

CONTRACT: C202849 TIP NO: U-2507A

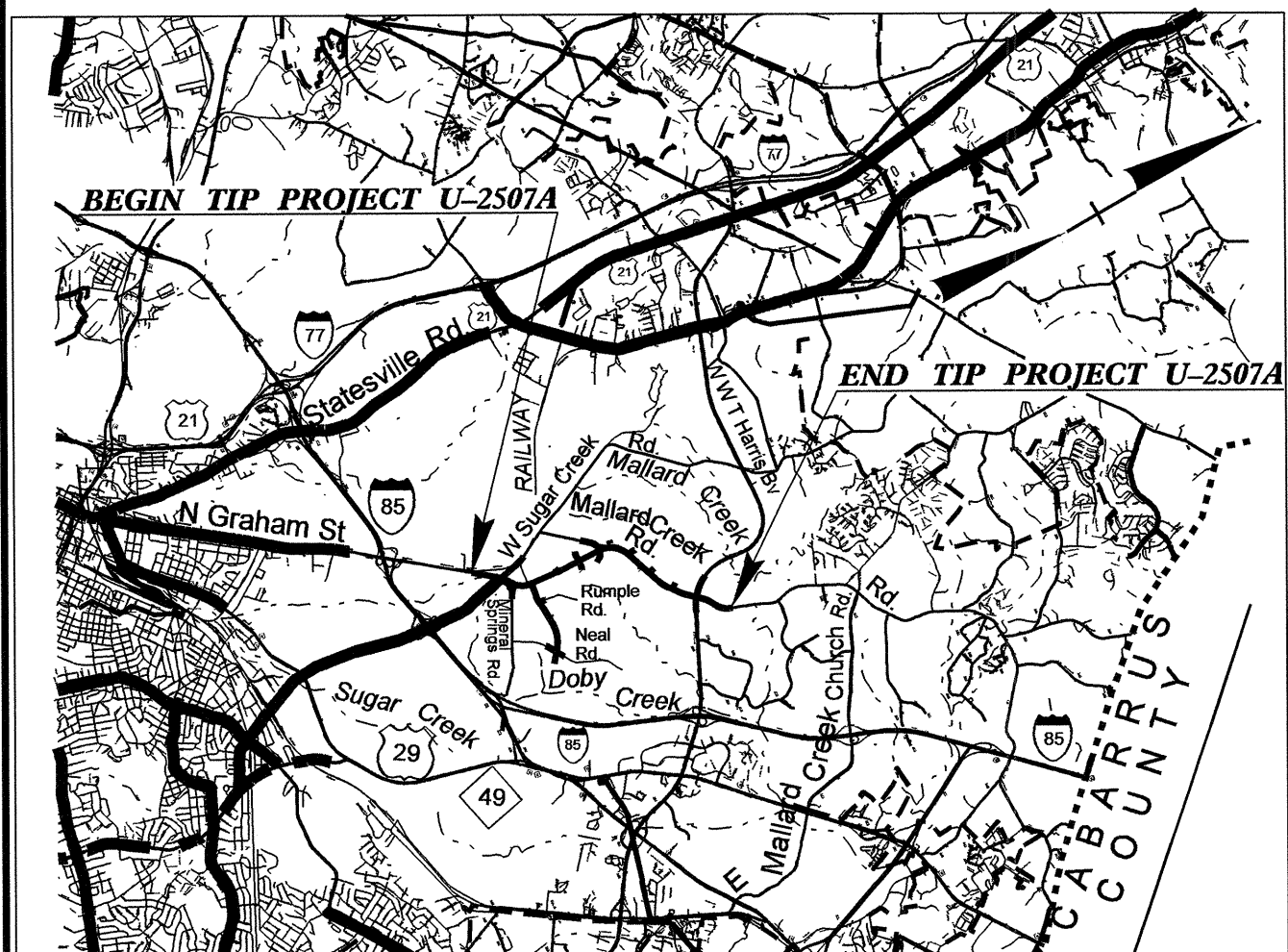
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2507A		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34811.1.1	STP-5238(2)	PE	
34811.2.3	STPDA-5238(4)	RW, UTIL.	
34811.3.FDS	STPDA-5238(5)	CONST.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

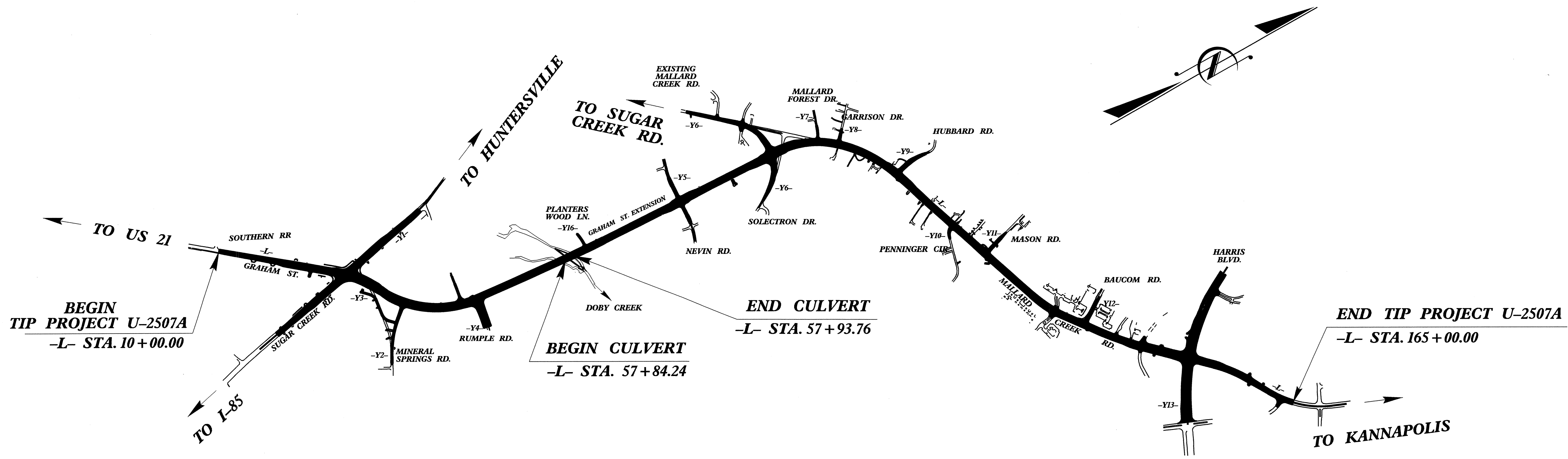
MECKLENBURG COUNTY

LOCATION: CHARLOTTE - SR 2467 (MALLARD CREEK ROAD)
FROM SR 2480 (SUGAR CREEK ROAD) TO
SR 2665 (HARRIS BOULEVARD)

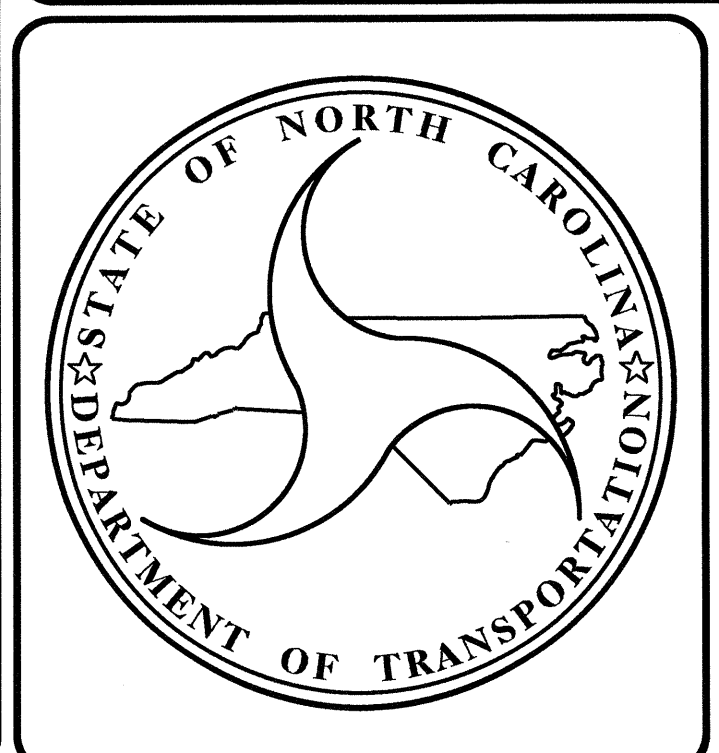
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERT AND SIGNALS



VICINITY MAP



CULVERT



DESIGN DATA

ADT 2012 =	34,150
ADT 2030 =	45,600
DHV =	10 %
D =	55 %
T =	7 % *
V =	50 MPH
* TTST 2 %	DUAL 5 %

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-2507A = 2.94 MILES

Prepared In the Office of:

DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

LETTING DATE :
NOVEMBER 19, 2013

B.C. HUNT, PE
PROJECT ENGINEER

V.A. PATEL, PE
PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

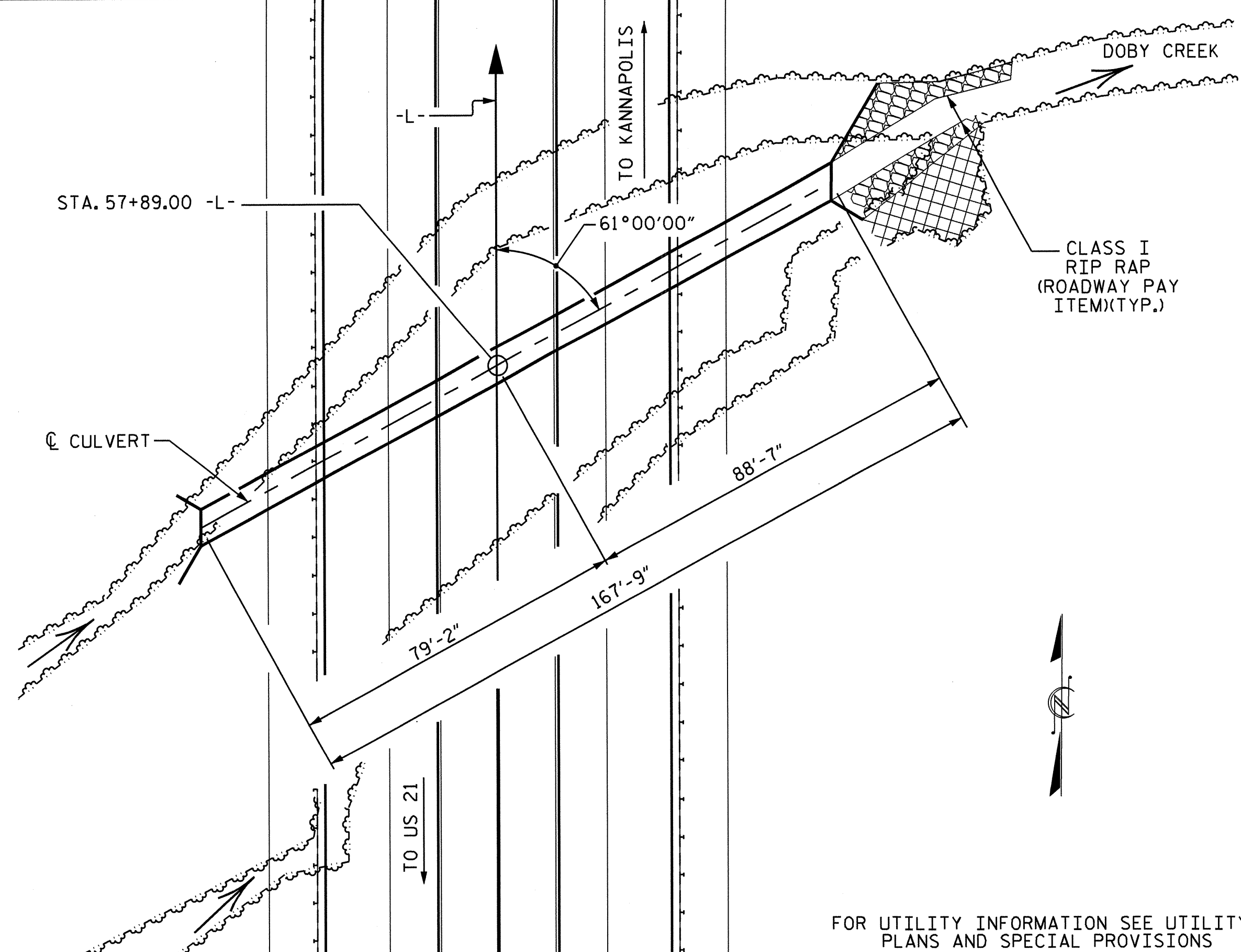
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER

**DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION**

APPROVED
DIVISION ADMINISTRATOR

P.E.
DATE



LOCATION SKETCH

ROADWAY DATA

GRADE POINT ELEV. @ STA. 57+89.00 -L-	= 770.63
BED ELEV. @ STA. 57+89.00 -L-	= 752.80
ROADWAY SLOPES @ STA. 57+89.00 -L-	= 2:1

HYDRAULIC DATA

DESIGN DISCHARGE	= 330 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YEARS
DESIGN HIGH WATER ELEVATION	= 761.50
DRAINAGE AREA	= 0.16 SQ. MI.
BASE DISCHARGE (Q100)	= 370 C.F.S.
BASE HIGH WATER ELEVATION	= 762.10

OVERTOPPING FLOOD DATA

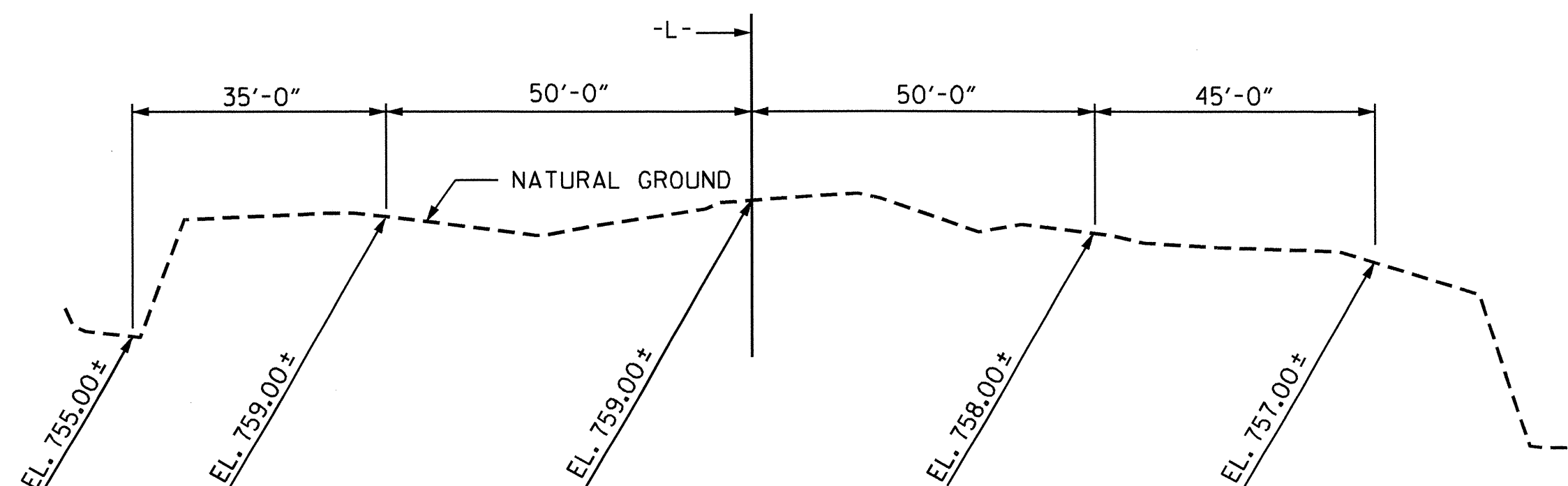
OVERTOPPING DISCHARGE	= 900 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEARS
OVERTOPPING FLOOD ELEVATION	= 768.20

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
BARREL @ 0.811 C.Y. / FT.	= 136.0 C.Y.
WINGS ETC.	= 26.0 C.Y.
TOTAL	= 162.0 C.Y.
REINFORCING STEEL	
BARREL	= 15,363 LBS.
WINGS ETC.	= 1,661 LBS.
TOTAL	= 17,024 LBS.
CULVERT EXCAVATION, STA. 57+89.00 -L-	LUMP SUM
FOUNDATION COND. MATERIAL, BOX CULVERT	= 146 TONS

NOTES

- ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 9.98 FT
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.



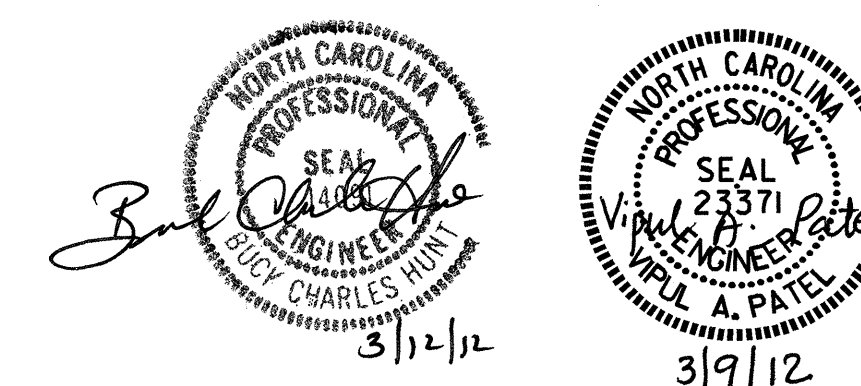
PROFILE ALONG CULVERT

PROJECT NO. U-2507A
MECKLENBURG COUNTY
 STATION: 57+89.00 -L-

SHEET 1 OF 4

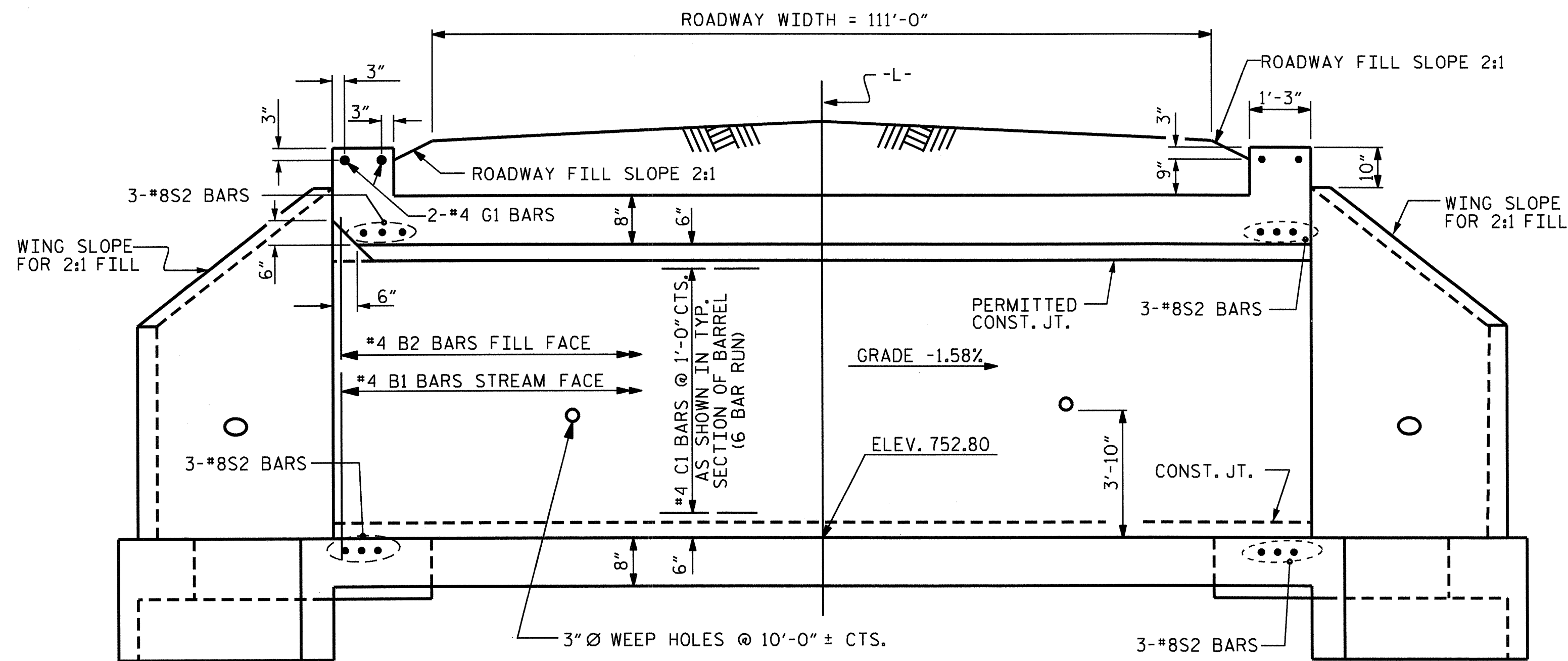
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 7 FT. X 8 FT.
 CONCRETE BOX CULVERT
 61° SKEW

