

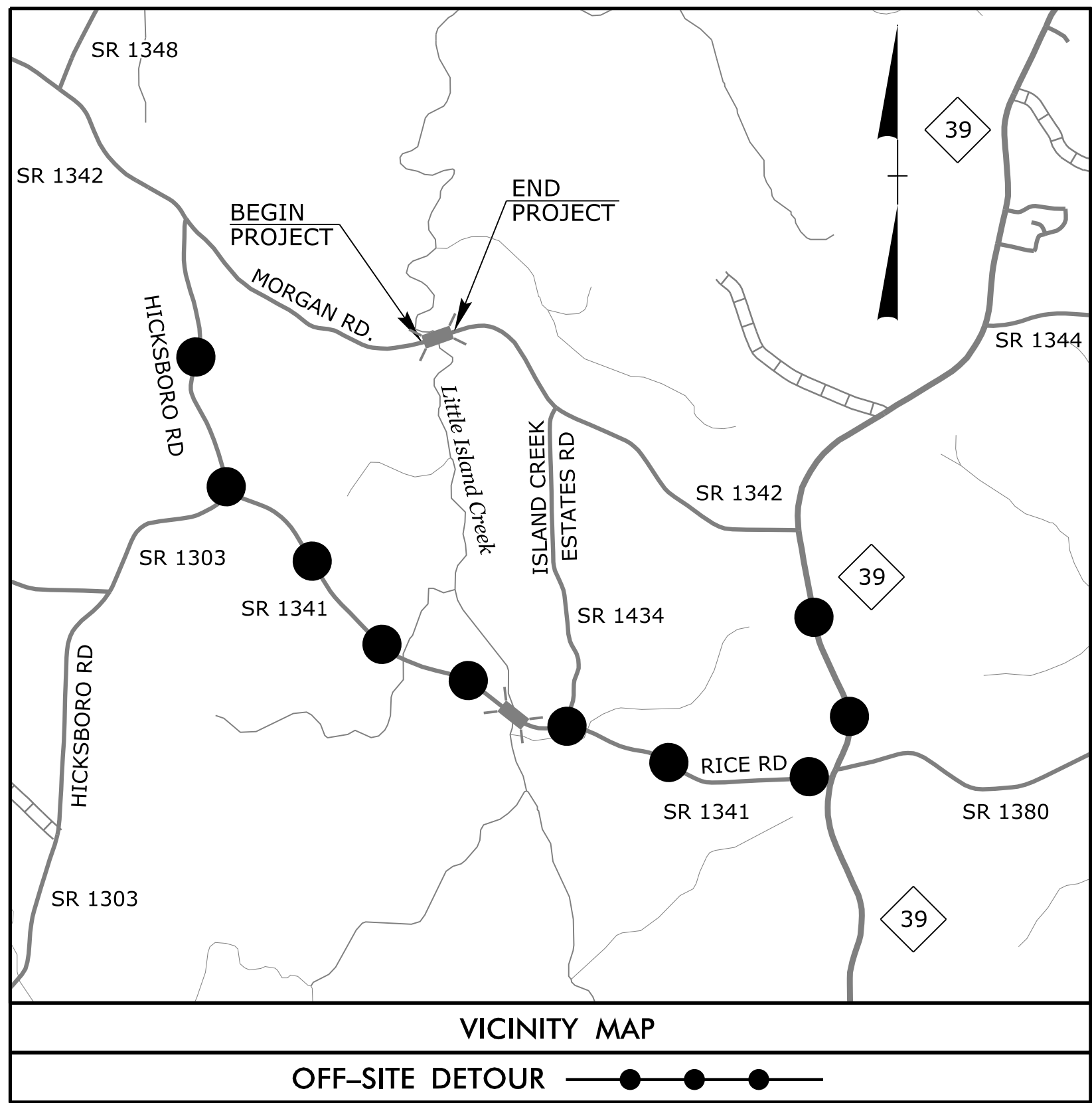
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for the convenience of the user
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and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

TIP PROJECT: 17BP.5.R.64

CONTRACT: DE00207



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

TO SR 1348
(TUNGSTEN MINE RD)

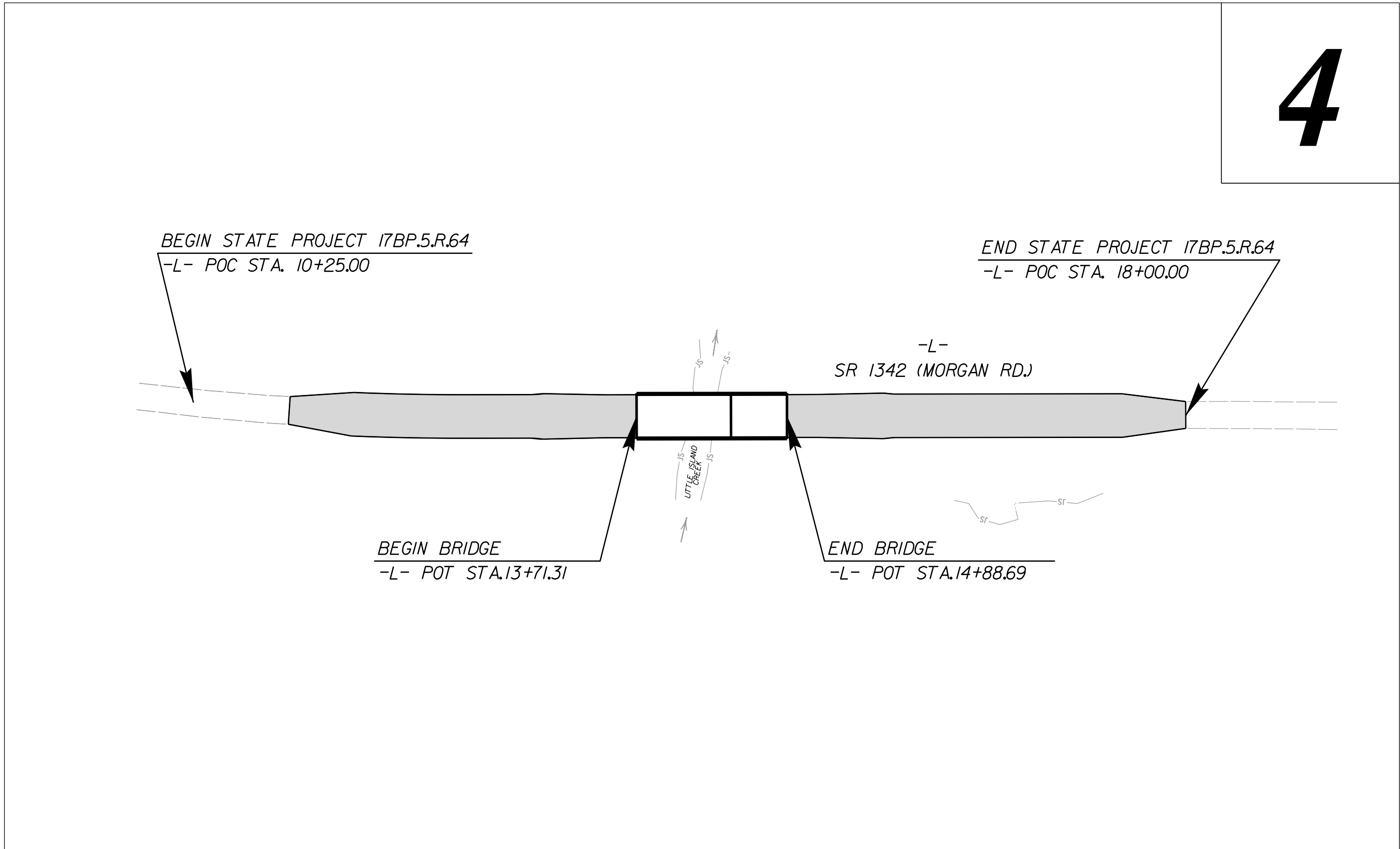
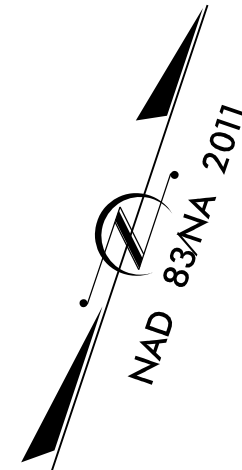
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

VANCE COUNTY

LOCATION: BRIDGE NO. 78 OVER LITTLE ISLAND CREEK
ON SR 1342 (MORGAN RD.)

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

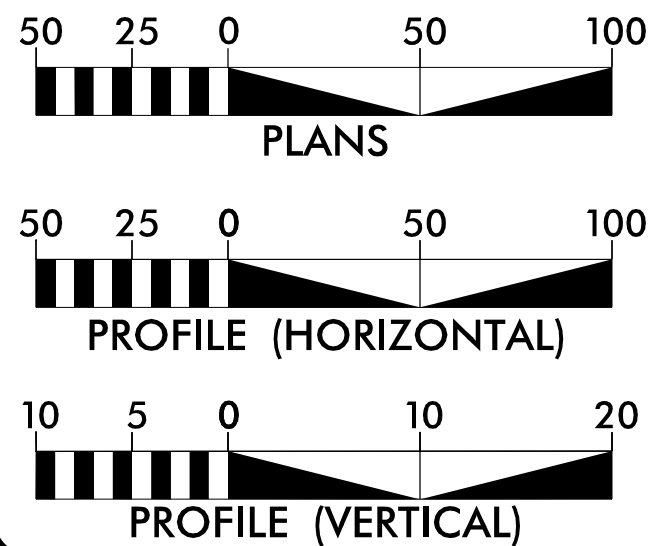
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.64	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.5.R.64	N/A	PE	
17BP.5.R.64	N/A	ROW & UTILITY	
17BP.5.R.64	N/A	CONSTRUCTION	



TO NC 39

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



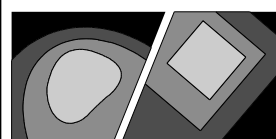
DESIGN DATA

ADT 2035 = <1000
V = 55 MPH
CLASS = MINOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT 17BP.5.R.64 = 0.111 mi.
LENGTH STRUCTURES STATE PROJECT 17BP.5.R.64 = 0.022 mi.
TOTAL LENGTH STATE PROJECT 17BP.5.R.64 = 0.133 mi.

Prepared in the Offices of:



421 FAIRVIEW ST., STE. 400
RALEIGH, NC 27601
T 919.380.8750



NC FIRM LICENSE No. F-1148
1151 SE Cary Parkway, Suite 101
Cary, NC 27513
(919) 557-0029

2012 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE:
NOVEMBER 18, 2016
RIGHT OF WAY COMPLETE:
JUNE 19, 2017
LETTING DATE:
OCTOBER 25, 2017

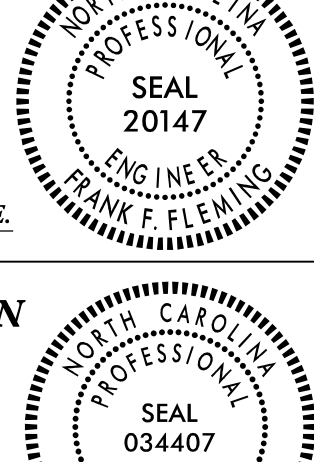
ANDY YOUNG, PE
PROJECT ENGINEER

MICHAEL BURNS, PE
PROJECT DESIGN ENGINEER

LISA GILCHRIST, EI
NCDOT CONTACT

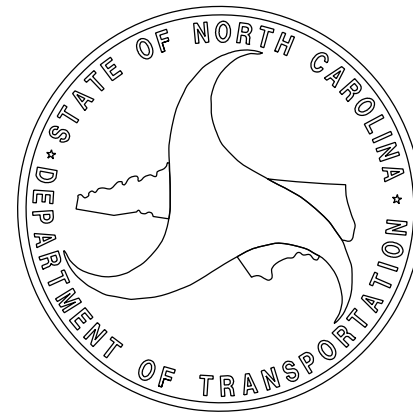
HYDRAULICS ENGINEER

DocuSigned by:
Frank F. Fleming
8/22/2017
P.E.



ROADWAY DESIGN ENGINEER

DocuSigned by:
Andrew P. Young
8/22/2017
P.E.



PROJECT REFERENCE NO.
17BP.5.R.64

SHEET NO.
1A

ROADWAY DESIGN
ENGINEER
NORTH CAROLINA
PROFESSIONAL
SEAL
034407
ANDREW P. YOUNG
DocuSign Envelope ID: 9/27/2017
Andrew P. Young
EF210A3D3D2F4EF


STEWART

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SHEET NUMBER	INDEX OF SHEETS SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEETS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1THRU 2C-6	GUARDRAIL PLACEMNET DETAILS
2C-7 THRU 2C-10	GUARDRAIL INSTALLATION DETAILS
2C-11 THRU 2C-14	STRUCTURE ANCHOR UNIT DETAILS
3B-1	ROADWAY SUMMARIES
3D-1	DRAINAGE SUMMARIES
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP-3	TRAFFIC MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION SHEET
UD-1 THRU UD-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-6	CROSS-SECTIONS
S-1 THRU S-21	STRUCTURE PLANS

EFF. 01-17-2012
REV. 02-29-2016

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
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
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	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage of 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
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 10-31-2014

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED 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

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 SURVEYOR 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

CENTURYLINK - Communications

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 CONTRACT.

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

BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Computed Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	
Primary Horiz Control Point	
Primary Horiz and Vert Control Point	
Exist Permanent Easment 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	
New Right of Way Line with Pin and Cap	
New Right of Way Line with Concrete or Granite R/W Marker	
New Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
New Control of Access	
Existing Easement Line	
New Temporary Construction Easement	
New Temporary Drainage Easement	
New Permanent Drainage Easement	
New Permanent Drainage /Utility Easement	
New Permanent Utility Easement	
New Temporary Utility Easement	
New Aerial Utility Easement	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

VEGETATION:

Single Tree	
Single Shrub	

*S.U.E. = Subsurface Utility Engineering

Hedge	
Woods Line	
Orchard	
Vineyard	

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

UTILITIES:

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.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

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.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

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	

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
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	
End of Information	

12/15/18

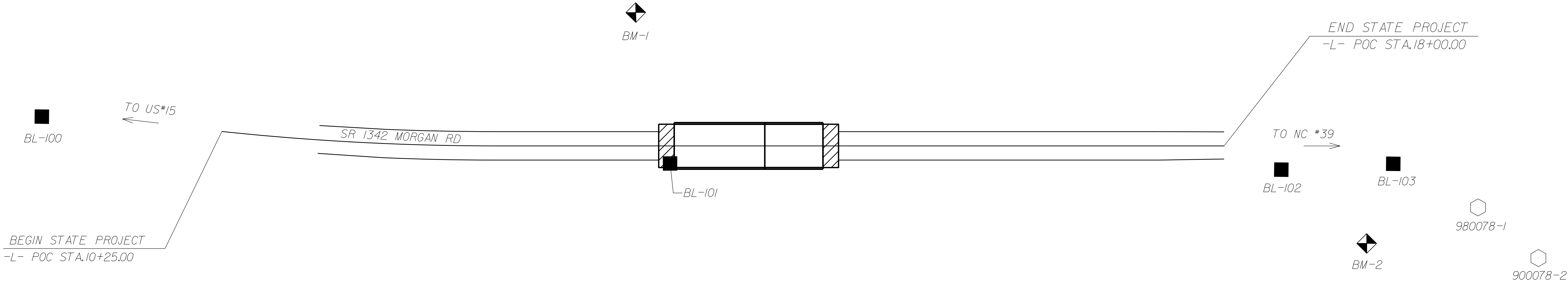
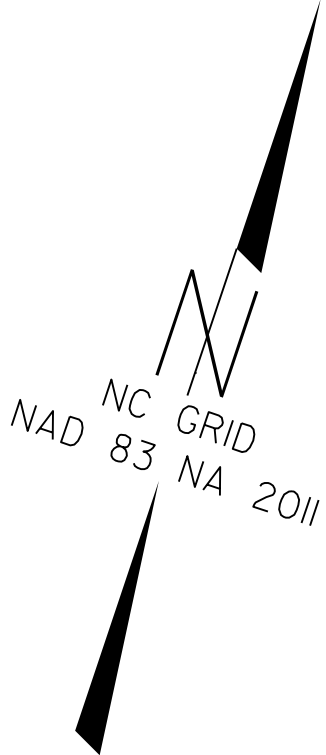
SURVEY CONTROL SHEET 90-0078

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.64	1C-1
Location and Surveys	

ROW MARKER CONCRETE OR GRANITE				
ALIGN	STATION	OFFSET	NORTH	EAST
L	10+25.00	-30.00	992539.0474	2156548.5825
L	10+25.00	-60.00	992568.3325	2156542.0722
L	11+00.00	30.00	992498.3734	2156635.5809
L	11+00.00	50.00	992479.0249	2156640.6443
L	12+36.87	50.00	992519.1137	2156775.0342
L	12+36.87	-60.00	992623.3958	2156740.0308
L	12+36.87	60.00	992509.6335	2156778.2164
L	14+00.00	-30.00	992646.8640	2156904.2236
L	14+00.00	-60.00	992675.3046	2156894.6772
L	16+00.00	60.00	992625.1849	2157122.4666
L	16+00.00	50.00	992634.6650	2157119.2845
L	17+91.95	50.00	992695.7464	2157301.2578
L	18+00.00	50.00	992698.2901	2157308.8473
L	18+00.00	30.00	992717.2562	2157302.4999

ROW MARKER PERMANENT EASEMENT				
ALIGN	STATION	OFFSET	NORTH	EAST
L	15+00.00	-60.00	992707.12586	2156989.47913
L	18+00.00	-40.00	992783.63730	2157280.28402
L	18+00.00	-30.00	992774.15428	2157283.45772

L			
TYPE	STATION	NORTH	EAST
PC	10+00.00	992504.4885	2156530.6556
PT	12+36.87	992566.5146	2156759.1236
PC	17+91.95	992743.1473	2157285.3471
PT	19+18.06	992782.4426	2157405.1758



BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
100	BL-100	992446.4660	2156324.3490	330.78	OUTSIDE PROJECT LIMITS	
101	BL-101	992596.4930	2156891.3540	306.93	13+71.77	13.66 RT
102	BL-102	992774.8820	2157423.4130	326.96	OUTSIDE PROJECT LIMITS	
103	BL-103	992847.2630	2157729.2660	343.71	OUTSIDE PROJECT LIMITS	
1	900078-1	992811.4410	2158147.5210	362.70	OUTSIDE PROJECT LIMITS	
2	900078-2	992391.0070	2158608.9840	364.72	OUTSIDE PROJECT LIMITS	

BM*1 ELEVATION = 302.56
N 992684 E 2156865
L STATION 13+75 78' LEFT
BENCHTIE NAIL SET IN 24" GUM TREE

BM*2 ELEVATION = 326.93
N 992709 E 2157422
L STATION 19+11 75' RIGHT
BENCHTIE NAIL SET IN 16" OAK TREE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "900078-1" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 992811.441(++) EASTING: 2158147.521(++) ELEVATION: 362.70(++) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00008871 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "900078-1" TO -L- STATION 10+25 IS S 79°16'22" W 1620.75' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTES:

- ⬡ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL AND VERTICAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT. SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

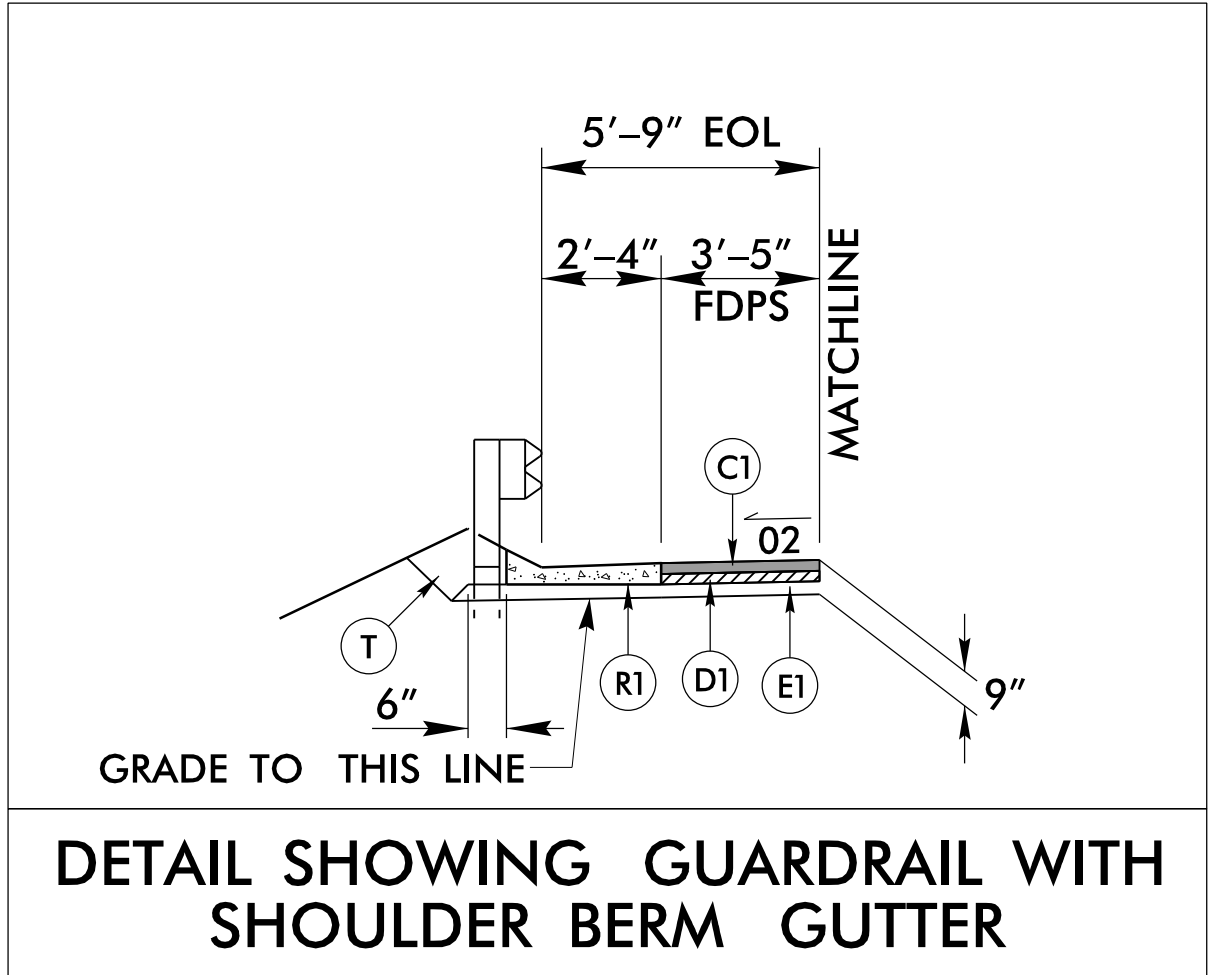
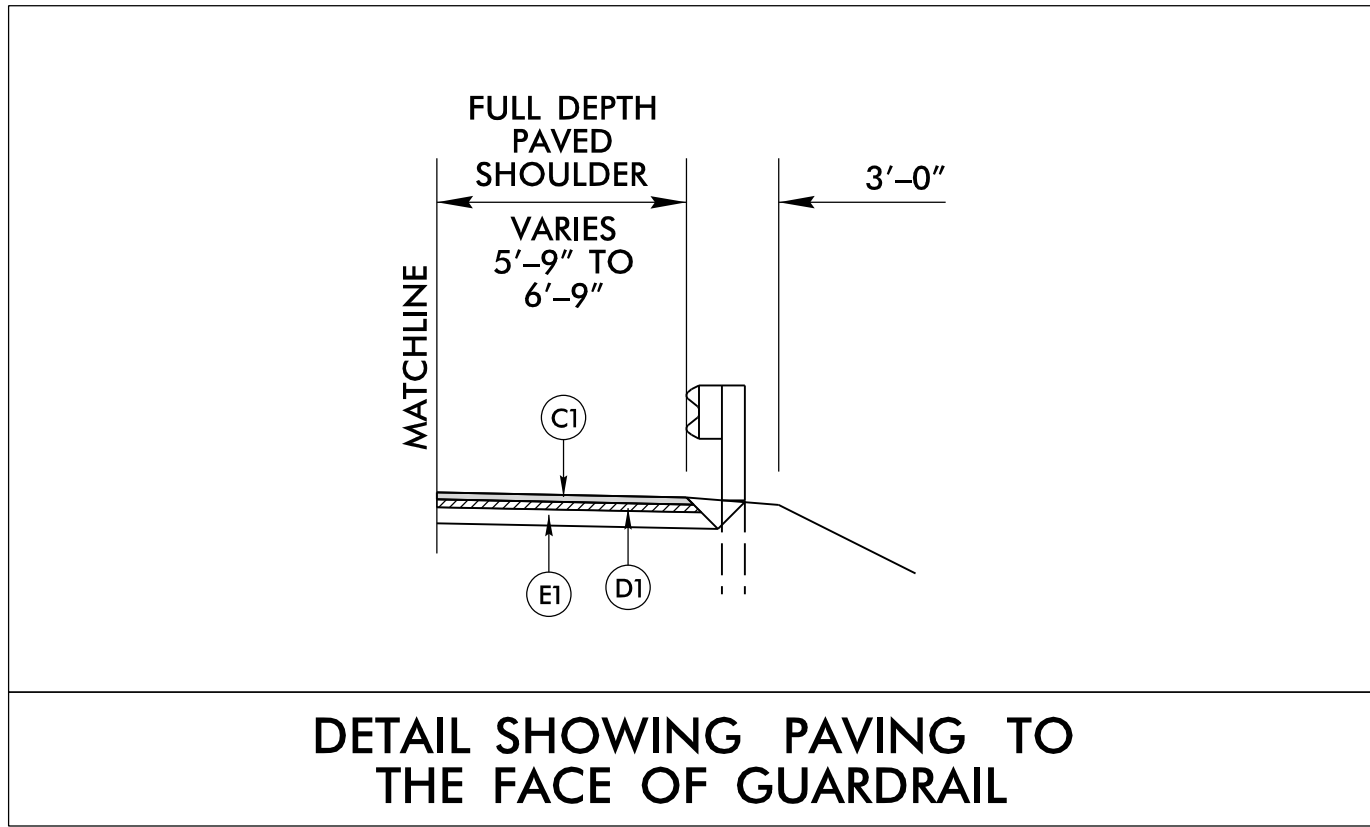
GEOID G12NC

NOTE: DRAWING NOT TO SCALE

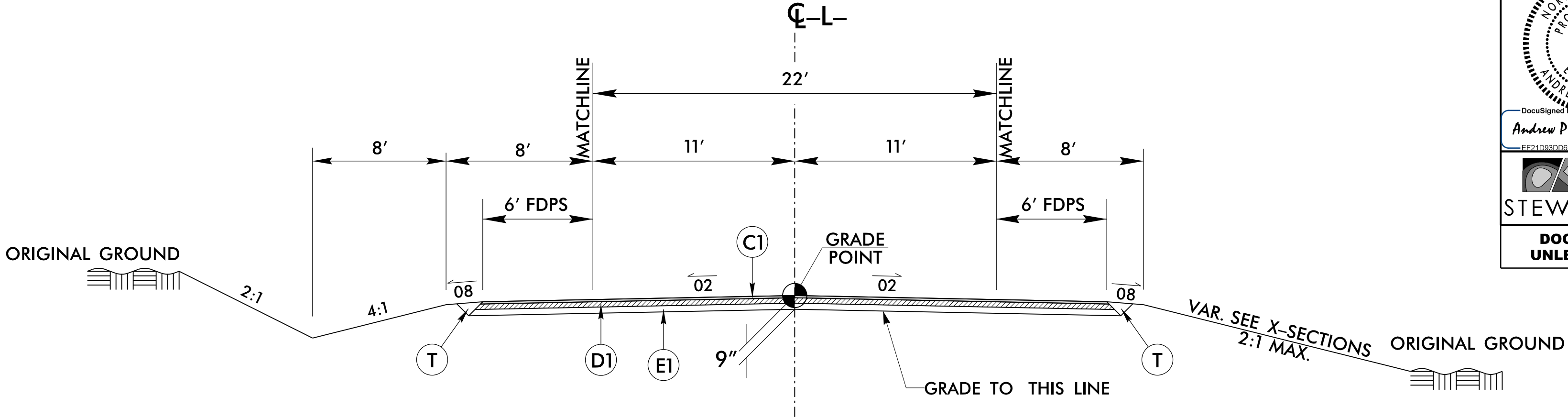
10/24/2017
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USF

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. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 3½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
T	EARTH MATERIAL.
R1	PROPOSED SHOULDER BERM GUTTER.
W	WEDGING (SEE THIS SHEET FOR WEDGING DETAIL).

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



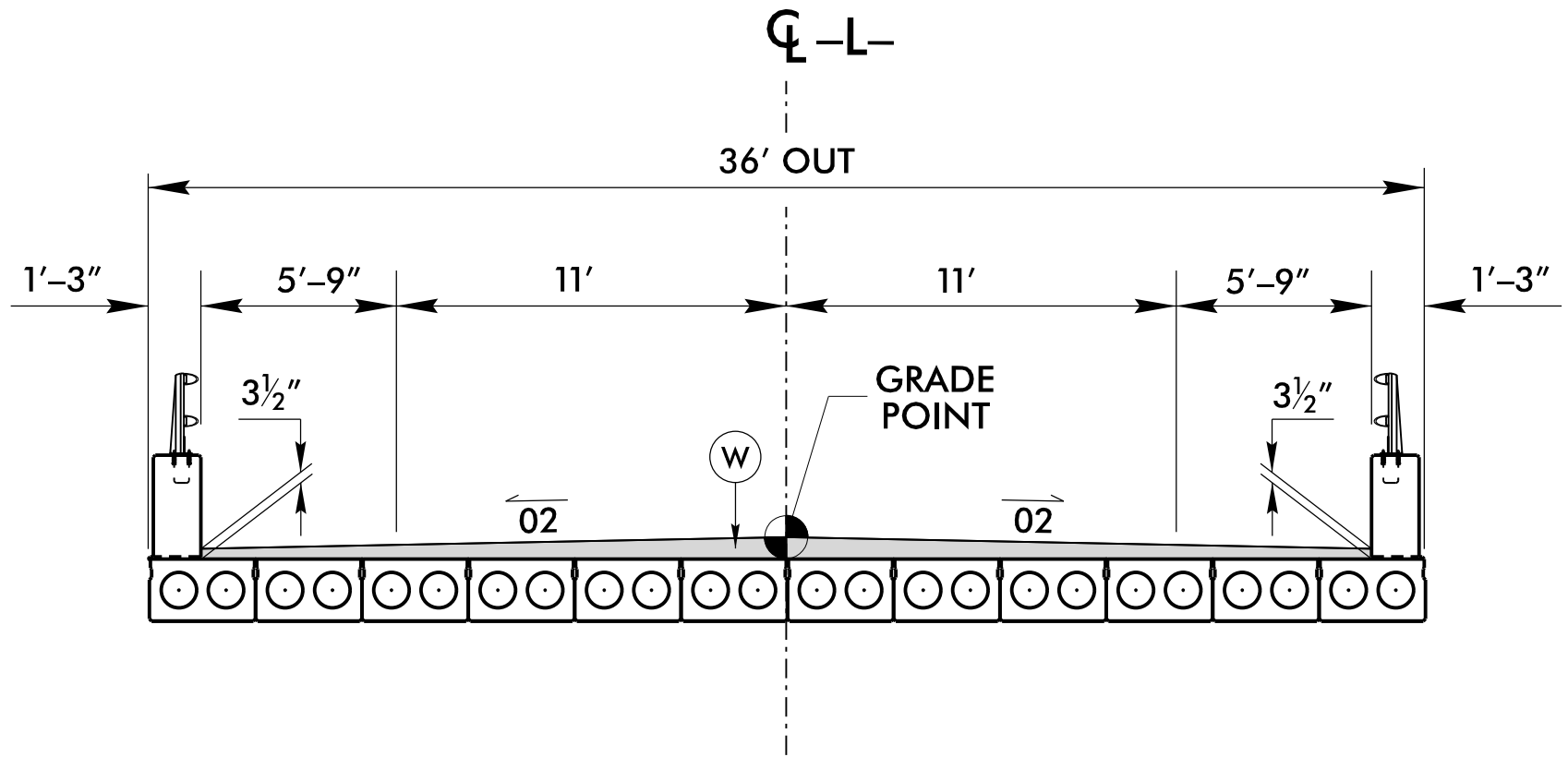
USE SHOULDER BERM GUTTER AT THE FOLLOWING LOCATIONS:
-L- STA. 13+49.00 TO -L- STA. 13+60.44 (BEG. APPROACH SLAB) (RIGHT)
-L- STA. 13+49.00 TO -L- STA. 13+60.44 (BEG. APPROACH SLAB) (LEFT)



TYPICAL SECTION NO. 1

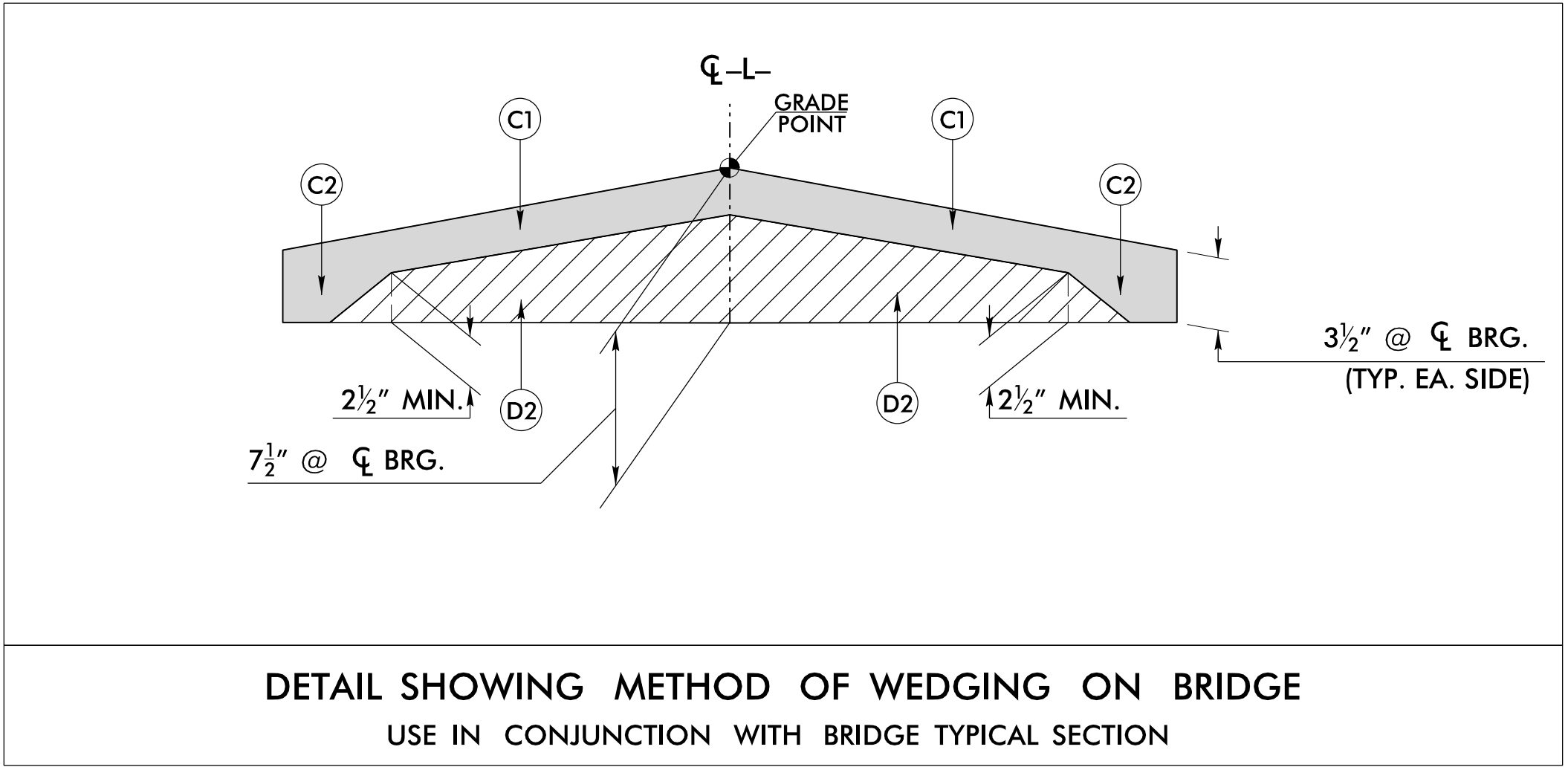
-L- STA. 11+00.00 TO -L- STA. 13+71.31 (BEGIN BRIDGE)
-L- STA. 14+88.69 (END BRIDGE) TO -L- STA. 18+00.00

NOTE:
6-FOOT FDPS IS TO ACCOMMODATE A FUTURE BIKE LANE



TYPICAL SECTION NO. 2

-L- STA. 13+71.31 TO -L- STA. 14+88.69



DETAIL SHOWING METHOD OF WEDGING ON BRIDGE
USE IN CONJUNCTION WITH BRIDGE TYPICAL SECTION

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.64	2A-1
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 034407 ANDREW P. YOUNG 9/27/2017	PAVEMENT DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 22896 CLARK S. MORRISON 9/27/2017
STEWART	STEWART
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

I3-JUL-2017 12:44
S:\Contracts\Special Details\Standard Drawings\Details in Lieu of Standards\Division 8\862d01 862d03 862d01.dgn
Jhowerton AT CSU-212595

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

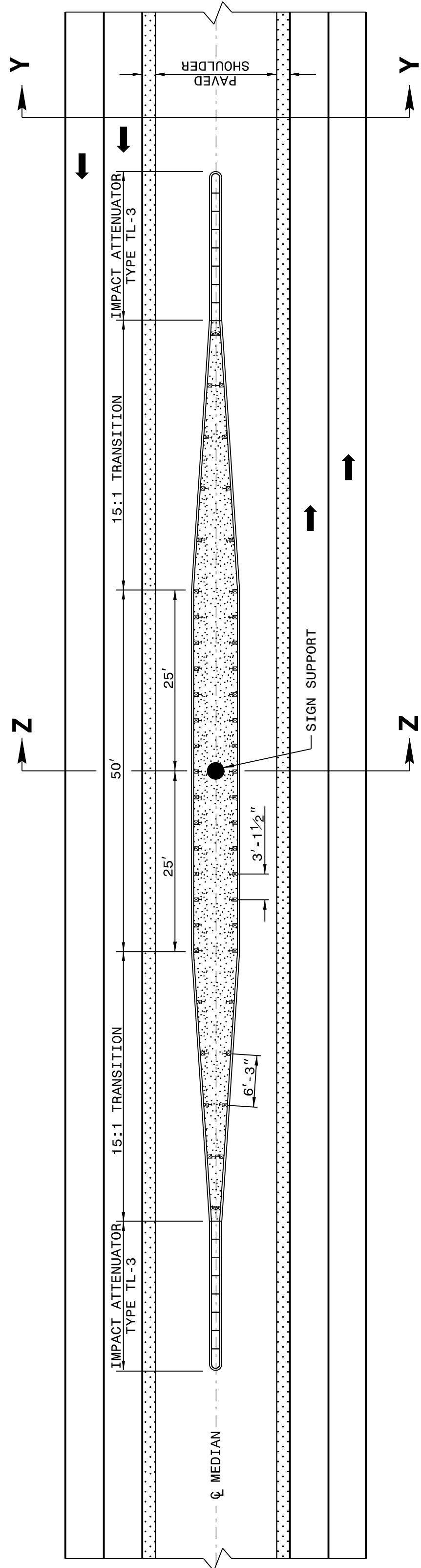
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 2 OF 11
862D01

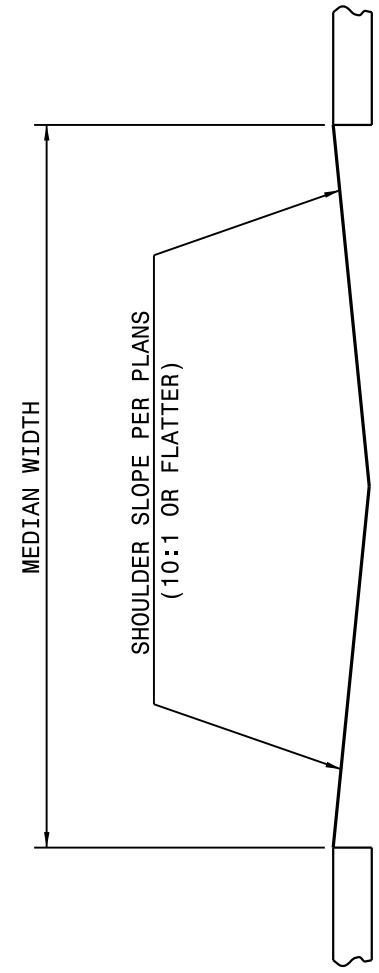
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

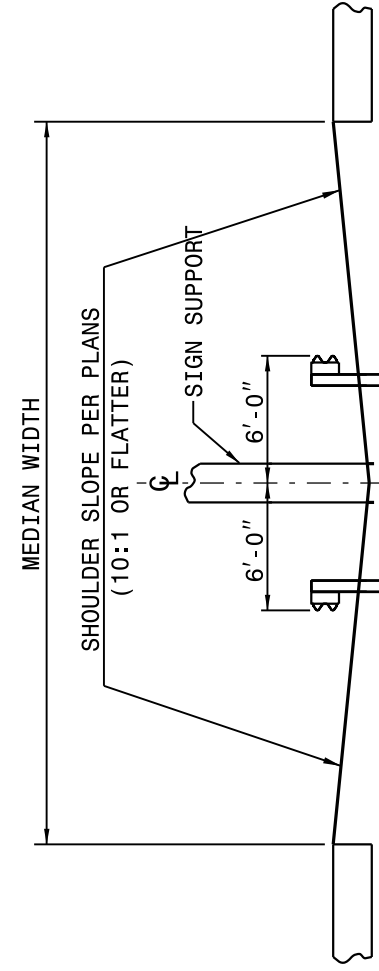
SHEET 2 OF 11
862D01



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).



SECT. YY



SECT. ZZ

DETAIL OF GUARDRAIL AT MEDIAN SIGN SUPPORT

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

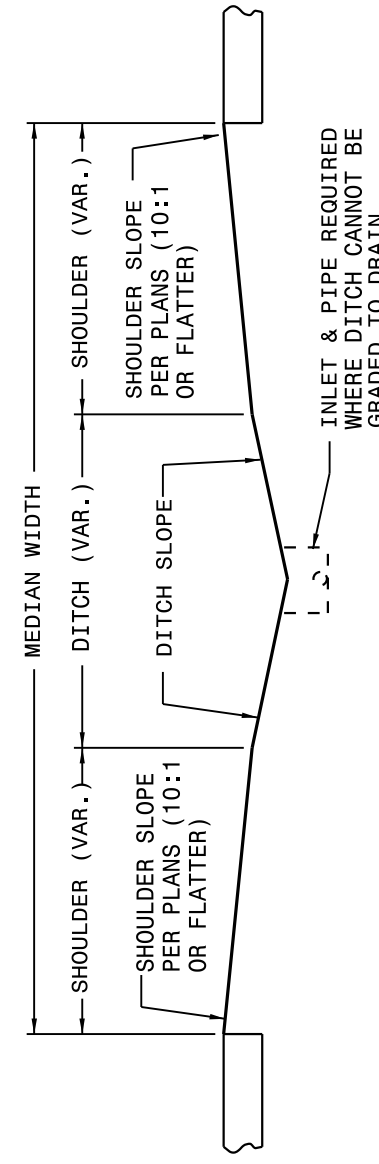
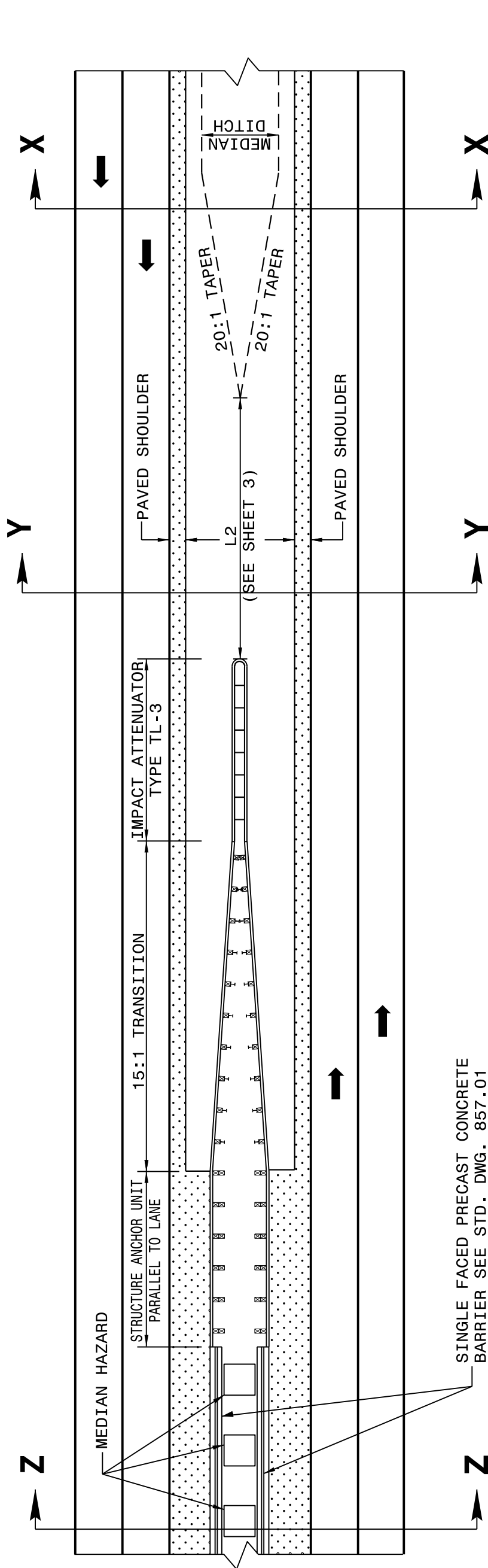
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 1 OF 11
862D01

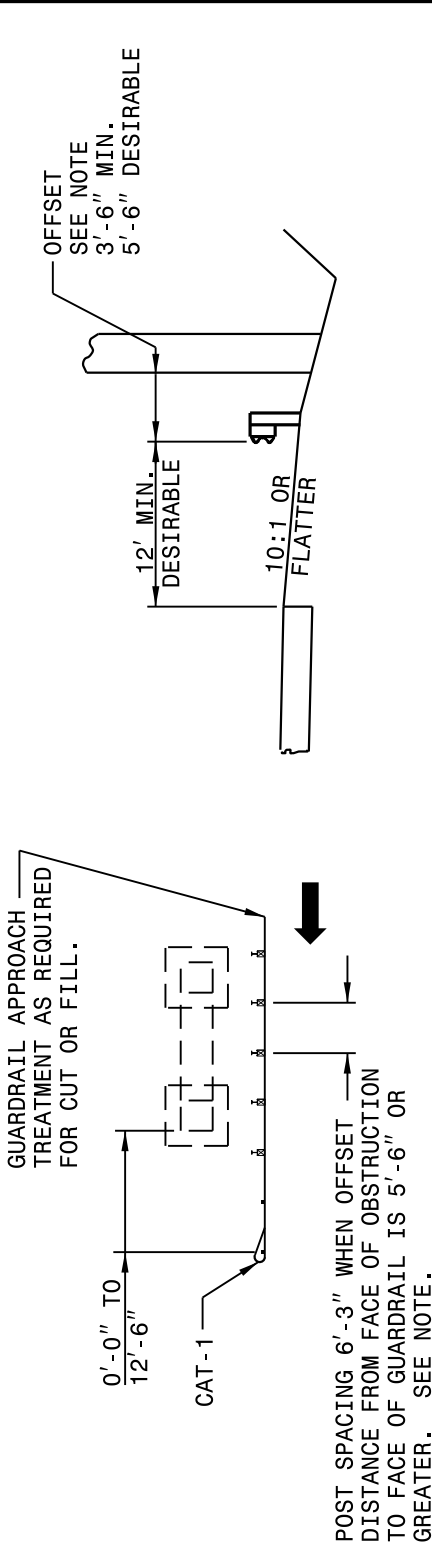
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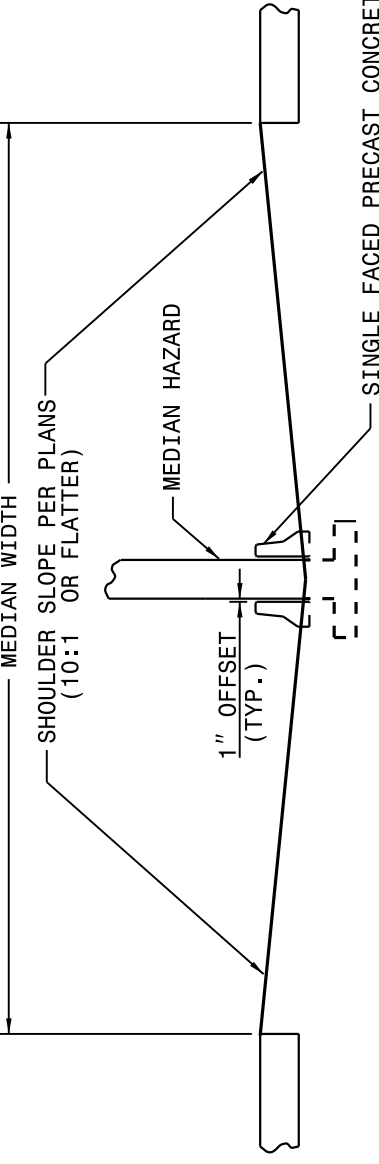
SHEET 1 OF 11
862D01



SECT. XX

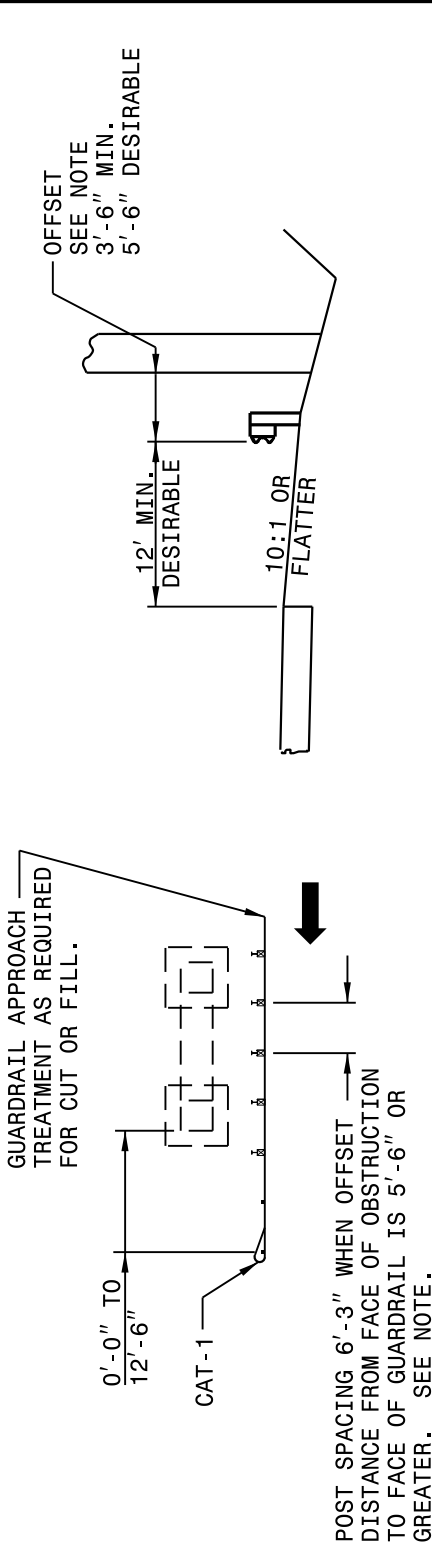


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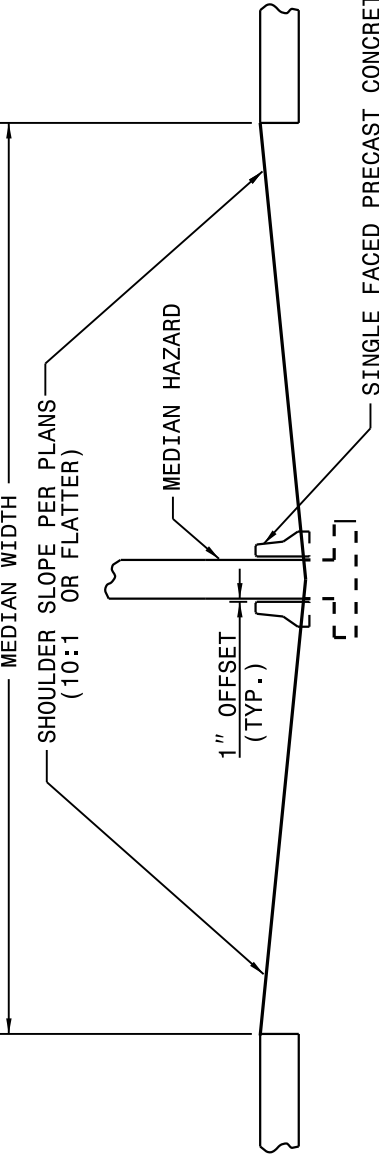


SECT. ZZ

DETAIL OF MEDIAN TREATMENT AT UNDERPASS



SECT. YY



SECT. ZZ

DETAIL OF RIGHT SIDE GUARDRAIL AT UNDERPASS

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 POINTS BEFORE REACHING THE OBSTRUCTION AND CARRY THROUGHOUT ITS LENGTH. IF THE OFFSET IS LESS THAN 3'-6" USE CONCRETE BARRIER.

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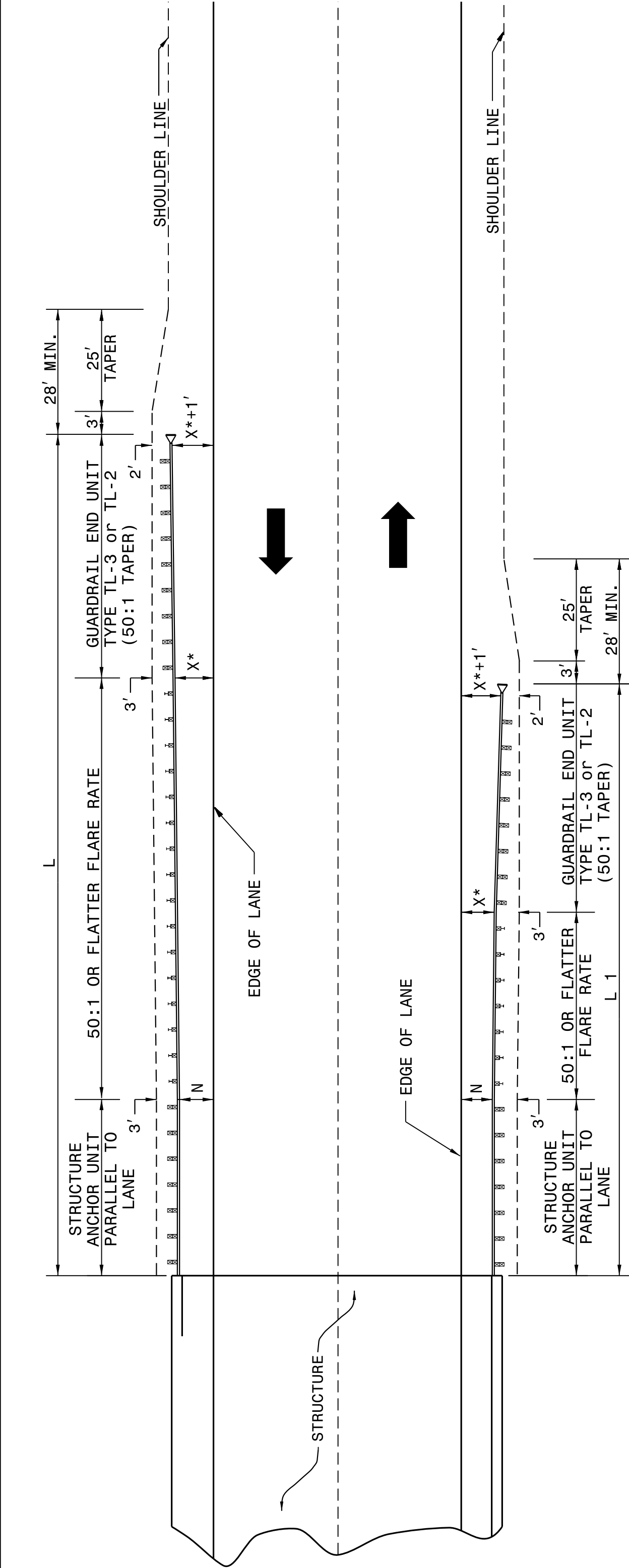
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ROADWAY DETAIL DRAWING FOR
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SHEET 4 OF 11
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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 11
862D01

GUARDRAIL INSTALLATION AT BRIDGE APPROACHES FOR TWO-LANE, TWO-WAY TRAFFIC									
DESIGN SPEED (MPH)	"L" APPROACH LENGTH (FT.)			"L1" TRAILING LENGTH (FT.)			CURRENT YEAR ADT		
	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)	DESIGN SPEED (MPH)
70	362.5'	362.5'	350.0'	287.5'	187.5'	175.0'	1000+	1000+	400+
60	300.0'	287.5'	275.0'	225.0'	137.5'	100.0'	1000+	1000+	400+
50	212.5'	212.5'	200.0'	162.5'	87.5'	75.0'	1000+	1000+	400+
40	175.0'	150.0'	137.5'	112.5'	75.0'	75.0'	1000+	1000+	400+
X *	8'	6'	4'	4'	8'	6'	4'	4'	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

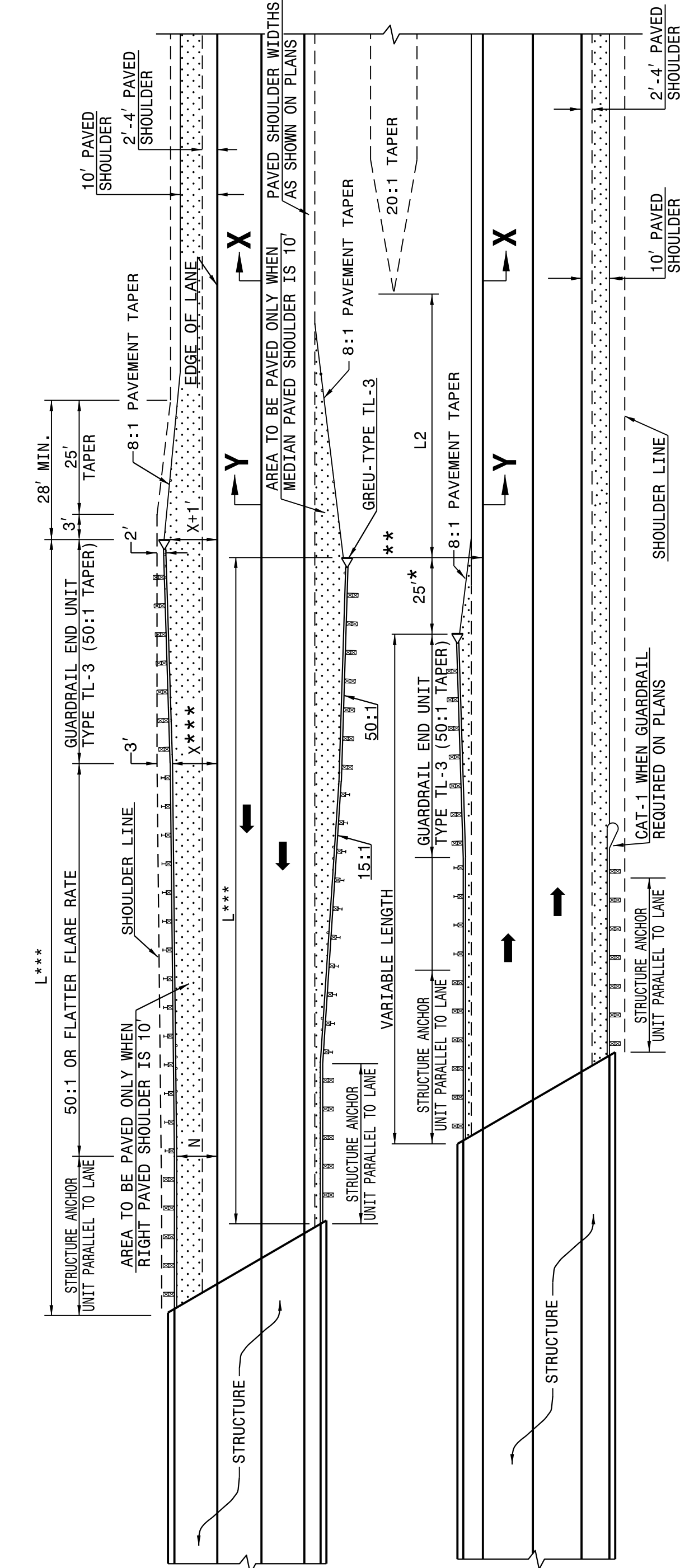
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

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

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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 3 OF 11
862D01

DIMENSIONS FOR LENGTH OF GUARDRAIL APPROACHING DUAL LANE BRIDGES				
MEDIAN WIDTH	-L-***			-L2- DIM.
	70 MPH	60 MPH	50 MPH	
30'	300.0'	250.0'	150.0'	80.0'
36'	300.0'	250.0'	150.0'	60.0'
40' & ABOVE	300.0'	250.0'	150.0'	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

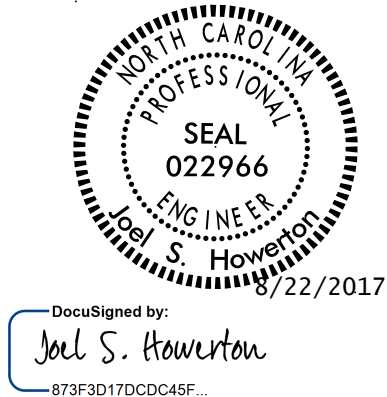
DETAIL OF GUARDRAIL APPROACHING DUAL LANE BRIDGES

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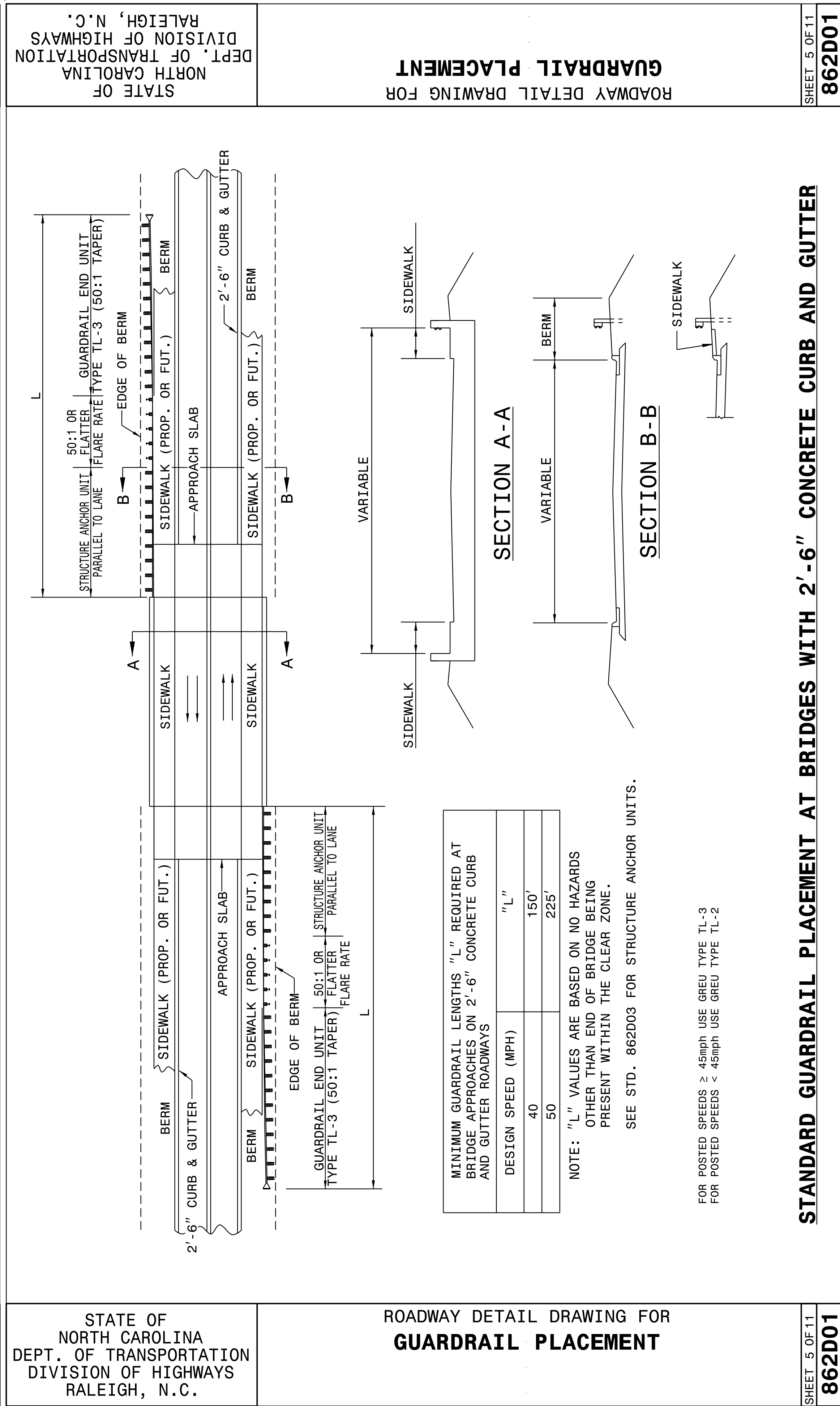
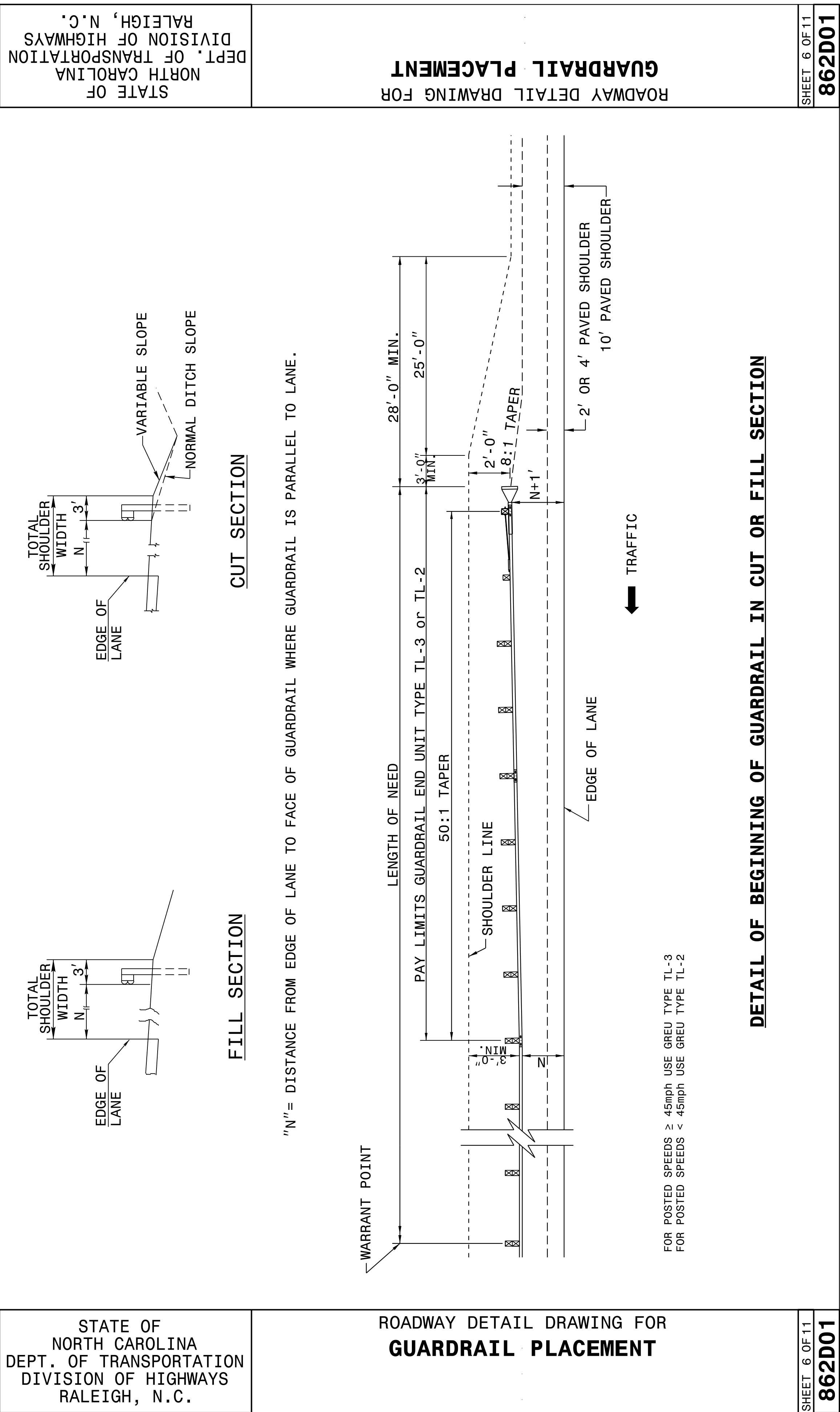
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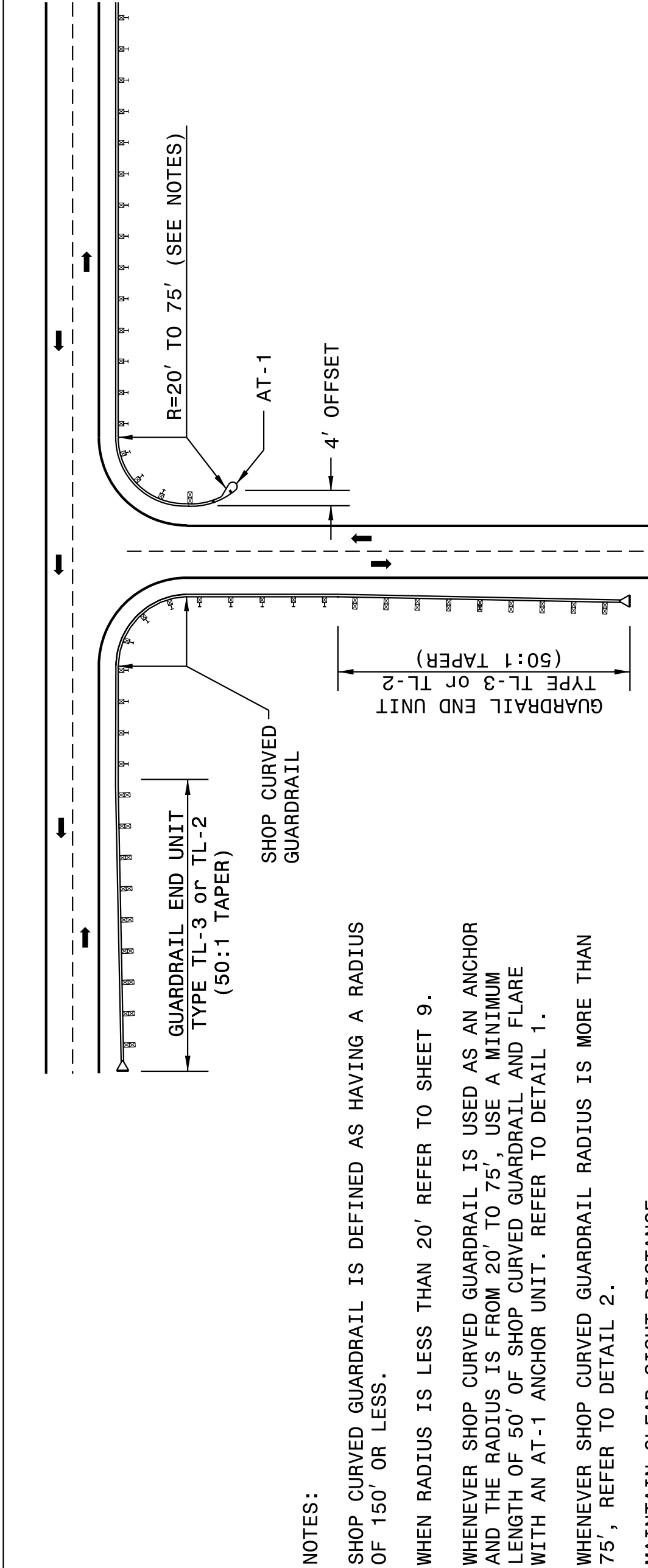
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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 8 OF 11
862D01

