

09/06/11

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

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

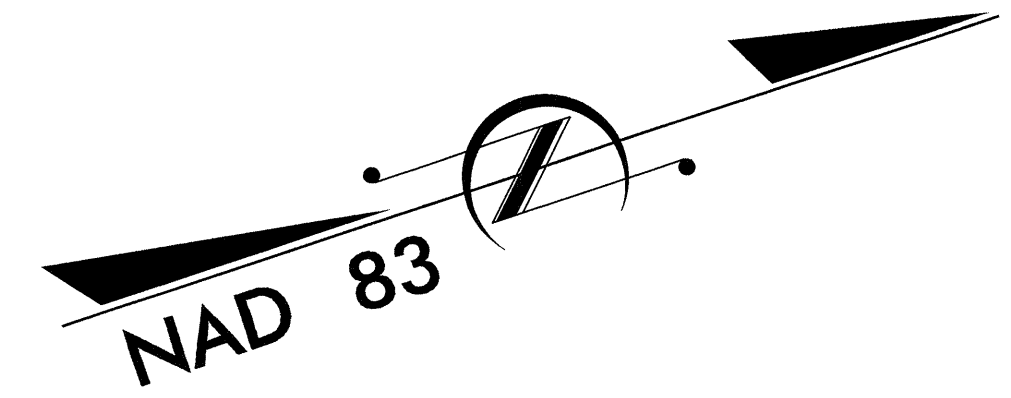
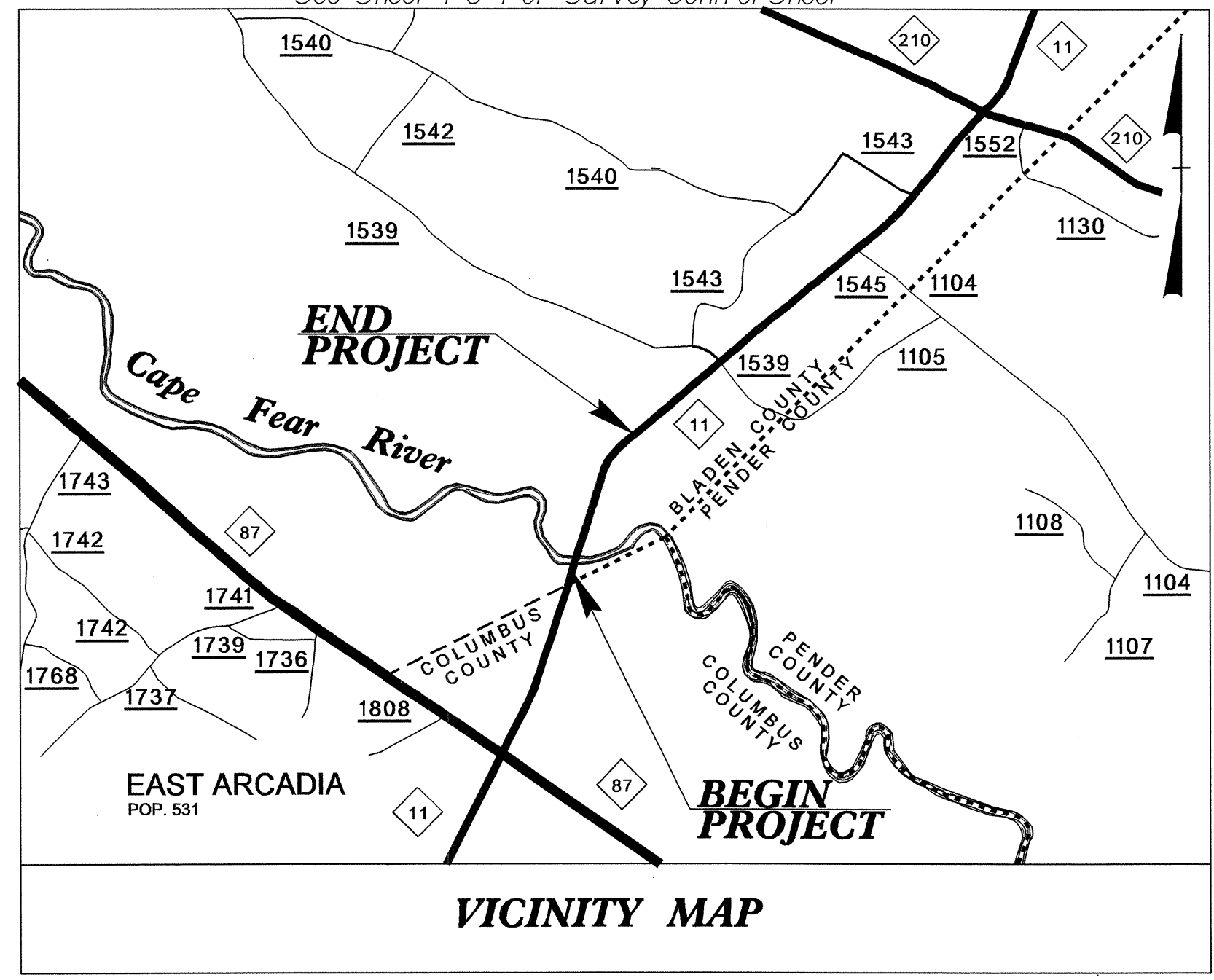
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4028	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33395.1.1	BRSTP-0011(9)	P.E.	
33395.3.1	BRSTP-0011(9)	RW & UTIL.	
33395.2.2	BRSTP-0011(9)	CONST.	

**BLADEN COUNTY**

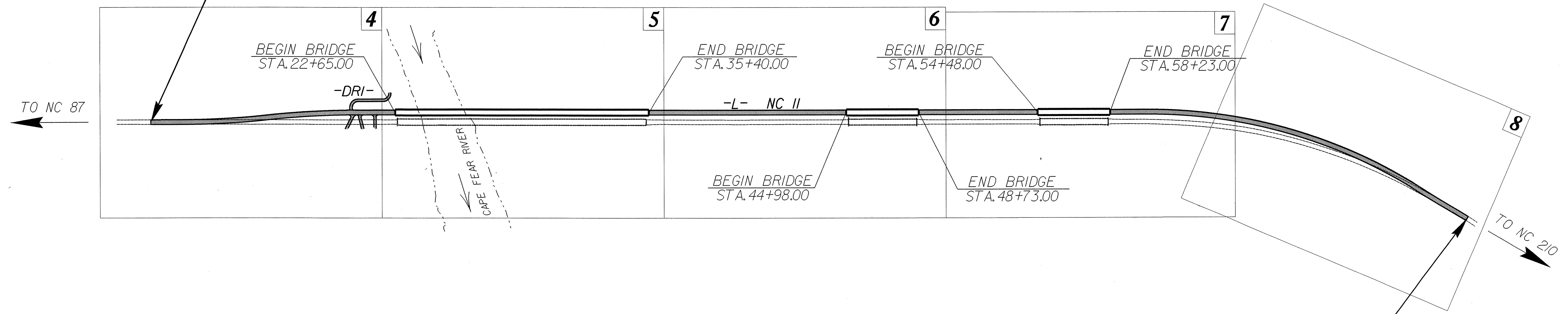
LOCATION: BRIDGE NOS. 12, 18 AND 42 OVER CAPE FEAR RIVER AND OVERFLOW ON NC 11

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES

TIP PROJECT: B-4028

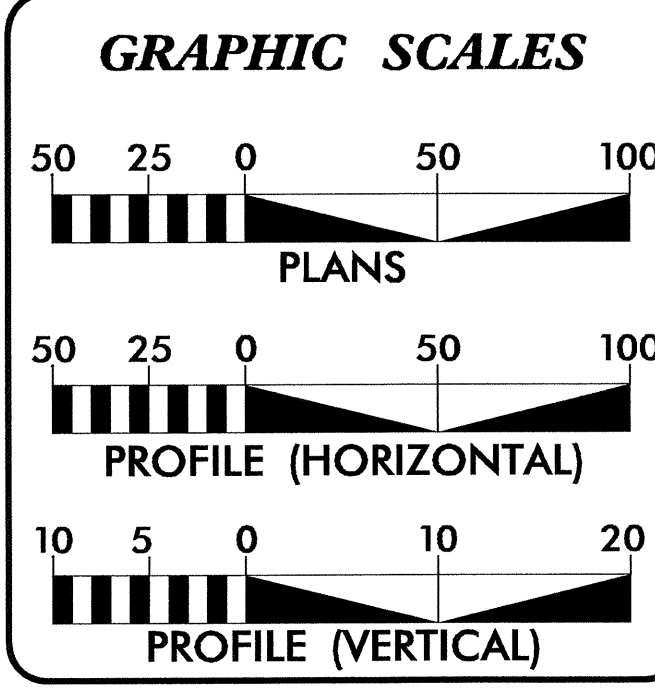


STA. 10+50.00 -L- BEGIN TIP PROJECT B-4028



STA. 77+00.00 -L- END TIP PROJECT B-4028

CONTRACT: C202878



**DESIGN DATA**

ADT 2012	=	3700
ADT 2032	=	6500
DHV	=	11 %
D	=	55 %
T	=	34 % *
V	=	60 MPH
* TTST	=	28% DUAL 6%
FUNC. CLASS=MAJOR COLLECTOR		
REGIONAL TIER		

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4028	=	0.875 MILES
LENGTH STRUCTURES TIP PROJECT B-4028	=	0.384 MILES
TOTAL LENGTH TIP PROJECT B-4028	=	1.259 MILES

Prepared In the Office of:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
OCTOBER 22, 2010

**LETTING DATE:**  
AUGUST 21, 2012

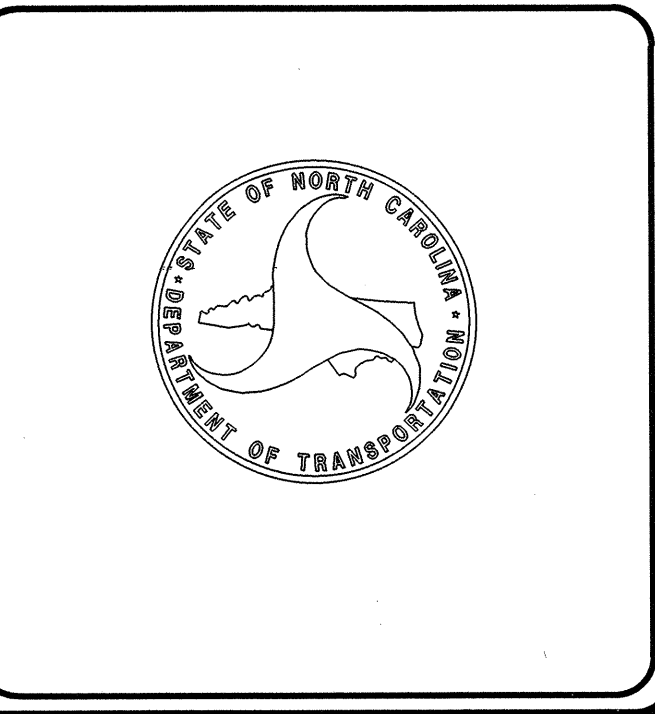
**BRENDA MOORE, PE**  
PROJECT ENGINEER

**TATIA L. WHITE, PE**  
PROJECT DESIGN ENGINEER

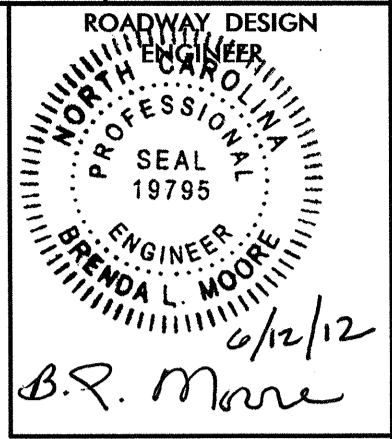
**HYDRAULIC ENGINEER**

**ROADWAY DESIGN ENGINEER**

Signature: *Brenda P. Moore* P.E. 5/28/12



25-MAY-2012 08:05  
r:\roadway\proj\bladen\4028\_rdy\_tsh.dgn  
\$\$\$\$\$USERNAME\$\$\$\$\$



SHEET NUMBER	INDEX OF SHEETS SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, WEDGING DETAILS, SHOULDER BERM GUTTER DETAIL
2-A	TEMPORARY ANCHOR UNIT TYPE W-BEAM
2-B	ROCK EMBANKMENT DETAILS
2-C THRU 2-C1	EMBANKMENT MONITORING DETAILS
2-D THRU 2-F	STANDARD TEMPORARY WALL
2-G	STANDARD TEMPORARY SHORING
3	SUMMARY OF QUANTITIES
3A-3B	SUMMARY OF DRAINAGE QUANTITIES SUMMARY OF GUARDRAIL, EARTHWORK SUMMARY, ASPHALT PAVEMENT REMOVAL SUMMARY AND SHOULDER BERM GUTTER SUMMARY
4 THRU 8	PLAN SHEET
9 THRU 11	PROFILE SHEET
TMP-1 THRU TMP-7	TRAFFIC CONTROL PLANS
PMP-1 THRU PMP-4	PAVEMENT MARKING PLANS
EC-1 THRU EC-13	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
SIGN-1 THRU SIGN-8	SIGNING PLANS
UO-1 THRU UO-6	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTIONS VOLUME SUMMARY
X-1 THRU X-38	CROSS-SECTIONS
S-1 THRU S-	STRUCTURE PLANS

**GENERAL NOTES:**

2012 SPECIFICATIONS  
EFFECTIVE: 01-17-12  
REVISED: 11/01/11

**GRADING AND SURFACING OR RESURFACING AND WIDENING:**

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

**CLEARING:**

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

**SUPERELEVATION:**

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

**SHOULDER CONSTRUCTION:**

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

**SIDE ROADS:**

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

**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".

**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 FOUR COUNTY EMC (ELECTRIC)  
EARTHLINK (TELEPHONE)  
AT&T (TELEPHONE)

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.

2012 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 January, 2012 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
<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 6 - ASPHALT BASES AND PAVEMENTS</b>	
654.01	Pavement Repairs
<b>DIVISION 8 - INCIDENTALS</b>	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.71	Concrete and Brick Pipe Plug
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
876.02	Guide for Rip Rap at Pipe Outlets

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

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

### BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○
Property Corner	✕
Property Monument	EDM
Parcel/Sequence Number	(123)
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	-----
Known Soil Contamination: Area or Site	☠ ☠
Potential Soil Contamination: Area or Site	☠ ?

### 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	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite R/W Marker	-----
Proposed Control of Access Line with Concrete CA 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 Drainage / Utility Easement	-----
Proposed Permanent Utility Easement	-----
Proposed Temporary Utility Easement	-----
Proposed Aerial Utility Easement	-----
Proposed Permanent Easement with Iron Pin and Cap Marker	-----

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Curb Ramp	-----
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	-----

### 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:

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:

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	-----
Designated U/G TV Cable (S.U.E.*)	-----
Recorded U/G Fiber Optic Cable	-----
Designated U/G Fiber Optic Cable (S.U.E.*)	-----

### GAS:

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

### SANITARY SEWER:

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

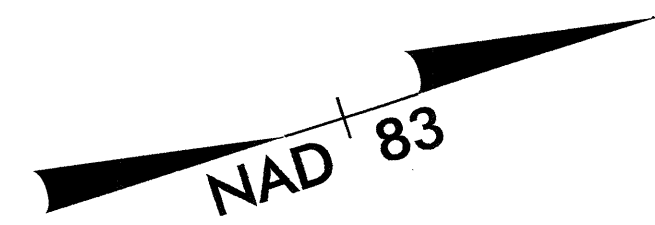
### MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	⊠
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line	-----
U/G Tank; Water, Gas, Oil	-----
Underground Storage Tank, Approx. Loc.	UST
A/G Tank; Water, Gas, Oil	-----
Geoenvironmental Boring	⊕
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-4028	1-C
Location and Surveys	

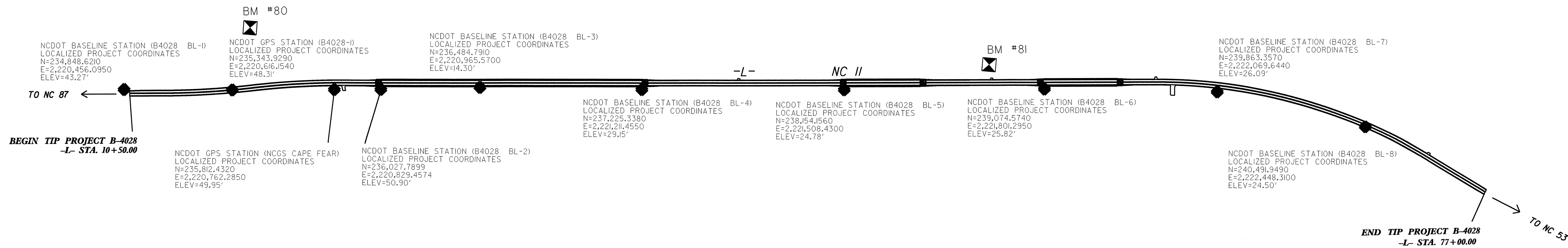
# SURVEY CONTROL SHEET B-4028



BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	B4028 BL-1	234848.6210	2220456.0950	43.27	10+25.87	16.61 LT
101	B4028-1 GPS	235343.9290	2220616.1540	48.31	15+46.79	0.19 RT
102	B4028-2 GPS	235812.4320	2220762.2850	49.95	20+38.63	30.61 RT
2	B4028 BL-2	236027.7899	2220829.4574	50.90	22+64.51	29.46 RT
3	B4028 BL-3	236484.7910	2220965.5700	14.30	27+41.26	20.53 RT
4	B4028 BL-4	237225.3380	2221211.4550	29.15	35+21.51	30.18 RT
5	B4028 BL-5	238154.1560	2221508.4300	24.78	44+96.64	31.41 RT
6	B4028 BL-6	239074.5740	2221801.2950	25.82	54+62.53	31.27 RT
7	B4028 BL-7	239863.3570	2222069.6440	26.09	62+99.80	31.08 RT
8	B4028 BL-8	240491.9490	2222448.3100	24.50	70+41.86	8.44 RT

.....  
 80 ELEVATION = 49.37  
 N 235530 E 2220352  
 L STATION 16+75.00 296 LEFT  
 RR SPIKE IN 20' PINE  
 .....

.....  
 81 ELEVATION = 11.51  
 N 238876 E 2221636  
 L STATION 52+24.00 66 LEFT  
 RR SPIKE IN 18' CYPRESS  
 .....



### DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "CAPE FEAR" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 2358124319(f1) EASTING: 22207622842(f1) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99998614 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CAPE FEAR" TO L- STATION 10+50.00 IS S 16°39'34.0" 987.2939' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

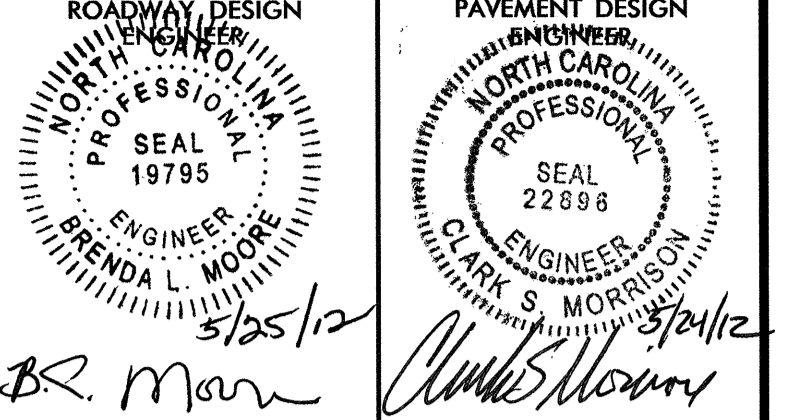
**NOTES:**

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.NCDOT.ORG/DOHPRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/B4028\\_LS\\_CONTROL\\_091116.TXT](http://www.ncdot.org/dohpreconstruct/highway/location/project/B4028_LS_CONTROL_091116.dgn)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 B4028\_LS\_CONTROL\_091116.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.

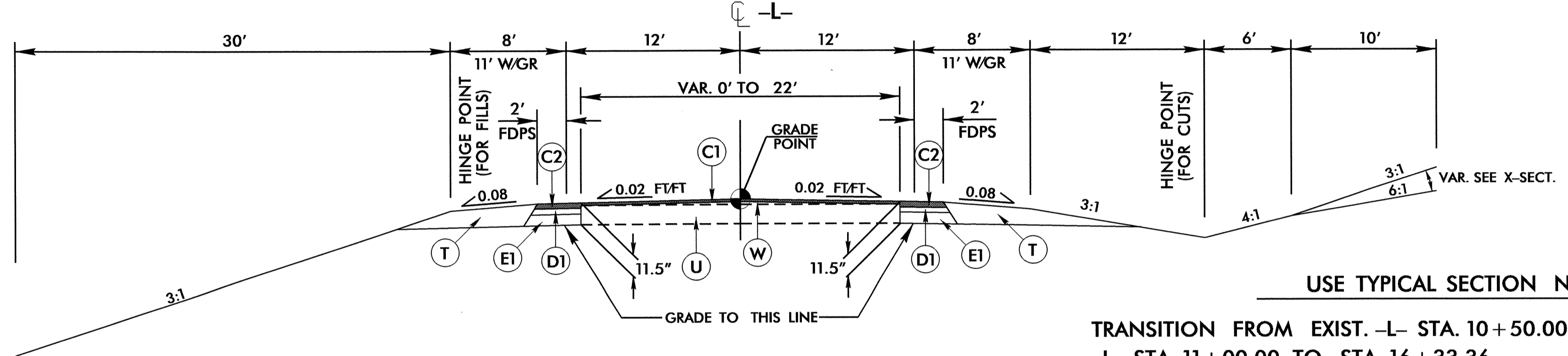
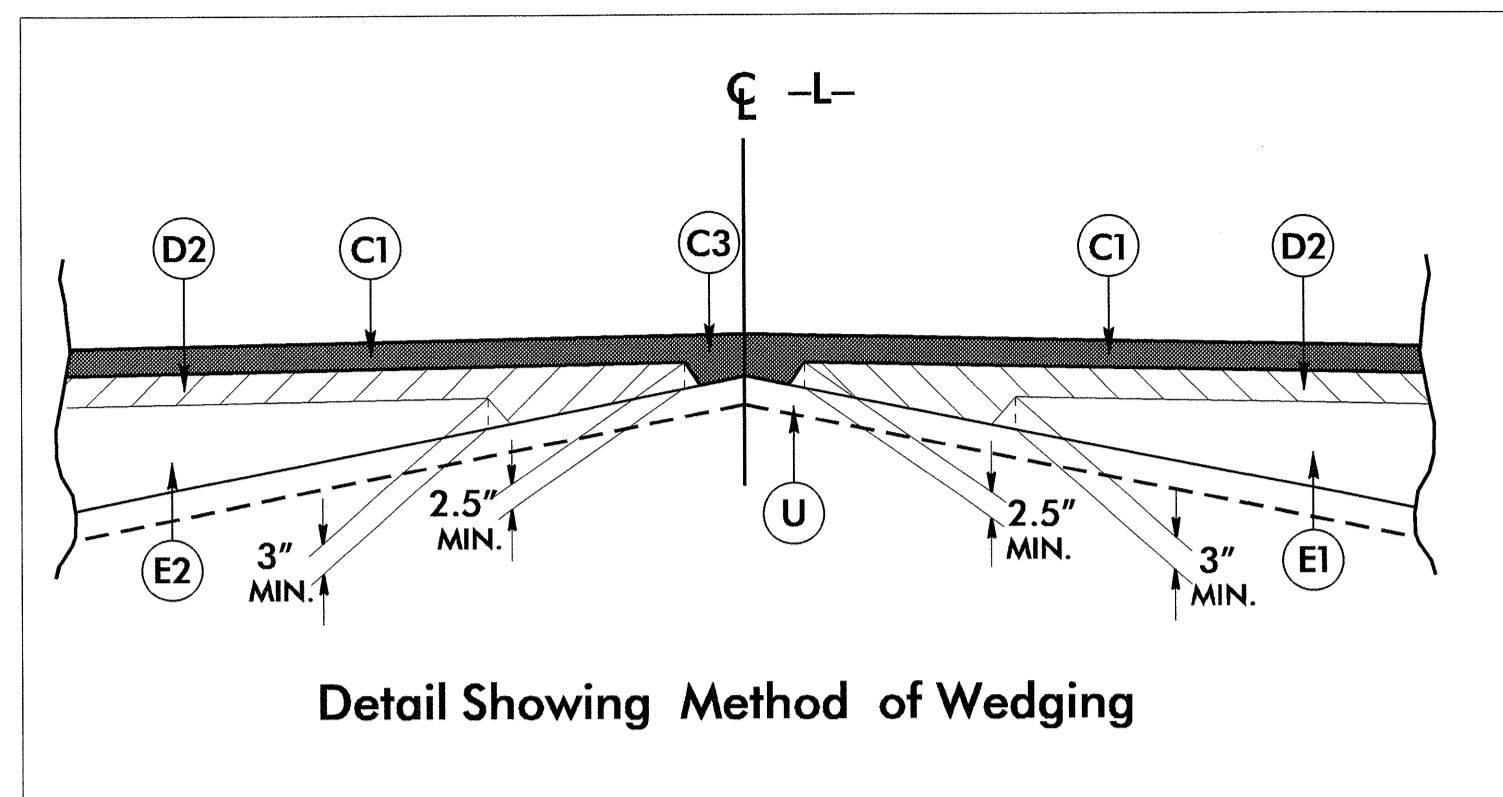
NOTE: DRAWING NOT TO SCALE

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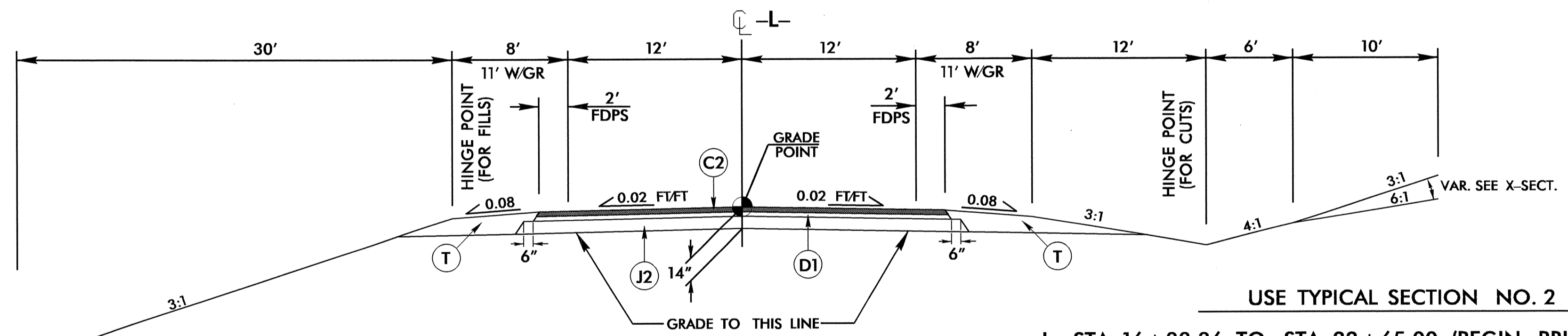


FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 5.5" 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 5 1/2" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE.
J2	PROP. 8" AGGREGATE BASE COURSE.
P	PRIME COAT AT THE RATE OF .35 GAL PER SQ. YD.
R	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET).

