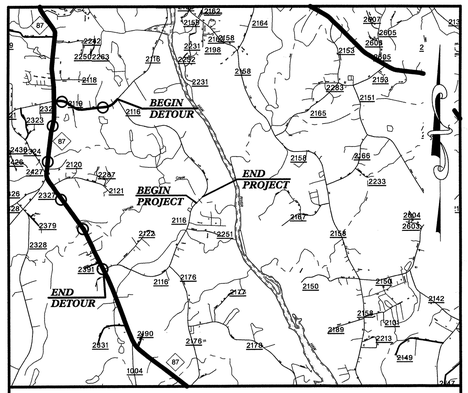
TIP PROJECT: B-4002

CONTRACT: C201811

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



VICINITY MAP
(NOT TO SCALE)
DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

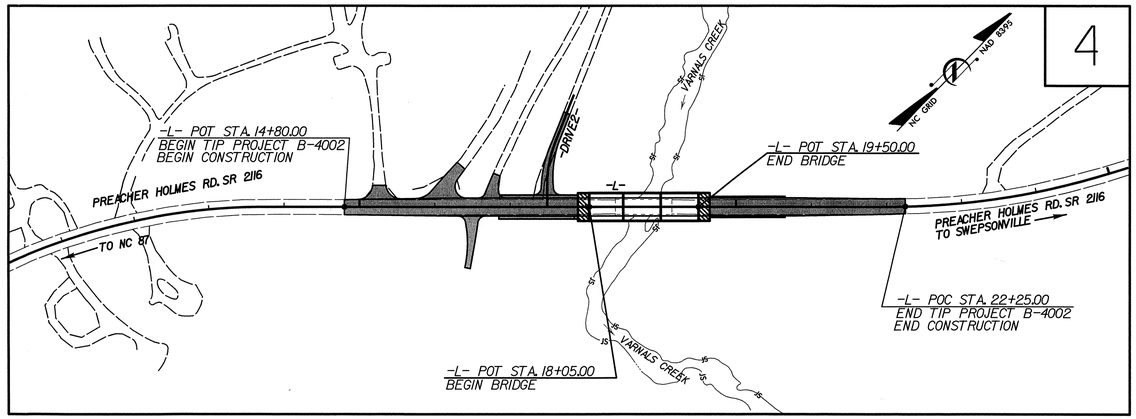
ALAMANCE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4002	1	

WBS NO.	F. A. PROJ. NO.	DESCRIPTION
33370.1.1	BRZ-2116(1)	P.E.
33370.2.1	BRZ-2116(1)	R/W, UTIL
33370.3.1	BRZ-2116(1)	CONST

LOCATION: BRIDGE NO. 96 OVER VARNALS CREEK ON SR 2116

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE



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PO Box 33127
RALEIGH, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

NCDOT CONTACT : DOUG TAYLOR, PE
PROJECT ENGINEER – ROADWAY DESIGN

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 1520
ADT 2030 = 2500
DHV = 10 %
D = 55 %
T = 4 % *
V = 50 MPH

FUNCTION. = RURAL
CLASS. LOCAL

* (TTST 1% + DUALS 3%)
** DESIGN EXCEPTION – SAG VERTICAL CURVE K

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4002 = 0.114 MI
LENGTH STRUCTURE TIP PROJECT B-4002 = 0.027 MI
TOTAL LENGTH TIP PROJECT B-4002 = 0.141 MI

Prepared In the Office of:
MULKEY ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 20, 2006

LETTING DATE:
APRIL 15, 2008

TIM S. HAYES, PE
PROJECT ENGINEER

JOHNNY R. BANKS
PROJECT MANAGER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. PECK

SIGNATURE: 1-17-08 *P.E.*

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT HAYES

SIGNATURE: 1-17-08 *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY DESIGN ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
B-4002	1-A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
SEAL 19963
NORTH CAROLINA PROFESSIONAL ENGINEER
SCOTT HAYES
1-29-08

Index of Sheets, General Notes, and List of Standards

Sheet #	Description
1	Title Sheet
1-A	Index of Sheets, General Notes, and List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
2	Pavement Schedule , Wedging Detail, and Typical Sections
2-A	Anchorage for Frames
3	Summary of Quantities
3-A	List of Pipe, Endwalls, Etc. (For Pipes 48" & Under), Guardrail Summary
3-B	Summary of Earthwork in Cubic Yards, Summary of Pavement Removal
4	Plan and Profile
5	Drive Profile
TCP-1 thru TCP-3	Traffic Control Plans
SD-1	Special Sign Design
EC-1 thru EC-5	Erosion Control Plans
SIGN-1 thru SIGN-3	Signing Plans
EW-Volume-1	Cross-Section Summary Sheet
X-1 thru X-10	Cross-Sections
S-1 thru S-34	Structure Plans

GENERAL NOTES:

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

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO.815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY CORPORATION, AT&T NORTH CAROLINA. 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.

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

2006 ROADWAY ENGLISH 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	
300.01	Method of Pipe Installation - Method 'A'
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
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
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
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

REVISIONS

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Note: Not to Scale

**S.U.E. = Subsurface Utility Engineering*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

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PROJECT REFERENCE NO.	SHEET NO.
B-4002	1-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISIONS

10/25/05

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1
- Buffer Zone 2
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- 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 — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- 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 — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- 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 — S
- 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.

