

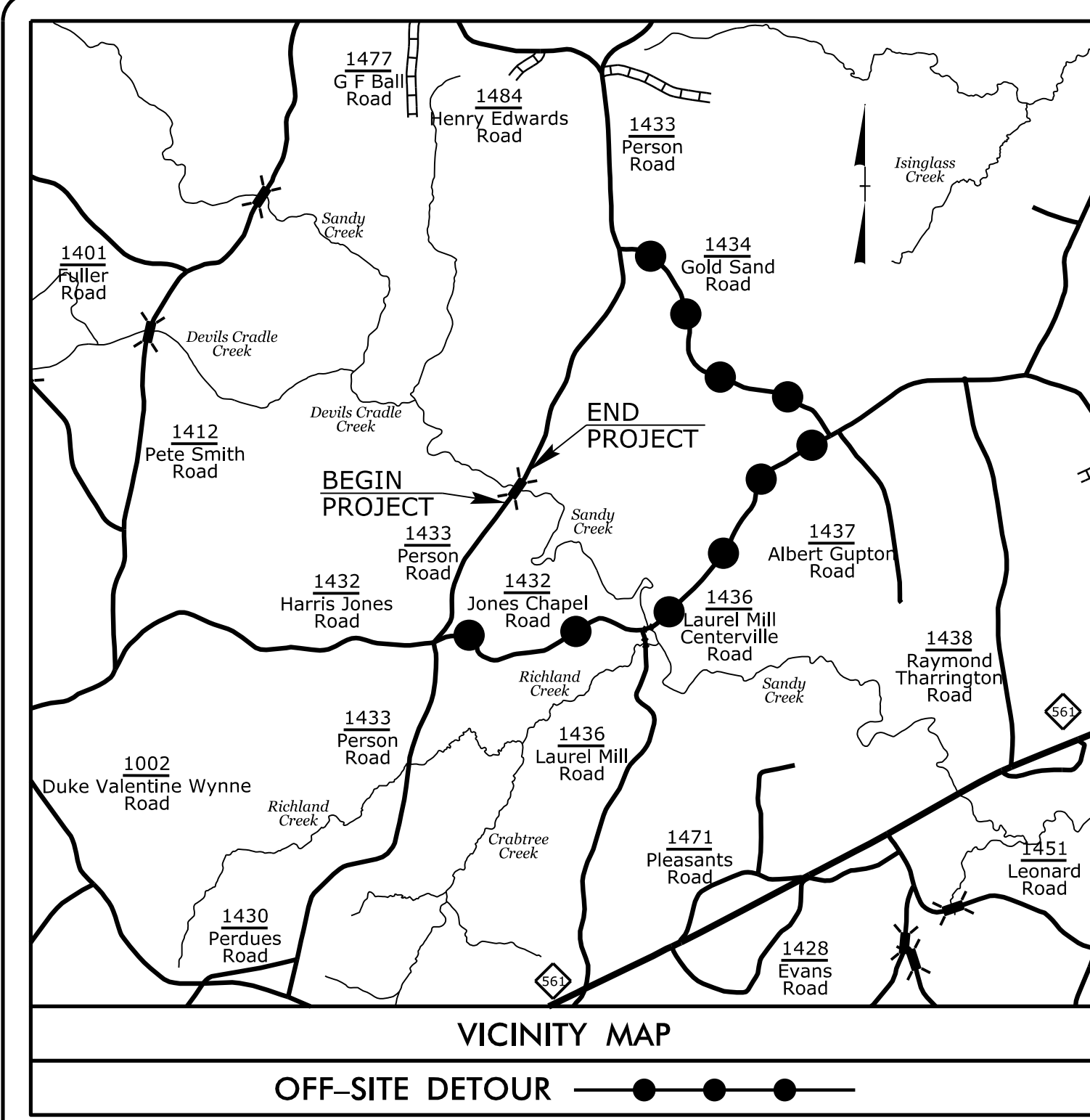
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numbers appear on each page, on the dates appearing  
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09\_08/19

**TIP PROJECT: B-4516**



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

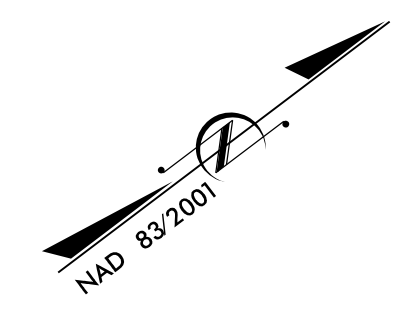
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**FRANKLIN COUNTY**

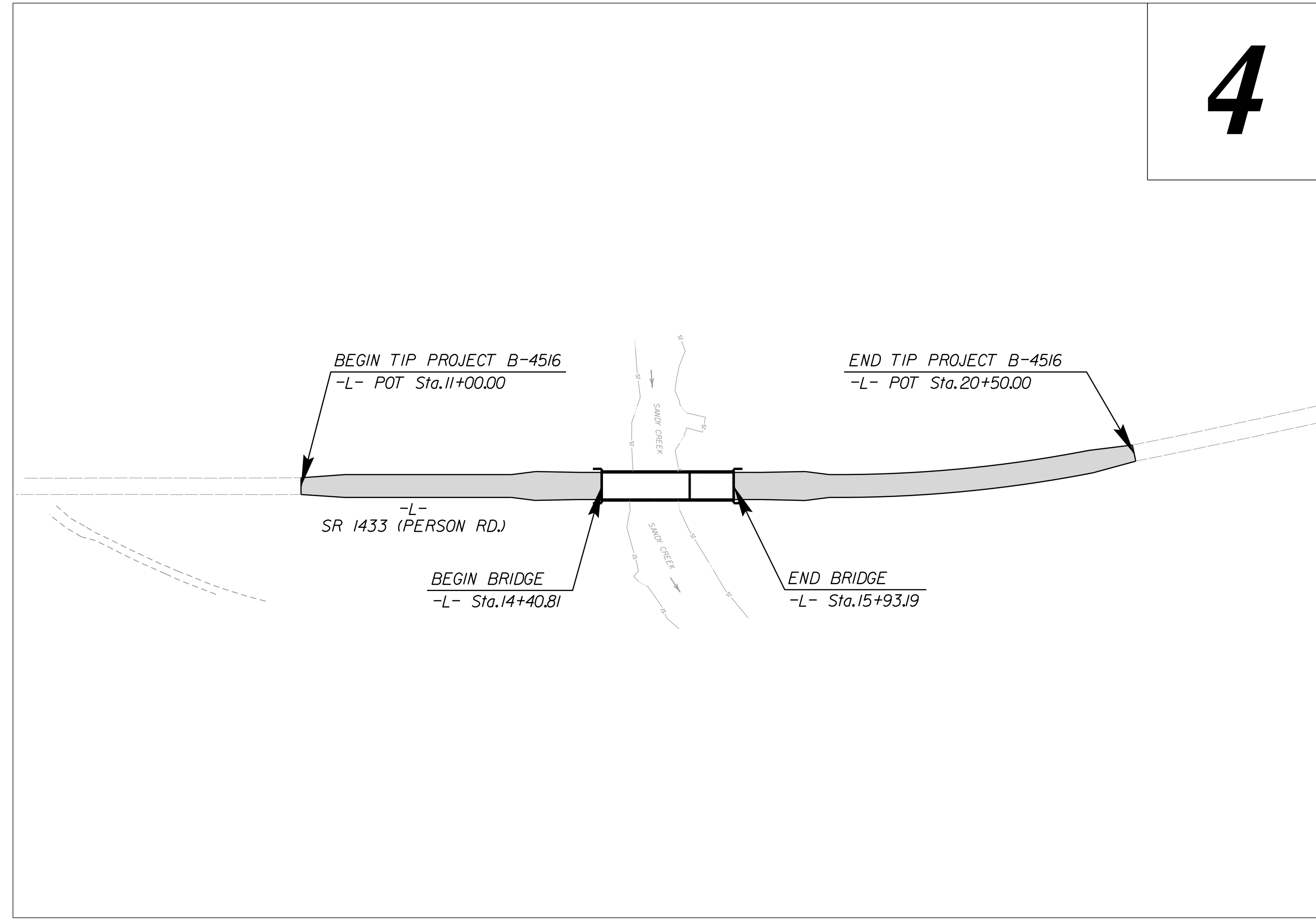
**LOCATION: BRIDGE NO. 52 OVER SANDY CREEK  
ON SR 1433 (PERSON RD.)**

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

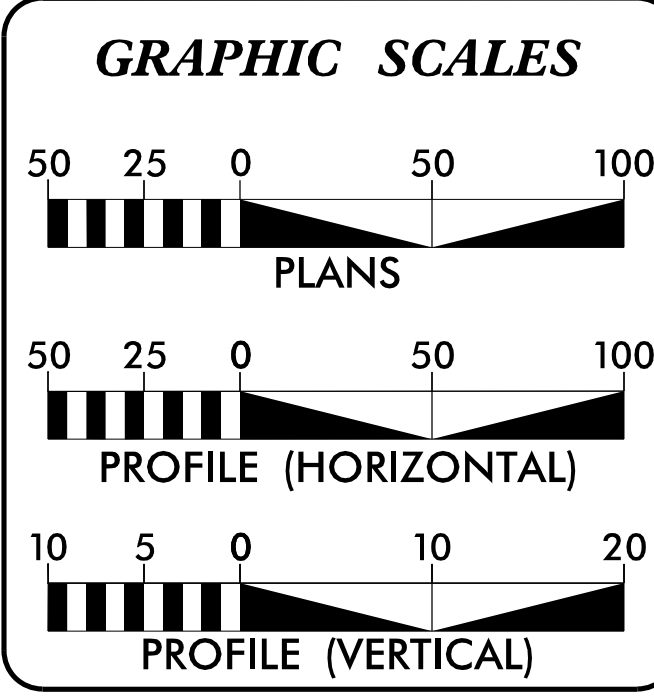
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	<b>B-4516</b>	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38400.1.FD2	BRZ-1433(9)	PE	
38400.2.2	BRZ-1433(9)	ROW	
38400.2.2	BRZ-1433(9)	UTILITIES	
38400.3.3	BRZ-1433(9)	CONSTRUCTION	



**CONTRACT: C204428**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

2019 ADT = 400  
V = 60 MPH  
FUNC. CLASS. = MINOR COLLECTOR  
SUBREGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4516 = 0.151 mi.  
LENGTH STRUCTURES TIP PROJECT B-4516 = 0.029 mi.  
TOTAL LENGTH TIP PROJECT B-4516 = 0.180 mi.