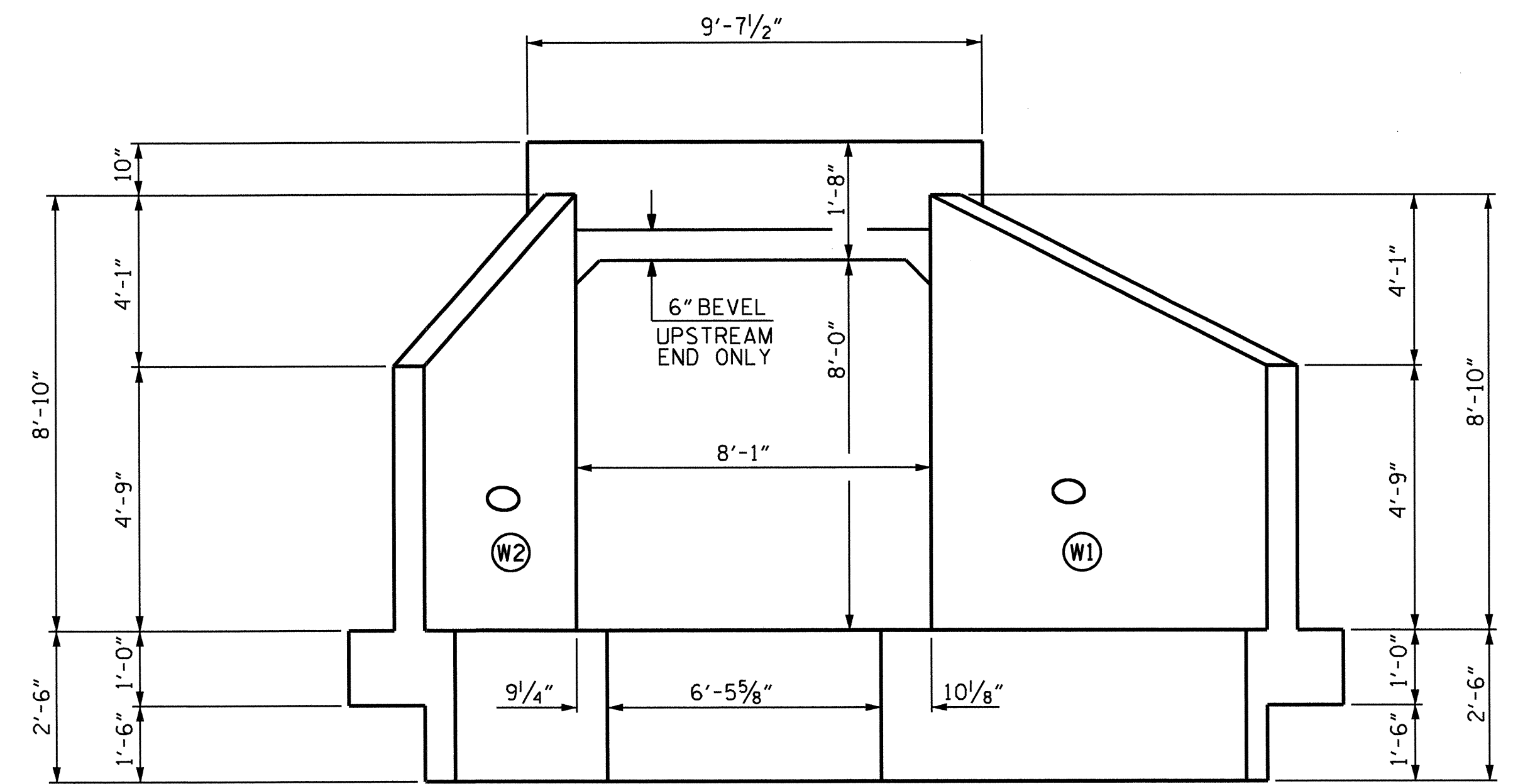


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			4

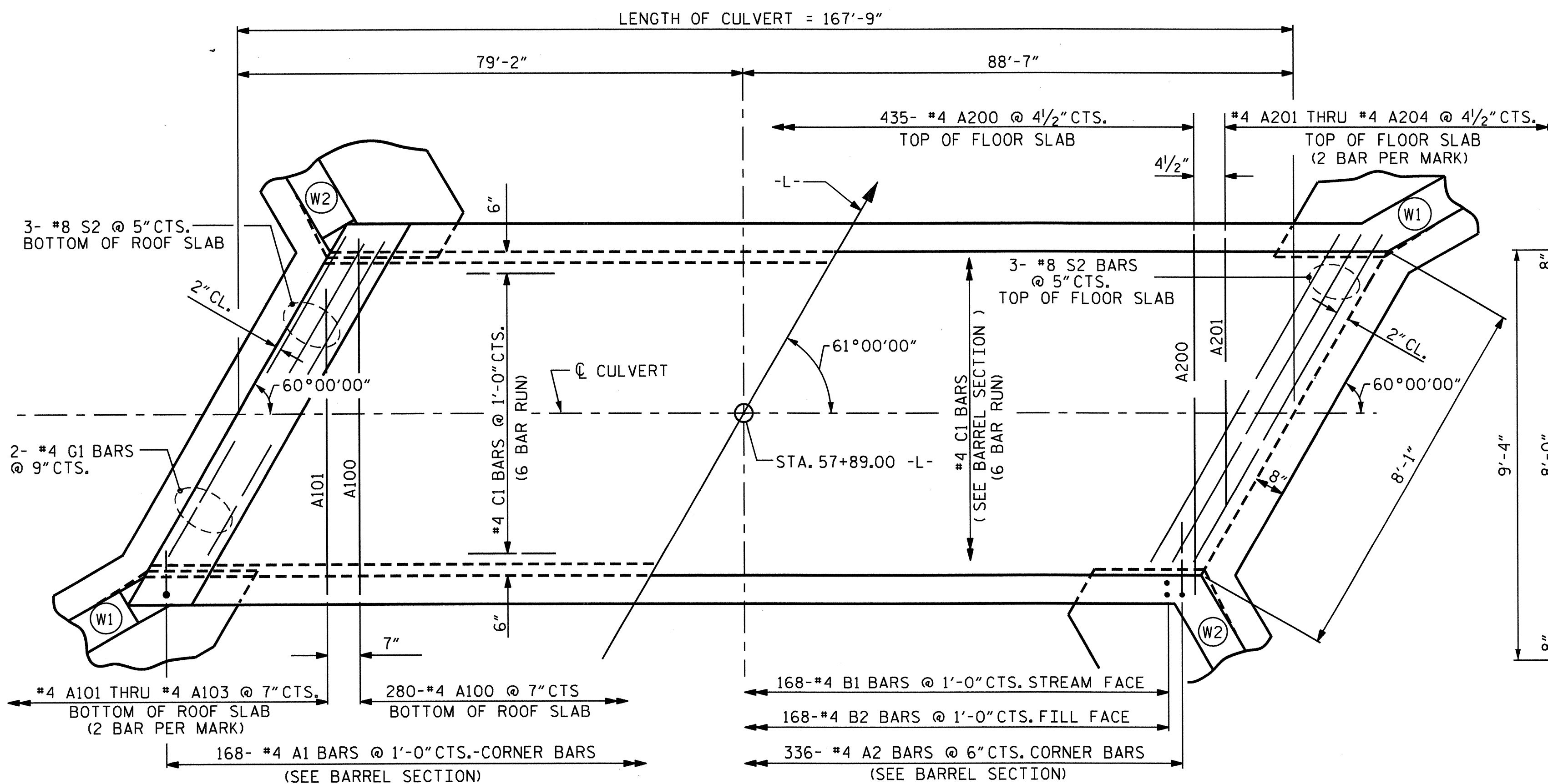
DRAWN BY : H.T. DIEU DATE : 2/21/12
 CHECKED BY : J.G. KHARVA DATE : 2/23/12



CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION NORMAL TO SKEW

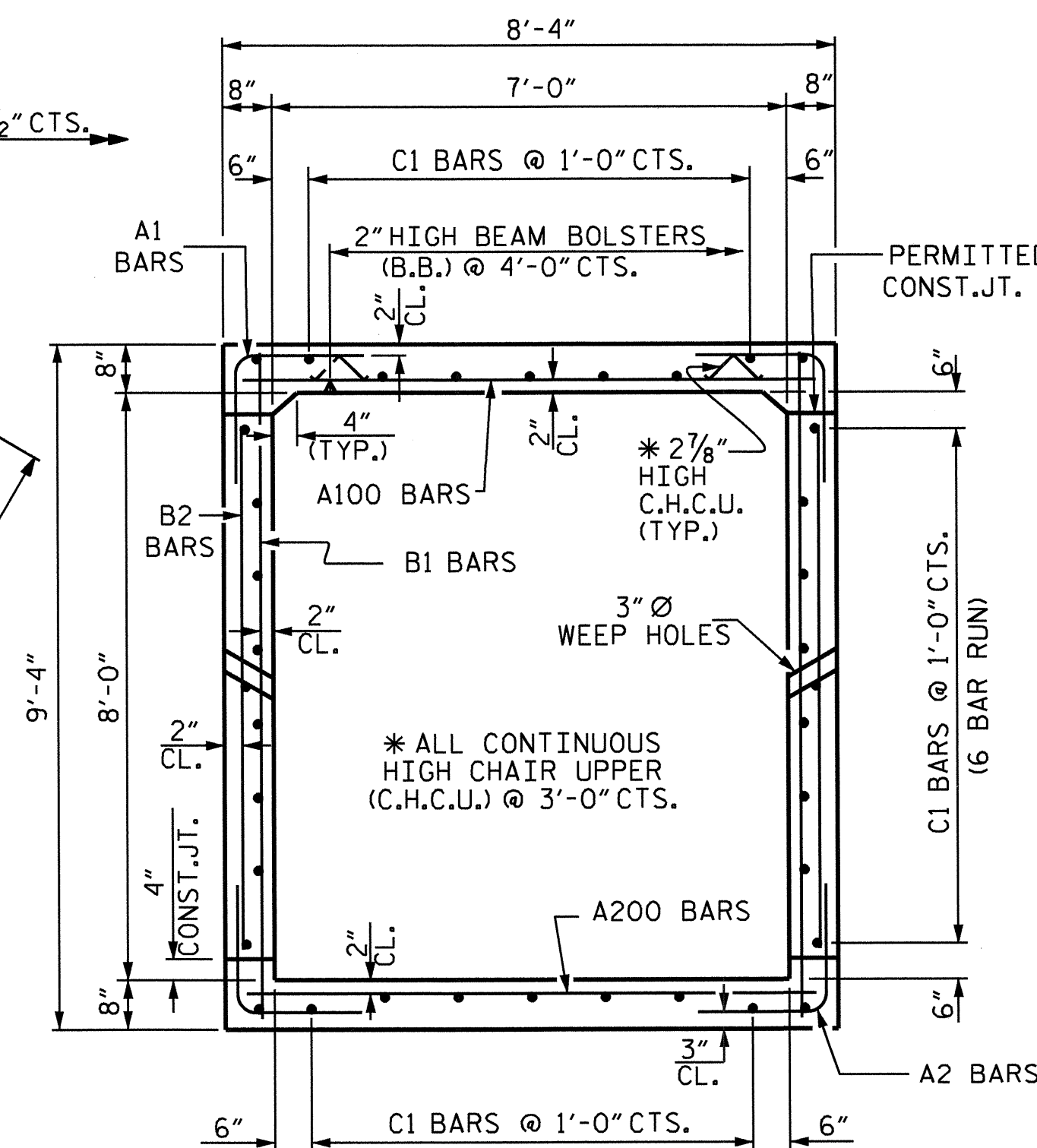


PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

SPLICE LENGTH CHART

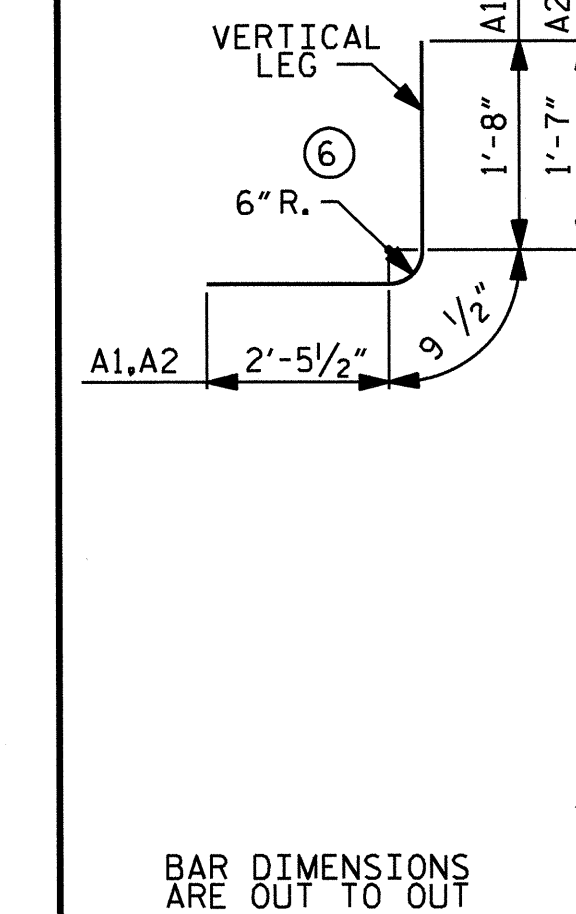
BAR	SIZE	SPLICE LENGTH
C1	#4	1'-11"
B1	#4	1'-9"