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1/16/2008

12/01/2005

PROJECT REFERENCE NO.	SHEET NO.
B–4002	1C
Location and Surveys	

B–4002 SURVEY CONTROL SHEET

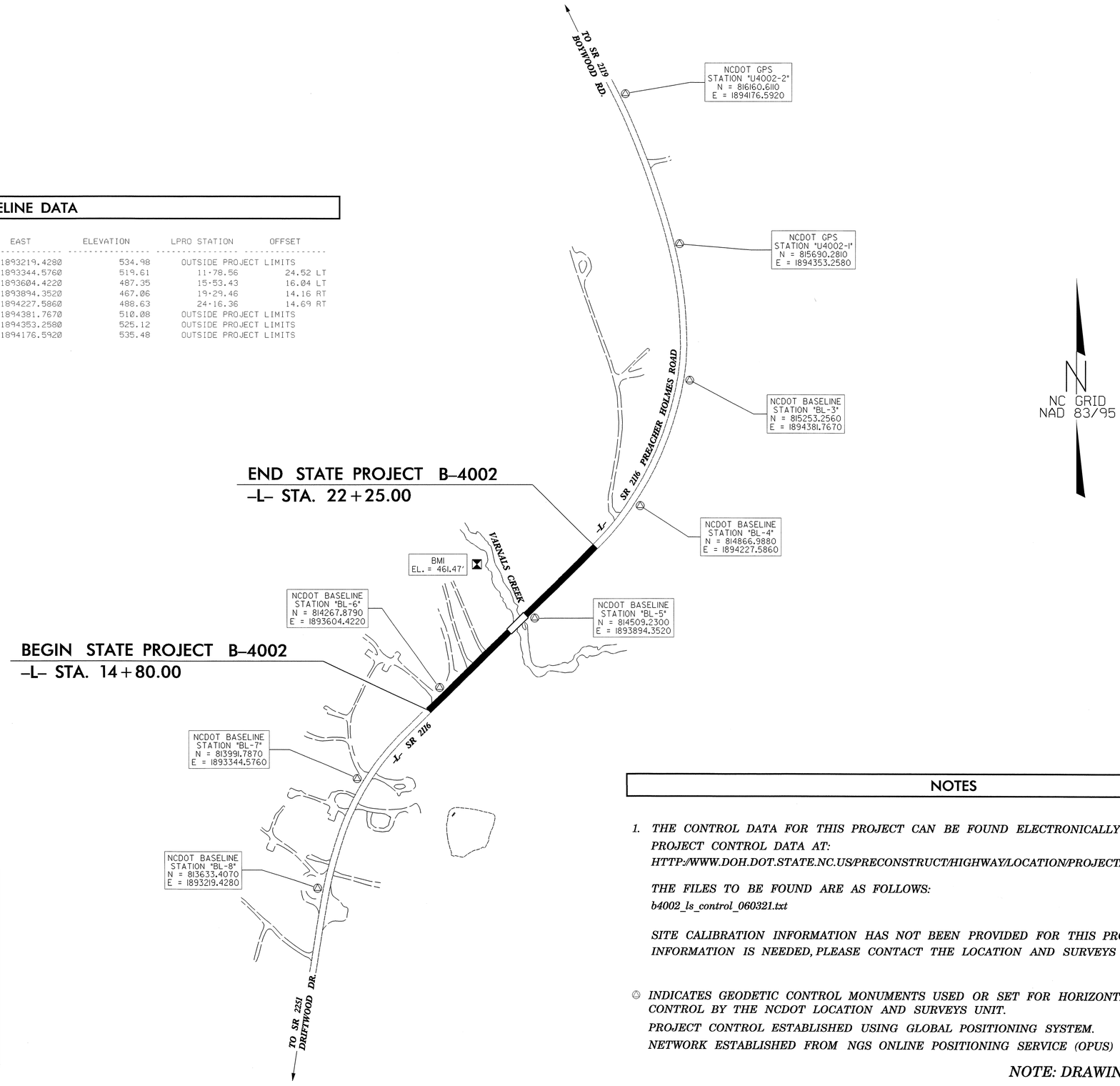
BASELINE DATA

BL

POINT	DESC.	NORTH	EAST	ELEVATION	LPRO STATION	OFFSET
8	BL-8	813633.4070	1893219.4280	534.98	OUTSIDE PROJECT LIMITS	
7	BL-7	813991.7870	1893344.5760	519.61	11+78.56	24.52 LT
6	BL-6	814267.8790	1893604.4220	487.35	15+53.43	16.04 LT
5	BL-5	814509.2300	1893894.3520	467.06	19+29.46	14.16 RT
4	BL-4	814866.9880	1894227.5860	488.63	24+16.36	14.69 RT
3	BL-3	815253.2560	1894381.7670	510.08	OUTSIDE PROJECT LIMITS	
1	B4002-1	815690.2810	1894353.2580	525.12	OUTSIDE PROJECT LIMITS	
2	B4002-2	816160.6110	1894176.5920	535.48	OUTSIDE PROJECT LIMITS	

BENCHMARK DATA

BM1 ELEVATION = 461.47
N 814671 E 1893718
LPRO STATION 19+16 225 LEFT



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4002-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 815690.281(ft) EASTING: 1894353.259(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99993530 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4002-1" TO -L- STATION 14+80.00 IS S 28°00'45" W 1682.30 ft 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.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/*

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   b4002_ls_control_060321.txt

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

△ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

NOTE: DRAWING NOT TO SCALE

25-JAN-2008 08:50
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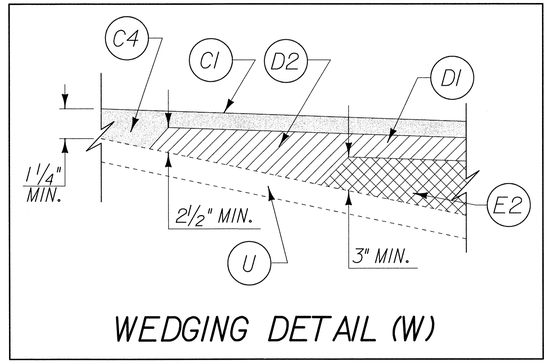
$$$$USERNAME$$$$

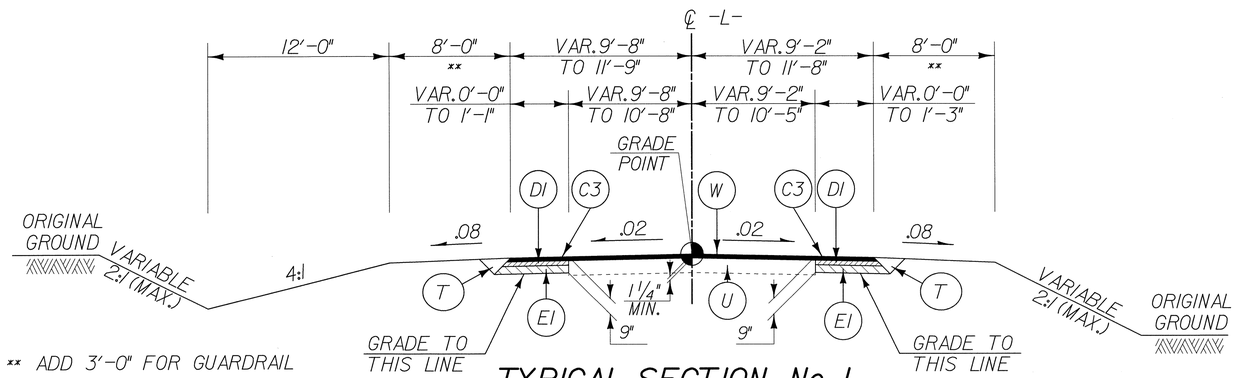
PAVEMENT SCHEDULE

C1	PROPOSED APPROX. 1 1/4" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YARD
C2	PROPOSED APPROX. 2 " ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YARD IN EACH OF TWO LAYERS..
C3	PROPOSED APPROX. 2 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YARD IN EACH OF TWO LAYERS
C4	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1" OR GREATER THAN 1 1/2" IN DEPTH.
D1	PROPOSED APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YARD
D2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROXIMATE 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.
E2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3 " OR GREATER THAN 5 1/2" IN DEPTH.
J	6" ABC
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

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



WEDGING DETAIL (W)

