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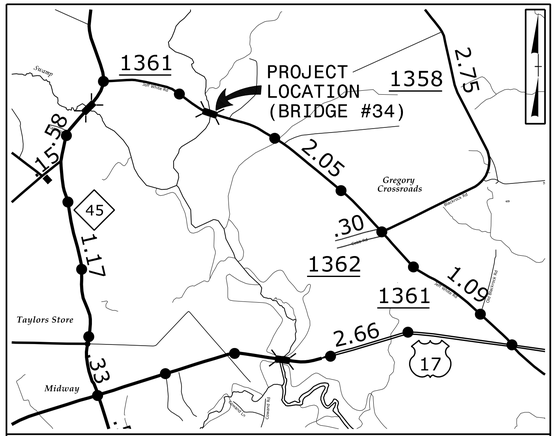
09/08/99

TIP PROJECT: 17BP.1.R.84

CONTRACT: DA00398



VICINITY MAP
(NOT TO SCALE)
DETOUR ROUTE (APPROXIMATE LENGTH = 8 MILES)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

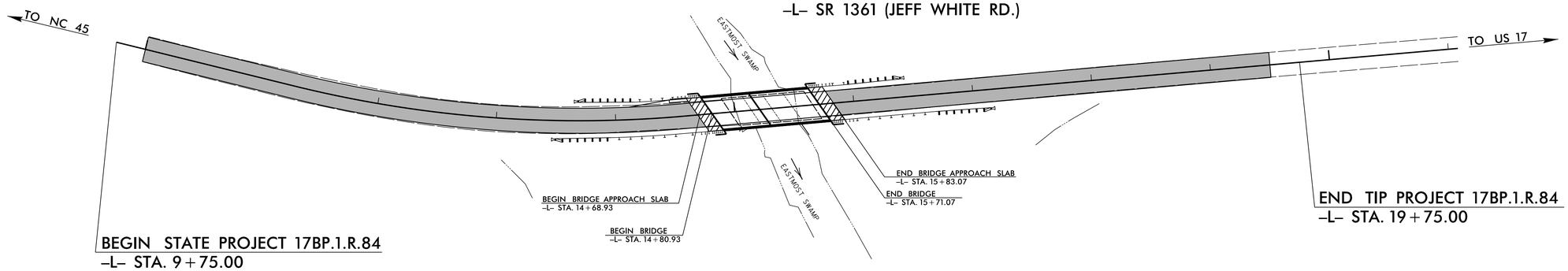
BERTIE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.1.R.84	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.1.R.84		PE

LOCATION: ***REPLACEMENT OF BRIDGE 34 OVER EASTMOST SWAMP ON SR 1361 (JEFF WHITE RD.)***

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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 2012 = 910

FUNC CLASS = LOCAL

SUB–REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT 17BP.1.R.84	=	0.172 MILES
LENGTH STRUCTURES STATE PROJECT 17BP.1.R.84	=	0.017 MILES
TOTAL LENGTH STATE PROJECT 17BP.1.R.84	=	0.189 MILES

Prepared for:
HIGHWAY DIVISION 1
113 Airport Drive, Suite 100
Edenton, NC 27932

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY, 2017

LETTING DATE:
March 21, 2018

Prepared by:
CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

L. KEVIN AUSTIN, PE
PROJECT MANAGER

STEPHEN C. BROWDE, PE
ROADWAY PROJECT DESIGN ENGINEER

JOHN S. ABEL, JR.
NCDOT CONTACT

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043870 REID B ROBOL
DocuSigned by: Reid B. Robol
P.E. 2/13/2018
SIGNATURE:

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15759 STEPHEN C. BROWDE
DocuSigned by: Stephen C. Browde
P.E. 2/14/2018
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

2/7/2018
R:\Roadway\Proj\Bertie 34_RDY_TSH.dgn
ewilliamson

8/17/99

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BP.I.R.84	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 39139 STEPHEN C. BROWN
Stephen C. Brown
2/14/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARDS

INDEX OF SHEETS

STANDARD SPECIFICATIONS

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

GRADE LINE:
GRADING AND SURFACING:

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

CLEARING:

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

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

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.

