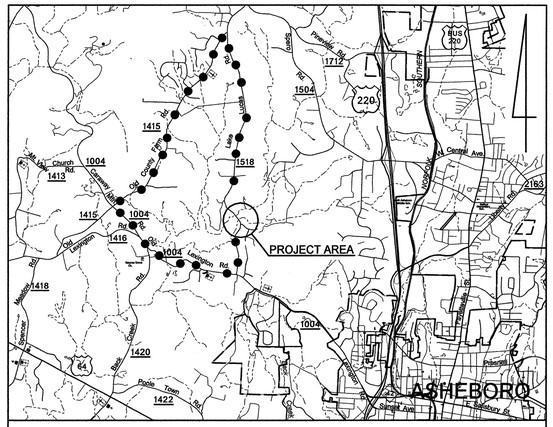
09/08/99

TIP PROJECT: B-4610

CONTRACT: C202553

See Sheet 1-A For Index of Sheets



VICINITY MAP

OFFSITE DETOUR ROUTE ●—●—●—●—●

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

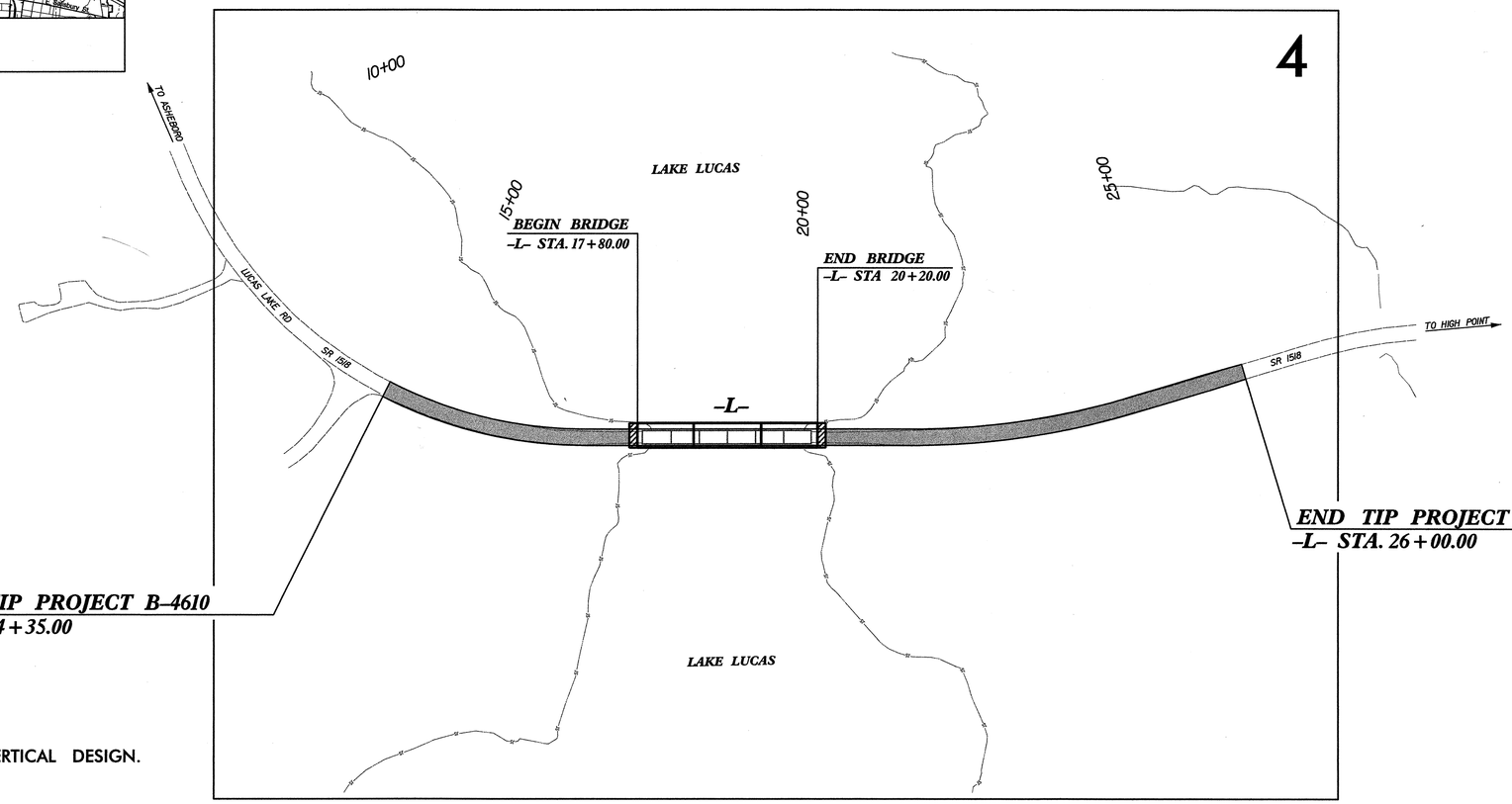
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4610	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33794.1.1	BRZ-1518(2)	P.E.
33794.2.1	BRZ-1518(2)	R/W
33794.3.1	BRZ-1518(2)	CONST.

NAD 83 (CORS 96)

LOCATION: BRIDGE NO. 73 OVER LAKE LUCAS ON SR 1518

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



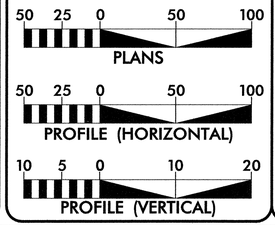
BEGIN TIP PROJECT B-4610
-L- STA. 14+35.00

END TIP PROJECT B-4610
-L- STA. 26+00.00

** DESIGN EXCEPTION REQUIRED FOR VERTICAL DESIGN.

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

GRAPHIC SCALES



DESIGN DATA

ADT 2010 = 1,200
ADT 2030 = 2,000
DHV = 10 %
D = 60 %
T = 3 % *
V = 50 MPH
*(TTST 1% + DUAL 2%)
FUNC. CLASS. = RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT	*B-4610*	=	*0.176 mi.*
LENGTH STRUCTURE TIP PROJECT	*B-4610*	=	*0.045 mi.*
TOTAL LENGTH OF TIP PROJECT	*B-4610*	=	*0.221 mi.*

SUB-REGIONAL TIER DESIGN

Prepared In the Office of:
Florence & Hutcheson
CONSULTING ENGINEERS
3121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0550
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
NORTH CAROLINA PROFESSIONAL SEAL 021162 ENGINEER W. HERBERT TURNER JR.
SIGNATURE: 3-15-2010

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 16689 ENGINEER BRIAN ALLEN WILES P.E.
SIGNATURE: 3/15/10

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION
P.E.
STATE HIGHWAY DESIGN ENGINEER

3/15/2010
R:\Roadway\Proj\B4610_Rdy_tsh.dgn
Florence & Hutcheson, Inc.

6/4/99

PROJECT REFERENCE NO.	SHEET NO.
B-4610	1-A

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

NORTH CAROLINA PROFESSIONAL SEAL 30689 ENGINEER BRIAN ALLEN WILES
3/13/18

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

INDEX OF SHEETS

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.

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 PROGRESS ENERGY, TIME WARNER CABLE 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 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - SUBGRADE, BASES AND SHOULDERS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
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
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
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

3/15/2018
R:\Roadway\Proj\b4610_Rdy_3series.dgn
Florence & Hutcheson, Inc.

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-4610	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- 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 — 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
- 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 — 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:

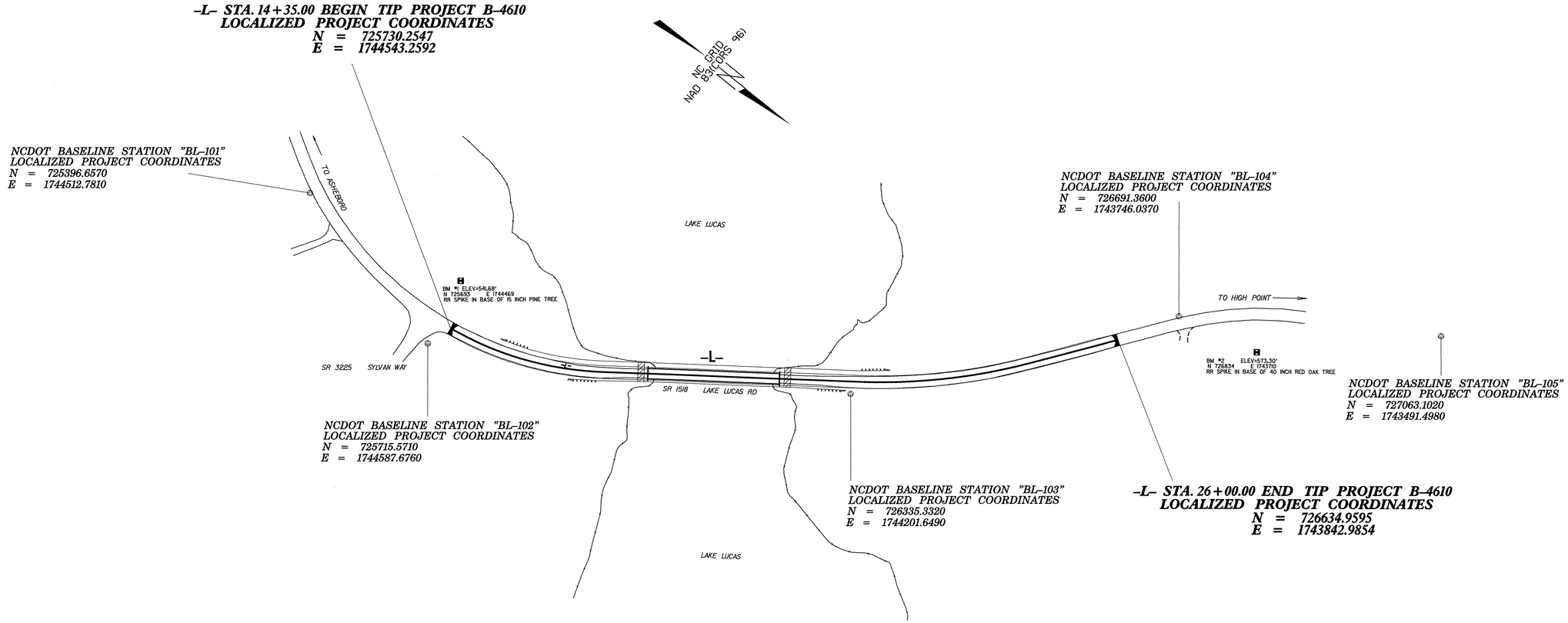
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4610	1C
Location and Surveys	

