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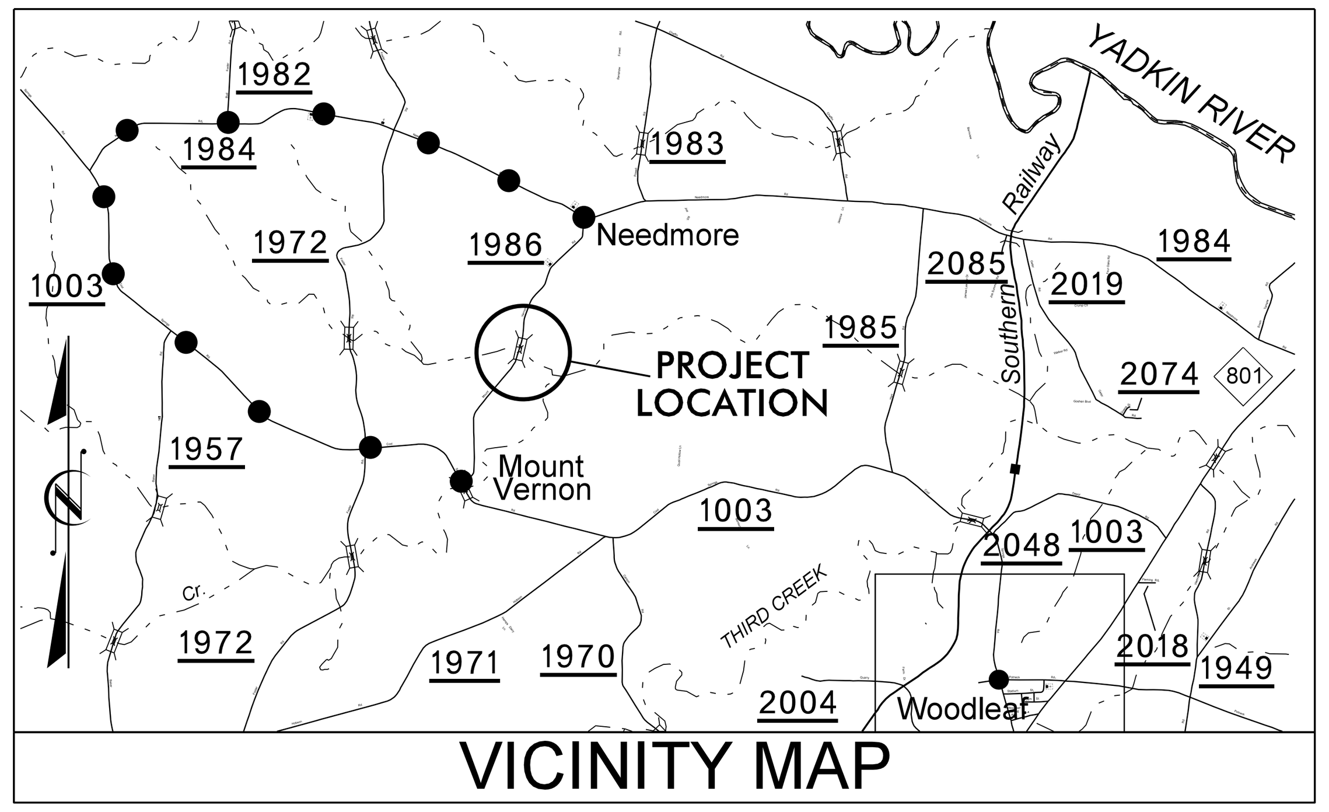
CONTRACT: DI00144

TIP PROJECT: B-5160

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



VICINITY MAP

DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

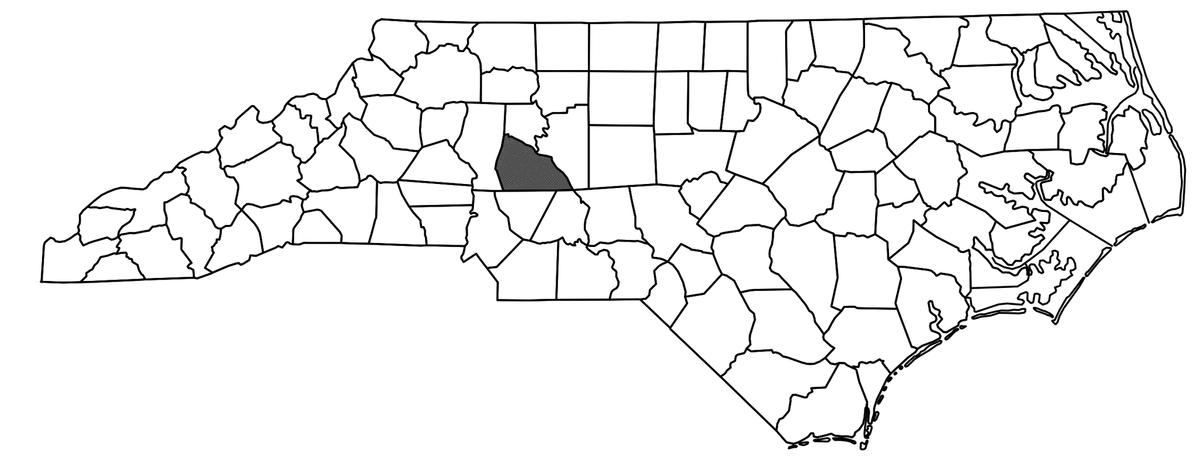
ROWAN COUNTY

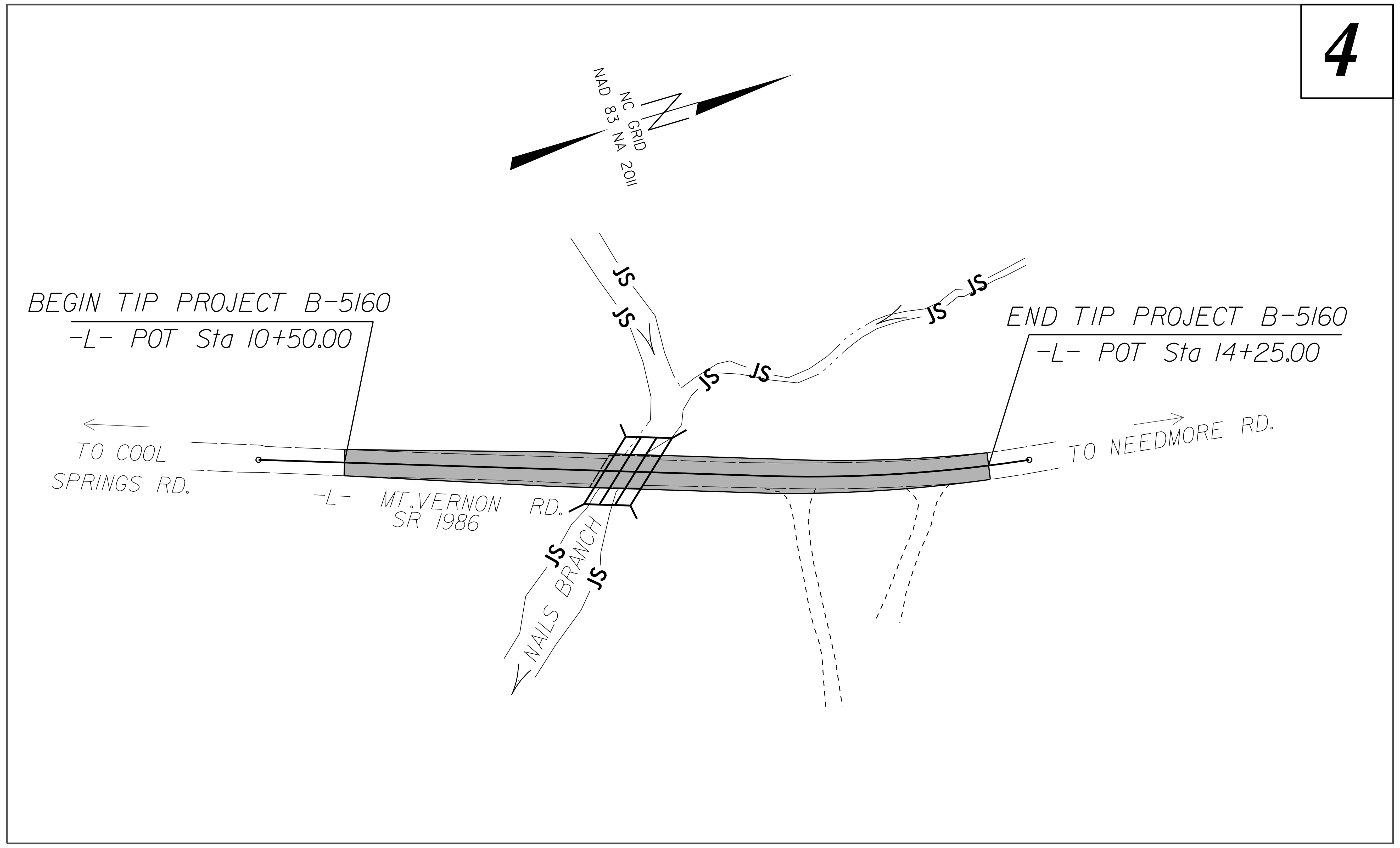
LOCATION: REPLACE EXISTING BRIDGE NO. 50 OVER NAILS BRANCH ON MT. VERNON RD. (SR 1986) WITH BOX CULVERT

TYPE OF WORK: GRADING, DRAINAGE, WIDENING, BOX CULVERT, AND PAVEMENT MARKINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5160	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
42335.1.1	BRZ-1986(001)	PE
42335.2.1	BRZ-1986(001)	RW/UTILS
42335.3.1	BRZ-1986(001)	CONST





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GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 700
ADT 2035 = XXX
DHV = X %
D = XX %
T = X % *
V = 60 MPH
* X% TTST + X% DUALS

FUNC CLASS = LOCAL SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5160 = 0.071 MILE
LENGTH STRUCTURE TIP PROJECT B-5160 = 0.009 MILE
TOTAL LENGTH TIP PROJECT B-5160 = 0.071 MILE

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 2015

LETTING DATE:
DECEMBER 20, 2016

MATTHEW W. JONES, PE
PROJECT ENGINEER

W. AL BLANTON, PE, PLS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
DocuSigned by: Matthew S. Lauffer 9/20/2016
SIGNATURE: P.E.
NORTH CAROLINA PROFESSIONAL SEAL 025325 ENGINEER MATTHEW S. LAUFFER

ROADWAY DESIGN ENGINEER
DocuSigned by: William A. Blanton 9/19/2016
SIGNATURE: P.E.
NORTH CAROLINA PROFESSIONAL SEAL 025499 ENGINEER WILLIAM A. BLANTON

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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wablanton AT DIV9-294552

PROJECT REFERENCE NO.	SHEET NO.
B-5160	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 025499 ENGINEER William A. Blanton

9/19/2016

DocuSigned by: William A. Blanton

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEETS
1D-1	CENTERLINE COORDINATE LIST
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
3B-1	ROADWAY AND DRAINAGE SUMMARIES
4	PLAN AND PROFILE SHEET
TMP-1 THRU TMP-2	TRAFFIC MANAGEMENT PLANS
EC-1 THRU EC-6	EROSION CONTROL PLANS
UO-1 THRU UO-4	UTILITIES BY OTHERS PLANS
X-1 THRU X-5	CROSS-SECTIONS
C-1 THRU C-6	STRUCTURE PLANS - CULVERT

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 10-31-2014

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 III.

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.

SUBSURFACE PLANS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE Duke Energy, AT&T

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

EFF. 01-17-2012
REV. 02-29-2016

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	
200.03	Method of Clearing - Method III
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
310.10	Driveway Pipe Construction
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
840.00	Concrete Base Pad for Drainage Structures
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
862.01	Guardrail Placement
862.02	Guardrail Installation
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
B-5160	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

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
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

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
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E.*) — W
- U/G Water Line LOS C (S.U.E.*) — W
- U/G Water Line LOS D (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

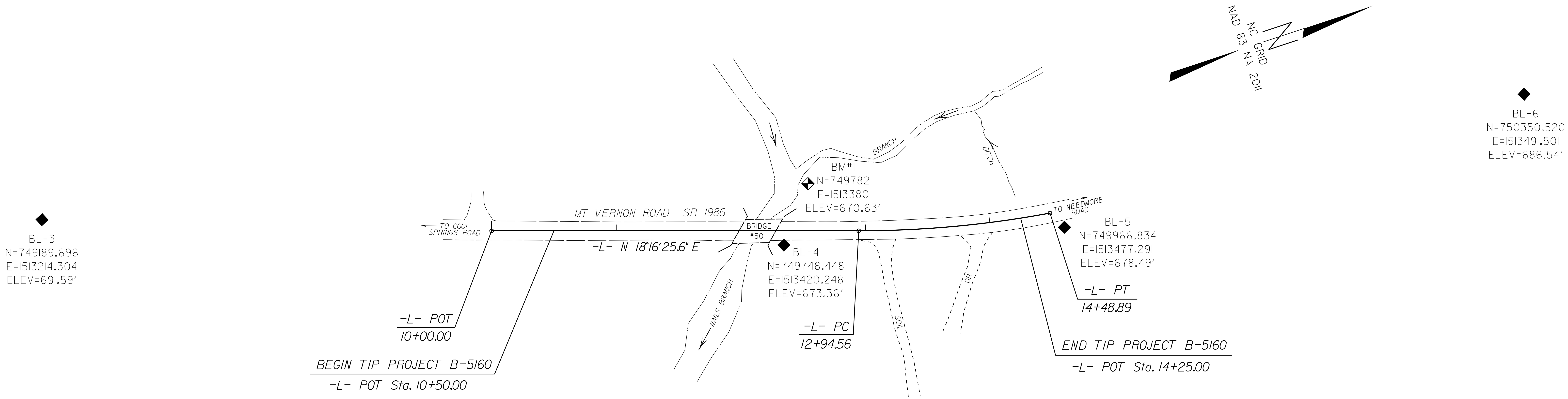
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?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 LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
B-5160	1C-1
DDC	

SURVEY CONTROL SHEET B–5160



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B5160-1"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 748345.169(ft) EASTING: 1512486.853(ft)
ELEVATION: 709.67(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988857
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B5160-1" TO -L- STATION 10+00.00 IS
N 35°38′21.6" E 1457.24
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	B5160-1	748345.1690	1512486.8530	709.67	OUTSIDE PROJECT LIMITS	
2	B5160-2	748889.1260	1512945.2260	700.96	OUTSIDE PROJECT LIMITS	
3	BL-3	749189.6960	1513214.3040	691.59	OUTSIDE PROJECT LIMITS	
4	BL-4	749748.4480	1513420.2480	673.36	12+34.37	11.38 RT
5	BL-5	749966.8340	1513477.2910	678.49	OUTSIDE PROJECT LIMITS	
6	BL-6	750350.5200	1513491.5010	686.54	OUTSIDE PROJECT LIMITS	

BENCHMARK (NAVD88)

BM1 ELEVATION = 670.63′
N 749782 E 1513380
L STATION 12+54 38′ LEFT
RR SPIKE IN BASE OF 12" WALNUT

NOTES:

◆ *INDICATES CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT DIVISION 9 DDC UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
B-5160	1D-1
DDC	

SURVEY CONTROL SHEET B-5160

DESIGN ALIGNMENT

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	749529.4670	1513335.9577
PC	12+94.56	749809.1702	1513428.3187
PCC	15+22.00	750032.1342	1513469.5240
PT	16+70.11	750180.1735	1513473.8065

ROW MARKER CONCRETE OR GRANITE

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+90.00	22.50	749607.8731	1513385.5432
L	11+50.00	60.00	749653.0888	1513439.9656
L	11+90.00	-60.00	749728.6986	1513338.5596
L	11+90.00	-22.50	749716.9402	1513374.1684
L	12+35.00	22.50	749745.5606	1513431.0091
L	12+35.00	60.00	749733.8022	1513466.6180
L	12+44.00	-60.00	749779.9753	1513355.4917
L	13+50.00	-22.50	749867.9739	1513422.1562

ROW MARKER PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+50.00	-22.50	749584.0005	1513330.2703
L	11+40.00	-43.00	749675.8896	1513339.0244
L	11+90.00	-43.00	749723.3681	1513354.7023
L	12+35.00	40.00	749740.0734	1513447.6266
L	13+40.00	34.00	749843.7977	1513474.2040
L	15+15.00	33.00	750023.3312	1513502.1191
L	15+15.00	22.50	750023.9077	1513491.6350

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N 35°38'21.6" E 1457.24
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

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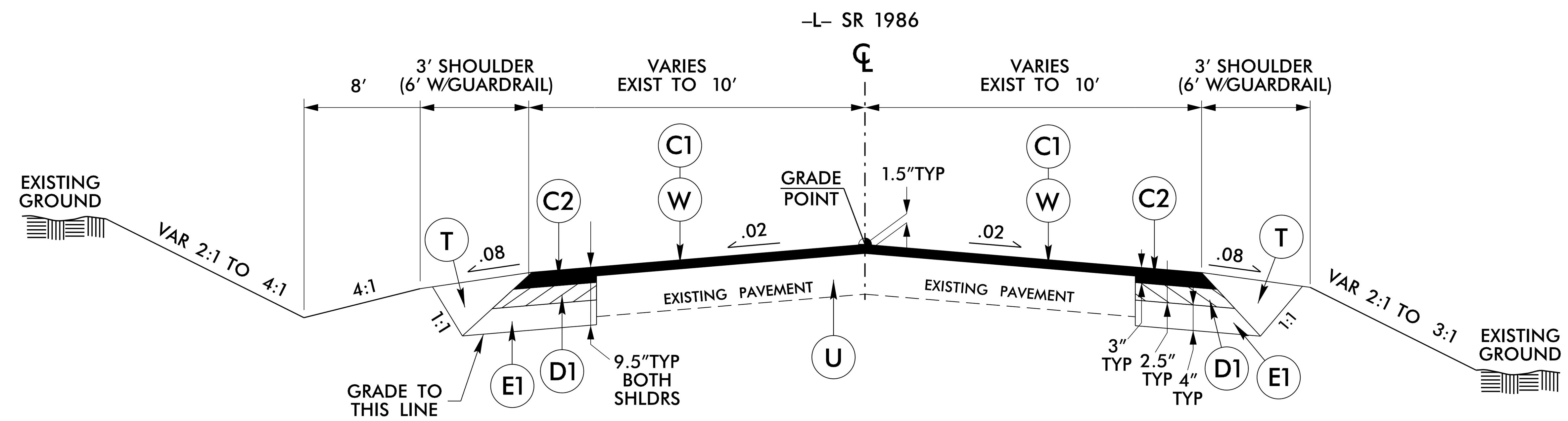
wablanton AT DIV9-294552

PROJECT REFERENCE NO.	SHEET NO.
B-5160	2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025499 William A. Blanton 9/19/2016

