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GEOTECHNICAL ENGINEER

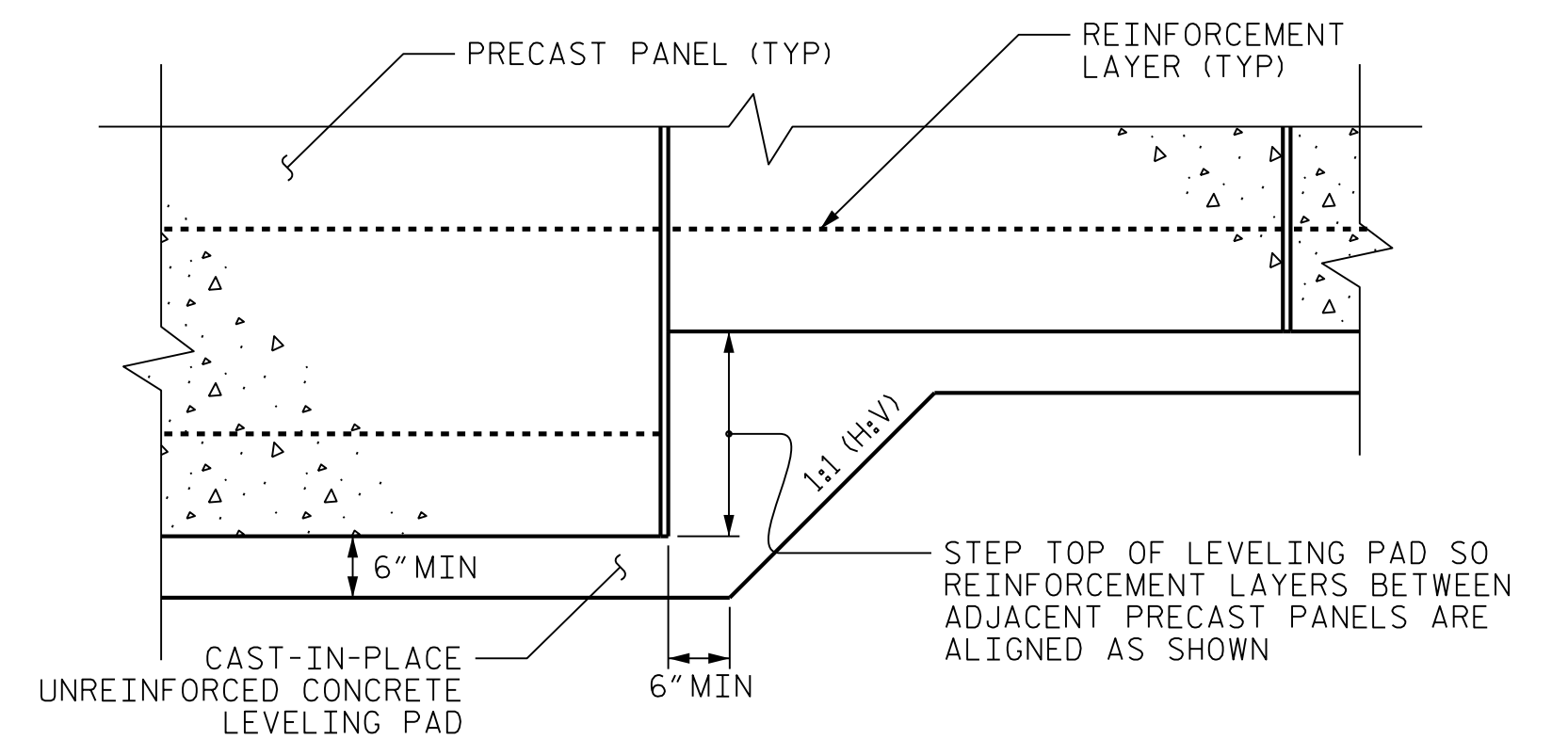
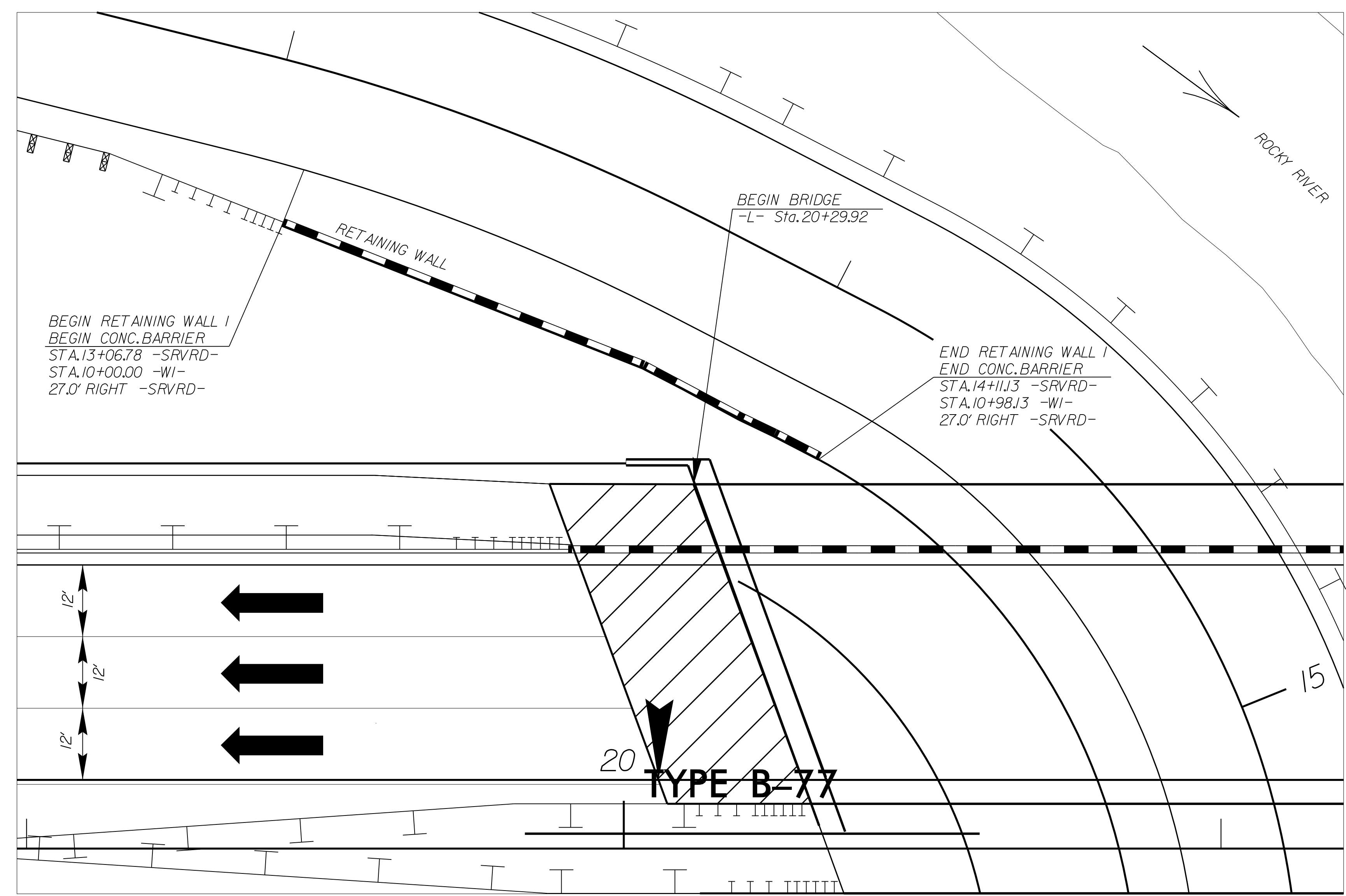
ENGINEER