RIGHT ANGLE SECTION OF BARREL

THERE ARE 36 C1 BARS IN SECTION OF BARREL

BAR TYPE		BILL OF MATERIAL				
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
A100	280	#4	STR	7'-11"	1481	
A101	4	#4	STR	5'-9"	15	
A102	4	#4	STR	3'-9"	10	
A103	4	#4	STR	1'-10"	5	
A200	435	#4	STR	7'-11"	2300	
A201	4	#4	STR	6'-7"	18	
A202	4	#4	STR	5'-3"	14	
A203	4	#4	STR	4'-0"	11	
A204	4	#4	STR	2'-8"	7	
A1	336	#4	6	4'-11"	1104	
A2	672	#4	6	4'-10"	2170	
B1	336	#4	STR	8'-10"	1983	
B2	336	#4	STR	7'-4"	1646	
C1	216	#4	STR	29'-8"	4281	
G1	4	#4	STR	9'-2"	24	
S2	12	#8	STR	9'-2"	294	
TOTAL REINFORCING STEEL					15363	LBS.



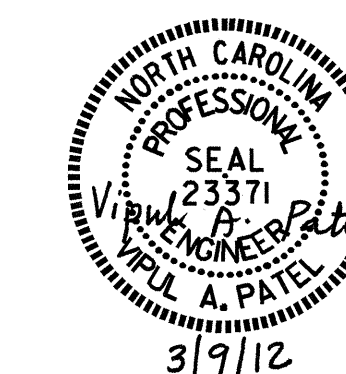
BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. U-2507A
MECKLENBURG COUNTY
 STATION: 57+89.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 7 FT. X 8 FT.
 CONCRETE BOX CULVERT
 61° SKEW



DRAWN BY : H.T. DIEU DATE : 2/20/12
 CHECKED BY : K.G. KHARVA DATE : 2/23/12

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			4

**LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS**

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										COMMENT NUMBER
						MOMENT					SHEAR					
						LIVE-LOAD FACTORS (LL)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.04	-	1.75	1.04	1	TOP SLAB	3.83	1.52	1	BOTTOM SALB	0.81		
	HL-93 (OPERATING)	N/A		1.34	--	1.35	1.34	1	TOP SLAB	3.83	1.97	1	BOTTOM SALB	0.81		
	HS-20 (INVENTORY)	36.000	②	1.49	53.78	1.75	1.49	1	TOP SLAB	3.83	1.92	1	BOTTOM SALB	0.81		
	HS-20 (OPERATING)	36.000		1.94	69.72	1.35	1.94	1	TOP SLAB	3.83	2.49	1	BOTTOM SALB	0.81		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.70	36.49	1.40	2.70	1	TOP SLAB	3.83	3.47	1	BOTTOM SALB	0.81	
		SNGARBS2	20.000		2.53	50.69	1.40	2.53	1	TOP SLAB	3.83	3.27	1	BOTTOM SALB	0.81	
		SNAGRIS2	22.000		2.70	59.47	1.40	2.70	1	TOP SLAB	3.83	3.47	1	BOTTOM SALB	0.81	
		SNCOTTS3	27.250	③	1.30	35.32	1.40	1.30	1	TOP SLAB	3.83	1.90	1	BOTTOM SALB	0.81	
		SNAGGRS4	34.925		1.70	59.36	1.40	1.70	1	TOP SLAB	3.83	2.52	1	BOTTOM SALB	0.81	
		SNS5A	35.550		1.54	54.84	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	
		SNS6A	39.950		1.54	61.63	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	
		SNS7B	42.000		1.54	64.79	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		2.70	89.21	1.40	2.70	1	TOP SLAB	3.83	3.47	1	BOTTOM SALB	0.81	
		TNT4A	33.075		1.54	51.02	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	
		TNT6A	41.600		1.54	64.17	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	
		TNT7A	42.000		1.54	64.79	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	
		TNT7B	42.000		1.54	64.79	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	
		TNAGRIT4	43.000		1.47	63.24	1.40	1.47	1	TOP SLAB	3.83	2.17	1	BOTTOM SALB	0.81	
		TNAGT5A	45.000		1.50	67.58	1.40	1.50	1	TOP SLAB	3.83	2.21	1	BOTTOM SALB	0.81	
		TNAGT5B	45.000		1.54	69.42	1.40	1.54	1	TOP SLAB	3.83	2.28	1	BOTTOM SALB	0.81	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS		
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	0.00
WA	1.00	0.00

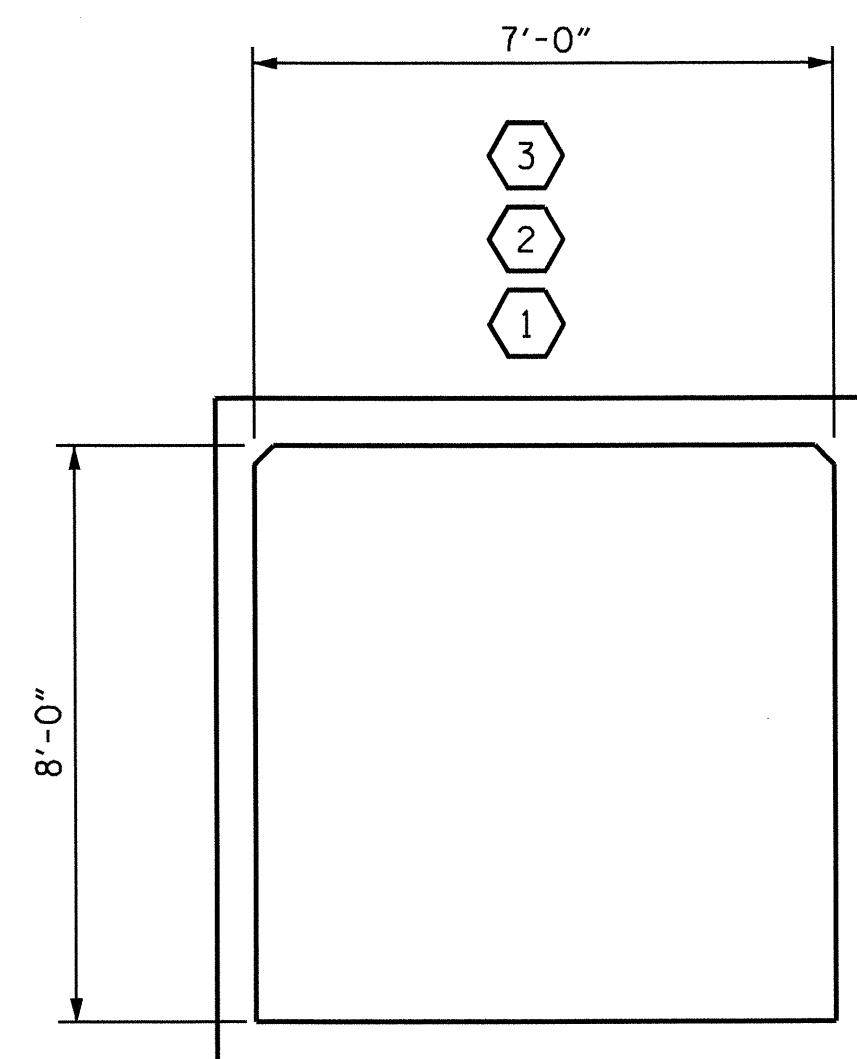
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

⊕	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY

(LOOKING DOWNSTREAM)

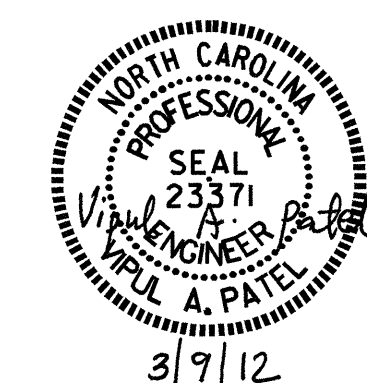
ASSEMBLED BY : R.L. CHESSON	DATE : 02/2012
CHECKED BY : H.T. DIEU	DATE : 02/2012
DRAWN BY : WMC 7/11	REV. 10/11/11
CHECKED BY : GM 7/11	MAA/GM

08-MAR-2012 08:30
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PROJECT NO. U-2507A
MECKLENBURG COUNTY
STATION: 57+89.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)



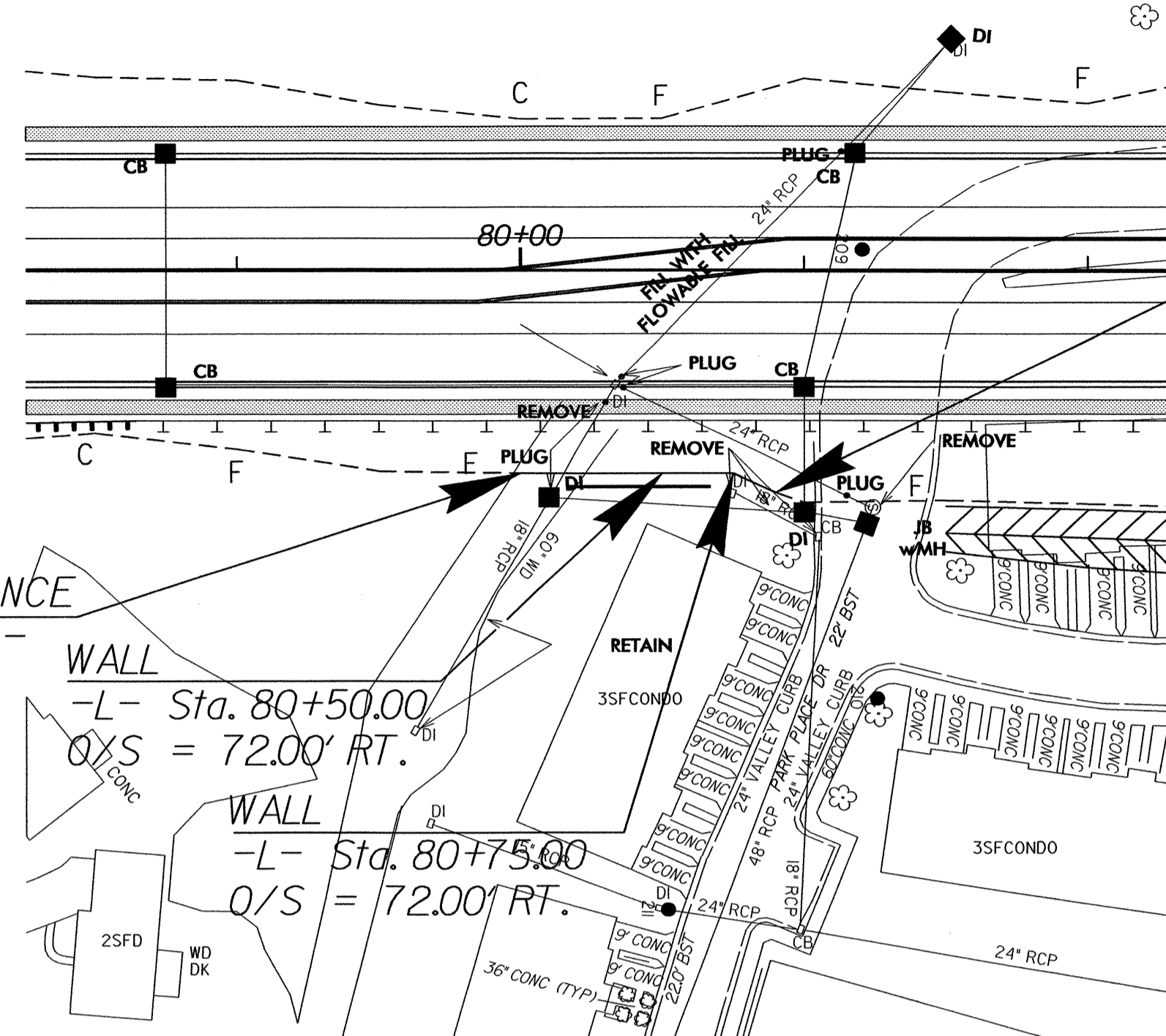
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS
2			4			4

