

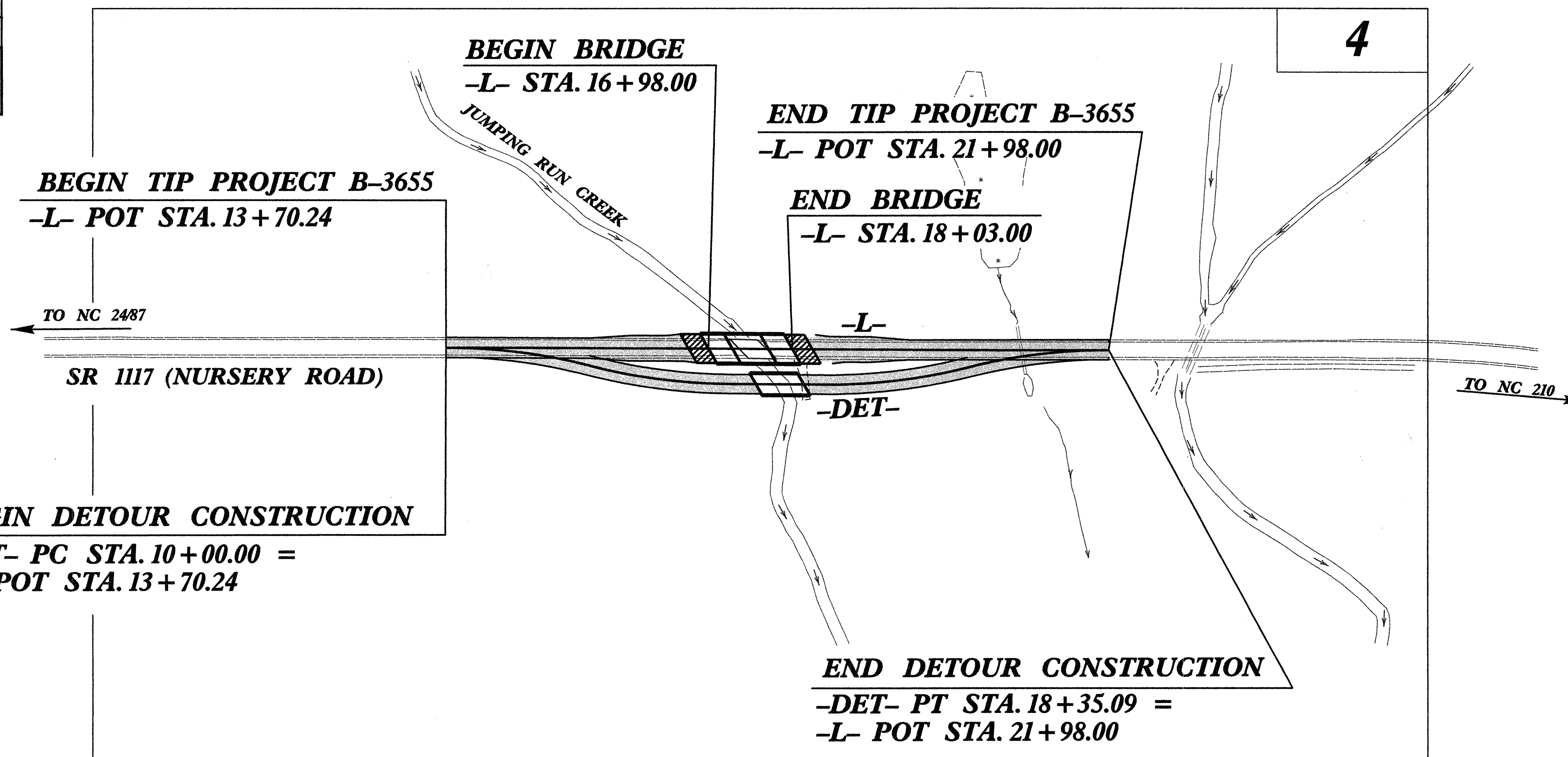
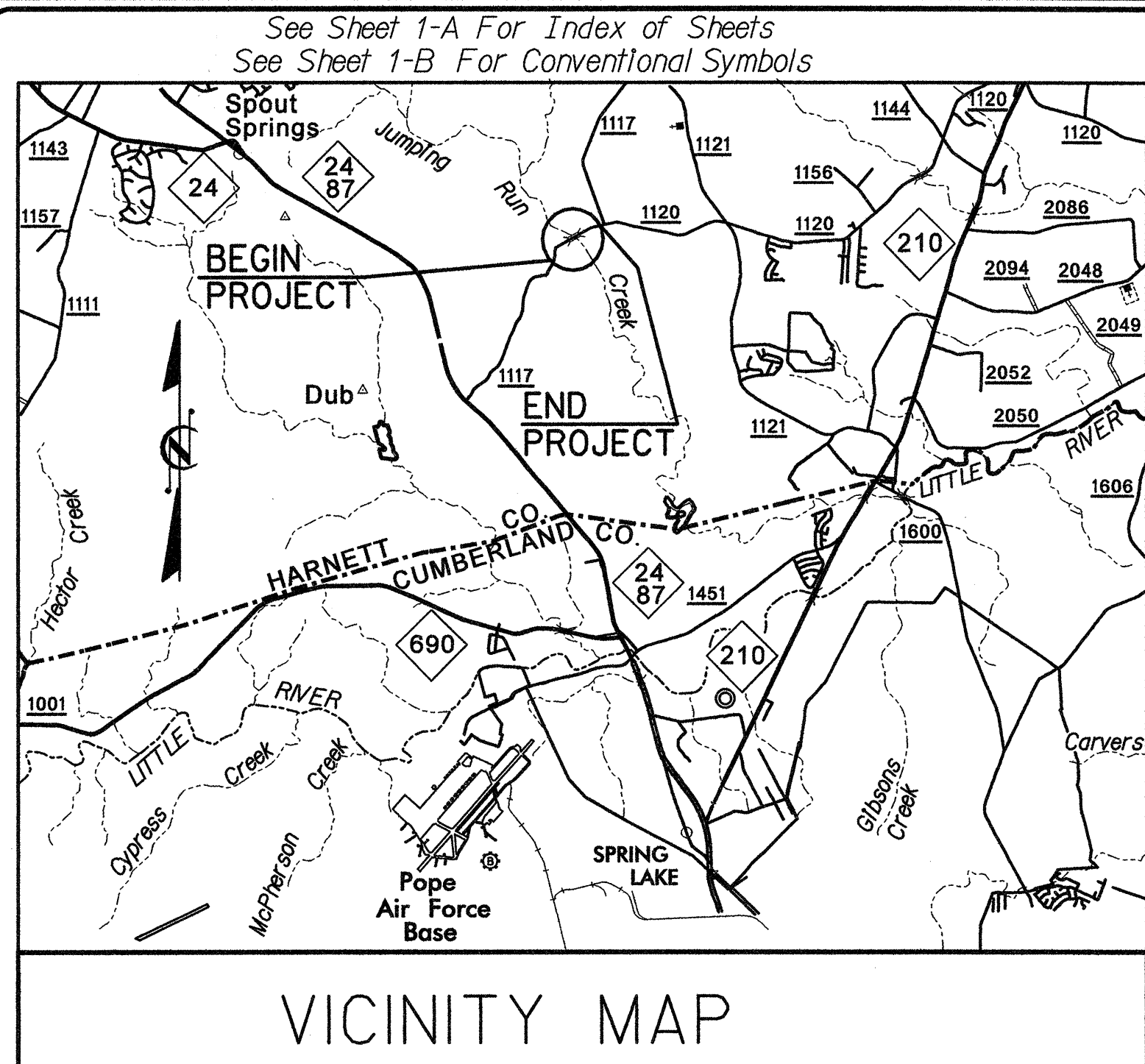
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3655	1	
WBS PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33201.1.1	BRZ-1117(3)	P.E.	
33201.2.1	BRZ-1117(3)	R /W & UTIL.	
33201.3.1	BRZ-1117(3)	CONST.	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HARNETT COUNTY**

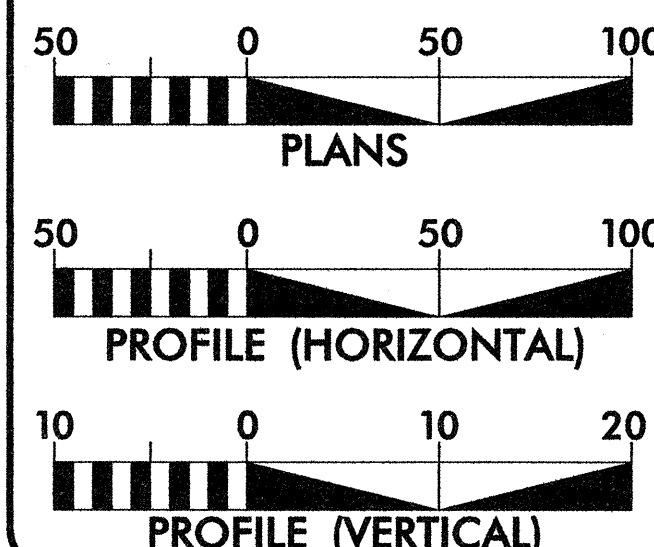
LOCATION: BRIDGE NO. 59 OVER JUMPING RUN CREEK  
ON SR 1117 (NURSERY ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING &  
STRUCTURE



NCDOT CONTACT: CATHY HOUSER, P.E.  
ROADWAY DESIGN - ENGINEERING COORDINATION

GRAPHIC SCALES



DESIGN DATA

ADT 2009 = 5800  
ADT 2029 = 9800  
DHV = 9 %  
D = 65 %  
T = 4 % \*  
V = 60 MPH  
\* TTST 1% DUAL 3%  
FUNC. CLASS = RURAL MINOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3655 = 0.137 MI.  
LENGTH STRUCTURE TIP PROJECT B-3655 = 0.020 MI.  
TOTAL LENGTH OF TIP PROJECT B-3655 = 0.157 MI.

Prepared in the Office of:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
5121 Kingdom Way, Suite 100 Raleigh, NC 27607  
919.851.6066

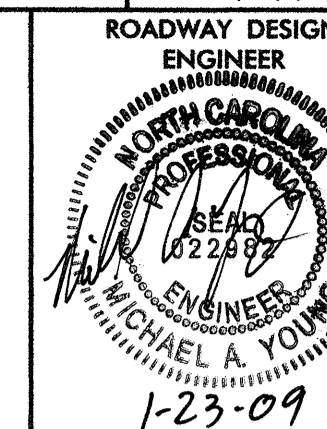
2006 STANDARD SPECIFICATIONS  
RIGHT OF WAY DATE:  
NOVEMBER 16, 2007  
LETTING DATE:  
AUGUST 18, 2009

MICHAEL A. YOUNG, PE  
PROJECT ENGINEER  
DAVID C. WALLER, PE  
PROJECT DESIGN ENGINEER

HYDRAULIC ENGINEER  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 21162  
W. [Signature] P.E. 1-23-09  
SIGNATURE:  
ROADWAY DESIGN ENGINEER  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 022982  
MICHAEL A. YOUNG  
SIGNATURE: [Signature] 1-23-09

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA  
STATE HIGHWAY DESIGN ENGINEER  
P.E.  
[Signature]

CONTRACT: C202092 TIP PROJECT: B-3655



# 2006 ROADWAY STANDARD DRAWINGS

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

## INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	Title Sheet
1-A	Index of Sheets, General Notes and List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
2 thru 2-A	Typical Sections, Wedging Detail and Pavement Schedule
2-B	Plan Sheet for Temporary Detour
2-C	Anchorage for Frames Detail
2-D	Guardrail Anchor Unit Type III Modified for Post and Beam Rail
2-E	Standard Temporary Shoring Detail
3	Summary of Quantities
3-A	Summary of Earthwork
3-B	Summaries of Drainage and Guardrail
3-C	Summary of Pavement Removal
4	Plan Sheet
5	Profile Sheet
TCP-1 thru TCP-6	Traffic Control Plans
EC-1 thru EC-6	Erosion Control Plans
RF-1	Reforestation Plan
U0-1 thru U0-2	Utility by Others
X-1	Cross Section Summary Sheet
X-2 thru X-5	Cross Sections
S-1 thru S-22	Structure Plans

## GENERAL NOTES:

**GENERAL NOTES:** 2006 SPECIFICATIONS  
EFFECTIVE: 07-18-06  
REVISED: 07-30-08

**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 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 NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

**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 HARNETT COUNTY DEPT. OF PUBLIC UTILITIES, SOUTH RIVER EMC, & EMBARQ.  
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

### 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
<b>DIVISION 2 - EARTHWORK</b>	
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
<b>DIVISION 3 - PIPE CULVERTS</b>	
300.01	Method of Pipe Installation - Method 'A'
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.10	Reinforced Bridge Approach Fills
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
<b>DIVISION 8 - INCIDENTALS</b>	
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.04	Drainage Ditches with Class 'B' Rip Rap

8/17/99

8/2/2009  
C:\Roadway\Pr-j\B3655\_Rdy\_tsh.dgn

3/15/06

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	○
Property Corner	⊗
Property Monument	□
Parcel/Sequence Number	⑫③
Existing Fence Line	—x—x—x—
Proposed Woven Wire Fence	—○—
Proposed Chain Link Fence	—□—
Proposed Barbed Wire Fence	—◇—
Existing Wetland Boundary	—WLB—
Proposed Wetland Boundary	—WLB—
Existing Endangered Animal Boundary	—EAB—
Existing Endangered Plant Boundary	—EPB—

### BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	⊙
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	—
False Sump	—

### RAILROADS:

Standard Gauge	_____
RR Signal Milepost	○
Switch	□
RR Abandoned	_____
RR Dismantled	_____

### RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	_____
Proposed Right of Way Line	—R/W—
Proposed Right of Way Line with Iron Pin and Cap Marker	—R/W—▲
Proposed Right of Way Line with Concrete or Granite Marker	—R/W—▲
Existing Control of Access	⊙
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—

### 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—
Proposed Wheel Chair Ramp Curb Cut	—WCC—
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	—

### EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	—CONC—
Bridge Wing Wall, Head Wall and End Wall	—CONC WW—
MINOR:	
Head and End Wall	—CONC HW—
Pipe Culvert	—
Footbridge	—
Drainage Box: Catch Basin, DI or JB	—CB—
Paved Ditch Gutter	—
Storm Sewer Manhole	⊙
Storm Sewer	—S—

### UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊙
Power Line Tower	⊗
Power Transformer	⊗
U/G Power Cable Hand Hole	⊕
H-Frame Pole	—
Recorded U/G Power Line	—P—
Designated U/G Power Line (S.U.E.*)	—P—

### TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊙
Telephone Booth	⊕
Telephone Pedestal	⊕
Telephone Cell Tower	⊕
U/G Telephone Cable Hand Hole	⊕
Recorded U/G Telephone Cable	—T—
Designated U/G Telephone Cable (S.U.E.*)	—T—
Recorded U/G Telephone Conduit	—TC—
Designated U/G Telephone Conduit (S.U.E.*)	—TC—
Recorded U/G Fiber Optics Cable	—T FO—
Designated U/G Fiber Optics Cable (S.U.E.*)	—T FO—

### WATER:

Water Manhole	⊙
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
Recorded U/G Water Line	—
Designated U/G Water Line (S.U.E.*)	—
Above Ground Water Line	—A/G Water—

### TV:

TV Satellite Dish	⊕
TV Pedestal	⊕
TV Tower	⊗
U/G TV Cable Hand Hole	⊕
Recorded U/G TV Cable	—TV—
Designated U/G TV Cable (S.U.E.*)	—TV—
Recorded U/G Fiber Optic Cable	—TV FO—
Designated U/G Fiber Optic Cable (S.U.E.*)	—TV FO—

### GAS:

Gas Valve	◇
Gas Meter	⊕
Recorded U/G Gas Line	—G—
Designated U/G Gas Line (S.U.E.*)	—G—
Above Ground Gas Line	—A/G Gas—

### SANITARY SEWER:

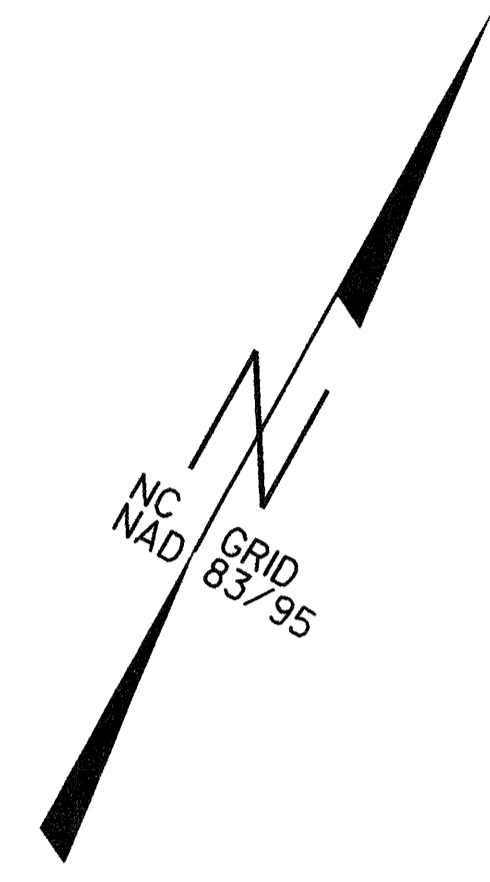
Sanitary Sewer Manhole	⊙
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	—SS—
Above Ground Sanitary Sewer	—A/G Sanitary Sewer—
Recorded SS Forced Main Line	—FSS—
Designated SS Forced Main Line (S.U.E.*)	—FSS—

### MISCELLANEOUS:

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

# SURVEY CONTROL SHEET B-3655

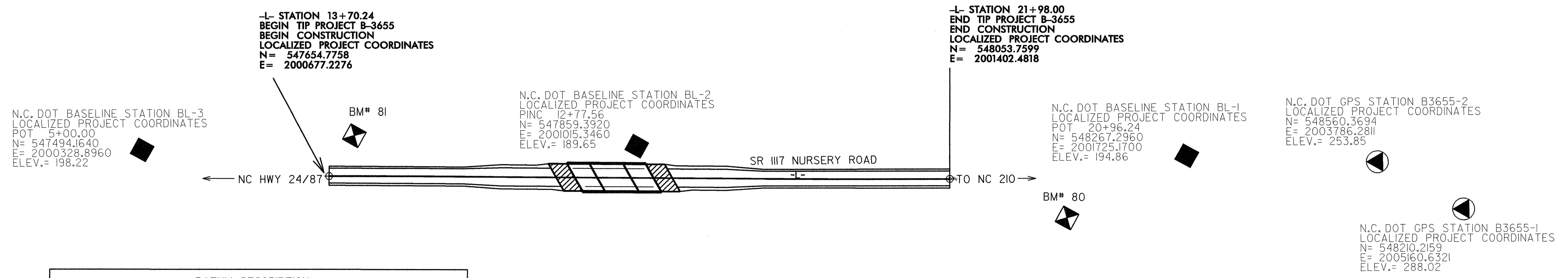
6/2/99



BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
3	B3655 BL-3	547494.1640	2000328.8960	198.22	OUTSIDE PROJECT LIMITS	
2	B3655 BL-2	547859.3920	2001015.3460	189.65	17+65.08	16.53 LT
1	B3655 BL-1	548267.2960	2001725.1700	194.86	OUTSIDE PROJECT LIMITS	

\*\*\*\*\*  
 BM80 ELEVATION = 190.96  
 N 548081 E 2001566  
 L STATION 23+54 55 RIGHT  
 R/R SPIKE IN BASE OF 15INCH PINE  
 \*\*\*\*\*

\*\*\*\*\*  
 BMB1 ELEVATION = 191.71  
 N 547720 E 2000680  
 L STATION 14+04 55 LEFT  
 R/R SPIKE IN BASE OF 15INCH PINE  
 \*\*\*\*\*



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "COOK"

WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 555019.5264(++) EASTING: 1979425.6245(++)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: .9998709000

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "COOK" TO -L- STATION 13+70.24 IS

S70°53'10"E 22,491.56'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88

**NOTES:**

I. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.NCDOT.ORG/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/preconstruct/highway/location/project/)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 B3655\_LS\_CONTROL\_070430.TXT

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

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

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.  
 NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION  
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

**NOTE: DRAWING NOT TO SCALE**

1/22/2009 11:22:00 AM \\proj\proj\3655\_1s\_1c\_070430.dgn

6/2/99

PAVEMENT SCHEDULE

A	CONCRETE OVERLAY (STRUCTURE PAY ITEM)	P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
C	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. (RESURFACING)	T	EARTH MATERIAL.
C1	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.	U	EXISTING PAVEMENT.
E	PROP. APPROX. 5 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT
J	PROP. 6" AGGREGATE BASE COURSE.		

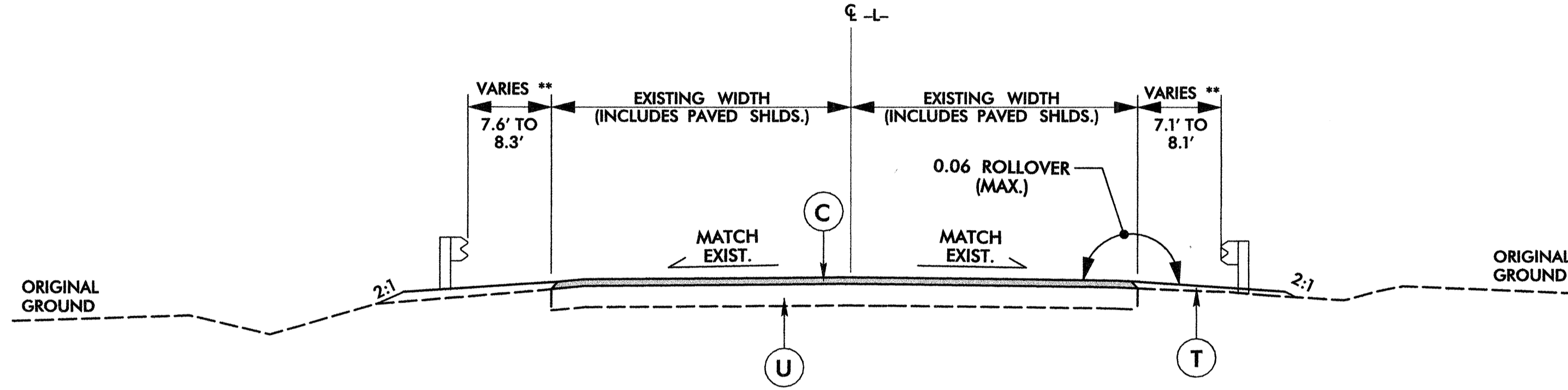
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 5121 KINGDOM WAY, SUITE 100 RALEIGH, N.C. 27607  
 (919) 851-6666

PROJECT REFERENCE NO. B-3655	SHEET NO. 2
ROADWAY DESIGN ENGINEER MICHAEL A. YOUNG 1-23-09	PAVEMENT DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 22896 1-23-09

TRANSITION FROM EXISTING TO T.S. NO. 1  
 -L- STA. 13+70.24 TO 13+85.24

USE TYPICAL SECTION NO. 1  
 -L- STA. 13+85.24 TO 15+50.00  
 -L- STA. 19+50.00 TO 21+83.00



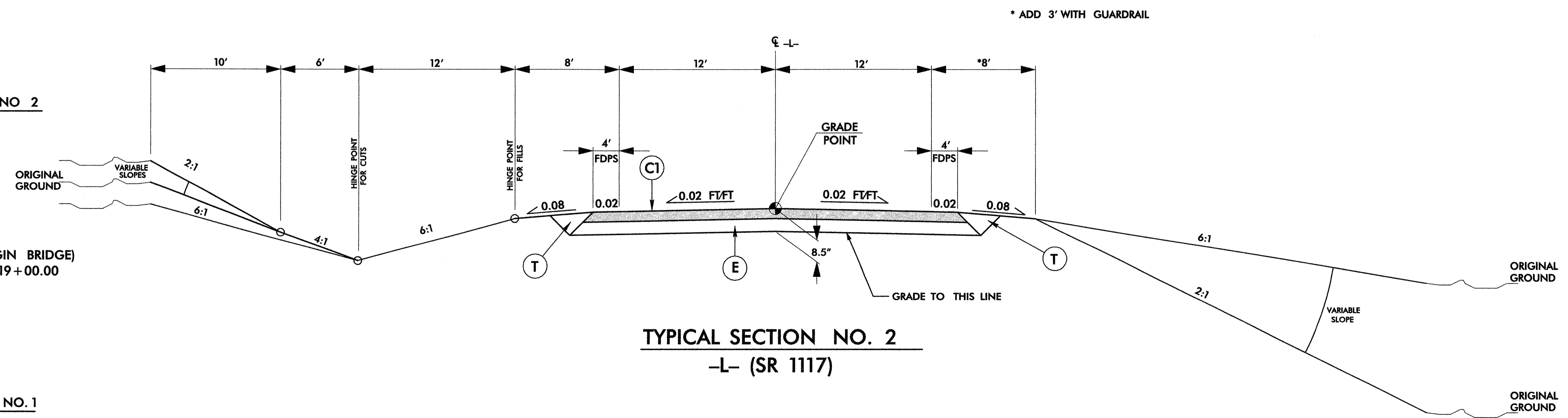
\*\* SHOULDER IMPROVEMENTS REQUIRED, AS SHOWN, ONLY WHEN PLACING GUARDRAIL

TYPICAL SECTION NO. 1  
 -L- (SR 1117)

TRANSITION FROM T.S. NO. 1 TO EXISTING  
 -L- STA. 21+83.00 TO 21+98.00

TRANSITION FROM T.S. NO. 1 TO T.S. NO. 2  
 -L- STA. 15+50.00 TO 16+00.00

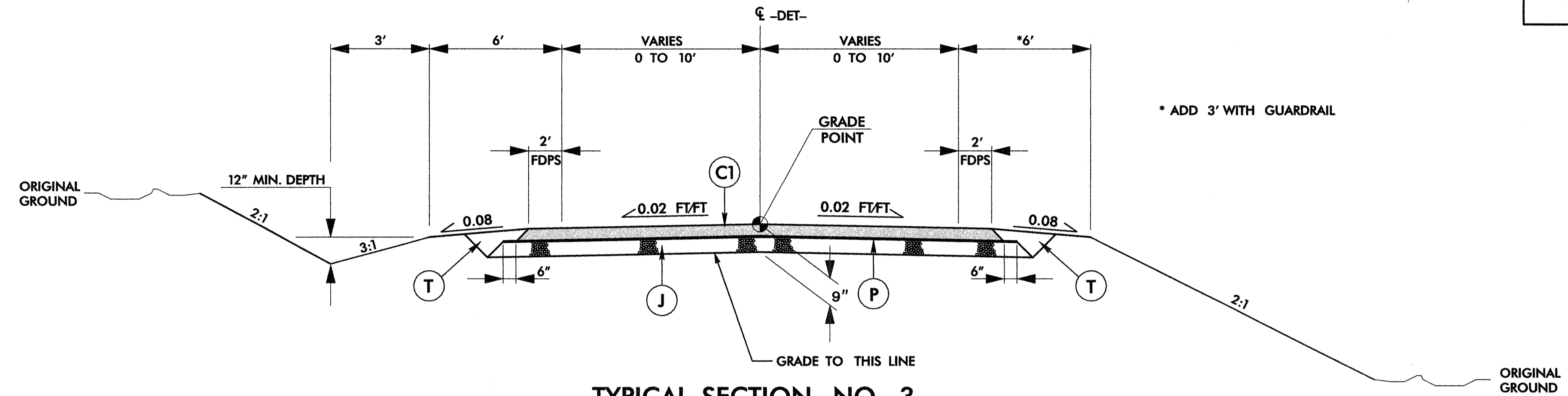
USE TYPICAL SECTION NO. 2  
 -L- STA. 16+00.00 TO 16+98.00 (BEGIN BRIDGE)  
 -L- STA. 18+03.00 (END BRIDGE) TO 19+00.00



TYPICAL SECTION NO. 2  
 -L- (SR 1117)

