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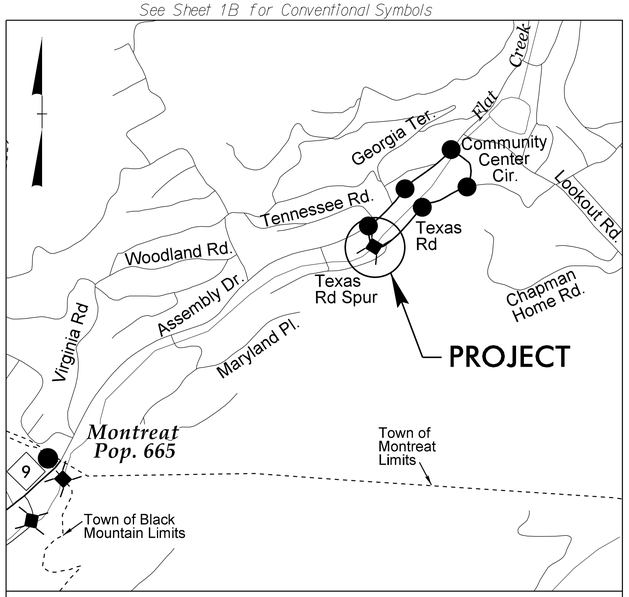
09/08/99

TIP PROJECT: B-5196

CONTRACT: 7500013353

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



VICINITY MAP

DETOUR ROUTE

(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

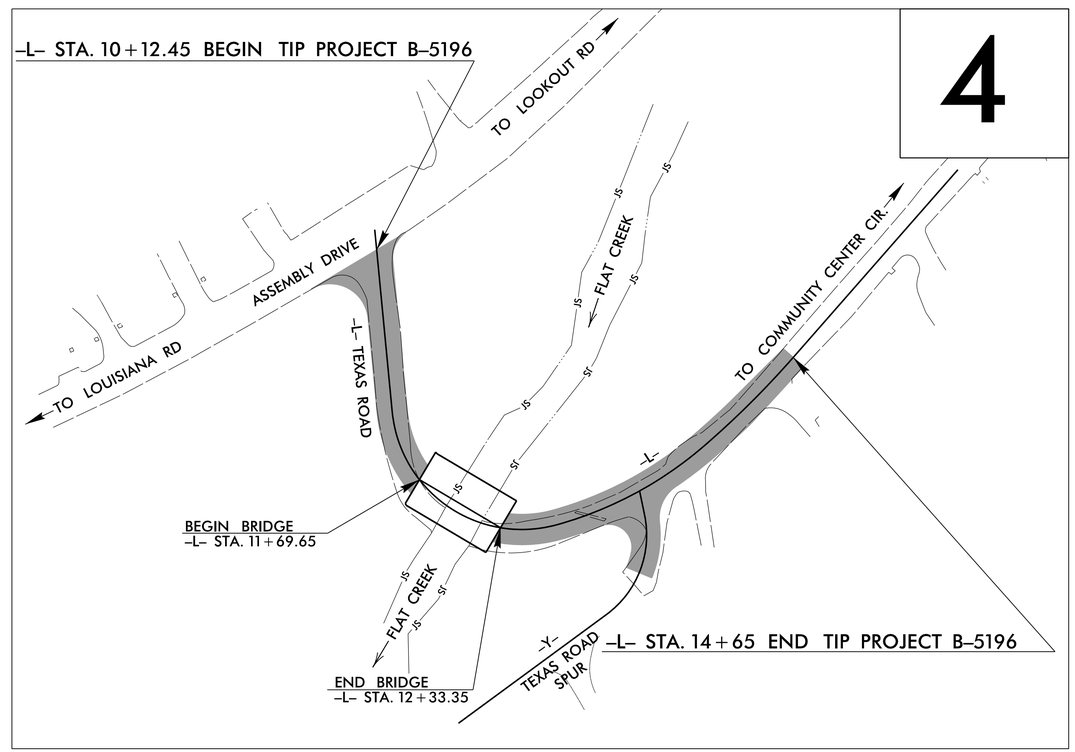
BUNCOMBE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5196	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
45252.1.1	BRZ-1329(6)	P.E.
45252.1.1	BRZ-1329(6)	R/W & UTIL.
45252.3.FD1	BRZ-1329(6)	CONST.

LOCATION: BRIDGE NO. 528 OVER FLAT CREEK ON TEXAS ROAD

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



NAD 83

SUNGATE DESIGN GROUP, P.A.
516 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6256
ENG FIRM LICENSE NO. C-950

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 266
ADT 2035 = 335
T = 7 % *
V = 20 MPH
* (TTST = 2% DUAL = 5%)

FUNC CLASS = RURAL LOCAL
SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5196	=	0.074 MILES
LENGTH OF STRUCTURE TIP PROJECT B-5196	=	0.012 MILES
TOTAL LENGTH OF TIP PROJECT B-5196	=	0.086 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
http://www.kci.com

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 10, 2015

LETTING DATE:
OCTOBER 20, 2015

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

DEWAYNE SYKES, P.E.
PROJECT ENGINEER

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

NCDOT CONTACT: MOHAMMED E. MAHJOUB, E.I.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
DocuSigned by: Joshua G Dalton
SIGNATURE: P.E. 11/2/2015
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

ROADWAY DESIGN ENGINEER
DocuSigned by: Barry C. Smith
SIGNATURE: P.E. 11/2/2015
NORTH CAROLINA PROFESSIONAL SEAL 034375 ENGINEER BARRY C. SMITH

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-5196	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 034375 ENGINEER BARRY C. SMITH

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEET
1D-1	RIGHT OF WAY SHEET
2A-1	TYPICAL SECTIONS, PAVEMENT SCHEDULE, WEDGING DETAILS, AND PROFILE KEY-IN DETAIL
2B-1	ROADWAY DESIGN DETAIL SHEET
2B-2	RETAINING WALL ENVELOPE
2C-1	TYPE III - SHOP CURVED STRUCTURE ANCHOR UNIT DETAIL
2C-2	TYPE III - STRUCTURE ANCHOR UNIT DETAIL
3A-1	SUMMARY OF EARTHWORK, SUMMARY OF PAVEMENT REMOVAL, SUMMARY OF PAVEMENT BREAKING, SUMMARY OF RIP RAP, SUMMARY OF CURB & GUTTER, DRAINAGE SUMMARY, AND GUARDRAIL SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP-4	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
UC-1 THRU UC-5	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-3	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-9	CROSS-SECTIONS
S-1 THRU S-22	STRUCTURE PLANS

GENERAL NOTES:

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

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

AT&T	MSD
Charter Communications	Town of Montreat
Duke Energy	

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.

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

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
DIVISION 4 - MAJOR STRUCTURES	
422.11	Reinforced 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	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
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
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.05	Curb Ramp - Proposed Curb & Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units (Beg. March 2013 Letting use detail in lieu of Standard)
866.01	Chain Link Fence - 4', 5', and 6' High Fence
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

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02/03/15

PROJECT REFERENCE NO.	SHEET NO.
B-5196	1B

Note: Not to Scale

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

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
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- 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 — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- 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 R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A 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
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- 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 — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line
- Designated U/G Water Line (S.U.E.*)
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- 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 — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
B-5196	1C-1
Location and Surveys	

SURVEY CONTROL SHEET B-5196

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	705661.5410	1018797.3470	2593.08	10+77.23	118.93 RT
5	BL-5	705550.9702	1018944.5083	2951.86	11+94.91	20.22 RT
4	BL-4	705565.6513	1019102.8256	2601.13	13+40.65	20.02 RT
3	BL-3	705780.8244	1019270.1477	2614.02	16+08.09	11.70 LT
6	BL-6	705423.8464	1018986.5981	2611.71	12+39.94	128.92 RT