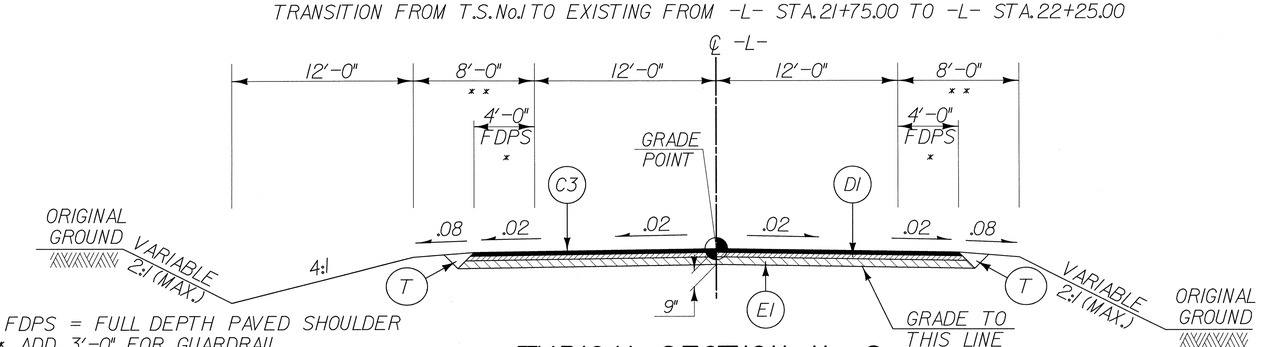


** ADD 3'-0" FOR GUARDRAIL

TYPICAL SECTION No. 1

USE TYPICAL SECTION No.1 AS FOLLOWS:

TRANSITION FROM EXISTING TO T.S.No.1 FROM -L- STA.14+80.00 TO -L- STA.15+30.00
FROM -L- STA.15+30.00 TO -L- STA.16+00
FROM -L- STA.21+00 TO -L- STA.21+75.00
TRANSITION FROM T.S.No.1 TO EXISTING FROM -L- STA.21+75.00 TO -L- STA.22+25.00



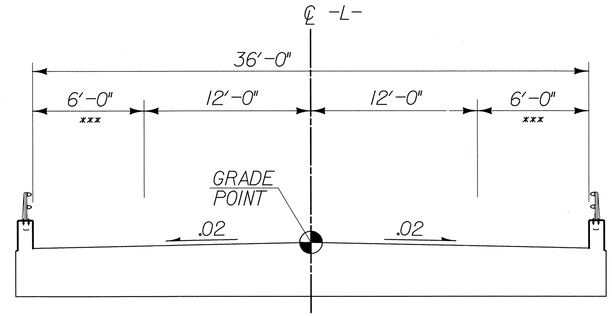
* FDPS = FULL DEPTH PAVED SHOULDER
** ADD 3'-0" FOR GUARDRAIL

NOTE : 4'-0" FDPS WILL EXTEND 100' FROM EACH SIDE OF THE PROP. APPROACH TO THE NEW BRIDGE TO ACCOMODATE BICYCLE ROUTE

TYPICAL SECTION No. 2

USE TYPICAL SECTION No.2 AS FOLLOWS:

FROM -L- STA.16+00 TO STA.18+05.00- (BEGIN BRIDGE)
FROM -L- STA.19+50.00 (END BRIDGE) TO -L- STA.21+00

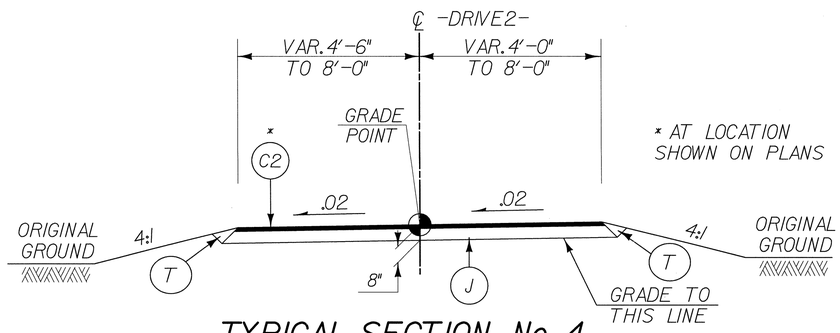


TYPICAL SECTION No. 3

USE TYPICAL SECTION No.2 AS FOLLOWS:

FROM -L- STA. 18+05.00 (BEGIN BRIDGE) TO -L- STA.19+50.00 (END BRIDGE)

*** OFFSET INCREASED TO 6'-0" TO ACCOUNT FOR HYDRAULIC SPREAD



* AT LOCATION SHOWN ON PLANS

TYPICAL SECTION No. 4

USE TYPICAL SECTION No.4 AS FOLLOWS:

FROM -DRIVE2- STA.10+25 TO STA.11+36.89

REVISIONS

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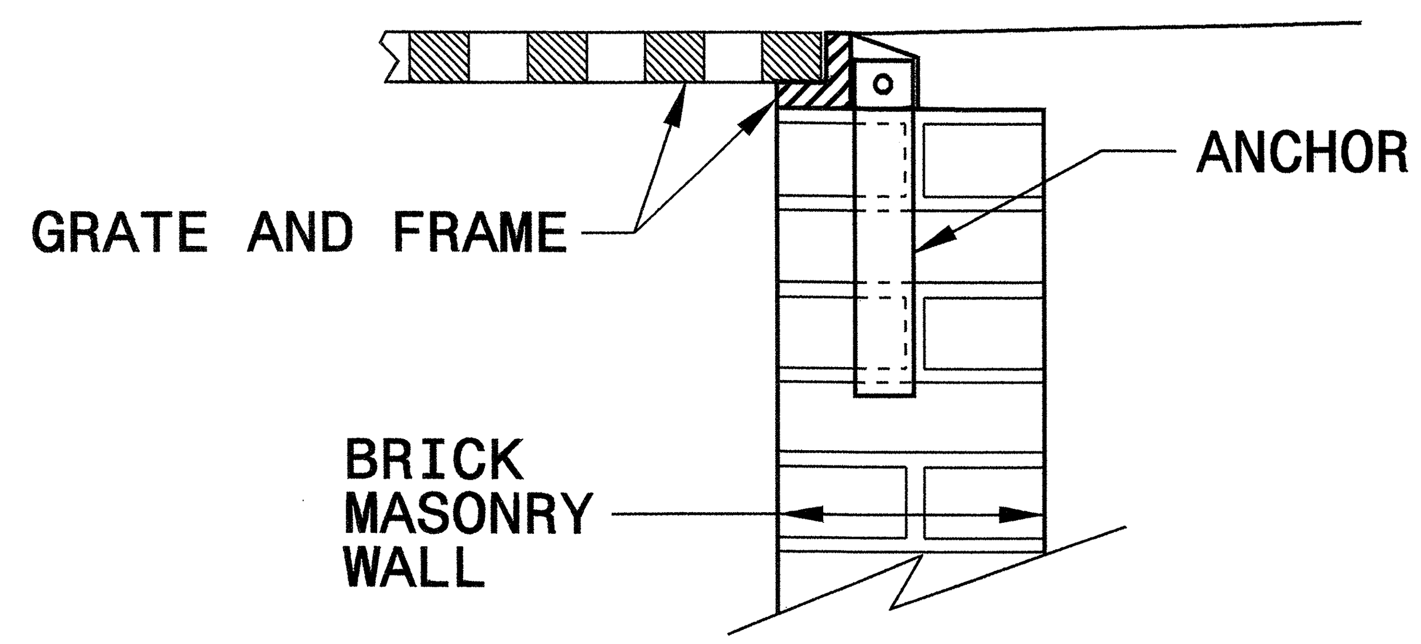
PROJECT REFERENCE NO.	SHEET NO.
B-4002	2
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 11863 ENGINEER JOHNNY SCOTT HAYES
1-29-08

