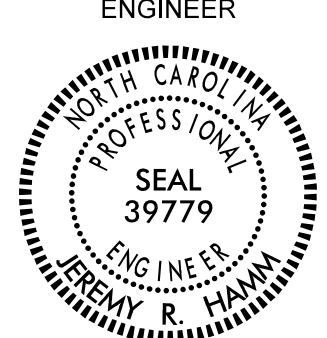




GEOTECHNICAL ENGINEER

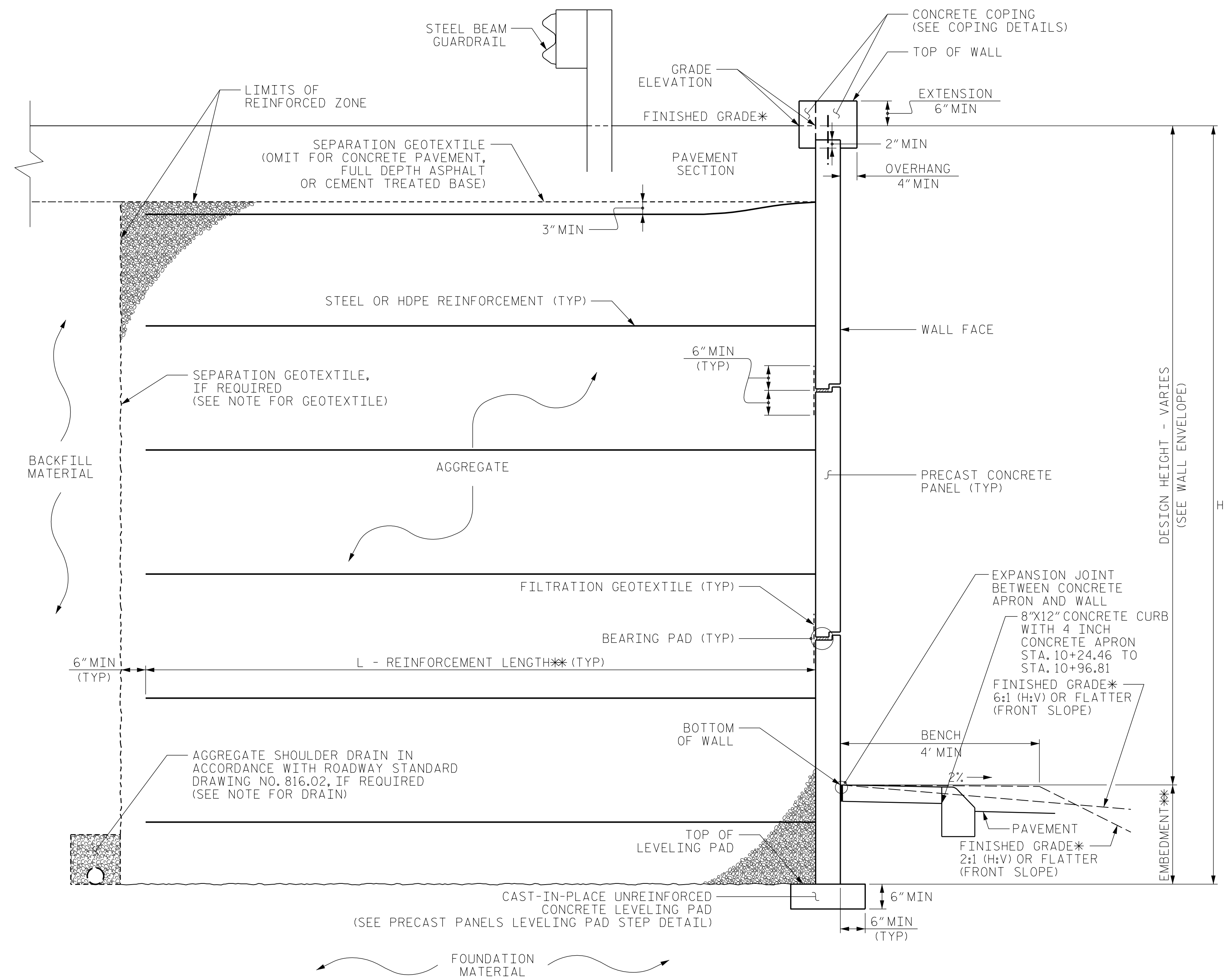


ENGINEER

DocuSigned by:  
**Jeremy R Hamm** 6/27/2019

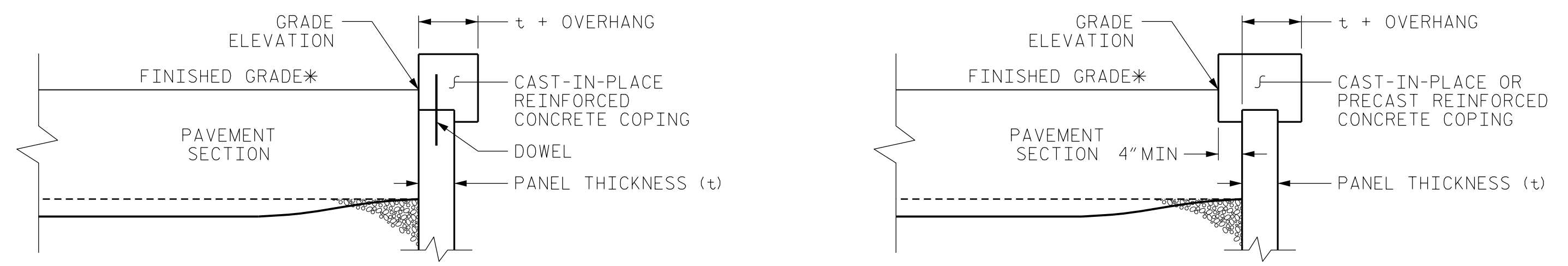
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**MSE WALL WITH PRECAST PANELS - TYPICAL SECTION**

\*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**

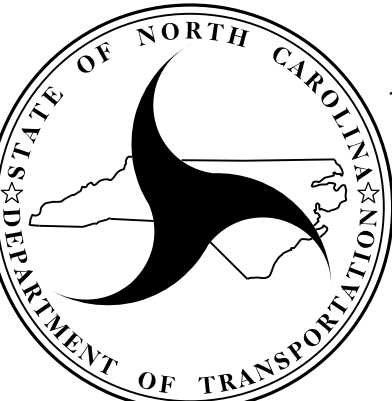
AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.  
 \*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: I-5711  
 ALAMANCE COUNTY  
 STATION: 34+82.39, 72.38' RT TO 36+04.76, 94.03' RT  
 SHEET 2 OF 3

PREPARED BY: S. C. CROCKETT      DATE: 5/22/19  
 REVIEWED BY: J. R. HAMM         DATE: 5/23/19



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



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

**GEOTECHNICAL  
 ENGINEERING UNIT**

