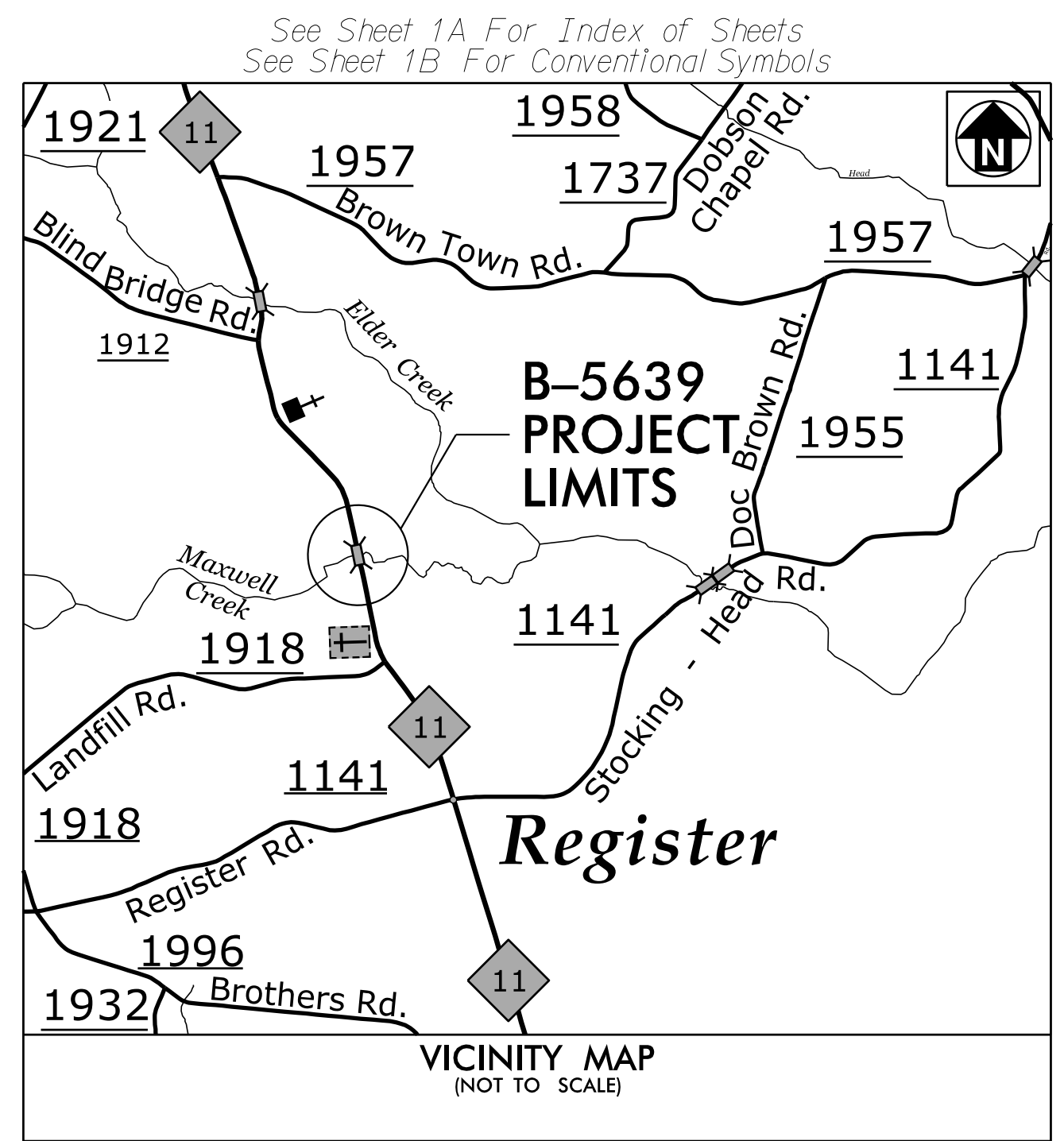


09/28/2019

**PROJECT: B-5639**

**CONTRACT: C204535**



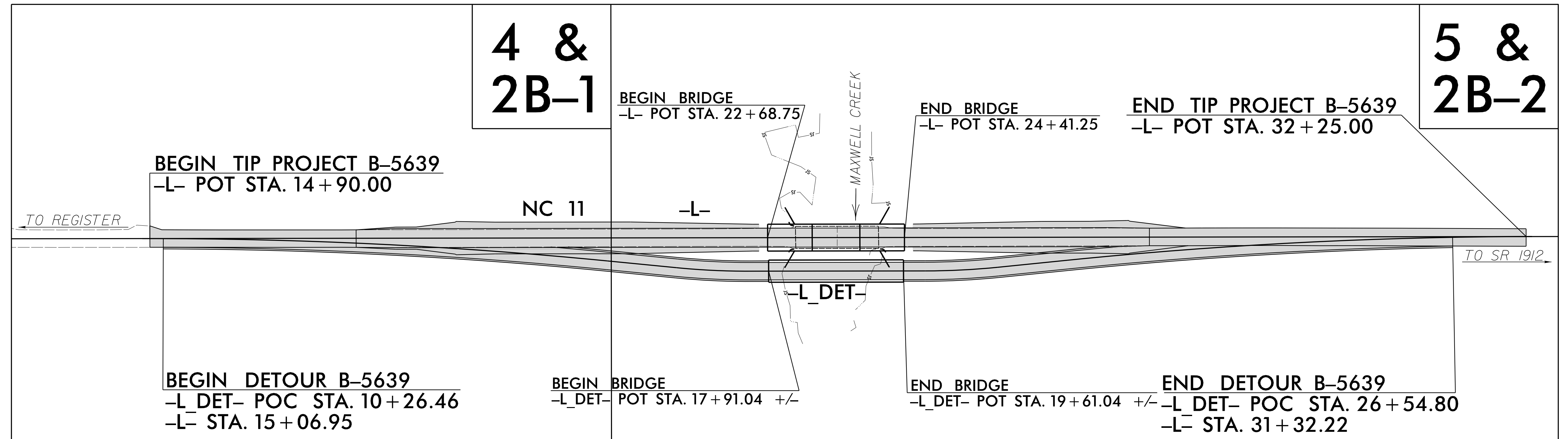
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# DUPLIN COUNTY

**LOCATION: BRIDGE NO. 36 OVER MAXWELL CREEK  
ON NC 11 (CLODFELTER ROAD)**

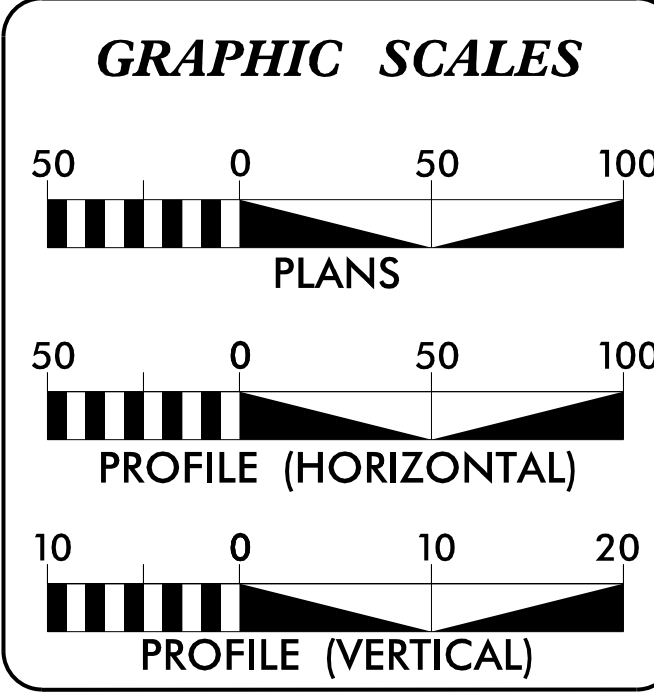
**TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	<b>B-5639</b>	<b>1</b>	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45594.1.1		P.E.	
45594.2.1		RW & UTL	
45594.3.1		CONST	



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

**SIMPSON & ASSOCIATES**  
5640 Dilford Drive  
Suite 200  
Cary, NC 27518  
(919) 852-0468  
(919) 852-0598 (Fax)  
www.simpsonengr.com  
**LICENSE NO. C-2521**



**DESIGN DATA**

ADT 2020 = 2,617  
ADT 2040 = 3,200

K = 9 %  
D = 55 %  
T = 5 %\*  
V = 60 MPH

\* TTST = 2% DUAL 3%

SUB-REGIONAL TIER  
MAJOR COLLECTOR

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-5639 = 0.296 MILES

LENGTH STRUCTURE TIP PROJECT B-5639 = 0.033 MILES

TOTAL LENGTH TIP PROJECT B-5639 = 0.329 MILES

PLANS PREPARED FOR NCDOT BY:

**M M**  
MOTT  
MACDONALD  
2018 STANDARD SPECIFICATIONS

PO Box 700  
Fuquay-Varina, NC 27526  
(919) 552-2253  
(919) 552-2254 (Fax)  
www.mottmac.com/americas  
LICENSE NO. F-0669

**RIGHT OF WAY DATE:**  
NOVEMBER 27, 2019

**LETTING DATE:**  
FEBRUARY 16, 2021

**SUNGATE DESIGN GROUP, P.A.**  
905 JONES FRANKLIN ROAD  
RALEIGH, NORTH CAROLINA 27608  
TEL (919) 859-2243  
ENG FIRM LICENSE NO. C-890

**MICHAEL PEKAREK, PE**  
PROJECT ENGINEER

**JOSH DALTON, PE**  
HYDRAULIC ENGINEER

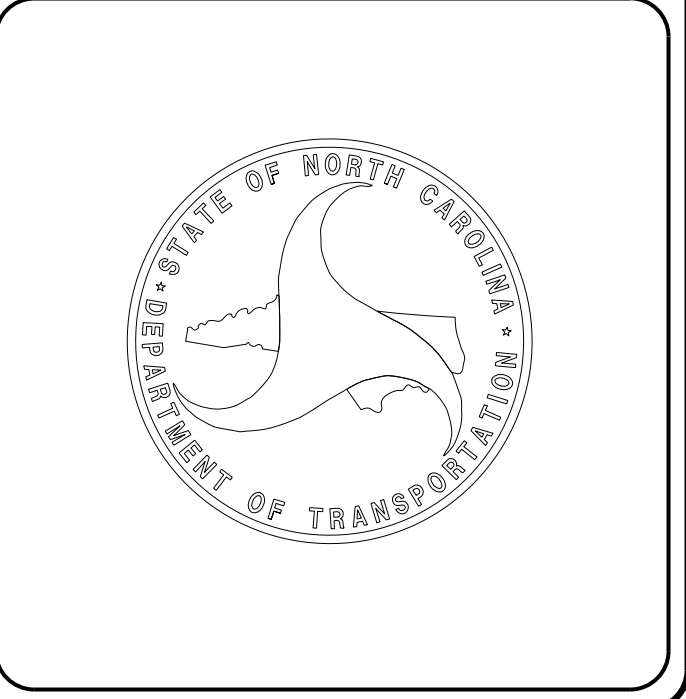
**DAVID STUTTS, PE**  
NCDOT BRIDGE PROGRAM MANAGER

**HYDRAULICS ENGINEER**

DocuSigned by:  
**Joshua G Dalton**  
SIGNATURE: P.E. 1/5/2021

**ROADWAY DESIGN ENGINEER**

DocuSigned by:  
**Michael Pekarek**  
SIGNATURE: P.E. 1/5/2021



4:56:06 PM  
R:\Roadway\Proj\B5639\_rdy\_tsh.dgn  
PEK56854

PROJECT REFERENCE NO. <i>B-5639</i>	SHEET NO. <i>1A</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	
Prepared in the Office of:	
<p><b>SUNGATE DESIGN GROUP, P.A.</b>                  905 JONES FRANKLIN ROAD                  RALEIGH, NORTH CAROLINA 27608                  TEL: (919) 858-2241                  ENG FIRM LICENSE NO. C-890</p>	

### GENERAL NOTES

**GENERAL NOTES:** 2018 SPECIFICATIONS  
EFFECTIVE: 01-16-18

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

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

**CLEARING:**

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY MODIFIED METHOD III. (SEE DETAIL 2C-3)

**SUPERELEVATION:**

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

**SHOULDER CONSTRUCTION:**

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

**SUBSURFACE DRAINS:**

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

**GUARDRAIL:**

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

**TEMPORARY SHORING:**

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

**END BENTS:**

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

**UTILITIES:**

UTILITY OWNERS ON THIS PROJECT ARE CENTURYLINK, FOUR COUNTY EMC, DUPLIN COUNTY UTILITY SERVICE, AND AT&T. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

**RIGHT-OF-WAY MARKERS:**

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

### LIST OF ROADWAY STANDARD DRAWINGS

EFF. 01-16-2018

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>	
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
275.01	Rock Plating
<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 Superelevated Curve - Method I
<b>DIVISION 8 - INCIDENTALS</b>	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

### INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-2	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1 THRU 2B-3	DETOUR PLAN AND PROFILE SHEETS
2C-1	GUARDRAIL INSTALLATION DETAIL
2C-2	GUARDRAIL ANCHOR UNITS DETAIL
2C-3	TYPE III MODIFIED ANCHOR UNITS DETAIL
2C-4	METHOD OF CLEARING DETAIL
2C-5	MODIFIED CONCRETE FLUME DETAIL
2G-1 THRU 2G-2	GEOTECHNICAL DETAILS
3B-1	GUARDRAIL, TEMPORARY GUARDRAIL, PAVEMENT REMOVAL, EARTHWORK, AND SHOULDER BERM GUTTER SUMMARY
3D-1	DRAINAGE SUMMARY
3G-1	GEOTECHNICAL SUMMARY
3P-1	PARCEL INDEX SHEET
4 THRU 6	PLAN AND PROFILE SHEETS
RW01 THRU RW05	SURVEY CONTROL SHEETS
TMP-1 THRU TMP-9	TRAFFIC MANAGEMENT PLANS
EC-1 THRU EC-11	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
UC-1 THRU UC-6	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-3	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-8	CROSS-SECTIONS
S-1 THRU S-25	STRUCTURE PLANS
SN	STRUCTURE NOTES



12/2/2016

# 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	○ EIP
Computed Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	---WLB---
Proposed Wetland Boundary	WLB
Existing Endangered Animal Boundary	---EAB---
Existing Endangered Plant Boundary	---EPB---
Existing Historic Property Boundary	---HPB---
Known Contamination Area: Soil	☠-s-☠
Potential Contamination Area: Soil	☠-s-☠
Known Contamination Area: Water	☠-w-☠
Potential Contamination Area: Water	☠-w-☠
Contaminated Site: Known or Potential	☠?

## BUILDINGS AND OTHER CULTURE:

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

## HYDROLOGY:

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

## RAILROADS:

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

## RIGHT OF WAY & PROJECT CONTROL:

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

## ROADS AND RELATED FEATURES:

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

## VEGETATION:

Single Tree	☀
Single Shrub	☁

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

Hedge	-----
Woods Line	-----
Orchard	☀ ☀ ☀ ☀
Vineyard	□ Vineyard

## EXISTING STRUCTURES:

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

## UTILITIES:

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

## TELEPHONE:

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

## WATER:

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

## TV:

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

## GAS:

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

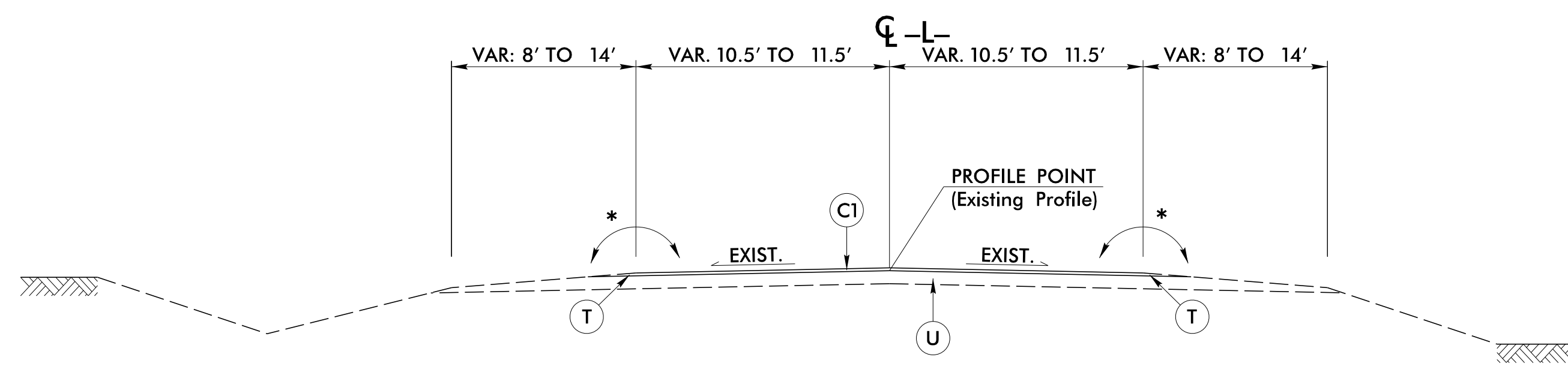
## SANITARY SEWER:

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

## MISCELLANEOUS:

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

6/2/2019

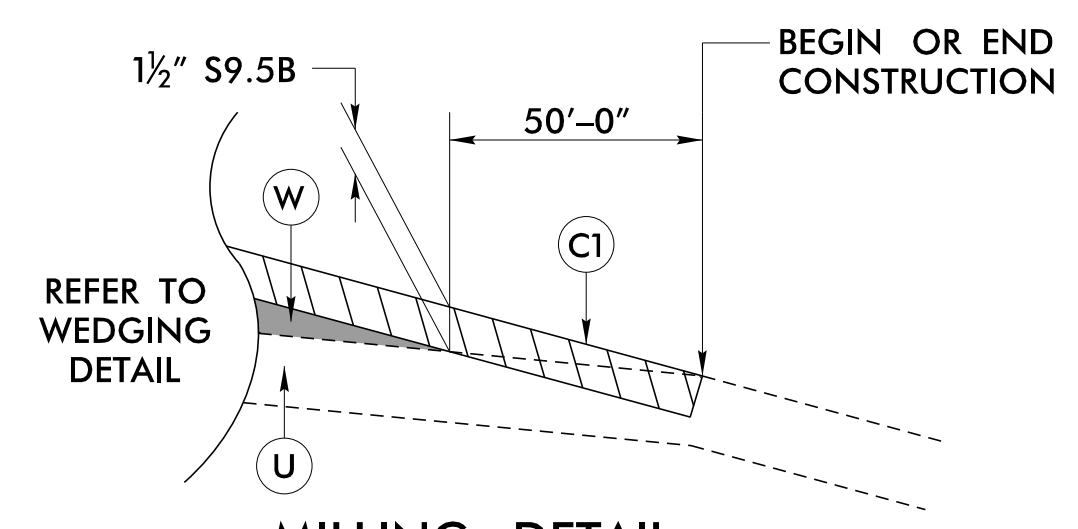


**TYPICAL SECTION NO. 1**

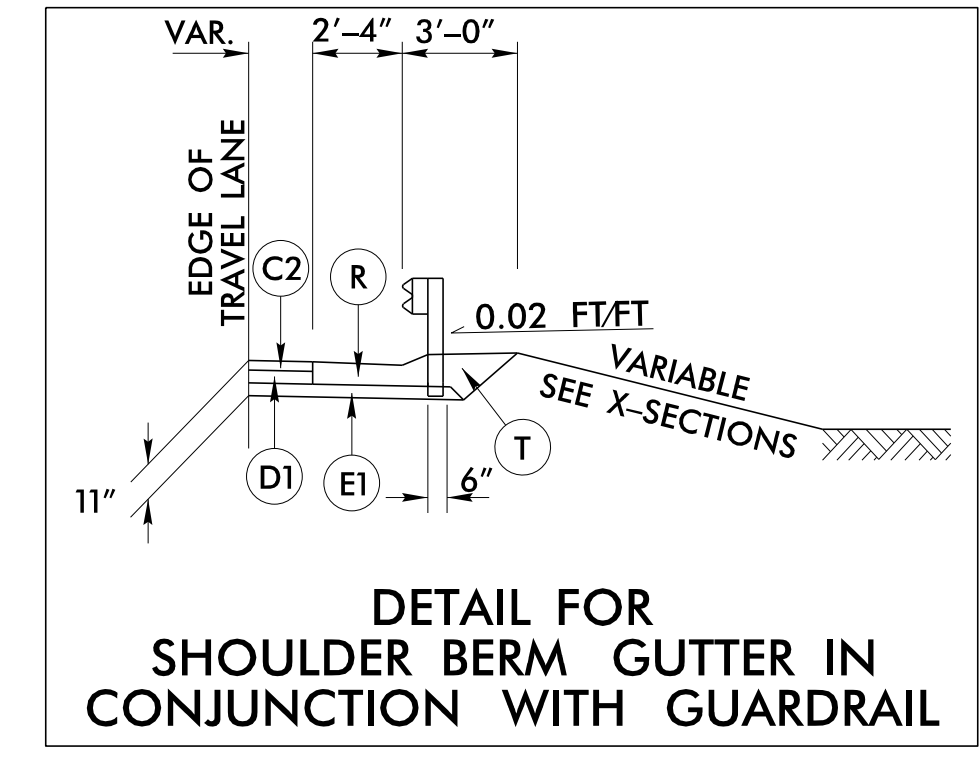
**USE TYPICAL SECTION NO. 1:**

- L- STA 14+90.00 TO 18+00.00
- L- STA 27+00.00 TO 32+25.00

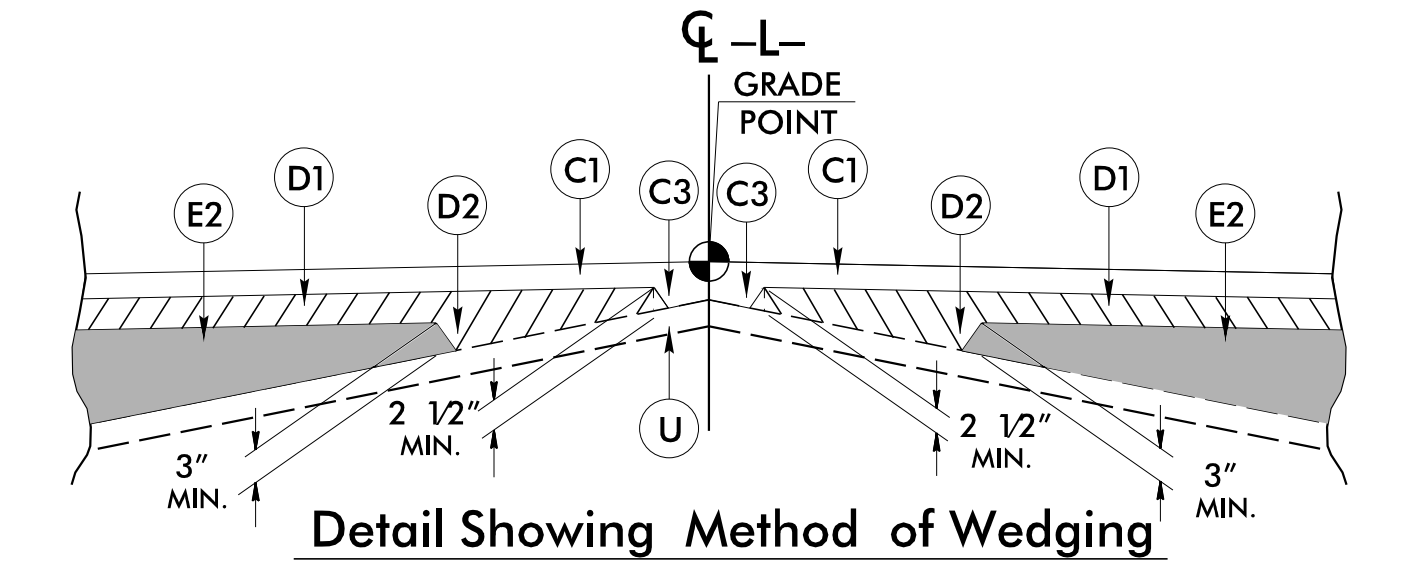
\* NOTE: MAX. 6% ROLLOVER FROM PAVEMENT CROSS SLOPE TO SHOULDER CROSS SLOPE



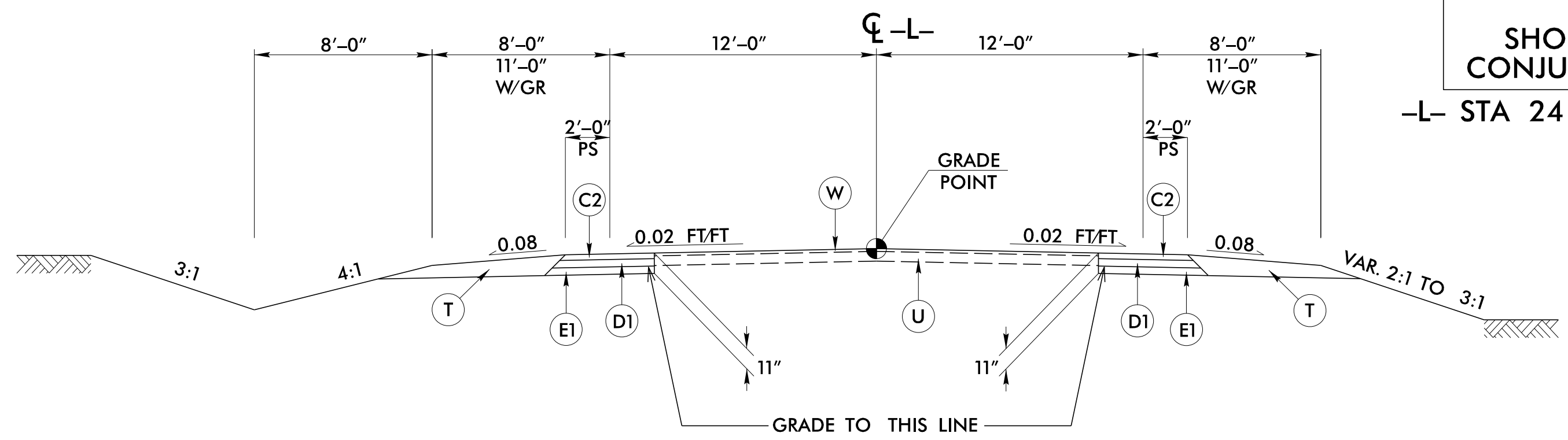
**MILLING DETAIL  
DETAIL SHOWING PROFILE VIEW**



**DETAIL FOR SHOULDER BERM GUTTER IN CONJUNCTION WITH GUARDRAIL**  
-L- STA 24+52.13 TO 24+65.50 LT & RT



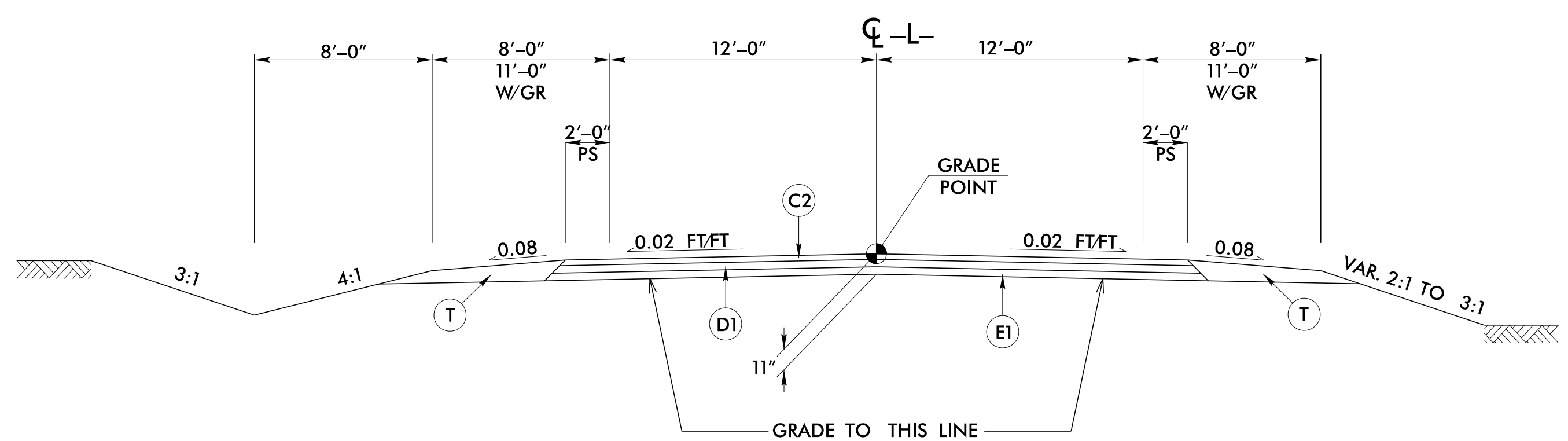
**Detail Showing Method of Wedging**



**TYPICAL SECTION NO. 2**

**USE TYPICAL SECTION NO. 2:**

- L- STA 18+00.00 TO 22+20.00
- L- STA 24+90.00 TO 27+00.00



**TYPICAL SECTION NO. 3**

**USE TYPICAL SECTION NO. 3:**

- L- STA 22+20.00 TO 22+68.75 (BEGIN BRIDGE)
- L- STA 24+41.25 (END BRIDGE) TO 24+90.00

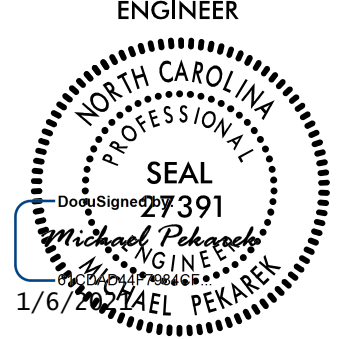


PROJECT REFERENCE NO. <b>B-5639</b>	SHEET NO. <b>2A-1</b>
ROADWAY DESIGN ENGINEER <b>SEAL</b> MICHAEL TEKASE 1/6/2019 MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	PAVEMENT DESIGN ENGINEER <b>SEAL</b> S. MORRISON 1/7/2019 MOTT MACDONALD I & E, LLC LICENSE NO. F-0669
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of:	<b>M</b> MOTT MACDONALD I & E, LLC PO Box 700 Fuquay-Varina, NC 27526 www.mottmcc.com/americas

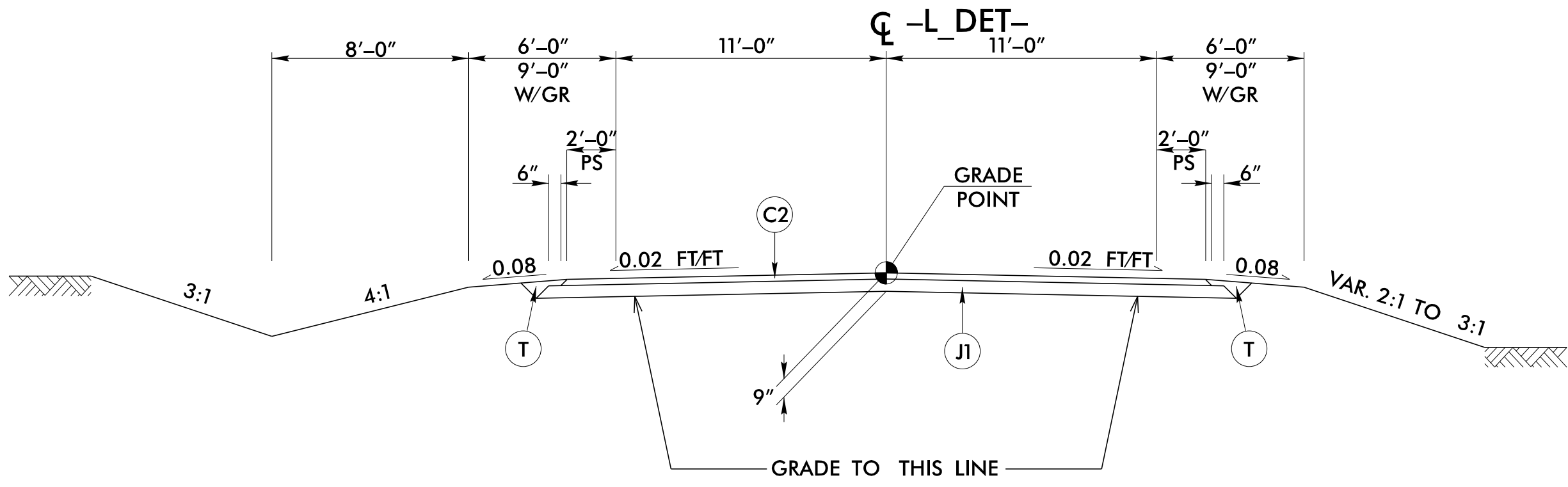
FINAL PAVEMENT SCHEDULE	
<b>C1</b>	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
<b>C2</b>	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
<b>C3</b>	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1 1/2" IN DEPTH.
<b>D1</b>	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
<b>D2</b>	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 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.
<b>E1</b>	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
<b>E2</b>	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
<b>J1</b>	PROP. 6" AGGREGATE BASE COURSE.
<b>R</b>	SHOULDER BERM GUTTER.
<b>T</b>	EARTH MATERIAL.
<b>U</b>	EXISTING PAVEMENT.
<b>W</b>	WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING).

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.  
NOTE: 2:1 SLOPES WILL REQUIRE ROCK PLATING. SEE PLAN FOR MORE DETAILS

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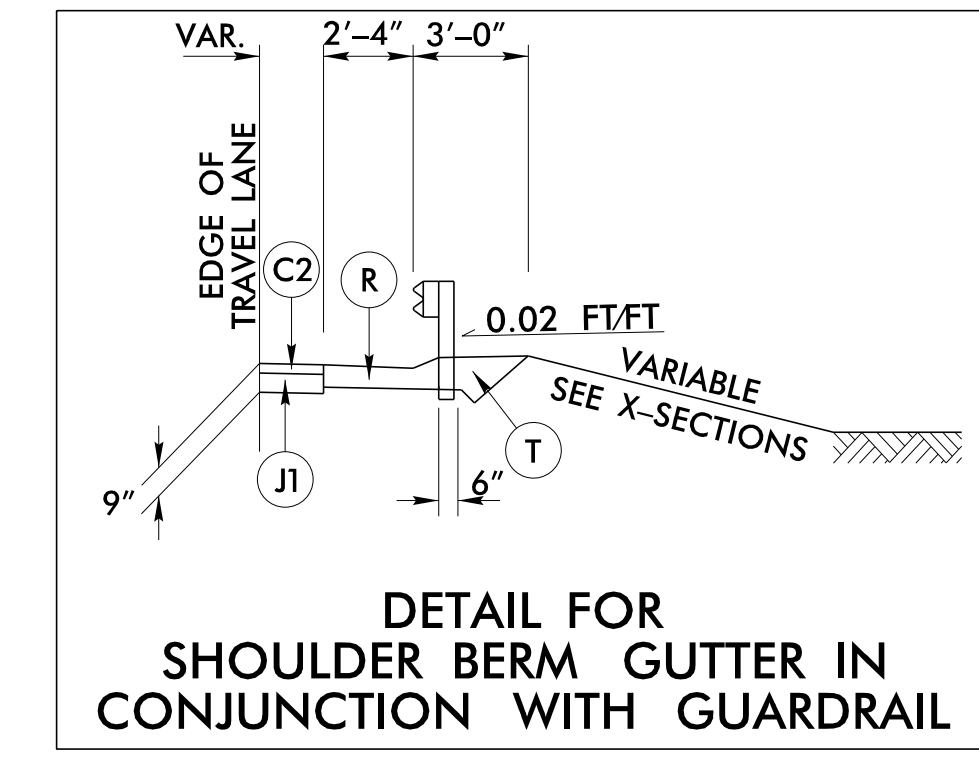
PROJECT REFERENCE NO. <b>B-5639</b>	SHEET NO. <b>2A-2</b>
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER 
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of:  <b>M</b> MOTT MACDONALD I & E, LLC Fuquay-Varina, NC 27526 www.mottmcc.com/americas	



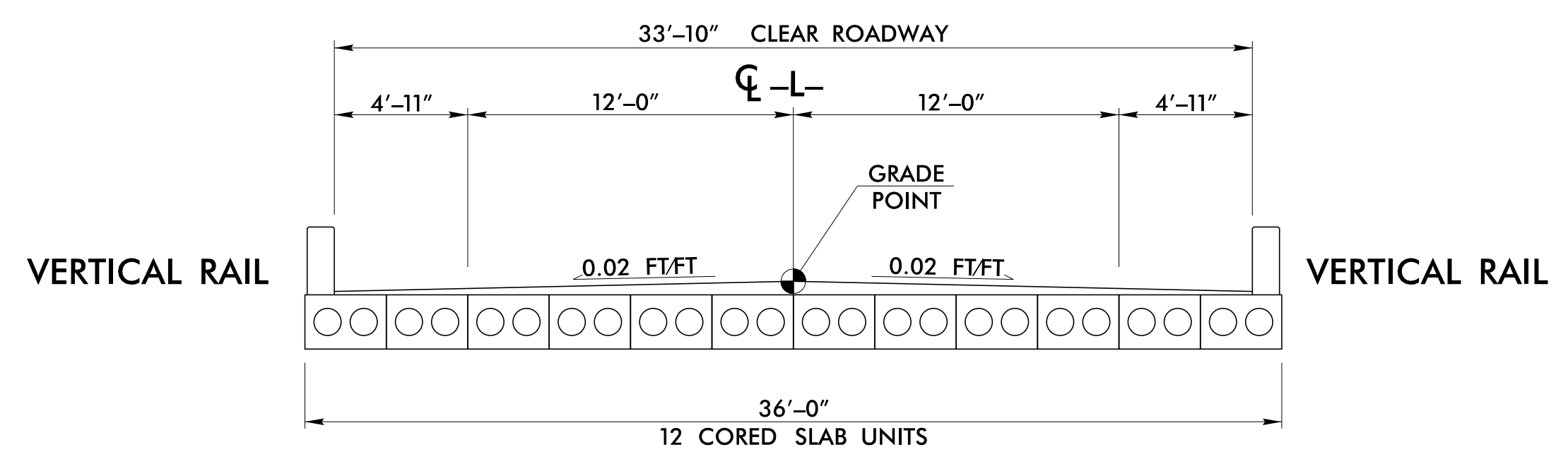
**TYPICAL SECTION NO. 4**

USE TYPICAL SECTION NO. 4

-L\_DET- STA. 13+71.67 TO 17+91.04 +/- (BEGIN BRIDGE)  
-L\_DET- STA. 19+61.04 +/- (END BRIDGE) TO 23+97.33



**-L\_DET- STA 19+61.04 +/- TO 19+94.44 LT**

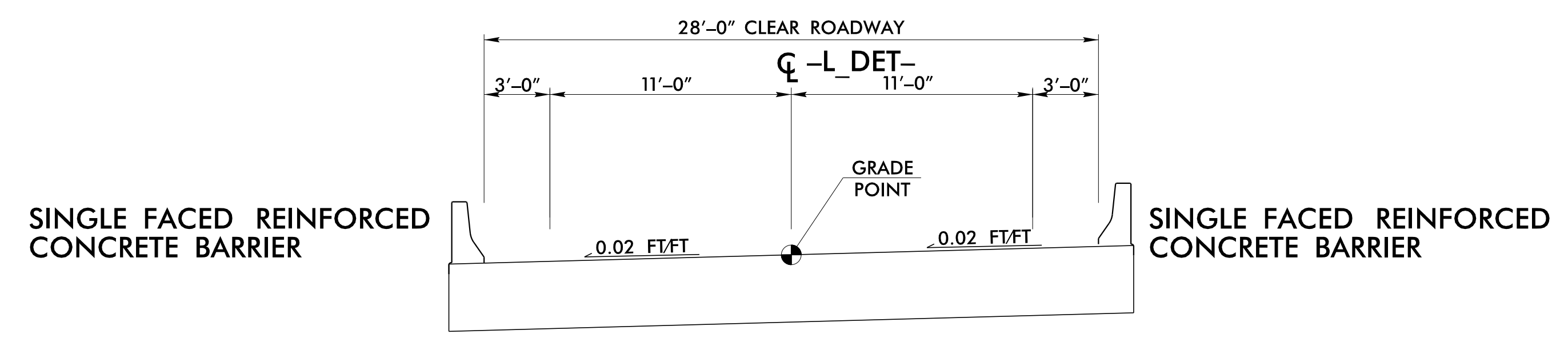


**TYPICAL SECTION NO. 5**

USE TYPICAL SECTION NO. 5:

-L- STA 22+68.75 (BEGIN BRIDGE) TO 24+41.25 (END BRIDGE)

NOTE: SEE STRUCTURE PLANS FOR AWS THICKNESS.