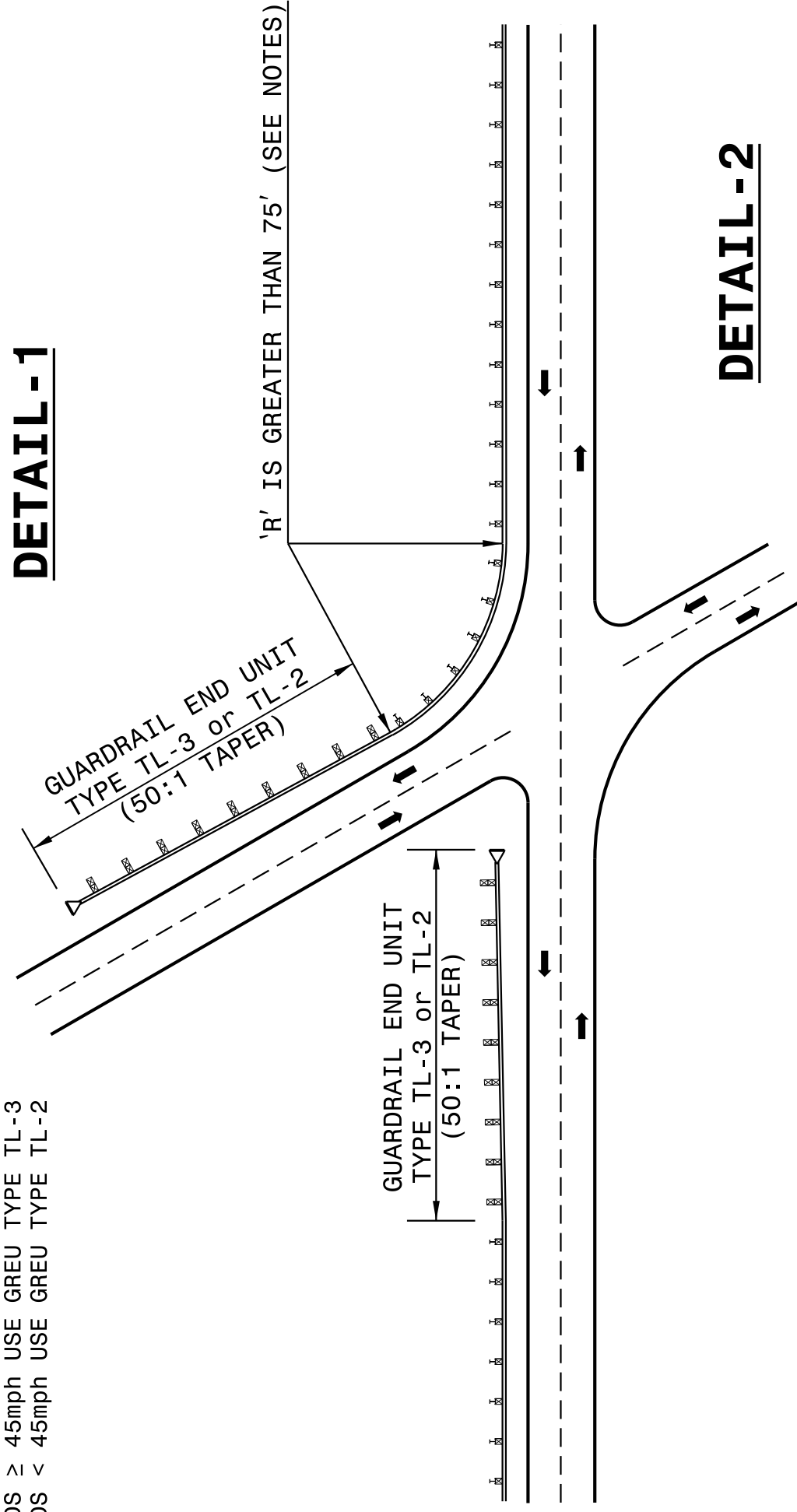


DETAIL -1

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

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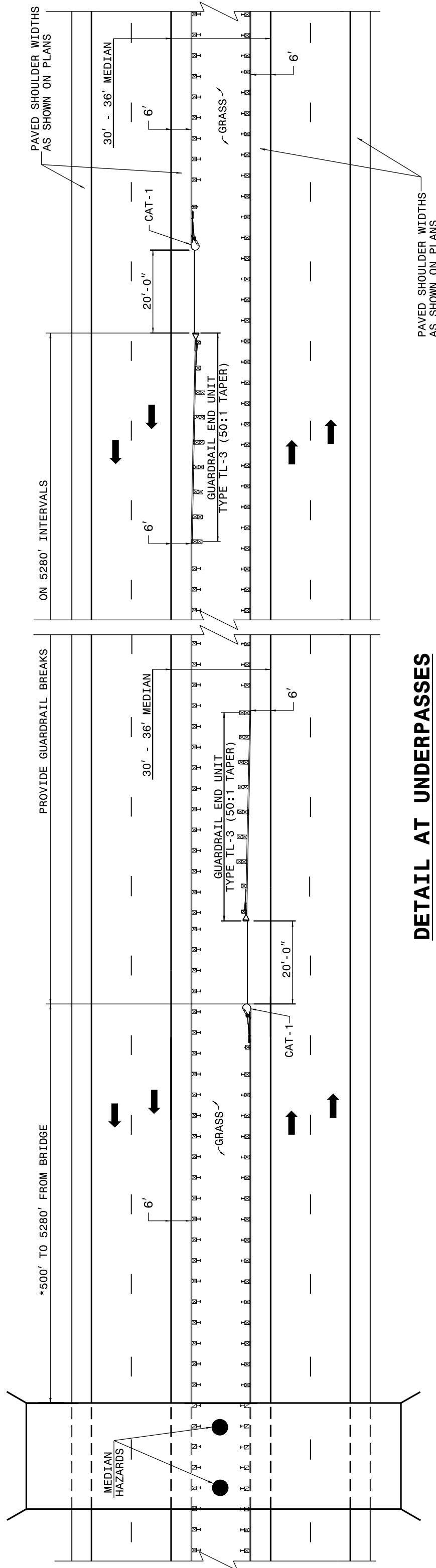
DETAIL -2

GUARDRAIL TREATMENT AT INTERSECTIONS

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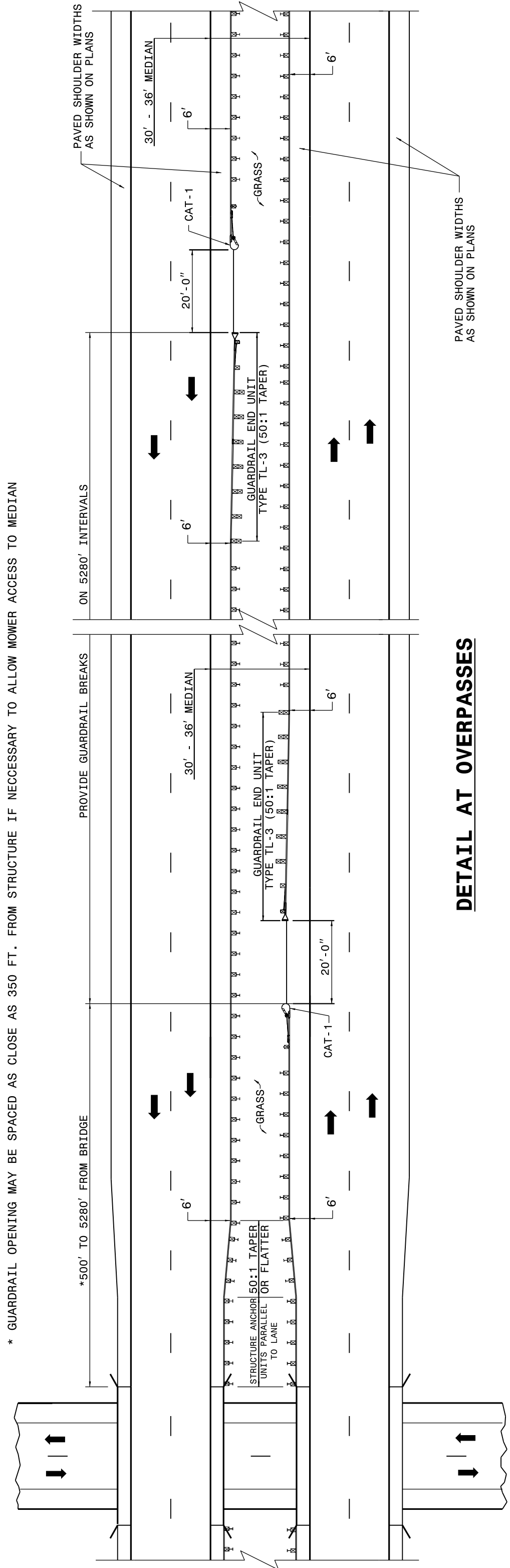
ROADWAY DETAIL DRAWING FOR
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SHEET 7 OF 11
862D01



DETAIL AT UNDERPASSES

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



DETAIL AT OVERPASSES

FOR POSTED SPEEDS $\geq$ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS $<$ 45mph USE GREU TYPE TL-2

GUARDRAIL BREAK INTERVALS WITH 30' - 36' MEDIANS

SHEET 7 OF 11
862D01

ROADWAY DETAIL DRAWING FOR
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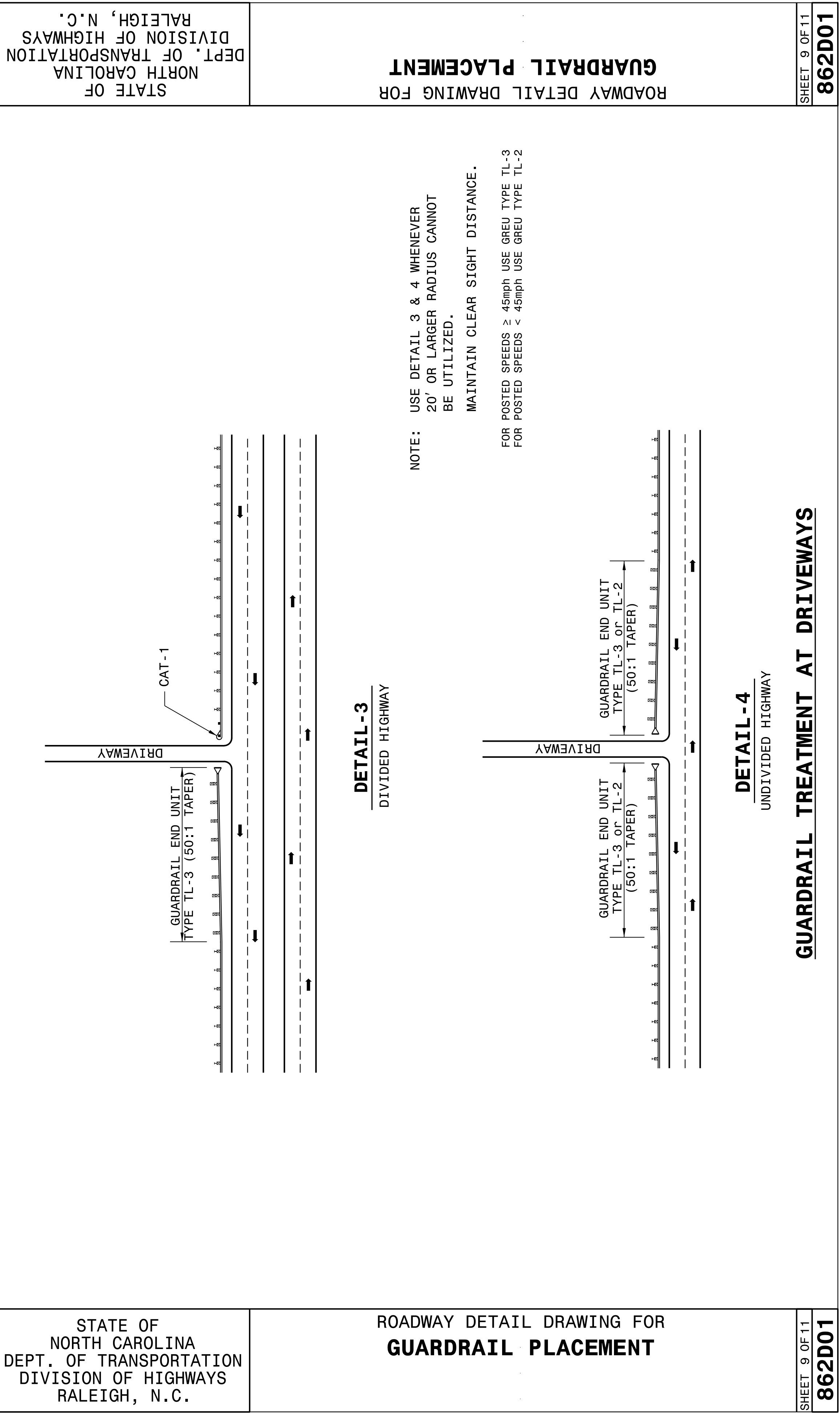
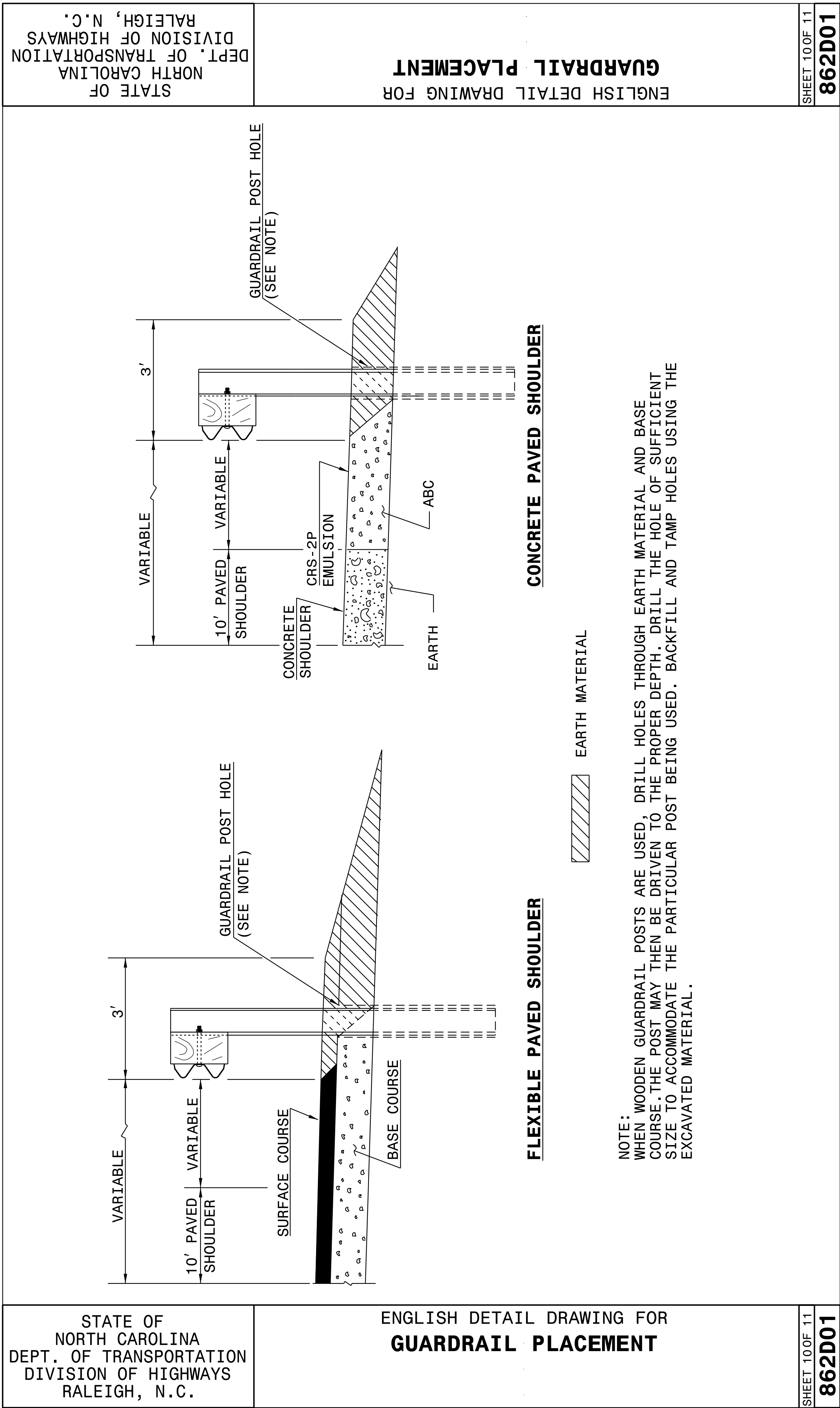
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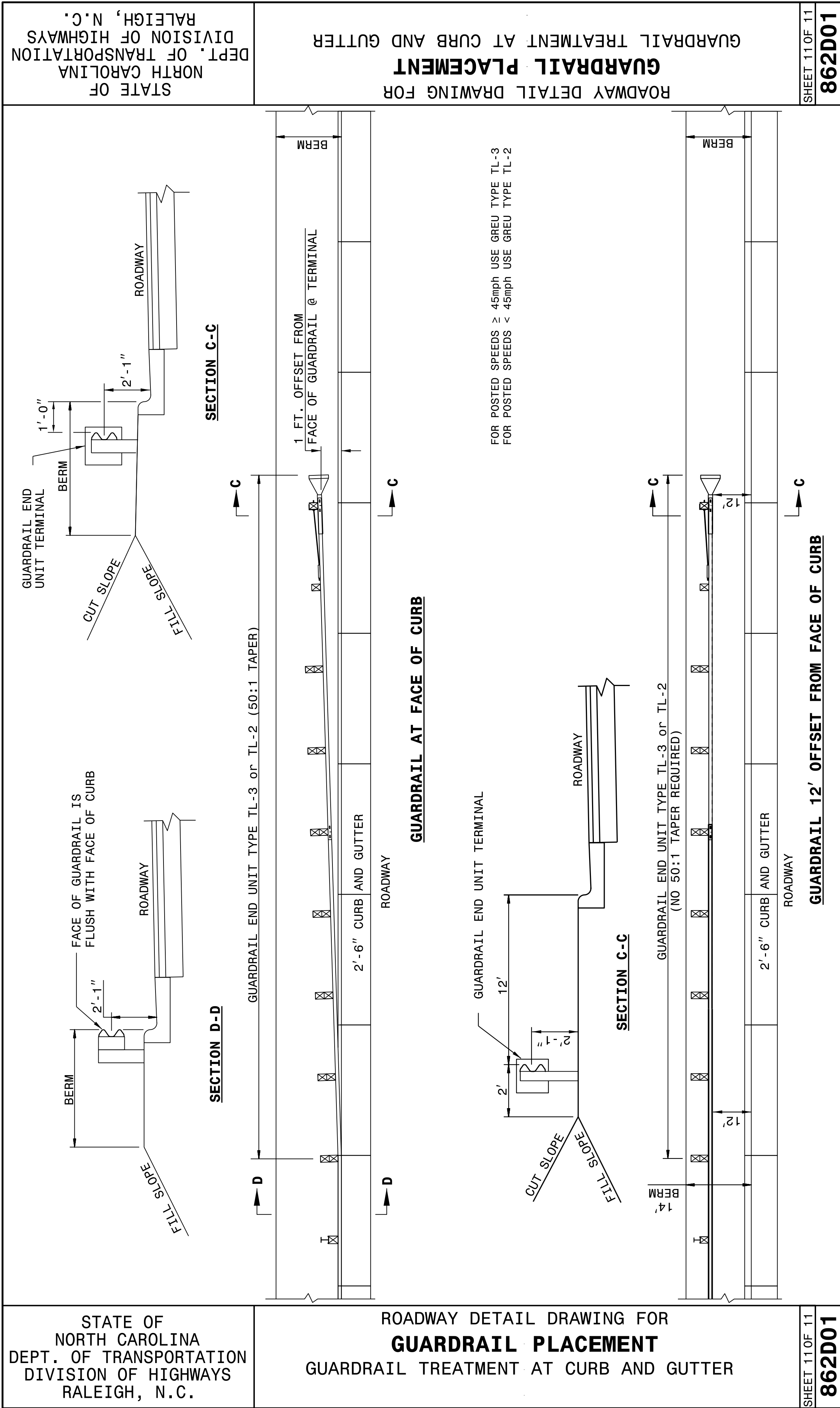
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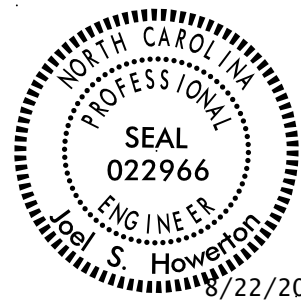
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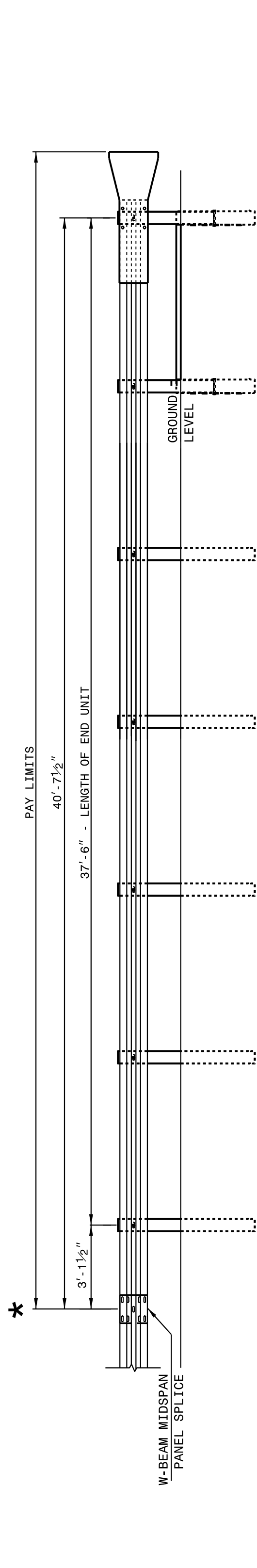
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 8
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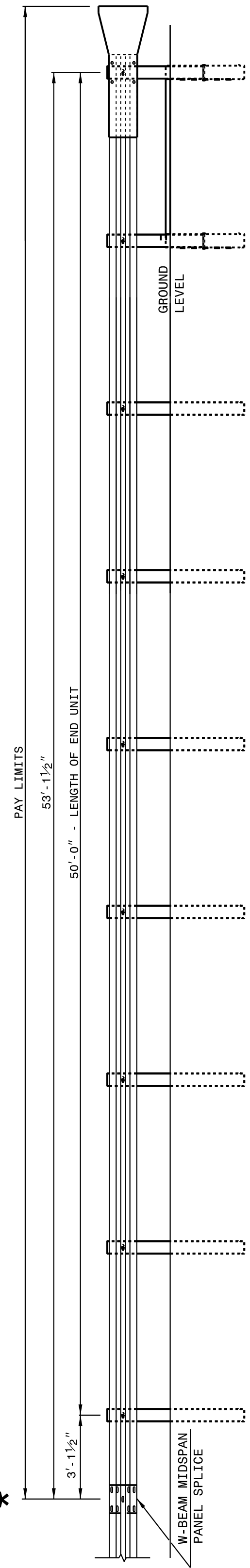
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 8
862D02



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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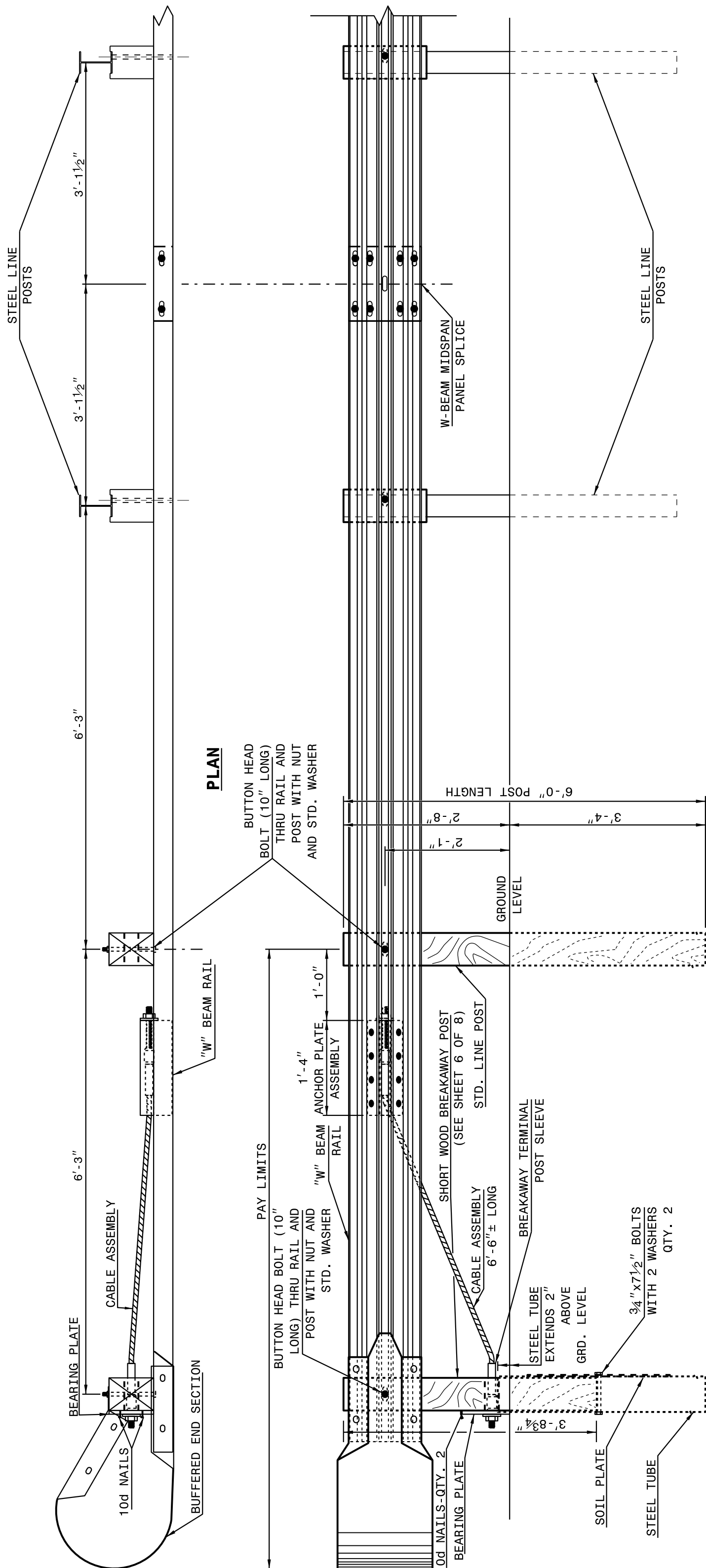
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ROADWAY DETAIL DRAWING FOR
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ELEVATION

TRAILING END UNIT ASSEMBLY

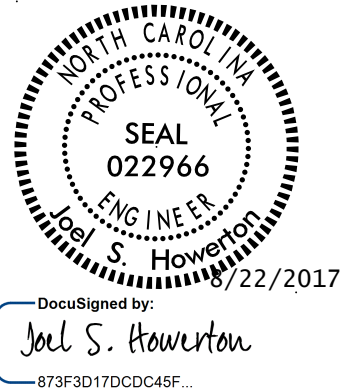
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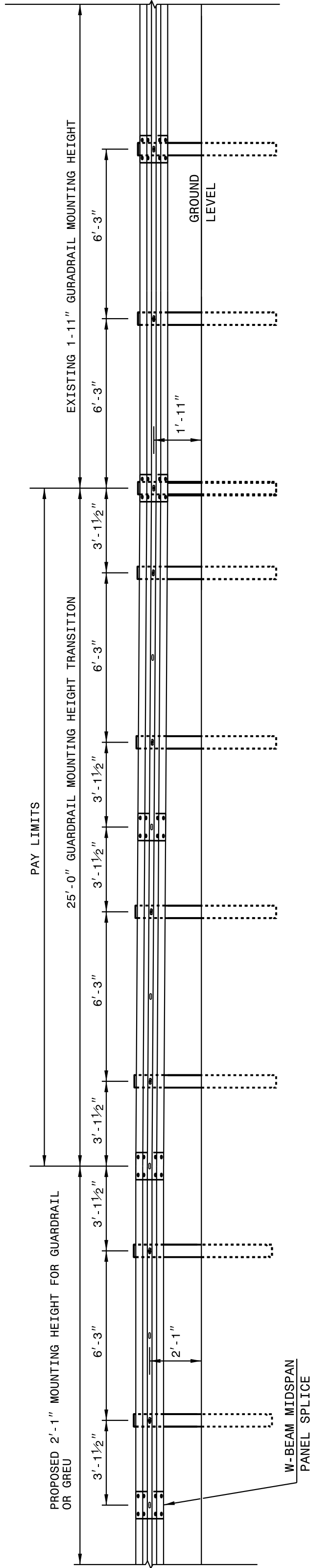
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ROADWAY DETAIL DRAWING FOR
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SHEET 4 OF 8
862D02

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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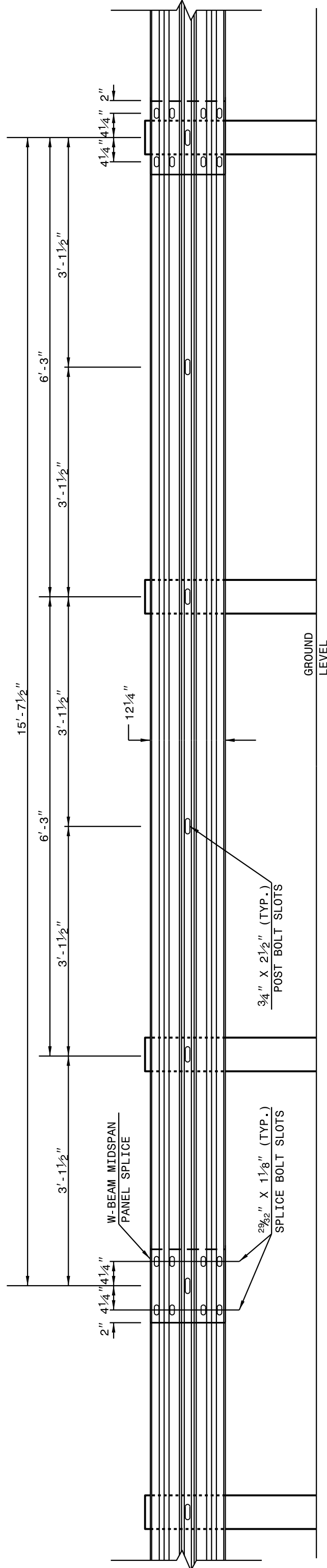
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ROADWAY DETAIL DRAWING FOR
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SHEET 3 OF 8
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15'-7 1/2" W-BEAM GUARDRAIL PANEL

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

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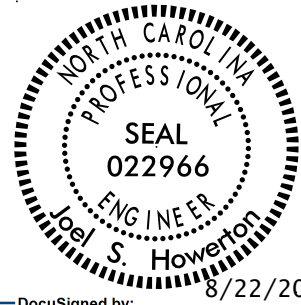
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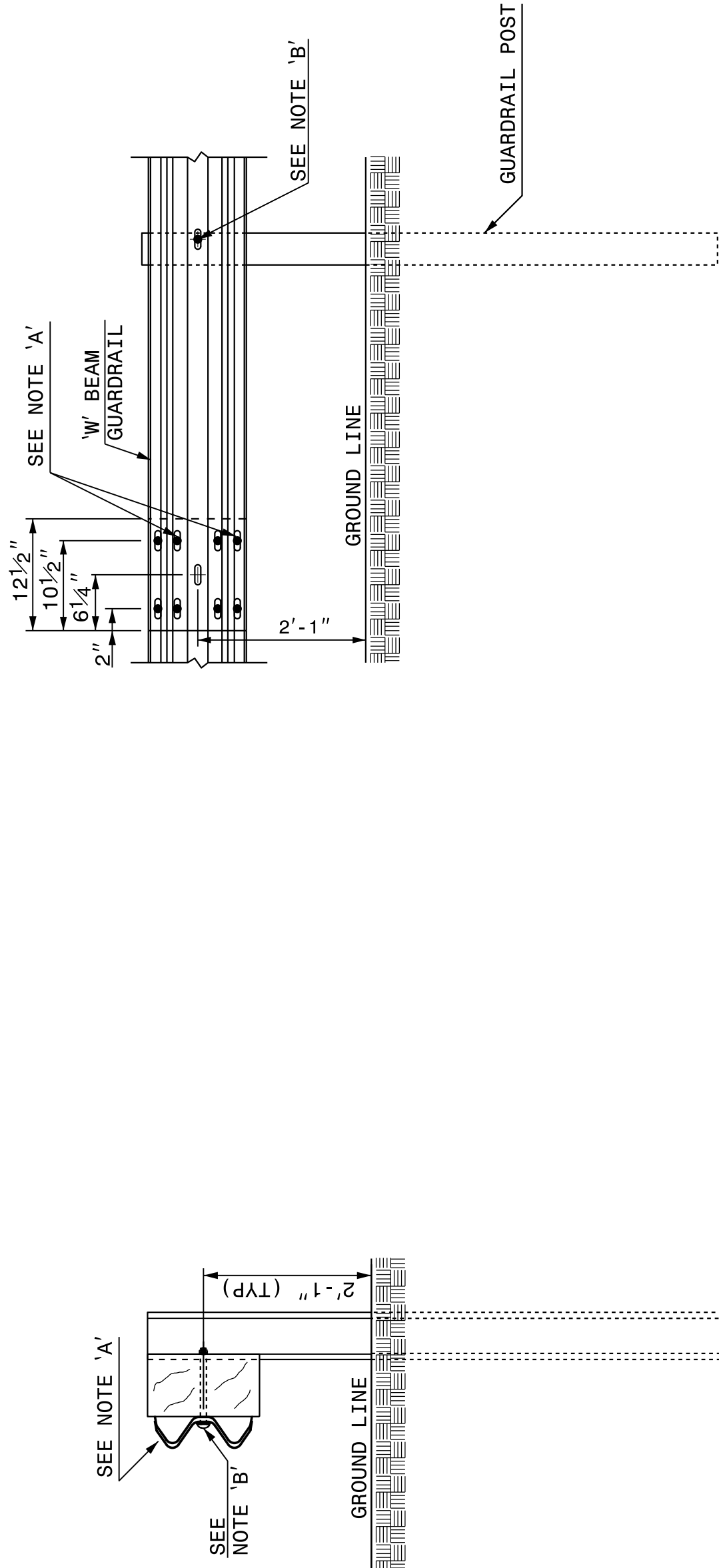
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TYPICAL GUARDRAIL AND GUARDRAIL POST ALTERNATIVES

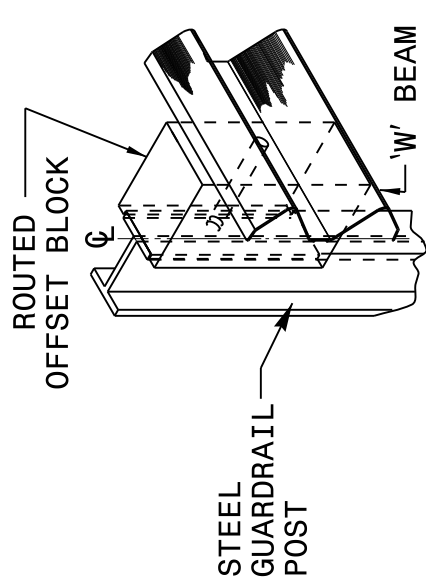
NOTES:
A - 5/8" DIA. BUTTON HEAD SPlice BOLT 1 1/4" LONG (8 REQ. PER SPlice JOINT).
B - 5/8" DIA. BUTTON HEAD BOLT 7 1/2"/9" LONG WITH NUT FOR BOLTING 6"/8" ROUTED OFFSET BLOCK TO STEEL POSTS.
C - FIELD PUNCHING OF HOLES INTO GUARDRAIL AS DIRECTED BY THE ENGINEER.

FRONT - MID SPAN SPLICE

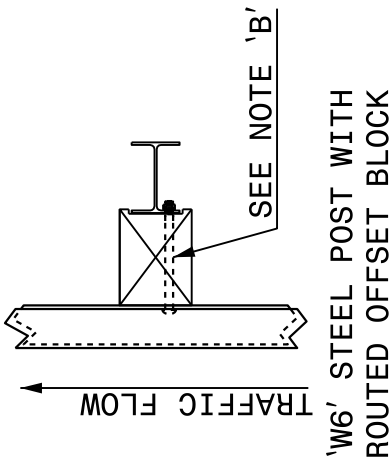
SIDE



ISOMETRIC VIEW



PLAN



ROADWAY DETAIL DRAWING FOR GUARDRAIL INSTALLATION

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862D02

SYSTEM PARTS

SHEET 6 OF 8
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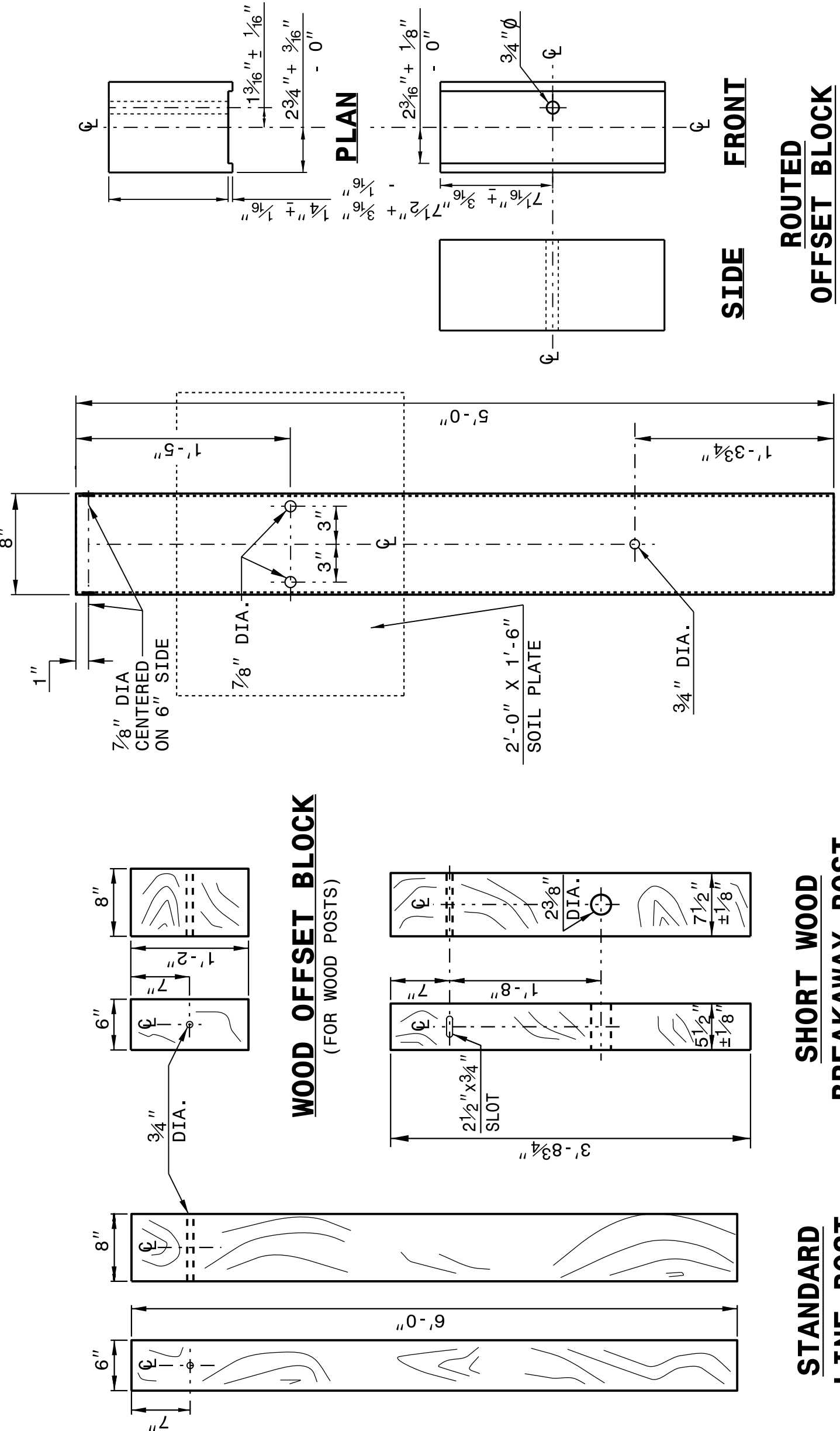
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STANDARD LINE POST

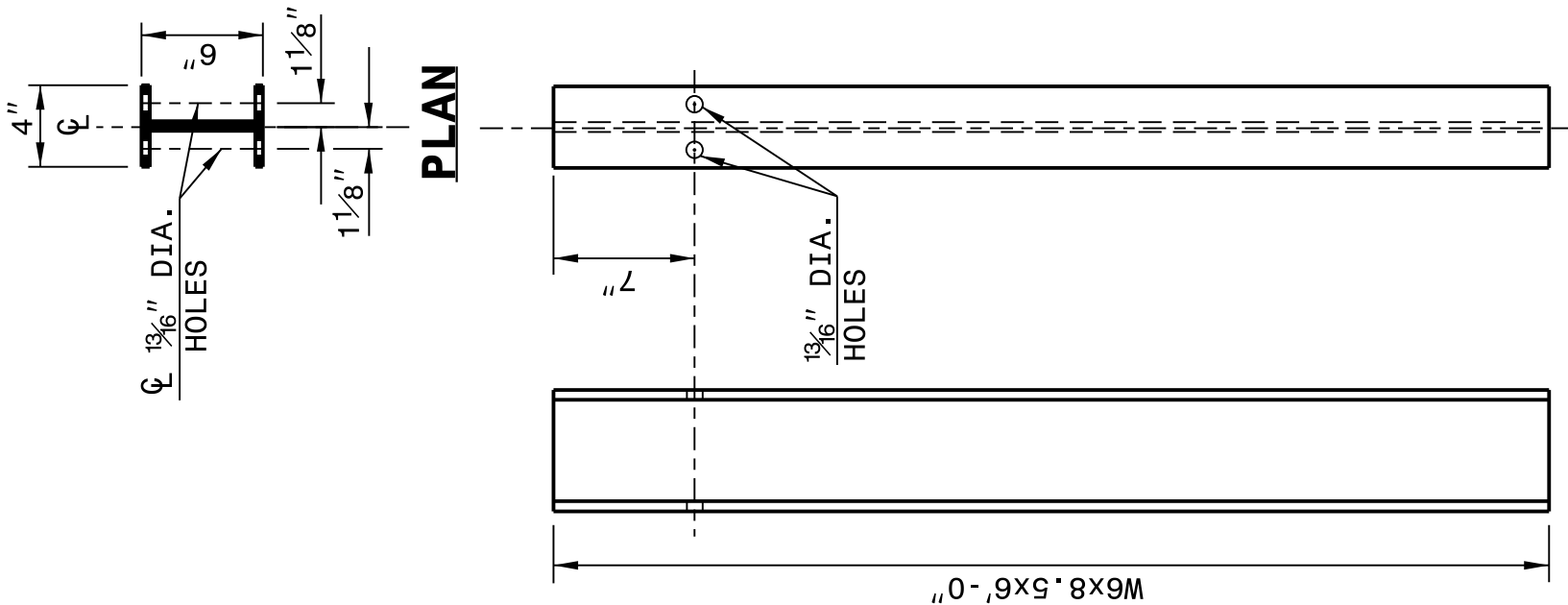
SHORT WOOD **BREAKAWAY POST**

STEEL TUBE
TS 6"x8"x0.1875"



SIDE **FRONT**

"W6" STEEL POST



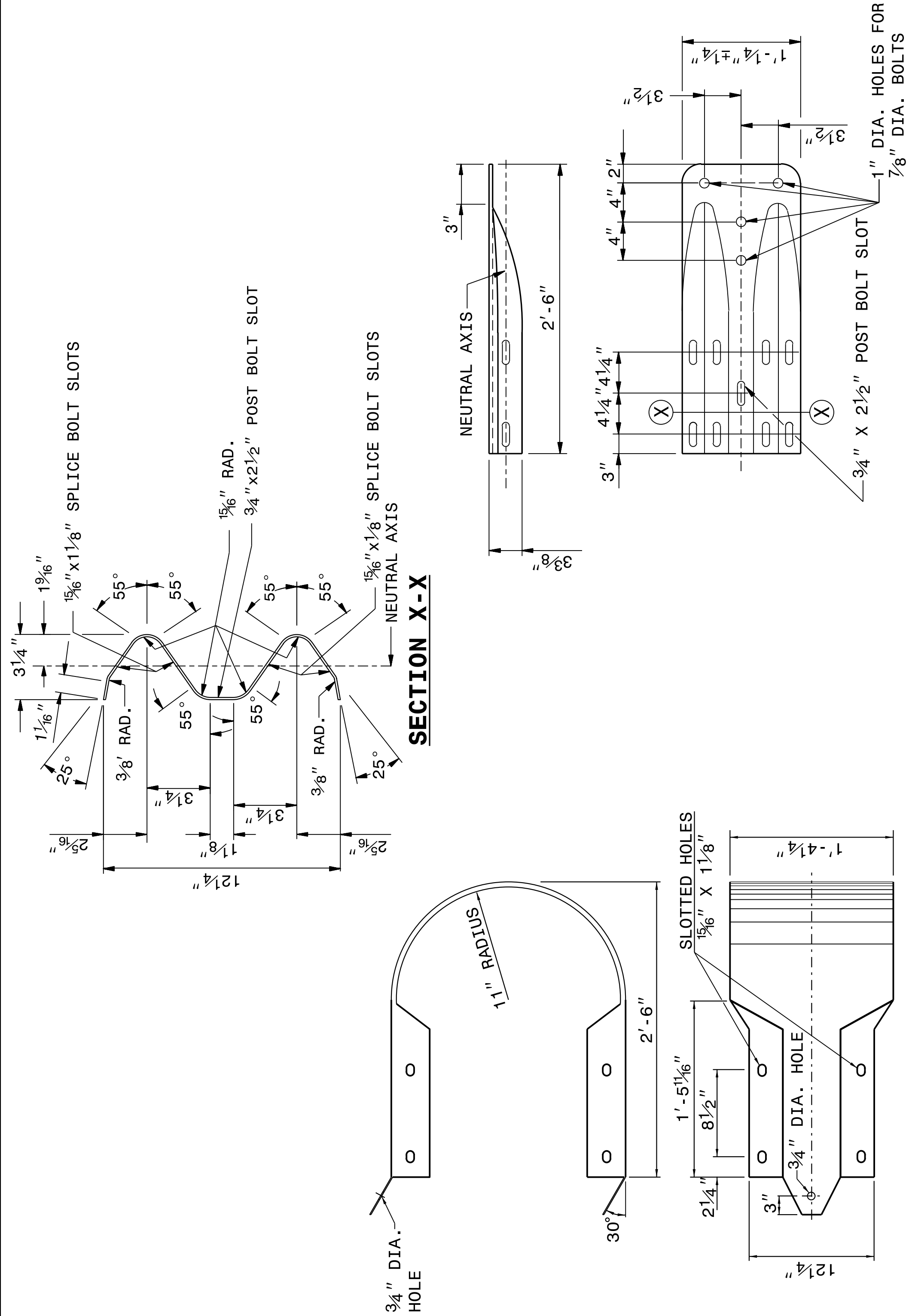
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ROADWAY DETAIL DRAWING FOR
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ROADWAY DETAIL DRAWING FOR
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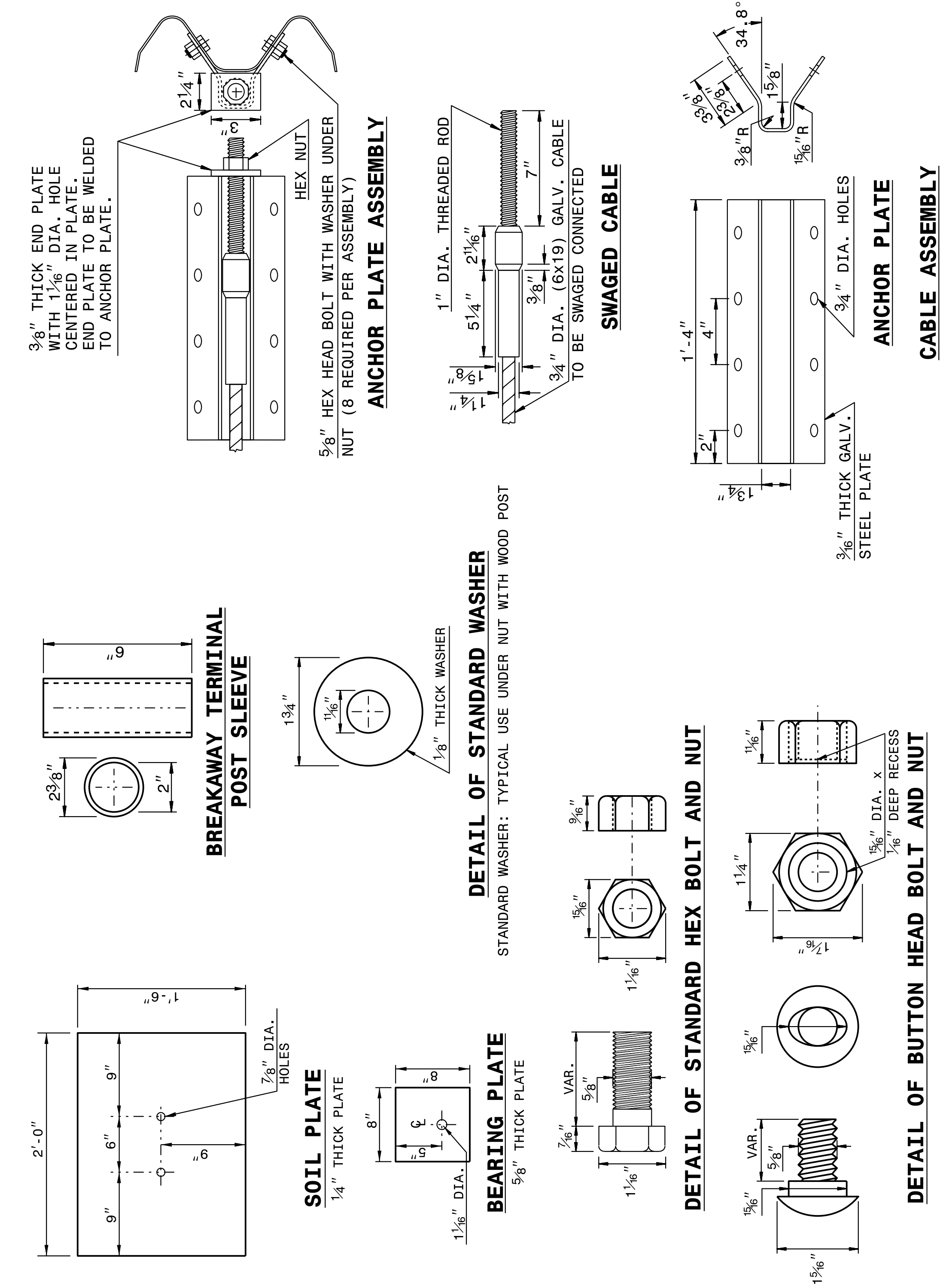
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Seal S. Howerton
Professional Engineer
Seal 022966
North Carolina
7/22/2017

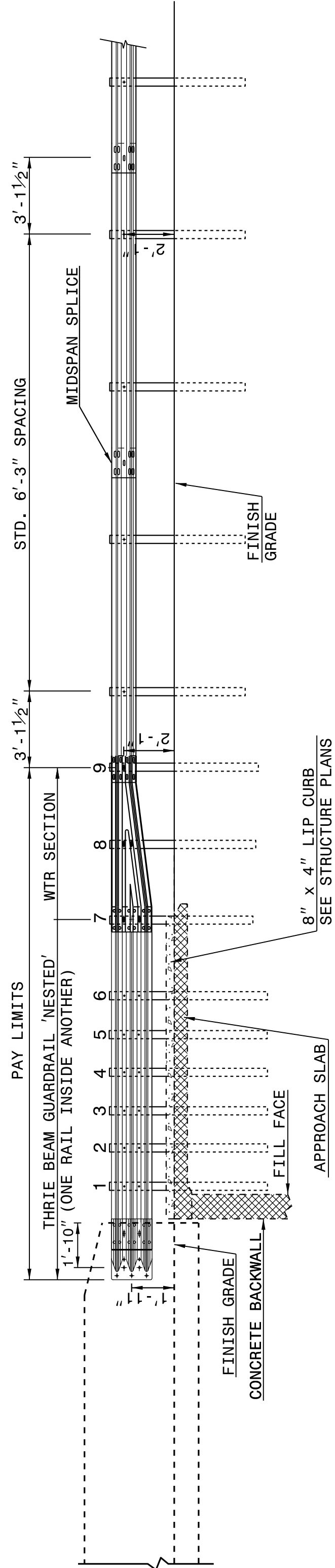
PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.64	2C-10

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Jhowerton AT CSO-252595

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

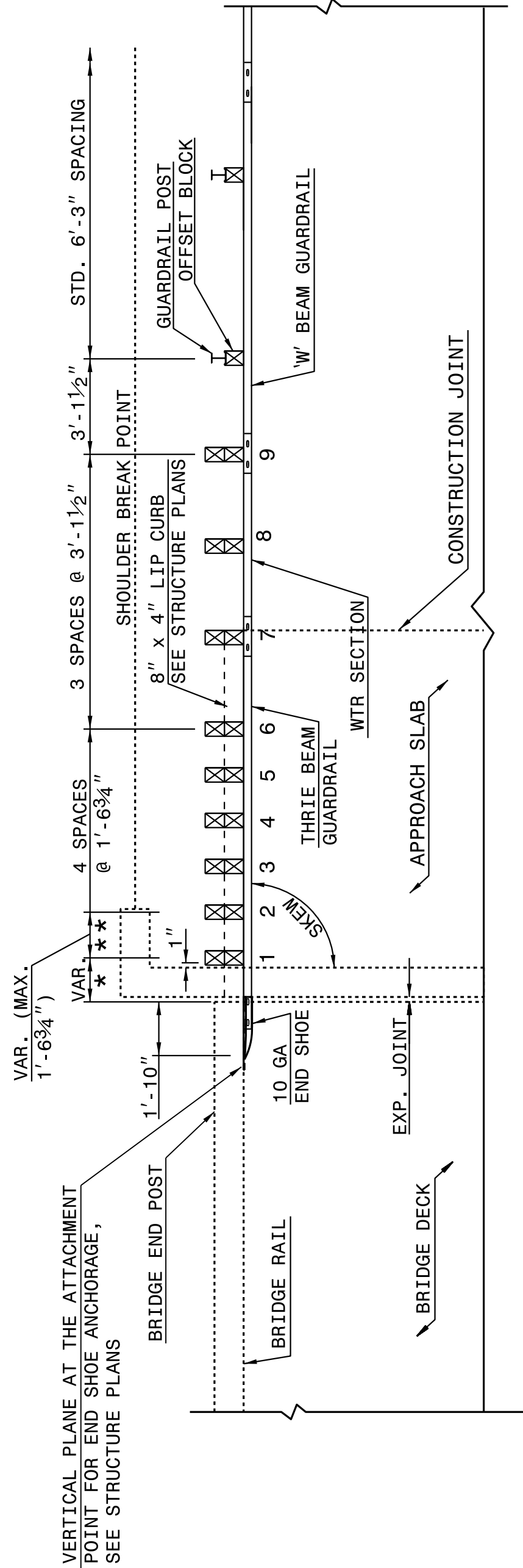
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03



ELEVATION

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.



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

SHEET 2 OF 7
862D03

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

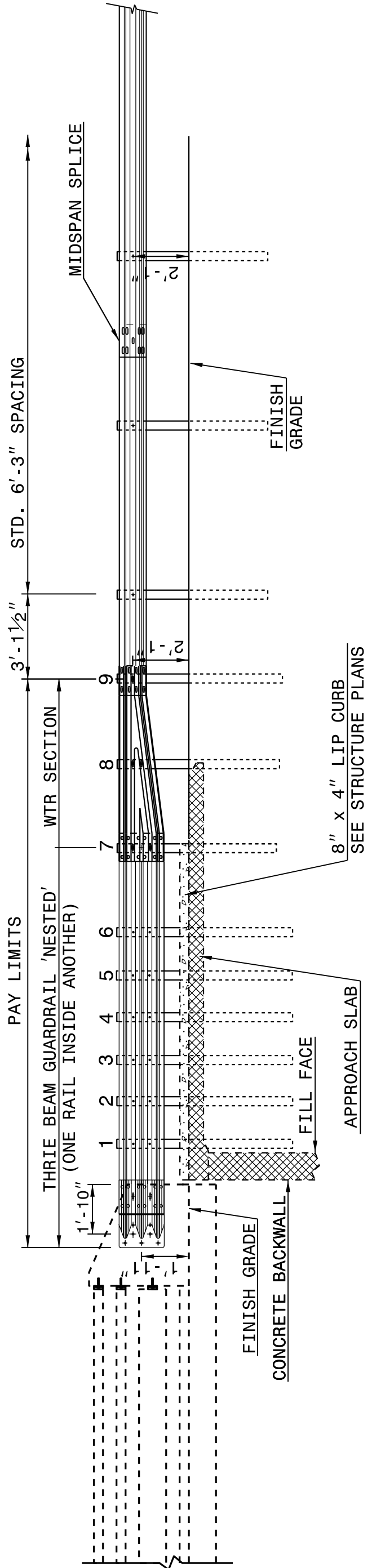
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03

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

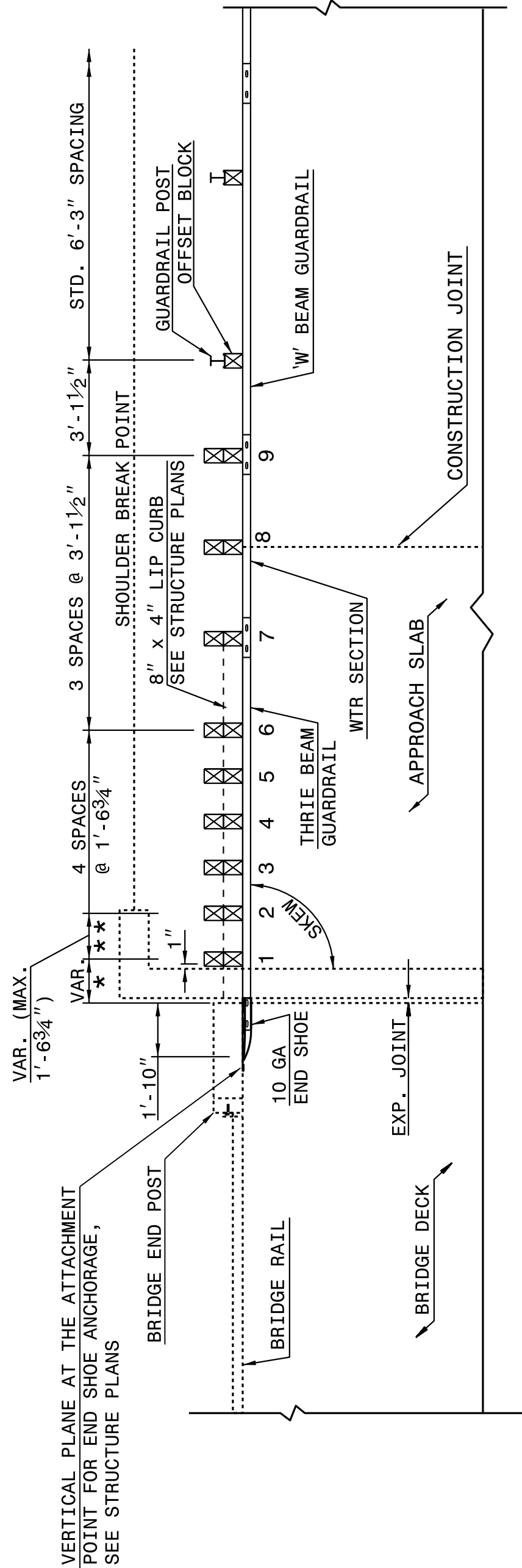
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

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.



PLAN VIEW
**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

SHEET 1 OF 7
862D03

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.: DATE:

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DocuSigned by:
Jael S. Howerton
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8/22/2017
NORTH CAROLINA
PROFESSIONAL
SEAL
022966
ENGINEER
Jael S. Howerton

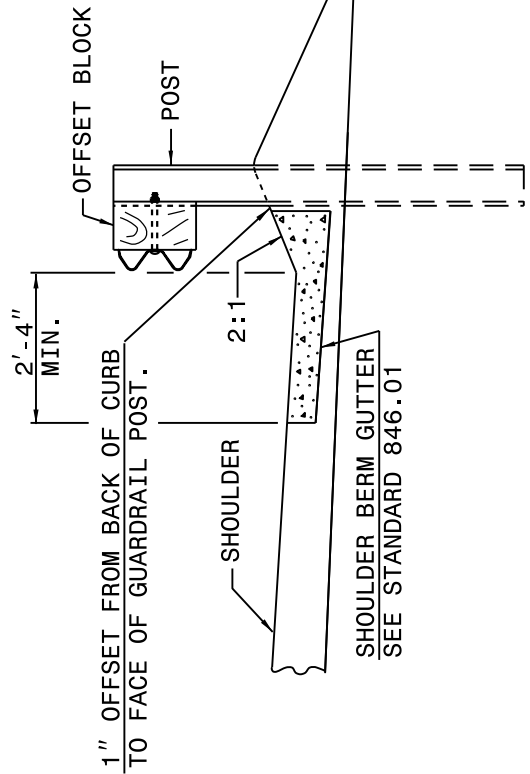
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Howerton AT CSO-232595

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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

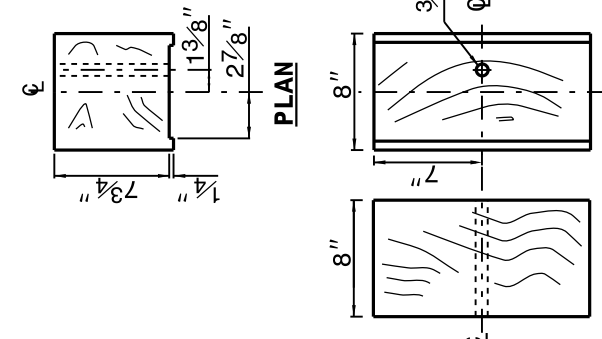
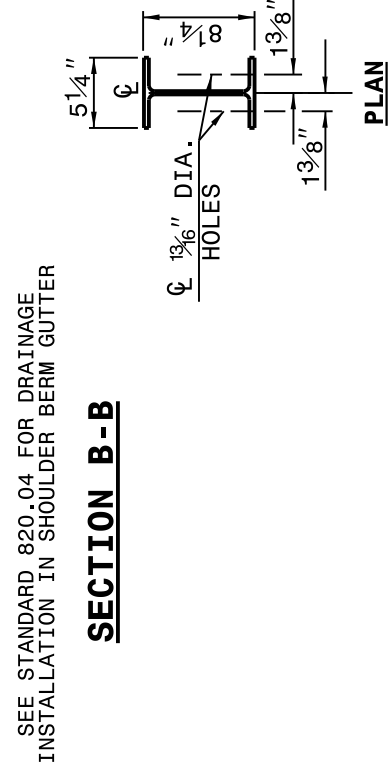
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STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT TYPE B-83

SHEET 6 OF 7
862D03

SECTION A-A

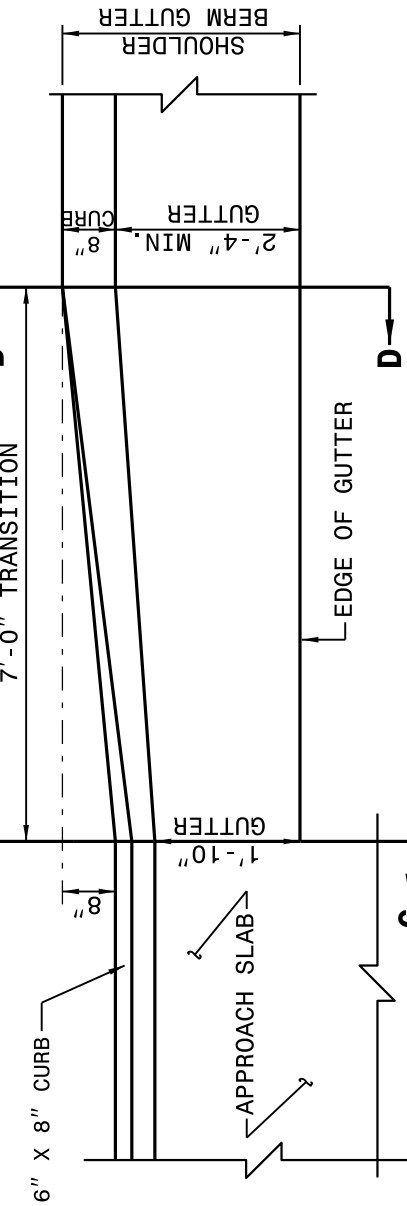


SECTION B-B



8' X 8' X 14' ROUTED
WOOD OFFSET BLOCK

PLAN VIEW



TRANSITION APPROACH SLAB CURB TO SHOULDER BERM GUTTER

GUARDRAIL ANCHOR UNIT TYPE B-83

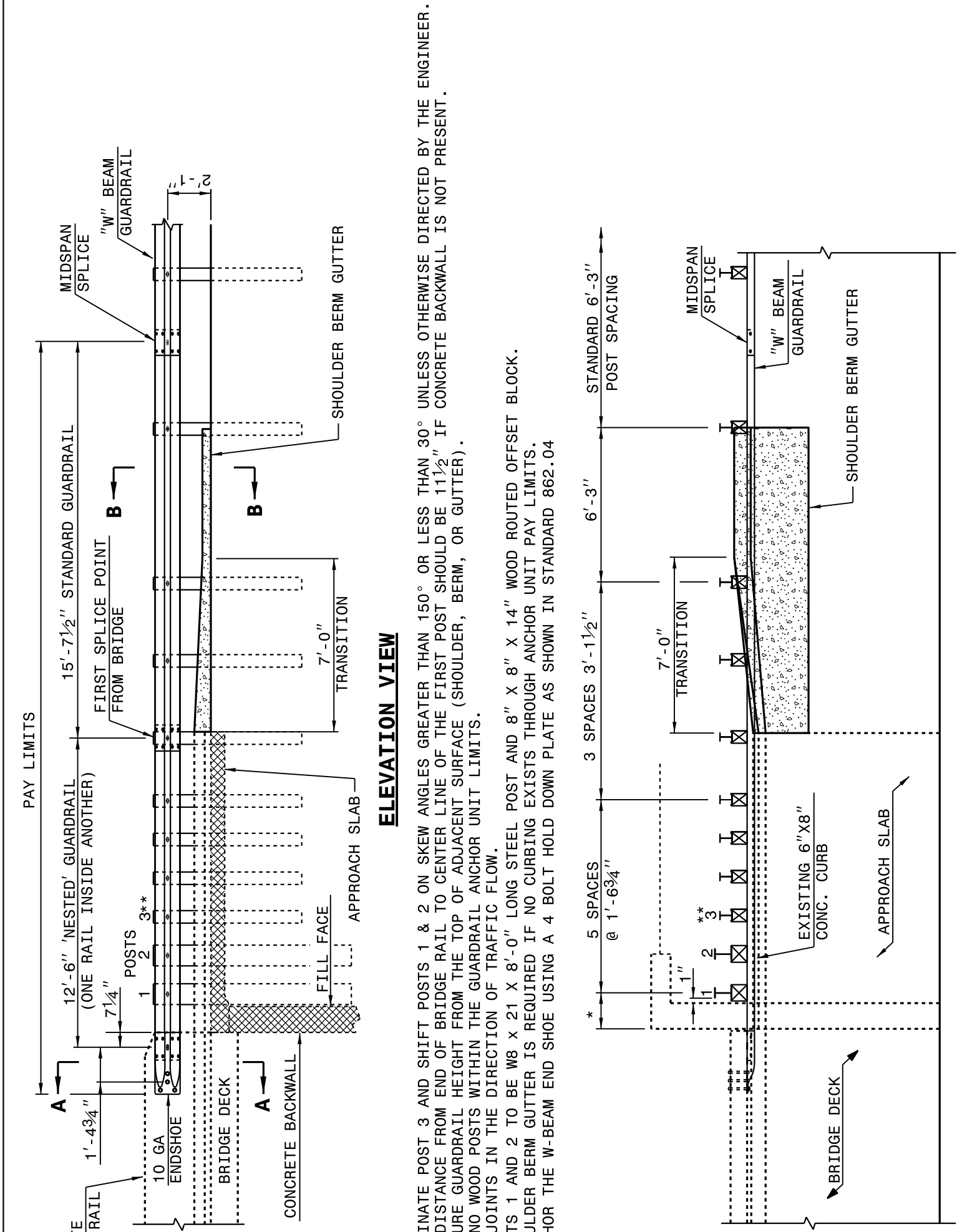
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STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT TYPE B-83

SHEET 6 OF 7
862D03

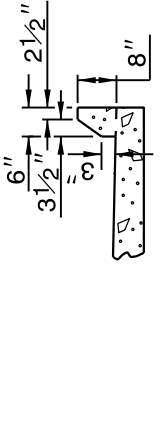
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

NOTE:
**ELIMINATE POST 3 AND SHIFT POSTS 1 & 2 ON SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
-POSTS 1 AND 2 FROM THE CENTERLINE OF BRIDGE DECK TO THE CENTERLINE OF APPROACH SLAB SHOULD BE 11'2". IF CONCRETE BACKWALL IS NOT PRESENT.
-USE STANDARD 846.01 FOR BRIDGE DECK AND APPROACH SLAB. (SHOULDER, BERM, OR GUTTER).
-USE NO WOOD POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-POSTS 1 AND 2 TO BE W8 X 21 X 8'-0" LONG STEEL POST AND 8" X 8" X 14" WOOD ROUTED OFFSET BLOCK.
-SHOULDER BERM GUTTER IS REQUIRED IF NO CURBING EXISTS THROUGH ANCHOR UNIT PAY LIMITS.
-ANCHOR THE W-BEAM END SHOE USING A 4 BOLT HOLD DOWN PLATE AS SHOWN IN STANDARD 862-04

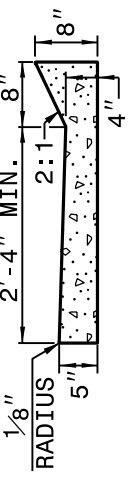
ELEVATION VIEW



SECTION C-C
APPROACH SLAB CURB



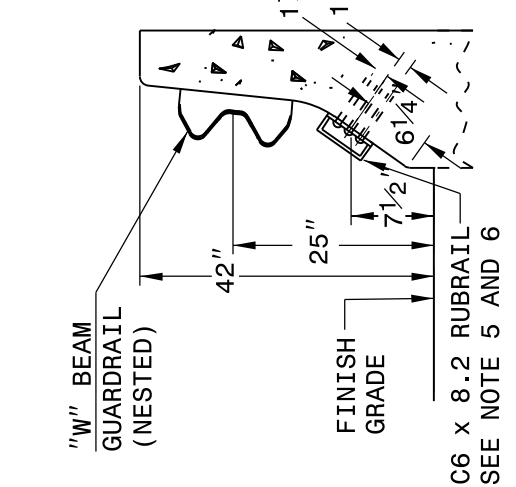
SECTION D-D
SHOULDER BERM GUTTER



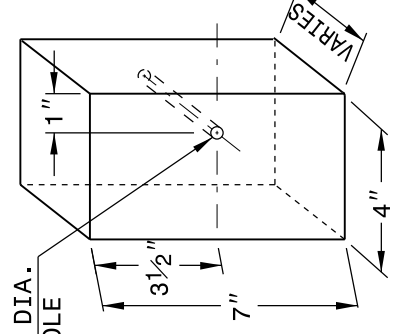
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

SHEET 5 OF 7
862D03



SECTION A-A

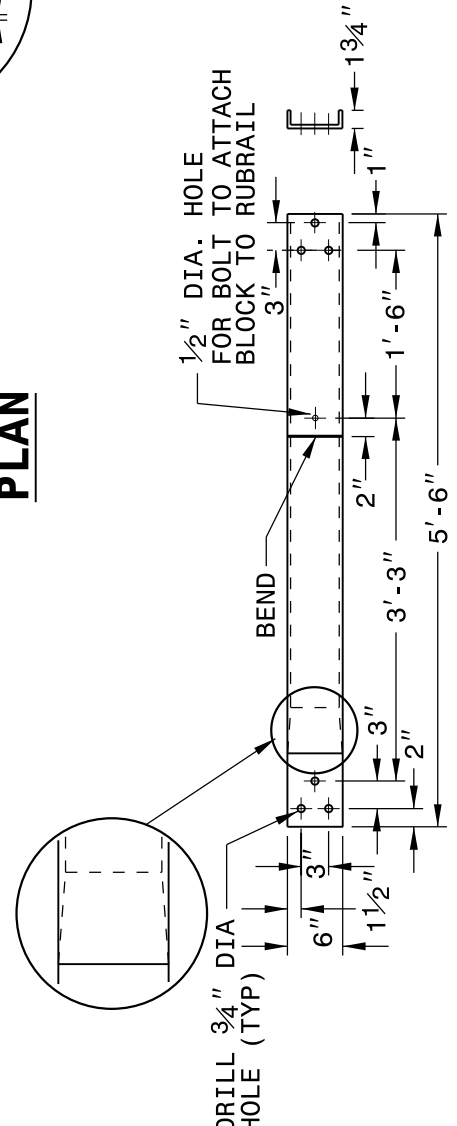
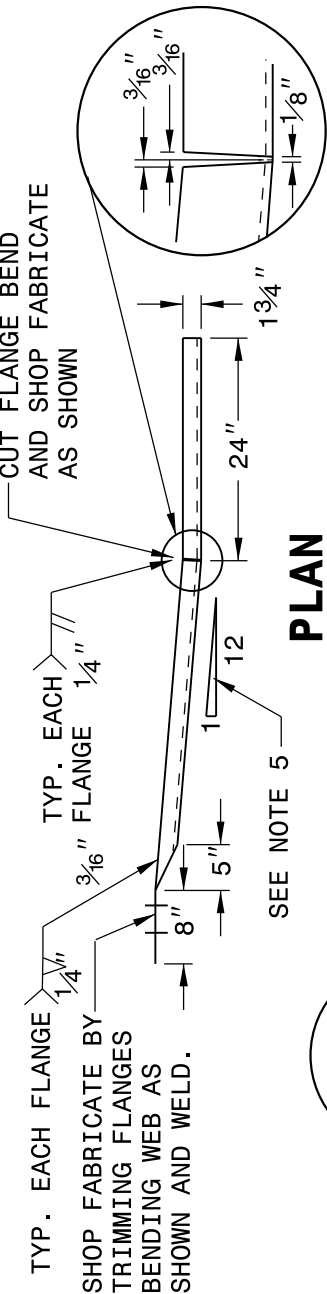


SECTION B-B

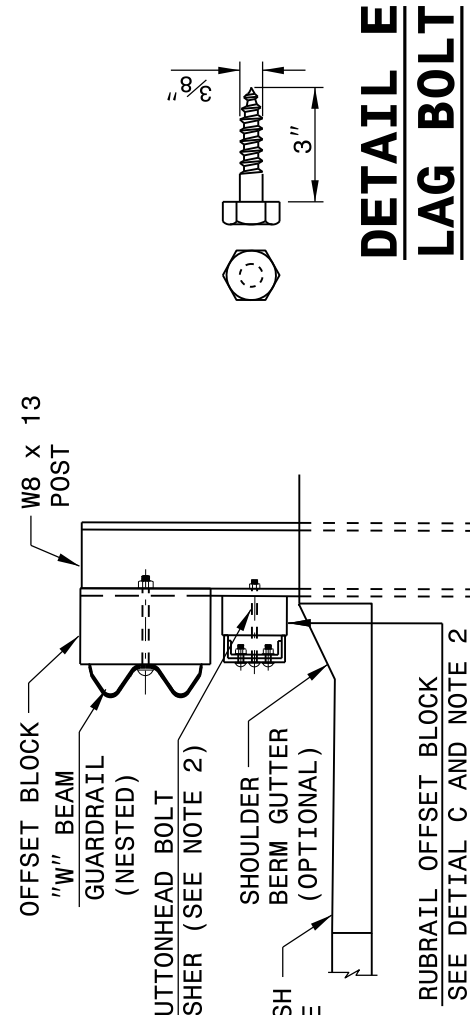
POST	THICKNESS	BOLT LENGTH
1	4 1/4"	9"
2	3 1/4"	5"*
3	2"	6"
4	1"	3"*

* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH TO BLOCK. RUBRAIL NOT ATTACHED TO BLOCK.

