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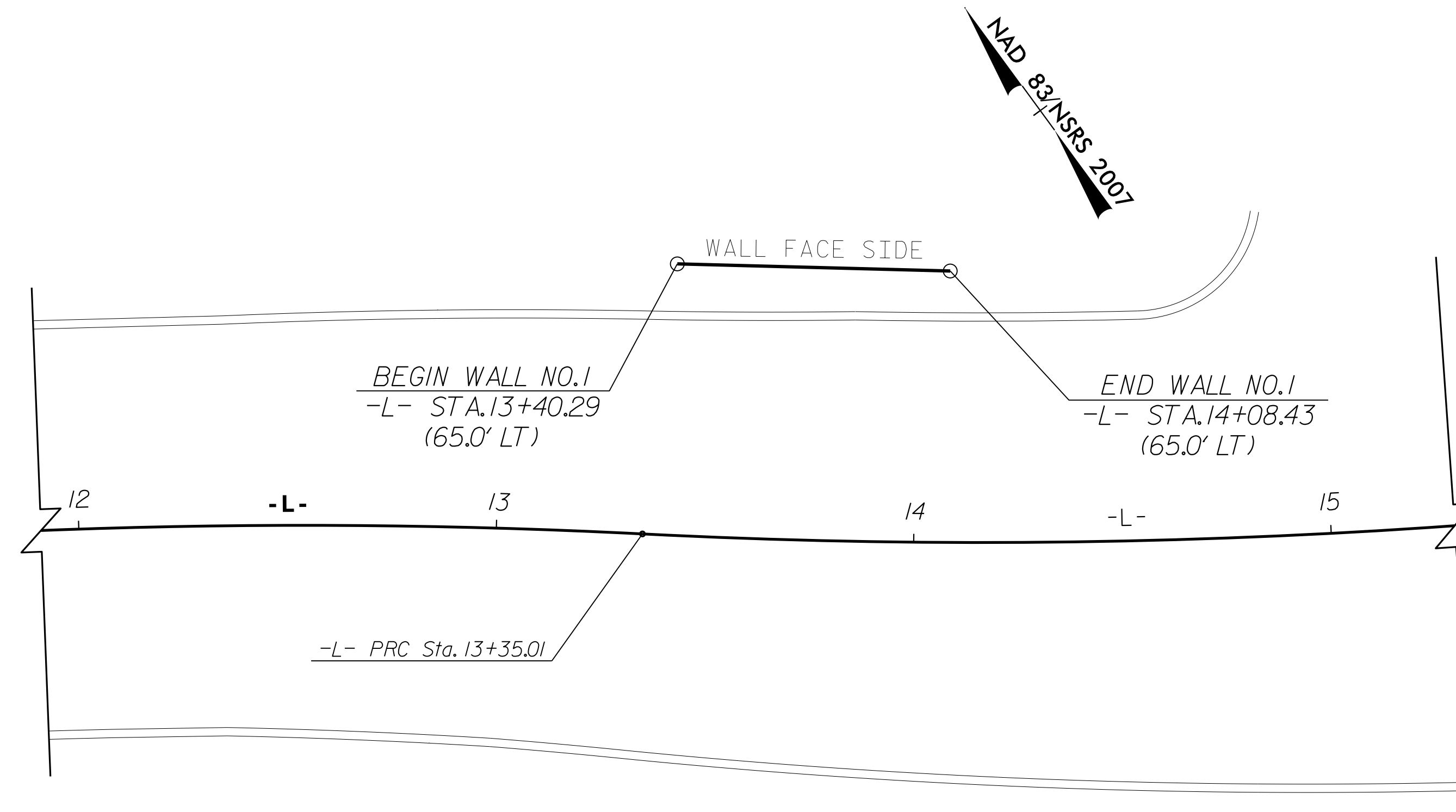
GEOTECHNICAL ENGINEER

ENGINEER

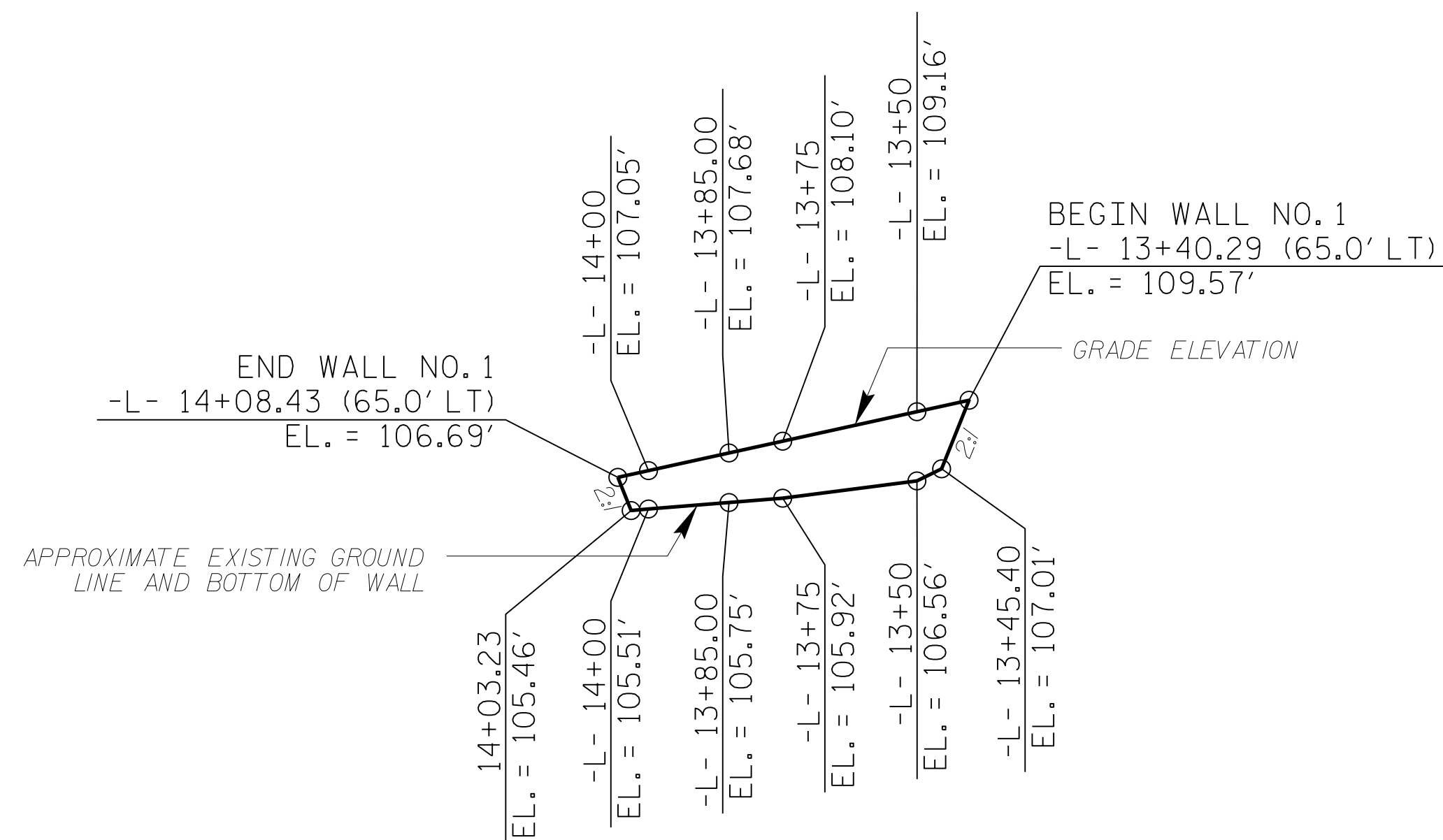
SEAL 032171

9/25/2015

9/25/2015



PLAN VIEW FOR RETAINING WALL NO. 1  
N.T.S.



WALL ENVELOPE FOR RETAINING WALL NO. 1  
EXPOSED WALL FACE VIEW, N.T.S.

ESTIMATED SEGMENTAL GRAVITY RETAINING WALL QUANTITY	
SEGMENTAL GRAVITY RETAINING WALLS	250 SF

PROJECT NO.: B-4490 (33727.1.1)  
CUMBERLAND COUNTY  
STATION: 13+41.00 -L-  
SHEET 1 OF 11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

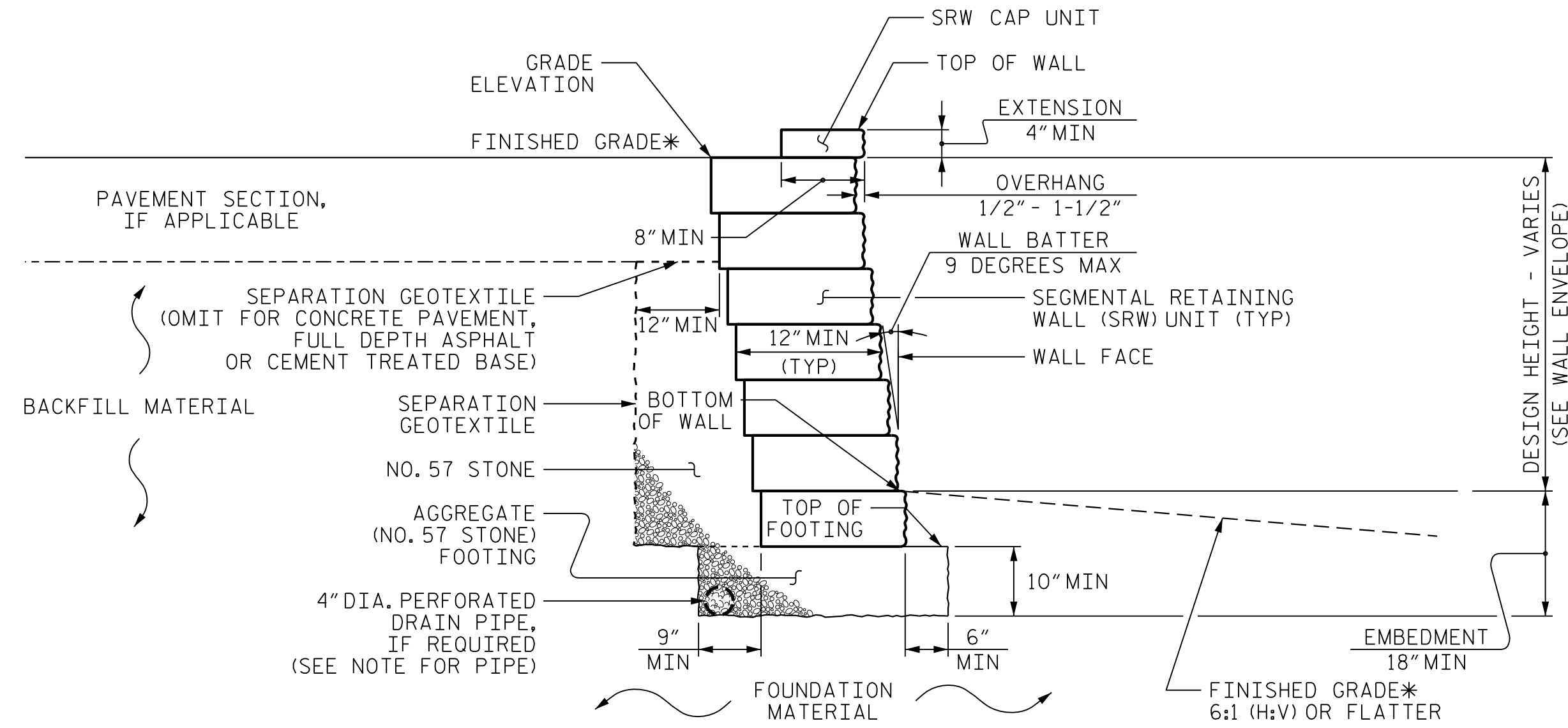
GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 1  
PLAN VIEW AND  
WALL ENVELOPE

