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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4822	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38592.1.1	BRZ-1119(4)	P.E.	
38592.2.FD1	BRZ-1119(4)	RW & UTIL.	
38592.3.FD1	BRZ-1119(4)	CONST.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

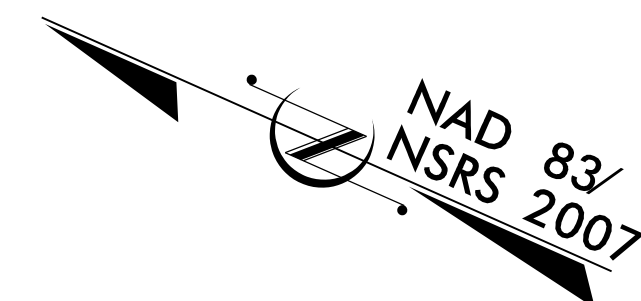
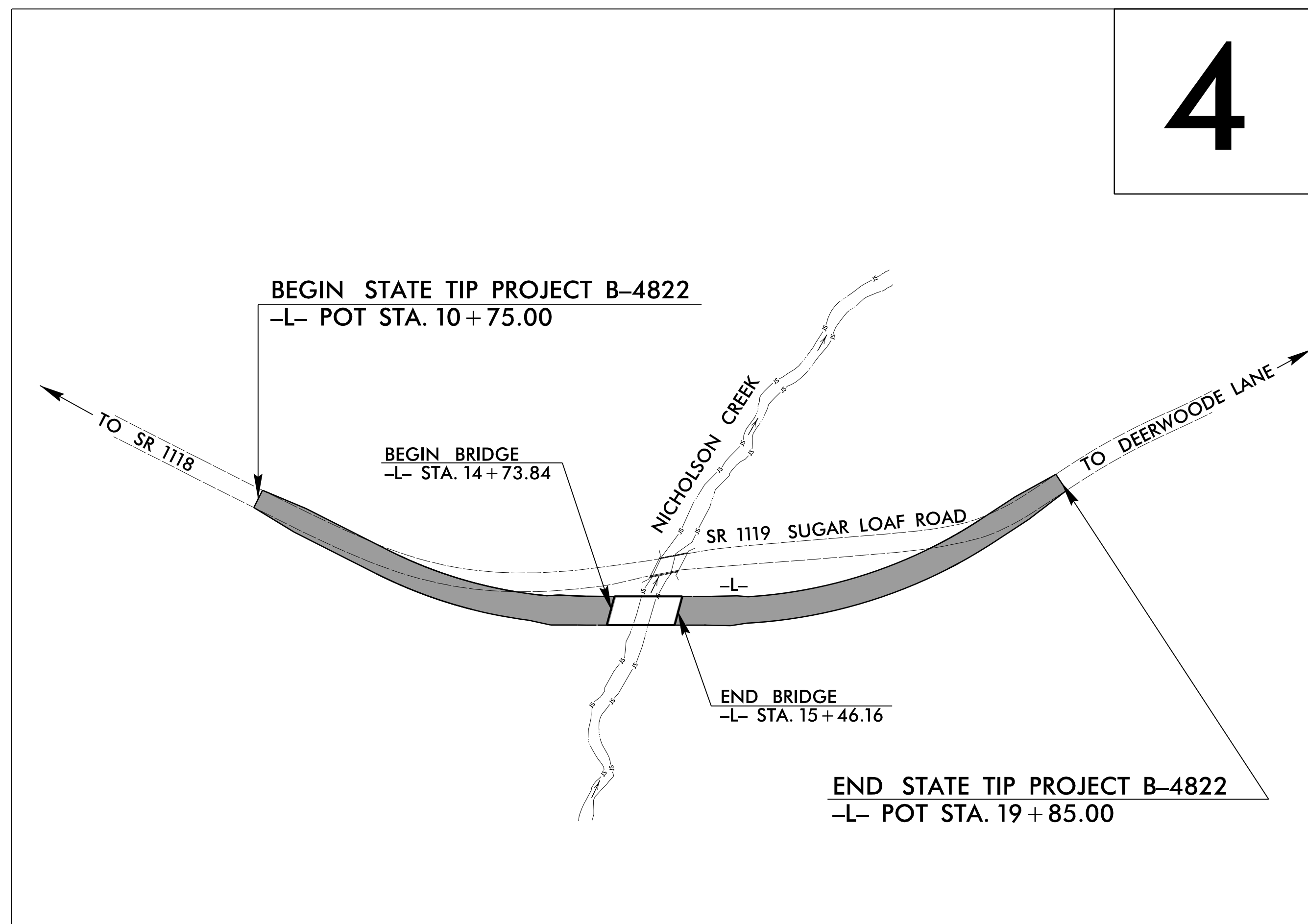
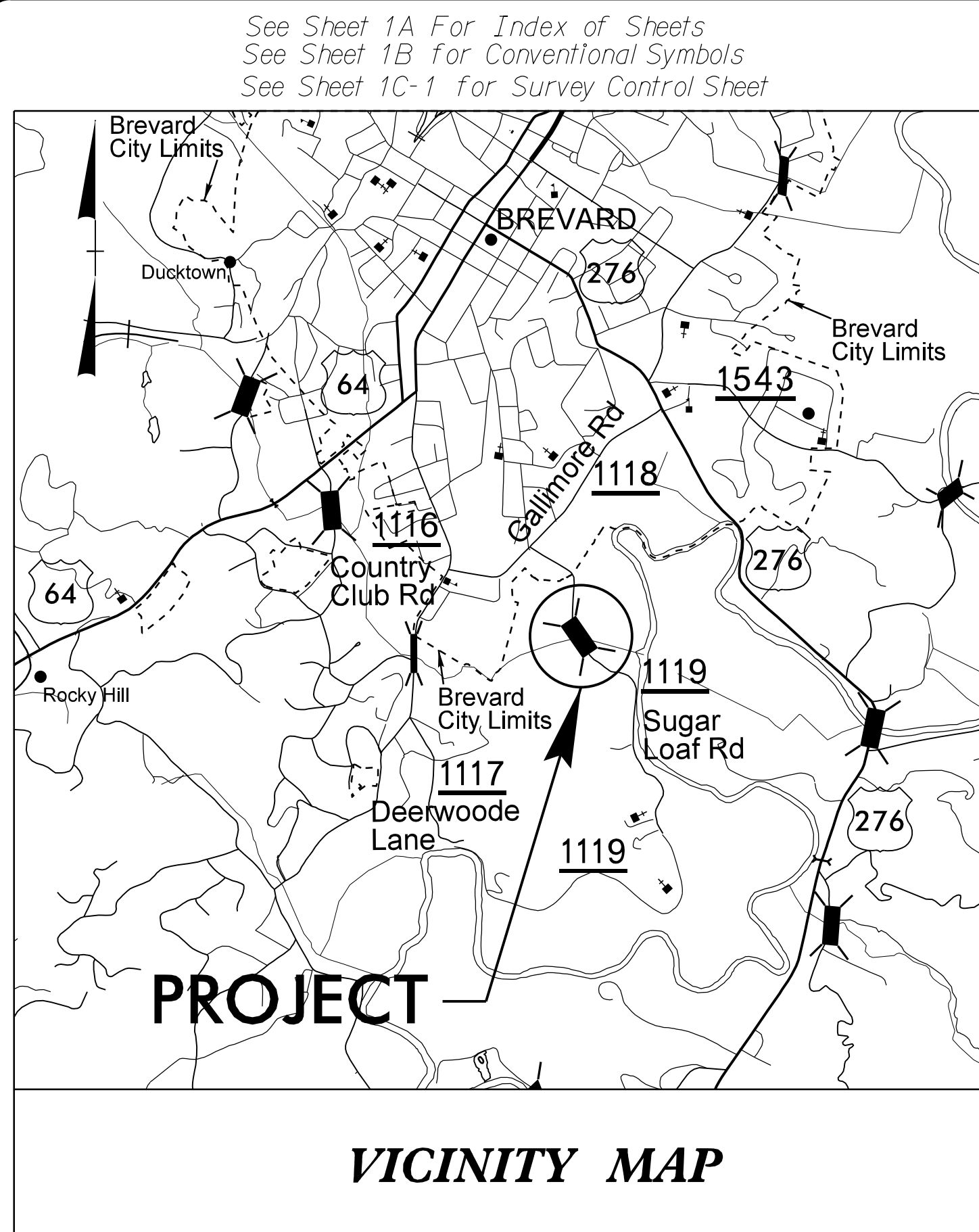
TRANSYLVANIA COUNTY

**LOCATION: BRIDGE NO. 13 OVER NICHOLSON CREEK
ON SR 1119 (SUGAR LOAF ROAD)**

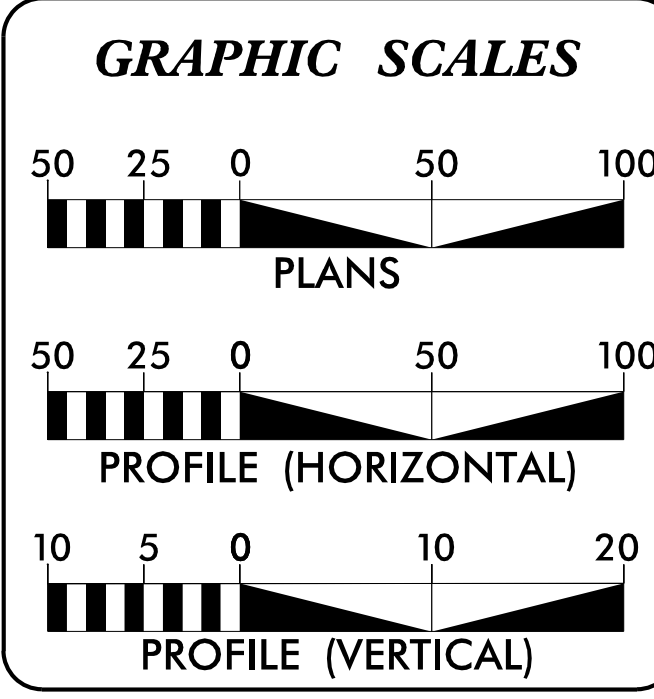
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

TIP PROJECT: B-4822

CONTRACT: C203666



SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL. (919) 859-2243 FAX (919) 859-9258
ENG FIRM LICENSE NO. C-890



DESIGN DATA

ADT 2016 =	230
ADT 2036 =	300
K =	9 %
D =	55 %
T =	6 % *
V =	40 MPH
* (TTST = 2% DUAL = 4%)	
FUNC CLASS =	RURAL LOCAL
SUB-REGIONAL TIER	