SURVEY CONTROL SHEET B-4610

-L- STA. 14+35.00 BEGIN TIP PROJECT B-4610
LOCALIZED PROJECT COORDINATES
N = 725730.2547
E = 1744543.2592



BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	BL-101	725396.6570	1744512.7810	561.09	10+99.56	13.97 RT
102	BL-102	725715.5710	1744587.6760	555.04	14+14.86	41.87 RT
103	BL-103	726335.3320	1744201.6490	532.28	21+34.82	21.61 RT
104	BL-104	726691.3600	1743746.0370	566.73	OUTSIDE PROJECT LIMITS	
105	BL-105	727063.1020	1743491.4980	589.20	OUTSIDE PROJECT LIMITS	

```
**************************************
BM1       ELEVATION = 541.68
N 725693      E 1744469
L STATION 14+86.79 LEFT
RR-SPIKE IN BASE OF 15 INCH PINE TREE
**************************************
**************************************
BM2       ELEVATION = 573.30
N 726834      E 1743710
L STATION 27+03
N 20° 05' 14.4" W  DIST    146.36
RR-SPIKE IN BASE OF 40 INCH RED OAK
**************************************
```

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4610-1" WITH NAD 83(COR96) STATE PLANE GRID COORDINATES OF NORTHING: 727430.0060(ift) EASTING: 1743466.7990(ift) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999885070 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4610-1" TO -L- STATION 14+35.00 IS S 32° 20' 46.6" E 2011.945' 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:
   B4610_LS_CONTROL_090501.TXT

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

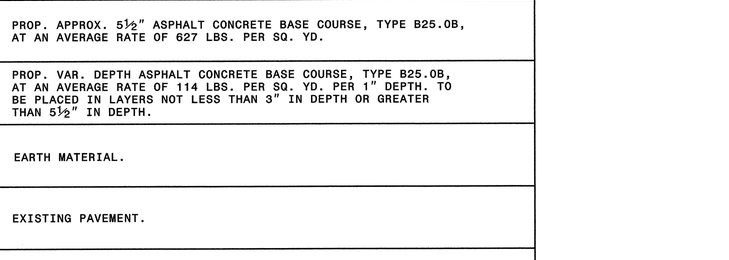
© *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

NOTE: DRAWING NOT TO SCALE

1/19/2010
R:\Roadway\Proj\b4610_ls_lc.dgn
Ko & Associates, P.C.

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" 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.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE TYPICAL WEDGING DETAIL THIS SHEET.)

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



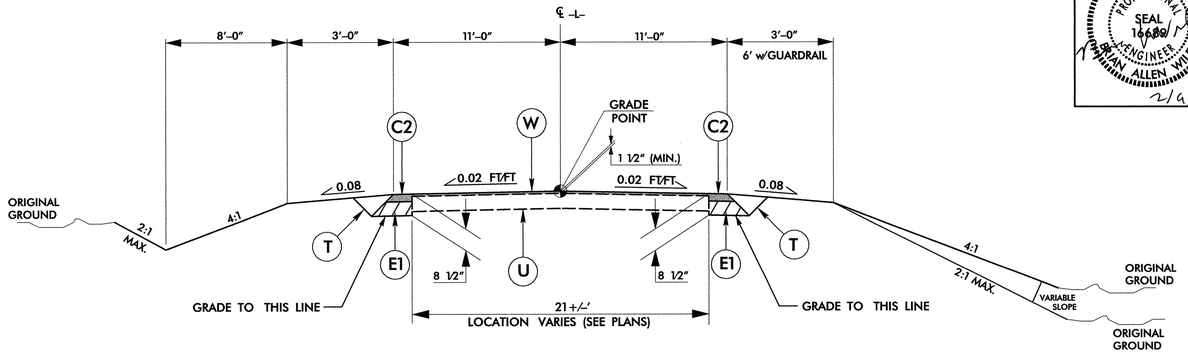
Detail Showing Method of Wedging (W)

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

PROJECT REFERENCE NO.	SHEET NO.
B-4610	2

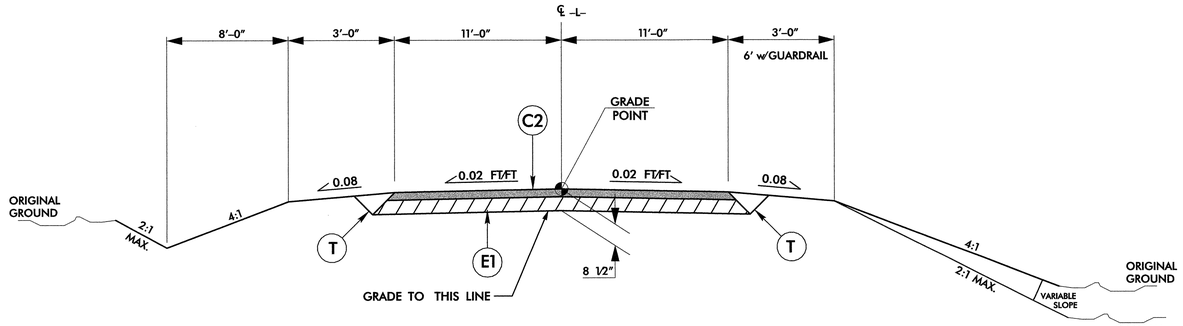
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 16680 ENGINEER IAN ALLEN WILES
2/9/10

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22856 ENGINEER CLARK S. MORRISON
2/12/10



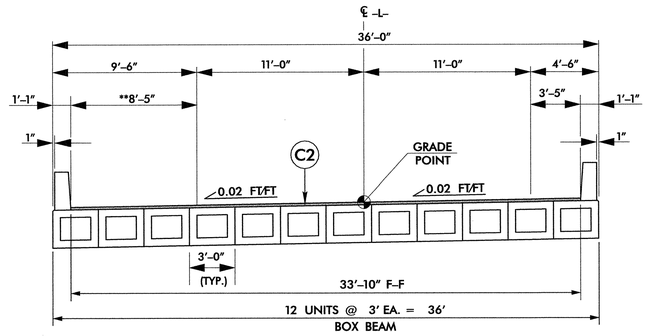
TYPICAL SECTION NO. 1
-L- (SR 1518)

STA 14+35.00 TO STA 16+25.00
STA 21+75.00 TO STA 26+00.00



TYPICAL SECTION NO. 2
-L- (SR 1518)

STA 16+25.00 TO STA 17+80.00 (BEGIN BRIDGE)
STA 20+20.00 (END BRIDGE) TO STA 21+75.00



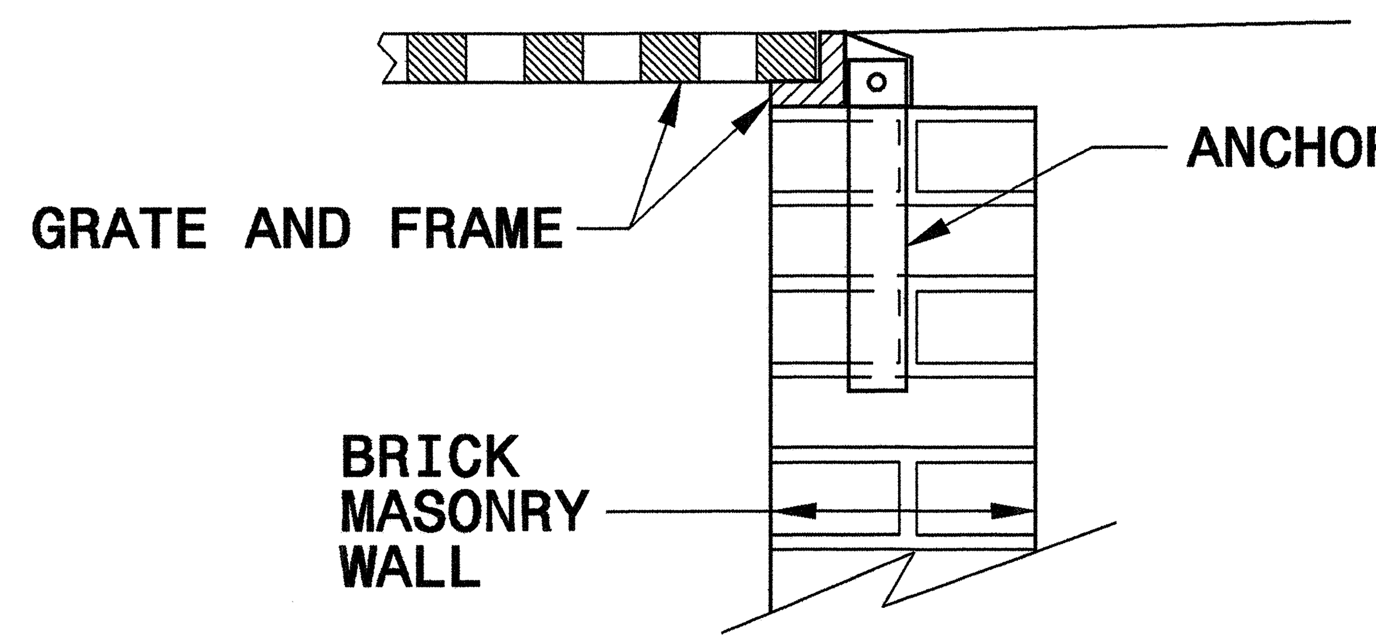
TYPICAL SECTION NO. 3
-L- (SR 1518)

STA 17+80.00 (BEGIN BRIDGE) TO STA 20+20.00 (END BRIDGE)

