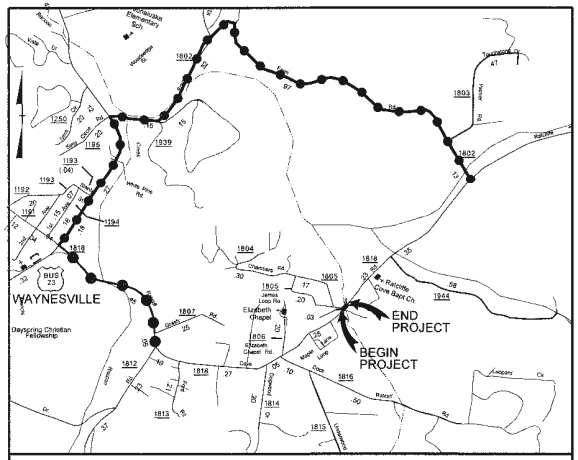
CONTRACT: DN00154

PROJECT: 17BP.14.R.21

FINAL PLANS

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP NTS

OFF-SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

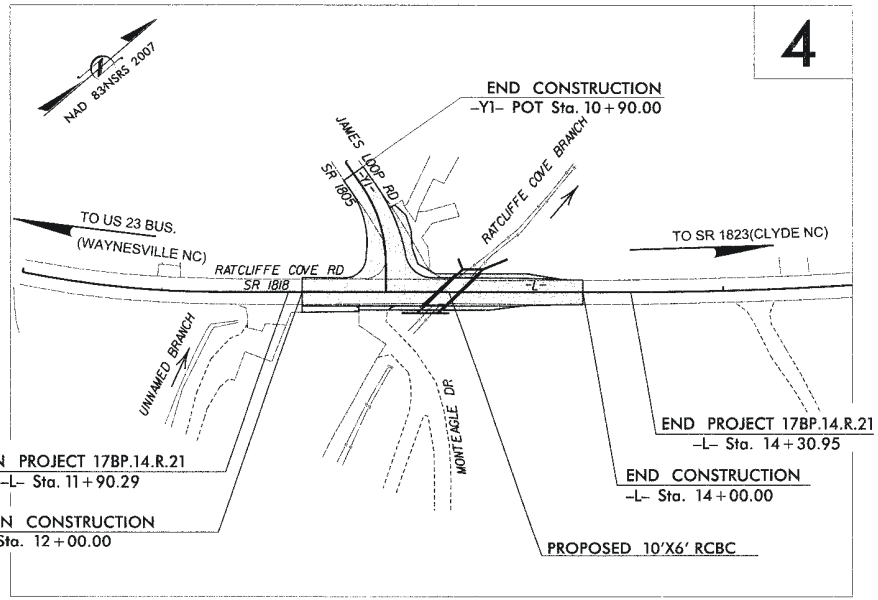
HAYWOOD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.21	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.14.R.21		

LOCATION: BRIDGE NO. 194 ON SR 1818 OVER RATCLIFFE COVE BRANCH

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



NCDOT CONTACT:
JOSH DEYTON, PE
HIGHWAY DIVISION 14
BRIDGE MANAGER
828-488-0902

GRAPHIC SCALES

PLANS: 20 10 0 20 40

PROFILE (HORIZONTAL): 20 10 0 20 40

PROFILE (VERTICAL): 4 2 0 4 8

DESIGN DATA

ADT 2009 = 1300
ADT =
DHV = %
D = %
T = % *
V = 35 MPH
* TTST = DUAL
FUNC CLASS =
MAJOR COLLECTOR
SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT	=	0.046 MILES
LENGTH STRUCTURES PROJECT	=	0.000 MILES
TOTAL LENGTH PROJECT	=	0.046 MILES

Prepared In the Office of:
THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 11, 2012

LETTING DATE: MAY 28, 2013

DEAN D. HATFIELD, PE
PROJECT ENGINEER

WILLIAM E. TILLITT, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.
SEAL 20744 NORTH CAROLINA PROFESSIONAL ENGINEER DAVID L. SMITH

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.
SEAL 16003 NORTH CAROLINA PROFESSIONAL ENGINEER DEAN D. HATFIELD

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE HIGHWAY DESIGN ENGINEER P.E.

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PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	1A

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 16003 ENGINEER
REGISTERED ENGINEER
592013

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

INDEX OF SHEETS

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
3	SUMMARY OF QUANTITIES
3A	SUMMARIES OF EARTHWORK, GUARDRAIL & SUMMARY OF DRAINAGE QUANTITIES
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP-2	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-4	EROSION CONTROL PLANS
UO-1 THRU UO-5	UTILITIES BY OTHERS PLANS
X-1 THRU X-7	CROSS-SECTIONS
C-1 THRU C-8	CULVERT PLANS

GENERAL NOTES

GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-12
REVISED: 11/01/11

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 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. 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.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

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.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

AT&T, PROGRESS ENERGY, & TOWN OF WAYNESVILLE

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

ROADWAY ENGLISH STANDARD DRAWINGS

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
225.06	Method of Grading Sight Distance at Intersections
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 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
840.22	Frames and Wide Slot Sag Grates
862.01	Guardrail Placement
862.02	Guardrail Installation

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PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	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 — CM
- 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 — SCA
- Potential Soil Contamination: Area or Site — SCA

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign
- 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 Marker — RW
- 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 — TH
- 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 — TV
- TV Tower
- U/G TV Cable Hand Hole — TVH
- 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 — SS
- 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.

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PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	1C
Location and Surveys	

SURVEY CONTROL SHEET 43-0194
-FINAL-

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	658970.9237	824176.3264	2666.39	10+04.27	11.65 LT
2	BL-2	659185.0266	824370.8245	2657.85	12+96.25	16.90 LT
3	BL-3	659409.1610	824595.3280	2662.85	OUTSIDE PROJECT LIMITS	

****

BM1 ELEVATION = 2669.15
N 658982 E 824231
BL STATION 5+45.00 34 RIGHT
5/8 " REBAR SET IN YARD

****

FINAL -L-

TYPE	STATION	NORTH	EAST
PC	10+00.00	658959.2800	824180.3744
PT	11+44.06	659058.6523	824284.3552
PC	14+30.95	659276.8993	824471.5810
PT	16+11.71	659417.1755	824584.4559

FINAL -Y1-

TYPE	STATION	NORTH	EAST
POT	10+00.20	659146.3023	824359.7922
PC	10+20.36	659159.5819	824344.3623
PT	10+81.68	659183.3130	824288.8598
POT	11+00.01	659185.0469	824270.6113

-FINAL- ROW MARKER IRON PIN AND CAP-E

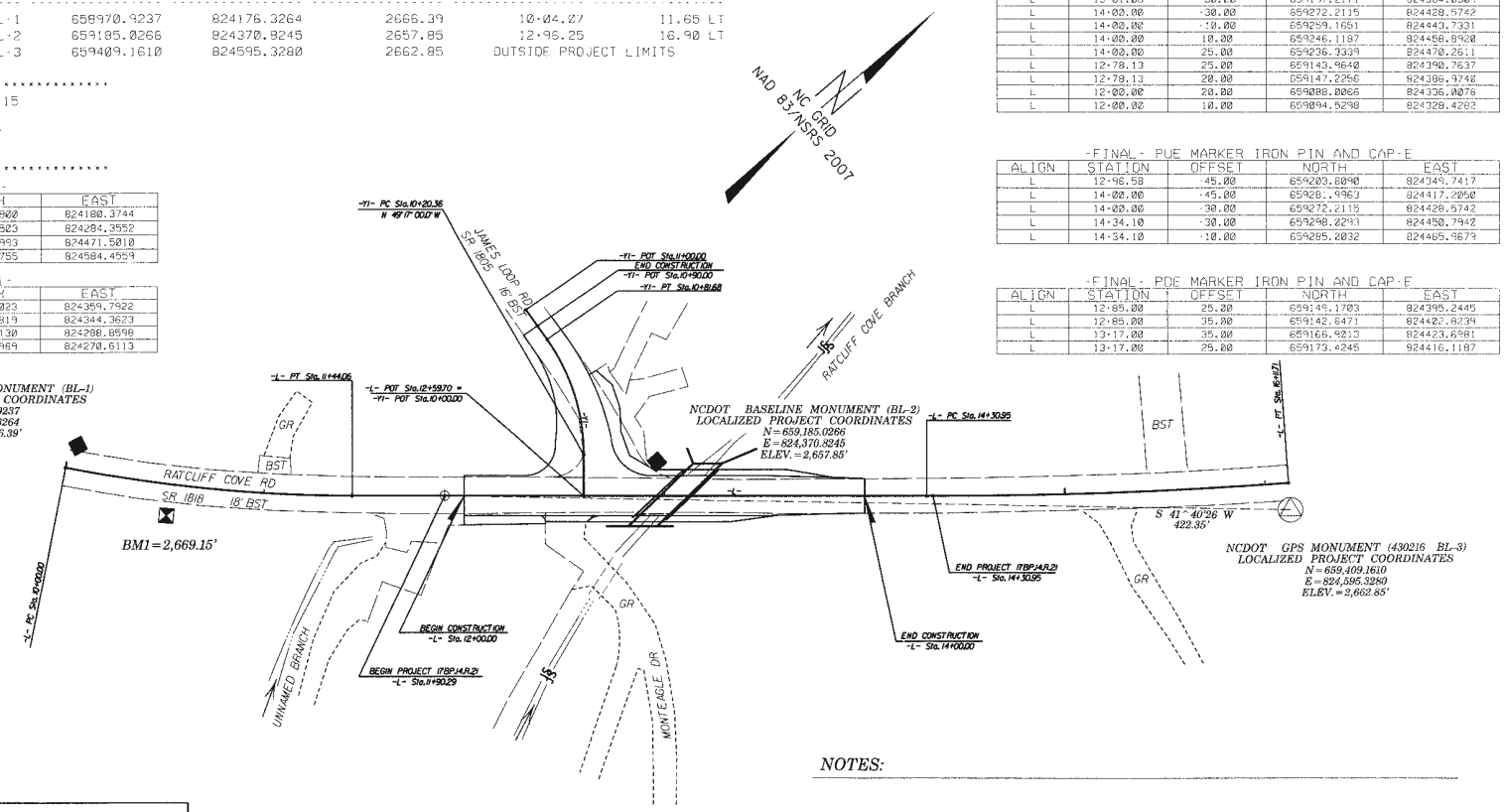
ALIGN	STATION	OFFSET	NORTH	EAST
L	12+00.00	-10.00	659107.5762	824313.2693
L	12+00.00	-25.00	659117.3610	824301.9001
L	12+39.99	-25.00	659147.6734	824327.9883
L	13+01.06	-30.00	659197.2171	824364.0304
L	14+00.00	-30.00	659272.2115	824428.5742
L	14+00.00	-10.00	659259.1651	824443.7331
L	14+00.00	10.00	659246.1187	824458.8920
L	14+00.00	25.00	659236.3339	824470.2611
L	12+78.13	25.00	659143.9640	824390.7637
L	12+78.13	20.00	659147.2256	824386.9748
L	12+00.00	20.00	659088.8066	824336.8076
L	12+00.00	10.00	659094.5298	824328.4282

-FINAL- PUE MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+96.58	45.00	659203.8090	824349.7417
L	14+00.00	45.00	659281.9963	824417.2050
L	14+00.00	30.00	659272.2115	824428.5742
L	14+34.10	30.00	659298.0293	824450.7942
L	14+34.10	10.00	659285.2032	824465.9679

-FINAL- PDE MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+85.00	25.20	659145.1703	824395.2445
L	12+85.00	35.00	659142.8471	824422.8239
L	13+17.00	35.00	659166.9213	824423.6981
L	13+17.00	25.00	659173.4245	824416.1187



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "430194 (BL-3)" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 659409.1610(ft) EASTING: 824595.3280(ft) ELEVATION: 2662.85(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999759011
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "430194 (BL-3)" TO -L- STATION 11+90.29 IS S 41°40'26" W 422.35'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

GEOID MODEL - G09NC
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:
   430194_LS_CONTROL.TXT

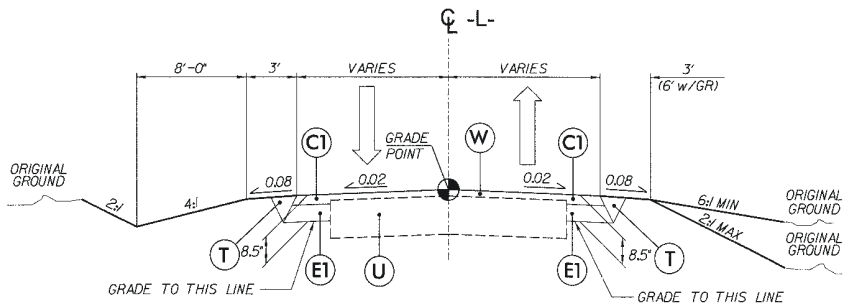
   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

△ *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.

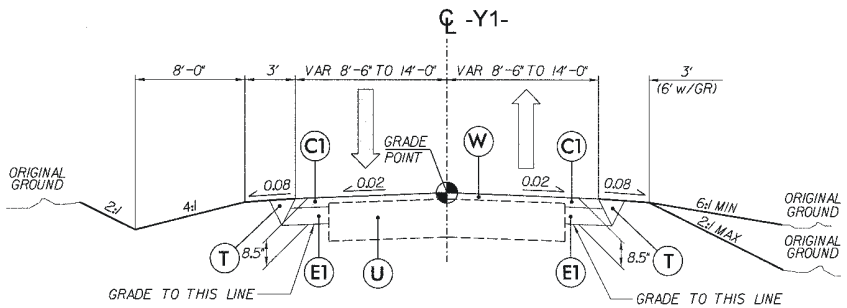
N.T.S

PROJECT REFERENCE NO.	SHEET NO.
17BPJ4.R.21	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
SEAL 16003 REGISTERED ENGINEER 5/9/2013	



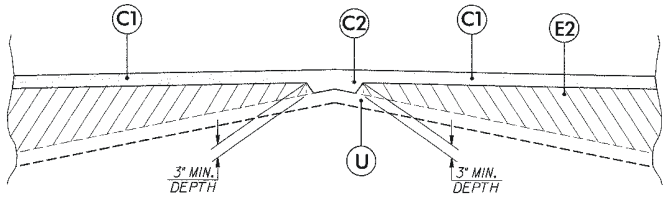
TYPICAL SECTION NO. 1

-L- STA 12+00.00 TO -L- STA 14+00.00



TYPICAL SECTION NO. 2

-Y1- STA 10+10.00 TO -Y1- STA 10+90.00



DETAIL SHOWING METHOD OF WEDGING

Note: Pavement edge slopes are 1:1 unless shown otherwise.

PAVEMENT SCHEDULE	
ITEM	DESCRIPTION
C1	Prop. Approx 3.0" Asphalt Concrete Surface Course, Type S9.5B, at an Average Rate of 168 lbs. Per sq. yard in each of two layers.
C2	Prop. Var. Depth Asphalt Concrete Surface Course, Type S9.5B, at an Average Rate of 112 lbs. Per sq. yard Per 1" Depth, to be placed in layers not less than 1.5" or greater than 2" in depth.
E1	Prop. Approx 5.5" Asphalt Concrete Base Course, Type B25.0B, at an Average Rate of 627 lbs. Per sq. yard.
E2	Prop. Var. Depth Asphalt Concrete Base Course, Type B25.0B, at an Average Rate of 114 lbs. Per sq. yard Per 1" Depth, to be placed in layers not less than 3" or greater than 5.5" in depth. For B25.0B placed on unstabilized subgrade, minimum lift thickness is 4.0"
T	Earth Material
U	Existing Pavement
W	Var. Depth Asphalt Pavement

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
17BP14R21	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

Line Item	Des	Sec No.	Description	Quantity	Unit
1	0000100000-N	800	MOBILIZATION	1	LS
2	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS
3	0001000000-E	200	CLEARING & GRUBBING (1 Acres)	1	LS
4	0003000000-E	200	SUPPLEMENTARY CLEARING & GRUB-BING	1	ACR
5	0022000000-E	225	UNCLASSIFIED EXCAVATION	45	CY
6	0036000000-E	225	UNDERCUT EXCAVATION	50	CY
7	0043000000-N	226	GRADING	1	LS
8	0106000000-E	230	BORROW EXCAVATION	115	CY
9	0195000000-E	265	SELECT GRANULAR MATERIAL	50	CY
10	0199000000-E	SP	TEMPORARY SHORING	300	SF
11	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL MINOR STRUCTURES	20	TON
12	0320000000-E	300	FOUNDATION CONDITIONING FABRIC	50	SY
13	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	52	LF
14	0448400000-E	310	24" RC PIPE CLUVERTS, CLASS IV	72	LF
15	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	10	LF
16	0636000000-E	310	18" CS PIPE ELBOWS, 0.064" THICK	1	EA
17	1011000000-N	500	FINE GRADING (360 SY)	1	LS
18	1220000000-E	545	INCIDENTAL STONE BASE	15	TON
19	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	100	TON
20	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	110	TON
21	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	15	TON
22	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	8	TON
23	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	1	EA
24	2365000000-N	840	FRAME WITH GRATE, STD 840.22	1	EA
25	2473000000-N	SP	18" CP PIPE ROD AND LUG WITH SLEEVE GASKETS	1	EA
26	2473000000-N	SP	SP 18" PIPE SLEEVE	1	EA
27	3030000000-E	862	STEEL BM GUARDRAIL	62.5	LF
28	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	31.25	LF
29	3165000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350 TL-2	2	EA
30	3195000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE AT-1	2	EA
31	3628000000-E	876	RIP RAP, CLASS I	46	TON
32	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	53	SY
33	4116100000-E	904	SIGN ERECTION, RELOCATE, TYPE E (GROUND MOUNTED)	1	EA
34	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	505	SF
35	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	94	SF
36	4445000000-E	1145	BARRICADES (TYPE III)	72	LF
37	4450000000-N	1150	FLAGGER	48	HR
38	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	1,926	LF
39	4900000000-E	1251	PERMANENT RAISED PAVEMENT MARKERS	4	EA
40	6000000000-E	1605	TEMPORARY SILT FENCE	155	LF
41	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	15	TON
42	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	50	TON
43	6012000000-E	1610	SEDIMENT CONTROL STONE	45	TON
44	6015000000-E	1615	TEMPORARY MULCHING	0.5	ACR
45	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	50	LB
46	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	0.25	TON
47	6030000000-E	1630	SILT EXCAVATION	20	CY
48	6036000000-E	1631	MATTING FOR EROSION CONTROL	3,580	SY
49	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	90	SY
50	6042000000-E	1632	1/4" HARDWARE CLOTH	55	LF
51	6070000000-N	1639	SPECIAL STILLLING BASIN (10 X 15)	1	EA
52	6071020000-E	SP	POLYACRYLAMIDE (PAM)	20	LB
53	6084000000-E	1660	SEEDING & MULCHING	0.5	ACR
54	6090000000-E	1661	SEED FOR REPAIR SEEDING	50	LB
55	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	0.25	TON
56	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	50	LB
57	6111000000-E	SP	IMPERVIOUS DIKE	40	LF
58	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	9	EA
59	6133000000-N	SP	GENERIC EROSION CONTROL ITEM (BYPASS PUMPING)	1	LS
			STRUCTURES		
60	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION -L- 13+04.95	1	LS
61	8126000000-N	414	CULVERT EXCAVATION, STATION -L- 13+04.95	1	LS
62	8133000000-E	414	FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT	53	TON
63	8196000000-E	420	CLASS A CONCRETE (CULVERT)	75.7	CY
64	8245000000-E	425	REINFORCING STEEL (CULVERT)	17,348	LB
65	8594000000-E	876	RIP RAP, CLASS B	17.7	TON

REVISIONS

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GA\CADD\Plot\DRI102\102_rdwy.tbl

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

ROADWAY PLANS

PROJECT REFERENCE NO.	SHEET NO.
17BPJ4.R.21	3A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

"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			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GRAU 350 TL-2	M-350	TYPE-III	CAT-1	VI MOD	B-77	AT-1	EA	G	NG				
L	12+90.00	13+60.00	LT	56.25	25	-	-	-	3'	6'	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	SHOP CURVED R=25'
L	12+62.00	13+34.00	RT	68.75	6.25	-	-	-	3'	6'	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	SHOP CURVED R=5'
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			SUB-TOTAL	125	31.25										DEDUCTIONS FOR GUARDRAIL ANCHOR UNITS															
	DEDUCTIONS FOR GUARDRAIL ANCHOR UNITS			62.5											TYPE TL-2			2 @ 25.00' =		50'										
			TOTAL	62.5											TYPE AT-1			2 @ 6.25' =		12.5'										
			SAY	62.5'															TOTAL =	62.5'										

SUMMARY OF EARTHWORK
(IN CUBIC YARDS)

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L- 12+10.00	13+04.95	11	66	55	-
-L- 13+04.95	14+00.00	9	78	69	-
-Y1- 10+10.00	10+90.00	29	8	-	21
PROJECT TOTALS:		49	152	124	21
WASTE IN LIEU OF BORROW		-	-	-21	-21
LOSS DUE TO CLEARING & GRUBBING		-5	-	5	-
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT		-	-	5	-
GRAND TOTALS:		44	-	113	0
SAY:		45		115	

CONTINGENCY ITEMS
UNDERCUT EXCAVATION 50 CY
SELECT GRANULAR MATERIAL 50 CY

NOTE: INVERT ELEVATIONS INDICATED ARE FOR BID PURPOSES ONLY AND SHALL NOT BE USED FOR PROJECT CONSTRUCTION STAKEOUT.
SEE "STANDARDS SPECIFICATIONS FOR ROADS AND STRUCTURES, SECTION 300-5".