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

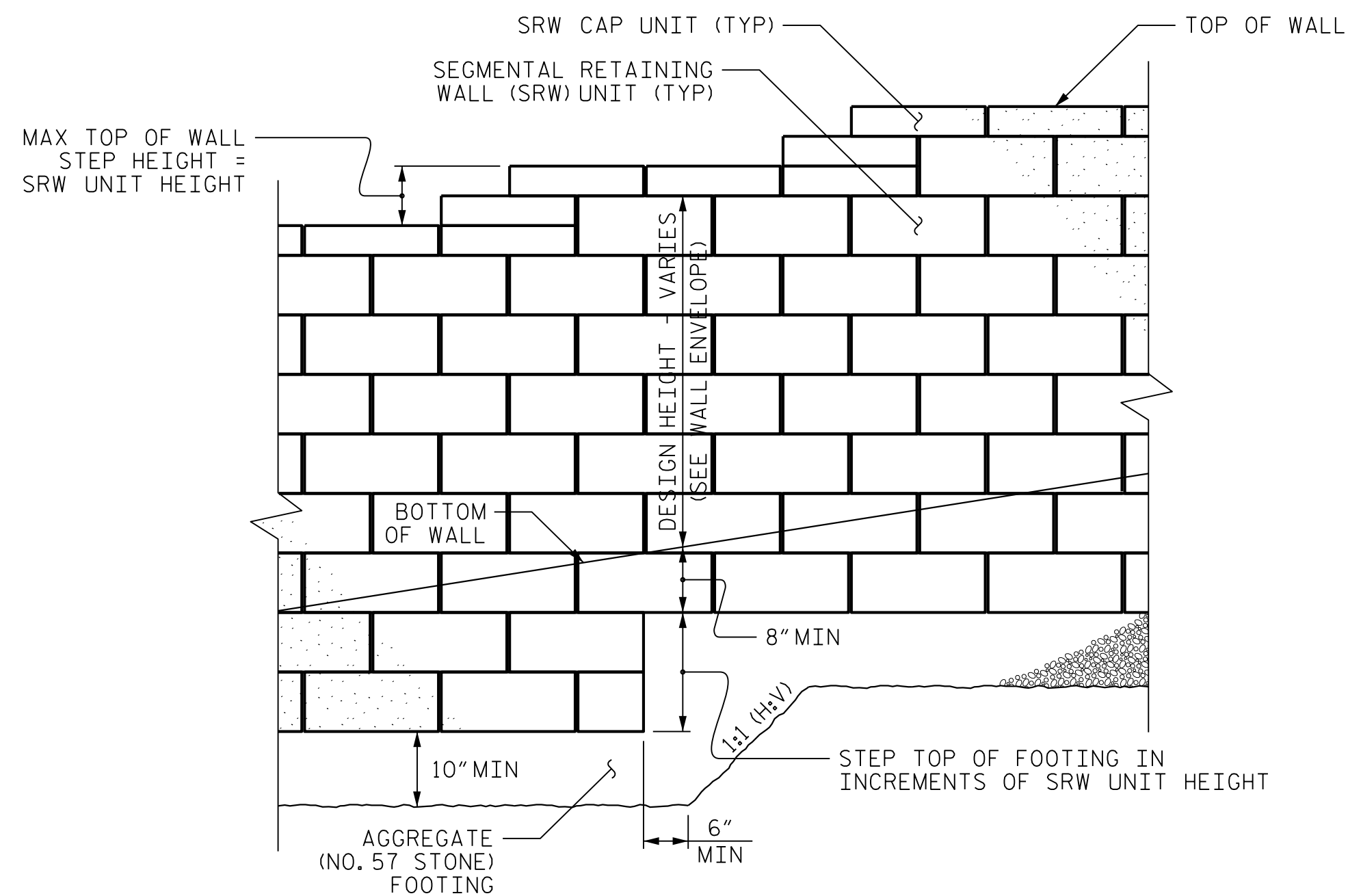
SHEET NO. W-1

PREPARED BY: J. PARK	DATE: 09/2015
REVIEWED BY: J. BATTS	DATE: 09/2015



**SEGMENTAL GRAVITY WALL - TYPICAL SECTION**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



**SEGMENTAL GRAVITY WALL - TYPICAL ELEVATION**

**NOTES:**

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS PROVISION.

USE SRW UNITS WITH THE COLOR MATCHING THE EXISTING GRANITE WALLS IN THE VETERAN'S PARK IN CUMBERLAND COUNTY.

A DRAIN PIPE IS REQUIRED FOR RETAINING WALL NO.1.

BEFORE BEGINNING SEGMENTAL GRAVITY 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 WALL HEIGHTS EQUAL TO THE DESIGN HEIGHT PLUS DEPTH TO TOP OF FOOTING (DIFFERENCE BETWEEN GRADE ELEVATION AND TOP OF FOOTING ELEVATION).

DESIGN RETAINING WALL NO.1 FOR THE FOLLOWING:  
 1) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 1,860 LB/SF

2) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

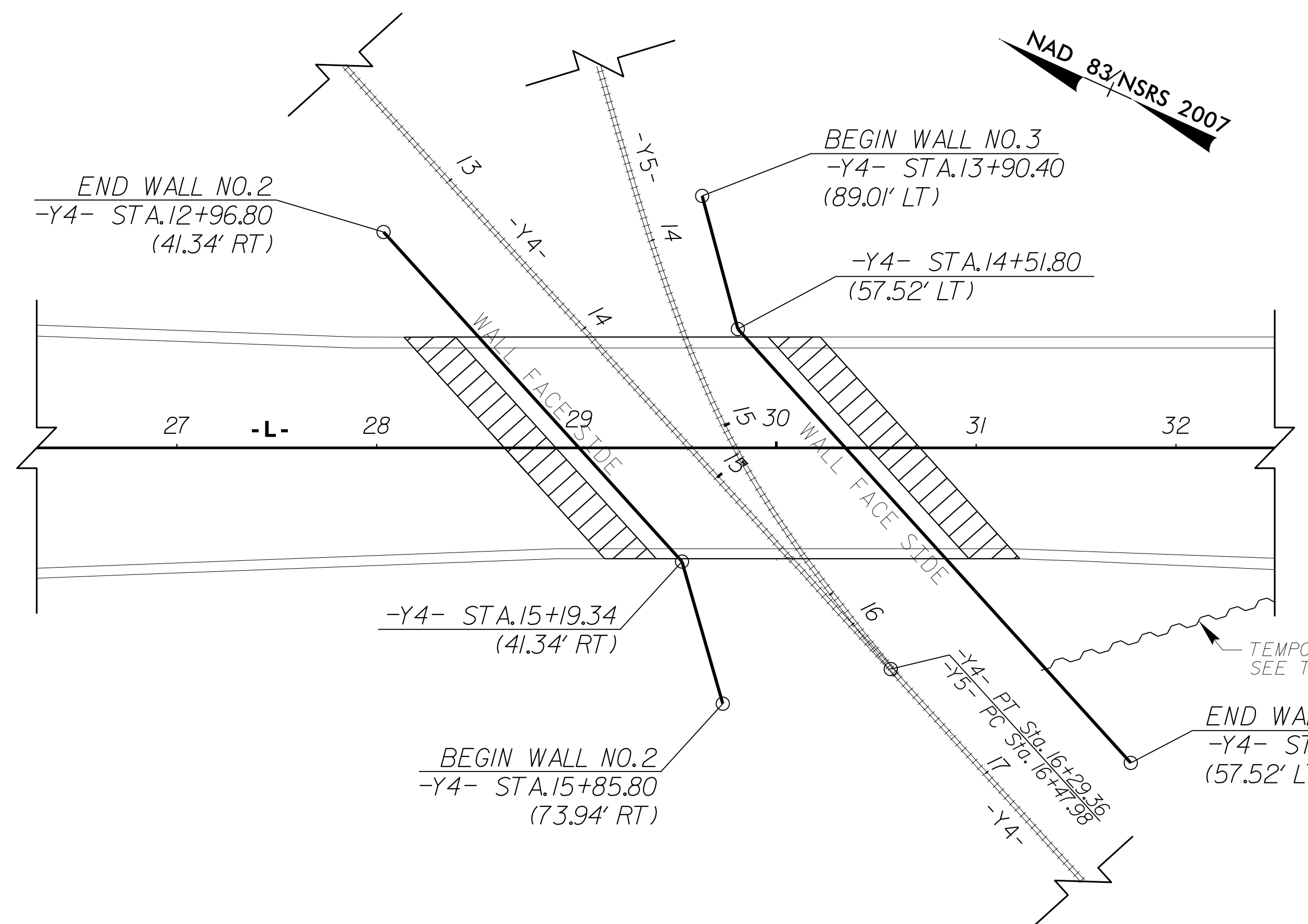
DO NOT PLACE NO.57 STONE FOR FOOTINGS FOR RETAINING WALL NO.1 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

PROJECT NO.: B-4490 (33727.1.1)

CUMBERLAND COUNTY

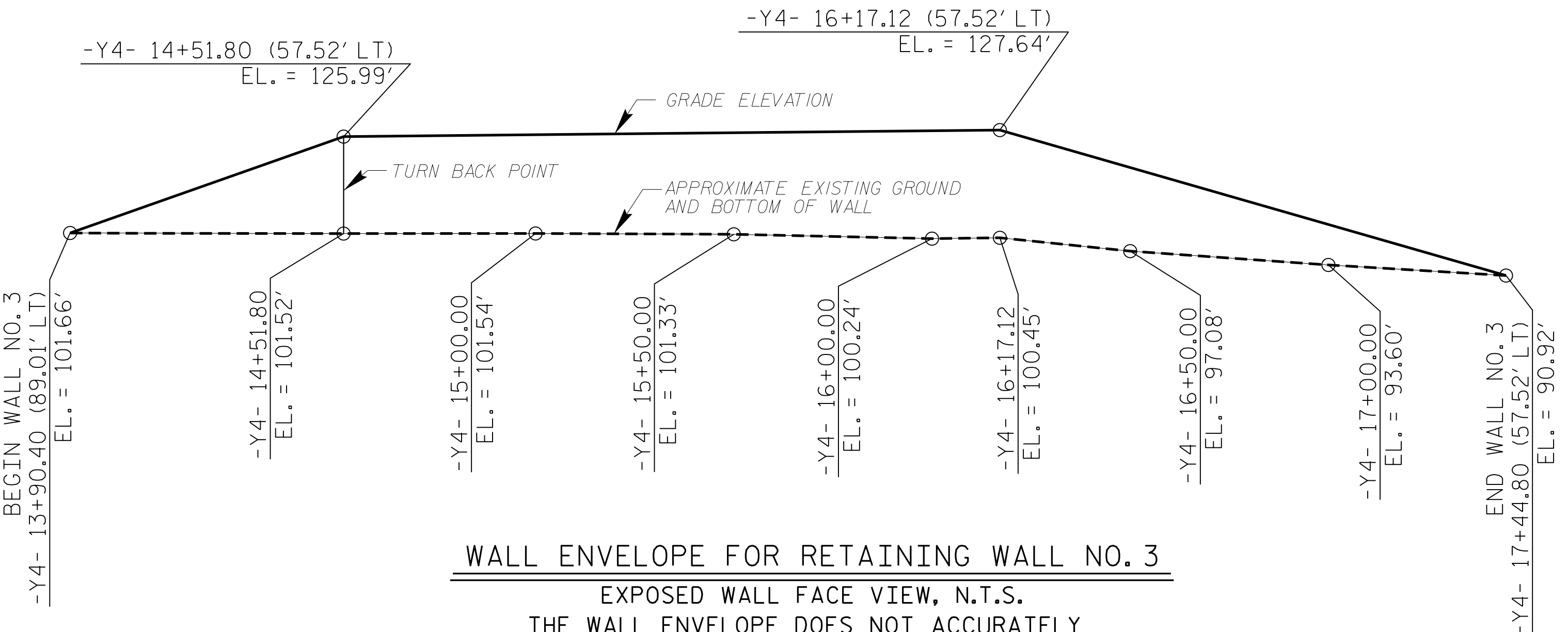
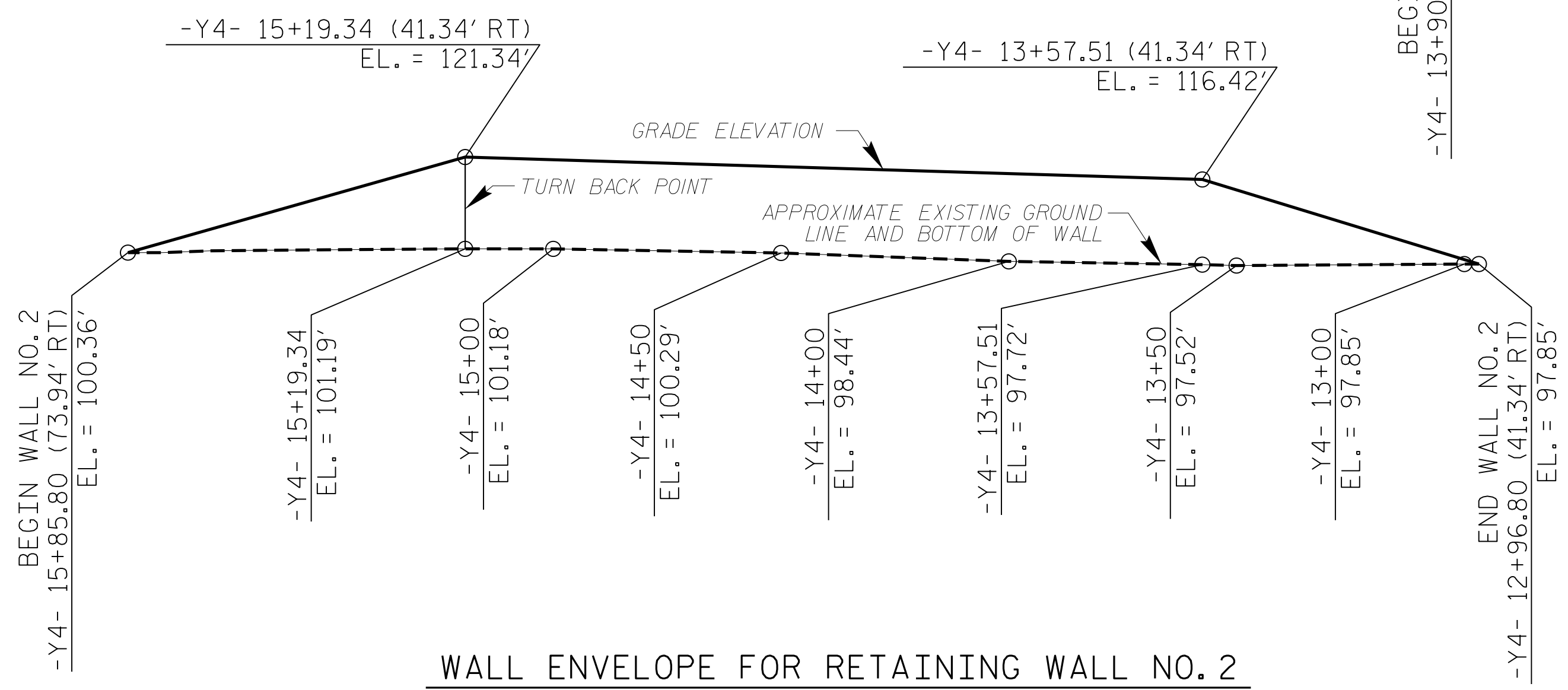
STATION: 13+41.00 -L-