Prepared in the Offices of:

223 S. WEST ST., STE 1100  
RALEIGH, NC 27603  
T 919.380.8750

VHB Engineering NC, P.C. (C-3705)  
940 Main Campus Drive, Suite 500  
Raleigh, NC 27606

2018 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
OCTOBER 8, 2018

**RIGHT OF WAY COMPLETE:**

**LETTING DATE:**  
JUNE 18, 2019

**ANDY YOUNG, PE**  
PROJECT ENGINEER

**MICHAEL BURNS, PE**  
PROJECT DESIGNER

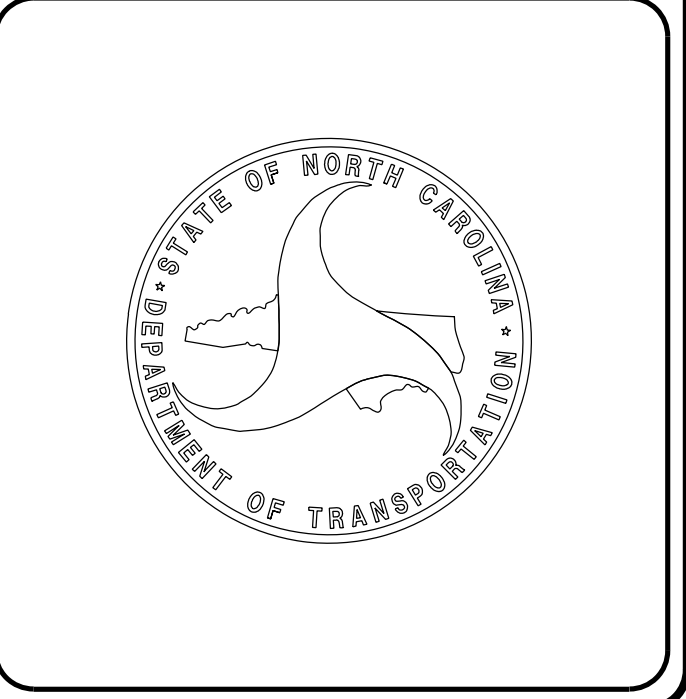
**LISA GILCHRIST, EI**  
NCDOT CONTACT

**HYDRAULICS ENGINEER**  
5/6/2019

DocuSigned by:  
*Frank F. Fleming*  
ABD478727EC484... P.E.

**ROADWAY DESIGN ENGINEER**  
5/6/2019

DocuSigned by:  
*Michael S. Burns, Jr.*  
D425C8CC008F437... P.E.



5/6/2019  
I:\Roadway\Proj\B4516\_RDY\_TSH.dgn  
USER:mrburns



**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
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1	GUARDRAIL INSTALLATION DETAIL
2C-2	STRUCTURE ANCHOR UNIT DETAIL
3B-1	ROADWAY SUMMARIES
3D-1	DRAINAGE SUMMARY
3G-1	GEO TECHNICAL SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
RW02C-1 THRU RW02C-3	SURVEY CONTROL SHEETS
TMP-1 THRU TMP-3	TRAFFIC MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION PLAN
U0-1 THRU U0-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-5	CROSS-SECTIONS
S-1 THRU S-22	STRUCTURE PLANS

EFF. 01-16-2018  
REV.

2018 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, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD. NO.	TITLE
<b>DIVISION 2 - EARTHWORK</b>	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Super-elevation - Two Lane Pavement
<b>DIVISION 3 - PIPE CULVERTS</b>	
300.01	Method of Pipe Installation
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.02	Bridge Approach Fills - Type II Modified Approach Fill
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	Method of Shoulder Construction - High Side of Super-elevated Curve - Method I
<b>DIVISION 8 - INCIDENTALS</b>	
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 for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

**GENERAL NOTES:**

2018 SPECIFICATIONS  
EFFECTIVE: 01-16-2018  
REVISED:

**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 - Telecommunications

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

12/2/2016

### BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EP
Computed Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Existing Endangered Animal Boundary	----- EAB
Existing Endangered Plant Boundary	----- EPB
Existing Historic Property Boundary	----- HPB
Known Contamination Area: Soil	☠-S-☠
Potential Contamination Area: Soil	☠-S-☠
Known Contamination Area: Water	☠-W-☠
Potential Contamination Area: Water	☠-W-☠
Contaminated Site: Known or Potential	☠?

### BUILDINGS AND OTHER CULTURE:

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

### HYDROLOGY:

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

### RAILROADS:

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

### RIGHT OF WAY & PROJECT CONTROL:

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

### ROADS AND RELATED FEATURES:

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

### VEGETATION:

Single Tree	○
Single Shrub	○

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

Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	----- Vineyard

### EXISTING STRUCTURES:

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

### UTILITIES:

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

### TELEPHONE:

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

### WATER:

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

### TV:

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

### GAS:

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


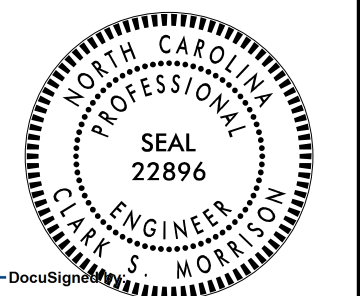

### SANITARY SEWER:

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

### MISCELLANEOUS:

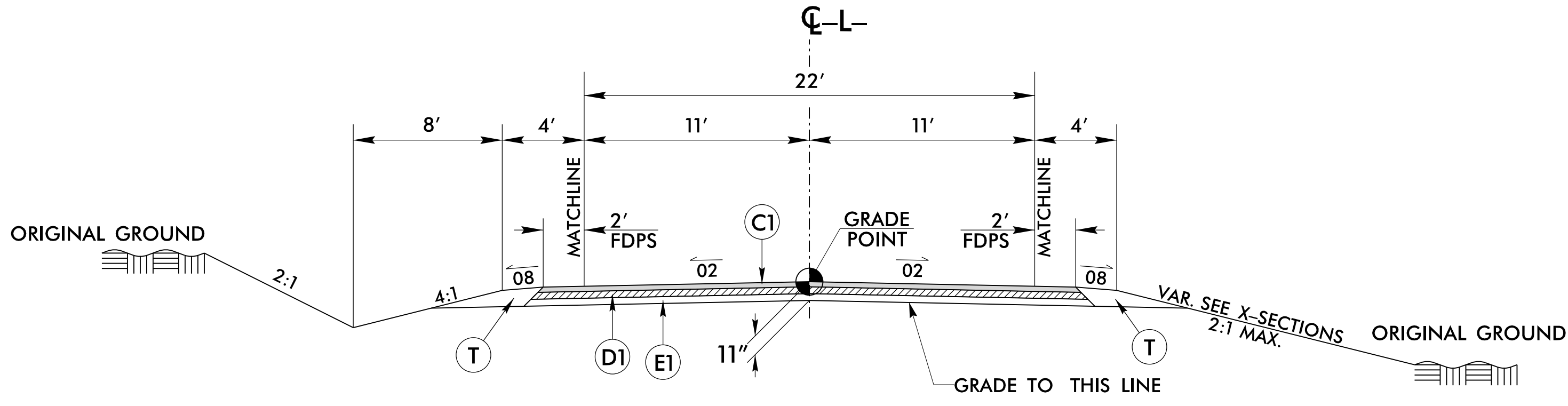
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line LOS B (S.U.E.*)	----- ?UTL
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	□ UST
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
U/G Test Hole LOS A (S.U.E.*)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