SEAL 028893

Michael H. Stephens

1/19/2016

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



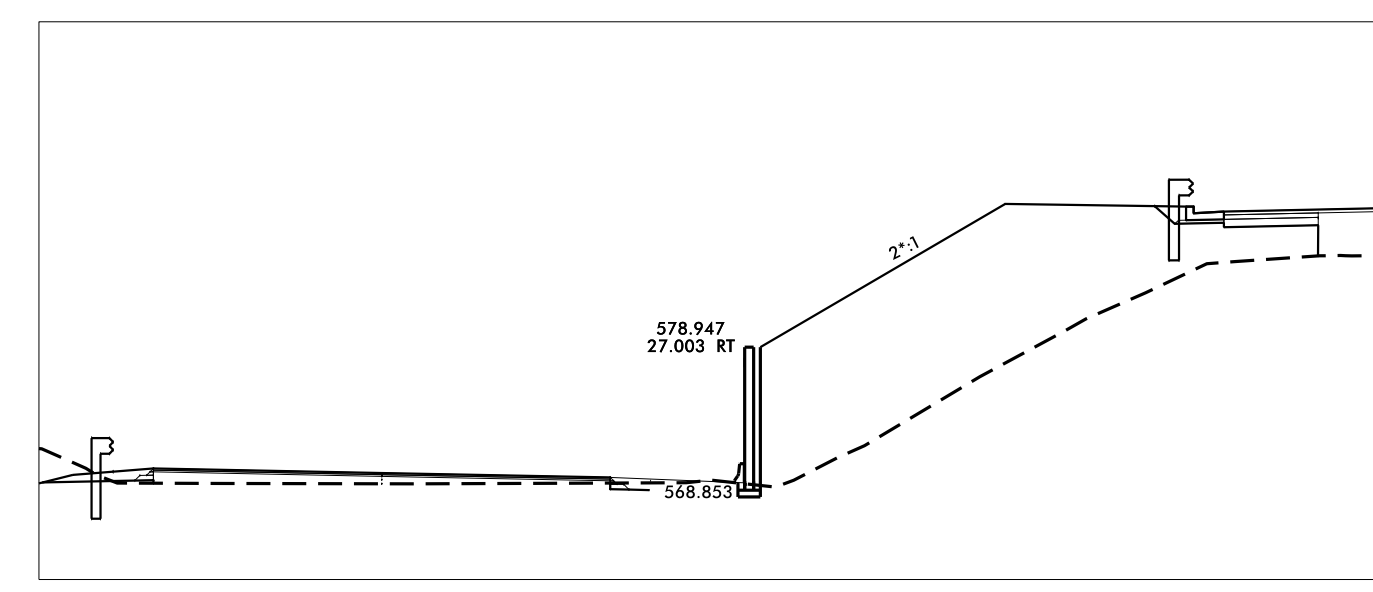
PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

| RETAINING WALL ELEVATIONS |                       |                    |                           |                          |                       |                           |
|---------------------------|-----------------------|--------------------|---------------------------|--------------------------|-----------------------|---------------------------|
| -SRVRD- STA               | OFFSET FROM C (RIGHT) | ELEV @ TOP OF WALL | * PROPOSED FINISHED GRADE | ELEV. AT EMBEDMENT DEPTH | * EXPOSED WALL HEIGHT | ** DESIGN WALL HEIGHT "H" |
| 13+06.78                  | 27.0' -SRVRD-         | 570.20             | 570.20                    | 568.20                   | 0.00                  | 2.00                      |
| 13+15.21                  | 27.0' -SRVRD-         | 571.58             | 570.01                    | 568.01                   | 1.57                  | 2.00                      |
| 13+44.43                  | 27.0' -SRVRD-         | 576.34             | 569.43                    | 567.43                   | 6.91                  | 2.00                      |
| 13+74.06                  | 27.0' -SRVRD-         | 578.05             | 568.94                    | 566.94                   | 9.11                  | 2.00                      |
| 13+77.22                  | 27.0' -SRVRD-         | 578.61             | 568.89                    | 566.89                   | 9.72                  | 2.00                      |
| 13+81.84                  | 27.0' -SRVRD-         | 579.07             | 568.81                    | 566.81                   | 10.26                 | 2.00                      |
| 13+84.74                  | 27.0' -SRVRD-         | 578.89             | 568.75                    | 566.75                   | 10.14                 | 2.00                      |
| 13+95.61                  | 27.0' -SRVRD-         | 575.47             | 568.54                    | 566.54                   | 6.93                  | 2.00                      |
| 14+01.98                  | 27.0' -SRVRD-         | 572.03             | 568.43                    | 566.43                   | 3.60                  | 2.00                      |
| 14+11.13                  | 27.0' -SRVRD-         | 568.27             | 568.27                    | 566.27                   | 0.00                  | 2.00                      |

