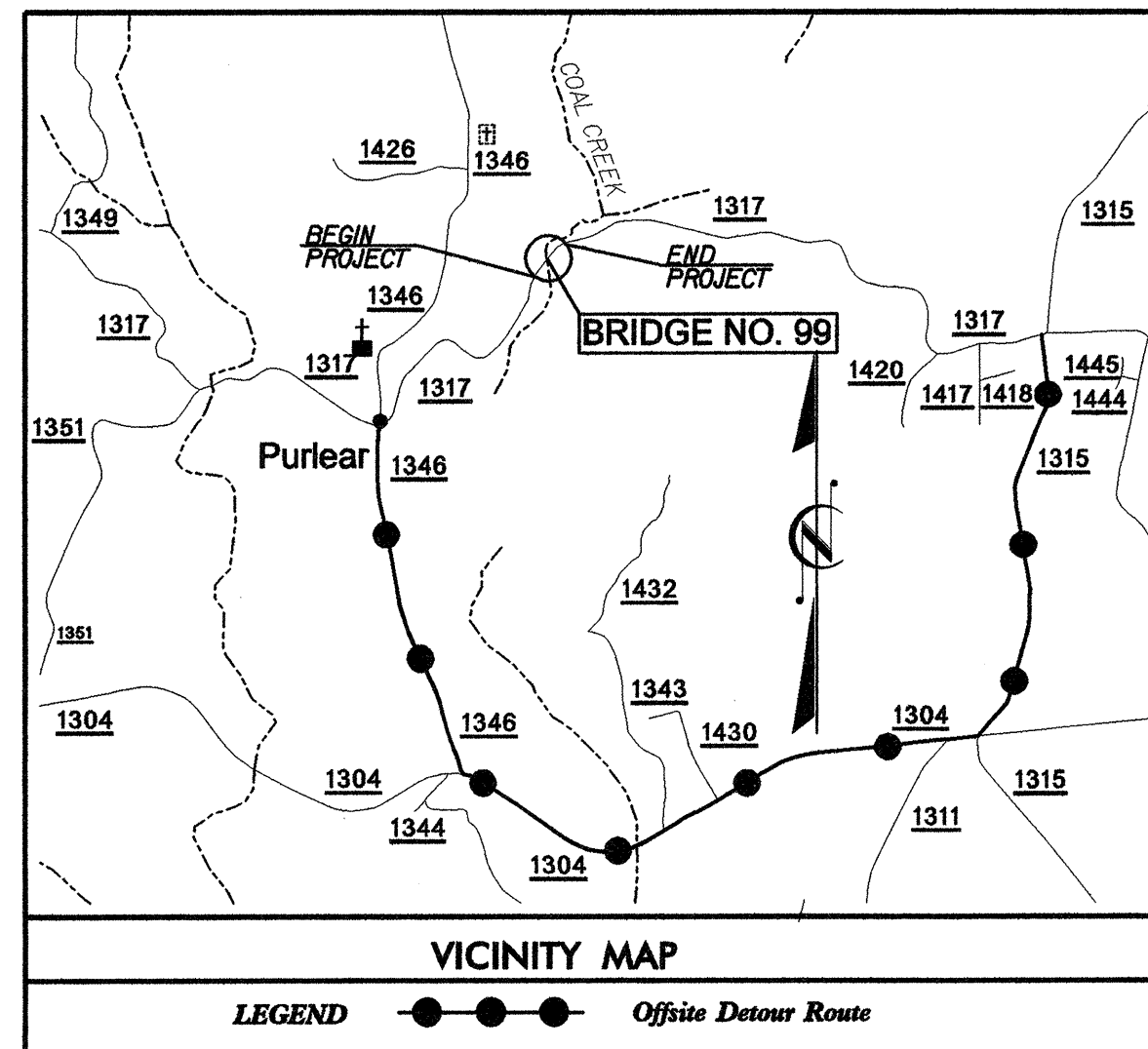


09/08/09

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



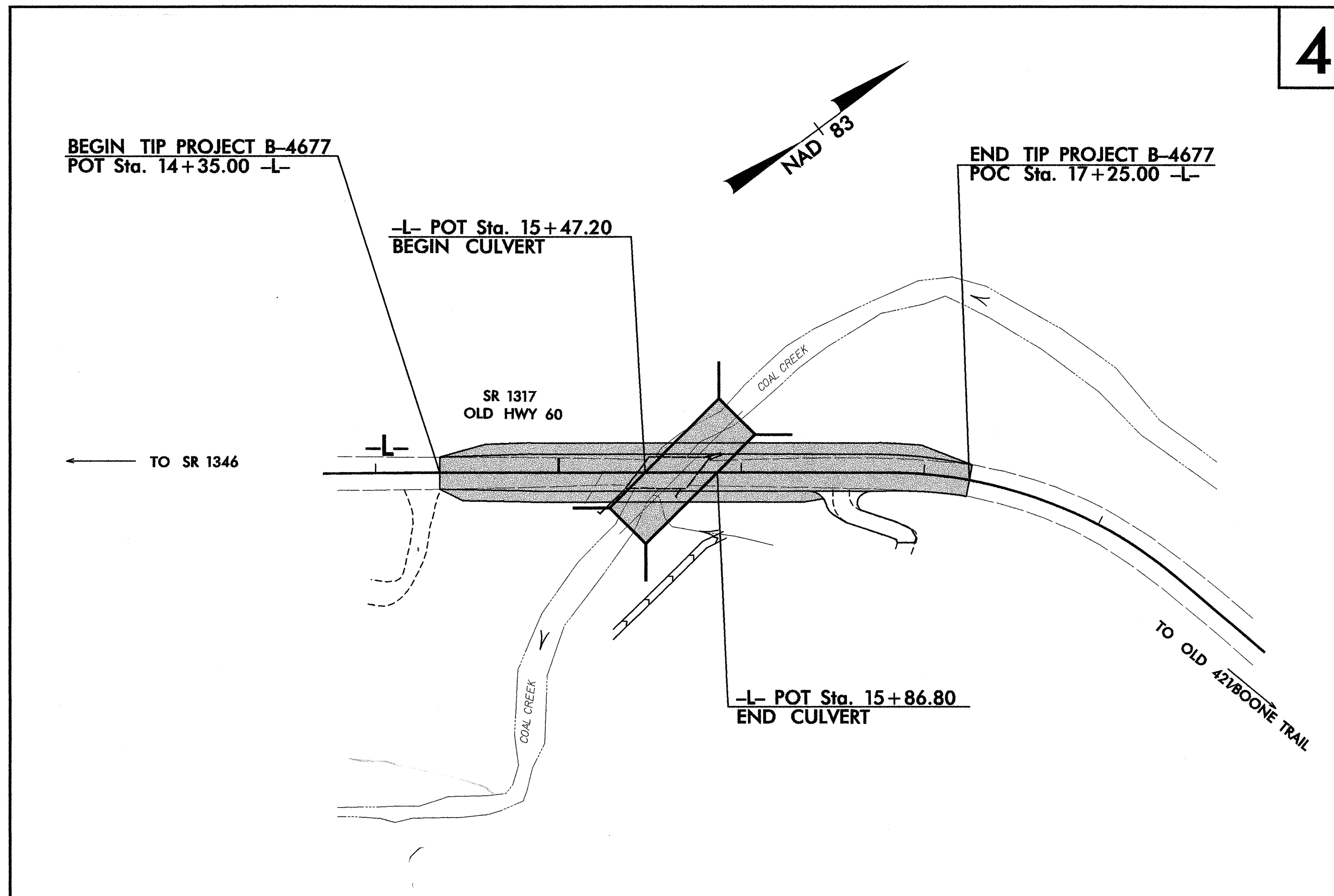
100% PLANS

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WILKES COUNTY**

LOCATION: BRIDGE NO. 99 OVER COAL CREEK ON SR 1317 (Old Hwy 60)

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

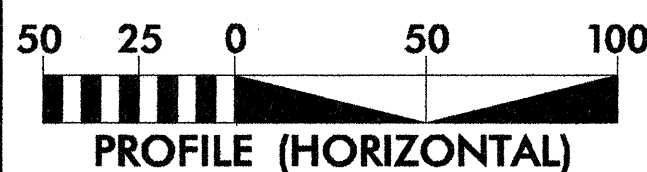


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4677	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33832.1.1	BRZ-1317(4)	P.E.	
33832.2.1	BRZ-1317(4)	RW /UTIL	
33832.3.1	BRZ-1317(4)	CONSTR.	

\*\* - DESIGN EXCEPTION REQUIRED FOR LANE WIDTH, SAG VERTICAL CURVE K VALUE, VERTICAL STOPPING SIGHT DISTANCE, SHOULDER WIDTH, AND HORIZONTAL CURVE RADIUS

NCDOT CONTACT: DOUG TAYLOR, P.E., PROJECT ENGINEER - ROADWAY DESIGN

GRAPHIC SCALES



DESIGN DATA

ADT 2010 = 600  
ADT 2030 = 900  
DHV = 11 %  
D = 65 %  
T = 5 % \*  
\*\* V = 60 MPH  
RURAL LOCAL  
\* TTST 1 % DUAL 4 %

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4677 = 0.048 mi.  
LENGTH STRUCTURE TIP PROJECT B-4677 = 0.007 mi.  
TOTAL LENGTH TIP PROJECT B-4677 = 0.055 mi.

