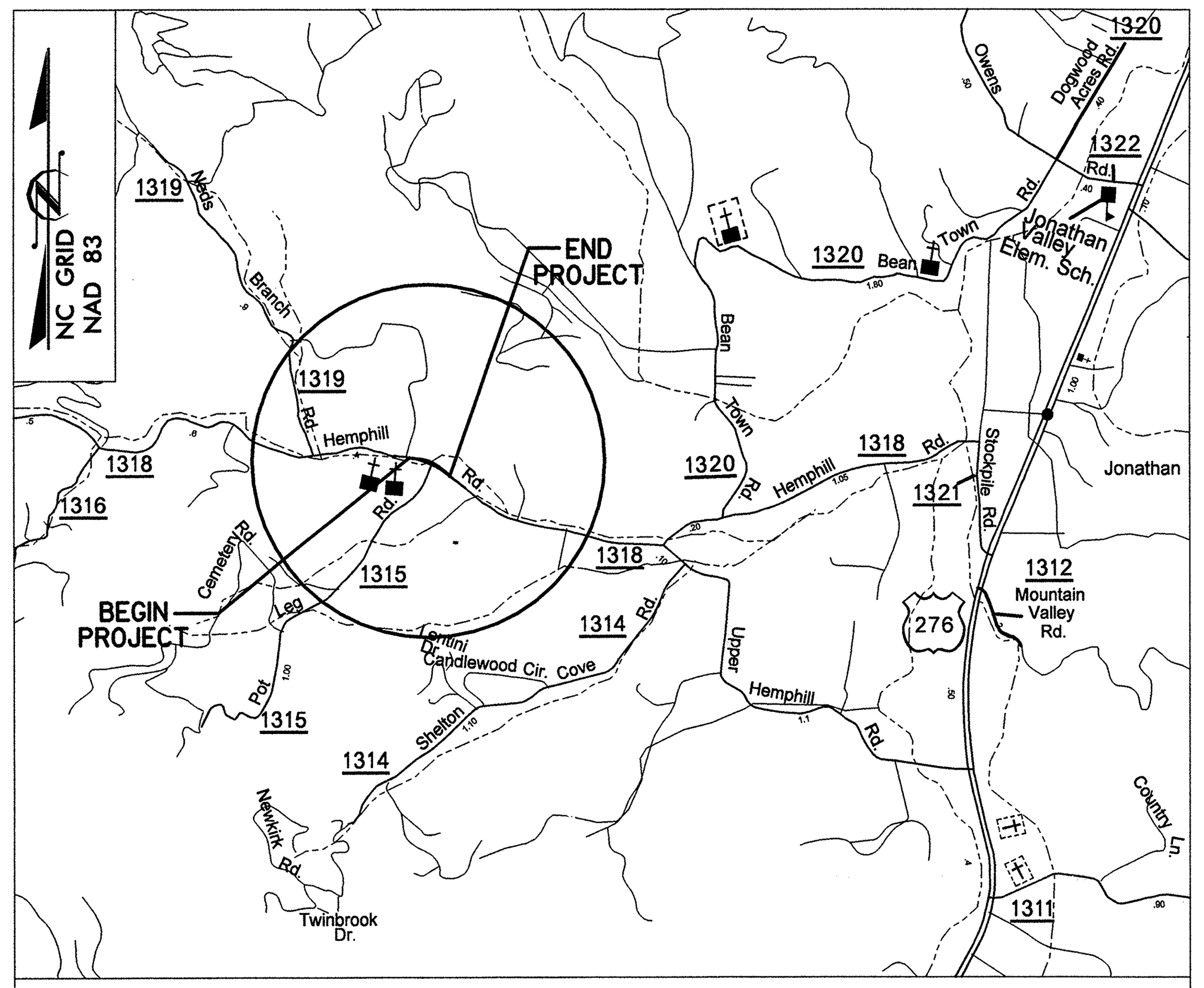
09/08/99

TIP PROJECT: B-3343

CONTRACT: C202071

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

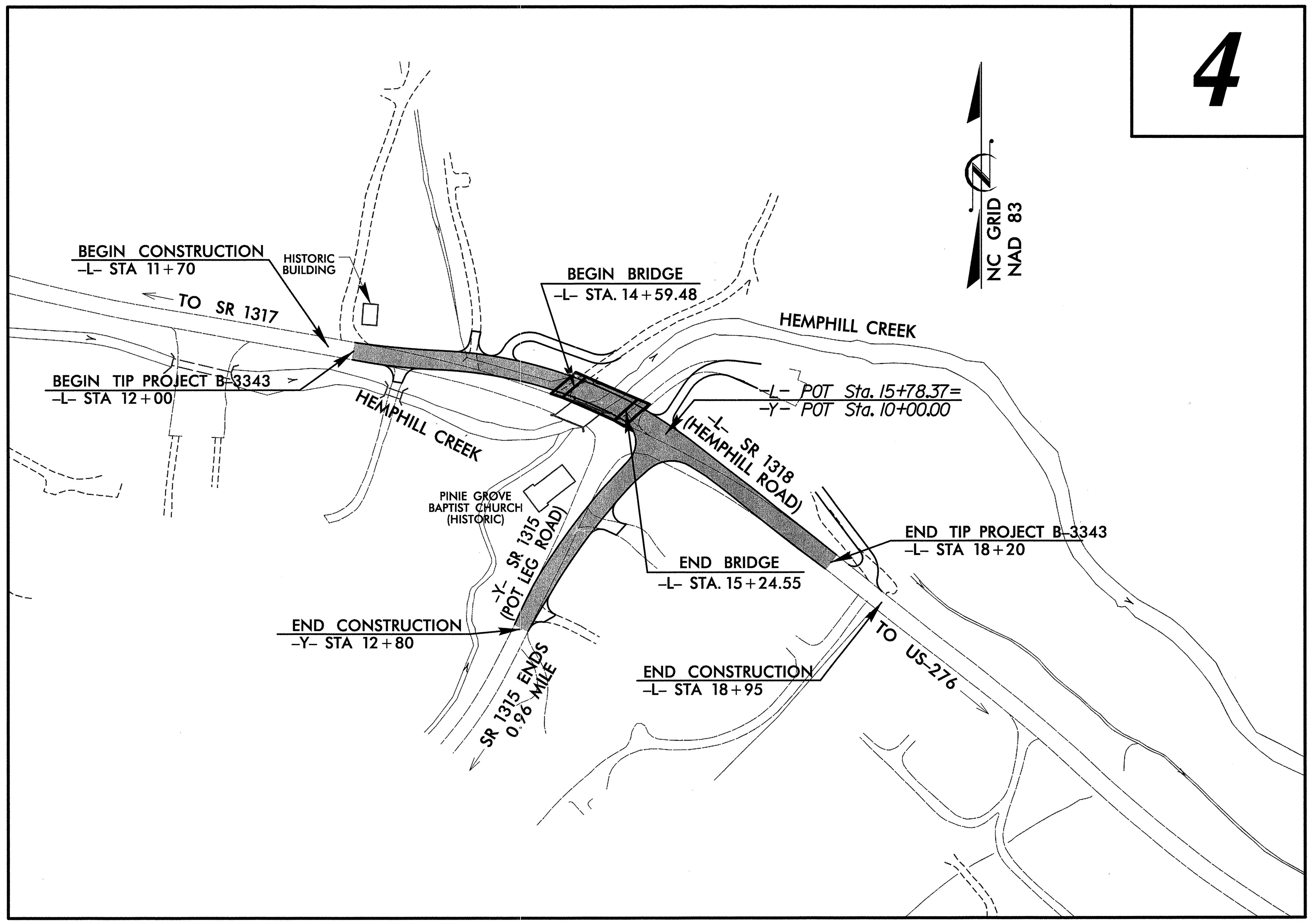
HAYWOOD COUNTY

LOCATION: BRIDGE No. 48 OVER HEMPHILL CREEK ON SR 1318

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3343	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33002.1.1	BRZ-1318(8)	P.E.
33002.2.2	BRZ-1318(8)	R/W & UTILITIES
33002.3.1	BRZ-1318(8)	CONST.



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 10 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 650
ADT 2030 = 1300
DHV = 14%
D = 65%
T = 3% (1% TTST + 2% DUALS)
V = 40 MPH *
FUNCT. CLASS = RURAL LOCAL

* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3343 = 0.105 MI
LENGTH STRUCTURE TIP PROJECT B-3343 = 0.012 MI
TOTAL LENGTH OF TIP PROJECT B-3343 = 0.117 MI

Prepared In the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE NC, 28806
FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 16, 2007

LETTING DATE:
March 17, 2009

REECE SCHULER, PE
PROJECT ENGINEER

AARON CARVER, PE
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
DOUG TAYLOR, PE
PROJECT ENGINEER - ROADWAY DESIGN

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.
SIGNATURE: 11/20/08 P.E.

ROADWAY DESIGN ENGINEER
11/19/08
NORTH CAROLINA PROFESSIONAL SEAL 20960 ENGINEER REECE M. SCHULER
SIGNATURE: P.E.

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

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

PROJECT REFERENCE NO.	SHEET NO.
B-3343	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26960 ENGINEER REECE A. SCHULER

11/19/08

INDEX OF SHEETS B-3343

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 SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-A	DETAIL OF GUARDRAIL ANCHOR UNIT TYPE B-77 SHOP CURVE
2-B	DETAIL OF GUARDRAIL ANCHOR UNIT - TEMPORARY RETROFIT
2-C	DETAIL OF MODIFIED CONCRETE FLUME
2-D	STANDARD TEMPORARY SHORING
2-E	BRIDGE APPROACH FILLS - SUB REGIONAL TIER
3	SUMMARY OF QUANTITIES
3-A	SUMMARY OF DRAINAGE QUANTITIES, SUMMARY OF GUARDRAIL, AND ASPHALT PAVEMENT REMOVAL SUMMARY
3-B	EARTHWORK SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
TCP-1 THRU TCP-8	TRAFFIC CONTROL PLANS
PM-1	FINAL PAVEMENT MARKING PLAN
EC-1 THRU EC-5	EROSION CONTROL PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-0	CROSS-SECTION SUMMARY
X-1 THRU X-6	CROSS-SECTIONS
S-1 THRU S-24	STRUCTURE PLANS

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-30-08

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED 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.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

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 NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING"

SUBSURFACE PLANS:

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

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE AT&T

AND HAYWOOD ELECTRIC MEMBERSHIP CORP.

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 OTHERS.

