

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

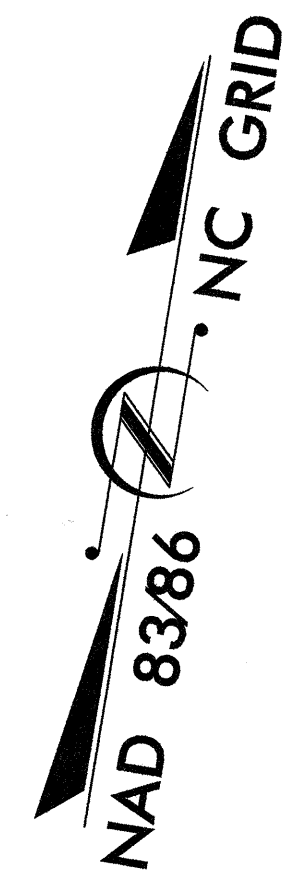
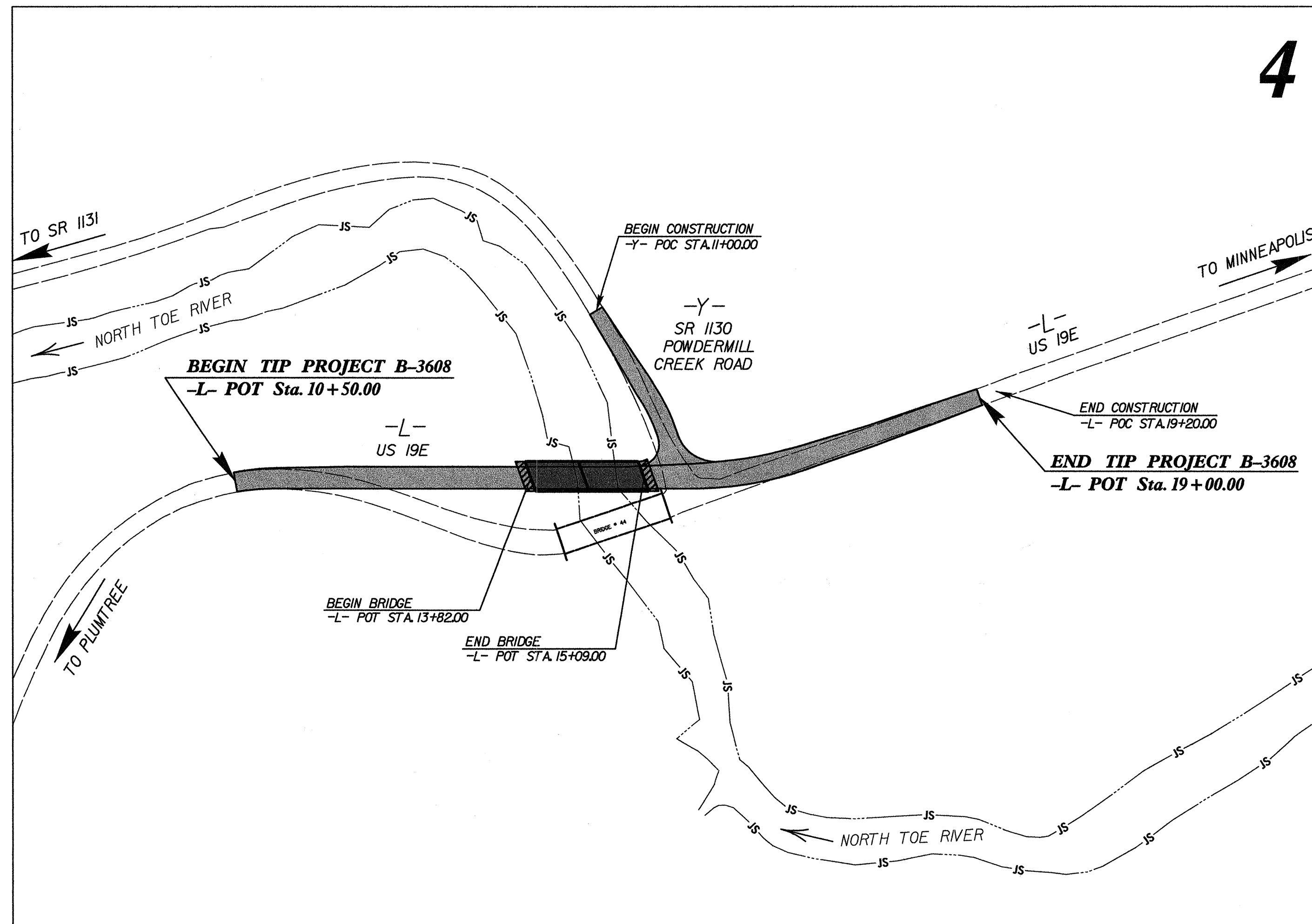
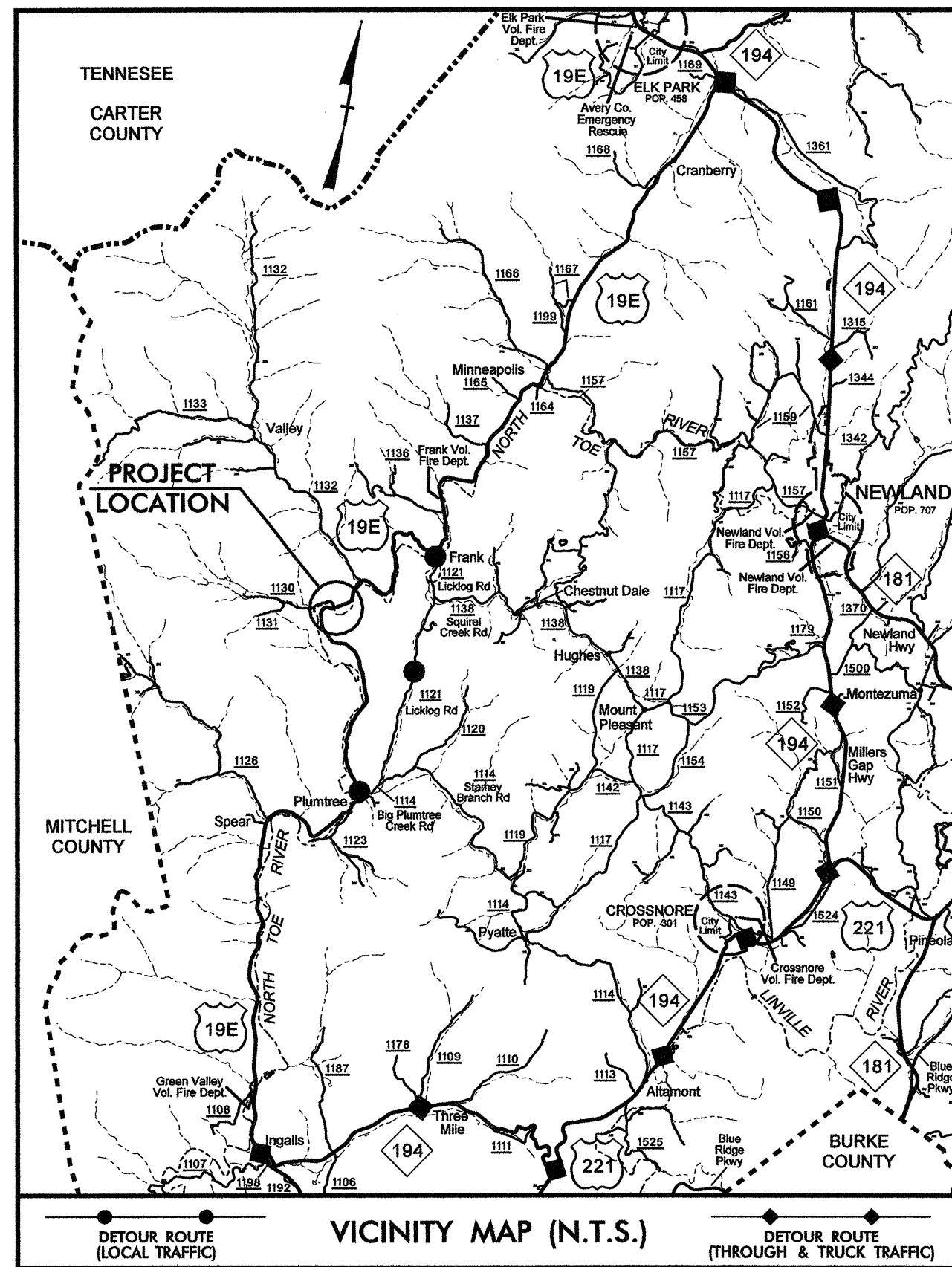
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

AVERY COUNTY

LOCATION: BRIDGE NO. 44 OVER NORTH TOE RIVER ON US 19E
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

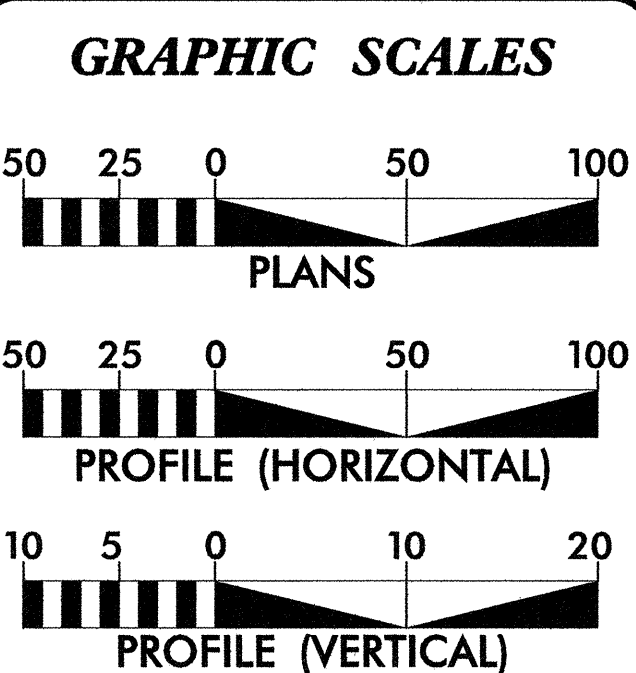
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3608	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33161.1.1	BRSTP-19E (3)	PE	
33161.2.1	BRSTP-19E (3)	R/W, UTILITIES	
33161.3.1	BRSTP-19E (3)	CONSTRUCTION	

TIP PROJECT: B-3608



CONTRACT: C202324

****DESIGN EXCEPTION**
MIN. HORIZ. CURVE RADIUS
HORIZONTAL SSD



DESIGN DATA

ADT 2010	=	2,170
ADT 2030	=	3,985
DHV	=	9 %
D	=	55 %
T	=	8 % *
V	=	55 MPH **
* (TTST 2% + DUAL 6%)		
FUNC. CLASS	=	RURAL MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3608	=	0.137 mile
LENGTH STRUCTURES TIP PROJECT B-3608	=	0.024 mile
TOTAL LENGTH TIP PROJECT B-3608	=	0.161 mile

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:
M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 20, 2009

LETTING DATE:
FEBRUARY 16, 2010

ROBERT W. PORTER, JR PE
PROJECT ENGINEER

KEVIN S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

Robert W. Porter, Jr. 11/23/09 P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

Robert W. Porter, Jr. 11-23-09 P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

Robert W. Porter, Jr. P.E.
STATE HIGHWAY DESIGN ENGINEER

NCDOT CONTACT:
MR. DOUG TAYLOR, PE - ENGINEERING
COORDINATION SECTION ENGINEER -
ROADWAY DESIGN UNIT

11/23/2009 R:\Roadway\Proj\B3608_Rdy_tsh.dgn 11:08:18 AM

PROJECT REFERENCE NO. B-3608	SHEET NO. 1-A
M A Engineering Consultants, Inc. 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: 07-30-08

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 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.

