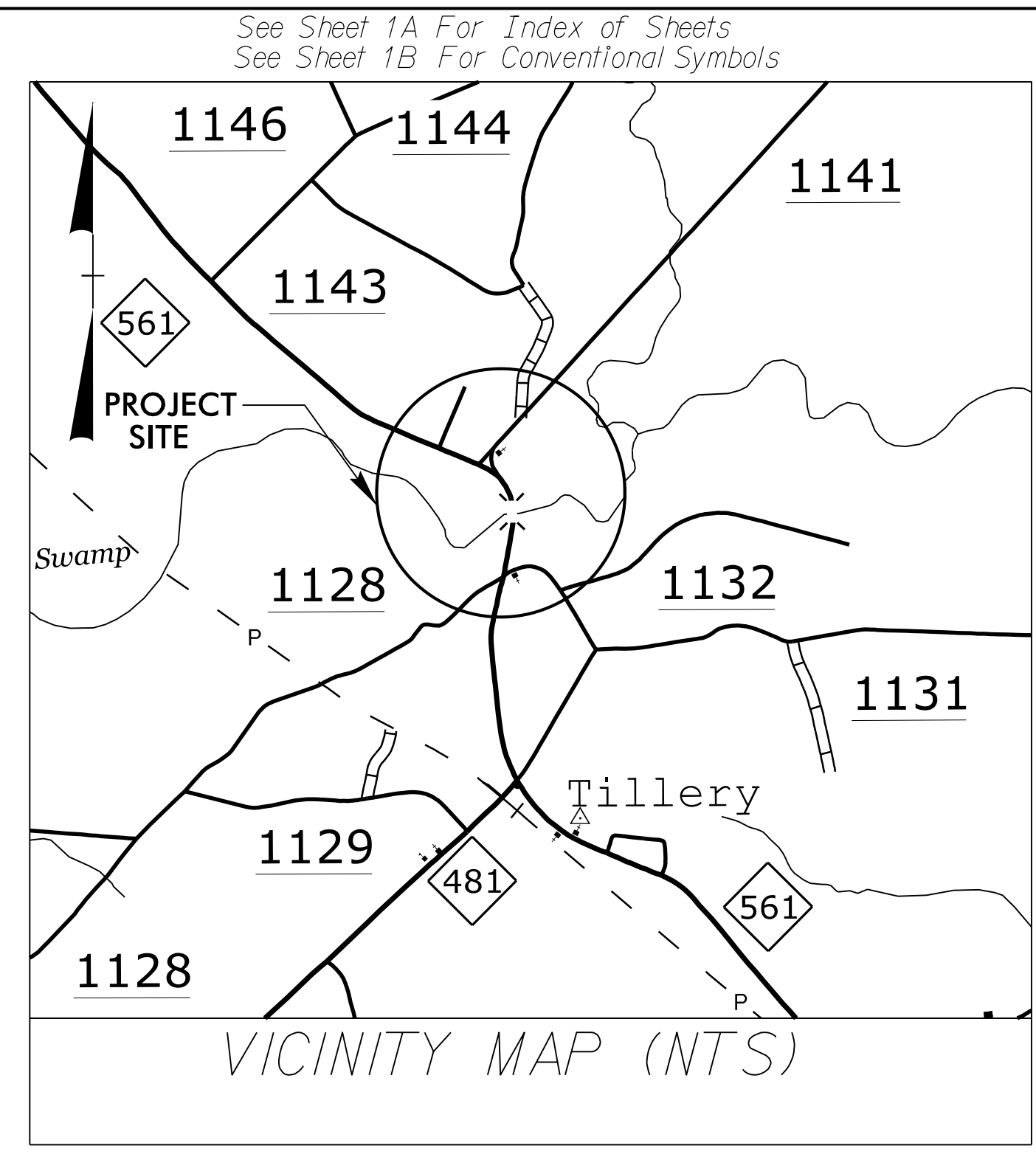


09_08/19

TIP PROJECT: B-5662

CONTRACT: C204489

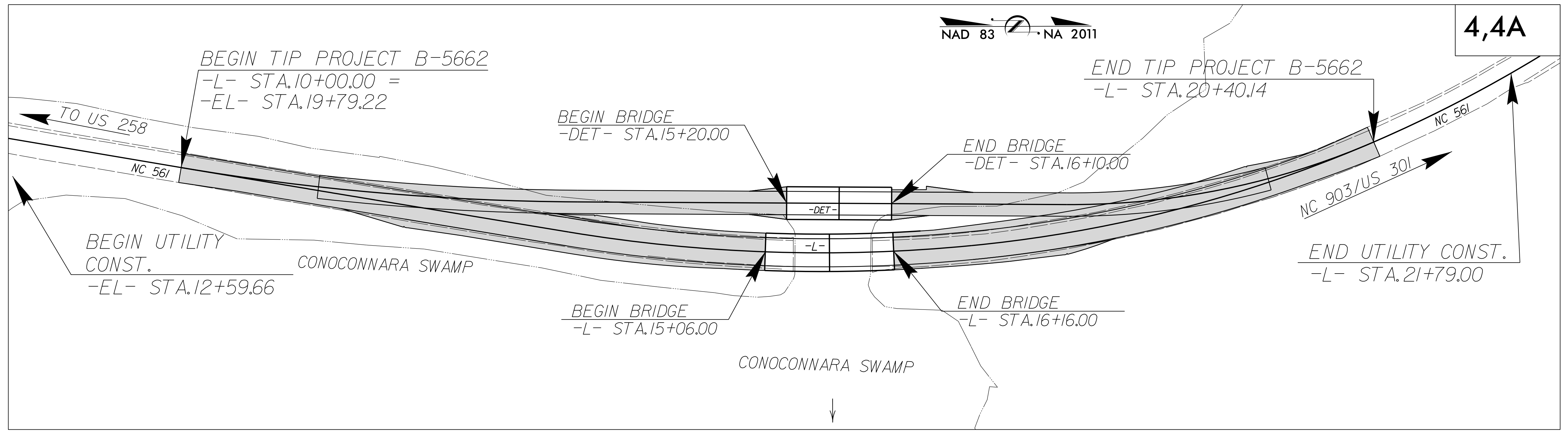


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
HALIFAX COUNTY

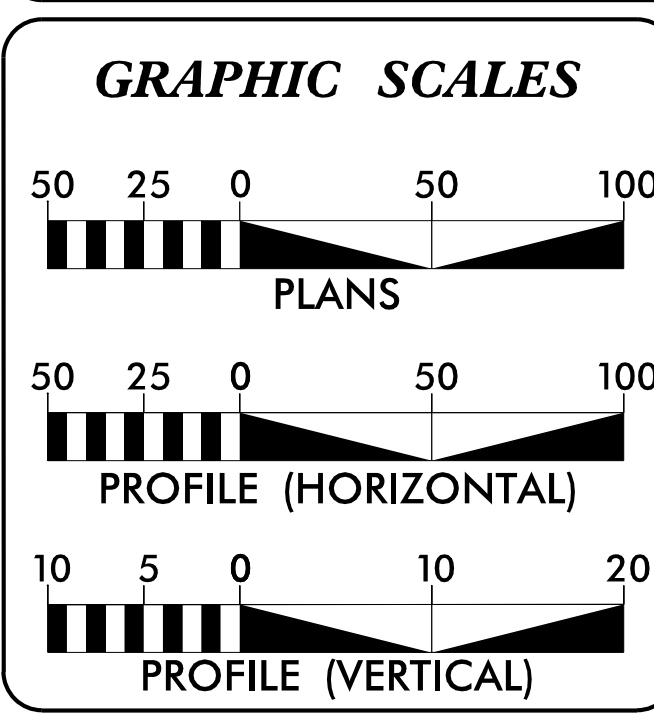
**LOCATION: REPLACE BRIDGE NO. 93 OVER
CONOCONNARA SWAMP ON NC 561**

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5662	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45617.1.2		P.E.	
45617.2.1		ROWUTIL	
45617.3.1		CONST.	



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2020 =	1150
ADT 2040 =	1400
K =	10 %
D =	55 %
T =	12 % *
V =	60 MPH
V DET =	45 MPH
* TTST =	5% DUAL 7%
MAJOR COLLECTOR REGIONAL TIER	

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5662	=	.176 MILES
LENGTH OF STRUCTURE TIP PROJECT B-5662	=	.021 MILES
TOTAL LENGTH OF TIP PROJECT B-5662	=	.197 MILES

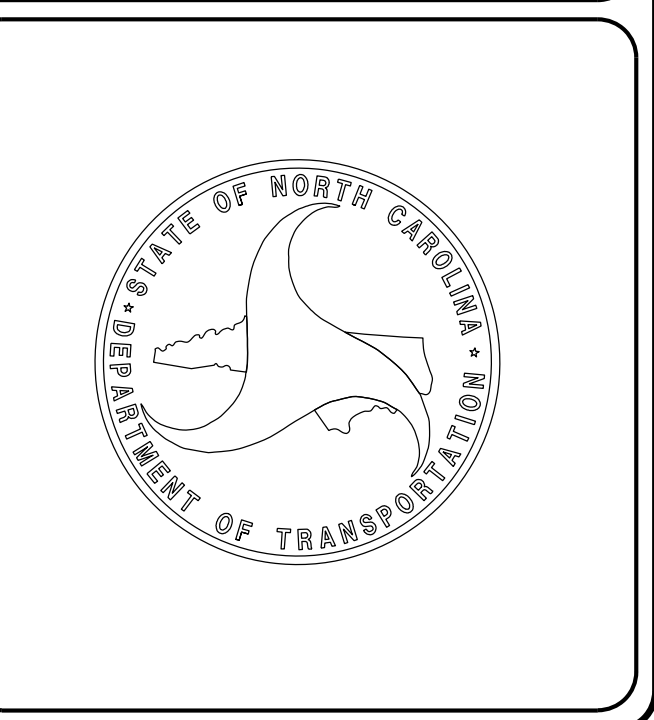
Prepared in the Office of: KCI KCI Associates of N.C., P.A. 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 Fax (919) 783-9266 http://www.kci.com	Plans Prepared For: DIVISION OF HIGHWAYS 1000 Birch Ridge Dr. Raleigh NC, 27610
2018 STANDARD SPECIFICATIONS	DEWAYNE L. SYKES, P.E. PROJECT ENGINEER
RIGHT OF WAY DATE: DECEMBER 9, 2019	BRYAN E. HOUGH, P.E. PROJECT DESIGN ENGINEER
LETTING DATE: FEBRUARY 16, 2021	KRISTY ALFORD, P.E. STRUCTURES MANAGEMENT UNIT
NC DOT CONTACT:	

HYDRAULICS ENGINEER

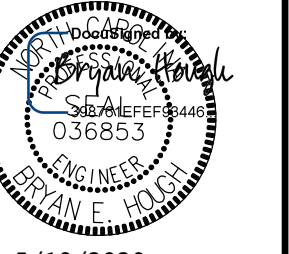
DocuSigned by:
CANCER/1853437
SIGNATURE:

ROADWAY DESIGN ENGINEER

DocuSigned by:
Bryan Hough
SIGNATURE:



05-JAN-2021 07:46
M:\2018\20180945\21B-5662\Roadway\Proj\B-5662_Rdy_tsh.dgn
\$\$\$\$\$SERNAME\$\$\$\$\$



5/19/2020

EFF. 01-16-2018

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 TO 2A-2	TYPICAL SECTIONS, PAVEMENT SCHEDULE, WEDGING DETAIL, AND INCIDENTAL MILLING DETAIL
2C-1	GUARDRAIL INSTALLATION DETAIL
2C-2	TYPE III GUARDRAIL DETAIL
3B-1	SUMMARY OF EARTHWORK, SUMMARY OF SHOULDER BERM GUTTER, SUMMARY OF PAVEMENT REMOVAL, AND SUMMARY OF GUARDRAIL
3D-1	DRAINAGE SUMMARY SHEET
4	PLAN SHEET
4A	DETOUR PLAN SHEET
5	PROFILE SHEET
5A	DETOUR PROFILE SHEET
RW-01	RW TITLE SHEET
RW02C-1 TO RW02C-3	SURVEY CONTROL SHEETS
RW02D-1	PROPOSED ALIGNMENT CONTROL SHEET
RW03E-1 TO RW03E-2	ROW AND PERMANENT EASEMENT CONTROL SHEETS
RW04 TO RW05	RIGHT OF WAY SHEET
TMP-1 TO TMP-5	TRANSPORTATION MANAGEMENT PLANS
PMP-1 TO PMP-2	PAVEMENT MARKING PLANS
EC-1 TO EC-5	EROSION CONTROL PLANS
SIGN-1 TO SIGN-4	SIGNING PLANS
UC-1 TO UC-7	UTILITY CONSTRUCTION PLANS
UO-1 TO UO-2	UTILITIES BY OTHERS PLANS
X-0	CROSS SECTION SUMMARY SHEET
X-1 TO X-8	-L- CROSS-SECTIONS
X-9 TO X-16	-DET- CROSS-SECTIONS
S-1 TO S-30	STRUCTURE PLANS

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

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SUBSURFACE DRAINS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE CENTURYLINK AND HALIFAX COUNTY WATER DEPARTMENT.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON PLANS.

