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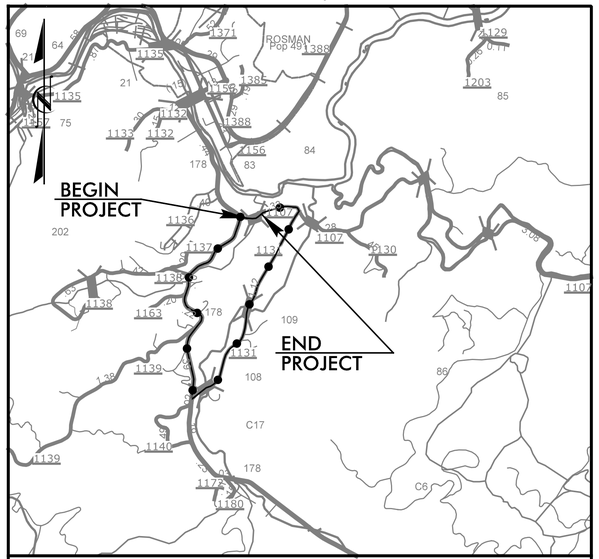
PROJECT: 17BP.14.R.58

CONTRACT: DN00183

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C for Survey Control



VICINITY MAP

DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

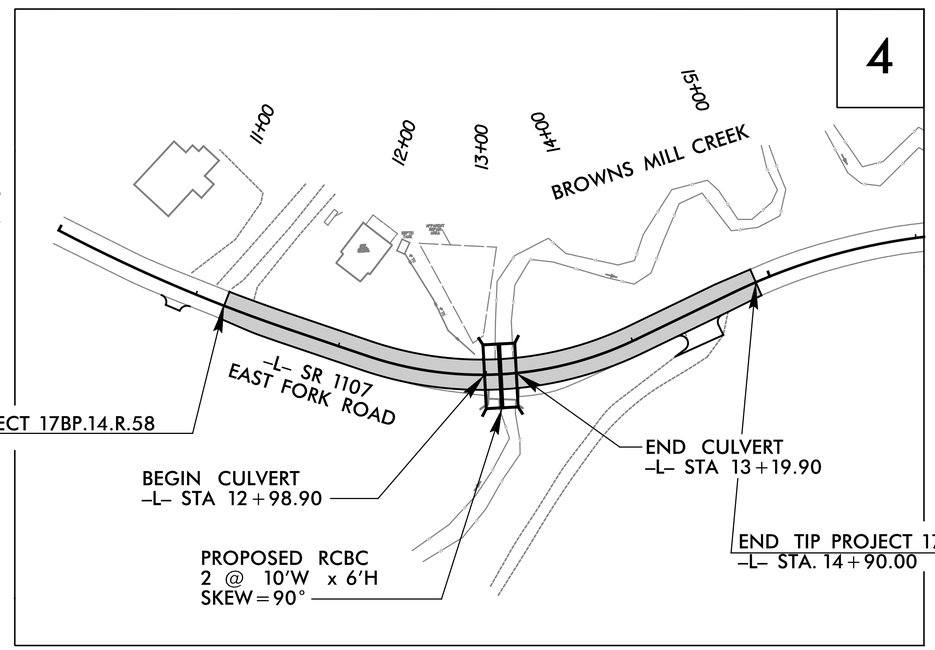
TRANSYLVANIA COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.58	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.14.R.58		PE
17BP.14.R.58		ROW & UTIL
17BP.14.R.58		CONSTR

LOCATION: BRIDGE NO. 83 ON SR 1107 (EAST FORK ROAD) OVER BROWNS MILL CREEK

TYPE OF WORK: PAVING, GRADING, GUARDRAIL, DRAINAGE AND STRUCTURE



NAD 83/
NSRS 2007

GRAPHIC SCALES

20 10 0 20 40
PLANS

20 10 0 20 40
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 1,160
ADT 2035 = 2,170
DHV = N/A %
D = N/A %
T = 6 % *
V = 40 MPH
* TTST = N/A DUAL 6%
FUNC CLASS =
MINOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.14.R.58	=	0.070 mi.
LENGTH STRUCTURE PROJECT 17BP.14.R.58	=	0.000 mi.
TOTAL LENGTH PROJECT 17BP.14.R.58	=	0.070 mi.

Prepared for NCDOT In the Office of:

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 7, 2013

LETTING DATE:
SEPTEMBER 8, 2015

TIM REID, P.E.
PROJECT ENGINEER

TRENT HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

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NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. RECK

DocuSigned by:
Jeffrey L. Reck
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Timothy R. Reid
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

7/24/2015
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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	1A

ROADWAY DESIGN ENGINEER

DocuSigned by:

NORTH CAROLINA PROFESSIONAL SEAL 015869 ENGINEER P. R. REID

7/27/2015

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INDEX OF SHEETS

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C	SURVEY CONTROL SHEET
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
3B-1	SUMMARY OF GUARDRAIL, EARTHWORK SUMMARY PARCEL INDEX, RIP RAP SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP- 3	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1, EC-3 THRU EC- 6	EROSION CONTROL PLAN
RF-1	REFORESTATION PLAN
X-A, X-1 THRU X-9	CROSS-SECTION SUMMARY, CROSS-SECTIONS
C-1 THRU C-6	CULVERT PLANS
SN	STANDARD STRUCTURE NOTE SHEET

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 07-30-2012

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04
SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT IN ACCORDANCE WITH SECTION 801 OF THE 2012 NORTH CAROLINA STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

EFF. 01-17-2012
REV. 10-30-2012

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.22	Frames and Wide Slot Sag Grates
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
862.01	Guardrail Placement
862.02	Guardrail Installation
876.02	Guide for Rip Rap at Pipe Outlets

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thiffman

12/05/11

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	1B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

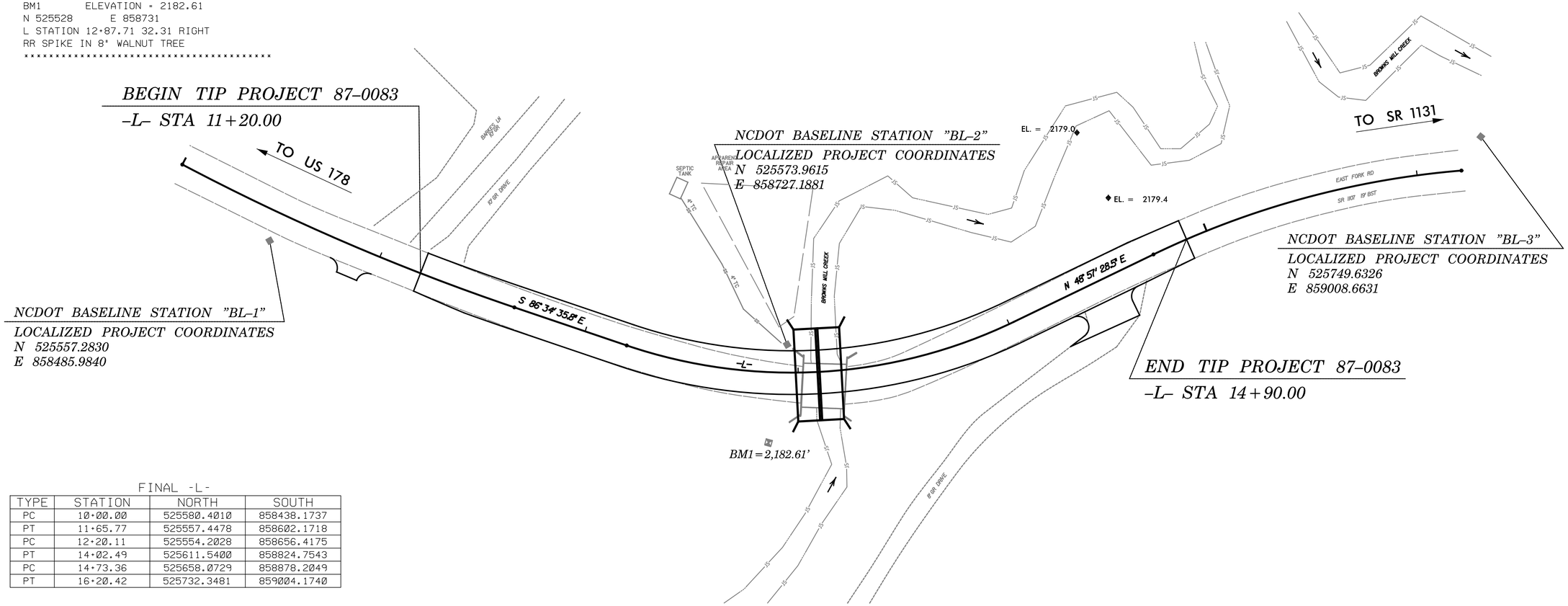
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	1C
Location and Surveys	

SURVEY CONTROL SHEET 87–0083
–FINAL–

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	525557.2830	858485.9840	2186.95	10+51.05	13.47 RT
2	BL-2	525573.9615	858727.1881	2182.38	12+94.84	12.81 LT
3	BL-3	525749.6326	859008.6631	2186.48	16+20.42	14.71 LT

****
BM1 ELEVATION = 2182.61
N 525528 E 858731
L STATION 12+87.71 32.31 RIGHT
RR SPIKE IN 8" WALNUT TREE
****



FINAL -L-

TYPE	STATION	NORTH	SOUTH
PC	10+00.00	525580.4010	858438.1737
PT	11+65.77	525557.4478	858602.1718
PC	12+20.11	525554.2028	858656.4175
PT	14+02.49	525611.5400	858824.7543
PC	14+73.36	525658.0729	858878.2049
PT	16+20.42	525732.3481	859004.1740

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "870083 BL-1"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 525557.2830(ft) EASTING: 858485.9840(ft)
ELEVATION: 2186.95(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999774931
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "870083 BL-1" TO -L- 11+35.00 STATION IS N 86° 50' 20.78" E 70.6812'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

FINAL ROW MARKER AND IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	SOUTH
L	11+20.00	-14.00	525575.1054	858558.0046
L	11+50.00	-30.00	525588.4243	858588.6804
L	12+50.00	-37.00	525591.2334	858683.7912
L	13+00.00	-50.00	525610.9982	858721.6108
L	13+70.00	-40.00	525625.4671	858776.9995
L	15+00.00	-30.00	525698.7721	858880.7154
L	15+00.00	-14.00	525686.0329	858890.3960
L	15+00.00	14.00	525654.7393	858907.3369
L	15+00.00	25.00	525654.9811	858913.9923
L	14+00.00	25.00	525590.8871	858839.0830
L	13+55.00	32.00	525556.3152	858801.7800
L	13+35.00	50.00	525529.6252	858789.0334
L	13+00.00	47.00	525517.7811	858748.4355
L	12+00.00	35.00	525520.4663	858634.2504
L	11+33.00	32.00	525528.0499	858566.5847
L	11+00.00	14.00	525549.5430	858534.9725

GEOIDAL MODEL –
NOTE: DRAWING NOT TO SCALE

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/

THE FILES TO BE FOUND ARE AS FOLLOWS:
87–0083_LS_CONTROL.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

◎ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

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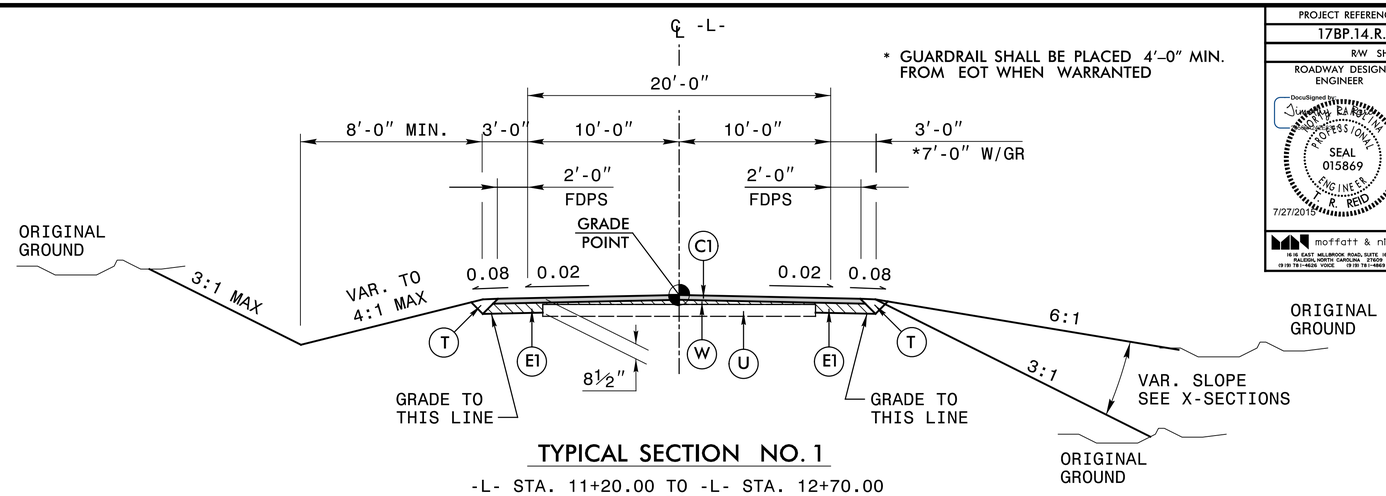
PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	PROP. 8" AGGREGATE BASE COURSE.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL ON THIS SHEET)

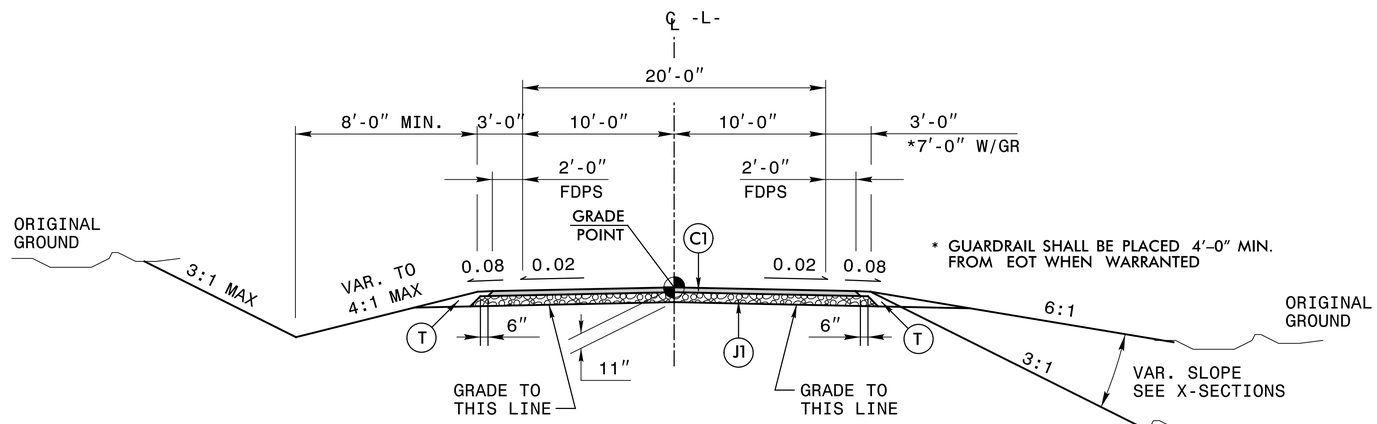
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



* GUARDRAIL SHALL BE PLACED 4'-0" MIN. FROM EOT WHEN WARRANTED

TYPICAL SECTION NO. 1

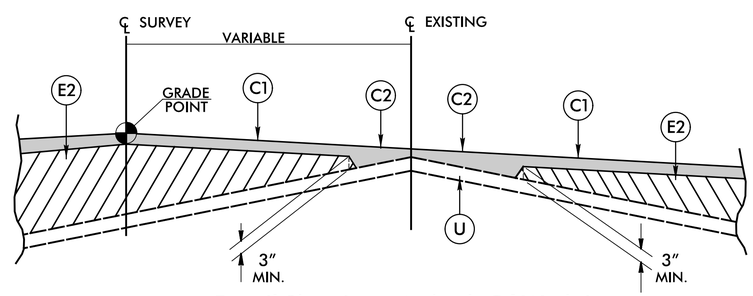
-L- STA. 11+20.00 TO -L- STA. 12+70.00
-L- STA. 13+60.00 TO -L- STA. 14+90.00



* GUARDRAIL SHALL BE PLACED 4'-0" MIN. FROM EOT WHEN WARRANTED

TYPICAL SECTION NO. 2

-L- STA. 12+70.00 TO -L- STA. 13+60.00



Detail Showing Method Of Wedging

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	2A-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

DocuSigned by: Julie Wright

NORTH CAROLINA PROFESSIONAL SEAL 015869 ENGINEER J. R. REID

7/27/2015

PAVEMENT ENGINEER

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7/24/2015
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12/06/07

COMPUTED BY: DGM	DATE: 7/30/2013
CHECKED BY: TEH	DATE: 7/30/2013

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	3B-1

SUMMARY OF EARTHWORK

ALIGNMENT	STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L-	11+20.00	14+90.00	13	421	408	
SUBTOTALS:			13	421	408	
MATERIAL FOR SHOULDER CONSTRUCTION				46	46	
PROJECT TOTAL:			13		454	
5% TO REPLACE TOPSOIL ON BORROW PIT					23	
GRAND TOTALS:			13		477	
SAY:			20		500	

VOLUME OF THE CULVERT HAS BEEN DEDUCTED

EST 50 CY UNDERCUT - (CONTINGENCY)
EST 50 CY SELECT GRANULAR MATERIAL - (CONTINGENCY)
EST 50 SY GEOTEXTILE FOR SOIL STABILIZATION - (CONTINGENCY)
EST 50 TON INCIDENTAL STONE - (CONTINGENCY)

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Shoulder Borrow, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."

