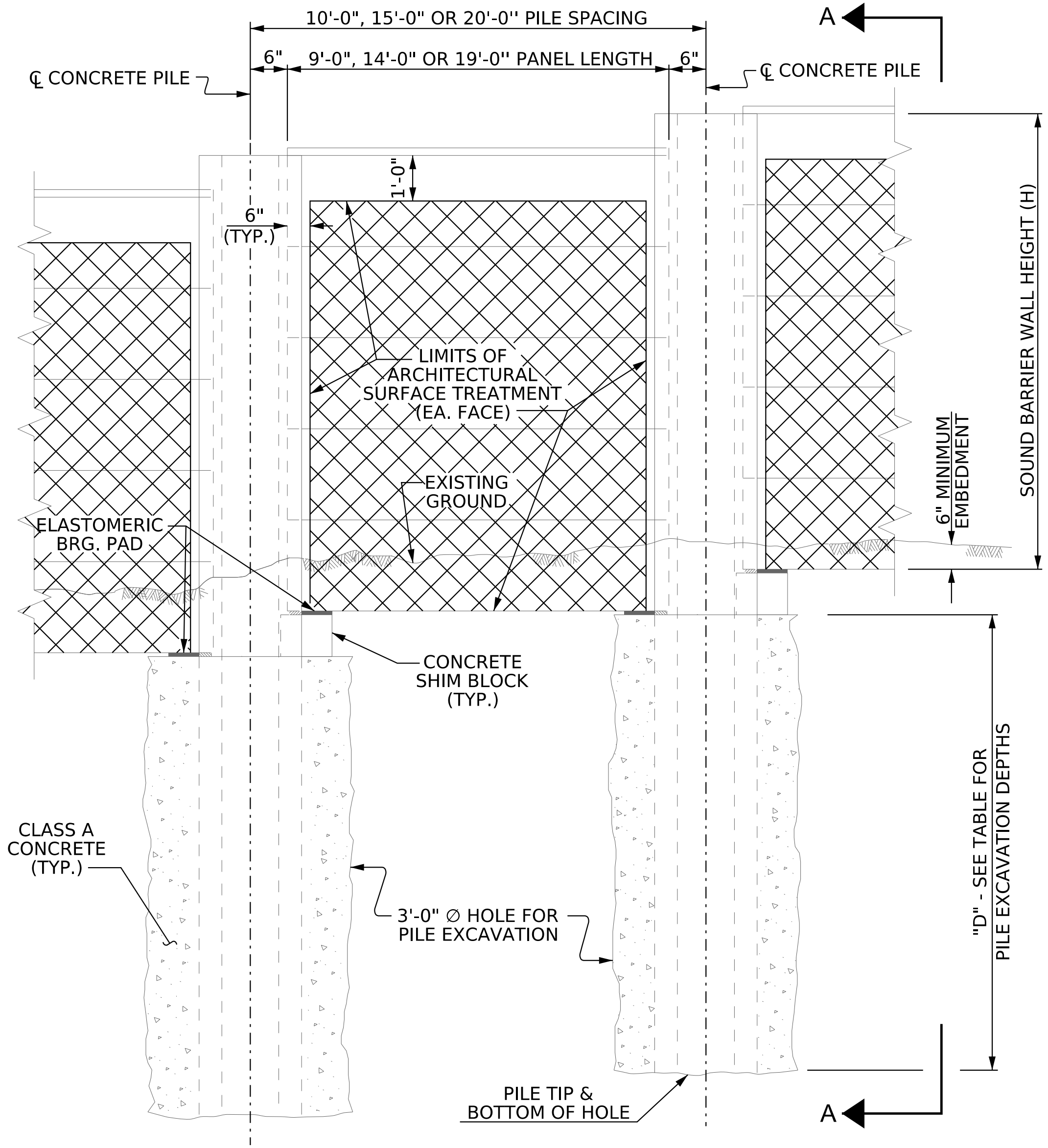
GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 453.01

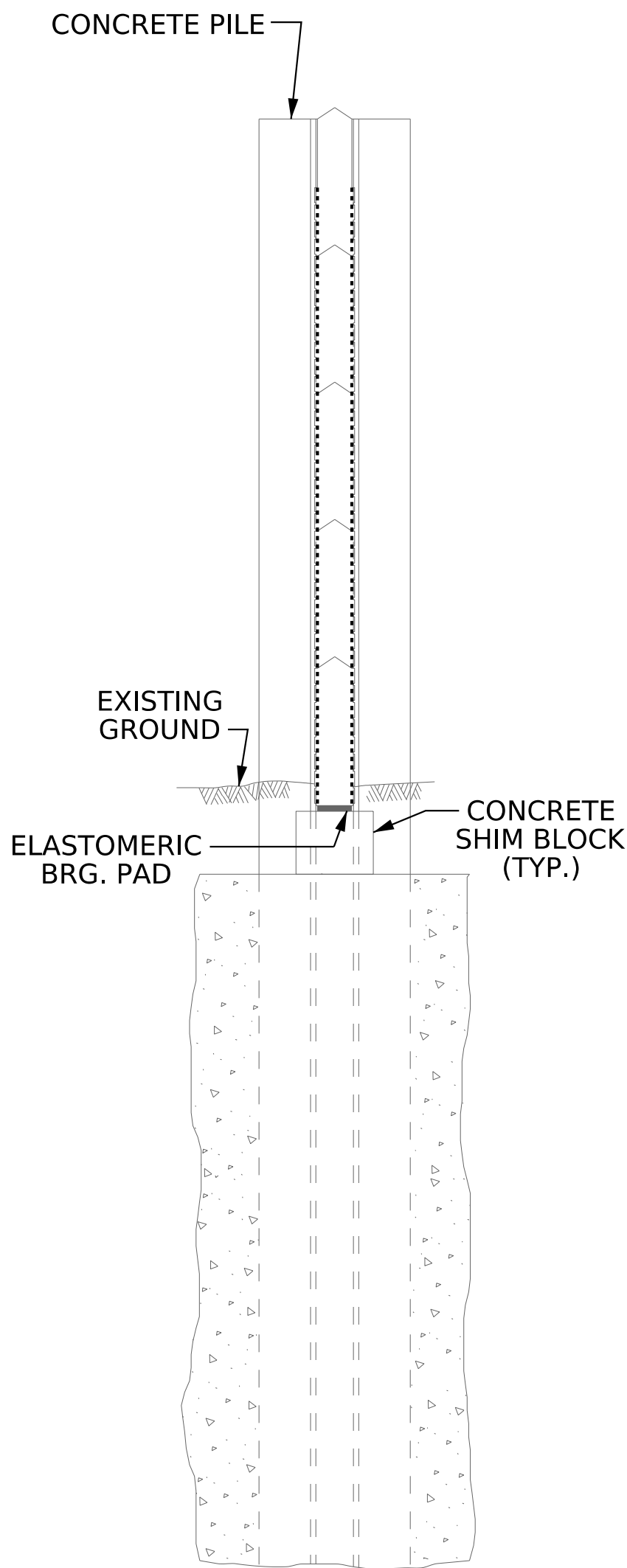
STANDARD
CIP GRAVITY
RETAINING WALL

DATE: 02-18-2025

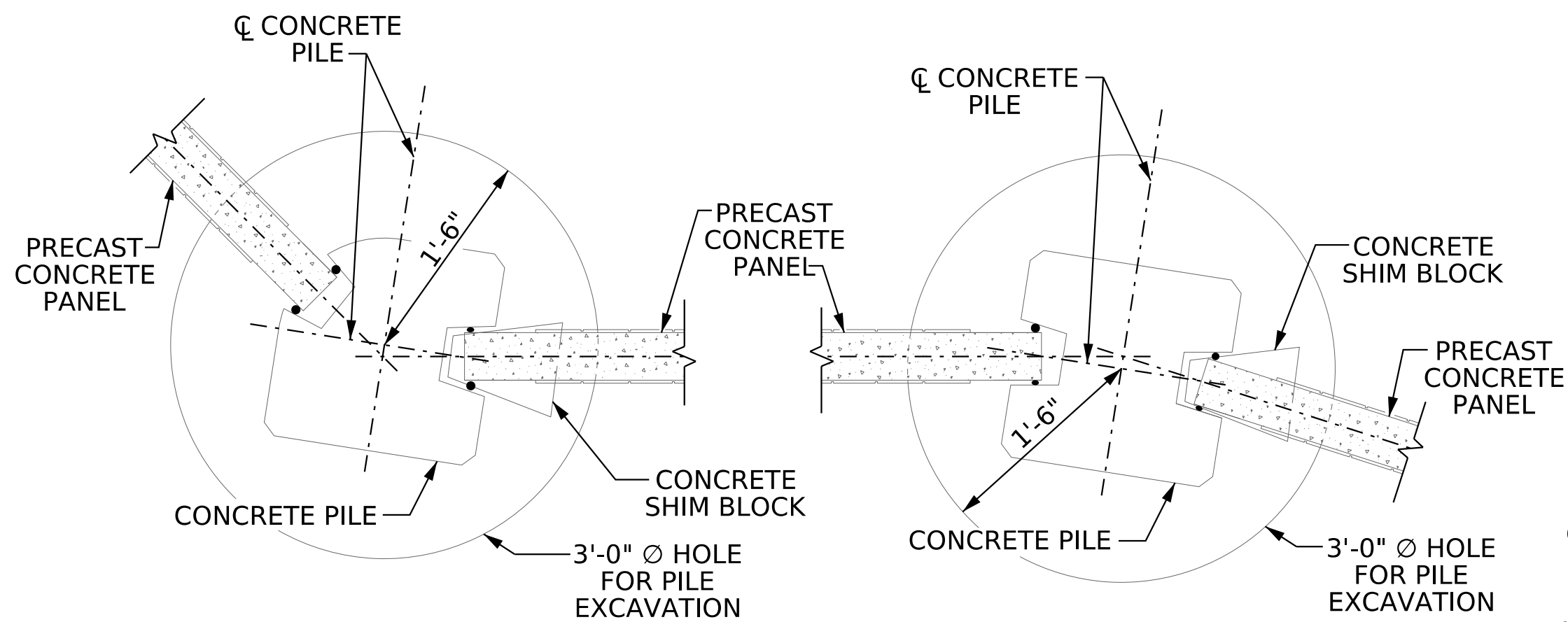
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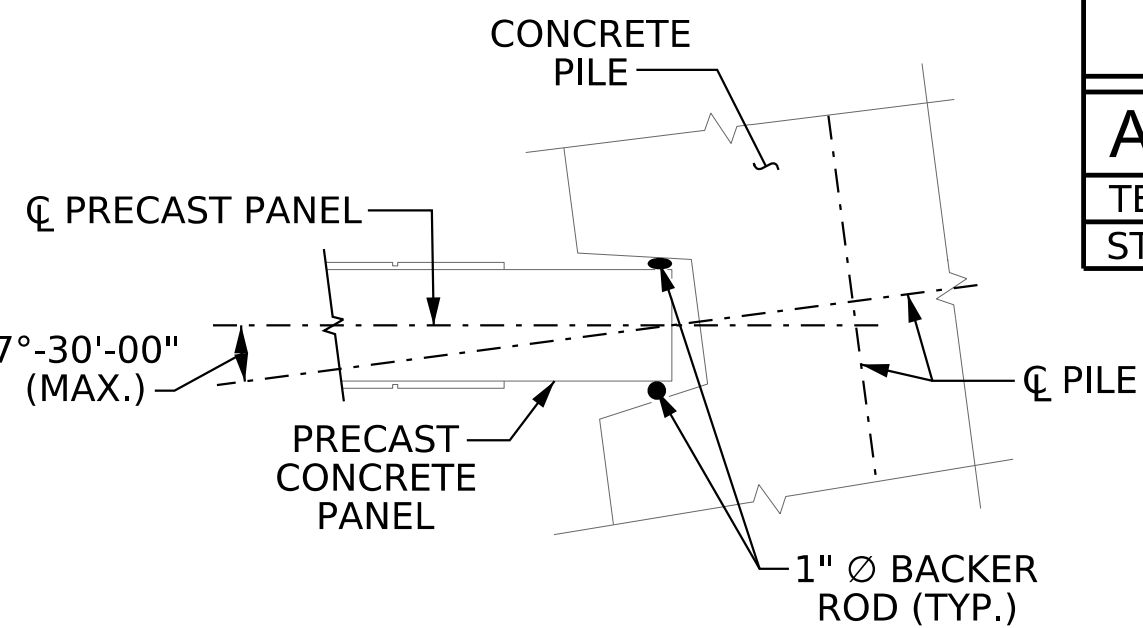
ELEVATION



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"

-NW1- FROM : STA. 10+00.93 TO : STA. 20+81.43					
3'-0" Ø HOLE	PILE NUMBER	WALL HEIGHT	PILE STATION	PILE TYPE	EMBEDMENT DEPTH
	1	14'	10+00.93	II	10'-0"
	2-9	14'-15'	10+15.93 - 11+20.93	I	10'-0"
	10	15'	11+35.93	I	13'-0"
	11	15'	11+50.93	I	NA
	12	15'	11+65.93	I	NA
3'-6" Ø HOLE	13	15'	11+80.93	I	13'-0"
	14-20	14'	11+95.93 - 12+85.93	I	10'-0"
3'-0" Ø HOLE	21-37	14'-18'	13+00.93 - 15+40.93	N/A	12'-0"
	38-51	18'-19'	15+55.93 - 17+50.93	I	12'-0"
	52-65	18'-19'	17+65.93 - 19+60.93	I	10'-0"
	66-73	18'-19'	19+75.93 - 20+80.93	I	9'-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 CONCRETE FOR PANELS AND CLASS A CONCRETE FOR PILE EXCAVATION BACKFILL, IN ACCORDANCE WITH ARTICLE 1000-3 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 VENDER 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.

FOR LAYOUT AND DETAILS OF #3 TIE BARS, SEE STD. SBW3.

PILE REINFORCING STEEL
WIND EXPOSURE CATEGORY B, DESIGN WIND PRESSURE = 27 PSF

PILE SPACING	MAXIMUM WALL HEIGHT (H)	PILE TYPE I	PILE TYPE II	PILE TYPE III	PILE TYPE III ALT.
		VERTICAL REINFORCING STEEL	VERTICAL REINFORCING STEEL	VERTICAL REINFORCING STEEL	VERTICAL REINFORCING STEEL
10'-0"	H ≤ 20'	4 - #5 EA. FACE	4 - #5 EA. FACE	3 - #5 SHORT FACE 4 - #5 LONG FACE	3 - #5 SHORT FACE 4 - #5 LONG FACE
	20' < H ≤ 25'	4 - #6 EA. FACE	4 - #5 EA. FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE
	25' < H ≤ 30'	4 - #7 EA. FACE	4 - #7 EA. FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE
15'-0"	H ≤ 20'	4 - #6 EA. FACE	4 - #5 EA. FACE	3 - #6 SHORT FACE 4 - #6 LONG FACE	3 - #6 SHORT FACE 4 - #6 LONG FACE
	20' < H ≤ 25'	4 - #7 EA. FACE	4 - #7 EA. FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE
	25' < H ≤ 30'	4 - #8 EA. FACE	4 - #8 EA. FACE	3 - #10 SHORT FACE 4 - #10 LONG FACE	3 - #10 SHORT FACE 4 - #10 LONG FACE
20'-0"	H ≤ 20'	4 - #6 EA. FACE	4 - #6 EA. FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE
	20' < H ≤ 25'	4 - #8 EA. FACE	4 - #8 EA. FACE	3 - #9 SHORT FACE 4 - #9 LONG FACE	3 - #9 SHORT FACE 4 - #9 LONG FACE
	25' < H ≤ 30'	4 - #10 EA. FACE	4 - #10 EA. FACE	3 - #11 SHORT FACE 4 - #11 LONG FACE	3 - #11 SHORT FACE 4 - #11 LONG FACE

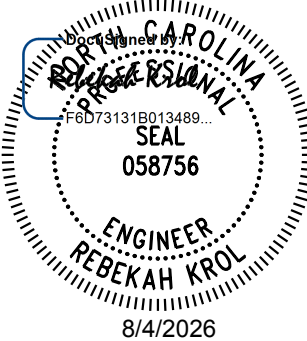
BILL OF MATERIAL

SOUND BARRIER WALL	16,916 S.F.
ARCHITECTURAL SURFACE TREATMENT	14,772 S.F.

QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.