RIGHT-OF-WAY MARKERS:

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

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
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	
422.01	Bridge Approach Fills - Type I Standard Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.20	Frames and Wide Slot Flat Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
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
846.04	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 Riprap at Pipe Outlets

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

12/2/2016

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	--- C ---
Proposed Slope Stakes Fill	--- F ---
Proposed Curb Ramp	--- CR ---
Existing Metal Guardrail	--- T ---
Proposed Guardrail	--- T ---
Existing Cable Guiderail	--- T ---
Proposed Cable Guiderail	--- T ---
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:

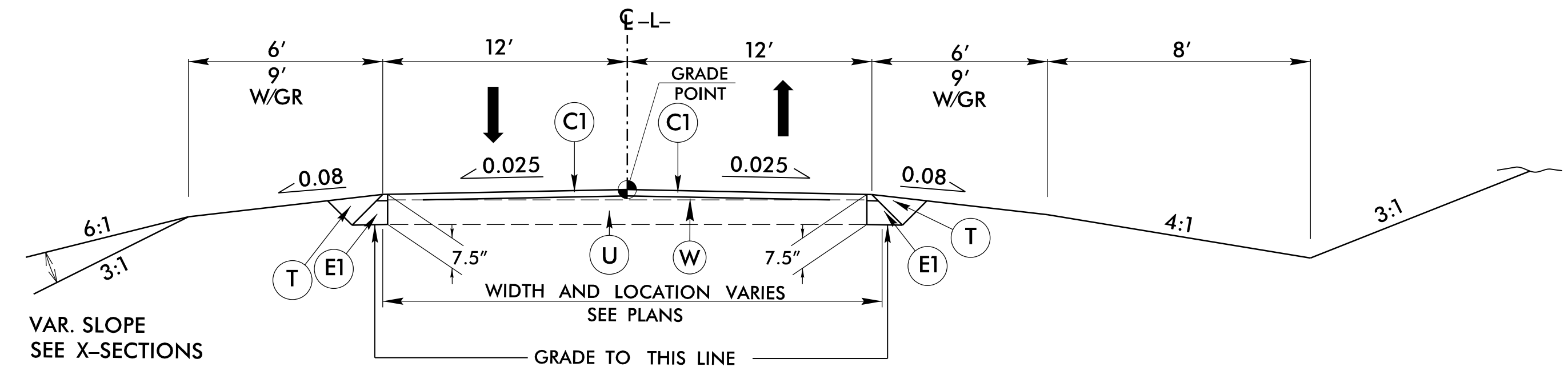
Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	--- SS ---
Above Ground Sanitary Sewer	--- A/G Sanitary Sewer ---
SS Forced Main Line LOS B (S.U.E.*)	--- FSS ---
SS Forced Main Line LOS C (S.U.E.*)	--- FSS ---
SS Forced Main Line LOS D (S.U.E.*)	--- FSS ---

MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line LOS B (S.U.E.*)	--- 7UTL ---
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.

6/22/20

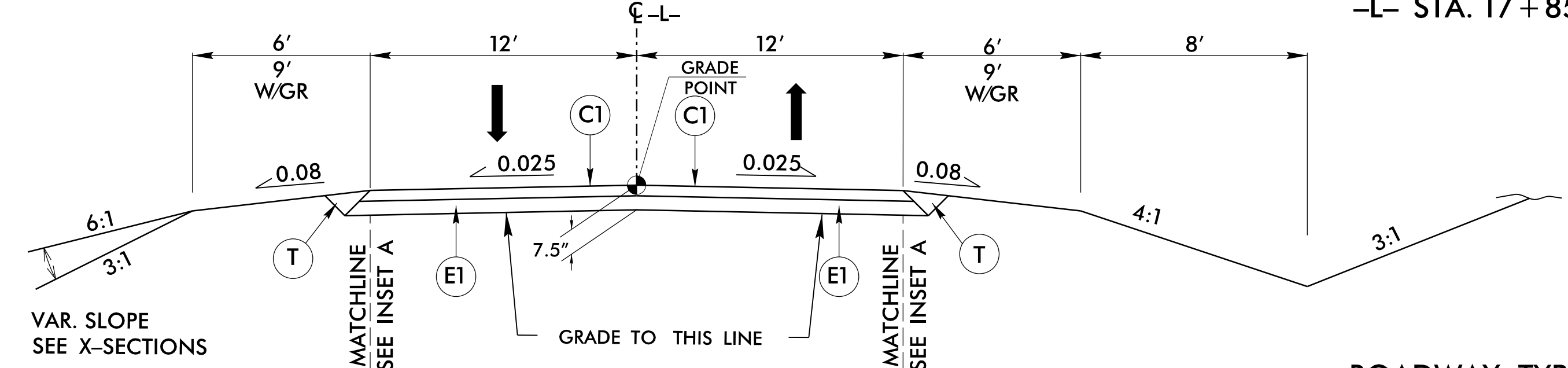
FINAL PAVEMENT SCHEDULE	
ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168.0 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.
E1	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E2	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
R1	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	INCIDENTAL MILLING
V2	MILLING (3")
W	WEDGING DETAIL



ROADWAY TYPICAL SECTION NO. 1

ROADWAY TYPICAL SECTION NO. 1

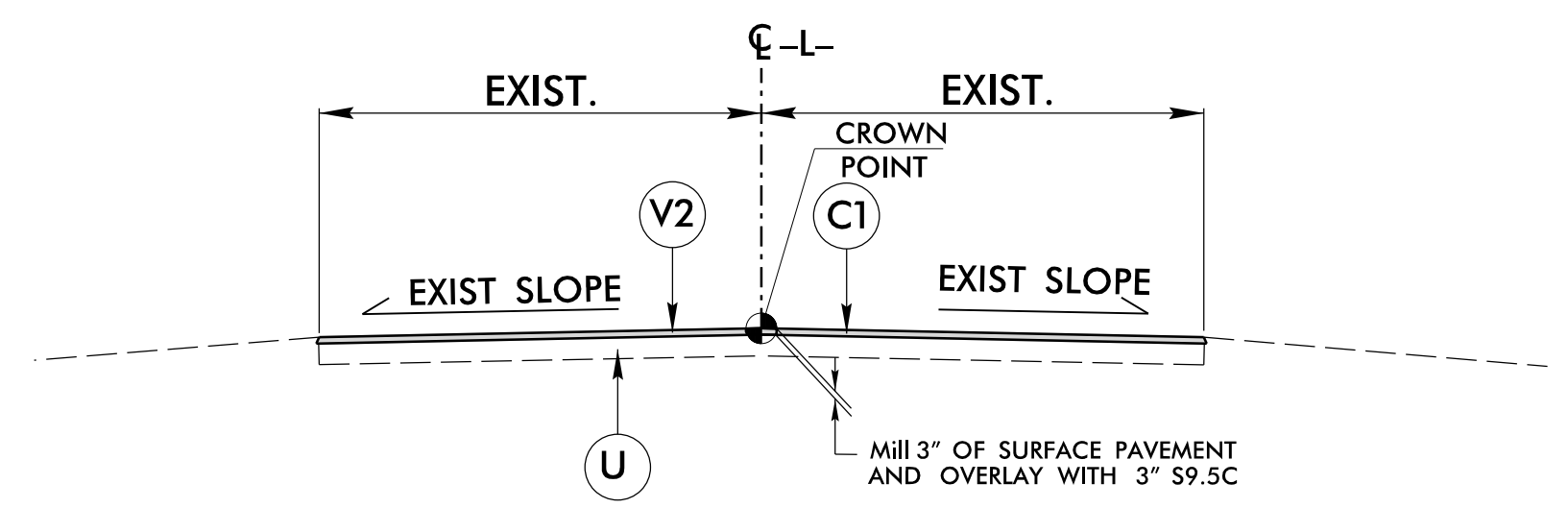
-L- STA. 10+00.00 TO STA. 12+48.00
-L- STA. 17+85.00 TO STA. 19+78.00