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:
Power - Progress Energy
Telephone - AT&T

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

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 Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
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	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
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
876.02	Guide for Rip Rap at Pipe Outlets

INDEX OF SHEETS

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2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAIL
2-A	DETAIL OF ANCHORAGE FOR FRAMES
2-B	DETAIL OF STRUCTURE ANCHOR UNIT, TYPE B-77 SHOP CURVED
2-C THRU 2-D	METHOD OF PIPE INSTALLATION
3	SUMMARY OF QUANTITIES
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5	PROFILE SHEET
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PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY
X-1 THRU X-10	CROSS-SECTIONS
S-1 THRU S-22	STRUCTURE PLANS

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	-x-x-x-
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	○ 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	----- FLD
False Sump	▽

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ CSX TRANSPORTATION 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	○
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 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	○ WCFR
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	○
Storm Sewer	----- S

UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	○
Power Line Tower	⊠
Power Transformer	⊠
U/G Power Cable Hand Hole	□
H-Frame Pole	●
Recorded U/G Power Line	----- P
Designated U/G Power Line (S.U.E.*)	----- P

TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	○
Telephone Booth	□
Telephone Pedestal	□
Telephone Cell Tower	⊠
U/G Telephone Cable Hand Hole	□
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	□
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:

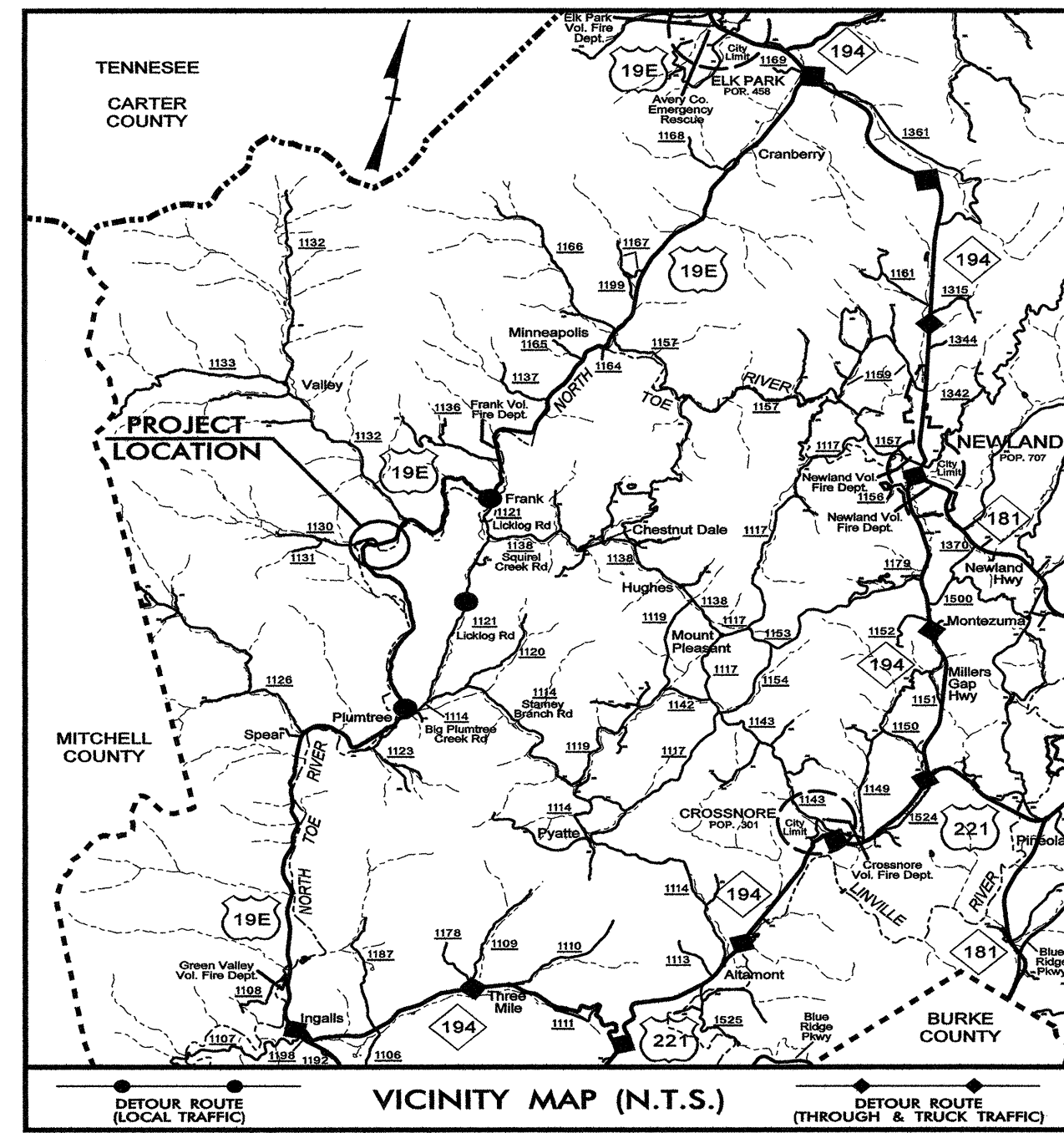
Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	----- SS
Above Ground Sanitary Sewer	----- A/G Sanitary Sewer
Recorded SS Forced Main Line	----- FSS
Designated SS Forced Main Line (S.U.E.*)	----- FSS

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.

9/15/06
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SURVEY CONTROL SHEET B-3608



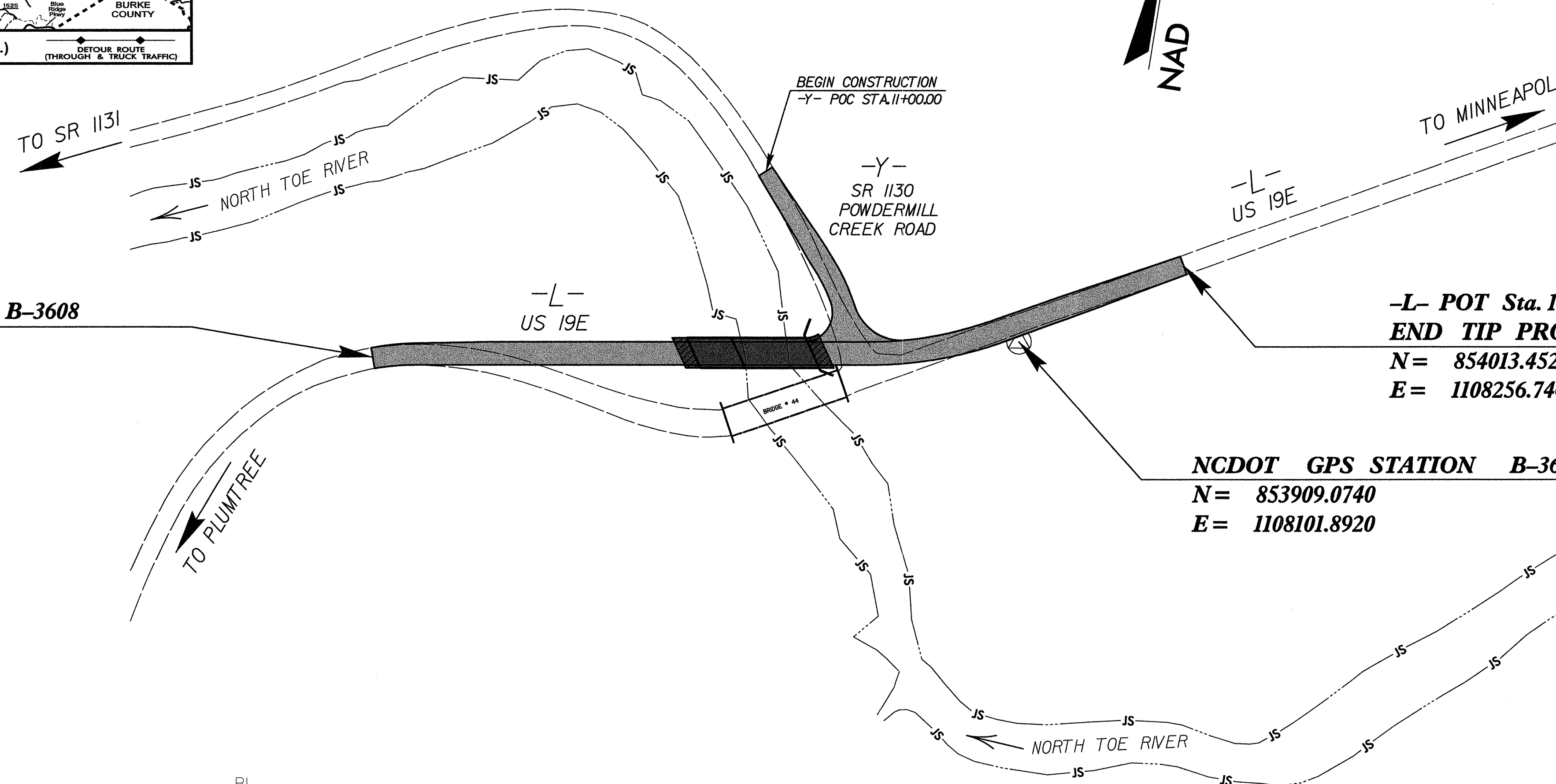
NAD 83/86
NC GRID

-L- POT Sta. 19+00.00
END TIP PROJECT B-3608-2
N= 854335.8880
E= 1108823.1670

-L- POT Sta. 10+50.00
BEGIN TIP PROJECT B-3608
N= 853786.0156
E= 1107447.1404

-L- POT Sta. 19+00.00
END TIP PROJECT B-3608
N= 854013.4522
E= 1108256.7464

NCDOT GPS STATION B-3608-1
N= 853909.0740
E= 1108101.8920



BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL3	(BL-3)	853778.6721	1107389.5760	2940.09'	OUTSIDE PROJECT LIMITS	
BL4	(BL-4)	853819.9382	1107942.4032	2946.77'	15+44.49	50.33' RT
GPSB36081	(GPS B3608-1)	853909.0740	1108101.8920	2946.99'	17+14.04	17.18' RT
GPSB36082	(GPS B3608-2)	854335.8880	1108823.1670	2959.27'	OUTSIDE PROJECT LIMITS	
BY POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
BY5	(BY-5)	854058.0617	1107326.1777	2930.41'	OUTSIDE PROJECT LIMITS	
BY6	(BY-6)	854186.2463	1107672.3175	2939.94'	OUTSIDE PROJECT LIMITS	
BY7	(BY-7)	854014.6540	1107822.2365	2945.52'	11+22.68	12.29' RT
BY8	(BL-4)	853819.9382	1107942.4032	2946.77'	OUTSIDE PROJECT LIMITS	