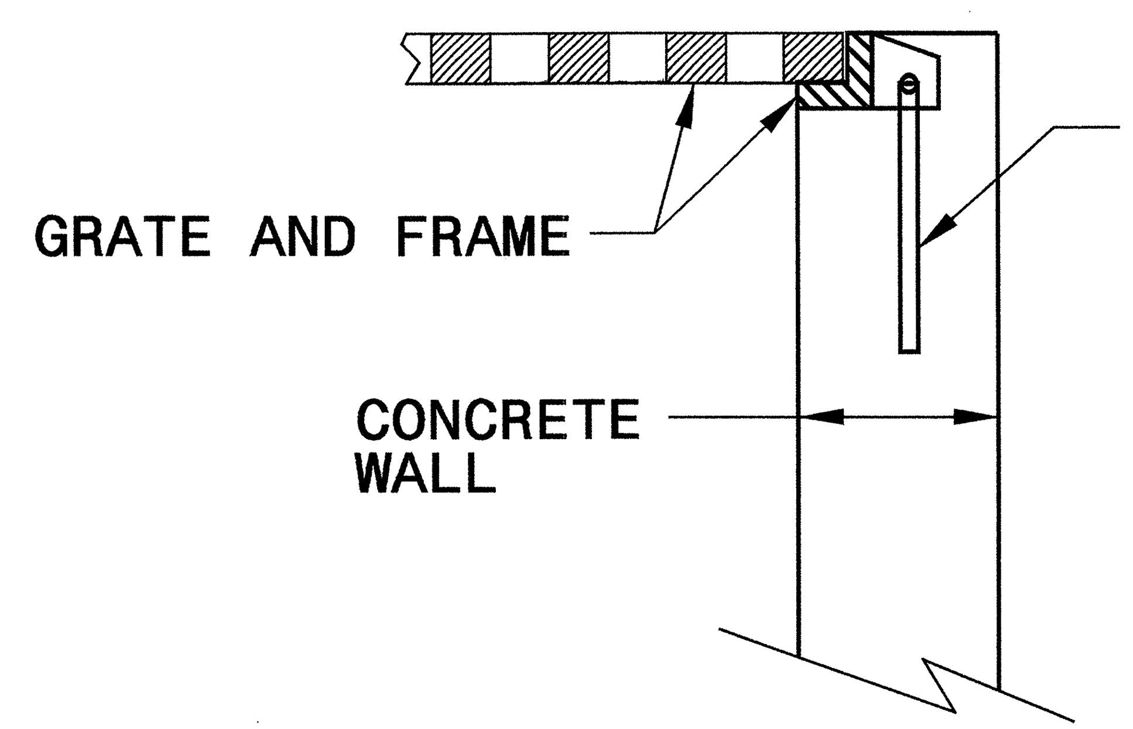
PAVEMENT ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
1/30/08

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

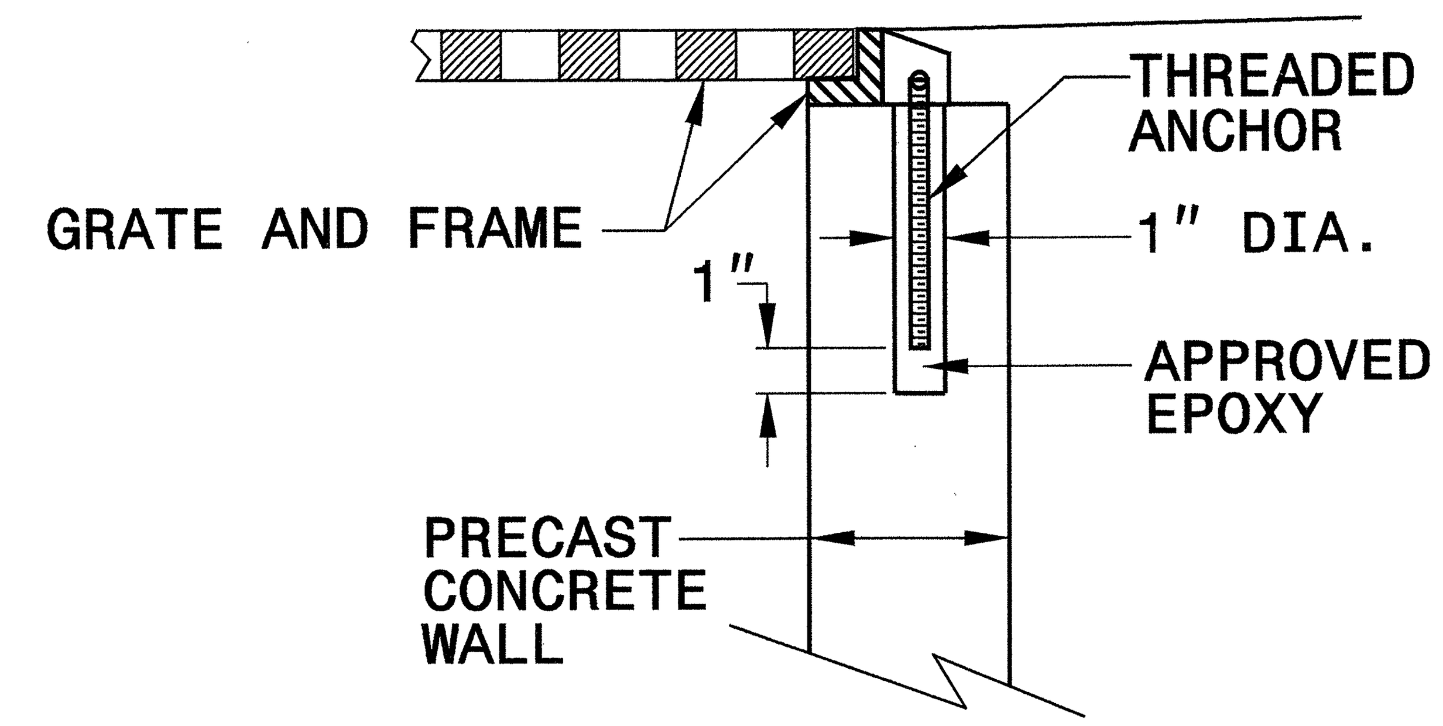
ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE



