GEOTECHNICAL
ENGINEER

MICHAEL H. STEPHENS
SEAL
028893

Signed by:
C447682092314CC...
03/10/2025

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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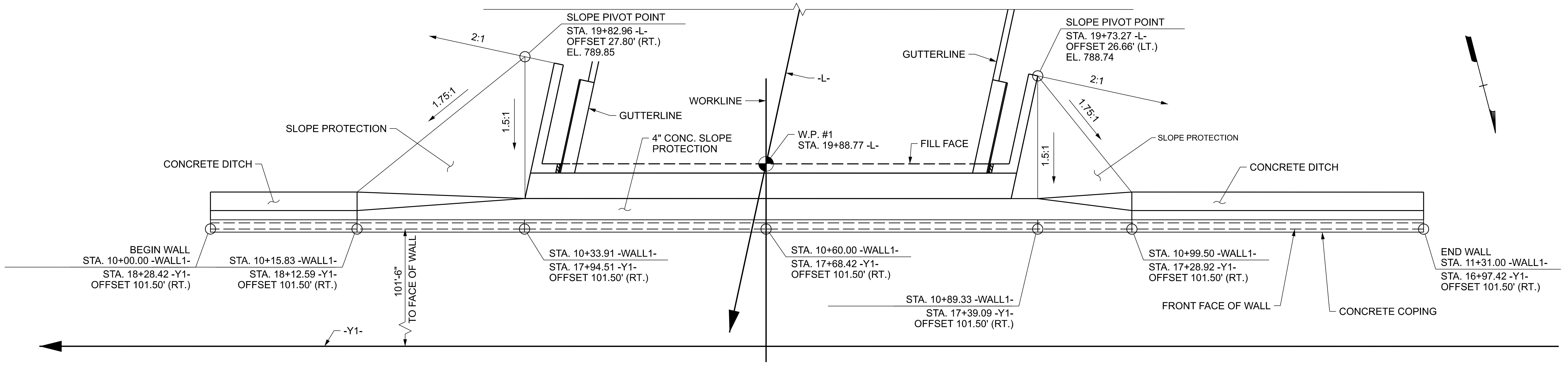
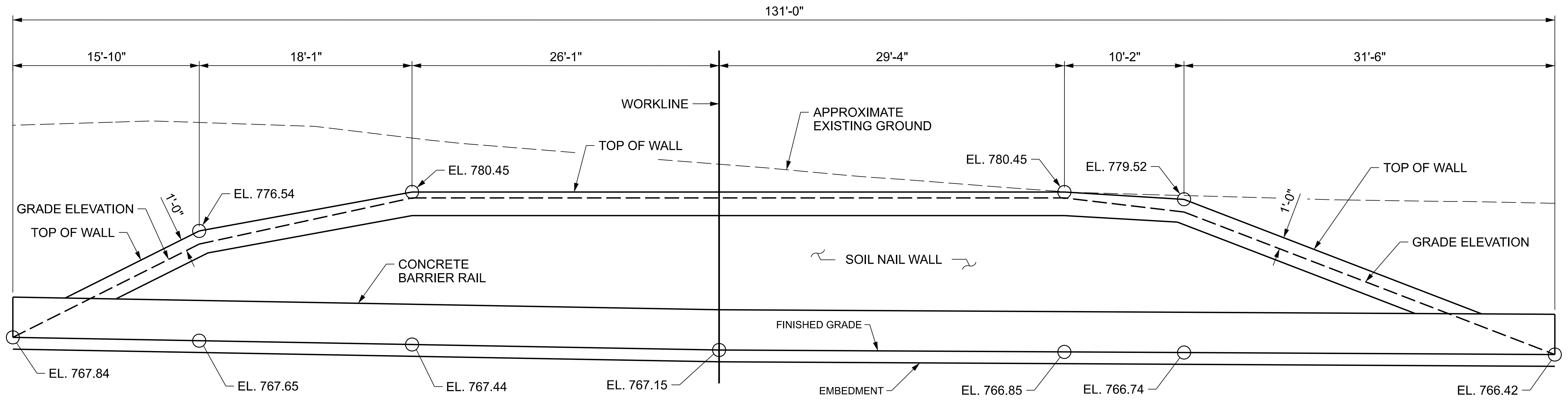
UNLESS ALL SIGNATURES COMPLETED



PLAN @ END BENT 1



ELEVATION @ END BENT 1
(LOOKING AT EXPOSED FACE OF WALL)

NOTES:

DIMENSIONS TAKEN ALONG FRONT FACE OF WALL.