BM*1	ELEVATION=2935.97'					
N	853684.	E	1107926.			
L STATION 15+06 182' RIGHT						
8" SPIKE IN ROOT OF 12" MAPLE						

NOTES:

1. 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:
B3608_LS_CONTROL_080606.HTML

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 "B3608-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 853909.0740(ft) EASTING: 1108101.8920(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99983573 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3608-1" TO -L- STATION 10+50.00 IS S 79°21'20" W 666.22' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

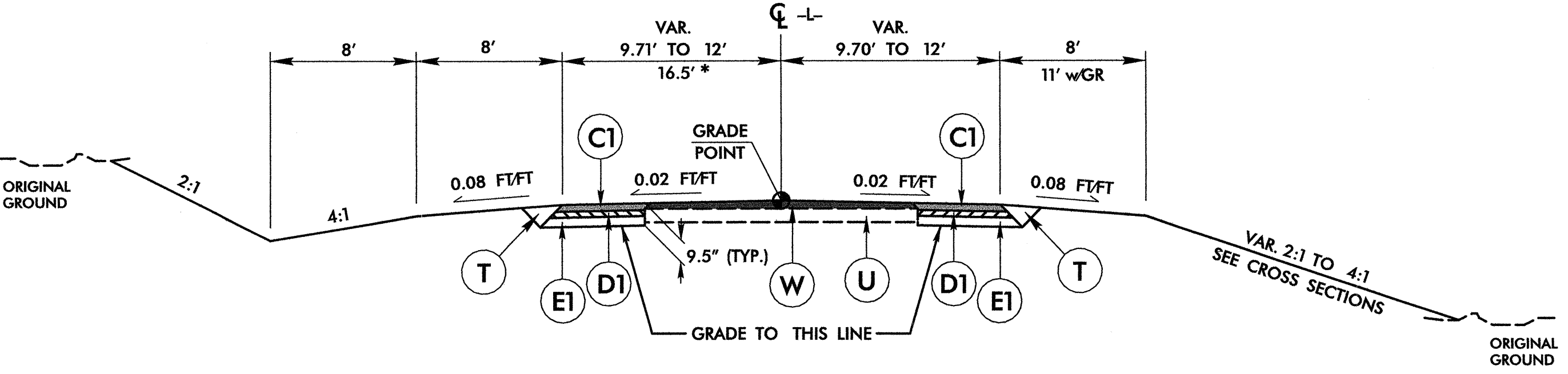
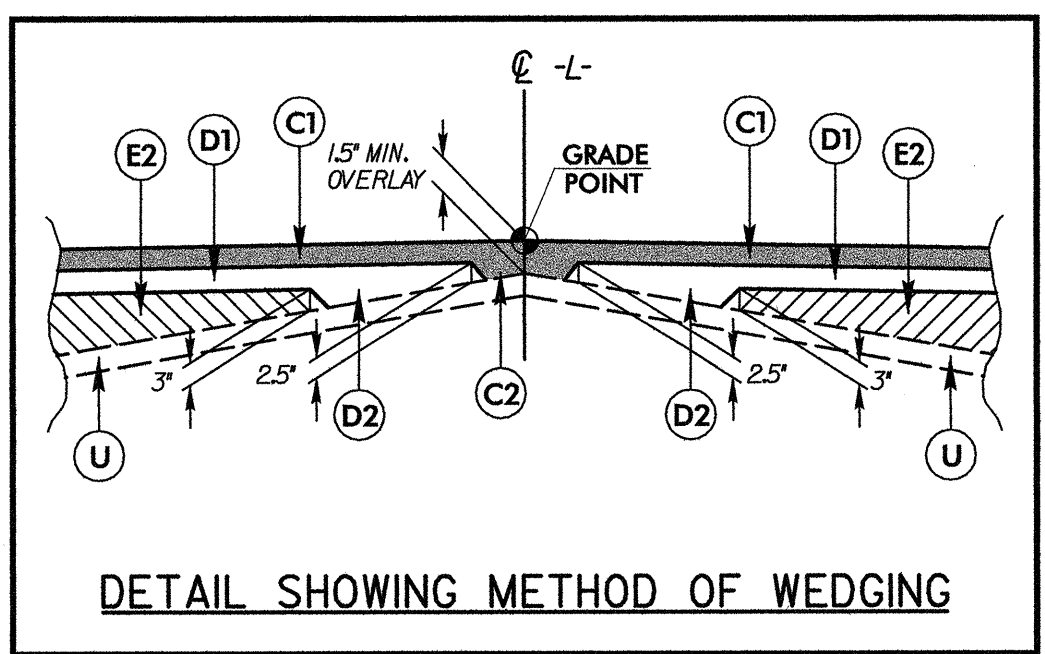
NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO. B-3608	SHEET NO. 2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER <i>Robert W. Porter</i> SEAL 19814 11-23-09	PAVEMENT DESIGN ENGINEER <i>Clark S. Morrison</i> SEAL 22898 11-23-09
 M A Engineering Consultants, Inc. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS PER SQUARE YARD IN EACH OF TWO LAYERS.
C2	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.5" OR GREATER THAN 2.0" IN DEPTH.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS PER SQUARE YARD.
D2	PROP. VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4.0" IN DEPTH.
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 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 WEDGING DETAIL THIS SHEET)

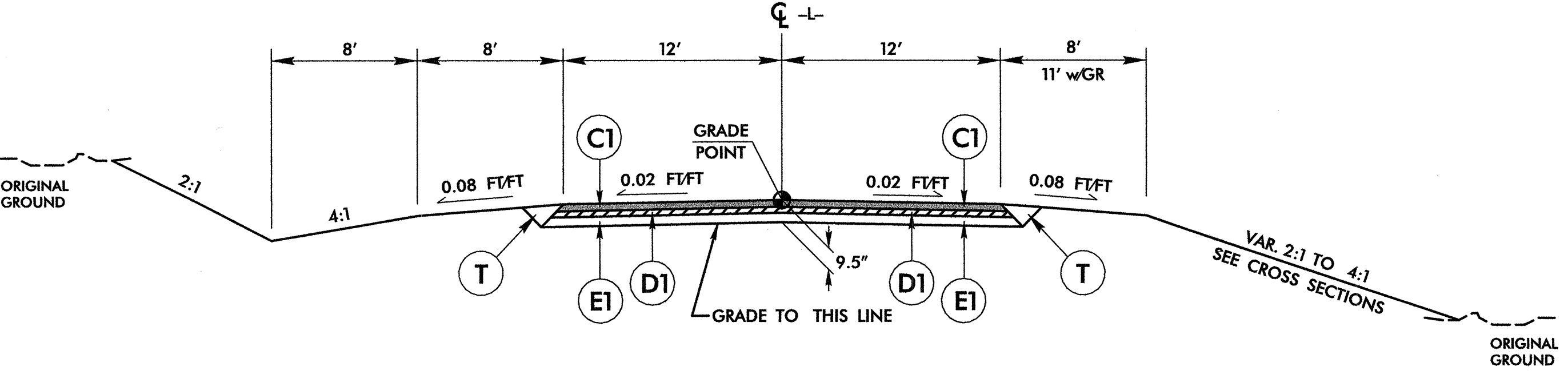
PAVEMENT EDGE SLOPES AND TRENCH SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 1

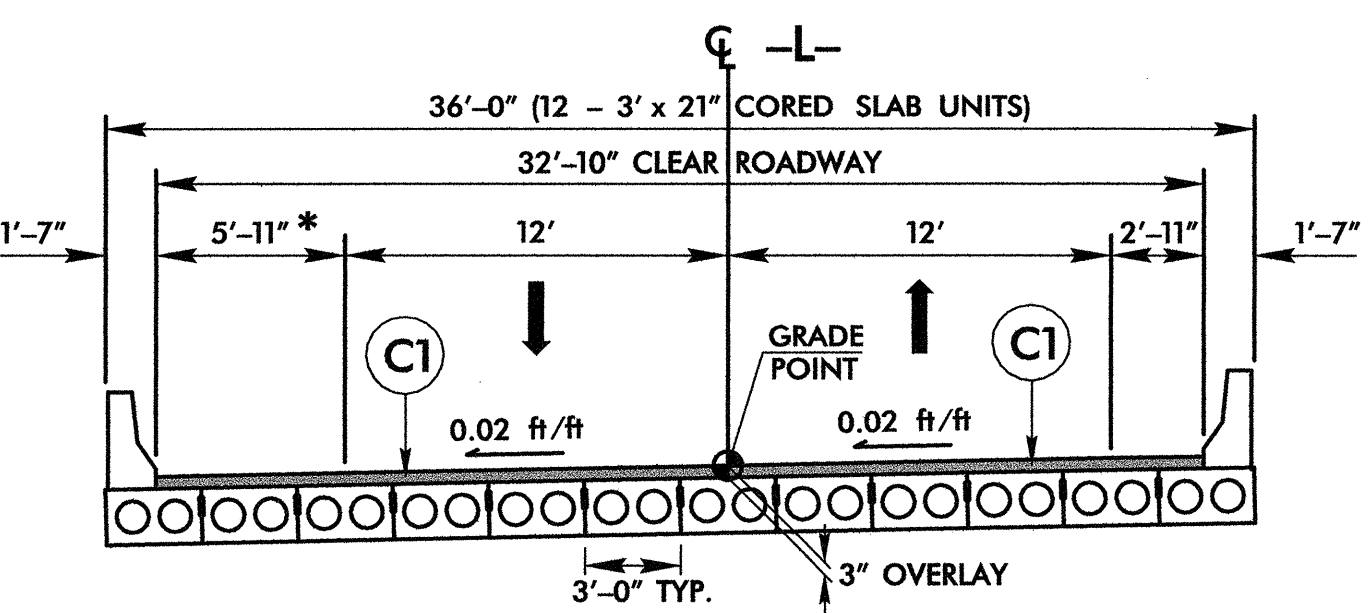
FROM -L- STA. 10+50.00 TO 12+21+/-
FROM -L- STA. 15+62+/- TO 19+00.00

*USE 16.5' INSIDE LANE (4.5' OF CURVE WIDENING):
FROM -L- STA. 15+89.27 TO 16+70.90 LT.
USE TAPER LENGTHS AS SHOWN ON PLAN SHEET 4.