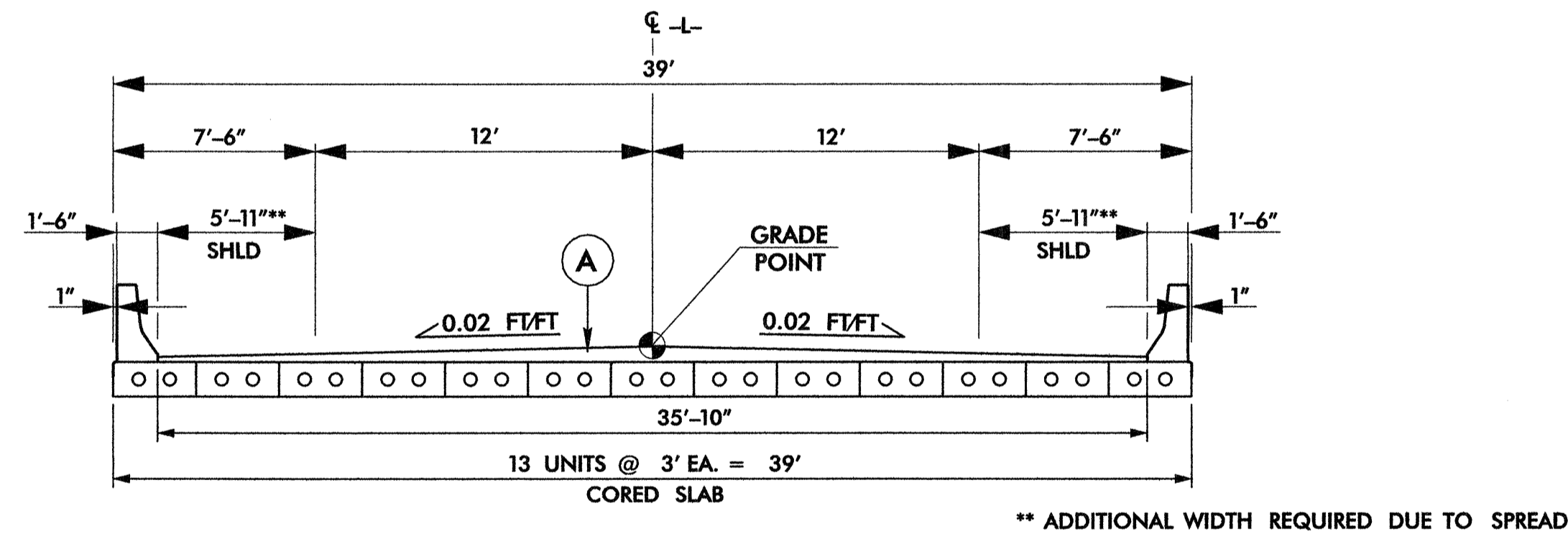
TRANSITION FROM T.S. NO. 2 TO T.S. NO. 1  
 -L- STA. 19+00.00 TO 19+50.00

1/2/2009 10:00 AM P:\c\B3655\_Rdy\_tup.dgn  
 KO & ASSOCIATES, P.C.



**TYPICAL SECTION NO. 3**  
 -DET- (TEMP. DETOUR)

USE TYPICAL SECTION NO. 3  
 -DET- STA. 10+00.00 TO 13+91.00 (BEGIN BRIDGE)  
 -DET- STA. 14+51.00 (END BRIDGE) TO 18+35.09



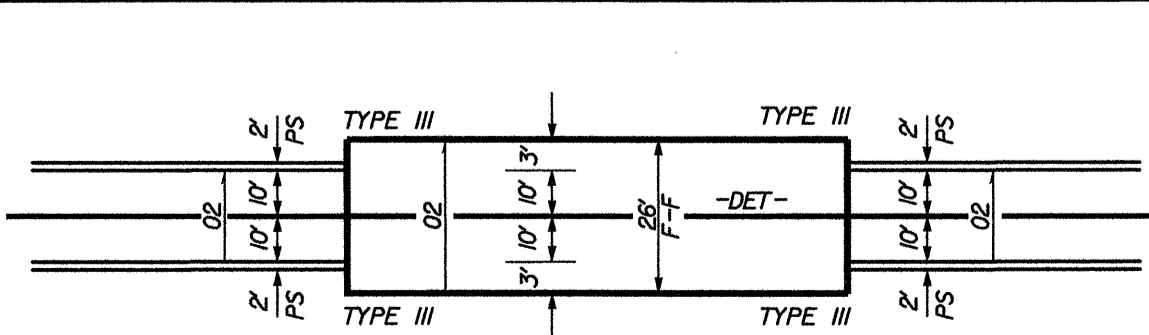
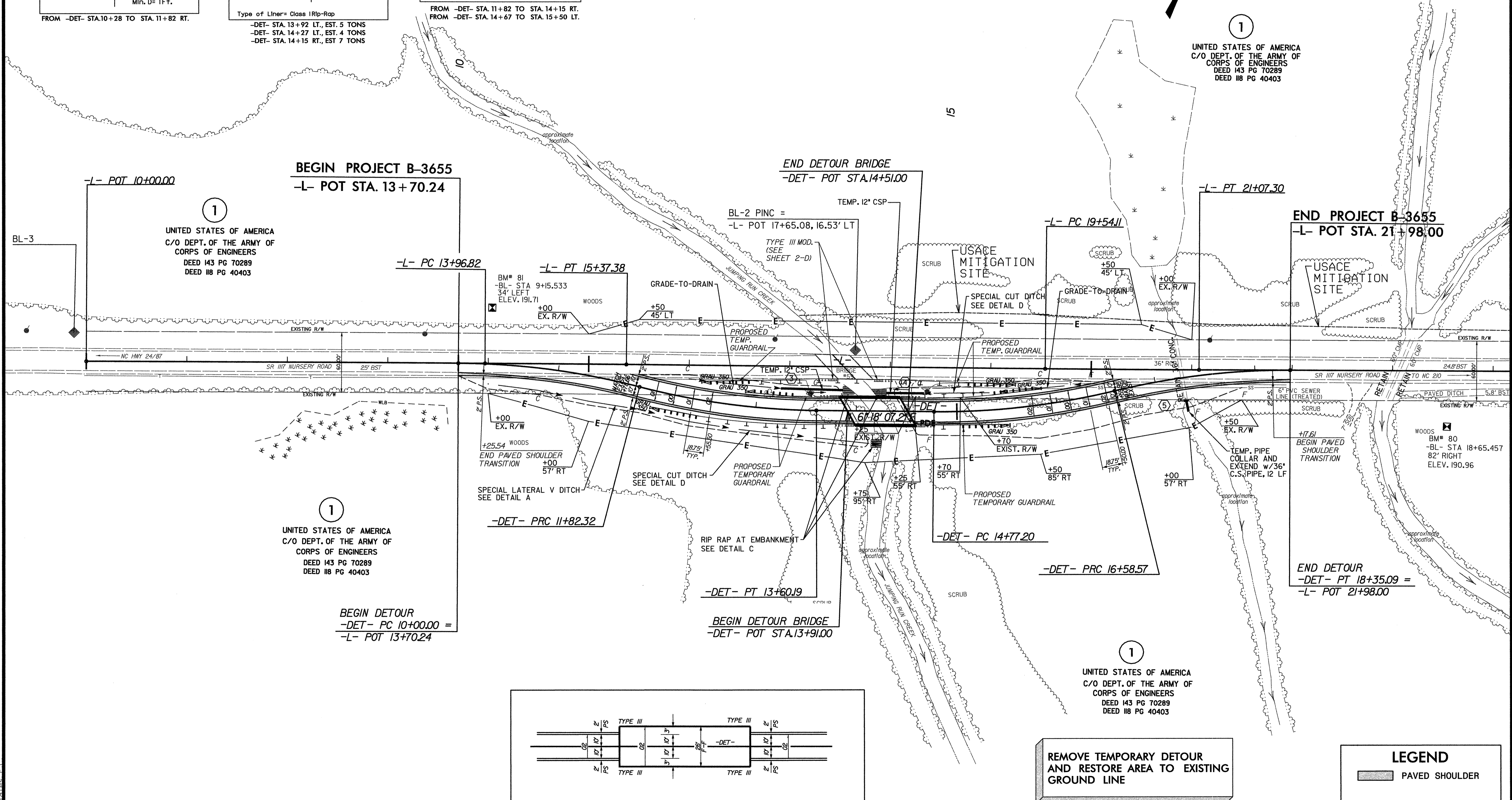
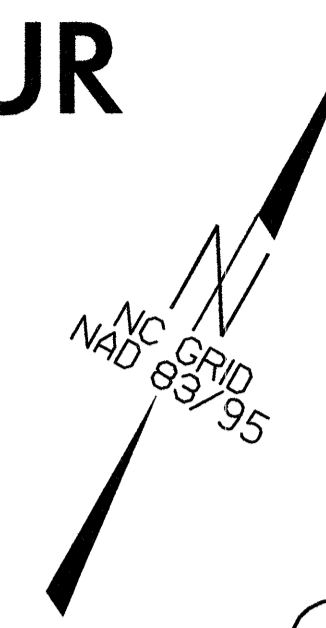
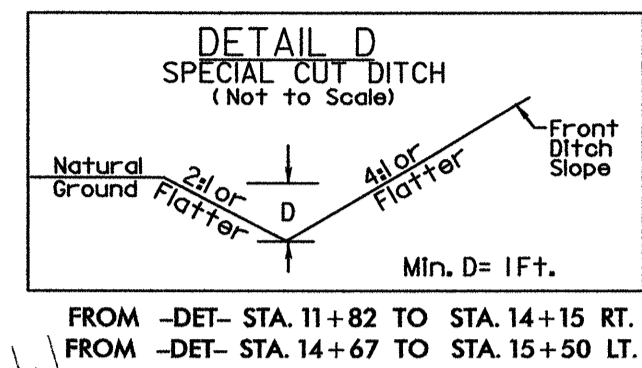
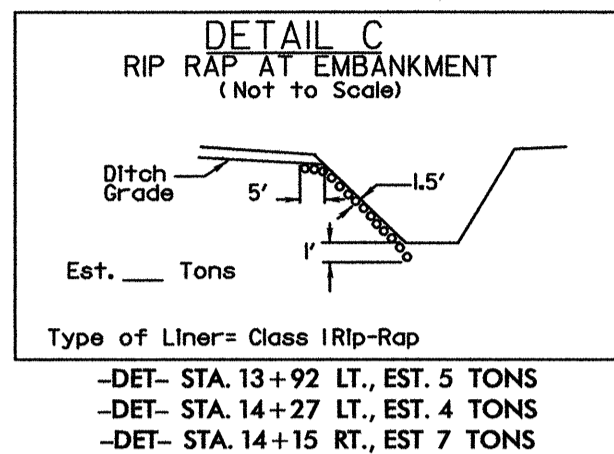
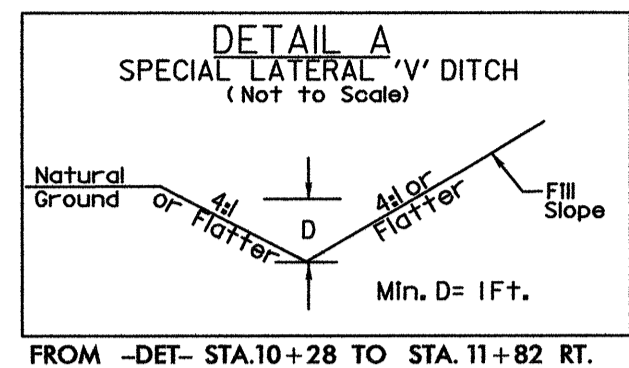
**TYPICAL SECTION NO. 4**  
 -L- (SR 1117)

USE TYPICAL SECTION NO. 4  
 -L- STA. 16+98.00 TO 18+03.00

# TEMPORARY DETOUR

-DET-

PI Sta 10+91.64 Δ = 14° 24' 29.5" (RT) D = 7' 54" 10.3" L = 182.32' T = 91.64' R = 725.00'	PI Sta 12+71.70 Δ = 14° 03' 24.5" (LT) D = 7' 54" 10.3" L = 177.87' T = 89.38' R = 725.00'	PI Sta 15+68.36 Δ = 14° 19' 59.1" (LT) D = 7' 54" 10.3" L = 181.37' T = 91.64' R = 725.00'	PI Sta 17+47.27 Δ = 13° 57' 00.4" (RT) D = 7' 54" 10.3" L = 176.52' T = 88.70' R = 725.00'
---	---	---	---



PAVEMENT - BRIDGE RELATIONSHIP SKETCH

**REMOVE TEMPORARY DETOUR  
 AND RESTORE AREA TO EXISTING  
 GROUND LINE**



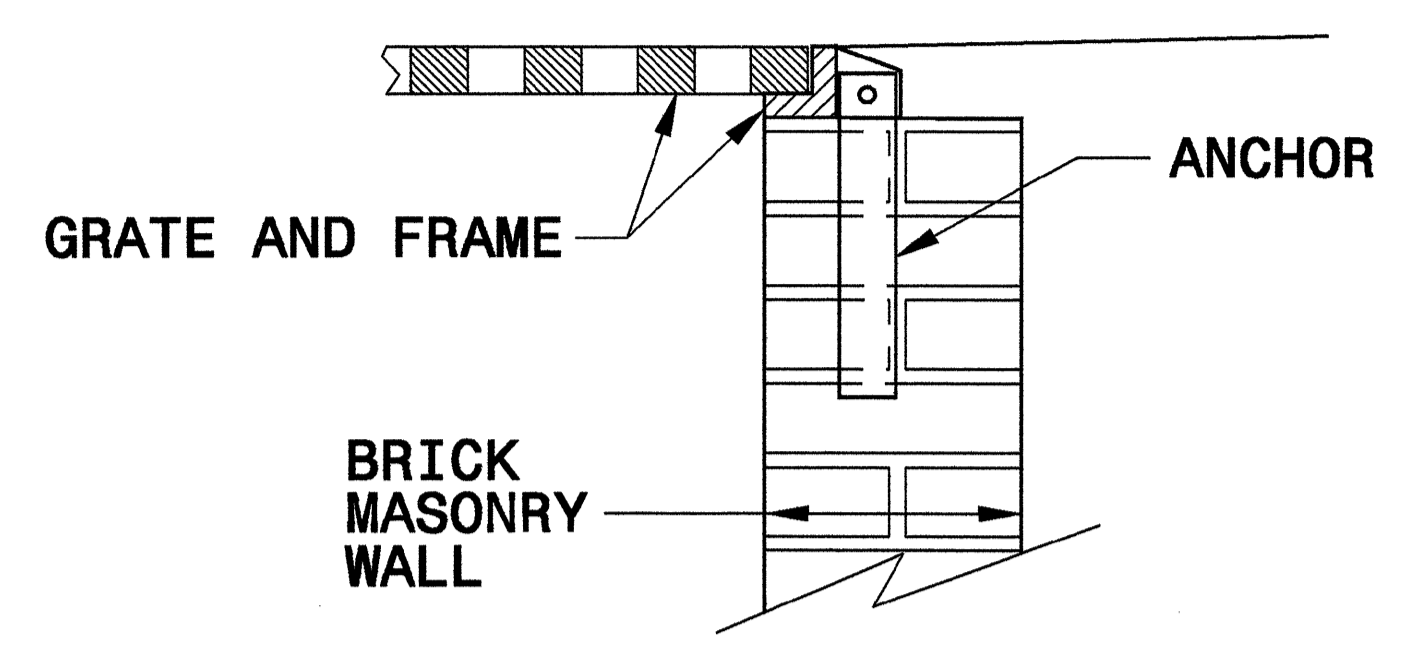
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-22.  
 FOR -DET- PROFILE, SEE SHEET NO. 5