RIGHT OF WAY AREA DATA

PARCEL NO.	PROPERTY OWNERS NAMES	TOTAL ACREAGE	AREA TAKEN	AREA REMAINING RT.	AREA REMAINING LT.	CONST. EASE.	PERM. DRAIN. EASE.	TEMP. DRAIN. EASE.
1	LANA R. RHYMER	2.61 AC	4419 SF	2.51 AC	-		-	-
2	HELEN D. STANSEL	2.14 AC	2043 SF	2.09 AC	-	852 SF	-	-
3	GERALD & MARY REESE	6.22 AC	7397 SF	2.46 AC	3.59 AC		1082 SF	-
4	EDWARD AND EVELYM STANALAND	7.59 AC	-	-	-		-	-

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
-L-	12+80	13+01	RT	2
-L-	13+20	13+66	RT	15
			TOTAL:	17
			SAY:	20

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION -L-	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. PIPE (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE (UNLESS OTHERWISE NOTED) 12"	15"	18"	24"	30"	36"	42"	48"
14+46	RT																														
14+66	RT	0401		2183.10	2179.68																										
14+66		0401	OUT		2179.68	2179.40				48																					
TOTALS										48																					

STATION -L-	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') PER EACH (0' THRU 5.0')	LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	T.B.D.I. STD. 840.36	G.D.I. FRAME WITH TWO GRATES STD. 840.37			CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
14+46																																			40	18" CMP REMOVAL
14+66						1										1	1																			
14+66																																				
TOTALS						1										1	1																		40	

ABBREVIATIONS

C.B. CATCH BASIN
N.D.I. NARROW DROP INLET
D.I. DROP INLET
G.D.I. GRATED DROP INLET
G.D.I. (N.S.) GRATED DROP INLET (NARROW SLOT)
J.B. JUNCTION BOX
M.H. MANHOLE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING JUNCTION BOX

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPROACH END	WARRANT POINT TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	FLARE LENGTH TRAILING END	W APPROACH END	W TRAILING END	ANCHORS XI MOD	XI	GRAU 350	III	XIII	CAT-1	VI MOD	BIC	AT-1	TL-2	IMPACT ATTENUATOR TYPE 350 EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
L	11+88.17	14+30.94	LT	242.77			13+23.88	12+94.92	4.0	7.0														2					36		CULVERT/FILL WARRANT
L	11+84.90	14+30.94	RT	246.04			12+97.73	13+21.07	4.0	7.0														2					34		CULVERT/FILL WARRANT
TOTAL:				488.81																				4					70		
LESS ANCHOR DEDUCTIONS:																															
			GRAU-350 (TYPE TL-2) 4 @ 25.0	-100.00																											
GRAND TOTALS				388.81																				4					70		
SAY				400																				4					70		

ADDITIONAL GUARDRAIL POSTS = 4

7/24/2015
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thuffman

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PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
DocuSigned by:
NORTH CAROLINA PROFESSIONAL SEAL 015869 ENGINEER T. R. REID
7/28/2015
moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

HYDRAULICS ENGINEER
DocuSigned by:
NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. RECK
7/29/2015
moffatt & nichol
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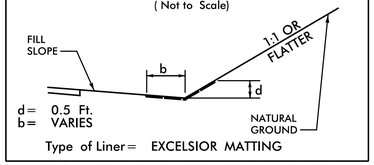
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

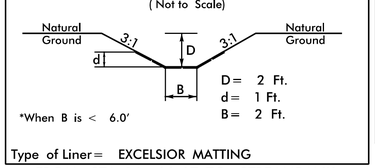
DETAIL A
TOE PROTECTION
(Not to Scale)



d = 0.5 Ft.
b = VARIES
Type of Liner = EXCELSIOR MATTING

FROM STA. 13+25 TO STA. 14+30 RT

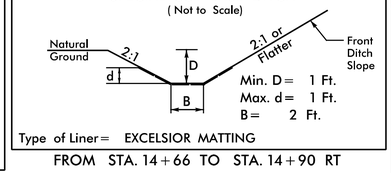
DETAIL B
TAIL DITCH
(Not to Scale)



D = 2 Ft.
d = 1 Ft.
B = 2 Ft.
*When B is < 6.0'
Type of Liner = EXCELSIOR MATTING

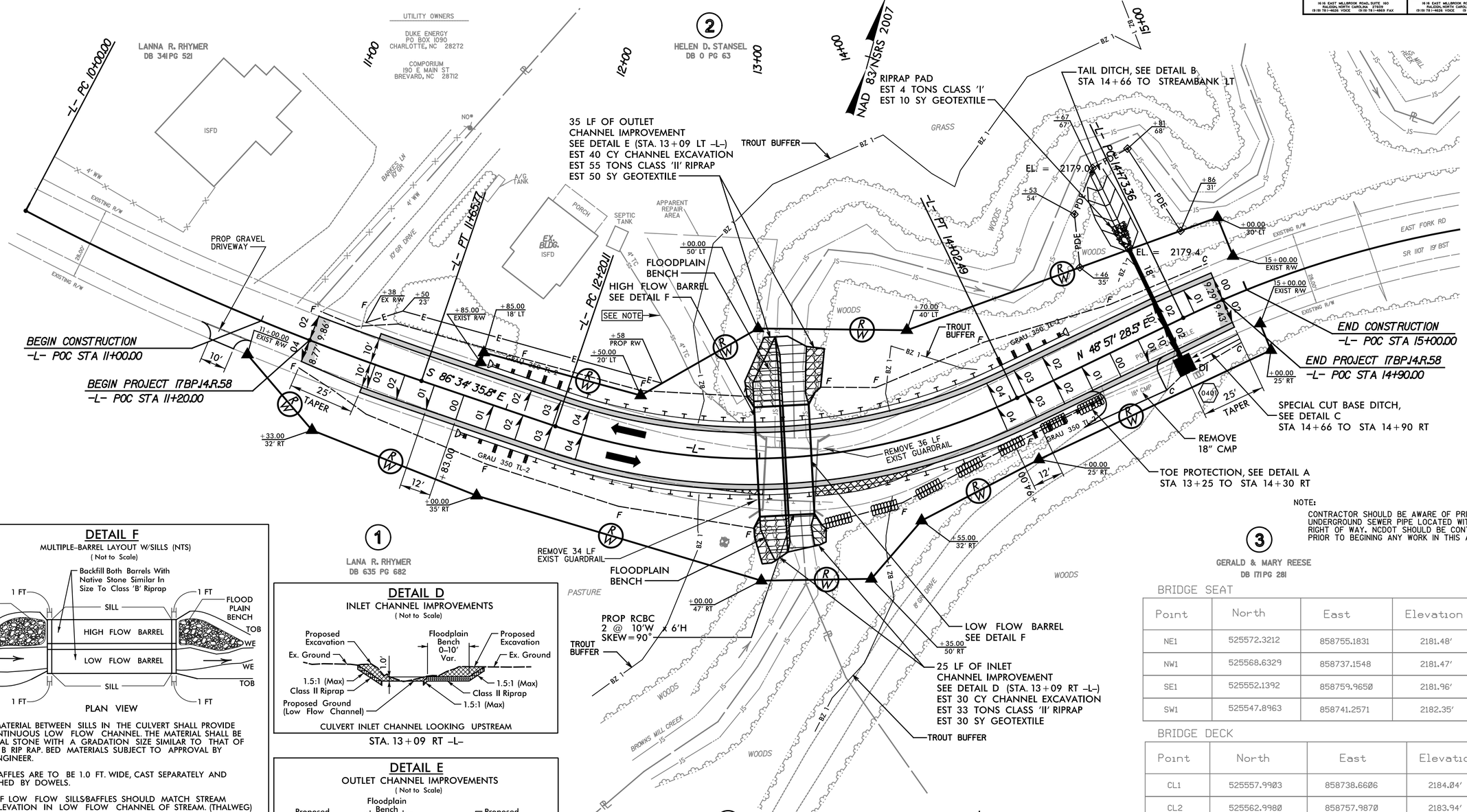
FROM STA. 14+66 LT TO STREAMBANK

DETAIL C
SPECIAL CUT BASE DITCH
(Not to Scale)



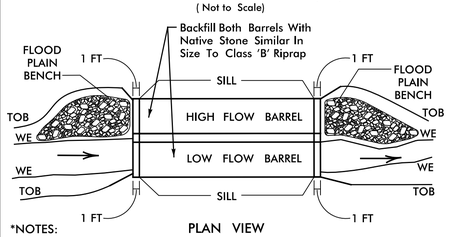
Min. D = 1 Ft.
Max. d = 1 Ft.
B = 2 Ft.
Type of Liner = EXCELSIOR MATTING

FROM STA. 14+66 TO STA. 14+90 RT



NOTE:
CONTRACTOR SHOULD BE AWARE OF PRIVATE UNDERGROUND SEWER PIPE LOCATED WITHIN RIGHT OF WAY. NCDOT SHOULD BE CONTACTED PRIOR TO BEGINING ANY WORK IN THIS AREA.

DETAIL F
MULTIPLE-BARREL LAYOUT W/SILLS (NTS)
(Not to Scale)



*NOTES:

1) BED MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. BED MATERIALS SUBJECT TO APPROVAL BY THE ENGINEER.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) TOP OF LOW FLOW SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) CLASS B RIP RAP MAY BE USED TO SUPPLEMENT NATURAL BED MATERIAL.

5) DO NOT SET ELEVATION OF HIGH SILL ABOVE BANK FULL.

6) THERE WILL BE A SILL LOCATED 1.0' INSIDE BOTH THE UPSTREAM & DOWNSTREAM END OF EACH BARREL.

7) SILL IN HIGH FLOW BARREL WILL BE 2.5 FT. HIGH. SILL IN LOW FLOW BARREL WILL BE 1.5' FT. HIGH.

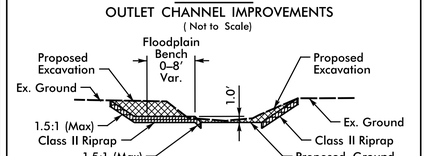
STA. 13+09 LT /RT -L-

DETAIL D
INLET CHANNEL IMPROVEMENTS
(Not to Scale)

CULVERT INLET CHANNEL LOOKING UPSTREAM

STA. 13+09 RT -L-

DETAIL E
OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



CULVERT OUTLET CHANNEL LOOKING DOWNSTREAM

STA. 13+09 LT -L-

-L-

PI Sta 10+83.06	PI Sta 13+16.17	PI Sta 15+47.72
Δ = 9° 05' 16.7" (LT)	Δ = 44° 27' 55.6" (LT)	Δ = 21° 02' 03.9" (RT)
D = 5° 28' 56.2"	D = 24° 22' 52.3"	D = 14° 18' 11.6"
L = 165.77'	L = 182.38'	L = 147.06'
T = 83.06'	T = 96.06'	T = 74.37'
R = 1,045.11'	R = 235.00'	R = 400.58'
e = Exist	e = 4.0%	e = Exist
DS = Exist	DS = 30 MPH	DS = Exist

BRIDGE SEAT

Point	North	East	Elevation
NE1	525572.3212	858755.1831	2181.48'
NW1	525568.6329	858737.1548	2181.47'
SE1	525552.1392	858759.9650	2181.96'
SW1	525547.8963	858741.2571	2182.35'

BRIDGE DECK

Point	North	East	Elevation
CL1	525557.9903	858738.6606	2184.04'
CL2	525562.9980	858757.9870	2183.94'
D1	525548.0373	858740.9375	2184.02'
D2	525567.7514	858736.6537	2183.12'
D3	525572.4506	858755.9211	2183.21'
D4	525552.5233	858760.2369	2183.64'

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PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	5

ROADWAY DESIGN ENGINEER

DocuSigned by:
Jun
NORTH CAROLINA PROFESSIONAL SEAL 015869 ENGINEER T. R. REID
7/28/2015

moffatt & nichol
16 16 EAST MILLBROOK ROAD, SUITE 160
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HYDRAULICS ENGINEER

DocuSigned by:
Jeff
NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. RECK
7/29/2015

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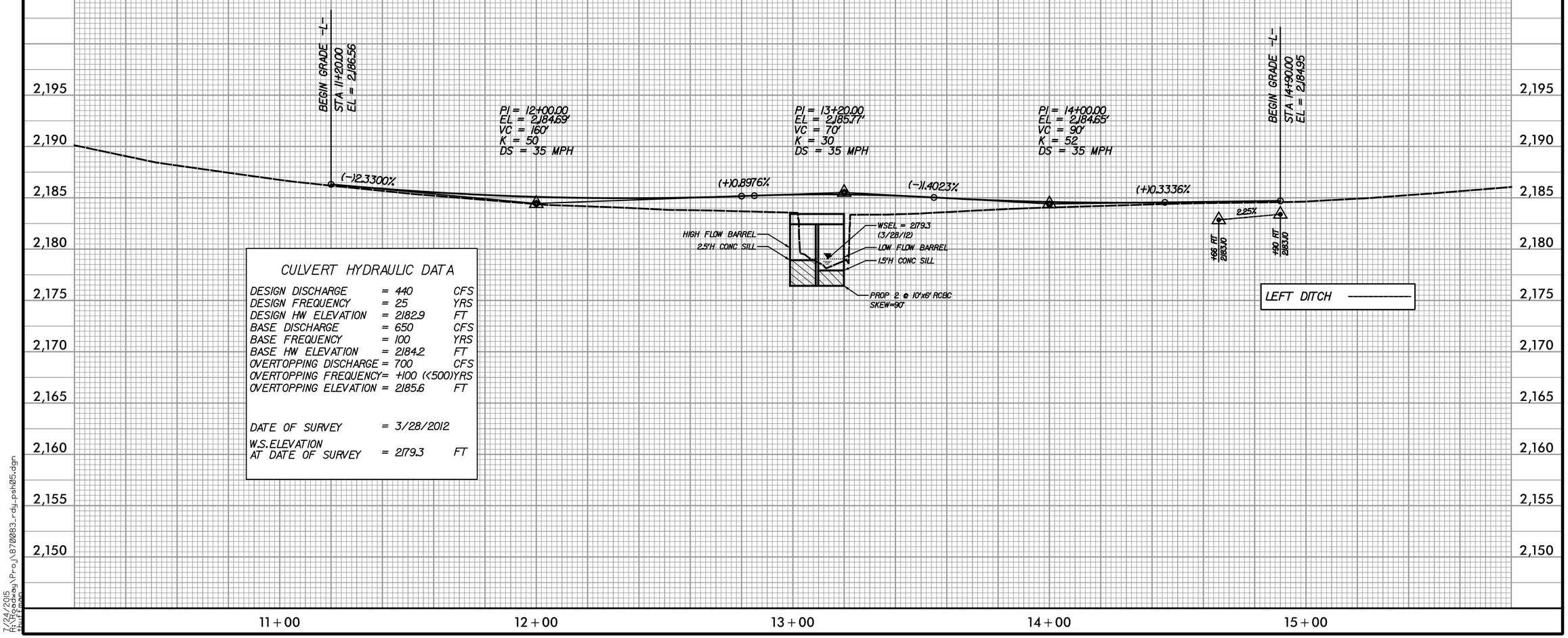

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 440	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 2182.9	FT
BASE DISCHARGE	= 650	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2184.2	FT
OVERTOPPING DISCHARGE	= 700	CFS
OVERTOPPING FREQUENCY	= +100 (<500)	YRS
OVERTOPPING ELEVATION	= 2185.6	FT
DATE OF SURVEY	= 3/28/2012	
W.S.ELEVATION AT DATE OF SURVEY	= 2179.3	FT

7/24/2015
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thjeffman

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PROJECT: 17BP.14.R.58

CONTRACT: DN00183

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.58	TMP-1

RAMEY KEMP & ASSOCIATES, INC.
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NC License No. C-0910

TRANSPORTATION MANAGEMENT PLAN

TRANSYLVANIA COUNTY

BRIDGE NO. 83 ON SR 1107 (EAST FORK ROAD)

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WORKING SIGNS FOR FACILITIES ≤ 55 MPH
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - (PERMANENT AND TEMPORARY)
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS. LEGEND AND INDEX OF SHEETS
TMP-2	GENERAL NOTES, PHASING
TMP-3	DETOUR SIGNING

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- REMOVAL

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM — SKINNY DRUM — TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW PANEL (TYPE C)
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

APPROVED: DocuSigned by: Merrick A. Dugal, III 360FF46B0664FE... DATE: 7/28/2015

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A. DUGAL, III

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS, INDEX OF SHEETS & LEGEND

$$$$$SYSTIME$$$$$
$$$$$USERNAME$$$$$

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PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.58	TMP-2

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Raleigh, North Carolina 27609
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NC License No. C-0910

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWING, STANDARD DETAILS AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEERING.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION SIGNING.

SIGNING

B) INSTALL ADVANCED WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

C) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

D) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

E) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

I) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROAD.

PAVEMENT MARKINGS AND MARKERS

F) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKERS
SR 1107 (East Fork Road)	PAINT	RAISED

G) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

H) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.

I) PASSING ZONE WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

PHASING

PHASE I

PRIOR TO ANY CONSTRUCTION OPERATIONS, PLACE AND COVER OFF-SITE DETOUR SIGNING AS SHOWN ON TMP-3 AND IN ACCORDANCE WITH RSD 1101.03 (SHEET 1 OF 9).

PHASE II

USING OFF-SITE DETOUR, UNCOVER DETOUR SIGNS, CLOSE -L- (SR 1107 / EAST FORK ROAD) TO TRAFFIC AND CONSTRUCT BRIDGE, APPROACHES AND ROADWAY UP TO AND INCLUDING FINAL LAYER OF SURFACE COURSE.

PHASE III

UPON COMPLETION OF BRIDGE, APPROACHES AND ROADWAY, PLACE FINAL PAVEMENT MARKING IN ACCORDANCE WITH RSD 1205.02 AND 1205.12. REMOVE BARRICADES AND DETOUR SIGNS AND OPEN -L- (SR 1107/ EAST FORK ROAD) TO TRAFFIC.

