

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

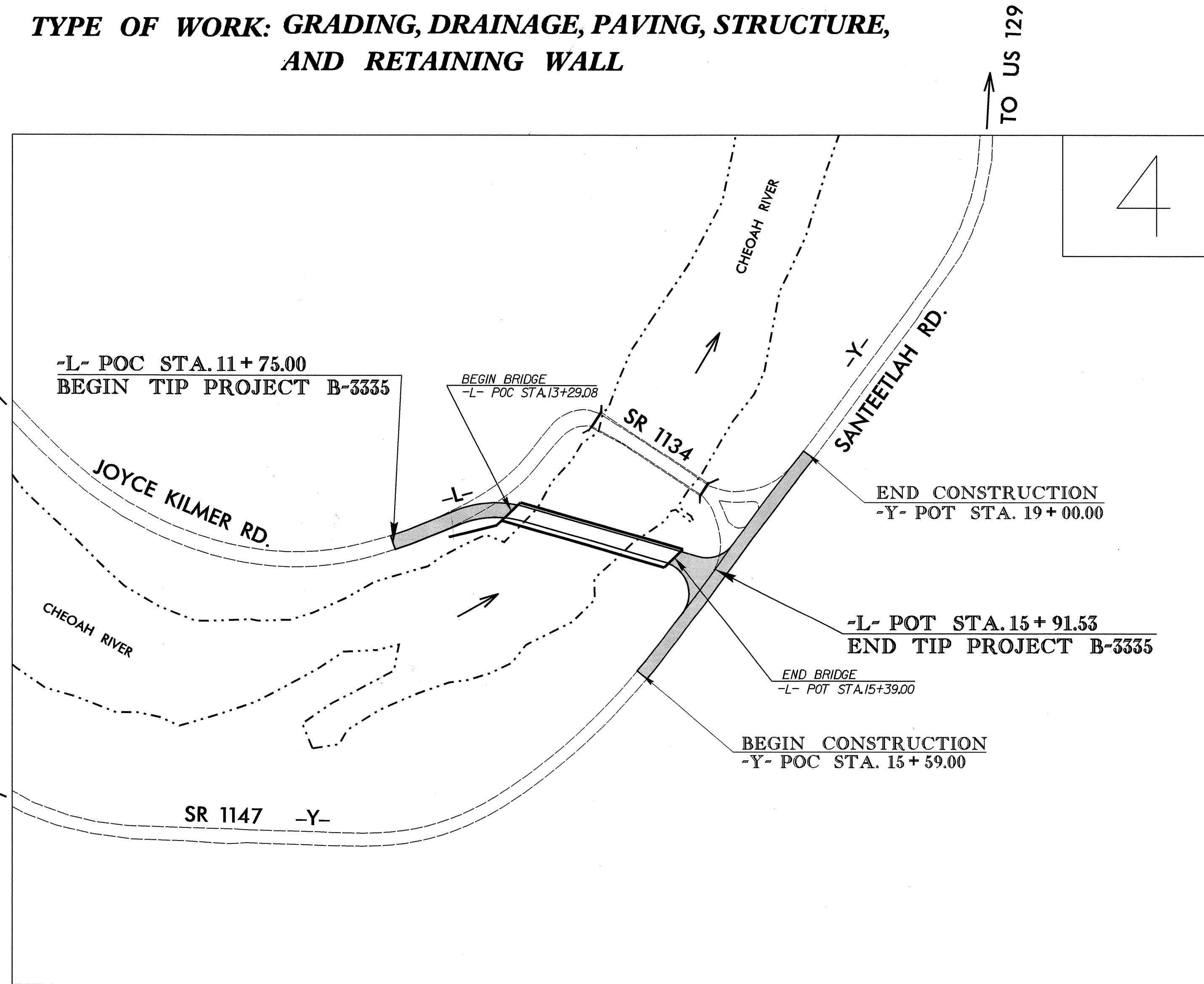
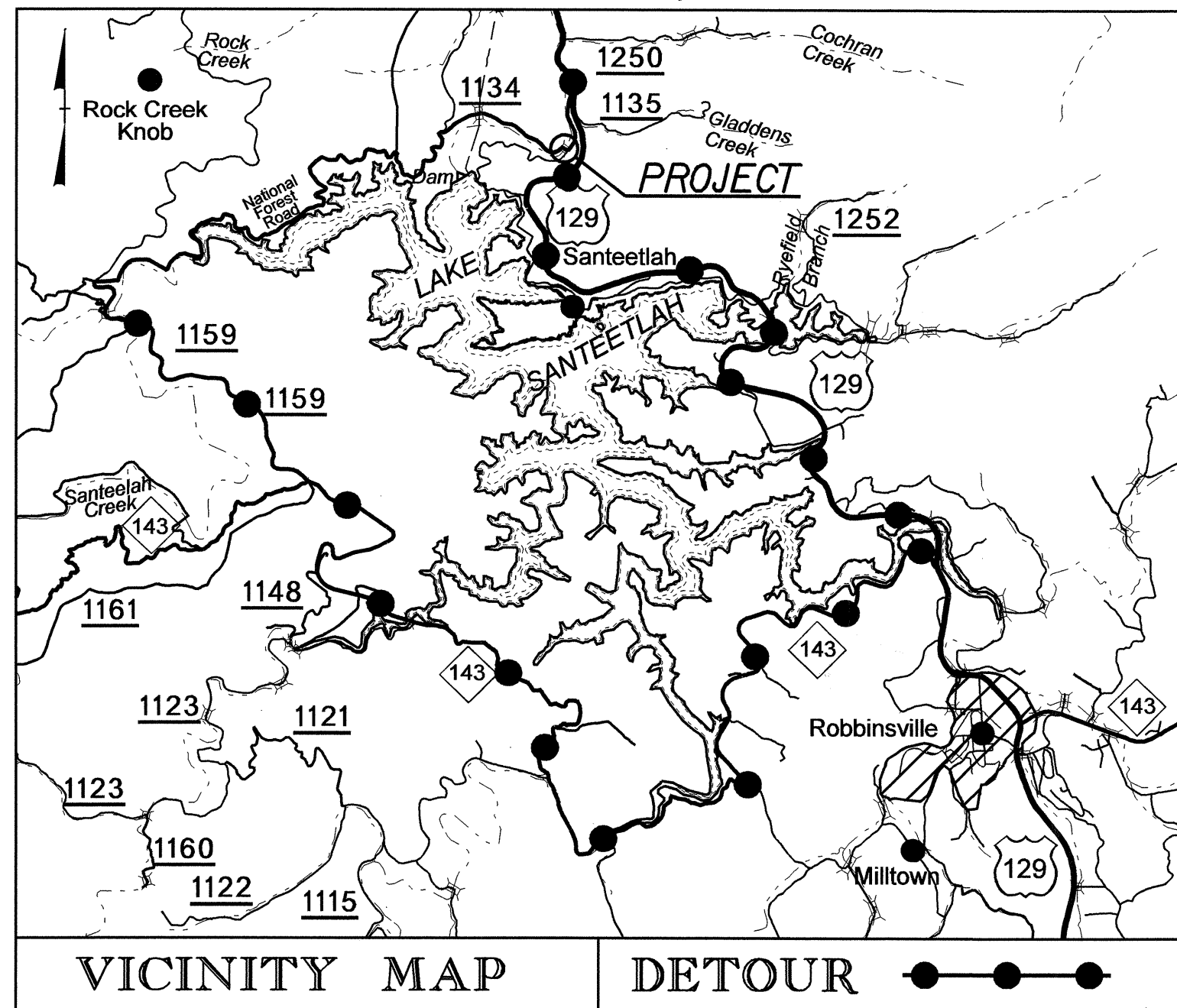
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3335	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32998.1.2	BRZ-1134(1)	PE	
32998.3.1	BRZ-1134(2)	ROW & UTIL.	
32998.2.2	BRZ-1134(4)	CONST.	

GRAHAM COUNTY

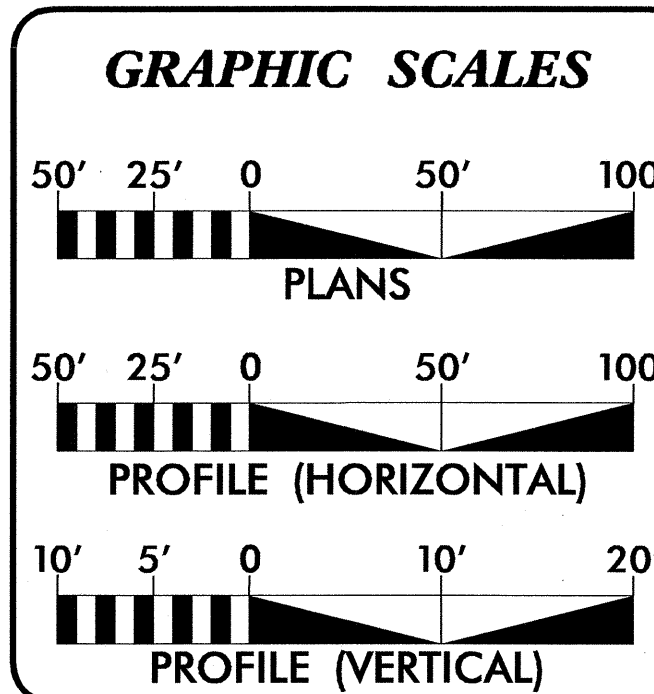
LOCATION: BRIDGE NO. 70 OVER CHEOAH RIVER ON SR 1134

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

TIP PROJECT: B-3335



CONTRACT: C202428



DESIGN DATA

ADT 2010 =	175
ADT 2030 =	250
DHV =	20 %
D =	65 %
T =	3 % *
V =	20 MPH
FUNC CLASS =	LOCAL
* TTST 1 % DUAL 2 %	
SUBREGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3335 =	0.039 MI.
LENGTH STRUCTURE TIP PROJECT B-3335 =	0.040 MI.
TOTAL LENGTH OF TIP PROJECT B-3335 =	0.079 MI.

