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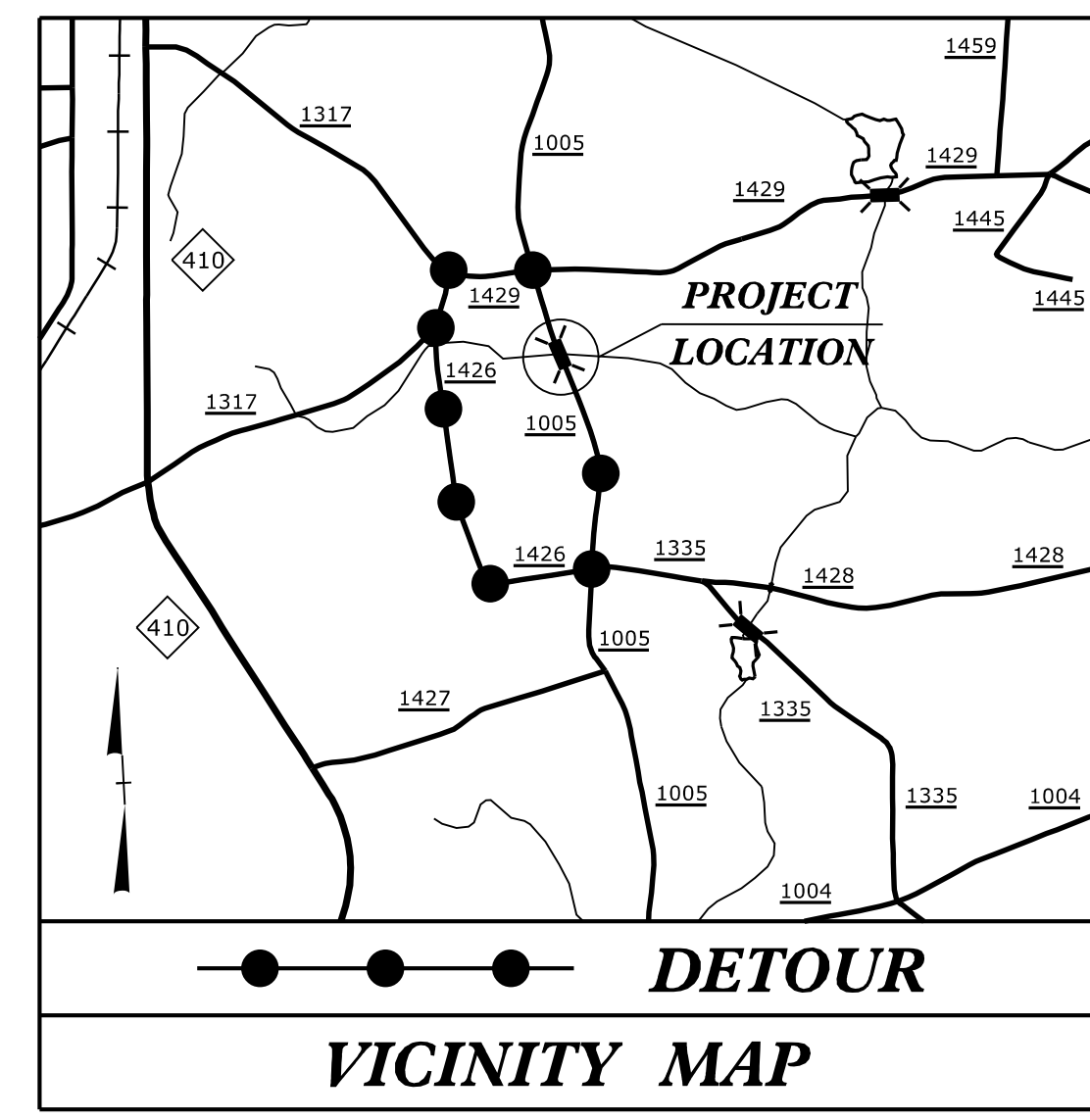
09/08/19

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

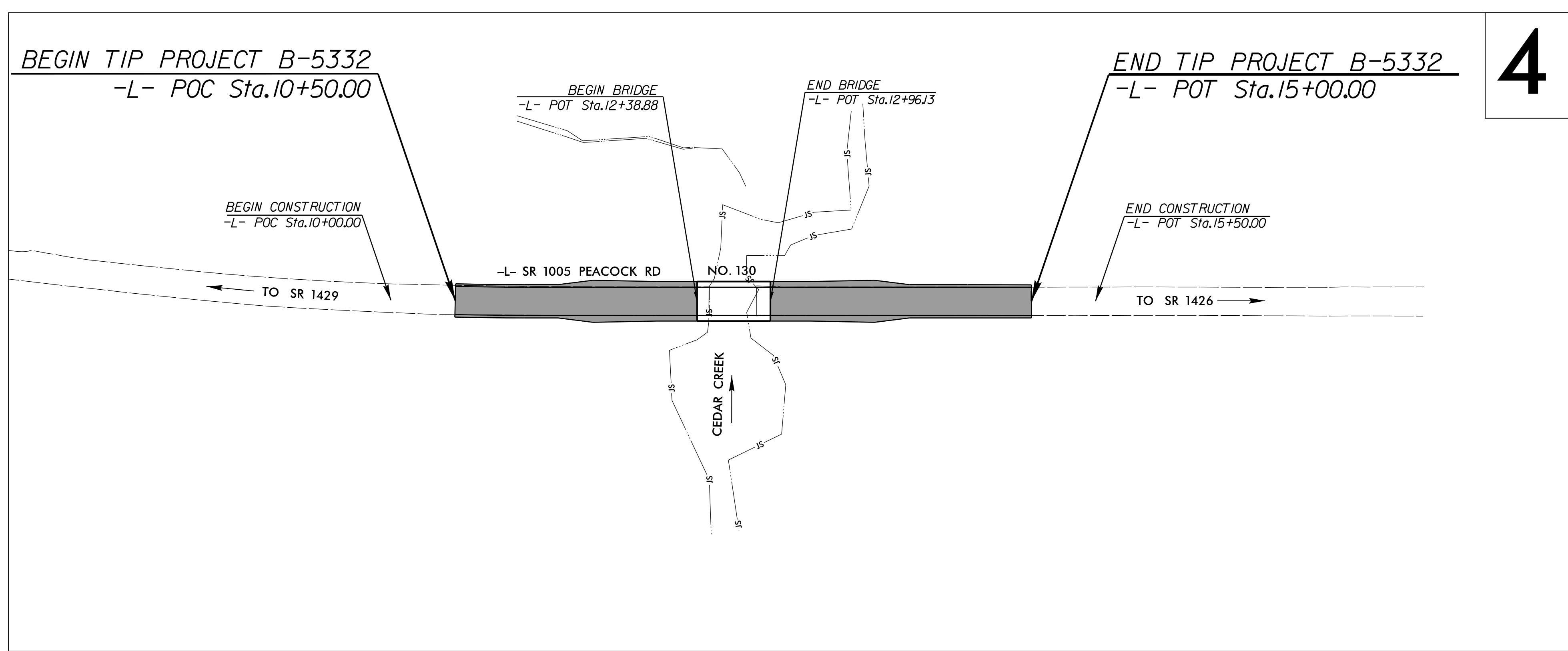
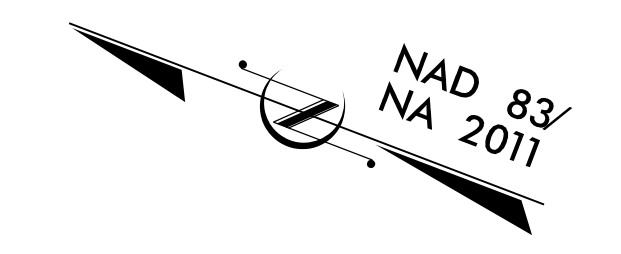
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5332	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46046.1.1	BRZ-1005(33)	PE	
46046.2.1	BRZ-1005(033)	ROW, UTIL	
46046.3.1	BRZ-1005(33)	CONST	

TIP PROJECT: B-5332



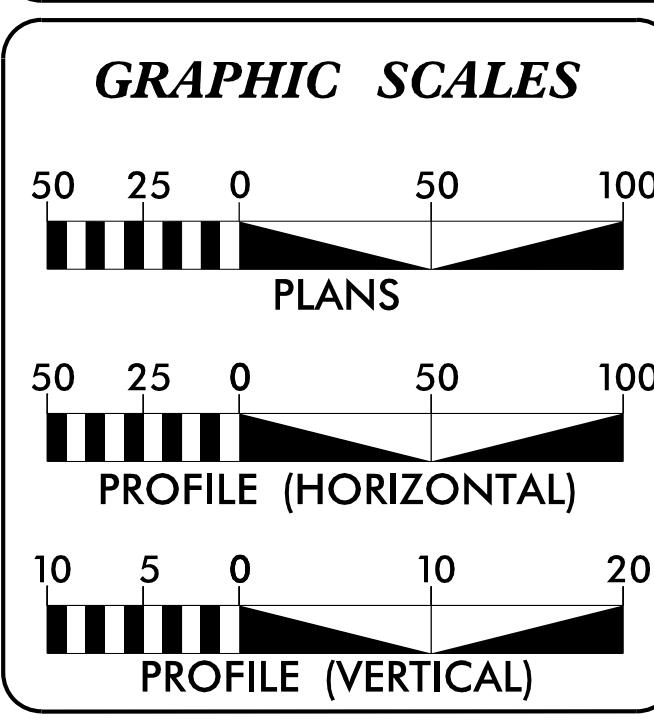
COLUMBUS COUNTY

**LOCATION: REPLACE BRIDGE 130 OVER CEDAR CREEK
ON SR 1005 (PEACOCK ROAD)**
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE



CONTRACT: C203988

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



DESIGN DATA

ADT 2017 =	1455
ADT 2037 =	1727
K =	10 %
D =	65 %
T =	4 % *
V =	60 MPH
*(TTST= 1% + DUAL=3%)	
FUNC CLASS =	MINOR COLLECTOR SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5332	=	0.074 MILE
LENGTH STRUCTURE TIP PROJECT B-5332	=	0.011 MILE
TOTAL LENGTH TIP PROJECT B-5332	=	0.085 MILE

PLANS PREPARED BY:

RS&H 8601 SIX FORKS RD, SUITE 260
RALEIGH, NC 27615
919-926-4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 9, 2016

LETTING DATE:
JULY 18, 2017

JENNIFER FARINO, PE
PROJECT ENGINEER

JARED BOND, PE
PROJECT DESIGN ENGINEER

TATIA L. WHITE, PE, PLS
NCDOT CONTACT

HYDRAULICS ENGINEER

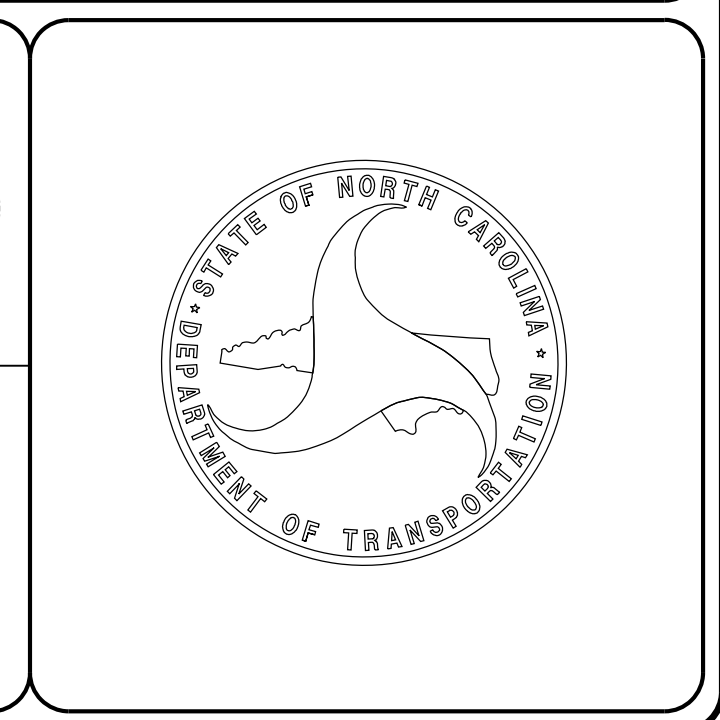
DocuSigned by:
Will Weatherstone
DC2FF7F825A80...

4/27/2017 P.E.

ROADWAY DESIGN ENGINEER


DocuSigned by:
Jared M. Bond
009F514BC52E477...

5/1/2017 P.E.



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\$\$\$\$\$SERVNAME\$\$\$\$\$

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-5332	1A
ROADWAY DESIGN ENGINEER	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEET
2A-1	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAIL
2C-1 THRU 2C-6	GUARDRAIL PLACEMENT DETAILS
2C-7 THRU 2C-10	GUARDRAIL INSTALLATION DETAILS
2C-11 THRU 2C-14	STRUCTURE ANCHOR UNITS DETAILS
2C-15	METHOD OF CLEARING DETAIL
3B-1	SUMMARY OF EARTHWORK, PAVEMENT REMOVAL, SHOULDER BERM GUTTER, AND GUARDRAIL
3D-1	SUMMARY OF DRAINAGE
3G-1	SUMMARY OF GEOTECHNICAL
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP-3	TRANSPORTATION MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
SIGN-1	SIGNING PLANS
UD-1 THRU UD-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-3	CROSS-SECTIONS
S1-1 THRU S1-14	STRUCTURE PLANS

GENERAL NOTES

GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 01-24-2017

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 11 "MODIFIED" WITH HAND CLEARING BEYOND THE SLOPE STAKES.

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

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 WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:
THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:
UTILITY OWNERS ON THIS PROJECT ARE Brunswick EMC, Time Warner Cable, CenturyLink, and Columbus County
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

2012 ROADWAY ENGLISH STANDARD DRAWINGS
EFF. 01-17-2012
REV. 02-29-2016

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
DIVISION 2 - EARTHWORK	
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
876.02	Guide for Rip Rap at Pipe Outlets

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STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

12/2/2016

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Computed Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Existing Endangered Animal Boundary	----- EAB
Existing Endangered Plant Boundary	----- EPB
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	-----
False Sump	▽

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	◆
Exist Permanent Easement Pin and Cap	◇
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	⊠
Existing Right of Way Marker	△
Existing Right of Way Line	-----
New Right of Way Line	----- R/W
New Right of Way Line with Pin and Cap	----- R/W
New Right of Way Line with Concrete or Granite R/W Marker	----- R/W
New Control of Access Line with Concrete C/A Marker	----- C/A
Existing Control of Access	----- C/A
New Control of Access	----- C/A
Existing Easement Line	----- E
New Temporary Construction Easement	----- E
New Temporary Drainage Easement	----- TDE
New Permanent Drainage Easement	----- PDE
New Permanent Drainage / Utility Easement	----- DUE
New Permanent Utility Easement	----- PUE
New Temporary Utility Easement	----- TUE
New Aerial Utility Easement	----- AUE

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	☼

Note: Not to Scale *S.U.E. = Subsurface Utility Engineering

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	⊕
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	⊕
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.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
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.*)	----- 7UTL
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	⊠ UST
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.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-5332	1C-1
Location and Surveys	

SURVEY CONTROL SHEET B-5332

BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL1	B5332	BL-1	201288.5952	2060665.0824	86.73	OUTSIDE PROJECT LIMITS	
BL2	B5332	BL-2	200831.9899	2060838.0692	81.30	12+38.30	15.25 RT
BL3	B5332	BL-3	200325.4500	2061040.4450	95.51	OUTSIDE PROJECT LIMITS	

FINAL ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+25.00	45.00	201017.48710	2060726.06788
L	13+50.00	45.00	200717.71702	2060855.52266
L	13+50.00	29.99	200723.72693	2060869.27998
L	10+25.00	29.91	201023.05027	2060740.09295
L	11+03.76	45.00	200943.36505	2060756.94798
L	11+03.76	-45.00	200979.39385	2060839.42177
L	10+25.00	-45.00	201050.67113	2060809.72683
L	14+00.00	-45.00	200707.92704	2060958.01244
L	14+00.00	-30.00	200701.92108	2060944.26415
L	10+25.00	-30.09	201045.17351	2060795.86700

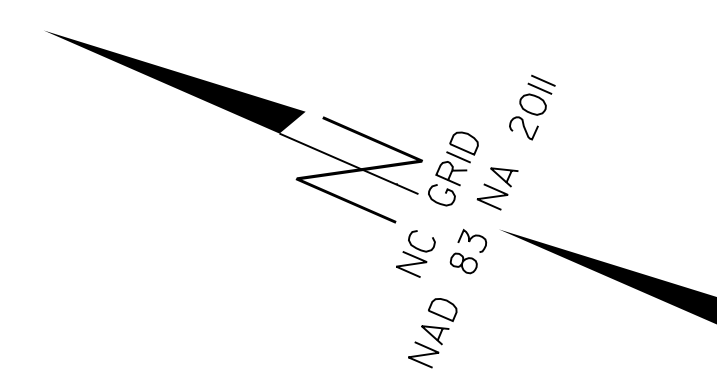
L

TYPE	STATION	NORTH	EAST
PC	10+00.00	201057.3674	2060758.8060
PT	11+03.76	200961.3794	2060798.1849
POT	16+21.54	200486.8981	2061005.4628

FINAL ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	15+35.00	-45.00	200584.21636	2061012.05564
L	15+35.00	-29.95	200578.19090	2060998.26271

 BMI ELEVATION = 90.03
 N 200482 E 2061144
 BL STATION 14+27.00 155 LEFT
 RAILROAD SPIKE IN 12" PINE



BEGIN TIP PROJECT B-5332
 -L- POC Sta. 10+50.00

BEGIN BRIDGE
 -L- POT Sta. 12+40 +/-

END TIP PROJECT B-5332
 -L- POT Sta. 15+00.00

■ NCDOT BASELINE STATION (BL-1)
 LOCALIZED PROJECT COORDINATES
 N=201288.5952
 E=2060665.0824
 ELEV=86.73'

■ NCDOT BASELINE STATION (BL-2)
 LOCALIZED PROJECT COORDINATES
 N=200831.9899
 E=2060838.0692
 ELEV=81.30'

■ BM#1

■ NCDOT BASELINE STATION (BL-3)
 LOCALIZED PROJECT COORDINATES
 N=200325.4500
 E=2061040.4450
 ELEV=95.51'

END BRIDGE
 -L- POT Sta. 12+95 +/-

DATUM DESCRIPTION
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "b5332-2"
 WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
 NORTHING: 199847.4750(ft) EASTING: 2061257.5450(ft)
 ELEVATION: 97.58(ft)
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00000962
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "b5332-2" TO -L- STATION 10+00 IS
 N22°24'08.35"W 1308.6558
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
 VERTICAL DATUM USED IS NAVD 88

- NOTES:**
- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION](https://connect.ncdot.gov/resources/location)
 THE FILES TO BE FOUND ARE AS FOLLOWS:
 B-5332_LS_CONTROL.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

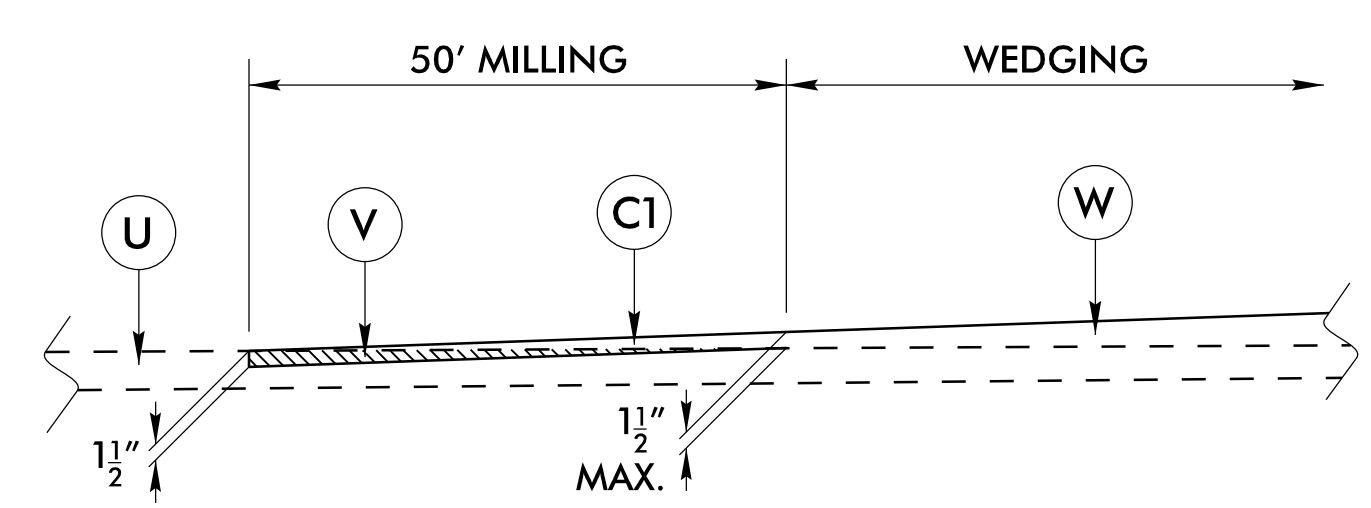
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 B5332-1S-1C-1.dwg

6/2/09

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 1½" 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 1½" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING ASPHALT PAVEMENT (0" TO 1½")
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

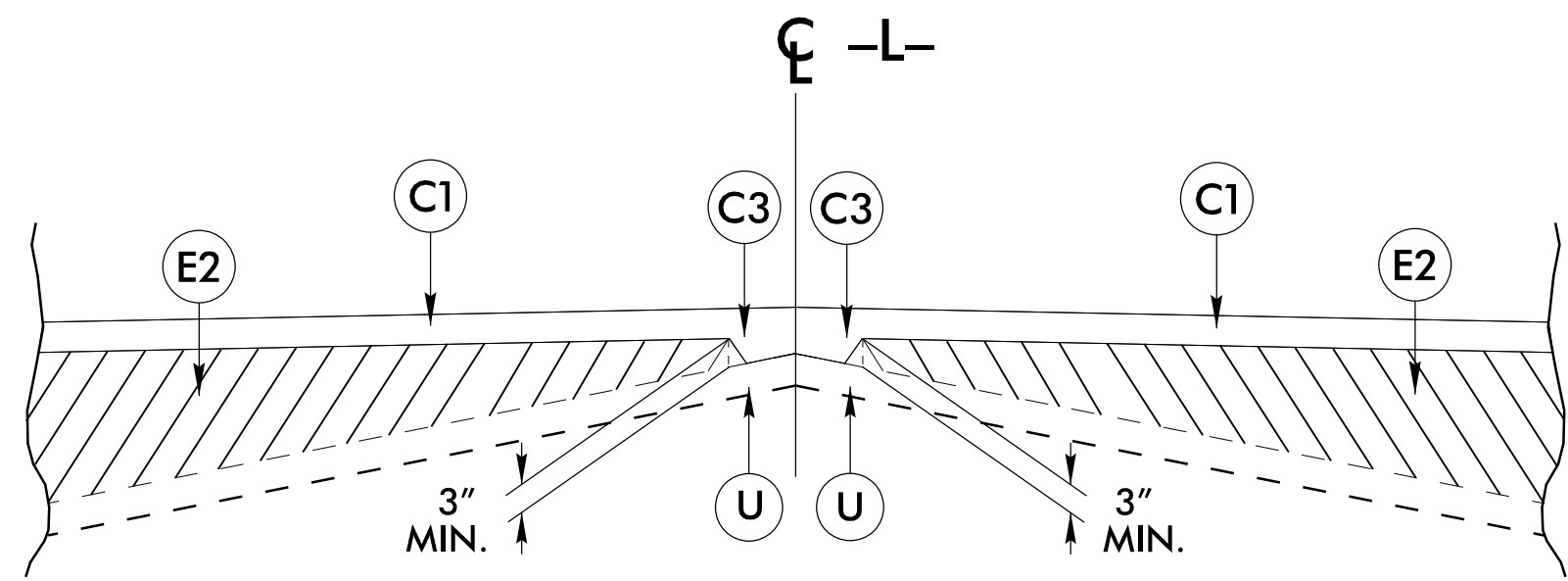
NOTE: ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE



