

09/08/09

See Sheet 1-A For Index of Sheets  
See Sheet 1-B For Symbology

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**ALLEGHANY COUNTY**

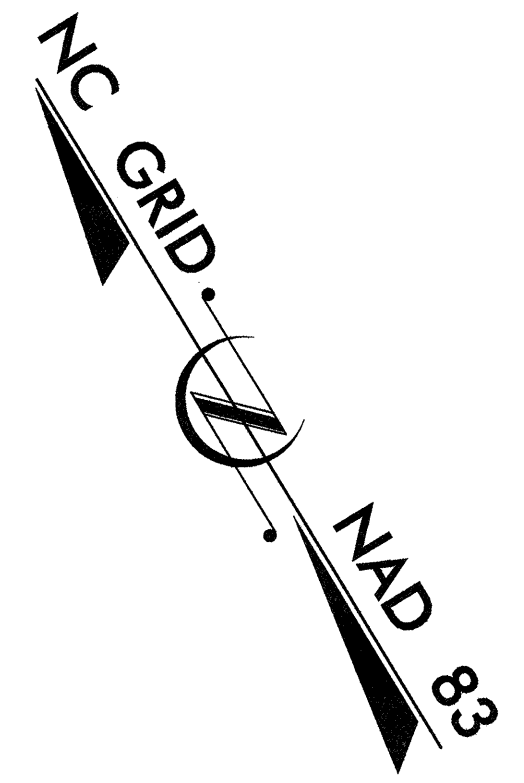
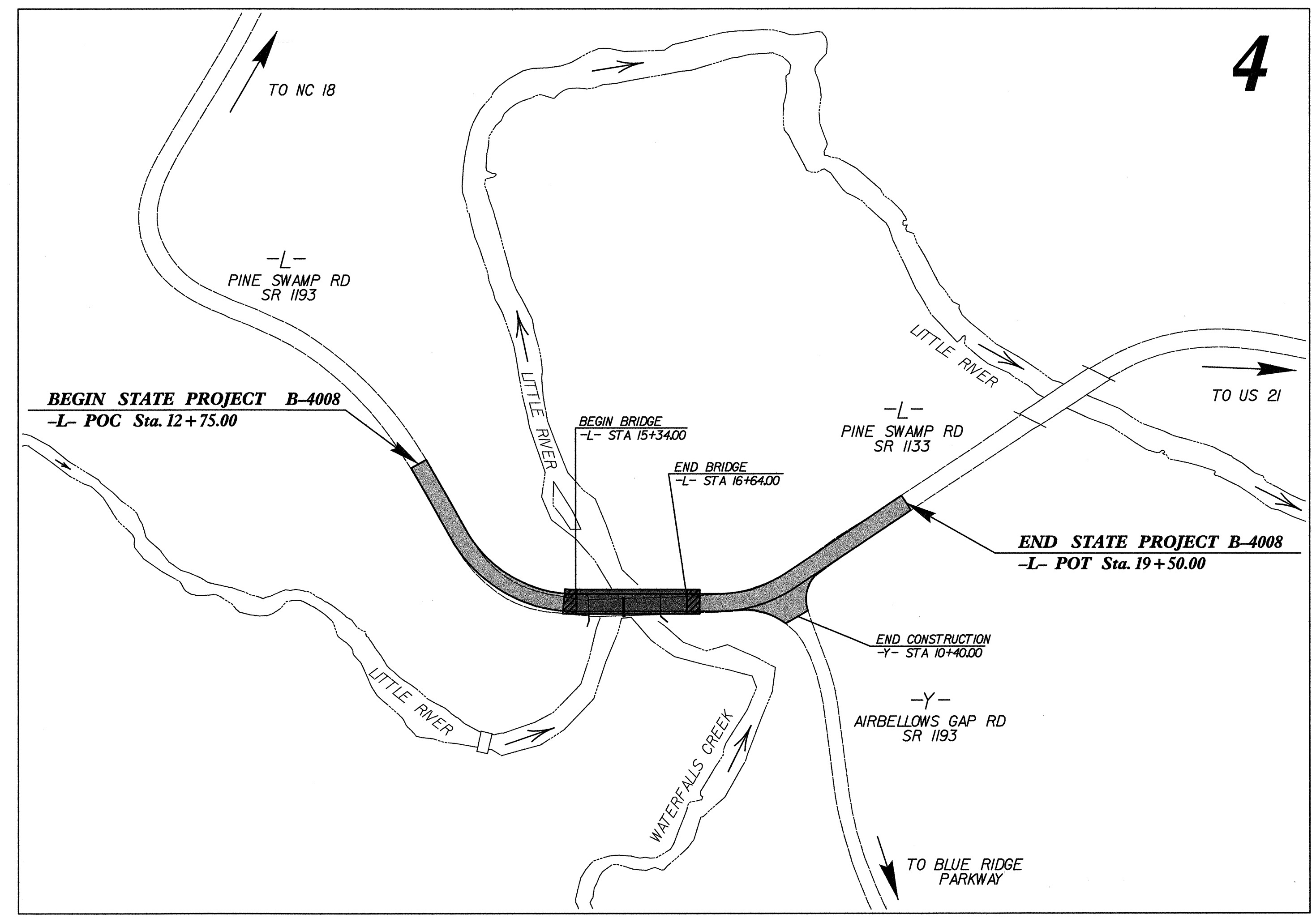
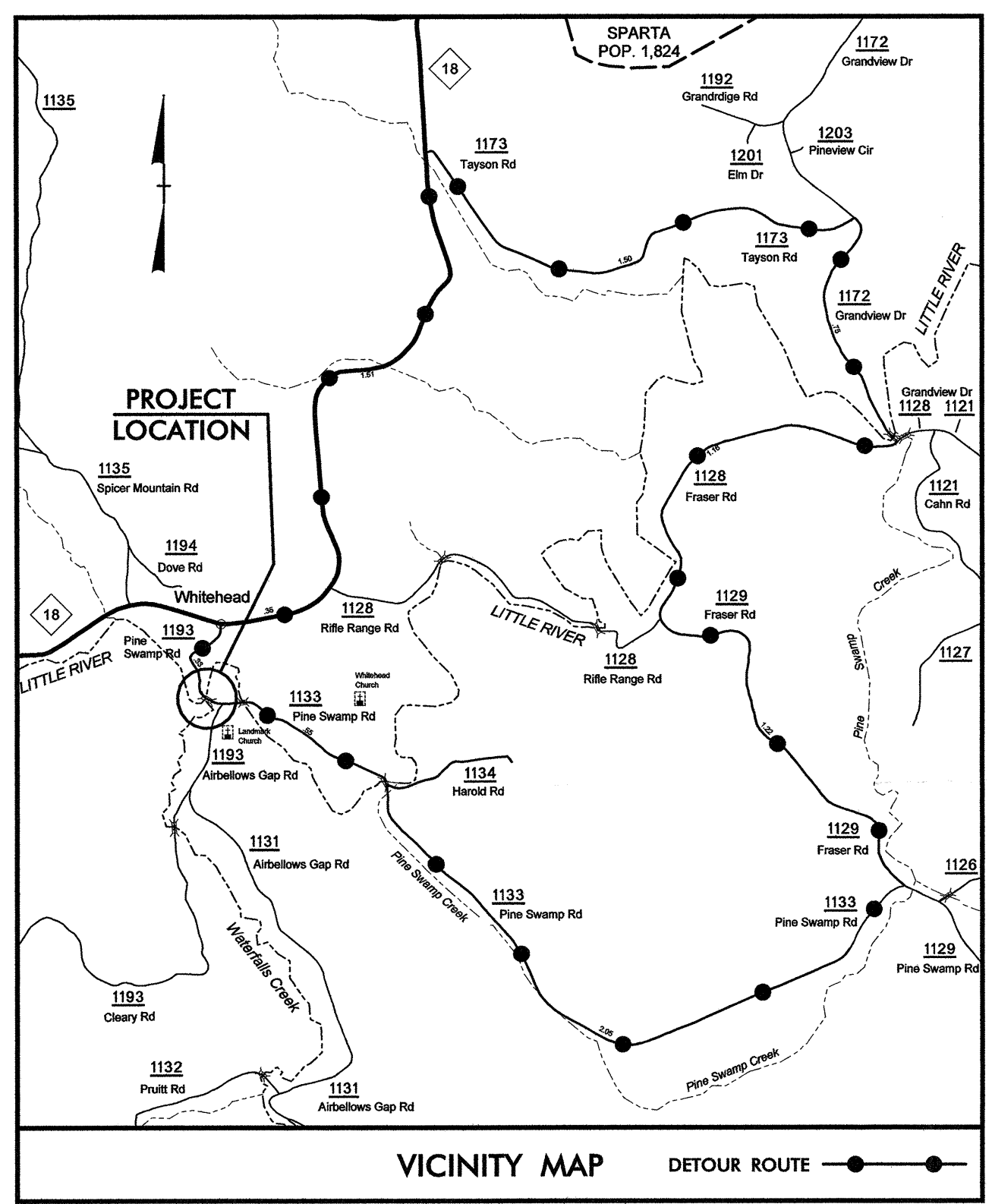
**LOCATION: BRIDGE NO. 39 OVER LITTLE RIVER  
ON SR 1193 (PINE SWAMP ROAD)**

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

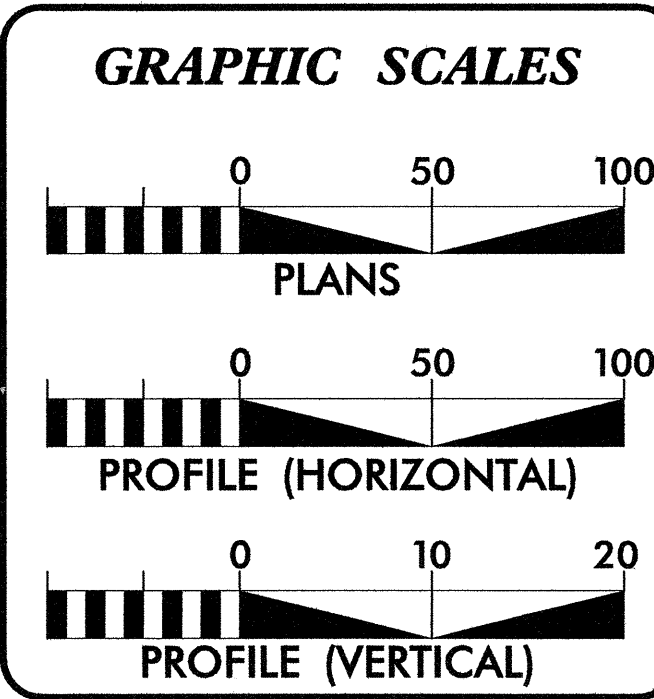
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	<b>B-4008</b>	<b>1</b>	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33376.1.1	BRZ-1193 (6)	PE	
33376.2.1	BRZ-1193 (6)	RW, UTILITIES	
33376.3.1	BRZ-1193 (6)	CONSTRUCTION	

**TIP PROJECT: B-4008**

**CONTRACT: C201922**



07/15/2008  
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**DESIGN DATA**

ADT 2008 = 580  
ADT 2028 = 840  
DHV = 10 %  
D = 60 %  
T = 3 % \*  
V = 25 MPH  
FUNCT CLASS = RURAL LOCAL  
\* (TTST 1% + DUAL 2%)

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4008	=	0.103 mile
LENGTH STRUCTURES TIP PROJECT B-4008	=	0.025 mile
TOTAL LENGTH TIP PROJECT B-4008	=	0.128 mile

Prepared For:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh NC, 27610  
By:  
**MA ENGINEERING CONSULTANTS, INC.**  
598 E CHATHAM STREET, SUITE 137  
CARY, NORTH CAROLINA 27511  
(919) 270-0220

2006 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
SEPTEMBER 21, 2007

**LETTING DATE:**  
SEPTEMBER 16, 2008

**ROBERT W. PORTER, JR. PE**  
PROJECT ENGINEER

**KEVIN S. HUTCHENS**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

*Roy Neal* 7/15/08 P.E.  
SIGNATURE:

**ROADWAY DESIGN ENGINEER**

*Robert W. Porter* P.E.  
SIGNATURE: 7-15-2008

**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA**

*Robert W. Porter* P.E.  
STATE HIGHWAY DESIGN ENGINEER

**NCDOT CONTACT:**  
**DOUG TAYLOR, PE**  
ENGINEERING COORDINATION SECTION ENGINEER  
ROADWAY DESIGN UNIT

PROJECT REFERENCE NO. B-4008	SHEET NO. 1-A
598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

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

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.