ROADWAY TYPICAL SECTION NO. 2

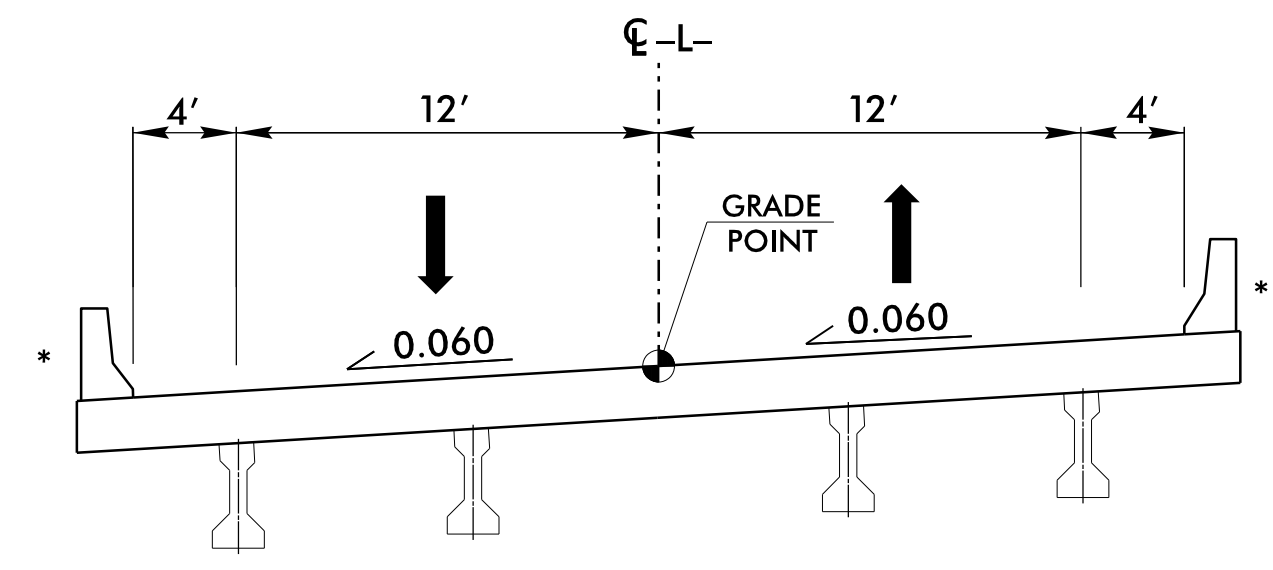
ROADWAY TYPICAL SECTION NO. 2

-L- STA. 12+48.00 TO STA. 15+06.00
-L- STA. 16+16.00 TO STA. 17+85.00



TYPICAL SECTION NO. 2A

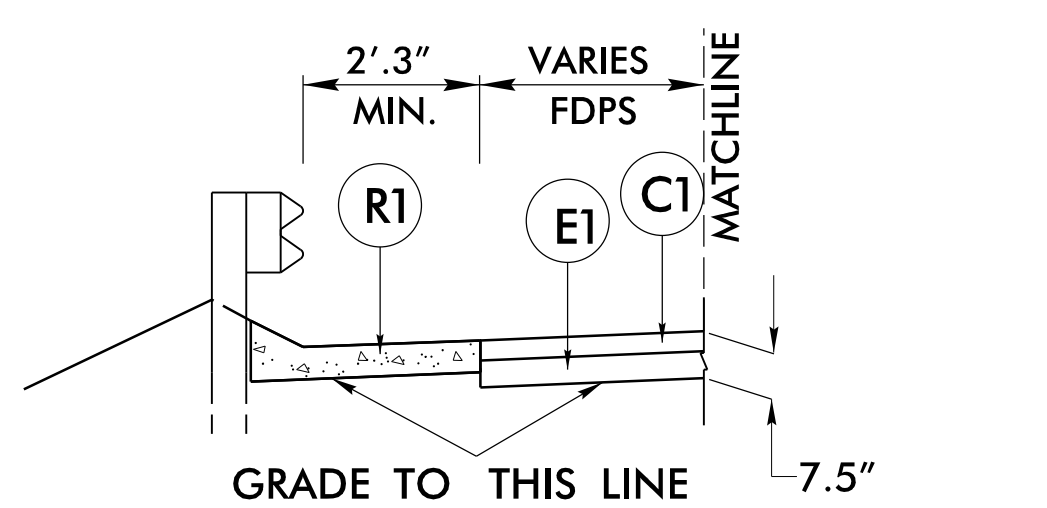
ROADWAY TYPICAL SECTION NO. 2A
MILLING ON -L- LINE FROM STA. 19+78.00 TO 20+40.14



-L- BRIDGE TYPICAL SECTION

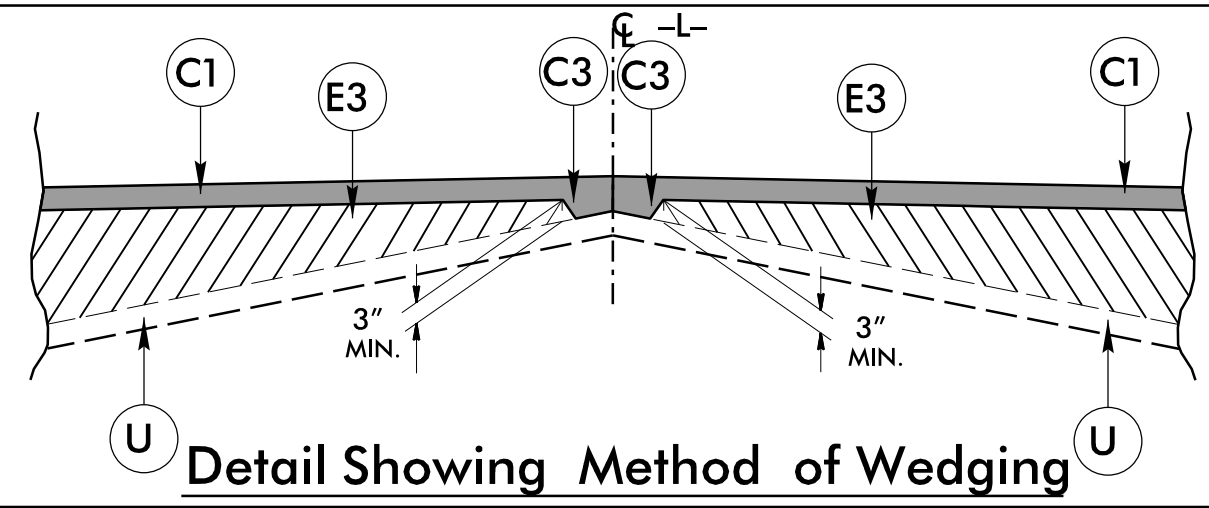
-L- BRIDGE TYPICAL SECTION
-L- STA. 15+06.00 TO STA. 16+16.00

* SEE STRUCTURE DRAWINGS FOR TYPE OF RAIL



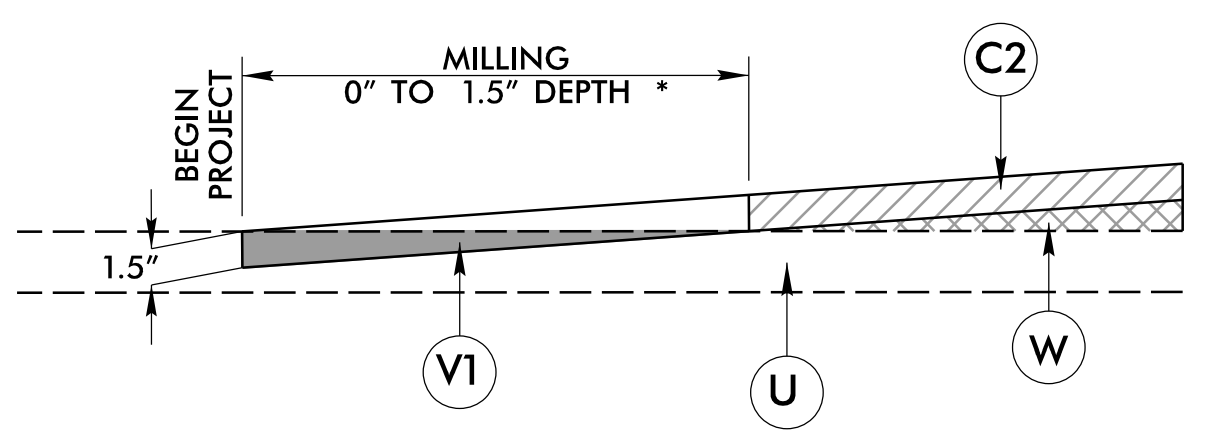
DETAIL SHOWING SHOULDER BERM GUTTER (SBG) ON TOP OF SUBGRADE

-L- STA. 16+30 (APP. SLAB) TO 16+52 LT
USE ROADWAY TYPICAL SECTION NO. 2

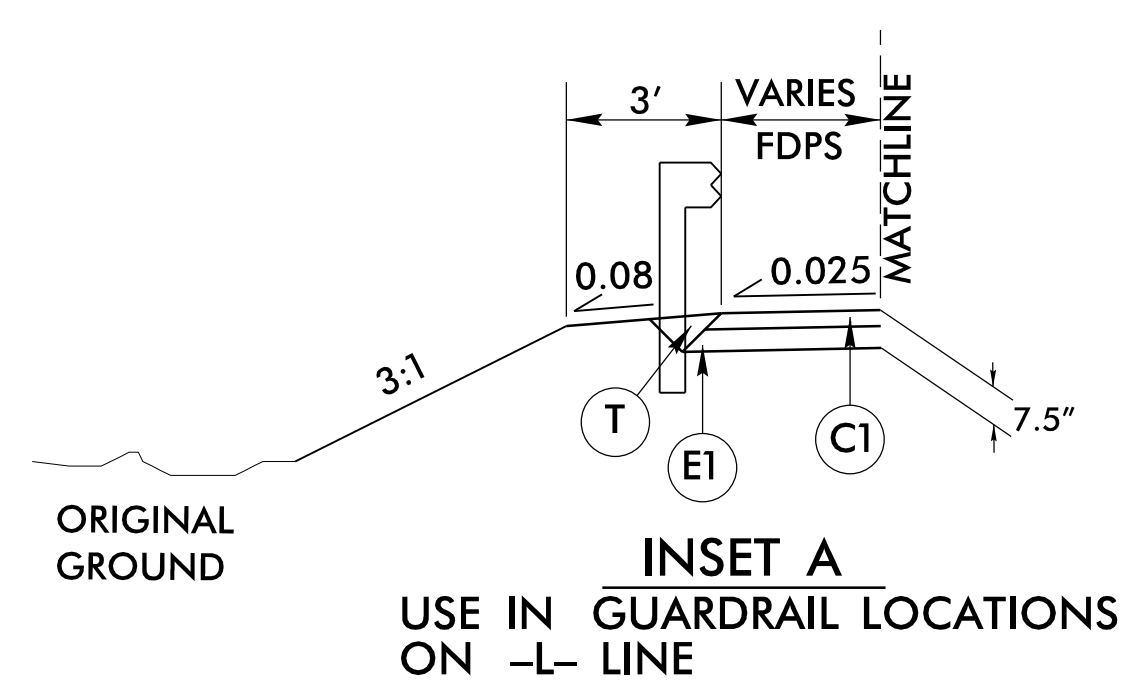


Detail Showing Method of Wedging

INCIDENTAL MILLING DETAIL



NOTE: MIRROR FOR END PROJECT * MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER



INSET A
USE IN GUARDRAIL LOCATIONS ON -L- LINE

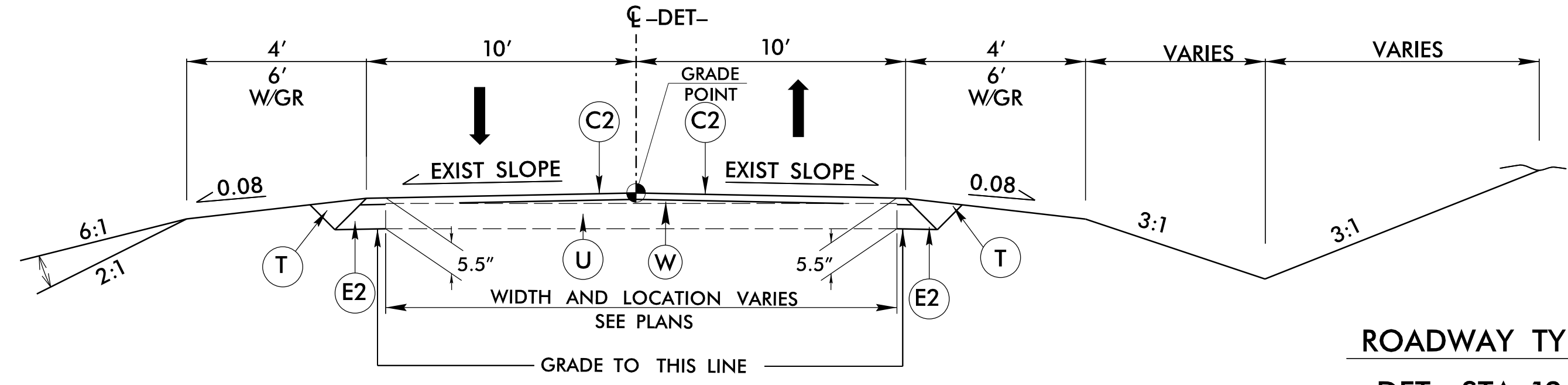
PROJECT REFERENCE NO. B-5662	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER
4/22/2020	4/22/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266	

P2: APR 2020 10:35
 M:\2018\05100187\B-5662-Roadway\Proj\B-5662-Rdy_tup.dgn
 11:51:11 AM 4/22/2020