2006 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 July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
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 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
816.04	Markers for Drainage Structure and Concrete Pad
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

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PROJECT REFERENCE NO.	SHEET NO.
B-3343	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

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
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- 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 Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal
- ROADWAY EXCAVATION (OPEN OLD CHANNEL)

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 — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
B-3343	1C
Location and Surveys	

SURVEY CONTROL SHEET B-3343

PROJECT CONTROL DATA AT:

HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:

B3343_LS_CONTROL_060215.TXT

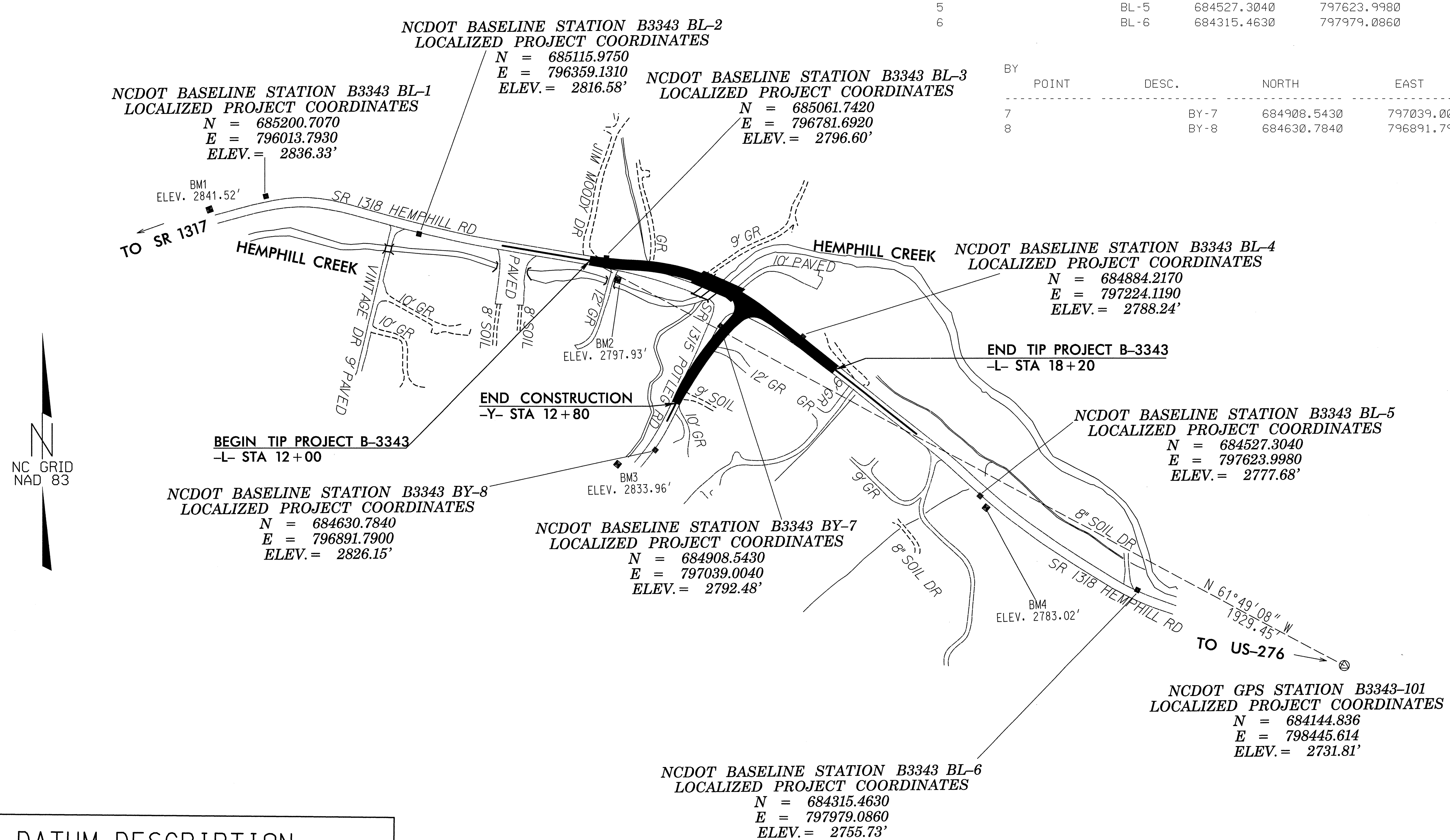
△ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	685200.7070	796013.7930	2836.33	OUTSIDE PROJECT LIMITS	
2	BL-2	685115.9750	796359.1310	2816.58	OUTSIDE PROJECT LIMITS	
3	BL-3	685061.7420	796781.6920	2796.60	12+35.82	11.10 LT
4	BL-4	684884.2170	797224.1190	2788.24	17+18.48	12.05 LT
5	BL-5	684527.3040	797623.9980	2777.68	OUTSIDE PROJECT LIMITS	
6	BL-6	684315.4630	797979.0860	2755.73	OUTSIDE PROJECT LIMITS	

BY

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
7	BY-7	684908.5430	797039.0040	2792.48	10+82.91	13.98 RT
8	BY-8	684630.7840	796891.7900	2826.15	OUTSIDE PROJECT LIMITS	



BM1 ELEVATION = 2841.52
N 685172 E 795887
L STATION 10+00
N 82° 56' 56.9" W DIST 665.78
8 INCH NAIL SET IN ROOT OF A 20 INCH WHITE OAK

BM2 ELEVATION = 2797.93
N 685013 E 796807
L STATION 12+66 35 RIGHT
CHISLED SQUARE WITH AN X ON END OF WINGWALL

BM3 ELEVATION = 2833.96
N 684598 E 796807
Y STATION 13+25
S 48° 29' 32.4" W DIST 149.06
8 INCH NAIL SET ON TOP OF CUT OFF POWER POLE

BM4 ELEVATION = 2783.02
N 684501 E 797638
L STATION 20+54
S 43° 15' 07.0" E DIST 229.08
8 INCH NAIL SET ON TOP OF 6 INCH DOGWOOD TREE STUMP

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS B3343-101"
WITH NAD 1983 STATE PLANE GRID COORDINATES OF
NORTHING: 684144.836(ft) EASTING: 798445.614(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99976177
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS B3343-101" TO -L- STATION 12+00.00 IS
N 61°49'08" W 1929.45'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

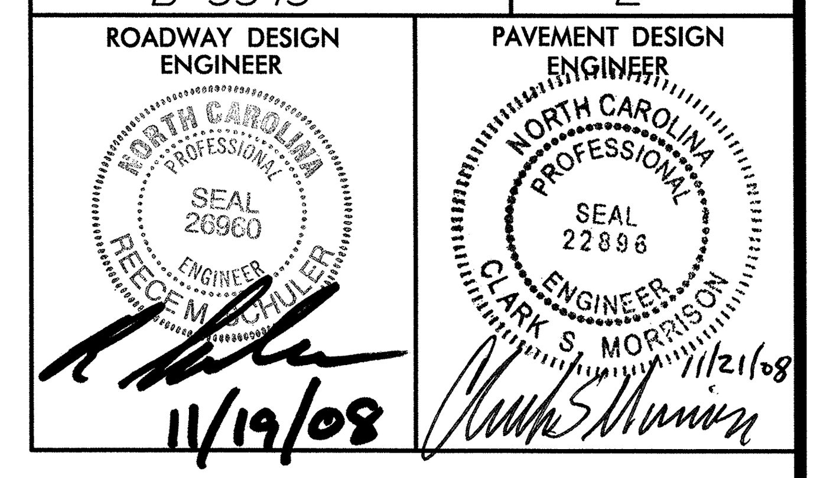
INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROLL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROLL ESTABLISHED USING NCDOT MONUMENT (GPS B3343-101)

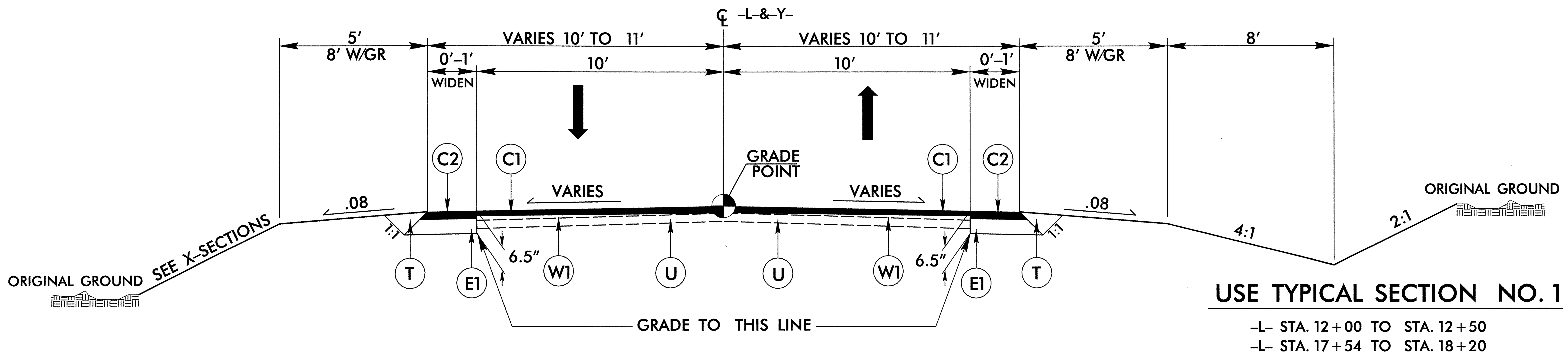
NOTE: DRAWING NOT TO SCALE

6/2/99

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

PROJECT REFERENCE NO.	SHEET NO.
B-3343	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