5/14/09  
 2/3/2009  
 R:\Roadway\Projects\B3655\_Rdy\_dtl\_det.dgn

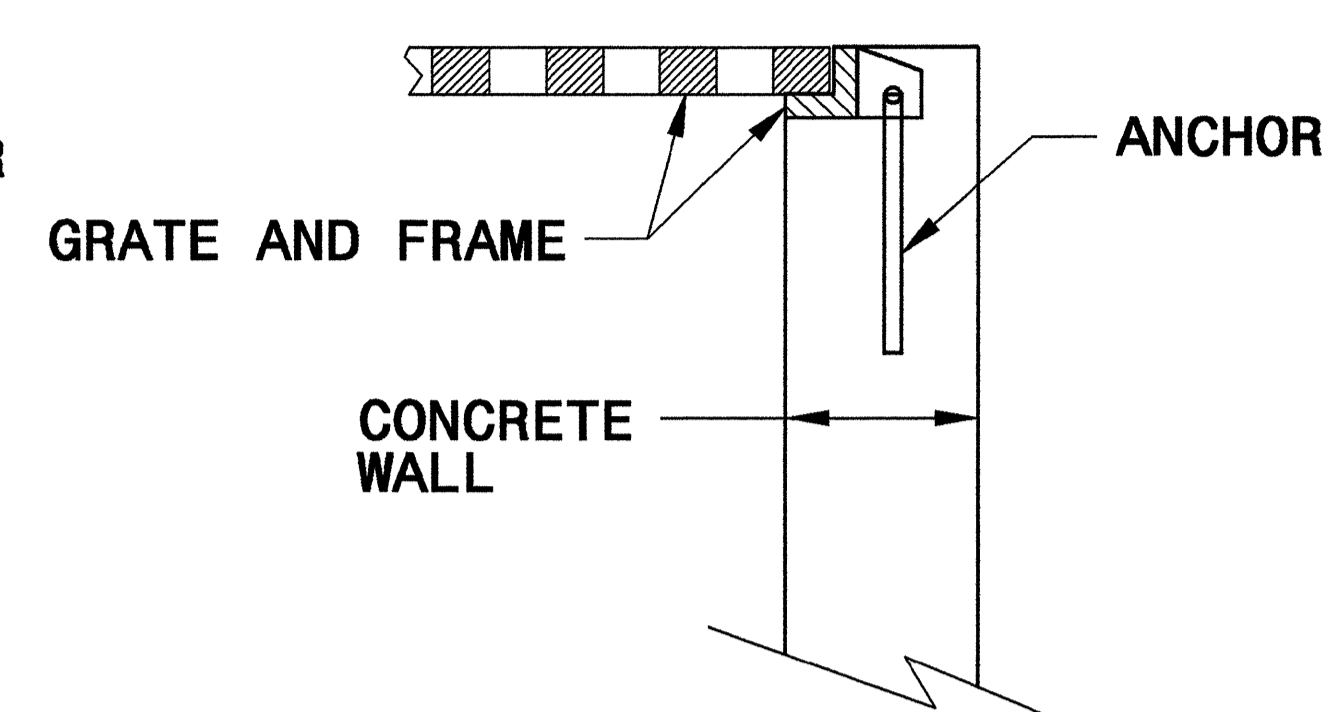
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

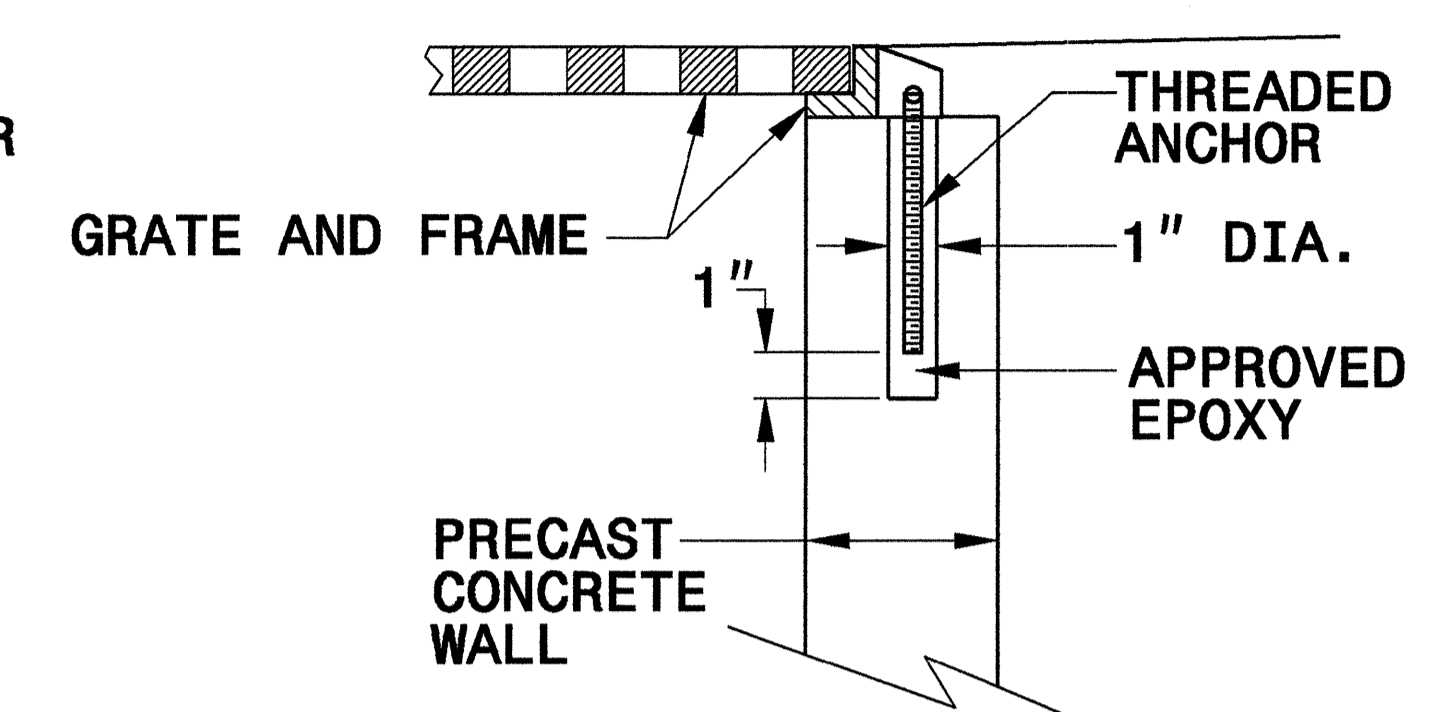
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



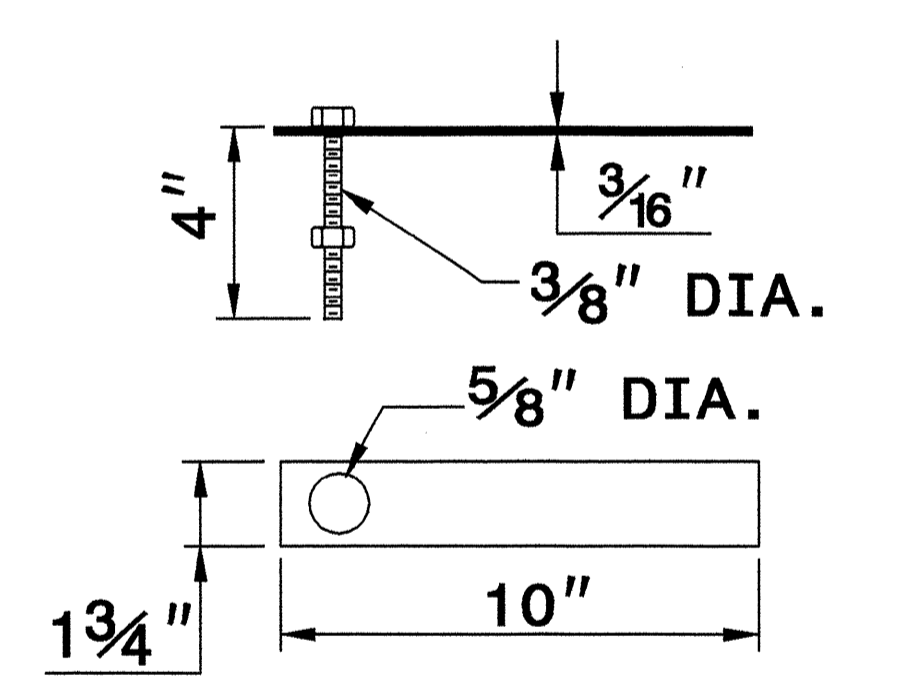
**CONCRETE CONSTRUCTION**



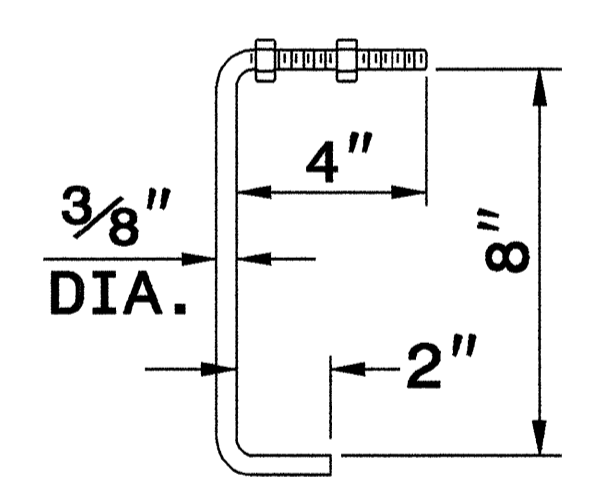
**PRECAST CONCRETE CONSTRUCTION**

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

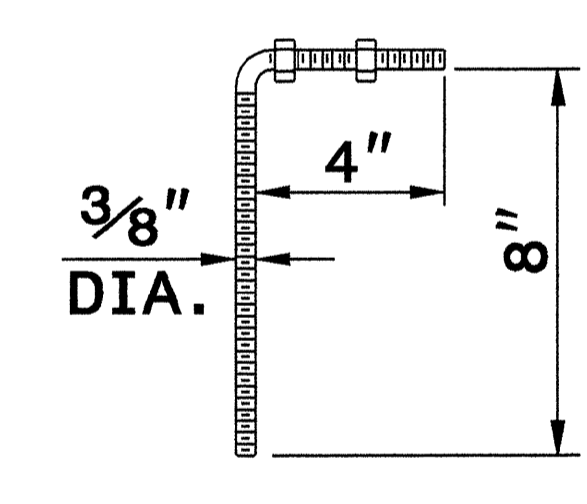
NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



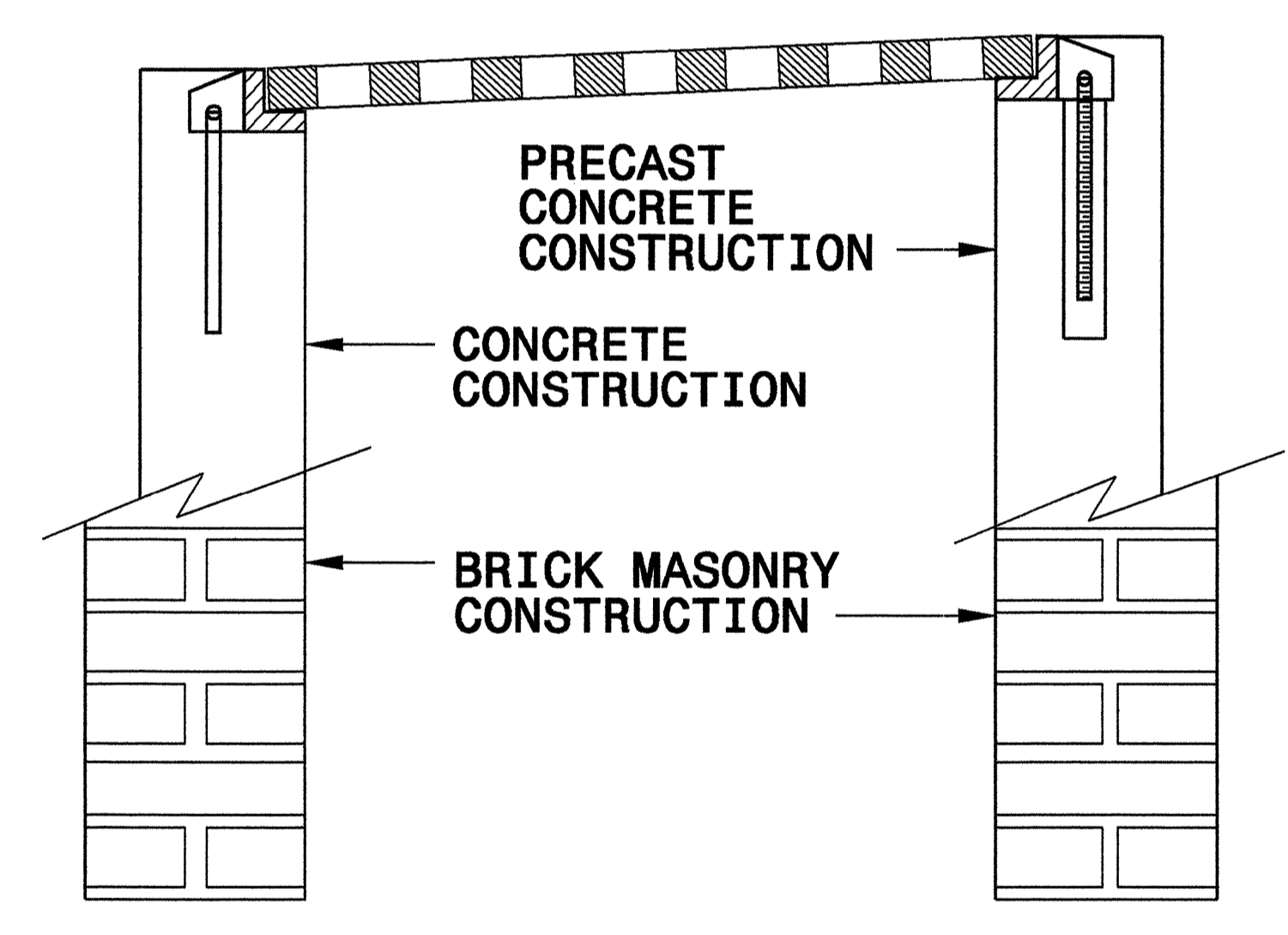
**MASONRY ANCHOR**  
3/8" DIA. BOLT WITH PLATE