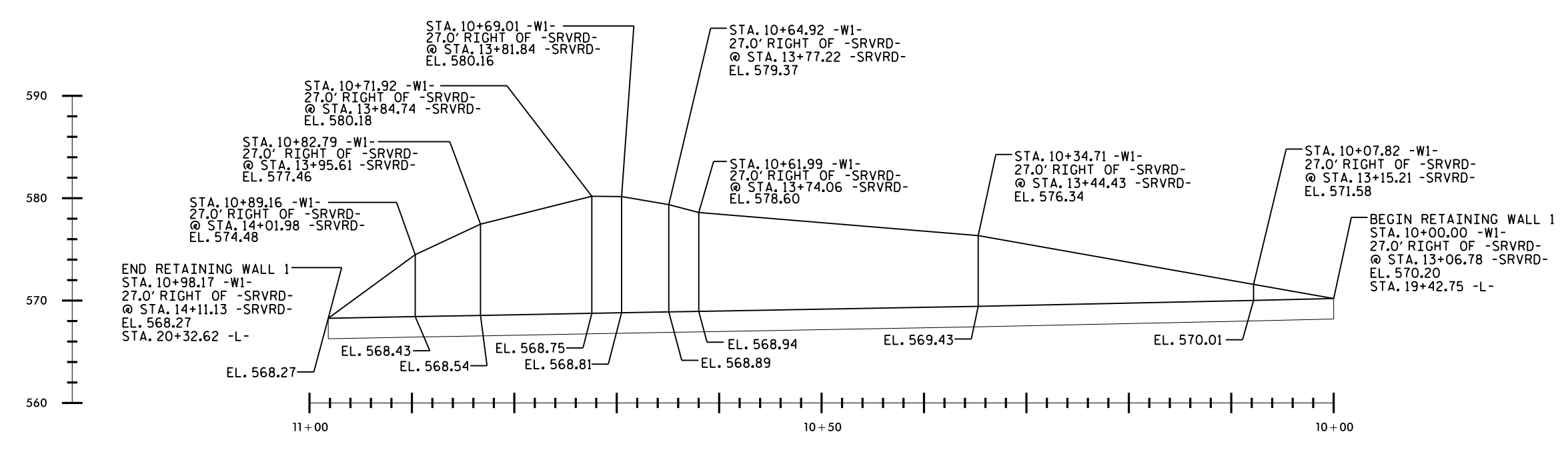
\* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

\*\* FOR DESIGN WALL HEIGHT "H" AND ADDITIONAL CONSTRUCTION DETAILS, SEE SHEET 2 OF 2



TYPICAL SECTION

\* WALL PERMANENT SLOPES ABOVE RETAINING WALL NO. 1 WILL BE CONSTRUCTED AT 2 HORIZ. TO 1 VERT. OR FLATTER SLOPE. TEMPORARY SLOPES DURING CONSTRUCTION WILL BE CONSTRUCTED AT 1.5 HORIZ. TO 1 VERT. OR FLATTER SLOPE.



WALL ENVELOPE

| ESTIMATED WALL QUANTITY |                   |
|-------------------------|-------------------|
| RETAINING WALL          | * 840 SQUARE FEET |

\* WALL AREA IS MEASURED USING THE WALL HEIGHT "H"

PROJECT NO.: 42265.1.1 (B-5123)

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

| MSE RETAINING WALL NO. 1 WALL AT BRIDGE NO. 19 END BENT NO. 1 |    |      |     |    |      |
|---|----|------|-----|----|------|
| REVISIONS   |    |      |     |    |      |
| NO.   | BY | DATE | NO. | BY | DATE |
| 1   |    |      | 3   |    |      |
| 2   |    |      | 4   |    |      |

