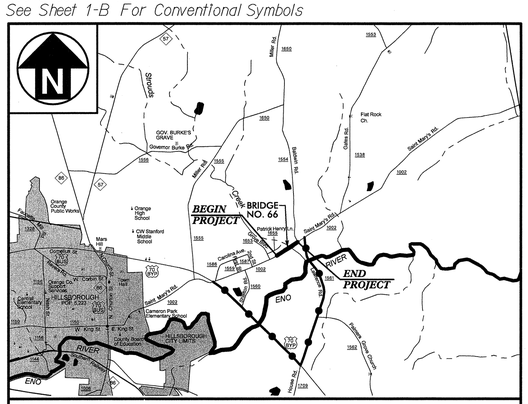
09/08/99

TIP PROJECT: B-4216

CONTRACT: C202267

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



VICINITY MAP — DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ORANGE COUNTY

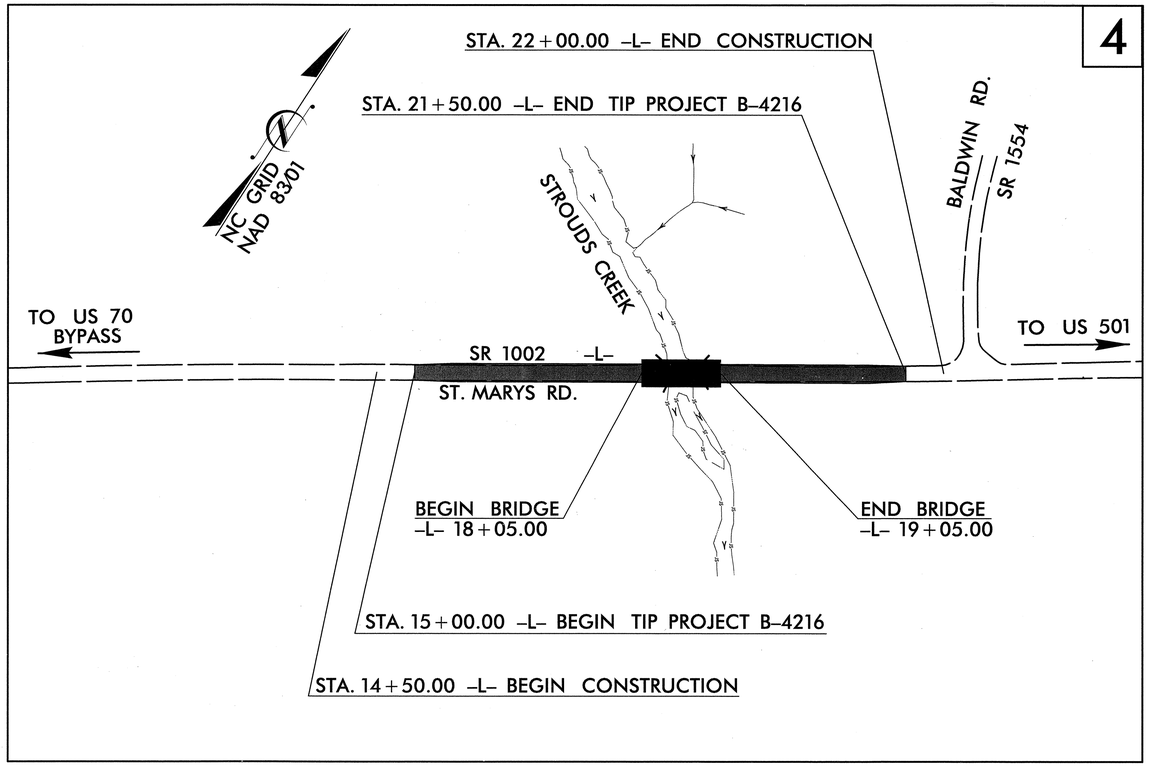
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4216	1	

W.B.S. ELEMENT	F. A. PROJ. NO.	DESCRIPTION
33562.1.1	BRSTP-1002(12)	P.E.
33562.2.1	BRSTP-1002(12)	R/W, UTIL
33562.3.1	BRSTP-1002(12)	CONST.

LOCATION: BRIDGE NO. 66 OVER STROUDS CREEK ON SR 1002

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

4



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

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 2010 = 11,400
ADT 2030 = 18,700
DHV = 10 %
D = 65 %
T = 4 %*
V = 50 MPH

* TTST 1% DUAL 3%

FUNC. CLASS. = COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4216 = 0.104 MILES
LENGTH STRUCTURE TIP PROJECT B-4216 = 0.019 MILES
TOTAL LENGTH TIP PROJECT B-4216 = 0.123 MILES

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 16, 2009

LETTING DATE:
JANUARY 19, 2010

TIM JORDAN, PE
ROADWAY PROJECT ENGINEER

JEFF RECK, PE
HYDRAULIC PROJECT ENGINEER

DOUG TAYLOR, PE
NCDOT ROADWAY DESIGN PROJECT ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. RECK
SIGNATURE: 9-11-09 P.E.

ROADWAY DESIGN
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN
SIGNATURE: 9/11/09 P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

9/8/2009
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PROJECT REFERENCE NO.	SHEET NO.
B-4216	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

10/21/09

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARDS

2006 ROADWAY ENGLISH STANDARD DRAWINGS — EFF. 07-18-06, REV. 01-02-07

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
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
876.04	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 II.

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.

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-sections prior to setting of the slope stakes for the embankment or excavation approaching a bridge.

Utilities:
Utility owners on this project are Duke Power, Centel, and Time Warner Cable.

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 others.

8/17/99
10/20/2009
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3:45:27 PM

Note: Not to Scale

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

PROJECT REFERENCE NO.	SHEET NO.
B-4216	1-B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign
- Well
- 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 — 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
- 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
- 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
- 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
- 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
- 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.

PROJECT REFERENCE NO.	SHEET NO.
B–4216	1–C
Location and Surveys	

B–4216 SURVEY CONTROL SHEET

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/

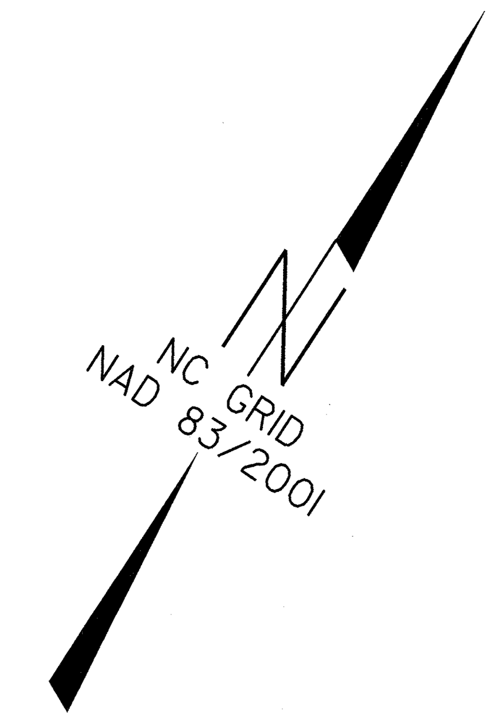
   THE FILES TO BE FOUND ARE AS FOLLOWS:
   b4216_ls_control_060706.txt