NC GRID
NAD 83 NA 2011

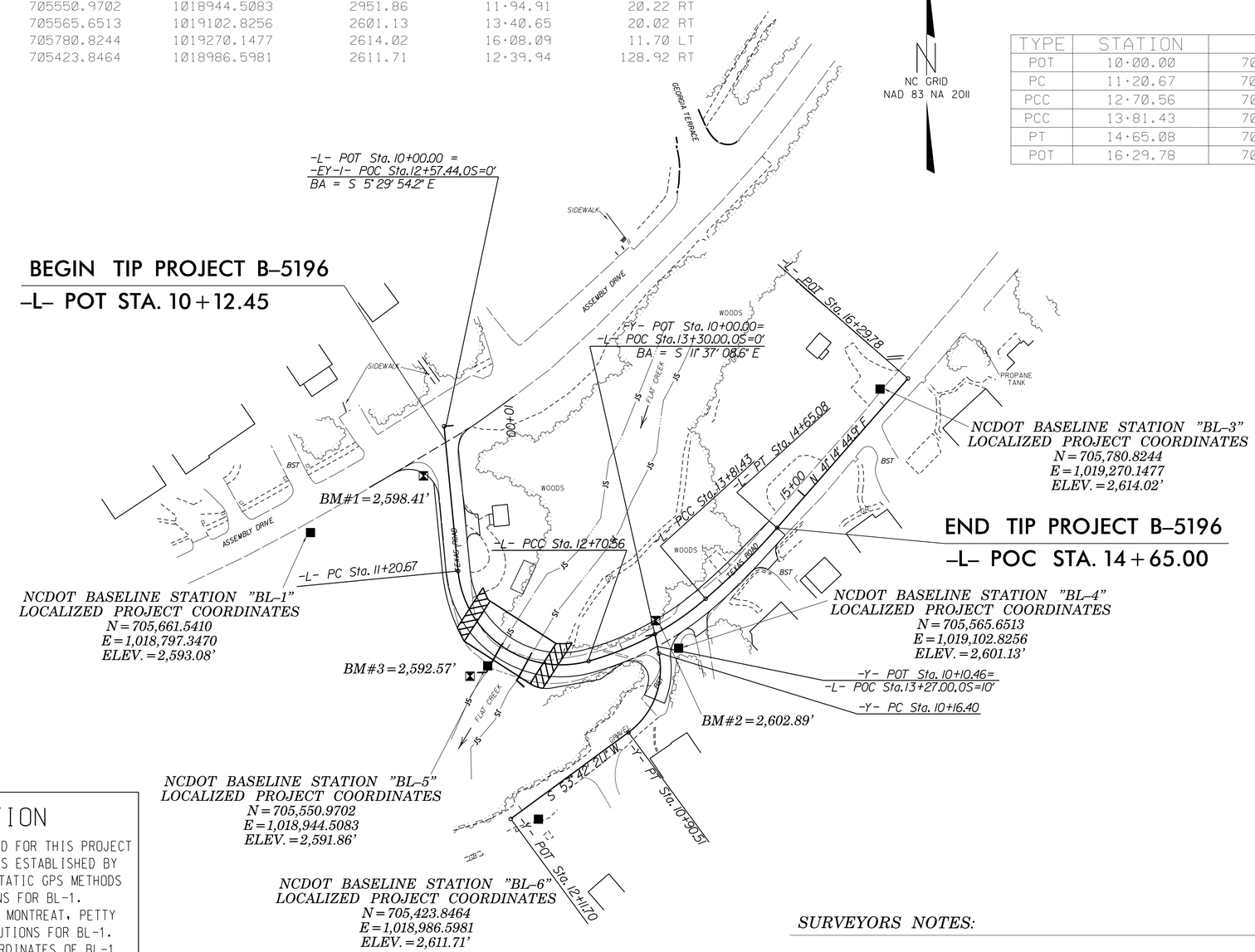
-L-

TYPE	STATION	NORTH	EAST
POT	10+00.00	705749.8110	1018908.3278
PC	11+20.67	705629.6941	1018919.8903
PCC	12+70.56	705555.0043	1019028.2672
PCC	13+81.43	705606.7354	1019125.3115
PT	14+65.08	705665.5886	1019184.6592
POT	16+29.78	705789.4257	1019293.2455

BM1 ELEVATION = 2598.41
N 705708.71 E 1018891.25
L STATION 10+39.27 20.94' RIGHT
RR SPIKE SET IN TREE

BM2 ELEVATION = 2602.89'
N 705588.65 E 1019083.83
L STATION 13+36.25 9.47' LEFT
RR SPIKE SET IN UTILITY POLE

BM3 ELEVATION = 2592.57'
N 705542.49 E 1018929.80
L STATION 11+89.84 35.82' RIGHT
RR SPIKE SET IN UTILITY POLE



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY KCI TECHNOLOGIES, INC UTILIZING FAST STATIC GPS METHODS AND REDUNDANT NGS "OPUS" SOLUTIONS FOR BL-1.
NORTH CAROLINA GEODETIC HARN STATIONS MONTREAT, PETTY AND RRPT WERE USED TO DERIVE THE SOLUTIONS FOR BL-1.
THE NAD 83(2011) STATE PLANE GRID COORDINATES OF BL-1
NORTHING: 705661.541(ft) EASTING: 1018797.347(ft)
ELEVATION: 2593.08(ft)
THE AVERAGE COMBINED SCALE FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99989534
THE LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL-1" TO -L- STATION 10+00.00 IS
N 22°33'53" E 44.50'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

SURVEYORS NOTES:

1. PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM, FAST STATIC METHODS IN OCTOBER 2012 BY KCI TECHNOLOGIES, INC.

GEOID MODEL—GEOID 12A
(NOTE: DRAWING IS NOT TO SCALE)

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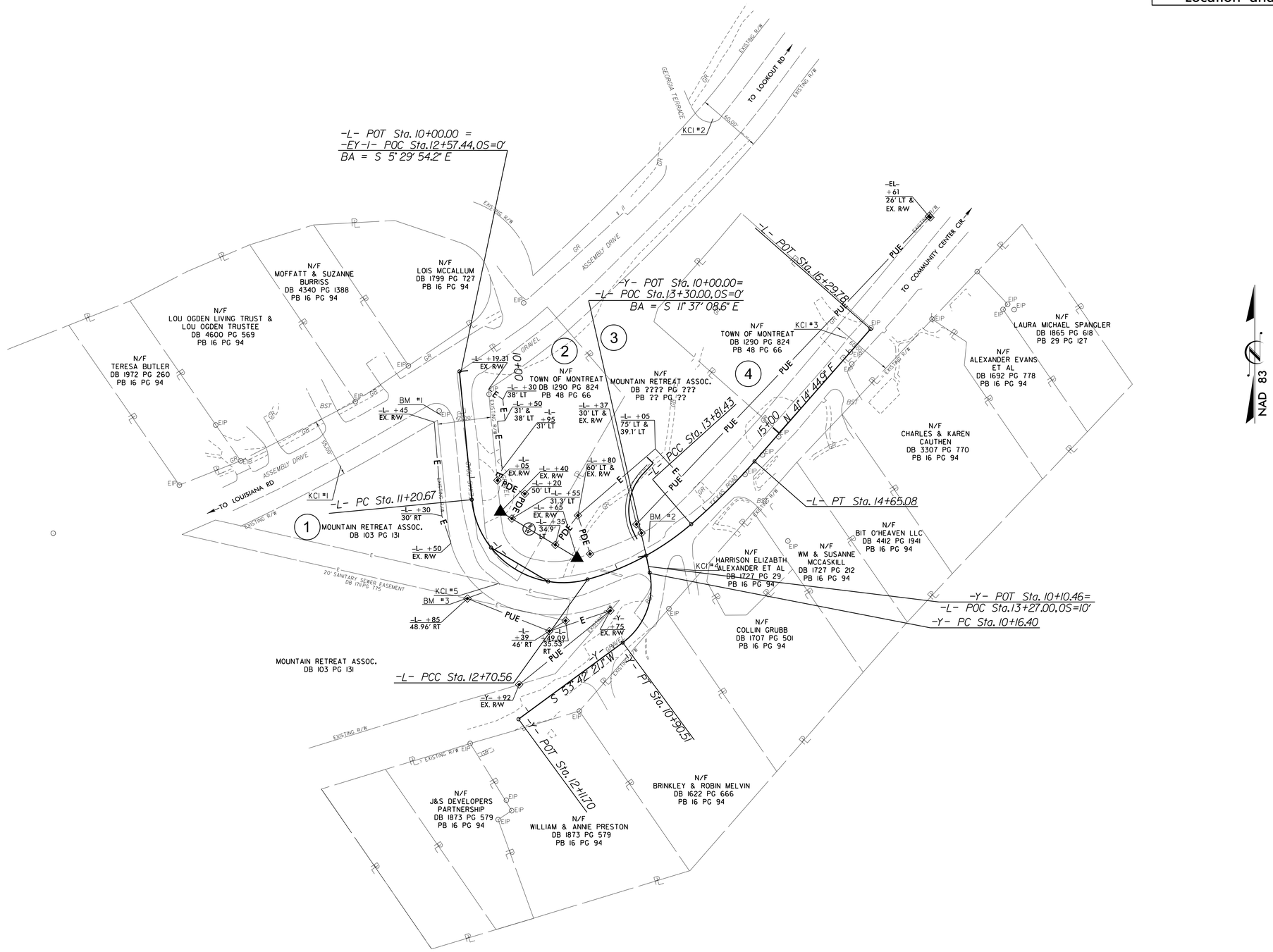
RIGHT-OF-WAY SHEET B-5196