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.

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:  
Telephone - Skyline Membership Corp.  
Power - Blue Ridge Electric Membership Corp. (BREMCO)

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.

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
  - 200.03 Method of Clearing - Method III
  - 225.02 Guide for Grading Subgrade - Secondary and Local
  - 225.04 Method of Obtaining Super-elevation - Two Lane Pavement
- DIVISION 3 - PIPE CULVERTS
  - 300.01 Method of Pipe Installation - Method 'A'
- DIVISION 5 - SUBGRADE, BASES AND SHOULDERS
  - 560.01 Method of Shoulder Construction - High Side of Super-elevated Curve - Method I
- DIVISION 8 - INCIDENTALS
  - 806.01 Concrete Right-of-Way Marker
  - 806.02 Granite Right-of-Way Marker
  - 815.03 Pipe Underdrain and Blind Drain
  - 816.04 Markers for Drainage Structure and Concrete Pad
  - 840.00 Concrete Base Pad for Drainage Structures
  - 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
  - 840.66 Drainage Structure Steps
  - 846.01 Concrete Curb, Gutter and Curb & Gutter
  - 846.04 Drop Inlet Installation in Shoulder Berm Gutter
  - 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
  - 866.04 Barbed Wire Fence with Wood Posts (2 - 7 Strands)
  - 876.04 Drainage Ditches with Class 'B' Rip Rap

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1-C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-A	DETAIL OF ANCHORAGE FOR FRAMES
2-B	DETAIL OF GUARDRAIL ANCHOR UNIT TYPE B-77 SHOP-CURVED
3	SUMMARY OF QUANTITIES
3-A	SUMMARIES OF EARTHWORK, PAVEMENT REMOVAL, DRAINAGE, AND GUARDRAIL
4	PLAN SHEET
5	PROFILE SHEET
TCP-1 THRU TCP-5	TRAFFIC CONTROL PLANS
SD-1	SPECIAL SIGN DESIGN
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SIGN-1 THRU SIGN-3	SIGNING PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1	CROSS-SECTION SUMMARY
X-2 THRU X-8	CROSS-SECTIONS
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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	○ 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

**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	-----
False Sump	▽

**RAILROADS:**

Standard Gauge	-----
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	-----
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	○ 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
Proposed Wheel Chair Ramp Curb Cut	○ WCC
Curb Cut for Future Wheel Chair Ramp	○ CCFR
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	▭ 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	○ W
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
Recorded U/G Water Line	----- W
Designated U/G Water Line (S.U.E.*)	----- W
Above Ground Water Line	----- A/G Water

**TV:**

TV Satellite Dish	⊕
TV Pedestal	▭
TV 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

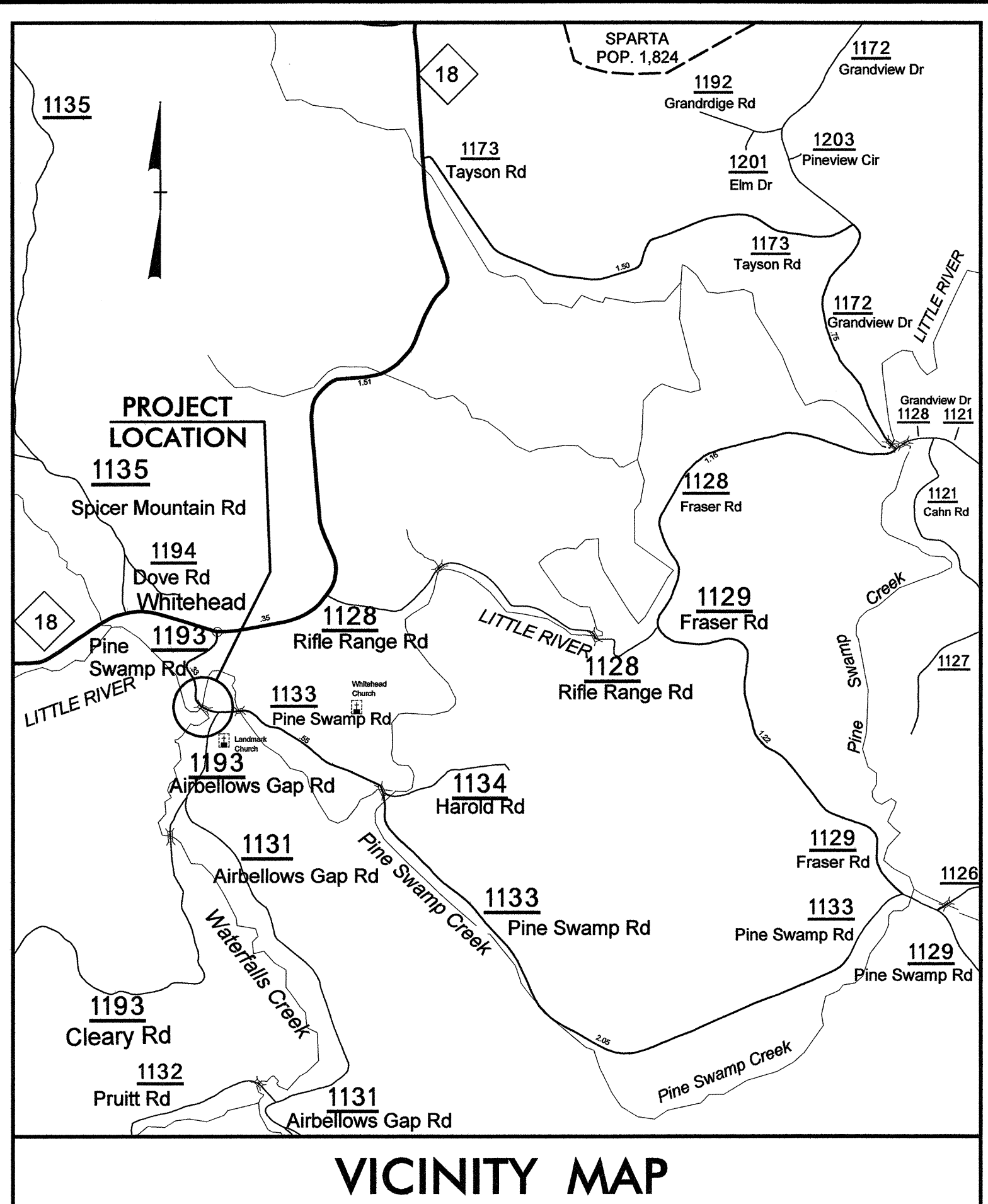
**SANITARY SEWER:**

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

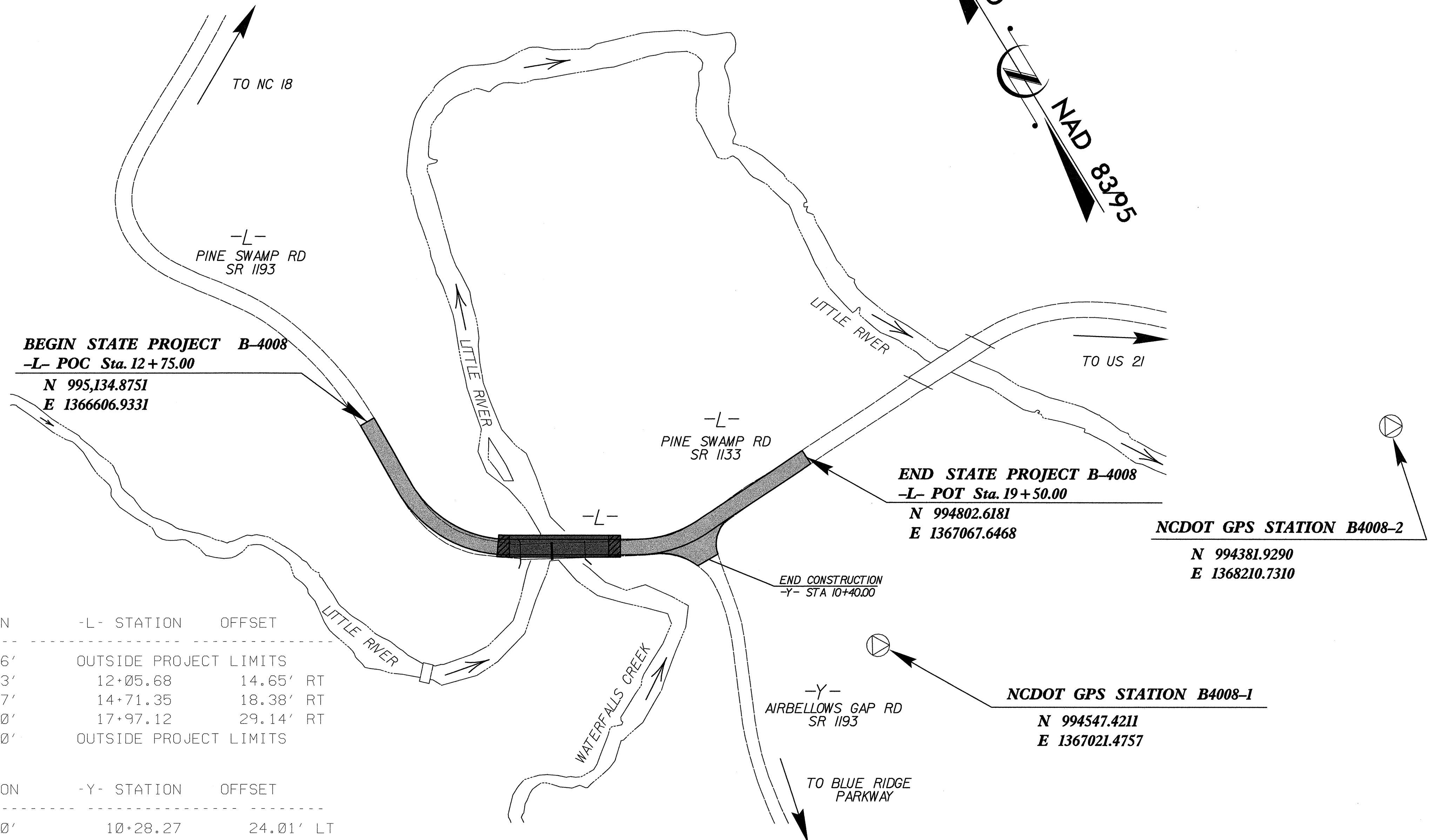
**MISCELLANEOUS:**

Utility Pole	●
Utility Pole with Base	▭
Utility Located Object	○
Utility Traffic Signal Box	▭
Utility Unknown U/G Line	----- UTIL
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-4008



**VICINITY MAP**



BL POINT	DESC.	NORTH	EAST	ELEVATION	-L- STATION	OFFSET
BL3	BL-3	995496.9474	1366456.9155	2988.46'	OUTSIDE PROJECT LIMITS	
BL4	BL-4	995201.7839	1366588.0729	2959.93'	12+05.68	14.65' RT
BL5	BL-5	994934.0211	1366618.8426	2942.37'	14+71.35	18.38' RT
BL6	BL-6	994766.8094	1366916.1892	2949.40'	17+97.12	29.14' RT
BL7	BL-7	994827.8928	1367334.4099	2935.20'	OUTSIDE PROJECT LIMITS	
BY POINT	DESC.	NORTH	EAST	ELEVATION	-Y- STATION	OFFSET
BY8	BY-8	994766.8094	1366916.1892	2949.40'	10+28.27	24.01' LT
BY9	BY-9	994471.5370	1366792.2418	2976.34'	OUTSIDE PROJECT LIMITS	

\*\*\*\*\*  
 BM #2 ELEVATION - 2933.87'  
 N 994777. E 1366750.  
 -L- STATION 16+59 71' RIGHT  
 8" SPIKE IN ROOT OF 10" TRIPLE MAPLE  
 \*\*\*\*\*

### DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4008-1" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 994547.4211 (ft) EASTING: 1367021.4757 (ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99995948 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4008-1" TO -L- STATION 12+75.00 IS N 35°12'33" W 718.99 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

### NOTES:

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.doh.dot.state.nc.us/preconstruct/highway/location/project/)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 B4008\_LS\_CONTROL\_070726.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)  
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