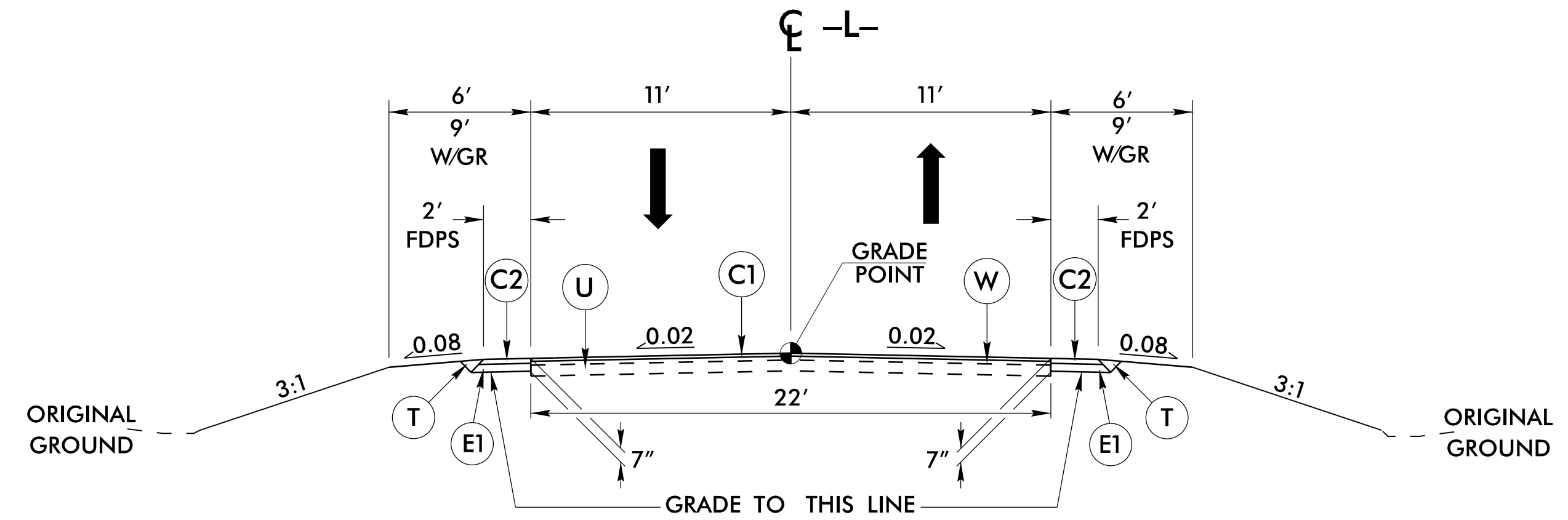
DETAIL OF MILLING AT PAVEMENT TIE-INS

****USE DETAIL**

-L- STA. 10+00.00 TO -L- STA. 10+50.00
 -L- STA. 15+00.00 TO -L- STA. 15+50.00



STANDARD WEDGING DETAIL

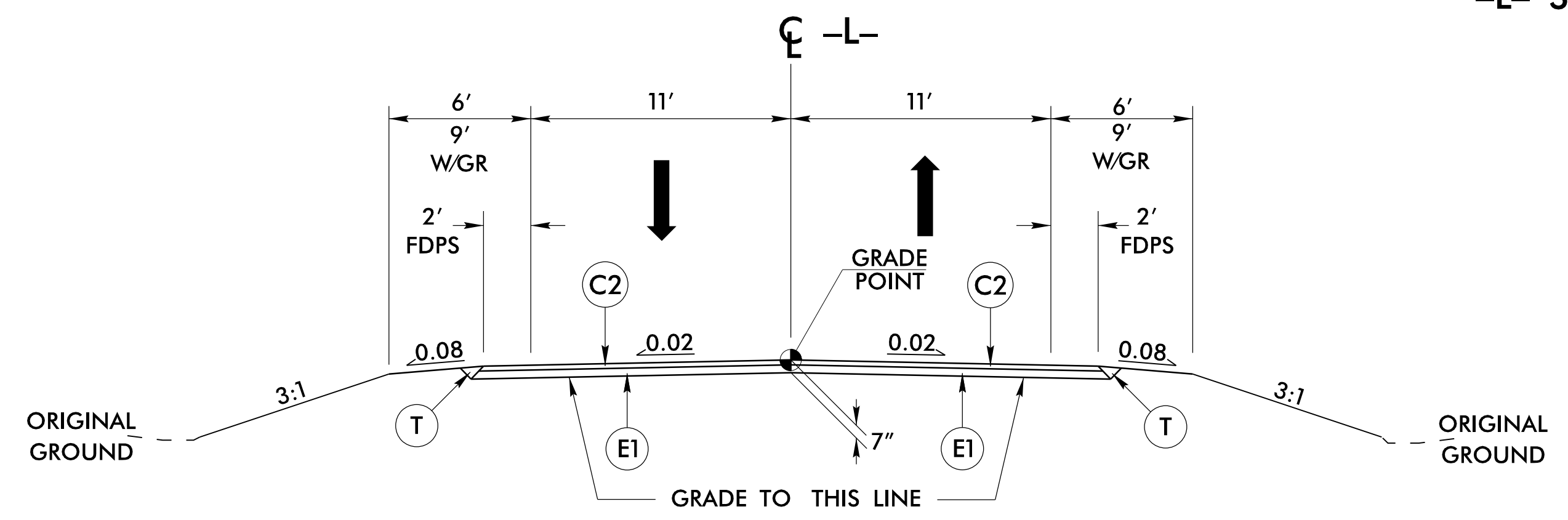


TYPICAL SECTION NO. 1

**** SEE DETAIL FOR LIMITS OF MILLING**

USE TYPICAL SECTION NO. 1

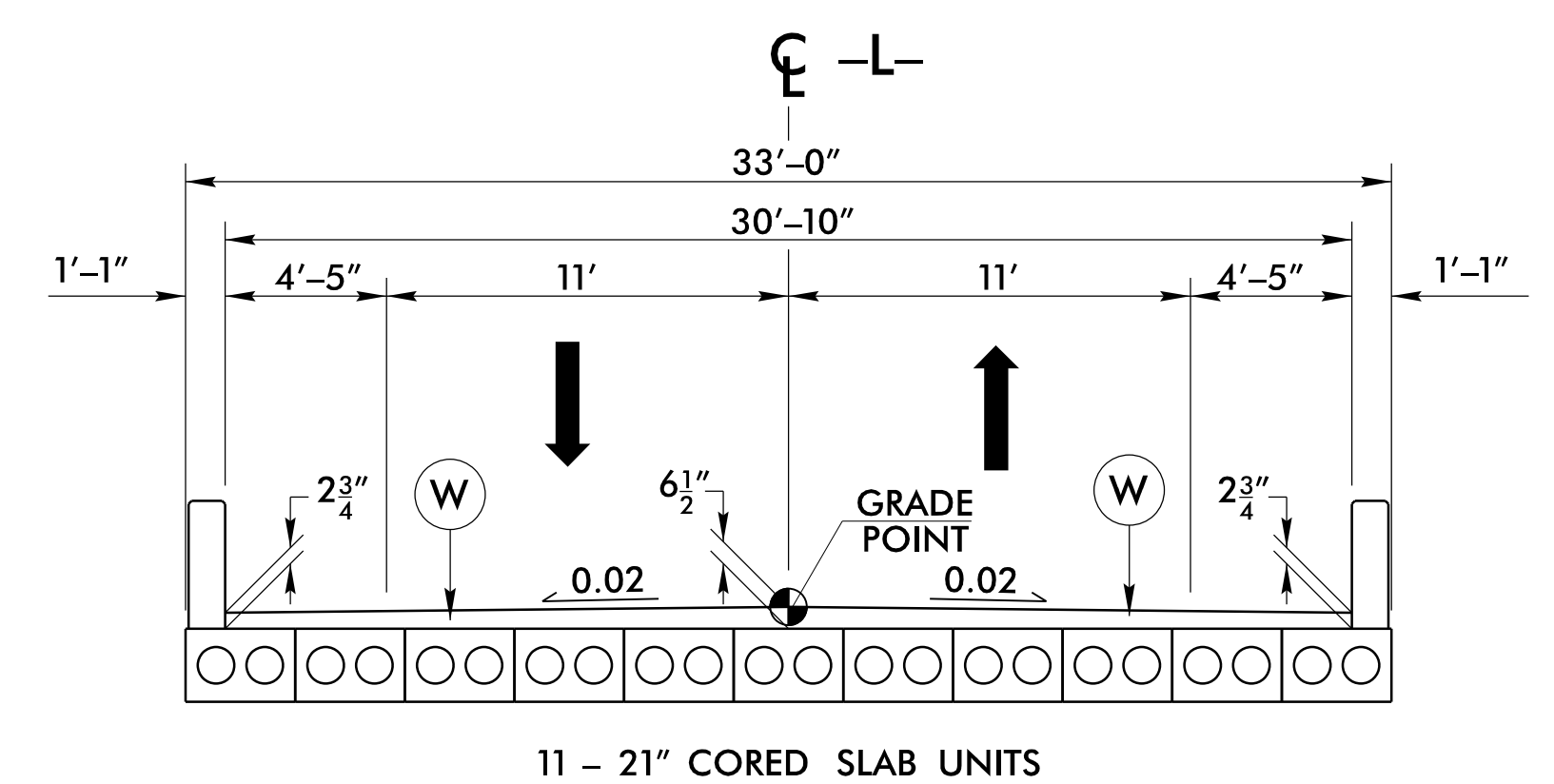
-L- STA. 10+50.00 TO -L- STA. 10+90.00
 -L- STA. 14+45.00 TO -L- STA. 15+00.00



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-L- STA. 10+90.00 TO -L- STA. 12+38.88 (BEGIN BRIDGE)
 -L- STA. 12+96.13 (END BRIDGE) TO -L- STA. 14+45.00



TYPICAL SECTION ON STRUCTURE

USE TYPICAL SECTION ON STRUCTURE

-L- STA. 12+38.88 (BEGIN BRIDGE) TO -L- STA. 12+96.13 (END BRIDGE)

PROJECT REFERENCE NO. B-5332	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER JIM J. GALLAGHER 040478 5/1/2017	PAVEMENT DESIGN ENGINEER CLARK S. MORRISON 022896 7/28/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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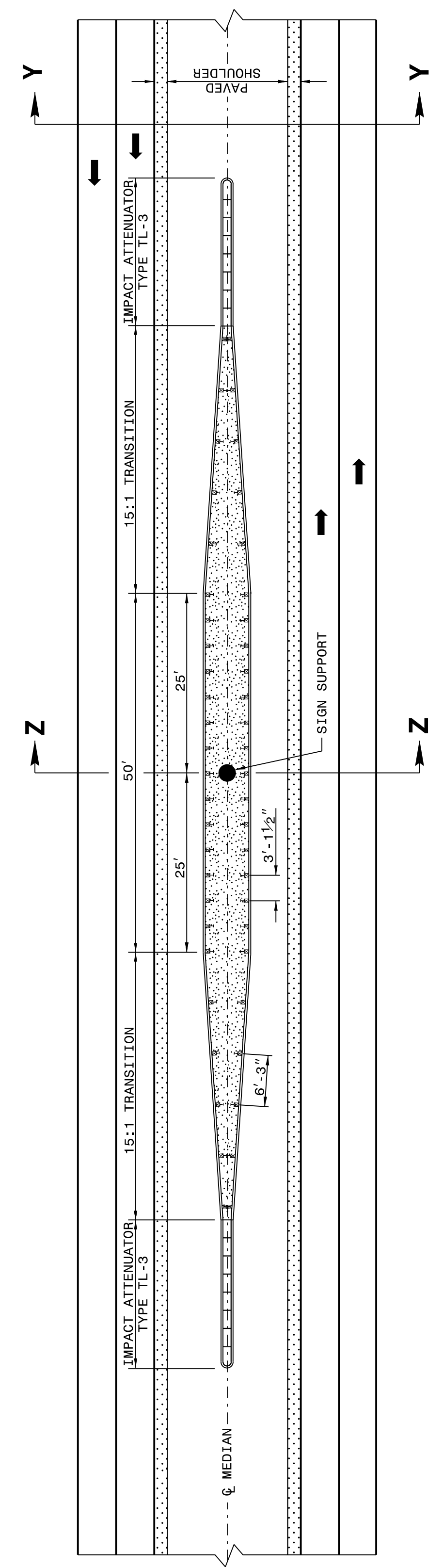
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 2 OF 11
862D01

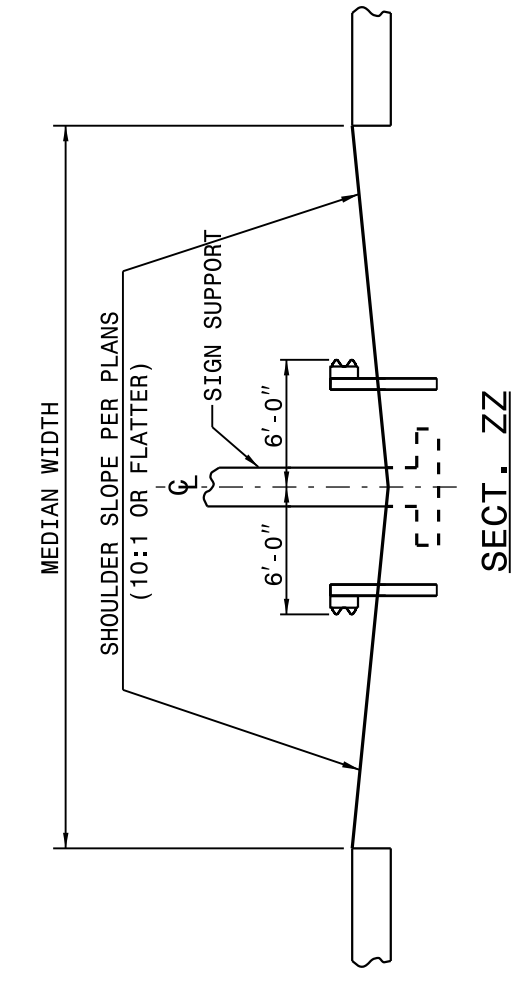
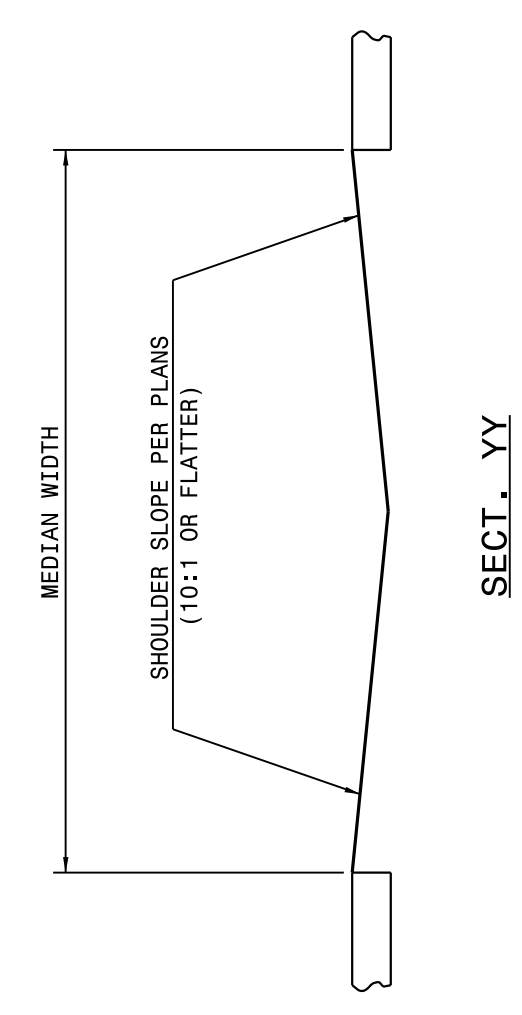
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ROADWAY DETAIL DRAWING FOR
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SHEET 2 OF 11
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NOTE SPECIAL LAYER OF PAVEMENT
 USE 3'-1 1/2" POST SPACING ON THE 50' OF GUARDRAIL PARALLEL TO LANES AND 6'-3" POST SPACING ON 15:1 TRANSITION SECTIONS.
 GRADE MEDIAN IN THE VICINITY OF THE SIGN SUPPORT AS ILLUSTRATED IN THE ROADWAY STANDARD DRAWINGS (STANDARD 862D01 SHEET 1 OF 12).

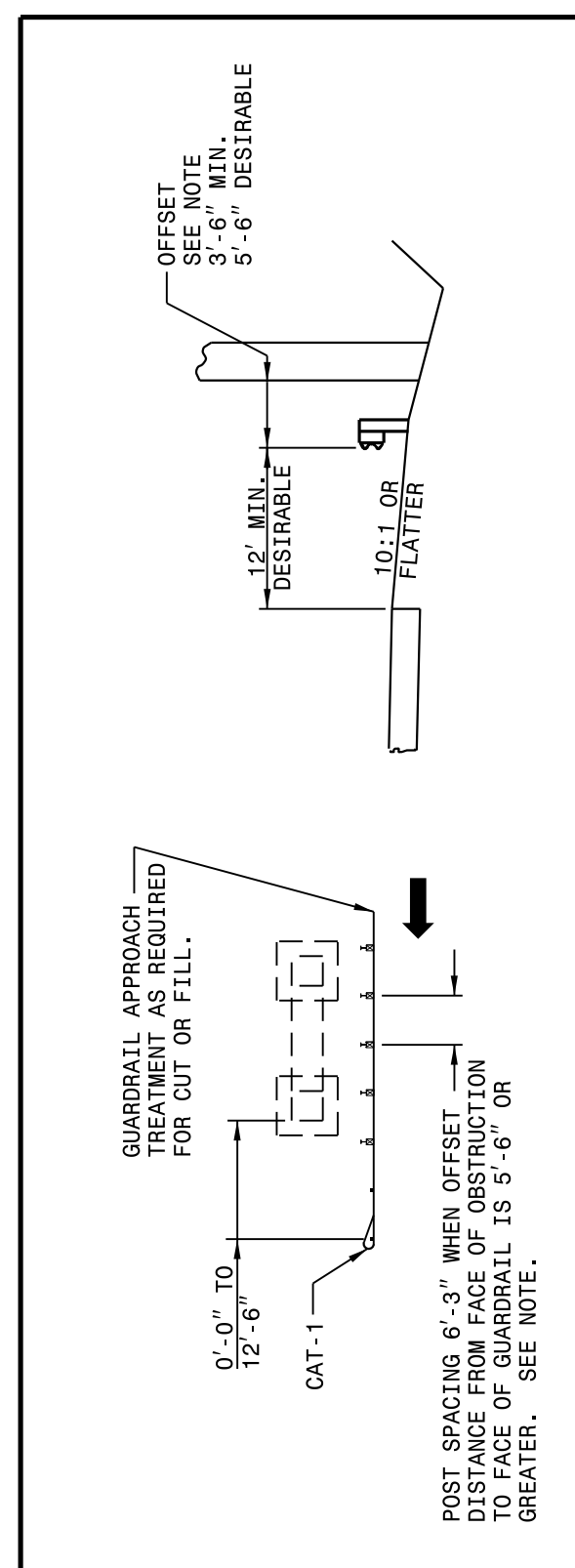
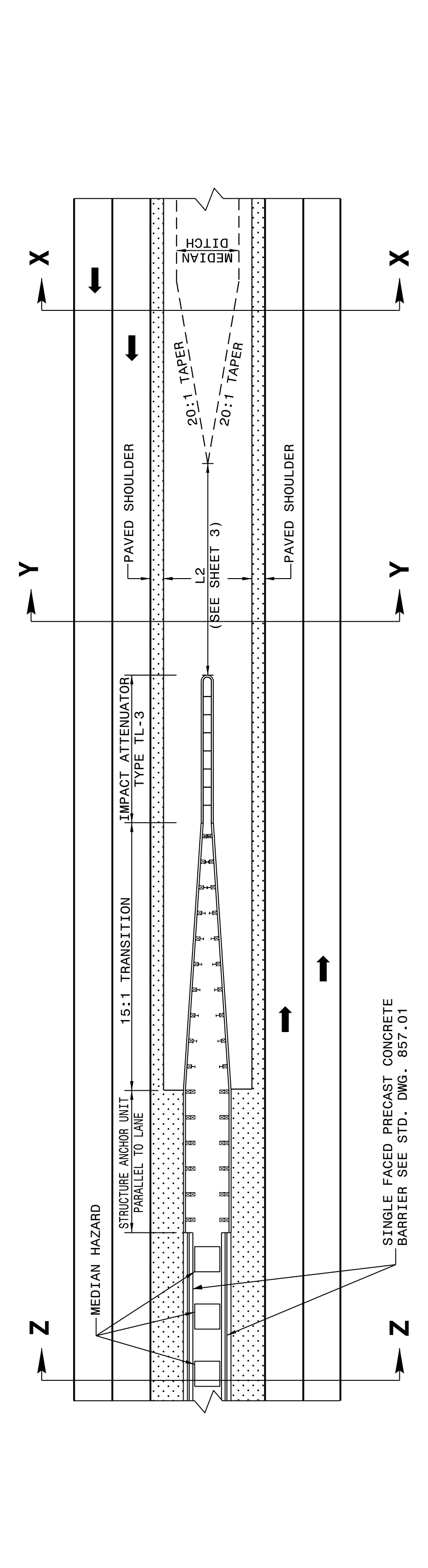


DETAIL OF GUARDRAIL AT MEDIAN SIGN SUPPORT

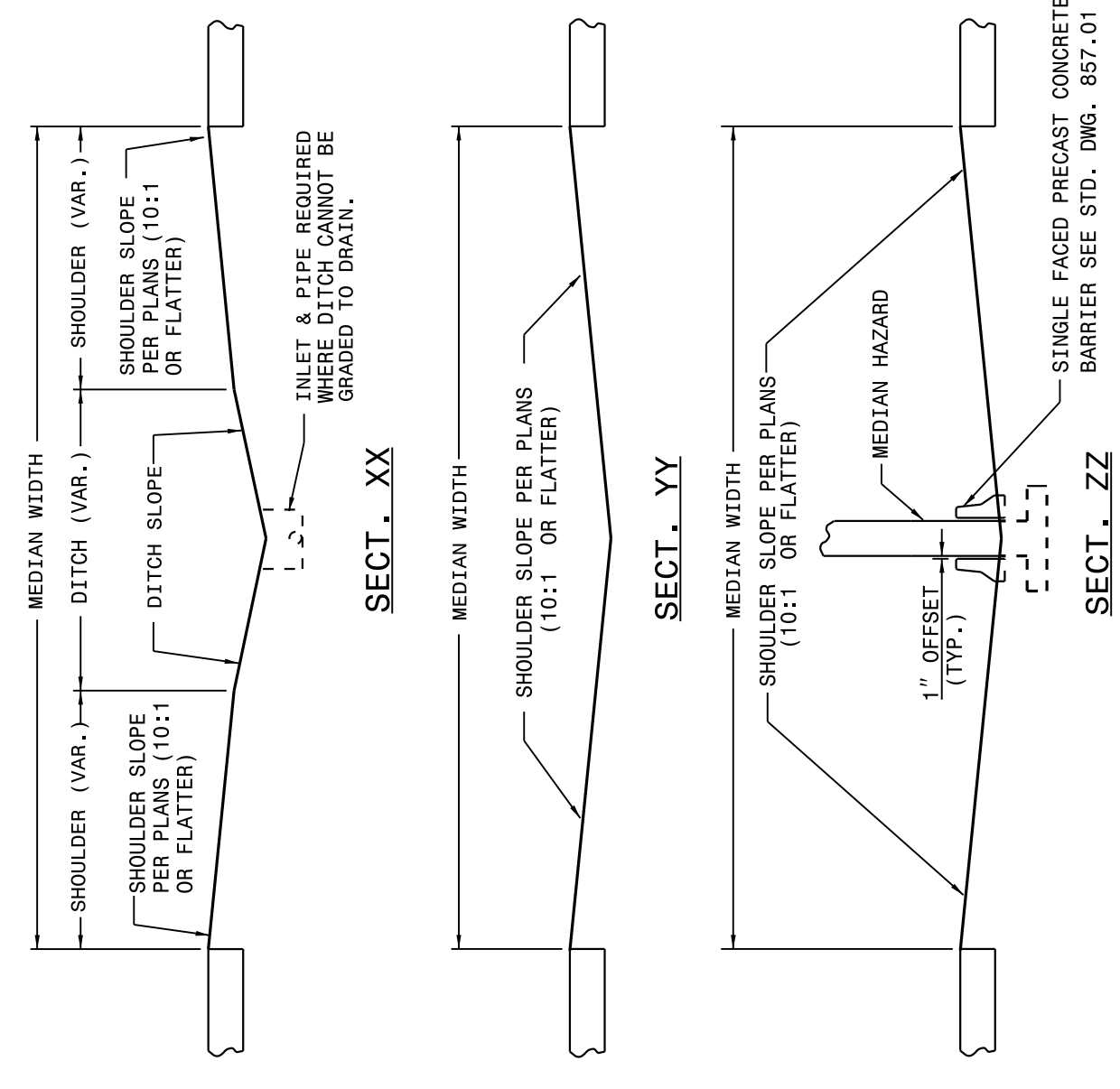
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ROADWAY DETAIL DRAWING FOR
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SHEET 1 OF 11
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NOTE: WHEN OFFSET DISTANCE FROM FACE OF OBSTRUCTION TO FACE OF GUARDRAIL IS BETWEEN 3'-6" AND 5'-6", BEGIN 3'-1 1/2" POST SPACING AT POINT 26' BEFORE REACHING THE OBSTRUCTION AND CARRY THROUGHOUT ITS LENGTH. IF THE OFFSET IS LESS THAN 3'-6" USE CONCRETE BARRIER.