ARCHITECTURAL SURFACE TREATMENT

TEXTURE OPTION:	DRY STACKED STONE
STAIN OPTION:	#30372



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Raleigh, NC 27601-1772
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PROJECT NO. I-5715
MECKLENBURG COUNTY
STATION: 21+72.10 - Y2RPB-
39.53' RT

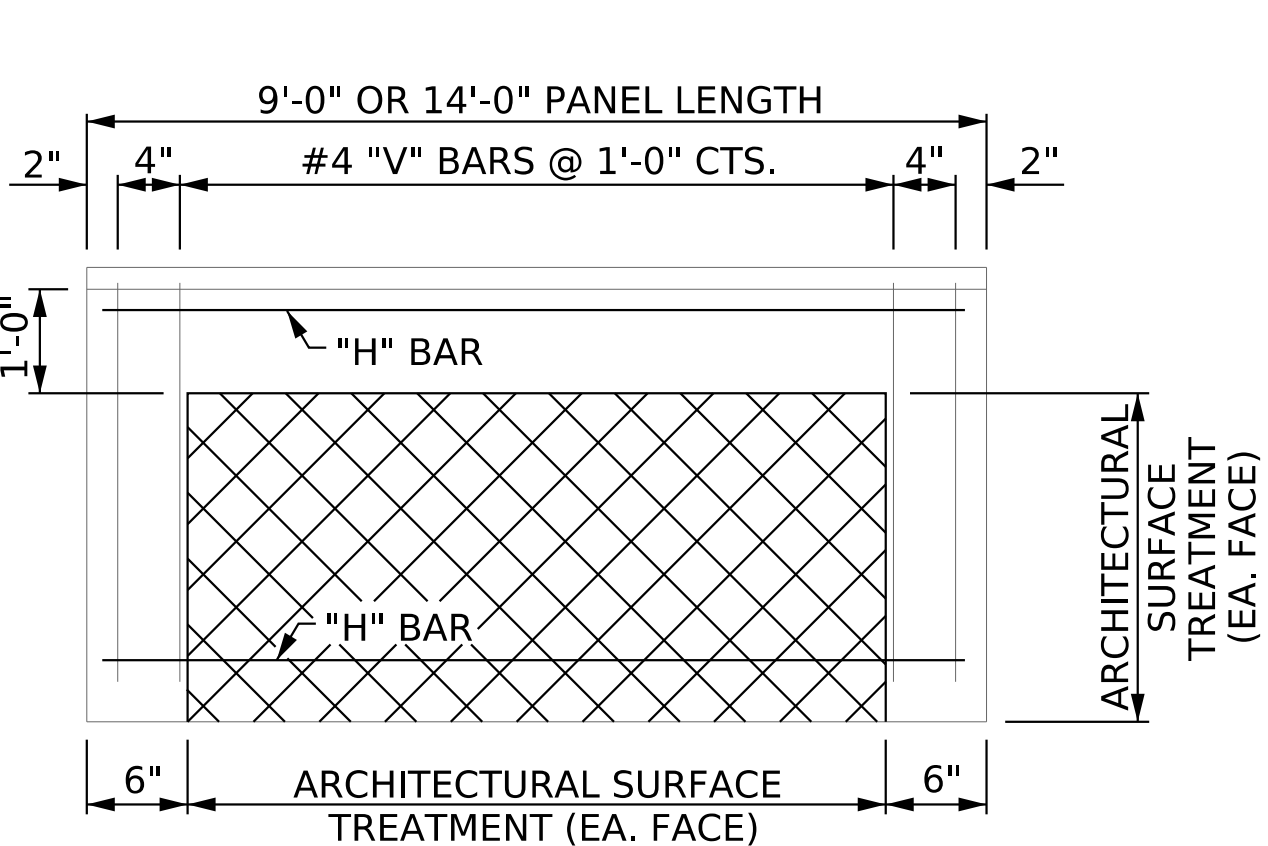
SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

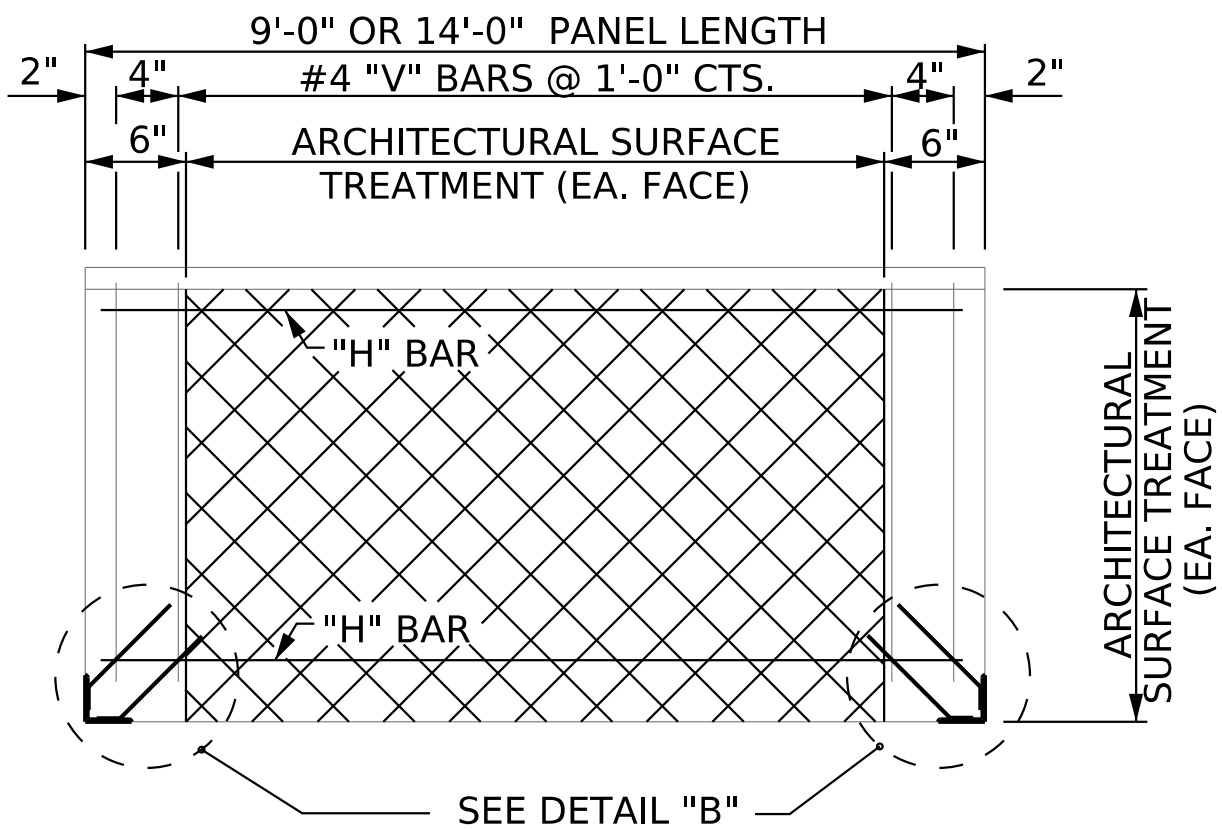
STANDARD
SOUND BARRIER WALL
(CONCRETE PILES)

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

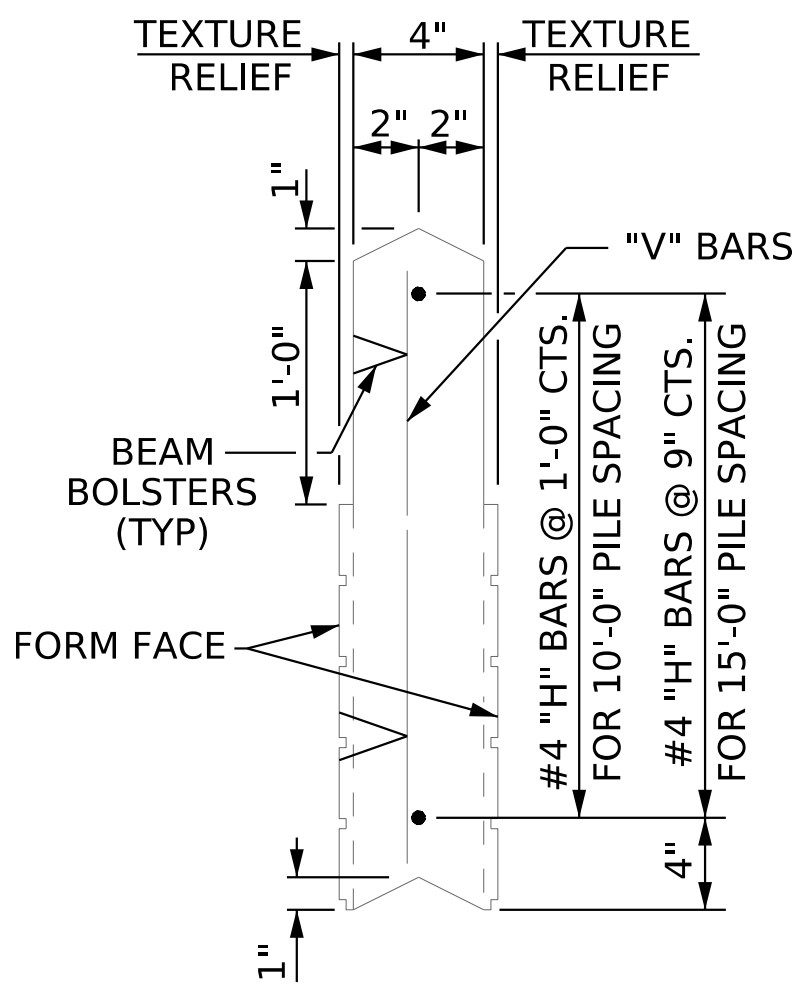
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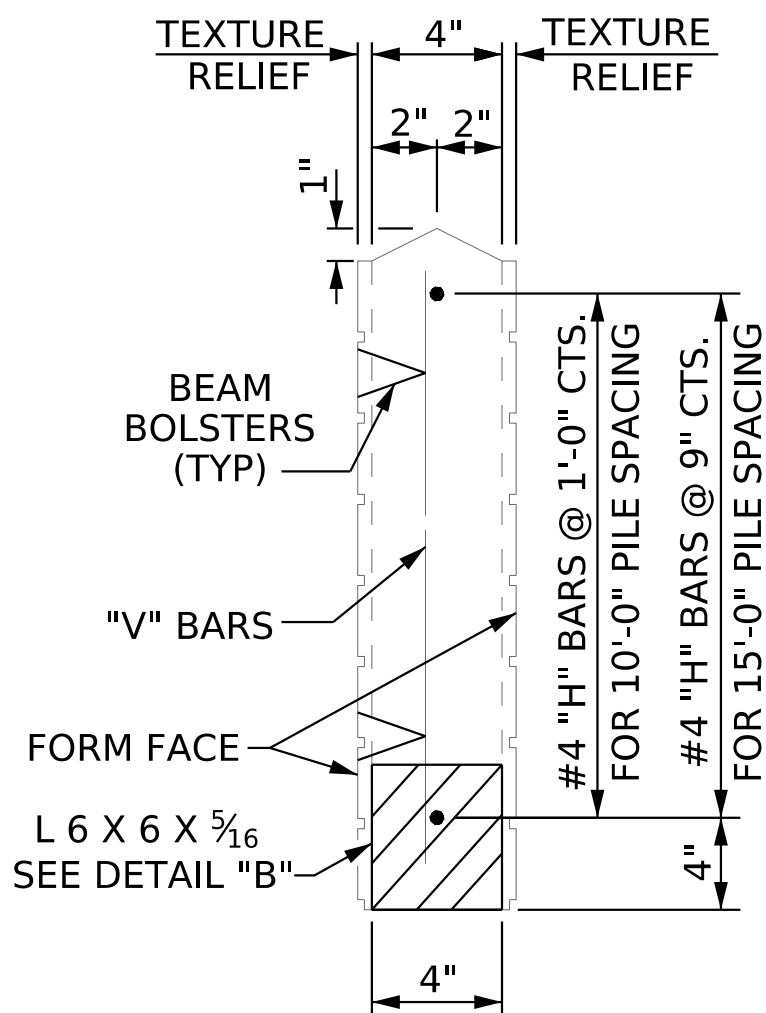
FRONT ELEVATION
OF UPPER PRECAST PANEL



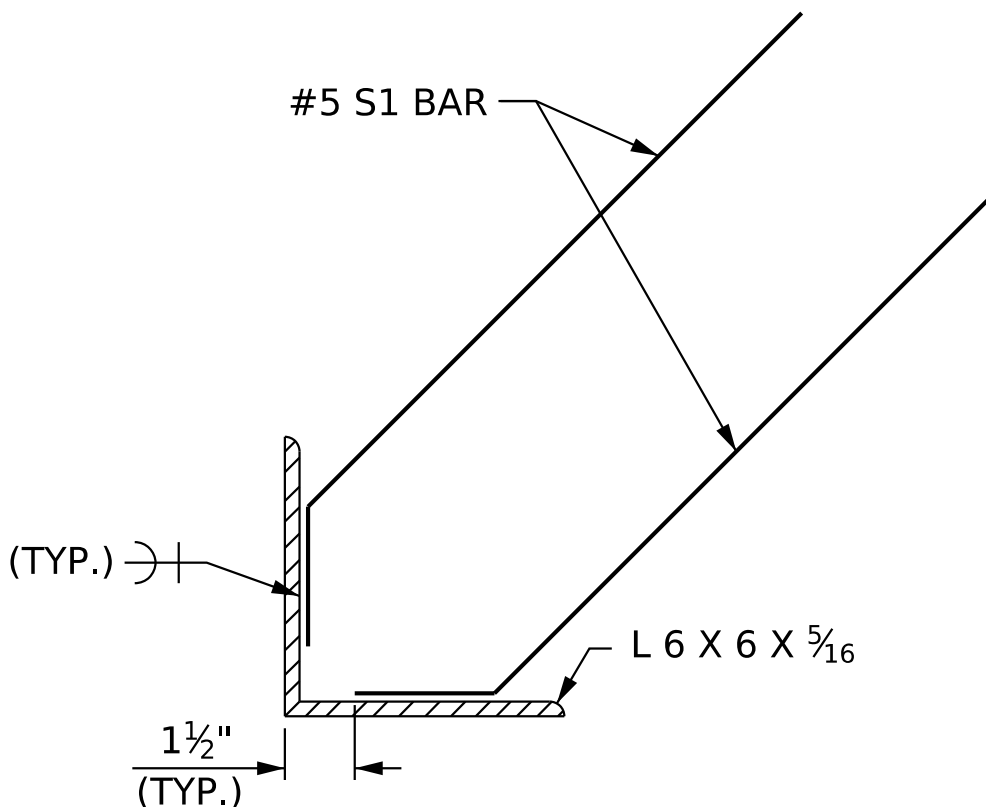
FRONT ELEVATION
OF BOTTOM PRECAST PANEL



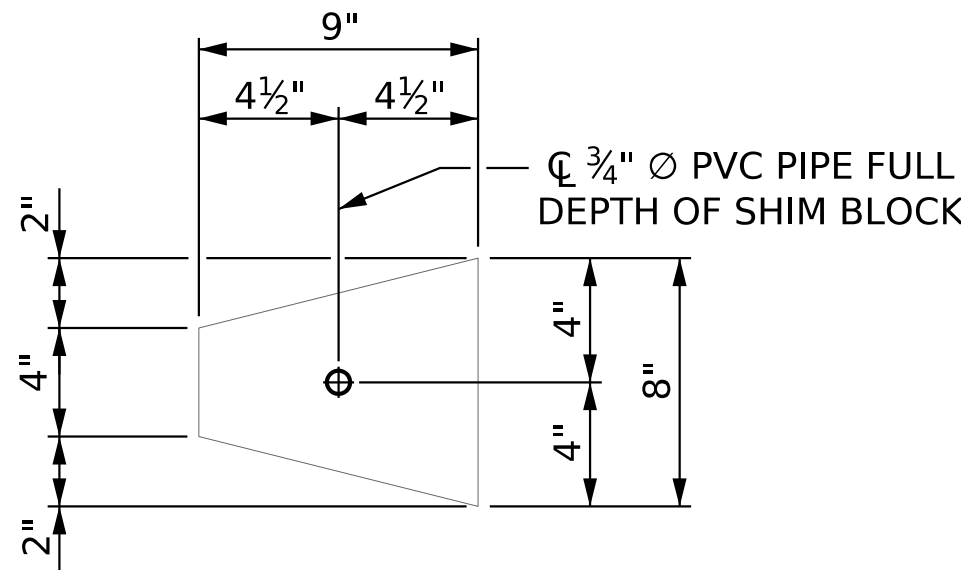
UPPER PANEL



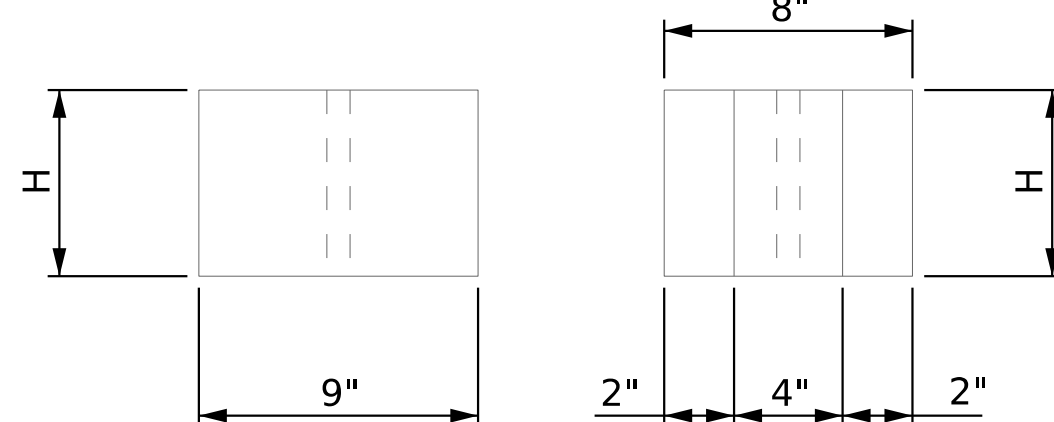
BOTTOM PANEL



DETAIL "B"