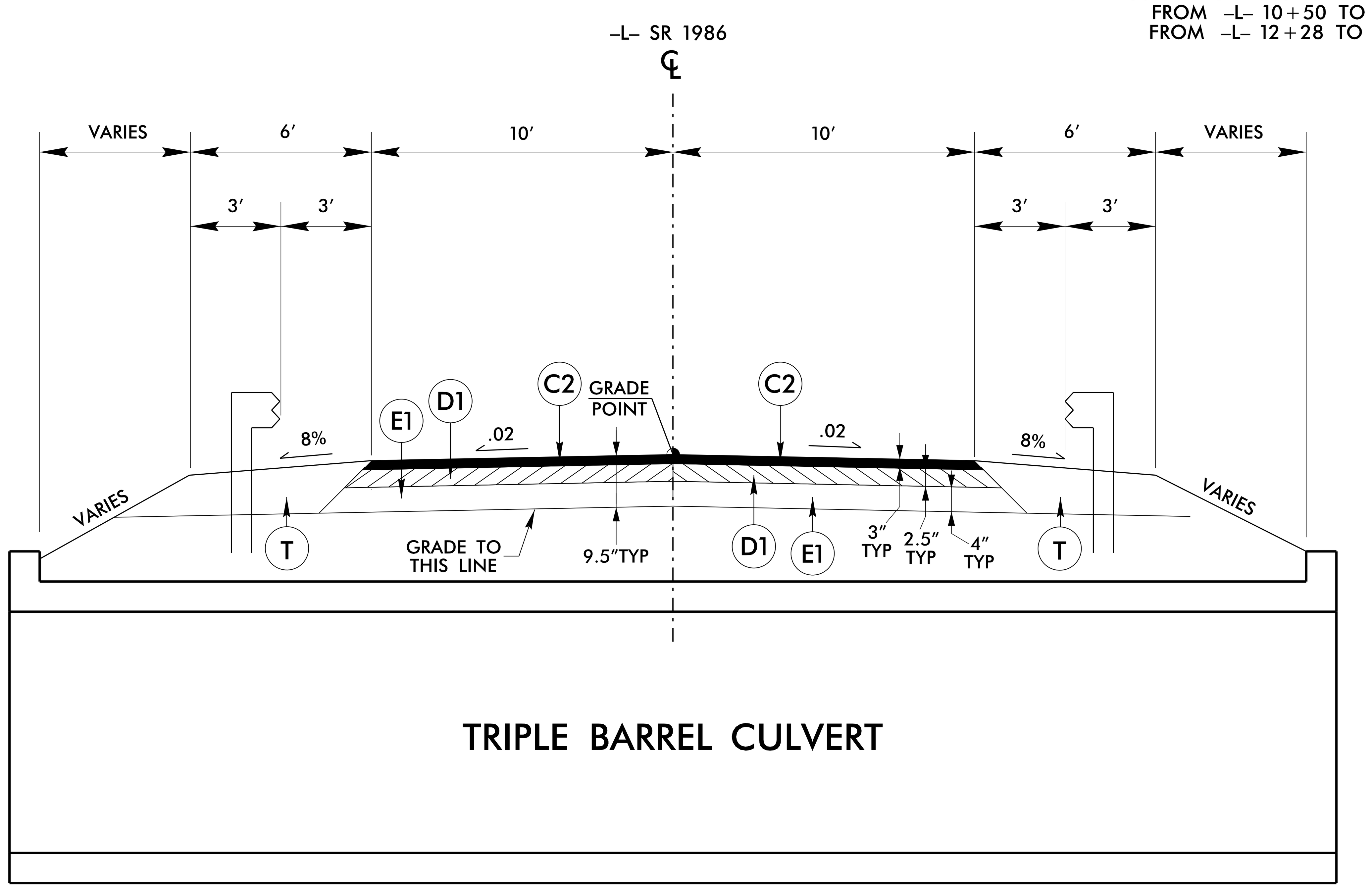
DocuSigned by: William A. Blanton

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



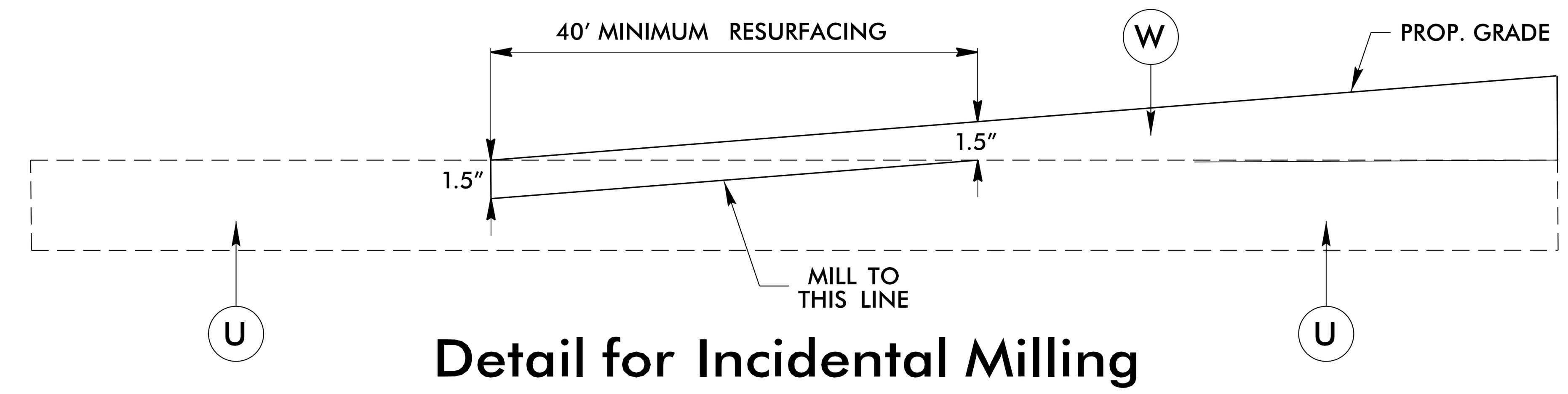
TYPICAL SECTION #1

USE TYPICAL SECTION NO. 1 AS FOLLOWS:
FROM -L- 10+50 TO -L- STA. 12+01
FROM -L- 12+28 TO -L- STA. 14+25

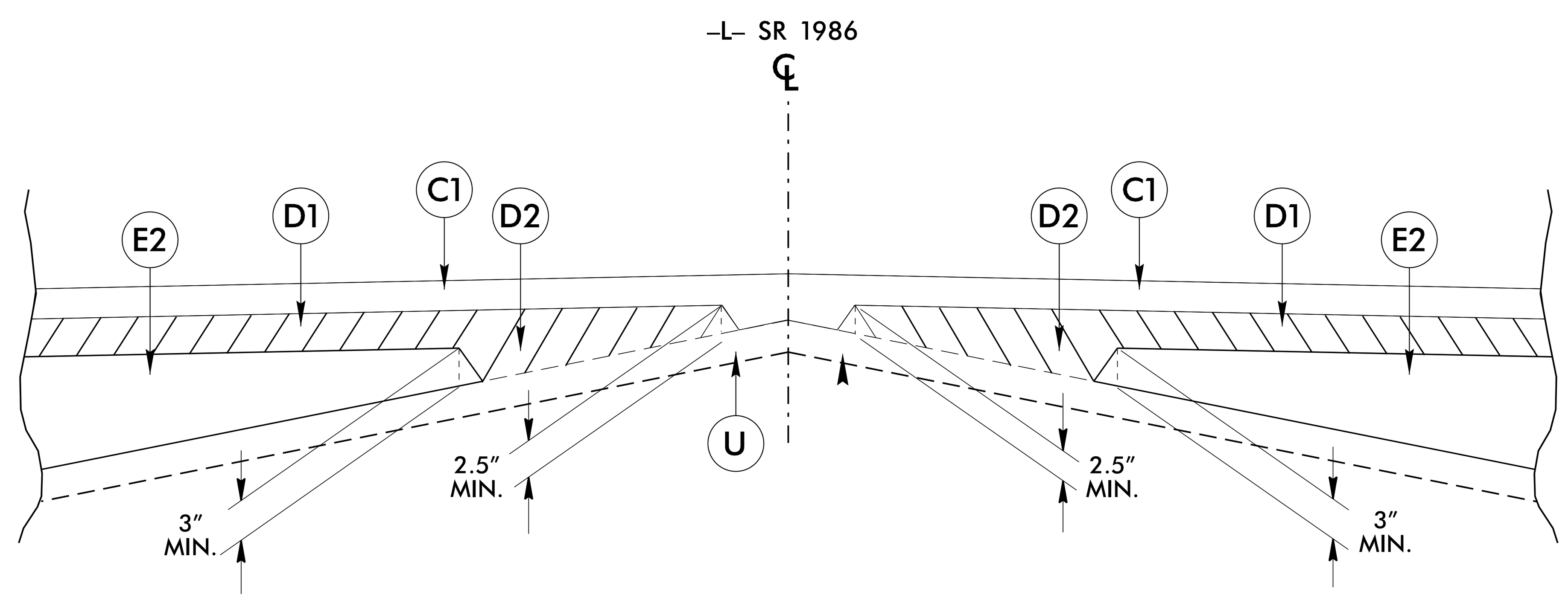


TYPICAL SECTION #2

USE TYPICAL SECTION No. 2 AS FOLLOWS:
FROM -L- STA. 12+01 (BEGIN CULVERT)
TO -L- STA. 12+28 (END CULVERT)



Detail for Incidental Milling



Detail Showing Method of Wedging

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I9.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACE IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 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 5.5" IN DEPTH.
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

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

6/2/99

6/21/00

COMPUTED BY:	DATE:
CHECKED BY:	DATE:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-5160	3B-1

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK. +20%	BORROW	WASTE
10+50 -L-	15+50	338	444	106	0
SUBTOTALS:		338	444	106	0
LOSS DUE TO CLEAR & GRUBB					
PROJECT TOTALS					
GRAND TOTALS					
SAY		340		110	

NOTE:
1) EARTHWORK QUANTITIES ARE CALCULATED BY DDC UNIT.

2) APPROXIMATE QUANTITIES ONLY, UNCLASSIFIED EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, BREAKING OF EXISTING ASPHALT, AND REMOVAL OF EXISTING ASPHALT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

3) EARTHWORK QUANTITIES EXCLUDE VOLUMES FOR "UNCLASSIFIED CULVERT EXCAVATION".

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
L	10+50	14+25	LT/RT	667
TOTAL:				667
SAY:				670

PARCEL INDEX

PARCEL NO.	SHEET NO.	PROPERTY OWNERS NAMES
1	4	MARY T. SEAMON & LARRY L. HOOD
2	4	KIRBY D. & LAURA M. NICKERSON
3	4	DAVID J. PREVETTE
4	4	PAMELA C. PARRISH
5	4	JOHN R. SR. & JUDIE P. WEBB

NOTE: Invert Elevations are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

STATION	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"
12+50	RT	404	403		668.3	668.6						88'			
13+35	RT	403		672.4											
	RT	403	402		668.6	670.9						76'			
14+10	RT	402		676.1											
15+05	RT	402	401		670.9	676.5									
TOTAL												164'			

STATION	C.S. PIPE (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"	CLASS V R.C. PIPE (UNLESS OTHERWISE NOTED) 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE
12+50																								
13+35																								
14+10																								
15+05																		96'						
TOTAL																		96'						

STATION	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 PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') 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		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. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32								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
12+50																																	20'	
13+35			1										1						1															
14+10			1	0.3									1						1														36'	
15+05																																	24'	
TOTAL			2										2						2														80'	

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	M-350	XIII	CAT-1	VI MOD	BIC	AT-1	IMPACT ATTENUATOR TYPE 350 EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-	11+55	13+24	LT	169'			CULVERT HEADWALL		3'	6'	50'	50'	1'	1'			2													
-L-	11+06	12+96	RT	190'			CULVERT HEADWALL		3'	6'	50'	50'	1'	1'			2													
	LESS ANCHOR DEDUCTIONS																													
	GRAU 350 4 @ 50'		=	-200'																										
			TOTAL	159'																										
			SAY	162.5'													4													

PROJECT REFERENCE NO.	SHEET NO.
B-5160	4
RW SHEET NO.	

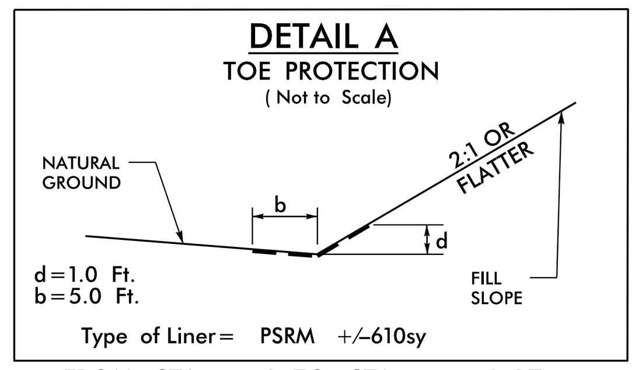
ROADWAY DESIGN ENGINEER — SEAL 025499 — WILLIAM A. BLANTON — 9/19/2016 — DocuSigned by: William A. Blanton

HYDRAULICS ENGINEER — SEAL 025325 — MATTHEW S. LAUFFER — 9/20/2016 — DocuSigned by: Matthew S. Lauffer

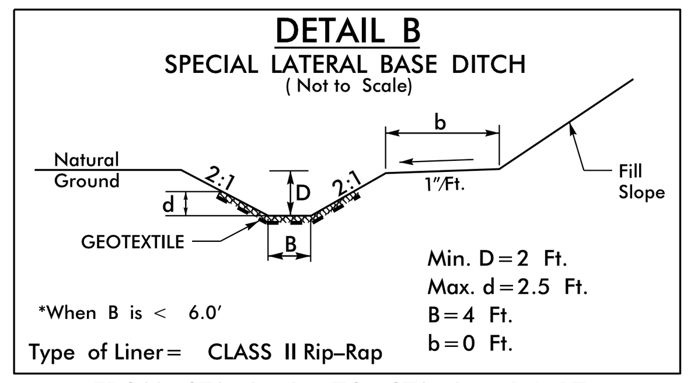
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8/17/99

REVISIONS



FROM STA.11+10 TO STA.11+75-L-RT.



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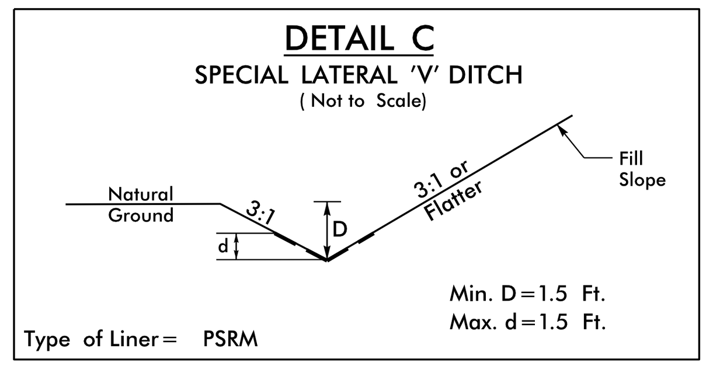

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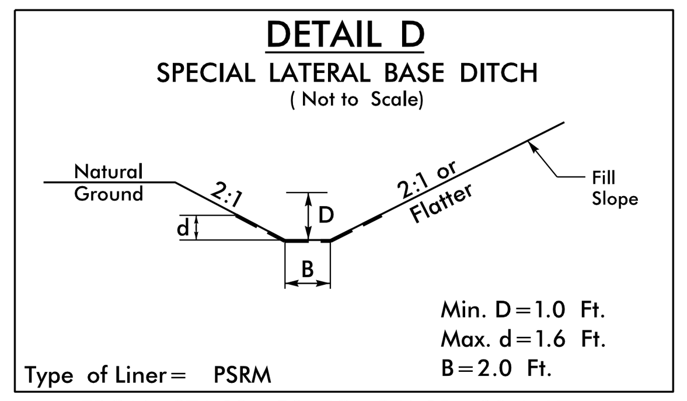

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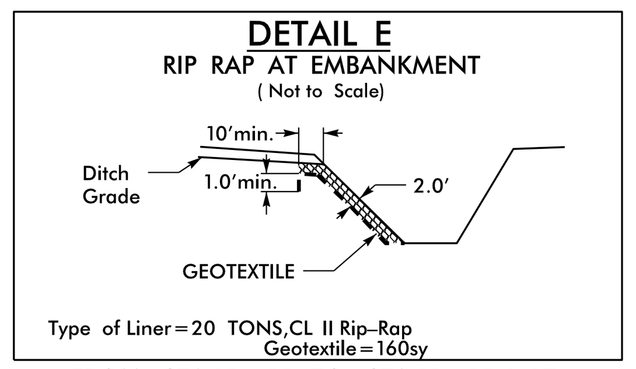

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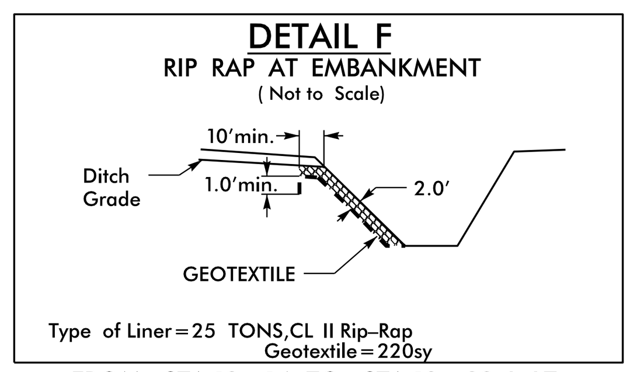