Prepared in the Office of:  
**WANG ENGINEERING COMPANY, INC.**  
CARY, N.C.  
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

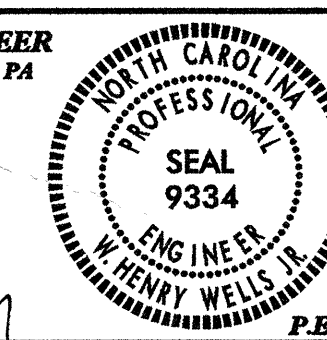
RIGHT OF WAY DATE:  
JANUARY 16, 2009

LETTING DATE:  
JANUARY 19, 2010

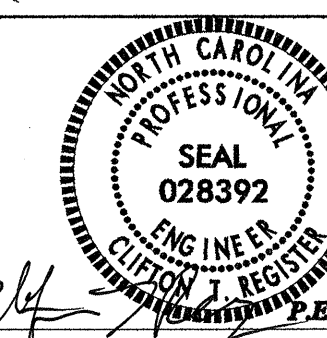
CLIFTON T. REGISTER, P.E.  
PROJECT ENGINEER

SCOTT L. KENNEDY  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER  
SUNGATE DESIGN GROUP, PA

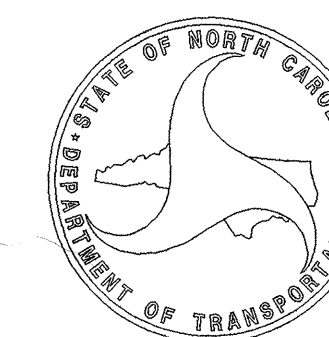


SIGNATURE:  
ROADWAY DESIGN ENGINEER  
WANG ENGINEERING



SIGNATURE: [Signature]  
STATE HIGHWAY DESIGN ENGINEER

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

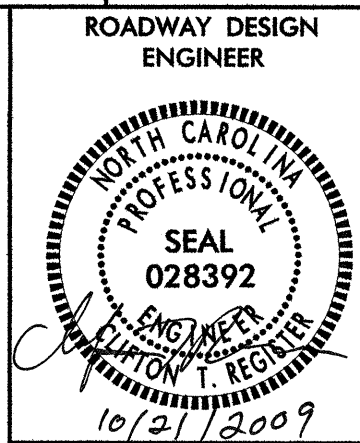


STATE HIGHWAY DESIGN ENGINEER

TIP PROJECT: B-4677

CONTRACT: C202273

SYSTEMS: [unreadable]  
USER: [unreadable]



EFF. 07-18-06  
REV. 01-02-07

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
2	TYPICAL SECTIONS, PAVEMENT SCHEDULE
2-A THRU 2-B	DETAIL OF METHOD OF PIPE INSTALLATION
2-C	DETAIL OF ANCHORAGE OF FRAMES
3	SUMMARY OF QUANTITIES
3A	SUMMARY OF EARTHWORK SUMMARY OF GUARDRAIL, LIST OF PIPES, ENDWALLS, ETC., AND ASPHALT PAVEMENT REMOVAL SUMMARY
4	PLAN/PROFILE SHEET
TCP-1 THRU TCP-4 PMP-1 THRU PMP-2 SD-1	TRAFFIC CONTROL PLANS PAVEMENT MARKING PLANS SPECIAL SIGN DESIGN
EC-1 THRU EC-6	EROSION CONTROL PLANS
UO-1 THRU UO- 2	UTILITY BY OTHERS
X-1	CROSS SECTION INDEX AND SUMMARY SHEET
X-2 THRU X-5	CROSS-SECTIONS
C-1 THRU C-3	CULVERT PLANS

2006 ROADWAY STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	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 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-way Marker
806.02	Granite Right-of-way Marker
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete
840.27	Brick Grated Drop Inlet Type 'B'
840.45	Precast Drainage Structure
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
866.04	Barbed wire fence with wood posts (2-7 strands)
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES:

2006 SPECIFICATIONS  
EFFECTIVE: 07-18-06  
REVISED: 09-12-08

GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD 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 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 SERRING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

Embarq

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.

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	⑩ 23
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	○ 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	○
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—
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	—T—T—T—
Proposed Guardrail	—T—T—T—
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—

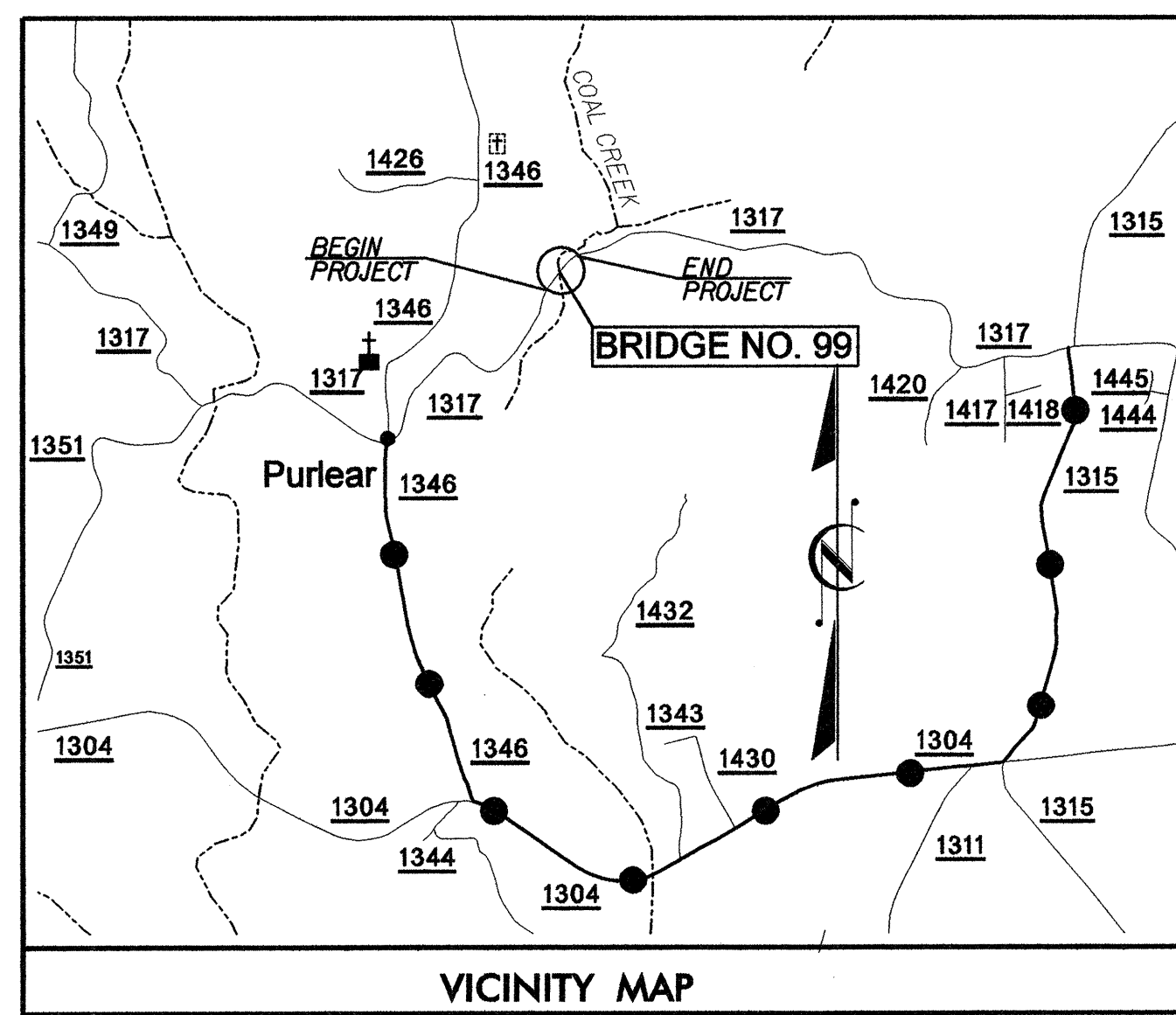
**SANITARY SEWER:**

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	—?UTL—
U/G Tank; Water, Gas, Oil	□
A/G Tank; Water, Gas, Oil	□
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

# SURVEY CONTROL SHEET B-4677



BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL3		BL-3	897685.0801	1326533.8848	1316.59'	OUTSIDE PROJECT LIMITS	
BL4		BL-4	898228.8184	1326778.8309	1307.43'	15+30.95	12.36' LT
BL5		BL-5	898431.9087	1326971.1728	1315.10'	18+07.33	14.35' LT
BL6		BL-6	898479.7605	1327253.8496	1322.71'	OUTSIDE PROJECT LIMITS	

