

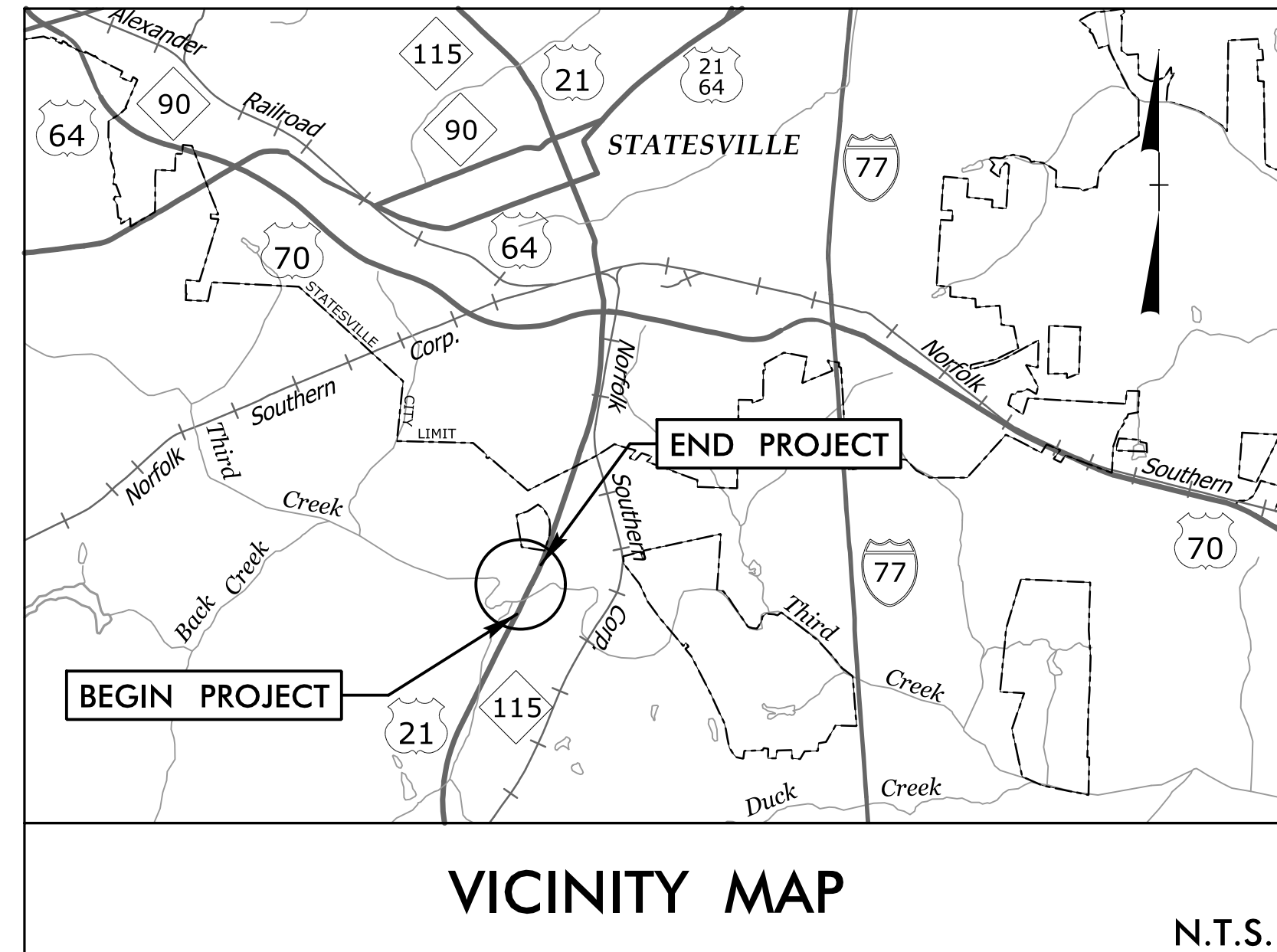
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09/08/19

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



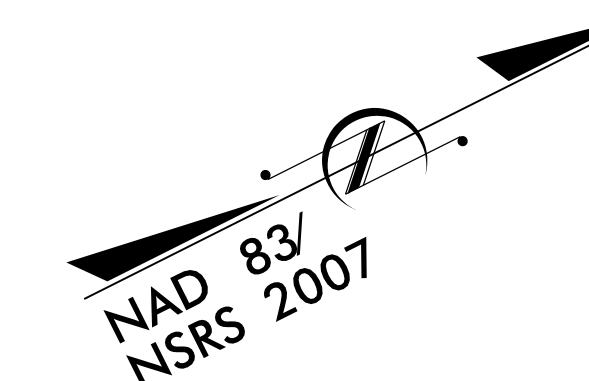
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**IREDELL COUNTY**

**LOCATION: REPLACE BRIDGE NO. 38 OVER THIRD CREEK  
ON US 21 - NC 115**

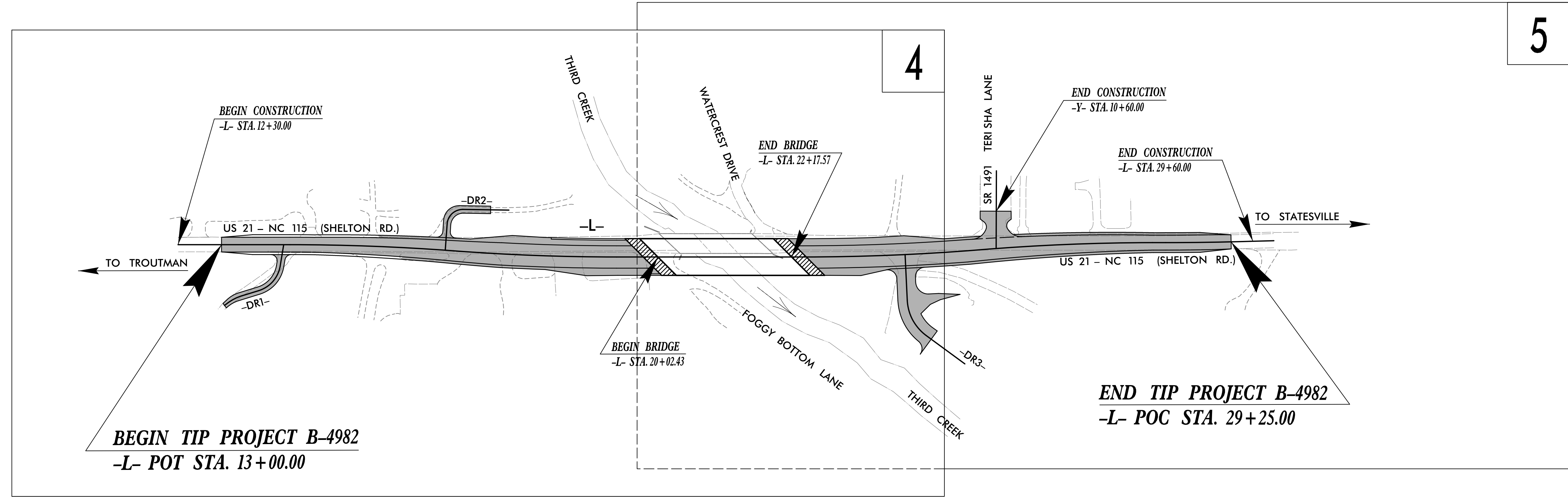
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	<b>B-4982</b>	<b>1</b>	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
40159.1.1	BRSTP-0021(15)	PE	
40159.2.1		R / W	
40159.3.1		CONSTRUCTION	



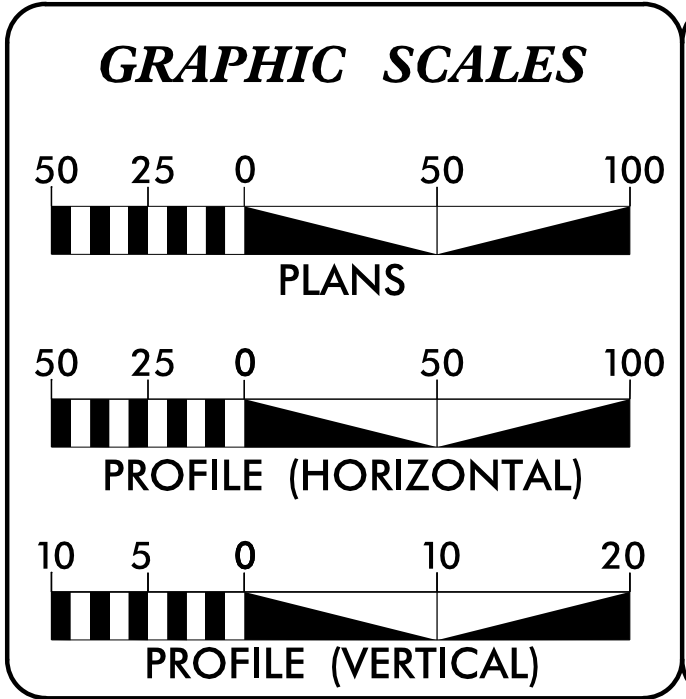
**TIP PROJECT: B-4982**

**CONTRACT: C203956**



NOTES:  
TRAFFIC IS TO BE MAINTAINED ONSITE USING STAGED CONSTRUCTION.

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



**DESIGN DATA**

ADT 2018 =	13100
ADT 2038 =	21700
K =	9 %
D =	55 %
T =	5 % *
V =	50 MPH
* TTST =	1% DUAL 4%
FUNC CLASS =	ARTERIAL
REGIONAL TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4982	=	0.267
LENGTH STRUCTURE TIP PROJECT B-4982	=	0.041
TOTAL LENGTH OF TIP PROJECT B-4982	=	0.308

NCDOT CONTACT: BRYAN KEY, PE  
PROJECT DESIGN ENGINEER

**PLANS PREPARED FOR THE NCDOT BY:**

STV Engineers, Inc.  
900 West Trade St., Suite 715  
Charlotte, NC 28202  
NC License Number F-0991

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
SEPTEMBER 22, 2016

LETTING DATE:  
JUNE 19, 2018

SEAN C. STEPHENS, PE  
PROJECT ENGINEER

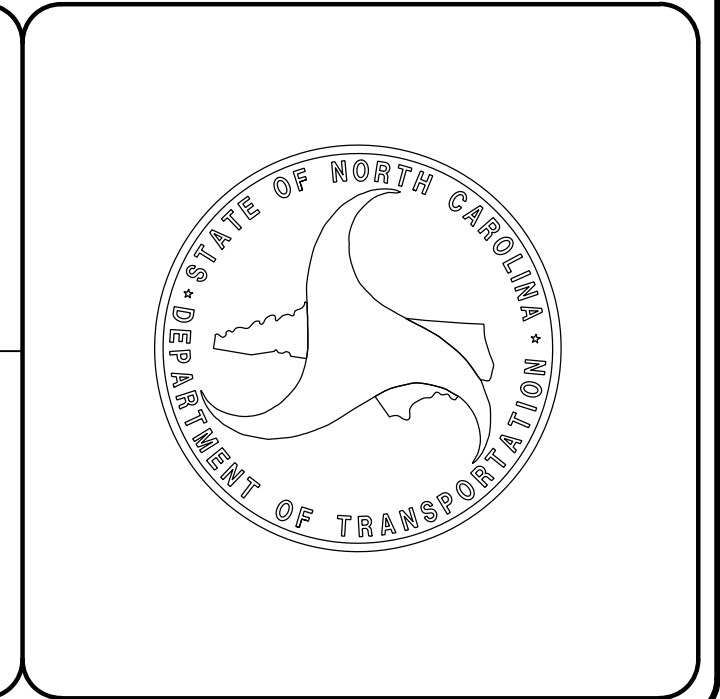
MAAMOON K. ABDELAZIZ  
PROJECT DESIGNER

**HYDRAULICS ENGINEER**

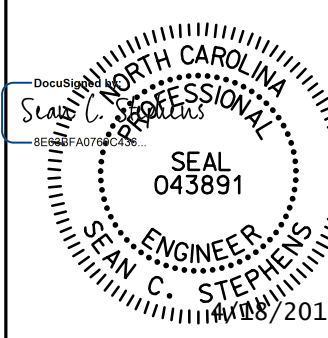

Signature: Sean C. Stephens P.E. 4/18/2018

**ROADWAY DESIGN ENGINEER**

Signature: Sean C. Stephens P.E. 4/18/2018



3/28/2018 11:04:00 AM C:\SHT\B-4982\_Rdy\_psh01\_tsh.dgn stephesc

PROJECT REFERENCE NO. <i>B-4982</i>	SHEET NO. <i>1A</i>
ROADWAY DESIGN ENGINEER	
	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
	
STV Engineers, Inc. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991	

## INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARDS
1B	CONVENTIONAL SYMBOLS
1C-1 THRU 1C-3	SURVEY CONTROL SHEETS
2A-1 THRU 2A-2	TYPICAL SECTIONS
2B-1	TEMPORARY PAVEMENT DETAILS
2C-1	GUARDRAIL INSTALLATION DETAIL
2C-2	GUARDRAIL ANCHOR UNIT DETAIL
2G-1	TEMPORARY SHORING DETAIL
3B-1	GUARDRAIL, PAVEMENT REMOVAL, EARTHWORK & SHOULDER BERM GUTTER SUMMARIES SHEET
3D-1	DRAINAGE SUMMARY SHEET
3G-1	GEOTECHNICAL SUMMARY SHEET
3P-1	PARCEL INDEX SHEET
4 THRU 5	PLAN SHEETS
6 THRU 7	PROFILE SHEETS
TMP-1 THRU TMP-6	TRANSPORTATION MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 THRU EC-7	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-3	SIGNING PLANS
UD-1 THRU UD-3	UTILITIES BY OTHERS PLANS
X-1A	CROSS SECTION INDEX OF SHEETS
X-1B	CROSS SECTION EW SUMMARY SHEET
X-1 THRU X-24	CROSS SECTIONS
S-1 THRU S-67	STRUCTURE PLANS

## GENERAL NOTES

**GENERAL NOTES:** 2018 SPECIFICATIONS  
EFFECTIVE: 01-16-2018  
REVISED:

**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.

**SUBSURFACE DRAINS:**  
SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 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".

**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  
City of Statesville (Power Distribution), AT&T, Time Warner Cable,  
City of Statesville (Water)  
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

**RIGHT-OF-WAY MARKERS:**  
ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

## STANDARD DRAWINGS

2018 ROADWAY ENGLISH STANDARD DRAWINGS EFF. 01-16-2018

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 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
310.10	Driveway Pipe Construction
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.01	Bridge Approach Fills - Type I Standard Approach Fill
<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
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
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 (Special Detail for Sheet 6 of 8)
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

# 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	○ EIP
Property Corner	→
Property Monument	□ ECM
Parcel/Sequence Number	(23)
Existing Fence Line	-X-X-X-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Existing Endangered Animal Boundary	----- EAB
Existing Endangered Plant Boundary	----- EPB
Existing Historic Property Boundary	----- HPB
Known Contamination Area: Soil	☠-S-☠
Potential Contamination Area: Soil	☠-S-☠
Known Contamination Area: Water	☠-W-☠
Potential Contamination Area: Water	☠-W-☠
Contaminated Site: Known or Potential	☠ ?

## BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	⋈
Foundation	□
Area Outline	□
Cemetery	↑
Building	□
School	□
Church	□
Dam	□

## HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	□
Jurisdictional Stream	----- JS
Buffer Zone 1	----- BZ 1
Buffer Zone 2	----- BZ 2
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	-----
Proposed Lateral, Tail, Head Ditch	----- FLOW
False Sump	▽

## RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

## RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	○ RW
Proposed Right of Way Line with Iron Pin and Cap Marker	○ RW ▲
Proposed Right of Way Line with Concrete or Granite RW Marker	▲ RW
Proposed Control of Access Line with Concrete C/A Marker	▲ C/A
Existing Control of Access	○ C/A
Proposed Control of Access	○ C/A
Existing Easement Line	----- E
Proposed Temporary Construction Easement	----- E
Proposed Temporary Drainage Easement	----- TDE
Proposed Permanent Drainage Easement	----- PDE
Proposed Permanent Drainage / Utility Easement	----- DUE
Proposed Permanent Utility Easement	----- PUE
Proposed Temporary Utility Easement	----- TUE
Proposed Aerial Utility Easement	----- AUE
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

## ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	----- C
Proposed Slope Stakes Fill	----- F
Proposed Curb Ramp	○ CR
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	⊗

## VEGETATION:

Single Tree	☼
Single Shrub	☼
Hedge	-----
Woods Line	-----

Orchard	☼ ☼ ☼ ☼
Vineyard	□ Vineyard

## EXISTING STRUCTURES:

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

## UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	○ P
Power Line Tower	□
Power Transformer	□
U/G Power Cable Hand Hole	●
H-Frame Pole	●
U/G Power Line LOS B (S.U.E.*)	----- P
U/G Power Line LOS C (S.U.E.*)	----- P
U/G Power Line LOS D (S.U.E.*)	----- P

## TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	○ T
Telephone Pedestal	□
Telephone Cell Tower	⊕
U/G Telephone Cable Hand Hole	⊕
U/G Telephone Cable LOS B (S.U.E.*)	----- T
U/G Telephone Cable LOS C (S.U.E.*)	----- T
U/G Telephone Cable LOS D (S.U.E.*)	----- T
U/G Telephone Conduit LOS B (S.U.E.*)	----- TC
U/G Telephone Conduit LOS C (S.U.E.*)	----- TC
U/G Telephone Conduit LOS D (S.U.E.*)	----- TC
U/G Fiber Optics Cable LOS B (S.U.E.*)	----- T FO
U/G Fiber Optics Cable LOS C (S.U.E.*)	----- T FO
U/G Fiber Optics Cable LOS D (S.U.E.*)	----- T FO

## WATER:

Water Manhole	○
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
U/G Water Line LOS B (S.U.E.*)	----- W
U/G Water Line LOS C (S.U.E.*)	----- W
U/G Water Line LOS D (S.U.E.*)	----- W
Above Ground Water Line	----- A/G Water

## TV:

TV Pedestal	□
TV Tower	⊗
U/G TV Cable Hand Hole	⊕
U/G TV Cable LOS B (S.U.E.*)	----- TV
U/G TV Cable LOS C (S.U.E.*)	----- TV
U/G TV Cable LOS D (S.U.E.*)	----- TV
U/G Fiber Optic Cable LOS B (S.U.E.*)	----- TV FO
U/G Fiber Optic Cable LOS C (S.U.E.*)	----- TV FO
U/G Fiber Optic Cable LOS D (S.U.E.*)	----- TV FO

## GAS:

Gas Valve	◇
Gas Meter	◇
U/G Gas Line LOS B (S.U.E.*)	----- G
U/G Gas Line LOS C (S.U.E.*)	----- G
U/G Gas Line LOS D (S.U.E.*)	----- G
Above Ground Gas Line	----- A/G Gas

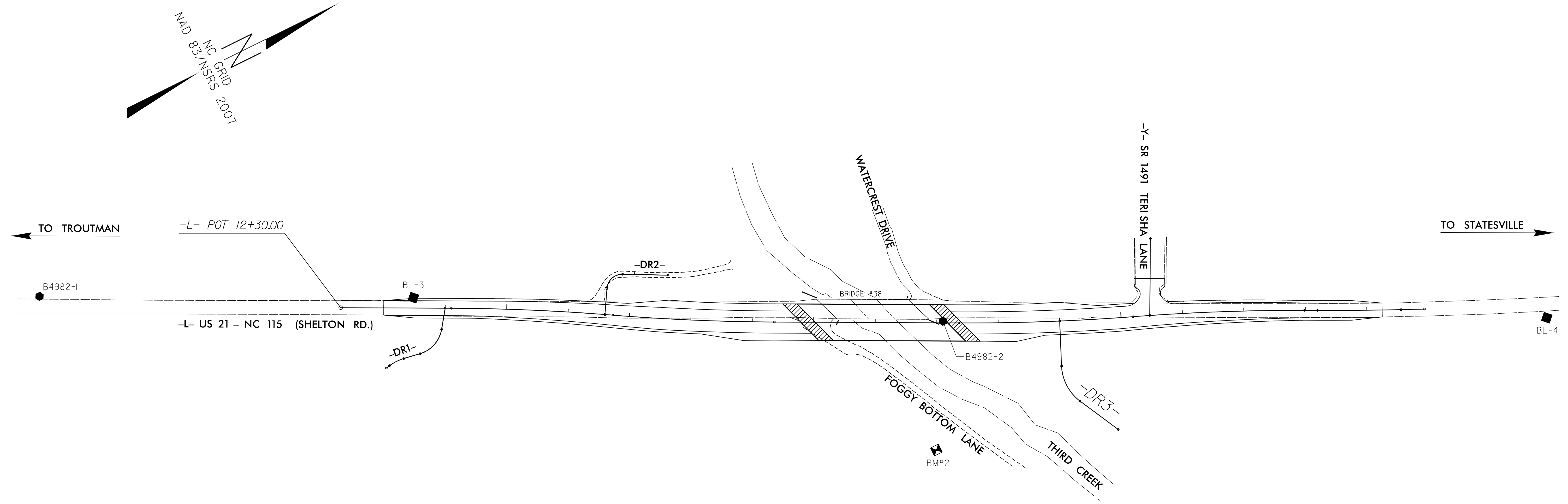
## SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	----- SS
Above Ground Sanitary Sewer	----- A/G Sanitary Sewer
SS Forced Main Line LOS B (S.U.E.*)	----- FSS
SS Forced Main Line LOS C (S.U.E.*)	----- FSS
SS Forced Main Line LOS D (S.U.E.*)	----- FSS

## MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line LOS B (S.U.E.*)	----- UUTL
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	□
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
U/G Test Hole LOS A (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

# SURVEY CONTROL SHEET B-4982



BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	B4982-1		732634.0570	1438341.5830	791.93	OUTSIDE PROJECT LIMITS	
3	BL-3		733177.9928	1438613.3462	792.13	13+48.09	16.90 LT
2	B4982-2		733932.7570	1439029.7980	793.82	22+09.96	2.78 LT
4	BL-4		734815.3503	1439460.7762	830.62	OUTSIDE PROJECT LIMITS	

.....  
 BM2 ELEVATION = 782.82  
 N 733830 E 1439213  
 L STATION 22+00.00 207 RIGHT  
 R/R SPIKE SET IN BASE OF 24" OAK ONSOUTHEAST  
 SIDE OF THIRD CREEK, 33' FROMCENTERLINE OF  
 FOGGY BOTTOM RD.  
 .....