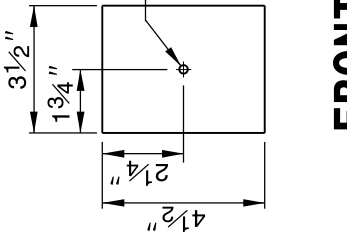
DETAIL C
RUBRAIL BLOCKOUT



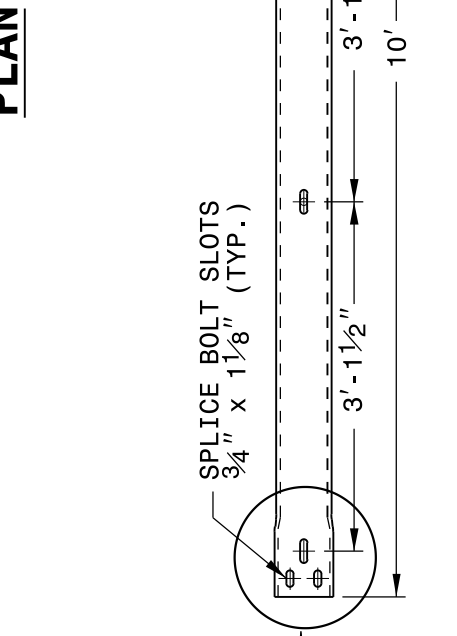
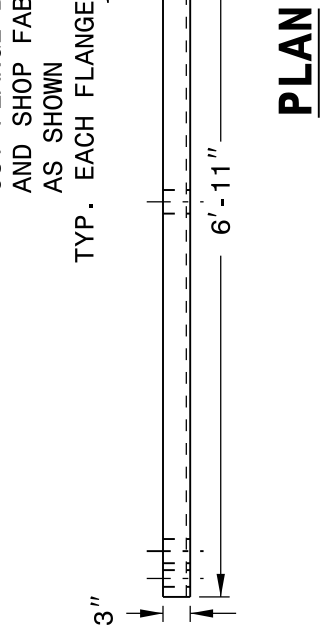
DETAIL A
C6 x 8.2 RUBRAIL



SECTION C-C



DETAIL D
SLOPED RUBRAIL BLOCKOUT

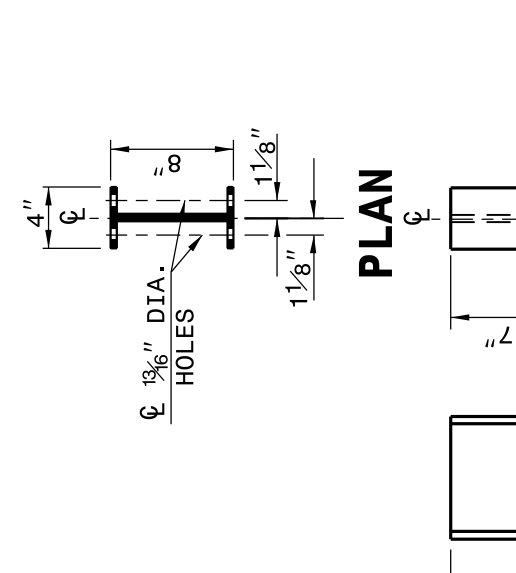


DETAIL B
BENT PLATE RUBRAIL

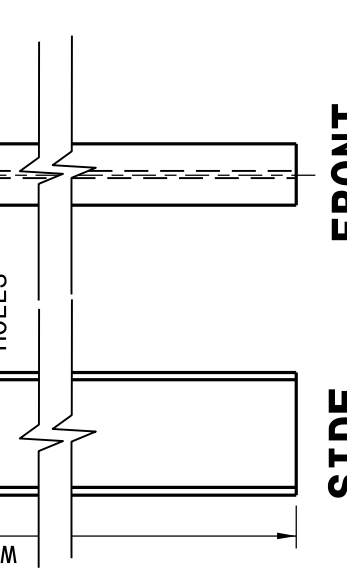
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

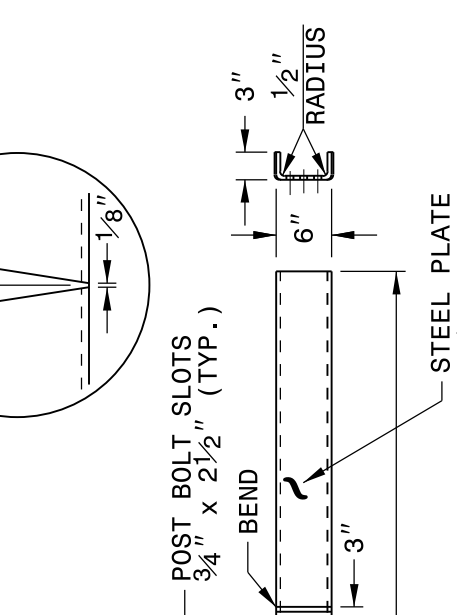
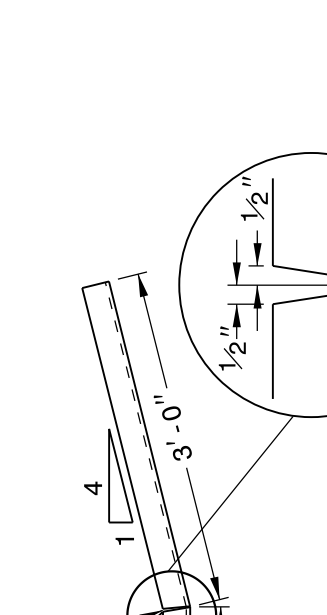
SHEET 5 OF 7
862D03



DETAIL E
LAG BOLT



DETAIL F
STEEL POST
"W8 X 13 X 7'-6"



DETAIL B
BENT PLATE RUBRAIL

SEE TITLE BLOCK

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

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Office 919-707-6950 FAX 919-250-4119

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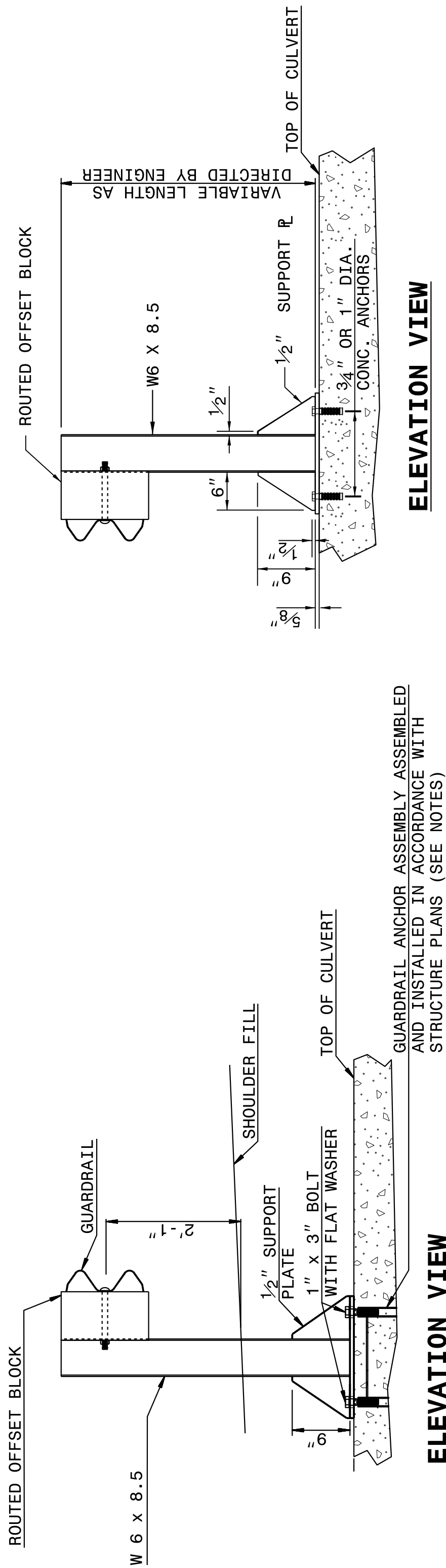
DocuSigned by:
Jael S. Howerton
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NORTH CAROLINA
PROFESSIONAL
SEAL
022966
ENGINEER
Jael S. Howerton
8/22/2017

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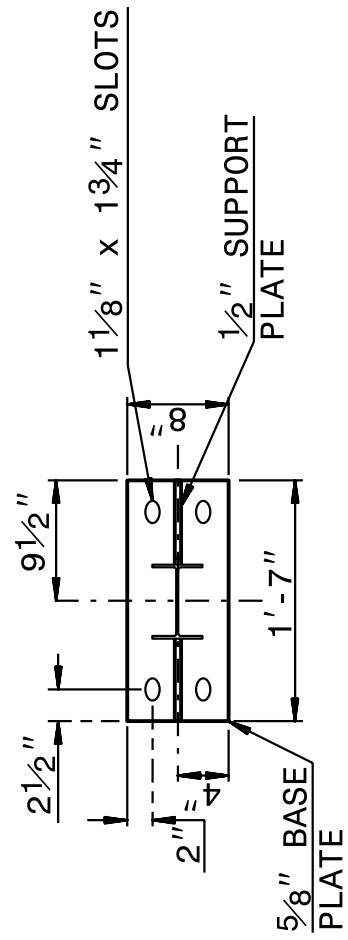
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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

SHEET 7 OF 7
862D03

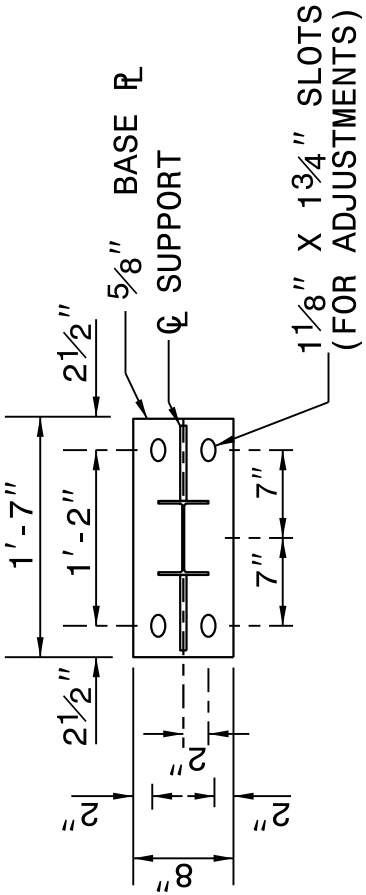


ELEVATION VIEW



PLAN VIEW

ELEVATION VIEW



PLAN VIEW

NOTES FOR:

- 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.

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

SHEET 7 OF 7
862D03

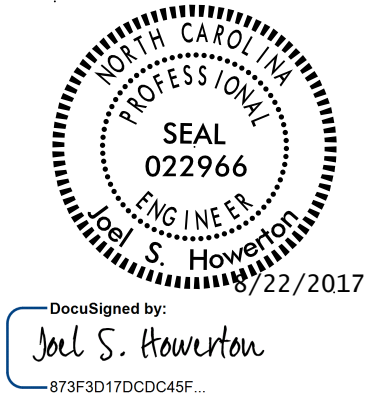
ANCHORAGE FOR GUARDRAIL POST ON BOX CULVERT

**CONTRACT STANDARDS
AND DEVELOPMENT UNIT**
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ORIGINAL BY: J HOWERTON DATE: 06-22-12
MODIFIED BY: DATE:
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FILE SPEC.: DATE:

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PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.64	2C-14

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L- Sta. 11+00.00	-L- Sta. 13+71.31	204	1,213	1,009	
-L- Sta. 14+88.69	-L- Sta. 18+00.00	225	1,228	1,003	
SUBTOTAL:		429	2,441	2,012	
PROJECT TOTALS:		429	2,441	2,012	
EST 5% TO REPLACE TOP SOIL ON BORROW PIT				101	
GRAND TOTAL:		429		2,113	
SAY:		450		2,220	

UNDERCUT EXCAVATION = 400 CY (Contingency)
SELECT GRANULAR MATERIAL = 400 CY (Contingency)
GEOTEXTILE FOR SOIL STABILIZATION = 400 SY (Contingency)

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement, and Removal of Existing Pavement will be paid for at the contract lump sum price for Grading.

Note: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

SHOULDER BERM GUTTER SUMMARY

IN LINEAR FEET

LINE	Station	Station	LENGTH
-L- (RT)	13+49.00	13+60.31	11.31
-L- (LT)	13+49.00	13+60.31	11.31
		TOTAL:	22.62
		SAY:	25

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	11+00.00	12+00.00	CL	238.72			
-L-	12+00.00	13+71.31	CL		390.44		
-L-	14+88.69	16+75.00	CL		432.65		
-L-	16+75.00	18+00.00	CL	294.24			
		TOTAL:		532.96	823.10		
		SAY:		550	850		

GUARDRAIL SUMMARY

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

[illegible]

COMPUTED BY: RBR	DATE: 11/15/2015
CHECKED BY: ECOLOGICAL ENG., LLP	DATE: 11/15/2015

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.64	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SUBREGIONAL

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

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REVISIONS

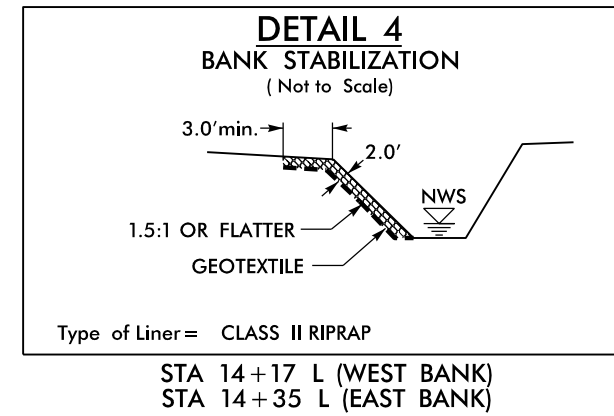
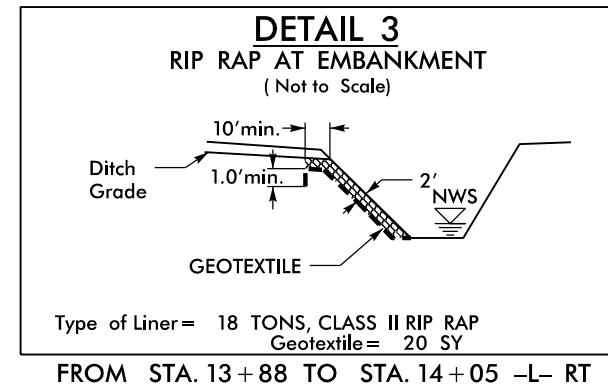
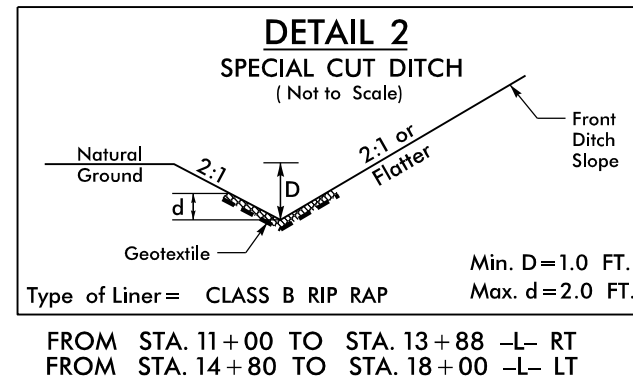
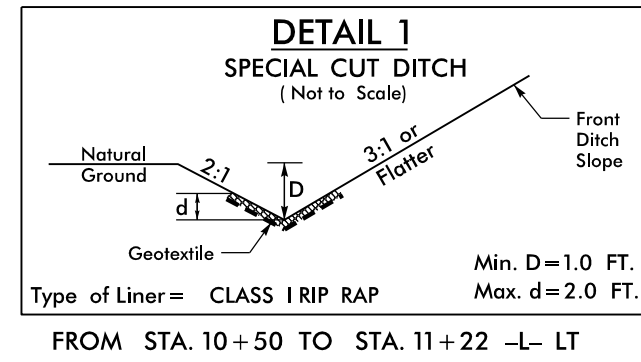
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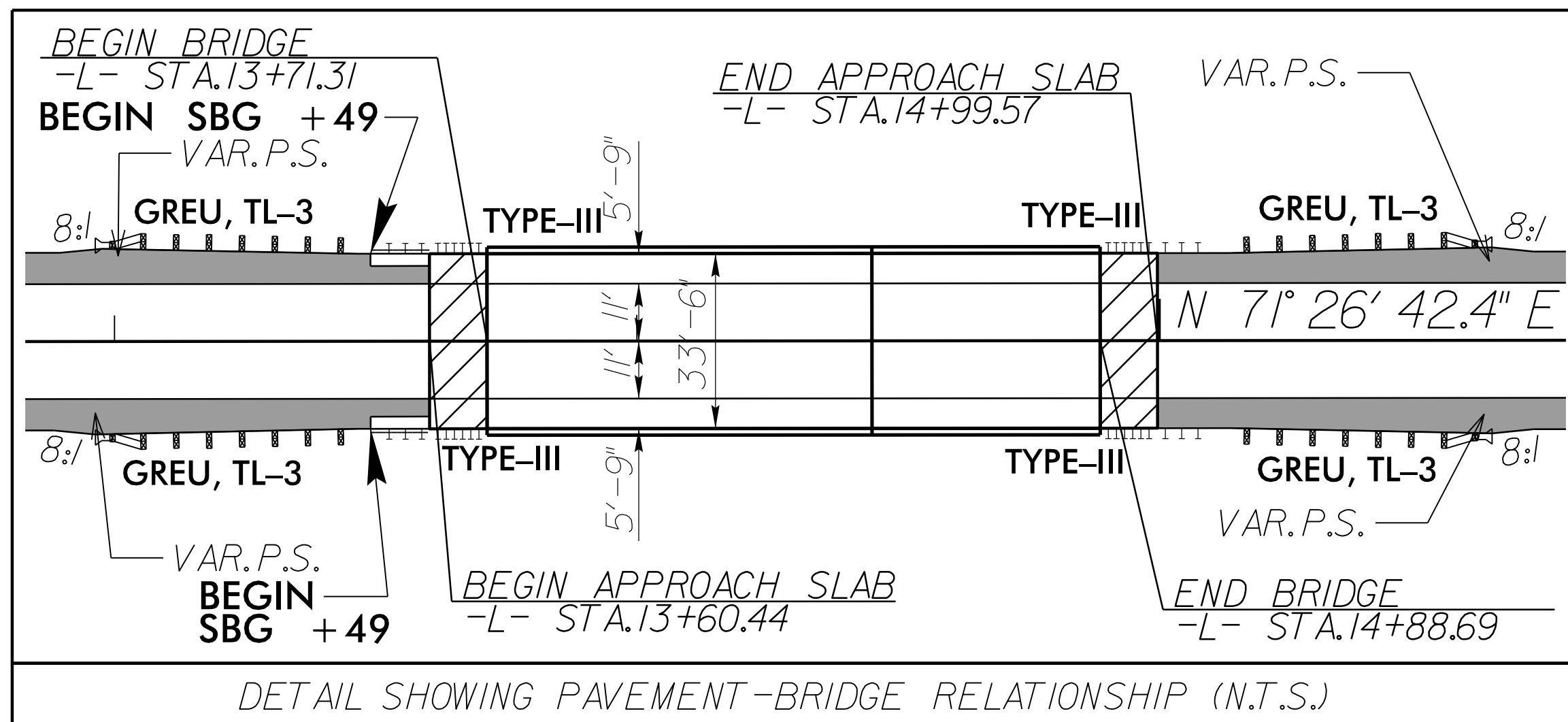
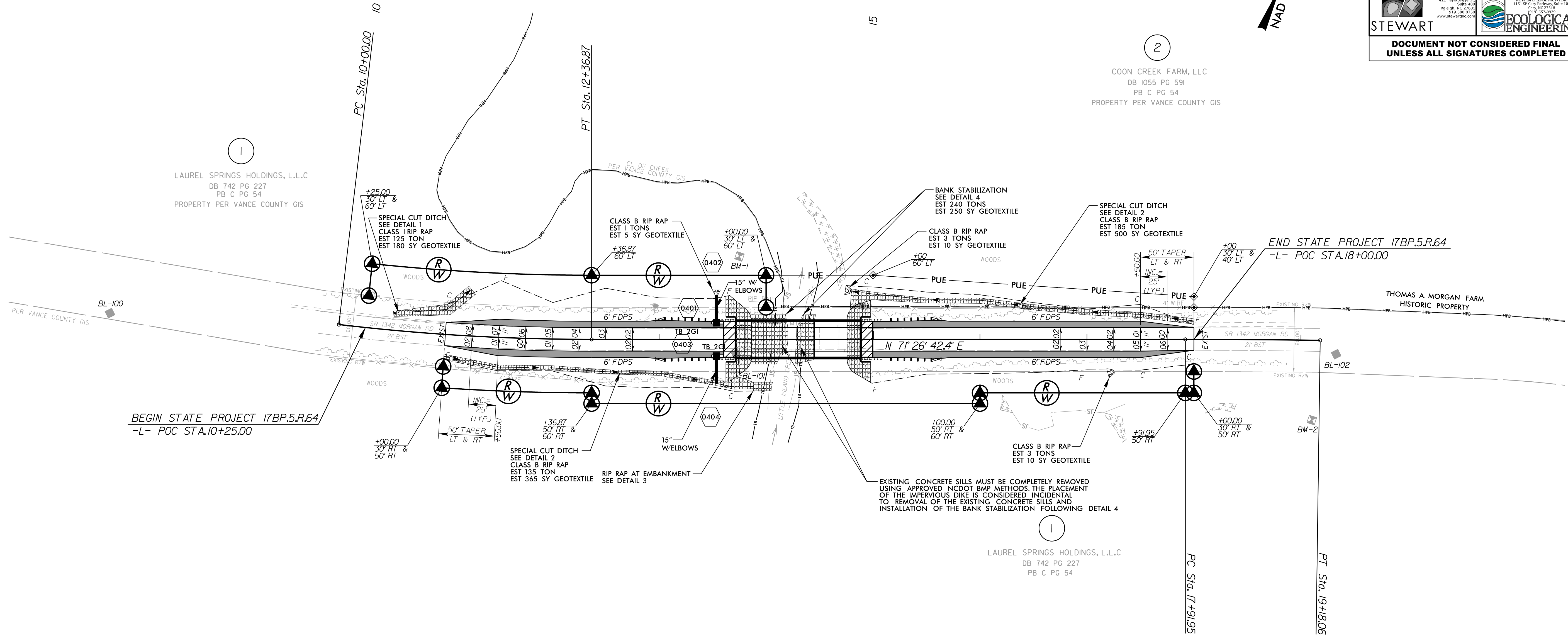
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 $\Delta = 6' 43' 54.7''$ (LT)
 $D = 2' 50' 31.0''$
 $L = 236.87'$
 $T = 118.57'$
 $R = 2,016.07'$
 $\text{Runoff} = 100'$
 $S_e = 4\%$

PI Sta 18+55.01
 $\Delta = 0' 47' 53.6''$ (RT)
 $D = 0' 37' 58.7''$
 $L = 126.11'$
 $T = 63.06'$
 $R = 9,052.04'$
 $\text{Runoff} = 100'$
 $S_e = 4\%$



2

COON CREEK FARM, LLC
DB 1055 PG 591
PB C PG 54
PROPERTY PER VANCE COUNTY GIS

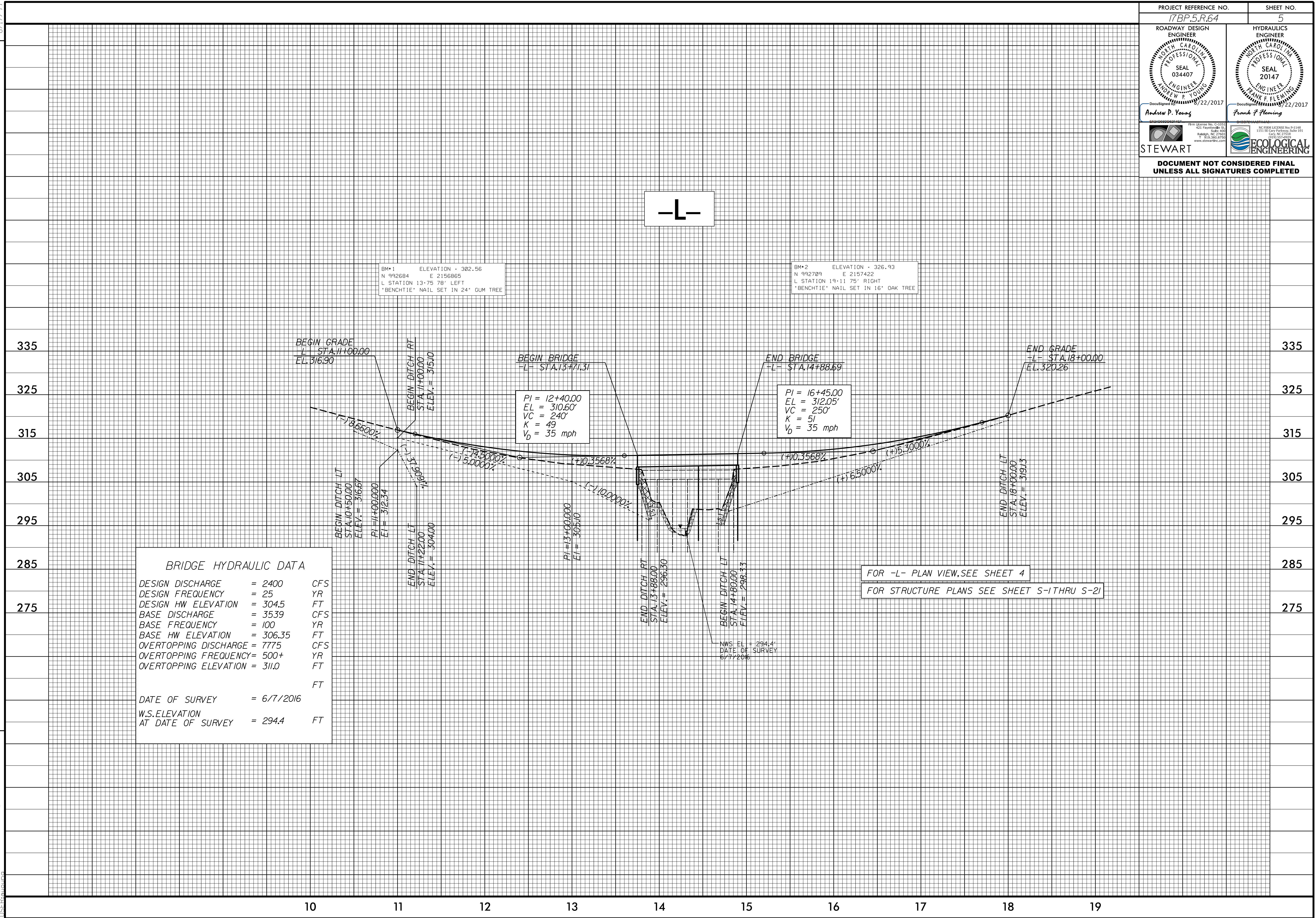


FOR -L- PROFILE, SEE SHEET 5

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-21

PROJECT REFERENCE NO.		SHEET NO.	
17BP.5.R.64		4	
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 034407 ANDREW P. YOUNG 9/27/2017		HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 20147 FRANK F. FLEMING 9/27/2017	
STEWART		ECOLOGICAL ENGINEERING	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

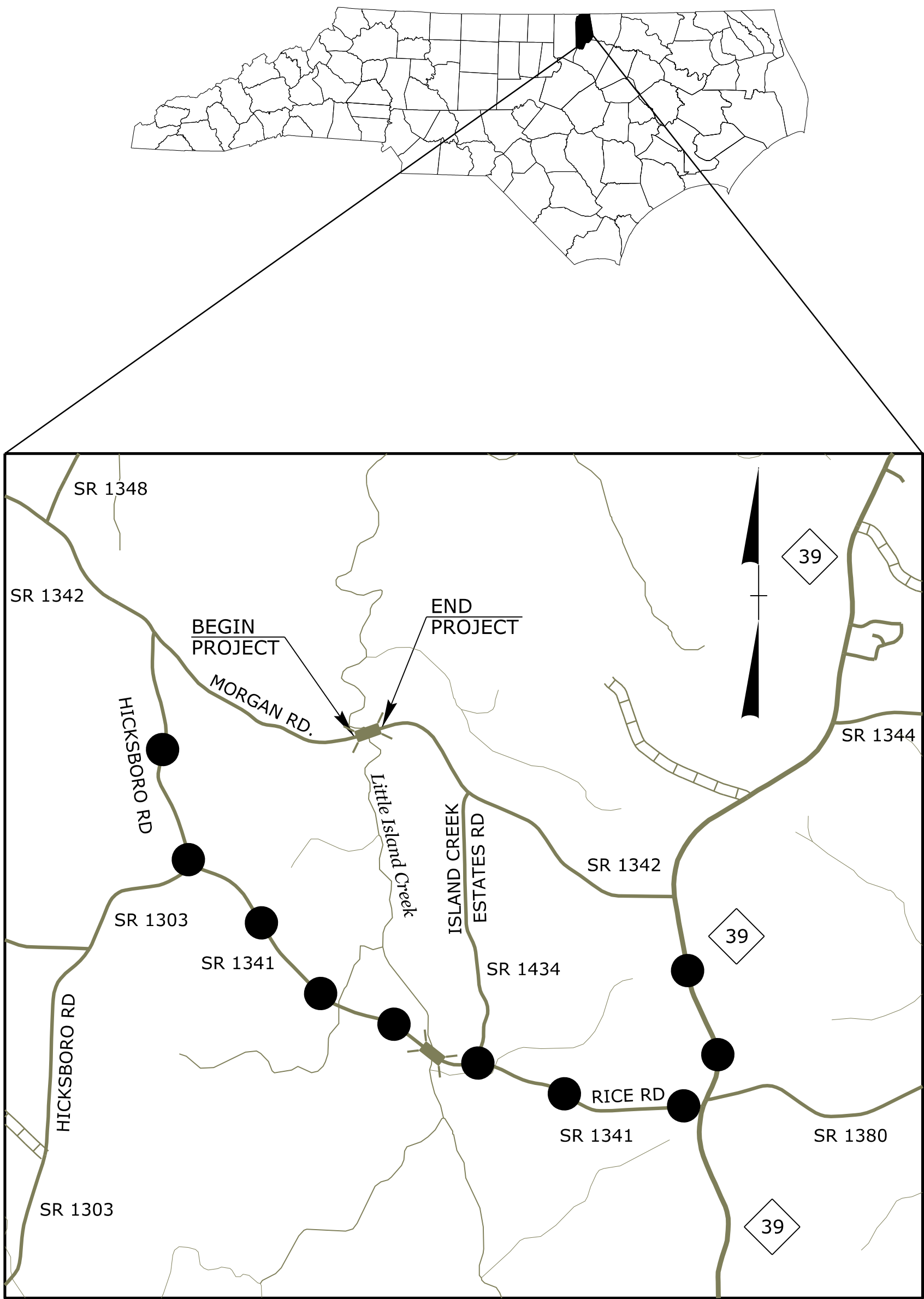
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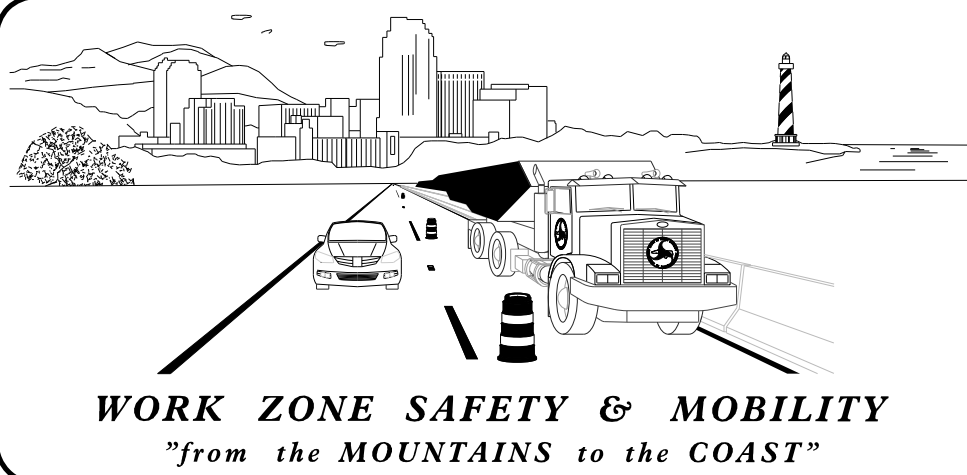
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

VANCE COUNTY

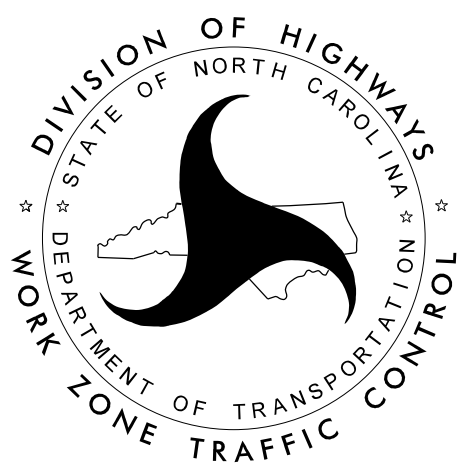


—●—●—●— OFF-SITE DETOUR



N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

ANDY YOUNG, PE TRAFFIC CONTROL PROJECT ENGINEER
MICHAEL BURNS, PE TRAFFIC CONTROL DESIGN ENGINEER



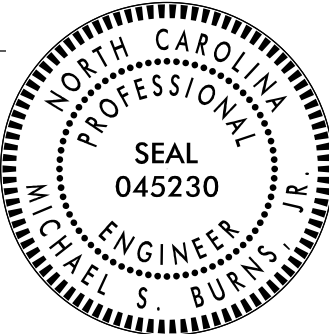
PLANS PREPARED BY:



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

APPROVED: Michael S. Burns, Jr.
DATE: 8/18/2017

SEAL



INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES, LOCAL NOTES, AND PHASING)
TMP-2	SPECIAL SIGN DESIGN
TMP-3	OFF-SITE DETOUR

SHEET NO.
TMP-1

17BP.5.R.64

TIP PROJECT:

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - 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:

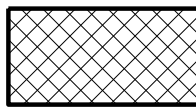
STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1130.01	DRUM
1145.01	BARRICADES

LEGEND

GENERAL

-  DIRECTION OF TRAFFIC FLOW
-  DIRECTION OF PEDESTRIAN TRAFFIC FLOW
-  EXIST. PVMT.
-  NORTH ARROW
-  PROPOSED PVMT.
-  TEMP. SHORING (LOCATION PURPOSES ONLY)

 WORK AREA

 REMOVAL

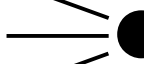
SIGNALS

-  EXISTING
-  PROPOSED
-  TEMPORARY

PAVEMENT MARKINGS

-  EXISTING LINES
-  TEMPORARY LINES

TRAFFIC CONTROL DEVICES

-  BARRICADE (TYPE III)
-  CONE
-  DRUM
-  SKINNY DRUM
-  TUBULAR MARKER
-  TEMPORARY CRASH CUSHION
-  FLASHING ARROW BOARD
-  FLAGGER
-  LAW ENFORCEMENT
-  TRUCK MOUNTED ATTENUATOR (TMA)
-  CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

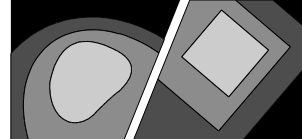
-  PORTABLE SIGN
-  STATIONARY SIGN
-  STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

-  CRYSTAL/CRYSTAL
-  CRYSTAL/RED
-  YELLOW/YELLOW

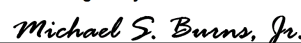
PAVEMENT MARKING SYMBOLS

-  PAVEMENT MARKING SYMBOLS

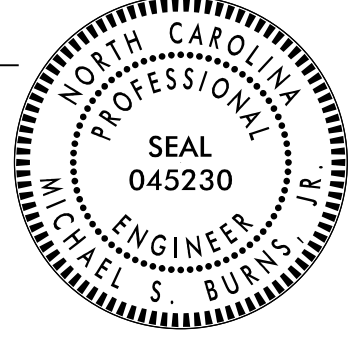


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T 919.380.8750
www.stewartinc.com

STEWART

APPROVED: 
DATE: 8/18/2017

SEAL





ROADWAY STANDARD
DRAWINGS & LEGEND

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MANAGEMENT STRATEGIES

DURING CONSTRUCTION OF PROPOSED STRUCTURE BRIDGE No. 78 OVER LITTLE ISLAND CREEK, SR 1342 (MORGAN RD) WILL BE CLOSED TO THROUGH TRAFFIC. THROUGH TRAFFIC ON SR 1342 (MORGAN RD) WILL BE MAINTAINED USING AN OFF-SITE DETOUR.

THE OFF-SITE DETOUR WILL INCLUDE SR 1303, SR 1341, AND NC 39 (SEE SHEET TMP-3).

ACCESS TO ALL RESIDENCES AND BUSINESSES WITHIN THE PROJECT LIMITS MUST BE MAINTAINED AT ALL TIMES.

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

SIGNING

- A) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

- B) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

- C) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

LOCAL NOTES

1. NOTIFY THE ENGINEER AT LEAST 30 DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.
2. NOTIFY THE VANCE COUNTY SCHOOLS TRANSPORTATION DIRECTOR OF THE BRIDGE REMOVAL 30 DAYS PRIOR TO ROAD CLOSURE.
3. NOTIFY THE VANCE COUNTY EMERGENCY MANAGEMENT SERVICES DIRECTOR OF BRIDGE REMOVAL 30 DAYS PRIOR TO ROAD CLOSURE.

PHASING

STEP 1:

PROVIDE AND MAINTAIN CHANGEABLE MESSAGE SIGNS AT EACH END OF SR 1342 (MORGAN RD) FOR FOURTEEN (14) CALENDAR DAYS PRIOR TO ROAD CLOSURE, AS SHOWN ON TMP-3

STEP 2:

USING RSD 1101.03, SHEET 1 OF 9, SHEETS TMP-2 AND TMP-3, INSTALL ROAD CLOSURE AND DETOUR SIGNS, PLACE TYPE III BARRICADES TO CLOSE SR 1342 (MORGAN RD) TO THROUGH TRAFFIC, AND DETOUR TRAFFIC OFF-SITE. REMOVE CHANGEABLE MESSAGE SIGNS ONCE DETOUR IS IN PLACE.

STEP 3:

REMOVE THE EXISTING STRUCTURE.

STEP 4:

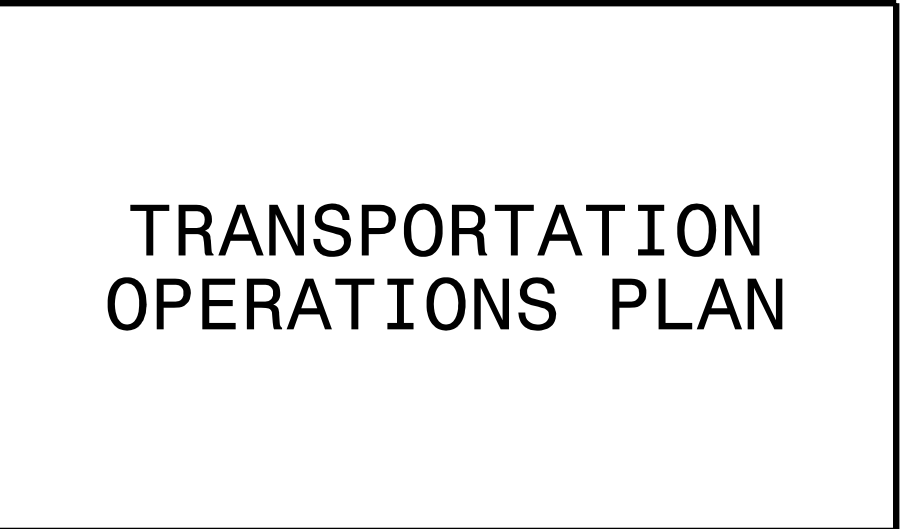
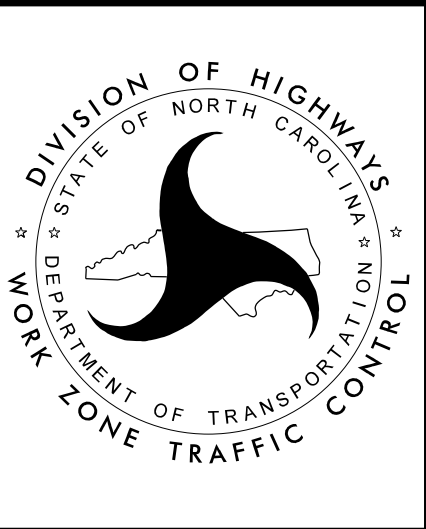
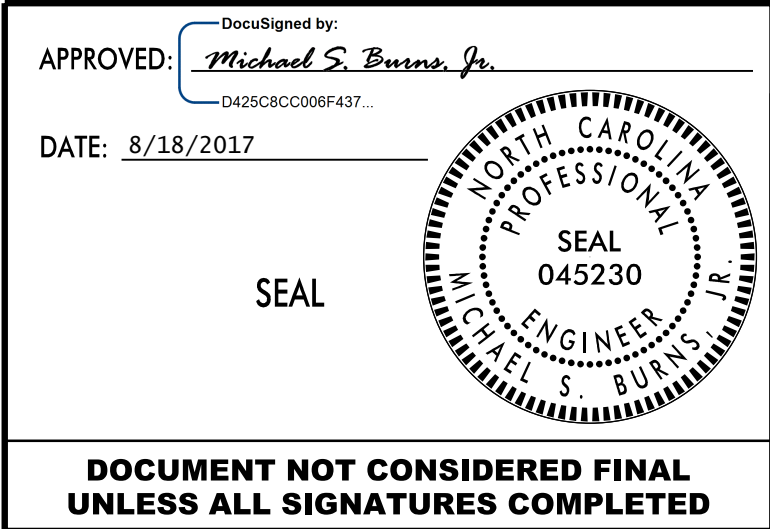
CONSTRUCT THE PROPOSED STRUCTURE AND ROADWAY.

STEP 5:

PLACE FINAL PAVEMENT MARKINGS ACCORDING TO THE PAVEMENT MARKING PLANS.

STEP 6:

OPEN SR 1342 (MORGAN RD) TO TRAFFIC AND REMOVE ALL WORK ZONE TRAFFIC CONTROL DEVICES.



SIGN NUMBER: MORGAN RD

TYPE: STATIONARY

QUANTITY: SEE PLANS

SIGN WIDTH: 3'-0"

HEIGHT: 2'-0"

TOTAL AREA: 6.0 Sq.Ft.

BORDER TYPE: INSET

RECESS: 0.38"

WIDTH: 0.5"

RADII: 1.5"

NO. Z BARS:

LENGTH:

BACKG COLOR: Fluorescent Orange

COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

DESIGN BY: MSB

PROJECT ID: 17BP.5.R.64

CHECKED BY: APY

LOCATION: VANCE COUNTY

Jan 05, 2017

DIV: 5

3'-0"

2'-0"

MORGAN RD

4.5"

6"D

4.5"

6"D

3"

2"

32"

2"

BORDER

R=1.5"

TH=0.5"

IN=0.38"

Panel Style: Traffic Control.ssi

M.U.T.C.D.: 2009 Edition

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner																												Series/Size Text Length	
	M	O	R	G	A	N																						D 2000	
	2	8.1	13.8	18.9	23.8	29.9																							32
	R	D																											D 2000
	13.4	18.5																											9.2

FILENAME: 900078_TC_TMP-02

NORTH CAROLINA D.O.T. SIGN DETAIL

8/18/2017
\\TCP\900078_TC_TMP-02.dgn
USER:mrburns

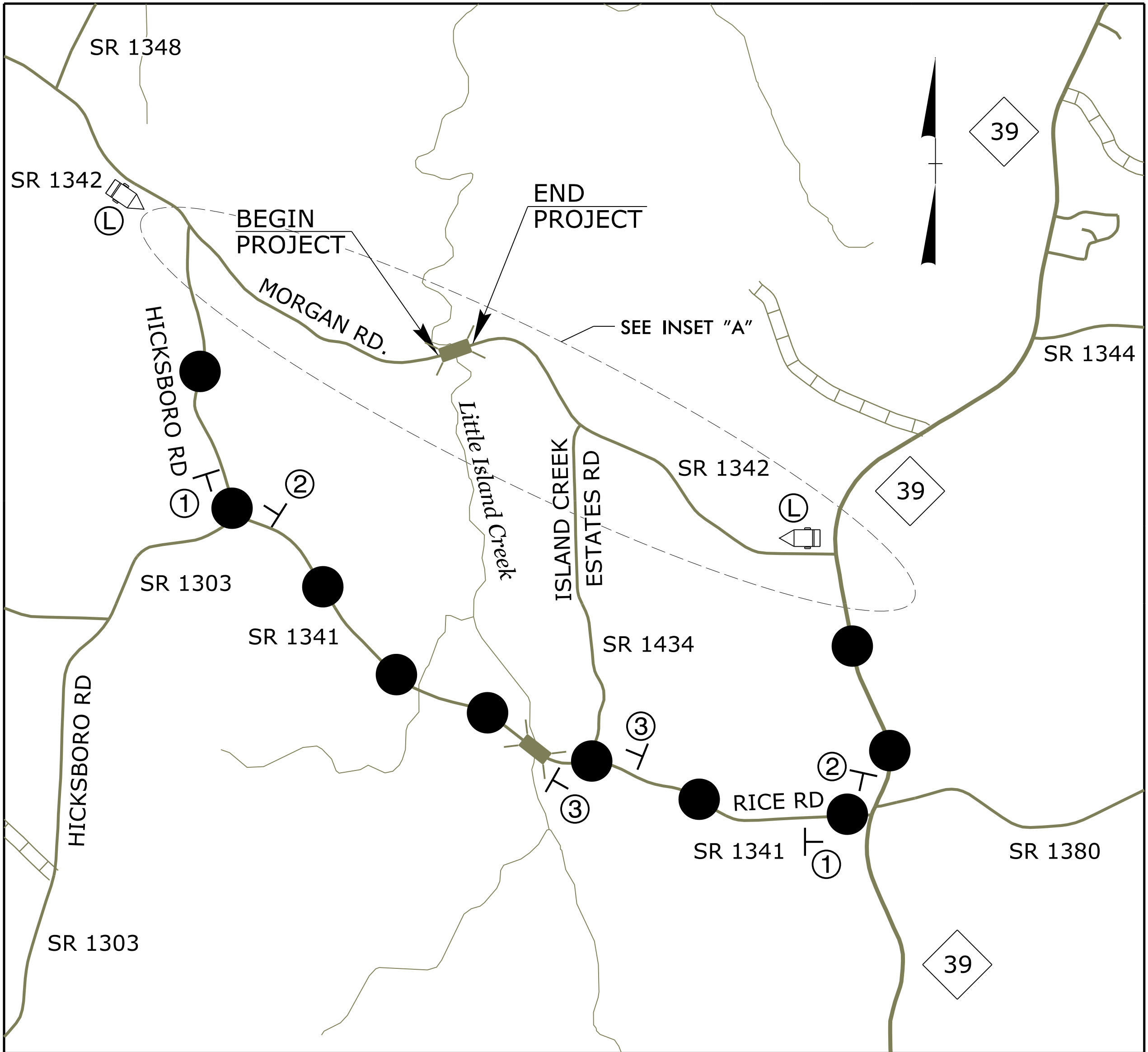
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www.stewartinc.com

APPROVED:
DATE: 8/18/2017

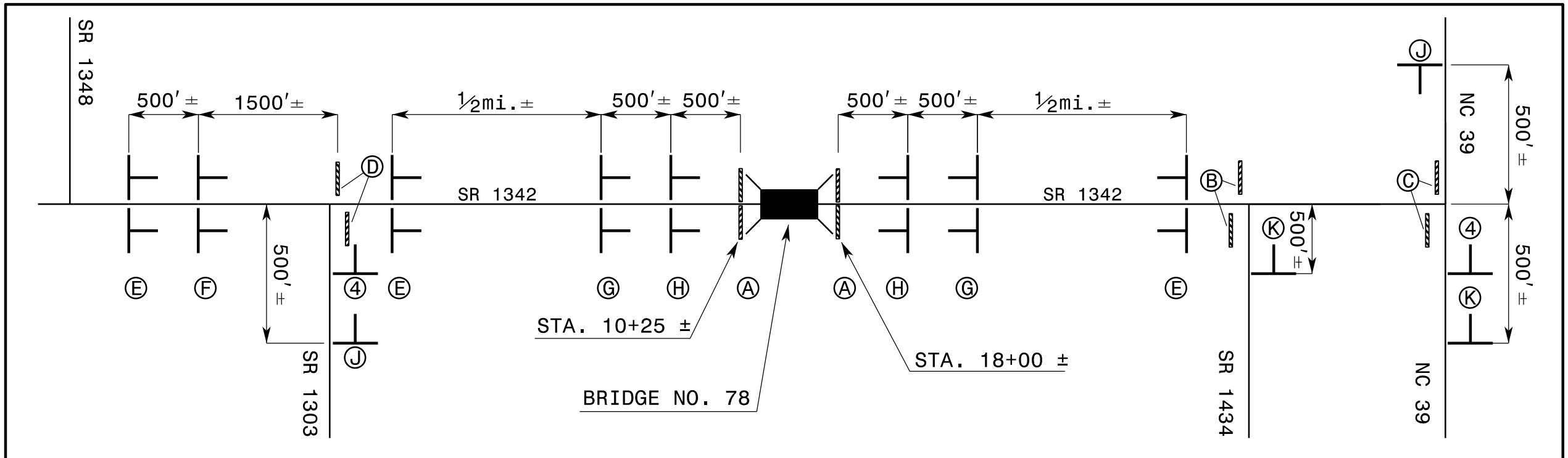
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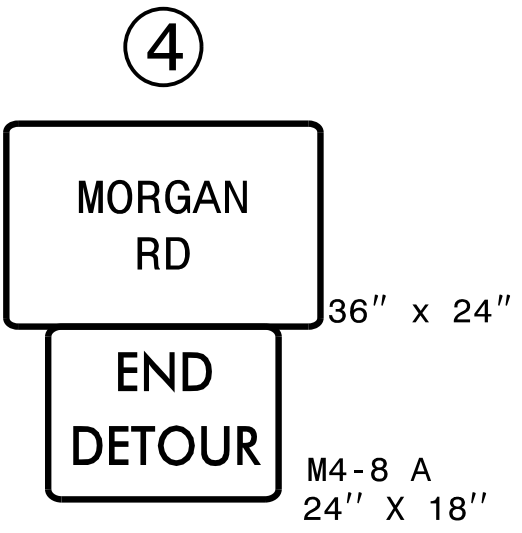
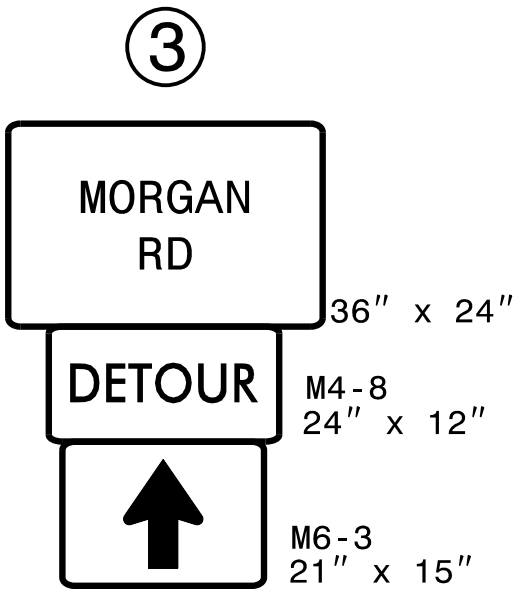
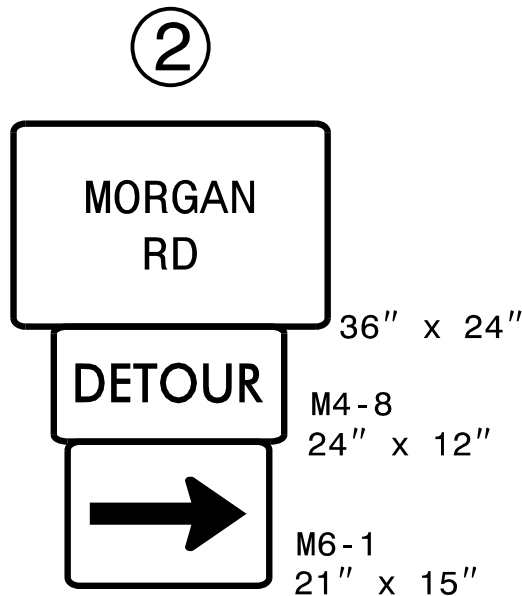
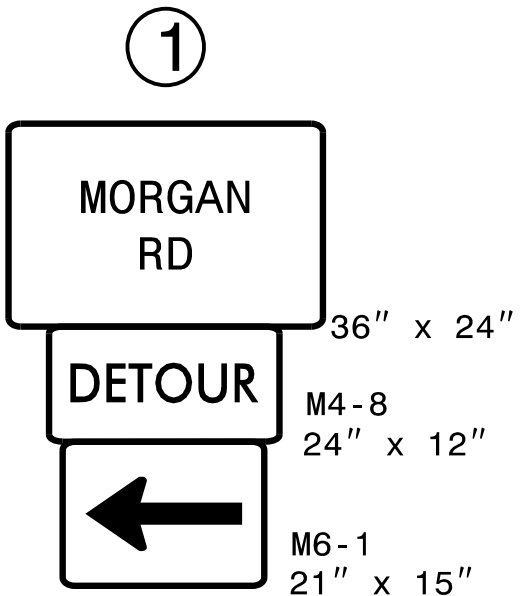
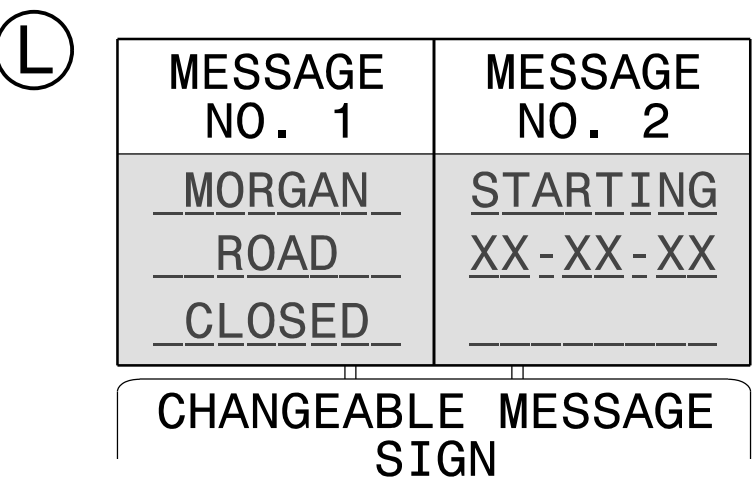
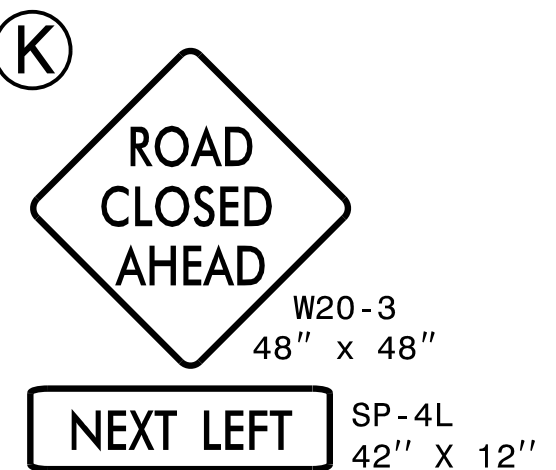
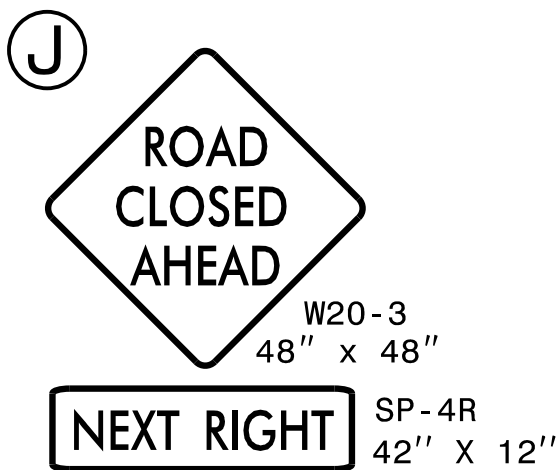
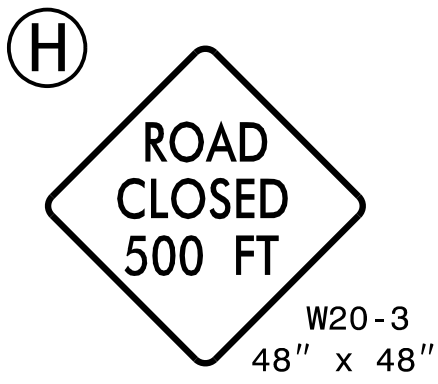
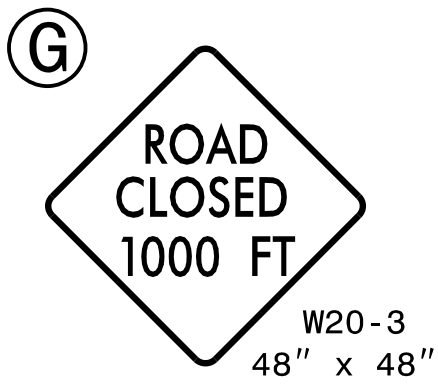
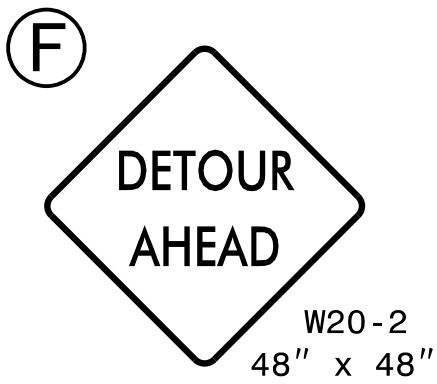
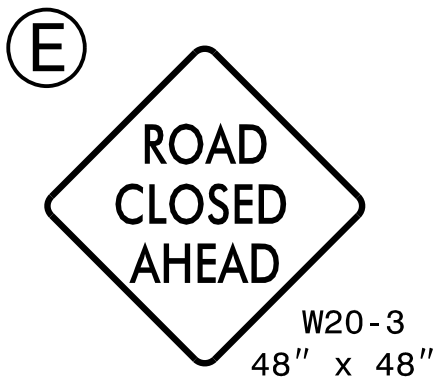
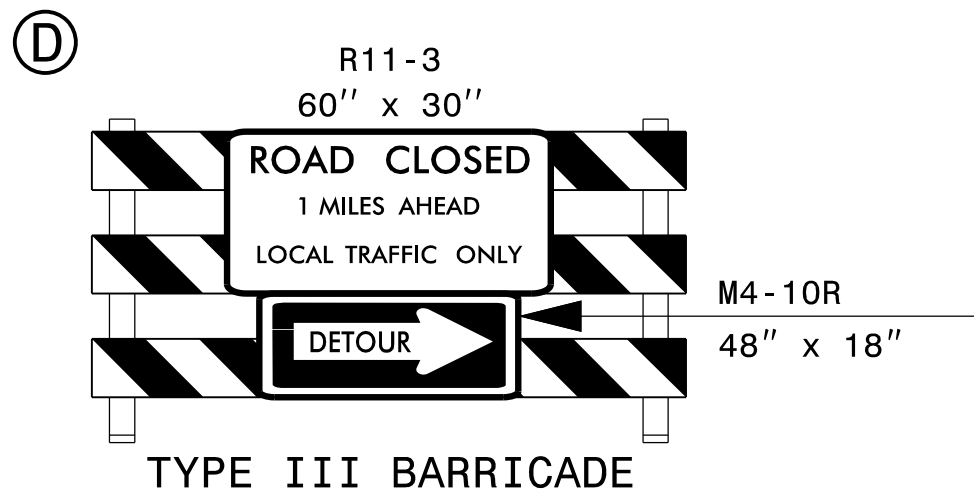
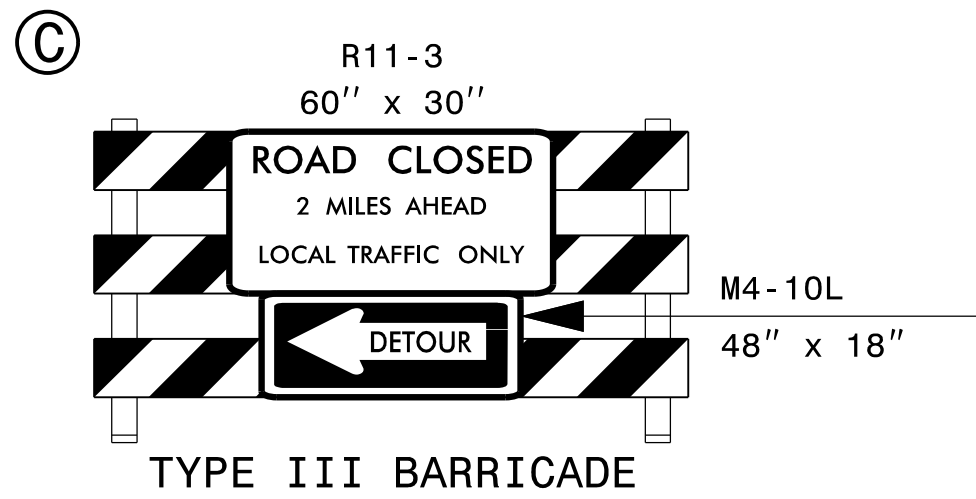
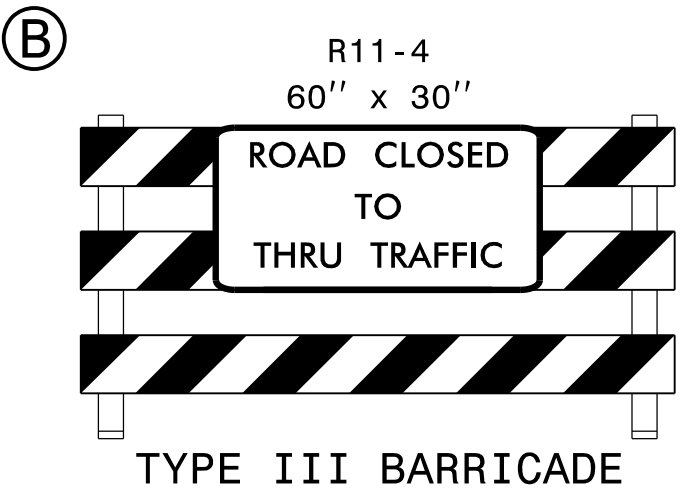
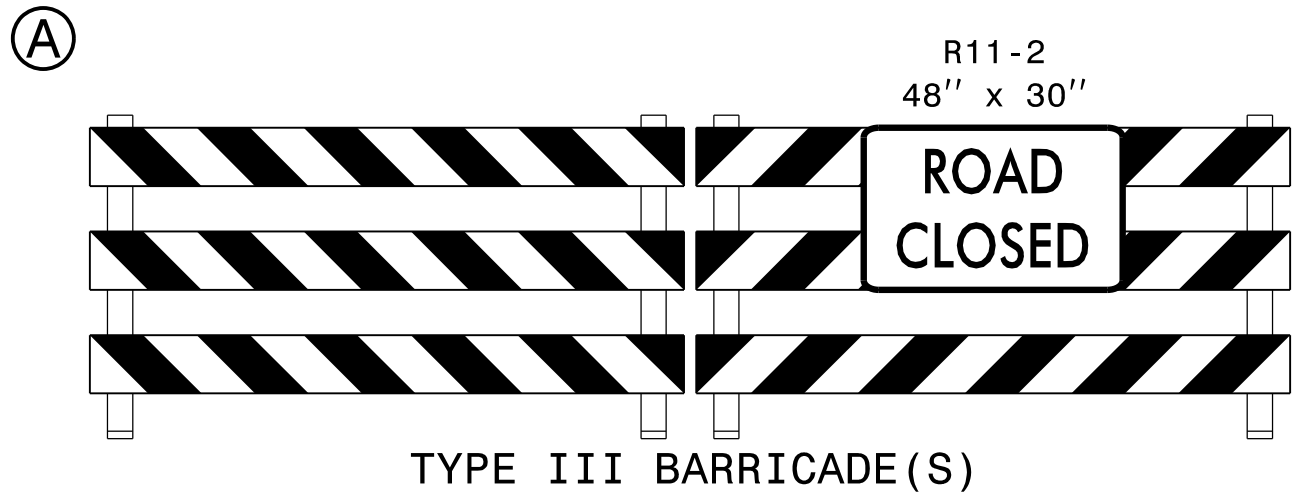
SPECIAL SIGN
DESIGN



INSET A



REFER TO ROADWAY STANDARD
DRAWING 1101.03, SHEET 1 OF 9
FOR APPLICABLE NOTES.