PROJECT REFERENCE NO.	SHEET NO.
B-5196	1D-1
Location and Surveys	



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PROJECT REFERENCE NO.	SHEET NO.
B-5196	2A-1

ROADWAY DESIGN ENGINEER

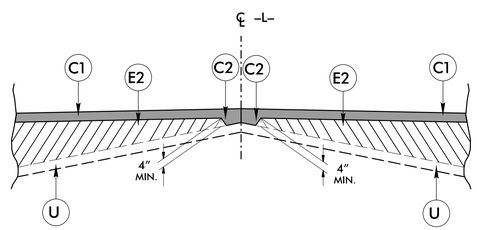
NORTH CAROLINA PROFESSIONAL SEAL 034375 ENGINEER BARRY C. SMITH

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
http://www.kci.com

FINAL PAVEMENT SCHEDULE

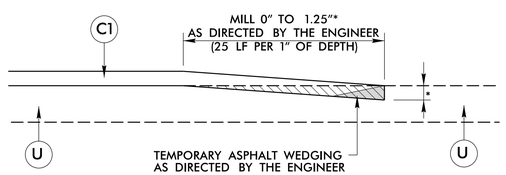
C1	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. PER 1½″ DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 2″ IN DEPTH.
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 5½″ IN DEPTH.
R	2′-6″ CONCRETE CURB AND GUTTER.
S	4″ CONCRETE SIDEWALK.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING).

ALL PAVEMENT EDGE SLOPES ARE 1:1



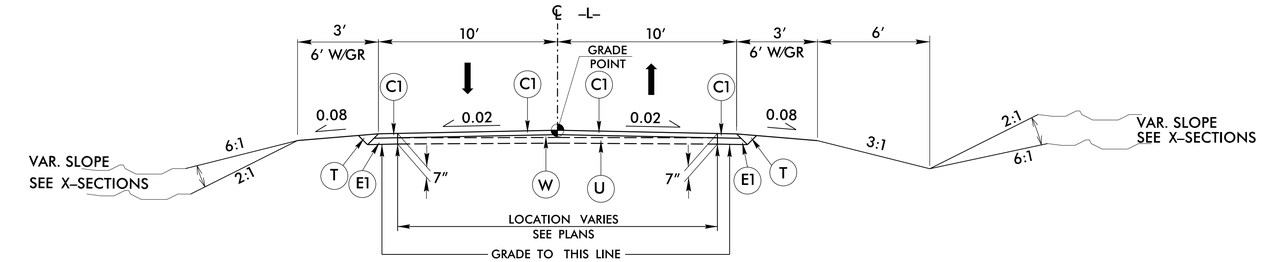
Detail Showing Method of Wedging

PROFILE KEY–IN DETAIL



* MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER

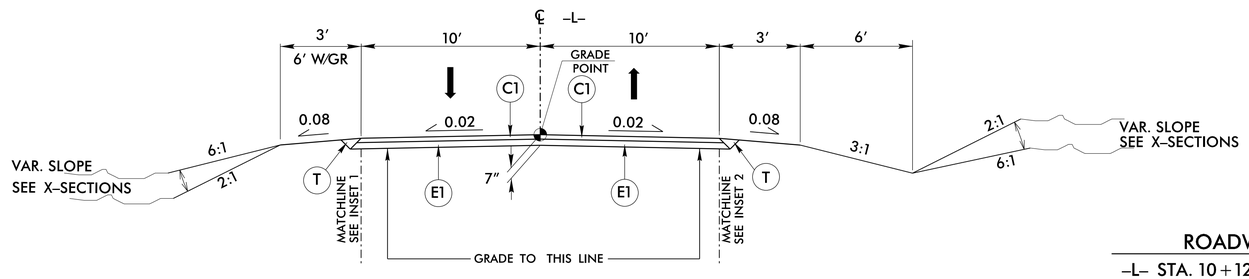
** SEE TYPICALS FOR MIX TYPE



ROADWAY TYPICAL SECTION NO. 1

ROADWAY TYPICAL SECTION NO. 1

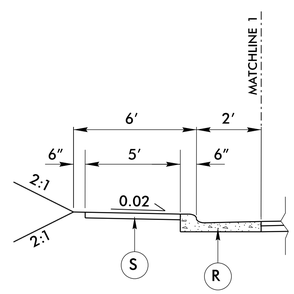
–L– STA. 13+80.00 TO STA. 14+65.00



ROADWAY TYPICAL SECTION NO. 2

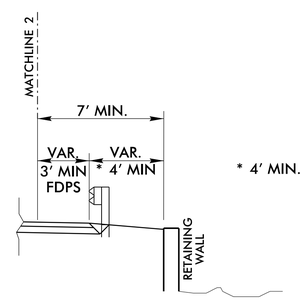
ROADWAY TYPICAL SECTION NO. 2

–L– STA. 10+12.45 TO STA. 11+69.65 (BEGIN BRIDGE)
–L– STA. 12+33.35 (END BRIDGE) TO STA. 13+80.00



INSET 1

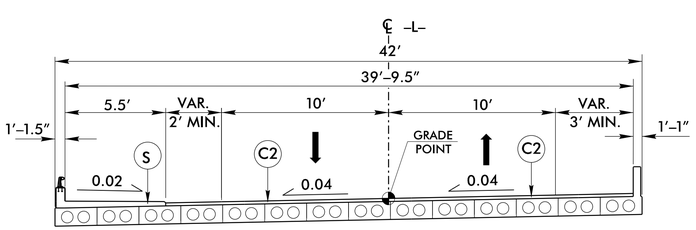
–L– STA. 11+15.00 TO STA. 11+69.65 LT (BEGIN BRIDGE)
–L– STA. 12+33.35 (END BRIDGE) TO STA. 13+33 LT



* 4′ MIN. WITH 8′ POSTS (STANDARD 6′3″ POST SPACING)

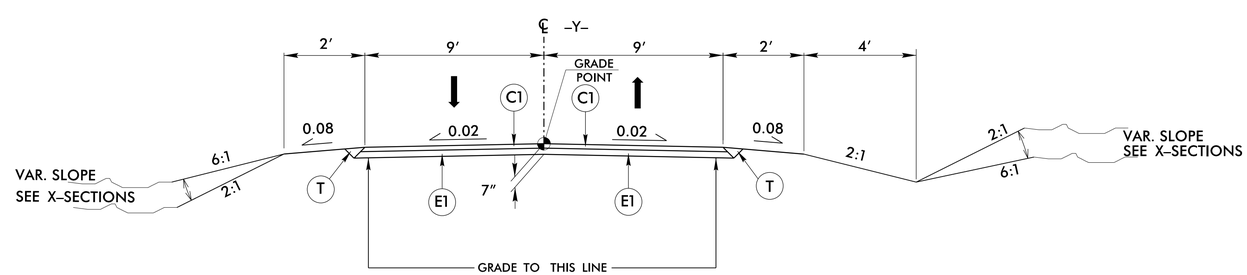
INSET 2

–L– STA. 10+60.00 TO STA. 11+69.65 RT (BEGIN BRIDGE)



STRUCTURE TYPICAL SECTION
(CORED SLAB)

–L– STA. 11+69.65 TO STA. 12+33.35



ROADWAY TYPICAL SECTION NO. 3

ROADWAY TYPICAL SECTION NO. 3

–Y– STA. 10+10.46 TO STA. 10+55.00

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ROADWAY DESIGN DETAIL SHEET

PROJECT REFERENCE NO.	SHEET NO.
B-5196	2B-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19075 ENGINEER BRYAN C. SMITH DocuSigned by: 11/2/2015	NORTH CAROLINA PROFESSIONAL SEAL 036963 ENGINEER JOSHUA G. DALTON DocuSigned by: 11/2/2015