**TYPICAL SECTION NO. 6**

USE TYPICAL SECTION NO. 6

-L\_DET- STA. 17+91.04 +/- (BEGIN BRIDGE) TO 19+61.04 +/- (END BRIDGE)

FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	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.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 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.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE.
R	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING).

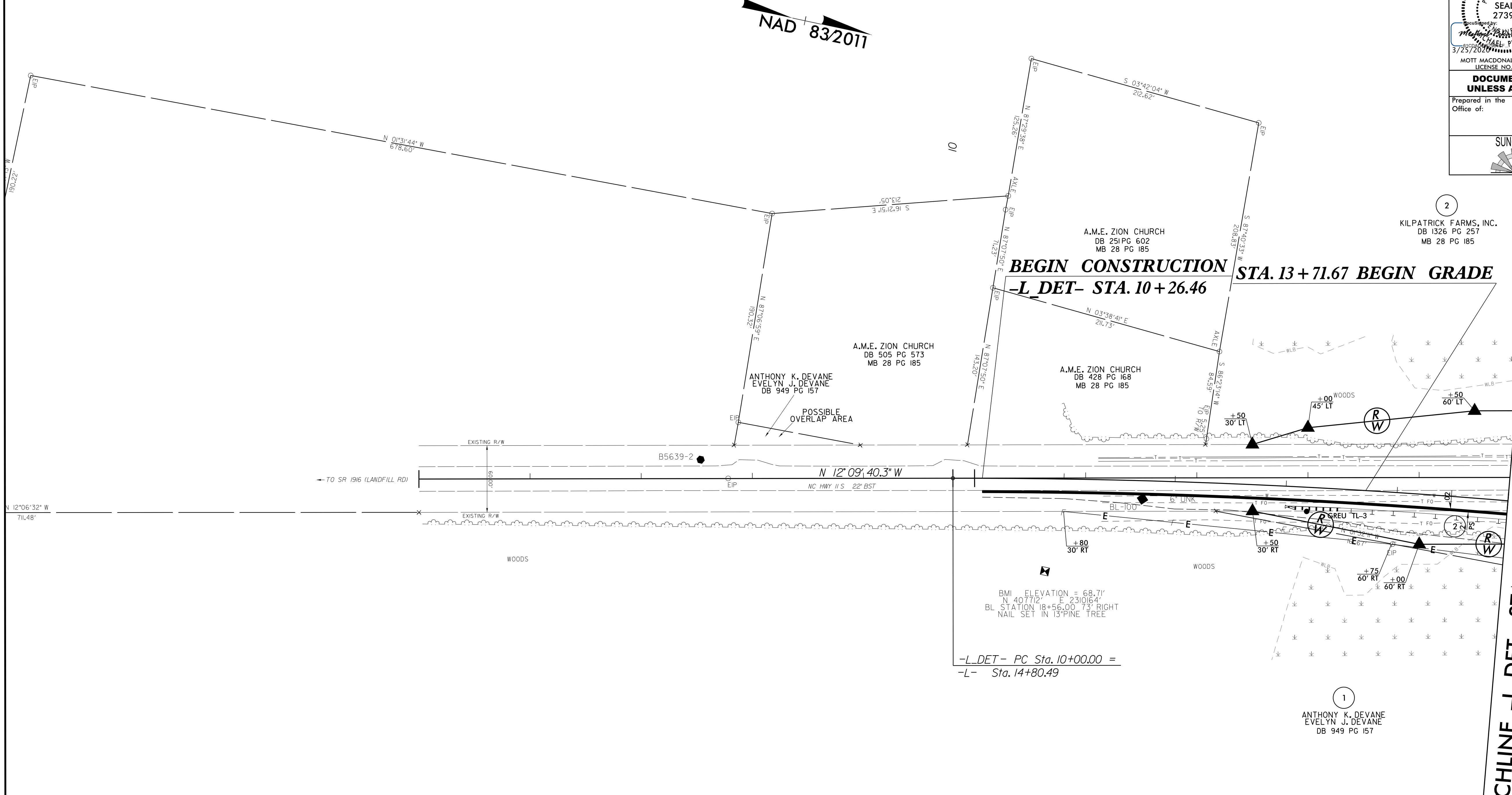
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

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8/17/19

PROJECT REFERENCE NO. B-5639	SHEET NO. 2B-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
MOTT MACDONALD 1 & E, LLC LICENSE NO. F-0669	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of:	<b>M</b> PO Box 700 MOTT MACDONALD Fuquay-Varina, NC 27524 www.motmac.com/americas
SUNGATE DESIGN GROUP, P.A. 905 JONES FRANKLIN ROAD DALLIEN, NORTH CAROLINA 27608 TEL: (919) 885-2245 ENG FIRM LICENSE NO. C-890	



MATCHLINE -L\_DET- STA. 15 + 00.00 SEE SHEET 2B-2

-L\_DET- PC Sta. 10+00.00 =  
-L- Sta. 14+80.49

-L\_DET-

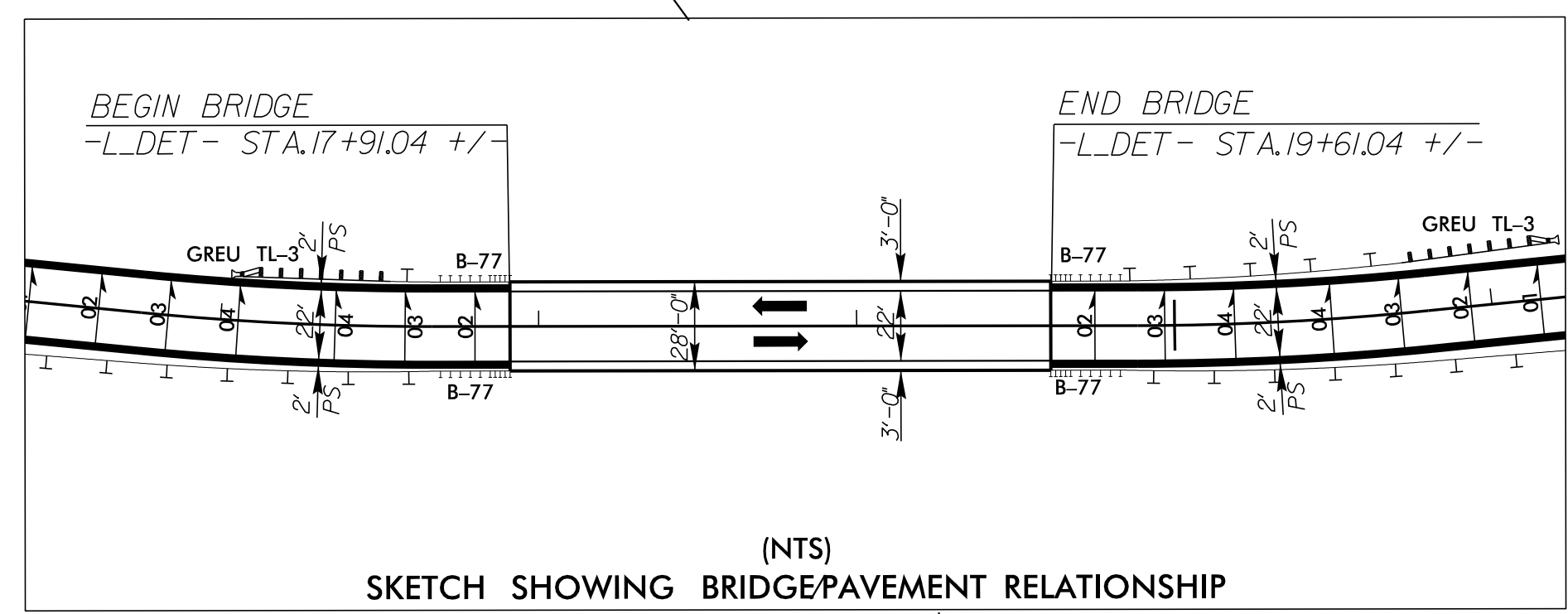
PI Sta 12+93.70  
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 $D = 0^\circ 57' 58.3"$   
 $L = 586.93'$   
 $T = 293.70'$   
 $R = 5,930.00'$   
 $V = 50 \text{ MPH}$   
 $SE = 0.02$   
 $RO = 44.00'$

FOR -L\_DET- PROFILE, SEE SHEET 7  
FOR -L- DESIGN, SEE SHEETS 4 & 5

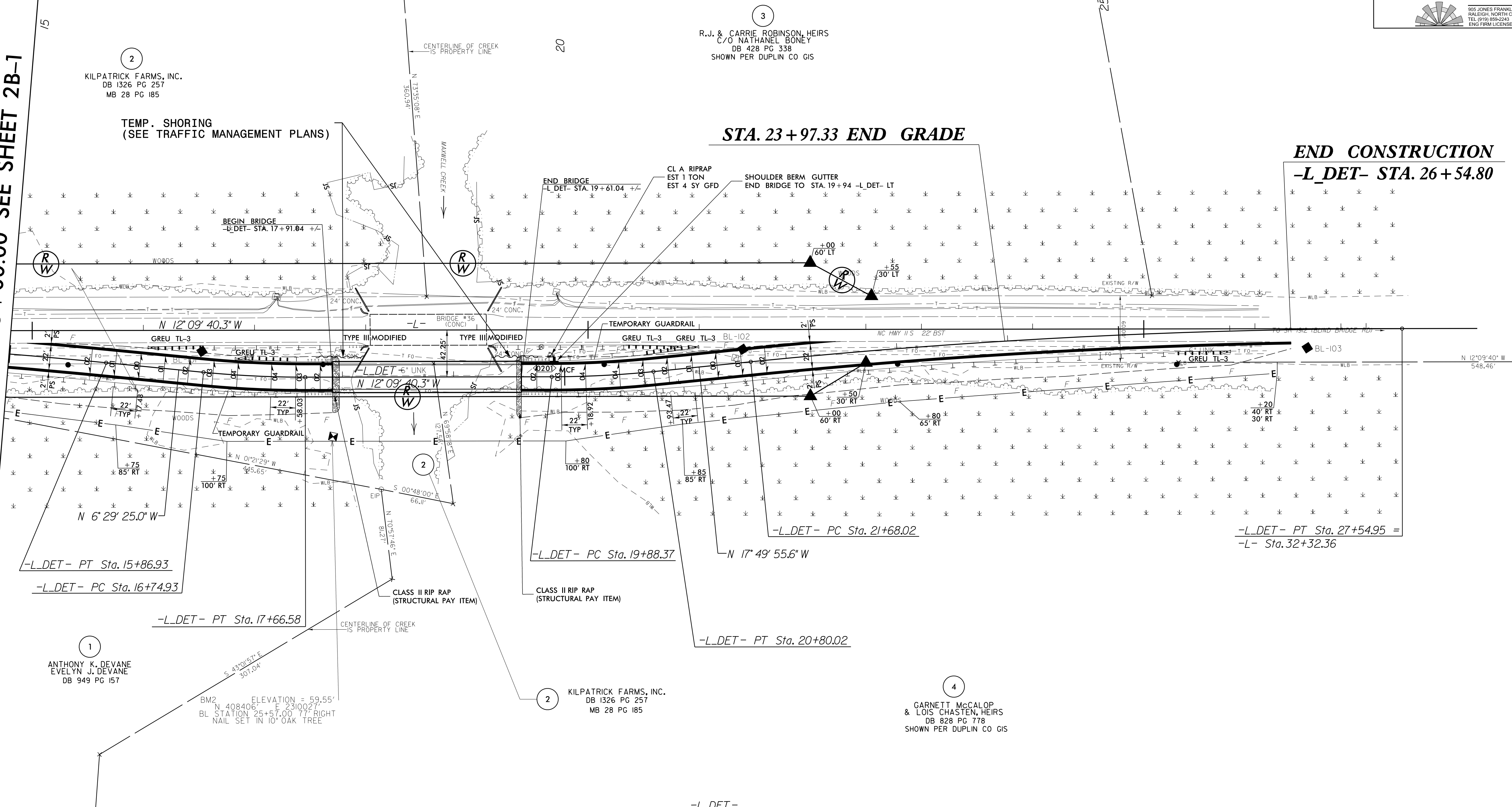
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6/17/19  
 08/01/24  
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 B5639

MATCHLINE -L\_DET- STA. 15 + 00.00 SEE SHEET 2B-1



PROJECT REFERENCE NO. B-5639	SHEET NO. 2B-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of:	
MOTT MACDONALD 1 & E, LLC LICENSE NO. F-0669	
SUNGATE DESIGN GROUP, P.A.  905 JONES FRANKLIN ROAD SALEM, NORTH CAROLINA 27584 TEL: (919) 866-2424 ENG FIRM LICENSE NO. C-890	



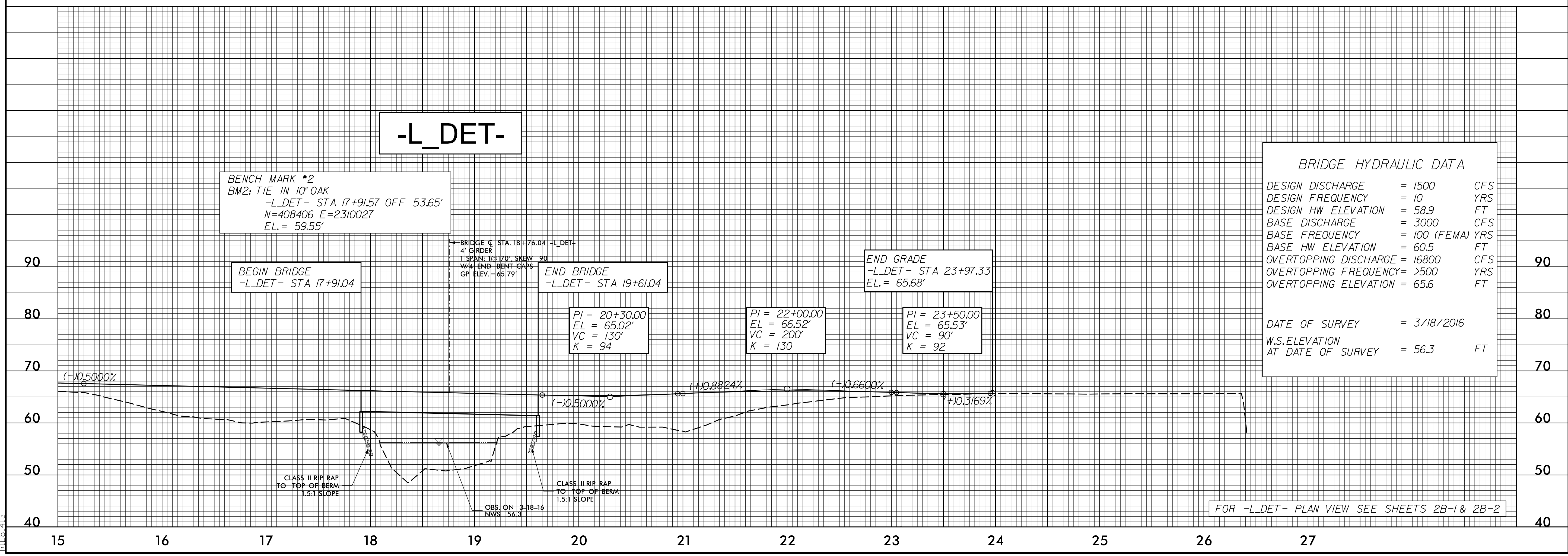
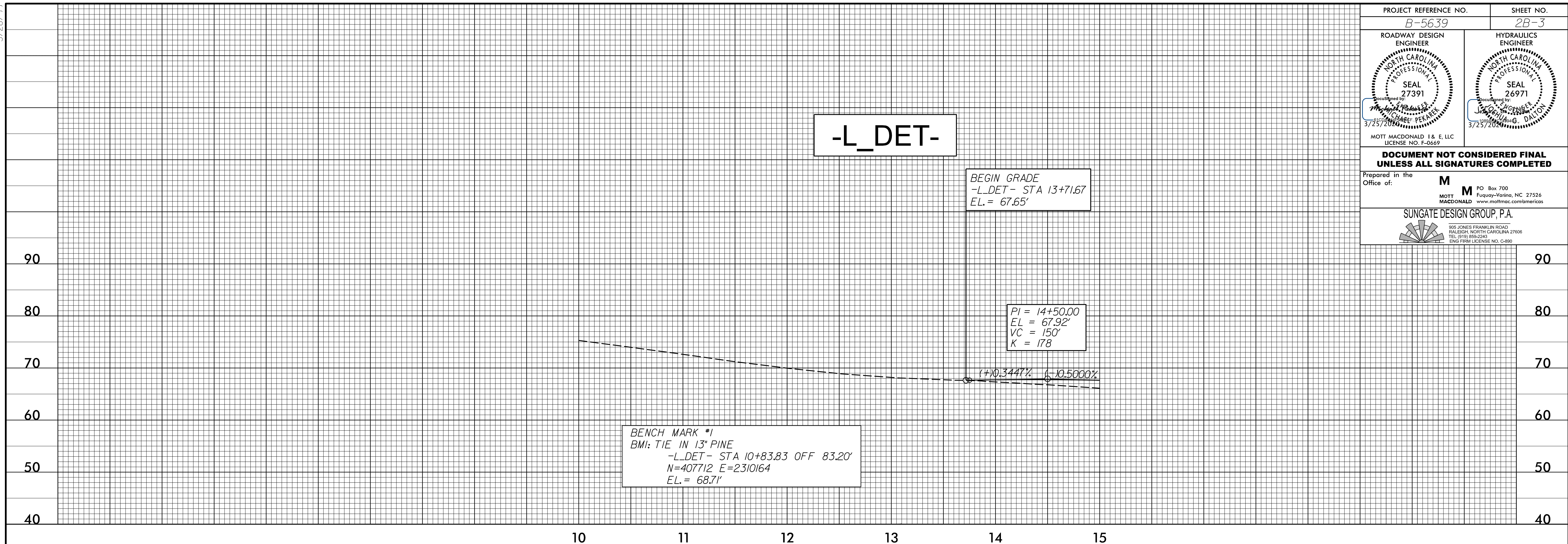
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PI Sta 12+93.70	PI Sta 17+20.79	PI Sta 20+34.23	PI Sta 24+61.72
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$D = 0' 57'' 58.3''$	$D = 6' 11'' 14.8''$	$D = 6' 11'' 14.8''$	$D = 0' 57'' 58.3''$
$L = 586.93'$	$L = 91.65'$	$L = 91.65'$	$L = 586.93'$
$T = 293.70'$	$T = 45.86'$	$T = 45.86'$	$T = 293.70'$
$R = 5,930.00'$	$R = 926.00'$	$R = 926.00'$	$R = 5,930.00'$
$V = 50 MPH$	$V = 50 MPH$	$V = 50 MPH$	$V = 50 MPH$
$SE = 0.02$	$SE = 0.04$	$SE = 0.04$	$SE = 0.02$
$RO = 44.00'$	$RO = 88.00'$	$RO = 88.00'$	$RO = 44.00'$