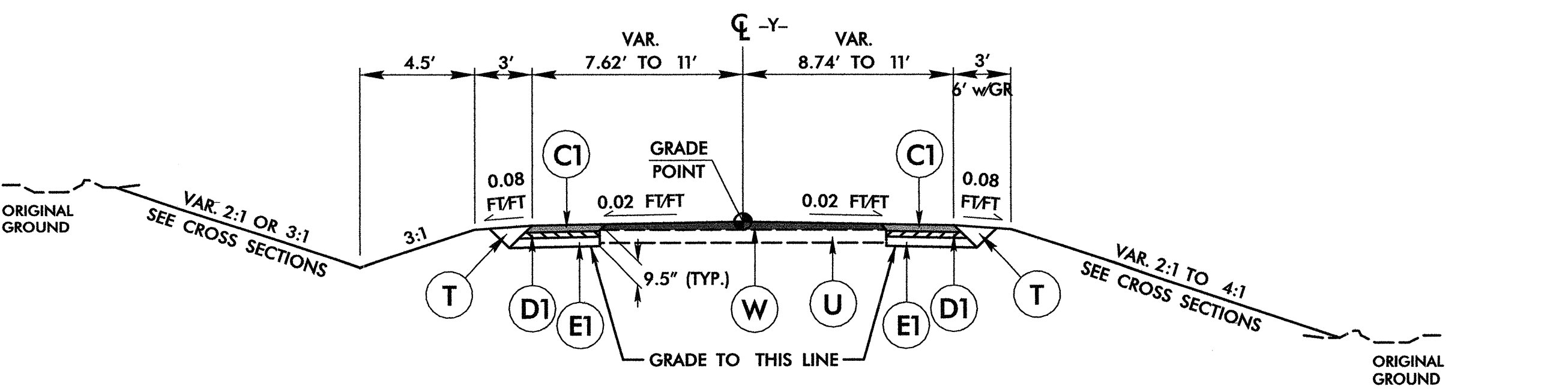
TYPICAL SECTION NO. 2

FROM -L- STA. 12+21+/- TO 13+82.00 (BEG. BRIDGE)
FROM -L- STA. 15+09.00 (END BRIDGE) TO 15+62+/-



TYPICAL SECTION ON STRUCTURE

FROM -L- STA. 13+82.00 TO 15+09.00
* BRIDGE RAIL OFFSET WIDTH ON LOW SIDE OF BRIDGE WIDENED DUE TO SPREAD.



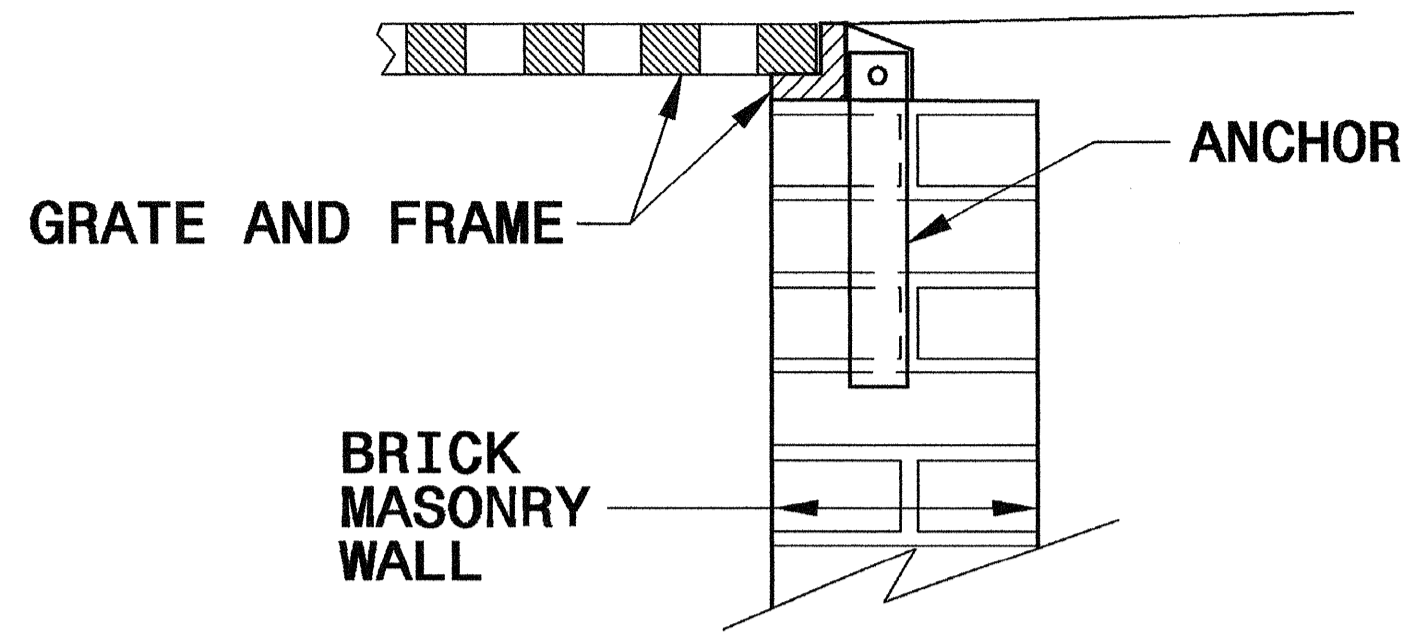
TYPICAL SECTION NO. 3

FROM -Y- STA. 11+00.00 TO 12+95.98

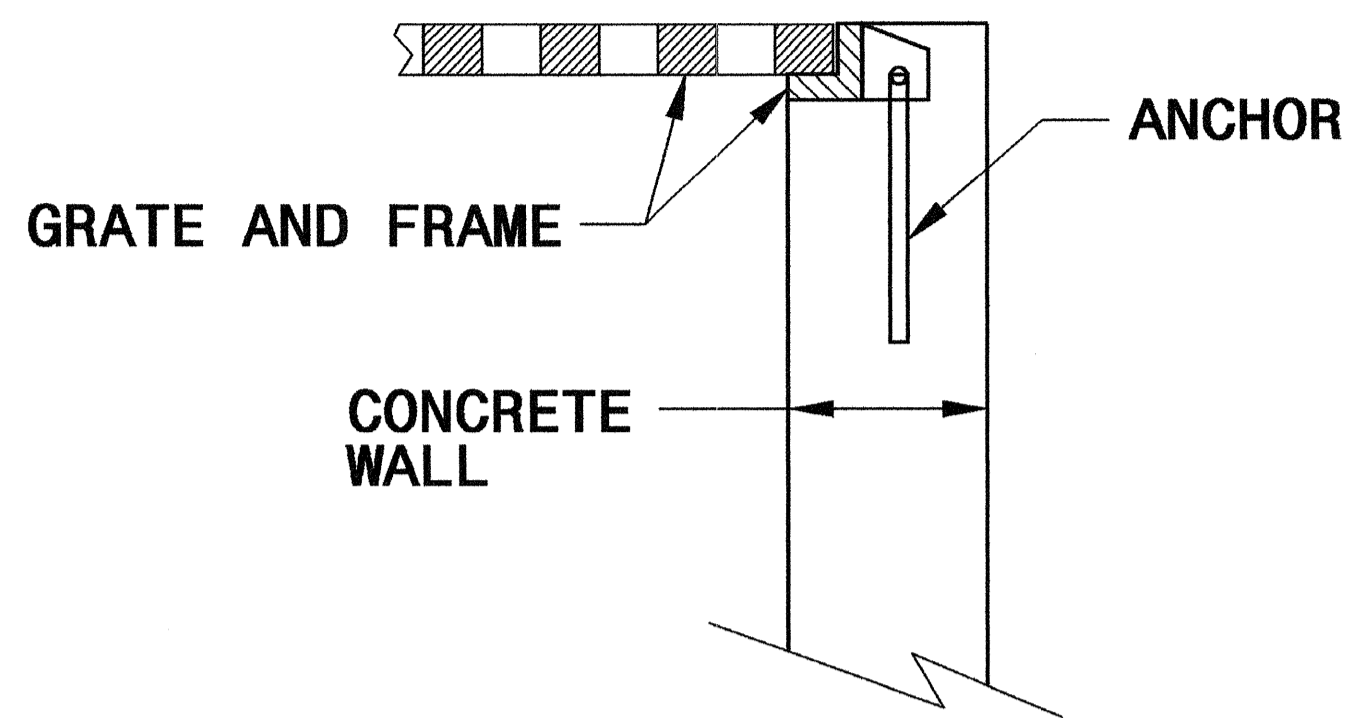
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