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4822	=	0.158 MILES
LENGTH OF STRUCTURE TIP PROJECT B-4822	=	0.014 MILES
TOTAL LENGTH OF TIP PROJECT B-4822	=	0.172 MILES

Prepared in the Office of:
KCI Associates of N.C., P.A.
4601 Six Forks Road
Landmark Center II, Suite 220
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266

KCI

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 20, 2015

LETTING DATE:
JANUARY 19, 2016

NCDOT CONTACT: **REKHA PATEL, PE**
PROJECT ENGINEER - ROADWAY DESIGN

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

DEWAYNE L. SYKES, P.E.
PROJECT ENGINEER

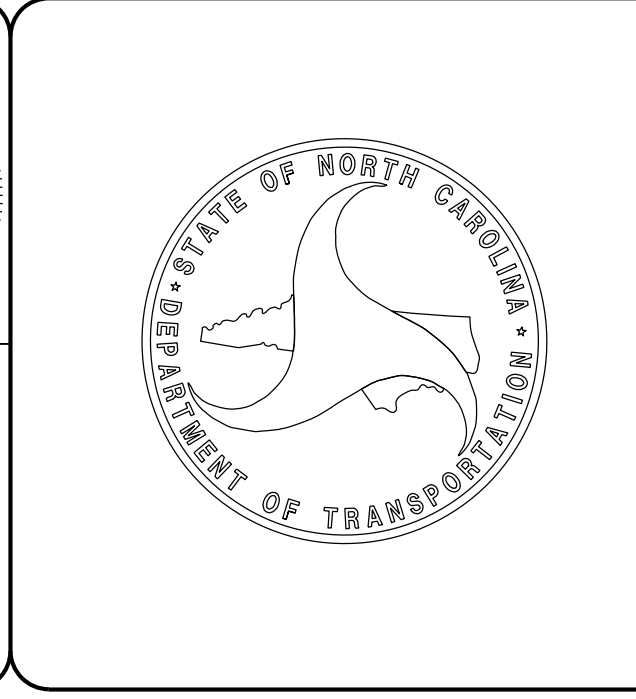
BARRY C. SMITH, P.E.
PROJECT DESIGN ENGINEER

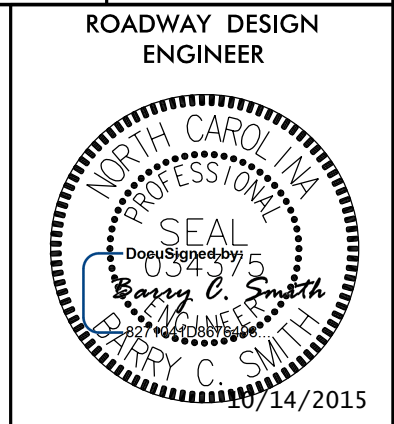
HYDRAULICS ENGINEER

DocuSigned by:
Joshua G Dalton
10/14/2015 P.E.

ROADWAY DESIGN ENGINEER

DocuSigned by:
Barry C. Smith
10/14/2015 P.E.





EFF. 01-17-2012
REV. 10-30-2012

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEET
2A-1	TYPICAL SECTIONS, PAVEMENT SCHEDULE, WEDGING DETAIL, AND PROFILE KEY-IN DETAIL
2C-1	TYPE III STRUCTURE ANCHOR UNIT DETAIL
2C-2	GUARDRAIL ANCHOR UNIT TYPE TEMP. W BEAM RETROFIT DETAIL
3B-1	SUMMARY OF EARTHWORK, SUMMARY OF SHOULDER BERM GUTTER, SUMMARY OF PAVEMENT REMOVAL, AND SUMMARY OF GUARDRAIL
3D-1	SUMMARY OF DRAINAGE QUANTITIES
3G-1	SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 TO TMP-4	TRANSPORTATION MANAGEMENT PLANS
PMP-1 TO PMP-2	PAVEMENT MARKING PLANS
EC-1 TO EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
SIGN-1	SIGNING PLANS
UO-1 TO UO-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS SECTION SUMMARY SHEET
X-1 TO X-4	-L- CROSS-SECTIONS
S-1 TO S-18	STRUCTURE PLANS

GENERAL NOTES:

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

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 II.

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

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

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 DUKE ENERGY CORPORATION (POWER) AND COMPORTIUM COMMUNICATIONS (TELEPHONE & CABLE).

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
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
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.11	Bridge Approach Fills - Sub Regional Tier
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
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
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
876.02	Guide for Rip Rap at Pipe Outlets

B-17/99

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BARRY C. SMITH

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

***S.U.E. = Subsurface Utility Engineering**

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
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 Soil Contamination: Area or Site	☠ ☠
Potential Soil Contamination: Area or Site	☠ ?

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	○
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	○ RW
Proposed Right of Way Line with Iron Pin and Cap Marker	○ RW ▲
Proposed Right of Way Line with Concrete or Granite RW Marker	▲ RW
Proposed Control of Access Line with Concrete CA Marker	○ CA
Existing Control of Access	○ CA
Proposed Control of Access	○ CA
Existing Easement Line	-E-
Proposed Temporary Construction Easement	-E-
Proposed Temporary Drainage Easement	-TDE-
Proposed Permanent Drainage Easement	-PDE-
Proposed Permanent Drainage / Utility Easement	-DUE-
Proposed Permanent Utility Easement	-PUE-
Proposed Temporary Utility Easement	-TUE-
Proposed Aerial Utility Easement	-AUE-
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

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-T-T-
Proposed Guardrail	-T-T-T-
Existing Cable Guiderail	-P-P-P-
Proposed Cable Guiderail	-P-P-P-
Equality Symbol	⊕
Pavement Removal	⊗
Single Tree	☼
Single Shrub	☼
Hedge	~~~~~
Woods Line	~~~~~

VEGETATION:

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	●
Recorded U/G Power Line	-P-
Designated U/G Power Line (S.U.E.*)	-P-

TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊕
Telephone Booth	□
Telephone Pedestal	⊕
Telephone Cell Tower	⊕
U/G Telephone Cable Hand Hole	□
Recorded U/G Telephone Cable	-T-
Designated U/G Telephone Cable (S.U.E.*)	-T-
Recorded U/G Telephone Conduit	-TC-
Designated U/G Telephone Conduit (S.U.E.*)	-TC-
Recorded U/G Fiber Optics Cable	-T FO-
Designated U/G Fiber Optics Cable (S.U.E.*)	-T FO-

WATER:

Water Manhole	⊕
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
Recorded U/G Water Line	-W-
Designated U/G Water Line (S.U.E.*)	-W-
Above Ground Water Line	-A/G Water-

TV:

TV Satellite Dish	☼
TV Pedestal	⊕
TV Tower	⊗
U/G TV Cable Hand Hole	□
Recorded U/G TV Cable	-TV-
Designated U/G TV Cable (S.U.E.*)	-TV-
Recorded U/G Fiber Optic Cable	-TV FO-
Designated U/G Fiber Optic Cable (S.U.E.*)	-TV FO-

GAS:

Gas Valve	◇
Gas Meter	⊕
Recorded U/G Gas Line	-G-
Designated U/G Gas Line (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-
Recorded SS Forced Main Line	-FSS-
Designated SS Forced Main Line (S.U.E.*)	-FSS-

MISCELLANEOUS:

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

02/03/15

SURVEY CONTROL SHEET B-4822 -PRELIMINARY-

BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
	1	BL-1	555060.5517	886538.6456	2110.60	10+24.82	16.33 LT
	2	BL-2	554562.8452	886634.8425	2112.54	15+55.47	41.34 LT
	3	BL-3	554252.2744	886833.0567	2117.57	19+35.07	15.63 RT

-PRELIMINARY- ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+75.00	30.00	555012.7265	886489.8848
L	12+25.00	55.00	554863.8231	886457.4795
L	14+49.35	55.00	554620.5941	886503.6688
L	15+89.47	55.00	554492.6002	886560.6676
L	17+75.00	55.00	554323.8694	886675.4490
L	19+20.00	29.38	554248.8779	886812.9447

.....
 BM1 ELEVATION = 2113.19
 N 554773 E 886506
 L STATION 13+12.00 10 RIGHT
 8" SPIKE SET IN BASE OF 15" OAK TREE

.....
 BM2 ELEVATION = 2127.01
 N 554251 E 886793
 L STATION 19+02.00 38 RIGHT
 8" SPIKE SET IN BASE OF 10" BIRCH TREE

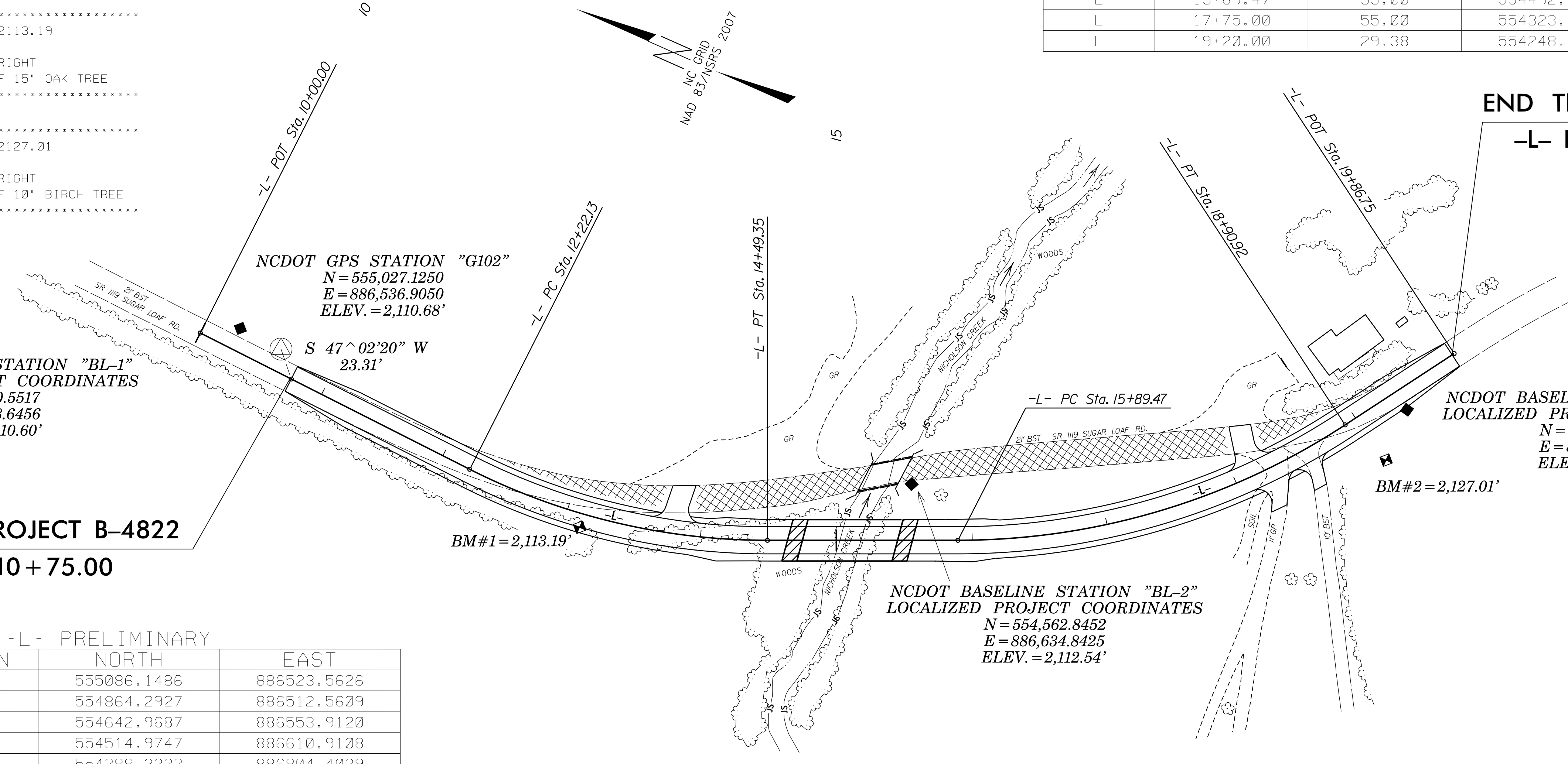
NCDOT BASELINE STATION "BL-1"
 LOCALIZED PROJECT COORDINATES
 N = 555,060.5517
 E = 886,538.6456
 ELEV. = 2,110.60'

