

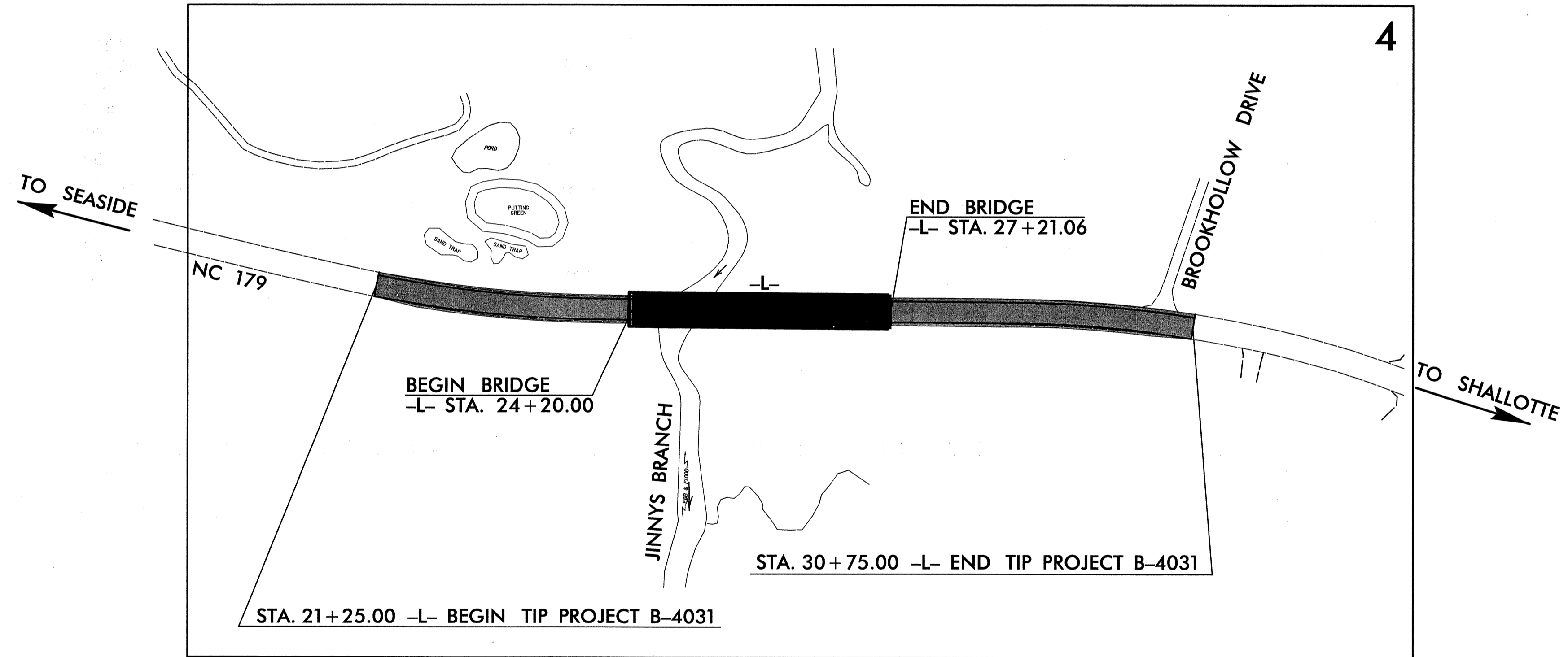
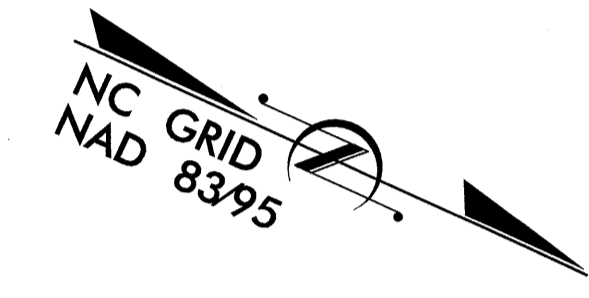
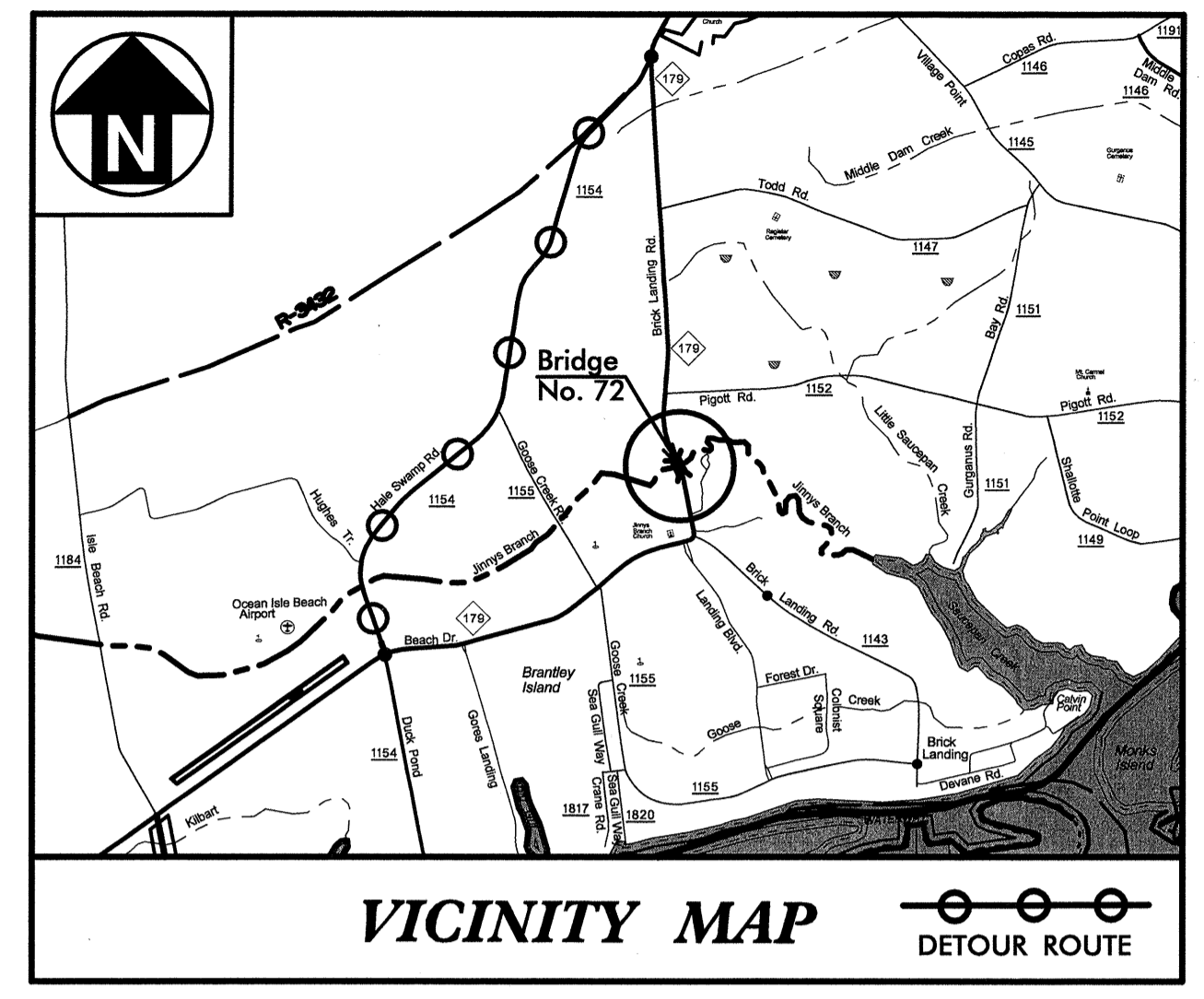
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4031	1	
W&R ELEMENT	F.A. PROJ. NO.	DESCRIPTION	
33398.1.1	BRSTP-0179(2)	P.E.	
33398.2.1	BRSTP-0179(2)	R/W & UTL.	
33398.3.1	BRSTP-0179(2)	CONST.	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

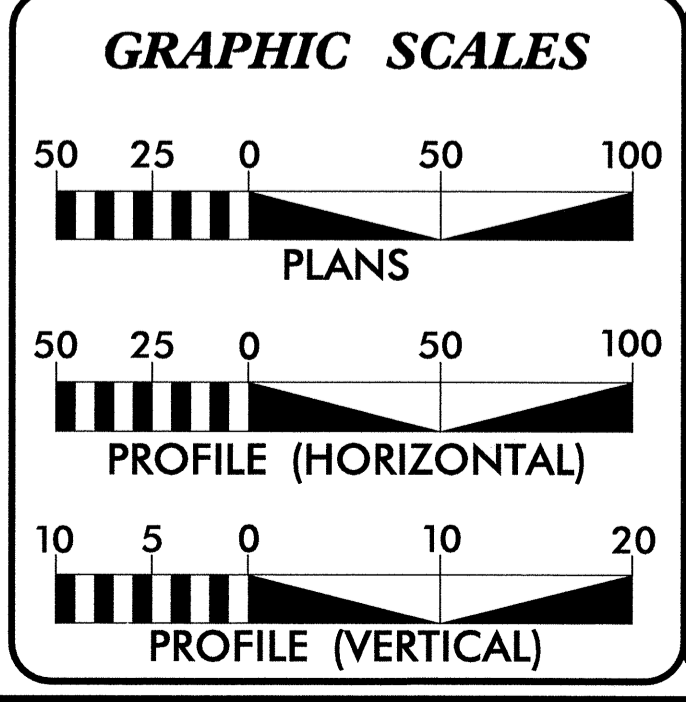
**BRUNSWICK COUNTY**

LOCATION: BRIDGE NO. 72 OVER JINNYS BRANCH ON NC 179  
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

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



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



**DESIGN DATA**

ADT 2007 =	9,100
ADT 2027 =	16,800
DHV =	15%
D =	55%
* T =	4%
** V =	60 mph
* Duals	3% TTST 1%
** Design Exception -	Sag vertical Curve K
	Horizontal Curve Radius

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4031	=	0.123 MILE
LENGTH STRUCTURE TIP PROJECT B-4031	=	0.057 MILE
TOTAL LENGTH STATE TIP PROJECT B-4031	=	0.180 MILE

Prepared In the Office of:  
**Mulkey Engineers & Consultants**  
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
2006 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
JUNE 16, 2006

**LETTING DATE:**  
JUNE 17, 2008

**NCDOT CONTACT:** CATHY S. HOUSER, PE  
ROADWAY DESIGN - PROJECT ENGINEER

**TIM JORDAN, PE**  
MULKEY E & C  
PROJECT MANAGER

**KEVIN ALFORD, PE**  
MULKEY E & C  
HYDRAULICS ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: *Kevin Alford*

**ROADWAY DESIGN**

SIGNATURE: *Cathy S. Houser*

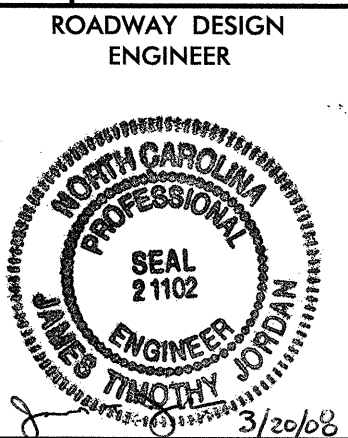
**DIVISION OF HIGHWAYS**  
STATE OF NORTH CAROLINA

*Timothy Jordan*  
STATE HIGHWAY DESIGN ENGINEER

TIP PROJECT: B-4031

CONTRACT: C201848

1/15/2008  
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**INDEX OF SHEETS**

Sheet #	Description
1	Title Sheet
1-A	Index of Sheets, General Notes, & List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
2	Pavement Schedule, Wedging Detail & Typical Sections
2-A	Infiltration Basin Construction Sequence & General Notes
2-B	Infiltration Basin Detail
2-C	Temporary Shoring Detail
2-D	Detail of Anchorage for Frames
3	Summary of Quantities
3-A	List of Pipe, Endwalls, Etc. (For Pipe 48" & Under), Guardrail Summary, Summary of Earthwork, & Summary of Pavement Removal
4	Plan
5	Profile
TCP-1 thru TCP-2	Traffic Control Plans
EC-1 thru EC-6	Erosion Control Plans
UC-1 thru UC-4	Utilities Construction Plans
UO-1 thru UO-2	Utilities by Others Plans
X-1	Cross Section Summary Sheet
X-2 thru X-6	Cross-Sections
S-1 thru S-33	Structure Plans

**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
<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'
310.10	Driveway Pipe Construction
<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>	
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
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

EFF. 07-18-06

**GENERAL NOTES:**

2006 SPECIFICATIONS  
EFFECTIVE: 07-18-06  
REVISED:

**GRADING AND SURFACING OR RESURFACING AND WIDENING:**  
The grade line 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 point 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 connection with all roads, streets, and drive entering this project. This work will be paid for at the contract unit price for the particular items involved.