PLAN

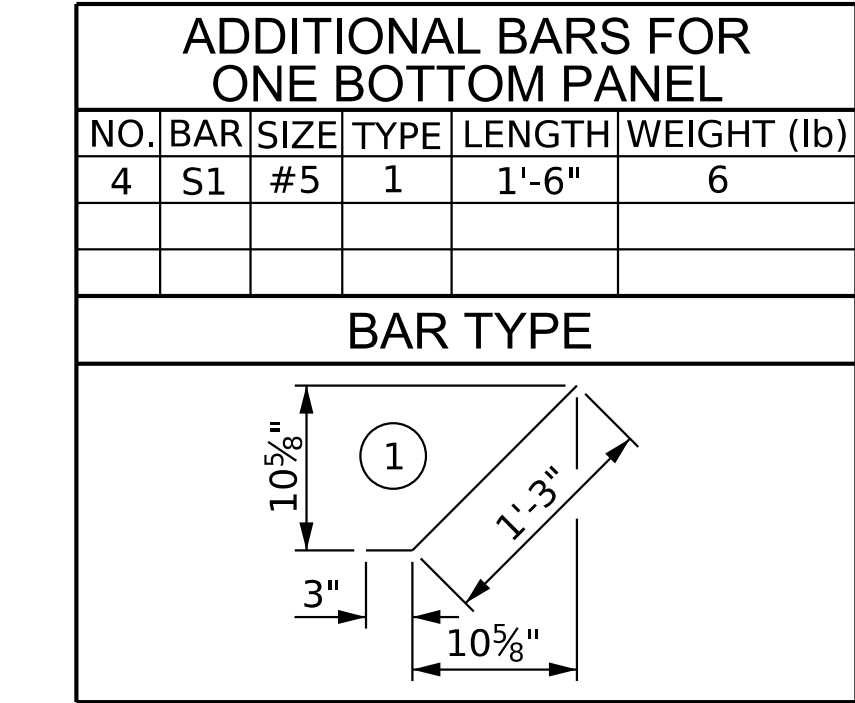


ELEVATION

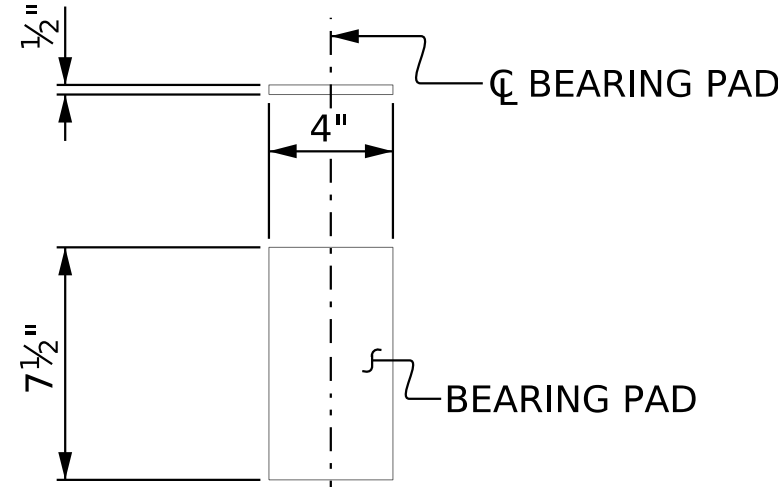
END

CONCRETE SHIM BLOCK

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



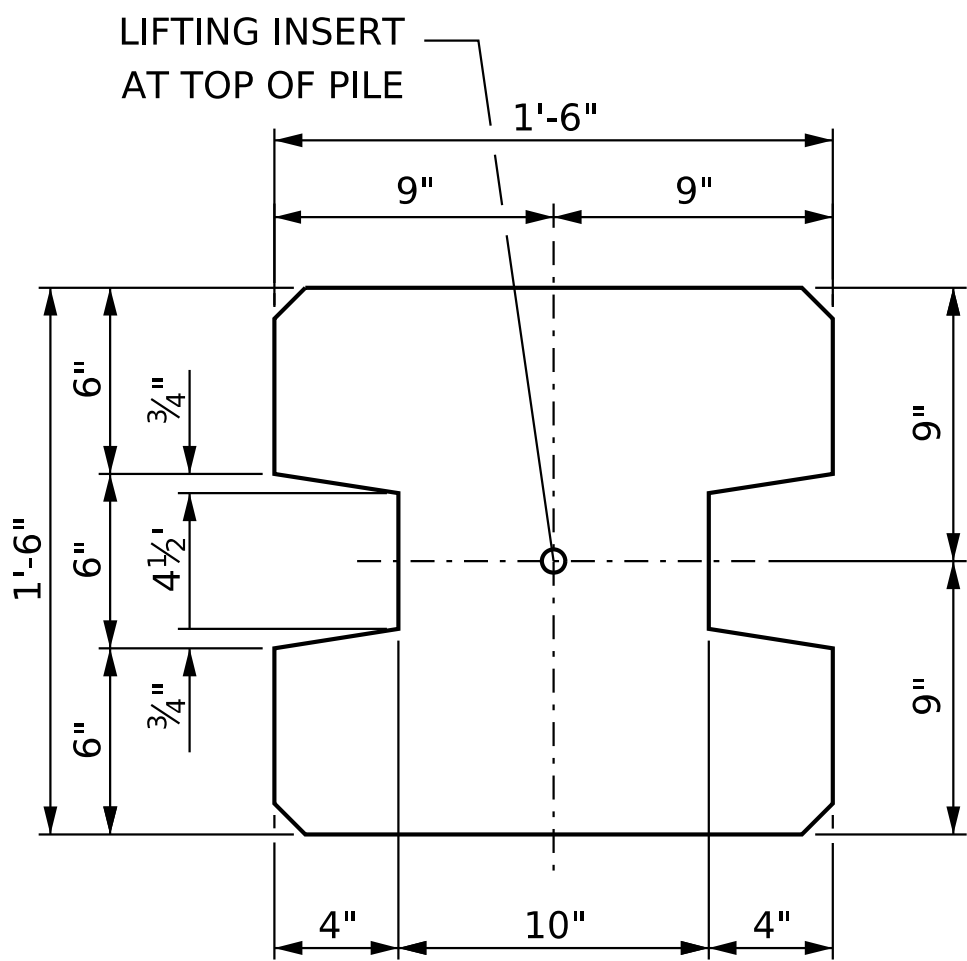
BAR TYPE



ELASTOMERIC
BEARING DETAILS

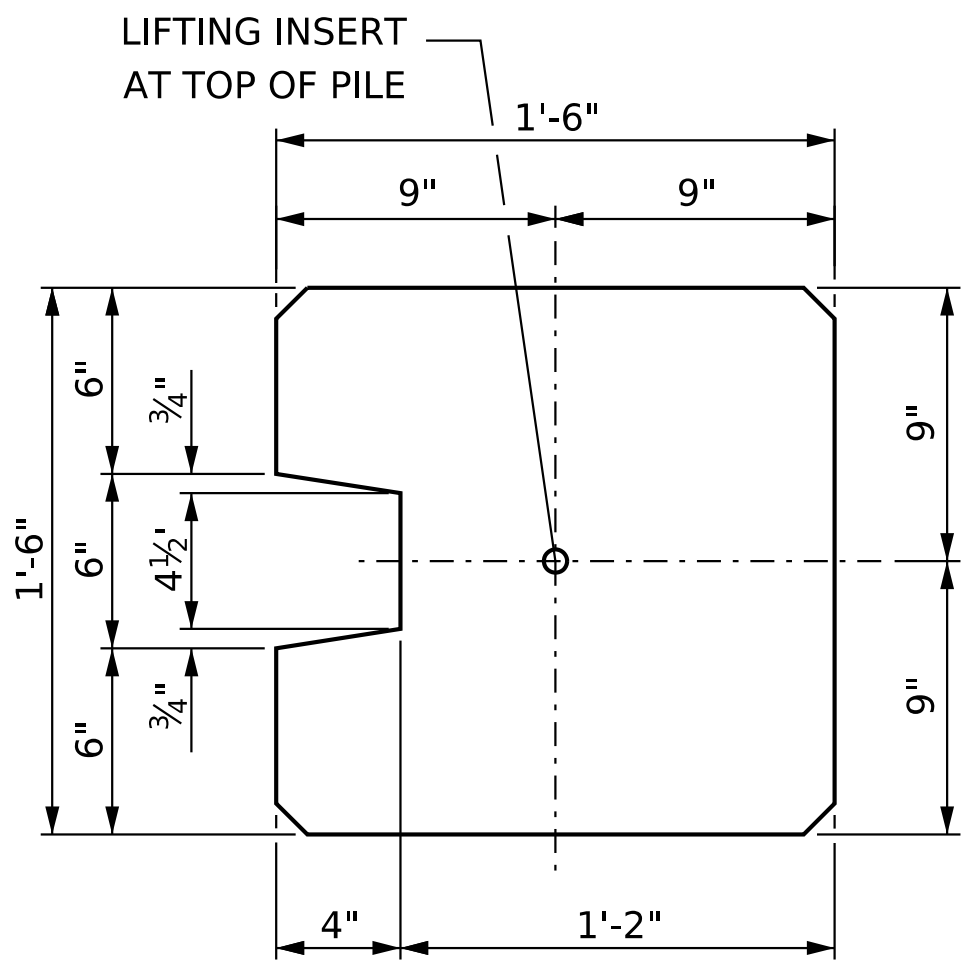
ELASTOMER IN BEARINGS SHALL
BE 50 DUROMETER HARDNESS.

SECTION THROUGH PRECAST PANELS



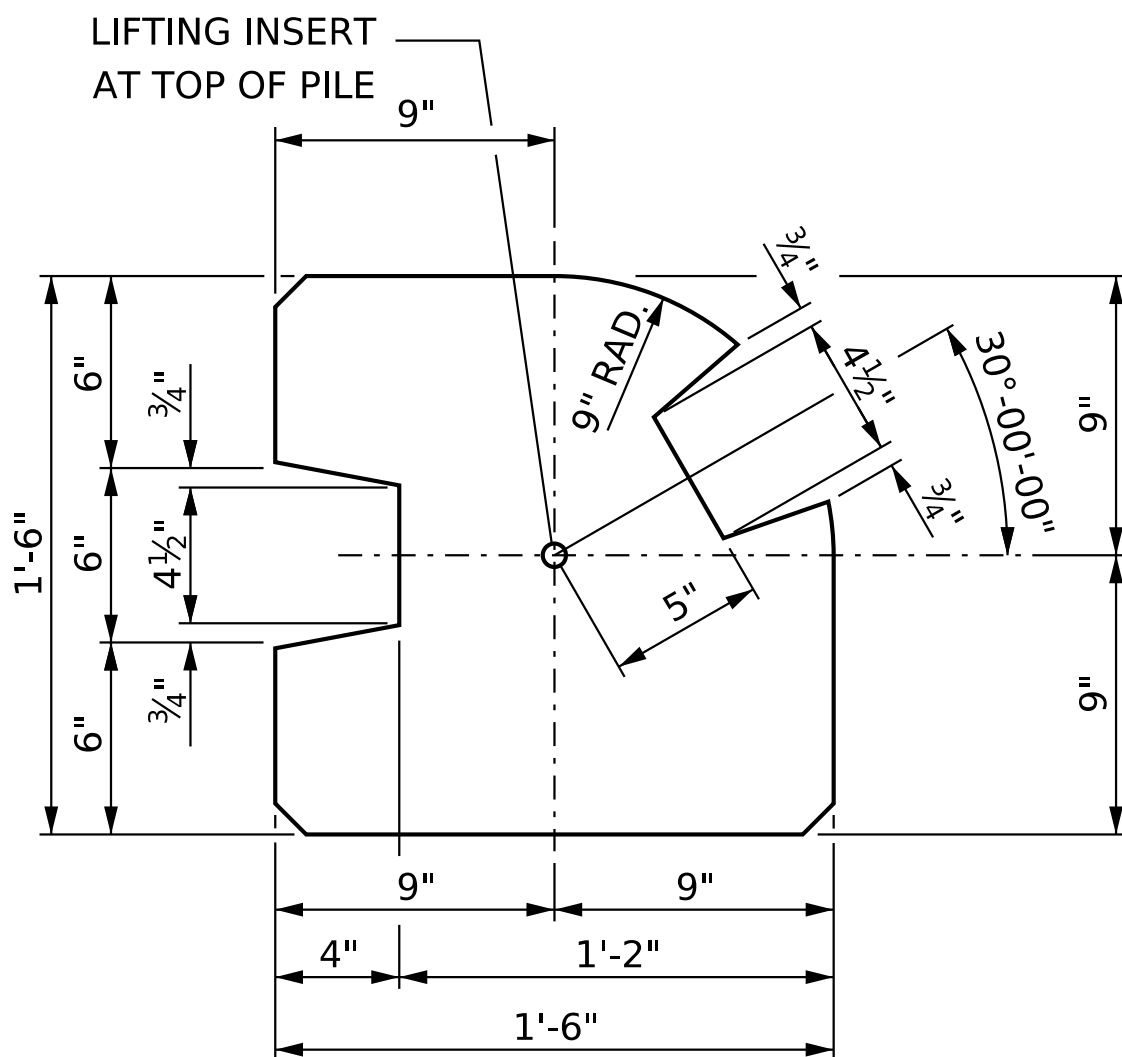
TYPE - I

(AREA = 1.9444 SQ. FT.)



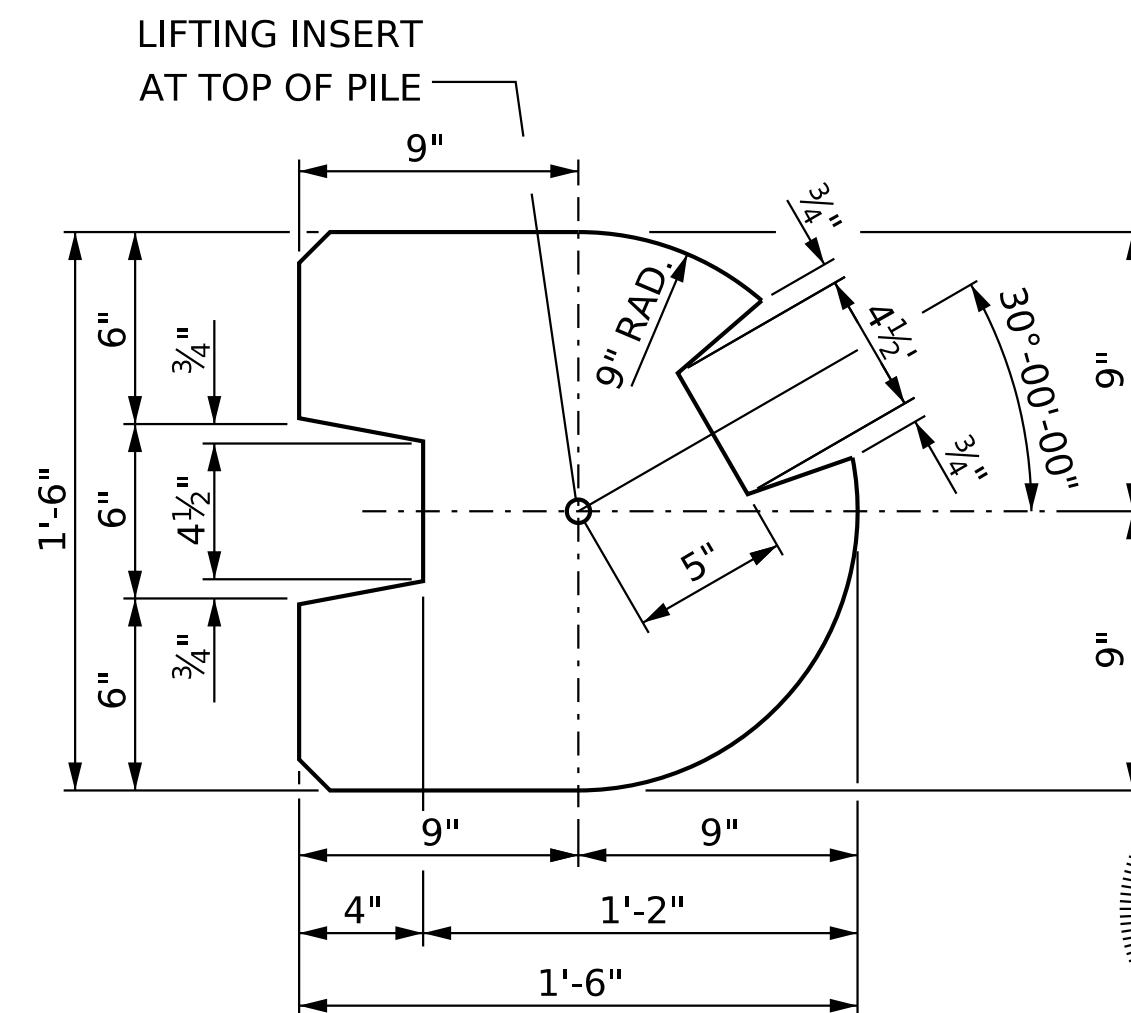
TYPE - II

(AREA = 2.0903 SQ. FT.)



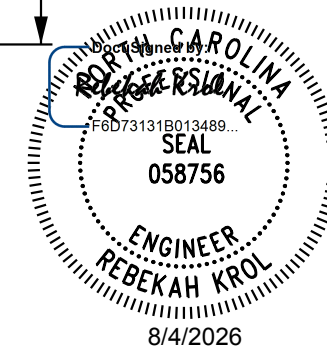
TYPE - III

(AREA = 1.8336 SQ. FT.)