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

STATION / SIZE / THICKNESS OR GAUGE	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"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
-L- 12+38.5	LT	0404	0401		2656.00	2653.10													
-L- 12+97.5	LT	0402	0401		2656.66	2653.80				10									
-L- 13+05.0	LT	0401		2656.60															
		0401	0403		2653.10	2652.50													
-L- 13+88.0	CL	0405			2655.40	2652.93													
SHEET TOTALS										10									

STATION	C.S. PIPE 12" (.064)	15" (.064)	18" (.064)	24" (.064)	30" (.079)	36" (.079)	42" (.109)	48" (.109)	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
-L- 12+38.5																				64				
-L- 12+97.5																								
-L- 13+05.0																								
																				8				
-L- 13+88.0											52													
SHEET TOTALS											52									72				

STATION	** R.C. PIPE (CLASS V)	*** R.C. PIPE CULVERTS, CONTRACTOR DESIGN	**** R.C. PIPE CULVERTS, CONTRACTOR DESIGN	18" 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
-L- 12+38.5													
-L- 12+97.5													
-L- 13+05.0							1						
-L- 13+88.0													
SHEET TOTALS							1						

STATION	CONCRETE TRASITIONAL SECTION DROP INLET	CATCH BASIN	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. 840.20	G.D.I. FRAME WITH TWO GRATE STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TB G.D.I STD. 840.35	F.E.S. FLARED END SECTION STD	CONVERT TO MH	DRAINAGE PIPE ELBOWS NO. & SIZE (18" CSP)	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 12+38.5																					REMOVE EXIST. 24" CMP
-L- 12+97.5																1					REMOVE PORTION OF 18" CMP, ROD & LUG
-L- 13+05.0									1												
																					DISCHARGE THROUGH WINGWALL
-L- 13+88.0																					REMOVE EXIST 15" CMP
SHEET TOTALS									1							1					

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

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

REVISIONS

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

ROADWAY PLANS

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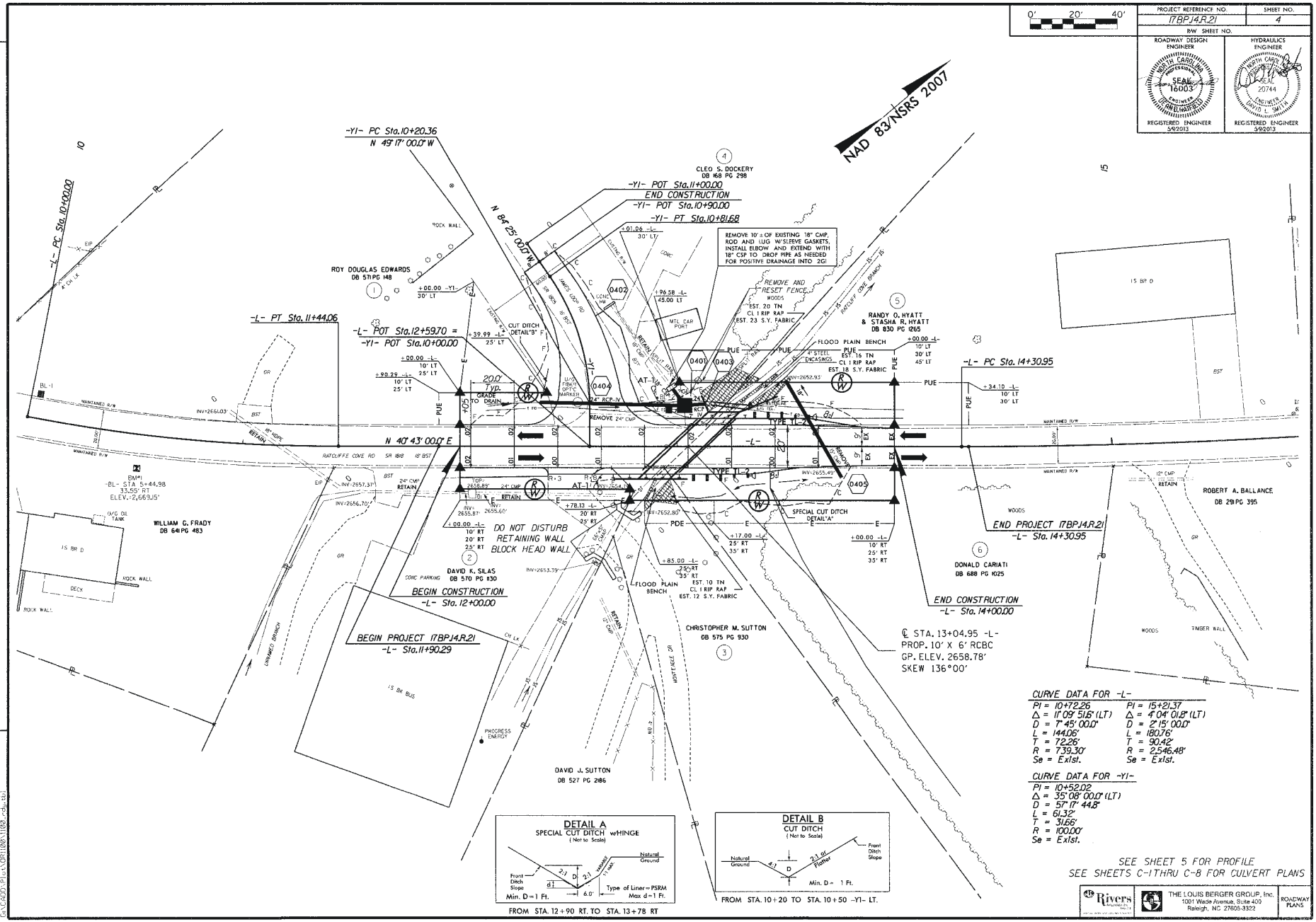
NAD 83/NSRS 2007
-Y1- PC Sta.10+20.36
N 49° 17' 00.0" W
-L- PC Sta.10+00.00
-L- PT Sta.11+44.06
-L- POT Sta.12+59.70 =
-Y1- POT Sta.10+00.00
-Y1- POT Sta.11+00.00
END CONSTRUCTION
-Y1- POT Sta.10+90.00
-Y1- PT Sta.10+81.68
N 84° 25' 00.0" W
N 40° 43' 00.0" E
-L- PC Sta.14+30.95
END PROJECT 17BP.14.R.21
-L- Sta.14+30.95
END CONSTRUCTION
-L- Sta.14+00.00
BEGIN CONSTRUCTION
-L- Sta.12+00.00
BEGIN PROJECT 17BP.14.R.21
-L- Sta.11+90.29
DO NOT DISTURB
RETAINING WALL
BLOCK HEAD WALL
REMOVE 10'± OF EXISTING 18" CMP, ROD AND LUG W/SLEEVE GASKETS, INSTALL ELBOW AND EXTEND WITH 18" CSP TO DROP PIPE AS NEEDED FOR POSITIVE DRAINAGE INTO 2GI
REMOVE AND RESET FENCE
REMOVE 24" CMP
℄ STA. 13+04.95 -L-
PROP. 10' X 6' RCBC
GP. ELEV. 2658.78'
SKEW 136°00'
CLEO S. DOCKERY
DB 168 PG 298
ROY DOUGLAS EDWARDS
DB 571 PG 148
WILLIAM G. FRADY
DB 641 PG 483
DAVID K. SILAS
DB 570 PG 130
CHRISTOPHER M. SUTTON
DB 575 PG 930
DAVID J. SUTTON
DB 527 PG 286
RANDY O. HYATT
& STASHA R. HYATT
DB 830 PG 1265
DONALD CARIATI
DB 688 PG 1025
ROBERT A. BALLANCE
DB 291 PG 395
BM#1
-BL- STA. 5+44.98
33.55' RT
ELEV.=2,669.15'
RATCLIFFE COVE RD SR 1868
MAINTAINED R/W
RETAIN
FLOOD PLAIN BENCH
EST. 10 TN
CL I RIP RAP
EST. 12 S.Y. FABRIC
EST. 16 TN
CL I RIP RAP
EST. 18 S.Y. FABRIC
EST. 20 TN
CL I RIP RAP
EST. 23 S.Y. FABRIC
SPECIAL CUT DITCH
DETAIL"A"
CUT DITCH
DETAIL"B"
TYPE II
TYPE III
UNDERGROUND FIBER OPTIC MARKER
CONC PARKING
MTL CAR PORT
ROCK WALL
DECK
WOODS
TIMBER WALL
PROGRESS ENERGY
UNNAMED BRANCH
MONTENEGRO DR
JAMES GOOD RD SR 1804
CH LK
PDE
PUE
RCP IV
CMP
BST
GR
WD
DETAIL A
SPECIAL CUT DITCH wHINGE
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D = 1 Ft.
Type of Liner = PSRM
Max d = 1 Ft.
FROM STA. 12+90 RT. TO STA. 13+78 RT
DETAIL B
CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D = 1 Ft.
FROM STA. 10+20 TO STA. 10+50 -Y1- LT.
CURVE DATA FOR -L-
PI = 10+72.26
Δ = 11° 09' 51.6" (LT)
D = 7° 45' 00.0"
L = 144.06'
T = 72.26'
R = 739.30'
Se = Exist.
PI = 15+21.37
Δ = 4° 04' 01.8" (LT)
D = 2° 15' 00.0"
L = 180.76'
T = 90.42'
R = 2,546.48'
Se = Exist.
CURVE DATA FOR -Y1-
PI = 10+52.02
Δ = 35° 08' 00.0" (LT)
D = 57° 17' 44.8"
L = 61.32'
T = 31.66'
R = 100.00'
Se = Exist.
SEE SHEET 5 FOR PROFILE
SEE SHEETS C-1 THRU C-8 FOR CULVERT PLANS
0' 20' 40'
PROJECT REFERENCE NO.
17BP.14.R.21
SHEET NO.
4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SEAL 16003 ENGINEER DAVID J. SUTTON
REGISTERED ENGINEER 5/9/2013
SEAL 20744 ENGINEER DAVID L. SMITH
REGISTERED ENGINEER 5/9/2013
REVISIONS
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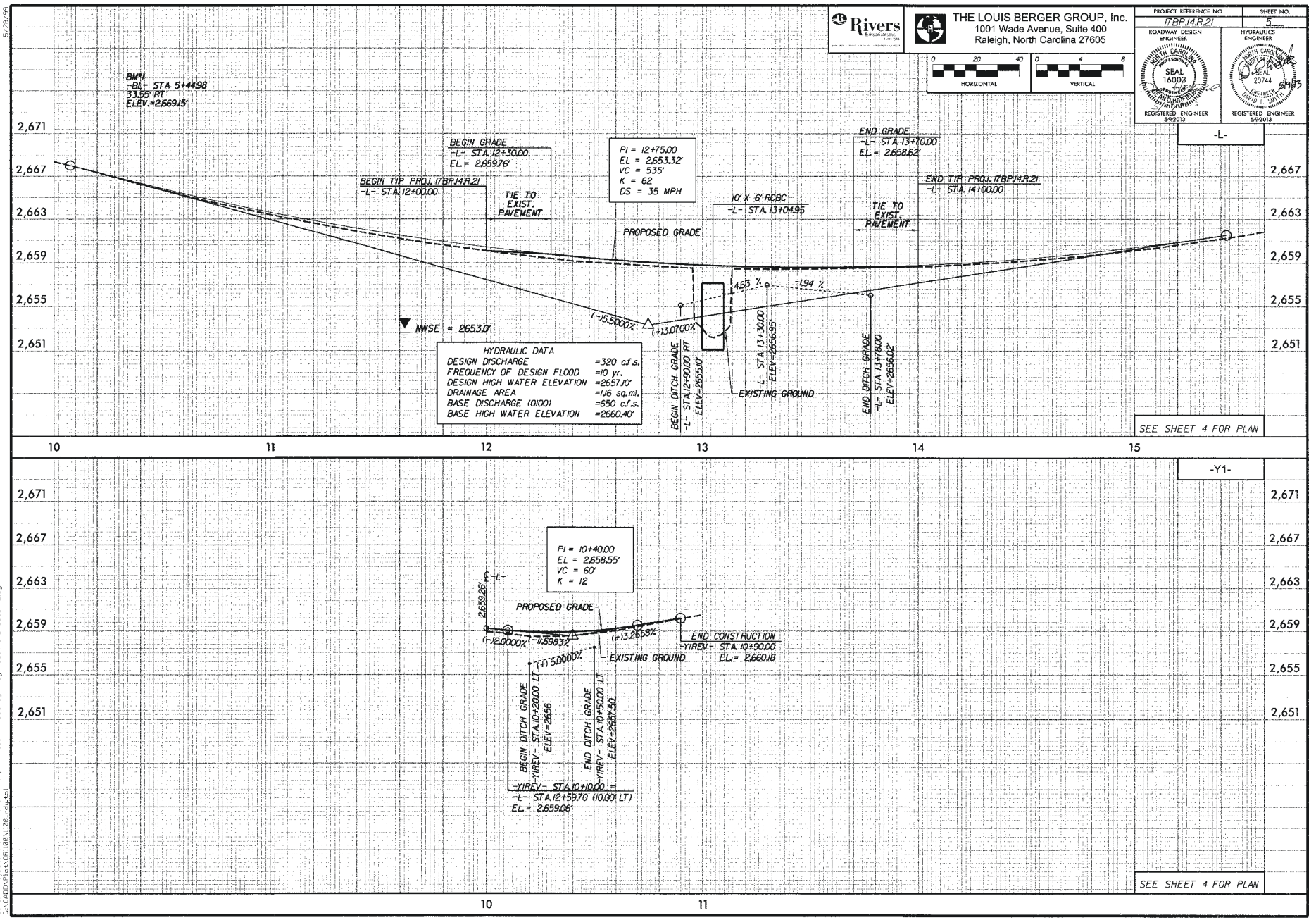
THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322
ROADWAY PLANS



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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

HAYWOOD COUNTY

VICINITY MAP NTS

●—●—●—● OFF-SITE DETOUR

LOCATION: BRIDGE NO. 194 ON SR 1818 OVER RATCLIFFE COVE BRANCH

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

J. S. BOURNE, P.E. STATE TRAFFIC MANAGEMENT ENGINEER
D. HATFIELD, P.E. TRAFFIC CONTROL PROJECT ENGINEER
C. WHITE, P. E. TRAFFIC CONTROL PROJECT DESIGN ENGINEER
________ TRAFFIC CONTROL DESIGN ENGINEER

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

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, LEGEND, AND TEMPORARY PAVEMENT MARKING
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES AND GENERAL NOTES) AND SPECIAL SIGN DETAIL
TMP-2	TEMPORARY TRAFFIC CONTROL PHASING

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

APPROVED: ________
DATE: ________

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 16003 ENGINEER

SHEET NO.
TMP-1

PROJECT: 17BP.14.R.21

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

PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.21	TMP-1A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR 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 WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1130.01	DRUMS
1145.01	BARRICADES
1150.01	FLAGGING DEVICES

LEGEND

GENERAL

DIRECTION OF TRAFFIC FLOW

NORTH ARROW

TRAFFIC CONTROL DEVICES

BARRICADE (TYPE III)

TEMPORARY SIGNING

STATIONARY SIGN

TEMPORARY PAVEMENT MARKING

N/A

APPROVED: _____ DATE: _____

SEAL

ROADWAY STANDARD DRAWINGS & LEGEND

PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.21	TMP-1B

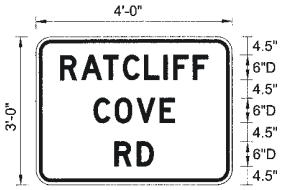
MANAGEMENT STRATEGIES

TRAFFIC WILL BE DETOURED OFFSITE DURING CONSTRUCTION ALONG A ROUTE DETERMINED BY NCDOT.

THE OFFSITE DETOUR WILL INCLUDE BUSINESS 23 AND SR 1802 (FRANCIS FARM RD.). (SEE SHEET TMP-2)

TRAFFIC SHALL BE MAINTAINED TO -Y1- (JAMES LOOP RD.) AND EXISTING DRIVEWAYS WITHIN THE PROJECT LIMITS AT ALL TIMES.

SPECIAL SIGN DETAIL



BORDER
R=3"
TH=0.75"
IN=0.75"
BLACK ON FLOURESCENT ORANGE

LETTER POSITIONS

5.9	R 5.2	A 5.4	T 4.8	C 5.2	L 4.8	I 2.3	F 4.8	F 3.6	6

14.1	C 5.2	O 5.3	V 5.6	E 3.7	14.1

19.2	R 5.5	D 4	19.3

NOTE:

1. LETTER SPACINGS ARE TO START OF NEXT LETTER.
2. LEGEND AND BORDER SHALL BE DIRECT APPLIED BLACK NON-REFLECTIVE SHEETING.
3. BACKGROUND SHALL BE TYPE VII, VIII, OR IX (PRISMATIC) FLOURESCENT ORANGE RETROREFLECTIVE SHEETING.

GENERAL NOTES / LOCAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, 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 ENGINEER.

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.

PAVEMENT EDGE DROP OFF REQUIREMENTS

A) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

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 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.