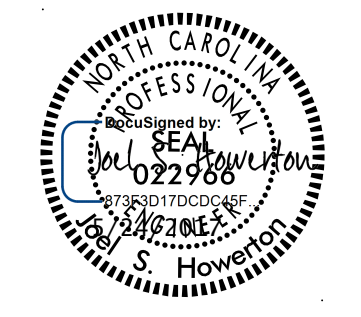
DETAIL OF MEDIAN TREATMENT AT UNDERPASS

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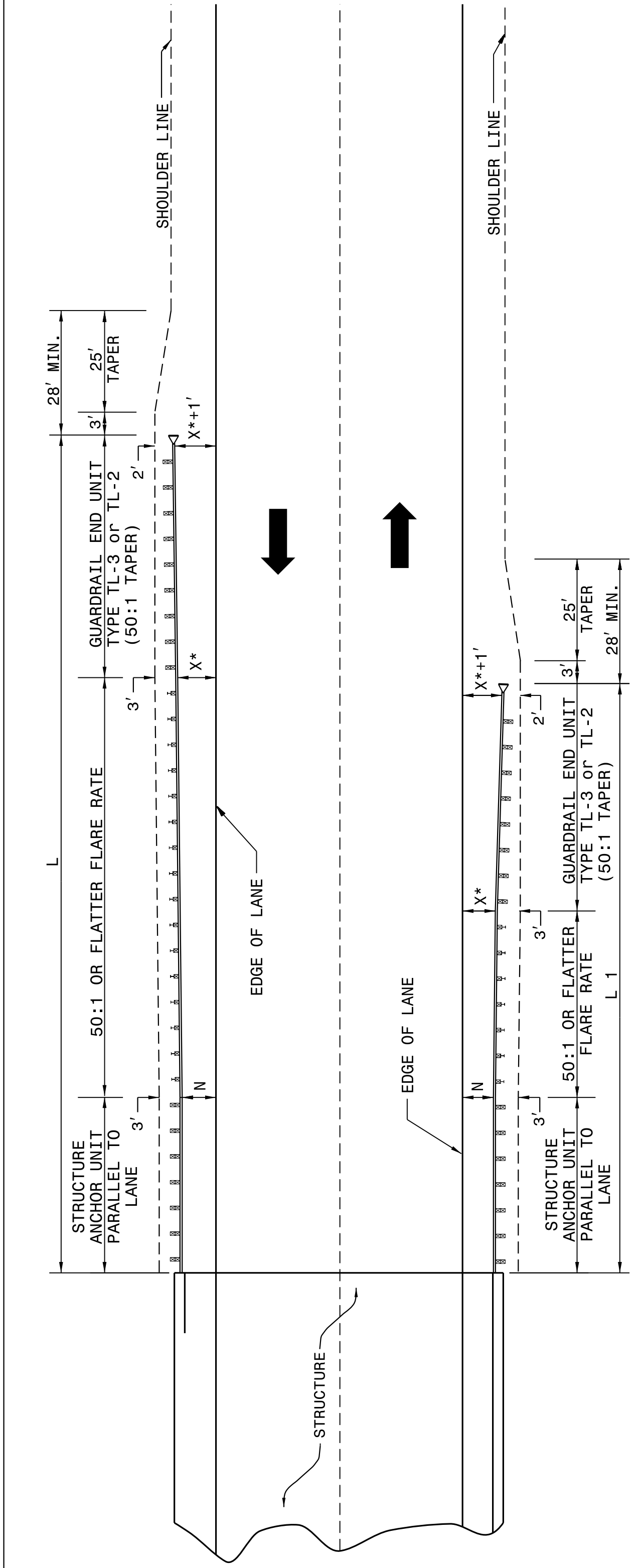


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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

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GUARDRAIL INSTALLATION AT BRIDGE APPROACHES FOR TWO-LANE, TWO-WAY TRAFFIC

DESIGN SPEED (MPH)	"L" APPROACH LENGTH (FT.)		"L+1" TRAILING LENGTH (FT.)	
	DESIGN YEAR ADT OVER 2000	CURRENT YEAR ADT 400-1000	DESIGN YEAR ADT OVER 2000	CURRENT YEAR ADT 400-1000
70	362.5'	362.5'	187.5'	175.0'
60	300.0'	287.5'	137.5'	100.0'
50	212.5'	212.5'	87.5'	75.0'
40	175.0'	150.0'	75.0'	75.0'
X *	8'	4'	6'	4'

* USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1).
 ** "N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.
 SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS
 FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

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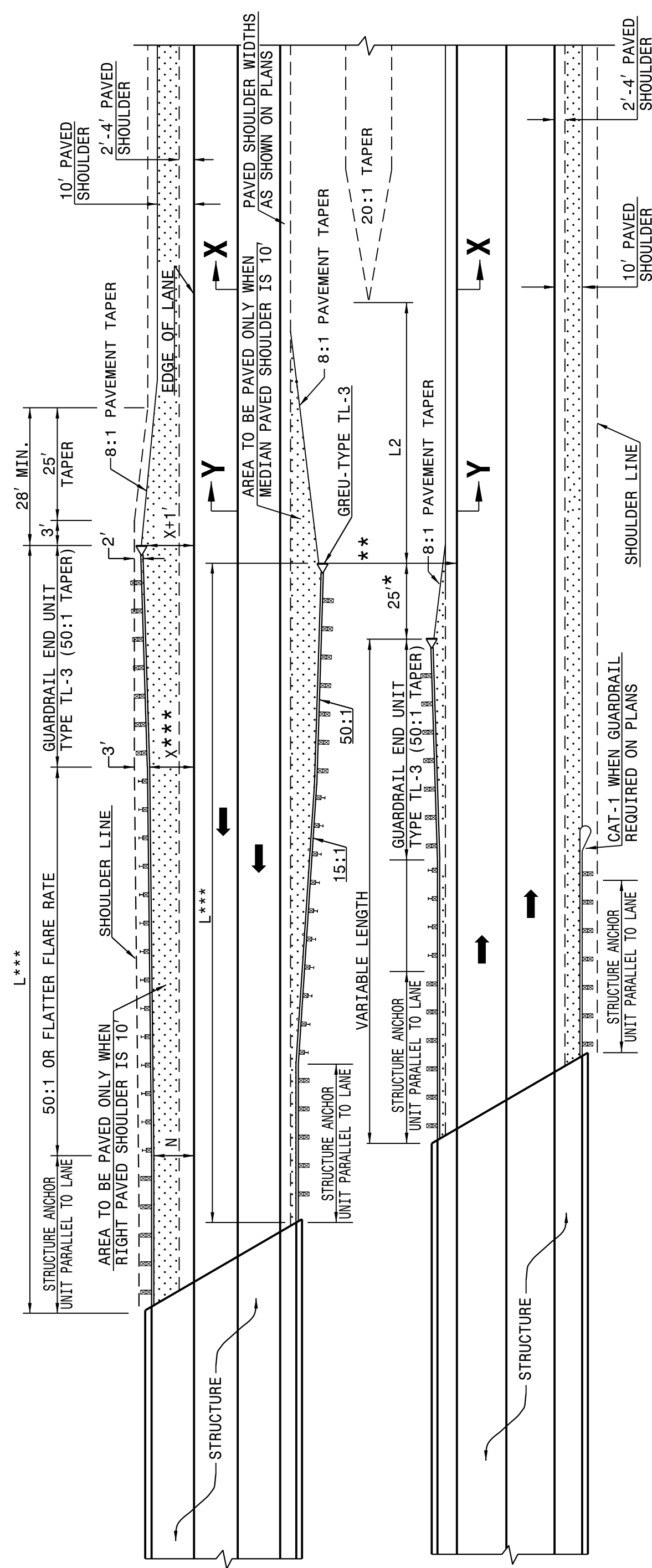
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LENGTHS AND OFFSETS FOR PROPOSED GUARDRAIL AT TWO LANE - TWO WAY LOCATIONS

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ROADWAY DETAIL DRAWING FOR
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FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

DIMENSIONS FOR LENGTH OF GUARDRAIL APPROACHING DUAL LANE BRIDGES

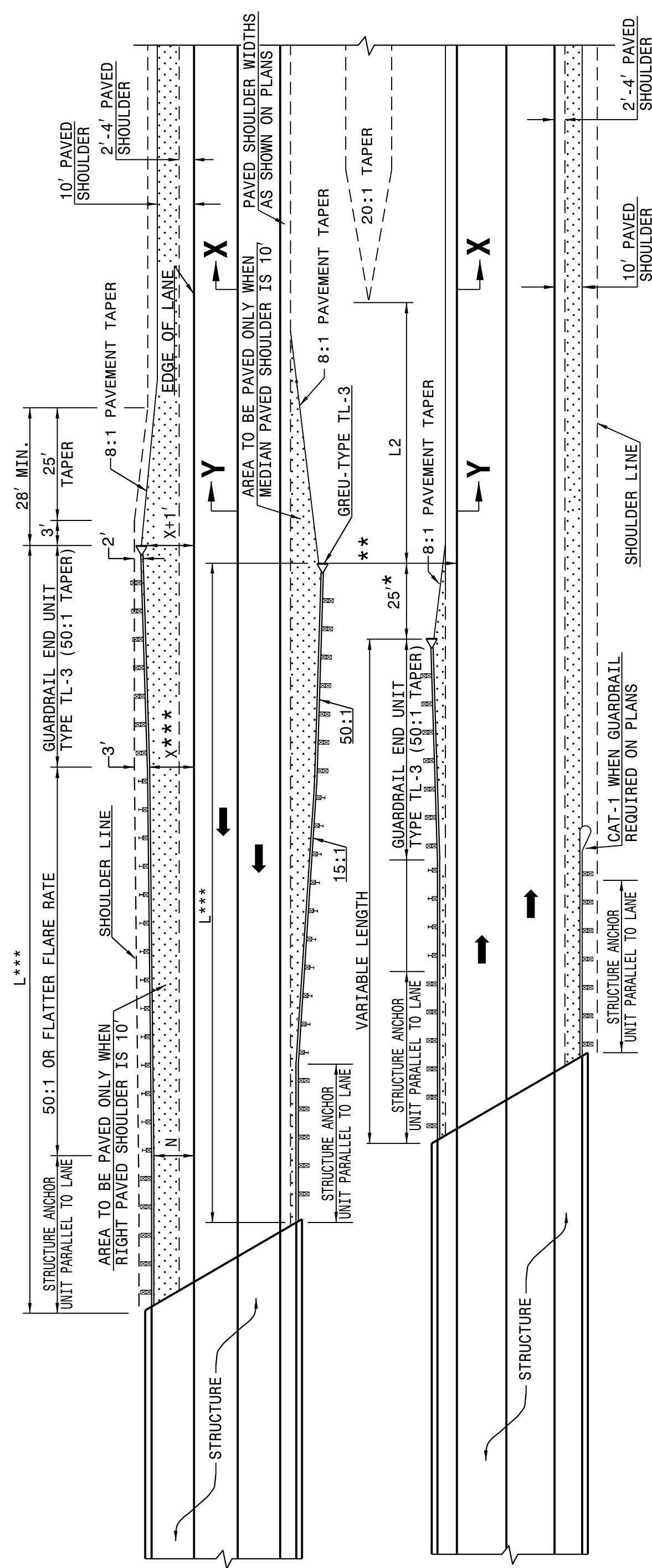
MEDIAN WIDTH	-L-***		-L2- DIM.
	60 MPH	50 MPH	
30'	300.0'	250.0'	80.0'
36'	300.0'	250.0'	60.0'
40' & ABOVE	300.0'	250.0'	40.0'

NOTES: * MINOR VARIATION TO THE 25'-0" DIMENSION IS PERMISSIBLE TO ACCOMMODATE THE 12'-6" IN GUARDRAIL LENGTHS.
 ** NO GUARDRAIL IS REQUIRED ON THE TRAILING END WHEN THIS DISTANCE EXCEEDS CLEAR ROADSIDE RECOVERY AREA FOR THE APPROPRIATE DESIGN SPEED.
 *** BASED ON "X" OF 12' USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1A).
 "N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.
 THE DESIGN LAYOUT FOR LENGTHS SHOWN ON THIS STANDARD ARE MINIMUM DESIGN LENGTHS.
 SEE SHEET 1 OF 12 FOR SECTIONS XX, YY
 SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

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ROADWAY DETAIL DRAWING FOR
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DETAIL OF GUARDRAIL APPROACHING DUAL LANE BRIDGES



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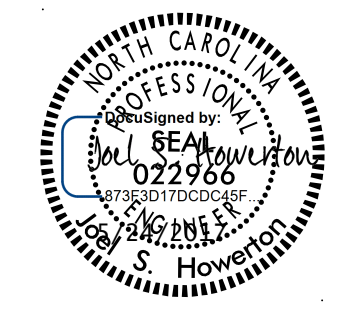
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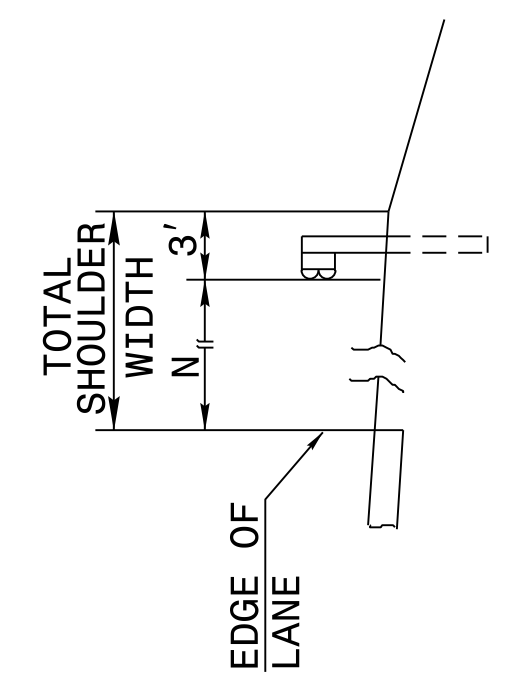
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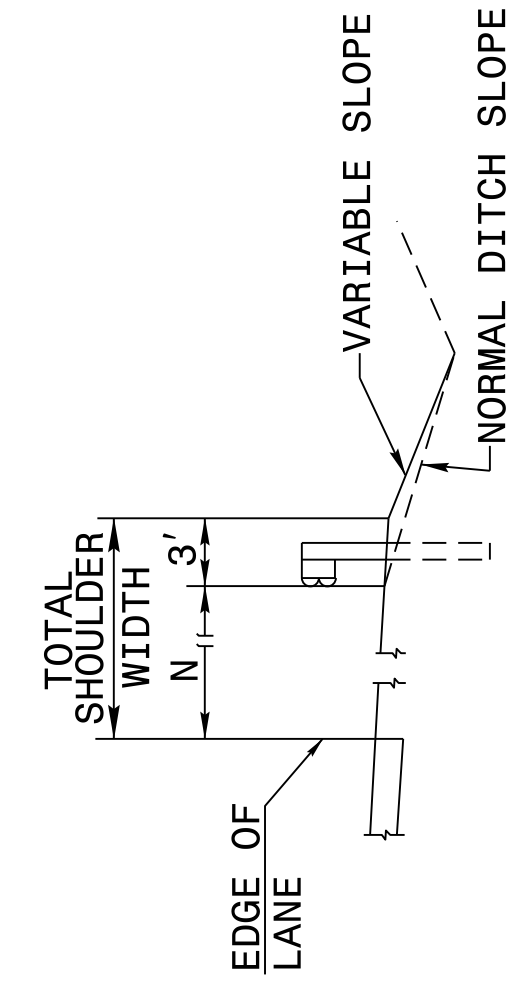


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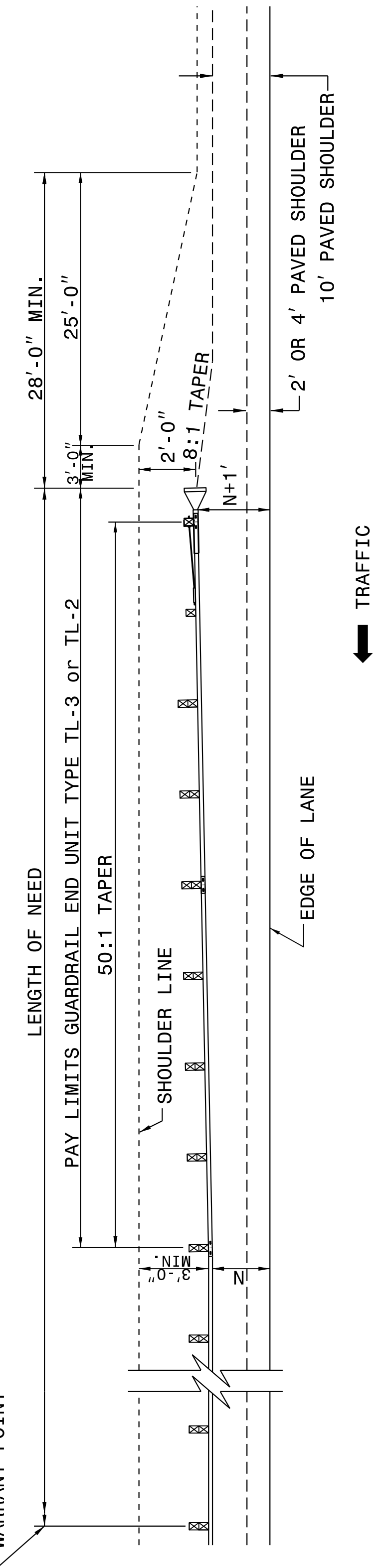


FILL SECTION



CUT SECTION

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.



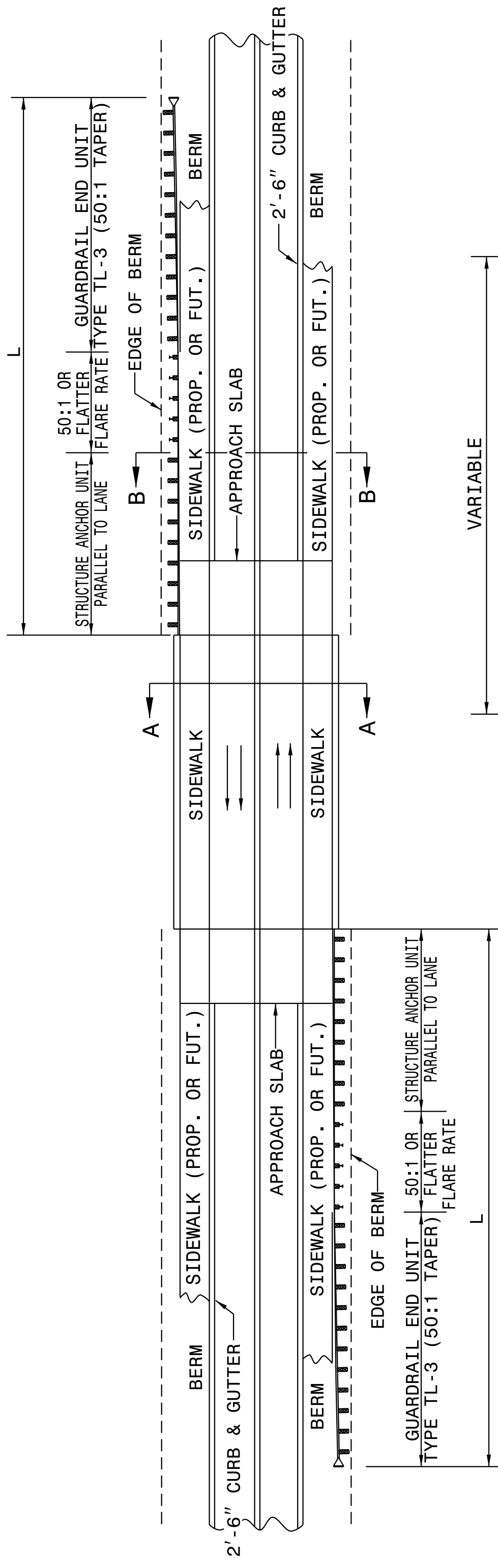
FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT

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DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

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MINIMUM GUARDRAIL LENGTHS "L" REQUIRED AT BRIDGE APPROACHES ON 2'-6" CONCRETE CURB AND GUTTER ROADWAYS	"L"
DESIGN SPEED (MPH)	150'
	225'

NOTE: "L" VALUES ARE BASED ON NO HAZARDS OTHER THAN END OF BRIDGE BEING PRESENT WITHIN THE CLEAR ZONE.

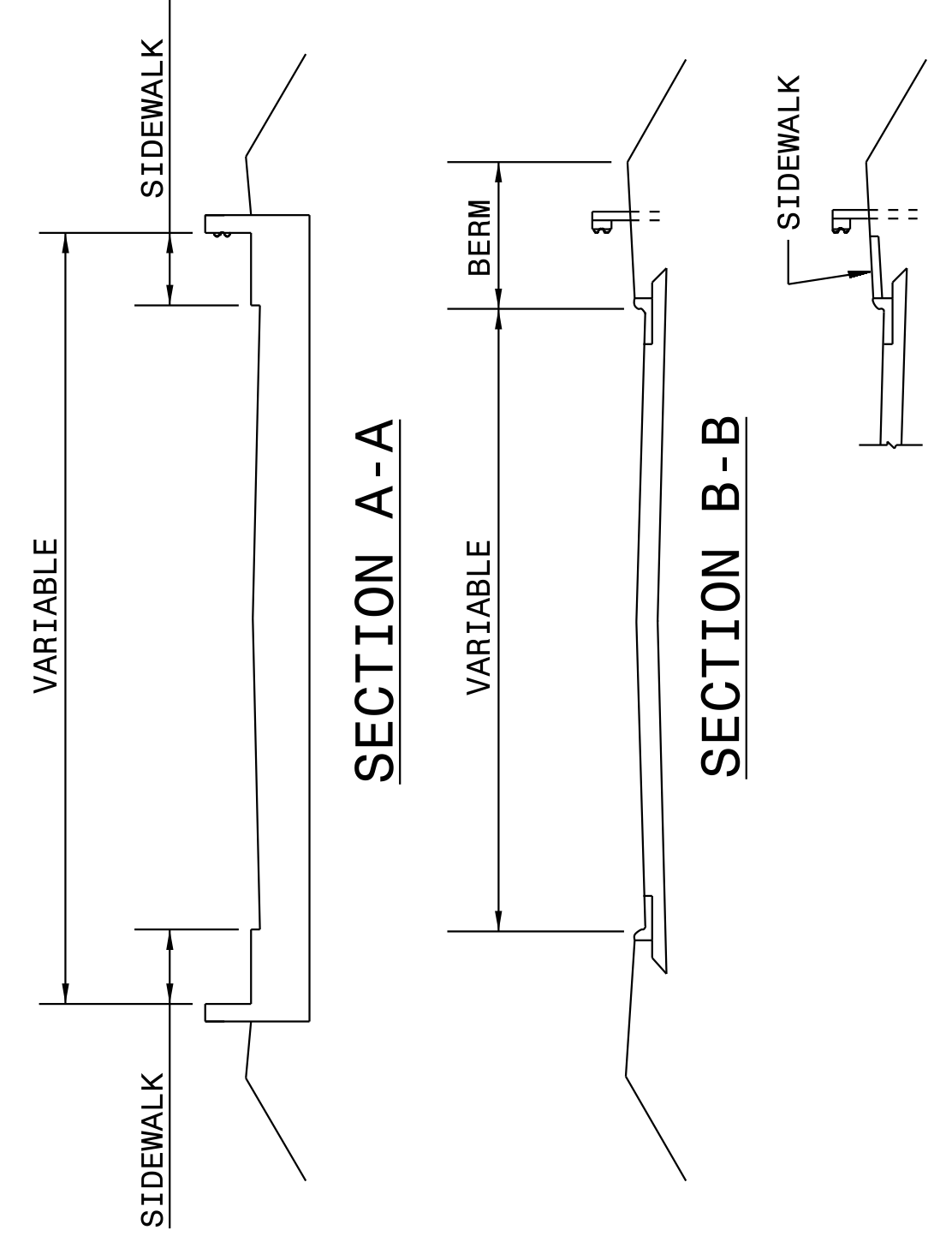
SEE STD. 862D03 FOR STRUCTURE ANCHOR UNITS.