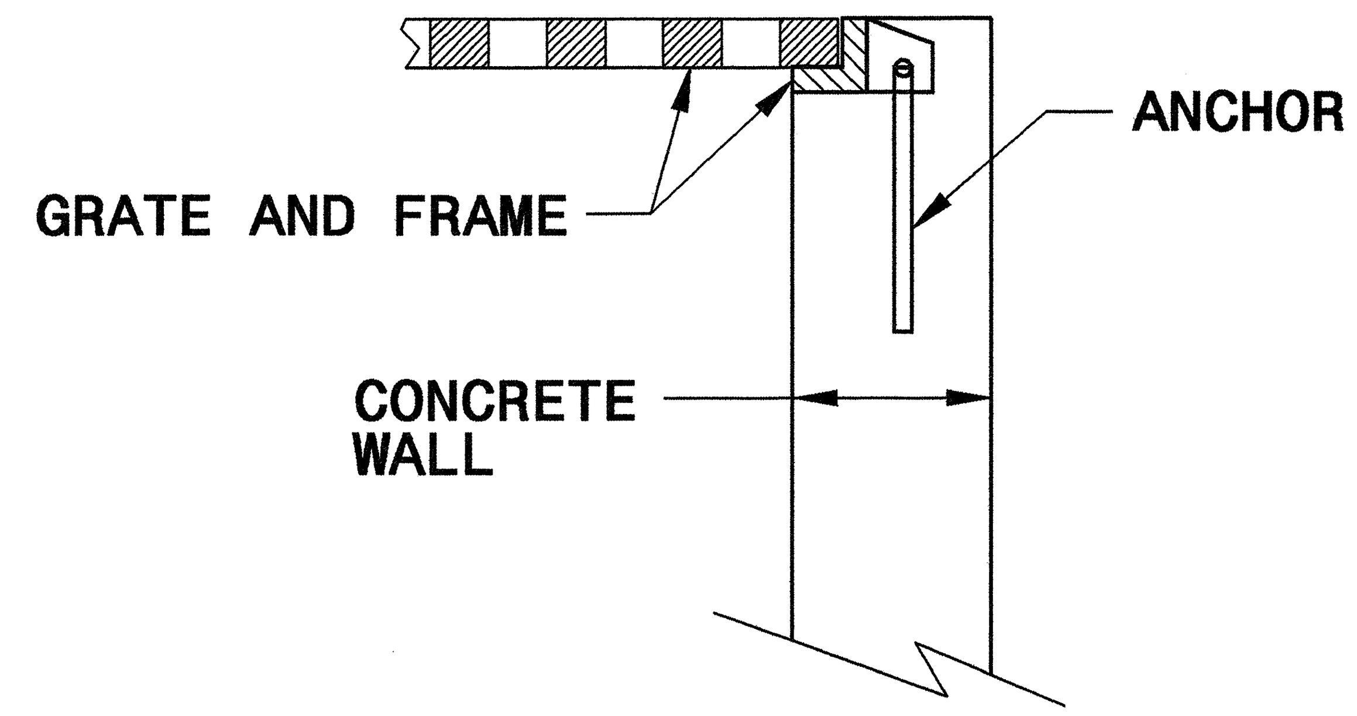
** ADDITIONAL WIDTH NEEDED FOR SPREAD

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

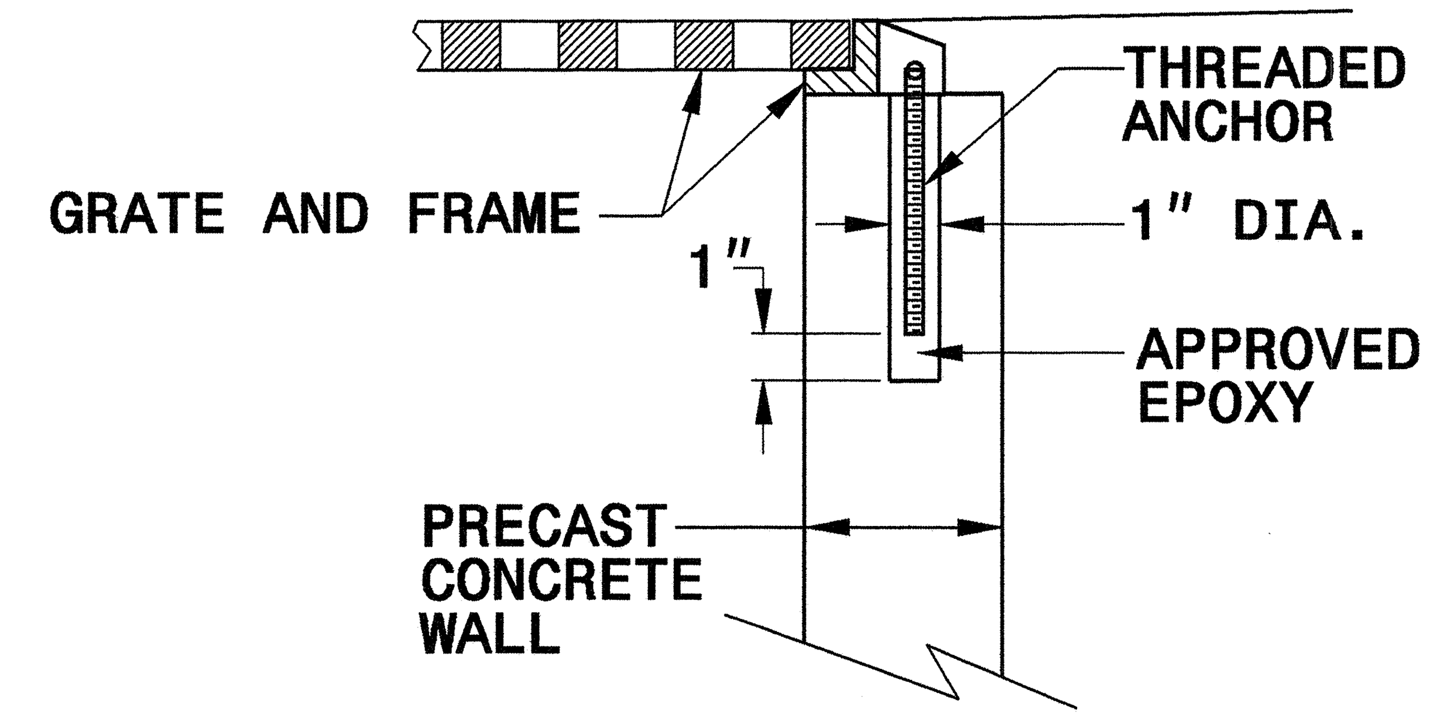
ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE



BRICK MASONRY CONSTRUCTION



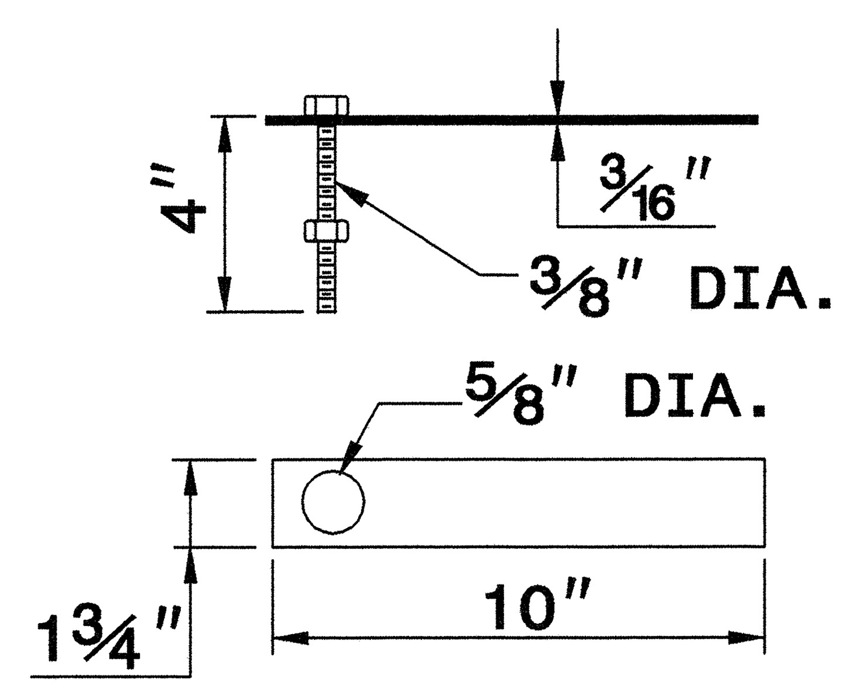
CONCRETE CONSTRUCTION



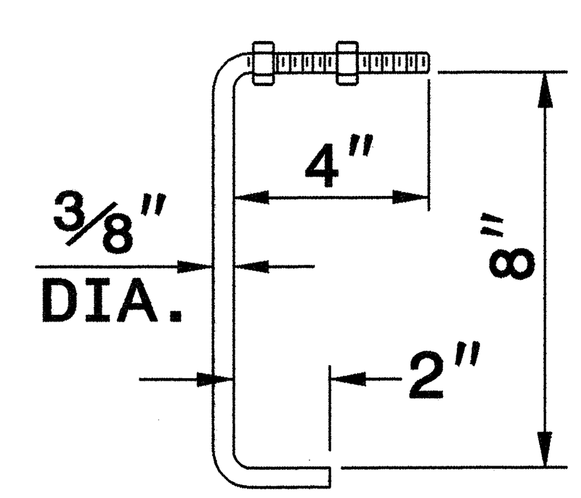
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

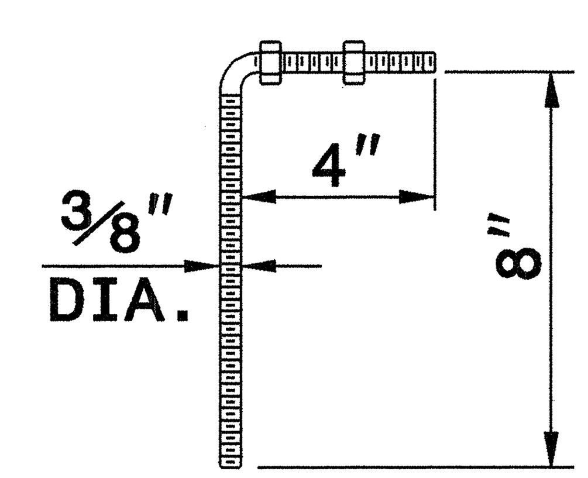
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