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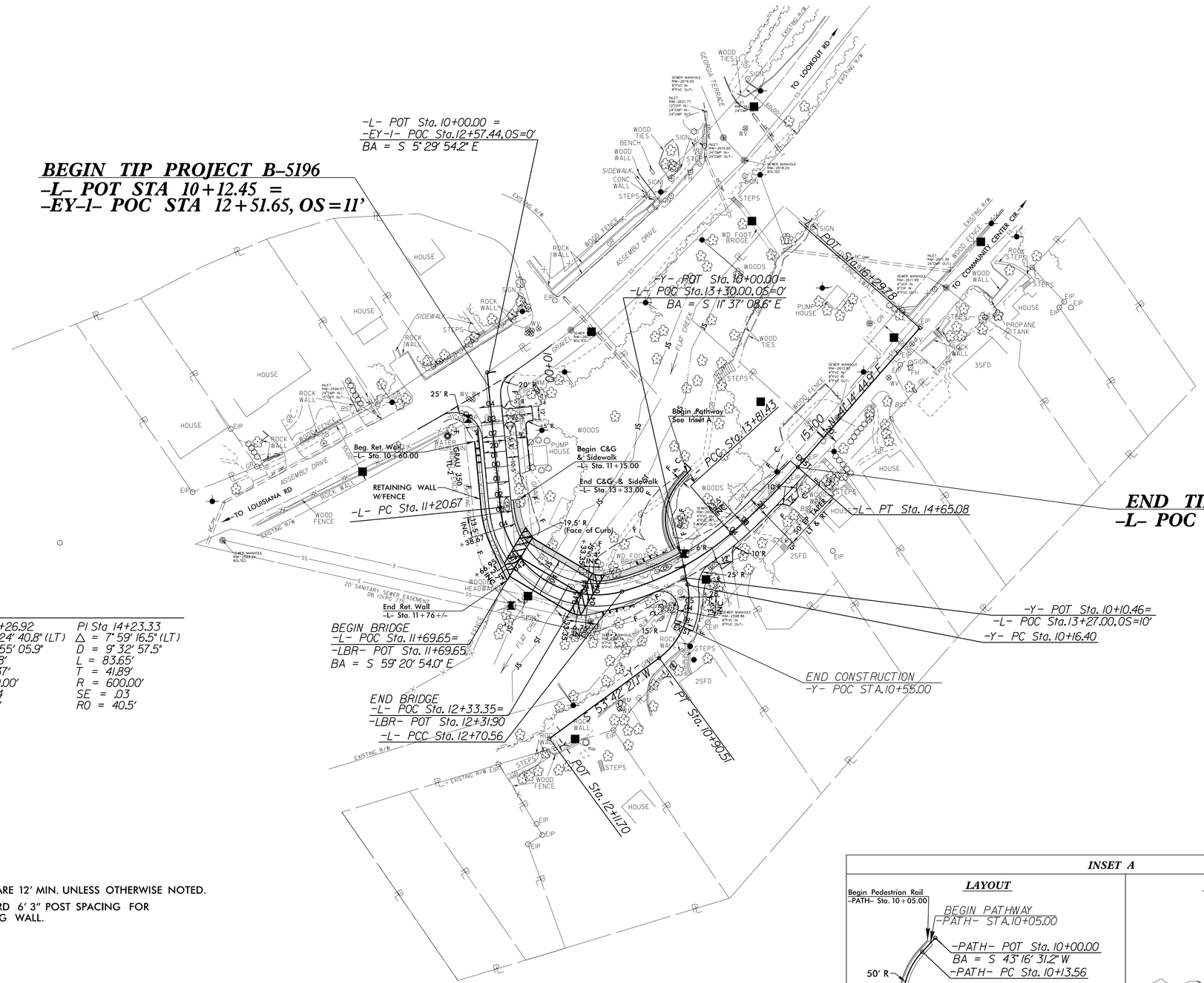
Raleigh, NC 27609-5210
Phone (919) 783-9214 • Fax (919) 783-9266

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-690

FOR -L- PROFILE, SEE SHEET 5
FOR -Y- PROFILE, SEE SHEET 5
FOR -PATH- PROFILE, SEE SHEET 5

NAD 83



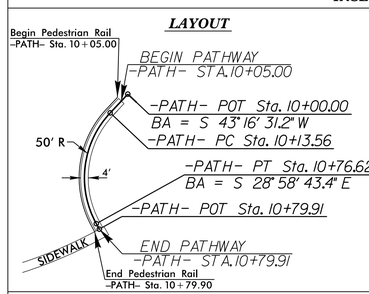
-L-		
PI Sta 12+22.90	PI Sta 13+26.92	PI Sta 14+23.33
Δ = 99° 51' 23.7" (LT)	Δ = 25° 24' 40.8" (LT)	Δ = 7° 59' 16.5" (LT)
D = 66° 37' 22.8"	D = 22° 55' 05.9"	D = 9° 32' 57.5"
L = 149.88'	L = 110.88'	L = 83.65'
T = 102.23'	T = 56.37'	T = 41.89'
R = 86.00'	R = 250.00'	R = 600.00'
SE = .04	SE = .04	SE = .03
RO = 54'	RO = 54'	RO = 40.5'

-Y-
PI Sta 10+58.07
Δ = 65° 19' 29.7" (RT)
D = 88° 08' 50.5"
L = 74.11'
T = 41.67'
R = 65.00'

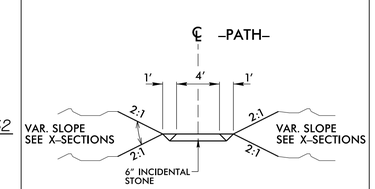
NOTES: ALL DRIVEWAY ENTRANCES ARE 12' MIN. UNLESS OTHERWISE NOTED.
USE 8' POSTS AND STANDARD 6' 3" POST SPACING FOR GUARDRAIL ABOVE RETAINING WALL.

INSET A

LAYOUT



TYPICAL SECTION



4' PATHWAY DESIGN
(FOR PROFILE SEE SHEET 5)

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PROJECT REFERENCE NO.	SHEET NO.
B-5196	2B-2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 034375 ENGINEER BARRY C. SMITH

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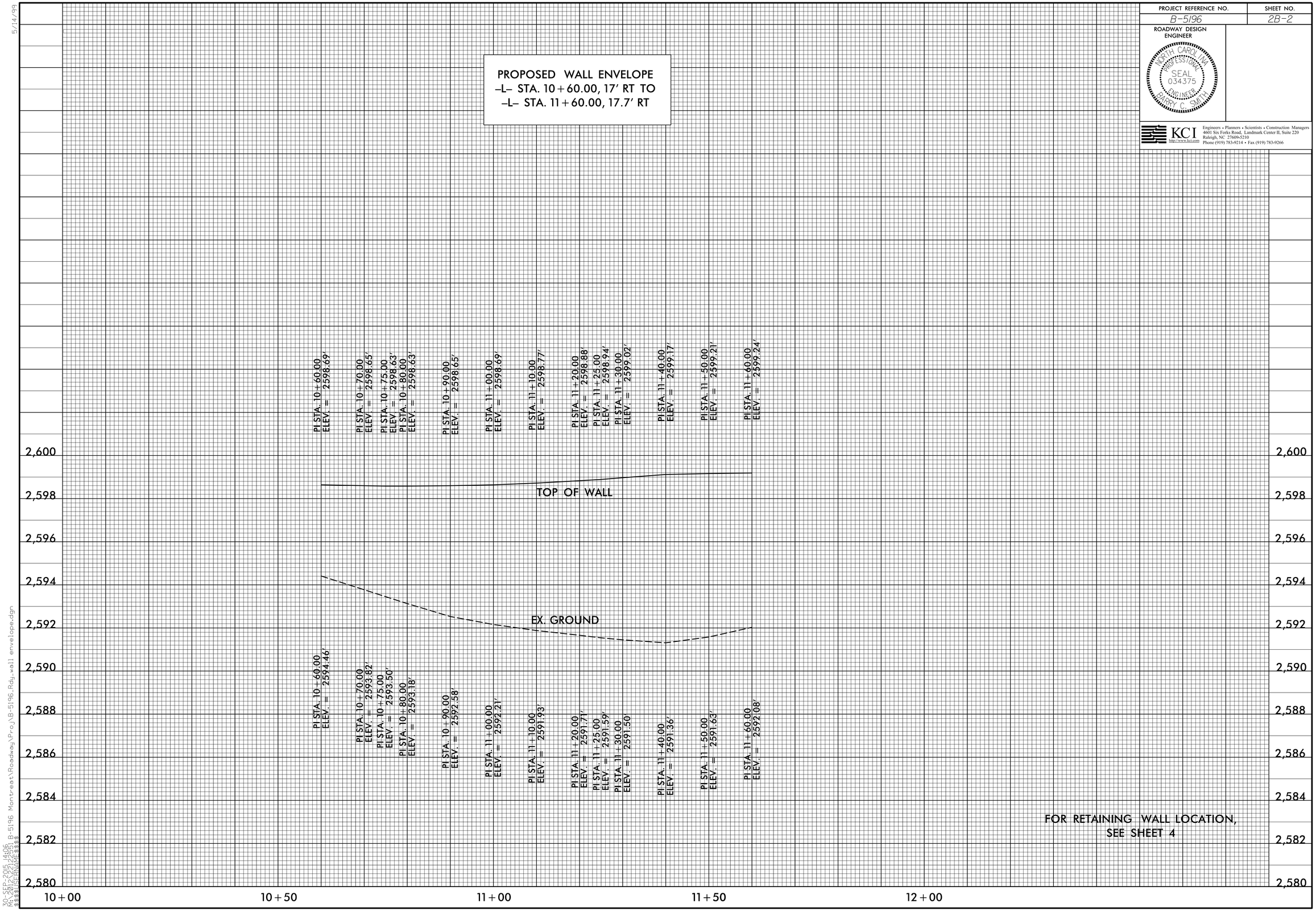
Engineers • Planners • Scientists • Construction Managers
4601 Six Forks Road, Landmark Center II, Suite 220
Raleigh, NC 27609-5210
Phone (919) 783-9214 • Fax (919) 783-9266