BEGIN TIP PROJECT B-4822
 -L- POT STA. 10+75.00

END TIP PROJECT B-4822
 -L- POT STA. 19+85.00

-L- PRELIMINARY

TYPE	STATION	NORTH	EAST
POT	10+00.00	555086.1486	886523.5626
PC	12+22.13	554864.2927	886512.5609
PT	14+49.35	554642.9687	886553.9120
PC	15+89.47	554514.9747	886610.9108
PT	18+90.92	554289.3222	886804.4029
POT	19+86.75	554237.4414	886884.9684



NCDOT BASELINE STATION "BL-2"
 LOCALIZED PROJECT COORDINATES
 N = 554,562.8452
 E = 886,634.8425
 ELEV. = 2,112.54'

NCDOT BASELINE STATION "BL-3"
 LOCALIZED PROJECT COORDINATES
 N = 554,252.2744
 E = 886,833.0567
 ELEV. = 2,117.57'

NOTES:

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)
 THE FILES TO BE FOUND ARE AS FOLLOWS:
 B-4822_LS_CONTROL.TXT
 SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
- ⊙ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
 PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "G102"
 WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
 NORTHING: 555027.125(ft) EASTING: 886536.905(ft)
 ELEVATION: 2110.68(ft)
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99977651
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "G102" TO -L- STATION 10+75.00 IS
 S 47°02'20" W 23.31'
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
 VERTICAL DATUM USED IS NAVD 88

GEOID MODEL—GEOID 03
 NOTE: DRAWING NOT TO SCALE

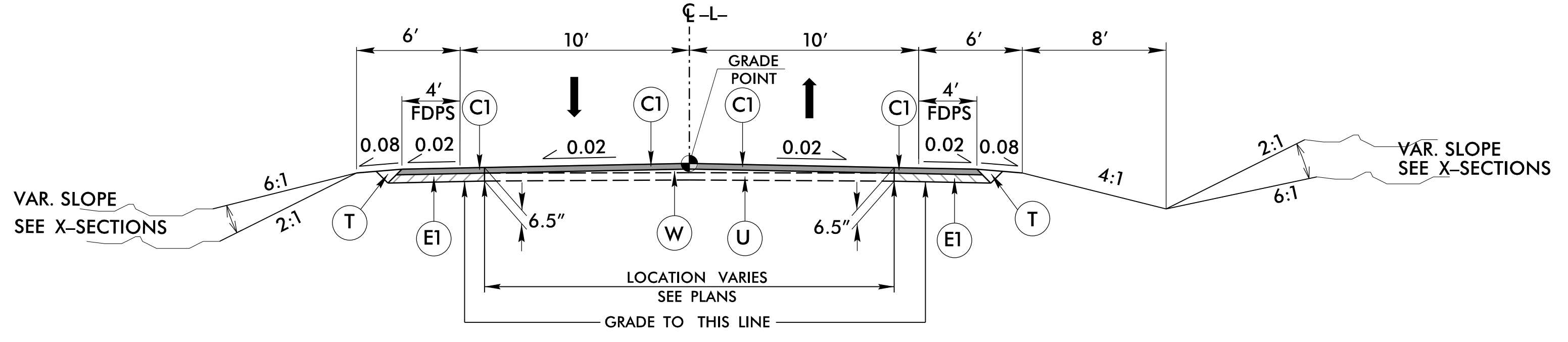
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6/2/2015

PROJECT REFERENCE NO. B-4822	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER
Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5310 Phone (919) 783-9214 • Fax (919) 783-9266	

FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" IN DEPTH.
C3	PROP. APPROX. 1 1/4" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 4" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING).

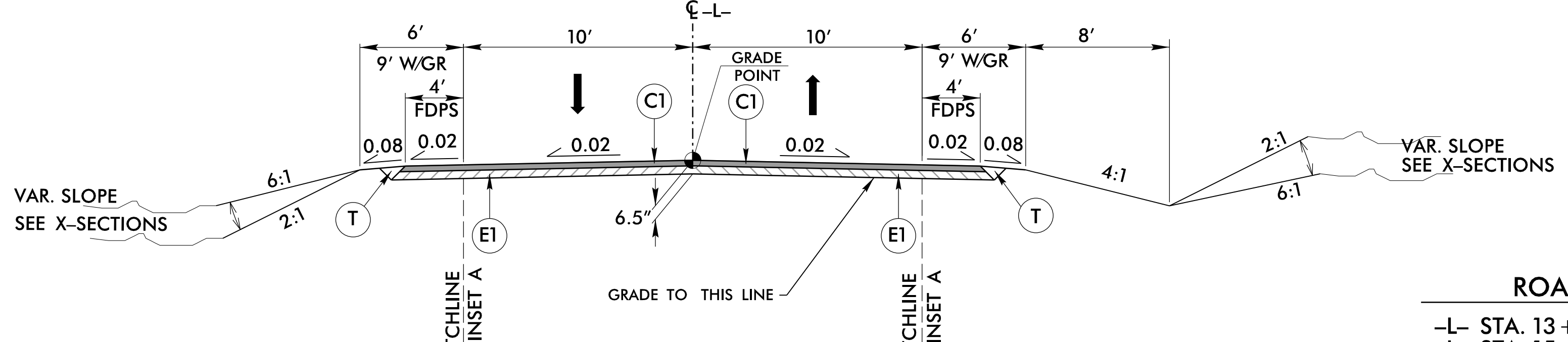
ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



ROADWAY TYPICAL SECTION NO. 1

ROADWAY TYPICAL SECTION NO. 1

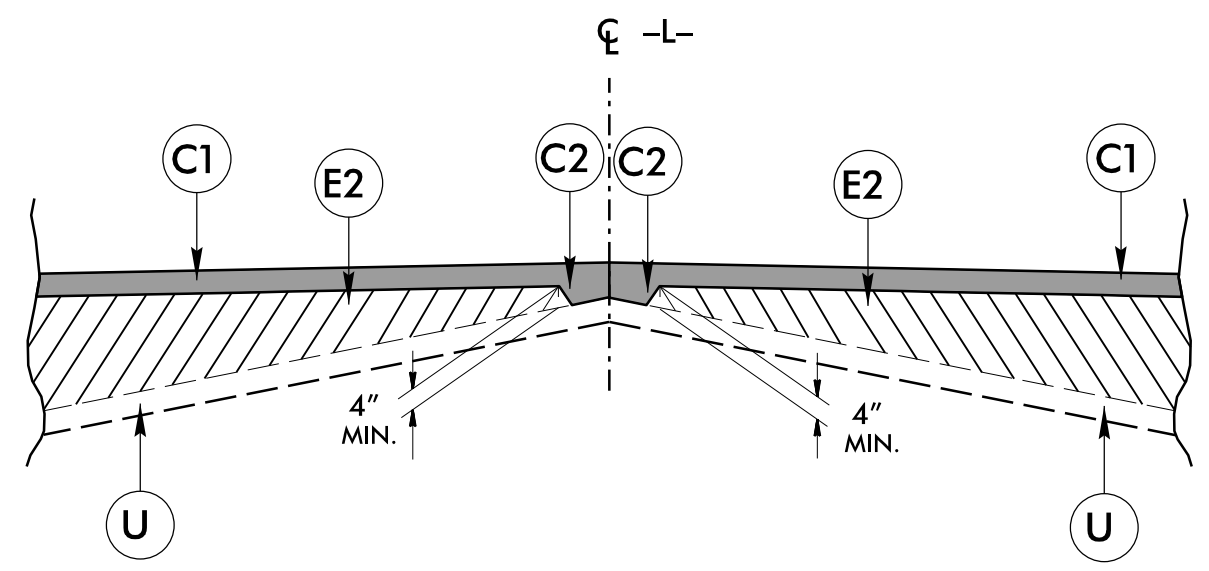
-L- STA. 10 + 75.00 TO STA. 13 + 25.00
-L- STA. 18 + 25.00 TO STA. 19 + 85.00