5/14/99

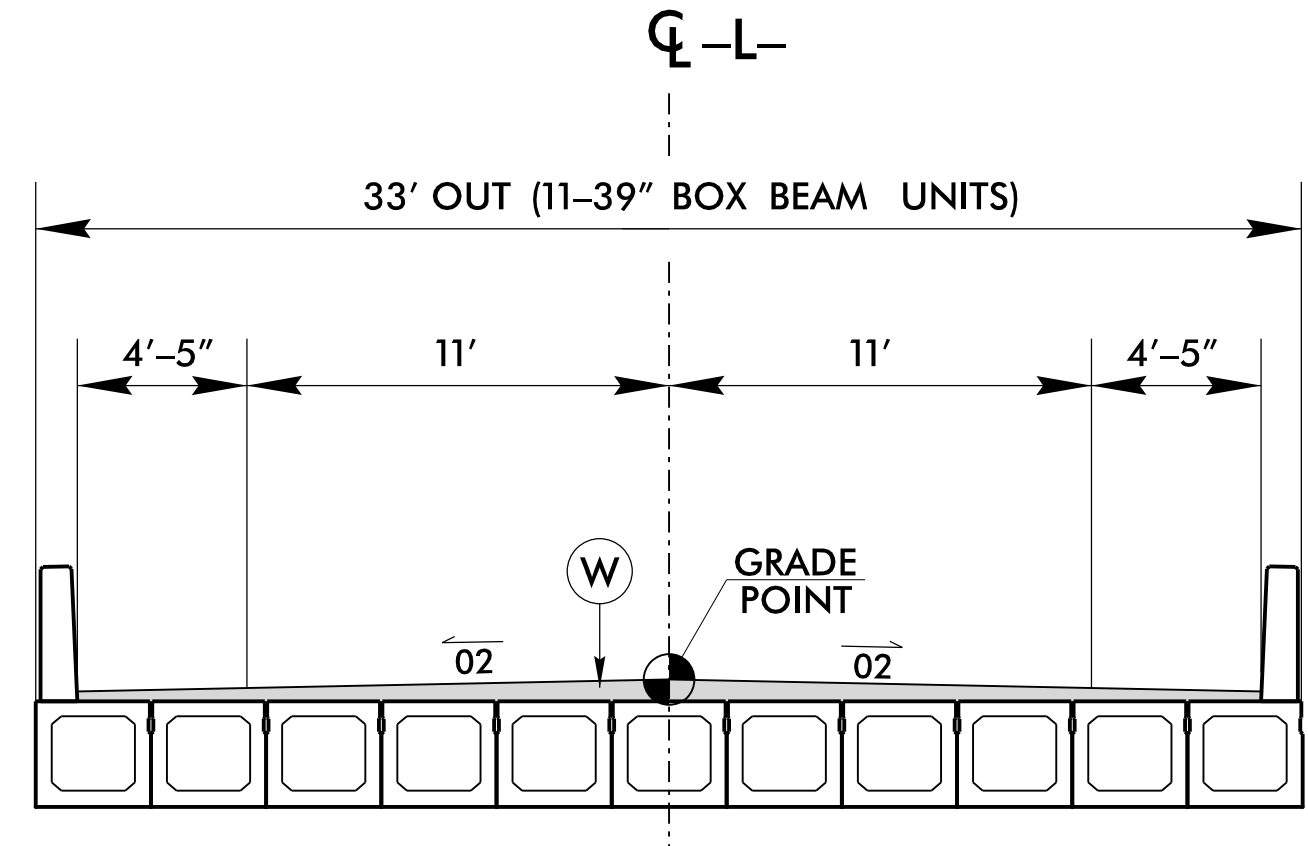
PROJECT REFERENCE NO. <b>B-4516</b>	SHEET NO. <b>2A-1</b>
ROADWAY DESIGN ENGINEER 4/24/2019 	PAVEMENT DESIGN ENGINEER 4/26/2019 
 <b>STEWART</b> 223 S. West St. Raleigh, NC 27603 P. 919.386.4799 www.stewartinc.com	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

PAVEMENT SCHEDULE <i>(FINAL PAVEMENT DESIGN)</i>	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH. ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
R1	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE THIS SHEET FOR WEDGING DETAIL).

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

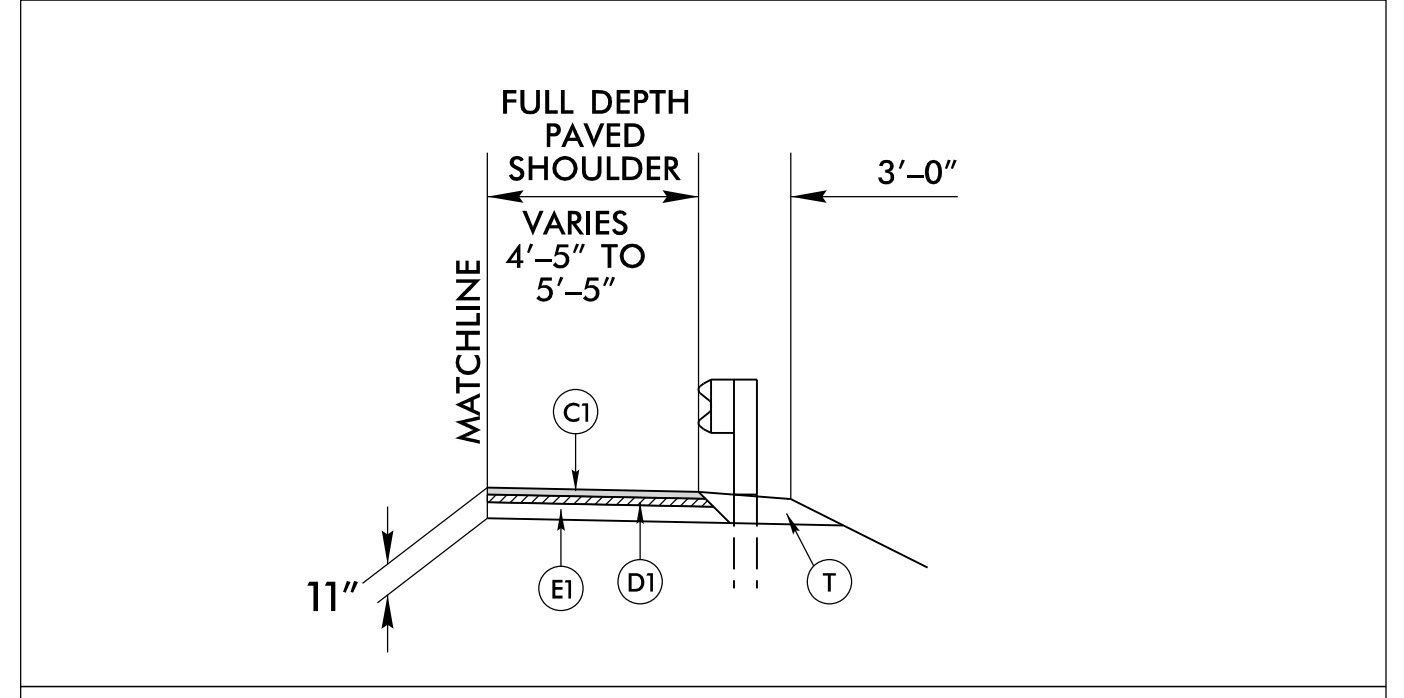


**TYPICAL SECTION NO. 1**  
 -L- STA. 11+00.00 TO -L- STA. 14+40.81 (BEGIN BRIDGE)  
 -L- STA. 15+93.19 (END BRIDGE) TO -L- STA. 20+50.00