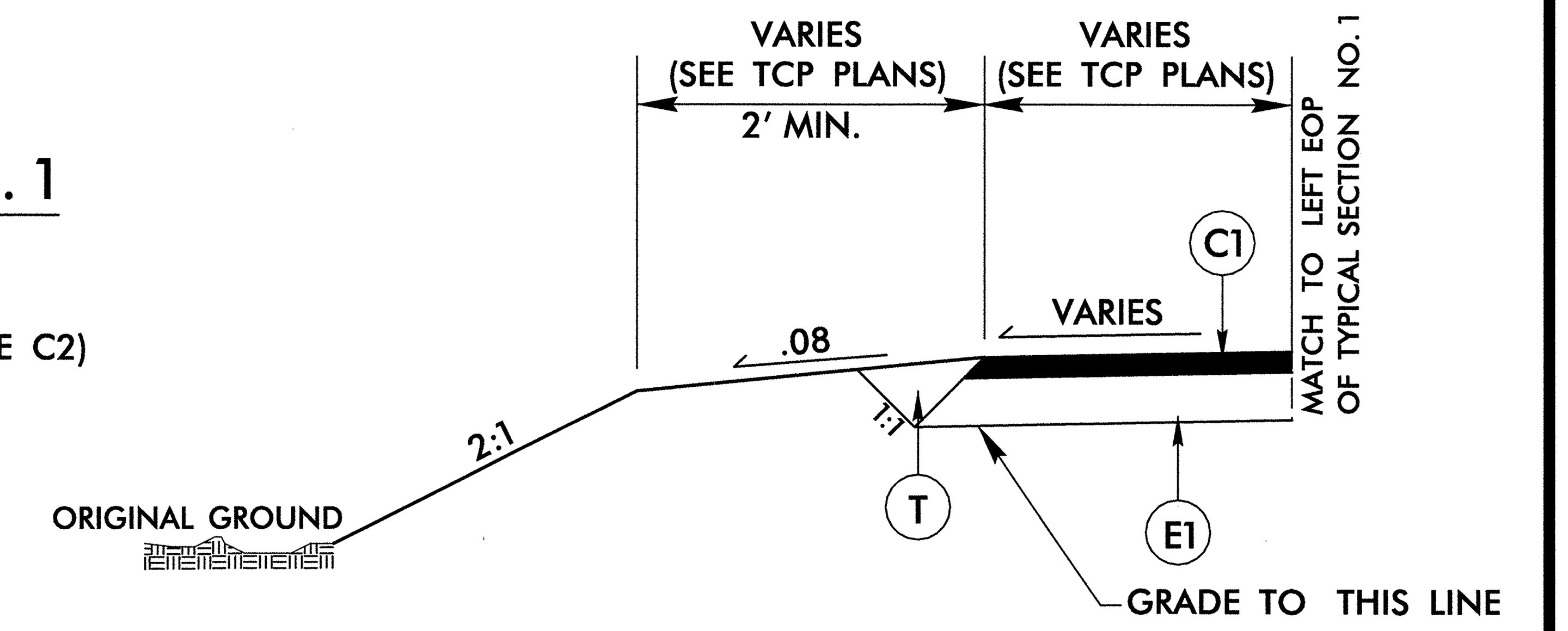




TYPICAL SECTION NO. 1

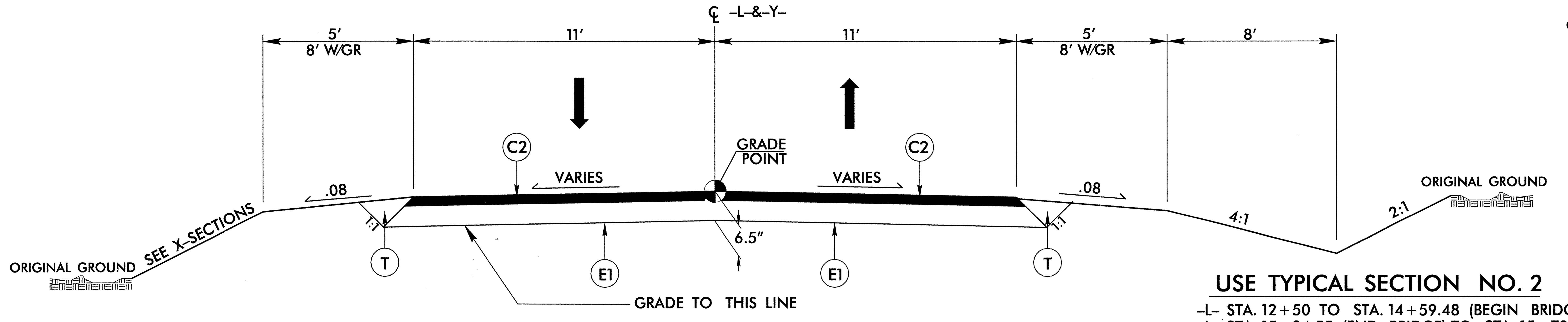
USE TYPICAL SECTION NO. 1

-L- STA. 12+00 TO STA. 12+50
-L- STA. 17+54 TO STA. 18+20
-Y- STA. 10+11.14 TO STA. 10+32 (USE C2)
-Y- STA. 12+30 TO STA. 12+80



TEMPOARARY PAVEMENT DETAIL FOR:

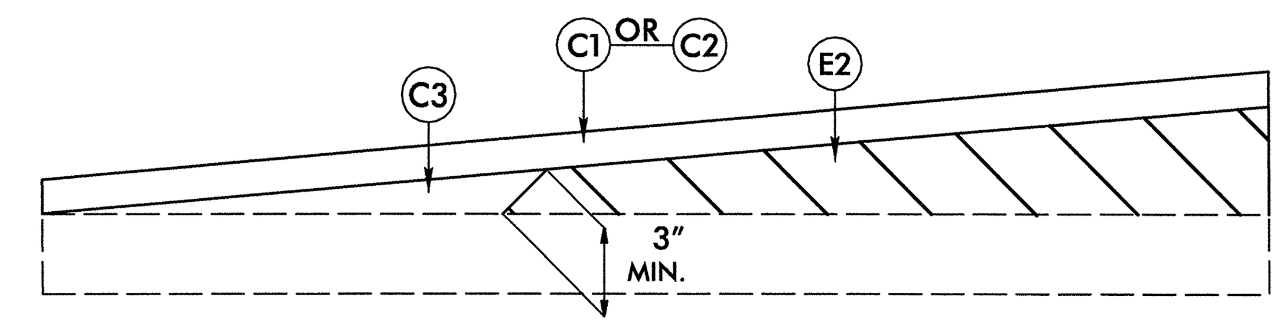
-L- STA. 13+75+/- TO STA. 14+45+/-
-L- STA. 15+40+/- TO STA. 16+75+/-
(SEE TRAFFIC CONTROL PLANS)



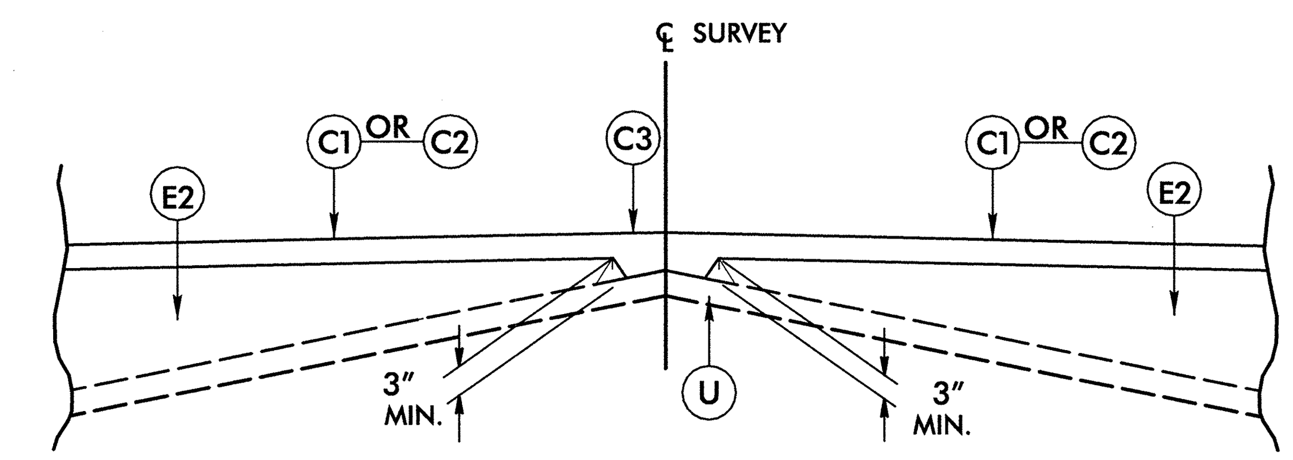
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

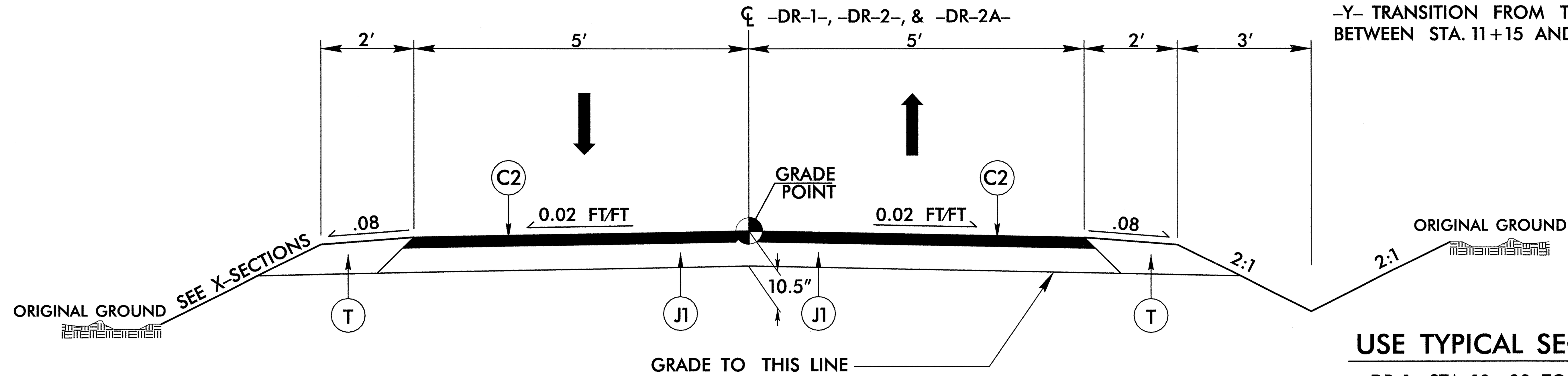
-L- STA. 12+50 TO STA. 14+59.48 (BEGIN BRIDGE)
-L- STA. 15+24.55 (END BRIDGE) TO STA. 15+72
-L- TRANSITION FROM TYPICAL NO.2 TO NO. 1 BETWEEN STA. 15+72 AND STA. 17+54
-Y- STA. 10+32 TO STA. 11+15
-Y- TRANSITION FROM TYPICAL NO.2 TO NO. 1 BETWEEN STA. 11+15 AND STA. 12+30



Wedging Detail



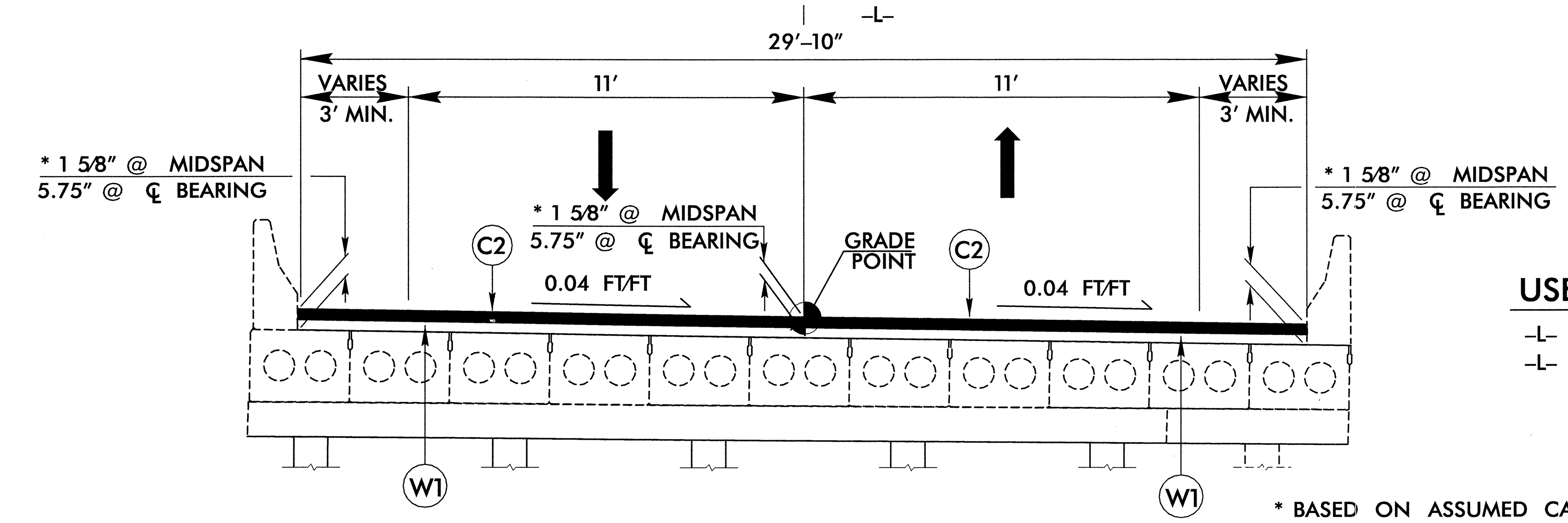
Detail Showing Method of Wedging



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

-DR-1- STA. 10+00 TO STA. 11+49.25
-DR-2- STA. 10+00 TO STA. 11+27.88
-DR-2A- STA. 10+00 TO STA. 11+40.22



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4

-L- STA. 14+59.48 (BEGIN BRIDGE) TO
-L- STA. 15+24.55 (END BRIDGE)

* BASED ON ASSUMED CAMBER AT MIDSPAN = 3.25"

C1	PROP. APPROX. 1¼" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
E1	PROP. APPROX. 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 5½" IN DEPTH.
J1	8" AGGREGATE BASE COURSE.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W1	VARIABLE DEPTH ASPHALT PAVEMENT FOR ROADWAY (SEE WEDGING DETAIL FOR RESURFACING).