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

SHEET NO. W-2

GEOTECHNICAL ENGINEER

ENGINEER

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DocuSigned by:  
**Jeremy R Hamm** 6/27/2019

DATE SIGNATURE DATE

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**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.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 1.

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 = 3300 PSF
  - 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H
  - 5) MINIMUM EMBEDMENT DEPTH = 2 FT
  - 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT ( $\gamma$ ) PCF	FRICTION ANGLE ( $\phi$ ) 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:

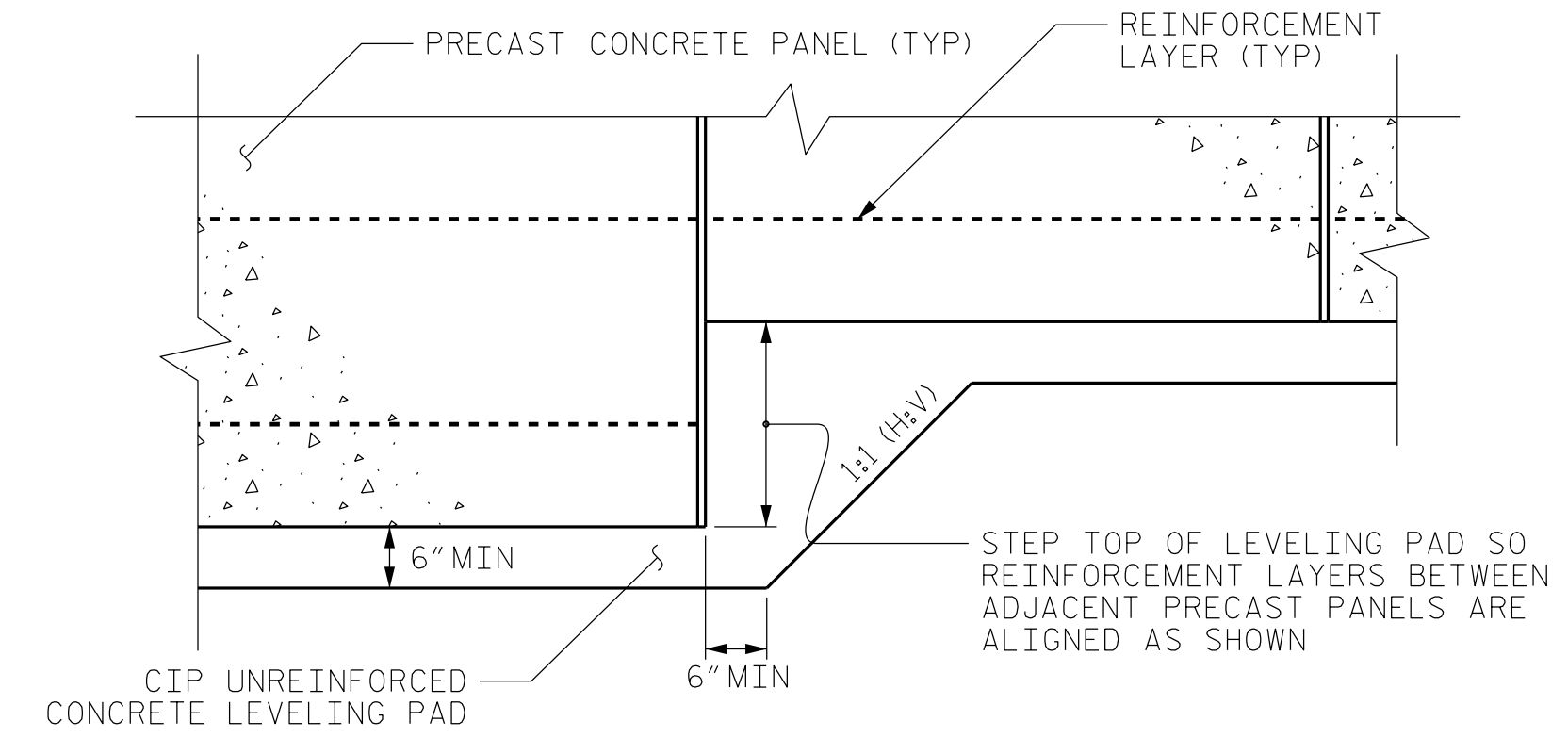
MATERIAL TYPE	UNIT WEIGHT ( $\gamma$ ) PCF	FRICTION ANGLE ( $\phi$ ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	115	26	0