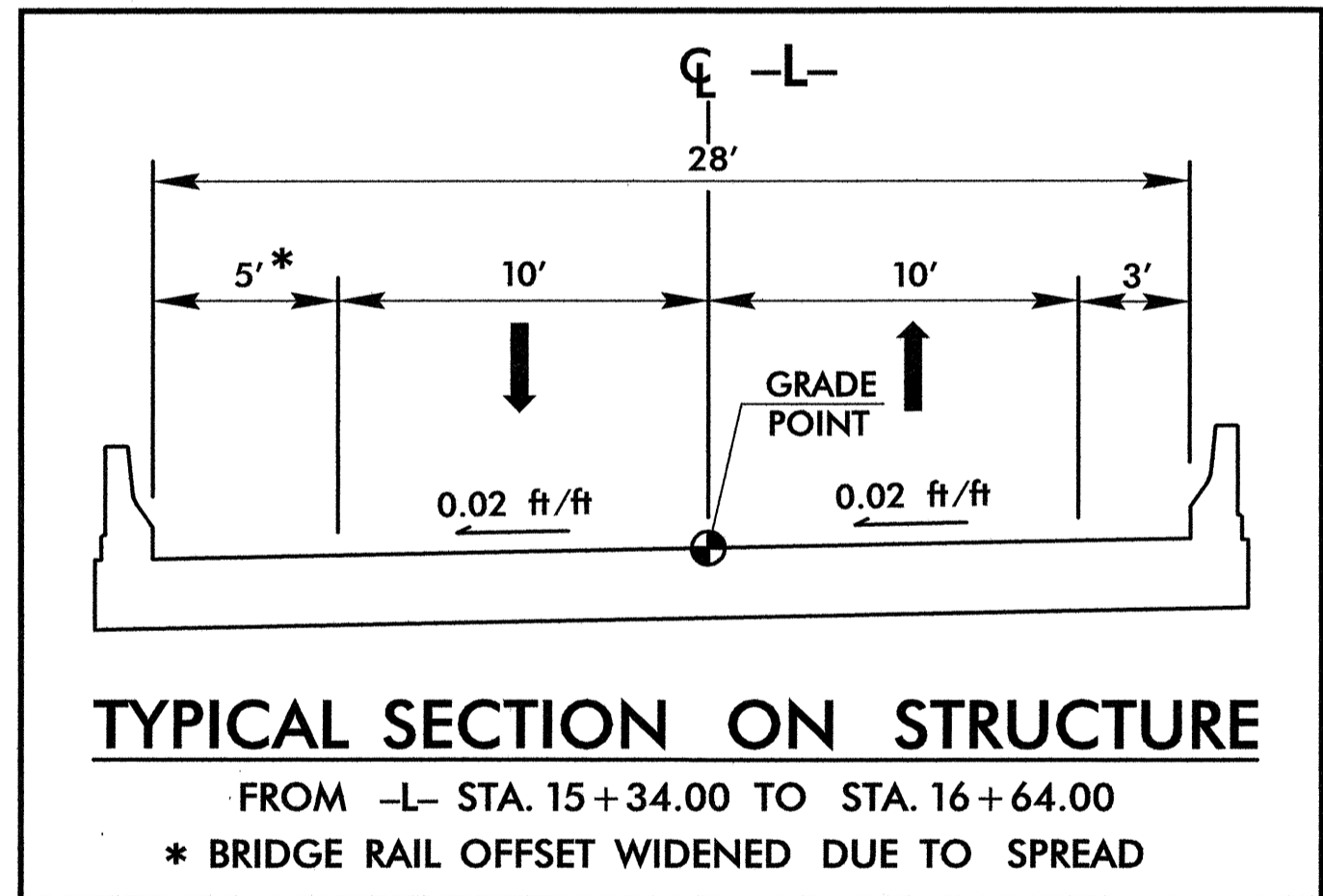
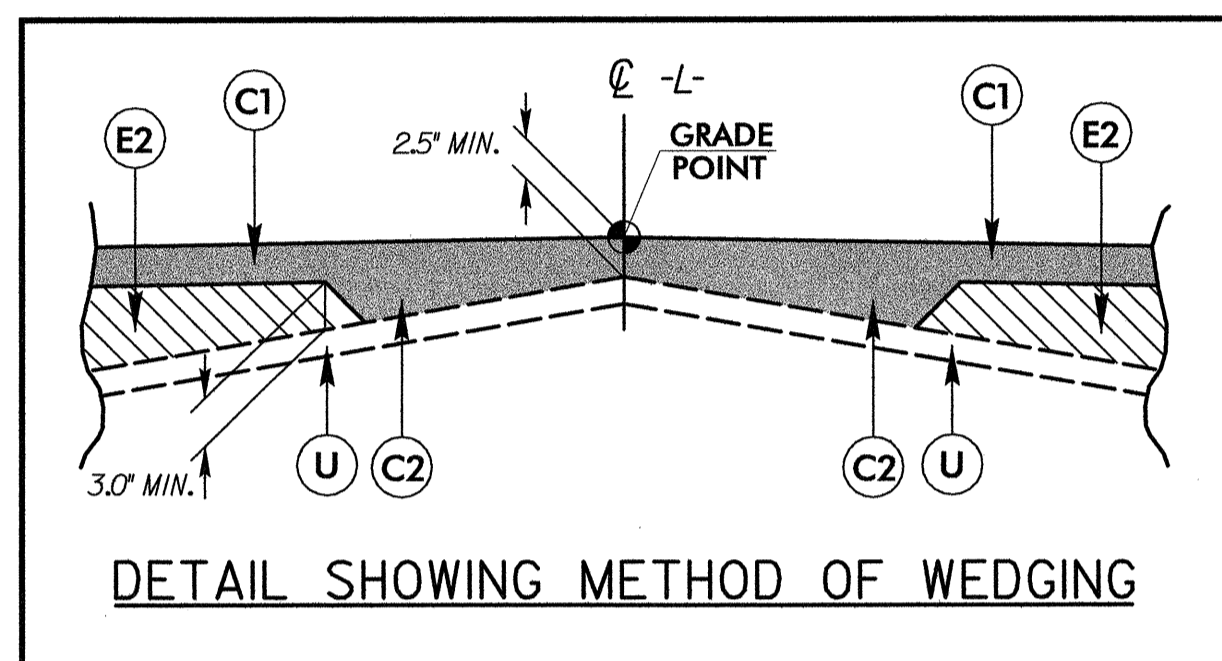
NOTE: DRAWING NOT TO SCALE

6/2/99 7/2/99 07/15/2008 R:\Projects\4008\Proj\4008\_1s\_1c\_070727.dgn

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PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS PER SQUARE YARD IN TWO LAYERS.
C2	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.0" OR GREATER THAN 1.5" IN DEPTH.
E1	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS PER SQUARE YARD.
E2	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0" OR GREATER THAN 5.5" IN DEPTH.
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)

PAVEMENT EDGE SLOPES AND TRENCH SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



**TYPICAL SECTION ON STRUCTURE**

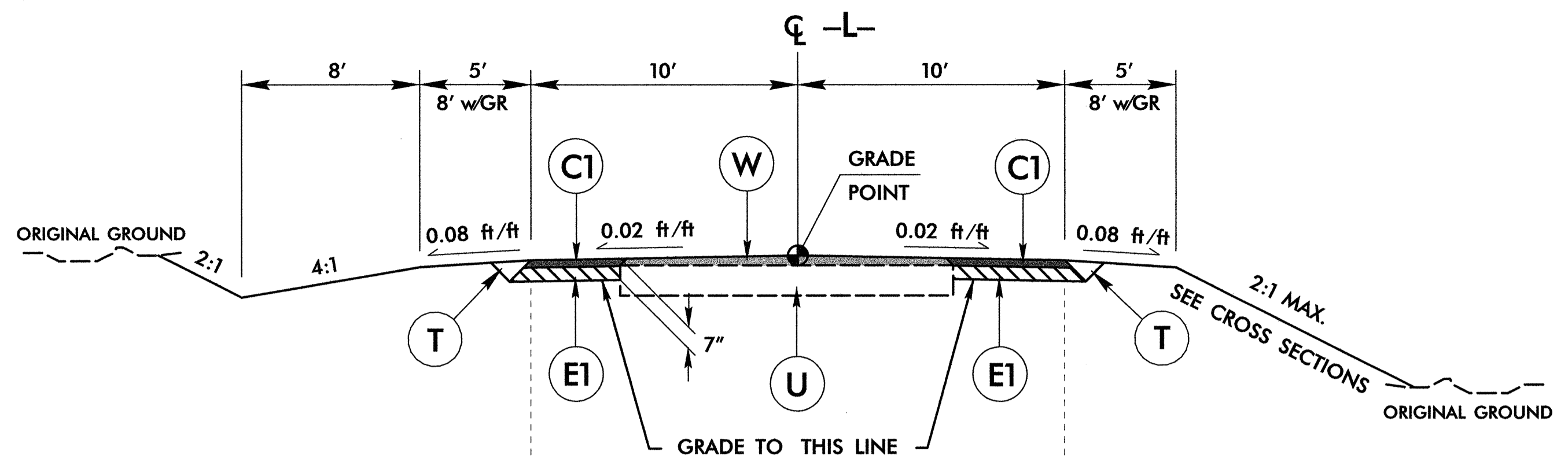
FROM -L- STA. 15+34.00 TO STA. 16+64.00  
 \* BRIDGE RAIL OFFSET WIDENED DUE TO SPREAD

USE PARTIAL TYPICAL SECTION NO. 3A IN CONJUNCTION WITH TYPICAL SECTIONS NO. 1 AND NO. 2:

- FROM -L- STA. 13+29.89 TO STA. 15+19.83 LT.
- FROM -L- STA. 16+78.17 TO STA. 18+74.09 LT.
- FROM -L- STA. 14+07.86 TO STA. 15+19.83 RT.
- FROM -L- STA. 16+78.17 TO STA. 17+18 +/- RT.

**NOTES:**

- \*\* USE MINIMUM 2' GRASS SHOULDER BEYOND EDGE OF PAVED SHOULDER. EXTEND SHOULDER 3' (MEASURED FROM FACE) WHEN USING GUARDRAIL. MIRROR AS NECESSARY.
- \*\*\* TRANSITION SUPERELEVATION ON RIGHT SIDE PAVED SHOULDER FROM A 2% SLOPE TO THE LEFT AT -L- STA. 16+88.06 TO A 2% SLOPE TO THE RIGHT AT -L- STA. 17+18.06.

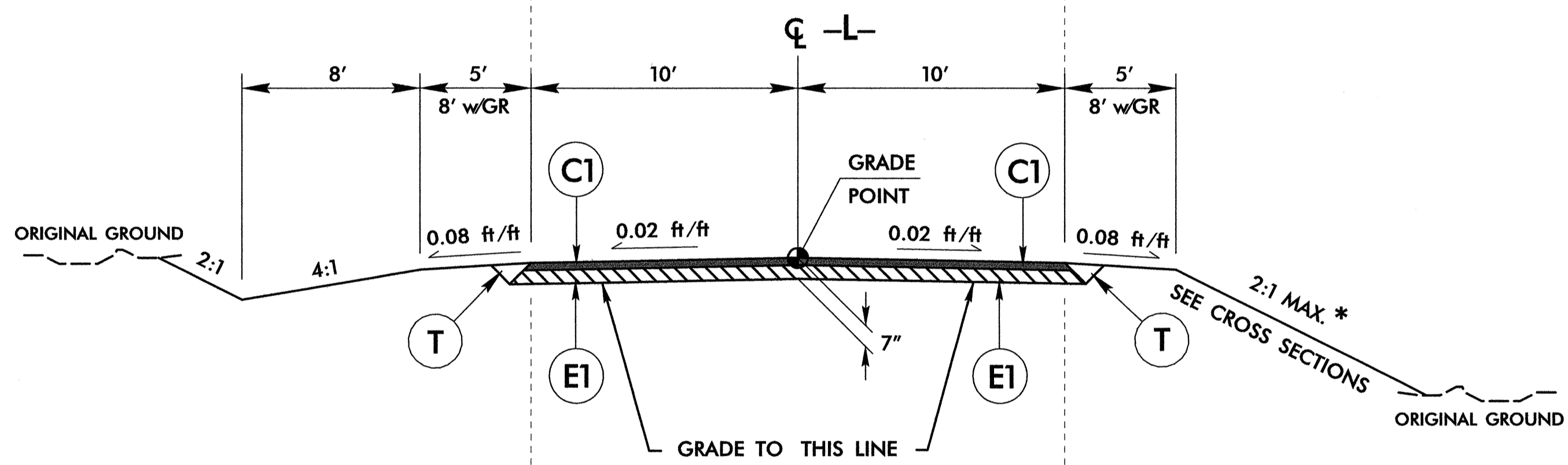


**TYPICAL SECTION NO. 1**

USE TYPICAL SECTION NO. 1:  
 FROM -L- STA. 13+25.00 TO STA. 14+50.00  
 FROM -L- STA. 17+50.00 TO STA. 19+00.00

BLEND TO EXISTING (SEE CROSS SECTIONS):  
 FROM -L- STA. 12+75.00 TO STA. 13+25.00  
 FROM -L- STA. 19+00.00 TO STA. 19+50.00