TIP: 17BP.5.R.64

CONTRACT: DE00207

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN
VANCE COUNTY

LOCATION: BRIDGE NO. 78 OVER LITTLE ISLAND CREEK ON SR 1342 (MORGAN RD.)

TIP NO.
17BP.5.R.64

SHEET NO.
PMP - 1

APPROVED:

DocuSigned by:
Michael S. Burns, Jr.
D425C8CC0006F437...

DATE: 8/18/2017

SEAL:

NORTH CAROLINA
PROFESSIONAL
ENGINEER
MICHAEL S. BURNS
SEAL
045230

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - 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
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
PA	PAINT WHITE EDGELINE (4") X2
PI	PAINT YELLOW DOUBLE CENTER (4") X2
MA	YELLOW & YELLOW, PERMANENT RAISED PAVEMENT MARKERS

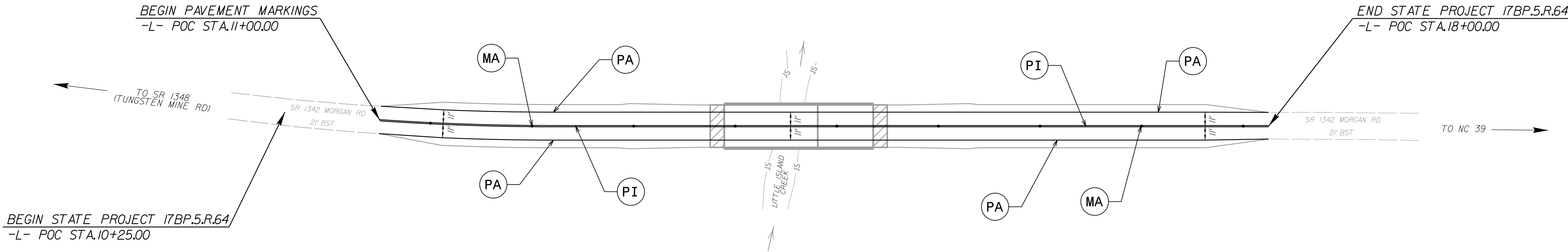
GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

- A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
MORGAN RD	PAINT	RAISED

- B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.



RAISED PAVEMENT MARKERS

TYP. SPACING	BEGIN STA.	END STA.
80'	11+00 +/-	18+00 +/-

PLAN PREPARED BY: STEWART

ANDY YOUNG, PE PROJECT ENGINEER
MICHAEL BURNS, PE PROJECT DESIGN ENGINEER

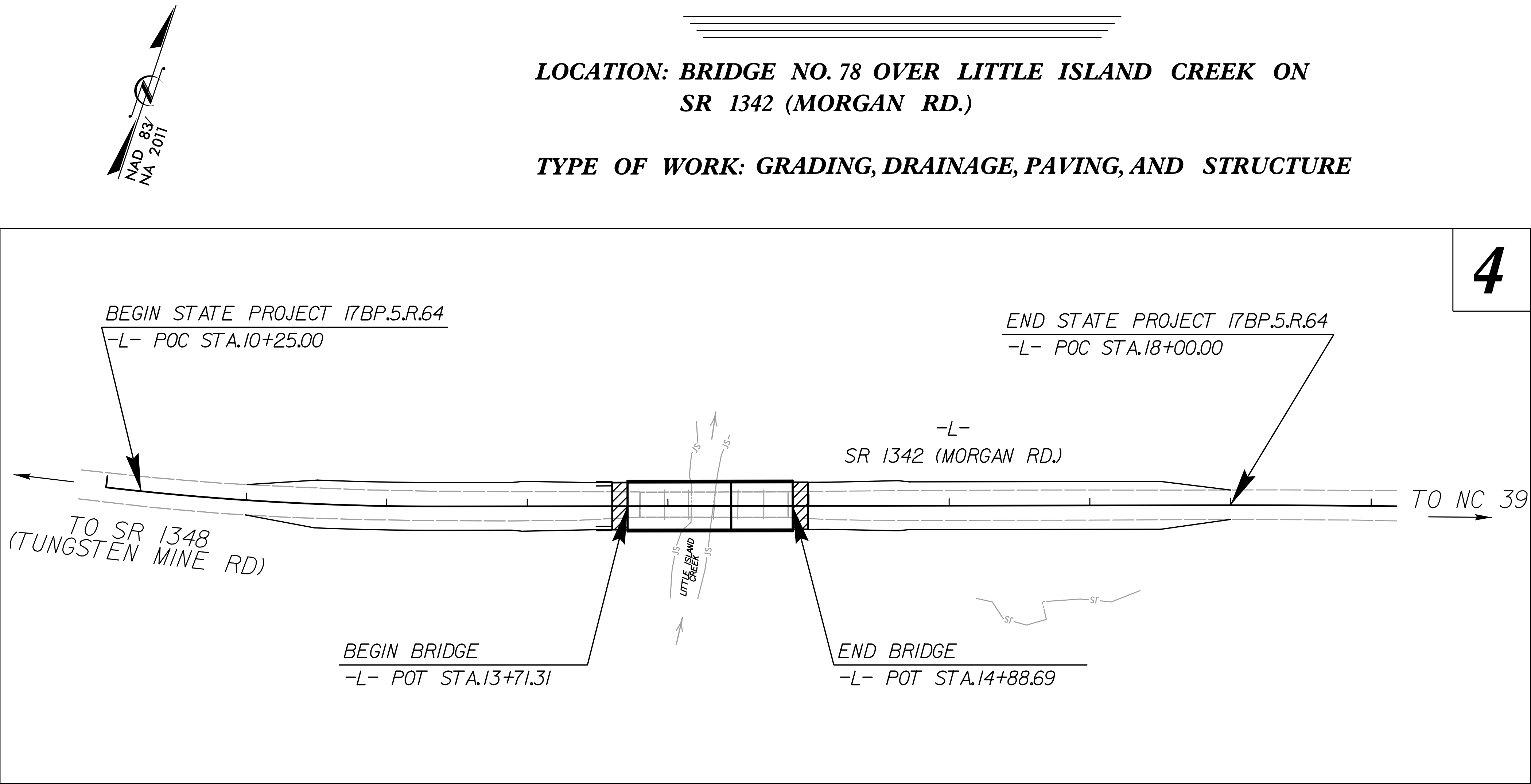
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TIP PROJECT: 17BP.5.R.64

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

LOCATION: BRIDGE NO. 78 OVER LITTLE ISLAND CREEK ON
SR 1342 (MORGAN RD.)

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



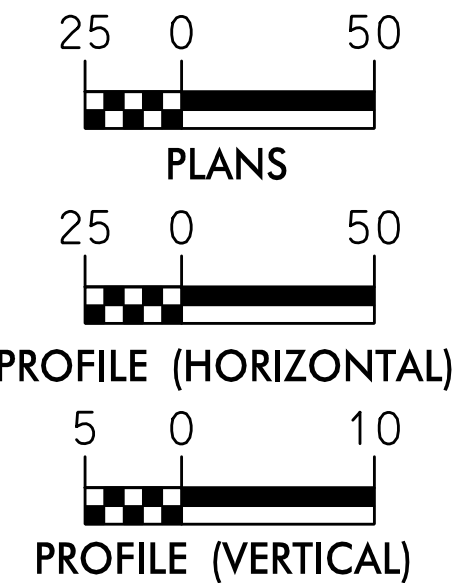
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.64	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.5.R.64	N/A	PE	
17BP.5.R.64	N/A	ROW & UTILITY	
17BP.5.R.64	N/A	CONSTRUCTION	

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	TSF
1606.01	Special Sediment Control Fence	SSF
1622.01	Temporary Berms and Slope Drains	TBSD
1630.02	Silt Basin Type B	SB
1633.01	Temporary Rock Silt Check Type-A	TRSCA
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	TRSCA-PAM
1633.02	Temporary Rock Silt Check Type-B	TRSCB
	Wattle/Coir Fiber Wattle	WF
	Wattle/Coir Fiber Wattle with Polyacrylamide (PAM)	WF-PAM
1634.01	Temporary Rock Sediment Dam Type-A	TRSDA
1634.02	Temporary Rock Sediment Dam Type-B	TRSDB
1635.01	Rock Pipe Inlet Sediment Trap Type-A	RPIST
1635.02	Rock Pipe Inlet Sediment Trap Type-B	RPISTB
1630.04	Stilling Basin	SB
1630.06	Special Stilling Basin	SSB
	Rock Inlet Sediment Trap:	
1632.01	Type A	RIA
1632.02	Type B	RIAB
1632.03	Type C	RIAC
	Skimmer Basin	SKB
	Tiered Skimmer Basin	TSKB
	Infiltration Basin	IB

THIS PROJECT CONTAINS
EROSION CONTROL PLANS
FOR CLEARING AND
GRUBBING PHASE OF
CONSTRUCTION.

GRAPHIC SCALE



THESE EROSION AND SEDIMENT
CONTROL PLANS COMPLY WITH
THE REGULATIONS SET FORTH
BY THE NCG-010000 GENERAL
CONSTRUCTION PERMIT EFFECTIVE
AUGUST 1, 2016 AND ISSUED BY
THE NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT AND NATURAL
RESOURCES DIVISION OF WATER
RESOURCES.



Prepared In the Office of:

NC FIRM LICENSE No: F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0929

Designed by:

REID ROBOL, PE
NAME

3409
LEVEL III CERTIFICATION NO.

Reviewed In the Office of:

ROADSIDE ENVIRONMENTAL UNIT

1 South Wilmington St.
Raleigh, NC 27611

2012 STANDARD SPECIFICATIONS

Reviewed by:

AARON HARPER

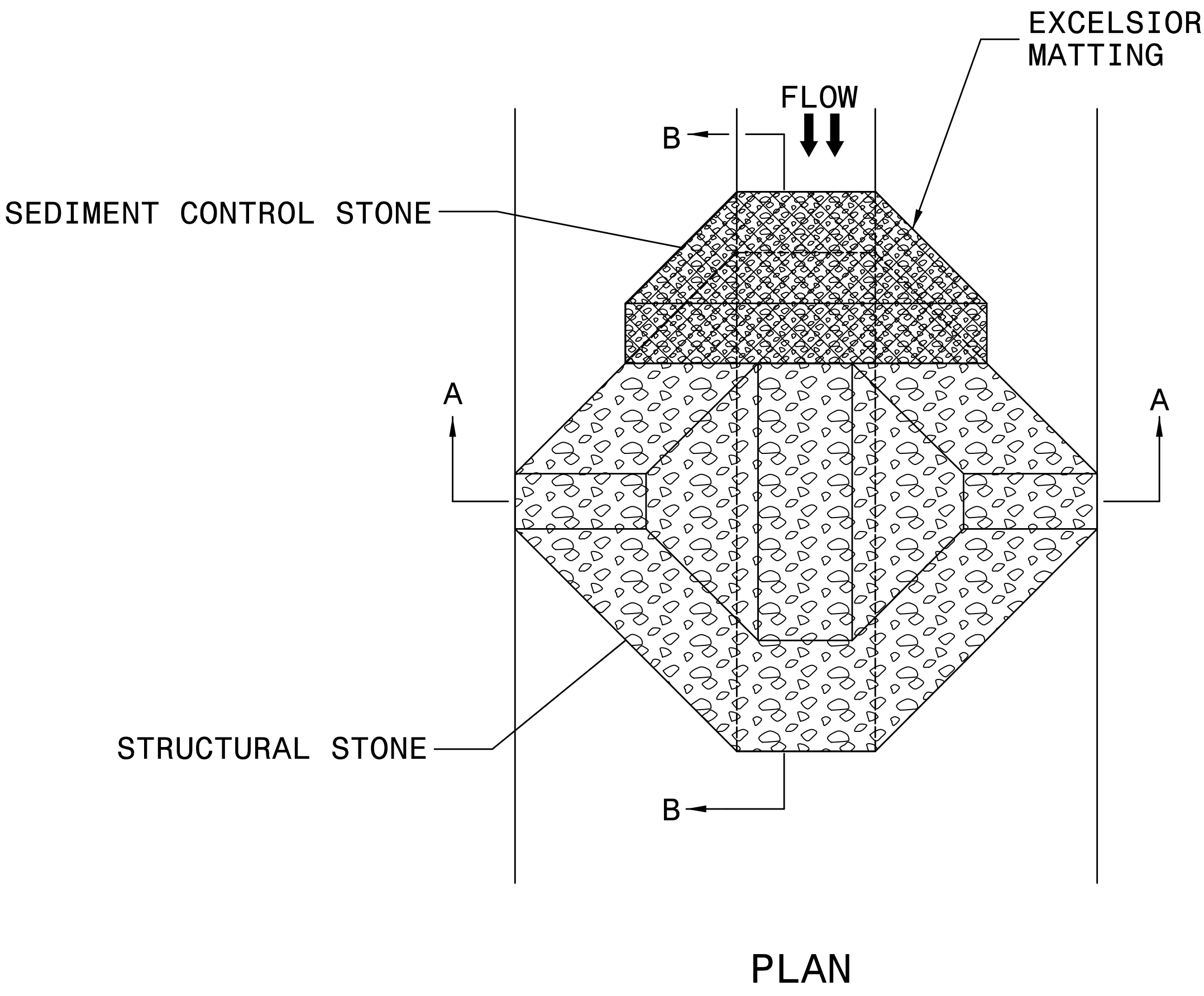
Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2012 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01 Railroad Erosion Control Detail	1632.01 Rock Inlet Sediment Trap Type A
1605.01 Temporary Silt Fence	1632.02 Rock Inlet Sediment Trap Type B
1606.01 Special Sediment Control Fence	1632.03 Rock Inlet Sediment Trap Type C
1607.01 Gravel Construction Entrance	1633.01 Temporary Rock Silt Check Type A
1622.01 Temporary Berms and Slope Drains	1633.02 Temporary Rock Silt Check Type B
1630.01 Riser Basin	1634.01 Temporary Rock Sediment Dam Type A
1630.02 Silt Basin Type B	1634.02 Temporary Rock Sediment Dam Type B
1630.03 Temporary Silt Ditch	1635.01 Rock Pipe Inlet Sediment Trap Type A
1630.04 Stilling Basin	1635.02 Rock Pipe Inlet Sediment Trap Type B
1630.05 Temporary Diversion	1640.01 Coir Fiber Baffle
1630.06 Special Stilling Basin	1645.01 Temporary Stream Crossing
1631.01 Matting Installation	

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)

PROJECT REFERENCE NO.	SHEET NO.
17BP5R64	EC-02
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



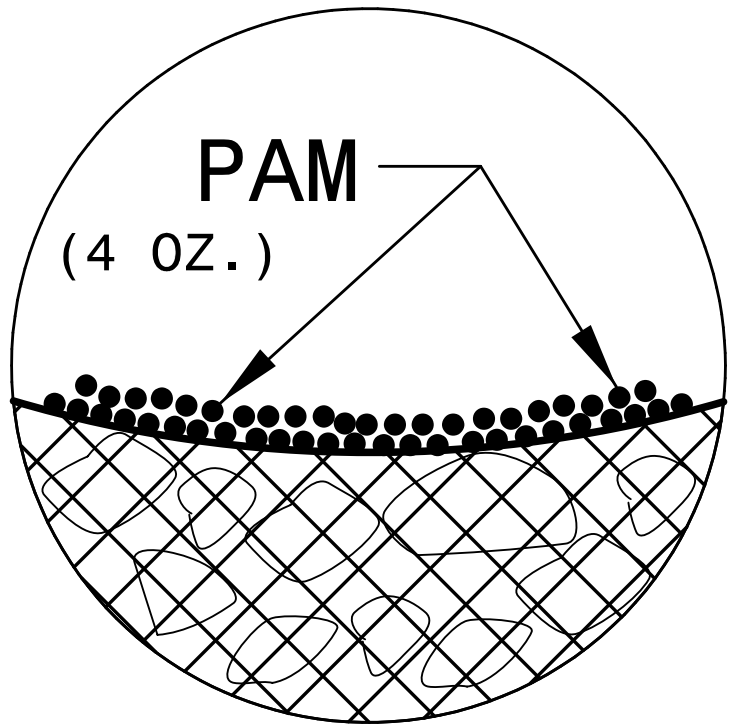
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

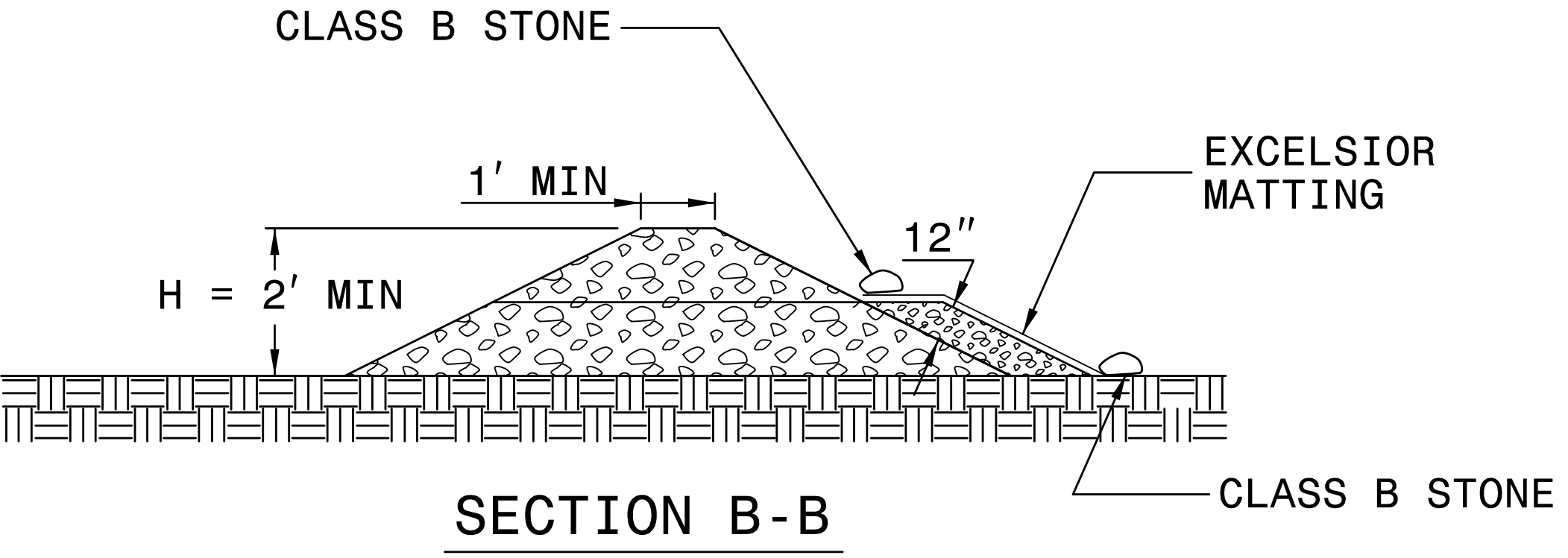
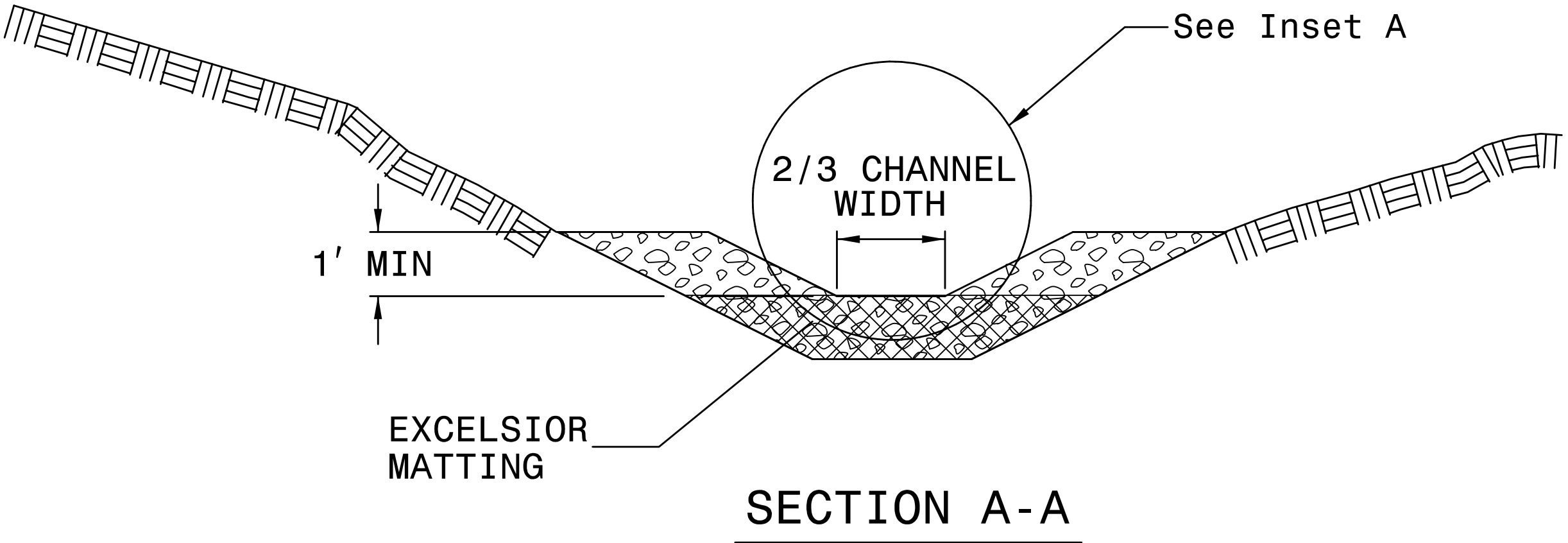
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



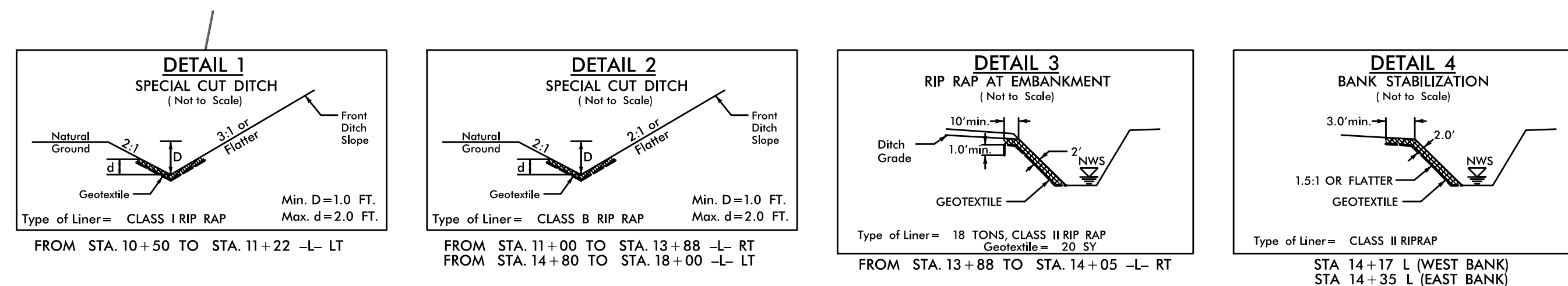
NOT TO SCALE

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

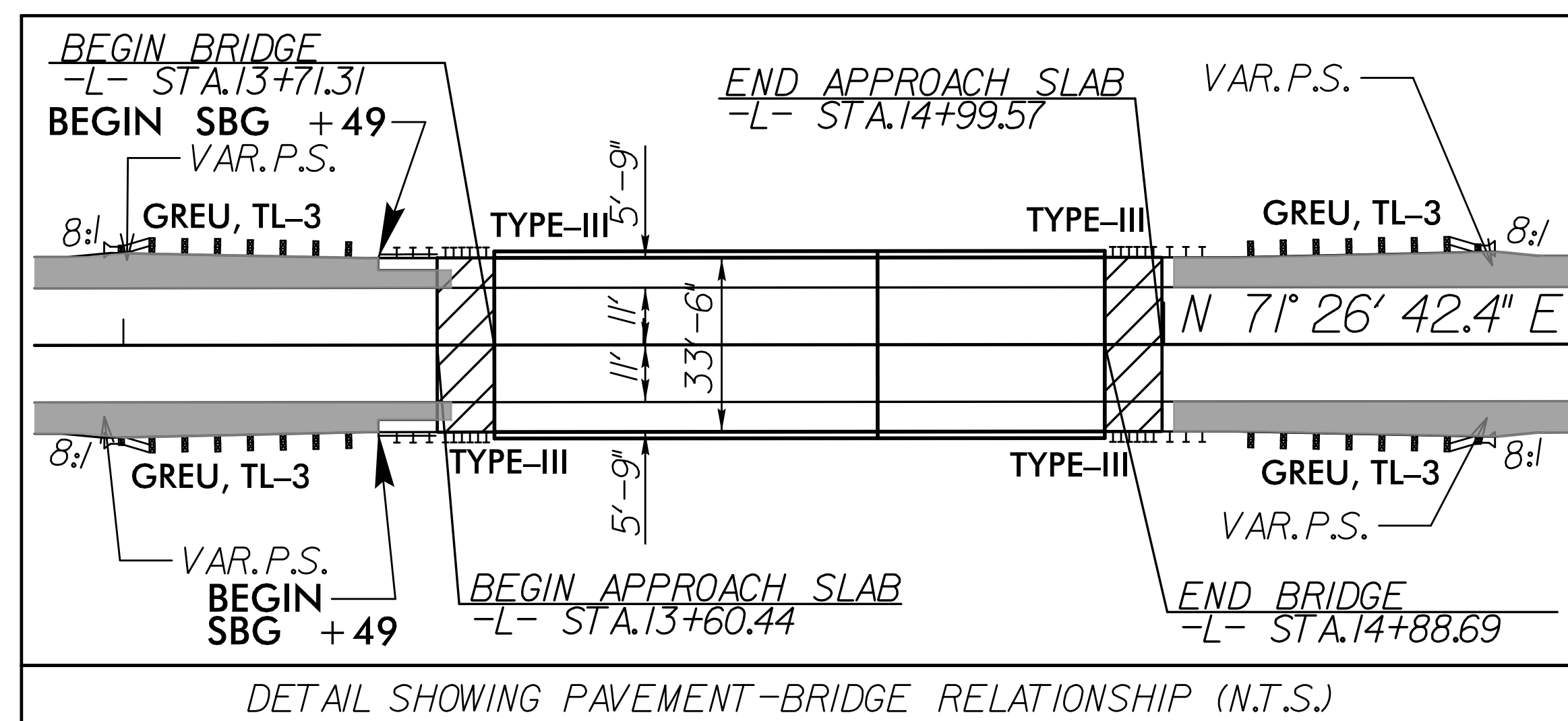
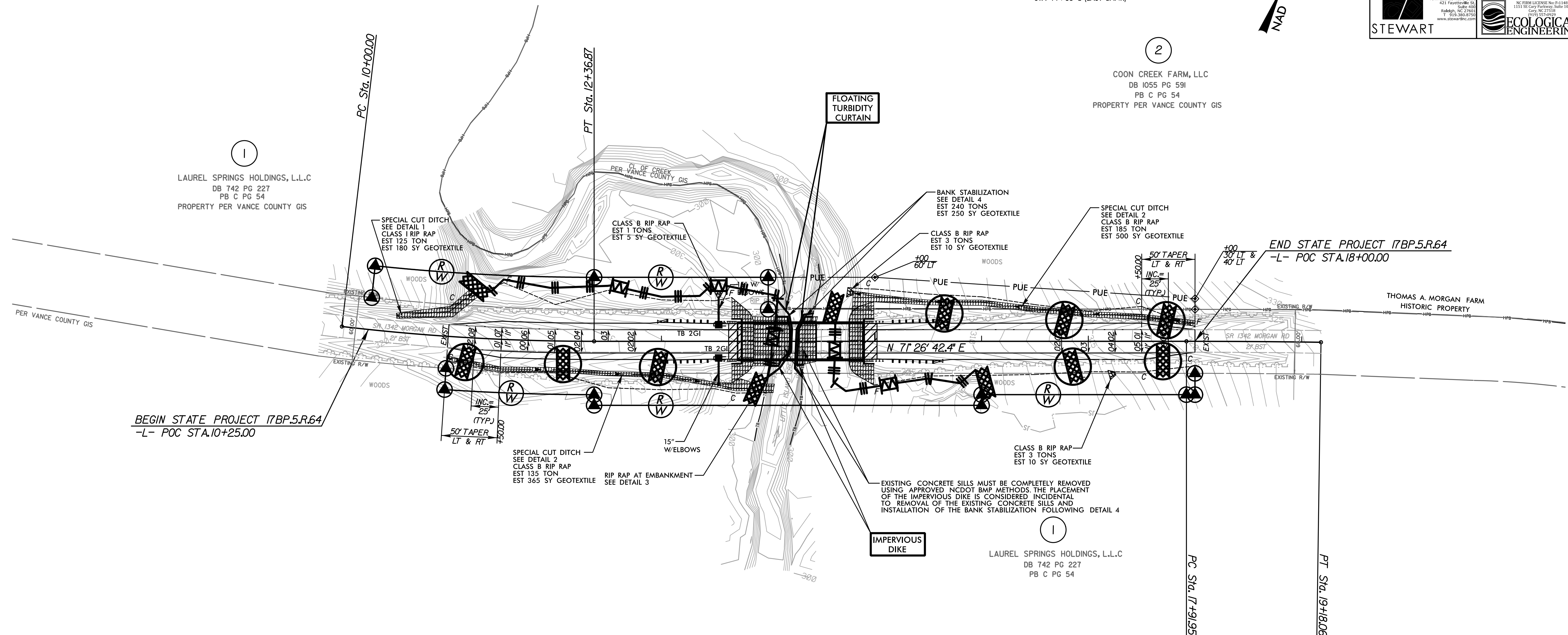
SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 04



NAD 83/NA 2011



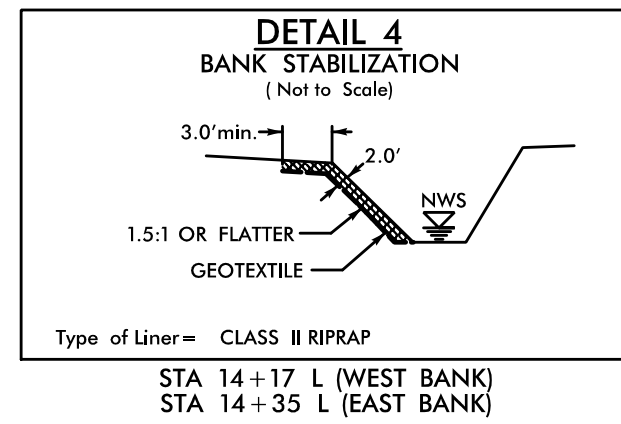
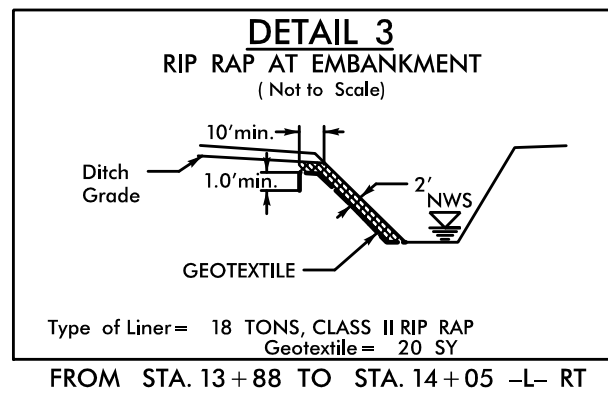
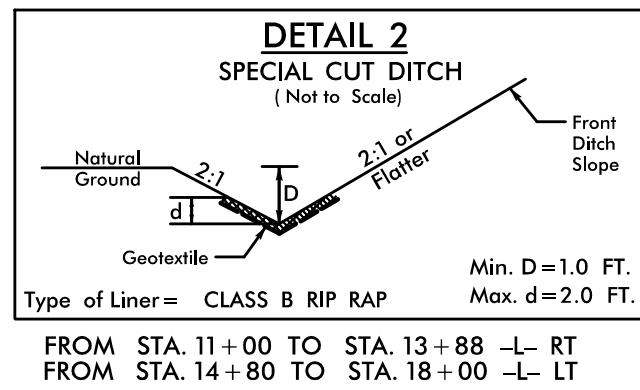
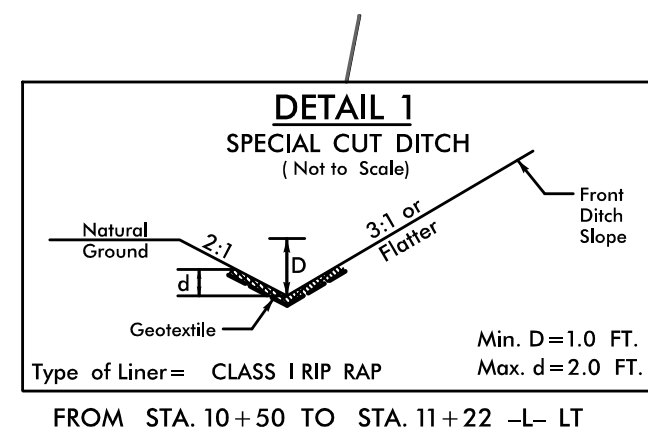
FOR -L- PROFILE, SEE SHEET 5

FOR STRUCTURE PLANS,SEE SHEETS S-1 THRU S-21

8/17/99

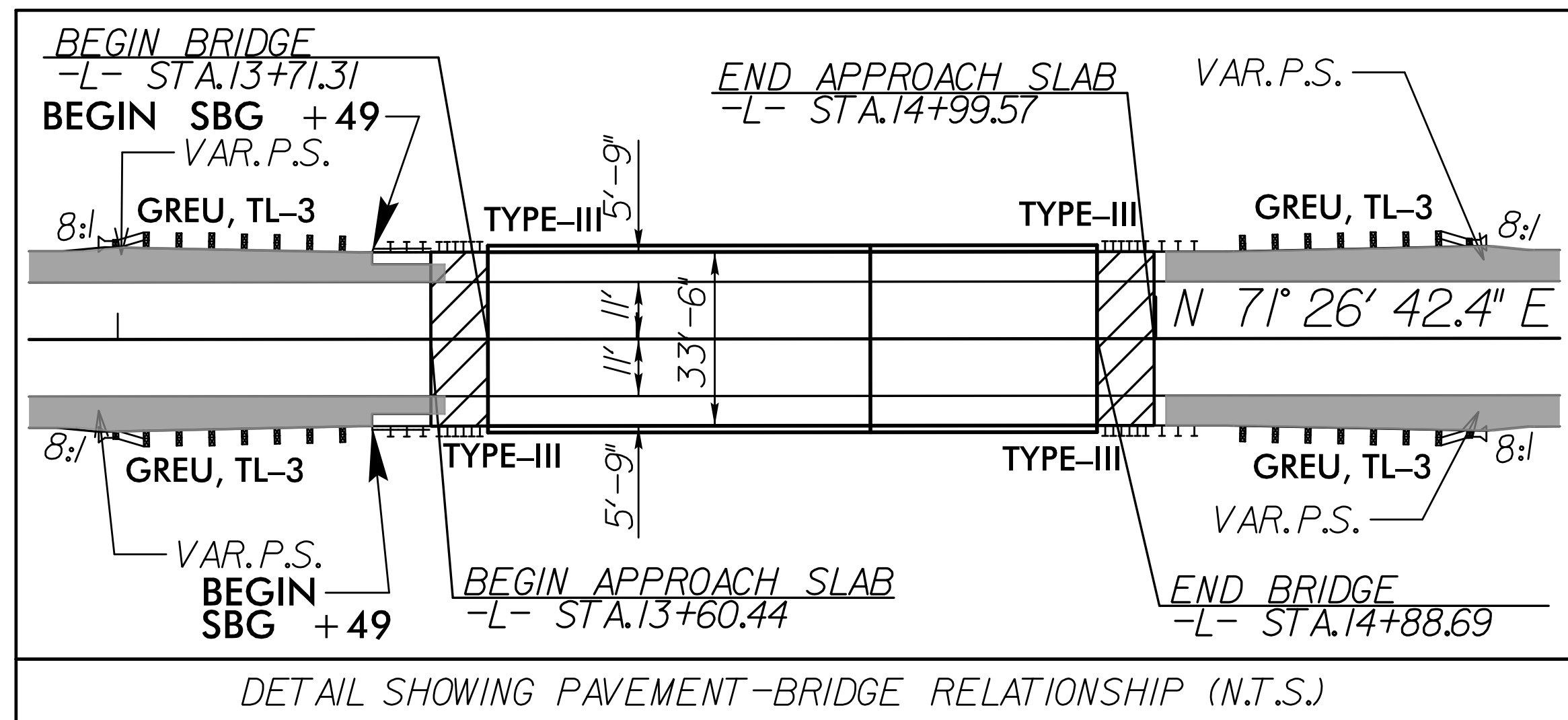
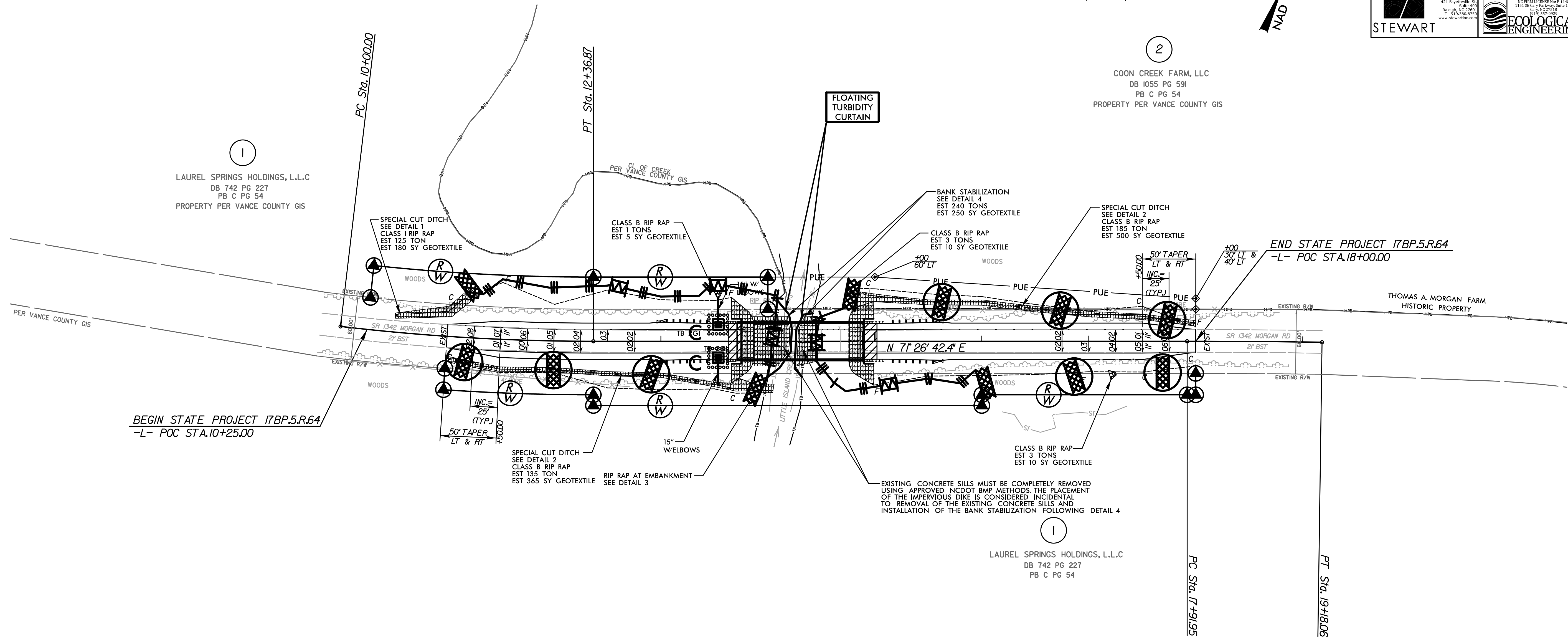
REVISIONS

9/2/03 AM
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NAD 83 NA 2011

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.64	EC-05/CONST.04
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 STEWART	 ECOLOGICAL ENGINEERING



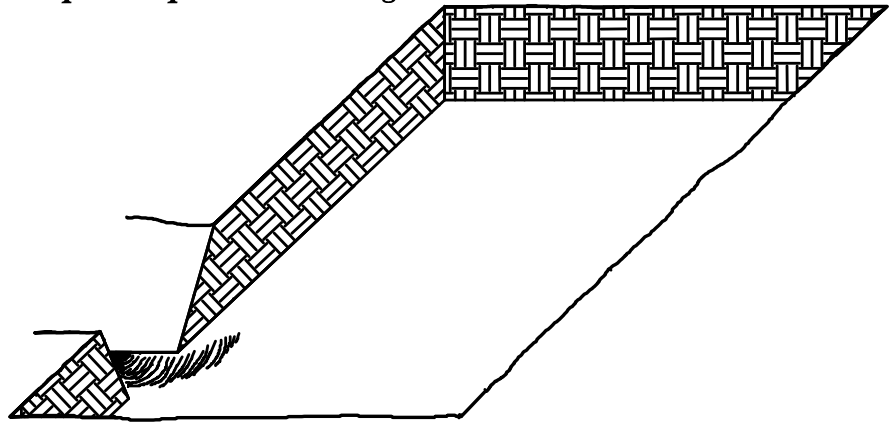
FOR -L- PROFILE, SEE SHEET 5

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-21

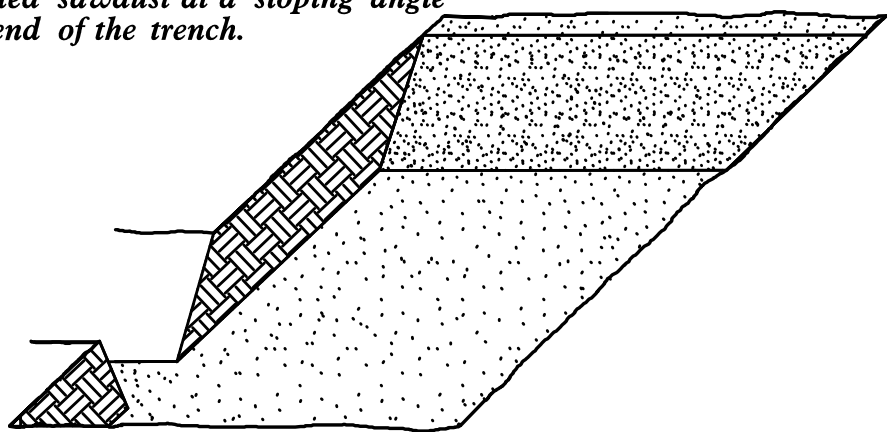
PLANTING DETAILS
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

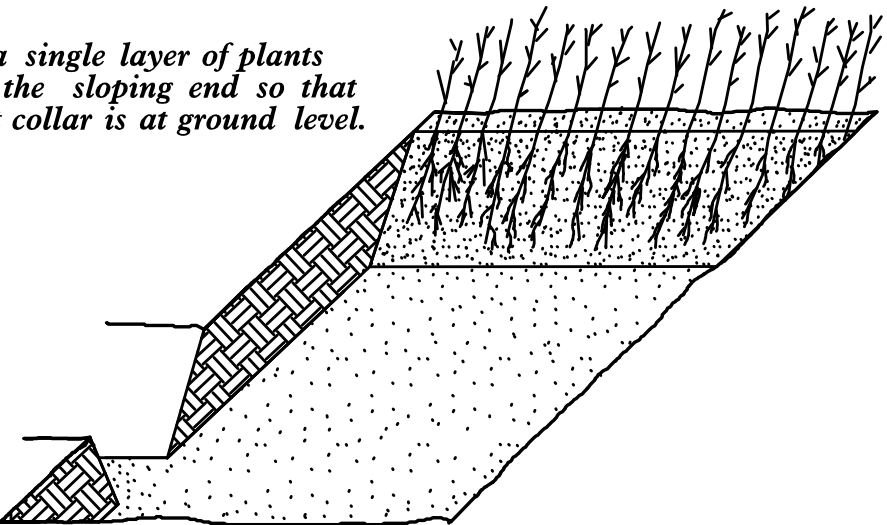
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



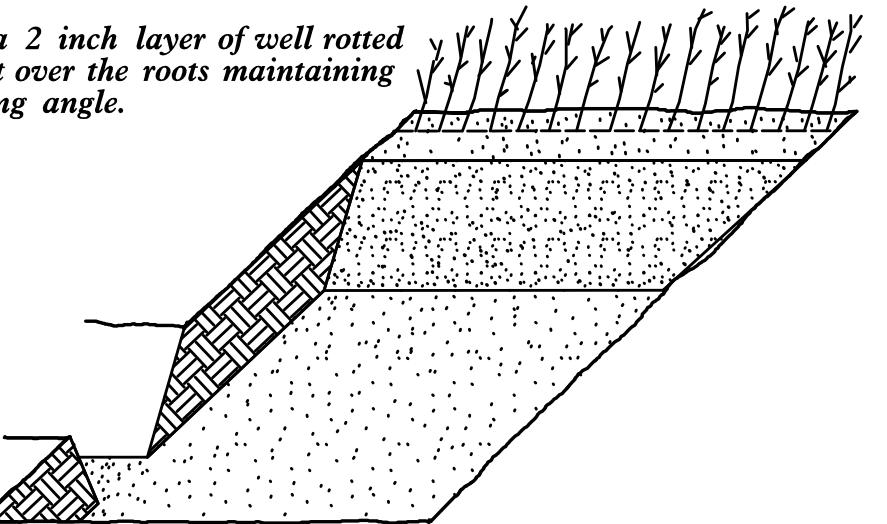
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

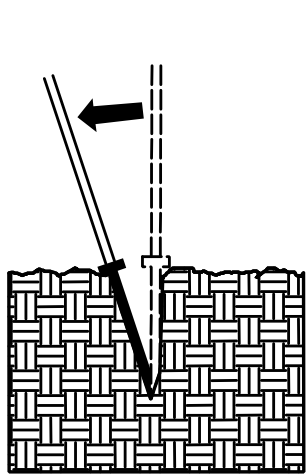


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

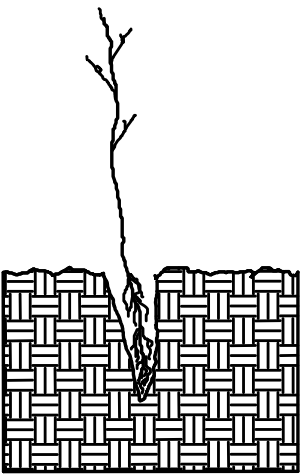


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

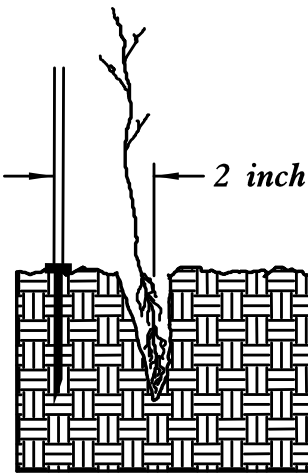
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



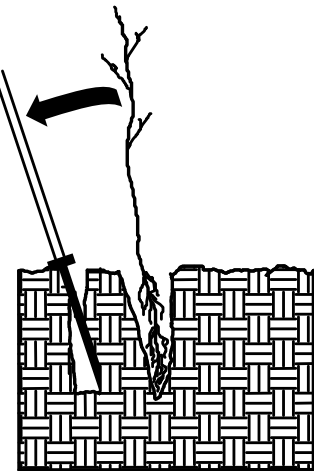
1. Insert planting bar as shown and pull handle toward planter.



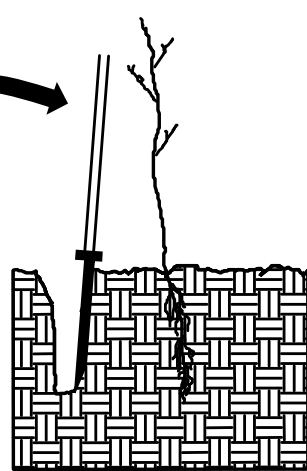
2. Remove planting bar and place seedling at correct depth.



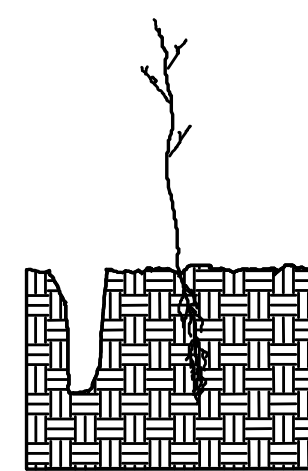
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



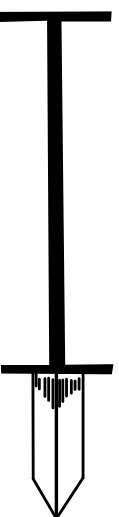
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

- ☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25%	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in – 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in – 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

09/08/99

TIP PROJECT: 17BP.5.R.64

T.I.P. NO.	SHEET NO.
17BP.5.R.64	UO-1

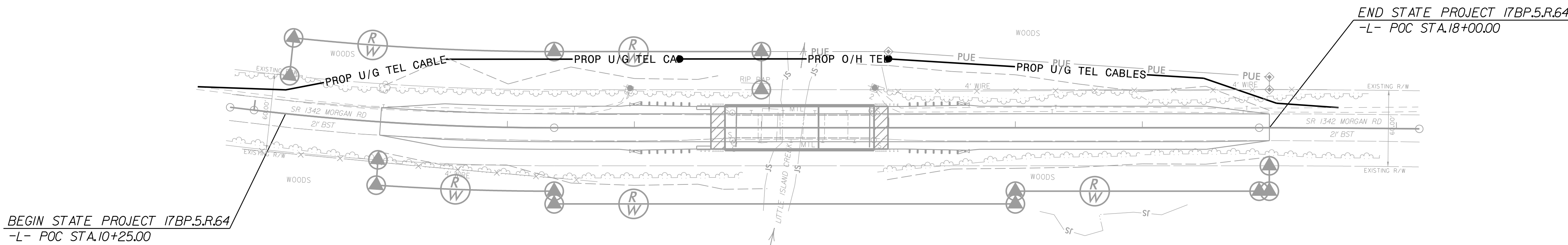
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
VANCE COUNTY

LOCATION: BRIDGE NO. 78 OVER LITTLE ISLAND CREEK
ON SR 1342 (MORGAN ROAD)

TYPE OF WORK: TELECOMMUNICATIONS RELOCATION

NAD 83/NA 2011



GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	UTILITY BY OTHERS PLAN SHEET

UTILITY OWNERS ON PROJECT

(A) CENTURY LINK

PREPARED IN THE OFFICE OF:

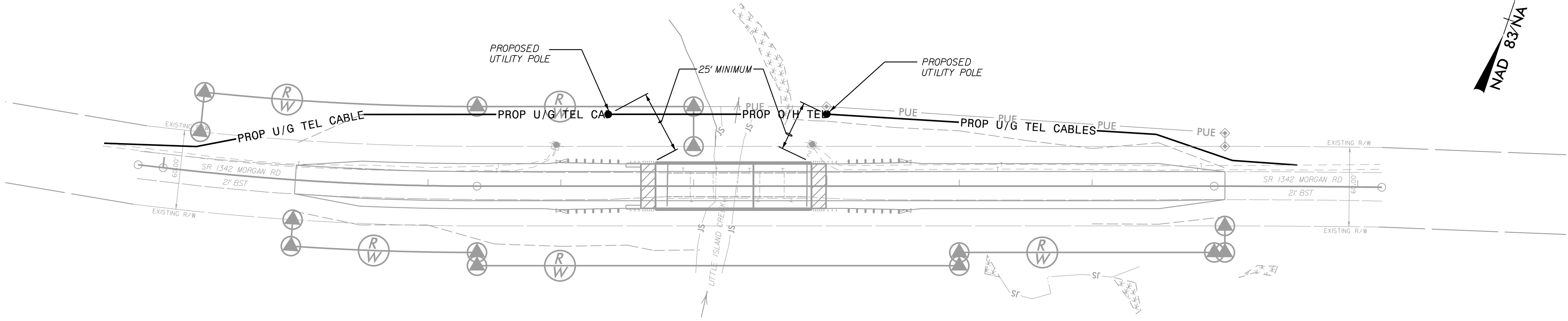
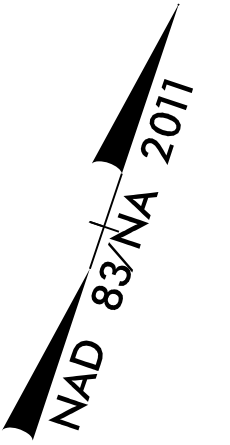


DAVID RUGGLES, PE PROJECT ENGINEER
HANAN ASSFOURA, EI PROJECT DESIGN ENGINEER

8/22/2017
\\proj\900078_UTL_PSH01.dgn
USER:default

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK
SHOWN ON THIS SHEET WILL
BE DONE BY OTHERS



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

Station	Uncl. Exc.	Embt
L	(cu. yd.)	(cu. yd.)
11+00.00	0	0
11+50.00	49	100
12+00.00	17	135
12+50.00	28	144
13+00.00	59	208
13+50.00	44	267
13+71.31	7	157

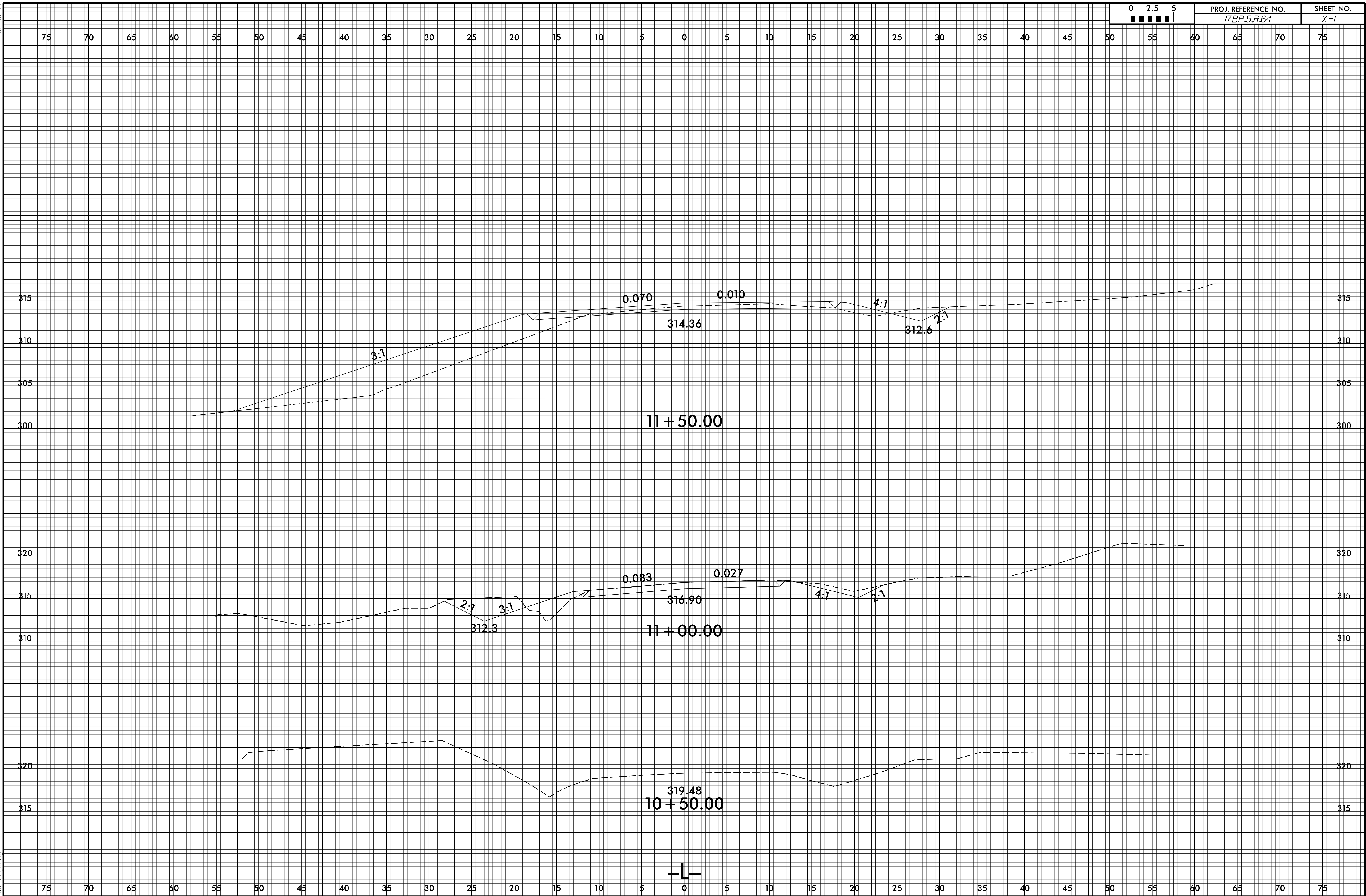
Station	Uncl. Exc.	Embt
L	(cu. yd.)	(cu. yd.)
14+88.69	0	0
15+00.00	7	86
15+50.00	44	374
16+00.00	36	256
16+50.00	22	172
17+00.00	12	95
17+50.00	44	33
18+00.00	60	7

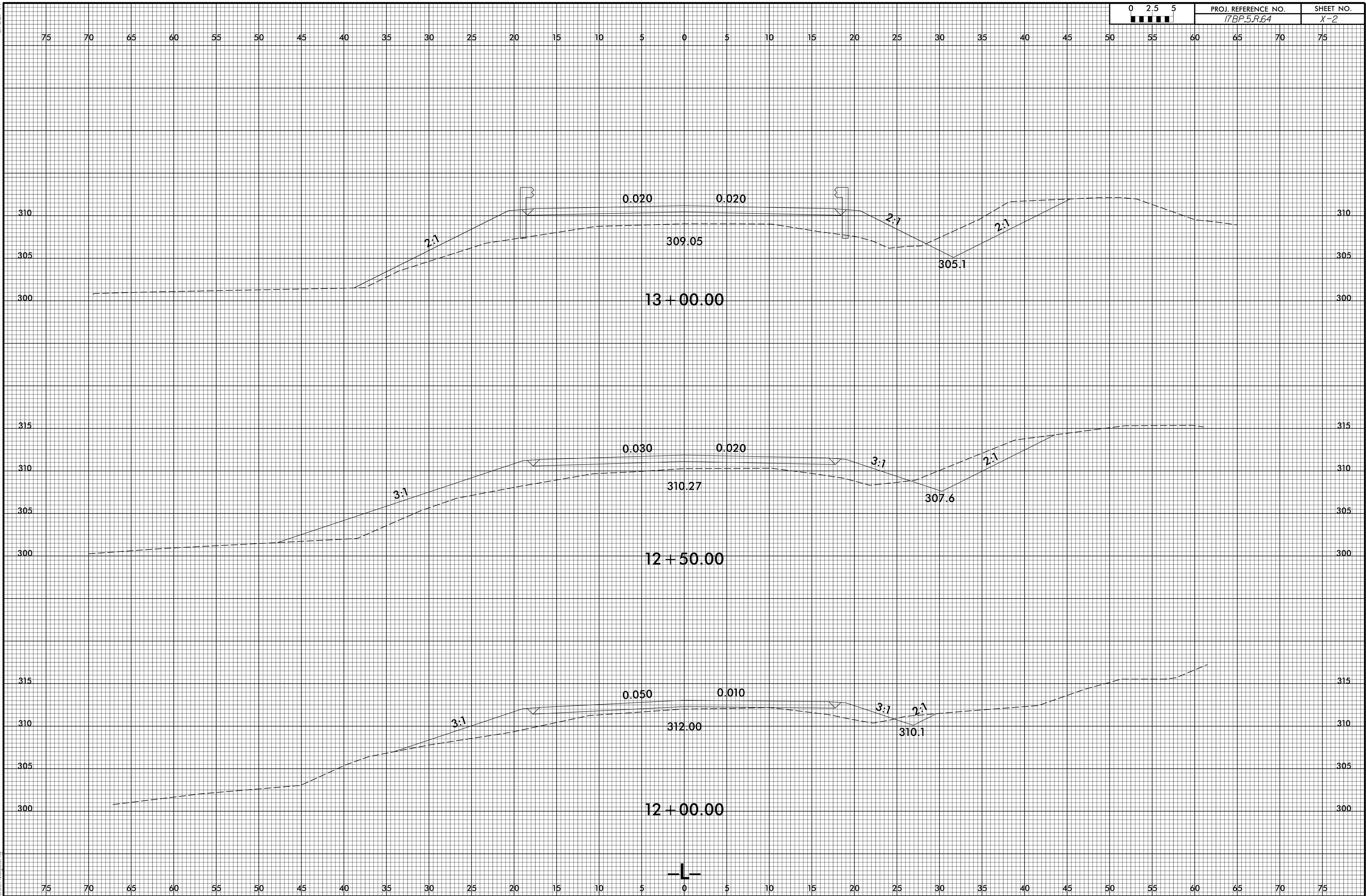
Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, breaking of existing pavement, and removal of existing pavement will be paid for at the lump sum price for "Grading".