**DATUM DESCRIPTION**  
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4982-1" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 732634.057(ft) EASTING: 1438341.583(ft) ELEVATION: 791.93(ft)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987725  
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4982-1" TO -L- STATION 12+30.00 IS N 28°30'16.08" E 490.21'  
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

**NOTES:**

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION](https://connect.ncdot.gov/resources/location)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 B4982\_LS\_CONTROL.TXT  
 B4982\_LS\_LOCAL.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.
- INDICATES CONTROL MONUMENTS SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
- INDICATES BENCHMARKS USED OR SET FOR VERTICAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.  
 PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.  
 NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

# ALIGNMENT CONTROL SHEET B-4982

L

TYPE	STATION	NORTH	EAST
POT	12+30.00	733064.8476	1438575.5267
PC	14+10.00	733225.7548	1438656.2044
PRC	16+72.99	733456.1762	1438782.8475
PT	19+35.99	733686.5976	1438909.4906
PC	22+35.99	733954.7762	1439043.9534
PRC	25+19.60	734213.1991	1439160.6040
PT	27+98.61	734467.5097	1439275.1961
PC	28+19.95	734486.6033	1439284.7380
PT	29+55.57	734608.7256	1439343.7114
POT	29+93.85	734643.4163	1439359.8872

LDET1

TYPE	STATION	NORTH	EAST
PC	10+00.00	733456.1762	1438782.8475
PCC	10+36.44	733487.3282	1438801.7576
PT	10+84.09	733526.5340	1438828.7959
PC	11+27.08	733560.5805	1438855.0395
PCC	12+05.88	733626.8761	1438897.4517
PT	12+64.66	733679.2022	1438924.2404

**DATUM DESCRIPTION**

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

Y

TYPE	STATION	NORTH	EAST
POT	10+00.00	734238.4628	1439170.9057
POT	11+25.00	734294.8668	1439059.3549

LDET2

TYPE	STATION	NORTH	EAST
PC	10+00.00	733919.5828	1439044.7655
PT	10+80.11	733992.5545	1439077.7655
PC	14+93.13	734375.3945	1439232.7462
PCC	15+62.77	734438.9873	1439261.1049
PT	15+94.59	734467.5138	1439275.1982
POT	15+94.59	734467.5138	1439275.1982

DR1

TYPE	STATION	NORTH	EAST
POT	10+00.00	733087.9215	1438696.3405
PC	10+06.37	733094.1911	1438695.2174
PT	10+32.30	733119.9949	1438695.1044
PC	10+60.16	733147.4570	1438699.7764
PT	11+15.63	733196.2467	1438679.9382
POT	11+50.55	733216.8155	1438651.7223

DR2

TYPE	STATION	NORTH	EAST
POT	10+00.00	733445.0216	1438776.1843
PC	10+42.48	733466.7396	1438739.6722
PT	10+80.33	733499.7632	1438730.2740
POT	11+54.37	733565.4495	1438764.4440

DR3

TYPE	STATION	NORTH	EAST
POT	10+00.00	734103.0704	1439113.9842
PC	10+73.23	734073.3699	1439180.9174
PT	11+39.99	734075.1409	1439245.4698
POT	12+17.21	734110.2849	1439314.2314

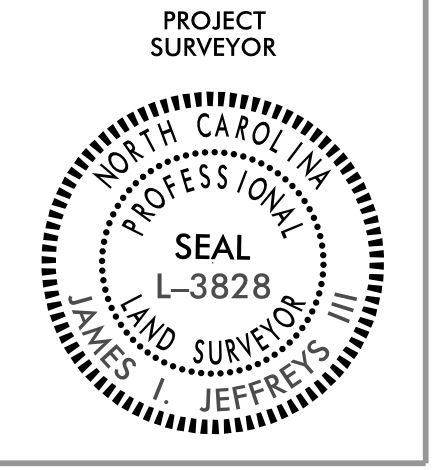
SEE SHEET 1C-1 FOR NOTES

6/6/17

6/29/2017  
C:\posdway\proj\SH\B4982\_1s\_1C-2.dgn  
pbal

# RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO. B-4982	SHEET NO. 1C-3
<b>Location and Surveys</b>	



ROW MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+30.00	-40.00	733082.7760	1438539.7696
L	12+30.00	-22.50	733074.9323	1438555.4133
L	12+38.00	22.50	733061.9143	1438599.2258
L	12+38.00	40.00	733054.0707	1438614.8695
L	14+10.00	-40.00	733243.6831	1438620.4472
L	14+10.00	40.00	733207.8264	1438691.9615
L	16+72.99	-40.00	733476.7531	1438748.5460
L	16+72.99	40.00	733435.5993	1438817.1490
L	17+98.58	-40.00	733584.3379	1438810.4725
L	19+35.99	40.00	733668.6692	1438945.2477
L	22+35.99	40.00	733936.8478	1439079.7105
L	24+25.55	-40.00	734142.4164	1439087.5808
L	24+90.00	-40.00	734201.0709	1439112.4507
L	25+19.60	40.00	734198.2411	1439197.7019
L	26+10.00	-40.00	734312.5125	1439158.7990
L	27+98.61	40.00	734449.6286	1439310.9769
L	27+98.61	-40.00	734485.3908	1439239.4153
L	28+19.95	40.00	734468.7222	1439320.5188
L	28+19.95	-40.00	734504.4845	1439248.9572
L	29+25.00	22.50	734571.4246	1439351.0406
L	29+25.00	40.00	734563.9322	1439366.8556
L	29+55.57	-40.00	734625.6298	1439307.4588
L	29+60.00	-22.50	734622.2476	1439325.1907
L	29+60.00	-40.00	734629.6432	1439309.3302

PERMANENT EASEMENT MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
L	15+70.00	-40.00	733386.6375	1438696.2847
L	16+00.00	40.00	733373.3397	1438780.6828
L	17+00.00	60.00	733448.9241	1438848.3406
L	17+71.00	60.00	733511.5152	1438884.3753
L	17+71.00	40.00	733521.3166	1438866.9416
L	18+00.00	-80.00	733604.8803	1438776.1220
L	18+35.00	60.00	733568.5549	1438915.7570
L	18+64.00	-85.00	733662.2465	1438801.3827
L	19+55.00	-90.00	733743.9333	1438837.5591
L	21+41.00	-77.00	733904.3773	1438932.5471
L	21+79.00	-54.00	733928.0377	1438970.1394
L	21+79.00	-44.78	733923.9050	1438978.3819
L	21+79.00	-63.00	733932.0716	1438962.0941
L	22+35.99	-50.00	733977.1899	1438999.2586
L	23+00.00	65.00	733984.2005	1439130.7484
L	24+60.00	75.00	734128.8873	1439206.9142
L	24+60.00	55.00	734136.6829	1439188.4960
L	24+98.00	-45.59	734210.5058	1439110.2904
L	25+00.00	75.00	734166.6083	1439222.6247
L	25+75.00	55.00	734243.0399	1439232.4064
L	25+75.00	40.00	734248.8699	1439218.5857
L	27+15.00	165.00	734322.0877	1439388.0488
L	27+75.00	75.00	734413.2865	1439332.0300
L	28+50.00	45.00	734493.6486	1439338.4632

ROW MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
Y	10+60.00	-30.00	734238.7645	1439103.8243
Y	10+60.00	30.00	734292.3089	1439130.8982

I, James I. Jeffreys, a Professional Land Surveyor in the state of North Carolina hereby certify to the best of my knowledge and belief that the following work item(s) (R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

I further certify that the right of way and permanent easement points shown herein and outlined in the tables shown hereon (localized coordinates, station/offset) have been checked and are accurate representations of the right of way and permanent easement points depicted on the corresponding highway plans. I also certify that the right of way and permanent easement points shown herein have been field monumented under my supervision from existing survey control provided by others; that the depicted property data shown herein were surveyed by others; and these monuments denote the right of way and easement boundaries at the time of staking which may be subject to change due to right of way revisions (See deeds for final determination).

Witness my original signature, registration number and seal this day 11/3/2017.

DocuSigned by:  
  
 A43045A2D7AE4CA ..... L-3828  
 Professional Land Surveyor PLS #

**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4982-1"

WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF  
 NORTHING: 732634.0571(ft) EASTING: 1438341.5831(ft)  
 ELEVATION: 791.931(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT  
 (GROUND TO GRID) IS: 0.99987725

THE N.C. LAMBERT GRID BEARING AND  
 LOCALIZED HORIZONTAL GROUND DISTANCE FROM  
 "B4982-1" TO -L- STATION 12+30.00 IS  
 N 28°30'16.08" E 490.21'

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

**NOTES:**

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

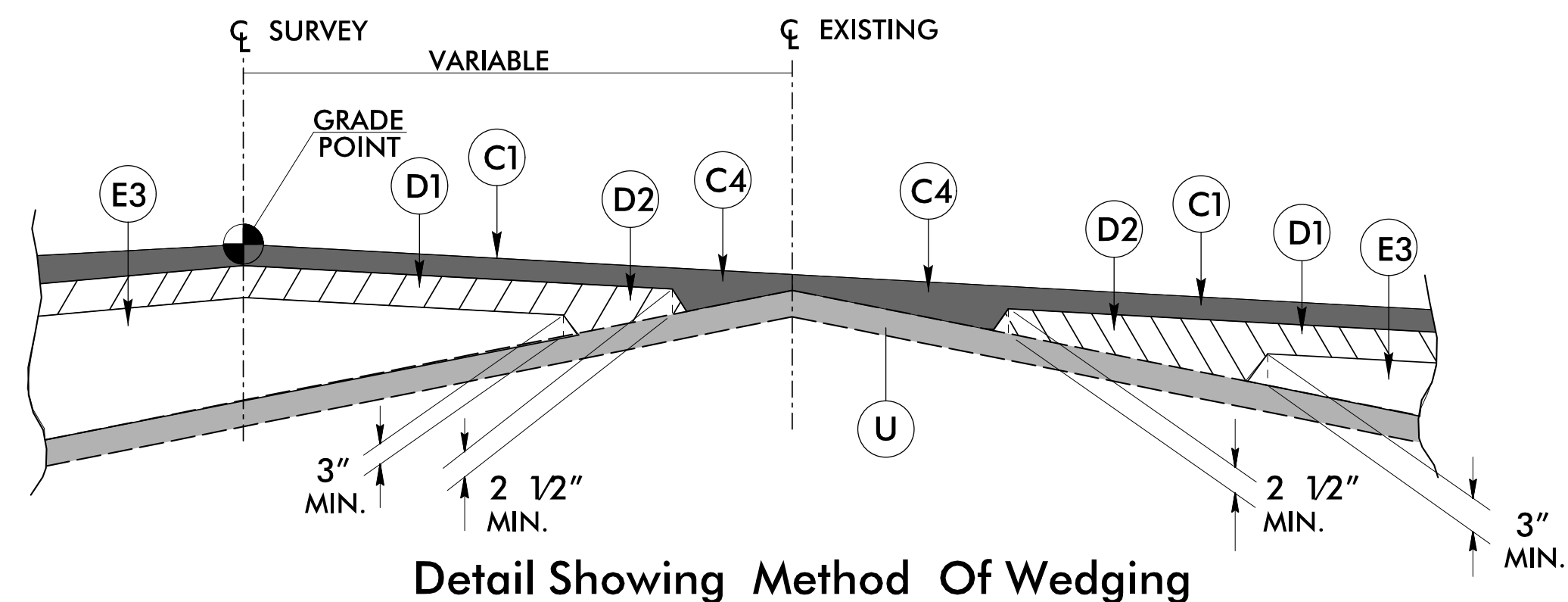
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

8/17/99

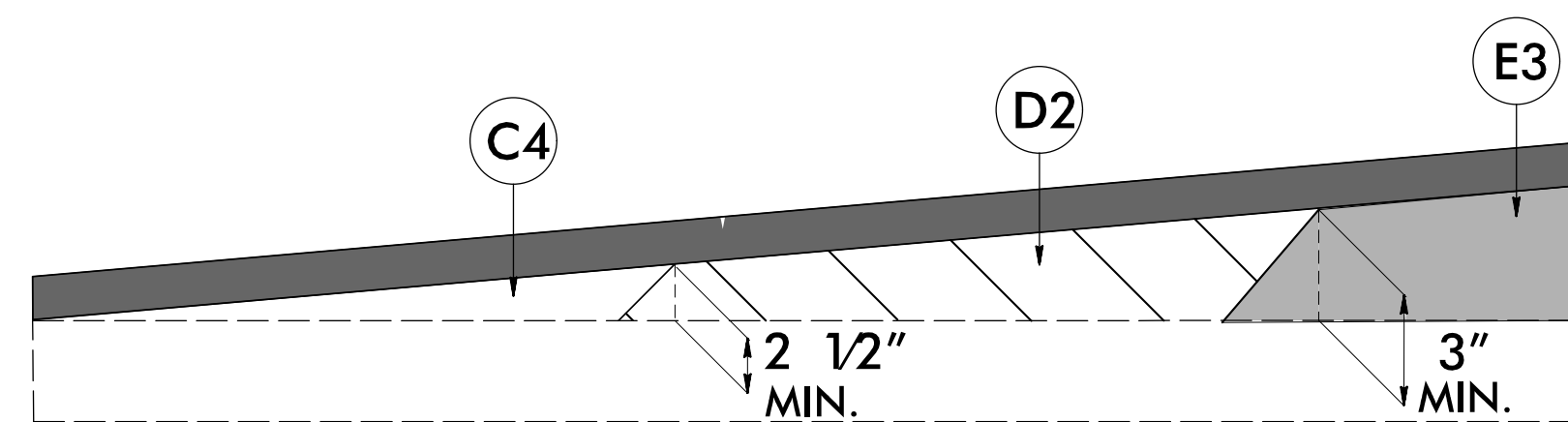
**PAVEMENT SCHEDULE**

(FINAL PAVEMENT DESIGN)

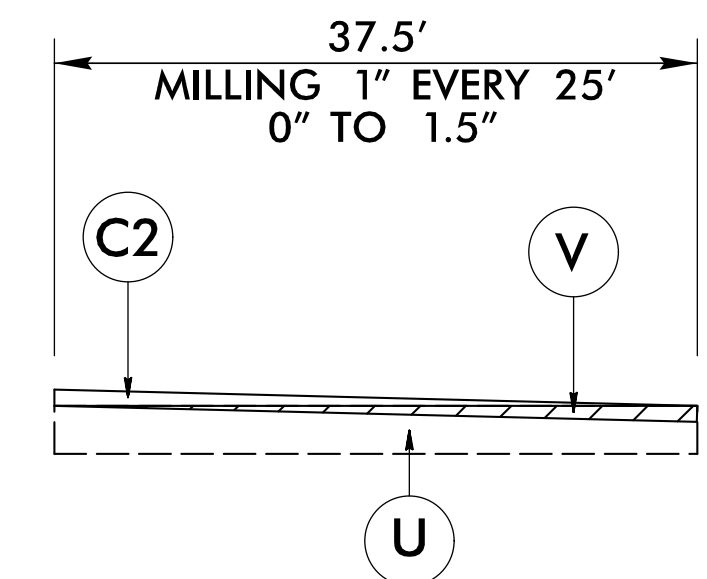
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 220 LBS. PER SQ. YD.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1½" IN DEPTH OR EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J	PROP. 8" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
R1	PROP. SHOULDER BERM GUTTER
R2	PROP. 2'-6" CURB AND GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING ASPHALT PAVEMENT, VARIABLE DEPTH
W	VARIABLE DEPTH ASPHALT PAVEMENT