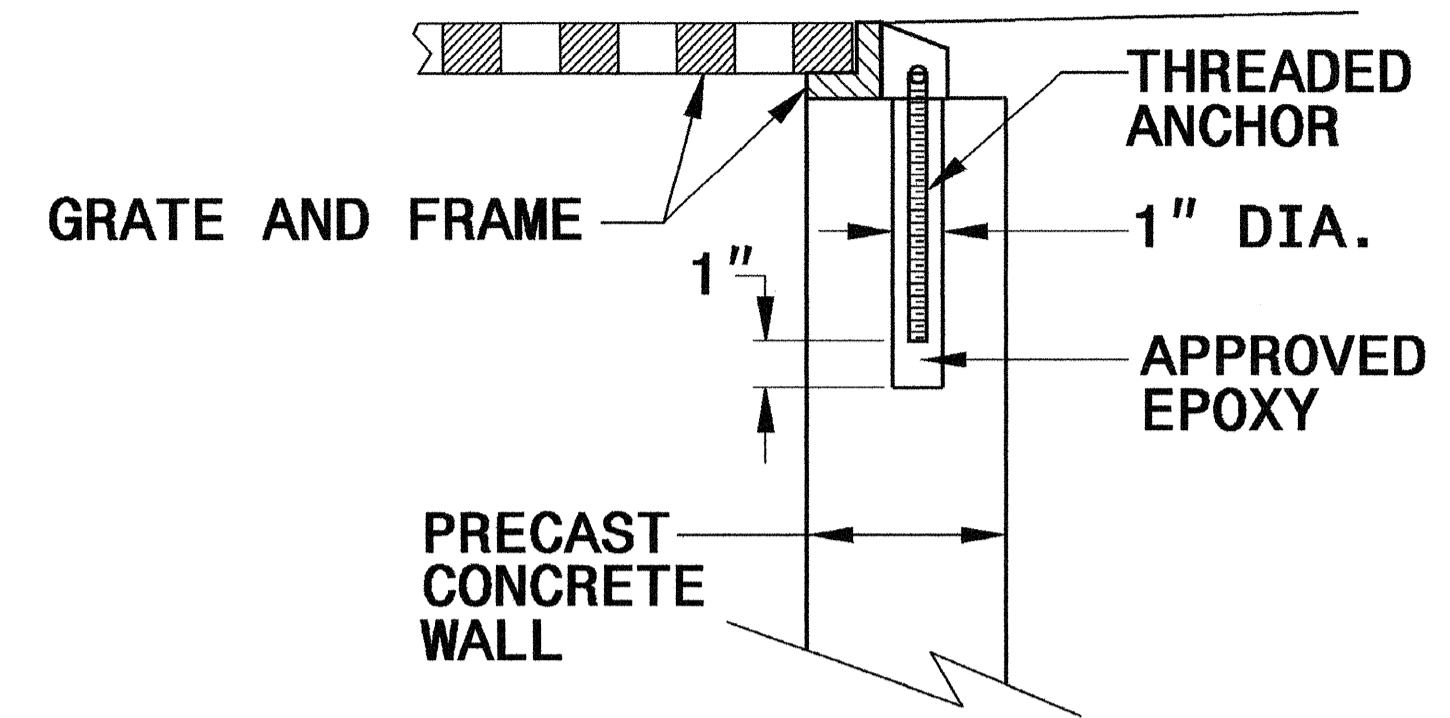
SHEET 1 OF 1
840D25



**BRICK MASONRY
CONSTRUCTION**



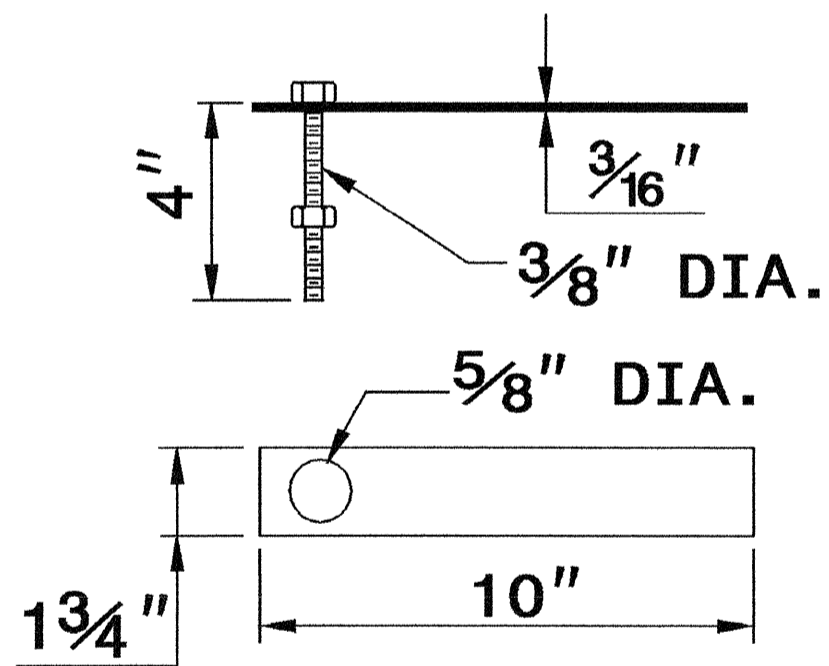
**CONCRETE
CONSTRUCTION**



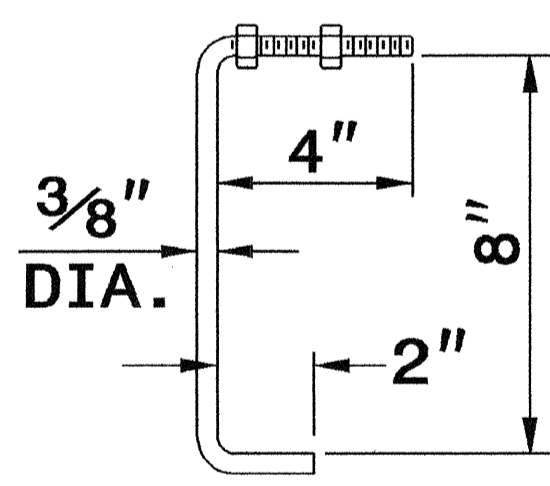
**PRECAST CONCRETE
CONSTRUCTION**

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

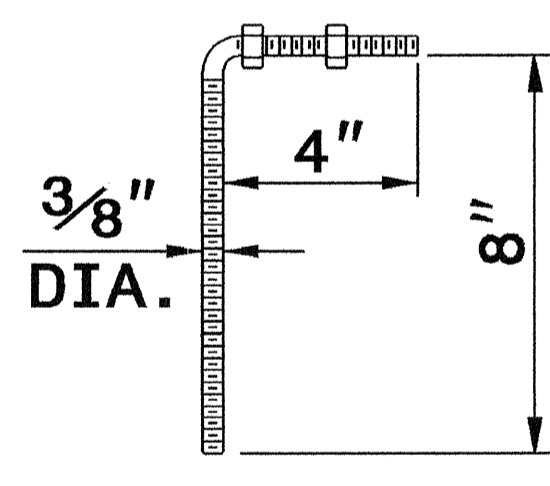
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL
OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



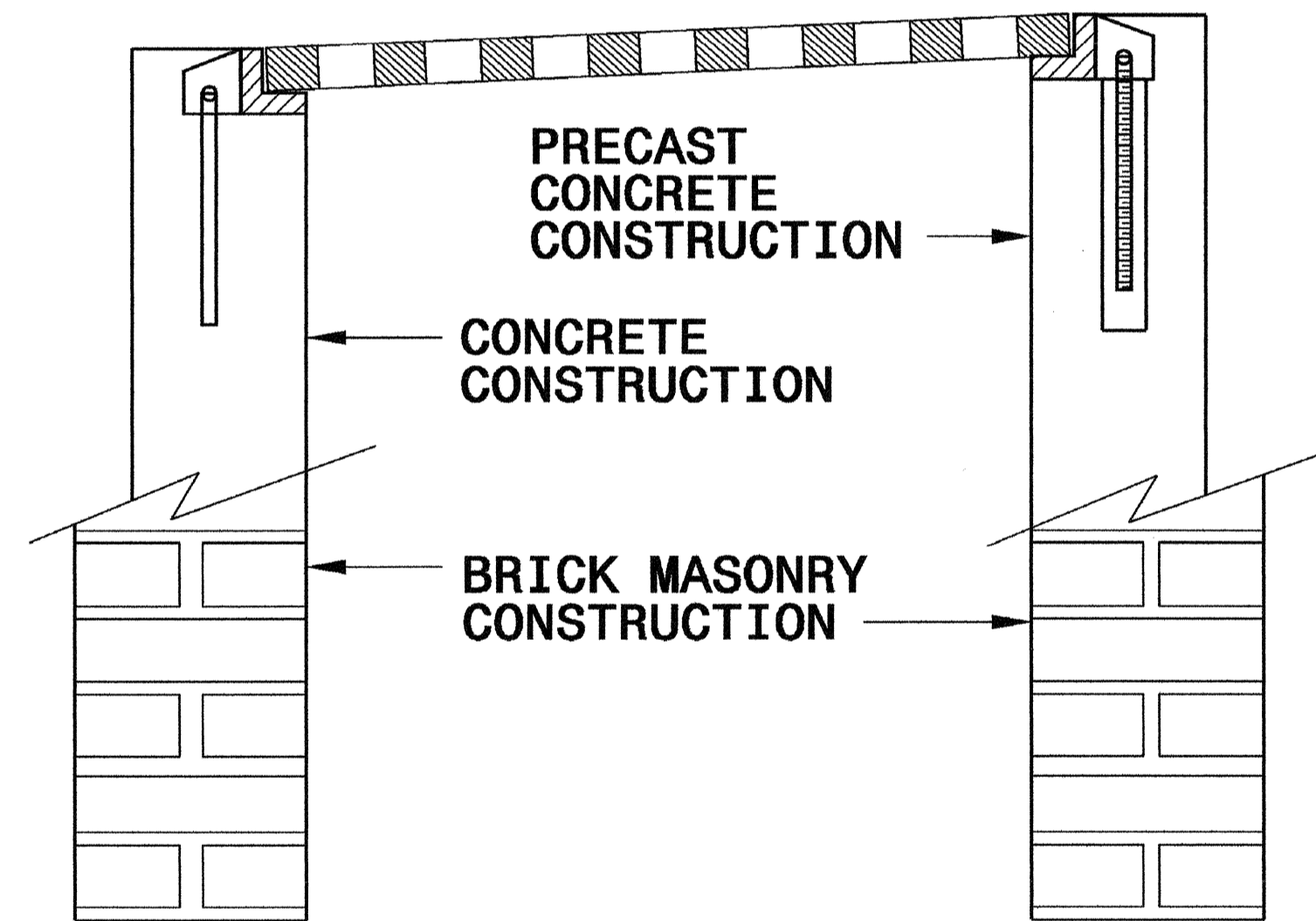
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