6/2/2019

FINAL PAVEMENT SCHEDULE
ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

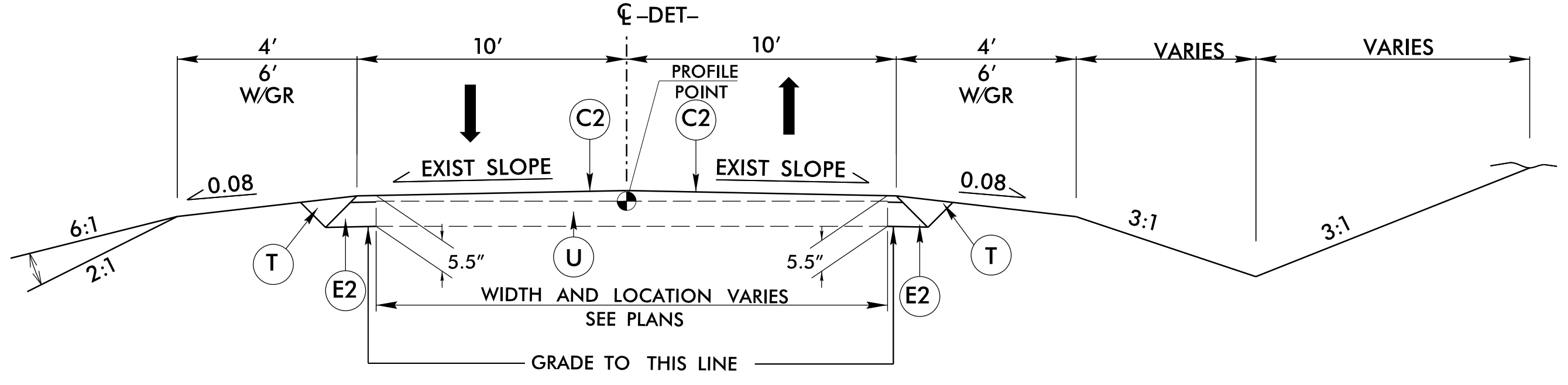
C1	3" S9.5C
C2	1.5" S9.5C
C3	VAR. S9.5C
E1	4.5" B25.0C
E2	4" B25.0C
E3	VAR. B25.0C
R1	SBG
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	INC. MILLING
V2	MILLING (3")
W	WEDGING DETAIL



ROADWAY TYPICAL SECTION NO. 3

ROADWAY TYPICAL SECTION NO. 3

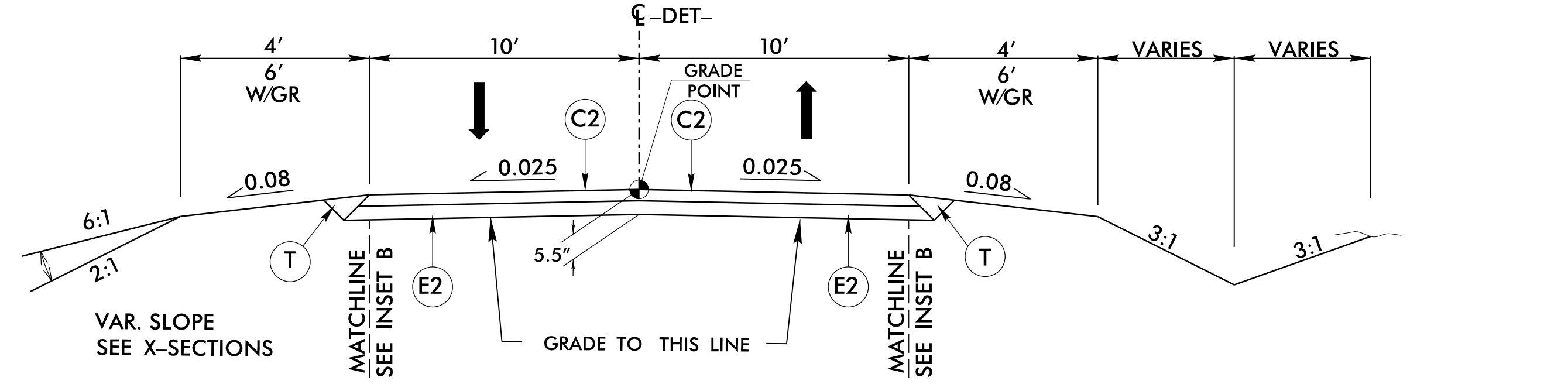
-DET- STA. 12+42.33 TO STA. 13+21.10
-DET- STA. 17+66.35 TO STA. 18+28.60



ROADWAY TYPICAL SECTION NO. 3A

ROADWAY TYPICAL SECTION NO. 3A

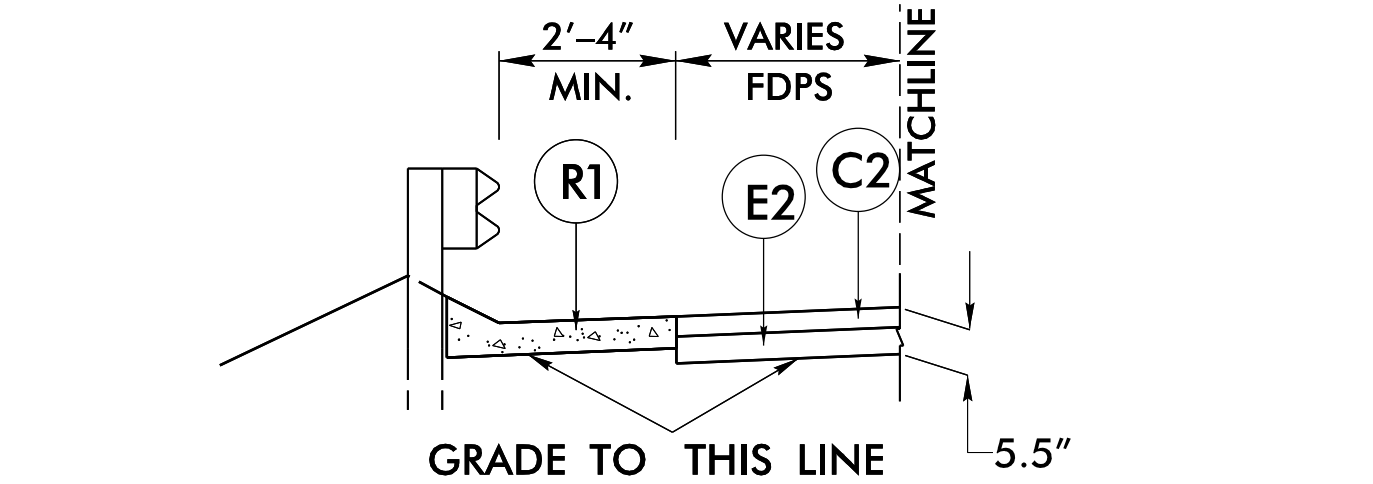
-DET- STA. 11+18.79 TO STA. 12+42.33
-DET- STA. 18+28.60 TO STA. 19+34.87