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT

SHEET 5 OF 11
862D01

STANDARD GUARDRAIL PLACEMENT AT BRIDGES WITH 2'-6" CONCRETE CURB AND GUTTER

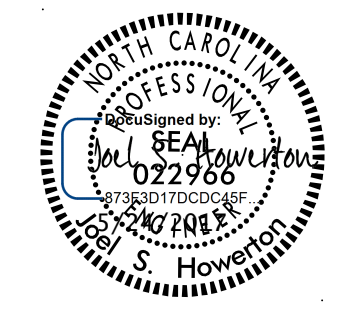


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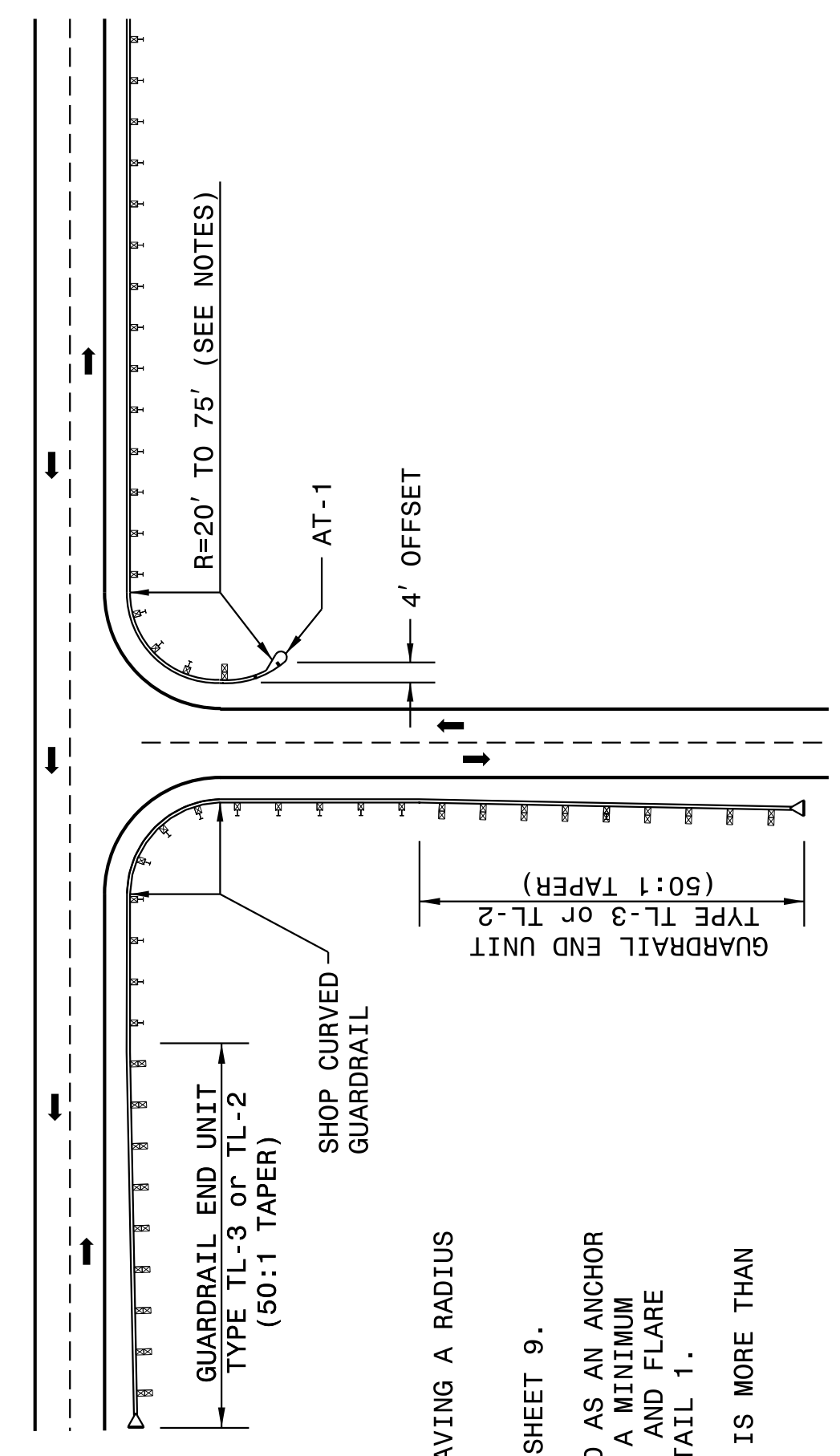
ROADWAY DETAIL DRAWING FOR
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SHEET 8 OF 11
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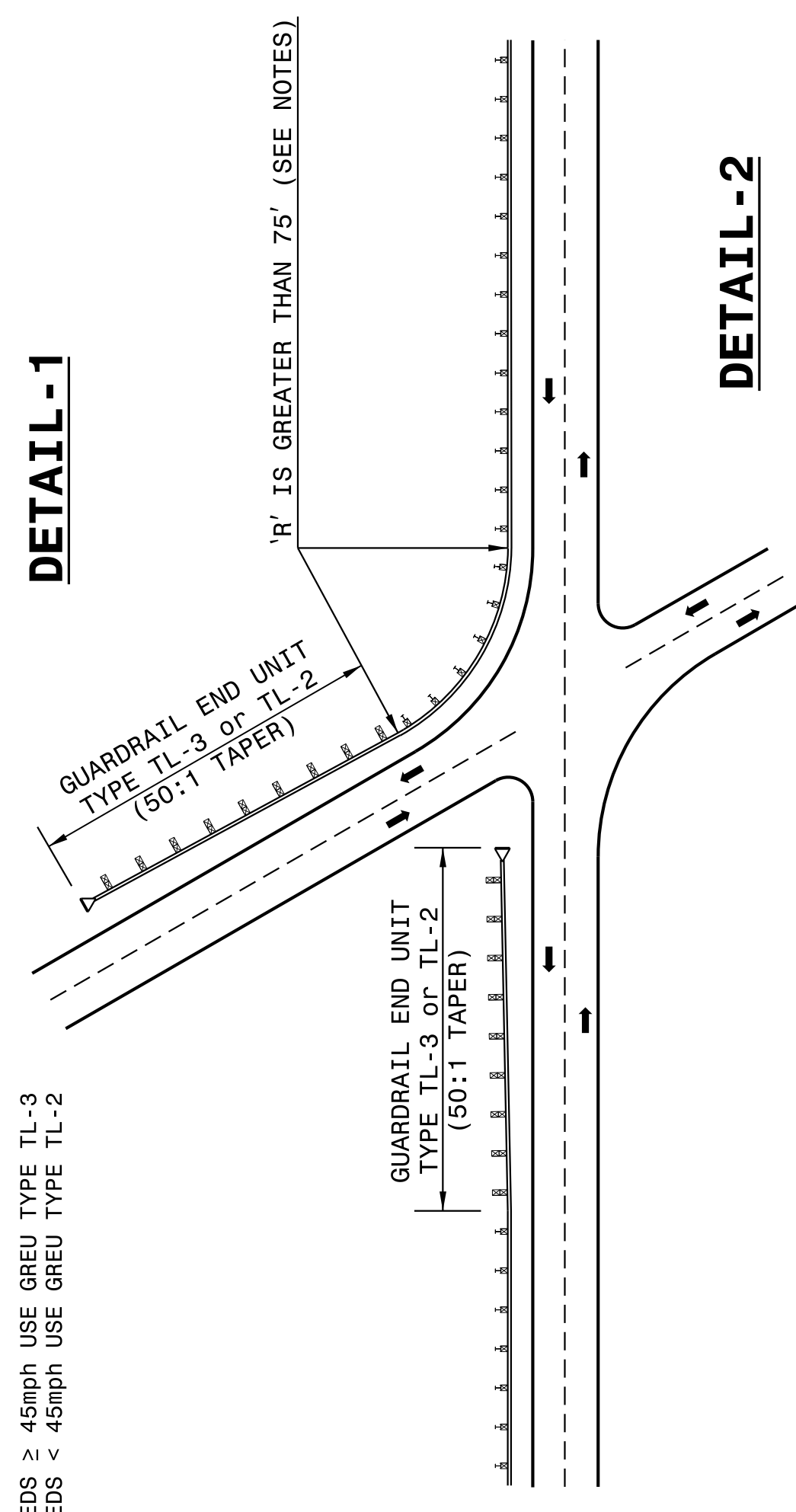
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NOTES:
SHOP CURVED GUARDRAIL IS DEFINED AS HAVING A RADIUS OF 150' OR LESS.
WHEN RADIUS IS LESS THAN 20' REFER TO SHEET 9.
WHENEVER SHOP CURVED GUARDRAIL IS USED AS AN ANCHOR AND THE RADIUS IS FROM 20' TO 75', USE A MINIMUM LENGTH OF 50' OF SHOP CURVED GUARDRAIL AND FLARE WITH AN AT-1 ANCHOR UNIT. REFER TO DETAIL 1.
WHENEVER SHOP CURVED GUARDRAIL RADIUS IS MORE THAN 75', REFER TO DETAIL 2.

MAINTAIN CLEAR SIGHT DISTANCE.
FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2



DETAIL -2

GUARDRAIL TREATMENT AT INTERSECTIONS

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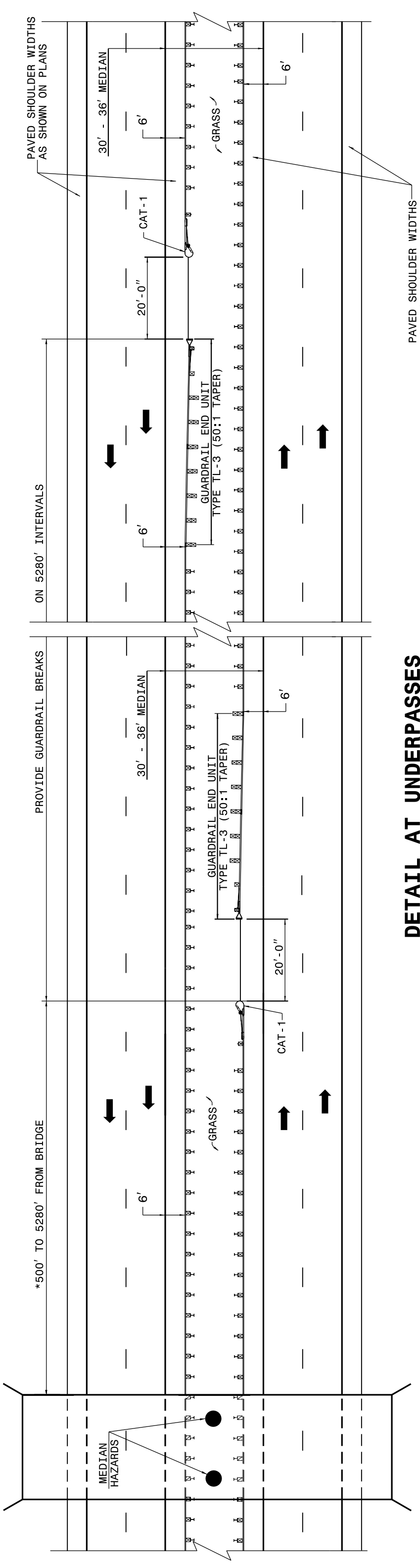
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 7 OF 11
862D01

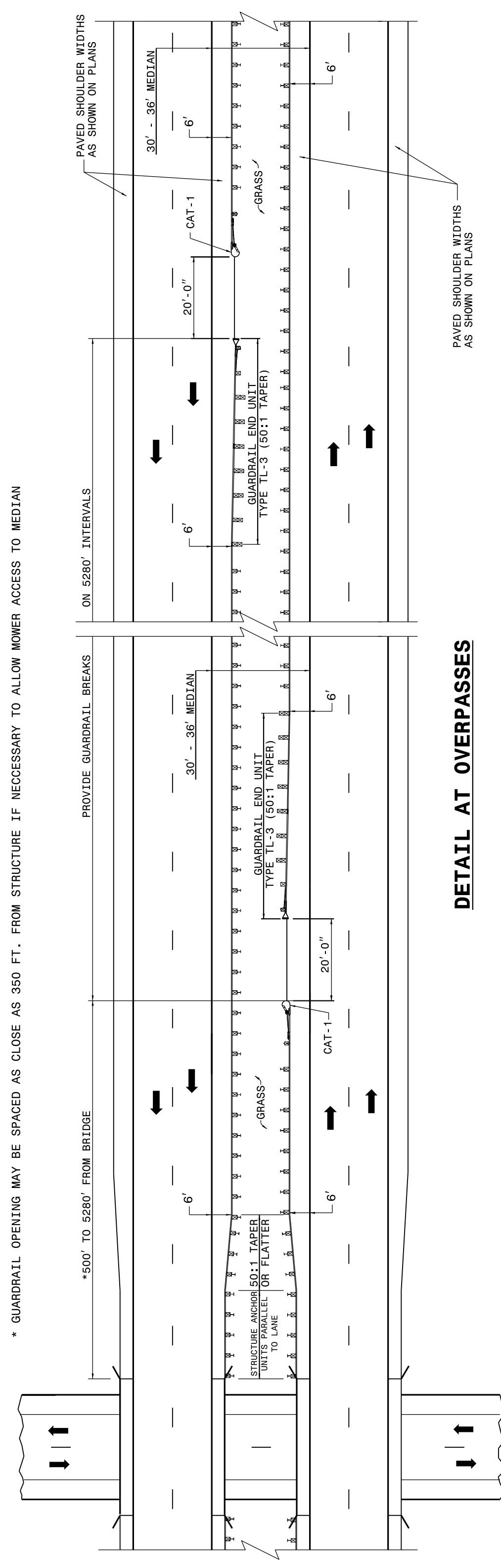
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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

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DETAIL AT OVERPASSES



* GUARDRAIL OPENING MAY BE SPACED AS CLOSE AS 350 FT. FROM STRUCTURE IF NECESSARY TO ALLOW MOWER ACCESS TO MEDIAN

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

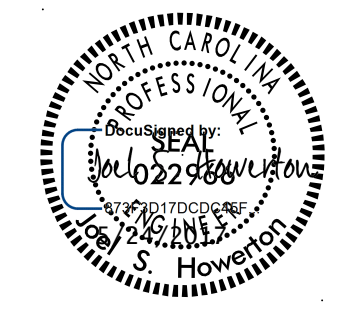
GUARDRAIL BREAK INTERVALS WITH 30' - 36' MEDIANS

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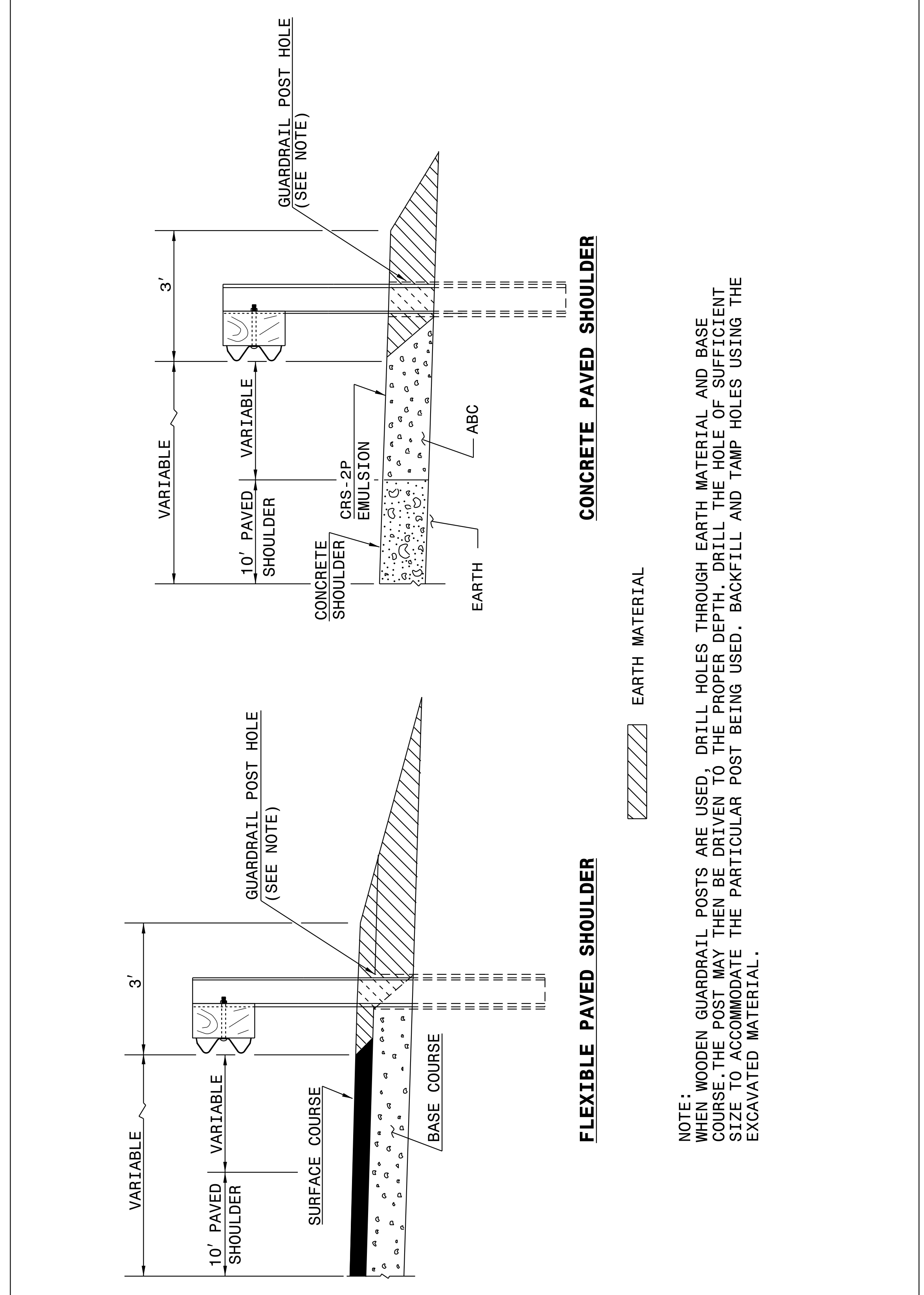
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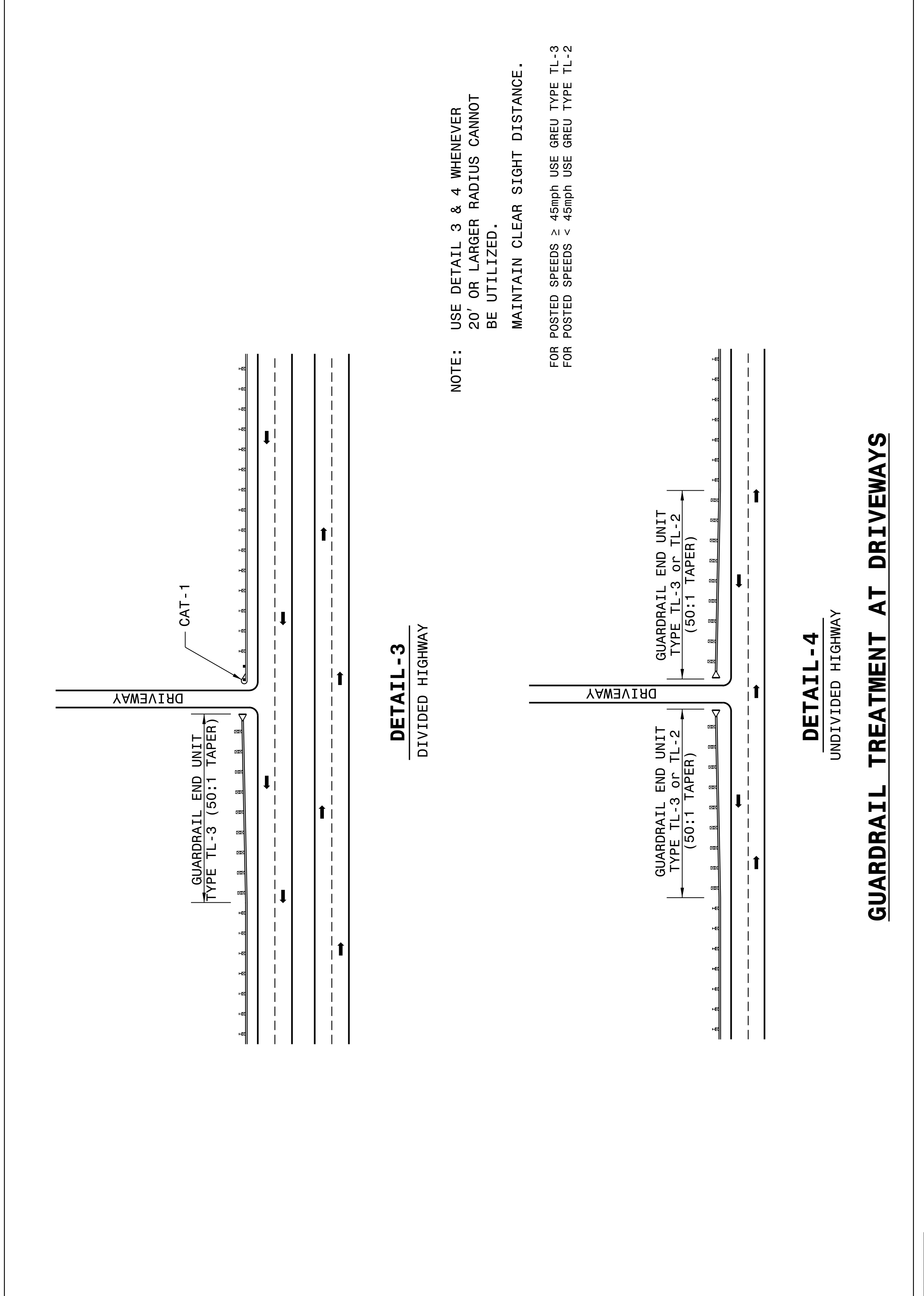


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ENGLISH DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

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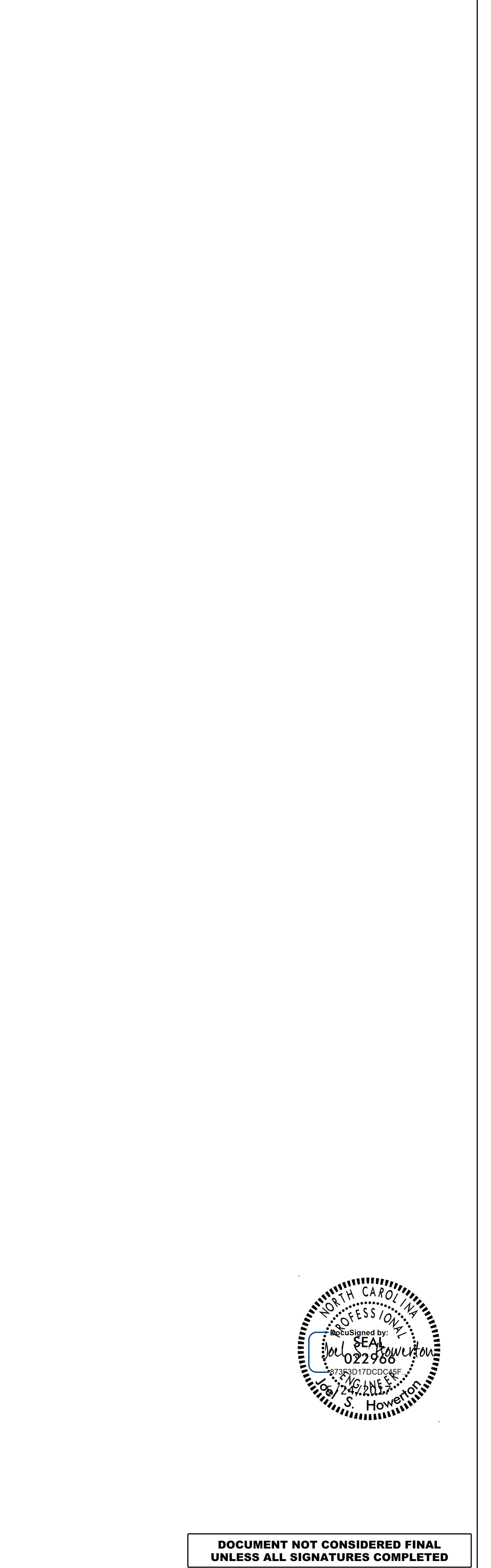
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 9 OF 11
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NOTE: USE DETAIL 3 & 4 WHENEVER
20' OR LARGER RADIUS CANNOT
BE UTILIZED.
MAINTAIN CLEAR SIGHT DISTANCE.

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

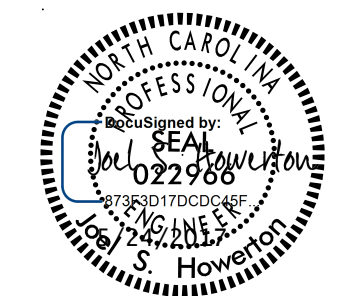
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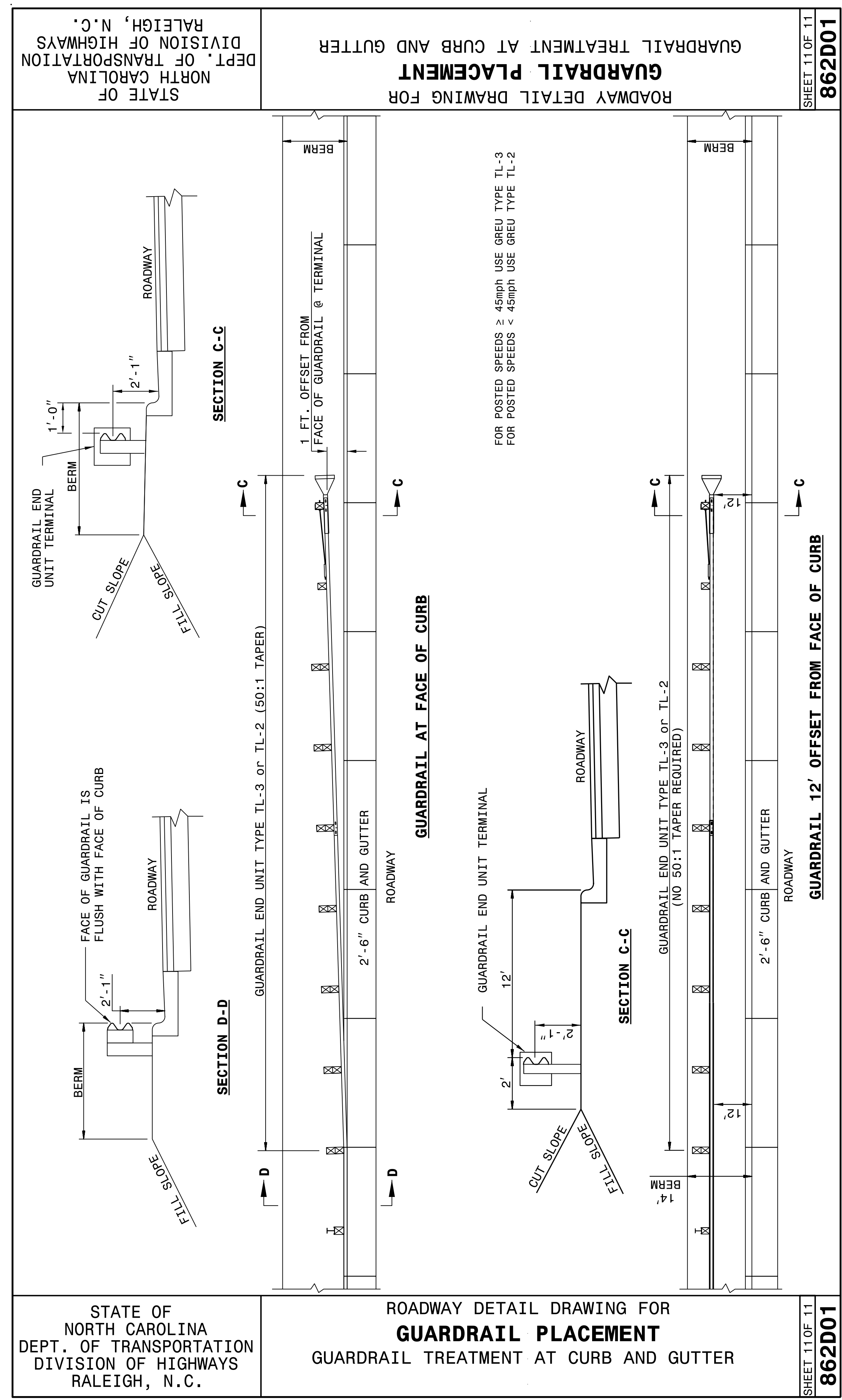
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ROADWAY DETAIL DRAWING FOR
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 GUARDRAIL TREATMENT AT CURB AND GUTTER

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ROADWAY DETAIL DRAWING FOR
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 GUARDRAIL TREATMENT AT CURB AND GUTTER

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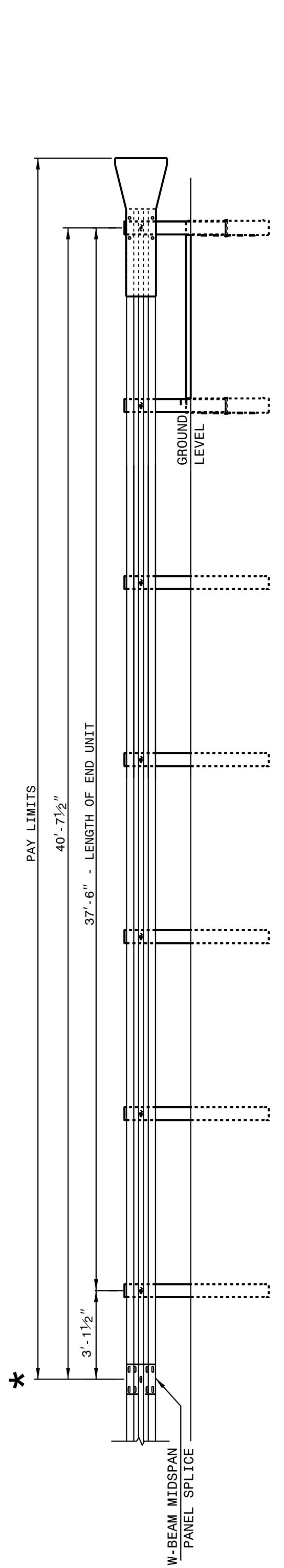
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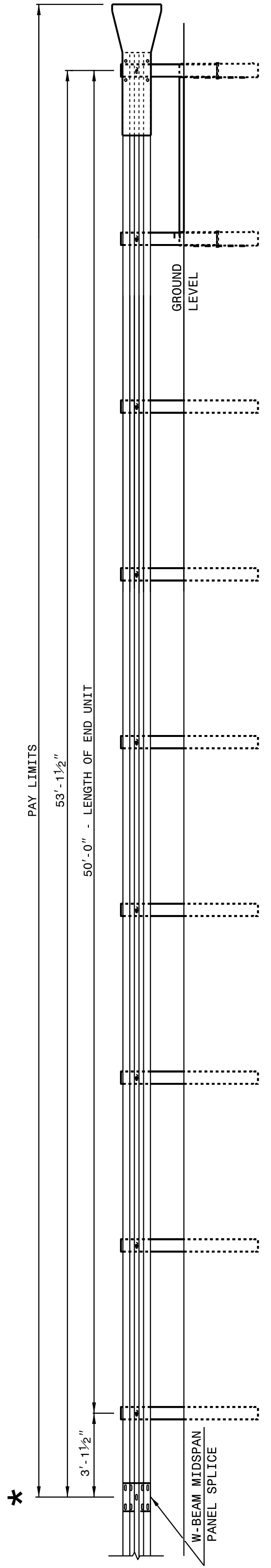
ROADWAY DETAIL DRAWING FOR
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**FLARED AND TANGENT
ELEVATION VIEW**

* WHEN INSTALLING GUARDRAIL END UNITS THAT ARE 2'-1" MOUNTING HEIGHT TO EXISTING GUARDRAIL, REMOVE THE EXISTING GUARDRAIL TO TRANSITION FROM THE EXISTING HEIGHT TO THE PROPOSED 2'-1" HEIGHT. SEE 862.02, SHEET 4 OF 8 FOR TRANSITION DETAILS.