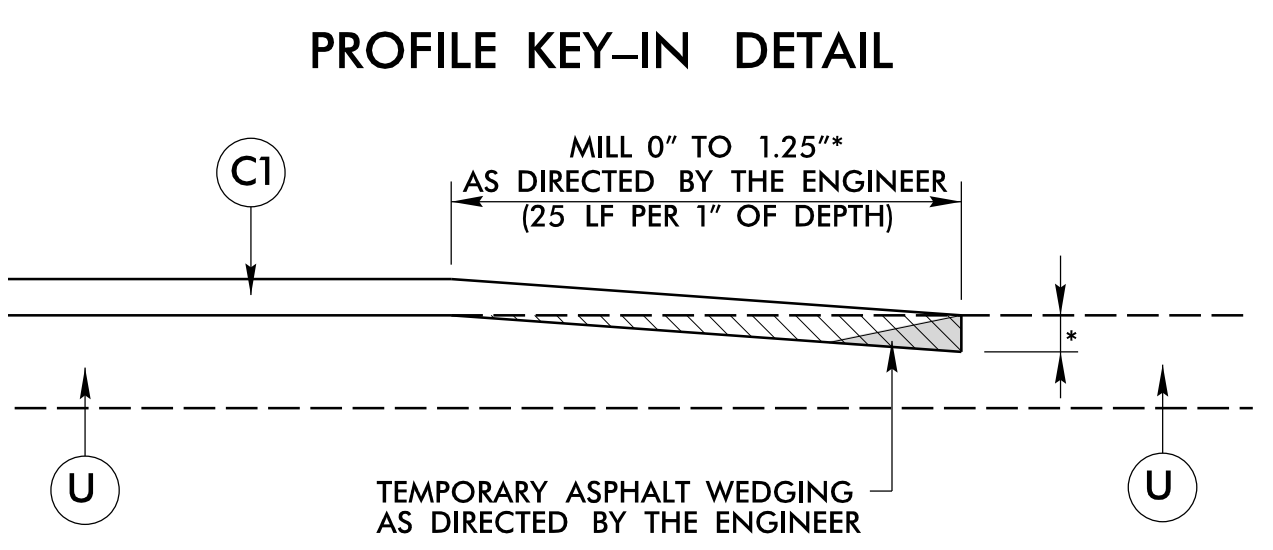
ROADWAY TYPICAL SECTION NO. 2

ROADWAY TYPICAL SECTION NO. 2

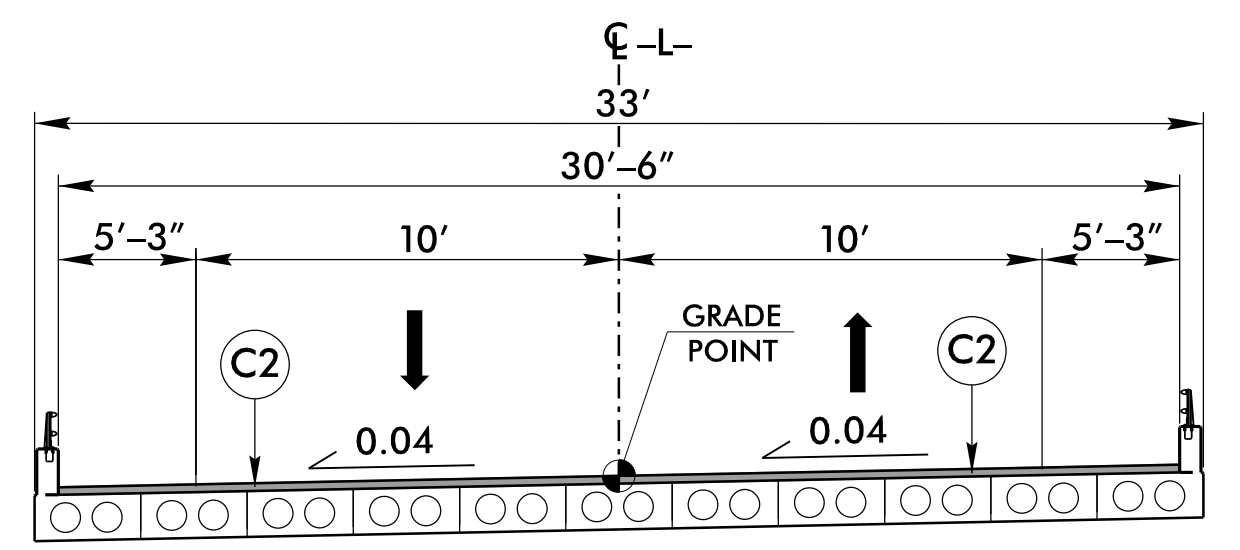
-L- STA. 13 + 25.00 TO STA. 14 + 73.84 (BEGIN BRIDGE)
-L- STA. 15 + 46.16 (END BRIDGE) TO STA. 18 + 25.00



Detail Showing Method of Wedging



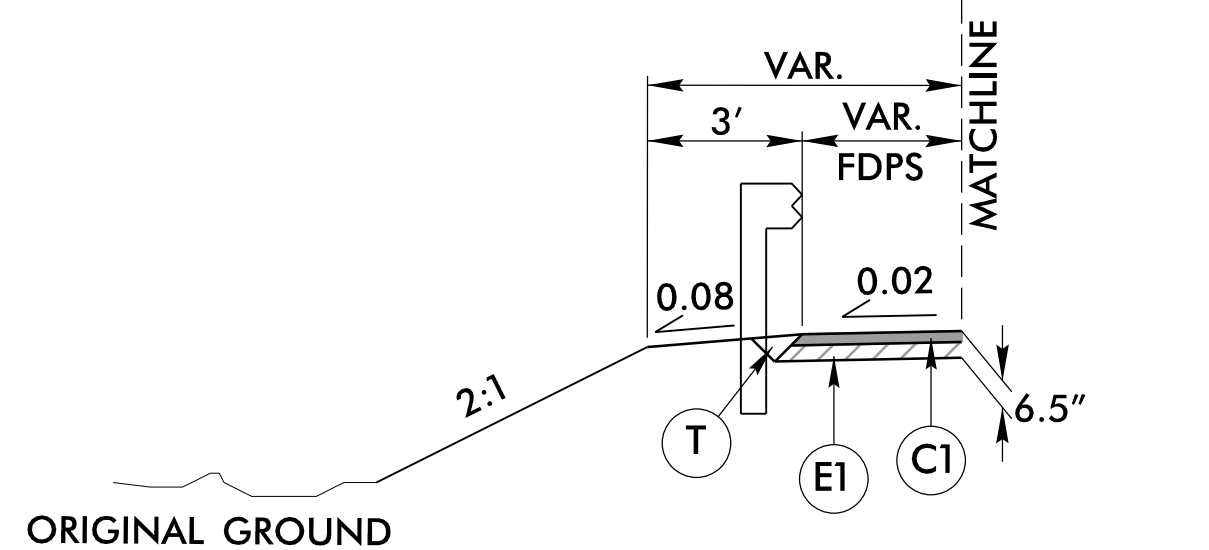
* MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER
** SEE TYPICALS FOR MIX TYPE



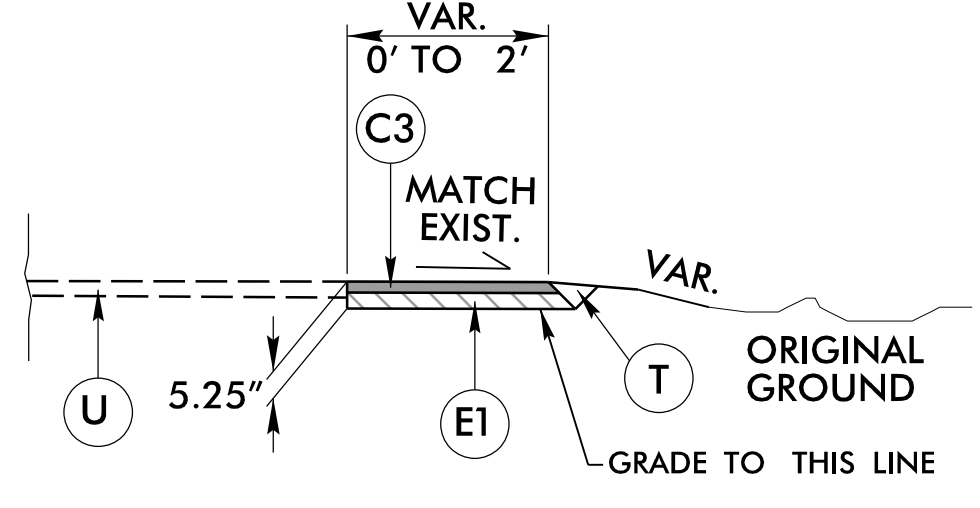
STRUCTURE TYPICAL SECTION

TYPICAL SECTION ON STRUCTURE

-L- STA. 14 + 73.84 TO STA. 15 + 46.16



INSET A
USE IN GUARDRAIL LOCATIONS



TEMPORARY PAVEMENT TYPICAL SECTION
(USE UNDER TEMPORARY BARRIER)

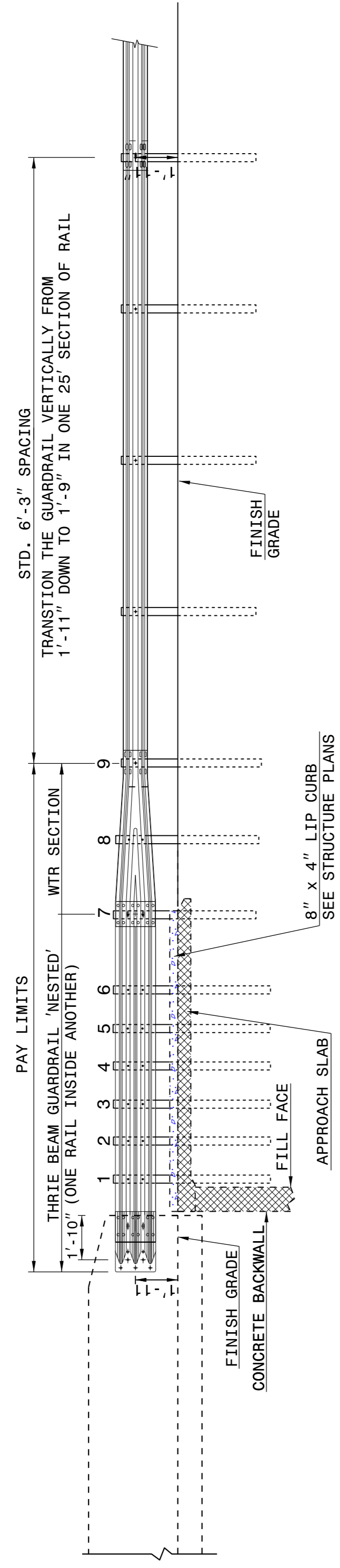
-L- STA. 14 + 73 +/- TO STA. 15 + 15 +/-

