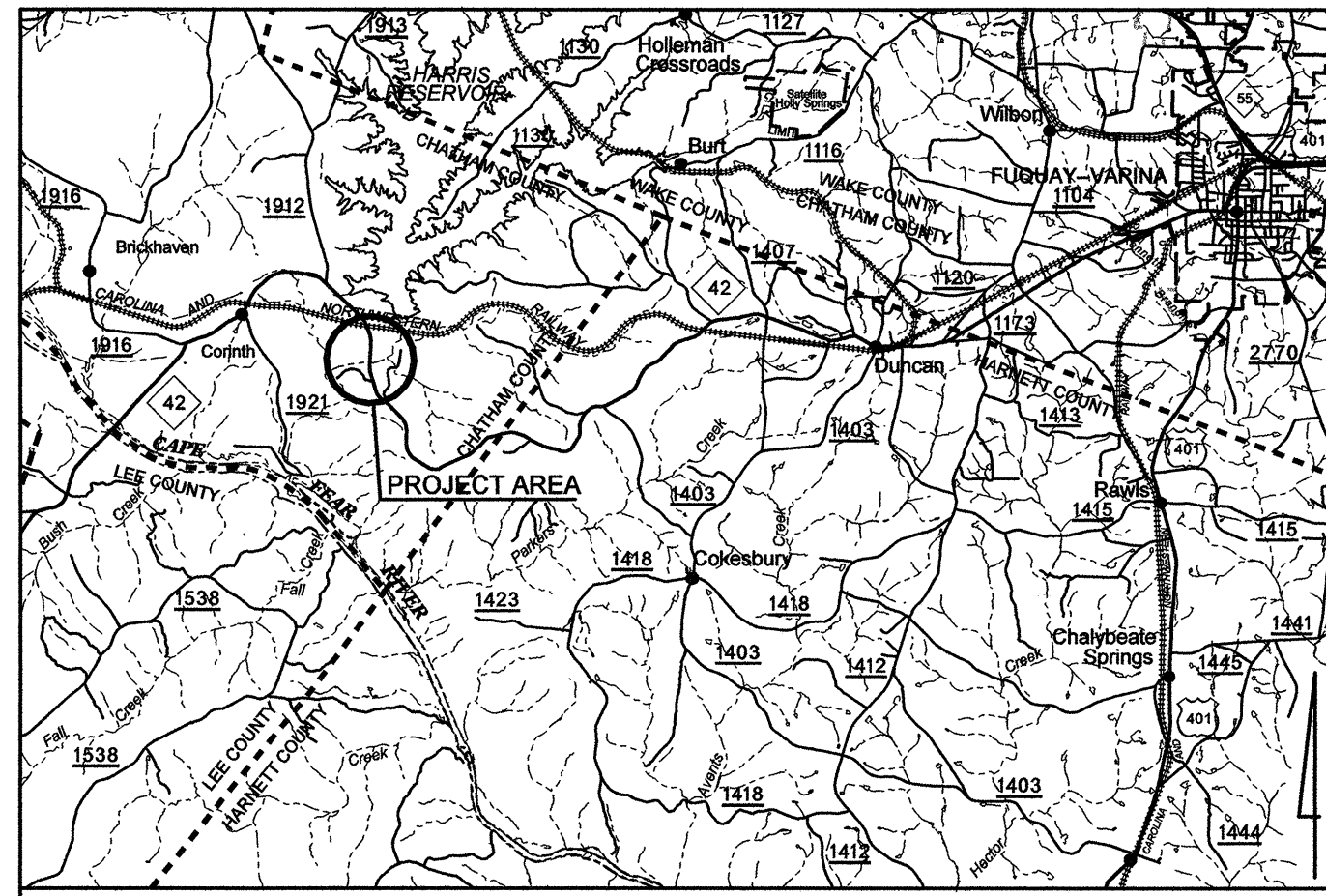


09/28/09

3/18/2010
F:\Roadway\Proj\B4459_Rdy-fsh.dgn
Florence & Hutcheson, Inc.

CONTRACT: C202551 **TIP PROJECT: B-4459**

See Sheet 1-A For Index of Sheets



VICINITY MAP

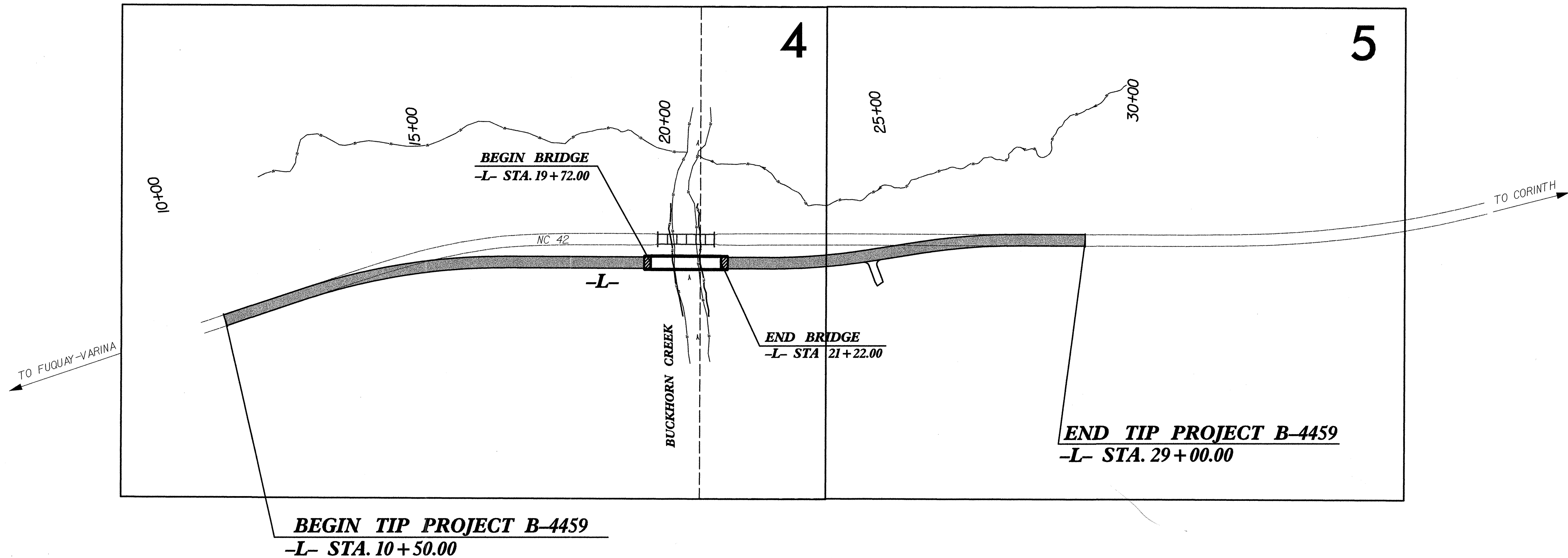
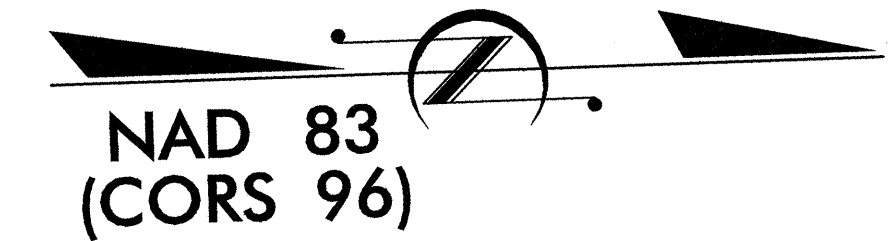
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CHATHAM COUNTY

LOCATION: BRIDGE NO. 56 ON NC 42 OVER BUCKHORN CREEK

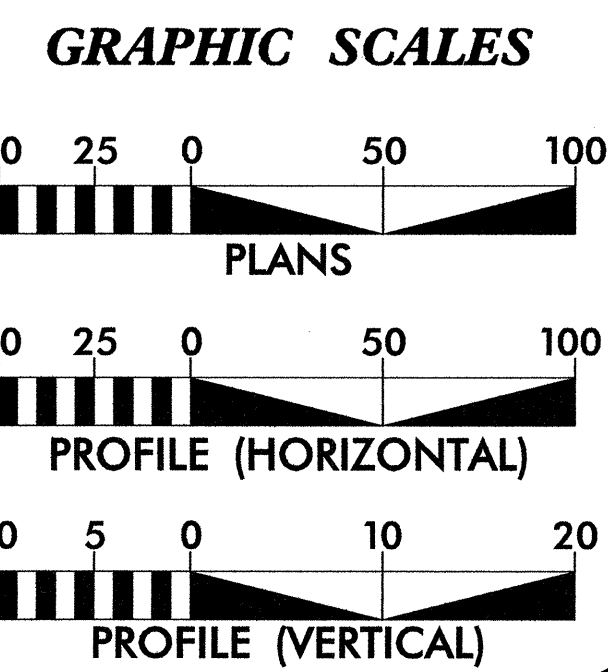
**TYPE OF WORK: GRADING, DRAINAGE, PAVING,
& STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4459	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
33710.1.1	BRSTP-0042(12)	P.E.	
33710.2.1	BRSTP-0042(12)	R/W	
33710.3.1	BRSTP-0042(12)	CONST.	



** DESIGN EXCEPTION REQUIRED FOR VERTICAL DESIGN.

NCDOT CONTACT: MR. DOUG TAYLOR, P.E.
ROADWAY DESIGN - ENGINEERING COORDINATION



DESIGN DATA

ADT 2011	=	2,200
ADT 2031	=	4,515
DHV	=	10 %
D	=	60 %
T	=	6 % *
V	=	55 MPH
*(TTST 2% + DUAL 4%)		
FUNC. CLASS	=	MAJOR COLL.

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4459	=	0.322 mi
LENGTH STRUCTURE TIP PROJECT B-4459	=	0.028 mi
TOTAL LENGTH OF TIP PROJECT B-4459	=	0.350 mi.

REGIONAL TIER DESIGN

Prepared In the Office of:

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingston Way, Suite 200 Raleigh, NC 27607
NC License No. P-9558

For North Carolina Department of Transportation

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 2, 2009

LETTING DATE:
JUNE 15, 2010

BRIAN A. WILES, P.E.
PROJECT ENGINEER

YVETTE T. MARIOTTE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

3/18/10 P.E.

ROADWAY DESIGN ENGINEER

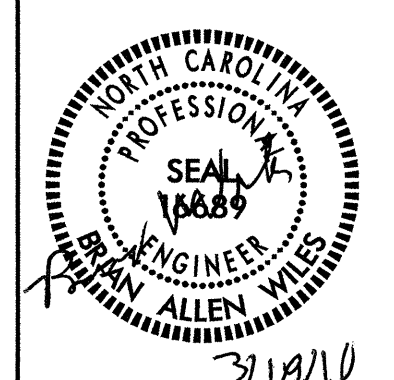
3/18/10

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

6/4/99

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0258

INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	Title Sheet
1-A	Index of Sheets, General Notes and List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
1-D	Centerline Coordinate List
2	Typical Sections, Wedging Detail and Pavement Schedule
2-A	Anchorage for Frames Detail
2-B and 2-C	Method of Pipe Installation
3	Summary of Quantities
3-A	List of Pipes, Endwalls, Etc. (for Pipes 48" and Under) and Summary of Guardrail
3-B	Summary of Earthwork and Summary of Pavement Removal
3-C	Parcel Index Sheet
4 and 5	Plan Sheets
6 and 7	Profile Sheets
TCP-1 thru TCP-5	Traffic Control Plans
SIGN-1 thru SIGN-4	Signing Plans
PMP-1 thru PMP-4	Pavement Marking Plans
EC-1 thru EC-7	Erosion Control Plans
RF-1	Reforestation Detail Sheet
UO-1 thru UO-3	Utility by Others Plans
XSUM-1	Cross Section Summary Sheet
X-1 thru X-16	Cross Sections
S-1 thru S-24	Structure Plans

GENERAL NOTES:

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

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.