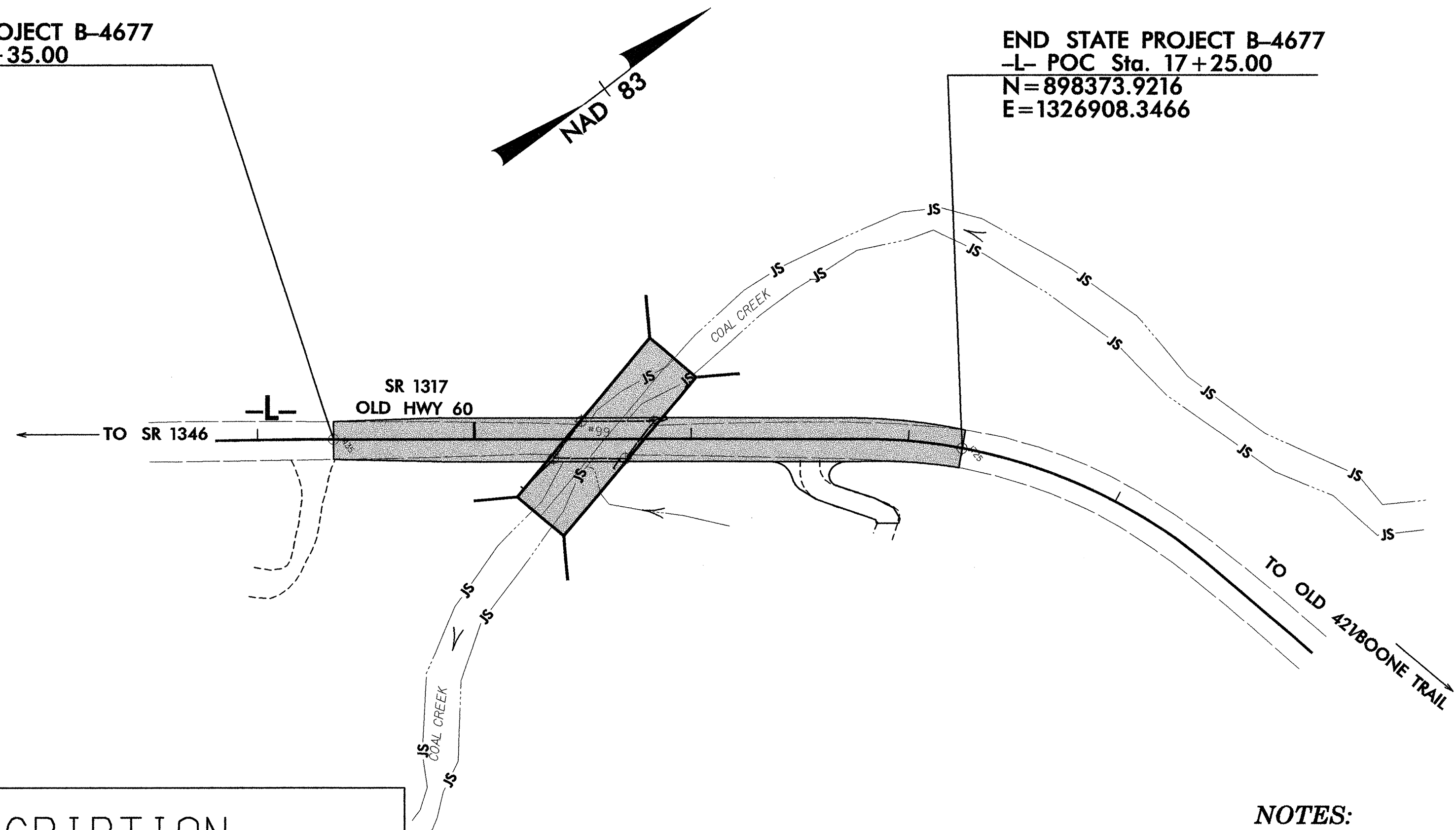
\*\*\*\*\*  
 BM#1 ELEVATION = 1306.30'  
 N 898178. E 1326921.  
 L STATION 15+76 132' RIGHT  
 8" SPIKE IN THE BASE OF POWER POLE  
 \*\*\*\*\*

BEGIN STATE PROJECT B-4677  
 -L- POT Sta. 14+35.00  
 N=898144.6519  
 E=1326731.1297

END STATE PROJECT B-4677  
 -L- POC Sta. 17+25.00  
 N=898373.9216  
 E=1326908.3466

NCDOT GPS STATION B-4677-1  
 N=898687.264  
 E=1327790.363

NCDOT GPS STATION B-4677-2  
 N=898494.022  
 E=1328704.409



## DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4677-1"  
 WITH NAD 83 STATE PLANE GRID COORDINATES OF  
 NORTHING: 898687.264(ft) EASTING: 1327790.363(ft)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999492026  
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4677-1" TO -L- STATION 14+35.00 IS  
 S 62°52'31" W 1190.13'  
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88

## NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/doh/preconstruct/highway/location/project/)

THE FILES TO BE FOUND ARE AS FOLLOWS:  
 B4677\_LS\_CONTROL\_071121.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 EXISTING HARN MONUMENTATION  
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

6/2/99

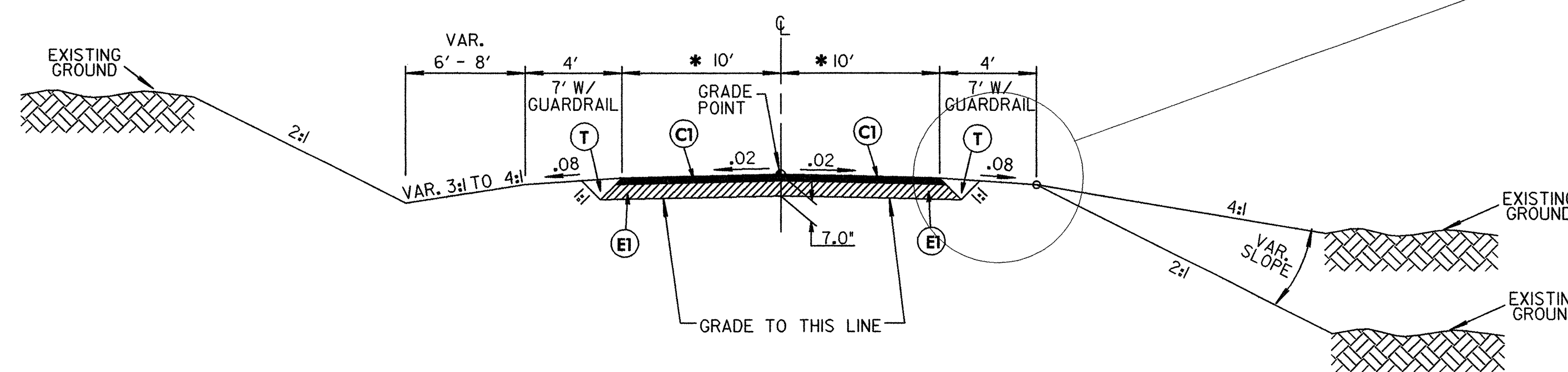
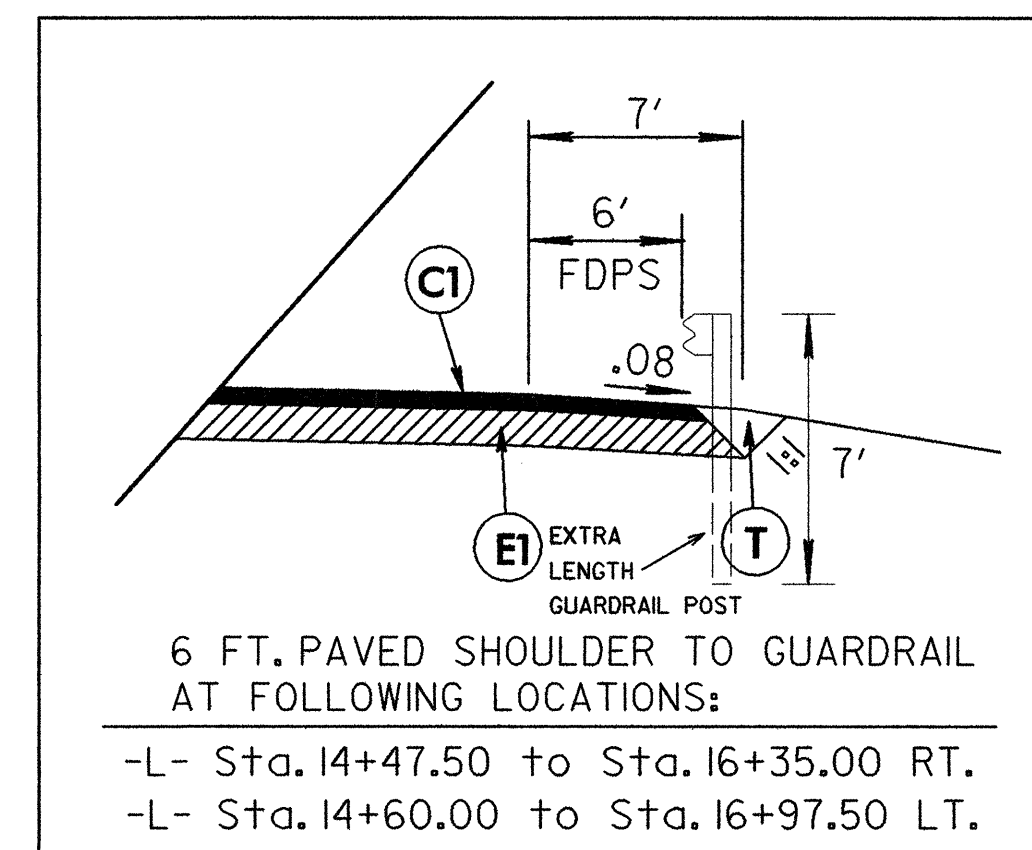
DATE PLOTTED: 07/11/21  
 TIME PLOTTED: 10:00 AM  
 PLOTTER: HP PLOTTER  
 PLOT SIZE: 11x17  
 PLOT SCALE: 1"=100'