PROJECT NO.: B-5777
DAVIDSON COUNTY
STATION: STA. 17+68.42 -Y1-
SHEET 1 OF 7

ESTIMATED SOIL NAIL WALL QUANTITIES

RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
1	1,405	1	3

PREPARED BY: MHS DATE: 3/25
REVIEWED BY: ENW DATE: 3/25

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 1
SOIL NAIL WALL PLAN AND ELEVATIONS VIEWS

REVISIONS

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

SHEET NO.
W-1

GEOTECHNICAL
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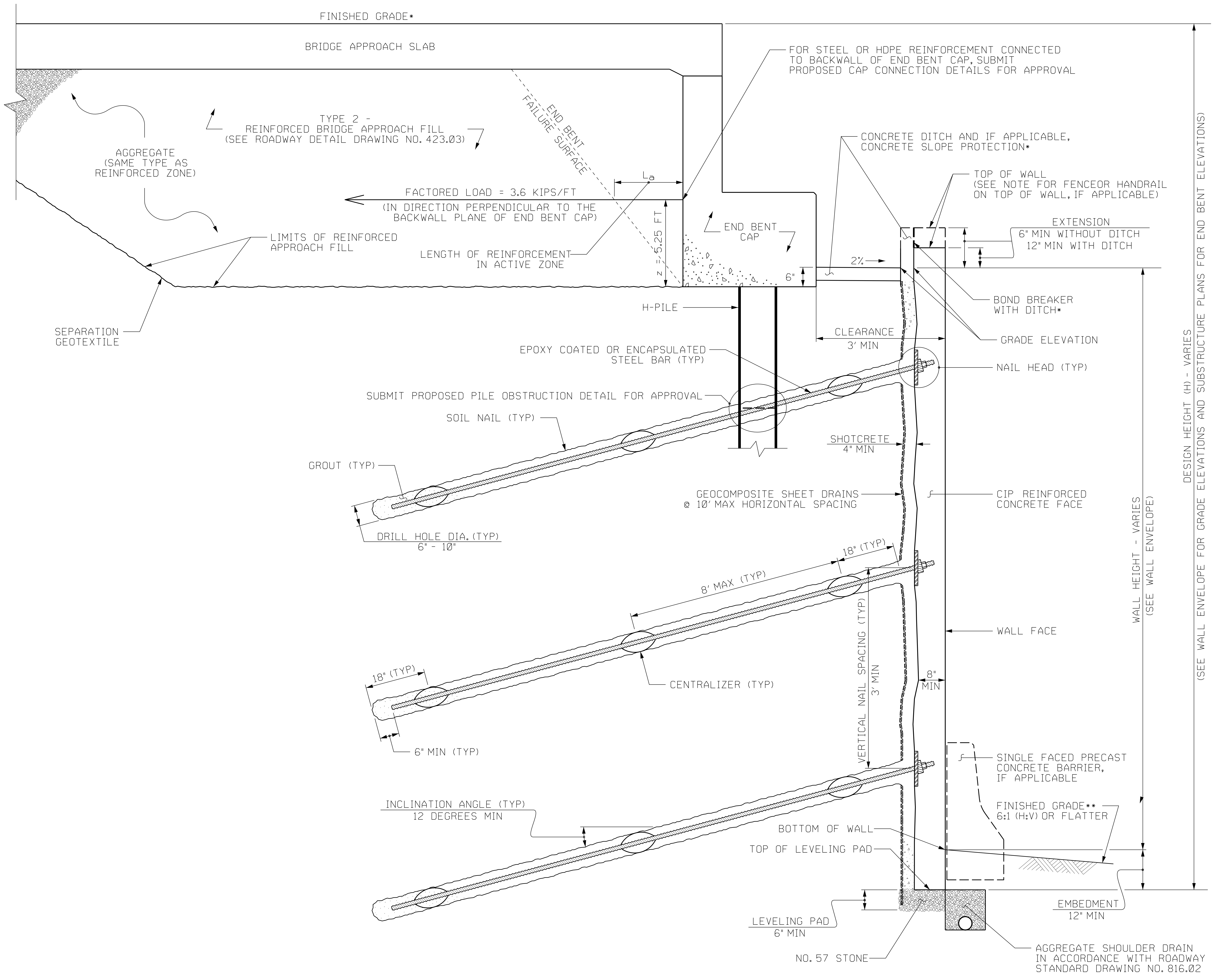

SOIL NAIL ABUTMENT WALL - TYPICAL SECTION

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

PROJECT NO.: B-5777
DAVIDSON COUNTY
STATION: STA. 17+68.42 -Y1-
SHEET 2 OF 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 1
SOIL NAIL ABUTMENT
WALL TYPICAL SECTION

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

PREPARED BY: MHS	DATE: 3/25
REVIEWED BY: ENW	DATE: 3/25

GEOTECHNICAL
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028893
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03/10/2025