APPROVED _____ DATE: _____

SEAL

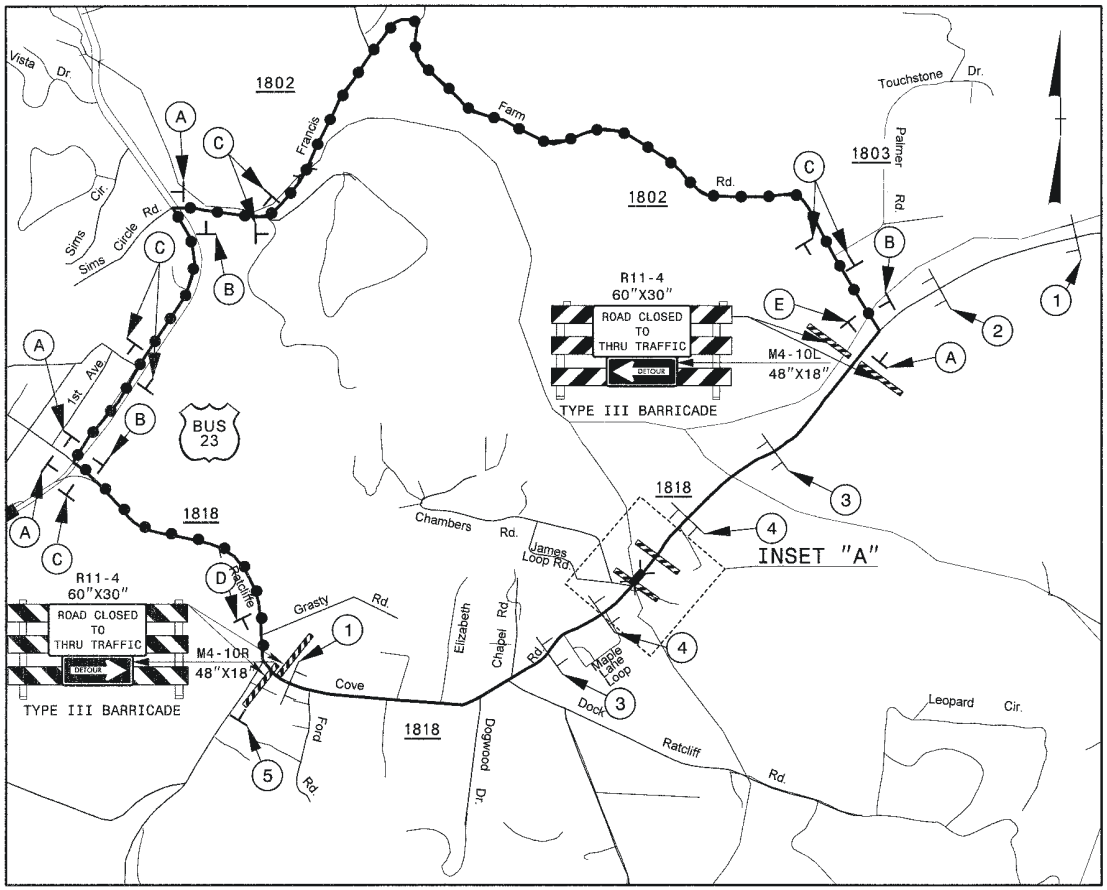
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16008 ENGINEER DEVIN R. CRISCO

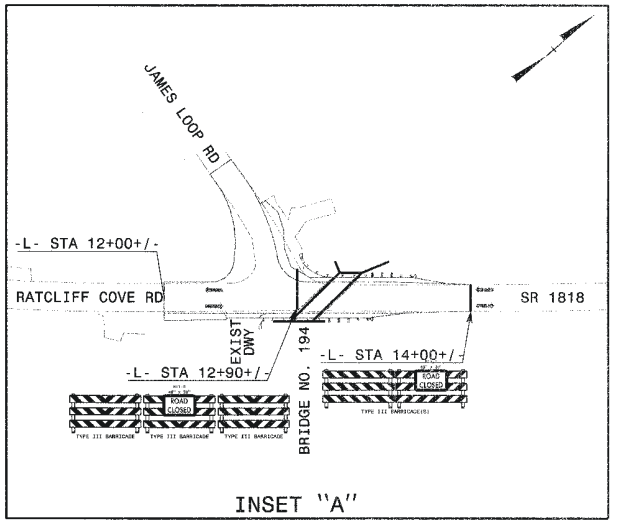
DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

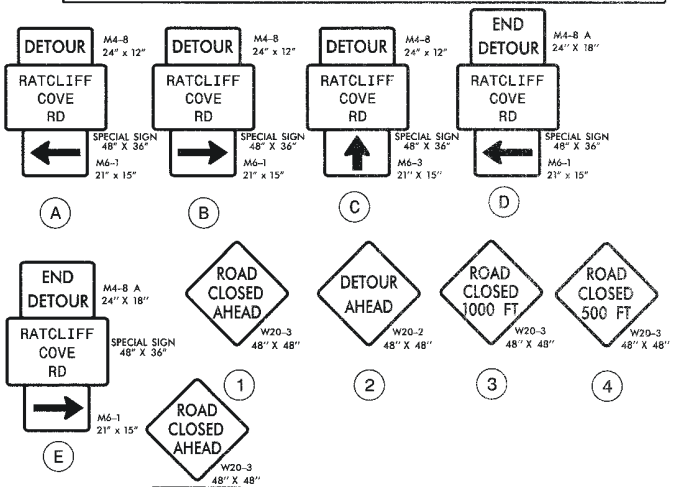
TRANSPORTATION OPERATIONS PLAN

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

PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.21	TMP-2







PROJECT PHASING

STEP 1:
- INSTALL OFF SITE DETOUR AND ROAD CLOSURE SIGNING (PROVIDED BY CONTRACTOR).

- USING RDWY STD 1101.03, SHEET 1 OF 9, CLOSE SR 1818 (RATCLIFF COVE RD.) TO THRU TRAFFIC FROM -L- STA. 12+90+/- TO -L- STA. 14+00+/- AND PLACE TRAFFIC ONTO OFF SITE DETOUR AS SHOWN ABOVE. MAINTAIN ACCESS TO JAMES LOOP RD.

STEP 2:
- REMOVE EXISTING BRIDGE No. 194 AND APPROACHES AND CONSTRUCT THE PROPOSED CULVERT AND ROADWAY UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE FROM -L- STA. 12+90+/- TO -L- STA. 14+00+/-.

- USING FLAGGERS (RDWY STD 1101.02, SHEET 1 OF 15), CONSTRUCT PROPOSED -Y1- WIDENING UP TO, AND INCLUDING THE FINAL LAYER OF SURFACE COURSE FROM -Y1- STA 10+10+/- TO -Y1- 10+90+/- AND PLACE FINAL LAYER OF SURFACE COURSE FROM -L- STA 12+00+/- TO -L- STA 14+00+/-. PLACE FINAL PAVEMENT MARKINGS ON -L- AND -Y1-. (SEE CONSTRUCTION AND PAVEMENT MARKING PLANS)

STEP 3:
- REMOVE ALL TRAFFIC CONTROL DEVICES, SIGNING AND DETOUR ROUTE SIGNING.

- OPEN TO FINAL TRAFFIC PATTERN.

NOTES:

- ALL DETOUR SIGN LOCATIONS ARE APPROXIMATE. FOR SIGNS 1-5, SEE ROADWAY STANDARD DRAWING NO. 1101.03, SHEET 1 OF 9 FOR SIGN PLACEMENT AND APPLICABLE NOTES.

- ALL DETOUR SIGNS ARE BLACK ON ORANGE UNLESS OTHERWISE NOTED.

- CONTRACTOR SHALL ENSURE BARRICADES ARE IN PLACE AT STA. 12+90+/- AT ALL TIMES AS SHOWN ON INSET A.

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

APPROVED: _____ DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16002 DIGITALLY SIGNED

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

TEMPORARY TRAFFIC CONTROL PHASING

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

STATE	PROJECT NO.	SHEET NO.	TOTAL SHTS.
N.C.	17BP.14.R.21	PMP-1	2

APPROVED: _____

DATE: _____

SEAL

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLANS

LOCATION: BRIDGE NO. 194 ON SR 1818 OVER RATCLIFFE COVE BRANCH, HAYWOOD COUNTY

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS"-ROADWAY DESIGN UNIT-N.C. DEPARTMENT OF TRANSPORTATION-RALEIGH, N.C., DATED JULY 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 & OFFSETS
1205.02	PAVEMENT MARKINGS - 2 LANE & MULTILANE ROADWAYS
1250.01	PAVEMENT MARKER SPACING

PAVEMENT MARKING SCHEDULE

ASPHALT PAVEMENT DESIGN
(AS SHOWN)

PAVEMENT MARKING LINES

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

GENERAL NOTES

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

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

ASPHALT PAVEMENT DESIGN:

ROAD NAME	MARKING	MARKER
ALL	PAINT	RAISED

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.

INDEX

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

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Raleigh, NC 27605-3322

ROADWAY PLANS

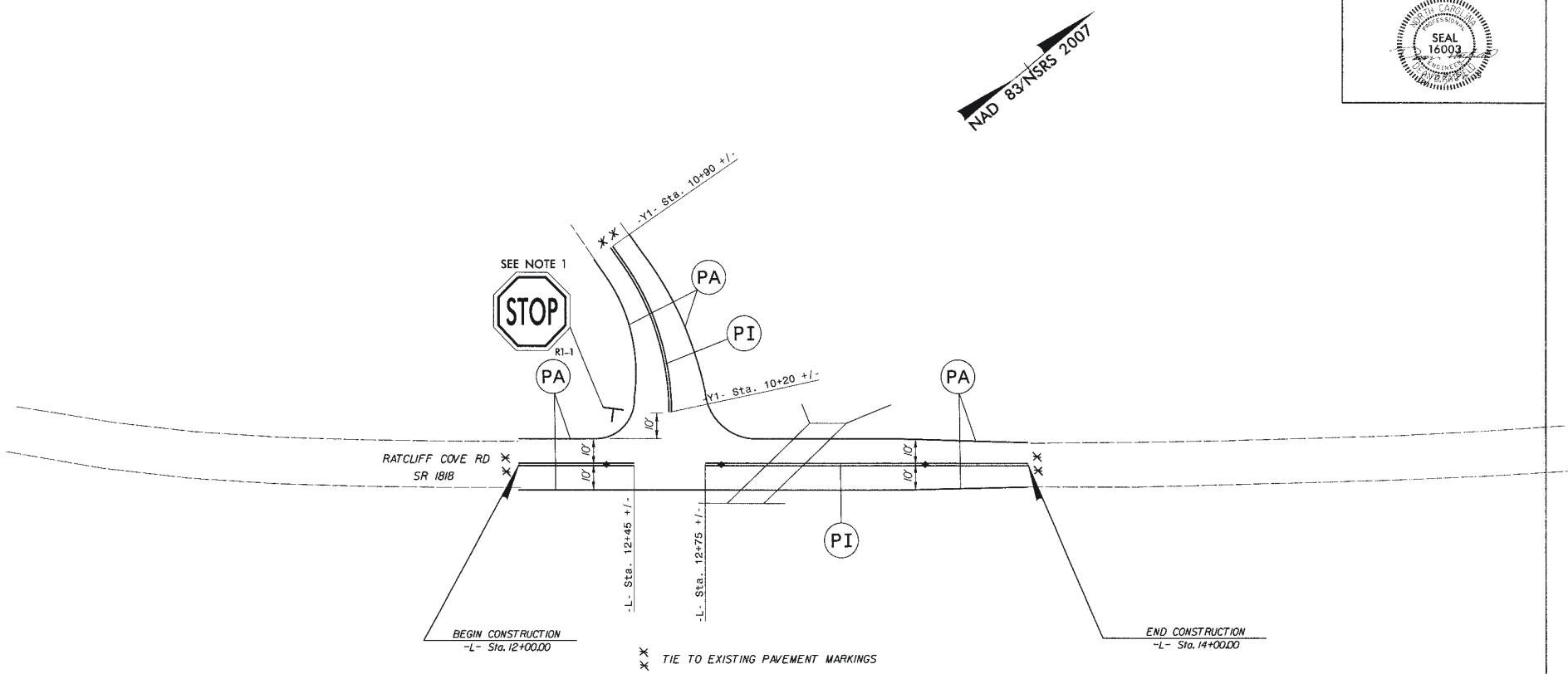
STATE	PROJECT NO.	SHEET NO.	TOTAL SHTS.
N.C.	17BP.14.R.21	PMP-2	2

APPROVED:

DATE:

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16003 OCAWBRA, ALLEN



TIE TO EXISTING PAVEMENT MARKINGS

NOTES:
1 RELOCATE SIGN, TYPE E (GROUND MOUNTED)
2 PAVEMENT MARKERS TO BE PLACED ACCORDING THE ROADWAY STANDARD DRAWINGS.

LEGEND

PA - PAINT - WHITE EDGELINE (4")

PI - PAINT - YELLOW DOUBLE CENTER LINE (4")

PAVEMENT MARKING DETAIL
RATCLIFF COVE RD

THE LOUIS BERGER GROUP, Inc.
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Raleigh, NC 27605-3322

ROADWAY PLANS

EROSION CONTROL PLANS

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

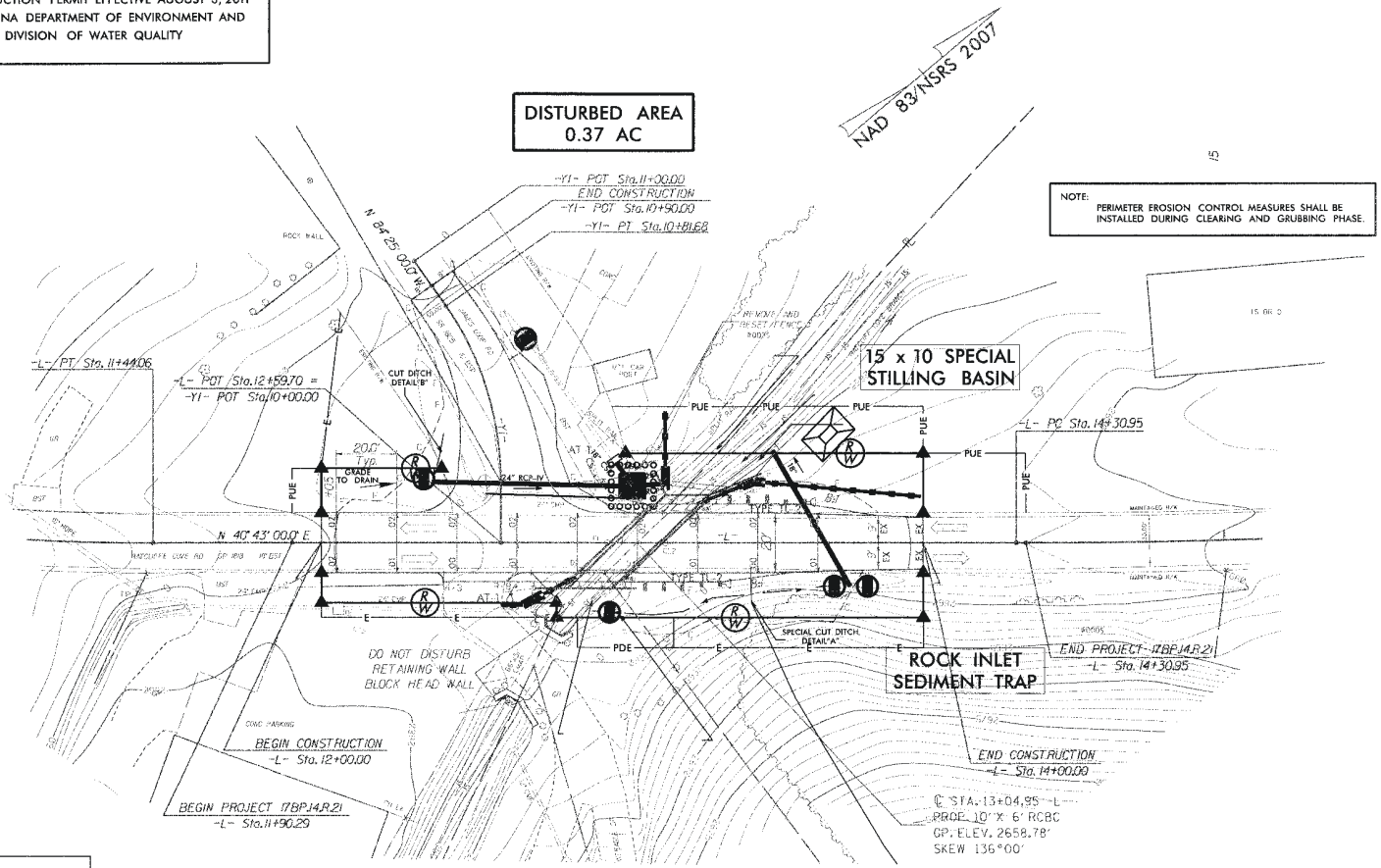
PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	EC-1
R/W SHEET NO.	

0' 20' 40'

DISTURBED AREA
0.37 AC

NAD 83/NSRS 2007

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



ROADSIDE ENVIRONMENTAL UNIT
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

2012 STANDARD SPECIFICATIONS

Std. #	Description	Symbol
1632.03	Rock Inlet Sediment Trap Type C	
1633.01	Temporary Rock Silt Check, Type A with PAM	
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	

NOTE: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

2012 STANDARD DRAWINGS

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		

David L. Smith, PE
LEVEL III : Designer of Erosion and Sediment Control Plans
Certification Number: 590

SEE SHEET 5 FOR PROFILE

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3222

ROADWAY PLANS

REVISIONS

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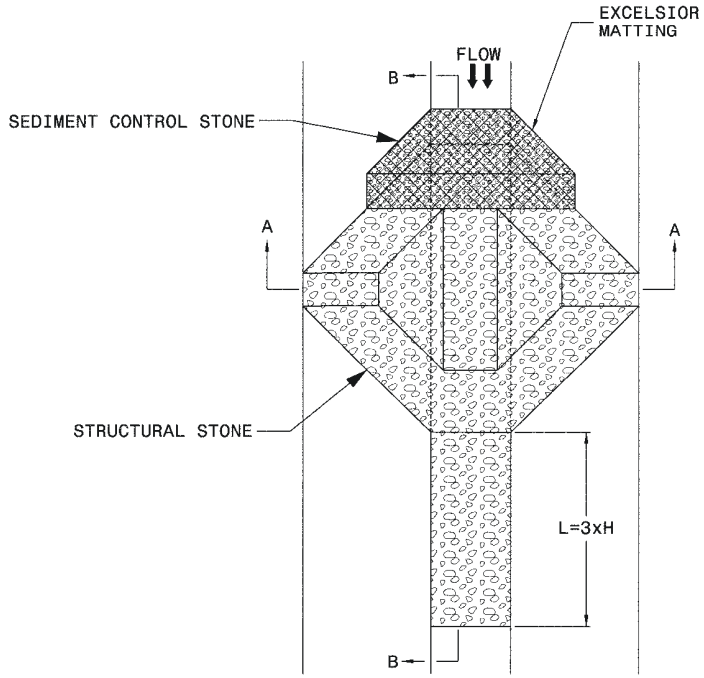
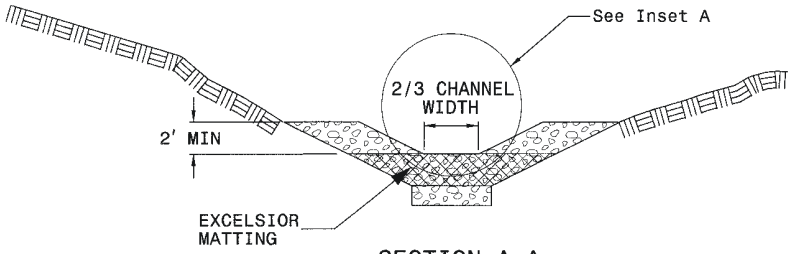
PROJECT REFERENCE NO.	SHEET NO.
17BP14,R,21	EC-2
R/W SHEET NO.	

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN



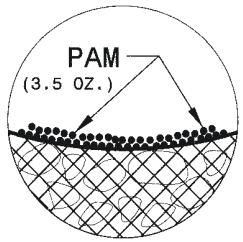
SECTION A-A

NOTES

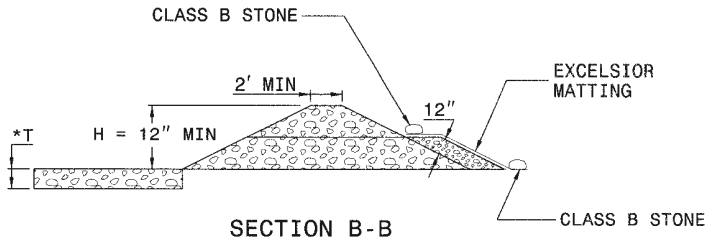
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 3.5 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION B-B

*T = 12" MIN., 18" MAX.