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



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



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

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

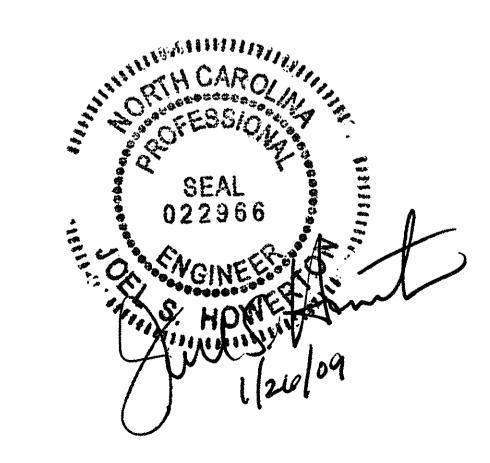
ENGLISH DETAIL DRAWING FOR  
**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1  
**840D25**

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

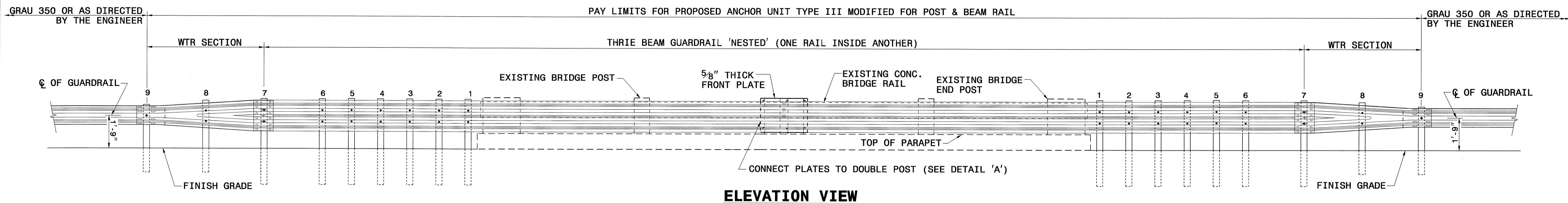
**SEE PLATE FOR TITLE**

ORIGINAL BY: 2006 STD 840.25	DATE: 07/18/06
MODIFIED BY: E.E. WARD	DATE: 9/25/06
CHECKED BY:	DATE:
FILE SPEC.:	

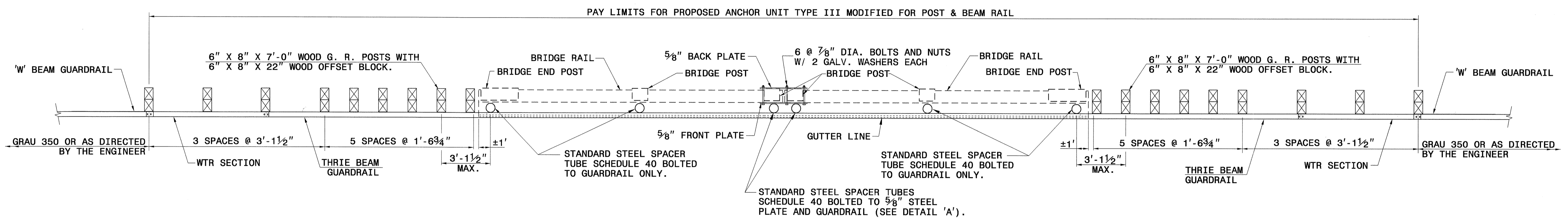


27-SEP-2006 08:59  
S:\Contracts\Contractors\Special Details\enward\stds\06\Std to Special Details\840D25 Anchorage for Frames\0840d25.dgn  
enward A1 P3222293