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.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 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. 1. SEE MSE RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.



PRECAST PANELS  
LEVELING PAD STEP DETAIL

PROJECT NO.: I-5711  
 ALAMANCE COUNTY  
 STATION: 34+82.39, 72.38' RT TO 36+04.76, 94.03' RT  
 SHEET 3 OF 3

PREPARED BY: S. C. CROCKETT	DATE: 5/22/19
REVIEWED BY: J. R. HAMM	DATE: 5/23/19

**FALCON ENGINEERING, INC.**  
 1210 TRINITY ROAD, SUITE 110  
 RALEIGH, NC 27607  
 PHONE: 919.871.0800  
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**NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS**  
  
**GEOTECHNICAL  
 ENGINEERING UNIT**

**RETAINING WALL NO. 1  
MSE WALL  
NOTES AND PRECAST PANELS  
LEVELING PAD STEP DETAILS**

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

SHEET NO. W-3

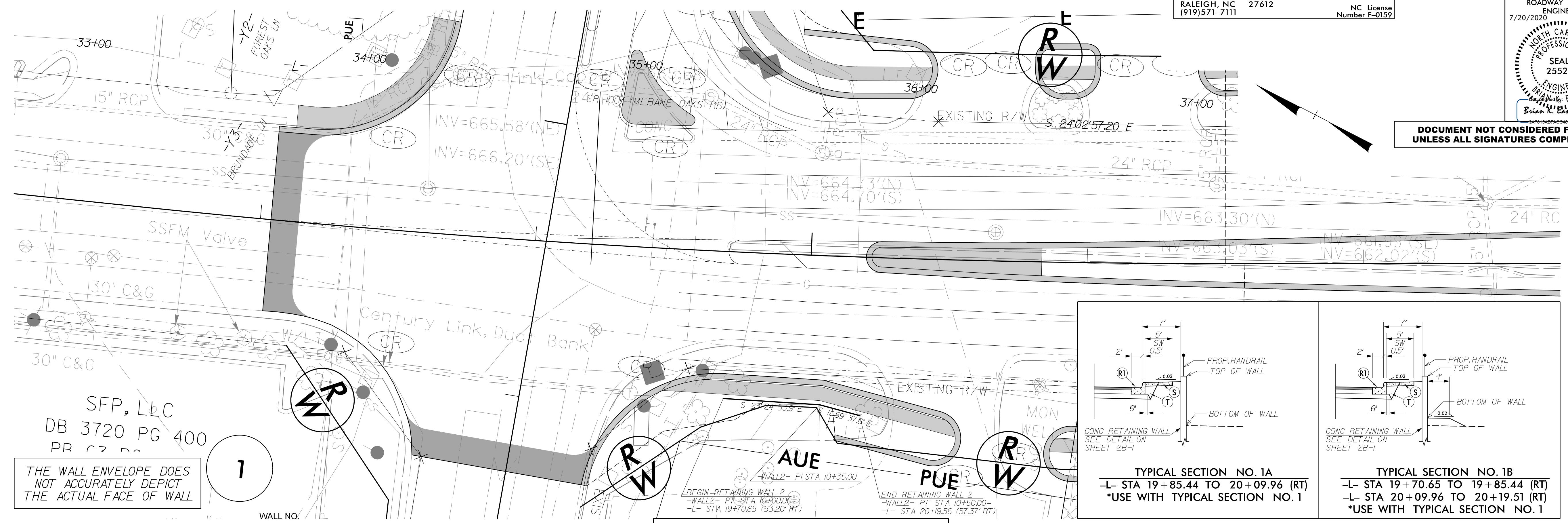
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**LOCHNER**  
 H. W. LOCHNER, INC.  
 2840 PLAZA PLACE, SUITE 202  
 RALEIGH, NC 27612  
 (919)571-7111