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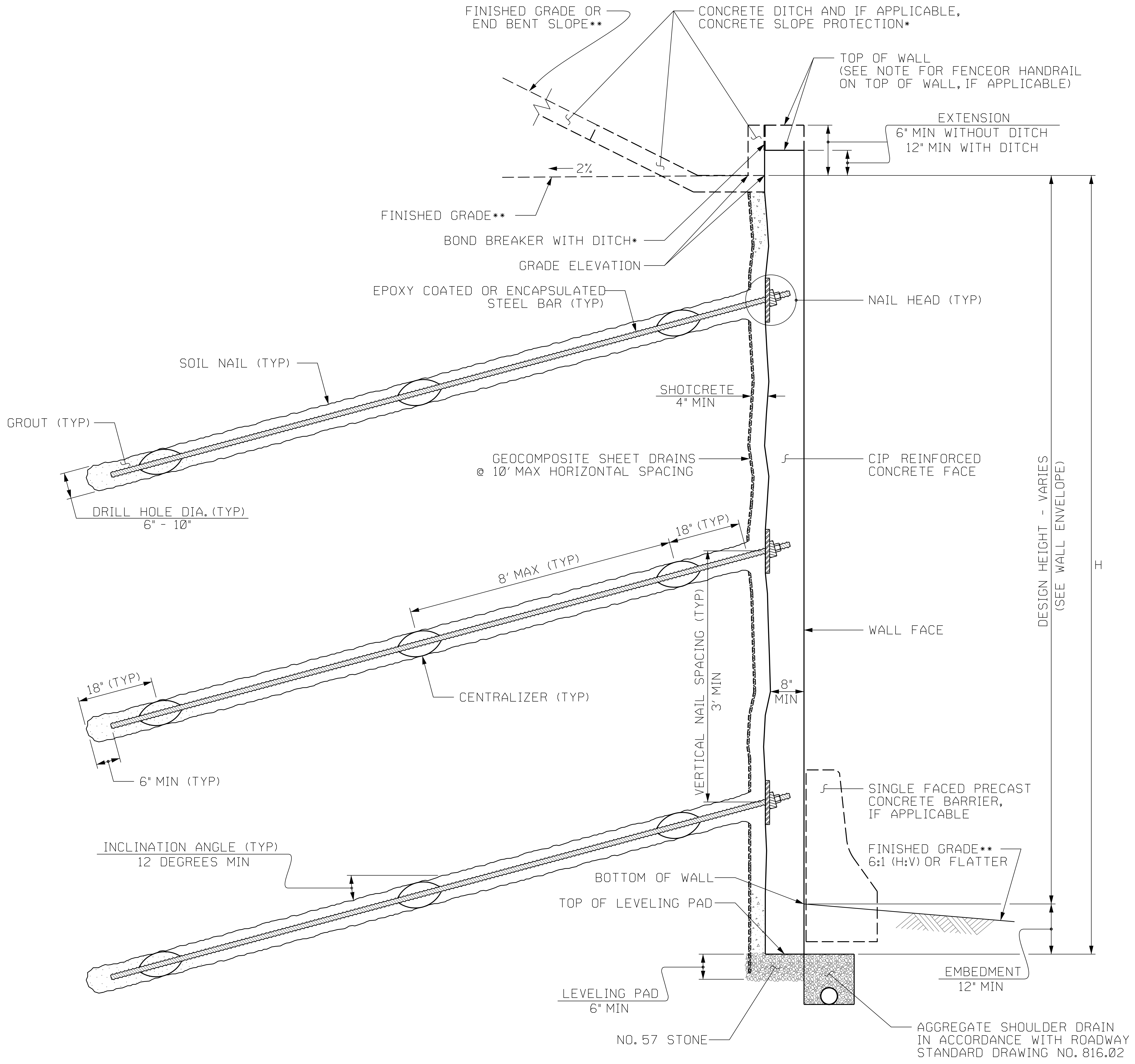

SOIL NAIL WALL - TYPICAL SECTION

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

NOTES:

FOR SOIL NAIL RETAINING WALLS, SEE SOIL NAIL RETAINING WALLS PROVISION.

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

BEFORE BEGINNING SOIL NAIL 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) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM EMBEDMENT ELEVATION = 1.0 FT
4) IN-SITU ASSUMED MATERIAL PARAMETERS:
  UNIT WEIGHT, γ = 120 PCF
  FRICTION ANGLE, ϕ = 30 DEGREES
  COHESION, c = 0 PSF

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

FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION STA. 19+88.77 -L- WILL INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. 1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

"TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NO. 1 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.

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 STA. 19+88.77 -L-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

PROJECT NO.: B-5777
DAVIDSON COUNTY
STATION: STA. 17+68.42 -Y1-
SHEET 3 OF 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 1
SOIL NAIL WALL TYPICAL
SECTION AND NOTES