RESURFACE USING 1.25" OF SF9.5A:  
 FROM -Y- STA. 10+10.00 TO STA. 10+40.00

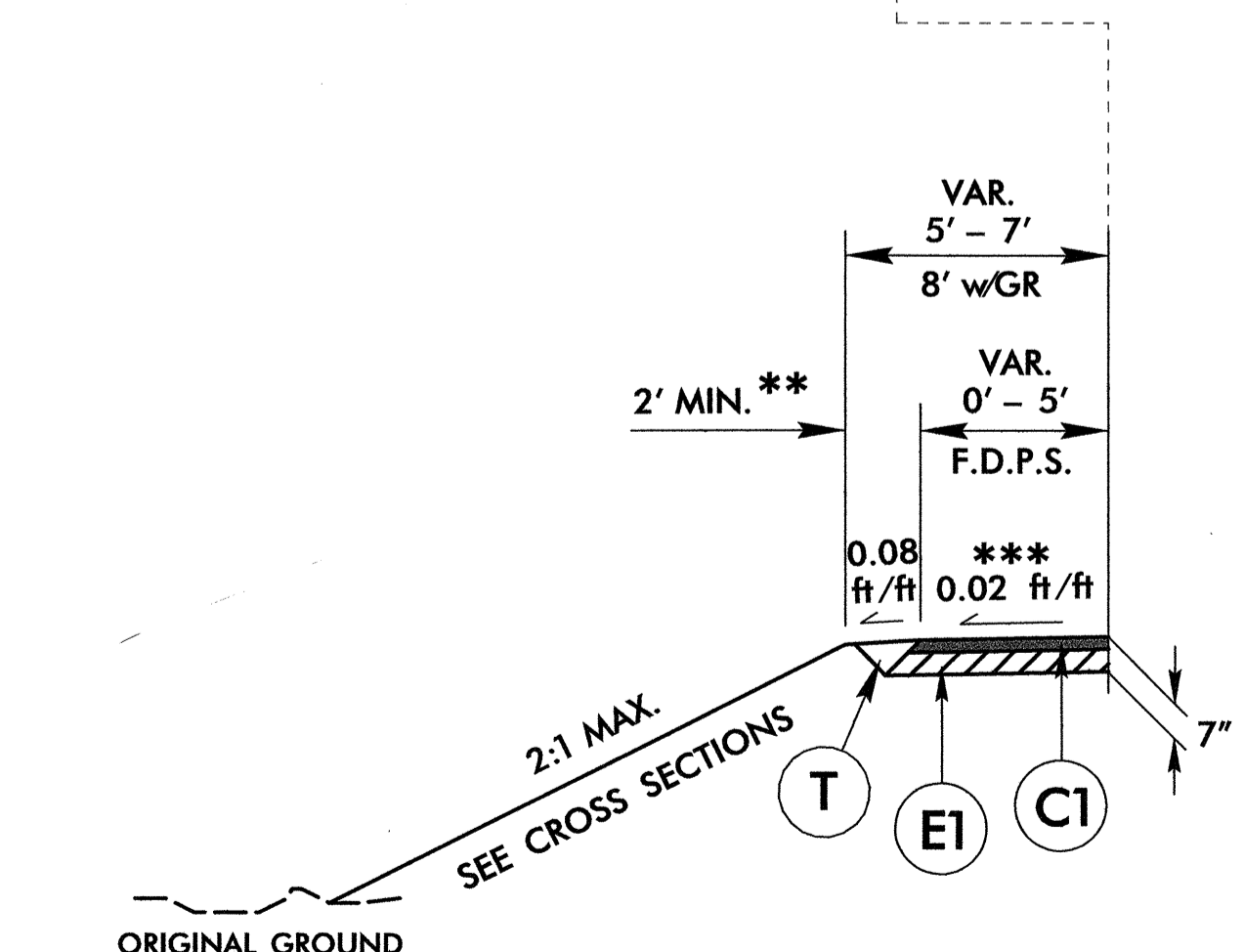


**TYPICAL SECTION NO. 2**

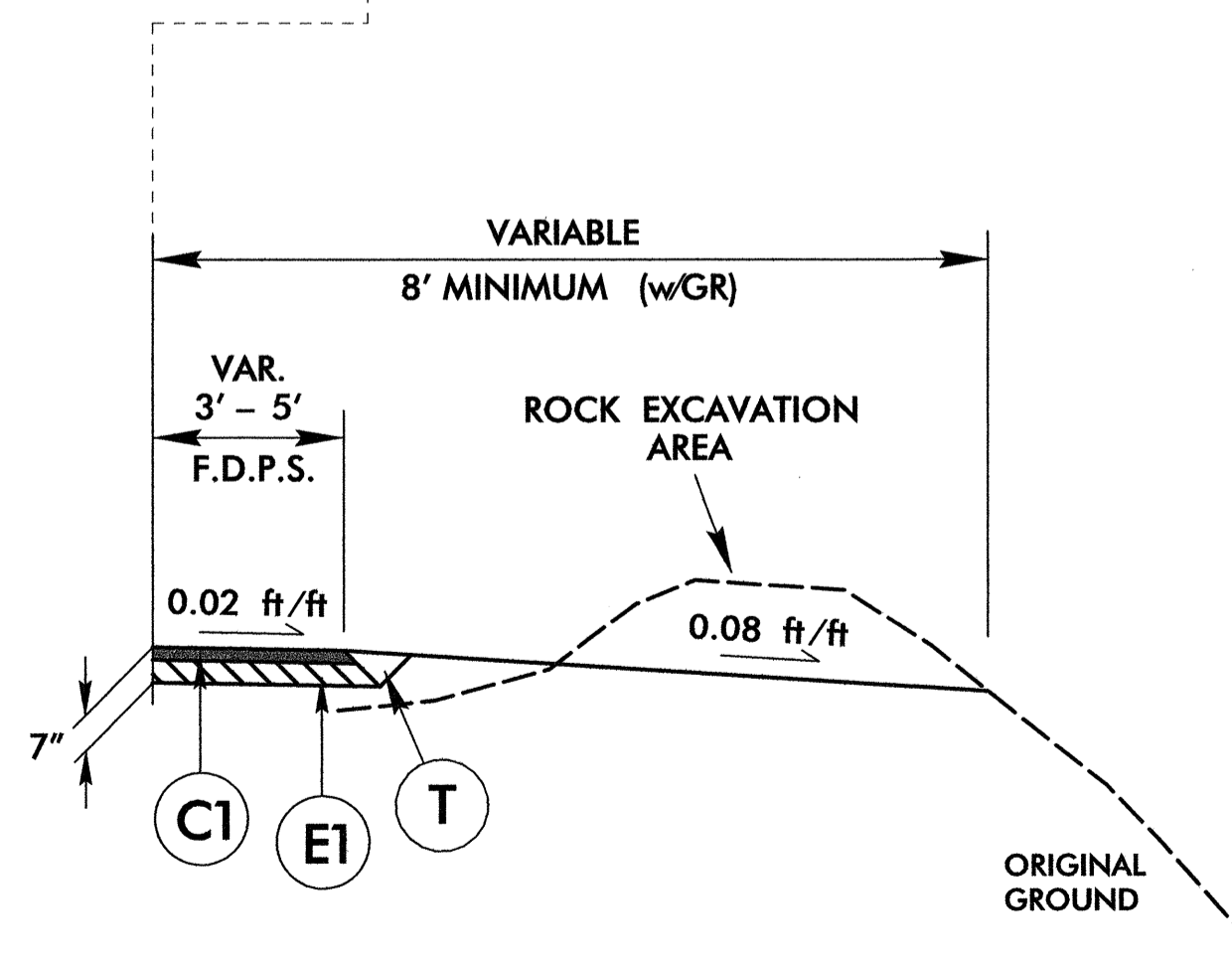
USE TYPICAL SECTION NO. 2:  
 FROM -L- STA. 14+50.00 TO STA. 15+34.00 (BEG. BRIDGE)  
 FROM -L- STA. 16+64.00 (END BRIDGE) TO STA. 17+50.00

**NOTES:**

- \* USE 1.5:1 SLOPES: FROM -L- STA. 16+54.00 TO STA. 17+10.00 RT. SEE CROSS SECTIONS AND DETAIL OF SCOUR PROTECTION STONE (SEE STRUCTURE PLANS).



**TYPICAL SECTION NO. 3A**



**TYPICAL SECTION NO. 3B**

USE PARTIAL TYPICAL SECTION NO. 3B IN CONJUNCTION WITH TYPICAL SECTIONS NO. 1 AND NO. 2:

- FROM -L- STA. 17+18 +/- RT. TO -Y- STA. 10+61 +/- RT.

**NOTES:**

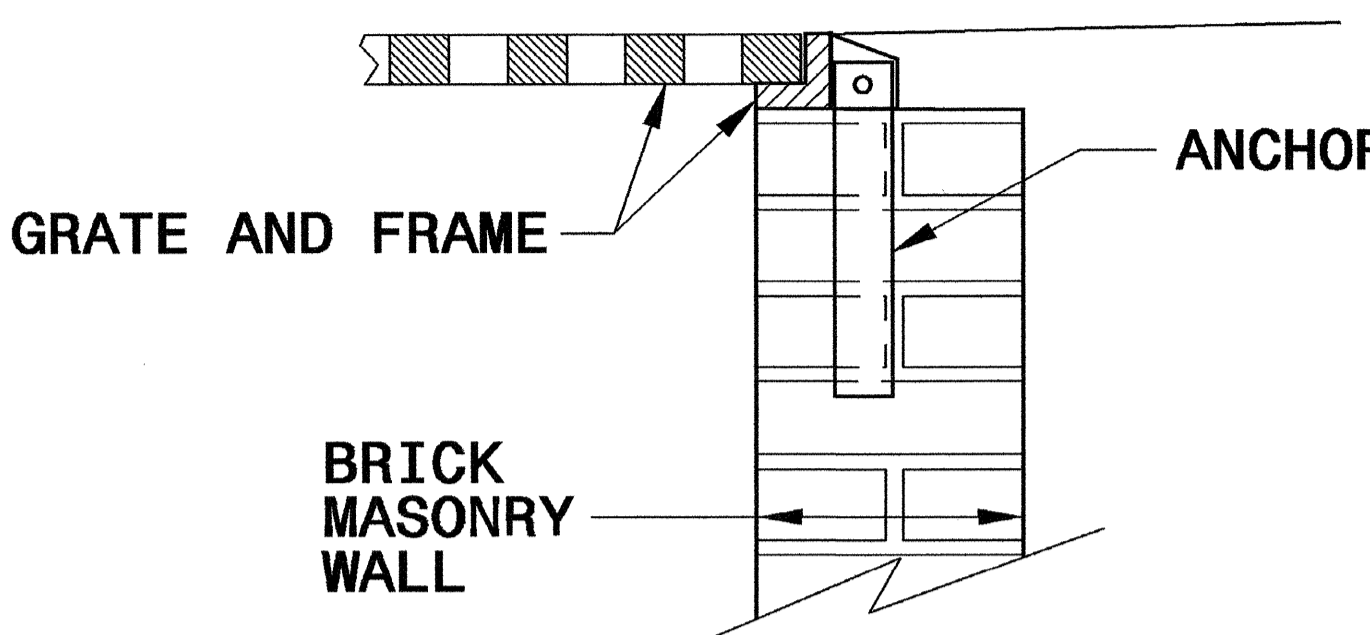
- GRADE / EXCAVATE SHOULDER TO ACHIEVE POSITIVE DRAINAGE AWAY FROM INTERSECTION RADIUS. SUPERELEVATION ON PAVED SHOULDER SHALL SLOPE AWAY FROM INTERSECTION RADIUS AT A MINIMUM 2% SLOPE.