TYPE - III (ALT.)

(AREA = 1.7163 SQ. FT.)



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PROJECT NO. I-5715
MECKLENBURG COUNTY
STATION: 21+72.10 - Y2RPB-
39.53' RT

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SOUND BARRIER WALL
DETAILS
(CONCRETE PILES)

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

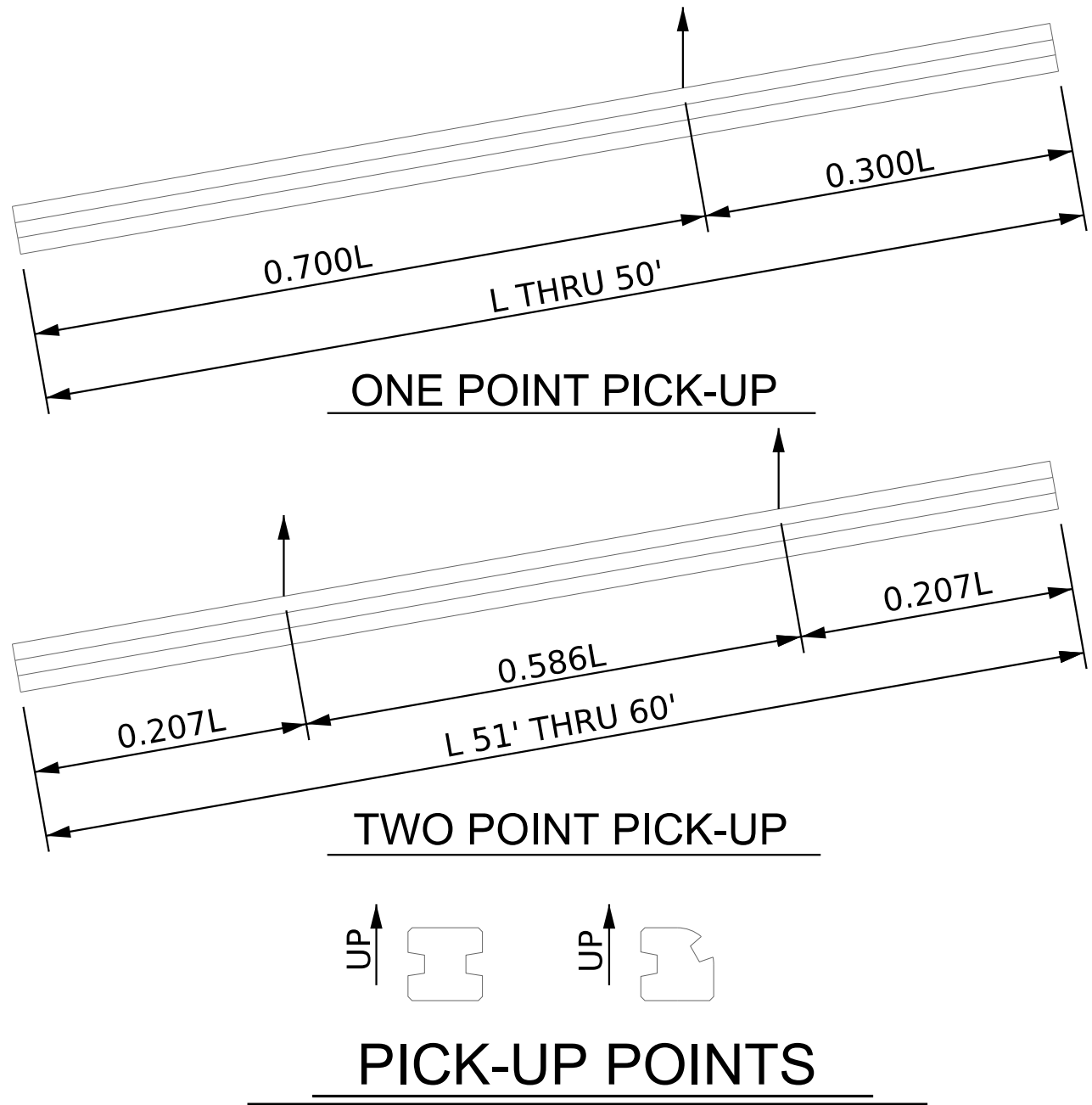
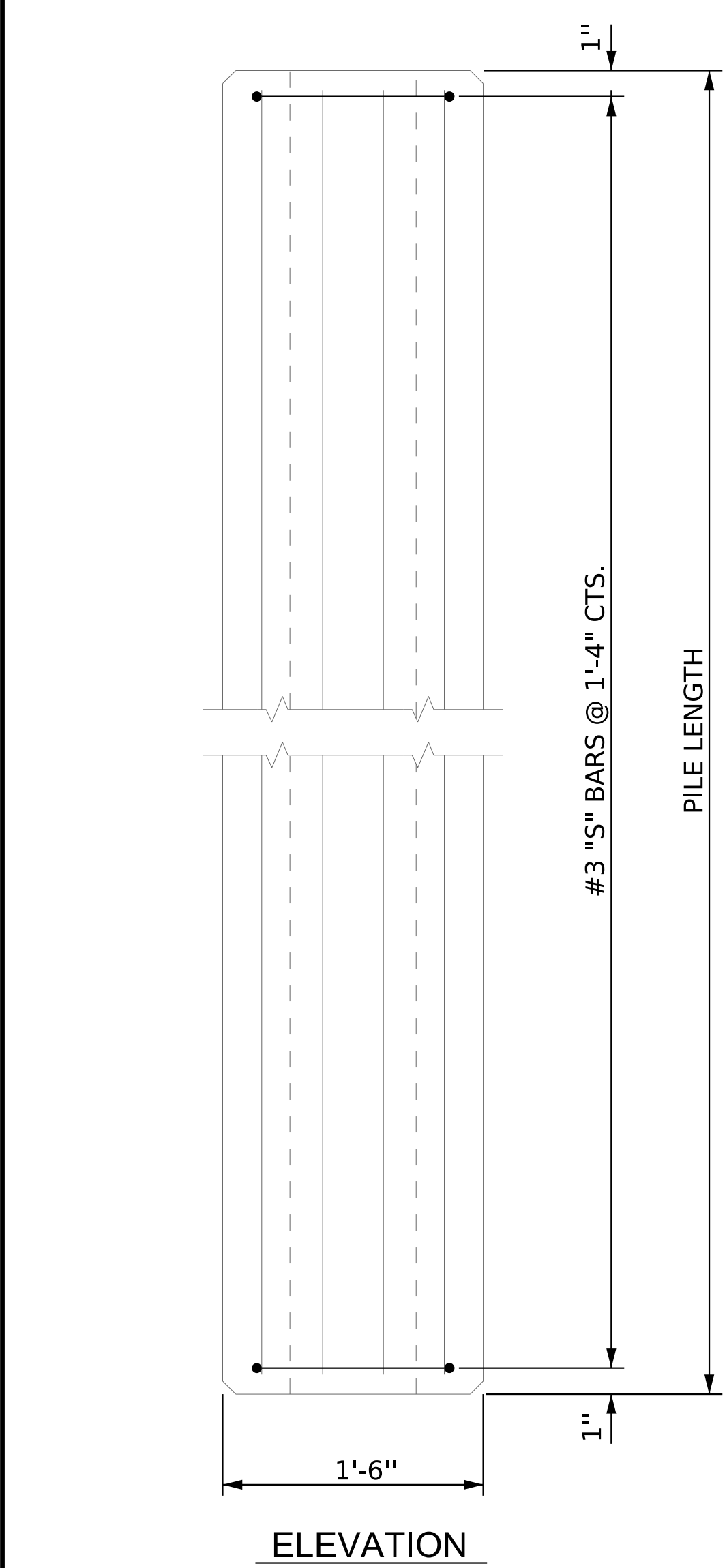
STD. NO. SBW1

ASSEMBLED BY : D. D. LOWERY	DATE : 06/25
CHECKED BY : C. T. POOLE	DATE : 06/25
DRAWN BY : MAA	6/II
CHECKED BY : GM	6/II
REV. 10/17	MAA/THC
REV. 05/18	MAA/THC
REV. 12/23	BNB/AYG

PILE DETAIL
(ALL CORNERS TO BE CHAMFERED 1")

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K:\BRI-Structures\Bridges\NC\01036524 - I-5715 Structure Design\Cadd\Drawings\Wall\420_005_151715_SBW_SBW_003.dgn 8/2/2026



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.