**FLARED AND TANGENT
ELEVATION VIEW**

APPROACH END UNITS

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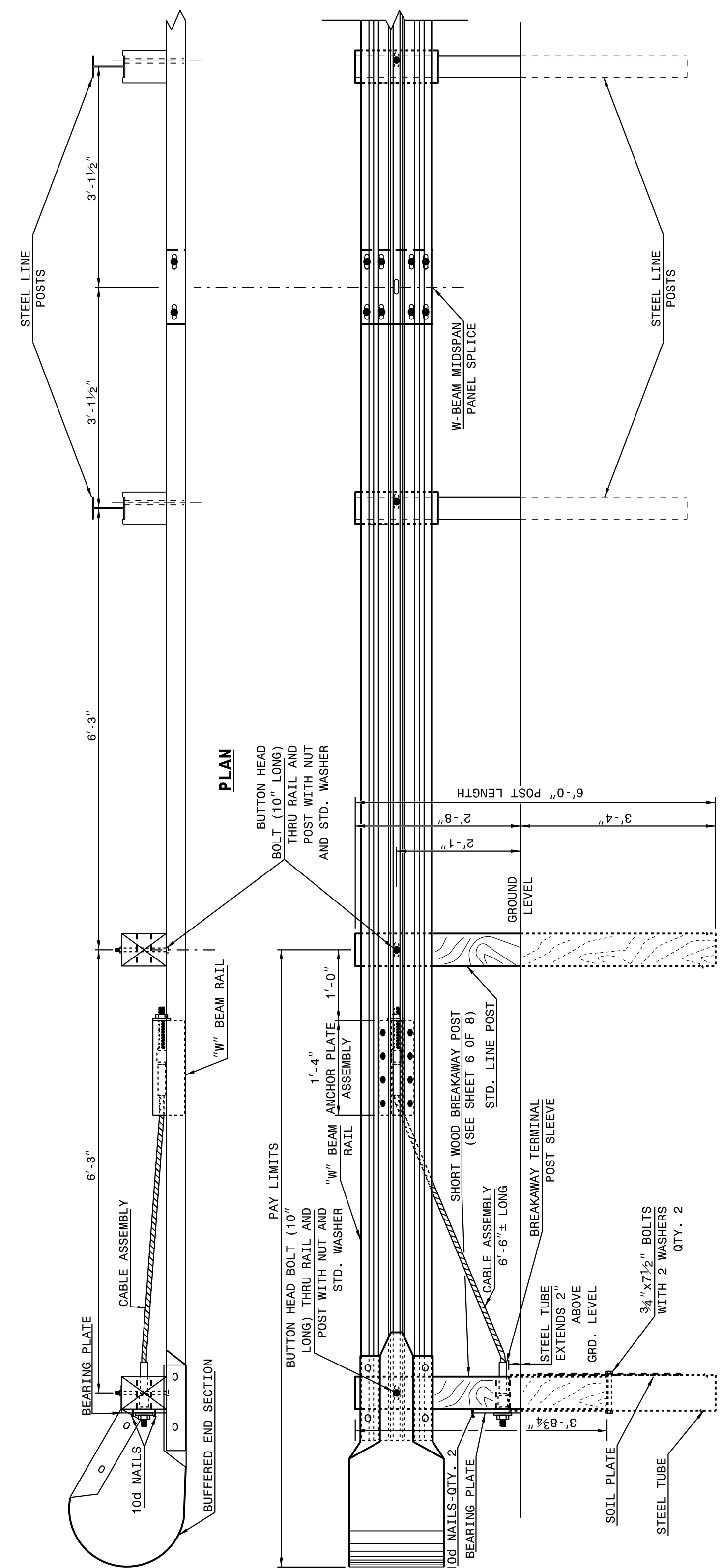
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ROADWAY DETAIL DRAWING FOR
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**TRAILING END UNIT ASSEMBLY
C.A.T.-1 SYSTEM**

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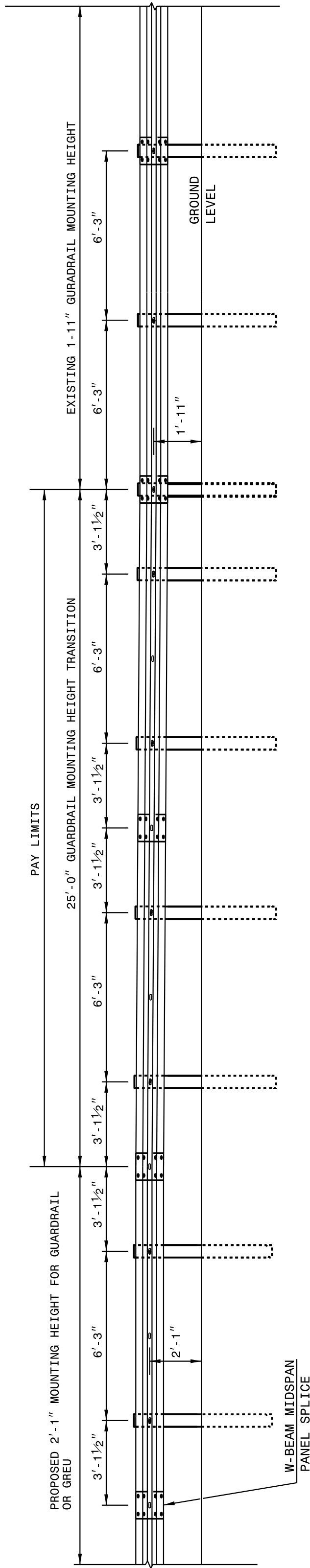


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ROADWAY DETAIL DRAWING FOR
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NOTE: IF EXISTING GUARDRAIL IS LOWER THAN 1'-11", USE AN ADDITIONAL 12'-6" LONG SECTION OF GUARDRAIL, FOR EVERY 1" OF HEIGHT DIFFERENCE, TO TRANSITION FROM EXISTING GUARDRAIL TO PROPOSED 2'-1" GUARDRAIL.



ELEVATION VIEW

TRANSITION FROM OR 1'-11" TO 2'-1" W-BEAM GUARDRAIL MOUNTING HEIGHT

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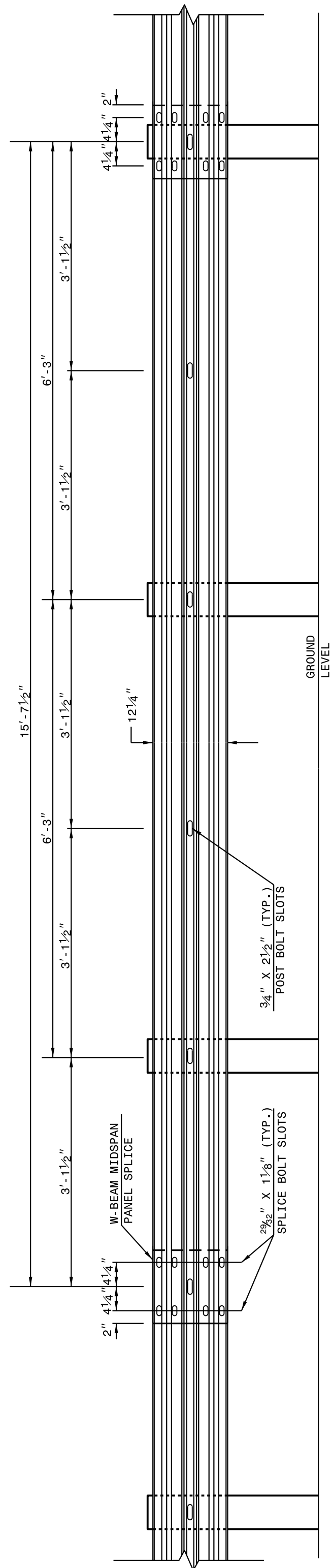
ROADWAY DETAIL DRAWING FOR
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ROADWAY DETAIL DRAWING FOR
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15'-7 1/2" W-BEAM GUARDRAIL PANEL

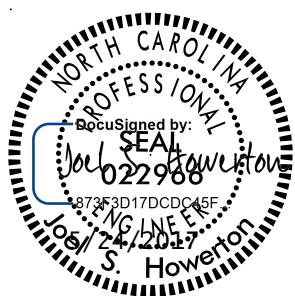
NOTE: USE 5-SPACE 15'-7 1/2" W-BEAM GUARDRAIL PANEL AT THE DOWNSTREAM END OF AN END UNIT OR EXISTING GUARDRAIL THAT DOES NOT OFFSET THE W-BEAM PANEL SPLICE TO MIDSPAN

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ROADWAY DETAIL DRAWING FOR
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862D02

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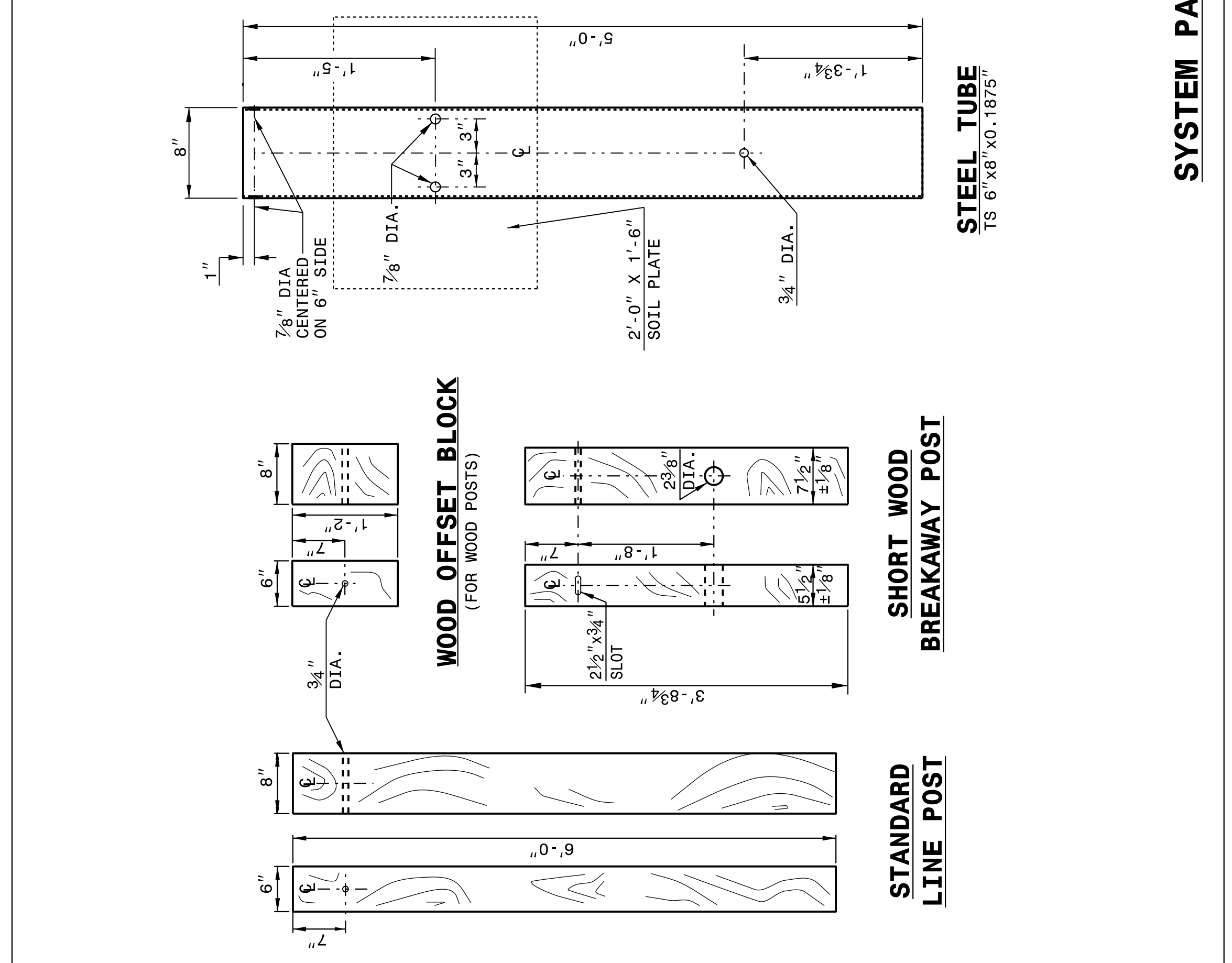
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STATE OF NORTH CAROLINA
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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

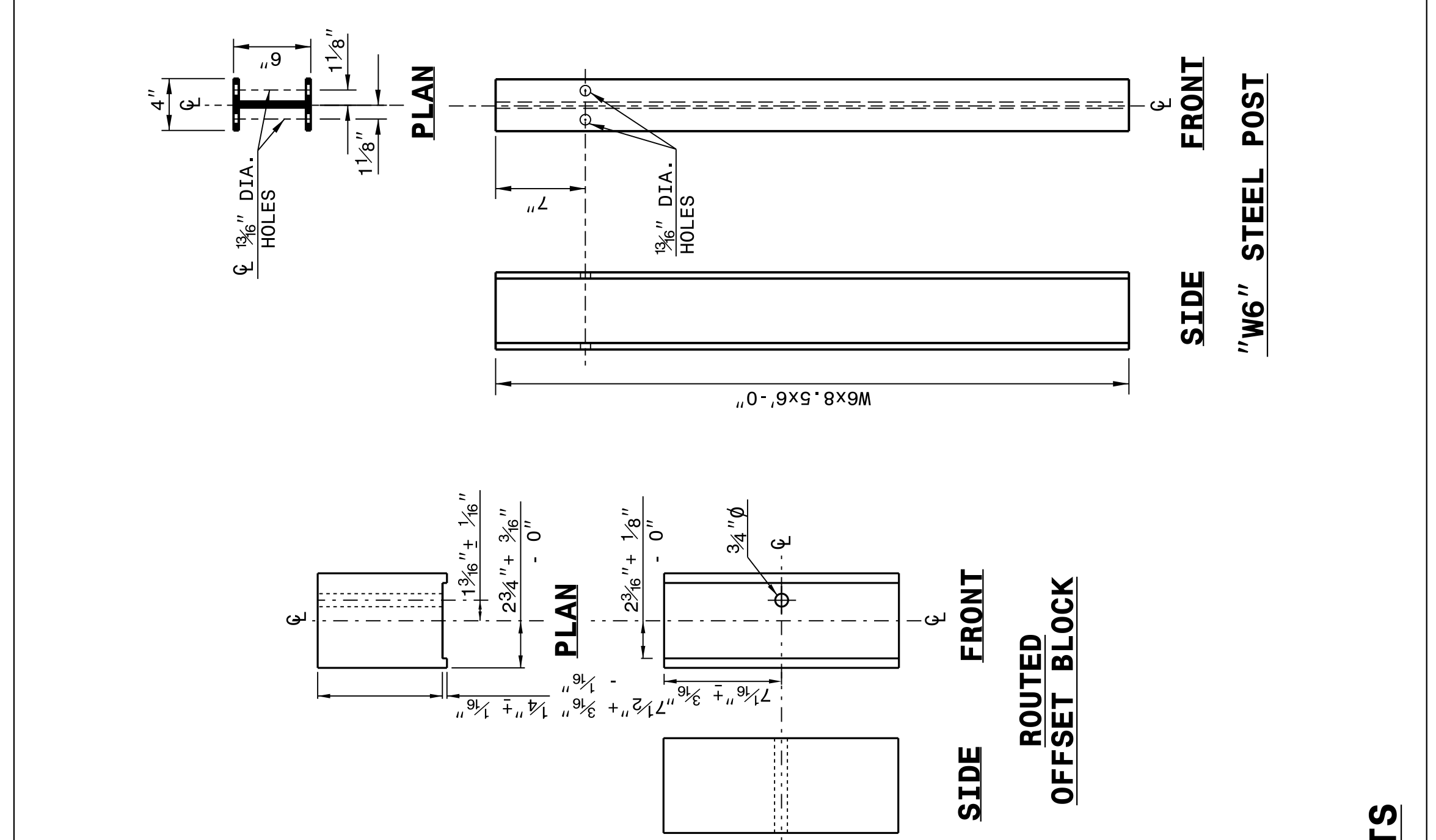


SYSTEM PARTS

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

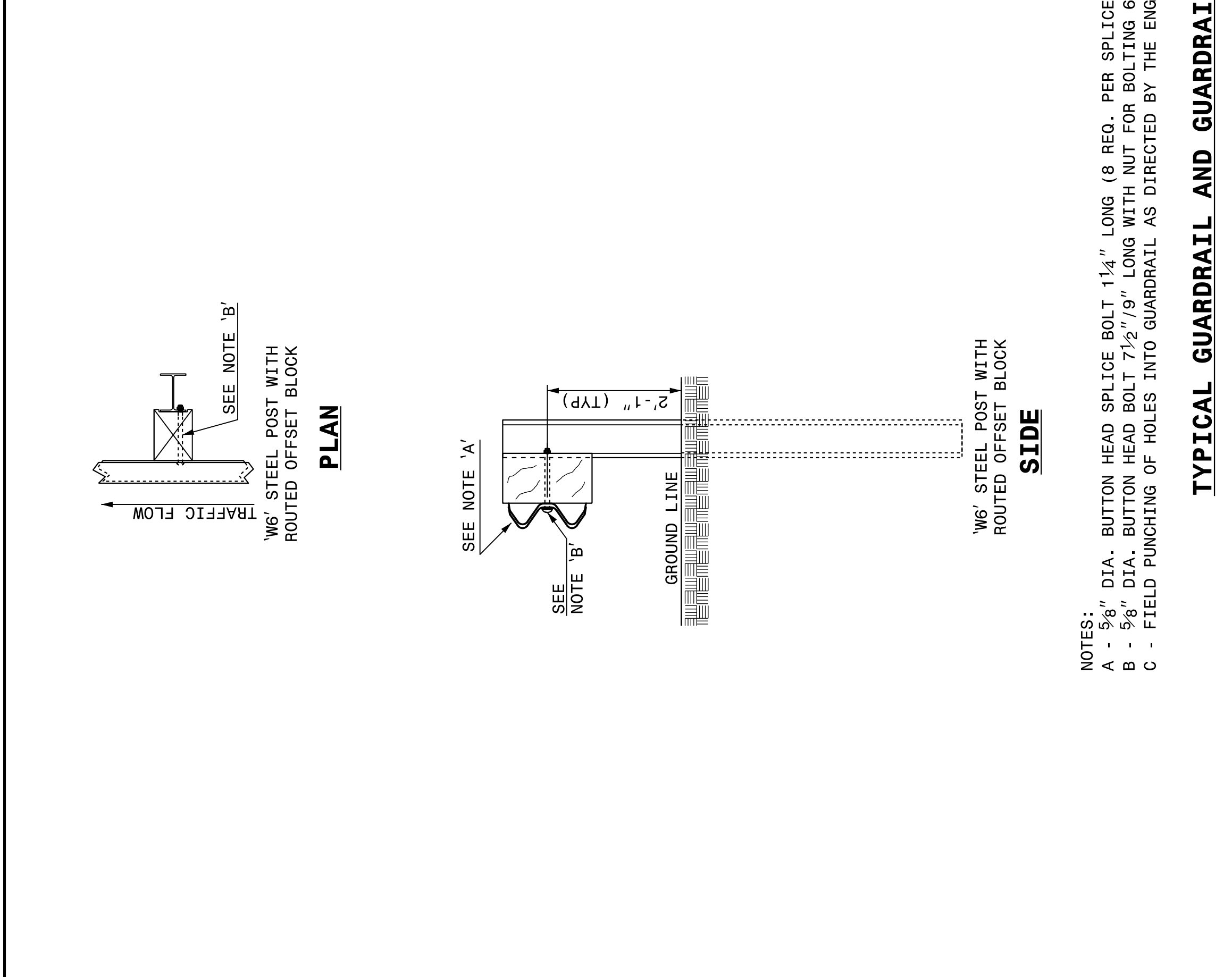
SHEET 6 OF 8
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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

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862D02



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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