APPROVED: DocuSigned by: Merrick A. Dugal, III 359E448DD664F5... DATE: 7/28/2015

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022609 ENGINEER MERRICK A DUGAL, III

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

GENERAL NOTES AND PHASING

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

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PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.58	TMP-3

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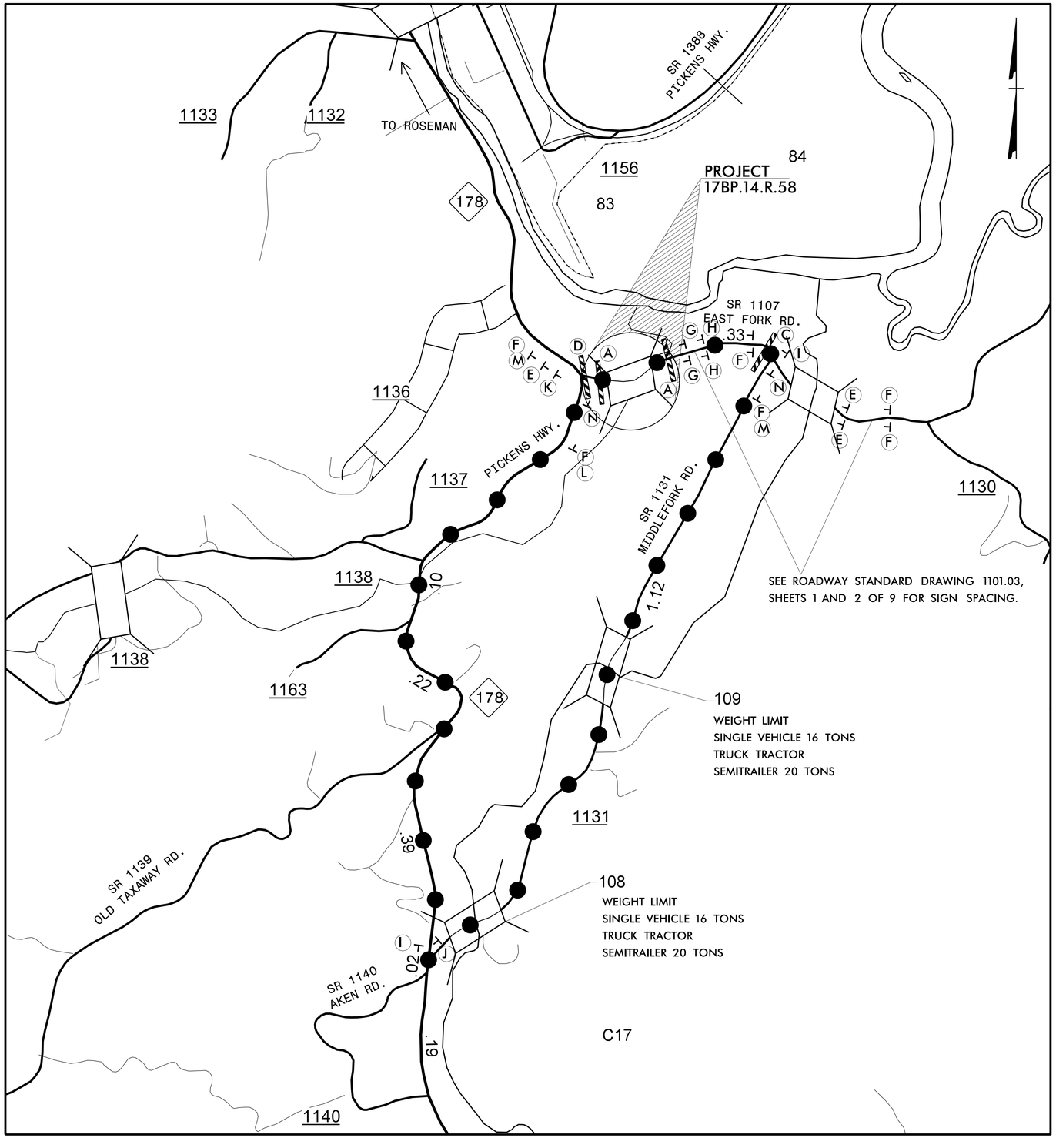
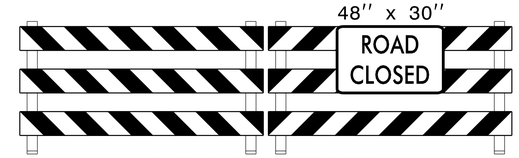
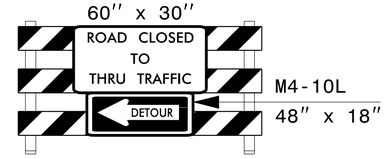


R11-2
48" x 30"



TYPE III BARRICADE(S)
(A)

R11-4
60" x 30"



M4-10L
48" x 18"

TYPE III BARRICADE
(C)

R11-4
60" x 30"

M4-10R
48" x 18"

TYPE III BARRICADE
(D)

W20-2
48" X 48"
(E)

W20-3
48" X 48"
(F)

W20-3
48" X 48"
(G)

W20-3
48" X 48"
(H)

M4-8
24" X 12"

M6-1 L
21" X 15"
(I)

M4-8
24" X 12"

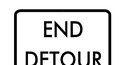
M6-1
21" X 15"
(J)

M4-8
24" X 12"

M6-3
21" X 15"
(K)

SP-4R
48" X 12"
(L)

SP-4L
48" X 12"
(M)



M4-8 A
24" X 18"
(N)

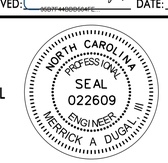
PROPOSED DETOUR

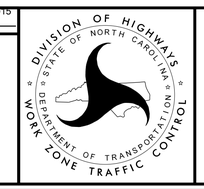
DETOUR ROUTE

DETOUR LENGTH 3 MILES

APPROVED: DocuSigned by: Merrick A. Dugal, III 7/28/2015 DATE:

SEAL





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$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$USERNAME$$$$

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PROJECT: 17BP.14.R.58

CONTRACT: DN00183

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	PMP-01

APPROVED: Timothy R. Reid
7/27/2015

DATE:

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 015869 ENGINEER T. R. REID

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLANS

LOCATION: BRIDGE NO. 141 ON SR 1107 (EAST FORK ROAD) OVER BROWNS MILL CREEK

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
SR 1107	PAINT	NONE

B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

C) REMOVE / REPLACE ANY CONFLICTING / DAMAGED PAVEMENT MARKINGS AND MARKERS.

D) PASSING ZONES WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
PA - WHITE EDGE LINE (4")	PAINT
PI - YELLOW DOUBLE CENTER LINE (4")	PAINT

INDEX

SHEET NO.	DESCRIPTION
PMP-1	PAVEMENT MARKING PLAN COVER SHEET NOTES & SCHEDULE
PMP-2	PAVEMENT MARKING DETAIL

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

PAVEMENT MARKING DETAIL
EAST FORK ROAD

7/24/2015
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thirfman

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PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	PMP-2

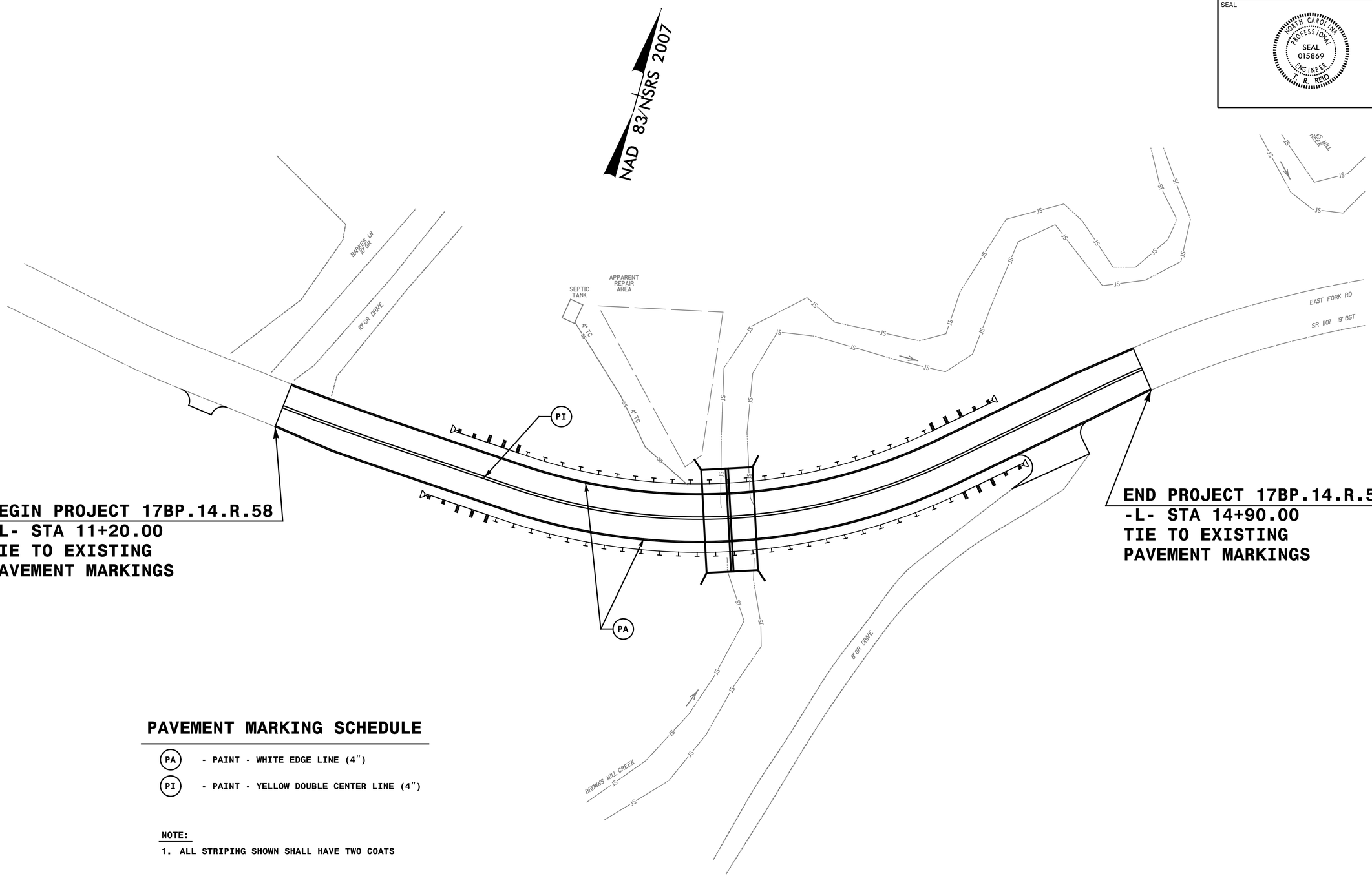
APPROVED: DocuSigned by: Timothy R. Reid 26569A242E83411...

DATE: 7/27/2015

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 015869 ENGINEER T. R. REID

SCALE 20 10 0 20 40



PAVEMENT MARKING SCHEDULE

PA	- PAINT - WHITE EDGE LINE (4")
PI	- PAINT - YELLOW DOUBLE CENTER LINE (4")

NOTE:

1. ALL STRIPING SHOWN SHALL HAVE TWO COATS

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

PAVEMENT MARKING DETAIL EAST FORK ROAD

7/24/2015
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thuffman

PROJECT: 17BP.14.R.58

CONTRACT: DN00183

BRIDGE 870083

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.58	EC-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.14.R.58		PE
17BP.14.R.58		ROW & UTIL
17BP.14.R.58		CONSTR

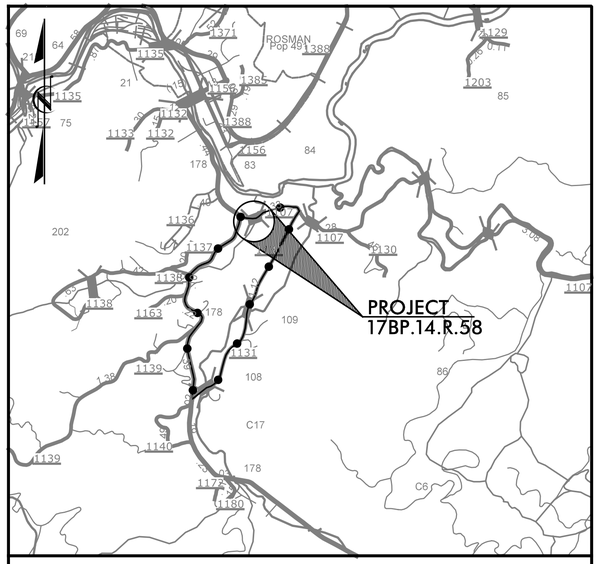
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

TRANSYLVANIA COUNTY

LOCATION: BRIDGE NO. 83 ON SR 1107 (EAST FORK ROAD) OVER BROWNS MILL CREEK

TYPE OF WORK: PAVING, GRADING, GUARDRAIL, DRAINAGE AND STRUCTURE

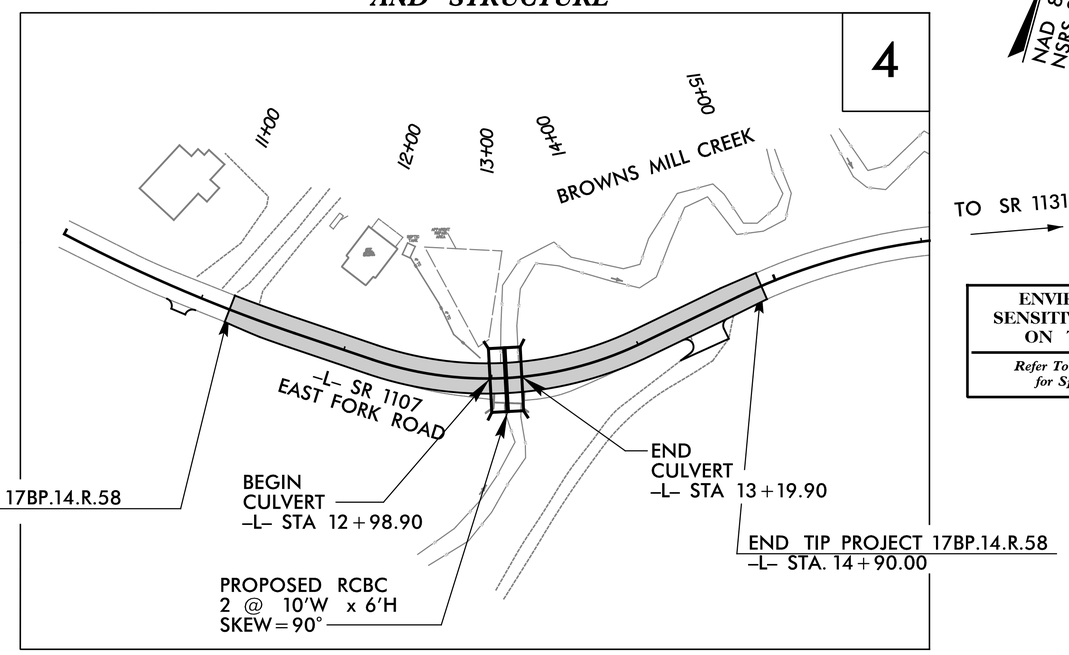


VICINITY MAP

DETOUR

TO US 178

TO SR 1131



NAD 83/ NSRS 2007

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	SW CFW
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

GRAPHIC SCALE

10 0 20
PLANS

10 0 20
PROFILE (HORIZONTAL)

2.5 0 5
PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

PREPARED BY: moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

DESIGN BY: *GREGORY W. BRICKHAM, PE*
NCDOT LEVEL III: DESIGNER OF EROSION AND SEDIMENT CONTROL PLANS CERT #3006

REVIEWED BY: *JEFFREY L. RECK, PE*
NCDOT LEVEL III-A: DESIGNER OF EROSION AND SEDIMENT CONTROL PLANS CERT #132

Prepared for the Office of:

ROADSIDE ENVIRONMENTAL UNIT

1 South Wilmington St.
Raleigh, NC 27611

2012 STANDARD SPECIFICATIONS

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

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7/24/2015
Chuf Tinsch

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	EC-3
R/W SHEET NO.	

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	11+20	13+00	LT	185
4	-L-	11+20	13+00	RT	220
4	-L-	13+25	14+90	LT	170
4	-L-	13+25	14+90	RT	100
			SUBTOTAL		675
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					50
				TOTAL	725
				SAY	750

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	14+66	14+66	LT	35
4	-L-	13+28	14+20	RT	70
4	-L-	14+68	14+90	RT	25
			SUBTOTAL		130
		ADDITIONAL PSRM TO BE INSTALLED			10
				TOTAL	140
				SAY	150

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bhuffman

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	EC-3A
R/W SHEET NO.	

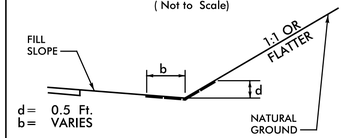
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	EC-4\CONST-4
R/W SHEET NO.	

DETAIL A
TOE PROTECTION
(Not to Scale)

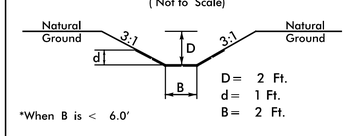


d = 0.5 Ft.
b = VARIES

Type of Liner = EXCELSIOR MATTING

FROM STA. 13+25 TO STA. 14+30 RT

DETAIL B
TAIL DITCH
(Not to Scale)



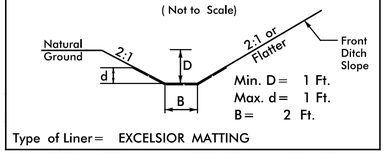
D = 2 Ft.
d = 1 Ft.
B = 2 Ft.