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 10, 2009

LETTING DATE:
JUNE 15, 2010

ROGER THOMAS, PE
PROJECT ENGINEER

MICHAEL LITTLE, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

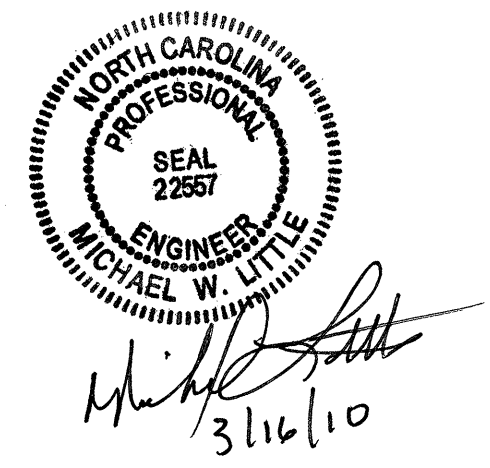
ROADWAY DESIGN ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

05-MAR-2010 13:30
r:\roadway\proj\b3335_rdy_tsh.dgn
\$\$\$\$\$USERNAME\$\$\$\$\$

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS



INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES AND LIST OF STANDARD DRAWINGS
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2	TYPICAL SECTIONS
2-A THRU 2-B	DETAIL FOR METHOD OF PIPE INSTALLATION
2-C	DETAIL FOR ANCHORAGE FOR FRAMES
2-D	DETAIL FOR TYPE III - SHOP CURVED STRUCTURE ANCHOR UNIT
2-E	DETAIL FOR BRIDGE APPROACH FILLS - NO APPROACH SLABS - SUBREGIONAL TIER
3	SUMMARY OF QUANTITIES
3-A	LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER) SUMMARY OF EARTHWORK
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4	PLAN SHEET
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SD-1	SIGN DESIGN SHEET
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION SHEET
SIGN-1 THRU SIGN-4	SIGNING PLANS
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UD-1 THRU UD-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
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S-1 THRU S-22	STRUCTURE PLANS

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

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

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

SUPERELEVATION:
ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

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

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 WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

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 DUKE ENERGY, VERIZON
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
EFF. 07-18-06
REV. 01-02-07

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 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
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

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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	○ EP
Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	②③
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

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	○
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	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	-----
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	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite Marker	-----
Existing Control of Access	-----
Proposed Control of Access	-----
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 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 Wheel Chair Ramp	----- WCR
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	-----

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	----- PH
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	-----
Telephone Cell Tower	-----
U/G Telephone Cable Hand Hole	----- PH
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	-----
Water Meter	-----
Water Valve	-----
Water Hydrant	-----
Recorded U/G Water Line	----- W
Designated U/G Water Line (S.U.E.*)	----- W
Above Ground Water Line	----- A/G Water

TV:

TV Satellite Dish	-----
TV Pedestal	-----
TV Tower	-----
U/G TV Cable Hand Hole	----- PH
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	-----
Utility Unknown U/G Line	----- TUTL
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.

SURVEY CONTROL SHEET B-3335

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL1	BL-1	629455.1070	549854.5090	1737.53	OUTSIDE PROJECT LIMITS	
BL2	BL-2	629142.5460	550189.9070	1734.40	OUTSIDE PROJECT LIMITS	
BL3	BL-3	629082.5560	550458.0230	1731.72	11+11.57	25.18 RT
BL4	BL-4	629263.0690	550741.8740	1732.60	13+77.75	117.99 LT
BL5	BL-5	629136.9870	550982.8170	1742.95	OUTSIDE PROJECT LIMITS	
BY POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
BY6	BY-6	628772.1430	550402.5700	1766.62	10+68.05	12.89 LT
BY7	BY-7	628770.6350	550626.1610	1760.23	12+88.31	19.23 RT
BY8	BY-8	628959.7410	550851.2960	1748.74	15+75.40	21.17 RT
55	BL-5	629136.9870	550982.8170	1742.95	17+95.24	20.01 RT
BY9	BY-9	629393.0120	551133.0040	1743.11	20+90.27	12.49 LT

**NCDOT GPS STATION B-3335 GPS-102
LOCALIZED PROJECT COORDINATES**
 N = 630,362.1850
 E = 548,243.7920
 ELEV. = 1,749.65'

**NCDOT BASELINE STATION B-3335 BL-1
LOCALIZED PROJECT COORDINATES**
 N = 629,455.1070
 E = 549,854.5090
 ELEV. = 1,737.53'

**NCDOT BM-1
1,736.73'**

**BEGIN TIP PROJECT B-3335
-L- STA. 11+75.00**

**NCDOT BASELINE STATION B-3335 BL-4
LOCALIZED PROJECT COORDINATES**
 N = 629,263.0690
 E = 550,741.8740
 ELEV. = 1,732.60'

**NCDOT BM-2
1,733.88'**

**NCDOT BASELINE STATION B-3335 BY-9
LOCALIZED PROJECT COORDINATES**
 N = 629,393.0120
 E = 551,133.0040
 ELEV. = 1,743.11'

 BM1 ELEVATION = 1736.73
 N 629435 E 549867
 L STATION 10+00
 S 55°24'43" E DIST. 578.01'
 8" SPIKE IN BASE OF WHITE OAK TREE

 BM2 ELEVATION = 1733.88
 N 629287 E 550773
 L STATION 14+02 149 LEFT
 CHISELED "X" ON CONC. HW

 BM3 ELEVATION = 1767.59
 N 628737 E 550568
 Y STATION 12+27 31 RIGHT
 8" SPIKE IN BASE OF POPLAR TREE

 BM4 ELEVATION = 1743.08
 N 629398 E 551127
 Y STATION 20+91 20 LEFT
 8" SPIKE IN BASE OF SYCAMORE TREE

**NCDOT BASELINE STATION B-3335 BL-2
LOCALIZED PROJECT COORDINATES**
 N = 629,142.5460
 E = 550,189.9070
 ELEV. = 1,734.40'

**NCDOT BASELINE STATION B-3335 BL-3
LOCALIZED PROJECT COORDINATES**
 N = 629,082.5560
 E = 550,458.0230
 ELEV. = 1,731.72'

**NCDOT BASELINE STATION B-3335 BL-5
LOCALIZED PROJECT COORDINATES**
 N = 629,136.9870
 E = 550,982.8170
 ELEV. = 1,742.95'

**-L- STA. 15+91.53
END TIP PROJECT B-3335**

**NCDOT BASELINE STATION B-3335 BY-7
LOCALIZED PROJECT COORDINATES**
 N = 628,770.6350
 E = 550,626.1610
 ELEV. = 1,760.23'

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTP://WWW.NCDOT.ORG/DOH/RECONSTRUCT/HIGHWAYLOCATION/PROJECT/](http://www.ncdot.org/DOH/RECONSTRUCT/HIGHWAYLOCATION/PROJECT/)

THE FILES TO BE FOUND ARE AS FOLLOWS:
 B3335_LS_CONTROL.TXT

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

⊕ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
 PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
 NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3335 GPS-102" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 630362.1850(±) EASTING: 548243.7920(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999796059 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3335 GPS-102" TO -L- STATION 11+75.00 IS S 61°22'47" E 2588.13'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
 VERTICAL DATUM USED IS NAVD 88

**NCDOT BASELINE STATION B-3335 BY-6
LOCALIZED PROJECT COORDINATES**
 N = 628,772.1430
 E = 550,402.5700
 ELEV. = 1,766.62'

NOTE: DRAWING NOT TO SCALE

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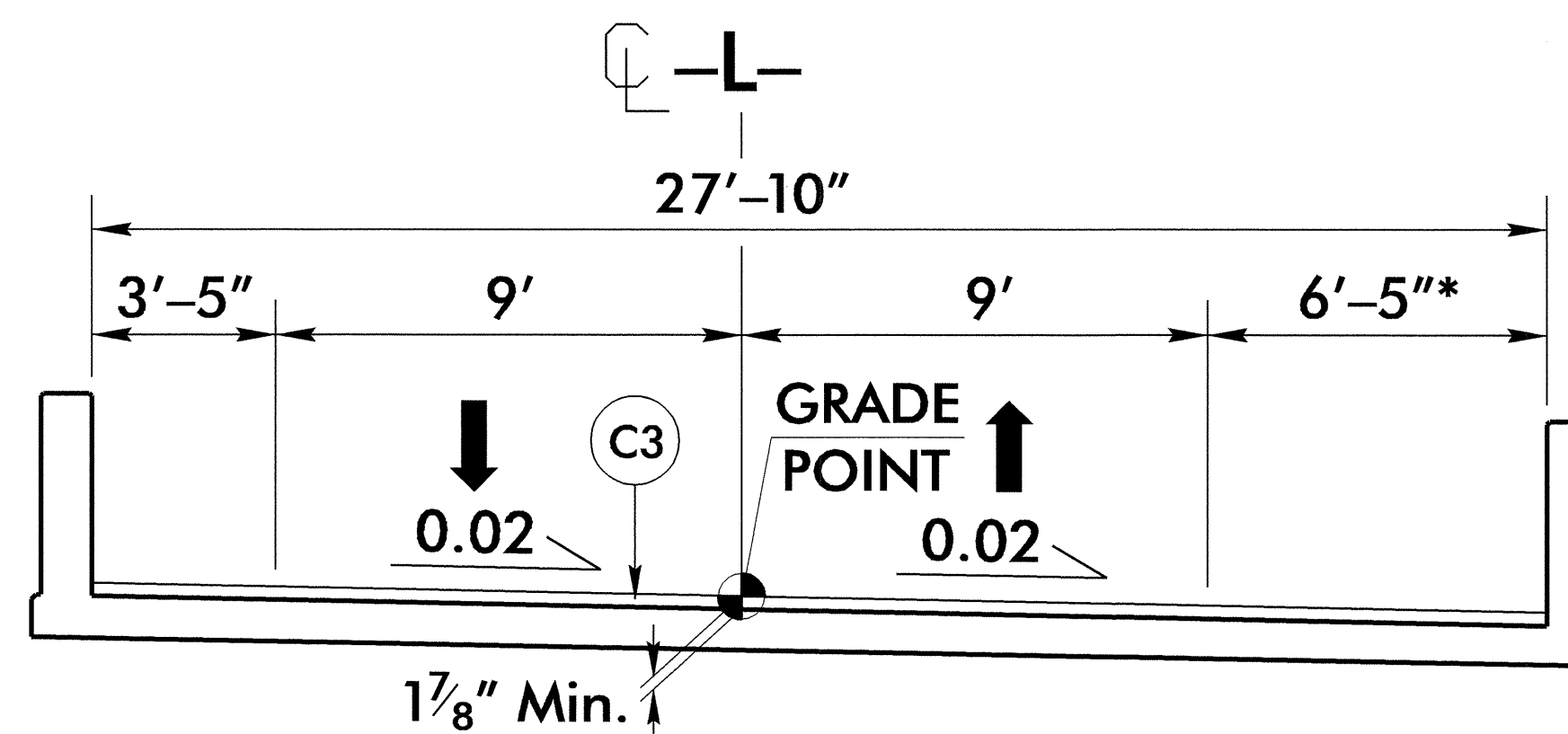
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PAVEMENT SCHEDULE

C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. IN EACH OF 2 LAYERS
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF 2 LAYERS
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
J1	8" AGGREGATE BASE COURSE
P	PRIME COAT
T	EARTH MATERIAL

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

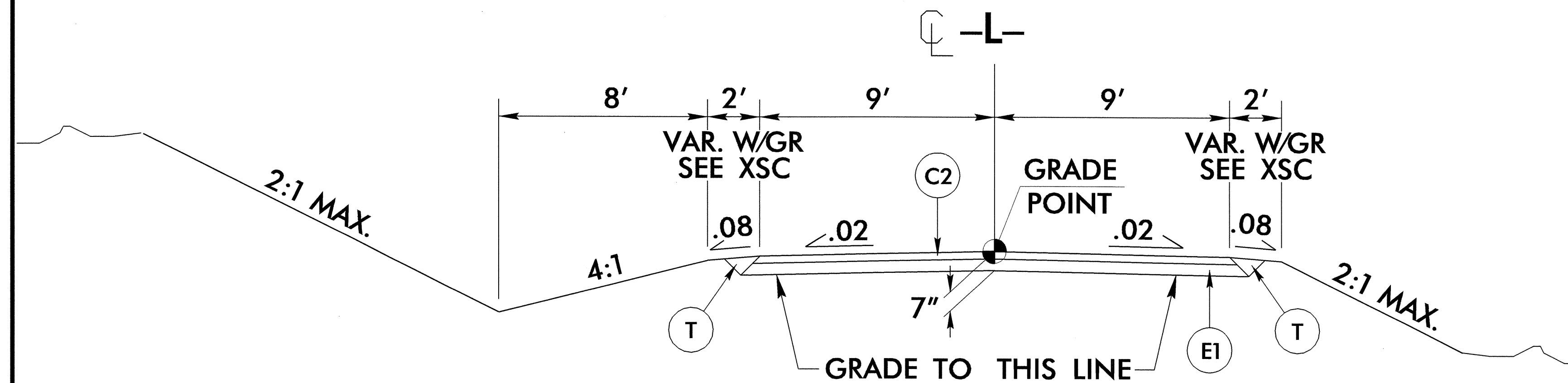
PROJECT REFERENCE NO. B-3335	SHEET NO. 2
ROADWAY DESIGN ENGINEER MICHAEL W. LITTLE SEAL 22557 3/16/10	PAVEMENT DESIGN ENGINEER CLARK S. MORRISON SEAL 22898 3/16/10



DETAIL SHOWING ASPHALT WEARING SURFACE ON CORED SLAB BRIDGE

-L- STA. 13+29.00 TO -L- STA. 15+39.00

* ADDITIONAL WIDTH REQUIRED TO OBTAIN MINIMUM HORIZONTAL CLEARANCE ON WEST END OF PROPOSED STRUCTURE.