BRICK MASONRY CONSTRUCTION



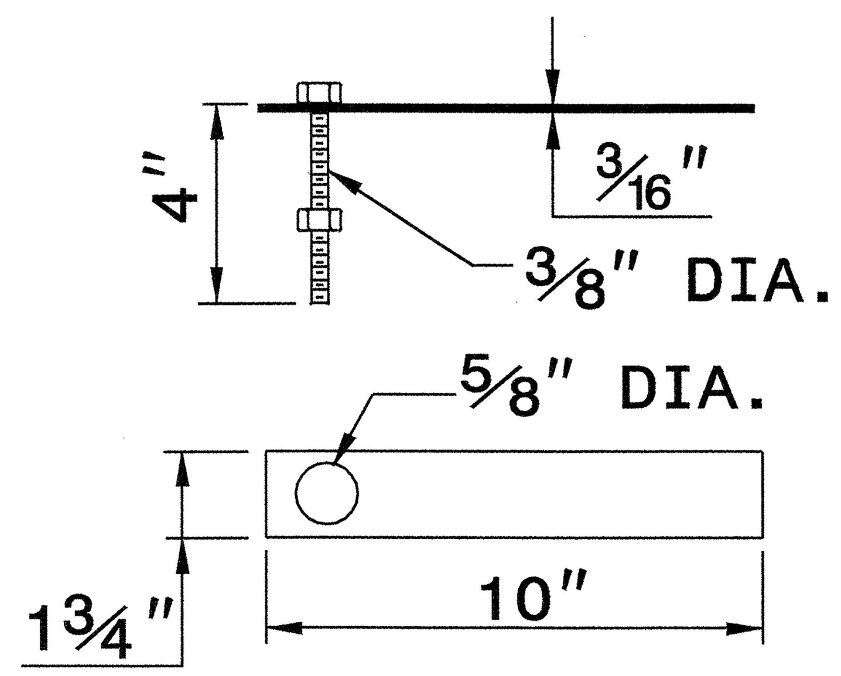
CONCRETE CONSTRUCTION



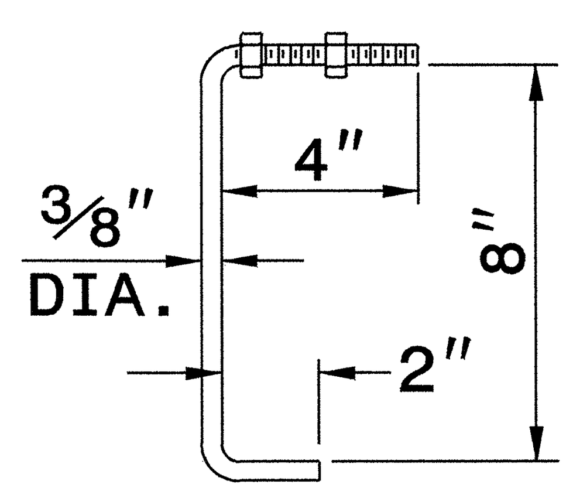
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

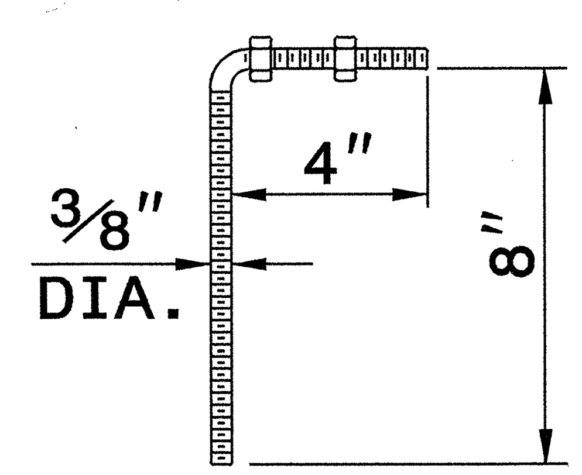
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



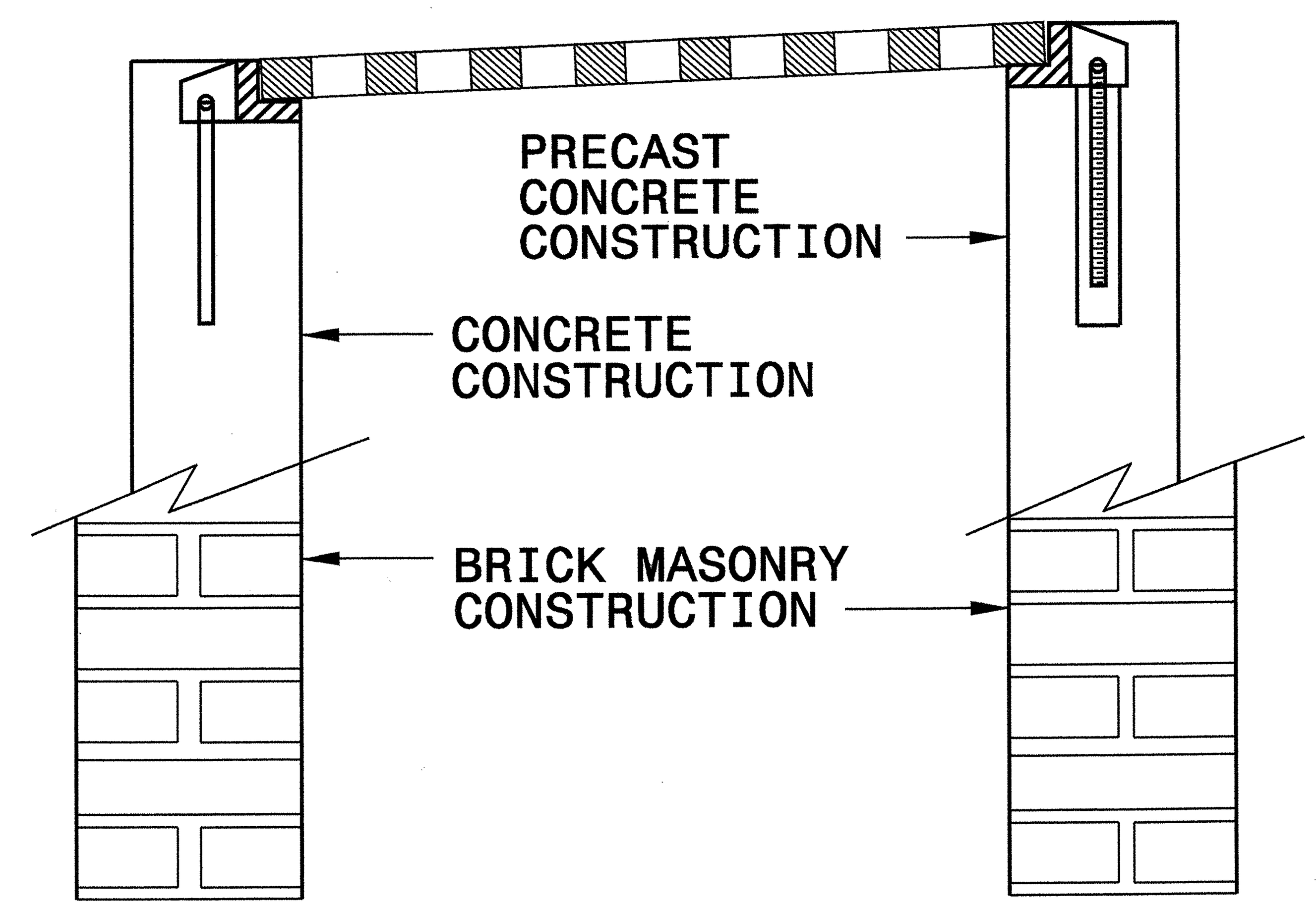
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 JOEL S. HOWERTON 1/25/08

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.:

01-MAR-2007 09:04
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jhowerton AT PS21260

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PROJECT REFERENCE NO.	SHEET NO.
B-4002	3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Summary of Quantities