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

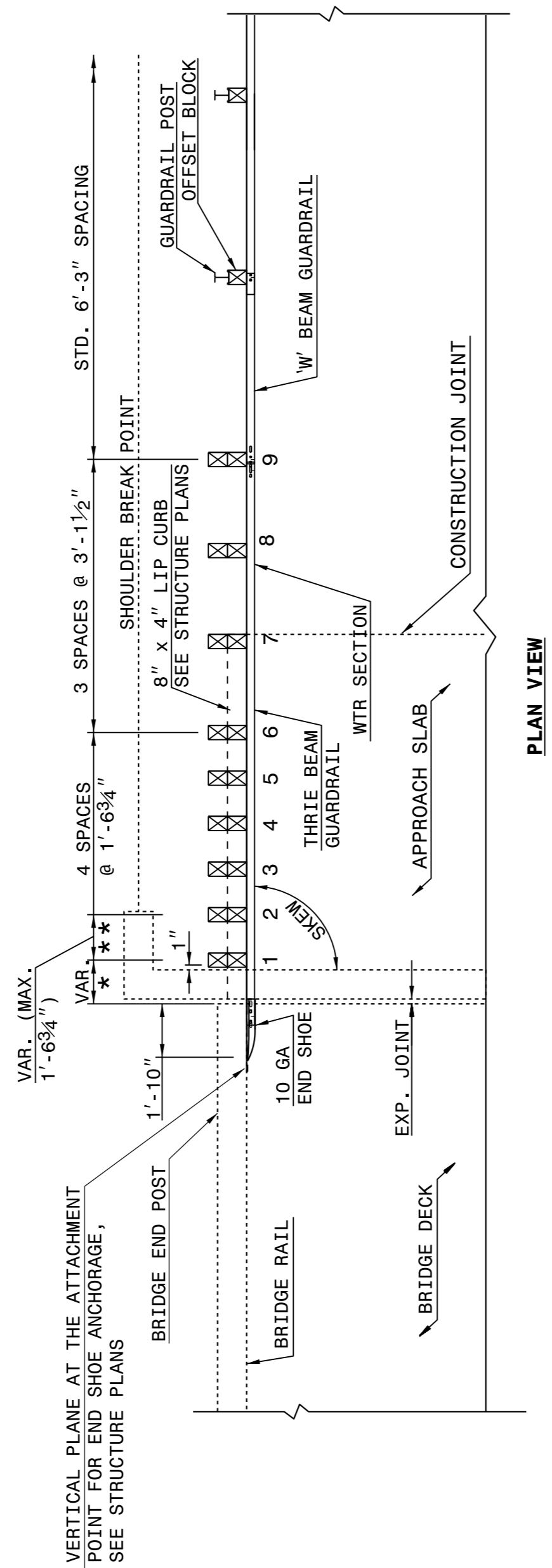
ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862d03



ELEVATION

NOTE:
 **POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 *THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2". IF CONCRETE BACKWALL IS NOT PRESENT.
 -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" X 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
 -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
 -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
 -SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.



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

SHEET 2 OF 7
862d03

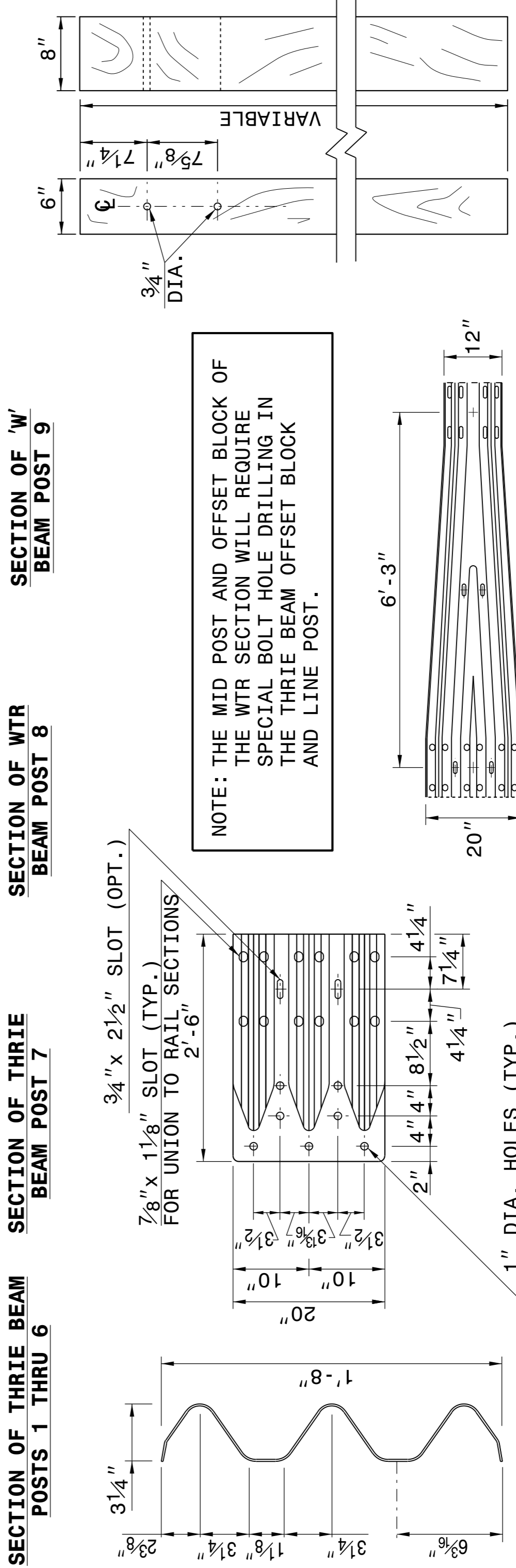
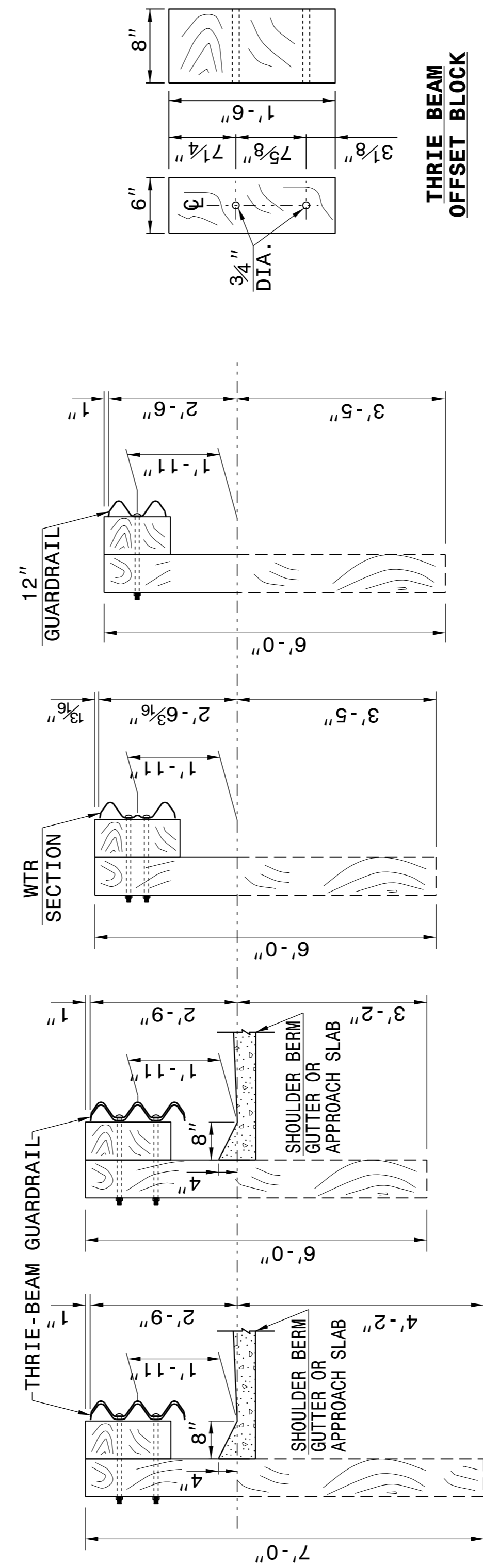
STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

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DIVISION OF HIGHWAYS
RALEIGH, N.C.

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

SHEET 3 OF 7
862d03

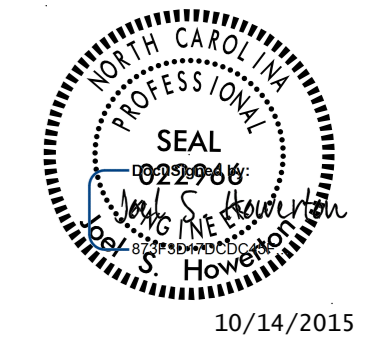


THRIE-BEAM SECTION
SECTION OF THRIE BEAM POSTS 1 THRU 6
SECTION OF THRIE BEAM POST 7
SECTION OF WTR BEAM POST 8
SECTION OF 'W' BEAM POST 9
THRIE BEAM OFFSET BLOCK
THRIE BEAM LINE POST
WTR SECTION ELEVATION VIEW
END SHOE

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RALEIGH, N.C.

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

SHEET 3 OF 7
862d03



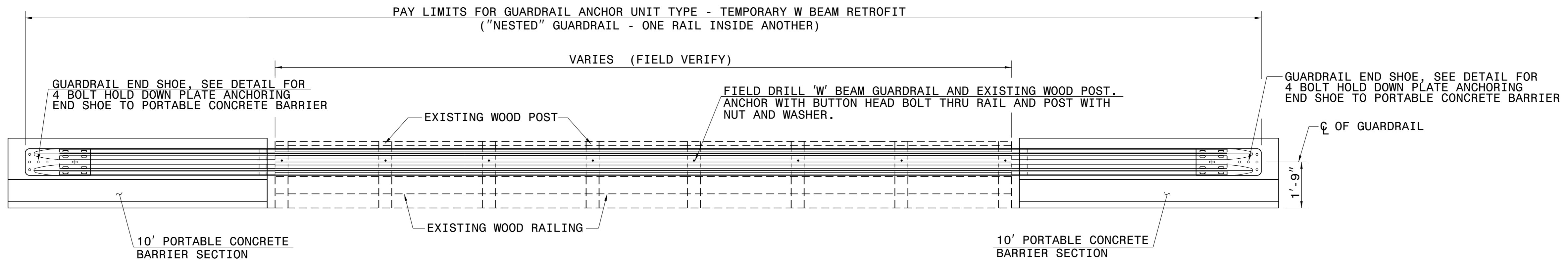
10/14/2015

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

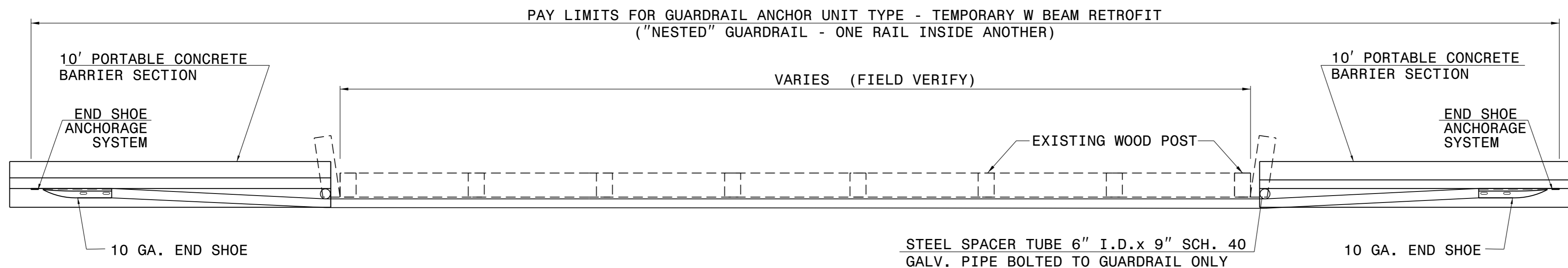
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ORIGINAL BY: J. HOWERTON DATE: 06-22-12
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: DATE:

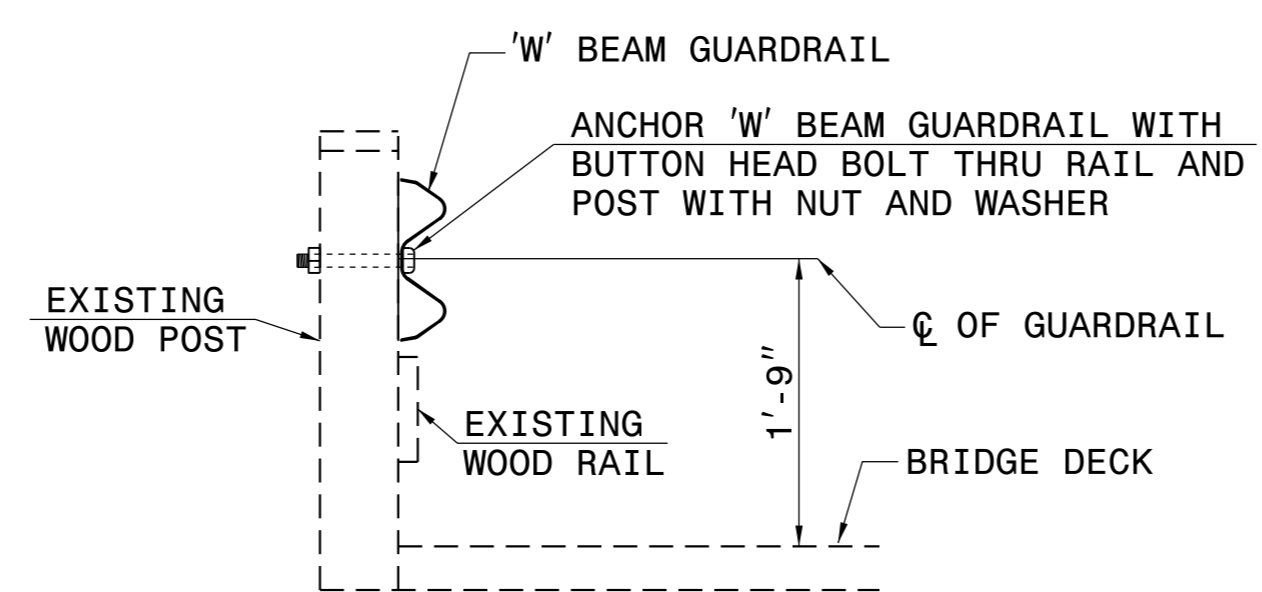
 STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.



ELEVATION VIEW



PLAN VIEW



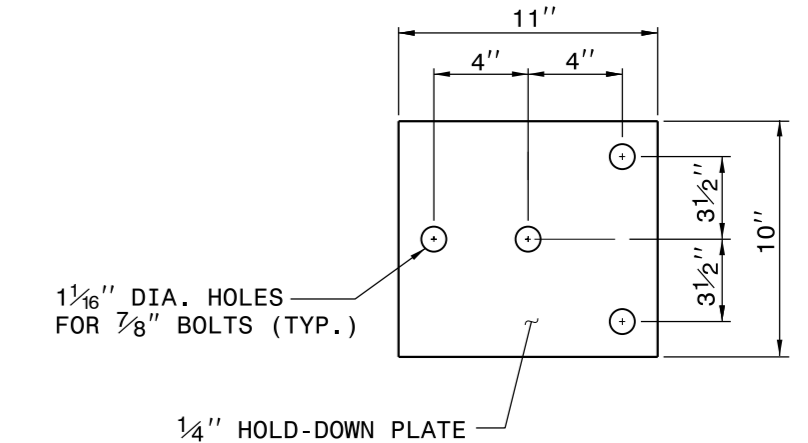
SECTION VIEW
GUARDRAIL ATTACHMENT TO WOOD POST

NOTES FOR 4 BOLT HOLD DOWN PLATE

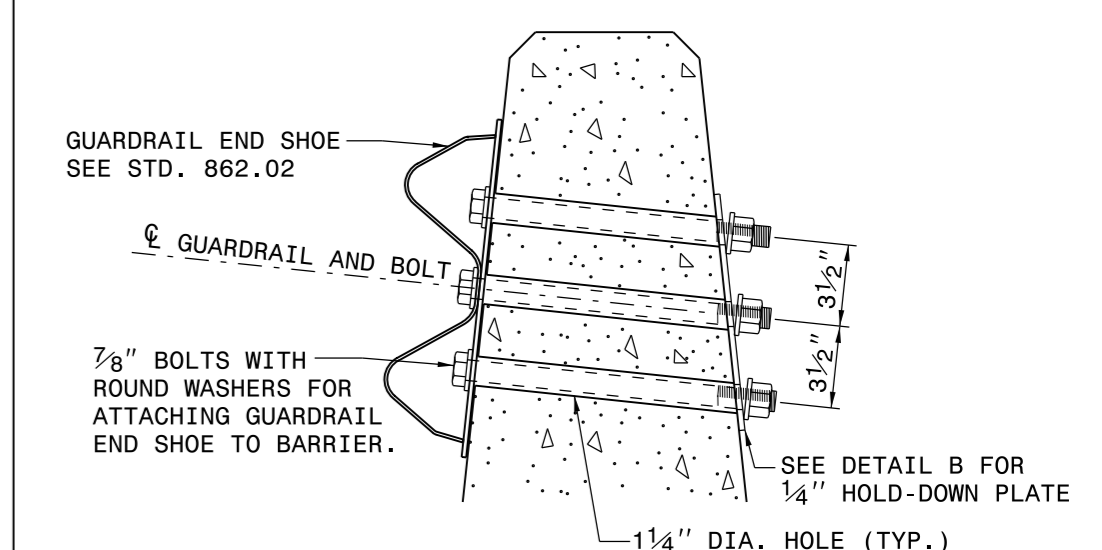
THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 4 - 7/8" DIA. BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL. THE 1 1/4" DIA. HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



4 BOLT HOLD DOWN PLATE



PART SECTION OF BARRIER OR RAIL THRU END SHOE SECTION AND 4 BOLT HOLD DOWN PLATE



10/14/2015

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

DETAIL OF GUARDRAIL ANCHOR UNIT TYPE TEMPORARY W BEAM RETROFIT

ORIGINAL BY: E.E. WARD DATE: 04-05
 MODIFIED BY: DATE: _____
 CHECKED BY: DATE: _____
 FILE SPEC.: usr/details/stand/862stds/anc.dgn

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 PLOT: 10/14/2015 10:14:15 AM
 PLOTTER: HP DesignJet 5000
 PLOTTER DRIVER: HP DesignJet 5000 PCL
 PLOTTER MODEL: HP DesignJet 5000
 PLOTTER SERIAL: HP DesignJet 5000
 PLOTTER FIRMWARE: HP DesignJet 5000
 PLOTTER LANGUAGE: HP DesignJet 5000
 PLOTTER STATUS: HP DesignJet 5000
 PLOTTER ERROR: HP DesignJet 5000
 PLOTTER MESSAGE: HP DesignJet 5000
 PLOTTER COMMAND: HP DesignJet 5000
 PLOTTER RESPONSE: HP DesignJet 5000
 PLOTTER OUTPUT: HP DesignJet 5000
 PLOTTER INPUT: HP DesignJet 5000
 PLOTTER SETTINGS: HP DesignJet 5000
 PLOTTER OPTIONS: HP DesignJet 5000
 PLOTTER FEATURES: HP DesignJet 5000
 PLOTTER CAPABILITIES: HP DesignJet 5000
 PLOTTER LIMITATIONS: HP DesignJet 5000
 PLOTTER SUPPORT: HP DesignJet 5000
 PLOTTER CONTACT: HP DesignJet 5000
 PLOTTER WEBSITE: HP DesignJet 5000
 PLOTTER MANUAL: HP DesignJet 5000
 PLOTTER TROUBLESHOOTING: HP DesignJet 5000
 PLOTTER FAQ: HP DesignJet 5000
 PLOTTER NEWS: HP DesignJet 5000
 PLOTTER UPDATES: HP DesignJet 5000
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 PLOTTER UPDATES: HP DesignJet 5000
 PLOTTER RELEASES: HP DesignJet 5000

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV.	UNDERCUT EXCAV.	EMBANK. +%	BORROW	WASTE
10+75.00	14+73.84	7		1,196	1,189	
13+75.00	14+75.00		425	489	489	425
SUBTOTAL:		7	425	1,685	1,678	425
15+46.16	19+85.00	3		1,674	1,671	
15+45.00	16+45.00		675	776	776	675
17+00.00	18+75.00		400	460	460	400
SUBTOTAL:		3	1,075	2,910	2,907	1,075
TOTALS:		10	1,500	4,595	4,585	1,500
ADDITIONAL UNDERCUT			300	345	345	300
WASTE IN LIEU OF BORROW						
SELECT GRANULAR MATERIAL IN LIEU OF BORROW				-1,725	-1,725	
PROJECT TOTAL:		10	1,800	3,215	3,205	1,800
EST 5% TO REPLACE TOP SOIL ON BORROW PIT					160	
GRAND TOTAL:		10			3,365	
SAY:		10			3,370	

EST. DDE = 845 CY
 PER GEOTECH RECOMMENDATION: EST. SELECT GRANULAR MATERIAL: 1,800 CY
 PER GEOTECH RECOMMENDATION: EST. SHALLOW UNDERCUT = 150 CY

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

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

SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LF	
-L-	15+60 +/-	15+72	LT	12	
				TOTAL:	12
				SAY:	12

EXISTING PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD ²	
-L-	10+75	15+25	LT	565.50	
-L-	15+46	19+37	LT	681.71	
				TOTAL:	1,247.21
				SAY:	1,250