PROJECT REFERENCE NO. B-4008	SHEET NO. 2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER ROBERT W. PORTER, JR. SEAL 19814 7-15-2008	PAVEMENT DESIGN ENGINEER JIAN CHEN SEAL 13368 9/16/08
598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

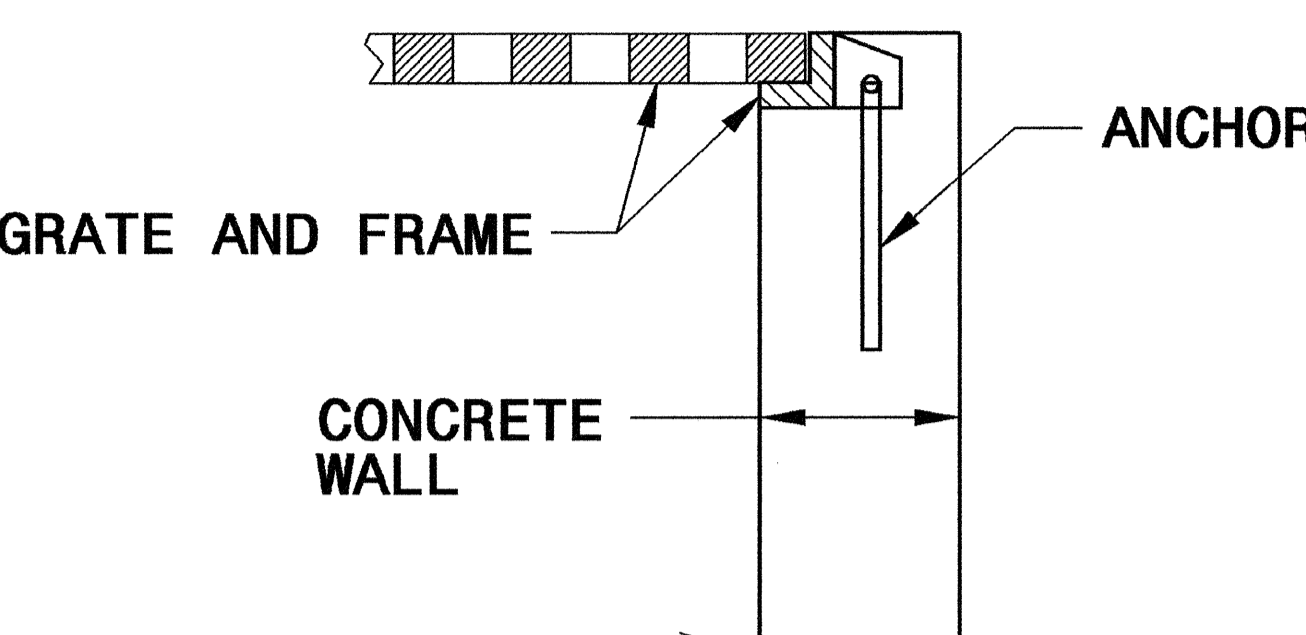
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

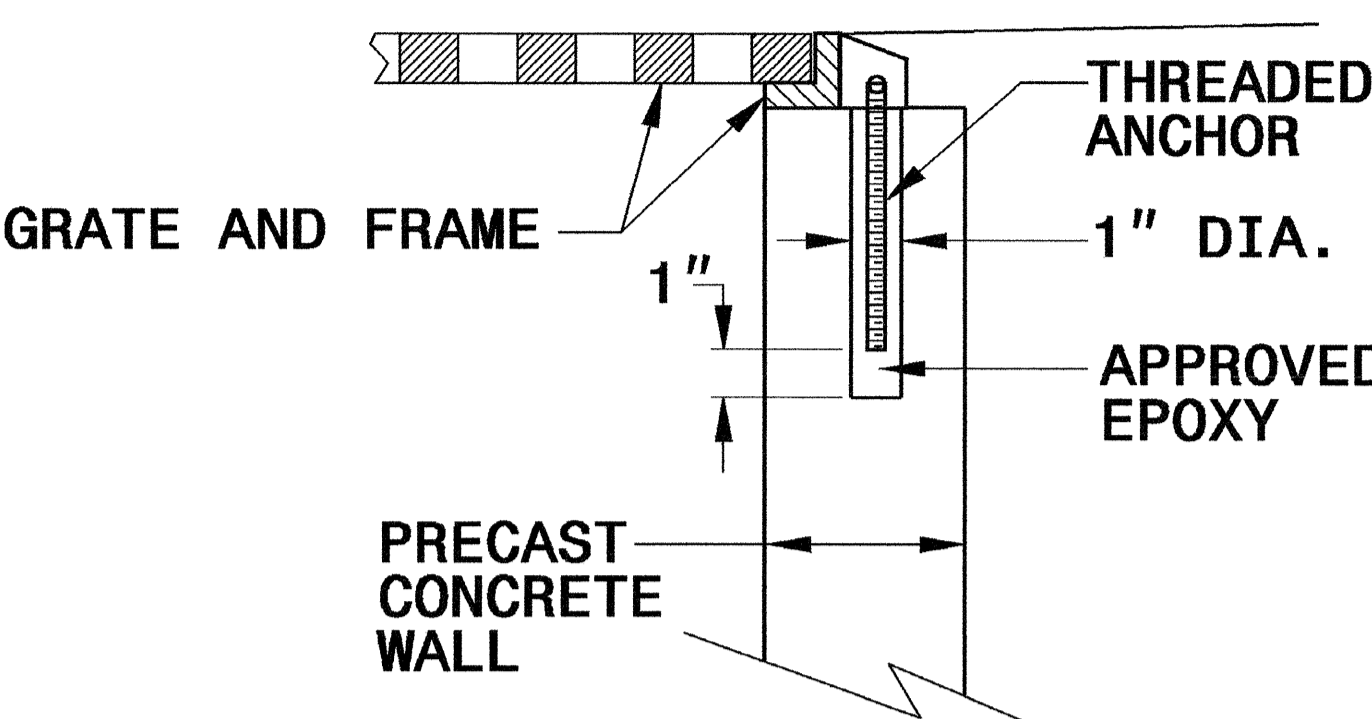
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY  
CONSTRUCTION**



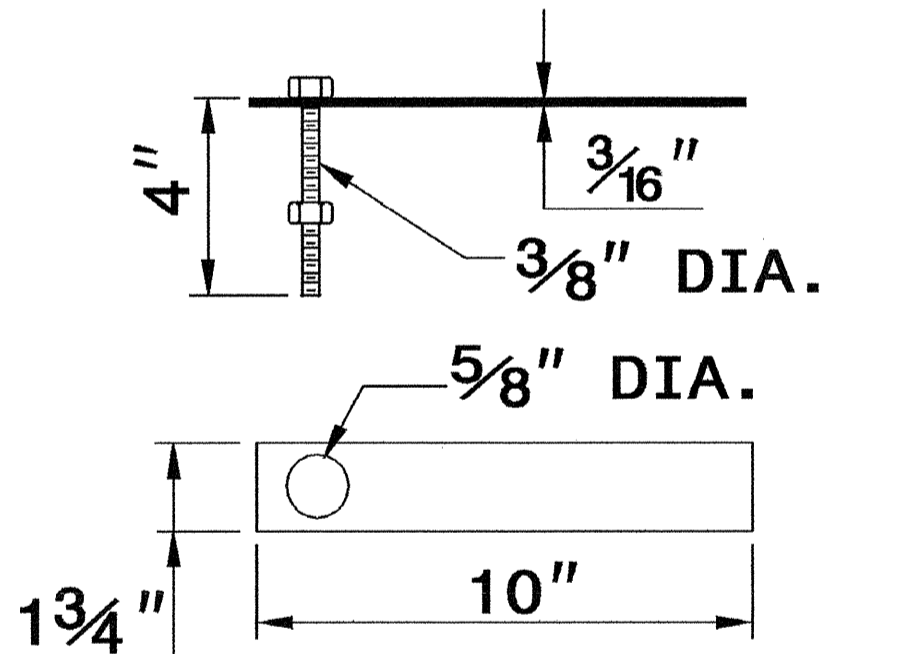
**CONCRETE  
CONSTRUCTION**



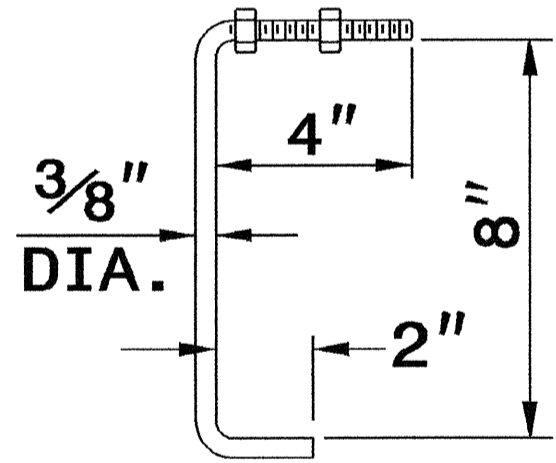
**PRECAST CONCRETE  
CONSTRUCTION**

**DETAIL SHOWING ANCHORAGE OF  
FRAME FOR GRATED DROP INLET**

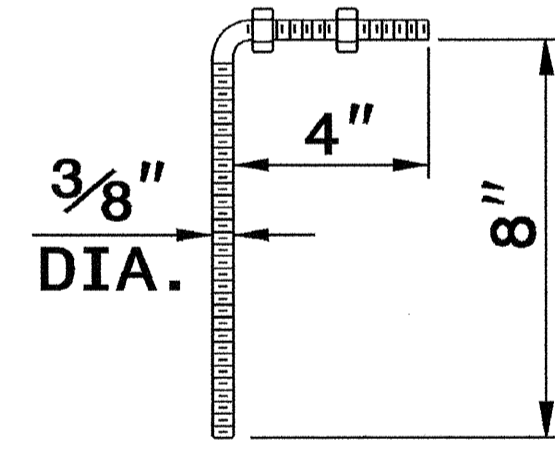
**NOTE:**  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



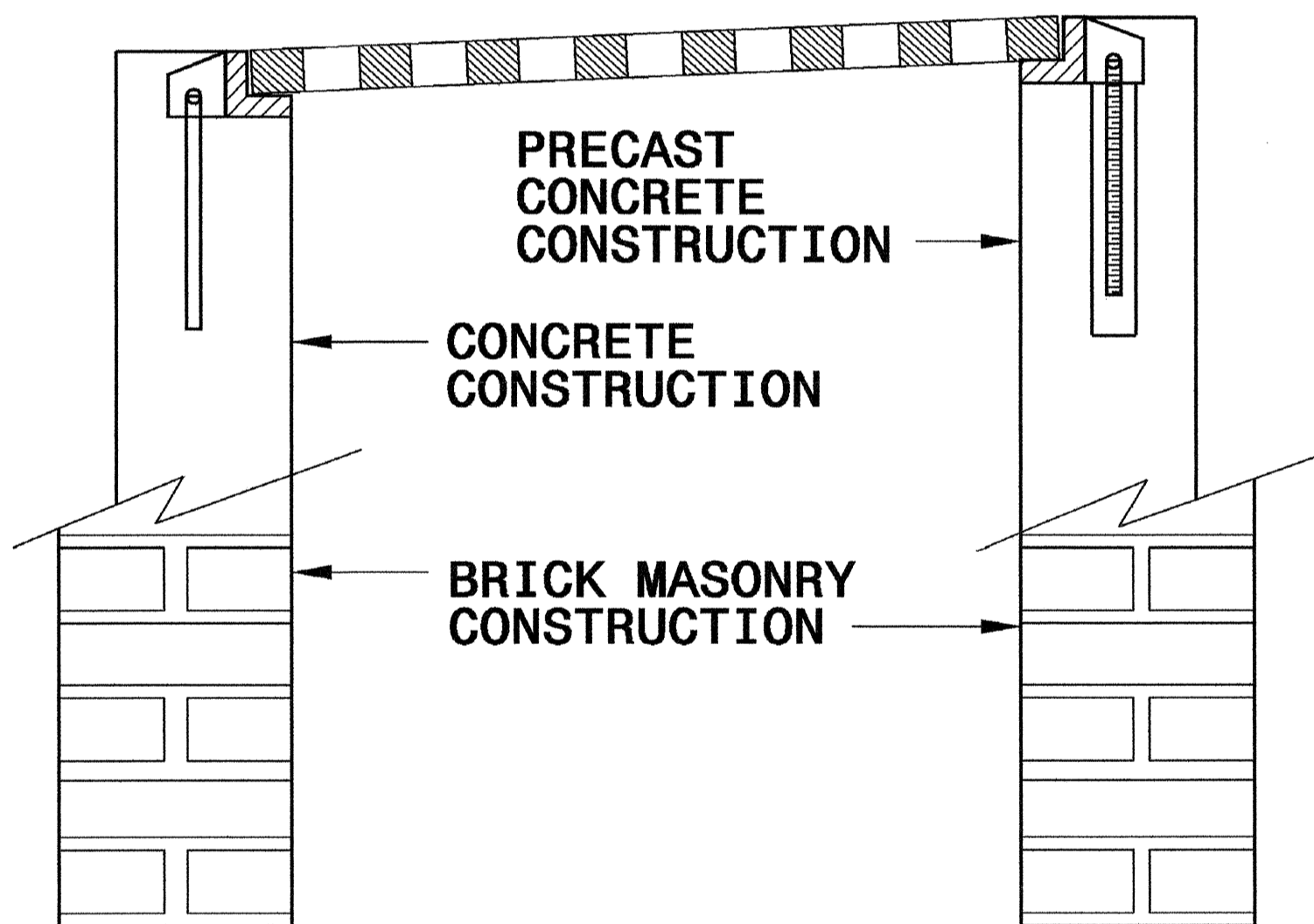
**MASONRY ANCHOR**  
 $\frac{3}{8}$ " DIA. BOLT WITH PLATE