**UNDERDRAINS:**  
Underdrains shall be constructed in accordance with Std. No. 815.03 at locations directed by the engineer.

**GUARDRAIL:**  
The guardrail locations shown on the plans may be adjusted during construction as directed by the engineer. The contractor should consult with the engineer prior to ordering guardrail material.

**TEMPORARY SHORING:**  
Shoring required for the maintenance of traffic not shown on the plans will be paid for at the contract price for "Temporary Shoring" or "Temporary Shoring-Barrier Supported" depending upon the location of the 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 Atlantic Telephone Membership Corp., Brunswick Electric Membership Corp., Brunswick County Water.

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 others.

8/17/99  
3/9/2008  
C:\p\projects\2005\108.00 (B-4031 Design)\Roadway\Proj\B4031\_rdy\_tsh.dgn

Note: Not to Scale

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

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

Table listing symbols for 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, Existing Fence Line, Proposed Woven Wire Fence, Proposed Chain Link Fence, Proposed Barbed Wire Fence, Existing Wetland Boundary, Proposed Wetland Boundary, Existing Endangered Animal Boundary, Existing Endangered Plant Boundary.

BUILDINGS AND OTHER CULTURE:

Table listing symbols for 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:

Table listing symbols for hydrology: Stream or Body of Water, Hydro, Pool or Reservoir, Jurisdictional Stream, Buffer Zone 1, Buffer Zone 2, Flow Arrow, Disappearing Stream, Spring, Wetlands, Proposed Lateral, Tail, Head Ditch, False Sump.

RAILROADS:

Table listing symbols for railroads: Standard Gauge, RR Signal Milepost, Switch, RR Abandoned, RR Dismantled.

RIGHT OF WAY:

Table listing symbols for 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, Proposed Temporary Construction Easement, Proposed Temporary Drainage Easement, Proposed Permanent Drainage Easement, Proposed Permanent Utility Easement.

ROADS AND RELATED FEATURES:

Table listing symbols for roads and related features: Existing Edge of Pavement, Existing Curb, Proposed Slope Stakes Cut, Proposed Slope Stakes Fill, Proposed Wheel Chair Ramp, Proposed Wheel Chair Ramp Curb Cut, Curb Cut for Future Wheel Chair Ramp, Existing Metal Guardrail, Proposed Guardrail, Existing Cable Guiderail, Proposed Cable Guiderail, Equality Symbol, Pavement Removal.

VEGETATION:

Table listing symbols for vegetation: Single Tree, Single Shrub, Hedge, Woods Line, Orchard, Vineyard.

EXISTING STRUCTURES:

Table listing symbols for existing structures: MAJOR: Bridge, Tunnel or Box Culvert, Bridge Wing Wall, Head Wall and End Wall; MINOR: Head and End Wall, Pipe Culvert, Footbridge, Drainage Box: Catch Basin, DI or JB, Paved Ditch Gutter, Storm Sewer Manhole, Storm Sewer.

UTILITIES:

Table listing symbols for 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, Designated U/G Power Line (S.U.E.\*).

TELEPHONE:

Table listing symbols for 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, Designated U/G Telephone Cable (S.U.E.\*), Recorded U/G Telephone Conduit, Designated U/G Telephone Conduit (S.U.E.\*), Recorded U/G Fiber Optics Cable, Designated U/G Fiber Optics Cable (S.U.E.\*).

WATER:

Table listing symbols for 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.

TV:

Table listing symbols for TV: TV Satellite Dish, TV Pedestal, TV Tower, U/G TV Cable Hand Hole, Recorded U/G TV Cable, Designated U/G TV Cable (S.U.E.\*), Recorded U/G Fiber Optic Cable, Designated U/G Fiber Optic Cable (S.U.E.\*).

GAS:

Table listing symbols for gas: Gas Valve, Gas Meter, Recorded U/G Gas Line, Designated U/G Gas Line (S.U.E.\*), Above Ground Gas Line.

SANITARY SEWER:

Table listing symbols for sanitary sewer: Sanitary Sewer Manhole, Sanitary Sewer Cleanout, U/G Sanitary Sewer Line, Above Ground Sanitary Sewer, Recorded SS Forced Main Line, Designated SS Forced Main Line (S.U.E.\*).

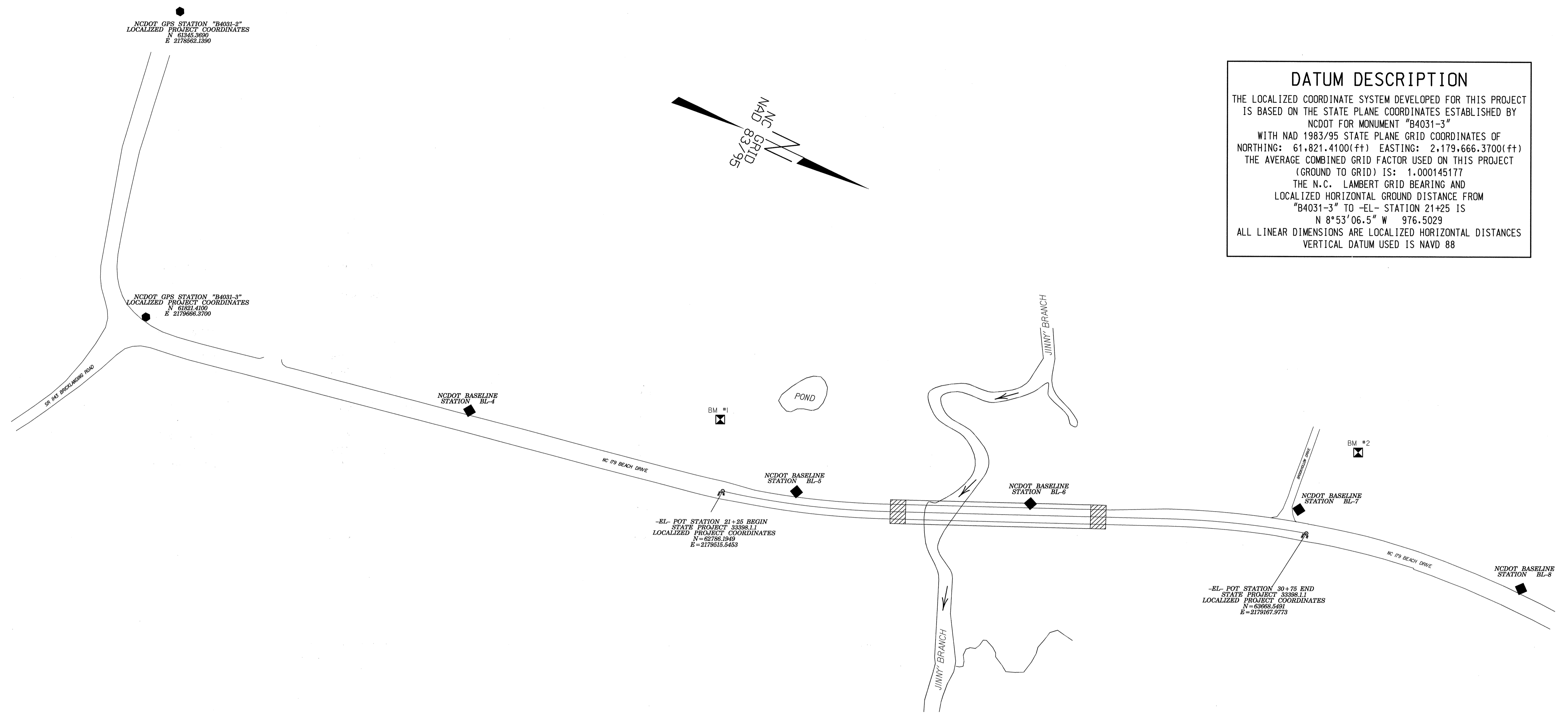
MISCELLANEOUS:

Table listing symbols for miscellaneous: Utility Pole, Utility Pole with Base, Utility Located Object, Utility Traffic Signal Box, Utility Unknown U/G Line, U/G Tank; Water, Gas, Oil, A/G Tank; Water, Gas, Oil, U/G Test Hole (S.U.E.\*), Abandoned According to Utility Records, End of Information.

6/2/09

# SURVEY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
B-4031	1-C
Location and Surveys	



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4031-3"

WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF  
 NORTHING: 61,821.4100(ft) EASTING: 2,179,666.3700(ft)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000145177

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4031-3" TO -EL- STATION 21+25 IS  
 N 8°53'06.5" W 976.5029

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

### NOTES:

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.NCDOT.ORG/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/preconstruct/highway/location/project/)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 TIP B4031\_LS\_CONTROL\_050920.HTML
- 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.

BL POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
3	NCDOT GPS MON * B4031-3*	61821.4100	2179666.3700	28.52	11+36.89	24.97 LT
4	BL-4	62360.3970	2179581.4110	21.42	16+94.41	16.33 LT
5	BL-5	62894.2500	2179465.9860	13.50	22+43.20	19.18 LT
6	BL-6	63243.7980	2179318.2740	9.52	26+24.99	18.77 LT
7	BL-7	63639.1700	2179137.8900	19.37	30+54.96	36.83 LT
8	BL-8	64021.6250	2179098.3790	26.60	34+32.66	20.55 LT

*****	BM1	ELEVATION = 16.09
*****	N 62732	E 2179412
*****	EL STATION 20+92	112' LEFT
*****	RAILROAD SPIKE SET IN 18' PINE TREE	
*****	*****	
*****	BM2	ELEVATION = 24.51
*****	N 63687	E 2179013
*****	EL STATION 31+28	146 LEFT
*****	RAILROAD SPIKE SET IN 18' PINE TREE	
*****	*****	

NOTE: DRAWING NOT TO SCALE

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8/17/99

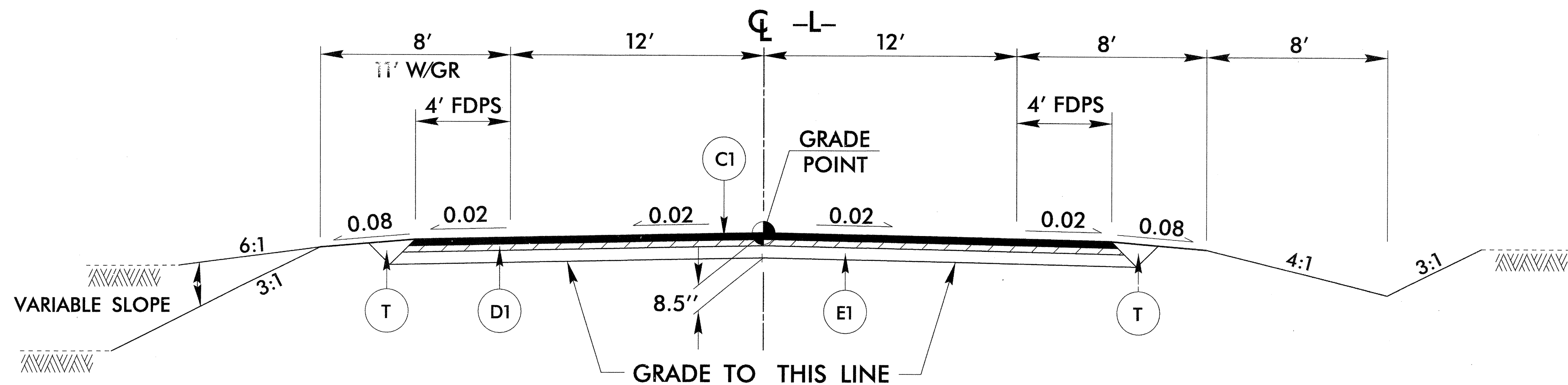
**PAVEMENT SCHEDULE**  
(FINAL PAVEMENT DESIGN)