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

PREPARED BY: MHS	DATE: 3/25
REVIEWED BY: ENW	DATE: 3/25

GEOTECHNICAL ENGINEER

028893
MICHAEL H. STEPHENS

Signed by:
03/10/2025
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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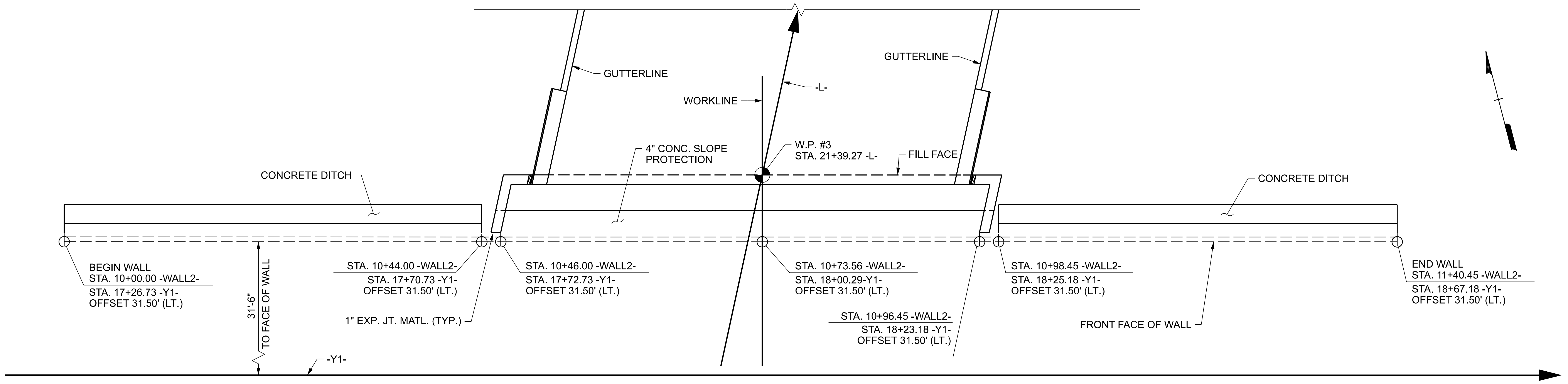
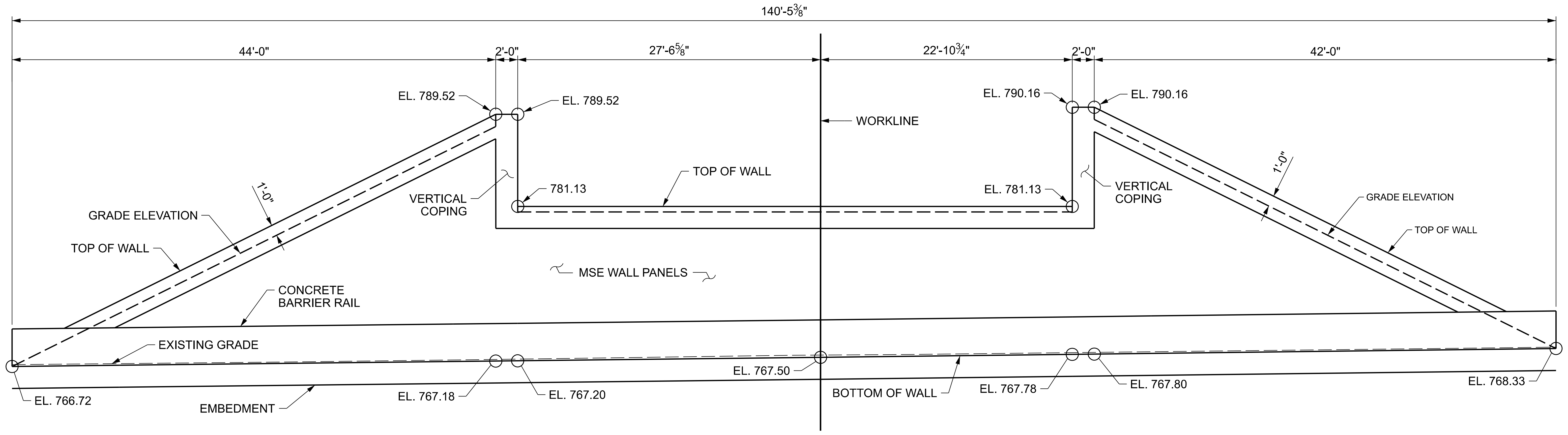


PLAN @ END BENT 2



ELEVATION @ END BENT 2
(LOOKING AT EXPOSED FACE OF WALL)

NOTES:

DIMENSIONS TAKEN ALONG FRONT FACE OF WALL.

ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL NO. 2	2,020 SF

PREPARED BY: MHS	DATE: 3/25
REVIEWED BY: ENW	DATE: 3/25

PROJECT NO.: B-5777
DAVIDSON COUNTY
STATION: STA. 17+68.42 -Y1-
SHEET 4 OF 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 2
MSE WALL PLAN AND
ELEVATIONS VIEWS

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

SHEET NO.
W-4

GEOTECHNICAL
ENGINEER

SEAL 028893
MICHAEL H. STEPHENS

Signed by:
03/10/2025
C447682092314CC...