STD. NO. LRFR5

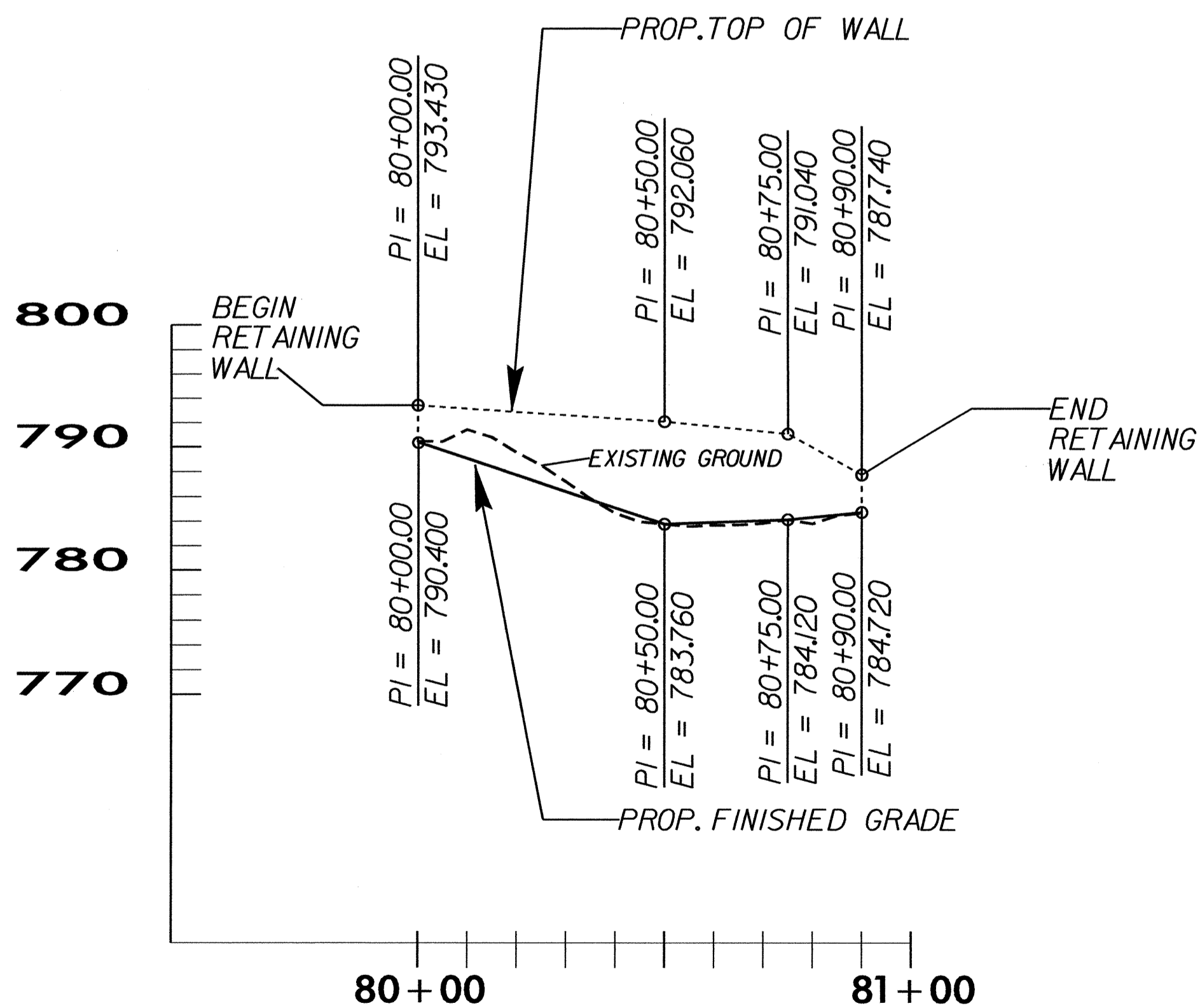
BM - 8 RR SPIKE IN BASE OF 17" OAK STA. 82+32.00 -L- 70.00' RT.
 EL. = 787.11' N 571267 E 1464873

NAD 83/95

-WALL 1-



LOCATION SKETCH



GEOTECHNICAL ENGINEER

ENGINEER

SEAL 29869

ENGINEER

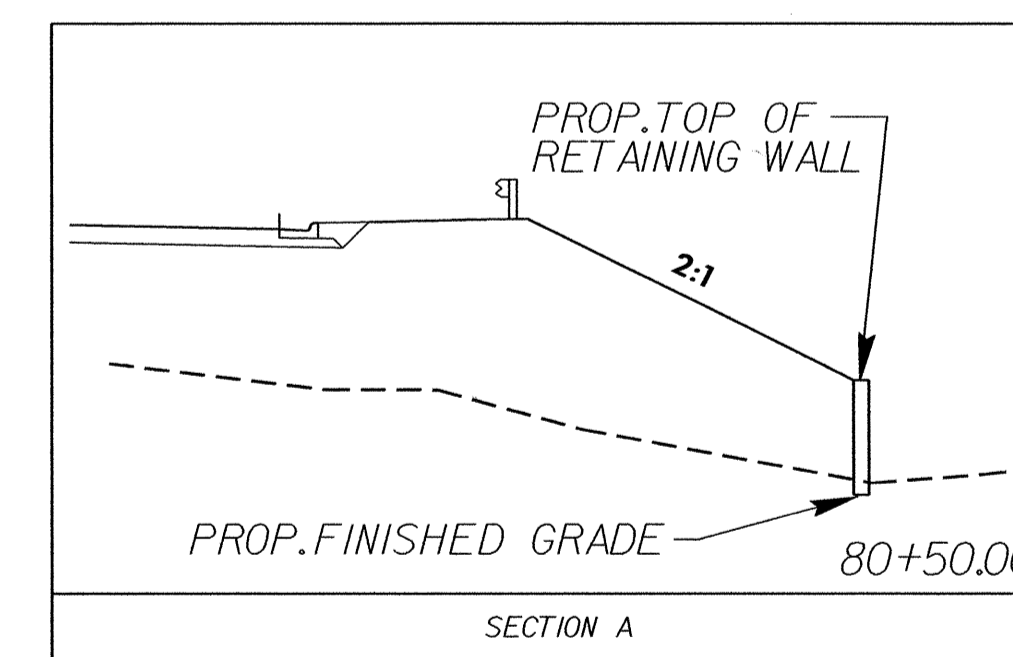
SHANE C. CLARK

7/17/12

-L- STA	OFFSET FROM CL (RIGHT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
80+00.00	72.00	793.430	790.400	3.03	2.53
80+50.00	72.00	792.060	783.760	8.30	7.80
80+75.00	72.00	791.040	784.120	6.92	6.42
80+90.00	78.50	787.740	784.720	3.02	2.52

* 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

MSE RETAINING WALL NO. 1	550 SF
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PROJECT NO.: U-2507A
 MECKLENBURG COUNTY
 STATION: 80+00.00 to 80+90.00 -L-
 SHEET 1 OF 3

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

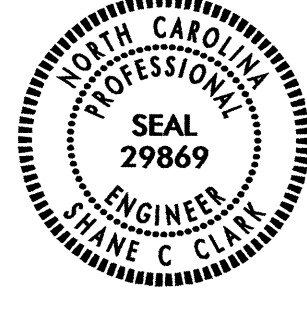
MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL NO. 1

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1			3			W-1
2			4			TOTAL SHEETS 5