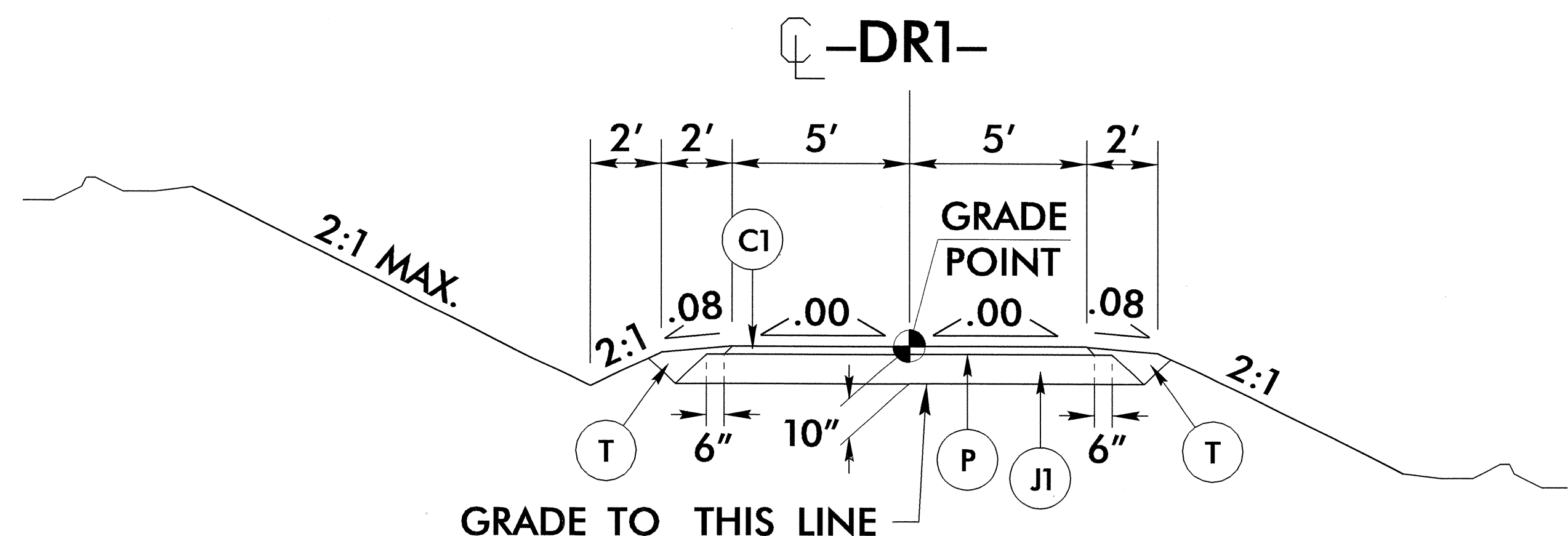
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

-L- STA. 12+00.00 TO -L- STA. 13+29.08 (BEGIN BRIDGE)
-L- STA. 15+39.00 (END BRIDGE) TO -L- STA. 15+91.53

NOTE:

TRANSITION FROM EXISTING TO T. S. NO.1
-L- STA. 11+75.00 TO -L- STA. 12+00.00



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-DR1- STA. 10+07.80 TO -DR1- STA. 11+60.00

NOTE:

-Y- STA. 15+59.00 TO -Y- STA. 19+00.00
OVERLAY EXISTING PAVEMENT WITH 1½" SF9.5A

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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06

ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION FLEXIBLE PIPE

SHEET 1 OF 3 300D01

GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
 LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

--- SPRINGLINE OF PIPE
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.
 APPROVED SUITABLE LOCAL MATERIAL.
 UNDISTURBED EARTH MATERIAL
 SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06

ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION RIGID PIPE

SHEET 2 OF 3 300D01

GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
 LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

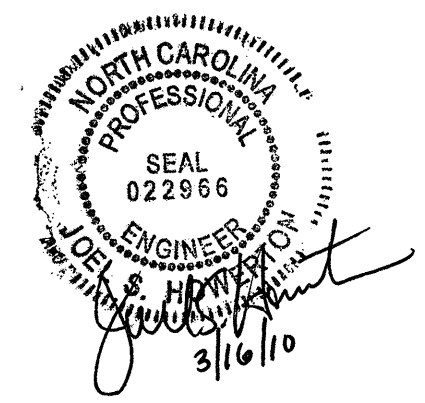
DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

--- SPRINGLINE OF PIPE
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.
 APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.
 UNDISTURBED EARTH MATERIAL
 SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

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

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
 MODIFIED BY: DATE: 7/20/09
 CHECKED BY: DATE: 7/20/09
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STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

FLEXIBLE PIPE

Round Corrugated Steel Pipe 2 2/3 x 1/2 corrugation **				
Diameter (inches)	Minimum cover (inches)	(Ga)	Maximum Height of Cover (feet)	B
12	12	204	14	10
15	12	162	14	10
18	12	135	14	10
21	12	115	14	10
24	12	100	14	10
30	12	79	14	10
36	12	65	14	10
42	12	55	14	10
48	12	48	14	10
54	12	42	14	10
60	12	37	14	10
66	12	32	14	10
72	12	28	14	10
78	12	24	14	10
84	12	21	14	10

Round Corrugated Aluminum Pipe 2 2/3 x 1/2 corrugation **				
Diameter (inches)	Minimum cover (inches)	(Ga)	Maximum Height of Cover (feet)	B
12	12	123	14	10
15	12	98	14	10
18	12	81	14	10
21	12	69	14	10
24	12	60	14	10
27	12	53	14	10
30	12	47	14	10
36	12	36	14	10
42	12	28	14	10
48	12	22	14	10
54	12	18	14	10
60	12	15	14	10
66	12	12	14	10
72	12	10	14	10

- HDPE - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"
 * (Maximum fill) 20' for pipe diameters ≤ 24"
 17' for pipe diameters ≥ 30" and ≤ 60"
- PVC - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 36"
 * (Maximum fill) 30' for pipe diameters ≥ 12" and ≤ 36"

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

- CSP - AASHTO M36
 CAAP - AASHTO M196
 HDPE - AASHTO M294
 PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

- RCP - * (Minimum fill) 1' for Class IV & CLASS V
 2' for Class III & Class II
 * (Maximum fill) 10' - Class II pipe
 20' - Class III pipe
 30' - Class IV pipe
 40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

- RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

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7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION

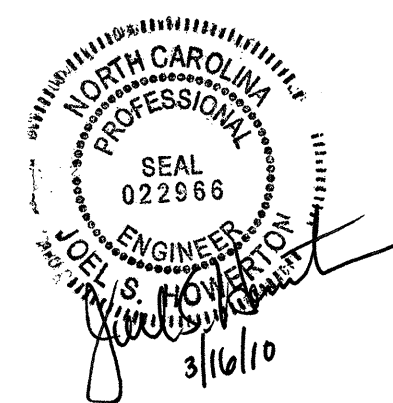
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