NC License  
 Number F-0159

PROJECT REFERENCE NO. 1-5711	SHEET NO. W-4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 7/20/2020	

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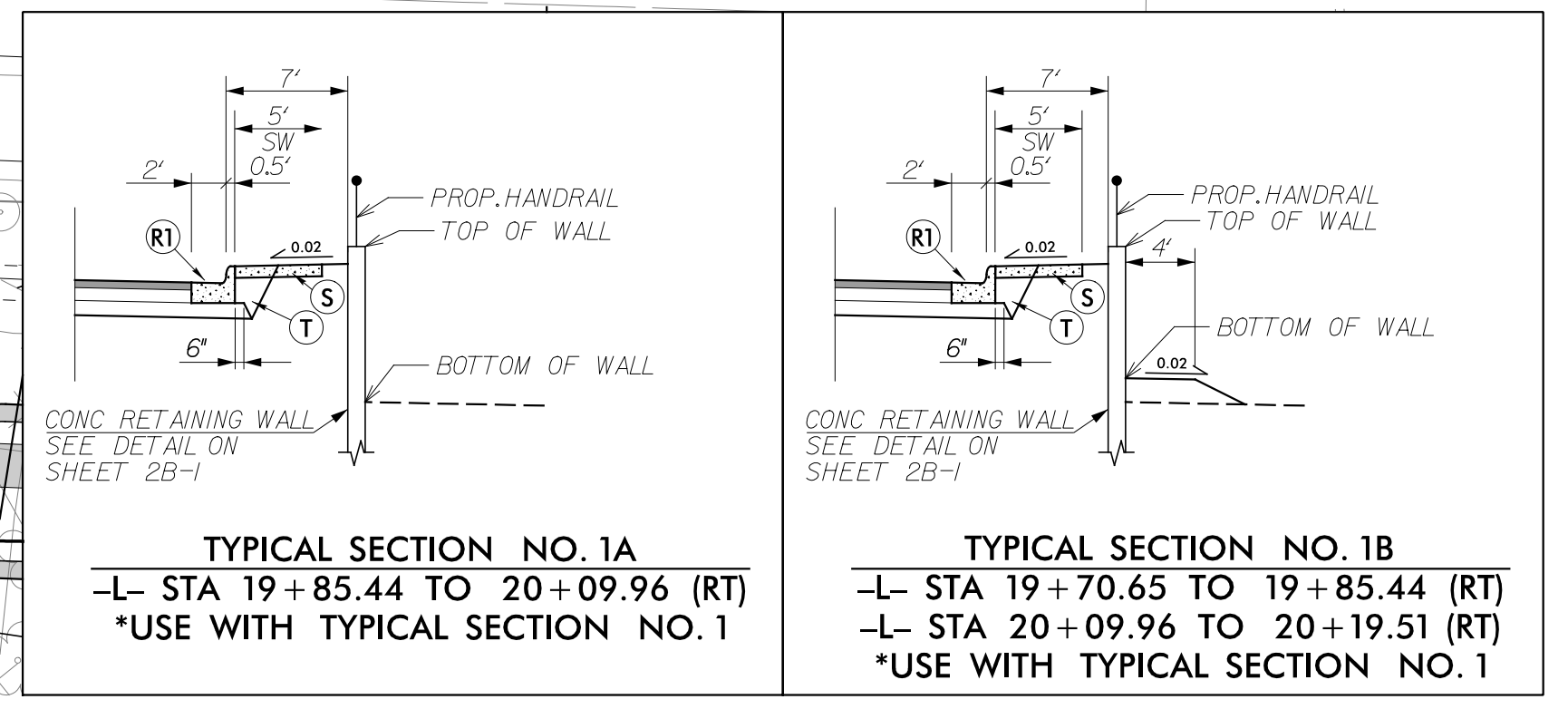
SFP, LLC  
 DB 3720 PG 400  
 PR 07 00

THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF WALL

1

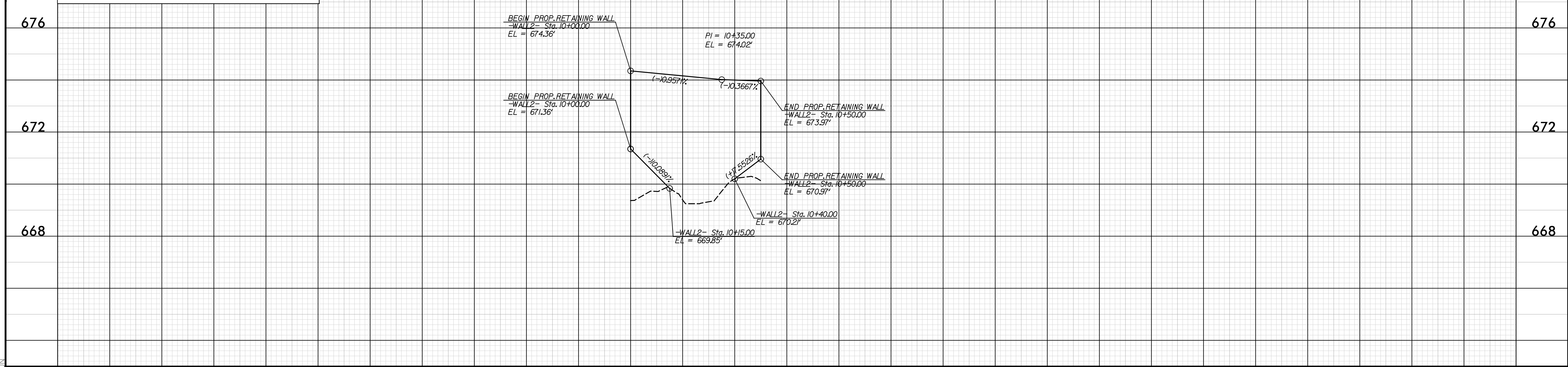
WALL NO.

**WALL 2 ENVELOPE**



**WALL 2 QUANTITIES**

WALL No.	BEGIN STA. (Offset)	END STA. (Offset)	RETAINING WALL TYPE	ESTIMATE AREA (SF)
2	-L- 19+70.65 (53.20' RT)	-L- 20+19.56 (57.37' RT)	STANDARD CIP GRAVITY RETAINING WALL	325



10

11

7-20-2020  
 1-5711-0000\_DET\_W-4.dgn  
 EASON

GEOTECHNICAL ENGINEER

ENGINEER

Seal No. 036278  
MAJID KHAZAEI  
ENGINEER

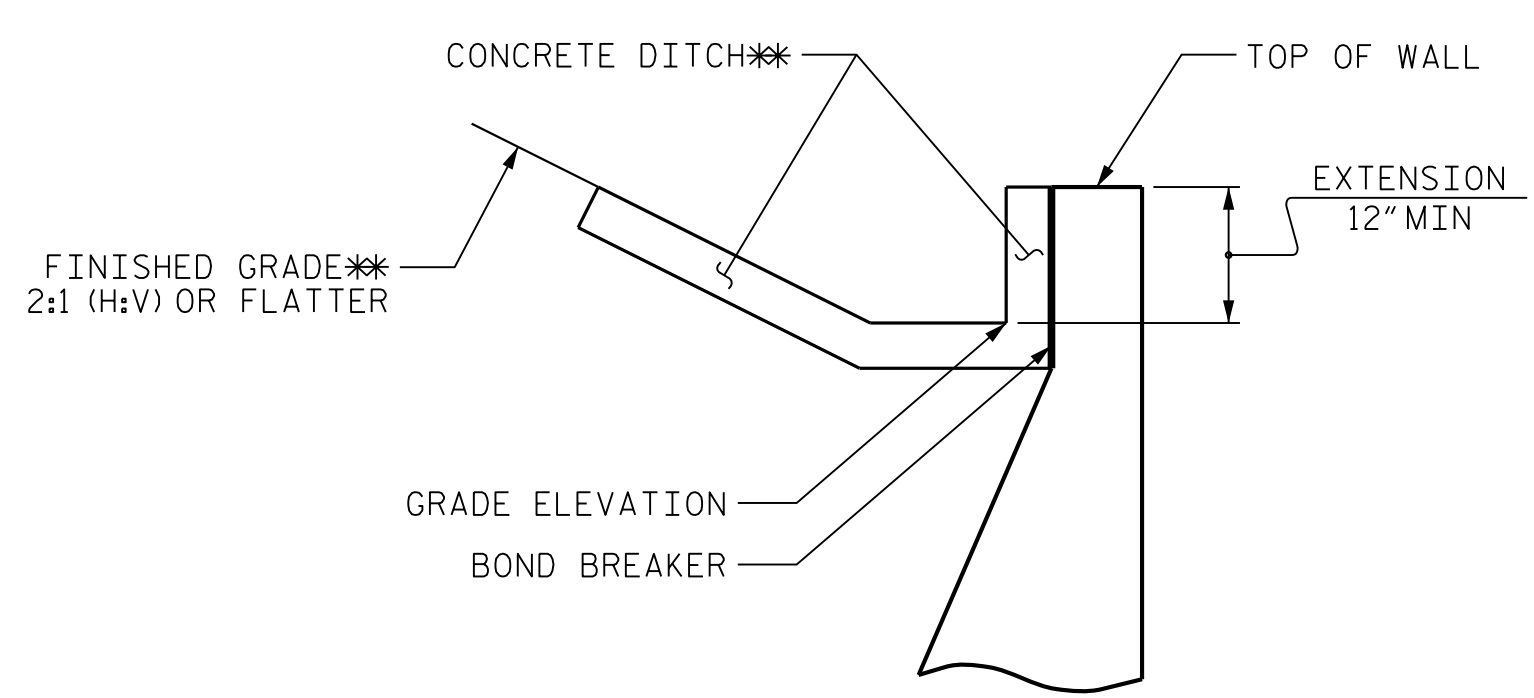
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6/29/2020  
DATE