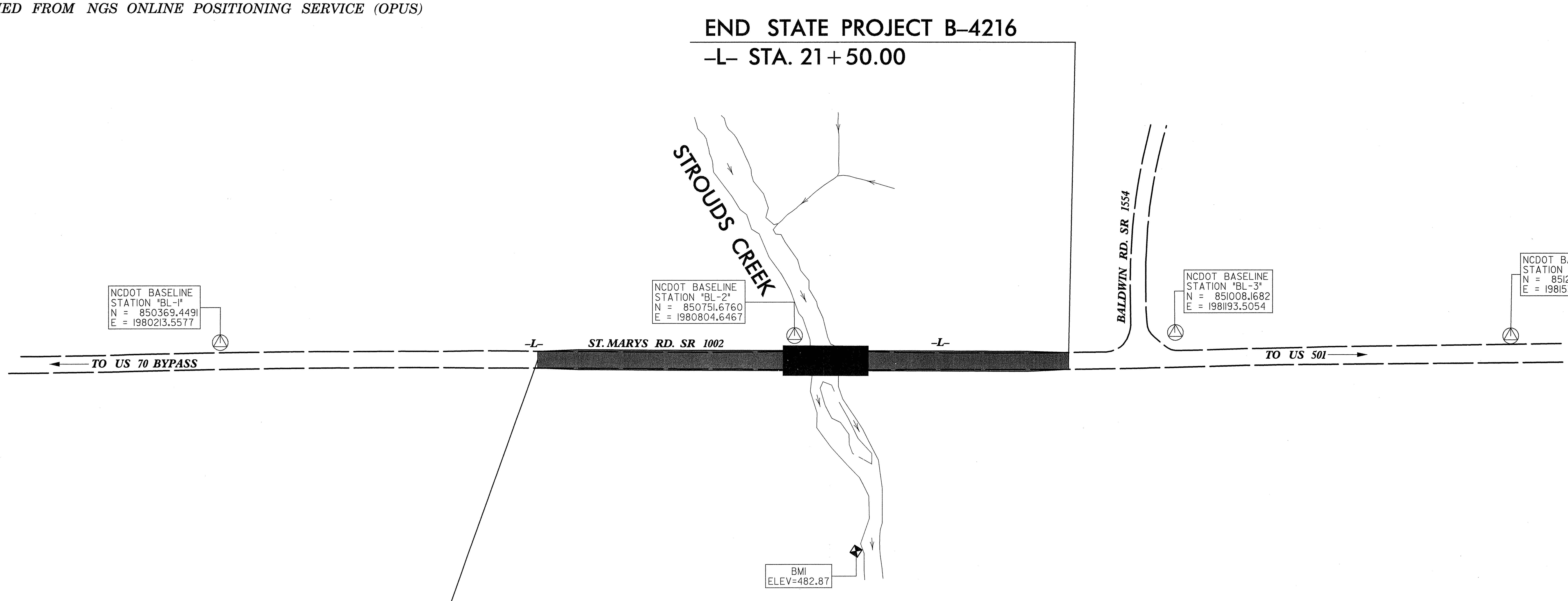
   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

△ *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)





BEGIN STATE PROJECT B–4216
–L– STA. 15+00.00

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4216-2"
WITH NAD 83/2001 STATE PLANE GRID COORDINATES OF
NORTHING: 849950.548(ft) EASTING: 1979550.411(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99995696
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4216-2" TO -L- STATION 12+50 IS
N58°33'33.09"E 919.6362
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	850369.4491	1980213.5577	509.65	11+15.30	17.09 LT
2	BL-2	850751.6760	1980804.6467	491.90	18+18.90	14.02 LT
3	BL-3	851008.1682	1981193.5054	508.43	22+85.13	14.53 LT
4	BL-4	851243.5085	1981531.2424	518.15	OUTSIDE PROJECT LIMITS	

****

BM1 ELEVATION = 482.87
N 850585 E 1981003
L STATION 18+95 234 RIGHT
BM1

****

NOTE: DRAWING NOT TO SCALE

12/01/2005

9/8/2009
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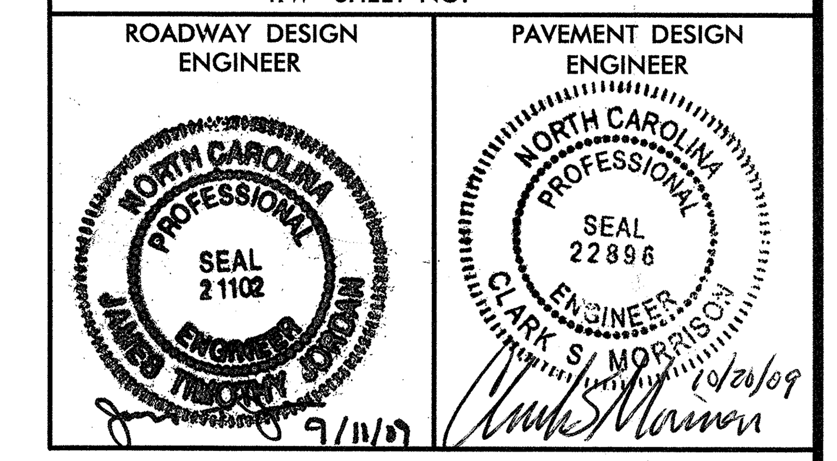
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4216	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