SHEET 2 OF 11



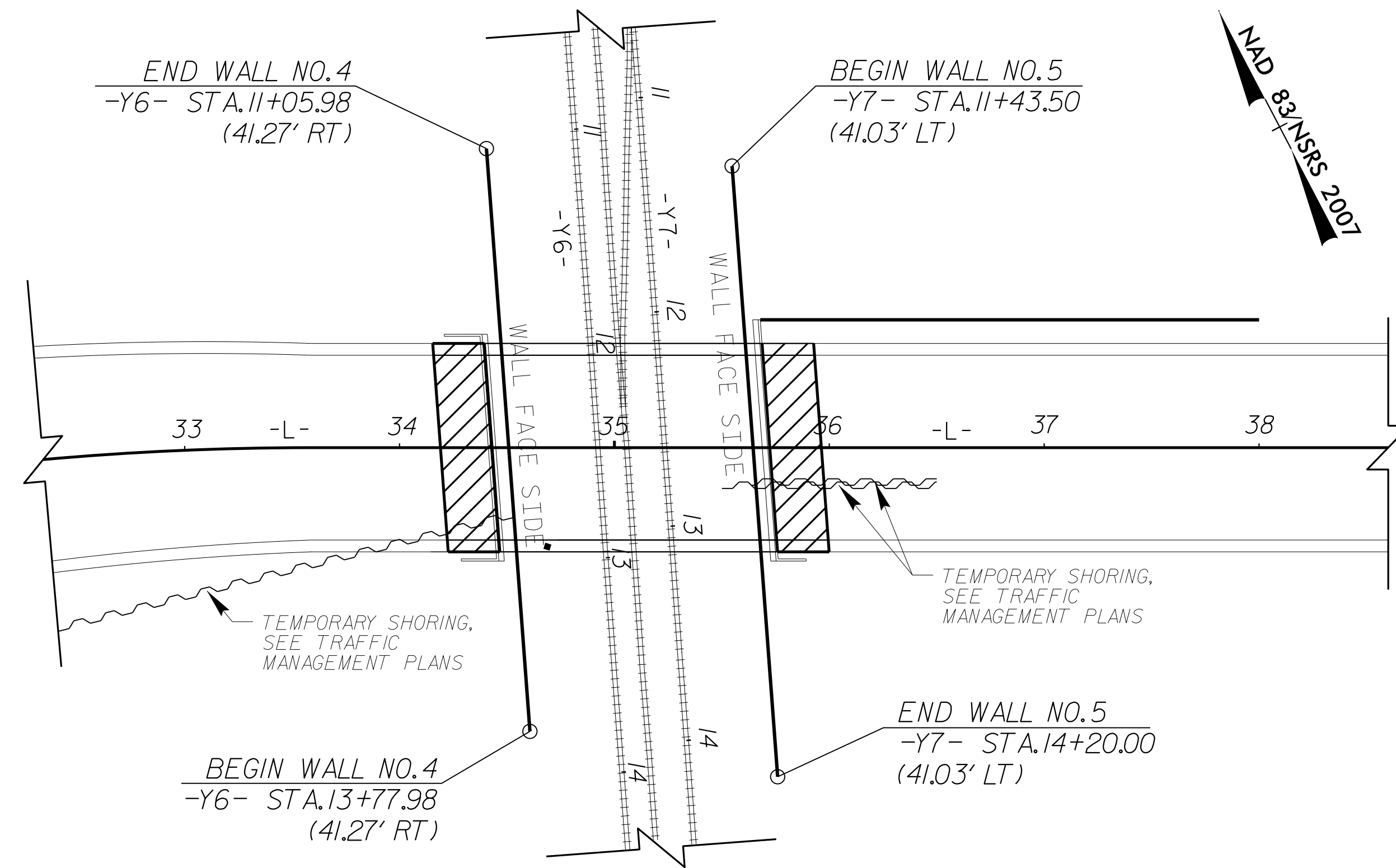
ESTIMATED RETAINING WALL NO. 2 QUANTITIES	
MSE RETAINING WALL NO. 2	5,500 SF
CIP MSE RETAINING WALL NO. 2 (ALTERNATE)	

ESTIMATED RETAINING WALL NO. 3 QUANTITIES	
MSE RETAINING WALL NO. 3	8,550 SF
CIP MSE RETAINING WALL NO. 3 (ALTERNATE)	



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

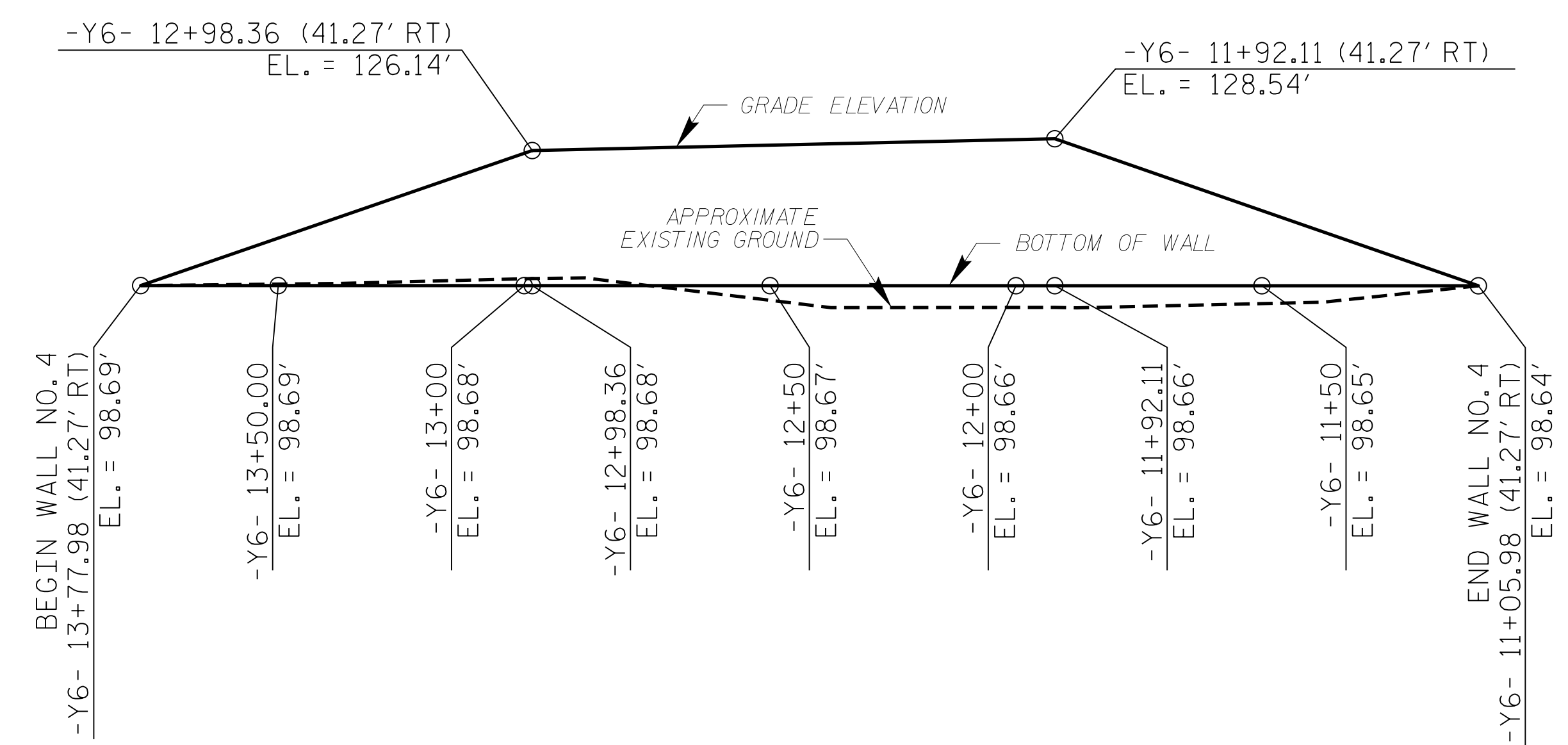
GEOTECHNICAL ENGINEER  
 ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 032171  
 ENGINEERS WINSTON-SALEM  
 9/25/2015  
 DATE  
 SIGNATURE DATE



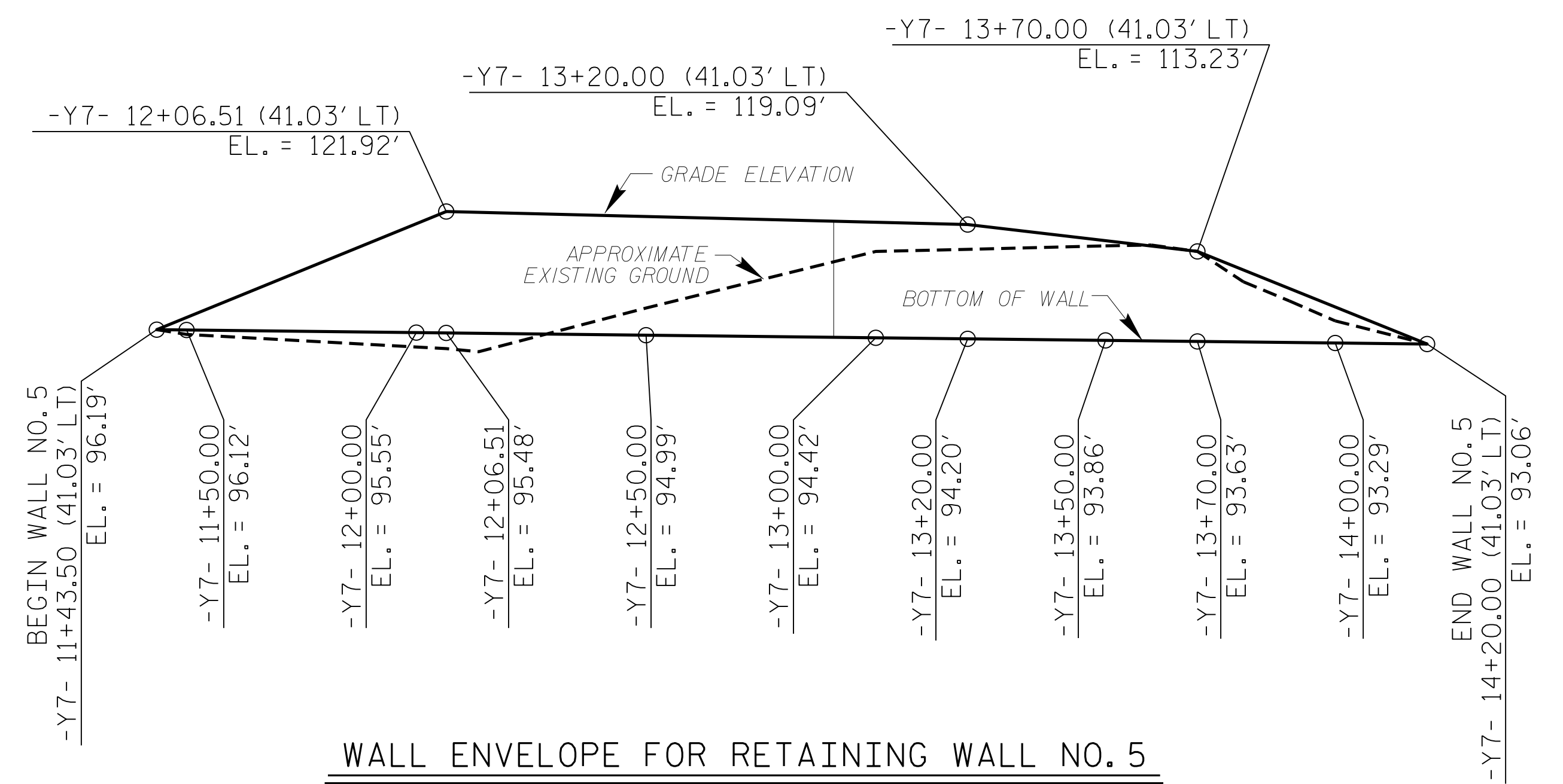
PLAN VIEW FOR RETAINING WALL NO. 4 & NO. 5  
N.T.S.