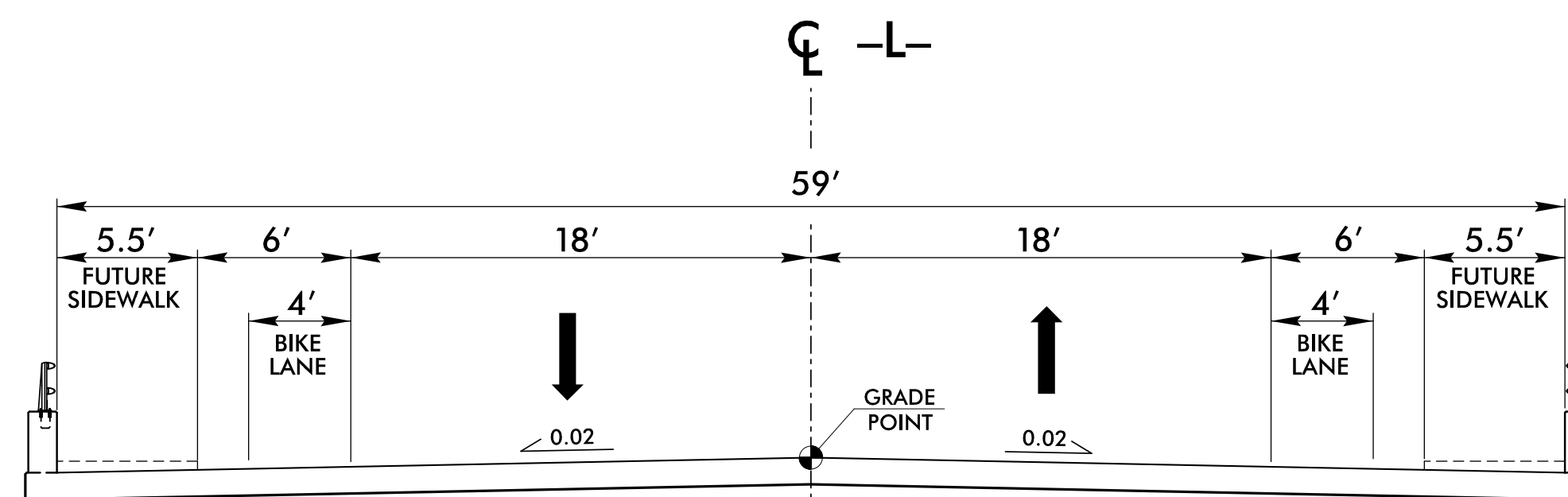
Detail Showing Method Of Wedging



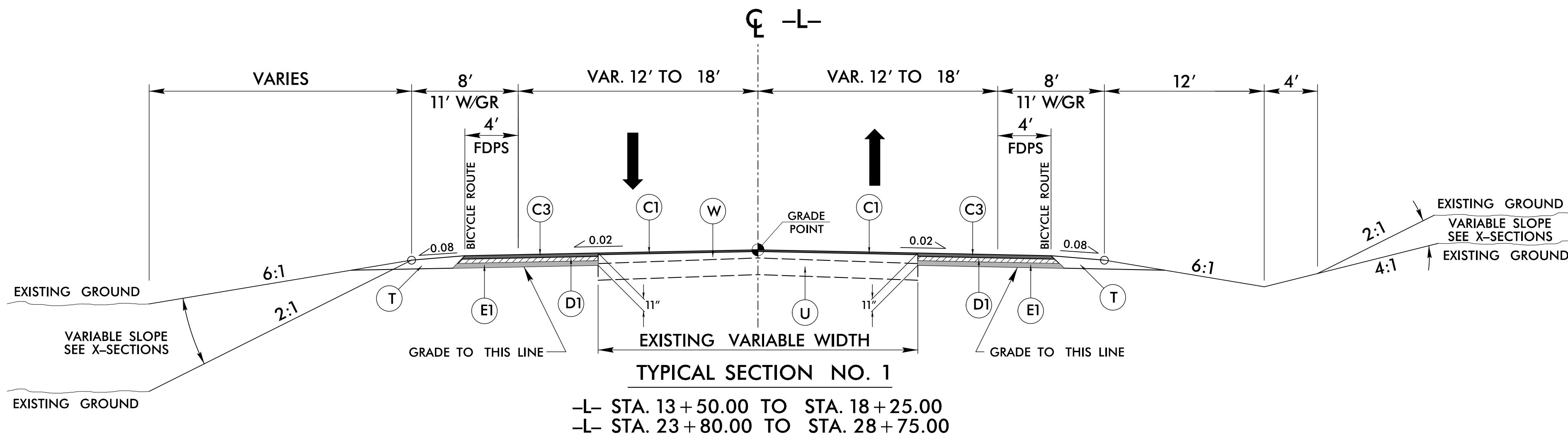
Wedging Detail For Resurfacing



INCIDENTAL MILLING DETAIL  
USE MILLING DETAIL AT RESURFACING TIES



TYPICAL SECTION ON STRUCTURE  
(SEE STRUCTURE PLANS)  
-L- STA. 20+02.43 TO STA. 22+17.57



TYPICAL SECTION NO. 1  
-L- STA. 13+50.00 TO STA. 18+25.00  
-L- STA. 23+80.00 TO STA. 28+75.00

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1  
-L- STA. 13+00.00 TO STA. 13+50.00  
-L- STA. 28+75.00 TO STA. 29+25.00

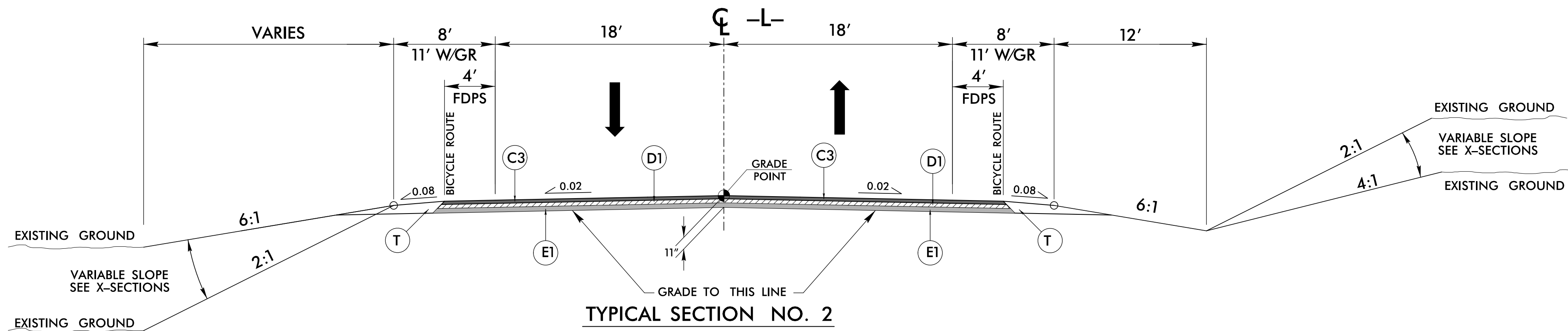
3/27/2018  
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stbnes

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

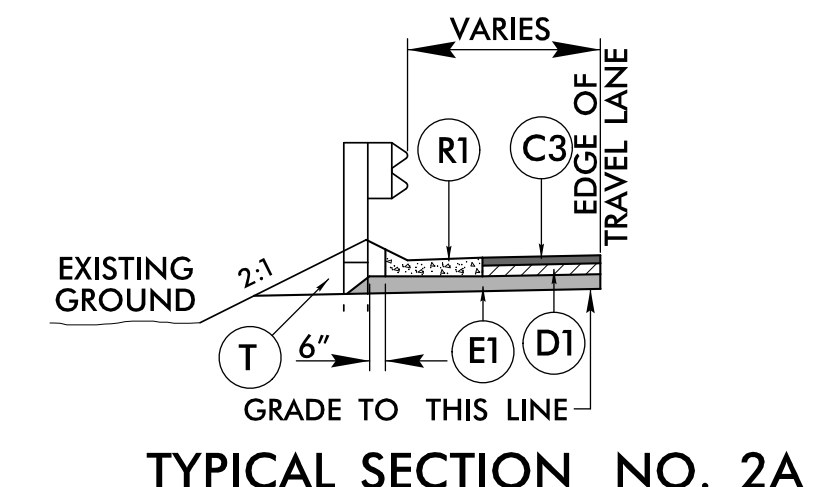
PROJECT REFERENCE NO. B-4982	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
STV Engineers, Inc. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991	



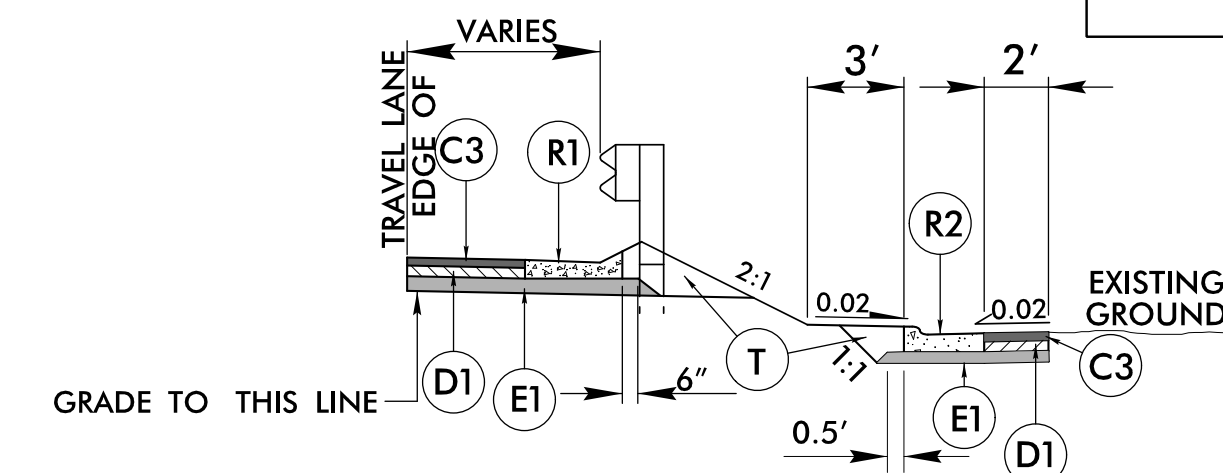
8/17/99



**TYPICAL SECTION NO. 2**  
 -L- STA. 18+25.00 TO -L- STA. 20+02.43 (BEGIN BRIDGE)  
 -L- STA. 22+17.57 (END BRIDGE) TO STA. 23+80.00

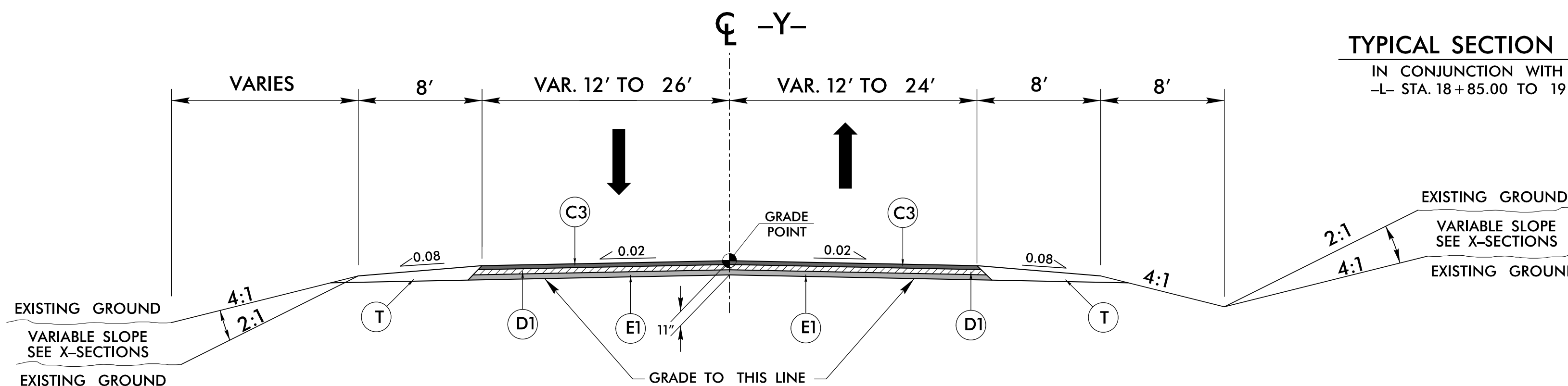


**TYPICAL SECTION NO. 2A**  
 IN CONJUNCTION WITH T.S. NO. 2  
 -L- STA. 18+30.00 TO 19+51.67 LT.  
 -L- STA. 19+83.00 TO 20+06.01 RT.

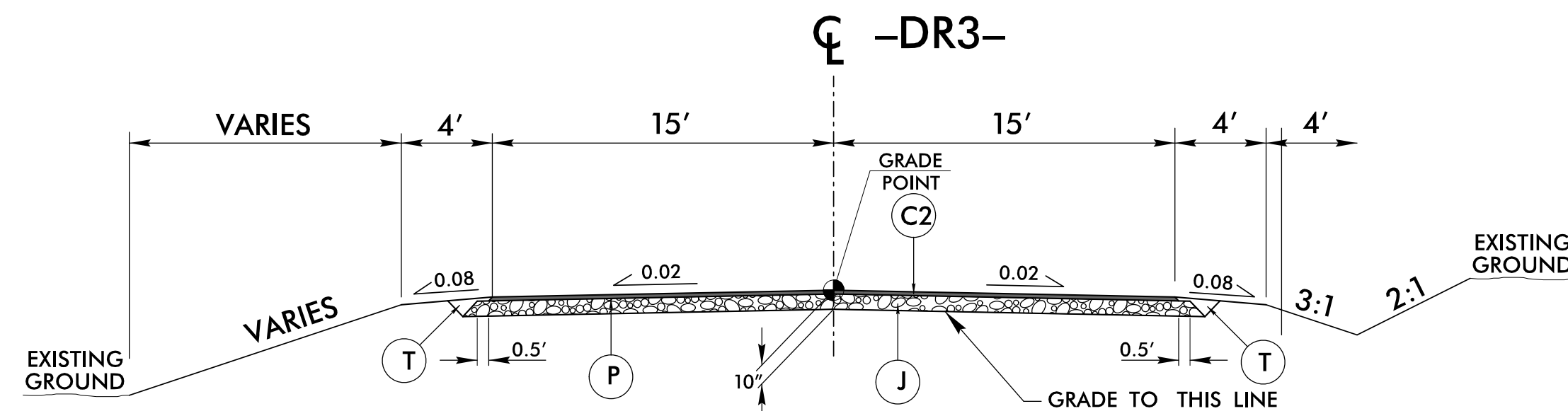


**TYPICAL SECTION NO. 2B**  
 IN CONJUNCTION WITH T.S. NO. 2  
 -L- STA. 18+85.00 TO 19+88.00 RT.

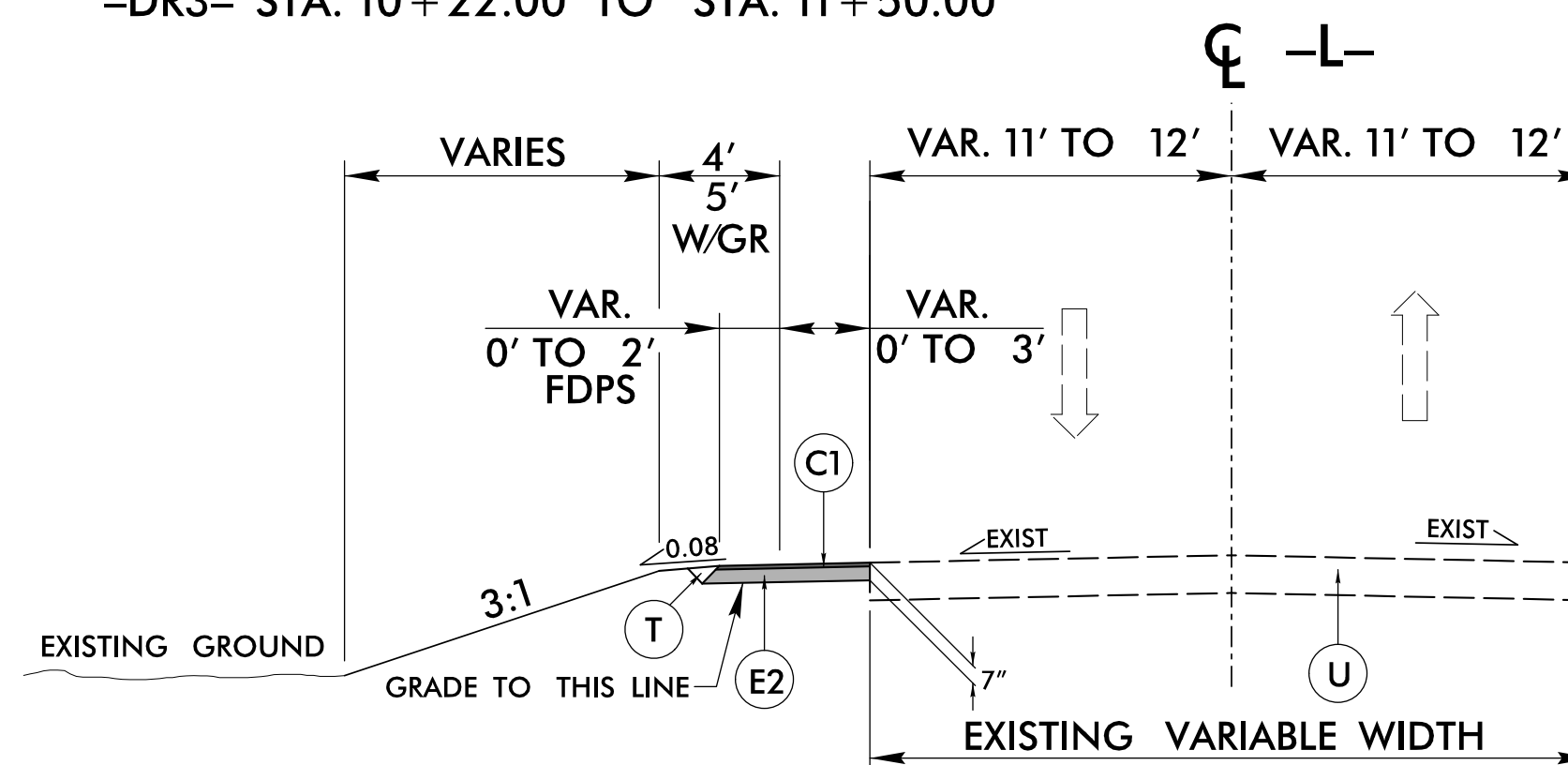
PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1 1/2" ACSC, TYPE S9.5B.
C2	PROP. APPROX. 2" ACSC, TYPE S9.5B.
C3	PROP. APPROX. 3" ACSC, TYPE S9.5B.
C4	PROP. VARI. DEPTH ACSC, TYPE S9.5B.
D1	PROP. APPROX. 4" ACIC, TYPE I19.0C.
D2	PROP. VARI. DEPTH ACIC, TYPE I19.0C.
E1	PROP. APPROX. 4" ACBC, TYPE B25.0C.
E2	PROP. APPROX. 5.5" ACBC, TYPE B25.0C.
E3	PROP. VARI. DEPTH ACBC, TYPE B25.0C.
J	PROP. 8" AGGREGATE BASE COURSE
P	PRIME COAT
R1	PROP. SHOULDER BERM GUTTER
R2	PROP. 2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING ASPHALT PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT



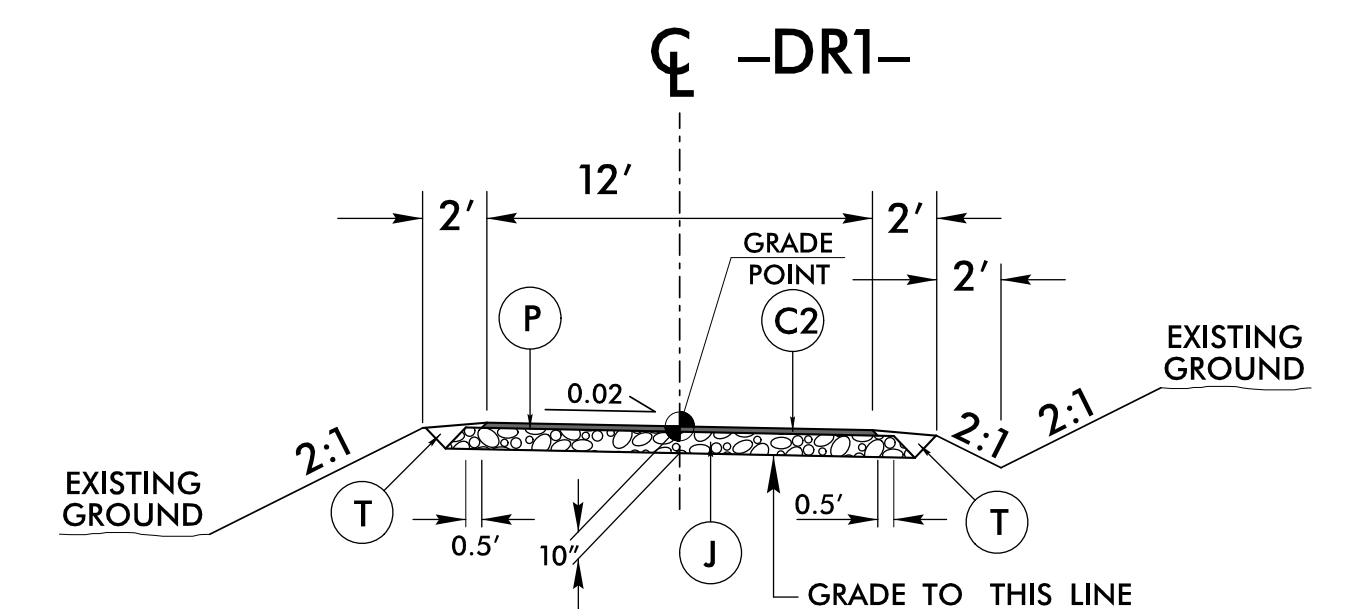
**TYPICAL SECTION NO. 3**  
 -Y- STA. 10+17.09 TO STA. 10+60.00