ROADWAY TYPICAL SECTION NO. 4

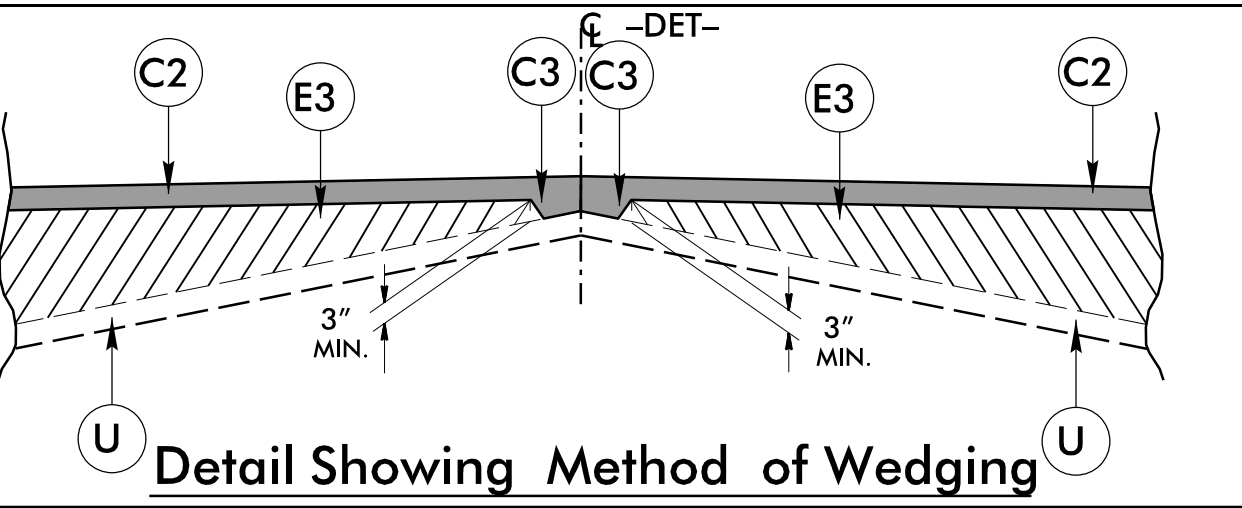
ROADWAY TYPICAL SECTION NO. 4

-DET- STA. 13+21.10 TO STA. 15+20.00
-DET- STA. 16+10.00 TO STA. 17+66.35

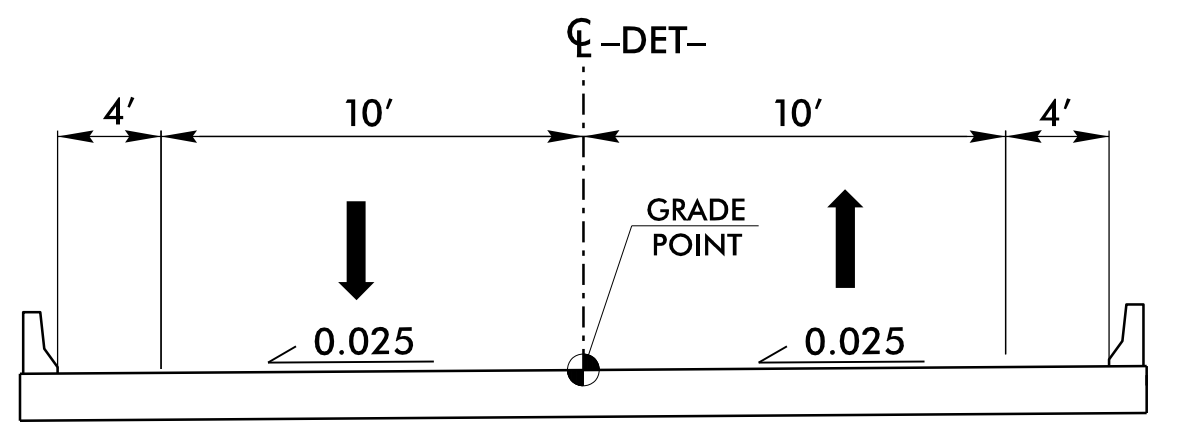


DETAIL SHOWING SHOULDER BERM GUTTER (SBG) ON TOP OF SUBGRADE

-DET- STA. 16+10.40 (APP. SLAB) TO 16+40.10 LT
USE ROADWAY TYPICAL SECTION NO. 4

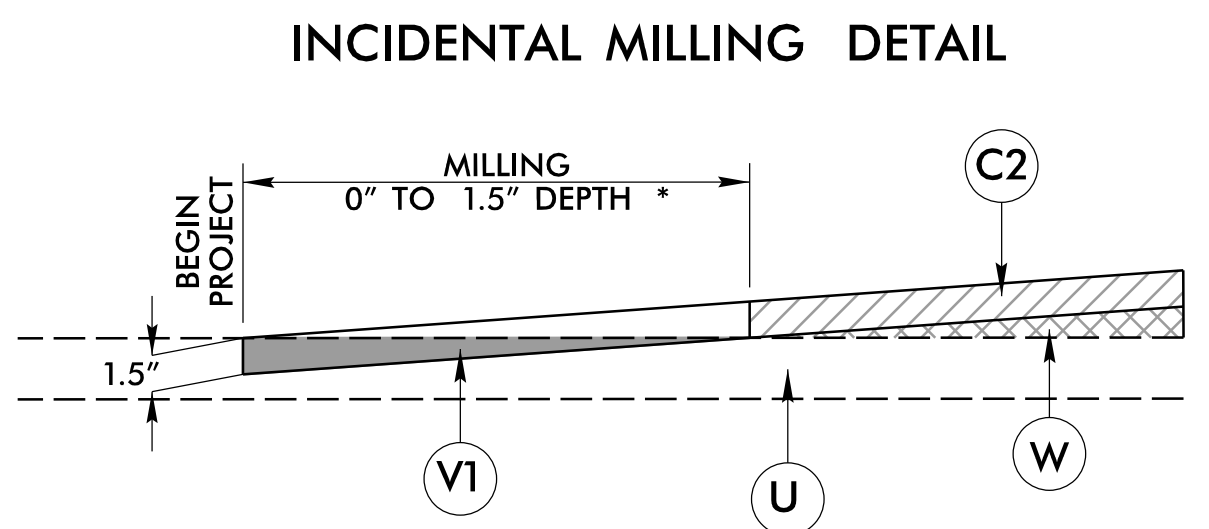


Detail Showing Method of Wedging



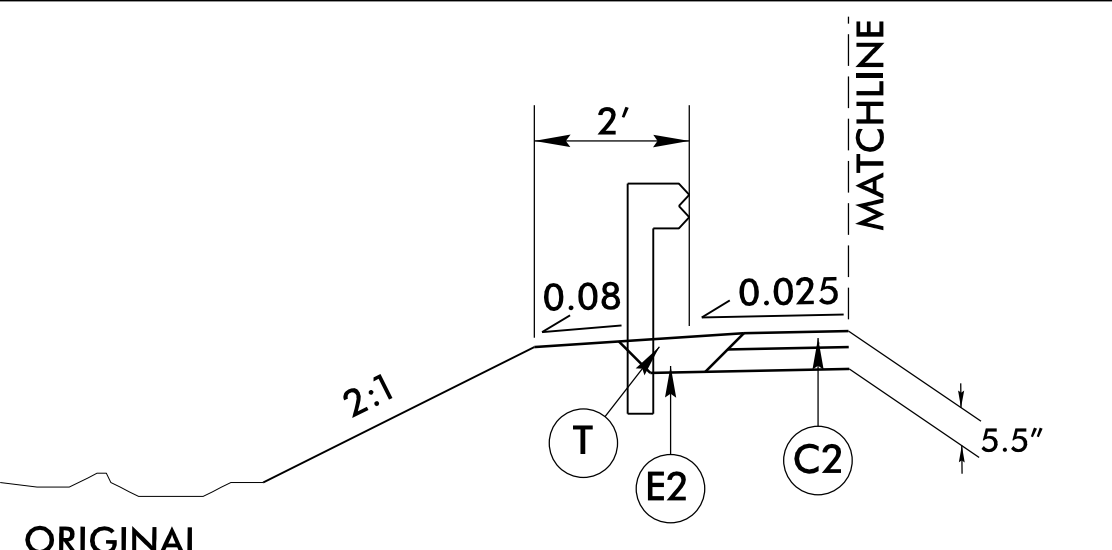
-DET- BRIDGE TYPICAL SECTION

-DET- BRIDGE TYPICAL SECTION
-DET- STA. 15+20.00 TO STA. 16+10.00



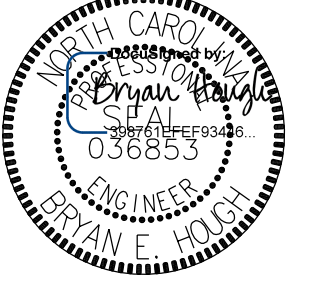
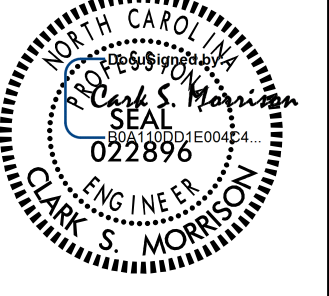

INCIDENTAL MILLING DETAIL

NOTE: MIRROR FOR END PROJECT * MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER



INSET B

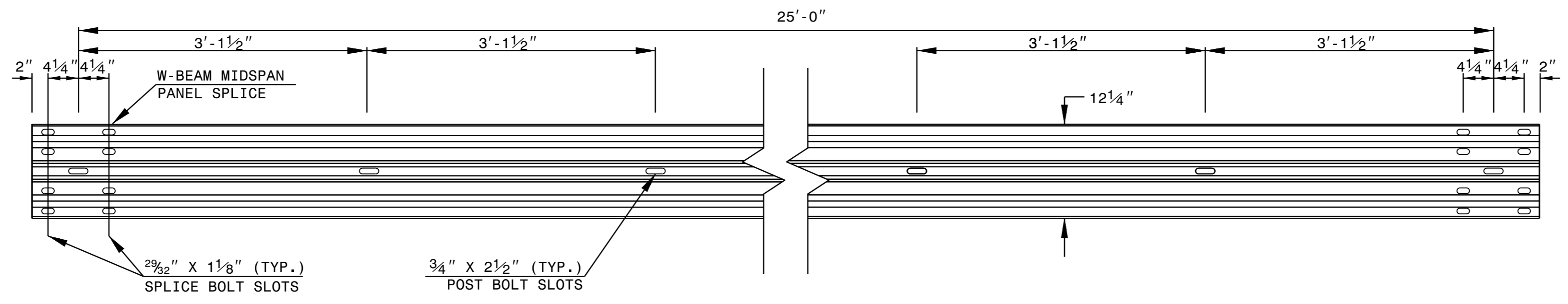
USE IN GUARDRAIL LOCATIONS ON -DET-

PROJECT REFERENCE NO. B-5662	SHEET NO. 2A-2
ROADWAY DESIGN ENGINEER  BRIAN E. HOUCH 4/22/2020	PAVEMENT DESIGN ENGINEER  CLARK S. MORRISON 4/22/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266	

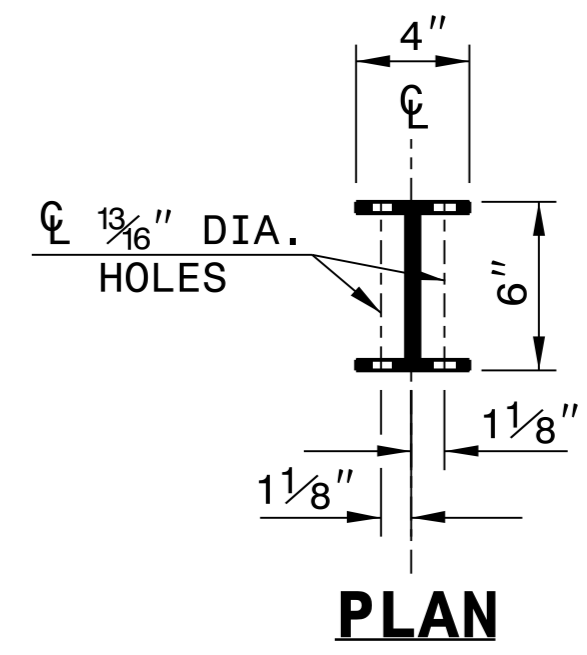
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

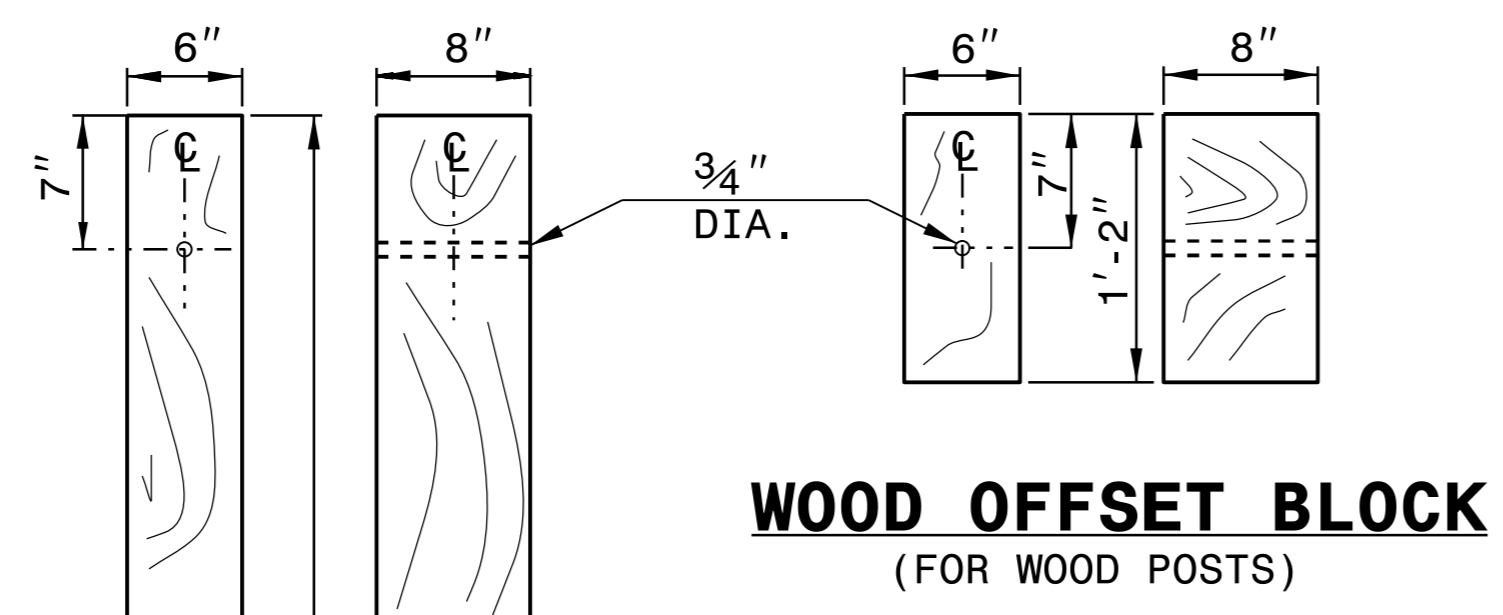
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL