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

GUARDRAIL SUMMARY

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

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		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	APPROACH END	TRAILING END	XI MOD	B-77	GRAU 350	M-350	TEMP. W-BEAM RETROFIT	TYPE III	VI MOD	GRAU 350 TL-2	AT-1	EA	G	NG											
-L-	14+21.68	14+77.93 (BR.)	LEFT	56.25'				14+77.93(BR.)	5.25'	8.25'		25'		0.5'																							
-L-	14+13.50	14+69.75 (BR.)	RIGHT	56.25'			14+69.75(BR.)		5.25'	8.25'	25'			0.5'																							
-L-	15+42.07 (BR.)	15+98.32	RIGHT	56.25'				15+42.07(BR.)	5.25'	8.25'		25'		0.5'																							
-L-	15+50.25 (BR.)	16+06.50	LEFT	56.25'			15+50.25(BR.)		5.25'	8.25'	25'			0.5'																							
SUBTOTAL				225.00'																																	
LESS ANCHOR DEDUCTIONS:																																					
GRAU 350 TL-2				4 @ 25.00' =	-100.00'																																
TYPE III				4 @ 18.75' =	-75.00'																																
ANCHOR DEDUCTION TOTAL:				-175.00'																																	
PROJECT TOTAL				50.00'																																	
SAY				50.00'																																	
ADDITIONAL GUARDRAIL POST =				5 EA																																	
TEMPORARY GUARDRAIL																																					
-L-	15+15 +/-	15+55 +/-	LT (SEE TMP PLANS)																																TEMP. EXIST. BRIDGE ANCHOR (SEE TMP PLANS & 2C-2)		
SAY:																																					

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COMPUTED BY: GEOTECH DATE: 1/2/15
 CHECKED BY: BEH DATE: 1/2/15

PROJECT NO.	SHEET NO.
B-4822	3G-1

**STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS**

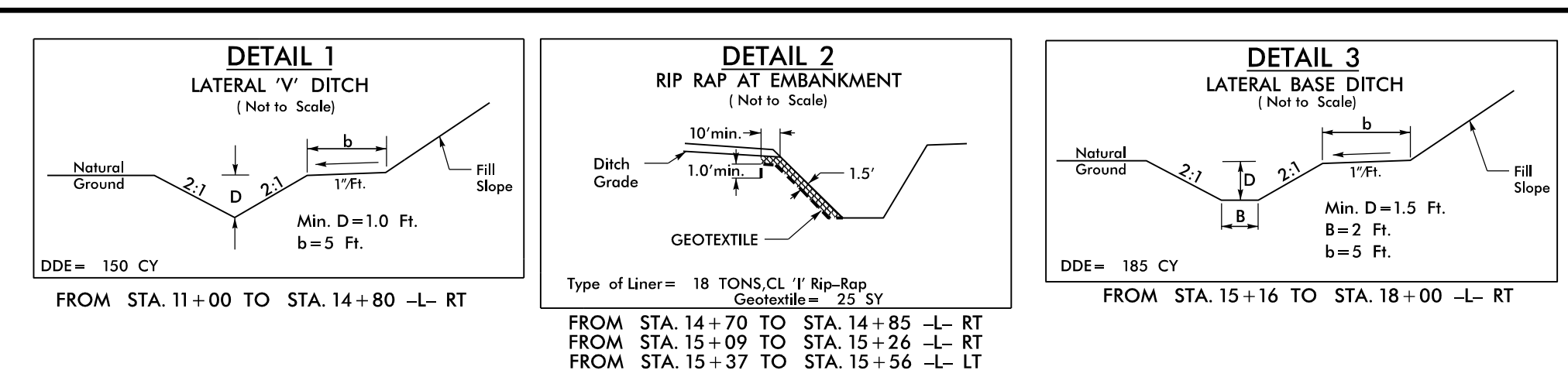
SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

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		150	250	300		
TOTAL CY/TONS/SY:					150	250	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.

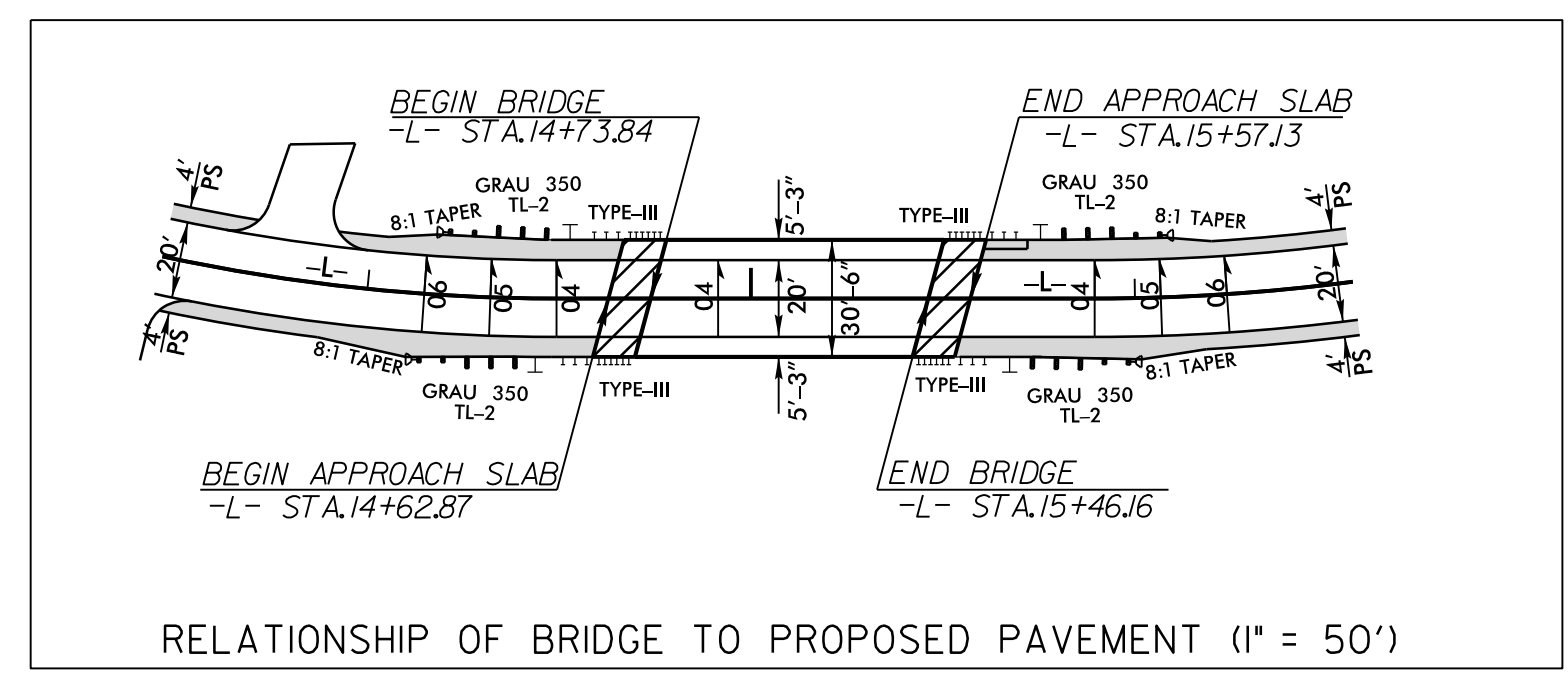
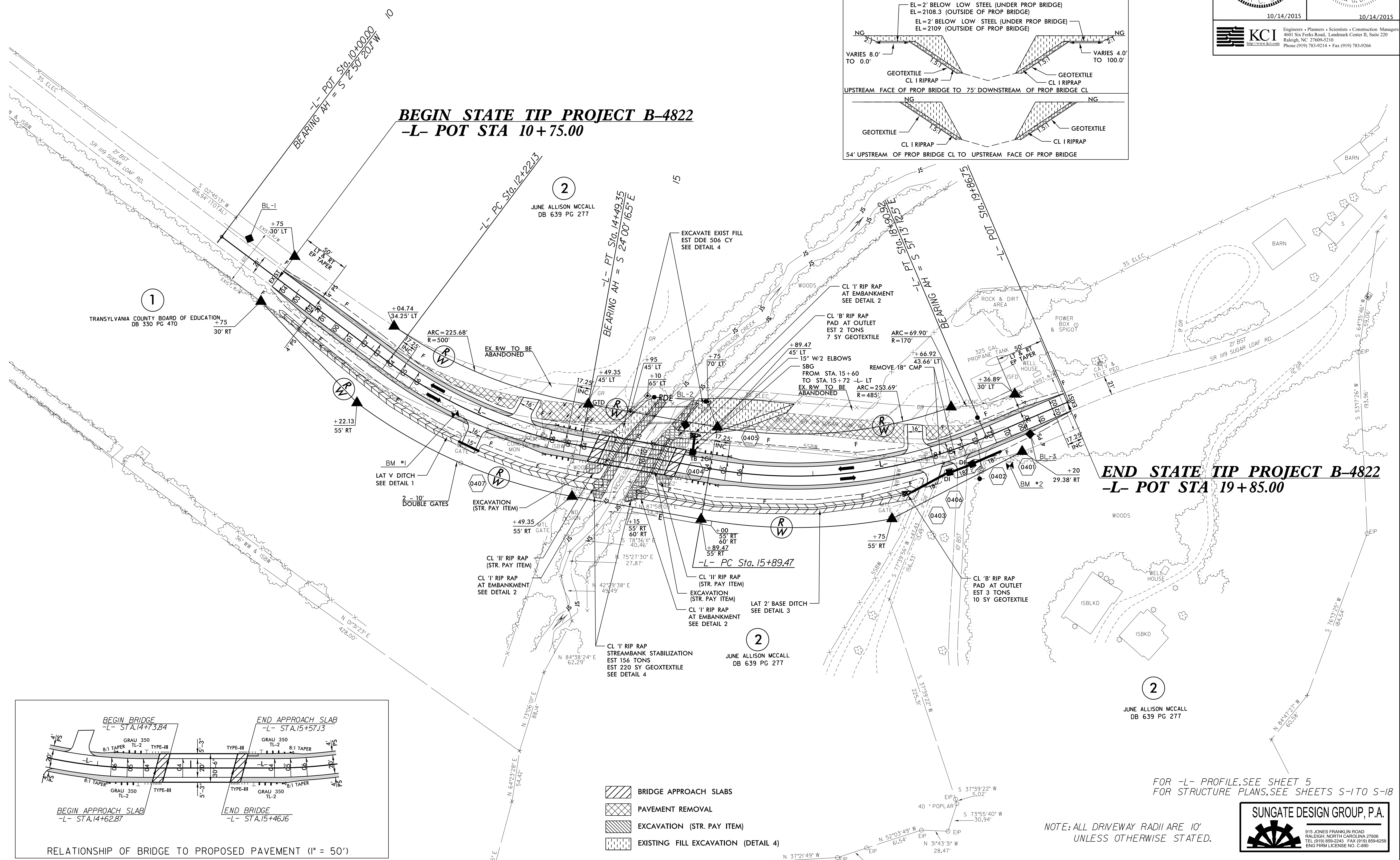
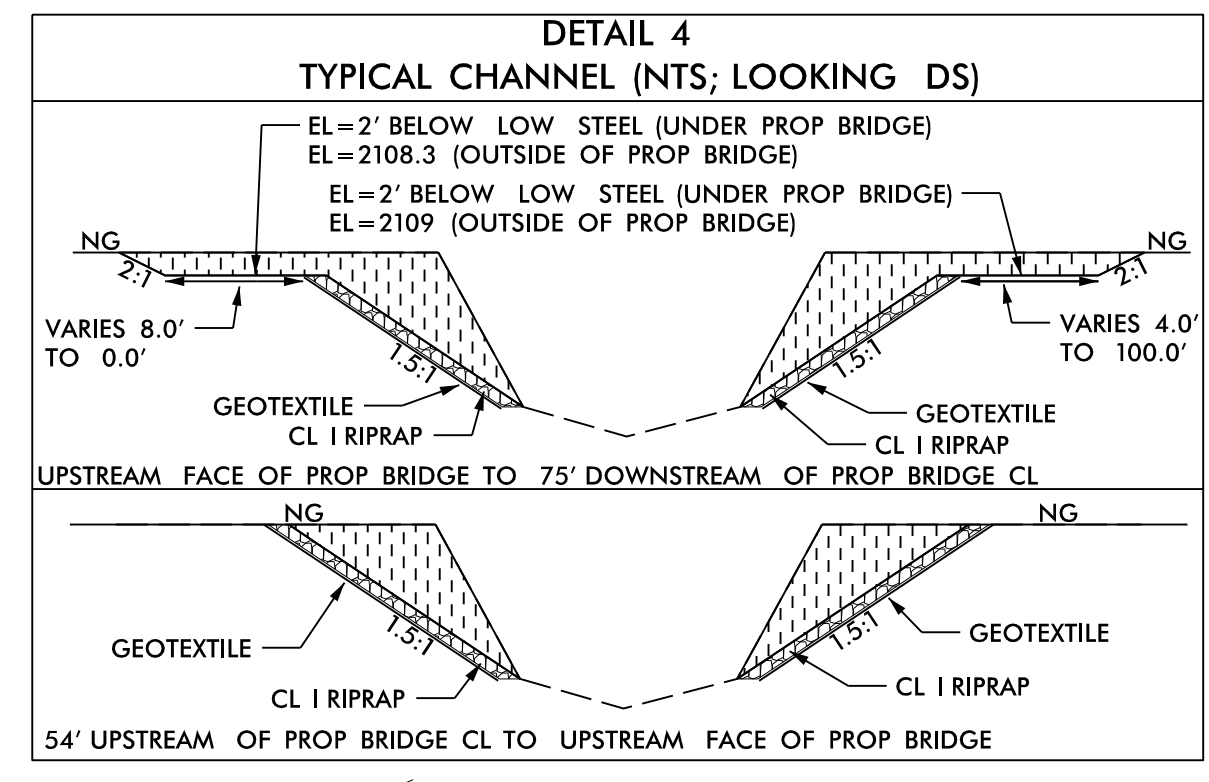
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PROJECT REFERENCE NO. B-4822		SHEET NO. 4
RW SHEET NO.		HYDRAULICS ENGINEER
	ROADWAY DESIGN ENGINEER	
10/14/2015		10/14/2015
		<small>Engineers • Planners • Scientists • Construction Managers</small> 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266