A	CONCRETE WEARING SURFACE (STRUCTURE PAY ITEM)
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
D1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
E1	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E2	PROP. APPROX. 6" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 684 LBS. PER SQ. YD.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

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



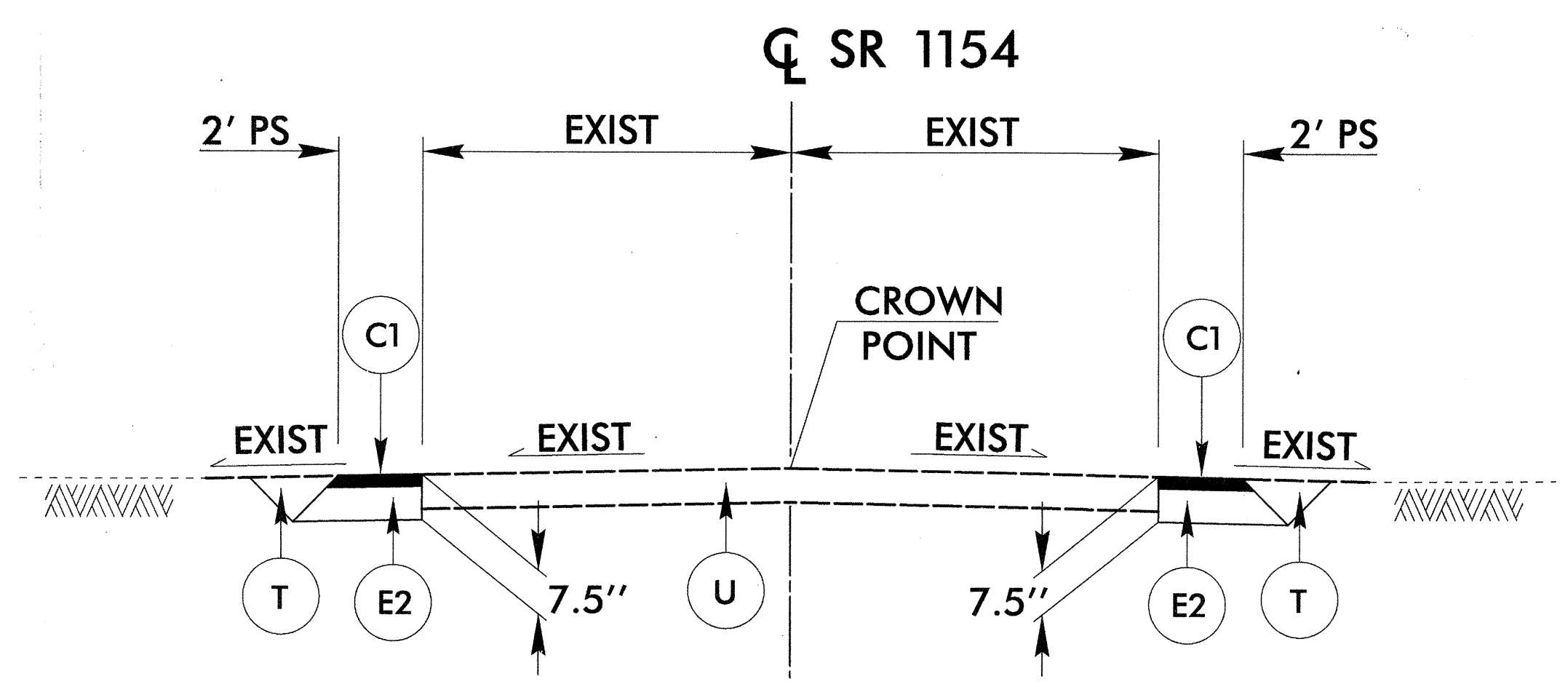
PROJECT REFERENCE NO. B-4031	SHEET NO. 2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



**TYPICAL SECTION NO. 1**

USE TYPICAL SECTION NO. 1  
AT THE FOLLOWING LOCATION:

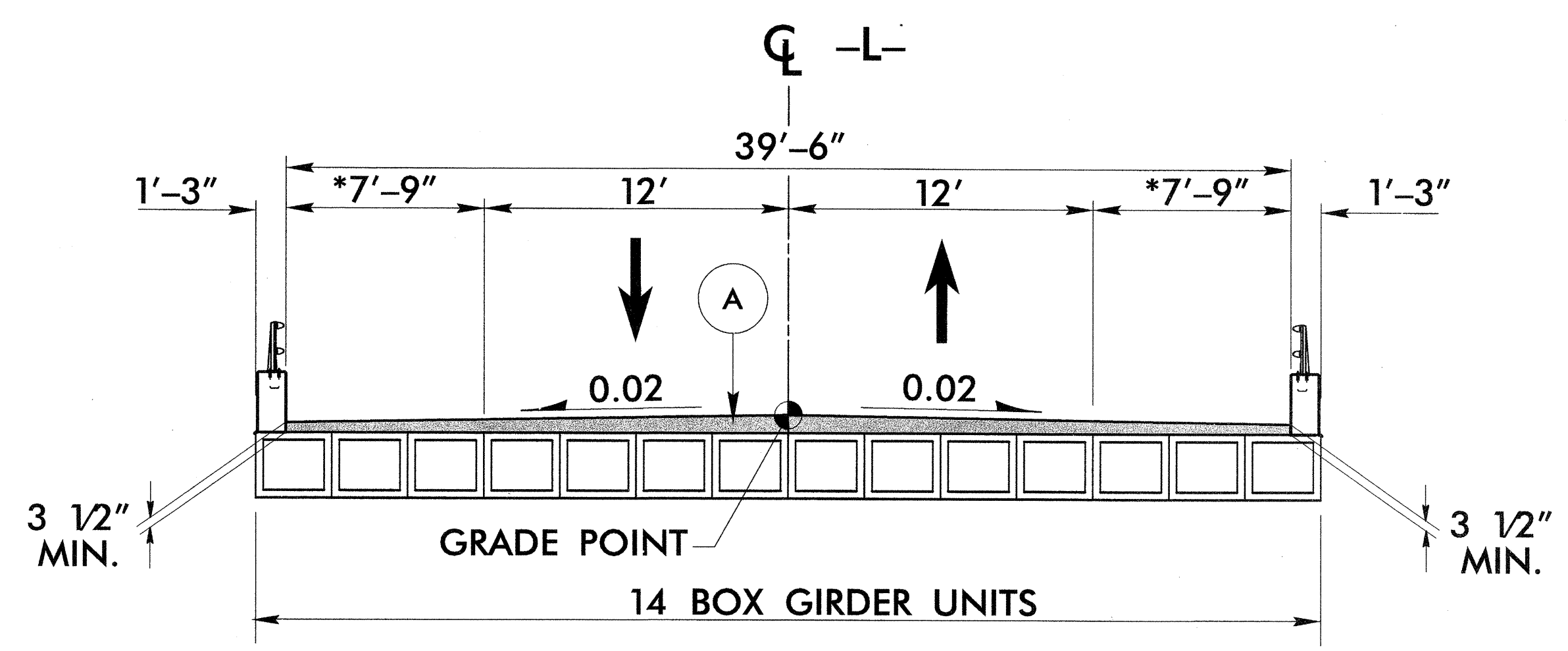
- TRANSITION FROM EXISTING TO T.S. NO. 1 FROM  
-L- STA. 21+25 TO STA. 21+75
- L- STA 21+75.00 TO STA 24+20.00 (BEGIN BRIDGE)
- L- STA 27+21.06 (END BRIDGE) TO STA 30+25.00
- TRANSITION FROM T.S. NO. 1 TO EXISTING FROM  
-L- STA. 30+25 TO STA. 30+75



**TYPICAL SECTION NO. 2**

USE TYPICAL SECTION NO. 1  
AT THE FOLLOWING LOCATION:

SR 1154 (OFFSITE DETOUR ROUTE)