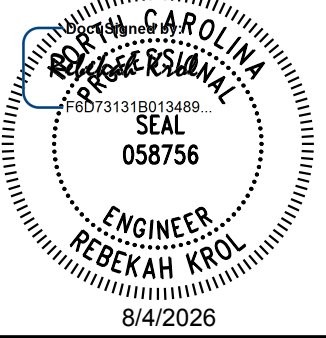
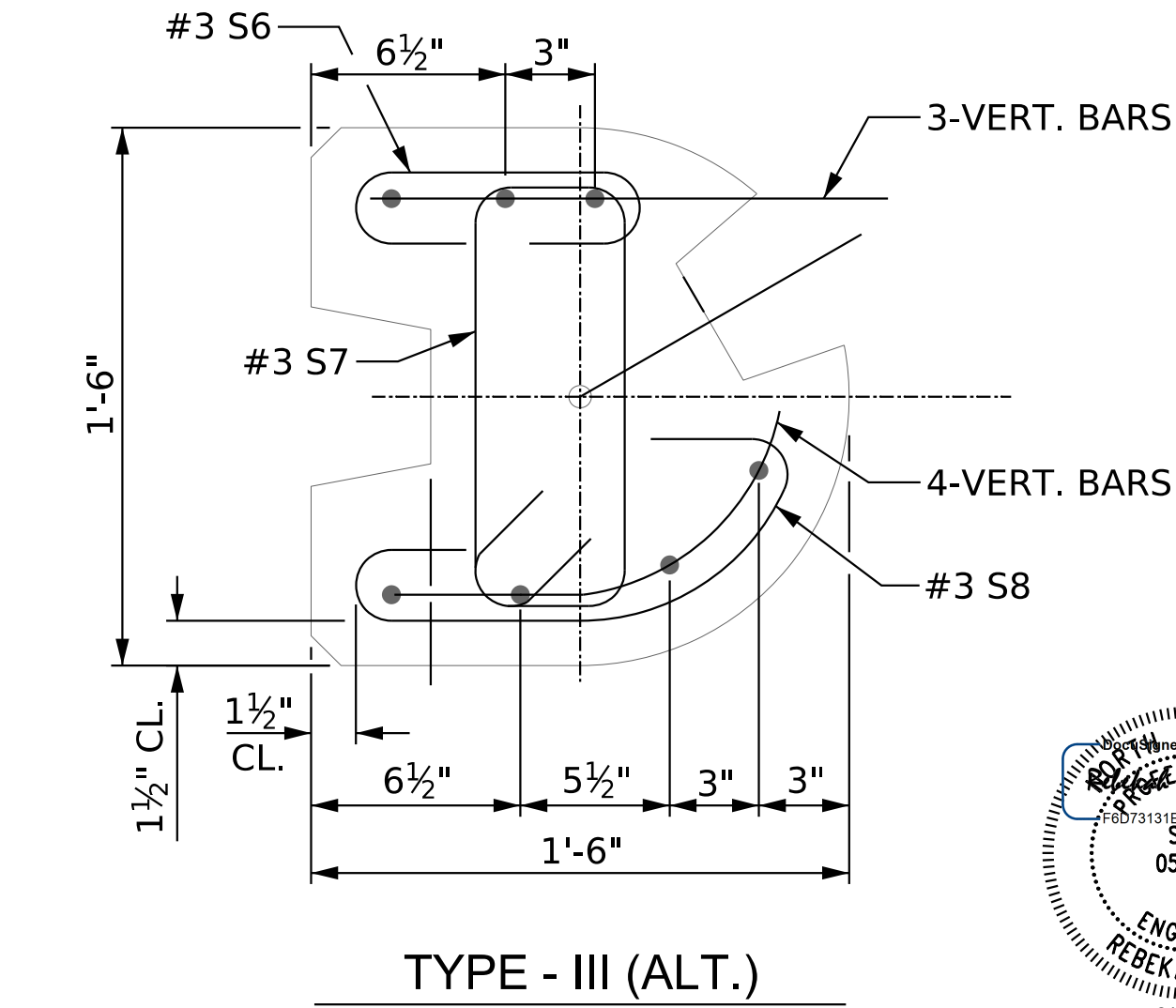
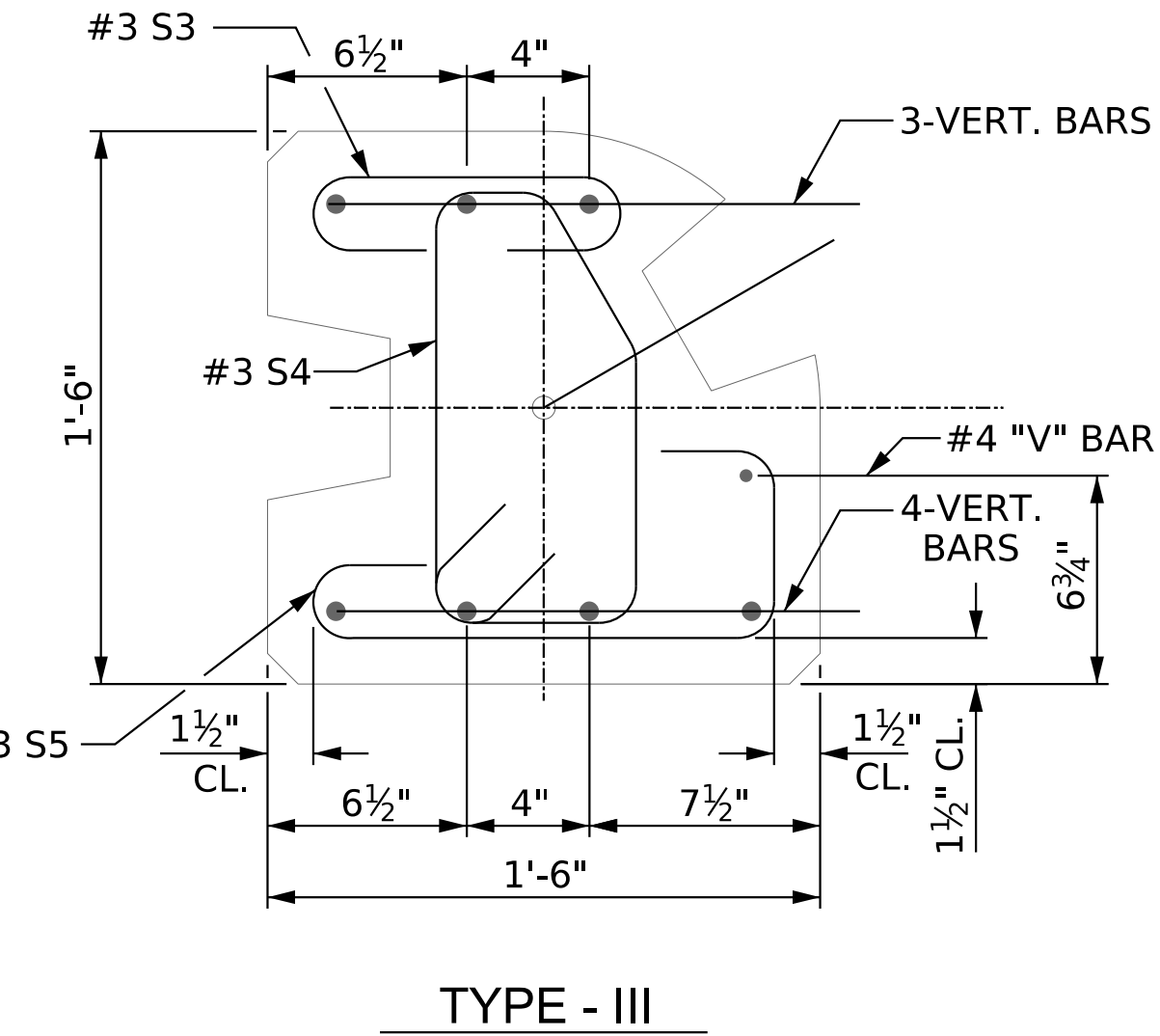
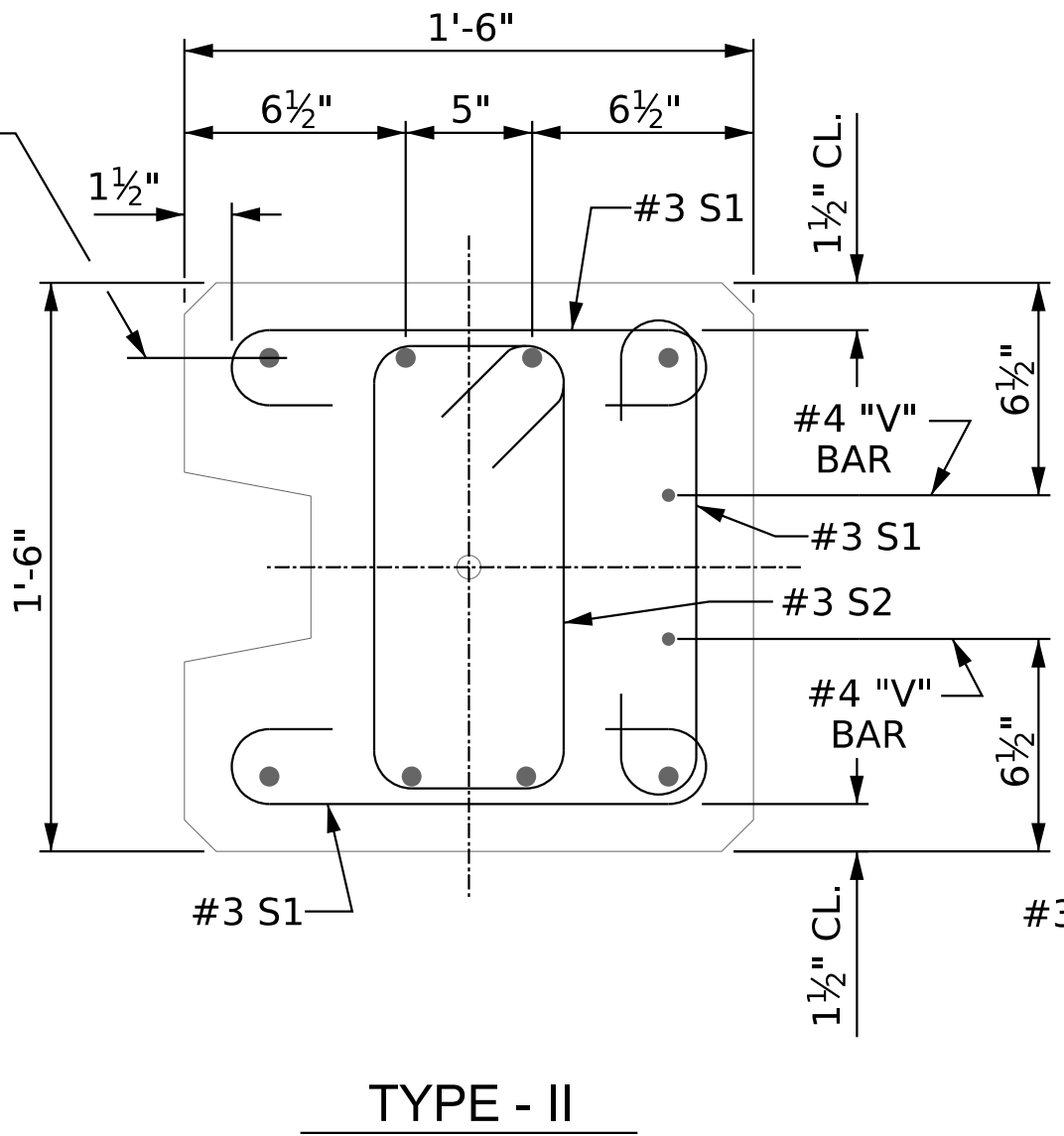
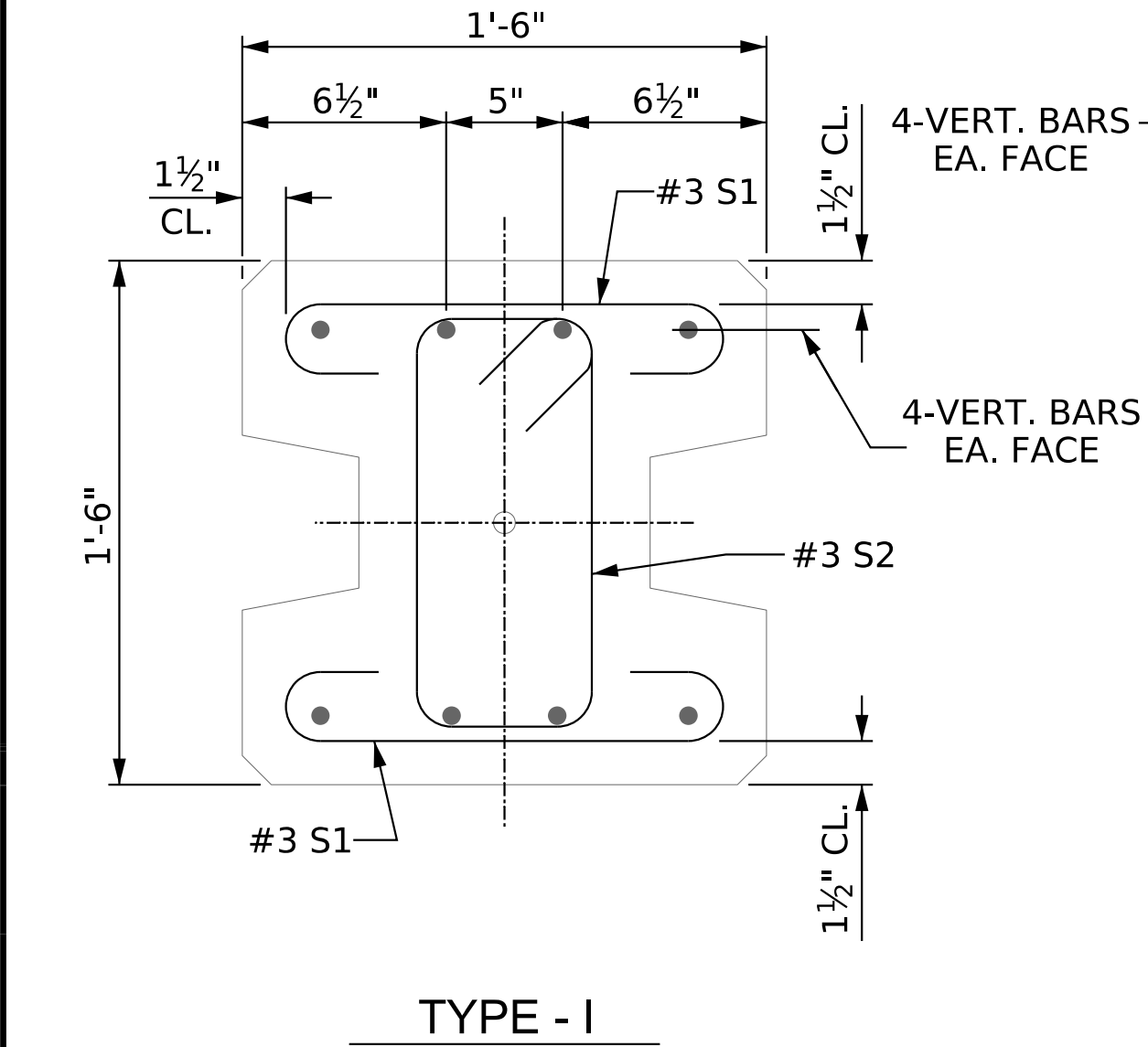
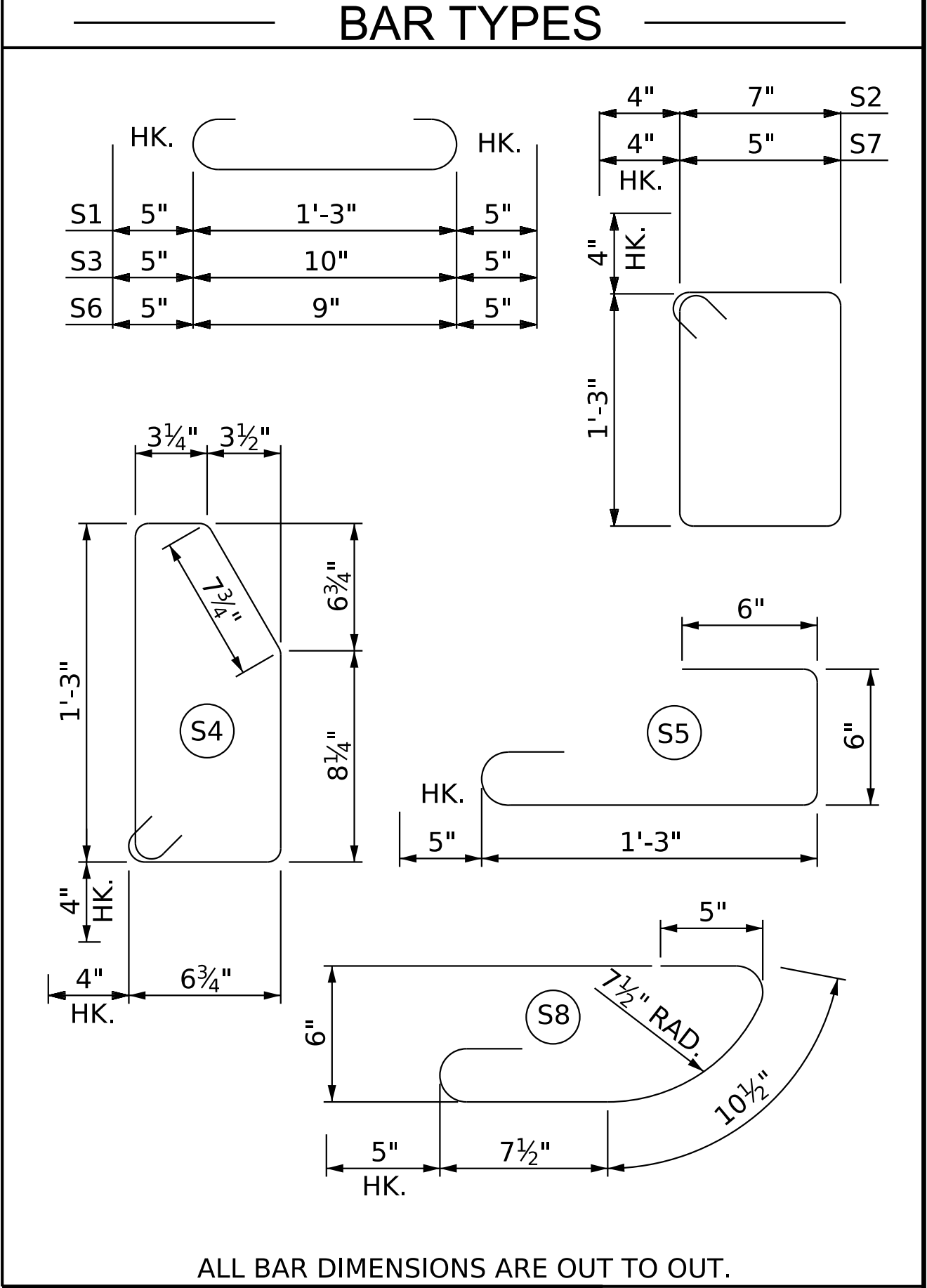
WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

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

ALL CORNERS TO BE CHAMFERED 1".

#3 @ 1'-4" CTS. TIES TO BE USED WITH ALL PILE TYPES.

QUANTITIES FOR ONE PRECAST CONCRETE PILE					
LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINTS	
		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'-4½"	32'-3"
60'-0"	9.42			12'-5"	35'-2"



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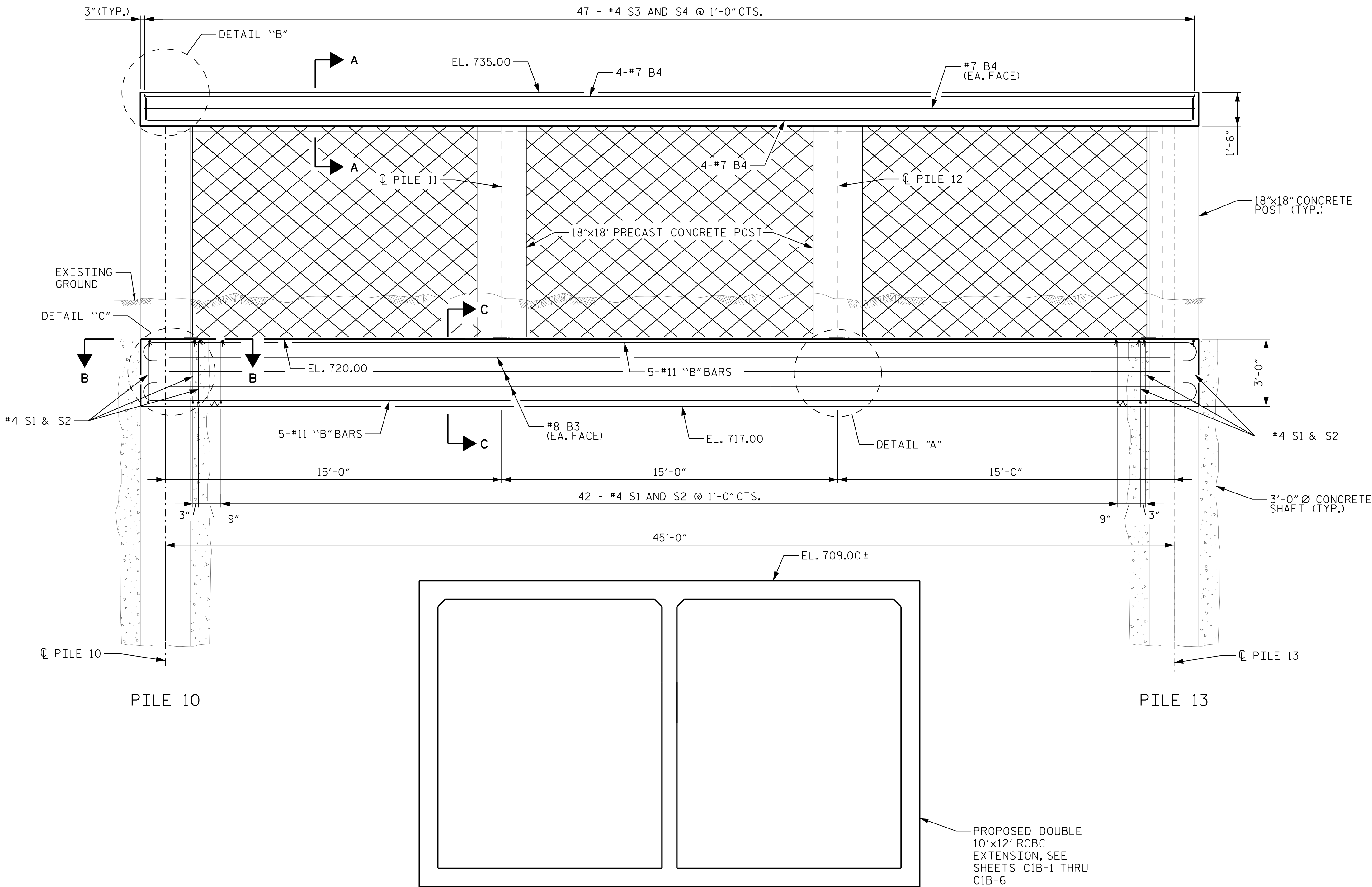
PROJECT NO. I-5715
MECKLENBURG COUNTY
STATION: 21+72.10 - Y2RPB-
39.53' RT

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

STD. NO. SBW3

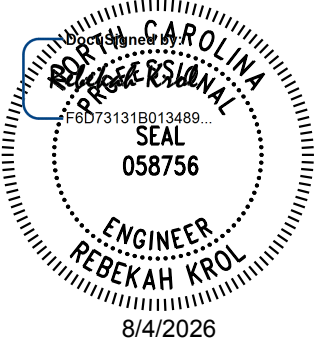
NOTES

- FOR DETAIL ``A``, DETAIL ``B``, AND DETAIL ``C``, SEE SHEET SBW-5.
- FOR SECTION A-A, SECTION B-B, AND SECTION C-C, SEE SHEET SWB-5.
- FOR MODIFIED SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.
- REINFORCING MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR ANCHOR BOLTS.
- USE CLASS A CONCRETE FOR SHAFTS.
- FOR CONCRETE PILE REINFORCING STEEL, SEE SHEET SBW-1.
- STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 15'-0" PILE/POST SPACING.
- FOR NOTES PERTAINING TO CONCRETE PILES AND CONCRETE PANELS, SEE SHEET SBW-1 AND SBW-3.