-L-

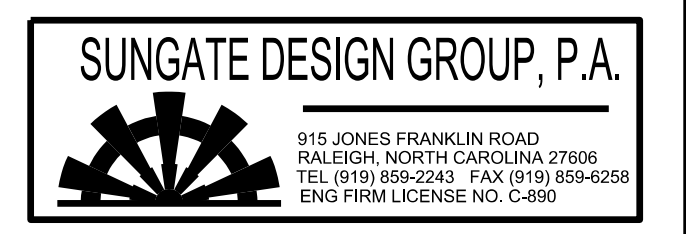
PI Sta 13+37.87	PI Sta 17+44.56
$\Delta = 26^{\circ}50'36.6''$ (LT)	$\Delta = 33^{\circ}12'56.0''$ (LT)
D = 11'48'48.8"	D = 11'01'06.3"
L = 227.23'	L = 301.45'
T = 115.74'	T = 155.10'
R = 485.00'	R = 520.00'
SE = .06	SE = .06
RO = 103.5'	RO = 103.5'



- BRIDGE APPROACH SLABS
- PAVEMENT REMOVAL
- EXCAVATION (STR. PAY ITEM)
- EXISTING FILL EXCAVATION (DETAIL 4)

FOR -L- PROFILE, SEE SHEET 5
FOR STRUCTURE PLANS, SEE SHEETS S-1 TO S-18

NOTE: ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE STATED.



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5/14/15

BM #1 - 8" SPIKE SET IN BASE OF 15" OAK TREE
-L- STA. 13+12.00, 10' RT
EL = 2113.19'

BM #2 - 8" SPIKE SET IN BASE OF 10" BIRCH TREE
-L- STA. 19+02.00, 38' RT
EL = 2127.01'

PROJECT REFERENCE NO. B-4822 SHEET NO. 5

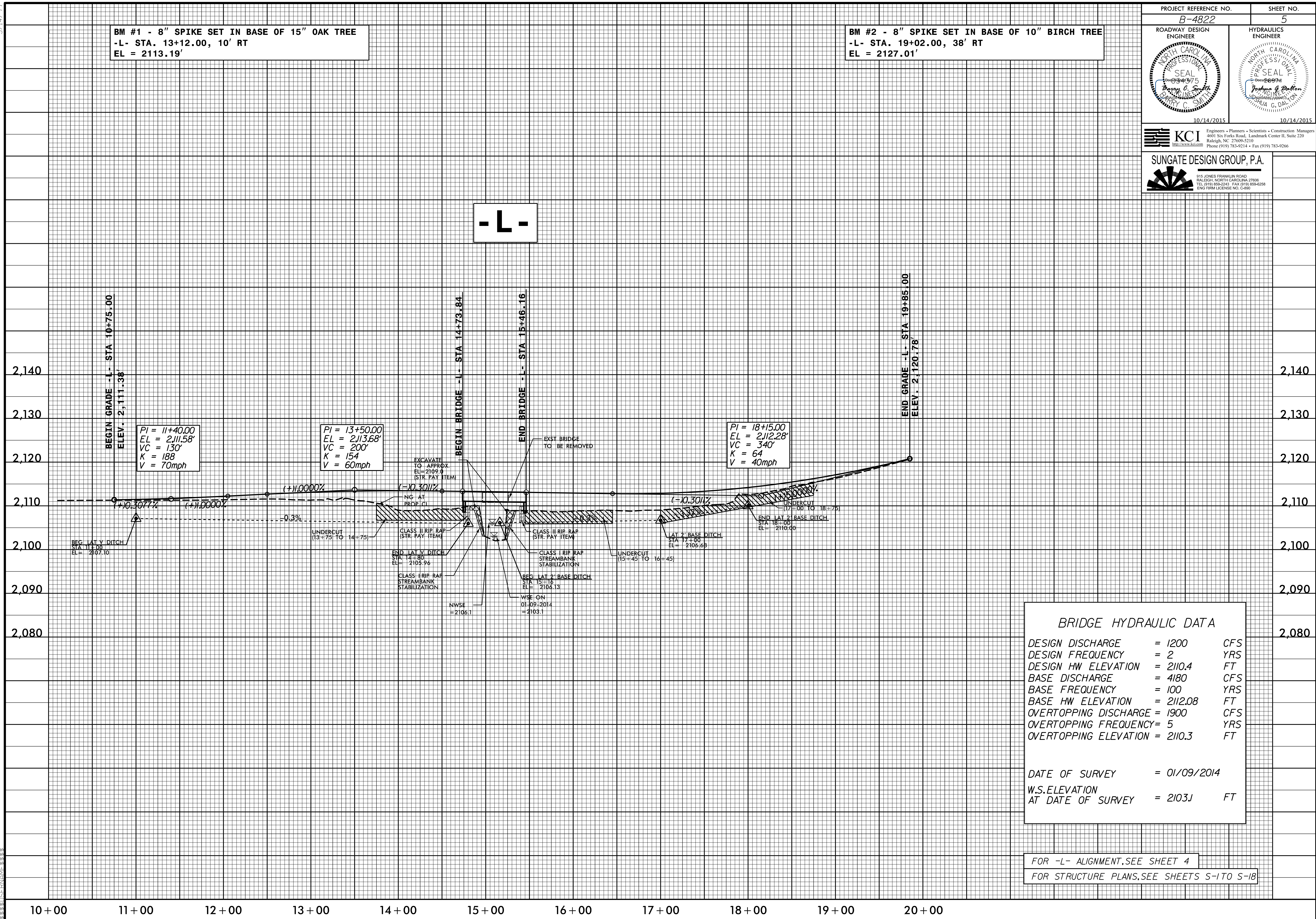
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

10/14/2015 10/14/2015

KCI Engineers • Planners • Scientists • Construction Managers
 4601 Six Forks Road, Landmark Center II, Suite 220
 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266

SUNGATE DESIGN GROUP, P.A.
 916 JONES FRANKLIN ROAD
 RALEIGH, NORTH CAROLINA 27606
 TEL (919) 859-2243 FAX (919) 859-6268
 ENG FIRM LICENSE NO. C-890



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1200	CFS
DESIGN FREQUENCY	= 2	YRS
DESIGN HW ELEVATION	= 2110.4	FT
BASE DISCHARGE	= 4180	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2112.08	FT
OVERTOPPING DISCHARGE	= 1900	CFS
OVERTOPPING FREQUENCY	= 5	YRS
OVERTOPPING ELEVATION	= 2110.3	FT

DATE OF SURVEY	= 01/09/2014
W.S. ELEVATION AT DATE OF SURVEY	= 2103.1 FT

FOR -L- ALIGNMENT, SEE SHEET 4
 FOR STRUCTURE PLANS, SEE SHEETS S-1 TO S-18

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