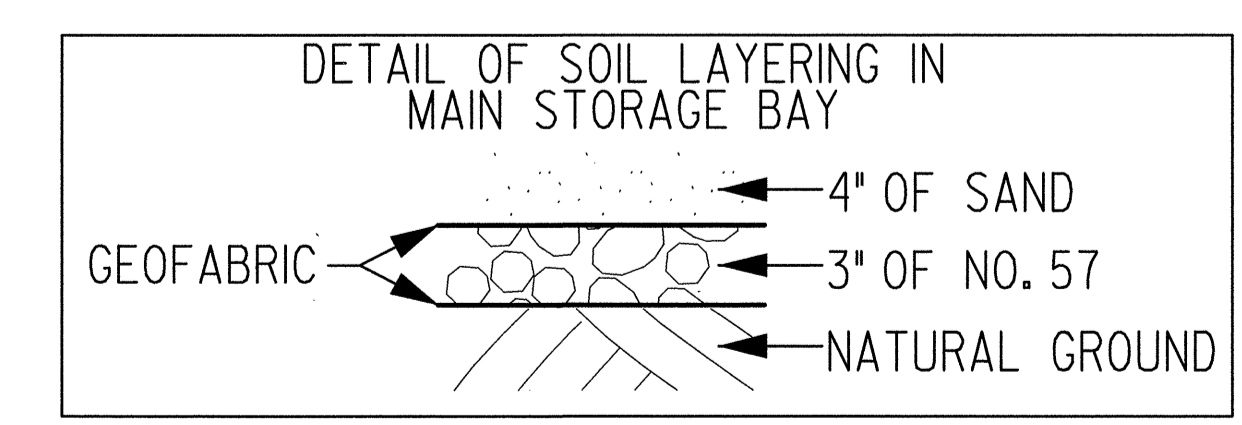
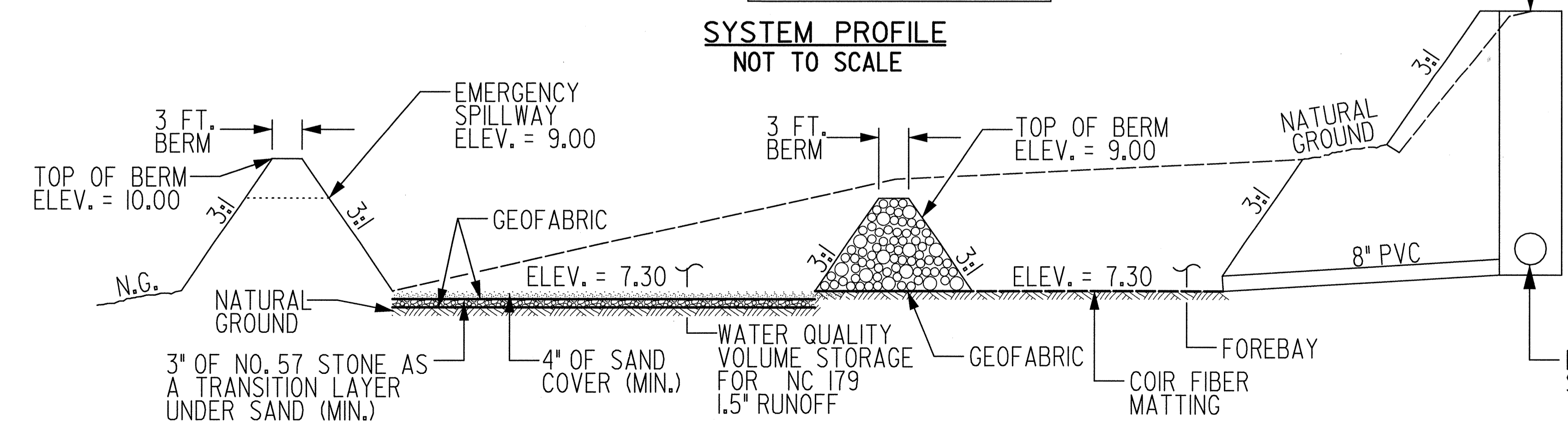
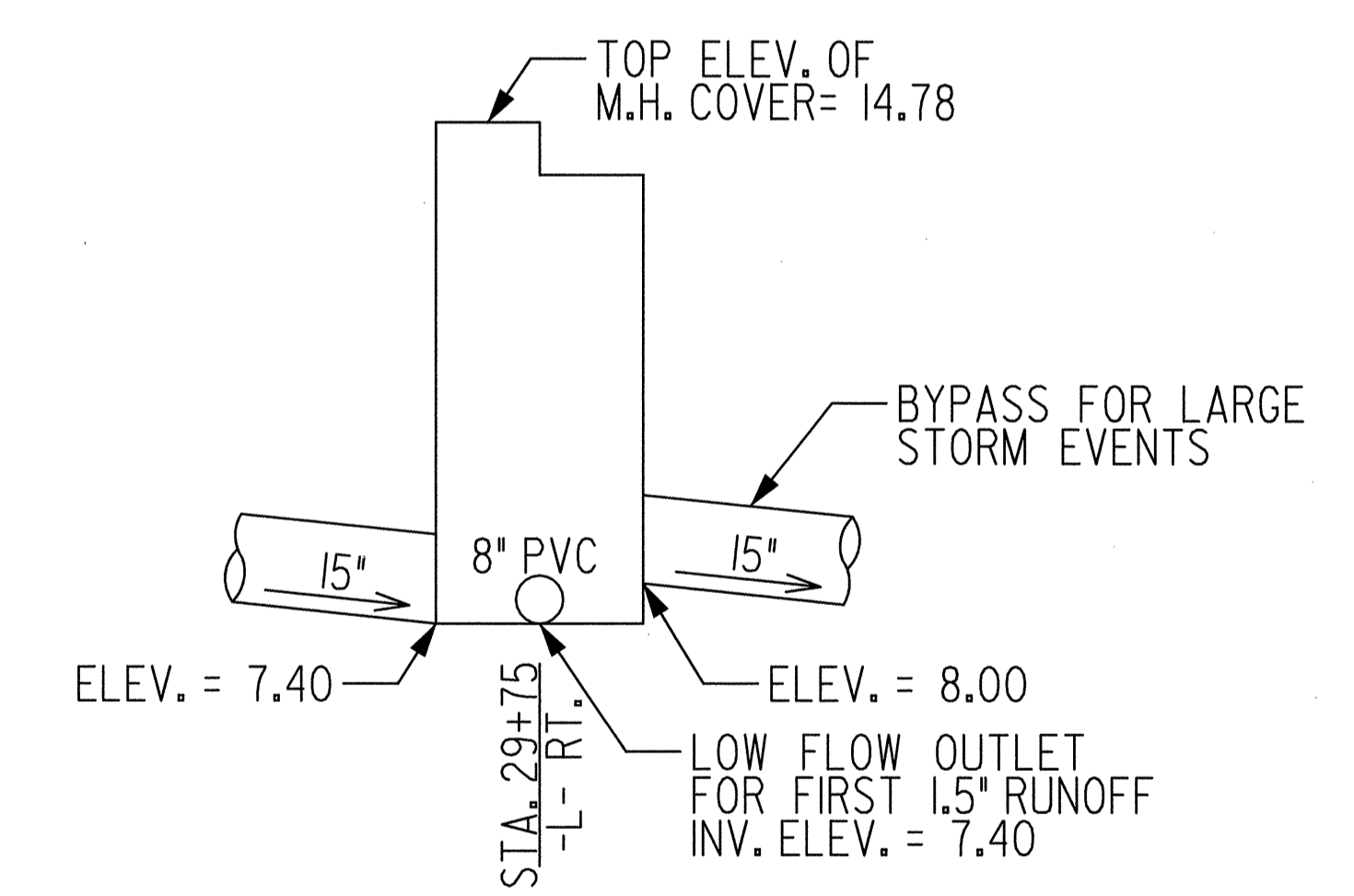
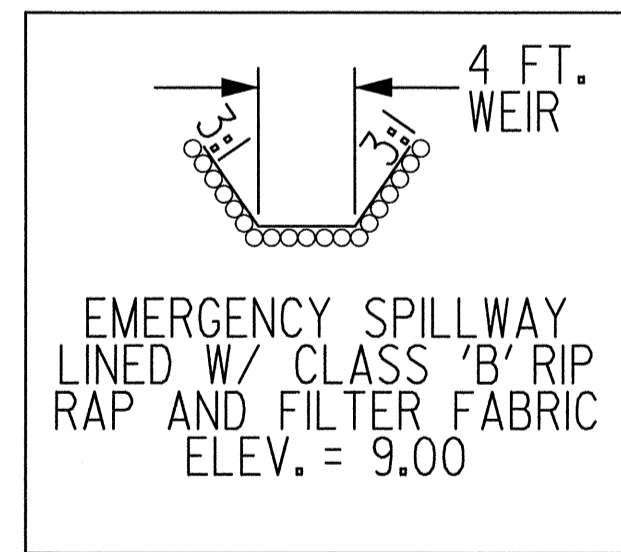
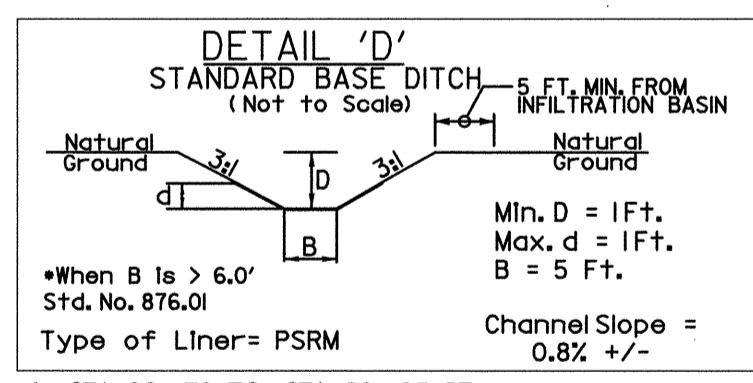
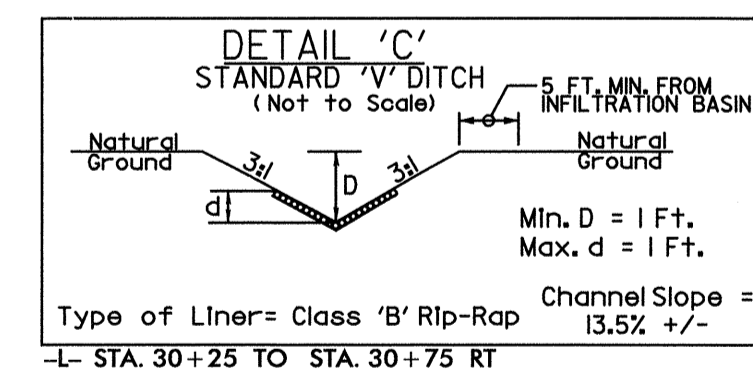
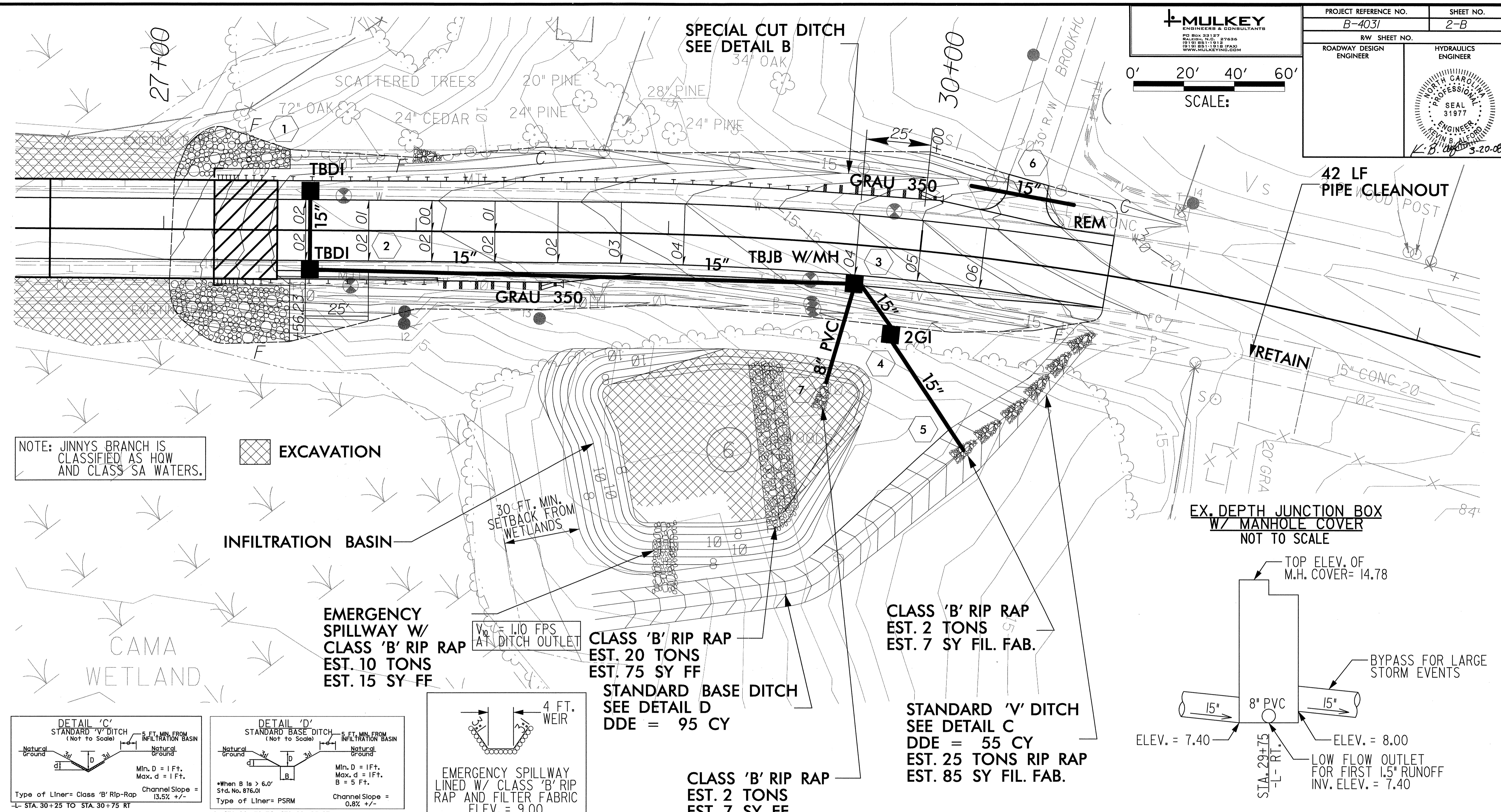
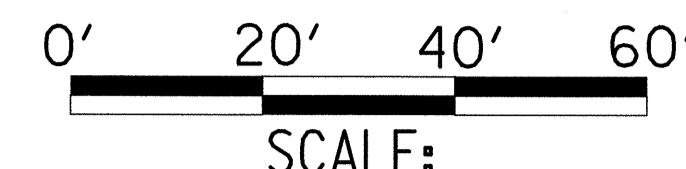
**DETAIL OF BRIDGE**