**CONCRETE ANCHOR**  
 $\frac{3}{8}$ " DIA. BENT BAR



**PRECAST  
CONCRETE ANCHOR**  
 $\frac{3}{8}$ " DIA. BENT BAR

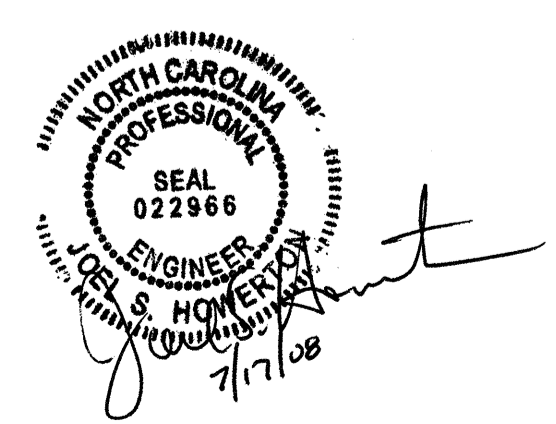


**FRAME AND GRATE INSTALLATION  
FOR NORMAL CROWN AND  
SUPERELEVATED SECTIONS**

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

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

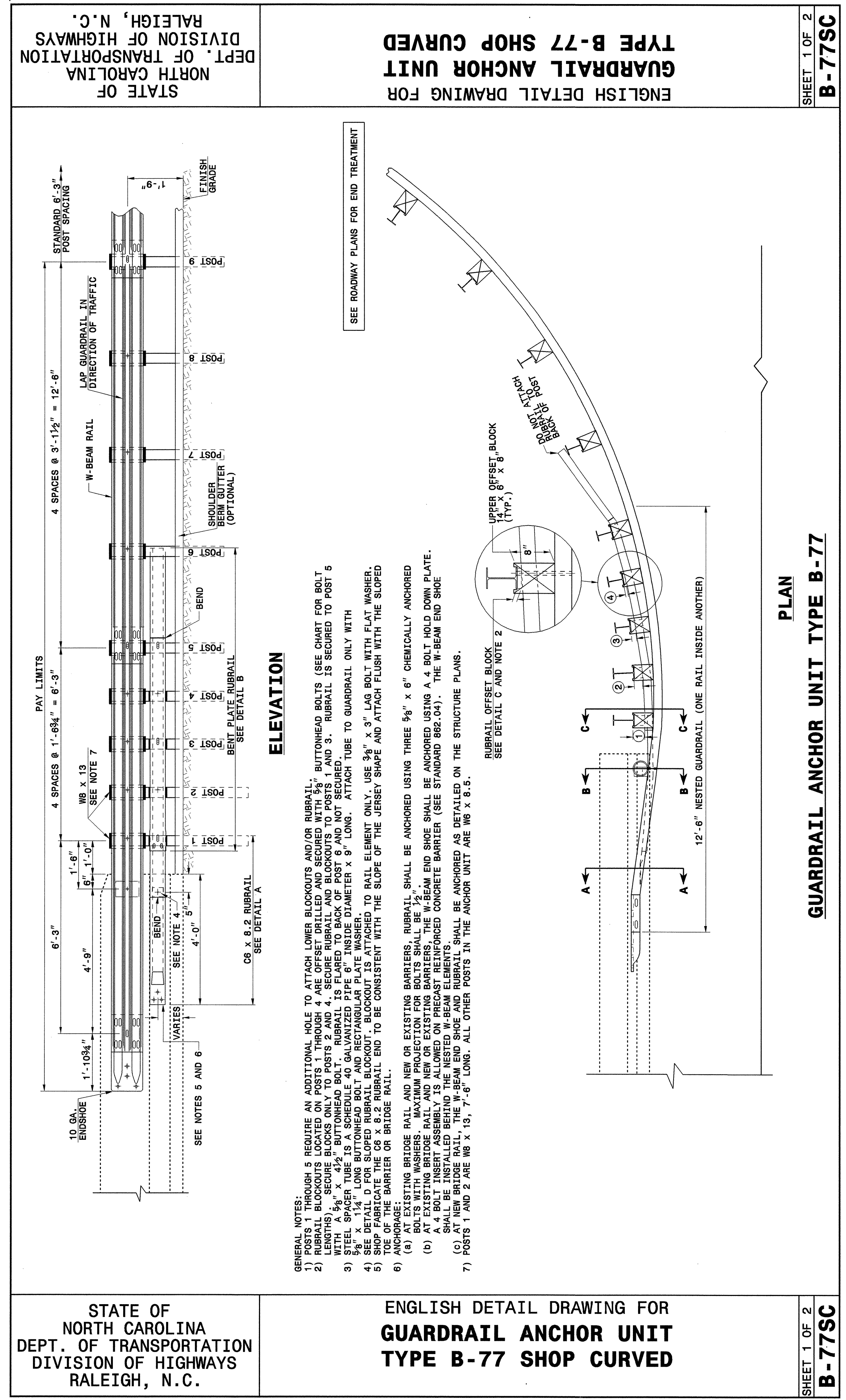
SHEET 1 OF 1  
**840D25**



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

**SEE PLATE FOR TITLE**

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06  
MODIFIED BY: E.E. WARD DATE: 9/25/06  
CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
FILE SPEC: \_\_\_\_\_



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**

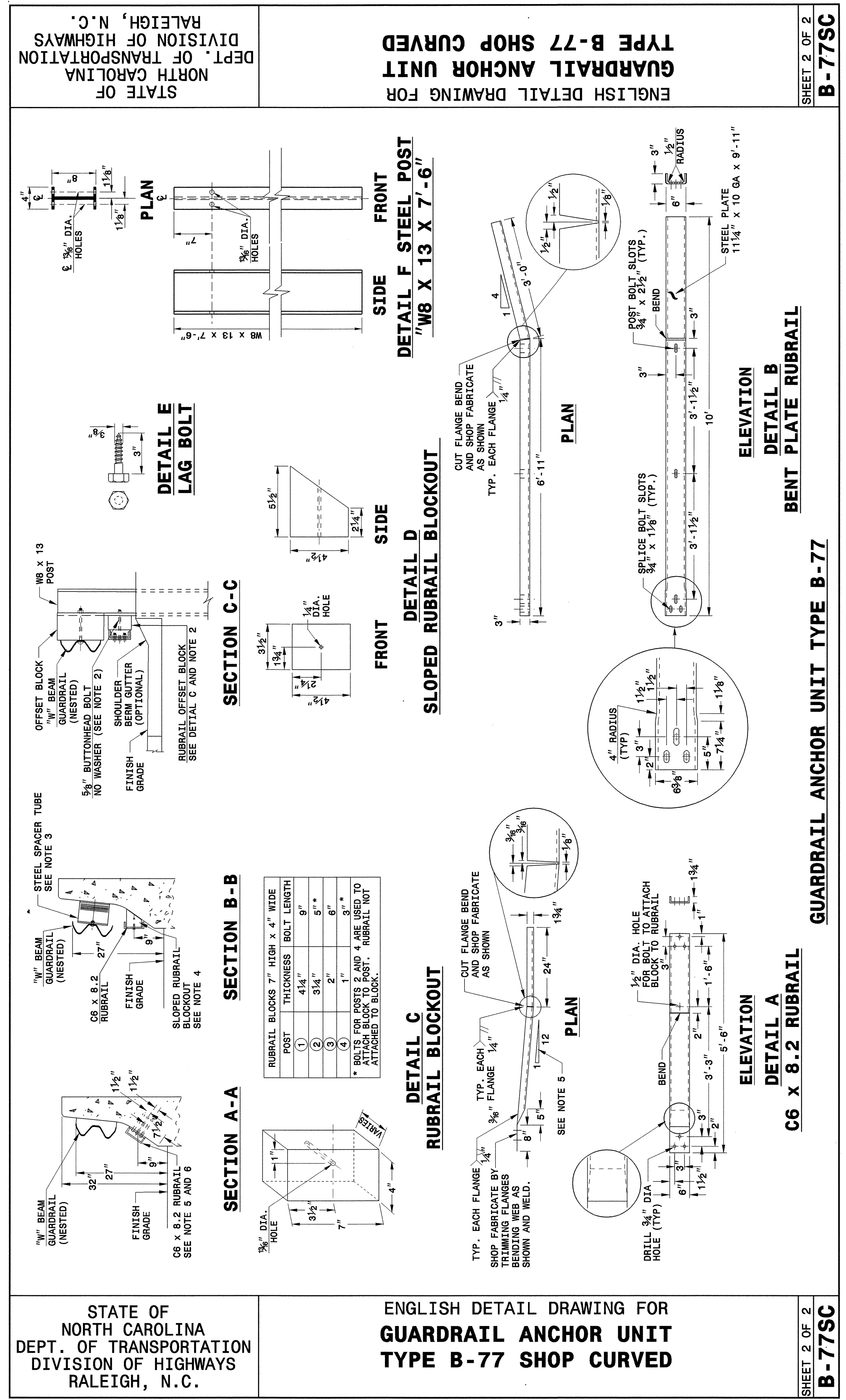
**ELEVATION**

**PLAN**

- GENERAL NOTES: (A) THROUGH (G) REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL. RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH 3/4\"/>
  - 1) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH 3/4\"/>
  - 2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 2 AND 4, SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A 5/8\"/>
  - 3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE WITH INSIDE DIAMETER X 9\"/>
  - 4) SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE 3/4\"/>
  - 5) 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) ANCHOR EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS. RUBRAIL SHALL BE ANCHORED USING THREE 5/8\"/>
  - 7) POSTS 1 AND 2 ARE W6 X 13, 7'-6\"/>

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

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



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

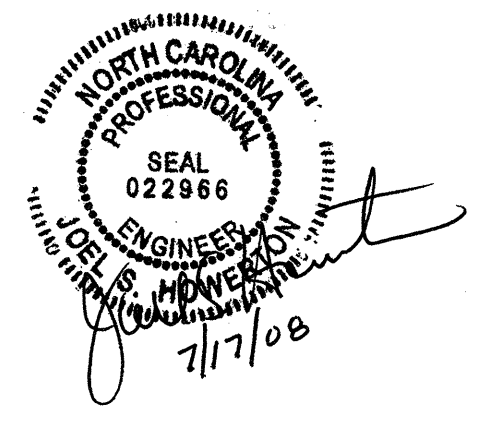
ENGLISH DETAIL DRAWING FOR  
**GUARDRAIL ANCHOR UNIT  
TYPE B-77 SHOP CURVED**

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

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: 5/5/08  
FILE SPEC.: @scguardrail/NCHRP350approved/B-77.dgn