FOR RETAINING WALL LOCATION, SEE SHEET 4

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
B-5196	2C-1

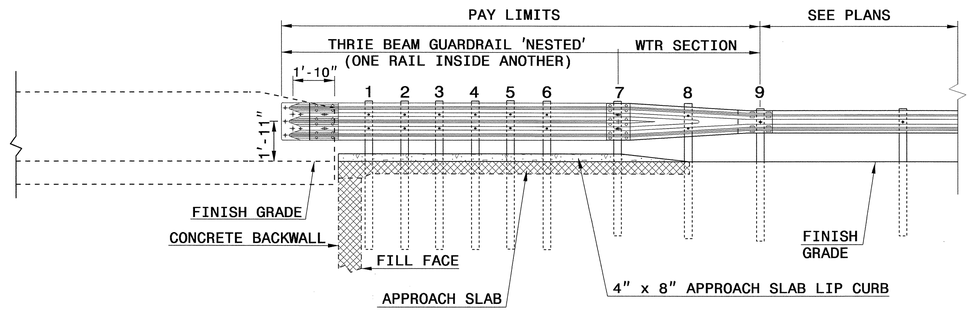
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

TYPE III - SHOP CURVED
STRUCTURE ANCHOR UNIT

SHEET 1 OF 1

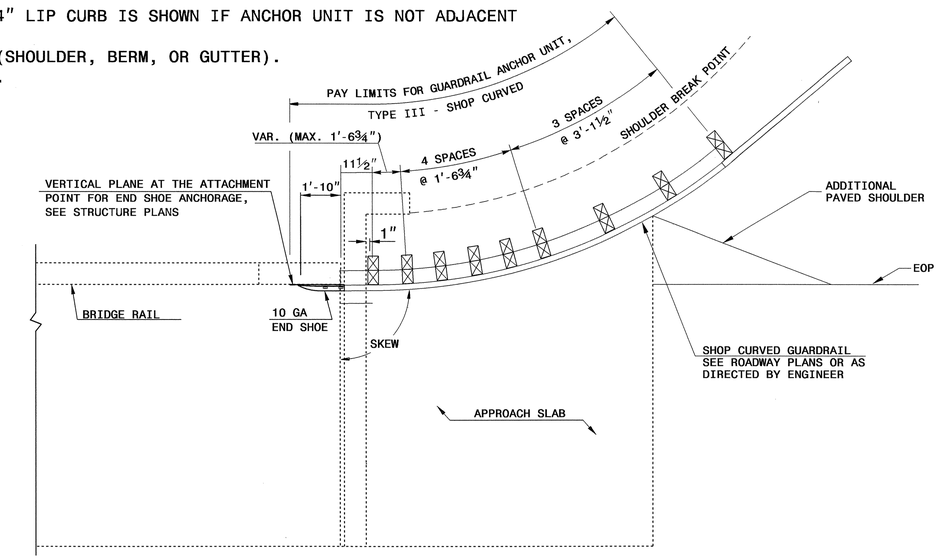
TYPE III SC



ELEVATION

SEE ROADWAY PLANS FOR END TREATMENT

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).
-USE NO STEEL POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE STANDARD 862.03 SHEET 4 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

GUARDRAIL ANCHOR UNIT, TYPE III - SHOP CURVED FOR ATTACHMENT TO RAIL ON BRIDGE

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

ENGLISH DETAIL DRAWING FOR

TYPE III - SHOP CURVED
STRUCTURE ANCHOR UNIT

SHEET 1 OF 1

TYPE III SC

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
7/15/15

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

SEE PLATE FOR TITLE

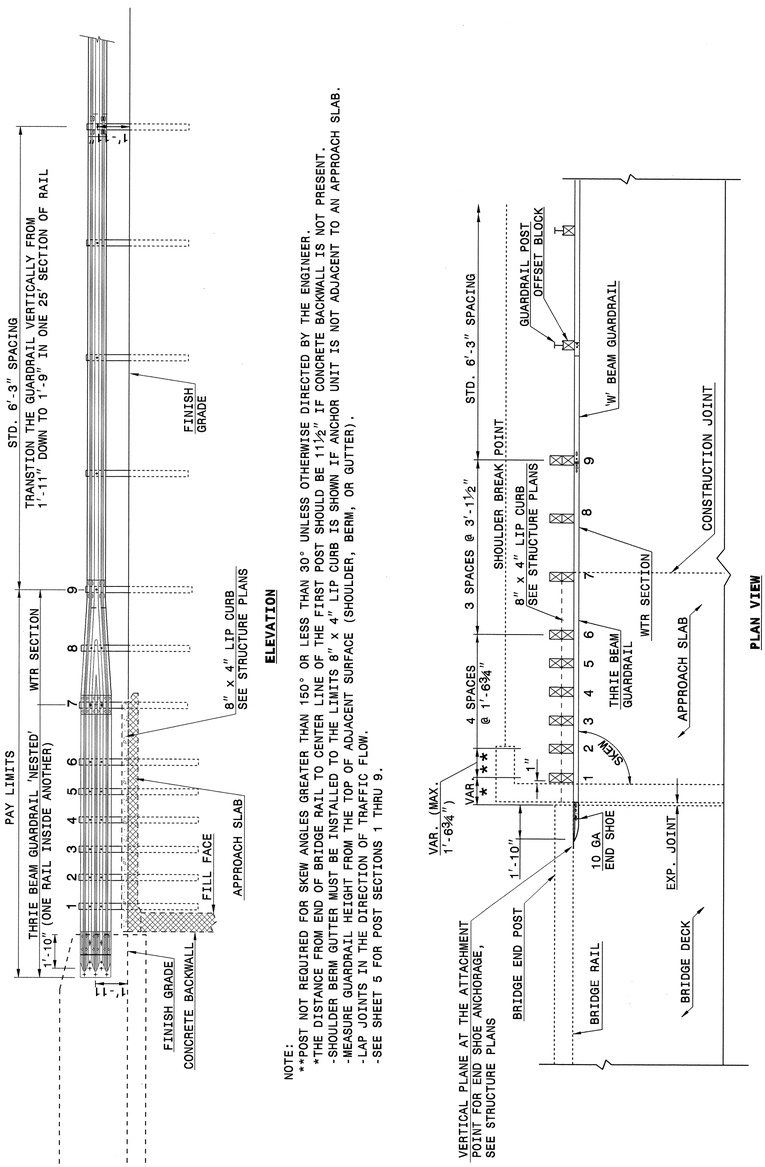
ORIGINAL BY: E.E.Ward DATE: 4-4-02
MODIFIED BY: T.S.Spell DATE: 5-29-09
CHECKED BY: DATE:
FILE SPEC.: ward:\usr\details\stand\862stds\typeiiisc.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-5196	2C-2

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



NOTE:
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-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