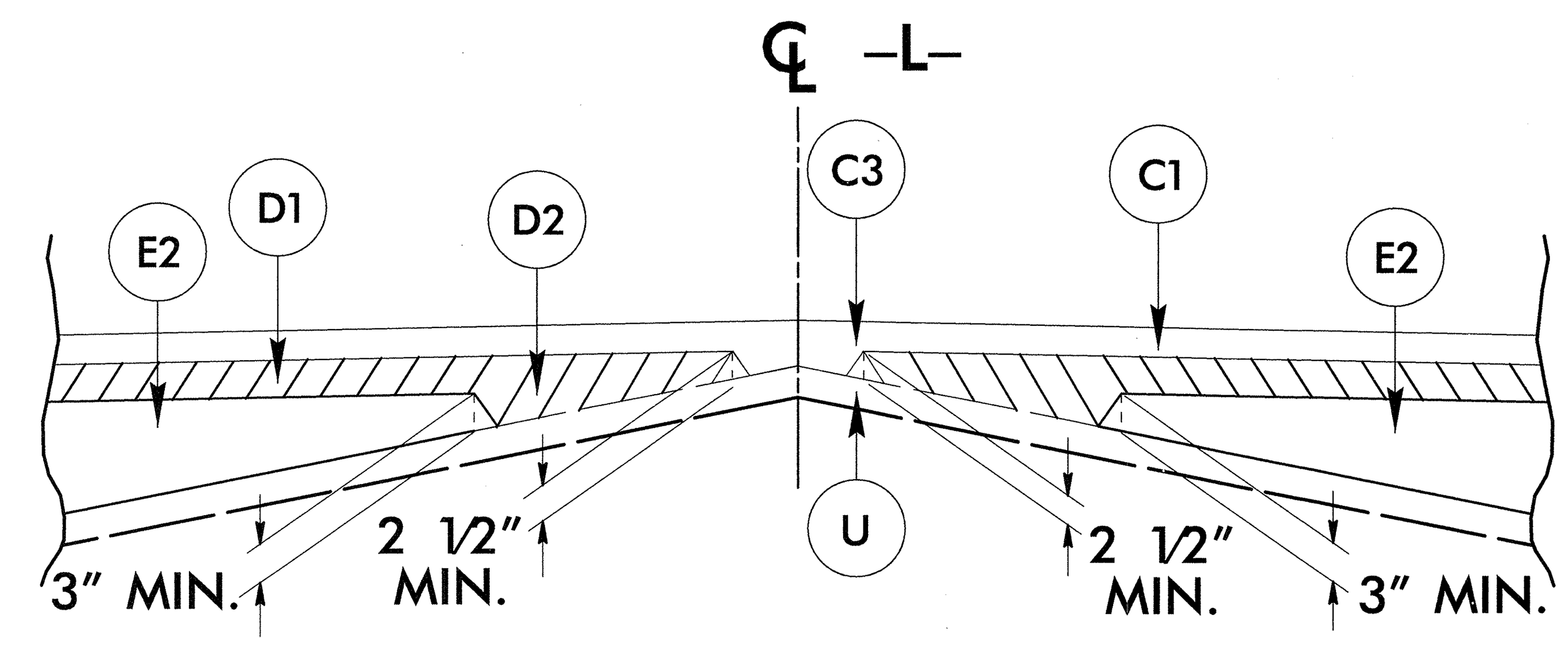


PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

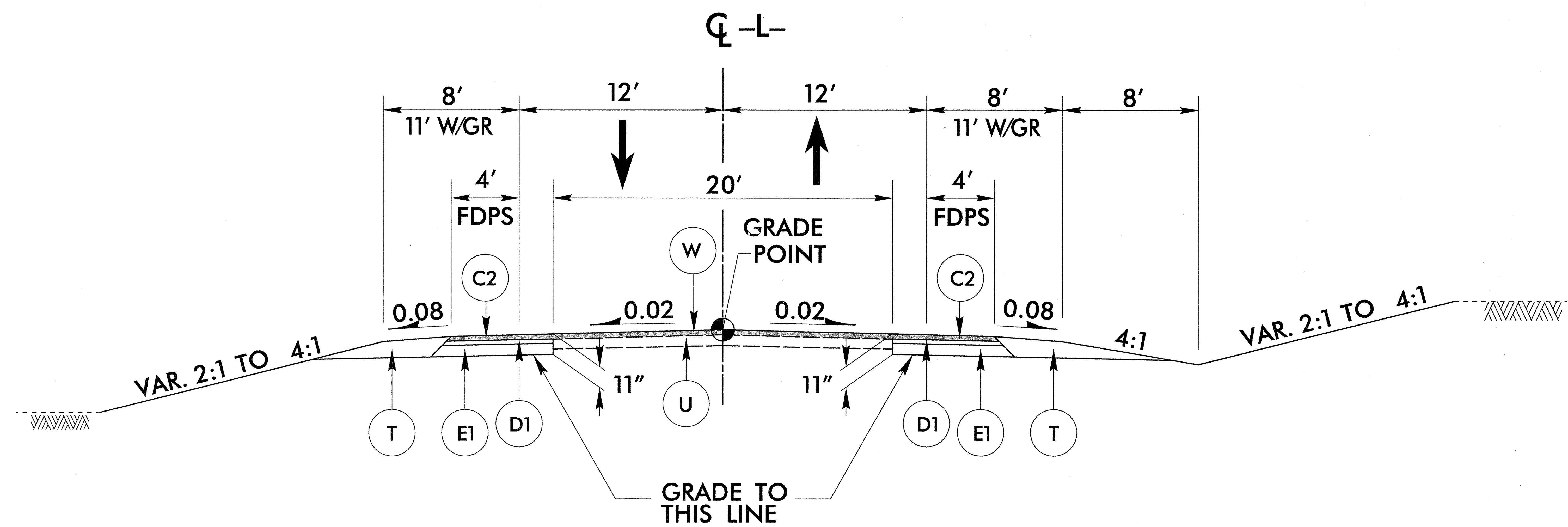
A	CONCRETE WEARING SURFACE (STRUCTURE PAY ITEM)
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. 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 LESS THAN 1½" IN DEPTH OR GREATER THAN 2" IN DEPTH.
D1	PROP. APPROX. 2½" 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 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 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 5½" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL)

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



DETAIL SHOWING METHOD OF WEDGING

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1



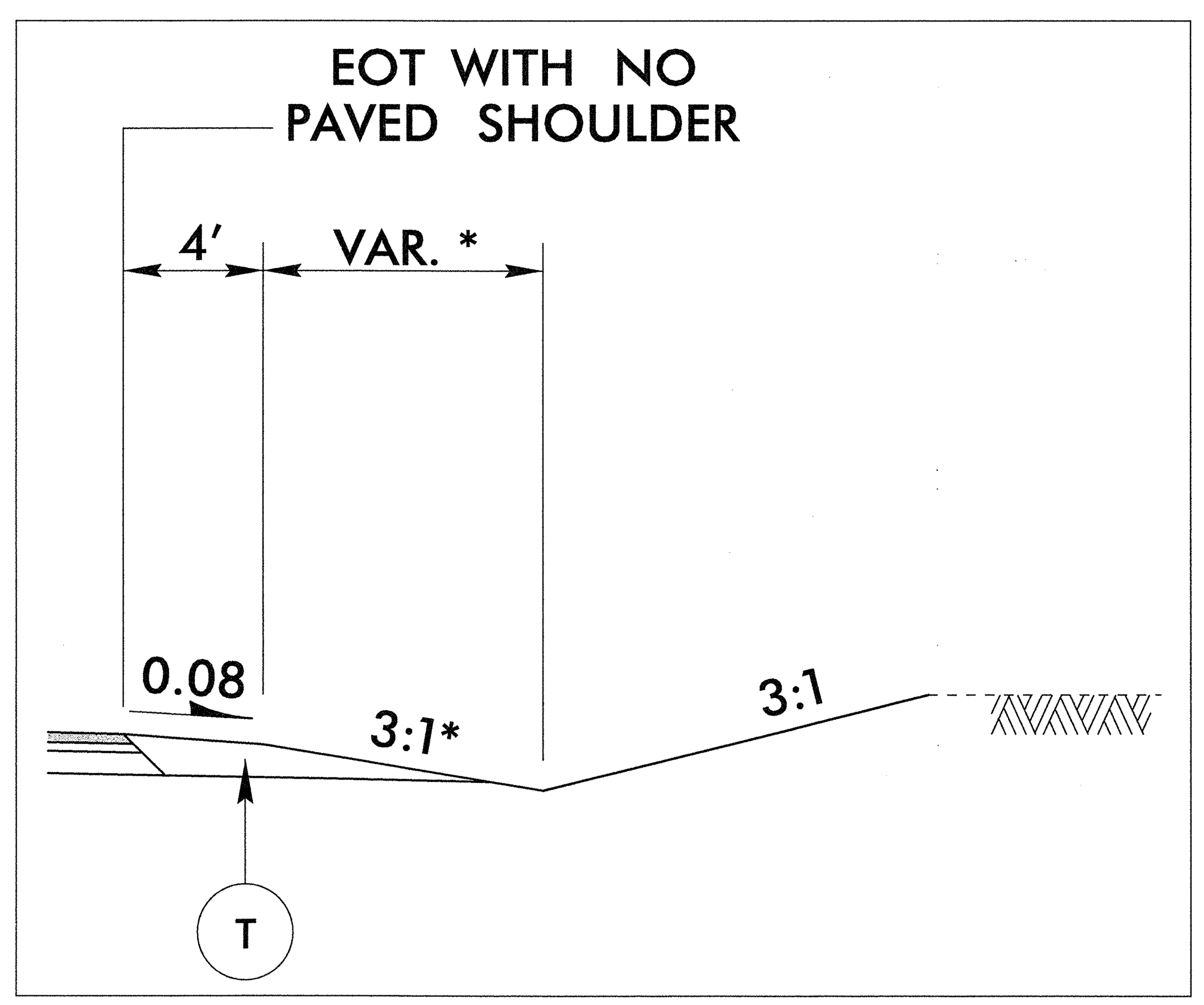
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
AT THE FOLLOWING LOCATIONS

TRANSITION FROM EXISTING TO T.S. NO. 1 FROM
-L- STA. 15+00.00 TO STA. 15+50.00

-L- STA. 15+50.00 TO STA. 16+75.00
-L- STA. 20+25.00 TO STA. 21+00.00 LT
-L- STA. 20+25.00 TO STA. 21+00.00 RT (SEE INSET)

TRANSITION FROM T.S. NO. 1 TO EXISTING
-L- STA. 21+00.00 TO STA. 21+50.00 LT
-L- STA. 21+00.00 TO STA. 21+50.00 RT (SEE INSET)



INSET

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1
*-L- STA. 20+25.00 TO STA. 21+00.00 RT
SEE CROSS SECTIONS FOR DITCH ELEVATIONS