FOR -L\_DET- PROFILE, SEE SHEET 7  
 FOR -L- DESIGN, SEE SHEETS 4 & 5



5/28/19

PROJECT REFERENCE NO. B-5639	SHEET NO. 2B-3
ROADWAY DESIGN ENGINEER MOTT MACDONALD & E, LLC SEAL 27391 3/25/2016	HYDRAULICS ENGINEER MOTT MACDONALD & E, LLC SEAL 26971 3/25/2016
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of: <b>M</b> MOTT MACDONALD & E, LLC PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/americas	
SUNGATE DESIGN GROUP, P.A. 805 JONES FRANKLIN ROAD RALEIGH NORTH CAROLINA 27609 TEL (919) 855-2443 ENG. REG. LICENSE NO. C-899	



**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE	= 1500	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 58.9	FT
BASE DISCHARGE	= 3000	CFS
BASE FREQUENCY	= 100 (FEMA)	YRS
BASE HW ELEVATION	= 60.5	FT
OVERTOPPING DISCHARGE	= 16800	CFS
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING ELEVATION	= 65.6	FT

DATE OF SURVEY	= 3/18/2016
W.S. ELEVATION AT DATE OF SURVEY	= 56.3 FT

FOR -L\_DET- PLAN VIEW SEE SHEETS 2B-1 & 2B-2

P:\0125  
 B5639\0125\Proj\B5639\_rdy\_psh\_pf\_2B-3.dgn  
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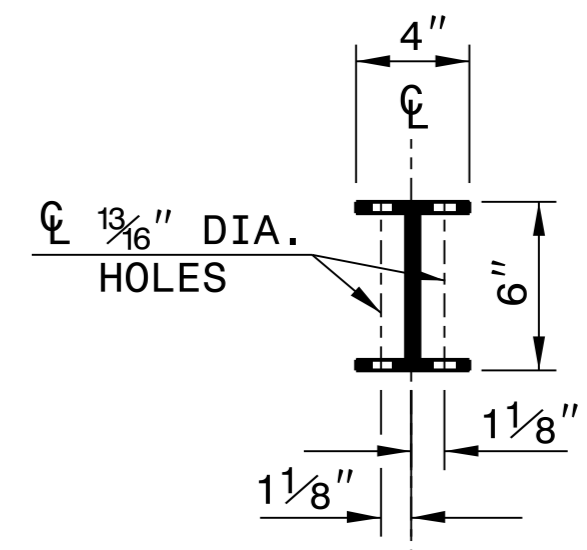
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**



**STANDARD W-BEAM GUARDRAIL**



**PLAN**



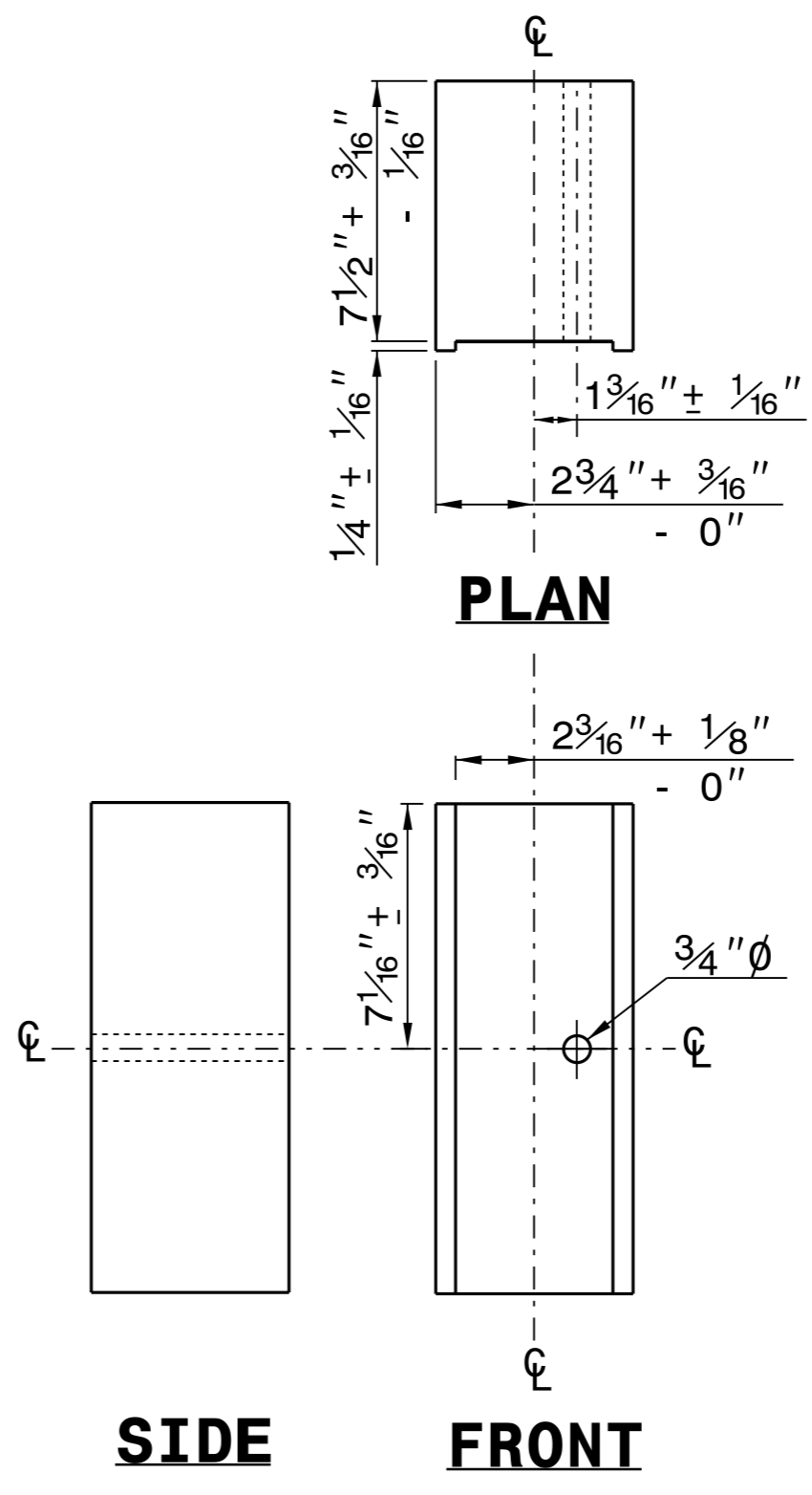
**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

**STANDARD  
LINE POST**

**SHORT WOOD  
BREAKAWAY POST**



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

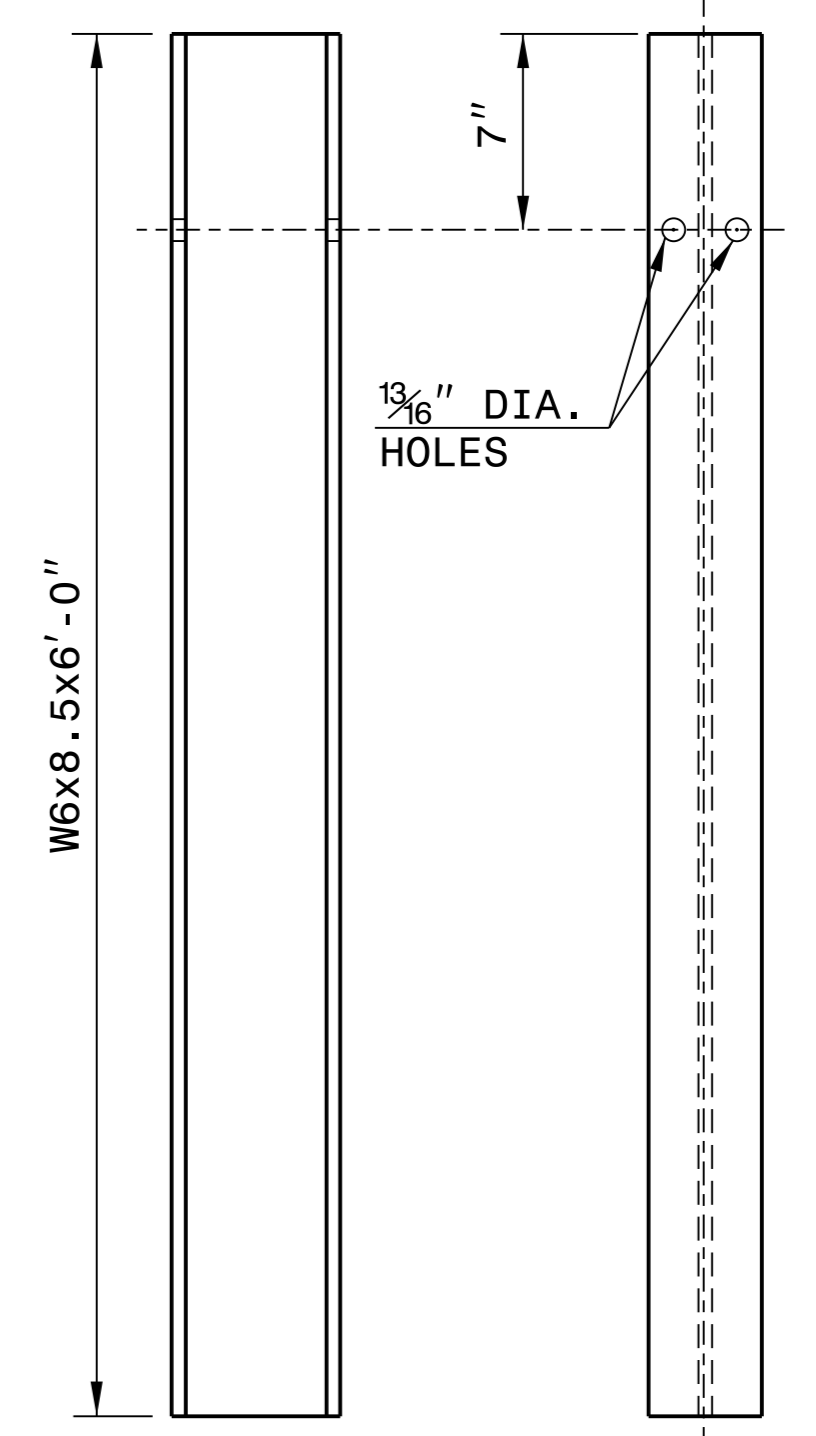


**PLAN**

**SIDE**

**FRONT**

**ROUTED  
OFFSET BLOCK**



**SIDE**

**FRONT**

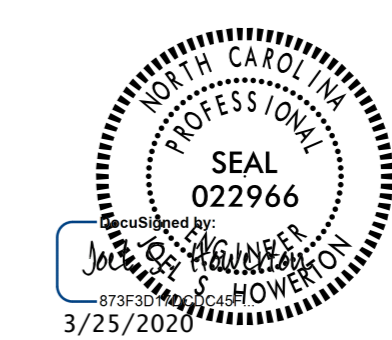
**"W6" STEEL POST**

**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**



**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.: \_\_\_\_\_

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 Jhowerton AT: CSU-212855

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**

SHEET 1 OF 7  
**862D03**

**ELEVATION**

**PLAN VIEW**

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**

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**

SHEET 2 OF 7  
**862D03**

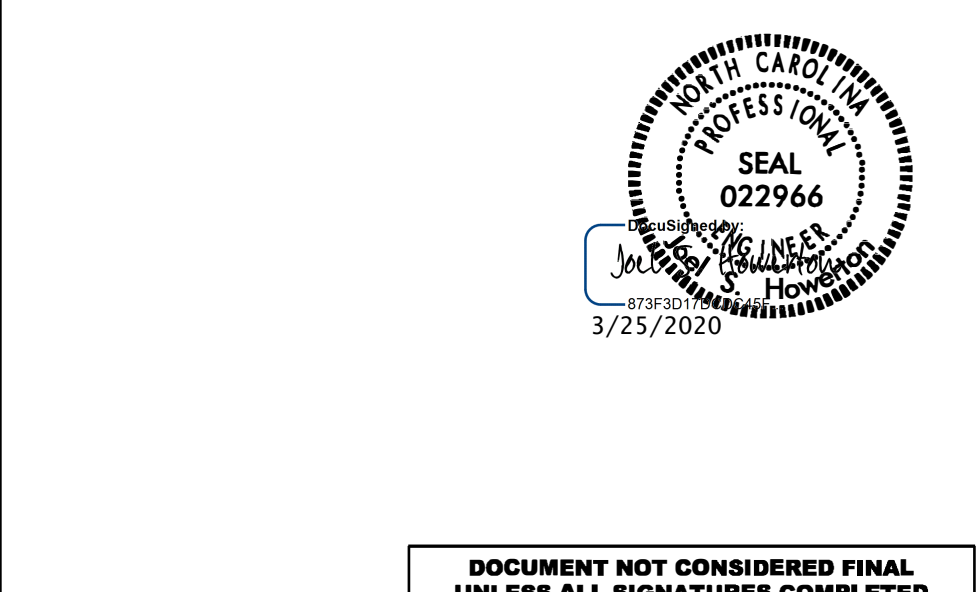
**ELEVATION**

**PLAN VIEW**

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**



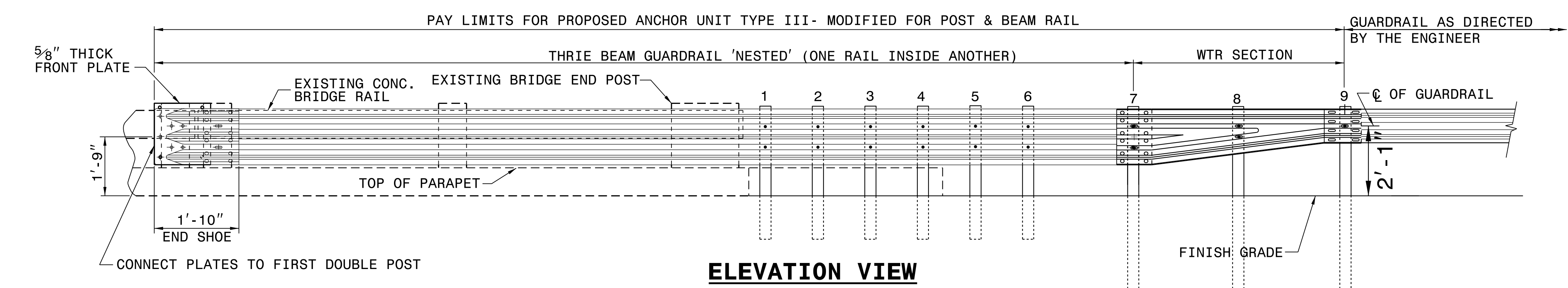
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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

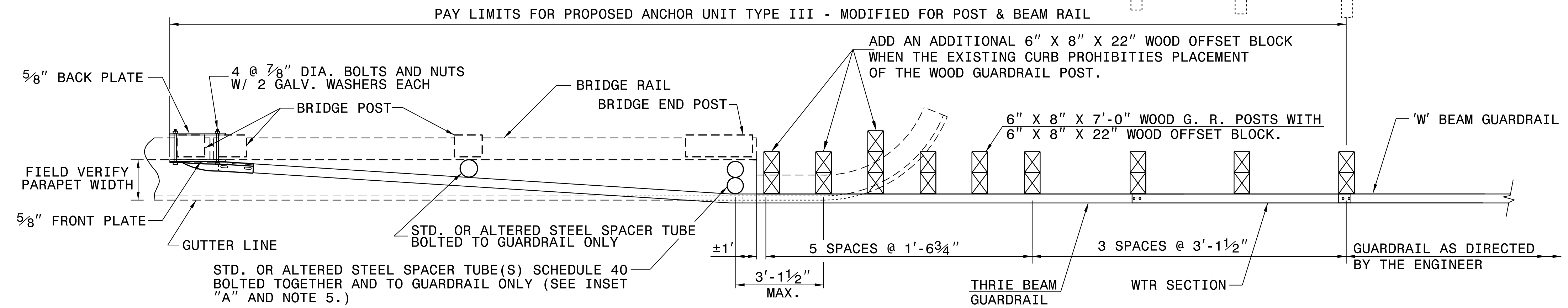
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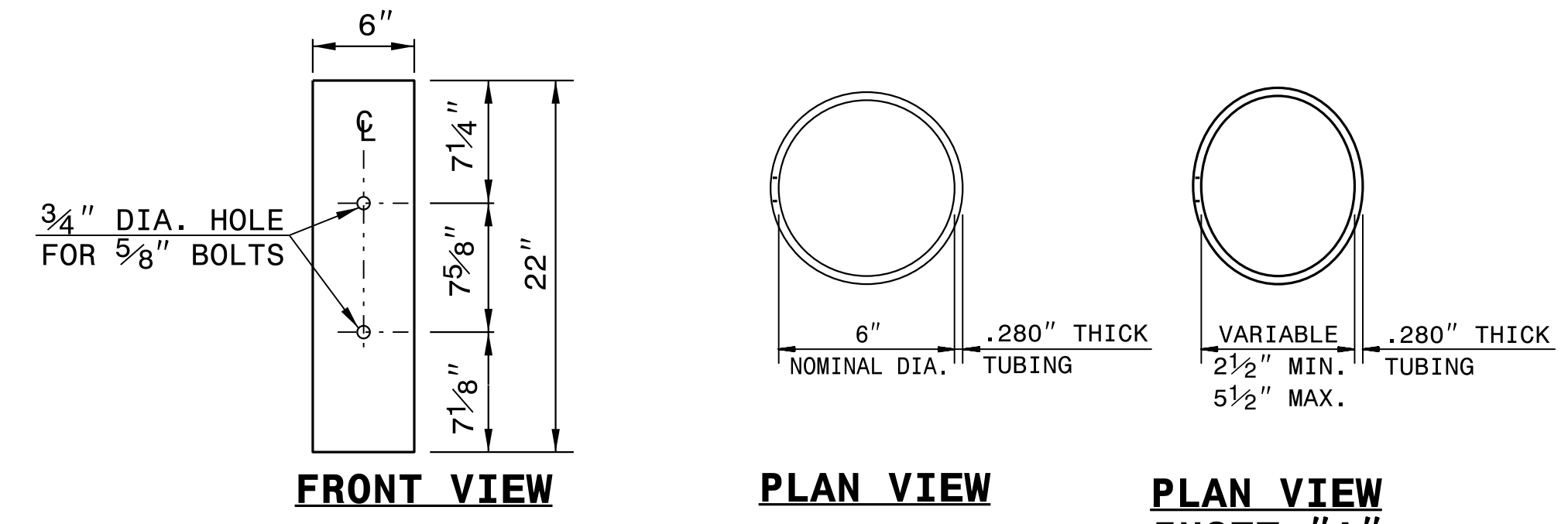