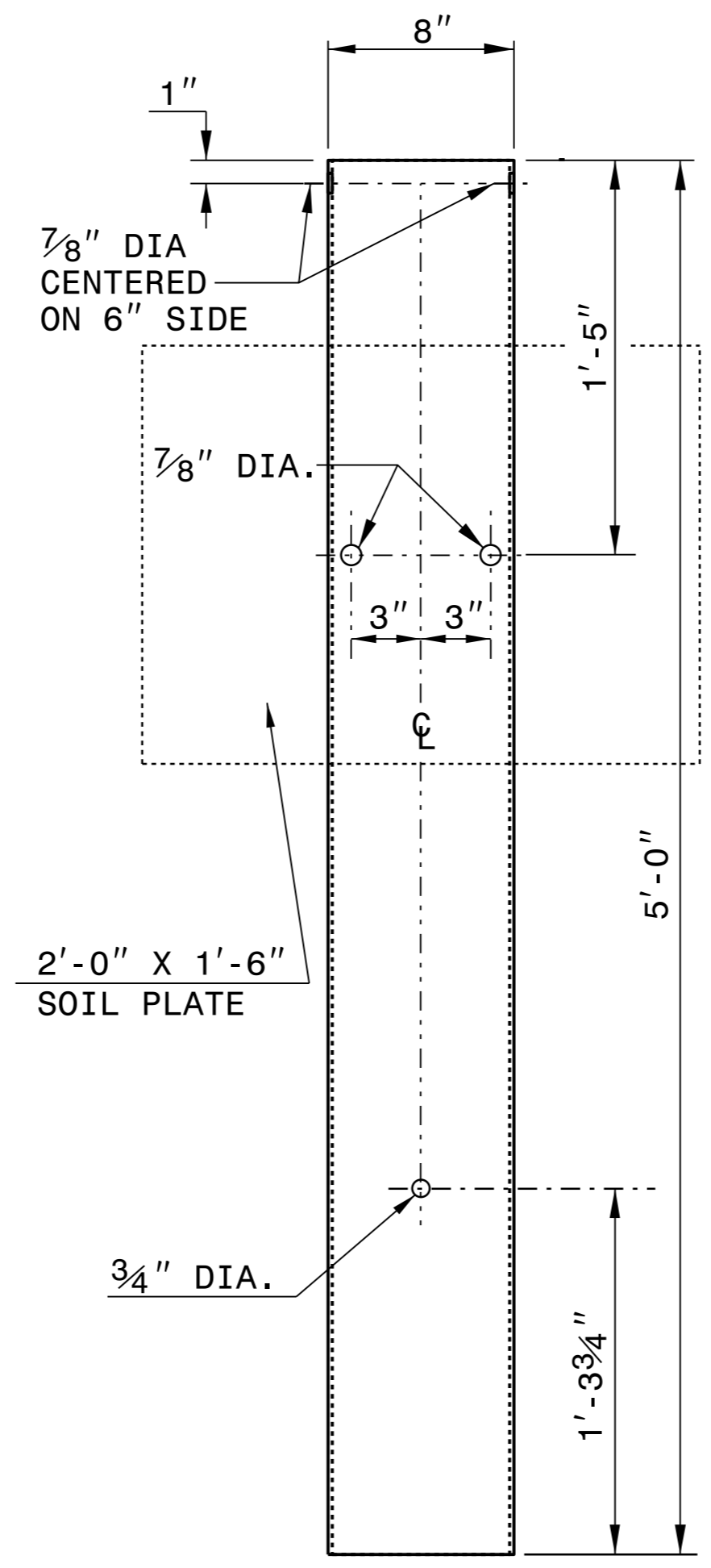
PLAN



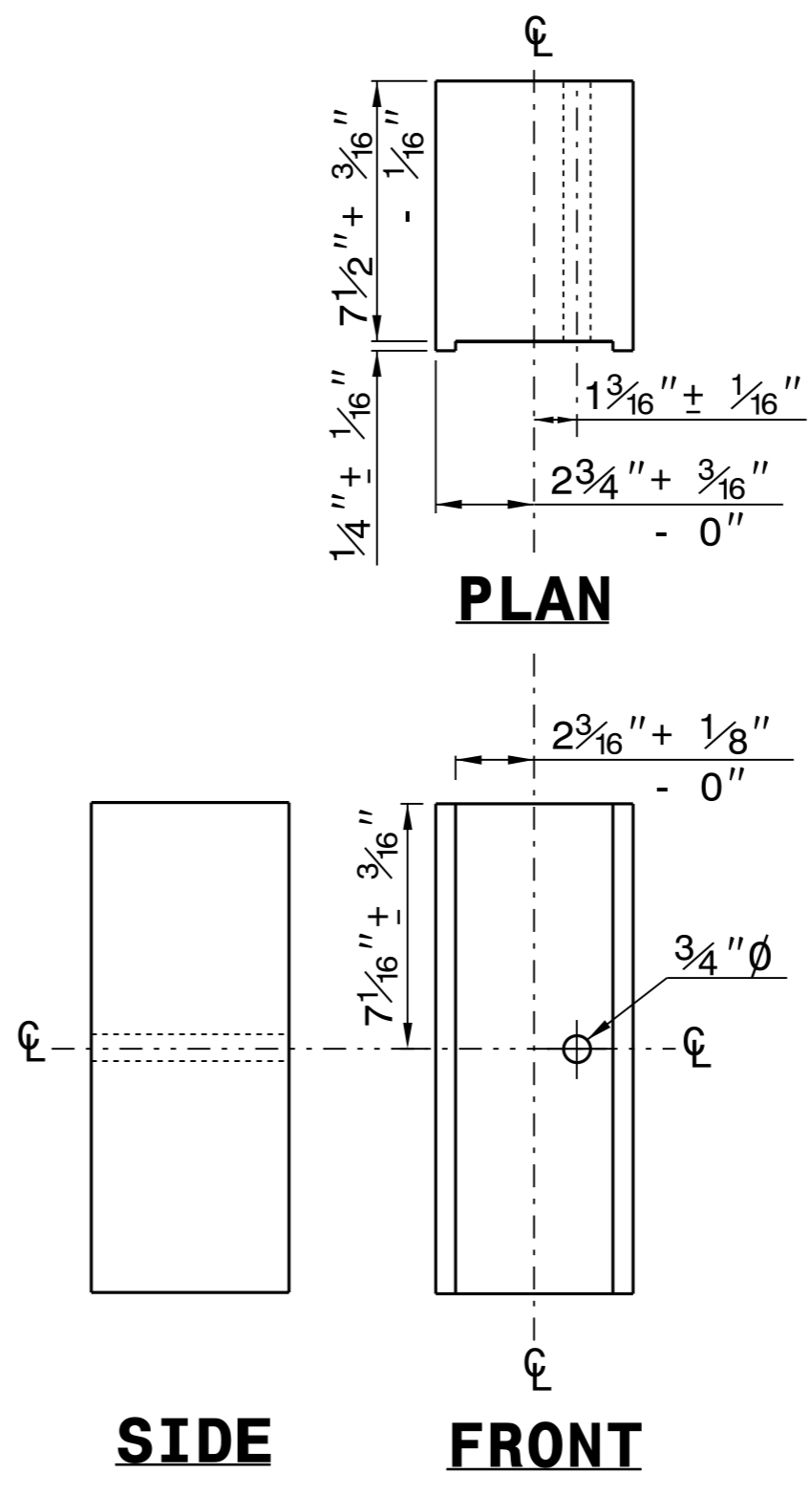
**WOOD OFFSET BLOCK
(FOR WOOD POSTS)**

**STANDARD
LINE POST**

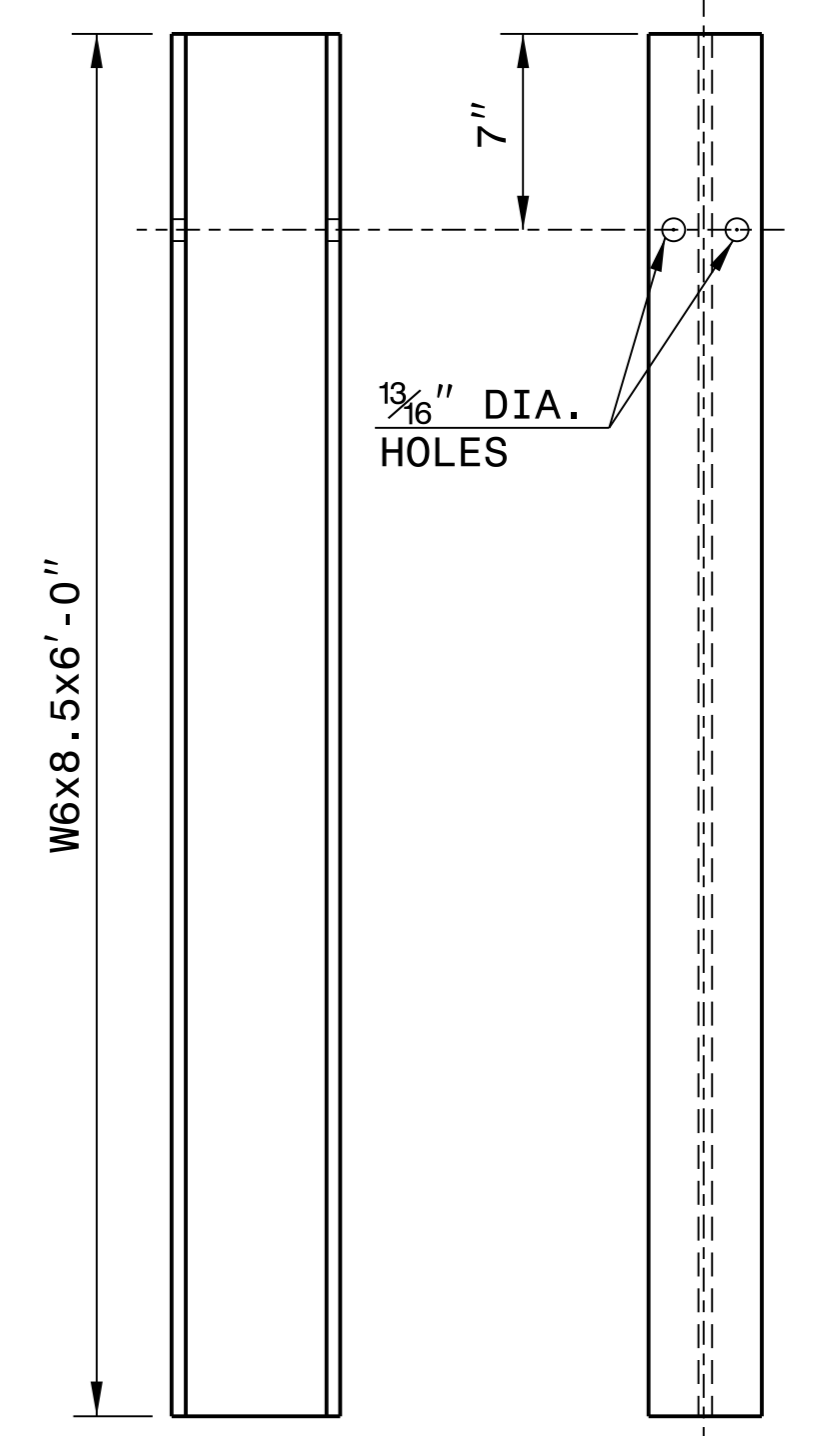
**SHORT WOOD
BREAKAWAY POST**



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



**ROUTED
OFFSET BLOCK**



"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



4/22/2020

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

SEE TITLE BLOCK

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

I4-DEC-2017 10:36
 S:\Contracts\Special Details\Standard Drawings\Division 8\08662d0301.dgn
 Jhowerton AT: CSU-292595

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

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 3 FOR POST SECTIONS 1 THRU 9.

PLAN VIEW

**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 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

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 3 FOR POST SECTIONS 1 THRU 9.

PLAN VIEW

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

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

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

4/22/2020

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

**SUMMARY OF EARTHWORK
 IN CUBIC YARDS**

STATION	STATION	UNCL. EXCAV.	EMBANK. +/-	BORROW	WASTE
-DET- 11+18.79	-DET- 15+20 +/-	17	3,793	3,776	
-DET- 16+10 +/-	-DET- 19+34.87	41	2,085	2,044	
PHASE 1 (DET) SUBTOTAL:		58	5,878	5,820	
-L- 10+00.00	-L- 15+06 +/-	27	3,735	3,708	
-L- 16+16 +/-	-L- 20+40.14	4	1,621	1,617	
PHASE 2 (L) SUBTOTAL:		31	5,356	5,325	
-L- 12+00.00	-L- 15+06.00	1,632			1,632
-L- 16+16.00	-L- 18+50.00	1,246			1,246
PHASE 3 (DET REMOVAL) SUBTOTAL:		2,878			2,878
TOTALS:		2,967	11,234	11,145	2,878
PROJECT TOTAL:		2,967	11,234	11,145	2,878
EST 5% TO REPLACE TOP SOIL ON BORROW PIT				557	
GRAND TOTAL:		2,967	11,234	11,702	2,878
SAY:		3,000		11,800	

SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LF
-L-	16+30.16	16+52.00	LT	22
-DET-	16+10.37	16+40.11	LT	30
TOTAL:				52
SAY:				57

REMOVAL OF EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD ²
-L-	12+48.00	15+29.78	CL	93.55
-L-	15+98.14	17+85.00	CL	60.94
-DET-	11+18.79	15+20 +/-	CL	626.16
-DET-	16+10 +/-	19+44.91	CL	509.03
TOTAL:				1,289.68
SAY:				1,350

PER GEOTECH RECOMMENDATION: EST. SELECT GRANULAR MATERIAL: 300 CY
 PER GEOTECH RECOMMENDATION: EST. UNDERCUT EXCAVATION: 300 CY