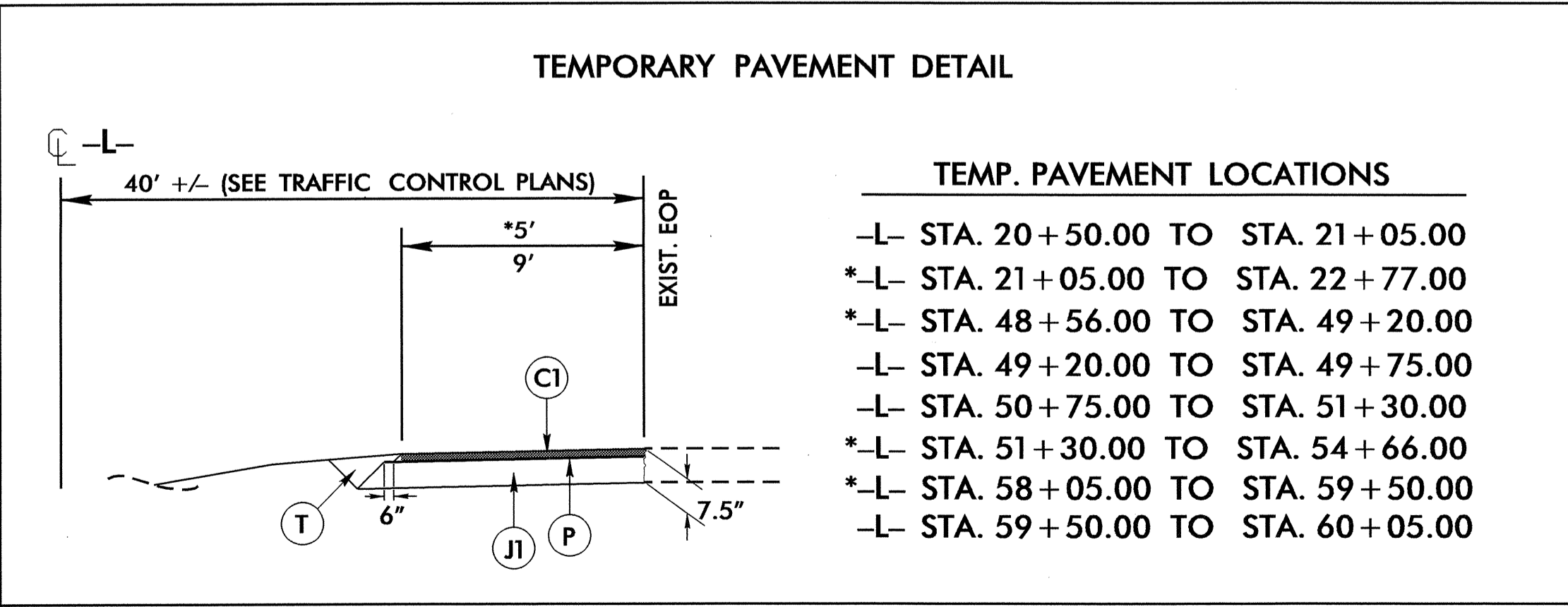
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



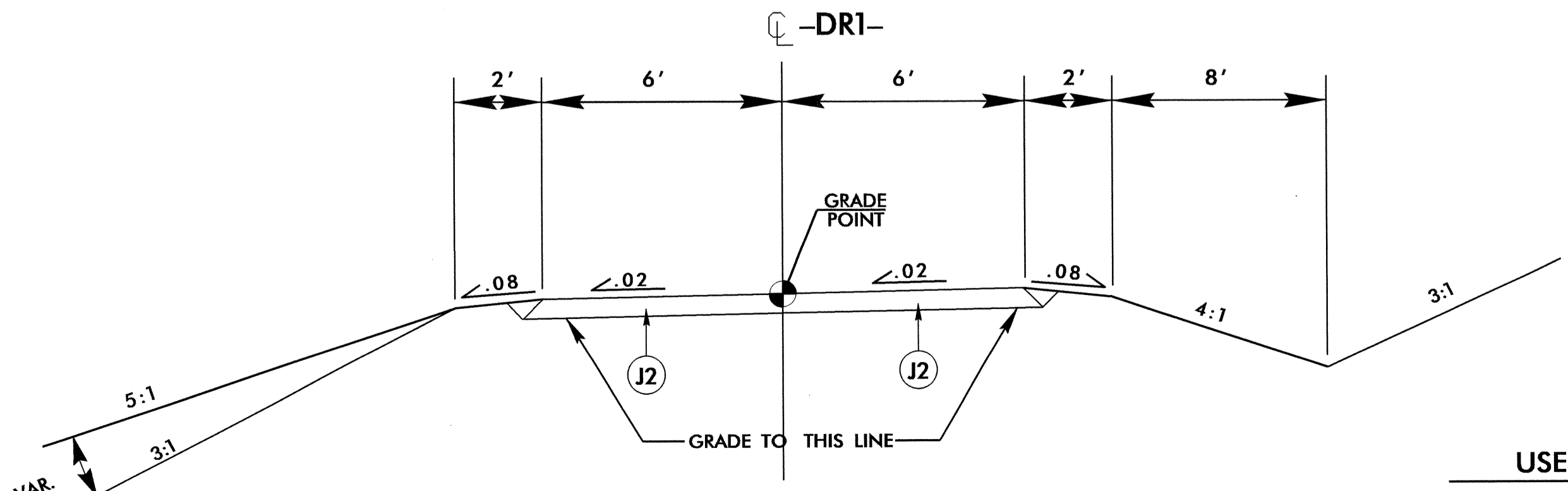
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 TRANSITION FROM EXIST. -L- STA. 10+50.00 TO STA. 11+00.00  
 -L- STA. 11+00.00 TO STA. 16+33.36  
 -L- STA. 71+01.97 TO STA. 76+50.00  
 TRANSITION TO EXIST. -L- STA. 76+50.00 TO STA. 77+00.00



USE TYPICAL SECTION NO. 2  
 -L- STA. 16+33.36 TO STA. 22+65.00 (BEGIN BRIDGE)  
 -L- STA. 35+40.00 (END BRIDGE) TO STA. 44+98.00 (BEGIN BRIDGE)  
 -L- STA. 48+73.00 (END BRIDGE) TO STA. 54+48.00 (BEGIN BRIDGE)  
 -L- STA. 58+23.00 (END BRIDGE) TO STA. 71+01.97

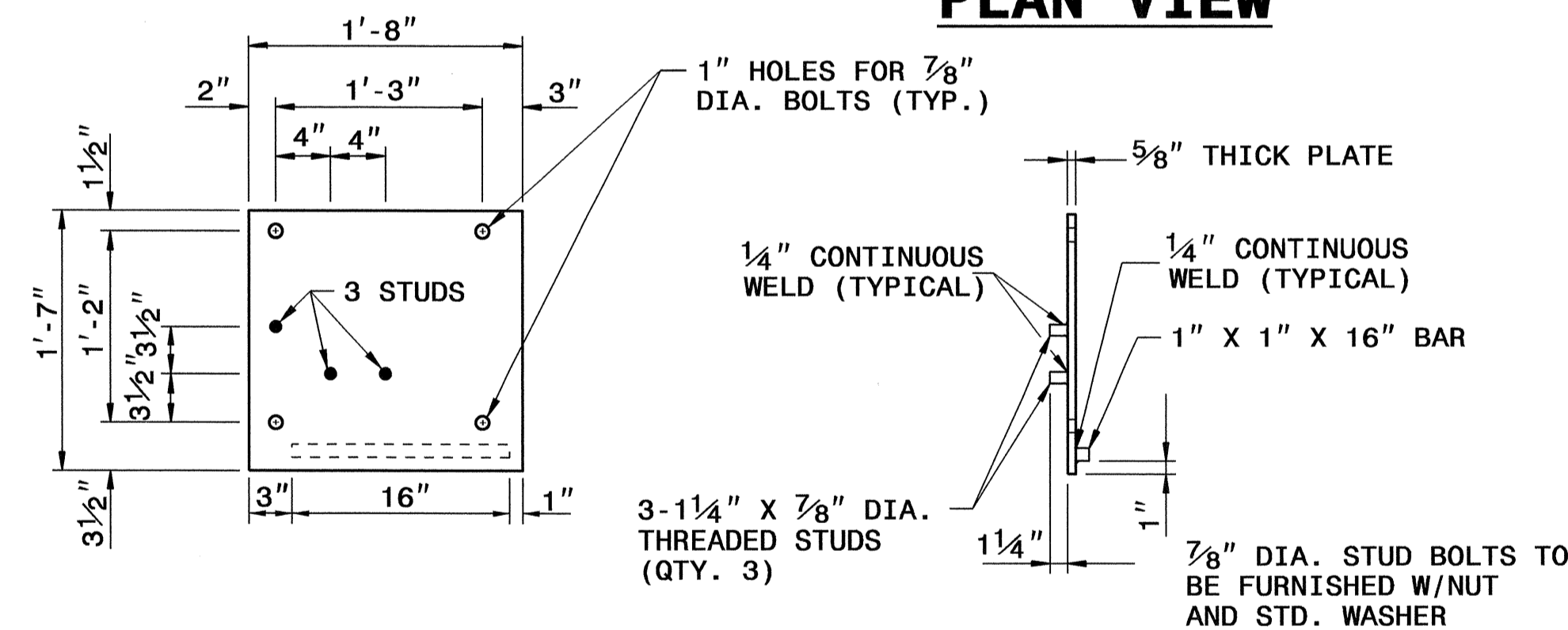
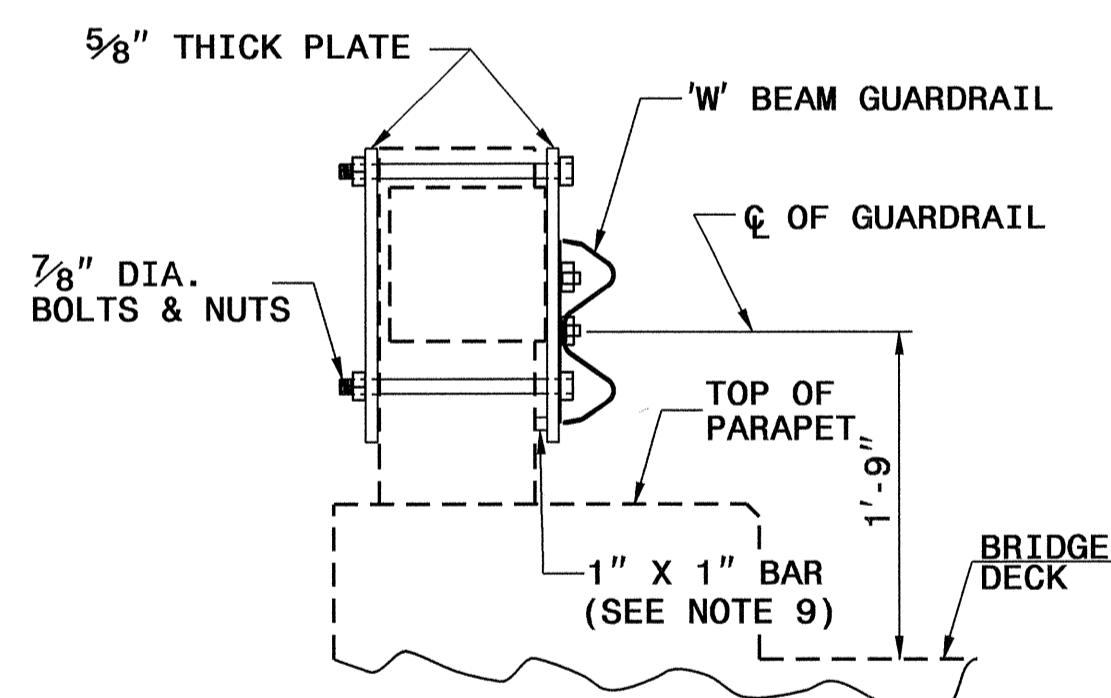
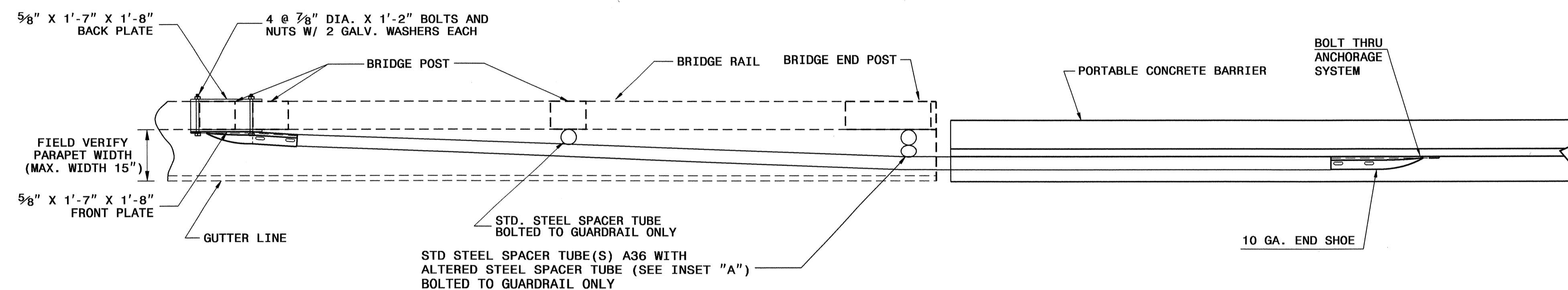
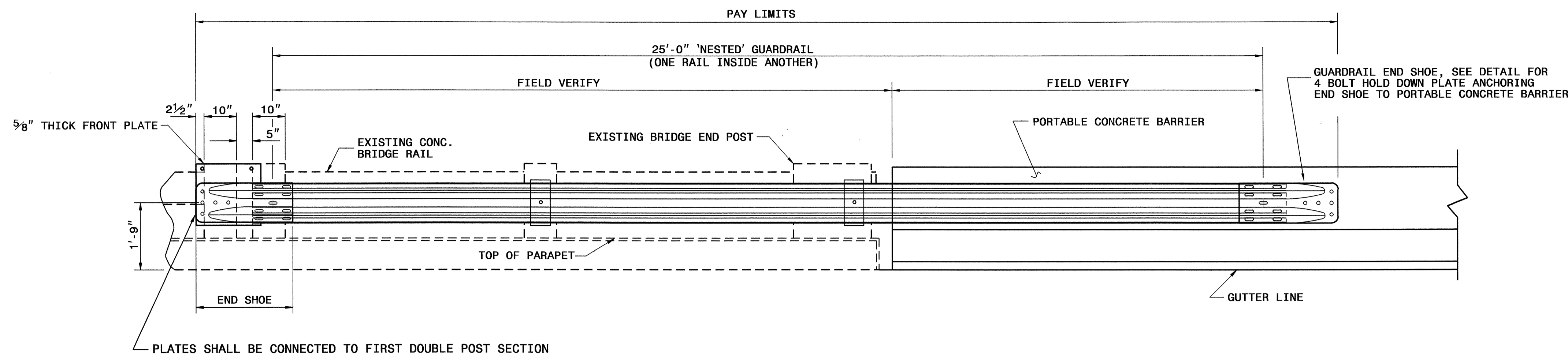


TEMP. PAVEMENT LOCATIONS	
-L-	STA. 20+50.00 TO STA. 21+05.00
*-L-	STA. 21+05.00 TO STA. 22+77.00
*-L-	STA. 48+56.00 TO STA. 49+20.00
-L-	STA. 49+20.00 TO STA. 49+75.00
-L-	STA. 50+75.00 TO STA. 51+30.00
*-L-	STA. 51+30.00 TO STA. 54+66.00
*-L-	STA. 58+05.00 TO STA. 59+50.00
-L-	STA. 59+50.00 TO STA. 60+05.00



USE TYPICAL SECTION NO. 2  
 -L- STA. 10+12.00 TO STA. 12+63.92

6/2/95 15-MAY-2012 07:52 b-4028\_r.dwg tjb.dgn

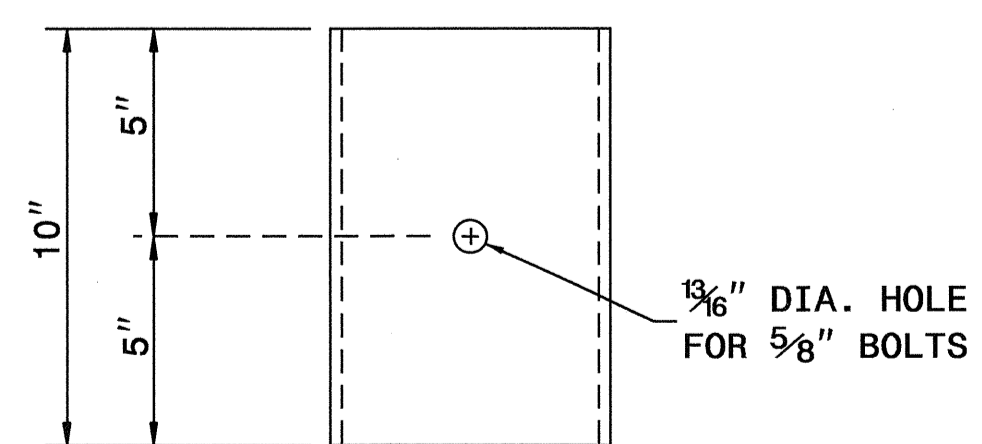


STUDS MAY BE ADJUSTED TO MEET FIELD CONDITIONS

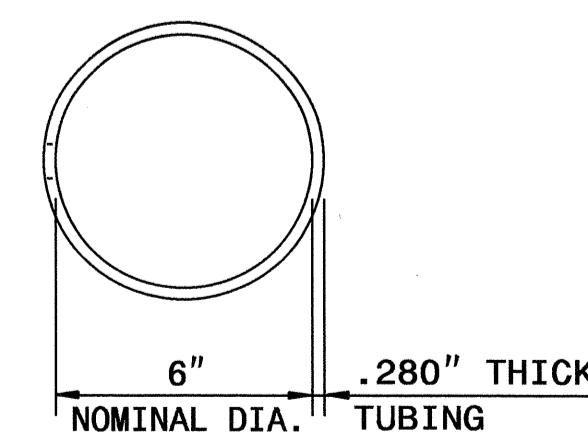
**FRONT VIEW**

**SIDE VIEW**

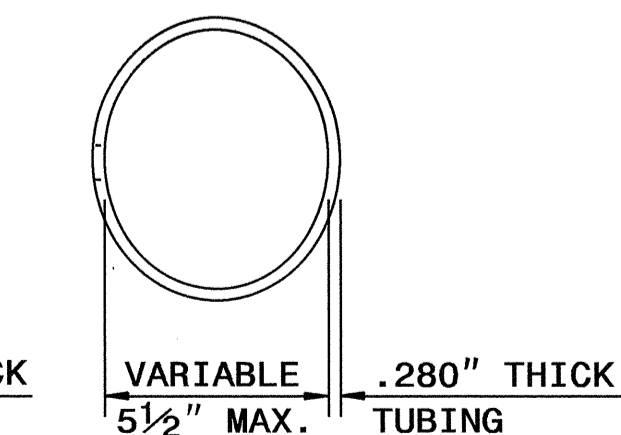
**FRONT PLATE**



**FRONT VIEW**



**PLAN VIEW**



**PLAN VIEW INSET "A"**

**STEEL SPACER TUBE**

**GENERAL NOTES:**

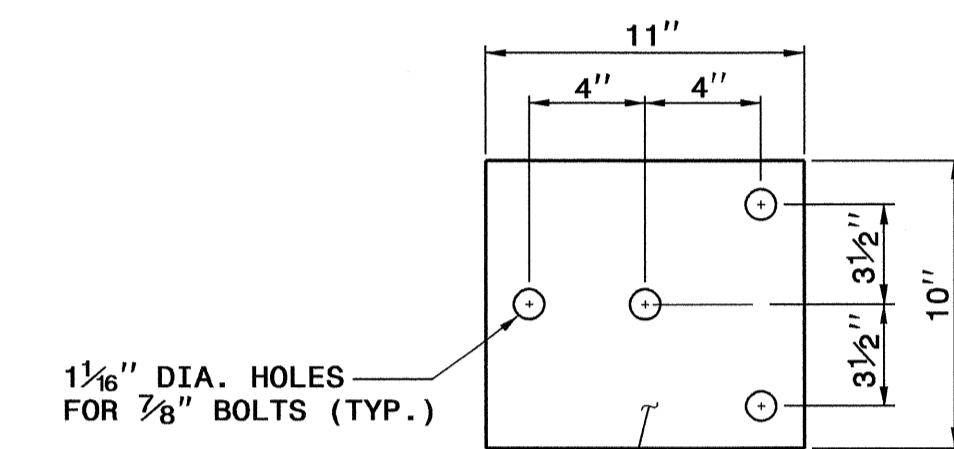
- USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
- TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
- USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
- ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
- INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE AT BRIDGE END POST SPACER TUBE LOCATION BY USING STANDARD OR ALTERED SPACER TUBES OR A COMBINATION THEREOF OR AS DIRECTED BY THE ENGINEER. FOR VERY SMALL PARAPET WIDTHS, GUARDRAIL MAY BE INSTALLED AGAINST BRIDGE RAIL WITHOUT SPACER TUBES.
- DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
- KEEP TOE OF PORTABLE CONCRETE BARRIER FLUSH WITH FACE OF PARAPET.
- ATTACH 1" X 1" BAR AND THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
- 1" X 1" BAR MAY NOT BE NEEDED ON BRIDGE RAILS WHERE FACE OF RAIL DOES NOT PROJECT BEYOND FACE OF POST.