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

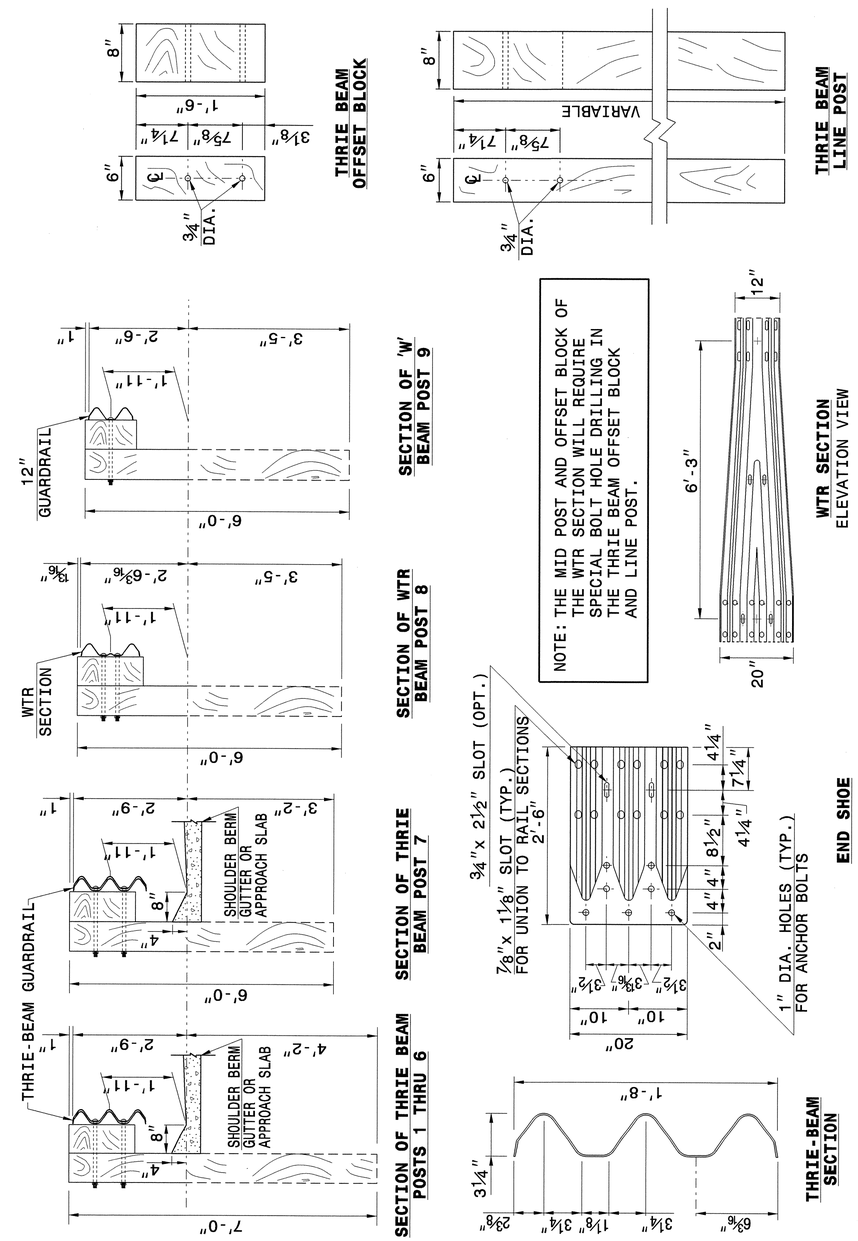
ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III

SHEET 2 OF 7
862d03

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

SHEET 3 OF 7
862d03



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

SHEET 3 OF 7
862d03

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
7/15/15

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.:

COMPUTED BY: T. CAREY	DATE: 04/08/2015
CHECKED BY: B. SMITH	DATE: 04/10/2015

4/04/06

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
B–5196	3A–1

SUMMARY OF EARTHWORK IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV.	EMBANK. + %	BORROW	WASTE
–L– 10+12.45	11+69.65		1,093	1,093	
SUBTOTAL:			1,093	1,093	
–L– 12+33.35	14+65.00	9	1,147	1,138	
–Y– 10+10.46	10+55.00	12	55	43	
–PATH– 10+05.00	10+79.91	2	120	118	
SUBTOTAL:		23	1,322	1,299	
PROJECT TOTAL:		23	2,415	2,392	
EST 5% TO REPLACE TOP SOIL ON BORROW PIT				120	
GRAND TOTAL:		23		2,512	
SAY:		25		2,515	

NOTES:
APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, REMOVAL OF EXISTING PAVEMENT, AND BREAKING OF EXISTING ASPHALT 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.

EXISTING PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	11+38.00	11+96.00	RT	119
–L–	12+17.00	12+60.00	RT	95
			TOTAL:	214
			SAY:	215

BREAKING OF PAVEMENT SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	10+12.45	11+38.00	CL	289
–L–	12+60.00	13+80.00	CL	268
			TOTAL:	557
			SAY:	560

2'– 6" CURB & GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
–L–	11+15.00	11+63+/–	48
–L–	12+39+/–	13+33.00	94
		TOTAL:	142
		SAY:	160

SUMMARY OF RIP RAP

LINE	STATION	STATION	LOC	RIP RAP CLASS I	II	A	B	RR (TON)	GF (SY)	DDE (CY)	DETAIL	COMMENTS
–L–	11+28.00		LT				X	1	5			
–L–	11+90.00		RT		X			45	55			STREAMBANK STAB.
–L–	12+18.00		RT		X			40	45			STREAMBANK STAB.
–L–	12+50.00	13+00.00	RT				X	11	25			TOE PROTECTION
–L–	12+72.00		LT				X	1	5			
–L–	13+00.00		RT				X	2	7			

	TOTAL (TON)	SAY
CLASS I		
CLASS II	85	85
CLASS A		
CLASS B	15	15
DDE (CY)		
	TOTAL (SQ. YD)	SAY
GEOTEXTILE	142	145

ABBREVIATIONS	
CY	CUBIC YARD
DDE	DRAINAGE DITCH EXCAVATION
GF	GEOTEXTILE FOR DRAINAGE
LOC	LOCATION
RR	RIP RAP
SY	SQUARE YARD

SUB–REGIONAL & REGIONAL LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

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

STATION (SIZE / THICKNESS OR GAUGE)	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
–L– 11+28.00	LT	0401		2596.9	2593.9														
–L– 11+28.00	LT	0401	0402		2593.9	2593.6			20'										
–L– 12+72.00	LT	0403		2597.5	2594.5														
–L– 12+72.00	LT	0403	0404		2594.5	2589.3			28'							X			
–L– 13+40.00	RT	0405		2601.2	2598.9														
–L– 13+00.00	RT	0405	0406		2598.9	2598.1													
SHEET TOTALS									48'										

STATION	C.S. PIPE 12" (.064)	15" (.064)	18" (.064)	24" (.064)	36" (.079)	42" (.109)	48" (.109)	R.C. PIPE (CLASS III) 15"	18"	24"	30"	36"	42"	48"	R.C. PIPE (CLASS IV) 12"	15"	18"	24"	30"	36"	42"	48"
–L– 11+28.00																						
–L– 11+28.00																						
–L– 12+72.00																						
–L– 12+72.00																						
–L– 13+40.00																						
–L– 13+00.00																44'						
SHEET TOTALS																44'						

STATION	**" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. FRAME WITH TWO GRATES STD. 840.16	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72		PIPE REMOVAL LIN.FT.	REMARKS
–L– 11+28.00								1			1		1															
–L– 11+28.00																												
–L– 12+72.00								1			1		1															
–L– 12+72.00																												
–L– 13+40.00								1										1	1									
–L– 13+00.00																												
SHEET TOTALS								3			2		2					1	1									

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

"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 STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPROACH END	WARRANT POINT TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	FLARE LENGTH TRAILING END	W APPROACH END	W TRAILING END	ANCHORS XI MOD	B–77	GRAU 350	M–350	XIII	TYPE III	SHOP CURVED TYPE III	GRAU 350 TL–2	AT–1	TEMP. CRASH CUSHIONS EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
–L–	10+50.31	11+65.44	RIGHT	89.25'	32.50'		11+65.44 (BR RAIL)		3'	7'	16.18'		4.2'							1		1								ATTACH STR. ANCH. UNIT TO EXTENDED BRIDGE RAIL (SEE STR. PLANS); USE 8' LENGTH POSTS
–L–	12+27.65	12+77.25	RIGHT	41.00'	18.75'			12+27.65 (BR)	6'	9'											1	1								SHOP CURVED TYPE III RADIUS = 25'
–L–	12+56.56	13+22.85	LEFT	41.00'	18.75'		12+56.56 (BR RAIL)		7.5'	10.5'	25'		1'								1	1								SHOP CURVED TYPE III RADIUS = 68.5' RADIUS FOR 11' ; ATTACH STR. ANCH. UNIT TO EXTENDED BRIDGE RAIL (SEE STR. PLANS)
			SUBTOTAL	171.25'	70.00'																									
		LESS ANCHOR DEDUCTIONS:																												
		GRAU 350 TL–2	3 @ 28.50' =	–85.50'																										
		TYPE III	1 @ 18.75' =	–18.75'																										
		SC TYPE III	2 @ 18.75' =		–37.50'																									
		ANCHOR DEDUCTION TOTAL:		–104.25'	–37.50'																									
			PROJECT TOTAL	67.00'	32.50'																									
			SAY	75'	37.50'															1	2	3								
		ADDITIONAL GUARDRAIL POST =		5																										