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

THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
 W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
 G = GATING IMPACT ATTENUATOR TYPE 350
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH		WARRANT POINT	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		ANCHORS						TEMP. CRASH CUSHIONS	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS			
				STRAIGHT	SHOP CURVED				DOUBLE FACED	APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	B-77	GREU 350						M-350	TEMP. W-BEAM RETROFIT	TYPE III
-L-	13+56.41	15+06 +/- (BR.)	LEFT	147.875'		15+06 +/- (BR.)	4.00'	7.00'		100'														
-L-	11+96.39	15+06 +/- (BR.)	RIGHT	310.375'		15+06 +/- (BR.)	4.00'	7.00'	150'															
-L-	16+16 +/- (BR.)	17+62.71	RIGHT	147.875'		16+16 +/- (BR.)	4.00'	7.00'		100'														
-L-	16+16 +/- (BR.)	19+30.01	LEFT	310.375'		16+16 +/- (BR.)	4.00'	7.00'	150'															
SUBTOTAL				916.50'																				
LESS ANCHOR DEDUCTIONS:																								
GREU TL-3 4 @ 50.00' =				-200.00'																				
B-77 4 @ 22.875' =				-91.50'																				
ANCHOR DEDUCTION TOTAL:				-291.50'																				
PROJECT TOTAL				625.00'																				
SAY				637.50'																				
TEMPORARY GUARDRAIL																								
-DET-	14+39.13	15+20 +/- (BR.)	LT (SEE DET PLANS)	81.25'		15+20 +/- (BR.)	VARIABLES			100'														
-DET-	14+01.63	15+20 +/- (BR.)	RT (SEE DET PLANS)	118.75'		15+20 +/- (BR.)	VARIABLES				100'													
-DET-	16+10 +/- (BR.)	18+04.19	LT (SEE DET PLANS)	193.75'		16+10 +/- (BR.)	VARIABLES					100'												
-DET-	16+10 +/- (BR.)	16+91.62	RT (SEE DET PLANS)	81.25'		16+10 +/- (BR.)	VARIABLES					100'												
SUBTOTAL				475.00'																				
LESS ANCHOR DEDUCTIONS:																								
TEMP GREU TL-3 4 @ 50.00' =				-200.00'																				
TEMP TYPE III 4 @ 18.75' =				-75.00'																				
ANCHOR DEDUCTION TOTAL:				-275.00'																				
PROJECT TOTAL				200.00'																				
SAY				212.50'																				
ADDITIONAL GUARDRAIL POST TOTAL =				10 EA																				

4/104/06
 7: APR 2000 11:57 AM
 K:\2018\1801154\1801154\21 B-5662\Roadway\Proc\B-5662.Rdy.sum.dgn

12/06/2012

COMPUTED BY: EAS DATE: 8/19/2019
CHECKED BY: LMY DATE: 8/19/2019

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO. SHEET NO.
B-5662 3D-1

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)

Table with columns: LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC), ENDWALLS, REINFORCED ENDWALLS, MASONRY, DRAINAGE STRUCTURE, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, GRATE TYPE, and REMARKS. Includes rows for L 16+47, DET 16+31, and EY1 11+66.

SHEET TOTALS: 88, 2, 2, 2, 4, 24
PROJECT TOTALS: 88, 2, 2, 2, 4, 24

ABBREVIATIONS
C.A.A. CORRUGATED ALUMINIUM ALLOY
C.B. CATCH BASIN
C.S. CORRUGATED STEEL
D.I. DROP INLET
G.D.I. GRATED DROP INLET
H.D.P.E. HIGH DENSITY POLYETHYLENE
J.B. JUNCTION BOX
M.H. MANHOLE
N.S. NARROW SLOT
P.V.C. POLYVINYL CHLORIDE
R.C. REINFORCED CONCRETE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING JUNCTION BOX
W.S. WIDE SLOT

COMPUTED BY: Tyler C. Bottoms DATE: 9/11/19
 CHECKED BY: Thein Tun Zan DATE: 09-19-2019

(5-15-18)

PROJECT NO.	SHEET NO.
B-5662	3G-1

**STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS**

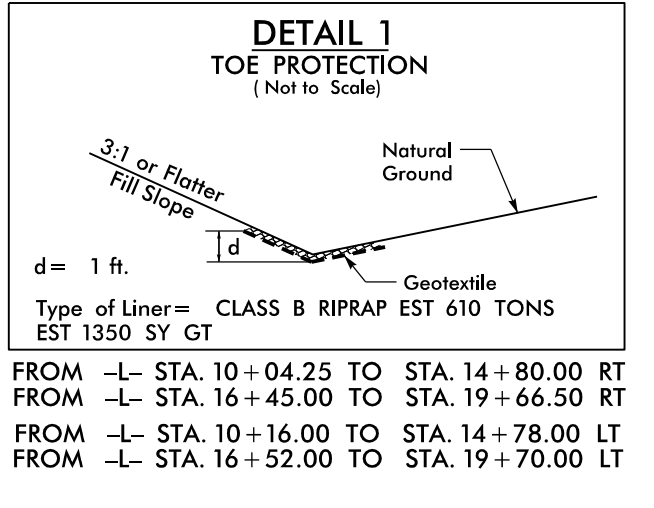
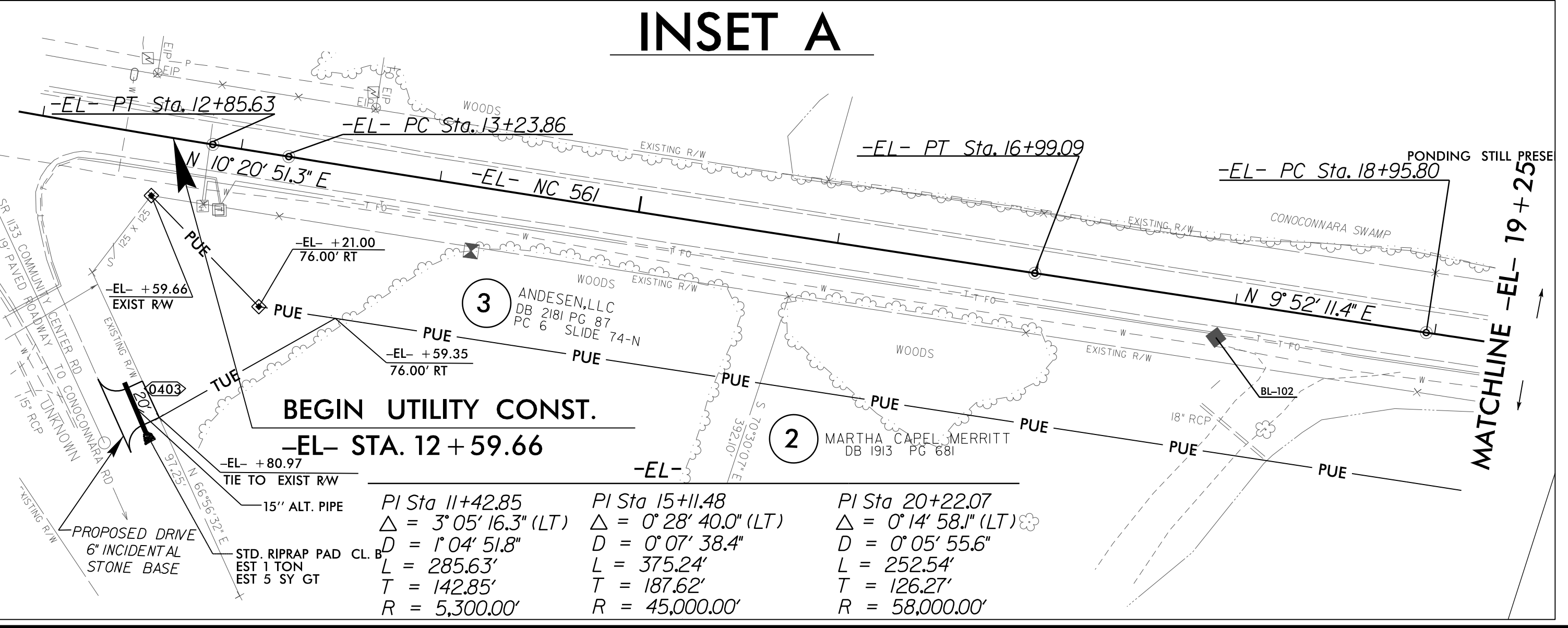
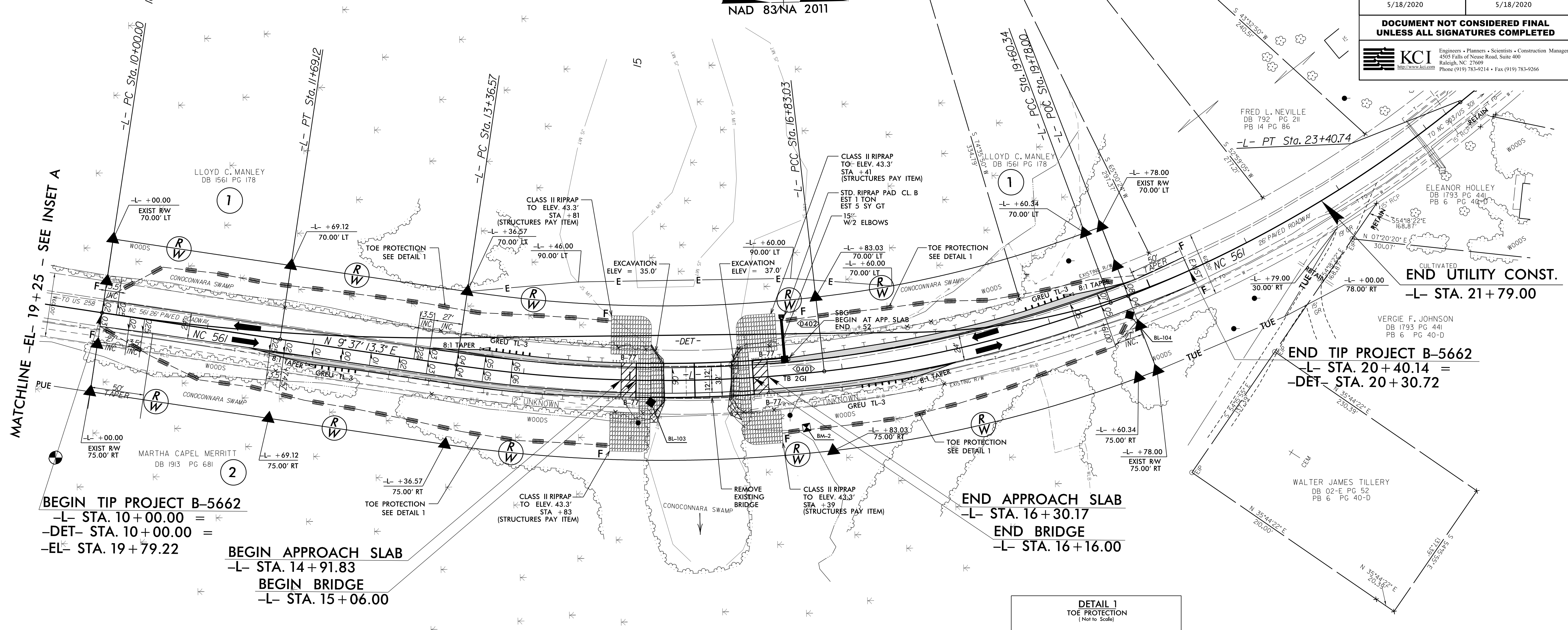
SUMMARY OF SUBSURFACE DRAINAGE

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

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

PROJECT REFERENCE NO. B-5662		SHEET NO. 4	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		SEAL	
5/18/2020		5/18/2020	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266			