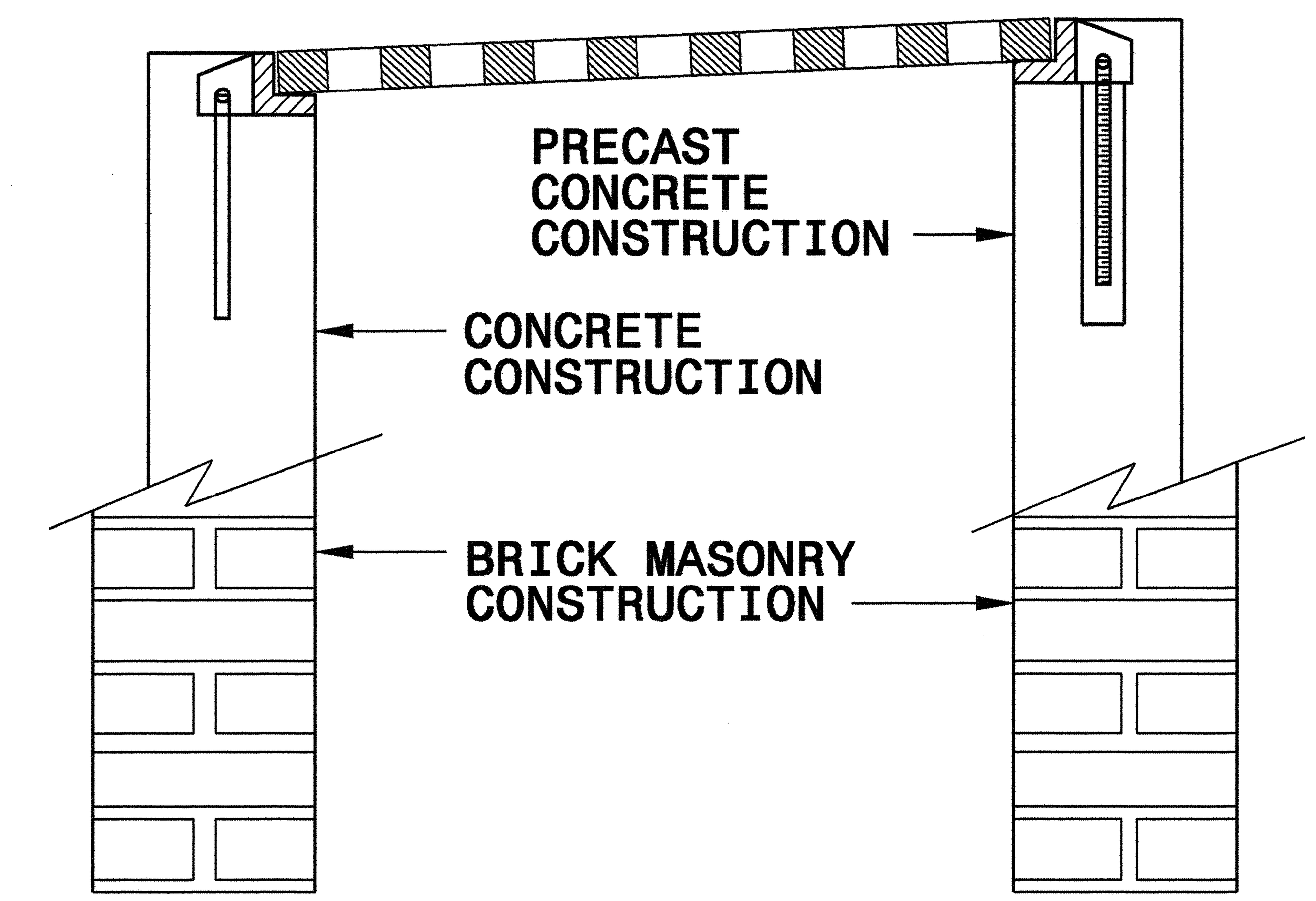
MASONRY ANCHOR
3/8″ DIA. BOLT WITH PLATE



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

SHEET 1 OF 1
840D25

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 SEAL 022866 ENGINEER
[illegible] 3/17/10

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.:

27-SEP-2006 08:59
S:\Contracts\Contracts\Special Details\ericward\stds\06' Stds to Special Details\84025 Anchorage for Frames\0840d25.dgn
ericward AT PS222293

PROJECT REFERENCE NO.	SHEET
B-4610 (33794.1.1)	2-B

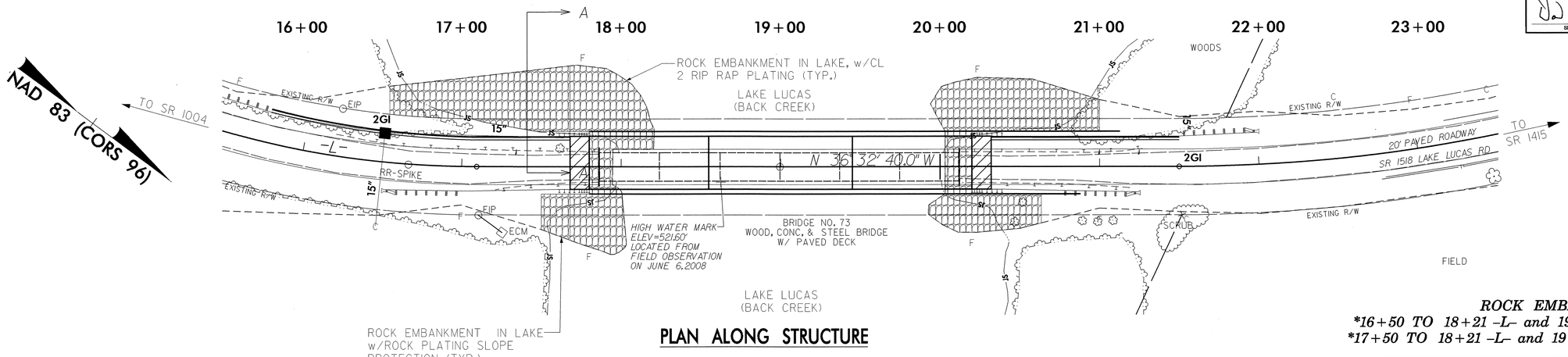
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE — DATE 2/24/10

ENGINEER

SIGNATURE — DATE



PLAN ALONG STRUCTURE

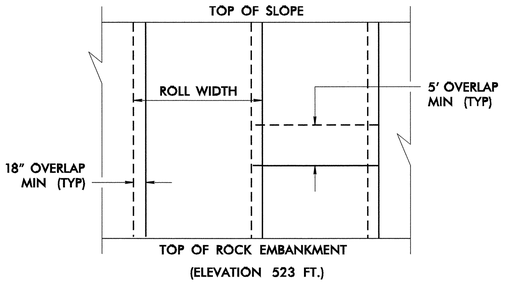
ROCK EMBANKMENT
**16+50 TO 18+21 –L– and 19+93 TO 21+00 –L– (LEFT)*
**17+50 TO 18+21 –L– and 19+93 TO 20+50 –L– (RIGHT)*

ESTIMATED QUANTITIES	
ROCK EMBANKMENTS	*2,700 TONS*
SELECT MATERIAL, CLASS VI (NO. 57 STONE)	*950 TONS*
FILTER FABRIC FOR ROCK EMBANKMENTS	*650 SY*

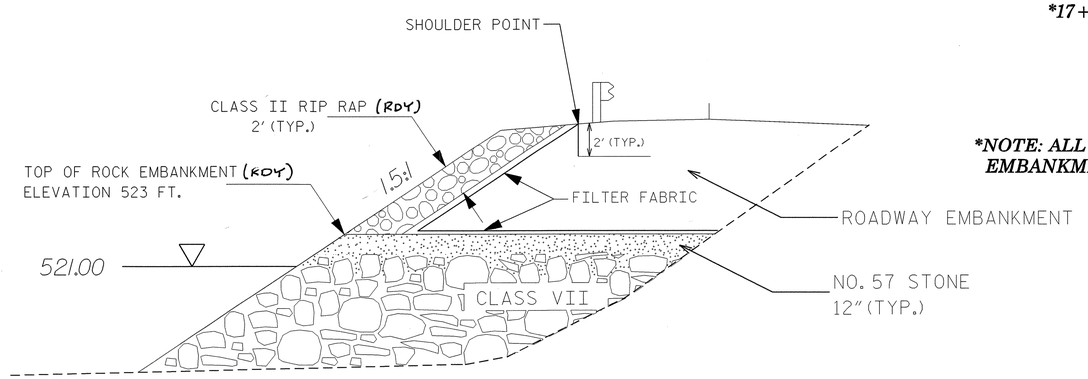
ROCK PLATING
**16+50 TO 18+21 –L– and 19+93 TO 21+00 –L– (LEFT)*
**17+50 TO 18+21 –L– and 19+93 TO 20+50 –L– (RIGHT)*

ESTIMATED QUANTITIES	
ROCK PLATING	*875 SY*

**NOTE: ALL STATION RANGES ARE APPROXIMATE. USE ROCK EMBANKMENT AND ROCK PLATING WHERE FILL WILL BE PLACED IN WATER.*



FABRIC OVERLAP DETAIL
(PLAN VIEW)



SECTION A-A
N.T.S

PREPARED BY: D. TEAGUE	DATE: 10/2009
REVIEWED BY: E. WILLIAMS	DATE: 10/2009

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

- ☐ EASTERN REGIONAL OFFICE
- ☐ WESTERN REGIONAL OFFICE
- ☒ CONTRACT OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