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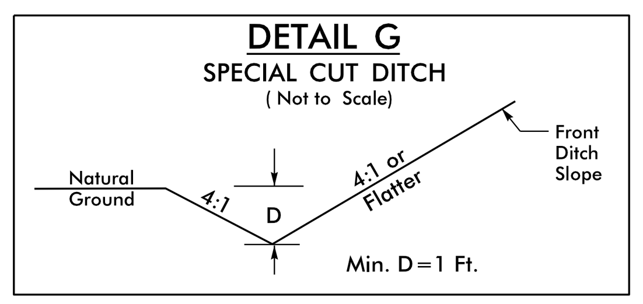
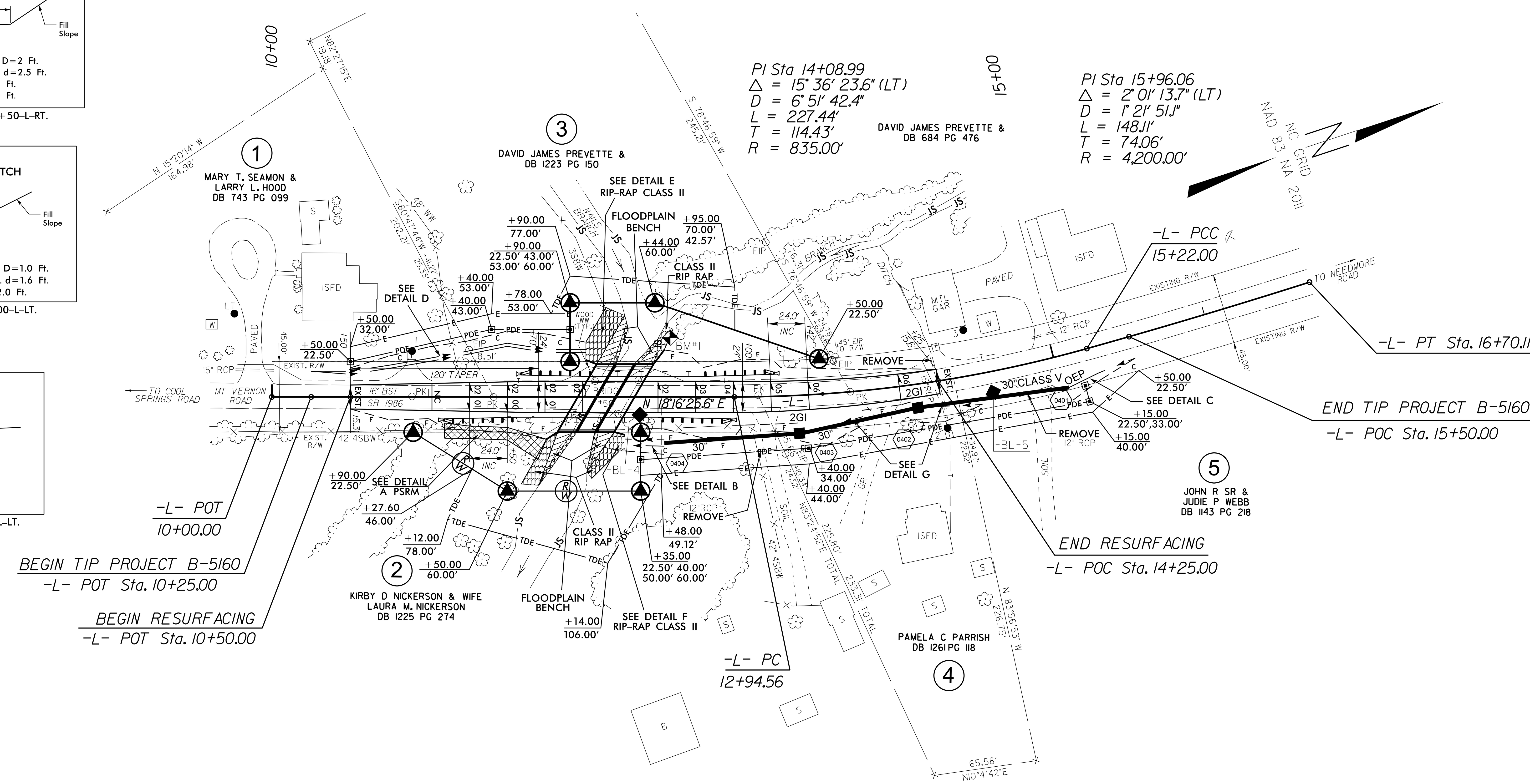
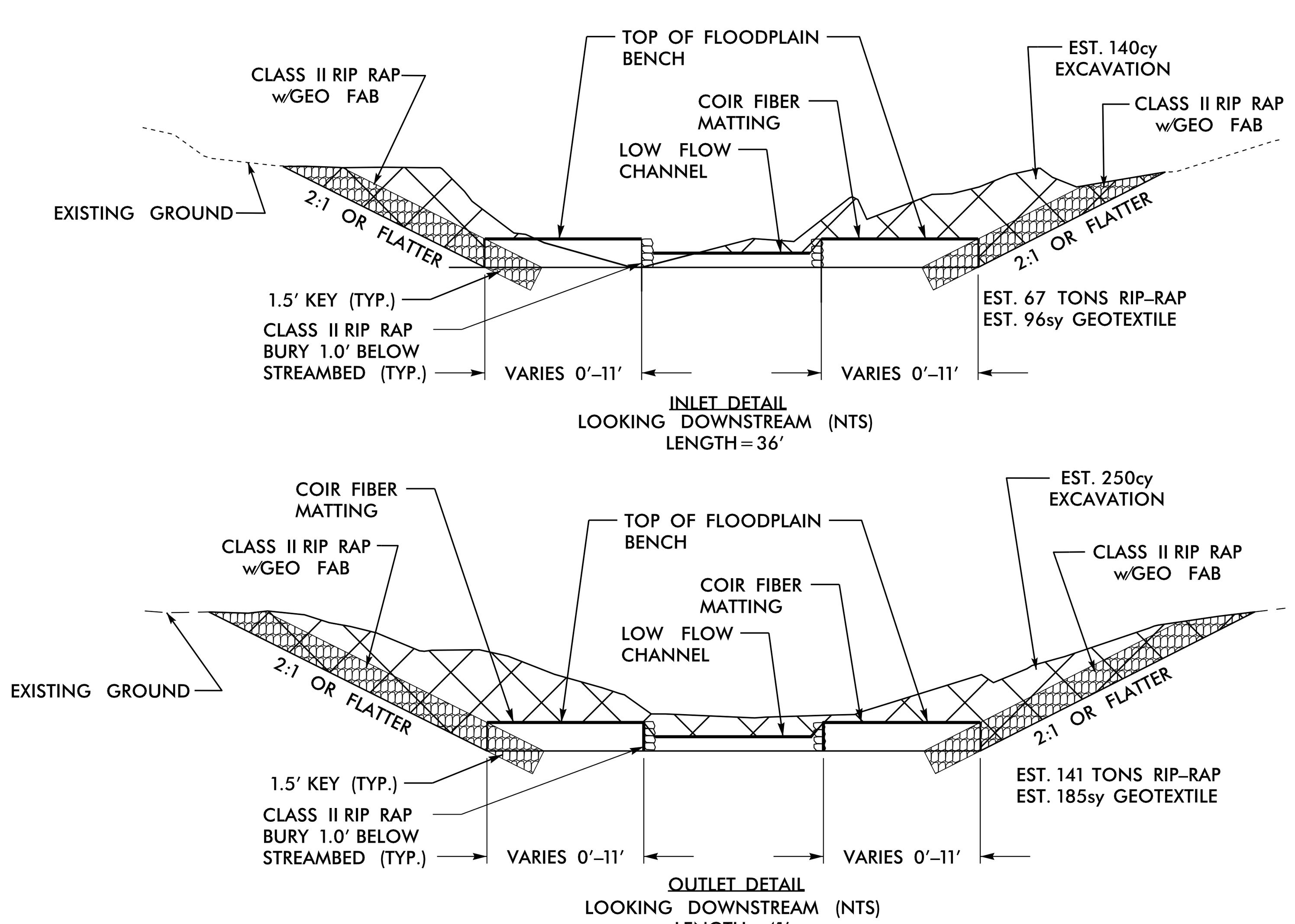
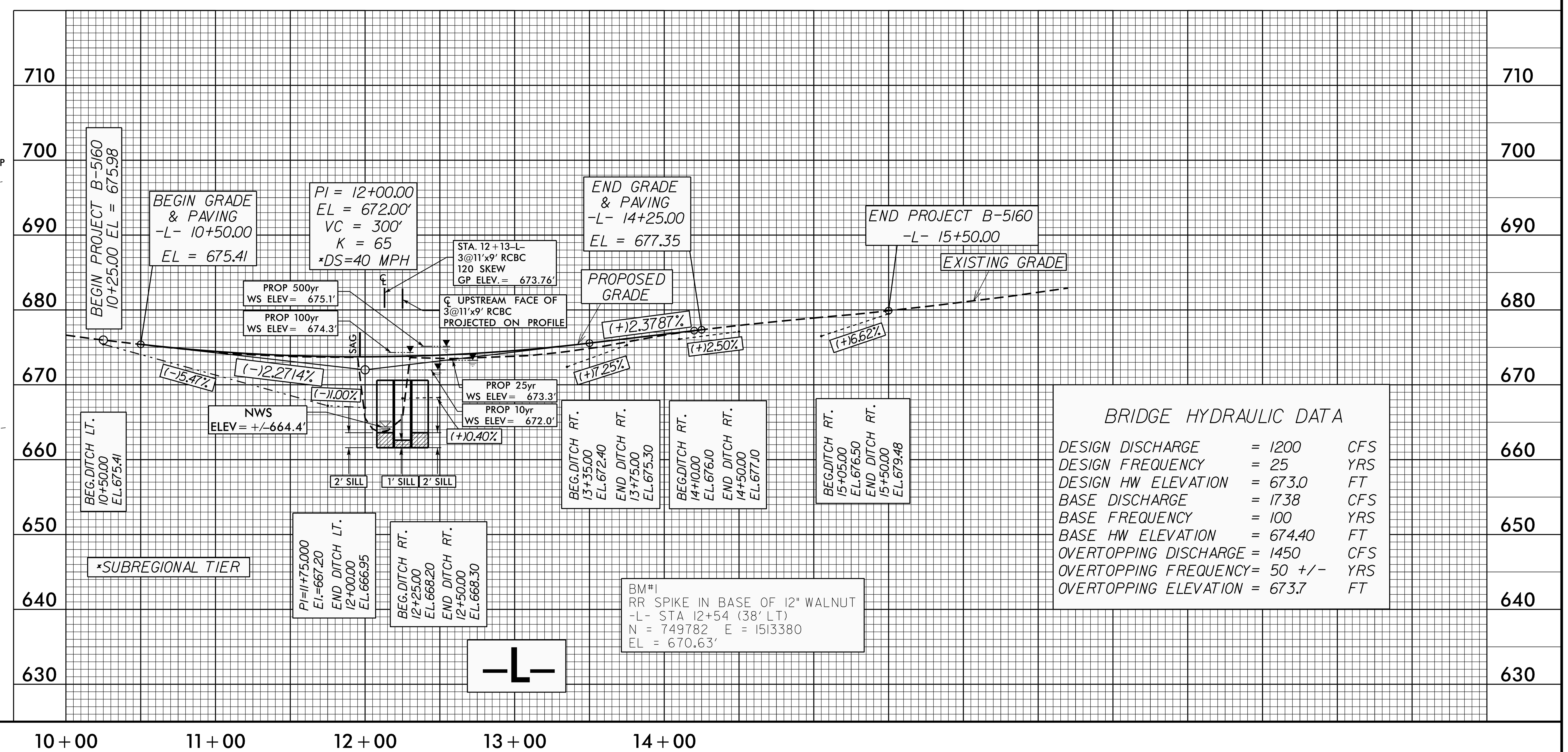


FROM STA.13+35 TO STA.13+75-L-RT.
FROM STA.14+10 TO STA.14+50-L-RT.





NOTE:
FOR CUT CONDITION, USE CLASS II RIP RAP FLOOD BENCH BORDER WITH NATURAL GROUND COVERED WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS II RIP RAP FILL THROUGHOUT WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	1200	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	673.0	FT
BASE DISCHARGE	=	1738	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	674.40	FT
OVERTOPPING DISCHARGE	=	1450	CFS
OVERTOPPING FREQUENCY	=	50 +/-	YRS
OVERTOPPING ELEVATION	=	673.7	FT

09/08/99

TIP PROJECT: B-5160

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJ. REFERENCE NO.	SHEET NO.
B-5160	TMP-1

PLAN FOR PROPOSED TRAFFIC CONTROL, MARKING & DELINEATION

ROWAN COUNTY

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
1101.03	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 MULTI-LANE ROADWAYS
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING

INDEX OF SHEETS

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL
- USER DEFINED (IF NEEDED)
- USER DEFINED (IF NEEDED)

SIGNALS

EXISTING PROPOSED TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM SKINNY DRUM TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- 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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · DIVISION 9 DESIGN CONSTRUCT

APPROVED: DocuSigned by: William A. Blanton CC8637 1B19FC44D...

DATE: 9/19/2016

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025499 ENGINEER William A. Blanton

PROJECT REFERENCE NO.	SHEET NO.
B-5160	TMP-2
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 025499 ENGINEER William A. Blanton 9/19/2016

DocuSigned by: William A. Blanton

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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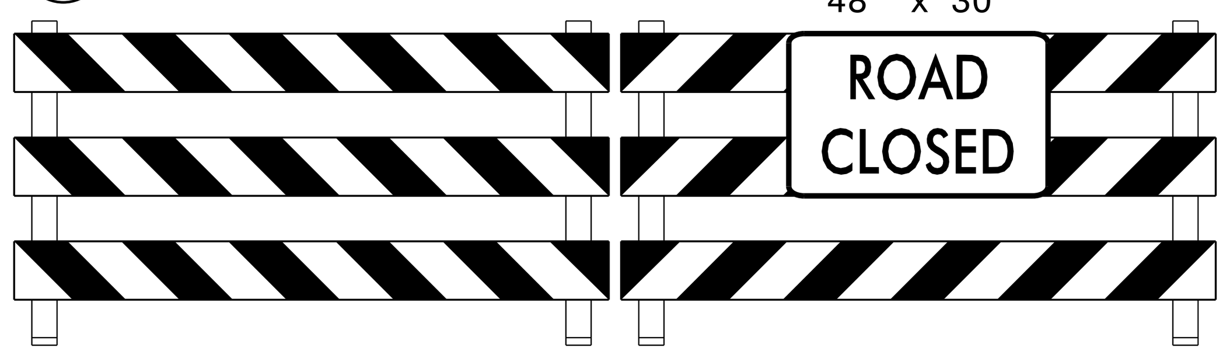

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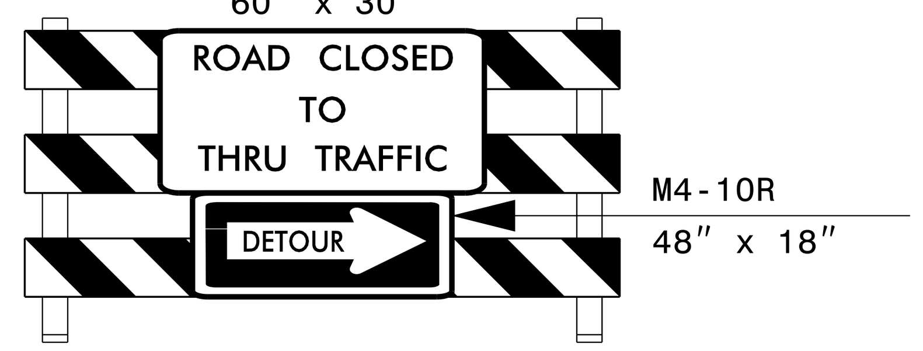

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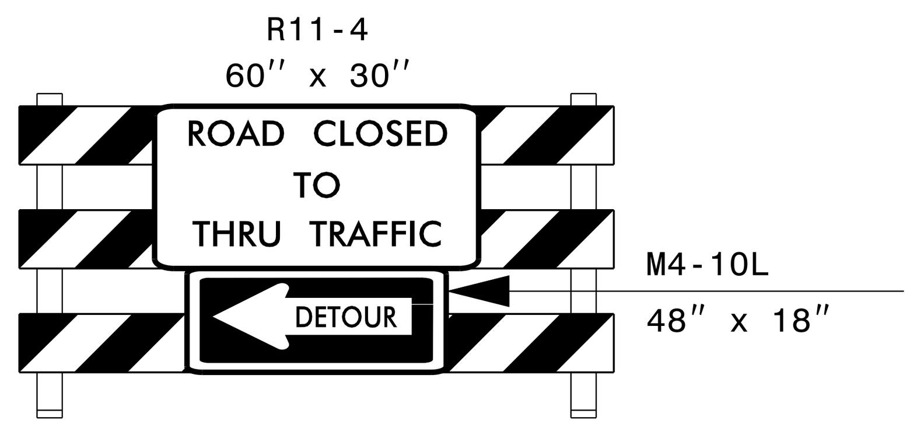
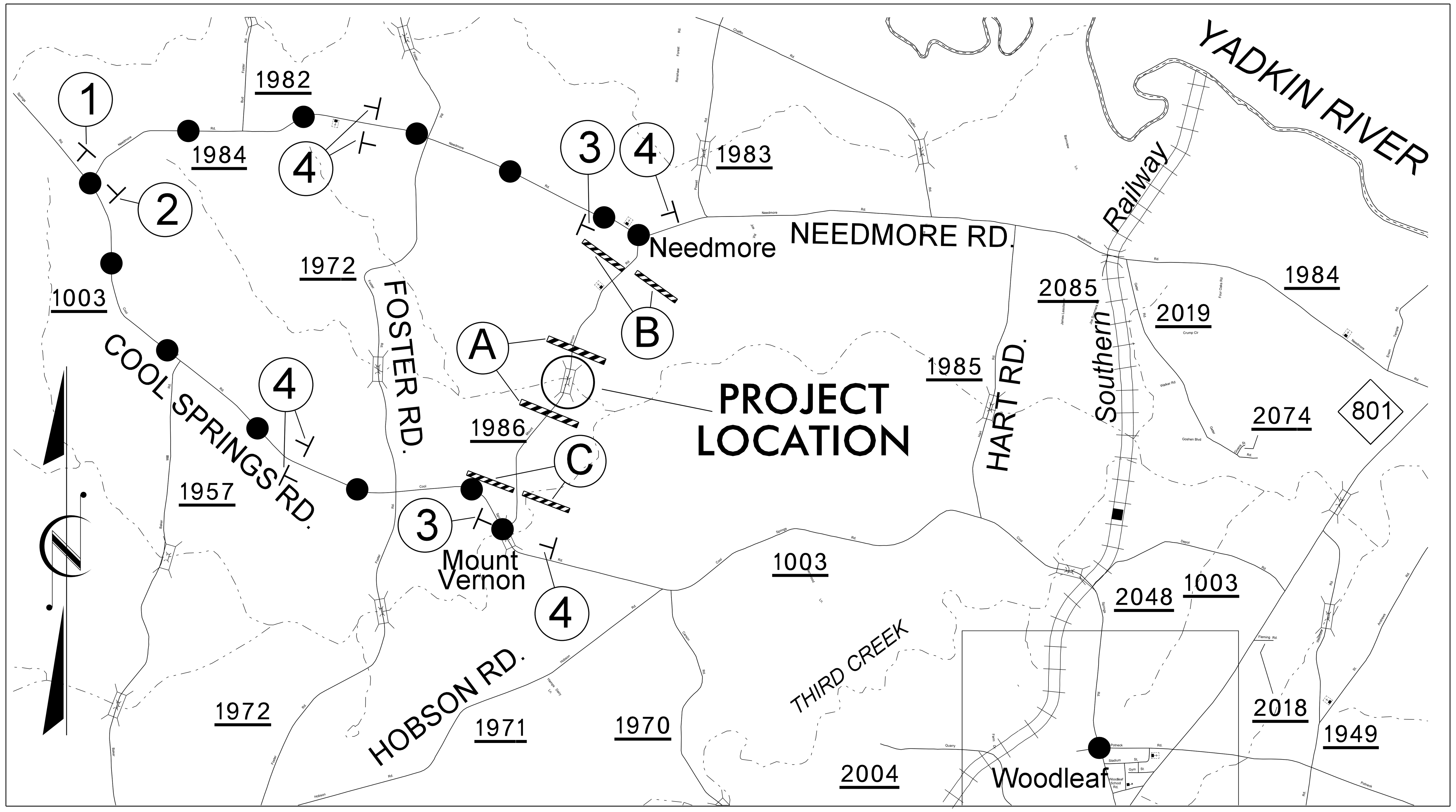
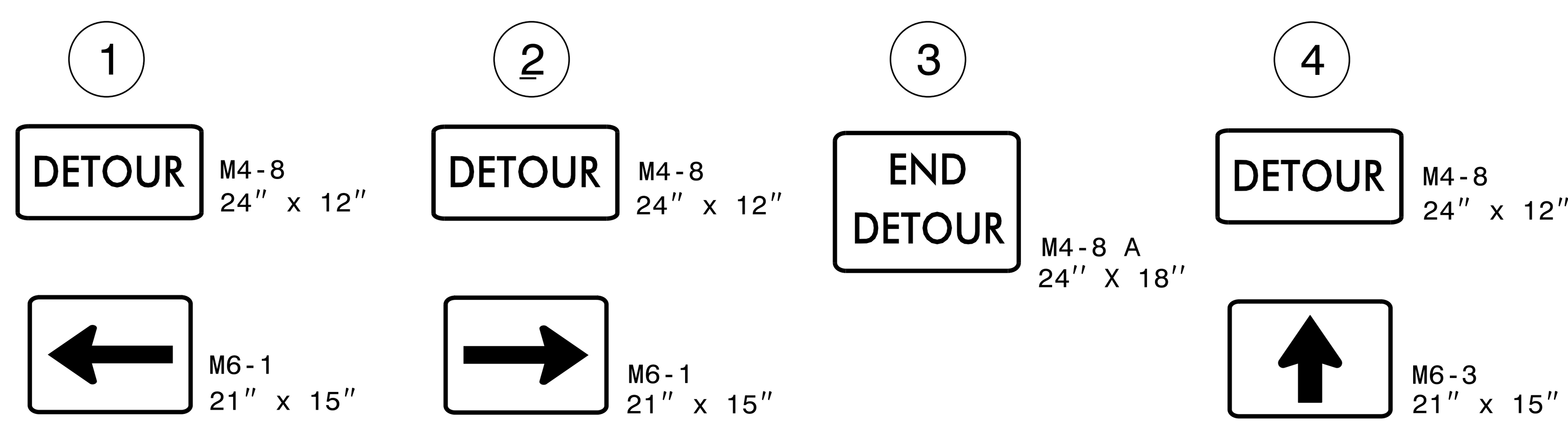




DETOUR ROUTE ●—●—● DETOUR LENGTH 6.1 MILES



GENERAL 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.