PI Sta 10+84.56 Δ = 0° 10' 01.5" (LT) D = 0' 05' 55.6" L = 169.12' T = 84.56' R = 58,000.00' DS = 60 mph e = NC	PI Sta 15+10.79 Δ = 14° 55' 31.0" (LT) D = 4' 18' 28.6" L = 346.46' T = 174.22' R = 1,330.00' DS = 60 mph e = .06 RO = 162'	PI Sta 18+22.36 Δ = 13° 48' 58.6" (LT) D = 4' 58' 56.1" L = 277.31' T = 139.33' R = 1,150.00' DS = 55 mph e = .06 RO = 162'	PI Sta 21+52.29 Δ = 18° 57' 08.9" (LT) D = 4' 58' 56.1" L = 380.40' T = 191.95' R = 1,150.00' DS = 55 mph e = .06 RO = 162'
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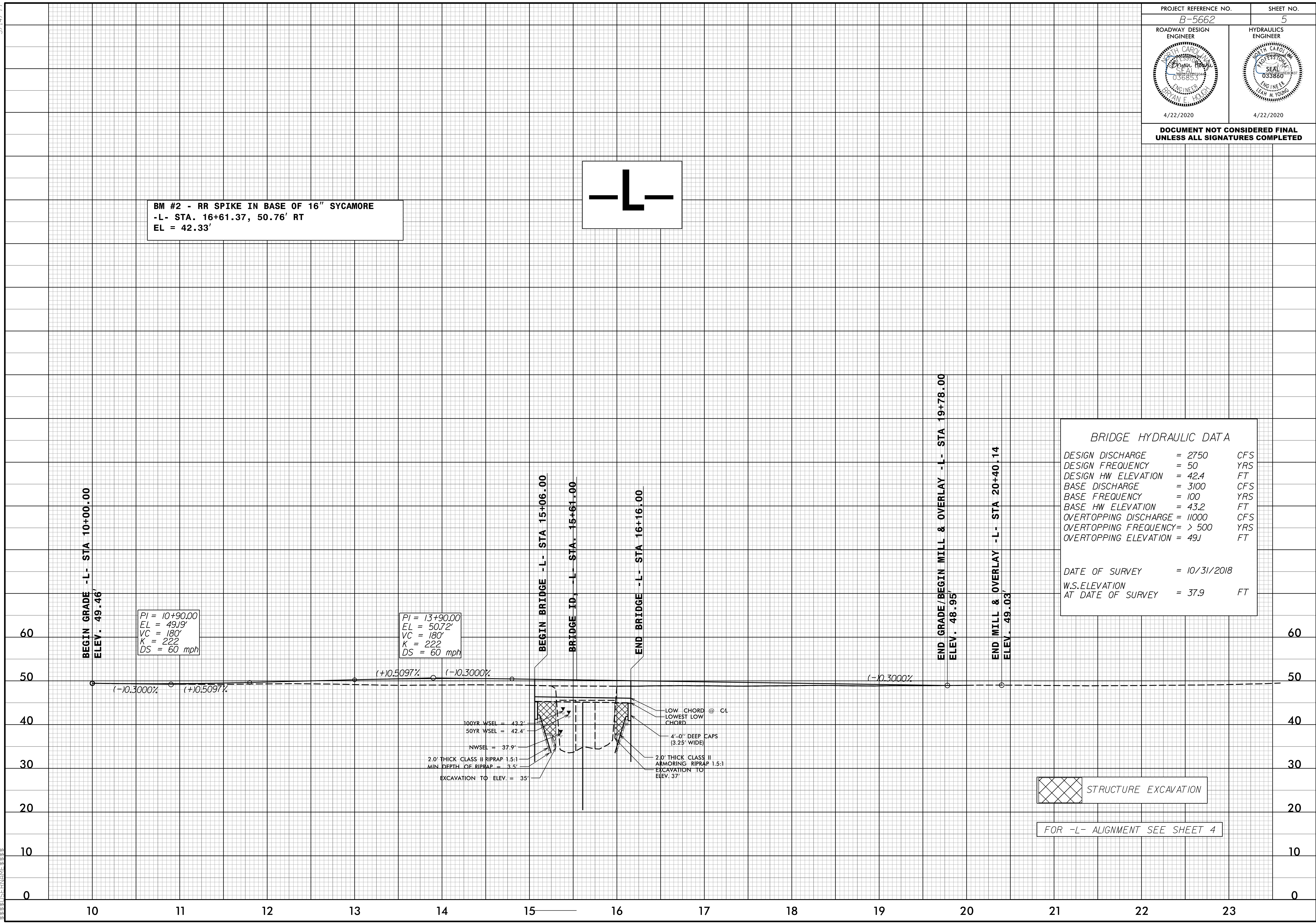
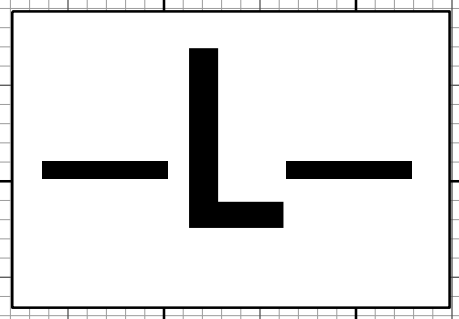


- BRIDGE APPROACH SLAB
- STRUCTURE EXCAVATION

FOR -L- PROFILE SEE SHEET 5
 FOR -DET- SEE SHEET 4A
 FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BM #2 - RR SPIKE IN BASE OF 16" SYCAMORE
-L- STA. 16+61.37, 50.76' RT
EL = 42.33'



$PI = 10+90.00$
 $EL = 49.19'$
 $VC = 180'$
 $K = 222$
 $DS = 60 \text{ mph}$

$PI = 13+90.00$
 $EL = 50.72'$
 $VC = 180'$
 $K = 222$
 $DS = 60 \text{ mph}$

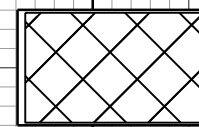
100YR WSEL = 43.2'
 50YR WSEL = 42.4'
 NWSEL = 37.9'
 2.0' THICK CLASS II RIPRAP 1.5:1
 MIN. DEPTH OF RIPRAP = 3.5'
 EXCAVATION TO ELEV. = 35'

LOW CHORD @ CL
 LOWEST LOW CHORD
 4'-0" DEEP CAPS (3.25' WIDE)
 2.0' THICK CLASS II ARMORING RIPRAP 1.5:1
 EXCAVATION TO ELEV. 37'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2750	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 42.4	FT
BASE DISCHARGE	= 3100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 43.2	FT
OVERTOPPING DISCHARGE	= 11000	CFS
OVERTOPPING FREQUENCY	= > 500	YRS
OVERTOPPING ELEVATION	= 49.1	FT

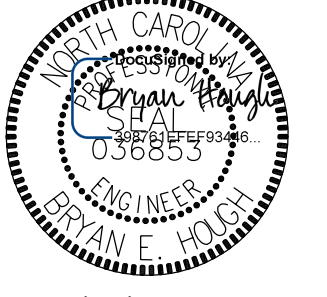

DATE OF SURVEY	= 10/31/2018
W.S. ELEVATION AT DATE OF SURVEY	= 37.9 FT

 STRUCTURE EXCAVATION

FOR -L- ALIGNMENT SEE SHEET 4

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5/14/99

PROJECT REFERENCE NO. B-5662	SHEET NO. 5A
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
4/22/2020	4/22/2020

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

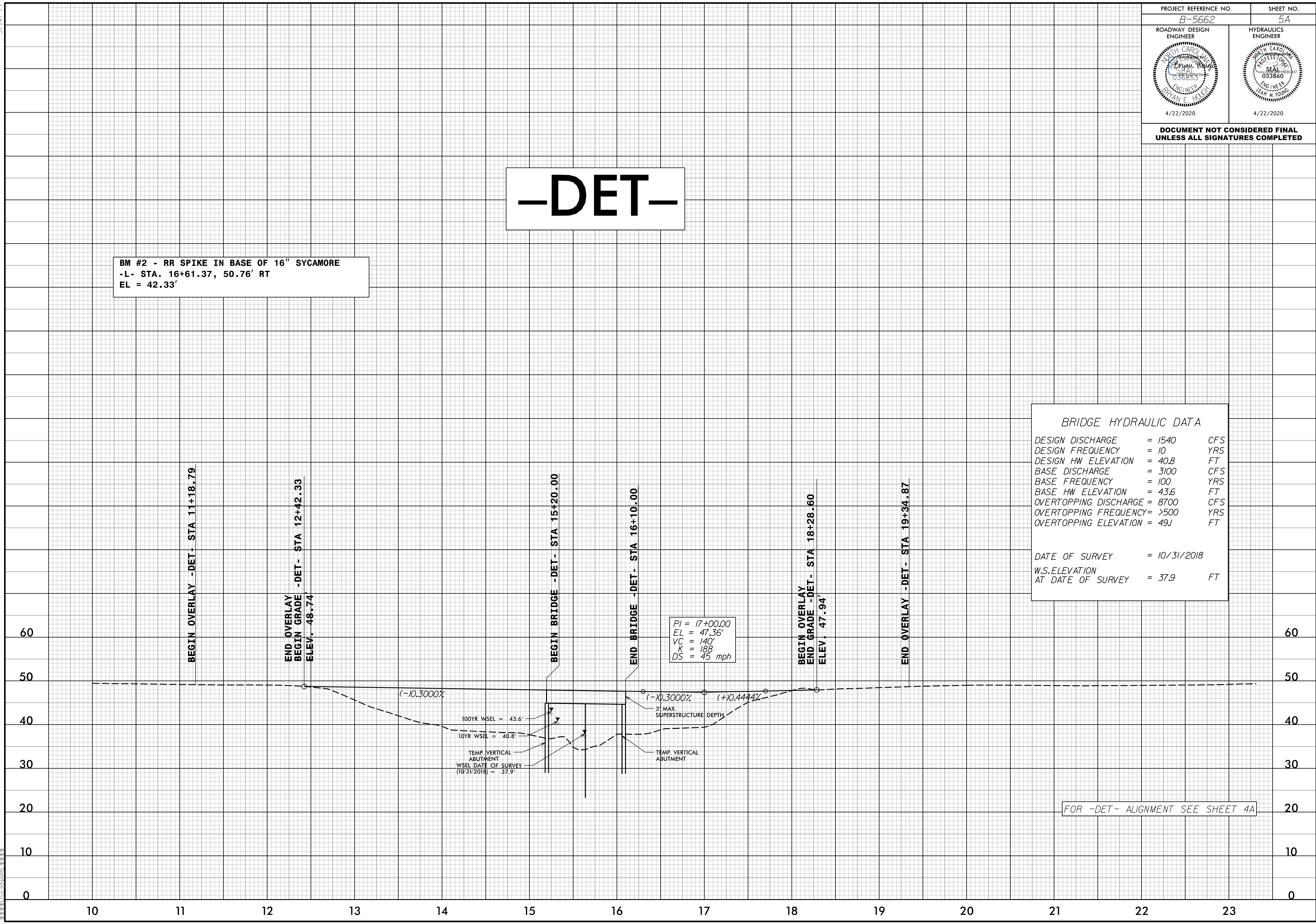
-DET-

BM #2 - RR SPIKE IN BASE OF 16" SYCAMORE
-L- STA. 16+61.37, 50.76' RT
EL = 42.33'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1540	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 40.8	FT
BASE DISCHARGE	= 3100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 43.6	FT
OVERTOPPING DISCHARGE	= 8700	CFS
OVERTOPPING FREQUENCY	= >500	YRS
OVERTOPPING ELEVATION	= 49.1	FT

DATE OF SURVEY	= 10/31/2018
W.S. ELEVATION AT DATE OF SURVEY	= 37.9 FT



FOR -DET- ALIGNMENT SEE SHEET 4A

I:\AEP-2020\10266\10266.dwg, 21 B-5662\Roadway\Proc\B-5662.Rdy.pfl, DET.dgn