6/2/99

PROJECT REFERENCE NO. B-4677	SHEET NO. 2
ROADWAY DESIGN ENGINEER WANG ENGINEERING	PAVEMENT DESIGN ENGINEER WANG ENGINEERING

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2.5" ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS PER SQ. YD. IN EACH OF TWO LAYERS.
E1	PROP. APPROX. 4.5" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS PER SQ. YD.
T	EARTH MATERIAL

NOTE: ALL SLOPES 1:1 UNLESS OTHERWISE SPECIFIED



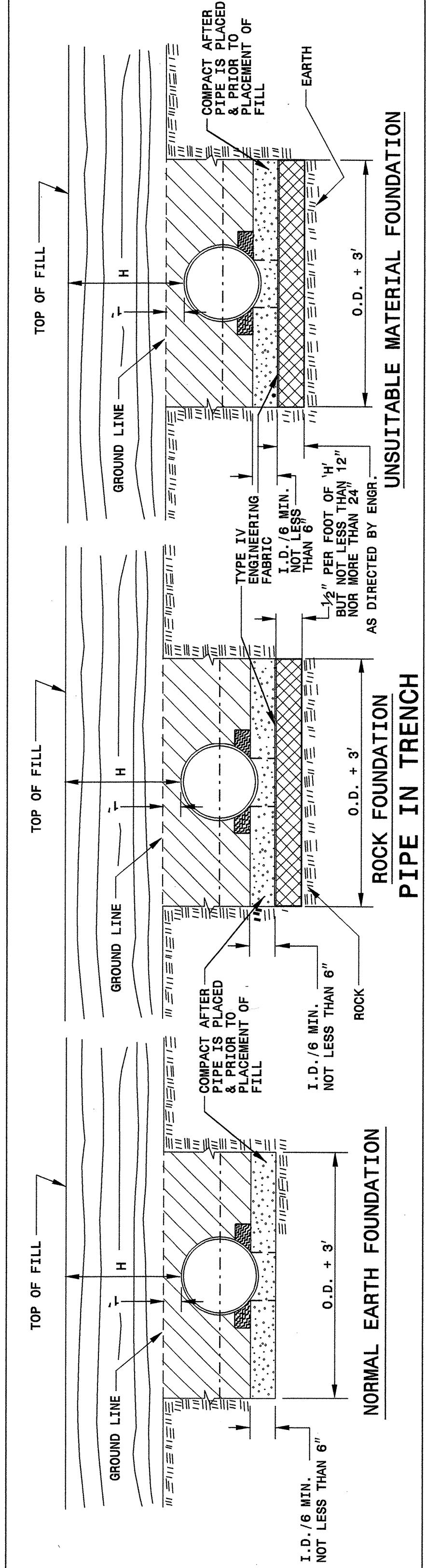
TYPICAL SECTION NO. 1  
 USE TYPICAL SECTION NO. 1 AS FOLLOWS  
 -L- Sta. 14+35.00 to Sta. 17+25.00  
 NOTE: REMOVE EXISTING PAVEMENT

\* DESIGN EXCEPTION REQUIRED FOR LANE WIDTH, SAG VERTICAL CURVE K VALUE, VERTICAL STOPPING SIGHT DISTANCE, SHOULDER WIDTH, AND HORIZONTAL CURVE RADIUS