LANE AND SHOULDER CLOSURE REQUIREMENTS:

A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

D) INSTALL ADVANCE 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.

E) 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 ON THIS SHEET.

F) 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.

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

TRAFFIC CONTROL DEVICES

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

PAVEMENT MARKINGS AND MARKERS

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

ROAD NAME	MARKING
SR 1986 (MT. VERNON RD.)	PAINT

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

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

M) 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 TCP-2 AND IN ACCORDANCE WITH RSD 1102.03 (SHEET 1 OF 9).

PHASE II

USING OFF-SITE DETOUR, UNCOVER DETOUR SIGNS, CLOSE -L- (SR 1986/MT. VERNON RD.) TO TRAFFIC, EXCAVATE AND CONSTRUCT NEW CULVERT AND ROADWAY UP TO AND INCLUDING FINAL LAYER OF SURFACE COURSE.

PHASE III

UPON COMPLETION OF CULVERT AND ROADWAY, PLACE FINAL PAVEMENT MARKING IN ACCORDANCE WITH RSD 1205.01. REMOVE BARRICADES, DETOUR SIGNS, AND OPEN -L- (SR 1986) TO TRAFFIC.

REVISIONS

8/17/99

TIP PROJECT: B-5160

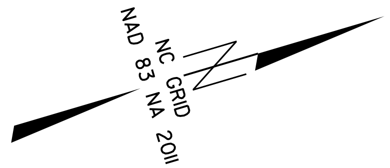
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5160	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

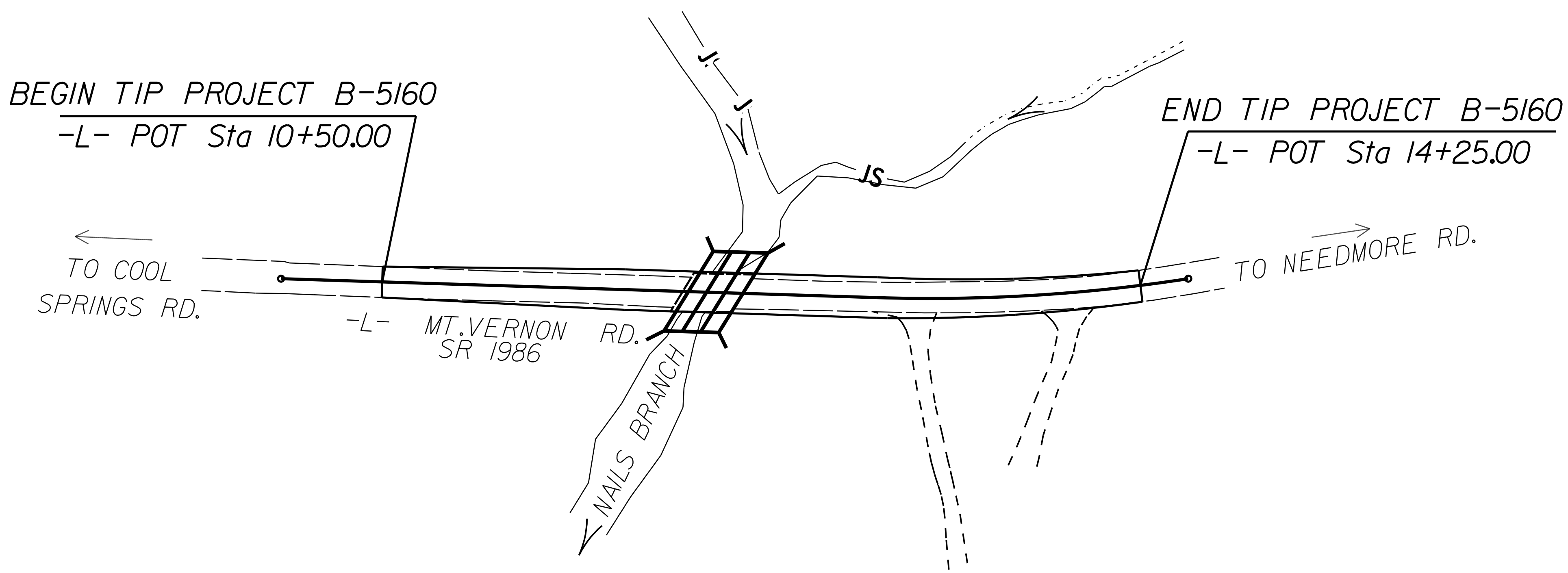
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

ROWAN COUNTY



LOCATION: *REPLACE EXISTING BRIDGE NO. 50 OVER NAILS BRANCH ON MT. VERNON RD. (SR 1986) WITH BOX CULVERT*

TYPE OF WORK: *GRADING, DRAINAGE, WIDENING, BOX CULVERT, AND PAVEMENT MARKINGS*



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	EW / 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	

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

GRAPHIC SCALE

0
PLANS

0
PROFILE (HORIZONTAL)

0
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 In the Office of:

ROADSIDE ENVIRONMENTAL UNIT
1 South Wilmington St.
Raleigh, NC 27611

2012 STANDARD SPECIFICATIONS

Designed by:

Natalie Chan, P.E.	*491*
NAME	*LEVEL III CERTIFICATION NO.*

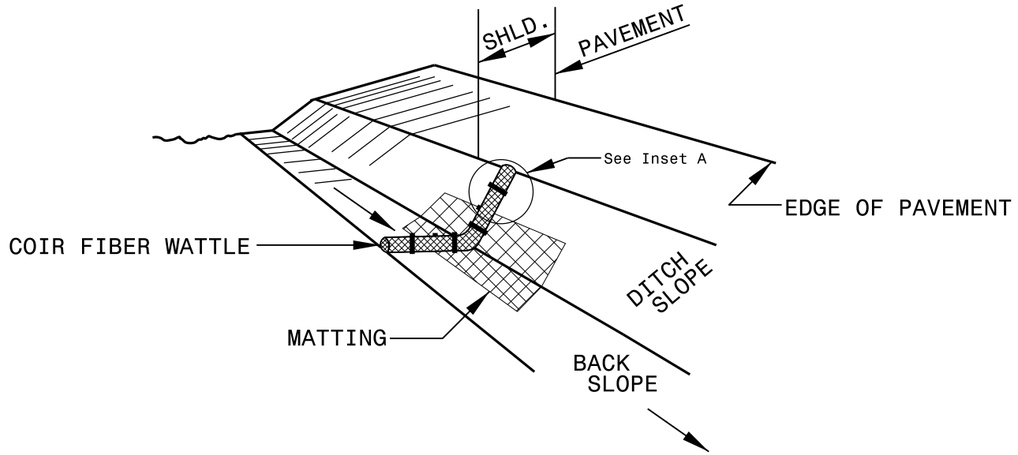
Roadway Standard Drawings

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.

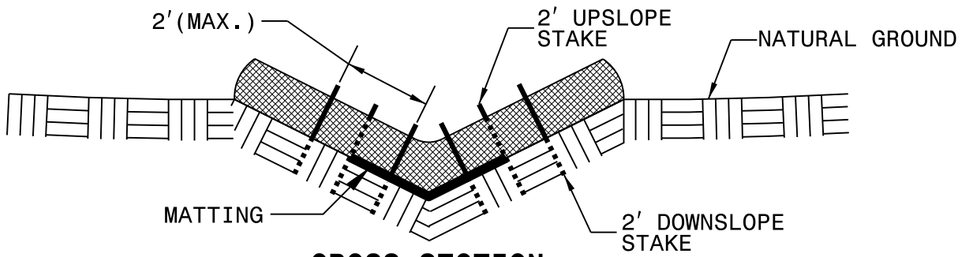
1604.01	Railroad Erosion Control Detail
1605.01	Temporary Silt Fence
1606.01	Special Sediment Control Fence
1607.01	Gravel Construction Entrance
1622.01	Temporary Berms and Slope Drains
1630.01	Riser Basin
1630.02	Silt Basin Type B
1630.03	Temporary Silt Ditch
1630.04	Stilling Basin
1630.05	Temporary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

PROJECT REFERENCE NO.	SHEET NO.
B-5160	EC-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

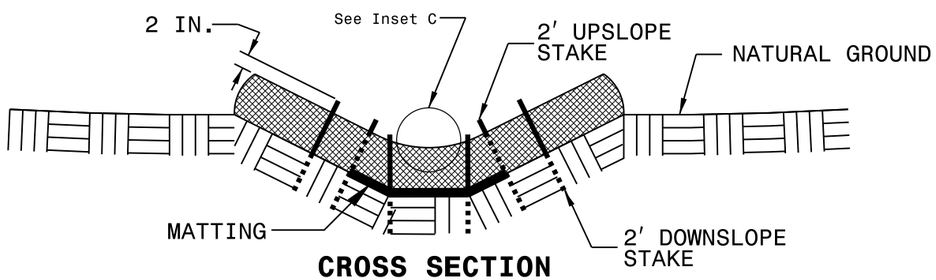
COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

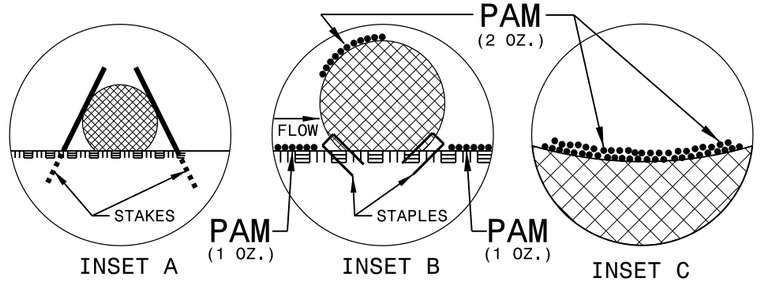
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

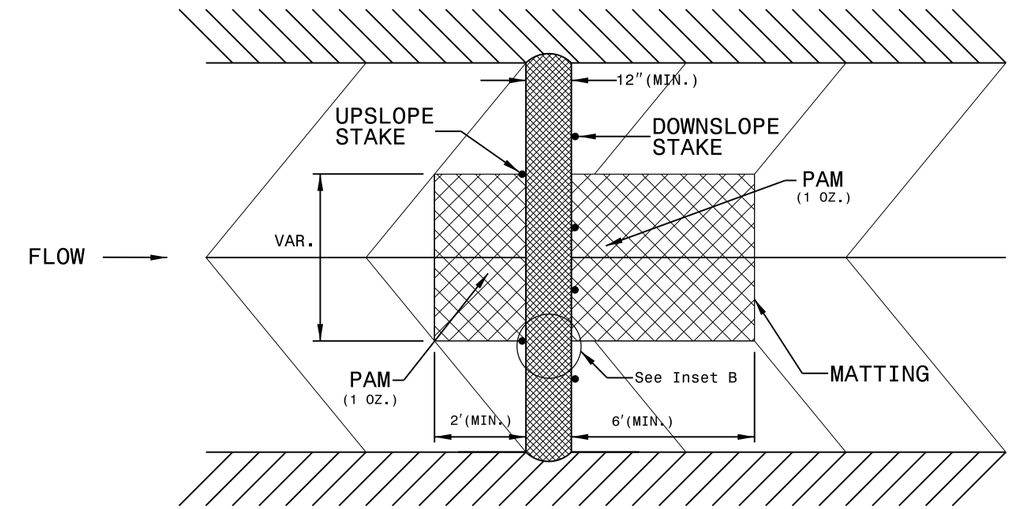
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

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 WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.





TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
B-5160	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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-	13+35	13+75	RT	40
4	-L-	14+10	14+50	RT	40
				SUBTOTAL	80
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					2900
				TOTAL	2980
				SAY	3000

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)

PROJECT REFERENCE NO.	SHEET NO.
B-5160	EC-3A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

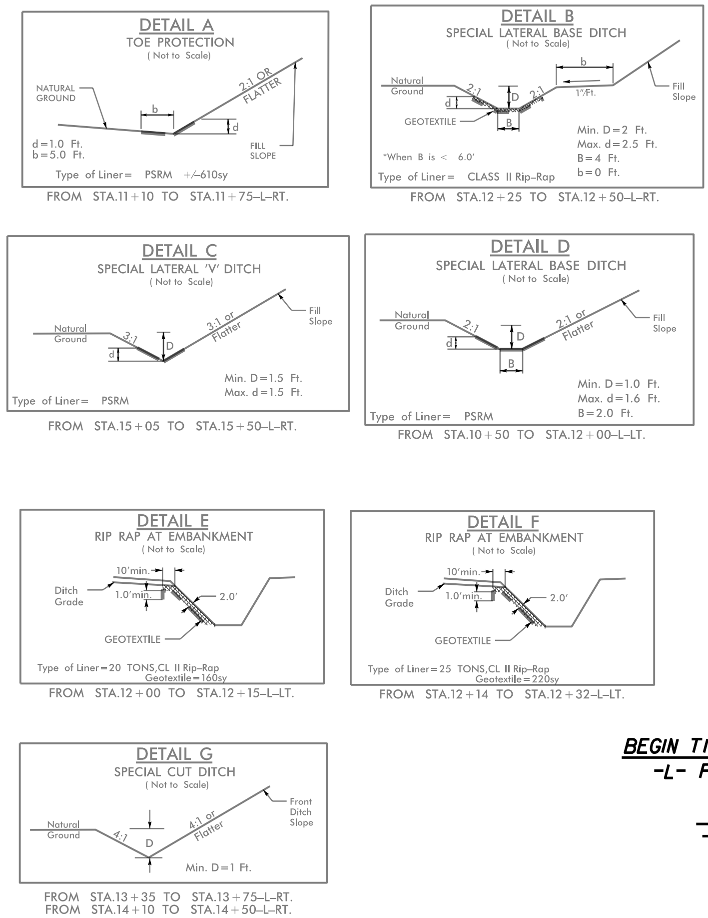
SOIL STABILIZATION TIMEFRAMES

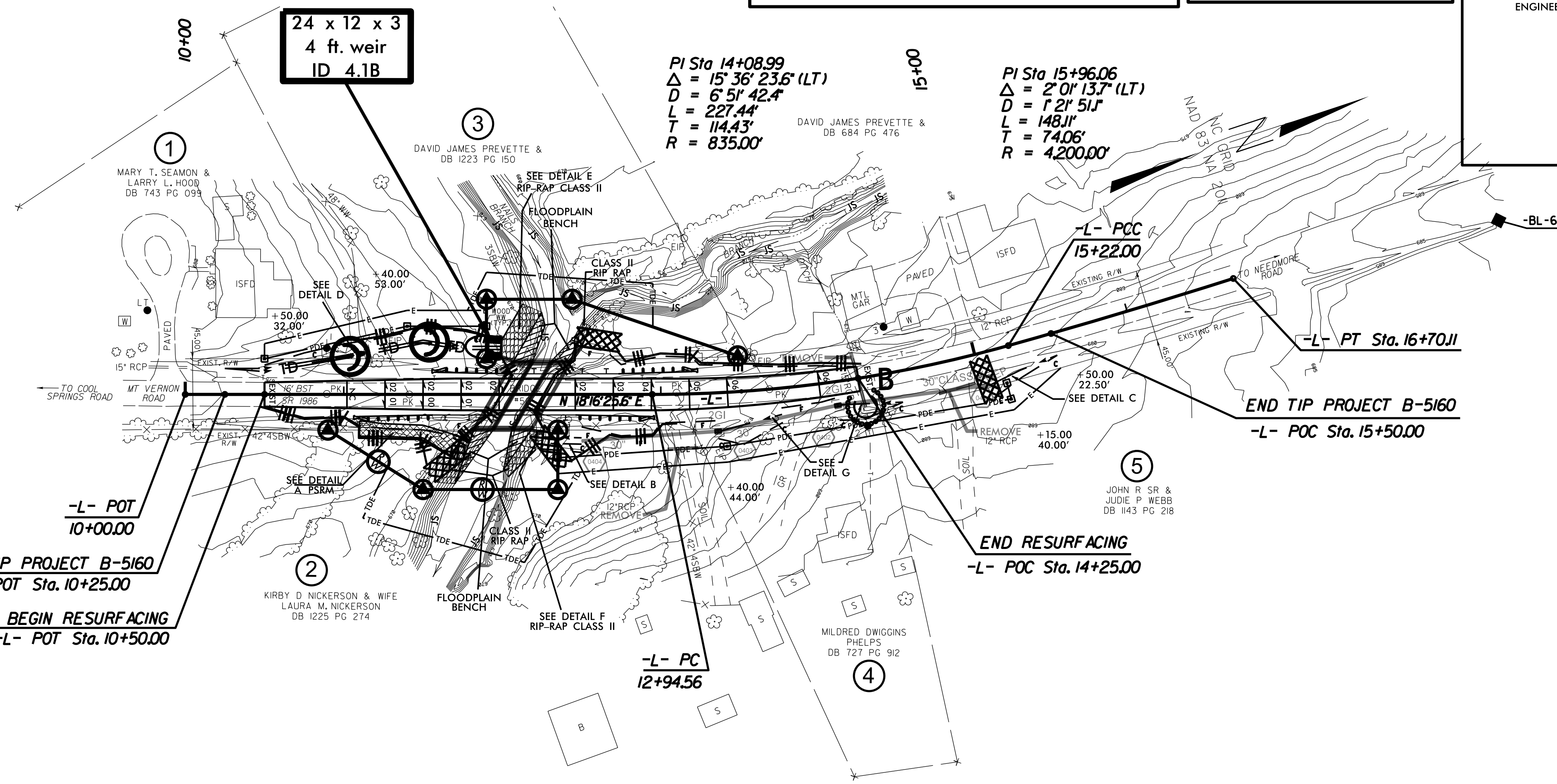
SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS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