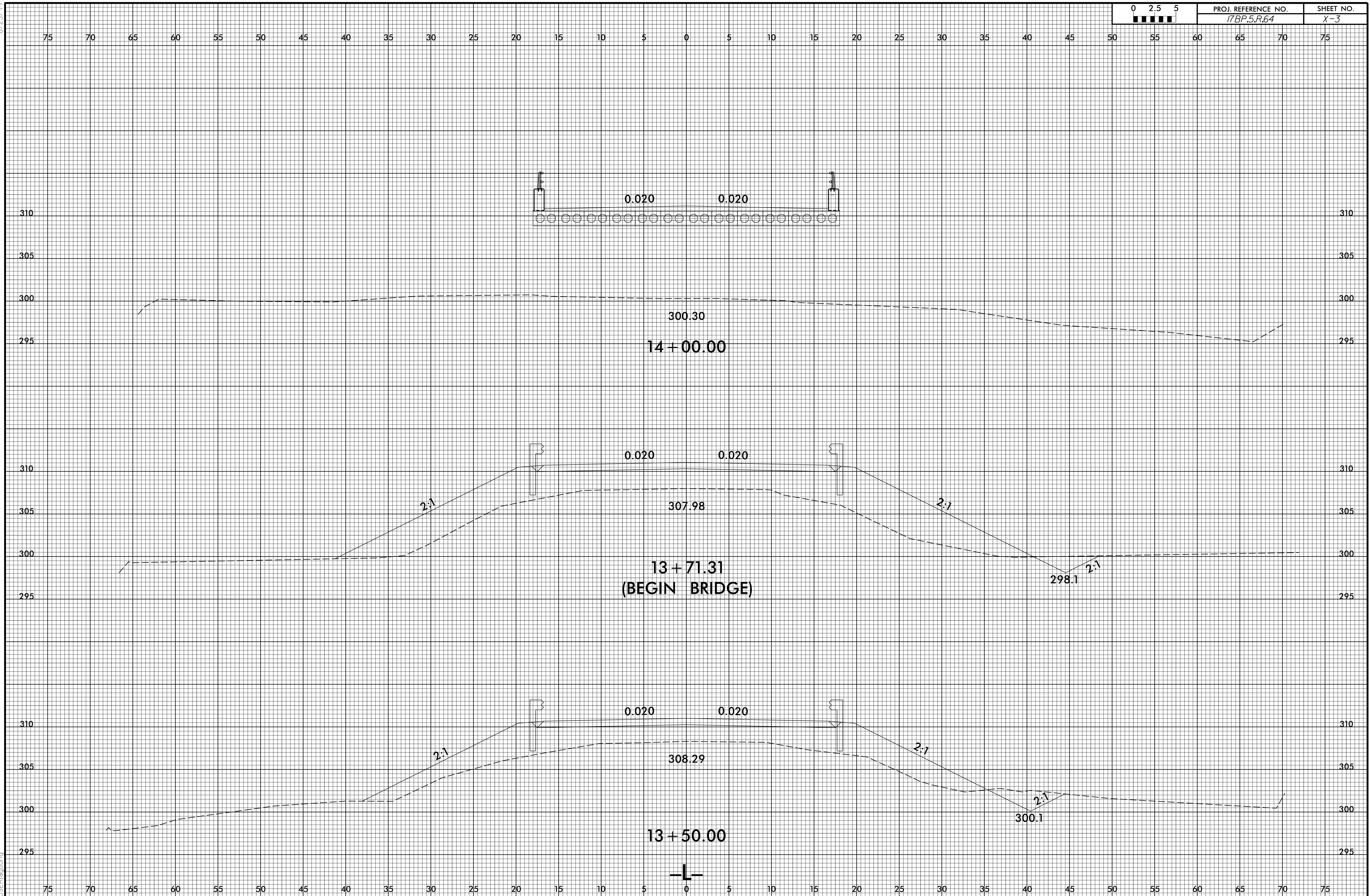
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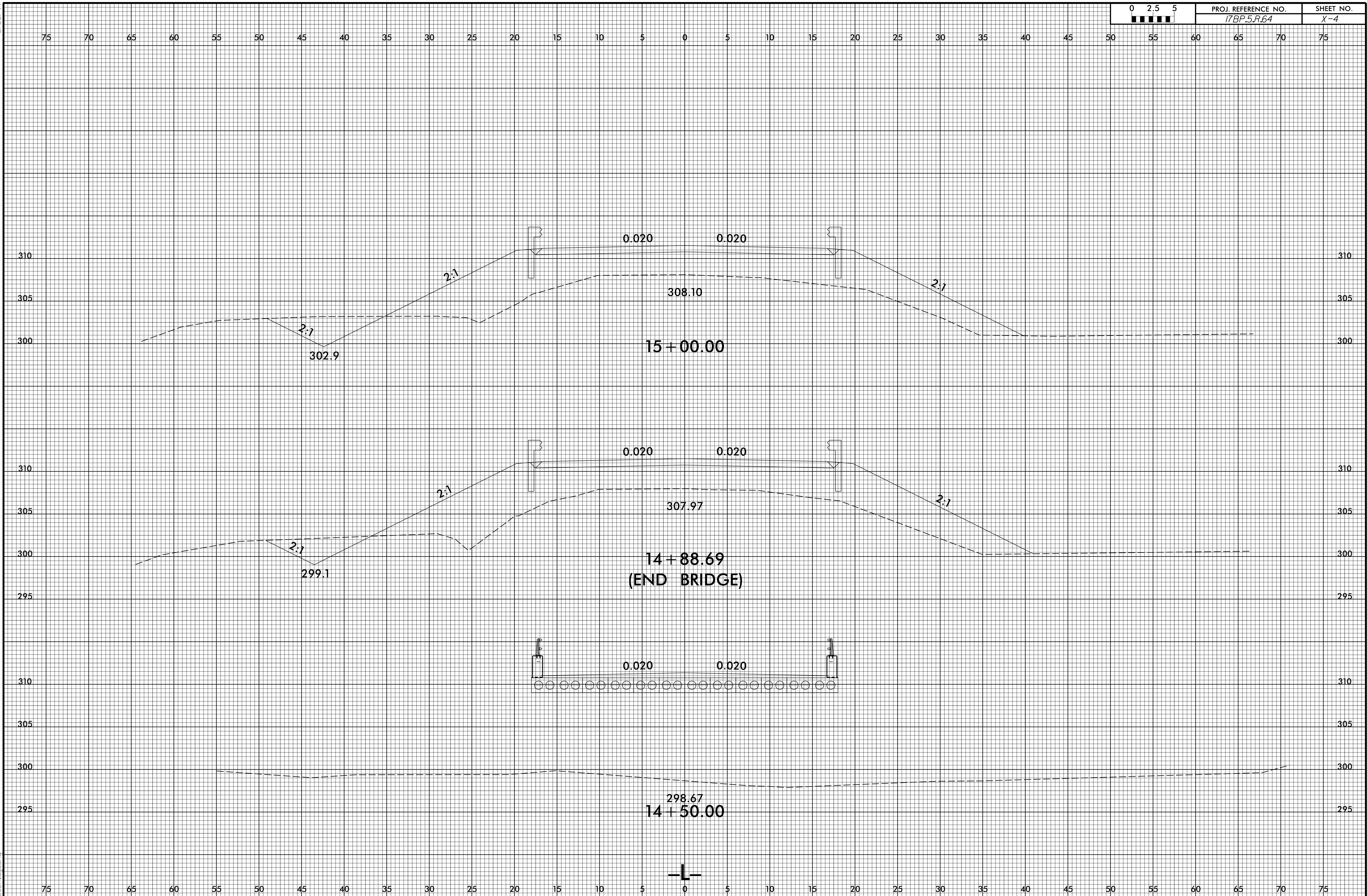
REVISIONS

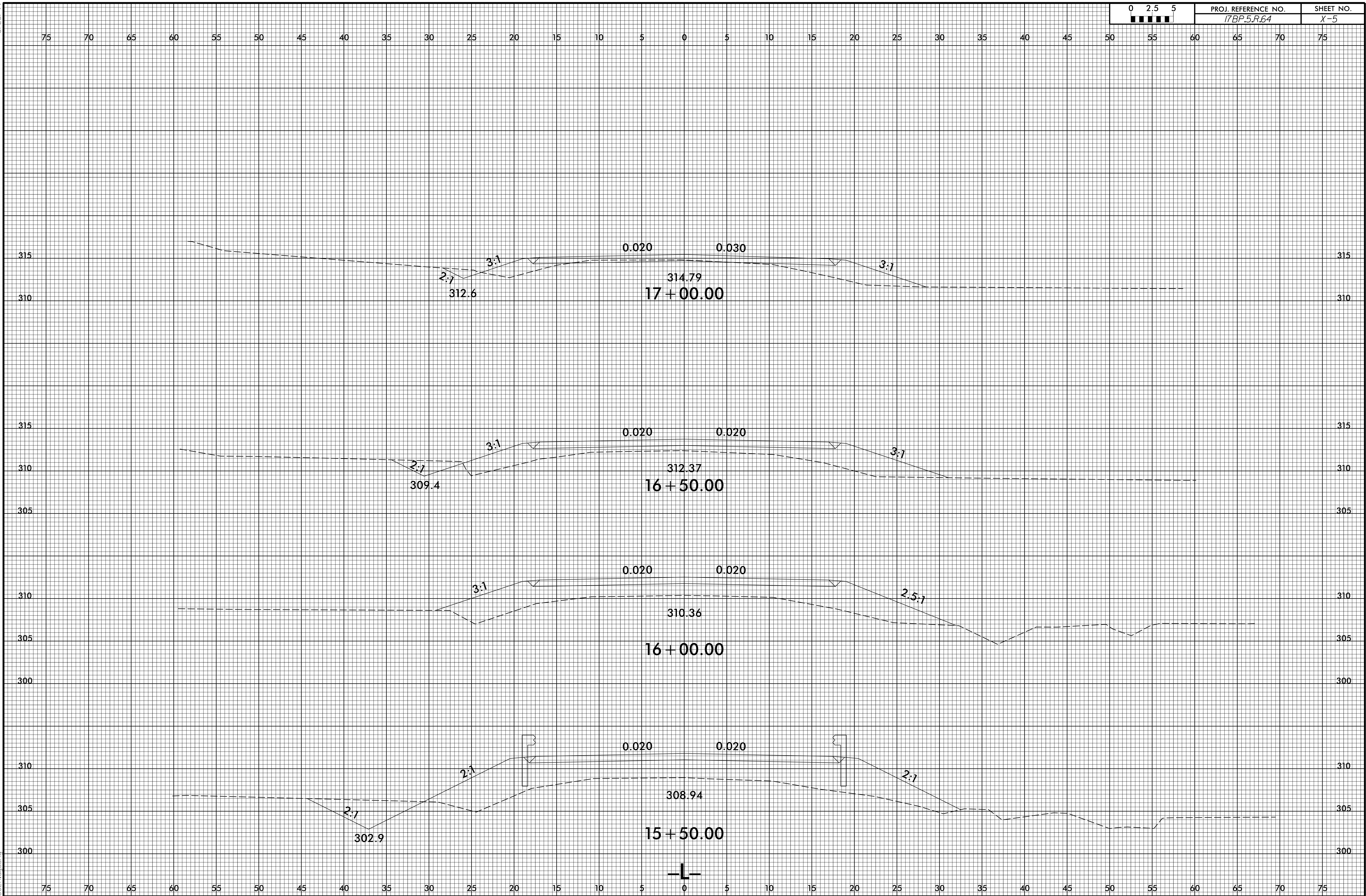
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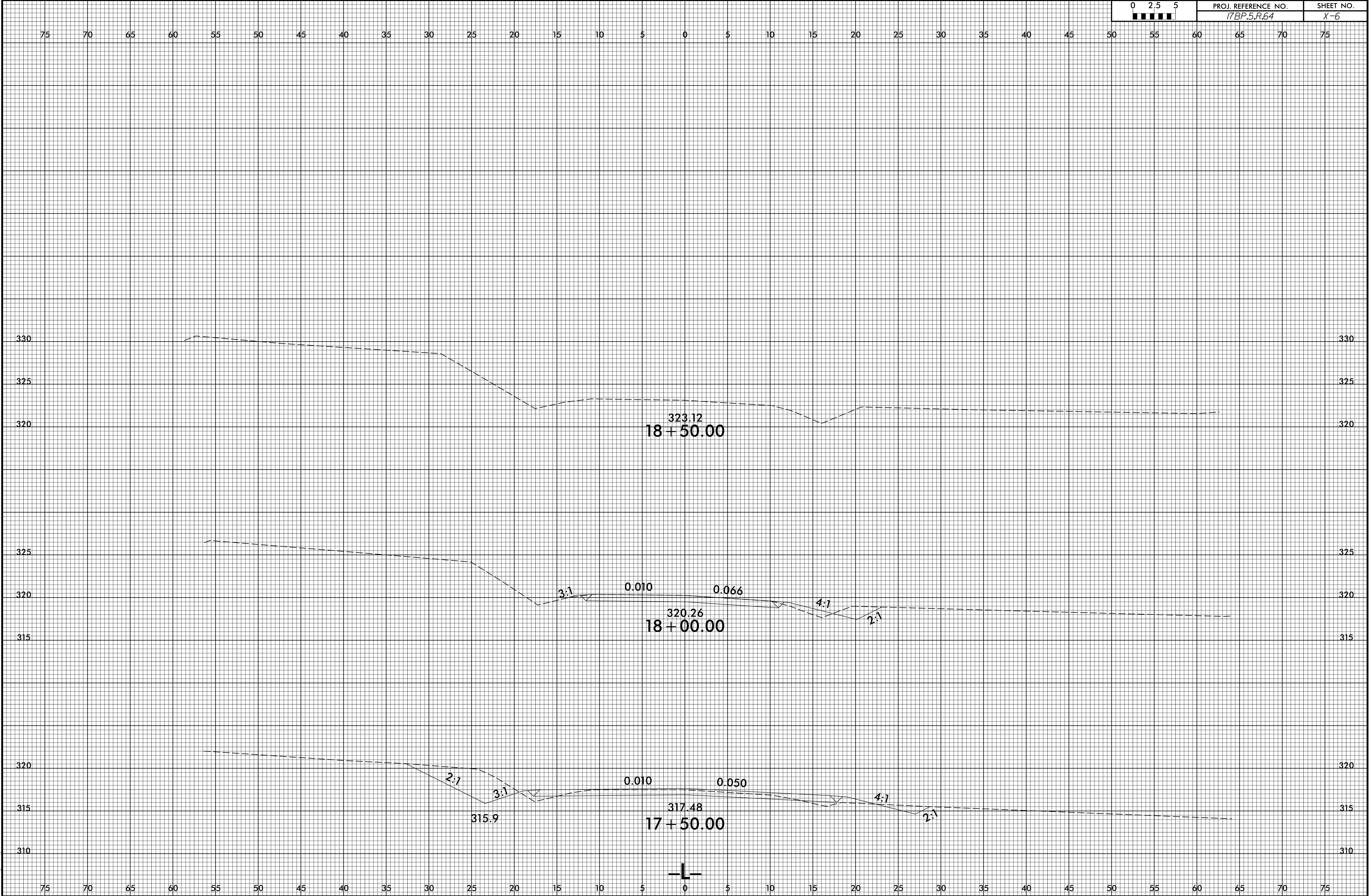




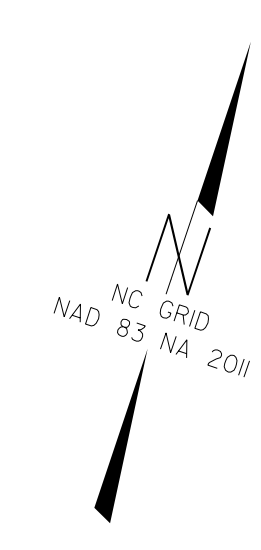


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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.5.R.64	X-6

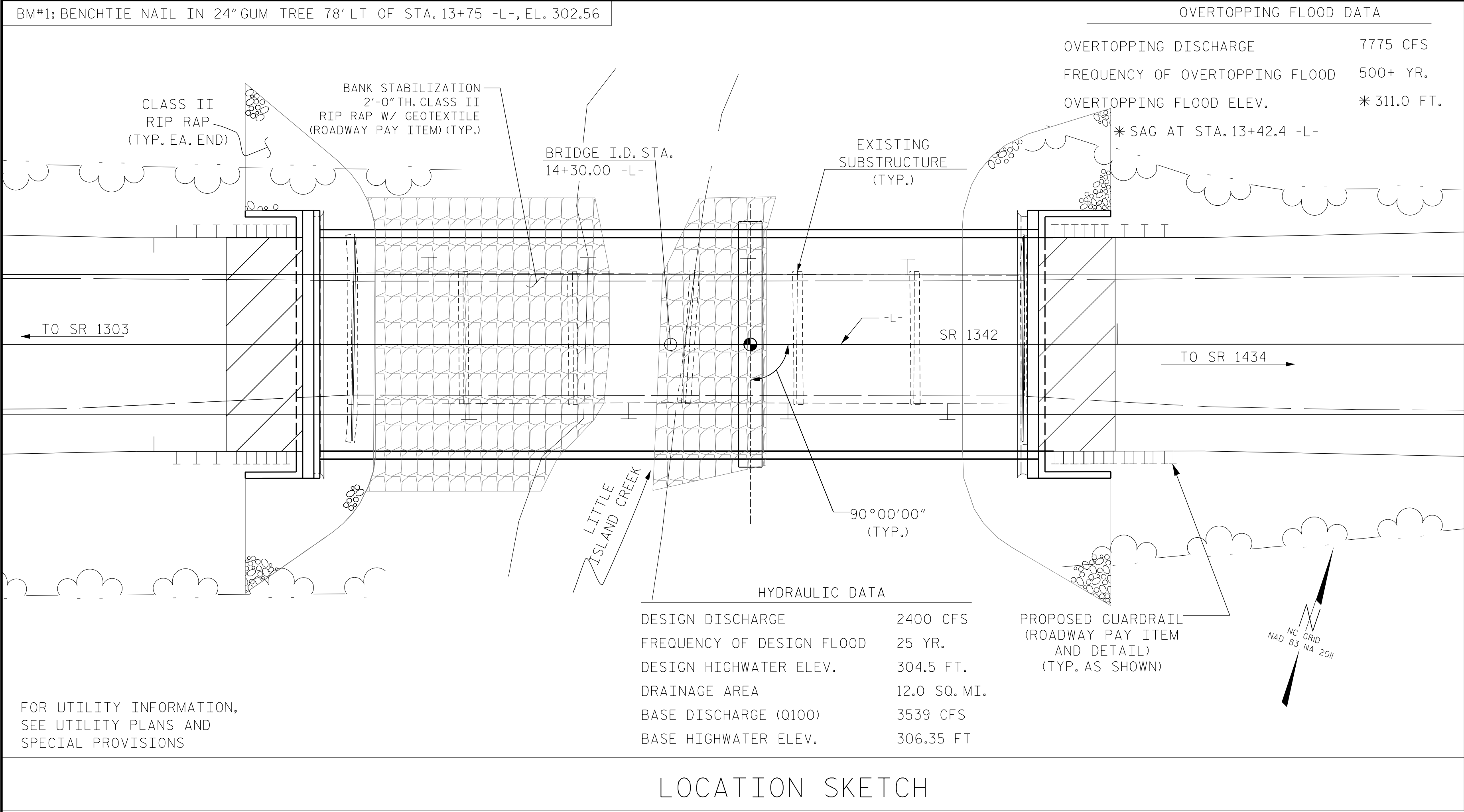


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
BRIDGE OVER LITTLE ISLAND
CREEK ON SR 1342 BETWEEN
SR 1303 AND SR 1434

REVISIONS						SHEET NO. S-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

 Firm License No. C-1051
421 Fayetteville St.
Suite 401
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

STEWART



NOTES:

1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

2. THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

3. THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

4. THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES."

5. THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCE BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

6. THE EXISTING STRUCTURE CONSISTING OF BRIDGE 900078 OF SIX SPANS (17'-10", 17'-6", 17'-9", 17'-6", 17'-9", 17'-6"); TIMBER DECK ON CONTINUOUS I BEAMS; 19.17' CLEAR ROADWAY WIDTH SUPPORTED ON TIMBER CAPS ON TIMBER PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED IN ITS ENTIRETY (INCLUDING PILES AND THE EXISTING CONCRETE SILLS IN THE STREAM BANK).

7. REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS. FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.

8. FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
9. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

10. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

11. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

12. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

13. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

14. ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

15. THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 35 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

16. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

17. INASMUCH AS THE PAINT SYSTEM OF THE STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 14+30.00 -L-"

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-0"DIA. DRILLED PIERS IN SOIL	3'-0"DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-0"DIA. DRILLED PIER	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINF. STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		STEEL PILE POINTS	2 BAR METAL RAIL	1'-2" X 2'-9 1/2" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 2'-0" PRESTRESSED CONCRETE CORED SLAB UNITS		ASBESTOS ASSESSMENT
	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	LUMP SUM	CY. YDS.	LUMP SUM	LBS	LBS	EACH	No.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	TON	SQ. YDS.	LUMP SUM	No.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE											LUMP SUM							215.25	230.25			LUMP SUM	24	1380	
END BENT No. 1		100.0	30.0						LUMP SUM	23.0		2,807		7	7	140	7			110	122				
BENT No. 1				27.0	30.0	33.0	1	1		17.8		9,619	1,347												
END BENT No. 2		50.0	35.0						LUMP SUM	23.0		2,807			7	105				139	154				
TOTAL	LUMP SUM	150.0	65.0	27.0	30.0	33.0	1	1	LUMP SUM	63.8	LUMP SUM	15,233	1,347	7	14	245	7	215.25	230.25	249	276	LUMP SUM	24	1380	LUMP SUM

FOUNDATION NOTES

1. FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

2. PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

3. DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

4. STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

5. PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 75 TONS PER PILE.

6. DRILLED-IN PILES ARE REQUIRED FOR END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 293 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

7. FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

8. DRILLED PIERS AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 315 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

9. INSTALL DRILLED PIERS AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 279 FT AND WITH THE REQUIRED TIP RESISTANCE.
10. PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT NO. 1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 287 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

11. THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 291 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

12. SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

13. CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

14. DO NOT USE SLURRY CONSTRUCTION FOR DRILLED PIERS AT BENT NO. 1.

SPECIAL FOUNDATION NOTES

1. THE CONTRACTOR MAY OPT TO DRILL-IN PILES FOR END BENT NO. 1. IF SO, EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 287 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. IF PILES FOR END BENT NO. 1 ARE DRILLED-IN, NO PILE POINTS ARE NECESSARY.

PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

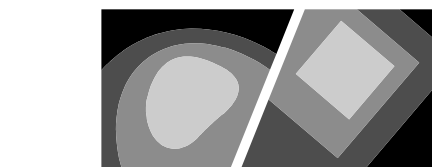
GENERAL DRAWING
BRIDGE OVER LITTLE ISLAND CREEK ON SR 1342 BETWEEN SR 1303 AND SR 1434

REVISIONS						SHEET NO. S-2
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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www.stewartinc.com



STEWART

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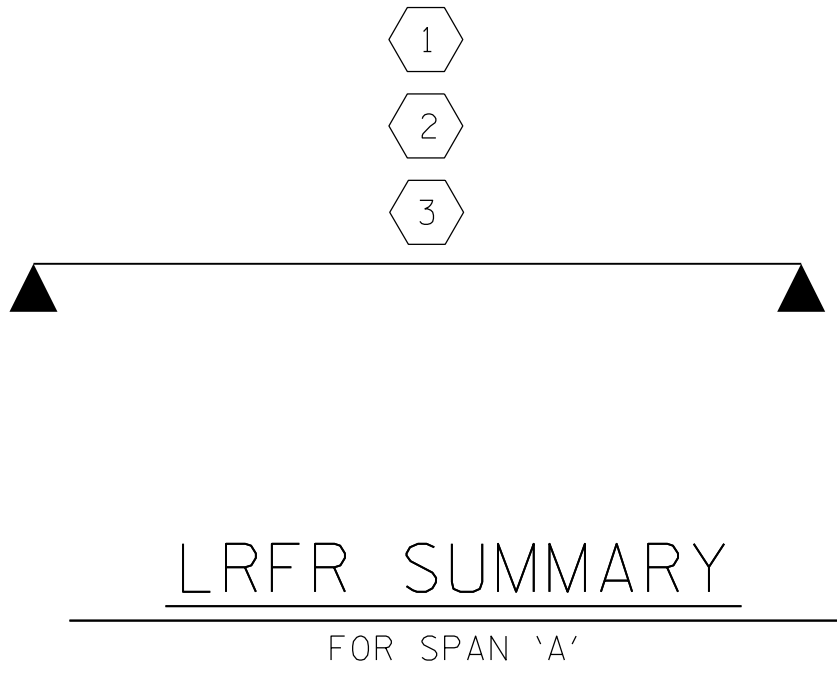
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USER:jlottus

DRAWN BY:	H.ASSFOURA	DATE :	10/16
CHECKED BY:	D. RUGGLES	DATE :	01/17
DESIGN ENGINEER OF RECORD:	D. RUGGLES	DATE :	01/17

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER	
							LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.006	--	1.75	0.273	1.03	70'	EL	34.5	0.507	1.32	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	
		HL-93(0pr)	N/A	--	1.341	--	1.35	0.273	1.34	70'	EL	34.5	0.507	1.72	70'	EL	6.9	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.306	47.02	1.75	0.273	1.34	70'	EL	34.5	0.507	1.65	70'	EL	6.9	0.80	0.273	1.31	70'	EL	34.5	
		HS-20(0pr)	36.000	--	1.74	62.64	1.35	0.273	1.74	70'	EL	34.5	0.507	2.14	70'	EL	6.9	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.917	39.379	1.4	0.273	3.75	70'	EL	34.5	0.507	4.87	70'	EL	6.9	0.80	0.273	2.92	70'	EL	34.5	
		SNGARBS2	20.000	--	2.187	43.741	1.4	0.273	2.81	70'	EL	34.5	0.507	3.47	70'	EL	6.9	0.80	0.273	2.19	70'	EL	34.5	
		SNAGRIS2	22.000	--	2.077	45.69	1.4	0.273	2.67	70'	EL	34.5	0.507	3.23	70'	EL	6.9	0.80	0.273	2.08	70'	EL	34.5	
		SNCOTTS3	27.250	--	1.452	39.565	1.4	0.273	1.87	70'	EL	34.5	0.507	2.43	70'	EL	6.9	0.80	0.273	1.45	70'	EL	34.5	
		SNAGGRS4	34.925	--	1.218	42.554	1.4	0.273	1.57	70'	EL	34.5	0.507	2.03	70'	EL	6.9	0.80	0.273	1.22	70'	EL	34.5	
		SNS5A	35.550	--	1.191	42.346	1.4	0.273	1.53	70'	EL	34.5	0.507	2.06	70'	EL	6.9	0.80	0.273	1.19	70'	EL	34.5	
		SNS6A	39.950	--	1.095	43.747	1.4	0.273	1.41	70'	EL	34.5	0.507	1.88	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		SNS7B	42.000	--	1.043	43.801	1.4	0.273	1.34	70'	EL	34.5	0.507	1.85	70'	EL	6.9	0.80	0.273	1.04	70'	EL	34.5	
	TTST	TNAGRIT3	33.000	--	1.336	44.087	1.4	0.273	1.72	70'	EL	34.5	0.507	2.23	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT4A	33.075	--	1.342	44.401	1.4	0.273	1.72	70'	EL	34.5	0.507	2.17	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT6A	41.600	--	1.1	45.746	1.4	0.273	1.41	70'	EL	34.5	0.507	1.98	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		TNT7A	42.000	--	1.106	46.462	1.4	0.273	1.42	70'	EL	34.5	0.507	1.94	70'	EL	6.9	0.80	0.273	1.11	70'	EL	34.5	
		TNT7B	42.000	--	1.147	48.18	1.4	0.273	1.47	70'	EL	34.5	0.507	1.8	70'	EL	6.9	0.80	0.273	1.15	70'	EL	34.5	
		TNAGRIT4	43.000	--	1.089	46.838	1.4	0.273	1.4	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.09	70'	EL	34.5	
		TNAGT5A	45.000	--	1.026	46.175	1.4	0.273	1.32	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.03	70'	EL	34.5	
		TNAGT5B	45.000	3	1.013	45.579	1.4	0.273	1.3	70'	EL	34.5	0.507	1.66	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	



LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER

PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-

SHEET 3 OF 4

Documented by:
David Ruggles
C482788DF412422...
9/27/2017

SEAL
11725
ENGINEER
DAVID R. RUGGLES

DOCUMENT NOT CONSIDERED
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						REVISIONS			SHEET NO.
STANDARD LRFR SUMMARY FOR 70' CORED SLAB UNIT 90° SKEW (NON-INTERSTATE TRAFFIC)						NO.	BY:	DATE:	S-3
1				3					TOTAL SHEETS
2				4					21

STD. NO. 24LRFR1_90S_70L

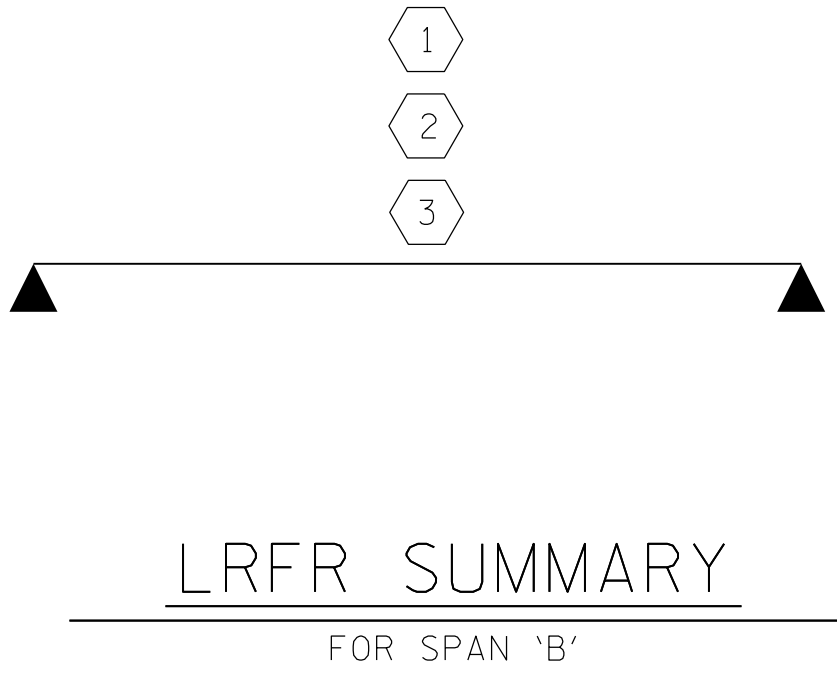
900078

8/16/2017

\\400_004_900078_SMU_LRFR02.dgn
USER:jlottus

DRAWN BY:	H.ASSFOURA	DATE :	10/16
CHECKED BY:	D. RUGGLES	DATE :	01/17
DESIGN ENGINEER OF RECORD:	D. RUGGLES	DATE :	01/17

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER	
							LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	2.14	--	1.75	0.230	2.14	45'	EL	22.0	0.240	2.83	45'	EL	42.2	0.80	0.230	2.50	45'	EL	22.0	
		HL-93(0pr)	N/A	--	2.77	--	1.35	0.230	2.77	45'	EL	22.0	0.240	3.67	45'	EL	42.2	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	2.63	94.68	1.75	0.230	2.63	45'	EL	22.0	0.240	3.37	45'	EL	42.2	0.80	0.230	3.07	45'	EL	22.0	
		HS-20(0pr)	36.000	--	3.41	122.76	1.35	0.230	3.41	45'	EL	22.0	0.240	4.37	45'	EL	42.2	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.86	65.61	1.4	0.230	6.27	45'	EL	22.0	0.240	8.14	45'	EL	26.5	0.80	0.230	4.86	45'	EL	22.0	
		SNGARBS2	20.000	--	3.89	77.80	1.4	0.230	5.02	45'	EL	22.0	0.240	6.28	45'	EL	31.0	0.80	0.230	3.89	45'	EL	22.0	
		SNAGRIS2	22.000	--	3.77	83.38	1.4	0.230	4.84	45'	EL	17.5	0.240	6.01	45'	EL	31.0	0.80	0.230	3.77	45'	EL	17.5	
		SNCOTTS3	27.250	--	2.41	65.67	1.4	0.230	3.12	45'	EL	22.0	0.240	4.25	45'	EL	31.0	0.80	0.230	2.41	45'	EL	22.0	
		SNAGGRS4	34.925	--	2.12	74.04	1.4	0.230	2.74	45'	EL	22.0	0.240	3.77	45'	EL	42.2	0.80	0.230	2.12	45'	EL	22.0	
		SNS5A	35.550	--	2.07	73.59	1.4	0.230	2.67	45'	EL	22.0	0.240	3.80	45'	EL	42.2	0.80	0.230	2.07	45'	EL	22.0	
		SNS6A	39.950	--	1.95	77.90	1.4	0.230	2.51	45'	EL	22.0	0.240	3.62	45'	EL	42.2	0.80	0.230	1.95	45'	EL	22.0	
		SNS7B	42.000	--	1.86	78.12	1.4	0.230	2.40	45'	EL	22.0	0.240	3.64	45'	EL	42.2	0.80	0.230	1.86	45'	EL	22.0	
	TTST	TNAGRIT3	33.000	--	2.39	78.87	1.4	0.230	3.09	45'	EL	22.0	0.240	4.53	45'	EL	42.2	0.80	0.230	2.39	45'	EL	22.0	
		TNT4A	33.075	--	2.41	79.71	1.4	0.230	3.11	45'	EL	22.0	0.240	4.07	45'	EL	42.2	0.80	0.230	2.41	45'	EL	22.0	
		TNT6A	41.600	--	2.02	84.03	1.4	0.230	2.61	45'	EL	22.0	0.240	3.96	45'	EL	42.2	0.80	0.230	2.02	45'	EL	22.0	
		TNT7A	42.000	--	2.06	86.52	1.4	0.230	2.66	45'	EL	22.0	0.240	3.66	45'	EL	42.2	0.80	0.230	2.06	45'	EL	22.0	
		TNT7B	42.000	--	2.14	89.88	1.4	0.230	2.76	45'	EL	22.0	0.240	3.49	45'	EL	42.2	0.80	0.230	2.14	45'	EL	22.0	
		TNAGRIT4	43.000	--	2.04	87.72	1.4	0.230	2.64	45'	EL	22.0	0.240	3.35	45'	EL	42.2	0.80	0.230	2.04	45'	EL	22.0	
		TNAGT5A	45.000	--	1.90	85.50	1.4	0.230	2.45	45'	EL	22.0	0.240	3.43	45'	EL	42.2	0.80	0.230	1.90	45'	EL	22.0	
		TNAGT5B	45.000	3	1.86	83.70	1.4	0.230	2.40	45'	EL	22.0	0.240	3.18	45'	EL	42.2	0.80	0.230	1.86	45'	EL	22.0	



LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER

PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-

SHEET 4 OF 4

Documented by:
David Ruggles
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9/27/2017

SEAL
11725
ENGINEER
DAVID R. RUGGLES

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						REVISIONS			SHEET NO.
STANDARD LRFR SUMMARY FOR 45' CORED SLAB UNIT 90° SKEW (NON-INTERSTATE TRAFFIC)						NO.	BY:	DATE:	S-4
						1			
						2			
						3			
						4			
						TOTAL SHEETS			21

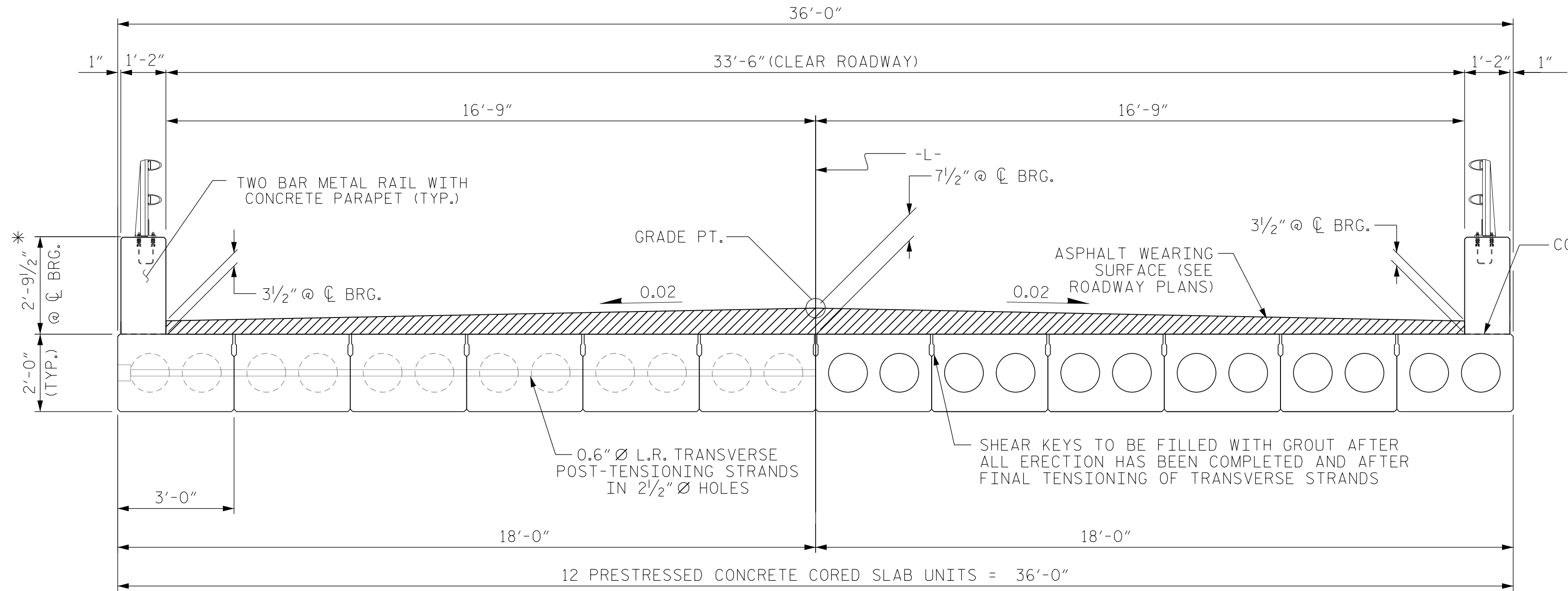
900078

9/28/2017

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DRAWN BY: HASSFOURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 01/17



HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

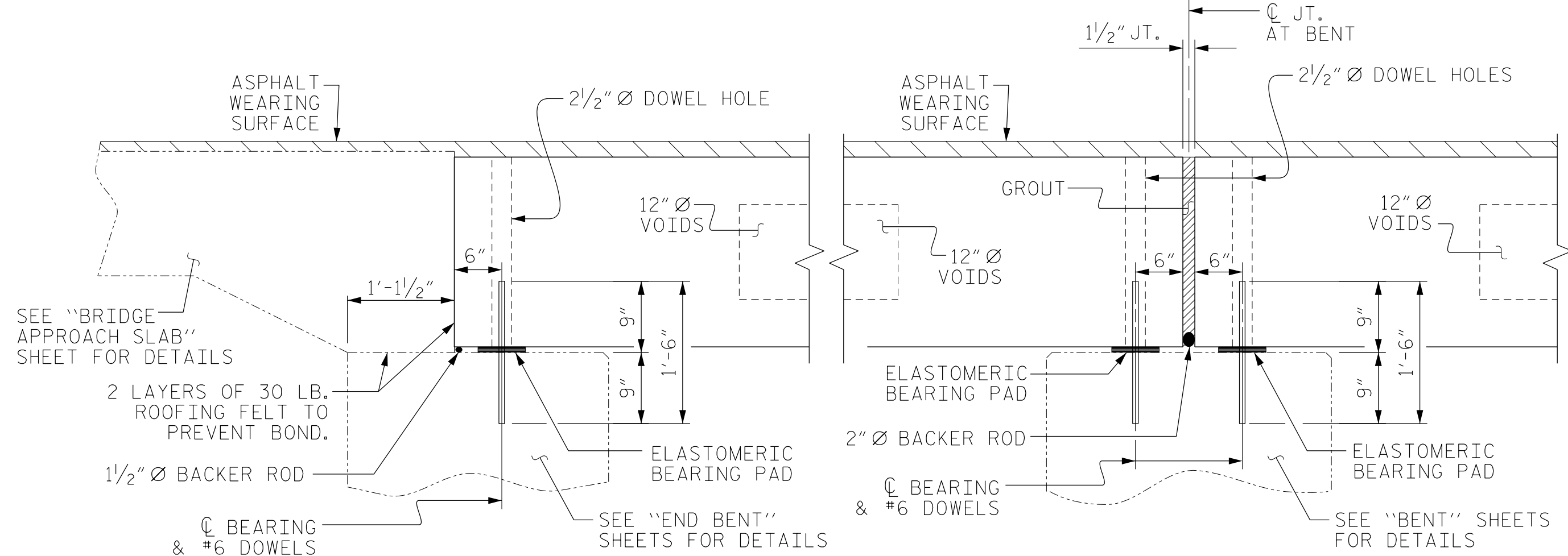
HALF SECTION
THROUGH VOIDS

* - THE MAXIMUM PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR PARAPET HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "PARAPET AND END POST FOR 2 BAR METAL RAIL" SHEET.

FIXED END

FIXED END

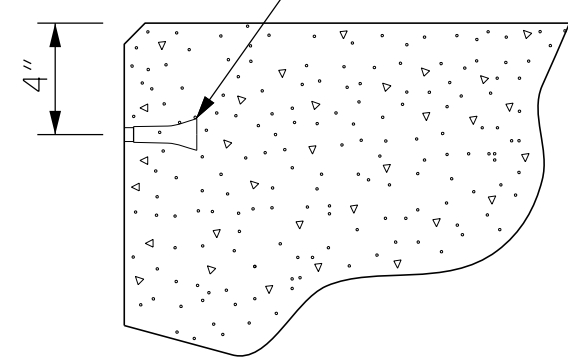
FIXED END



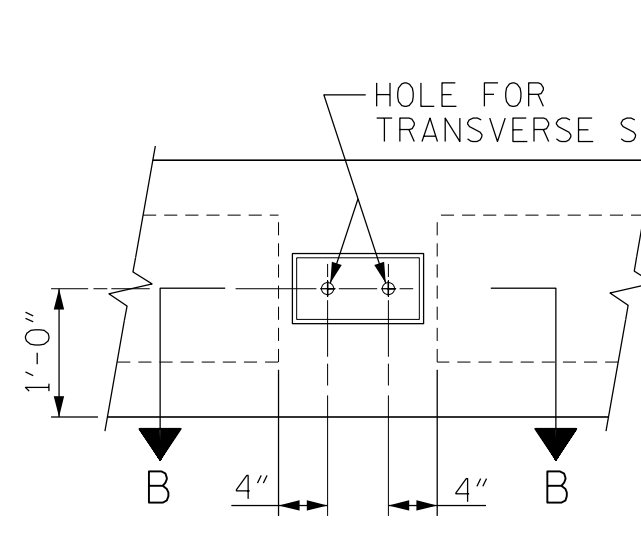
SECTION AT END BENT

SECTION AT BENT

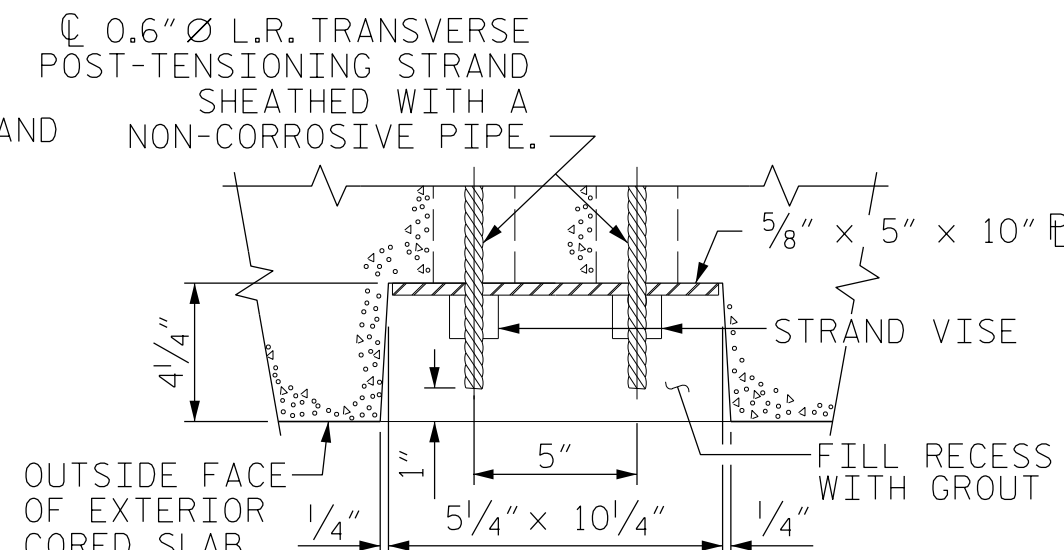
PERMITTED THREADED INSERT
CAST IN OUTSIDE FACE OF
EXTERIOR UNIT AND
RECESSED 3/8" SIZE TO BE
DETERMINED
BY CONTRACTOR.



THREADED INSERT DETAIL

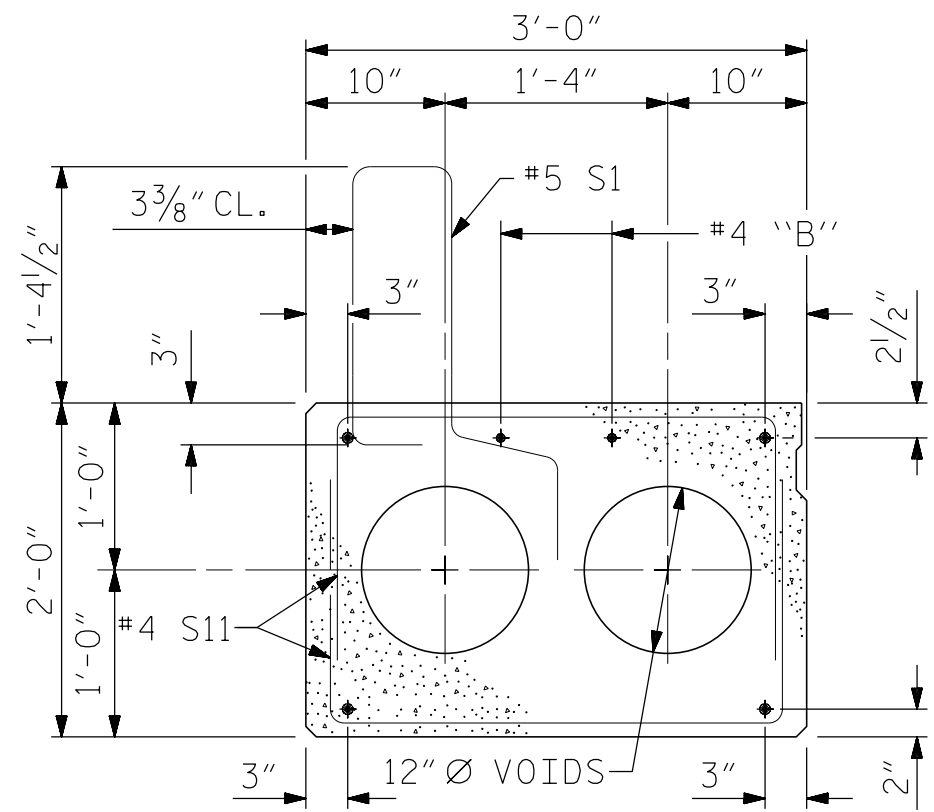


ELEVATION VIEW



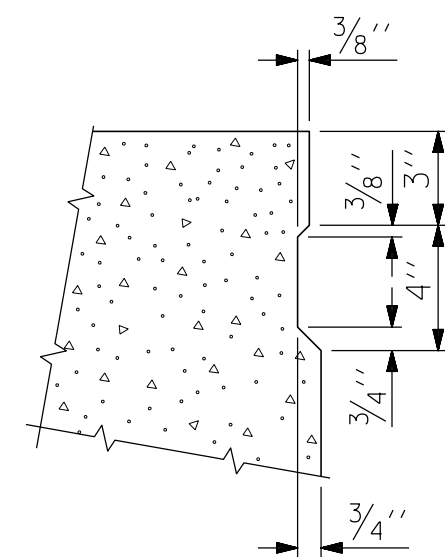
SECTION B-B

GROUTED RECESS AT END OF
POST-TENSIONED STRAND CORED SLABS



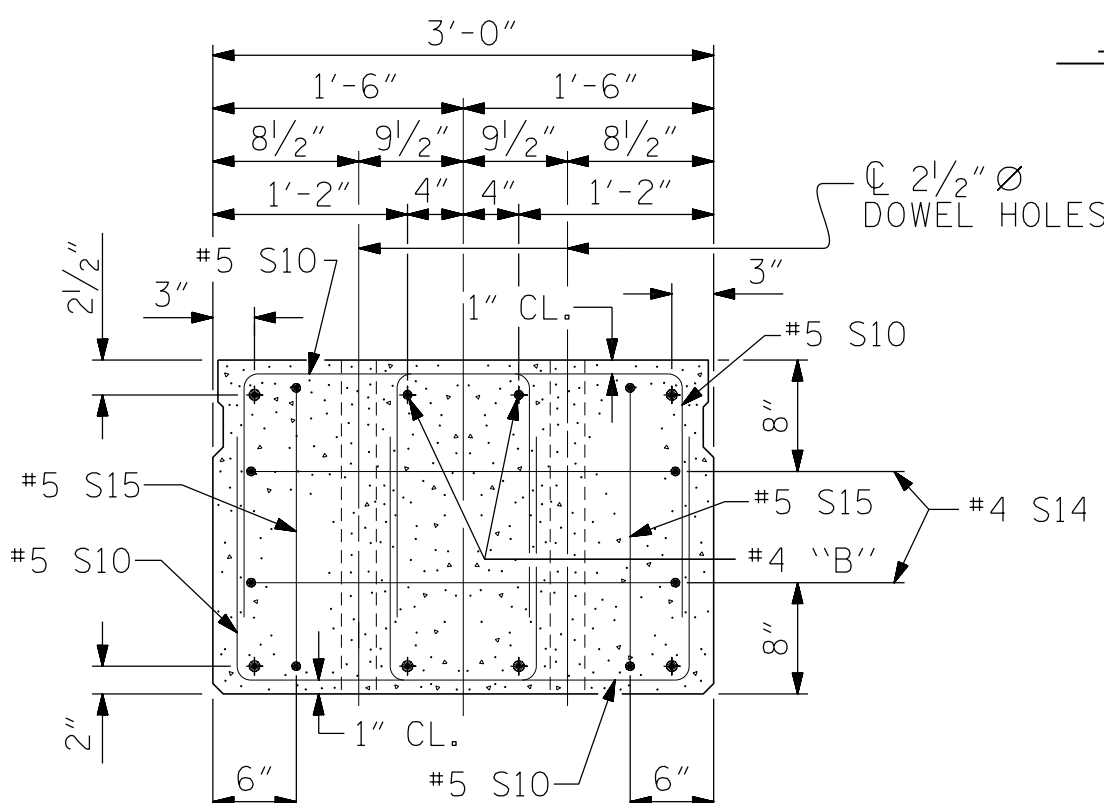
EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)
NOTE: S1 BAR SPACING IS ASSYMETRIC FOR EACH SPAN.
SEE SHEETS S-6 & S-7 FOR SPACINGS.



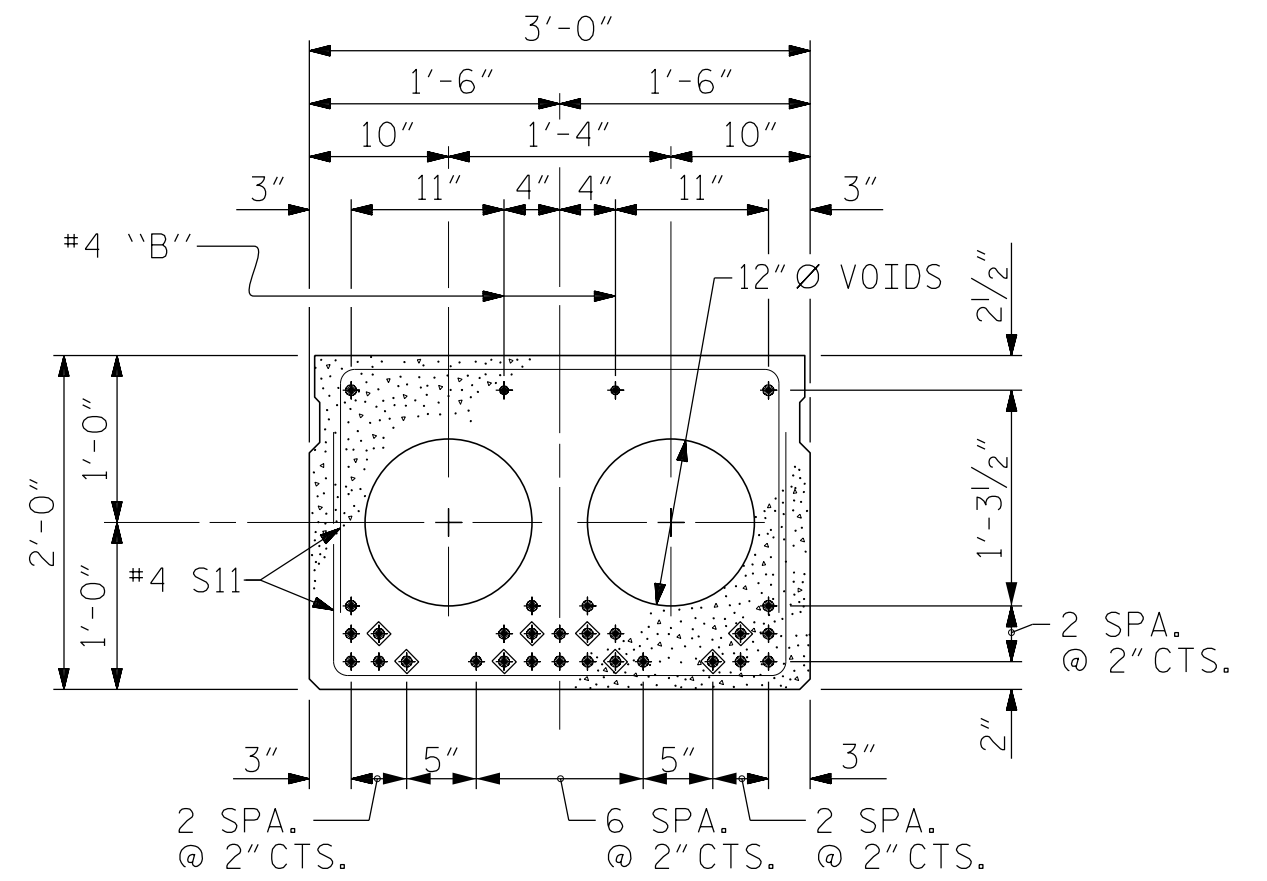
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE
OF EXTERIOR CORED SLABS.



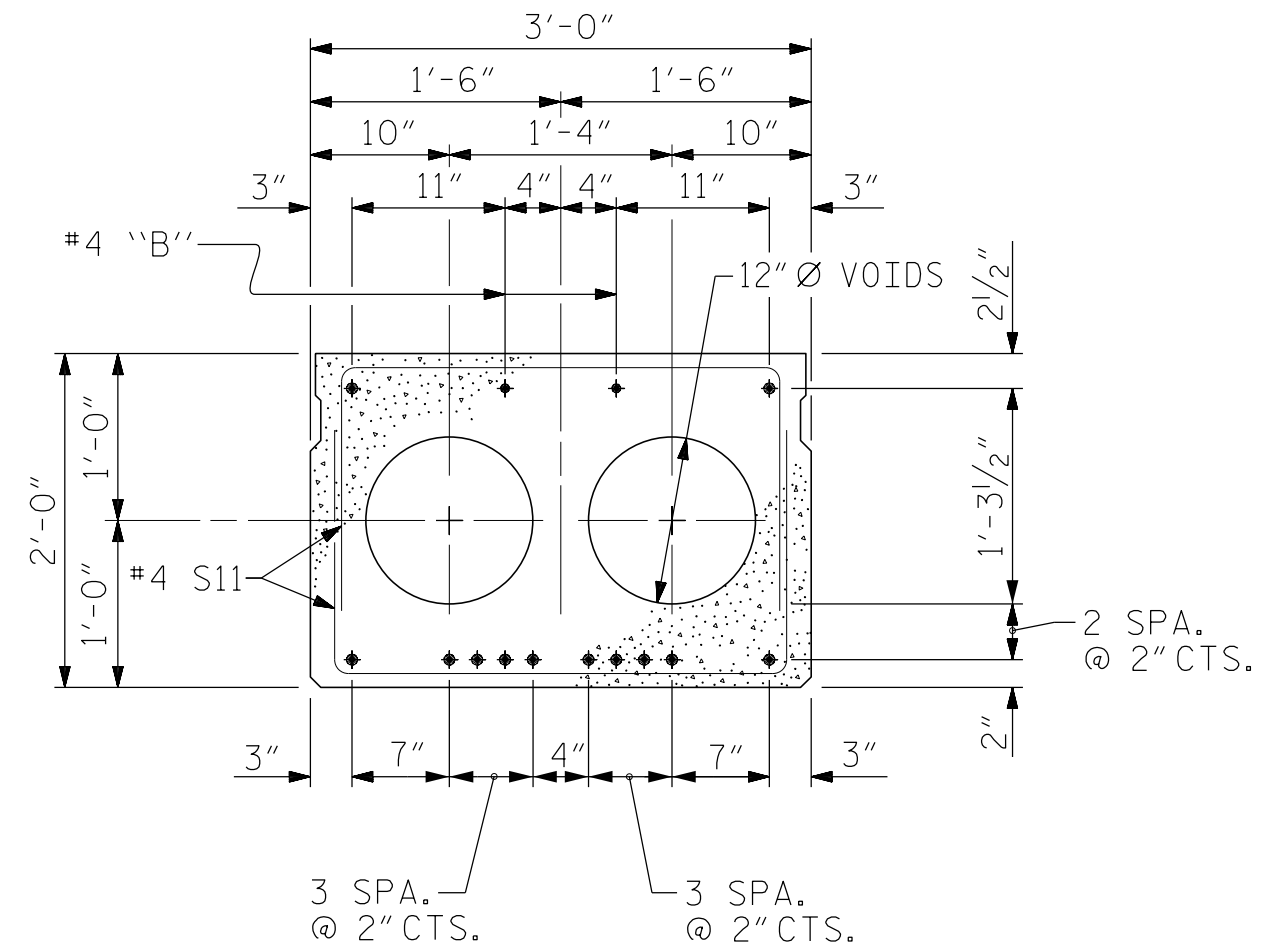
END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS
AND LOCATION OF DOWEL HOLES.
(STRAND LAYOUT NOT SHOWN.)
INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB
UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



INTERIOR SLAB SECTION (SPAN A)
(28 STRANDS REQUIRED)

0.6" Ø LOW
RELAXATION STRAND LAYOUT



INTERIOR SLAB SECTION (SPAN B)
(12 STRANDS REQUIRED)

BOND SHALL BE BROKEN ON THESE STRANDS FOR A
DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT.
SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

PROJECT NO. 17BP.5.R.64

VANCE COUNTY

STATION: 14+30.00 -L-

SHEET 1 OF 8



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

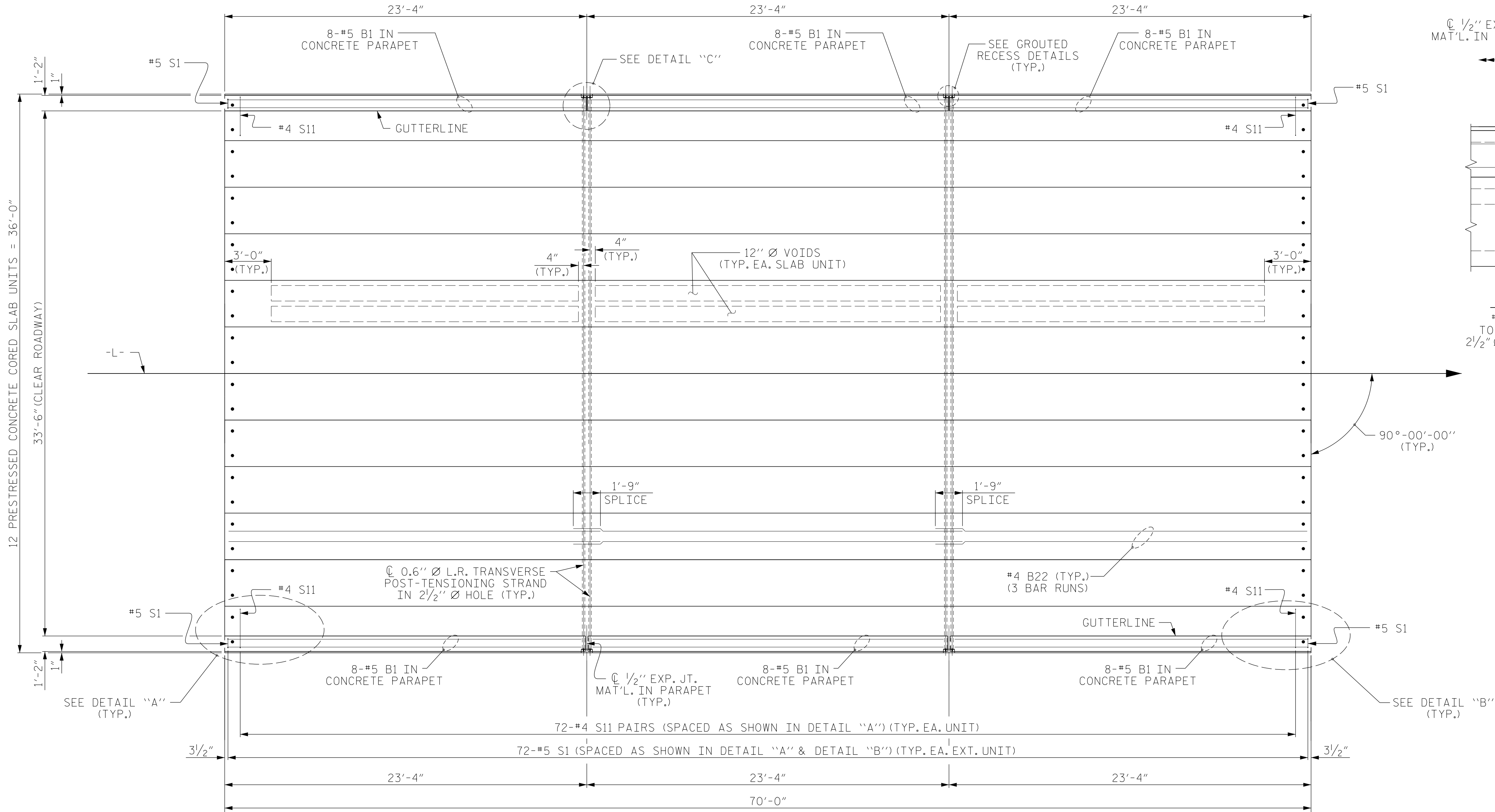
REVISIONS						SHEET NO. S-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

STD. NO. 24PCS4.36_90S

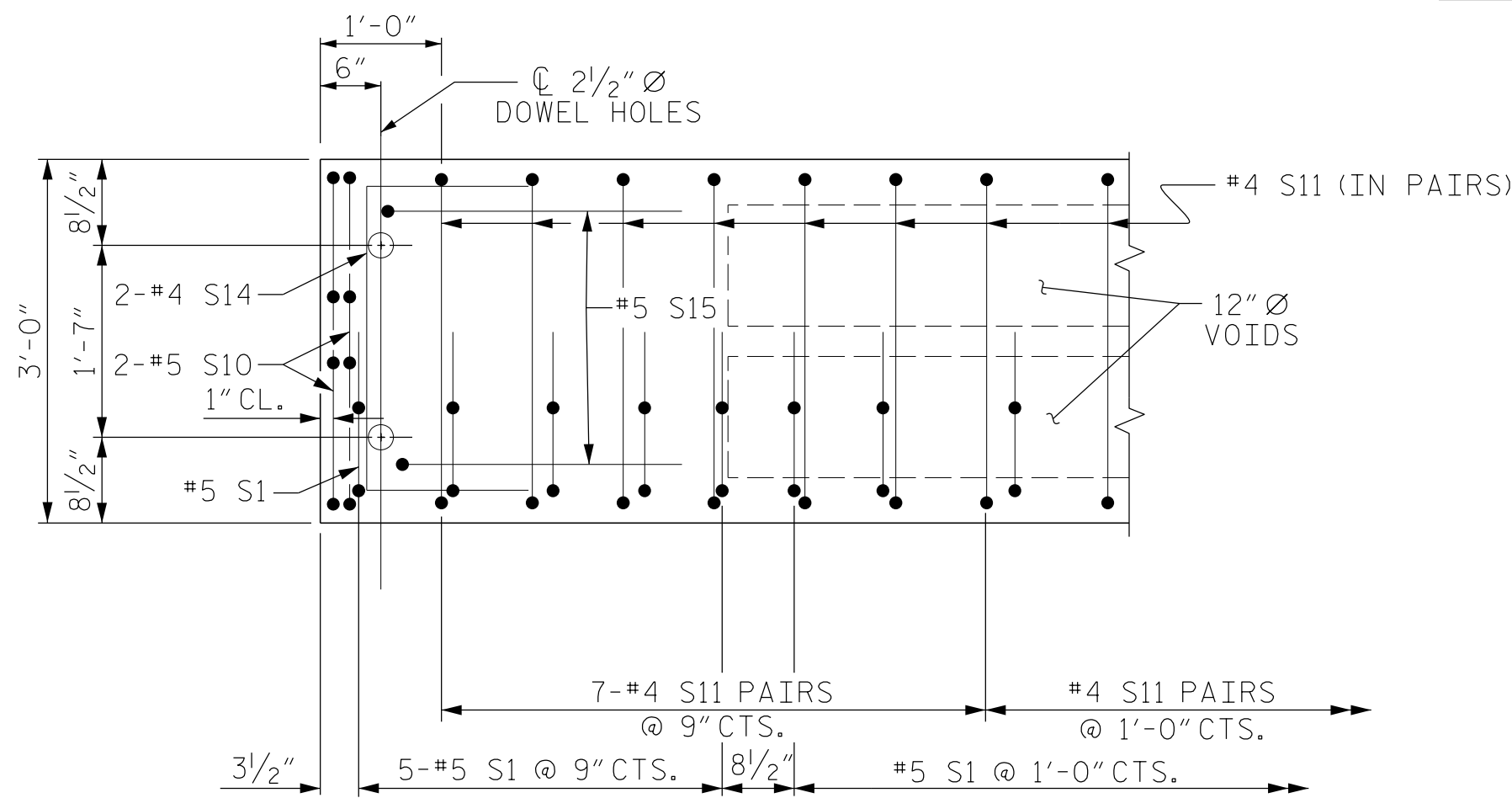
900078

8/16/2017
\\400_006_900078_SML_SP01.dgn
USER:jloftus

DRAWN BY: HASSFOURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 01/17

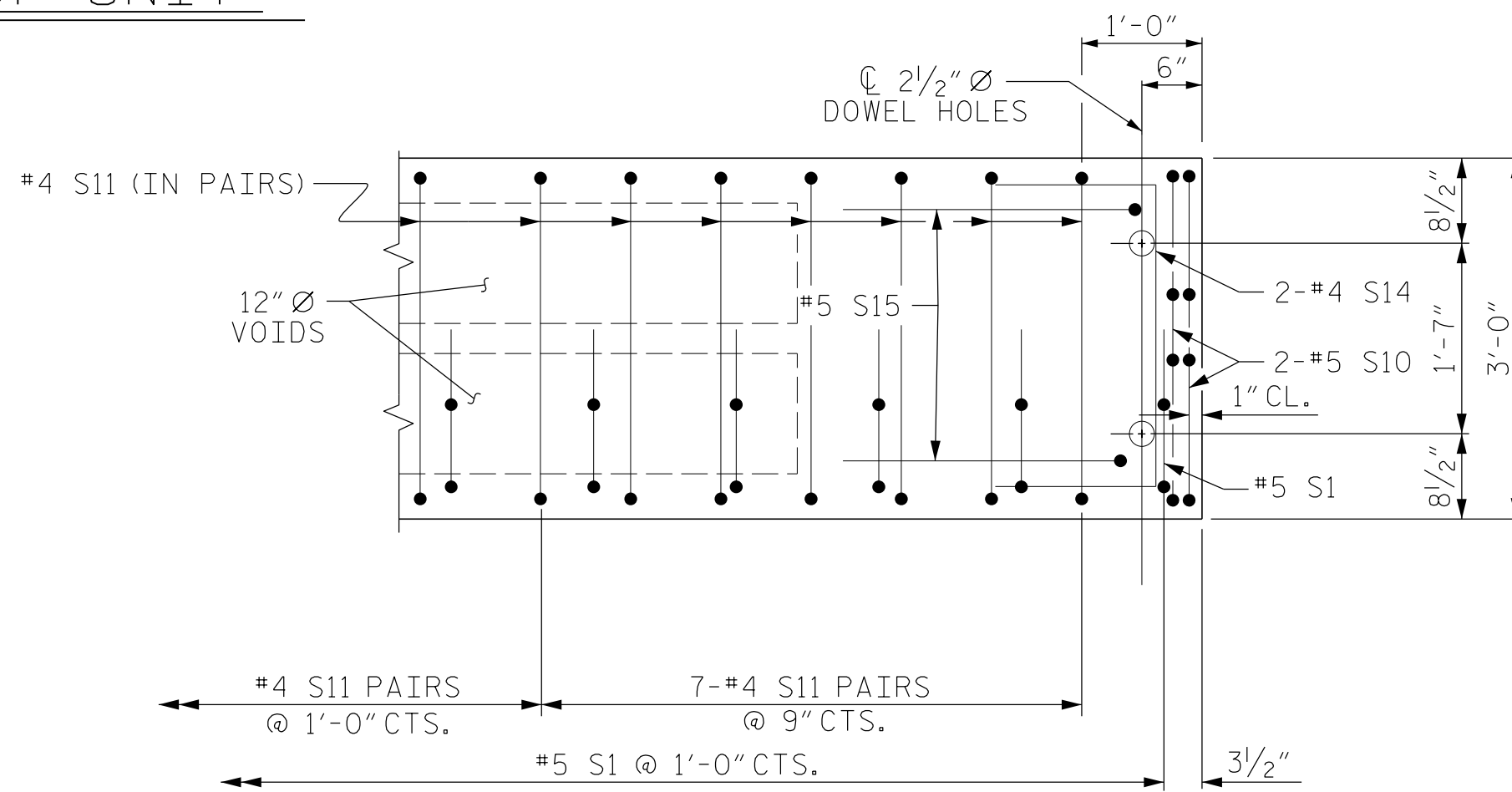


PLAN OF UNIT



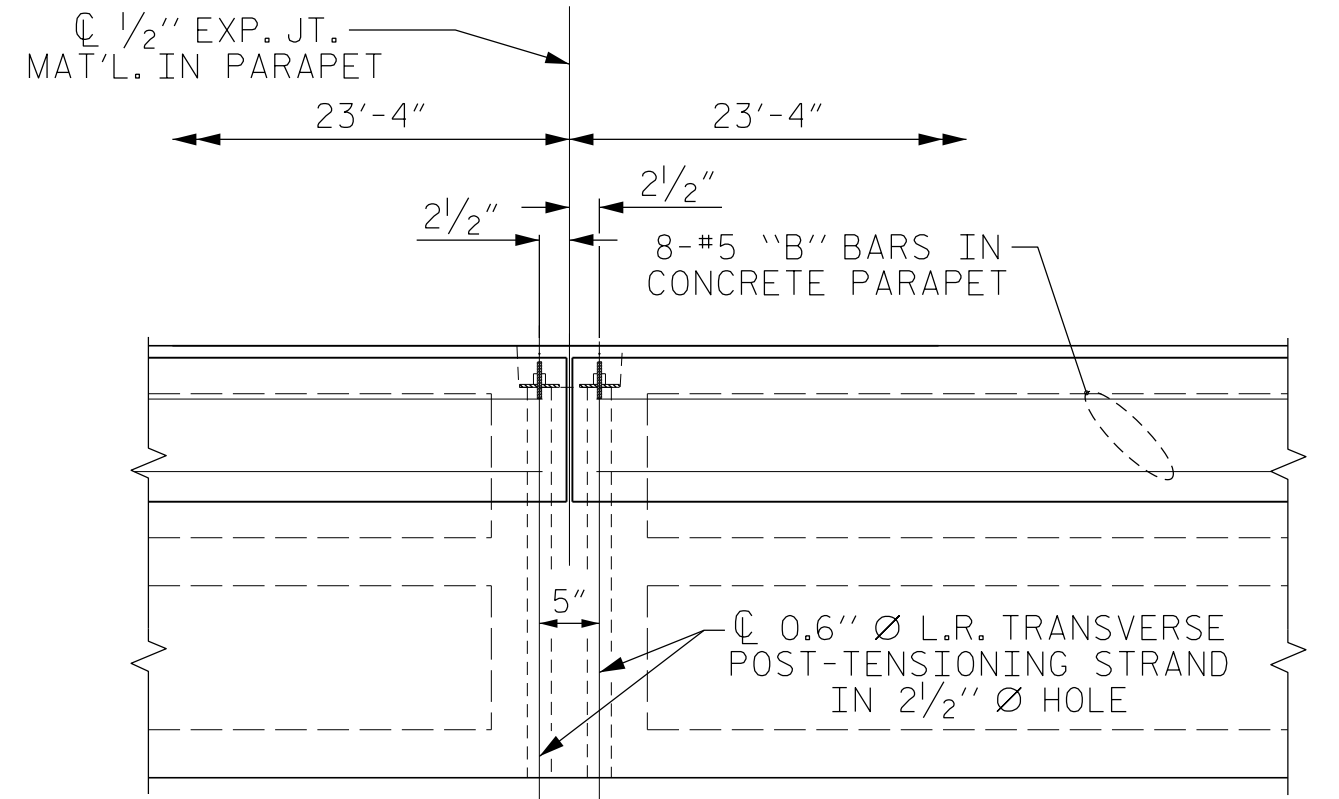
DETAIL "A"

(TYPICAL END BENT 1 END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR
UNIT SIMILAR EXCEPT OMIT #5 S1 BARS.



DETAIL "B"

(TYPICAL BENT 1 END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR
UNIT SIMILAR EXCEPT OMIT #5 S1 BARS.