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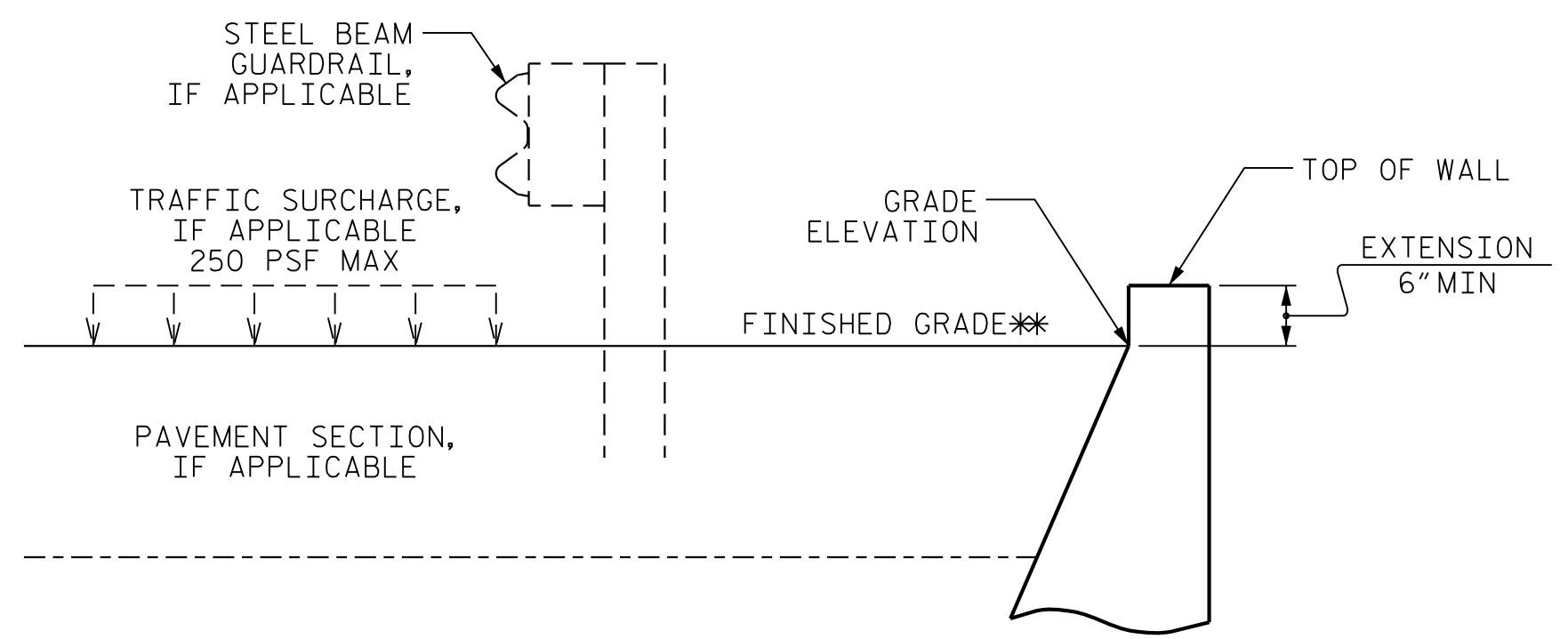
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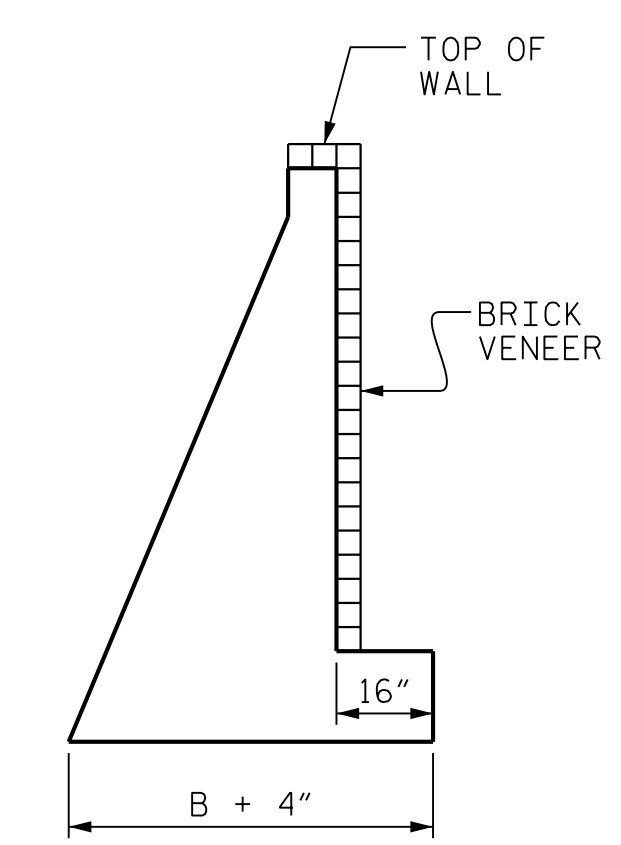
**SLOPE CASE**