TRANSITION FROM INSET TO EXISTING
-L- STA. 21+00.00 TO STA. 21+50.00 RT

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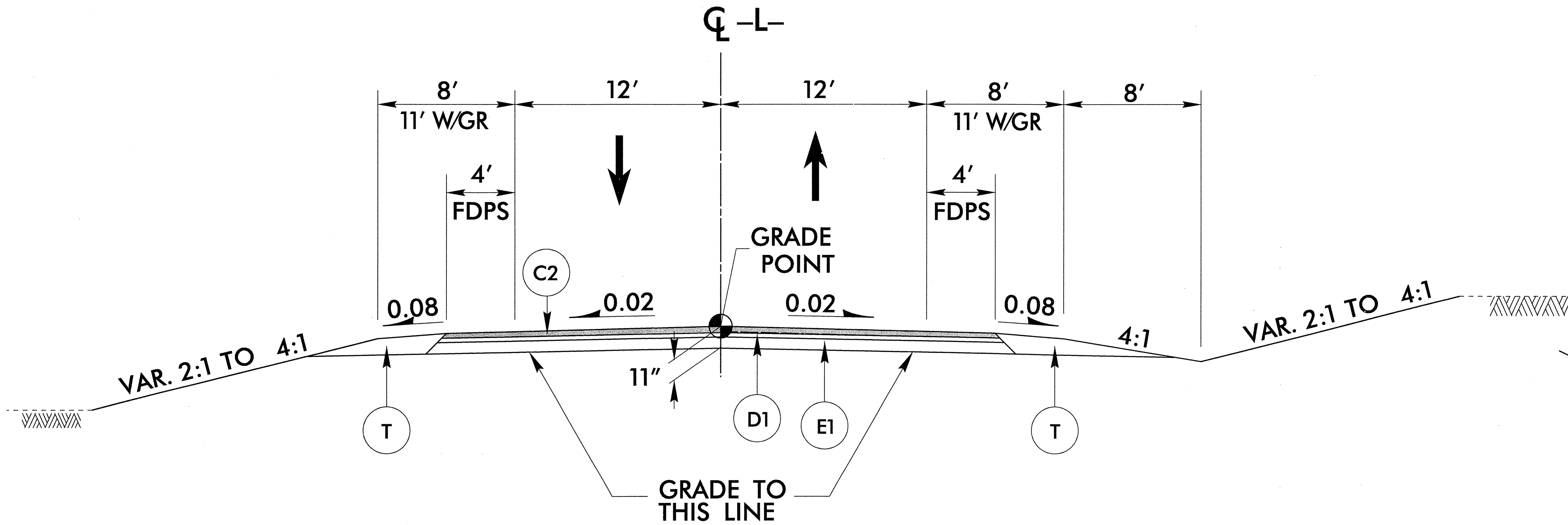
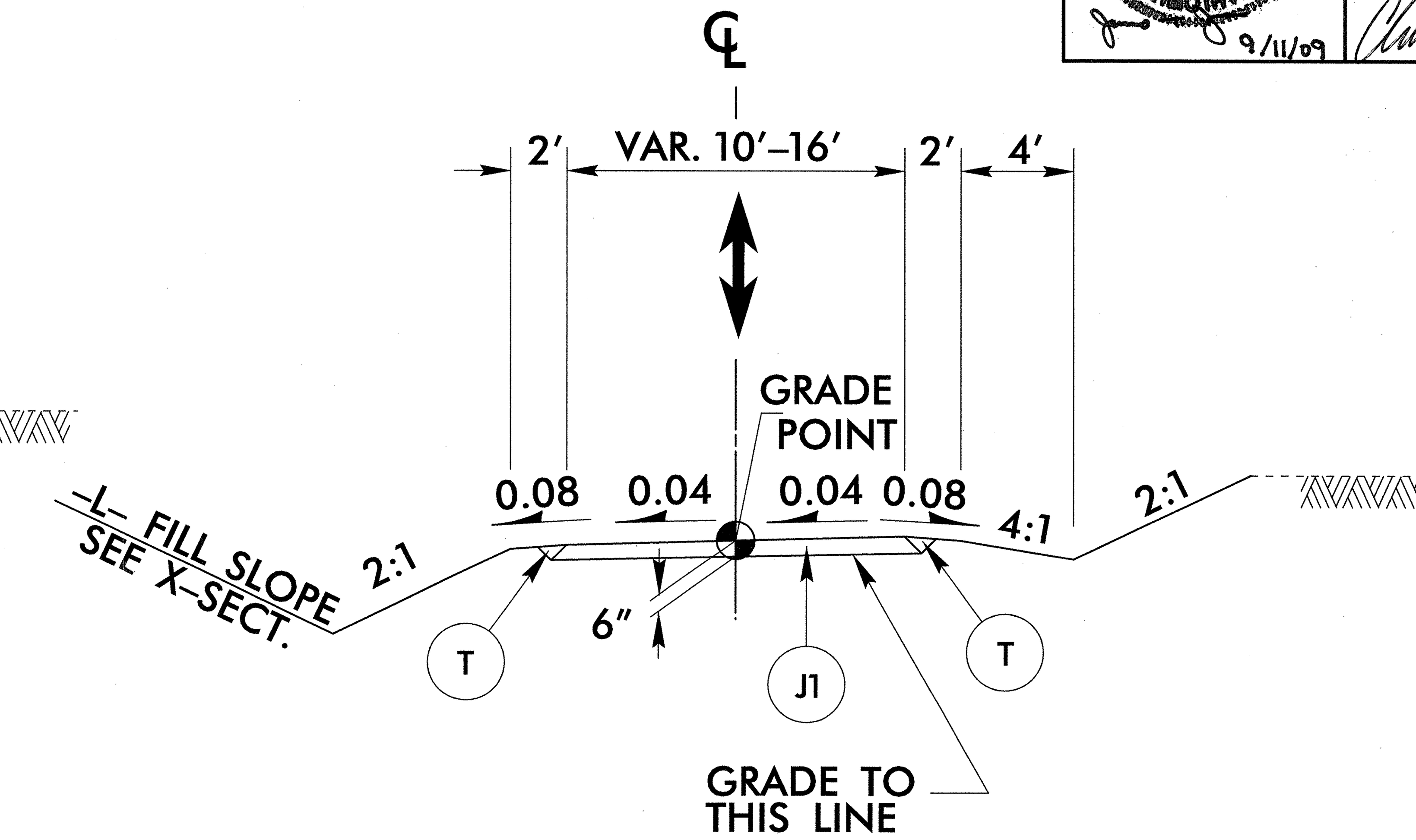
PROJECT REFERENCE NO.	SHEET NO.
B-4216	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN 9/11/09	NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/20/09



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
AT THE FOLLOWING LOCATIONS

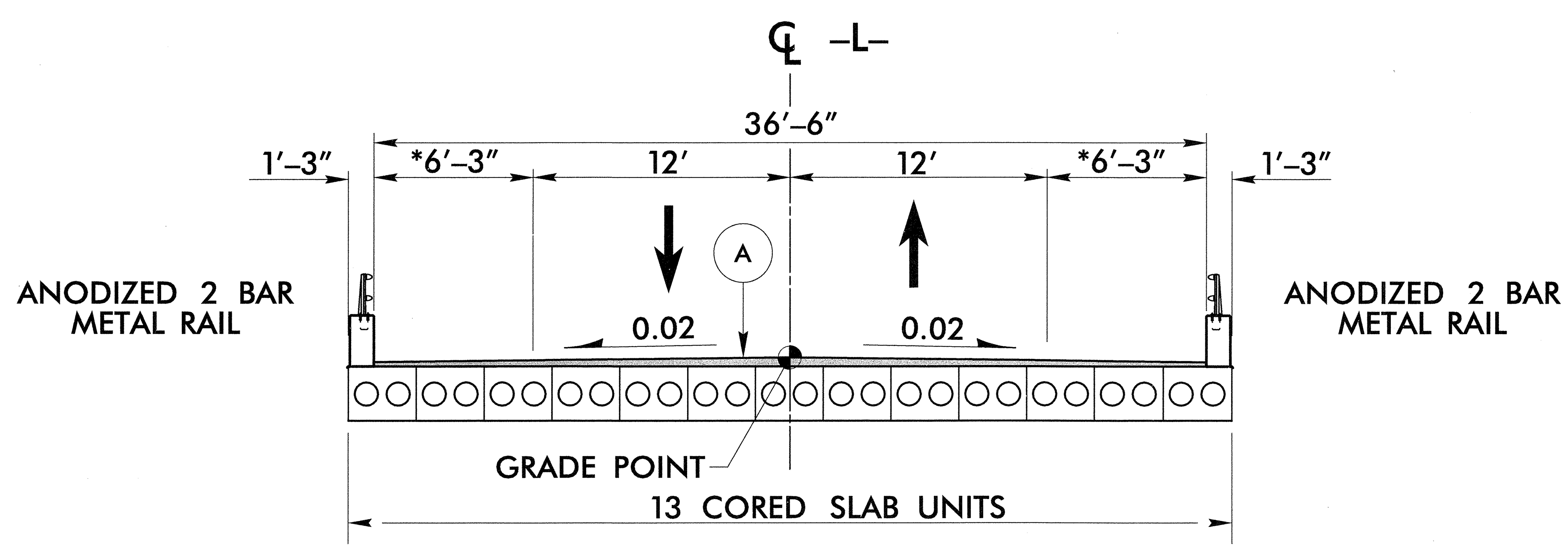
-L- STA. 16+75.00 TO STA. 18+05.00 (BEGIN BRIDGE)
-L- STA. 19+05.00 (END BRIDGE) TO STA. 20+25.00