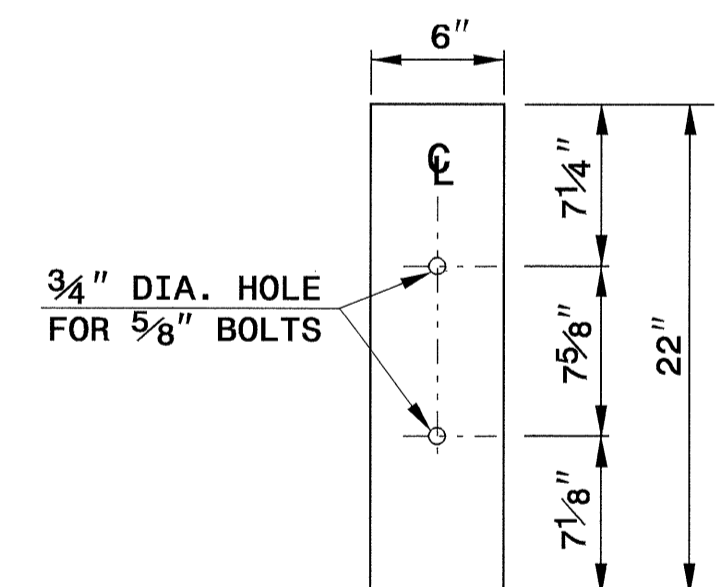




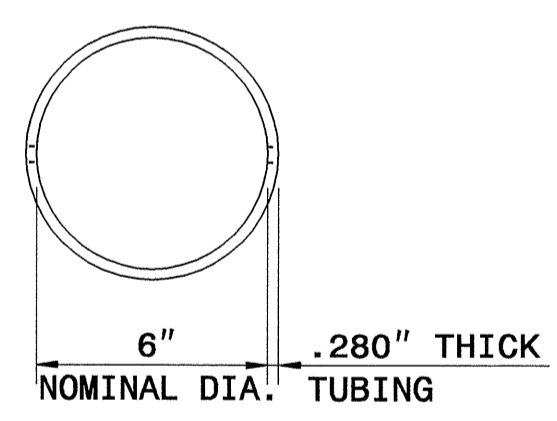
**ELEVATION VIEW**



**PLAN VIEW**

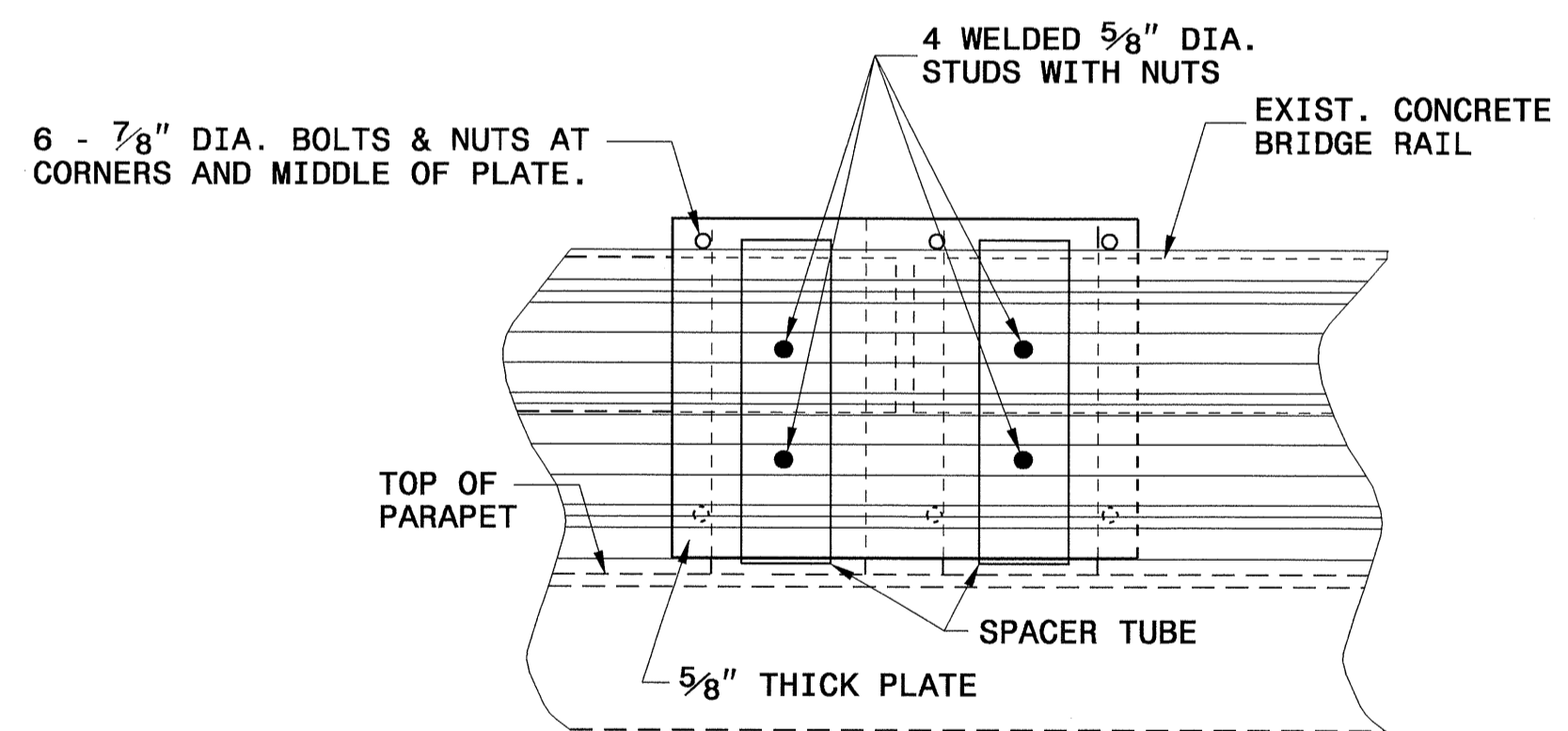


**FRONT VIEW**

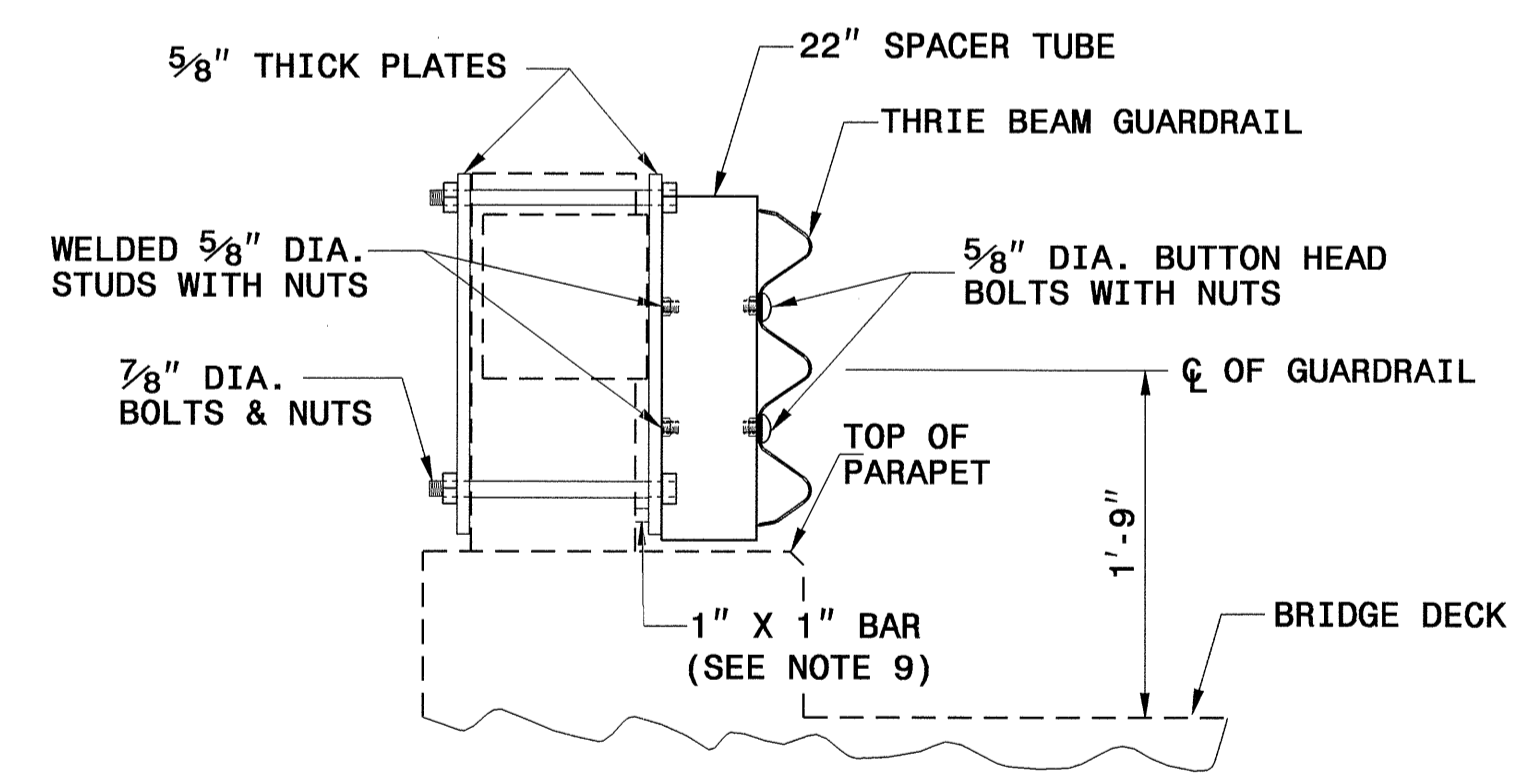


**PLAN VIEW**

**STEEL SPACER TUBE**



**ELEVATION VIEW**

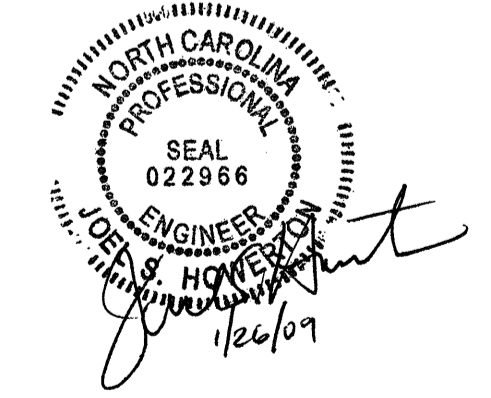


**SECTION VIEW**

**DETAIL 'A'  
GUARDRAIL ATTACHMENT  
TO BRIDGE POST**

**GENERAL NOTES:**

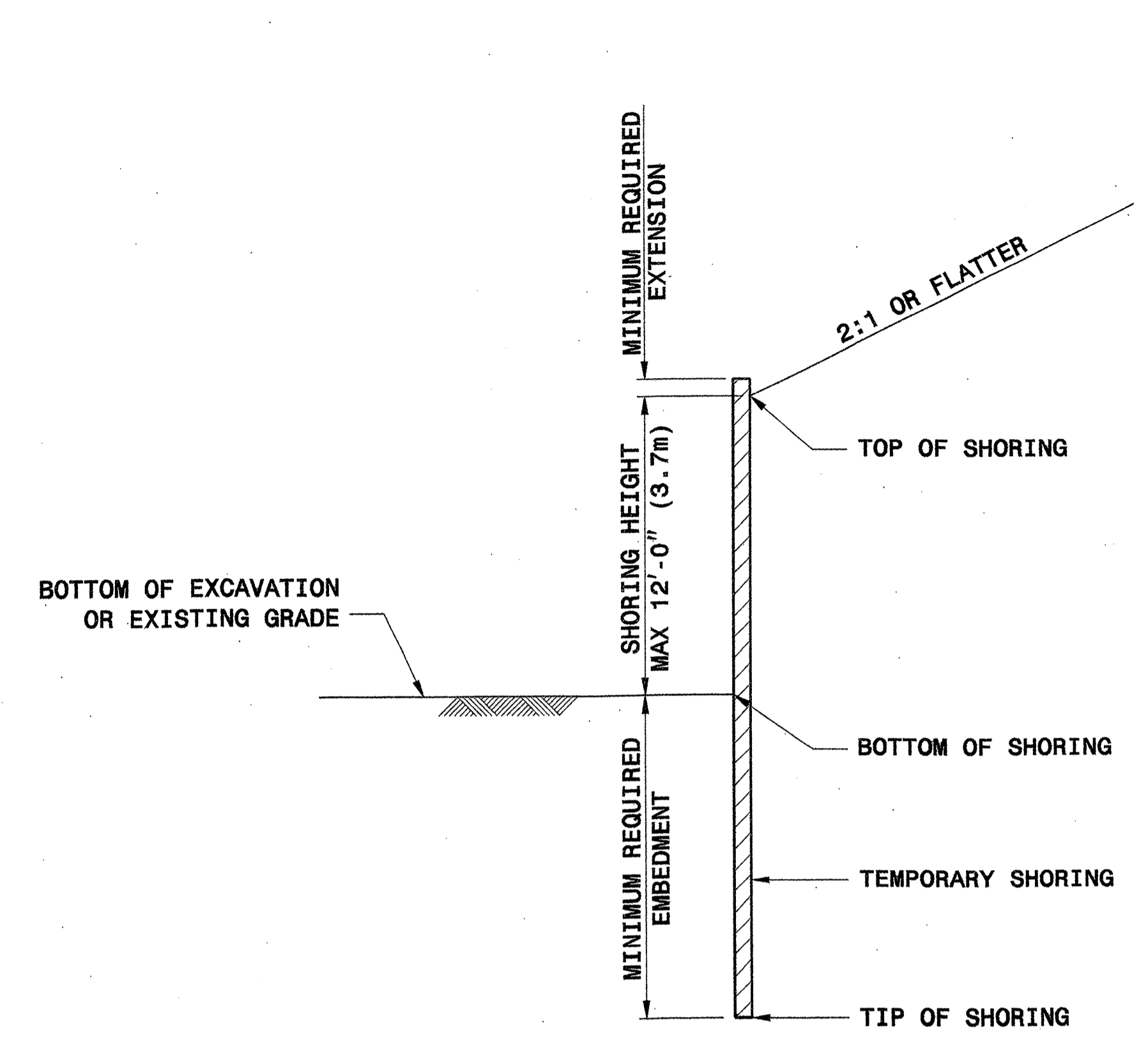
1. USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
2. TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
3. USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
4. ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
5. INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE WITH SPACER TUBE OR AS DIRECTED BY THE ENGINEER.
6. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
7. USE THIS DETAIL ONLY FOR BRIGES WITH POST AND BEAM TYPE RAIL.
8. ATTACH 1" X 1" BAR AND THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
9. 1" X 1" BAR MAY NOT BE NEEDED ON BRIDGE RAILS WHERE FACE OF RAIL DOES NOT PROJECT BEYOND FACE OF POST.
10. PROVIDE SHOP DRAWINGS OF THE PLATES TO THE ENGINEER FOR APPROVAL BEFORE FABRICATING THE PLATES.
11. LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
12. SEE ROADWAY STARDARD DRAWING 862.03 SHEET 5 FOR ADDITIONAL INFORMATION ON THE TYPE III ANCHOR UNIT



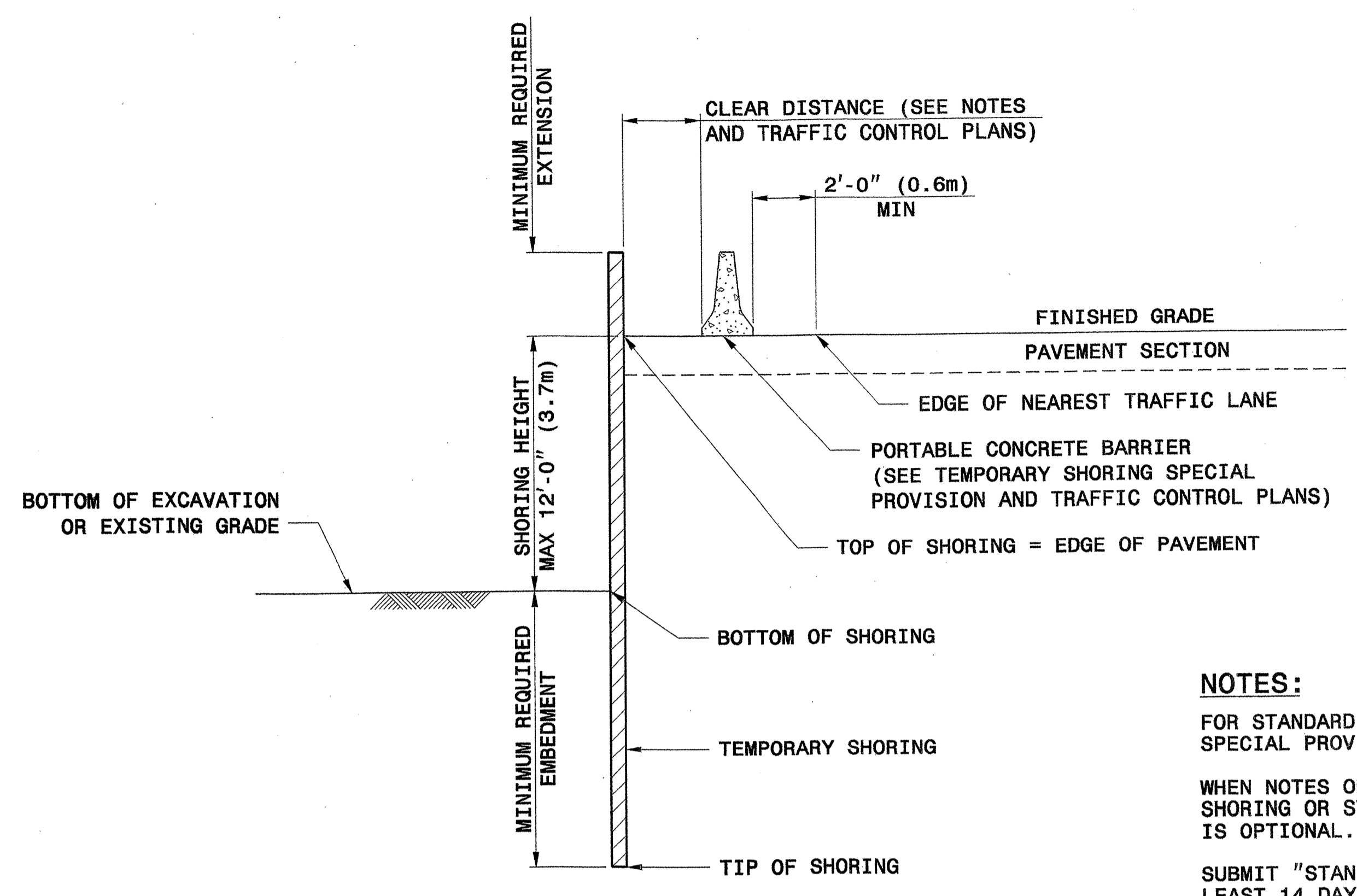
**PROJECT SERVICES UNIT  
STANDARDS AND SPECIAL DESIGN**  
Office 919-250-4128 FAX 919-250-4119

**GUARDRAIL ANCHOR UNIT  
TYPE III MODIFIED  
FOR POST & BEAM RAIL**

ORIGINAL BY: E.E. WARD DATE: 03-06  
 MODIFIED BY: DATE:   
 CHECKED BY: DATE: 12/16/08  
 FILE SPEC: \usr\details\stand\bp111 original.dgn



**SLOPE CASE**



**SURCHARGE CASE**

**NOTES:**

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.  
 WHEN NOTES ON PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING OR STANDARD SHORING, STANDARD TEMPORARY SHORING IS OPTIONAL.  
 SUBMIT "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 14 DAYS BEFORE BEGINNING SHORING CONSTRUCTION. UP TO THREE LOCATIONS MAY BE INCLUDED ON EACH SELECTION FORM.

- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING CONDITIONS:
- 1) MAXIMUM SHORING HEIGHT IS 12'-0" (3.7m).
  - 2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
  - 3) BOTTOM OF EXCAVATION OR EXISTING GRADE IN FRONT OF SHORING IS 6:1 (H:V) SLOPE OR FLATTER.
  - 4) H PILE SPACING IS 6'-0" (1.8m).
  - 5) H PILE EMBEDMENT DEPTHS ARE FOR DRIVEN PILES.
  - 6) TIMBER LAGGING IS A MINIMUM OF 3" (75mm) THICK.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
 TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M<sup>3</sup>)  
 FRICTION ANGLE = 30 DEGREES  
 COHESION = 0 PSF (0 KPA)  
 GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT WITHIN THE EMBEDMENT DEPTH.

VERIFY GROUNDWATER ELEVATION BEFORE BEGINNING SHORING CONSTRUCTION.

IF THE CLEAR DISTANCE AVAILABLE IS LESS THAN THE MINIMUM REQUIRED IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS, SET THE BARRIER AGAINST THE TRAFFIC SIDE OF THE SHORING AND USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT".

AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF THE SHORING. COLLECT AND DIRECT RUNOFF AWAY FROM SHORING.

CONTACT THE ENGINEER IF MINIMUM REQUIRED EMBEDMENT IS NOT ACHIEVED.

GROUNDWATER CONDITION	SHORING HEIGHT FT (m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN <sup>3</sup> /FT (cm <sup>3</sup> /m)	H PILES WITH TIMBER LAGGING			MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN <sup>3</sup> /FT (cm <sup>3</sup> /m)	H PILES WITH TIMBER LAGGING		
				HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)			HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)
GROUNDWATER ELEVATION BELOW TIP OF SHORING	< 6 (1.8)	7.5 (2.3)	3.0 (161)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	11.0 (3.4)	10.0 (538)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)
	7 (2.1)	8.5 (2.6)	4.5 (242)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)	12.0 (3.7)	12.0 (645)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)
	8 (2.4)	10.0 (3.0)	6.5 (349)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)	12.5 (3.8)	14.0 (753)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)
	9 (2.7)	11.0 (3.4)	9.5 (511)	--	12.0 (3.7)	12.0 (3.7)	13.5 (4.1)	16.5 (887)	--	12.5 (3.8)	12.5 (3.8)
	10 (3.0)	12.5 (3.8)	13.0 (699)	--	--	13.5 (4.1)	14.0 (4.3)	19.5 (1048)	--	13.5 (4.1)	13.5 (4.1)
	11 (3.4)	13.5 (4.1)	17.0 (914)	--	--	14.5 (4.4)	15.0 (4.6)	22.5 (1210)	--	--	14.5 (4.4)
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND TIP OF SHORING	< 6 (1.8)	11.5 (3.5)	4.5 (242)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)	16.0 (4.9)	12.0 (645)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)
	7 (2.1)	13.0 (4.0)	7.0 (376)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)	17.0 (5.2)	14.5 (780)	14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
	8 (2.4)	15.0 (4.6)	10.0 (538)	--	15.0 (4.6)	15.0 (4.6)	18.0 (5.5)	17.0 (914)	--	15.5 (4.7)	15.5 (4.7)
	9 (2.7)	17.0 (5.2)	14.0 (753)	--	17.0 (5.2)	17.0 (5.2)	19.0 (5.8)	20.0 (1075)	--	17.0 (5.2)	17.0 (5.2)
	10 (3.0)	18.5 (5.6)	19.5 (1048)	--	--	18.5 (5.6)	20.0 (6.1)	23.5 (1263)	--	--	18.5 (5.6)
	11 (3.4)	20.5 (6.3)	26.0 (1398)	--	--	--	21.0 (6.4)	28.0 (1505)	--	--	20.0 (6.1)
	12 (3.7)	22.5 (6.9)	33.0 (1774)	--	--	--	22.0 (6.7)	33.0 (1774)	--	--	21.5 (6.6)

NOTE: MINIMUM REQUIRED EXTENSION IS 6" (150mm) FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" (800 mm) FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".