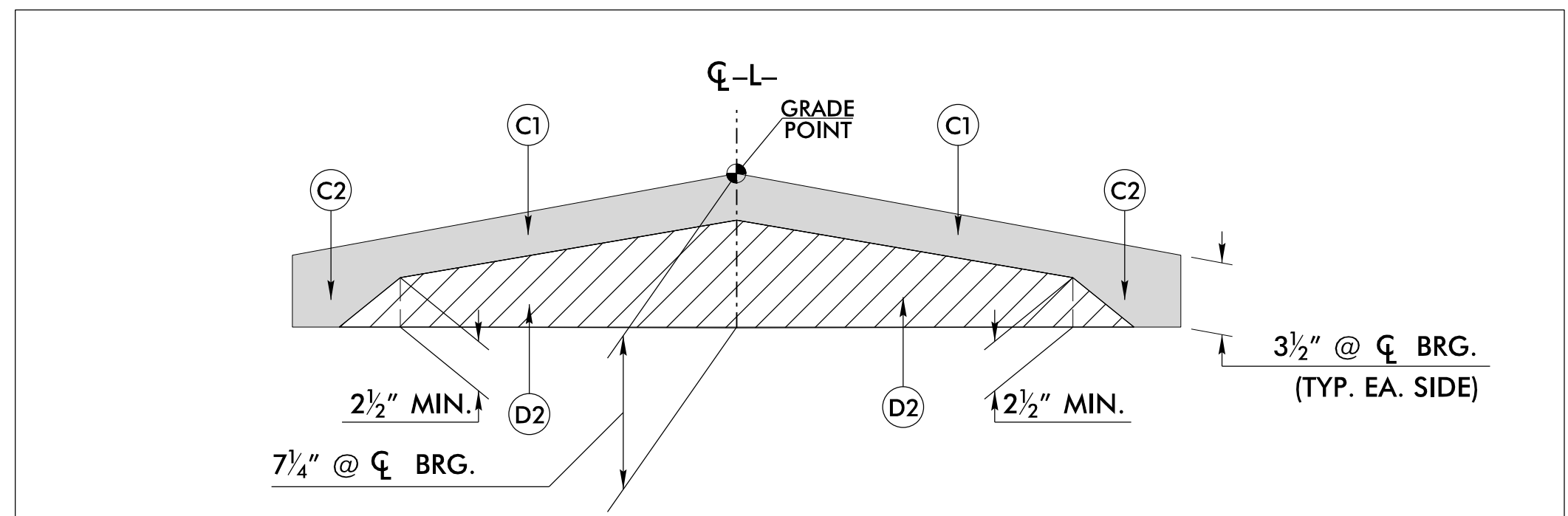


**TYPICAL SECTION NO. 2**  
 -L- STA. 14+40.81 TO -L- STA. 15+93.19

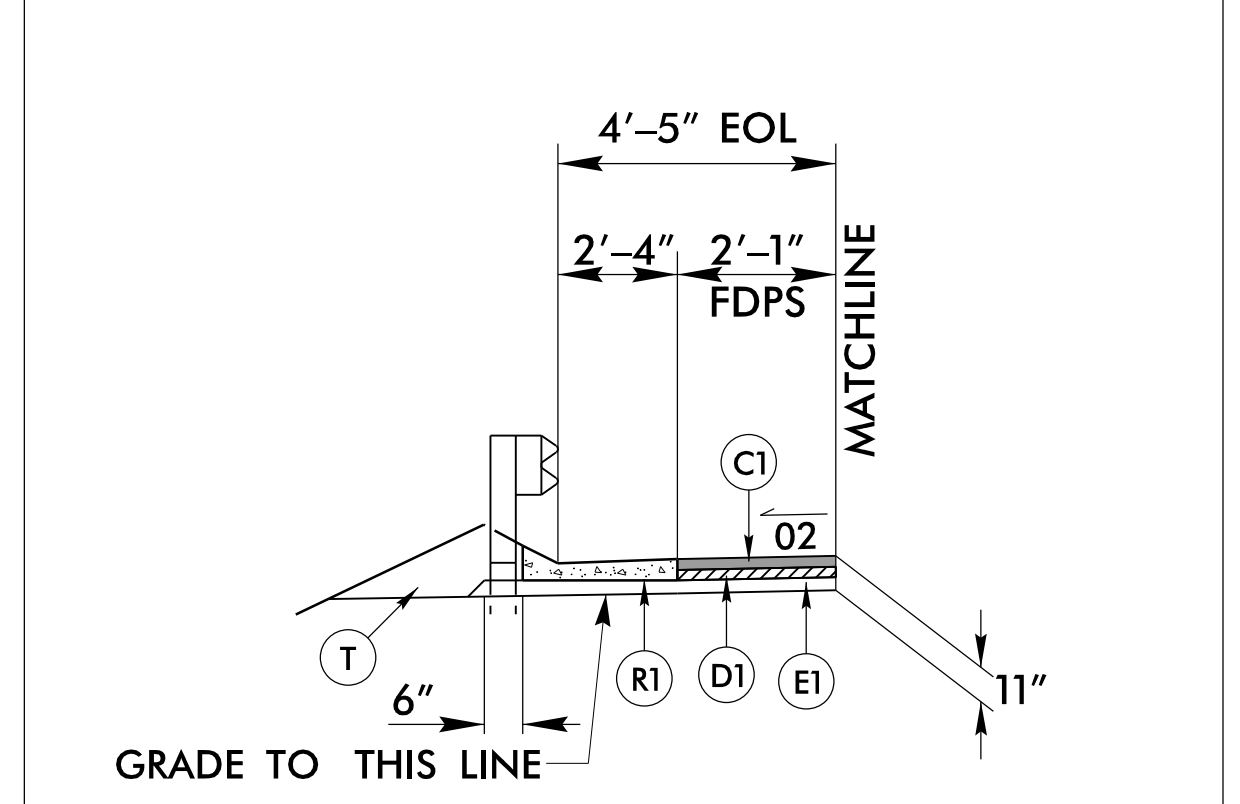
NOTE:  
SEE STRUCTURE PLANS FOR PAVEMENT DEPTHS ON STRUCTURE



**DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL**



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



**DETAIL SHOWING GUARDRAIL WITH SHOULDER BERM GUTTER**

USE SHOULDER BERM GUTTER AT THE FOLLOWING LOCATIONS:  
 -L- STA. 16+04.07 (END APPROACH SLAB) TO -L- STA. 16+18.00 (LEFT)  
 -L- STA. 16+04.07 (END APPROACH SLAB) TO -L- STA. 16+18.00 (RIGHT)

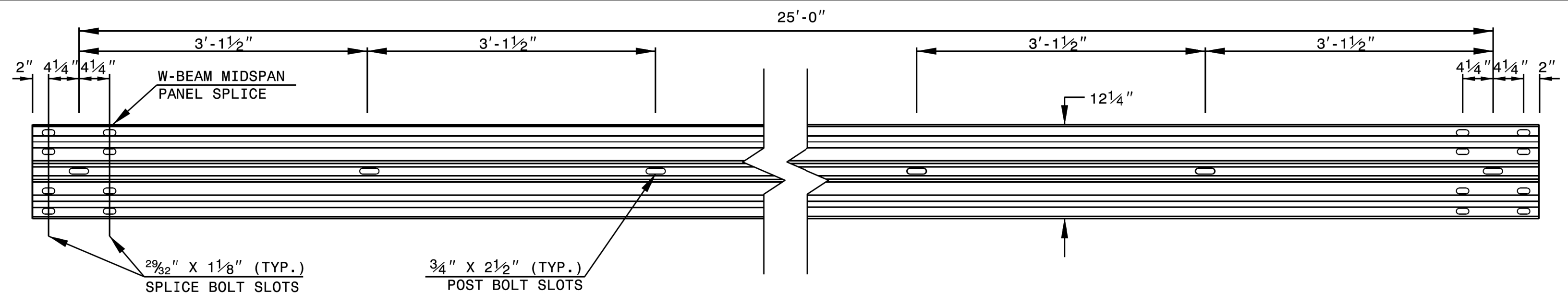
REVISIONS

2/28/2018  
 C:\Users\jpr\OneDrive\Documents\B4516.RDY\_TYP.dgn  
 JPR

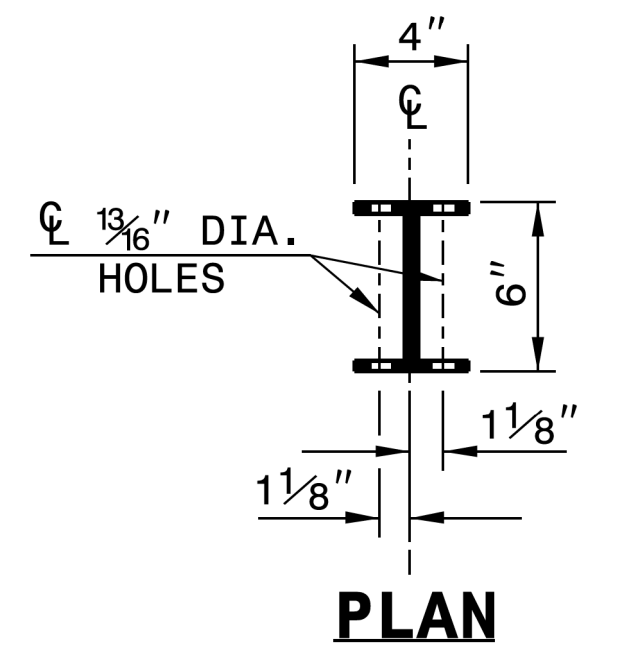
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