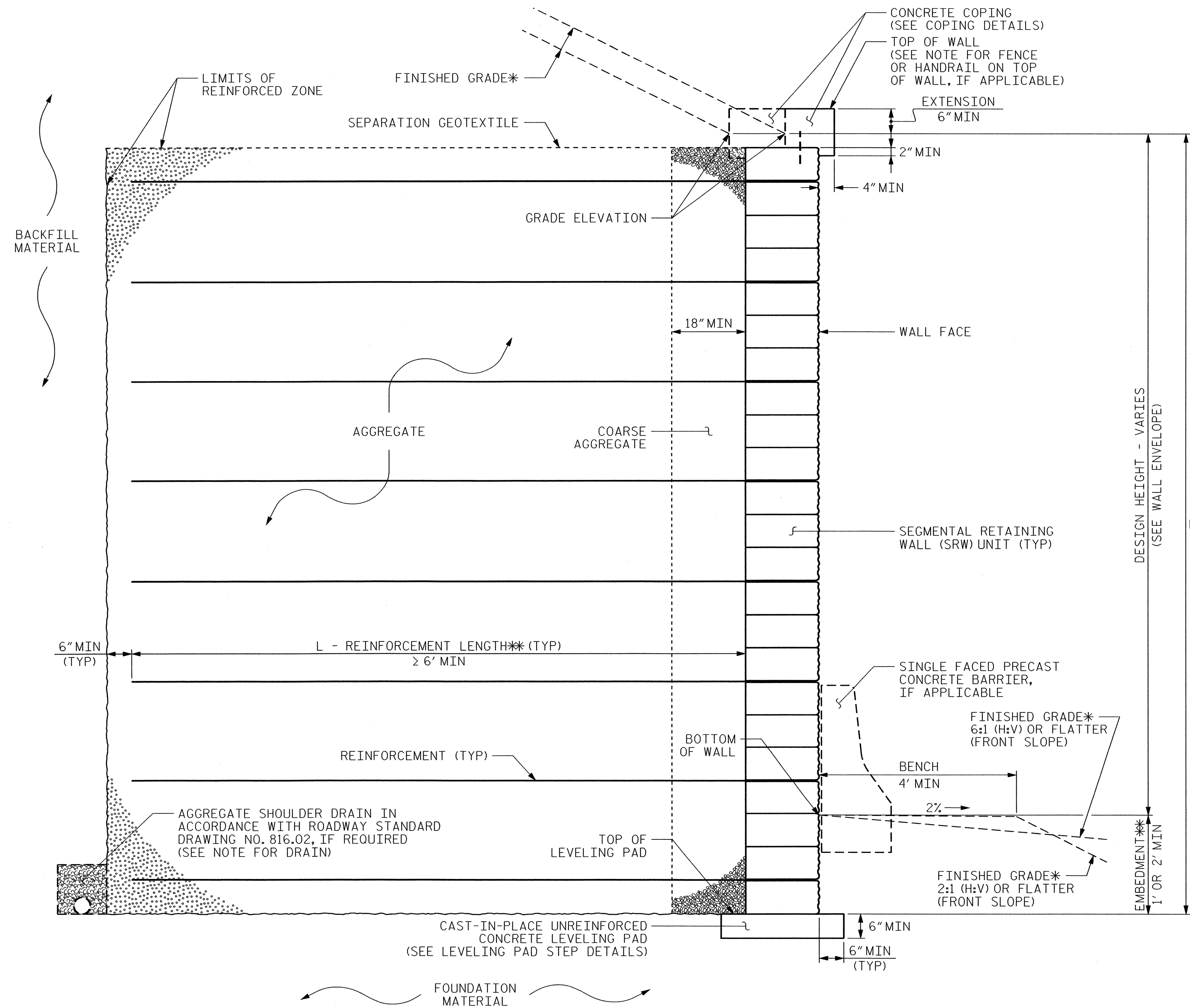
PREPARED BY: J.T.W. DATE: 5.13
 REVIEWED BY: S.C.C. DATE: 7.13

GEOTECHNICAL ENGINEER

ENGINEER

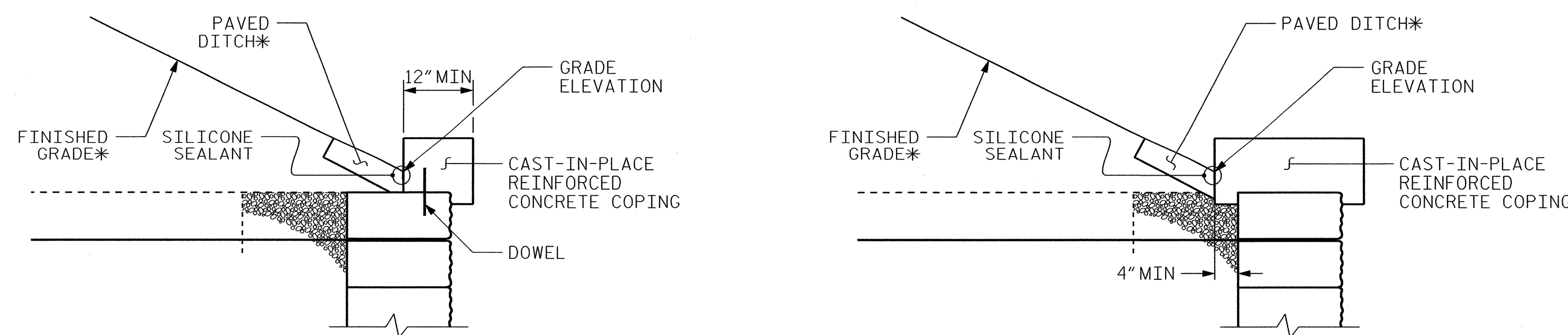


E. Clark 7/1/13
 SIGNATURE DATE SIGNATURE DATE



MSE WALL WITH SRW UNITS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.
 **SEE MSE RETAINING WALLS PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



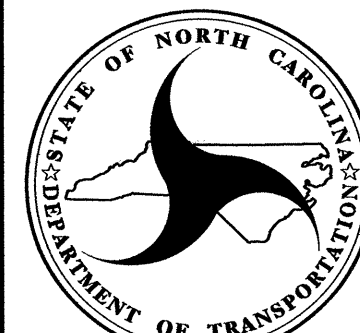
COPING DETAILS

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

PREPARED BY: JTW	DATE: 5.13
REVIEWED BY: SCC	DATE: 7.13

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PROJECT NO.: U-2507A

MECKLENBURG COUNTY

STATION: 80+00.00 to 80+90.00 -L-

SHEET 2 OF 3

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL NO. 1 DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	w-2
1			3			TOTAL SHEETS
2			4			5

NOTES:

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

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

USE AN MSE WALL SYSTEM WITH SRW UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO.1.

WHEN USING AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL (SRW) UNITS FOR RETAINING WALL NO. 1, FREEZE-THAW DURABLE SRW UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS ARE REQUIRED.

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO.1.

A DRAIN IS NOT 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 STRESS ON FOUNDATION MATERIAL = 3000 LB/SF
- 4) MINIMUM EMBEDMENT ELEVATION = 2 FT
- 5) AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	125	34	0

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


6) IN-SITU ASSUMED MATERIAL PARAMETERS:

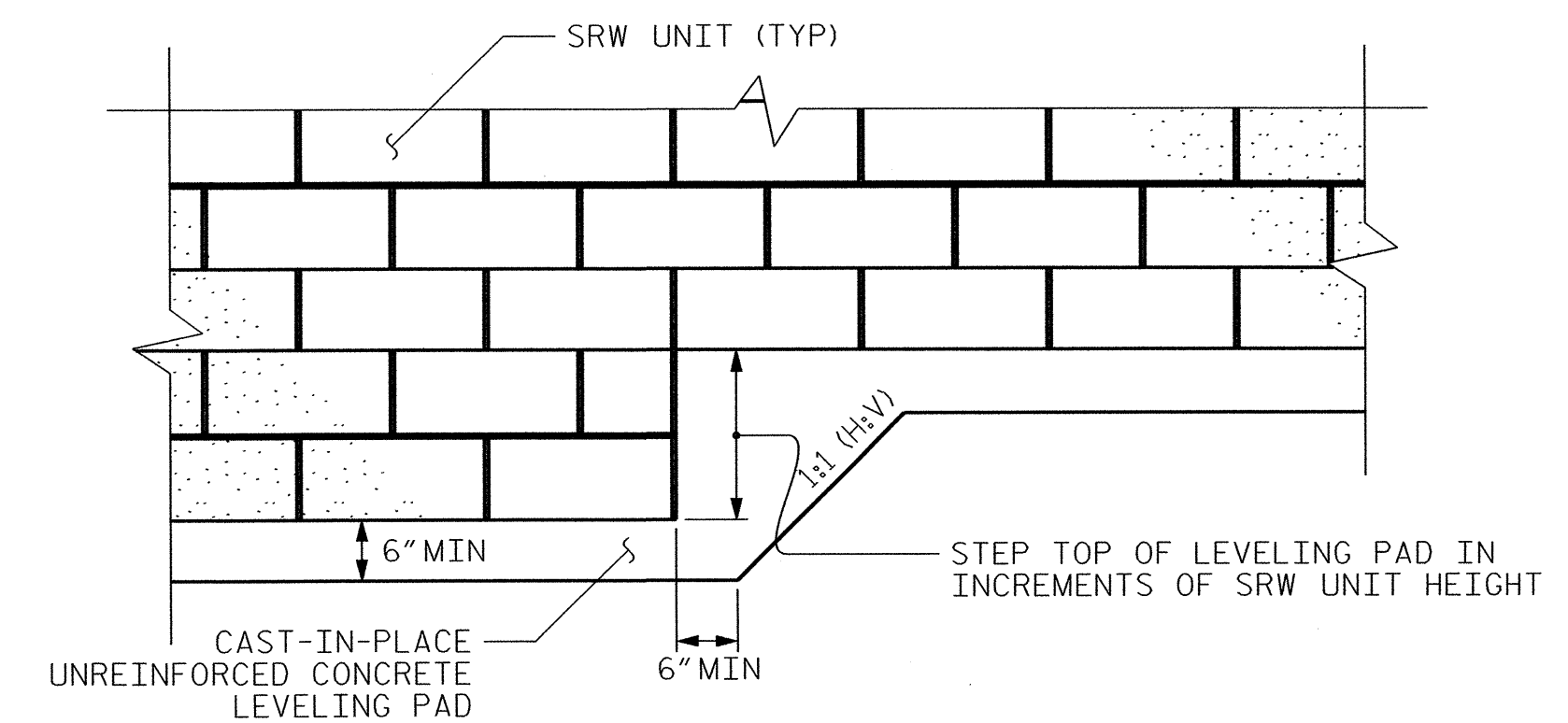
MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

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

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.

GEOTECHNICAL ENGINEER  6-Clark SIGNATURE	ENGINEER 7/13/13 DATE
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SEGMENTAL RETAINING WALL (SRW) UNITS

LEVELING PAD STEP DETAILS

PROJECT NO.: U-2507A
MECKLENBURG COUNTY
STATION: 80+00.00 to 80+90.00 -L-
 SHEET 3 OF 3

PREPARED BY: JTW DATE: 5.13
 REVIEWED BY: SCC DATE: 7.13

GEOTECHNICAL ENGINEERING UNIT

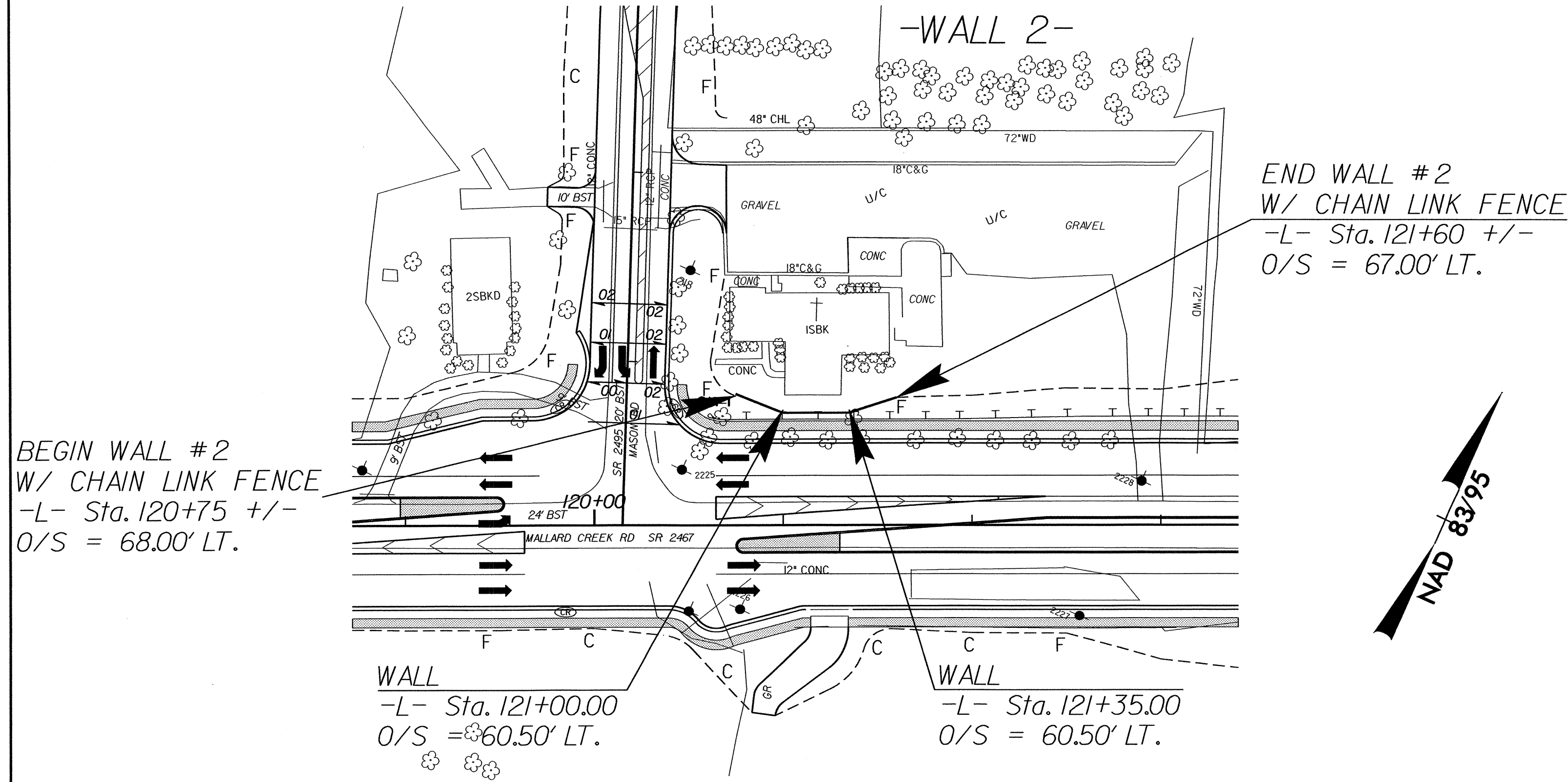
EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL NO. 1 DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-3
1			3			TOTAL SHEETS
2			4			5