RIGHT-OF-WAY MARKERS:

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

LIST OF STANDARD DRAWINGS

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
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	
422.02	Bridge Approach Fills - Type II Modified Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
876.02	Guide for Rip Rap at Pipe Outlets

2/1/2018
R:\Roadway\Proj\Bertie 34_RDY_1A&1B.dgn
pwilliamson

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
17BPJR.84	1B

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
- 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
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- 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 — 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 — C/A
- Existing Control of Access — C/A
- Proposed Control of Access — C/A
- 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
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

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

WATER:

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

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- 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:

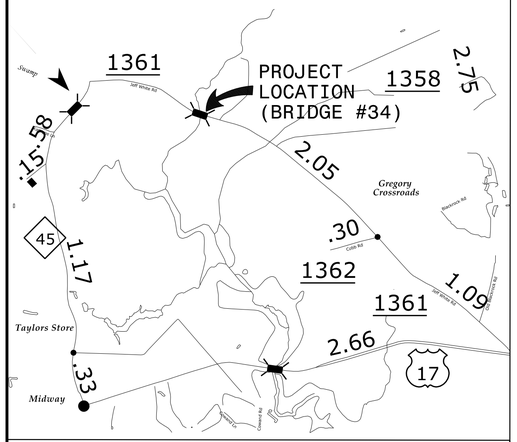
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	*1C–1*
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET 07–0034



VICINITY MAP

CONTROL DATA

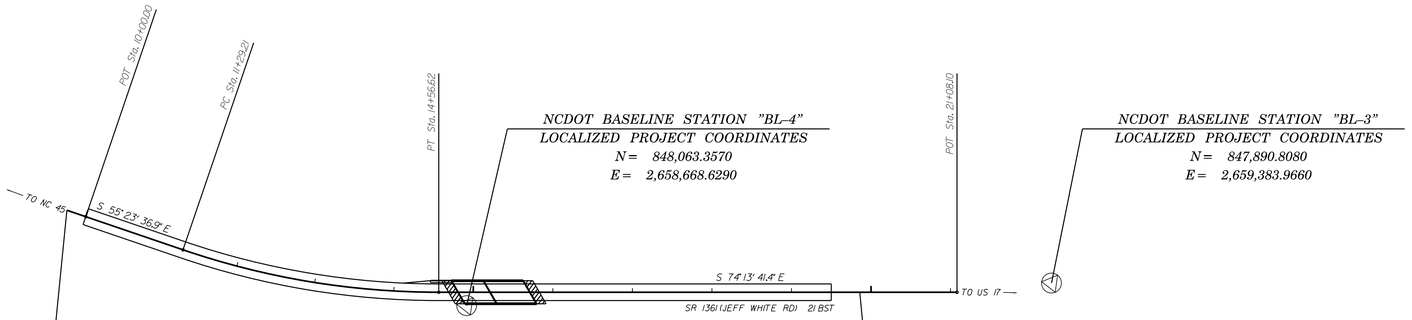
BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL4	BL-4	848063.3570	2658668.6290	8.79	14+91.63	16.82 RT
BL3	BL-3	847890.8080	2659383.9660	29.16	OUTSIDE PROJECT LIMITS	
0700341	0700341 (GPS MON)	847705.3587	2660016.5399	35.37	OUTSIDE PROJECT LIMITS	
0700342	0700342 (GPS MON)	847321.9020	2660664.4130	25.60	OUTSIDE PROJECT LIMITS	