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

6/2/99

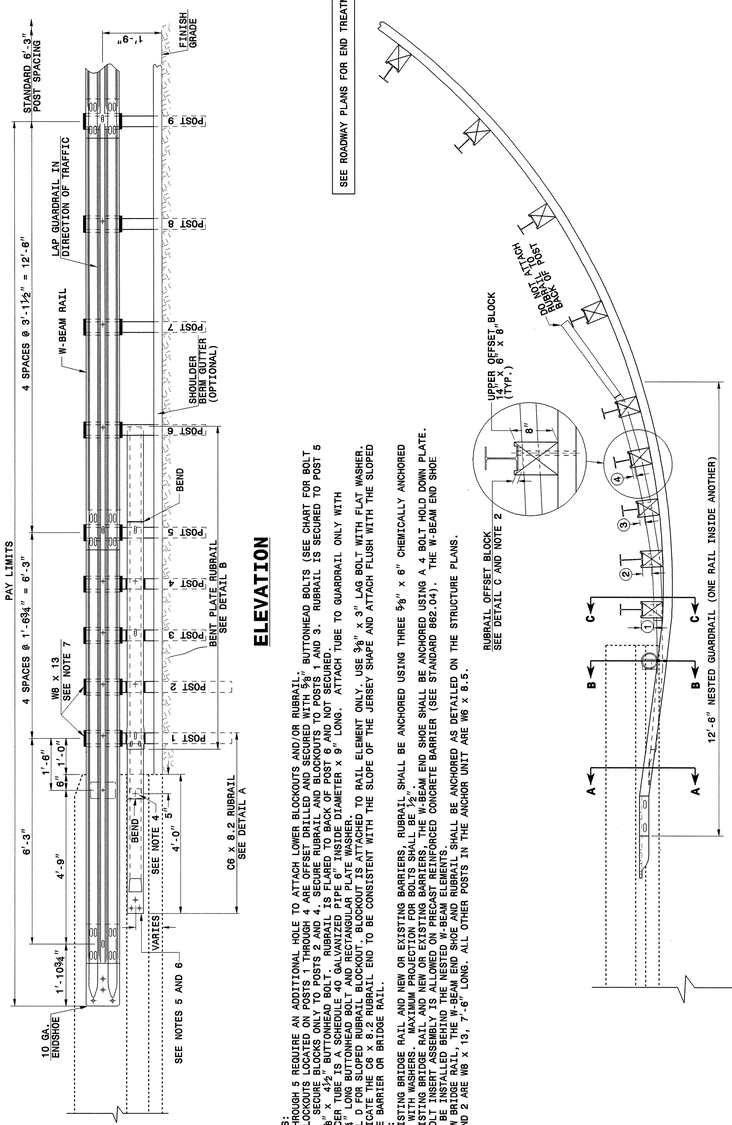
$$$$$$$$SYSTIME$$$$$$$$ $$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$ $$$$$$$$USERNAME$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-3343	2-A

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
TYPE B-77 SHOP CURVED

SHEET 1 OF 2 **B-77SC**



ELEVATION

GENERAL NOTES:
1) POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL.
2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH ⅝" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4. SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A ⅝" x 4½" BUTTONHEAD BOLT. RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED.
3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE, NOMINAL DIAMETER x 9" LONG. ATTACH TUBE TO GUARDRAIL WITH A ⅝" x 1¼" LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER.
4) SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE ⅜" x 3" LAG BOLT WITH FLAT WASHER. SHOP FABRICATE THE C6 x 8.2 RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE JERSEY SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
6) ANCHORAGE:
   (a) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, RUBRAIL SHALL BE ANCHORED USING THREE ⅝" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS SHALL BE 12". THE W-BEAM END SHOE SHALL BE ANCHORED USING A 4 BOLT HOLD DOWN PLATE.
   (b) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, USE STANDARD 862.04). THE W-BEAM END SHOE SHALL BE INSTALLED BEHIND THE NESTED W-BEAM ELEMENTS.
   (c) AT NEW BRIDGE RAIL, THE W-BEAM END SHOE AND RUBRAIL SHALL BE ANCHORED AS DETAILED ON THE STRUCTURE PLANS.
7) POSTS 1 AND 2 ARE W8 x 13, 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W8 x 9.5.

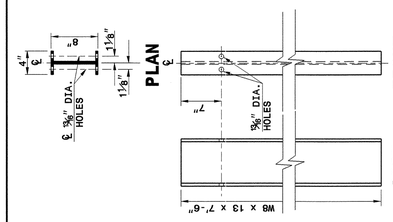
PLAN

GUARDRAIL ANCHOR UNIT TYPE B-77

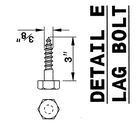
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

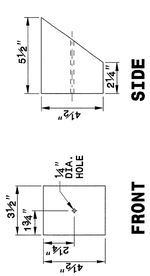
ENGLISH DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
TYPE B-77 SHOP CURVED

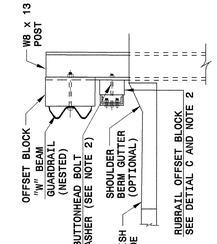
SHEET 2 OF 2 **B-77SC**



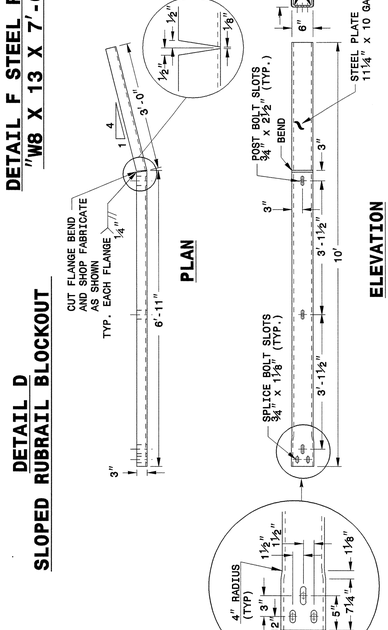
DETAIL F STEEL POST "W8 X 13 X 7'-6"

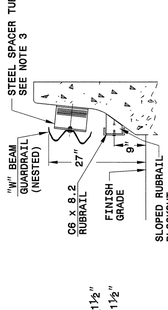






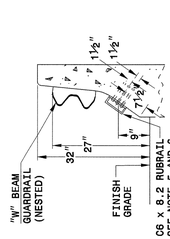
SECTION C-C

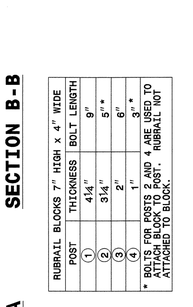




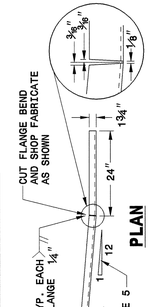
RUBRAIL BLOCKS 7" HIGH x 4" WIDE		
POST	THICKNESS	BOLT LENGTH
①	4¼"	9"
②	3¼"	5"*
③	2"	6"
④	1"	3"*

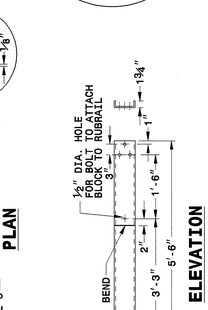
* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH BLOCK TO POST. RUBRAIL NOT ATTACHED TO BLOCK.





DETAIL C RUBRAIL BLOCKOUT





GUARDRAIL ANCHOR UNIT TYPE B-77

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER E. HOWARD WARD
12/2/08

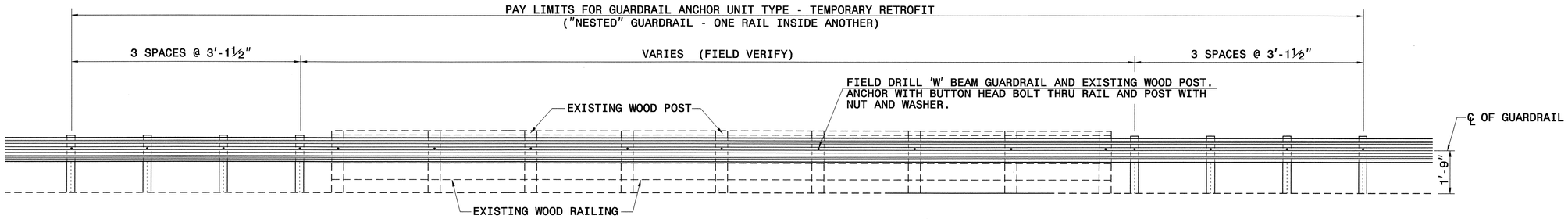
PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

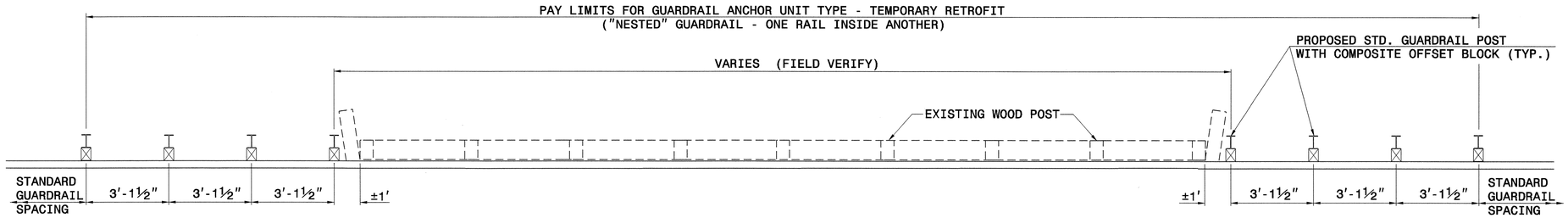
ORIGINAL BY: E.E. WARD DATE: 06-04-04
MODIFIED BY: DATE:
CHECKED BY: DATE: 11/6/08
FILE SPEC.: m:\sc\guardrail\NCHRP350approved\B-77.dgn

$$$$USERNAME=$$$$
$$$$USERTIME=$$$$
$$$$USERDATE=$$$$

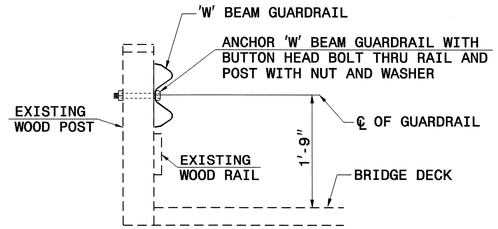
PROJECT REFERENCE NO.	SHEET NO.
B-3343	2-B



ELEVATION VIEW



PLAN VIEW



SECTION VIEW

GUARDRAIL ATTACHMENT TO WOOD POST

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOMEWOOD
12/2/08

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

DETAIL OF GUARDRAIL ANCHOR UNIT TYPE- TEMPORARY RETROFIT

ORIGINAL BY: E.E. WARD DATE: 10-04
MODIFIED BY: DATE:
CHECKED BY: DATE: 10/14/08
FILE SPEC.: usr/details/stand/bp.dgn