**PRECAST
CONCRETE ANCHOR**
3/8" DIA. BENT BAR

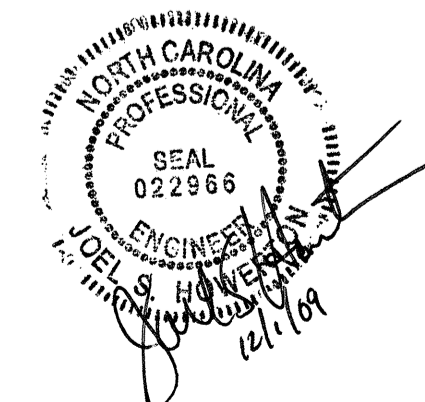


**FRAME AND GRATE INSTALLATION
FOR NORMAL CROWN AND
SUPERELEVATED SECTIONS**

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.: _____

7/2/99
 27-SEP-2006 08:59
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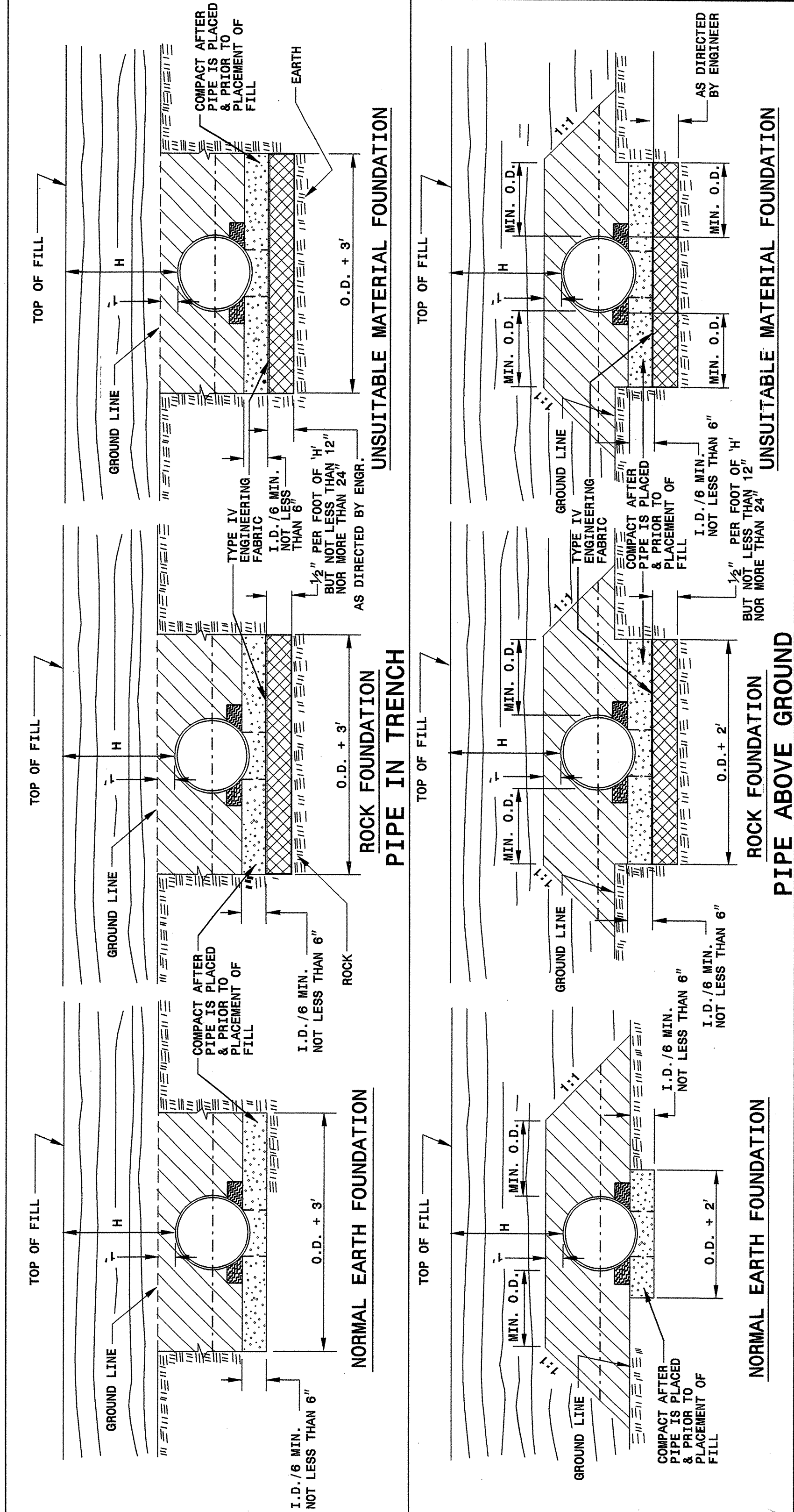
30-JUL-2009 08:48
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 Jhower-ton HI P5237501

5/14/99

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

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 FLEXIBLE PIPE

SHEET 1 OF 3
300D01



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

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 FLEXIBLE PIPE

SHEET 1 OF 3
300D01

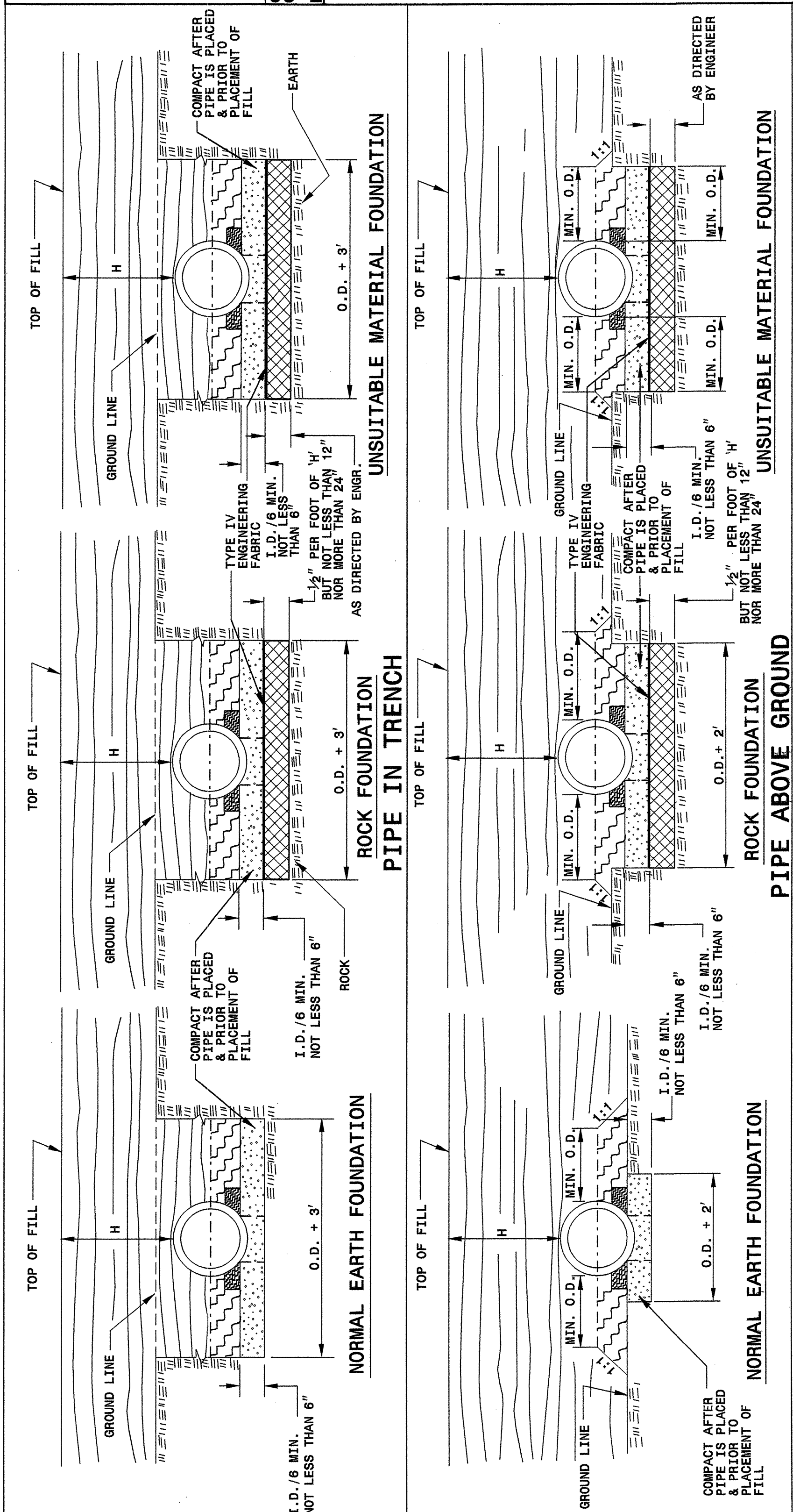
GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

- 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.

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 RIGID PIPE

SHEET 2 OF 3
300D01



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

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 RIGID PIPE

SHEET 2 OF 3
300D01

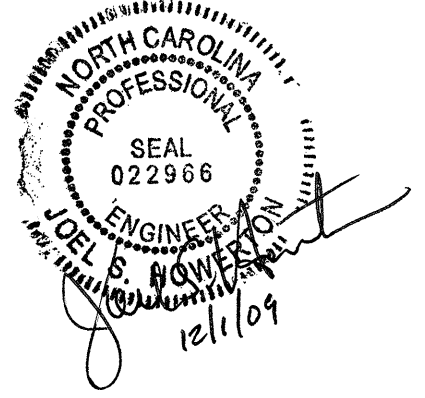
GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

- 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:
 CHECKED BY: DATE: 7/20/09
 FILE SPEC:\vericard\stds\stdstodetails\30001\0300d01.dgn



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) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69		
66	12				81	100
72	12					74
78	12					81
84	12					69

Round Corrugated Aluminum Pipe 2 2/3 x 1/2 corrugation **						
Diameter (inches)	Minimum cover (inches)	(Ga) 16	14	12	10	8
12	12	123	155	216	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** 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

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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION

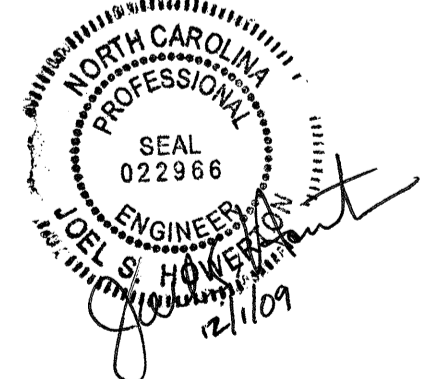
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

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

SEE PLATE FOR TITLE

ORIGINAL BY: K Kempf DATE: 5-15-09
 MODIFIED BY: *Joel S. Howerton* DATE: 7/20/09
 CHECKED BY: *Joel S. Howerton* DATE: 7/20/09
 FILE SPEC: /enward/stds/stdstodetails/30001/0300d01.dgn