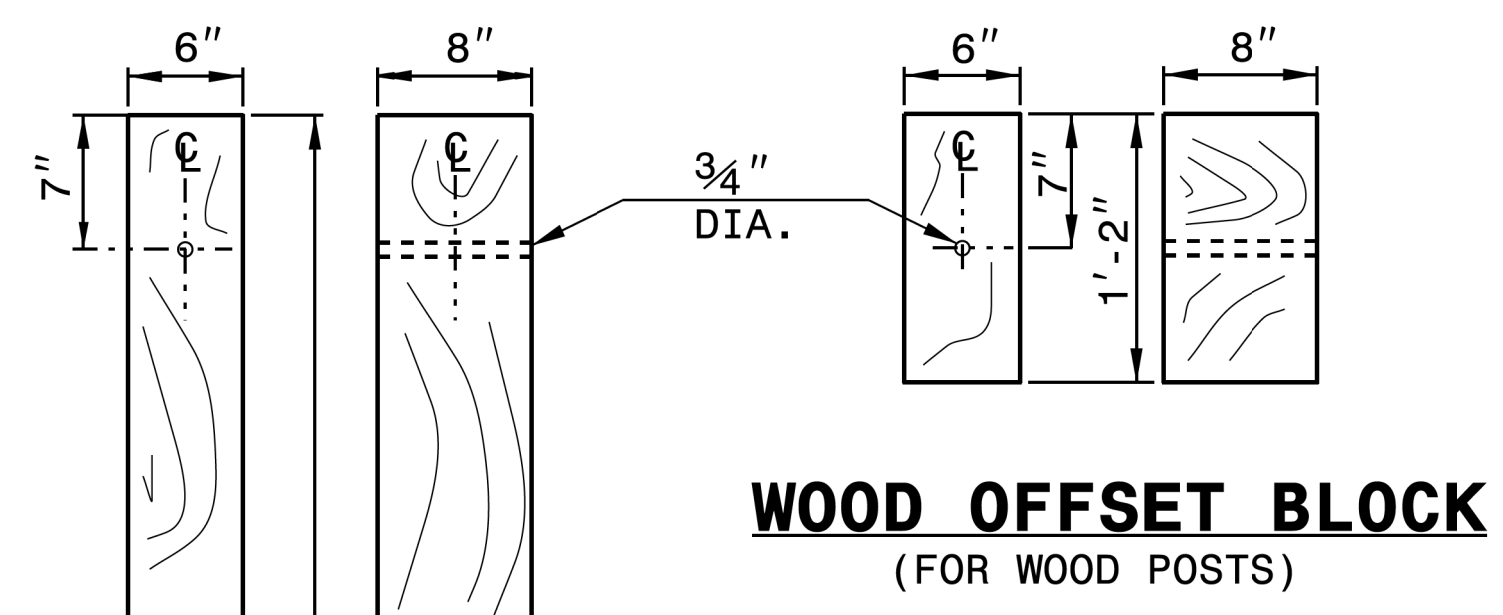
SHEET 6 OF 8  
**862D02**



**STANDARD W-BEAM GUARDRAIL**



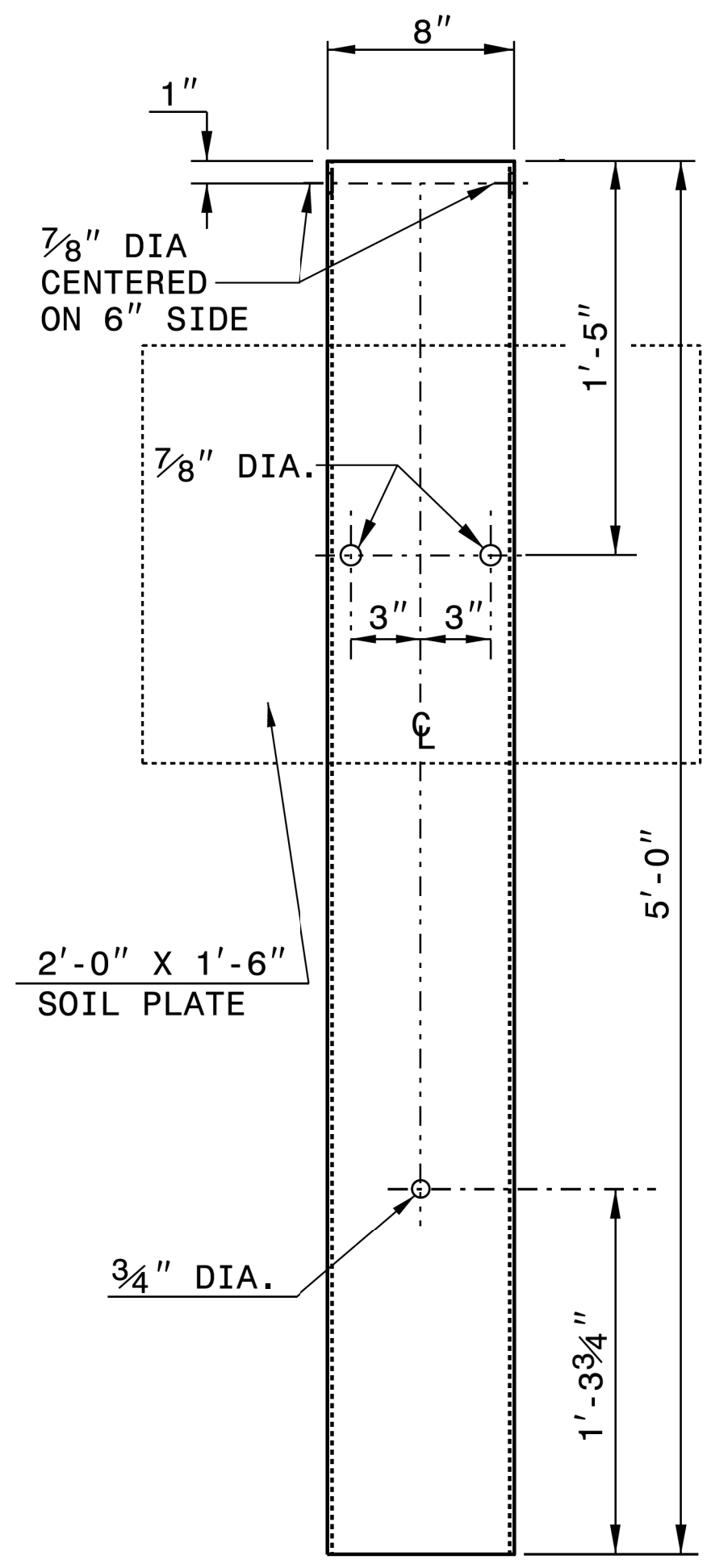
**PLAN**



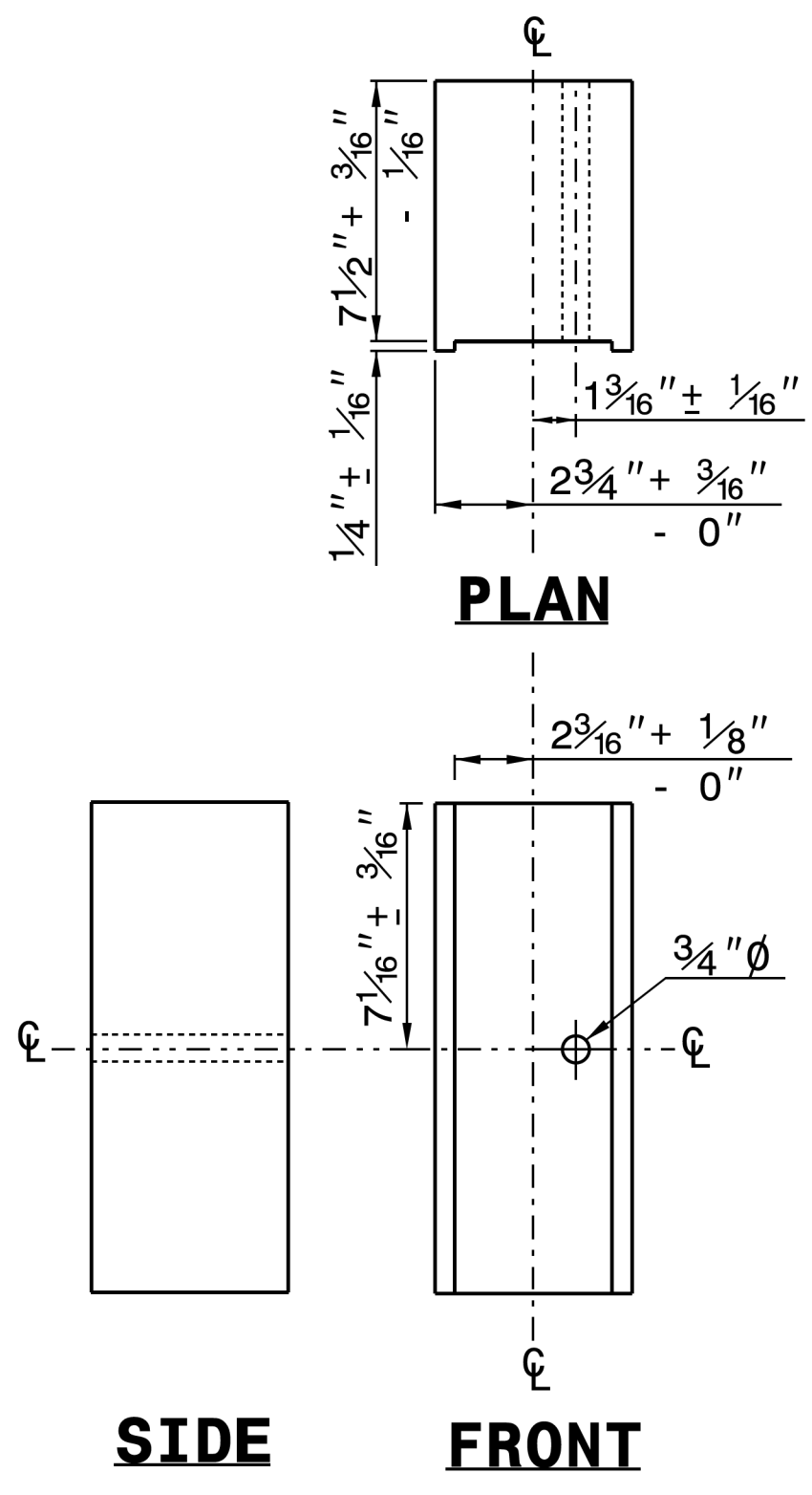
**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

