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PROJECT REFERENCE NO.	SHEET NO.
U-4910B	W-1
R/W SHEET NO.	

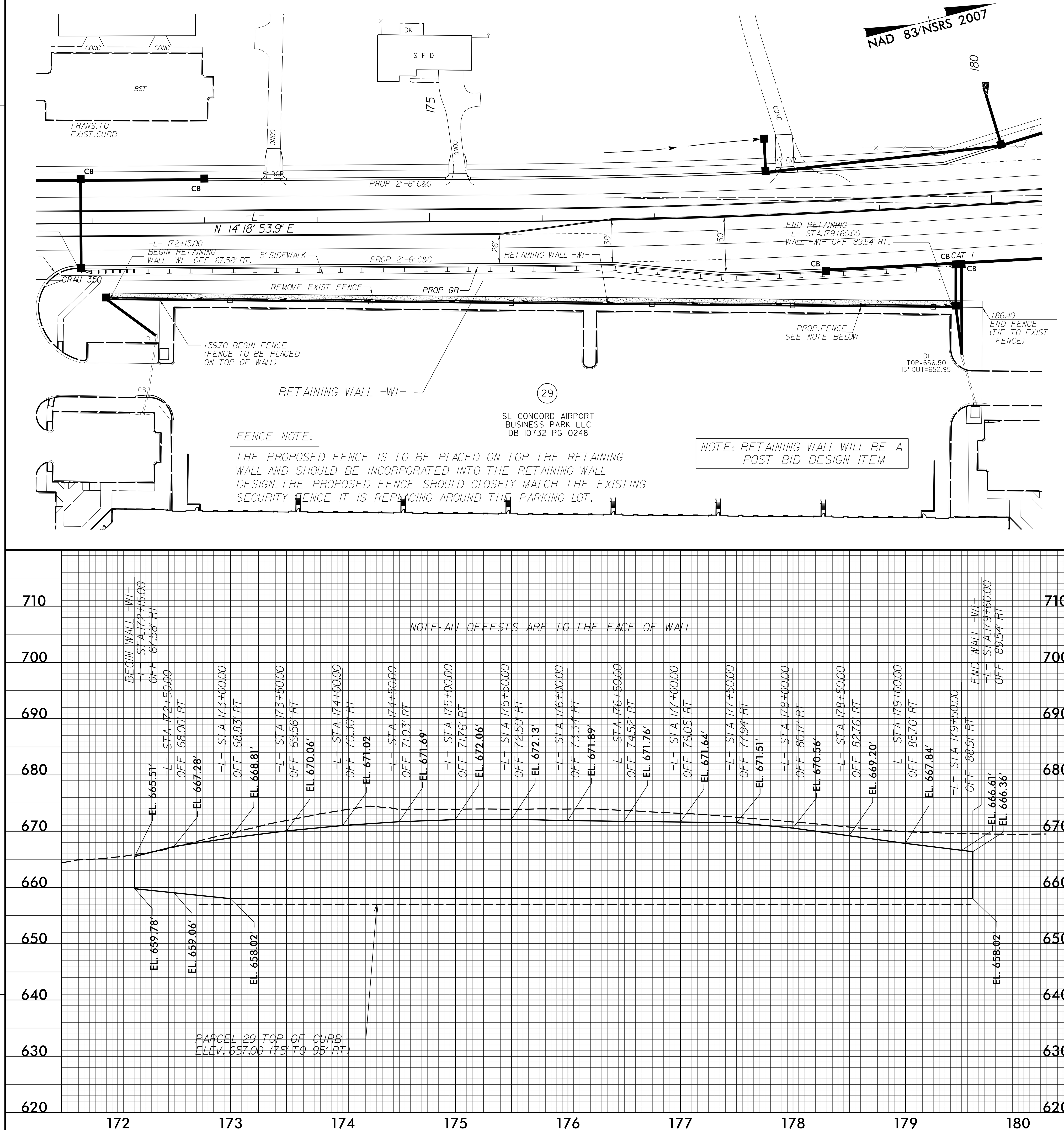
ROADWAY DESIGN ENGINEER — GEOTECHNICAL ENGINEER

SEAL 039779 — 1/22/2016

Prepared in the Office of: AECOM — NC FIRM LICENSE No: F-0342, 701 Corporate Center Drive, Suite 475, Raleigh, NC 27607, (919) 854-6200 - (919) 854-6259(FAX)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