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-5196	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 034375 ENGINEER — DocuSigned by: Barry G. Smith — 11/2/2015

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 034861 ENGINEER — DocuSigned by: Joshua G. Dalton — 11/2/2015

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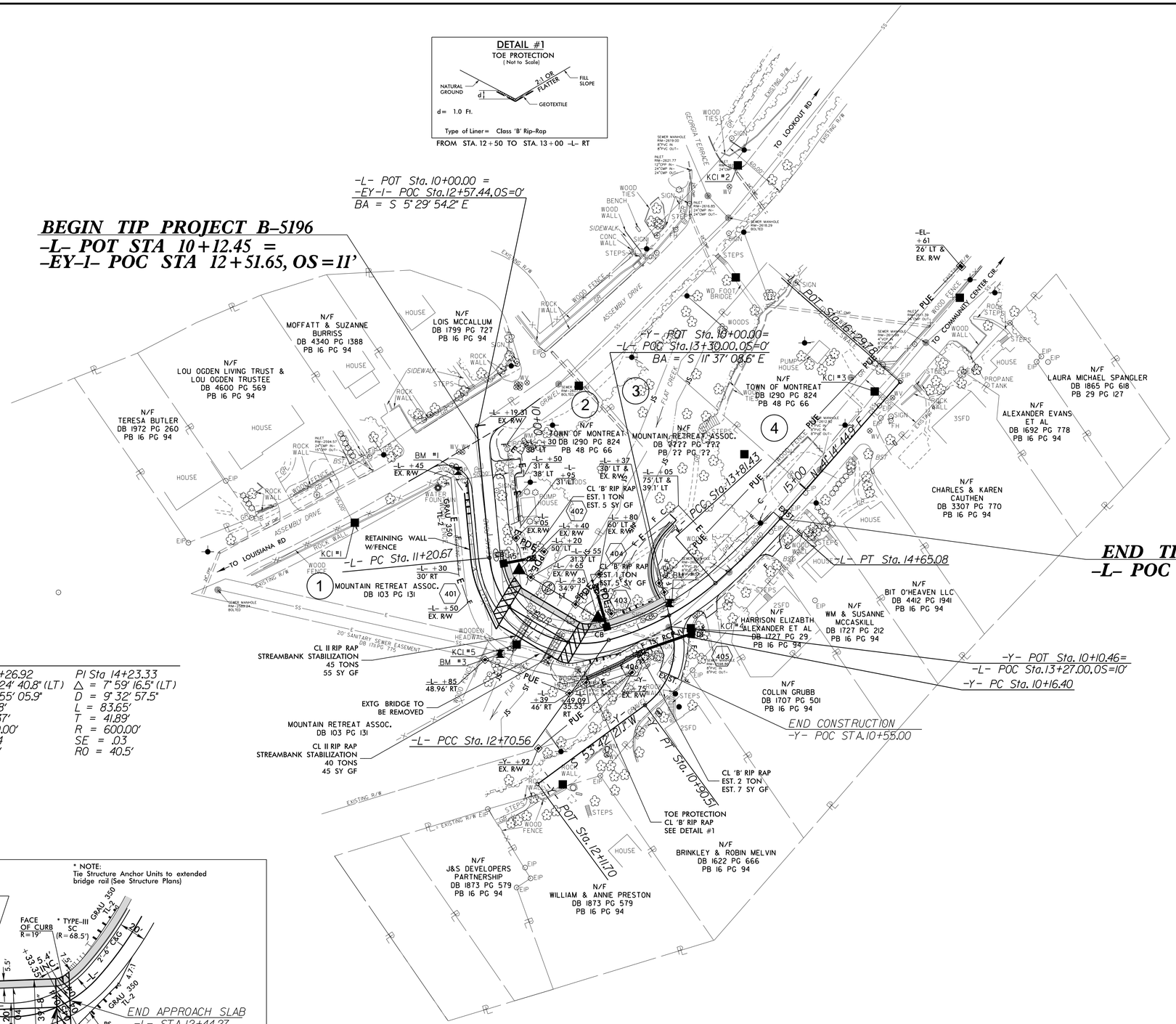
SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-8258
ENG FIRM LICENSE NO. C-890

FOR -L- PROFILE, SEE SHEET 5
FOR -Y- PROFILE, SEE SHEET 5
FOR STRUCTURE PLANS,
SEE SHEETS S-1 TO S-22

NAD 83



-L-

PI Sta 12+22.90	PI Sta 13+26.92	PI Sta 14+23.33
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D = 66° 37' 22.8"	D = 22° 55' 05.9"	D = 9° 32' 57.5"
L = 149.88'	L = 110.88'	L = 83.65'
T = 102.23'	T = 56.37'	T = 41.89'
R = 86.00'	R = 250.00'	R = 600.00'
SE = .04	SE = .04	SE = .03
RO = 54'	RO = 54'	RO = 40.5'

-Y-

PI Sta 10+58.07
Δ = 65° 19' 29.7" (RT)
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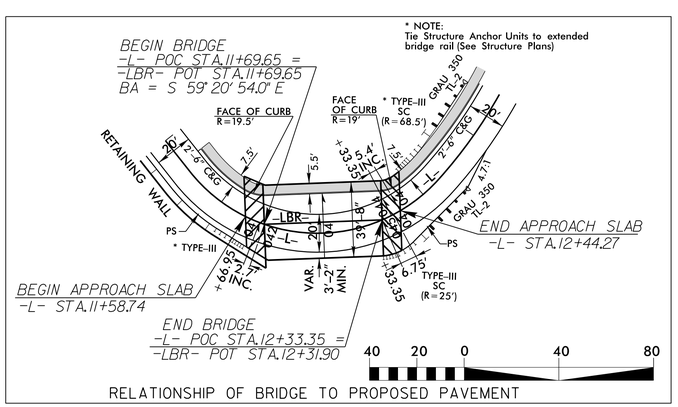
R = 65.00'



RELATIONSHIP OF BRIDGE TO PROPOSED PAVEMENT

NOTES: SEE DETAIL SHEET 2B-1 FOR DIMENSIONS AND SUPERS
SEE SURVEY SHEET 1D-1 FOR RIGHT-OF-WAY INFORMATION
ALL DRIVEWAY ENTRANCES ARE 12' MIN. UNLESS OTHERWISE NOTED.
USE 8' POSTS AND STANDARD 6' 3" POST SPACING FOR GUARDRAIL ABOVE RETAINING WALL.

05-OCT-2015 15:49
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PROJECT REFERENCE NO.	SHEET NO.
B-5196	5

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 034575 ENGINEER BARRY C. SMITH — 11/2/2015

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON — 11/2/2015

KCI http://www.kci.com
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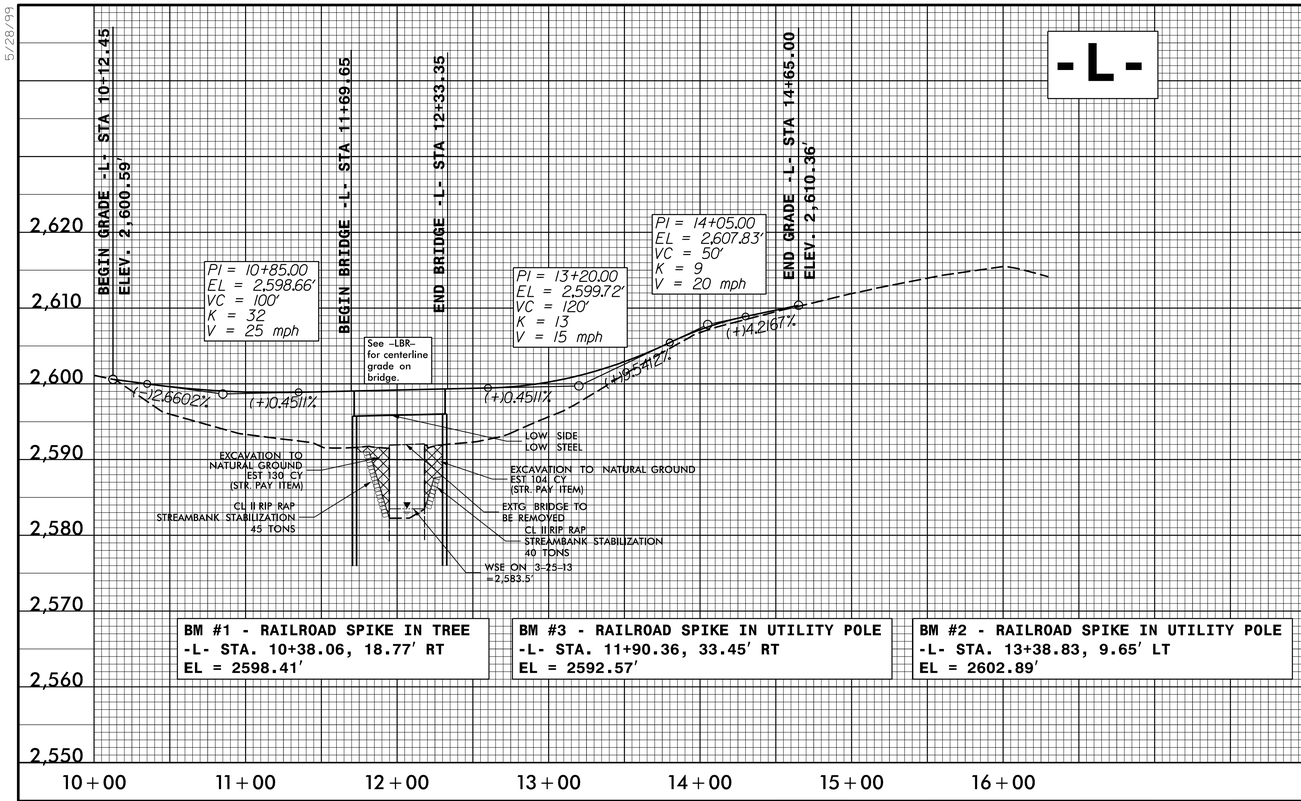
SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-890