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

PROJECT REFERENCE NO.	SHEET NO.
B-3343	2-C

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

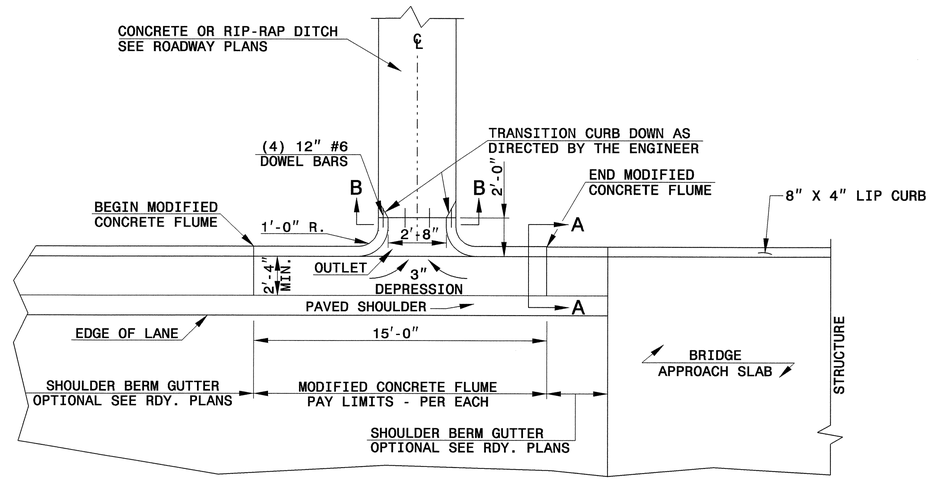
ENGLISH DETAIL DRAWING FOR

MODIFIED CONCRETE FLUME

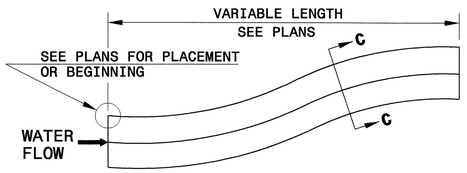
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1

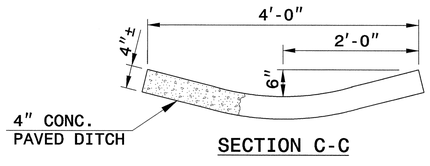
MODFLMDTCH



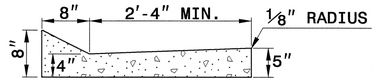
PLAN VIEW



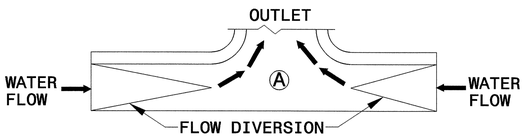
DOWNGRADE OR SAG



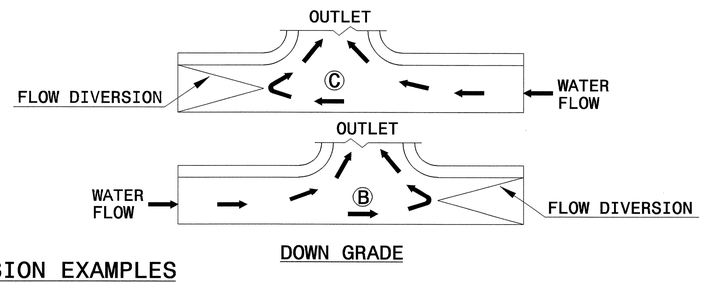
SECTION C-C



SECTION A-A

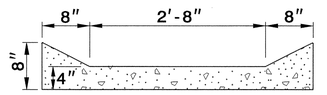


SAG

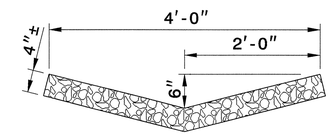


DOWN GRADE

FLOW DIVERSION EXAMPLES



SECTION B-B



RIP-RAP LINED DITCH

NOTES:

- CONSTRUCT MODIFIED CONCRETE FLUME AND SHOULDER BERM GUTTER IN ACCORDANCE WITH THIS DETAIL.
- CONSTRUCT CONCRETE DITCH IN ACCORDANCE WITH STD. DWG. NO. 850.01.
- CONSTRUCT RIP RAP LINED DITCH IN ACCORDANCE WITH THIS DETAIL, IF CALLED FOR IN PLANS.
- CONCRETE OR RIP RAP LINED DITCH SHALL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. THE DITCH SHALL TERMINATE AS SHOWN ON THE PLANS. IF NO TERMINATION IS INDICATED PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18" PIPE. TRANSITIONS FROM THE DITCH TO TERMINATION SHALL BE AS DIRECTED BY THE ENGINEER.
- MODIFICATIONS SHALL BE AS DICTATED BY SITE CONDITIONS AND DIRECTED BY THE ENGINEER.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

MODIFIED CONCRETE FLUME

WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1

MODFLMDTCH

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: E.E. Ward DATE: Apr. 2002
MODIFIED BY: E.E. Ward DATE: July 2004
CHECKED BY: DATE: 12/2/08
FILE SPEC.: w:\details\stand\modifiedflume.dgn

PROJECT REFERENCE NO.	SHEET
B-3343	2-D

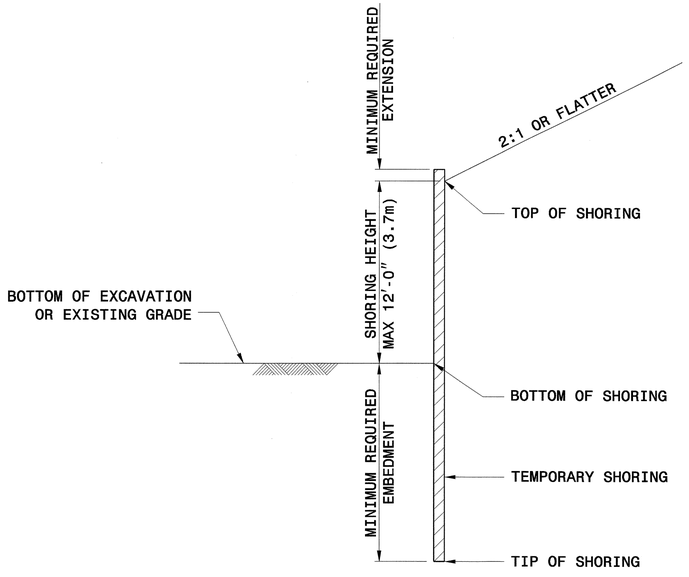
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

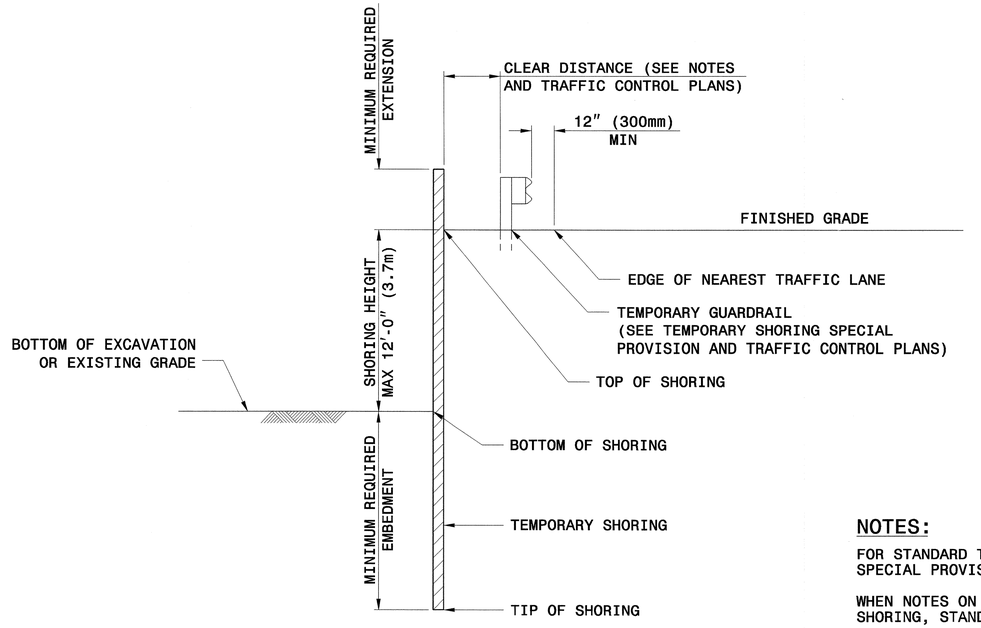
Scott A. Hidden 10/21/08
SIGNATURE DATE

ENGINEER

SIGNATURE DATE



SLOPE CASE



SURCHARGE CASE

GROUNDWATER CONDITION	SHORING HEIGHT FT (m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT: SHEET PILES: MINIMUM REQUIRED EMBEDMENT FT (m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT: SHEET PILES: MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT: H PILES WITH TIMBER LAGGING: MINIMUM REQUIRED EMBEDMENT FT (m) HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)	SURCHARGE CASE WITH TRAFFIC IMPACT: SHEET PILES: MINIMUM REQUIRED EMBEDMENT FT (m)	SURCHARGE CASE WITH TRAFFIC IMPACT: SHEET PILES: MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	SURCHARGE CASE WITH TRAFFIC IMPACT: H PILES WITH TIMBER LAGGING: MINIMUM REQUIRED EMBEDMENT FT (m) HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)
GROUNDWATER ELEVATION BELOW TIP OF SHORING	< 6 (1.8)	7.5 (2.3)	3.0 (161)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	11.0 (3.4)	10.0 (538)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)
	7 (2.1)	8.5 (2.6)	4.5 (242)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)	12.0 (3.7)	12.0 (645)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)
	8 (2.4)	10.0 (3.0)	6.5 (349)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)	12.5 (3.8)	14.0 (753)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)
	9 (2.7)	11.0 (3.4)	9.5 (511)	--	12.0 (3.7)	12.0 (3.7)	13.5 (4.1)	16.5 (887)	--	12.5 (3.8)	12.5 (3.8)
	10 (3.0)	12.5 (3.8)	13.0 (699)	--	--	13.5 (4.1)	14.0 (4.3)	19.5 (1048)	--	13.5 (4.1)	13.5 (4.1)
	11 (3.4)	13.5 (4.1)	17.0 (914)	--	--	14.5 (4.4)	15.0 (4.6)	22.5 (1210)	--	--	14.5 (4.4)
	12 (3.7)	15.0 (4.6)	21.5 (1156)	--	--	16.0 (4.9)	16.0 (4.9)	25.5 (1371)	--	--	15.5 (4.7)
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND TIP OF SHORING	< 6 (1.8)	11.5 (3.5)	4.5 (242)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)	16.0 (4.9)	12.0 (645)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)
	7 (2.1)	13.0 (4.0)	7.0 (376)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)	17.0 (5.2)	14.5 (780)	14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
	8 (2.4)	15.0 (4.6)	10.0 (538)	--	15.0 (4.6)	15.0 (4.6)	18.0 (5.5)	17.0 (914)	--	15.5 (4.7)	15.5 (4.7)
	9 (2.7)	17.0 (5.2)	14.0 (753)	--	17.0 (5.2)	17.0 (5.2)	19.0 (5.8)	20.0 (1075)	--	17.0 (5.2)	17.0 (5.2)
	10 (3.0)	18.5 (5.6)	19.5 (1048)	--	--	18.5 (5.6)	20.0 (6.1)	23.5 (1263)	--	--	18.5 (5.6)
	11 (3.4)	20.5 (6.3)	26.0 (1398)	--	--	--	21.0 (6.4)	28.0 (1505)	--	--	20.0 (6.1)
	12 (3.7)	22.5 (6.9)	33.0 (1774)	--	--	--	22.0 (6.7)	33.0 (1774)	--	--	21.5 (6.6)

NOTE: MINIMUM REQUIRED EXTENSION IS 6" (150mm) FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" (800 mm) FOR "SURCHARGE CASE WITH TRAFFFIC IMPACT".