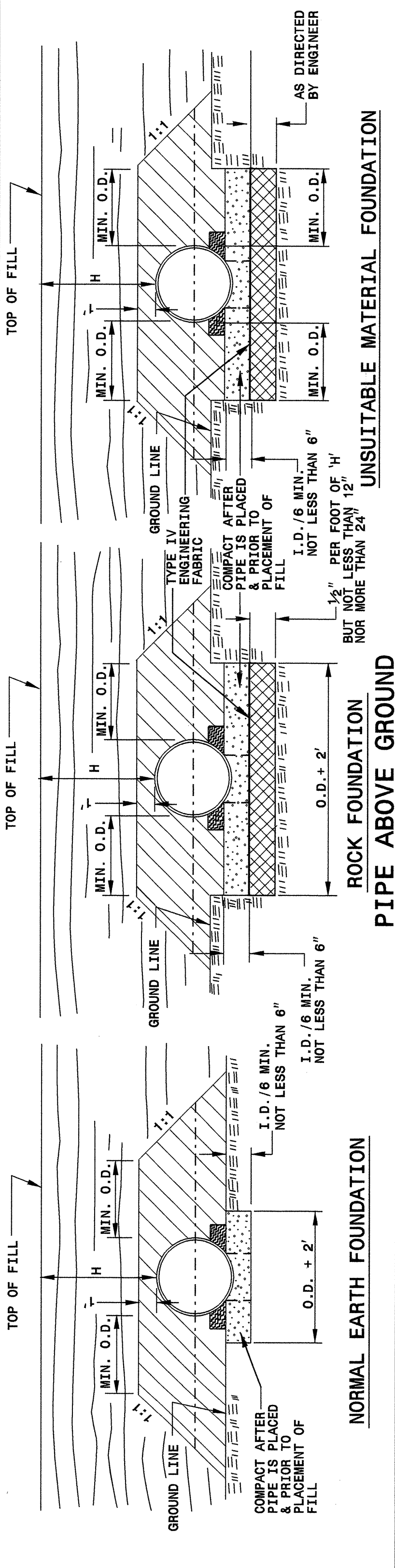
6/2/99

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

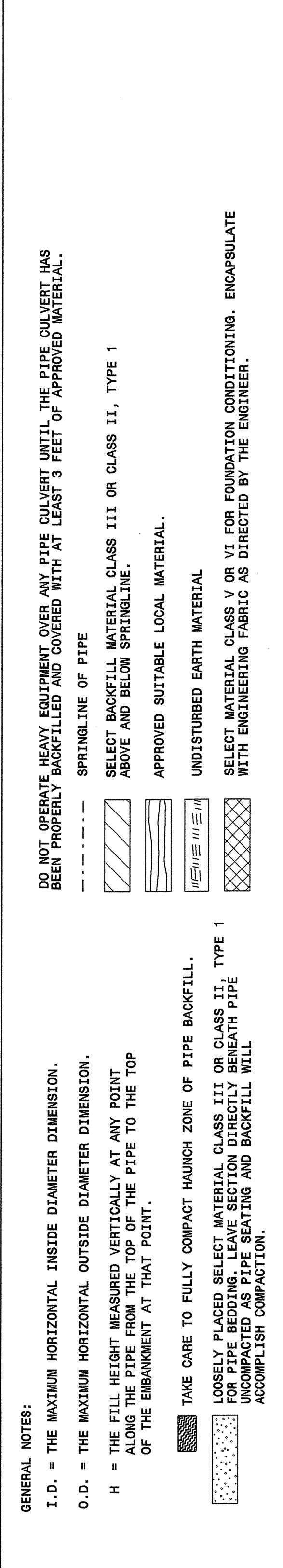
7-06



ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE

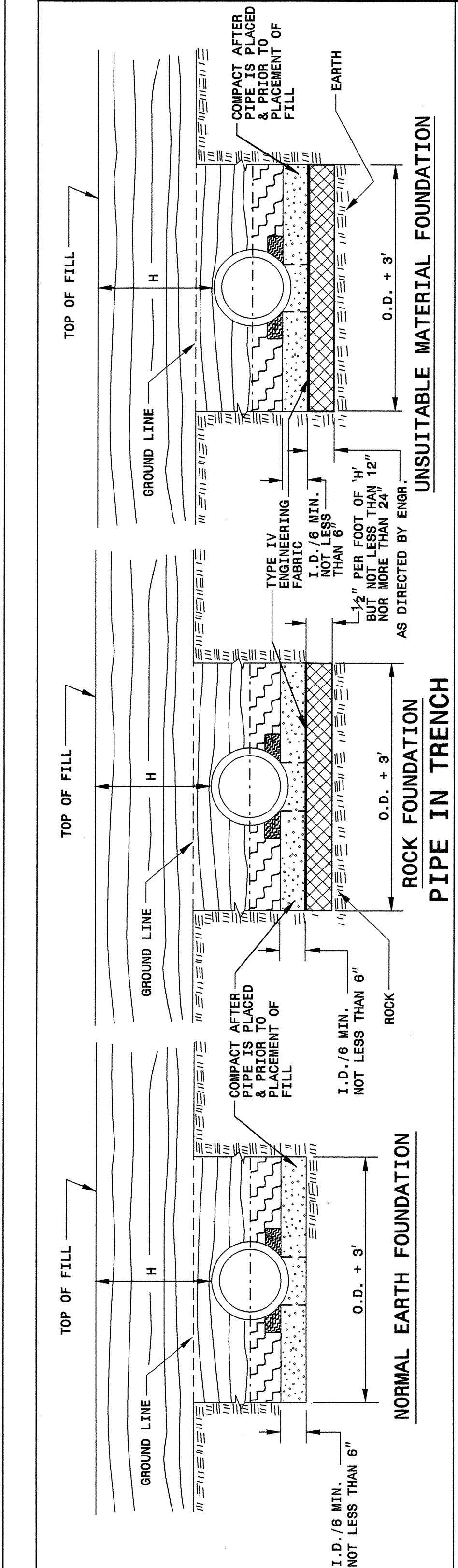


ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE

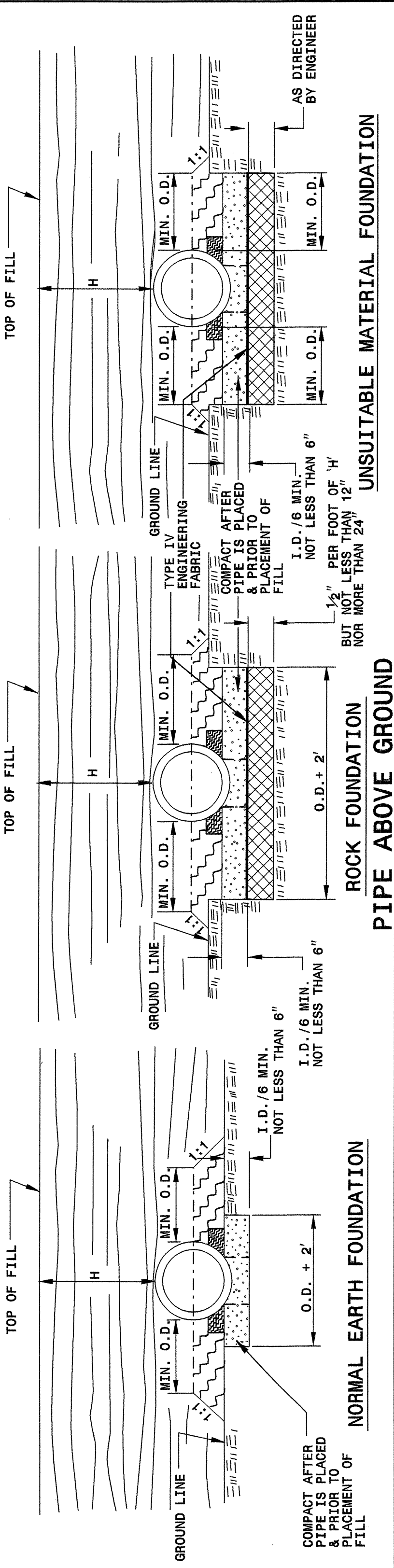


STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

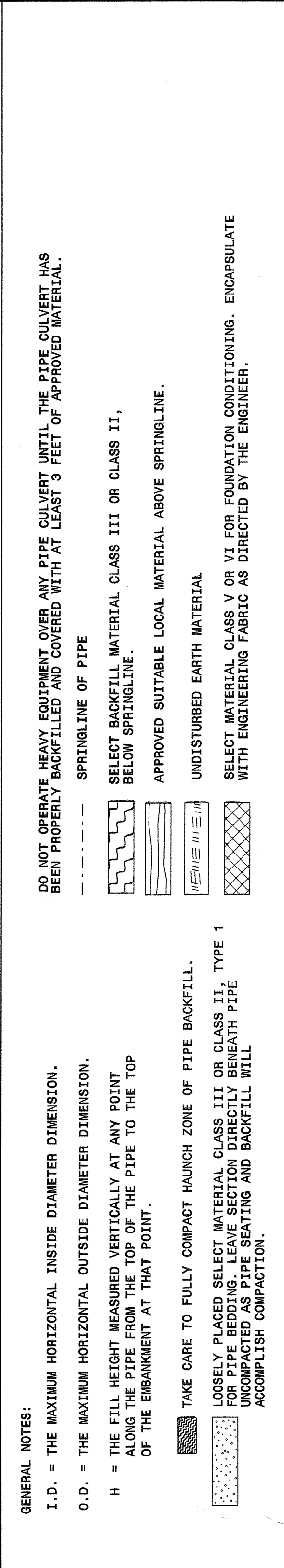
7-06



ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 RIGID PIPE



ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 RIGID PIPE



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**

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**

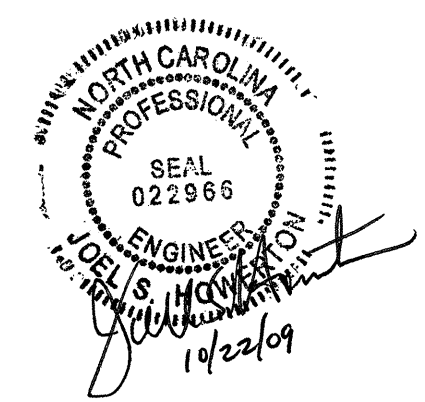
- GENERAL NOTES:**
- I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
  - O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
  - H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.
  - TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
  - LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 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.

- 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 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 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: KKempff DATE: 5-15-09  
 MODIFIED BY: DATE:   
 CHECKED BY: DATE: 7/20/09  
 FILE SPE6/erward/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)	Maximum Height of Cover (feet)		10	8
		(Ga)	16		
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
48	12	48	61	87	113
54	12	42	54	77	100
60	12		48	69	90
66	12				81
72	12				74
78	12				69
84	12				69

Round Corrugated Aluminum Pipe 2 2/3 x 1/2 corrugation **					
Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet)		10	8
		(Ga)	16		
12	12	123	155	218	281
15	12	98	123	174	224
18	12	81	102	144	187
21	12	69	87	123	160
24	12	60	76	108	139
27	12		67	95	123
30	12		60	85	111
36	12		50	71	92
42	12		42	60	78
48	12		36	52	68
54	12		30	46	60
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 M504

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

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

**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**

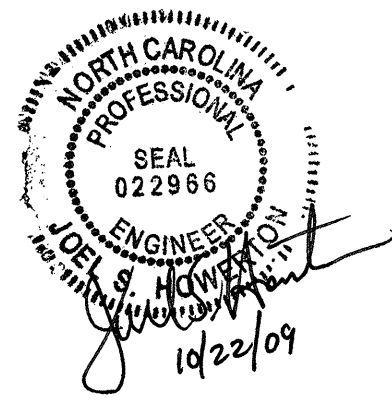
FILL HEIGHT TABLES

SHEET 3 OF 3  
**300D01**

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

**SEE PLATE FOR TITLE**

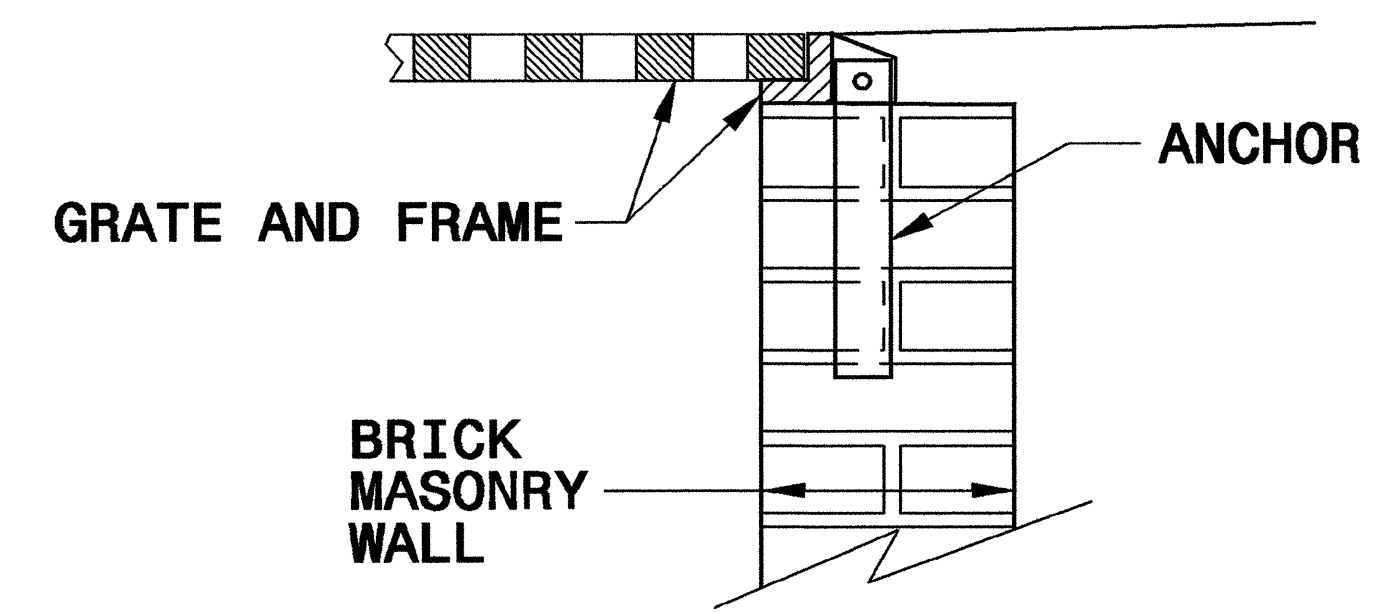
ORIGINAL BY: KKempf DATE: 5-15-09  
 MODIFIED BY: *Joel S. Howard* DATE: *7/30/09*  
 CHECKED BY: *Joel S. Howard* DATE: *7/30/09*  
 FILE SPEC: s:\contracts\contracts\special\_details\ward\stds\stdstodetail\30001\0300d01.dgn