BENCHMARK DATA

BM10 ELEVATION = 9.40
N 848095 E 2658489
-L- 13+16.14 45.13' RT
RR SPIKE 30" GUM

NC GRID
NAD 83 NA 2011



NCDOT BASELINE STATION "BL–4"
LOCALIZED PROJECT COORDINATES
N = 848,063.3570
E = 2,658,668.6290

NCDOT BASELINE STATION "BL–3"
LOCALIZED PROJECT COORDINATES
N = 847,890.8080
E = 2,659,383.9660

NCDOT GPS STATION "070034–1"
LOCALIZED PROJECT COORDINATES
N = 847,705.3587
E = 2,660,016.5399

–L– STA 9+75
BEGIN CONSTRUCTION
LOCALIZED PROJECT COORDINATES
N = 848,315.3657
E = 2,658,217.6409

–L– STA 19+75
END CONSTRUCTION
LOCALIZED PROJECT COORDINATES
N = 847,948.1626
E = 2,659,138.3742

NCDOT GPS STATION "070034–2"
LOCALIZED PROJECT COORDINATES
N = 847,321.9020
E = 2,660,664.4130

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "070034-1"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 847705.3587(ft) EASTING: 2660016.5399(ft)
ELEVATION: 35.37(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999975677
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"070034-1" TO -L- STATION 9+75 IS
N 71 ° 16' 05.49" W 1899.51'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.NCDOT.GOV/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
TIP 070034_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.

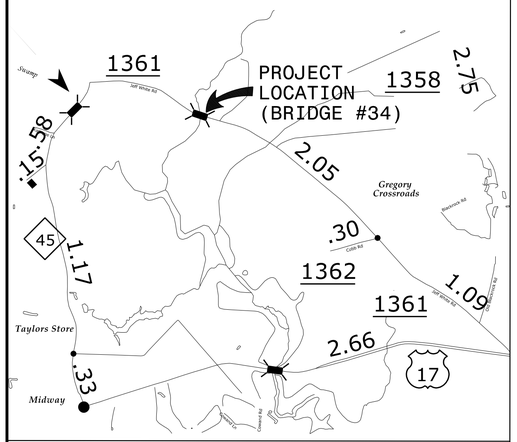
INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	*1C–2*
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET 07–0034

ROW/PERMANENT EASEMENT POINTS



VICINITY MAP

ROW/PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+00.00	-20.00	848317.62875	2658249.57642
L	10+00.00	-40.00	848334.09021	2658260.93514
L	10+00.00	40.00	848268.24439	2658215.50026
L	10+00.00	30.00	848276.47512	2658221.17962
L	11+29.21	-40.00	848260.70598	2658367.28611
L	11+29.21	40.00	848194.86017	2658321.85123
L	13+00.00	51.00	848096.98025	2658471.37020
L	13+00.00	40.00	848106.96727	2658475.98099
L	13+25.00	40.00	848096.36480	2658499.72464
L	13+25.00	51.00	848086.26520	2658495.36596
L	14+40.00	-44.00	848135.85063	2658636.21893
L	14+40.00	-40.00	848132.01990	2658635.06762
L	14+56.62	-40.00	848127.55518	2658650.38543
L	14+56.62	40.00	848050.56704	2658628.64087
L	14+60.00	-44.00	848130.48669	2658654.72252
L	14+60.00	-40.00	848126.63729	2658653.63529
L	17+00.00	-30.00	848051.78008	2658881.88165
L	17+00.00	-40.00	848061.40359	2658884.59972
L	19+75.00	30.00	847919.29203	2659130.21996
L	19+75.00	40.00	847909.66851	2659127.50189

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "070034-1"
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THE FILES TO BE FOUND ARE AS FOLLOWS:
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SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL STEPHEN C. BROWDE 2/14/2018