PROJECT NO. I-5715
MECKLENBURG COUNTY
STATION: 21+72.10 - Y2RPB-
39.53' RT

SHEET 4 OF 6



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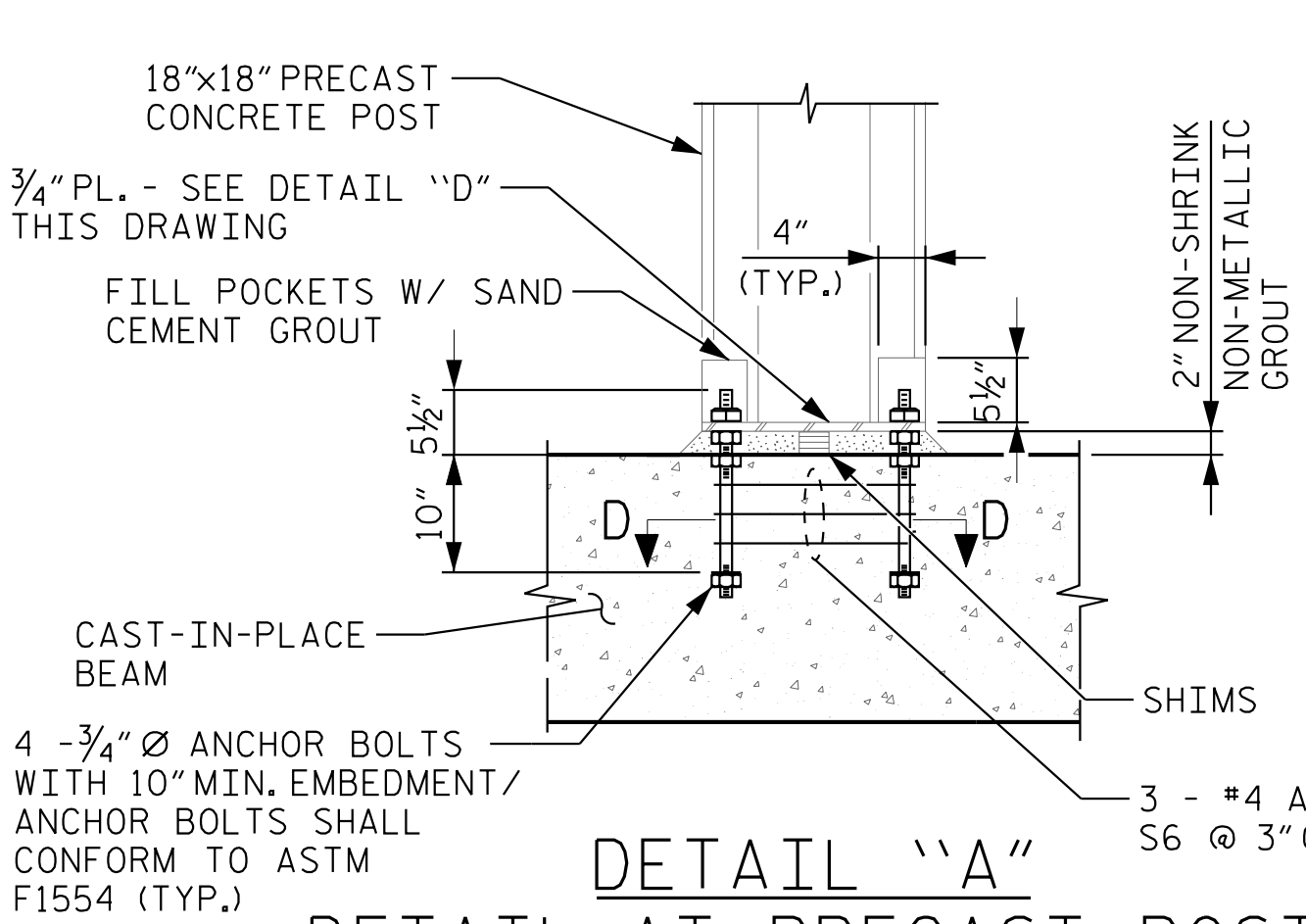
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**MODIFIED
SOUND BARRIER WALL**

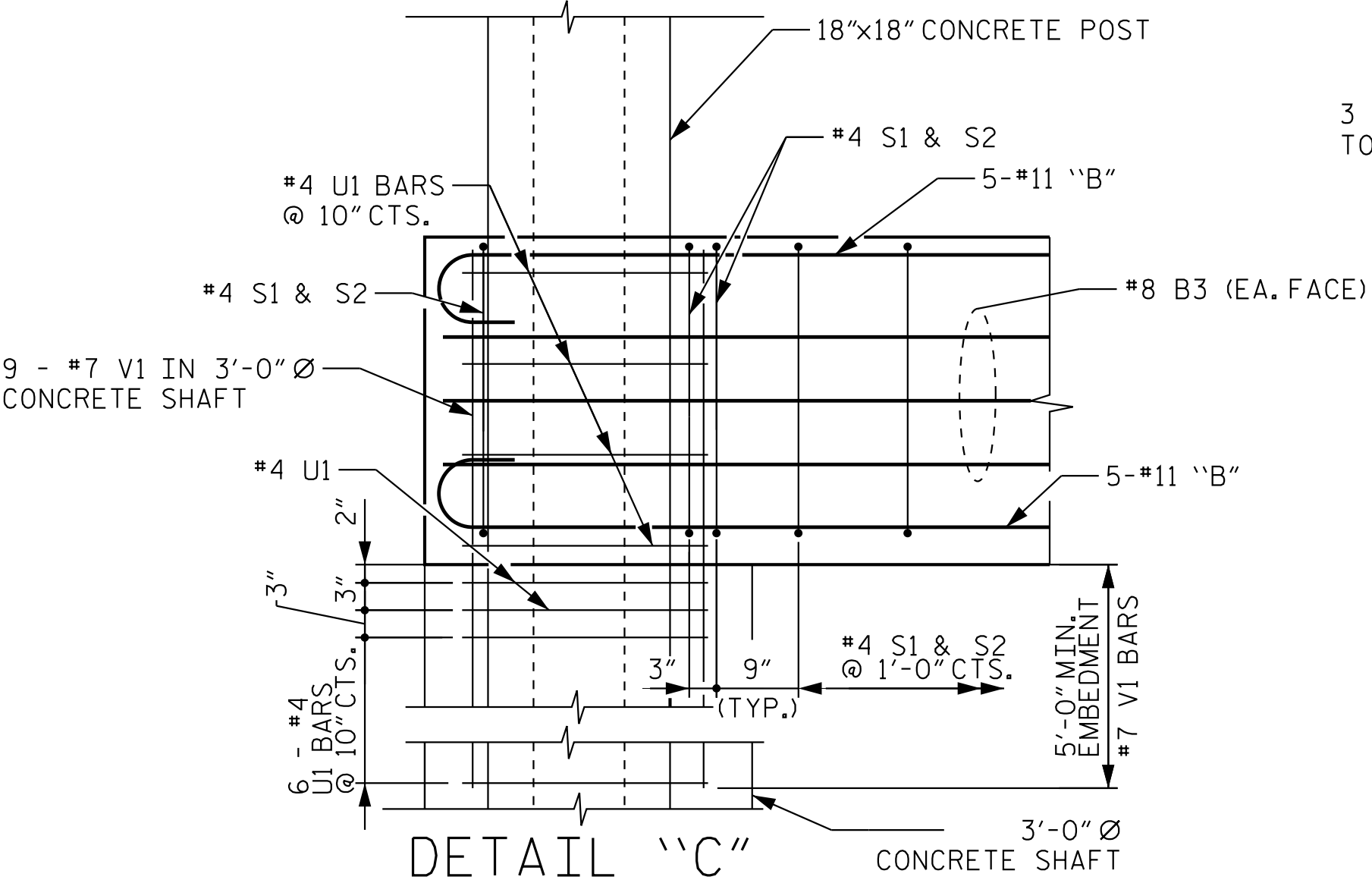
REVISIONS						SHEET NO. SBW-4
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 6
2			4			

DRAWN BY: E.W. SPRABERRY DATE: 04/26
CHECKED BY: B.M. KROL DATE: 04/26
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 04/26

K:\PDI_Structures\Bridges\NC\01036524 - I-5715 Structure Design\Coord\gn\Noise Wall\420_009_151715_SBW_SBW_005.dgn 8/2/2026