**NOTES FOR 4 BOLT HOLD DOWN PLATE**

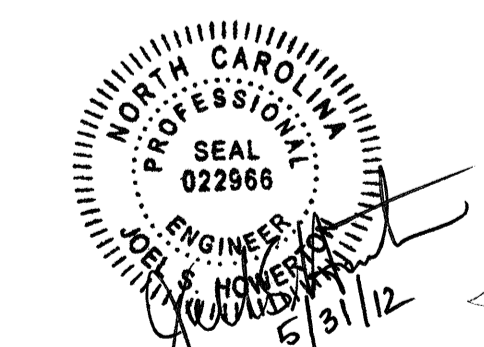
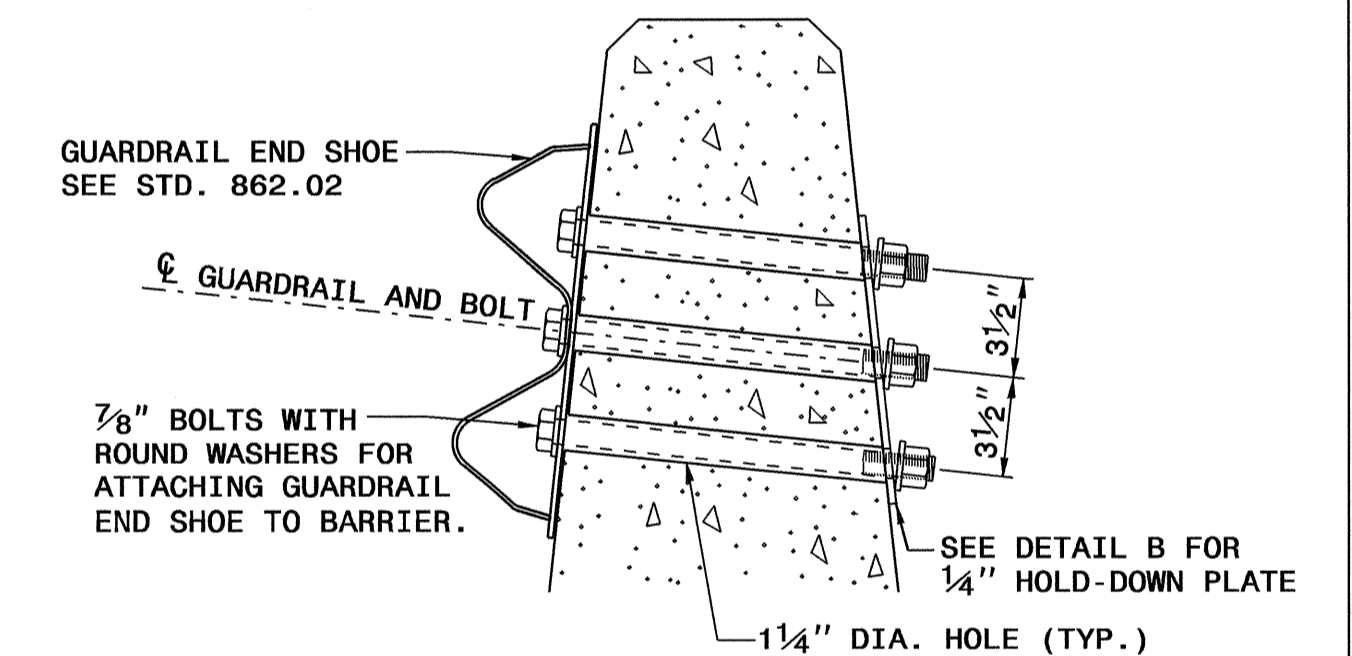
THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 4 - 7/8" DIA. BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL. THE 1/4" DIA. HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



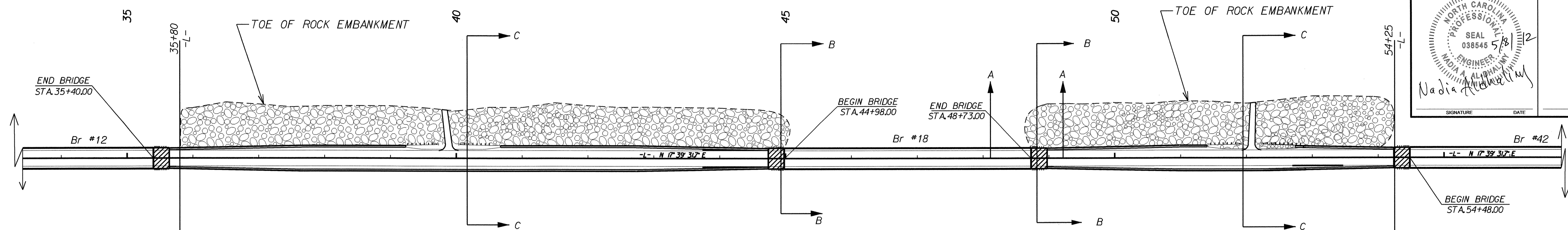
**4 BOLT HOLD DOWN PLATE**



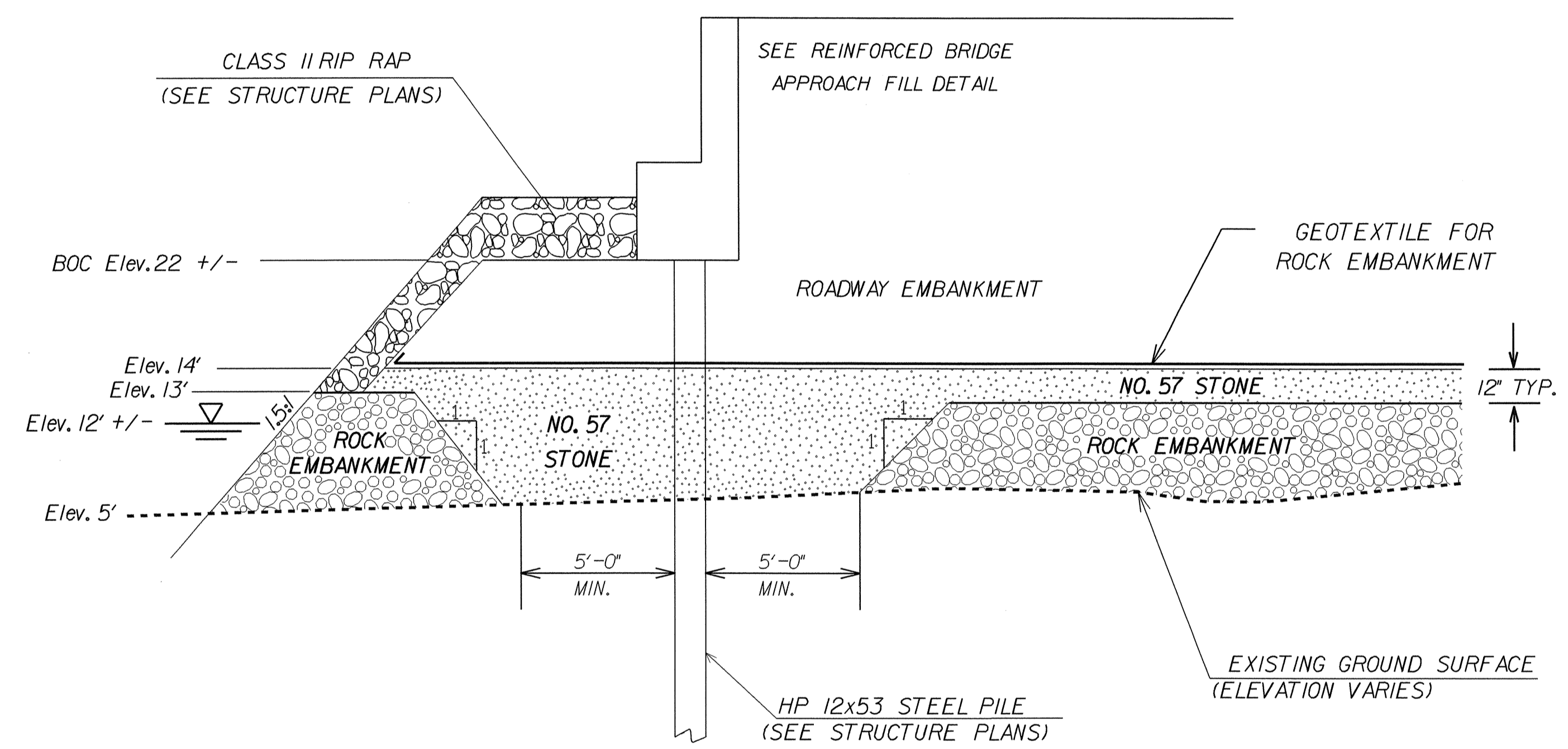
**CONTRACT STANDARDS AND DEVELOPMENT UNIT**  
Office 919-707-6950 FAX 919-250-4119

**TEMPORARY ANCHOR UNIT TYPE W-BEAM**

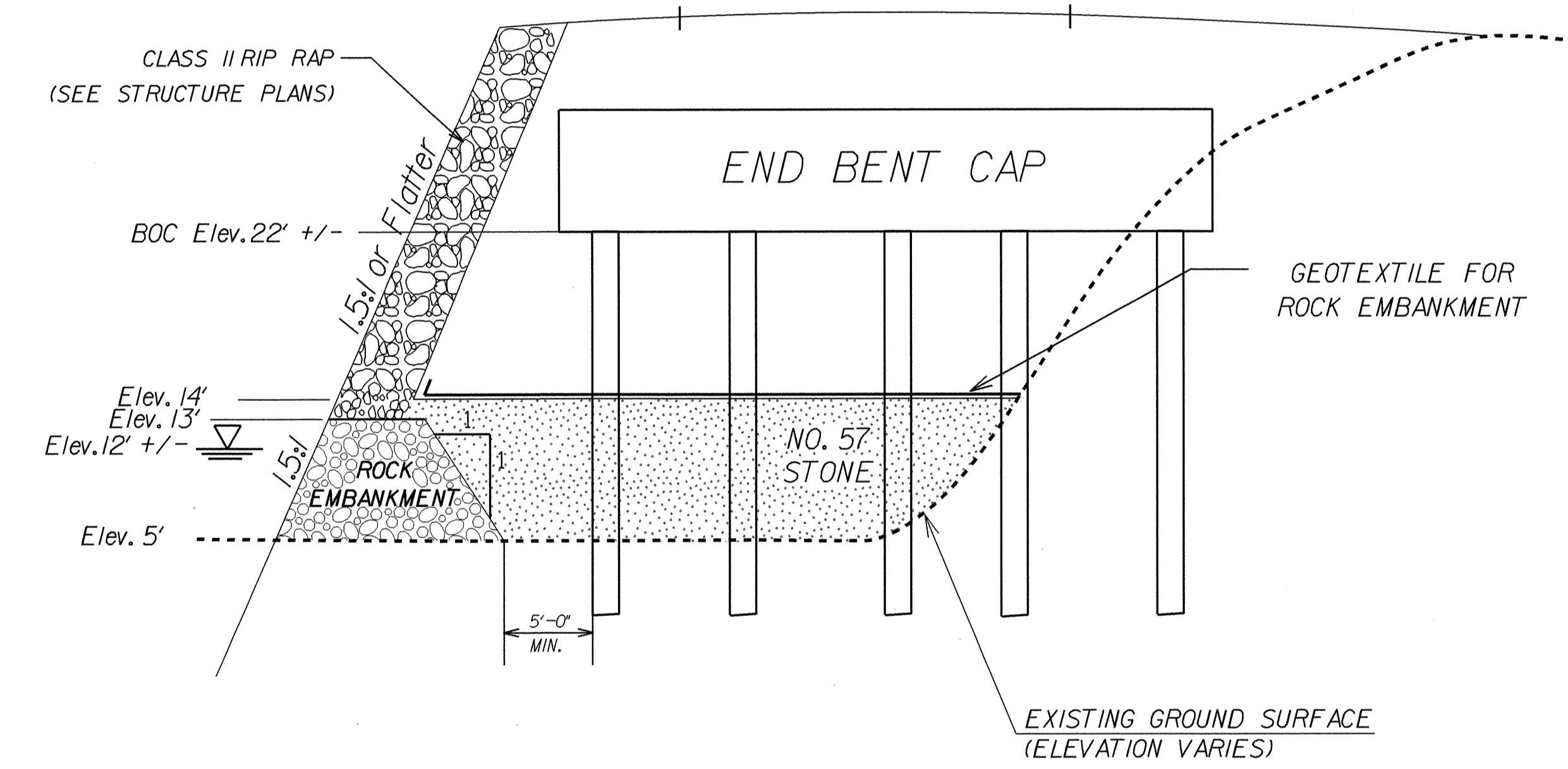
ORIGINAL BY: E.E. WARD DATE: 4-03  
MODIFIED BY: E.E. WARD DATE: 6-04  
CHECKED BY: [Signature] DATE: 4/10/12  
FILE SPEC.: [Path]



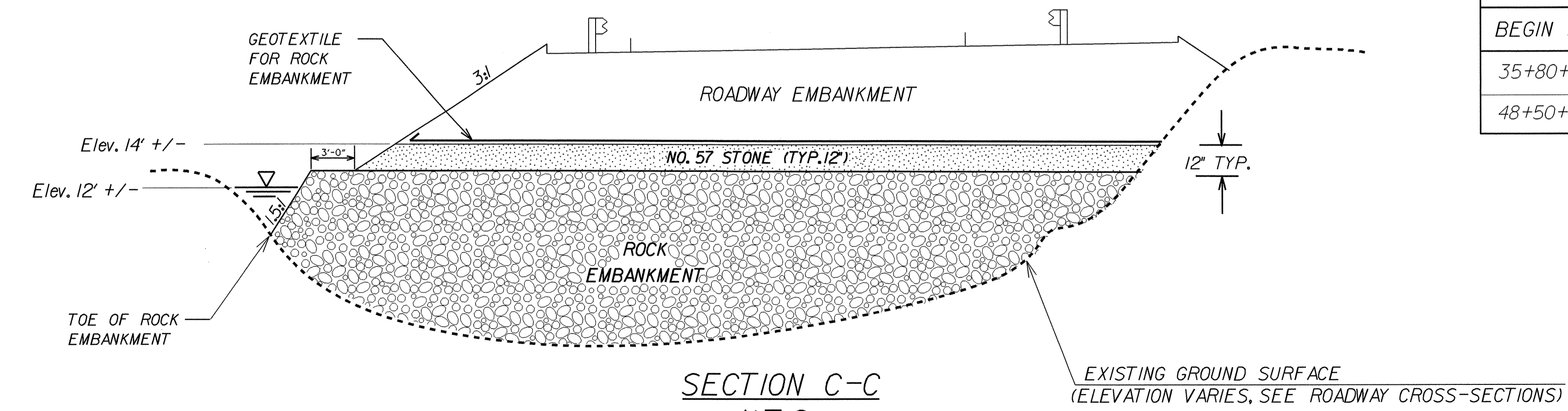
PLAN VIEW  
N.T.S.



SECTION (A-A TYP. STA 44+98-L- AND STA 48+73-L-)  
N.T.S.



SECTION B-B  
N.T.S.



SECTION C-C  
N.T.S.

ROCK EMBANKMENT STATIONS		
BEGIN STATION	END STATION	LOCATION
35+80 +/- -L-	45+25 +/- -L-	Left
48+50 +/- -L-	54+25 +/- -L-	Left

ESTIMATED QUANTITIES	
ROCK EMBANKMENTS	38435 TONS
# 57 STONE	9200 TONS
GEOTEXTILE FOR ROCK EMBANKMENTS	12000 SY

PREPARED BY: N. AL-DHALIMY DATE: 4-2011  
 REVIEWED BY: J. PARK DATE: 5-2011

**GEOTECHNICAL ENGINEERING UNIT**

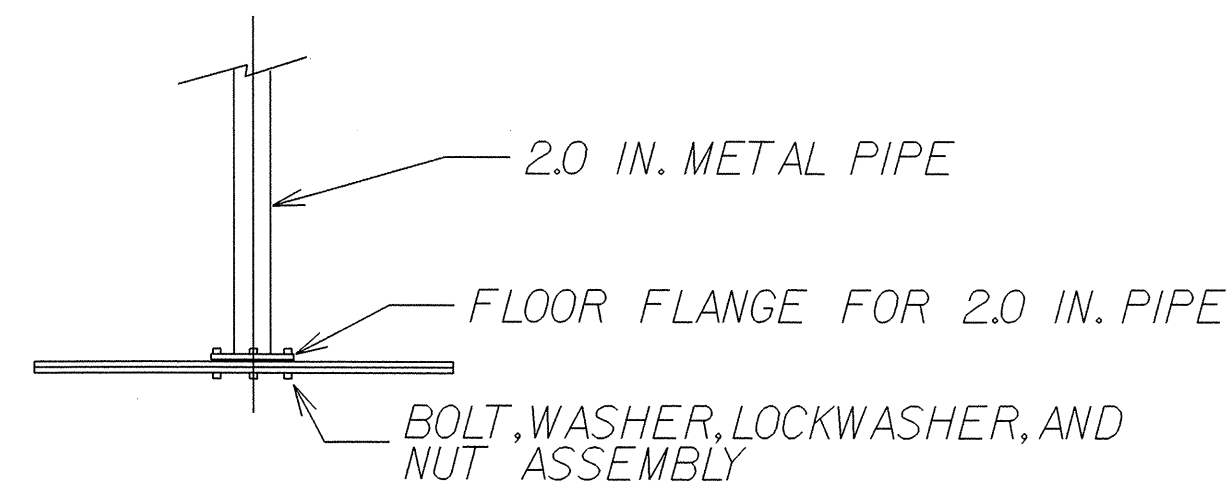
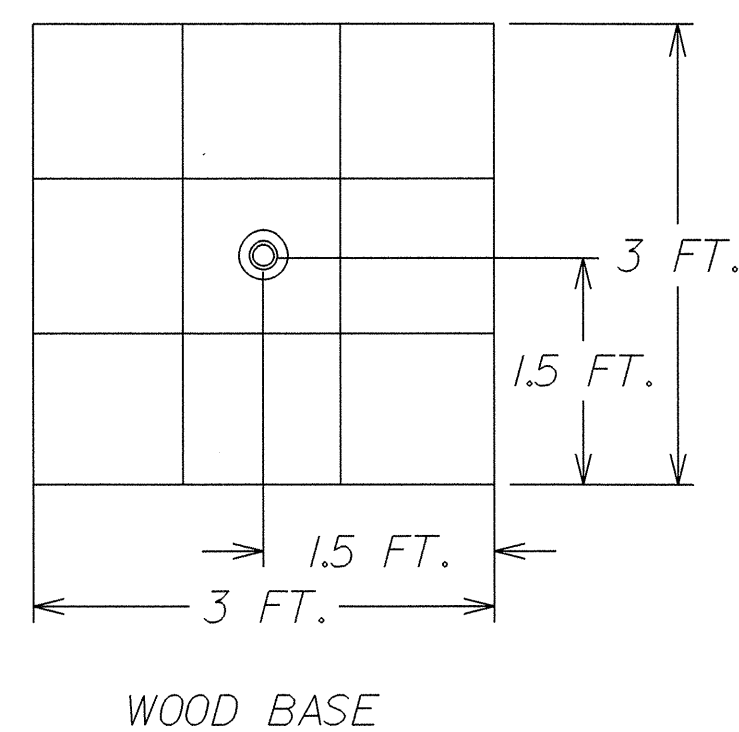
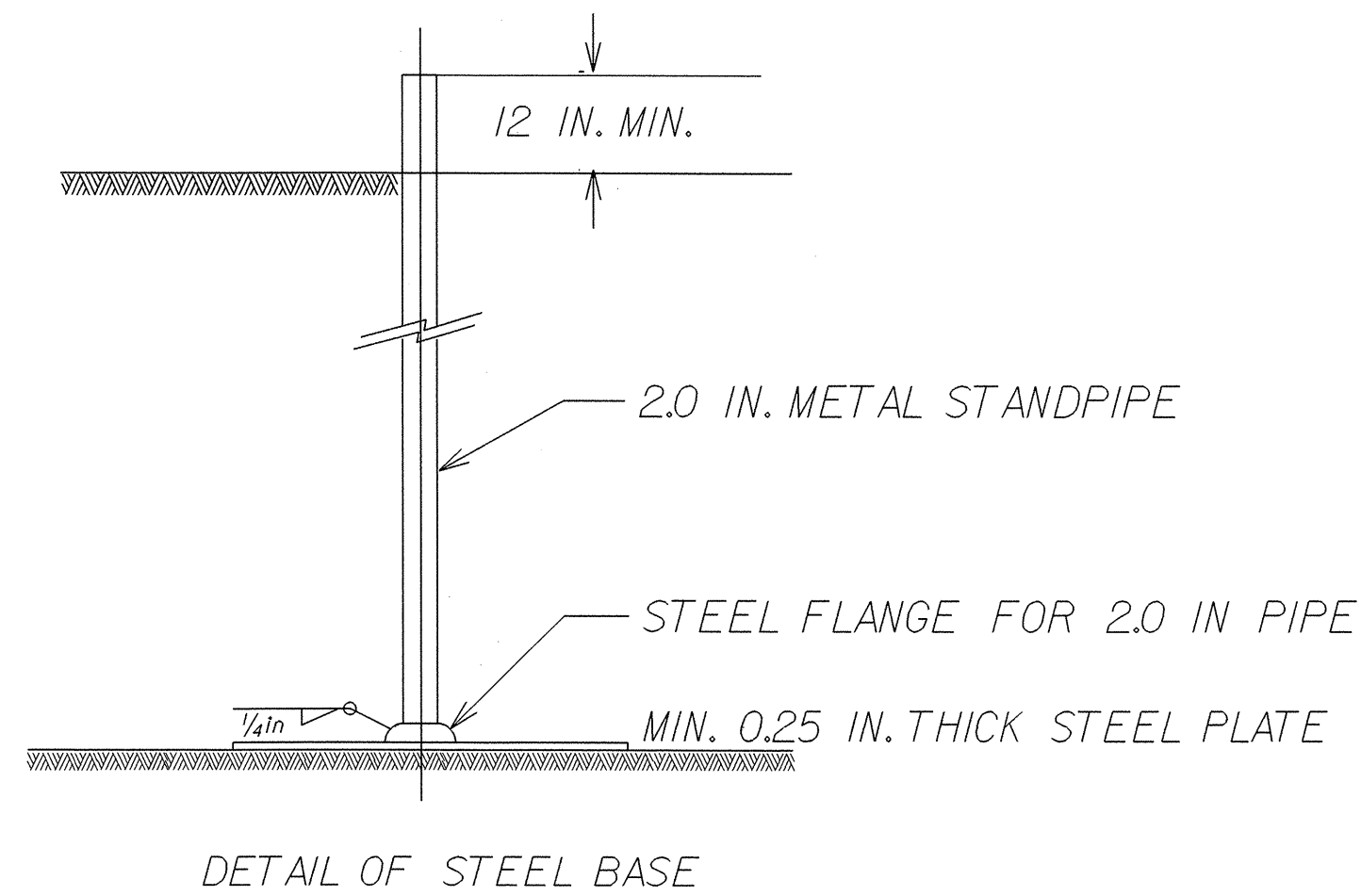
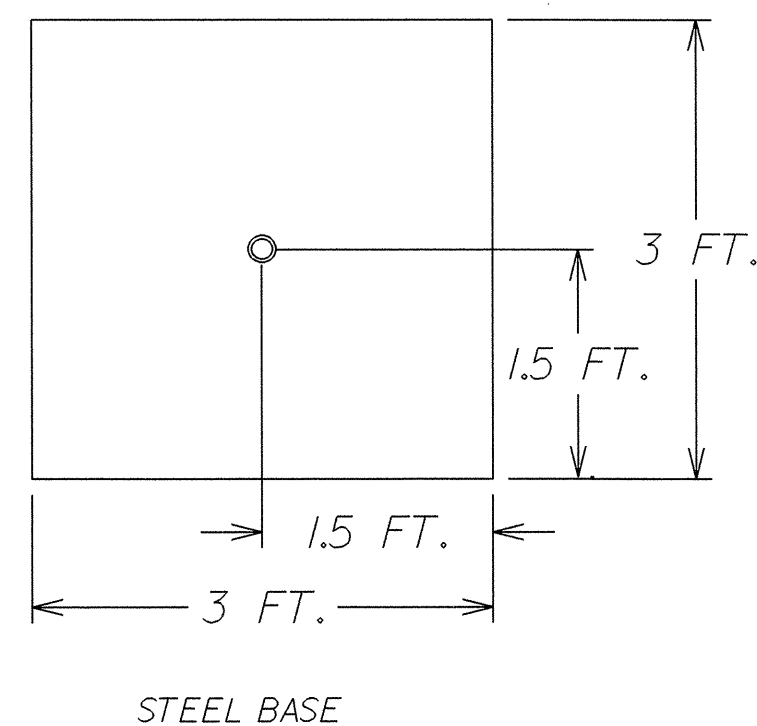
EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**ROCK EMBANKMENT DETAILS**