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 WINDSTREAM COMMUNICATIONS AND CENTURYLINK.
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

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

**2006 ROADWAY
STANDARD DRAWINGS**

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

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 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 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
840.72	Pipe Collar
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
876.04	Drainage Ditches with Class 'B' Rip Rap

3/18/2010
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Florence & Hutcheson, Inc.

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin	○ EP
Property Corner	_____
Property Monument	□ ECM
Parcel/Sequence Number	(23)
Existing Fence Line	-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	○ R/W
Proposed Right of Way Line with Iron Pin and Cap Marker	○ R/W ▲
Proposed Right of Way Line with Concrete or Granite Marker	○ R/W ▲
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-
Proposed Temporary Utility Easement	-TUE-
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	_____
Existing Curb	_____
Proposed Slope Stakes Cut	-C-
Proposed Slope Stakes Fill	-F-
Proposed Wheel Chair Ramp	○ WCR
Existing Metal Guardrail	_____
Proposed Guardrail	_____
Existing Cable Guiderail	_____
Proposed Cable Guiderail	_____
Equality Symbol	⊕
Pavement Removal	□

VEGETATION:

Single Tree	○
Single Shrub	○
Hedge	_____
Woods Line	_____
Orchard	□
Vineyard	□ 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	_____	_____
Designated U/G Water Line (S.U.E.*)	_____	_____
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:

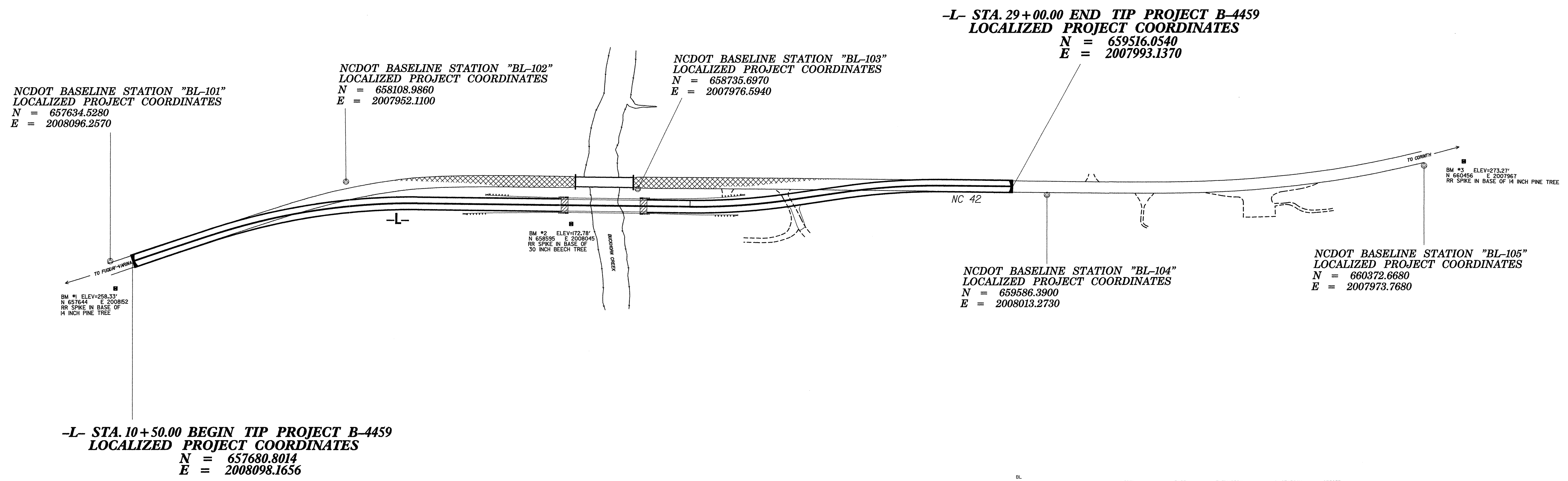
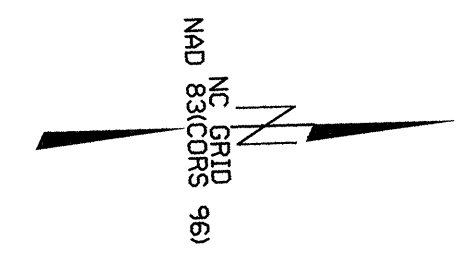
Utility Pole	_____	●
Utility Pole with Base	_____	□
Utility Located Object	_____	○
Utility Traffic Signal Box	_____	□
Utility Unknown U/G Line	_____	UTUL
U/G Tank; Water, Gas, Oil	_____	□
A/G Tank; Water, Gas, Oil	_____	□
U/G Test Hole (S.U.E.*)	_____	⊕
Abandoned According to Utility Records	_____	AATUR
End of Information	_____	E.O.I.

6/2/99

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SURVEY CONTROL SHEET B-4459

PROJECT REFERENCE NO.	SHEET NO.
B-4459	1C
Location and Surveys	



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4459-1"

WITH NAD 83(COR96) STATE PLANE GRID COORDINATES OF NORTHING: 655168.8640(ft) EASTING: 2010045.0850(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999875420

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4459-1" TO L- STATION 10+50.00 IS

N 37° 46' 41.1" W 3178.101'

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.DOHDOT.STATE.NC.US/PRECONSTRUCTION/HIGHWAY/LOCATION/PROJECT/](http://www.doh.dot.state.nc.us/preconstruction/highway/location/project/)
- THE FILES TO BE FOUND ARE AS FOLLOWS:
B4459_LS_CONTROL_060501.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.

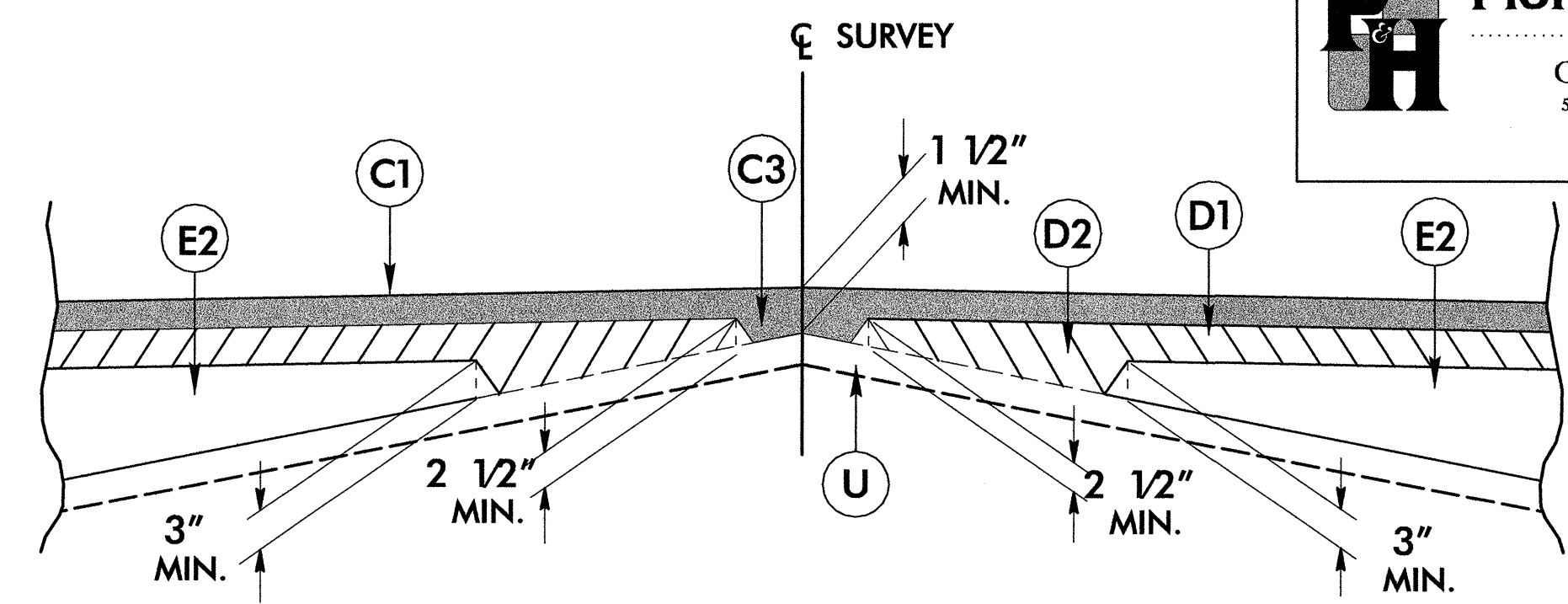
BL POINT	DESC.	NORTH	EAST	ELEVATION	L. STATION	OFFSET
181	BL-181	657634.5280	2008096.2570	268.33	10+46.24	15.16 LT
182	BL-182	658108.9860	2007952.1100	218.85	14+44.65	45.84 LT
183	BL-183	658735.6970	2007976.5940	179.51	21+16.50	30.51 LT
184	BL-184	659586.3900	2008013.2730	224.75	29+11.88	17.32 RT
185	BL-185	660372.6680	2007973.7680	272.27		OUTSIDE PROJECT LIMITS
.....						
BM1	ELEVATION = 268.33					
N 657644	E 2008052					
L STATION 10+00						
N 74° 38' 42.2"	E DIST 41.26					
RR SPIKE IN BASE OF 14 INCH PINE TREE						
.....						
BM2	ELEVATION = 172.78					
N 658596	E 2008045					
L STATION 19+79.25 RIGHT						
RR SPIKE IN BASE OF 30 IN BEECH TREE						
.....						
BM3	ELEVATION = 273.27					
N 660456	E 2007967					
L STATION 28+06						
N 2° 04' 40.9"	W DIST 834.54					
RR SPIKE IN BASE OF 14 INCH PINE TREE						
.....						