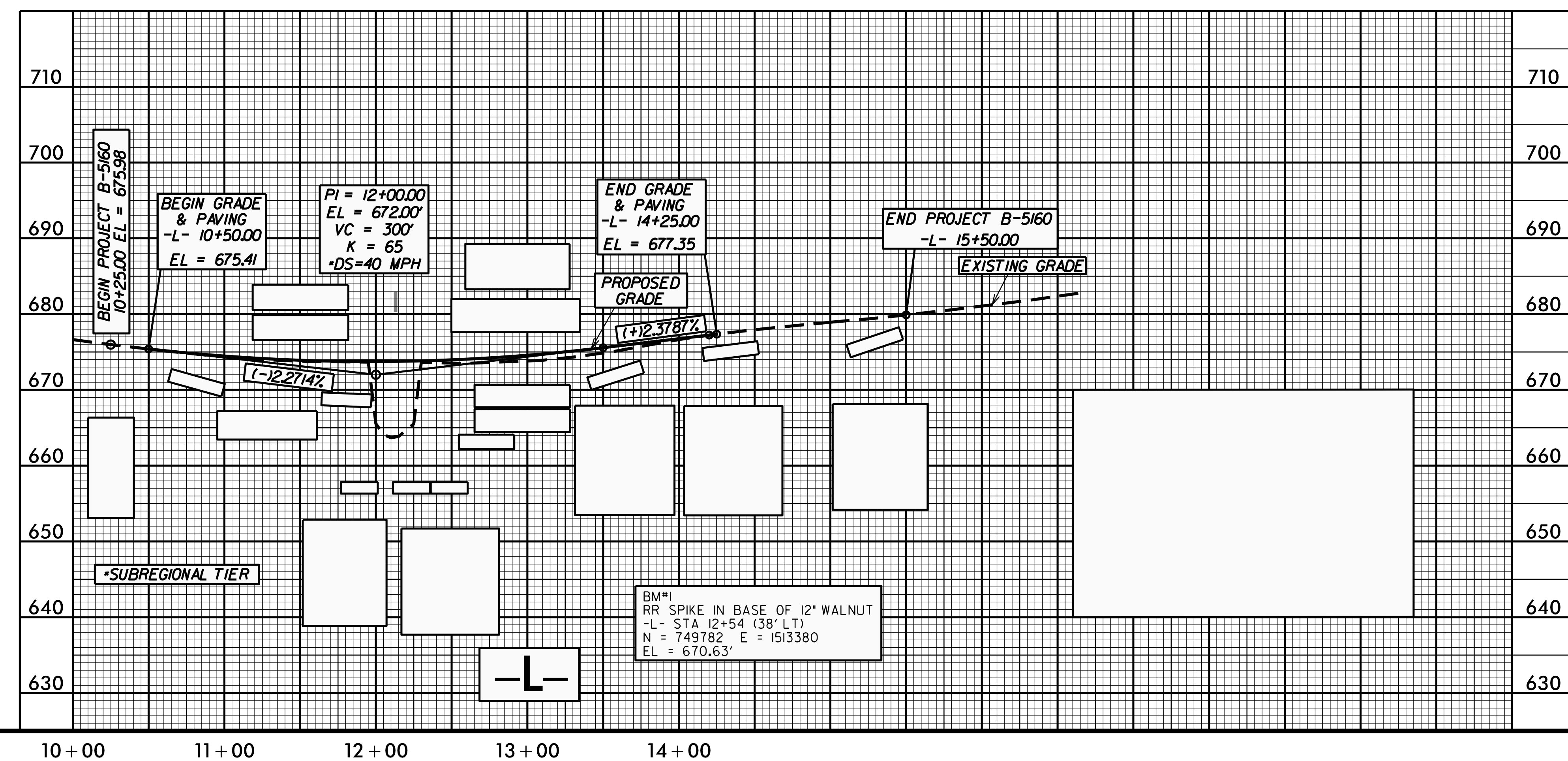
PROJECT REFERENCE NO.	SHEET NO.
B-5160	EC-4/CONST.4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 4

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE - B AND TEMPORARY ROCK SILT CHECKS TYPE - A AT DRAINAGE OUTLETS.







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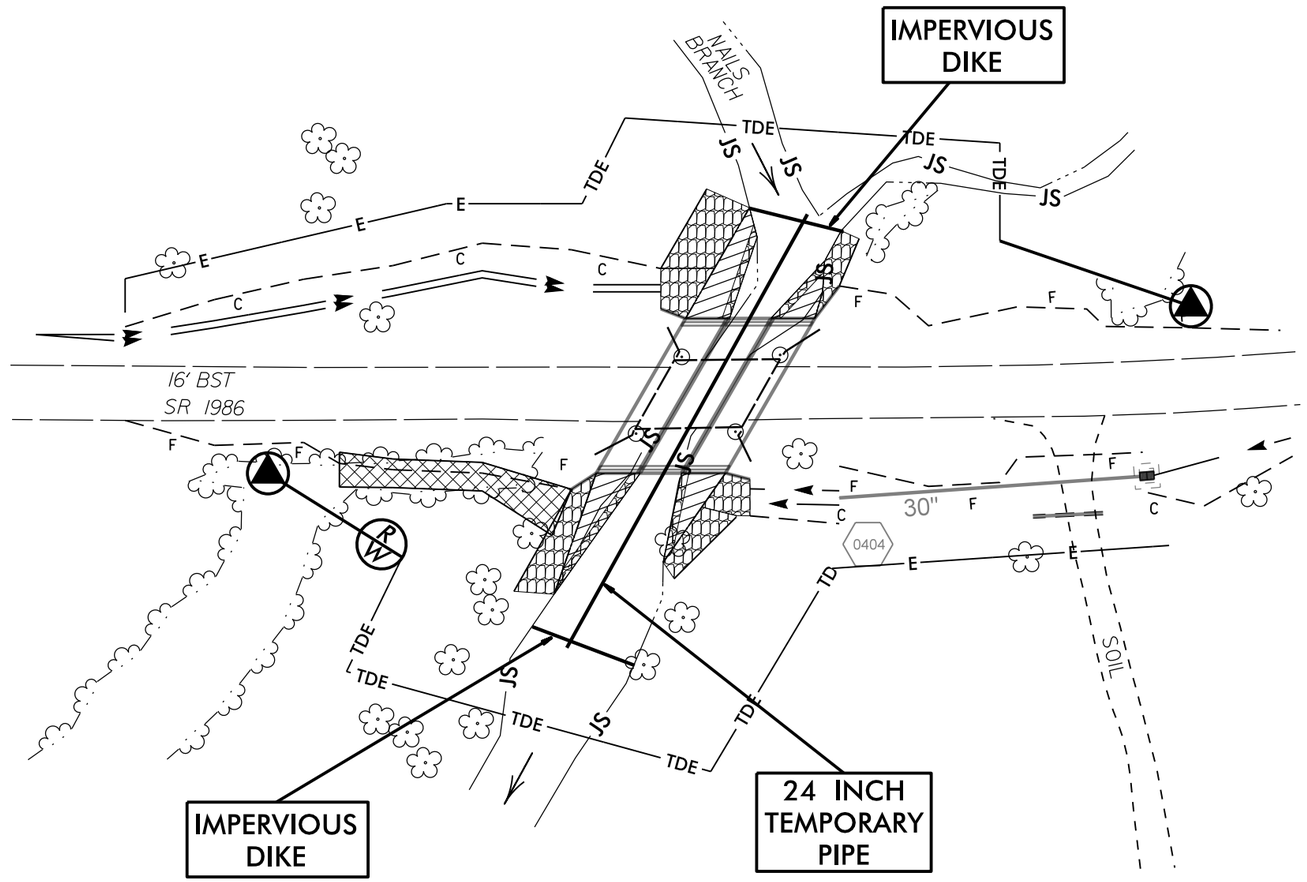
CULVERT CONSTRUCTION SEQUENCE STA. 12+25 –L–

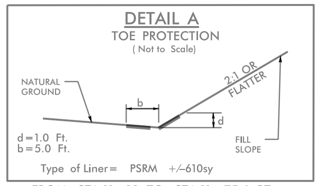
PROJECT REFERENCE NO.	SHEET NO.
B-5160	EC-5/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

1. INSTALL SPECIAL STILLING BASIN(S).
2. INSTALL UPSTREAM IMPERVIOUS DIKE AND 24" TEMPORARY PIPE ON 0.7% SLOPE TO CONVEY FLOW THROUGH THE WORK AREA.
3. INSTALL DOWNSTREAM IMPERVIOUS DIKE AND DEWATER WORK AREA.
4. INSTALL CULVERT(S) IN ACCORDANCE WITH THE PLANS.
5. REMOVE DOWNSTREAM IMPERVIOUS DIKE AND 24" TEMPORARY PIPE.
6. REMOVE UPSTREAM IMPERVIOUS DIKE AND SPECIAL STILLING BASIN(S).

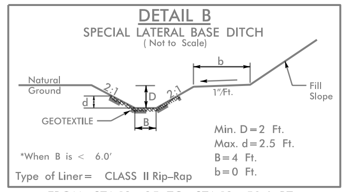


PROJECT REFERENCE NO.	SHEET NO.
B-5160	EC-6/CONST.4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

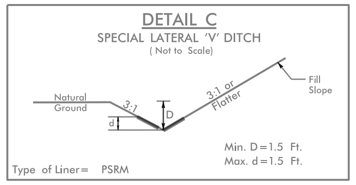
8/17/99



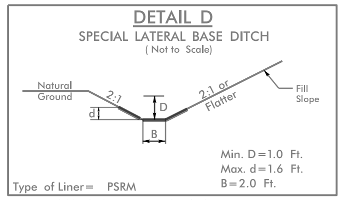
FROM STA.11+10 TO STA.11+75-L-RT.



FROM STA.12+25 TO STA.12+50-L-RT.



FROM STA.15+05 TO STA.15+50-L-RT.



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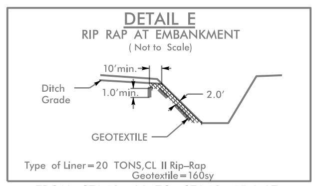
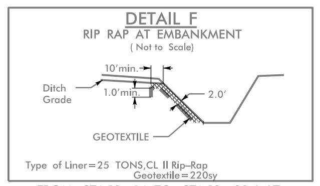
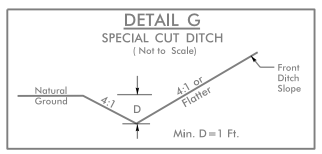


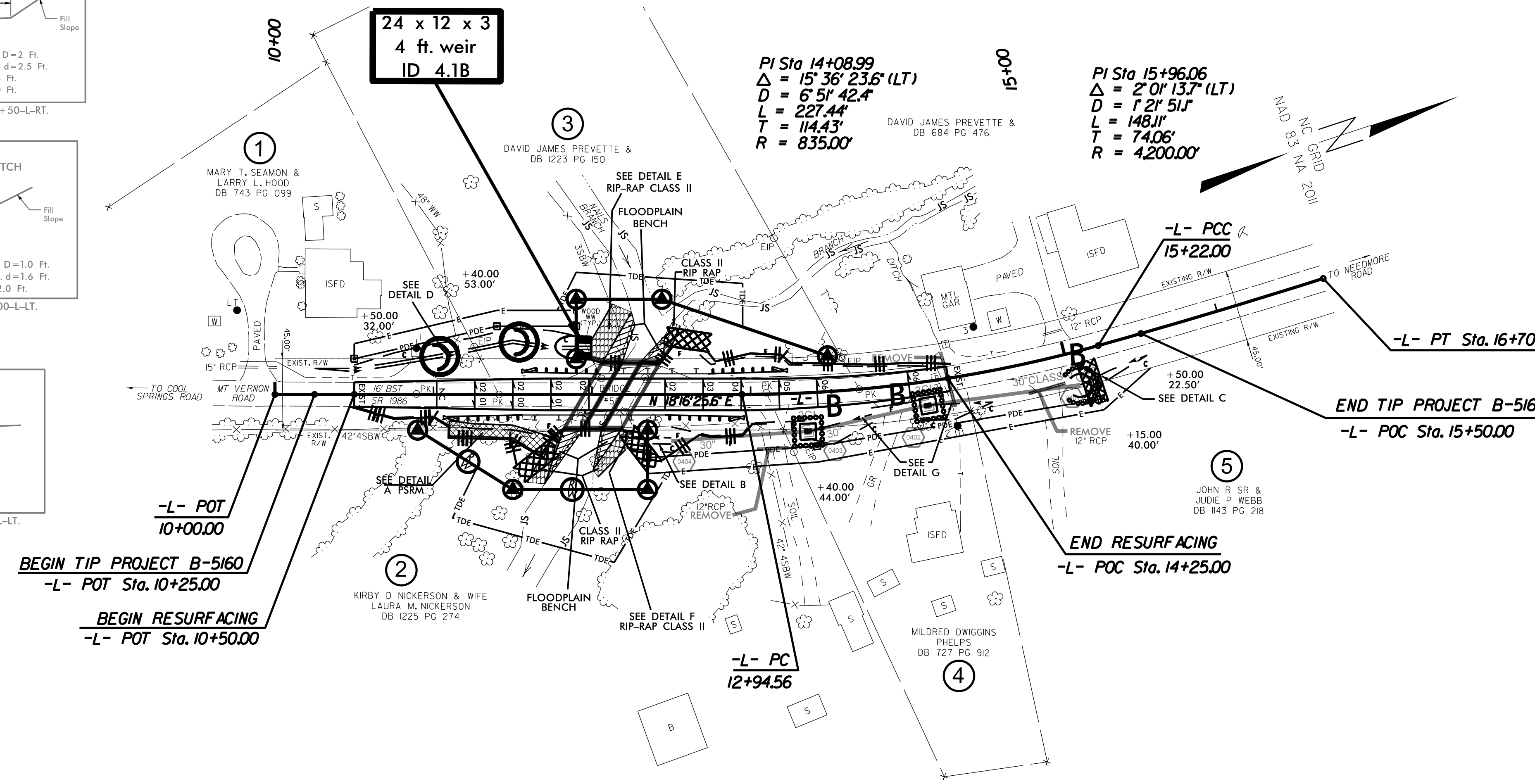
FROM STA.12+00 TO STA.12+15-L-LT.

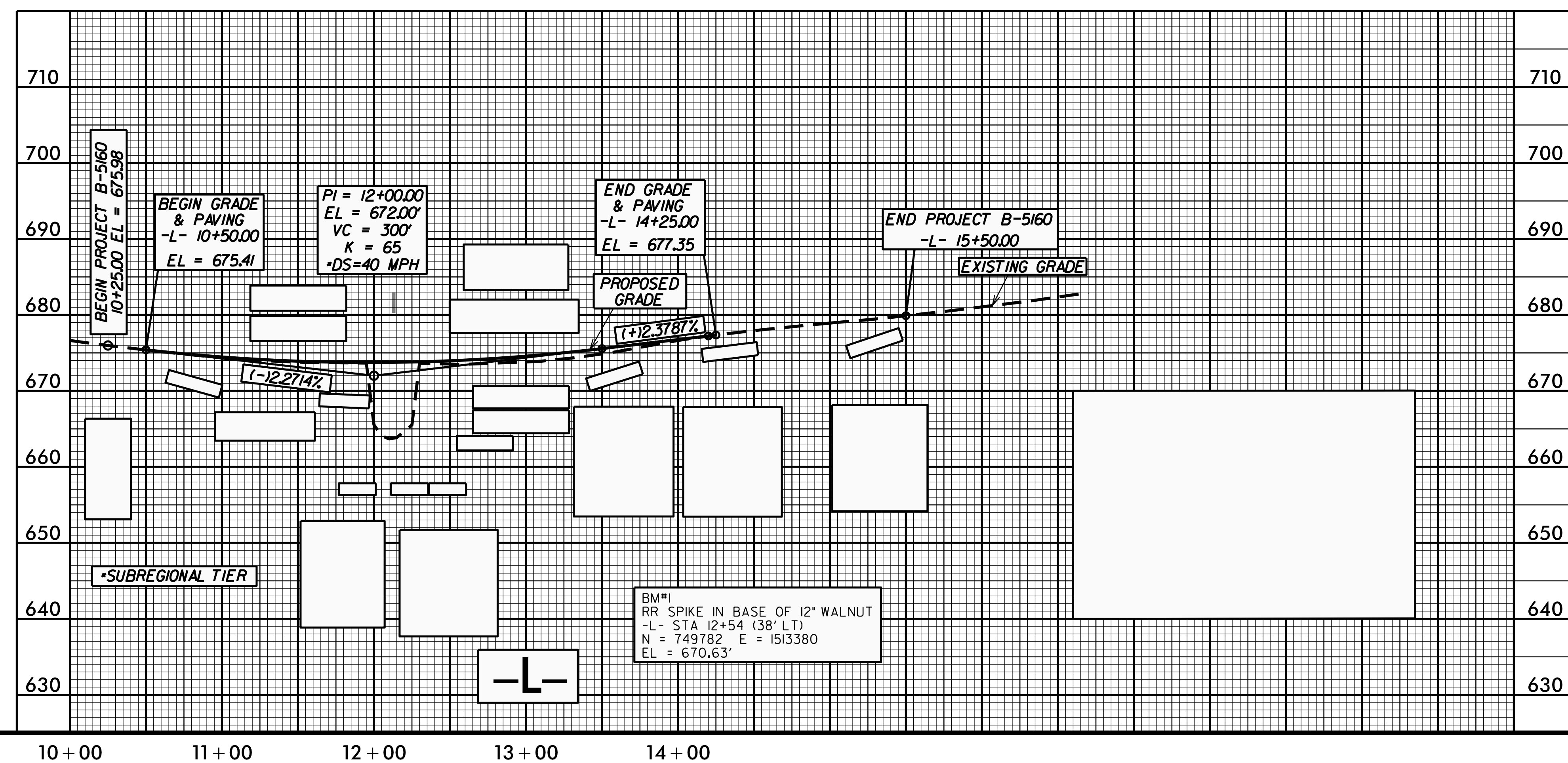


FROM STA.12+14 TO STA.12+32-L-LT.