-L- STA 24+20.00 TO STA 27+21.06

\* WIDENED FOR HYDRAULIC SPREAD ON STRUCTURE

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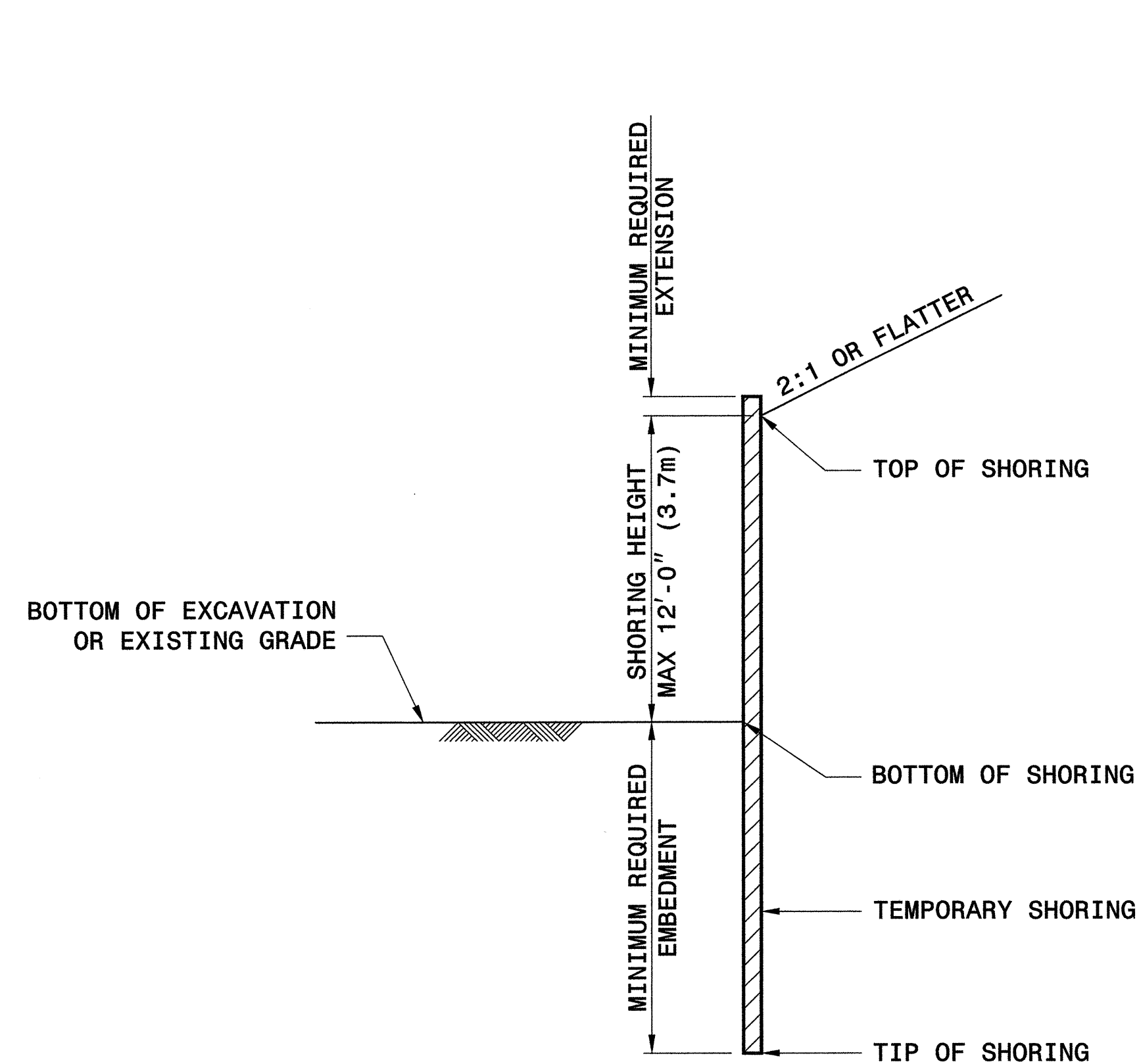


**INFILTRATION BASIN**

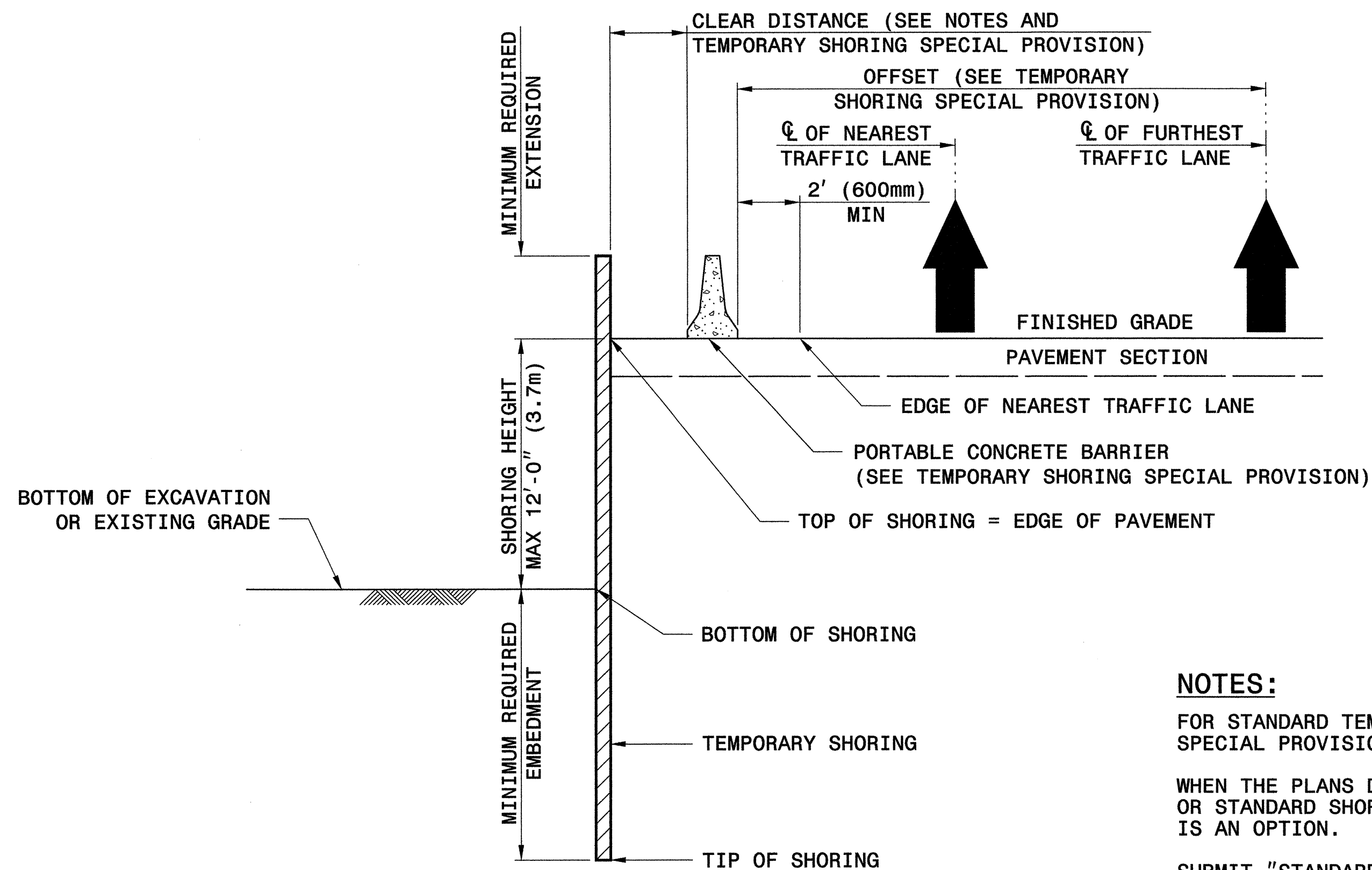
- BOTTOM ELEV. = 7.30
- EMERGENCY SPILLWAY ELEV. = 9.00
- BERM ELEV. = 10.00
- DESIGN STORM = FIRST 1.5" RUNOFF
- DESIGN VOLUME = 2396 FT<sup>3</sup>
- VOLUME PROVIDED = 2447 FT<sup>3</sup>

**GENERAL NOTES:**

- ALL SIDE SLOPES ARE TO BE 3:1 OR FLATTER AND STABILIZED WITH VEGETATED COVER
- BOTTOM OF POND IS TO BE COVERED WITH A LAYER OF CLEAN SAND TO AN AVERAGE DEPTH OF 4 INCHES
- FOREBAY MUST RECEIVE REGULAR MAINTENANCE TO REMAIN EFFECTIVE



**SLOPE CASE**



**SURCHARGE CASE**

**NOTES:**

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.  
 WHEN THE PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING OR STANDARD SHORING, THE USE OF STANDARD TEMPORARY SHORING IS AN OPTION.  
 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.

THE 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 TEMPORARY SHORING SPECIAL PROVISION, USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT" AND SET THE BARRIER AGAINST THE BACK OF THE SHORING.

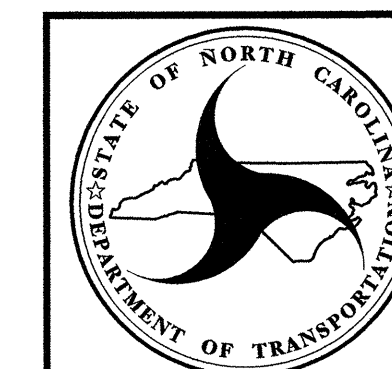
AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

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 TEMPORARY SHORING**



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

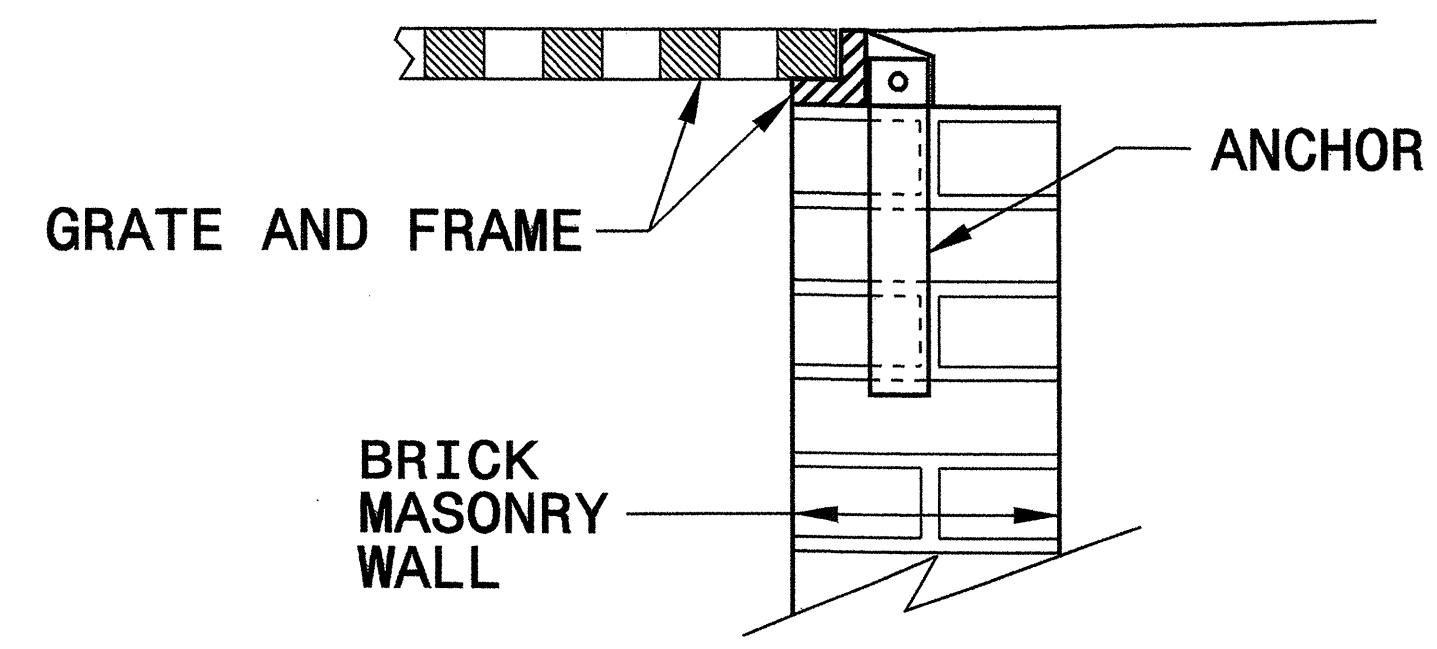
ENGLISH DETAIL DRAWING FOR  
**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1  
**840D25**