NOTE: DRAWING NOT TO SCALE

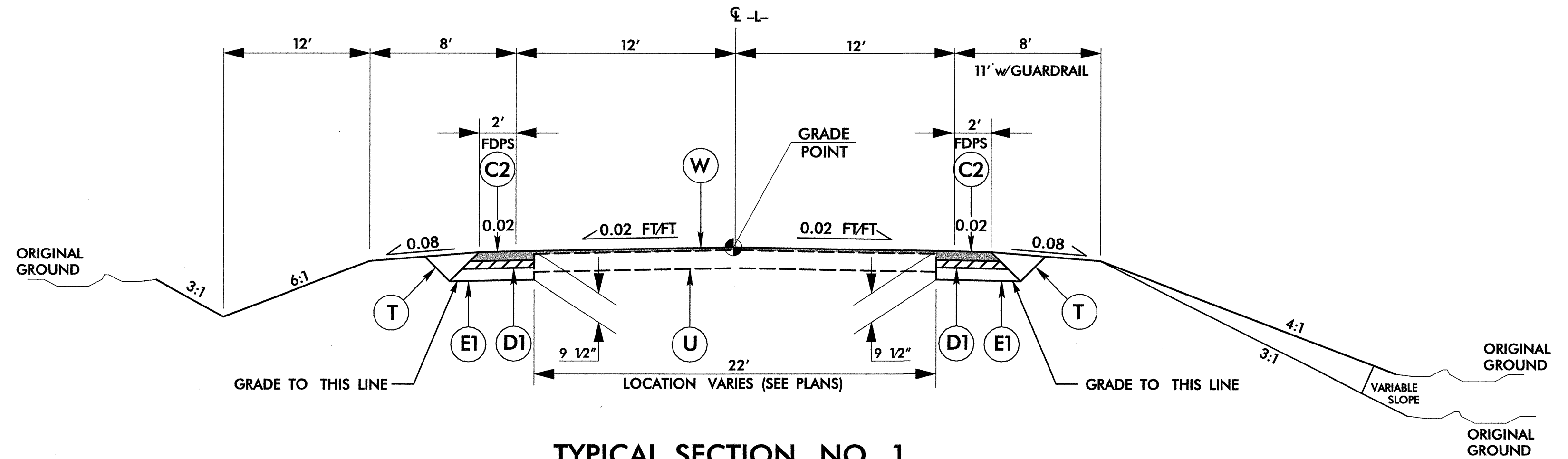
6/2/99

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET.)

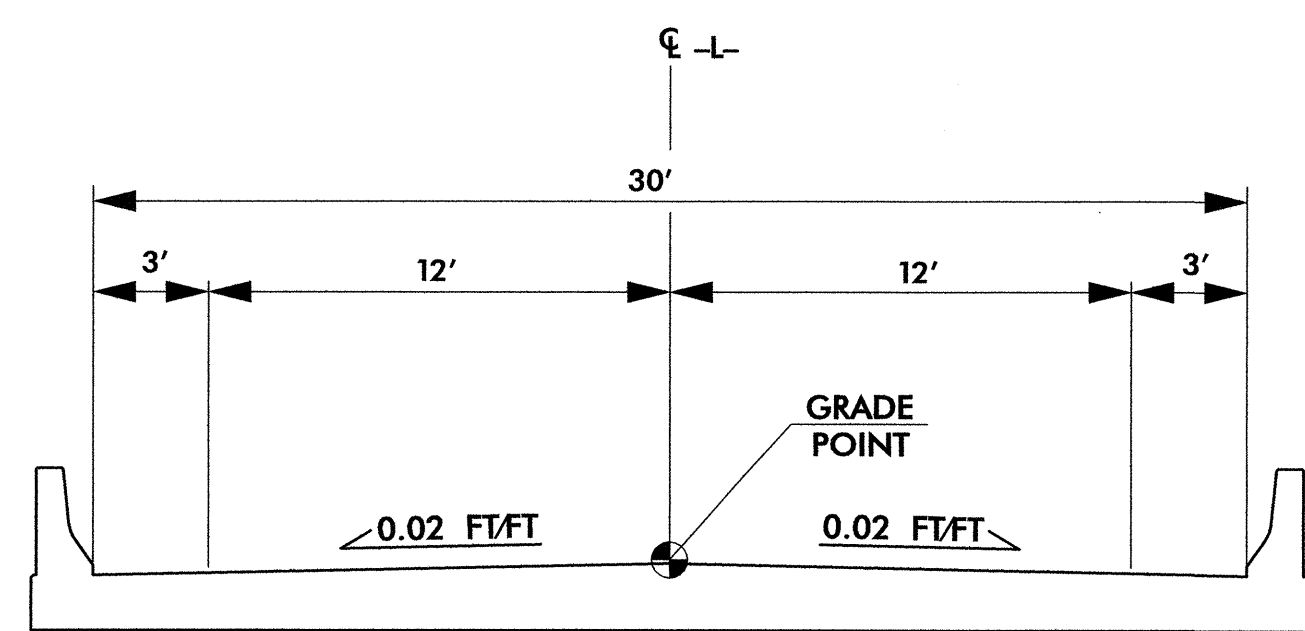
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Detail Showing Method of Wedging (W)

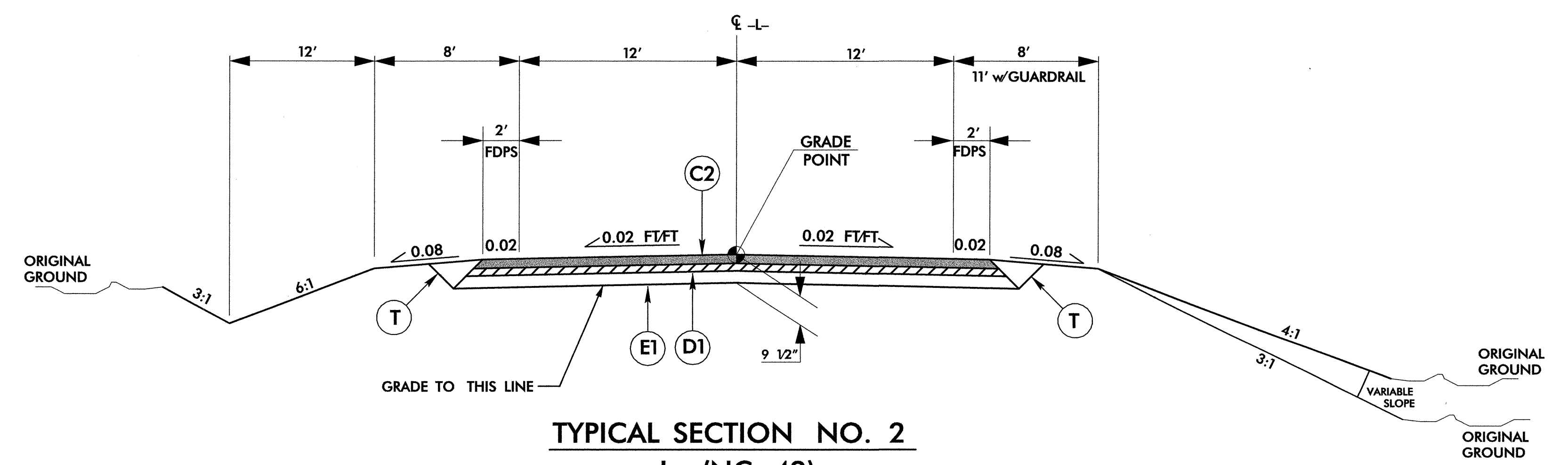


TYPICAL SECTION NO. 1
 -L- (NC 42)
 STA 10+50.00 TO STA 14+50.00
 STA 26+00.00 TO STA 29+00.00



TYPICAL SECTION NO. 3
 -L- (NC 42)

STA 19+72.00 (BEGIN BRIDGE) TO STA 21+22.00 (END BRIDGE)



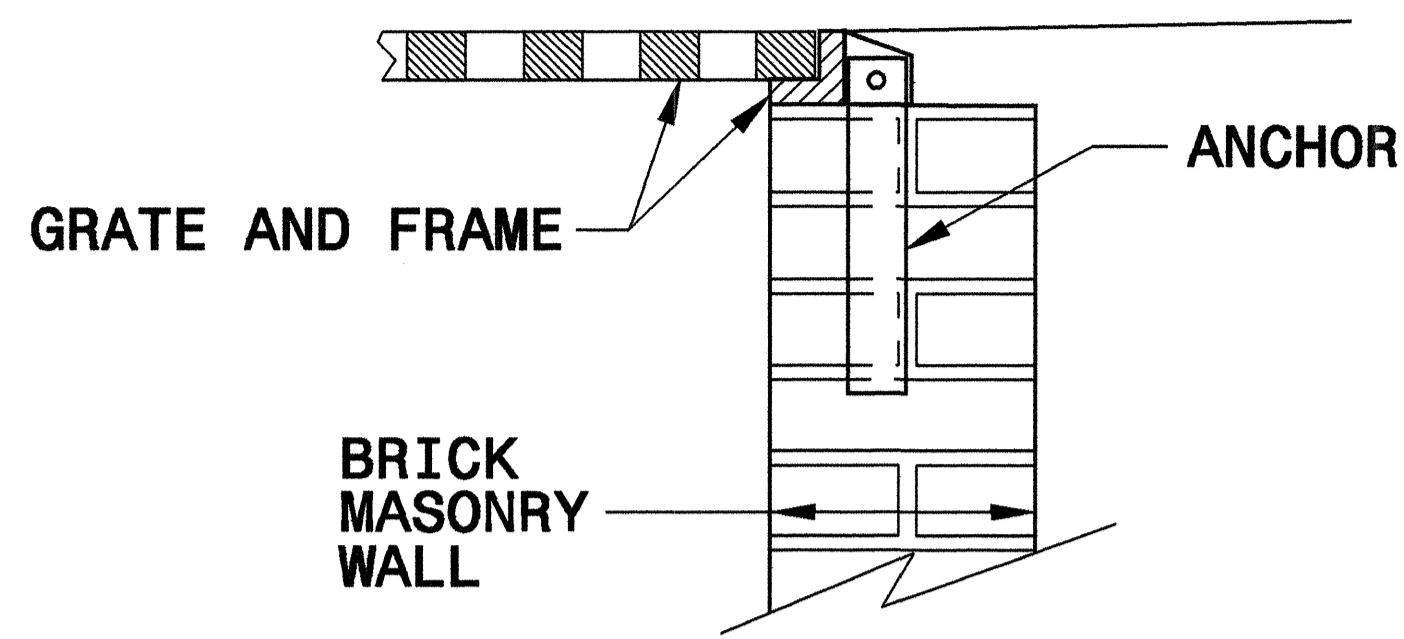
TYPICAL SECTION NO. 2
 -L- (NC 42)
 STA 14+50.00 TO STA 19+72.00 (BEGIN BRIDGE)
 STA 21+22.00 (END BRIDGE) TO STA 26+00.00

3/18/2010
 R:\Roadway\Projects\B4459_Rdwy_tup.dgn
 Florence & Hutcheson, Inc.