BM - 11 RR SPIKE IN BASE OF 12" OAK STA. 119+79.00 -L- 49.00' RT.
 EL. = 785.12' N 573700 E 1467062



LOCATION SKETCH

GEOTECHNICAL ENGINEER

ENGINEER

8/1/13

7/17/13

RETAINING WALL ELEVATIONS

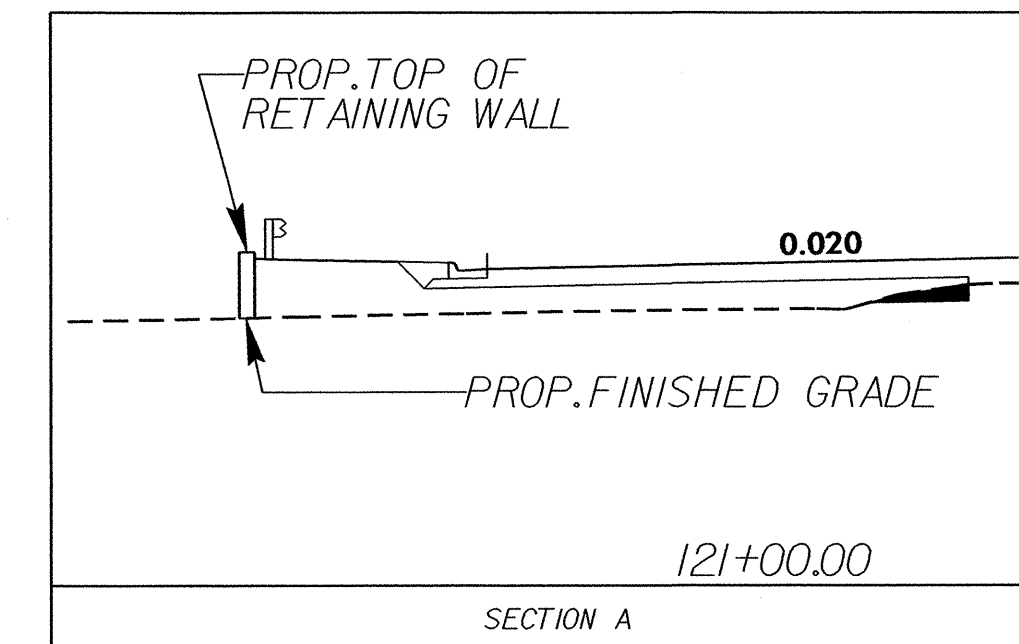
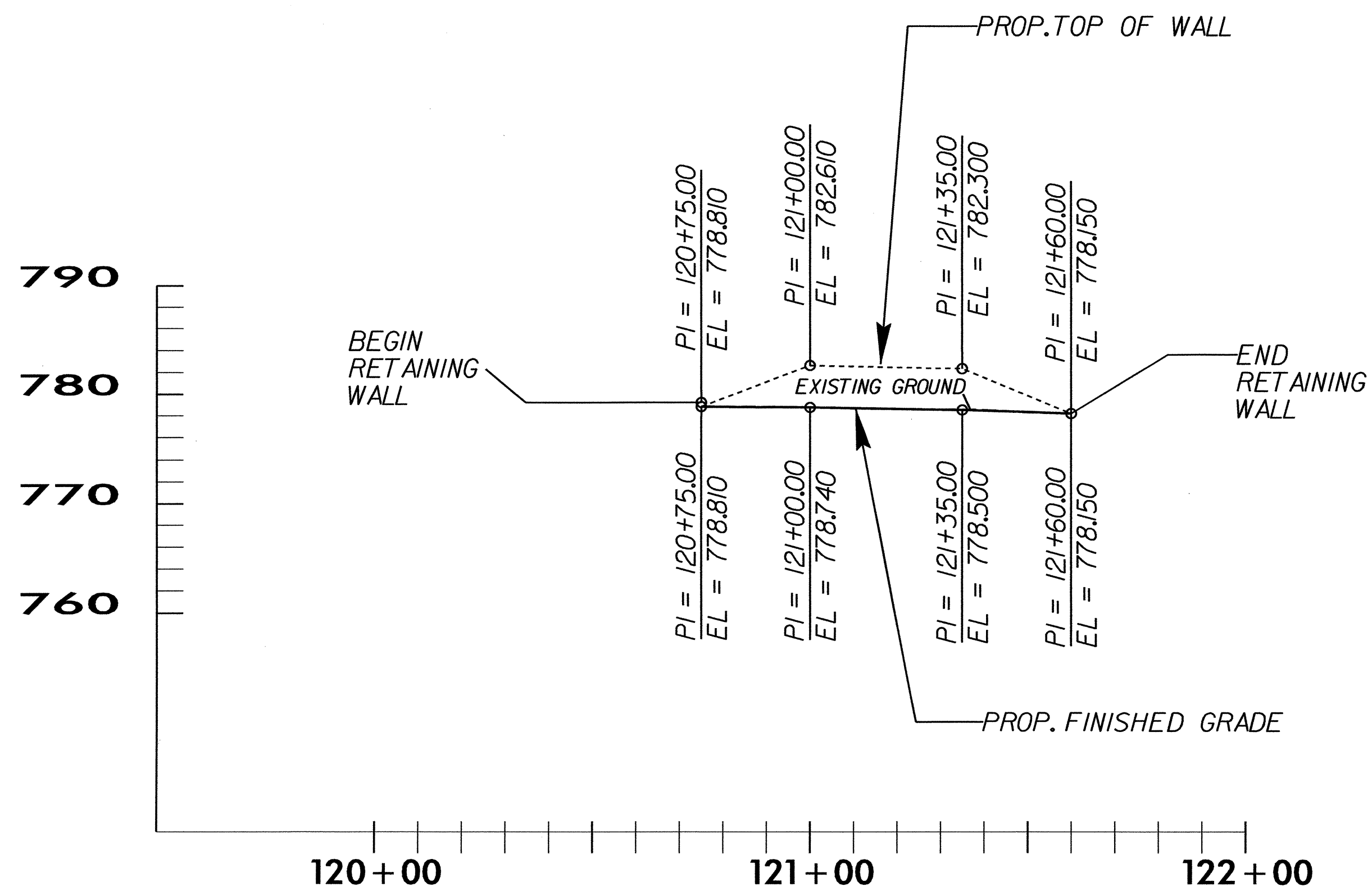
-L- STA	OFFSET FROM CL (LEFT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
120+75.00	68.00	778.810	778.810	0.00	0.00
121+00.00	60.50	782.610	778.740	3.87	3.37
121+35.00	60.50	782.300	778.500	3.80	3.30
121+60.00	67.00	778.150	778.150	0.00	0.00

* 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

ESTIMATED WALL QUANTITIES

RETAINING WALL NO.	SEGMENTAL GRAVITY RETAINING WALLS (SQUARE FEET)
1	230 SF
TOTAL QUANTITY = 230 SF	



PROJECT NO.: U-2507A
 MECKLENBURG COUNTY
 STATION: 120+75.00 to 121+60.00 -L-
 SHEET 1 OF 2

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE

WESTERN REGIONAL OFFICE

CONTRACT OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SEGMENTAL GRAVITY RETAINING WALL NO. 2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-4
1			3			TOTAL SHEETS
2			4			5

PREPARED BY: J.T.W. DATE: 5.13
 REVIEWED BY: S.C.C. DATE: 7.13



Signature: [Signature] DATE: 2/12/12

NOTES:

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

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

A FENCE IS REQUIRED ALONG THE BACK EDGE OF THE RETAINING WALL. DO NOT ATTACH FENCES OR HANDRAILS TO STANDARD SEGMENTAL GRAVITY WALLS. SEE ROADWAY PLANS FOR DETAILS.

DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS FOR INTERSTATE HIGHWAY OR RAILROAD PROJECTS.

DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN SURCHARGE LOADS WILL BE WITHIN 5'-6" OF THE BACK OF SRW CAP UNITS.

DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW WALLS.