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17BPJ4.R.21	EC-03/CONST.04

CULVERT CONSTRUCTION SEQUENCE STA. 13+04.95–L–

PHASE I

a) INSTALL IMPERVIOUS DIKE UPSTREAM AND DOWNSTREAM OF EXISTING BRIDGE AS SHOWN
b) SET UP BYPASS PUMPING SYSTEM TO DIVERT WATER AROUND THE WORK AREA
c) DEWATER WORK AREA AND UTILIZE SPECIAL STILLING BASIN ON DOWNSTREAM EAST BANK FOR EROSION CONTROL PRIOR TO RETURNING WATER TO THE STREAM
d) REMOVE EXISTING BRIDGE AND CONSTRUCT PROPOSED CULVERT, WINGWALLS, & BANK WORK

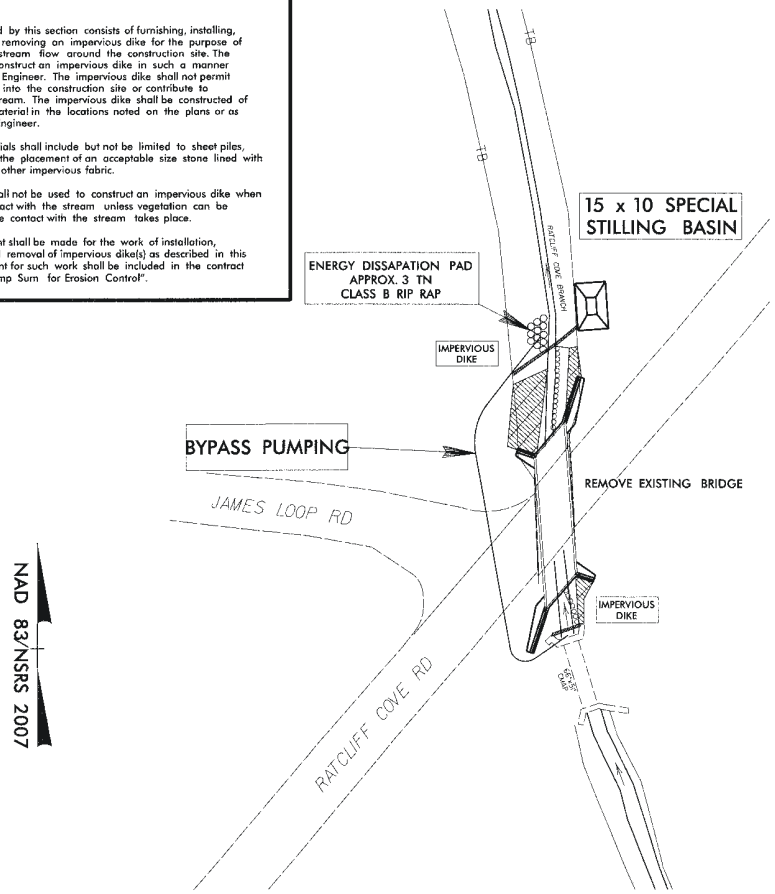
Impervious Dike:

The work covered by this section consists of furnishing, installing, maintaining, and removing an impervious dike for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed by the Engineer.

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious fabric.

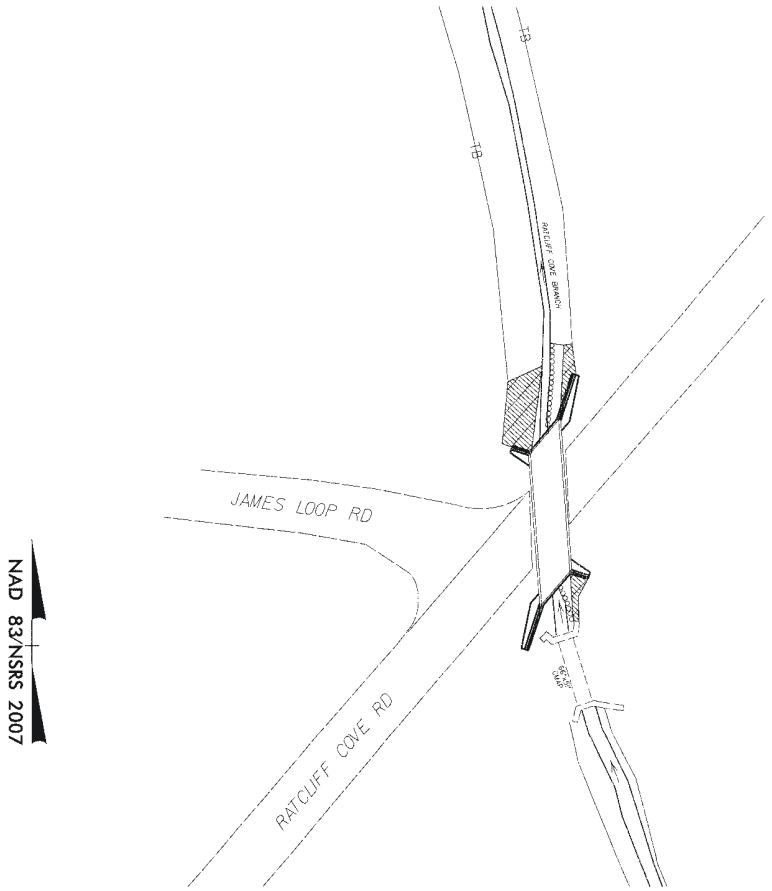
Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

No direct payment shall be made for the work of installation, maintenance, and removal of impervious dike(s) as described in this provision. Payment for such work shall be included in the contract bid price for "Lump Sum for Erosion Control".



PHASE II

REMOVE DIKES, BYPASS PUMPING EQUIPMENT, ENERGY DISSIPATION PAD, & SPECIAL STILLING BASIN ONCE AREA IS STABILIZED AND CONCRETE HAS CURED



PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	EC-04

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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.

REVISIONS

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Rivers
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Raleigh, NC 27605-3322

ROADWAY PLANS

PROJECT: 17BP.14.R.21

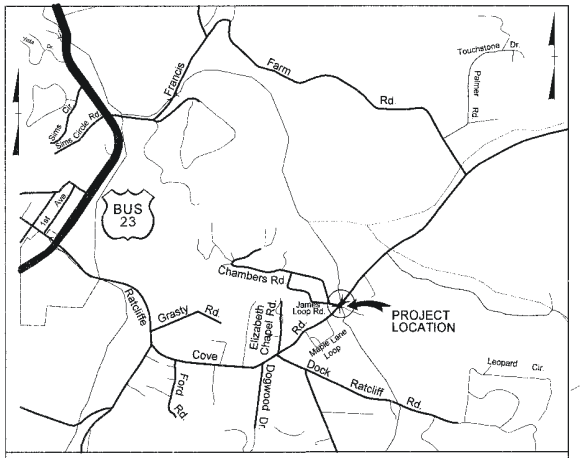
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

T.I.P. NO.	SHEET NO.
17BP.14.R.21	UO-1

UTILITIES BY OTHERS PLANS
HAYWOOD COUNTY

LOCATION: BRIDGE NO. 194 ON SR 1818 OVER RATCLIFFE COVE BRANCH

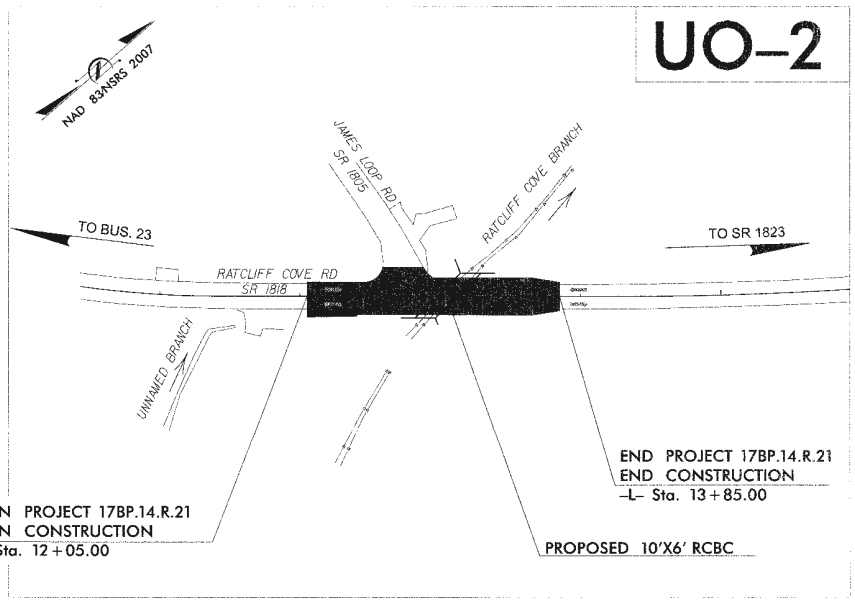
TYPE OF WORK: AERIAL UTILITIES AND UTILITY CONSTRUCTION



VICINITY MAP NTS

OFF-SITE DETOUR

All materials, equipment, labor, and workmanship shall be in accordance with and subject to the Water and Sewer Authority of Haywood County's standard specifications; and the North Carolina Administrative Code for wastewater collection and water distribution systems. In the event of conflict between Water and Sewer Authority of Haywood County's standard specifications; or the North Carolina Administrative Code, the more restrictive requirements shall apply.



GRAPHIC SCALES

20 10 0 20 40
PLANS

10 5 0 10 20
PROFILE (HORIZONTAL)

2 1 0 2 4
PROFILE (VERTICAL)

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	SYMBOLOGY SHEET
UO-3	UTILITY PLAN AND PROFILE SHEET
UO-4	UTILITY DETAILS AND CONSTRUCTION NOTES
UO-5	UTILITIES BY OTHERS PLAN SHEET

UTILITY OWNERS ON PROJECT

(1) POWER: PROGRESS ENERGY – Cynthia Roarty (919) 481-6119

(2) TELEPHONE: AT&T – Scott Addington (828) 258-7138

(3) CABLE: CHARTER COMMUNICATIONS – John Grindstaff (828) 231-8724

(4) WATER: TOWN OF WAYNESVILLE – Fred Baker (828) 456-4410

(5) SEWER: TOWN OF WAYNESVILLE – Fred Baker (828) 456-4410

PLANS PREPARED BY:

CH ENGINEERING
3220 GLEN ROYAL RD. RALEIGH, NC 27617
TELE 919.788.0224 FAX 919.788.0232
NC LICENSE #P-0189

UTILITIES PROJECT ENGINEER

Eric Tweed, P.E.

PREPARED FOR THE OFFICE OF:

DIVISION OF HIGHWAYS
UTILITIES UNIT
UTILITIES ENGINEERING

1555 MAIL SERVICE CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

Roger Worthington, P.E. UTILITIES SECTION ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	UO-2
BRIDGE NO. 194	

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NC LICENSE #P-0189

PROPOSED WATER SYMBOLS

- Water Line (Sized as Shown)
- 11¼ Degree Bend
- 22½ Degree Bend
- 45 Degree Bend
- 90 Degree Bend
- Plug
- Tee
- Cross
- Reducer
- Gate Valve (GV)
- Butterfly Valve (BV)
- Tapping Valve (TDV)
- Line Stop (LS)
- Line Stop with Bypass (LS/BP)
- Blow Off (BO)
- Fire Hydrant (PFH)
- Relocate Fire Hydrant (RFH)
- Remove Fire Hydrant — REM FH
- Water Meter (PWM)
- Relocate Water Meter (RWM)
- Remove Water Meter — REM WM
- Water Pump Station (PS(WP))
- RPZ Backflow Preventer (PBPZ)
- DCV Backflow Preventer (PBFP)
- Relocate RPZ Backflow Preventer (RBPZ)
- Relocate DCV Backflow Preventer (RBFP)

PROPOSED SEWER SYMBOLS

- Gravity Sewer Line (Sized as Shown)
- Force Main Sewer Line (Sized as Shown)
- Manhole (Sized per Note)
- Sewer Pump Station (PS(SS))

PROPOSED MISCELLANOUS UTILITIES SYMBOLS

- Power Pole
- Telephone Pole
- Joint Use Pole
- Telephone Pedestal (TP)
- Utility Line by Others (Type as Shown)
- Trenchless Installation
- Encasement by Open Cut
- Encasement
- Thrust Block
- Air Release Valve (AR)
- Utility Vault (UV)
- Concrete Pier (CP)
- Steel Pier (SP)
- Plan Note — NOTE
- Pay Item Note — PAY ITEM

EXISTING UTILITIES SYMBOLS

- Power Pole
- Telephone Pole
- Joint Use Pole
- Utility Pole
- Utility Pole with Base
- H-Frame Pole
- Power Transmission Line Tower
- Water Manhole
- Power Manhole
- Telephone Manhole
- Sanitary Sewer Manhole
- Hand Hole for Cable
- Power Transformer
- Telephone Pedestal
- CATV Pedestal
- Gas Valve
- Gas Meter
- Located Miscellaneous Utility Object
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.
- *Underground Power Line
- *Underground Telephone Cable
- *Underground Telephone Conduit
- *Underground Fiber Optics Telephone Cable
- *Underground TV Cable
- *Underground Fiber Optics TV Cable
- *Underground Gas Pipeline
- Aboveground Gas Pipeline — A/G Gas
- *Underground Water Line
- Aboveground Water Line — A/G Water
- *Underground Gravity Sanitary Sewer Line
- Aboveground Gravity Sanitary Sewer Line — A/G Sanitary Sewer
- *Underground SS Forced Main Line
- Underground Unknown Utility Line
- SUE Test Hole
- Water Meter
- Water Valve
- Fire Hydrant
- Sanitary Sewer Cleanout

*For Existing Utilities

- Utility Line Drawn from Record (Type as Shown)
- Designated Utility Line (Type as Shown)

REV: 2/1/2012

NOTE:
COORDINATE WITH UTILITY OWNER FOR MAKING TIES TO EXISTING LINE.

THRUST COLLARS SHALL BE ON THE SAME JOINT OF PIPE AS THE NEW RJ BEND OR THE BEND SHALL BE RODDED TO THE CONCRETE COLLAR.

ALL STREAM CROSSINGS 401-404 PERMITS ARE COVERED UNDER BRIDGE RELOCATION.

CONTRACTOR SHALL BE RESPONSIBLE FOR DISINFECTION OF PROPOSED WATER LINES.

LOCATION OF EXISTING WATER LINE IS APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY LOCATION.

176 LF OF RJ DIP PIPE

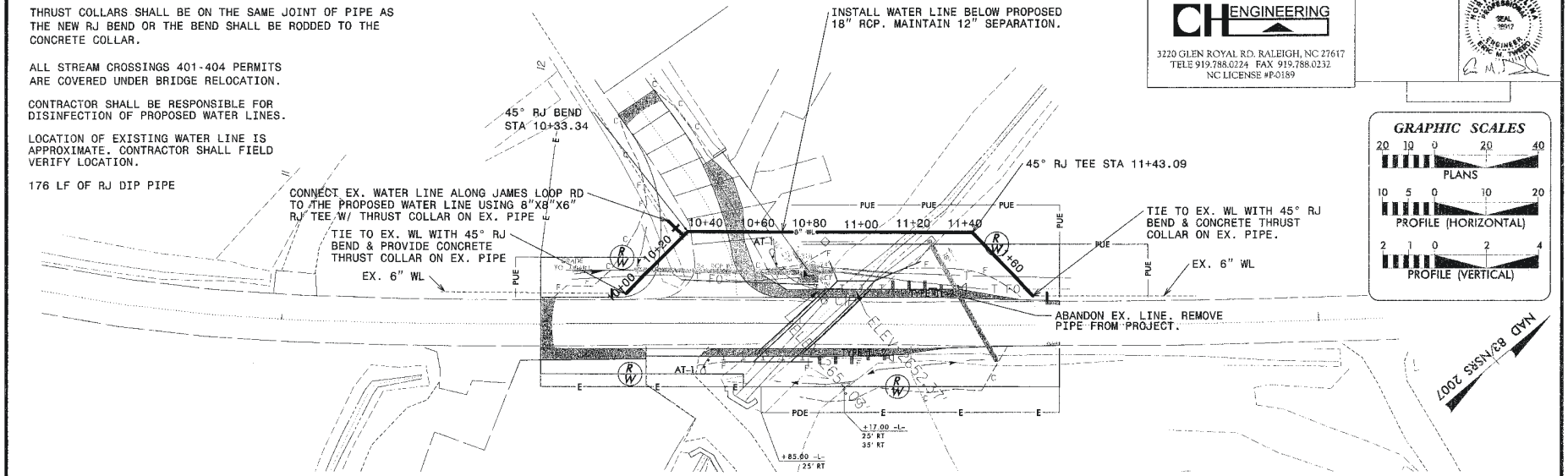
CONTRACTOR TO RECONNECT ALL SERVICES TIED TO THE PORTION OF LINE TO BE ABANDONED AND INDICATE LOCATIONS ON CONTRACTOR'S FIELD SET OF DRAWINGS

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

CH ENGINEERING
3220 GLEN ROYAL RD. RALEIGH, NC 27617
TELE 919.788.0224 FAX 919.788.0232
NC LICENSE #P-0189

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	U0-3
BRIDGE 194	

UTILITY ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 38517 ENGINEER
5-7-13



GRAPHIC SCALES
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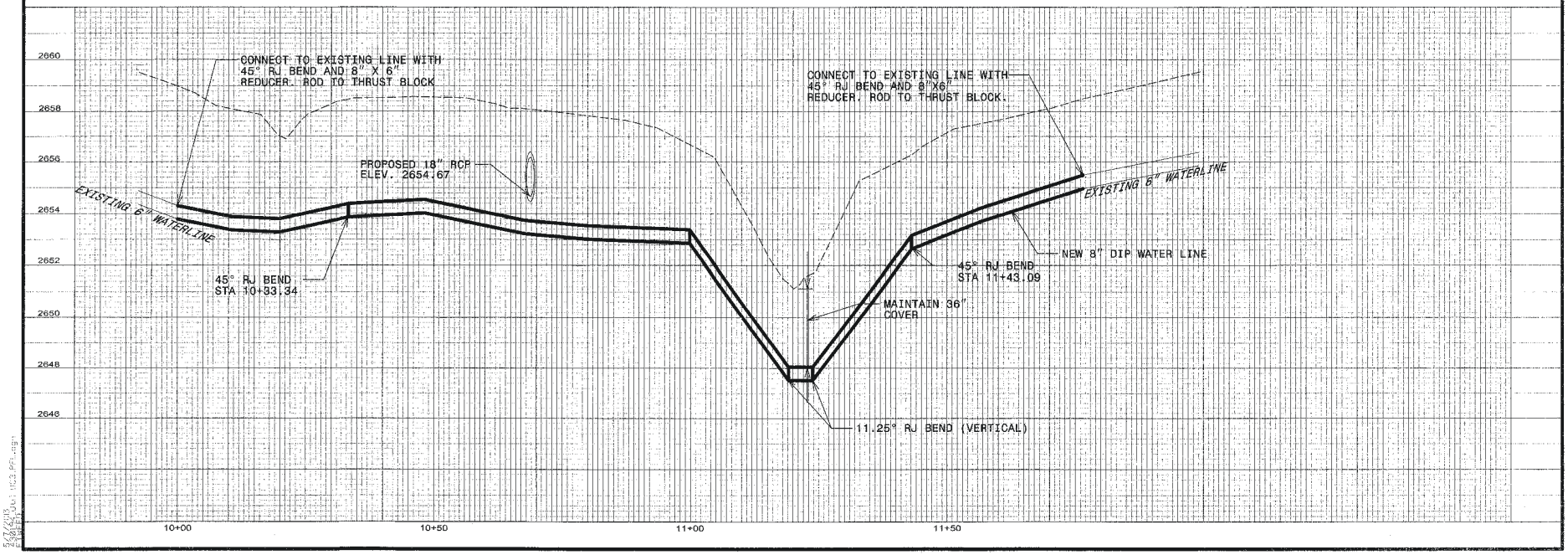
PLANS
10 5 0 10 20
PROFILE (HORIZONTAL)
2 1 0 2 4
PROFILE (VERTICAL)

NAD 83/NSRS 2007



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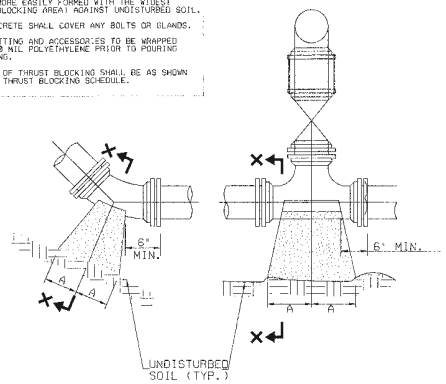
TELE 919.788.0224 FAX 919.788.0232
NC LICENSE #P-0189

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	UO-4
BRIDGE NO.	194
ROADWAY DESIGN ENGINEER	UTILITY ENGINEER

4-25-13

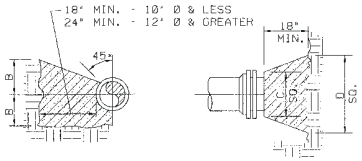
NOTES:

1. CONCRETE SHALL BE 3,000 PSI MIN.
2. CONCRETE FOR THRUST BLOCKING SHALL BE KEPT FAIRLY DRY, THUS MAKING THE CONCRETE WEDGE SHAPE MORE EASILY FORMED WITH THE WIDEST PART (BLOCKING AREA) AGAINST UNDISTURBED SOIL.
3. NO CONCRETE SHALL COVER ANY BOLTS OR GLANDS.
4. ALL FITTING AND ACCESSORIES TO BE WRAPPED WITH 10 MIL POLYETHYLENE PRIOR TO POURING BLOCKING.
5. VOLUME OF THRUST BLOCKING SHALL BE AS SHOWN ON THE THRUST BLOCKING SCHEDULE.