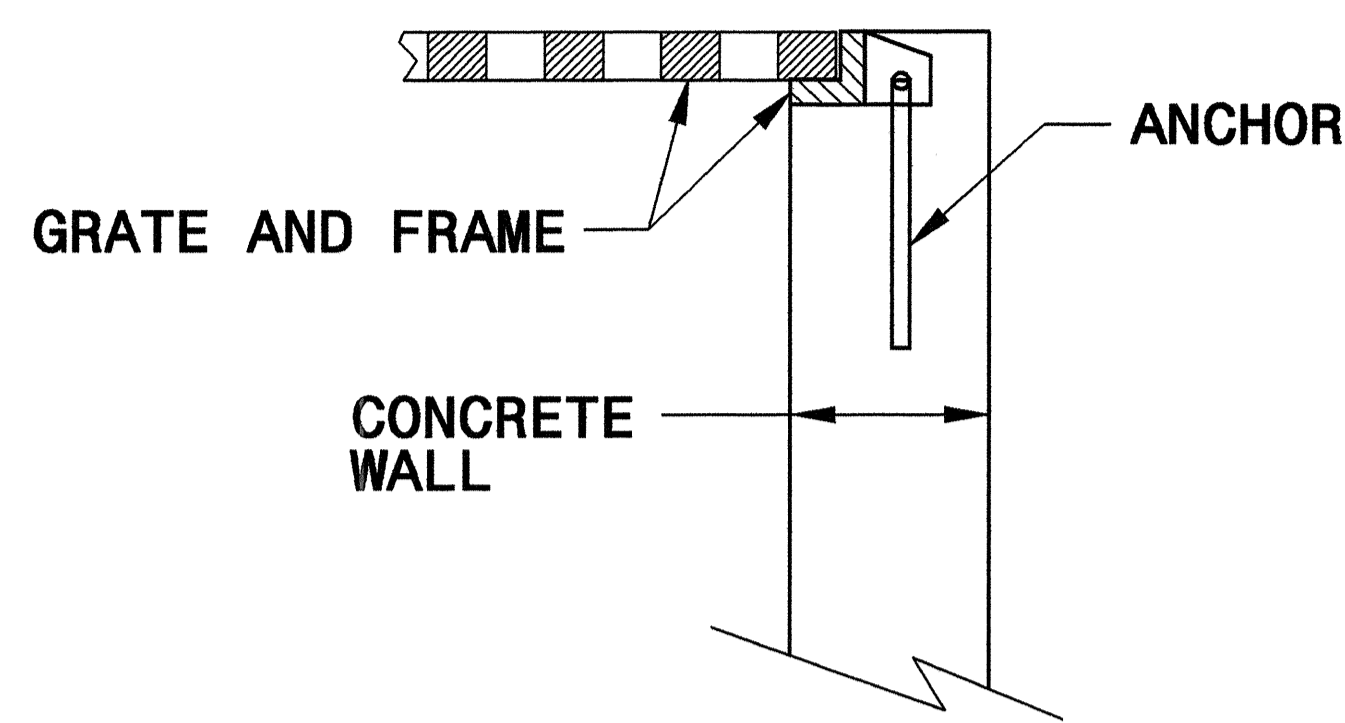
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

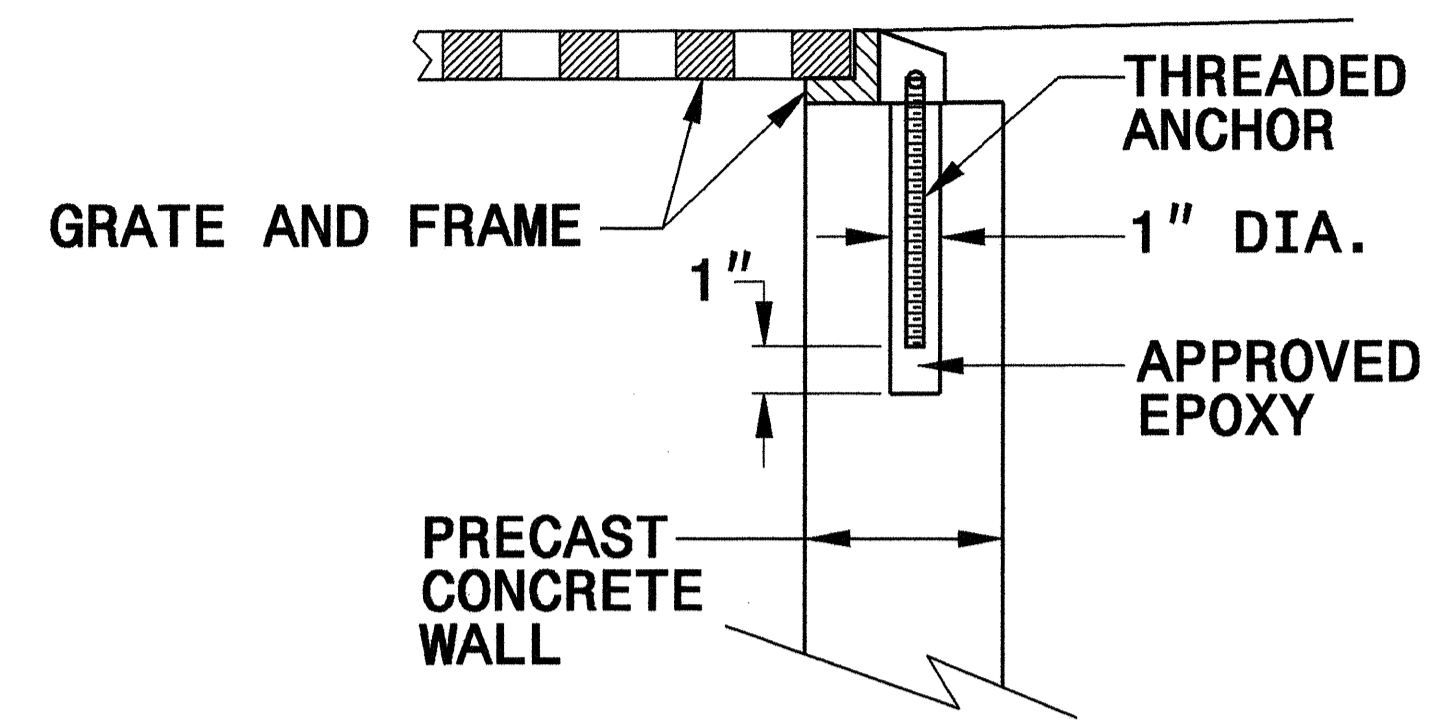
SHEET 1 OF 1
840D25



**BRICK MASONRY
CONSTRUCTION**



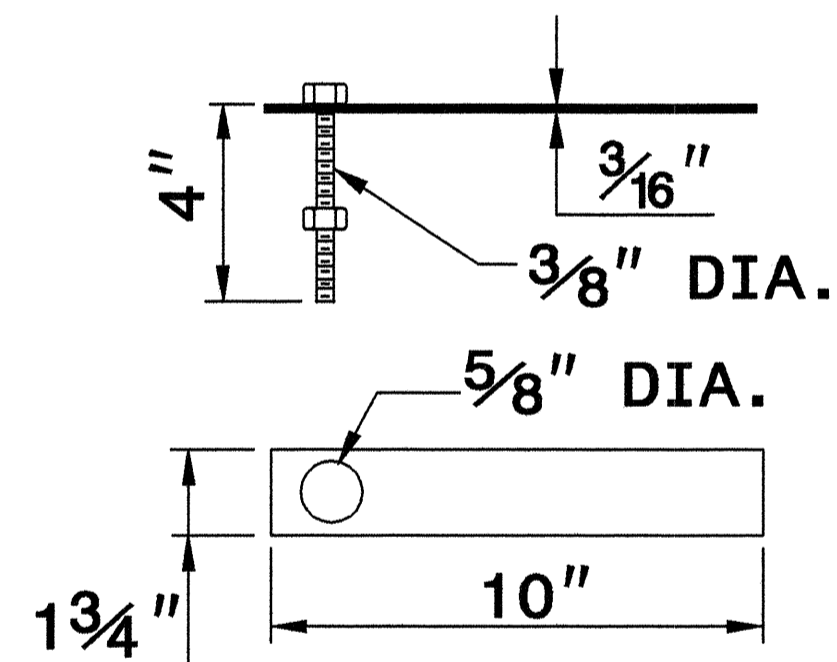
**CONCRETE
CONSTRUCTION**



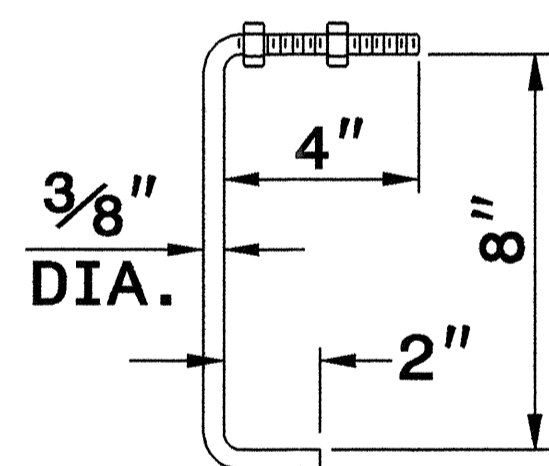
**PRECAST CONCRETE
CONSTRUCTION**

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

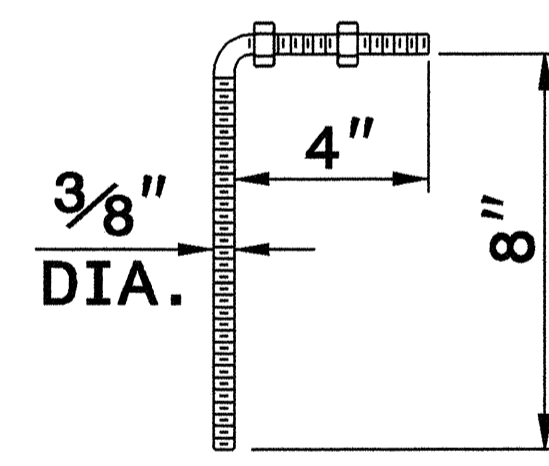
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL
OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



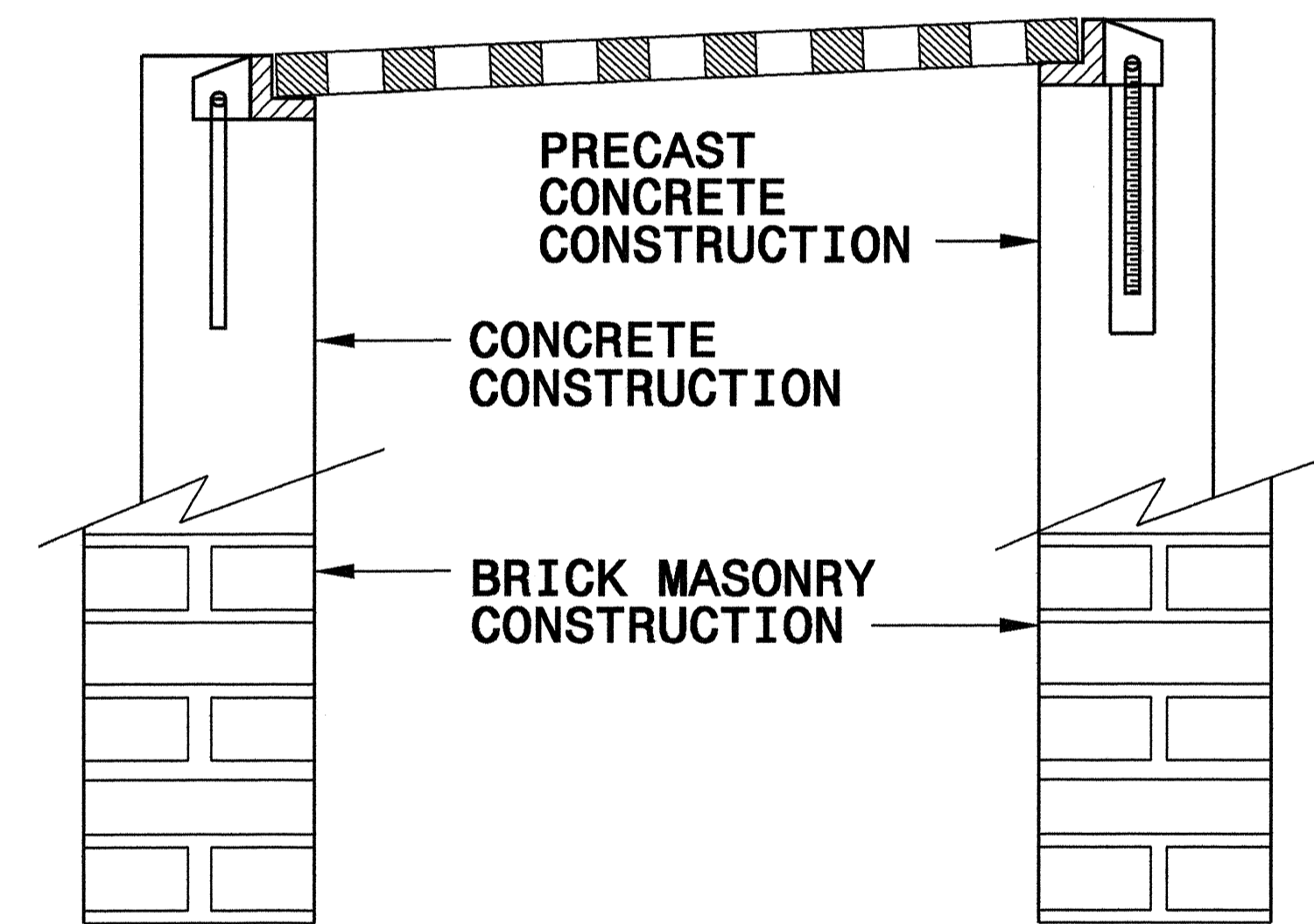
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