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

SEE PLATE FOR TITLE

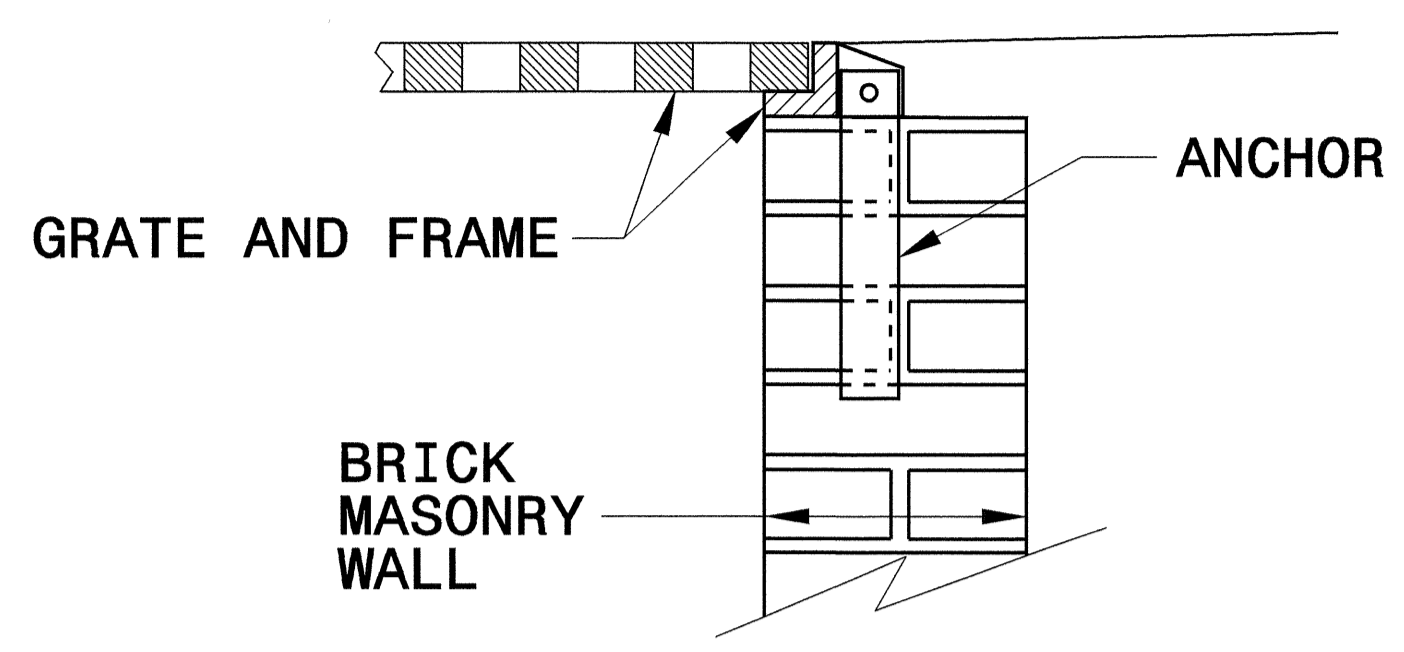
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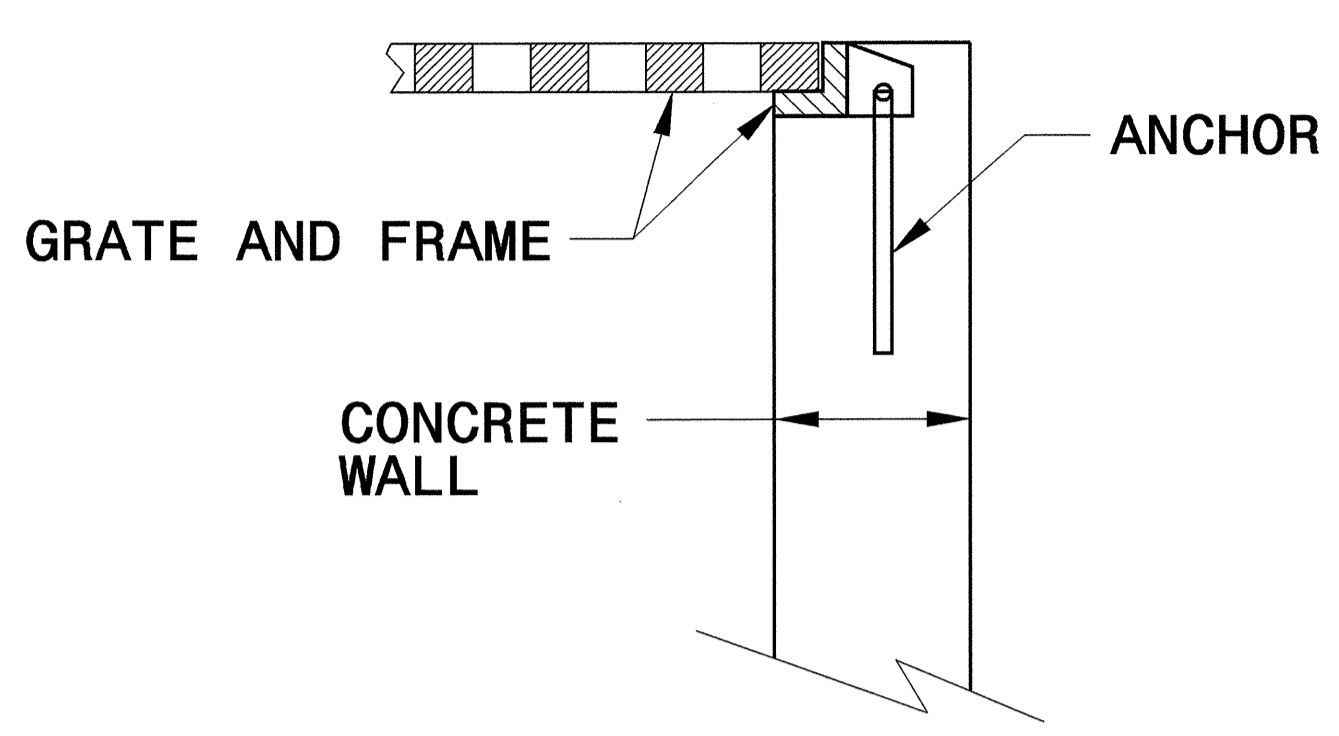
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ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

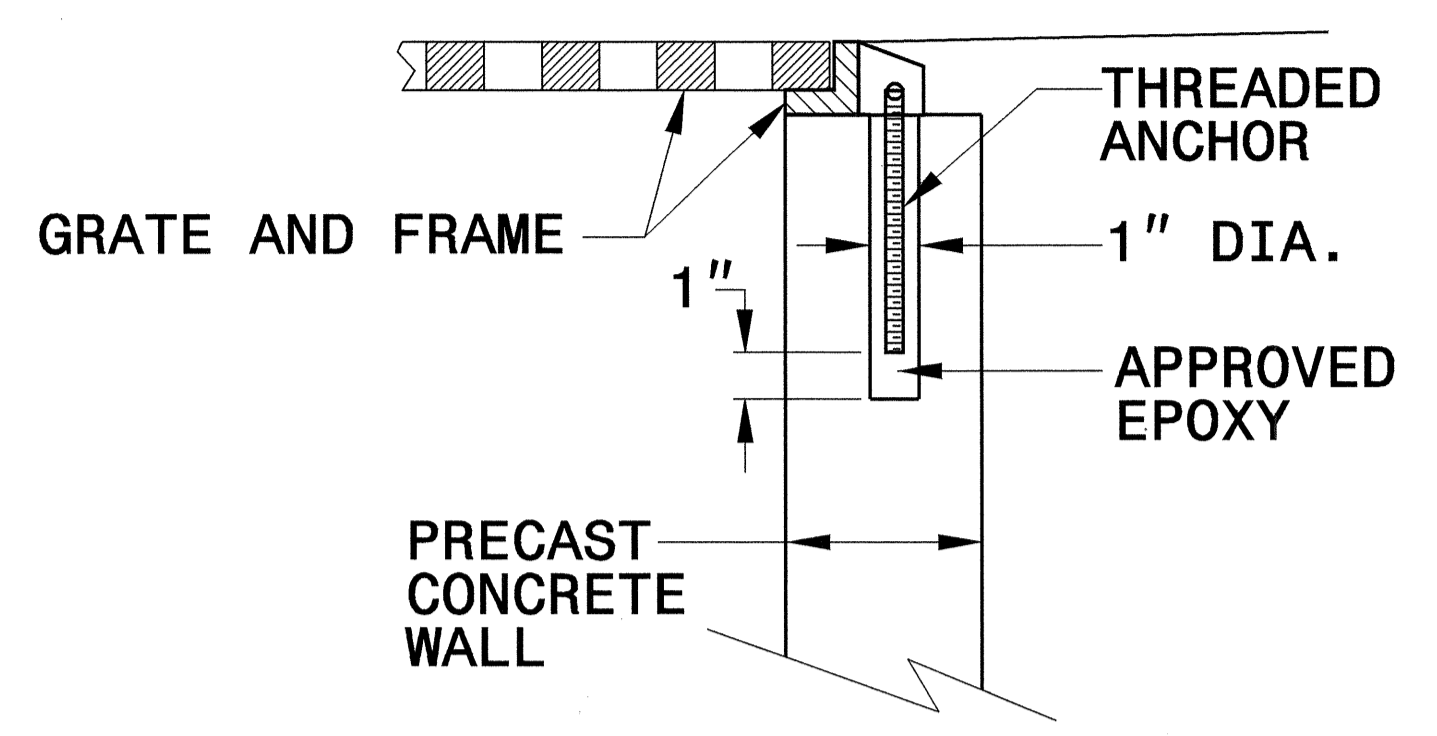
SHEET 1 OF 1
840D25



BRICK MASONRY CONSTRUCTION



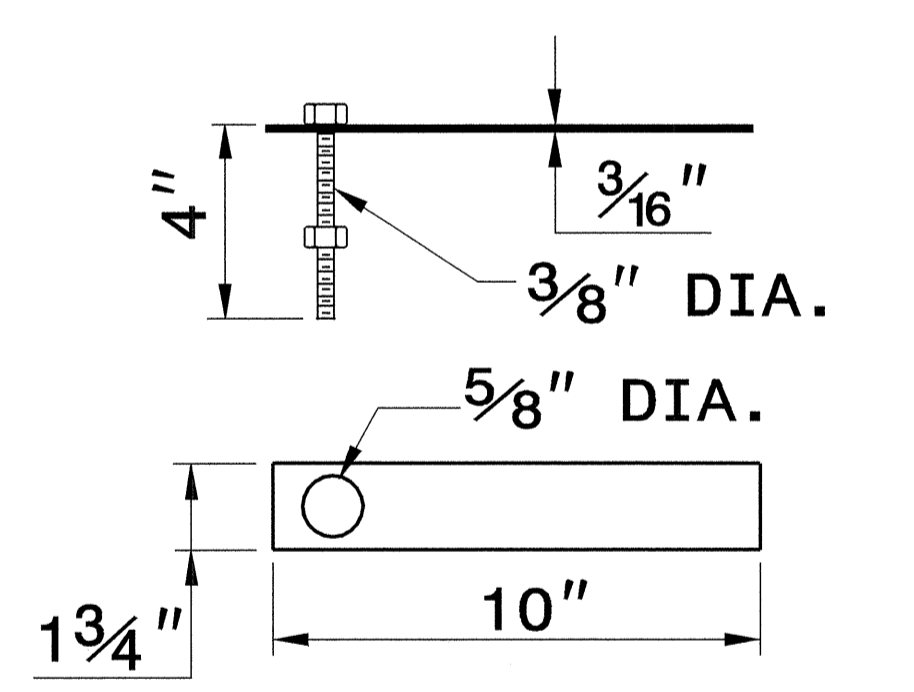
CONCRETE CONSTRUCTION



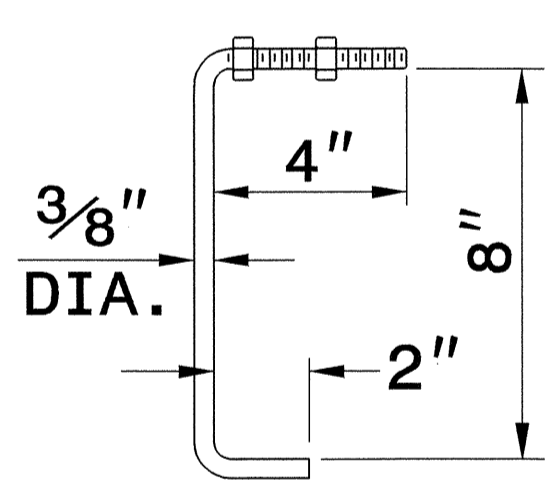
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

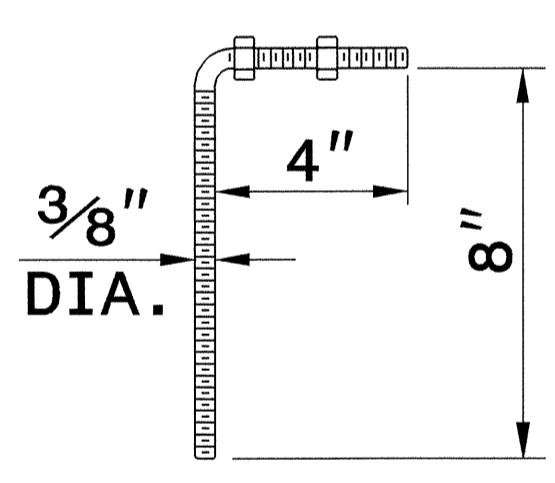
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