ESTIMATED RETAINING WALL NO. 4 QUANTITIES	
MSE RETAINING WALL NO. 4	6,700 SF
CIP MSE RETAINING WALL NO. 4 (ALTERNATE)	

ESTIMATED RETAINING WALL NO. 5 QUANTITIES	
MSE RETAINING WALL NO. 5	6,500 SF
CIP MSE RETAINING WALL NO. 5 (ALTERNATE)	



WALL ENVELOPE FOR RETAINING WALL NO. 4  
EXPOSED WALL FACE VIEW, N.T.S.



WALL ENVELOPE FOR RETAINING WALL NO. 5  
EXPOSED WALL FACE VIEW, N.T.S.

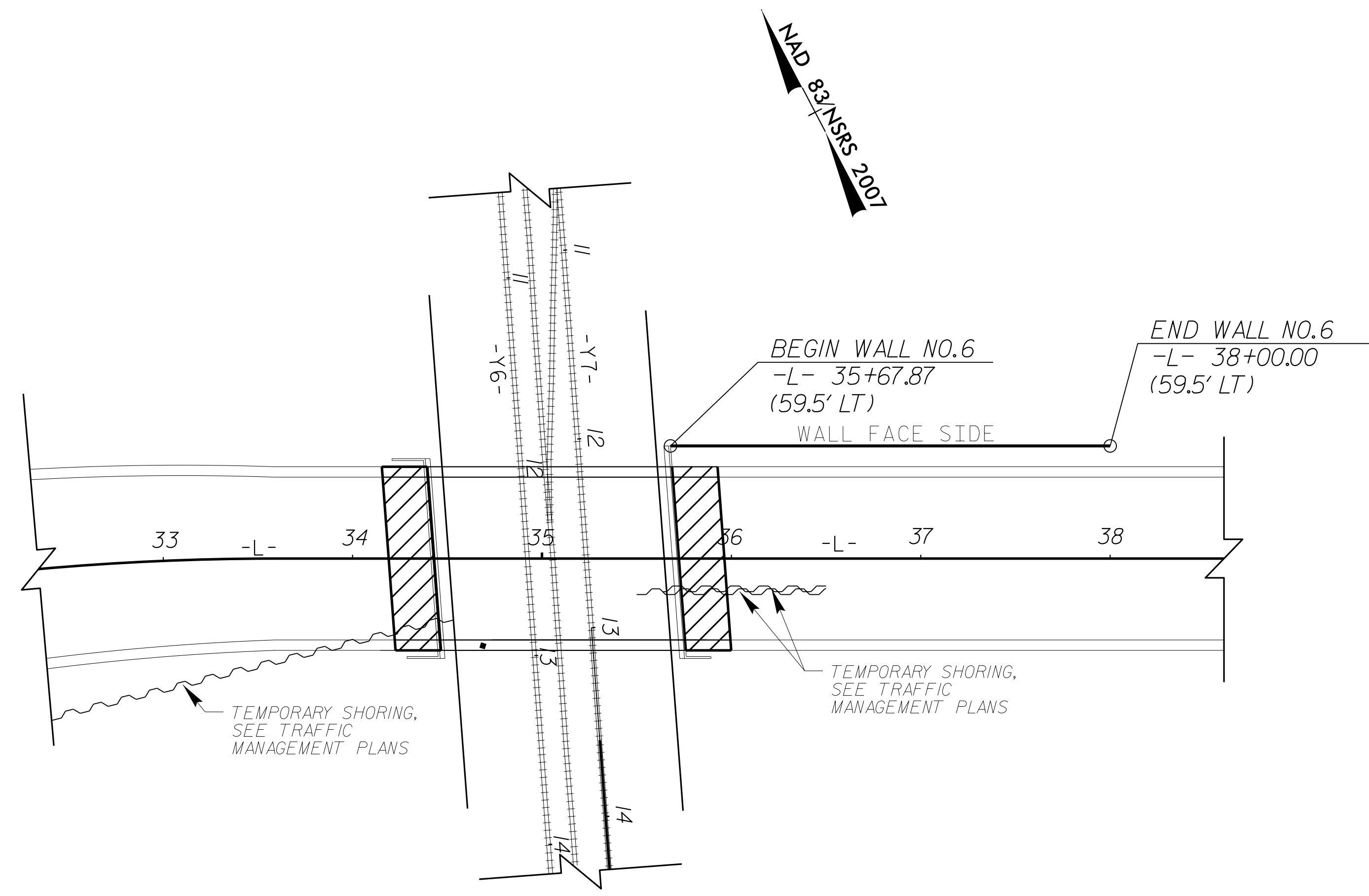
PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: 11+06.00 -Y6- / 11+44.00 -Y7-  
 SHEET 4 OF 11

NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL  
 ENGINEERING UNIT

RETAINING WALL NO. 4 AND NO. 5  
PLAN VIEW AND  
WALL ENVELOPES

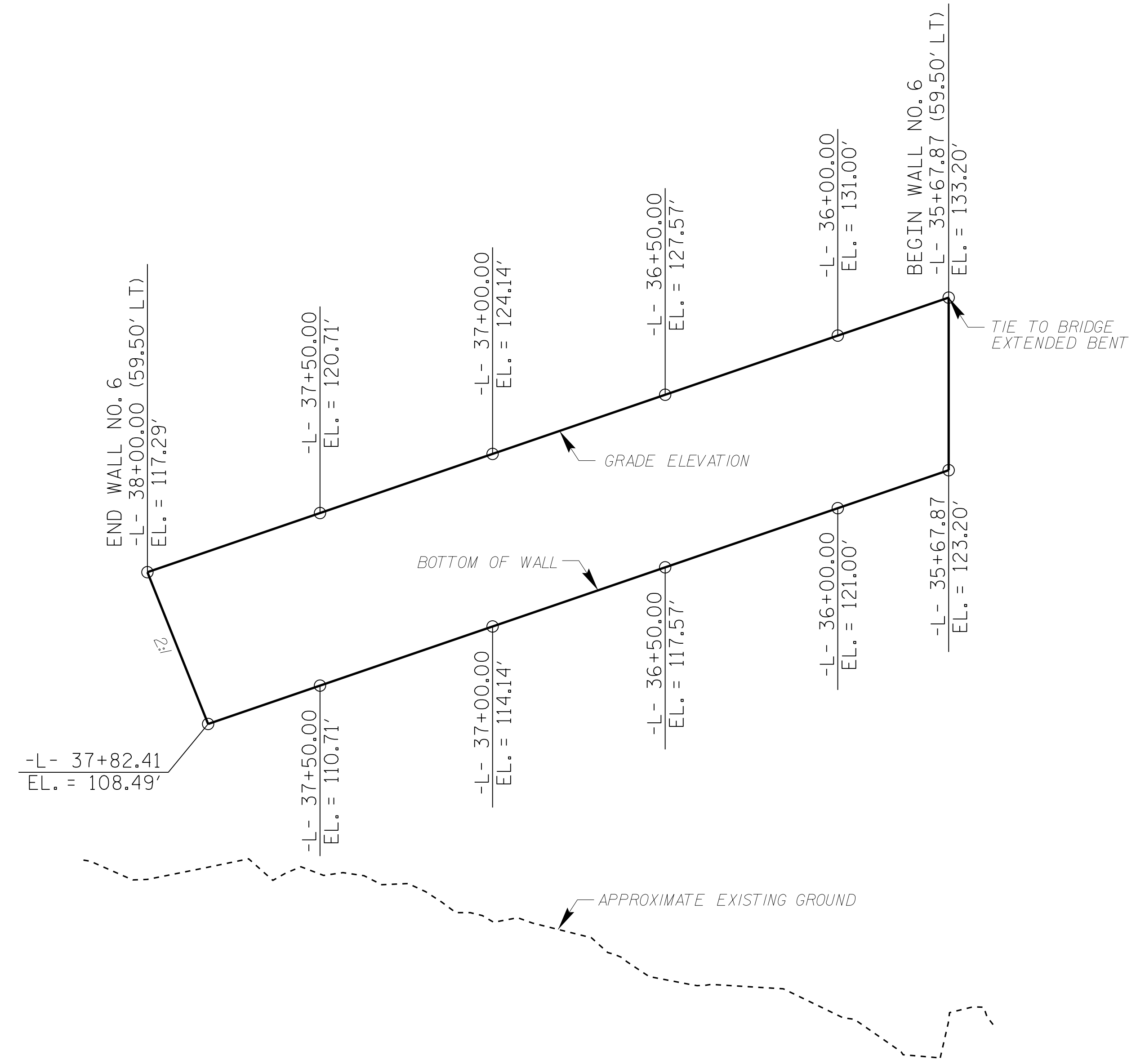
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-4
2	-	-	4	-	-	

PREPARED BY: J. PARK	DATE: 09 / 2015
REVIEWED BY: J. BATTS	DATE: 09 / 2015



PLAN VIEW FOR RETAINING WALL NO. 4 & NO. 5  
 N.T.S.

ESTIMATED RETAINING WALL NO. 6 QUANTITIES	
MSE RETAINING WALL NO. 6	2,600 SF
CIP MSE RETAINING WALL NO. 6 (ALTERNATE)	



WALL ENVELOPE FOR RETAINING WALL NO. 6  
 EXPOSED WALL FACE VIEW, N.T.S.

PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: 35+68.00 -L-  
 SHEET 5 OF 11

**NOTES:**

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

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

A SPECIAL ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS FOR RETAINING WALL NO. 2 THROUGH NO. 6.

FOR A SPECIAL ARCHITECTURAL FINISH, SEE SPECIAL PROVISION, CONCRETE SURFACE TREATMENT FOR ARCHITECTURAL FINISH.

DESIGN THE PRECAST CONCRETE PANELS TO BE CRUCIFORM IN SHAPE.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 2 THROUGH NO. 6.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 2 THROUGH NO. 6.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 2 THROUGH 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. 2 THROUGH NO. 6 FOR THE FOLLOWING:

- 1) H = DESIGN HEIGHT + EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 8,150 LB/SF (RW2), 9,800 LB/SF (RW3), 10,020 LB/SF (RW4), 9,160 LB/SF (RW5), 2,260 LB/SF (RW6)
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
- 5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0

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

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 2 THROUGH 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 (L<sub>a</sub>) SHOWN. CAST REINFORCEMENT CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 28+89.67 -L-, END BENT NO. 2 LOCATED AT STATION 30+46.17 -L-, END BENT NO. 1 LOCATED AT STATION 34+43.06 -L- AND END BENT NO. 2 LOCATED AT STATION 35+72.31 -L-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 2 THROUGH NO. 6.

INSTALL 24 INCH DIAMETER 16 GAUGE CORRUGATED STEEL PIPES FOR HP12X53 STEEL PILE FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 28+89.67 -L-, END BENT NO. 2 LOCATED AT STATION 30+46.17 -L-, END BENT NO. 1 LOCATED AT STATION 34+43.06 -L- AND STAGE 1 END BENT NO. 2 LOCATED AT STATION 35+72.31 -L-, WHICH WILL INTERFERE WITH THE REINFORCEMENT FOR RETAINING WALL NO. 2, NO. 3, NO. 4, AND NO. 5, RESPECTIVELY. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

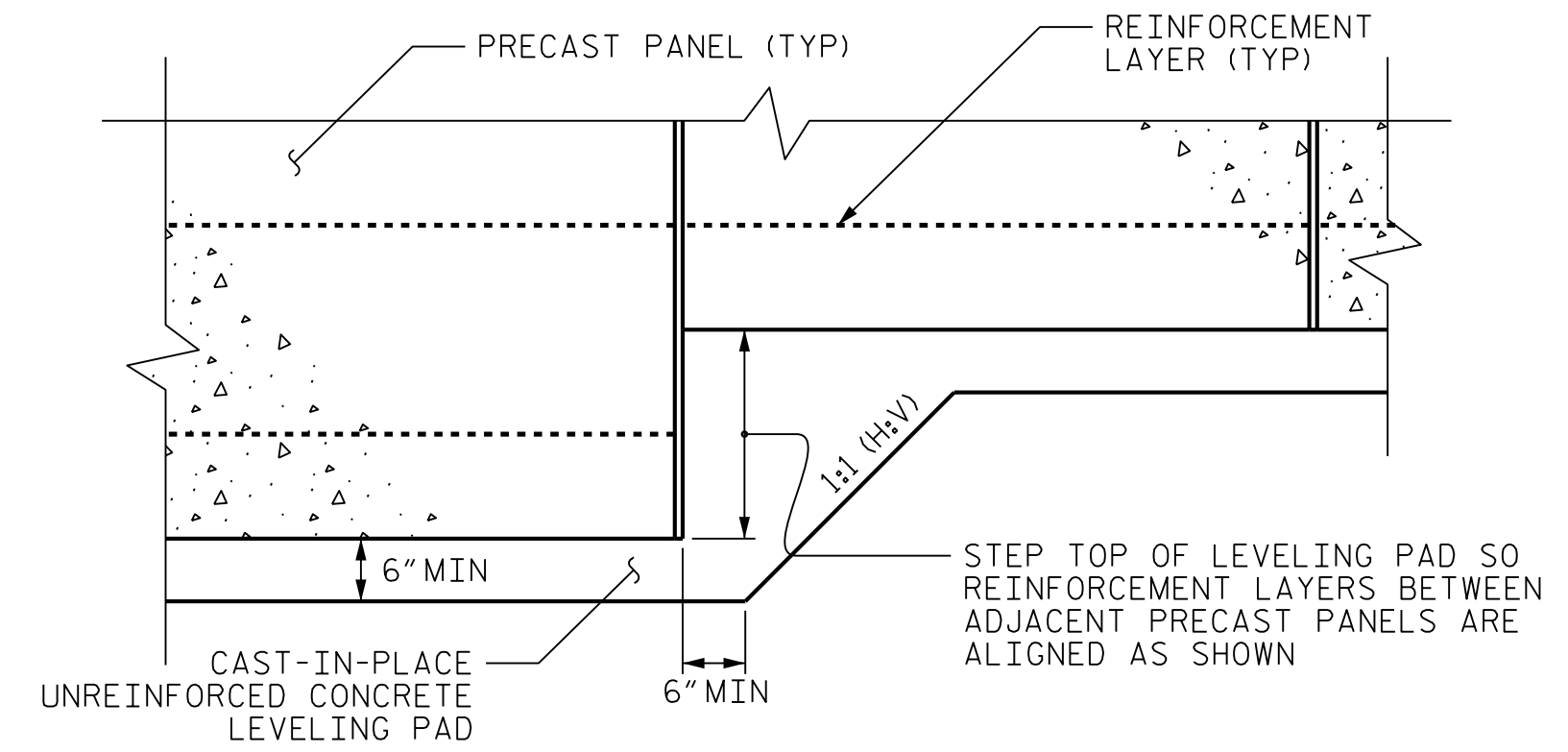
THE COST FOR THE 24 INCH DIAMETER 16 GAUGE CORRUGATED STEEL PIPES IS INCIDENTAL TO MSE RETAINING WALL.