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



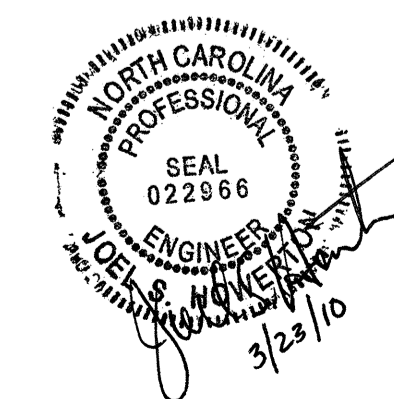
**FRAME AND GRATE INSTALLATION
FOR NORMAL CROWN AND
SUPERELEVATED SECTIONS**

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 St:\Contracts\10022293\Special\Details\enward\stds\06\Stds to Special\Details\840D25 Anchorage For Frames\0840d25.dgn enward A1 P022293



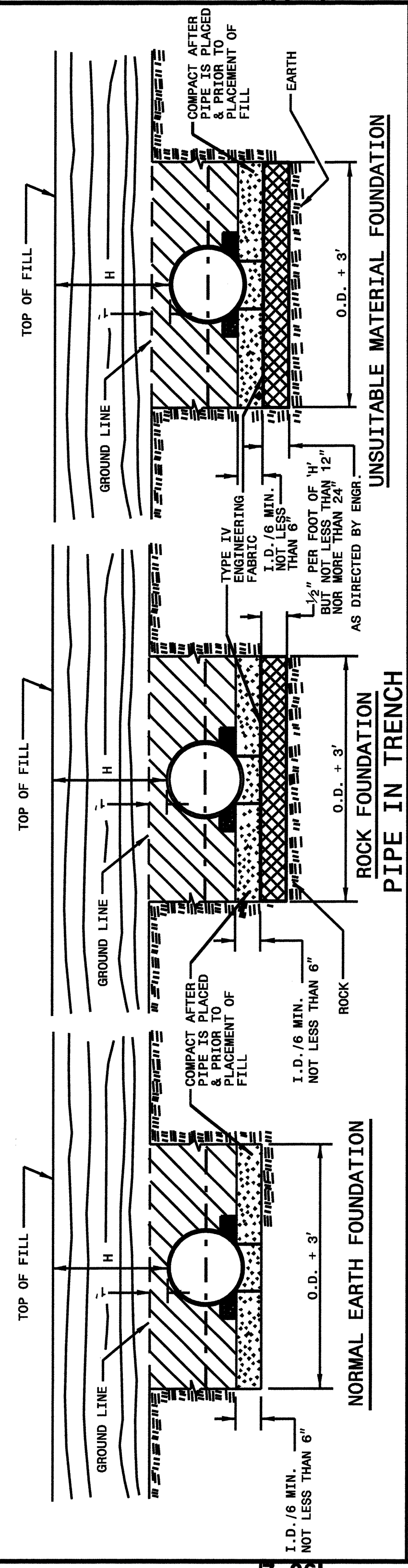
**PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN**
Office 919-250-4128 FAX 919-250-4119

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.

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



ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 FLEXIBLE PIPE

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 FLEXIBLE PIPE

SHEET 1 OF 3
300D01

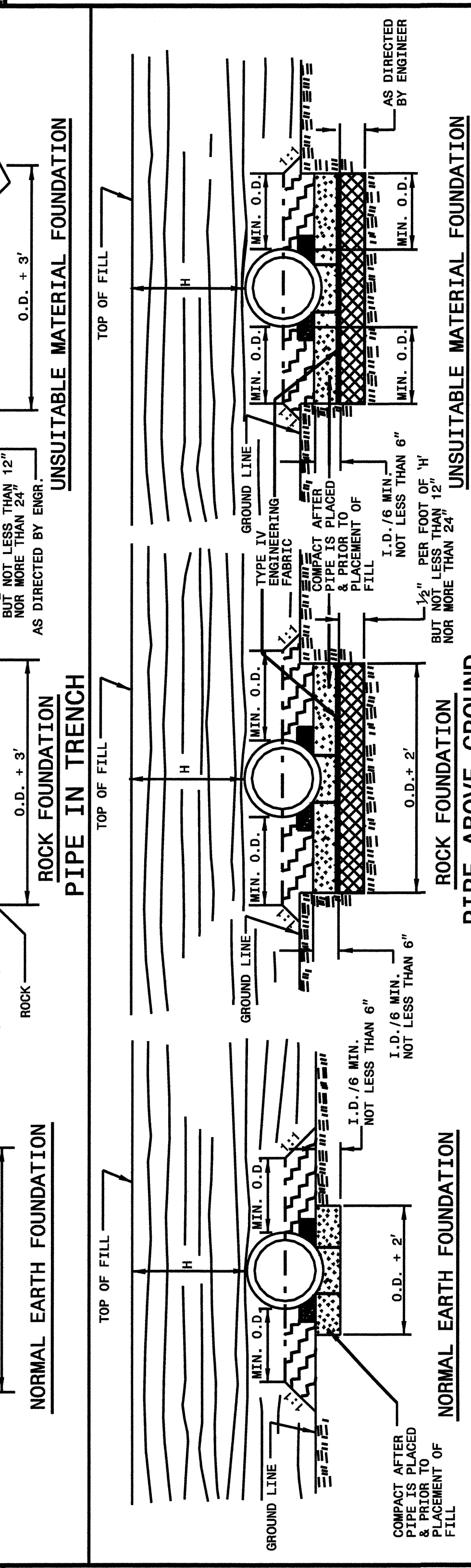
SHEET 1 OF 3
300D01

GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.
 TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
 LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

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

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



ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 RIGID PIPE

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 RIGID PIPE

SHEET 2 OF 3
300D01

SHEET 2 OF 3
300D01

GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.
 TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
 LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.
 SPRINGLINE OF PIPE ABOVE 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: K Kempf DATE: 5-15-09
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPE&P:\ricward/stds/stdsdetails\30001\030001.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	48	54	77	100	123	
60	12			69	90	111	
66	12				81	100	
72	12					74	81
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	218	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		42	60	78	96	
48	12		32	52	68	84	
54	12			46	50	74	
60	12				50	62	51
66	12					51	41
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.

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION

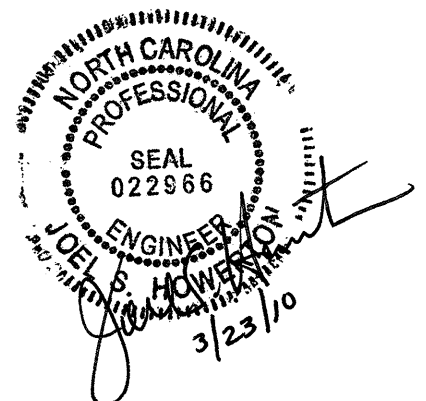
FILL HEIGHT TABLES

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: DATE: _____
 CHECKED BY: DATE: _____
 FILE SPEC: ericward/stds/stdstodetails/30001/0300d01.dgn



DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202551

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL STATION ***** (20+47)
0038000000-E	SP	750	CY	SHALLOW UNDERCUT
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB- BING
0057000000-E	226	1,110	CY	UNDERCUT EXCAVATION
0080000000-E	SP	1,500	TON	CLASS IV SUBGRADE STABILIZA- TION
0134000000-E	240	480	CY	DRAINAGE DITCH EXCAVATION
0196000000-E	270	2,650	SY	FABRIC FOR SOIL STABILIZATION
0234000000-E	SP	1,650	CY	GENERIC GRADING ITEM SELECT GRANULAR MATERIAL
0320000000-E	SP	100	SY	FOUNDATION CONDITIONING FABRIC
0330000000-E	SP	40	TON	GENERIC DRAINAGE ITEM FOUNDATION CONDITIONING MATE- RIAL, MINOR STRS
0448200000-E	SP	176	LF	15" RC PIPE CULVERTS, CLASS IV
0986000000-E	SP	80	LF	GENERIC PIPE ITEM 24" RC PIPE CULVERTS, CLASS III
0986000000-E	SP	40	LF	GENERIC PIPE ITEM 36" RC PIPE CULVERTS, CLASS III
0995000000-E	340	64	LF	PIPE REMOVAL
1489000000-E	610	1,150	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	800	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	900	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	142	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
2000000000-N	806	13	EA	RIGHT OF WAY MARKERS
2022000000-E	815	56	CY	SUBDRAIN EXCAVATION
2033000000-E	815	42	CY	SUBDRAIN FINE AGGREGATE

ItemNumber	Sec #	Quantity	Unit	Description
2044000000-E	815	250	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	8	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
2209000000-E	838	3.4	CY	ENDWALLS
2253000000-E	840	2.5	CY	PIPE COLLARS
2286000000-N	840	3	EA	MASONRY DRAINAGE STRUCTURES
2367000000-N	840	3	EA	FRAME WITH TWO GRATES, STD 840.29
2556000000-E	846	168	LF	SHOULDER BERM GUTTER
3030000000-E	862	537.5	LF	STEEL BM GUARDRAIL
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3270000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3317000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77
3628000000-E	876	35	TON	RIP RAP, CLASS I
3649000000-E	876	390	TON	RIP RAP, CLASS B
3656000000-E	876	1,490	SY	FILTER FABRIC FOR DRAINAGE
4072000000-E	903	45	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	4	EA	SIGN ERECTION, TYPE E
4155000000-N	907	5	EA	DISPOSAL OF SIGN SYSTEM, U- CHANNEL
4400000000-E	1110	80	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	20	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4430000000-N	1130	44	EA	DRUMS
4435000000-N	1135	44	EA	CONES
4445000000-E	1145	48	LF	BARRICADES (TYPE III)
4450000000-N	1150	2,400	HR	FLAGGER