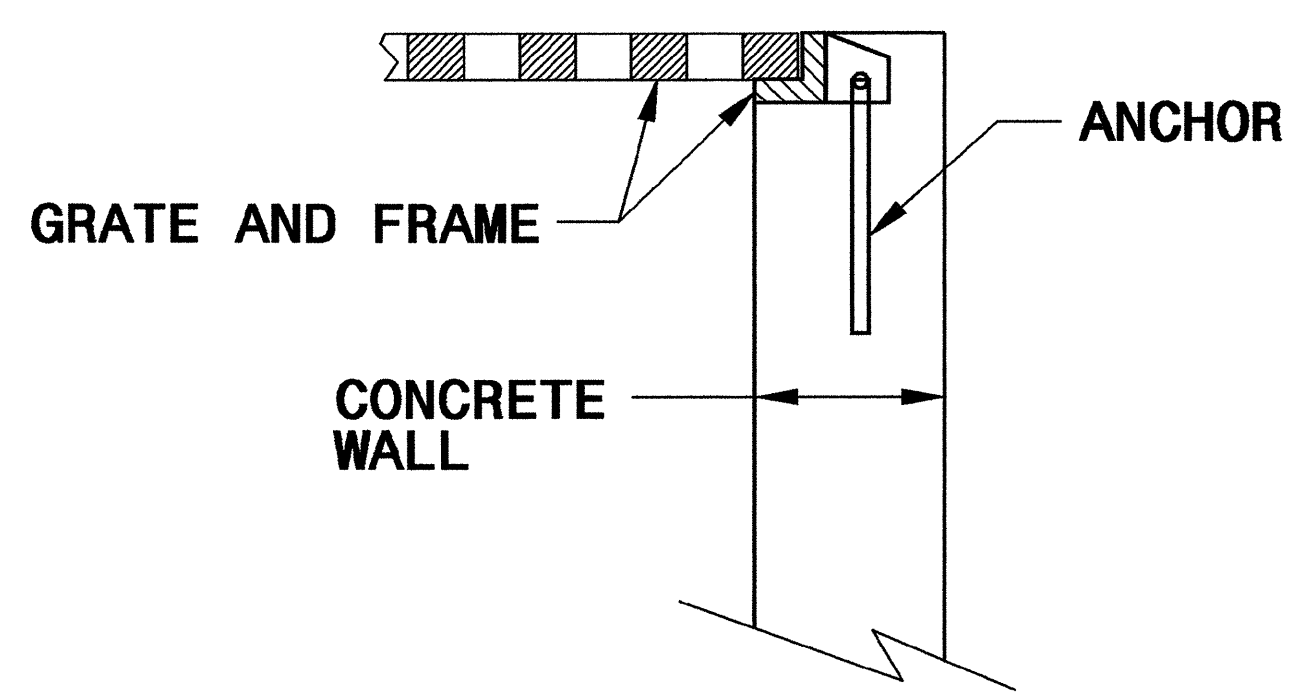
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

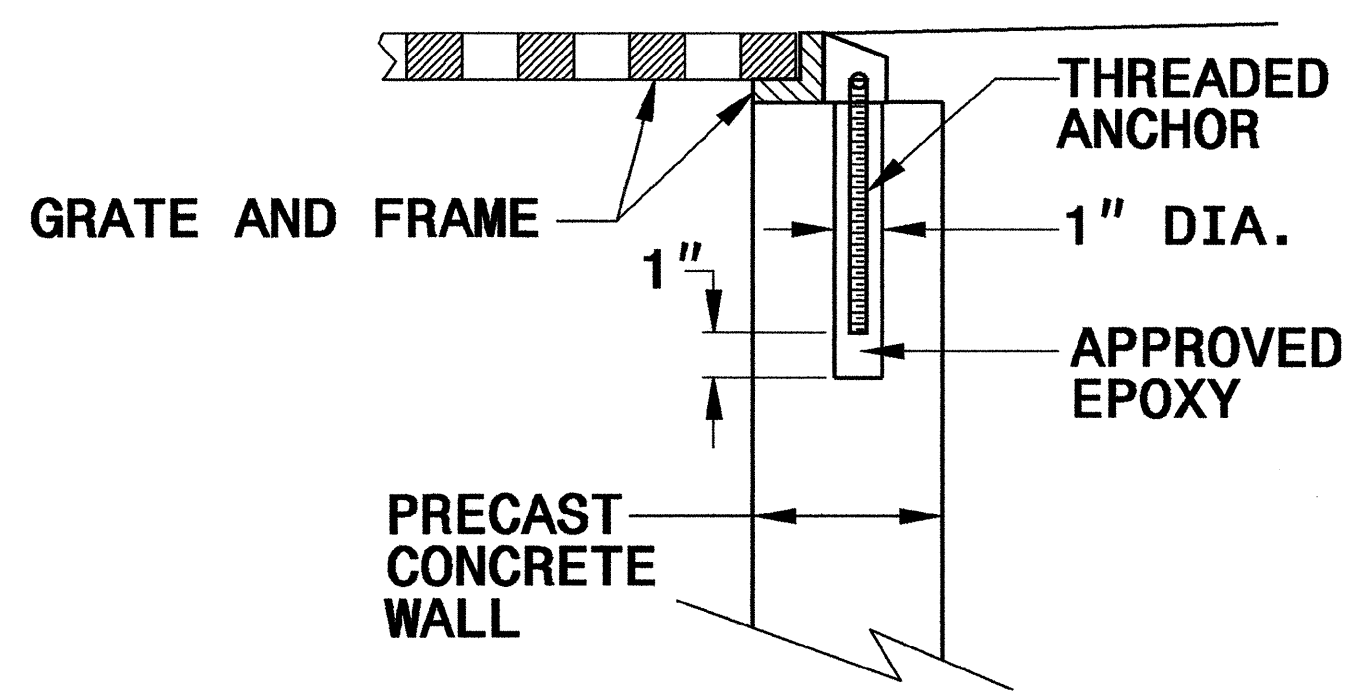
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



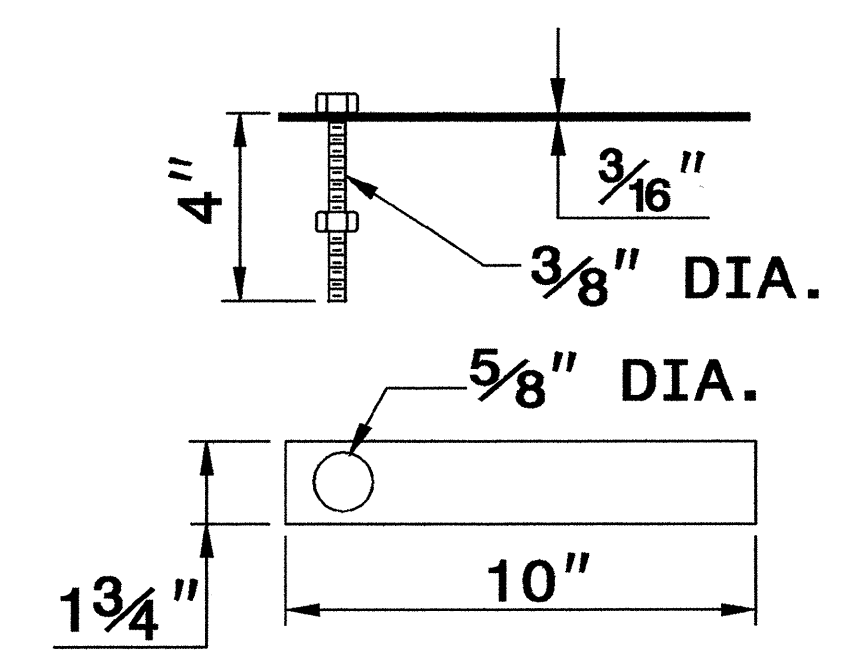
**CONCRETE CONSTRUCTION**



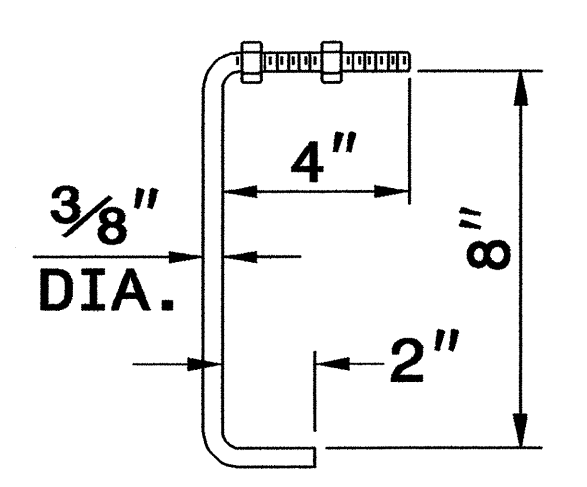
**PRECAST CONCRETE CONSTRUCTION**

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

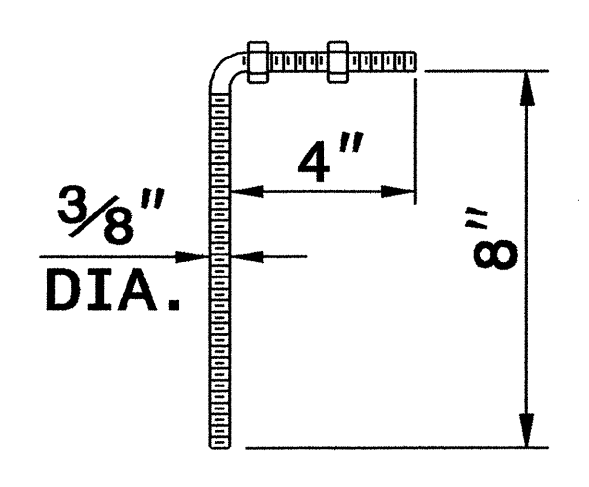
NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