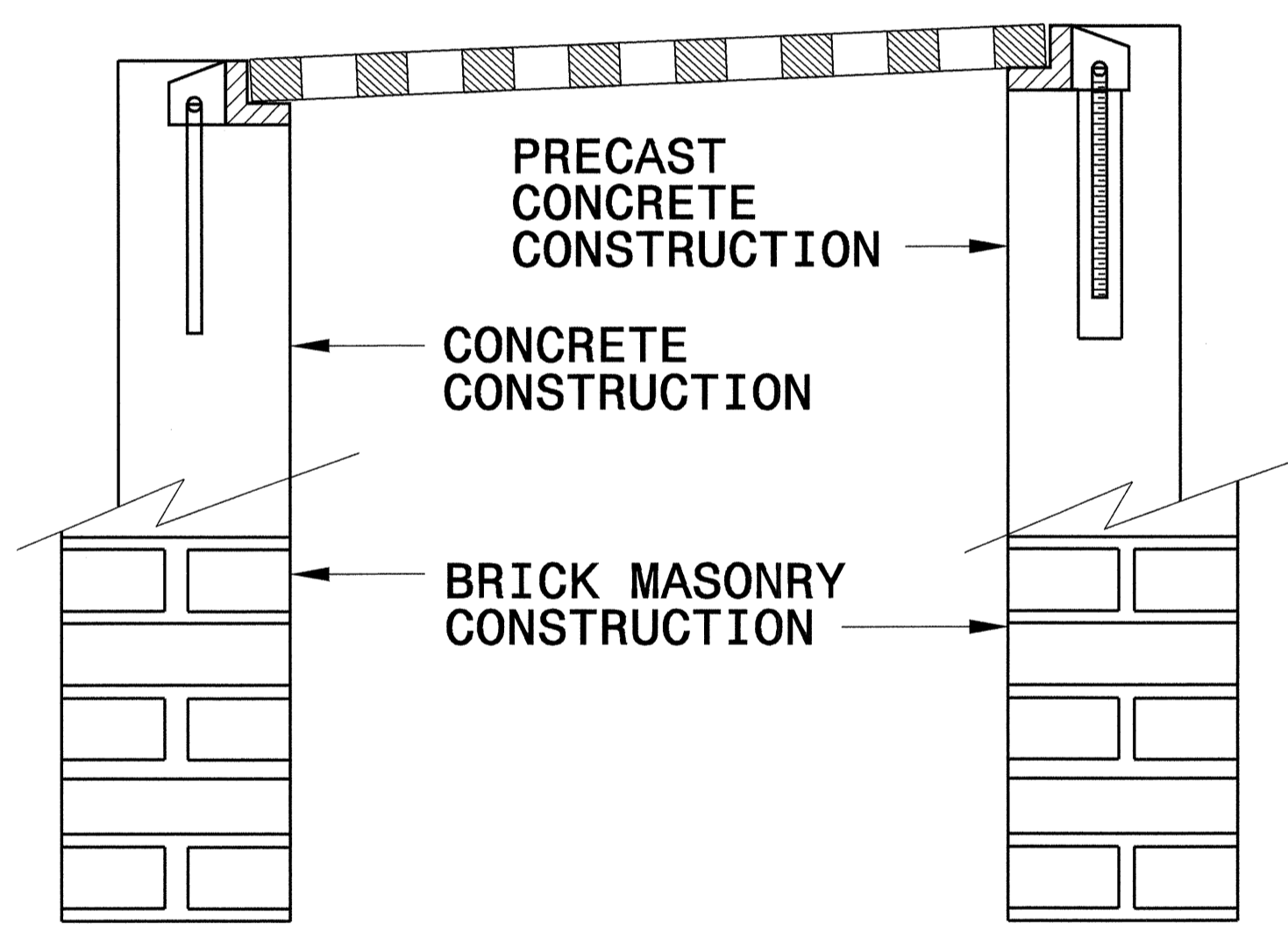
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



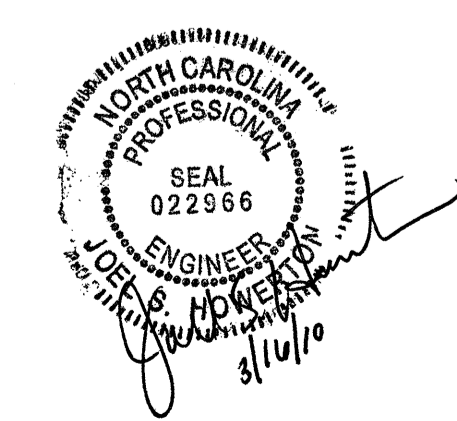
FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

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ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1
840D25

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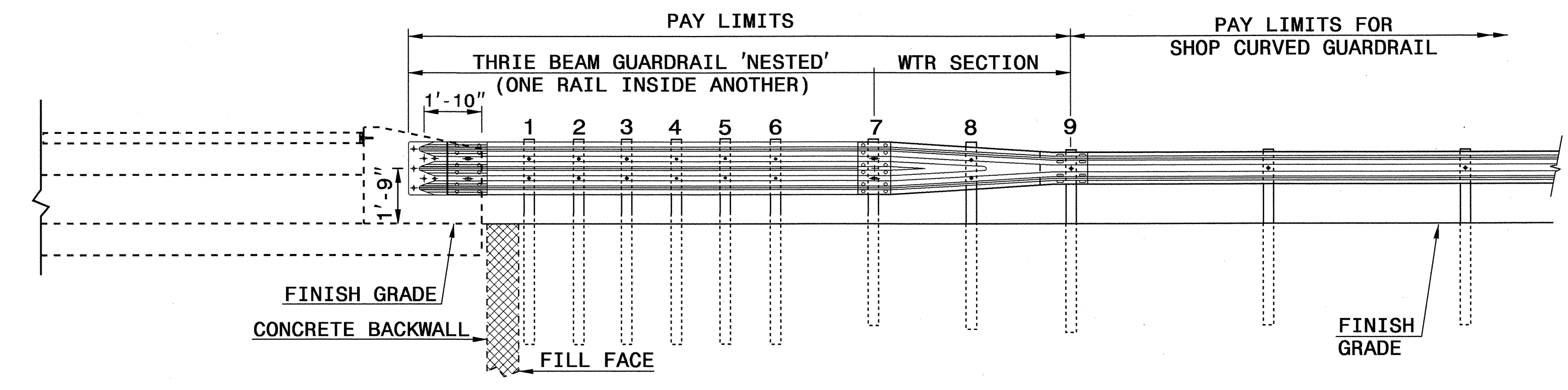
SEE PLATE FOR TITLE

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DIVISION OF HIGHWAYS
RALEIGH, N.C.

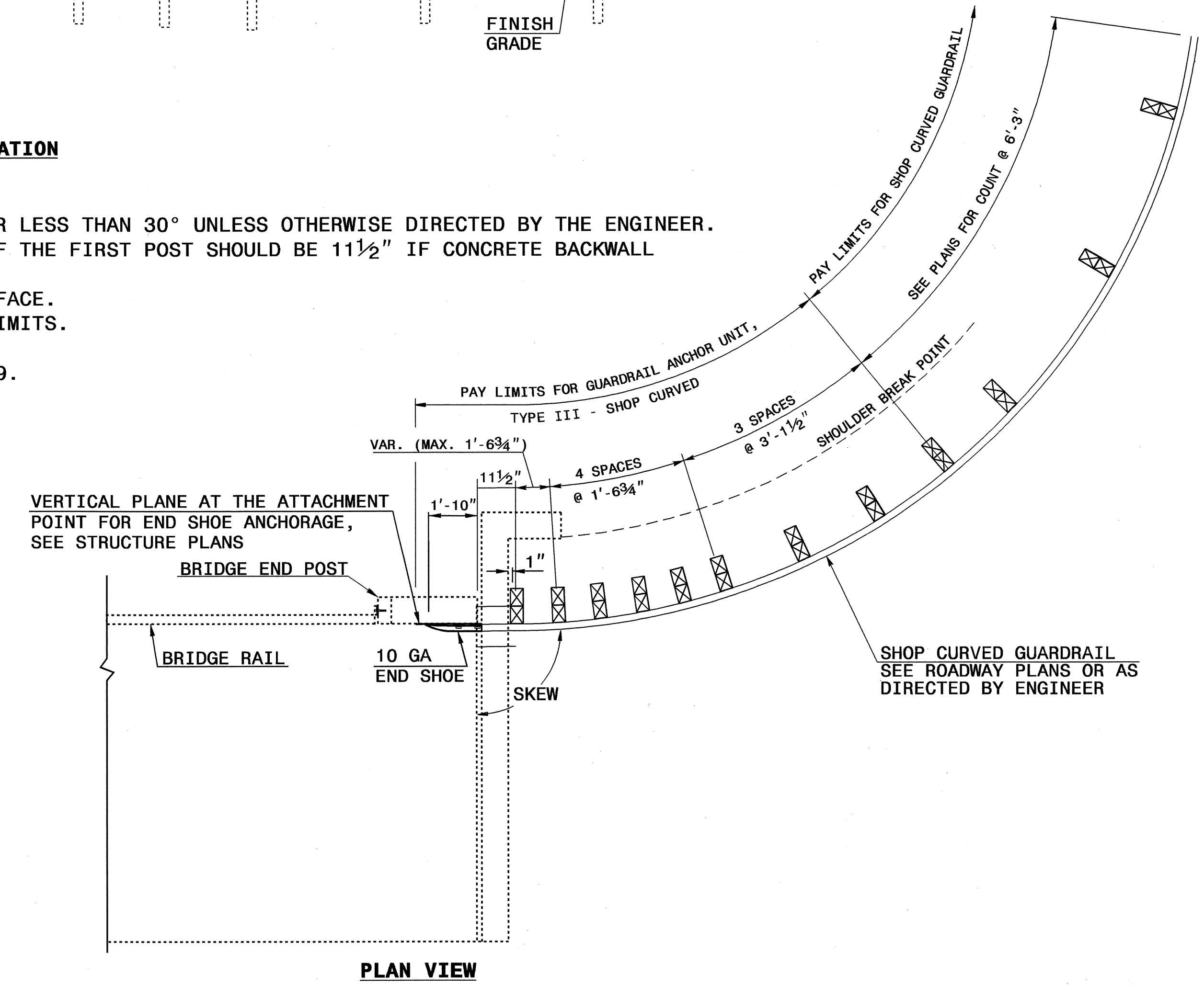
ENGLISH DETAIL DRAWING FOR
TYPE III - SHOP CURVED
STRUCTURE ANCHOR UNIT

SHEET 1 OF 1
TYPE III SC



NOTE:

- **POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- *THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
- MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE.
- USE NO STEEL POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
- LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- SEE STANDARD 862.03 SHEET 4 FOR POST SECTIONS 1 THRU 9.