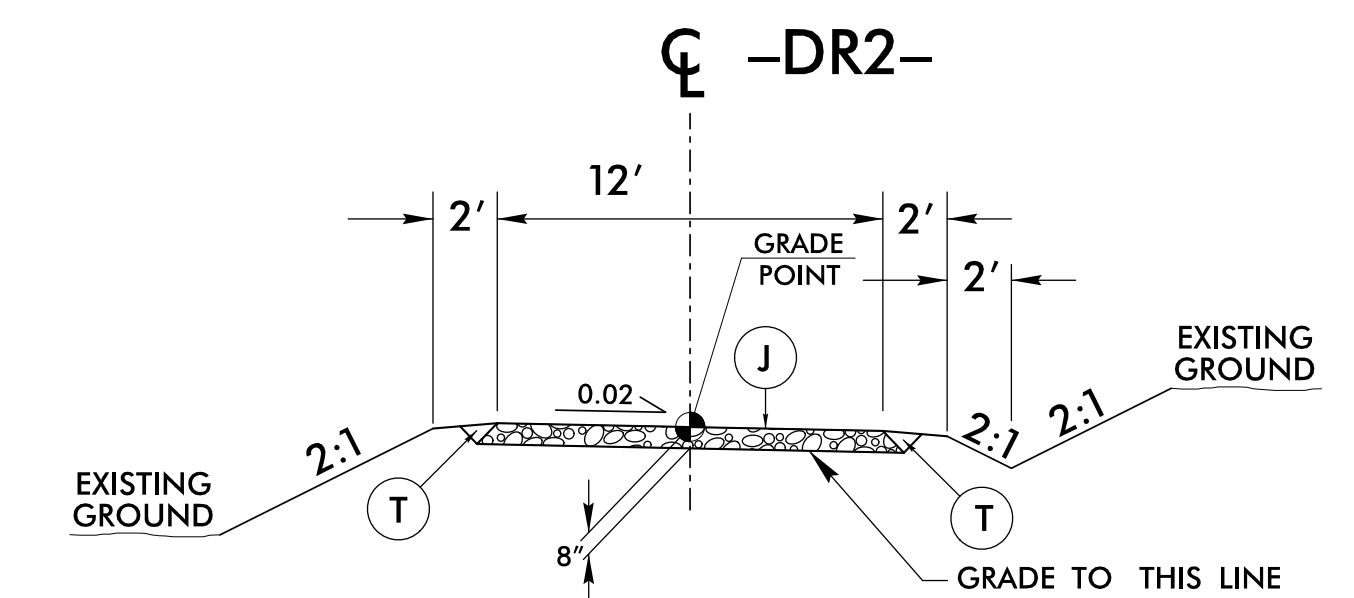
**TYPICAL SECTION NO. 4**  
 -DR3- STA. 10+22.00 TO STA. 11+50.00



**TEMPORARY WIDENING DETAIL**  
 -L- STA. 17+50.00 TO STA. 20+04.08 LT  
 -L- STA. 21+53.18 TO STA. 26+25.00 LT



**TYPICAL SECTION NO. 5**  
 -DR1- STA. 10+00.00 TO STA. 11+34.33



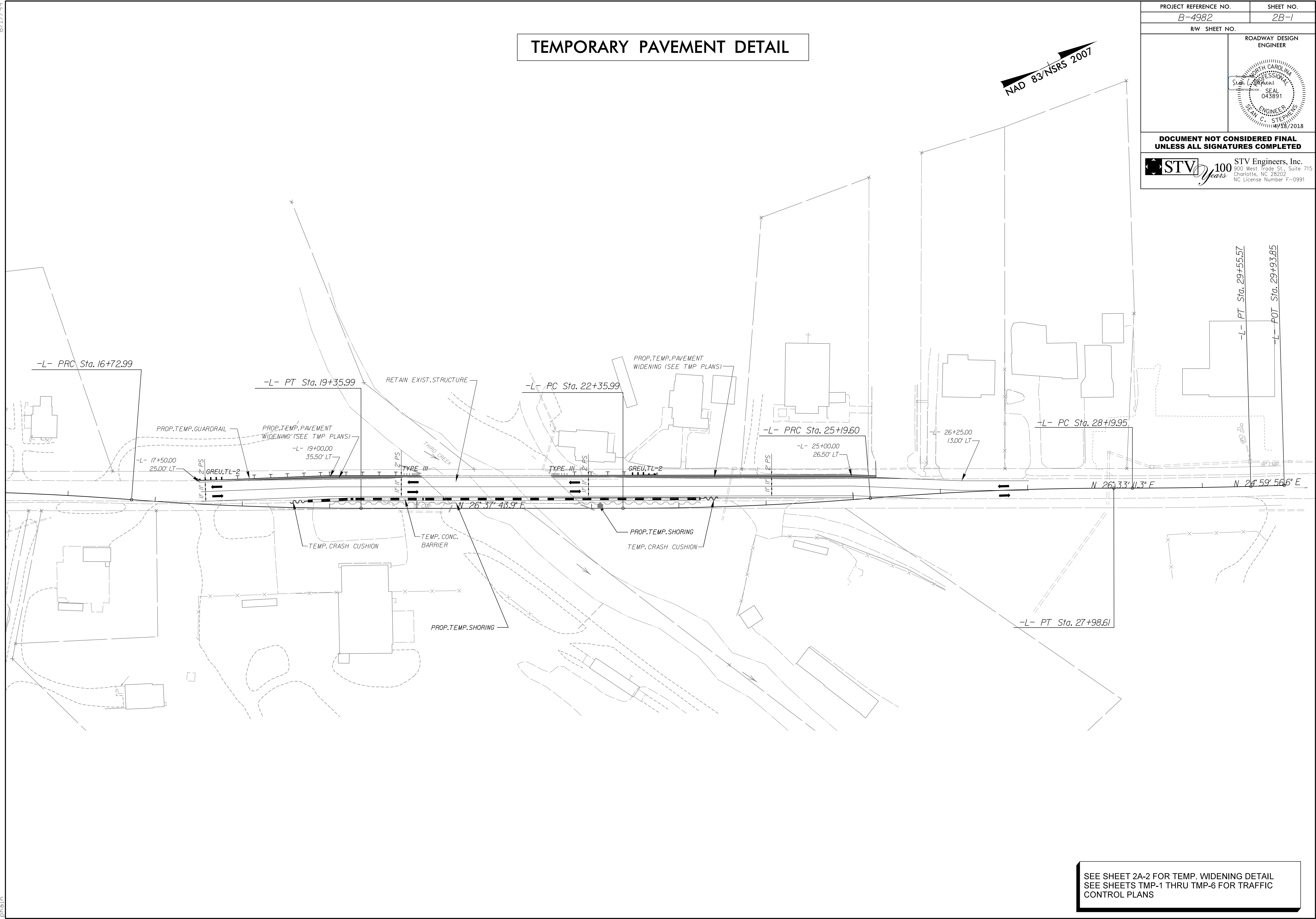
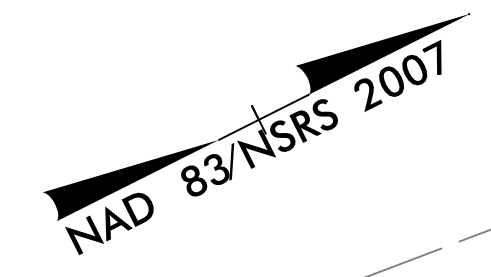
**TYPICAL SECTION NO. 6**  
 -DR2- STA. 10+20.20 TO STA. 11+25.00

PROJECT REFERENCE NO. B-4982	SHEET NO. 2A-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
STV Engineers, Inc. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991	

3/26/2018  
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 eubnesec

PROJECT REFERENCE NO. B-4982	SHEET NO. 2B-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
STV Engineers, Inc. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991	

# TEMPORARY PAVEMENT DETAIL



SEE SHEET 2A-2 FOR TEMP. WIDENING DETAIL  
 SEE SHEETS TMP-1 THRU TMP-6 FOR TRAFFIC CONTROL PLANS

8/17/19  
 6/28/2017  
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STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

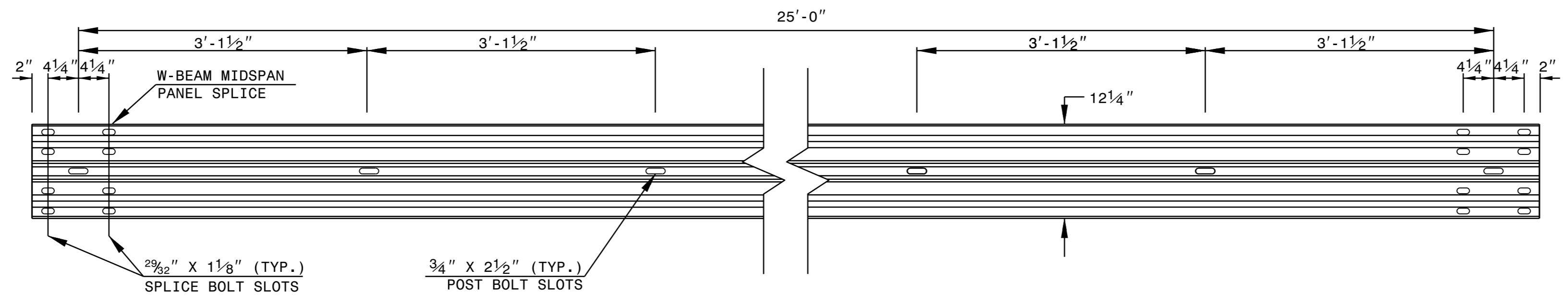
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**

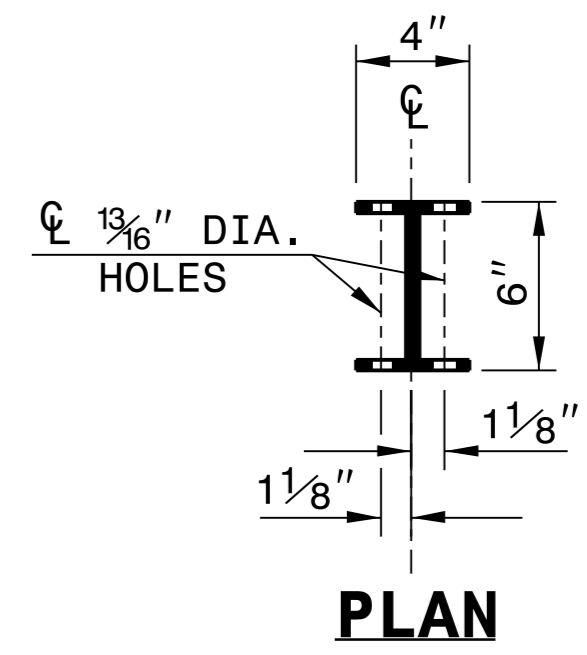
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