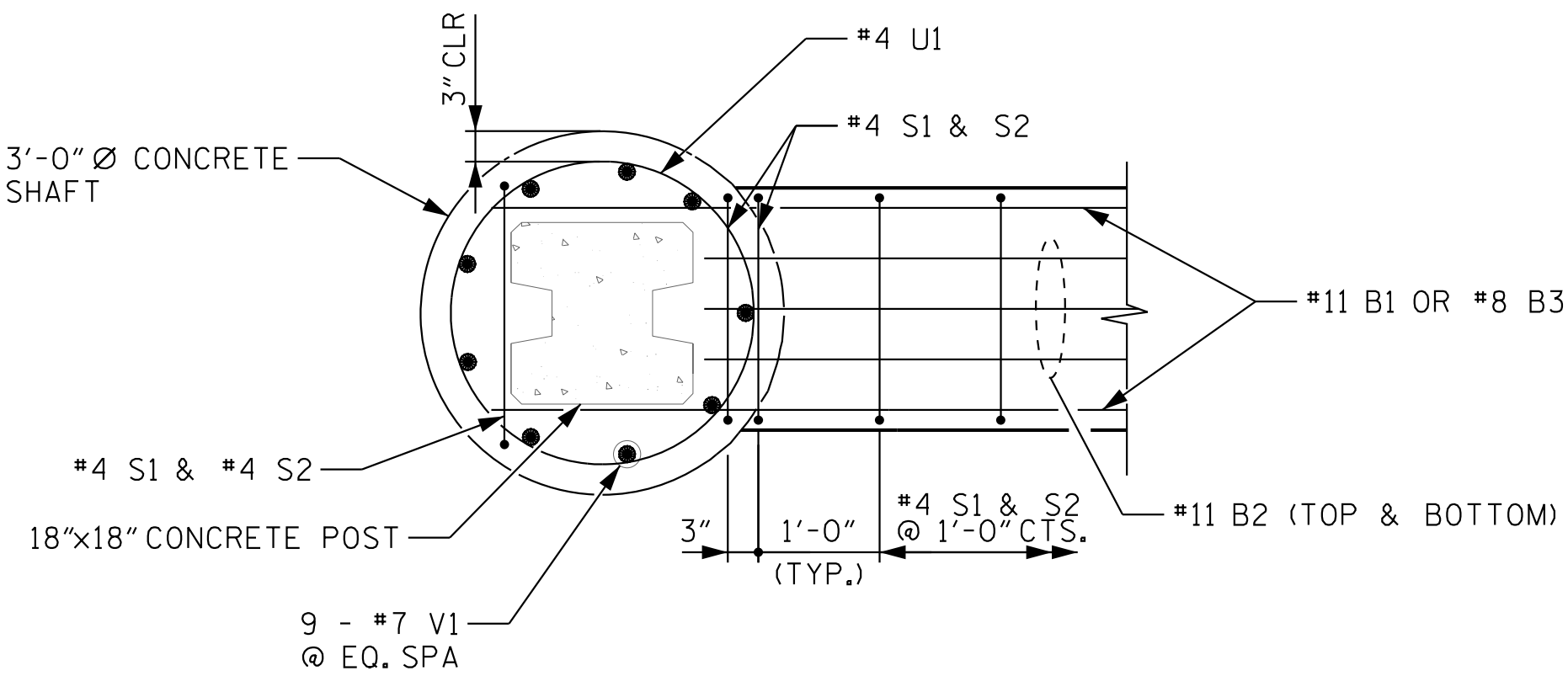


DETAIL "A"
DETAIL AT PRECAST POST
AND CAST-IN-PLACE BEAM



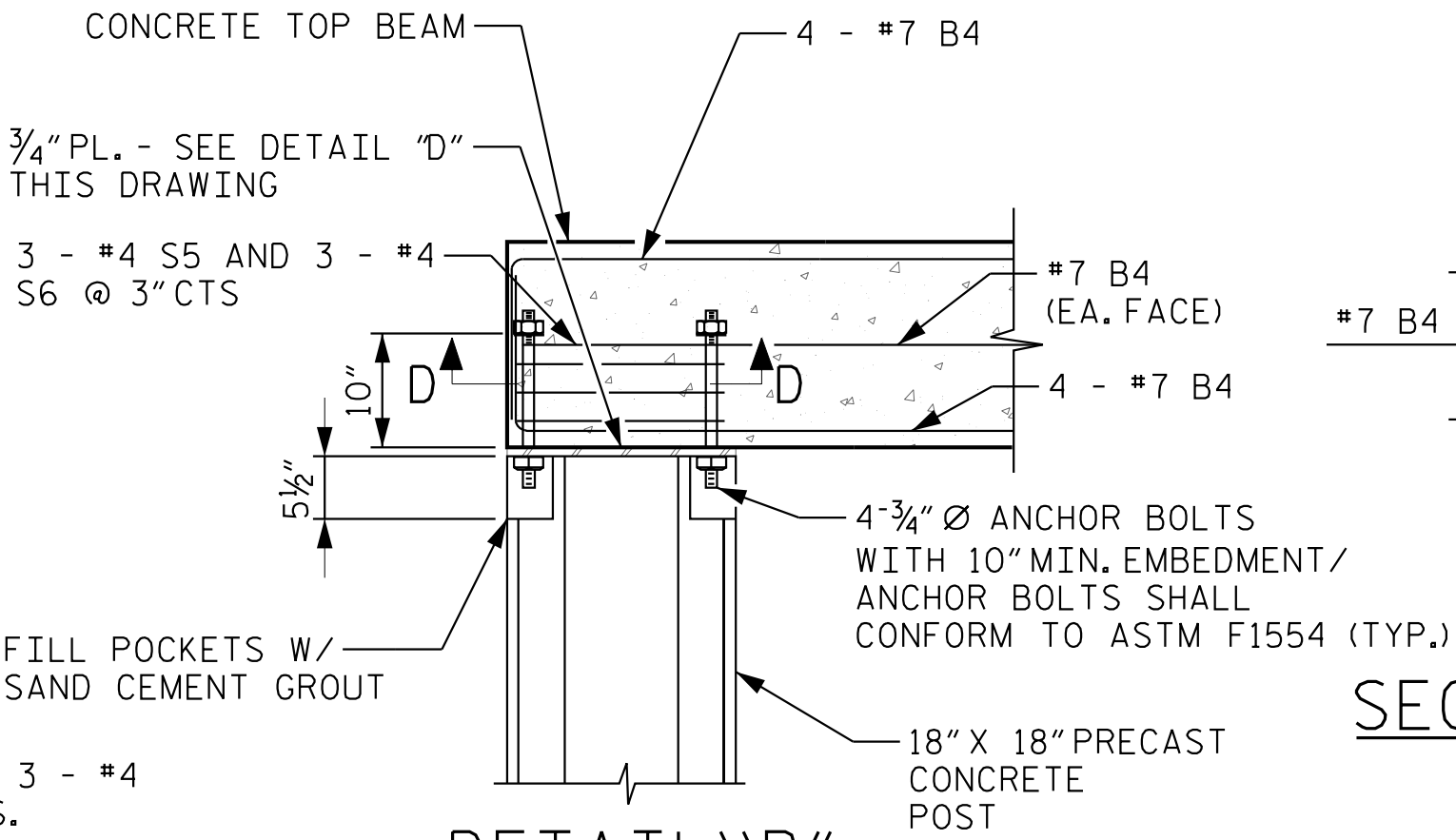
DETAIL "C"
DETAIL AT CAST-IN-PLACE
BEAM AND PRECAST PILE

PILE 10 SHOWN, PILE 13 SIMILAR

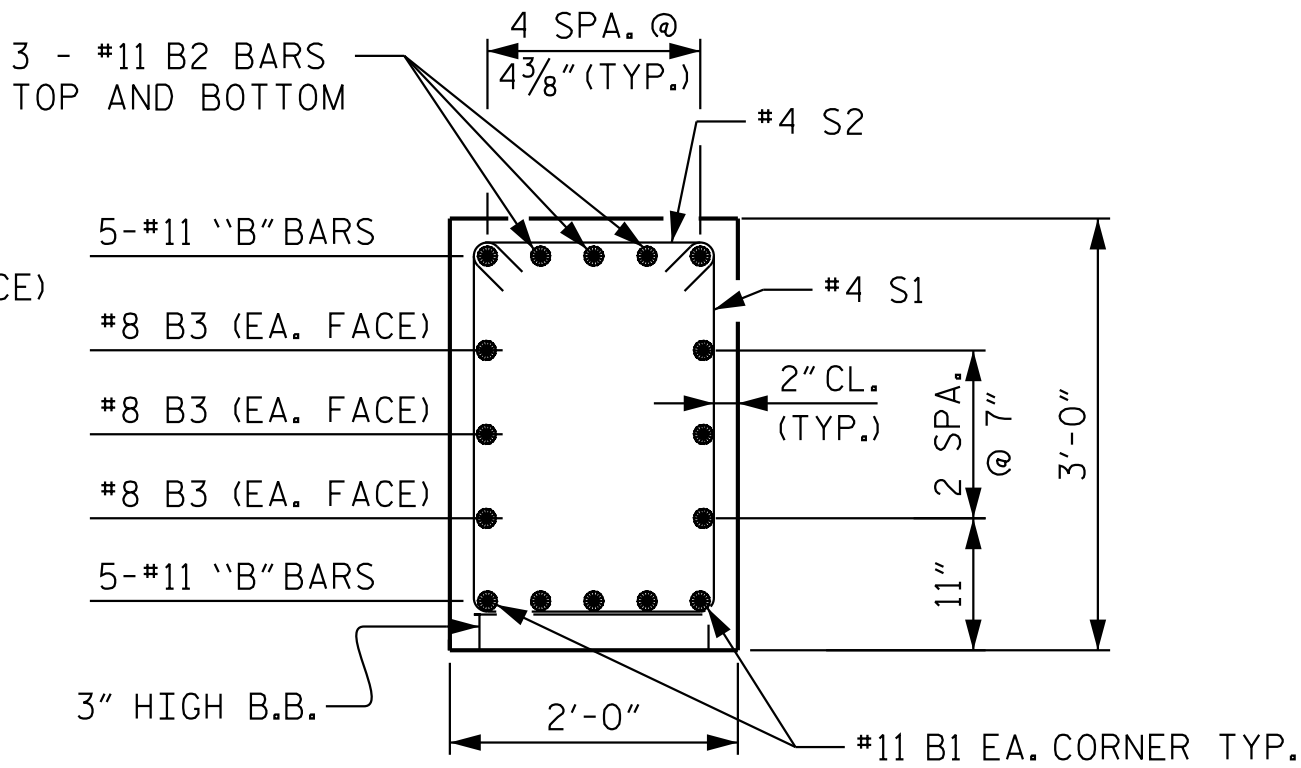


SECTION B-B
AT CAST-IN-PLACE
BEAM AND PRECAST
PILE

PILE 10 SHOWN, PILE 13 SIMILAR

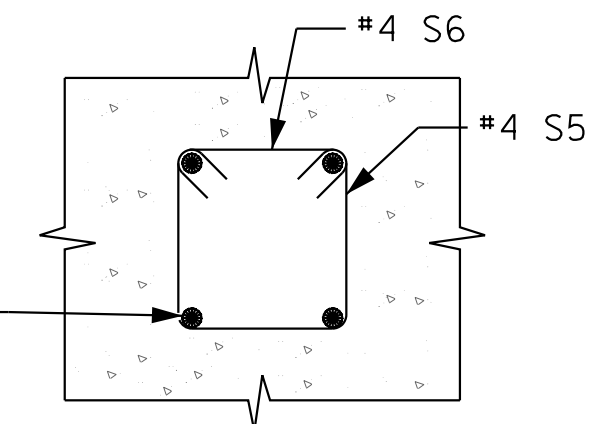


DETAIL "B"
DETAIL AT PRECAST POST/
PILE AND TOP BEAM

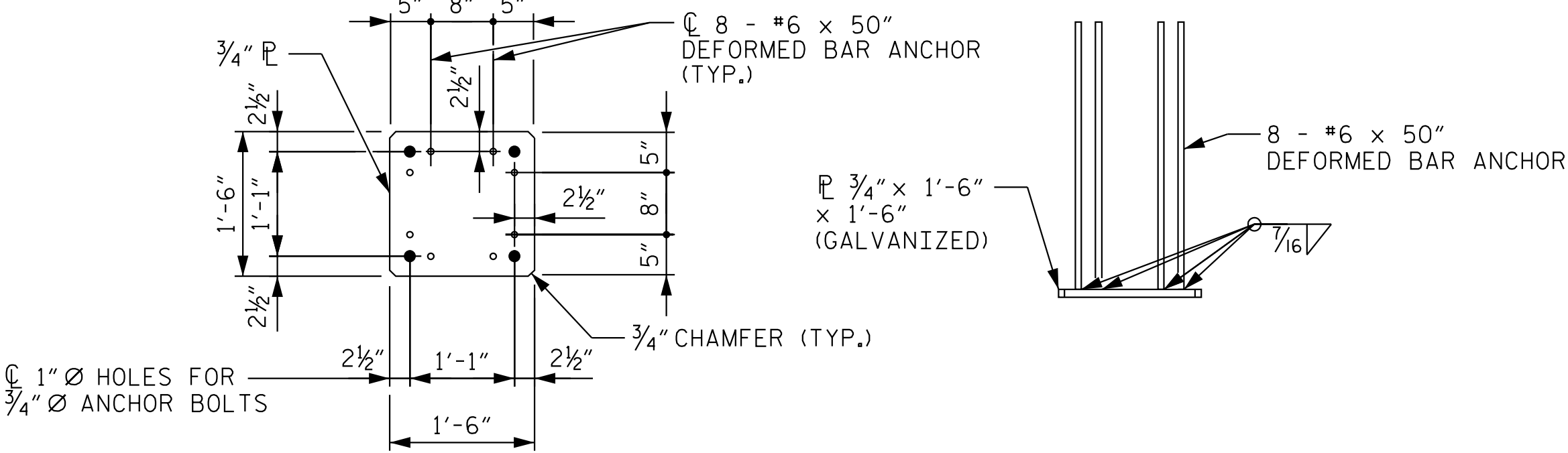


SECTION C-C
THROUGH CAST-IN-PLACE
BOTTOM BEAM

4-3/4" Ø ANCHOR BOLTS
WITH 10" MIN. EMBEDMENT/
ANCHOR BOLTS SHALL
CONFORM TO ASTM F1554 (TYP.)

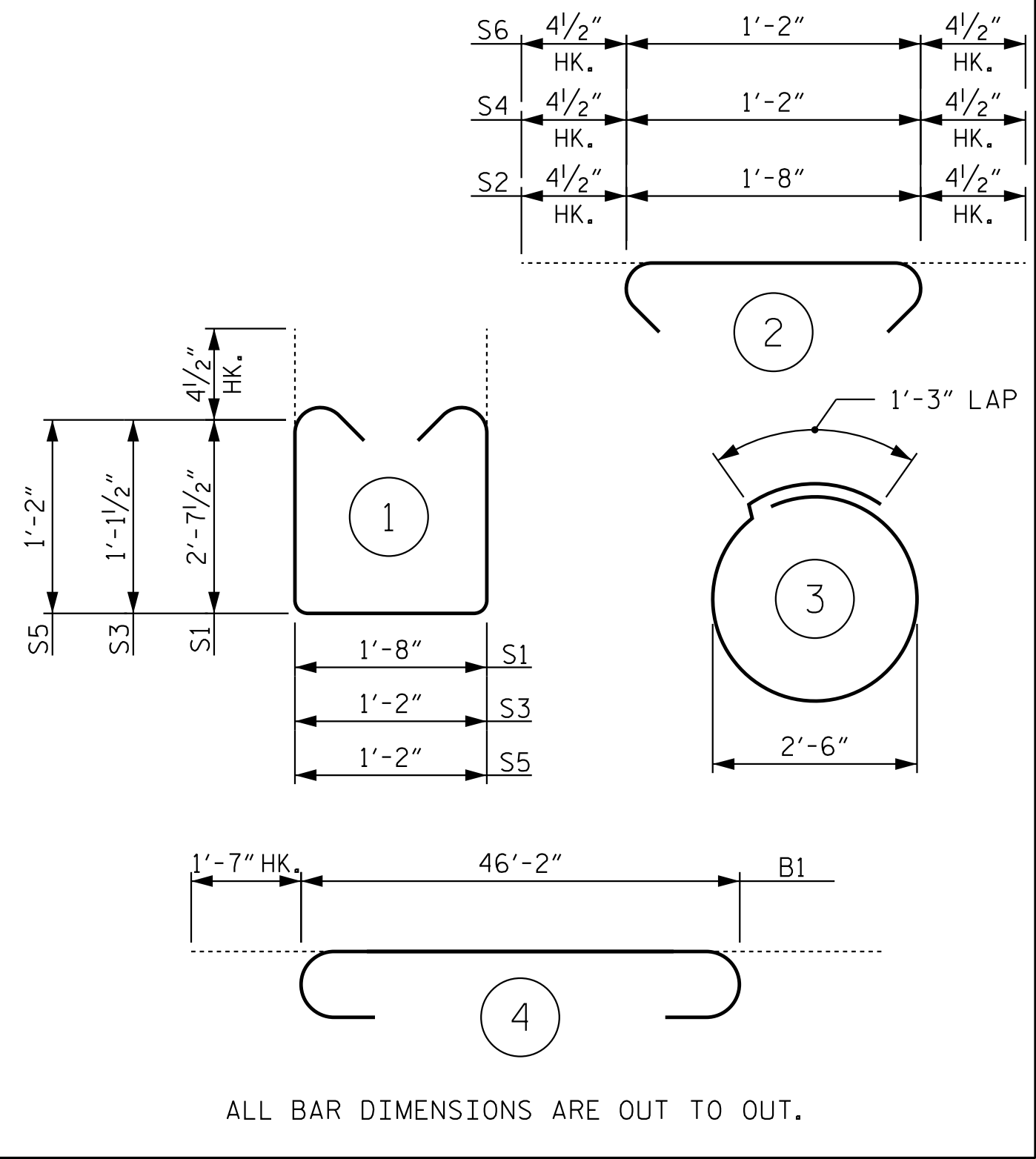


SECTION D-D



DETAIL "D"
TYPICAL BASE PLATE

BAR TYPES



BILL OF MATERIAL

CONCRETE BEAMS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	11	STR	49'-4"	1,048
B2	6	11	STR	43'-2"	1,376
B3	6	8	STR	43'-2"	692
B4	10	7	STR	46'-2"	944

S1	48	4	1	7'-8"	246
S2	48	4	2	2'-5"	77
S3	47	4	1	4'-2"	131
S4	47	4	2	1'-11"	60
S5	18	4	1	4'-2"	50
S6	18	4	2	1'-11"	23

REINFORCING STEEL 4,647 LBS.

CLASS A CONCRETE BREAKDOWN

POUR 1 (BOTTOM BEAM) 9.7 C.Y.

POUR 2 (TOP BEAM) 3.9 C.Y.

TOTAL CLASS A CONCRETE 13.6 C.Y.

CONCRETE SHAFT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
U1	24	4	3	9'-2"	147
V1	18	7	STR	7'-10"	288

REINFORCING STEEL 435 LBS.

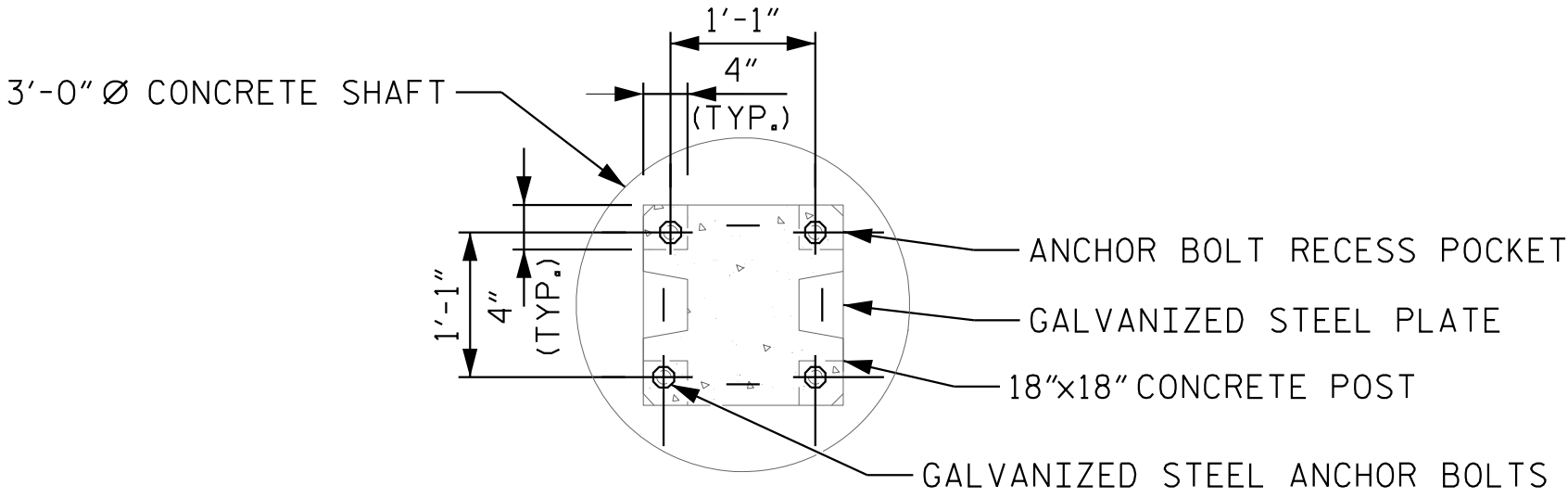
CLASS A CONCRETE BREAKDOWN

EA. SHAFT 2.5 C.Y.

TOTAL CLASS A CONCRETE 5.0 C.Y.

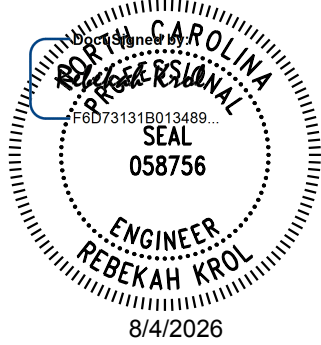
TYPICAL POST SECTION

SEE SHEET SBW-1 FOR PILE EMBEDMENT DEPTH AND REINFORCEMENT



PROJECT NO. I-5715
MECKLENBURG COUNTY
STATION: 21+72.10 - Y2RPB-
39.53' RT

SHEET 5 OF 6



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This document, together with the concepts and designs presented herein, is an integral part of the project. It is intended for the specific project and shall not be used for any other project without the written authorization and signature of Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

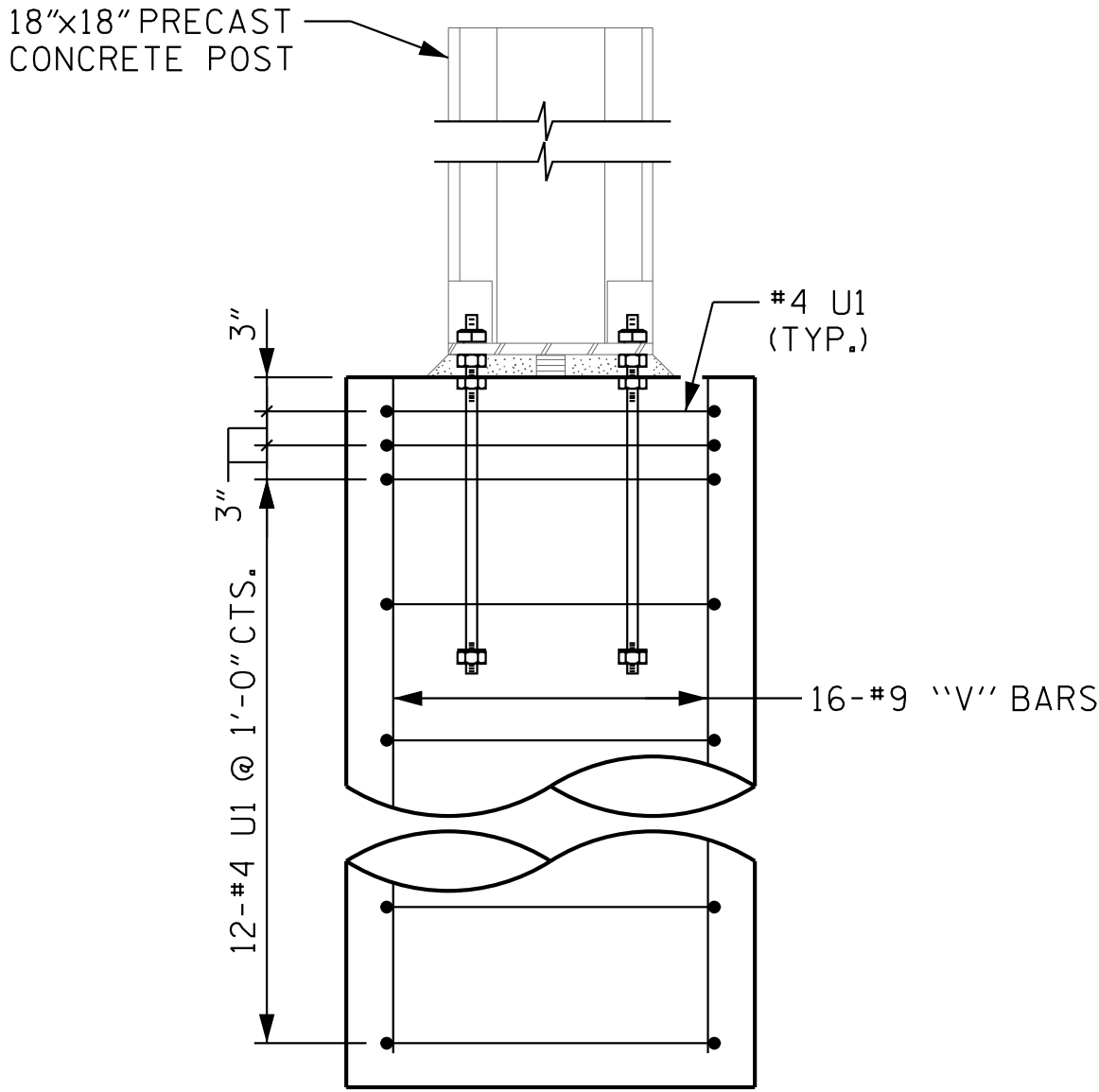
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**MODIFIED
SOUND BARRIER WALL
CONCRETE BEAM
DETAILS**