DETAIL "C"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY
TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND
2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



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PROJECT NO. 17BP.5.R.64

VANCE COUNTY

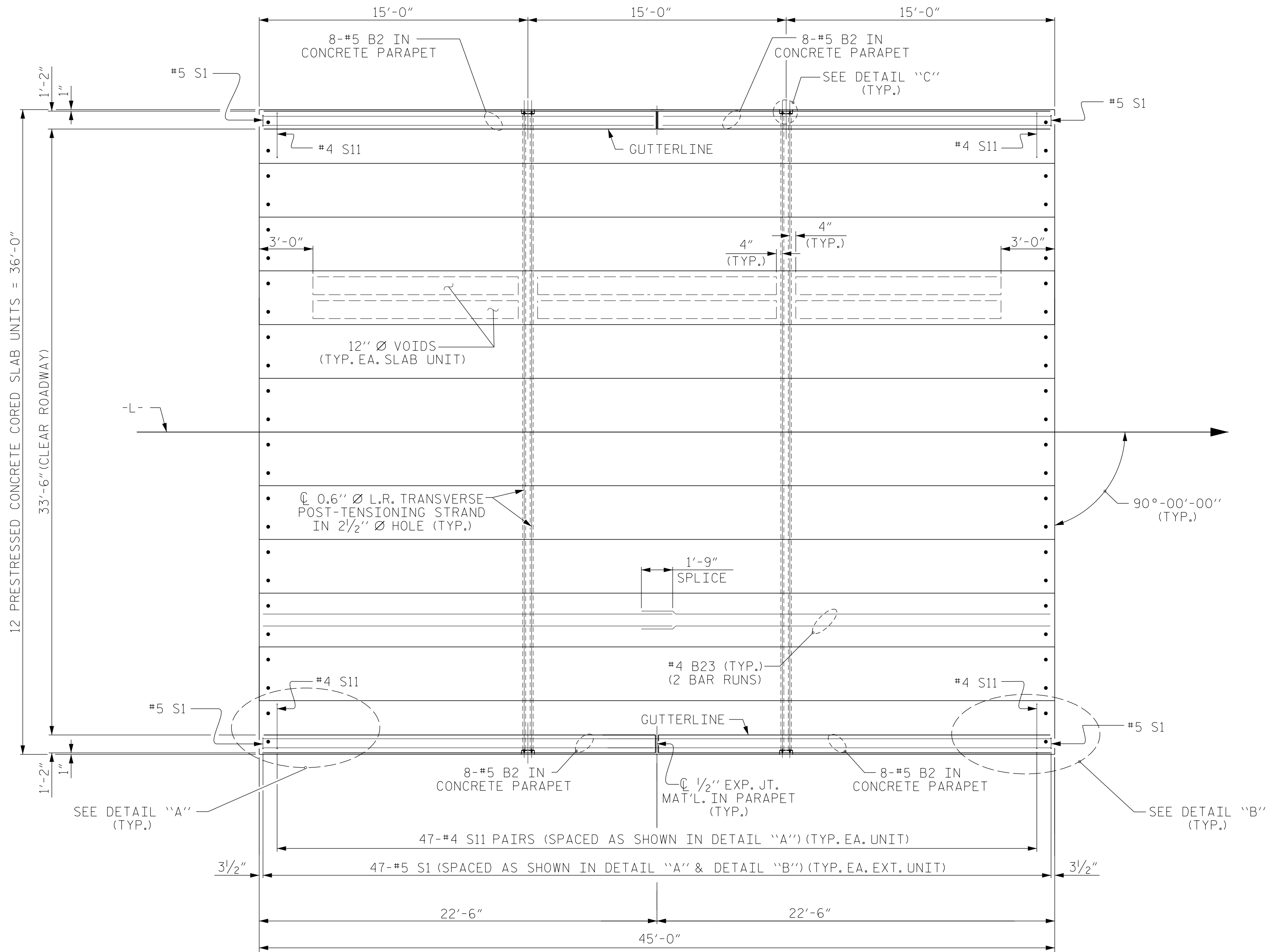
STATION: 14+30.00 -L-

SHEET 2 OF 8

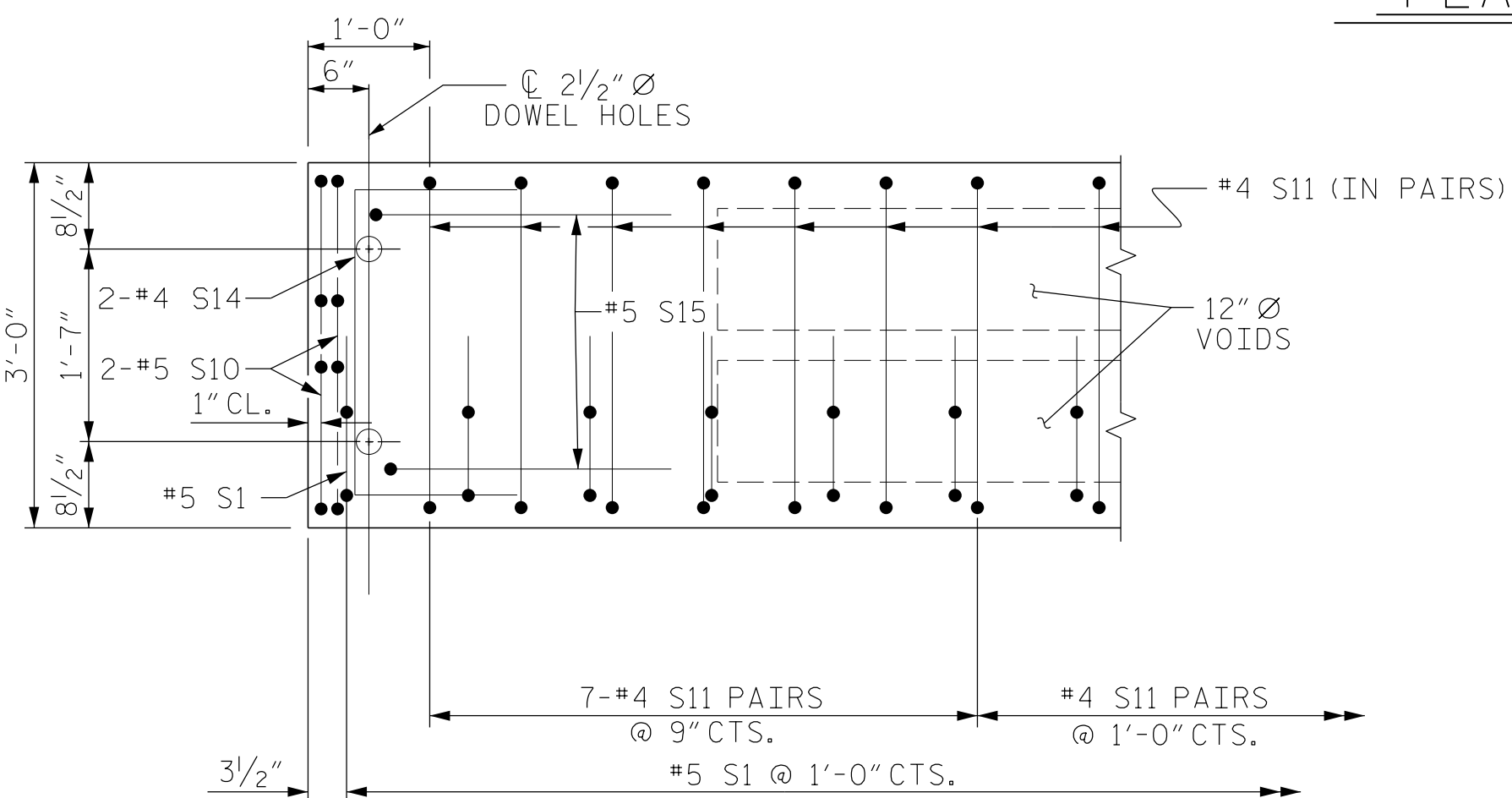
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 70' UNIT
33'-6" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-6
2			4			
TOTAL SHEETS						21

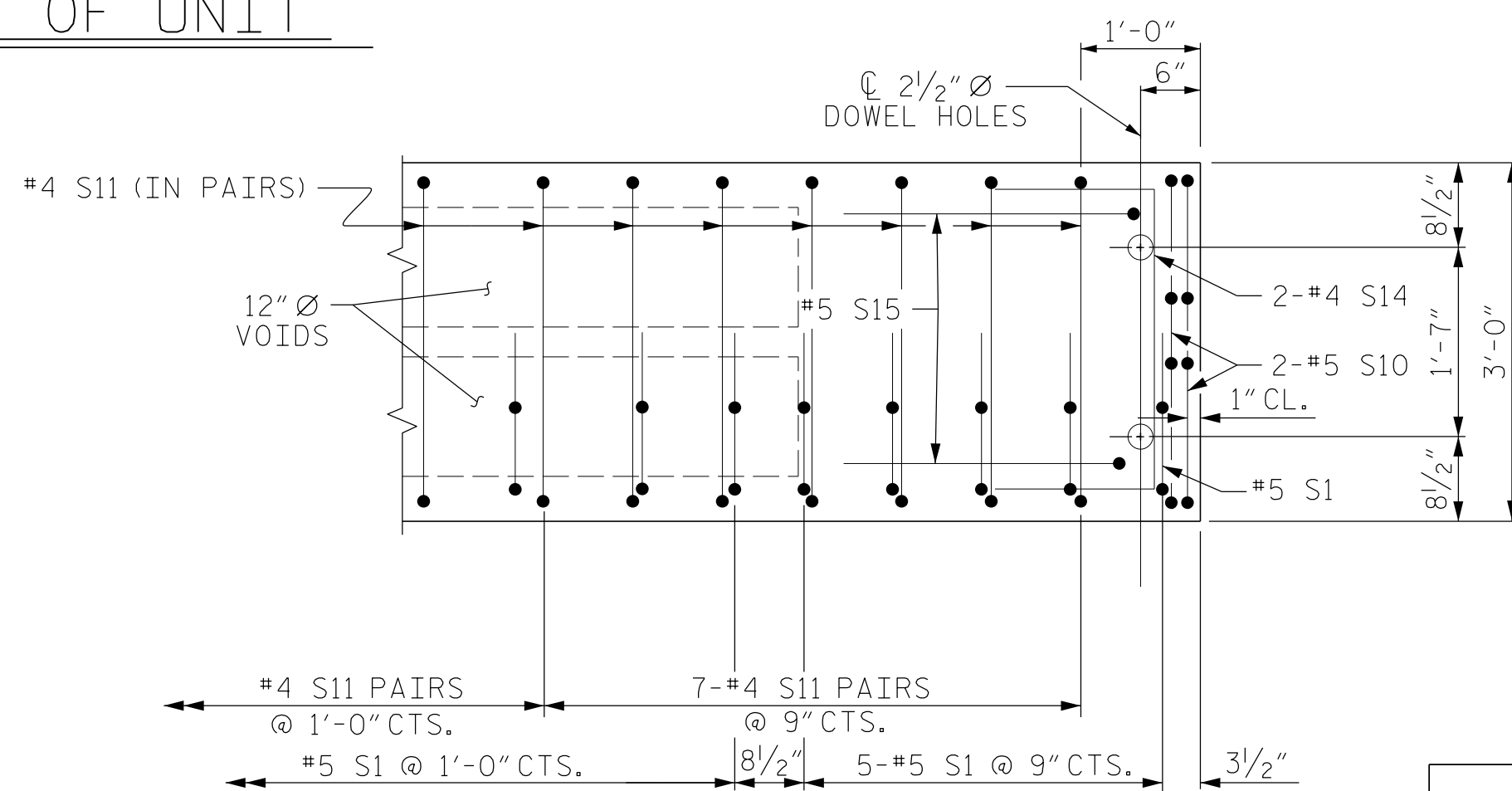


PLAN OF UNIT



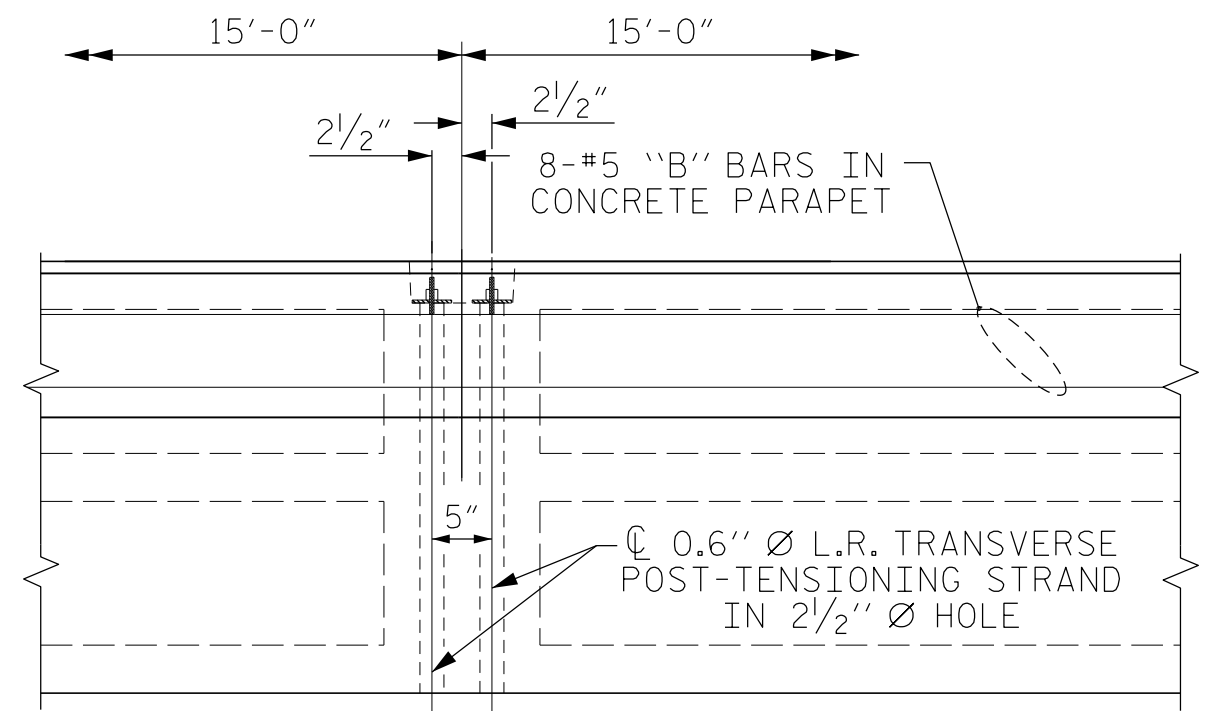
DETAIL "A"

(TYPICAL BENT 1 END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR
UNIT SIMILAR EXCEPT OMIT #5 S1 BARS.



DETAIL "B"

(TYPICAL BENT 2 END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR
UNIT SIMILAR EXCEPT OMIT #5 S1 BARS.



DETAIL "C"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY
TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND
2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



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STEWART

PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 45' UNIT
33'-6" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-7 TOTAL SHEETS 21
2			4			

DRAWN BY: H.ASSFOURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 01/17

9/26/2017
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USER: default

900078

900078

9/28/2017

\\400_008_900078_SML_CDR02.dgn

USERdefault

DRAWN BY:	H.ASSFOURA	DATE :	10/16
CHECKED BY:	D. RUGGLES	DATE :	01/17
DESIGN ENGINEER OF RECORD:	D. RUGGLES	DATE :	01/17

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
70' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2 1/4" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/4" ↓
FINAL CAMBER	1 1/2" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
45' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 1/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/8" ↓
FINAL CAMBER	9/16" ↑

** INCLUDES FUTURE WEARING SURFACE

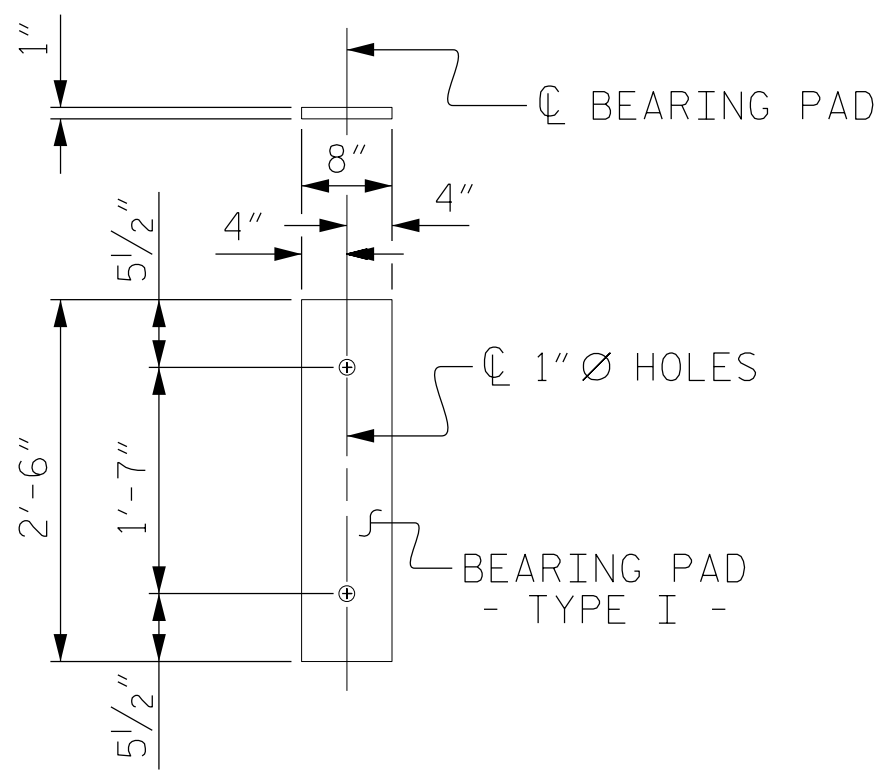
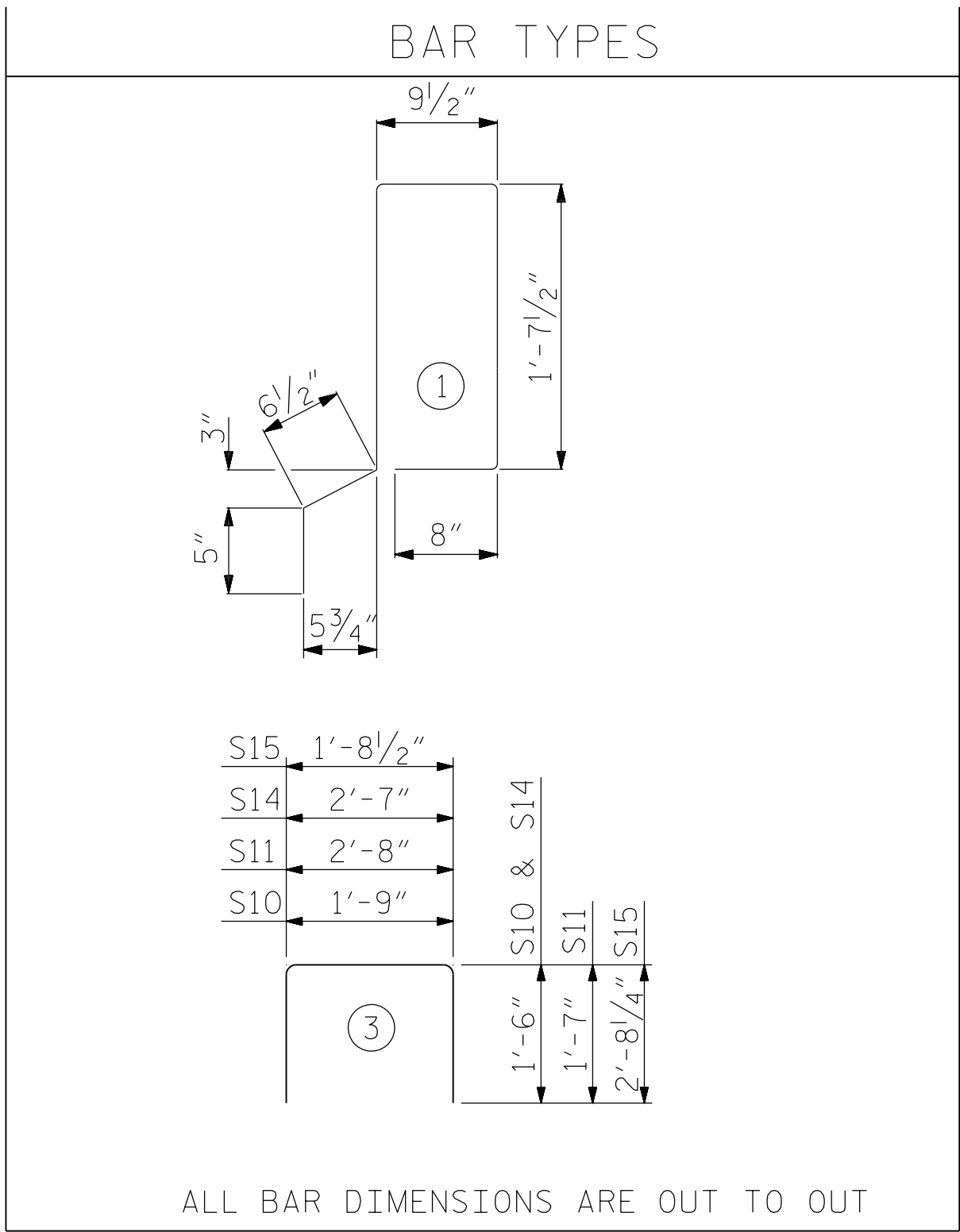
BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT							
				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
*S1	72	#5	1	5'-8"	426		
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	144	#4	3	5'-10"	561	5'-10"	561
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL				LBS.	744		744
* EPOXY COATED REINFORCING STEEL				LBS.	426		
7000 P.S.I. CONCRETE				CU. YDS.	11.8		11.8
0.6" Ø L.R. STRANDS				No.	28		28

BILL OF MATERIAL FOR ONE 45' CORED SLAB UNIT							
				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B23	4	#4	STR	23'-3"	62	23'-3"	62
*S1	47	#5	1	5'-8"	278		
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	94	#4	3	5'-10"	366	5'-10"	366
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL				LBS.	513		513
* EPOXY COATED REINFORCING STEEL				LBS.	278		
7000 P.S.I. CONCRETE				CU. YDS.	7.6		7.6
0.6" Ø L.R. STRANDS				No.	12		12

CONCRETE RELEASE STRENGTH	
UNIT	PSI
70' UNITS	5500
45' UNITS	5500

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR C.S.	2	70'-0"	140'-0"
INTERIOR C.S.	10	70'-0"	700'-0"
TOTAL	12		840'-0"
45' UNIT			
EXTERIOR C.S.	2	45'-0"	90'-0"
INTERIOR C.S.	10	45'-0"	450'-0"
TOTAL	12		540'-0"

GRADE 270 STRANDS	
AREA (SQUARE INCHES)	0.6" Ø L.R.
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN CONCRETE PARAPETS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

PROJECT NO. 17BP.5.R.64

VANCE COUNTY

STATION: 14+30.00 -L-

SHEET 4 OF 8

DocuSigned by:
David Ruggles
C402708DFF412422
9/29/2017



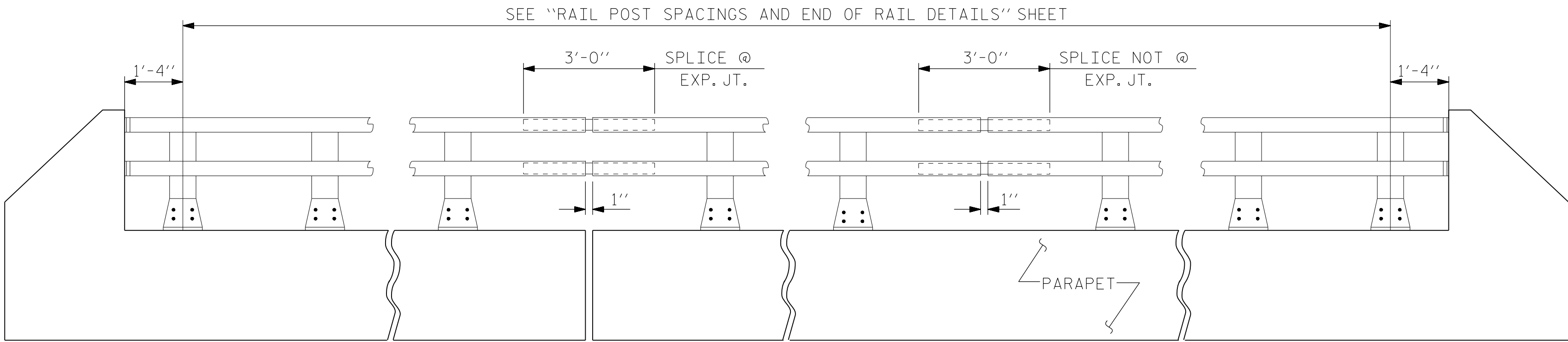
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FINAL UNLESS ALL
SIGNATURES COMPLETED



STEWART

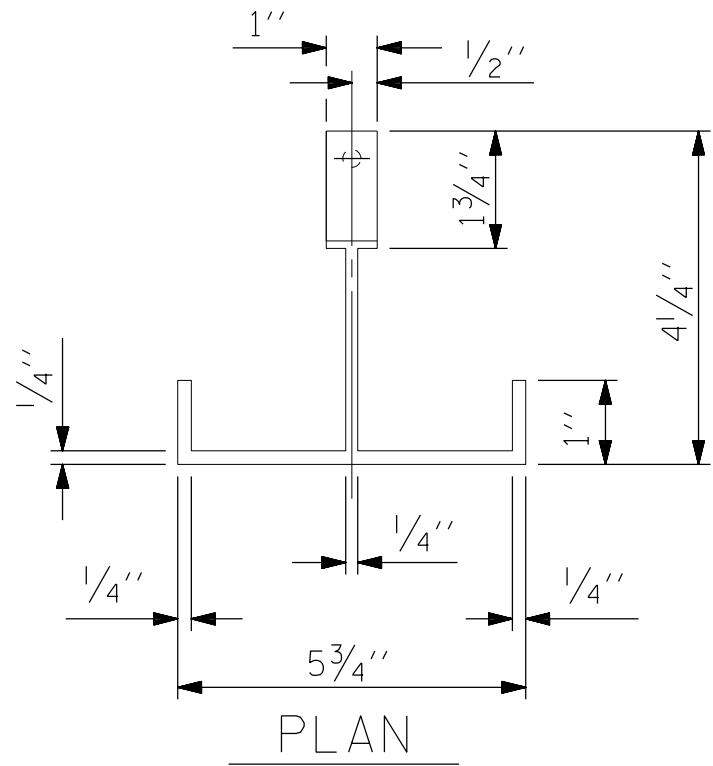
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421 Fayetteville St,
Suite 400
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T 919.380.8750
www.stewartinc.com

REVISIONS						SHEET NO. S-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

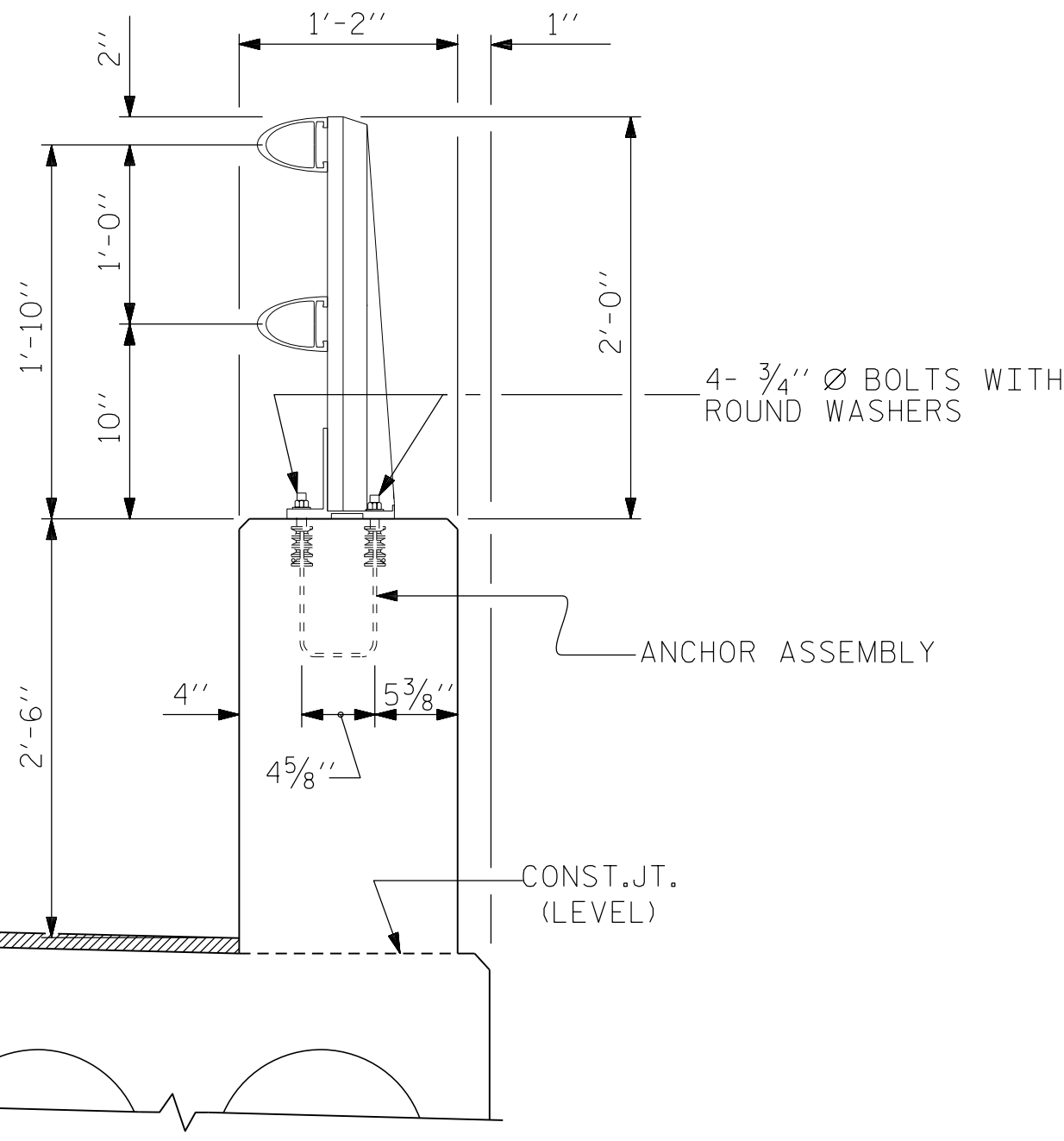


ELEVATION

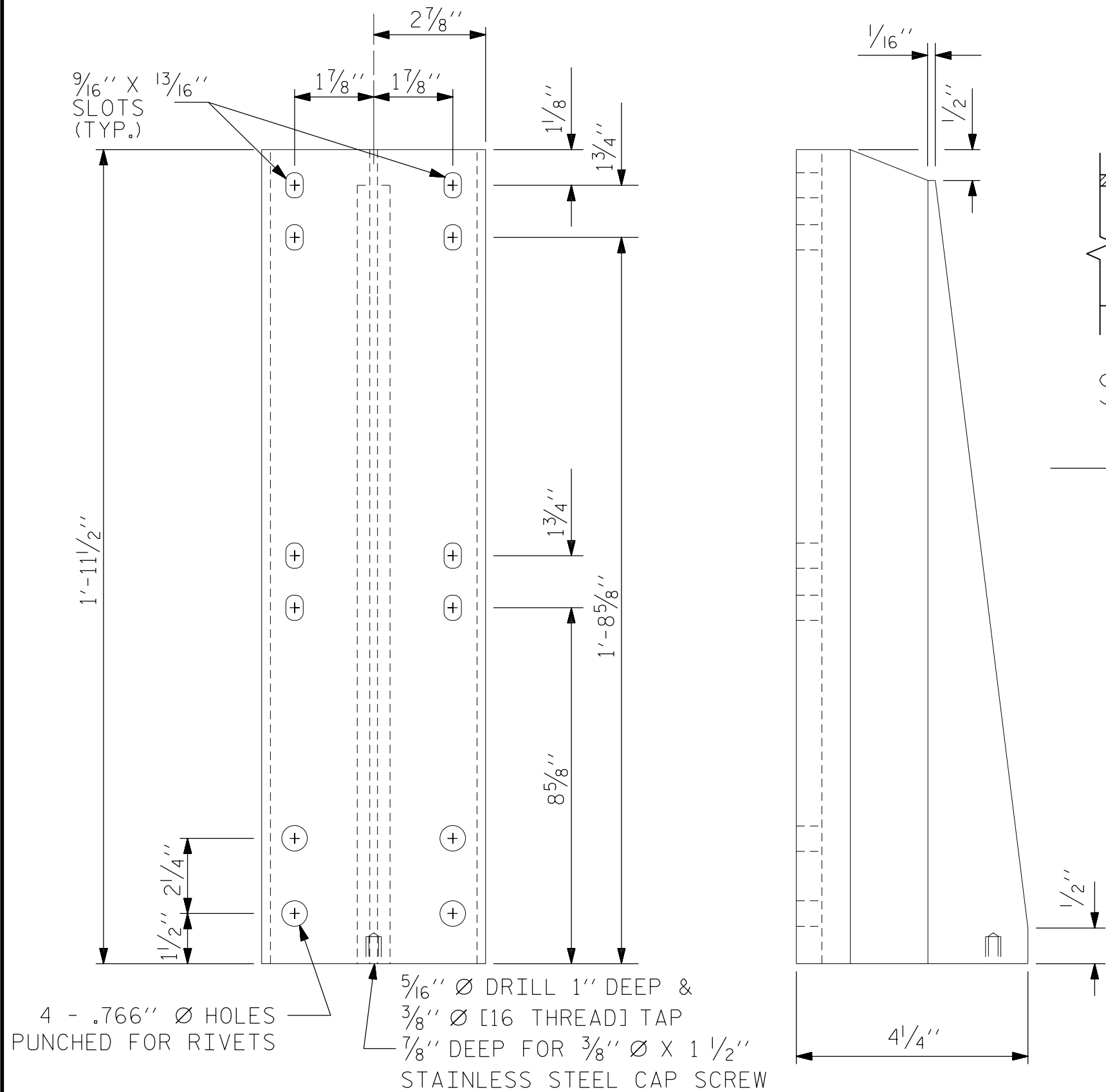
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN



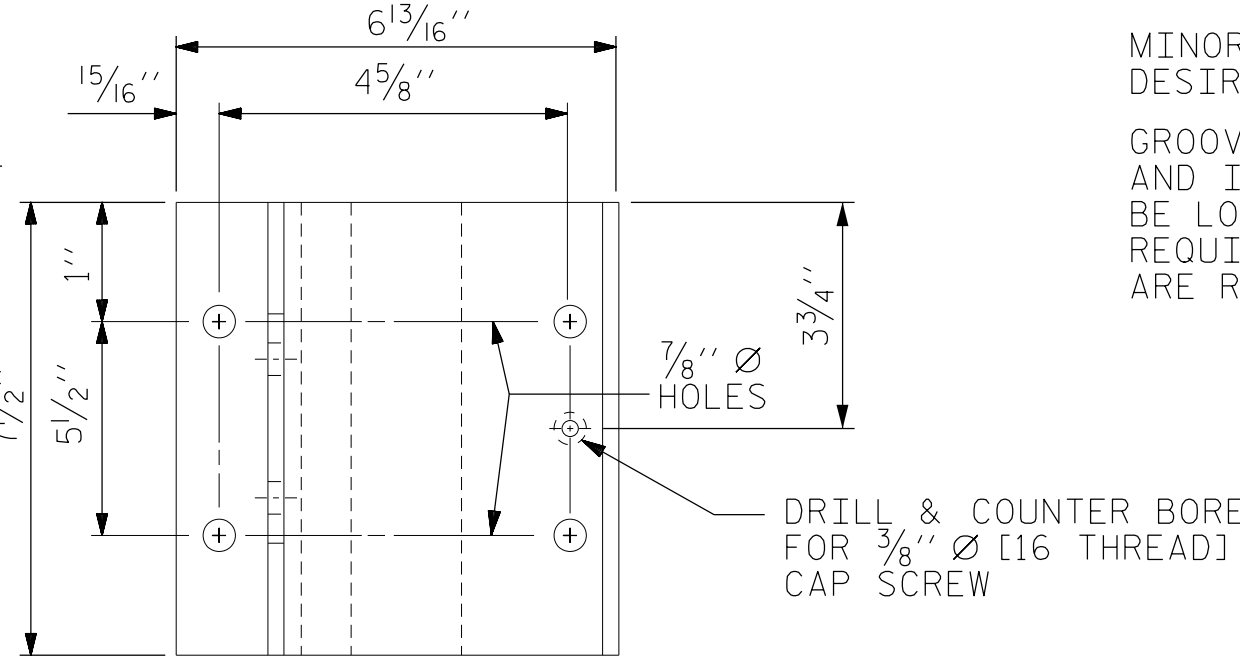
SECTION THRU PARAPET AND RAIL



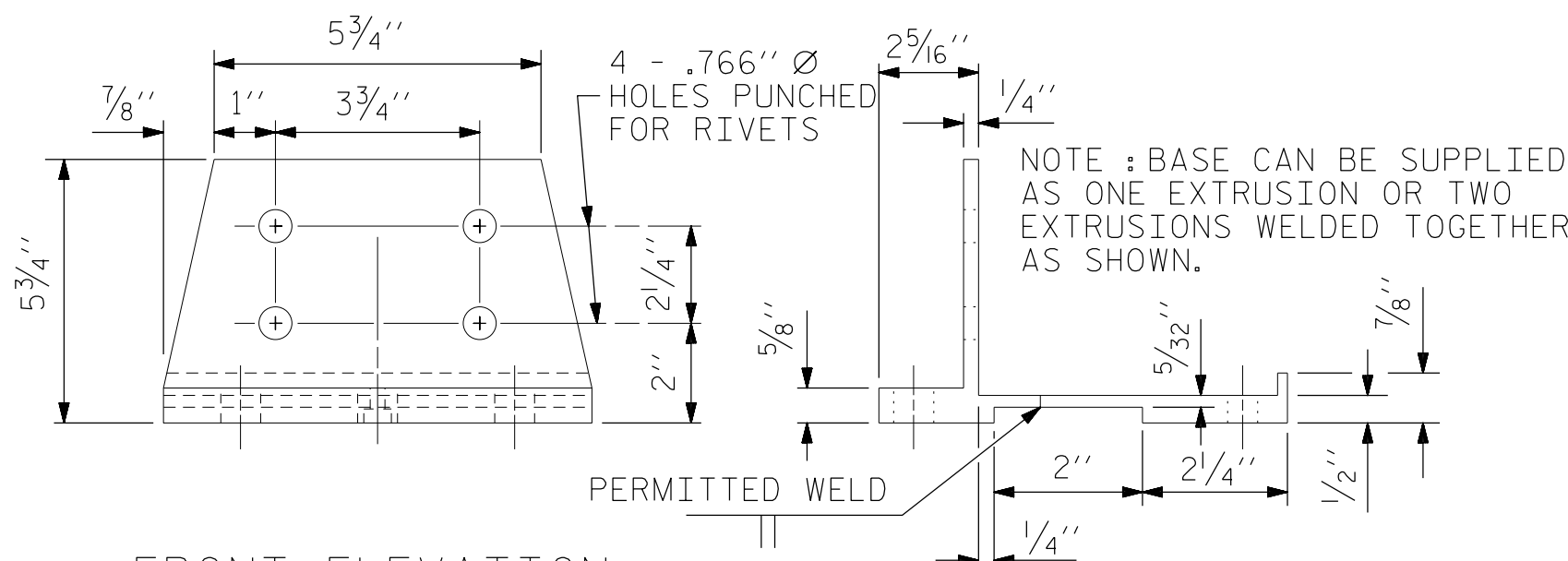
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



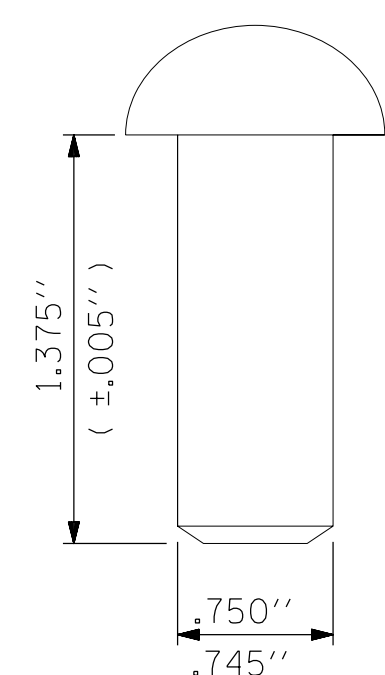
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M11.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M11.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M11.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 215.25 LIN. FT.

PROJECT NO. 17BP.5.R.64

VANCE COUNTY

STATION: 14+30.00 -L-

SHEET 5 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

2 BAR METAL RAIL

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	
1			3		S-9
2			4		
TOTAL SHEETS					21



DOCUMENT NOT CONSIDERED
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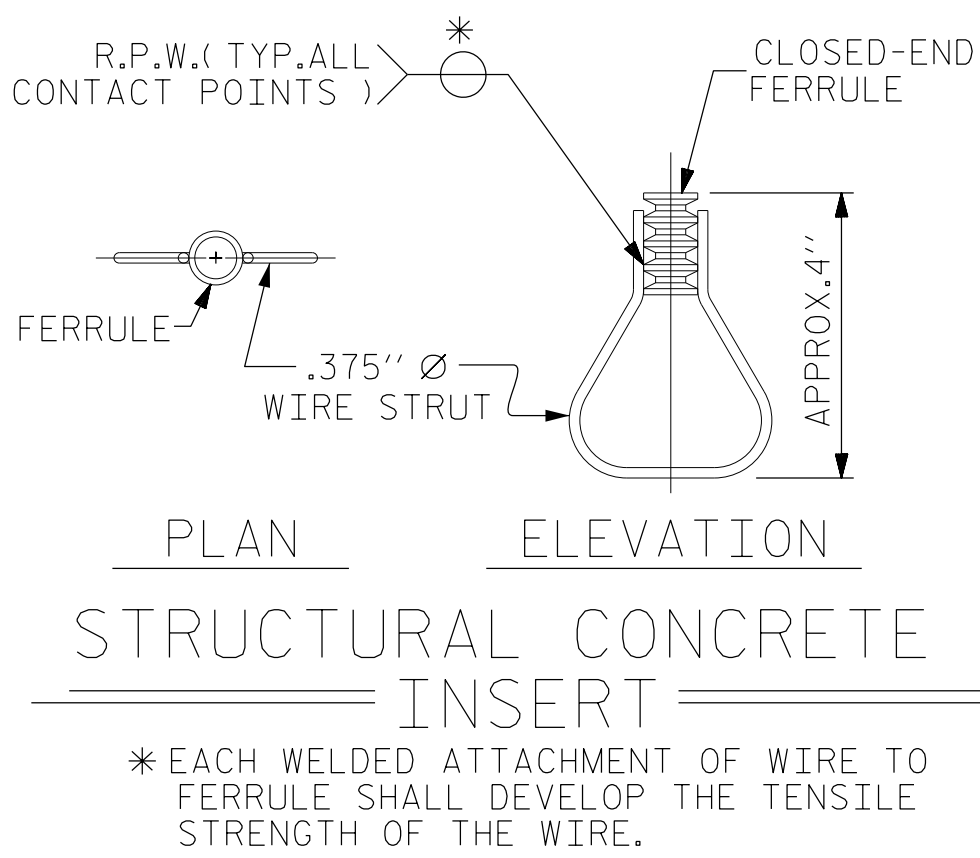
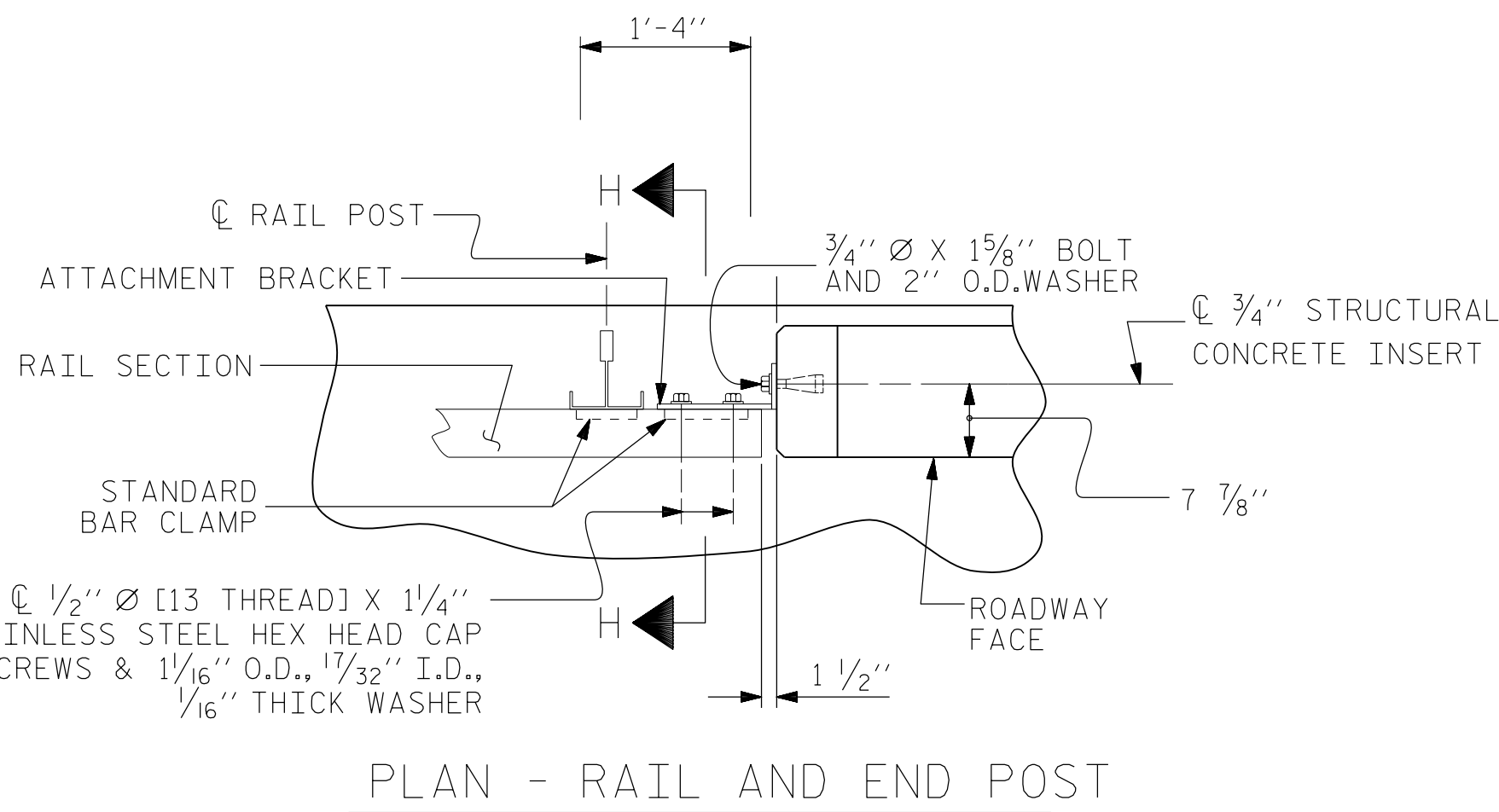
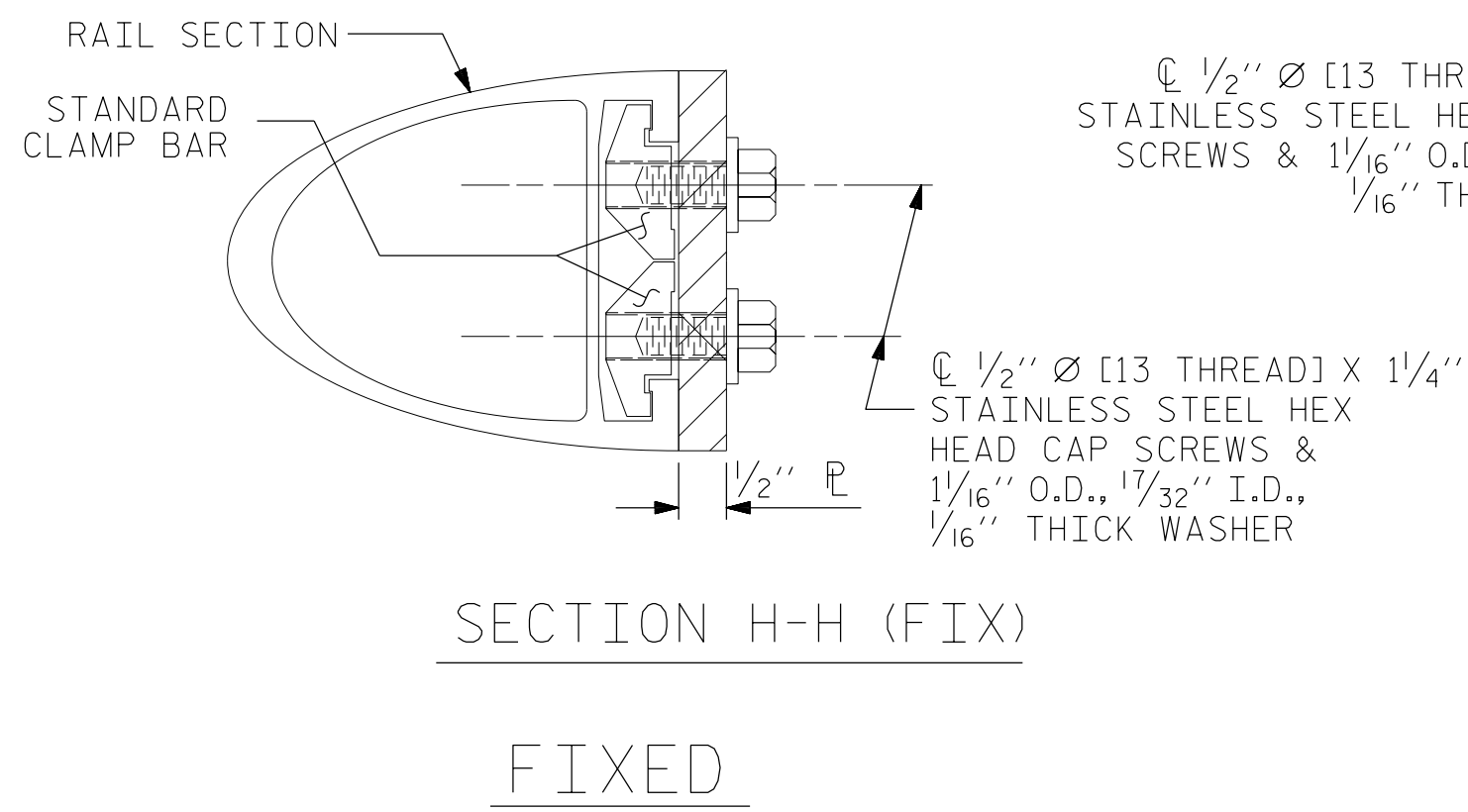
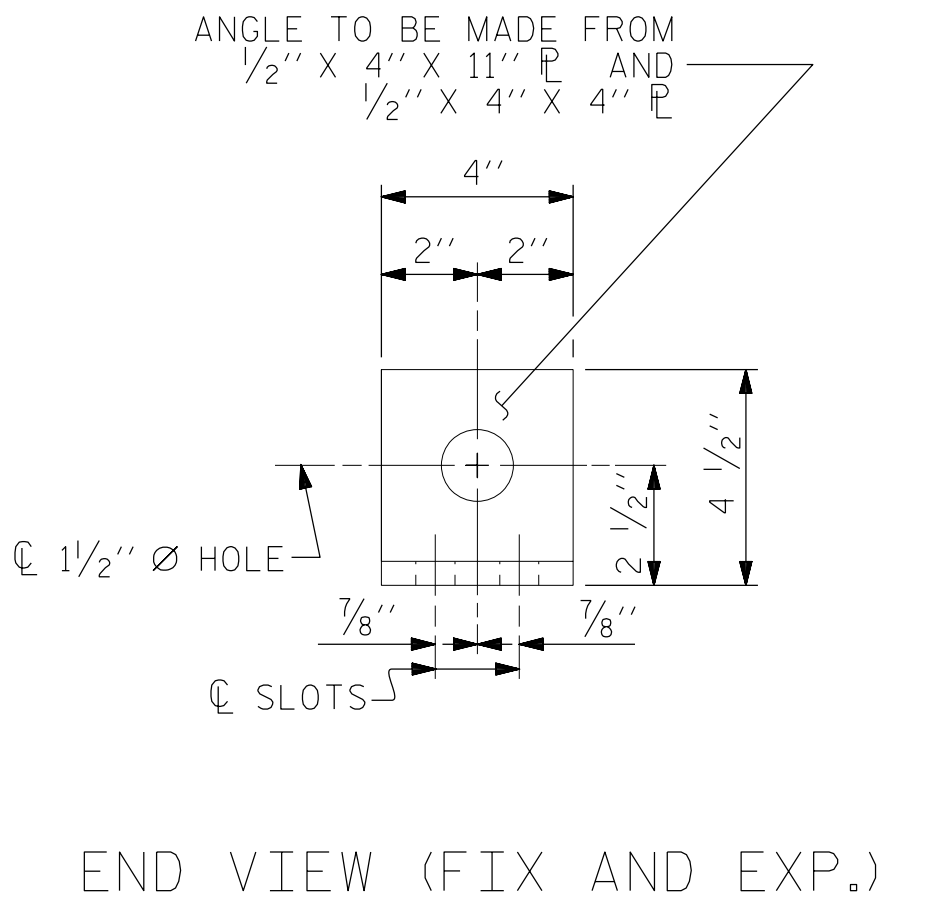
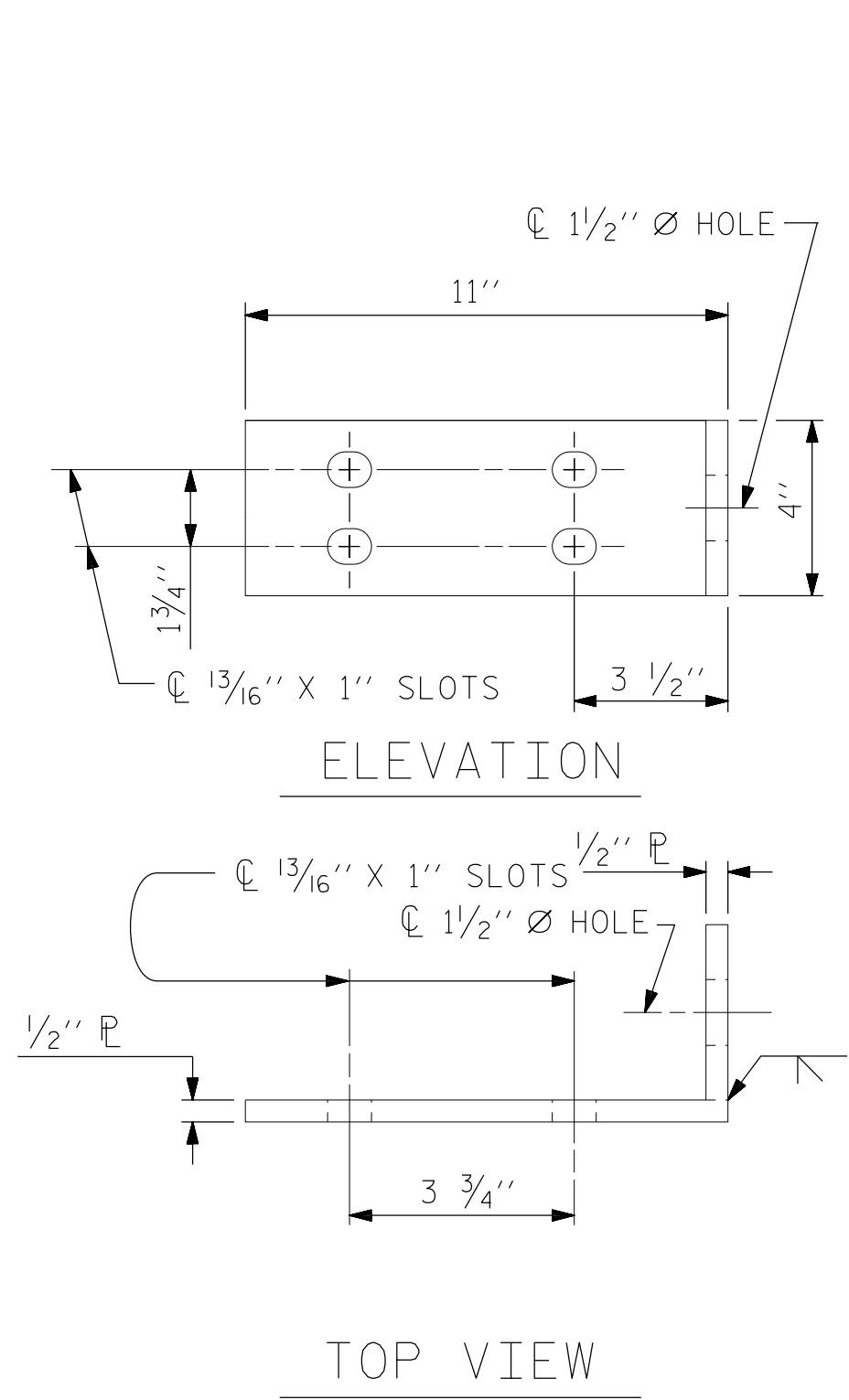
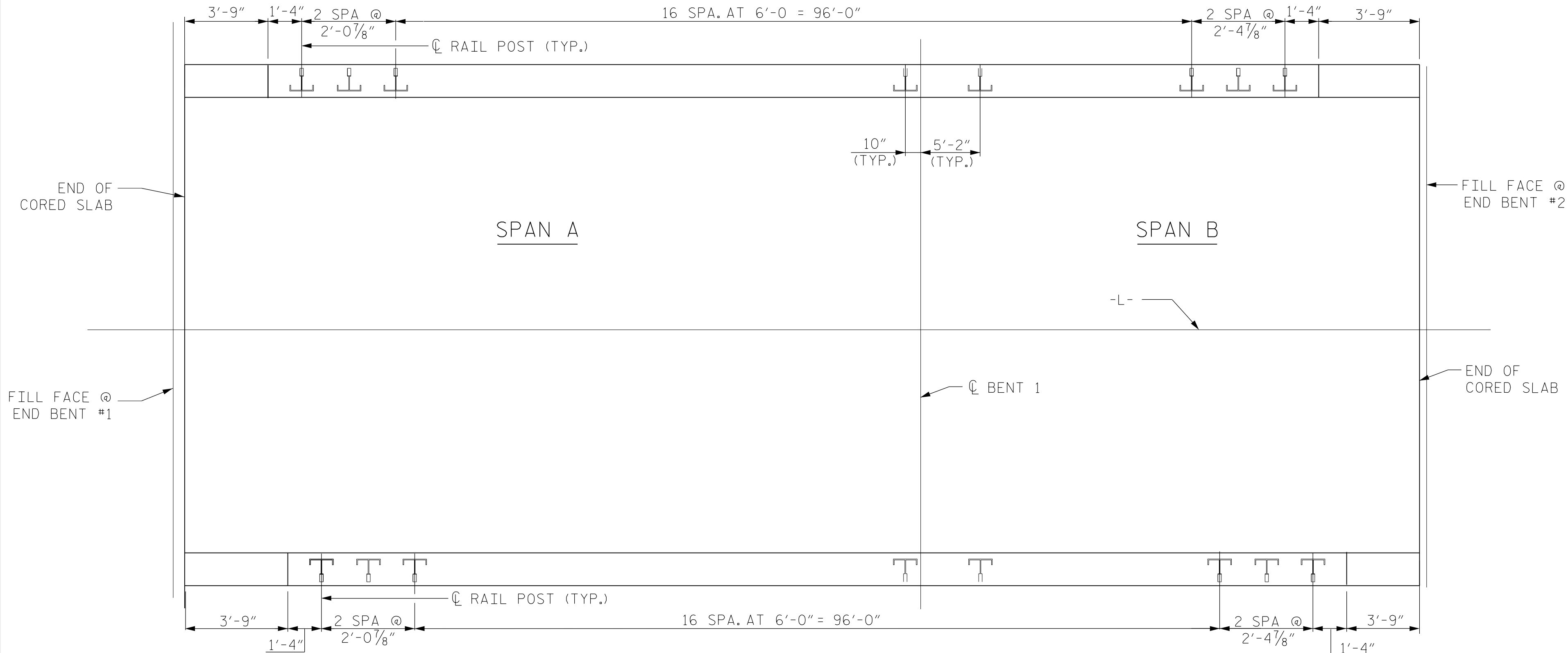
STEWART

DRAWN BY: HASSFOURA	DATE: 10/16
CHECKED BY: D. RUGGLES	DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES	DATE: 01/17

900078

8/16/2017
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USER: jloftus

DRAWN BY:	H.ASSFOURA	DATE :	10/16
CHECKED BY:	D. RUGGLES	DATE :	01/17
DESIGN ENGINEER OF RECORD:	D. RUGGLES	DATE :	01/17



NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
- 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
- CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
- STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
- 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

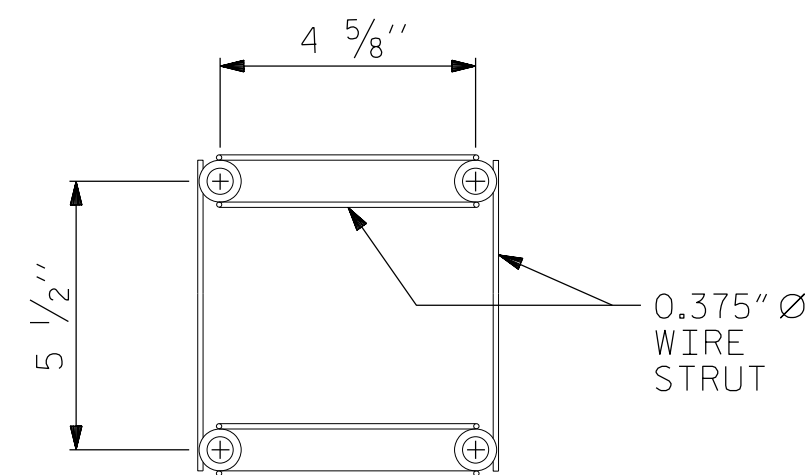
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-

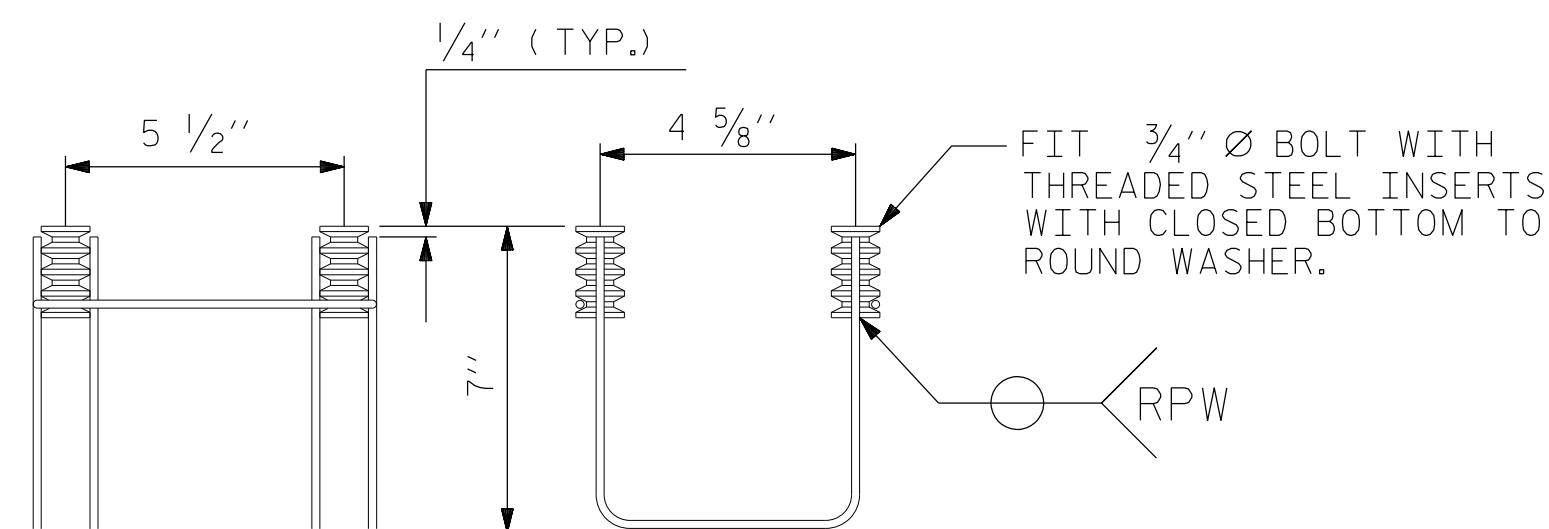
SHEET 6 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
RAIL POST SPACINGS
AND
END OF RAIL DETAILS
FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			21



PLAN



SIDE VIEW

ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(42 ASSEMBLIES REQUIRED)

NOTES

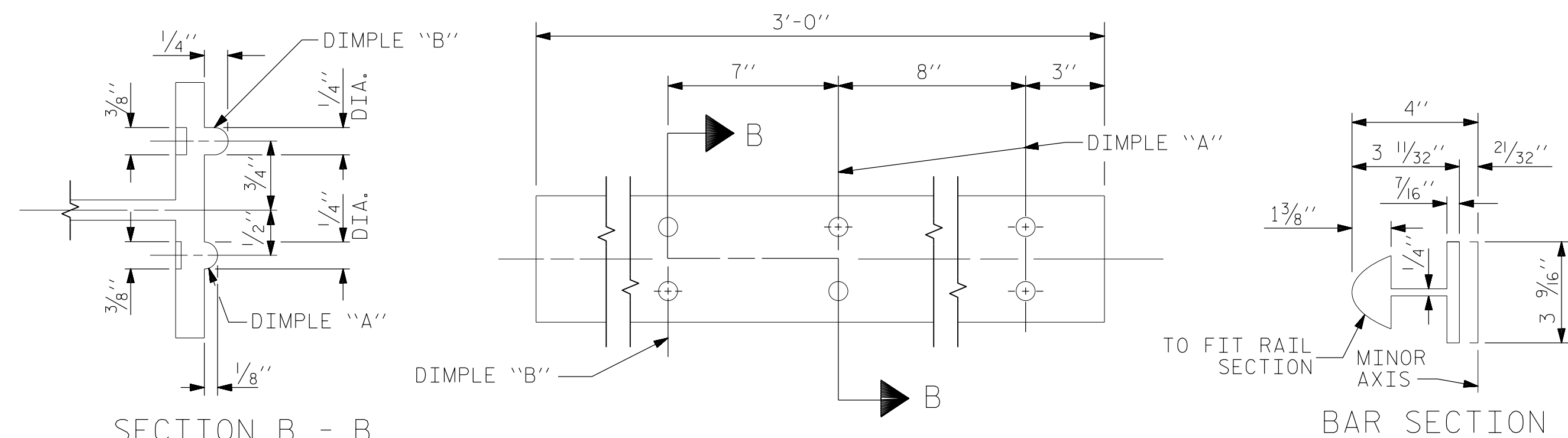
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR $\frac{3}{4}$ " FERRULES.
- B. 4 - $\frac{3}{4}$ " $\varnothing$ X $2\frac{1}{2}$ " BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE $\frac{3}{4}$ " $\varnothing$ X $2\frac{1}{2}$ " GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A $\frac{7}{16}$ " $\varnothing$ WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE $\frac{3}{4}$ " Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

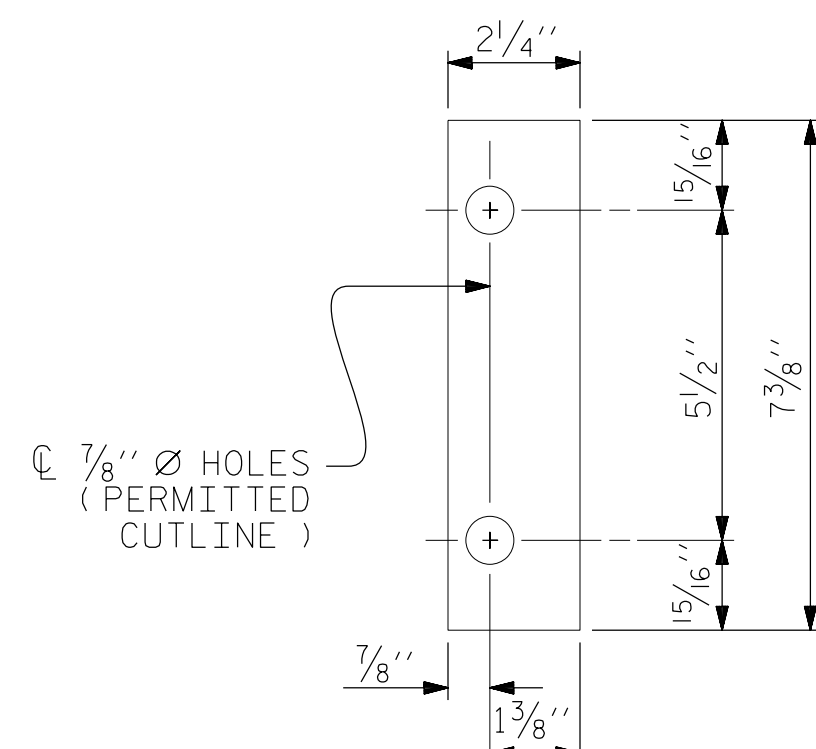
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F959 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F959 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



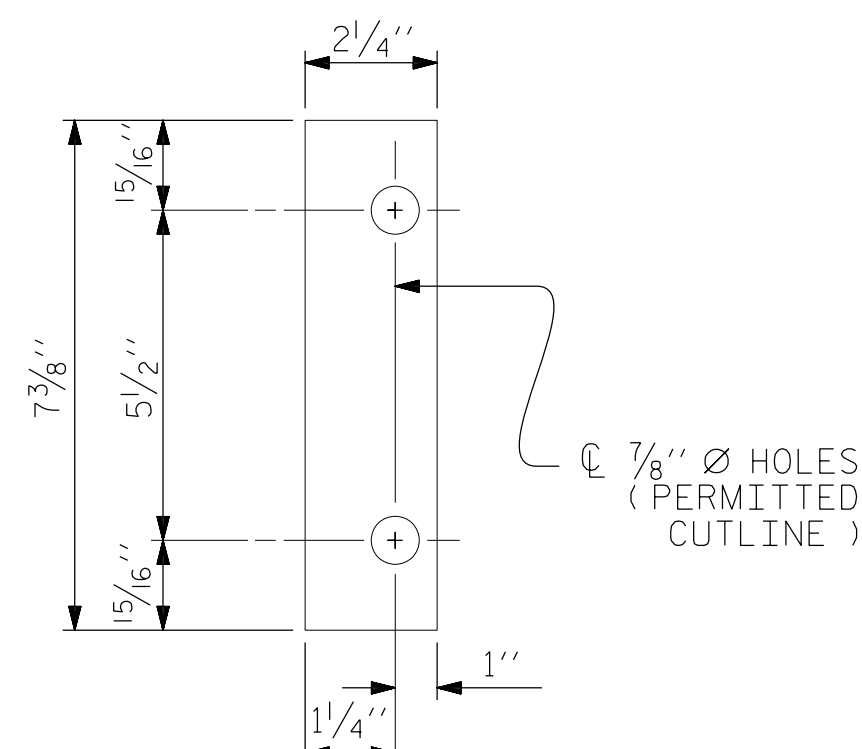
SECTION B - B

EXPANSION BAR DETAILS

BAR SECTION



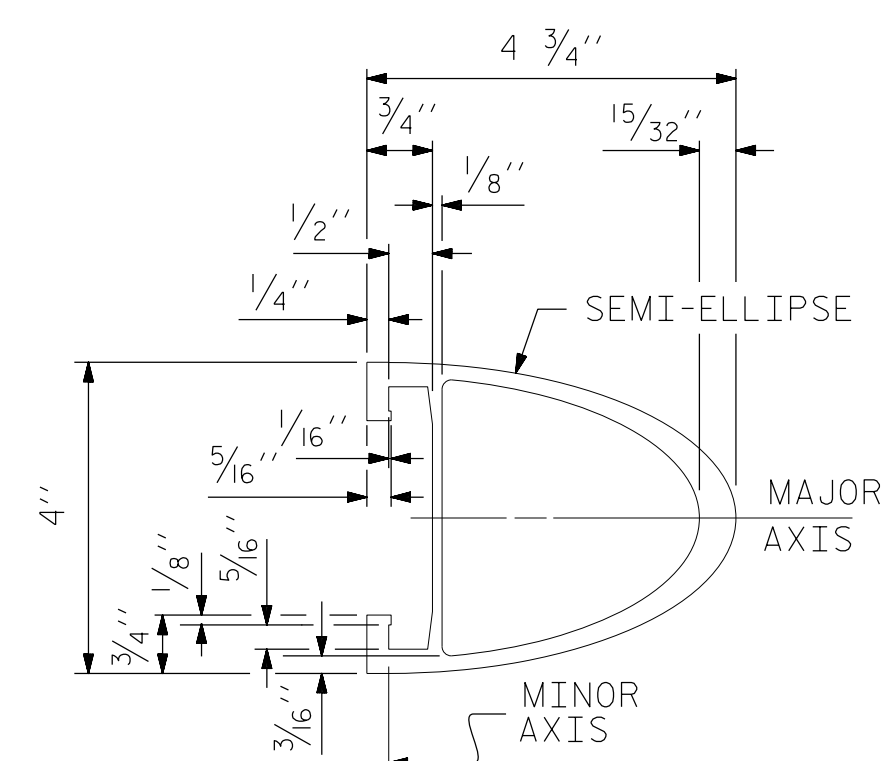
FRONT PLATE



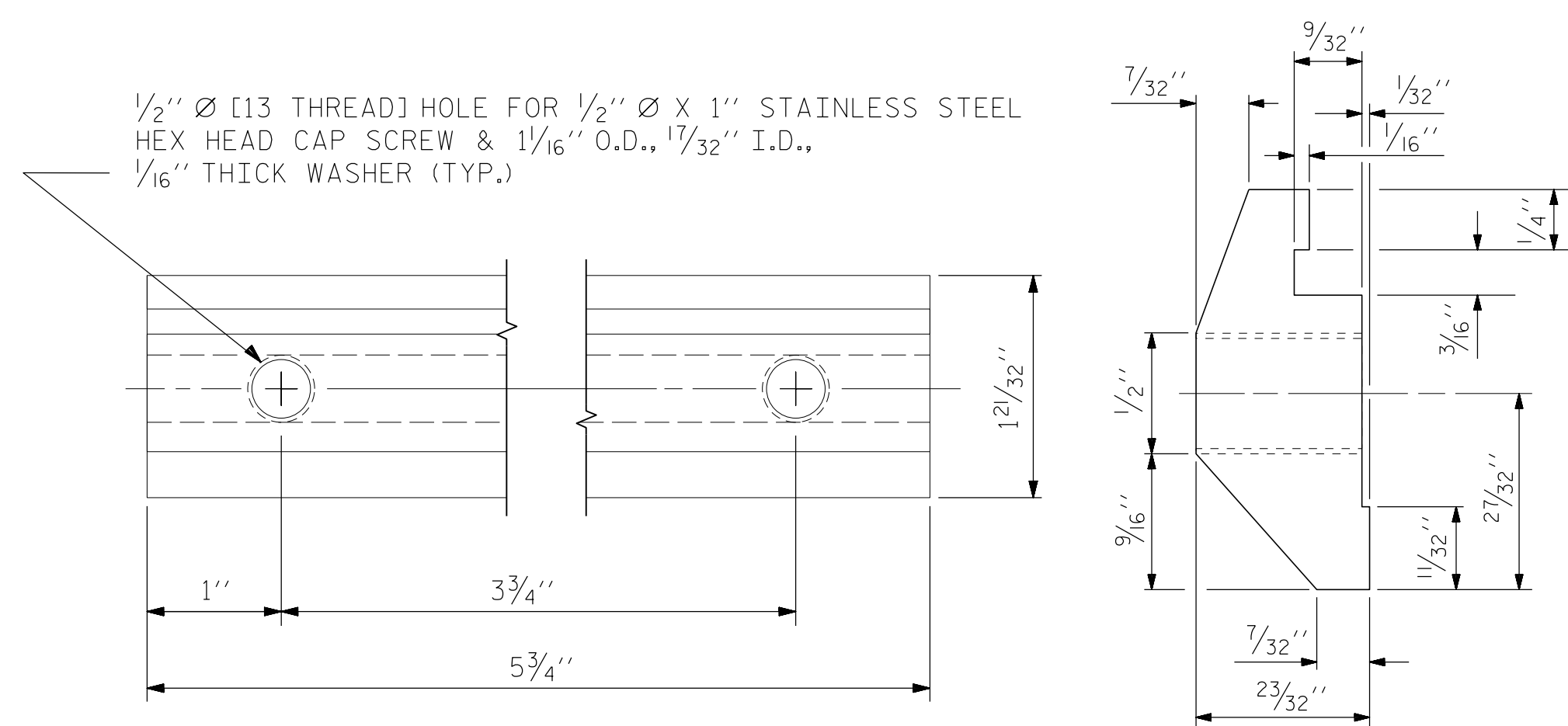
REAR PLATE

SHIM DETAILS

NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR
SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