**STANDARD  
LINE POST**

**SHORT WOOD  
BREAKAWAY POST**



**STEEL TUBE  
TS 6"X8"X0.1875"**

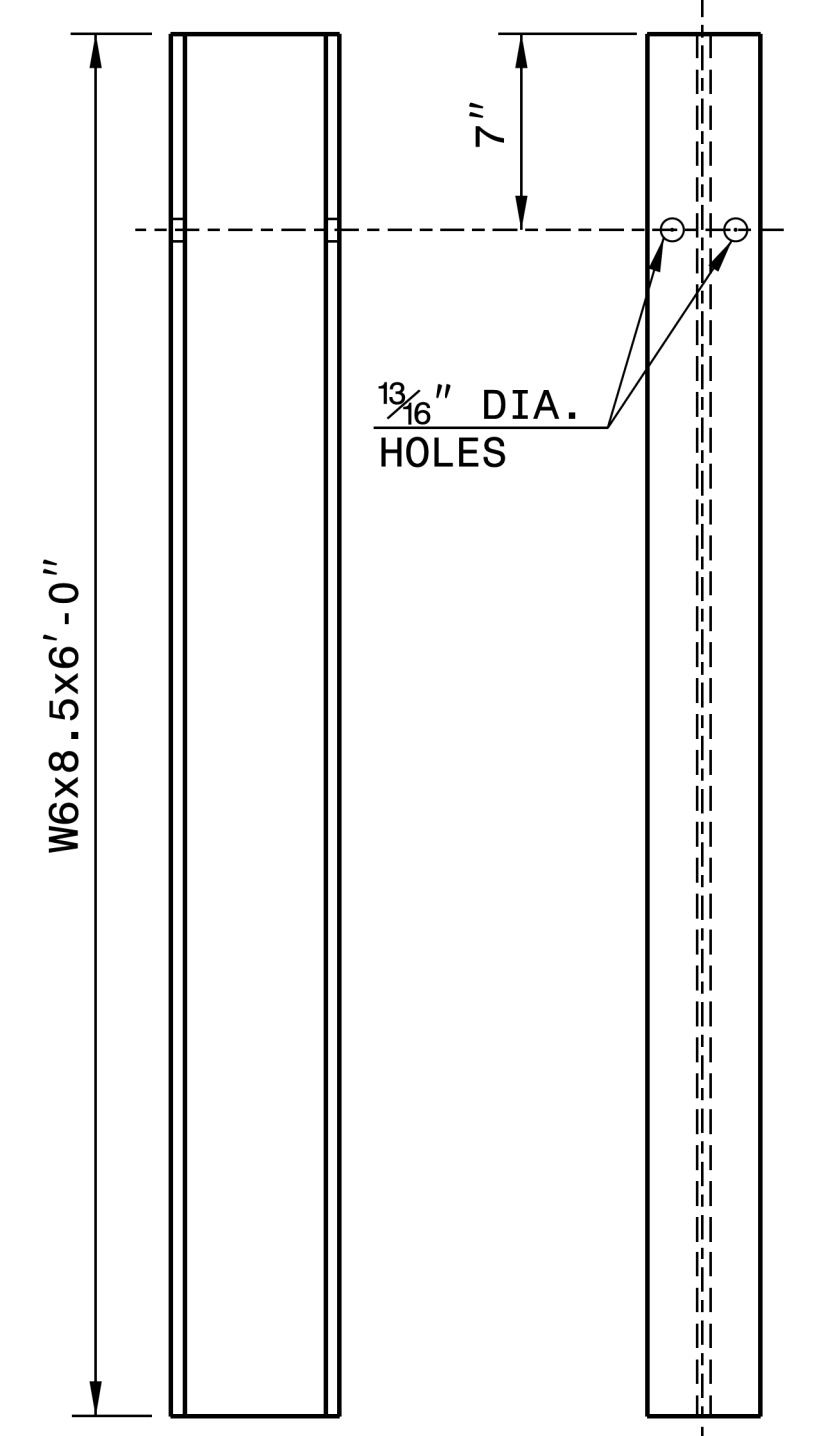


**PLAN**

**SIDE**

**FRONT**

**ROUTED  
OFFSET BLOCK**



**SIDE**

**FRONT**

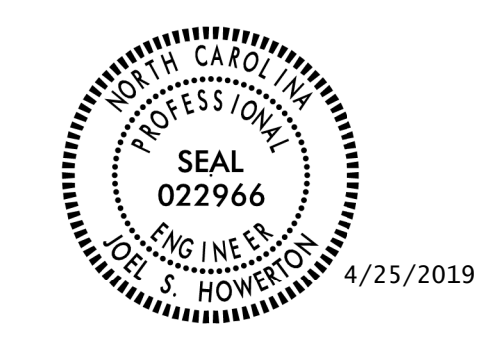
**"W6" STEEL POST**

**SYSTEM PARTS**

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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**



DocuSigned by:  
Joel S. Howerton  
873F3D17DCD045F

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

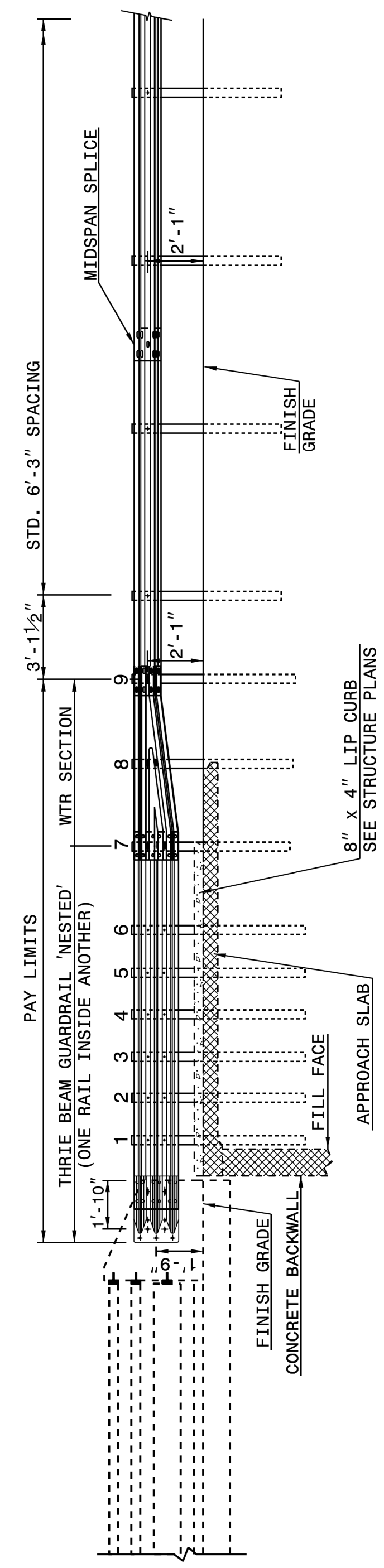
**SEE TITLE BLOCK**

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

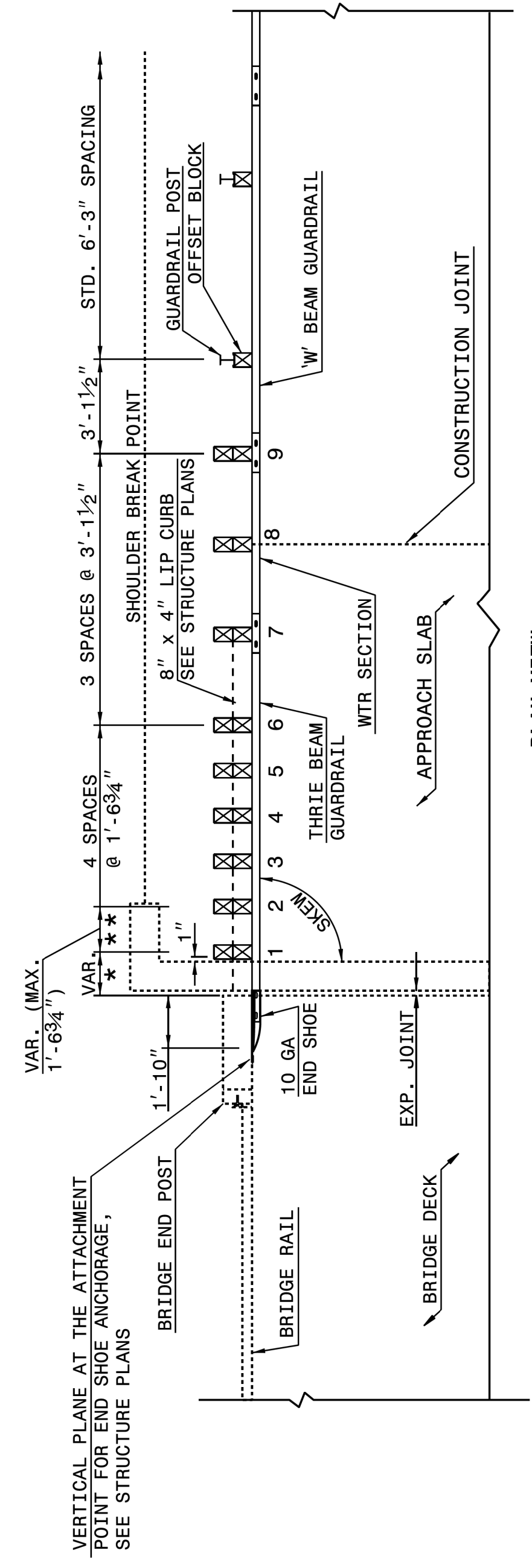
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

SHEET 1 OF 7  
**862D03**



**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 3 FOR POST SECTIONS 1 THRU 9.



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

SHEET 1 OF 7  
**862D03**

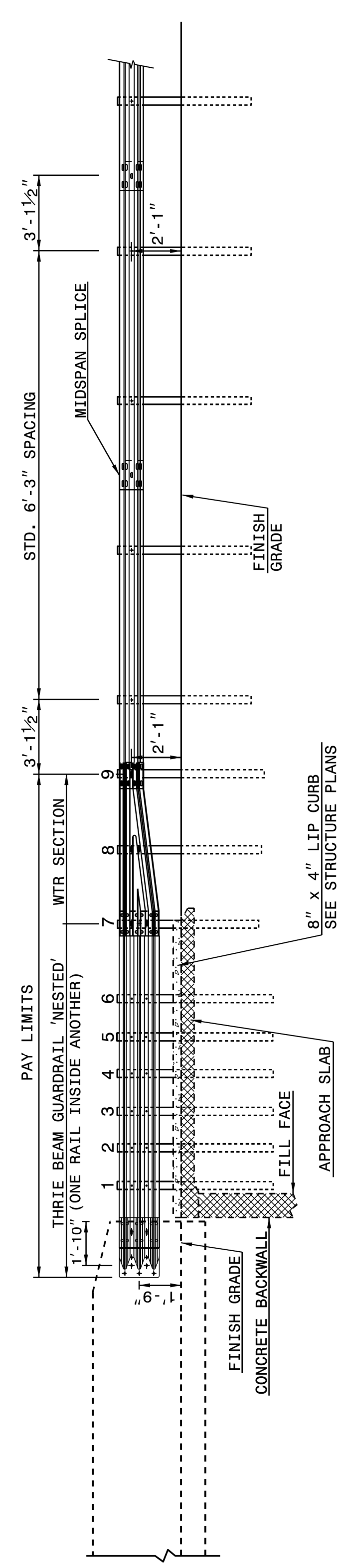
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