PLAN BENDS

HYDRANT TEE PLAN TEES



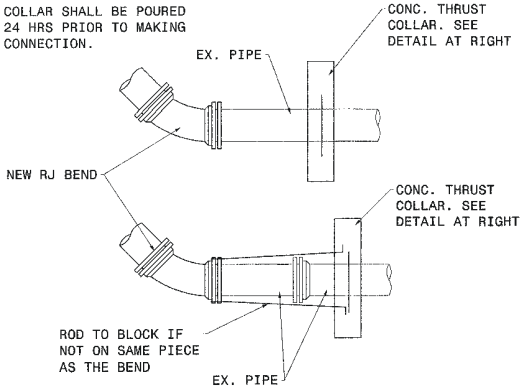
SECTION X-X BENDS & TEES

PLAN & ELEV. PLUGS

PIPE SIZE	90° BEND		45° BEND		22 ½° BEND		11 ¼° BEND		TEE		PLUG	
	A	B	A	B	A	B	A	B	A	B	C	D
4"	8"	12"	8"	8"	6"	6"	6"	6"	8"	9"	10"	16"
6"	10"	12"	8"	10"	8"	8"	8"	8"	10"	10"	12"	18"
8"	15"	13"	10"	10"	8"	8"	8"	8"	10"	12"	12"	24"
10"	16"	14"	10"	12"	6"	10"	6"	10"	11"	14"	14"	25"
12"	20"	16"	12"	14"	8"	12"	8"	12"	14"	16"	16"	30"
14"	22"	18"	14"	16"	10"	14"	10"	14"	16"	18"	18"	34"
16"	26"	20"	16"	18"	12"	16"	12"	16"	18"	20"	20"	36"

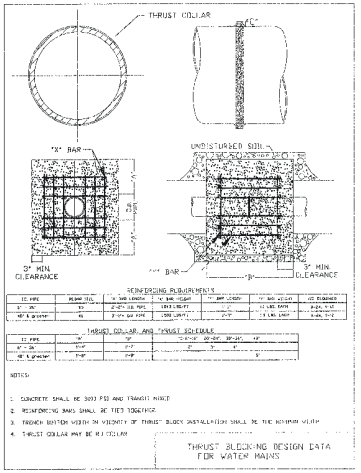
THRUST BLOCK DETAIL

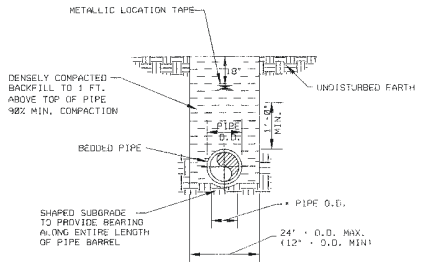
NOT TO SCALE



RODS SHALL BE SAME Ø AS BOLTS SUPPLIED WITH THE BEND.

PIPE CONNECTION DETAIL





WATER MAINS 8" AND SMALLER SHALL HAVE A MINIMUM OF 3' OF COVER.

PIPE LAYING CONDITION

NOT TO SCALE

REVISIONS

$DATE$ $SYSTIME$ $PLTORN$
$FILEL$
$PENTBL$

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27606-3322

UTILITY PLANS

CONTACT INFORMATION FOR UTILITIES

POWER: PROGRESS ENERGY; CYNTHIA ROARTY 919-481-6119 CYNTHIA.ROARTY@PGNMAIL.COM
PHONE: AT&T; SCOTT ADDINGTON 1-828-258-7138 JA2089@ATT.COM
CABLE: CHARTER COMM; JOHN GRINDSTAFF 1-828-258-7138 JOHN.GRINDSTAFF@CHARTERCOM.COM
WATER: TOWN OF WAYNESVILLE; FRED BAKER 828-456-4410 PUBLICWORKSDIRECTOR@TOENOFWAYNESVILLE.ORG

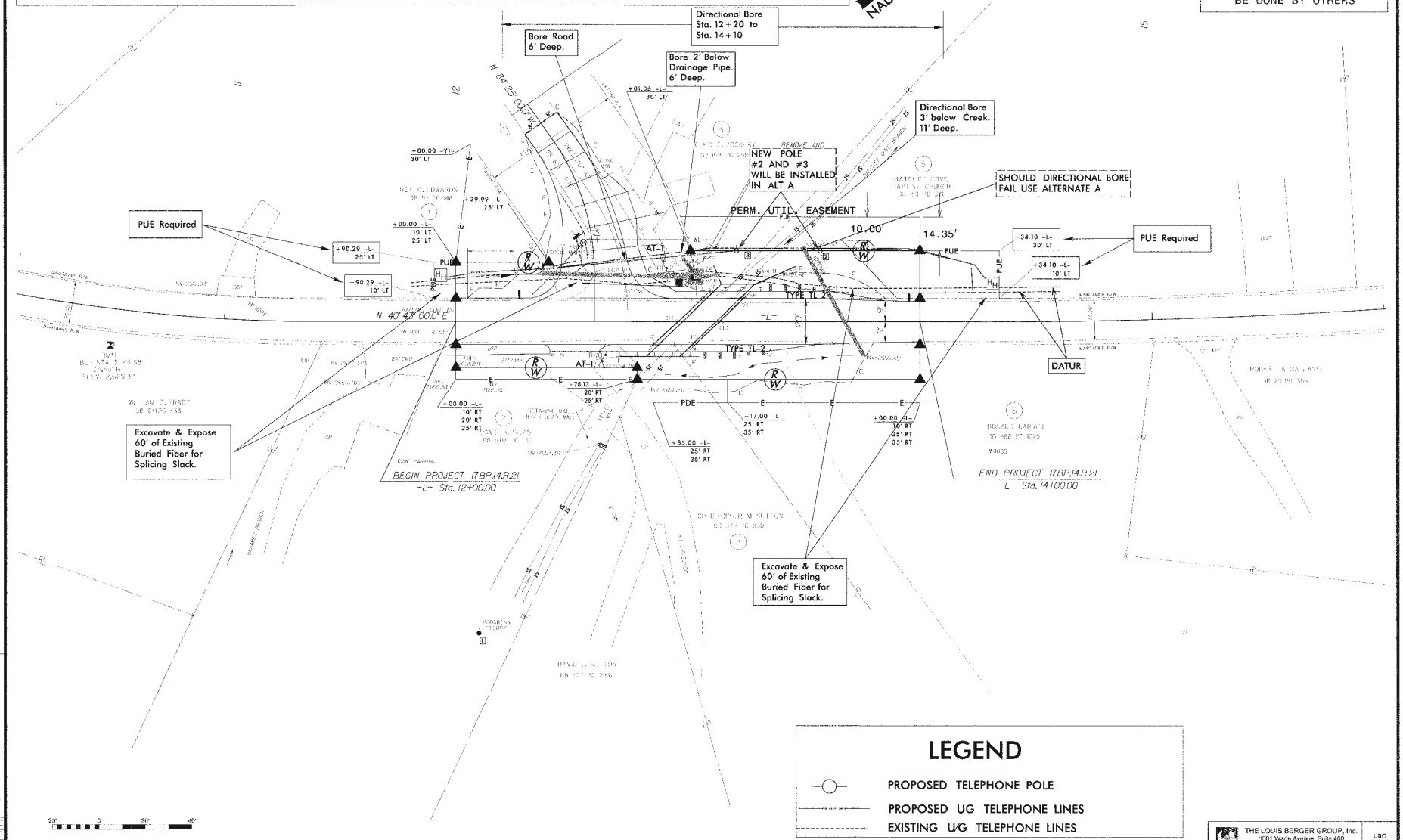
CH ENGINEERING
3220 GLEN ROYAL RD. RALEIGH, NC 27617
TELE 919.788.0224 FAX 919.788.0232
NC LICENSE #P-0189

PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.21	UO-5
BRIDGE NO. 194	

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS

NAD 83/NSRS 2007



LEGEND

- PROPOSED TELEPHONE POLE
- PROPOSED UG TELEPHONE LINES
- EXISTING U/G TELEPHONE LINES

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

UBO PLANS

PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.21	X-1

17BP.14.R.21
CROSS SECTIONS

INDEX OF SHEETS

TITLE	STATION	SHEET NO.
CROSS-SECTION INDEX		X-1
CROSS-SECTION SUMMARY		X-1A
-L- CROSS-SECTIONS	12+00 - 14+00	X-2 THROUGH X-5
-Y1- CROSS-SECTIONS	10+00 - 10+90	X-6 THROUGH X-7

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

8/23/99
4/12/2013
9:25:15 AM
C:\OH Projects\OR11100 - NCDOT Group W\430194\Roadway\XSC\430194_RDY_XPL_001.dgn

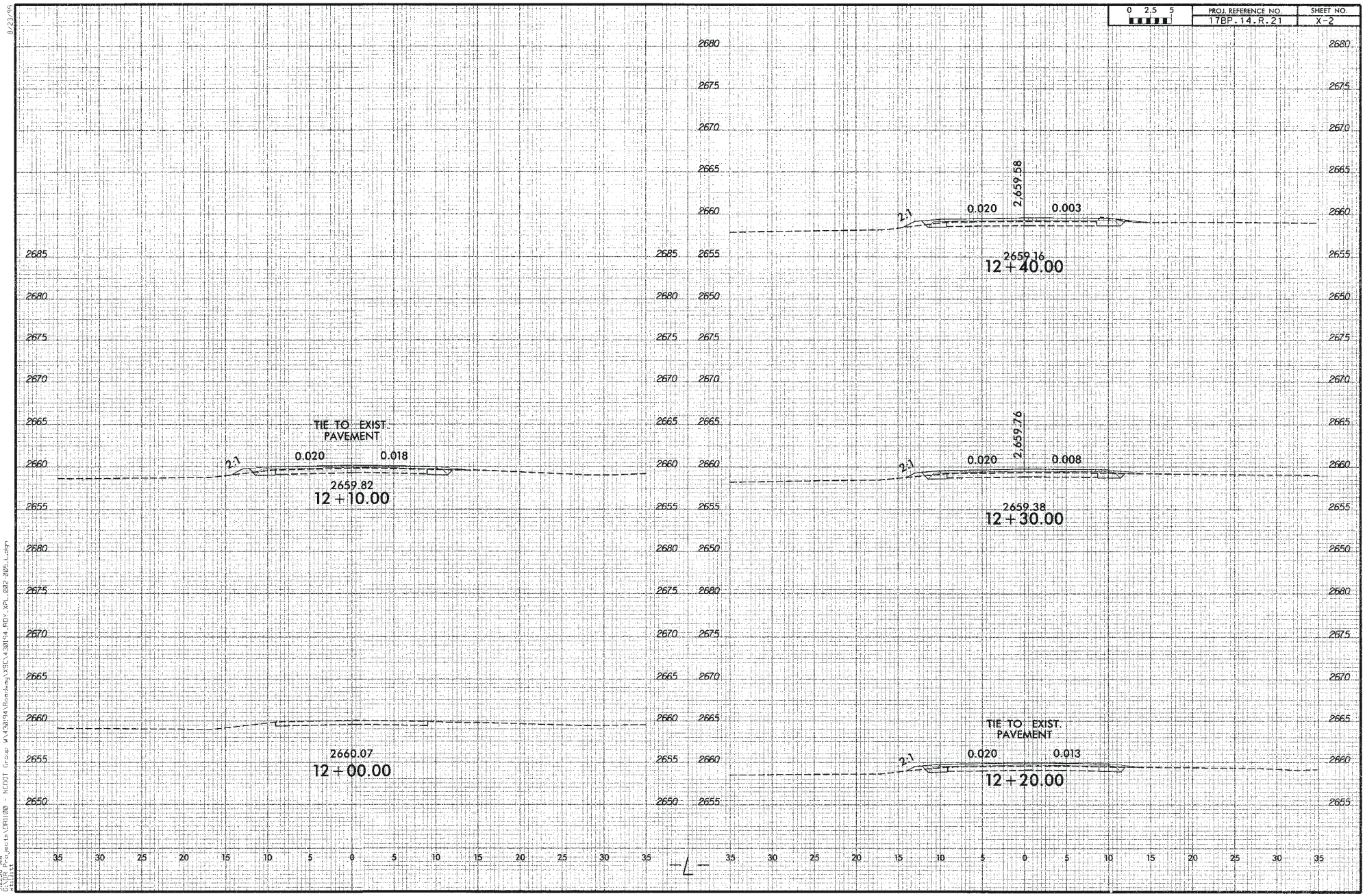
PROJ. REFERENCE NO.	SHEET NO.
17BP.14.R.21	X-1A

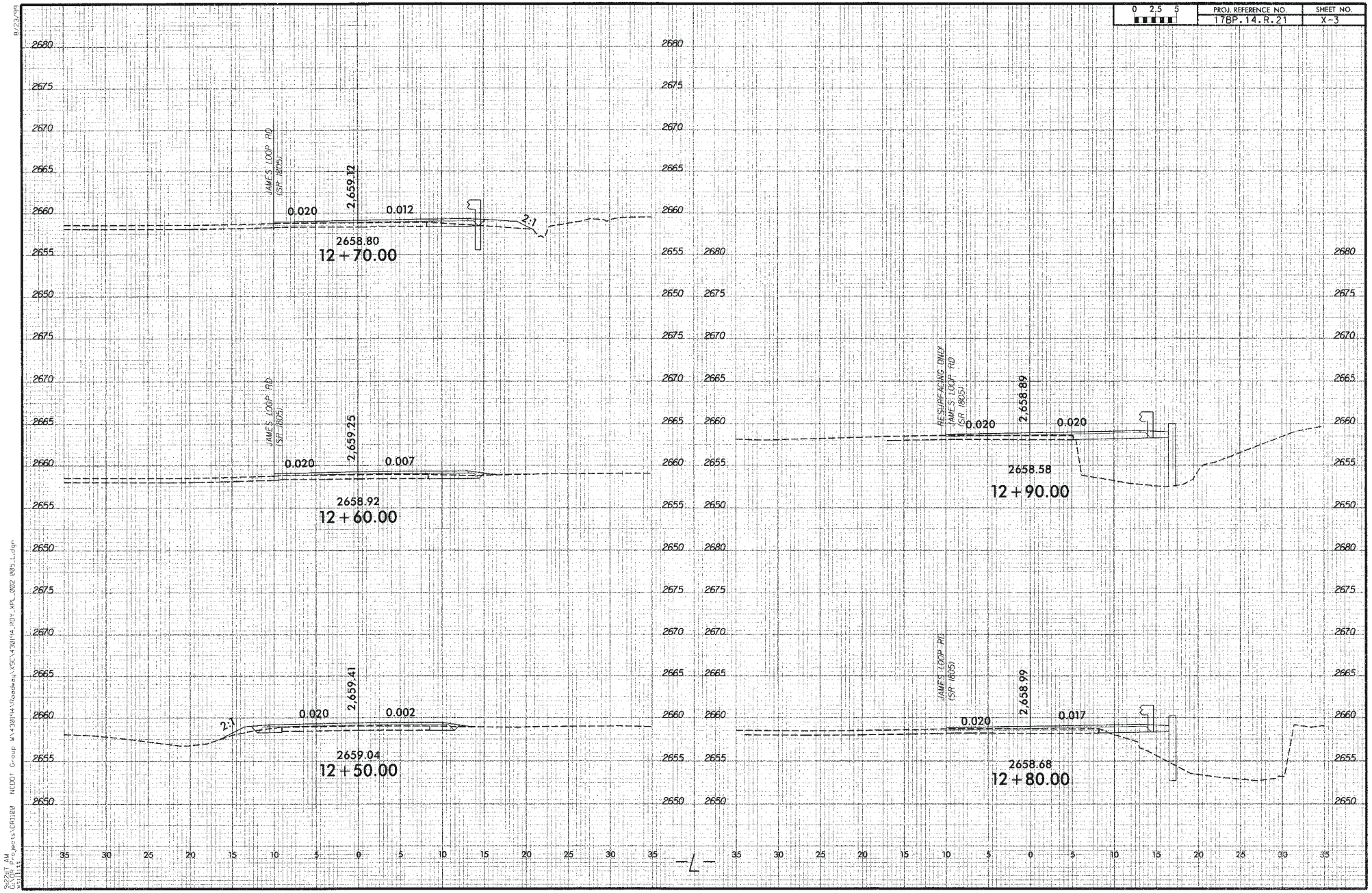
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