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
AT THE FOLLOWING LOCATIONS

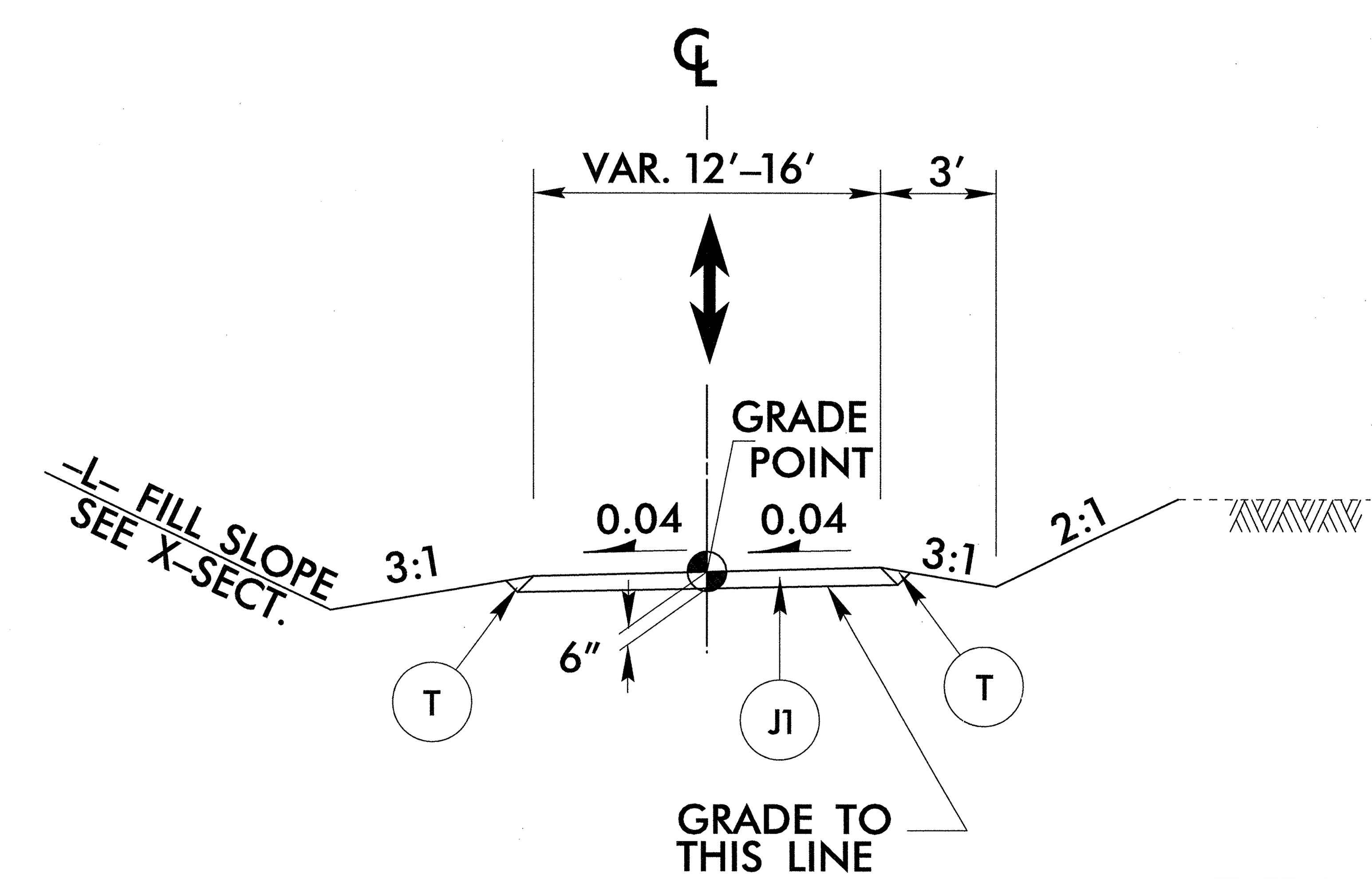
-DR1- STA. 10+16.00 TO STA. 12+09.34



DETAIL OF BRIDGE

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

* WIDENED FOR HYDRAULIC SPREAD ON STRUCTURE
SEE STRUCTURE PLANS FOR CONCRETE OVERLAY



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
AT THE FOLLOWING LOCATIONS

-DR2- STA. 10+16.00 TO STA. 11+20.00

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
A	CONC. WEAR SURF.
C2	3" S9.5B
D1	2½" I19.0B
E1	5½" B25.0B
J1	6" ABC
T	EARTH MATERIAL

5/14/99

9/8/2009
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9:32:39 AM

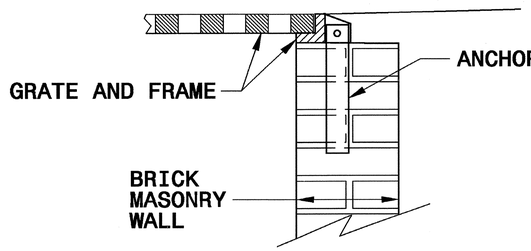
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4216	2-B
R/W SHEET NO.	

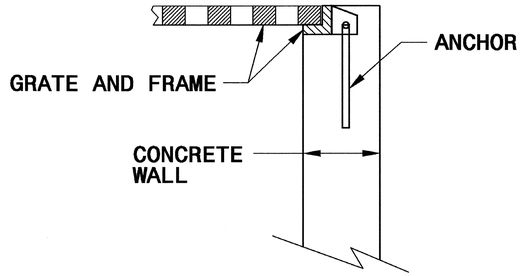
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

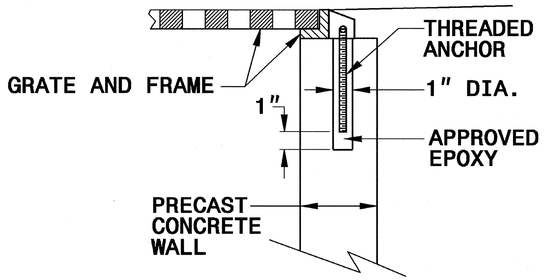
SHEET 1 OF 1
840D25



BRICK MASONRY CONSTRUCTION



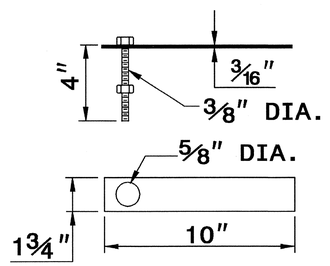
CONCRETE CONSTRUCTION



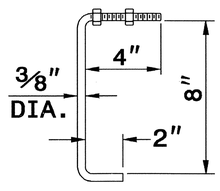
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

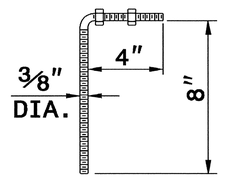
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



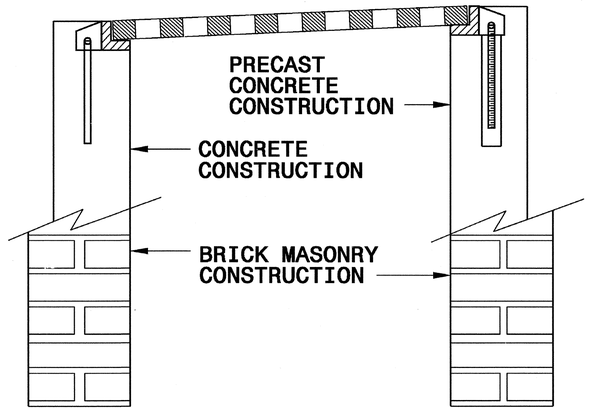
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



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
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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 SEAL 022966 ENGINEER JOEL S. HOWERTON
10/22/09

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ORIGINAL BY:	2006 STD 840.25	DATE:	07/18/06
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FILE SPEC.:			