CONSTRUCT RETAINING WALL NO. 2 THROUGH NO. 5 BEFORE INSTALLING FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 28+89.67 -L-, END BENT NO. 2 LOCATED AT STATION 30+46.17 -L-, END BENT NO. 1 LOCATED AT STATION 34+43.06 -L- AND STAGE 1 END BENT NO. 2 LOCATED AT STATION 35+72.31 -L-, RESPECTIVELY.

TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC SHOWN ON PLANS W-3, W-4, AND W-5 WILL INTERFERE WITH THE WALL CONSTRUCTION. SEE TRAFFIC MANAGEMENT PLANS FOR THE TEMPORARY SHORING.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 2 THROUGH NO. 6 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

PLACE GEOTEXTILE FOR EMBANKMENT STABILIZATION ON THE EXISTING GROUND OR BOTTOM OF WALL EXCAVATION AT RETAINING WALL NO. 2, NO. 3, AND NO. 4. FOR DETAILS, SEE PLAN SHEET 2G-1, EMBANKMENT STABILIZATION DETAILS AT BRIDGE APPROACHES.

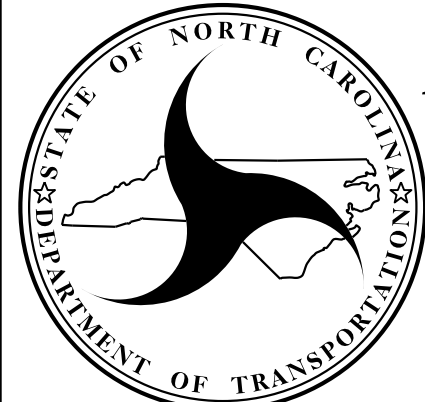


PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS


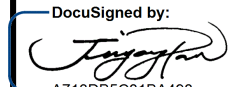
PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: SEE WALL NO. 2 TO NO. 6  
 SHEET 6 OF 11

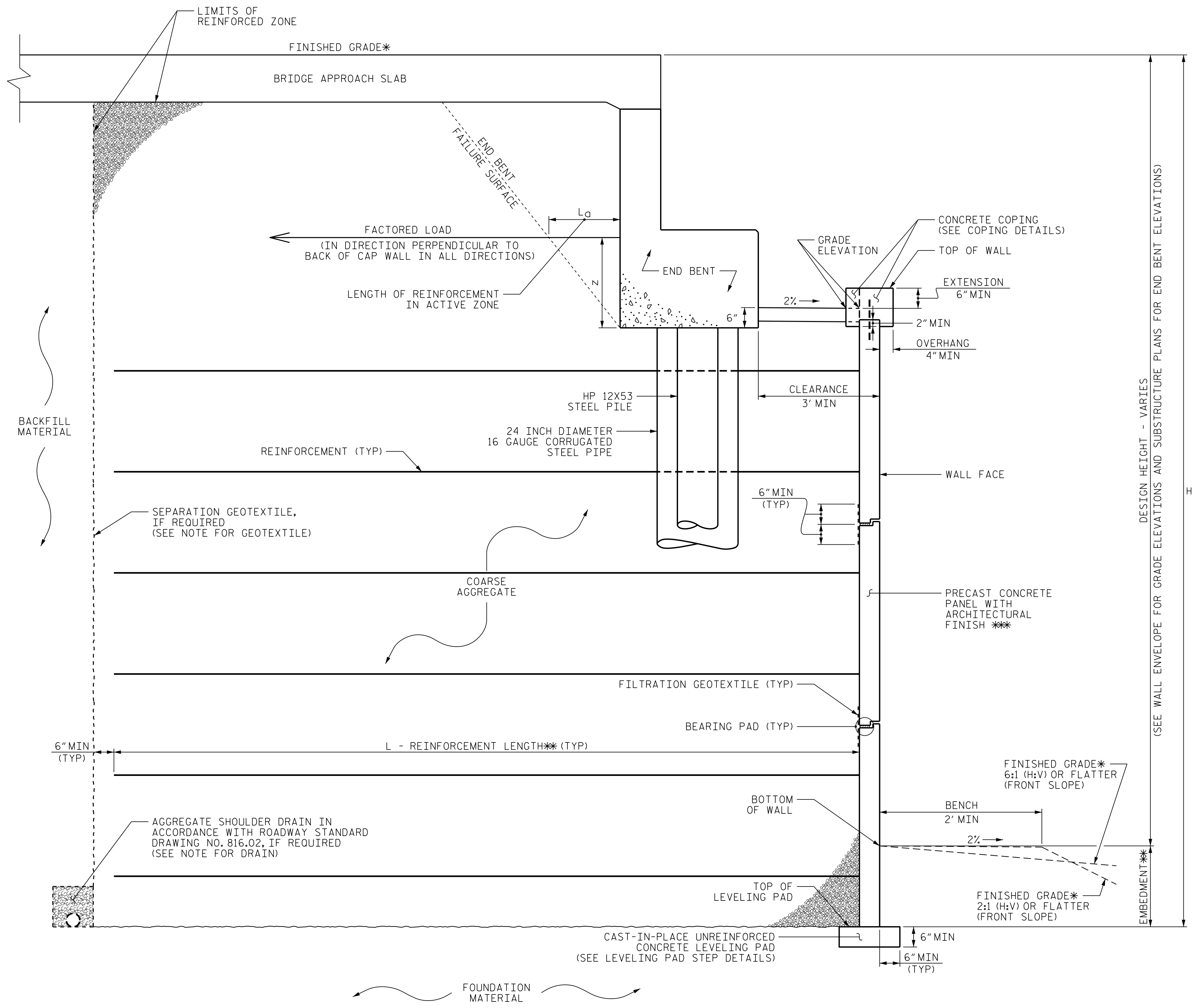
PREPARED BY: J. PARK      DATE: 09/2015  
 REVIEWED BY: J. BATTS      DATE: 09/2015



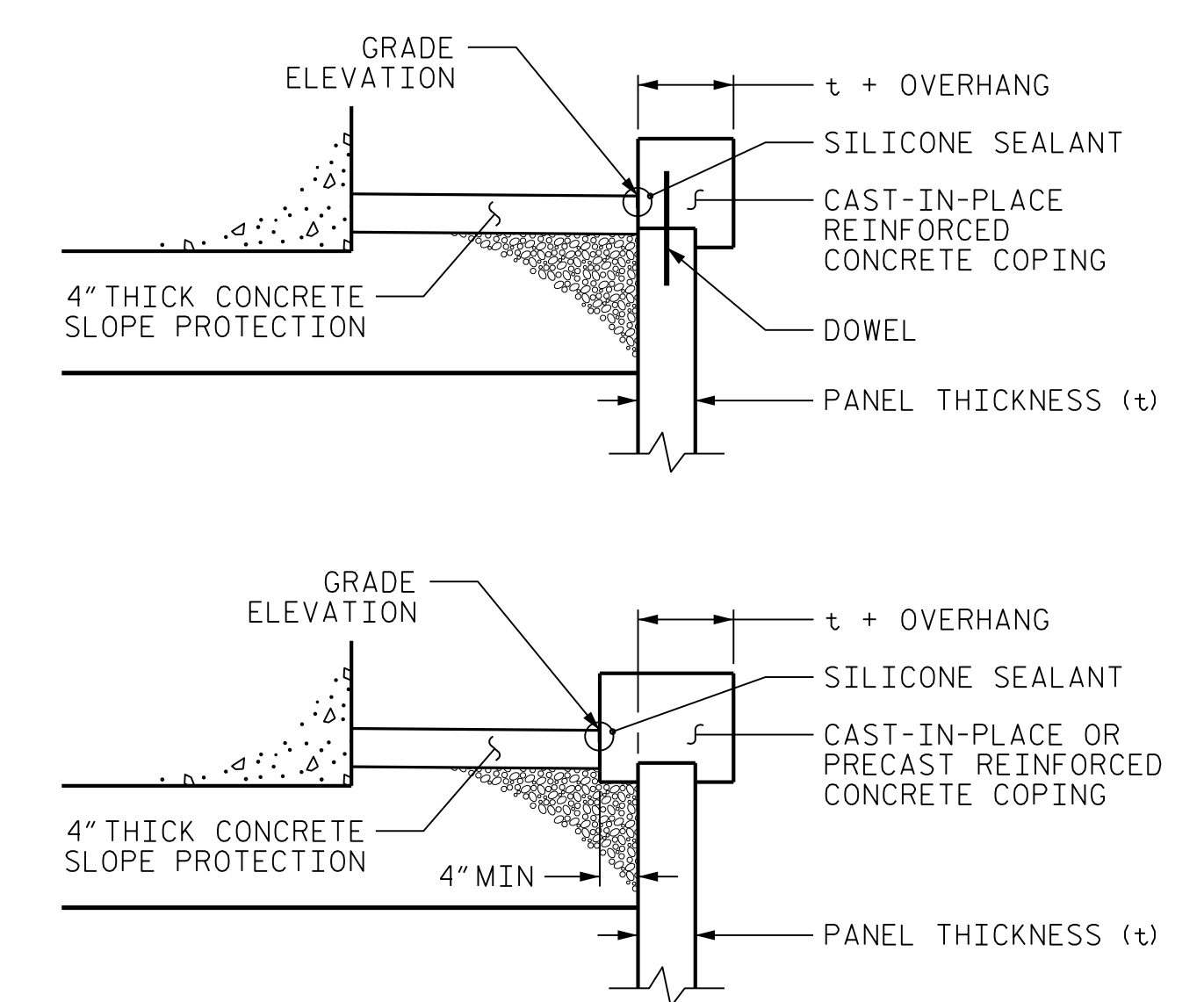
**NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
  
**GEOTECHNICAL**  
**ENGINEERING UNIT**

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

GEOTECHNICAL ENGINEER  
 ENGINEER  
  
 DocuSigned by:  9/25/2015  
 DATE SIGNATURE DATE



FACTORED LOAD AND LOCATION OF STRAP LOAD			
STATION	BENT NO.	FACTORED LOAD (KIPS/FT)	Z (FT)
-L- 28+89.67	END BENT 1	3.17	4.17
-L- 30+46.17	END BENT 2	3.10	4.17
-L- 34+43.06	END BENT 1	2.03	3.61
-L- 35+72.31	END BENT 2	2.07	3.57

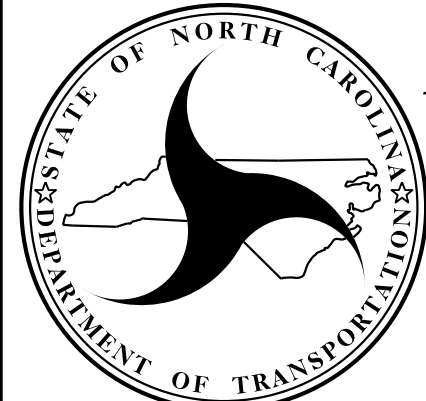


**COPING DETAILS**  
 AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

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

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE MSE RETAINING WALLS PROVISION.  
 \*\*\*SEE CONCRETE SURFACE TREATMENT FOR ARCHITECTURAL FINISH SPECIAL PROVISION  
 RW2, -Y4- STA. 13+57.51 (41.34' RT) TO -Y4- STA. 15+19.34 (41.34' RT)  
 RW3, -Y4- STA. 14+51.80 (57.52' LT) TO -Y4- STA. 16+17.12 (57.52' LT)  
 RW4, -Y6- STA. 11+92.11 (41.27' RT) TO -Y6- STA. 12+98.36 (41.27' RT)  
 RW5, -Y7- STA. 12+06.51 (41.03' LT) TO -Y7- STA. 13+20.00 (41.03' LT)