SHEET NO. W1

PREPARED BY: MHS DATE: 1/14/16

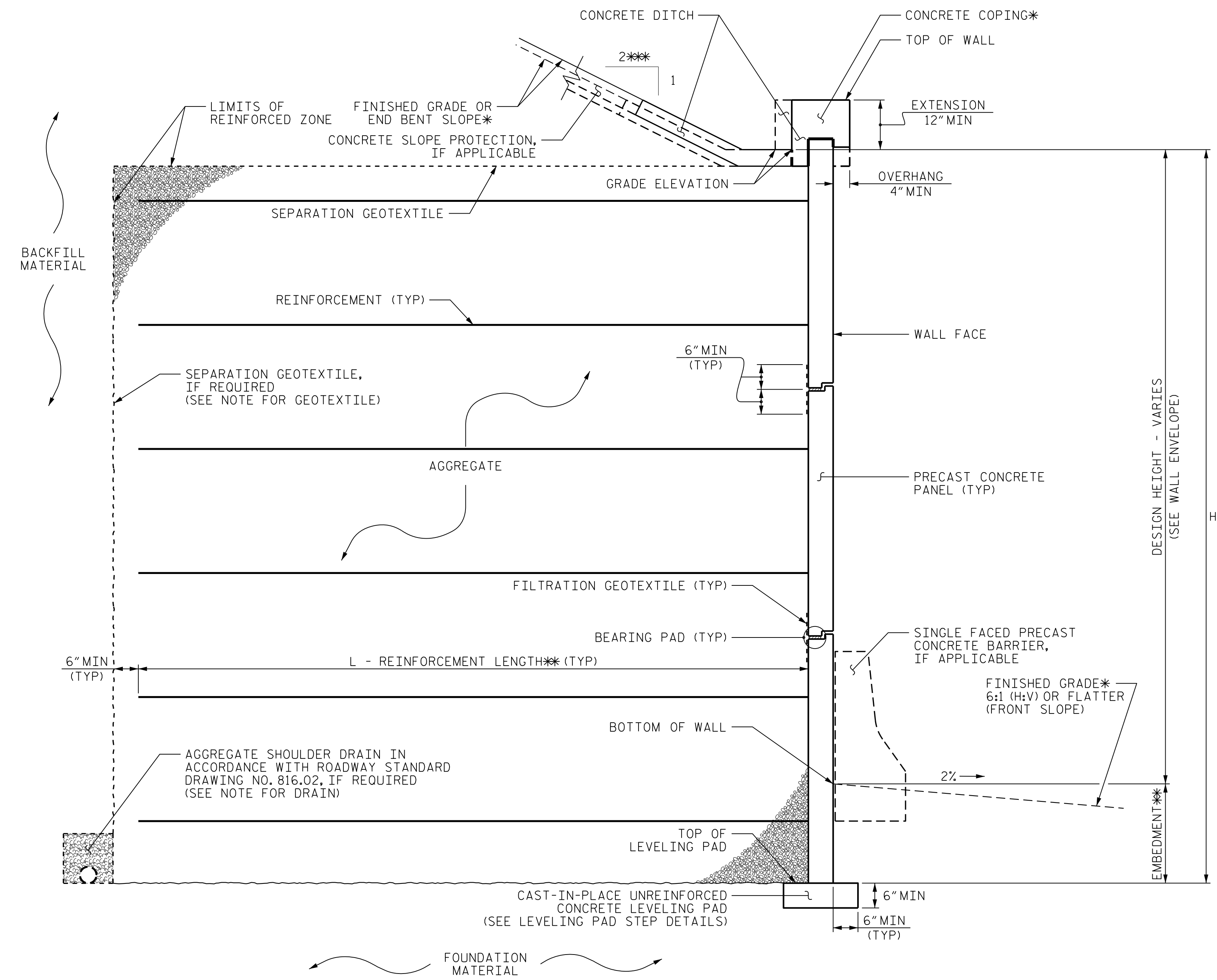
REVIEWED BY: SCC DATE: 1/14/16



ENGINEER

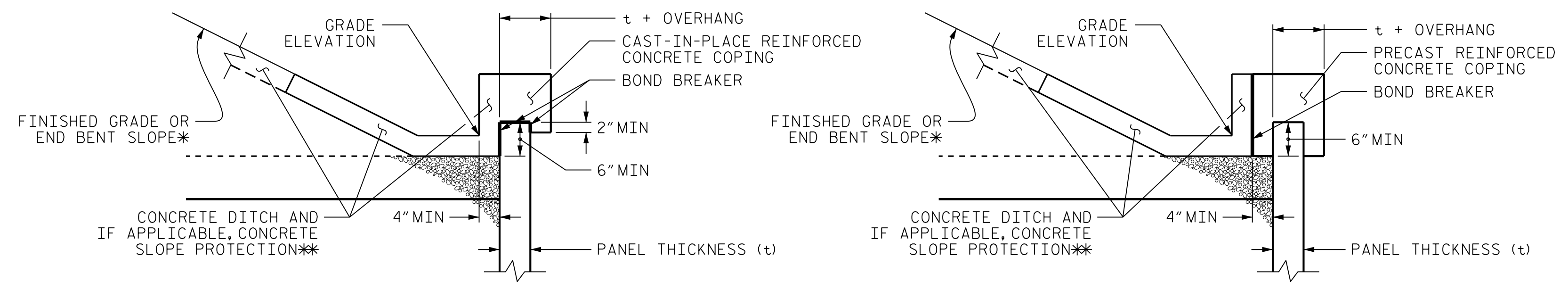
Michael H. Stephens  
1/19/2016

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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.  
 \*\*\*ALL PERMANENT SLOPES ABOVE RETAINING WALL NO.1 WILL BE CONSTRUCTED AT 2 HORIZ. TO 1 VERT. OR FLATTER SLOPE. TEMPORARY SLOPES DURING CONSTRUCTION WILL BE CONSTRUCTED AT 1.5 HORIZ. TO 1 VERT. OR FLATTER SLOPE.



**COPING DETAILS**

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

**NOTES:**

- FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.
- FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 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) H = DESIGN HEIGHT + EMBEDMENT
  - 2) DESIGN LIFE = 100 YEARS
  - 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 3,500 LB/SF
  - 4) MINIMUM REINFORCEMENT LENGTH (L) = 1.4H OR 6 FT, WHICHEVER IS LONGER
  - 5) MINIMUM EMBEDMENT DEPTH = 2 FT
  - 6) 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.

7) 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    | 115                   | 28                         | 0                  |

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