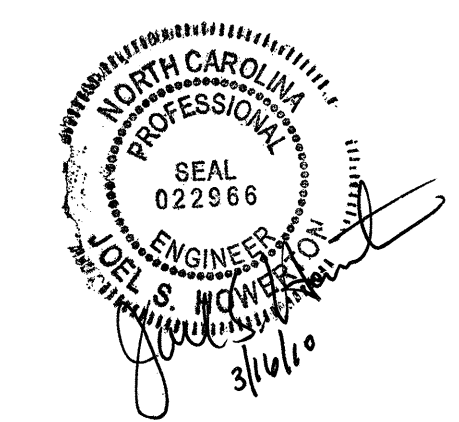


**GUARDRAIL ANCHOR UNIT, TYPE III - SHOP CURVED
FOR ATTACHMENT TO RAIL ON BRIDGE**

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ENGLISH DETAIL DRAWING FOR
TYPE III - SHOP CURVED
STRUCTURE ANCHOR UNIT

SHEET 1 OF 1
TYPE III SC

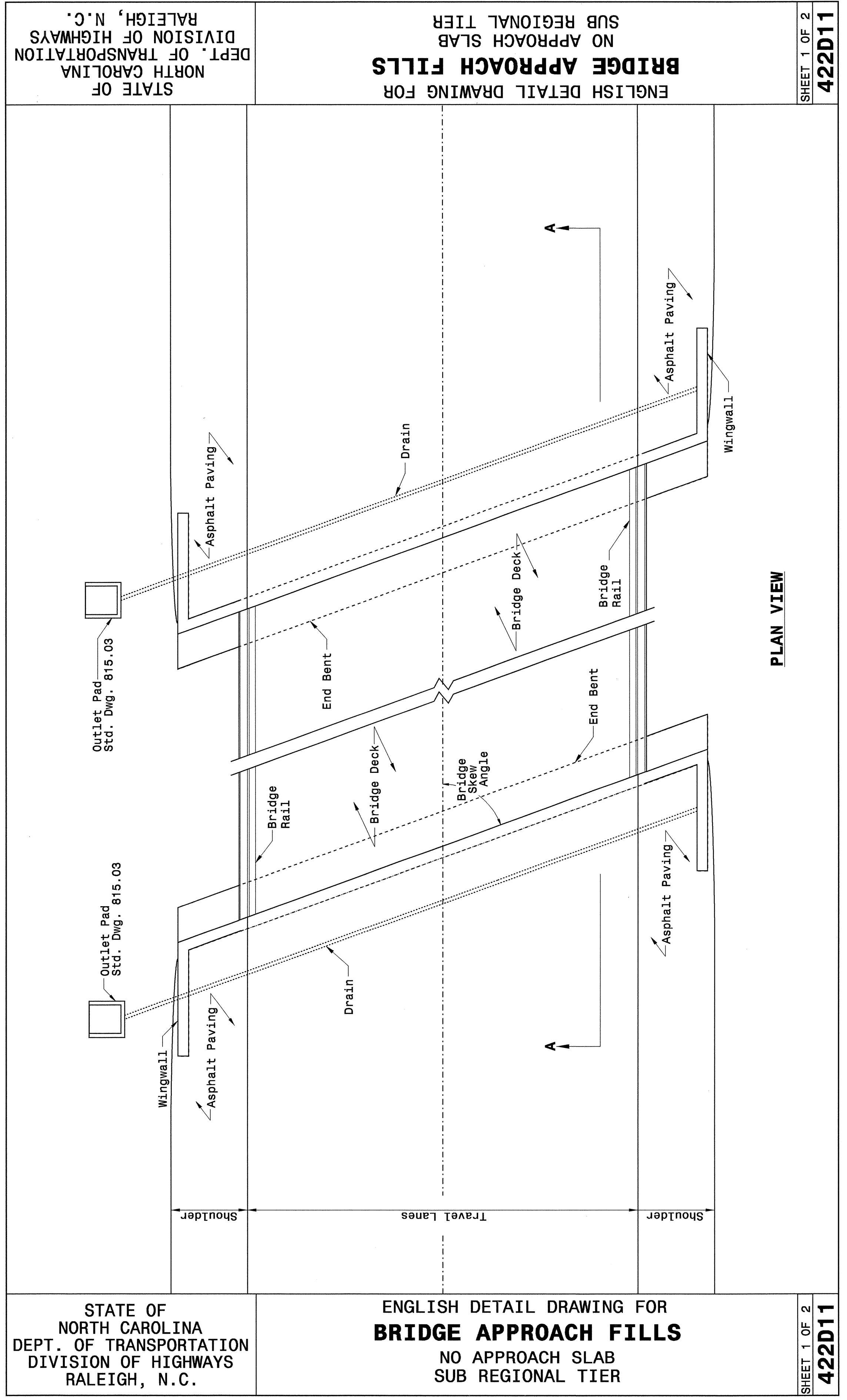


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STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

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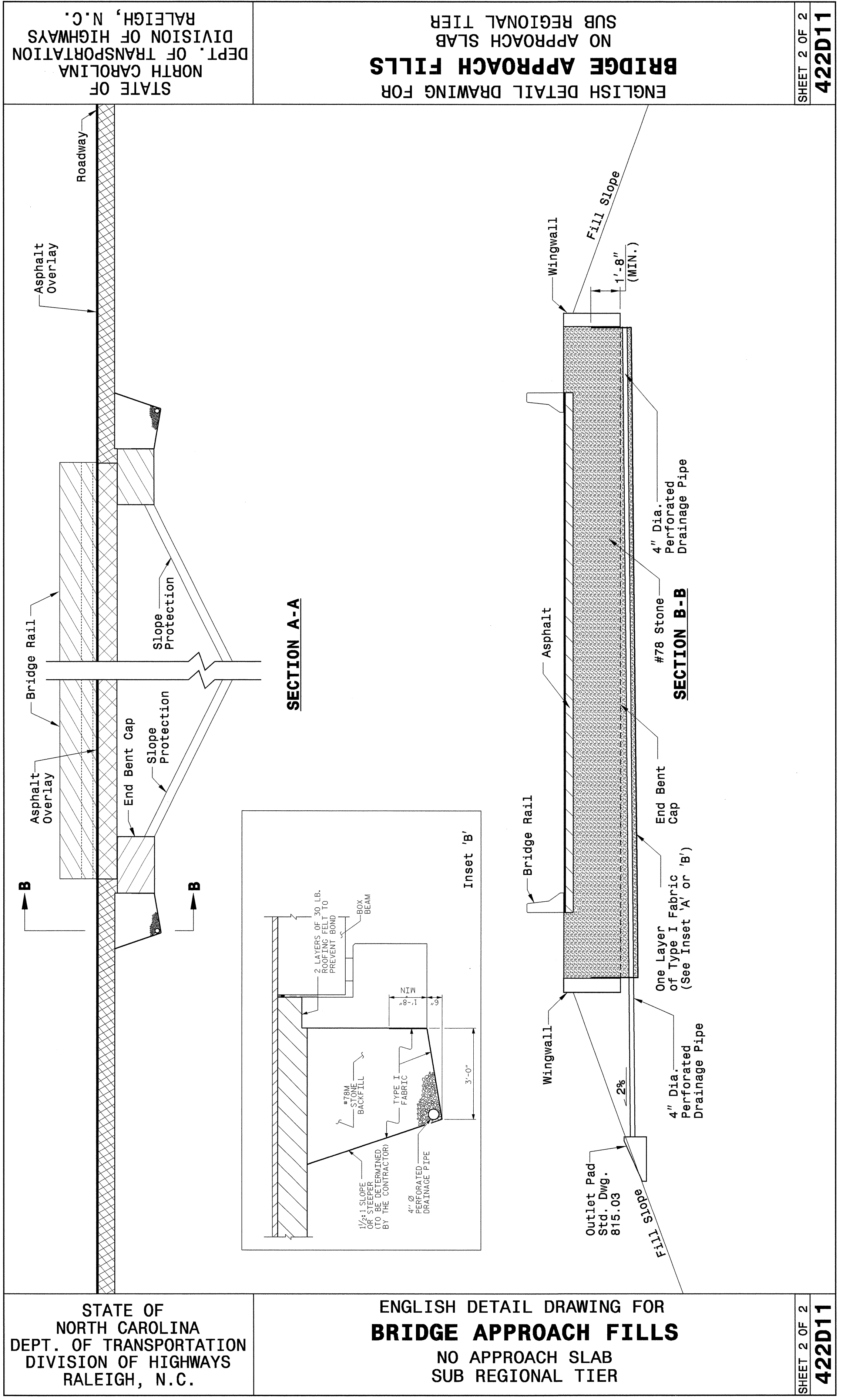
ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
NO APPROACH SLAB
SUB REGIONAL TIER

SHEET 1 OF 2
422D11

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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
NO APPROACH SLAB
SUB REGIONAL TIER

SHEET 1 OF 2
422D11



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

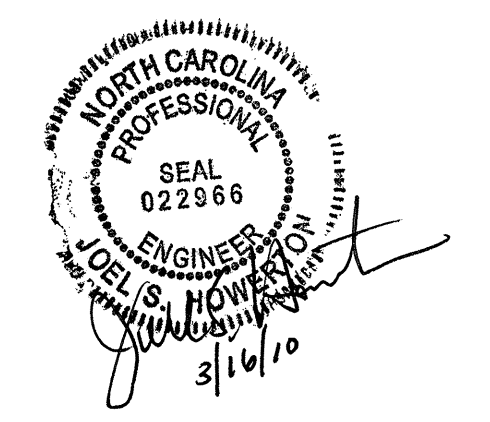
ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
NO APPROACH SLAB
SUB REGIONAL TIER

SHEET 2 OF 2
422D11

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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
NO APPROACH SLAB
SUB REGIONAL TIER

SHEET 2 OF 2
422D11



**PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN**
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BRIDGE APPROACH FILLS
NO APPROACH SLAB
SUB REGIONAL TIER

ORIGINAL BY: K. A. Kempf DATE: 6-10-08
MODIFIED BY: *[Signature]* DATE: *[Blank]*
CHECKED BY: *[Signature]* DATE: 3/13/10
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k Kempf

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202428

ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION
003000000-N	SP	Lump Sum		BRIDGE APPROACH FILL - SUB REGIONAL TIER, STATION ***** (14+34.00)
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING
005700000-E	226	200	CY	UNDERCUT EXCAVATION
006300000-N	SP	Lump Sum		GRADING
010600000-E	230	2,400	CY	BORROW EXCAVATION
013400000-E	240	200	CY	DRAINAGE DITCH EXCAVATION
019600000-E	270	50	SY	FABRIC FOR SOIL STABILIZATION
023400000-E	SP	50	CY	GENERIC GRADING ITEM SELECT GRANULAR MATERIAL
032000000-E	SP	60	SY	FOUNDATION CONDITIONING FABRIC
033000000-E	SP	20	TON	GENERIC DRAINAGE ITEM FOUNDATION CONDITIONING MATERIAL, MINOR STRS
033520000-E	SP	48	LF	15" DRAINAGE PIPE
098600000-E	SP	132	LF	GENERIC PIPE ITEM 18" SIDE DRAIN PIPE
112100000-E	520	110	TON	AGGREGATE BASE COURSE
122000000-E	545	250	TON	INCIDENTAL STONE BASE
127500000-E	600	73.5	GAL	PRIME COAT
148900000-E	610	120	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
152500000-E	610	260	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
156000000-E	620	25	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
169300000-E	654	50	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
202200000-E	815	22.4	CY	SUBDRAIN EXCAVATION
203300000-E	815	16.8	CY	SUBDRAIN FINE AGGREGATE
204400000-E	815	100	LF	6" PERFORATED SUBDRAIN PIPE
205500000-E	815	3	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
206600000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
207700000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
227500000-E	SP	2	CY	FLOWABLE FILL
228600000-N	840	2	EA	MASONRY DRAINAGE STRUCTURES
236700000-N	840	2	EA	FRAME WITH TWO GRATES, STD 840.29
255600000-E	846	25	LF	SHOULDER BERM GUTTER
300000000-N	SP	1	EA	IMPACT ATTENUATOR UNIT, TYPE 350 (TL-2)
304500000-E	862	125	LF	STEEL BM GUARDRAIL, SHOP CURVED
315000000-N	862	4	EA	ADDITIONAL GUARDRAIL POSTS
316500000-N	SP	3	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** 350 (TL-2)
318000000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** (III SC)
321500000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE III
364900000-E	876	10	TON	RIP RAP, CLASS B
365600000-E	876	1,180	SY	FILTER FABRIC FOR DRAINAGE
407200000-E	903	70	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
410200000-N	904	3	EA	SIGN ERECTION, TYPE E
410800000-N	904	1	EA	SIGN ERECTION, TYPE F
415500000-N	907	4	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
440000000-E	1110	385	SF	WORK ZONE SIGNS (STATIONARY)
440500000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)
441000000-E	1110	141	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
443500000-N	1135	23	EA	CONES
444500000-E	1145	180	LF	BARRICADES (TYPE III)
445000000-N	1150	96	HR	FLAGGER