NOTES:

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING, STANDARD TEMPORARY SHORING IS OPTIONAL.

SUBMIT "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 14 DAYS BEFORE BEGINNING SHORING CONSTRUCTION. UP TO THREE LOCATIONS MAY BE INCLUDED ON EACH SELECTION FORM.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM SHORING HEIGHT IS 12'-0" (3.7m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) BOTTOM OF EXCAVATION OR EXISTING GRADE IN FRONT OF SHORING IS 6:1 (H:V) SLOPE OR FLATTER.
4) H PILE SPACING IS 6'-0" (1.8m).
5) H PILE EMBEDMENT DEPTHS ARE FOR DRIVEN PILES.
6) TIMBER LAGGING IS A MINIMUM OF 3" (75mm) THICK.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M^3)
FRICTION ANGLE = 30 DEGREES
COHESION = 0 PSF (0 KPA)
GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT WITHIN THE EMBEDMENT DEPTH.

VERIFY GROUNDWATER ELEVATION BEFORE BEGINNING SHORING CONSTRUCTION.

IF THE CLEAR DISTANCE IS LESS THAN THE 3'-0", USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT".

AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF THE SHORING. COLLECT AND DIRECT RUNOFF AWAY FROM SHORING.

CONTACT THE ENGINEER IF MINIMUM REQUIRED EMBEDMENT IS NOT ACHIEVED.

PREPARED BY:	DATE:
REVIEWED BY:	DATE:

GEOTECHNICAL ENGINEERING UNIT

- ☐ *EASTERN REGIONAL OFFICE*
- ☐ *WESTERN REGIONAL OFFICE*
- ☒ *CENTRAL OFFICE*

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD TEMPORARY SHORING

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
B-3343	2-E

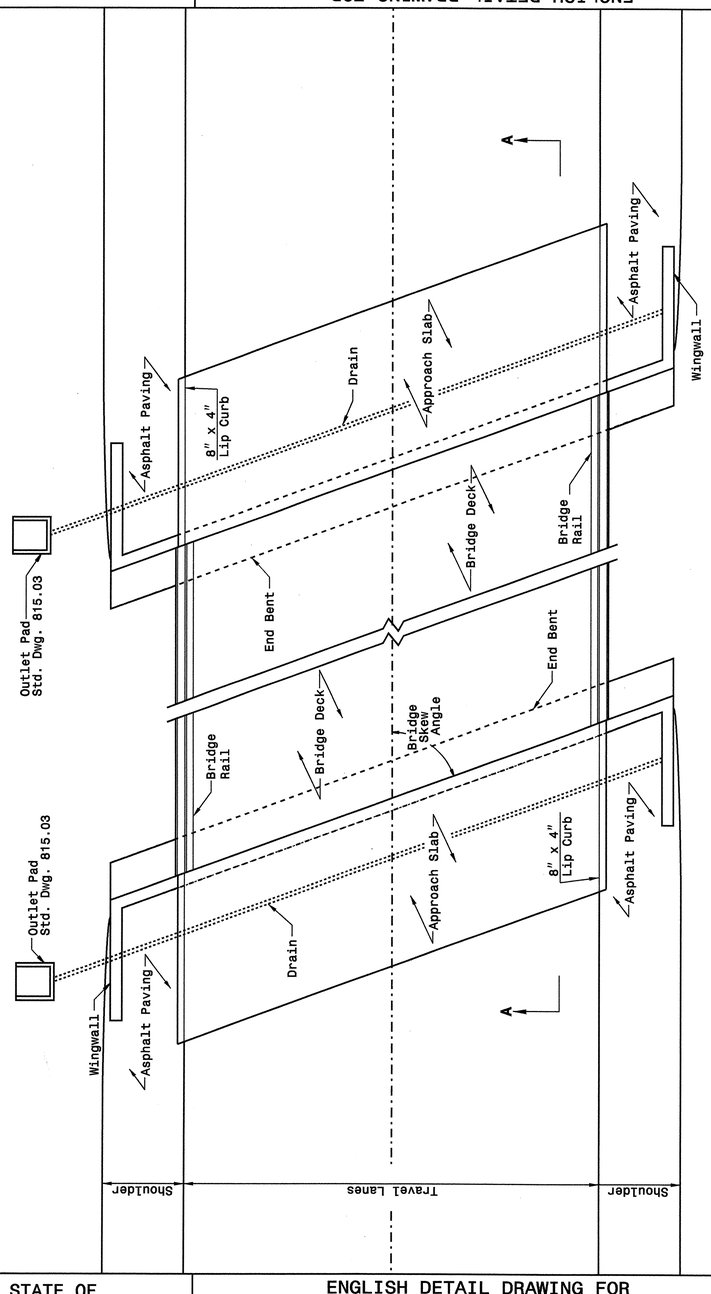
ENGLISH DETAIL DRAWING FOR

BRIDGE APPROACH FILLS

CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

PLAN VIEW
12' APPROACH SLAB



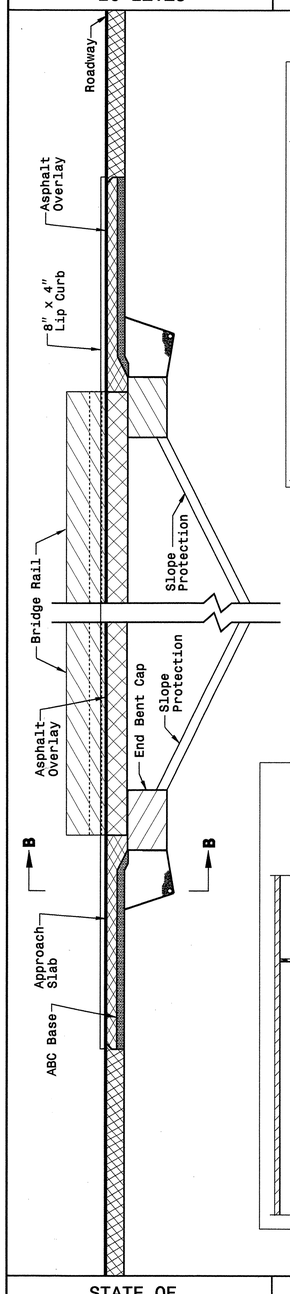
ENGLISH DETAIL DRAWING FOR

BRIDGE APPROACH FILLS

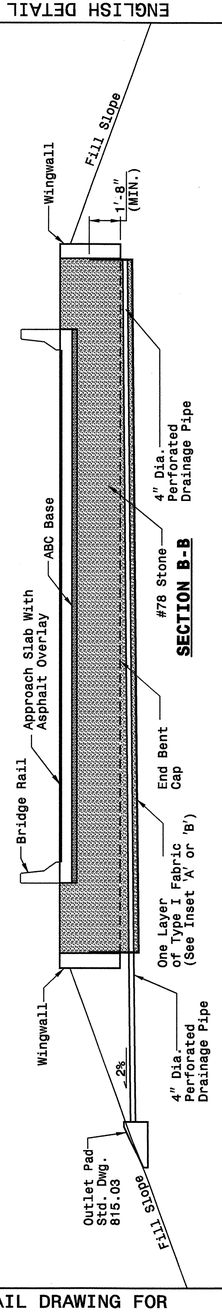
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

SECTION A-A



SECTION B-B



12' APPROACH SLAB

2/2/09

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

ORIGINAL BY: K. A. Kempf DATE: 6-10-08
MODIFIED BY: DATE:
CHECKED BY: DATE: 4/27/09
FILE SPEC.: kkempf\english\bridge approach fills.dgn

26-JUN-2008 15:32
c:\projects\special details\kkempf\english\bridge approach fill.dgn
kkempf PS237489

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-3343	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202071

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0030000000-N	SP	Lump Sum		BRIDGE APPROACH FILL - SUB REGIONAL TIER, STATION ******* (14+92.02)
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0057000000-E	226	600	CY	UNDERCUT EXCAVATION
0080000000-E	SP	200	TON	CLASS IV SUBGRADE STABILIZATION
0134000000-E	240	45	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	200	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	500	SY	FABRIC FOR SOIL STABILIZATION
0199000000-E	SP	402	SF	TEMPORARY SHORING
0318000000-E	300	35	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0344000000-E	310	144	LF	18" SIDE DRAIN PIPE
0372000000-E	310	108	LF	18" RC PIPE CULVERTS, CLASS III
0390000000-E	310	56	LF	36" RC PIPE CULVERTS, CLASS III
0995000000-E	340	316	LF	PIPE REMOVAL
1121000000-E	520	370	TON	AGGREGATE BASE COURSE
1220000000-E	545	250	TON	INCIDENTAL STONE BASE
1489000000-E	610	530	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1525000000-E	610	460	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
1560000000-E	620	53	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1693000000-E	654	100	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2022000000-E	815	45	CY	SUBDRAIN EXCAVATION
2033000000-E	815	35	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	200	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	6	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
2209000000-E	838	4	CY	ENDWALLS
2570000000-N	SP	1	EA	MODIFIED CONCRETE FLUME
3030000000-E	862	237.5	LF	STEEL BM GUARDRAIL
3045000000-E	862	87.5	LF	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3195000000-N	862	3	EA	GUARDRAIL ANCHOR UNITS, TYPE AT-1
3270000000-N	SP	3	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3317000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77
3380000000-E	862	137.5	LF	TEMPORARY STEEL BM GUARDRAIL
3389000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE ********** TEMPORARY (350 TL-2)
3436000000-N	862	1	EA	GENERIC GUARDRAIL ITEM GUARDRAIL ANCHOR UNIT, TYPE TEMPORARY RETROFIT
3574000000-E	867	305	LF	GENERIC FENCING ITEM LANDSCAPE FENCE RESET
3628000000-E	876	2	TON	RIP RAP, CLASS I
3649000000-E	876	110	TON	RIP RAP, CLASS B
3656000000-E	876	650	SY	FILTER FABRIC FOR DRAINAGE
4400000000-E	1110	144	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	30	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4430000000-N	1130	80	EA	DRUMS
4445000000-E	1145	40	LF	BARRICADES (TYPE III)
4450000000-N	1150	960	HR	FLAGGER
4810000000-E	1205	11,586	LF	PAINT PAVEMENT MARKING LINES (4")
4835000000-E	1205	81	LF	PAINT PAVEMENT MARKING LINES (24")
4850000000-E	1205	3,302	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
6000000000-E	1605	1,780	LF	TEMPORARY SILT FENCE
6006000000-E	1610	200	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	445	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	145	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	2.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	2.25	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	150	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	2	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	500	LF	SAFETY FENCE
6030000000-E	1630	840	CY	SILT EXCAVATION
6036000000-E	1631	1,400	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	20	SY	COIR FIBER MAT
6038000000-E	SP	125	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	125	LF	1/4" HARDWARE CLOTH
6071030000-E	SP	135	LF	COIR FIBER BAFFLES
6071050000-E	SP	3	EA	**" SKIMMER (1-1/2")
6084000000-E	1660	3.5	ACR	SEEDING & MULCHING
6087000000-E	1660	1	ACR	MOWING
6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	1.25	TON	FERTILIZER TOPDRESSING
6114000000-N	SP	5	HR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL

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$$$$$SYSTIME$$$$$
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COMPUTED BY: ACC	DATE: 07-06-06
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-3343	3-A

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

LINE	LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE REMOVAL
–L–	12+50 TO 14+56 (BEGIN EXIST. BRIDGE)	441			
–L–	14+95 (END EXIST. BRIDGE) TO 17+54	50			
–Y–	10+00 TO 12+30	402			
–L–	13+75 TO 14+45 LT (TEMP. DUE TO TC PLANS)	19			
–L–	15+40 TO 16+75 LT (TEMP. DUE TO TC PLANS)	54			
	TOTAL	966			
	SAY	970			

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

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO.		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE)								BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE)								CLASS III R.C. PIPE OR C.S. PIPE, TYPE IR ALUMINIZED OR HDPE PIPE, TYPE S OR D								15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE)		QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')			C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03			MODIFIED CONCRETE FLUME	PIPE REMOVAL LIN.FT.	REMARKS
SIZE		FROM	TO					12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"				CU. YDS.		PER EACH (0' THRU 5.0')	LIN. *FT. A: 5.0' THRU 10.0'	B: 10.0' AND ABOVE		TYPE OF GRATE: E	F	G			
THICKNESS OR GAUGE																.064	.064	.064	.064	.079	.079	.109	.109												R.C.P.	C.S.P.										
12+10 –L–	LT		1																														76												72	REMOVE 12" CMP
13+40 –L–	CL		2		2790.9	2790.4							56																						3.4										32	REMOVE 36" CMP
15+75 –L–	CL		3		2786.9	2785.0				108																																			76	REMOVE 44' 18" CMP & 32' 8" CORR. PLASTIC
15+75 –L–	RT		4																																									1		
11+20 –Y–	LT		5																														32												100	REMOVE 72' 18" CMP & 28' 15" CMP
12+50 –Y–	LT		6																														36												36	REMOVE 18" CMP
TOTALS										108			56																				144		SAY 4									1	316	

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: TEMP-STRAIGHT	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	ANCHORS: XI	ANCHORS: GRAU 350	ANCHORS: B-77	ANCHORS: AT-1	TEMP. ANCHORS	TEMP. ANCHORS: TL-2	TEMP. ANCHORS	TEMP. ANCHORS	IMPACT ATTENUATOR TYPE 350: EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
–L–	12+89.12	14+50.96	RT	162.5'			14+50.96		3'	8'	137.5'		2'				1	1												
–L–	14+00.60	14+68.68	LT	75'				14+68.68	3'	8'		50'		1'			1	1												
–L–	15+18.36	15+52.27	RT		50'			15+18.36	3'	8'		SHOP CURVED		SHOP CURVED				1	1											
–L–	15+31.83	15+60	LT		50'		15+31.83		5'	8'	SHOP CURVED		SHOP CURVED					1	1											
–L–	15+80	18+10	LT	200'	50'		16+00	17+50	5'	8'							1		1											
–L–	13+80	15+80	RT			200'			1'	4'											2							200		TEMPORARY GUARDRAIL DUE TO TC PLANS
–L–	14+40	15+80	RT			137.5'			1'	4'											2							137.5		TEMPORARY GUARDRAIL DUE TO TC PLANS
																														TEMPORARY GUARDRAIL DUE TO TC PLANS
		SUBTOTAL		437.5	150	337.5'											3	4	3		4									
		LESS DEDUCTIONS FOR ANCHORS																												
		GRAU-350 3 @ 50'=		-150'																										
		TL-2 4 @ 50'=				-200'																								
		B-77 4 @ 25'=		-50'	-50'																									
		AT-1 3 @ 6.25'=			-18.75'																									
		PROJECT TOTALS		237.5'	81.25'	137.5'											3	4	3		4							337.5		
		SAY		237.5'	87.5'	137.5'											3	4	3		4							337.5		
		ADDITIONAL GUARDRAIL POSTS=5 EA.																												

COMPUTED BY: ACC	DATE: 7/13/05
CHECKED BY: RMS	DATE: 7/13/05

6/4/99

PROJECT REFERENCE NO.	SHEET NO.
B-3343	3-B

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK

IN CUBIC YARDS

NOTE: EMBANKMENT COLUMN INCLUDES BACKFILL FOR UNDERCUT

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
SUMMARY NO.1					
-L- STA. 12+00 TO STA. 14+59.48 (BEG. BRIDGE)	175		975	800	
SUBTOTAL SUMMARY NO.1	175		975	800	
SUMMARY NO.2					
-L- STA. 15+24.55 (END BRIDGE) TO STA. 18+20	189		1305	1116	
-Y- STA. 10+11.14 TO STA. 12+80	512		221		291
-DR-2A- STA. 10+00 TO STA. 11+40.22	0		623	623	
SUBTOTAL SUMMARY NO.2	701		2149	1740	291
PROJECT SUB-TOTAL	876		3125	2540	291
WASTE IN LIEU OF BORROW				-291	-291
LOSS DUE TO CLEARING AND GRUBBING	-5			5	
PROJECT TOTAL	871		3125	2254	
EST. 5% FOR REPLACING TOP SOIL ON BORROW PITS				113	
GRAND TOTAL	871		3125	2366	
SAY	900			2600	

CONTINGENCY ITEMS:

UNDERCUT = 600 CY

SELECT GRANULAR MATERIAL (CLASS II & III) = 200 CY

CLASS IV SUBGRADE STABILIZATION = 200 TONS

FABRIC FOR SOIL STABILIZATION = 500 SY

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

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

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PROJECT REFERENCE NO. B-3343 | SHEET NO. 4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

Vaughn & Melton Consulting Engineers — Middlesboro, Kentucky; Greeneville, Tennessee; Asheville, North Carolina

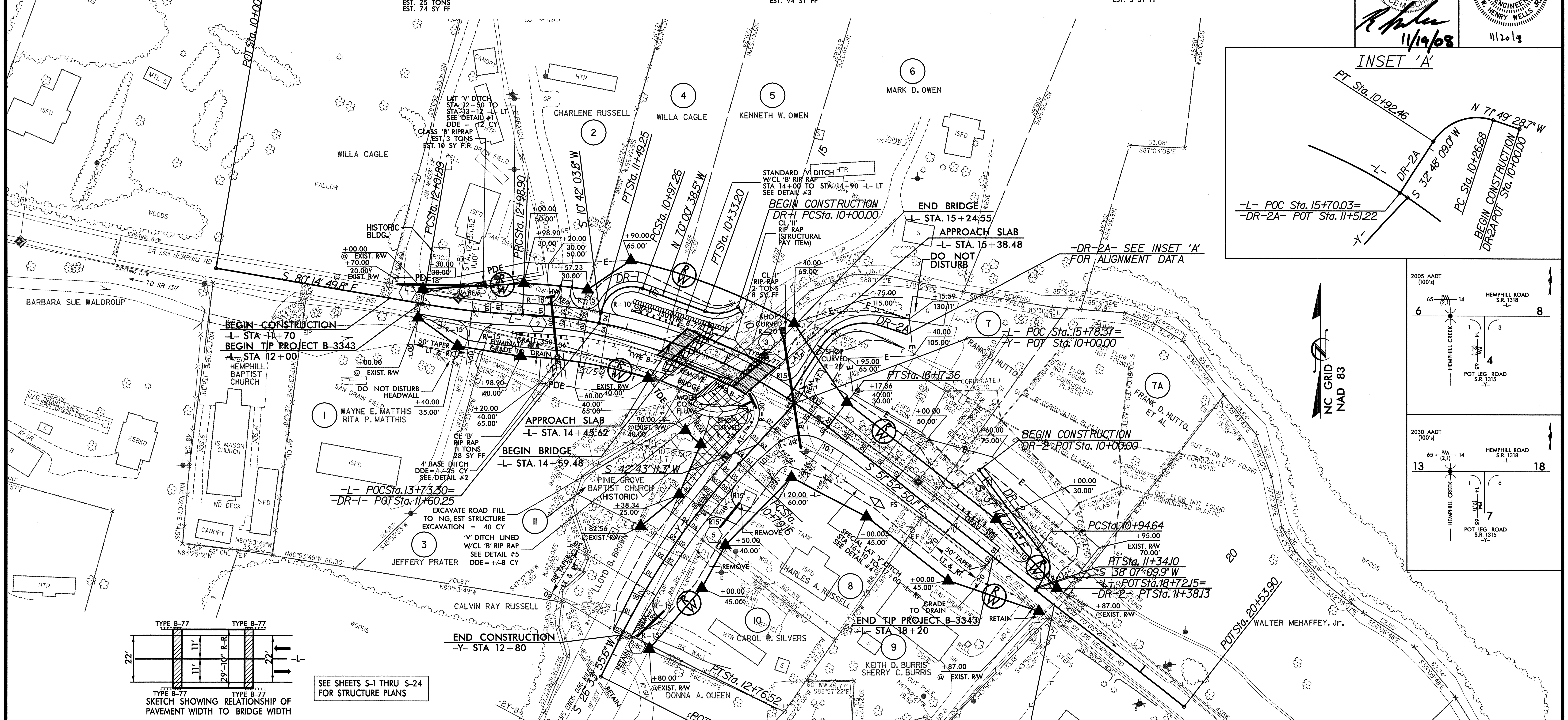
DETAIL #1 — LATERAL 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft. Max. d= 1.0 Ft. b= 5.0 Ft.
FROM STA. 12+50 TO STA. 13+12 -L- LT
Type of Liner= Class B Rip-Rap
EST. 25 TONS
EST. 74 SY FF

DETAIL #2 — LATERAL BASE DITCH (Not to Scale)
Min. D= 1.0 Ft. B= 4.0 Ft.
FROM STA. 13+36 TO STA. 13+42 -L- LT

DETAIL #3 — STANDARD 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft. Max. d= 1.0 Ft.
FROM STA. 14+00 TO STA. 14+90 -L- LT
Type of Liner= Class B Rip-Rap
EST. 32 TONS
EST. 94 SY FF

DETAIL #4 — SPECIAL LATERAL 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft.
FROM STA. 16+10 TO STA. 17+00 -L- RT

DETAIL #5 — STANDARD 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft. Max. d= 1.0 Ft.
STA. 15+60 -L- RT
Type of Liner= Class B Rip-Rap
EST. 30 TONS
EST. 5 SY FF



-L- CURVE DATA

PI Sta 12+50.46	PI Sta 14+63.51
Δ = 7° 24' 39.4" (LT)	Δ = 35° 46' 39.2" (RT)
D = 7° 38' 22.0"	D = 11° 14' 04.1"
L = 97.01'	L = 318.46'
T = 48.57'	T = 164.62'
R = 750.00'	R = 510.00'
SE = NC	**SE = 0.04
RO = N/A	**RO = 83

-Y- CURVE DATA

PI Sta 11+78.50
Δ = 16° 09' 15.7" (LT)
D = 8° 11' 06.4"
L = 197.36'
T = 99.34'
R = 700.00'
SE = 0.057
RO = 118

-DR-1- CURVE DATA

PI Sta 10+17.97	PI Sta 11+32.56
Δ = 54° 20' 35.2" (RT)	Δ = 99° 17' 17.7" (LT)
D = 163° 42' 08.0"	D = 190° 59' 09.4"
L = 33.20'	L = 51.99'
T = 17.97'	T = 35.30'
R = 35.00'	R = 30.00'