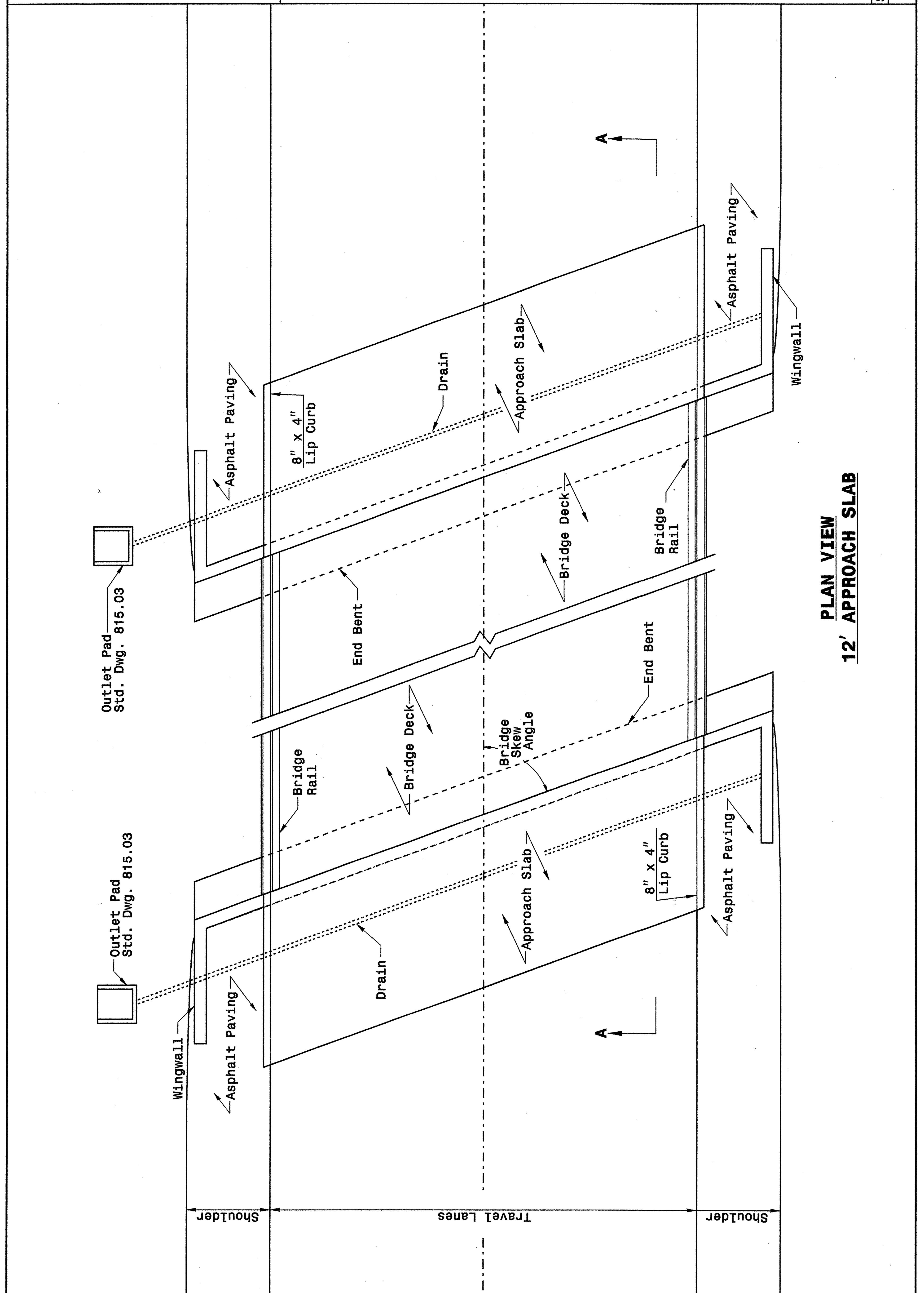
ROCK EMBANKMENT ROCK PLATING DETAIL

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO.	SHEET NO.
B-4610	2-C

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR BRIDGE APPROACH FILLS
SUB REGIONAL TIER
SHEET 1 OF 2 422D11



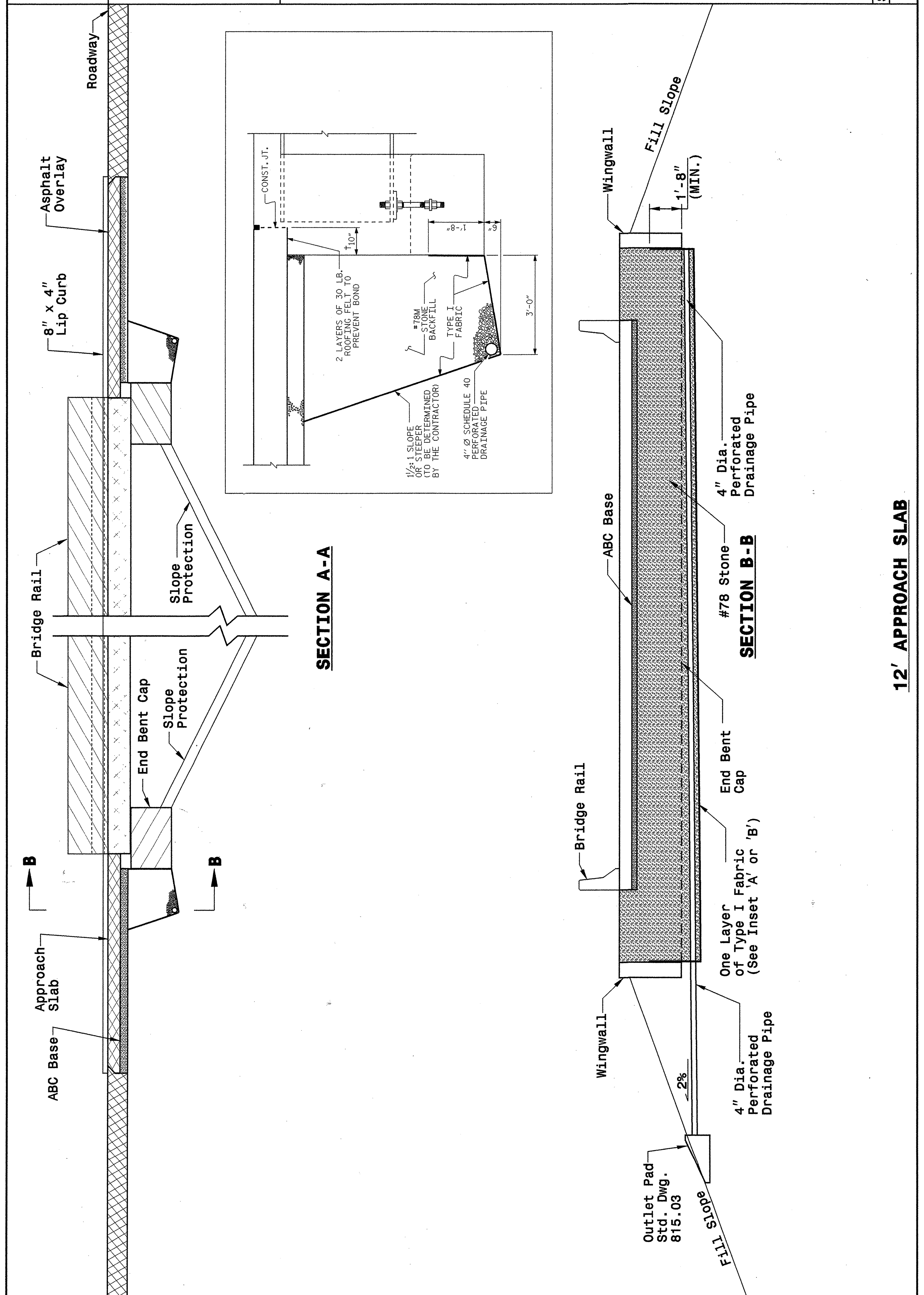
PLAN VIEW
12' APPROACH SLAB

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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
SUB REGIONAL TIER

SHEET 1 OF 2
422D11

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR BRIDGE APPROACH FILLS
SUB REGIONAL TIER
SHEET 2 OF 2 422D11



12' APPROACH SLAB

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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
SUB REGIONAL TIER

SHEET 2 OF 2
422D11

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 3/17/10

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

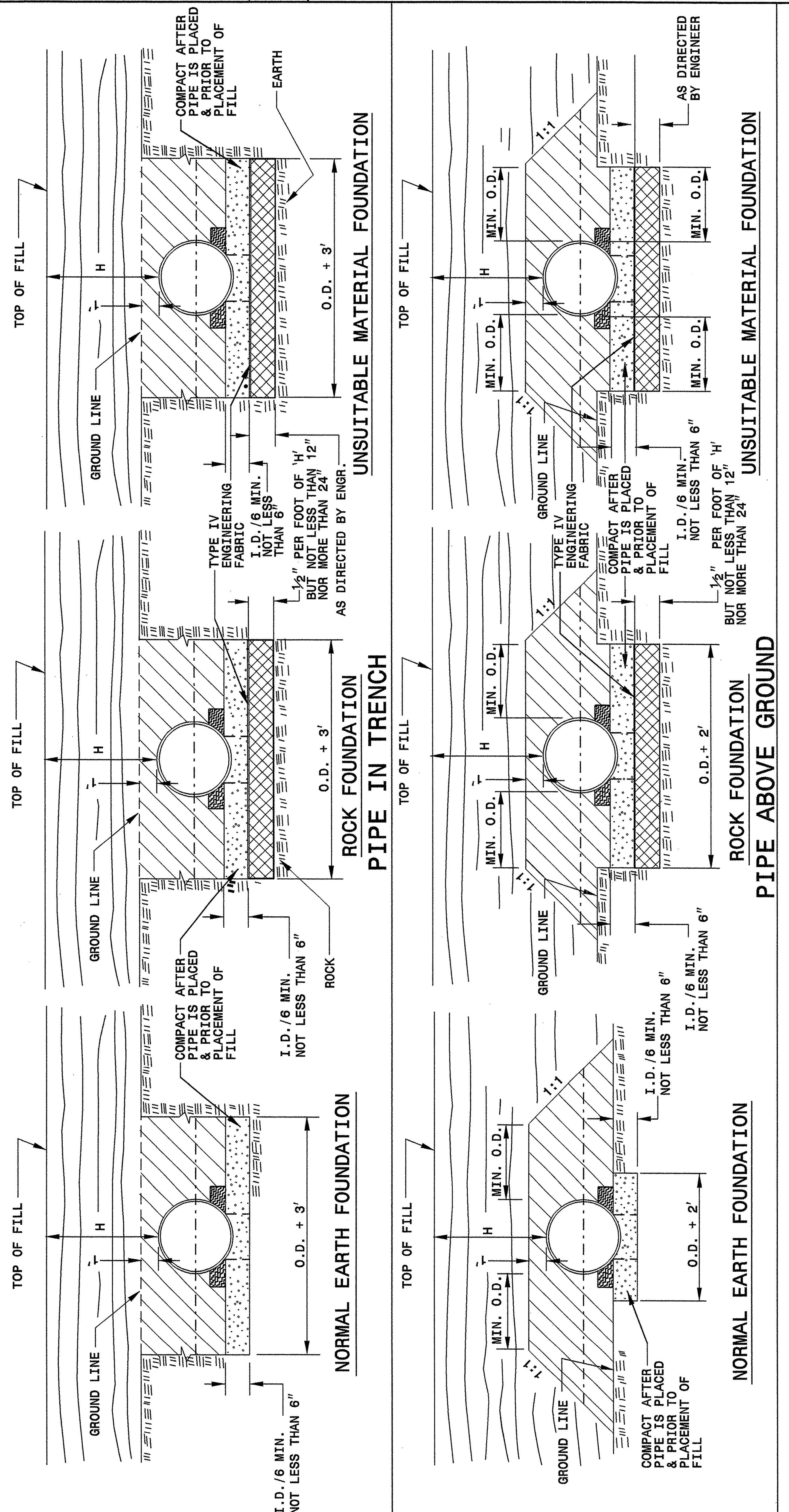
BRIDGE APPROACH FILLS

SUB REGIONAL TIER

ORIGINAL BY: K. A. Kempf DATE: 6-10-08
MODIFIED BY: DATE:
CHECKED BY: [signature] DATE: 3/16/10
FILE SPEC.: kkempf\english\bridge approach fills.dgn

$$$$$$SYSTIME$$$$$
$$$$$$$$$$DGN$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