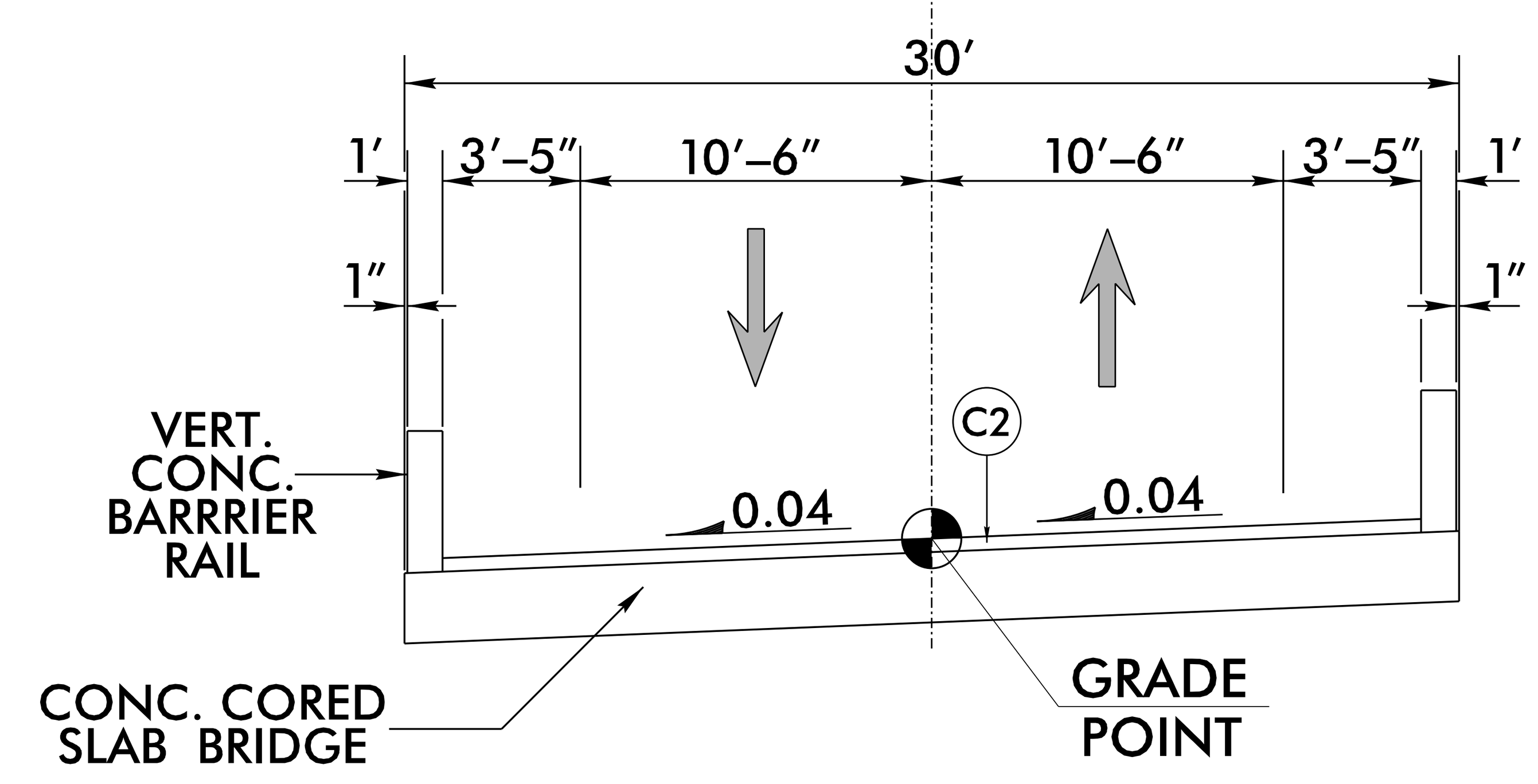
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	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 1.5" IN DEPTH.
E1	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
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 PLACE IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
R	PROP. SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

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

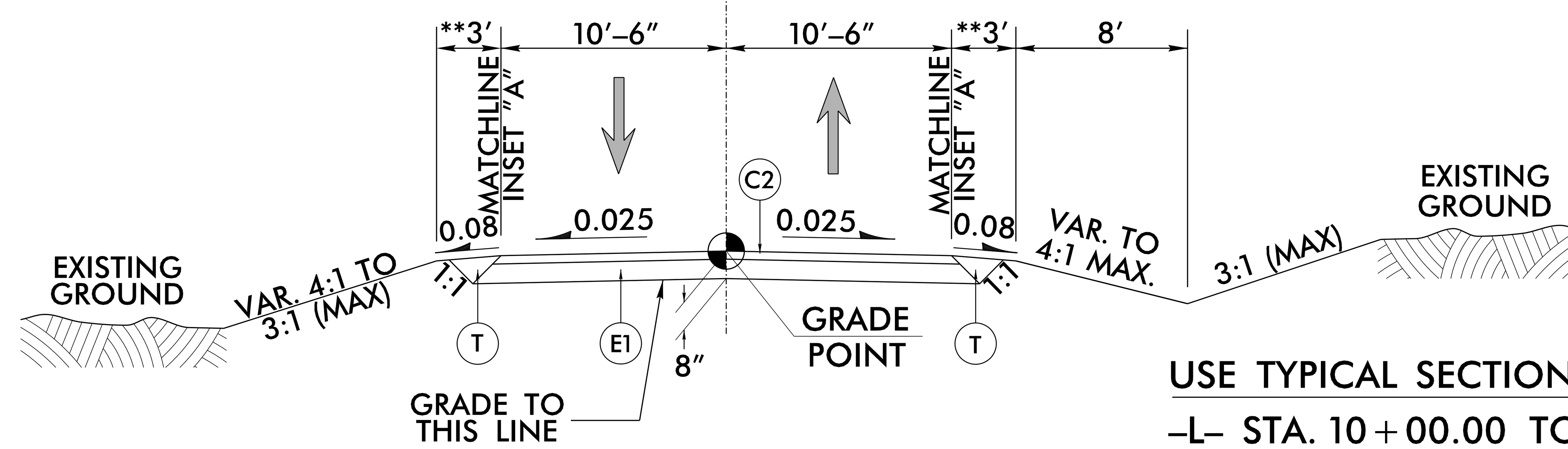
℄ -L- (SR 1361 JEFF WHITE RD.)