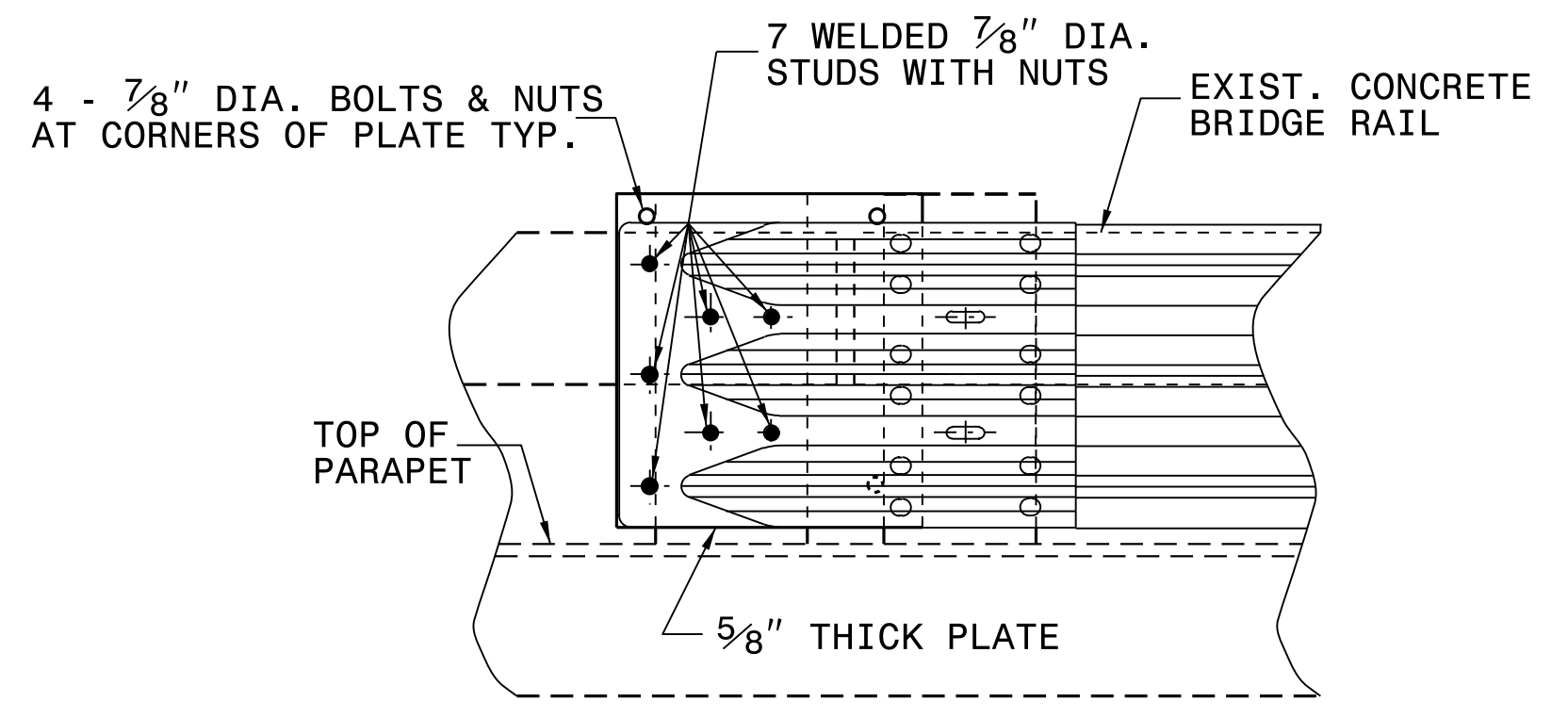
**ELEVATION VIEW**



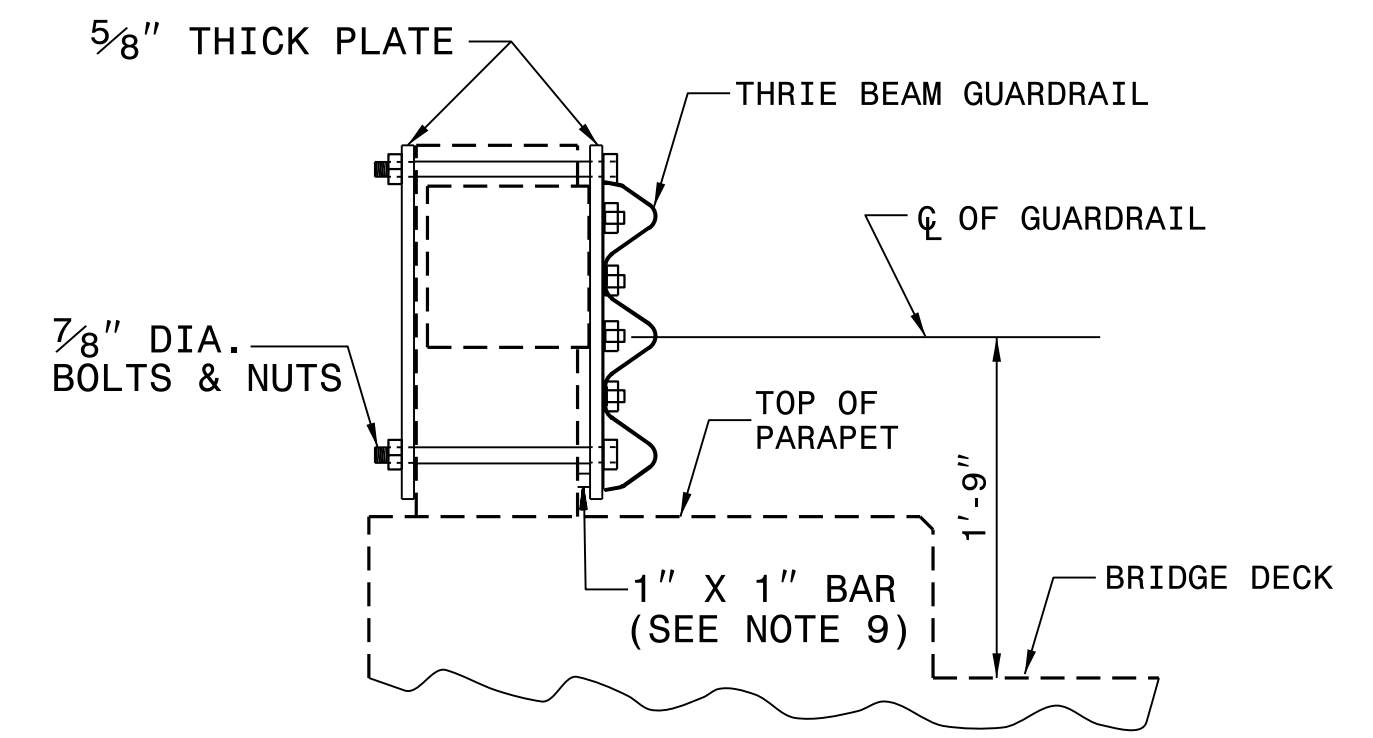
**PLAN VIEW**



**STEEL SPACER TUBE**



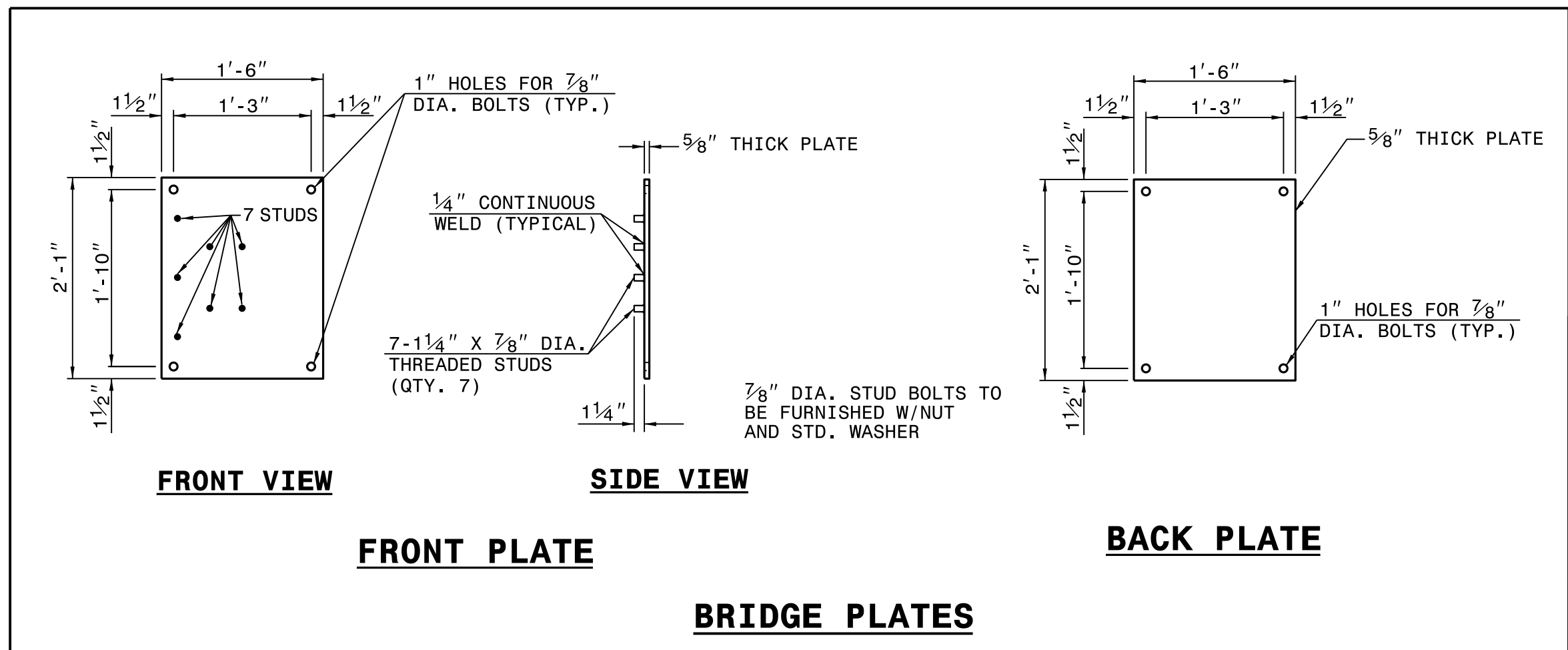
**ELEVATION VIEW**



**SECTION VIEW**

**GENERAL NOTES:**

1. USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
2. TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
3. USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
4. ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
5. INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE AT BRIDGE END POST SPACER TUBE LOCATION BY USING STANDARD OR ALTERED SPACER TUBES OR A COMBINATION THEREOF OR AS DIRECTED BY THE ENGINEER. FOR VERY SMALL PARAPET WIDTHS, GUARDRAIL MAY BE INSTALLED AGAINST BRIDGE RAIL WITHOUT SPACER TUBES.
6. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
7. USE THIS DETAIL ONLY FOR BRIGES WITH POST AND BEAM TYPE RAIL.
8. ATTACH 1" X 1" BAR AND THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
9. 1" X 1" BAR MAY NOT BE NEEDED ON BRIDGE RAILS WHERE FACE OF RAIL DOES NOT PROJECT BEYOND FACE OF POST.
10. PROVIDE SHOP DRAWINGS OF THE PLATES TO THE ENGINEER FOR APPROVAL BEFORE FABRICATING THE PLATES.
11. LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
12. SEE ROADWAY STANDARD DRAWING 862.03 SHEET 3 FOR ADDITIONAL INFORMATION ON THE TYPE III ANCHOR UNIT



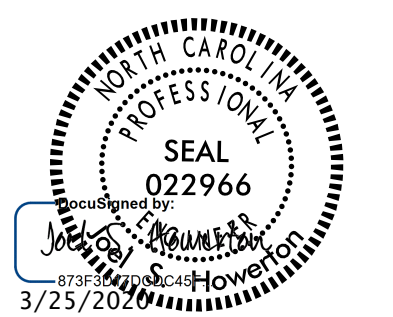
**FRONT VIEW**

**SIDE VIEW**

**FRONT PLATE**

**BACK PLATE**

**BRIDGE PLATES**



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

**TYPE III MODIFIED FOR POST AND BEAM RAIL**

ORIGINAL BY: E.E. WARD DATE: 01-03  
 MODIFIED BY: JS Howerton DATE: 01-18  
 CHECKED BY: DATE:  
 FILE SPEC.: s:\details\stand\bpii original.dgn

24-JAN-2018 14:51 S:\Contracts\Special\Details\stand\bp\_iii original.dgn J:\power\ton AT\_CSD-292595



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

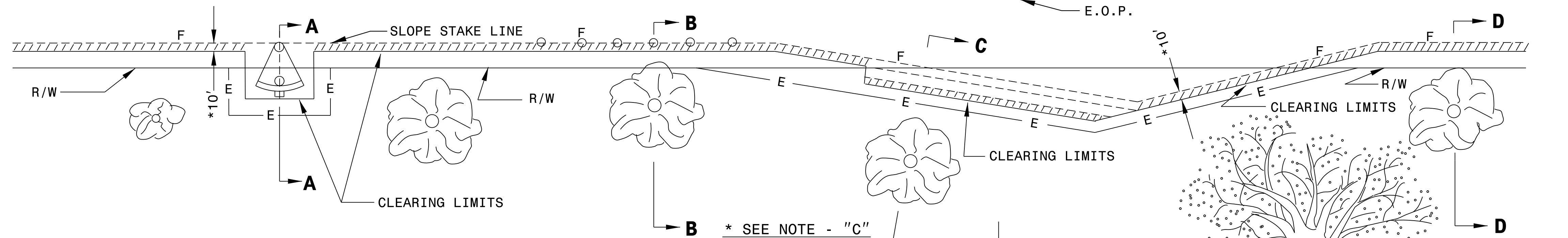
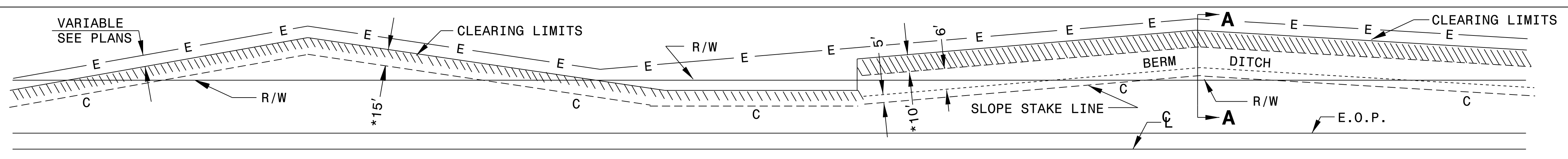
ENGLISH DETAIL DRAWING FOR  
**METHOD OF CLEARING**  
MODIFIED METHOD - III