FROM STA.13+35 TO STA.13+75-L-RT.
FROM STA.14+10 TO STA.14+50-L-RT.





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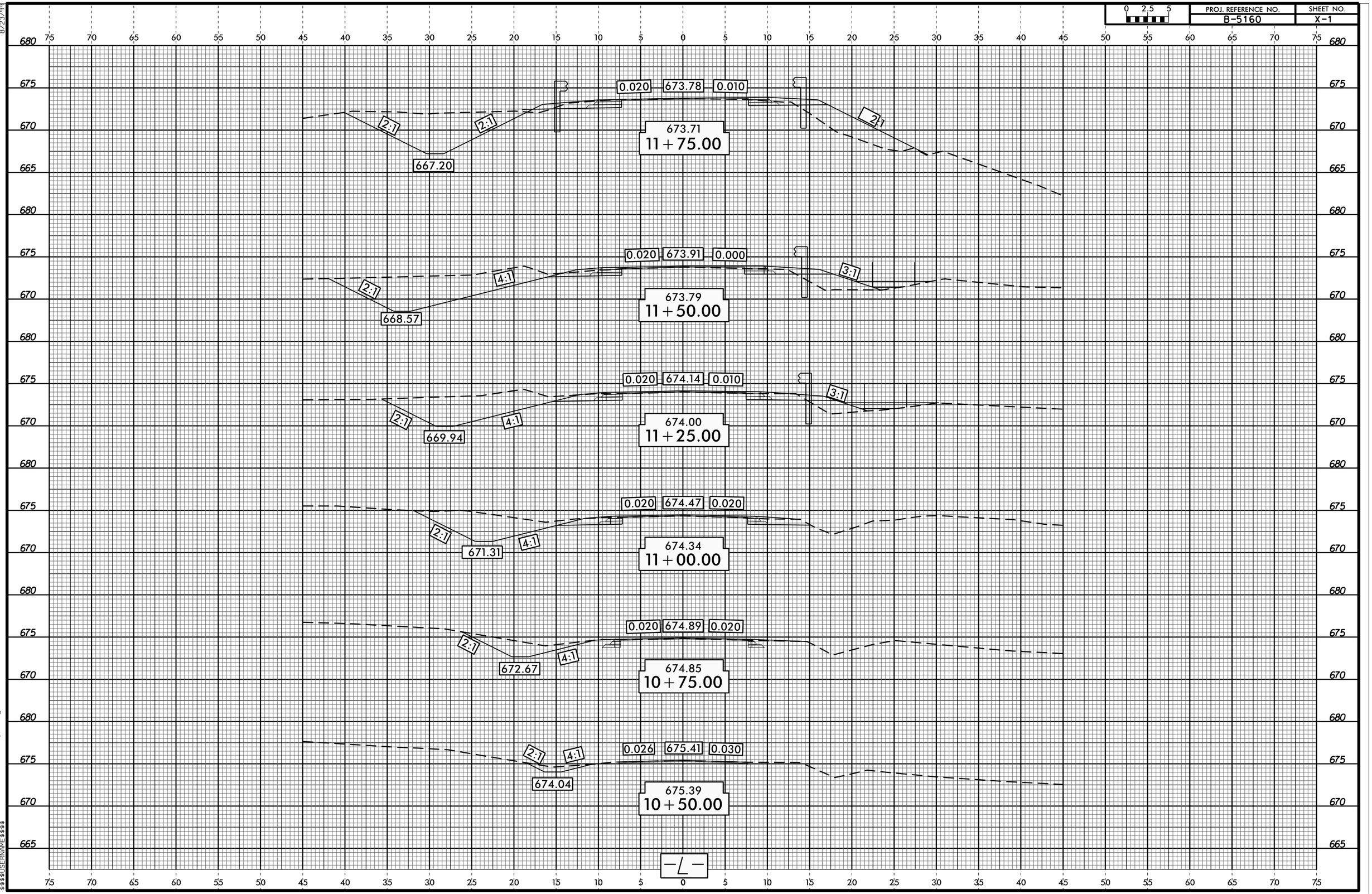
	B-5160	X-1



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B-5160	X-2

0 2.5 5

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

680 675 670 665 660 655

0.032 | 674.22 | 0.032

3:1 3:1

673.54
12 + 75.00

0.022 | 673.96 | 0.022

3:1 2:1 2:1

673.53
12 + 50.00

4.00'

668.30

0.020 | 673.81 | 0.020

2:6:1 2:1 2:1

4.00

668.20

665.51
12 + 25.00

0.020 | 673.74 | 0.020

2:1 2:1 2.8:1

666.95

665.54
12 + 00.00

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8/23/99

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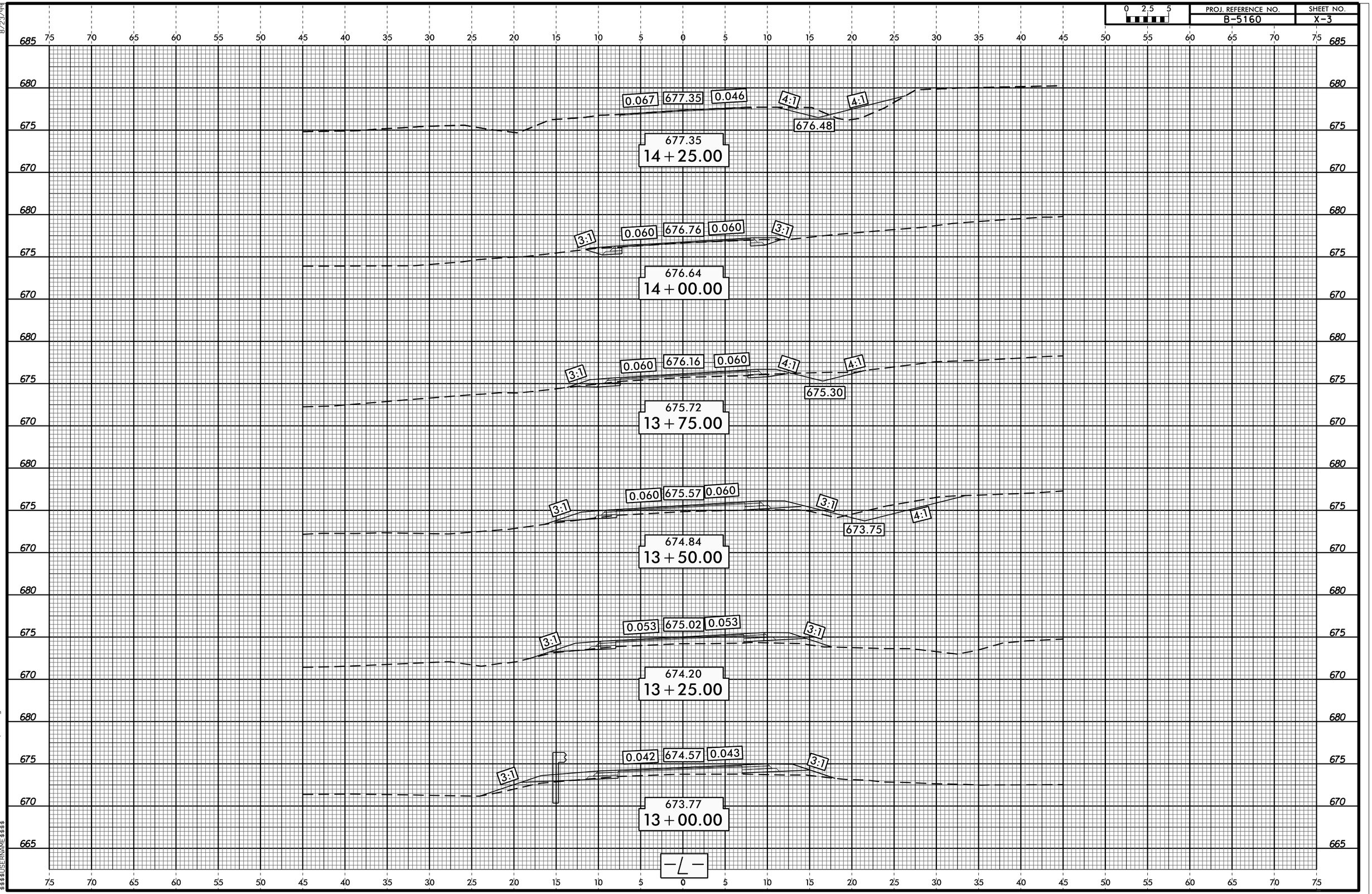
	B-5160	X-3



8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5160	X-4

681.67
16+25.00

681.06
16+00.00

680.45
15+75.00

679.48

679.90
15+50.00

3:1 677.82 3:1

679.37
15+25.00

678.93
15+00.00

678.45
14+75.00

677.10

677.93
14+50.00

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5160	X-5

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

685

680

675

682.36
16+50.00

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

685

680

675

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TIP PROJECT: B-5160

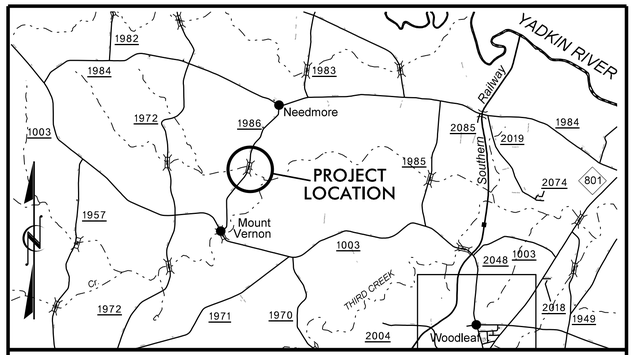
CONTRACT: C

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROWAN COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5160		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
42335.1.1	BRZ-1986(1)	PE
42335.2.1	BRZ-1986(1)	R/W, UTILITIES
42335.3.1	BRZ-1986(1)	CONSTR.



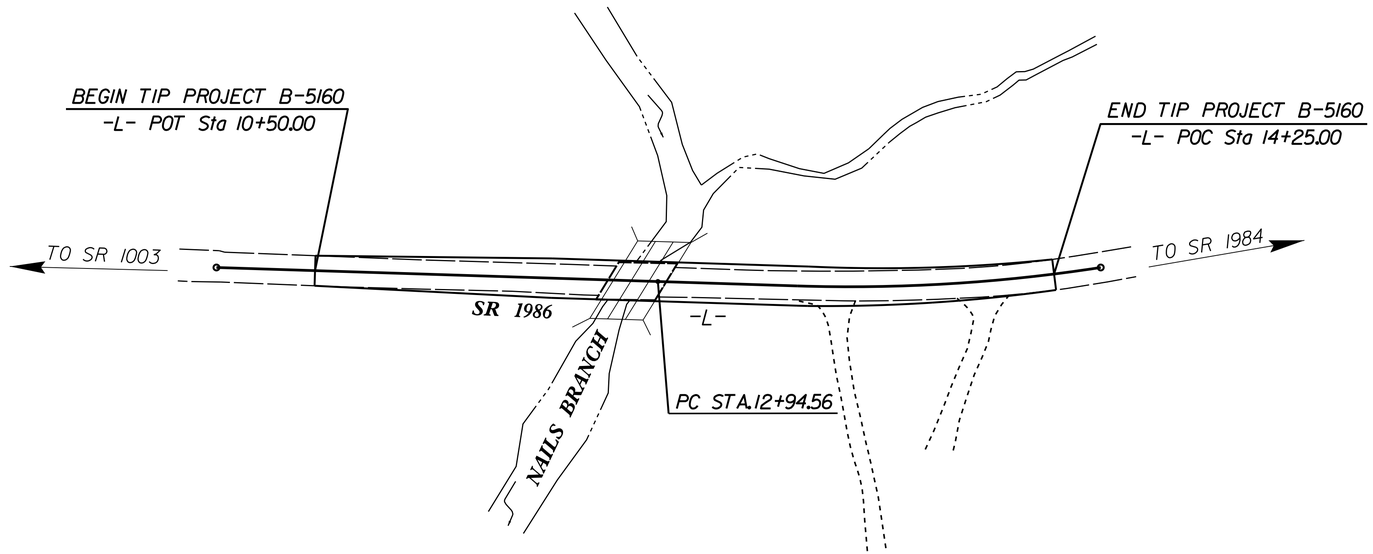
VICINITY MAP

OFFSITE DETOUR ROUTE

LOCATION: REPLACE BRIDGE 50 OVER NAILS BRANCH ON MT. VERNON RD. (SR 1986) WITH BOX CULVERT

TYPE OF WORK: GRADING, DRAINAGE, WIDENING, BOX CULVERT, AND PAVEMENT MARKINGS

NAD 83/
NSRS 2007



CULVERT

DESIGN DATA

ADT 2014 = 700
ADT 2035 = XXXX
K = XX %
D = XX %
*T = XX %
V = 60 MPH
(RURAL LOCAL)
SUB-REGIONAL TIER
* TTST XX% + DUAL XX%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5160 = 0.071 MILE
LENGTH OF STRUCTURE TIP PROJECT B-5160 = 0.008 MILE
TOTAL LENGTH OF TIP PROJECT B-5160 = 0.079 MILE

Prepared in the Office of:
DIVISION OF HIGHWAYS
STRUCTURE MANAGEMENT UNIT
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE:
DECEMBER 20, 2016

L. E. SUTTON, PE
PROJECT ENGINEER

V. A. PATEL, PE
PROJECT DESIGN ENGINEER

14-JUN-2016 07:54
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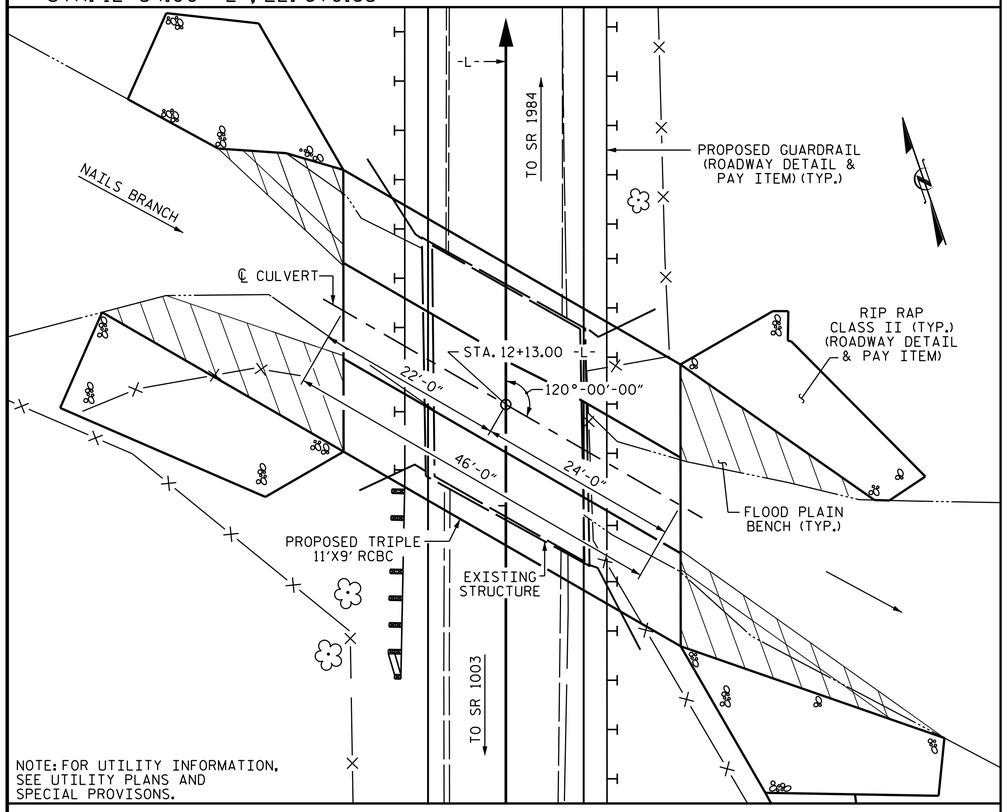
vpatel

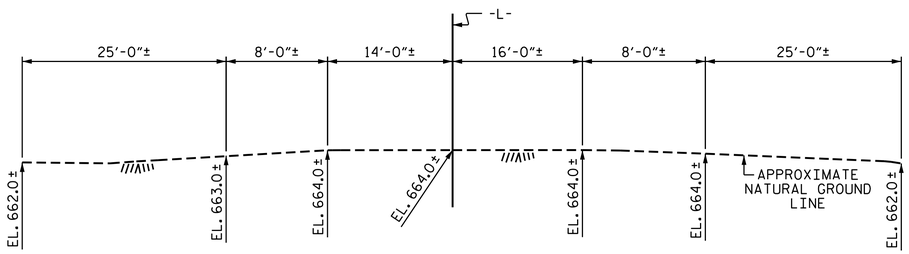
B.M. #1: R.R. SPIKE IN BASE OF 12" WALNUT TREE, 38' LEFT OF STA. 12+54.00 -L-, EL. 670.63



LOCATION SKETCH

ROADWAY DATA

GRADE POINT EL. @ STA. 12+13.00 -L-	= 673.76
BED ELEVATION @ STA. 12+13.00 -L-	= 661.36
ROADWAY SLOPES	= 2:1



PROFILE ALONG ℄ CULVERT

NOTES

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

DESIGN FILL----------3.71 FT. (MAX. FILL), 3.11 FT. (MIN. FILL)

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.

2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

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.

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.

THE EXISTING STRUCTURE CONSISTS OF 1 SPAN @ 30'-6" WITH 19.1' CLEAR ROADWAY WIDTH AND TIMBER DECK ON STEEL I-BEAMS ON END BENTS OF TIMBER CAPS, POST AND SILLS, AND TIMBER BULKHEADS LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED CULVERT, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

INASMUCH 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 12+13.00 -L-".

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MATTER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE INDICATED ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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.

FOR CULVERT DIVERSION DETAILS & PAY ITEM, SEE EROSION CONTROL PLAN.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR 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.