-DR-2- CURVE DATA

PI Sta 11+17.81
Δ = 75° 21' 32.5" (RT)
D = 190° 59' 09.4"
L = 39.46'
T = 23.17'
R = 30.00'

-DR-2A- CURVE DATA

PI Sta 10+65.31
Δ = 114° 35' 29.6" ... Δ = 75° 22' 22.3" (LT)
D = 114° 35' 29.6"
L = 65.78'
T = 38.63'
R = 50.00'

**DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE

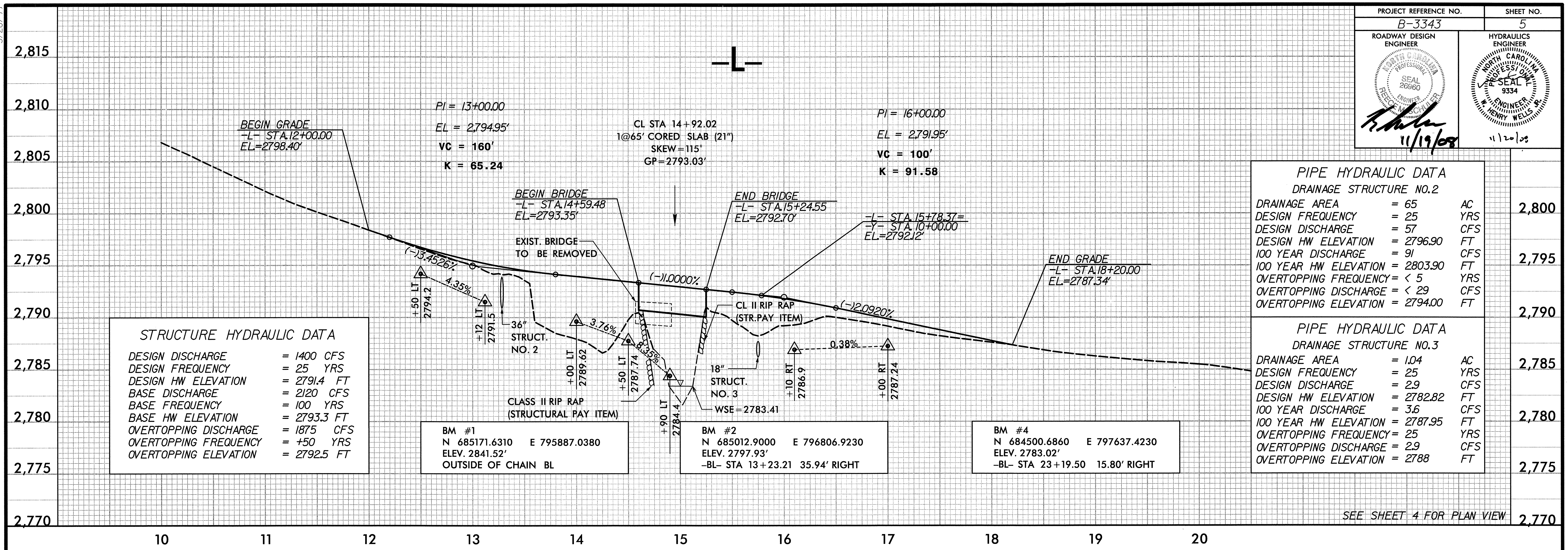
NOTE:
TEMPORARY SHORING REQUIRED FOR MAINTENANCE OF TRAFFIC:
-L- STA 14+50+/- TO 14+70+/-, 13.4' +/- RT.
-L- STA 15+10+/- TO 15+30+/-, 13.4' +/- RT.
SEE TRAFFIC CONTROL PLANS FOR SHORING REQUIREMENTS.

SEE SHEET 5 FOR PROFILES

REVISIONS

8/17/99

-L-



2,815
2,810
2,805
2,800
2,795
2,790
2,785
2,780
2,775
2,770
BEGIN GRADE
-L- STA.12+00.00
EL=2798.40'
PI = 13+00.00
EL = 2,794.95'
VC = 160'
K = 65.24
CL STA 14+92.02
1@65' CORED SLAB (21")
SKEW=115°
GP=2793.03'
PI = 16+00.00
EL = 2,791.95'
VC = 100'
K = 91.58
BEGIN BRIDGE
-L- STA.14+59.48
EL=2793.35'
END BRIDGE
-L- STA.15+24.55
EL=2792.70'
-L- STA.15+78.37=
-Y- STA.10+00.00
EL=2792.12'
EXIST. BRIDGE
TO BE REMOVED
(-)3.4526%
4.35%
(-)1.0000%
(-)2.0920%
CL II RIP RAP
(STR.PAY ITEM)
END GRADE
-L- STA.18+20.00
EL=2787.34'
+50 LT 2794.2
+12 LT 2791.5
36" STRUCT. NO. 2
3.76%
+00 LT 2789.62
+50 LT 2787.74
8.35%
+90 LT 2784.4
18" STRUCT. NO. 3
WSE=2783.41
+10 RT 2786.9
0.38%
+00 RT 2787.24
CLASS II RIP RAP
(STRUCTURAL PAY ITEM)
10
11
12
13
14
15
16
17
18
19
20

STRUCTURE HYDRAULIC DATA	
DESIGN DISCHARGE	= 1400 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2791.4 FT
BASE DISCHARGE	= 2120 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2793.3 FT
OVERTOPPING DISCHARGE	= 1875 CFS
OVERTOPPING FREQUENCY	= +50 YRS
OVERTOPPING ELEVATION	= 2792.5 FT

BM #1
N 685171.6310 E 795887.0380
ELEV. 2841.52'
OUTSIDE OF CHAIN BL

BM #2
N 685012.9000 E 796806.9230
ELEV. 2797.93'
-BL- STA 13+23.21 35.94' RIGHT

BM #4
N 684500.6860 E 797637.4230
ELEV. 2783.02'
-BL- STA 23+19.50 15.80' RIGHT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2

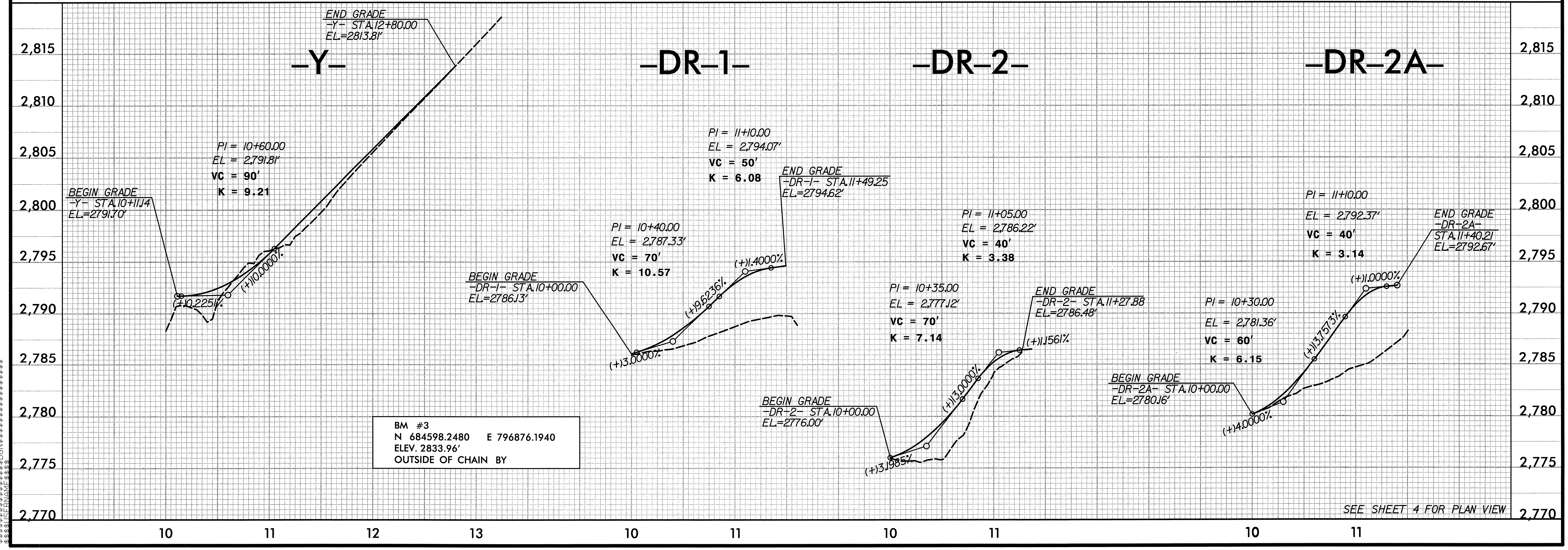
DRAINAGE AREA	= 65	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 57	CFS
DESIGN HW ELEVATION	= 2796.90	FT
100 YEAR DISCHARGE	= 91	CFS
100 YEAR HW ELEVATION	= 2803.90	FT
OVERTOPPING FREQUENCY	= < 5	YRS
OVERTOPPING DISCHARGE	= < 29	CFS
OVERTOPPING ELEVATION	= 2794.00	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 3

DRAINAGE AREA	= 1.04	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 2.9	CFS
DESIGN HW ELEVATION	= 2782.82	FT
100 YEAR DISCHARGE	= 3.6	CFS
100 YEAR HW ELEVATION	= 2787.95	FT
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING DISCHARGE	= 2.9	CFS
OVERTOPPING ELEVATION	= 2788	FT

SEE SHEET 4 FOR PLAN VIEW

-Y- -DR-1- -DR-2- -DR-2A-



2,815
2,810
2,805
2,800
2,795
2,790
2,785
2,780
2,775
2,770
END GRADE
-Y- STA.12+80.00
EL=2813.81'
PI = 10+60.00
EL = 2,791.81'
VC = 90'
K = 9.21
BEGIN GRADE
-Y- STA.10+11.14
EL=2791.70'
(+)0.2251%
(+)10.0000%
PI = 11+10.00
EL = 2,794.07'
VC = 50'
K = 6.08
END GRADE
-DR-1- STA.11+49.25
EL=2794.62'
PI = 10+40.00
EL = 2,787.33'
VC = 70'
K = 10.57
BEGIN GRADE
-DR-1- STA.10+00.00
EL=2786.13'
(+)3.0000%
(+)9.6236%
(+)1.4000%
PI = 11+05.00
EL = 2,786.22'
VC = 40'
K = 3.38
PI = 10+35.00
EL = 2,777.12'
VC = 70'
K = 7.14
END GRADE
-DR-2- STA.11+27.88
EL=2786.48'
(+)1.1561%
(+)13.0000%
BEGIN GRADE
-DR-2- STA.10+00.00
EL=2776.00'
(+)3.1985%
PI = 11+10.00
EL = 2,792.37'
VC = 40'
K = 3.14
END GRADE
-DR-2A-
STA.11+40.21
EL=2792.67'
(+)1.0000%
(+)13.7573%
PI = 10+30.00
EL = 2,781.36'
VC = 60'
K = 6.15
BEGIN GRADE
-DR-2A- STA.10+00.00
EL=2780.16'
(+)4.0000%
10
11
12
13
10
11
10
11
10
11

BM #3
N 684598.2480 E 796876.1940
ELEV. 2833.96'
OUTSIDE OF CHAIN BY

SEE SHEET 4 FOR PLAN VIEW