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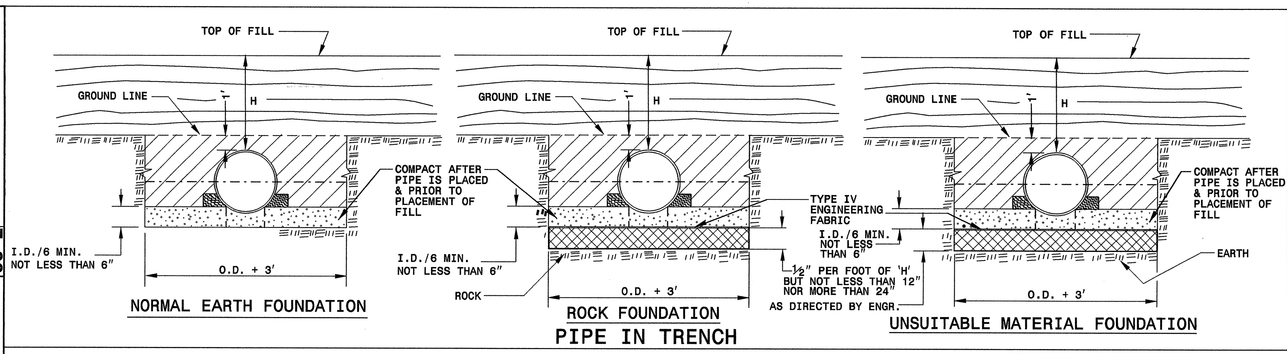
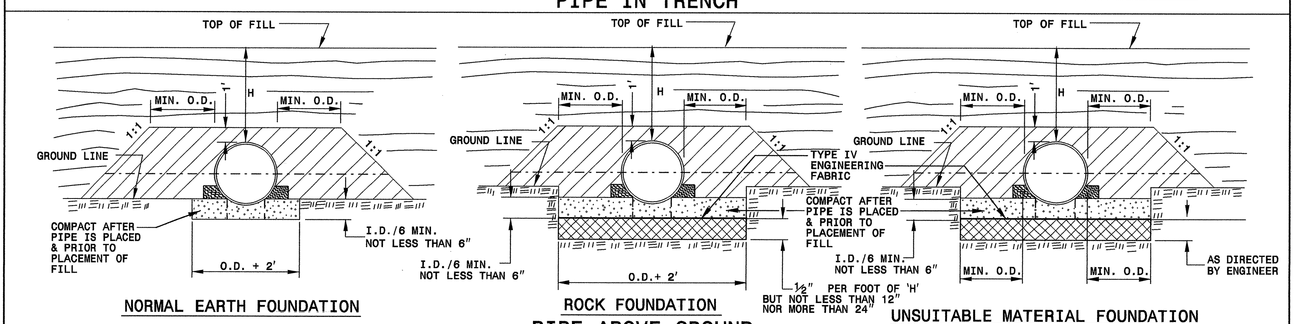
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE



PIPE IN TRENCH



PIPE ABOVE GROUND

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

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.

SHEET 1 OF 3
300D01

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ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 3
300D01

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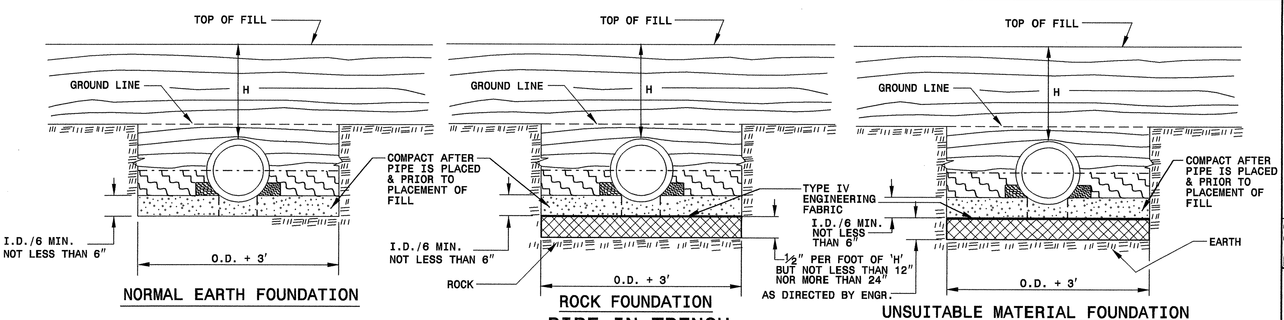
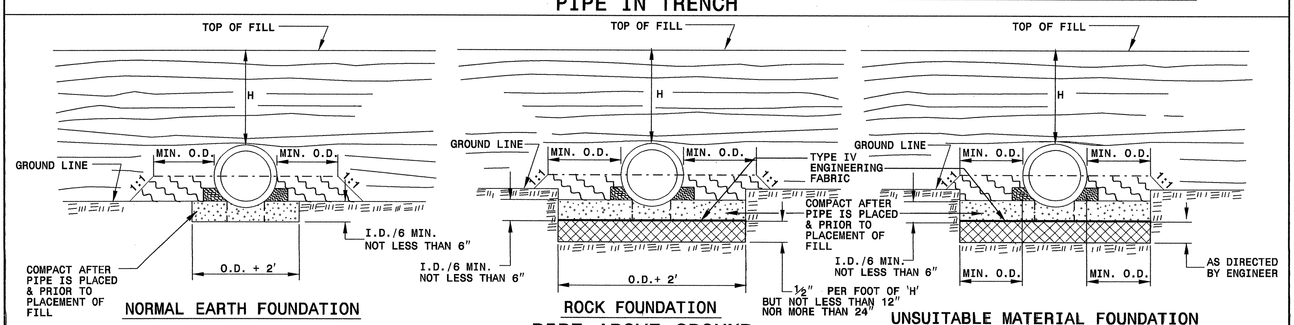
ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE



PIPE IN TRENCH



PIPE ABOVE GROUND

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

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 2 OF 3
300D01

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PROJECT REFERENCE NO. B-4216
SHEET NO. 2-C

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PROJECT REFERENCE NO.	SHEET NO.
B-4216	2-D

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (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			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 60″
* (Maximum fill) 20′ for pipe diameters ≤ 24″
17′ for pipe diameters ≥ 30″ and ≤ 60″

PVC - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 36″
* (Maximum fill) 30′ for pipe diameters ≥ 12″ and ≤ 36″

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

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
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DIVISION OF HIGHWAYS
RALEIGH, N.C.
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 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
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL ... HOWERTON
10/22/09

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PROJECT REFERENCE NO.	SHEET NO.
B-4216	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202267