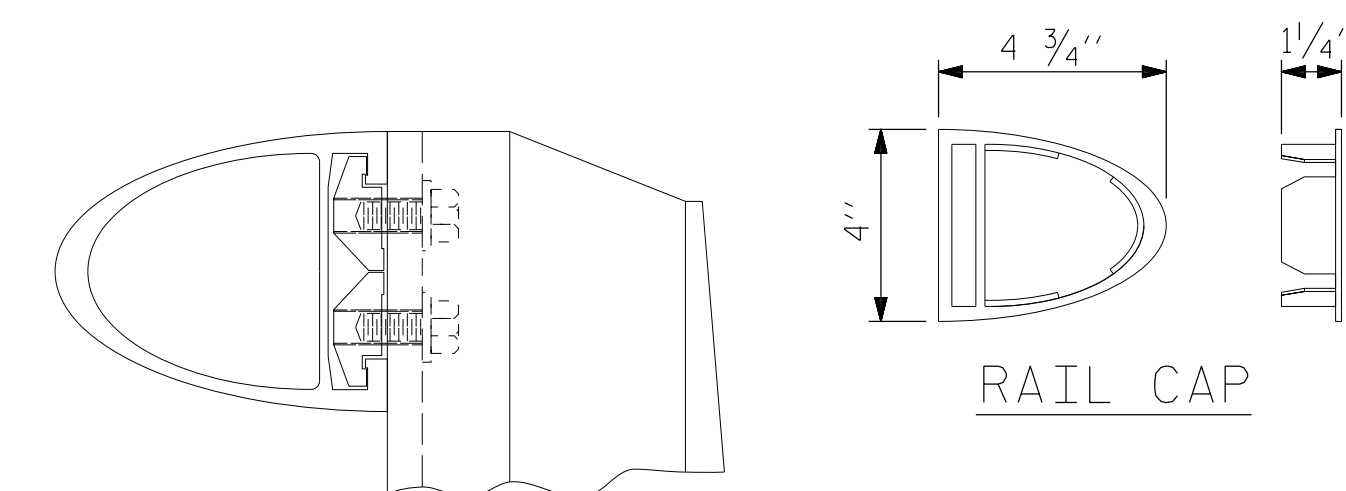


RAIL SECTION

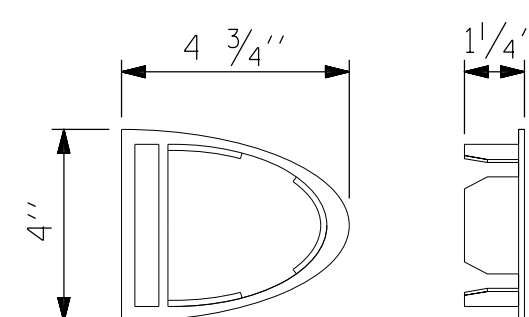


CLAMP BAR DETAIL

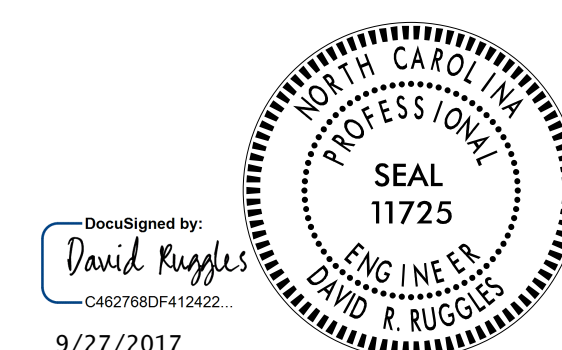
(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. 17BP.5.R.64
 VANCE COUNTY
 STATION: 14+30.00 -L-

SHEET 7 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

2 BAR METAL RAIL

50 m	REVISIONS						SHEET NO.
	NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
	1			3			TOTAL SHEETS
	2			4			21

DRAWN BY: H.ASSFOURA DATE : 10/16
 CHECKED BY: D. RUGGLES DATE : 01/17
 DESIGN ENGINEER OF RECORD: D. RUGGLES DATE : 01/17

STEWART

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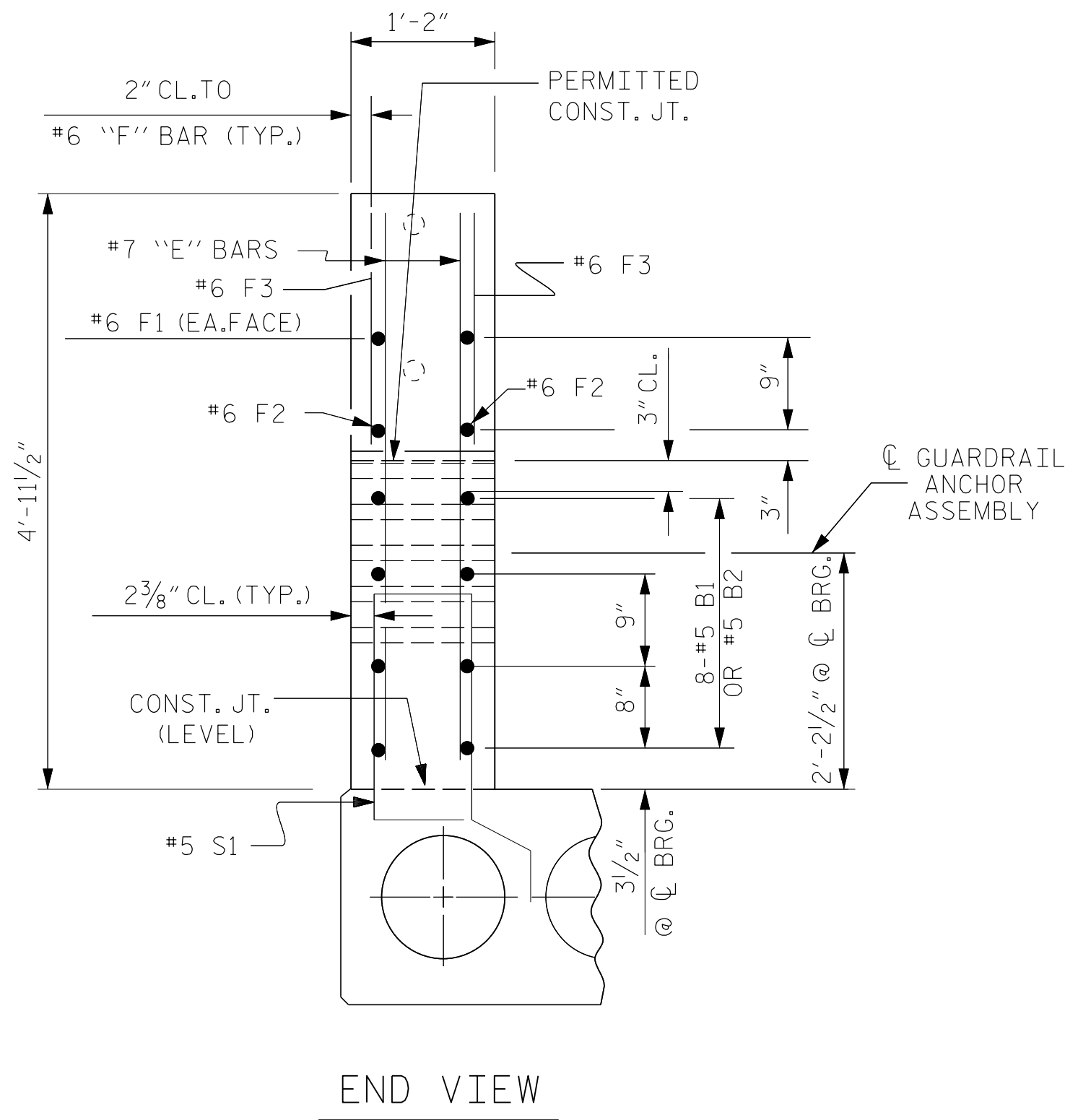
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8/16/2017

\\V400_012-900078_SMU-BMR04.dgn
USER:jlottus

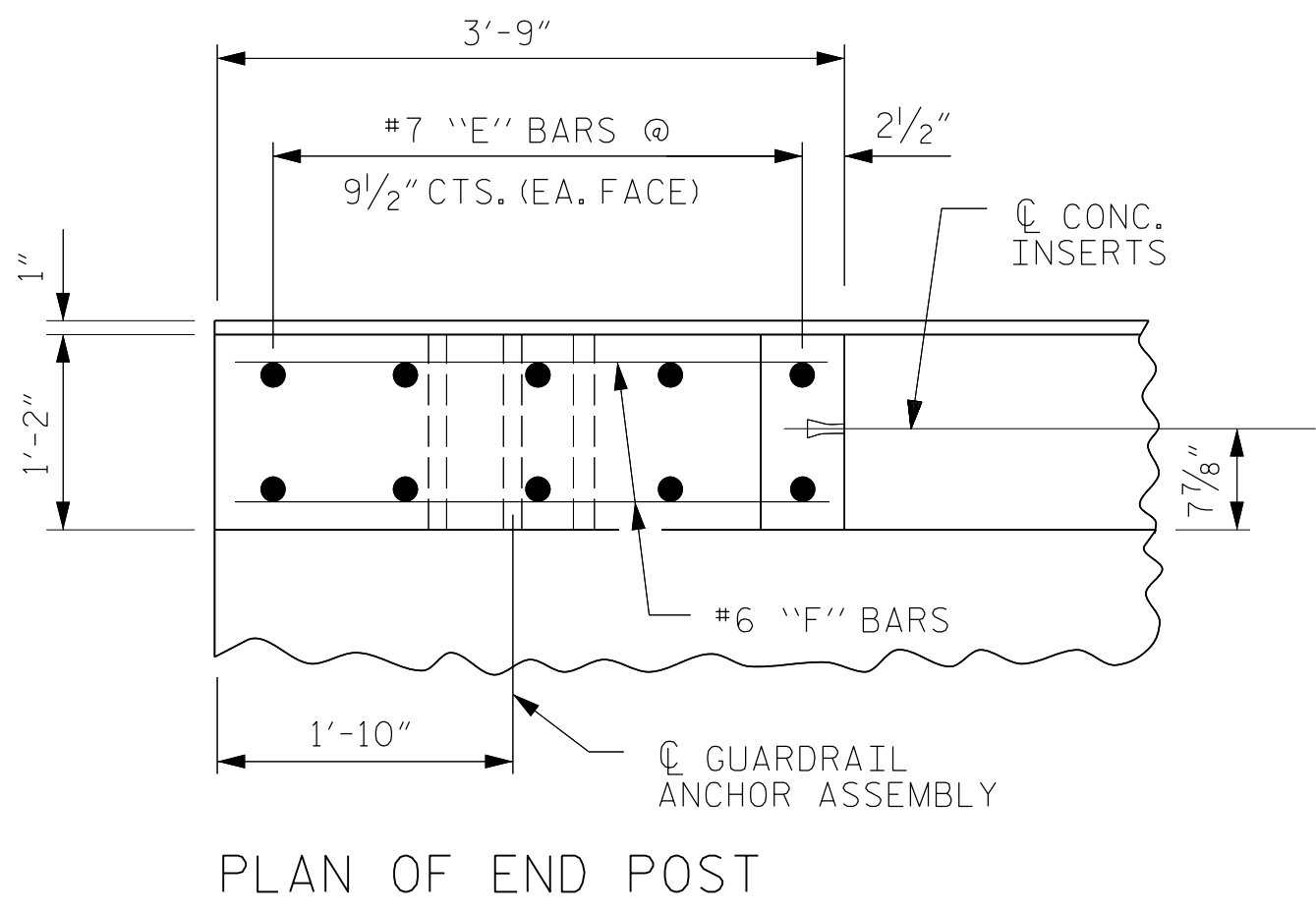
DRAWN BY: H.ASSFOURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 01/17

GUTTERLINE ASPHALT THICKNESS & PARAPET HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	PARAPET HEIGHT @ MID-SPAN
70' UNITS	2"	2'-8"
45' UNITS	2 ⁵ / ₁₆ "	2'-8 ⁵ / ₁₆ "

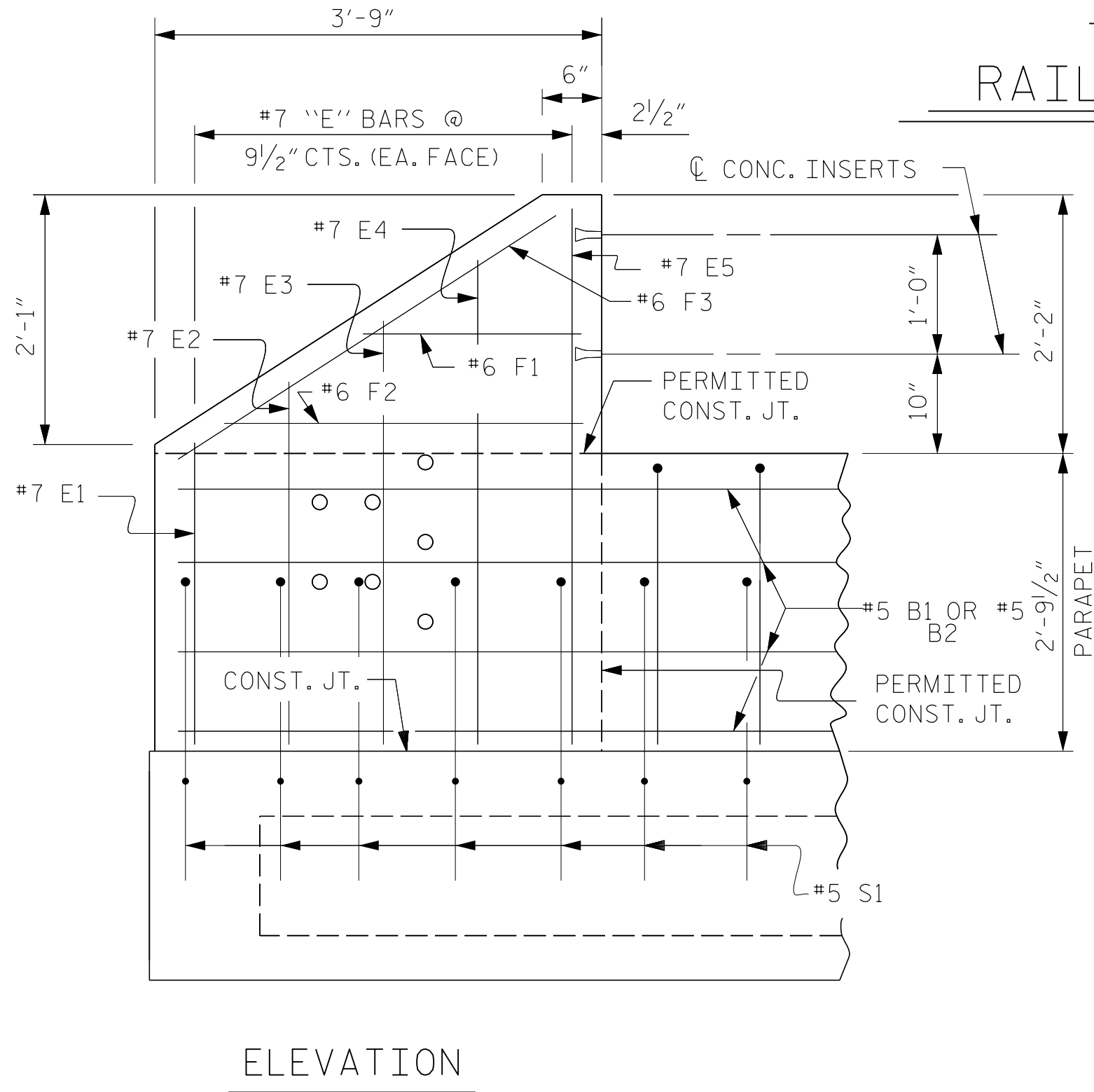


END VIEW

PARAPET AND END POST FOR TWO BAR RAIL

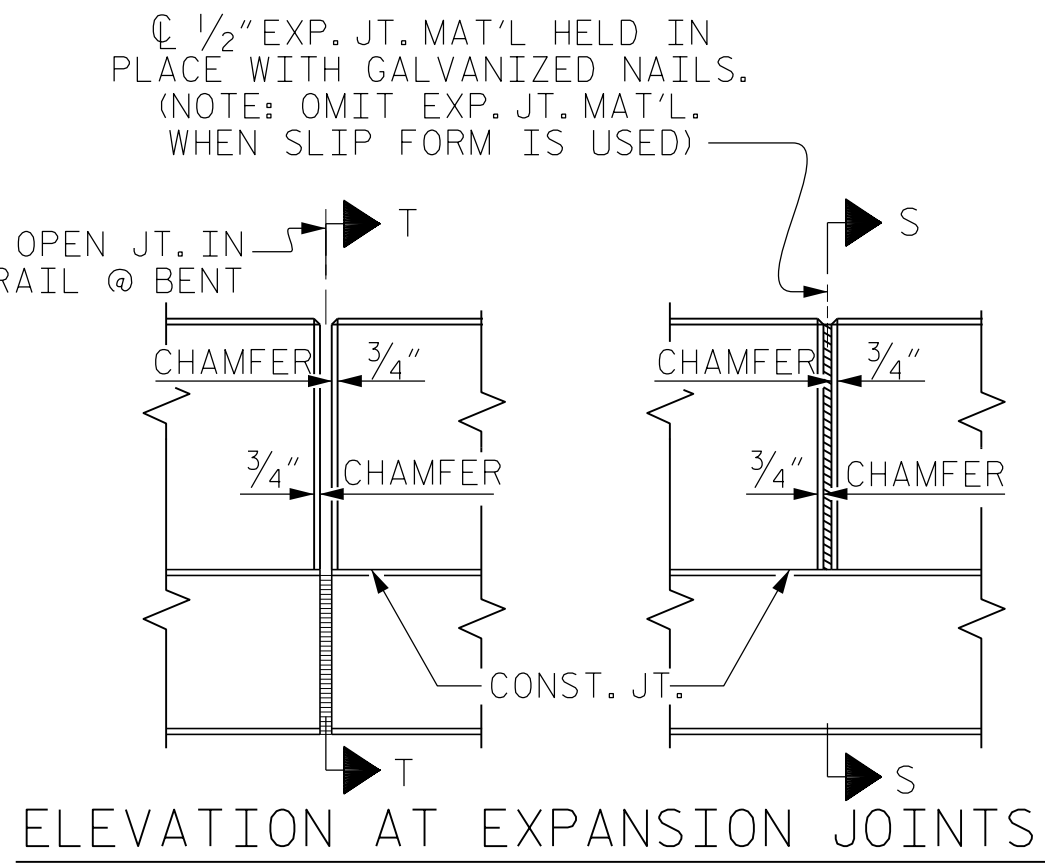
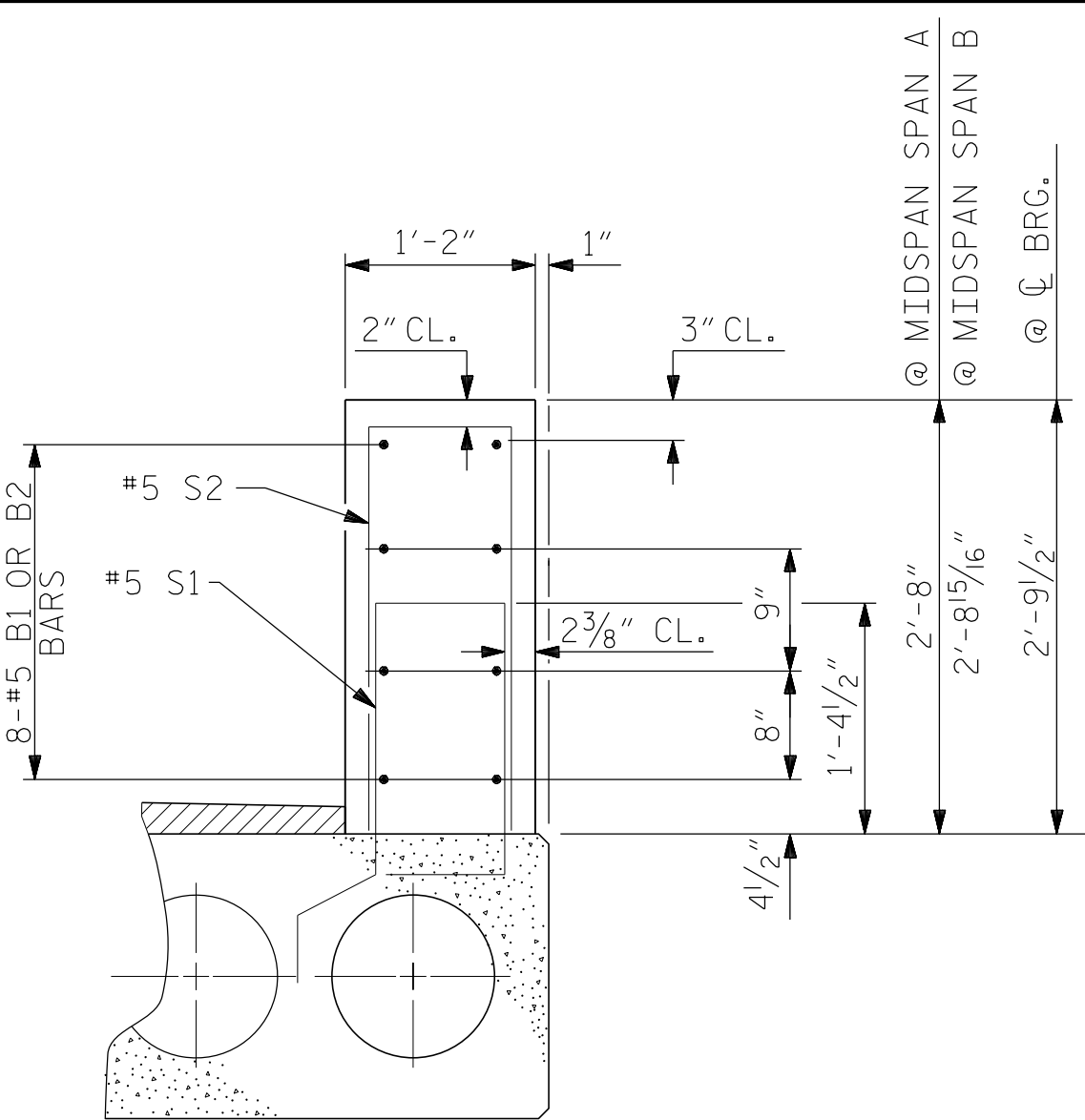


PLAN OF END POST

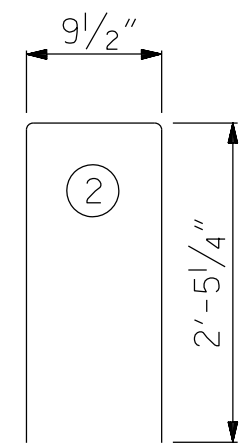


ELEVATION

TWO BAR METAL RAIL PARAPET SECTION



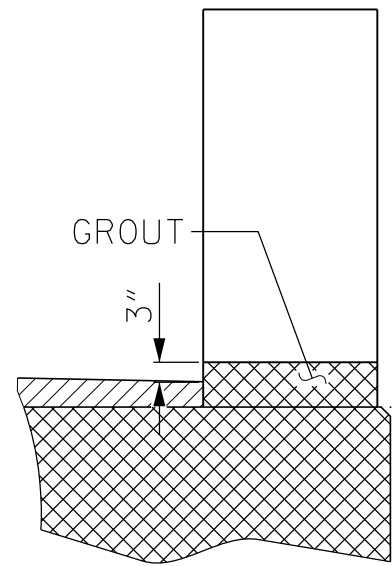
BAR TYPE



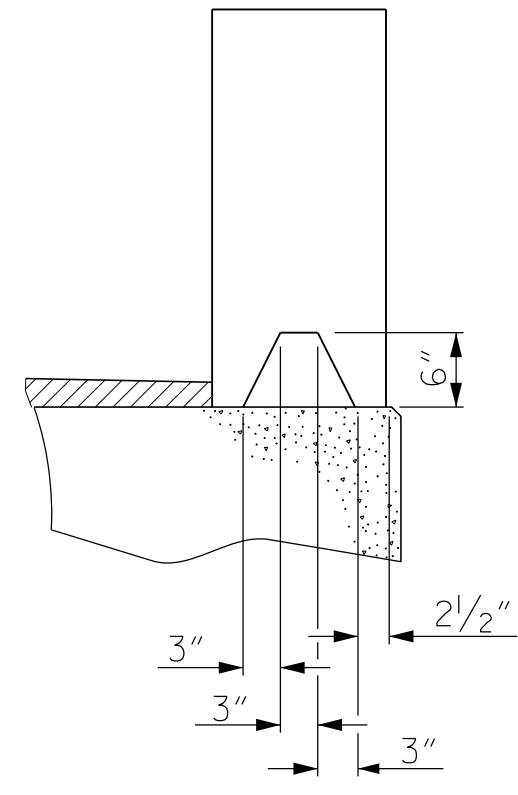
BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR PARAPET & END POSTS

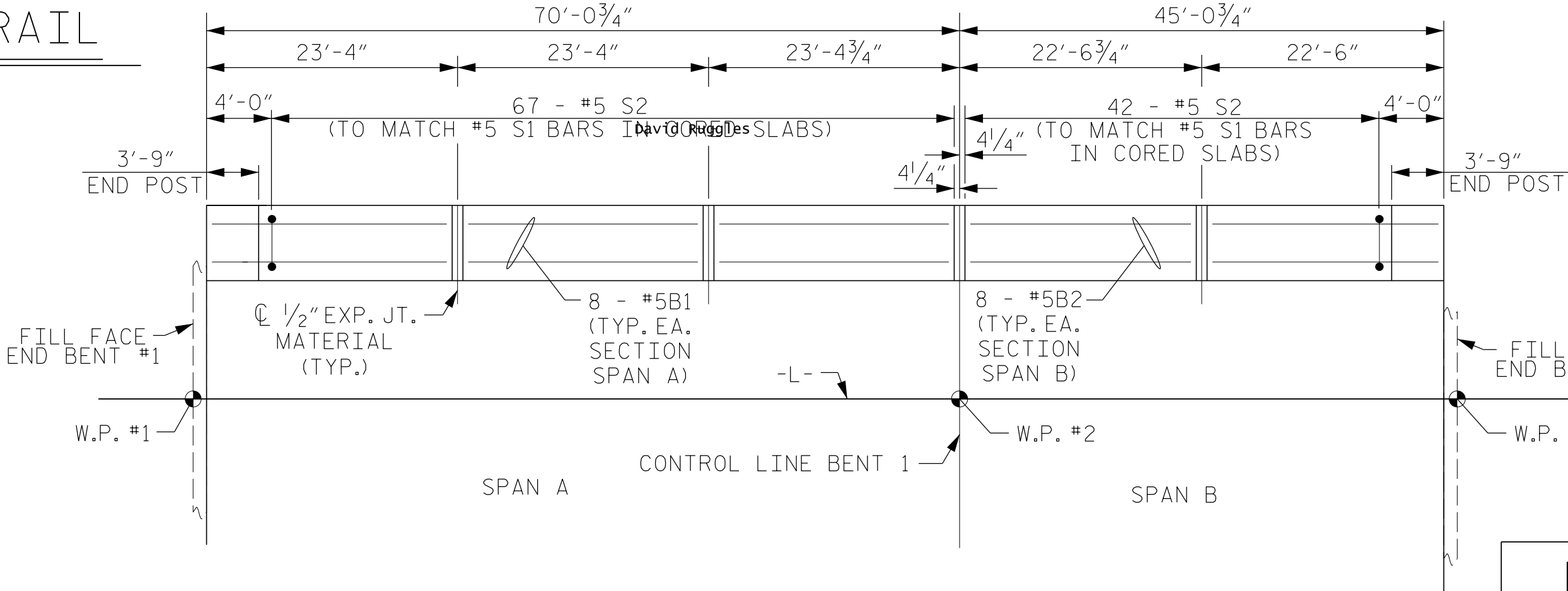
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	48	# 5	STR	23'-0"	1151
*B2	32	# 5	STR	22'-2"	740
*E1	8	# 7	STR	2'-7"	42
*E2	8	# 7	STR	3'-1"	50
*E3	8	# 7	STR	3'-7"	59
*E4	8	# 7	STR	4'-1"	67
*E5	8	# 7	STR	4'-5"	72
*F1	8	# 6	STR	1'-10"	22
*F2	8	# 6	STR	3'-0"	36
*F3	8	# 6	STR	3'-9"	45
*S2	218	# 5	2	5'-8"	1288
*EPOXY COATED REINFORCING STEEL				LBS.	3572
CLASS AA CONCRETE				CU.YDS.	28.5
TOTAL LIN. FT. OF CONCRETE PARAPET					230.25



SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE
FOAM JOINT IS NOT USED)



SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



PLAN OF PARAPET

LEFT PARAPET SHOWN, RIGHT PARAPET SIMILAR
FOR SPACING OF #5S1 BARS OUTSIDE OF END POST, SEE SHEETS 2 OF 8 & 3 OF 8



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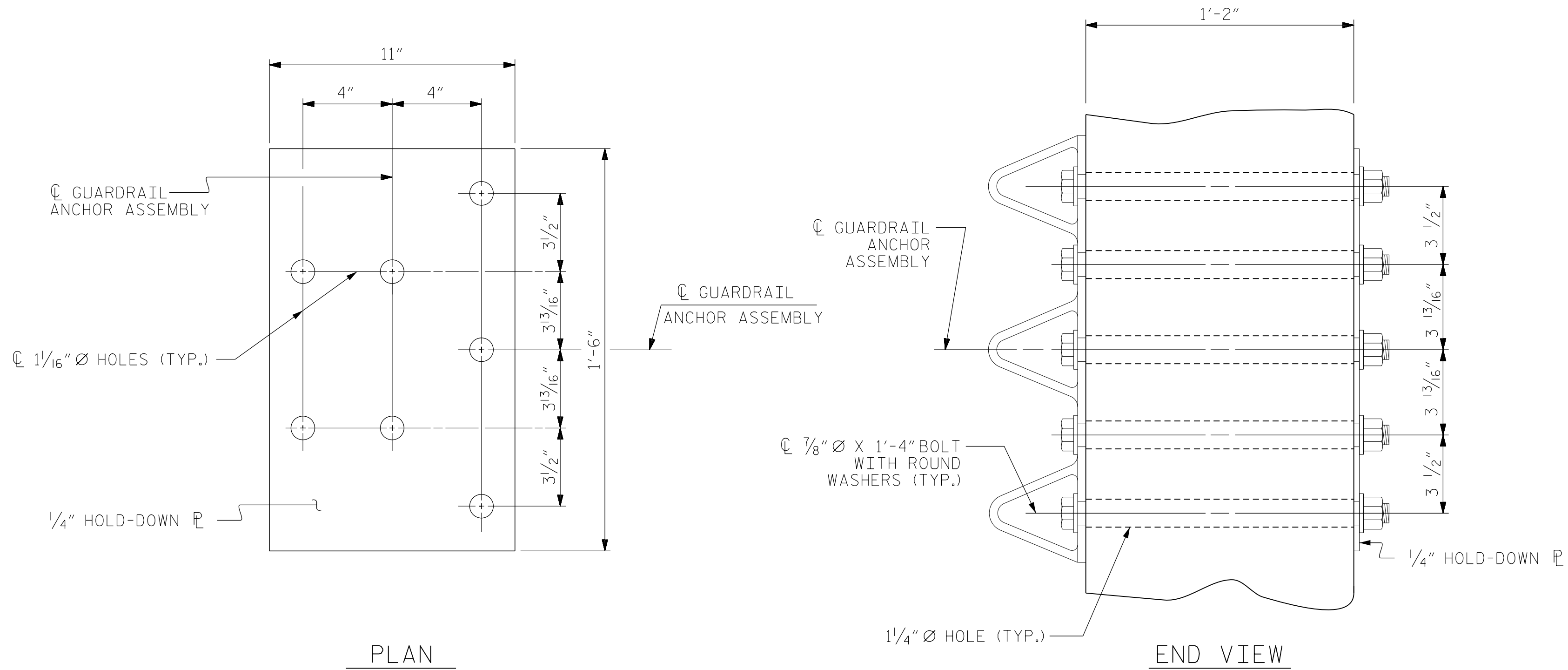
PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-

SHEET 8 OF 8

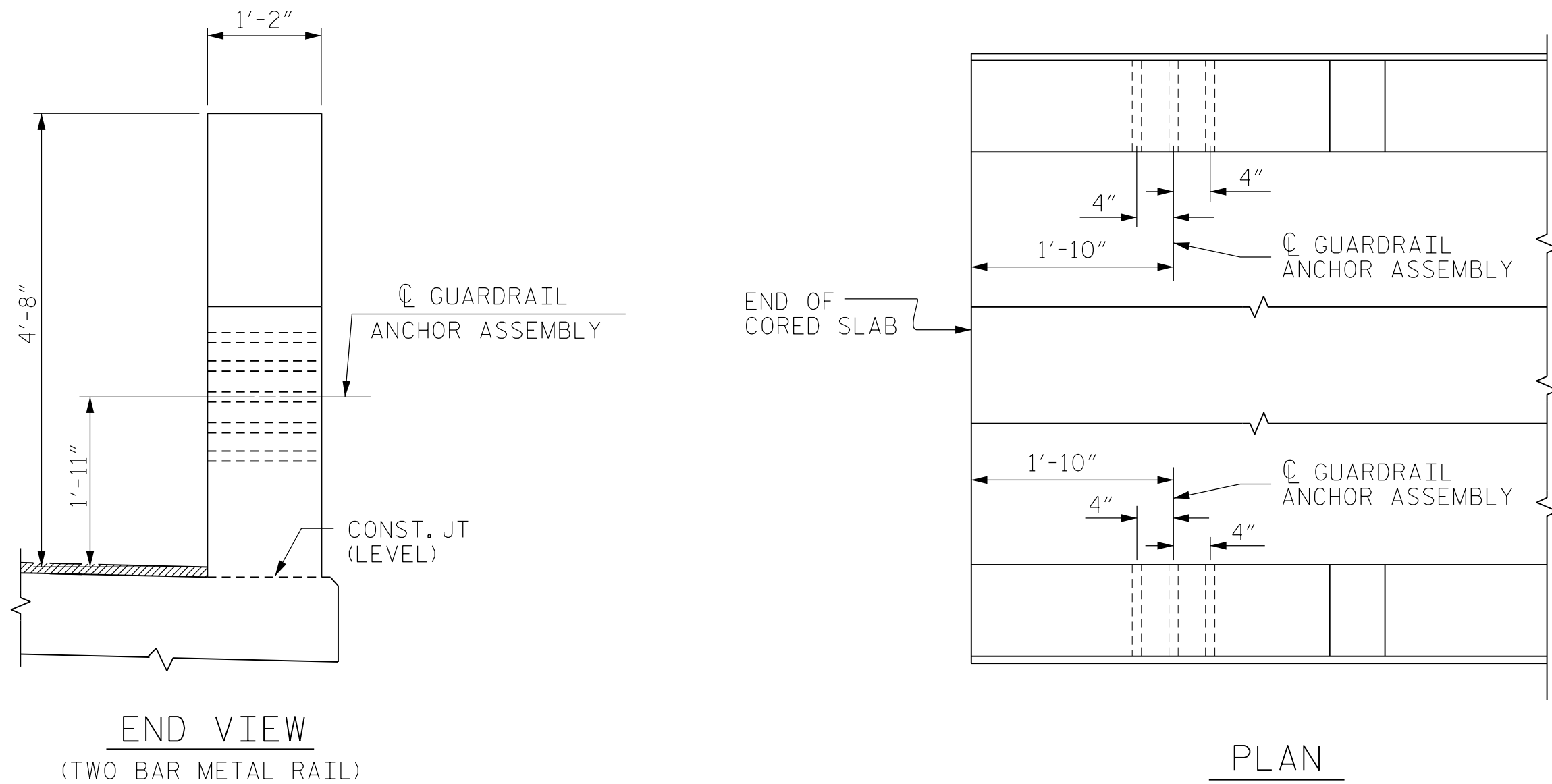
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PARAPET AND END POST
FOR 2 BAR METAL RAIL

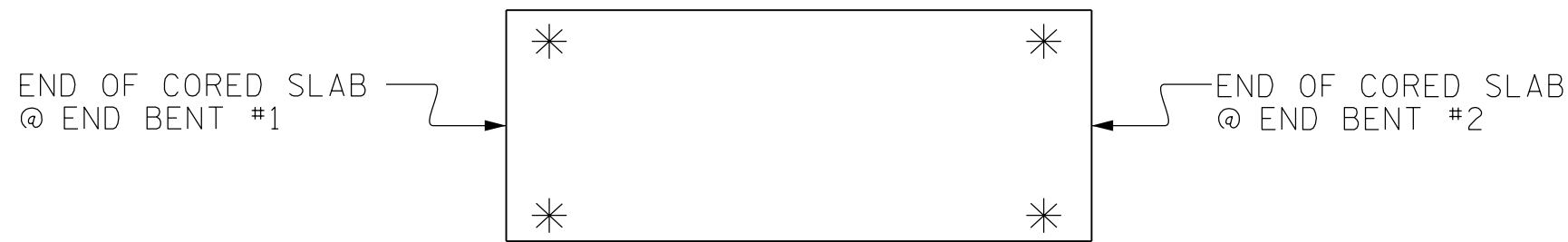
REVISIONS						SHEET NO. S-12
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			



GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE
DETAILS FOR
2 BAR METAL RAILS

REVISIONS						SHEET NO. S-13
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

(SHT 2) STD. NO. GRA3

DRAWN BY: H. ASSFOURA DATE : 12-16
CHECKED BY: D. RUGGLES DATE : 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE : 01/17

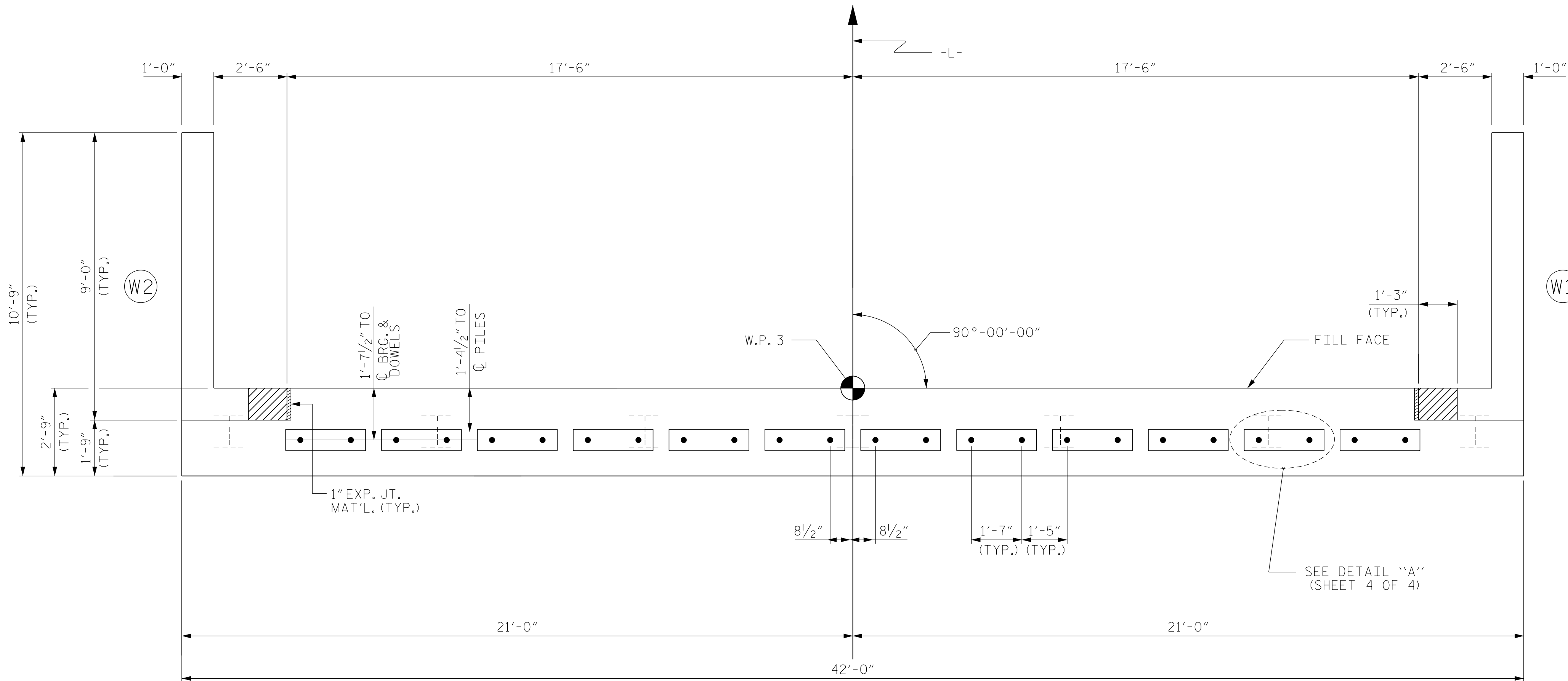
8/16/2017
\\400_013_900012_SMU_GRA01.dgn
USER:jlottus

900078

FOR WING DETAILS, SEE SHEET 3 OF 4.



...\\400_014_900078_SMU_EB01.dgn
USER:jloftus



NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

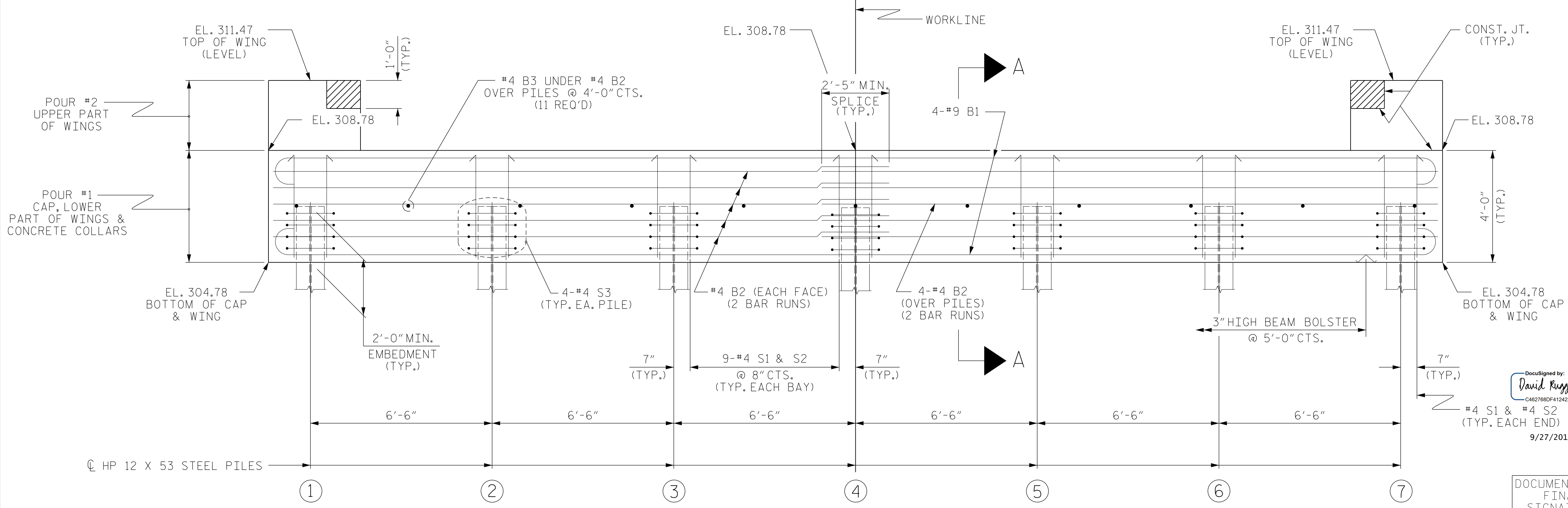
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

DRILLED-IN PILES ARE REQUIRED FOR END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 293 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.



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SHEET 2 OF 4

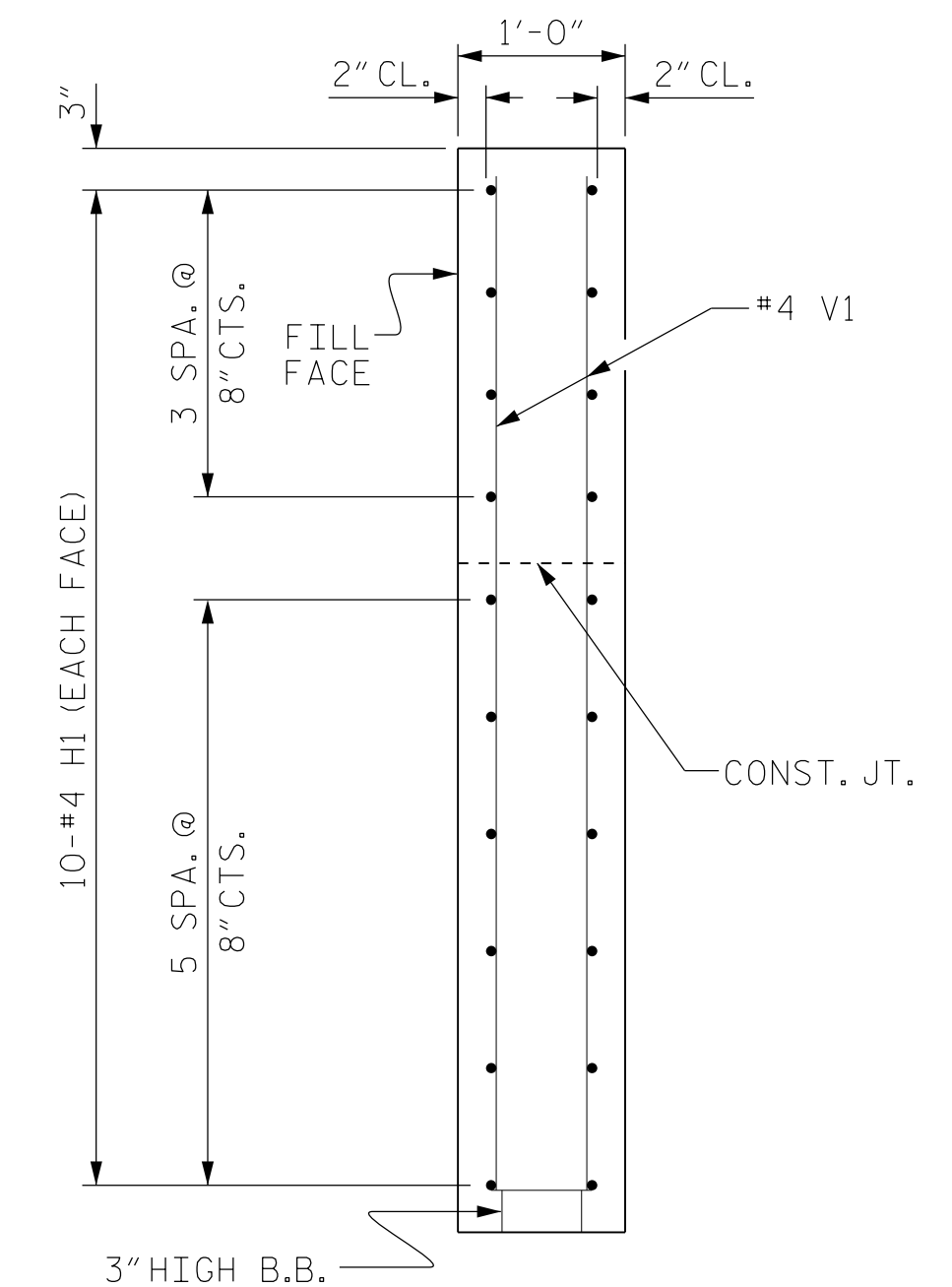
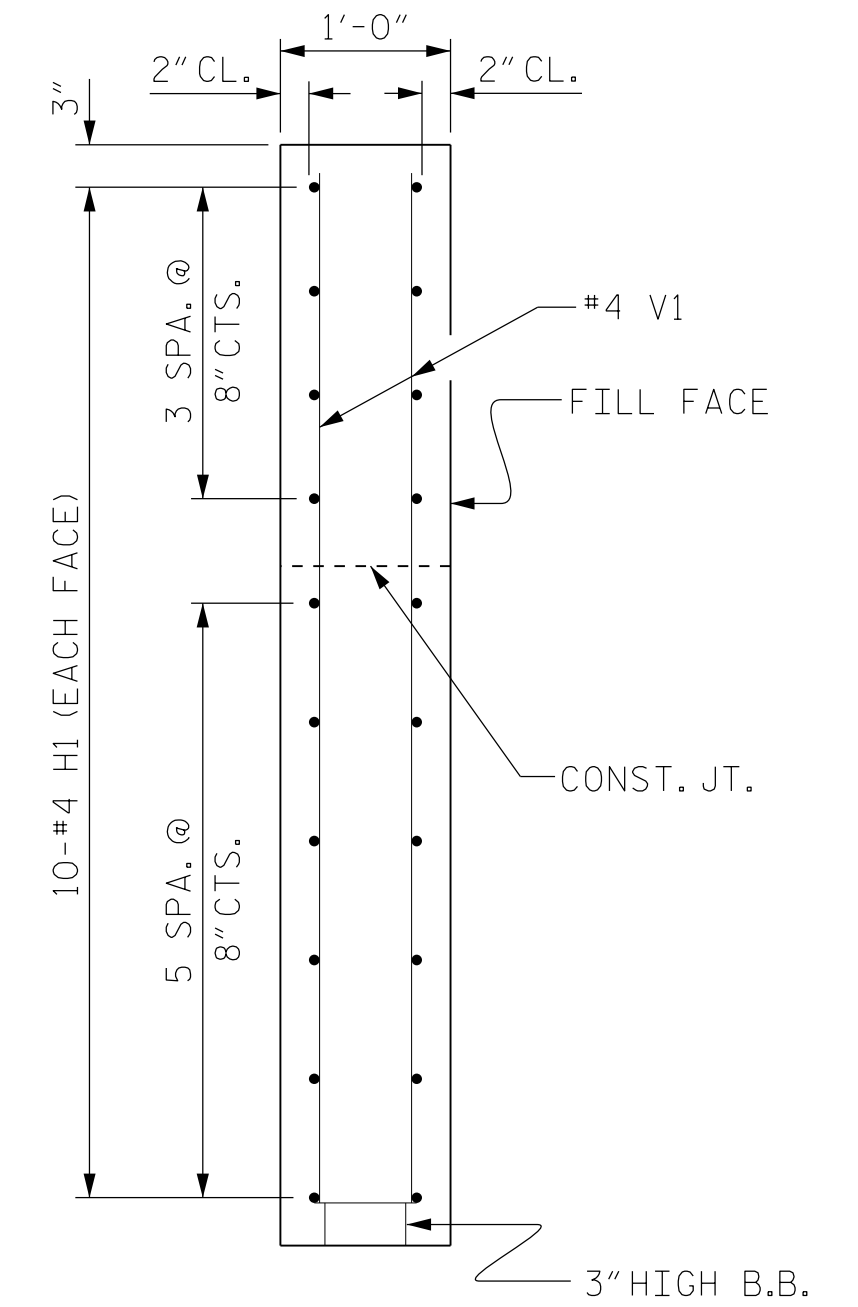
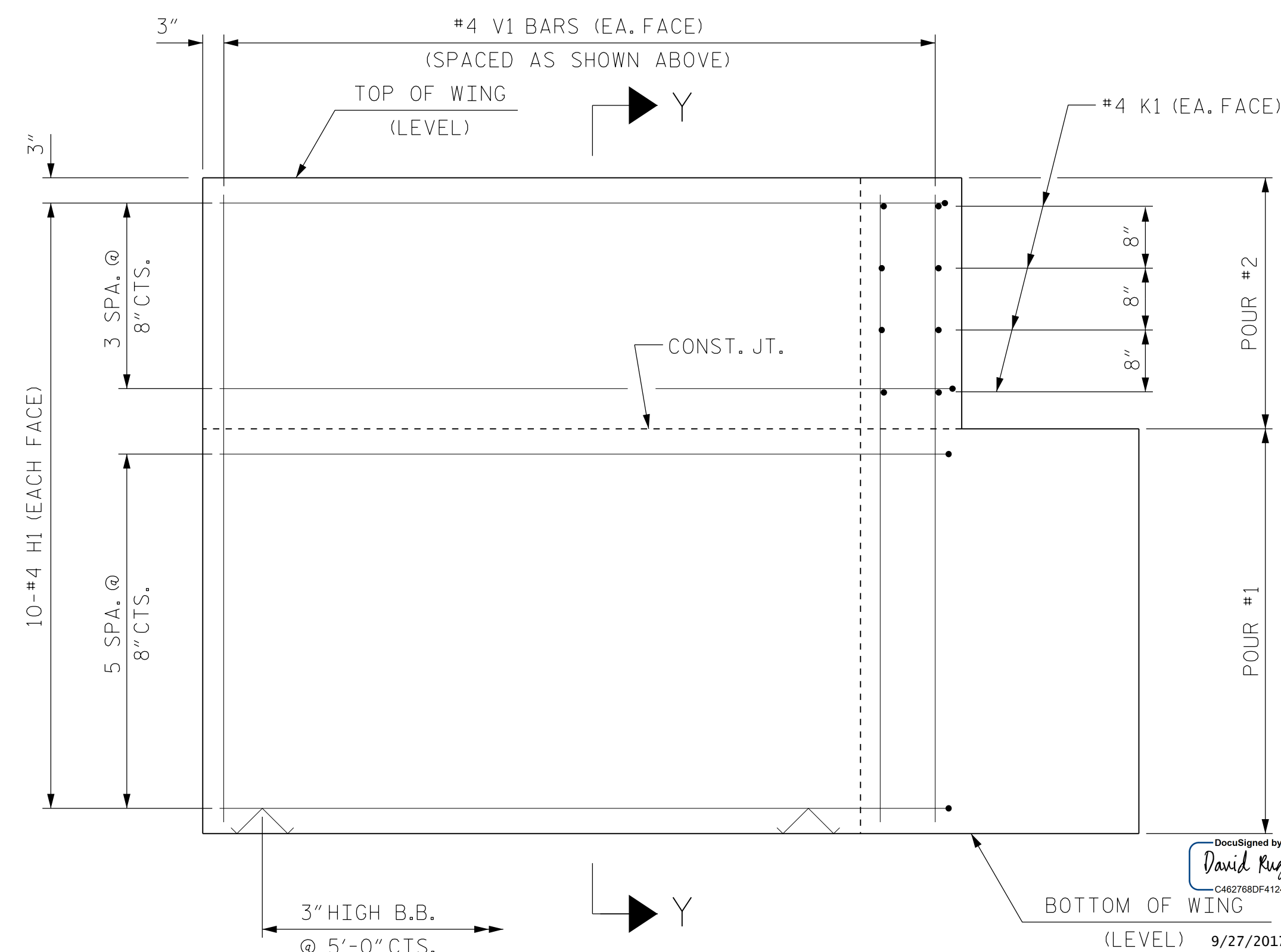
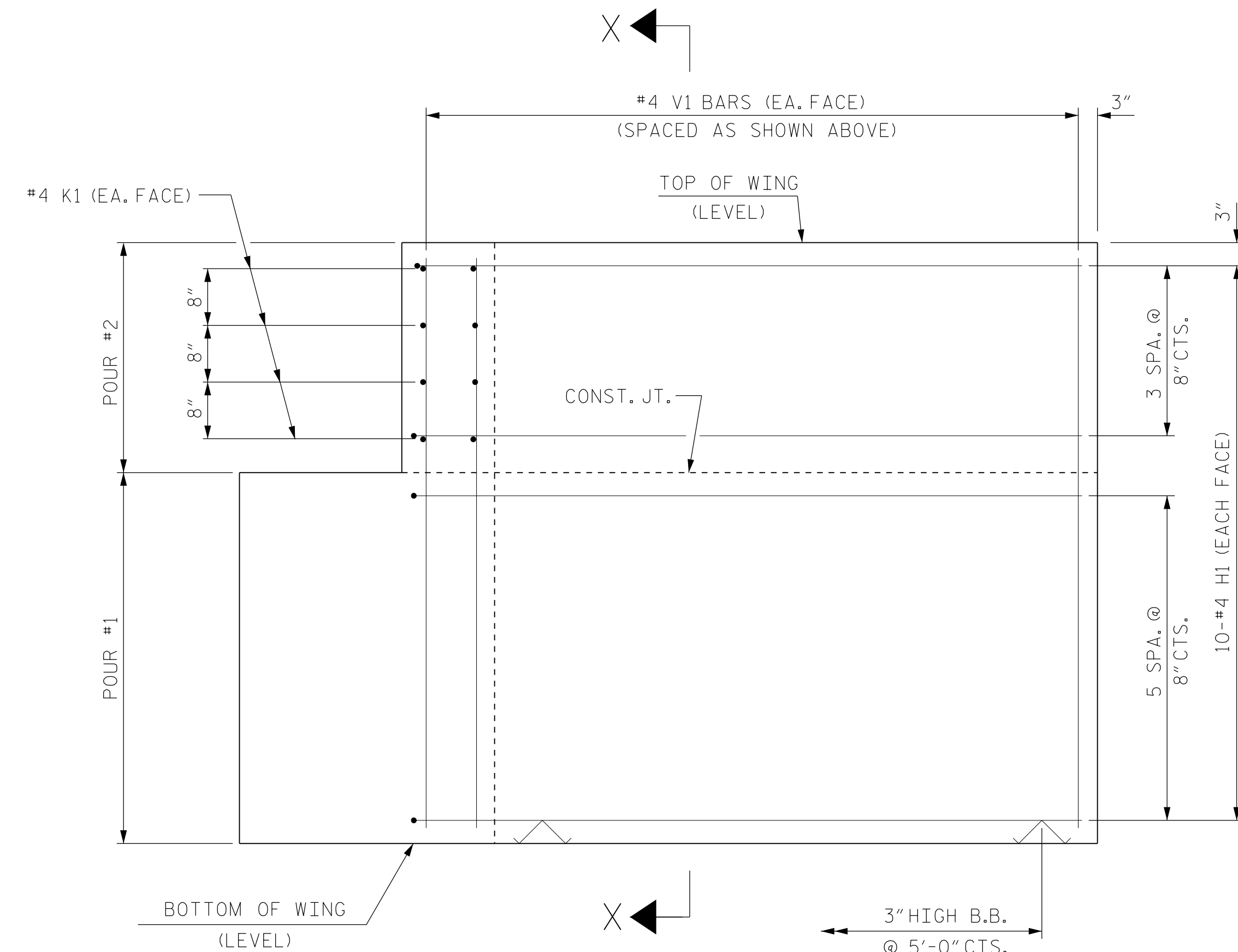
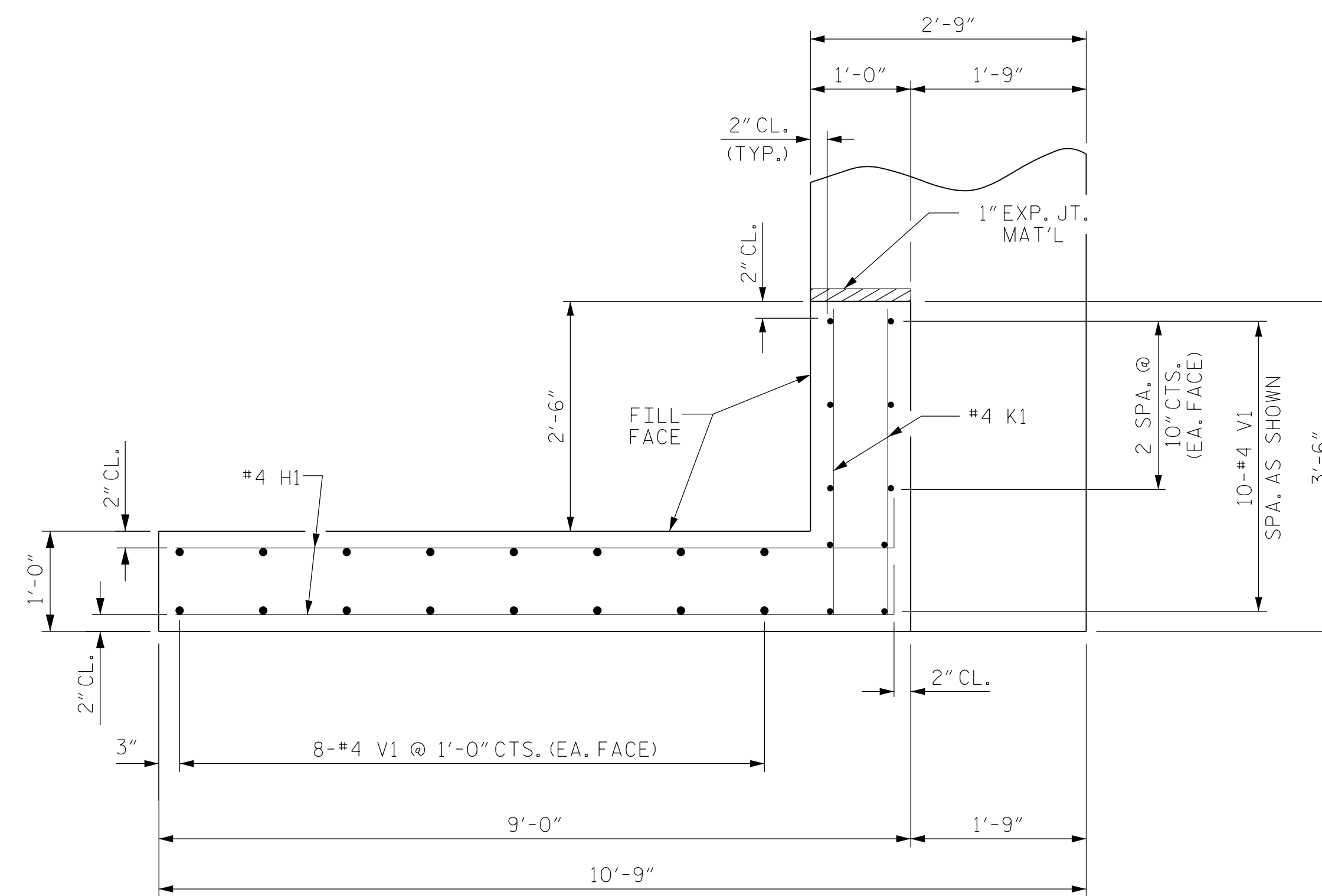
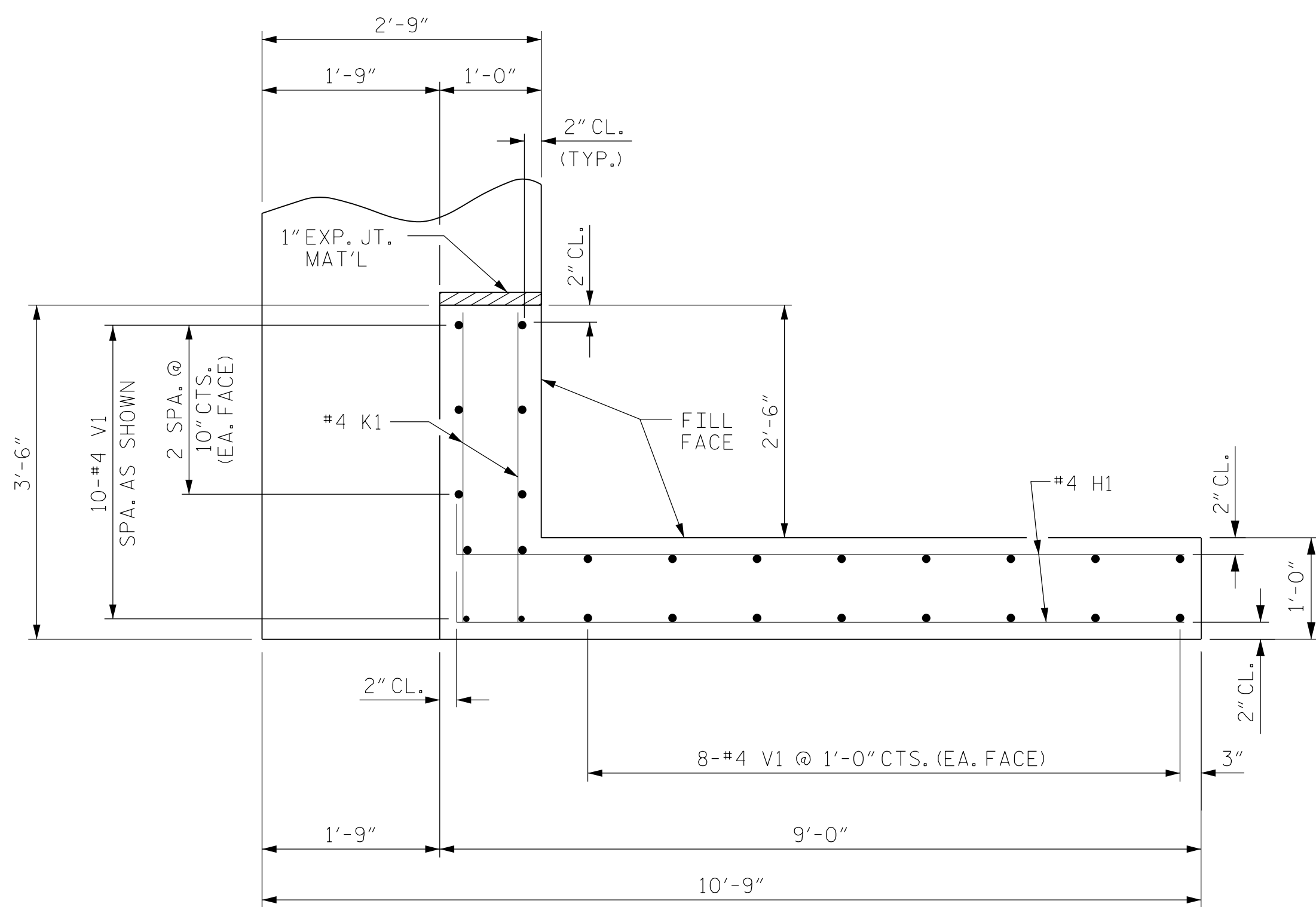
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-15
2			4			
TOTAL SHEETS						21

STD. NO. EB.36_90S4

900078

8/16/2017
\\400_015_900078_SMU_EB02.dgn
USER: jloftus

DRAWN BY: HASSFOURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 01/17



PROJECT NO. 17BP.5.R.64
VANCE COUNTY
 STATION: 14+30.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT
WING DETAILS

REVISIONS						SHEET NO. S-16
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

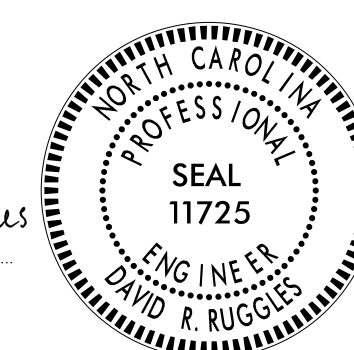
STD. NO. EB_36_90S4

DRAWN BY: H.ASSFOURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 01/17

DocuSigned by
David Ruy
C482768DE412

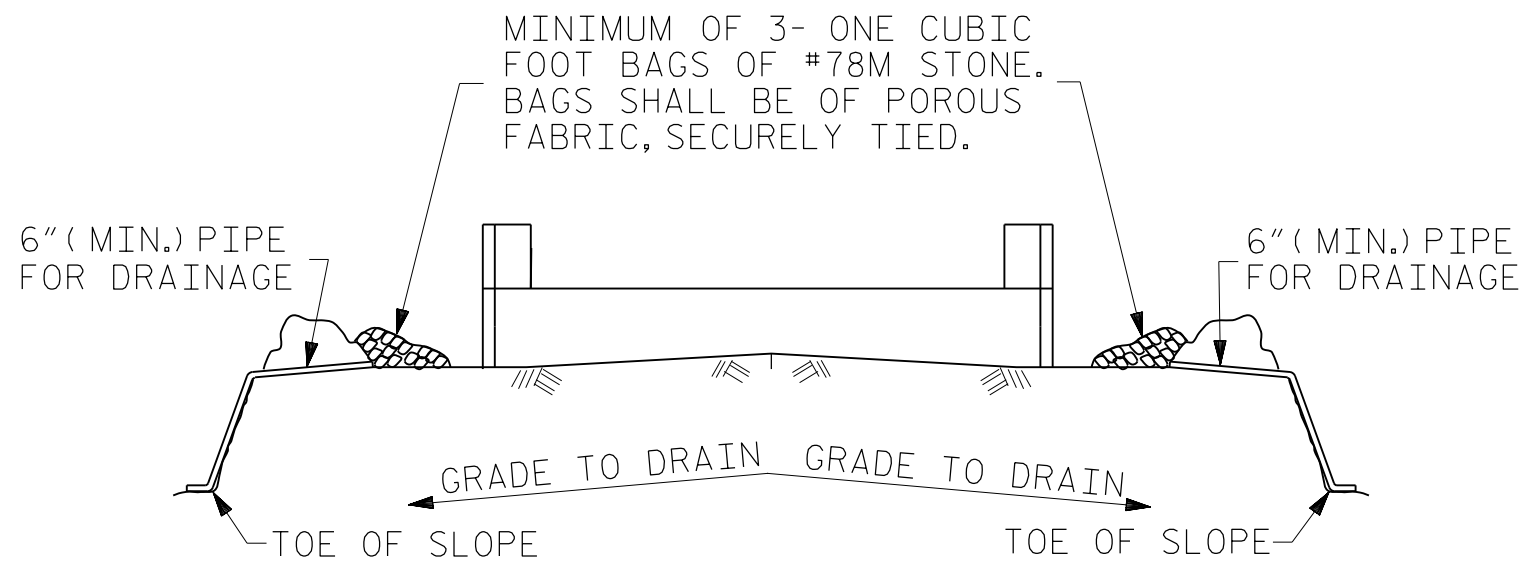
WING
9/27/201

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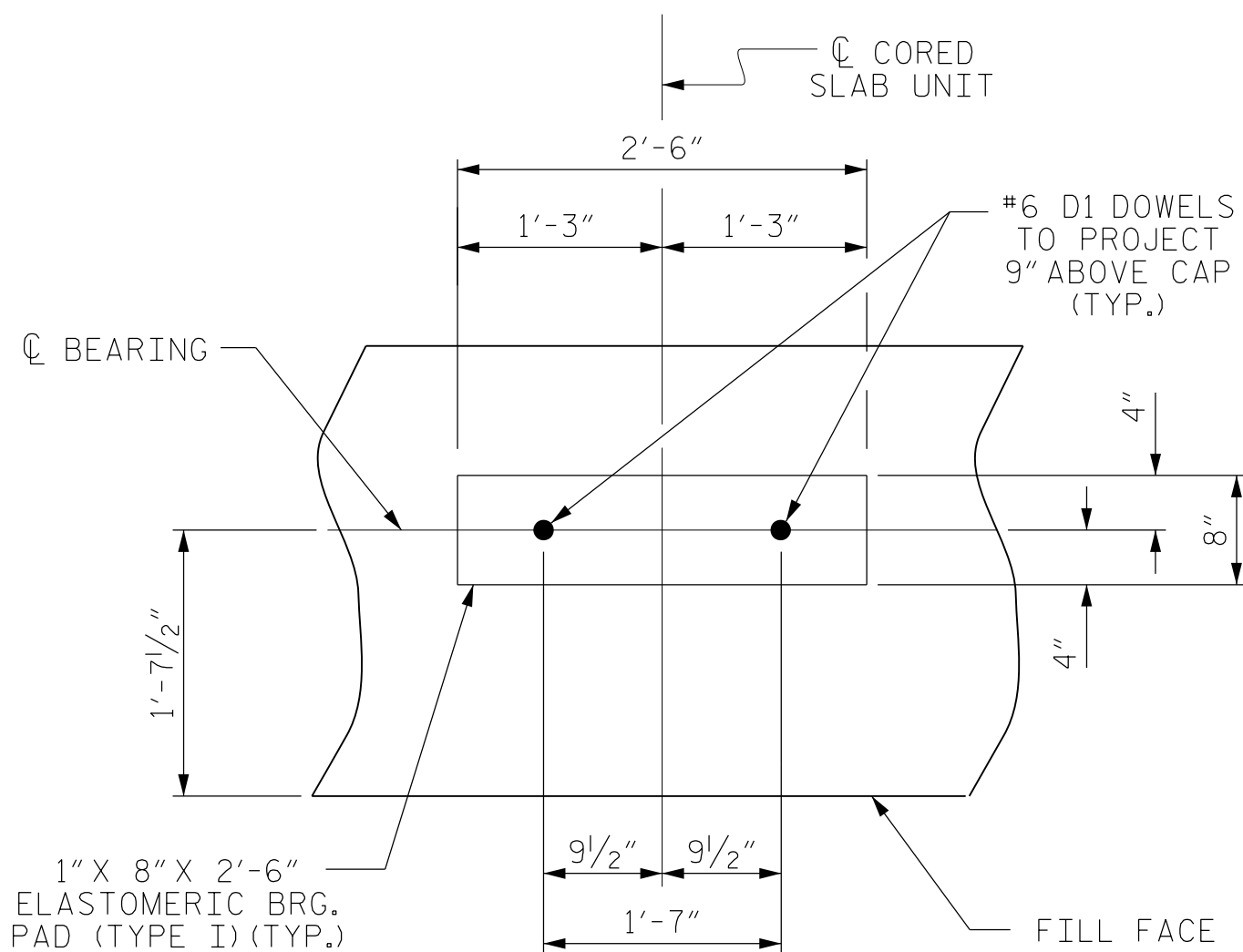