*When B is < 6.0'

Type of Liner = EXCELSIOR MATTING

FROM STA. 14+66 LT TO STREAMBANK

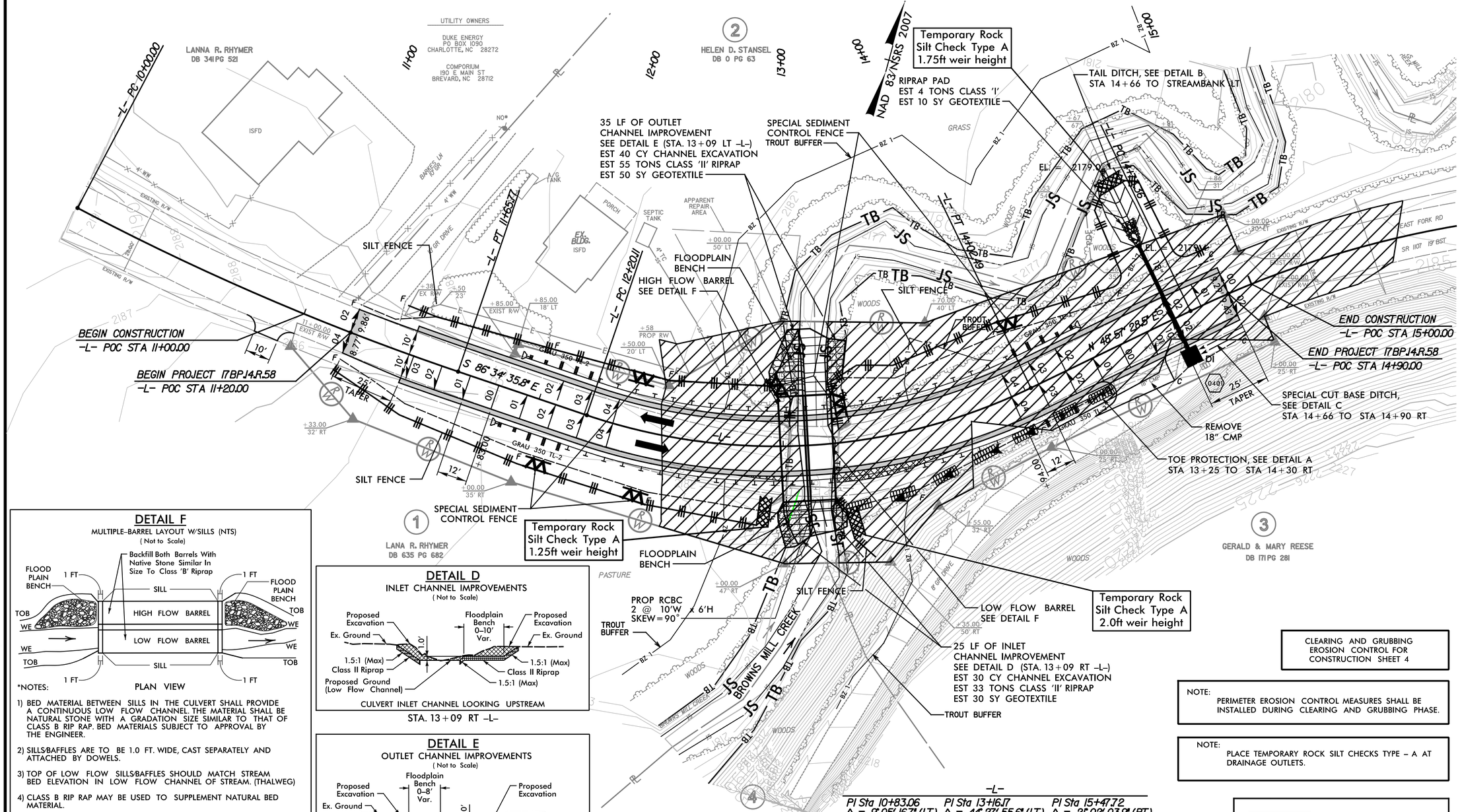
DETAIL C
SPECIAL CUT BASE DITCH
(Not to Scale)



Min. D = 1 Ft.
Max. d = 1 Ft.
B = 2 Ft.

Type of Liner = EXCELSIOR MATTING

FROM STA. 14+66 TO STA. 14+90 RT



DETAIL F
MULTIPLE-BARREL LAYOUT W/SILLS (NTS)
(Not to Scale)

*NOTES:

1) BED MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. BED MATERIALS SUBJECT TO APPROVAL BY THE ENGINEER.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) TOP OF LOW FLOW SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) CLASS B RIP RAP MAY BE USED TO SUPPLEMENT NATURAL BED MATERIAL.

5) DO NOT SET ELEVATION OF HIGH SILL ABOVE BANK FULL.

6) THERE WILL BE A SILL LOCATED 1.0' INSIDE BOTH THE UPSTREAM & DOWNSTREAM END OF EACH BARREL.

7) SILL IN HIGH FLOW BARREL WILL BE 2.5 FT. HIGH. SILL IN LOW FLOW BARREL WILL BE 1.5' FT. HIGH.

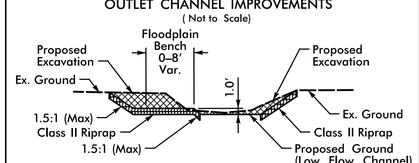
STA. 13+09 LT /RT -L-

DETAIL D
INLET CHANNEL IMPROVEMENTS
(Not to Scale)

CULVERT INLET CHANNEL LOOKING UPSTREAM

STA. 13+09 RT -L-

DETAIL E
OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



CULVERT OUTLET CHANNEL LOOKING DOWNSTREAM

STA. 13+09 LT -L-

-L-

PI Sta 10+83.06	PI Sta 13+16.17	PI Sta 15+47.72
Δ = 9° 05' 16.7" (LT)	Δ = 44° 27' 55.6" (LT)	Δ = 21° 02' 03.9" (RT)
D = 5° 28' 56.2"	D = 24° 22' 52.3"	D = 14° 18' 11.6"
L = 165.77'	L = 182.38'	L = 147.06'
T = 83.06'	T = 96.06'	T = 74.37'
R = 1,045.11'	R = 235.00'	R = 400.58'
e = Ex1st	e = 4.0%	e = Ex1st
DS = Ex1st	DS = 30 MPH	DS = Ex1st

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

NOTE:
PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED DURING CLEARING AND GRUBBING PHASE.

NOTE:
PLACE TEMPORARY ROCK SILT CHECKS TYPE - A AT DRAINAGE OUTLETS.

TROUT STREAM BUFFER ZONE

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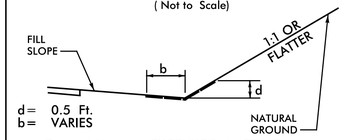
thulfman

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	EC-5\CONST-4
R/W SHEET NO.	

CULVERT CONSTRUCTION SEQUENCE

1. INSTALL PORTABLE STILLING BASIN FOR PUMPED EFFLUENT
2. INSTALL IMPERVIOUS DIKES AND TEMPORARY 2 @ 42" HDPE
3. REMOVE EXISTING BRIDGE AND ROADWAY EMBANKMENT
4. CONSTRUCT NEW 2 @ 10' X 6' RCBC
   A. CONSTRUCT LB RCBC FIRST, SHIFT TEMPORARY PIPES INSIDE LB
   B. CONSTRUCT LA RCBC
5. COMPLETE U/S & D/S CHANNEL IMPROVEMENTS
6. REMOVE IMPERVIOUS DIKES AND TEMPORARY 2 @ 42" HDPE

DETAIL A
TOE PROTECTION
(Not to Scale)

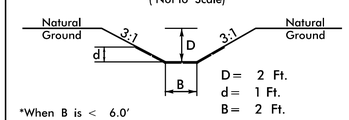


d= 0.5 Ft.
b= VARIES

Type of Liner= EXCELSIOR MATTING

FROM STA. 13+25 TO STA. 14+30 RT

DETAIL B
TAIL DITCH
(Not to Scale)



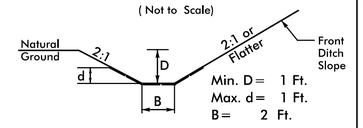
D= 2 Ft.
d= 1 Ft.
B= 2 Ft.

*When B is < 6.0'

Type of Liner= EXCELSIOR MATTING

FROM STA. 14+66 LT TO STREAMBANK

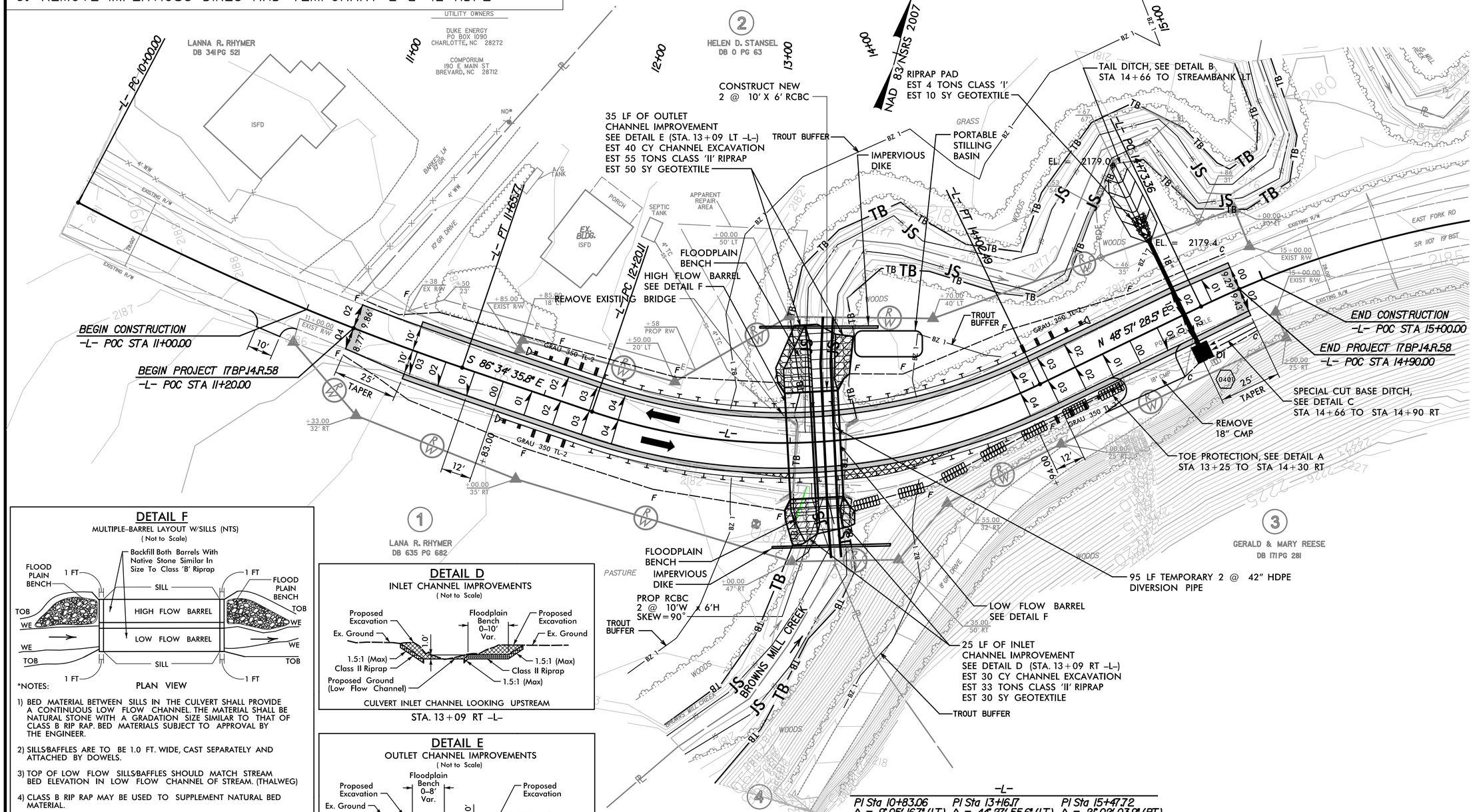
DETAIL C
SPECIAL CUT BASE DITCH
(Not to Scale)



Min. D= 1 Ft.
Max. d= 1 Ft.
B= 2 Ft.

Type of Liner= EXCELSIOR MATTING

FROM STA. 14+66 TO STA. 14+90 RT



DETAIL F
MULTIPLE-BARREL LAYOUT W/SILLS (NTS)
(Not to Scale)

*NOTES:

1) BED MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. BED MATERIALS SUBJECT TO APPROVAL BY THE ENGINEER.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) TOP OF LOW FLOW SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) CLASS B RIP RAP MAY BE USED TO SUPPLEMENT NATURAL BED MATERIAL.

5) DO NOT SET ELEVATION OF HIGH SILL ABOVE BANK FULL.

6) THERE WILL BE A SILL LOCATED 1.0' INSIDE BOTH THE UPSTREAM & DOWNSTREAM END OF EACH BARREL.

7) SILL IN HIGH FLOW BARREL WILL BE 2.5 FT. HIGH. SILL IN LOW FLOW BARREL WILL BE 1.5' FT. HIGH.

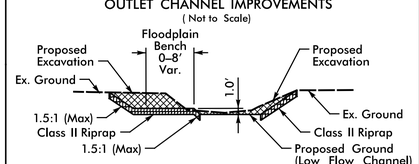
STA. 13+09 LT /RT -L-

DETAIL D
INLET CHANNEL IMPROVEMENTS
(Not to Scale)

CULVERT INLET CHANNEL LOOKING UPSTREAM

STA. 13+09 RT -L-

DETAIL E
OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



CULVERT OUTLET CHANNEL LOOKING DOWNSTREAM

STA. 13+09 LT -L-

-L-

PI Sta 10+83.06	PI Sta 13+16.17	PI Sta 15+47.72
Δ = 9° 05' 16.7" (LT)	Δ = 44° 27' 55.6" (LT)	Δ = 21° 02' 03.9" (RT)
D = 5° 28' 56.2"	D = 24° 22' 52.3"	D = 14° 18' 11.6"
L = 165.77'	L = 182.38'	L = 147.06'
T = 83.06'	T = 96.06'	T = 74.37'
R = 1,045.11'	R = 235.00'	R = 400.58'
e = Ex1st	e = 4.0%	e = Ex1st
DS = Ex1st	DS = 30 MPH	DS = Ex1st

8/17/99

7/24/2015
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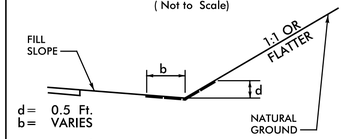
thulfman

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	EC-6\CONST-4
R/W SHEET NO.	

DETAIL A
TOE PROTECTION
(Not to Scale)

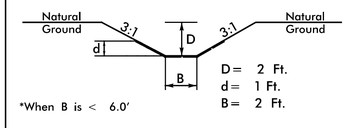


d = 0.5 Ft.
b = VARIES

Type of Liner = EXCELSIOR MATTING

FROM STA. 13+25 TO STA. 14+30 RT

DETAIL B
TAIL DITCH
(Not to Scale)



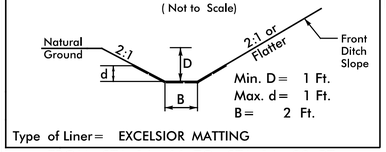
D = 2 Ft.
d = 1 Ft.
B = 2 Ft.

*When B is < 6.0'

Type of Liner = EXCELSIOR MATTING

FROM STA. 14+66 LT TO STREAMBANK

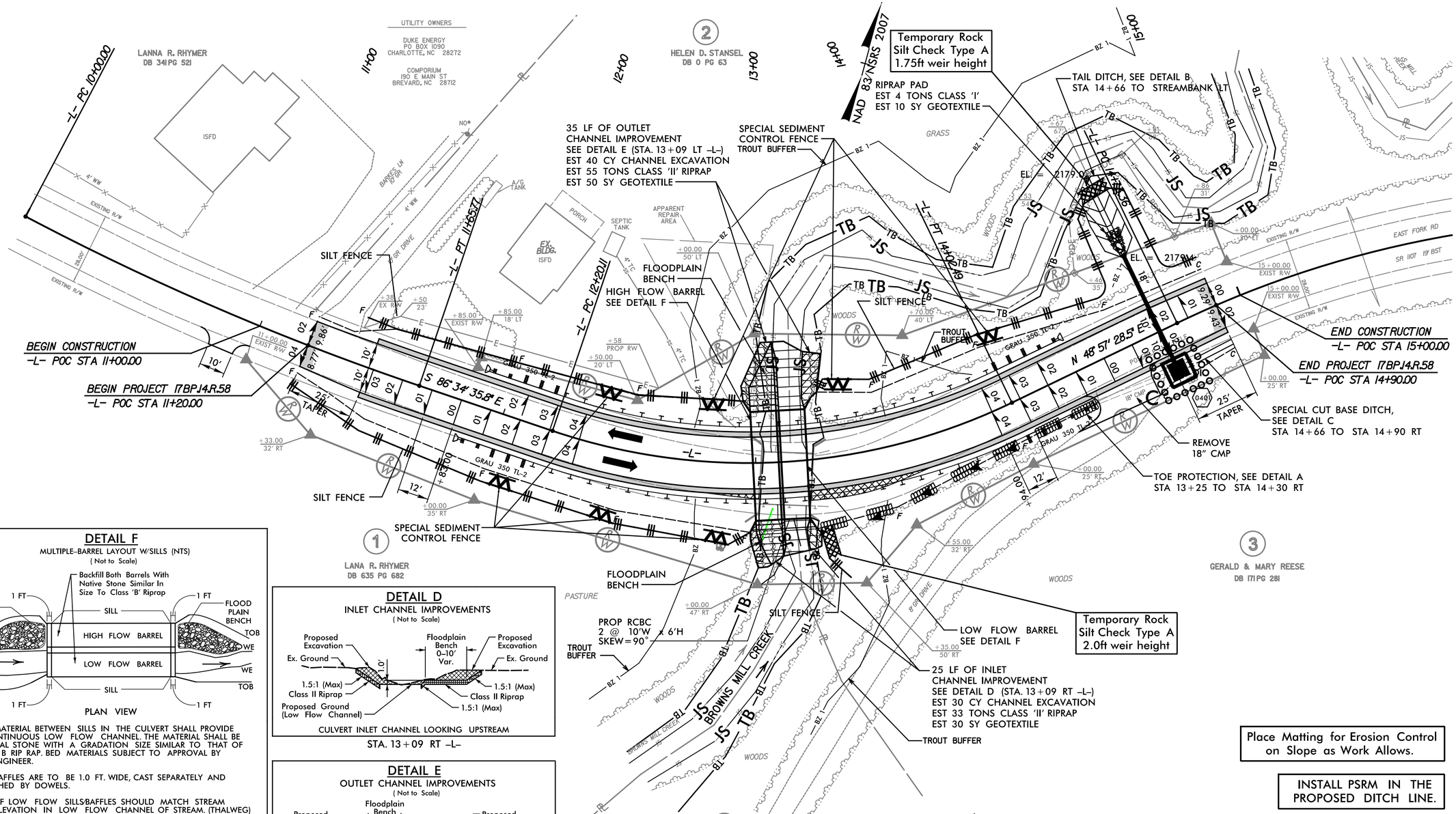
DETAIL C
SPECIAL CUT BASE DITCH
(Not to Scale)



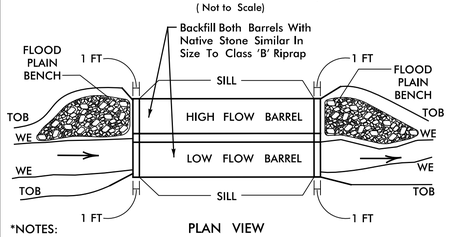
Min. D = 1 Ft.
Max. d = 1 Ft.
B = 2 Ft.