ItemNumber	Sec #	Quantity	Unit	Description
4516000000-N	1180	72	EA	SKINNY DRUM
4650000000-N	1251	47	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	3,700	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	3,700	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4770000000-E	1205	600	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)
4810000000-E	1205	14,800	LF	PAINT PAVEMENT MARKING LINES (4")
4900000000-N	1251	23	EA	PERMANENT RAISED PAVEMENT MARKERS
6000000000-E	1605	4,650	LF	TEMPORARY SILT FENCE
6006000000-E	1610	230	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	650	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	230	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	9.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	300	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	2	TON	FERTILIZER FOR TEMPORARY SEED- ING
6024000000-E	1622	350	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	650	LF	SAFETY FENCE
6030000000-E	1630	1,150	CY	SILT EXCAVATION
6036000000-E	1631	9,000	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	450	SY	COIR FIBER MAT
6038000000-E	SP	1,100	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	400	LF	1/4" HARDWARE CLOTH
6071020000-E	SP	130	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	650	LF	COIR FIBER BAFFLES
6071050000-E	SP	6	EA	*** SKIMMER (1-1/2")
6084000000-E	1660	9	ACR	SEEDING & MULCHING
6087000000-E	1660	6	ACR	MOWING
6090000000-E	1661	100	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	175	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	4.75	TON	FERTILIZER TOPDRESSING
6114500000-N	SP	15	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.1	ACR	REFORESTATION

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK
 IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
SUMMARY NO. 1					
-L- 10+50 TO 19+72.00	7304		5338		1966
TOTAL SUMMARY NO. 1	7304		5338		1966
SUMMARY NO. 2					
-L- 21+22.00 TO 29+00	2632		6521	3889	
TOTAL SUMMARY NO. 2	2632		6521	3889	
SUB-TOTAL SUMMARY NOS. 1 & 2	9936		11858	3889	1966
EST. LOSS DUE TO CLEARING & GRUBBING	-600			600	
UNDERCUT (19+75 TO 20+20)		110	72	72	110
UNCLASSIFIED EXCAVATION (END BENT #1)	105				105
WASTE TO REPLACE BORROW				-2071	-2071
PROJECT TOTAL	9441		11930	2490	
EST. 5% REPLACE TOPSOIL ON BORROW PITS				124	
GRAND TOTALS	9441	110		2614	
SAY	9500	110		2700	

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD ²
L	12+75	19+85	LT	1534.44
L	21+07	26+75	LT	1211.11
TOTAL:				2745.56
SAY:				2750

DRAINAGE DITCH EXCAVATION = 480 C.Y.
 SUBGRADE UNDERCUT = 1,000 C.Y.
 SHALLOW UNDERCUT = 750 C.Y.
 FABRIC FOR SOIL STABILIZATION = 2,650 SY
 CLASS IV SUBGRADE STABILIZATION = 1,500 TONS
 6" PERFORATED SUBDRAIN PIPE = 250 LF
 SELECT GRANULAR MATERIAL = 1,650 CY

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.

Note: 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."

3/18/2010
 C:\Users\jprince\Documents\Projects\B4459_Rdy_3ser.es.dgn
 Prince, J. & Harrison, Inc.

6/4/99

PROJECT REFERENCE NO.	SHEET NO.
B-4459	3-C

PARCEL INDEX SHEET

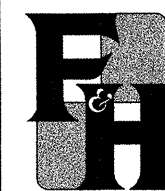
PARCEL NO.	R/W SHEET NO.	PROPERTY OWNERS NAME
1	4	William & Carolyn Pugh
2	4	William & Glendora Woodard
3	4, 5	Progress Energy Carolinas Inc.
4	4, 5	C. Wesley & Robin Tutor & Charles & Lois Jones

1/20/2010
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K & Associates, P.C.

8/17/99


REVISIONS

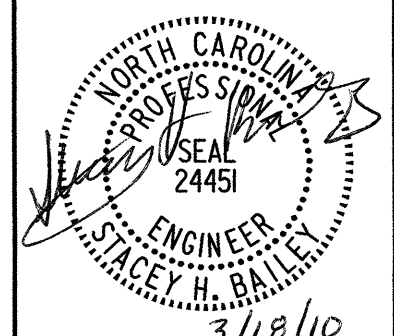
3/18/2010
R:\Roadway\Projects\B4459_Rdu\psh_4.dgn
Florence & Hutcheson



Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258

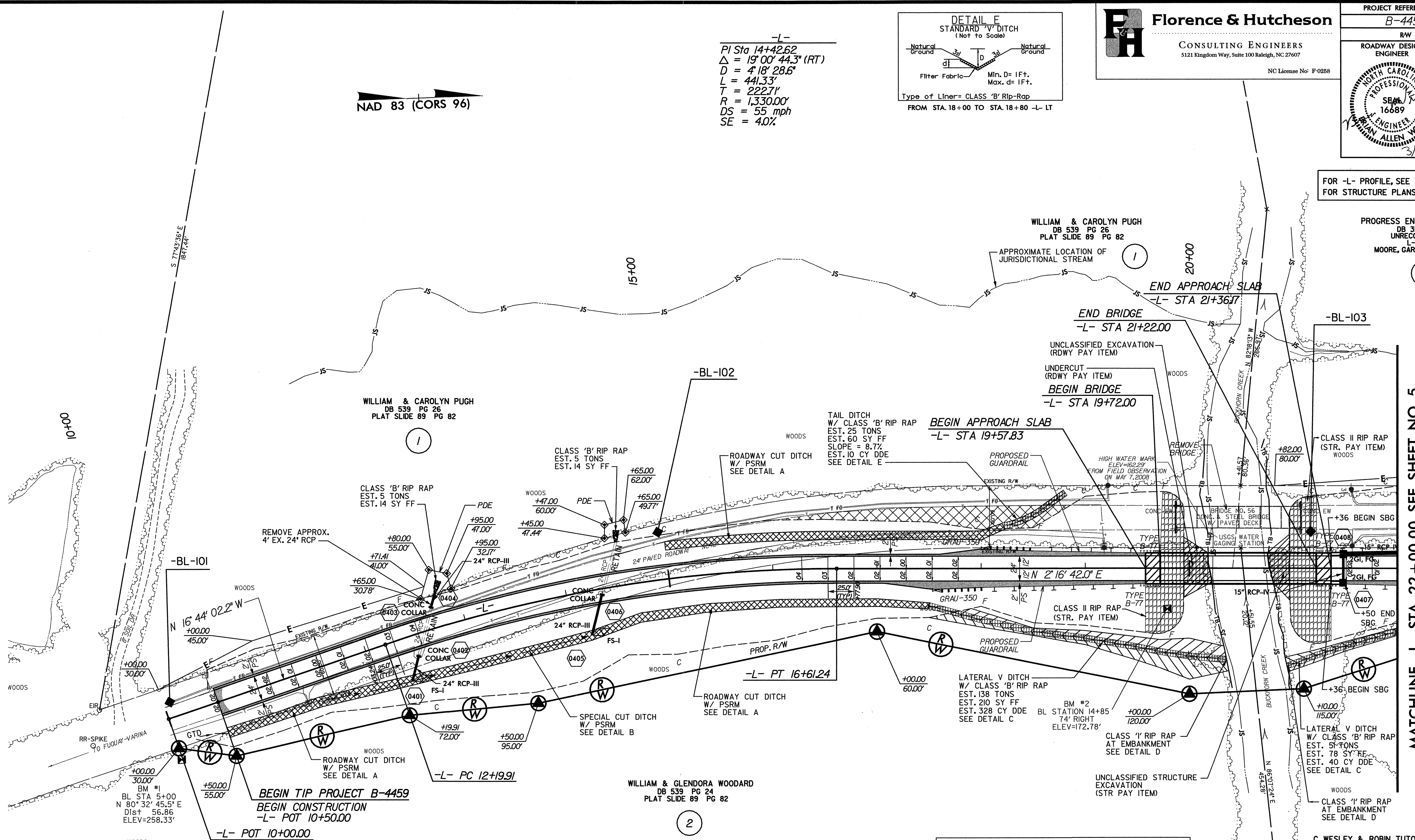
PROJECT REFERENCE NO. B-4459	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



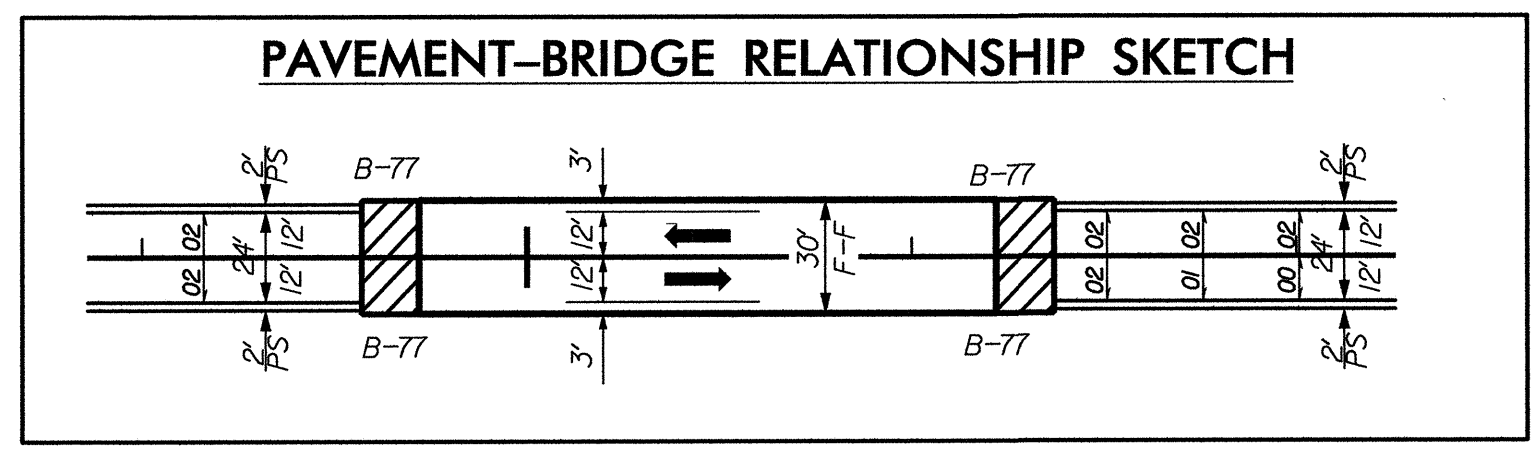
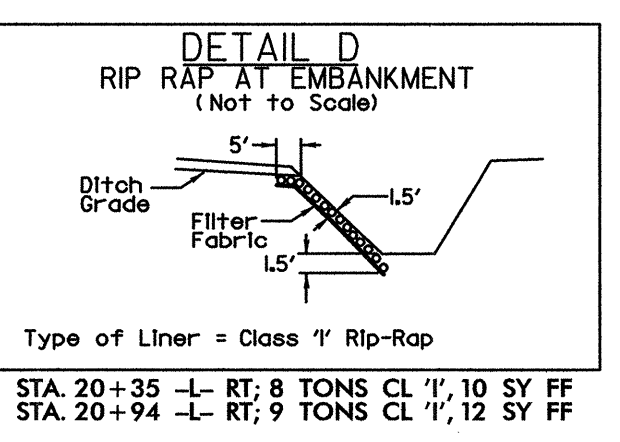
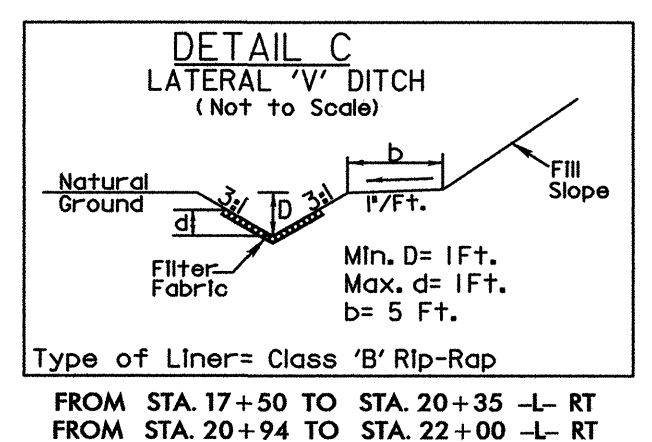
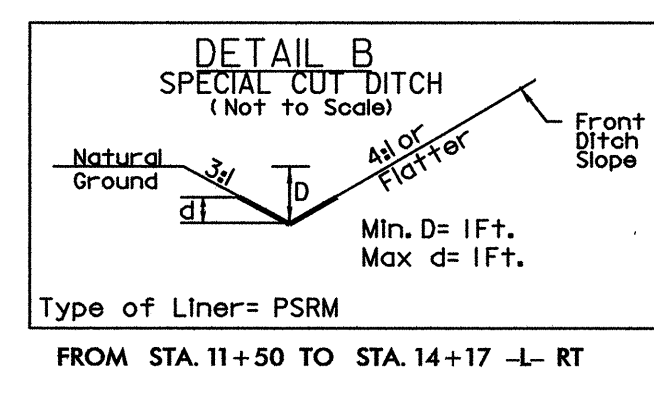
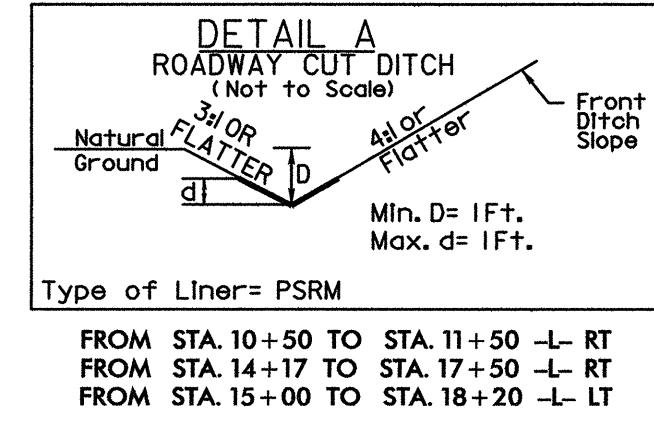
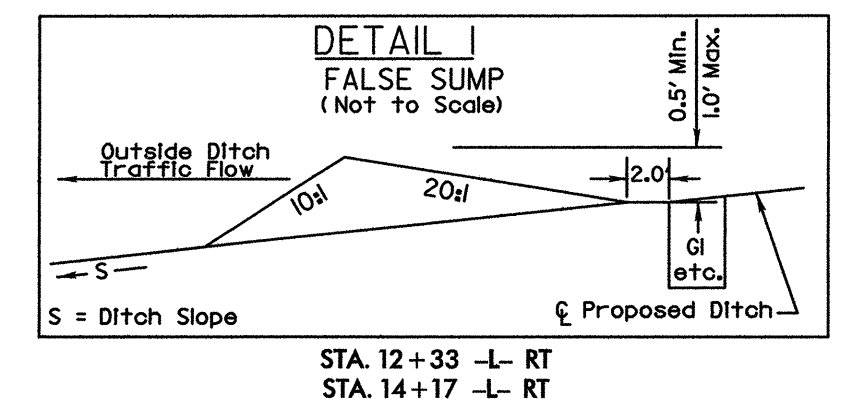