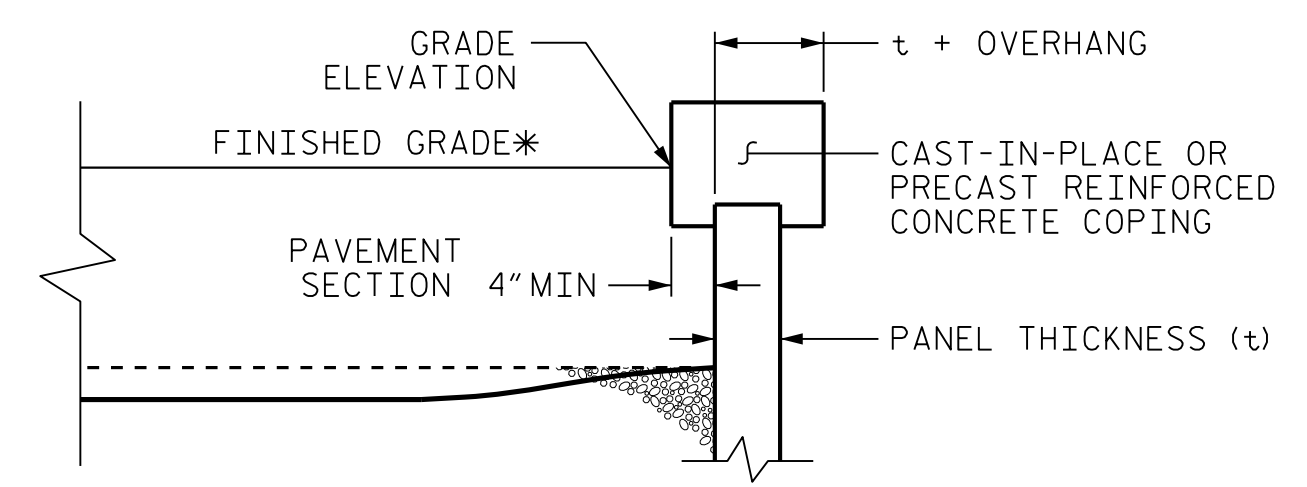
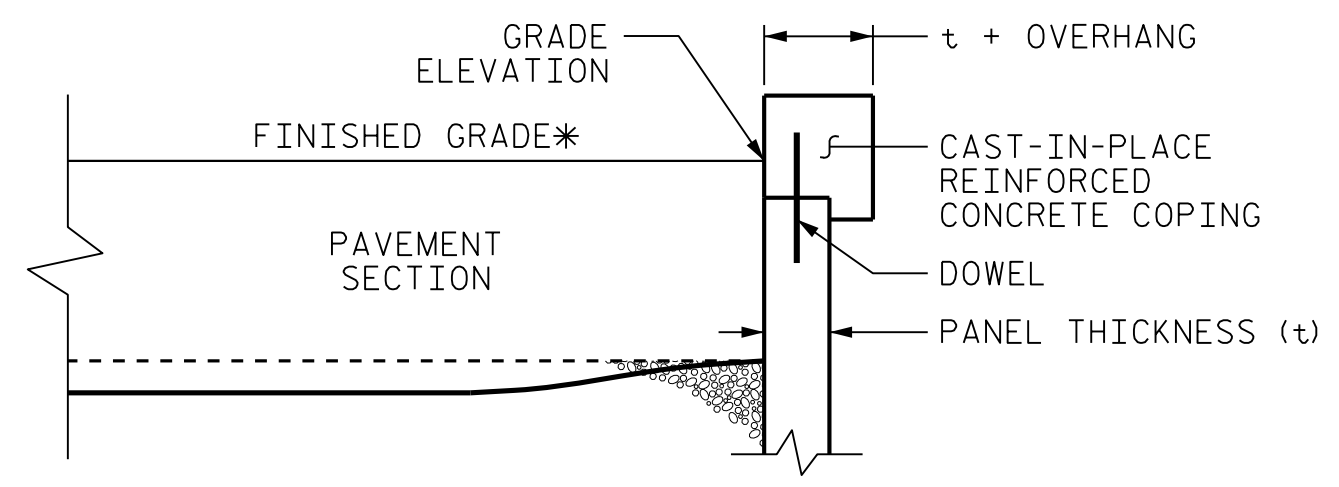
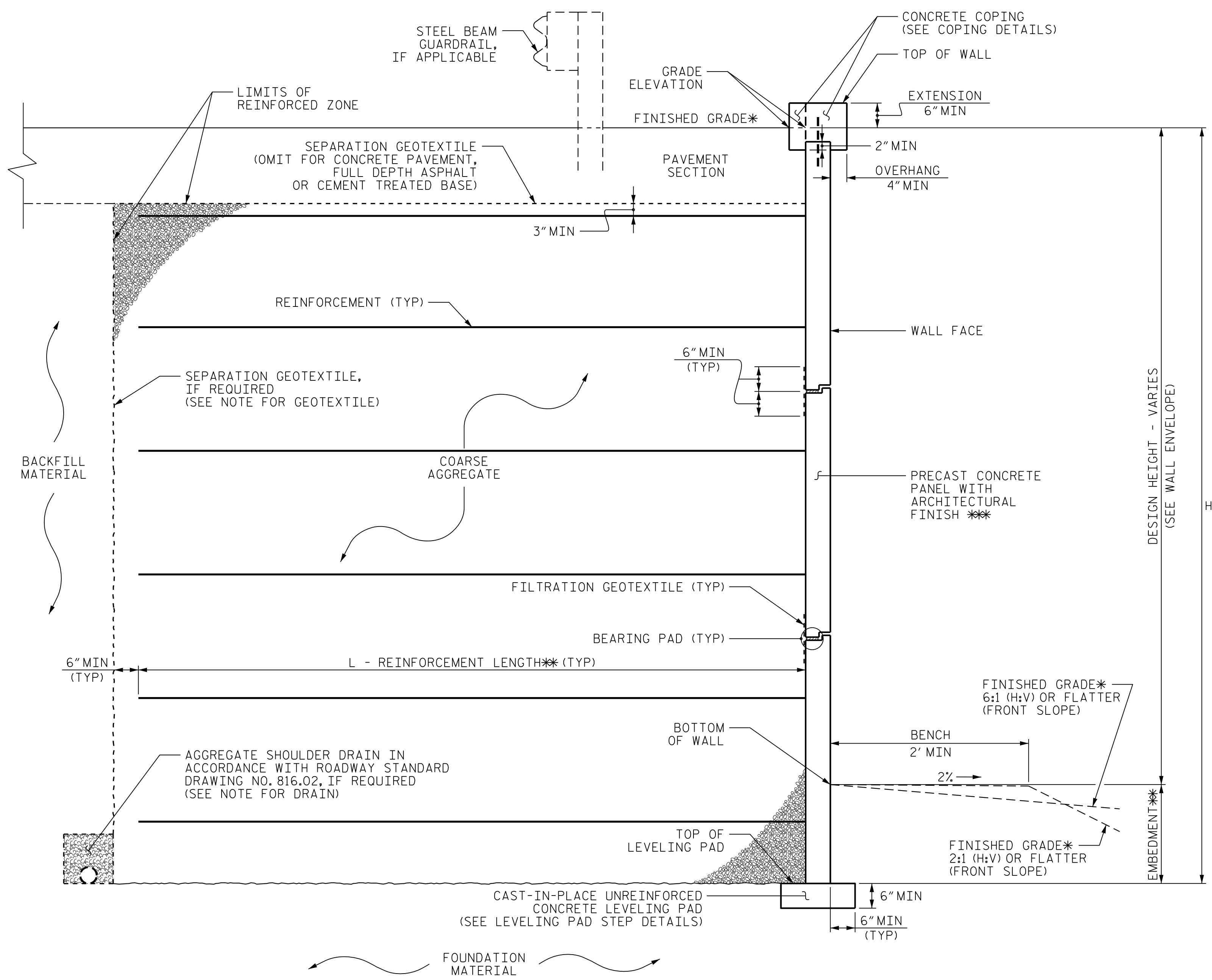
PREPARED BY: J. PARK DATE: 09/2015  
 REVIEWED BY: J. BATTS DATE: 09/2015

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

PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: SEE WALL NO. 2 TO NO. 5  
 SHEET 7 OF 11

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





**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.

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

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE MSE RETAINING WALLS PROVISION.  
 \*\*\*SEE CONCRETE SURFACE TREATMENT FOR ARCHITECTURAL FINISH SPECIAL PROVISION

- RW2, -Y4- STA. 12+96.80 (41.34' RT) TO -Y4- STA. 13+57.51 (41.34' RT)
- RW2, -Y4- STA. 15+19.34 (41.34' RT) TO -Y4- STA. 15+85.80 (73.94' RT)
- RW3, -Y4- STA. 13+90.40 (89.01' LT) TO -Y4- STA. 14+51.80 (57.52' LT)
- RW3, -Y4- STA. 16+17.12 (57.52' LT) TO -Y4- STA. 17+44.80 (57.52' LT)
- RW4, -Y6- STA. 11+05.98 (41.27' RT) TO -Y6- STA. 11+92.11 (41.27' RT)
- RW4, -Y6- STA. 12+98.36 (41.27' RT) TO -Y6- STA. 13+77.98 (41.27' RT)
- RW5, -Y7- STA. 11+43.50 (41.03' LT) TO -Y7- STA. 12+06.51 (41.03' LT)
- RW5, -Y7- STA. 13+20.00 (41.03' LT) TO -Y7- STA. 14+20.00 (41.03' LT)
- RW6, -L- STA. 35+67.87 (59.50' LT) TO -L- STA. 38+00.00 (59.50' LT)

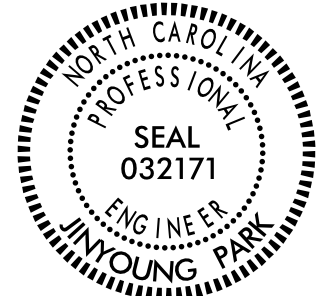

PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: SEE WALL NO. 2 TO NO. 6  
 SHEET 8 OF 11

PREPARED BY: J. PARK DATE: 09/2015  
 REVIEWED BY: J. BATTS DATE: 09/2015

NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL  
 ENGINEERING UNIT

**MSE RETAINING WALL DETAILS**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-8
2	-	-	4	-	-	

GEOTECHNICAL ENGINEER  SEAL 032171 ENGINEER WINSTON-SALEM, NC	ENGINEER
DocuSigned by:  9/25/2015 DATE	SIGNATURE DATE

**NOTES:**

FOR CAST-IN-PLACE (CIP) MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE CAST-IN-PLACE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

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

A SPECIAL ARCHITECTURAL FINISH IS REQUIRED FOR THE CIP MSE RETAINING WALL NO. 2 THROUGH NO. 6.

FOR A SPECIAL ARCHITECTURAL FINISH, SEE SPECIAL PROVISION, CONCRETE SURFACE TREATMENT FOR ARCHITECTURAL FINISH.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 2 THROUGH NO. 6.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 2 THROUGH NO. 6.

BEFORE BEGINNING CIP MSE WALL DESIGN FOR RETAINING WALL NO. 2 THROUGH 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. 2 THROUGH NO. 6 FOR THE FOLLOWING:

- 1) H = DESIGN HEIGHT + EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION 8,150 LB/SF (RW2), 9,800 LB/SF (RW3), 10,020 LB/SF (RW4), 9,160 LB/SF (RW5), 2,260 LB/SF (RW6)
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
- 5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT ( $\gamma$ ) LB/CF	FRICTION ANGLE ( $\phi$ ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0

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

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT ( $\gamma$ ) LB/CF	FRICTION ANGLE ( $\phi$ ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 2 THROUGH 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 ( $L_a$ ) SHOWN. CAST REINFORCEMENT CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 28+89.67 -L-, END BENT NO. 2 LOCATED AT STATION 30+46.17 -L-, END BENT NO. 1 LOCATED AT STATION 34+43.06 -L- AND STAGE 1 END BENT NO. 2 LOCATED AT STATION 35+72.31 -L-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 2 THROUGH NO. 6.

INSTALL 24 INCH DIAMETER 16 GAUGE CORRUGATED STEEL PIPES FOR HP12X53 STEEL PILE FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 28+89.67 -L-, END BENT NO. 2 LOCATED AT STATION 30+46.17 -L-, END BENT NO. 1 LOCATED AT STATION 34+43.06 -L- AND STAGE 1 END BENT NO. 2 LOCATED AT STATION 35+72.31 -L-, WHICH WILL INTERFERE WITH THE REINFORCEMENT FOR RETAINING WALL NO. 2, NO. 3, NO. 4 AND NO. 5, RESPECTIVELY. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

THE COST FOR THE 24 INCH DIAMETER 16 GAUGE CORRUGATED STEEL PIPES IS INCIDENTAL TO MSE RETAINING WALL.