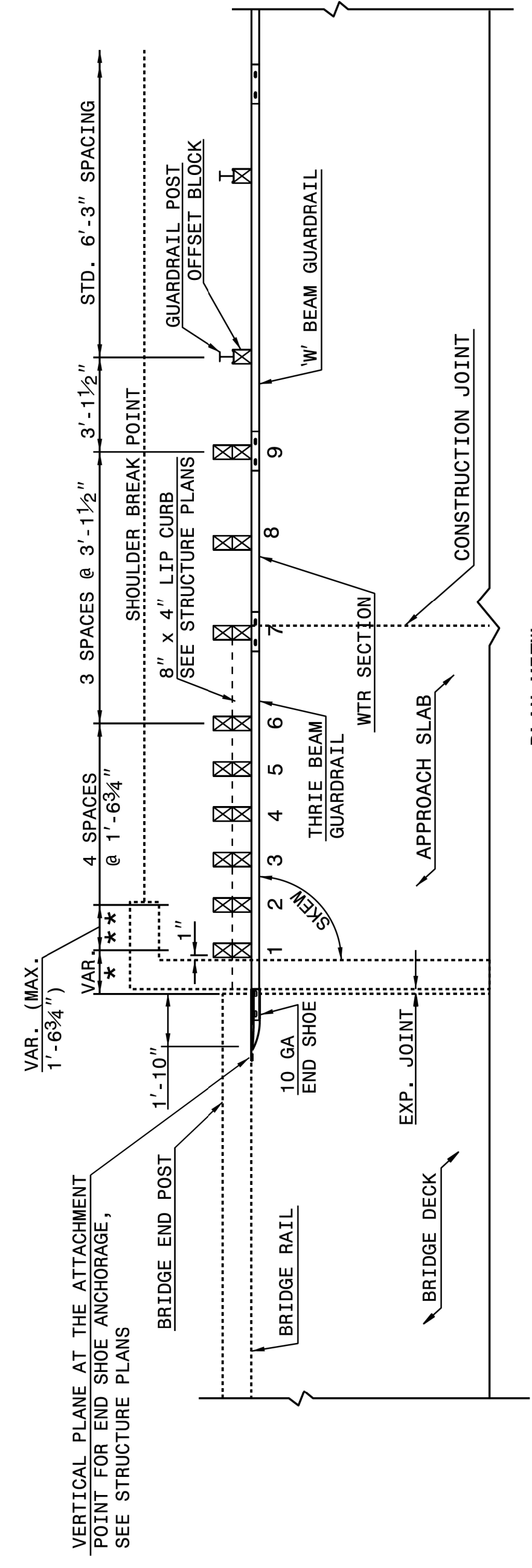
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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**



**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 3 FOR POST SECTIONS 1 THRU 9.



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

SHEET 2 OF 7  
**862D03**

STATE OF  
NORTH CAROLINA  
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RALEIGH, N.C.

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

I4-DEC-2017 10:36 S:\Contracts\Special Details\Standard Drawings\Details in Lieu of Standards\Division 8\0862d0301.dgn Jhowerton AT CSU-292895

4/25/2019



DocuSigned by:  
Joel S. Howerton  
873F3D17DCDC45F

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UNLESS ALL SIGNATURES COMPLETED

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

**SEE TITLE BLOCK**

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







8/17/99

REVISIONS

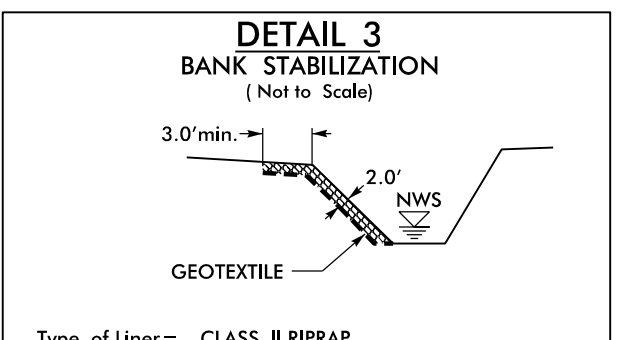
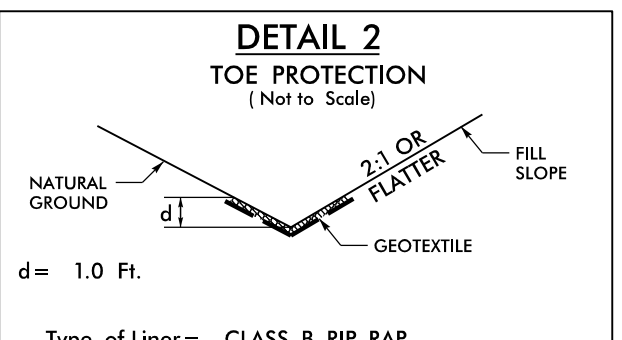
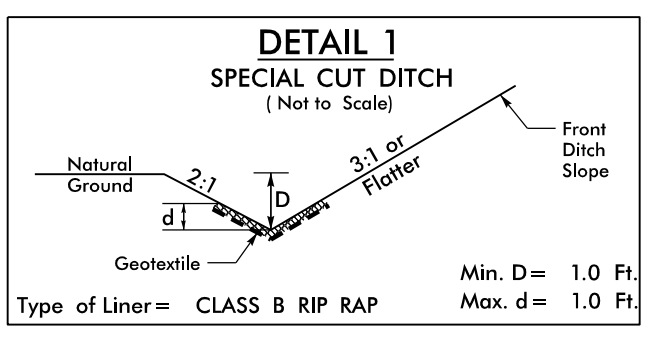
**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
			CONTINGENCY	ASU	100	200	300		
				<b>TOTAL CY/TONS/SY:</b>	100	200	300*		

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

PROJECT REFERENCE NO. B-4516	SHEET NO. 4
ROADWAY DESIGN ENGINEER MICHAEL S. BURNS, JR. SEAL 045230 4/24/2019	HYDRAULICS ENGINEER FRANK F. FLEMING SEAL 20147 4/24/2019
DocuSigned by: Michael S. Burns, Jr.	DocuSigned by: Frank F. Fleming
STEWART	vhb VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

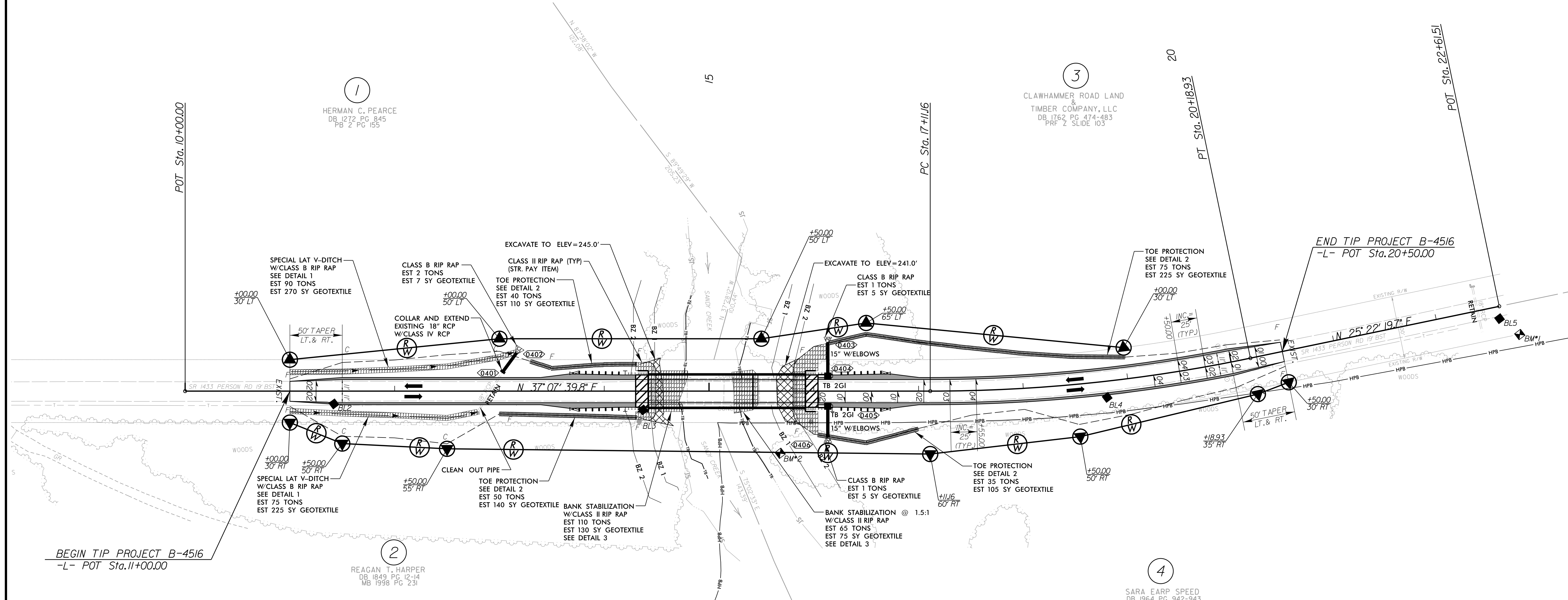
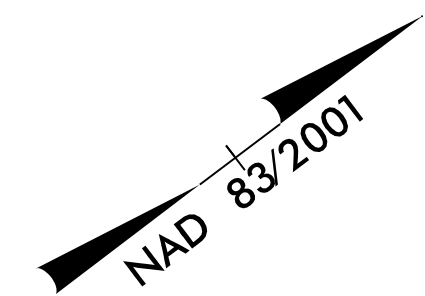
-L-  
 PI Sta 18+65.59  
 $\Delta = 17^{\circ}45'20.1''$  (LT)  
 $D = 3^{\circ}49'11.0''$   
 $L = 307.76'$   
 $R = 1,500.00'$   
 $S_e = 4\%$   
 Runoff = 100'



FROM STA. 11+00 TO STA. 13+15 -L- LT.  
 FROM STA. 11+00 TO STA. 12+78 -L- RT.