FOR -L- PROFILE, SEE SHEET 6
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-24

PROGRESS ENERGY CAROLINAS
DB 359 PG 426
UNRECORDED PLAT
L-D-3064
MOORE, GARNER, & ASC. INC.



MATCHLINE -L- STA. 22 + 00.00 SEE SHEET NO. 5



LEGEND

- PAVED SHOULDER
- APPROACH SLAB
- PAVEMENT REMOVAL
- PSRM

DECK DRAIN SPACING: PLACE 6" DIAMETER DECK DRAINS ON THE LEFT AND RIGHT SIDE OF THE BRIDGE AT 12' CENTER FROM STA. 19+84 TO STA. 20+08 -L- AND FROM STA. 20+92 TO STA. 21+16 -L-.

8/17/09

PROJECT REFERENCE NO. B-4459	SHEET NO. 5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

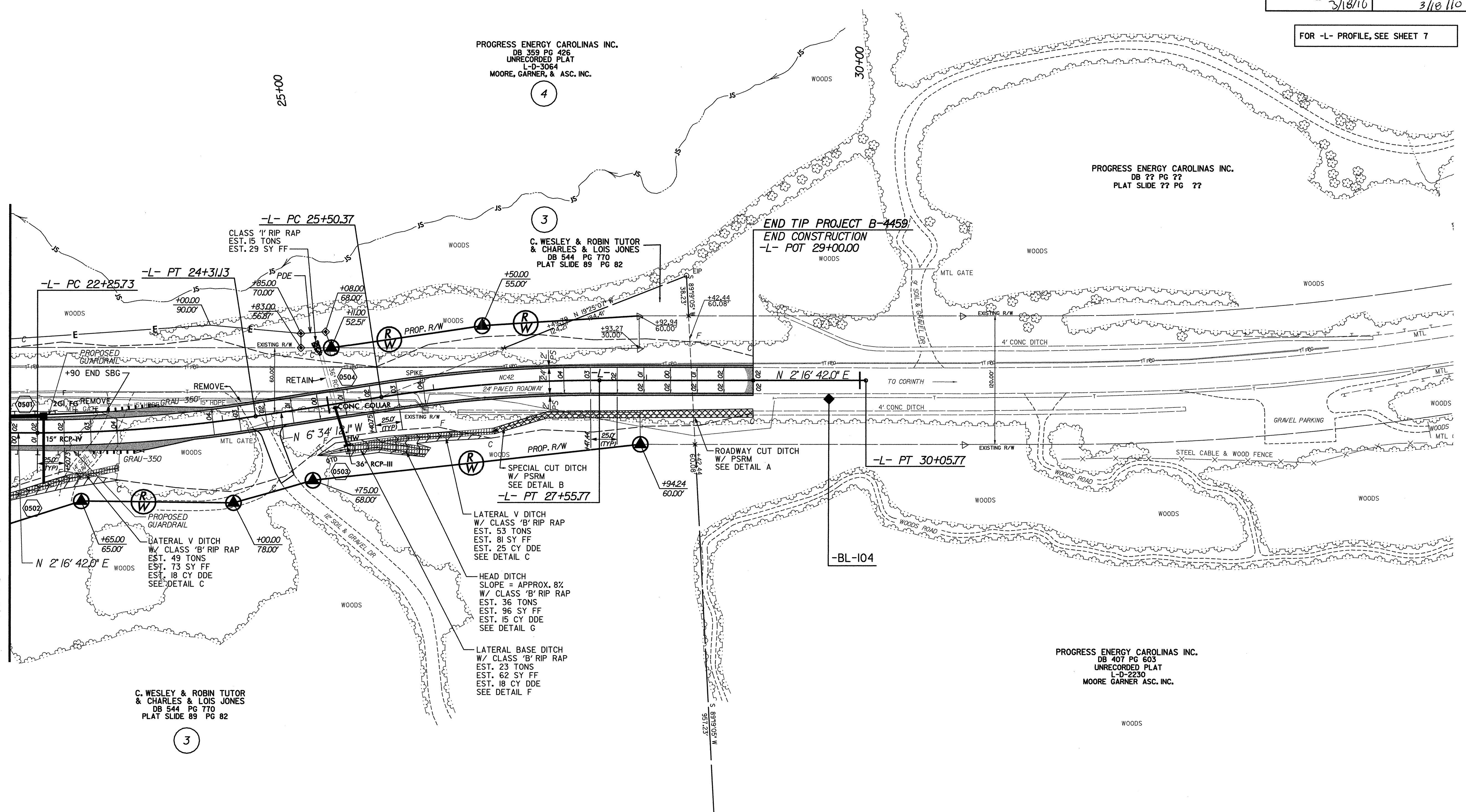
FOR -L- PROFILE, SEE SHEET 7

-L-
 PI Sta 23+28.63
 $\Delta = 8' 50' 54.1''$ (LT)
 $D = 4' 18' 28.6''$
 $L = 205.40'$
 $T = 102.90'$
 $R = 1,330.00'$
 $DS = 55$ mph
 $SE = 4.0\%$

-L-
 PI Sta 26+53.28
 $\Delta = 8' 50' 54.1''$ (RT)
 $D = 4' 18' 28.6''$
 $L = 205.40'$
 $T = 102.90'$
 $R = 1,330.00'$
 $DS = 55$ mph
 $SE = 4.0\%$

NAD 83 (CORS 96)

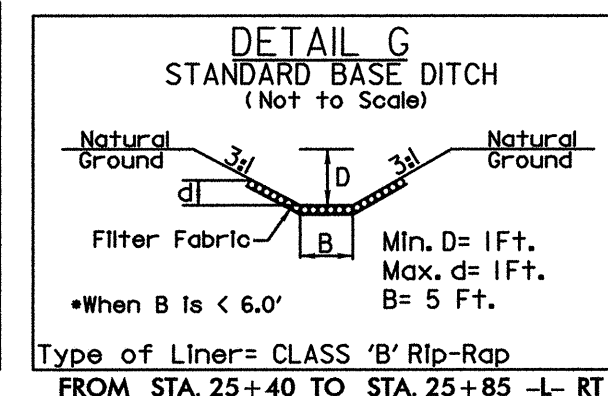
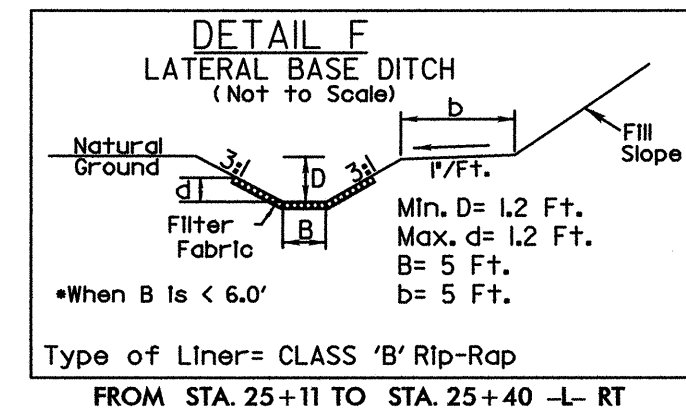
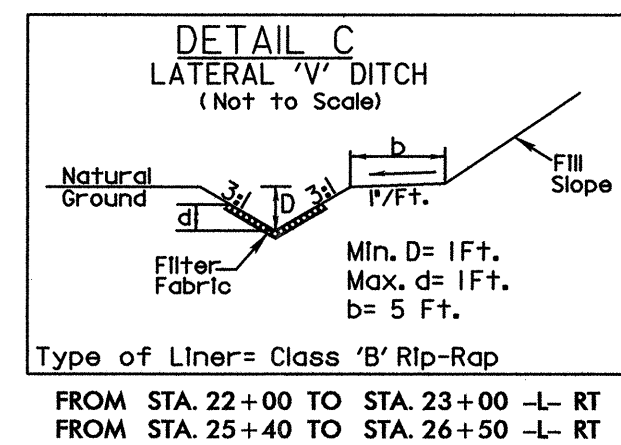
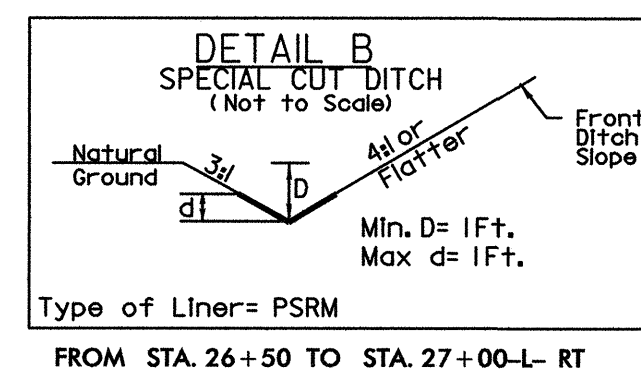
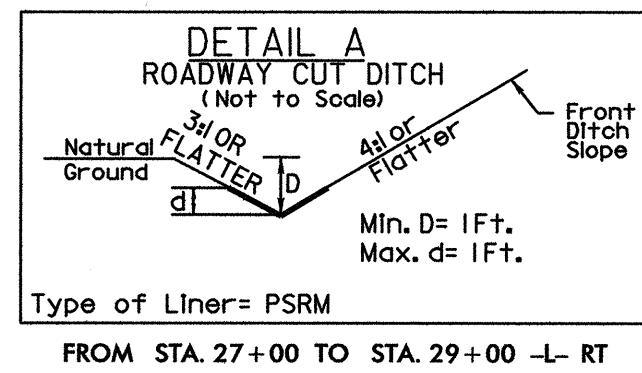
MATCHLINE -L- STA. 22 + 00.00 SEE SHEET NO. 4