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0022000000-E	225	1,800	CY	UNCLASSIFIED EXCAVATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (18+55.00-L-)
0036000000-E	225	600	CY	UNDERCUT EXCAVATION
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0063000000-N	SP	Lump Sum		GRADING
0134000000-E	240	48	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	600	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	600	SY	FABRIC FOR SOIL STABILIZATION
0320000000-E	SP	50	SY	FOUNDATION CONDITIONING FABRIC
0330000000-E	SP	16	TON	GENERIC DRAINAGE ITEM FOUNDATION COND MATERIAL MINOR STRS
0335200000-E	SP	104	LF	15" DRAINAGE PIPE
0335400000-E	SP	40	LF	24" DRAINAGE PIPE
0995000000-E	340	80	LF	PIPE REMOVAL
1121000000-E	520	142	TON	AGGREGATE BASE COURSE
1220000000-E	545	150	TON	INCIDENTAL STONE BASE
1330000000-E	607	230	SY	INCIDENTAL MILLING
1489000000-E	610	350	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	170	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	270	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	40	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
2286000000-N	840	2	EA	MASONRY DRAINAGE STRUCTURES
2367000000-N	840	2	EA	FRAME WITH TWO GRATES, STD 840.29
2556000000-E	846	40	LF	SHOULDER BERM GUTTER
3420000000-E	SP	350	LF	GENERIC GUARDRAIL ITEM PAINTED GALVANIZED STEEL BEAM GUARDRAIL
3435000000-N	SP	5	EA	GENERIC GUARDRAIL ITEM PAINTED GALVANIZED ADDITIONAL GUARDRAIL POSTS
3435000000-N	SP	4	EA	GENERIC GUARDRAIL ITEM PAINTED GALVANIZED GUARDRAIL ANCHOR UNIT, TYPE 350
3435000000-N	SP	4	EA	GENERIC GUARDRAIL ITEM PAINTED GALVANIZED GUARDRAIL ANCHOR UNIT, TYPE III
3628000000-E	876	233	TON	RIP RAP, CLASS I
3635000000-E	876	20	TON	RIP RAP, CLASS II
3649000000-E	876	155	TON	RIP RAP, CLASS B
3656000000-E	876	1,290	SY	FILTER FABRIC FOR DRAINAGE
3659000000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4072000000-E	903	38	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	3	EA	SIGN ERECTION, TYPE E
4155000000-N	907	9	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4400000000-E	1110	491	SF	WORK ZONE SIGNS (STATIONARY)
4410000000-E	1110	139	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4430000000-N	1130	20	EA	DRUMS
4445000000-E	1145	160	LF	BARRICADES (TYPE III)
4810000000-E	1205	5,200	LF	PAINT PAVEMENT MARKING LINES (4")
4900000000-N	1251	24	EA	PERMANENT RAISED PAVEMENT MARKERS
6000000000-E	1605	700	LF	TEMPORARY SILT FENCE
6006000000-E	1610	230	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	180	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	150	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	1.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	1.25	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	200	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	850	LF	SAFETY FENCE
6030000000-E	1630	550	CY	SILT EXCAVATION
6036000000-E	1631	8,500	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	50	SY	COIR FIBER MAT
6038000000-E	SP	150	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	560	LF	1/4" HARDWARE CLOTH
6071010000-E	SP	40	LF	WATTLE
6071020000-E	SP	10	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	380	LF	COIR FIBER BAFFLES
6071050000-E	SP	4	EA	** SKIMMER (1-1/2")
6084000000-E	1660	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	0.75	TON	FERTILIZER TOPDRESSING
6114500000-N	SP	10	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.25	ACR	REFORESTATION

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO.	SHEET NO.
B-4216	3-A

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
17+61 -L-	RT	1					
17+67.4 -L-	LT	2		493.0			
17+67.4 -L-	CL	2	3		489.8	489.7	YES
17+67.4 -L-	RT	3		493.0			
17+67.4 -L-	RT	3	4		489.7	489.0	
19+25 -L-	RT	5					
20+00 -L-	RT	6					
TOTAL							
SAY							

STATION	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, OR PVC) 12"	15"	18"	24"	30"	36"	42"	48"
17+61 -L-																				40				
17+67.4 -L-																								
17+67.4 -L-																		36						
17+67.4 -L-																								
17+67.4 -L-																		16						
19+25 -L-																		28						
20+00 -L-																		24						
TOTAL																		104		40				
SAY																								

STATION	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. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') PER EACH (0' THRU 5.0')	LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	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. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING DROP INLET STD. 840.35	M.D.I. ANGLED VANE FRAME WITH GRATE STD. 840.33	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
17+61 -L-																													28	PIPE REMOVAL RT.
17+67.4 -L-						1																1		1						SEE STD. 846.04
17+67.4 -L-																														NO CSP, CAAP
17+67.4 -L-						1																1		1						SEE STD. 846.04
17+67.4 -L-																														NO CSP, CAAP
19+25 -L-																													28	PIPE REMOVAL RT.
20+00 -L-																													24	PIPE REMOVAL LT.
TOTAL						2																2		2					80	
SAY																														

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

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PROJECT REFERENCE NO.	SHEET NO.
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STATE OF NORTH CAROLINA
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"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.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

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	GRAU 350	TYPE III	AT-1						EA	G	NG				
-L-	15+89.46	18+08.21	RT	218.75'				BRIDGE 18+05	8'	11'					1	1													PAINTED GALVANIZED STEEL BEAM GUARDRAIL & ANCHOR UNITS
-L-	17+08.04	18+01.79	LT	93.75'				BRIDGE 18+05	8'	11'					1	1													PAINTED GALVANIZED STEEL BEAM GUARDRAIL & ANCHOR UNITS
-L-	19+01.79	21+20.54	LT	218.75'			BRIDGE 19+05		8'	11'					1	1													PAINTED GALVANIZED STEEL BEAM GUARDRAIL & ANCHOR UNITS
-L-	19+08.21	19+89.46	RT	81.25'			BRIDGE 19+05		8'	11'					1	1													PAINTED GALVANIZED STEEL BEAM GUARDRAIL & ANCHOR UNITS
		LESS ANCHOR DEDUCTIONS																											
		GRAU-350 4 @ 50' =		- 200.00'																									
		TYPE III 4 @ 18.75' =		- 75.00'																									
			TOTAL	337.50'											4	4													
			SAY	350.00'			(5 ADDITIONAL GUARDRAIL POSTS)																							

SUMMARY OF EARTHWORK
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-L-					
14+50 TO 18+05	1201		374		827
-L-					
19+05 TO 22+00	524		191		333
SUBTOTAL	1725		565		1160
TOTAL	1725		565		1160
LOSS DUE TO CLEARING AND GRUBBING					
NEGLIGIBLE PER GEOTECH					
PROJECT TOTAL	1725		565		1160
GRAND TOTAL	1725		565		1160
SAY	1800				

EST. DDE = 48 CY
EST. UNDERCUT EXCAVATION = 600 CY (CONTIGENCY FROM GEOTECHNICAL)
EST. SELECT GRANULAR MATERIAL = 600 CY
EST. FABRIC FOR SOIL STABILIZATION = 600 SY
EST. SHOULDER BORROW = 300 CY

Note: Approximate quantities only. Shoulder Borrow, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement and Removal of Existing Pavement will be paid for at the contract Lump Sum price for "Grading".

Note: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Unit.

SUMMARY OF REMOVAL OF EXISTING ASPHALT PAVEMENT
IN SQUARE YARDS

LOCATION	LOCATION LT/RT/CL	ASPHALT SY
-L- 16+75 TO 17+45	CL	155
-L- 17+81.02 TO 18+32	CL	124
-L- 18+83 TO 19+28.98	CL	115
-L- 19+95 TO 20+25	CL	66
TOTAL		460
SAY		470