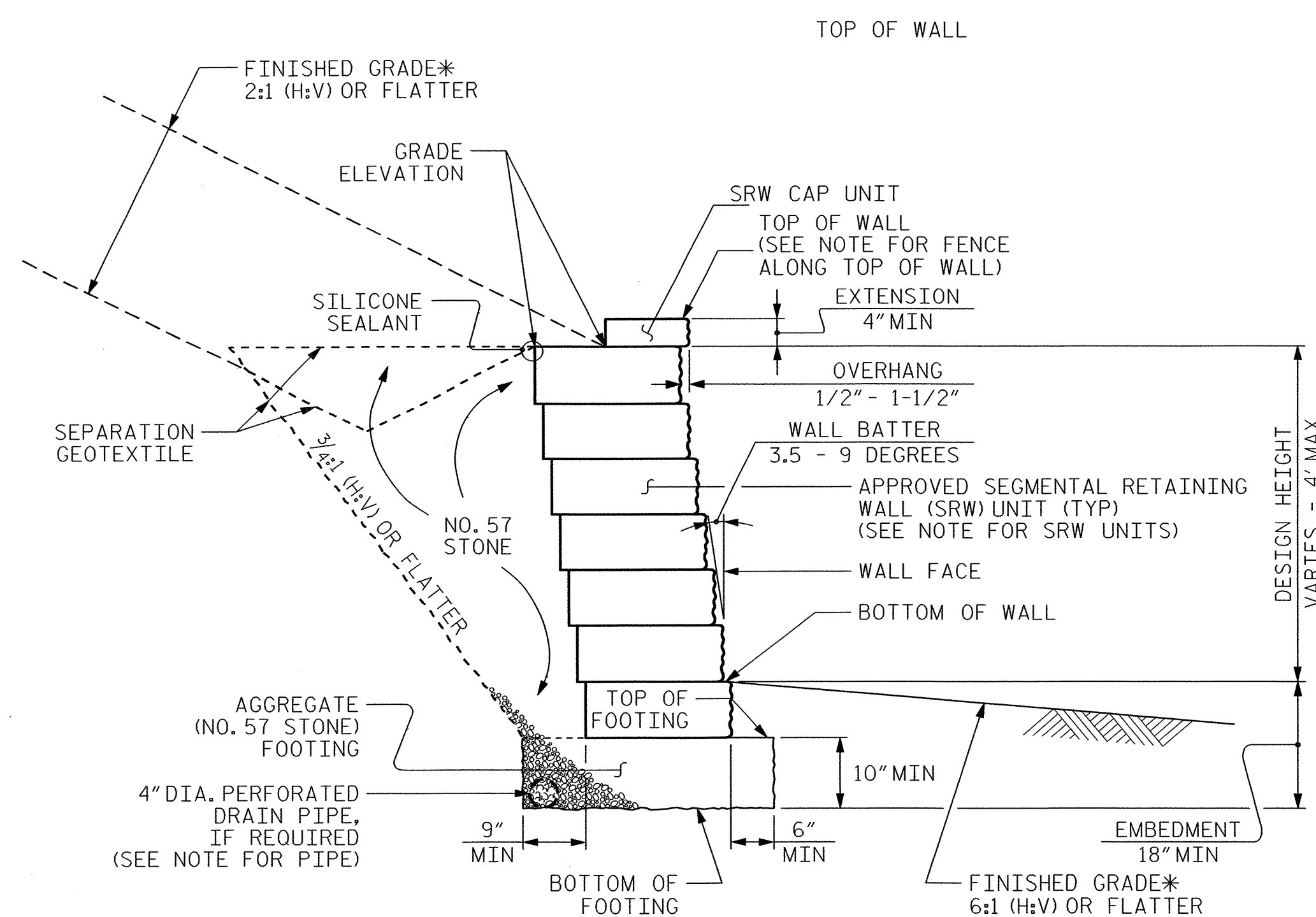
SEGMENTAL RETAINING WALL (SRW) UNITS ARE APPROVED FOR EITHER 2' OR 4' MAXIMUM DESIGN HEIGHTS. FOR DETAILS AND DIMENSIONS OF APPROVED SRW UNITS AND MAXIMUM DESIGN HEIGHTS, SEE www.ncdot.org/dob/preconstruct/highway/geotech/seggravwalls

DO NOT MIX APPROVED SRW UNITS FROM DIFFERENT VENDORS ON THE SAME STANDARD SEGMENTAL GRAVITY WALL. USE THE SAME SIZE APPROVED SRW UNITS FOR EACH WALL SECTION.

BEFORE BEGINNING STANDARD SEGMENTAL 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.

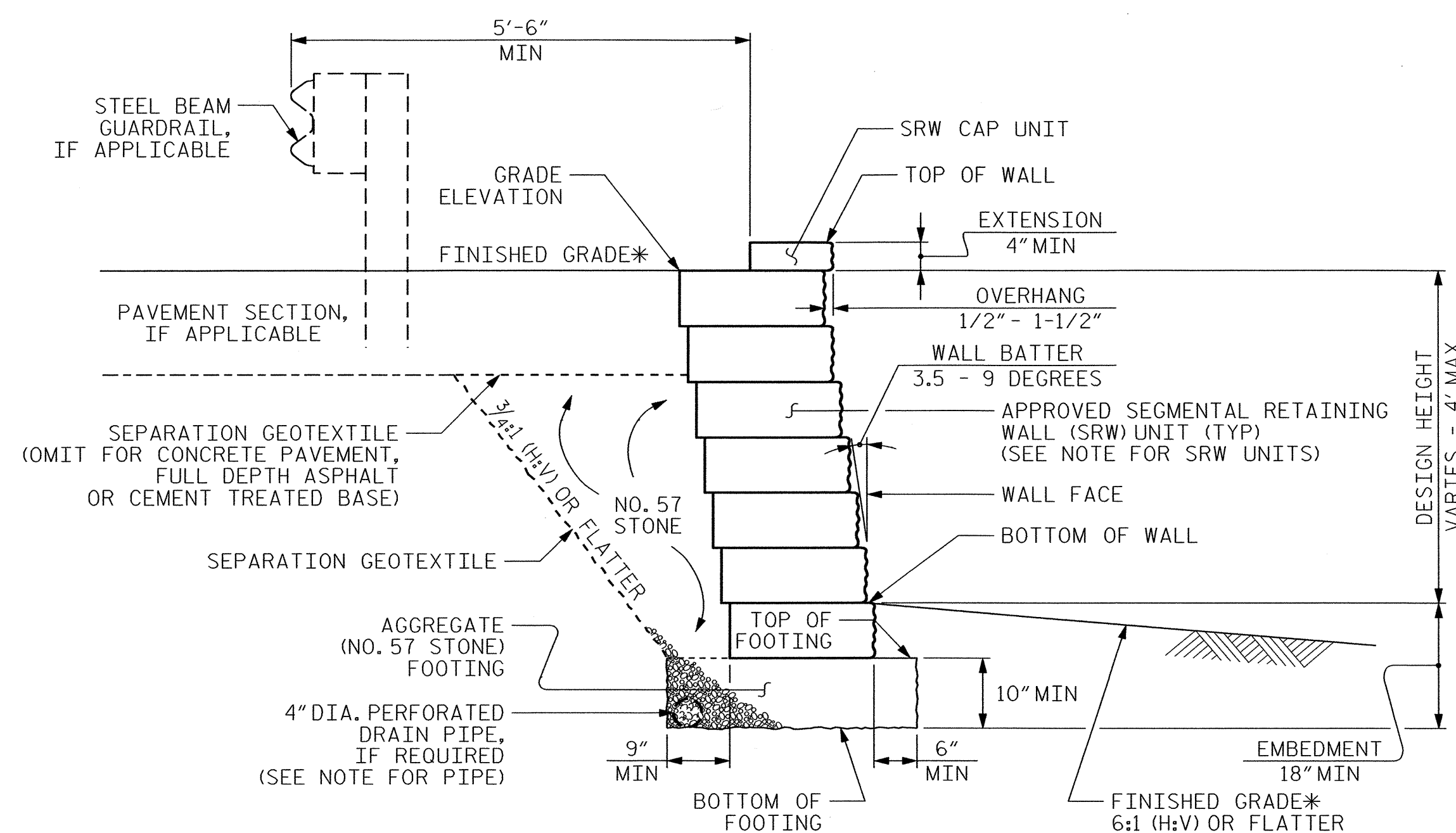
A DRAIN PIPE IS REQUIRED IF GROUNDWATER IS ABOVE BOTTOM OF FOOTINGS.

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



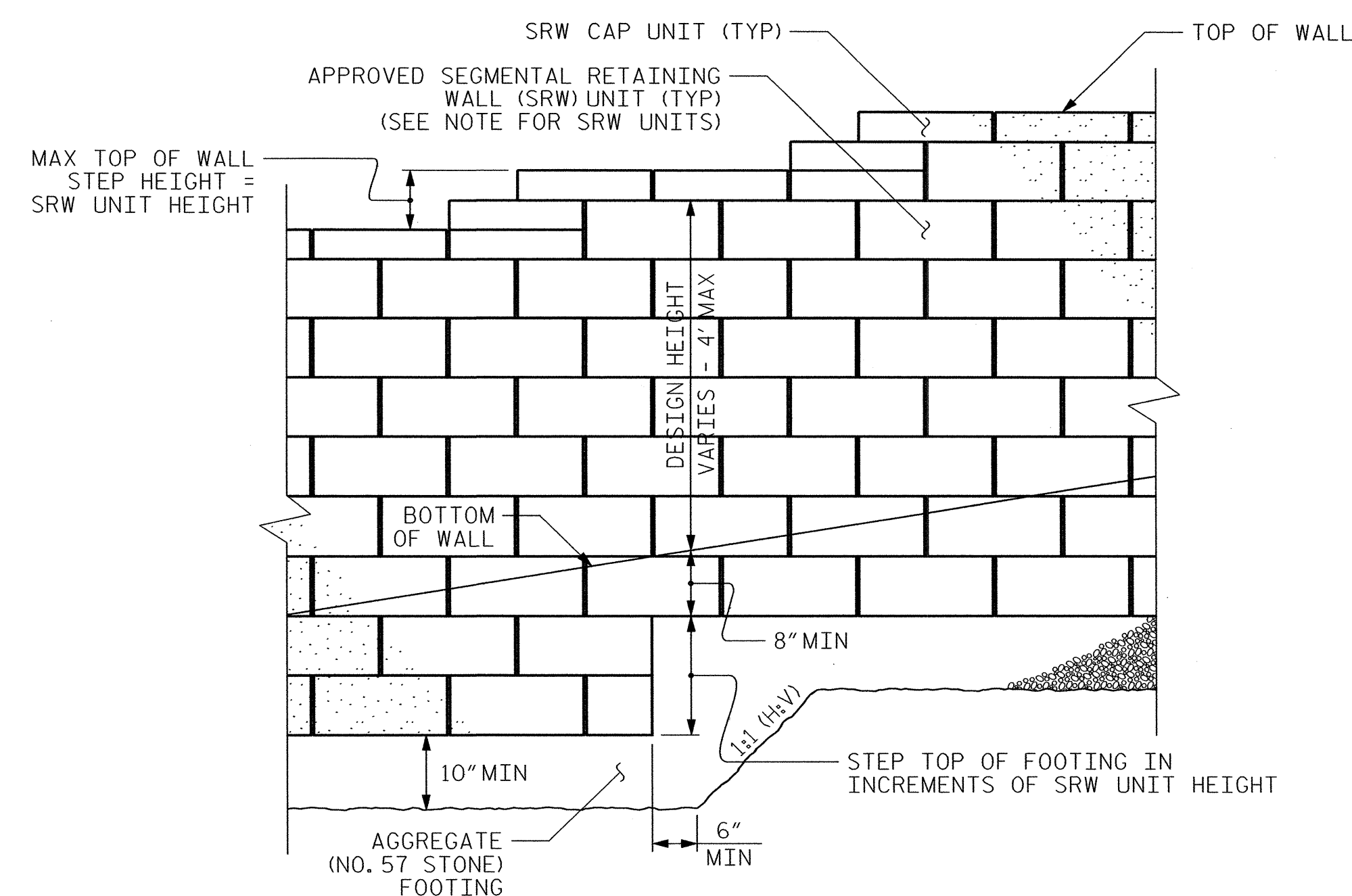
STANDARD SEGMENTAL GRAVITY WALL WITH SLOPE

*SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.



STANDARD SEGMENTAL GRAVITY WALL WITHOUT SLOPE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



STANDARD SEGMENTAL GRAVITY WALL - PARTIAL ELEVATION

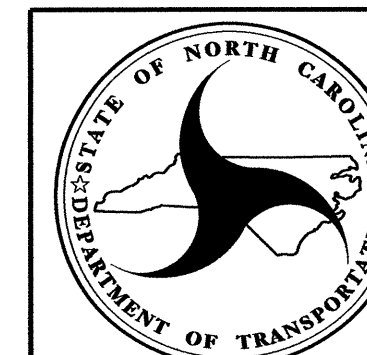
PROJECT NO.: U-2507A

MECKLENBURG COUNTY

STATION: 120+75.00 to 121+60.00 -L-

SHEET 2 OF 2

STANDARD DRAWING NO. 453.02



GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD SEGMENTAL GRAVITY RETAINING WALL

SHEET NO. W-5 TOTAL SHEETS 5

DATE: 1-17-12

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