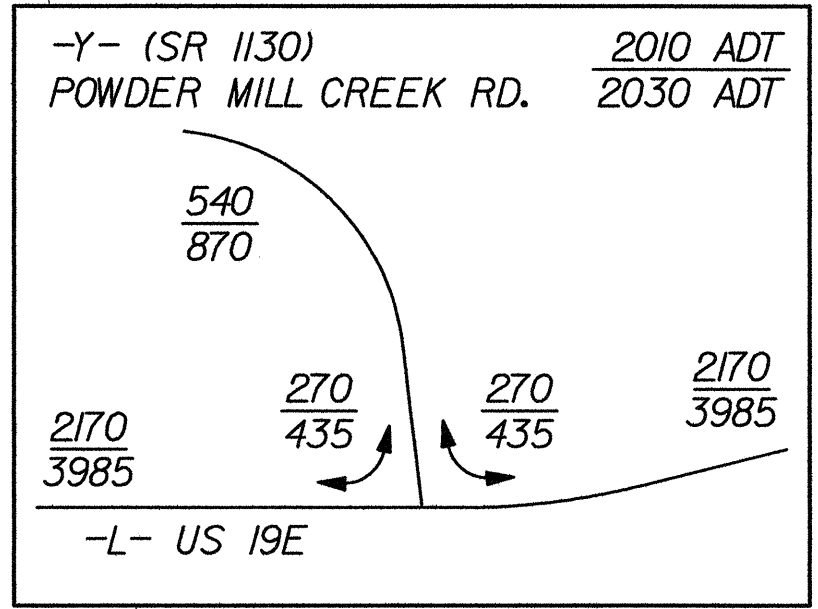
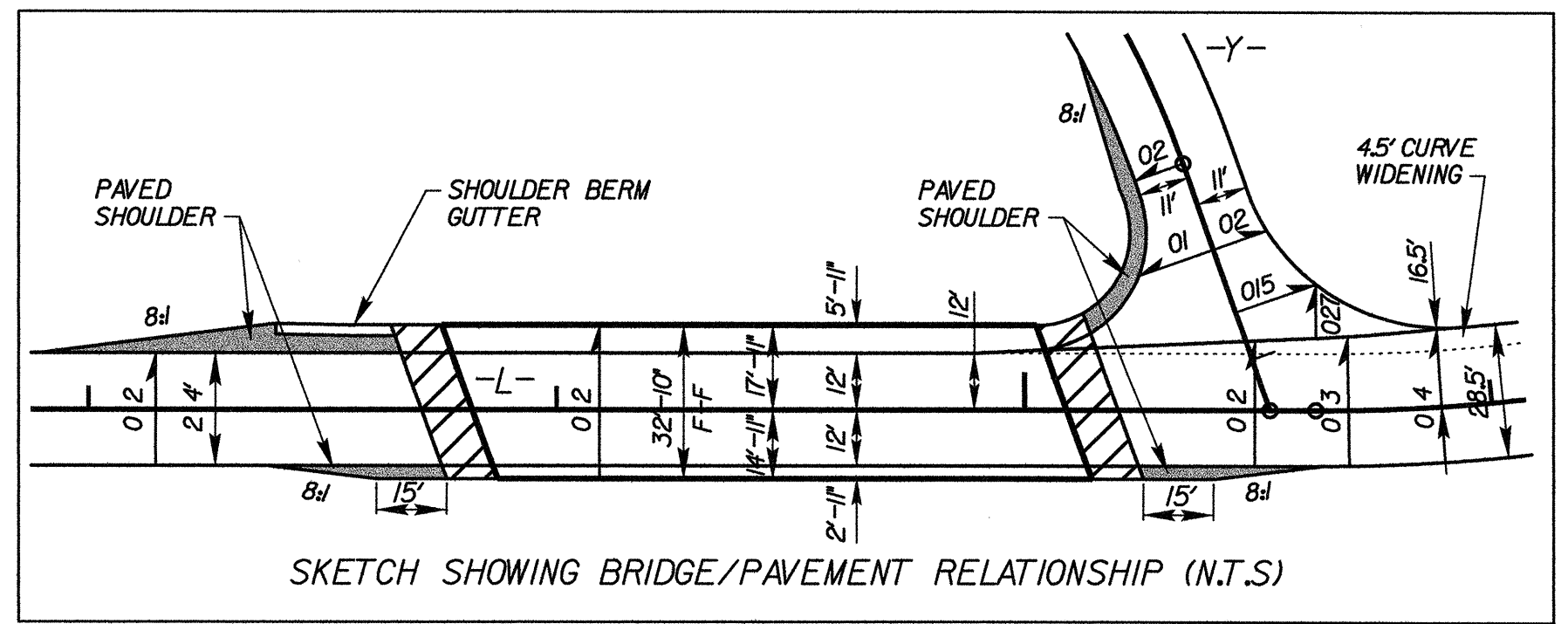
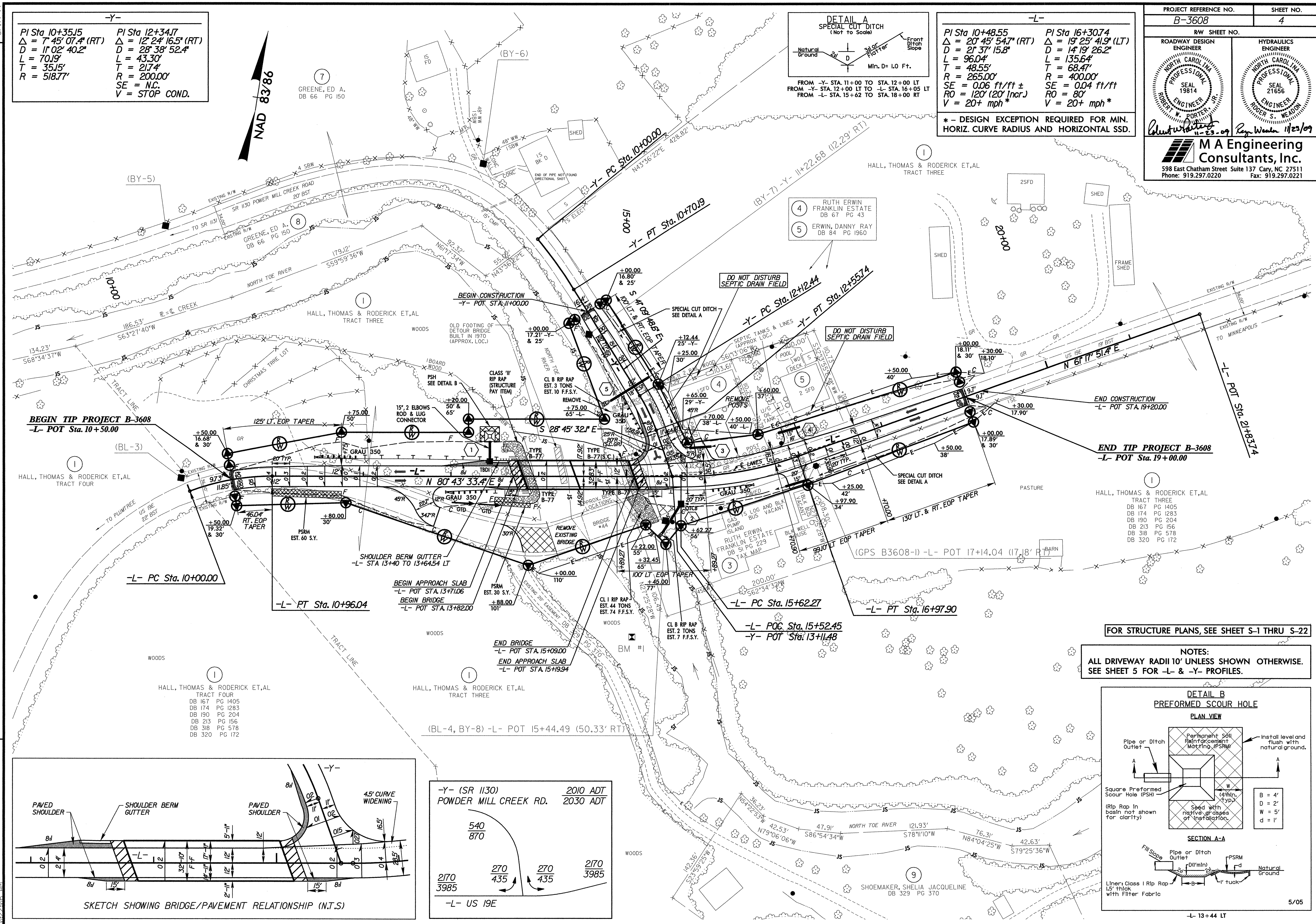
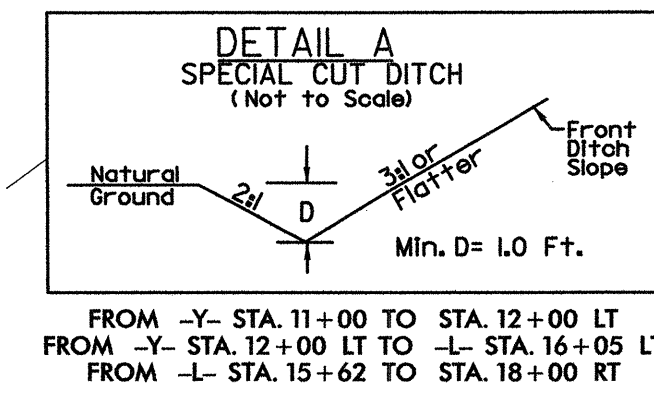
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202324														
ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION	2044000000-E	815	400	LF	6" PERFORATED SUBDRAIN PIPE	4450000000-N	1150	960	HR	FLAGGER
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (14+45.50)	2055000000-E	815	12	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS	4480000000-N	1165	1	EA	TMIA
0036000000-E	225	100	CY	UNDERCUT EXCAVATION	2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET	4507000000-E	SP	208	LF	WATER FILLED BARRIER
0043000000-N	226	Lump Sum		GRADING	2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)	4508000000-E	SP	208	LF	RESET WATER FILLED BARRIER
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING	2286000000-N	840	2	EA	MASONRY DRAINAGE STRUCTURES	4516000000-N	1180	50	EA	SKINNY DRUM
0080000000-E	SP	100	TON	CLASS IV SUBGRADE STABILIZATION	2367000000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.29	4650000000-N	1251	30	EA	TEMPORARY RAISED PAVEMENT MARKERS
0195000000-E	265	100	CY	SELECT GRANULAR MATERIAL	2556000000-E	846	25	LF	SHOULDER BERM GUTTER	4685000000-E	1205	2,028	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
0196000000-E	270	100	SY	FABRIC FOR SOIL STABILIZATION	3030000000-E	862	250	LF	STEEL BM GUARDRAIL	4686000000-E	1205	1,952	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
0320000000-E	SP	60	SY	FOUNDATION CONDITIONING FABRIC	3045000000-E	862	25	LF	STEEL BM GUARDRAIL, SHOP CURVED	4810000000-E	1205	8,400	LF	PAINT PAVEMENT MARKING LINES (4")
0330000000-E	SP	20	TON	GENERIC DRAINAGE ITEM FOUNDATION CONDITIONING MATERIAL, MINOR STRS	3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS	4835000000-E	1205	22	LF	PAINT PAVEMENT MARKING LINES (24")
0335200000-E	SP	124	LF	15" DRAINAGE PIPE	3180000000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** (B-77, SHOP CURVED)	4905000000-N	1253	20	EA	SNOWPLOWABLE PAVEMENT MARKERS
0335850000-E	SP	2	EA	*** DRAINAGE PIPE ELBOWS (15")	3270000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350	6000000000-E	1605	1,600	LF	TEMPORARY SILT FENCE
0986000000-E	SP	52	LF	GENERIC PIPE ITEM 18" CS PIPE CULVERTS 0.064" THICK	3317000000-N	862	3	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77	6006000000-E	1610	300	TON	STONE FOR EROSION CONTROL, CLASS A
0995000000-E	340	48	LF	PIPE REMOVAL	3563000000-E	SP	150	LF	TEMP *** WOVEN WIRE FENCE, COMPLETE W/POSTS (48")	6009000000-E	1610	200	TON	STONE FOR EROSION CONTROL, CLASS B
1220000000-E	545	75	TON	INCIDENTAL STONE BASE	3628000000-E	876	50	TON	RIP RAP, CLASS 1	6012000000-E	1610	300	TON	SEDIMENT CONTROL STONE
1489000000-E	610	318	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	3649000000-E	876	10	TON	RIP RAP, CLASS B	6015000000-E	1615	3.5	ACR	TEMPORARY MULCHING
1498000000-E	610	250	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	3656000000-E	876	1,145	SY	FILTER FABRIC FOR DRAINAGE	6018000000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING
1519000000-E	610	532	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	3659000000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	6021000000-E	1620	1.5	TON	FERTILIZER FOR TEMPORARY SEEDING
1560000000-E	620	58	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22	4400000000-E	1110	675	SF	WORK ZONE SIGNS (STATIONARY)	6024000000-E	1622	250	LF	TEMPORARY SLOPE DRAINS
1693000000-E	654	14	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR	4405000000-E	1110	112	SF	WORK ZONE SIGNS (PORTABLE)	6027000000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
2000000000-N	806	25	EA	RIGHT OF WAY MARKERS	4410000000-E	1110	223	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)	6029000000-E	SP	700	LF	SAFETY FENCE
2022000000-E	815	90	CY	SUBDRAIN EXCAVATION	4430000000-N	1130	50	EA	DRUMS	6030000000-E	1630	420	CY	SILT EXCAVATION
2033000000-E	815	70	CY	SUBDRAIN FINE AGGREGATE	4435000000-N	1135	50	EA	CONES	6036000000-E	1631	8,000	SY	MATTING FOR EROSION CONTROL
					4445000000-E	1145	160	LF	BARRICADES (TYPE III)	6037000000-E	SP	100	SY	COIR FIBER MAT
										6038000000-E	SP	440	SY	PERMANENT SOIL REINFORCEMENT MAT
										6042000000-E	1632	150	LF	1/4" HARDWARE CLOTH
										6070000000-N	SP	8	EA	SPECIAL STILLING BASINS
										6071010000-E	SP	200	LF	WATTLE
										6071020000-E	SP	50	LB	POLYACRYLAMIDE (PAM)
										6071030000-E	SP	300	LF	COIR FIBER BAFFLES
										6071050000-E	SP	1	EA	*** SKIMMER (1-1/2")
										6084000000-E	1660	3	ACR	SEEDING & MULCHING
										6087000000-E	1660	2	ACR	MOWING
										6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
										6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
										6096000000-E	1662	75	LB	SEED FOR SUPPLEMENTAL SEEDING
										6108000000-E	1665	2	TON	FERTILIZER TOPDRESSING
										6114500000-N	SP	20	MHR	SPECIALIZED HAND MOWING
										6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
										6123000000-E	1670	0.2	ACR	REFORESTATION