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**SUMMARY OF QUANTITIES**

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C201922

ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION	3045000000-E	862	125	LF	STEEL BM GUARDRAIL, SHOP CURVED	6006000000-E	1610	75	TON	STONE FOR EROSION CONTROL, CLASS A
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING	3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS	6009000000-E	1610	205	TON	STONE FOR EROSION CONTROL, CLASS B
0043000000-N	226	Lump Sum		GRADING	3165000000-N	SP	1	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** (TL-2)	6012000000-E	1610	65	TON	SEDIMENT CONTROL STONE
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING	3180000000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** (B-77, SHOP CURVED)	6015000000-E	1615	1	ACR	TEMPORARY MULCHING
0057000000-E	226	500	CY	UNDERCUT EXCAVATION	3270000000-N	SP	3	EA	GUARDRAIL ANCHOR UNITS, TYPE 350	6018000000-E	1620	50	LB	SEED FOR TEMPORARY SEEDING
0080000000-E	SP	475	TON	CLASS IV SUBGRADE STABILIZATION	3317000000-N	862	3	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77	6021000000-E	1620	0.25	TON	FERTILIZER FOR TEMPORARY SEEDING
0195000000-E	265	500	CY	SELECT GRANULAR MATERIAL	3559000000-E	866	40	LF	** STRAND BARBED WIRE FENCE WITH POSTS (6)	6024000000-E	1622	30	LF	TEMPORARY SLOPE DRAINS
0196000000-E	270	500	SY	FABRIC FOR SOIL STABILIZATION	3649000000-E	876	5	TON	RIP RAP, CLASS B	6027000000-N	1622	1	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
0318000000-E	300	5	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS	3656000000-E	876	160	SY	FILTER FABRIC FOR DRAINAGE	6029000000-E	SP	300	LF	SAFETY FENCE
0708000000-E	310	26	LF	15" BIT COAT CS PIPE CULVERTS, TYPE B 0.064" THICK	3659000000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	6030000000-E	1630	340	CY	SILT EXCAVATION
1220000000-E	545	100	TON	INCIDENTAL STONE BASE	4072000000-E	903	13	LF	SUPPORTS, 3-LB STEEL U-CHANNEL	6036000000-E	1631	390	SY	MATting FOR EROSION CONTROL
1489000000-E	610	282	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	4102000000-N	904	1	EA	SIGN ERECTION, TYPE E	6038000000-E	SP	110	SY	PERMANENT SOIL REINFORCEMENT MAT
1525000000-E	610	239	TON	ASPHALT CONC SURFACE COURSE, TYPE SP9.5A	4155000000-N	907	4	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6042000000-E	1632	20	LF	1/4" HARDWARE CLOTH
1560000000-E	620	28	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22	4158000000-N	907	5	EA	DISPOSAL OF SIGN SYSTEM, WOOD	6071030000-E	SP	100	LF	COIR FIBER BAFFLES
2000000000-N	806	16	EA	RIGHT OF WAY MARKERS	4400000000-E	1110	312	SF	WORK ZONE SIGNS (STATIONARY)	6084000000-E	1660	1	ACR	SEEDING & MULCHING
2022000000-E	815	45	CY	SUBDRAIN EXCAVATION	4405000000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)	6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
2033000000-E	815	35	CY	SUBDRAIN FINE AGGREGATE	4410000000-E	1110	94	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)	6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
2044000000-E	815	200	LF	6" PERFORATED SUBDRAIN PIPE	4430000000-N	1130	24	EA	DRUMS	6096000000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
2055000000-E	815	6	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS	4435000000-N	1135	24	EA	CONES	6108000000-E	1665	0.75	TON	FERTILIZER TOPDRESSING
2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET	4445000000-E	1145	88	LF	BARRICADES (TYPE III)	6114000000-N	SP	2	HR	SPECIALIZED HAND MOWING
2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)	4450000000-N	1150	480	HR	FLAGGER	6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
2286000000-N	840	1	EA	MASONRY DRAINAGE STRUCTURES	4810000000-E	1205	6,400	LF	PAINT PAVEMENT MARKING LINES (4")					
2367000000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.29	6000000000-E	1605	850	LF	TEMPORARY SILT FENCE					
2556000000-E	846	15	LF	SHOULDER BERM GUTTER										
3030000000-E	862	75	LF	STEEL BM GUARDRAIL										



**SUMMARY OF EARTHWORK**  
 IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
-L- 12+75.00 TO 15+34.00 (BEGIN BRIDGE)	26		541	515	
-L- 15+34 TO 15+60 (STRUCTURE EXCAVATION)	132				132
-L- 16+26 TO 16+64 (STRUCTURE EXCAVATION)	265				265
-L- 16+64.00 (END BRIDGE) TO 19+50.00	176		739	563	
<b>TOTAL</b>	<b>599</b>		<b>1,280</b>	<b>1,078</b>	<b>397</b>
LOSS DUE TO CLEARING & GRUBBING	-75			75	
WASTE TO REPLACE BORROW				-397	-397
<b>PROJECT TOTAL</b>	<b>524</b>		<b>1,280</b>	<b>756</b>	<b>0</b>
ESTIMATE 5% TO REPLACE TOPSOIL ON BORROW PIT				38	
<b>GRAND TOTAL (CUBIC YARDS)</b>	<b>524</b>			<b>794</b>	
SAY (CUBIC YARDS)	600			800	

SELECT GRANULAR MATERIAL (CL II or III) = 500 CY (THESE ARE CONTINGENCY ITEMS PER 'GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED AUGUST 22, 2006)  
 ESTIMATED UNDERCUT = 500 CY

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".

**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.

**SUMMARY OF PAVEMENT REMOVAL**  
 IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE BREAK-UP
-L- 14+50 TO 15+49	223			
-L- 16+32 TO 17+50	273			
<b>GRAND TOTAL</b>	<b>496</b>			
SAY	500			

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

STATION	SIZE	THICKNESS OR GAUGE	LOCATION (L/RT OR CL)	STRUCTURE NO.	TOP 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	ENDWALLS				QUANTITIES FOR DRAINAGE STRUCTURES				PERFORMED SCOUR HOLE	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"	15"	18"	24"	R.C.P.	C.S.P.	PER EACH (0' THRU 5.0')	5.0' THRU 10.0'							10.0' AND ABOVE	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
-L- 15+10	12"	1/2"	LT	1	2942.1																								
-L- 15+08	12"	1/2"	LT	2		2939.3	2933.5																						
-L- 15+05	12"	1/2"	LT	2	2933.5																								
<b>TOTALS</b>								26							1									1	1				

\*"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.

**GUARDRAIL SUMMARY**

G = GATING IMPACT ATTENUATOR TYPE 350  
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

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 TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS		
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	B-77	GRAU 350	TL-2	PERMITTED	NO.	G	NG							
-L-	14+61	15+35	RT	81.25			15+35		5.00	8.00	50.00		7.25			1	1											
-L-	14+45	15+35	LT	50.00	31.25			15+35	5.00	8.00		50.00		1.00		1*	1											*
-L- /-Y-	-L- 16+63	-Y- 10+47	RT/RT	93.75	25.00			-Y- 10+47	5.00	8.00				NA		1		1										
-L-	16+63	18+26	LT	81.25	75.00		17+75		5.00	8.00	50.00		1.00			1	1											
	<b>SUBTOTAL</b>			306.25	131.25											4	3	1										
	<b>LESS ANCHORS</b>	<b>GRAU-350</b>		3 x 50.00' =	150.00																							
		<b>B-77</b>		4 x 18.75' =	56.25																							
		<b>TL-2</b>		1 x 25.00' =	25.00																							
	<b>TOTAL</b>			75.00	112.50																							ADDITIONAL GUARDRAIL POSTS = 5 EACH

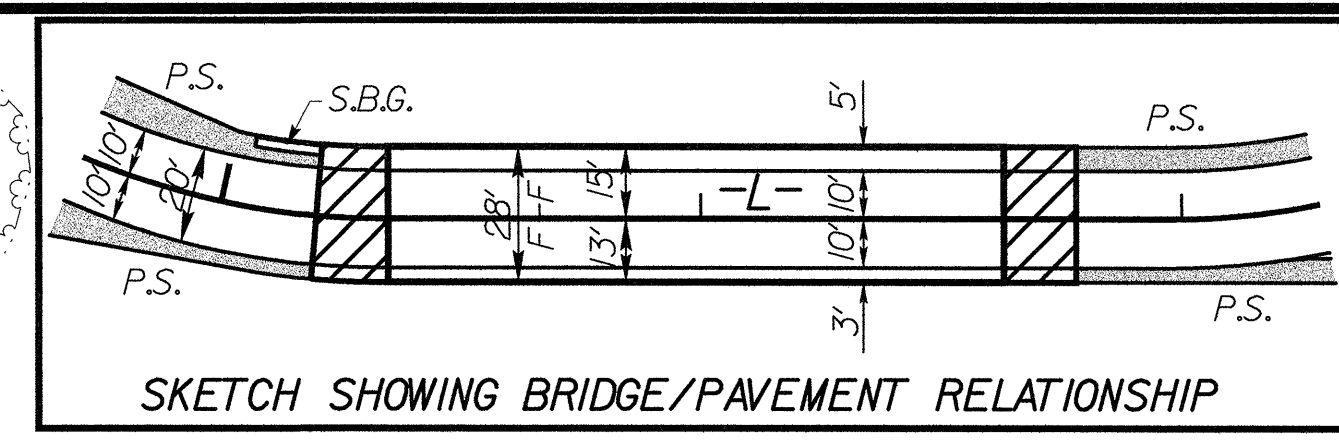
4/04/06

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PI Sta 11+46.54  
 $\Delta = 38^\circ 50' 13.1''$  (RT)  
 D = 14' 19" 26.2"  
 L = 271.13'  
 T = 141.01'  
 R = 400.00'

PI Sta 14+60.11  
 $\Delta = 60^\circ 24' 03.3''$  (LT)  
 D = 36' 57" 54.1"  
 L = 163.40'  
 T = 90.21'  
 R = 155.00'  
 RO = 60'  
 S.E. = 0.04 ft/ft  
 V = 25 mph