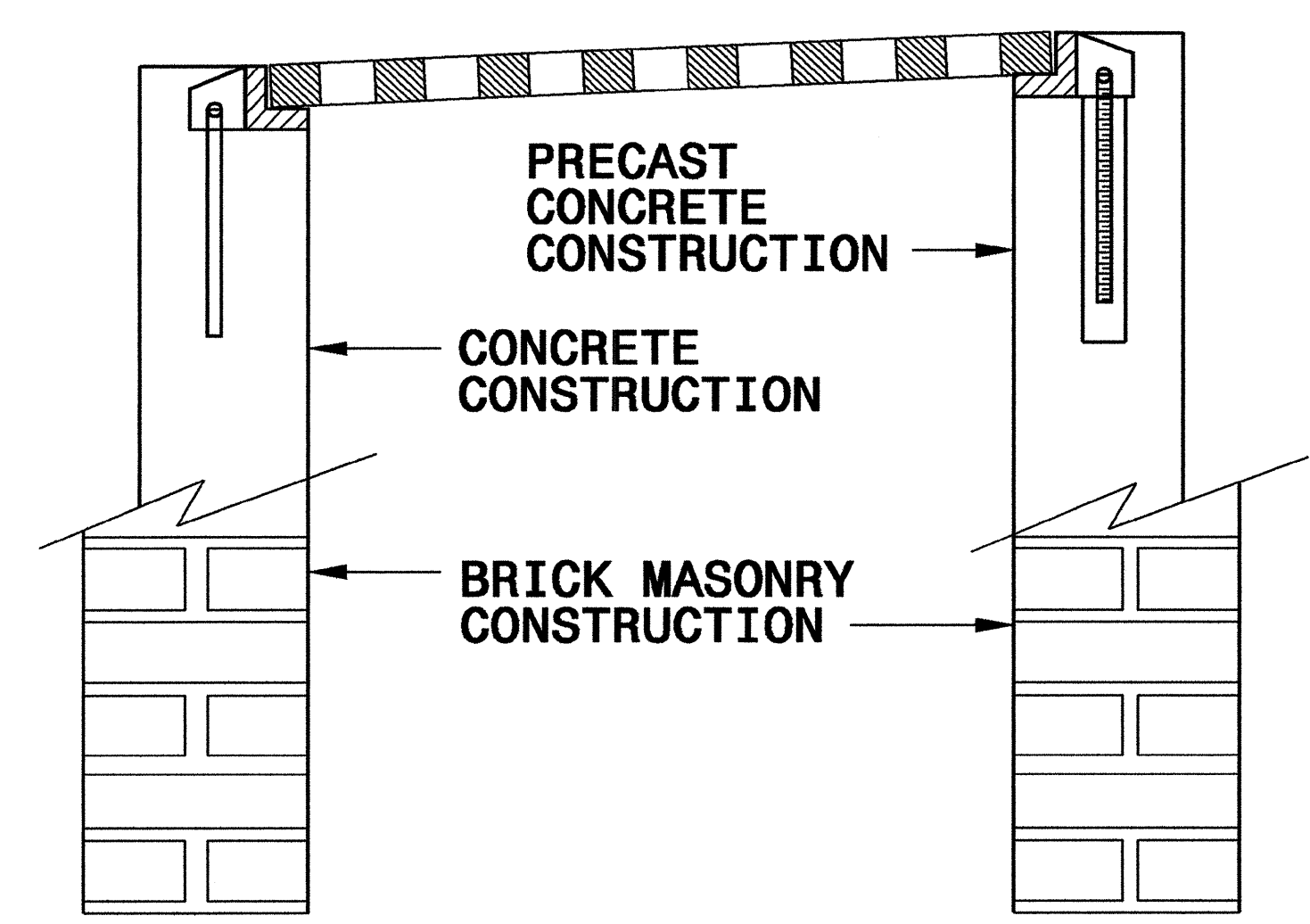
**MASONRY ANCHOR**  
3/8" DIA. BOLT WITH PLATE



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



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



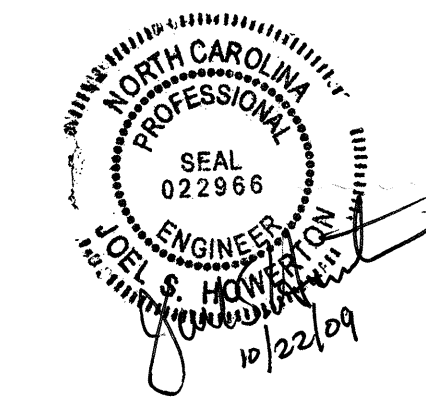
**FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS**

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**

27 SEP 2006 08:59  
C:\p\projects\Special Details\ward\stds\06\stds to Special Details\840D25 Anchorage for Frames\0840d25.dgn  
erloward AT 05/22/06



**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.:



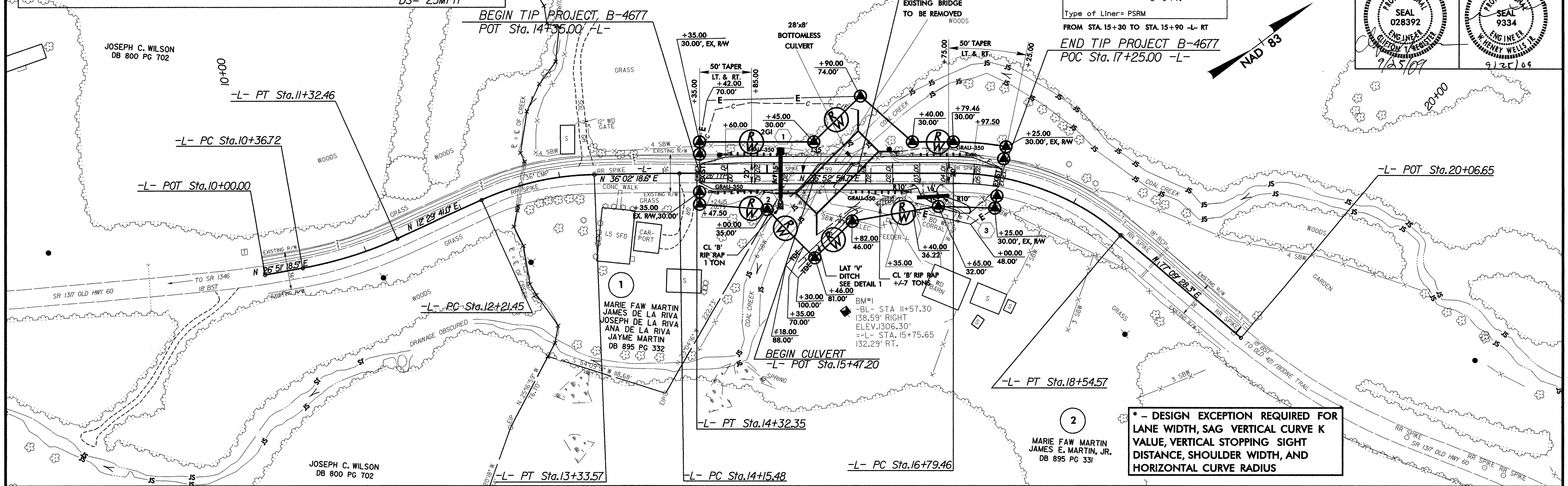
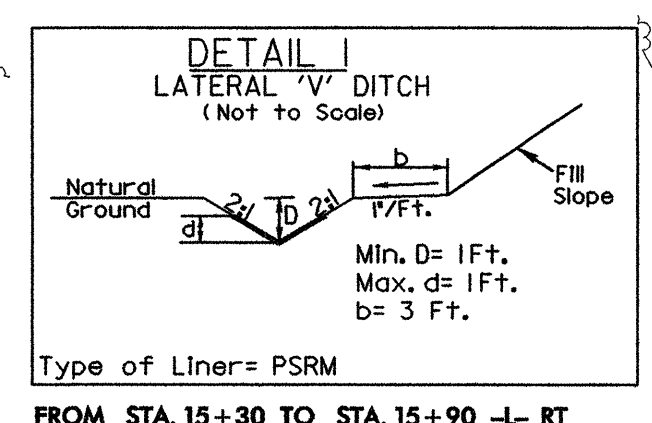
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**SUMMARY OF QUANTITIES**