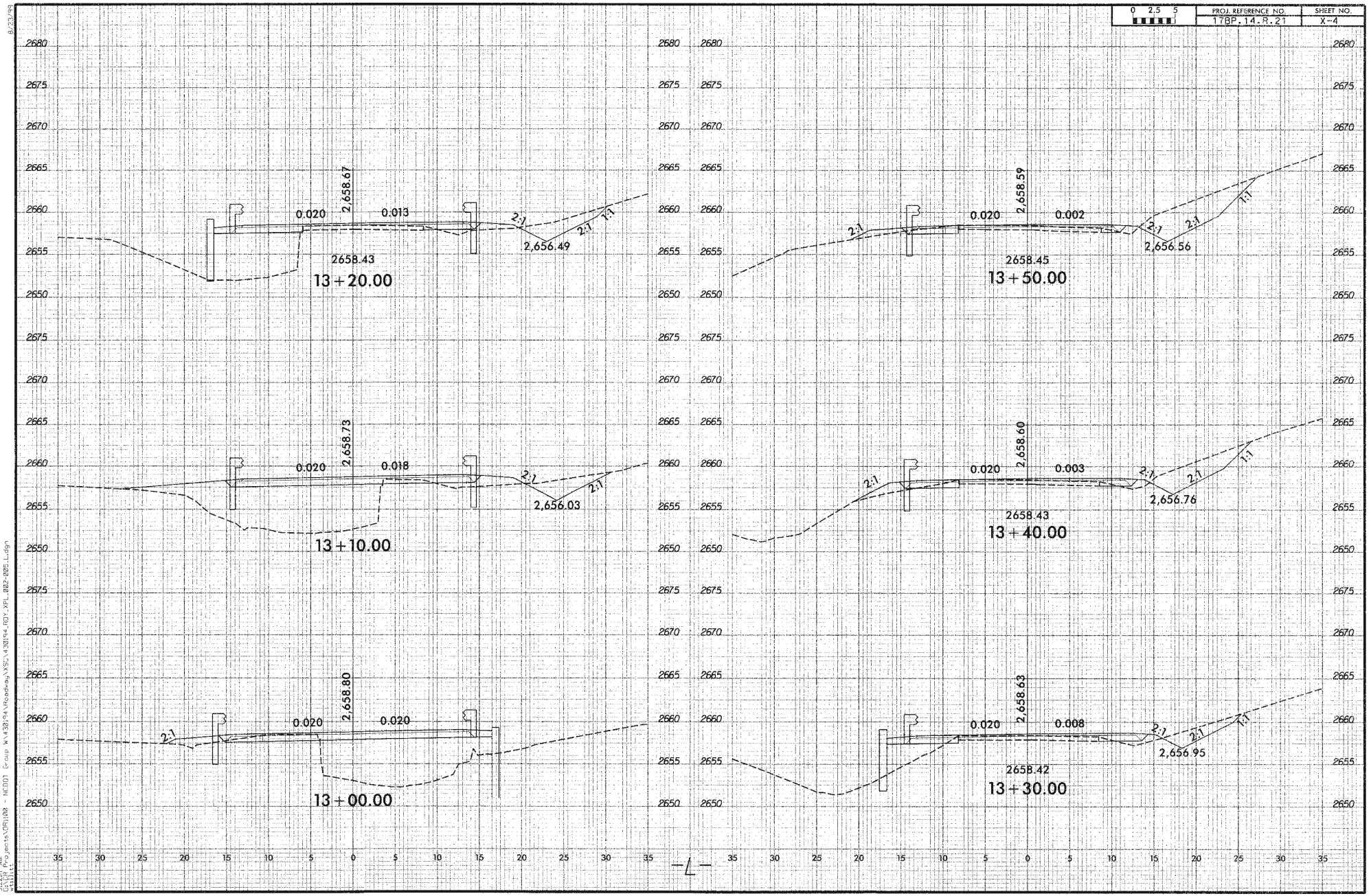
CROSS-SECTION SUMMARY

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
12+10.00	0	0
12+20.00	1	1
12+30.00	1	0
12+40.00	1	1
12+50.00	1	1
12+60.00	1	1
12+70.00	1	1
12+80.00	1	1
12+90.00	0	1
13+00.00	1	1
13+10.00	0	11
13+20.00	1	23
13+30.00	0	2
13+40.00	7	2
13+50.00	18	2
13+60.00	26	1
13+70.00	30	1
13+80.00	17	2

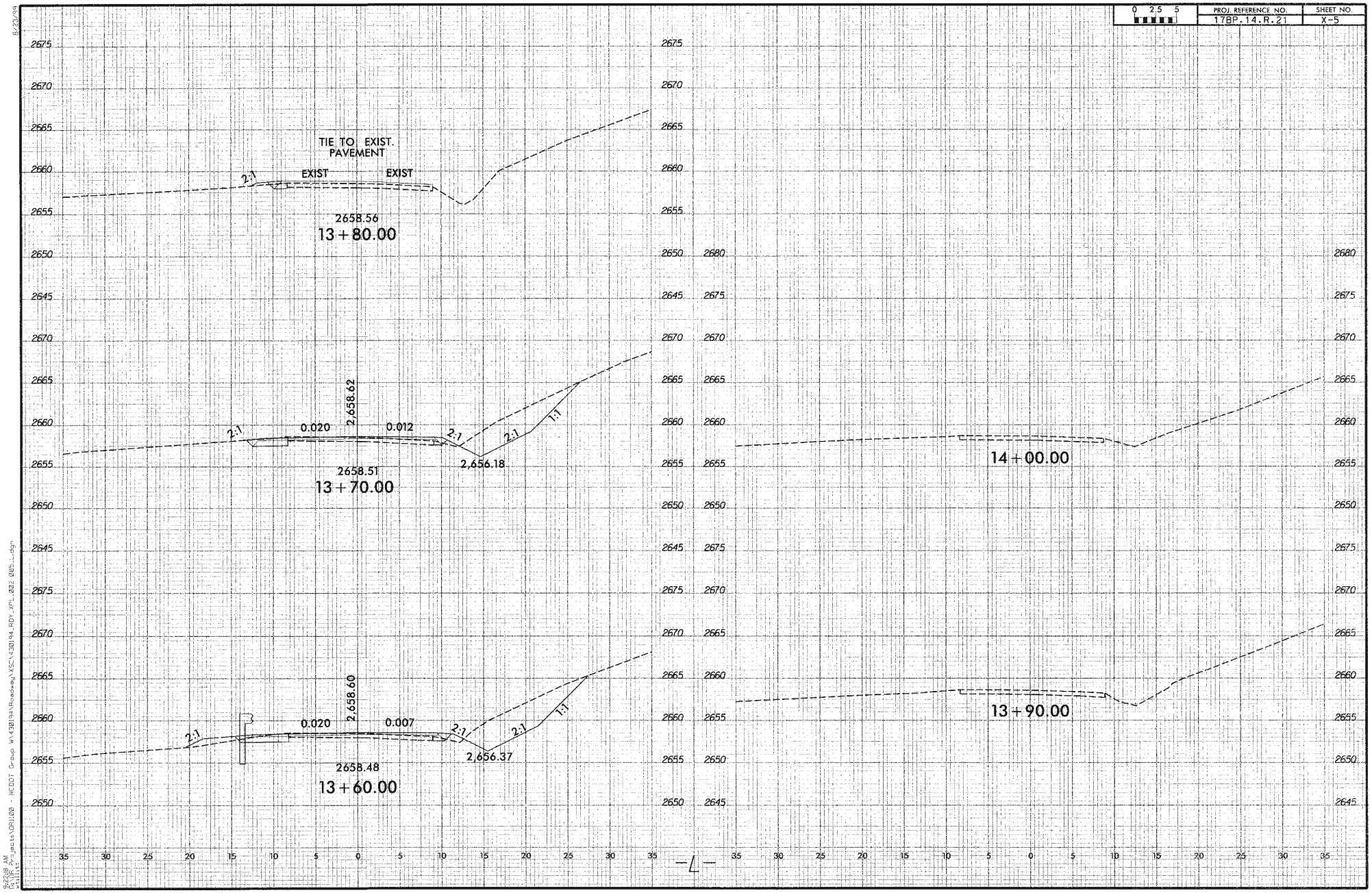

0 2.5 5
PROJ. REFERENCE NO.
17BP.14.R.21
SHEET NO.
X-2
TIE TO EXIST. PAVEMENT
2:1
0.020
0.018
2659.82
12+10.00
2660.07
12+00.00
2:1
0.020
0.003
2659.58
2659.16
12+40.00
2:1
0.020
0.008
2659.76
2659.38
12+30.00
TIE TO EXIST. PAVEMENT
2:1
0.020
0.013
12+20.00

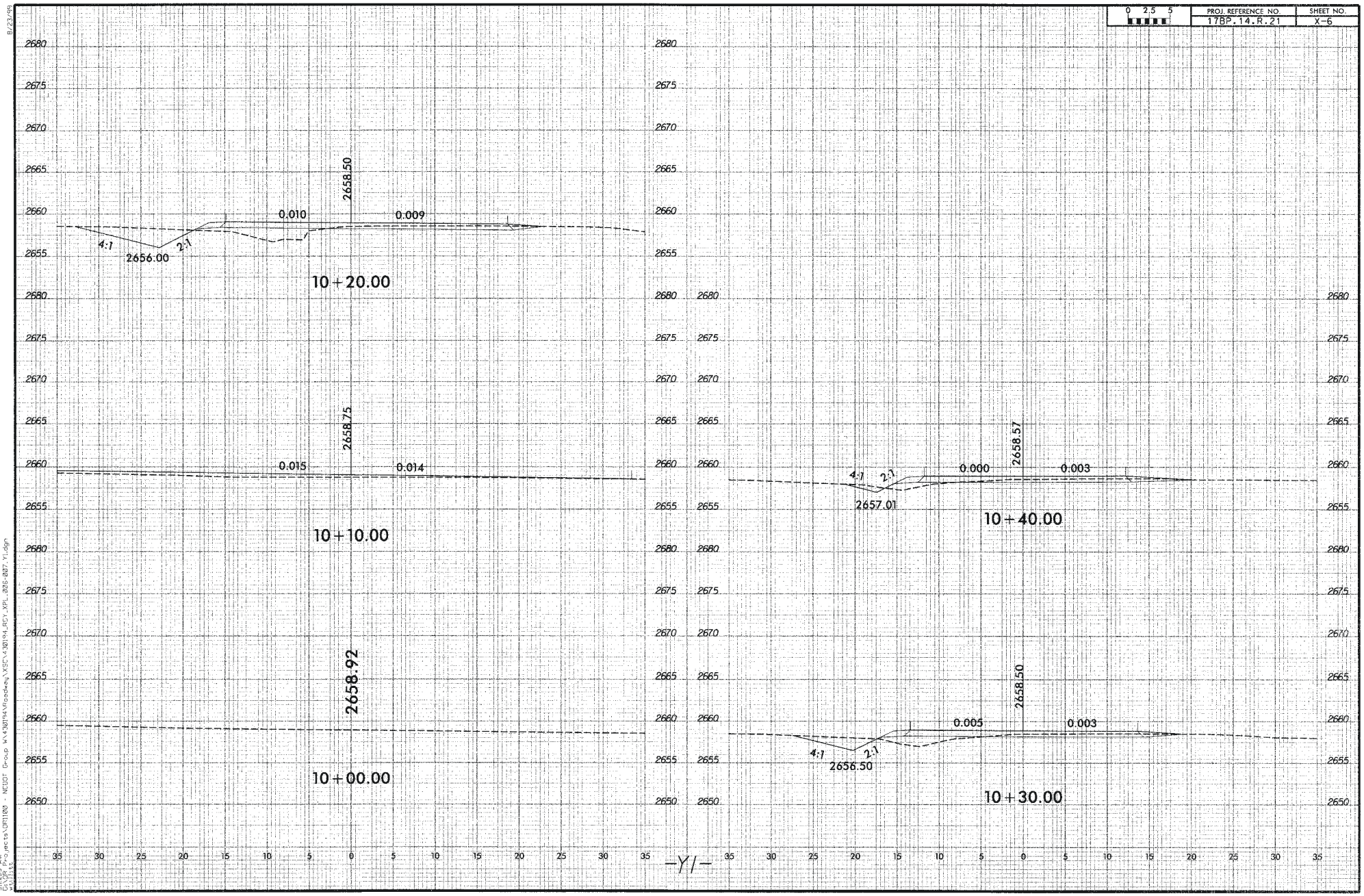


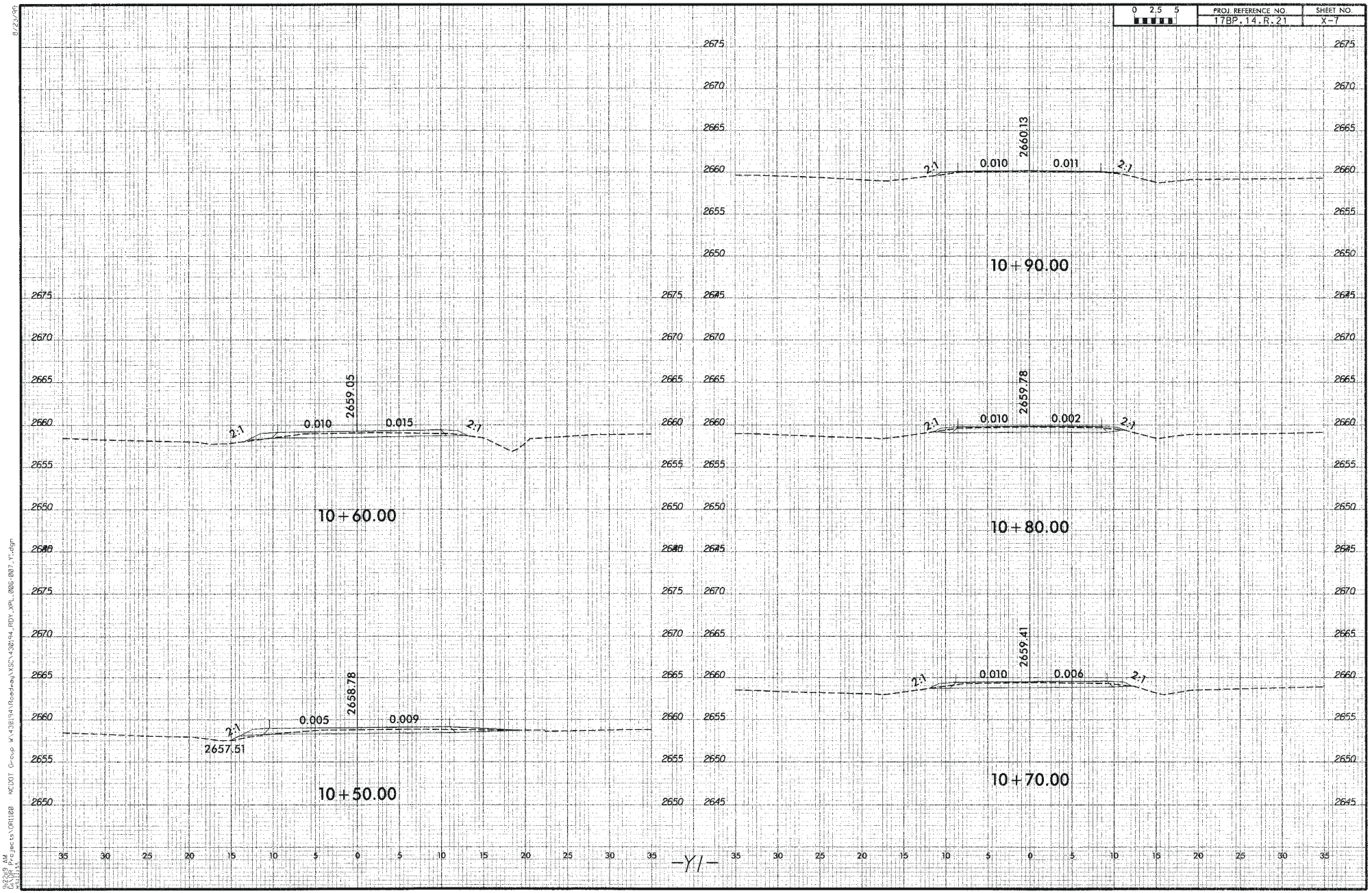
0 2.5 5
PROJ. REFERENCE NO.
17BP.14.R.21
SHEET NO.
X-3
JAMES LOOP RD (SR 1805)
2,659.12
0.020
0.012
2:1
2658.80
12+70.00
JAMES LOOP RD (SR 1805)
2,659.25
0.020
0.007
2658.92
12+60.00
2,659.41
0.020
0.002
2:1
2659.04
12+50.00
RESURFACING ONLY
JAMES LOOP RD (SR 1805)
2,658.89
0.020
0.020
2658.58
12+90.00
JAMES LOOP RD (SR 1805)
2,658.99
0.020
0.017
2658.68
12+80.00
-L-



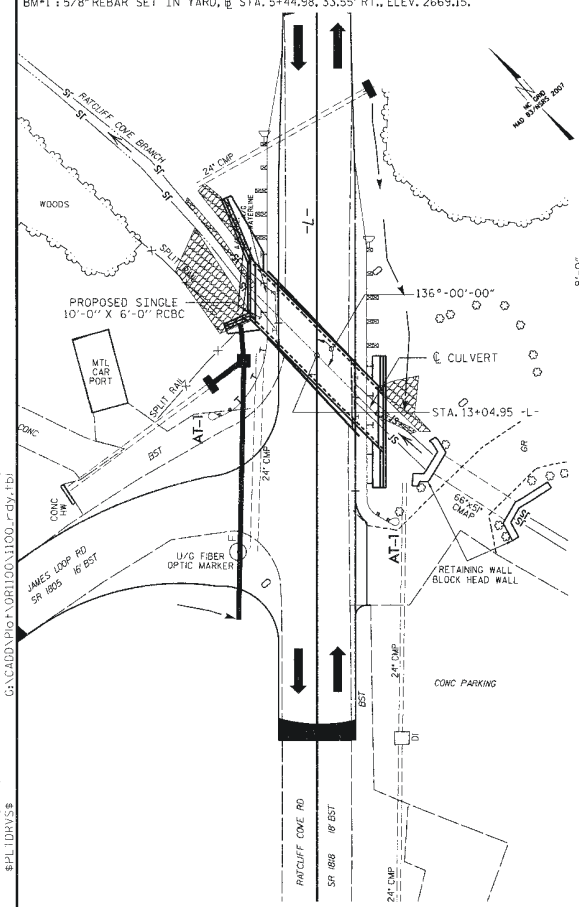
0 2.5 5
PROJ. REFERENCE NO.
17BP.14.R.21
SHEET NO.
X-4
2680
2675
2670
2665
2660
2655
2650
2,658.67
0.020
0.013
2:1
2:1
1:1
2,656.49
2658.43
13+20.00
2,658.59
0.020
0.002
2:1
2:1
2:1
1:1
2,656.56
2658.45
13+50.00
2,658.73
0.020
0.018
2:1
2:1
2,656.03
13+10.00
2,658.60
0.020
0.003
2:1
2:1
2:1
1:1
2,656.76
2658.43
13+40.00
2,658.80
0.020
0.020
2:1
13+00.00
2,658.63
0.020
0.008
2:1
2:1
1:1
2,656.95
2658.42
13+30.00
35 30 25 20 15 10 5 0 5 10 15 20 25 30 35
-L-


0 2.5 5
PROJ. REFERENCE NO.
17BP.14.R.21
SHEET NO.
X-5
TIE TO EXIST. PAVEMENT
EXIST
EXIST
2658.56
13+80.00
2658.62
0.020
0.012
2,656.18
2658.51
13+70.00
14+00.00
2658.60
0.020
0.007
2,656.37
2658.48
13+60.00
13+90.00
2:1
1:1

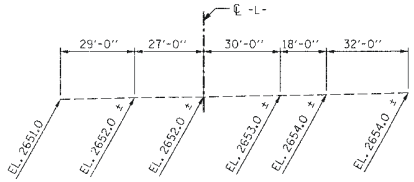

0 2.5 5
PROJ. REFERENCE NO.
17BP.14.R.21
SHEET NO.
X-6
10+20.00
2658.50
0.010
0.009
4:1
2:1
2656.00
10+10.00
2658.75
0.015
0.014
10+00.00
2658.92
10+40.00
2658.57
0.000
0.003
4:1
2:1
2657.01
10+30.00
2658.50
0.005
0.003
4:1
2:1
2656.50
-Y/-


0 2.5 5
PROJ. REFERENCE NO.
17BP.14.R.21
SHEET NO.
X-7
10+90.00
2660.13
0.010
0.011
2:1
10+80.00
2659.78
0.010
0.002
10+70.00
2659.41
0.010
0.006
10+60.00
2659.05
0.010
0.015
10+50.00
2658.78
0.005
0.009
2657.51
-Y/-

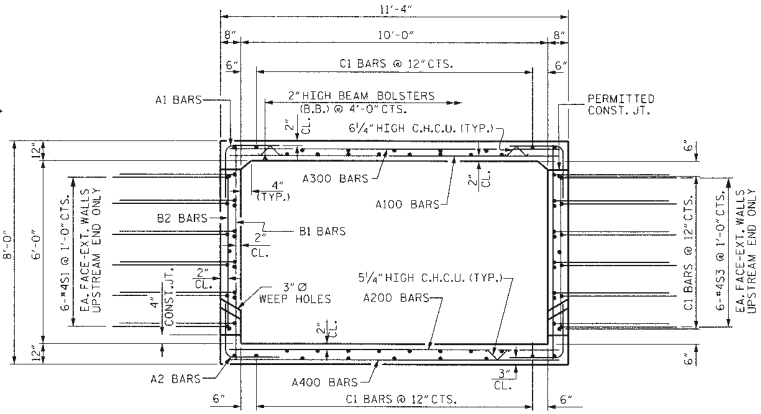
BM#1 : 5/8" REBAR SET IN YARD, ℄ STA. 5+44.98, 33.55' RT., ELEV. 2669.15.