SIGNATURE DATE

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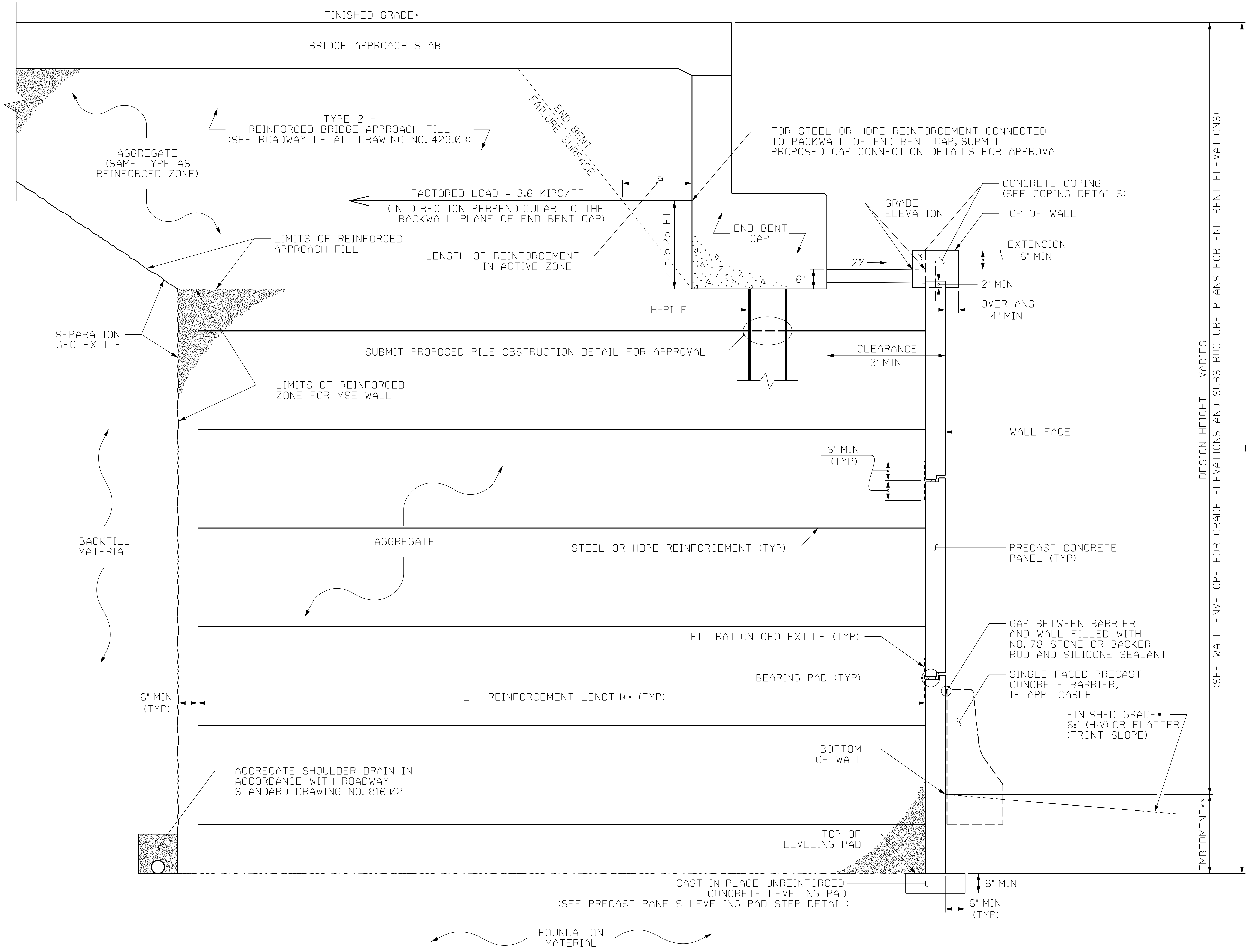
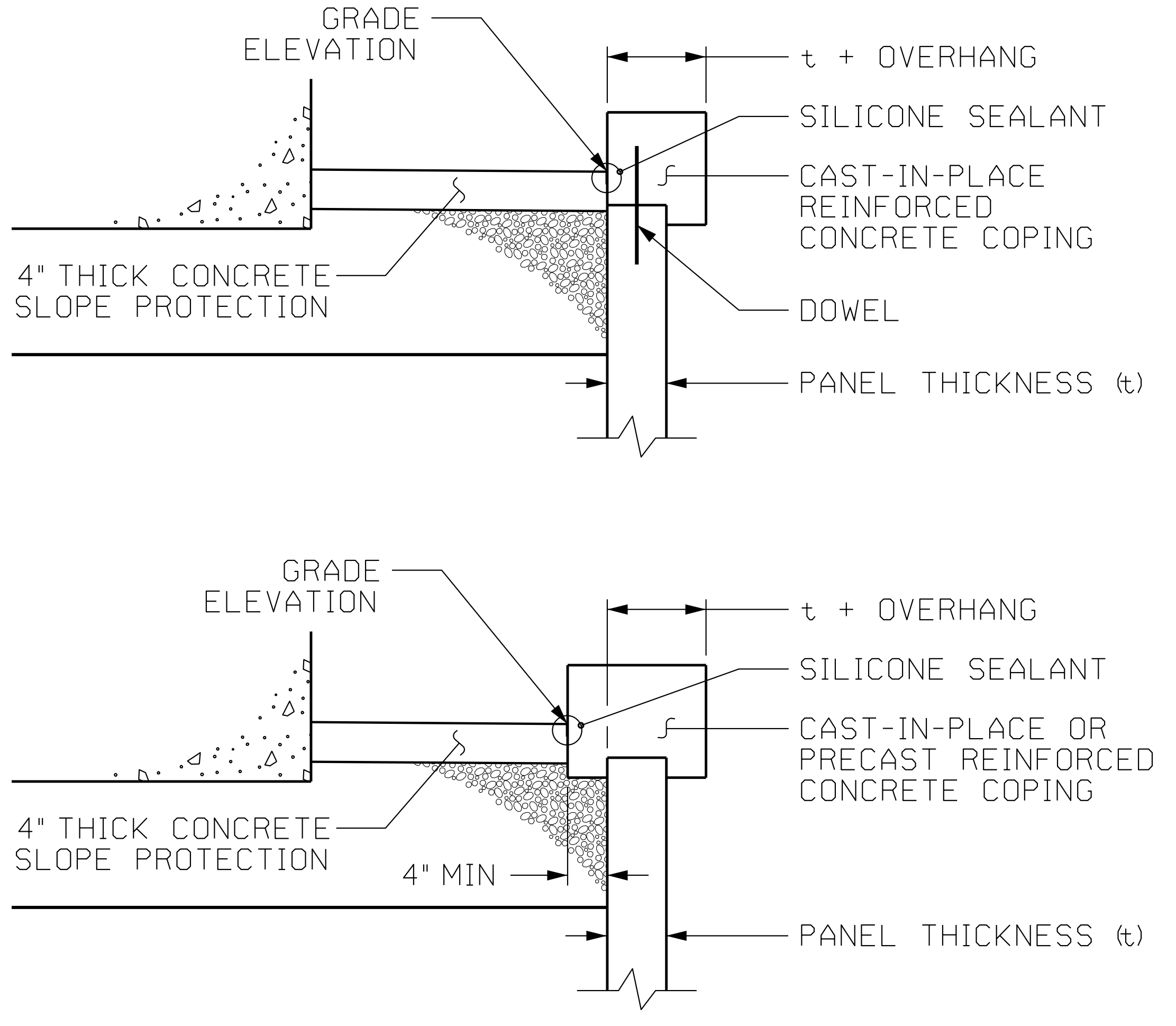


MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

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



COPING DETAILS

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

PROJECT NO.: B-5777
DAVIDSON COUNTY
STATION: STA. 17+68.42 -Y1-
SHEET 5 OF 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 2
MSE ABUTMENT WALL
TYPICAL SECTION AND
COPING DETAILS

REVISIONS

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

SHEET NO.
W-5

PREPARED BY: MHS	DATE: 3/25
REVIEWED BY: ENW	DATE: 3/25

GEOTECHNICAL ENGINEER	ENGINEER
SEAL 028893 MICHAEL H. STEPHENS Signed by: 03/10/2025 C447682092314CC...	
SIGNATURE DATE	SIGNATURE DATE

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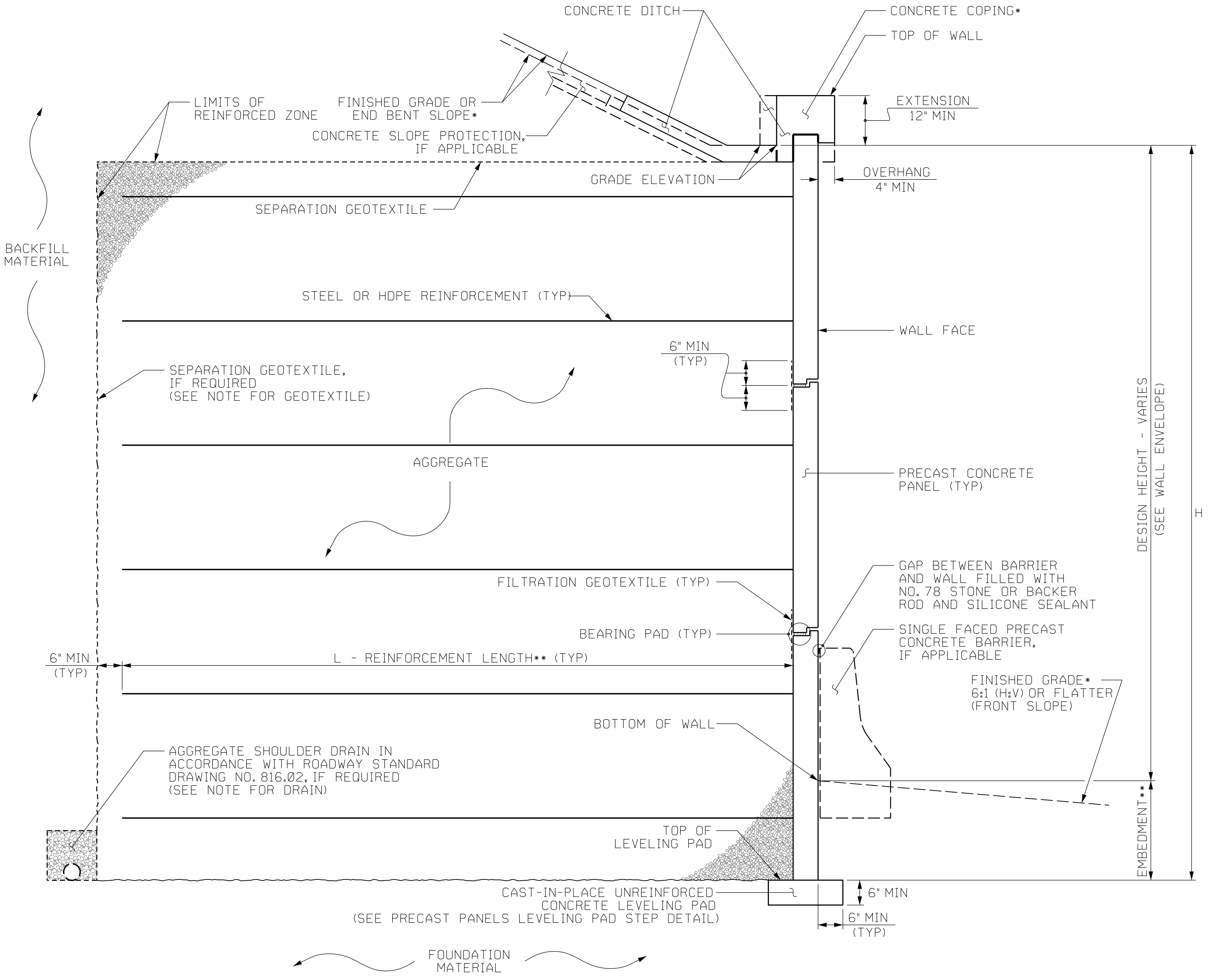
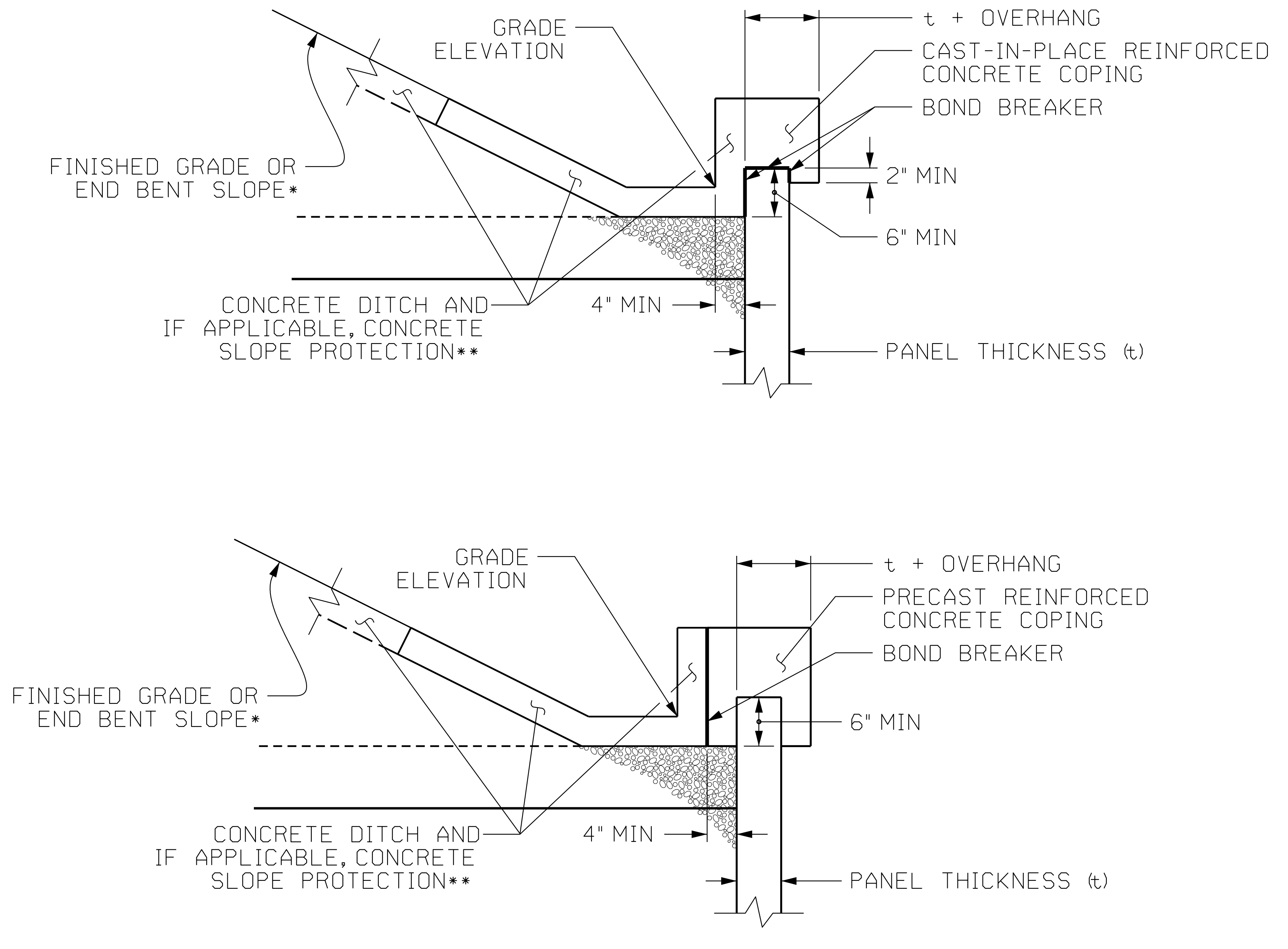


MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

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



COPING DETAILS

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

PROJECT NO.: B-5777
DAVIDSON COUNTY
STATION: STA. 17+68.42 -Y1-
SHEET 6 OF 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 2 MSE WALL TYPICAL SECTION AND COPING DETAILS

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

PREPARED BY: MHS	DATE: 3/25
REVIEWED BY: ENW	DATE: 3/25

GEOTECHNICAL
ENGINEER

SEAL 028893
MICHAEL H. STEPHENS

Signed by:
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03/10/2025

SIGNATURE DATE

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NOTES:

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

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

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

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 2.