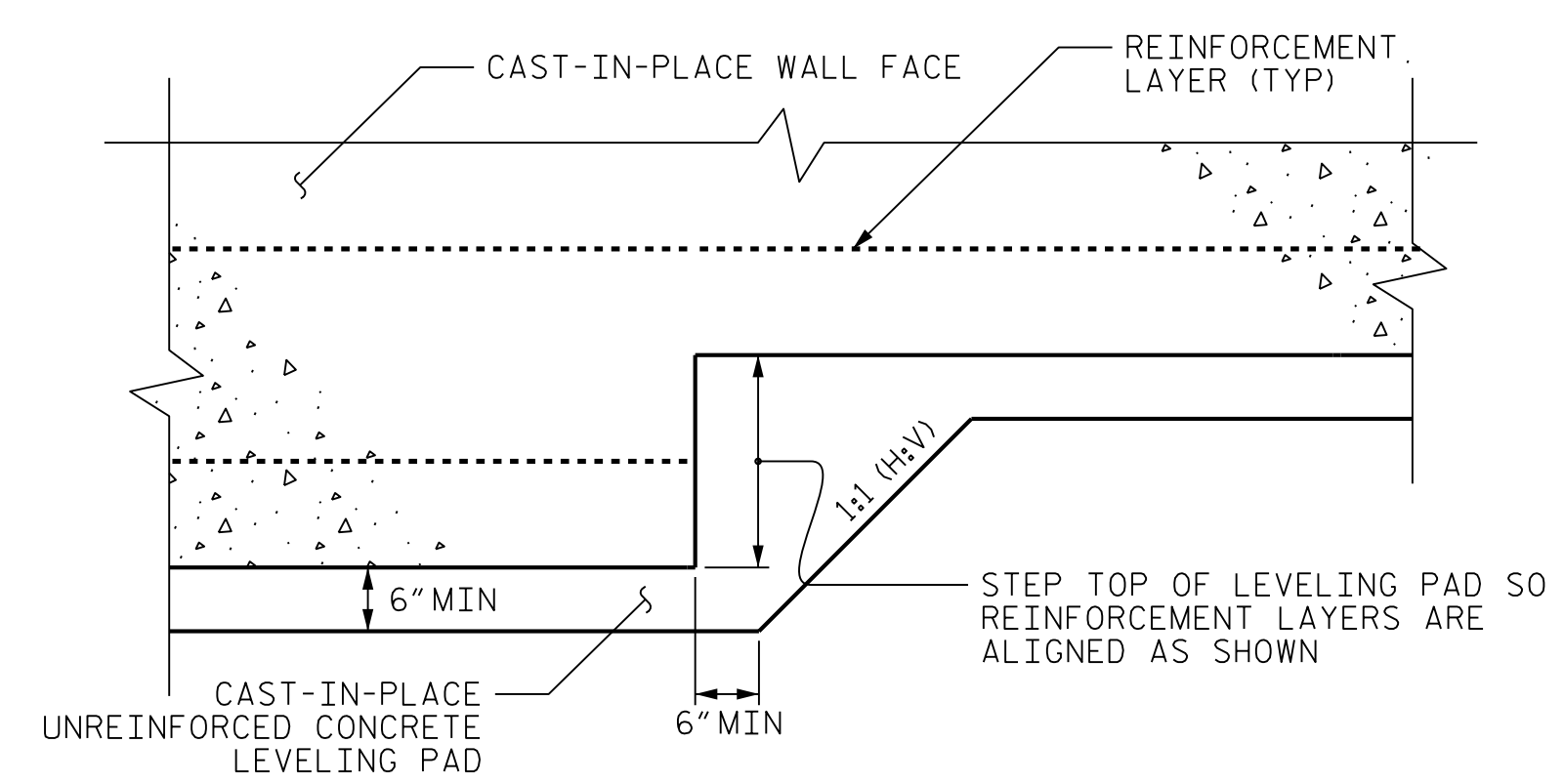
CONSTRUCT RETAINING WALL NO. 2 THROUGH NO. 5 BEFORE INSTALLING FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 28+89.67 -L-, END BENT NO. 2 LOCATED AT STATION 30+46.17 -L-, END BENT NO. 1 LOCATED AT STATION 34+43.06 -L- AND STAGE 1 END BENT NO. 2 LOCATED AT STATION 35+72.31 -L-, RESPECTIVELY.

TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC SHOWN ON PLANS W-3, W-4, AND W-5 WILL INTERFERE WITH THE WALL CONSTRUCTION. SEE TRAFFIC MANAGEMENT PLANS FOR THE TEMPORARY SHORING.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 2 THROUGH NO. 6 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

DO NOT PLACE WELDED WIRE FACING, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 2 THROUGH NO. 6 UNTIL OBTAINING APPROVAL OF THE EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL.

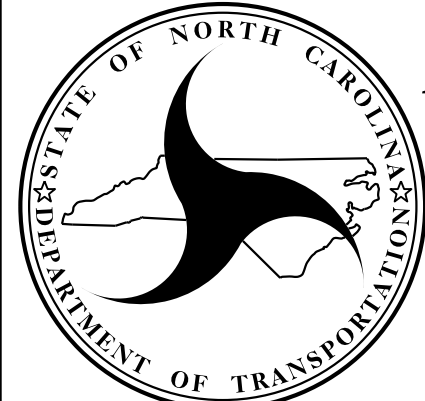
PLACE GEOTEXTILE FOR EMBANKMENT STABILIZATION ON THE EXISTING GROUND OR BOTTOM OF WALL EXCAVATION AT RETAINING WALL NO. 2, NO. 3, AND NO. 4. FOR DETAILS, SEE PLAN SHEET 2G-1, EMBANKMENT STABILIZATION DETAILS AT BRIDGE APPROACHES.



CAST-IN-PLACE CONCRETE PANELS

LEVELING PAD STEP DETAILS

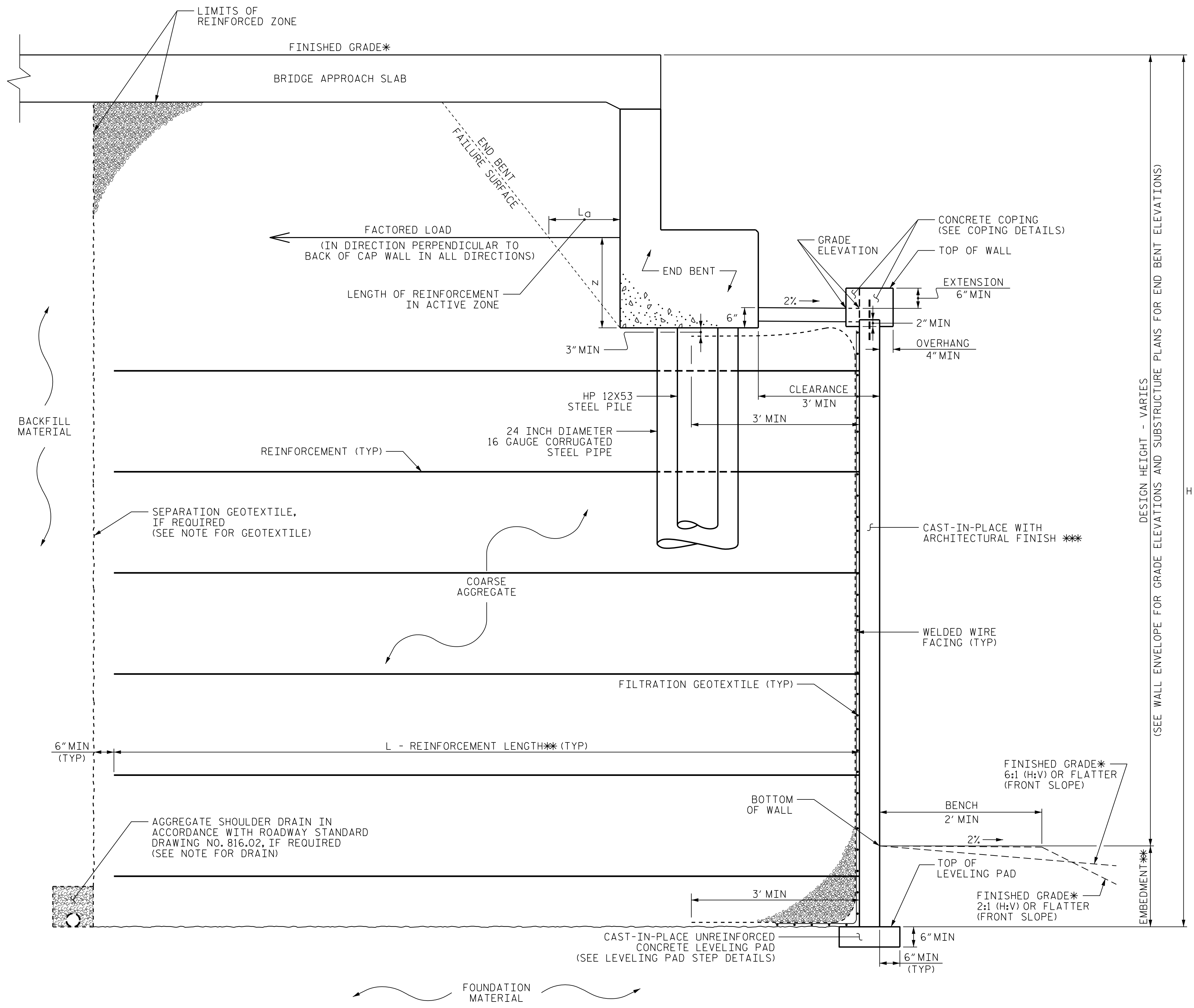
PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: SEE WALL NO. 2 TO NO. 6  
 SHEET 9 OF 11

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

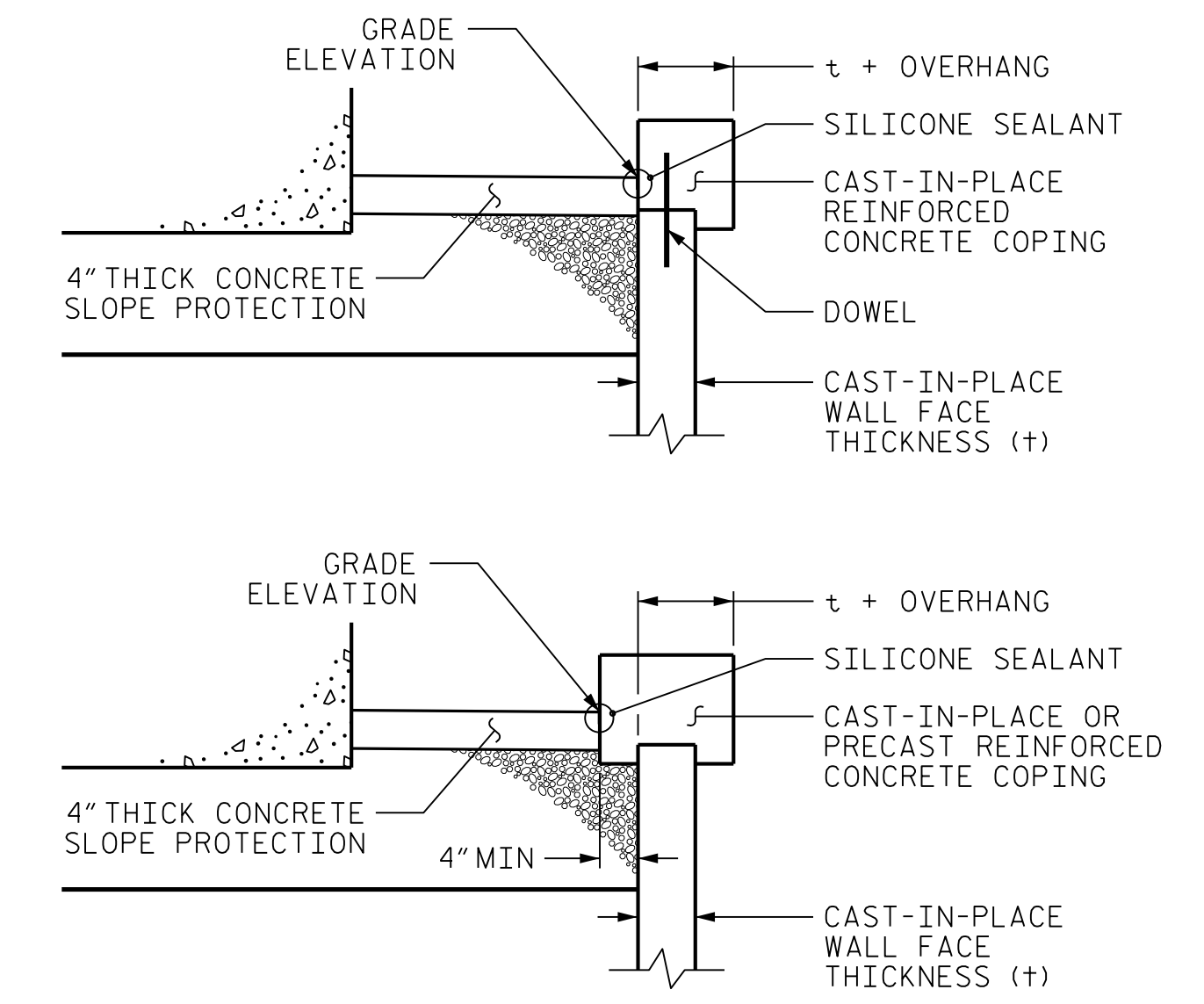
**CIP MSE RETAINING**  
**WALL (ALTERNATE)**  
**NOTES AND DETAILS**

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

PREPARED BY: J. PARK	DATE: 09 / 2015
REVIEWED BY: J. BATTS	DATE: 09 / 2015



FACTORED LOAD AND LOCATION OF STRAP LOAD			
STATION	BENT NO.	FACTORED LOAD (KIPS/FT)	Z (FT)
-L- 28+89.67	END BENT 1	3.17	4.17
-L- 30+46.17	END BENT 2	3.10	4.17
-L- 34+43.06	END BENT 1	2.03	3.61
-L- 35+72.31	END BENT 2	2.07	3.57