RETAINING WALL DETAIL -W1-



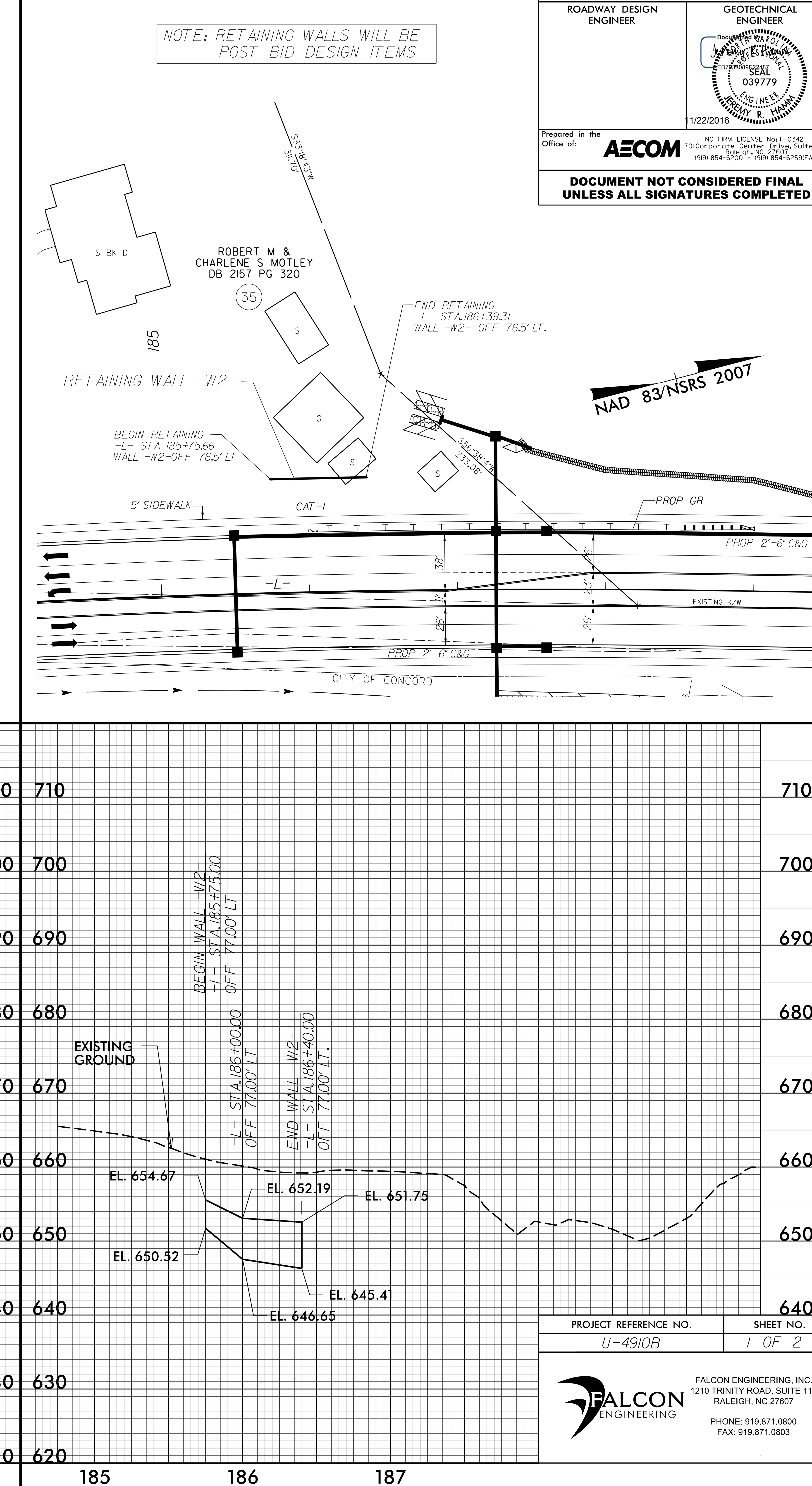
FENCE NOTE:

THE PROPOSED FENCE IS TO BE PLACED ON TOP THE RETAINING WALL AND SHOULD BE INCORPORATED INTO THE RETAINING WALL DESIGN. THE PROPOSED FENCE SHOULD CLOSELY MATCH THE EXISTING SECURITY FENCE IT IS REPLACING AROUND THE PARKING LOT.