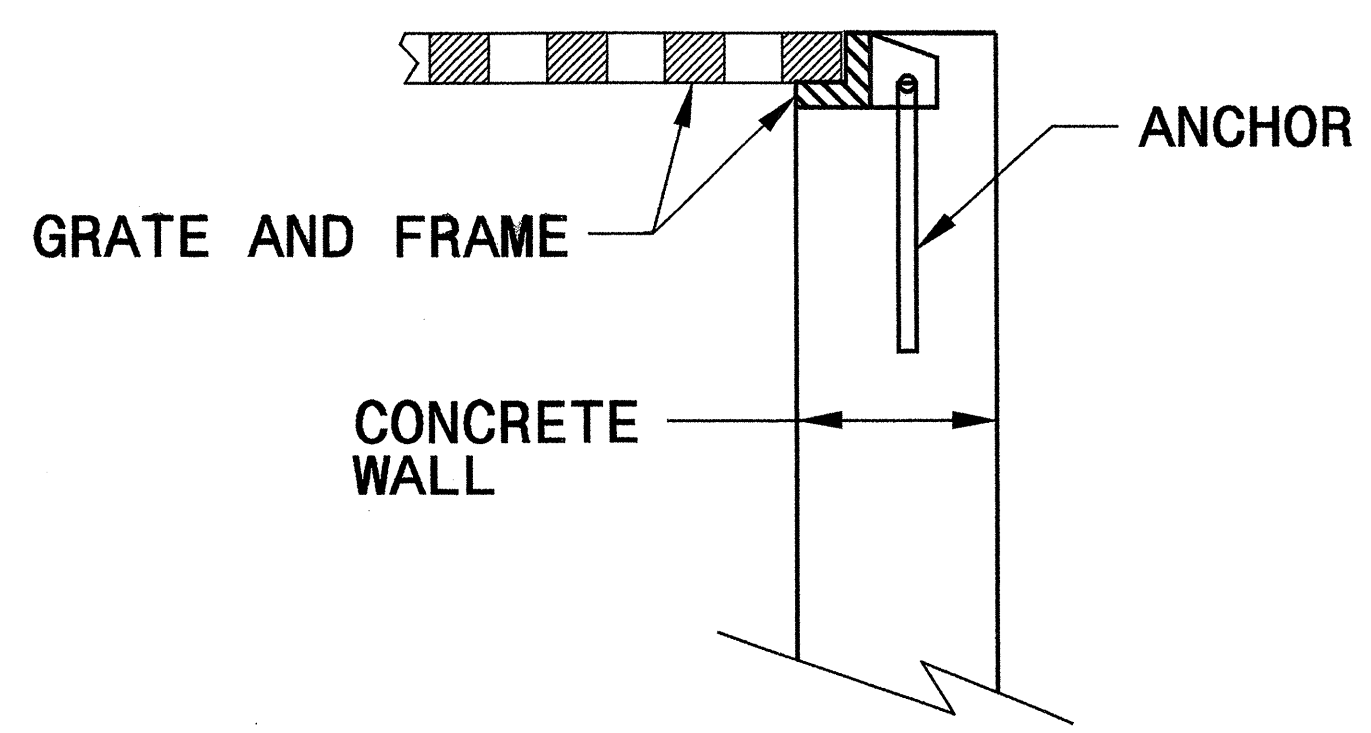
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

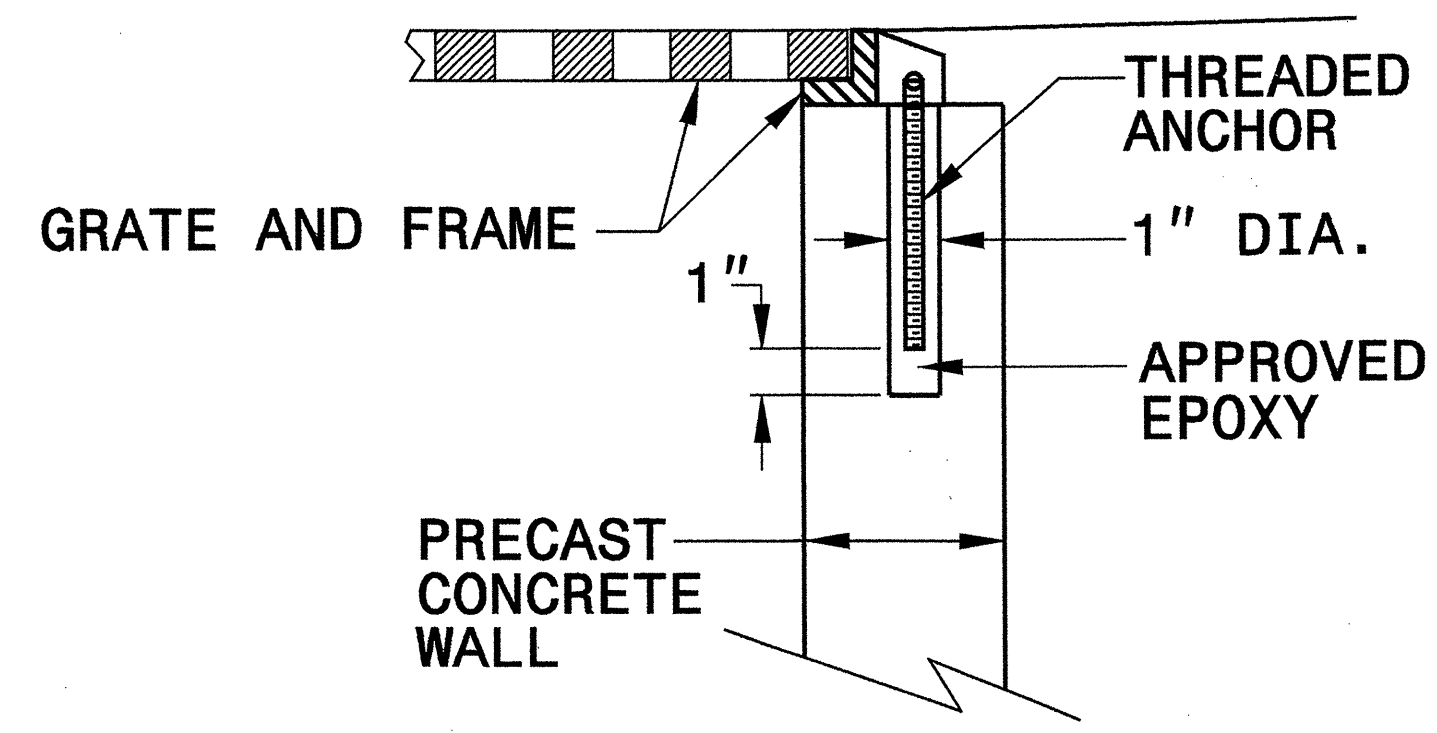
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY  
CONSTRUCTION**



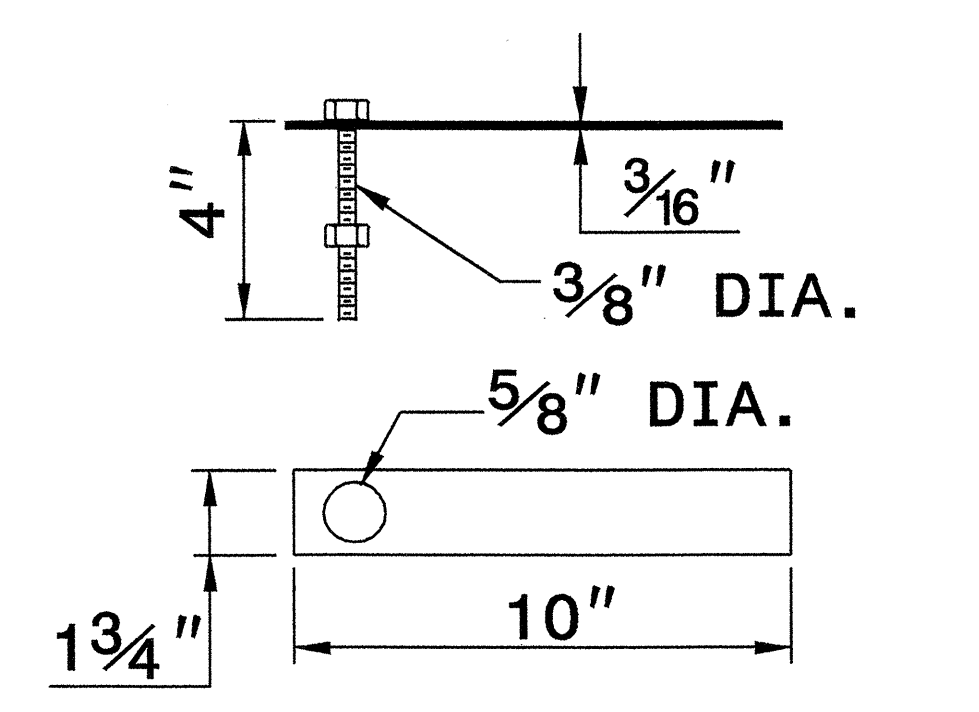
**CONCRETE  
CONSTRUCTION**



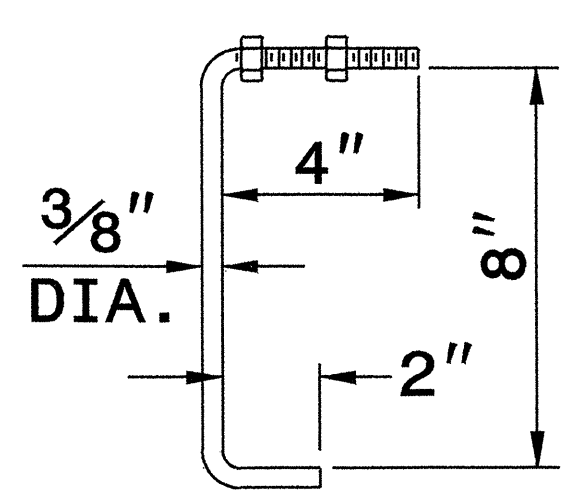
**PRECAST CONCRETE  
CONSTRUCTION**

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

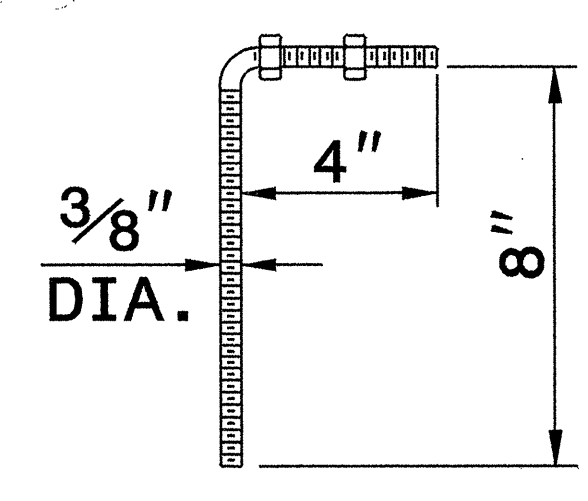
NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL  
OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