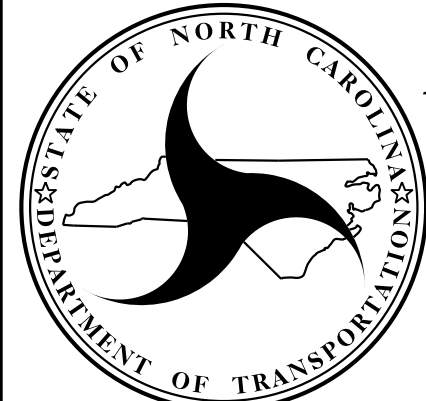


**COPING DETAILS**  
 AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

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

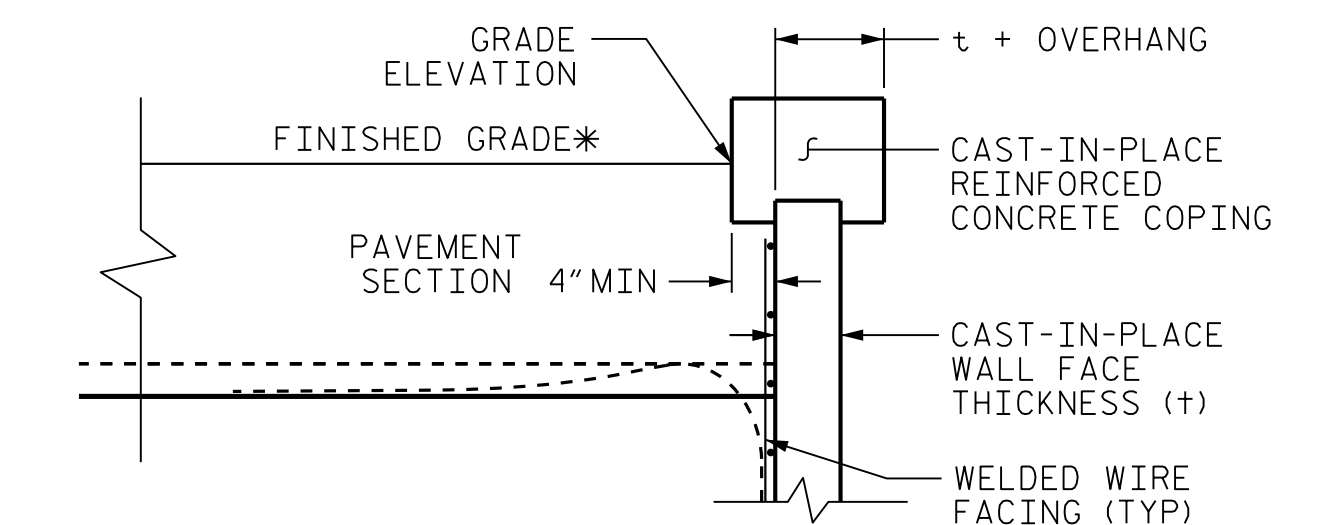
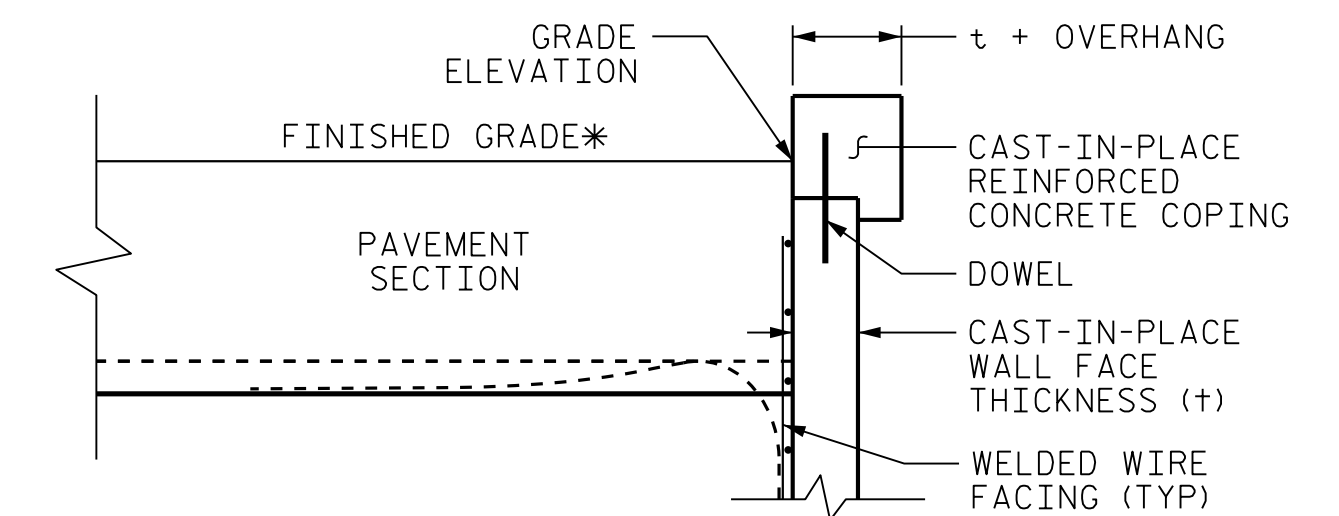
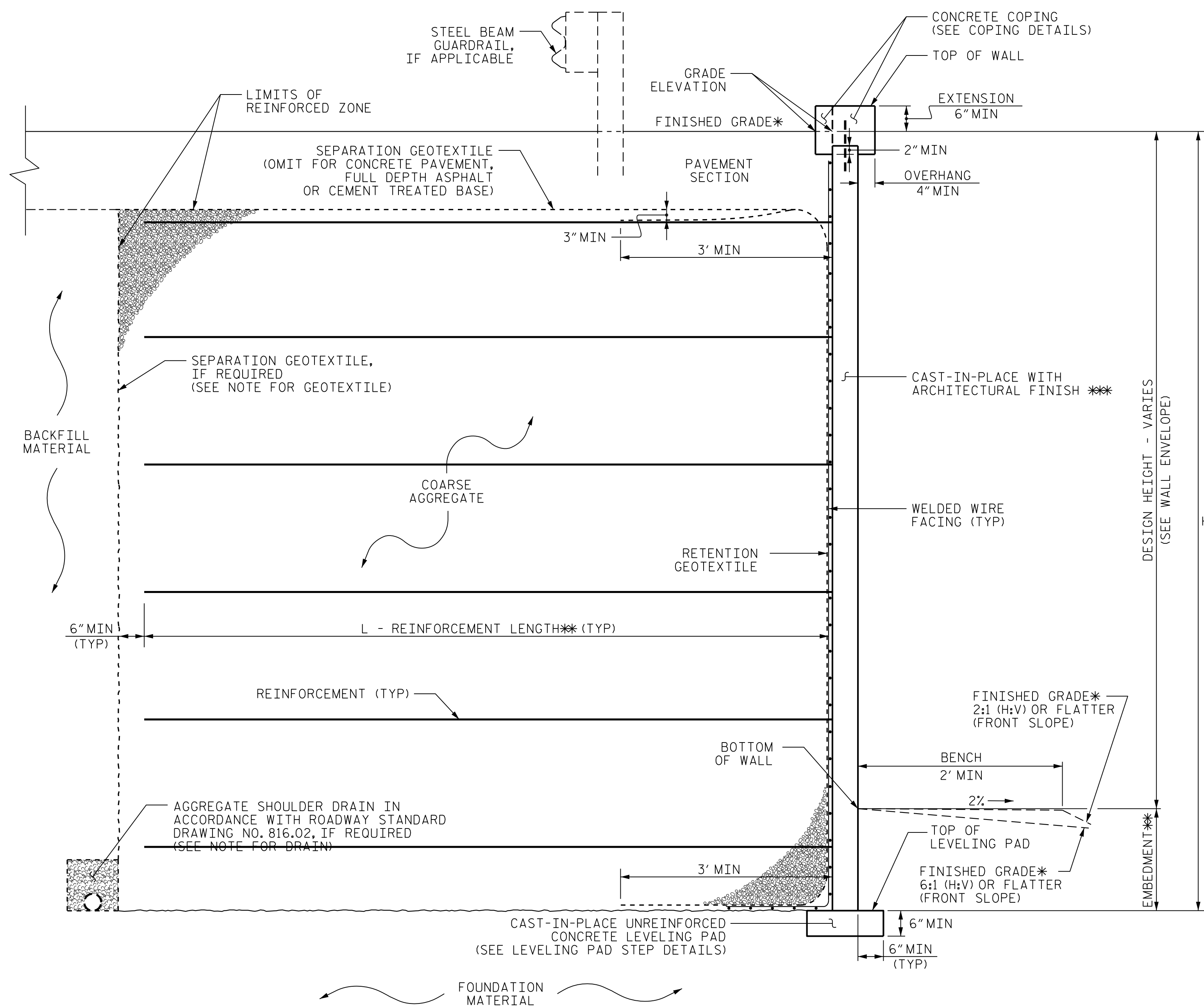
\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE CAST-IN-PLACE MSE RETAINING WALLS PROVISION.  
 \*\*\*SEE CONCRETE SURFACE TREATMENT FOR ARCHITECTURAL FINISH SPECIAL PROVISION  
 RW2, -Y4- STA. 13+57.51 (41.34' RT) TO -Y4- STA. 15+19.34 (41.34' RT)  
 RW3, -Y4- STA. 14+51.80 (57.52' LT) TO -Y4- STA. 16+17.12 (57.52' LT)  
 RW4, -Y6- STA. 11+92.11 (41.27' RT) TO -Y6- STA. 12+98.36 (41.27' RT)  
 RW5, -Y7- STA. 12+06.51 (41.03' LT) TO -Y7- STA. 13+20.00 (41.03' LT)

PREPARED BY: J. PARK  
 DATE: 09/2015  
 REVIEWED BY: J. BATTS  
 DATE: 09/2015

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

PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: SEE WALL NO. 2 TO NO. 5  
 SHEET 10 OF 11

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-10
2	-	-	4	-	-	



**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.

**CAST-IN-PLACE MSE RETAINING WALL - TYPICAL SECTION**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE CAST-IN-PLACE MSE RETAINING WALLS PROVISION.  
 \*\*\*SEE CONCRETE SURFACE TREATMENT FOR ARCHITECTURAL FINISH SPECIAL PROVISION

- RW2, -Y4- STA. 12+96.80 (41.34' RT) TO -Y4- STA. 13+57.51 (41.34' RT)
- RW2, -Y4- STA. 15+19.34 (41.34' RT) TO -Y4- STA. 15+85.80 (73.94' RT)
- RW3, -Y4- STA. 13+90.40 (89.01' LT) TO -Y4- STA. 14+51.80 (57.52' LT)
- RW3, -Y4- STA. 16+17.12 (57.52' LT) TO -Y4- STA. 17+44.80 (57.52' LT)
- RW4, -Y6- STA. 11+05.98 (41.27' RT) TO -Y6- STA. 11+92.11 (41.27' RT)
- RW4, -Y6- STA. 12+98.36 (41.27' RT) TO -Y6- STA. 13+77.98 (41.27' RT)
- RW5, -Y7- STA. 11+43.50 (41.03' LT) TO -Y7- STA. 12+06.51 (41.03' LT)
- RW5, -Y7- STA. 13+20.00 (41.03' LT) TO -Y7- STA. 14+20.00 (41.03' LT)
- RW6, -L- STA. 35+67.87 (59.50' LT) TO -L- STA. 38+00.00 (59.50' LT)

PROJECT NO.: B-4490 (33727.1.1)  
 CUMBERLAND COUNTY  
 STATION: SEE WALL NO. 2 TO NO. 6  
 SHEET 11 OF 11

PREPARED BY: J. PARK DATE: 09 / 2015  
 REVIEWED BY: J. BATTS DATE: 09 / 2015

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

**CIP MSE RETAINING WALL (ALTERNATE) DETAILS**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-11
2	-	-	4	-	-	

## STANDARD NOTES

### DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	--	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	-----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

### CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

### CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

### DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

### ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.  
ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.  
IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.  
DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.  
WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".  
EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.  
WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.  
METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

# ENGLISH

JANUARY, 1990

STD. NO. SN