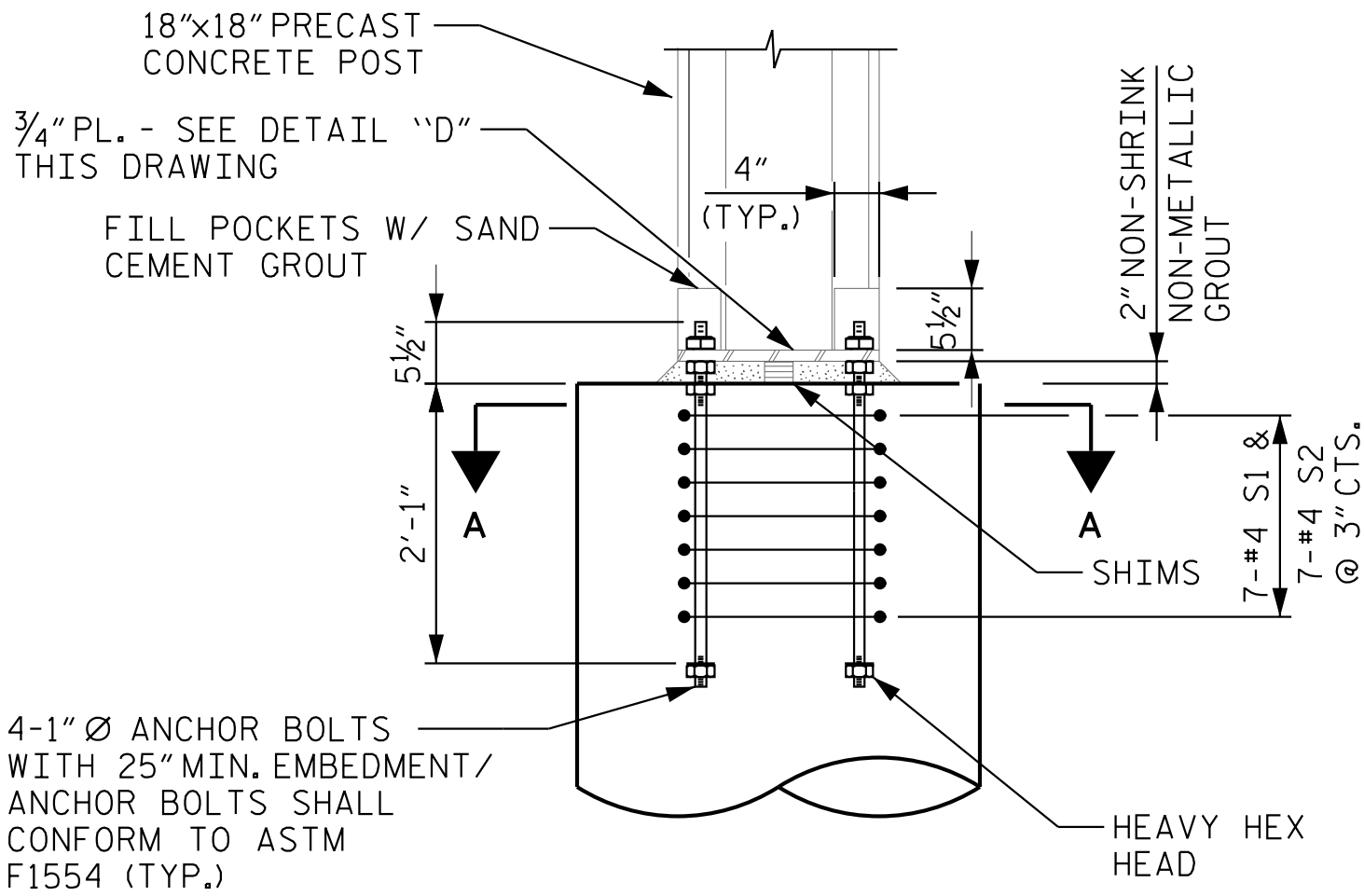
REVISIONS						SHEET NO. SBW-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 6
2			4			

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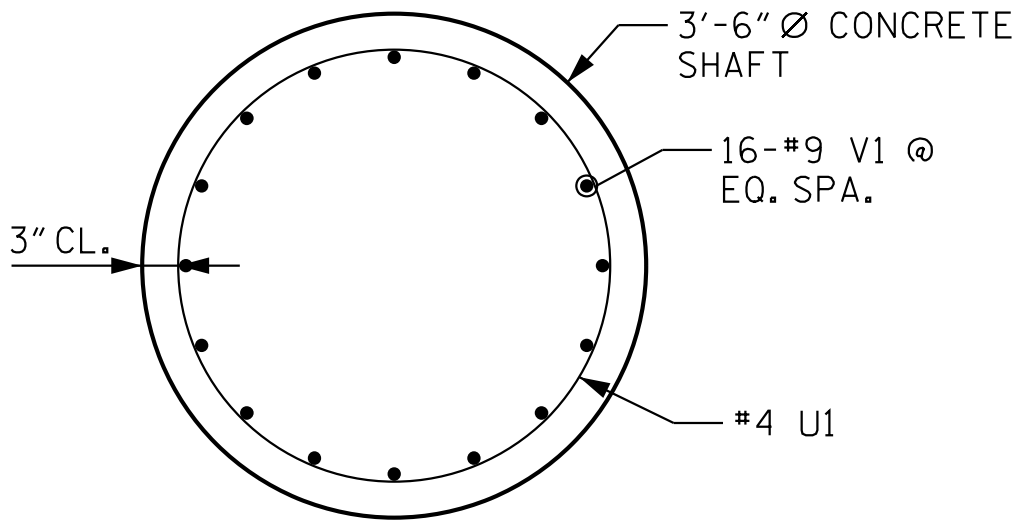


TYPICAL POST & AUGERED PILE

SEE SHEET SBW-1 FOR SHAFT EMBEDMENT DEPTH

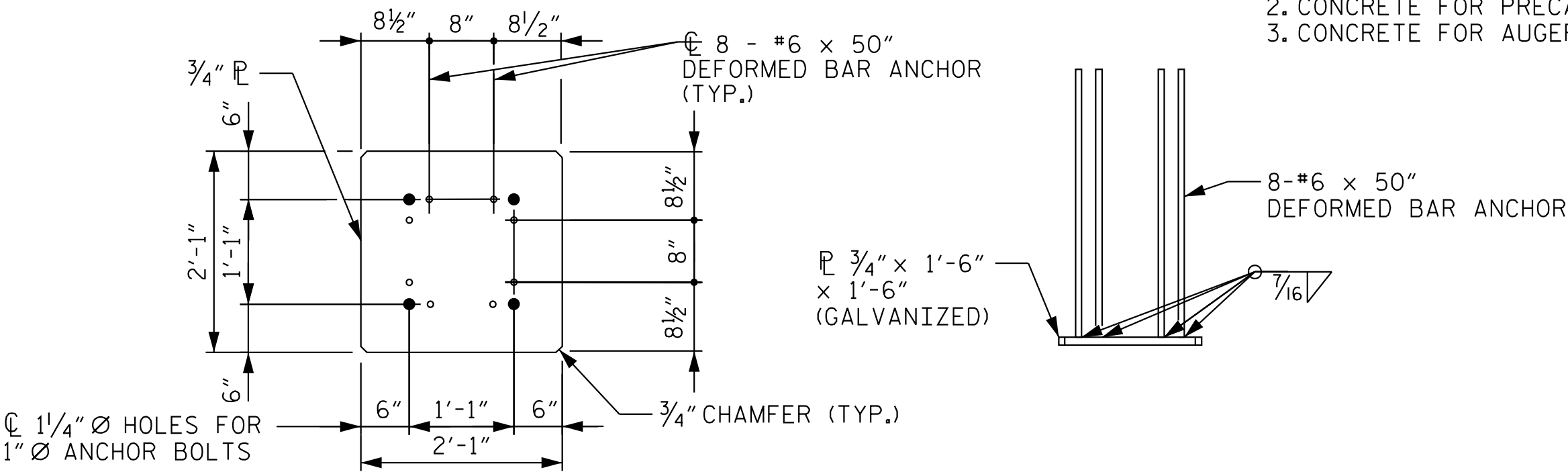


DETAIL "A"

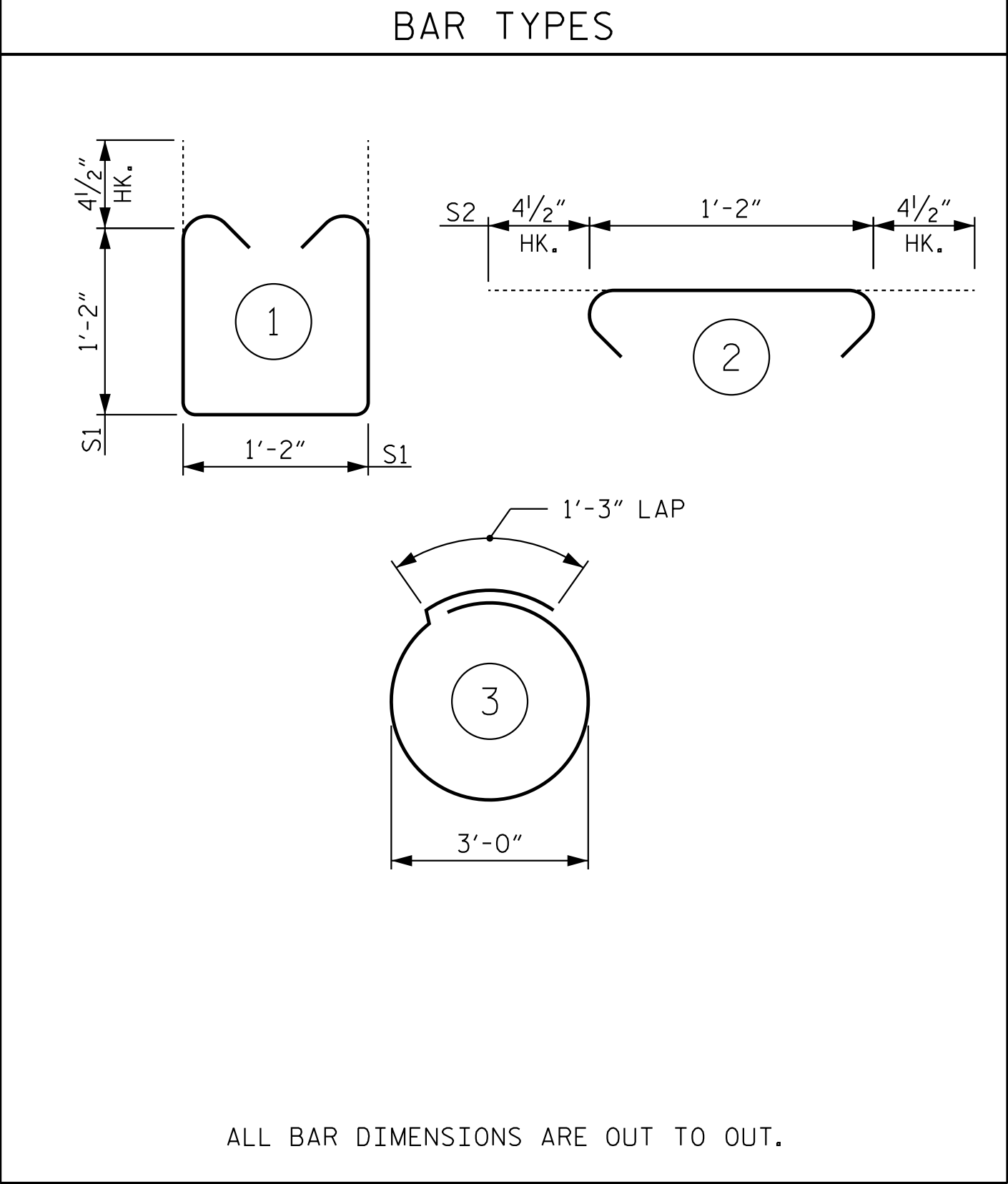


TYPICAL AUGERED PILE SECTION

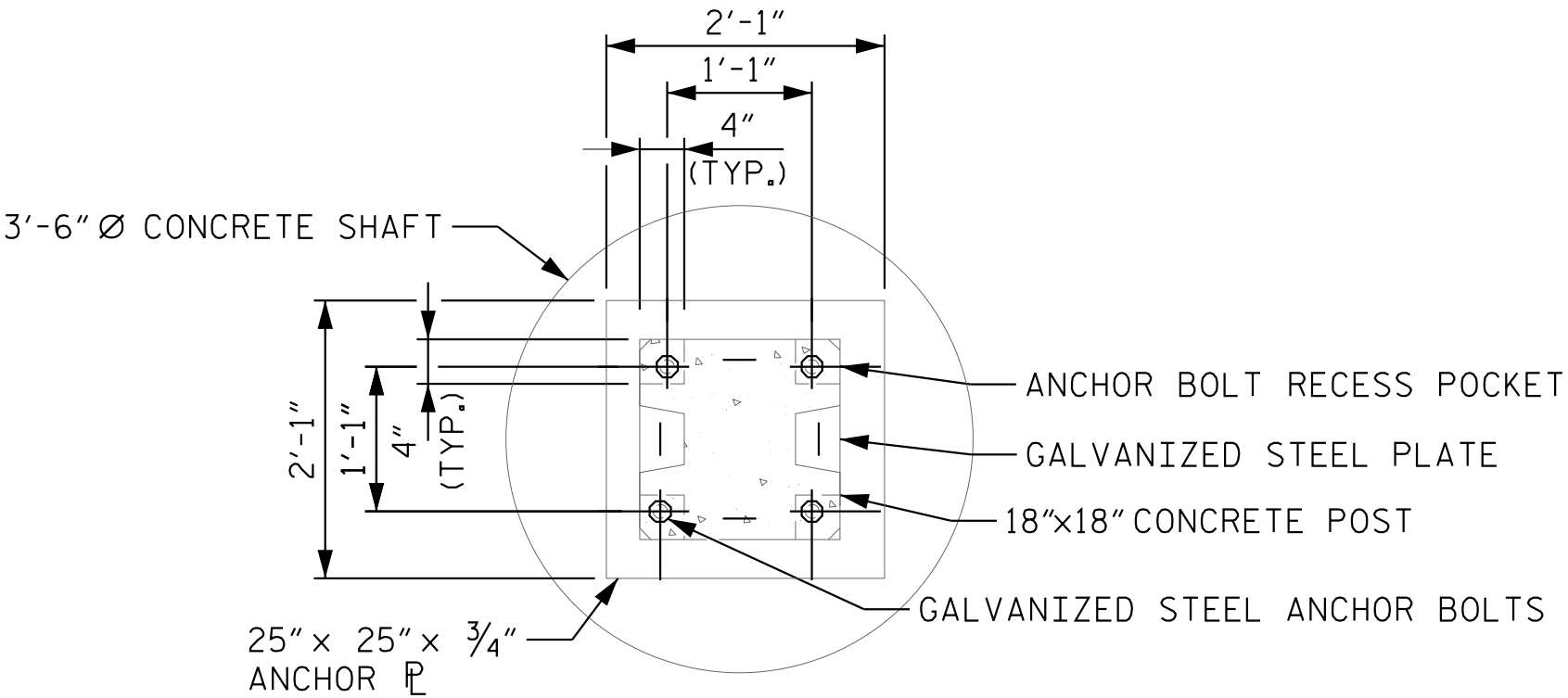
- NOTES
1. ALL REINFORCING STEEL SHALL BE ASTM A706, GRADE 60
 2. CONCRETE FOR PRECAST POST SHALL BE 5,000 PSI F'C @ 28 DAYS
 3. CONCRETE FOR AUGER CAST PILES SHALL BE 4,500 PSI F'C @ 28 DAYS



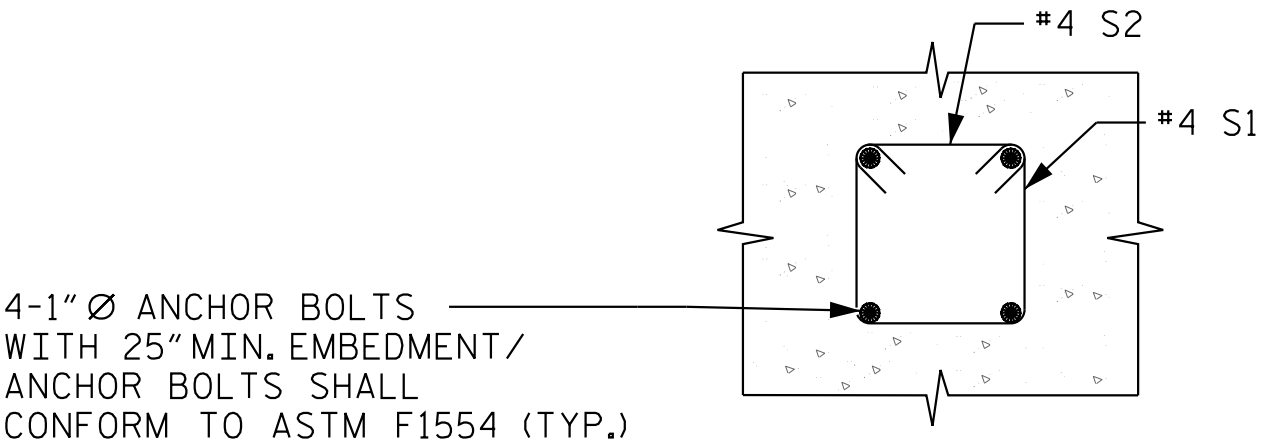
DETAIL "B"
TYPICAL BASE PLATE



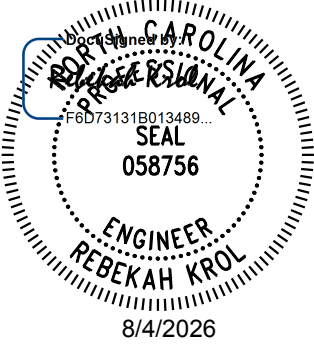
BILL OF MATERIAL					
CONCRETE SHAFT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
U1	14	4	3	10'-8"	100
V1	16	9	STR	11'-7"	630
S1	7	4	1	4'-3"	20
S2	7	4	2	1'-11"	9
REINFORCING STEEL					759 LBS.
DRILLED PIER CONCRETE BREAKDOWN					
EA. SHAFT					4.3 C.Y.
TOTAL DRILLED PIER CONCRETE					4.3 C.Y.



TYPICAL POST SECTION



SECTION A-A



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SHEET 6 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
MODIFIED SOUND BARRIER WALL DRILLED SHAFT DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. SBW-6					TOTAL SHEETS 6

DRAWN BY: E.W. SPRABERRY DATE: 04/26
CHECKED BY: B.M. KROL DATE: 04/26
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 04/26