7-06
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE
SHEET 1 OF 3
300D01



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

- SPRINGLINE OF PIPE
- SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.
- APPROVED SUITABLE LOCAL MATERIAL.
- UNDISTURBED EARTH MATERIAL
- SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

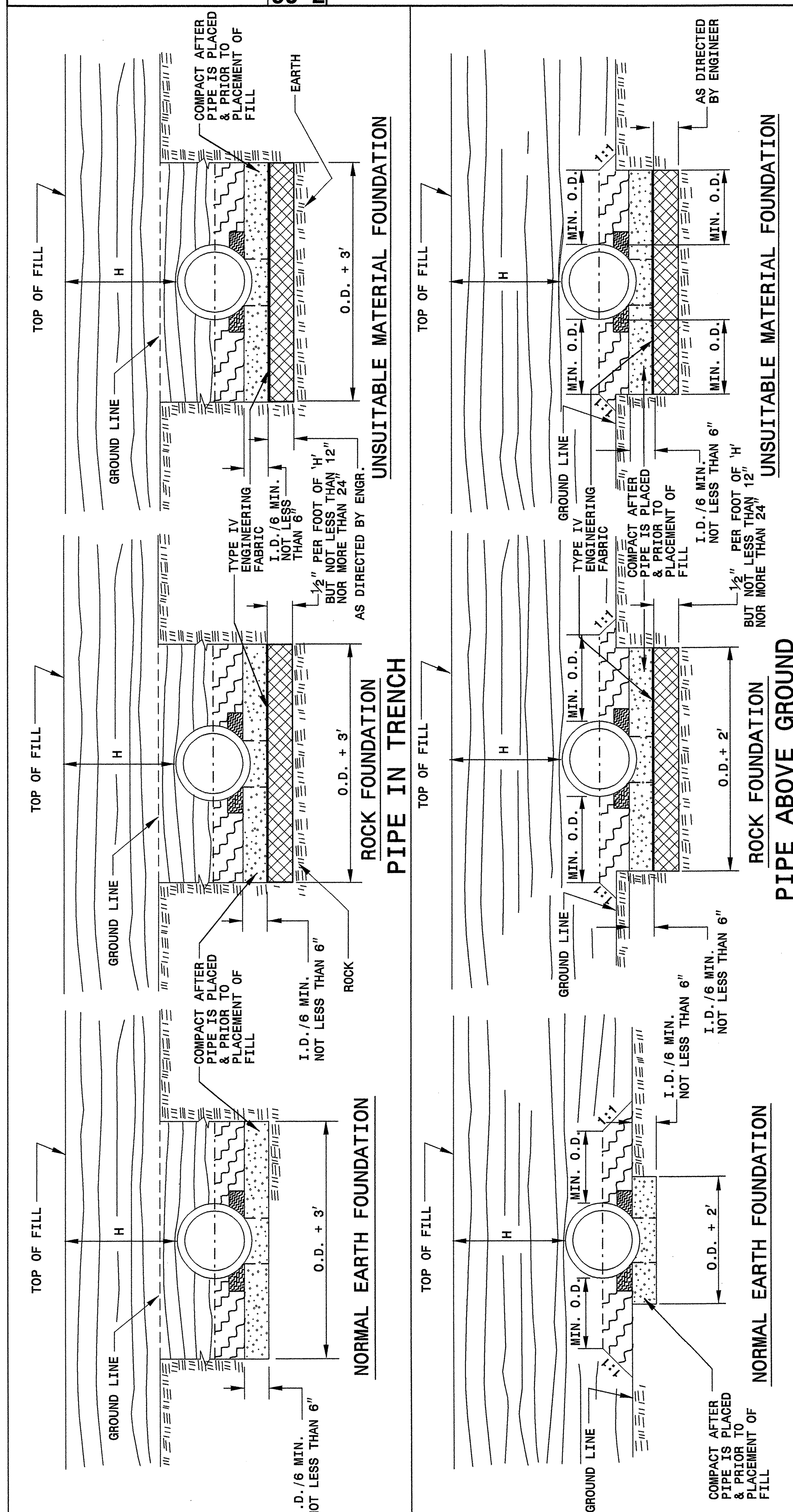
- TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
- LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 3
300D01

7-06
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE
SHEET 2 OF 3
300D01



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.

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.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 3
300D01

PROJECT REFERENCE NO.	SHEET NO.
B-4610	2-D

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
[illegible]
3/17/10

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: [illegible] DATE: 7/30/09
FILE SPEC: /ericward/stds/stdstodetails/30001/0300d01.dgn

5/14/99

30-JUL-2009 08:48
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jhowerton AT PS237501

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4610	2-E

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 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
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 S. HOWERTON
[illegible] 3/17/10

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: [illegible] DATE: 7/30/09
FILE SPEC: c:/ericward/stds/stdstodetails/30001/0300d01.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-4610	3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202553

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0030000000-N	SP	Lump Sum		BRIDGE APPROACH FILL - SUB REGIONAL TIER, STATION ******* (19+00)
0038000000-E	SP	50	CY	SHALLOW UNDERCUT
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0057000000-E	226	250	CY	UNDERCUT EXCAVATION
0063000000-N	SP	Lump Sum		GRADING
0080000000-E	SP	100	TON	CLASS IV SUBGRADE STABILIZATION
0106000000-E	230	3,050	CY	BORROW EXCAVATION
0134000000-E	240	160	CY	DRAINAGE DITCH EXCAVATION
0196000000-E	270	400	SY	FABRIC FOR SOIL STABILIZATION
0220000000-E	SP	2,700	TON	ROCK EMBANKMENTS
0223000000-E	SP	875	SY	ROCK PLATING
0234000000-E	SP	250	CY	GENERIC GRADING ITEM SELECT GRANULAR MATERIAL
0241000000-E	SP	650	SY	GENERIC GRADING ITEM FILTER FABRIC FOR ROCK EMBANKMENTS
0320000000-E	SP	110	SY	FOUNDATION CONDITIONING FABRIC
0330000000-E	SP	40	TON	GENERIC DRAINAGE ITEM FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0335200000-E	SP	148	LF	15" DRAINAGE PIPE
0448200000-E	SP	156	LF	15" RC PIPE CULVERTS, CLASS IV
1077000000-E	SP	950	TON	#57 STONE SELECT MATERIAL, CLASS (VI)
1489000000-E	610	1,050	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1525000000-E	610	500	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
1560000000-E	620	78	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1693000000-E	654	50	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2000000000-N	806	11	EA	RIGHT OF WAY MARKERS
2286000000-N	840	5	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	1.8	LF	MASONRY DRAINAGE STRUCTURES
2367000000-N	840	5	EA	FRAME WITH TWO GRATES, STD 840.29
2556000000-E	846	315	LF	SHOULDER BERM GUTTER
3030000000-E	862	400	LF	STEEL BM GUARDRAIL
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3215000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3360000000-E	863	450	LF	REMOVE EXISTING GUARDRAIL
3628000000-E	876	25	TON	RIP RAP, CLASS I
3649000000-E	876	35	TON	RIP RAP, CLASS B
3656000000-E	876	1,355	SY	FILTER FABRIC FOR DRAINAGE
4400000000-E	1110	297	SF	WORK ZONE SIGNS (STATIONARY)
4410000000-E	1110	94	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4445000000-E	1145	96	LF	BARRICADES (TYPE III)
4810000000-E	1205	9,320	LF	PAINT PAVEMENT MARKING LINES (4")
4900000000-N	1251	17	EA	PERMANENT RAISED PAVEMENT MARKERS
6000000000-E	1605	500	LF	TEMPORARY SILT FENCE
6006000000-E	1610	225	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	170	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	345	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	4.5	ACR	TEMPORARY MULCHING
6018000000-E	1620	175	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	2.75	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	375	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	5	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	1,050	LF	SAFETY FENCE
6030000000-E	1630	485	CY	SILT EXCAVATION
6036000000-E	1631	8,500	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	40	SY	COIR FIBER MAT
6038000000-E	SP	1,100	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	675	LF	1/4" HARDWARE CLOTH
6048000000-E	SP	525	SY	FLOATING TURBIDITY CURTAIN
6070000000-N	SP	8	EA	SPECIAL STILLING BASINS
6071010000-E	SP	530	LF	WATTLE
6071020000-E	SP	135	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	260	LF	COIR FIBER BAFFLES
6071050000-E	SP	4	EA	** SKIMMER (1-1/2")
6084000000-E	1660	6.5	ACR	SEEDING & MULCHING
6087000000-E	1660	3.5	ACR	MOWING
6090000000-E	1661	75	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.5	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	75	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	2	TON	FERTILIZER TOPDRESSING
6114500000-N	SP	10	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL

COMPUTED BY: B. A.WILES	DATE: 1/19/2010
CHECKED BY: M. A. YOUNG	DATE: 1/19/2010

PROJECT REFERENCE NO.	SHEET NO.
B-4610	3-A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
SUB-REGIONAL & REGIONAL
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
17+64	LT	0401		534.5	531.7														
17+64	LT	0401	0402		531.7	531.5													
17+00	LT	0402		535.3	531.5														
17+00	LT	0402	0403		531.5	531.2			96										
16+00	LT	0403		538.0	531.2														
16+00	LT	0403	0404		531.2	526.4			32							X			
20+58	LT	0407		533.0	530.3														
20+58	LT	0407	0408		530.3	529.8													
21+50	LT	0408		534.3	529.8														
21+50	LT	0408	0409		529.8	529.6			20										
TOTAL									148										