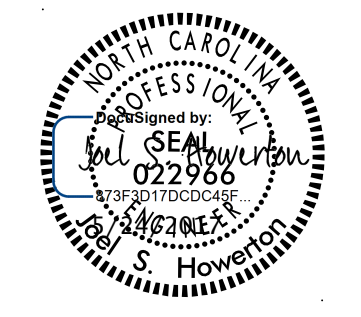
SHEET 5 OF 8
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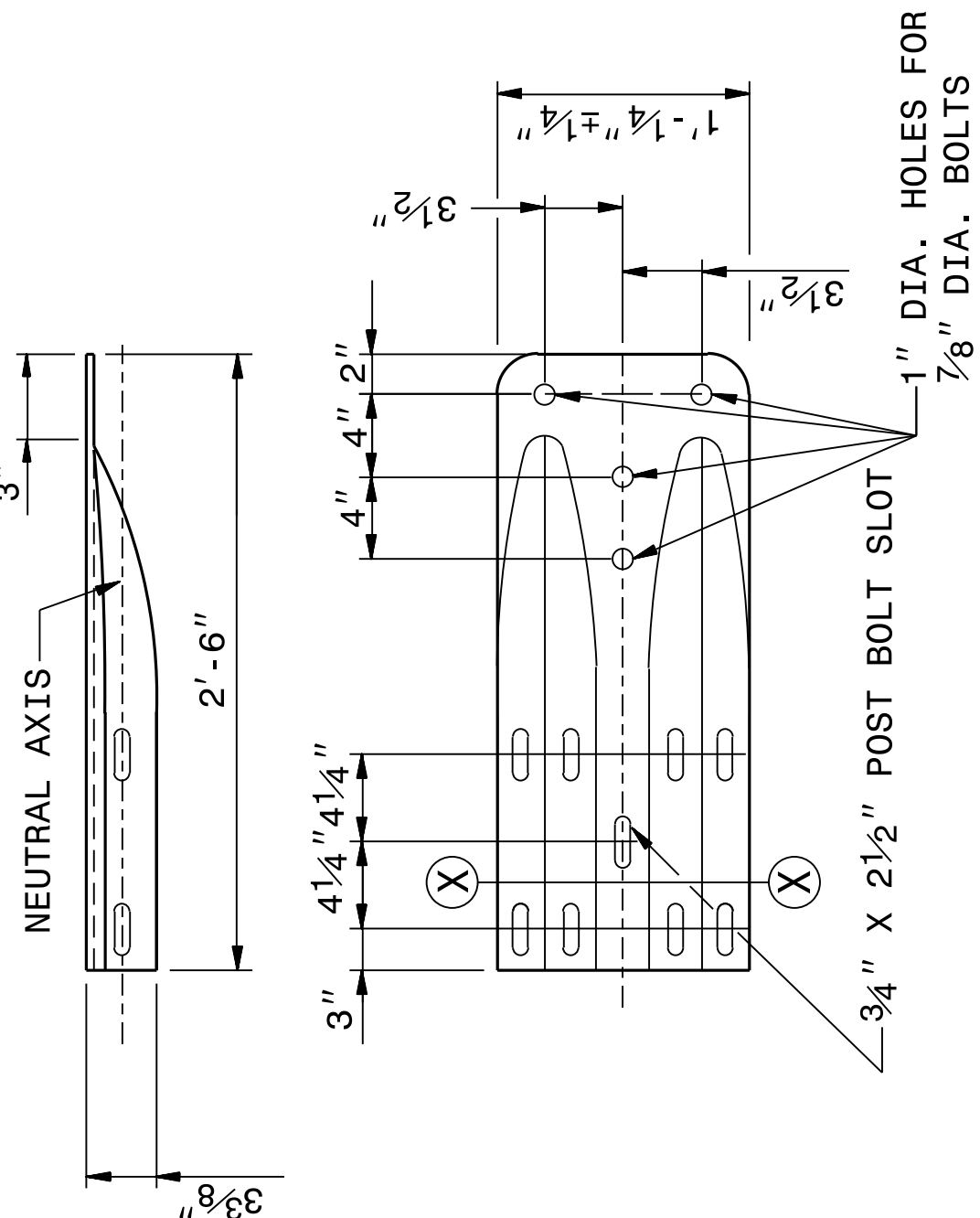
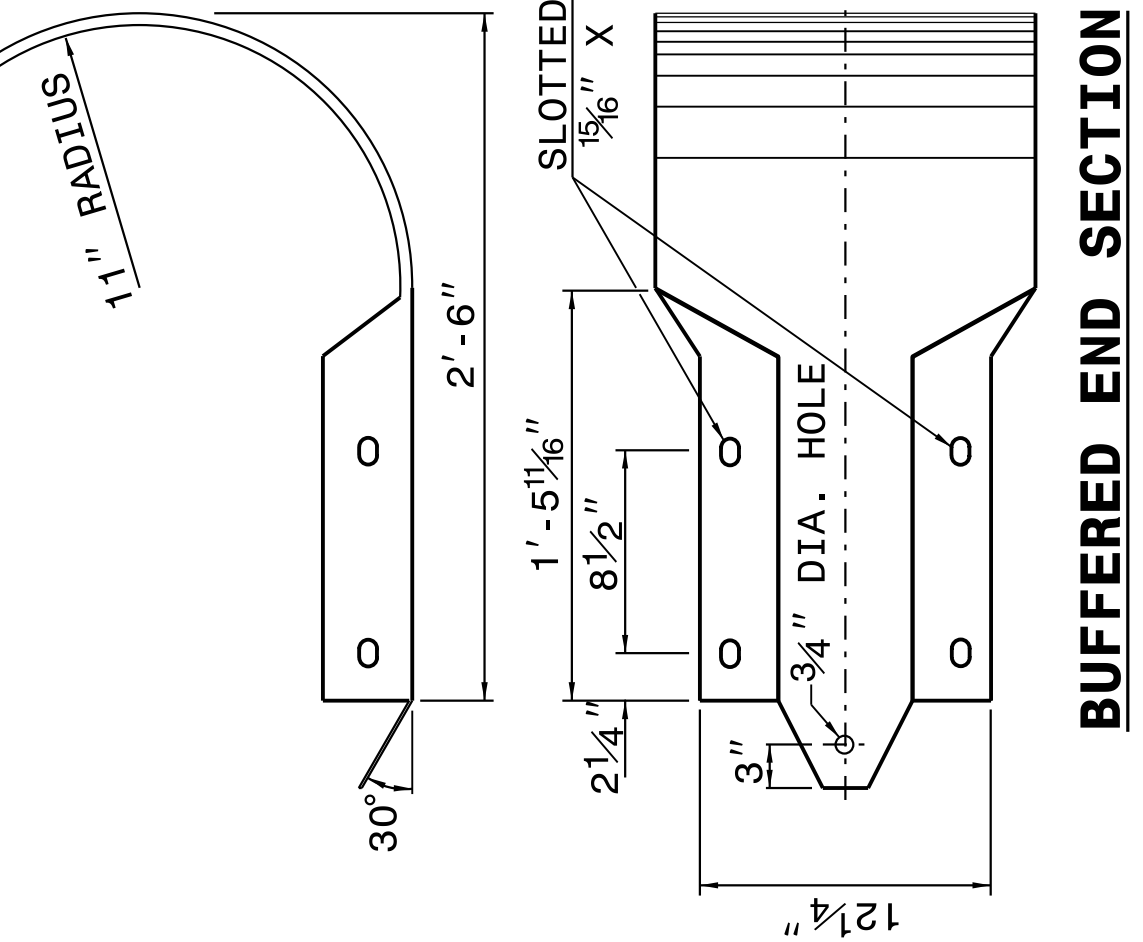
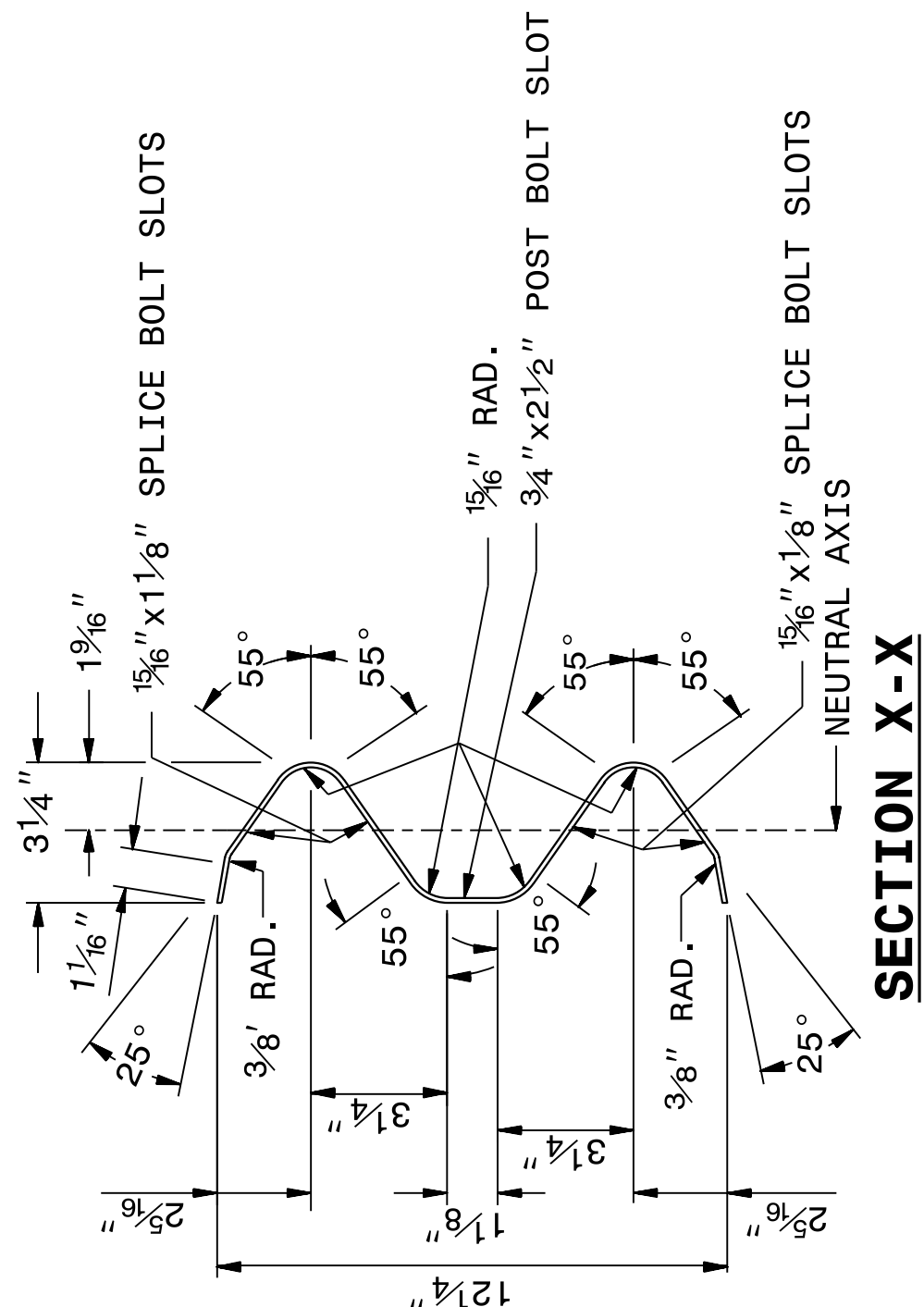
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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 8 OF 8
862D02



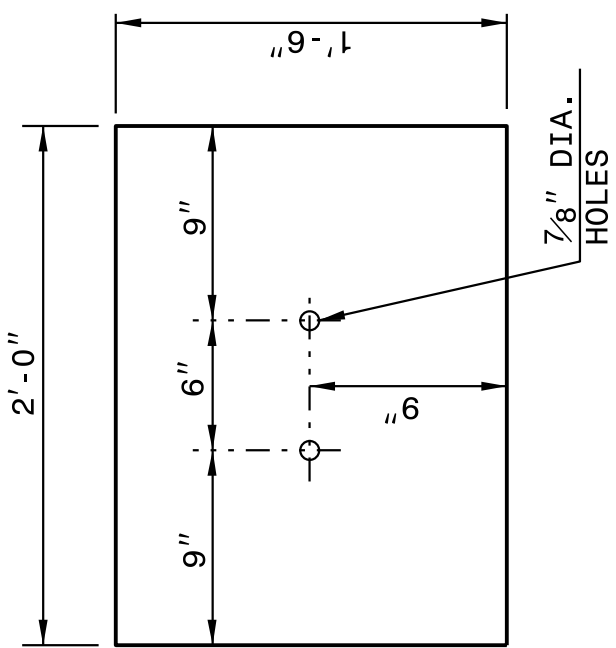
GENERAL USE

SYSTEM PARTS - GENERAL USE

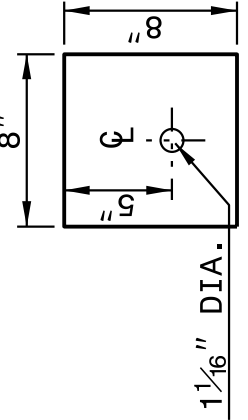
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ROADWAY DETAIL DRAWING FOR
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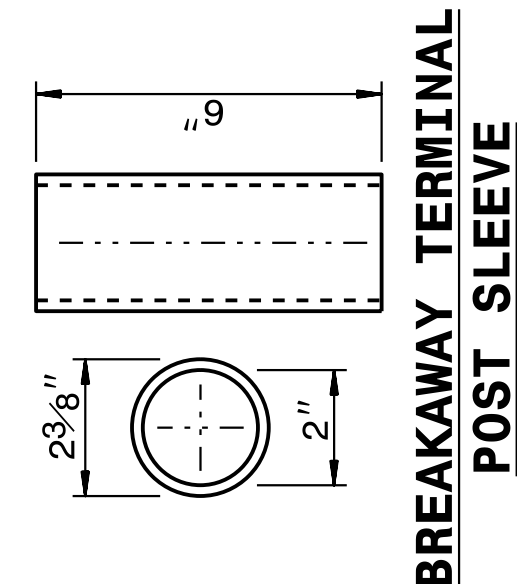
SHEET 7 OF 8
862D02



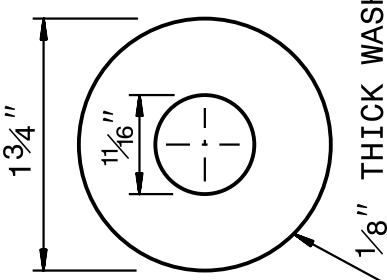
SOIL PLATE
1/4" THICK PLATE



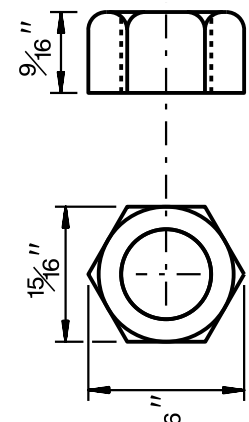
BEARING PLATE
5/8" THICK PLATE



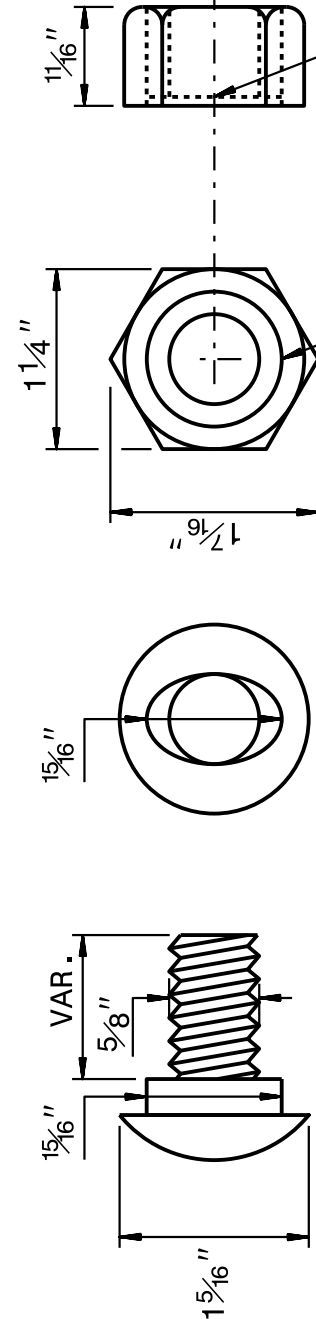
BREAKAWAY TERMINAL POST SLEEVE



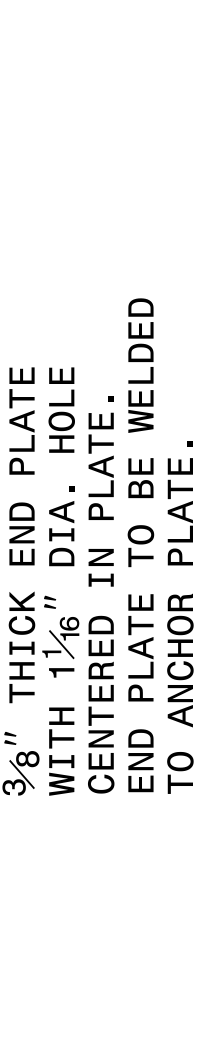
DETAIL OF STANDARD WASHER
STANDARD WASHER: TYPICAL USE UNDER NUT WITH WOOD POST



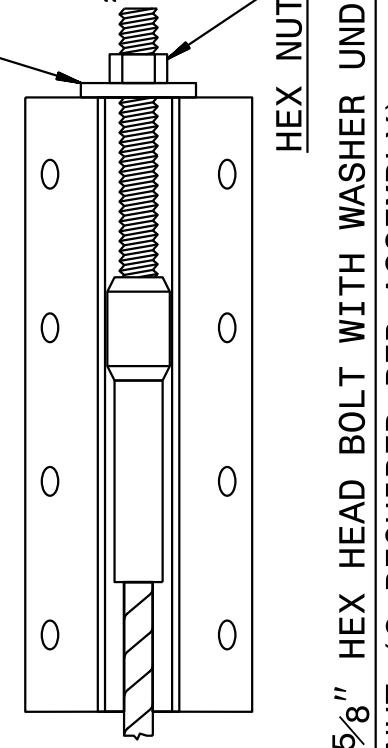
DETAIL OF STANDARD HEX BOLT AND NUT



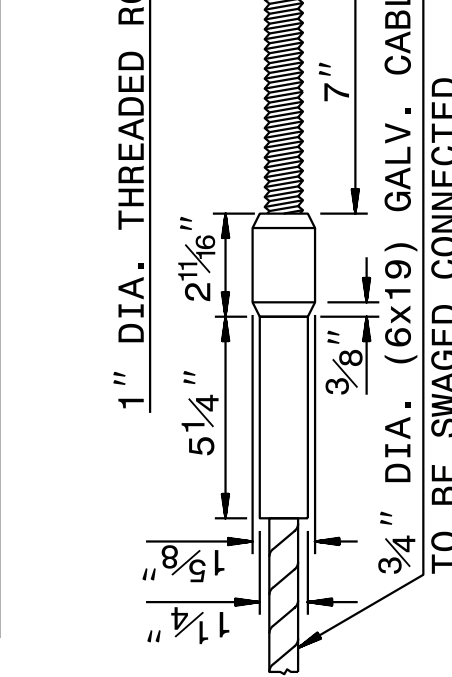
DETAIL OF BUTTON HEAD BOLT AND NUT



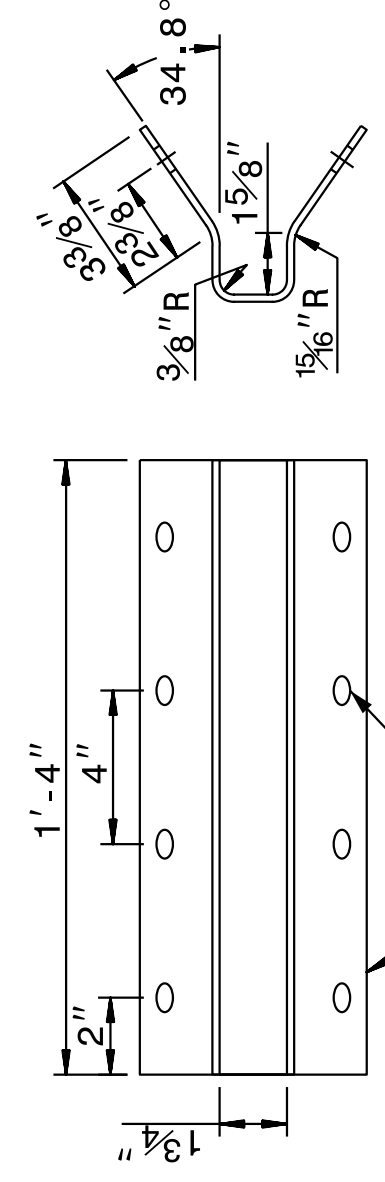
3/8" THICK END PLATE WITH 1 1/8" DIA. HOLE CENTERED IN PLATE. END PLATE TO BE WELDED TO ANCHOR PLATE.



5/8" HEX HEAD BOLT WITH WASHER UNDER NUT (8 REQUIRED PER ASSEMBLY)



SWAGED CABLE



3/16" THICK GALV. STEEL PLATE

ANCHOR PLATE

CABLE ASSEMBLY

SYSTEM PARTS

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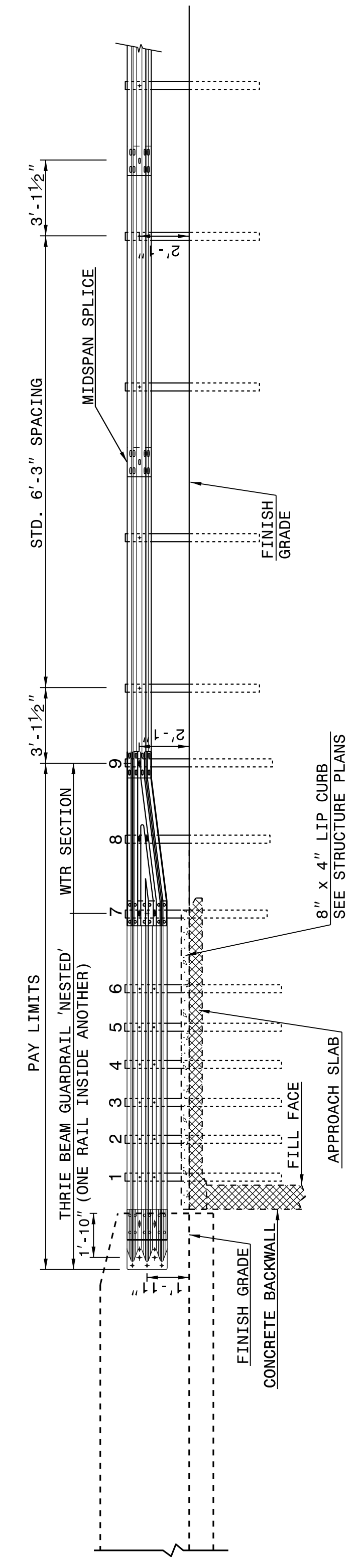
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03

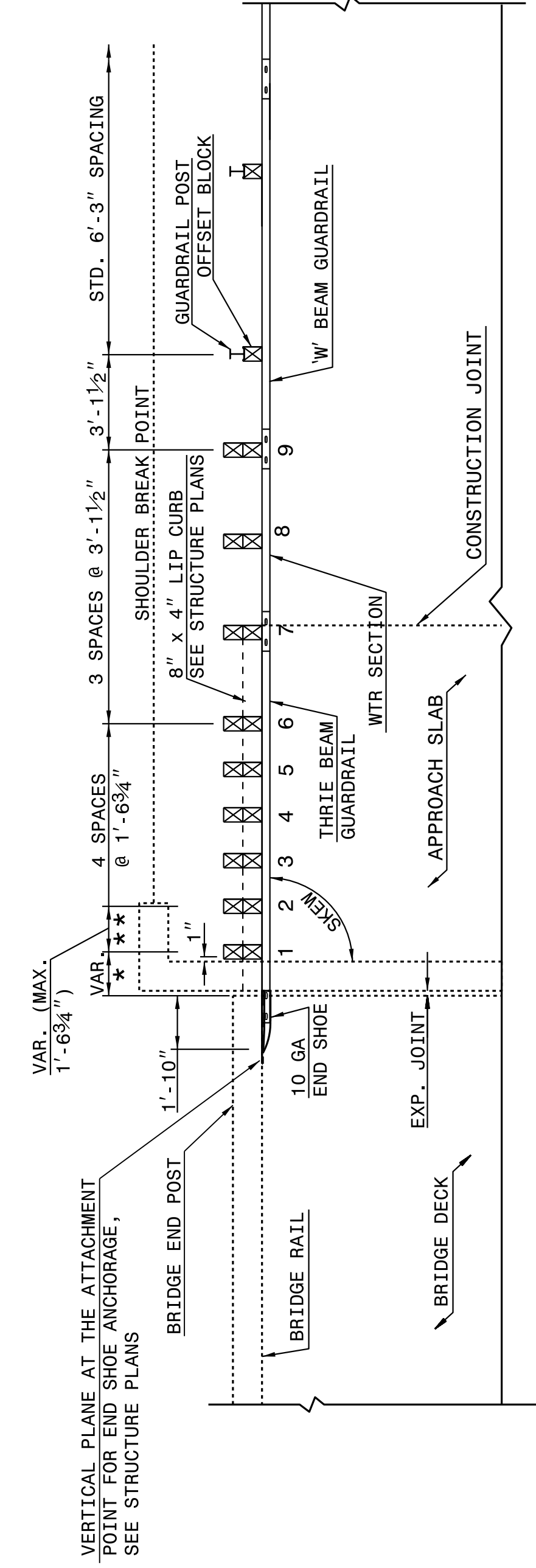
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ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03



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 11½" 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 5 FOR POST SECTIONS 1 THRU 9.



**GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER**

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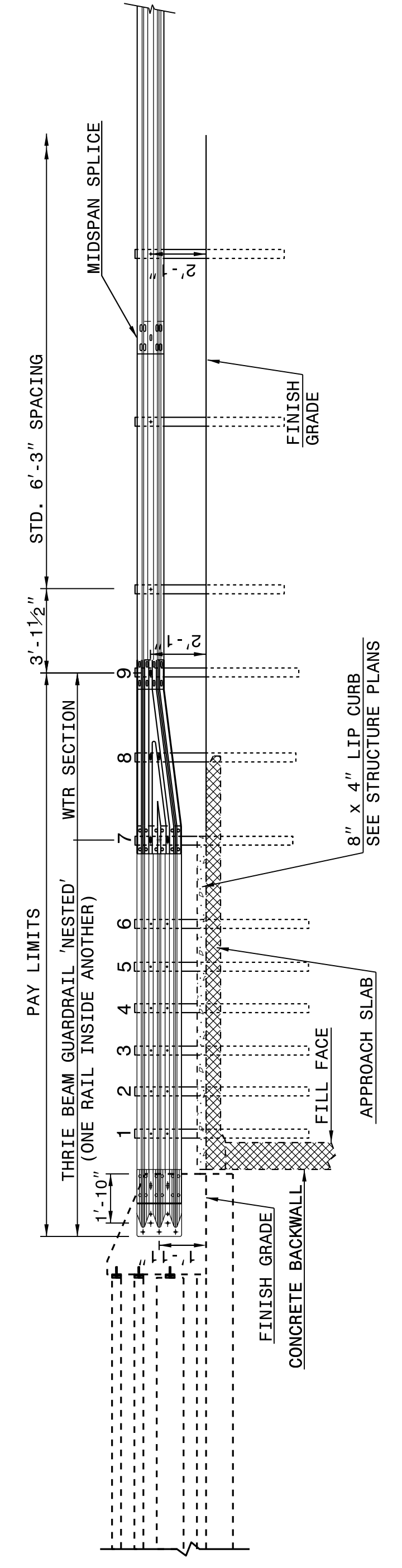
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03

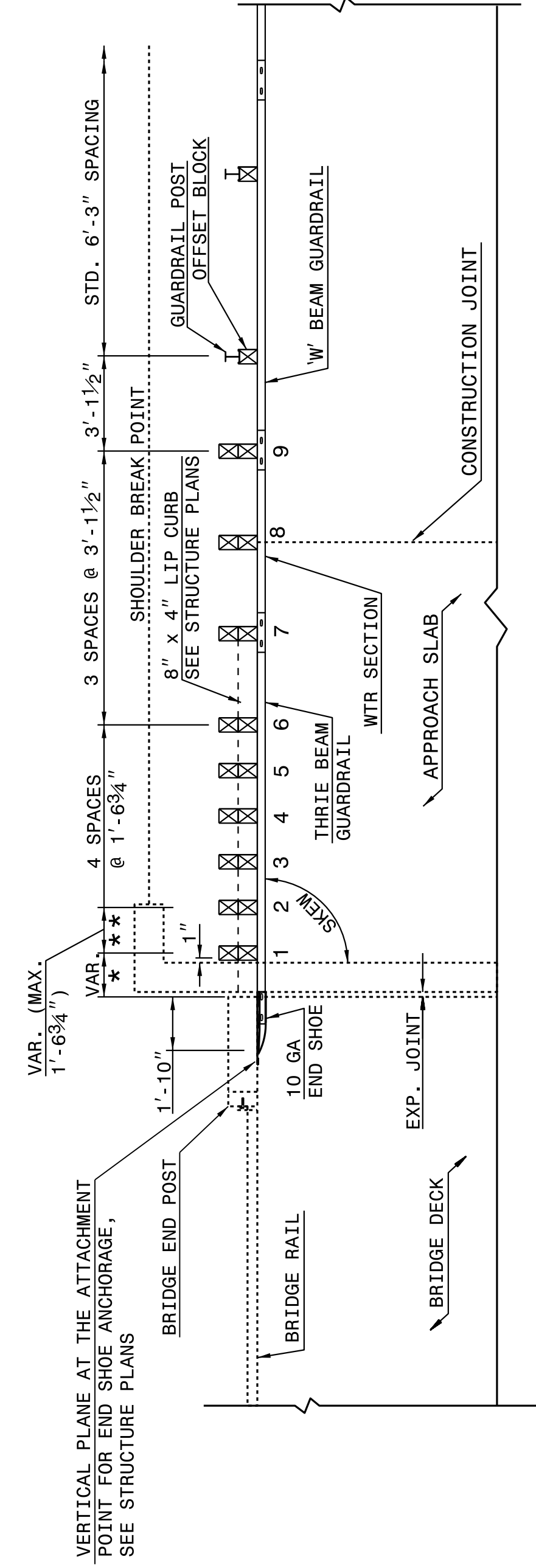
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ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



NOTE:
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 *THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" 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 5 FOR POST SECTIONS 1 THRU 9.



**GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE**

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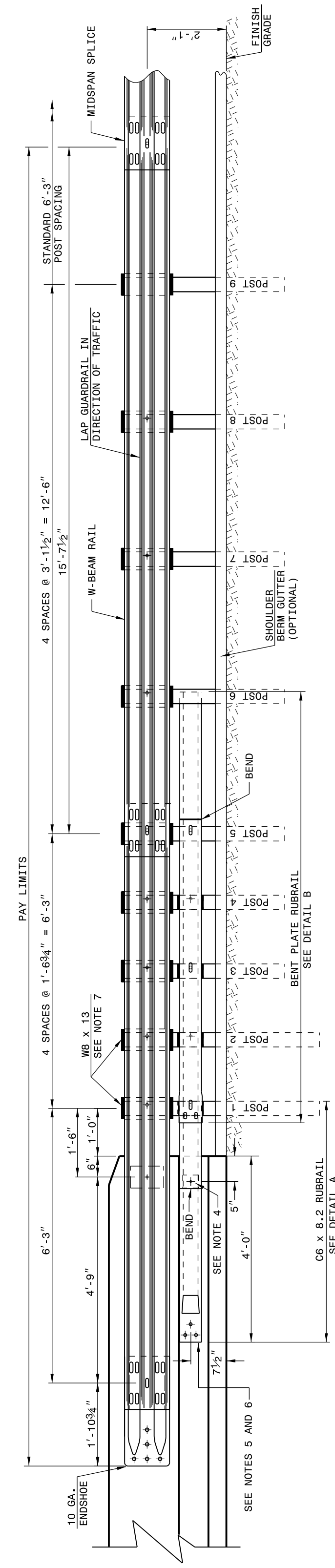
ROADWAY DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 4 OF 7
862D03

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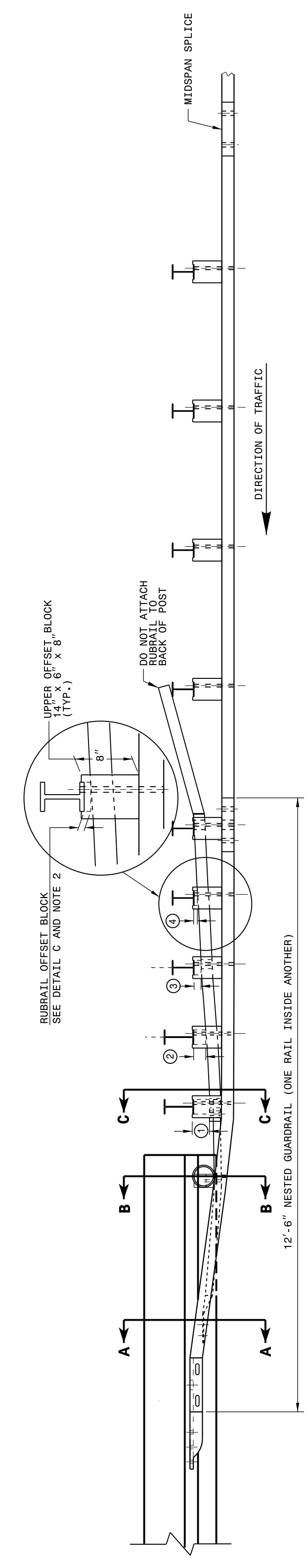
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
FOR F-SHAPE BARRIER

SHEET 4 OF 7
862D03



ELEVATION

- GENERAL NOTES:**
- POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL; RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH 5/8" BUTT WASHERS. RUBRAIL BLOCKOUTS LOCATED ON POSTS 2 AND 4, SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH 5/8" x 1 1/4" LONG BUTT WASHERS. RUBRAIL IS FLARED TO BACK OF POST 6, AND NOT SECURED.
 - W-BEAM GUARDRAIL TUBE SHALL BE CALIBRATED TO FIT OVER W-BEAM GUARDRAIL TUBE. W-BEAM GUARDRAIL TUBE SHALL BE CALIBRATED TO FIT OVER W-BEAM GUARDRAIL TUBE.
 - 5/8" x 1 1/4" LONG BUTT WASHERS AND RECTANGULAR PLATE WASHER. ATTACH TUBE TO GUARDRAIL ONLY WITH 5/8" x 1 1/4" LONG BUTT WASHERS. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE 3/8" x 3" LAG BOLT WITH FLAT WASHER.
 - SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE 3/8" x 3" LAG BOLT WITH FLAT WASHER.
 - SHOP FABRICATE THE C6 x 8.2 RUBRAIL END TO BE CONSISTENT WITH THE SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
 - ANCHOR THE RUBRAIL TO THE W-BEAM GUARDRAIL USING THREE 5/8" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS IS 1/2".
 - AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR RUBRAIL USING THREE 5/8" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS IS 1/2".
 - A 4 BOLT HOLD DOWN PLATE (SEE STD. DWG. 862.041).
 - INSTALL THE W-BEAM END SHOE BEHIND THE NESTED W-BEAM ELEMENTS.
 - 1 1/2" DIA. HOLES FOR ANCHOR BOLTS. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W8 x 8.5.
 - POSTS 1 AND 2 ARE W8 x 13, 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W8 x 8.5.



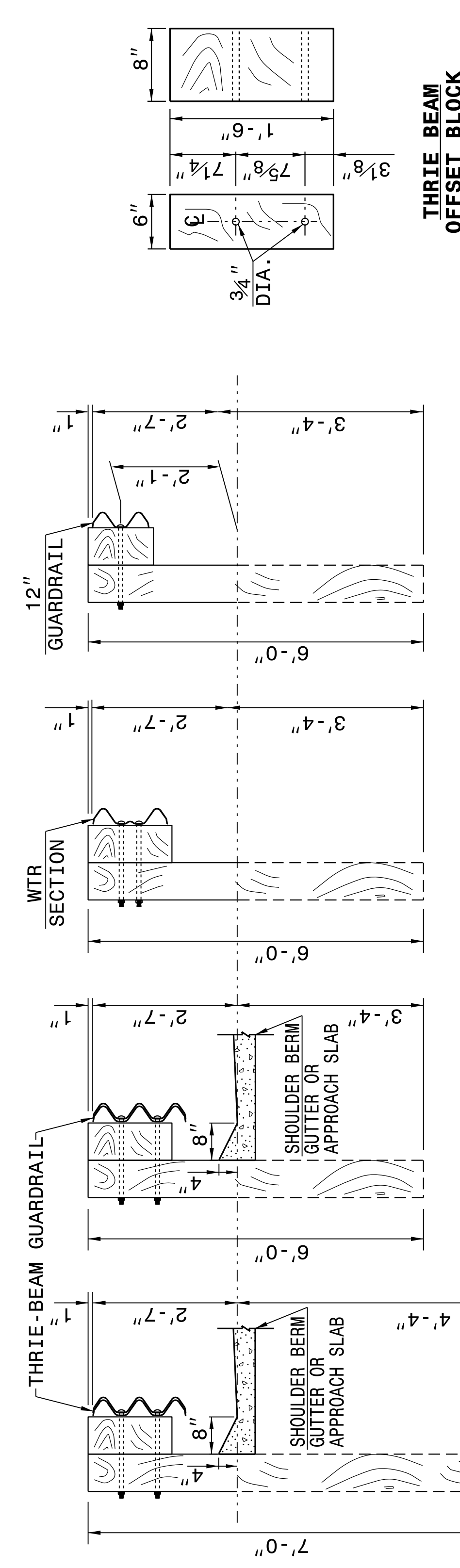
PLAN

GUARDRAIL ANCHOR UNIT TYPE B-77

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ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III

SHEET 3 OF 7
862D03



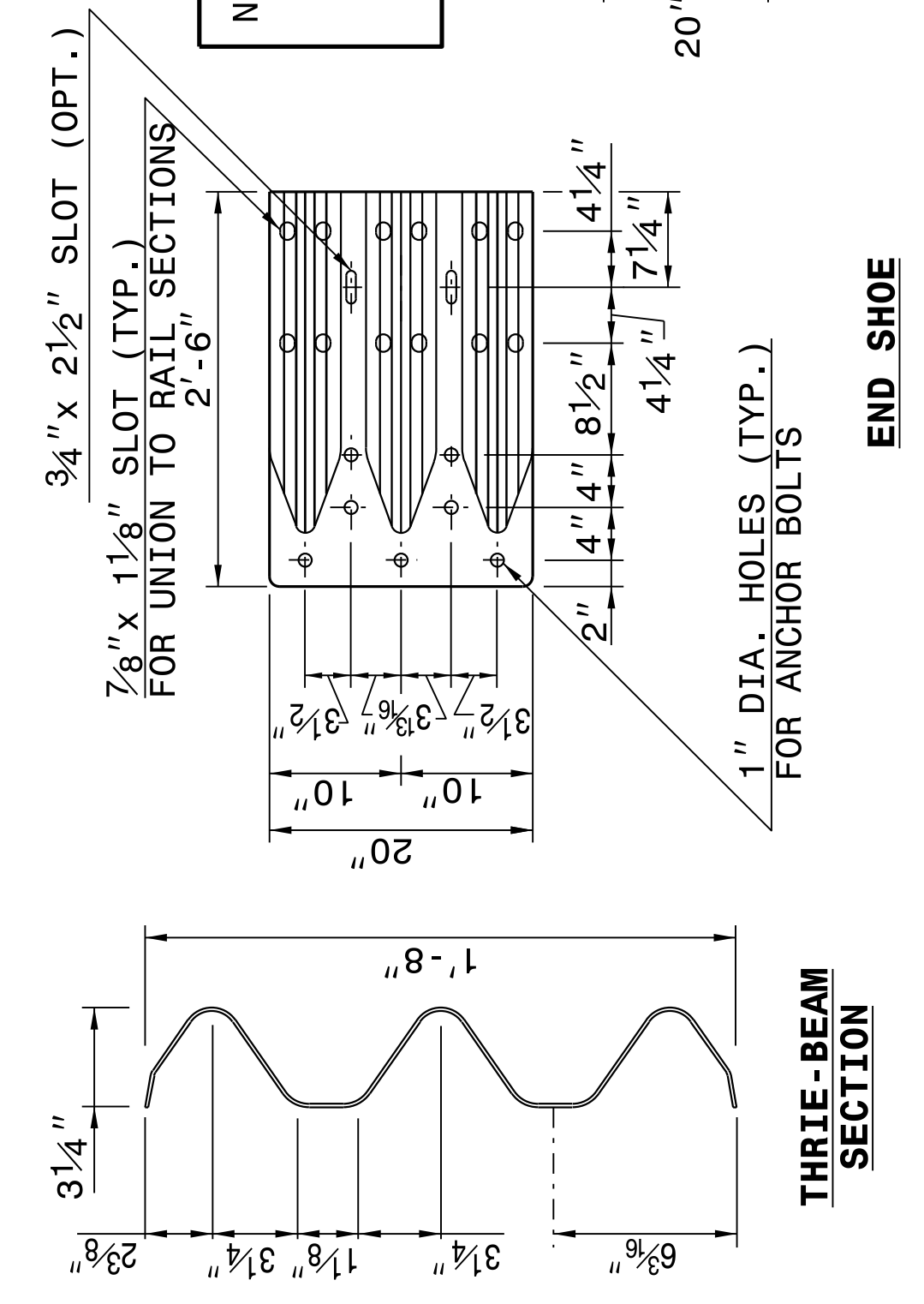
SECTION OF 'W' BEAM POST 9

SECTION OF WTR BEAM POST 8

SECTION OF THRIE BEAM POST 7

SECTION OF THRIE BEAM POSTS 1 THRU 6

NOTE: THE MID POST AND OFFSET BLOCK OF SPECIAL BOLT HOLE DRILLING IN THE THRIE BEAM OFFSET BLOCK AND LINE POST.



END SHOE

WTR SECTION ELEVATION VIEW

THRIE BEAM LINE POST

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ROADWAY DETAIL DRAWING FOR
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SHEET 3 OF 7
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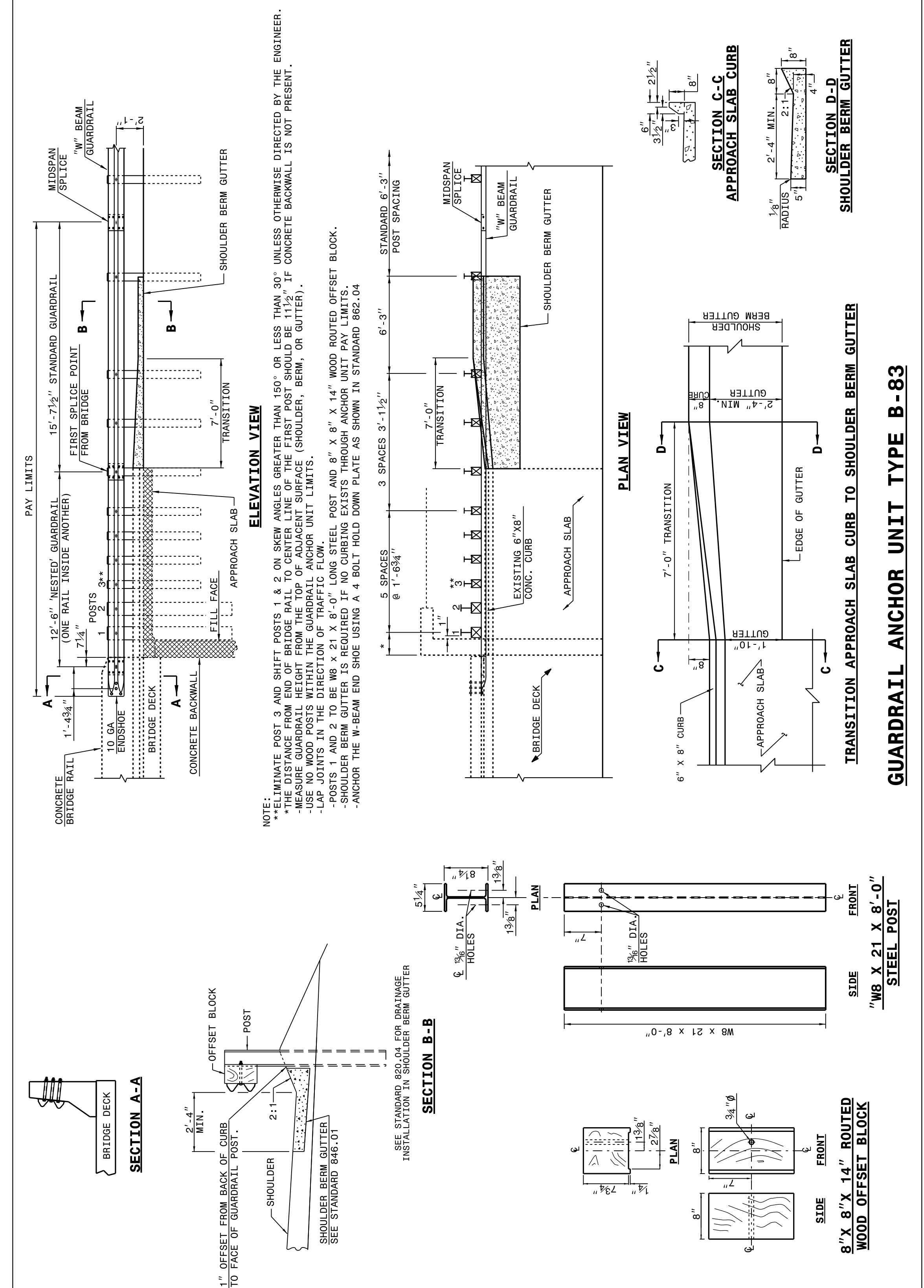
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ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT TYPE B-83

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT TYPE B-83



SHEET 6 OF 7
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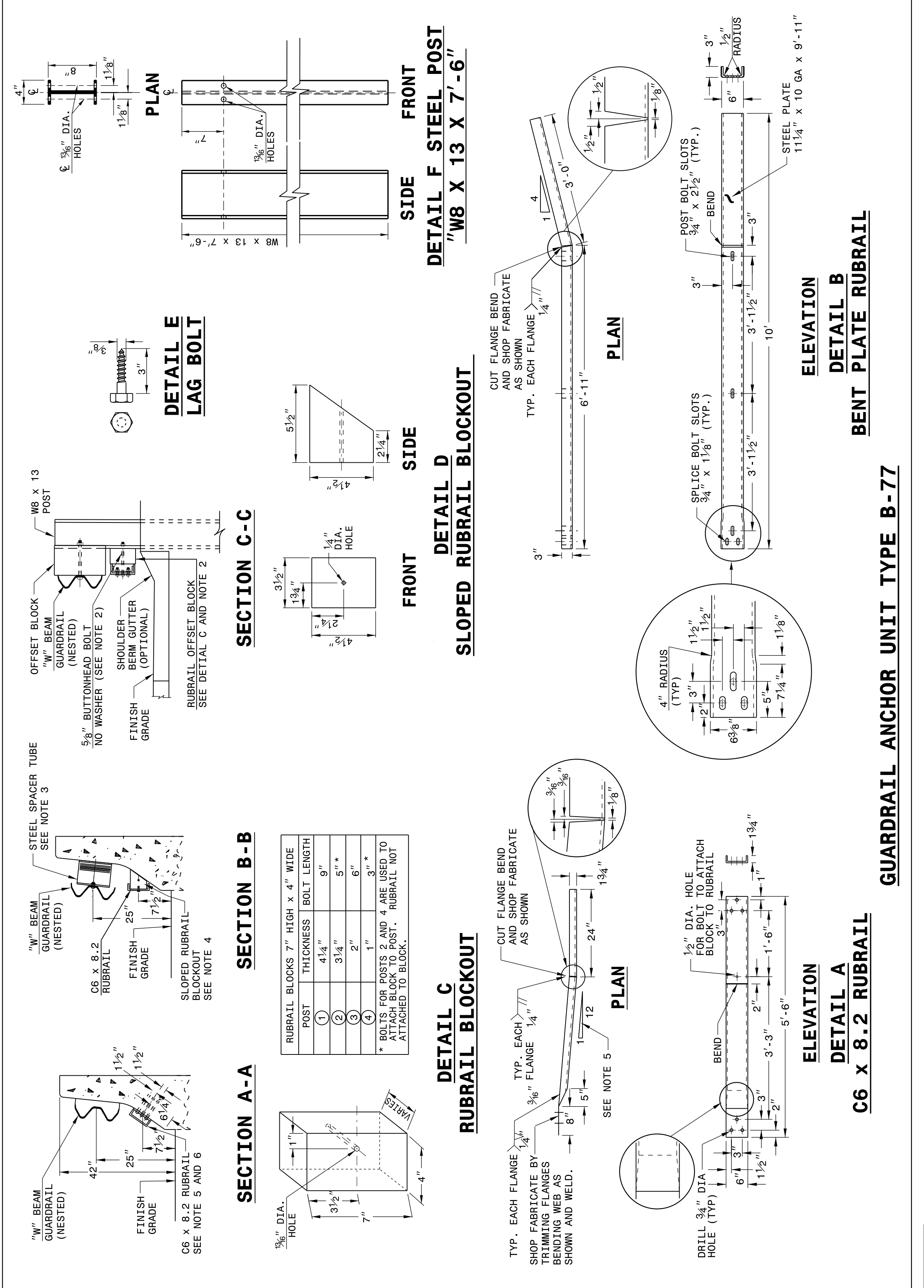
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ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER



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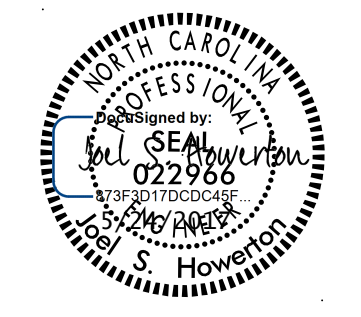
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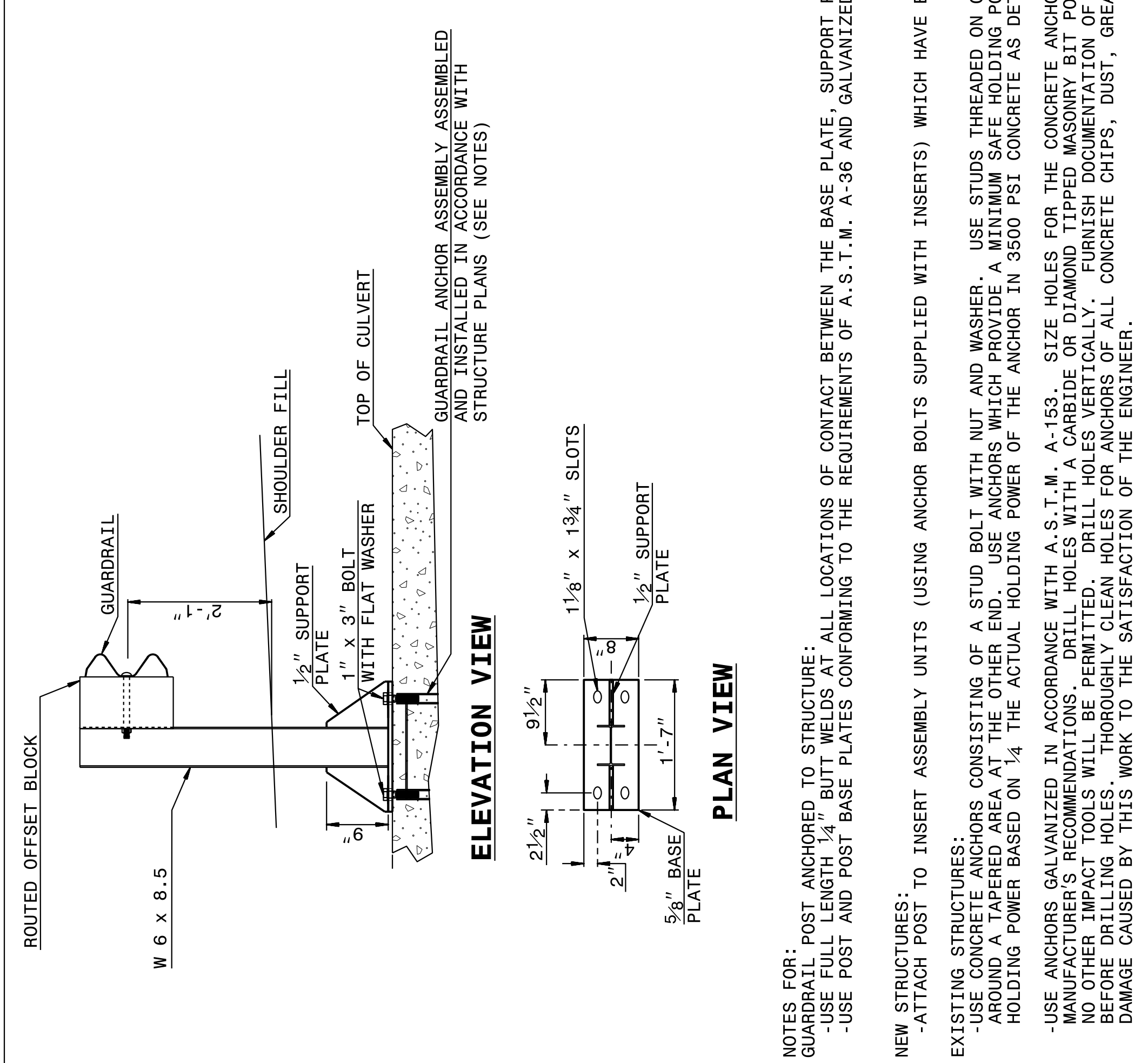
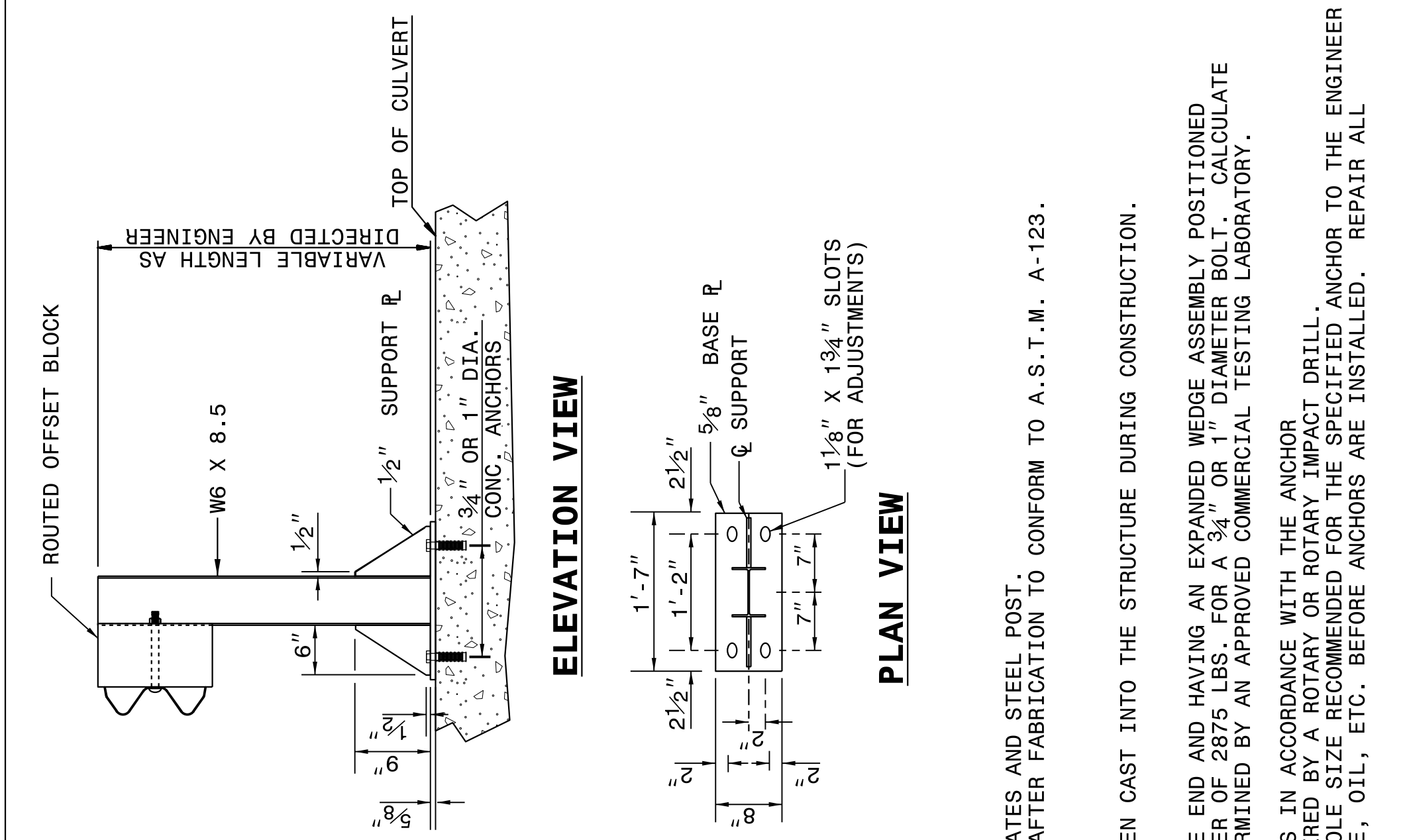
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B-5332	2C-14

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

ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS ANCHORAGE FOR GUARDRAIL POST ON BOX CULVERT

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

ROADWAY DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS ANCHORAGE FOR GUARDRAIL POST ON BOX CULVERT

SHEET 7 OF 7
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NOTES FOR:
 -GUARDRAIL POST ANCHORED TO STRUCTURE:
 -USE FULL LENGTH 1/4" BUTT WELDS AT ALL LOCATIONS OF CONTACT BETWEEN THE BASE PLATE, SUPPORT PLATES AND STEEL POST.
 -USE POST AND POST BASE PLATES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION TO CONFORM TO A.S.T.M. A-123.