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C201811

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (18+77.50)
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0057000000-E	226	800	CY	UNDERCUT EXCAVATION
0080000000-E	SP	100	TON	CLASS IV SUBGRADE STABILIZATION
0134000000-E	240	150	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	200	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	200	SY	FABRIC FOR SOIL STABILIZATION
0318000000-E	300	40	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0995000000-E	340	52	LF	PIPE REMOVAL
1121000000-E	520	54	TON	AGGREGATE BASE COURSE
1220000000-E	545	250	TON	INCIDENTAL STONE BASE
1489000000-E	610	290	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	190	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1525000000-E	610	280	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
1560000000-E	620	40	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
2000000000-N	806	8	EA	RIGHT OF WAY MARKERS
2022000000-E	815	90	CY	SUBDRAIN EXCAVATION
2033000000-E	815	70	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	400	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	12	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)

ItemNumber	Sec #	Quantity	Unit	Description
2286000000-N	840	5	EA	MASONRY DRAINAGE STRUCTURES
2367000000-N	840	5	EA	FRAME WITH TWO GRATES, STD 840.29
2556000000-E	846	38	LF	SHOULDER BERM GUTTER
3030000000-E	862	231.25	LF	STEEL BM GUARDRAIL
3045000000-E	862	43.75	LF	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3195000000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE AT-1
3215000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	3	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3628000000-E	876	185	TON	RIP RAP, CLASS I
3649000000-E	876	16	TON	RIP RAP, CLASS B
3656000000-E	876	860	SY	FILTER FABRIC FOR DRAINAGE
4025000000-E	901	11.25	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (E)
4072000000-E	903	27	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	2	EA	SIGN ERECTION, TYPE E
4155000000-N	907	10	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4400000000-E	1110	302	SF	WORK ZONE SIGNS (STATIONARY)
4410000000-E	1110	94	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4430000000-N	1130	10	EA	DRUMS
4435000000-N	1135	10	EA	CONES
4445000000-E	1145	80	LF	BARRICADES (TYPE III)
4810000000-E	1205	6,560	LF	PAINT PAVEMENT MARKING LINES (4")
6000000000-E	1605	350	LF	TEMPORARY SILT FENCE
6006000000-E	1610	150	TON	STONE FOR EROSION CONTROL, CLASS A

ItemNumber	Sec #	Quantity	Unit	Description
6009000000-E	1610	125	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	280	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	1.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	50	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	0.25	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	65	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	1	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	285	LF	SAFETY FENCE
6030000000-E	1630	940	CY	SILT EXCAVATION
6036000000-E	1631	1,200	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	45	SY	COIR FIBER MAT
6042000000-E	1632	50	LF	1/4" HARDWARE CLOTH
6070000000-N	SP	8	EA	SPECIAL STILLING BASINS
6071030000-E	SP	300	LF	COIR FIBER BAFFLES
6071050000-E	SP	4	EA	**" SKIMMER (1-1/2")
6071050000-E	SP	1	EA	**" SKIMMER (2-1/2")
6084000000-E	1660	1.5	ACR	SEEDING & MULCHING
6087000000-E	1660	1	ACR	MOWING
6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	1.25	TON	FERTILIZER TOPDRESSING
6114000000-N	SP	2	HR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL

ItemNumber	Sec #	Quantity	Unit	Description
******* BEGIN SCHEDULE AA ******* ******* (3 ALTERNATES) *******				
0366000000-EAA1	310	204	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-EAA1	310	120	LF	18" RC PIPE CULVERTS, CLASS III
*** OR ***				
0366000000-EAA2	310	32	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-EAA2	310	48	LF	18" RC PIPE CULVERTS, CLASS III
0536000000-EAA2	SP	172	LF	***" HDPE PIPE CULVERTS (15")
0536000000-EAA2	SP	72	LF	***" HDPE PIPE CULVERTS (18")
*** OR ***				
0366000000-EAA3	310	32	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-EAA3	310	48	LF	18" RC PIPE CULVERTS, CLASS III
0540000000-EAA3	SP	172	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (15", 0.064")
0540000000-EAA3	SP	72	LF	***" ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, ****" THICK (18", 0.064")
******* END SCHEDULE AA *******				

REVISIONS

COMPUTED BY: W.A. DATE: 10 /07
CHECKED BY: J.B. DATE: 10 /07

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO.	SHEET NO.
B-4002	3-A
R/W SHEET NO.	

REVISIONS

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO.		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE)								BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE)							
SIZE								12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE		FROM	TO													.064	.064	.064	.064	.079	.079	.109	.109
-L- 15+19.00	CL	1	OUT		488.8	483.3				48													
-L- 15+79.00	LT	2		483.4																			
	LT	2	3		480.2	474.4																	
-L- 16+55.00	LT	3		477.2																			
	LT	3	4		474.4	468.6																	
-L- 17+27.00	LT	4		471.8																			
	LT	4	OUT		468.6	463.5																	
-L- 19+83.00	LT	5		471.8																			
	LT	5	6		468.6	468.5	X		32														
-L- 19+83.00	RT	6		471.8																			
	RT	6	OUT		468.5	468.1																	
TOTAL									32	48													

STATION	LOCATION (LT,RT, OR CL)	FROM	TO	CLASS III R.C. PIPE OR C.S. PIPE OR TYPE IR ALUMINIZED OR HDPE PIPE, TYPE S OR D								15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS.		QUANTITIES FOR DRAINAGE STRUCTURES	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT.		C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE			
				12"	15"	18"	24"	30"	36"	42"	48"				R.C.P.	C.S.P.	PER EACH (0' THRU 5.0')	A 5.0' THRU 10.0'	B 10.0' AND ABOVE		E	F	G	
-L- 15+19.00	CL	1	OUT																					
-L- 15+79.00	LT	2															1							
	LT	2	3		76																			
-L- 16+55.00	LT	3															1							
	LT	3	4		72																			
-L- 17+27.00	LT	4															1							
	LT	4	OUT			72																		
-L- 19+83.00	LT	5															1							
	LT	5	6																					
-L- 19+83.00	RT	6															1							
	RT	6	OUT		24																			
TOTAL					172	72											5							

STATION	LOCATION (LT,RT, OR CL)	FROM	TO	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING JB STD. 840.34	TRAFFIC BEARING DI STD. 840.35	TRAFFIC BEARING DI STD. 840.36	STEEL FRAME W/TWO GRATES STD 840.37			CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
-L- 15+19.00	CL	1	OUT																						
-L- 15+79.00	LT	2											1			1									
	LT	2	3																						
-L- 16+55.00	LT	3											1			1									
	LT	3	4																					32	
-L- 17+27.00	LT	4											1			1									
	LT	4	OUT																					20	
-L- 19+83.00	LT	5											1			1									
	LT	5	6																						
-L- 19+83.00	RT	6											1			1									
	RT	6	OUT																						
TOTAL													5			5								52	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TYPE 350					REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	TYPE III	GRAU-350	CAT-1	AT-1	EA	G	NG			
-L-	16+67.50	18+05.00	RT	137.50'			18+05.00		6.00'	11.00'	50.00'		1.00'			1	1								
-L-	17+86.25	18+05.00	LT	18.75'	50.00'			18+05.00	6.00'	11.00'						1			1						
-L-	19+50.00	21+62.50	LT	212.50'				19+50.00	6.00'	11.00'		50.00'		1.00'		1	1								
-L-	19+50.00	20+37.50	RT	87.50'			19+50.00		6.00'	11.00'	50.00'		1.00'			1	1								
			SUB-TOTAL	456.25'	50.00'											4	3		1						
		AT-1 @ 6.25' EA.			-6.25'																				
		GRAU-350 - 3 @ 50.00' EA.		-150.00'																					
		TYPE III -4 @ 18.75' EA.		-75.00'																					
			TOTAL	231.25'	43.75'											4	3		1						
			SAY	231.25'	43.75'											4	3		1						

ADDITIONAL GUARDRAIL POST = 5 EA.