ItemNumber	Sec #	Quantity	Unit	Description
481000000-E	1205	5,764	LF	PAINT PAVEMENT MARKING LINES (4")
483500000-E	1205	76	LF	PAINT PAVEMENT MARKING LINES (24")
600000000-E	1605	1,325	LF	TEMPORARY SILT FENCE
600600000-E	1610	330	TON	STONE FOR EROSION CONTROL, CLASS A
600900000-E	1610	170	TON	STONE FOR EROSION CONTROL, CLASS B
601200000-E	1610	370	TON	SEDIMENT CONTROL STONE
601500000-E	1615	2	ACR	TEMPORARY MULCHING
601800000-E	1620	50	LB	SEED FOR TEMPORARY SEEDING
602100000-E	1620	1.25	TON	FERTILIZER FOR TEMPORARY SEEDING
602400000-E	1622	200	LF	TEMPORARY SLOPE DRAINS
602700000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
602900000-E	SP	1,350	LF	SAFETY FENCE
603000000-E	1630	310	CY	SILT EXCAVATION
603600000-E	1631	5,460	SY	MATTING FOR EROSION CONTROL
603700000-E	SP	10	SY	COIR FIBER MAT
603800000-E	SP	175	SY	PERMANENT SOIL REINFORCEMENT MAT
604200000-E	1632	650	LF	1/4" HARDWARE CLOTH
607000000-N	SP	8	EA	SPECIAL STILLING BASINS
607101000-E	SP	100	LF	WATTLE
607102000-E	SP	25	LB	POLYACRYLAMIDE (PAM)
607103000-E	SP	180	LF	COIR FIBER BAFFLES
607105000-E	SP	1	EA	*** SKIMMER (1-1/2")
608400000-E	1660	3	ACR	SEEDING & MULCHING
608700000-E	1660	3	ACR	MOWING
609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
609600000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
610800000-E	1665	1	TON	FERTILIZER TOPDRESSING
611450000-N	SP	10	MHR	SPECIALIZED HAND MOWING
611700000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
612300000-E	1670	0.15	ACR	REFORESTATION

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TL-2 TYPE 350 PERMITTED			SINGLE FACED CONCRETE BARRIERS	REMOVE EXISTING GUARDRAIL	REMARKS											
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	TL-2 TYPE 350	TYPE-III	TYPE-III SC																			
-L-	12+35.51	13+17.76	RT.	25	56.25				3.88	VAR	18.75		0.88					1		1																
-L-	VAR.	13+37.45	LT.						3.60	VAR																										
-L-/-Y-	15+30.10	16+25.00	RT.	25	62.5				6.42	VAR	18.75		0.42					1		1																
-L-/-Y-	15+46.17	17+00.00	LT.	43.75	43.75				3.42	VAR	43.75		2.58					1	1																	
SUBTOTAL				93.75 Ft.	162.50 Ft.													TOTALS	3	1	2															
LESS ANCHOR DEDUCTIONS																																				
	TL-2	3 @ 25.00 Ft.		75.00 Ft.																																
	TYPE-III	1 @ 18.75 Ft.		18.75 Ft.																																
	TYPE-III SC	2 @ 18.75 Ft.		37.50 Ft.																																
SUBTOTAL				-93.75 Ft.	-37.50 Ft.																															
PROJECT TOTAL				0.00	125.00 Ft.																															
SAY				0.00	125.00 Ft.																															
ADDITIONAL GUARDRAIL POSTS					4 EA.																															

**SUMMARY OF PAVEMENT REMOVAL
 IN SQUARE YARDS**

LOCATION	ASPHALT REMOVAL
-L- 12+00.00 TO -L- 13+08.00 (LT./RT.)	179.00
-L- 12+29.00 TO -Y- 14+00.00 (LT.)	395.00
-Y- 17+34.00 TO -Y- 18+80.00 (LT.)	280.00
PROJECT TOTAL	854.00
SAY	860.00

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

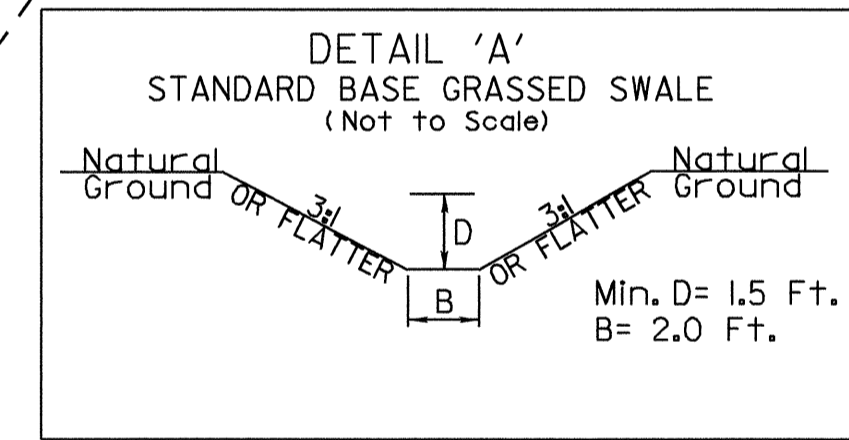
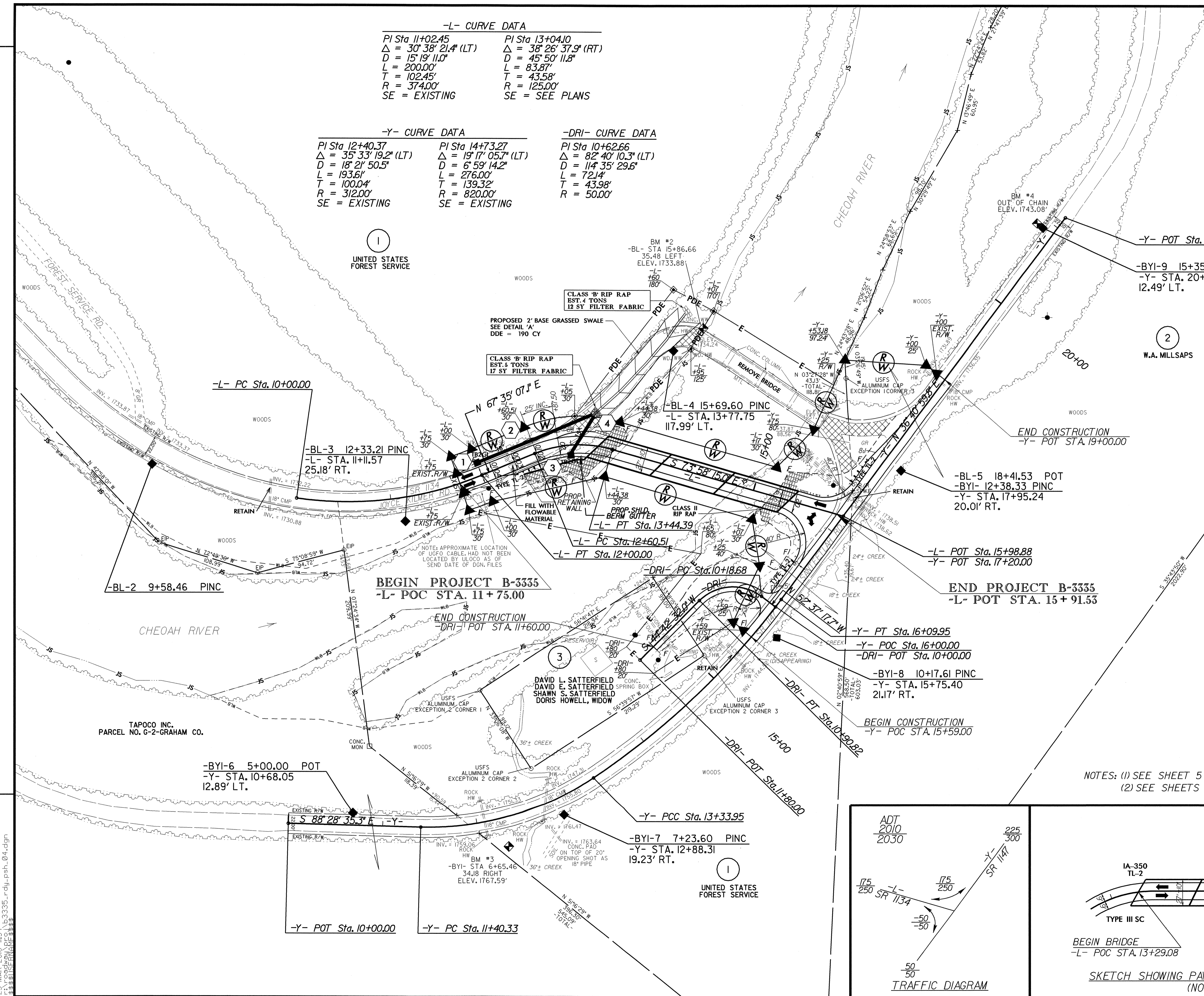
SUMMARY OF SHOULDER BERM GUTTER