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

# SETTLEMENT GAUGE DETAIL



**DETAIL OF WOOD BASE**

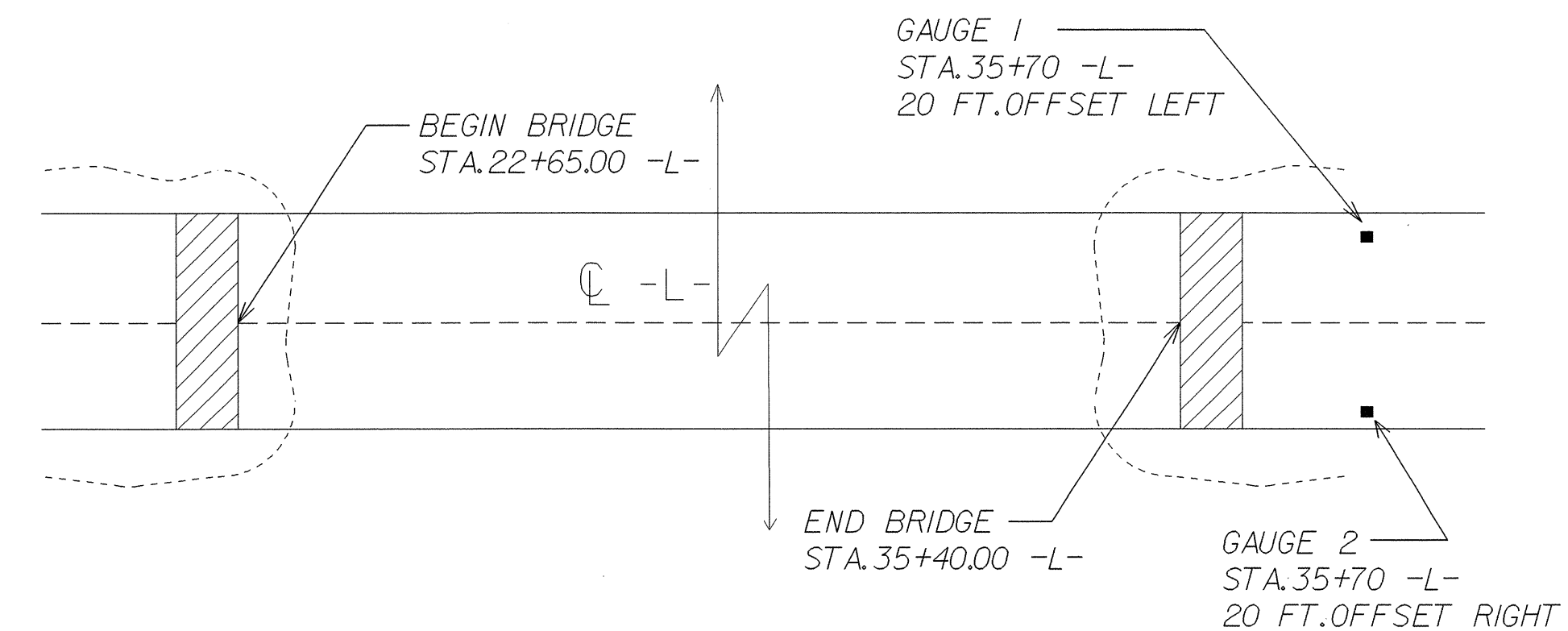
SIX - 1 IN. X 1 FT. X 3 FT. PLANKS OF LUMBER OR TWO PIECES 1 IN. X 3 FT. X 3 FT. EXTERIOR GRADE PLYWOOD, SECURELY FASTENED AND THEN COATED WITH WOOD PRESERVATIVE

**QUANTITIES**

SETTLEMENT GAUGES..... 2 EACH

## PLAN VIEW

N.T.S.



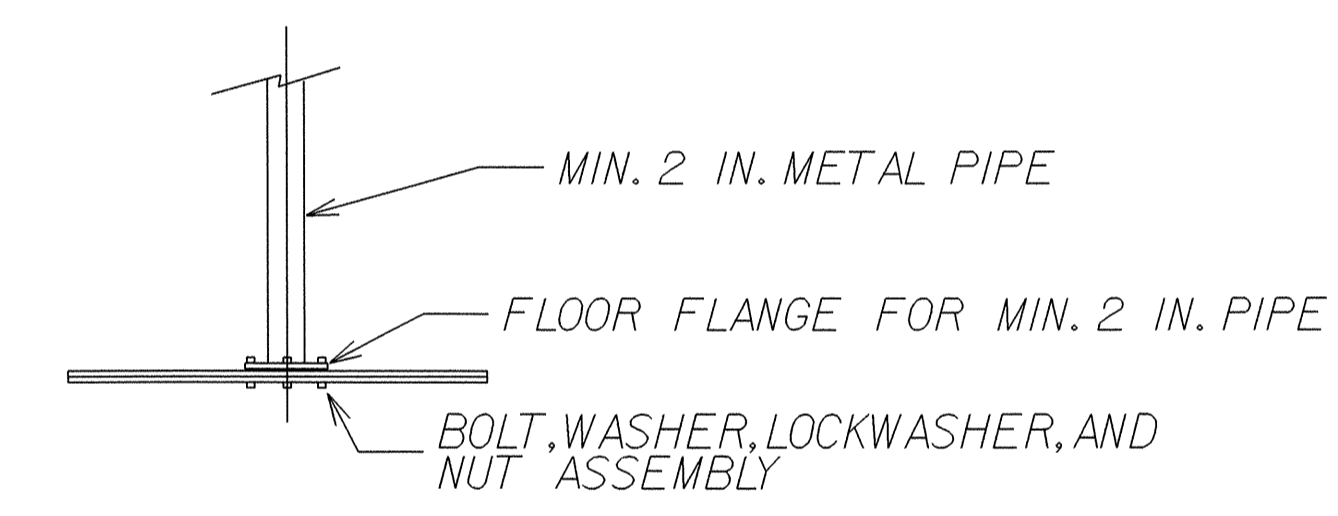
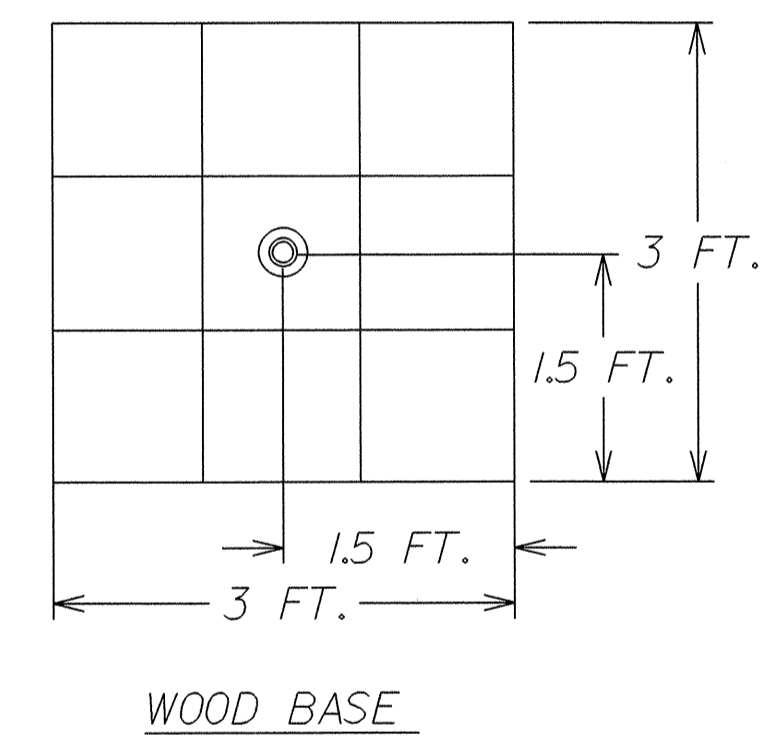
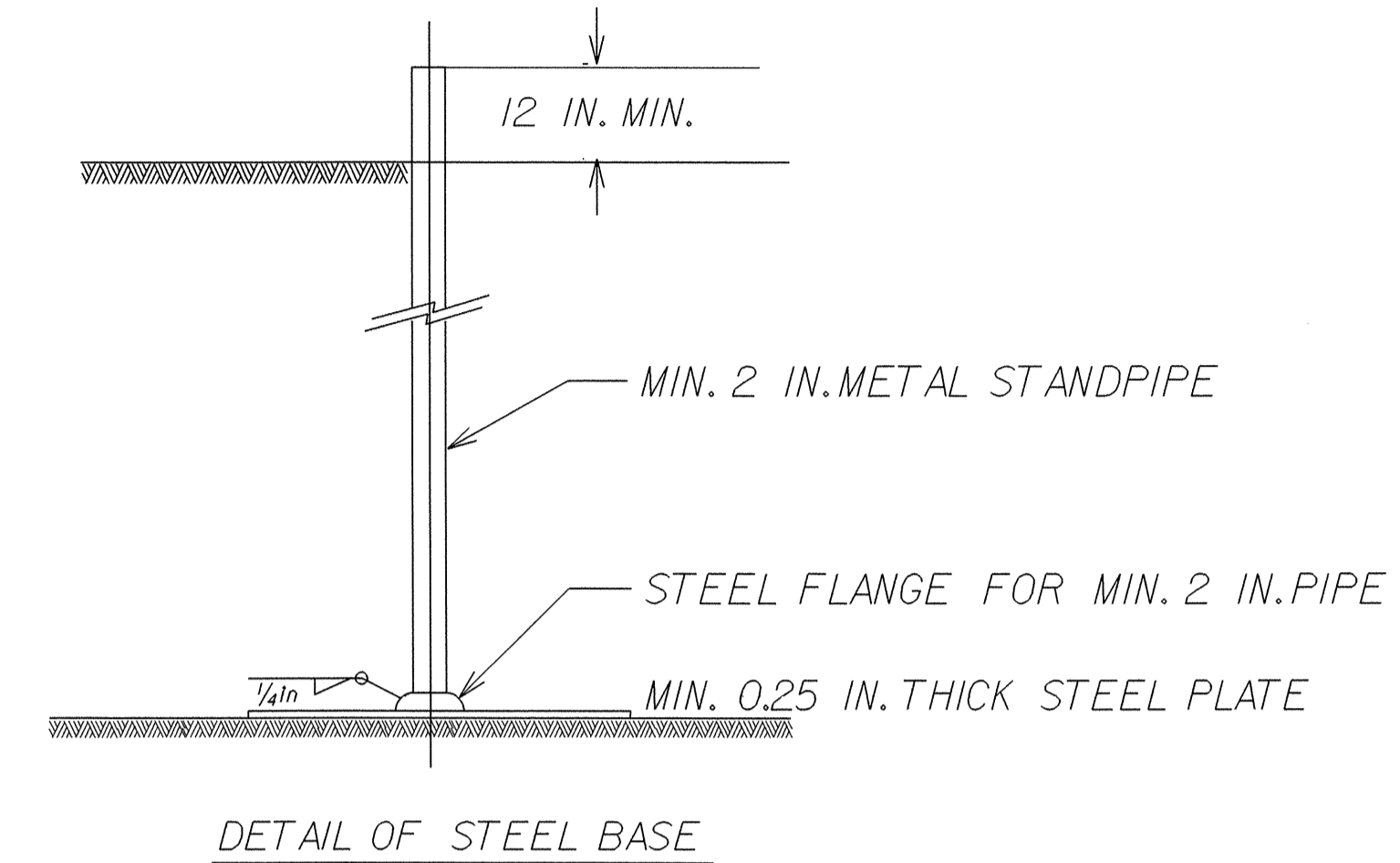
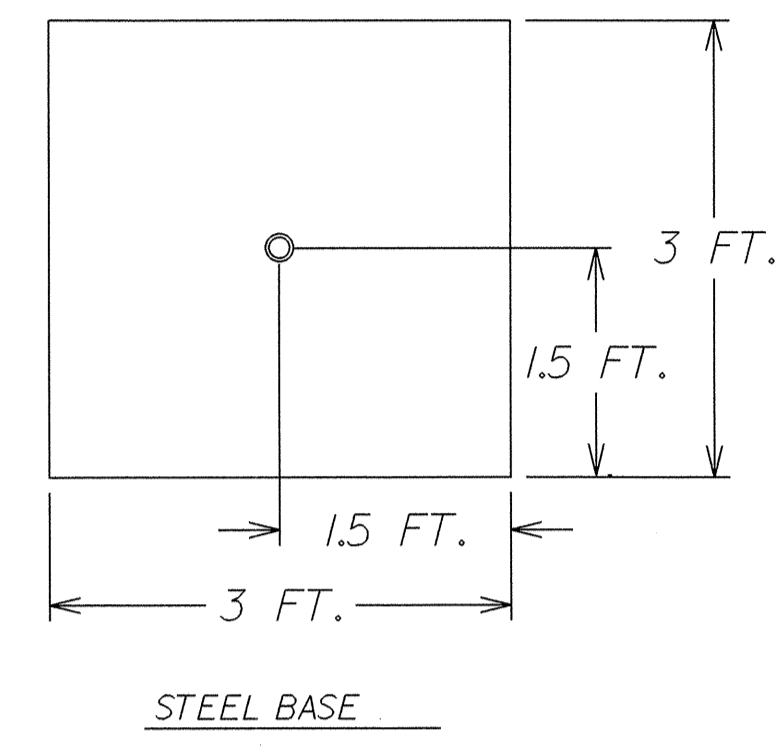
## NOTES

1. THE USE OF EITHER THE WOOD BASE OR THE STEEL BASE SETTLEMENT GAUGE SHALL BE THE CONTRACTOR'S OPTION.
2. SETTLEMENT GAUGES SHALL BE INSTALLED BEFORE ANY FILL IS PLACED.
3. SETTLEMENT GAUGE ELEVATIONS ARE TO BE DETERMINED AND RECORDED WEEKLY BY THE RESIDENT ENGINEER. THE INITIAL ELEVATION OF THE SETTLEMENT GAUGE PLATE (AT TOP OF PLATE) SHALL BE DETERMINED AT THE TIME OF INSTALLATION ALONG WITH THE EMBANKMENT ELEVATION. WHEN NEW SECTIONS OF THE PIPE ARE ADDED, ELEVATIONS SHALL BE RECORDED AT THE TOP OF EXISTING PIPE AND AT THE TOP OF THE NEW PIPE. THIS IS TO TAKE INTO ACCOUNT INTERIM SETTLEMENT, VARIABLE PIPE LENGTHS, AND THREAD LENGTHS IN COUPLING. RESULTS OF SETTLEMENT GAUGE READINGS SHALL BE FORWARDED TO MR. K.J. KIM, EASTERN REGIONAL GEOTECHNICAL MANAGER, WITHIN THREE DAYS.

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



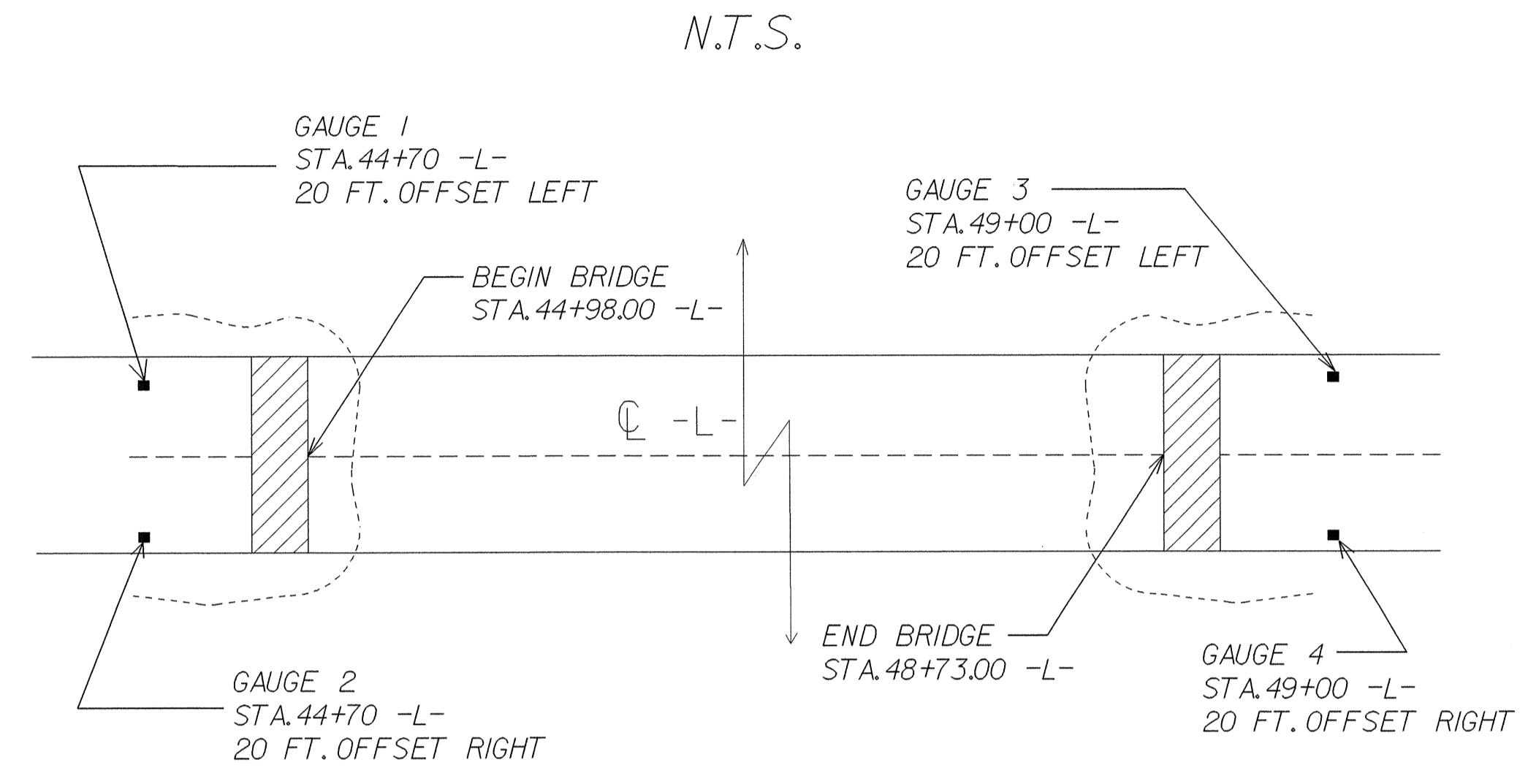
# SETTLEMENT GAUGE DETAIL



DETAIL OF WOOD BASE  
 SIX - 1 IN. X 1 FT. X 3 FT. PLANKS OF LUMBER OR TWO PIECES 1 IN. X 3 FT. X 3 FT. EXTERIOR GRADE PLYWOOD, SECURELY FASTENED AND THEN COATED WITH WOOD PRESERVATIVE

QUANTITIES  
 SETTLEMENT GAUGES..... 4 EACH

## PLAN VIEW



## NOTES

1. THE USE OF EITHER THE WOOD BASE OR THE STEEL BASE SETTLEMENT GAUGE SHALL BE THE CONTRACTOR'S OPTION.
2. SETTLEMENT GAUGES SHALL BE INSTALLED BEFORE ANY FILL IS PLACED.
3. SETTLEMENT GAUGE ELEVATIONS ARE TO BE DETERMINED AND RECORDED WEEKLY BY THE RESIDENT ENGINEER. THE INITIAL ELEVATION OF THE SETTLEMENT GAUGE PLATE (AT TOP OF PLATE) SHALL BE DETERMINED AT THE TIME OF INSTALLATION ALONG WITH THE EMBANKMENT ELEVATION. WHEN NEW SECTIONS OF THE PIPE ARE ADDED, ELEVATIONS SHALL BE RECORDED AT THE TOP OF EXISTING PIPE AND AT THE TOP OF THE NEW PIPE. THIS IS TO TAKE INTO ACCOUNT INTERIM SETTLEMENT, VARIABLE PIPE LENGTHS, AND THREAD LENGTHS IN COUPLING. RESULTS OF SETTLEMENT GAUGE READINGS SHALL BE FORWARDED TO MR. K.J. KIM, EASTERN REGIONAL GEOTECHNICAL MANAGER, WITHIN THREE DAYS.