SHEET 1 OF 1  
**200D03**

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

ENGLISH DETAIL DRAWING FOR  
**METHOD OF CLEARING**  
MODIFIED METHOD - III

SHEET 1 OF 1  
**200D03**



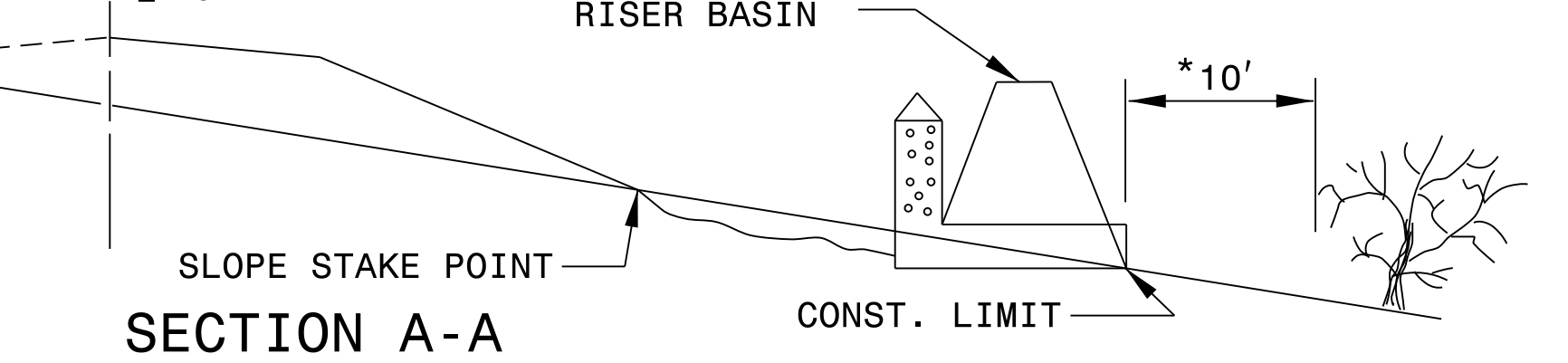
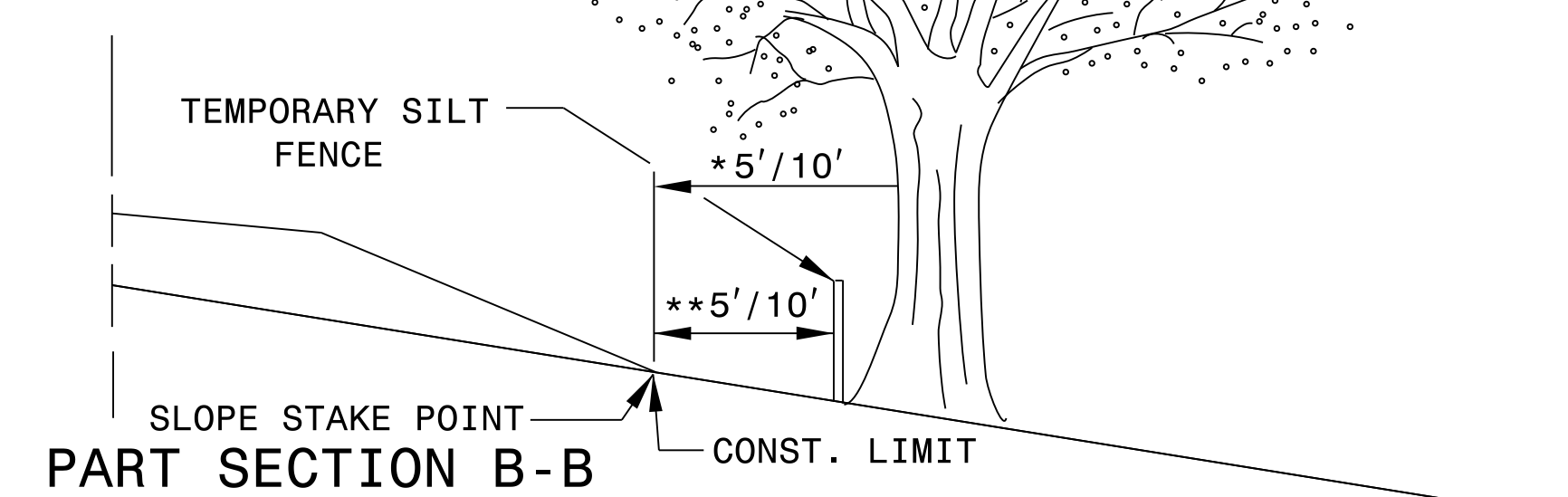
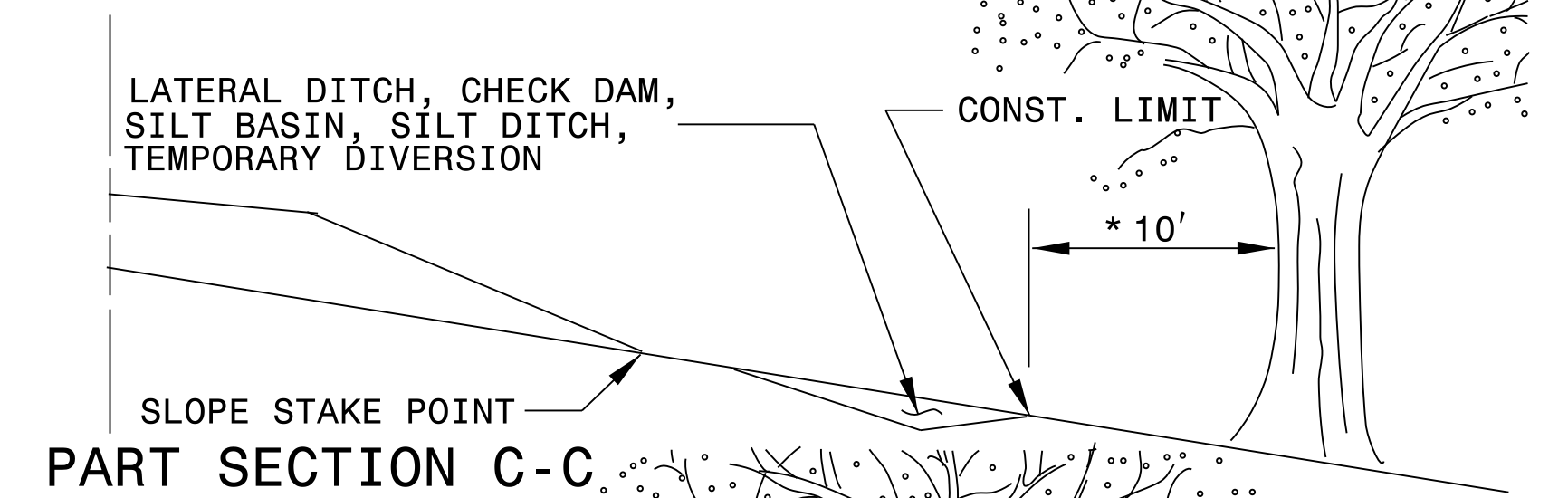
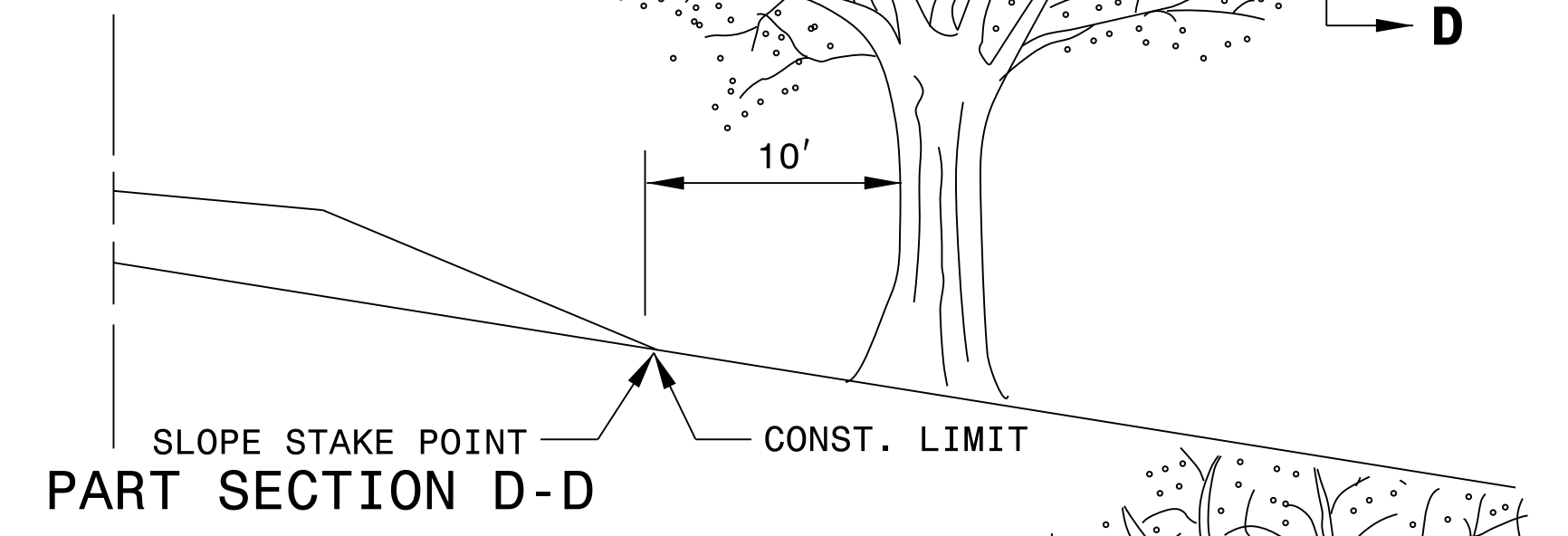
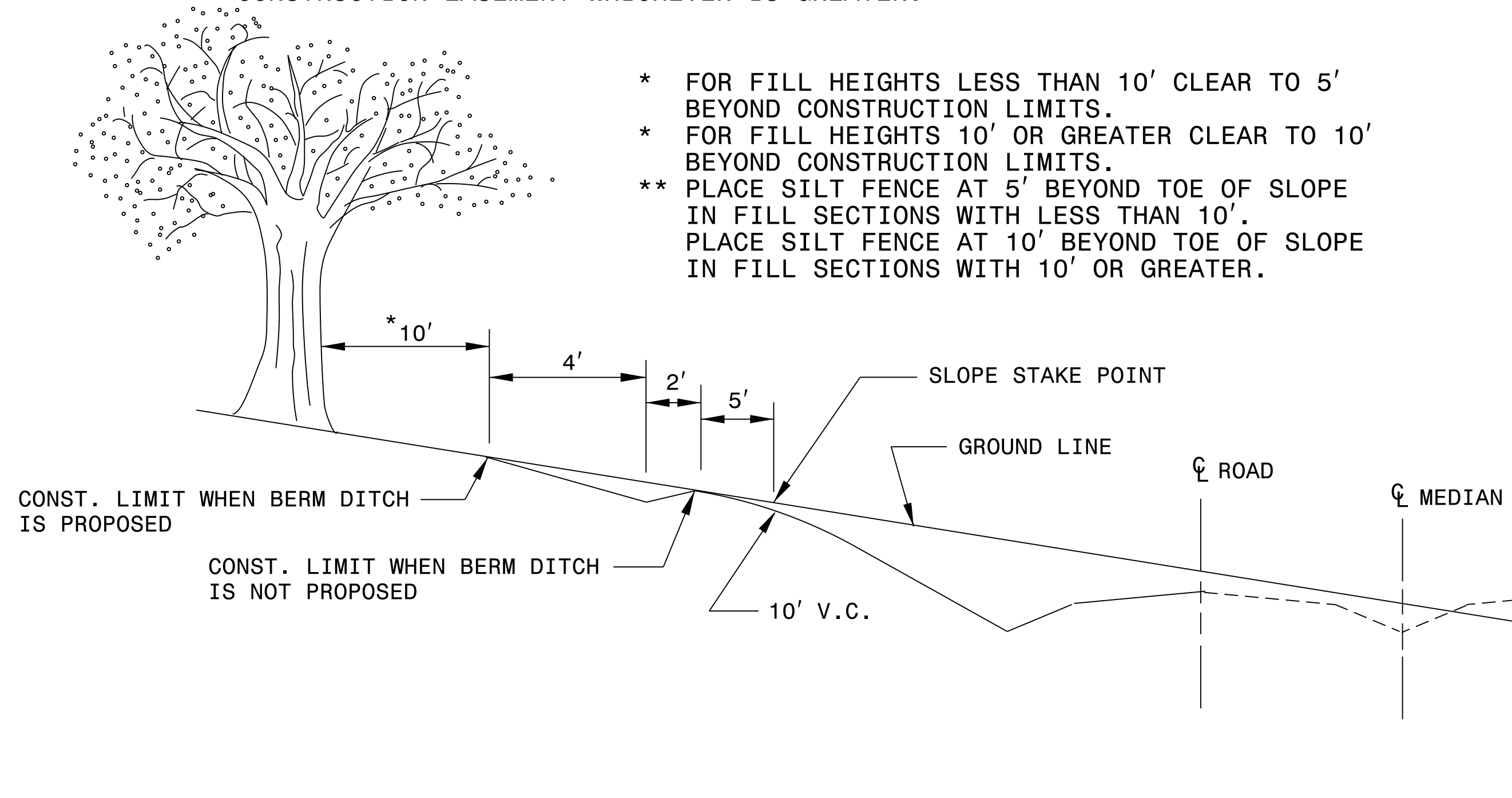
**GENERAL NOTES:**

1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.

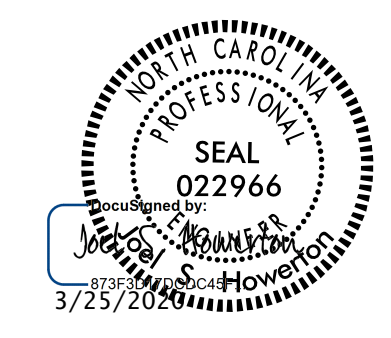
**METHOD III CLEARING LIMITS**

- (A) CUTS -- CLEAR TO CONSTRUCTION LIMITS.
- (B) FILLS - CLEAR TO 5'/10' \* BEYOND CONSTRUCTION LIMITS, UNLESS SPECIFIED OTHERWISE BY WETLAND PERMIT.
- (C) CUTS AND FILLS - WHEN THE CLEARING LIMITS (A AND B) EXCEED THE PROPOSED R/W OR PROPOSED CONSTRUCTION EASEMENTS, THEN CLEAR ONLY TO THE R/W OR CONSTRUCTION EASEMENT WHICHEVER IS GREATER.

- \* FOR FILL HEIGHTS LESS THAN 10' CLEAR TO 5' BEYOND CONSTRUCTION LIMITS.
- \* FOR FILL HEIGHTS 10' OR GREATER CLEAR TO 10' BEYOND CONSTRUCTION LIMITS.
- \*\* PLACE SILT FENCE AT 5' BEYOND TOE OF SLOPE IN FILL SECTIONS WITH LESS THAN 10'. PLACE SILT FENCE AT 10' BEYOND TOE OF SLOPE IN FILL SECTIONS WITH 10' OR GREATER.



05-DEC-2017 10:31  
S:\Contracts\Projects\Special\Details\kkempf\english\0200d301.modified.method III Cond.dgn  
Jhower-ton AT CSD-292595



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

**SEE TITLE BLOCK**

ORIGINAL BY: T.S.S. DATE: FEB. 2000  
 MODIFIED BY: K.A.K. DATE: AUG. 2016  
 CHECKED BY: DATE:  
 FILE SPEC.: kkempf/english/0200d301.dgn

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



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

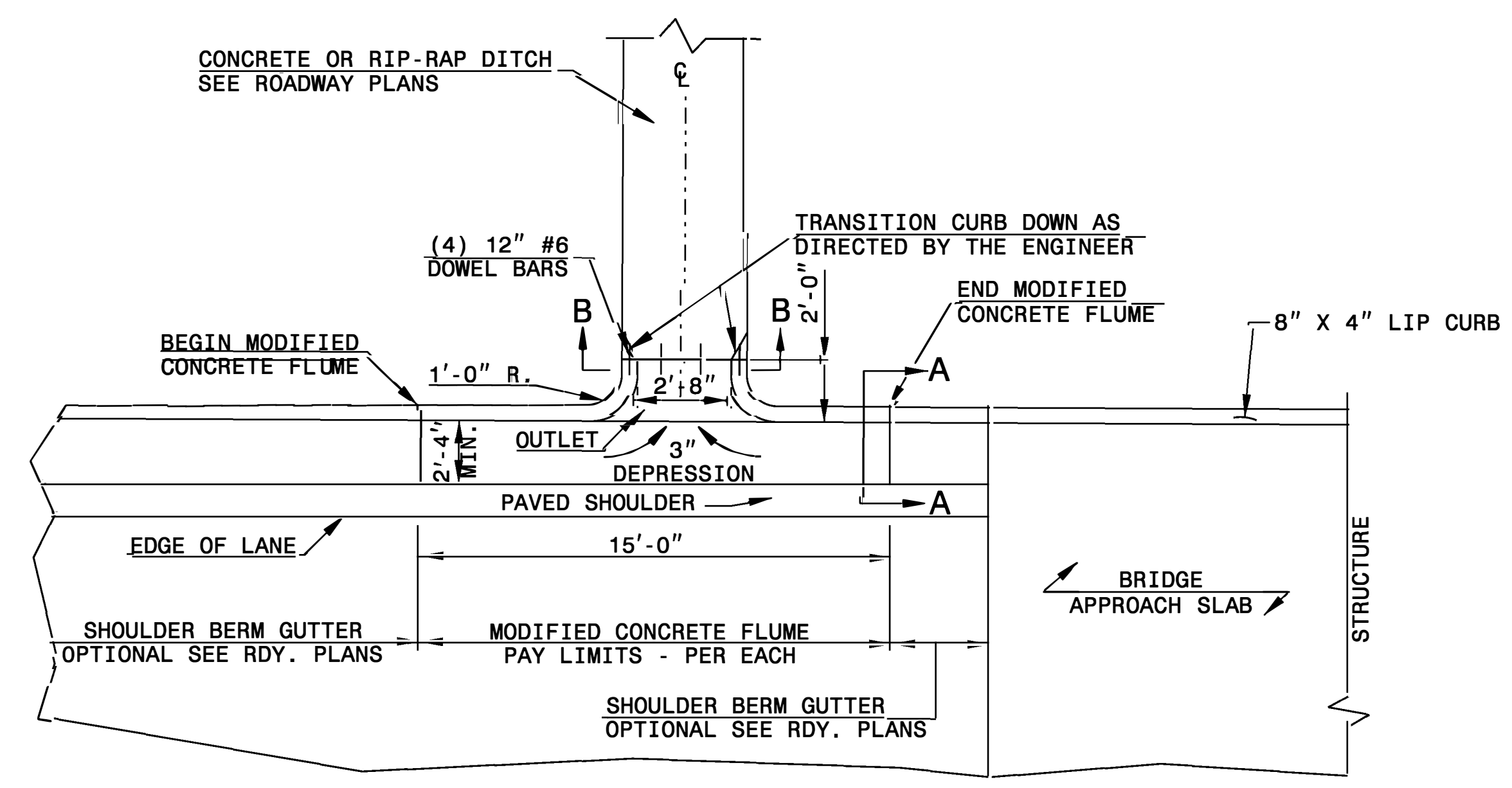
ENGLISH DETAIL DRAWING FOR  
**MODIFIED CONCRETE FLUME**  
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1  
MODFLMDTCH

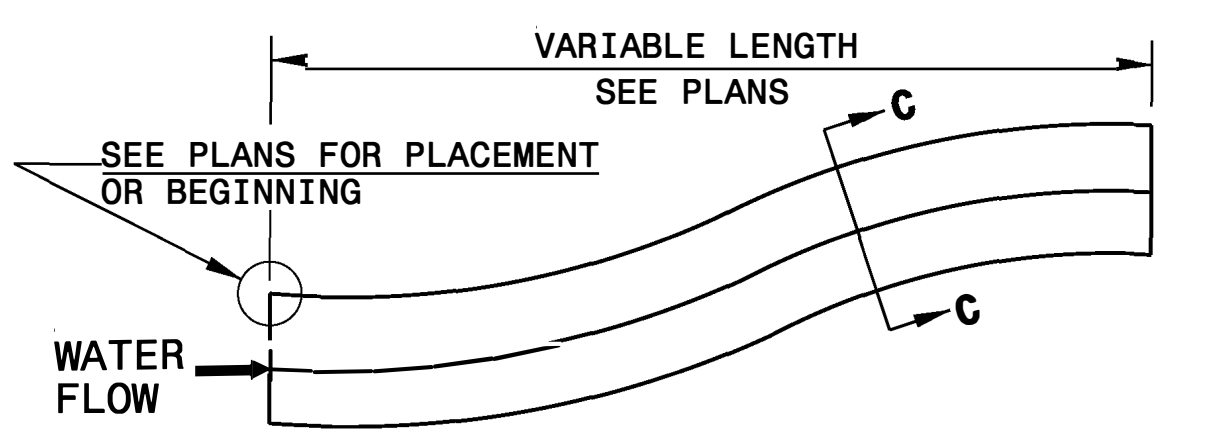
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR  
**MODIFIED CONCRETE FLUME**  
WITH CONCRETE OR RIP-RAP DITCH