LOCATION SKETCH



PROFILE ALONG ℄ CULVERT



RIGHT ANGLE SECTION OF BARREL

THERE ARE 48 "C" BARS IN SECTION OF BARREL

HYDRAULIC DATA

DESIGN DISCHARGE	= 320 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 10 YEARS
DESIGN HIGH WATER ELEVATION	= 2657.1'
DRAINAGE AREA	= 1.16 SQ. MI.
BASE DISCHARGE (Q100)	= 650 C.F.S.
BASE HIGH WATER ELEVATION	= 2660.4'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 390 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 10 + YEARS
OVERTOPPING FLOOD ELEVATION	= 2658.6'

NOTES

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL----------L.7'.

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"
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.

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.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

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 CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THESTANDARD SPECIFICATIONS.

IN AS MUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 13+04.95 -L-"

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

THE EXISTING STRUCTURE CONSISTING OF ONE 18'-6" SPAN WITH TIMBER FLOOR ON SALVAGED I-BEAMS ON TIMBER END BENTS 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.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 1.1 CY/FT	53.9	C.Y.
WING ETC.	20.4	C.Y.
SILLS	1.4	C.Y.
TOTAL	75.7	C.Y.
REINFORCING STEEL		
BARREL	16,056	LBS.
WINGS ETC.	1,213	LBS.
SILLS	79	LBS.
TOTAL	17,348	LBS.
FOUNDATION COND. MAT.'L	53	TONS
CULVERT EXCAVATION	LUMP SUM	
REMOVAL OF EXISTING STRUCTURE	LUMP SUM	
RIP-RAP, CLASS B	17.7 TONS	

FOUNDATION NOTES

SEE SECTION 414 OF THE STANDARD SPECIFICATIONS FOR CULVERT EXCAVATION AND BACKFILLING.

EXCAVATE AT LEAST 1 FOOT BELOW CULVERTS AND FOOTINGS AND REPLACE WITH COMPACTED FOUNDATION CONDITIONING MATERIAL.

FOUNDATION CONDITIONING MATERIAL SHALL BE CLASS VI SELECT MATERIAL DESCRIBED IN SECTION 1016 OF THE STANDARD SPECIFICATIONS.

USE TYPE 2 GEOTEXTILE MEETING SECTION 1056 OF THE NCDOT STANDARD SPECIFICATIONS.

WING WALL BACKFILL SHALL BE CLASS II OR BETTER AS SPECIFIED IN SECTION 1016 OF THE NCDOT STANDARD SPECIFICATIONS.

PROJECT NO. 17BP.14.R.21

HAYWOOD COUNTY

STATION: 13+04.95 -L-

SHEET 1 OF 8 REPLACES BRIDGE #430194

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD SINGLE 10 FT. x 6 FT. CONCRETE BOX CULVERT 136° SKEW

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14047 STEPHEN D. COOK

REGISTERED ENGINEER

5/9/13

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			8

STD. NO. CB41A

ASSEMBLED BY : R. KNIGHT	DATE : APR. 2012	SPECIAL
CHECKED BY : S. COOK	DATE : JUNE 2012	
DRAWN BY : R.W. WRIGHT	DATE : AUG. 1989	STANDARD
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989	

REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
ADDED 8-22-89

g:\or projects\or1100 - ncdot group w\430194\Structures\430194_STR_RCBC01.dgn
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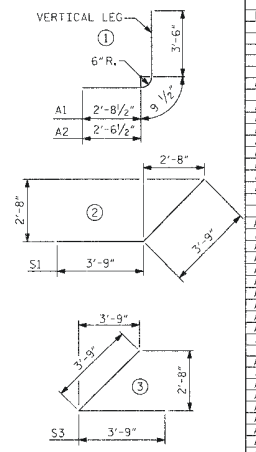
$PLTDRVS$
4/17/2013

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

SPLICE CHART	
#4C1	1'-5"
#5B1	1'-9"

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	196	7	1	7'-0"	2804
A2	196	6	1	6'-10"	2012
A100	76	6	STR	11'-0"	1256
A101	4	6	STR	10'-0"	60
A102	4	6	STR	9'-0"	54
A103	4	6	STR	8'-0"	48
A104	4	6	STR	7'-0"	42
A105	4	6	STR	6'-0"	36
A106	4	6	STR	5'-0"	30
A107	4	6	STR	4'-0"	24
A108	4	6	STR	3'-0"	18
A109	4	6	STR	2'-0"	12
A110	4	6	STR	1'-0"	6
A200	76	6	STR	11'-0"	1256
A201	4	6	STR	10'-0"	60
A202	4	6	STR	9'-0"	54
A203	4	6	STR	8'-0"	48
A204	4	6	STR	7'-0"	42
A205	4	6	STR	6'-0"	36
A206	4	6	STR	5'-0"	30
A207	4	6	STR	4'-0"	24
A208	4	6	STR	3'-0"	18
A209	4	6	STR	2'-0"	12
A210	4	6	STR	1'-0"	6
A300	76	6	STR	11'-0"	1256
A301	4	6	STR	10'-0"	60
A302	4	6	STR	9'-0"	54
A303	4	6	STR	8'-0"	48
A304	4	6	STR	7'-0"	42
A305	4	6	STR	6'-0"	36
A306	4	6	STR	5'-0"	30
A307	4	6	STR	4'-0"	24
A308	4	6	STR	3'-0"	18
A309	4	6	STR	2'-0"	12
A310	4	6	STR	1'-0"	6
A400	76	6	STR	11'-0"	1256
A401	4	6	STR	10'-0"	60
A402	4	6	STR	9'-0"	54
A403	4	6	STR	8'-0"	48
A404	4	6	STR	7'-0"	42
A405	4	6	STR	6'-0"	36
A406	4	6	STR	5'-0"	30
A407	4	6	STR	4'-0"	24
A408	4	6	STR	3'-0"	18
A409	4	6	STR	2'-0"	12
A410	4	6	STR	1'-0"	6
B1	196	5	STR	7'-8"	1567
B2	196	5	STR	5'-4"	1090
C1	96	4	STR	25'-6"	1635
C1	4	4	STR	15'-8"	42
S1	6	4	2	7'-6"	30
S2	12	8	STR	15'-8"	502
S3	6	4	3	7'-6"	30

REVISED 11-13-91 BY E.L.R. CHECKED BY C.R.P. G:\or projects\or1100 - ncdot group w\430194\Structures\430194_STR_RCBC02.dgn
ADDED 8-22-89 G:\CADD\Plot\OR1100\1100_rdy.tbl
4/17/2013 $PLTDRVS$

ASSEMBLED BY : R. KNIGHT	DATE : APR. 2012	SPECIAL
CHECKED BY : S. COOK	DATE : JUNE 2012	
DRAWN BY : R.W. WRIGHT	DATE : AUG. 1989	STANDARD
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989	

PROJECT NO. 17BP.14.R.21
HAYWOOD COUNTY
STATION: 13+04.95 -L-

SHEET 2 OF 8 REPLACES BRIDGE #430194

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

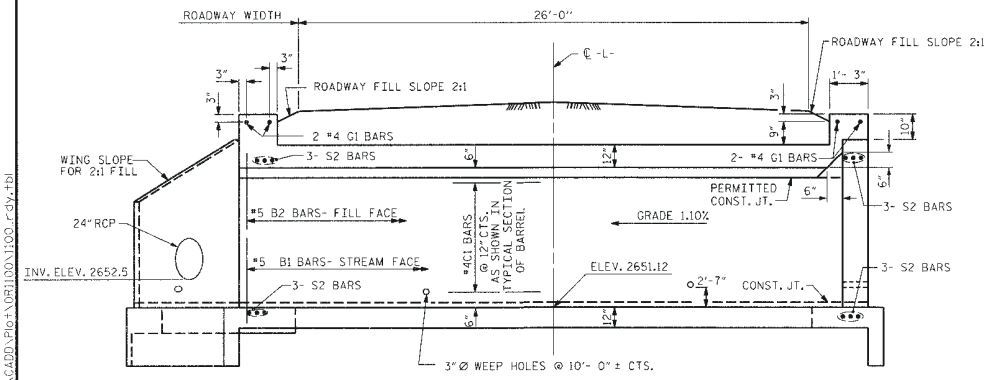
BARREL STANDARD
SINGLE 10 FT. x 6 FT.
CONCRETE BOX CULVERT
136° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 14047 ENGINEER TIMOTHY D. COOK
REGISTERED ENGINEER
5/9/13

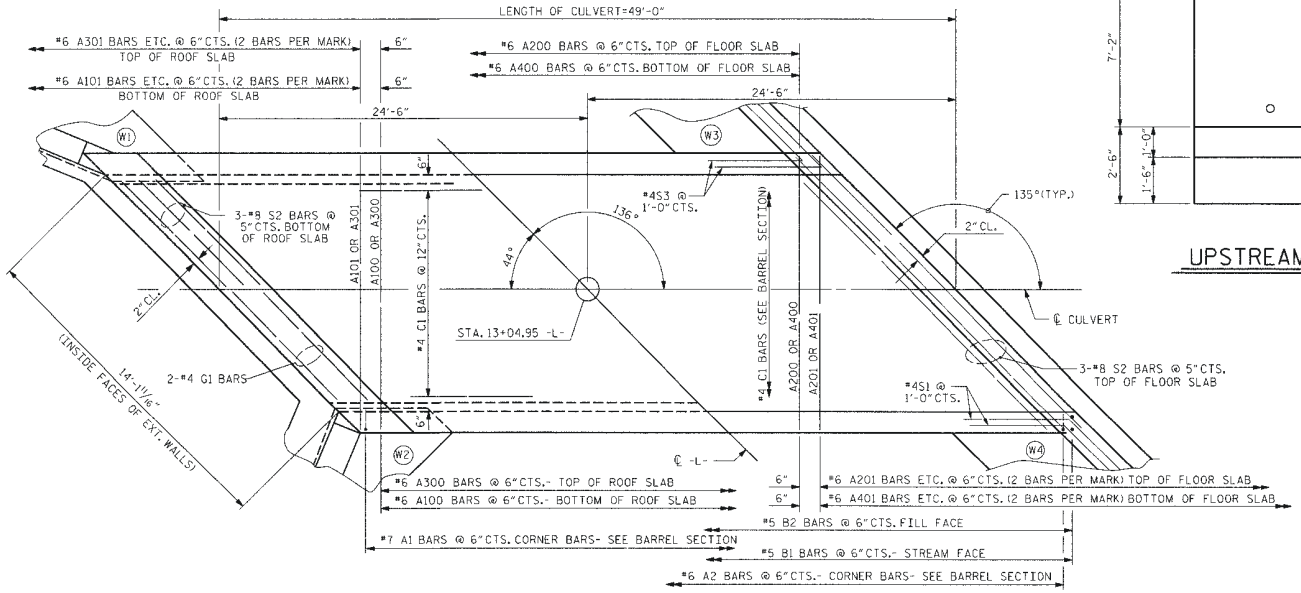
THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			8

STD. NO. CB41A

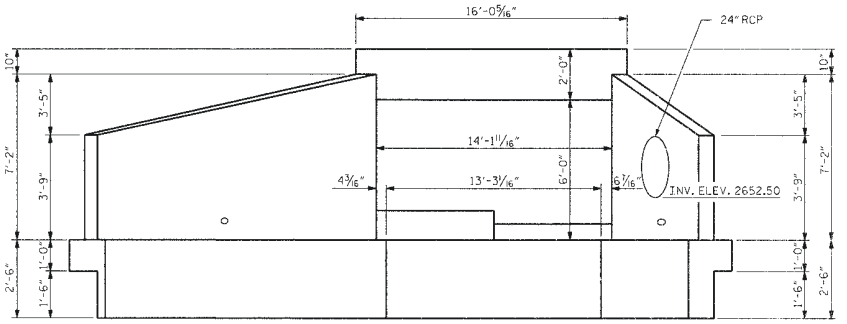


CULVERT SECTION NORMAL TO ROADWAY



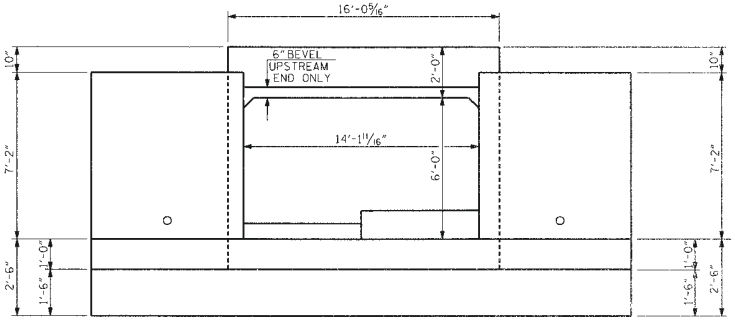
PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB



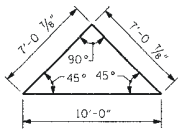
DOWNSTREAM END ELEVATION NORMAL TO SKEW

FOR CULVERT SILL DETAILS, SEE SHEET 4 OF 8.



UPSTREAM END ELEVATION NORMAL TO SKEW

FOR CULVERT SILL DETAILS. SEE SHEET 4 OF 8.



SKEW TRIANGLE

PROJECT NO. 17BP.14.R.21

HAYWOOD COUNTY

STATION: 13+04.95 -L-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD
SINGLE 10 FT. x 6 FT. CONCRETE BOX CULVERT 135° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 14047 ENGINEER STEPHEN D. REGISTERED ENGINEER 3/9/13

THE LOUIS BERGER GROUP Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS
2			4			8

STD. NO. CB41

ASSEMBLED BY : R. KNIGHT	DATE : APR 2012	SPECIAL	
CHECKED BY : S. COOK	DATE : JUNE 2012		
DRAWN BY : R.W. WRIGHT	DATE : AUG. 1989	STANDARD	
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989		

REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
REVISED 6-22-98 BY A.R.B. CHECKED BY C.A.R.
REDRAWN 6-22-98

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W. 4/11/2013

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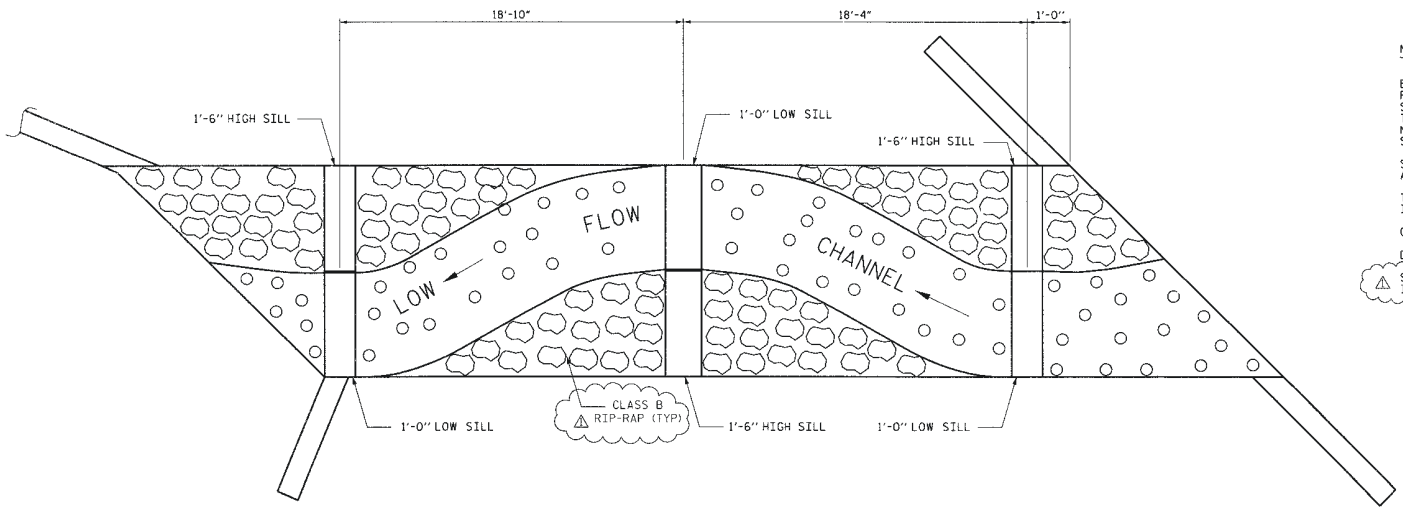


PLAN

NOTES:

BED MATERIAL BETWEEN SILLS/BAFFLES 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. STONES LARGER THAT 6" SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIALS SUBJECT TO APPROVAL BY THE ENGINEER

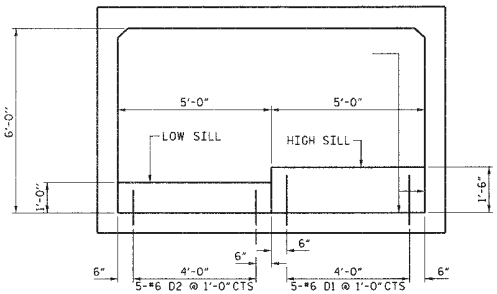
SILLS/BAFFLES ARE TO BE 1'-0" WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

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

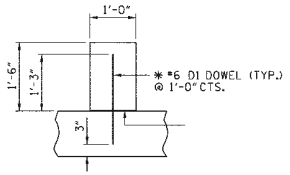
CLASS B RIP RAP MAY BE USED TO SUPLEMENT NATURAL BED MATERIAL.

DO NOT SET ELEVATION OF HIGH SILLS/BAFFLES ABOVE BANK FULL.

⚠ SET ASIDE EXCAVATED NATURAL BED MATERIAL AND USE IT TO BACKFILL INSIDE BOTTOM OF RCBC CELLS.

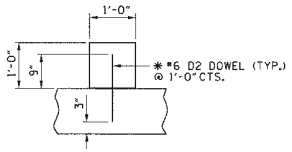


ELEVATION VIEW - INLET



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

SECTION THRU 1'-6" SILL



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

SECTION THRU 1'-0" SILL

SILL QUANTITIES
(INCLUDED IN TOTAL FOR STRUCTURE)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
D1	15	#6	STR	2'-0"	45
D2	15	#6	STR	1'-6"	34
REINFORCING STEEL TOTAL					79 LBS
CLASS A CONCRETE TOTAL					1.4 CY
RIP-RAP, CLASS B					17.7 TONS

PROJECT NO. 17BP.14.R.21
HAYWOOD COUNTY
STATION: 13+04.95 -L-

SHEET 4 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE SILL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 14047 ENGINEER STEPHEN D. COOK

REGISTERED ENGINEER

DRAWN BY : R. KNIGHT DATE : JUNE 2012
CHECKED BY : S. COOK DATE : JUNE 2012

⚠ ADDED RIP-RAP AND BED MATERIAL NOTES.