LOCATION	LINEAR FEET
-L- 12+92.76 TO -L- 13+17.76 RT.	25
PROJECT TOTAL	25
SAY	25

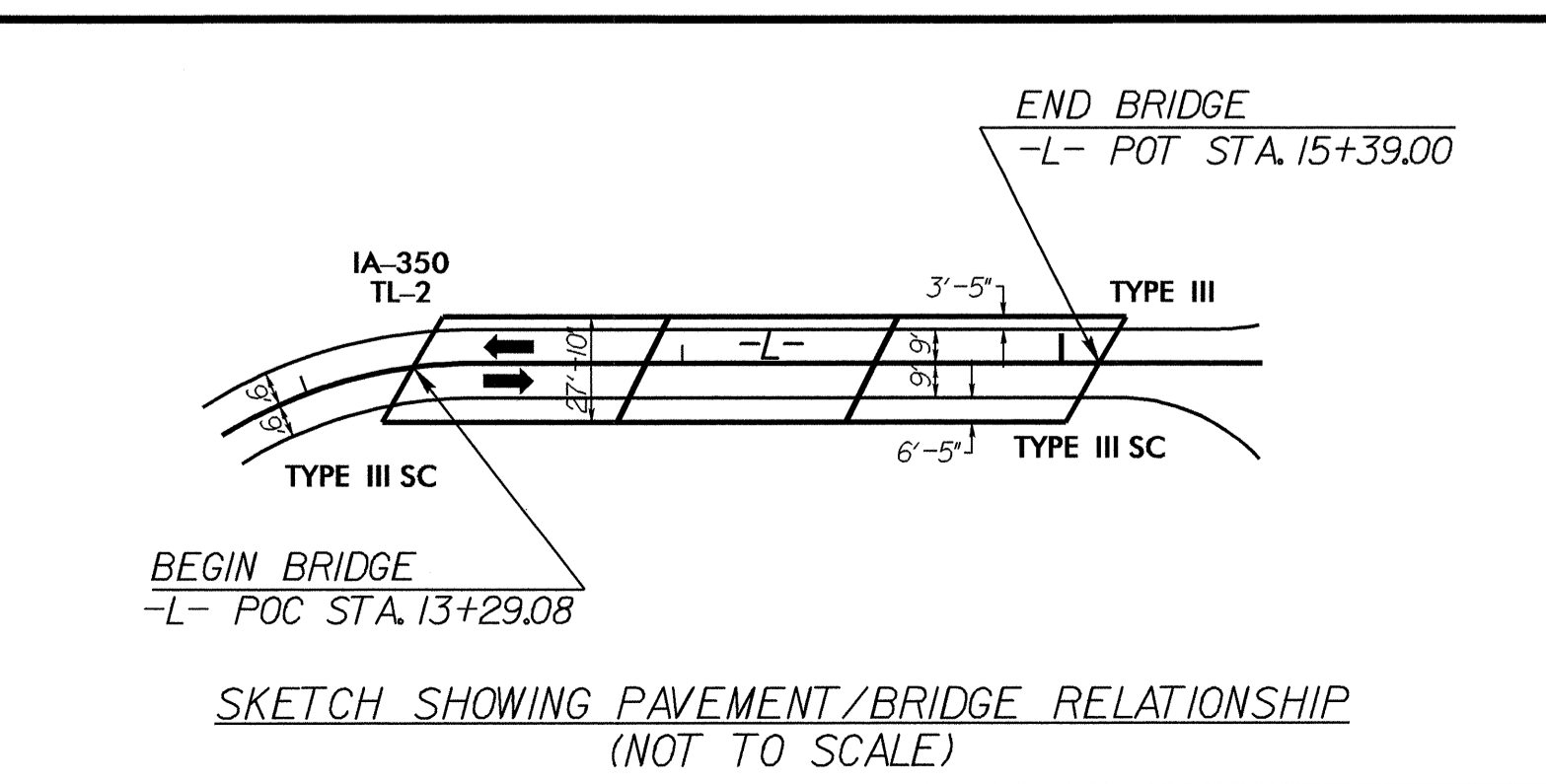
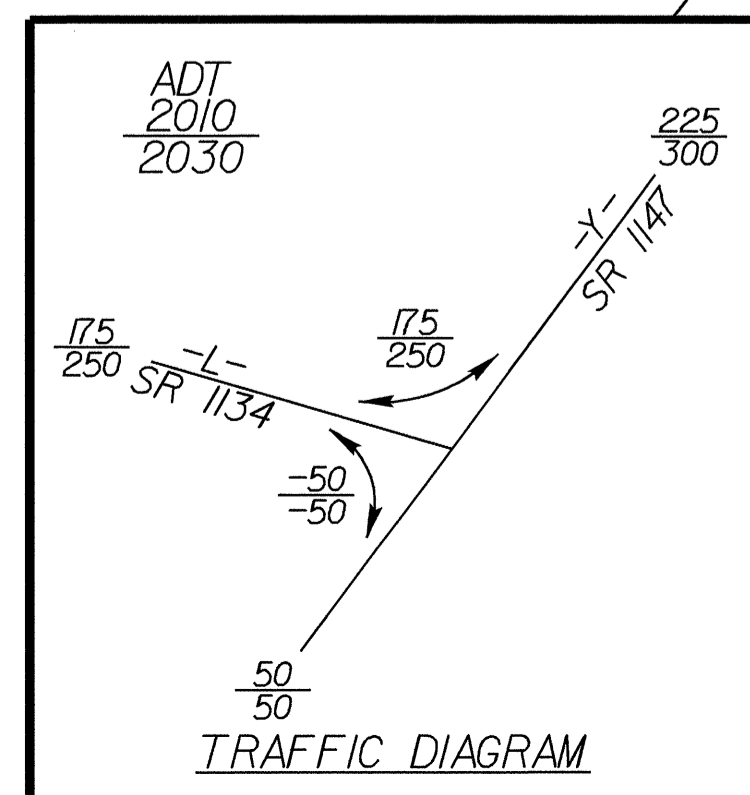
-L- CURVE DATA	
PI Sta 11+02.45	PI Sta 13+04.10
$\Delta = 30^\circ 38' 21.4"$ (LT)	$\Delta = 38^\circ 26' 37.9"$ (RT)
D = 15' 19' 11.0"	D = 45' 50' 11.8"
L = 200.00'	L = 83.87'
T = 102.45'	T = 43.58'
R = 374.00'	R = 125.00'
SE = EXISTING	SE = SEE PLANS

-Y- CURVE DATA		-DRI- CURVE DATA	
PI Sta 12+40.37	PI Sta 14+73.27	PI Sta 10+62.66	
$\Delta = 35^\circ 33' 19.2"$ (LT)	$\Delta = 19^\circ 17' 05.7"$ (LT)	$\Delta = 82^\circ 40' 10.3"$ (LT)	
D = 18' 21' 50.5"	D = 6' 59' 14.2"	D = 114' 35' 29.6"	
L = 193.61'	L = 276.00'	L = 72.14'	
T = 100.04'	T = 139.32'	T = 43.98'	
R = 312.00'	R = 820.00'	R = 50.00'	
SE = EXISTING	SE = EXISTING		

REVISIONS



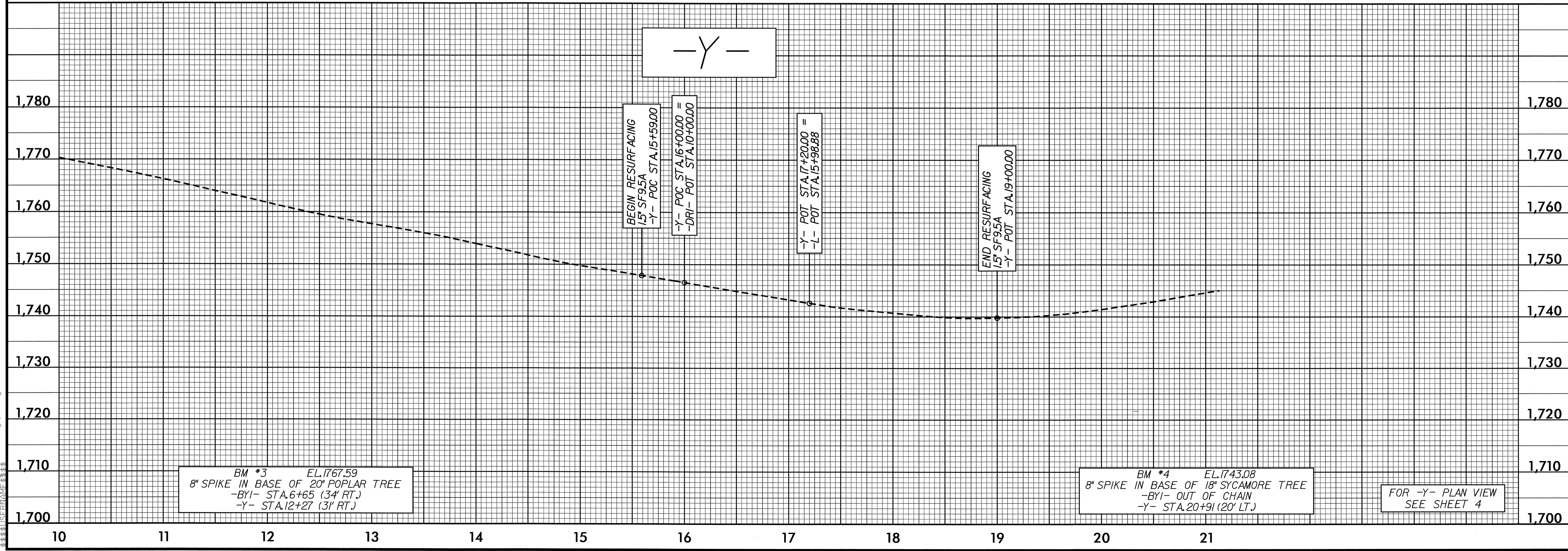
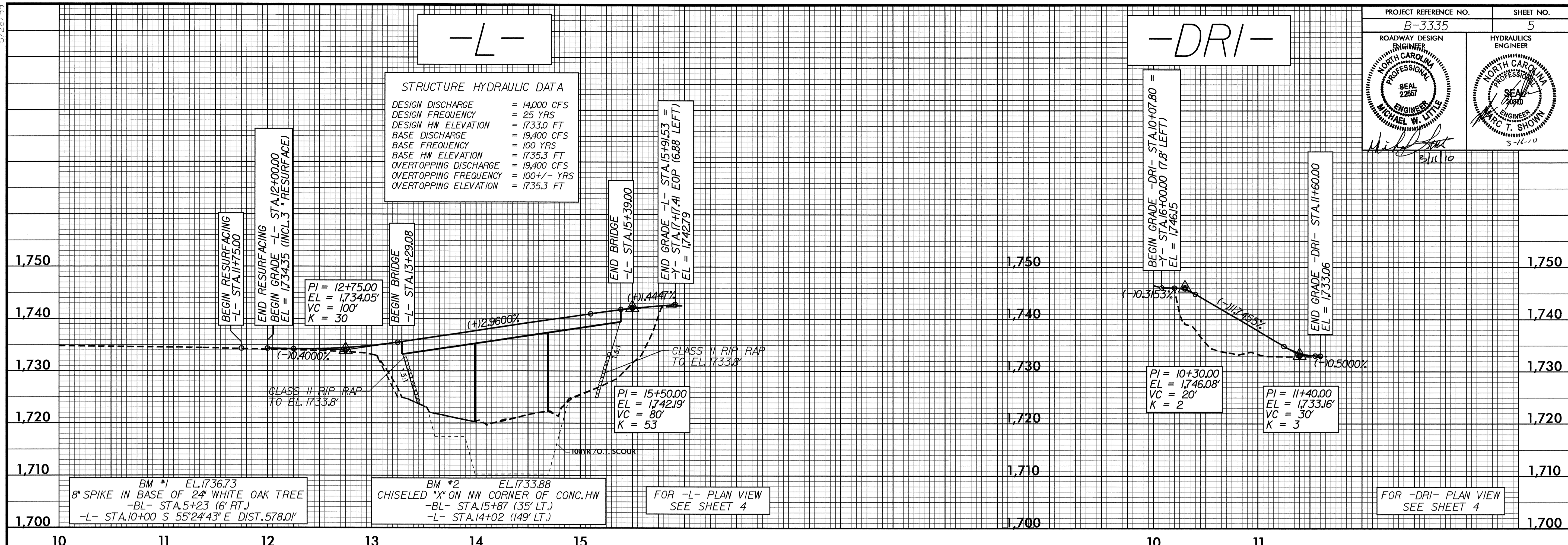
NOTES: (1) SEE SHEET 5 FOR -L-, -Y- & -DRI- PROFILES
(2) SEE SHEETS S-1 TO S-22 FOR STRUCTURE DETAILS



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5/28/99

PROJECT REFERENCE NO. B-3335	SHEET NO. 5
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 22857 MICHAEL W. LITTLE	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 17800 MARC T. SHOWN 3-11-10



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