Type of Liner = EXCELSIOR MATTING

FROM STA. 14+66 TO STA. 14+90 RT



DETAIL F
MULTIPLE-BARREL LAYOUT W/SILLS (NTS)
(Not to Scale)



*NOTES:

1) BED MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. BED MATERIALS SUBJECT TO APPROVAL BY THE ENGINEER.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) TOP OF LOW FLOW SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) CLASS B RIP RAP MAY BE USED TO SUPPLEMENT NATURAL BED MATERIAL.

5) DO NOT SET ELEVATION OF HIGH SILL ABOVE BANK FULL.

6) THERE WILL BE A SILL LOCATED 1.0' INSIDE BOTH THE UPSTREAM & DOWNSTREAM END OF EACH BARREL.

7) SILL IN HIGH FLOW BARREL WILL BE 2.5 FT. HIGH. SILL IN LOW FLOW BARREL WILL BE 1.5' FT. HIGH.

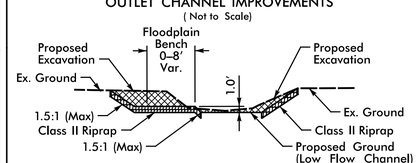
STA. 13+09 LT /RT –L–

DETAIL D
INLET CHANNEL IMPROVEMENTS
(Not to Scale)

CULVERT INLET CHANNEL LOOKING UPSTREAM

STA. 13+09 RT –L–

DETAIL E
OUTLET CHANNEL IMPROVEMENTS
(Not to Scale)



CULVERT OUTLET CHANNEL LOOKING DOWNSTREAM

STA. 13+09 LT –L–

–L–

PI Sta 10+83.06	PI Sta 13+16.17	PI Sta 15+47.72
Δ = 9° 05' 16.7" (LT)	Δ = 44° 27' 55.6" (LT)	Δ = 21° 02' 03.9" (RT)
D = 5° 28' 56.2"	D = 24° 22' 52.3"	D = 14° 18' 11.6"
L = 165.77'	L = 182.38'	L = 147.06'
T = 83.06'	T = 96.06'	T = 74.37'
R = 1,045.11'	R = 235.00'	R = 400.58'
e = Ex1st	e = 4.0%	e = Ex1st
DS = Ex1st	DS = 30 MPH	DS = Ex1st

Place Matting for Erosion Control on Slope as Work Allows.

INSTALL PSRM IN THE PROPOSED DITCH LINE.

8/17/99

7/24/2015
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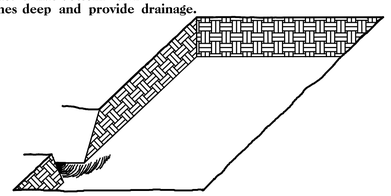
PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.58	RF-1
R/W SHEET NO.	

PLANTING DETAILS

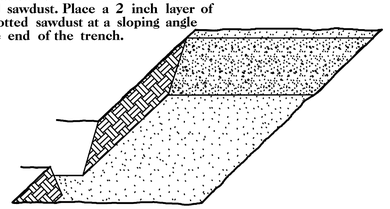
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

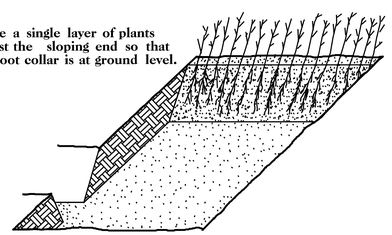
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



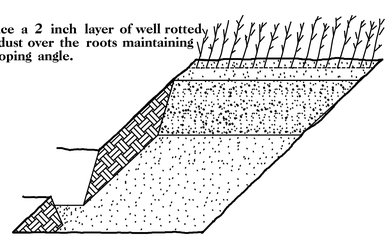
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

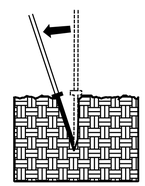


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

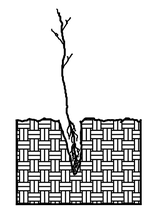


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

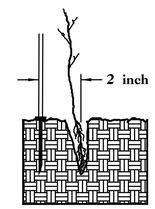
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



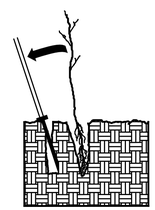
1. Insert planting bar as shown and pull handle toward planter.



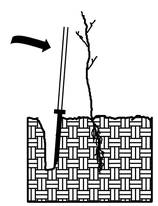
2. Remove planting bar and place seedling at correct depth.



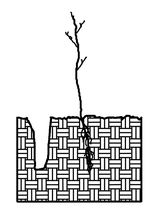
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in – 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in – 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.58	X-A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

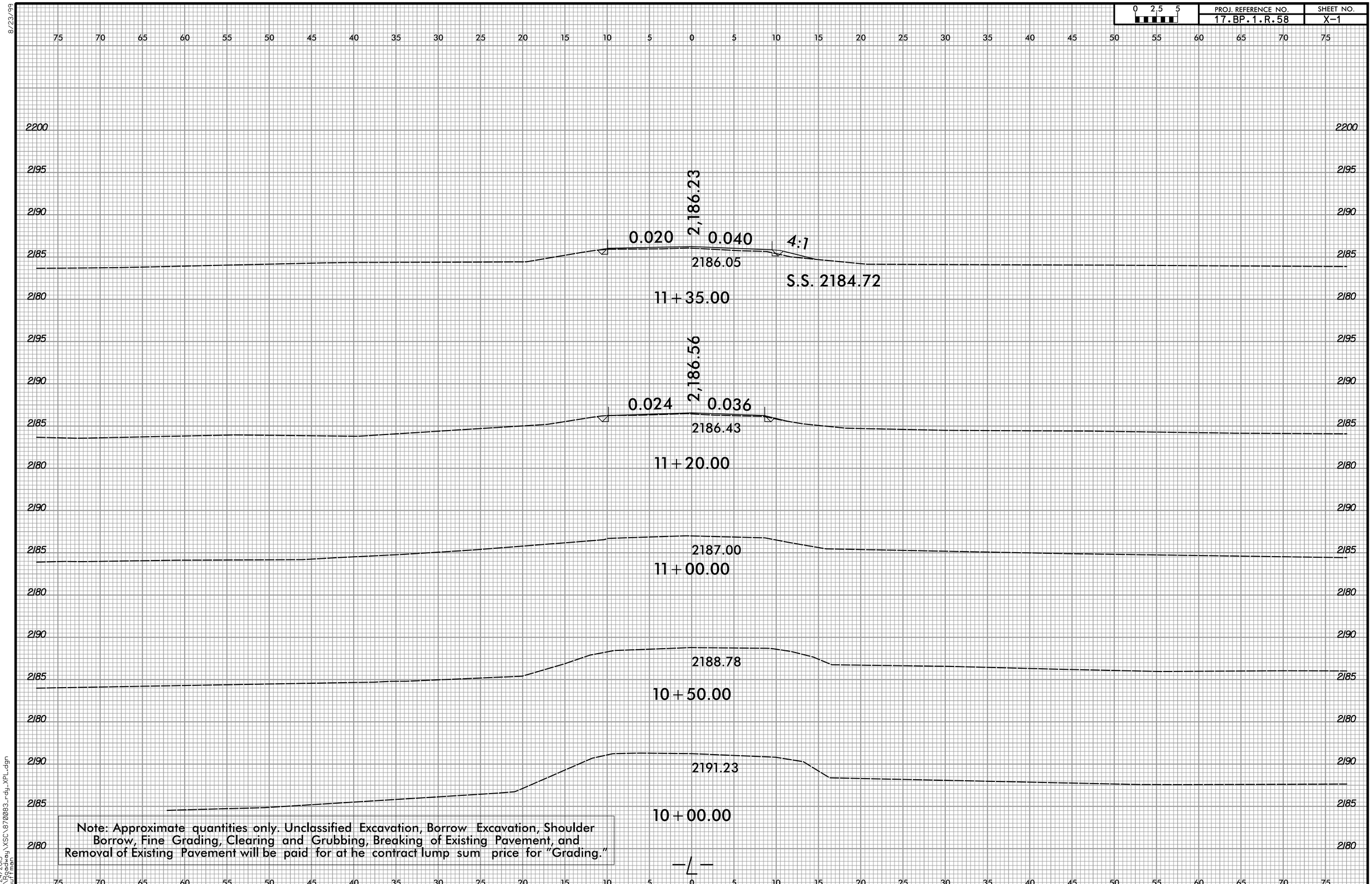
CROSS-SECTION SUMMARY

Approximate quantities only. Unclassified excavation, borrow excavation, shoulder borrow, fine grading, clearing and grubbing, breaking of existing pavement and removal of existing pavement will be paid for at the lump sum price for "Grading".

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDES BACKFILL FOR UNDERCUT

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
11+20.00000	0	0
11+35.00000	1	0
11+50.00000	1	2
12+00.00000	1	27
12+50.00000	0	62
13+00.00000	0	69
13+01.67000	0	2
13+12.00000	0	15
13+22.33000	0	27
13+50.00000	0	76
14+00.00000	0	63
14+50.00000	4	22
14+90.00000	6	1

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-1



Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Shoulder Borrow, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement, and Removal of Existing Pavement will be paid for at he contract lump sum price for "Grading."

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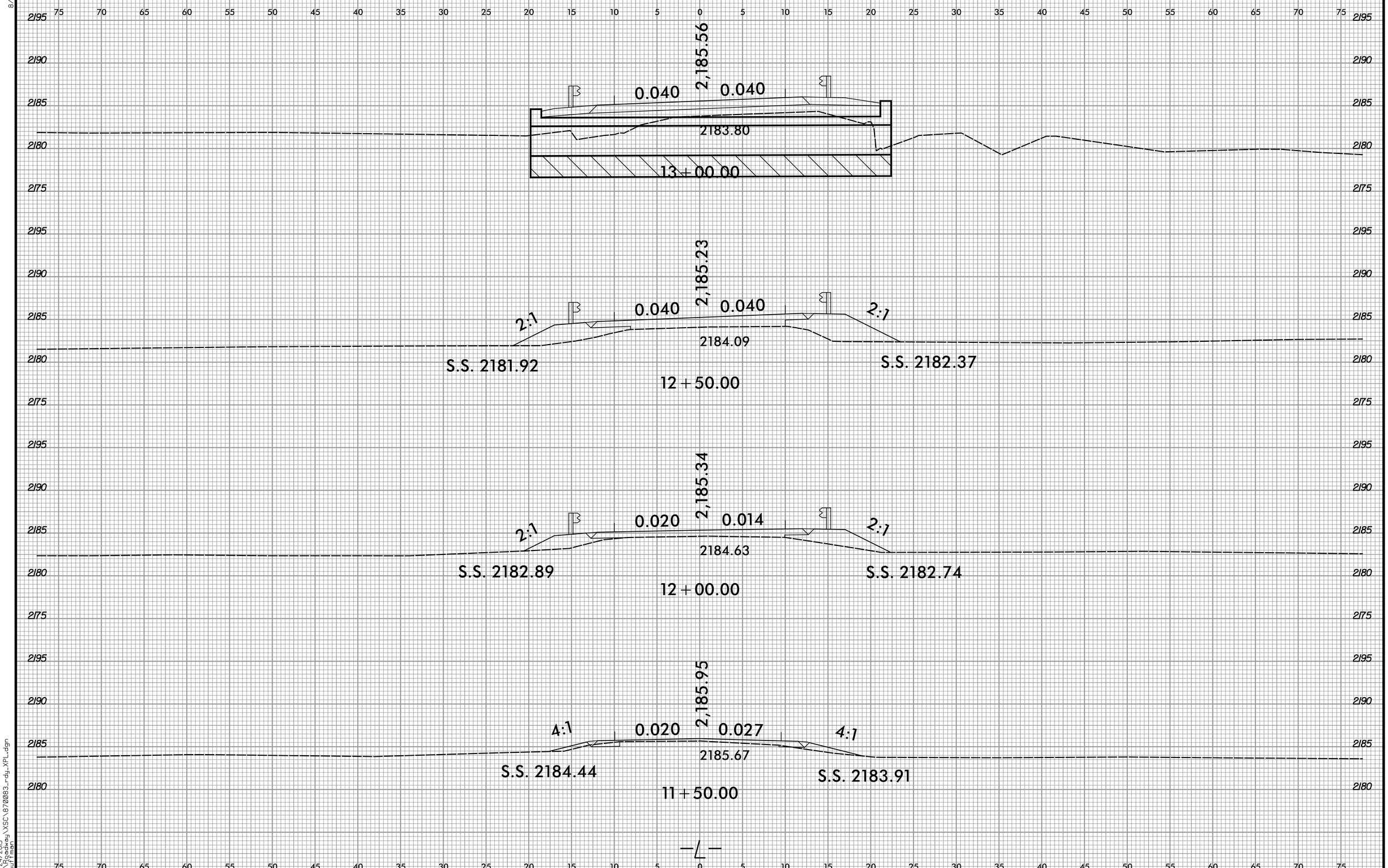
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-2



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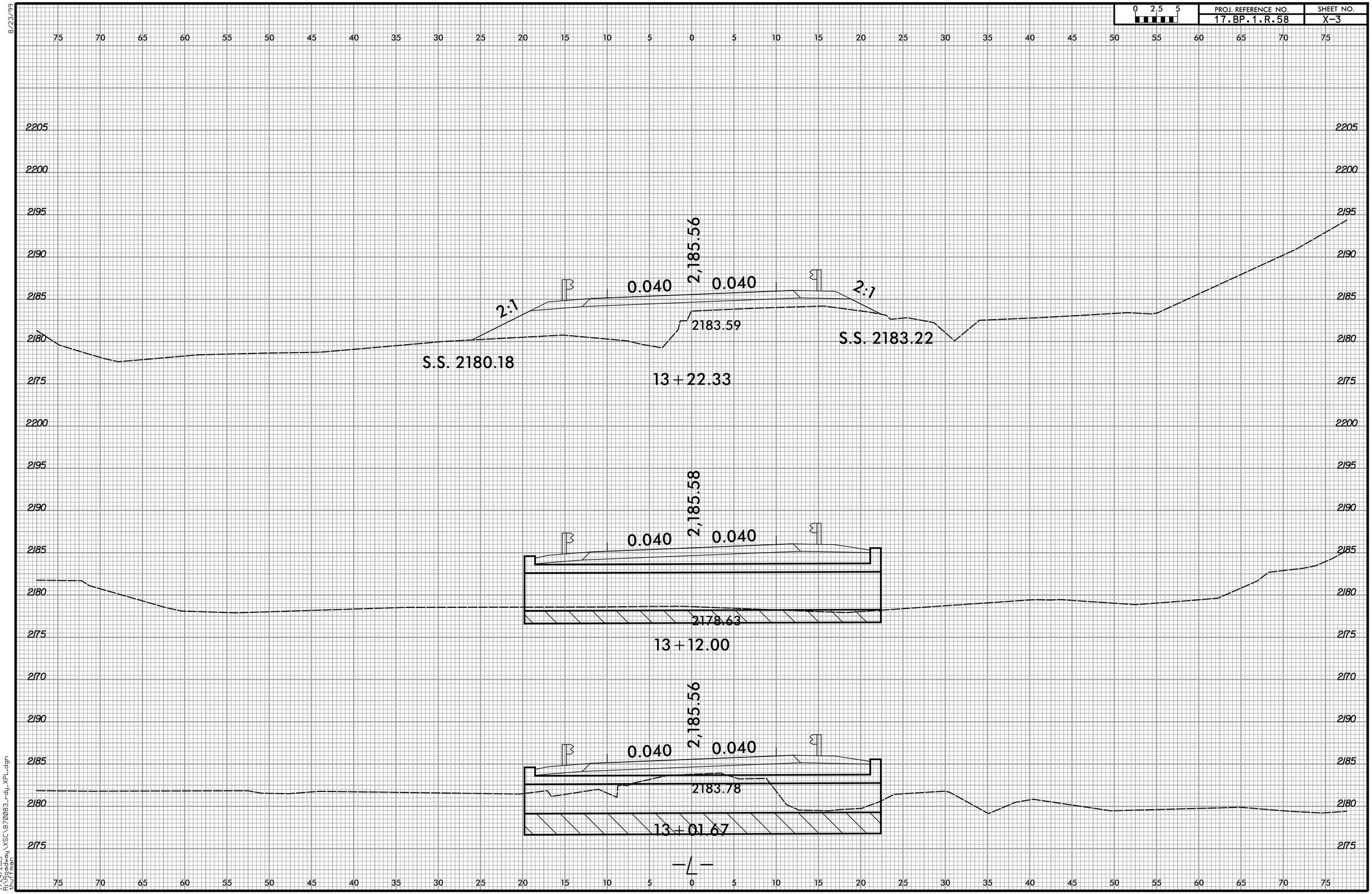
PROJ. REFERENCE NO.	SHEET NO.
17.BP.1.R.58	X-3