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1	JAD	8/3/2012	3			TOTAL SHEETS
2			4			8

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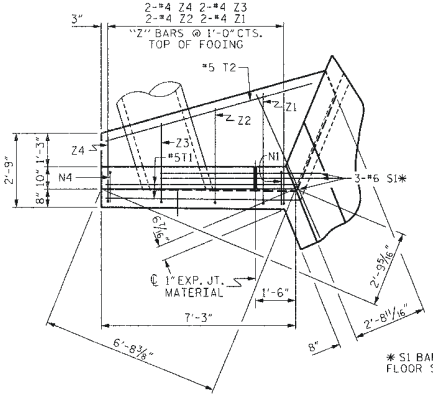
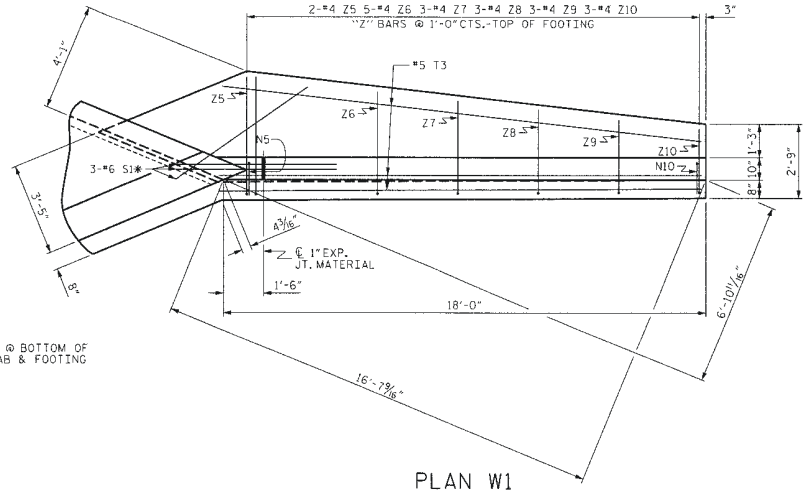
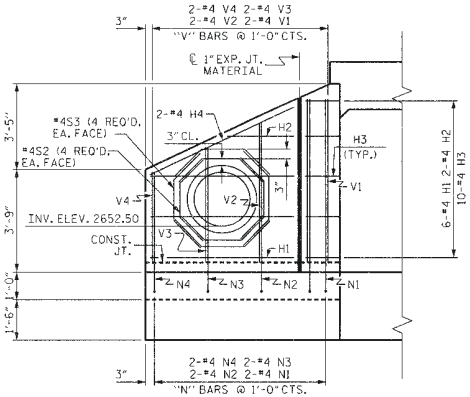


* S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING

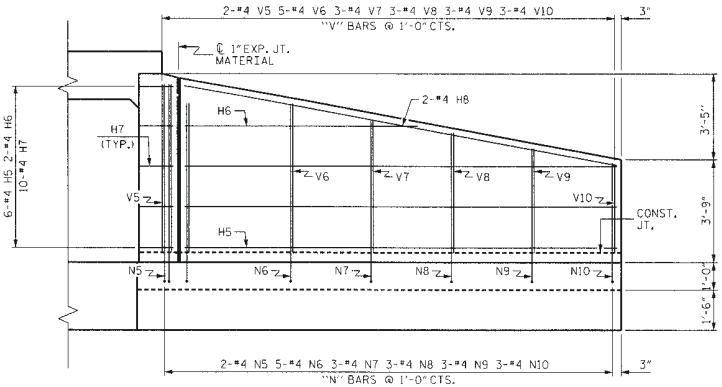
PLAN W2



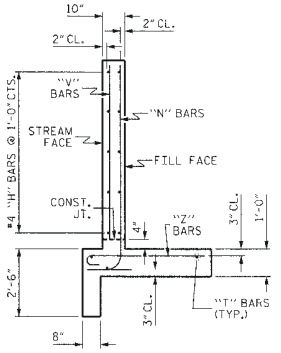
PLAN W1



ELEVATION W2



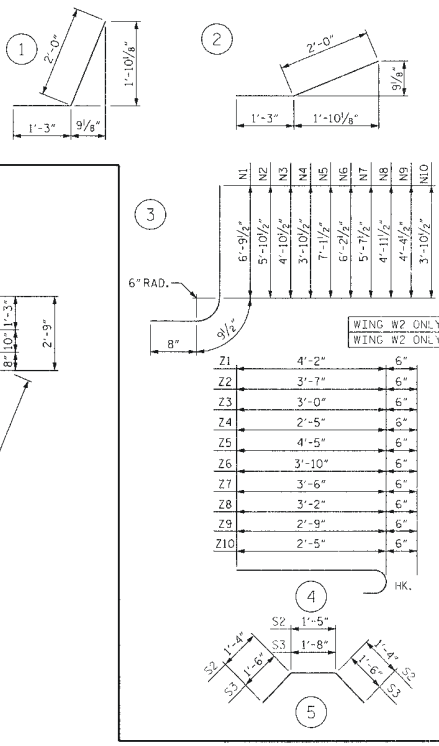
ELEVATION W1



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	5'-4"	21
H2	2	#4	STR	2'-6"	3
H3	10	#4	1	3'-3"	22
H4	2	#4	STR	5'-11"	8
H5	6	#4	STR	16'-1"	64
H6	2	#4	STR	8'-8"	12
H7	10	#4	2	3'-3"	22
H8	2	#4	STR	16'-4"	22
N1	2	#4	3	8'-1"	11
N2	2	#4	3	7'-3"	10
N3	2	#4	3	6'-3"	8
N4	2	#4	3	5'-4"	7
N5	2	#4	3	8'-4"	11
N6	5	#4	3	7'-6"	25
N7	3	#4	3	7'-0"	14
N8	3	#4	3	6'-5"	13
N9	3	#4	3	5'-10"	12
N10	3	#4	3	5'-4"	11
S1	6	#6	STR	6'-0"	54
S2	8	#4	5	4'-1"	22
S3	8	#4	5	4'-8"	25
T1	2	#5	STR	7'-3"	15
T2	1	#5	STR	8'-0"	8
T3	3	#5	STR	18'-0"	56
V1	2	#4	STR	6'-1"	8
V2	2	#4	STR	5'-2"	7
V3	2	#4	STR	4'-3"	6
V4	2	#4	STR	3'-4"	4
V5	2	#4	STR	6'-3"	8
V6	5	#4	STR	5'-6"	18
V7	3	#4	STR	4'-11"	10
V8	3	#4	STR	4'-5"	9
V9	3	#4	STR	3'-10"	8
V10	3	#4	STR	3'-3"	7
Z1	2	#4	4	4'-8"	6
Z2	2	#4	4	4'-1"	5
Z3	2	#4	4	3'-6"	5
Z4	2	#4	4	2'-11"	4
Z5	2	#4	4	4'-11"	7
Z6	5	#4	4	4'-4"	14
Z7	3	#4	4	4'-0"	8
Z8	3	#4	4	3'-8"	7
Z9	3	#4	4	3'-3"	7
Z10	3	#4	4	2'-11"	6

REINFORCING STEEL	
WING W1	583 LBS
WING W2	630 LBS

CLASS A CONCRETE	
2 WINGS	9.2 CY
1 HEADWALL	1.5 CY
1 END CURTAIN WALL	2.0 CY
TOTAL	12.7 CY

PROJECT NO. 17BP.14R.21

HAYWOOD COUNTY

STATION: 13+04.95 -L-

SHEET 5 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 2:1

45° OR 135° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			8

STD. NO. CW4506

ASSEMBLED BY : R. KNIGHT	DATE : APR. 2012
CHECKED BY : S. COOK	DATE : JUNE 2012
DRAWN BY : CCJ 01/00	
CHECKED BY : RWW 03/00	

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3522

NORTH CAROLINA PROFESSIONAL SEAL 14047 ENGINEER STEPHEN D. COOK
REGISTERED ENGINEER
5/9/13

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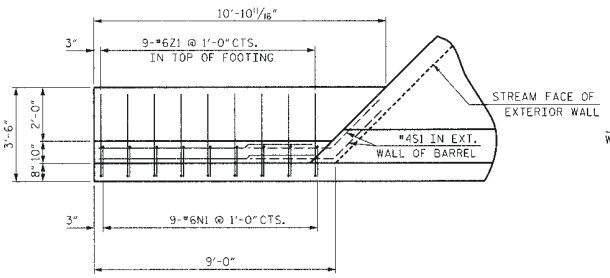
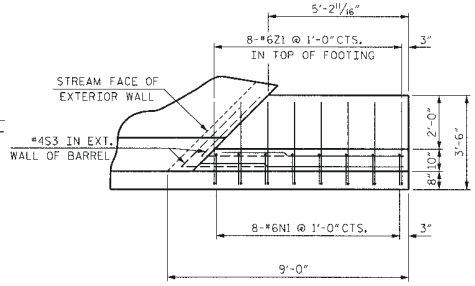


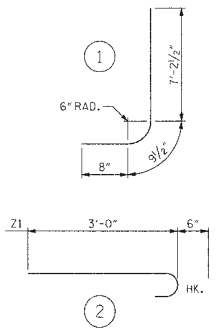
PLAN W3



PLAN W4

BAR TYPES

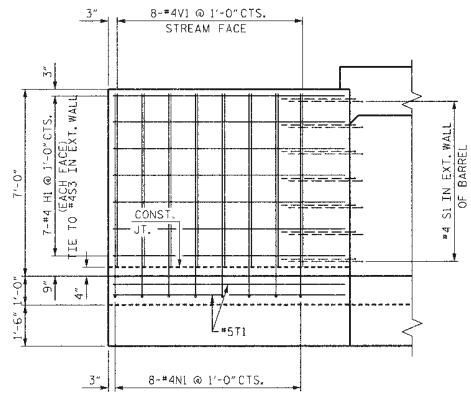
ALL BAR DIMENSIONS ARE OUT TO OUT.



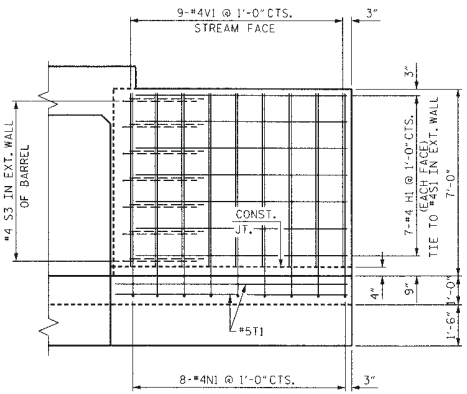
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	28	#4	STR	8'-8"	162
N1	17	#4	1	8'-8"	98
T1	6	#5	STR	8'-3"	52
V1	17	#4	STR	6'-8"	78
Z1	17	#4	2	3'-6"	40

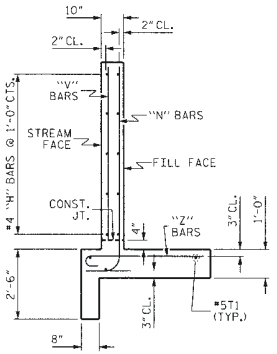
REINFORCING STEEL FOR 2 WINGS	428 LBS
CLASS A CONCRETE	
2 WINGS	5.7 CY
1 HEADWALL	0.7 CY
1 END CURTAIN WALL	1.3 CY
TOTAL	7.7 CY



ELEVATION W3



ELEVATION W4



TYPICAL WING SECTION

PROJECT NO. 17BP.14.R.21

HAYWOOD COUNTY

STATION: 13+04.95 -L-

SHEET 6 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WING DETAILS FOR CONCRETE BOX CULVERT UPSTREAM END

REVISIONS

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

SHEET NO. C-6

TOTAL SHEETS 8

STD. NO. CW4506

SEAL 14047 — NORTH CAROLINA PROFESSIONAL ENGINEER — STEPHEN D. COOK

REGISTERED ENGINEER

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

ASSEMBLED BY :	R. KNIGHT	DATE :	APR 2012
CHECKED BY :	S. COOK	DATE :	JUNE 2012
DRAWN BY :	CCJ 01/00		
CHECKED BY :	RWW 03/00		

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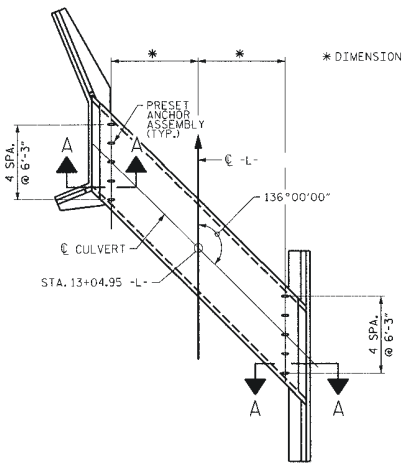
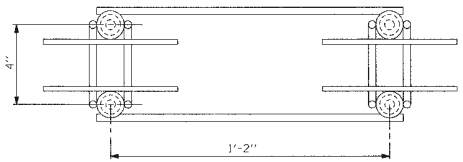


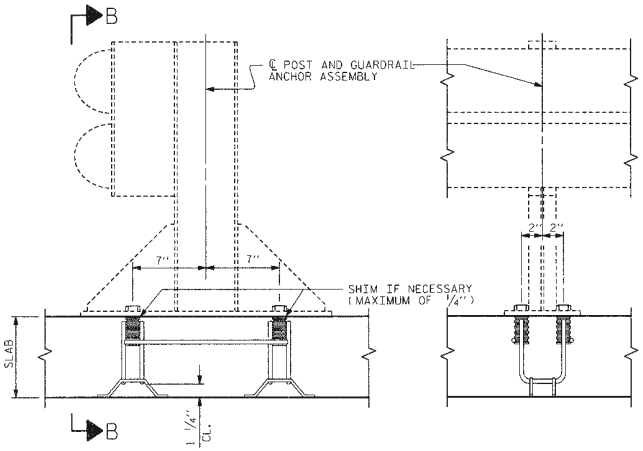
*DIMENSION TO BE FURNISHED BY THE ENGINEER.

PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

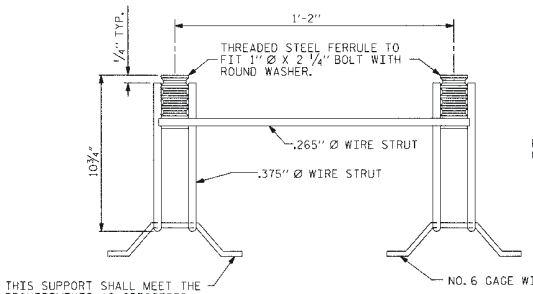


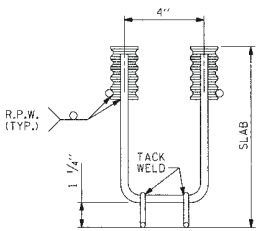
PLAN



SECTION A-A

SECTION B-B





ELEVATION

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 2½" 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.

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. 17BP.14.R.21

HAYWOOD COUNTY

STATION: 13+04.95 -L-

SHEET 7 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

ASSEMBLED BY : R. KNIGHT	DATE : APR. 2012
CHECKED BY : S. COOK	DATE : JUNE 2012
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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14047 JEREMY D. GRAY
REGISTERED ENGINEER
5/7/13

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

REVISIONS

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

SHEET NO. C-7

TOTAL SHEETS 8

STD. NO. GRAI

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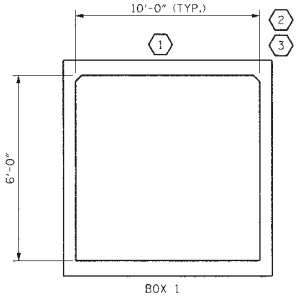
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

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)	1.59	--	1.75	1.83	1	Middle of Top Slab, Inside Face	5.67	1.59	1	Left End of Top Slab	0.00	
		HL-93 (OPERATING)	N/A		2.06	--	1.35	2.38	1	Middle of Top Slab, Inside Face	5.67	2.06	1	Left End of Top Slab	0.00	
		HS-20 (INVENTORY)	36.000	(2)	1.78	64.08	1.75	1.78	1	Middle of Top Slab, Inside Face	5.67	1.98	1	Left End of Top Slab	0.00	
		HS-20 (OPERATING)	36.000		2.31	83.16	1.35	2.31	1	Middle of Top Slab, Inside Face	5.67	2.57	1	Left End of Top Slab	0.00	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.23	43.61	1.40	3.23	1	Middle of Top Slab, Inside Face	5.67	3.93	1	Left End of Top Slab	0.00	
		SNGARBS2	20.000		3.03	60.60	1.40	3.03	1	Middle of Top Slab, Inside Face	5.67	3.63	1	Left End of Top Slab	0.00	
		SNAGRIS2	22.000		3.23	71.06	1.40	3.23	1	Middle of Top Slab, Inside Face	5.67	3.93	1	Left End of Top Slab	0.00	
		SNCOTTS3	27.250	(3)	1.99	54.23	1.40	2.29	1	Middle of Top Slab, Inside Face	5.67	1.99	1	Left End of Top Slab	0.00	
		SNAGGRS4	34.925		2.29	79.98	1.40	2.29	1	Middle of Bottom Slab, Inside Face	5.67	2.72	1	Left End of Top Slab	0.00	
		SNS5A	35.550		2.40	85.32	1.40	2.40	1	Middle of Bottom Slab, Inside Face	5.67	2.43	1	Left End of Top Slab	0.00	
		SNS6A	39.950		2.40	95.88	1.40	2.40	1	Middle of Bottom Slab, Inside Face	5.67	2.43	1	Left End of Top Slab	0.00	
		SNS7B	42.000		2.40	100.80	1.40	2.40	1	Middle of Bottom Slab, Inside Face	5.67	2.43	1	Left End of Top Slab	0.00	
	TRUCK TRACTOR SEMI-TRAILER (TST)	TNAGRIT3	33.000		3.02	99.66	1.40	3.02	1	Middle of Bottom Slab, Inside Face	5.67	3.72	1	Left End of Bottom Slab	0.00	
		TNT4A	33.075		2.48	82.03	1.40	2.73	1	Middle of Top Slab, Inside Face	5.67	2.48	1	Left End of Top Slab	0.00	
		TNT6A	41.600		2.42	100.67	1.40	2.42	1	Middle of Bottom Slab, Inside Face	5.67	2.46	1	Left End of Top Slab	0.00	
		TNT7A	42.000		2.49	104.58	1.40	2.60	1	Middle of Bottom Slab, Inside Face	5.67	2.49	1	Left End of Top Slab	0.00	
		TNT7B	42.000		2.41	101.22	1.40	2.41	1	Middle of Bottom Slab, Inside Face	5.67	2.49	1	Left End of Top Slab	0.00	
		TNAGRIT4	43.000		2.48	106.64	1.40	2.73	1	Middle of Top Slab, Inside Face	5.67	2.48	1	Left End of Top Slab	0.00	
		TNAGT5A	45.000		2.51	112.95	1.40	2.74	1	Middle of Top Slab, Inside Face	5.67	2.51	1	Left End of Top Slab	0.00	
		TNAGT5B	45.000		2.48	111.60	1.40	2.73	1	Middle of Top Slab, Inside Face	5.67	2.48	1	Left End of Top Slab	0.00	



LRFR SUMMARY

(LOOKING DOWNSTREAM)

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

PROJECT NO. 17BP.14.R.21

HAYWOOD COUNTY

STATION: 13+04.95 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14047 STEPHEN D. CRIDER

REGISTERED ENGINEER

7/9/12

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605-3322

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			8

STD. NO. LRFR5

ASSEMBLED BY : R. KNIGHT	CHECKED BY : S. COOK	DATE : MAR. 2012 DATE : JUNE 2012
DRAWN BY : WMC 7/8	CHECKED BY : GM 7/8	REV. 10/1/8 MAA/GM

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4/17/2013 3:13:54 PM $PLTDRV$ G:\CADD\Plot\ORI100\1100_rdy.tbl