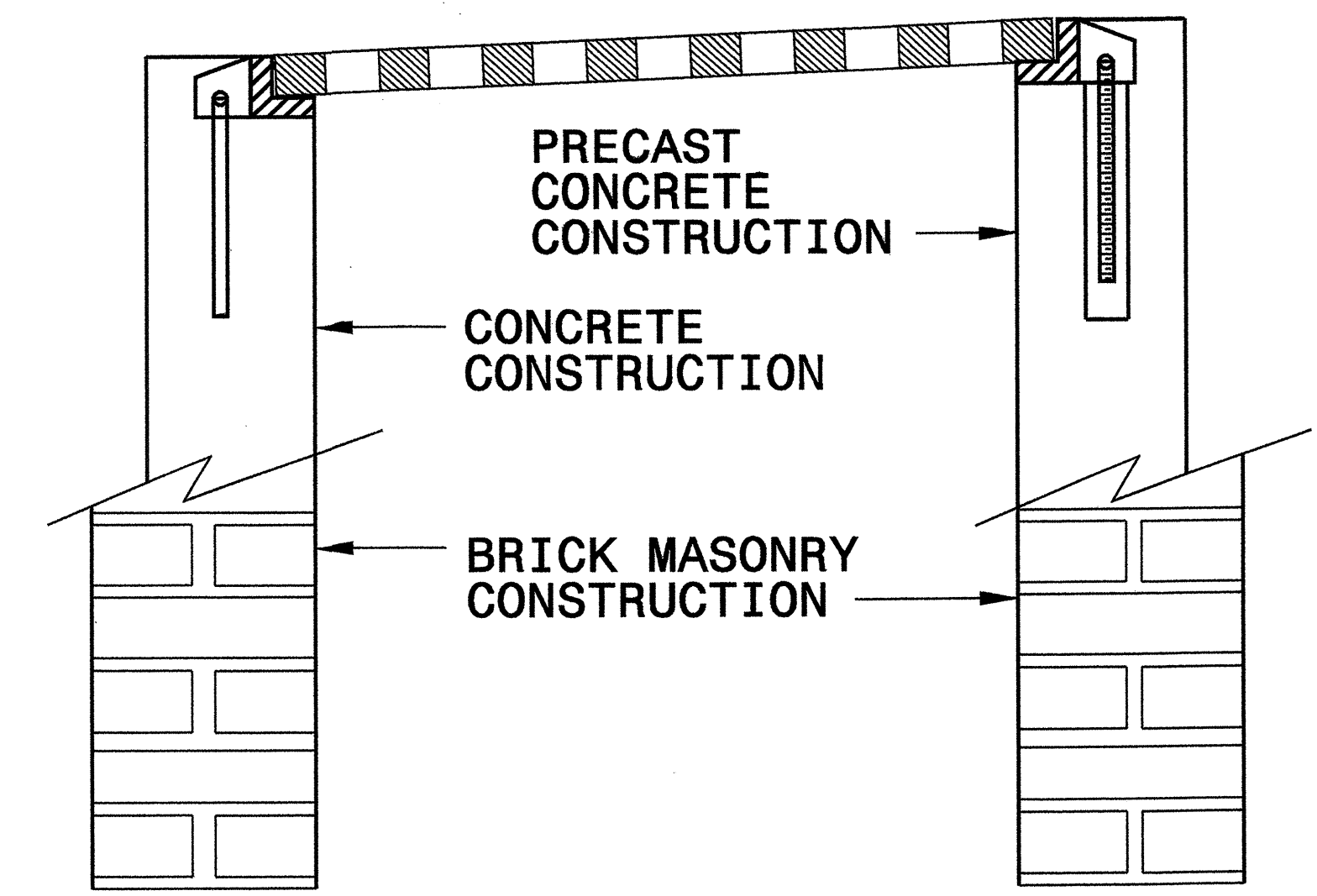
**MASONRY ANCHOR**  
3/8" DIA. BOLT WITH PLATE



**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**

01-MAR-2007 09:04 s:\contracts\contracts\stds\06\stds to special\details\ward\stds\84025 anchor-age for frames\0840d25.dgn .jflower-ton AT P5212260



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

**SEE PLATE FOR TITLE**

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

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C201848



ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION	481000000-E	1205	22,852	LF	PAINT PAVEMENT MARKING LINES (4")
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL STATION ***** (25+70.53)	490000000-N	1251	12	EA	PERMANENT RAISED PAVEMENT MARKERS
004300000-N	226	Lump Sum		GRADING	532620000-E	1510	998	LF	12" WATER LINE
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING	555800000-E	1515	2	EA	12" VALVE
005700000-E	226	200	CY	UNDERCUT EXCAVATION	564900000-N	1515	1	EA	RECONNECT WATER METER
013400000-E	240	150	CY	DRAINAGE DITCH EXCAVATION	567200000-N	1515	1	EA	RELOCATE FIRE HYDRANT
019500000-E	265	100	CY	SELECT GRANULAR MATERIAL	580400000-E	1530	890	LF	ABANDON 12" UTILITY PIPE
019600000-E	270	100	SY	FABRIC FOR SOIL STABILIZATION	587170000-E	1550	200	LF	TRENCHLESS INSTALLATION OF 12" IN SOIL
019900000-E	SP	1,100	SF	TEMPORARY SHORING	587171000-E	1550	185	LF	TRENCHLESS INSTALLATION OF 12" NOT IN SOIL
031800000-E	300	45	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS	600000000-E	1605	1,440	LF	TEMPORARY SILT FENCE
034300000-E	310	44	LF	15" SIDE DRAIN PIPE	600600000-E	1610	50	TON	STONE FOR EROSION CONTROL, CLASS A
098600000-E	SP	40	LF	GENERIC PIPE ITEM 8" PVC PIPE	600900000-E	1610	130	TON	STONE FOR EROSION CONTROL, CLASS B
099500000-E	340	44	LF	PIPE REMOVAL	601200000-E	1610	50	TON	SEDIMENT CONTROL STONE
099600000-N	350	1	EA	PIPE CLEAN-OUT	601500000-E	1615	5.5	ACR	TEMPORARY MULCHING
122000000-E	545	25	TON	INCIDENTAL STONE BASE	601800000-E	1620	200	LB	SEED FOR TEMPORARY SEEDING
133000000-E	607	315	SY	INCIDENTAL MILLING	602100000-E	1620	0.75	TON	FERTILIZER FOR TEMPORARY SEEDING
148900000-E	610	3,000	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	602400000-E	1622	50	LF	TEMPORARY SLOPE DRAINS
149800000-E	610	310	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE 119.0B	602700000-N	1622	2	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
151900000-E	610	715	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	602900000-E	SP	300	LF	SAFETY FENCE
156000000-E	620	183	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22	603000000-E	1630	400	CY	SILT EXCAVATION
170400000-E	SP	100	TON	PATCHING EXISTING PAVEMENT	603600000-E	1631	370	SY	MATTING FOR EROSION CONTROL
202200000-E	815	23	CY	SUBDRAIN EXCAVATION	603800000-E	SP	450	SY	PERMANENT SOIL REINFORCEMENT MAT
203300000-E	815	17	CY	SUBDRAIN FINE AGGREGATE	604200000-E	1632	60	LF	1/4" HARDWARE CLOTH
204400000-E	815	100	LF	6" PERFORATED SUBDRAIN PIPE	604800000-E	SP	140	SY	FLOATING TURBIDITY CURTAIN
205500000-E	815	3	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS	607103000-E	SP	220	LF	COIR FIBER BAFFLES
206600000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET	608400000-E	1660	5.5	ACR	SEEDING & MULCHING
207700000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)	608700000-E	1660	3.5	ACR	MOWING
228600000-N	840	4	EA	MASONRY DRAINAGE STRUCTURES	609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
230800000-E	840	2.4	LF	MASONRY DRAINAGE STRUCTURES	609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
236500000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.22	609600000-E	1662	150	LB	SEED FOR SUPPLEMENTAL SEEDING
236700000-N	840	2	EA	FRAME WITH TWO GRATES, STD 840.29	610800000-E	1665	4	TON	FERTILIZER TOPDRESSING
239600000-N	840	1	EA	FRAME WITH COVER, STD 840.54	611400000-N	SP	2	HR	SPECIALIZED HAND MOWING
247400000-N	SP	Lump Sum		GENERIC DRAINAGE ITEM INFILTRATION BASIN	611700000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
255600000-E	846	65	LF	SHOULDER BERM GUTTER	613500000-E	SP	0.298	ACR	GENERIC EROSION CONTROL ITEM DISKING
303000000-E	862	525	LF	STEEL BM GUARDRAIL	613500000-E	SP	0.298	ACR	GENERIC EROSION CONTROL ITEM RIPPING
315000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS	613500000-E	SP	0.151	ACR	GENERIC EROSION CONTROL ITEM WETLAND GRASS PLANTING
321500000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III	614700000-E	SP	120	LF	GENERIC EROSION CONTROL ITEM TREE PROTECTION FENCE
327000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350					
336000000-E	863	1,150	LF	REMOVE EXISTING GUARDRAIL					
364900000-E	876	32	TON	RIP RAP, CLASS B					
365600000-E	876	259	SY	FILTER FABRIC FOR DRAINAGE					
440000000-E	1110	670	SF	WORK ZONE SIGNS (STATIONARY)					
441000000-E	1110	144	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)					
443000000-N	1130	23	EA	DRUMS					
444500000-E	1145	64	LF	BARRICADES (TYPE III)					
445500000-N	1150	60	MD	FLAGGER					
468500000-E	1205	1,298	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)					
468600000-E	1205	1,298	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)					
477000000-E	1205	1,208	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (3, PERMANENT WET REFLECTIVE)					

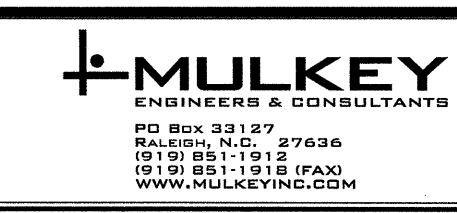
\*\*\*\*\* BEGIN SCHEDULE AA \*\*\*\*\*  
 \*\*\*\*\* (3 ALTERNATES) \*\*\*\*\*

036600000-E	310	324	LF	15" RC PIPE CULVERTS, CLASS III
AA1				
*** OR ***				
036600000-E	310	300	LF	15" RC PIPE CULVERTS, CLASS III
AA2				
053600000-E	SP	24	LF	**** HDPE PIPE CULVERTS (15")
AA2				
*** OR ***				
036600000-E	310	300	LF	15" RC PIPE CULVERTS, CLASS III
AA3				
054000000-E	SP	24	LF	**** ALUMINIZED CORRUGATED STEEL PIPE CULVERTS, **** THICK (15", 0.064")
AA3				