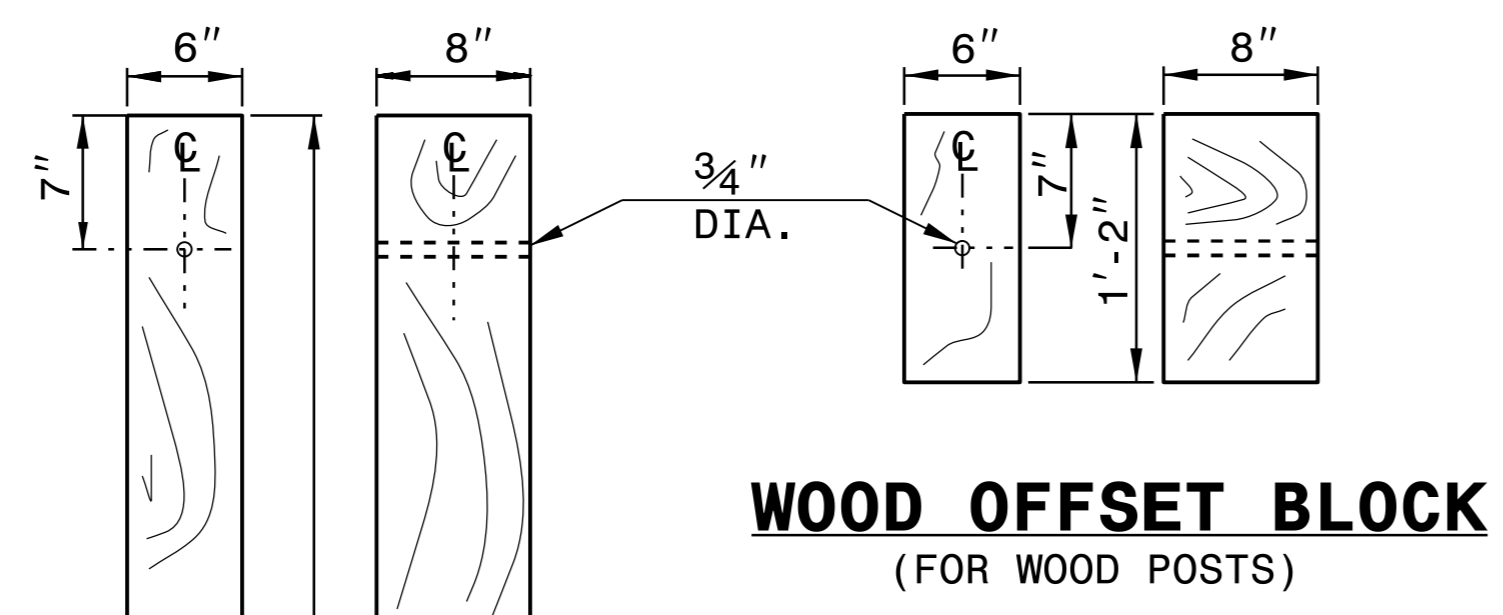
SHEET 6 OF 8  
**862D02**



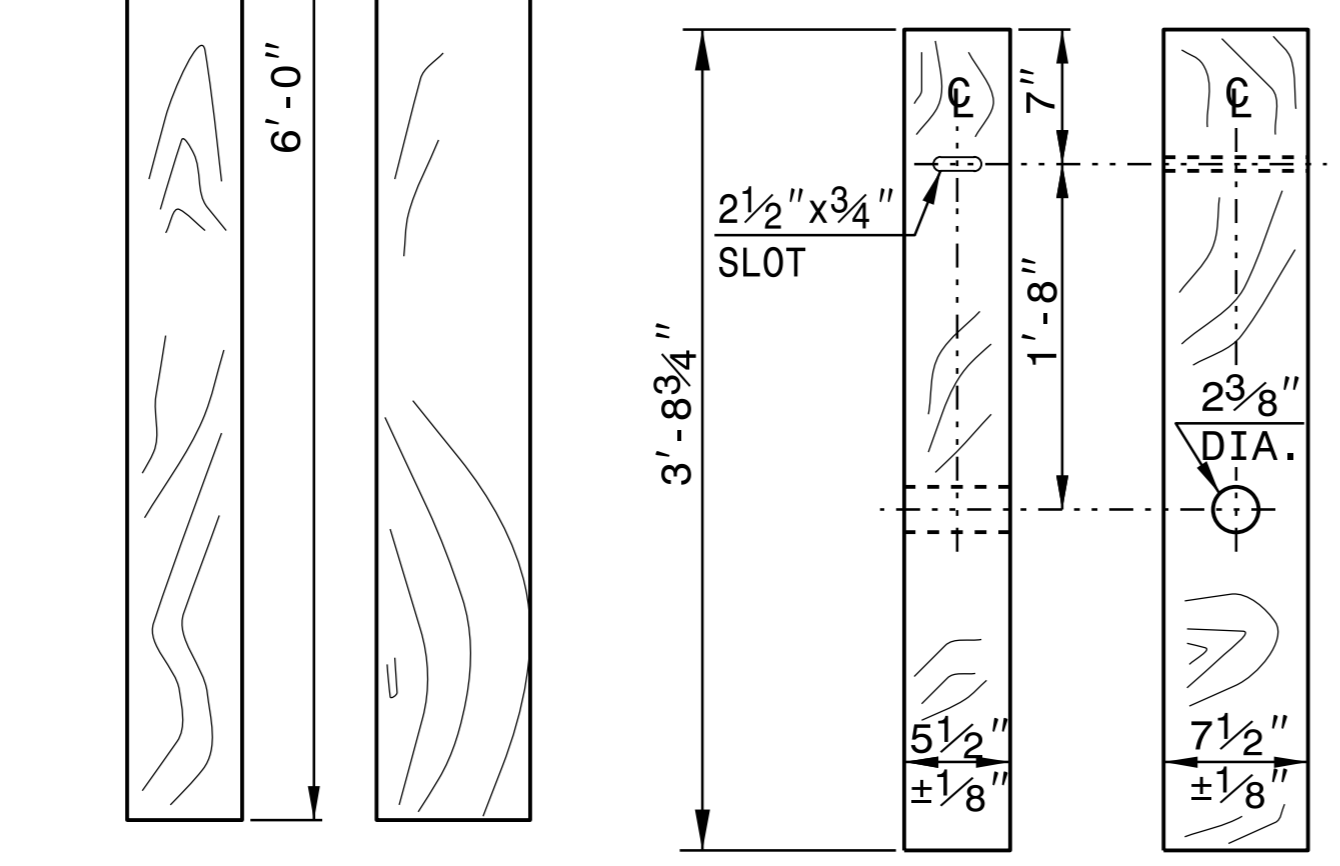
**STANDARD W-BEAM GUARDRAIL**



**PLAN**

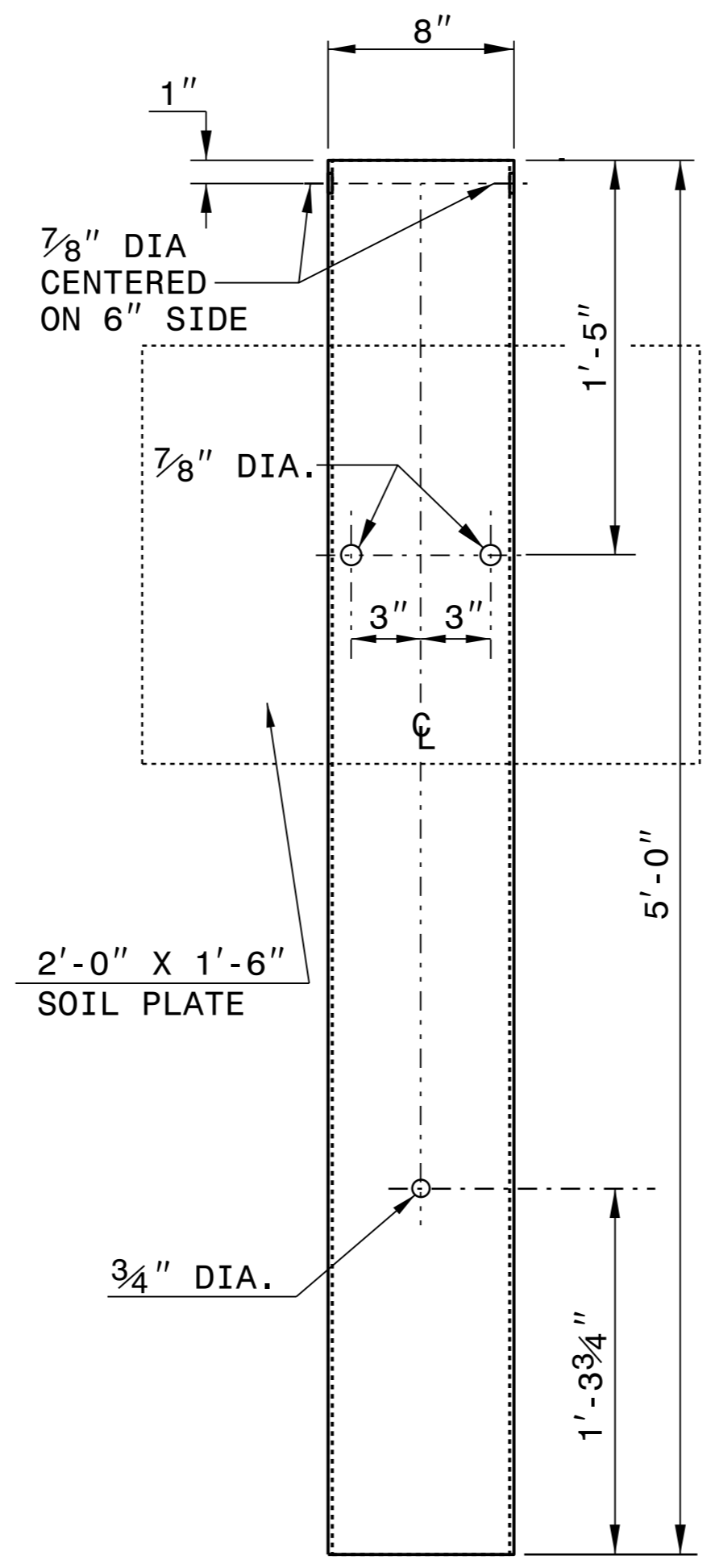


**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

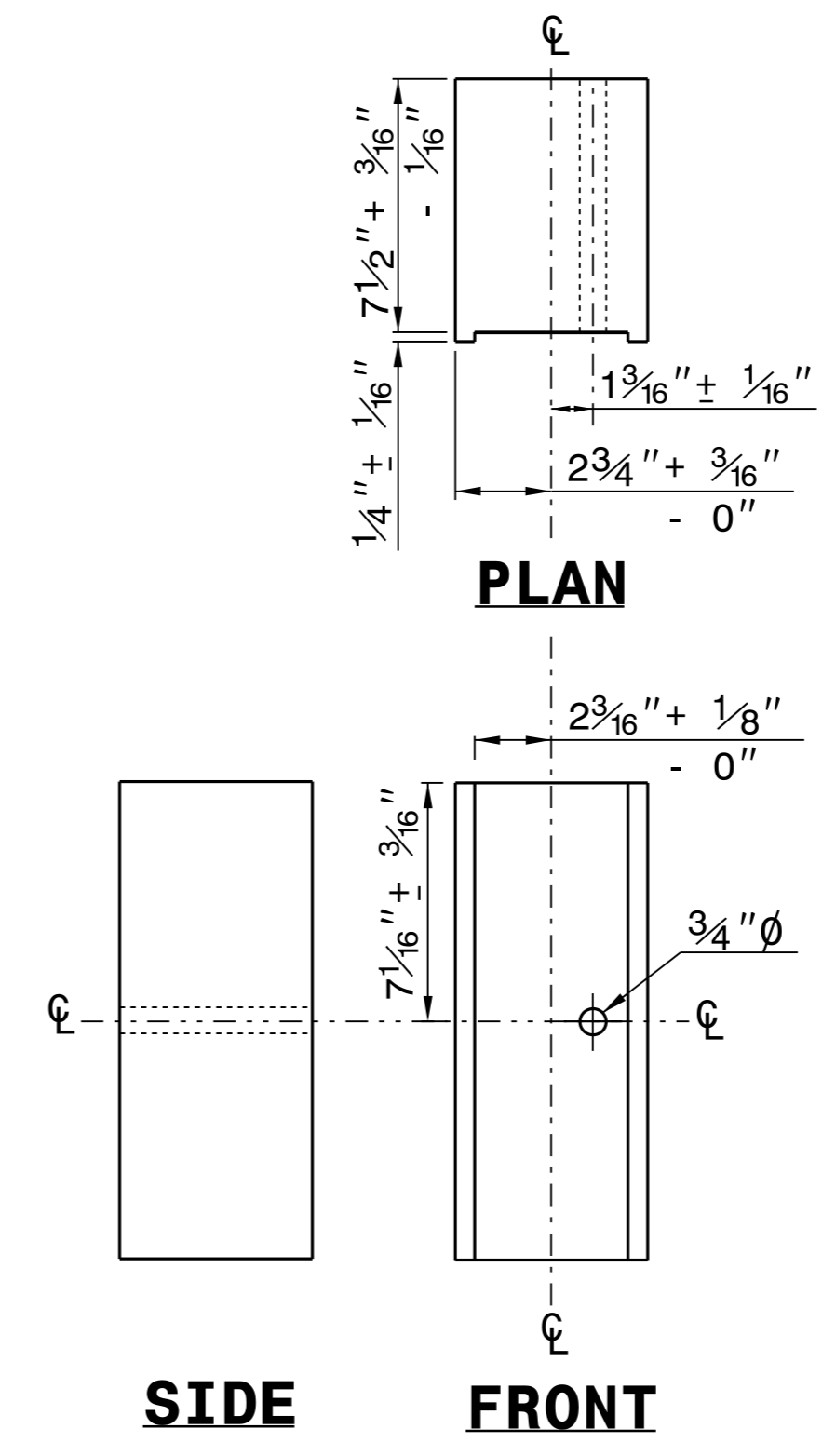


**STANDARD  
LINE POST**

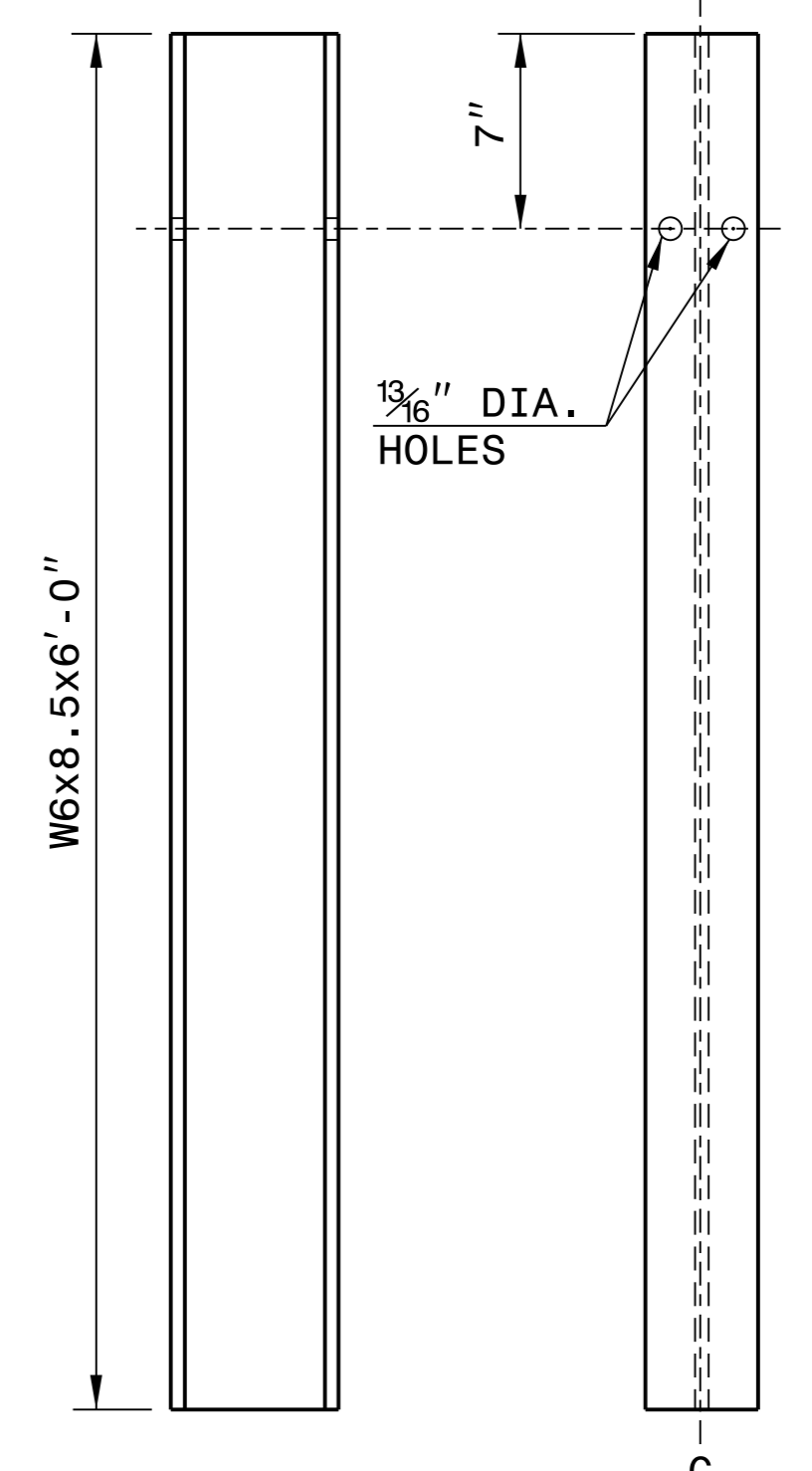
**SHORT WOOD  
BREAKAWAY POST**



**STEEL TUBE  
TS 6"x8"x0.1875"**

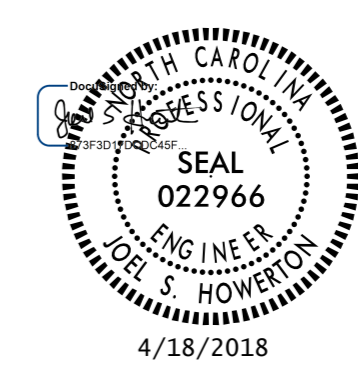


**ROUTED  
OFFSET BLOCK**



**"W6" STEEL POST**

**SYSTEM PARTS**



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

**SEE TITLE BLOCK**

ORIGINAL BY: J. HOWERTON DATE: 3-7-2018  
 MODIFIED BY: DATE: \_\_\_\_\_  
 CHECKED BY: DATE: \_\_\_\_\_  
 FILE SPEC.: \_\_\_\_\_

I4-DEC-2017 10:36  
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 Jhowerton AT: USD-292595

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

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
GUARDRAIL ANCHOR UNIT, TYPE III  
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7  
**862D03**

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
GUARDRAIL ANCHOR UNIT, TYPE III  
FOR ATTACHMENT TO RAIL ON BRIDGE

**NOTE:**

- \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT.
- SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
- MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
- LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

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

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO  
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 1 OF 7  
**862D03**

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO  
RAIL ON BRIDGE - SUB REGIONAL TIER

**NOTE:**

- \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT.
- SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
- MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
- LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

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

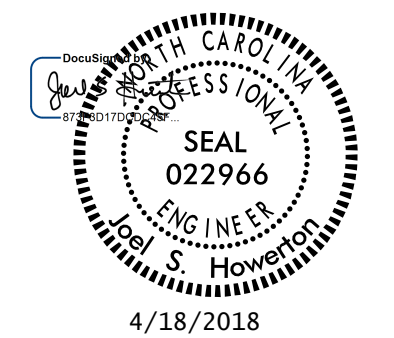
ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO  
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7  
**862D03**

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO  
RAIL ON BRIDGE - SUB REGIONAL TIER

**NOTE:**

- \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT.
- SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
- MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
- LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

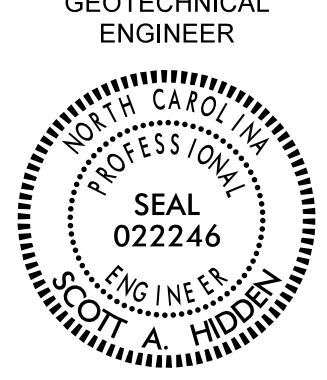


DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

ORIGINAL BY: J. HOWERTON	DATE: 06-22-12
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.:	

<b>PROJECT REFERENCE NO.</b> B-4982		<b>SHEET NO.</b> 2G-1	
GEOTECHNICAL ENGINEER  SEAL 022246 SCOTT A. HIDDEN ENGINEER		ENGINEER	
Date Signed by: Scott A. Hidden 6/7/2017		DATE SIGNATURE DATE	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			

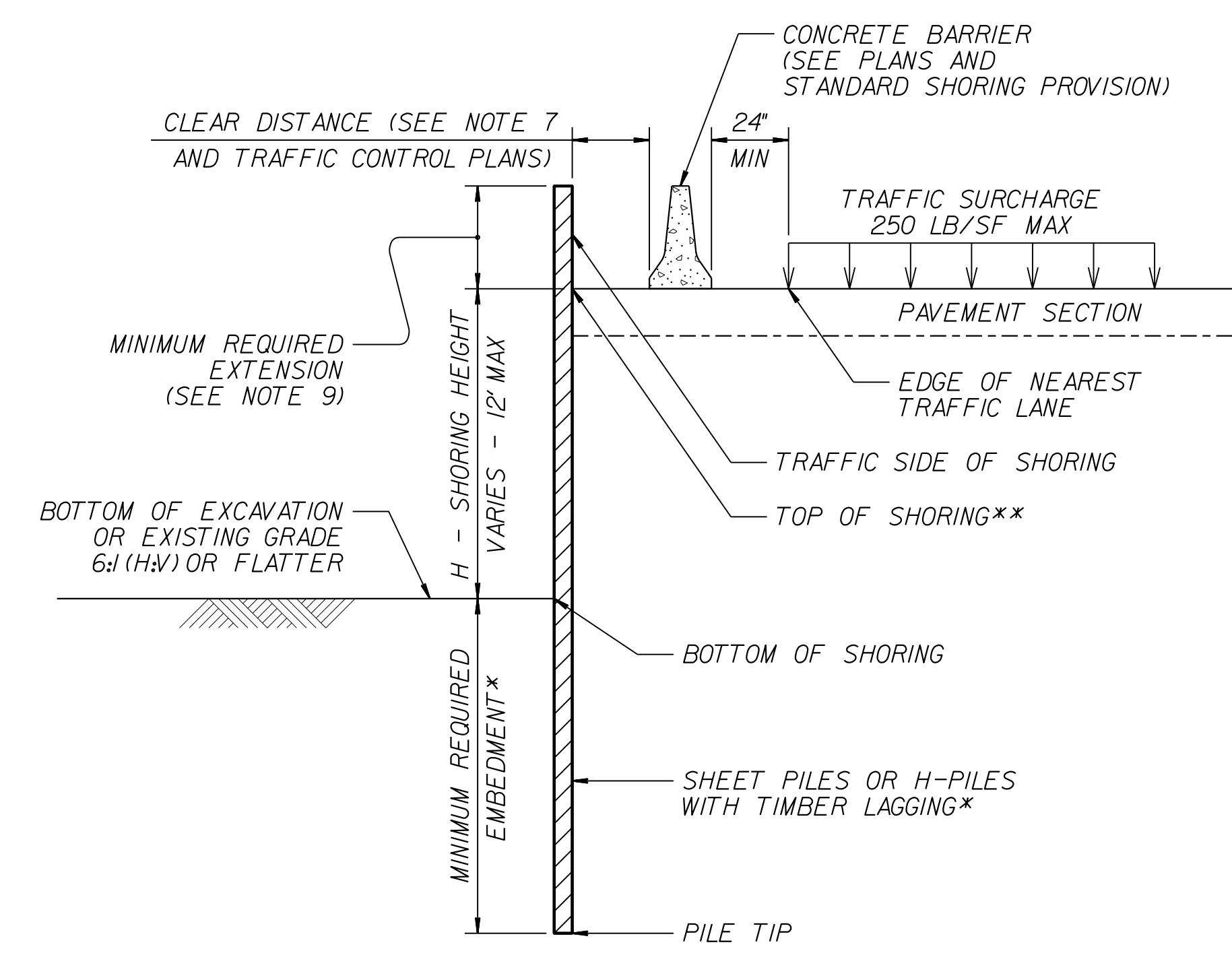
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (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**

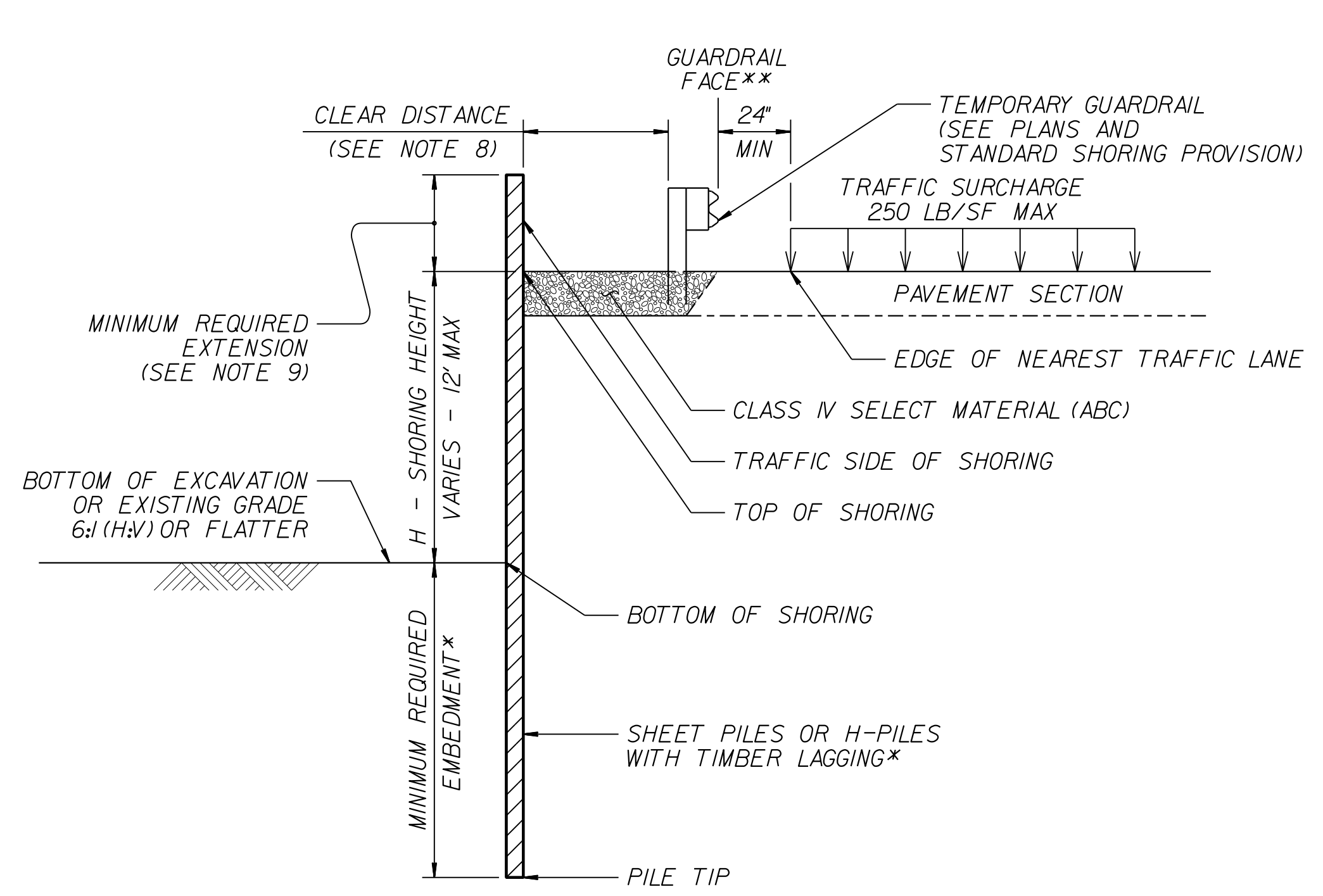
**\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**