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) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5,000 PSF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT ELEVATION = 2 FT
6) REINFORCED ZONE AGGREGATE PARAMETERS:

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

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

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

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

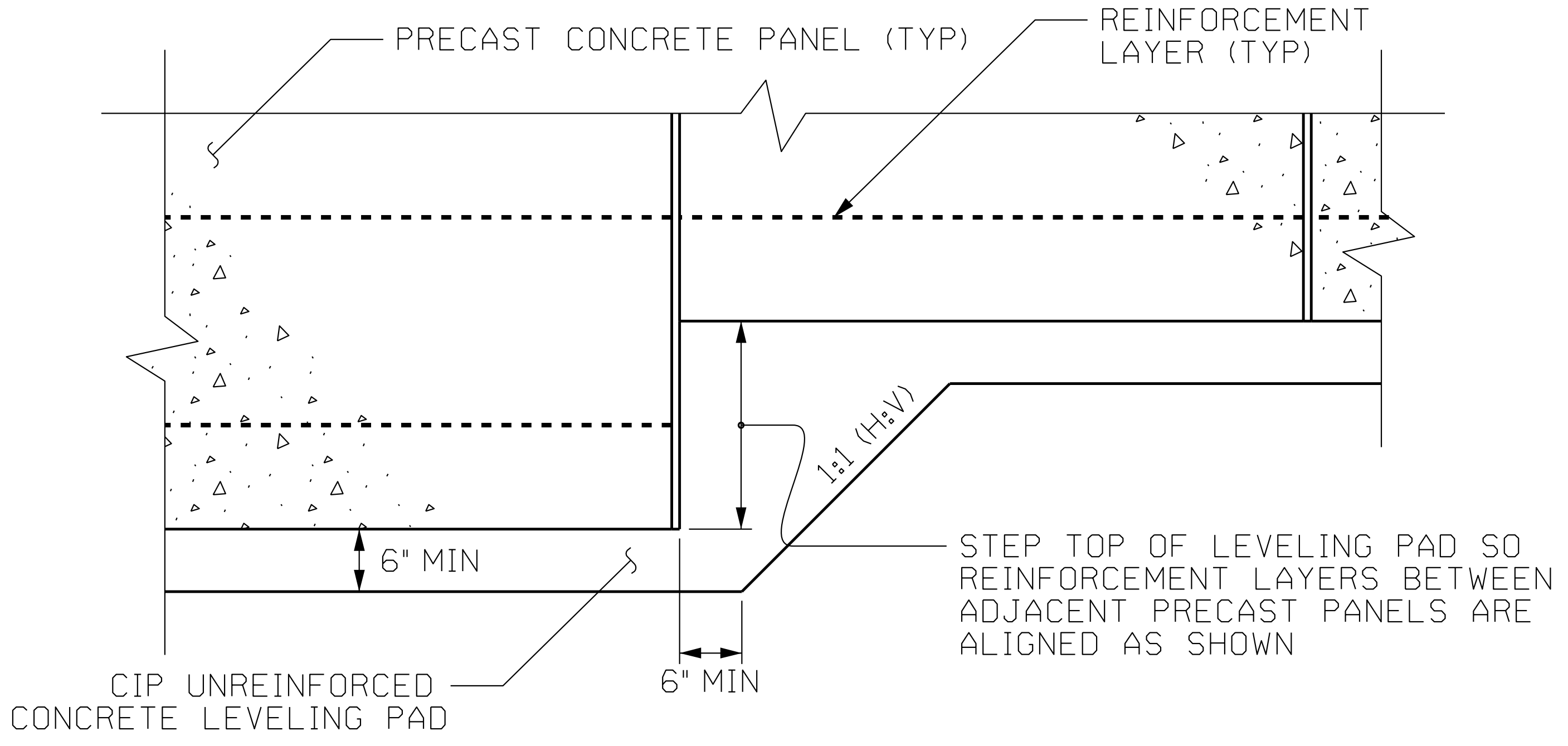
DESIGN RETAINING WALL NO. 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_a) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 2 LOCATED AT STATION STA. 21+39.27 -L-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR END BENT NO. 2 LOCATED AT STATION STA. 21+39.27 -L- 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.

"TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NO. 2 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: B-5777
DAVIDSON COUNTY
STATION: STA. 17+68.42 -Y1-
SHEET 7 OF 7

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

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

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

PREPARED BY: MHS	DATE: 3/25
REVIEWED BY: ENW	DATE: 3/25