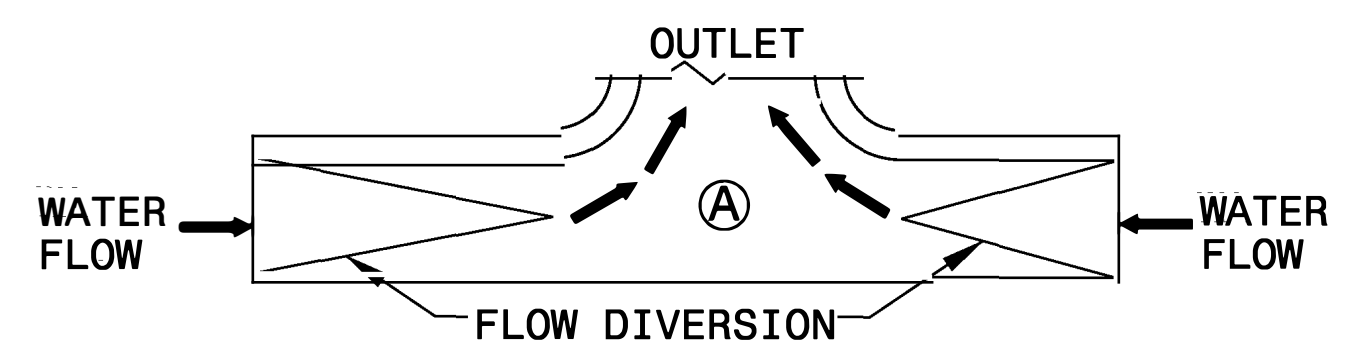
SHEET 1 OF 1  
MODFLMDTCH



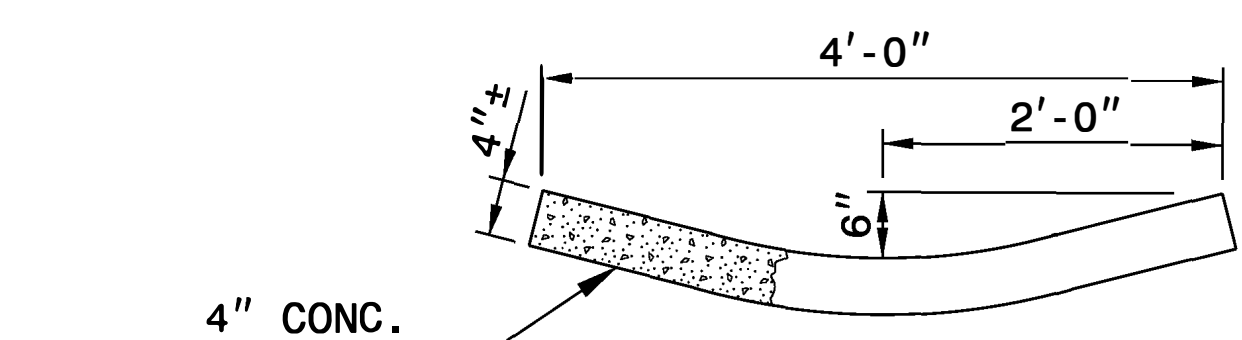
PLAN VIEW



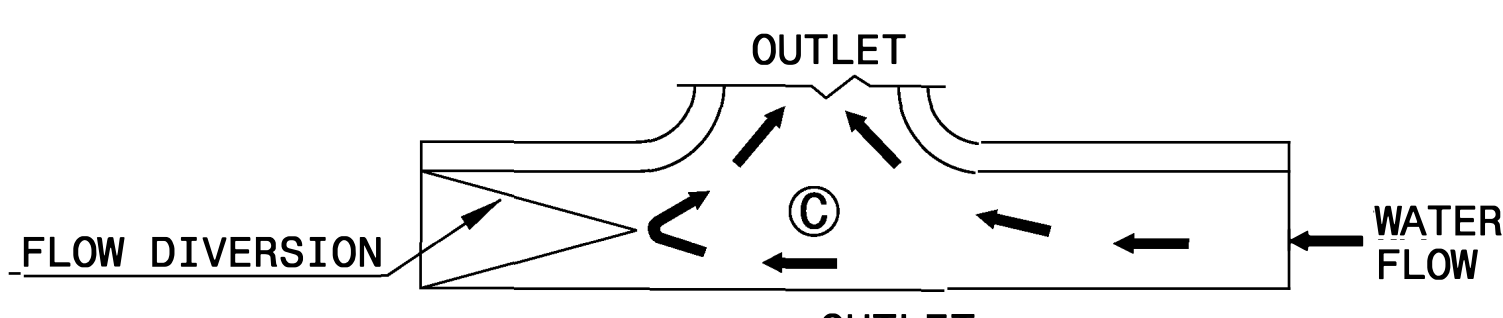
DOWNGRADE OR SAG



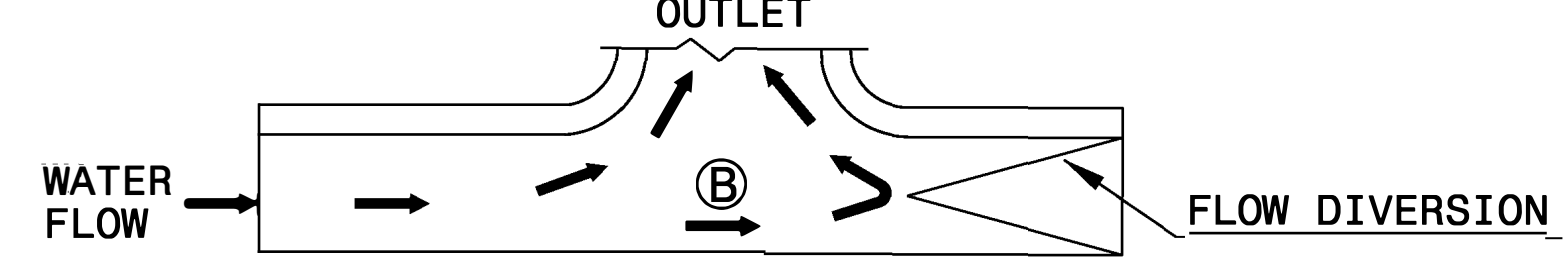
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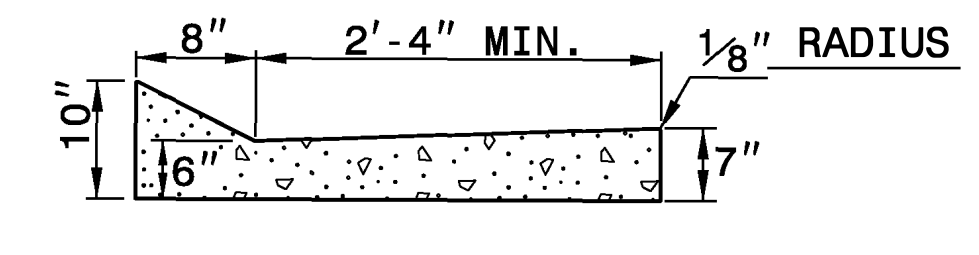
SECTION C-C



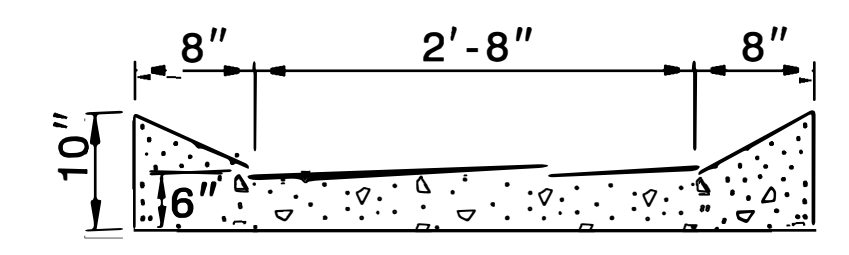
FLOW DIVERSION EXAMPLES



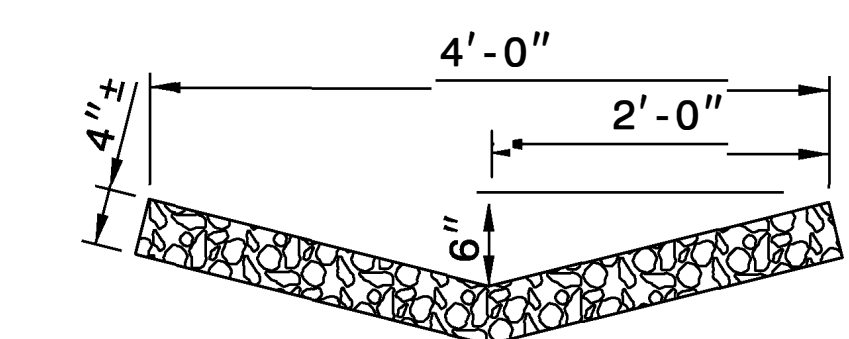
DOWN GRADE



SECTION A-A



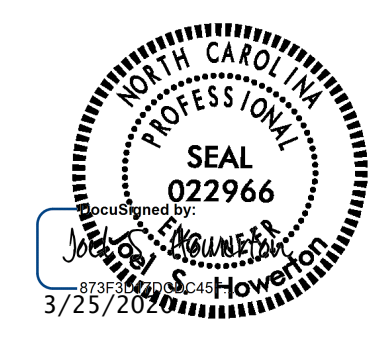
SECTION B-B



RIP-RAP LINED DITCH

- NOTES:
- CONSTRUCT MODIFIED CONCRETE FLUME AND SHOULDER BERM GUTTER IN ACCORDANCE WITH THIS DETAIL.
  - CONSTRUCT CONCRETE DITCH IN ACCORDANCE WITH STD. DWG. NO. 850.01.
  - CONSTRUCT RIP RAP LINED DITCH IN ACCORDANCE WITH THIS DETAIL, IF CALLED FOR IN PLANS.
  - CONCRETE OR RIP RAP LINED DITCH SHALL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. THE DITCH SHALL TERMINATE AS SHOWN ON THE PLANS. IF NO TERMINATION IS INDICATED PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18" PIPE. TRANSITIONS FROM THE DITCH TO TERMINATION SHALL BE AS DIRECTED BY THE ENGINEER.
  - MODIFICATIONS SHALL BE AS DICTATED BY SITE CONDITIONS AND DIRECTED BY THE ENGINEER.

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 J:\power\ton - H1\_CSD-232595




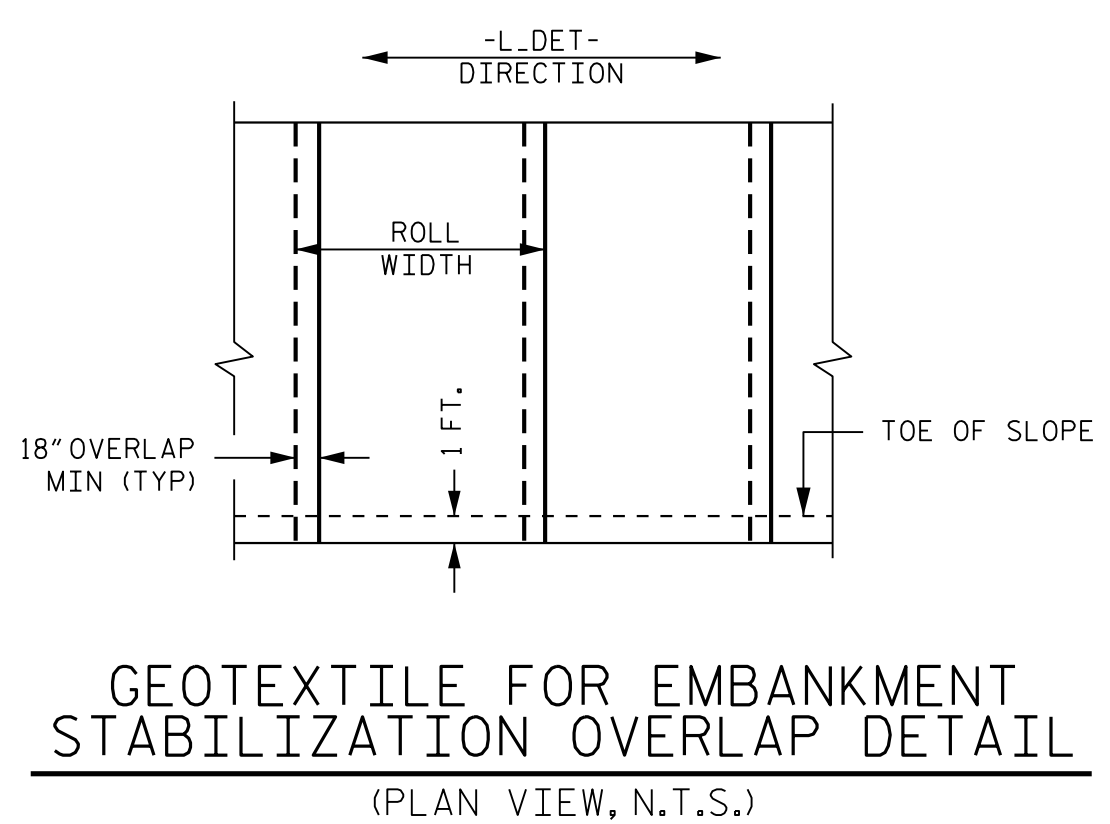
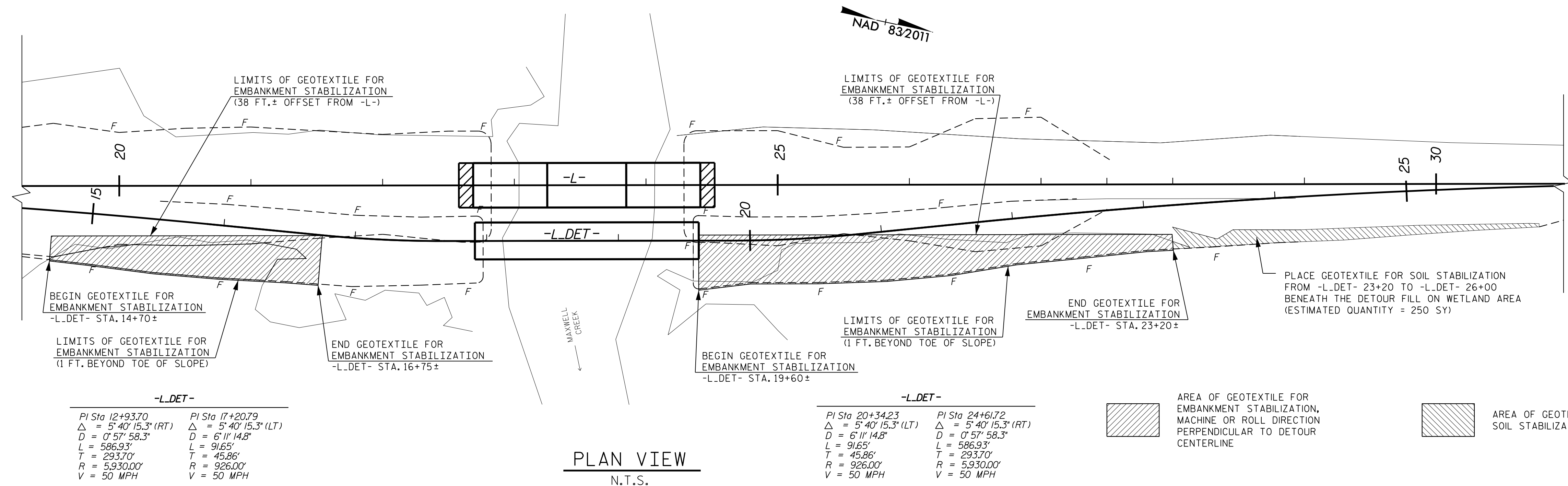
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UNLESS ALL SIGNATURES COMPLETED

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

**SEE PLATE FOR TITLE**

ORIGINAL BY: E.E. Ward      DATE: Apr. 2002  
 MODIFIED BY: J.S. Howerton      DATE: October 2017  
 CHECKED BY:      DATE:        
 FILE SPEC.: w:\details\stand\modifiedflume.dgn

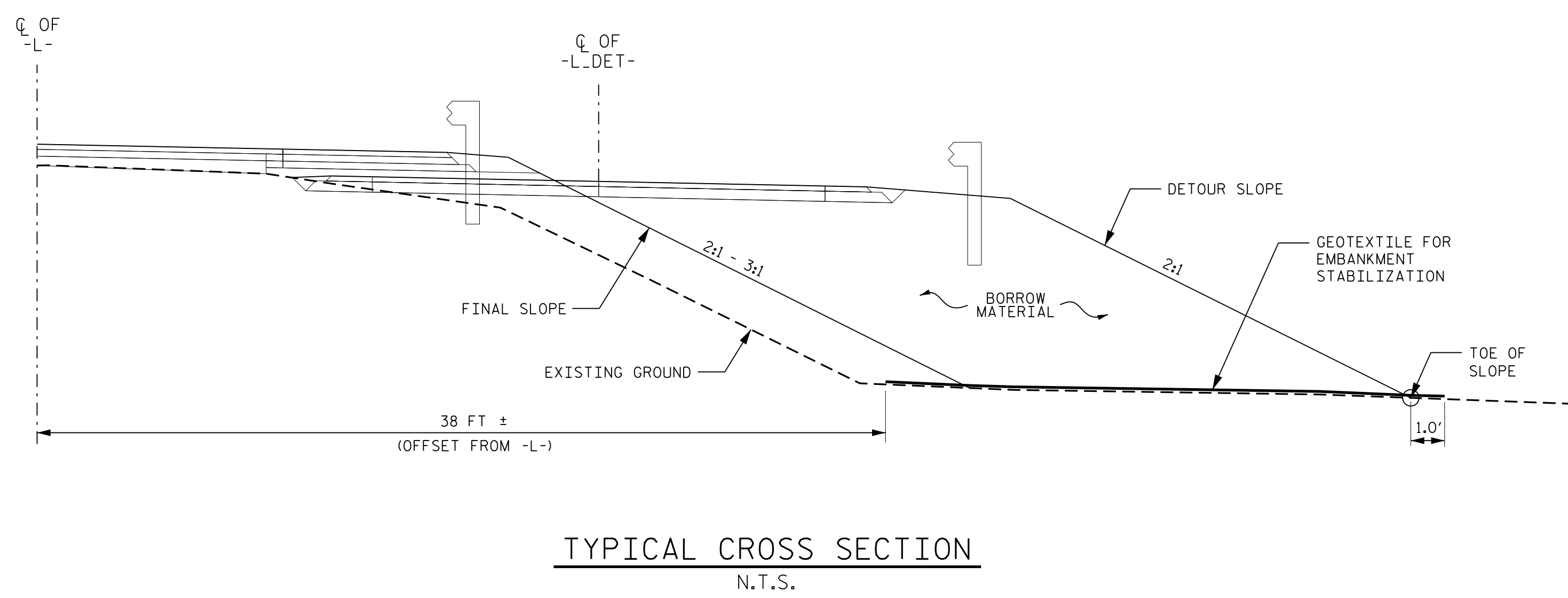
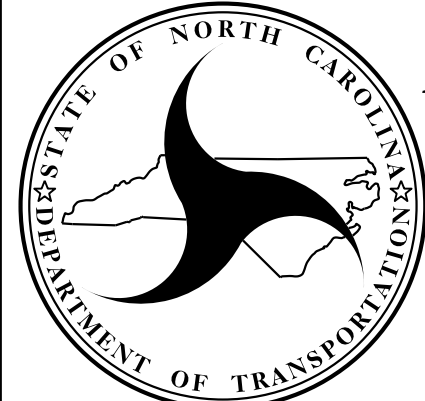
<b>PROJECT REFERENCE NO.</b> B-5639		<b>SHEET NO.</b> 2G-1	
GEOTECHNICAL ENGINEER  DocuSigned by: <i>J. Park</i> 2/5/2020 DATE: 2/5/2020		ENGINEER DATE: _____ SIGNATURE: _____	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			



GEOTEXTILE FOR EMBANKMENT STABILIZATION QUANTITIES

LINE	STATIONS	OFFSET	QUANTITIES
-L-DET-	STA. 14+70± TO STA. 16+75±	RT	700 SY
-L-DET-	STA. 19+60± TO STA. 23+20±	RT	1,200 SY

- NOTES
- FOR GEOTEXTILE FOR EMBANKMENT STABILIZATION, SEE GEOTEXTILE FOR EMBANKMENT STABILIZATION SPECIAL PROVISION.
  - DO NOT GRUB, ONLY CLEAR THE AREA WITHIN THE LIMITS OF THE GEOTEXTILE FOR EMBANKMENT STABILIZATION.
  - PLACE GEOTEXTILE FOR EMBANKMENT STABILIZATION PERPENDICULAR TO EMBANKMENT CENTERLINE ON THE SLOPE OF -L-DET- ALIGNMENT AS SHOWN IN THE PLAN OR AS DIRECTED BY THE ENGINEER.
  - PLACE THE GEOTEXTILE WITHOUT ANY WRINKLES OR CREASES.
  - NO SEAMS OR JOINTS ARE ALLOWED IN THE MACHINE DIRECTION OF GEOTEXTILE.
  - THE TERMS ROLL AND MACHINE DIRECTION ARE USED INTERCHANGEABLY.
  - ALL JOINTS IN THE CROSS MACHINE DIRECTION MUST BE OVERLAPPED A MINIMUM OF 18 INCHES.

**NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS**

**GEOTECHNICAL  
ENGINEERING UNIT**

**GEOTEXTILE FOR EMBANKMENT STABILIZATION DETAILS**

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

PREPARED BY: J. PARK      DATE: 02/2020  
 REVIEWED BY: J. BATTS      DATE: 02/2020

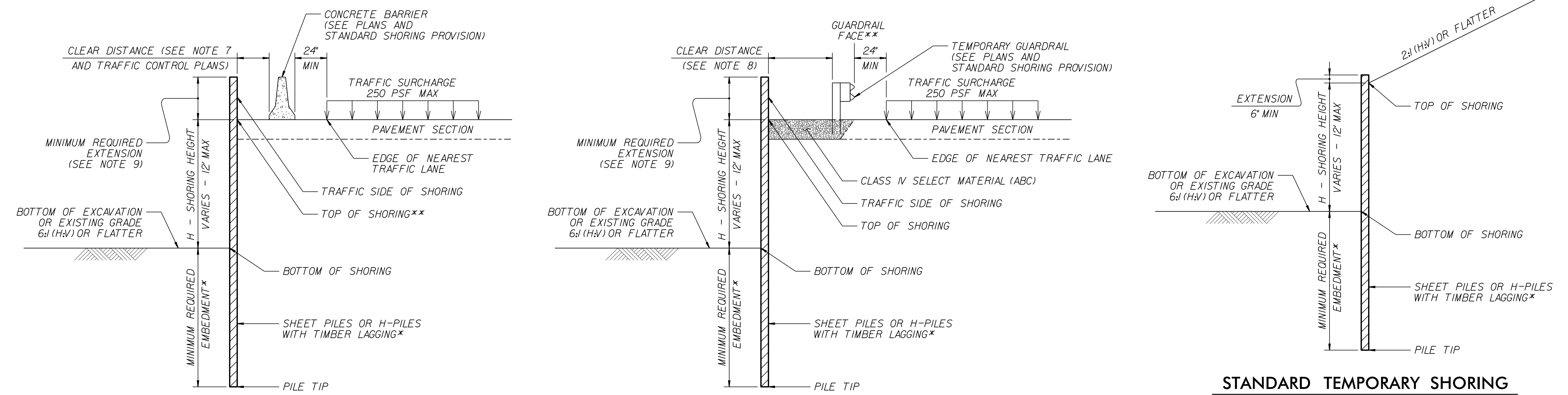


GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

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

**MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS**

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

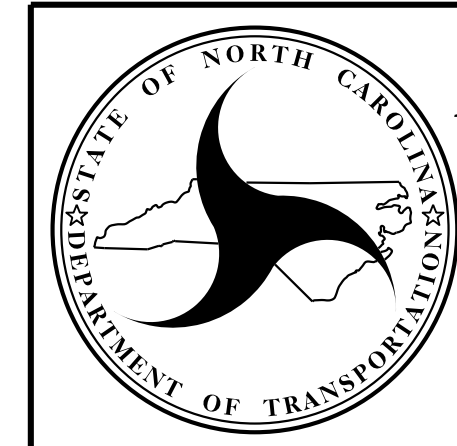


**CONCRETE BARRIER**  
\*\*TOP OF SHORING = EDGE OF PAVEMENT

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

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

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



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

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

5/28/99

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

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

### GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS							IMPACT ATTENUATOR TYPE 350			REMARKS														
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU, TL-3	TYPE III	CAT-1									NO.	PERMITTED G	NG											
-L-	18+75.00	22+68.75	RT	393.75'			20+00.00		4' 11"	8'	154'	50'	3' 1"	1'	1	1																							
-L-	18+75.00	22+68.75	LT	393.75'				20+00.00	4' 11"	8'	50'	154'	1'	3' 1"	1	1																							
-L-	24+41.25	27+25.00	RT	293.75'				26+00.00	4' 11"	8'	50'	154'	1'	3' 1"	1	1																							
-L-	24+41.25	27+25.00	LT	293.75'			24+41.25		4' 11"	8'	154'	50'	3' 1"	1'	1	1																							
SUBTOTAL				1375.00'																																			
LESS ANCHOR DEDUCTIONS																																							
GREU, TL-3 4 x 50.00'				=	-200.00'																																		
TYPE III 4 x 18.75'				=	-75.00'																																		
ADDITIONAL POSTS: 5																																							
TOTAL				1100.00'																																			

### TEMPORARY GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS							IMPACT ATTENUATOR TYPE 350			REMARKS														
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU, TL-3	B-77	CAT-1	TYPE III MODIFIED									NO.	PERMITTED G	NG										
-L_DET-	13+00.00	17+91.04	RT	491.75'			14+00.00		3'	6'	150'		3'	1'	1	1																							
-L_DET-	17+03.54	17+91.04	LT	87.50'				17+91.04	3'	6'		12.5'	1'	0.25"	1	1																							
-L_DET-	19+61.04	26+00.00	RT	639.375'				25+00.00	3'	6'		12.5'	1'	0.25"	1	1																							
-L_DET-	19+61.04	21+22.19	LT	160.375'			19+61.04		3'	6'	150'		3'	1'	1	1																							
-L-	21+04.20	23+04.20	RT	200.00'			23+04.20		2'	2'					1																								
-L-	24+08+84	25+83.84	RT	175.00'				24+08.84	2'	2'					1																								
SUBTOTAL				1754.00'																																			
LESS ANCHOR DEDUCTIONS																																							
TYPE III, MODIFIED 2 x 18.75'				=	-37.50'																																		
GREU, TL-3 6 x 50.00'				=	-300.00'																																		
B-77 4 x 22.875'				=	-91.50'																																		
ADDITIONAL POSTS: 5																																							
TOTAL				1325.00'																																			

### SUMMARY OF EARTHWORK IN CUBIC YARDS

### SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD'
-L-	22+20	23+03.97	CL	213.13
-L-	24+08.65	24+90	CL	210.20
-L_DET-	10+26.46	15+36.18	CL	570.81
-L_DET-	15+36.18	17+91.04	CL	736.26
-L_DET-	19+61.04	22+22.65	CL	755.76
-L_DET-	22+22.65	26+54.80	CL	559.34
TOTAL:				3045.51
SAY:				3200

### SUMMARY OF SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH
-L-	24+52.13	24+65.50	LT	13.37'
-L-	24+52.13	24+65.50	RT	13.37'
-L_DET-	19+61.04	19+94.00	LT	32.96'
TOTAL:				59.7
SAY:				65

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
-L- 17+50.00 TO 22+68.75 (BEGIN BRIDGE)	67		1115	1048	
-L- 24+41.25 (END BRIDGE) TO 27+50.00	88		340	252	
-L_DET- 10+26.46 TO 17+91.04 (BEGIN BRIDGE)	29		4268	4239	
-L_DET- 19+61.04 (END BRIDGE) TO 26+54.80	50		3816	3766	
SUBTOTAL		234	9539	9305	
DETOUR REMOVAL		5955			5955
PROJECT TOTAL		6189	9539	9305	5955
EST. 5% TO REPLACE TOPSOIL ON BORROW PIT				466	
GRAND TOTAL		6189		9771	5955
SAY		6500		10260	

EST. UNDERCUT EXCAVATION = 300 CUBIC YARDS  
EST. SELECT GRANULAR MATERIAL = 300 CUBIC YARDS

NOTE: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Asphalt Pavement will be paid for at the contract Lump Sum price for "Grading".

NOTE: Earthwork quantities are calculated by the designer. These quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

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COMPUTED BY: Tyler C. Bottoms DATE: 9/5/19  
 CHECKED BY: Jinyoung Park DATE: 2/4/20

(12-17-19)

PROJECT NO.	SHEET NO.
B-5639	3G-1

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	200
				<b>TOTAL LF:</b>	200

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

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
-L-	2.5:1	19+75 ±	2:1	22+70 ±	LT	1	-	750
-L-	2.5:1	19+75 ±	2:1	22+70 ±	RT	1	-	720
-L-	2.5:1	25+25 ±	2.5:1	26+25 ±	RT	1	-	230
							<b>TOTAL SY:</b>	1700

\*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

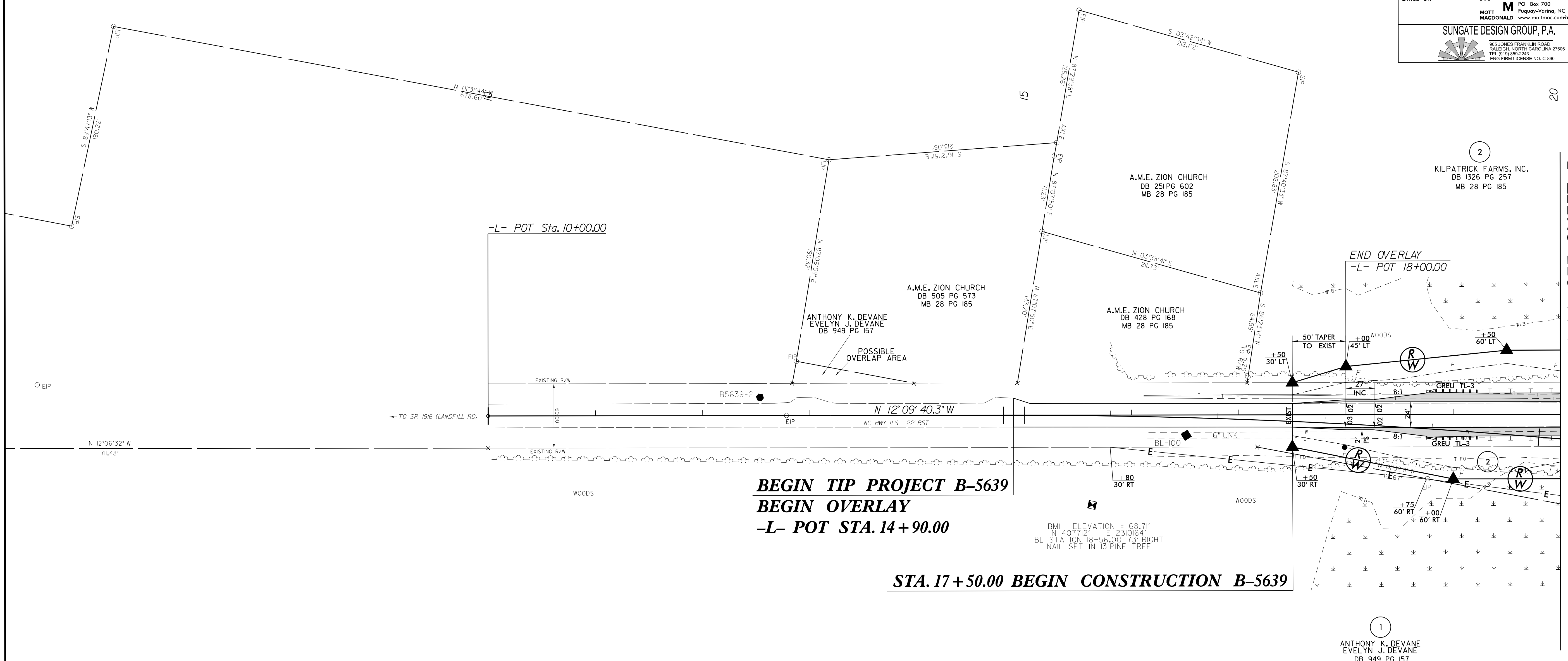




8/17/99

PROJECT REFERENCE NO. <i>B-5639</i>		SHEET NO. 4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
MOTT MACDONALD 1 & E, LLC LICENSE NO. F-0669			
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
Prepared in the Office of:		<b>M</b> PO Box 700 MOTT MACDONALD Fuquay-Varina, NC 27524 www.mottmac.com/americas	
<b>SUNGATE DESIGN GROUP, P.A.</b> 905 JONES FRANKLIN ROAD DALLICH NORTH CAROLINA 27608 TEL: (919) 895-2245 ENG FIRM LICENSE NO. C-890			

NAD 83/2011



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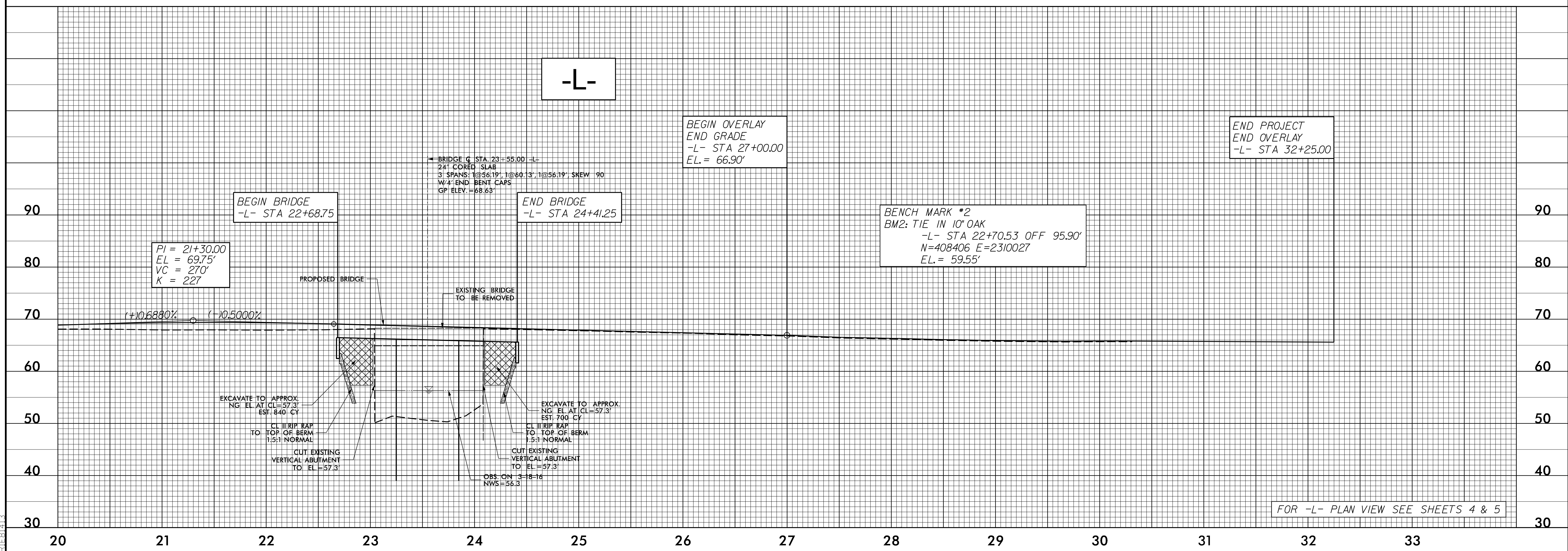
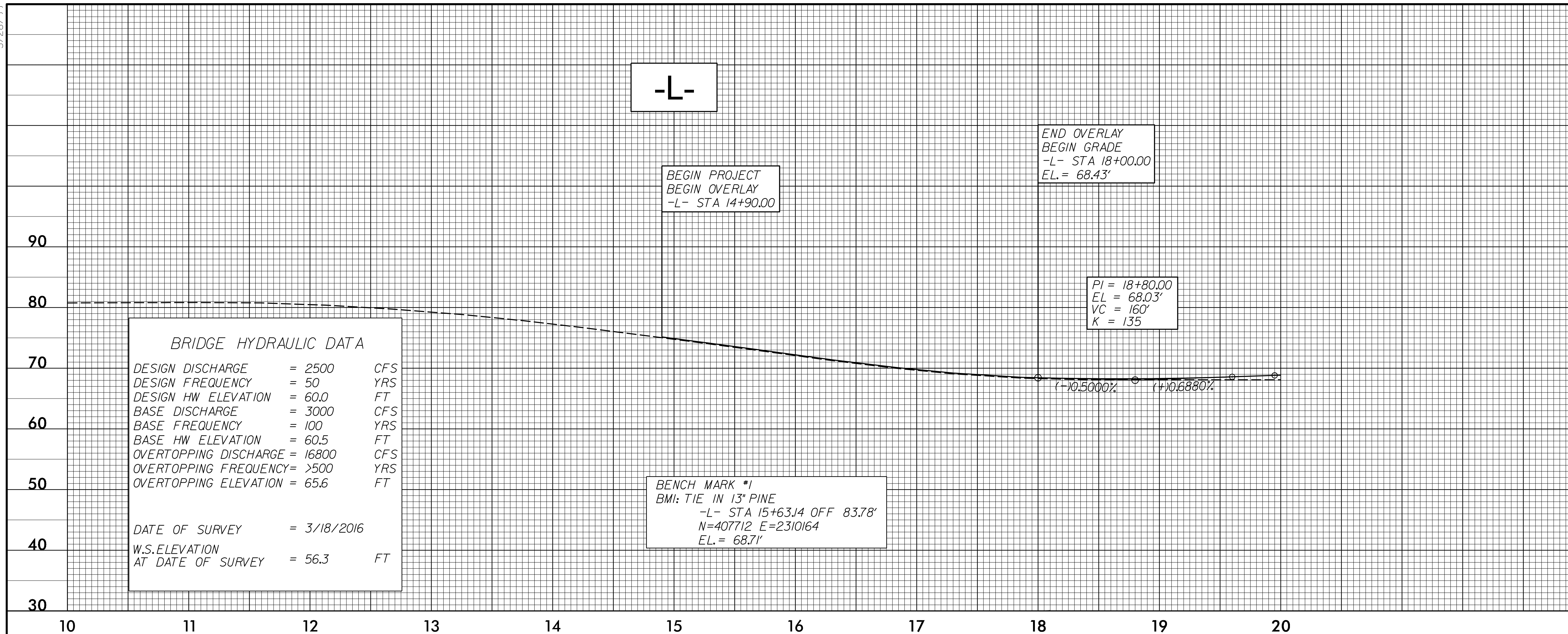
FOR -L- PROFILE, SEE SHEET 6  
FOR DETOUR DESIGN, SEE SHEETS 2B-1 & 2B-2





5/28/19

PROJECT REFERENCE NO. <i>B-5639</i>	SHEET NO. <i>6</i>
ROADWAY DESIGN ENGINEER MOTT MACDONALD & E, LLC SEAL 27391 3/25/2016	HYDRAULICS ENGINEER MOTT MACDONALD & E, LLC SEAL 26971 3/25/2016
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of: <b>M</b> MOTT MACDONALD & E, LLC PO Box 700 Furqan-Yarima, NC 27526 www.mottmac.com/americas	
SUNGATE DESIGN GROUP, P.A. 905 JONES FRANKLIN ROAD RALEIGH NORTH CAROLINA 27609 TEL (919) 855-2443 FAX (919) 855-2444 ENG. FIRM LICENSE NO. C-899	



FOR -L- PLAN VIEW SEE SHEETS 4 & 5

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