NEW STRUCTURES:
 -ATTACH POST TO INSERT ASSEMBLY UNITS (USING ANCHOR BOLTS SUPPLIED WITH INSERTS) WHICH HAVE BEEN CAST INTO THE STRUCTURE DURING CONSTRUCTION.

EXISTING STRUCTURES:
 -USE CONCRETE ANCHORS CONSISTING OF A STUD BOLT WITH NUT AND WASHER. USE STUDS THREADED ON ONE END AND HAVING AN EXPANDED WEDGE ASSEMBLY POSITIONED AROUND A TAPERED AREA AT THE OTHER END. USE ANCHORS WHICH PROVIDE A MINIMUM SAFE HOLDING POWER OF 2875 LBS. FOR A 3/4" OR 1" DIAMETER BOLT. CALCULATE HOLDING POWER BASED ON 1/4 THE ACTUAL HOLDING POWER OF THE ANCHOR IN 3500 PSI CONCRETE AS DETERMINED BY AN APPROVED COMMERCIAL TESTING LABORATORY.

-USE ANCHORS GALVANIZED IN ACCORDANCE WITH A.S.T.M. A-153. SIZE HOLES FOR THE CONCRETE ANCHORS IN ACCORDANCE WITH THE ANCHOR MANUFACTURER'S RECOMMENDATIONS. DRILL HOLES WITH A CARBIDE OR DIAMOND TIPPED MASONRY BIT POWERED BY A ROTARY OR ROTARY IMPACT DRILL. NO OTHER IMPACT TOOLS WILL BE PERMITTED. DRILL HOLES VERTICALLY. FURNISH DOCUMENTATION OF HOLE SIZE RECOMMENDED FOR THE SPECIFIED ANCHOR TO THE ENGINEER BEFORE DRILLING HOLES. THOROUGHLY CLEAN HOLES FOR ANCHORS OF ALL CONCRETE CHIPS, DUST, GREASE, OIL, ETC. BEFORE ANCHORS ARE INSTALLED. REPAIR ALL DAMAGE CAUSED BY THIS WORK TO THE SATISFACTION OF THE ENGINEER.

ANCHORAGE FOR GUARDRAIL POST ON BOX CULVERT

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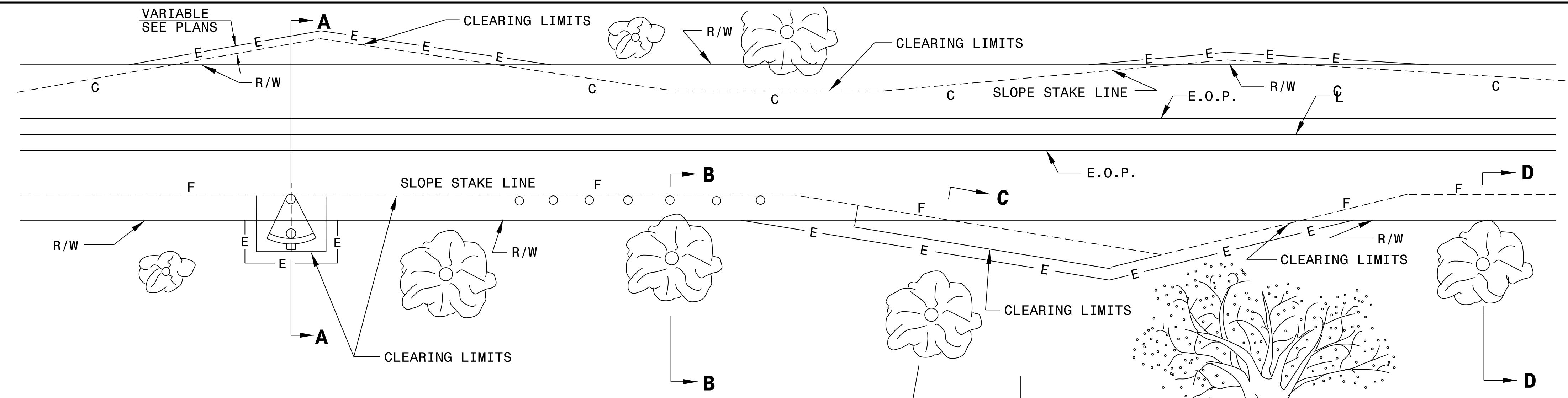
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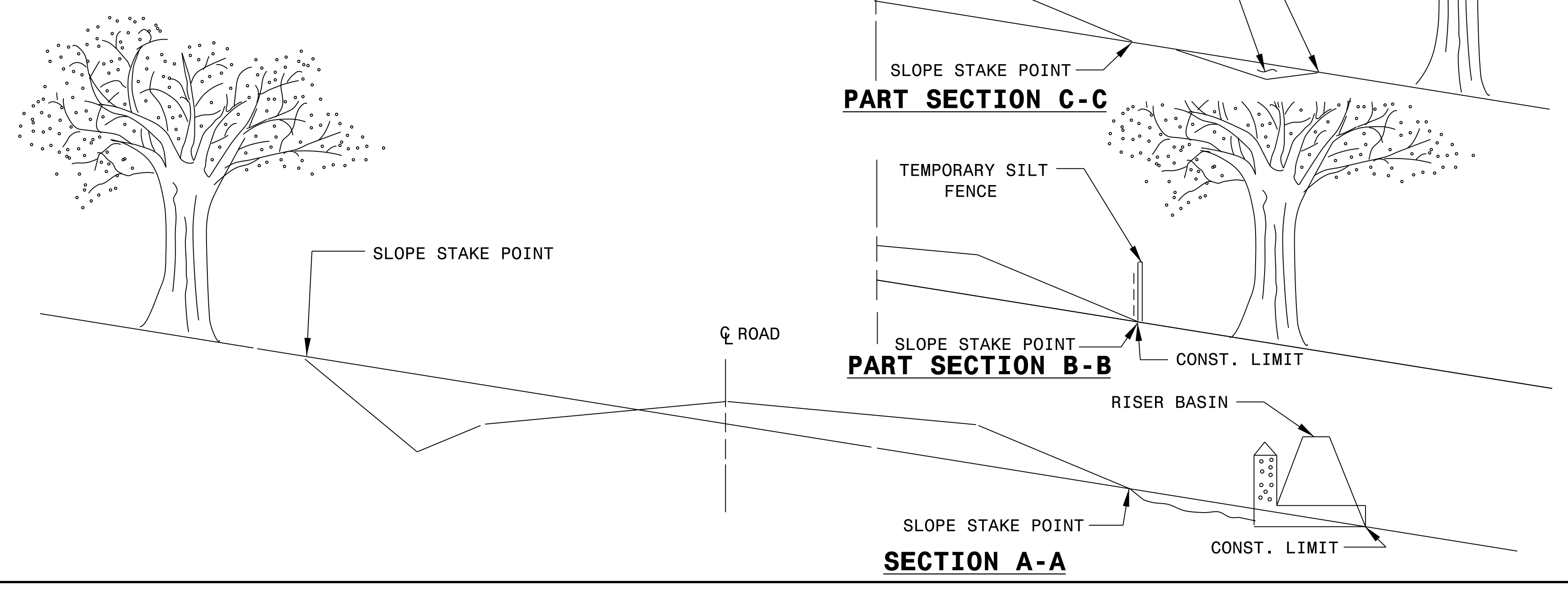
ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
 MODIFIED METHOD - II

SHEET 1 OF 1
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- GENERAL NOTES:**
1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
 2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.
 3. FOR SECTIONS WITH WIDE MEDIANS WHERE TREES ARE TO REMAIN, CLEAR THE MEDIAN SIDE IN THE SAME MANNER AS ON THE OUTSIDE.
 4. HAND CLEAR AS NEEDED OUTSIDE THE SLOPE STAKE LINES FOR INSTALLATION OF EROSION CONTROL DEVICES.

CLEAR TO SLOPE STAKE LINE OR CONSTRUCTION LIMITS



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

ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
 MODIFIED METHOD - II

SHEET 1 OF 1
200d02



CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
 Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: rnbritt DATE: 05-02-11
 MODIFIED BY: DATE:
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 FILE SPEC.: details/rnbritt/english/urban/u3615aconcretefume.dgn

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12/06/07

COMPUTED BY: JMB DATE: 5/26/16
 CHECKED BY: SMK DATE: 7/13/16

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. B-5332
 SHEET NO. 3B-1

SUMMARY OF EARTHWORK

IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L- 10+50.00	-L- 12+38.88 (BR)	44	180	148	
SUBTOTAL		44	180	148	
-L- 12+96.13 (BR)	-L- 15+00.00	54	254	200	
SUBTOTAL		54	254	200	
PROJECT TOTALS:		98	434	336	
EST. 5% TO REPLACE SOIL IN BORROW PIT				17	
GRAND TOTALS:		98	434	353	
SAY:		110		400	

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD ²
-L-	10+90.00	12+48.61	CL	387.71
-L-	12+85.24	14+45.00	CL	390.52
TOTAL:				778.24
SAY:				780

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-L- LT.	12+18.25	12+28.00	9.75'
-L- RT.	12+18.25	12+28.00	9.75'
TOTAL:			19.5'
SAY:			20'

EST UNDERCUT EXCAVATION = 700 CY CONTINGENCY (FROM GEOTECH RECS. DATED 4-27-16)
 EST SELECT GRANULAR MATERIAL = 700 CY CONTINGENCY (FROM GEOTECH RECS. DATED 4-27-16)
 EST SHALLOW UNDERCUT = 100 CY CONTINGENCY (FROM GEOTECH RECS. DATED 4-27-16)

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.

APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
 TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
 FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
 W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
 G = GATING IMPACT ATTENUATOR TYPE 350
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS		
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU, TL-3	CAT-1	TYPE III	EA	G	NG								
-L-	11+57.63	12+38.88	LT	81.25				BRIDGE	BRIDGE	4'-5"	7'-5"	50.00	50.00	1.00	1.00	1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
-L-	12+96.13	13+77.38	LT	81.25				BRIDGE		4'-5"	7'-5"	50.00		1.00		1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
-L-	11+57.63	12+38.88	RT	81.25				BRIDGE		4'-5"	7'-5"	50.00		1.00		1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
-L-	12+96.13	13+77.38	RT	81.25				BRIDGE		4'-5"	7'-5"		50.00		1.00	1		1										GUARDRAIL CALCULATED USING SUBREGIONAL TIER GUIDELINES
SUBTOTALS				325.00																								
ANCHOR DEDUCTION				275.00																								
TOTAL				50.00												4		4										
SAY				75.00												4		4										

ANCHOR DEDUCTION
 GREU, TL-3: 4 @ 50' = 200'
 TYPE III: 4 @ 18.75' = 75'
 GRAND TOTAL = 275'
 ADDITIONAL GUARDRAIL POSTS = 5

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COMPUTED BY: Tyler C. Bottoms DATE: 02/23/16
 CHECKED BY: Jinyoung Park DATE: 4/26/16

(2-16-16)

PROJECT NO.	SHEET NO.
B-5332	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	500
				TOTAL LF:	500

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

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

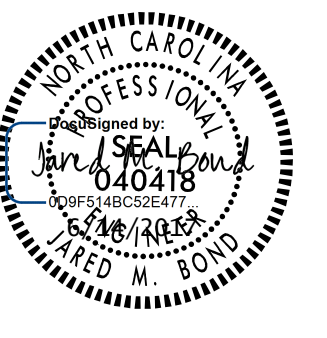
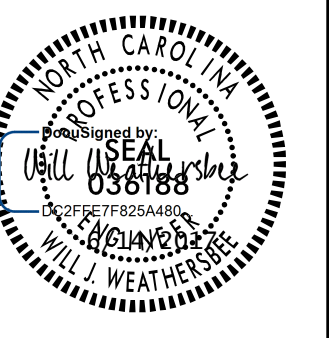
LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU	12	100	190	300		
					TOTAL CY/TONS/SY:	100	190	300**	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.

8/17/99

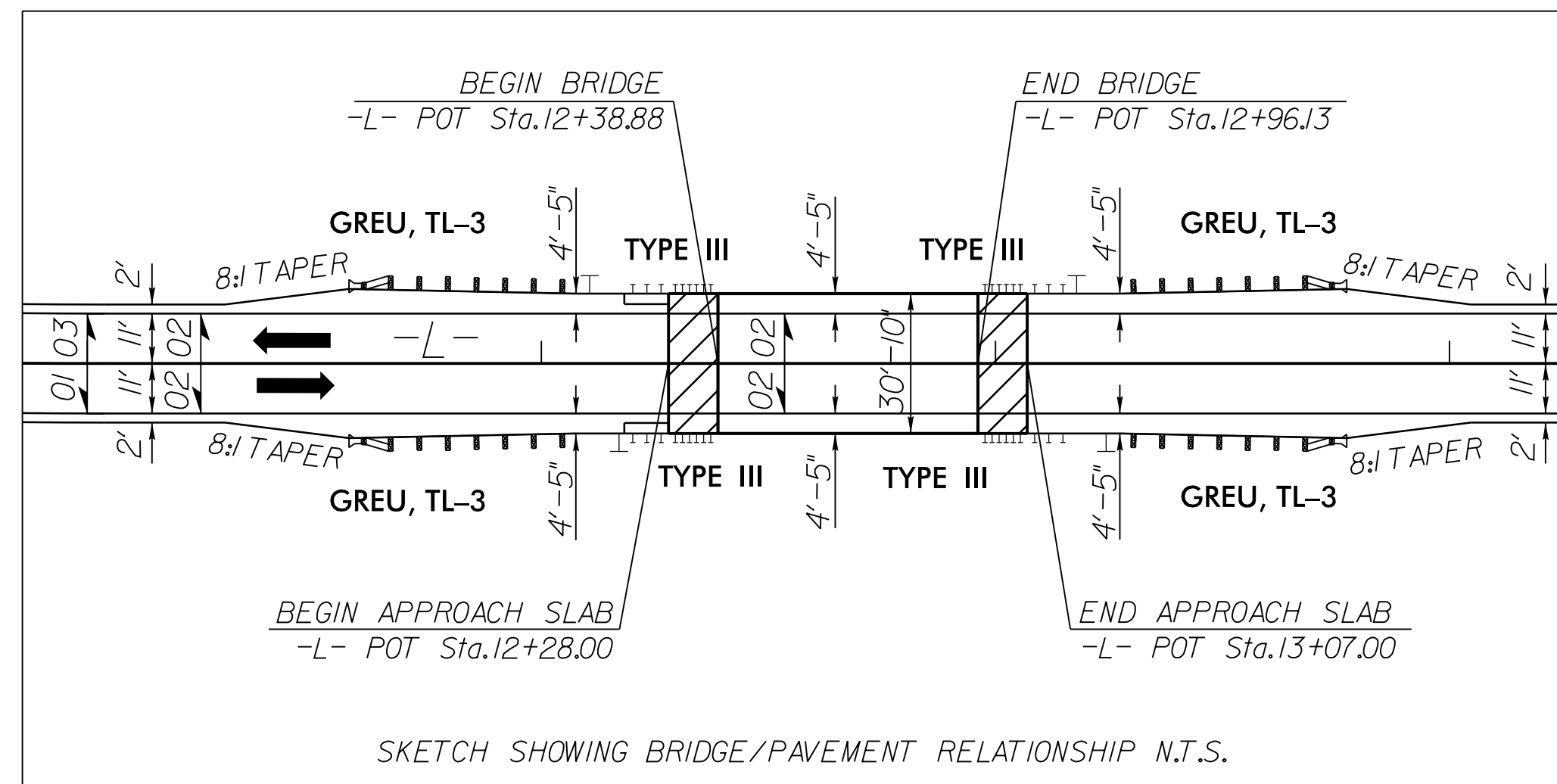
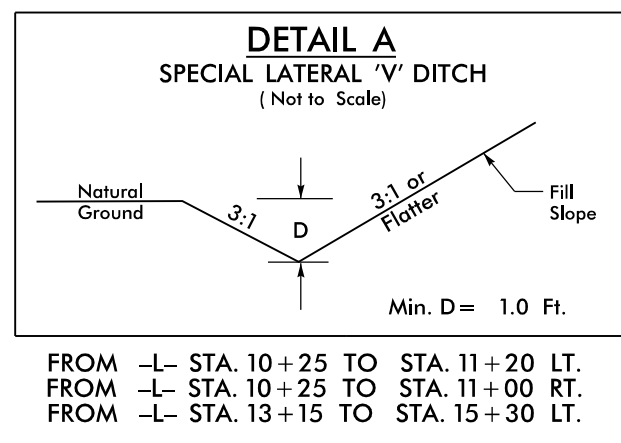
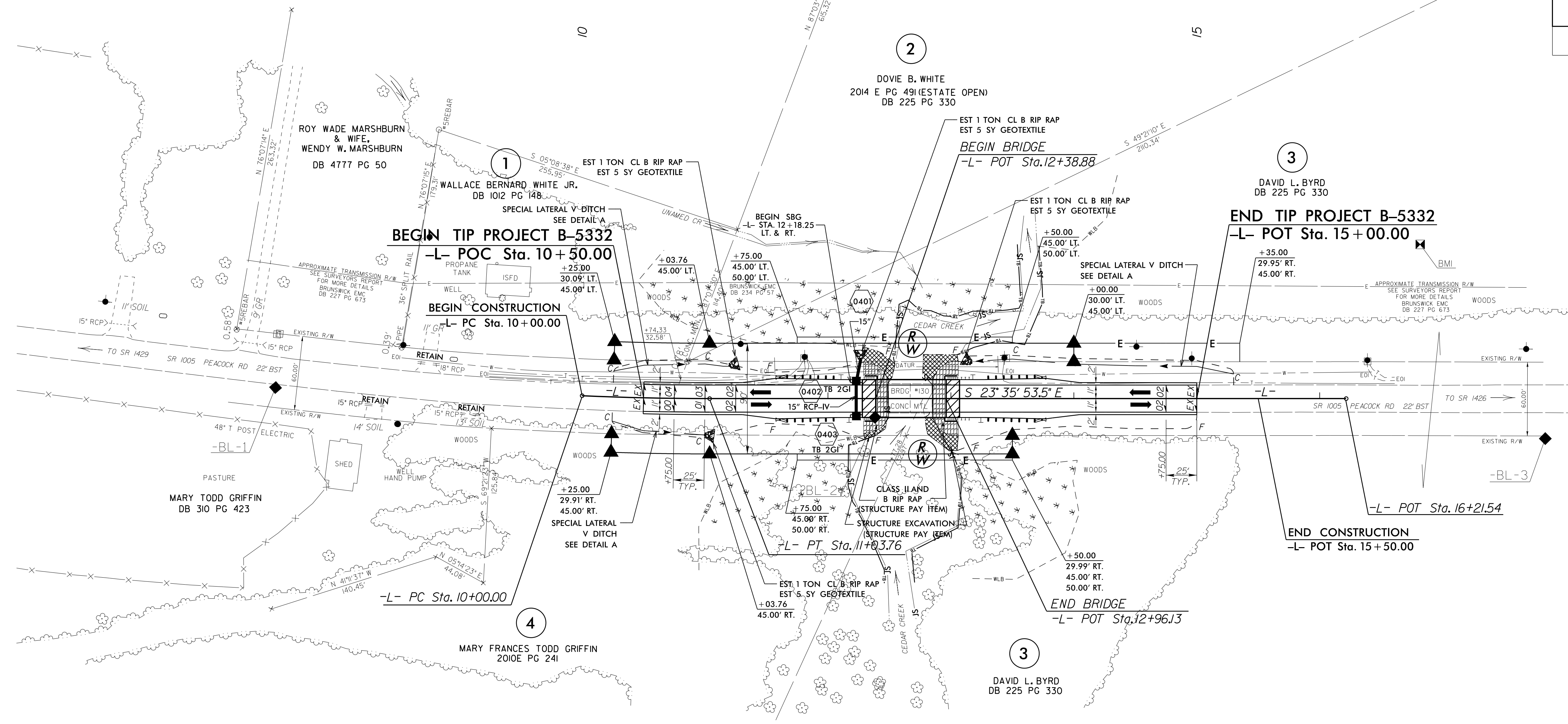
-L- CURVE DATA

PI Sta 10+51.89
BK = S 21° 00' 48.2" E
Δ = 2° 35' 05.3" (LT)
D = 2° 29' 28.0"
L = 103.76'
T = 51.89'
R = 2,300.00'
SE = 05
RO = SEE PLANS

PROJECT REFERENCE NO. B-5332	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



REVISIONS



FOR -L- PROFILE, SEE SHEET NO. 5
FOR STRUCTURE PLANS, SEE SHEETS S1-1 THRU S1-14

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PROJECT REFERENCE NO. B-5332	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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STRUCTURE HYDRAULIC DATA

DRAINAGE AREA	= 2.92	SQ. MI.
DESIGN DISCHARGE	= 470	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 78.7	FT
BASE DISCHARGE	= 700	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 79.1	FT
OVERTOPPING DISCHARGE	= 2150	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 82.0	FT

BRIDGE STA. = 12+67.50 -L-
1@55' 2" CORED SLAB BRIDGE
WITH 4' END BENT CAPS
SKEW = 90°
℄ ELEV. = 82.38'

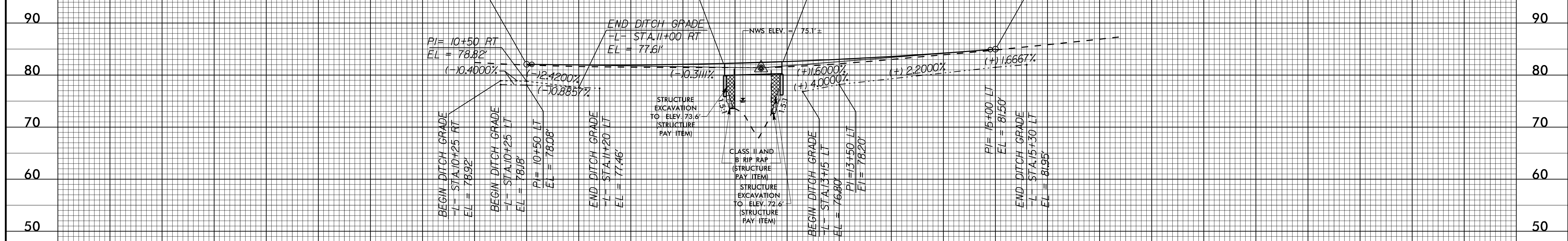
PI = 12+75.00
EL = 81.38'
VC = 440'
K = 230

BEGIN PROPOSED GRADE
 -L- STA. 10+50.00
 ELEV. = 82.08'

BEGIN BRIDGE
 -L- STA. 12+38.88

END BRIDGE
 -L- STA. 12+96.13

END PROPOSED GRADE
 -L- STA. 15+00.00
 ELEV. = 84.98'



BM *1
RAILROAD SPIKE IN 12" PINE
 -L- STA 16+21.00
 N 87°44' 45.59" W DIST. 139' LT.
 ELEV. = 90.03'

RIGHT DITCH -----
 LEFT DITCH -----

FOR -L- ALIGNMENT, SEE SHEET NO. 4

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