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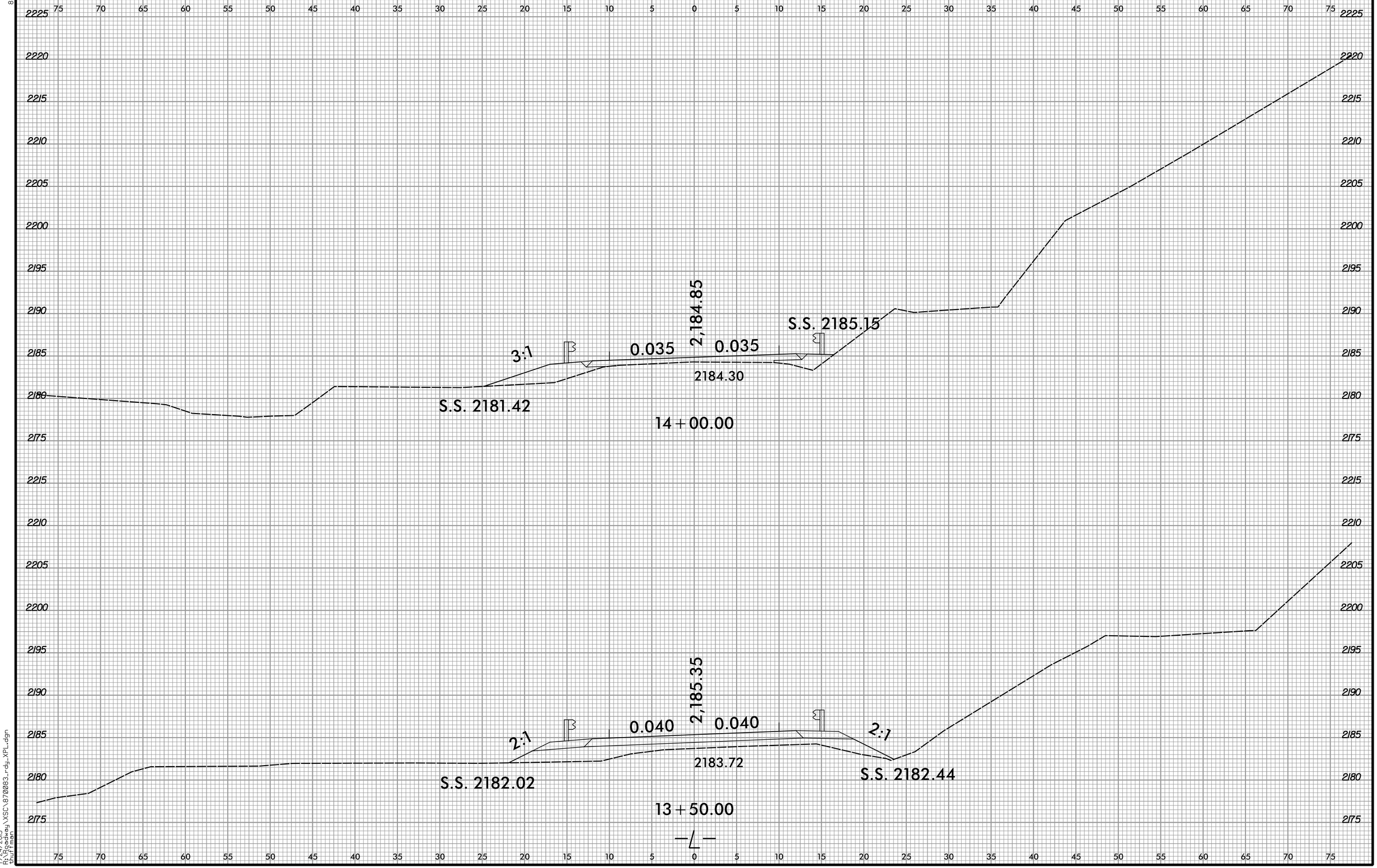
thuffman

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-4



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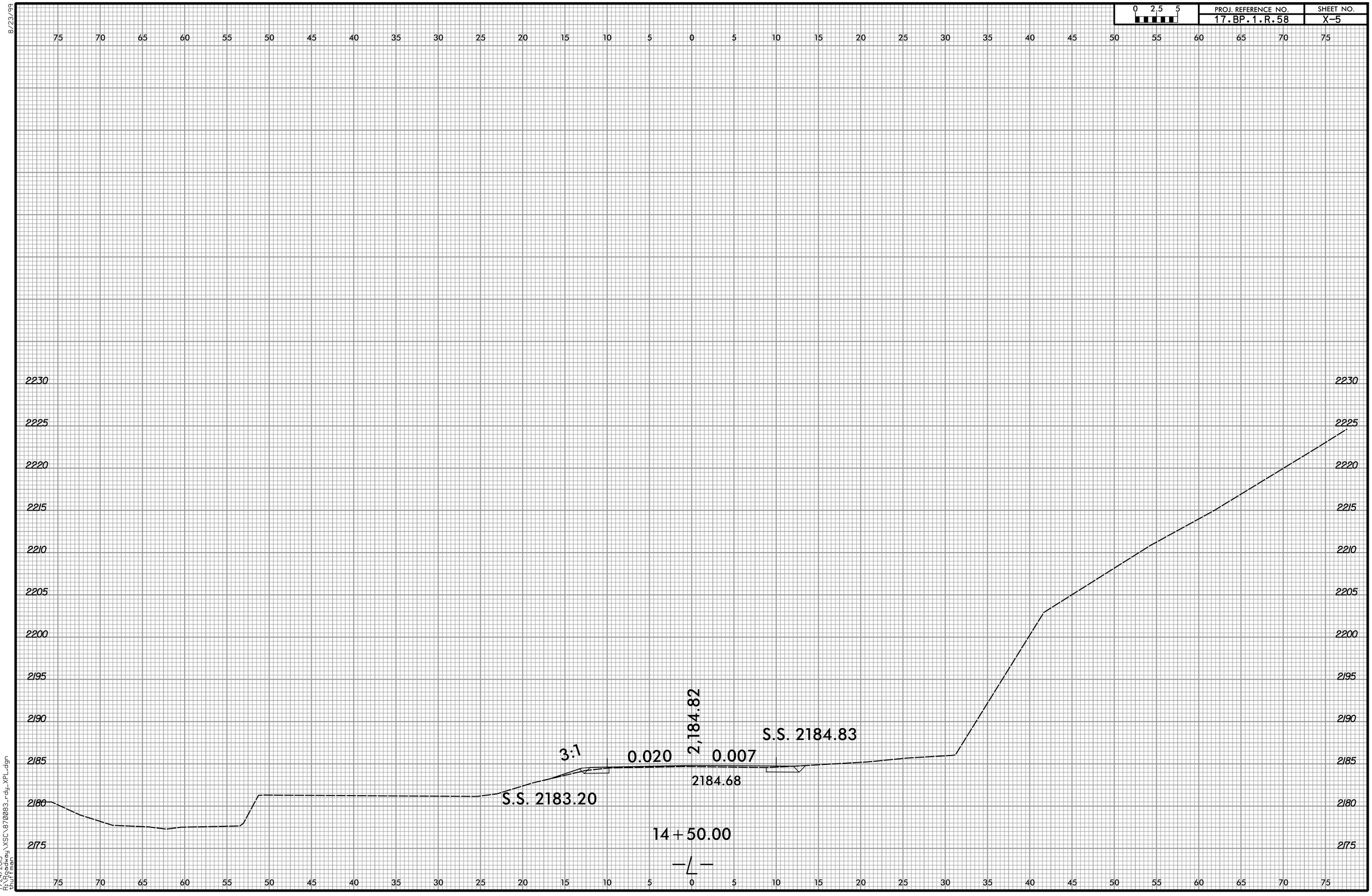
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-5



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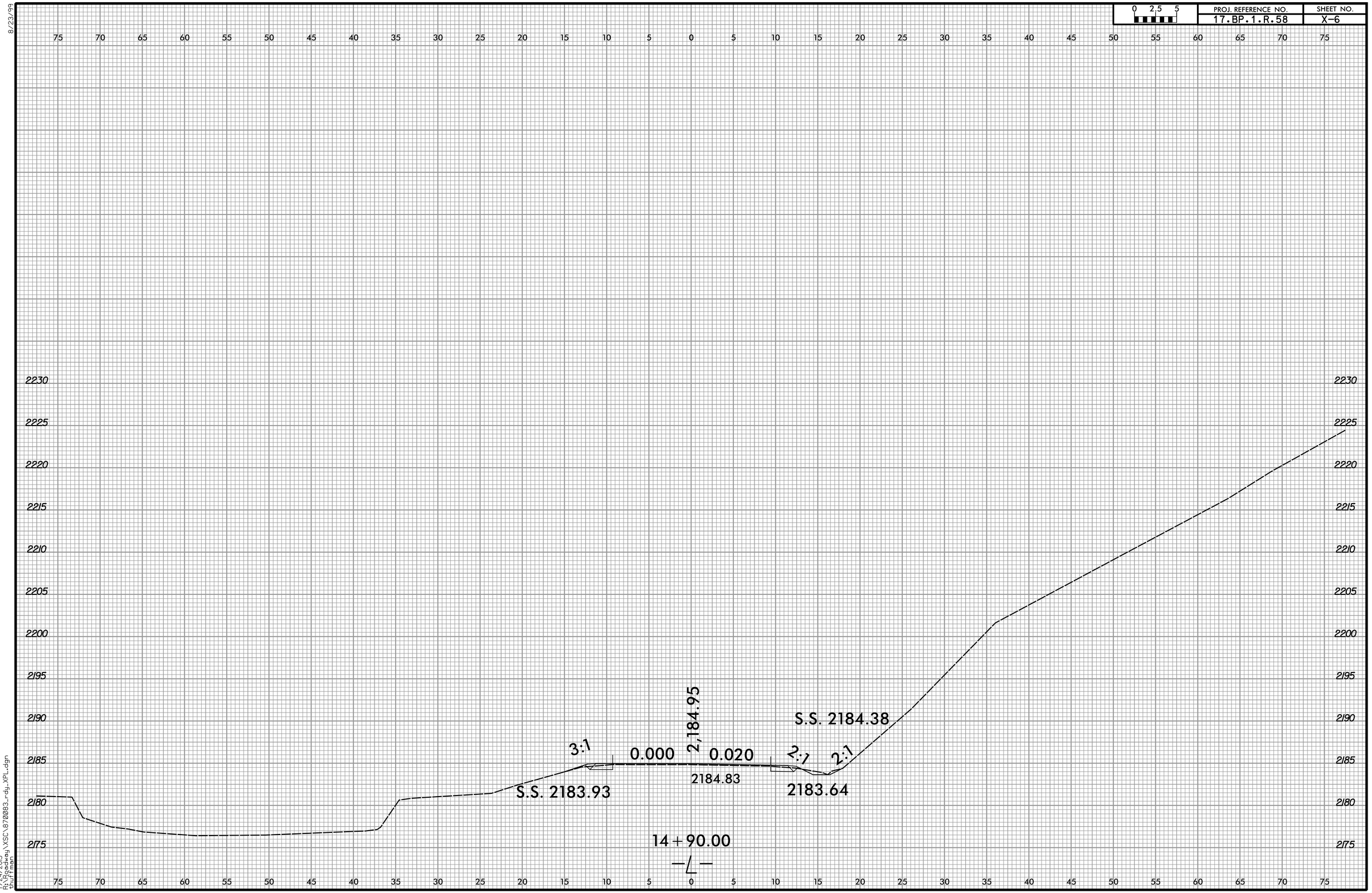
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-6



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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-7

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thuffman

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-8

7/24/2015
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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17.BP.1.R.58	X-9

7/24/2015
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thuffman

PROJECT: 17BP.14.R.58

CONTRACT: DN00183

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.58	1	

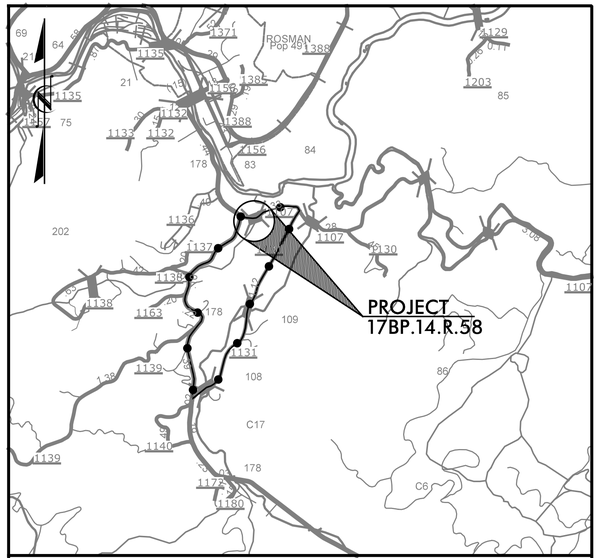
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.14.R.58		PE
17BP.14.R.58		ROW & UTIL
17BP.14.R.58		CONST.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSYLVANIA COUNTY

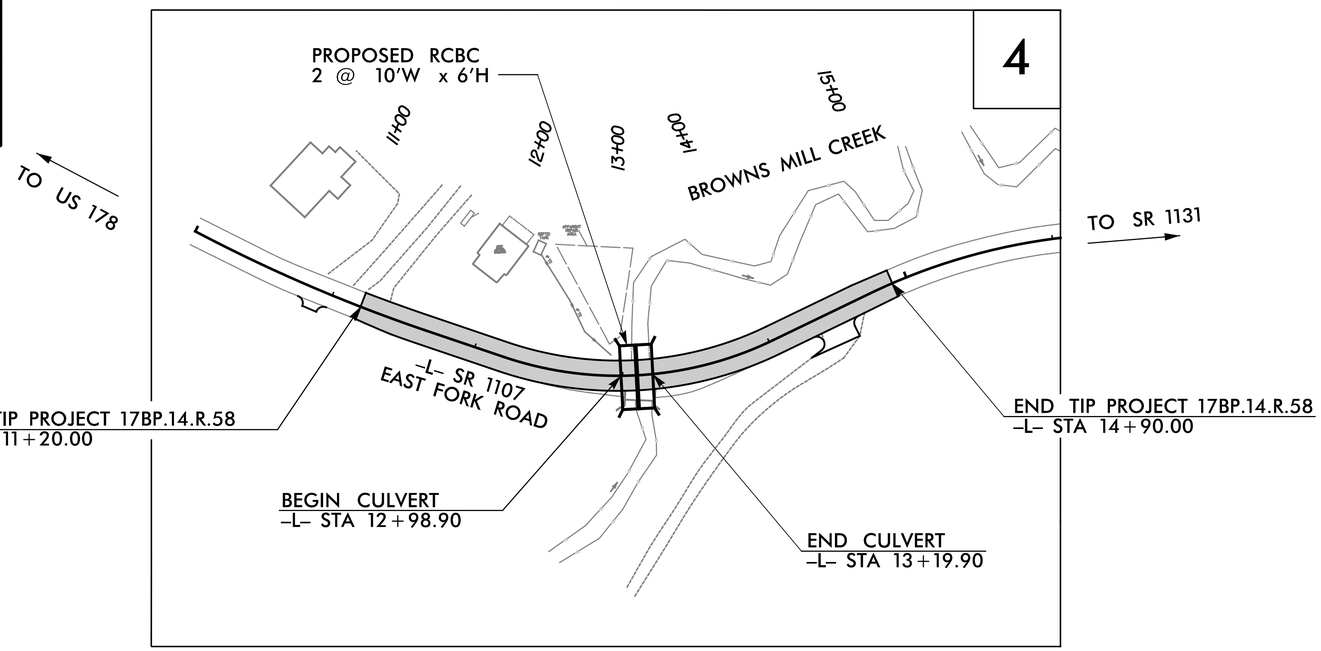
LOCATION: BRIDGE NO. 83 ON SR 1107 (EAST FORK ROAD) OVER BROWNS MILL CREEK

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



VICINITY MAP

DETOUR



CULVERT

DESIGN DATA

ADT 2015 = 1,160
ADT 2035 = 2,170
DHV = N/A %
D = N/A %
T = 6 % *
V = 40 MPH
* TTST = N/A DUAL 6%
FUNC CLASS =
MINOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY OF PROJECT 17BP.14.R.58 = 0.063 mi.
LENGTH STRUCTURE OF PROJECT 17BP.14.R.58 = 0.004 mi.
TOTAL LENGTH OF STATE PROJECT 17BP.14.R.58 = 0.067mi.

Prepared for NCDOT In the Office of:
moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

2012 STANDARD SPECIFICATIONS

LETTING DATE :
SEPTEMBER 8, 2015

TIM REID, P.E.
PROJECT ENGINEER

MIKELE WINTERS, P.E.
PROJECT DESIGN ENGINEER

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

7/24/2015
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thurfman

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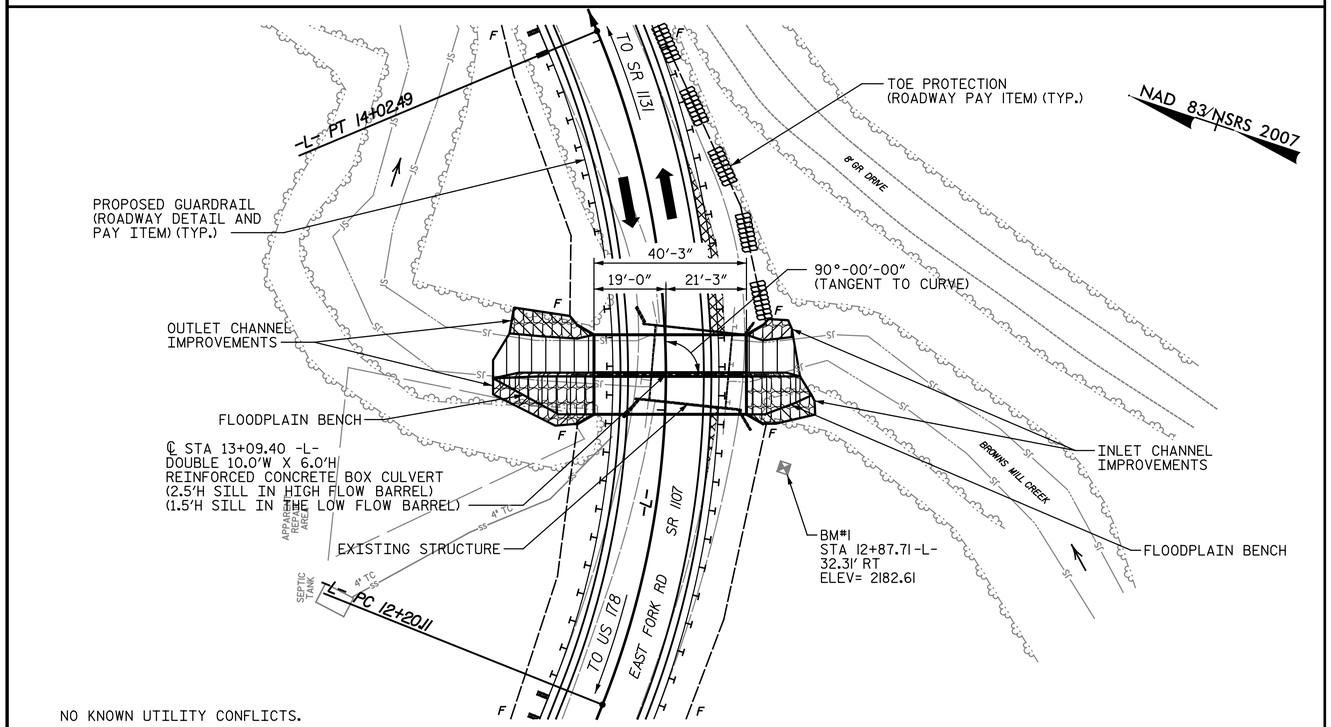
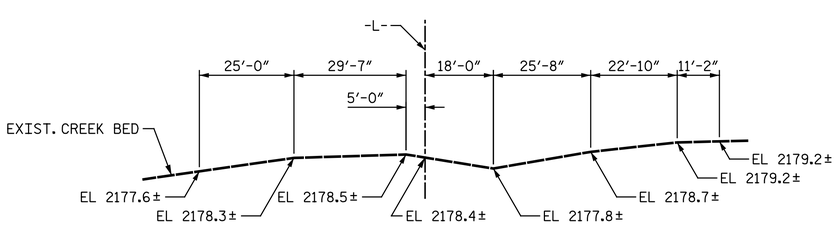
TBM BM#1 RR SPIKE IN 8" WALNUT TREE AT STA 12+87.71 -L-; 32.31' RT, EL 2182.61



LOCATION SKETCH

NOTES:

1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
2. DESIGN FILL = 3.3'
3. FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
4. THE EXISTING STRUCTURE CONSISTING OF ONE SPAN, 1 @ 20'-6" WITH A TIMBER FLOOR ON I BEAMS AND A CLEAR ROADWAY WIDTH OF 17'-0" ON TIMBER CAPS AND TIMBER POSTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
5. 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
6. 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.
7. 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.
8. DIMENSIONS FOR WING WALL LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
9. STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
10. AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS 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.
11. 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.
12. A THREE FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
13. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
14. FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
15. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
16. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
17. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
18. BED MATERIAL PLACED BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER SILLS. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. STONES LARGER 12 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.