PREPARED BY: N. AL-DHALIMY      DATE: 5-2012  
 REVIEWED BY: J. BATTS            DATE: 5-2012

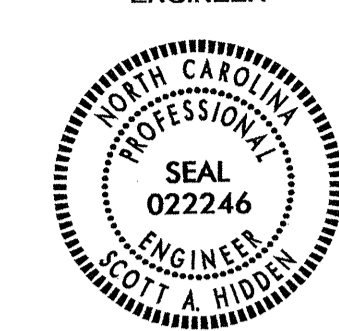
**GEOTECHNICAL ENGINEERING UNIT**

EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE

**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**RALEIGH**

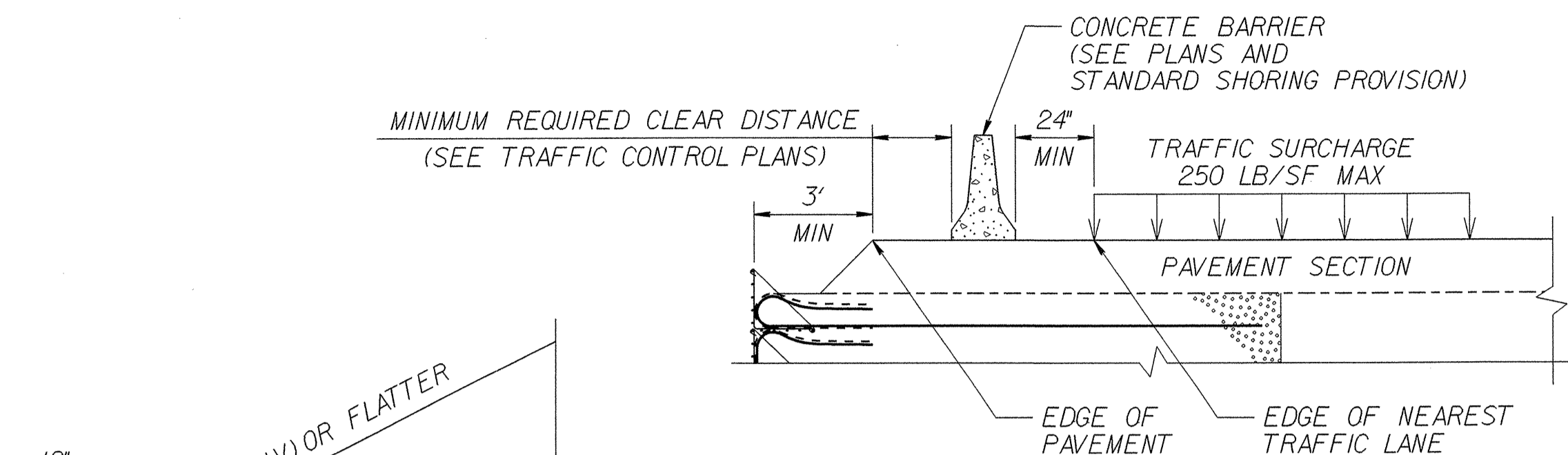
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

### EMBANKMENT MONITORING DETAILS

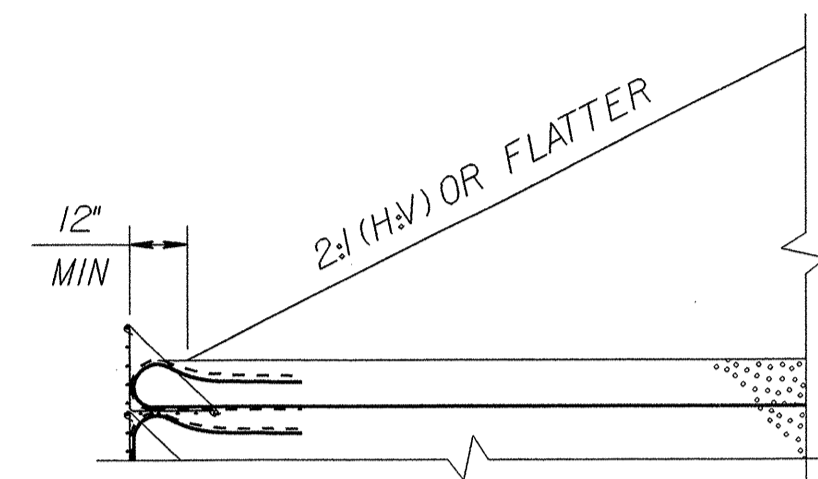


Scott A. Hilder 11/19/11  
SIGNATURE DATE

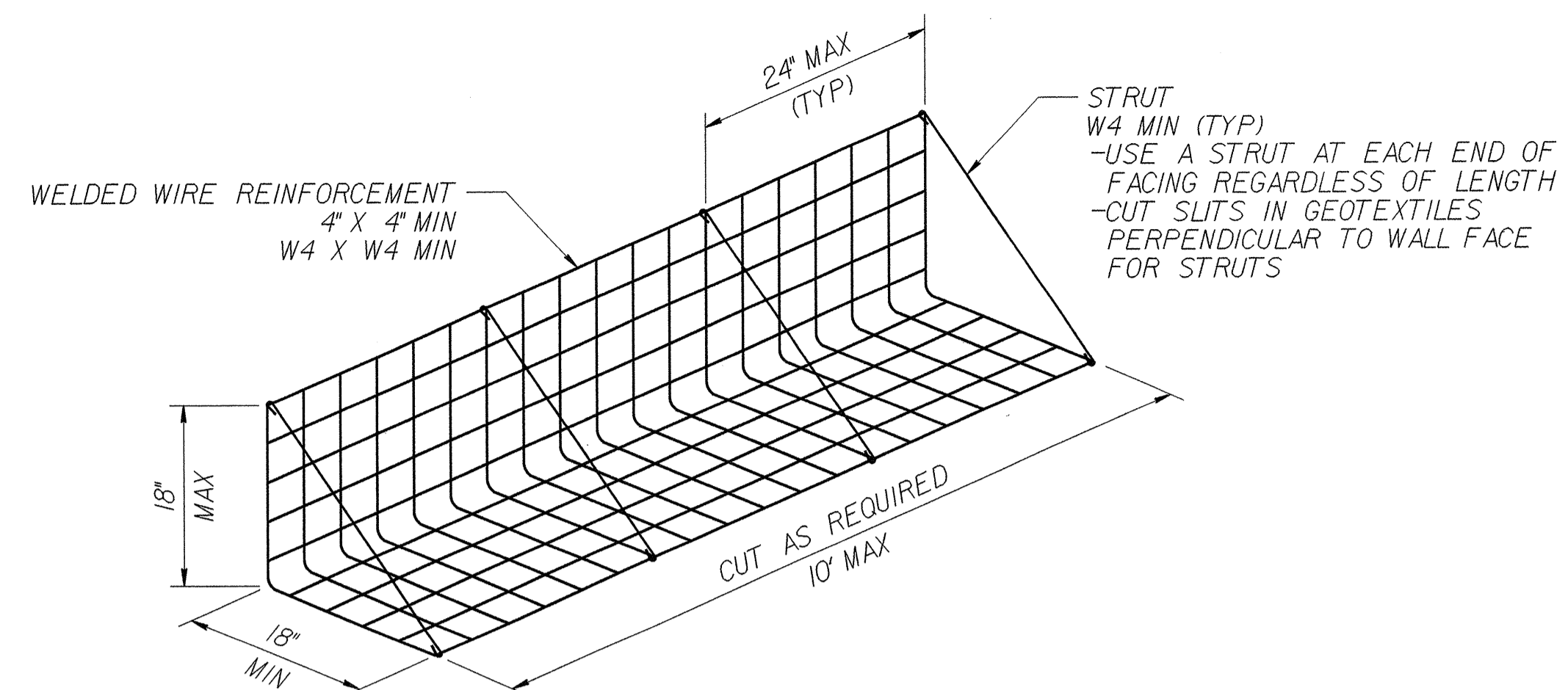
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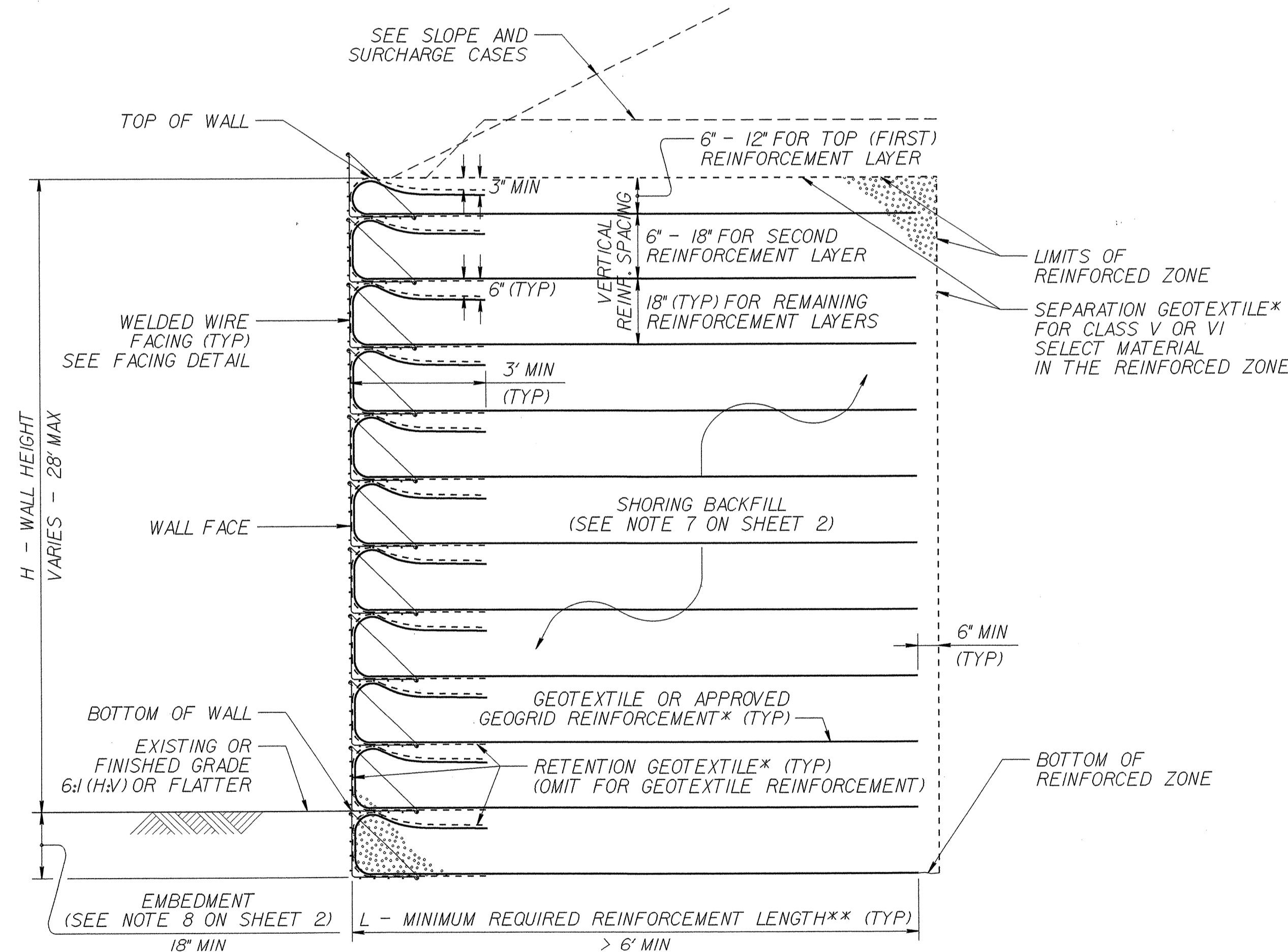
**SURCHARGE CASE**



**SLOPE CASE**



**FACING DETAIL**

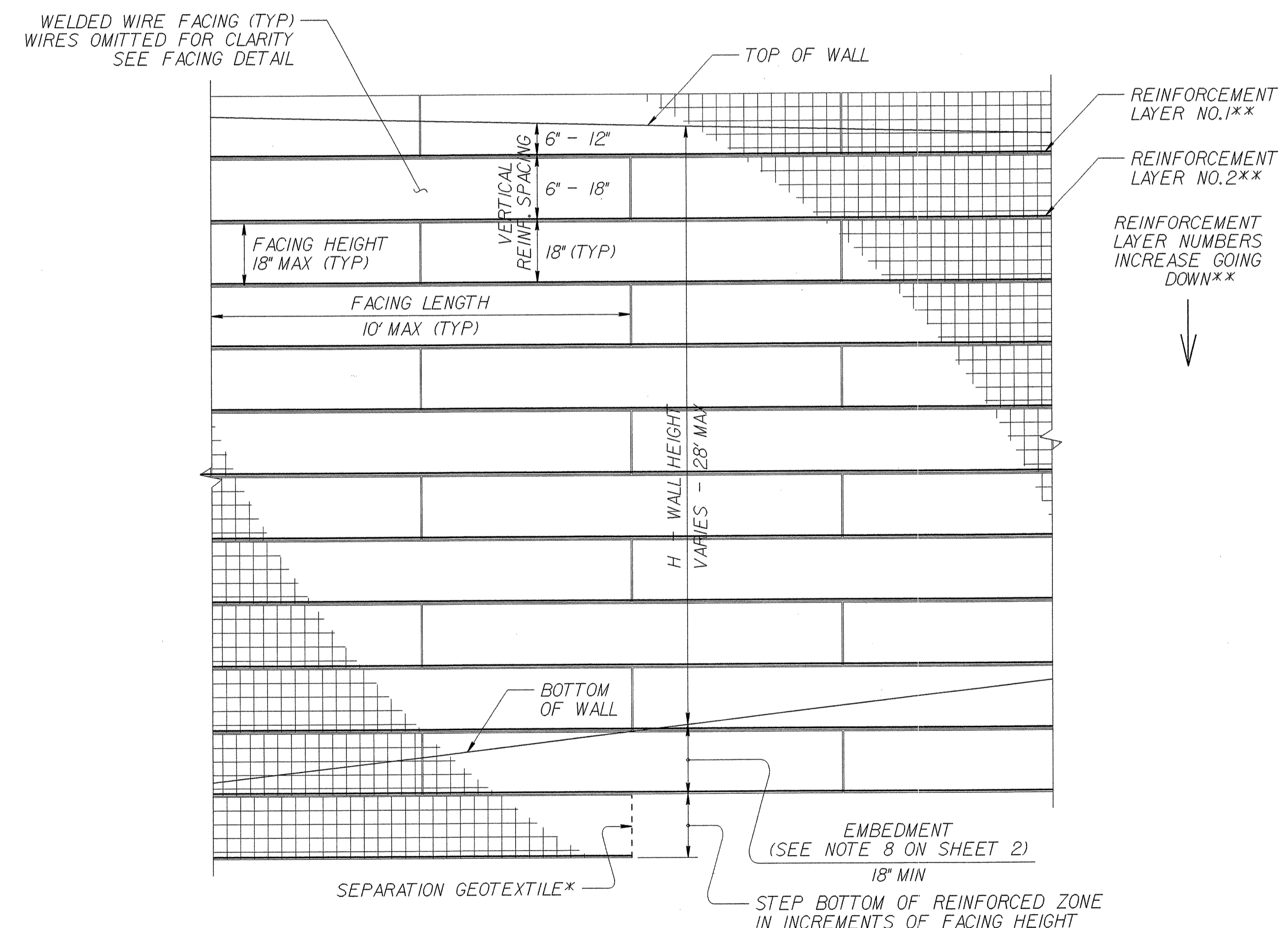


**STANDARD TEMPORARY WALL**

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)

\*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.

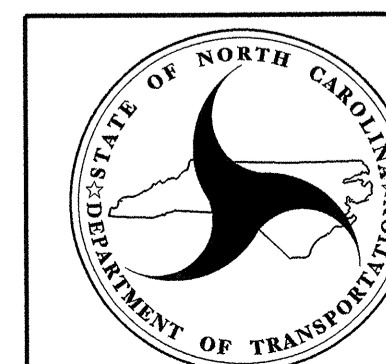
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.



**STANDARD TEMPORARY WALL - PARTIAL ELEVATION**

\*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.

\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

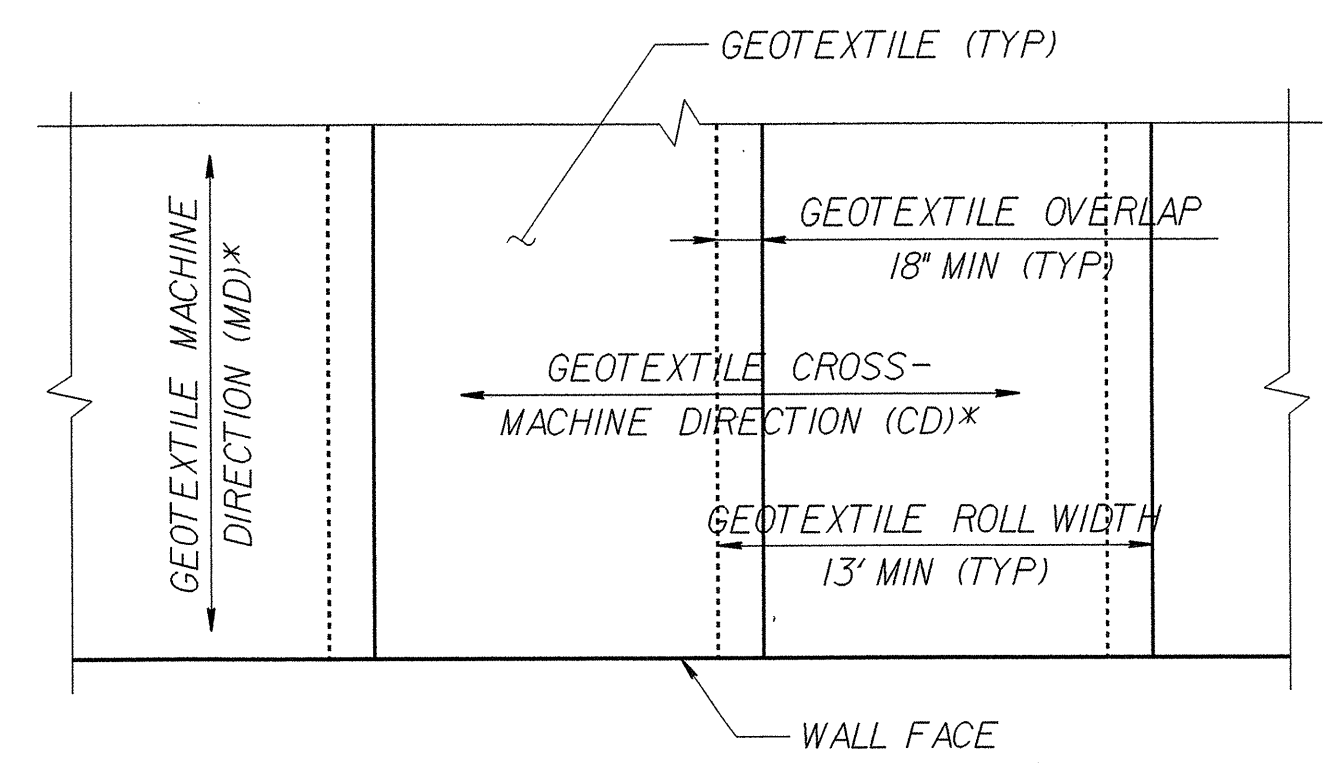


**GEOTECHNICAL ENGINEERING UNIT**  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

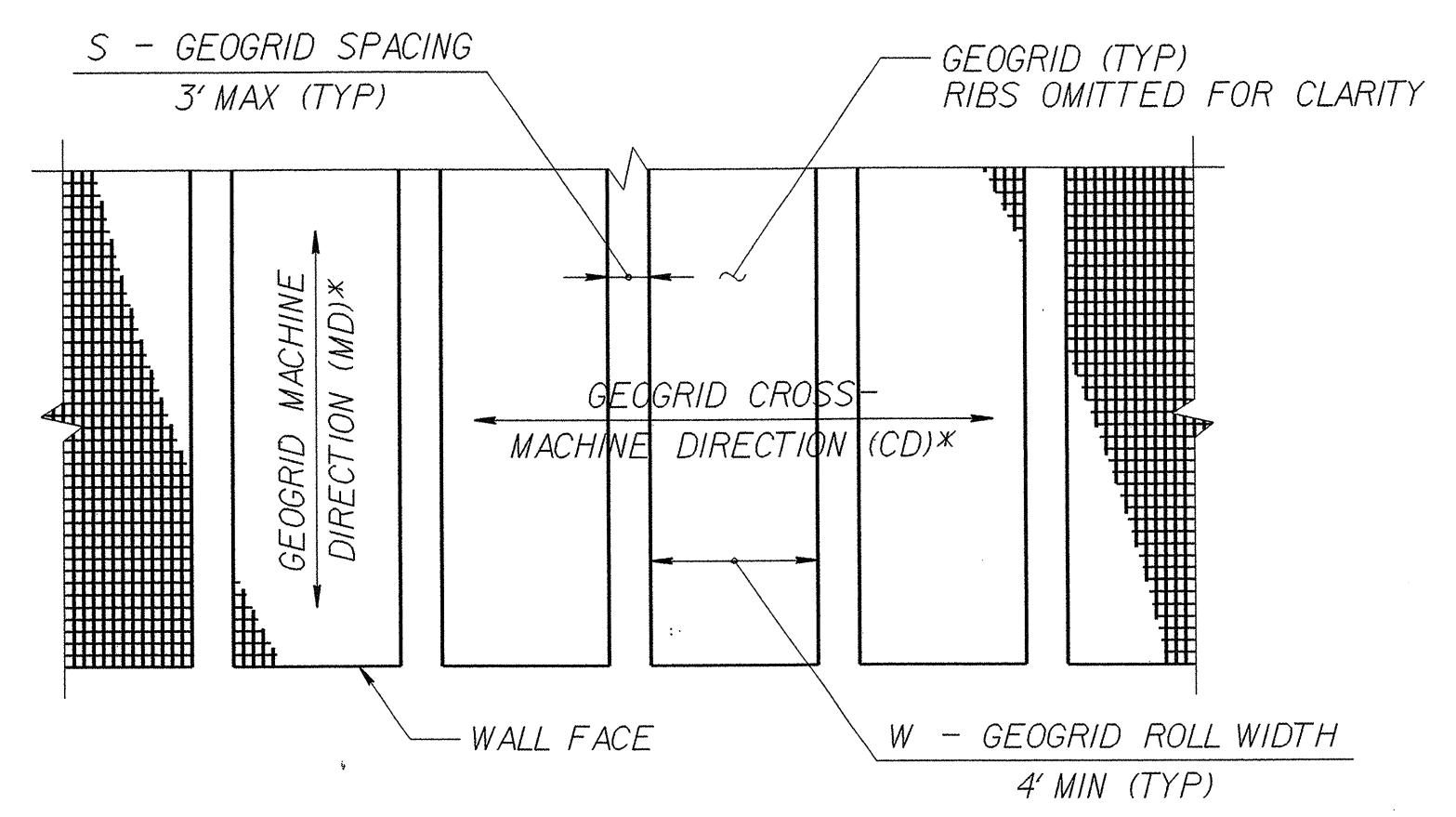
STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY WALL  
Sheet 1 of 3

DATE: 1-17-12

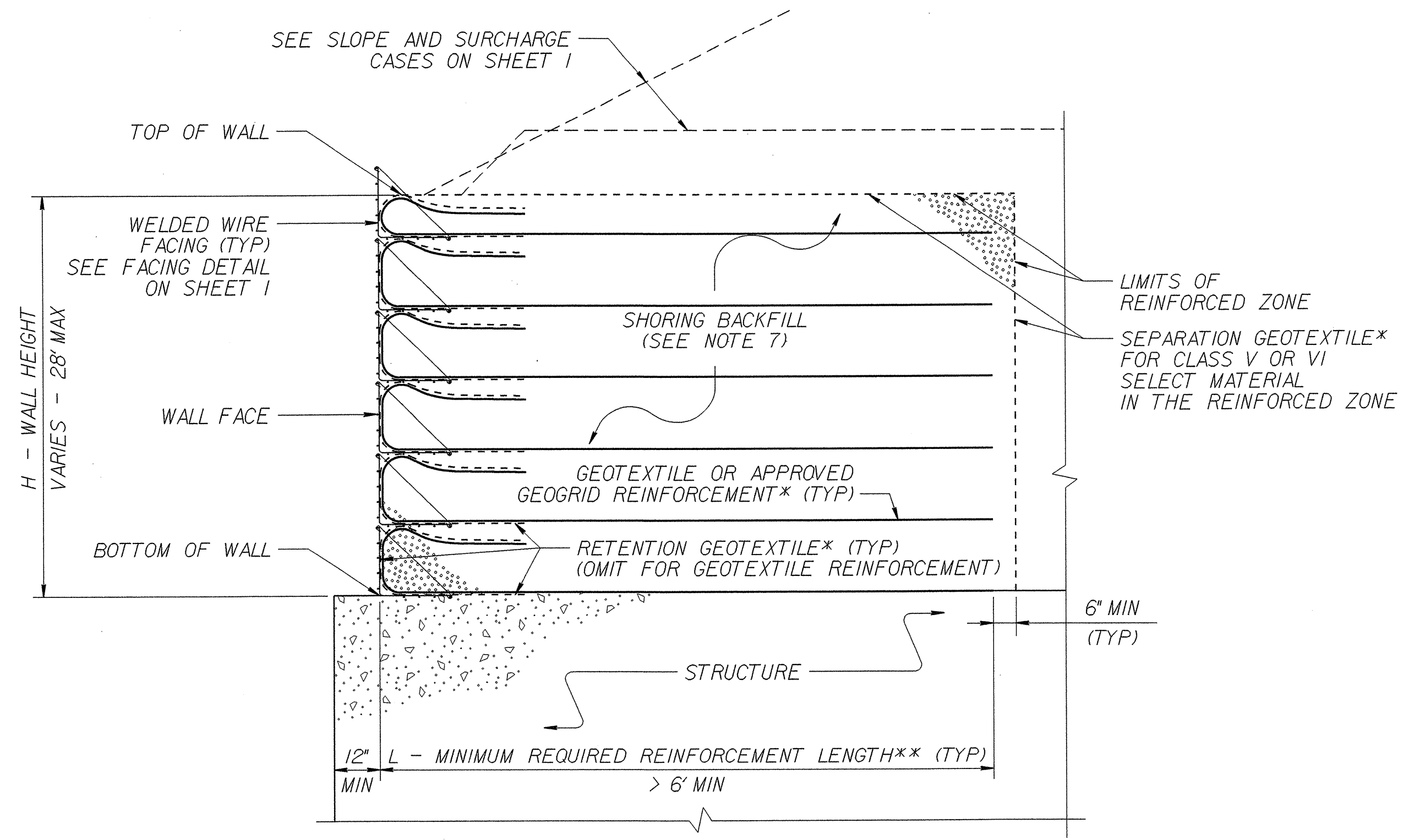


**GEOTEXTILE PLACEMENT**  
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



**GEOGRID PLACEMENT**  
(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT -  $\frac{W}{W+S} \times 100 \geq 80\%$ , SEE NOTE 11)

**GEOSYNTHETIC PLACEMENT DETAILS**  
(PLAN VIEW)  
\*SEE NOTE 12.



**TEMPORARY WALL ON STRUCTURE DETAIL**  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.


**NOTES:**

- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  LB/CF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  LB/SF
- DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
- DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
- GEOGRIDS ARE APPROVED FOR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) BASED ON MATERIAL TYPE. FOR DETAILS OF APPROVED GEOGRIDS AND SHORT-TERM DESIGN STRENGTHS, SEE [www.ncdot.org/dob/operations/materials/soils/gep.html](http://www.ncdot.org/dob/operations/materials/soils/gep.html) DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

- FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
- AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH THE FOLLOWING CONDITIONS OCCUR:  
-  $W$  (REINFORCEMENT ROLL WIDTH)  $\geq L$  (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND  
- REINFORCEMENT STRENGTH IN CD  $\geq$  MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
- SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION.
- DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
- DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
- CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
- FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
- FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

GEOTECHNICAL ENGINEER ENGINEER



swt a. hadden 1/18/11

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																									
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27	
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21	
		A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15	16	16	17	17	18	19	19	20	
		CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18	19	
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	16	16	17	18	18	

**L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)**  
(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

\*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

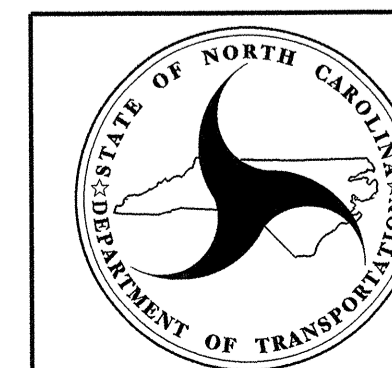
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

**GEOTEXTILE REINFORCEMENT ULTIMATE TENSILE STRENGTH (LB/FT)**

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

**GEOGRID REINFORCEMENT SHORT-TERM DESIGN STRENGTH (LB/FT)**  
(SEE NOTE 10 ON SHEET 2.)

**MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD**  
(SEE NOTE 9 ON SHEET 2.)  
\*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.