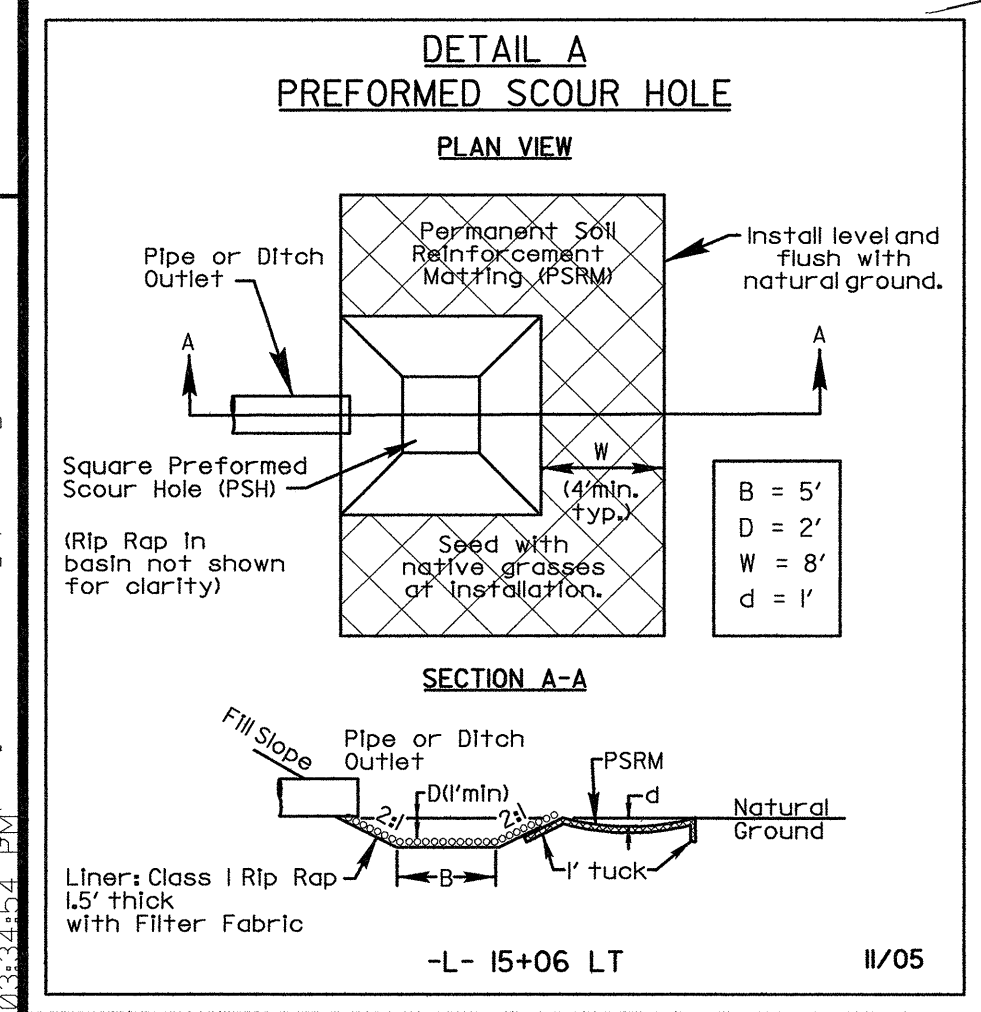
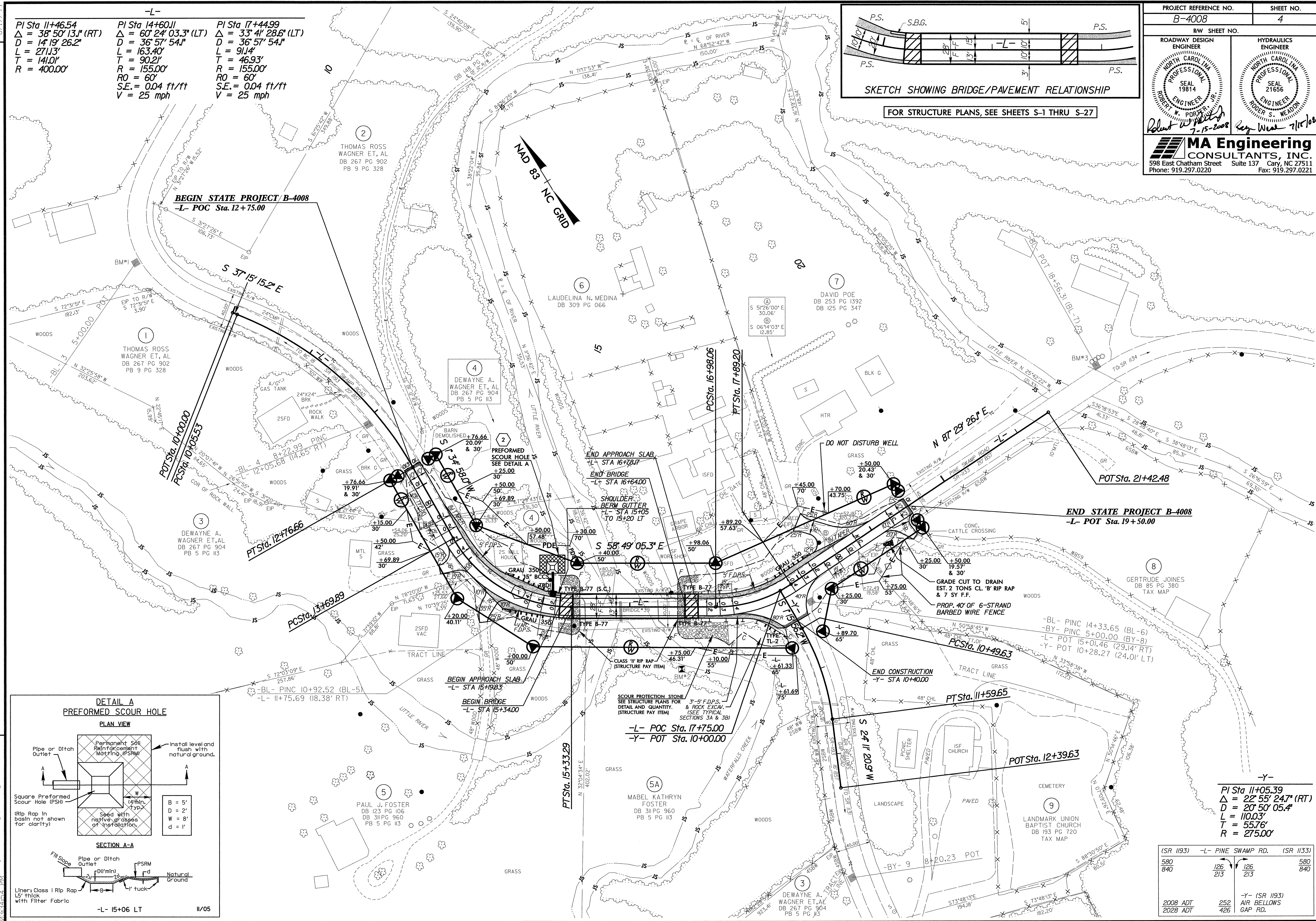
PI Sta 17+44.99  
 $\Delta = 33^\circ 41' 28.6''$  (LT)  
 D = 36' 57" 54.1"  
 L = 91.14'  
 T = 46.93'  
 R = 155.00'  
 RO = 60'  
 S.E. = 0.04 ft/ft  
 V = 25 mph



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP  
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-27

PROJECT REFERENCE NO. B-4008	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>MA Engineering CONSULTANTS, INC.</b> 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

REVISIONS



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PI Sta 11+05.39  
 $\Delta = 22^\circ 55' 24.7''$  (RT)  
 D = 20' 50" 05.4"  
 L = 110.03'  
 T = 55.76'  
 R = 275.00'

(SR 1193)	-L- PINE SWAMP RD.	(SR 1133)
580	126	580
840	213	840
	126	
	213	
2008 ADT	252	-Y- (SR 1193)
2028 ADT	426	AIR BELLOWS GAP RD.

5/28/08

BM\*1 = -BL- 3  
IRON AND CAP  
-BL- STA.5+00.00  
ELEVATION = 2,988.46'

BM\*2 8" SPIKE IN ROOT  
OF 10" TRIPLE MAPLE  
-L- STA.16+59.22 (70.82' RT)  
ELEVATION = 2,933.87

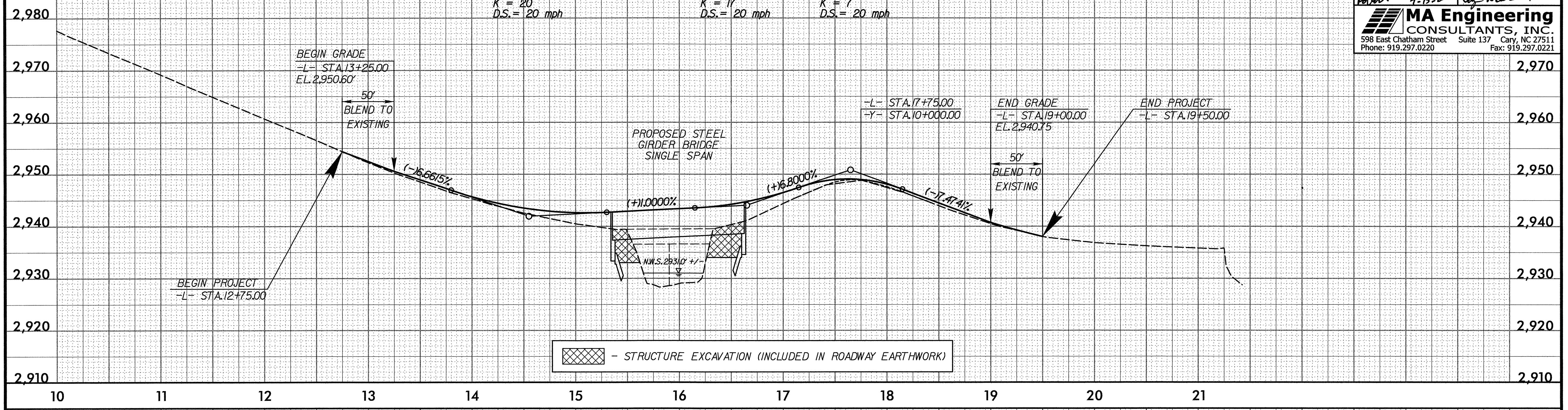
BM\*3 = -BL- 7  
IRON AND CAP  
-BL- STA.18+56.31  
ELEVATION = 2,935.20'

PROJECT REFERENCE NO. B-4008	SHEET NO. 5
ROADWAY DESIGN ENGINEER ROBERT W. PORTER, JR. SEAL 19814	HYDRAULICS ENGINEER ROGER S. WEADON SEAL 21656
<b>MA Engineering</b> CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

PI = 14+55.00  
EL = 2,941.94'  
VC = 150'  
K = 20  
D.S. = 20 mph

PI = 16+65.00  
EL = 2,944.04'  
VC = 100'  
K = 17  
D.S. = 20 mph

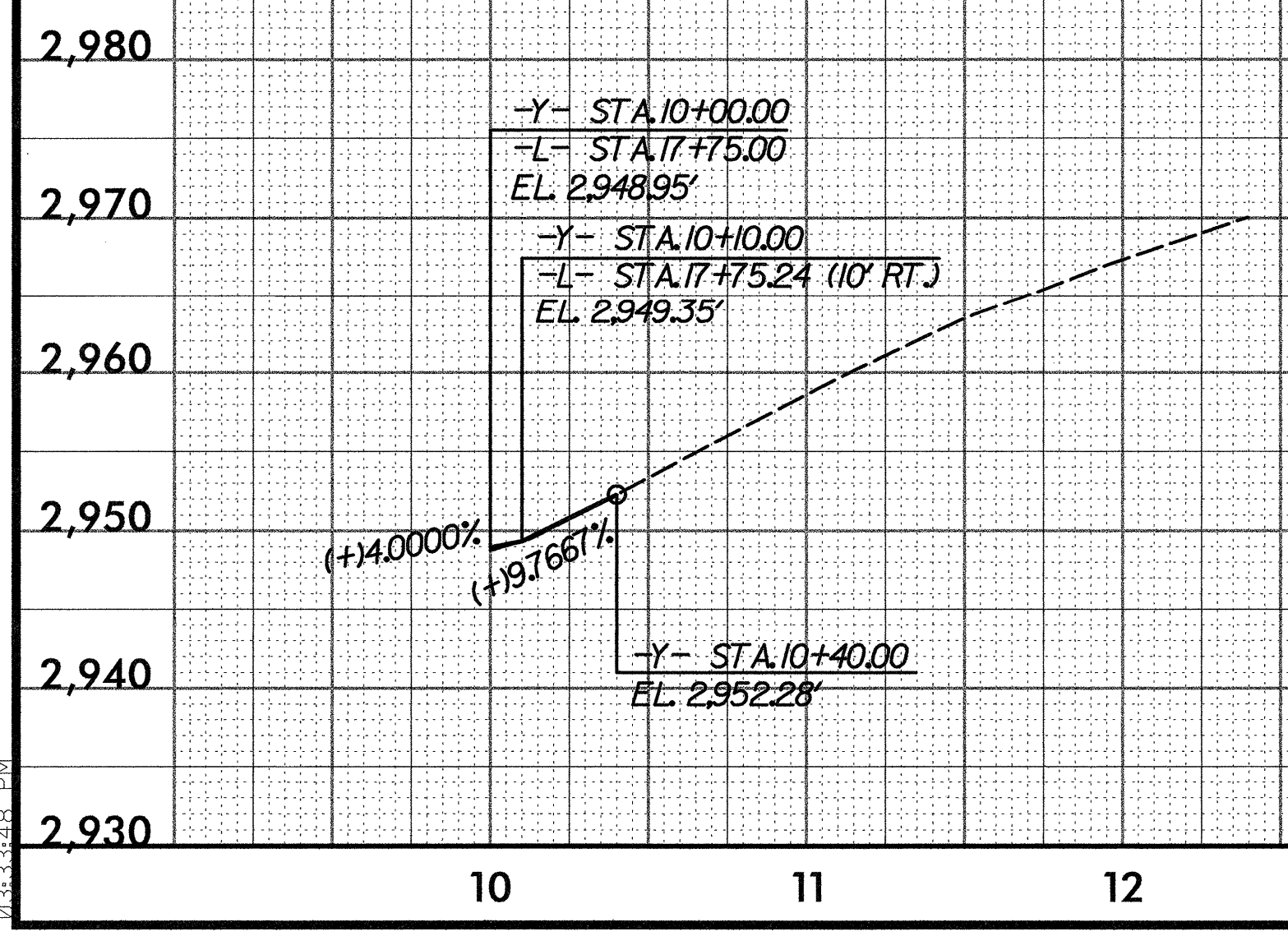
PI = 17+65.00  
EL = 2,950.84'  
VC = 100'  
K = 7  
D.S. = 20 mph



▨ - STRUCTURE EXCAVATION (INCLUDED IN ROADWAY EARTHWORK)

-Y-

BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 3,100	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 2,937.5	FT
BASE DISCHARGE	= 4,600	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2,938.6	FT
OVERTOPPING DISCHARGE	= 10,000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2,942.6	FT
ESTIMATED NORMAL WATER SURFACE ELEVATION	= 2,931.0 +/-	FT
DATE OF SURVEY	= MARCH 2006	
W.S. ELEVATION AT DATE OF SURVEY	= 2,931.0 +/-	FT



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