PROFILE ALONG ℄ CULVERT

HYDRAULIC DATA

DESIGN DISCHARGE	= 440 CFS
FREQUENCY OF DESIGN DISCHARGE	= 25-YR
DESIGN HIGH WATER ELEVATION	= 2182.9
DRAINAGE AREA	= 1.16 SQ MI
BASE DISCHARGE (Q100)	= 650 CFS
BASE HIGH WATER ELEVATION	= 2184.15

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 700 CFS
FREQUENCY OF OVERTOPPING	= >100+-YR
OVERTOPPING ELEVATION	= 2185.6

GRADE DATA

GRADE POINT ELEV. @ STATION 13+09.40	= 2185.58
BED ELEV. @ STATION 13+09.40	= 2176.7
ROADWAY SLOPES	= 2:1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
BARREL @ 2.082 CY/FT	83.8 C.Y.
WING ETC.	21.2 C.Y.
TOTAL	105.0 C.Y.
REINFORCING STEEL	
BARREL	12,663 LBS.
WING ETC.	793 LBS.
TOTAL	13,456 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	62 TONS
STRUCTURE REMOVAL	LUMP SUM

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.14.R.58
TRANSYLVANIA COUNTY
STATION: 13+09.40 -L-

SHEET 1 OF 5 REPLACES BRIDGE No. 83

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL 10 FT. X 6 FT. CONCRETE BOX CULVERT 90° SKEW

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

STD. NO. CB12A

ASSEMBLED BY : C. POWELL DATE : 01/2013
CHECKED BY : M. WINTERS DATE : 04/2013
DESIGN ENGINEER OF RECORD : M. WINTERS DATE :
DRAWN BY : R.W. WRIGHT DATE : JULY. 1990
CHECKED BY : D.A. GLADDEN DATE : JULY. 1990

SPECIAL
STANDARD

ADDED NOV. 1, 1990

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

DocuSigned by: Mike Winters
77F61C8[illegible]
NORTH CAROLINA PROFESSIONAL SEAL 026433 ENGINEER MIKELE E. WINTERS
7/27/2015

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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
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								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**	1.60	--	1.75	**1.60**	1.00	TOP SLAB	**5.33**	1.78	1.00	TOP SLAB	9.61	
		HL-93 (OPERATING)	N/A	--	2.07	--	1.35	2.07	1.00	TOP SLAB	5.33	2.31	1.00	TOP SLAB	9.61	
		HS-20 (INVENTORY)	36.000	**2**	1.64	59.04	1.75	**1.64**	1.00	TOP SLAB	**5.33**	1.86	1.00	TOP SLAB	9.61	
		HS-20 (OPERATING)	36.000	--	2.13	76.68	1.35	2.13	1.00	TOP SLAB	5.33	2.41	1.00	TOP SLAB	9.61	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.52	47.52	1.40	3.52	1.00	TOP SLAB	5.33	3.95	1.00	TOP SLAB	9.61	
		SNGARBS2	20.000	--	3.30	66	1.40	3.30	1.00	TOP SLAB	5.33	3.66	1.00	TOP SLAB	9.61	
		SNAGRIS2	22.000	--	3.52	77.44	1.40	3.52	1.00	TOP SLAB	5.33	3.87	1.00	TOP SLAB	9.61	
		SNCOTTS3	27.250	--	3.36	91.56	1.40	3.36	1.00	BOTTOM SLAB	10.33	4.38	1.00	TOP SLAB	9.61	
		SNAGGRS4	34.925	--	2.71	94.647	1.40	2.71	1.00	BOTTOM SLAB	10.33	3.63	1.00	BOTTOM SLAB	9.61	
		SNS5A	35.550	--	3.14	111.63	1.40	3.14	1.00	BOTTOM SLAB	10.33	4.22	1.00	BOTTOM SLAB	9.61	
		SNS6A	39.950	--	3.23	129.04	1.40	3.23	1.00	BOTTOM SLAB	10.33	4.34	1.00	BOTTOM SLAB	9.61	
		SNS7B	42.000	--	3.48	146.16	1.40	3.48	1.00	BOTTOM SLAB	10.33	4.68	1.00	BOTTOM SLAB	9.61	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	3.11	102.63	1.40	3.11	1.00	BOTTOM SLAB	10.33	3.56	1.00	TOP SLAB	9.61	
		TNT4A	33.075	--	3.51	116.09	1.40	3.51	1.00	BOTTOM SLAB	10.33	4.72	1.00	BOTTOM SLAB	9.61	
		TNT6A	41.600	--	3.62	150.59	1.40	3.62	1.00	BOTTOM SLAB	10.33	4.87	1.00	BOTTOM SLAB	9.61	
		TNT7A	42.000	--	4.00	168	1.40	4.00	1.00	BOTTOM SLAB	10.33	5.37	1.00	BOTTOM SLAB	9.61	
		TNT7B	42.000	--	4.00	168	1.40	4.00	1.00	BOTTOM SLAB	10.33	5.37	1.00	BOTTOM SLAB	9.61	
		TNAGRIT4	43.000	**3**	2.70	116.1	1.40	**2.70**	1.00	BOTTOM SLAB	**10.33**	3.63	1.00	BOTTOM SLAB	9.61	
		TNAGT5A	45.000	--	2.97	133.65	1.40	2.97	1.00	BOTTOM SLAB	10.33	3.98	1.00	BOTTOM SLAB	9.61	
		TNAGT5B	45.000	--	2.97	133.65	1.40	2.97	1.00	BOTTOM SLAB	10.33	3.98	1.00	BOTTOM SLAB	9.61	

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	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1.
2.
3.
4.

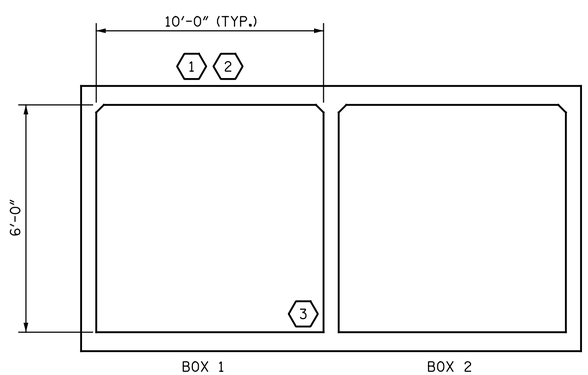
(#) CONTROLLING LOAD RATING

(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)

PROJECT NO. 17BP.14.R.58

TRANSYLVANIA COUNTY

STATION: 13+09.40 -L-

SHEET 2 OF 5

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-2
1			3			TOTAL SHEETS
2			4			5

STD. NO. LRFR5

ASSEMBLED BY : C. POWELL DATE : 12/2012
CHECKED BY : M. WINTERS DATE : 04/2013
DESIGN ENGINEER OF RECORD : M. WINTERS DATE :

DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11

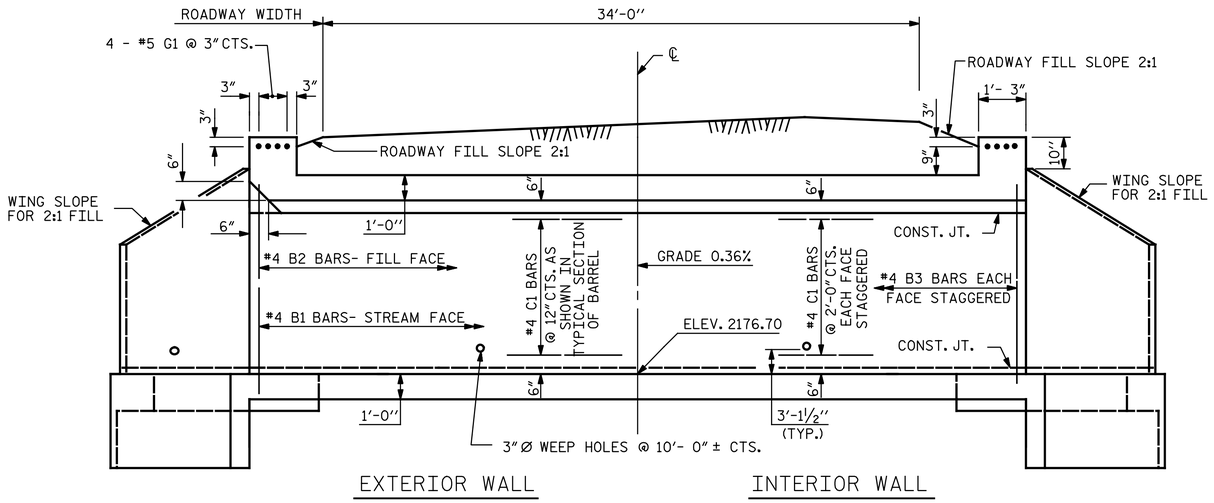
REV. 10/1/11 MAA/GM

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

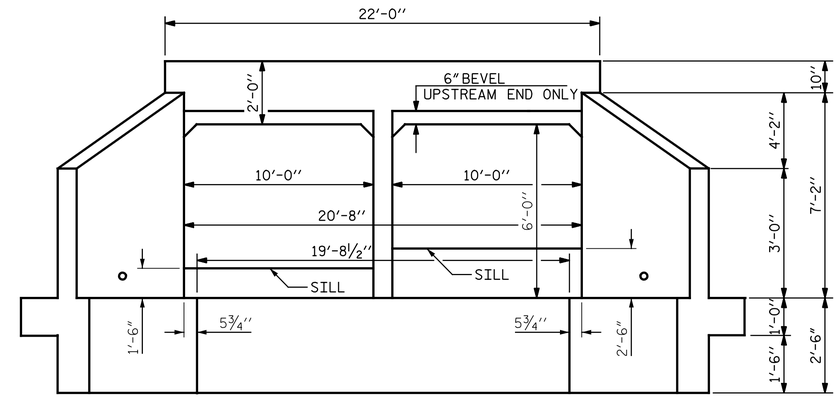
DocuSigned by: Mike Winters
NORTH CAROLINA PROFESSIONAL SEAL 026433 ENGINEER MIKELE E WINTERS
7/27/2015

7/24/2015
R:\Structures\870083_C2_LRFR.dgn
thuffman

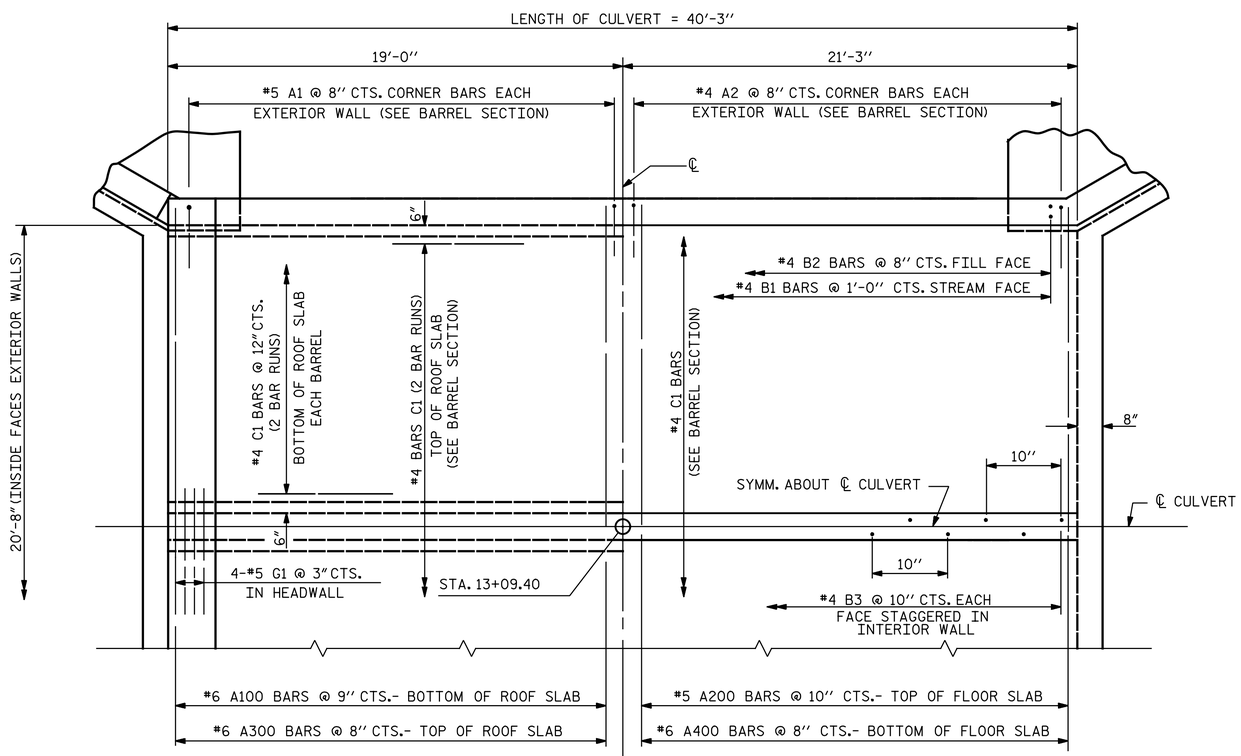
DocuSign Envelope ID: 35CF3C97-ACBC-4AF2-A1E4-7BE36C819E9D



CULVERT SECTION NORMAL TO ROADWAY

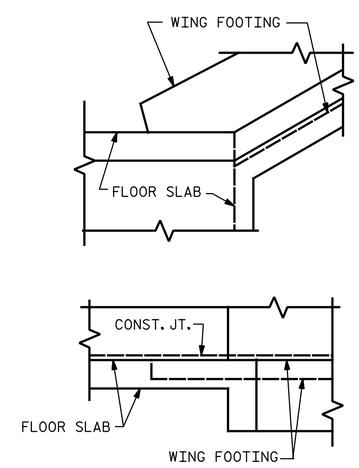


END ELEVATION



PART PLAN-ROOF SLAB

PART PLAN-FLOOR SLAB



DETAIL

CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING

PROJECT NO. 17BP.14.R.58
TRANSYLVANIA COUNTY
STATION: 13+09.40 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD DOUBLE 10 FT. X 6 FT. CONCRETE BOX CULVERT 90° SKEW

ASSEMBLED BY : C. POWELL	DATE : 12/2012	SPECIAL	
CHECKED BY : M. WINTERS	DATE : 04/2013		
DESIGN ENGINEER OF RECORD : M. WINTERS	DATE :		
DRAWN BY : RALPH D. UNDERWOOD	DATE : MAY 1971	STANDARD	
CHECKED BY : JOEL A. JOHNSON	DATE : JULY 1971		

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REDRAWN NOV. 1990 BY TSS CHECKED BY ARB

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

DocuSigned by: Mike Winters 77F61CBE0...
NORTH CAROLINA PROFESSIONAL SEAL 026433 ENGINEER MIKELE F. WINTERS
7/27/2015