-L-



BM #1 - RAILROAD SPIKE IN TREE
-L- STA. 10+38.06, 18.77' RT
EL = 2598.41'

BM #3 - RAILROAD SPIKE IN UTILITY POLE
-L- STA. 11+90.36, 33.45' RT
EL = 2592.57'

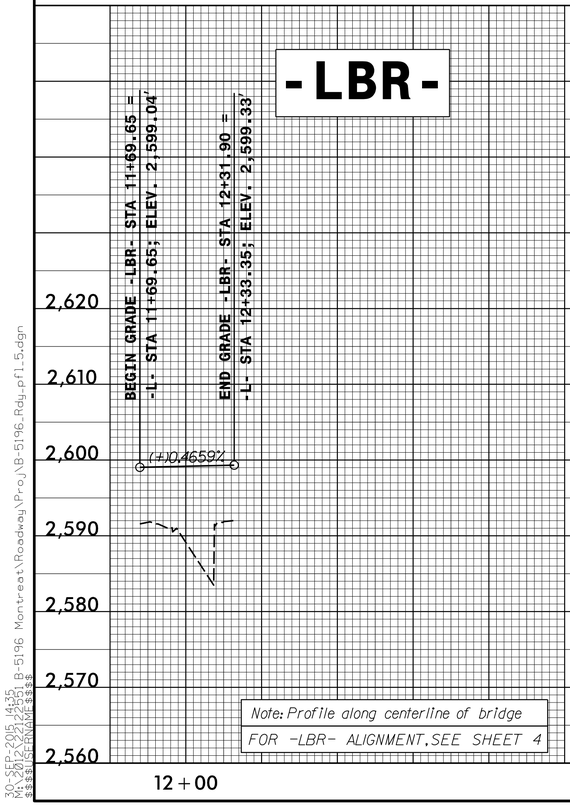
BM #2 - RAILROAD SPIKE IN UTILITY POLE
-L- STA. 13+38.83, 9.65' LT
EL = 2602.89'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1700	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 2591.2	FT
BASE DISCHARGE	= 2660	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2592.63	FT
OVERTOPPING DISCHARGE	= 3940+	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2598.85	FT
DATE OF SURVEY	= 03/25/2013	
W.S.ELEVATION AT DATE OF SURVEY	= 2583.5	FT

FOR -L- ALIGNMENT, SEE SHEET 4

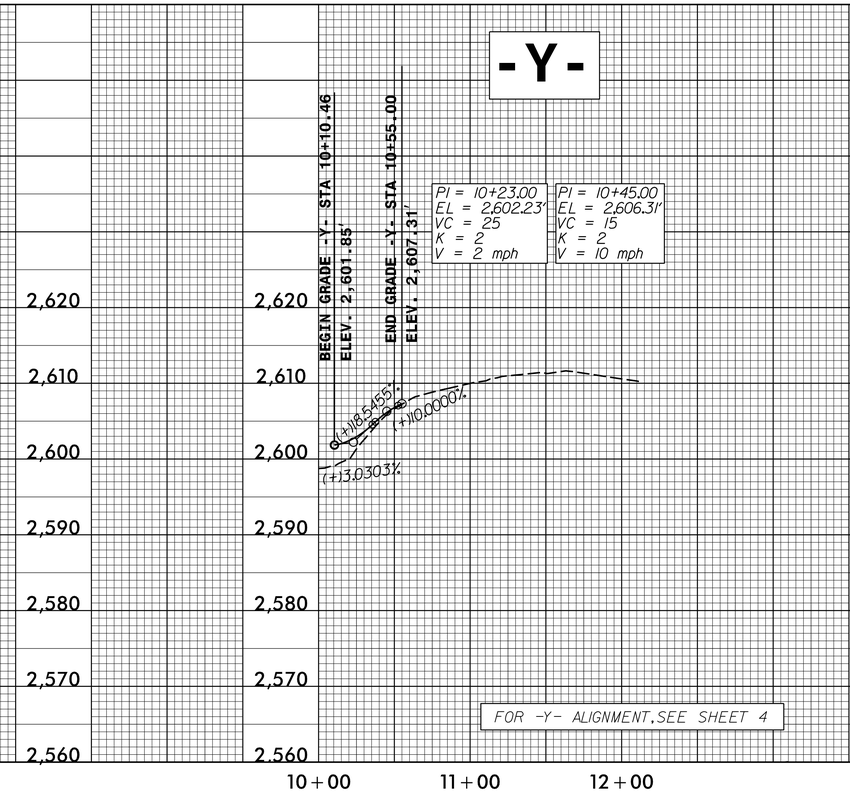
-LBR-



Note: Profile along centerline of bridge

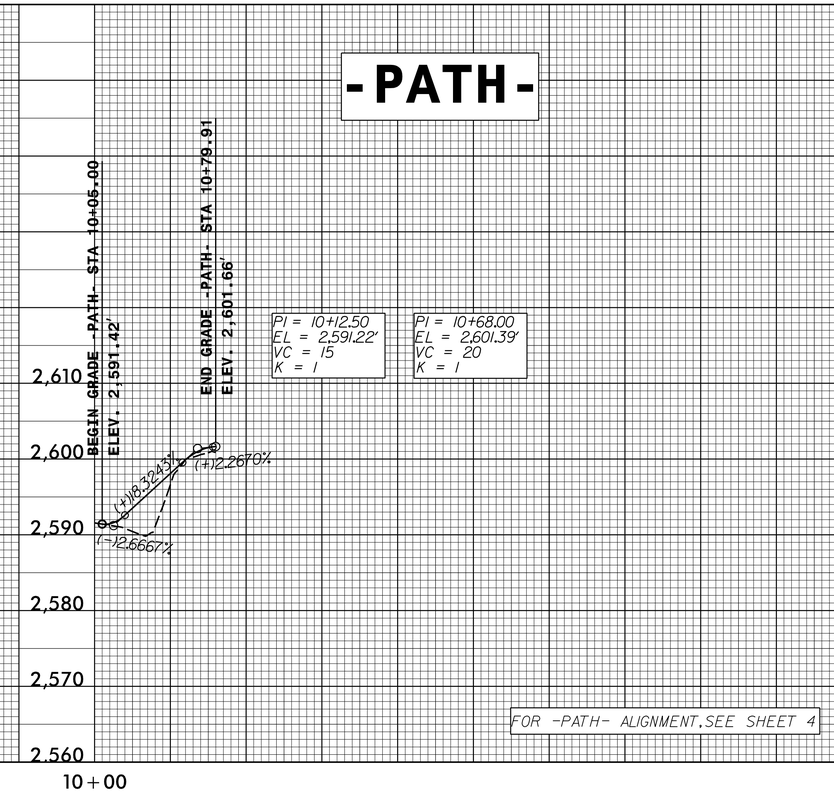
FOR -LBR- ALIGNMENT, SEE SHEET 4

-Y-



FOR -Y- ALIGNMENT, SEE SHEET 4

-PATH-



FOR -PATH- ALIGNMENT, SEE SHEET 4

5/28/99
30-SEP-2015 14:35
M:\2012\22122551 B-5196 Montreat\Roadway\Proj\B-5196_Rdy_pfl_5.dgn
$$$$USERNAME$$$$