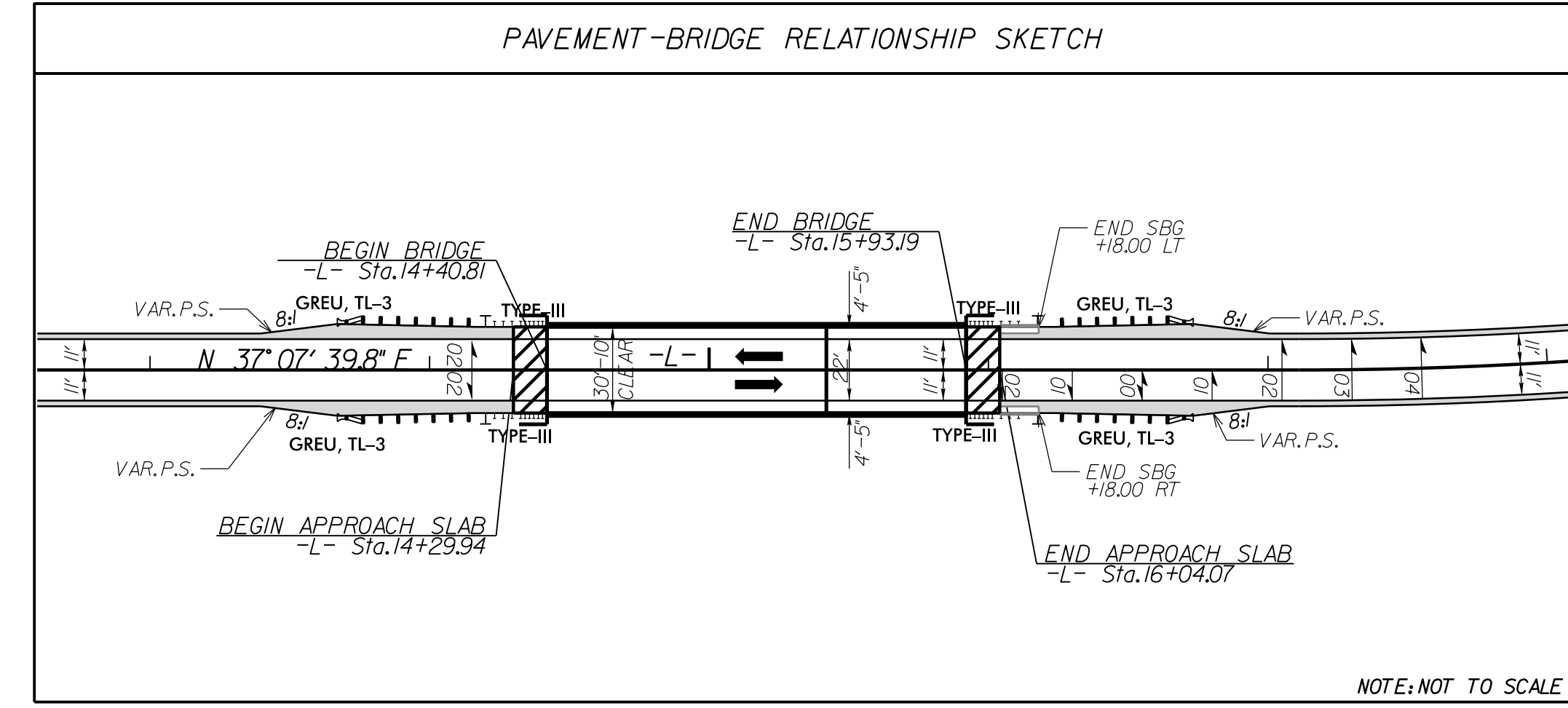
FROM STA. 13+29 TO STA. 14+30 -L- LT.  
 FROM STA. 13+00 TO STA. 14+30 -L- RT.  
 FROM STA. 16+04 TO STA. 17+00 -L- RT.  
 FROM STA. 16+12 TO STA. 19+00 -L- LT.

FROM STA. 14+49 TO STA. 14+80 -L- LT.  
 FROM STA. 15+22 TO STA. 15+41 -L- LT.



BEGIN TIP PROJECT B-4516  
 -L- POT Sta. 11+00.00

END TIP PROJECT B-4516  
 -L- POT Sta. 20+50.00



The contractor will provide at least three weeks notification to the Resident Engineer and Division Environmental Officer concerning start of work at the bridge to allow the Department to contact the North Carolina Wildlife Resource Commission (NCWRC). NCWRC staff may move aquatic species out of the work area prior to construction activity

FOR -L- PROFILE, SEE SHEET 5

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-22

REVISIONS

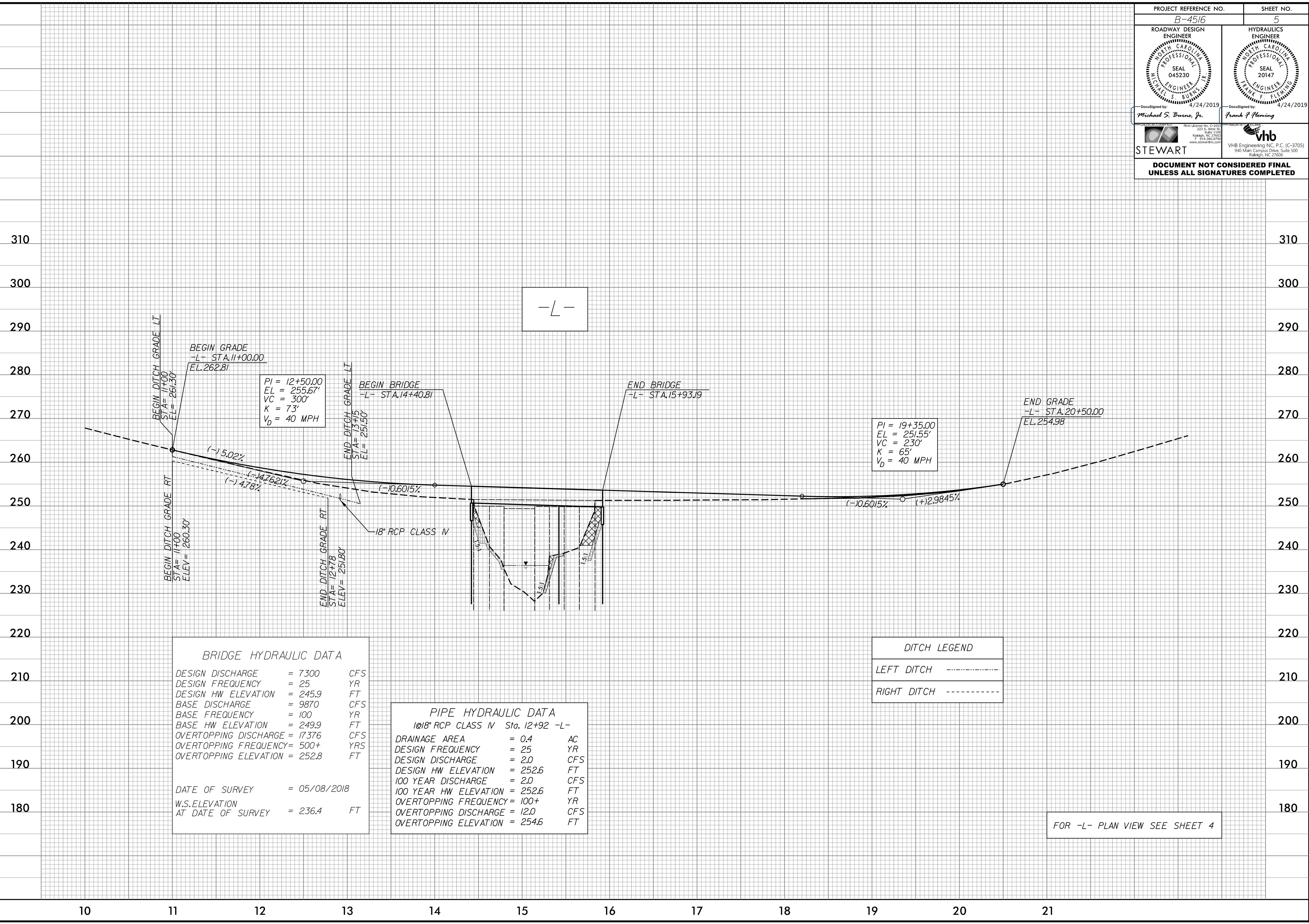
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 8/17/99  
 I:SEB/burns

5/28/99

REVISIONS

PROJECT REFERENCE NO. <b>B-4516</b>	SHEET NO. <b>5</b>
ROADWAY DESIGN ENGINEER MICHAEL S. BURNS SEAL 045230 NORTH CAROLINA PROFESSIONAL ENGINEERS	HYDRAULICS ENGINEER FRANK F. FLEMING SEAL 20147 NORTH CAROLINA PROFESSIONAL ENGINEERS
DocuSigned by: <b>Michael S. Burns, Jr.</b> 4/24/2019	DocuSigned by: <b>Frank F. Fleming</b> 4/24/2019
STEWART 223 S. West St. Raleigh, NC 27603 www.stewartinc.com	vhb VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606

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



PI = 12+50.00  
EL = 255.67'  
VC = 300'  
K = 73'  
V<sub>D</sub> = 40 MPH

PI = 19+35.00  
EL = 251.55'  
VC = 230'  
K = 65'  
V<sub>D</sub> = 40 MPH

BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 7300	CFS
DESIGN FREQUENCY	= 25	YR
DESIGN HW ELEVATION	= 245.9	FT
BASE DISCHARGE	= 9870	CFS
BASE FREQUENCY	= 100	YR
BASE HW ELEVATION	= 249.9	FT
OVERTOPPING DISCHARGE	= 17376	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 252.8	FT
DATE OF SURVEY = 05/08/2018		
W.S.ELEVATION AT DATE OF SURVEY = 236.4 FT		

PIPE HYDRAULIC DATA		
18" RCP CLASS IV Sta. 12+92 -L-		
DRAINAGE AREA	= 0.4	AC
DESIGN FREQUENCY	= 25	YR
DESIGN DISCHARGE	= 2.0	CFS
DESIGN HW ELEVATION	= 252.6	FT
100 YEAR DISCHARGE	= 2.0	CFS
100 YEAR HW ELEVATION	= 252.6	FT
OVERTOPPING FREQUENCY	= 100+	YR
OVERTOPPING DISCHARGE	= 12.0	CFS
OVERTOPPING ELEVATION	= 254.6	FT

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

FOR -L- PLAN VIEW SEE SHEET 4

3/7/2019 8:45:16 AM RDY\_PFL05.dgn  
MS:MBURNS