SUMMARY OF BREAKING OF EXISTING ASPHALT PAVEMENT
IN SQUARE YARDS

LOCATION	LOCATION LT/RT/CL	ASPHALT SY
-L- 17+45 TO 17+81.02	CL	84
-L- 19+28.98 TO 19+95	CL	148
TOTAL		232
SAY		240

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-DR1-
PI Sta 10+40.00
△ = 90° 00' 00.0" (LT)
D = 381° 58' 18.7"
L = 23.56'
T = 15.00'
R = 15.00'
SE = 02
PI Sta 12+00.77
△ = 90° 10' 44.0" (RT)
D = 381° 58' 18.7"
L = 23.61'
T = 15.05'
R = 15.00'
SE = 02
-L-
PI Sta 12+67.24
△ = 1° 05' 19.4" (RT)
D = 0° 27' 40.6"
L = 236.02'
T = 118.01'
R = 12,421.00'
PI Sta 21+45.38
△ = 1° 28' 42.0" (LT)
D = 1° 45' 17.5"
L = 84.24'
T = 42.12'
R = 3,265.00'
SE = 04
DS = 50 mph
-DR2-
PI Sta 10+39.23
△ = 90° 11' 01.0" (RT)
D = 381° 58' 18.7"
L = 23.61'
T = 15.05'
R = 15.00'
SE = 02
PI Sta 11+04.88
△ = 94° 14' 18.5" (LT)
D = 572° 57' 28.1"
L = 16.45'
T = 10.77'
R = 10.00'
SE = 02
DETAIL A
SPECIAL CUT BASE DITCH
Type of Liner= Class 'B' Rip-Rap
-L- STA. 15+00 TO STA. 15+50 RT
-L- STA. 15+00 TO STA. 16+00 LT
DETAIL B
SPECIAL CUT BASE DITCH
-L- STA. 15+50 TO STA. 17+20 RT
DETAIL C
LATERAL BASE DITCH
Type of Liner = Class 'B' Rip Rap
-L- STA. 16+00 TO STA. 17+50 LT
MULKEY ENGINEERS & CONSULTANTS
WWW.MULKEYINC.COM
PROJECT REFERENCE NO. B-4216
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
FOR -L- PROFILE SEE SHEET 5
FOR STRUCTURE PLANS SEE SHEETS S-1 TO S-24
NAD 83/01 NC GRID
-BL-1 POT 5+00.00 (-L- 11+15.30 17.09' LT)
-BL-2 PINC 12+03.91 (-L- 18+18.90 14.02' LT)
-BL-3 PINC 16+69.74 (-L- 22+85.13 14.53' LT)
BEGIN PROJECT B-4216 -L- POT Sta.15+00.00
BEGIN CONSTRUCTION -L- POT Sta.14+50.00
END CONSTRUCTION -L- POT Sta.22+00.00
END PROJECT B-4216 -L- POC Sta.21+50.00
NATIONAL REGISTER - ELIGIBLE HISTORIC PROPERTY BOUNDARY
ALEXANDER G. BALDWIN AND WIFE, ELLEN F. BALDWIN DB 3900 PG 583 HISTORIC PROPERTY
WILLIAM E. WILSON JR. MARCIA N. WILSON DB 3411 PG 583 PB 85 PG 12
WILLIAM L. McKINLEY PAULA J. McKINLEY DB 3438 PG 248 PB 85 PG 12
GARRY C. WHICKER SYLVIA S. WHICKER DB 922 PG 599 PB 41 PG 181 PB 57 PG 33
STATE OF NORTH CAROLINA DB 3878 PG 461 PB 98 PG 11 (ENO STATE PARK)
HYLA S. COHEN DB 2555 PG 153 DB 619 PG 485 PB 39 PG 153
JULIETTE R. ROBERTS DB 3730 PG 138 PB 97 PG 76
DONN K. JARRELL BEVERLY K. JARRELL DB 3462 PG 52 PB 53 PG 36
DO NOT DISTURB EXISTING SEPTIC DRAIN LINES LOCATED ON PARCEL 3 APPROX.15' FROM EXIST. R/W AT -L- STA.20+75 RT.
BM #1 -L- STA 18+95.00 234' RIGHT ELEV.482.87'
PREFORMED SCOUR HOLE DETAIL F
SKETCH SHOWING RELATIONSHIP OF BRIDGE TO PAVEMENT AND SHOULDERS
BEGIN BRIDGE -L- 18+05.00
END BRIDGE -L- 19+05.00
BEGIN APPROACH SLAB -L- 17+81.02
END APPROACH SLAB -L- 19+28.98
* ANODIZED 2 BAR METAL RAIL ON BRIDGE
DETAIL D LATERAL BASE DITCH
Type of Liner: Class 'I' Rip-Rap
-L- STA. 19+20 TO STA. 20+00 LT
DETAIL E SPECIAL CUT BASE DITCH
Type of Liner= Class 'I' Rip-Rap
-L- STA. 20+00 TO STA. 21+50 LT
DETAIL G RIP RAP AT EMBANKMENT
Type of Liner = Class 'II' Rip-Rap
-L- STA. 19+05 TO 19+33 RT
NOTE: LEVEL SPREADERS DO NOT WORK AT DISSIPATOR PAD LOCATIONS DUE TO EACH EXCEEDING 130' IN LENGTH.
DETAIL H DISSIPATOR PAD
-L- STA. 17+50 +/- LT
-L- STA. 17+60 +/- RT
-L- STA. 19+20 +/- LT
REVISIONS

5/28/99

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-4216	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN 9/11/09	NORTH CAROLINA PROFESSIONAL SEAL 026696 ENGINEER JEFFREY L. RECK 9/11/09

-BL-1
-L- 11+15.30 17.09' LT
EL = 509.65'

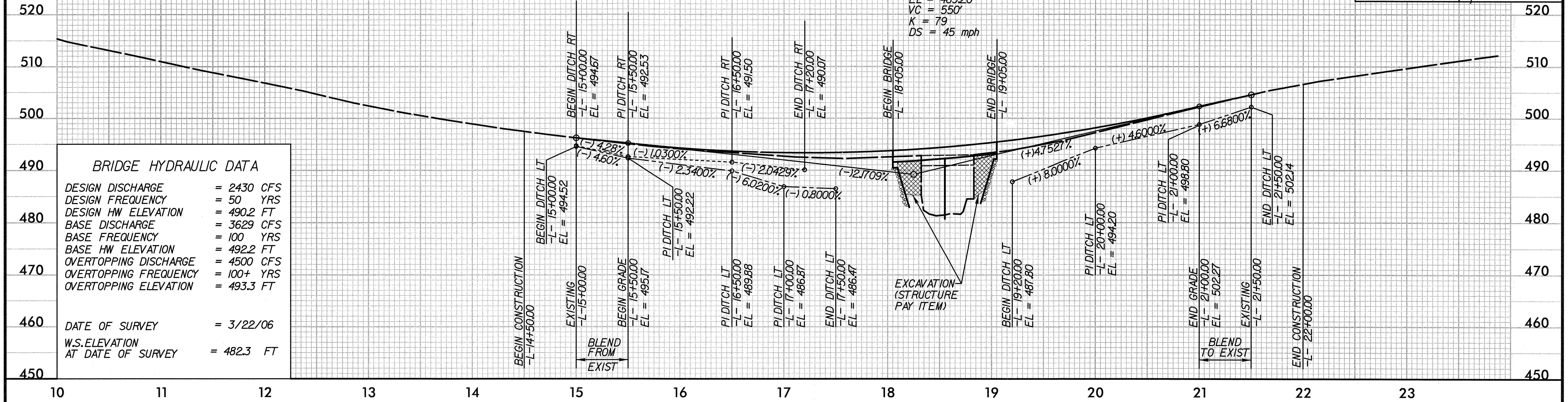
-L-

FOR -L- PLAN VIEW SEE SHEET 4

-BL-2
-L- 18+18.90 14.02' LT
EL = 491.90'

BM-#1
RAILROAD SPIKE IN 20" OAK TREE
-L- 18+95.00 234' RT
EL = 482.87'

-BL-3
-L- 22+85.13 14.53' LT
EL = 508.43'

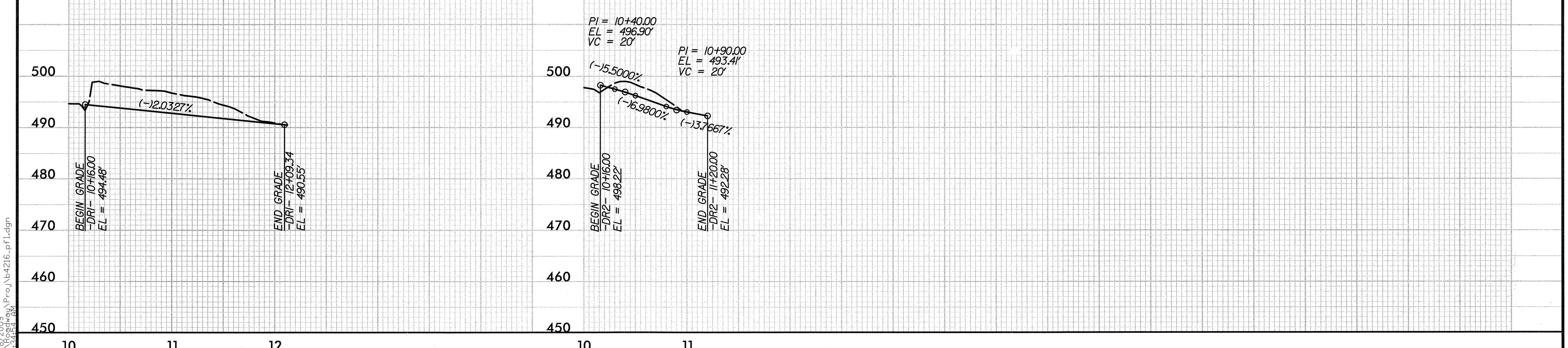


BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2430 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 490.2 FT
BASE DISCHARGE	= 3629 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 492.2 FT
OVERTOPPING DISCHARGE	= 4500 CFS
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING ELEVATION	= 493.3 FT
DATE OF SURVEY	= 3/22/06
W.S. ELEVATION AT DATE OF SURVEY	= 482.3 FT

-DR1-

-DR2-



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