**GEOTECHNICAL ENGINEERING UNIT**  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD DRAWING NO. 1801.01  
**STANDARD TEMPORARY SHORING**  
 DATE: 2-20-07

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202092

ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION	235500000-N	840	2	EA	FRAME WITH GRATE, STD 840.29	468500000-E	1205	1,350	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING	255600000-E	846	30	LF	SHOULDER BERM GUTTER	468600000-E	1205	1,350	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (17+50.50)	303000000-E	862	550	LF	STEEL BM GUARDRAIL	481000000-E	1205	14,528	LF	PAINT PAVEMENT MARKING LINES (4")
004300000-N	226	Lump Sum		GRADING	315000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS	485000000-E	1205	3,000	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING	327000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350	490000000-N	1251	11	EA	PERMANENT RAISED PAVEMENT MARKERS
005700000-E	226	250	CY	UNDERCUT EXCAVATION	331700000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77	600000000-E	1605	1,000	LF	TEMPORARY SILT FENCE
013400000-E	240	10	CY	DRAINAGE DITCH EXCAVATION	338000000-E	862	387.5	LF	TEMPORARY STEEL BM GUARDRAIL	600600000-E	1610	100	TON	STONE FOR EROSION CONTROL, CLASS A
019500000-E	265	250	CY	SELECT GRANULAR MATERIAL	338700000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** TEMPORARY (III MODIFIED)	600900000-E	1610	225	TON	STONE FOR EROSION CONTROL, CLASS B
019600000-E	270	250	SY	FABRIC FOR SOIL STABILIZATION	338700000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** TEMPORARY (III)	601200000-E	1610	125	TON	SEDIMENT CONTROL STONE
019900000-E	SP	340	SF	TEMPORARY SHORING	338910000-N	SP	6	EA	GUARDRAIL ANCHOR UNITS, TYPE 350 TEMPORARY	601500000-E	1615	3	ACR	TEMPORARY MULCHING
031800000-E	300	20	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS	362800000-E	876	20	TON	RIP RAP, CLASS I	601800000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING
036600000-E	310	48	LF	15" RC PIPE CULVERTS, CLASS III	364900000-E	876	50	TON	RIP RAP, CLASS B	602100000-E	1620	1.5	TON	FERTILIZER FOR TEMPORARY SEEDING
057600000-E	310	100	LF	*** CS PIPE CULVERTS, ***** THICK (12", 0.064")	365600000-E	876	375	SY	FILTER FABRIC FOR DRAINAGE	602400000-E	1622	75	LF	TEMPORARY SLOPE DRAINS
057600000-E	310	12	LF	*** CS PIPE CULVERTS, ***** THICK (36", 0.079")	365900000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON	602700000-N	1622	2	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
099500000-E	340	112	LF	PIPE REMOVAL	440000000-E	1110	128	SF	WORK ZONE SIGNS (STATIONARY)	602900000-E	SP	425	LF	SAFETY FENCE
112100000-E	520	570	TON	AGGREGATE BASE COURSE	440500000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)	603000000-E	1630	350	CY	SILT EXCAVATION
122000000-E	545	100	TON	INCIDENTAL STONE BASE	441000000-E	1110	36	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)	603600000-E	1631	2,000	SY	MATTING FOR EROSION CONTROL
127500000-E	600	535	GAL	PRIME COAT	443000000-N	1130	20	EA	DRUMS	603700000-E	SP	30	SY	COIR FIBER MAT
133000000-E	607	50	SY	INCIDENTAL MILLING	443500000-N	1135	15	EA	CONES	603800000-E	SP	200	SY	PERMANENT SOIL REINFORCEMENT MAT
148900000-E	610	380	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	444500000-E	1145	48	LF	BARRICADES (TYPE III)	604200000-E	1632	225	LF	1/4" HARDWARE CLOTH
151900000-E	610	530	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	445000000-N	1150	1,920	HR	FLAGGER	607103000-E	SP	500	LF	COIR FIBER BAFFLES
156000000-E	620	50	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22	448000000-N	1165	2	EA	TMIA	607105000-E	SP	5	EA	*** SKIMMER (1-1/2")
225300000-E	840	0.76	CY	PIPE COLLARS	451600000-N	1180	15	EA	SKINNY DRUM	608400000-E	1660	5	ACR	SEEDING & MULCHING
228600000-N	840	2	EA	MASONRY DRAINAGE STRUCTURES	465000000-N	1251	63	EA	TEMPORARY RAISED PAVEMENT MARKERS	608700000-E	1660	1.5	ACR	MOWING
										609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
										609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
										609600000-E	1662	75	LB	SEED FOR SUPPLEMENTAL SEEDING
										610800000-E	1665	1.75	TON	FERTILIZER TOPDRESSING
										611400000-N	SP	5	HR	SPECIALIZED HAND MOWING
										611700000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
										612300000-E	1670	0.7	ACR	REFORESTATION

# DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

## SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
<b>SUMMARY NO. 1</b>					
-L- 13+70.24 TO 16+98.00	37		110	73	0
<b>TOTAL SUMMARY NO. 1</b>	<b>37</b>		<b>110</b>	<b>73</b>	<b>0</b>
<b>SUMMARY NO. 2</b>					
-L- 18+03.00 TO 21+98.00	28		184	156	0
<b>TOTAL SUMMARY NO. 2</b>	<b>28</b>		<b>184</b>	<b>156</b>	<b>0</b>
<b>SUMMARY NO. 3</b>					
-DET- (-L- 13+70.24 TO 17+57.74)	236		146	0	90
<b>TOTAL SUMMARY NO. 3</b>	<b>236</b>		<b>146</b>	<b>0</b>	<b>90</b>
<b>SUMMARY NO. 4</b>					
-DET- (-L- 18+17.68 TO 21+98.00)	122		925	803	0
<b>TOTAL SUMMARY NO. 4</b>	<b>122</b>		<b>925</b>	<b>803</b>	<b>0</b>
<b>SUB-TOTAL SUMMARY NOS. 1 THRU 4</b>	<b>423</b>		<b>1365</b>	<b>1032</b>	<b>90</b>
EST. BORROW IN LIEU OF WASTE				-90	-90
<b>PROJECT SUB-TOTAL</b>	<b>423</b>		<b>1365</b>	<b>942</b>	<b>0</b>
<b>SUMMARY NO. 5 (REMOVAL)</b>					
-DET- (-L- 13+70.24 TO 17+57.74)	110		183	73	0
<b>TOTAL SUMMARY NO. 5</b>	<b>110</b>		<b>183</b>	<b>73</b>	<b>0</b>
<b>SUMMARY NO. 6 (REMOVAL)</b>					
-DET- (-L- 18+17.68 TO 21+98.00)	740		0	0	740
<b>TOTAL SUMMARY NO. 6</b>	<b>740</b>		<b>0</b>	<b>0</b>	<b>740</b>
<b>SUB-TOTAL SUMMARY NOS. 5 THRU 6</b>	<b>850</b>		<b>183</b>	<b>73</b>	<b>740</b>
<b>PROJECT TOTAL</b>	<b>1273</b>		<b>1548</b>	<b>1015</b>	<b>740</b>
EST. 5% FOR REPLACING TOPSOIL IN BORROW PITS				51	
<b>GRAND TOTALS</b>	<b>1273</b>		<b>1548</b>	<b>1066</b>	<b>740</b>
SAY	1300			1100	

ESTIMATE DDE = 10 CY  
 ESTIMATE UNDERCUT EXCAVATION = 250 CY  
 SELECT GRANULAR MATERIAL = 250 CY  
 ESTIMATE FABRIC FOR SOIL STABILIZATION = 250 SY

**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."

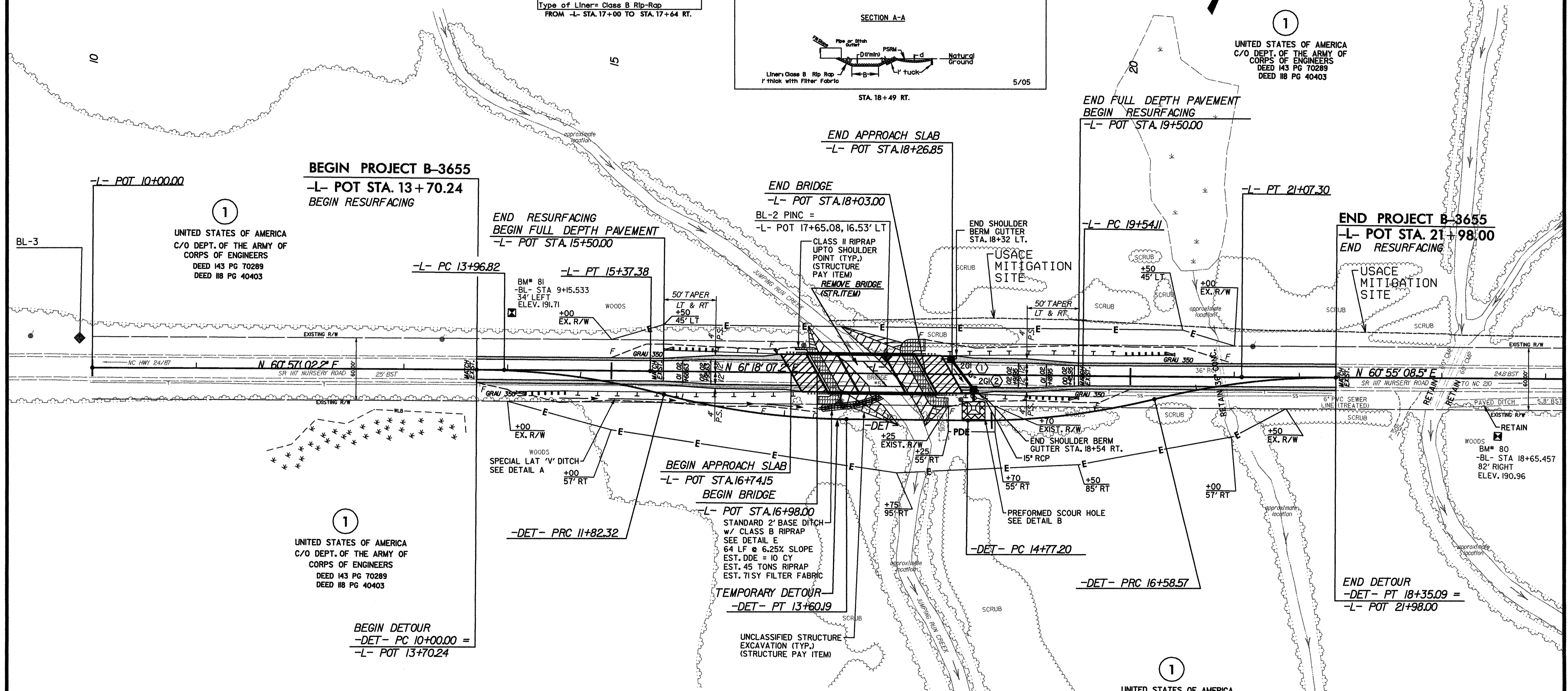
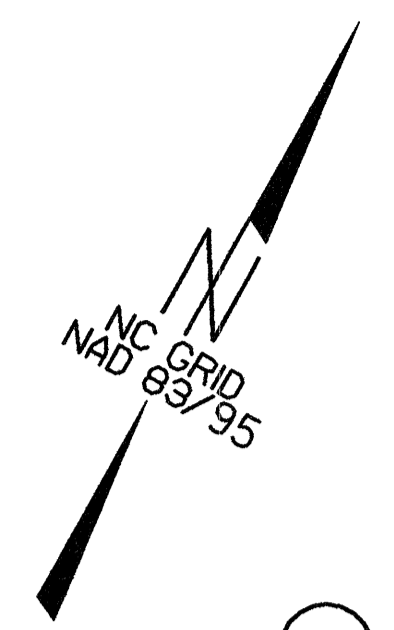
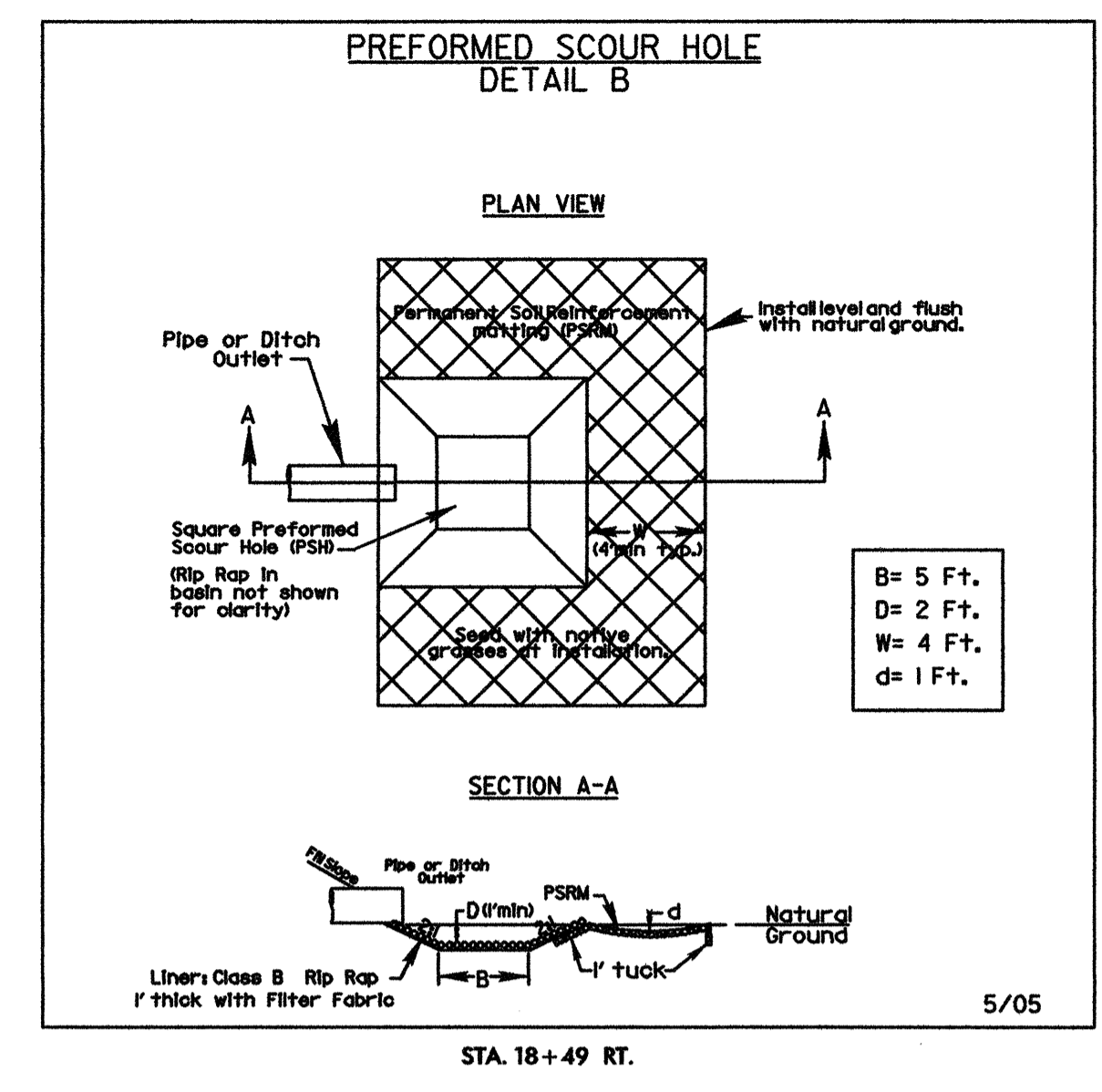
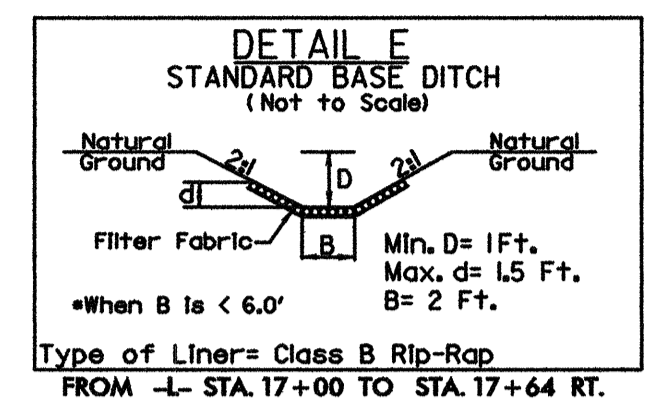
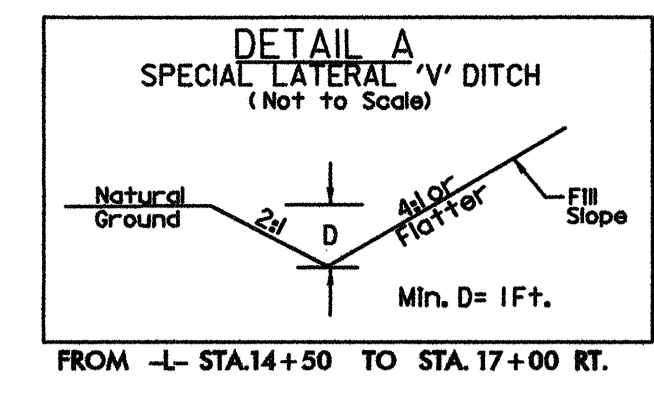


STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

SUMMARY OF PAVEMENT REMOVAL

SURVEY LINE	STATION TO STATION	LOCATION	ASPHALT REMOVAL (SY)
-L-	15+50 TO 17+34	CL	398.7
-L-	17+70 TO 19+50	CL	375.3
-DET-	10+00 TO 11+79	LT	190.7
-DET-	11+79 TO 13+91	CL	566.2
-DET-	14+51 TO 16+60	CL	557.2
-DET-	16+60 TO 18+35	LT	192.7
	TOTAL		2280.8
	SAY		2300.0

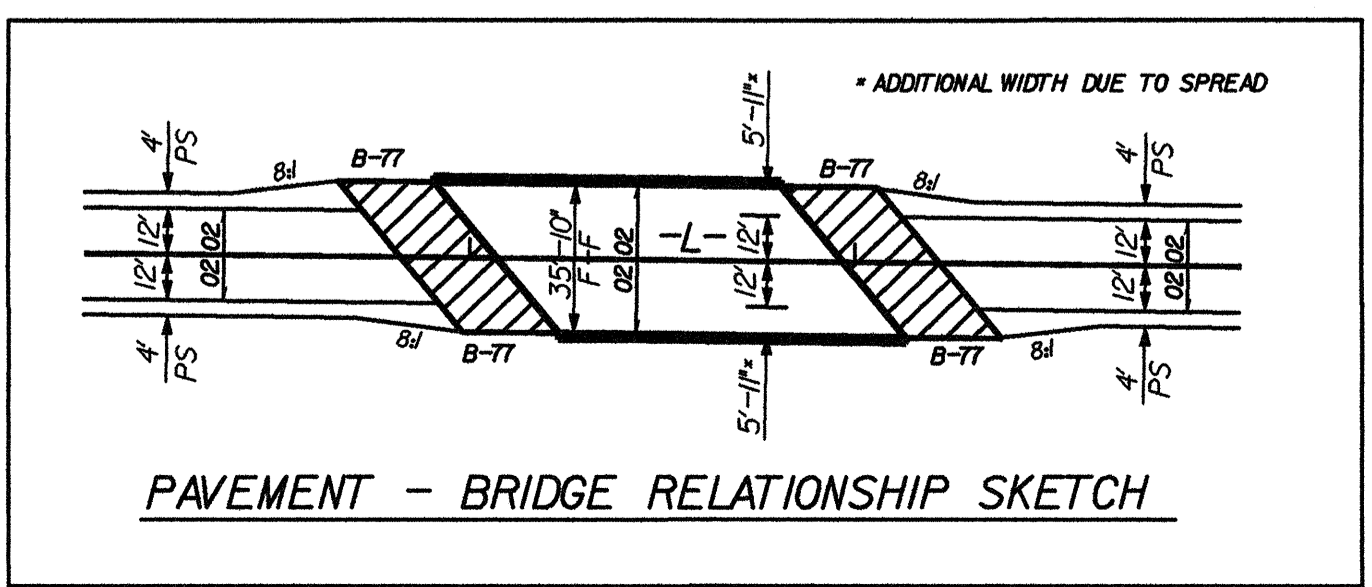
-L-  
 PI Sta 14+67.10 Δ = 0° 21' 05.1" (RT)  
 D = 0' 15' 00.0"  
 L = 140.56'  
 T = 70.28'  
 R = 22,918.31'  
 PI Sta 20+30.71 Δ = 0° 22' 58.7" (LT)  
 D = 0' 15' 00.0"  
 L = 153.19'  
 T = 76.60'  
 R = 22,918.31'



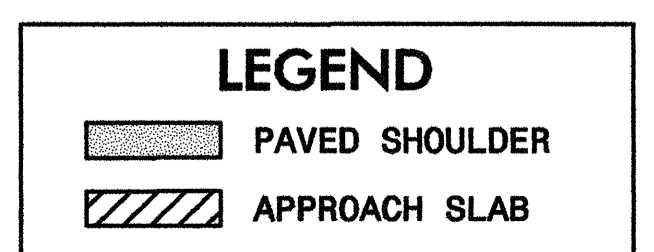
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 UNITED STATES OF AMERICA  
 C/O DEPT. OF THE ARMY OF  
 CORPS OF ENGINEERS  
 DEED 143 PG 70289  
 DEED 118 PG 40403

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 UNITED STATES OF AMERICA  
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 CORPS OF ENGINEERS  
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 DEED 118 PG 40403

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 UNITED STATES OF AMERICA  
 C/O DEPT. OF THE ARMY OF  
 CORPS OF ENGINEERS  
 DEED 143 PG 70289  
 DEED 118 PG 40403



REMOVE TEMPORARY DETOUR  
 AND RESTORE AREA TO EXISTING  
 GROUND LINE



FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-22.  
 FOR -L- PROFILE, SEE SHEET NO. 5

5/14/99  
 12/22/2009  
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BM \* 81 EL.191.71  
 -L- STA.14+03.81, 55.44' LT

BM \* 80 EL.190.96  
 -L- STA.23+54.18, 55.32' LT

**BRIDGE HYDRAULIC DATA**

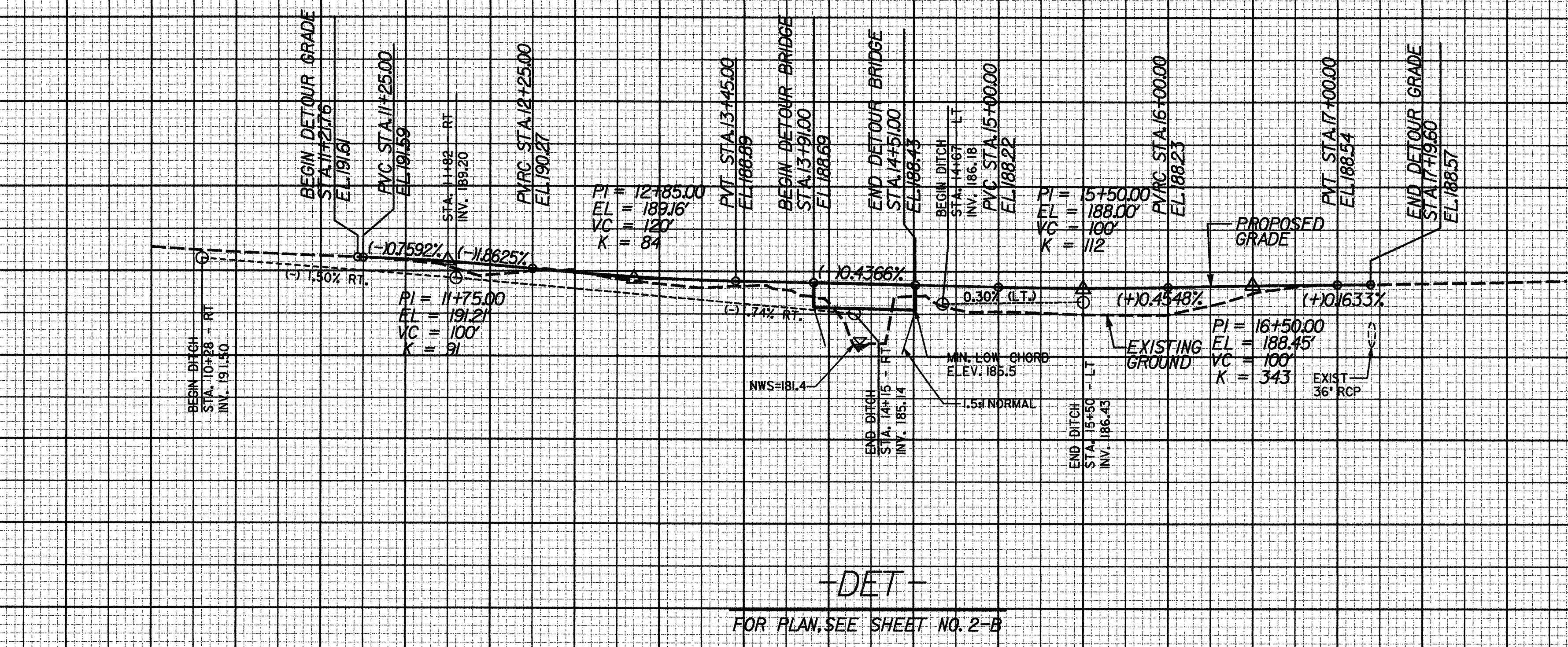
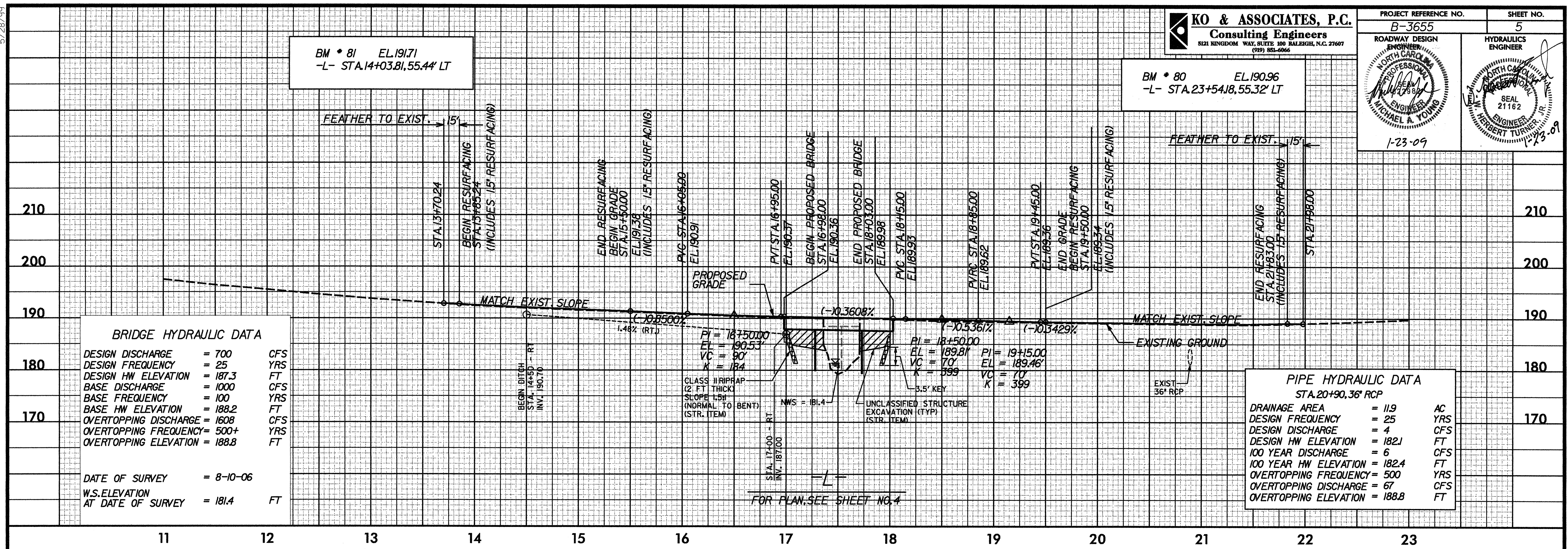
DESIGN DISCHARGE = 700	CFS
DESIGN FREQUENCY = 25	YRS
DESIGN HW ELEVATION = 187.3	FT
BASE DISCHARGE = 1000	CFS
BASE FREQUENCY = 100	YRS
BASE HW ELEVATION = 188.2	FT
OVERTOPPING DISCHARGE = 1608	CFS
OVERTOPPING FREQUENCY = 500+	YRS
OVERTOPPING ELEVATION = 188.8	FT

DATE OF SURVEY = 8-10-06	
W.S.ELEVATION AT DATE OF SURVEY = 181.4	FT

**PIPE HYDRAULIC DATA**  
 STA. 20+90, 36" RCP

DRAINAGE AREA = 11.9	AC
DESIGN FREQUENCY = 25	YRS
DESIGN DISCHARGE = 4	CFS
DESIGN HW ELEVATION = 182.1	FT
100 YEAR DISCHARGE = 6	CFS
100 YEAR HW ELEVATION = 182.4	FT
OVERTOPPING FREQUENCY = 500	YRS
OVERTOPPING DISCHARGE = 67	CFS
OVERTOPPING ELEVATION = 188.8	FT



5/28/99

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