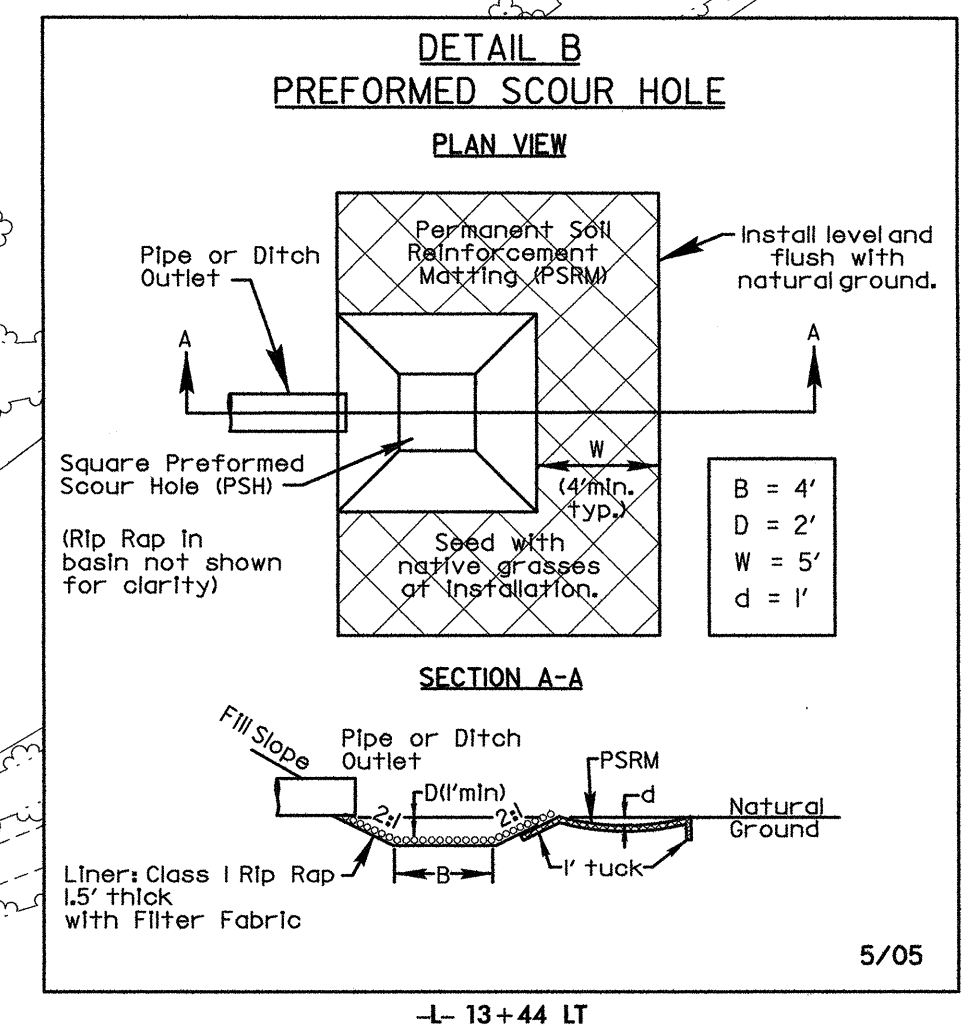
-Y-	
PI Sta 10+35.15	PI Sta 12+34.17
$\Delta = 7^{\circ} 45' 07.4''$ (RT)	$\Delta = 12^{\circ} 24' 16.5''$ (RT)
D = 11' 02" 40.2"	D = 28' 38" 52.4"
L = 70.19'	L = 43.30'
T = 35.15'	T = 21.74'
R = 518.77'	R = 200.00'
	SE = N.C.
	V = STOP COND.

-L-	
PI Sta 10+48.55	PI Sta 16+30.74
$\Delta = 20^{\circ} 45' 54.7''$ (RT)	$\Delta = 19^{\circ} 25' 41.9''$ (LT)
D = 21' 37" 15.8"	D = 14' 19" 26.2"
L = 96.04'	L = 135.64'
T = 48.55'	T = 68.47'
R = 265.00'	R = 400.00'
SE = 0.06 ft/ft ±	SE = 0.04 ft/ft
RO = 120' (20' Incr.)	RO = 80'
V = 20+ mph*	V = 20+ mph*
* - DESIGN EXCEPTION REQUIRED FOR MIN. HORIZ. CURVE RADIUS AND HORIZONTAL SSD.	



FOR STRUCTURE PLANS, SEE SHEET S-1 THRU S-22

NOTES:
ALL DRIVEWAY RADII 10' UNLESS SHOWN OTHERWISE.
SEE SHEET 5 FOR -L- & -Y- PROFILES.



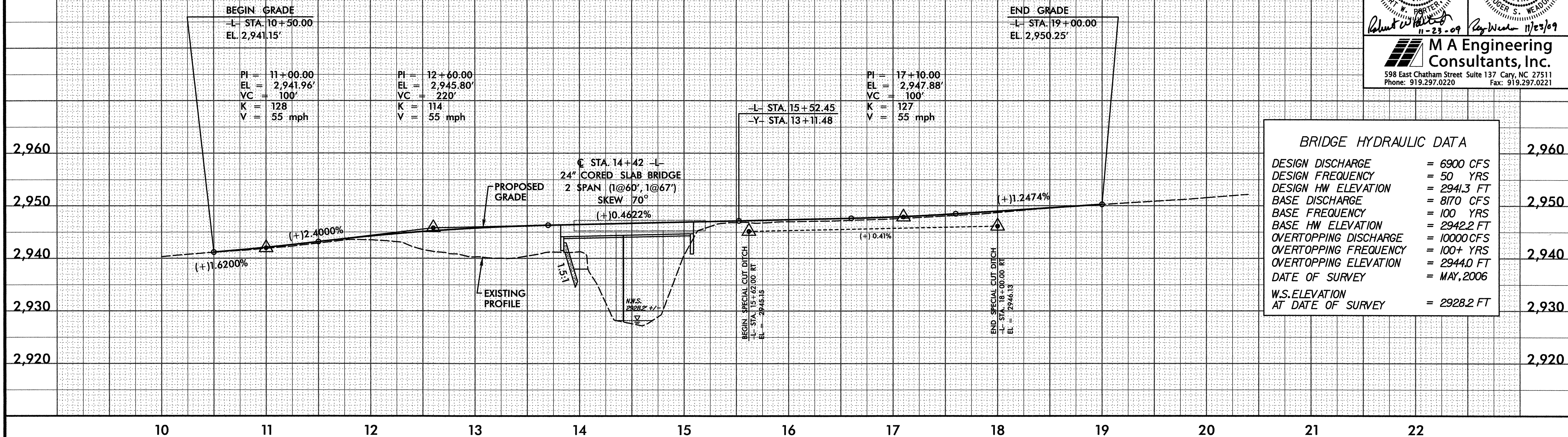
REVISIONS

11/23/2009
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11/23/09

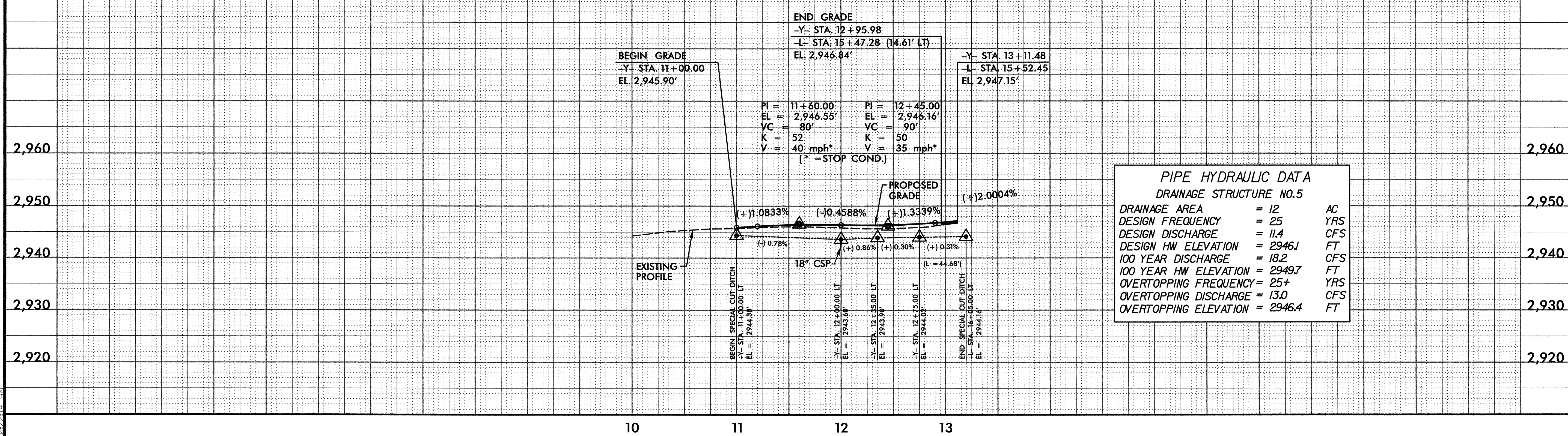
5/28/99

BM#1
8" SPIKE IN ROOT OF 8" MAPLE
-L- STA. 15+06.39 (181.84' RT)
ELEV. 2,935.97'

PROJECT REFERENCE NO. B-3608	SHEET NO. 5
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 19814 ROBERT W. PARTER	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 21656 ROBERT S. WEADON
11-23-09 Robert W. Partar Robert S. Weadon 11/23/09	
 M A Engineering Consultants, Inc. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	



-Y-



11/23/2009
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10/22/14