NATURAL STREAM BED MATERIAL SHALL BE USED TO BACKFILL THE CULVERT BETWEEN THE SILLS. FOR PLACEMENT OF NATURAL STREAM BED MATERIAL, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 1,200 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 673.0
DRAINAGE AREA	= 3.73 SQ. MI.
BASE DISCHARGE (Q100)	= 1,738 C.F.S.
BASE HIGH WATER ELEVATION	= 674.4

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 1,450 C.F.S
FREQUENCY OF OVERTOPPING FLOOD	= 50 +/- YRS.
OVERTOPPING FLOOD ELEVATION	= 673.7

TOTAL STRUCTURE QUANTITIES

REMOVAL OF EXISTING STRUCTURE	LUMP SUM
CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MAT'L	130 TONS
CLASS A CONCRETE	
BARREL @ 3.268 CY/FT	150.3 C.Y.
WING, ETC.	43.3 C.Y.
TOTAL	193.6 C.Y.
REINFORCING STEEL	
BARREL	21,951 LBS.
WINGS, ETC.	2,148 LBS.
TOTAL	24,099 LBS.
PLACEMENT OF NATURAL STREAM BED MATERIAL	LUMP SUM
ASBESTOS ASSESSMENT	LUMP SUM

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-5160

ROWAN COUNTY

STATION: 12+13.00 -L-

SHEET 1 OF 6 REPLACES BRIDGE NO. 50

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 11 FT. X 9 FT. CONCRETE BOX CULVERT

120° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA... 8/12/2016

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

DRAWN BY : N.D'AIUTO DATE : 7/30/15
CHECKED BY : J.K.BOWLES DATE : 8/5/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 8/5/15

12-AUG-2016 12:08
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vpatel

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

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)	**1.00**	--	1.75	**1.00**	1	TOP SLAB	4.96	1.20	1	TOP SLAB	10.61	4
		HL-93 (OPERATING)	N/A		1.30	--	1.35	1.30	1	TOP SLAB	4.96	1.51	1	TOP SLAB	10.61	3
		HS-20 (INVENTORY)	36.000	(2)	**1.14**	41.12	1.75	**1.14**	1	TOP SLAB	4.96	1.22	1	BOTTOM SLAB	10.76	2
		HS-20 (OPERATING)	36.000		1.48	53.30	1.35	1.48	1	TOP SLAB	4.96	1.58	1	BOTTOM SLAB	10.76	2
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.08	28.03	1.40	2.08	1	TOP SLAB	4.96	2.60	1	TOP SLAB	10.61	1
		SNGARBS2	20.000		1.94	38.89	1.40	1.94	1	TOP SLAB	4.96	2.43	1	TOP SLAB	10.61	1
		SNAGRIS2	22.000		2.08	45.67	1.40	2.08	1	TOP SLAB	4.96	2.50	1	BOTTOM SLAB	10.76	2
		SNCOTTS3	27.250		1.26	34.46	1.40	1.26	1	TOP SLAB	4.96	1.46	1	TOP SLAB	10.61	1
		SNAGGRS4	34.925		1.55	53.98	1.40	1.55	1	TOP SLAB	5.25	1.58	1	BOTTOM SLAB	10.76	2
		SNS5A	35.550		1.46	52.00	1.40	1.46	1	TOP SLAB	4.96	1.56	1	BOTTOM SLAB	10.76	4
		SNS6A	39.950		1.39	55.64	1.40	1.46	1	TOP SLAB	4.96	1.39	1	BOTTOM SLAB	10.76	4
		SNS7B	42.000		1.32	55.42	1.40	1.51	1	TOP SLAB	4.96	1.32	1	BOTTOM SLAB	10.76	4
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.68	55.30	1.40	2.08	1	TOP SLAB	4.96	1.68	1	BOTTOM SLAB	10.76	2
		TNT4A	33.075		1.50	49.66	1.40	1.50	1	TOP SLAB	4.96	1.69	1	BOTTOM SLAB	10.76	4
		TNT6A	41.600		1.33	55.41	1.40	1.53	1	TOP SLAB	4.96	1.33	1	BOTTOM SLAB	10.76	2
		TNT7A	42.000		1.40	58.79	1.40	1.56	1	TOP SLAB	4.96	1.40	1	BOTTOM SLAB	10.76	2
		TNT7B	42.000		1.40	58.90	1.40	1.48	1	TOP SLAB	5.25	1.40	1	BOTTOM SLAB	10.76	4
		TNAGRIT4	43.000		1.30	55.72	1.40	1.43	1	TOP SLAB	4.96	1.30	1	BOTTOM SLAB	10.76	4
		TNAGT5A	45.000	(3)	**1.24**	55.66	1.40	1.47	1	TOP SLAB	4.96	**1.24**	1	BOTTOM SLAB	10.76	4
		TNAGT5B	45.000		1.24	55.92	1.40	1.50	1	TOP SLAB	4.96	1.24	1	BOTTOM SLAB	10.76	4

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	-

NOTES

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS

1. BOTH MOMENT AND SHEAR RATING FACTORS ARE CONTROLLED BY MINIMUM FILL.
2. MOMENT RATING FACTOR IS CONTROLLED BY MINIMUM FILL, SHEAR RATING FACTOR IS CONTROLLED BY MAXIMUM FILL.
3. MOMENT RATING FACTOR IS CONTROLLED BY MAXIMUM FILL, SHEAR RATING FACTOR IS CONTROLLED BY MINIMUM FILL.
4. BOTH MOMENT AND SHEAR RATING FACTORS ARE CONTROLLED BY MAXIMUM FILL.

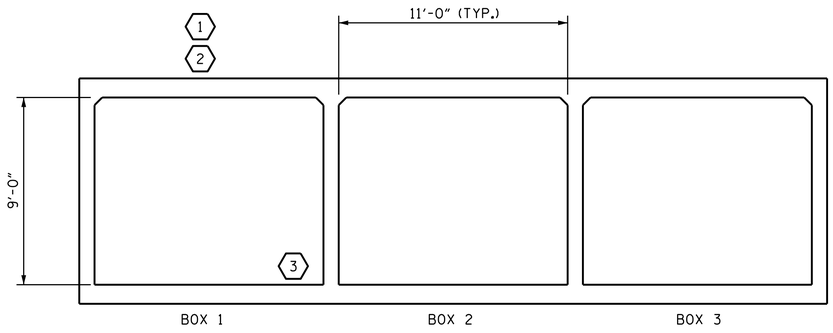
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING HL-93

(2) DESIGN LOAD RATING HS-20 (INVENTORY)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. B-5160

ROWAN COUNTY

STATION: 12+13.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D4644A... 10/13/2015

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

STD. NO. LRFR5

ASSEMBLED BY : H.A.LOCKLEAR DATE : 7/30/15
CHECKED BY : N.D'AIUTO DATE : 8/5/15

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

REV. 10/1/11 MAA/GM

DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 8/5/15

12-OCT-2015 13:10
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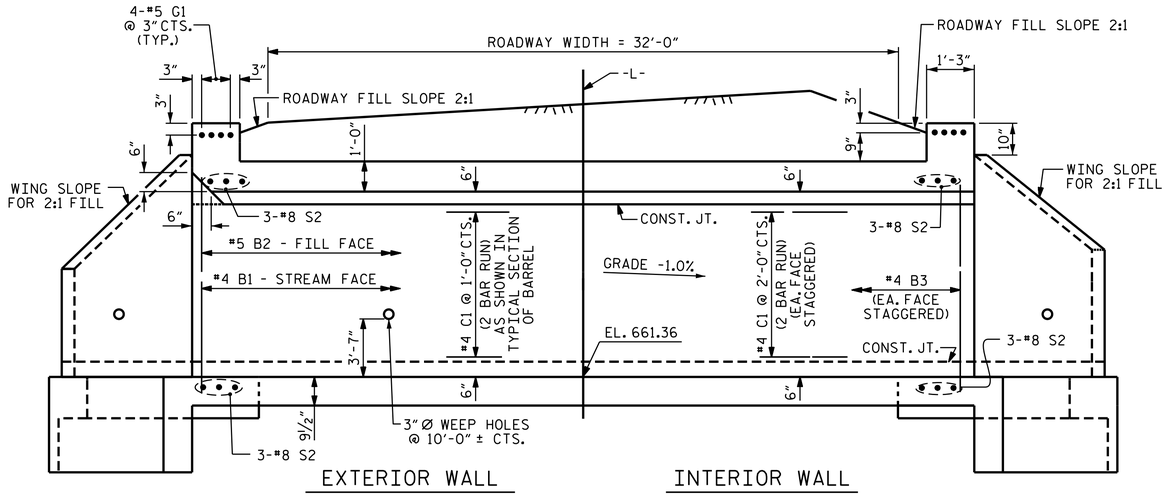
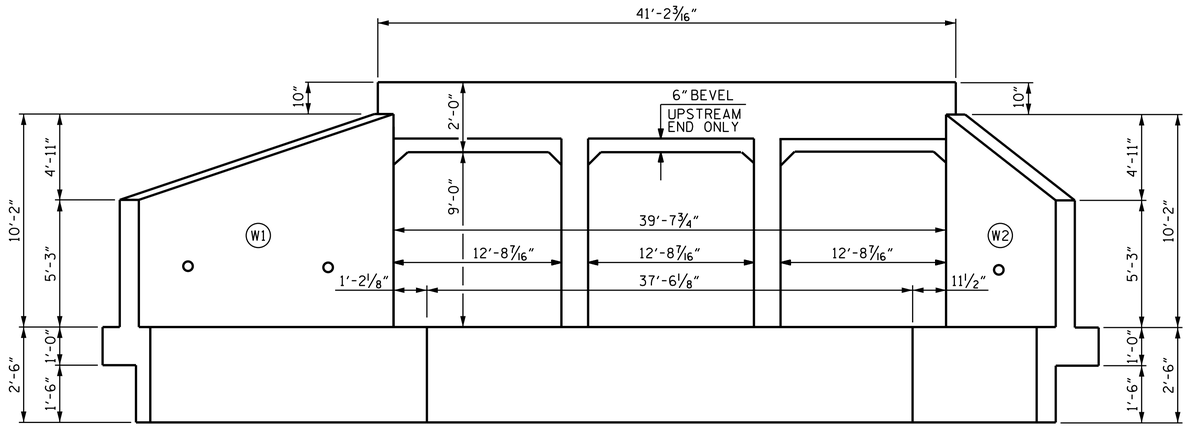
thcarroll

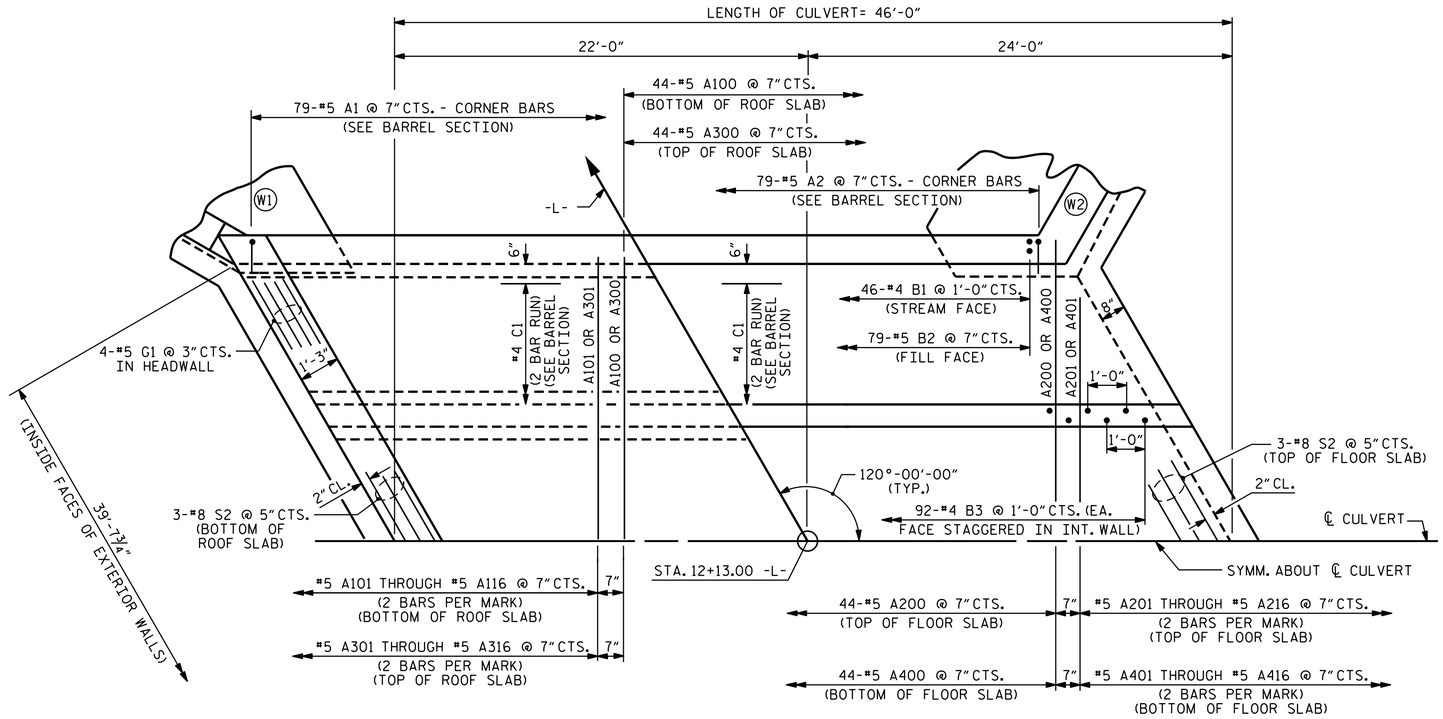


CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION-NORMAL TO SKEW

(LOOKING DOWNSTREAM)
(SILLS NOT SHOWN)



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-5160

ROWAN COUNTY

STATION: 12+13.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD

TRIPLE 11 FT. X 9 FT. CONCRETE BOX CULVERT

120° SKEW

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

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA... 10/13/2015

DRAWN BY :	N.D'AIUTO	DATE :	7/30/15
CHECKED BY :	J.K.BOWLES	DATE :	8/5/15
DESIGN ENGINEER OF RECORD:	H.A.LOCKLEAR	DATE :	8/5/15

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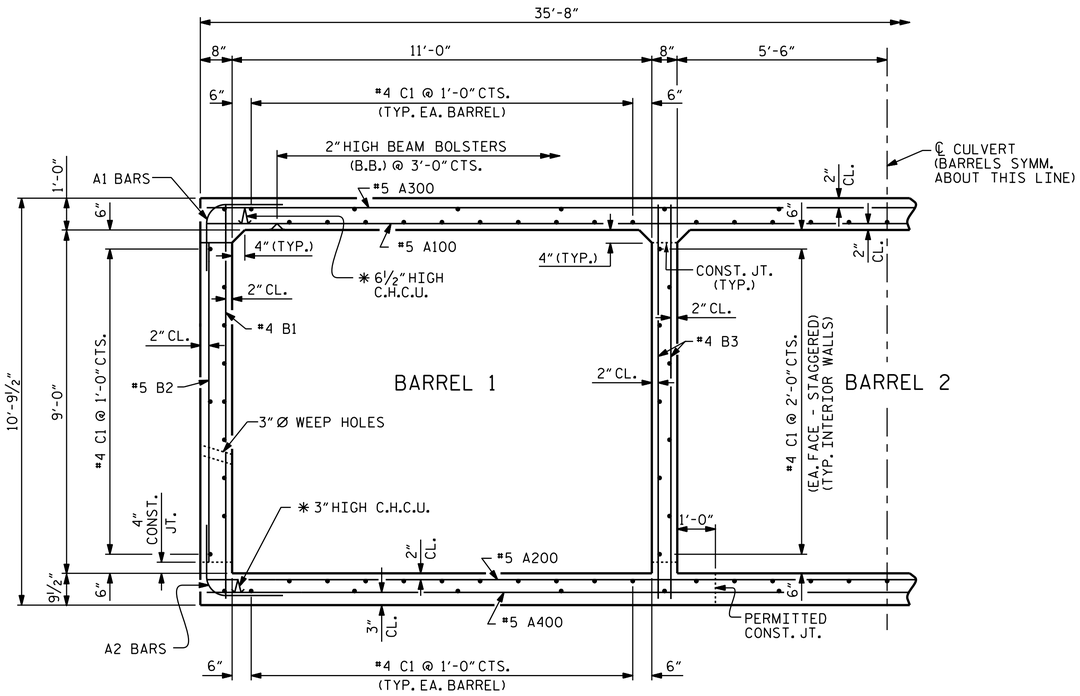
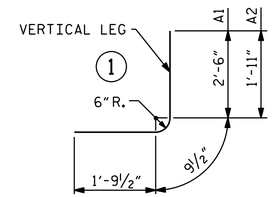
STD. NO. CB333



RIGHT ANGLE SECTION OF BARREL

THERE ARE 130 "C" BARS IN SECTION OF BARREL.
✱ ALL CONTINUOUS HIGH CHAIR UPPER (C.H.C.U.) @ 3'-0" CTS.

BAR TYPE



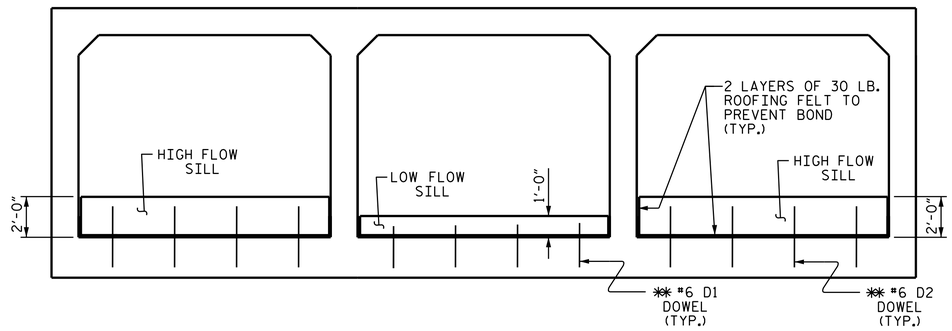
BAR DIMENSIONS ARE OUT TO OUT.