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COMPUTED BY: W.A. DATE: 10/07

CHECKED BY: J.B. DATE: 10/07

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DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO.	SHEET NO.
B-4002	3-B
R/W SHEET NO.	

REVISIONS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

SURVEY LINE	STATION	STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANKMENT +%	BORROW	WASTE
-L-	14+80.00	18+05.00	92		1,384	1,292	0
BRIDGE							
-DRIVE2-	10+25	11+50	1		344	343	0
SUBTOTAL			93		1,728	1,635	0
BRIDGE							
-L-	19+50.00	22+25	677		778	101	0
SUBTOTAL			677		778	101	0
PROJECT SUBTOTALS			770		2,506	1,736	0
LOSS DUE TO CLEARING AND GRUBBING			-130			130	0
PROJECT TOTALS			640		2,506	1,866	0
ESTIMATED 5% FOR REPLACING TOPSOIL ON BORROW PITS						93	
GRAND TOTAL			640			1,959	0
SAY			675			2,000	0

DRAINAGE DITCH EXCAVATION = 150 CY
UNDERCUT EXCAVATION = 800 CY (CONTINGENCY)

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

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".

SUMMARY OF PAVEMENT REMOVAL

IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE BREAK-UP
-L- 16+00.00 - 18+39.71	519			
-L- 19+14.77 - 21+00	405			
TOTAL	924			
SAY	930			

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PROJECT REFERENCE NO.	SHEET NO.
B-4002	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT MATES
1-17-08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. RECK
1-17-08

REVISIONS

-DRIVE2-
PI Sta 10+94.54
△ = 21° 50' 42.8" (LT)
D = 38° 11' 49.9"
L = 57.19
T = 28.95
R = 150.000

JUDY A COTE
DB 1820 PG 840
PB 67 PG 250 LOT 5

CHARLES PHILLIP ALLEN & KATHRYN
DB 899 PG 725
PB 51PG 37 LOT 1

RANDY MOODY ALLEN
DB 899 PG 727
PB 51PG 37 LOT 2

KATHY A JAMPETRO
DB 1808 PG 422
PB 67 PG 250 LOT 4

DAVID H THAXTON
DB 1221PG 182
PB 51PG 37 LOT 3

KATHRYN HENRY ROHR
DB 1671PG 448
PB 66 PG 392 LOT 3

OLIVER WILTON HOLMES, JR.
DB 1671PG 435
PB 66 PG 392 LOT 4

JAMES D GREGORY & DEBRA
DB 2081PG 468
PB 42 PG 65 LOT 5

RAY G HARCLERODE &BERNICE L
DB 1314 PG 648

TIMOTHY W SELLERS
DB 1795 PG 799
PB 42 PG 65 LOT 4

NC GRID — NAD 8395

-BL- 7 PINC 8+79.60 =
-L- POC 11+78.56, 24.52 LT.

-BL- 6 PINC 12+58.74 =
-L- POT 15+53.43, 16.04 LT.

-BL- 5 PINC 16+35.98 =
-L- POT 19+29.46, 14.16 RT.

-BL- 4 PINC 21+24.89 =
-L- POC 24+16.36, 14.69 RT.

BM #1
-L- STA. 19+16.01
225.01' LT
ELEV. 461.47'

-DRIVE2- POT 10+00.00
+65.00 -L- 138.50 LT

-DRIVE2- POT 10+25.00
BEGIN CONSTUCTION

-DRIVE2- PC 10+65.60
+25.00 -L- 58.85 LT

-DRIVE2- PT 11+22.79
+93.00 -L- 128.00 LT

PROP. SPECIAL CUT DITCH
-L- STA. 16+99 TO 17+27 LT.
SEE DITCH DETAIL C
SEE PROFILE
+80.00 -L- 52.95 LT

PROP. SPECIAL CUT DITCH
-L- STA. 16+49 TO 16+55 LT.
SEE DITCH DETAIL C
SEE PROFILE
+30.00 -L- 72.00 LT

PROP. SPECIAL CUT DITCH
-L- STA. 15+50 TO 16+79 LT.
SEE DITCH DETAIL C
SEE PROFILE
+80.00 -L- 39.84 LT
+05.00 -L- EXIST.R/W

PROP. RIP-RAP @ EMBANKMENT
-L- STA. 18+70 TO 18+85 LT.
SEE DITCH DETAIL B

PROP. LATERAL 2' BASE DITCH
-L- STA. 17+95 TO 18+70 LT.
SEE DITCH DETAIL A
SEE PROFILE

CLASS I RIP RAP
EST. 4 TONS
F.F. =10 SY
+10.00 -L- 70.00 LT

PROP. LATERAL 2' BASE DITCH
-L- STA. 19+26 TO 20+50 LT.
SEE PROFILE
SEE DITCH DETAIL A

-L- POT 19+50.00
END BRIDGE

-L- POT 19+64.00
END APPROACH SLAB

+83 END SHOULDER BERM GUTTER -L-

+50.00 -L- 70.00 LT

-L- PC 22+00.71

+25.00 -L- EXIST.R/W

150' UNIFORM TAPER LT.& RT.

END 4' PS +60.00

GRAU-350

TIE TO EXISTING DITCH

-L- PT 13+74.98

-L- POT 14+80.00
BEGIN TIP PROJECT B-4002
BEGIN CONSTRUCTION
+80.00 -L- EXIST.R/W

CLASS I RIP RAP
EST. 4 TONS
F.F. =10 SY

24.00' (TYP.)

NOTE: ALL DRIVE RADII 10' UNLESS OTHERWISE NOTED

-DRIVE2- POT 11+52.88 =
-L- POT 17+49.25

-L- POT 17+91.00
BEG. APPROACH SLAB

-L- POT 18+05.00
BEGIN BRIDGE

+00.00 -L- 60.00 RT

+83 END SHOULDER BERM GUTTER -RT.
+80.00 -L- 60.00 RT

+72.00 -L- 87.00 RT

+97.00 -L- 99.00 RT

CLASS II RIP RAP W/FILTER FABRIC (TYP) (STR. PAY ITEM)

CLASS 'B' RIP RAP
EST. 2 TONS
F.F. =7.5 SY

PROP. TAIL DITCH
-L- STA. 19+90.00 RT.
SEE DITCH DETAIL D

TIE TO EXISTING DITCH

+05.00 -L- 60.00 RT

+15.00 -L- 60.00 RT

150' UNIFORM TAPER LT.& RT.