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 BRIDGE 19 END BENT NO.1 LOCATED AT STATION 20+29.92 -L- AND DETOUR BRIDGE END BENT NO.1 MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS. CONTRACTOR TO VERIFY FOUNDATION PILES FOR BRIDGE 19 AND DETOUR DO NOT INTERFERE WITH THE REINFORCEMENT FOR RETAINING WALL NO.1 PRIOR TO CONSTRUCTION OF RETAINING WALL NO.1. IF FOUNDATION PILES INTERFERE WITH THE RETAINING WALL REINFORCEMENT, THE CONTRACTOR WILL INSTALL FOUNDATION PILES FOR BRIDGE 19 AND DETOUR BRIDGE AT END BENT NO.1 PRIOR TO CONSTRUCTING RETAINING WALL NO.1.

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

"TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALL NO.1 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY, STRUCTURE, AND TRAFFIC CONTROL PLANS.

AT THE CONTRACTOR'S OPTION, "TEMPORARY SHORING FOR WALL CONSTRUCTION" MAY BE USED TO CONSTRUCT RETAINING WALL NO.1. SEE MSE RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.

PROJECT NO.: 42265.1.1 (B-5123)  
 CABARRUS COUNTY  
 STATION: 21+44.10 -L-  
 SHEET 2 OF 2

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

**GEOTECHNICAL  
ENGINEERING UNIT**

| REVISIONS |    |      |     |    |      | SHEET NO. |
|-----------|----|------|-----|----|------|-----------|
| NO.       | BY | DATE | NO. | BY | DATE |           |
| 1         | -  | -    | 3   | -  | -    | W2        |
| 2         | -  | -    | 4   | -  | -    |           |

PREPARED BY: MHS      DATE: 1/14/16  
 REVIEWED BY: SCC      DATE: 1/14/16