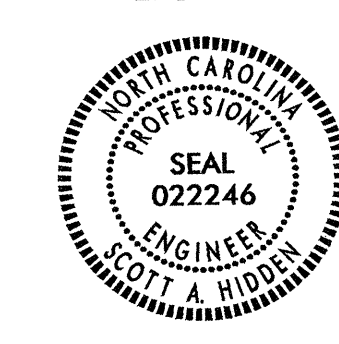


**GEOTECHNICAL ENGINEERING UNIT**  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY WALL  
Sheet 3 of 3

DATE: 1-17-12



Scott O. Hadden 11/18/11  
SIGNATURE DATE SIGNATURE DATE

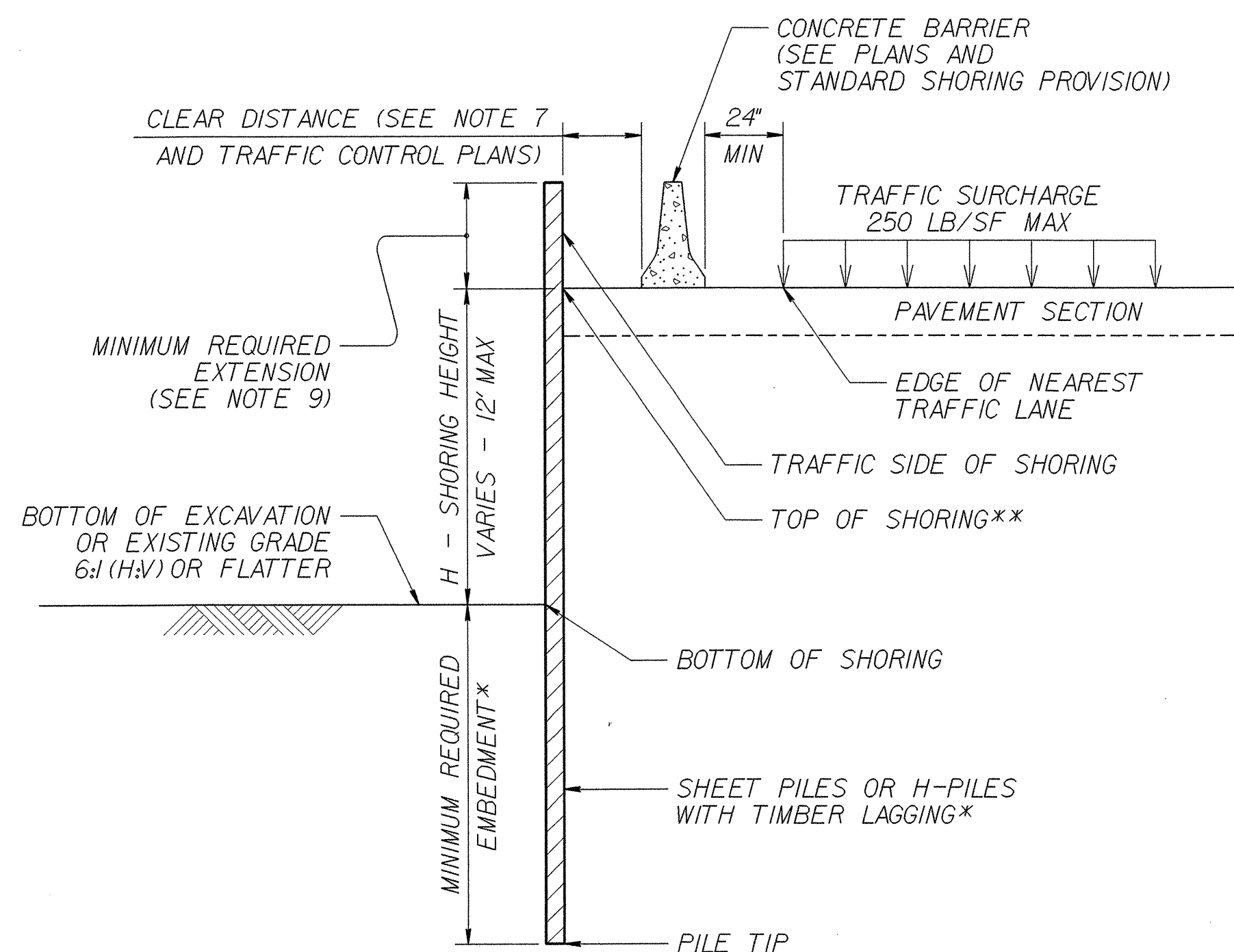
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
			HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73	
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5	
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5	

**MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS**

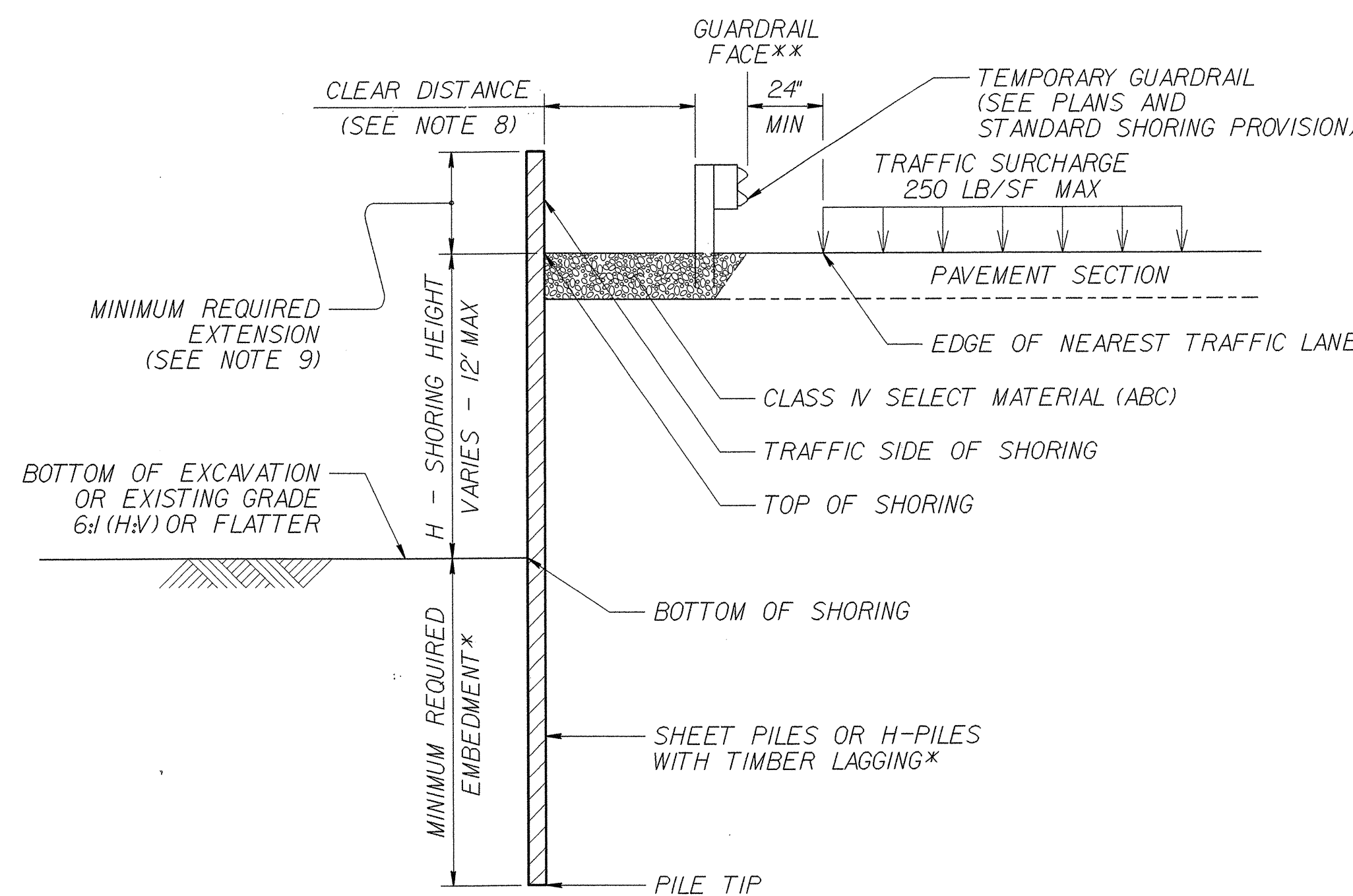
**\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**

**NOTES:**

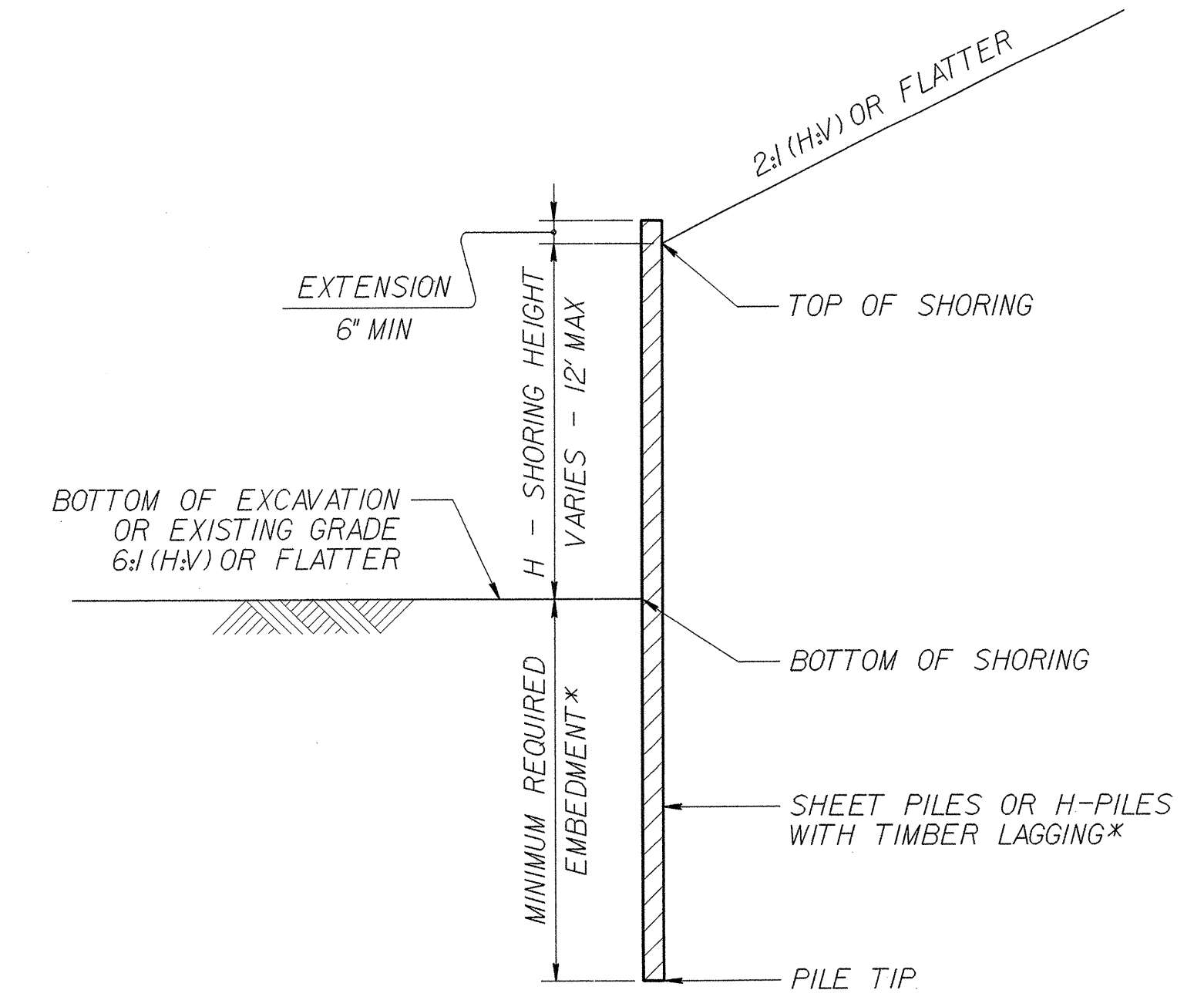
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120 \text{ LB/CF}$   
FRICTION ANGLE,  $\phi = 30 \text{ DEGREES}$   
COHESION,  $c = 0 \text{ LB/SF}$
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
- SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM.
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



**CONCRETE BARRIER**  
\*\*TOP OF SHORING =  
EDGE OF PAVEMENT

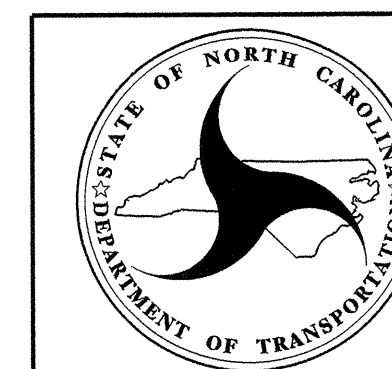


**TEMPORARY GUARDRAIL**  
\*\*GUARDRAIL FACE =  
EDGE OF PAVEMENT



**STANDARD TEMPORARY SHORING**  
(SLOPE CASE)  
\*SEE TABLE ABOVE.

**STANDARD TEMPORARY SHORING**  
(SURCHARGE CASE)  
\*SEE TABLE ABOVE.



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

STANDARD DRAWING NO. 1801.01

**STANDARD TEMPORARY SHORING**

DATE: 1-17-12

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202878

ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION
000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
000100000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
000800000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
002200000-E	225	26,000	CY	UNCLASSIFIED EXCAVATION
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (29+02.50)
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (46+85.50)
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (56+35.50)
003600000-E	225	3,350	CY	UNDERCUT EXCAVATION
010600000-E	230	112,500	CY	BORROW EXCAVATION
012700000-N	SP	6	EA	EMBANKMENT SETTLEMENT GAUGES
015600000-E	250	10,020	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
019500000-E	265	4,300	CY	SELECT GRANULAR MATERIAL
019600000-E	270	4,000	SY	GEOTEXTILE FOR SOIL STABILIZATION
019900000-E	SP	2,619	SF	TEMPORARY SHORING
022000000-E	SP	38,435	TON	ROCK EMBANKMENTS
022200000-E	SP	12,000	SY	GEOTEXTILE FOR ROCK EMBANKMENTS
031800000-E	300	110	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES
032000000-E	300	320	SY	FOUNDATION CONDITIONING GEOTEXTILE
034300000-E	310	536	LF	15" SIDE DRAIN PIPE
034800000-E	310	17	EA	*** SIDE DRAIN PIPE ELBOWS (15")
044820000-E	310	412	LF	15" RC PIPE CULVERTS, CLASS IV
099500000-E	340	196	LF	PIPE REMOVAL
101100000-N	500	Lump Sum		FINE GRADING

ItemNumber	Sec #	Quantity	Unit	Description
468600000-E	1205	9,250	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
477000000-E	1205	8,100	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)
481000000-E	1205	46,400	LF	PAINT PAVEMENT MARKING LINES (4")
490000000-N	1251	83	EA	PERMANENT RAISED PAVEMENT MARKERS
600000000-E	1605	16,500	LF	TEMPORARY SILT FENCE
600600000-E	1610	310	TON	STONE FOR EROSION CONTROL, CLASS A
600900000-E	1610	1,570	TON	STONE FOR EROSION CONTROL, CLASS B
601200000-E	1610	2,260	TON	SEDIMENT CONTROL STONE
601500000-E	1615	31.5	ACR	TEMPORARY MULCHING
601800000-E	1620	900	LB	SEED FOR TEMPORARY SEEDING
602100000-E	1620	4.5	TON	FERTILIZER FOR TEMPORARY SEEDING
602400000-E	1622	3,950	LF	TEMPORARY SLOPE DRAINS
602900000-E	SP	3,000	LF	SAFETY FENCE
603000000-E	1630	2,400	CY	SILT EXCAVATION
603600000-E	1631	23,500	SY	MATting FOR EROSION CONTROL
603700000-E	SP	500	SY	COIR FIBER MAT
604200000-E	1632	7,750	LF	1/4" HARDWARE CLOTH
6071012000-E	SP	700	LF	COIR FIBER WATTLE
6071020000-E	SP	25	LB	POLYACRYLAMIDE (PAM)
6071030000-E	1640	750	LF	COIR FIBER BAFFLE
6071050000-E	SP	1	EA	*** SKIMMER (1-1/2")
608400000-E	1660	20	ACR	SEEDING & MULCHING
608700000-E	1660	18	ACR	MOWING
609000000-E	1661	350	LB	SEED FOR REPAIR SEEDING
609300000-E	1661	1	TON	FERTILIZER FOR REPAIR SEEDING

Summary of Quantities - B-4028

ItemNumber	Sec #	Quantity	Unit	Description
107700000-E	SP	9,200	TON	#57 STONE
112100000-E	520	6,800	TON	AGGREGATE BASE COURSE
122000000-E	545	500	TON	INCIDENTAL STONE BASE
127500000-E	600	231	GAL	PRIME COAT
148900000-E	610	190	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
149800000-E	610	2,190	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
151900000-E	610	2,360	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
157500000-E	620	260	TON	ASPHALT BINDER FOR PLANT MIX
169300000-E	654	300	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
202200000-E	815	22.4	CY	SUBDRAIN EXCAVATION
202600000-E	815	100	SY	GEOTEXTILE FOR SUBSURFACE DRAINS
203600000-E	815	16.8	CY	SUBDRAIN COARSE AGGREGATE
204400000-E	815	100	LF	6" PERFORATED SUBDRAIN PIPE
207000000-N	815	1	EA	SUBDRAIN PIPE OUTLET
207700000-E	815	6	LF	6" OUTLET PIPE
226400000-E	840	0.1	CY	PIPE PLUGS
227500000-E	SP	10	CY	FLOWABLE FILL
228600000-N	840	18	EA	MASONRY DRAINAGE STRUCTURES
235500000-N	840	18	EA	FRAME WITH GRATE, STD 840.29
255600000-E	846	2,900	LF	SHOULDER BERM GUTTER
303000000-E	862	3,937.5	LF	STEEL BM GUARDRAIL
315000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
327000000-N	SP	10	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
331700000-N	862	12	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77
336000000-E	863	5,300	LF	REMOVE EXISTING GUARDRAIL

ItemNumber	Sec #	Quantity	Unit	Description
609600000-E	1662	725	LB	SEED FOR SUPPLEMENTAL SEEDING
610800000-E	1665	21.5	TON	FERTILIZER TOPDRESSING
611450000-N	1667	30	MHR	SPECIALIZED HAND MOWING
611700000-N	SP	75	EA	RESPONSE FOR EROSION CONTROL
612300000-E	1670	1	ACR	REFORESTATION

ItemNumber	Sec #	Quantity	Unit	Description
338700000-N	862	6	EA	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ***** (W-BEAM)
338910000-N	SP	4	EA	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE 350
364900000-E	876	11	TON	RIP RAP, CLASS B
365600000-E	876	615	SY	GEOTEXTILE FOR DRAINAGE
407200000-E	903	200	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
409600000-N	904	5	EA	SIGN ERECTION, TYPE D
410200000-N	904	1	EA	SIGN ERECTION, TYPE E
410800000-N	904	1	EA	SIGN ERECTION, TYPE F
411610000-N	904	1	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (D)
411610000-N	904	2	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (E)
415500000-N	907	18	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
419200000-N	907	2	EA	DISPOSAL OF SUPPORT, U-CHANNEL
440000000-E	1110	48	SF	WORK ZONE SIGNS (STATIONARY)
440500000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)
441000000-E	1110	40	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
443000000-N	1130	60	EA	DRUMS
443500000-N	1135	30	EA	CONES
444500000-E	1145	48	LF	BARRICADES (TYPE III)
445500000-N	1150	100	DAY	FLAGGER
446500000-N	1160	4	EA	TEMPORARY CRASH CUSHIONS
448000000-N	1165	2	EA	TMA
448500000-E	1170	877	LF	PORTABLE CONCRETE BARRIER
465000000-N	1251	200	EA	TEMPORARY RAISED PAVEMENT MARKERS
468500000-E	1205	9,250	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)



"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

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  
**GUARDRAIL SUMMARY**

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS			TEMP IMPACT ATTENUATOR TYPE 350			IMPACT ATTENUATOR TYPE 350			REMOVE EXISTING GUARDRAIL	ADDITIONAL GUARDRAIL POSTS	REMARKS
				STRAIGHT	DOUBLE FACED	TEMP DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	M-350	GRAU 350	B-77	EA	G	NG	EA	G	NG			
-L-	20+65.43	22+59.18	LT	193.75			22+59.18	21+90.00	8	11		175.00		5.00			1	1								
-L-	21+77.07	22+70.82	RT	93.75			22+26.00	22+70.82	8	11	75.00			2.50			1	1								
-L-	35+40.00	39+71.25	LT	431.25			38+48.00	35+40.00	8	11	50.00	200.00	1.00	4.00			1	1					464.00			
-L-	35+40.00	44+98.00	RT	962.50			35+40.00	44+98.00	8	11	200.00	200.00	4.00	4.00									1004.00			
-L-	40+04.25	44+98.00	LT	493.75			44+98.00	41+28.00	8	11	200.00	50.00	4.00	1.00			1	1						505.00		
-L-	48+73.00	51+91.75	LT	318.75			50+68.00	48+73.00	8	11	50.00	200.00	1.00	4.00			1	1						336.00		
-L-	48+73.00	54+48.00	RT	575.00			48+73.00	54+48.00	8	11	200.00	200.00	4.00	4.00					2					611.00		
-L-	52+16.75	54+48.00	LT	231.25			54+48.00	53+48.00	8	11		200.00		5.00			1	1						243.00		
-L-	58+23.00	59+79.25	LT	156.25			58+23.00		8	11	137.50		4.00				1	1						192.00		
-L-	58+23.00	60+66.75	RT	243.75			58+23.00	59+36.00	8	11		212.50		5.00			1	1						255.00		
-L-	60+15.50	69+28.00	LT	912.50			68+03.00	61+40.00	8	11	50.00	50.00	1.00	1.00			2							1675.00		
SUBTOTAL				4612.50			TEMP. GR. ANCHORS										10	12								
LESS ANCHORS				725.00			TEMP. W-BEAM = 6 EA.																			
							TEMP. GRAU-350 = 4 EA.																			
TOTAL				3887.50																					5285.00	
SAY				3937.50																					5300.00	

ADDITIONAL POSTS = 5 EACH

**SUMMARY OF ASPHALT PAVEMENT BREAK-UP / REMOVAL**  
 (IN SQUARE YARDS)

LINE	BEGIN STATION	END STATION	LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP
-L-	13+66.00	22+76.00	RT	1836.80	
-L-	35+13.00	45+16.00	RT	2473.65	
-L-	48+56.00	54+65.00	RT	1506.13	
-L-	58+05.00	75+12.00	RT	3572.66	
Temporary Pavement Removal					
-L-	20+50.00	21+05.00	RT	55.00	
-L-	21+05.00	22+77.00	RT	95.56	
-L-	48+56.00	49+20.00	RT	35.56	
-L-	49+20.00	49+75.00	RT	55.00	
-L-	50+75.00	51+30.00	RT	55.00	
-L-	51+30.00	54+66.00	RT	186.67	
-L-	58+05.00	59+50.00	RT	80.56	
-L-	59+50.00	60+05.00	RT	55.00	
TOTAL				10,007.57	
SAY				10,020.00	