STATION	FROM	TO	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	36" .079	42" .109	48" .109	R.C. PIPE (CLASS III) 15"	18"	24"	30"	36"	42"	48"	R.C. PIPE (CLASS IV) 12"	15"	18"	24"	30"	36"	42"	48"
17+64	0401																							
17+64	0401	0402																64						
17+00	0402																							
17+00	0402	0403																						
16+00	0403																							
16+00	0403	0404																						
20+58	0407																							
20+58	0407	0408																92						
21+50	0408																							
21+50	0408	0409																						
TOTAL																		156						

STATION	FROM	TO	**" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" 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 PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') 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		CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET
17+64	0401									1									
17+64	0401	0402																	
17+00	0402									1									
17+00	0402	0403																	
16+00	0403									1	1.8								
16+00	0403	0404																	
20+58	0407									1									
20+58	0407	0408																	
21+50	0408									1									
21+50	0408	0409																	
TOTAL										5	1.8								

STATION	FROM	TO	G.D.I. TYPE "B" STD. 840.18 OR 840.27	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	MANHOLE FRAME AND COVER STD. 840.54	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+64	0401		1				1							
17+64	0401	0402												
17+00	0402		1				1							
17+00	0402	0403												
16+00	0403		1				1							
16+00	0403	0404												
20+58	0407		1				1							
20+58	0407	0408												
21+50	0408		1				1							
21+50	0408	0409												
TOTAL			5				5							

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

"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 STRAIGHT	SHOP CURVED	DOUBLE FACED	WARRANT POINT APPROACH END	TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	TRAILING END	W APPROACH END	TRAILING END	ANCHORS XI MOD	III	GRAU 350	M-350	XIII	CAT-1	VI MOD	BIC	AT-1	IMPACT ATTENUATOR TYPE 350 EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-	15+23.75	17+80.00	LT	256.25			16+25	17+80	8.5	11.5	50		1			1	1											165		
-L-	16+48.75	17+80.00	RT	131.25			17+50	17+80	3.5	6.5	112.50		2.25			1	1											65		
-L-	20+20.00	22+01.25	LT	181.25			21+00	20+20	8.5	11.5	50		1			1	1											115		
-L-	20+20.00	21+26.25	RT	106.25			20+20	20+20	3.5	6.5	87.50		1.75			1	1											105		
		SUB TOTALS		675.00						ANCHOR DEDUCTIONS:						4	4											450		
		ANCHOR DEDUCTIONS		275.00						TYPE III 4 x 18.75' = 75'																				
		TOTALS		400.00						GRAU-350 4 x 50' = 200'																				
										TOTAL = 275'																				
										ADDITIONAL GUARDRAIL POSTS = 5 EACH																				

COMPUTED BY:	DATE:
CHECKED BY:	DATE:

6/4/99

PROJECT REFERENCE NO.	SHEET NO.
B-4610	3-B

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
SUMMARY NO. 1					
-L- 14+35 TO 17+80.00	114		2516	2402	
TOTAL SUMMARY NO. 1	114		2516	2402	
SUMMARY NO. 2					
-L- 20+20.00 TO 26+00	1292		1633	341	
TOTAL SUMMARY NO. 2	1292		1633	341	
SUB-TOTAL SUMMARY NOS. 1 & 2	1406		4149	2743	
EST. LOSS DUE TO CLEARING & GRUBBING	-130			130	
PROJECT TOTAL	1276		4149	2873	
EST. 5% REPLACE TOPSOIL ON BORROW	PITS			144	
GRAND TOTALS	1276			3017	
SAY	1300			3050	

DRAINAGE DITCH EXCAVATION = 160 CY
UNDERCUT FOR EMBANKMENT STABILITY = 100 CY
FABRIC FOR SOIL STABILIZATION = 400 SY
UNDERCUT FOR SUBGRADE STABILIZATION = 150 CY
SHALLOW UNDERCUT = 50 CY
SELECT GRANULAR MATERIAL = 250 CY
CLASS IV SUBGRADE STABILIZATION MATERIAL = 100 TONS
ROCK EMBANKMENT = 2700 TONS
SELECT MATERIAL CLASS VI (#57 STONE) = 950 TONS
FILTER FABRIC FOR ROCK EMBANKMENT = 650 SY
ROCK PLATING = 875 SY

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
L	17+50	17+86	CL	64.00
L	20+12	20+50	CL	63.33
			TOTAL:	127.33
			SAY:	130

SUMMARY OF EXISTING ASPHALT PAVEMENT BREAKING

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
L	16+25	17+50	CL	250.00
L	20+50	21+75	CL	236.11
			TOTAL:	486.11
			SAY:	490

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, Fine Grading, Clearing and Grubbing, Removal of Existing Pavement and Breaking of Existing Pavement will be paid for at the contract lump sum price for "Grading."

3/15/2010
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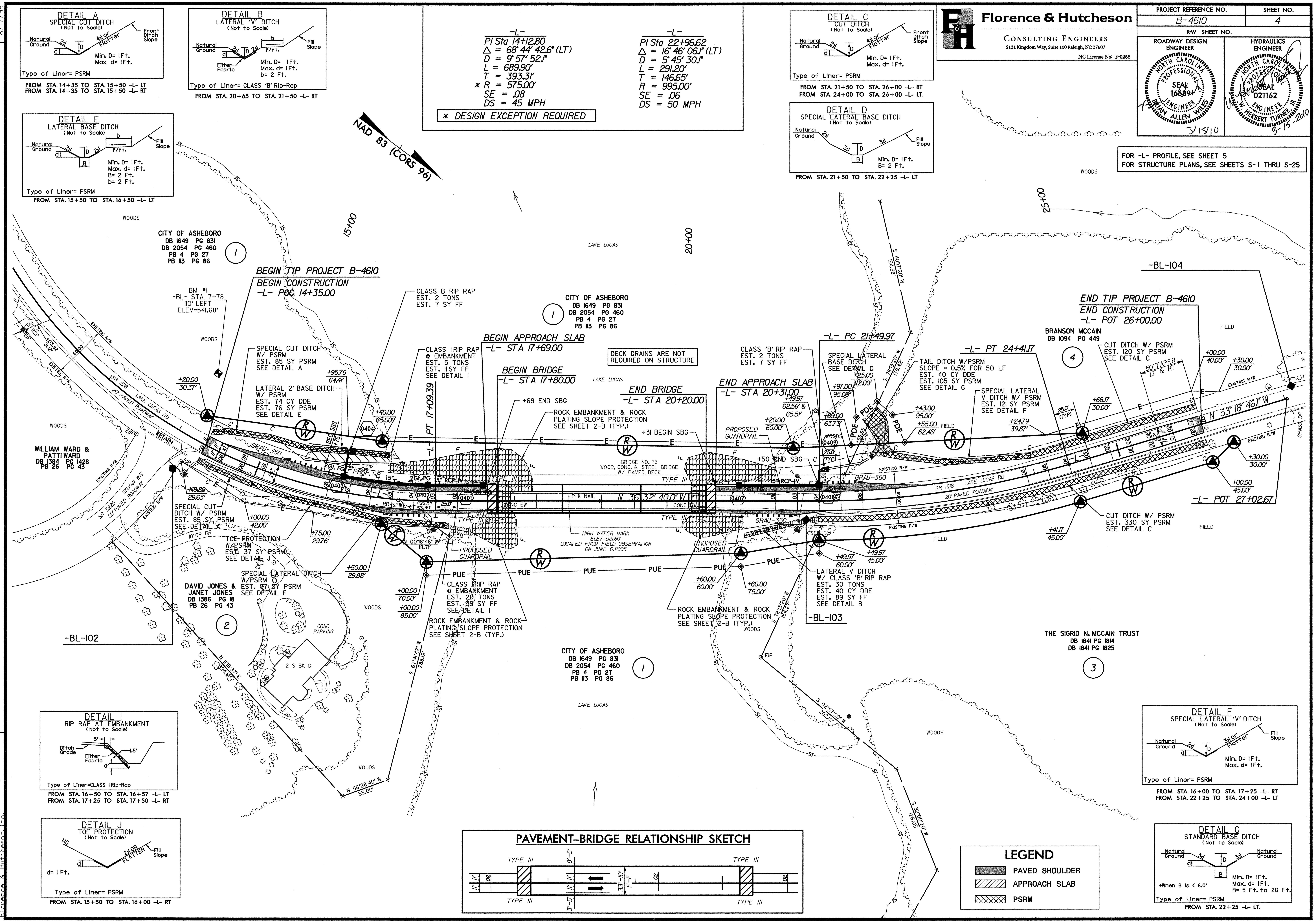
Florence & Hutcheson, Inc.