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

STD. NO. CB12

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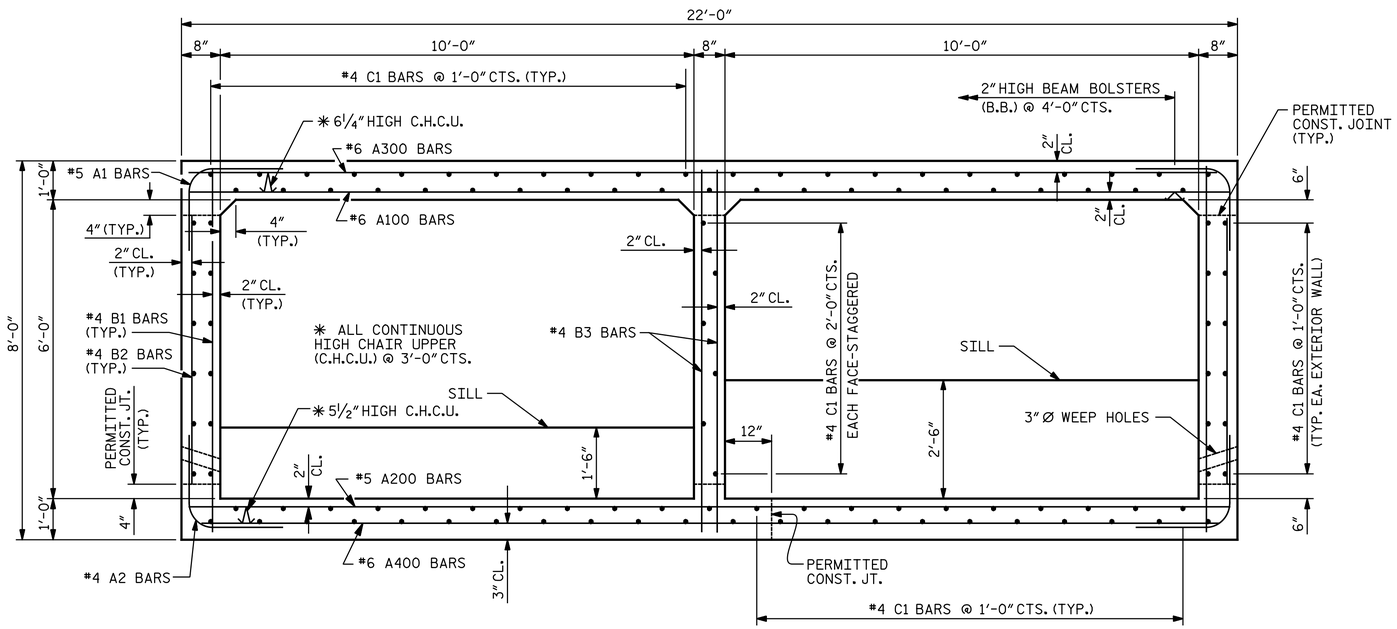
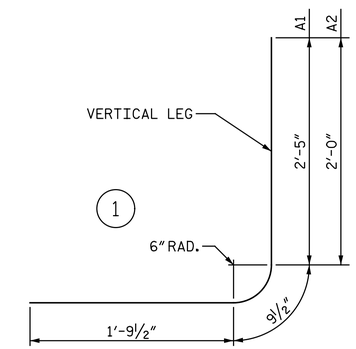


RIGHT ANGLE SECTION OF BARREL

THERE ARE 116 "C" BARS IN SECTION OF BARREL.
LOOKING UPSTREAM

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

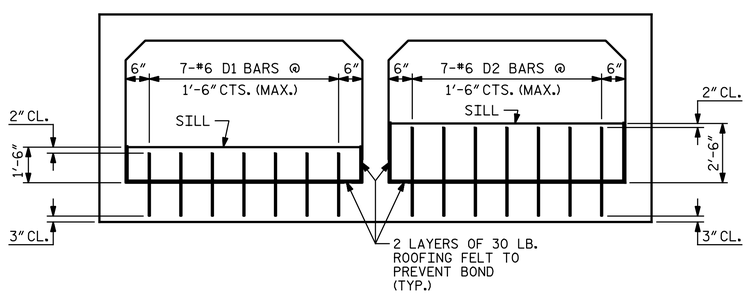
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	122	#5	1	5'-0"	636
A2	122	#4	1	4'-7"	374
A100	54	#6	STR	21'-7"	1751
A200	49	#5	STR	21'-7"	1103
A300	61	#6	STR	21'-7"	1978
A400	61	#6	STR	21'-7"	1978
B1	82	#4	STR	7'-6"	411
B2	122	#4	STR	5'-4"	435
B3	98	#4	STR	7'-6"	491
C1	232	#4	STR	20'-9"	3216
D1	14	#6	STR	2'-1"	44
D2	14	#6	STR	3'-1"	65
G1	8	#5	STR	21'-8"	181

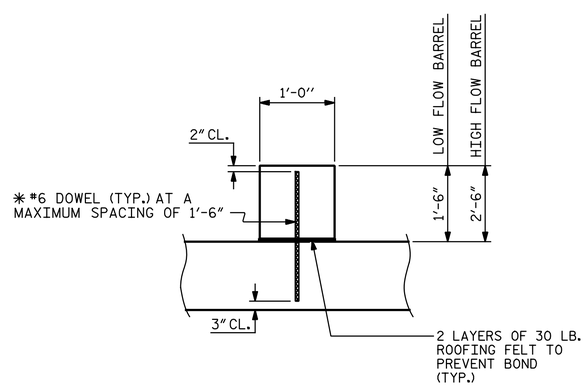
TOTAL REINFORCING STEEL 12,663 LBS

SPLICE CHART

BAR	SIZE	SPLICE LENGTH
A200	#5	1'-9"
A400	#6	2'-3"
B1	#4	1'-9"
B3	#4	1'-9"
C1	#4	1'-9"



ELEVATION



SECTION THROUGH SILL

✳ DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

CULVERT SILL DETAILS

(LOOKING UPSTREAM)

PROJECT NO. 17BP.14.R.58
TRANSYLVANIA COUNTY
STATION: 13+09.40 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 10 FT. X 6 FT. CONCRETE BOX CULVERT

DRAWN BY : C. POWELL DATE : 12/2012
CHECKED BY : M. WINTERS DATE : 04/2013
DESIGN ENGINEER OF RECORD : M. WINTERS DATE :

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

DocuSigned by: Mike Winters 77F61C8E0B
NORTH CAROLINA PROFESSIONAL SEAL 026433 ENGINEER MIKELE E WINTERS
7/27/2015

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

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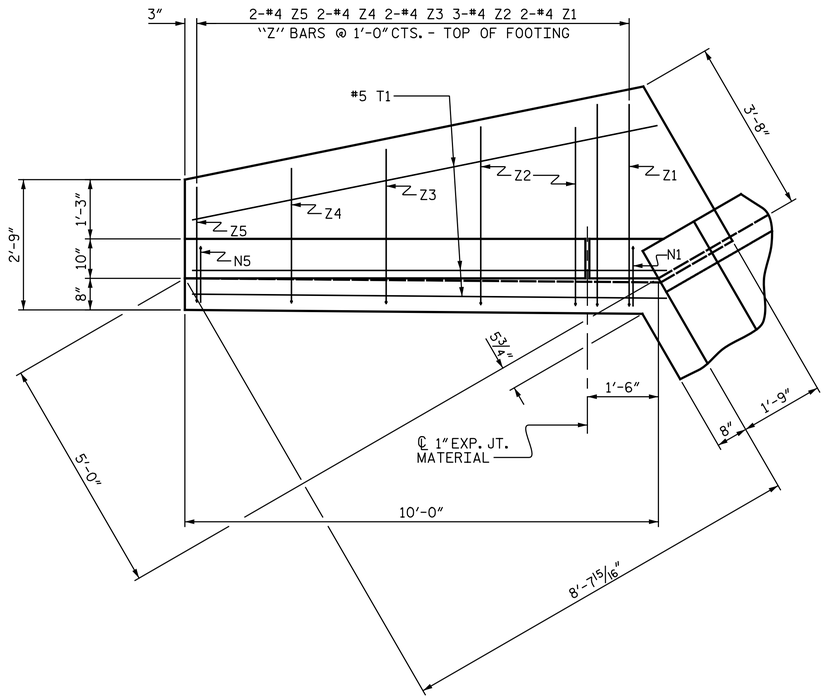
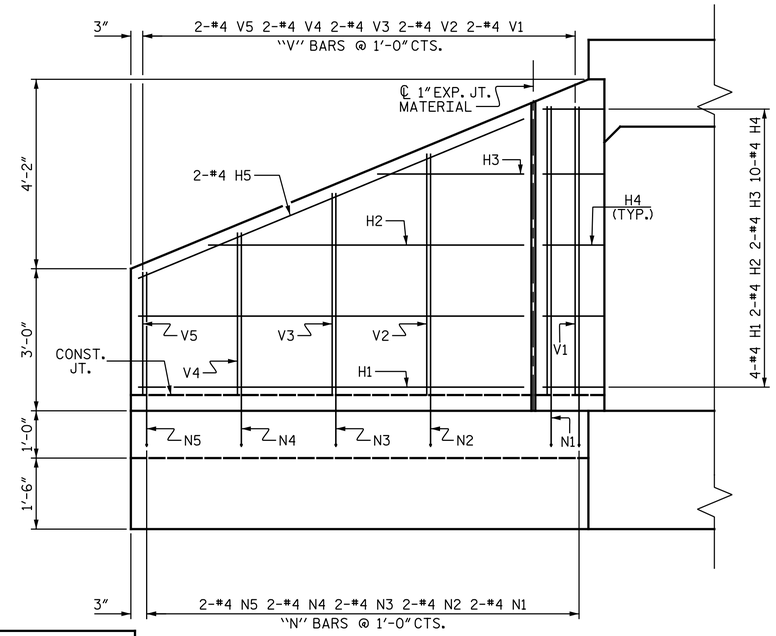


PLAN



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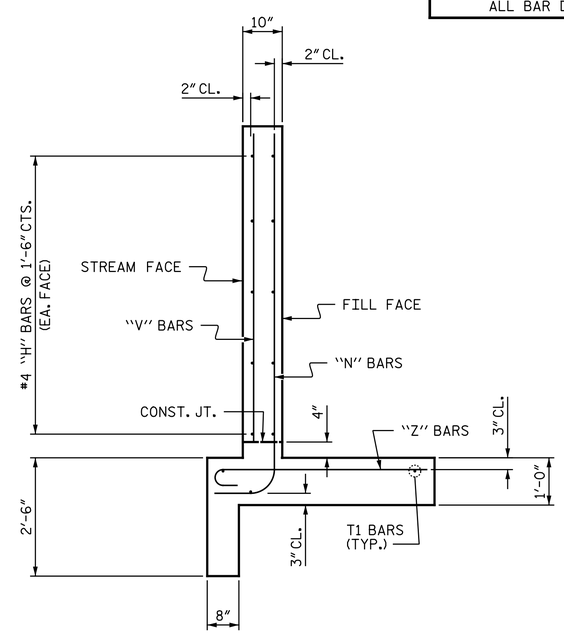
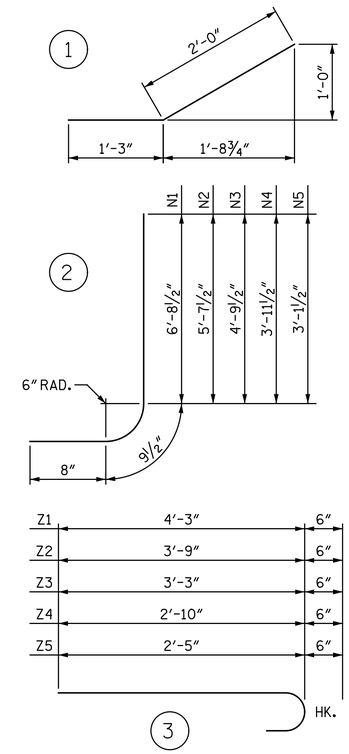


TYPICAL WING SECTION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	8'-1"	86
H2	8	#4	STR	6'-8"	36
H3	8	#4	STR	3'-1"	16
H4	40	#4	1	3'-3"	87
H5	8	#4	STR	8'-9"	47
N1	8	#4	2	8'-2"	44
N2	8	#4	2	7'-1"	38
N3	8	#4	2	6'-3"	33
N4	8	#4	2	5'-5"	29
N5	8	#4	2	4'-7"	24
T1	12	#5	STR	10'-0"	125
V1	8	#4	STR	6'-1"	33
V2	8	#4	STR	5'-1"	27
V3	8	#4	STR	4'-3"	23
V4	8	#4	STR	3'-5"	18
V5	8	#4	STR	2'-7"	14
Z1	8	#4	3	4'-9"	25
Z2	12	#4	3	4'-3"	34
Z3	8	#4	3	3'-9"	20
Z4	8	#4	3	3'-4"	18
Z5	8	#4	3	2'-11"	16

REINFORCING STEEL FOR 4 WINGS 793 LBS

CLASS A CONCRETE

4 WINGS	13.8	CY
2 HEADWALLS	2.0	CY
END CURTAIN WALLS	2.4	CY
4 SILLS	3.0	CY
TOTAL	21.2	CY

PROJECT NO. 17BP.14.R.58
TRANSYLVANIA COUNTY
STATION: 13+09.40 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 2:1
90° SKEW

ASSEMBLED BY : C. POWELL DATE : 12/2012
CHECKED BY : M. WINTERS DATE : 04/2013
DESIGN ENGINEER OF RECORD : M. WINTERS DATE :

DRAWN BY : CCJ 10/99
CHECKED BY : RWW 03/00

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

DocuSigned by: Mike Winters 77F61C8E0E

NORTH CAROLINA PROFESSIONAL SEAL 026433 ENGINEER MIKELE E. WINTERS

7/27/2015

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

STD. NO. CW9006

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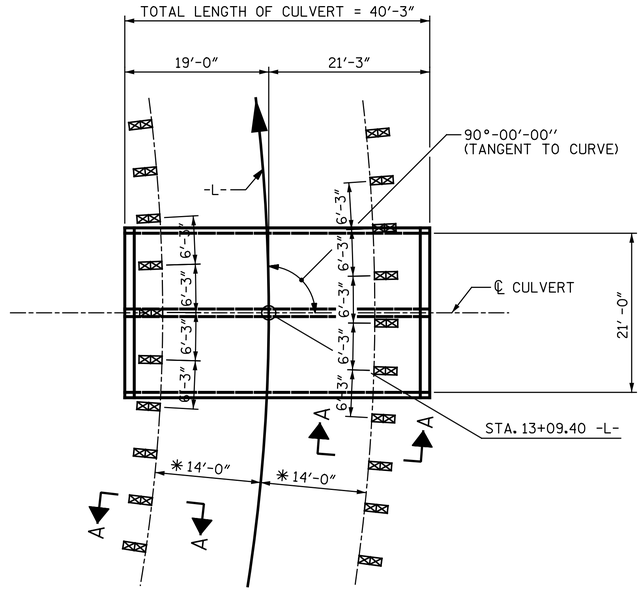


✳ THIS DIMENSION TO BE VERIFIED BY THE ENGINEER.

PLAN

SHOWING GUARDRAIL ANCHOR ASSEMBLY SPACING

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1" Ø X 2 ¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

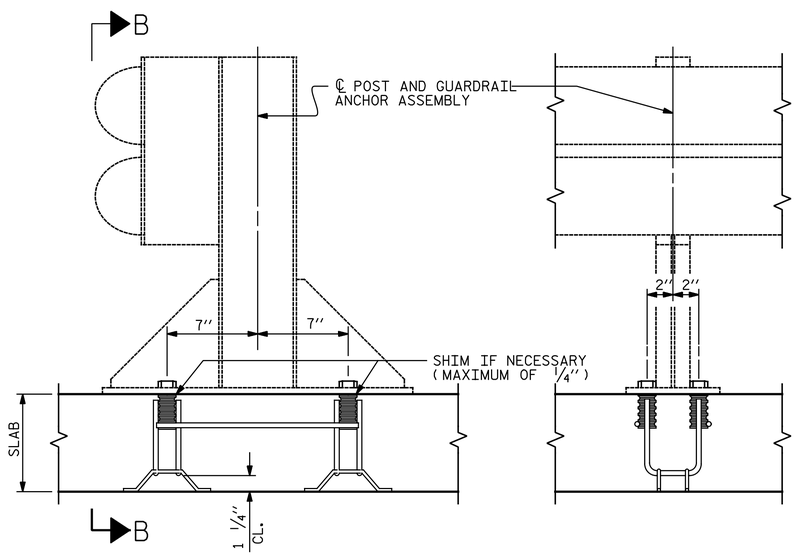
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

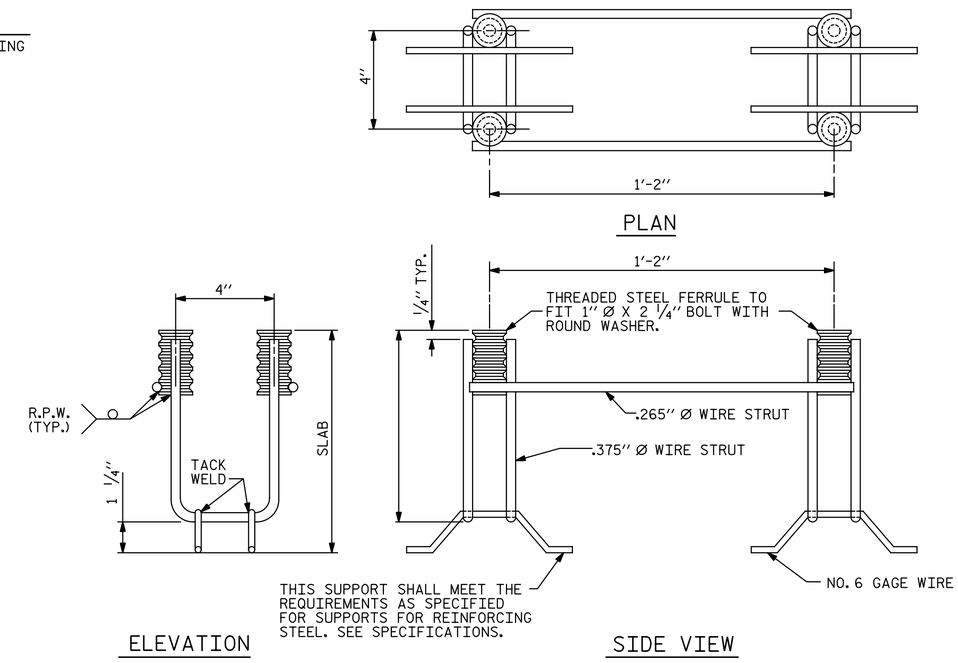
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.



SECTION A-A

SECTION B-B



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. 17BP.14.R.58

TRANSYLVANIA COUNTY

STATION: 13+09.40 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

ASSEMBLED BY : C. POWELL	DATE : 06/2015		
CHECKED BY : M. WINTERS	DATE : 06/2015		
DESIGN ENGINEER OF RECORD : M. WINTERS	DATE : 06/2015		
DRAWN BY : FCJ 6/88	REV. 7/10/01	LES/RDR	
CHECKED BY : ARB 6/88	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06R	KMM/GM	

moffatt & nichol
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX

DocuSigned by: Mike Winters 77F61C8E9...

NORTH CAROLINA PROFESSIONAL SEAL 026433 ENGINEER MIKELE E WINTERS

7/27/2015

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			6

STD. NO. GRA1

7/24/2015
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thuffman

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 ¾" 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. FINS 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