**SHOULDER BERM GUTTER SUMMARY**

SURVEY LINE	STATION	STATION	LENGTH
-L- (LT)	22+19.48	22+36.10	16.80
-L- (RT)	22+24.00	22+46.03	22.00
-L- (LT)	35+64.00	39+21.25	357.25
-L- (RT)	35+64.00	44+73.83	909.83
-L- (LT)	40+54.25	44+73.83	419.63
-L- (LT)	48+97.17	51+41.75	244.58
-L- (RT)	48+97.17	54+23.83	526.66
-L- (LT)	52+66.75	54+23.83	157.08
-L- (LT)	58+47.17	59+29.25	82.08
-L- (RT)	58+47.17	60+04.25	157.08
TOTAL:			2893.00
SAY:			2900

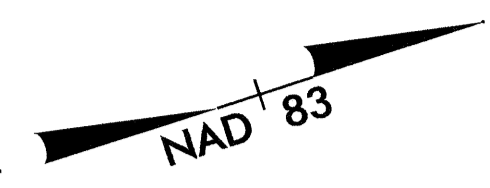
**SUMMARY OF EARTHWORK**  
 (CUBIC YARDS)

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
PHASE 1					
-L- 17+00.00 TO 22+65.00	1174		3448		2274
-DRI- 10+12.00 TO 12+62.73	81		773		692
-L- 35+40.00 TO 44+98.00			34895		34895
-L- 48+73.00 TO 54+48.00		233	27853		27853
-L- 58+23.00 TO 69+50.00	36		35335		35299
REMOVE EXISTING					
-L- 10+50.00 TO 22+65.00	2796	562	1610		1748
-L- 35+40.00 TO 44+98.00	9314				9314
-L- 48+73.00 TO 54+48.00	3544		460		3084
-L- 58+23.00 TO 77+00.00	8947		4224		4723
PROJECT SUBTOTAL					
	25892	795	108596	101012	19102
LOSS DUE TO CLEAR. & GRUB.					
SHOULDER MATERIAL			2518		2518
ADDITIONAL UNDERCUT			2500	3125	3125
PROJECT TOTAL			25892	3295	114239
EST. 5% TO REPLACE TOPSOIL ON BORROW PITS					5333
GRAND TOTAL			25892	3295	114239
SAY			26000	3350	112500

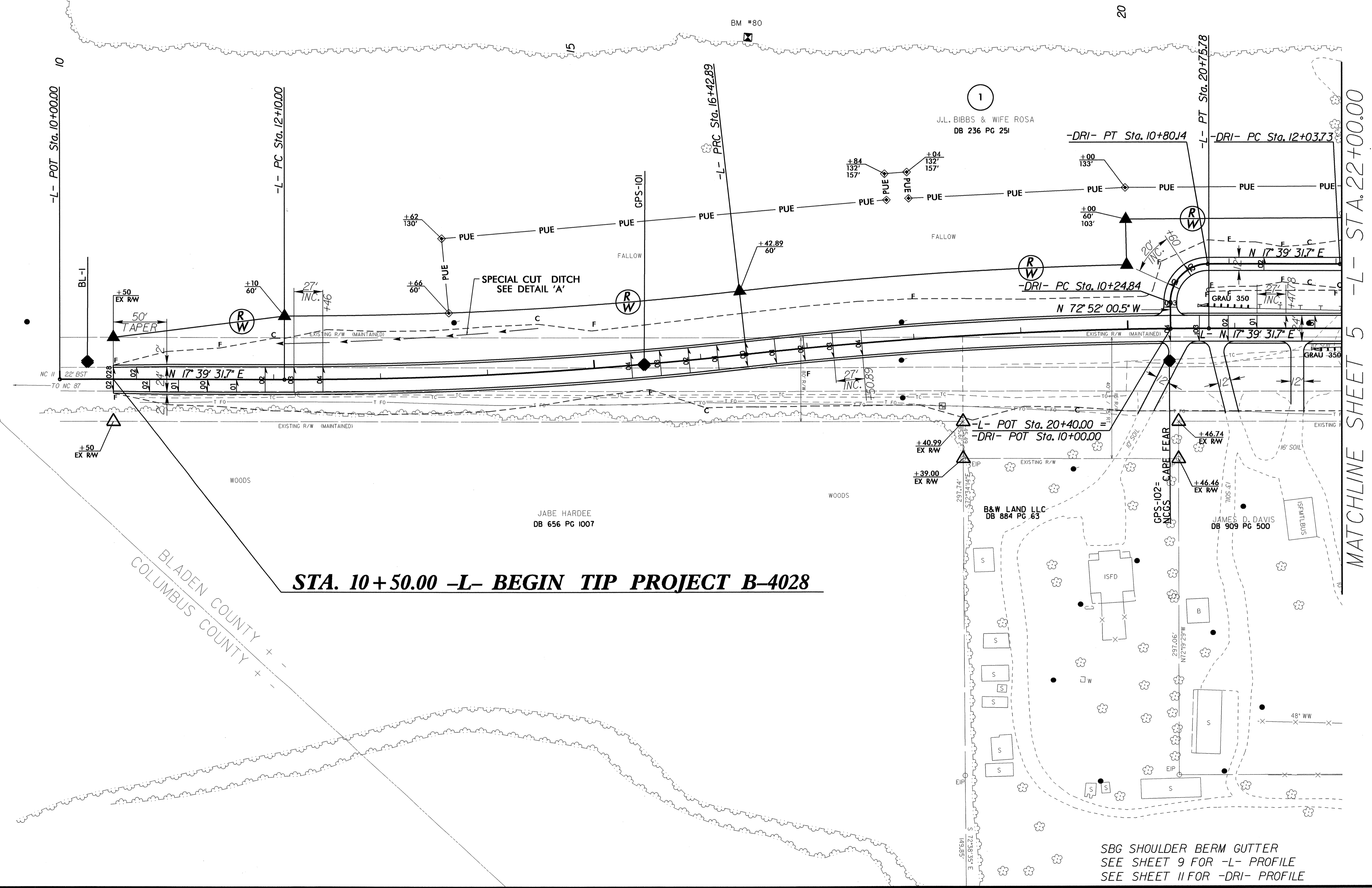
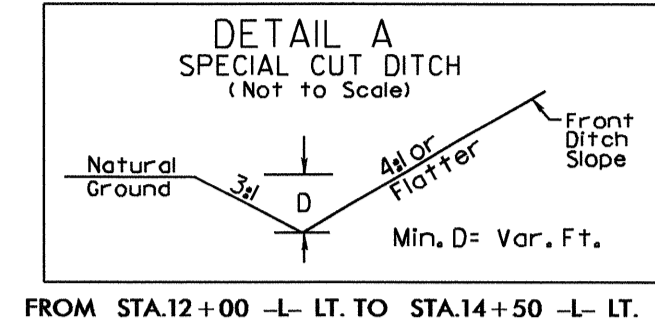
Note: "Quantities are approximate only. The Resident Engineer will re-cross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid."

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.





-L-		-DRI-	
PI Sta 14+26.67	PI Sta 18+59.56	PI Sta 10+60.17	PI Sta 12+43.01
$\Delta = 6' 21'' 34.8''$ (LT)	$\Delta = 6' 21'' 34.8''$ (RT)	$\Delta = 90' 31'' 32.2''$ (RT)	$\Delta = 96' 35'' 49.4''$ (LT)
D = 1' 28' 08.8"	D = 1' 28' 08.8"	D = 163' 42' 08.0"	D = 163' 42' 08.0"
L = 432.89'	L = 432.89'	L = 55.30'	L = 59.01'
T = 216.67'	T = 216.67'	T = 35.32'	T = 39.28'
R = 3,900.00'	R = 3,900.00'	R = 35.00'	R = 35.00'
SE = 04	SE = 04	SE = SEE PLANS	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS



**STA. 10+50.00 -L- BEGIN TIP PROJECT B-4028**

SBG SHOULDER BERM GUTTER  
SEE SHEET 9 FOR -L- PROFILE  
SEE SHEET 11 FOR -DRI- PROFILE

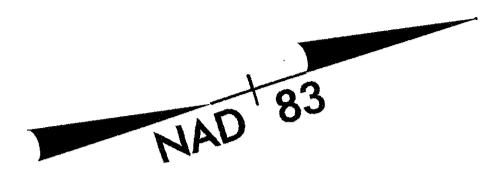
8/17/99

REVISIONS

10-MAY-2012 08:33  
R:\Roadway\Projects\B-4028-rdy\_psh4.dgn  
BRENDA L. MOORE

8/17/99

PROJECT REFERENCE NO. B-4028		SHEET NO. 5	
RW SHEET NO.			
ROADWAY DESIGN PROFESSIONAL SEAL 19795 BRENDA MOORE 5/25/12		HYDRAULICS ENGINEER SEAL 19870 MARC T. SHOWN 5/25/12	

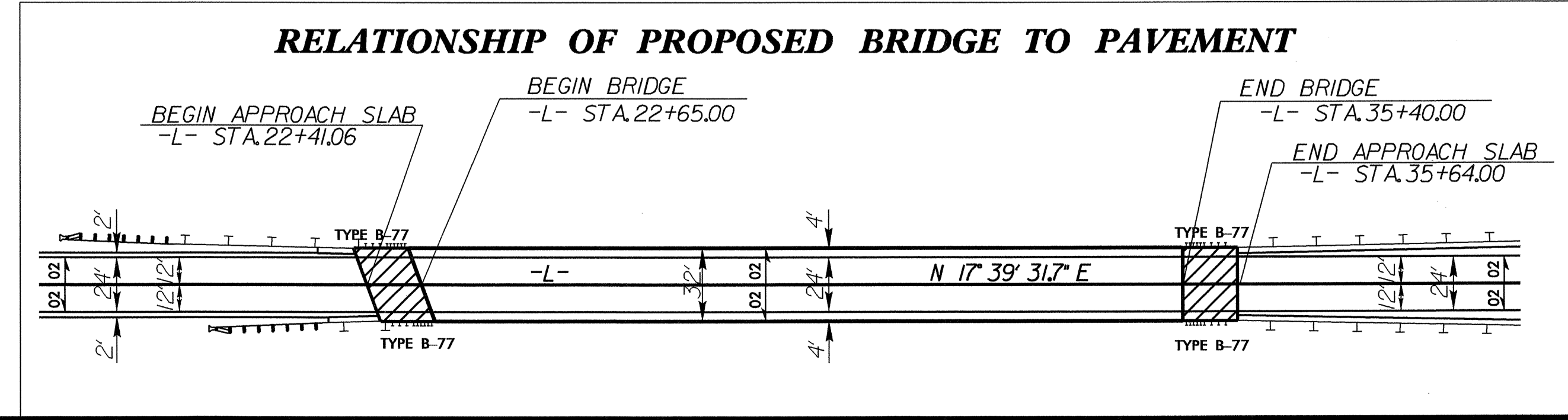
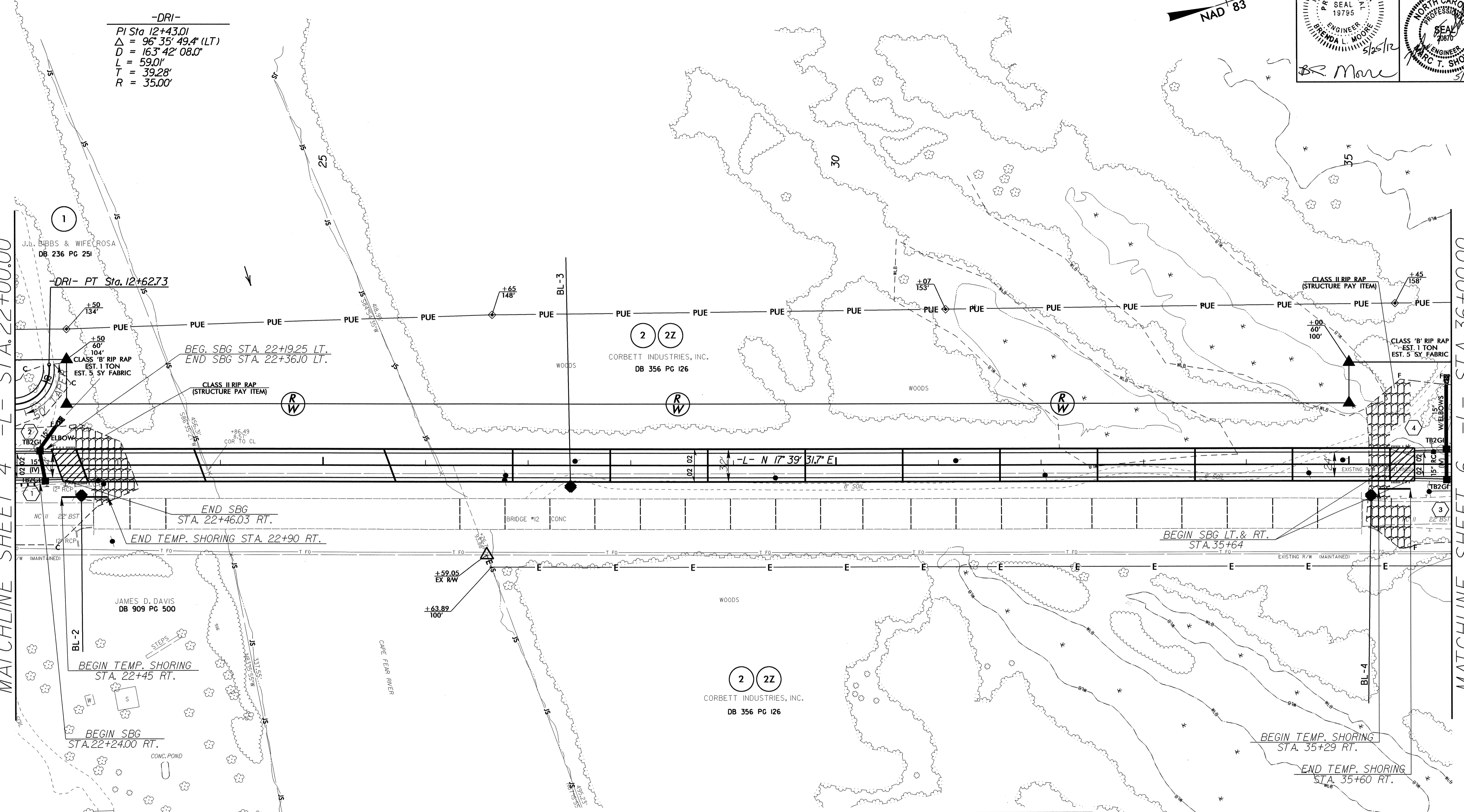


**-DRI-**  
 PI Sta 12+43.01  
 $\Delta = 96^{\circ} 35' 49.4''$  (LT)  
 $D = 163^{\circ} 42' 08.0''$   
 $L = 59.01'$   
 $T = 39.28'$   
 $R = 35.00'$

MATCHLINE SHEET 4 -L- STA. 22+00.00

MATCHLINE SHEET 6 -L- STA. 36+00.00

REVISIONS

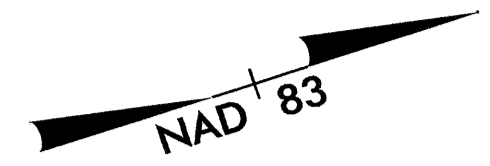


SBG SHOULDER BERM GUTTER  
 SEE SHEET 9 FOR -L- PROFILE  
 SEE SHEET 11 FOR -DRI- PROFILE  
 SEE SHEETS S- THROUGH S- FOR STRUCTURE PLANS  
 SEE TMP PLANS FOR TEMPORARY SHORING NOTES

24-MAY-2012 09:22  
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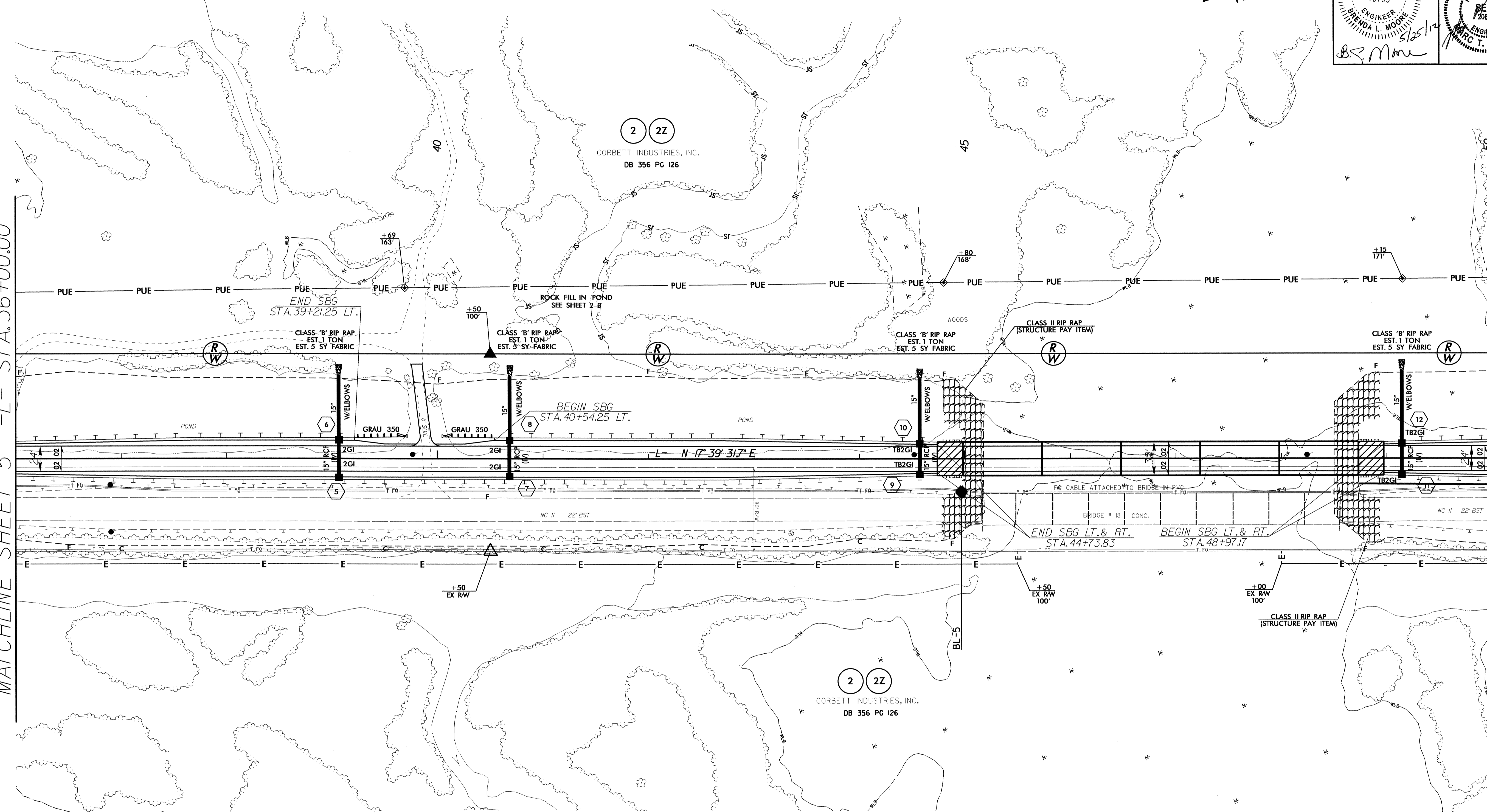
8/17/99

PROJECT REFERENCE NO. B-4028	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER BRENDAN L. MOORE SEAL 19795 5/25/12	HYDRAULICS ENGINEER MARC T. SHOWN SEAL 20870 5/29/12



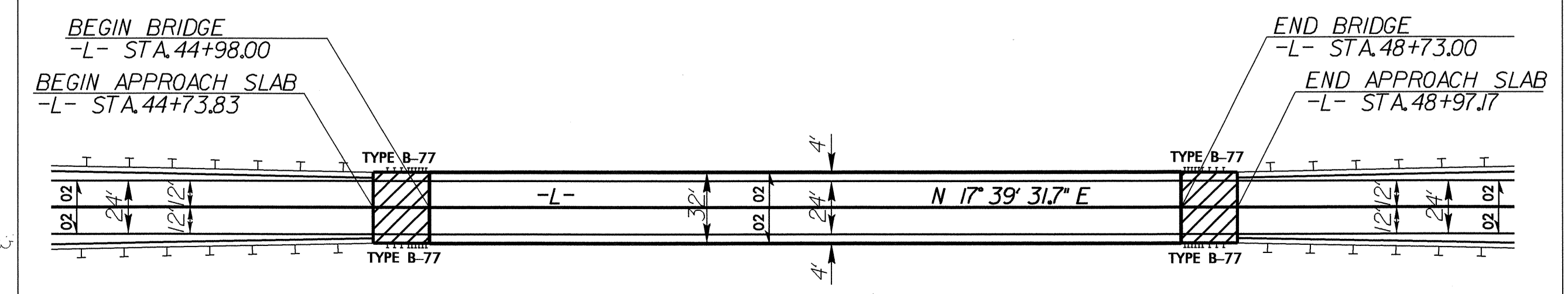
MATCHLINE SHEET 5 -L- STA.36+00.00

MATCHLINE SHEET 7 -L- STA.50+00.00



REVISIONS

### RELATIONSHIP OF PROPOSED BRIDGE TO PAVEMENT



SBG SHOULDER BERM GUTTER  
 SEE SHEET 10 FOR -L- PROFILE  
 SEE SHEETS S- THROUGH S- FOR STRUCTURE PLANS  
 SEE TMP PLANS FOR TEMPORARY SHORING NOTES