\*\*\*\*\* END SCHEDULE AA \*\*\*\*\*



8/17/09



PROJECT REFERENCE NO. B-4031	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
FOR -L- PROFILE SEE SHEET 5	

**DETAIL 'A'**  
TOE PROTECTION  
(Not to Scale)

d = 1 Ft.  
Type of Liner = PSRM  
-L- STA. 21+50 TO STA. 23+00 LT

**DETAIL 'B'**  
CUT DITCH  
(Not to Scale)

Min. D = 1 Ft.  
-L- STA. 22+00 TO STA. 24+00 RT  
-L- STA. 28+50 TO STA. 30+75 LT

**DETAIL 'C'**  
STANDARD 'V' DITCH  
(Not to Scale)

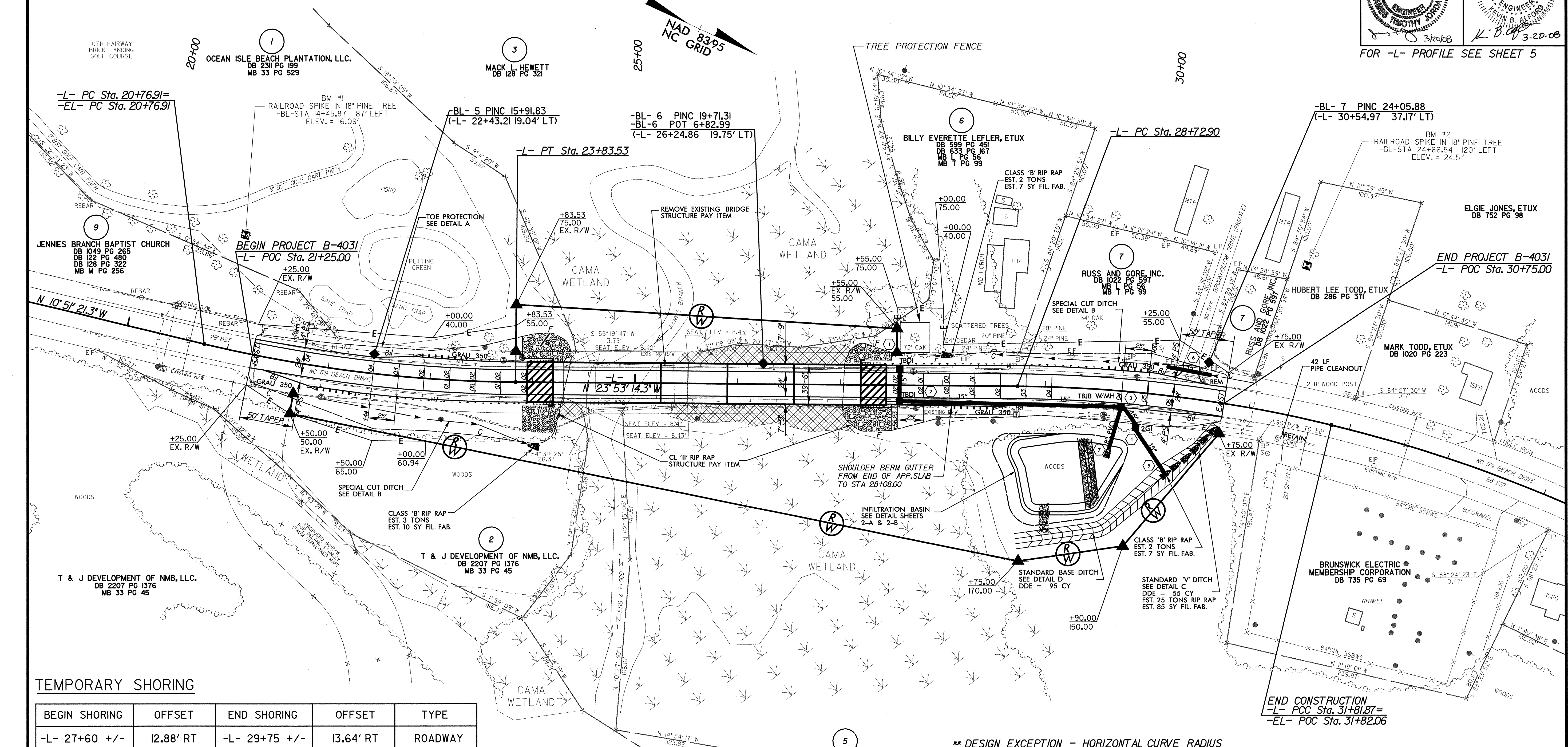
5 FT. MIN. FROM INFILTRATION BASIN  
Min. D = 1 Ft.  
Max. d = 1 Ft.  
Channel Slope = 13.5% +/-  
Type of Liner = Class 'B' Rip-Rap  
-L- STA. 30+25 TO STA. 30+75 RT

**DETAIL 'D'**  
STANDARD BASE DITCH  
(Not to Scale)

5 FT. MIN. FROM INFILTRATION BASIN  
Min. D = 1 Ft.  
Max. d = 1 Ft.  
B = 5 Ft.  
Channel Slope = 0.8% +/-  
Type of Liner = PSRM  
-L- STA. 28+70 TO STA. 30+25 RT

APPROACH SLAB

EXCAVATION TO NATURAL GROUND (STRUCTURE PAY ITEM)



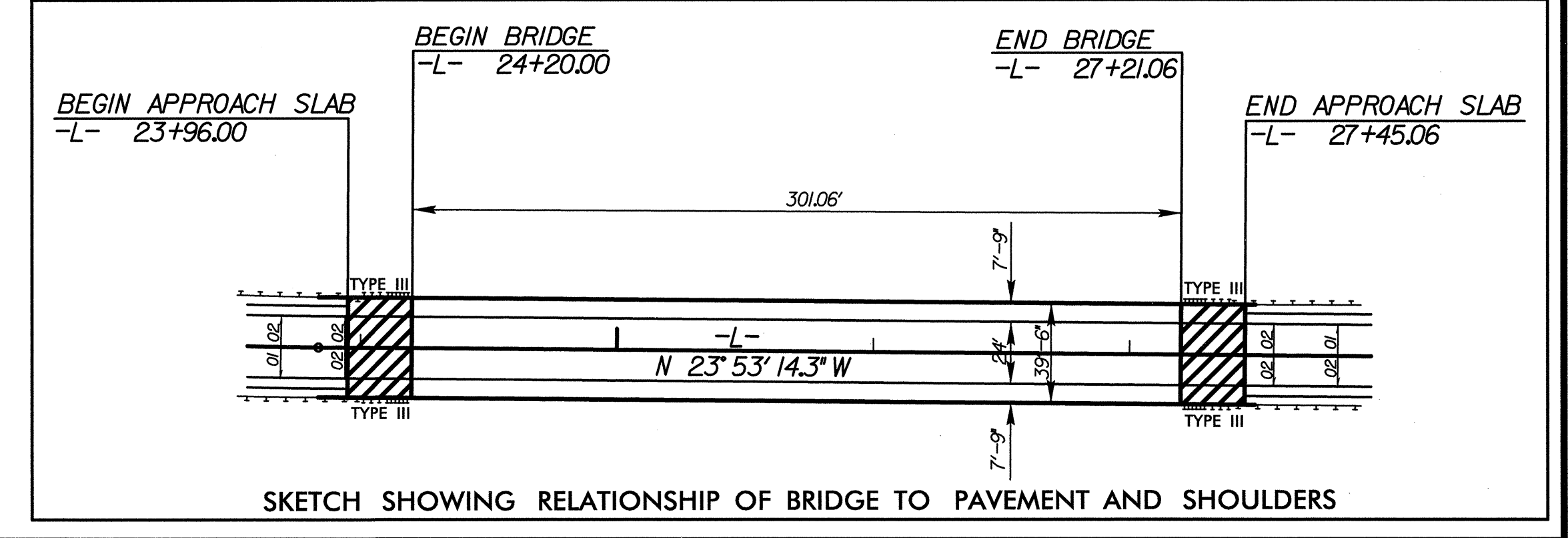
**TEMPORARY SHORING**

BEGIN SHORING	OFFSET	END SHORING	OFFSET	TYPE
-L- 27+60 +/-	12.88' RT	-L- 29+75 +/-	13.64' RT	ROADWAY

- TEMPORARY SHORING IS REQUIRED FOR THE PIPE INSTALLATION FROM -L- STA. 27+60 +/- TO 29+75 +/- . SEE TEMPORARY SHORING SPECIAL PROVISION AND DETAIL SHEET 2-C.
- WHEN USING CONTRACTOR DESIGNED SHORING, USE THE FOLLOWING SOIL PARAMETERS:  
UNIT WEIGHT OF SOIL ABOVE WATER TABLE,  $\gamma = 120$  PCF  
UNIT WEIGHT OF SOIL BELOW WATER TABLE,  $\gamma = 60$  PCF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  PSF
- FOR CONTRACTOR DESIGNED SHORING, SURVEY THE SHORING LOCATION TO DETERMINE EXISTING ELEVATIONS AND ACTUAL DESIGN HEIGHTS BEFORE BEGINNING DESIGN.
- DO NOT USE A TEMPORARY MSE WALL.
- NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF THE TEMPORARY SHORING. THE INFORMATION PROVIDED FOR DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

-L-		
PI Sta 22+30.89	PI Sta 30+28.06	PI Sta 33+74.16
$\Delta = 13^{\circ} 01' 53.0''$ (LT)	$\Delta = 13^{\circ} 06' 45.9''$ (RT)	$\Delta = 15^{\circ} 17' 32.3''$ (RT)
D = 4' 15' 00.0"	D = 4' 14' 38.9"	D = 4' 00' 00.0"
L = 306.62'	L = 308.96'	L = 382.31'
T = 153.98'	T = 155.16'	T = 192.30'
**R = 1,348.14'	**R = 1,350.00'	R = 1,432.39'
SE = 04	SE = 04	SE = 06
DS = 60	DS = 60	DS = 60

**\*\* DESIGN EXCEPTION - HORIZONTAL CURVE RADIUS**



3/6/2008 R:\Roadway\Proj\4031\psh.dgn

5/28/99

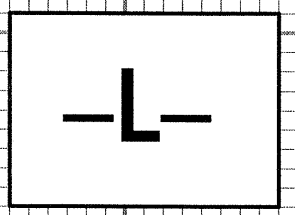


PROJECT REFERENCE NO. B-4031	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
3/22/08	3-20-08

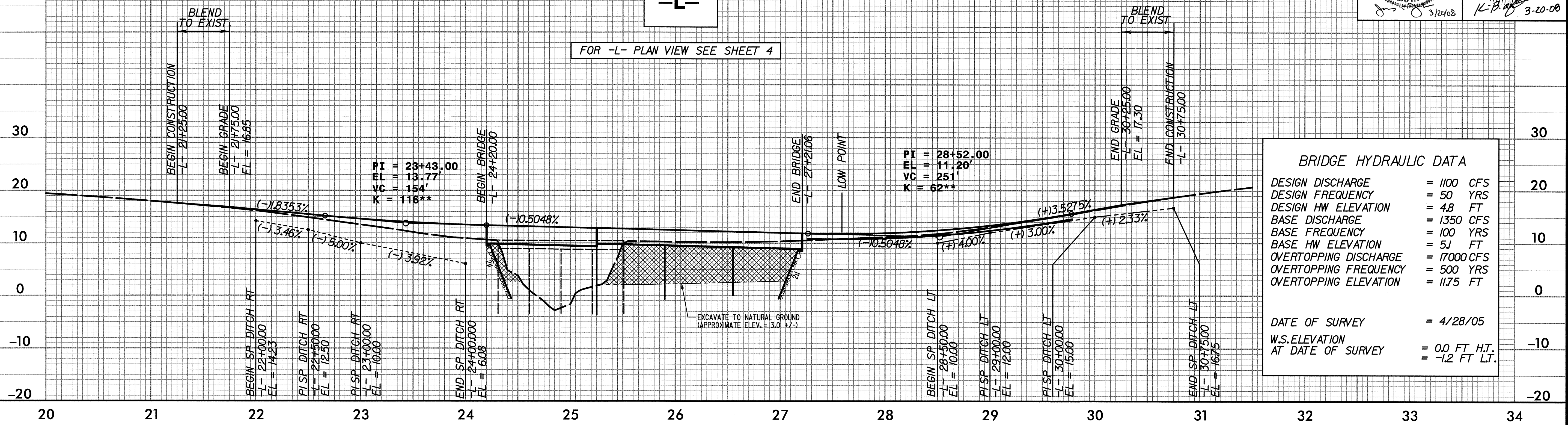
BM-#1  
RAILROAD SPIKE IN 18" PINE TREE  
-BL- STA 14+45.87 87' LEFT  
EL = 16.09'

BM-#2  
RAILROAD SPIKE IN 18" PINE TREE  
-BL- STA 22+66.54 120' LEFT  
EL = 24.51'

= DESIGN EXCEPTION - SAG VERTICAL CURVE K



FOR -L- PLAN VIEW SEE SHEET 4



**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE	= 1100 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 4.8 FT
BASE DISCHARGE	= 1350 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 5J FT
OVERTOPPING DISCHARGE	= 17000 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 11.75 FT

DATE OF SURVEY	= 4/28/05
W.S. ELEVATION AT DATE OF SURVEY	= 0.0 FT HT. = -1.2 FT LT.

1/18/2008  
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