\*\*SEE ROADWAY PLANS FOR CONCRETE DITCH AND FINISHED GRADE DETAILS.



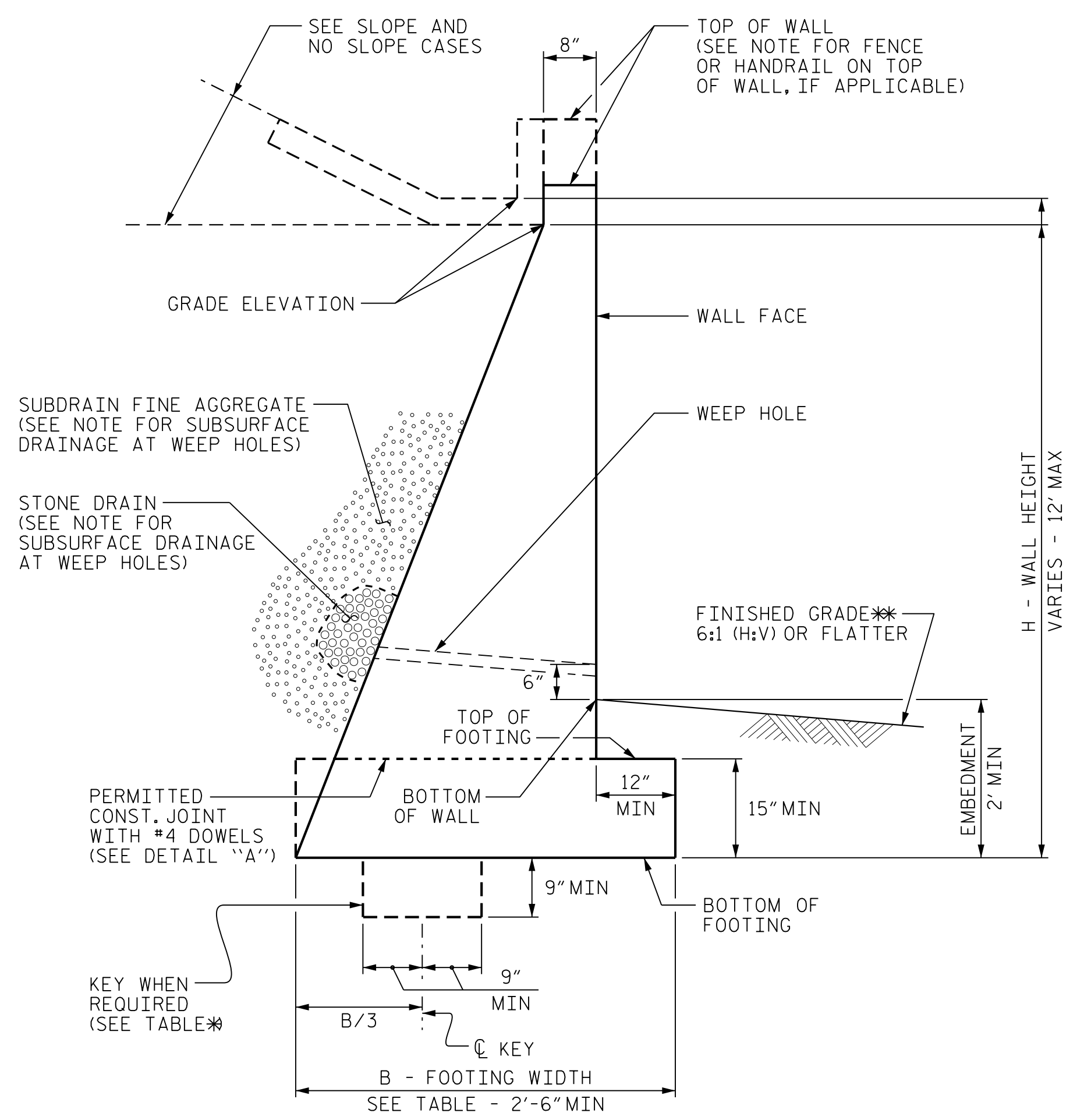
**NO SLOPE CASE**

\*\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



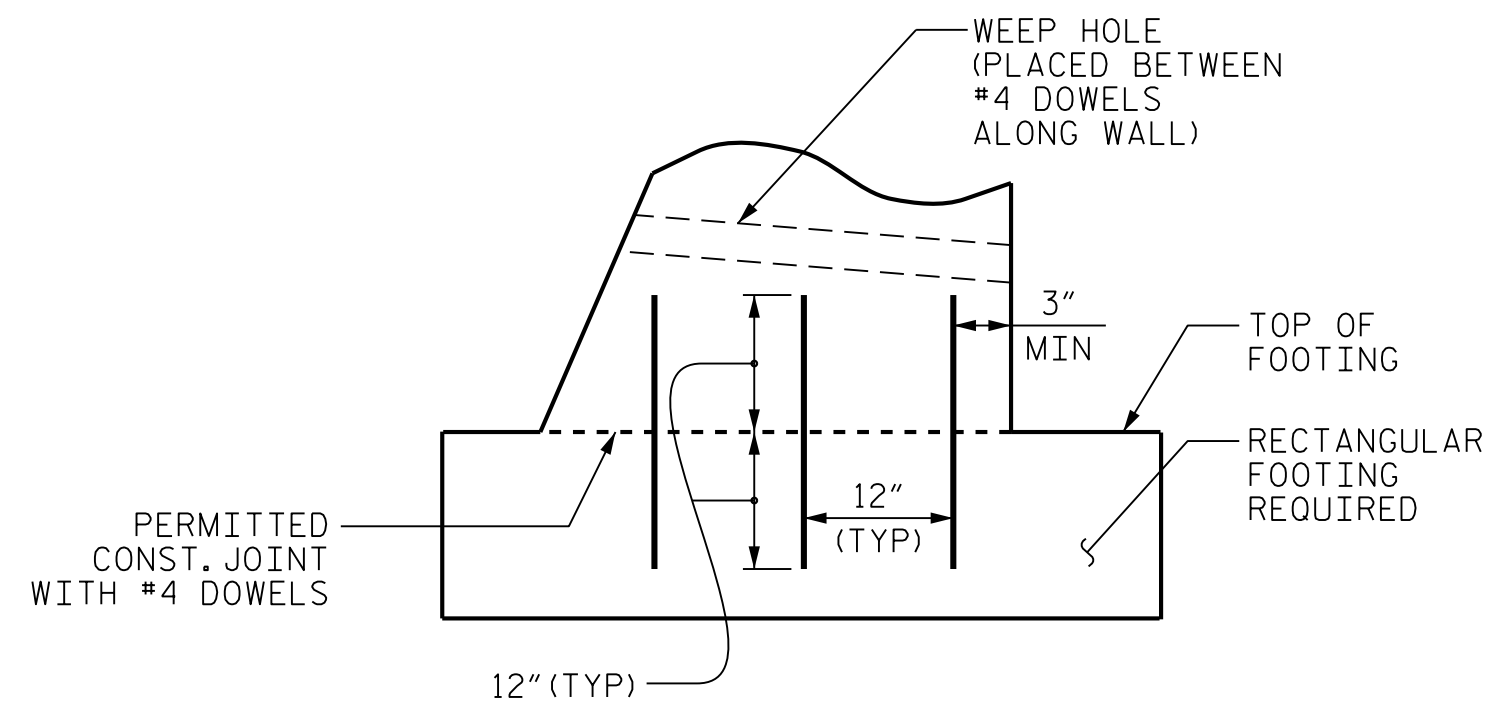
**BRICK VENEER DETAIL**

(WHEN APPLICABLE)



**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.

**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 FENCES OR HANDRAILS ON TOP OF WALLS, SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.
- FOR SUBSURFACE DRAINAGE AT WEAP 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,  $\gamma = 120$  PCF  
FRICTION ANGLE,  $\phi = 35$  DEGREES (GROUNDWATER WITHIN 7' OF BOTTOM OF FOOTING)  
FRICTION ANGLE,  $\phi = 30$  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.
- 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.

PROJECT NO.: 50401.3.GV1 (I-5711)  
ALAMANCE COUNTY  
STATION: -L- STA.19+70.65 (53.20' RT)  
SHEET 1 OF 1 TO STA.20+19.56 (57.37' RT)

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

**GEOTECHNICAL  
ENGINEERING UNIT**

**STANDARD DETAIL NO. 453.01**

**STANDARD  
CAST-IN-PLACE (CIP)  
GRAVITY RETAINING WALL  
(RETAINING WALL NO. 2)**

SHEET NO. W-5  
DATE: 1-16-18