NOTE: RETAINING WALL WILL BE A POST BID DESIGN ITEM

RETAINING WALL DETAIL -W2-

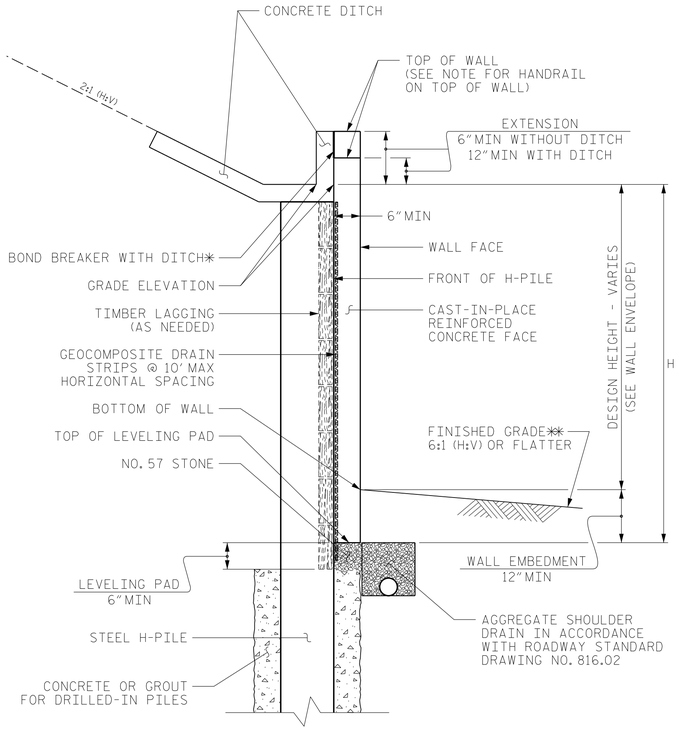
NOTE: RETAINING WALLS WILL BE POST BID DESIGN ITEMS



PROJECT REFERENCE NO.	SHEET NO.
U-4910B	1 OF 2

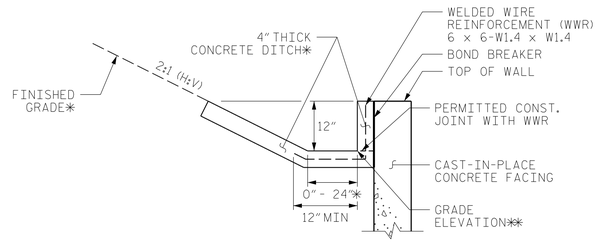
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607
PHONE: 919.871.0800
FAX: 919.871.0803

Revisions:



SOLDIER PILE WALL WITH CAST-IN-PLACE FACE - TYPICAL SECTION

*SEE CONCRETE DITCH BEHIND WALL DETAILS.
**SEE PLANS FOR FINISHED GRADE DETAILS.



CONCRETE DITCH BEHIND WALL WITH CONCRETE FACING

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

FOR CONCRETE DITCHES, SEE SECTION 850 OF THE STANDARD SPECIFICATIONS.

NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.

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

A FENCE IS REQUIRED ON TOP OF RETAINING WALL NO. 1. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

AT THE CONTRACTOR'S OPTION, USE DRIVEN H-PILES FOR RETAINING WALL NO. 1.

USE A SOLDIER PILE RETAINING WALL WITH A CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 1.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL NO. 1, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
4) MINIMUM PILE PENETRATION INTO ROCK = N/A
5) IN-SITU ASSUMED MATERIAL PARAMETERS ABOVE ELEVATION 664 FT:
   UNIT WEIGHT, γ = 110 LB/CF
   FRICTION ANGLE, ϕ = 28 DEGREES
   COHESION, c = 0 LB/SF
6) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 664 FT:
   UNIT WEIGHT, g = 120 LB/CF
   FRICTION ANGLE, f = 30 DEGREES
   COHESION, c = 0 LB/SF
7) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW ELEVATION 628 FT:
   UNIT WEIGHT, g = 134 LB/CF
   FRICTION ANGLE, f = 34 DEGREES
   COHESION, c = 0 LB/SF

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

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

PROJECT REFERENCE NO.	SHEET NO.
U-4910B	W-2
R/W SHEET NO.	