REVISIONS

C. WESLEY & ROBIN TUTOR
 & CHARLES & LOIS JONES
 DB 544 PG 770
 PLAT SLIDE 89 PG 82

PROGRESS ENERGY CAROLINAS INC.
 DB 407 PG 603
 UNRECORDED PLAT
 L-D-2230
 MOORE GARNER ASC. INC.



LEGEND

	PAVED SHOULDER
	APPROACH SLAB
	PAVEMENT REMOVAL
	PSRM

3/18/2010 10:51:19 AM Project: N4459_Rdy_psh_5.dgn Florence & Hutcheson, Inc.

5/14/99

BM#1
RR SPIKE BASE OF 1" PINE
BL STA 5+00.00 56.88' RT
L- STA 9+99.03 41.25' RT
ELEV = 258.33'

PIPE HYDRAULIC DATA
STA.-L- 12+60

DRAINAGE AREA = 1.13 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 4 CFS
DESIGN HW ELEVATION = 237.17 FT
100 YEAR DISCHARGE = 5 CFS
100 YEAR HW ELEVATION = 237.24 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 27 CFS
OVERTOPPING ELEVATION = 239.89 FT

FOR PLAN, SEE SHEET NO. 4

PIPE HYDRAULIC DATA
STA.-L- 14+37

DRAINAGE AREA = 0.64 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 2 CFS
DESIGN HW ELEVATION = 222.28 FT
100 YEAR DISCHARGE = 3 CFS
100 YEAR HW ELEVATION = 222.35 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 27 CFS
OVERTOPPING ELEVATION = 225.23 FT

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268

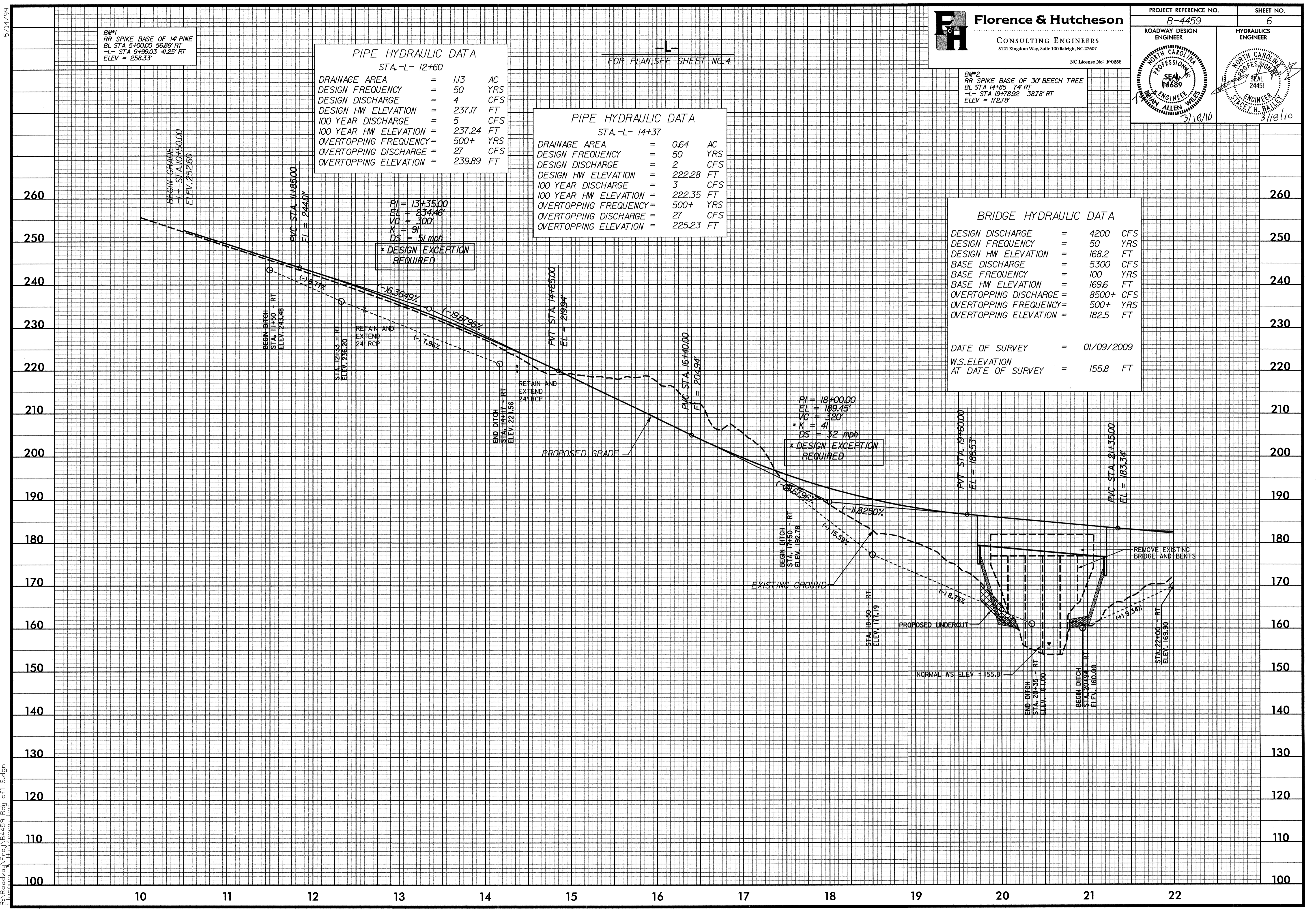
PROJECT REFERENCE NO. B-4459	SHEET NO. 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BM#2
RR SPIKE BASE OF 30" BEECH TREE
BL STA 14+85 74' RT
L- STA 19+78.92 38.78' RT
ELEV = 172.78'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE = 4200 CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 168.2 FT
BASE DISCHARGE = 5300 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 169.6 FT
OVERTOPPING DISCHARGE = 8500+ CFS
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING ELEVATION = 182.5 FT

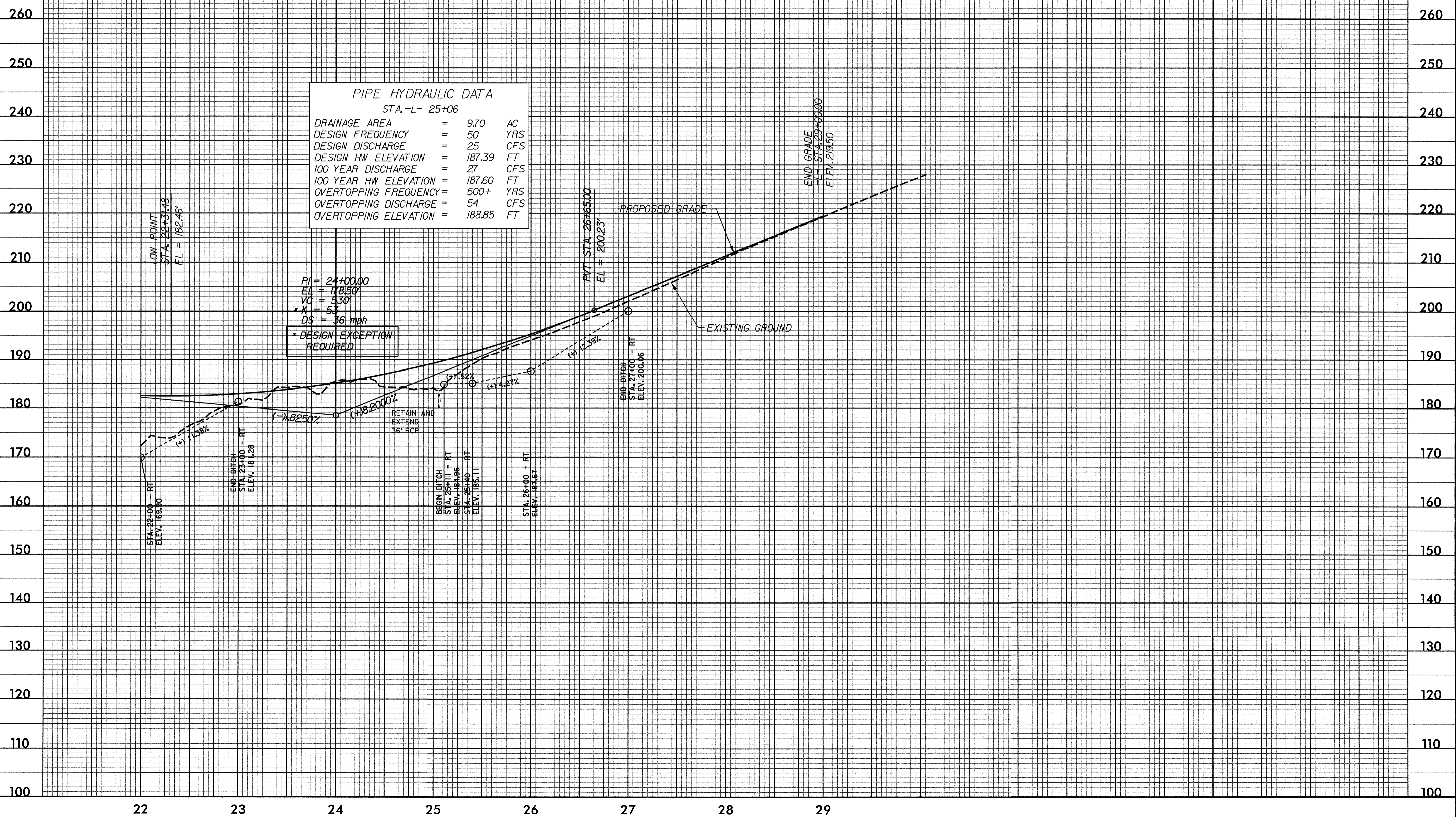
DATE OF SURVEY = 01/09/2009
W.S. ELEVATION AT DATE OF SURVEY = 155.8 FT



3/18/2010
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FOR PLAN, SEE SHEET NO. 3



2/4/2010
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 Co. Associates, P.C.