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202273														
ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION	228600000-N	840	1	EA	MASONRY DRAINAGE STRUCTURES	603700000-E	SP	20	SY	COIR FIBER MAT
002200000-E	225	1,250	CY	UNCLASSIFIED EXCAVATION	236600000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.24	603800000-E	SP	300	SY	PERMANENT SOIL REINFORCEMENT MAT
003600000-E	225	100	CY	UNDERCUT EXCAVATION	327000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350	604200000-E	1632	400	LF	1/4" HARDWARE CLOTH
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING	342000000-E	SP	225	LF	GENERIC GUARDRAIL ITEM STEEL BEAM GUARDRAIL	607000000-N	SP	2	EA	SPECIAL STILLING BASINS
006300000-N	SP	Lump Sum		GRADING	343500000-N	SP	3	EA	GENERIC GUARDRAIL ITEM ADDITIONAL GUARDRAIL POSTS	607101000-E	SP	80	LF	WATTLE
008000000-E	SP	100	TON	CLASS IV SUBGRADE STABILIZATION	357500000-E	SP	600	LF	GENERIC FENCING ITEM TEMPORARY 4 STRAND BARBED WIRE FENCE WITH POSTS	607102000-E	SP	20	LB	POLYACRYLAMIDE (PAM)
013400000-E	240	10	CY	DRAINAGE DITCH EXCAVATION	364900000-E	876	10	TON	RIP RAP, CLASS B	607103000-E	SP	100	LF	COIR FIBER BAFFLES
019500000-E	265	100	CY	SELECT GRANULAR MATERIAL	365600000-E	876	675	SY	FILTER FABRIC FOR DRAINAGE	607105000-E	SP	1	EA	*** SKIMMER (1-1/2")
019600000-E	270	100	SY	FABRIC FOR SOIL STABILIZATION	440000000-E	1110	335	SF	WORK ZONE SIGNS (STATIONARY)	608400000-E	1660	5	ACR	SEEDING & MULCHING
032000000-E	SP	30	SY	FOUNDATION CONDITIONING FABRIC	441000000-E	1110	119	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)	608700000-E	1660	0.5	ACR	MOWING
033000000-E	SP	10	TON	GENERIC DRAINAGE ITEM FOUNDATION COND MATERIAL MINOR STRS	444500000-E	1145	96	LF	BARRICADES (TYPE III)	609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
098600000-E	SP	40	LF	GENERIC PIPE ITEM 15" RC PIPE CULVERTS CLASS IV	481000000-E	1205	1,160	LF	PAINT PAVEMENT MARKING LINES (4")	609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
098600000-E	SP	32	LF	GENERIC PIPE ITEM 15" SIDE DRAIN PIPE	600000000-E	1605	450	LF	TEMPORARY SILT FENCE	609600000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
122000000-E	545	50	TON	INCIDENTAL STONE BASE	600600000-E	1610	250	TON	STONE FOR EROSION CONTROL, CLASS A	610800000-E	1665	0.5	TON	FERTILIZER TOPDRESSING
148900000-E	610	260	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	600900000-E	1610	70	TON	STONE FOR EROSION CONTROL, CLASS B	611000000-E	SP	150	LF	IMPERVIOUS DIKE
152500000-E	610	140	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	601200000-E	1610	150	TON	SEDIMENT CONTROL STONE	611450000-N	SP	10	MHR	SPECIALIZED HAND MOWING
156000000-E	620	25	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22	601500000-E	1615	1	ACR	TEMPORARY MULCHING	611700000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
200000000-N	806	16	EA	RIGHT OF WAY MARKERS	601800000-E	1620	75	LB	SEED FOR TEMPORARY SEEDING					
202200000-E	815	22.4	CY	SUBDRAIN EXCAVATION	602100000-E	1620	1.25	TON	FERTILIZER FOR TEMPORARY SEEDING					
203300000-E	815	16.8	CY	SUBDRAIN FINE AGGREGATE	602400000-E	1622	250	LF	TEMPORARY SLOPE DRAINS					
204400000-E	815	100	LF	6" PERFORATED SUBDRAIN PIPE	602700000-N	1622	5	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS					
205500000-E	815	3	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS	602900000-E	SP	700	LF	SAFETY FENCE					
206600000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET	603000000-E	1630	160	CY	SILT EXCAVATION					
207700000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)	603600000-E	1631	7,000	SY	MATTING FOR EROSION CONTROL					

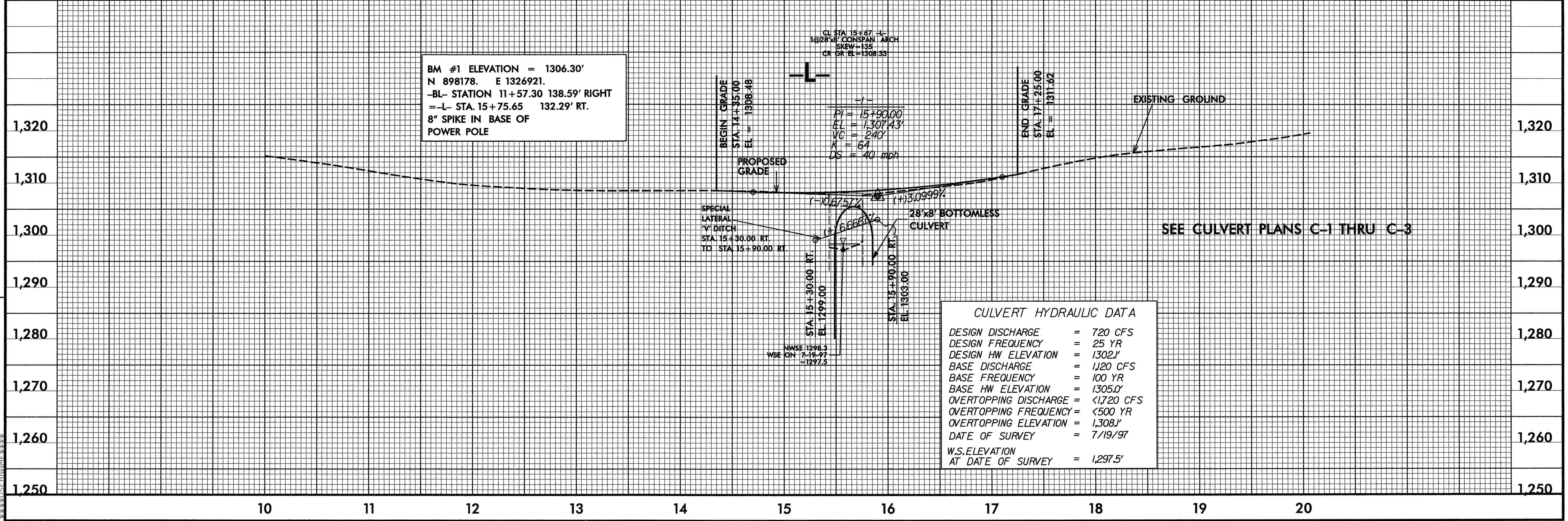


PI Sta 10+84.84 Δ = 14° 21' 37.5" (LT) D = 15' 00' 00.0" L = 95.74' T = 48.12' R = 381.97'	PI Sta 12+78.31 Δ = 23° 32' 37.6" (RT) D = 21' 00' 00.0" L = 112.11' T = 56.86' R = 272.84'	PI Sta 14+23.91 Δ = 0° 50' 36.2" (RT) D = 5' 00' 00.0" L = 16.87' T = 8.43' R = 1,145.92'	PI Sta 17+70.81 Δ = 40° 16' 33.6" (RT) D = 23' 00' 00.0" L = 175.11' T = 91.35' *R = 249.11' DS = 25MPH
---	--	--	---

PROJECT REFERENCE NO. B-4677	SHEET NO. 4
R/W SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	SEAL 028392
	SEAL 9334
	9/25/07
	9/25/07



\* - DESIGN REQUIRED FOR LANE WIDTH, SAG VERTICAL CURVE K VALUE, VERTICAL STOPPING SIGHT DISTANCE, SHOULDER WIDTH, AND HORIZONTAL CURVE RADIUS



DESIGN DISCHARGE	= 720 CFS
DESIGN FREQUENCY	= 25 YR
DESIGN HW ELEVATION	= 1302.1'
BASE DISCHARGE	= 1,120 CFS
BASE FREQUENCY	= 100 YR
BASE HW ELEVATION	= 1305.0'
OVERTOPPING DISCHARGE	= <1,720 CFS
OVERTOPPING FREQUENCY	= <500 YR
OVERTOPPING ELEVATION	= 1,308.1'
DATE OF SURVEY	= 7/19/97
W.S. ELEVATION AT DATE OF SURVEY	= 1,297.5'

REVISIONS

8/17/99  
SYSTEMS  
DRAWING  
REVISIONS