GEOTECHNICAL ENGINEER

Prepared in the Office of:
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FALCON ENGINEERING, INC. | LICENSE C-3193
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PROJECT NO.: U-4910
CITY OF CONCORD, CABARRUS COUNTY
STATION: VARIES
SHEET 1 OF 1

PREPARED BY: HUNSBERGER, W. S.	DATE: 11/21
REVIEWED BY: HAMM, J. R.	DATE: 11/21

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 1

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
			3		
			4		

SHEET NO. 2

PROJECT REFERENCE NO.	SHEET NO.
U-4910B	W-3
R/W SHEET NO.	

GEOTECHNICAL ENGINEER
SEAL 039779
11/22/2016

Prepared in the Office of: FALCON ENGINEERING, INC. | LICENSE C-3193
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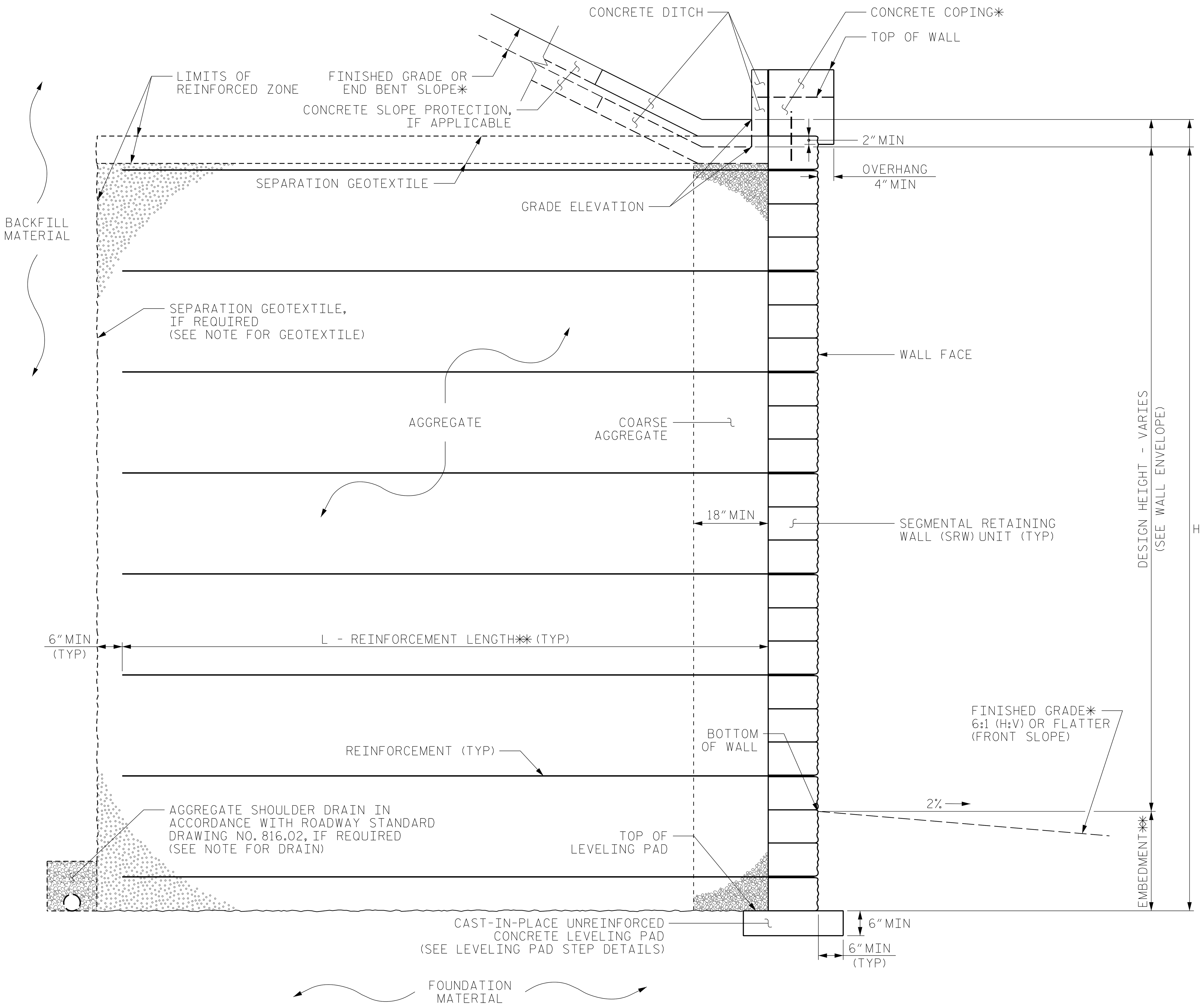

MSE WALL WITH SRW UNITS - TYPICAL SECTION

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

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.

USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL UNITS (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 2.

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

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 2.

A SEPARATION GEOTEXTILE IS NOT REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 2.

A DRAIN IS NOT 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 = 2,000 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 6 FT
5) MINIMUM EMBEDMENT DEPTH = 2 FT
6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (g) LB/CF	FRICTION ANGLE (f) DEGREES	COHESION (c) LB/SF
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 (g) LB/CF	FRICTION ANGLE (f) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	110	28	0

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.

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

AT THE CONTRACTOR'S OPTION, "TEMPORARY SHORING FOR WALL CONSTRUCTION" MAY BE USED TO CONSTRUCT RETAINING WALL NO. 2. SEE MSE RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.

PROJECT NO.: U-4910
CITY OF CONCORD, CABARRUS COUNTY
STATION: VARIES
SHEET 1 OF 2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 2

REVISIONS

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
			3			3
			4			

PREPARED BY: HUNSBERGER, W. S.	DATE: 11/21
REVIEWED BY: HAMM, J. R.	DATE: 11/21

PROJECT REFERENCE NO.	SHEET NO.
U-4910B	W-4
R/W SHEET NO.	

GEOTECHNICAL ENGINEER

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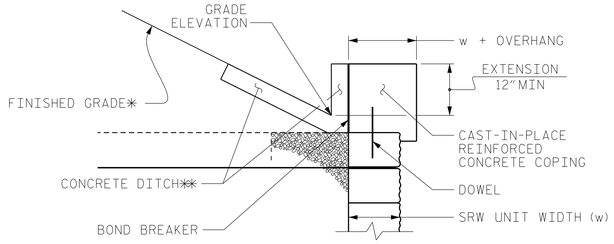
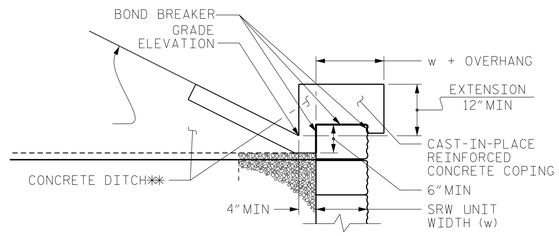
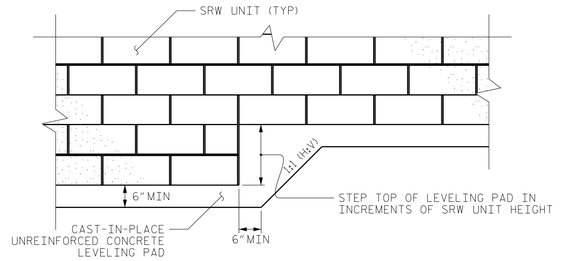


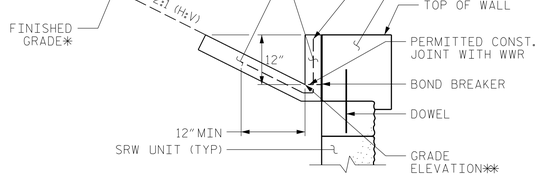


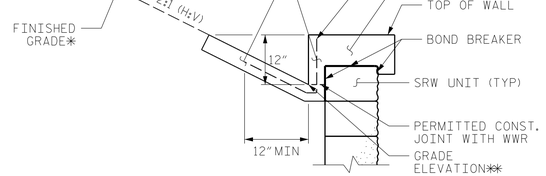
COPING DETAILS

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



LEVELING PAD STEP DETAILS





CONCRETE DITCH BEHIND WALL WITH CONCRETE COPING

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

FOR CONCRETE DITCHES, SEE SECTION 850 OF THE STANDARD SPECIFICATIONS.

PROJECT NO.: U-4910
CITY OF CONCORD, CABARRUS COUNTY
STATION: VARIES
SHEET 2 OF 2

PREPARED BY: HUNSBERGER, W. S.	DATE: 11/21
REVIEWED BY: HAMM, J. R.	DATE: 11/21

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 2

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