SPLICE LENGTH CHART

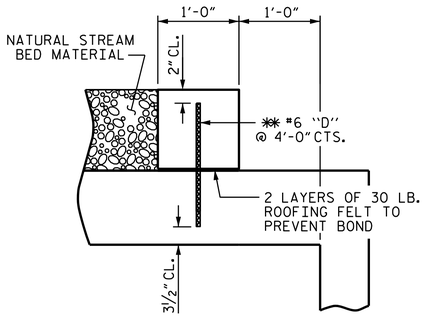
BAR	SIZE	SPLICE LENGTH
"A"	#5	1'-9"
B1, B3	#4	1'-5"
C1	#4	1'-11"
S2	#8	4'-0"

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	158	#5	1	5'-1"	838	A305	4	#5	STR	25'-0"	104
A2	158	#5	1	4'-6"	742	A306	4	#5	STR	23'-0"	96
						A307	4	#5	STR	21'-0"	88
A100	44	#5	STR	35'-3"	1618	A308	4	#5	STR	19'-0"	79
A101	4	#5	STR	33'-1"	138	A309	4	#5	STR	16'-11"	71
A102	4	#5	STR	31'-1"	130	A310	4	#5	STR	14'-11"	62
A103	4	#5	STR	29'-1"	121	A311	4	#5	STR	12'-11"	54
A104	4	#5	STR	27'-1"	113	A312	4	#5	STR	10'-11"	46
A105	4	#5	STR	25'-0"	104	A313	4	#5	STR	8'-10"	37
A106	4	#5	STR	23'-0"	96	A314	4	#5	STR	6'-10"	29
A107	4	#5	STR	21'-0"	88	A315	4	#5	STR	4'-10"	20
A108	4	#5	STR	19'-0"	79	A316	4	#5	STR	2'-10"	12
A109	4	#5	STR	16'-11"	71						
A110	4	#5	STR	14'-11"	62	A400	44	#5	STR	35'-3"	1618
A111	4	#5	STR	12'-11"	54	A401	4	#5	STR	33'-1"	138
A112	4	#5	STR	10'-11"	46	A402	4	#5	STR	31'-1"	130
A113	4	#5	STR	8'-10"	37	A403	4	#5	STR	29'-1"	121
A114	4	#5	STR	6'-10"	29	A404	4	#5	STR	27'-1"	113
A115	4	#5	STR	4'-10"	20	A405	4	#5	STR	25'-0"	104
A116	4	#5	STR	2'-10"	12	A406	4	#5	STR	23'-0"	96
						A407	4	#5	STR	21'-0"	88
A200	44	#5	STR	35'-3"	1618	A408	4	#5	STR	19'-0"	79
A201	4	#5	STR	33'-1"	138	A409	4	#5	STR	16'-11"	71
A202	4	#5	STR	31'-1"	130	A410	4	#5	STR	14'-11"	62
A203	4	#5	STR	29'-1"	121	A411	4	#5	STR	12'-11"	54
A204	4	#5	STR	27'-1"	113	A412	4	#5	STR	10'-11"	46
A205	4	#5	STR	25'-0"	104	A413	4	#5	STR	8'-10"	37
A206	4	#5	STR	23'-0"	96	A414	4	#5	STR	6'-10"	29
A207	4	#5	STR	21'-0"	88	A415	4	#5	STR	4'-10"	20
A208	4	#5	STR	19'-0"	79	A416	4	#5	STR	2'-10"	12
A209	4	#5	STR	16'-11"	71						
A210	4	#5	STR	14'-11"	62	B1	92	#4	STR	10'-3"	630
A211	4	#5	STR	12'-11"	54	B2	158	#5	STR	8'-4"	1373
A212	4	#5	STR	10'-11"	46	B3	184	#4	STR	10'-3"	1260
A213	4	#5	STR	8'-10"	37						
A214	4	#5	STR	6'-10"	29	C1	260	#4	STR	23'-11"	4154
A215	4	#5	STR	4'-10"	20						
A216	4	#5	STR	2'-10"	12	D1	4	#6	STR	1'-4"	8
						D2	8	#6	STR	2'-4"	28
A300	44	#5	STR	35'-3"	1618						
A301	4	#5	STR	33'-1"	138	G1	8	#5	STR	40'-9"	340
A302	4	#5	STR	31'-1"	130						
A303	4	#5	STR	29'-1"	121	S2	12	#8	STR	40'-9"	1306
A304	4	#5		27'-1"	113	REINFORCING STEEL				LBS.	21,951



ELEVATION



SECTION THROUGH SILL

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

SILL DETAILS

PROJECT NO. B-5160
ROWAN COUNTY
STATION: 12+13.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 11 FT. X 9 FT. CONCRETE BOX CULVERT

120° SKEW

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

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D4544A... 10/13/2015

DRAWN BY : N.D'AIUTO DATE : 7/30/15
CHECKED BY : J.K.BOWLES DATE : 8/5/15
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 8/5/15

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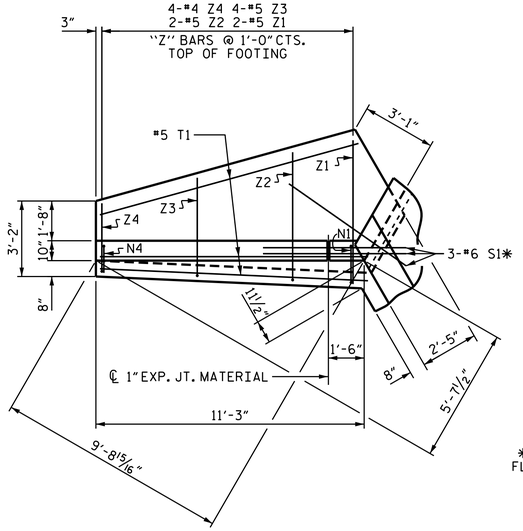
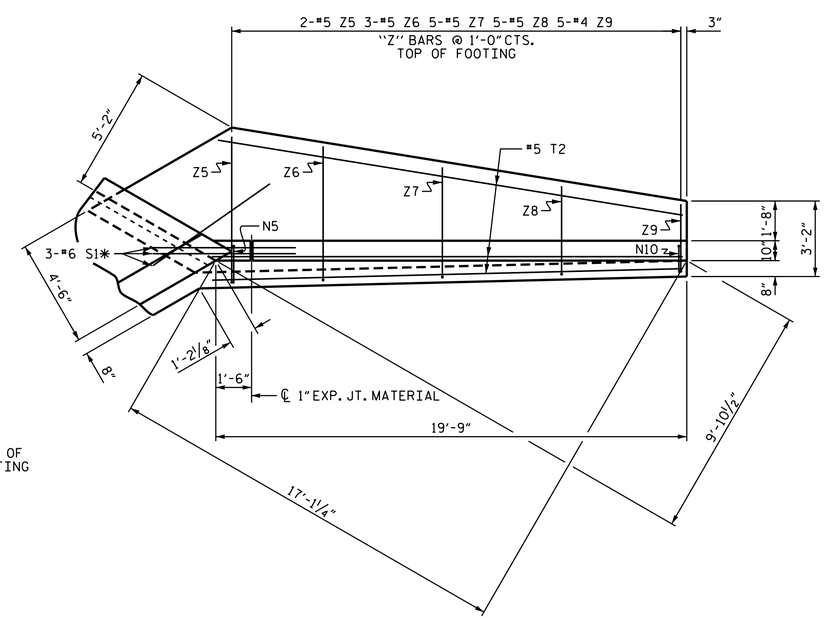
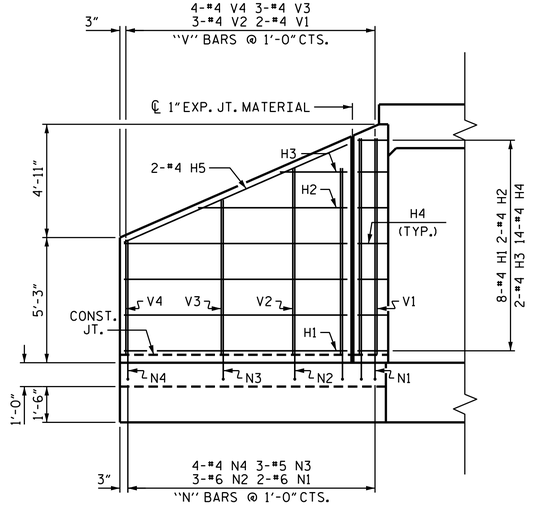


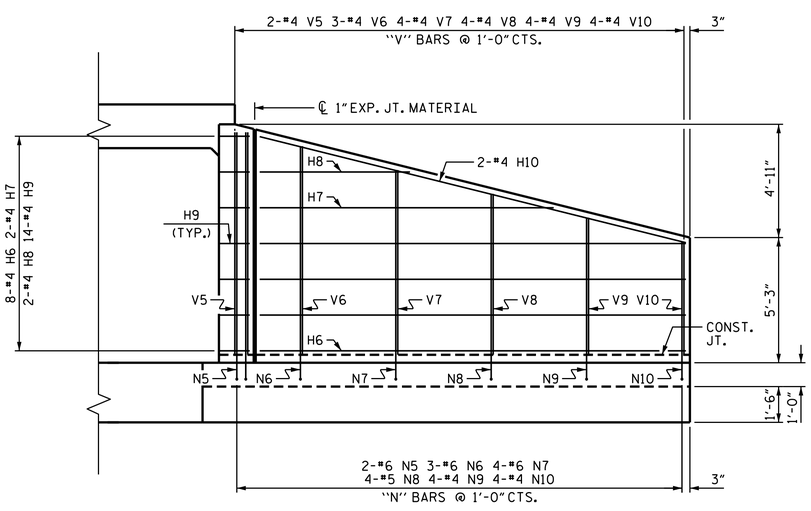


* S1 BARS @ BOTTOM OF FLOOR SLAB AND FOOTING

PLAN W2

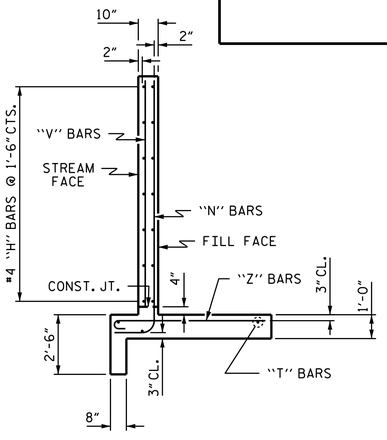
PLAN W1





ELEVATION W2

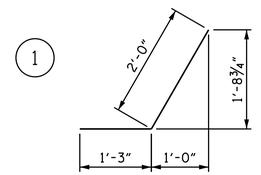
ELEVATION W1

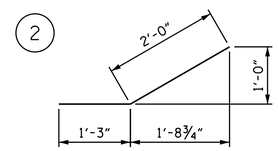


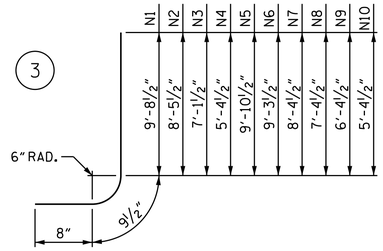
TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.







Z1	6'-0" 7"
Z2	5'-5" 7"
Z3	4'-2" 7"
Z4	2'-10" 6"
Z5	6'-2" 7"
Z6	5'-8" 7"
Z7	4'-8" 7"
Z8	3'-9" 7"
Z9	2'-10" 6"

HK.

4

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	9'-4"	100
H2	4	#4	STR	6'-3"	17
H3	4	#4	STR	2'-10"	8
H4	28	#4	1	3'-3"	61
H5	4	#4	STR	10'-2"	27
H6	16	#4	STR	17'-10"	191
H7	4	#4	STR	12'-4"	33
H8	4	#4	STR	6'-3"	17
H9	28	#4	2	3'-3"	61
H10	4	#4	STR	18'-5"	49
N1	4	#6	3	11'-2"	67
N2	6	#6	3	9'-11"	89
N3	6	#5	3	8'-7"	54
N4	8	#4	3	6'-10"	37
N5	4	#6	3	11'-4"	68
N6	6	#6	3	10'-9"	97
N7	8	#6	3	9'-10"	118
N8	8	#5	3	8'-10"	74
N9	8	#4	3	7'-10"	42
N10	8	#4	3	6'-10"	37
S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	11'-3"	70
T2	6	#5	STR	19'-9"	124
V1	4	#4	STR	9'-1"	24
V2	6	#4	STR	7'-10"	31
V3	6	#4	STR	6'-6"	26
V4	8	#4	STR	4'-10"	26
V5	4	#4	STR	9'-4"	25
V6	6	#4	STR	8'-9"	35
V7	8	#4	STR	7'-9"	41
V8	8	#4	STR	6'-9"	36
V9	8	#4	STR	5'-9"	31
V10	8	#4	STR	4'-9"	25
Z1	4	#5	4	6'-7"	27
Z2	4	#5	4	6'-0"	25
Z3	8	#5	4	4'-9"	40
Z4	8	#4	4	3'-4"	18
Z5	4	#5	4	6'-9"	28
Z6	6	#5	4	6'-3"	39
Z7	10	#5	4	5'-3"	55
Z8	10	#5	4	4'-4"	45
Z9	10	#4	4	3'-4"	22

REINFORCING STEEL FOR 4 WINGS	LBS.	2,148
CLASS A CONCRETE		
4 WINGS	C.Y.	30.2
2 HEADWALLS	C.Y.	3.8
2 END CURTAIN WALLS	C.Y.	4.6
6 SILLS	C.Y.	4.7
TOTAL	C.Y.	43.3

PROJECT NO. B-5160

ROWAN COUNTY

STATION: 12+13.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 9'-0" SLOPE = 2:1

120° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D484A3... 10/13/2015

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			6

STD. NO. CW6009

ASSEMBLED BY :	N.D'AIUTO	DATE :	7/30/15
CHECKED BY :	J.K.BOWLES	DATE :	8/5/15
DRAWN BY :	CCJ		12/99
CHECKED BY :	RWW		03/00

12-OCT-2015 13:10
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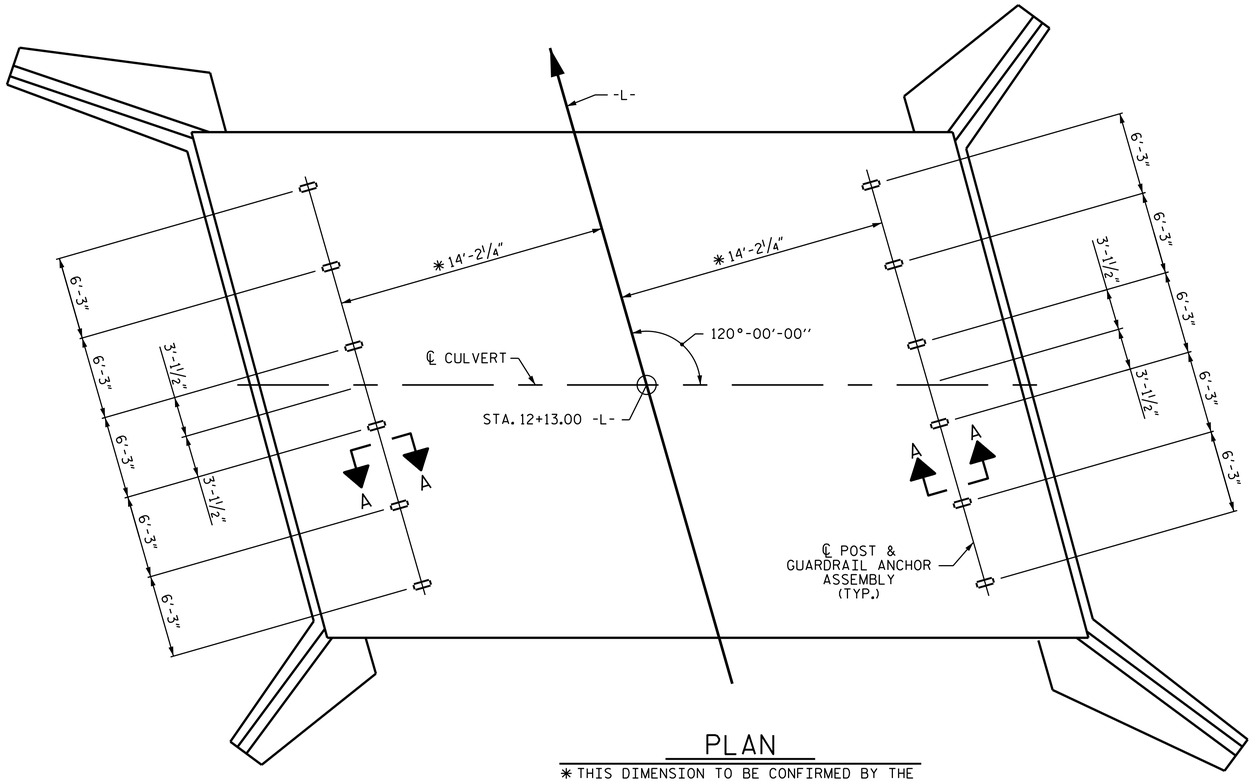


PLAN

✱ THIS DIMENSION TO BE CONFIRMED BY THE ENGINEER IN THE FIELD.

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 2¼" 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 COMPLETED IN PLACE SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

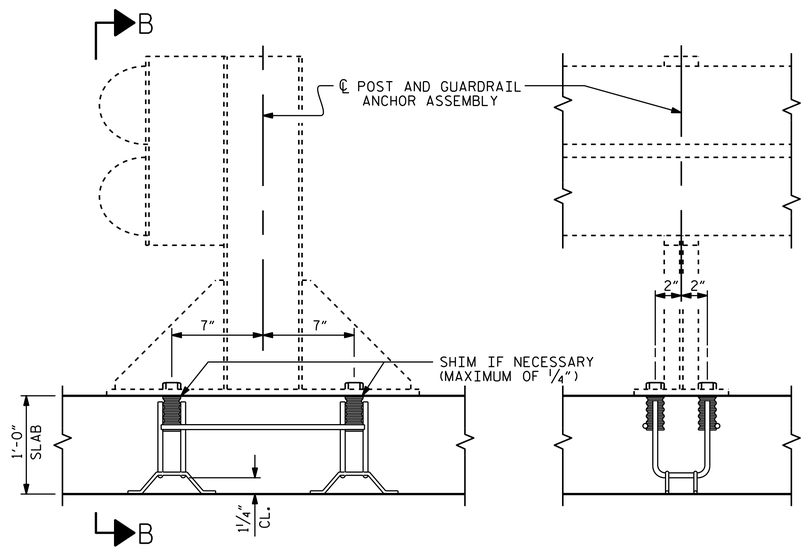
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

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.

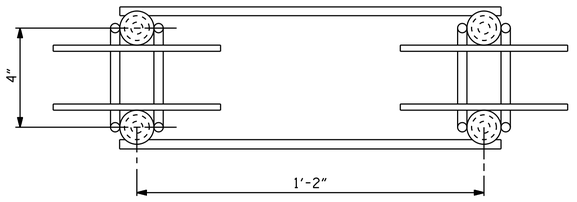
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

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.

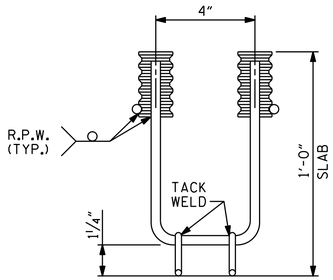


SECTION A-A

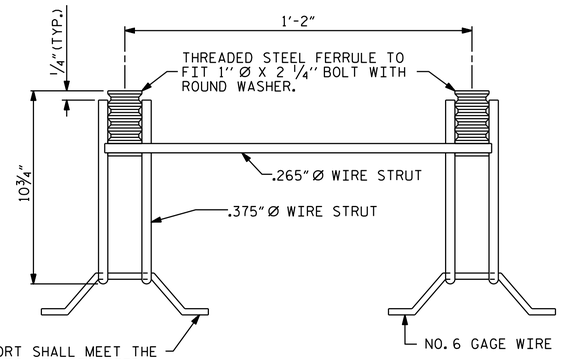
SECTION B-B



PLAN



ELEVATION



THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERT

ASSEMBLED BY :	N.D'AIUTO	DATE :	7/30/15
CHECKED BY :	J.K.BOWLES	DATE :	8/5/15
DRAWN BY : FCJ	6/88	REV. 5/7/03	RWW/JTE
CHECKED BY : ARB	6/88	REV. 5/1/06R	KMM/GM
		REV. 10/1/11	MAA/GM

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thcarroll

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D466AA... 10/13/2015

PROJECT NO. B-5160

ROWAN COUNTY

STATION: 12+13.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

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

STD. NO. GRA1

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF	
STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION	
GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR	
UNTREATED - EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. 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

REV. 6-16-95 EEM (W) RGW REV. 5-7-03 RWW (W) JTE REV. 10-1-11 MAA (W) GM
REV. 8-16-99 RWW (W) LES REV. 5-1-06 TLA (W) GM
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