24-MAY-2012 09:21  
 R:\Roadwork\Projects\B4028-rdy-psh6.dgn  
 BLS\BLS\BLS

8/17/09

24-MAY-2012 09:21  
R:\Projects\11164028-rd-j-psr7.dgn  
BRENDA L. MOORE

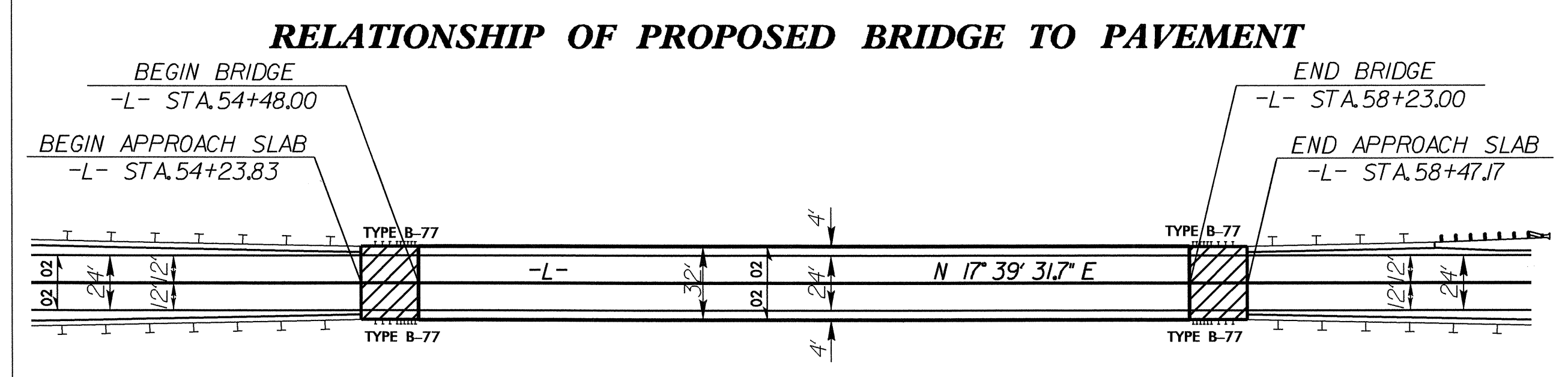
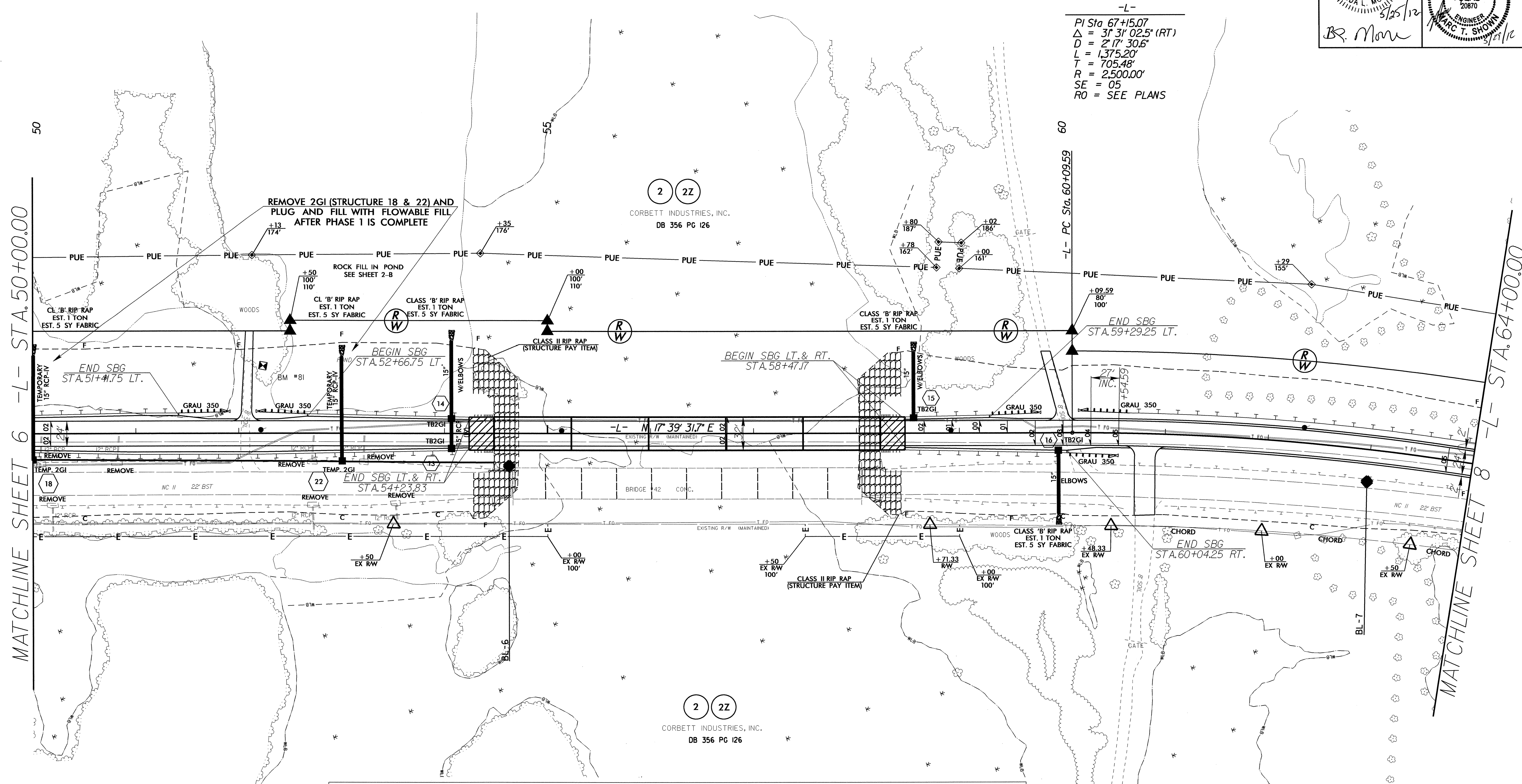
PROJECT REFERENCE NO. B-4028	SHEET NO. 7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER PROFESSIONAL SEAL 19793 BRENDA L. MOORE 5/25/12	HYDRAULICS ENGINEER PROFESSIONAL SEAL 20870 MARC T. SHOWN 5/25/12



-L-  
 PI Sta 67+15.07  
 $\Delta = 3' 31'' 02.5''$  (RT)  
 $D = 2' 17'' 30.6''$   
 $L = 1,375.20'$   
 $T = 705.48'$   
 $R = 2,500.00'$   
 $SE = 05$   
 $RO = \text{SEE PLANS}$

MATCHLINE SHEET 6 -L- STA. 50+00.00

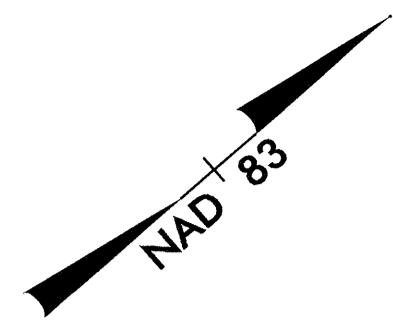
MATCHLINE SHEET 8 -L- STA. 64+00.00



SBG SHOULDER BERM GUTTER  
 SEE SHEET 10 FOR -L- PROFILE  
 SEE SHEETS S- THROUGH S- FOR STRUCTURE PLANS  
 SEE TMP PLANS FOR TEMPORARY SHORING NOTES

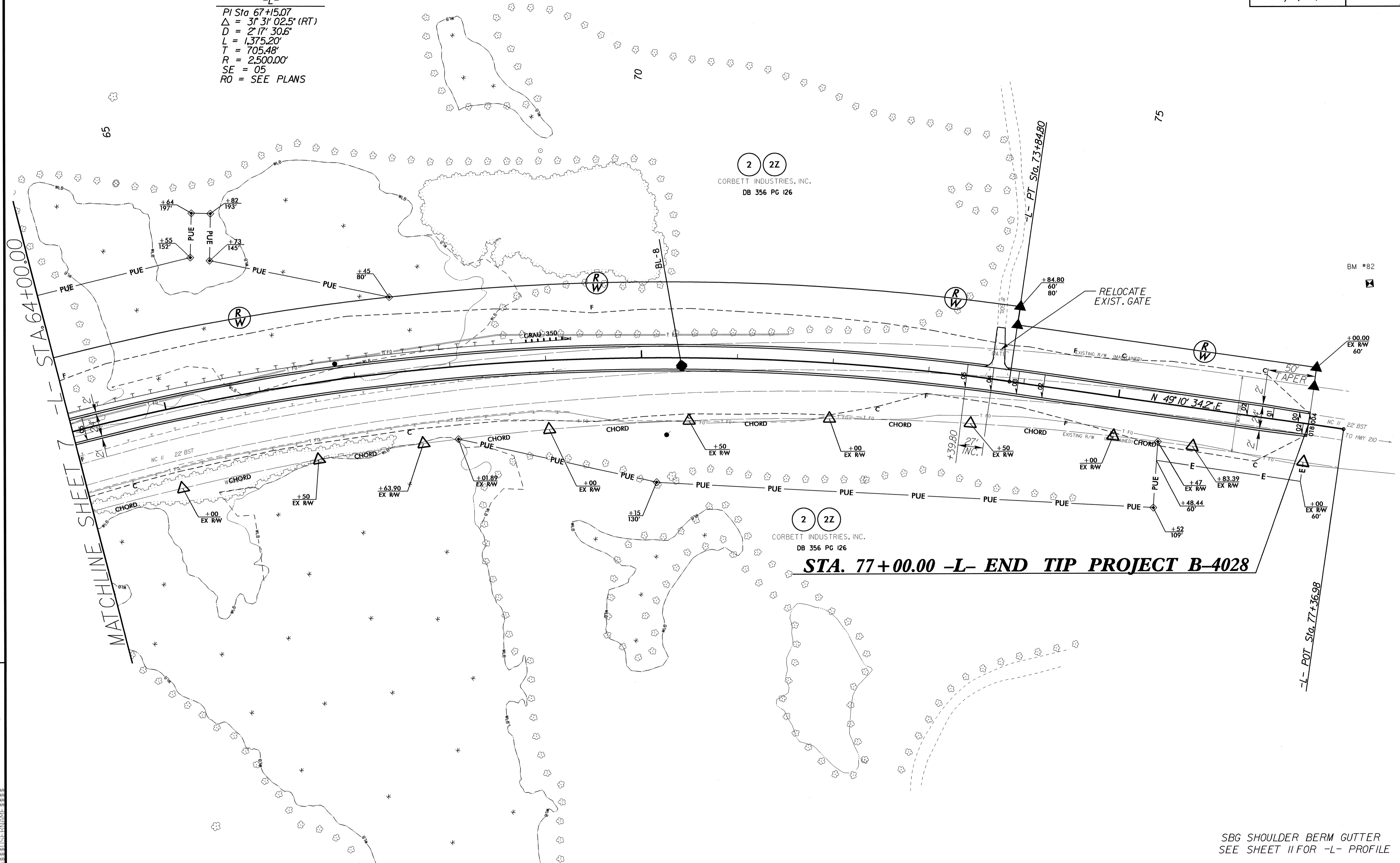
8/17/99

PROJECT REFERENCE NO. B-4028	SHEET NO. 8
R/W SHEET NO.	
ROADWAY DESIGN NORTH CAROLINA PROFESSIONAL SEAL 19795 B. S. Moore	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 20670 MARC T. SHOWN



-L-  
 PI Sta 67+15.07  
 $\Delta = 31^{\circ} 31' 02.5''$  (RT)  
 $D = 2^{\circ} 17' 30.8''$   
 $L = 1,375.20'$   
 $T = 705.48'$   
 $R = 2,500.00'$   
 $SE = 05$   
 $RO = \text{SEE PLANS}$

REVISIONS

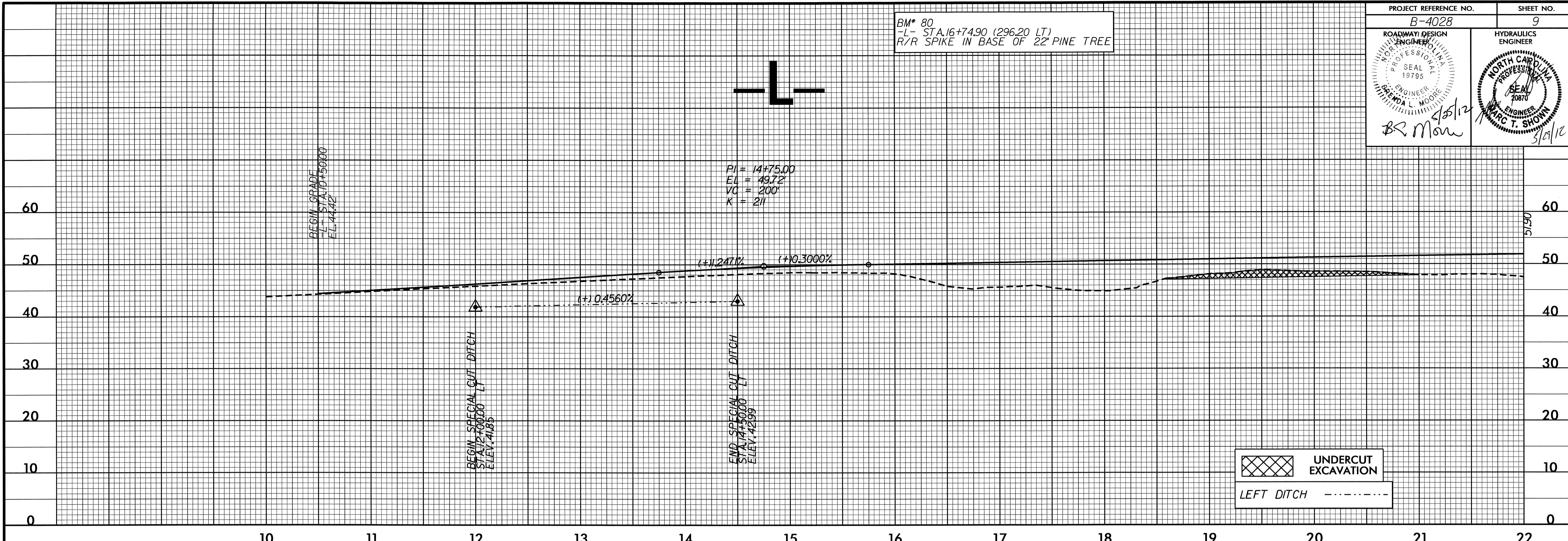


**STA. 77+00.00 -L- END TIP PROJECT B-4028**

10-MAY-2012 08:33  
 6-1028-r.dj-psh8.dgn  
 44.33 MB  
 100%  
 100%

SBG SHOULDER BERM GUTTER  
 SEE SHEET II FOR -L- PROFILE

BM\* 80  
-L- STA. 16+74.90 (296.20 LT)  
R/R SPIKE IN BASE OF 22' PINE TREE



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	=	82600	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	22.6	FT
BASE DISCHARGE	=	93300	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	23.5	FT
OVERTOPPING DISCHARGE	=	77000	CFS
OVERTOPPING FREQUENCY	=	25+	YRS
OVERTOPPING ELEVATION	=	22.1	FT

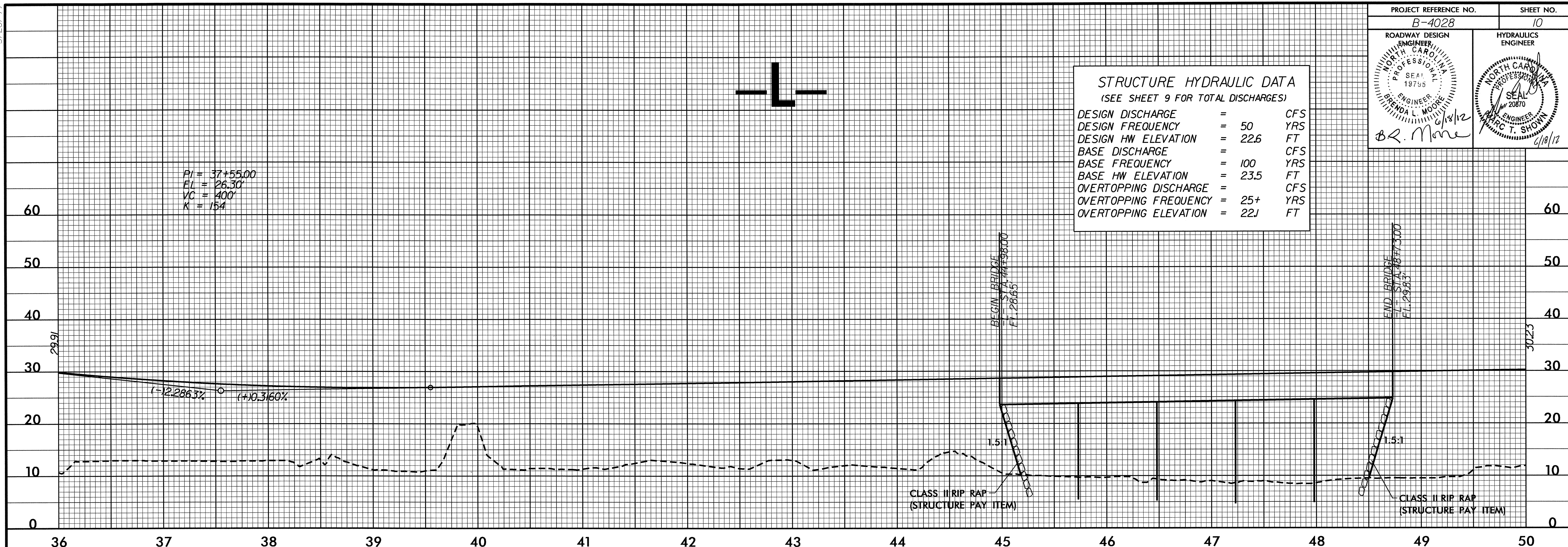


5/28/99

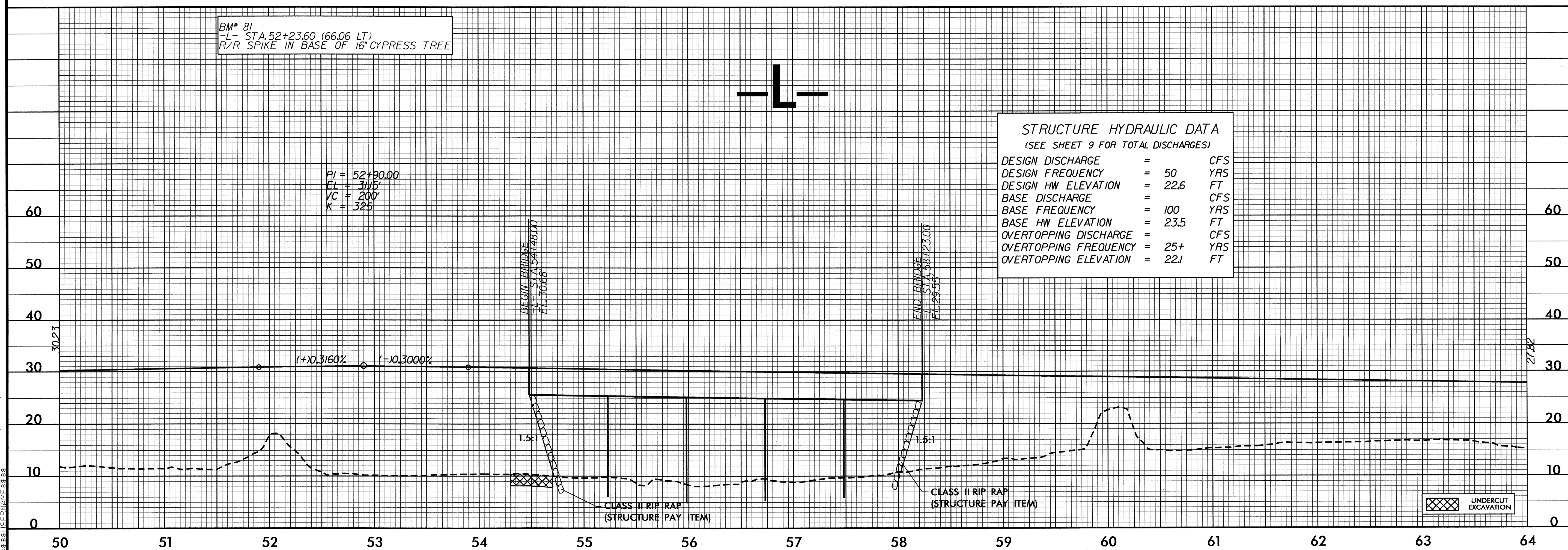
P

P

MAY 2012 07:33 p4028.rdy.pfl.dgn

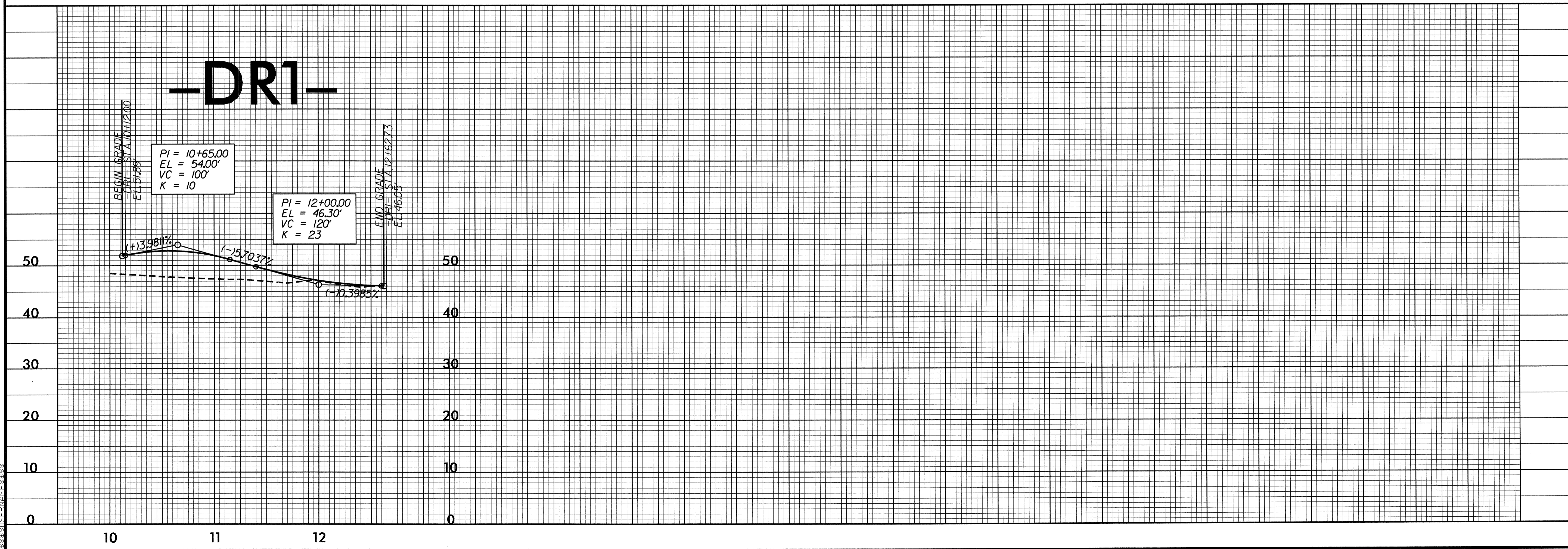
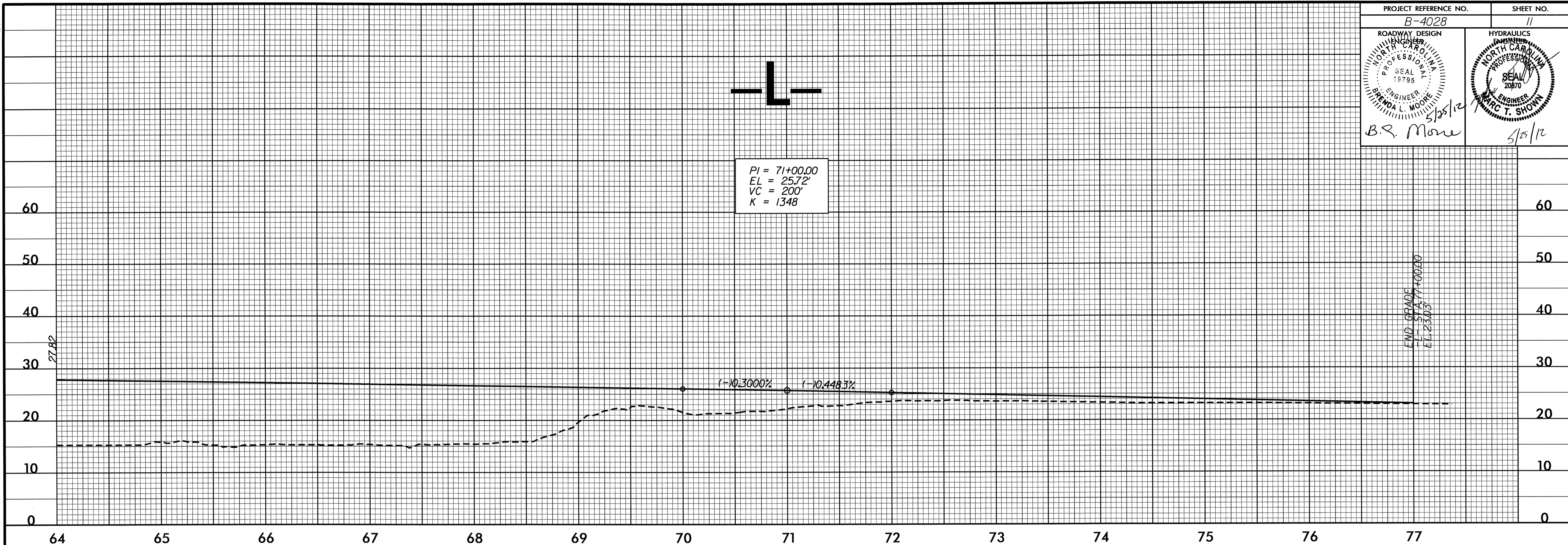


BM# 81  
 1- STA. 52+23.60 (66.06 LT)  
 R/R SPIKE IN BASE OF 16" CYPRESS TREE



5/28/99

PROJECT REFERENCE NO. B-4028	SHEET NO. 11
ROADWAY DESIGN NORTH CAROLINA ENGINEER PROFESSIONAL SEAL 15795 BRAND L. MOORE	HYDRAULICS NORTH CAROLINA ENGINEER PROFESSIONAL SEAL 20870 MARC T. SHOWN
B.L. Moore	5/28/12



15-MAY-2012 08:13 C:\Users\m\4028.r\dj.plt.dgn