**NOTES:**

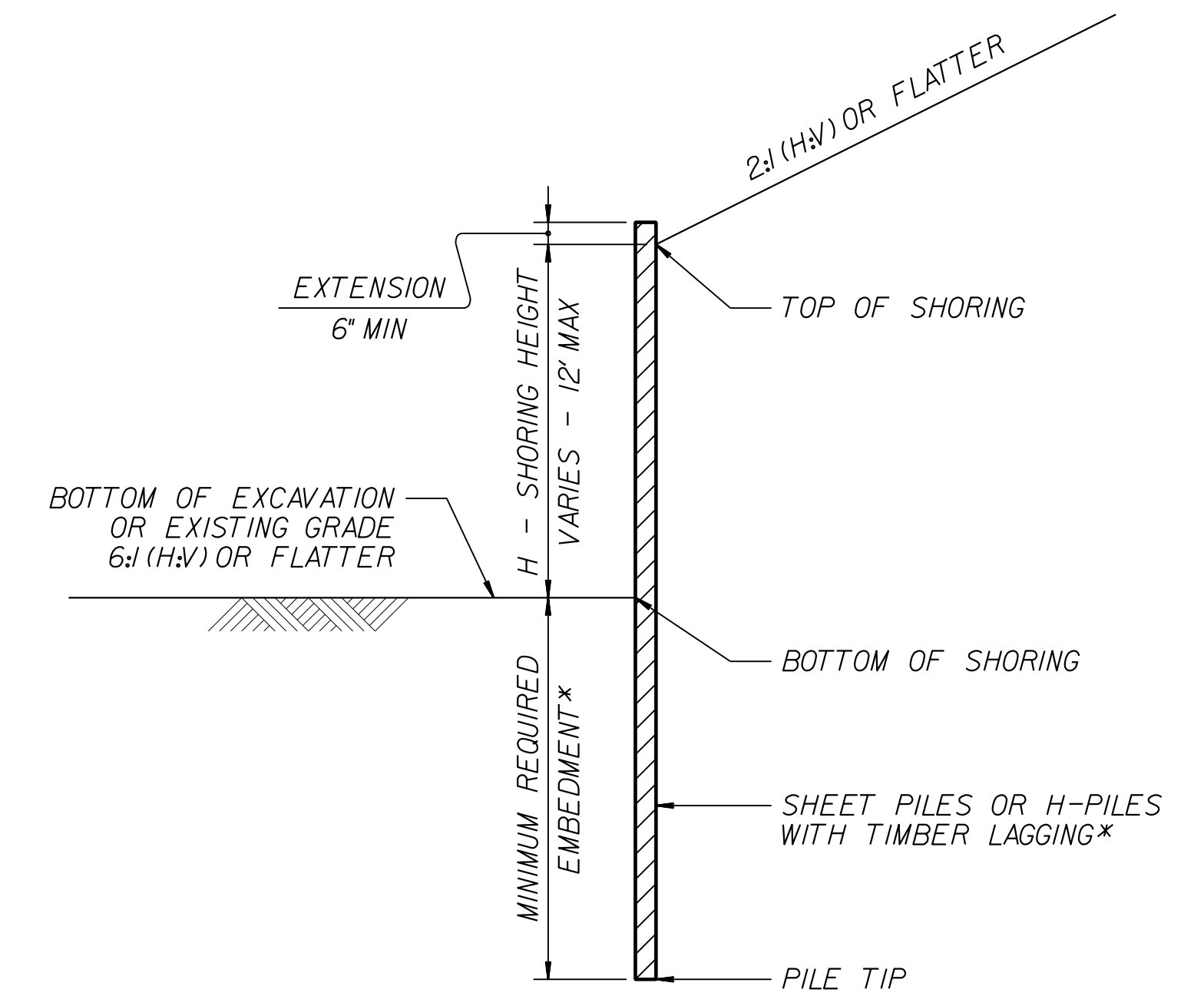
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120 \text{ LB/CF}$   
FRICTION ANGLE,  $\phi = 30 \text{ DEGREES}$   
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. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:  
[connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



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

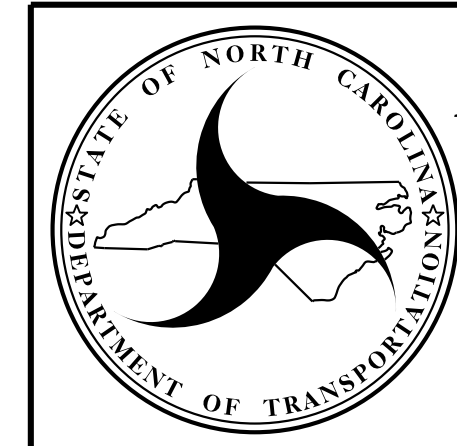


**TEMPORARY GUARDRAIL**  
**\*\*GUARDRAIL FACE =**  
**EDGE OF PAVEMENT**



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

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



**NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
  
**GEOTECHNICAL**  
**ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.01

STANDARD  
TEMPORARY SHORING

COMPUTED BY: MKA DATE: 09-14-2017  
 CHECKED BY: SCS DATE: 09-14-2017

PROJECT NO. B-4982 SHEET NO. 3B-1

## STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

### GUARDRAIL SUMMARY

"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 BEGIN

G = GATING IMPACT ATTENUATOR TYPE 350  
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS (PERMANENT)				ANCHORS (TEMPORARY)				IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS	
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	CAT-1	TYPE III	GREU TL-3	GREU TL-2	CAT-1	TYPE III	GREU TL-3	GREU TL-2	G	NG					
-L-	17+66.68	19+72.93	LT	206.25			Bridge		11.5'	14.5'	50'		1'																
-L-	18+88.18	20+31.93	RT	143.75					11.5'	14.5'	50'		1'																
-L-	21+88.07	24+06.82	LT	218.75					11.5'	14.5'	50'		1'																
-L-	22+46.98	23+28.23	RT	81.25			Bridge		11.5'	14.5'	50'		1'																
<b>TOTAL</b>				<b>650.00</b>												<b>4</b>	<b>4</b>												
<b>DEDUCTION FOR ANCHORS:</b>																													
	<b>TYPE</b>	<b>QTY</b>	<b>LT/EA</b>																										
	GREU, TL-3	4.00	50.00	-200.00																									
	TYPE III	4.00	18.75	-75.00																									
	<b>TOTAL</b>			<b>375.00</b>																									
	<b>SAY</b>			<b>375.00</b>																									
<b>ADDITIONAL GUARDRAIL POSTS</b>				<b>5</b>	<b>EA</b>																								
<b>TEMPORARY GUARDRAIL</b>																													
-L-	17+47.83	20+04.08	LT	256.25			Bridge		2'	4'	25'	25'	1'																
-L-	21+53.18	22+71.93	LT	118.75				Bridge	2'	4'	25'	25'	1'																
<b>TOTAL</b>				<b>375.00</b>																									
<b>DEDUCTION FOR ANCHORS:</b>																													
	<b>TYPE</b>	<b>QTY</b>	<b>LT/EA</b>																										
	TYPE III	0.00	18.75	0.00																									
	GREU, TL-2	2.00	25.00	-50.00																									
	<b>TOTAL</b>			<b>325.00</b>																									
	<b>SAY</b>			<b>325.00</b>																									

### PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	15+10.00	20+32.00	LT	777.1			
-L-	18+75.00	19+88.00	RT	89.2			
-L-	21+54.38	25+29.00	LT	918.8			
-L-	25+76.00	29+25.00	LT	183.5			
-DR1-	10+40.00	11+37.00	RT	75.3			
-DR1-	10+00.00	10+40.00	RT			45.2	
<b>TOTAL:</b>				<b>2,043.8</b>		<b>45.2</b>	
<b>SAY:</b>				<b>2,050</b>		<b>46</b>	

### SHOULDER BERM GUTTER SUMMARY

LINE	Station	Station	LENGTH (LF)
-L-	18+30.00	19+51.67	121.67
-L-	19+83.00	20+06.01	23.01
<b>TOTAL:</b>			<b>144.68</b>
<b>SAY:</b>			<b>150</b>

### SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L- 13+00.00 RT	-L- 20+02.43 RT	1790	860		930
-DR1- 10+00.00	-DR1- 11+34.33	345	37		308
-L- 22+17.57 RT	-L- 29+25.00 RT	194	8917	8723	
-DR3- 10+22.00	-DR3- 11+50.00	41	662	621	
-L- 13+00.00 LT	-L- 20+02.43 LT	107	430	323	
-DR2- 10+20.20	-DR2- 11+20.00	5	107	102	
-L- 22+17.57 LT	-L- 29+25.00 LT	299	834	535	
-Y- 10+17.09	-Y- 10+60.00	9	9		
<b>SUBTOTALS:</b>		<b>2790</b>	<b>11856</b>	<b>10304</b>	<b>1238</b>
MATERIAL FOR SHOULDER CONSTRUCTION			421	421	
LOSS DUE TO CLEARING & GRUBBING			-400	400	
WASTE IN LIEU OF BORROW				-1238	-1238
<b>PROJECT TOTALS:</b>		<b>2390</b>	<b>12277</b>	<b>9887</b>	<b>0</b>
ESTIMATE 5% TO REPLACE TOP SOIL ON BORROW PIT				494	
<b>GRAND TOTALS:</b>		<b>2390</b>		<b>10381</b>	
<b>SAY:</b>		<b>2,500</b>		<b>10,500</b>	
DRAINAGE DITCH EXCAVATION = 150 CUBIC YARDS					
ADDITIONAL UNDERCUT = 400 CUBIC YARDS					
SHALLOW UNDERCUT = 150 CUBIC YARDS					
CLASS IV SUBGRADE STABILIZATION = 300 TONS					
SELECT GRANULAR MATERIAL = 500 CUBIC YARDS					

### TEMPORARY CHAIN LINK FENCE, 72" FABRIC

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	A	B	C	D	E	F
				FABRIC L.F.	END BRACE	CORNER BRACE	LINE BRACE	LINE POSTS	TERMINAL POSTS
L	24+15.00	24+35.00	RT	32.78	2	0	0	2.40	2
L	24+53.55	26+69.00	RT	253.16	2	1	0	20.93	3
<b>TOTAL:</b>				<b>285.94</b>				<b>23.33</b>	<b>5</b>
<b>SAY:</b>				<b>286</b>				<b>24</b>	<b>5</b>



COMPUTED BY: NP DATE: 06/25/2017  
 CHECKED BY: SCS DATE: 06/29/2017

PROJECT NO. SHEET NO.  
 B-4982 3G-1

## STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

### SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	100
<b>TOTAL LF:</b>					100

\*UD = Underdrain  
 \*BD = Blind Drain  
 \*SD = Subsurface Drain

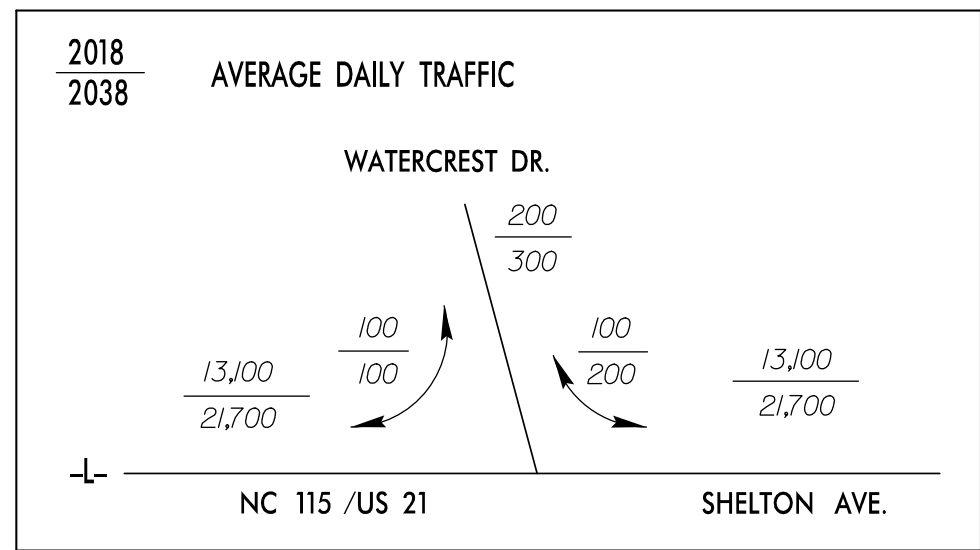
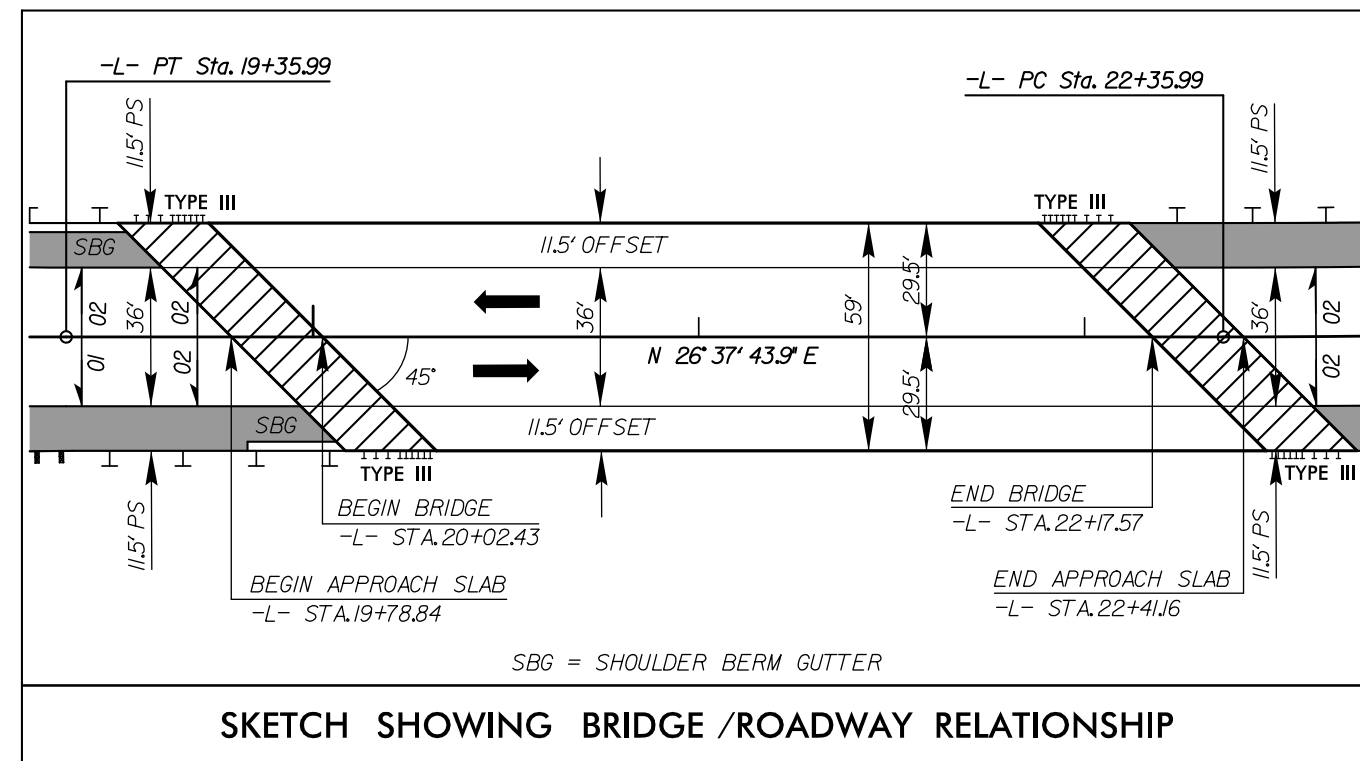
### SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU		150	300	500		
<b>TOTAL CY/TONS/SY:</b>					150	300	500**	0	0

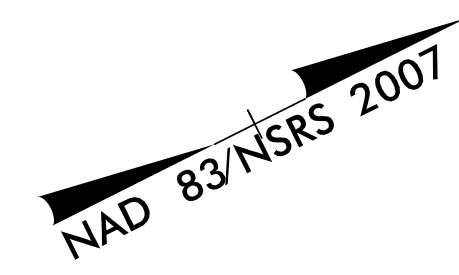
\*ASU = Aggregate Subgrade  
 \*AST = Aggregate Stabilization  
 \*\*Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.







-L-		
PI Sta 15+41.56	PI Sta 18+04.55	PI Sta 23+77.87
$\Delta = 4' 19'' 48.0''$ (RT)	$\Delta = 4' 19'' 48.0''$ (LT)	$\Delta = 4' 40'' 09.9''$ (LT)
$D = 1' 38'' 47.1''$	$D = 1' 38'' 47.1''$	$D = 1' 38'' 47.1''$
$L = 262.99'$	$L = 262.99'$	$L = 283.61'$
$T = 131.56'$	$T = 131.56'$	$T = 141.88'$
$R = 3,480.00'$	$R = 3,480.00'$	$R = 3,480.00'$
$SE = 0.03$	$SE = 0.03$	$SE = 0.03$



PROJECT REFERENCE NO. B-4982 SHEET NO. 4

RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

STV Engineers, Inc. 100 Years

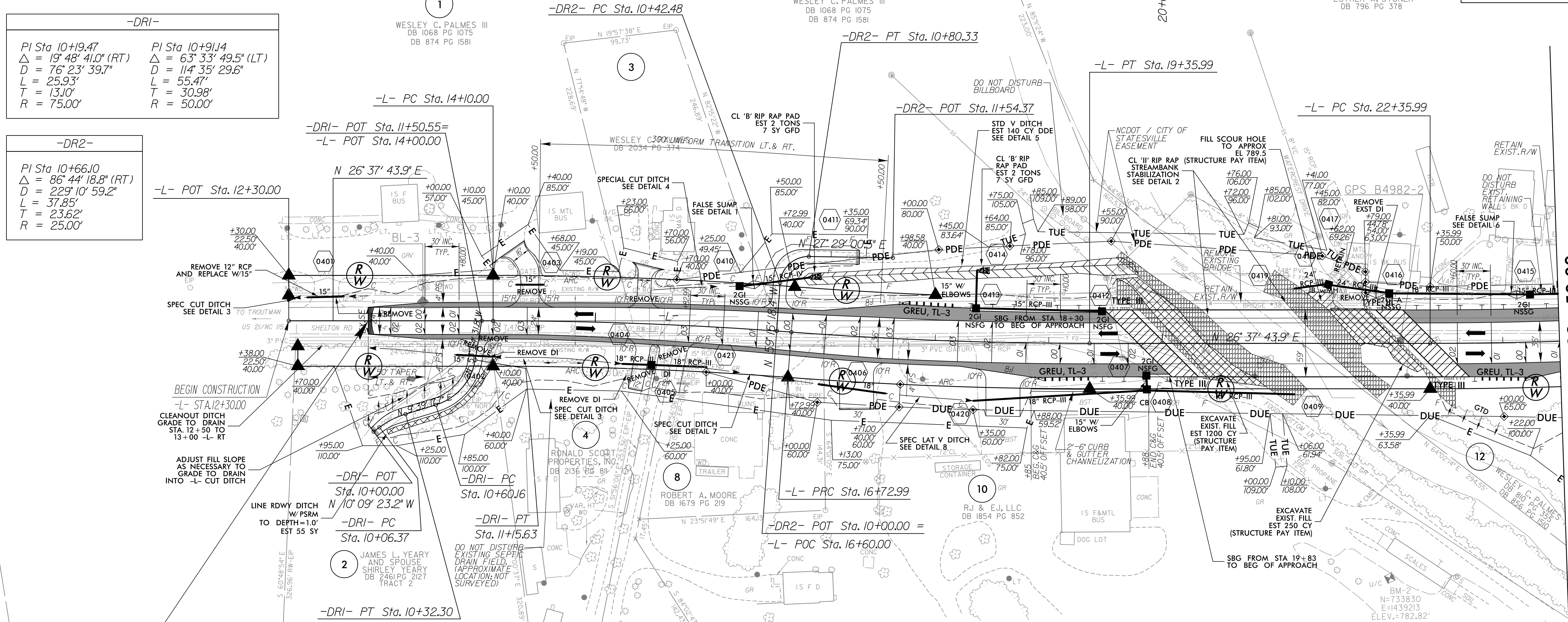
STV Engineers, Inc. 800 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991