END TIP PROJECT B-4002
END CONSTRUCTION
-L-

PI Sta 11+90.84
△ = 26° 14' 56.0" (RT)
D = 7° 00' 00.0"
L = 374.98'
T = 190.84'
R = 818.51'
Se = EXIST.
D.S. = N/A

PI Sta 25+22.63
△ = 35° 21' 28.2" (LT)
D = 5° 40' 22.3"
L = 623.28'
T = 321.92'
R = 1,010.00'
Se = EXIST.
D.S. = N/A

SEE SHEET 5 FOR DRIVE PROFILE
SEE SHEETS S-1THRU S-34 FOR STRUCTURE PLANS

SKETCH SHOWING PROPOSED BRIDGE WIDTH IN RELATION TO PROPOSED PAVEMENT WIDTH

BM #1: -L- STA.19+16.01, 225.01' LT.
RAILROAD SPIKE SET IN 12" MAPLE
ELEV. = 461.47'

-L- STA. 15+19.25

DRAINAGE AREA	1.6 AC.
DESIGN FREQUENCY	25 YRS
DESIGN DISCHARGE	3.04 CFS
DESIGN H.W. ELEV.	490.49'
Q 100 DISCHARGE	4.84 CFS
Q 100 H.W. ELEV.	490.79'
OVERTOPPING FREQUENCY	500+ YR
OVERTOPPING DISCHARGE	12 CFS
OVERTOPPING ELEV.	491.00'

DETAIL 'A'
LATERAL BASE DITCH
(Not to Scale)

Min. D = 1 Ft.
Max. d = 1 Ft.
B = 2 Ft.
b = 5 Ft.
Type of Liner = Class I Rip-Rap

LINE	STA. TO STA.	D.D.E. (YD³)	RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	17+95 – 18+70 LT.	24	60	54
-L-	19+26 – 20+50 LT.	119	100	89

DETAIL 'B'
RIP RAP AT EMBANKMENT
(Not to Scale)

Min. D = 1 Ft.
Max. d = 1 Ft.
B = 2 Ft.
b = 5 Ft.
Type of Liner = Class I Rip-Rap

LINE	STA. TO STA.		RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	18+70 – 18+85 LT.		15	15

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

Min. D= 1Ft.
Max. d= 1Ft.
Type of Liner= Class 'B' Rip-Rap

LINE	STA. TO STA.		RIP RAP (TONS)	FILTER FABRIC (YD²)
-L-	15+50 – 15+79 LT.		6	14
-L-	16+49 – 16+55 LT.		1	3
-L-	16+99 – 17+27 LT.		7	14

DETAIL 'D'
TAIL DITCH
(Not to Scale)

Min. D = 1 Ft.

LINE	STA. TO STA.	D.D.E. (YD³)
-L-	19+90 RT.	4

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 3500 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 462.5 FT
BASE DISCHARGE	= 5390 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 464.9 FT
OVERTOPPING DISCHARGE	= 10750 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 472.1 FT
DRAINAGE AREA	= 11.6 SQ.MI.
DATE OF SURVEY	= 1/17/06
W.S. ELEVATION AT DATE OF SURVEY	= 454.7 FT

EXISTING
STA.14+80.00
-L- BEGIN TIP PROJECT B-4002
EL= 494.39

-L- STA.15+30.00
BEGIN GRADE EL= 489.70
(INCLUDING 2" RESURFACING)

BEGIN SPECIAL CUT DITCH
PI Sta. 15+50.00 LT.
EL = 486.25

END SPECIAL CUT DITCH
PI Sta. 15+79.00 LT.
EL = 483.40

-L- STA.16+48.95 =
EL = 480.06'

PI = 17+04.00
EL = 472.91'
VC = 342'
K = 57**
D.S. = 30 mph

18" RCP

(-) 9.83%
(-) 9.69%
(-) 6.00%
(-) 7.18%
(-) 0.3000%
(-) 8.67%
(+) 8.00%
(-) 0.3000%
(+) 4.7682%

BEGIN SPECIAL CUT DITCH
PI Sta. 16+49.00 LT.
EL = 477.56

END SPECIAL CUT DITCH
PI Sta. 16+55.00 LT.
EL = 477.20

BEGIN SPECIAL CUT DITCH
PI Sta. 16+98.00 LT.
EL = 473.81

END SPECIAL CUT DITCH
PI Sta. 17+27.00 LT.
EL = 471.80

-L- STA.17+49.25 =
-DRIVE2- 11+52.88
EL= 474.93'

-L- STA.18+05.00
BEGIN BRIDGE

PROPOSED GRADE

-L-

-L- STA.19+50.00
END BRIDGE

PI = 20+65.00
EL = 471.83'
VC = 186'
K = 37**
D.S. = 30 mph

-L- STA.21+75.00
END GRADE EL= 477.07
(INCLUDING 2" RESURFACING)

-L- STA.22+25.00
END TIP PROJECT B-4002
EL= 479.29

BLEND TO EXISTING

EXISTING GROUND

END LAT. 2' BASE DITCH
PI Sta. 20+50.00 LT.
EL = 468.67

BEGIN LAT. 2' BASE DITCH
PI Sta. 19+26.00 LT.
EL = 458.67

END LAT. 2' BASE DITCH
PI Sta. 18+70.00 LT.
EL = 457.00

BEGIN LAT. 2' BASE DITCH
PI Sta. 17+95.00 LT.
EL = 463.50

NWS. ELEV. = 454.7 (1-17-06)

** DESIGN EXCEPTION REQUIRED

520 510 500 490 480 470 460 450 440

11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00

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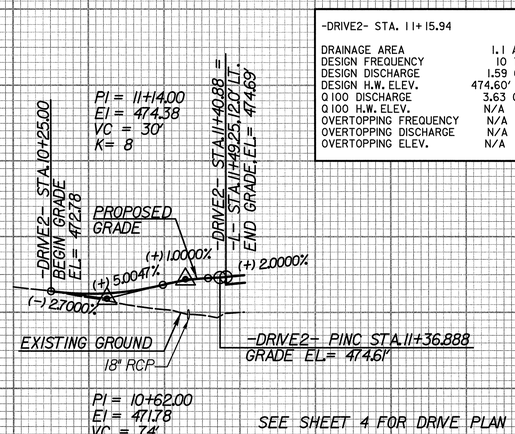
1/16/2008

MULKEY
ENGINEERS & CONSULTANTS
PO BOX 33127
RALEIGH, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4002	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19563 ENGINEER TIMOTHY SCOTT HAYES
1-17-08

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. RECK
1-17-08



-DRIVE2- STA. 11+15.94

DRAINAGE AREA	1.1 AC.
DESIGN FREQUENCY	10 YRS
DESIGN DISCHARGE	1.59 CFS
DESIGN H.W. ELEV.	474.60'
Q 100 DISCHARGE	3.63 CFS
Q 100 H.W. ELEV.	N/A
OVERTOPPING FREQUENCY	N/A
OVERTOPPING DISCHARGE	N/A
OVERTOPPING ELEV.	N/A

SEE SHEET 4 FOR DRIVE PLAN

-DRIVE2-

520 510 500 490 480 470 460 450 440 430

10+00 11+00 12+00

REVISIONS