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

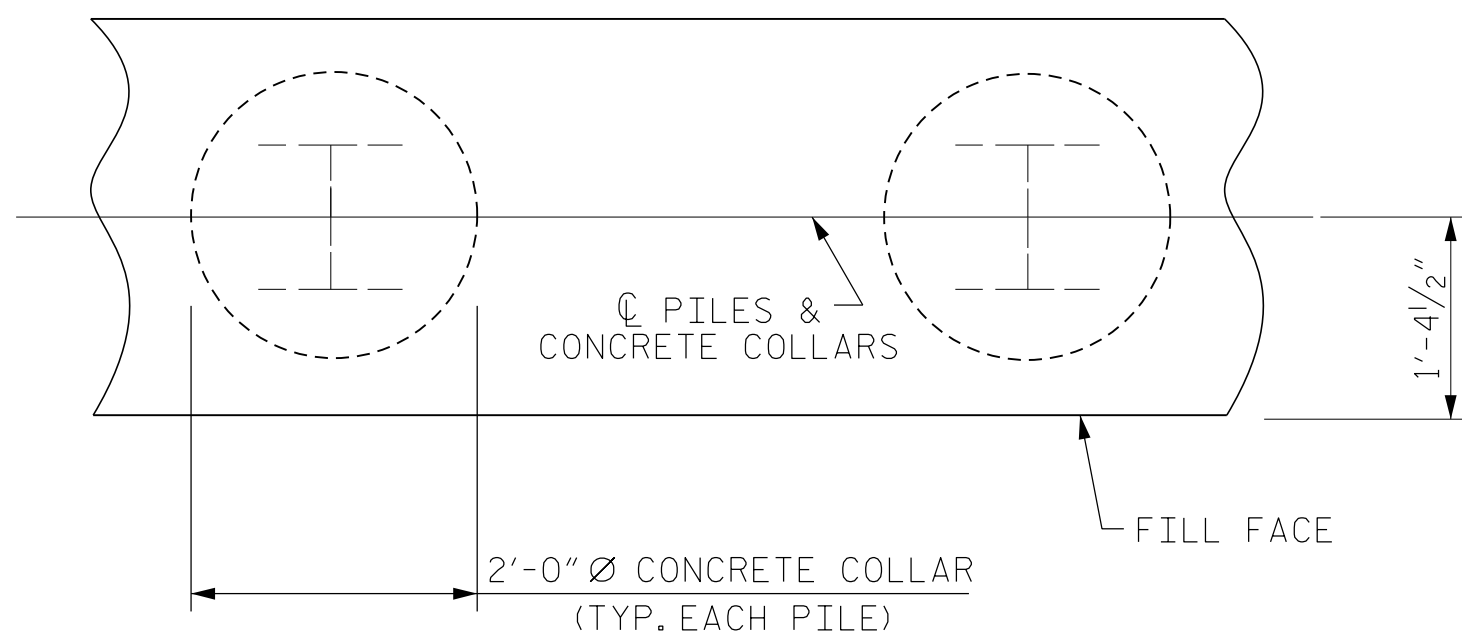
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



DETAIL "A"

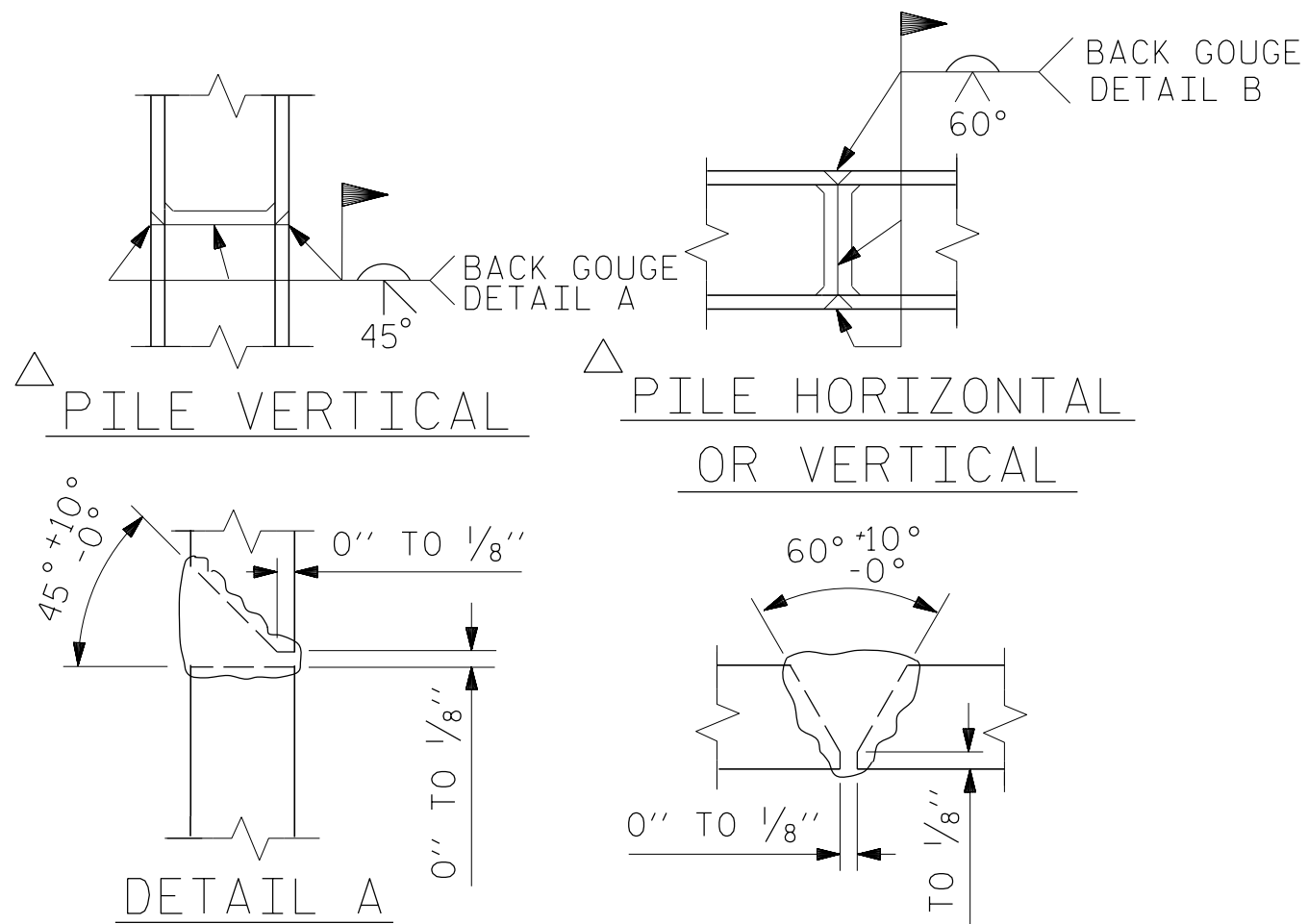
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



PLAN

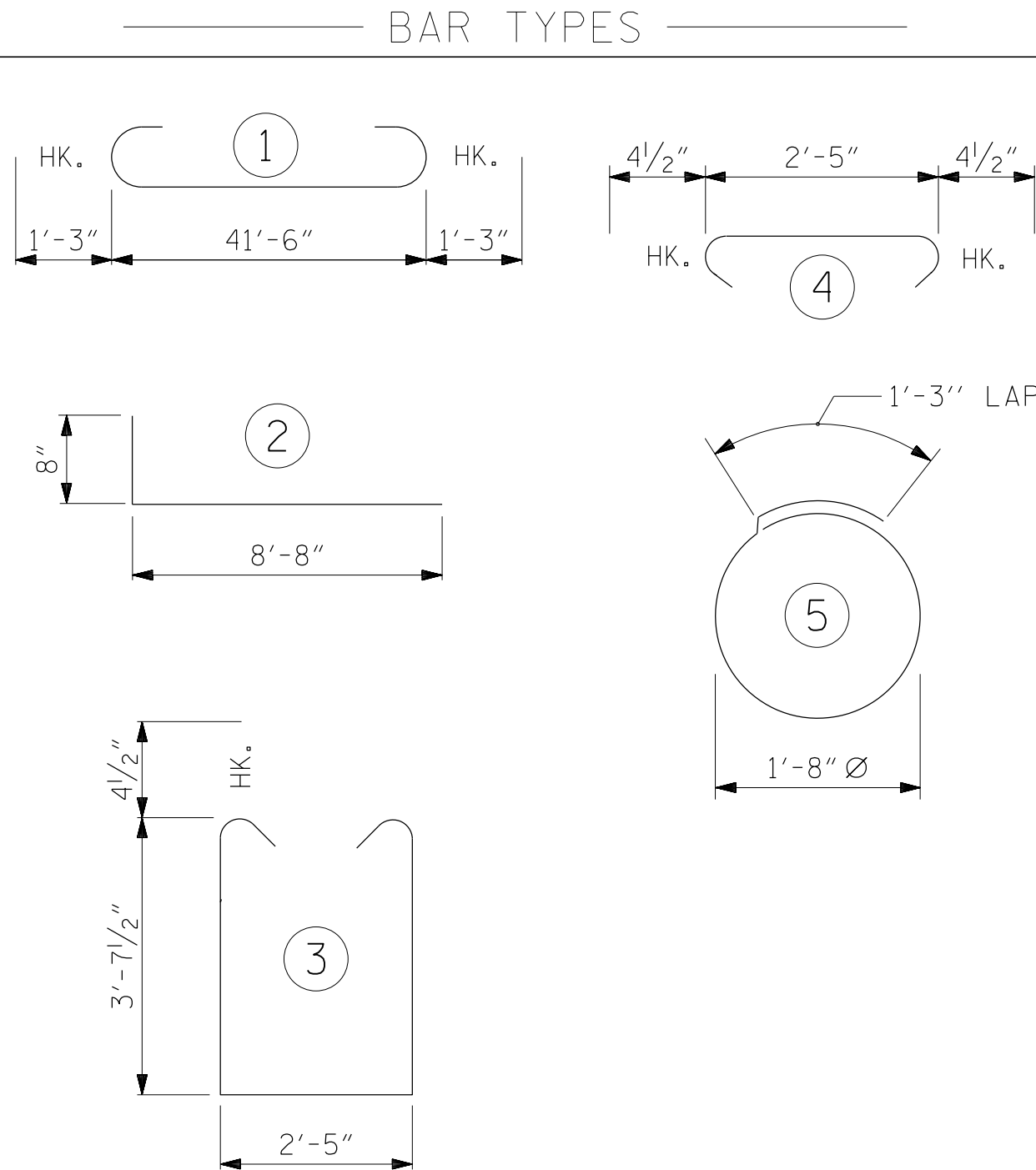
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



PILE SPLICE DETAILS

POSITION OF PILE DURING WELDING.



ALL BAR DIMENSIONS ARE OUT TO OUT.

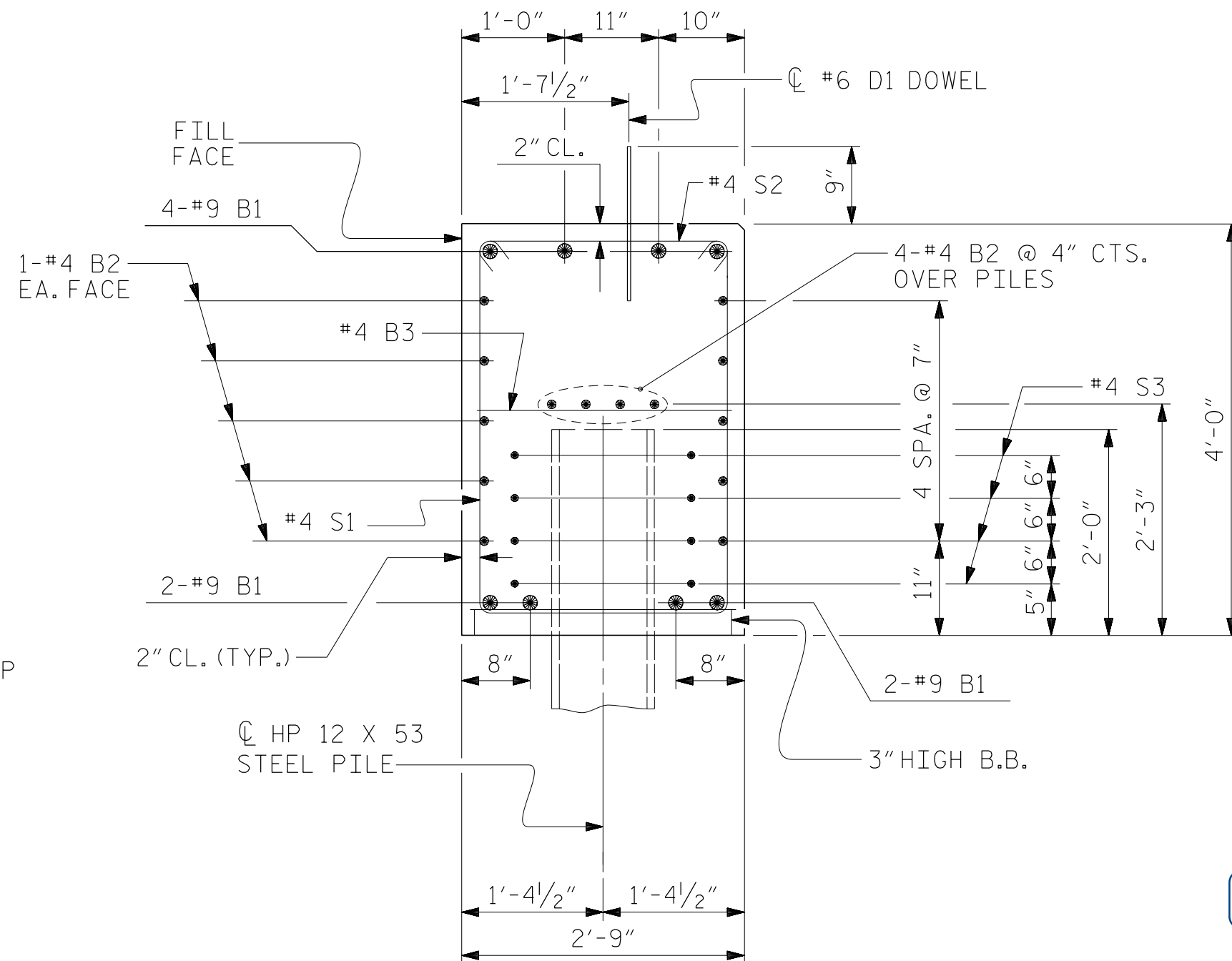
END BENT No. 1		END BENT No. 2	
HP 12 X 53 STEEL PILES		HP 12 X 53 STEEL PILES	
NO: 7 LIN. FT.= 140.0		NO: 7 LIN. FT.= 105.0	
STEEL PILE POINTS EA. 7			
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES EA. 7			
PILE EXCAVATION IN SOIL 100 LIN. FT.		PILE EXCAVATION IN SOIL 50 LIN. FT.	
NOT IN SOIL 30 LIN. FT.		NOT IN SOIL 35 LIN. FT.	

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		44'-0"	1197
B2	28	#4	STR	22'-1"	413
B3	11	#4	STR	2'-5"	18
D1	24	#6	STR	1'-6"	54
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	3'-0"	32
S1	56	#4	3	10'-5"	390
S2	56	#4	4	3'-2"	118
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-2"	214

REINFORCING STEEL (FOR ONE END BENT)		2807 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)		
POUR #1	CAP, LOWER PART OF WINGS & COLLARS	20.7 C.Y.
POUR #2	UPPER PART OF WINGS	2.3 C.Y.
TOTAL CLASS A CONCRETE		23.0 C.Y.



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



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SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2
DETAILS

REVISIONS						SHEET NO. S-17
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

STD. NO. EB_36_90S4

DRAWN BY: HASSFOURA	DATE: 10/16
CHECKED BY: D. RUGGLES	DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES	DATE: 01/17

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY
TO CLEAR DOWELS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY
FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD
SPECIFICATIONS.

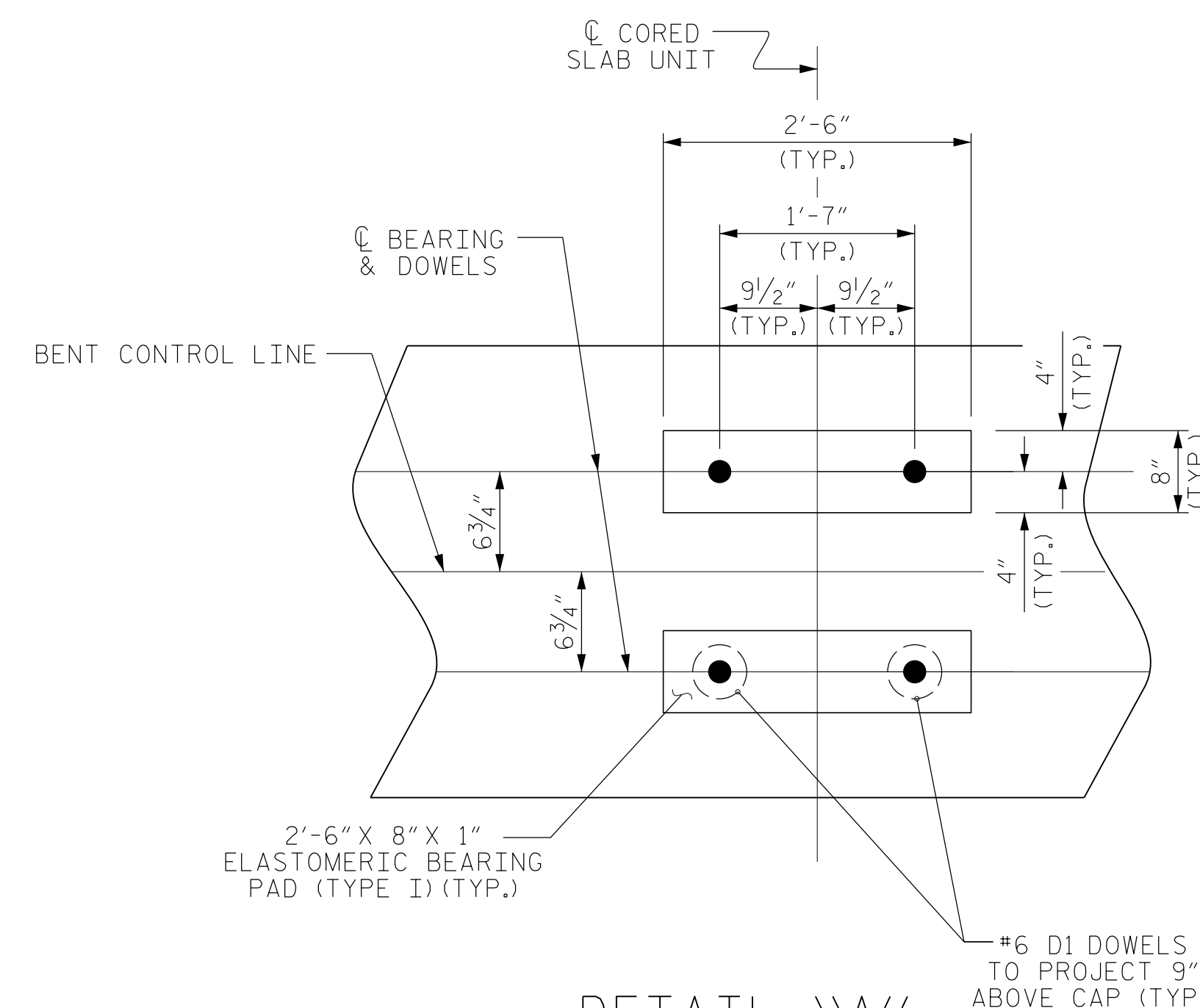
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE
PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL
COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

DRILLED PIERS SHALL BE TERMINATED ONE FOOT $\pm$ ABOVE
NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED
IN WATER.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.5.R.64

VANCE COUNTY

STATION: 14+30.00 -L-

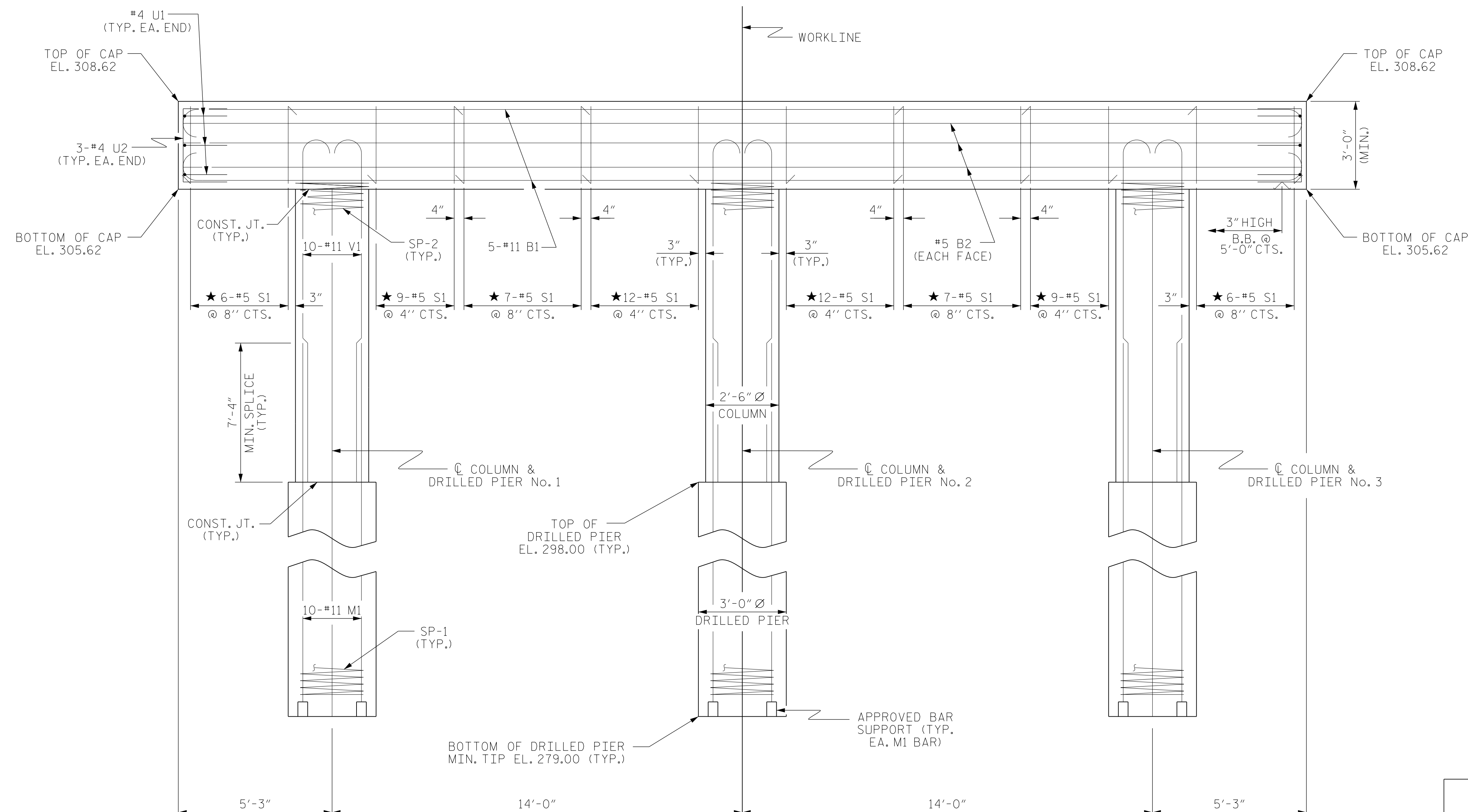
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 1

50 mm	REVISIONS						SHEET NO S-18 TOTAL SHEETS 21
	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			

STD. NO. DP_BT_36_90S_<50'



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

DocuSigned by:
David Ruggles
C462768DF412422...

9/27/2017

NORTH CAROLINA
PROFESSIONAL
SEAL
11725
ENGINEER
DAVID R. RUGGLES

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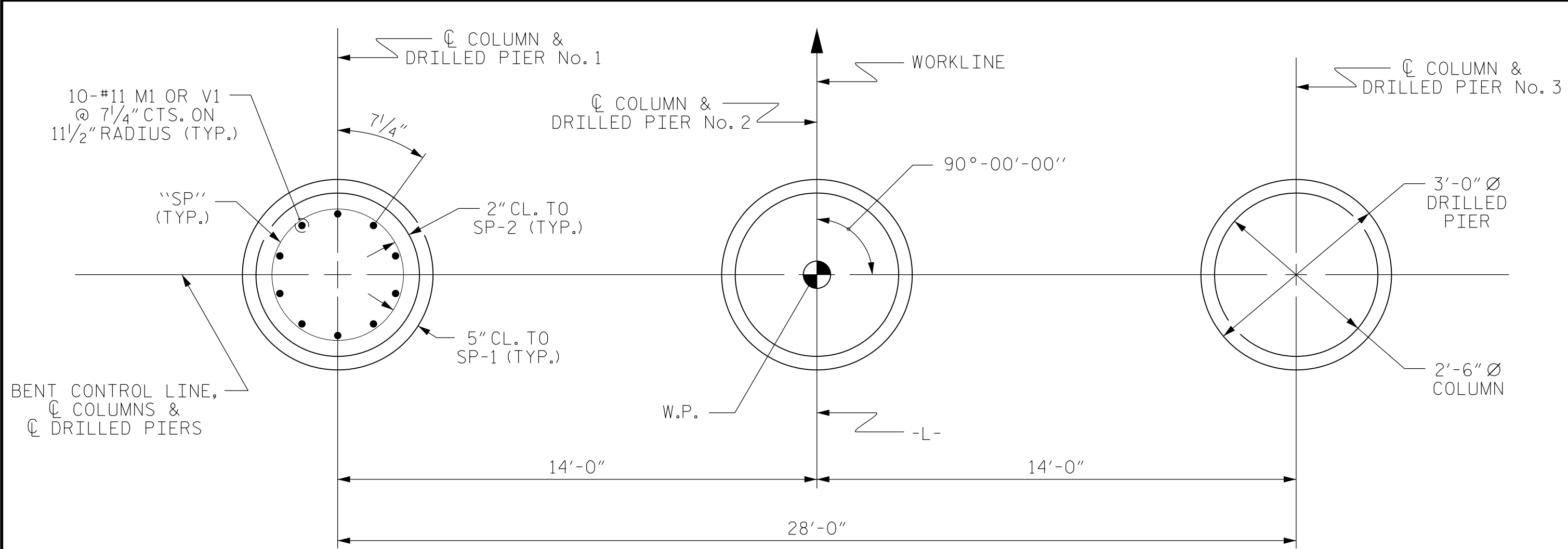
DRAWN BY: H.QSSFURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 01/17

8/16/2017

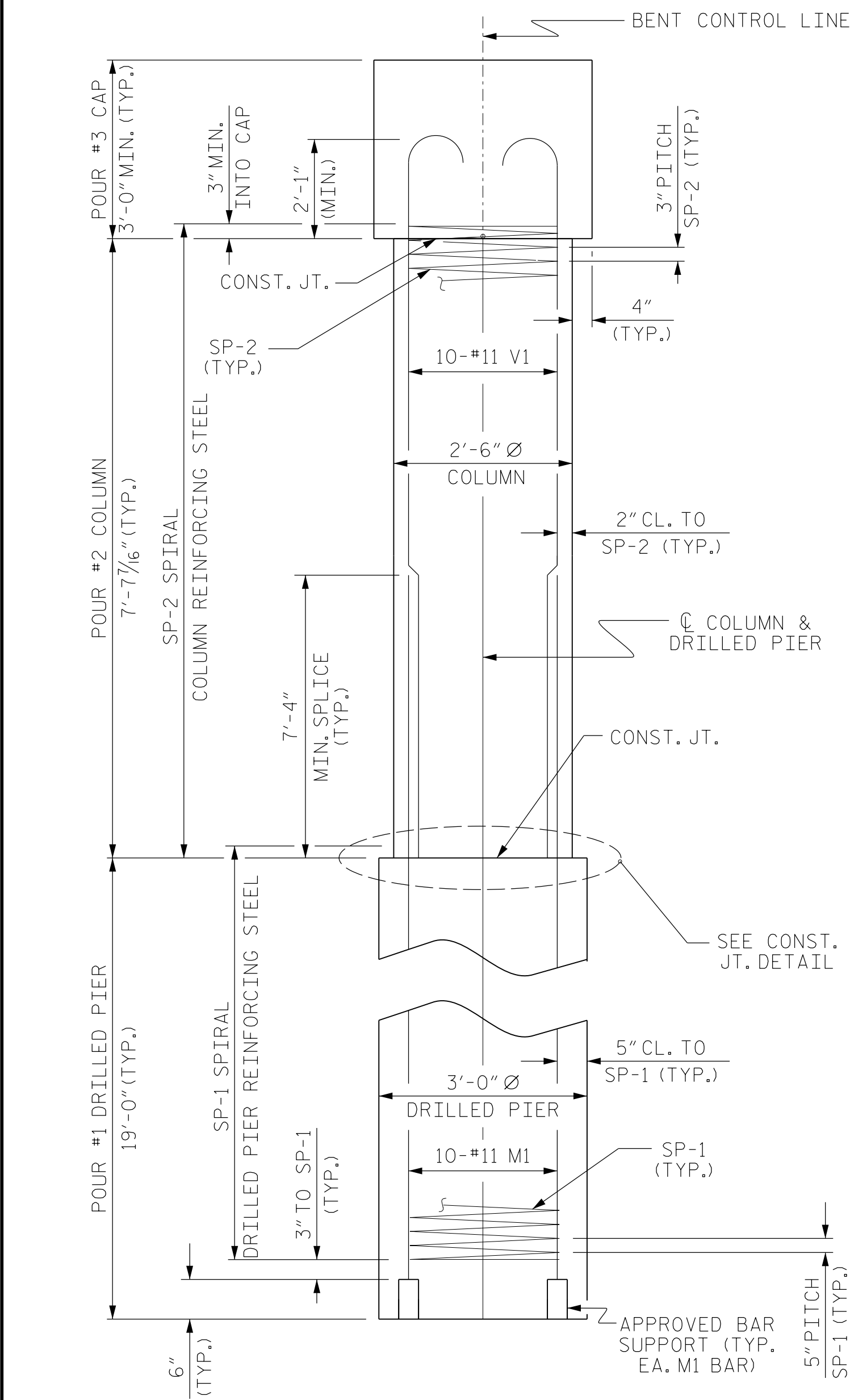
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USER:iloftus

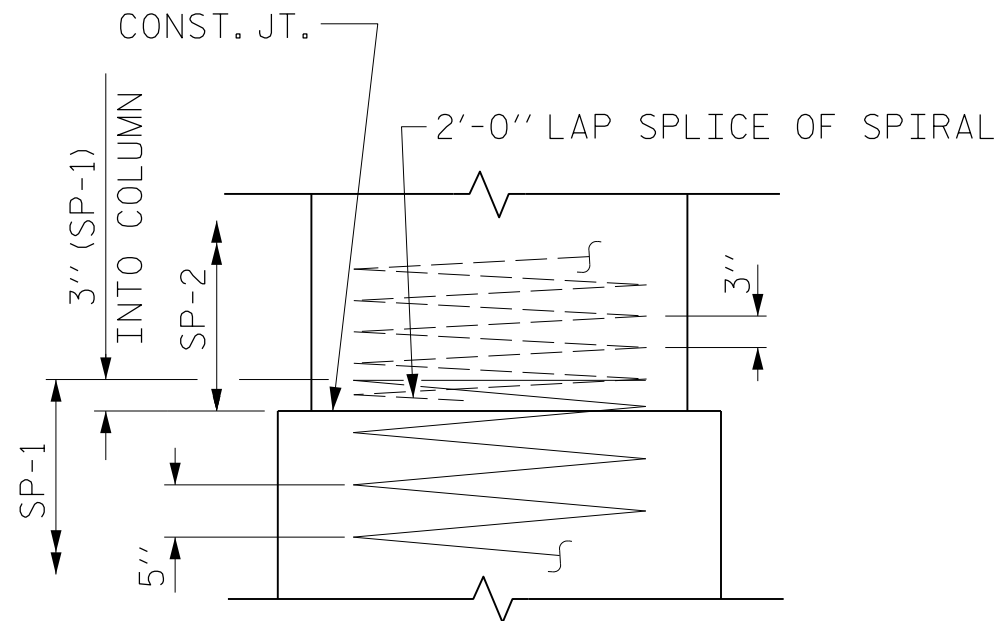
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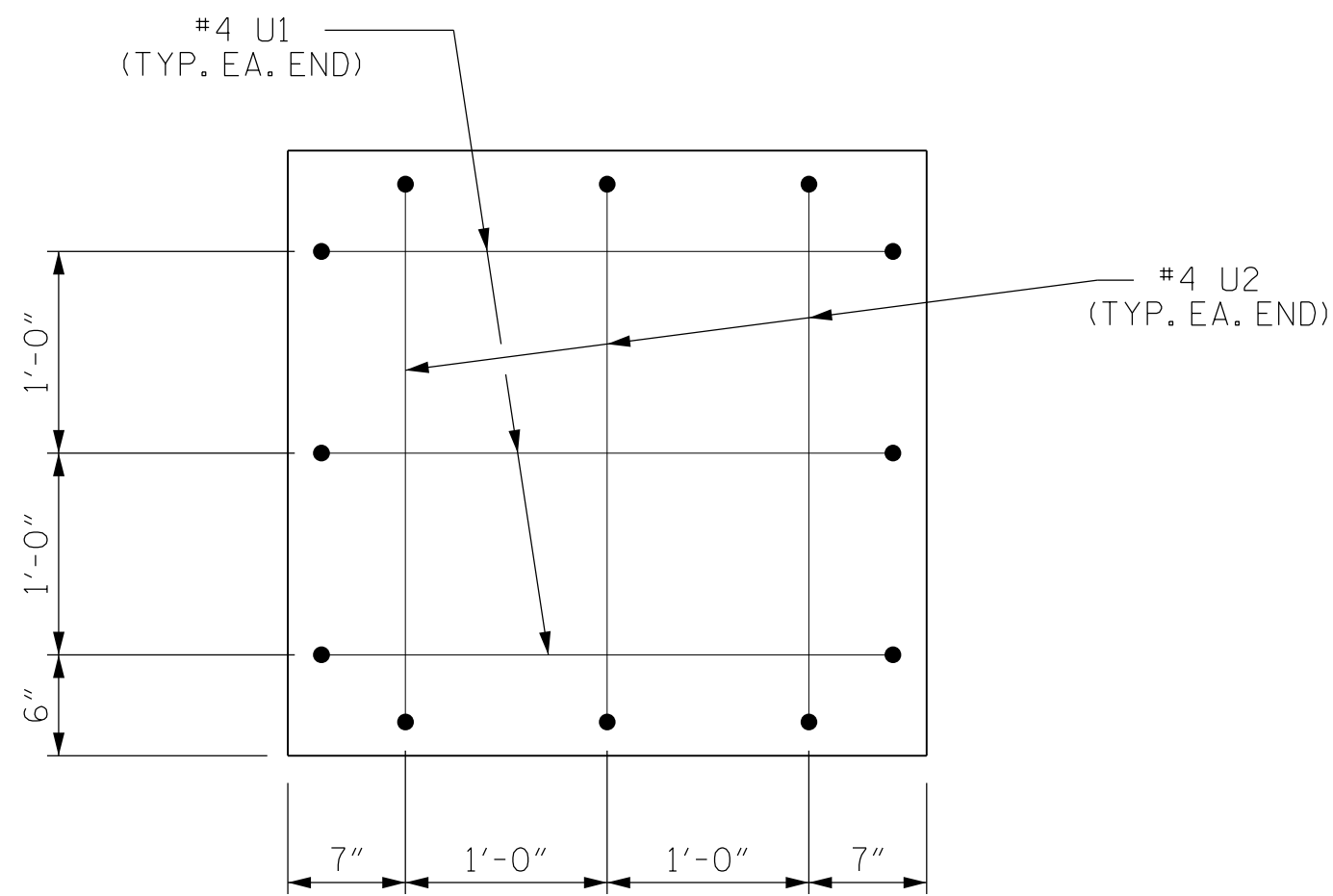
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

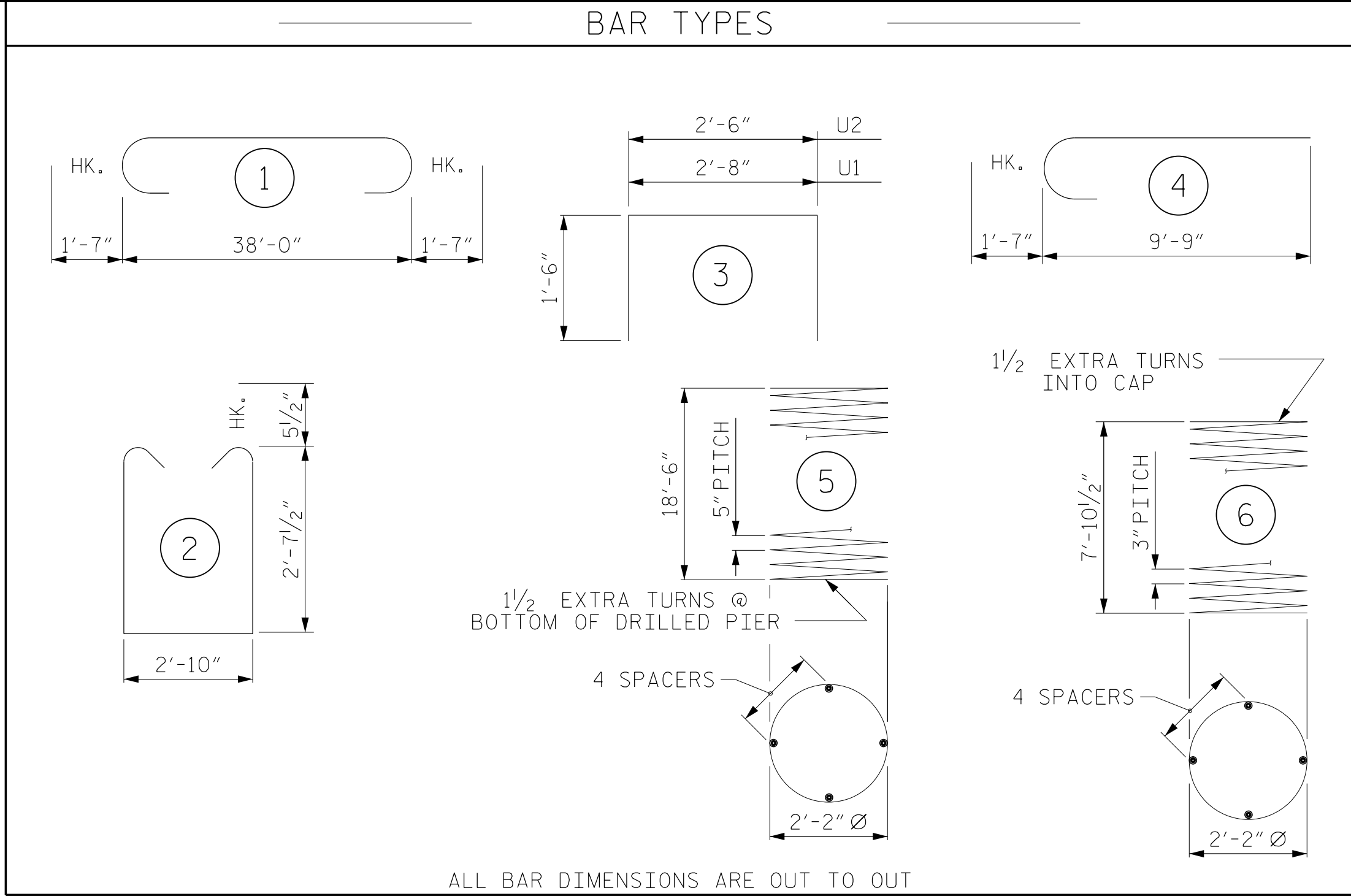


CONSTRUCTION JOINT DETAIL



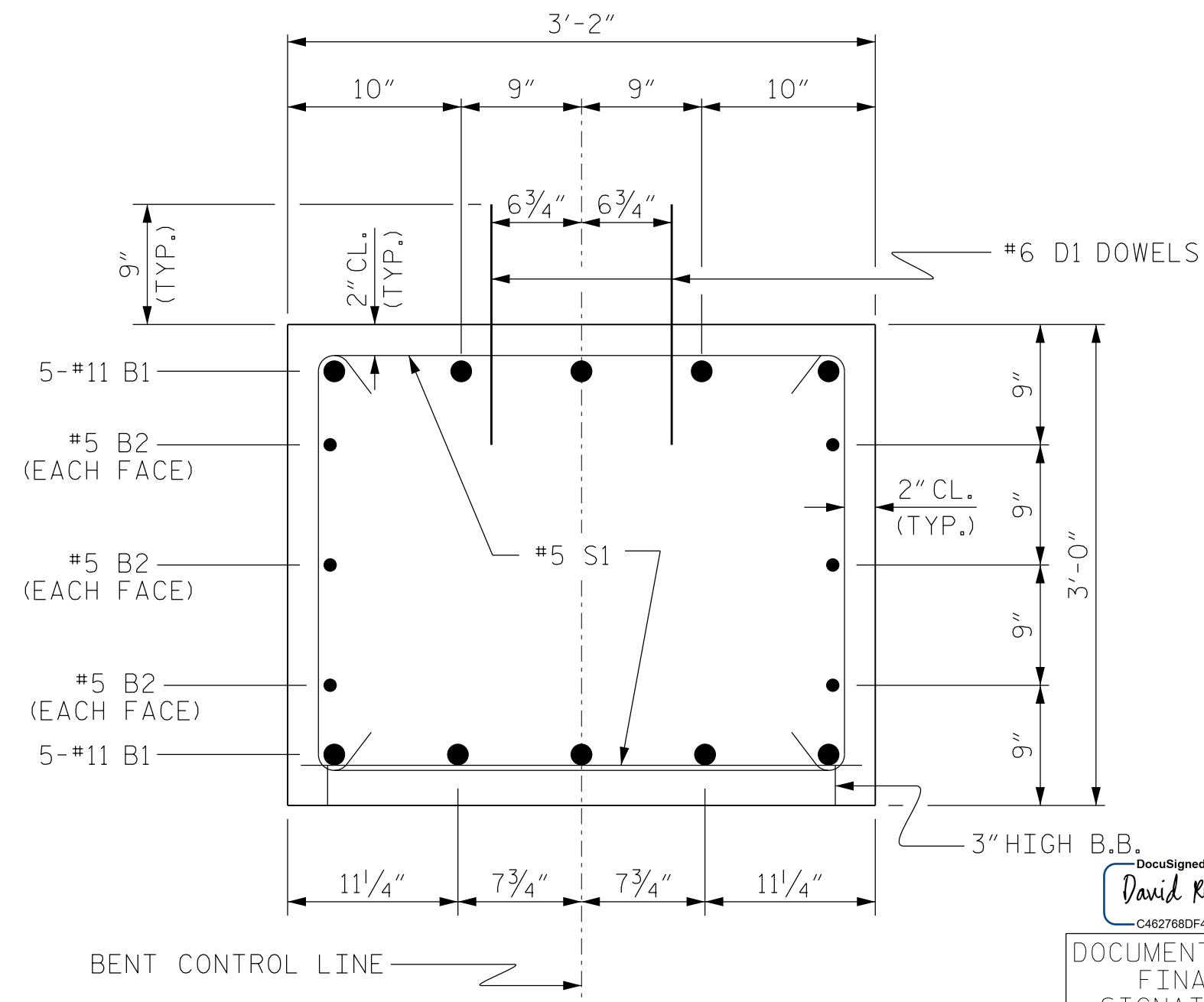
END OF CAP VIEW

(TYPICAL BOTH ENDS)

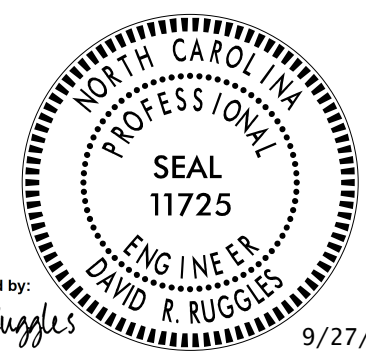


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	41'-2"	2187
B2	6	#5	STR	38'-2"	239
D1	48	#6	STR	1'-6"	108
M1	30	#11	STR	28'-10"	4596
S1	68	#5	2	9'-0"	638
U1	6	#4	3	5'-8"	23
U2	6	#4	3	5'-6"	22
V1	30	#11	4	11'-4"	1806
REINFORCING STEEL (FOR ONE BENT)					9619 LBS.
SP-1	3	*	5	295'-7"	925
SP-2	3	**	6	210'-5"	422
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					1347 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #2 (COLUMNS)					4.2 C.Y.
POUR #3 (CAP)					13.6 C.Y.
TOTAL CLASS A CONCRETE					17.8 C.Y.
DRILLED PIERS: (FOR ONE BENT)					
DRILLED PIER CONCRETE					14.9 C.Y.
POUR #1 (DRILLED PIERS)					14.9 C.Y.
3'-0" Ø DRILLED PIER NOT IN SOIL					30 LIN. FT.
3'-0" Ø DRILLED PIER IN SOIL					27 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER					33 LIN. FT.
CSL TUBES					246 LIN. FT.
SID INSPECTIONS					1 EA.
CSL TESTING					1 EA.



SECTION THRU CAP



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STATION: 14+30.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-19					TOTAL SHEETS 21

STD. NO. DP_BT_36_90S_<50'

900078

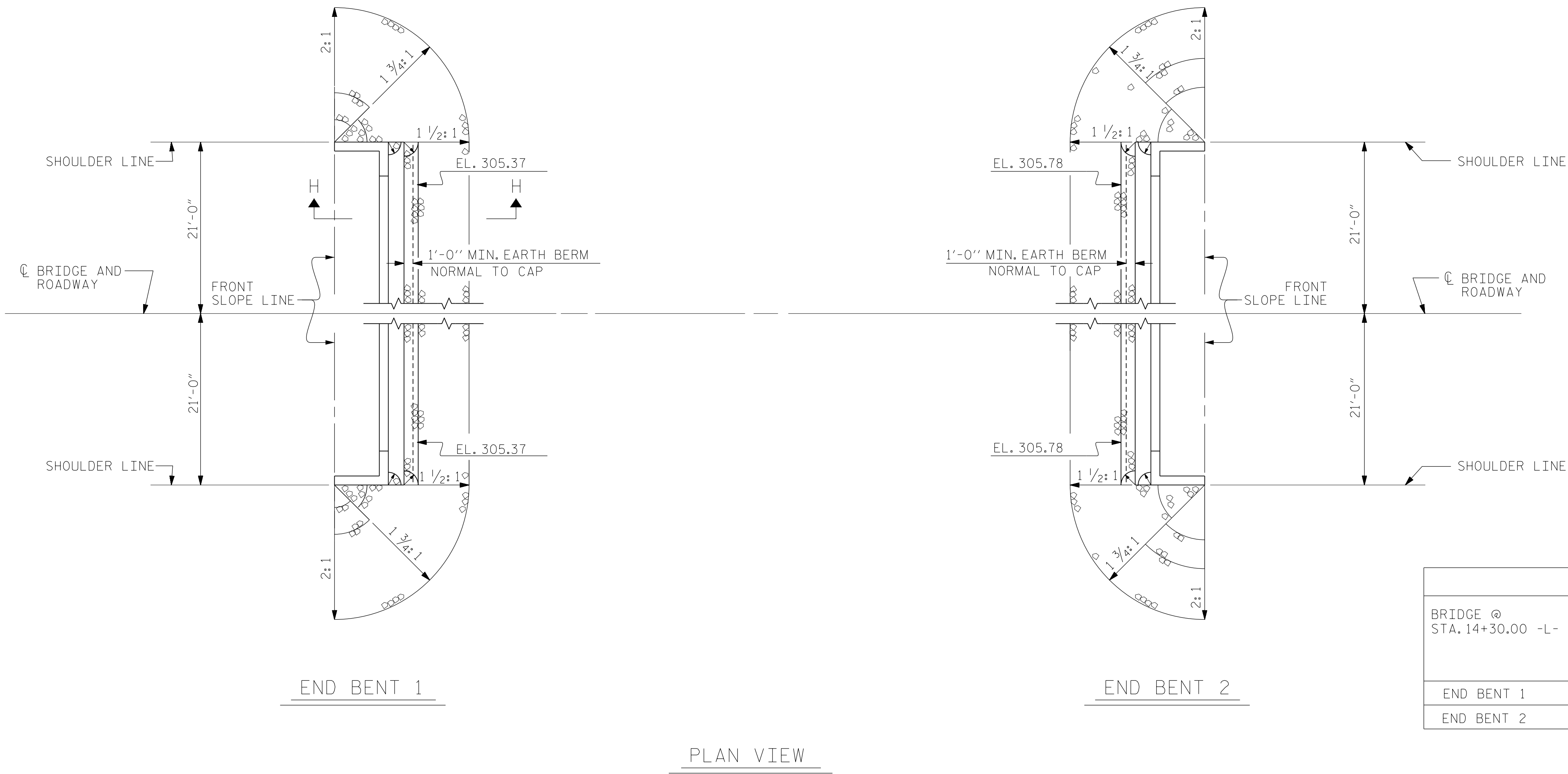
8/16/2017

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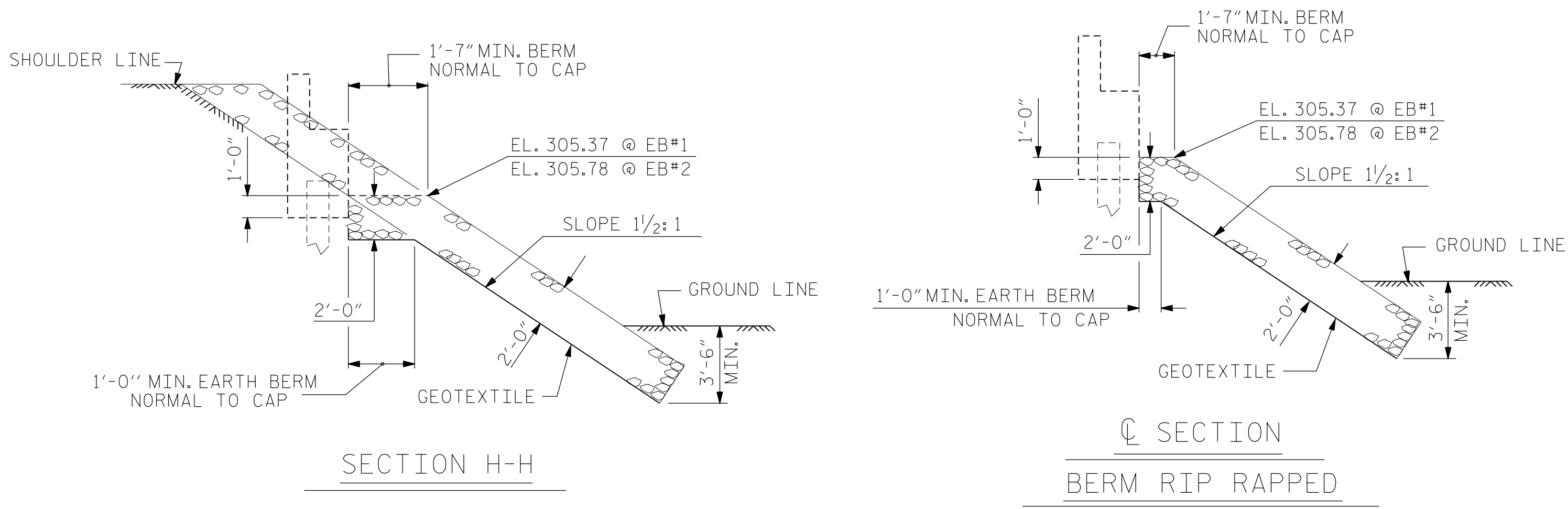
USER:jloftus

DRAWN BY: HASSFOURA	DATE: 11/16
CHECKED BY: D. RUGGLES	DATE: 01/17
DESIGN ENGINEER OF RECORD: D. RUGGLES	DATE: 01/17

NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



ESTIMATED QUANTITIES		
BRIDGE @ STA. 14+30.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	110	122
END BENT 2	139	154



PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
—RIP RAP DETAILS—



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1			3			TOTAL SHEETS 21
2			4			

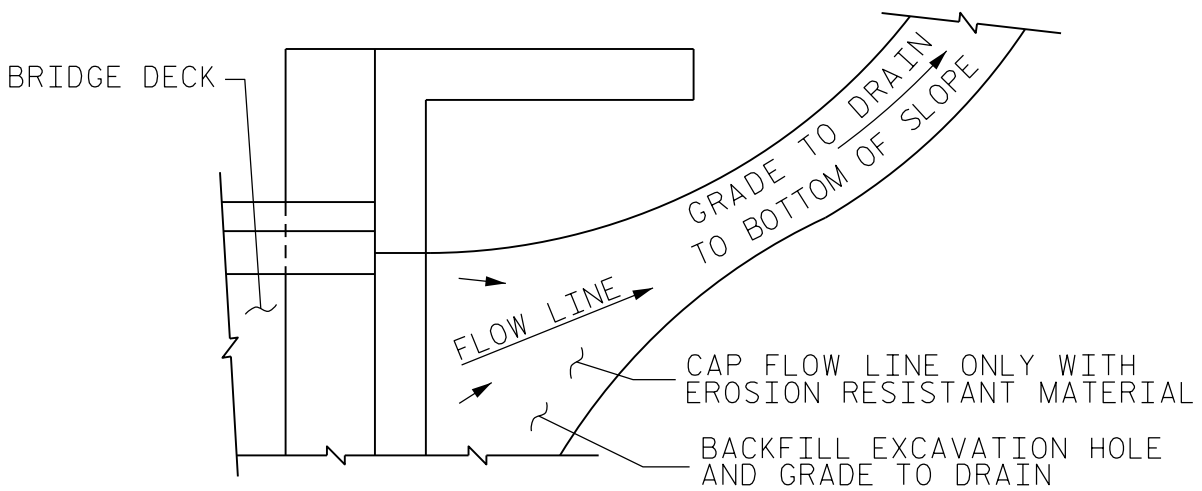
DRAWN BY: HASSFOURA	DATE: 10/16
CHECKED BY: D. RUGGLES	DATE: 01/17
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NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4"Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

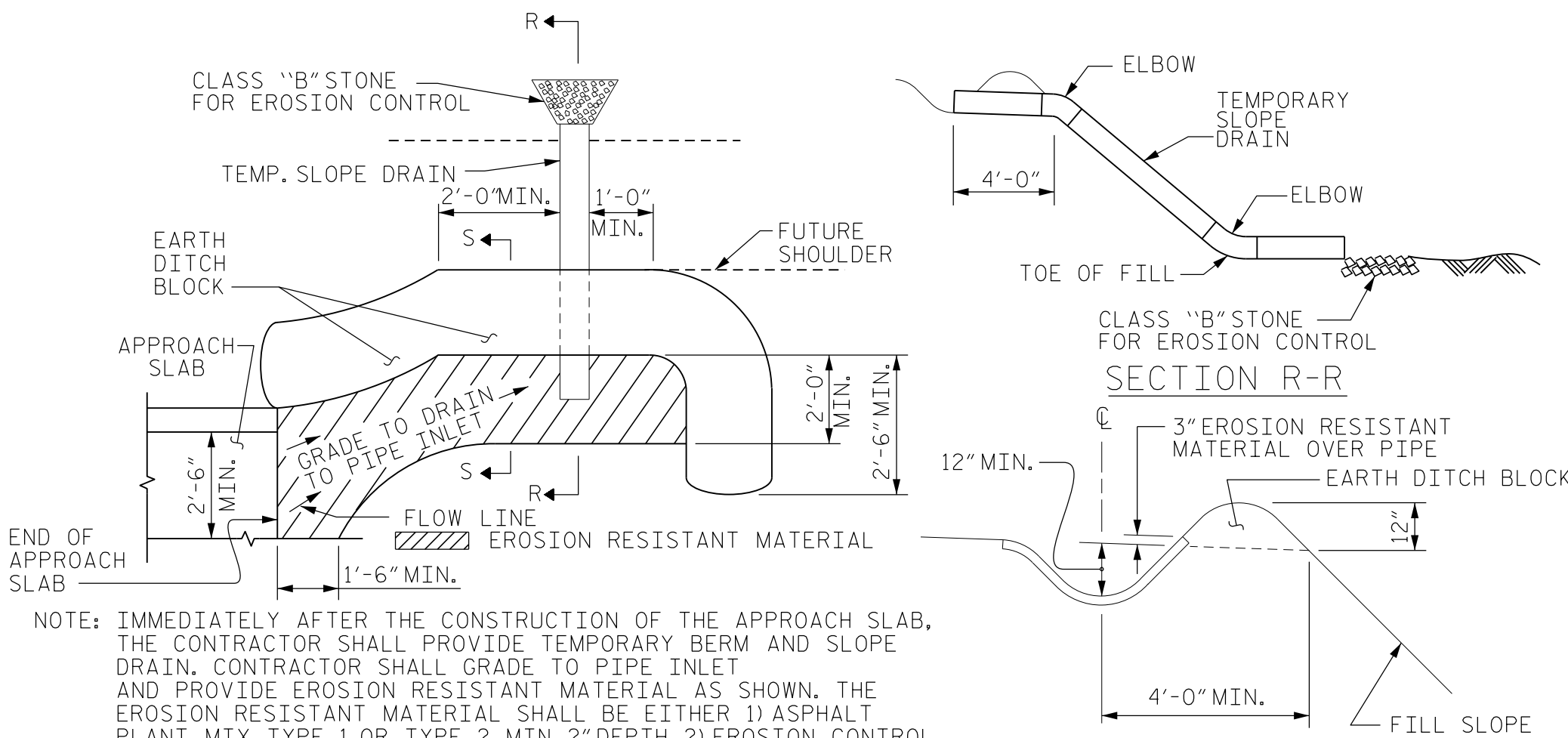
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED, SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

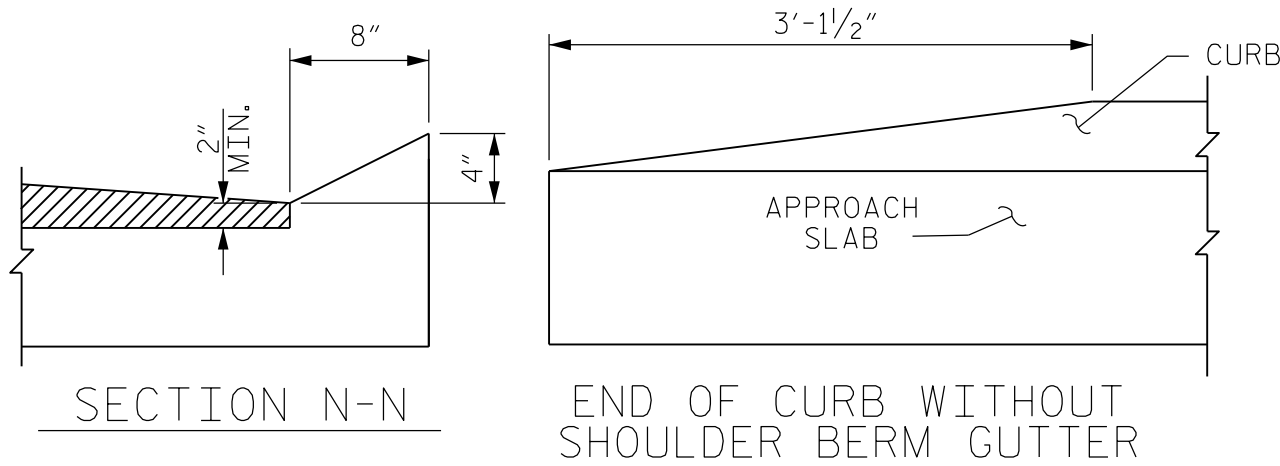


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



CURB DETAILS



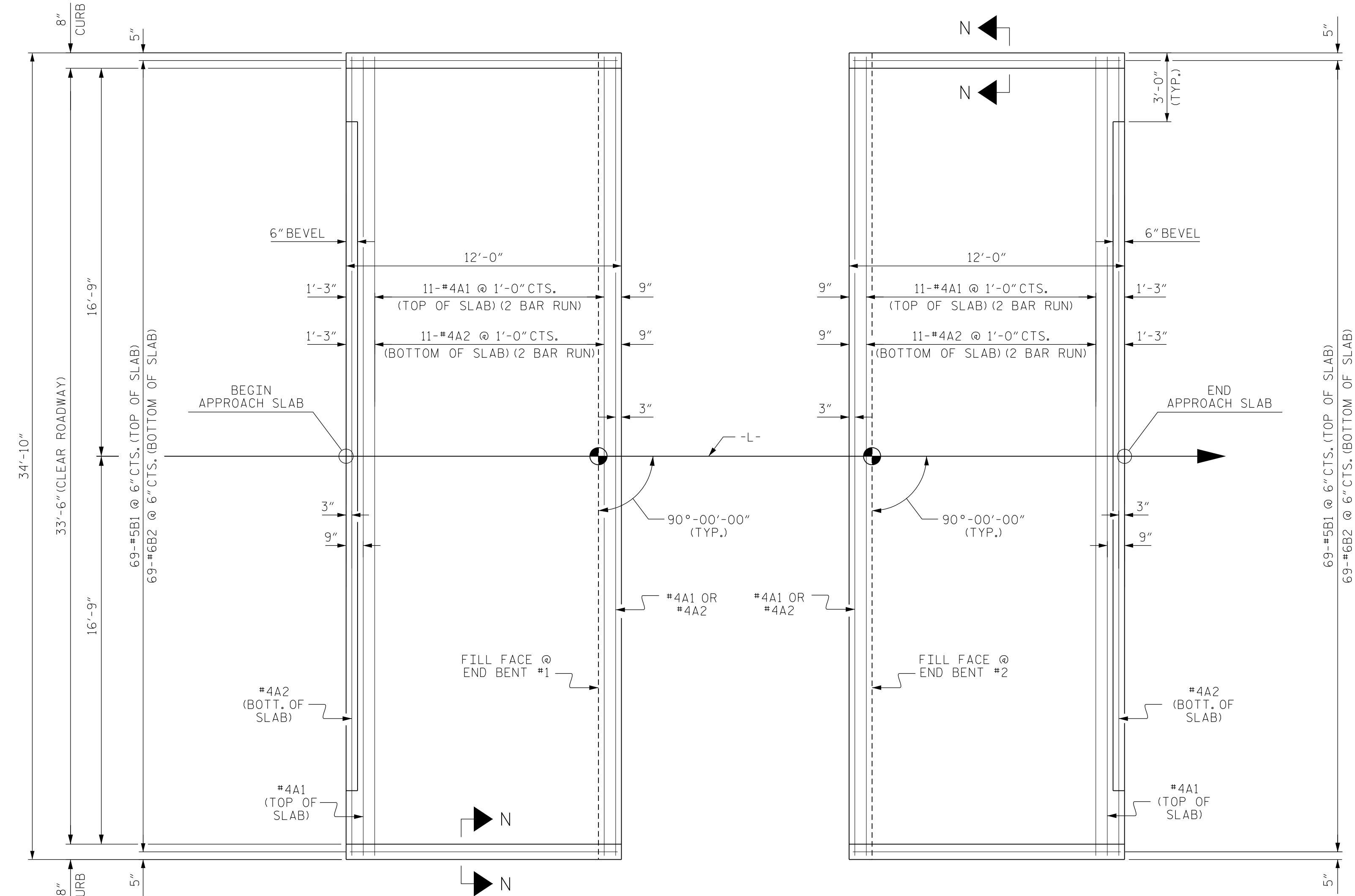
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BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	18'-3"	317
A2	26	#4	STR	18'-2"	316
* B1	69	#5	STR	11'-2"	804
B2	69	#6	STR	11'-8"	1209
REINFORCING STEEL				LBS.	1525
* EPOXY COATED REINFORCING STEEL				LBS.	1121
CLASS AA CONCRETE				C. Y.	20.6
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	18'-3"	317
A2	26	#4	STR	18'-2"	316
* B1	69	#5	STR	11'-2"	804
B2	69	#6	STR	11'-8"	1209
REINFORCING STEEL				LBS.	1525
* EPOXY COATED REINFORCING STEEL				LBS.	1121
CLASS AA CONCRETE				C. Y.	20.6

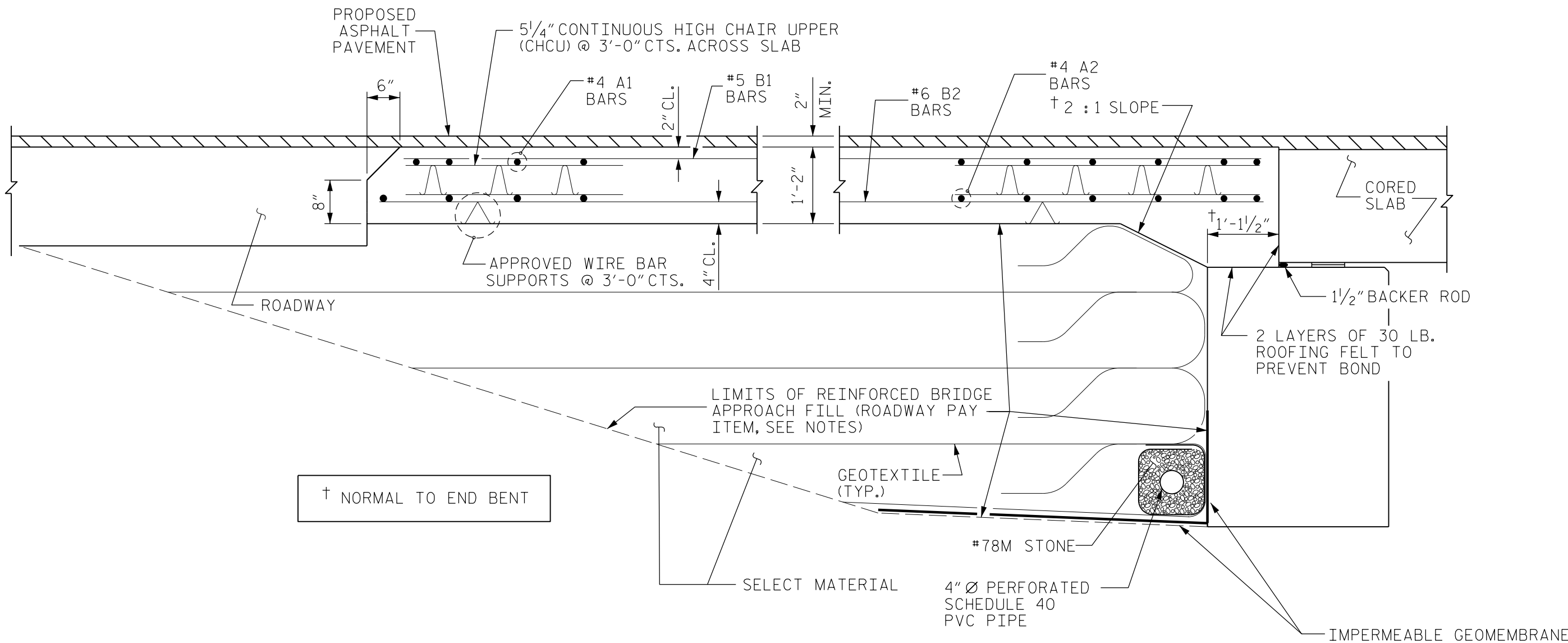


PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



SECTION THRU SLAB

DRAWN BY: HASSFOURA DATE: 10/16
CHECKED BY: D. RUGGLES DATE: 01/17
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PROJECT NO. 17BP.5.R.64
VANCE COUNTY
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)
90° SKEW

REVISIONS					SHEET NO. S-21
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2			4		

STD. NO. BAS_36_90S

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	- - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	- - - - -	SEE PLANS
IMPACT ALLOWANCE	- - - - -	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	- -	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	- - - - -	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	- - - - -	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	- - - - -	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	- - - - -	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	- - - - -	30 LBS. PER CU. FT.
		(MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8"Ø SHEAR STUDS FOR THE 3/4"Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8"Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4"Ø STUDS BASED ON THE RATIO OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB. METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

PROJECT NO. 17BP.5.R.64
VANCE COUNTY
STATION: 14+30.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
NOTES

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JANUARY, 1990