-DRI-

PI Sta 10+91.47	PI Sta 10+91.14
$\Delta = 19' 48'' 41.0''$ (RT)	$\Delta = 63' 33'' 49.5''$ (LT)
$D = 76' 23'' 39.7''$	$D = 114' 35'' 29.6''$
$L = 25.93'$	$L = 55.47'$
$T = 13.10'$	$T = 30.98'$
$R = 75.00'$	$R = 50.00'$

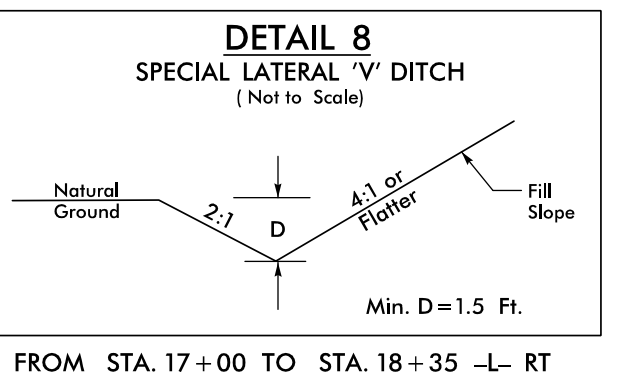
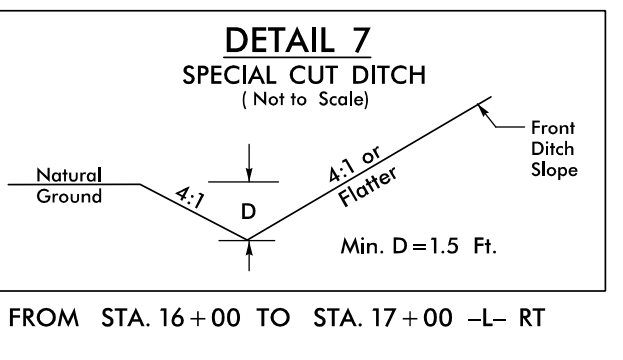
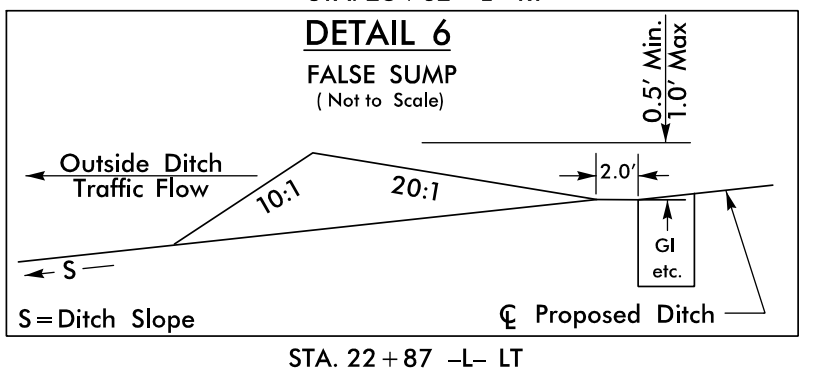
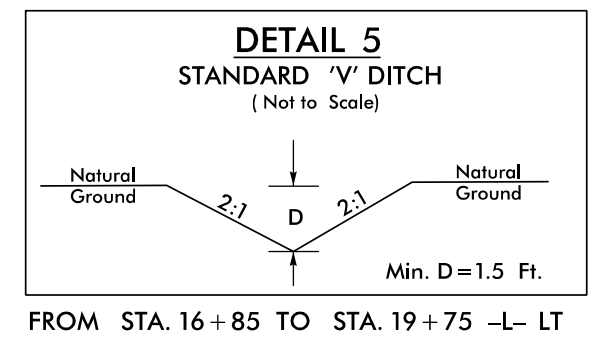
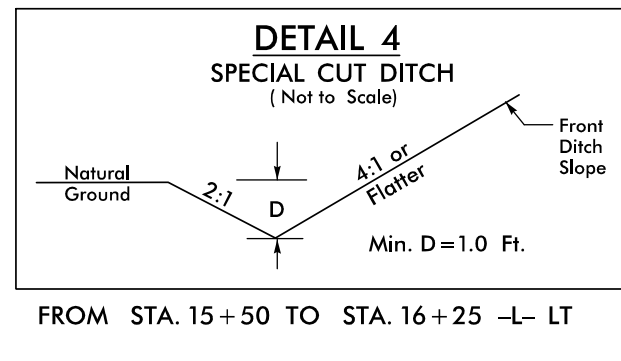
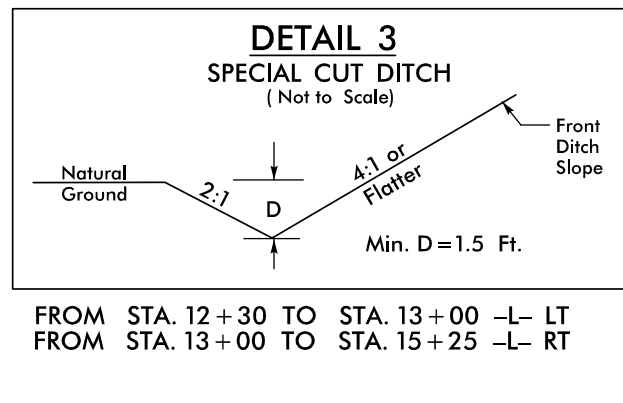
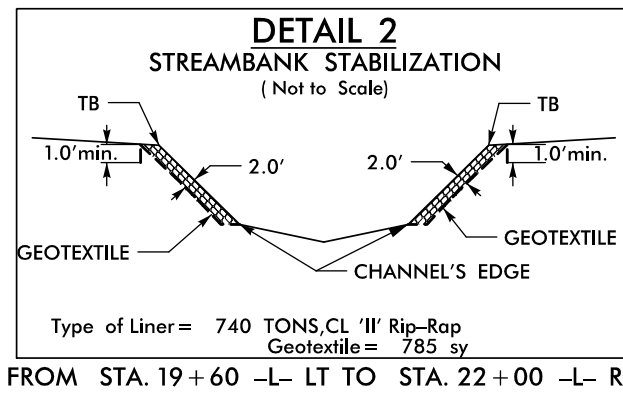
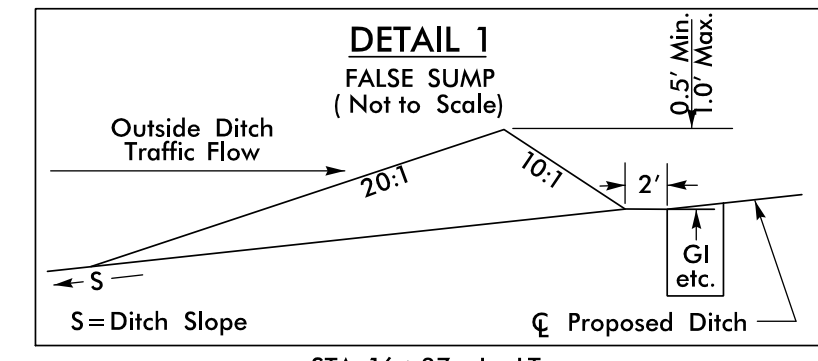
-DR2-

PI Sta 10+66.10
$\Delta = 86' 44'' 18.8''$ (RT)
$D = 229' 10'' 59.2''$
$L = 37.85'$
$T = 23.62'$
$R = 25.00'$

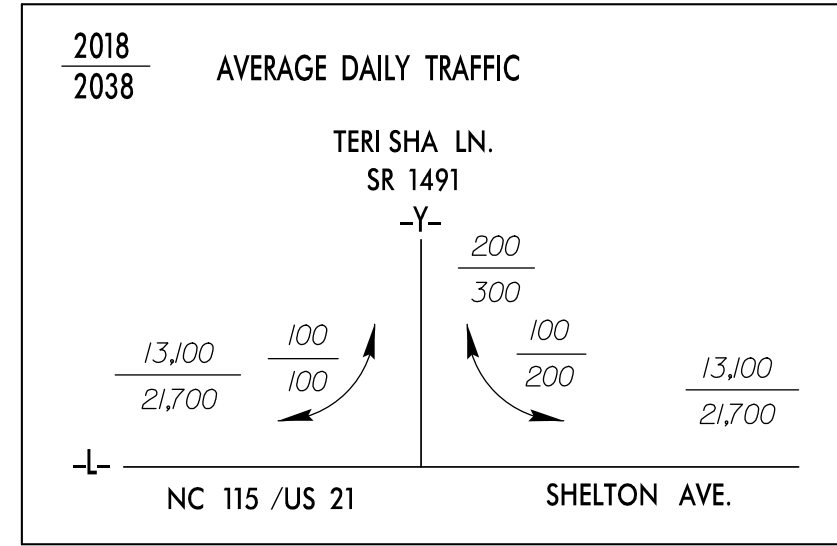


**BEGIN T.I.P. PROJECT B-4982**  
**-L- POT STA. 13+00.00**

**-L- STA. 23+50.00**  
**MATCHLINE SEE SHEET 5**



SEE SHEET 6 FOR -L- PROFILE  
 SEE SHEET 7 FOR -DRI- PROFILE  
 SEE SHEET 7 FOR -DR2- PROFILE  
 SEE SHEETS S-1 THRU S-67 FOR STRUCTURE PLANS

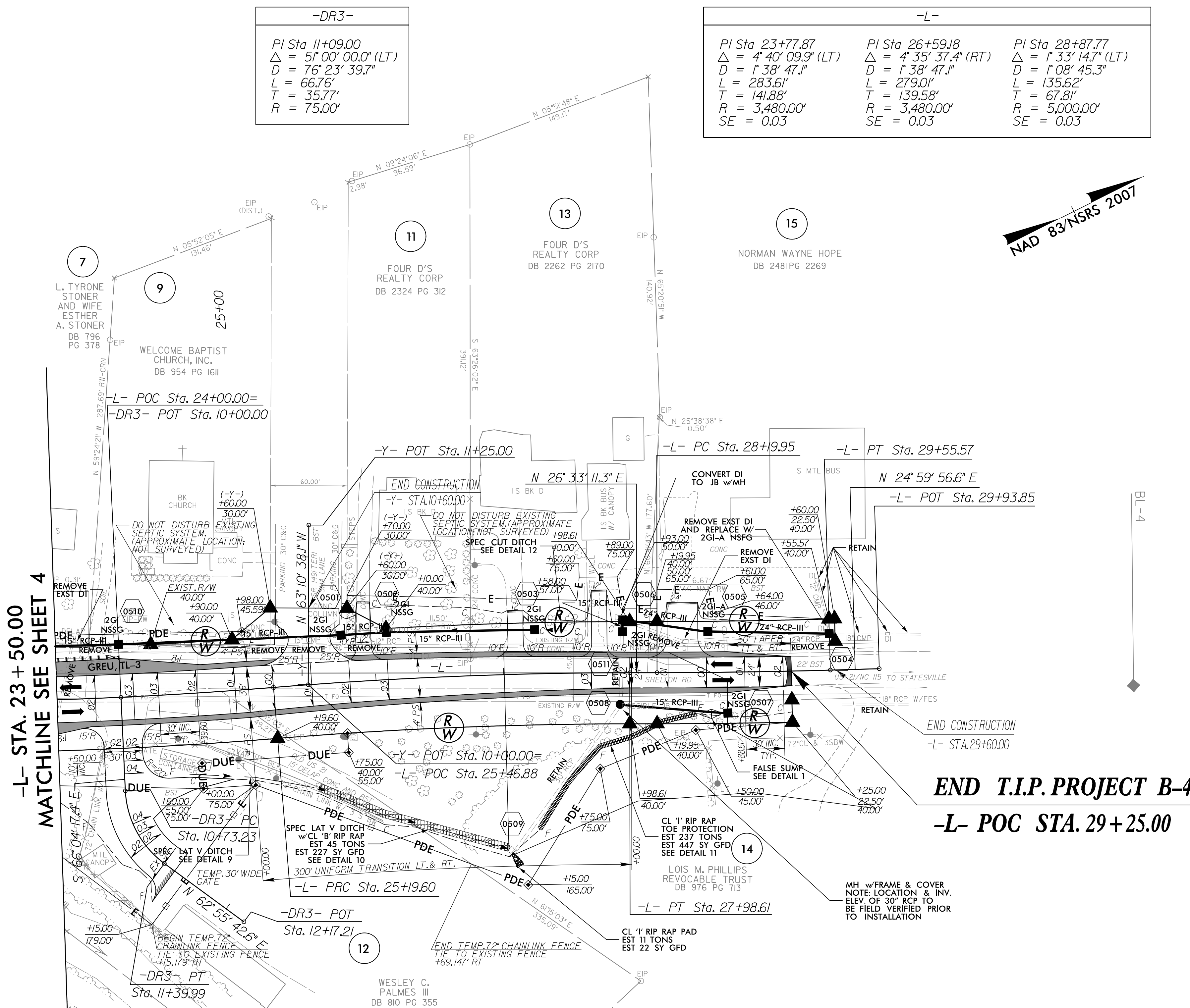
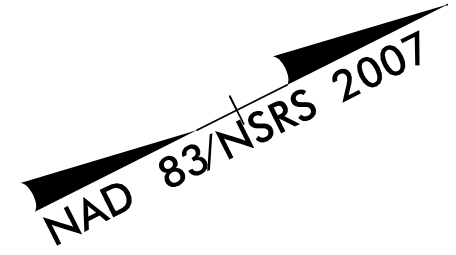


**-DR3-**  
 PI Sta 11+09.00  
 $\Delta = 51^{\circ}00'00.0''$  (LT)  
 $D = 76^{\circ}23'39.7''$   
 $L = 66.76'$   
 $T = 35.77'$   
 $R = 75.00'$

**-L-**

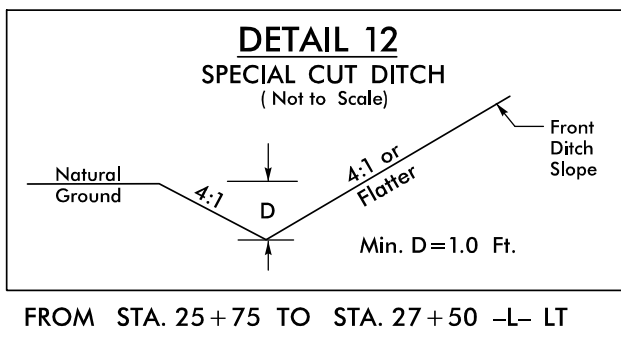
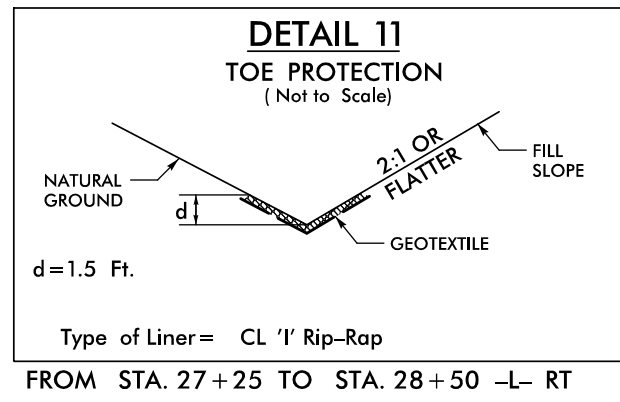
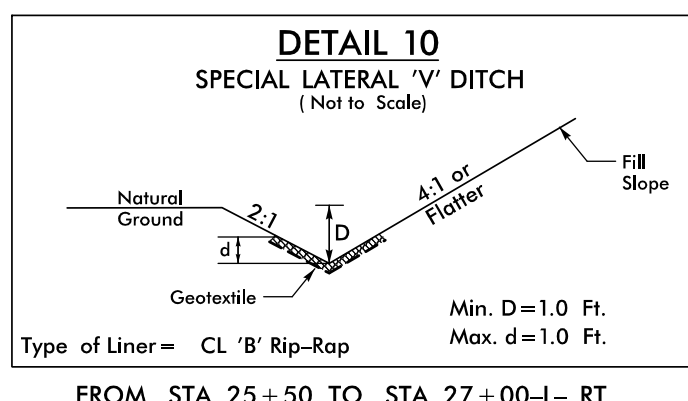
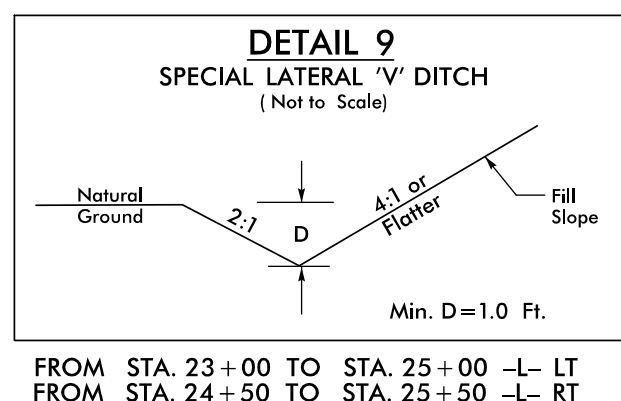
PI Sta 23+77.87 $\Delta = 4^{\circ}40'09.9''$ (LT) $D = 1^{\circ}38'47.1''$ $L = 283.61'$ $T = 141.88'$ $R = 3,480.00'$ SE = 0.03	PI Sta 26+59.18 $\Delta = 4^{\circ}35'37.4''$ (RT) $D = 1^{\circ}38'47.1''$ $L = 279.01'$ $T = 139.58'$ $R = 3,480.00'$ SE = 0.03	PI Sta 28+87.77 $\Delta = 1^{\circ}33'14.7''$ (LT) $D = 1^{\circ}08'45.3''$ $L = 135.62'$ $T = 67.81'$ $R = 5,000.00'$ SE = 0.03
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PROJECT REFERENCE NO. B-4982	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	
<p>STV Engineers, Inc.        900 West Trade St., Suite 715        Charlotte, NC 28202        NC License Number F-0991</p>	