8/17/99
REVISIONS
DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Front Ditch Slope
d
Min. D= 1Ft.
Max d= 1Ft.
Type of Liner= PSRM
FROM STA. 14+35 TO STA. 15+50 -L- LT
FROM STA. 14+35 TO STA. 15+50 -L- RT
DETAIL B
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
b
1"/Ft.
Fill Slope
Filter Fabric
Min. D= 1Ft.
Max. d= 1Ft.
b= 2 Ft.
Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 20+65 TO STA. 21+50 -L- RT
-L-
PI Sta 14+12.80
Δ = 68° 44' 42.6" (LT)
D = 9° 57' 52.1"
L = 689.90'
T = 393.31'
* R = 575.00'
SE = .08
DS = 45 MPH
* DESIGN EXCEPTION REQUIRED
-L-
PI Sta 22+96.62
Δ = 16° 46' 06.1" (LT)
D = 5° 45' 30.1"
L = 291.20'
T = 146.65'
R = 995.00'
SE = .06
DS = 50 MPH
DETAIL C
CUT DITCH
(Not to Scale)
Natural Ground
4:1 or Flatter
Front Ditch Slope
Min. D= 1Ft.
Max. d= 1Ft.
Type of Liner= PSRM
FROM STA. 21+50 TO STA. 26+00 -L- RT
FROM STA. 24+00 TO STA. 26+00 -L- LT.
DETAIL D
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground
3:1
Fill Slope
Min. D= 1Ft.
B= 2 Ft.
FROM STA. 21+50 TO STA. 22+25 -L- LT
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258
PROJECT REFERENCE NO. B-4610
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 16689 ENGINEER BRIAN ALLEN WILES
3/15/10
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021162 ENGINEER W. HERBERT TURNER, JR.
3-15-2010
FOR -L- PROFILE, SEE SHEET 5
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-25
DETAIL E
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
1"/Ft.
Fill Slope
Min. D= 1Ft.
Max. d= 1Ft.
B= 2 Ft.
b= 2 Ft.
Type of Liner= PSRM
FROM STA. 15+50 TO STA. 16+50 -L- LT
NAD 83 (CORS 96)
WOODS
CITY OF ASHEBORO
DB 1649 PG 831
DB 2054 PG 460
PB 4 PG 27
PB 113 PG 86
15+00
20+00
25+00
LAKE LUCAS
BEGIN TIP PROJECT B-4610
BEGIN CONSTRUCTION
-L- POC 14+35.00
BM #1
-BL- STA 7+78
110' LEFT
ELEV=541.68'
CLASS B RIP RAP
EST. 2 TONS
EST. 7 SY FF
BEGIN APPROACH SLAB
-L- STA 17+69.00
BEGIN BRIDGE
-L- STA 17+80.00
DECK DRAINS ARE NOT REQUIRED ON STRUCTURE
END BRIDGE
-L- STA 20+20.00
END APPROACH SLAB
-L- STA 20+31.00
-L- PC 21+49.97
-L- PT 24+41.17
END TIP PROJECT B-4610
END CONSTRUCTION
-L- POT 26+00.00
-BL-104
BRANSON MCCAIN
DB 1094 PG 449
FIELD
SPECIAL CUT DITCH
W/ PSRM
EST. 85 SY PSRM
SEE DETAIL A
LATERAL 2' BASE DITCH
W/ PSRM
EST. 74 CY DDE
EST. 76 SY PSRM
SEE DETAIL E
CLASS I RIP RAP
@ EMBANKMENT
EST. 5 TONS
EST. 11 SY FF
SEE DETAIL I
-L- PT 17+09.39
+69 END SBG
ROCK EMBANKMENT & ROCK
PLATING SLOPE PROTECTION
SEE SHEET 2-B (TYP.)
+31 BEGIN SBG
CLASS 'B' RIP RAP
EST. 2 TONS
EST. 7 SY FF
SPECIAL LATERAL
BASE DITCH
SEE DETAIL D
PROPOSED GUARDRAIL
+50 END SBG
TAIL DITCH W/PSRM
SLOPE = 0.5% FOR 50 LF
EST. 40 CY DDE
EST. 105 SY PSRM
SEE DETAIL G
SPECIAL LATERAL
V DITCH W/ PSRM
EST. 121 SY PSRM
SEE DETAIL F
CUT DITCH W/ PSRM
EST. 120 SY PSRM
SEE DETAIL C
50' TAPER LT & RT
N 53° 18' 46.1" W
EXISTING R/W
SR 1518 LAKE LUCAS RD
20' PAVED ROADWAY
BRIDGE NO. 73
WOOD, CONC, & STEEL BRIDGE
W/ PAVED DECK
TYPE III
P-K NAIL
N 36° 32' 40.0" W
CONC EW
GRAU-350
HIGH WATER MARK
ELEV=521.60'
LOCATED FROM FIELD OBSERVATION
ON JUNE 6, 2008
-L- POT 27+02.67
CUT DITCH W/ PSRM
EST. 330 SY PSRM
SEE DETAIL C
WILLIAM WARD &
PATTI WARD
DB 1384 PG 1428
PB 26 PG 43
RETAIN
SR 3225 SYLVAN WAY
20' PAVED ROADWAY
SPECIAL CUT DITCH W/ PSRM
EST. 85 SY PSRM
SEE DETAIL A
TOE PROTECTION
W/PSRM
EST. 37 SY PSRM
SEE DETAIL J
SPECIAL LATERAL DITCH
W/PSRM
EST. 87 SY PSRM
SEE DETAIL F
DAVID JONES &
JANET JONES
DB 1386 PG 18
PB 26 PG 43
CONC PARKING
2 S BK D
-BL-102
CLASS I RIP RAP
@ EMBANKMENT
EST. 20 TONS
EST. 39 SY FF
SEE DETAIL I
PUE
LATERAL V DITCH
W/ CLASS 'B' RIP RAP
EST. 30 TONS
EST. 40 CY DDE
EST. 89 SY FF
SEE DETAIL B
-BL-103
THE SIGRID N. MCCAIN TRUST
DB 1841 PG 1814
DB 1841 PG 1825
DETAIL I
RIP RAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
Filter Fabric
Type of Liner=CLASS I Rip-Rap
FROM STA. 16+50 TO STA. 16+57 -L- LT
FROM STA. 17+25 TO STA. 17+50 -L- RT
DETAIL J
TOE PROTECTION
(Not to Scale)
NG
2:1 OR FLATTER
Fill Slope
d= 1 Ft.
Type of Liner= PSRM
FROM STA. 15+50 TO STA. 16+00 -L- RT
PAVEMENT-BRIDGE RELATIONSHIP SKETCH
TYPE III
8'-5"
3'-5"
33'-10" F-F
LEGEND
PAVED SHOULDER
APPROACH SLAB
PSRM
DETAIL F
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
3:1 or Flatter
Min. D= 1Ft.
Max. d= 1Ft.
Type of Liner= PSRM
FROM STA. 16+00 TO STA. 17+25 -L- RT
FROM STA. 22+25 TO STA. 24+00 -L- LT
DETAIL G
STANDARD BASE DITCH
(Not to Scale)
*When B is < 6.0'
Min. D= 1Ft.
Max. d= 1Ft.
B= 5 Ft. to 20 Ft.
Type of Liner= PSRM
FROM STA. 22+25 -L- LT.
3/15/2010
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Florence & Hutcheson, Inc.

5/14/99

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

PROJECT REFERENCE NO.	SHEET NO.
B-4610	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 16689 ENGINEER BRIAN ALLEN WILES [illegible] 2/9/10	NORTH CAROLINA PROFESSIONAL SEAL 021162 ENGINEER W. HERBERT TURNER, JR. [illegible] 2/9/2010

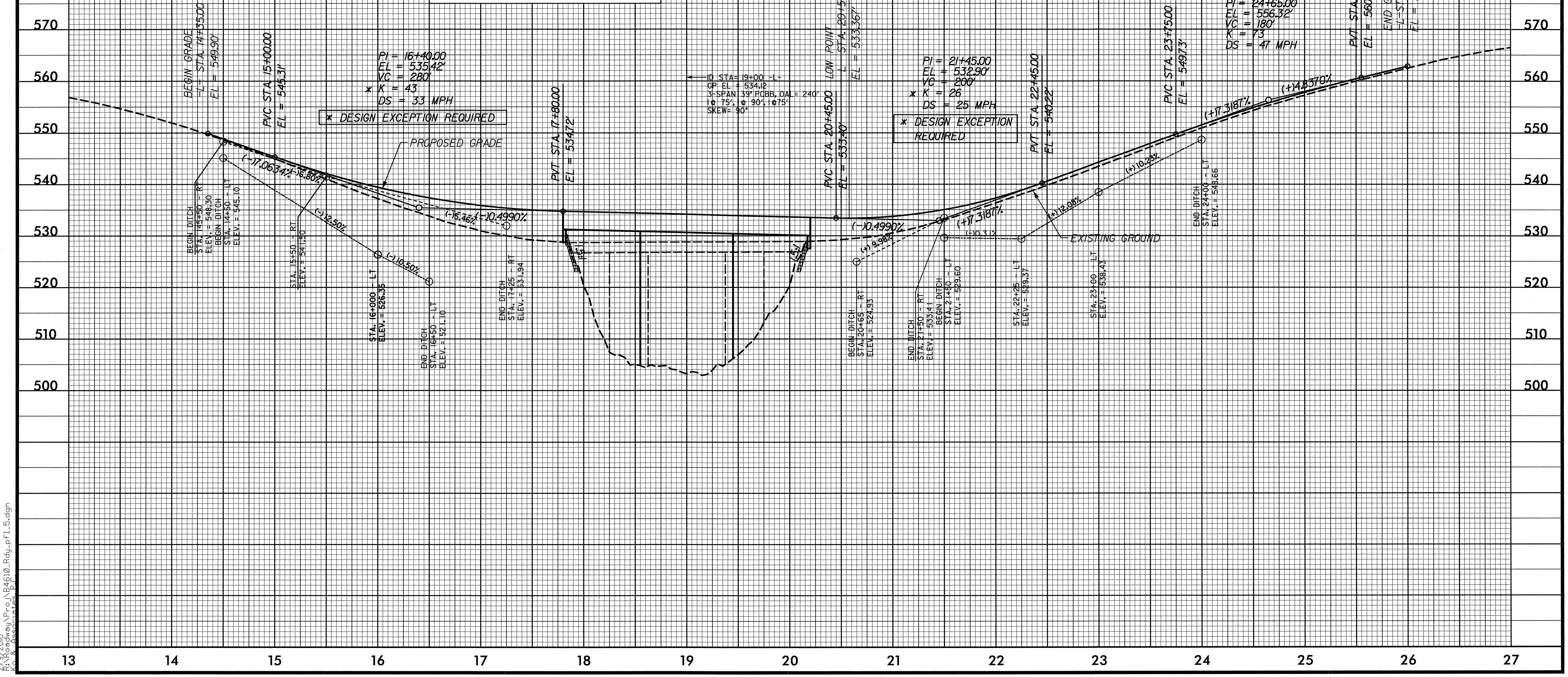
BM*1
rRR SPIKE IN BASE OF 15" PINE TREE
BL STA 7+78 110' LT
-L- STA 14+05.95 78.60' LT
ELEV = 541.68'

-L-

FOR PLAN, SEE SHEET NO. 4

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	2300	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	526.8	FT
BASE DISCHARGE	=	3400	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	528.2	FT
OVERTOPPING DISCHARGE	=	14,000 +/-	CFS
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING ELEVATION	=	533.6	FT
DATE OF SURVEY	=	1/9/2009	
W.S. ELEVATION AT DATE OF SURVEY	=	521.5	FT



2/9/2010
R:\Roadway\Proj\B4610_Rdy_pfl_5.dgn
Ko & Associates, P.C.