-L- STA. 23+50.00  
 MATCHLINE SEE SHEET 4

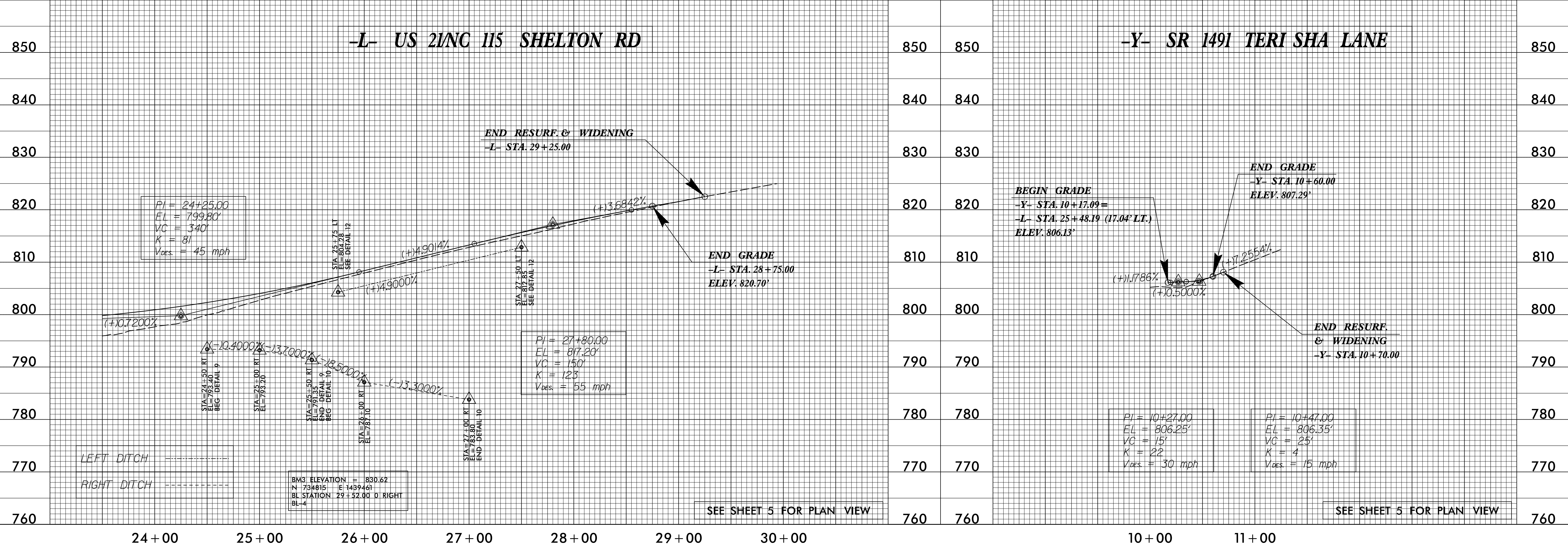
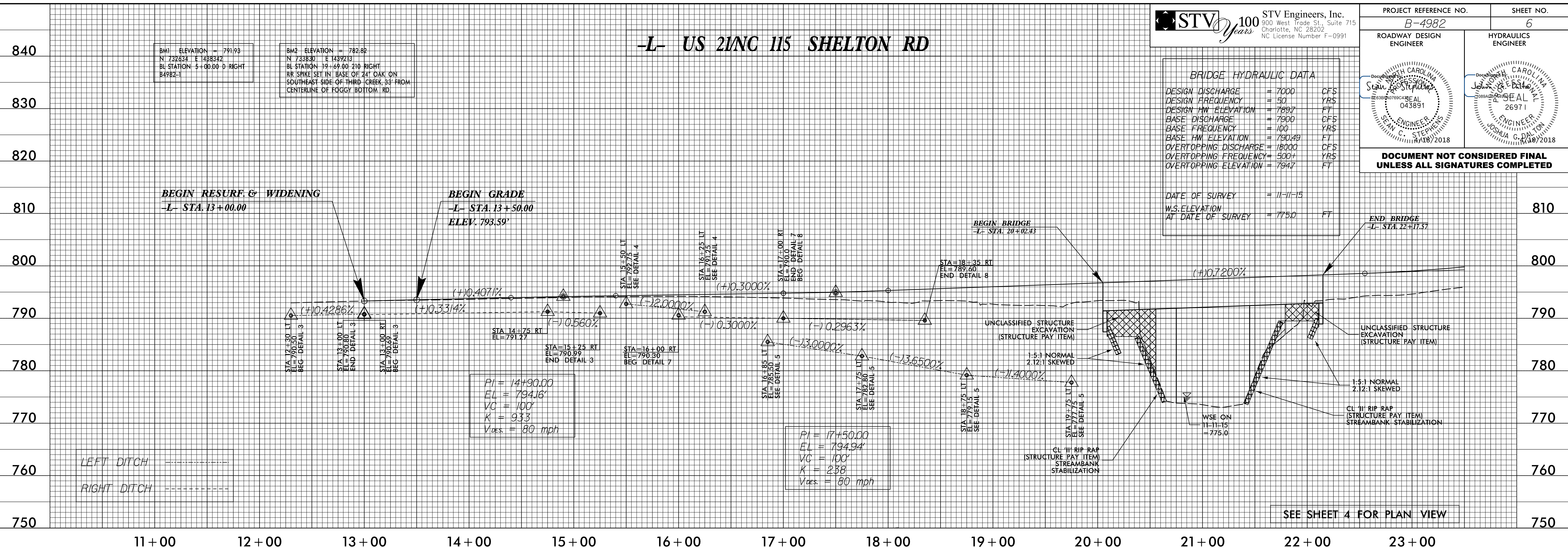
**END T.I.P. PROJECT B-4982**  
**-L- POC STA. 29+25.00**



SEE SHEET 6 FOR -L- PROFILE  
 SEE SHEET 6 FOR -Y- PROFILE  
 SEE SHEET 7 FOR -DR3- PROFILE  
 SEE SHEETS S-1 THRU S-67 FOR STRUCTURE PLANS

BRIDGE HYDRAULIC DATA table with columns for DESIGN DISCHARGE, DESIGN FREQUENCY, DESIGN HW ELEVATION, etc.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

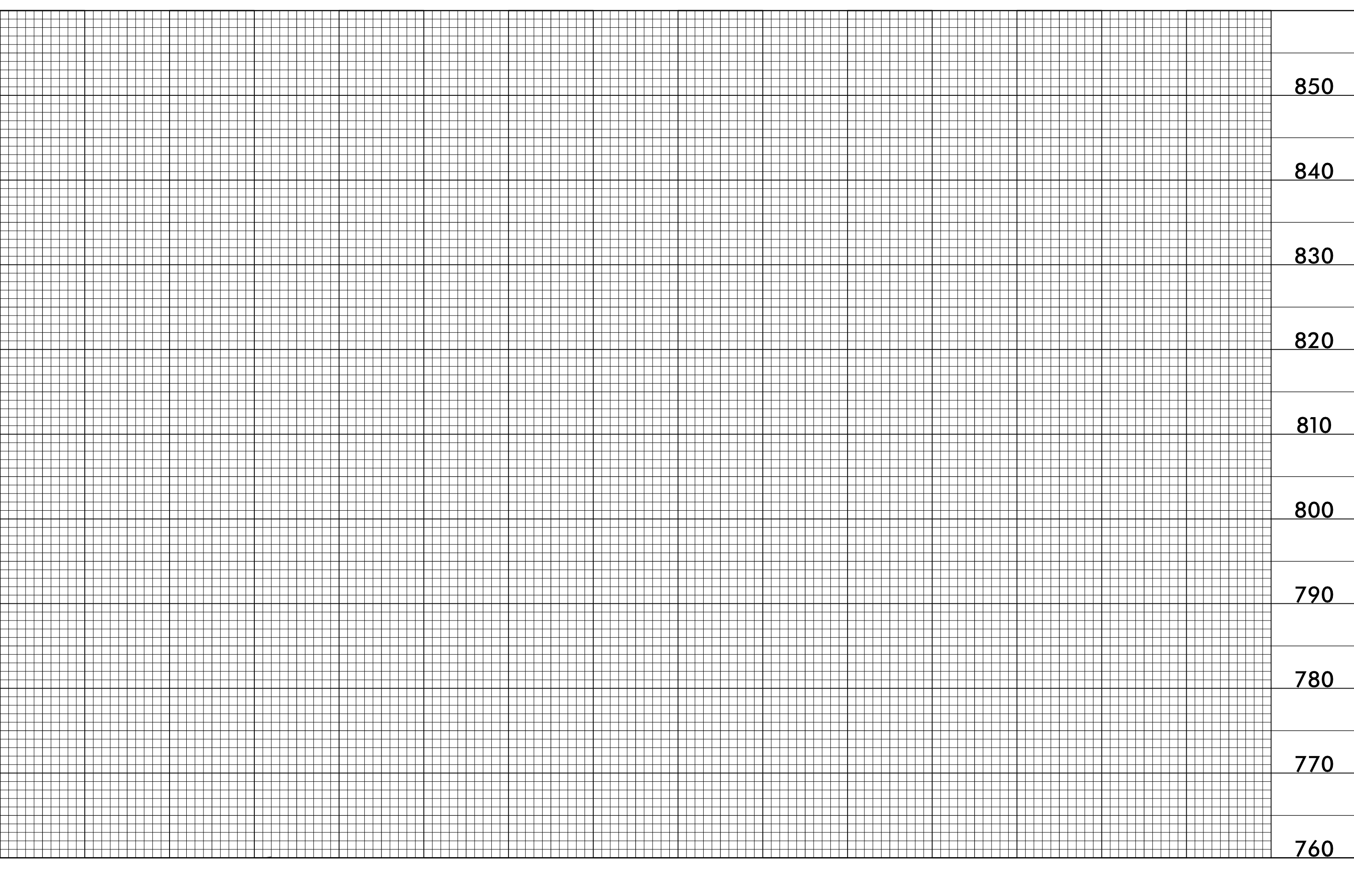
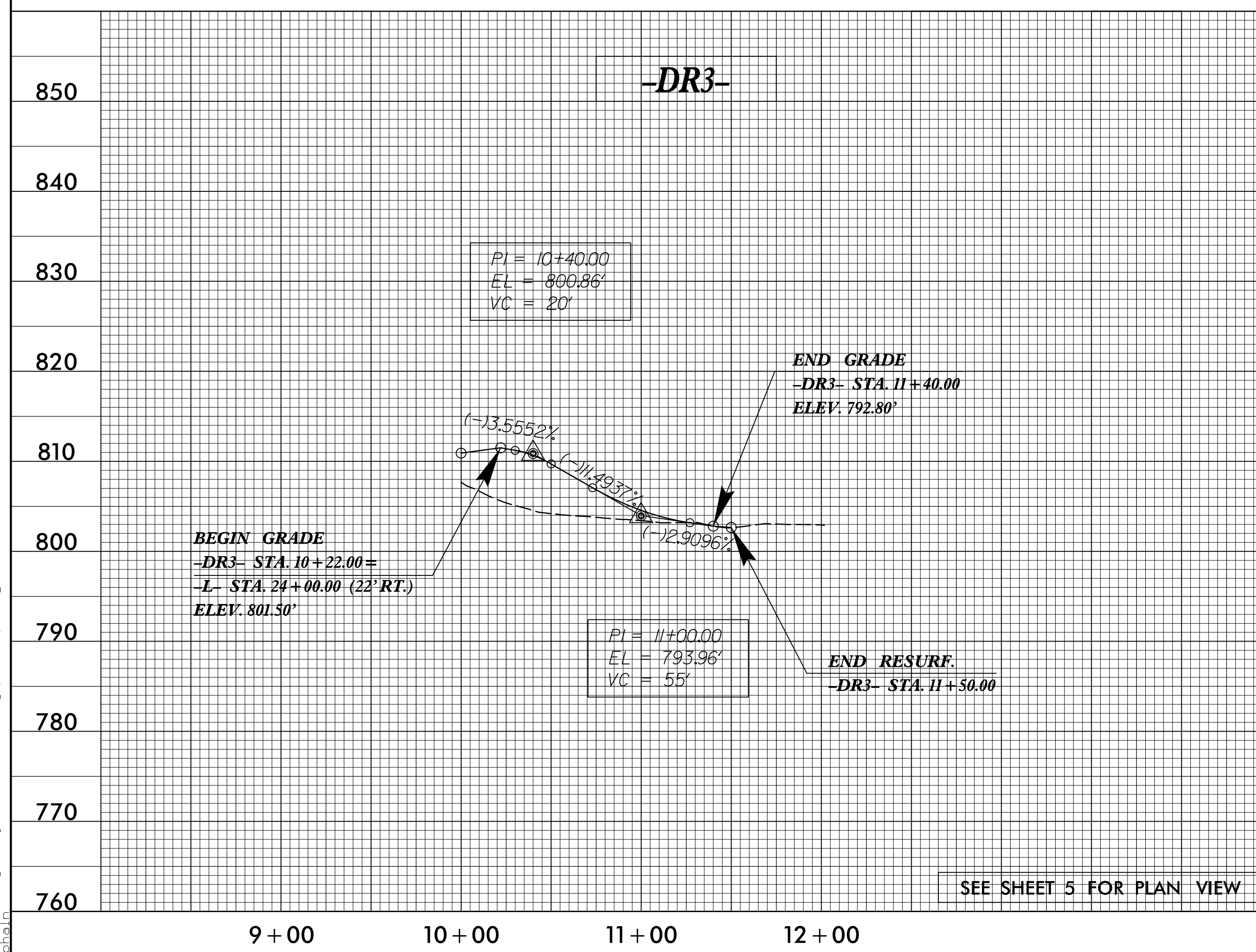
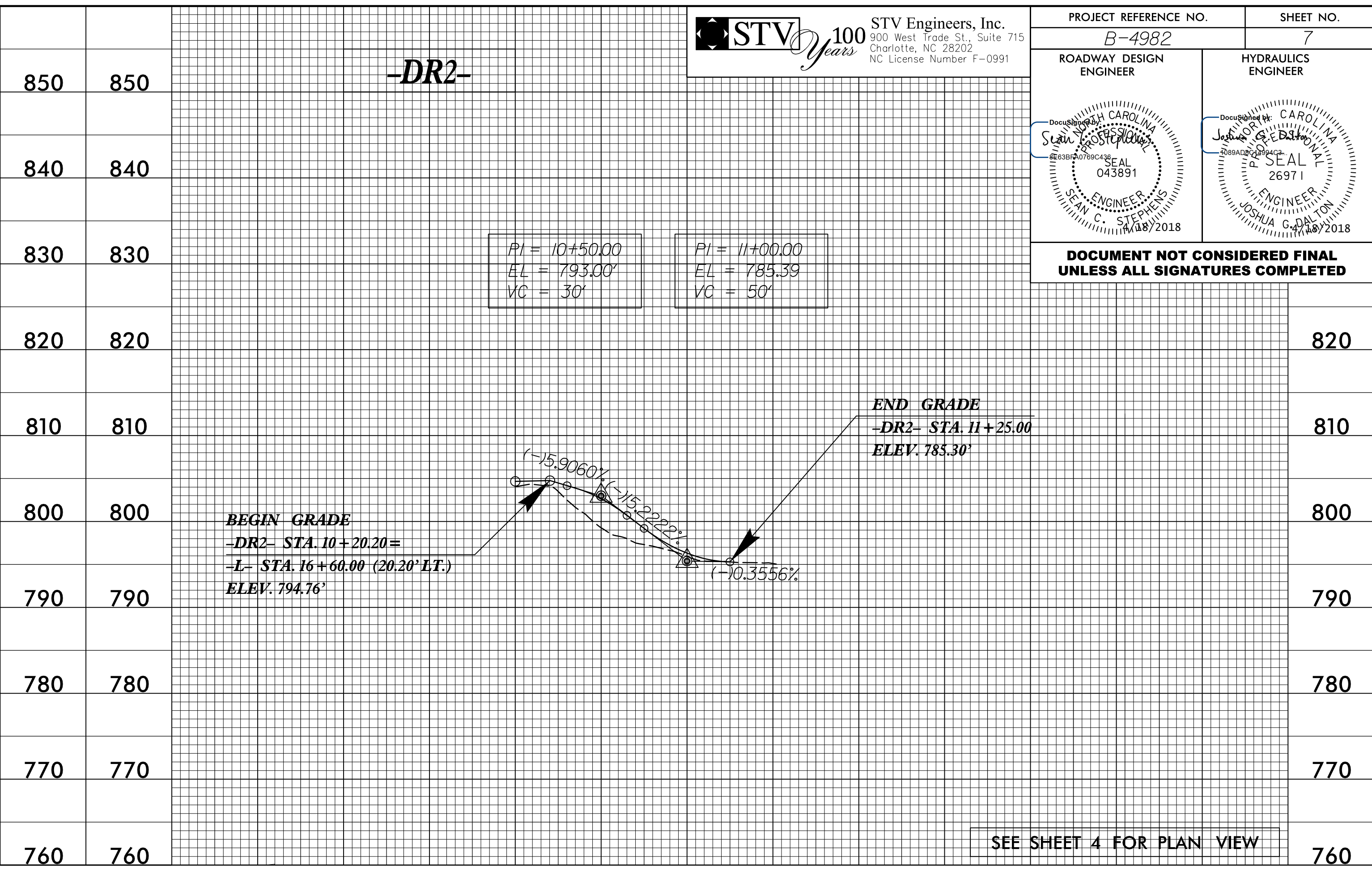
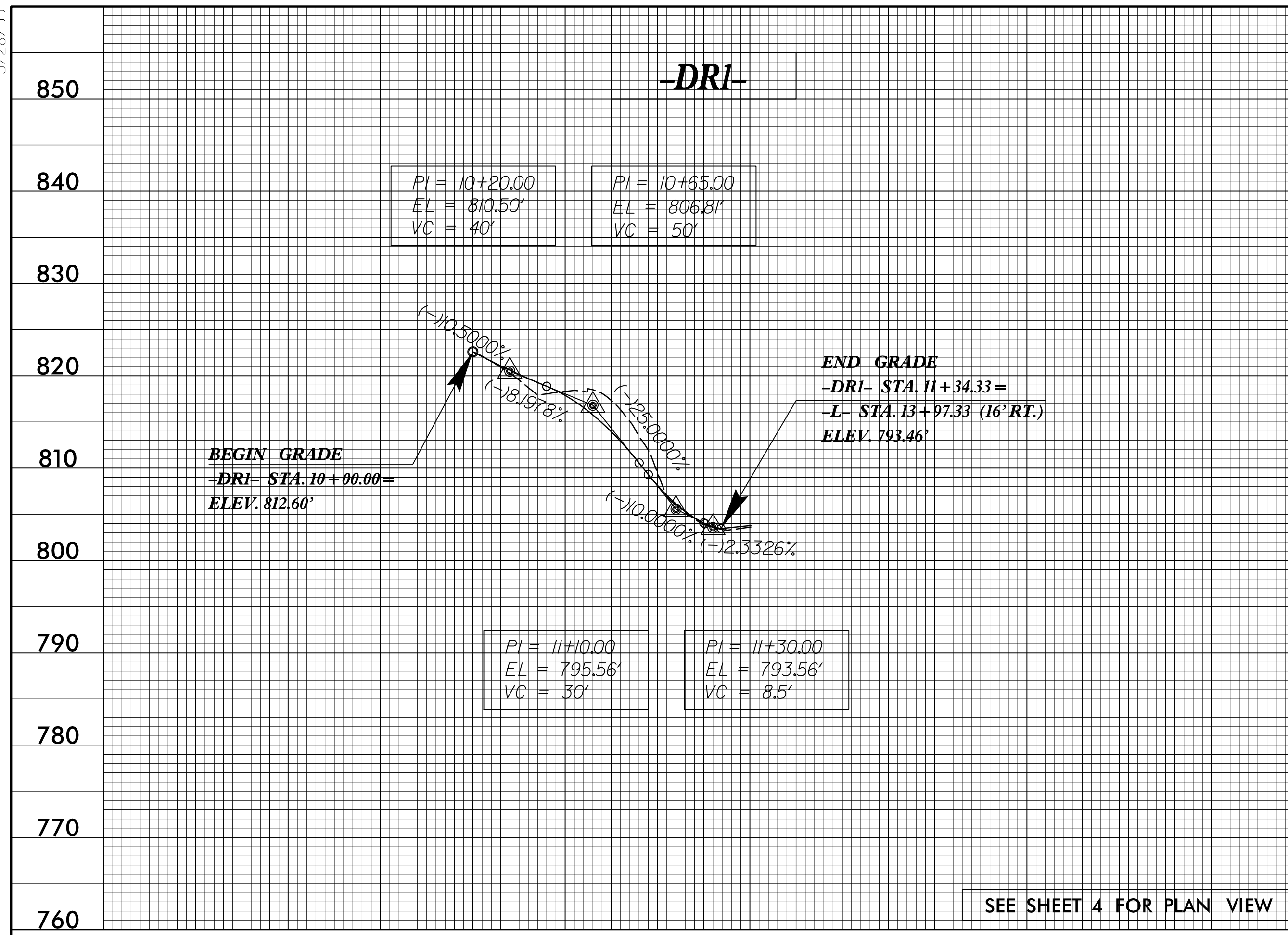


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PROJECT REFERENCE NO. <b>B-4982</b>	SHEET NO. <b>7</b>
ROADWAY DESIGN ENGINEER <i>Stanley G. Stephens</i>	HYDRAULICS ENGINEER <i>Joshua C. Patton</i>

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6/29/2017 10:00:00 AM C:\Users\pco\OneDrive\Projects\SH11B-4982-Rdy\psh07.cpl.dgn