BRIDGE SKETCH NO.1
BRIDGE #34

USE BRIDGE SKETCH NO. 1 AS FOLLOWS:
-L- STA. 14+80.93 (BEGIN BRIDGE) TO 15+71.07 (END BRIDGE)

℄ -L- (SR 1361 JEFF WHITE RD.)



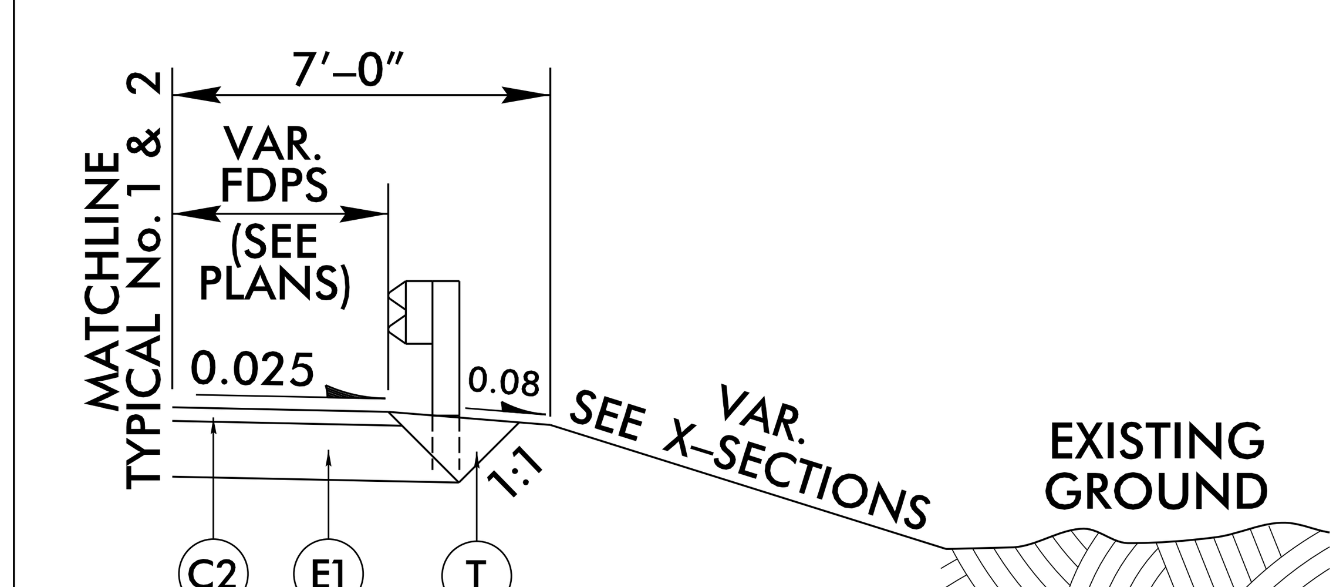
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 AS FOLLOWS:
-L- STA. 10+00.00 TO 11+00.00
-L- STA. 18+00.00 TO 19+50.00
**NOTE 1: USE INSET "A" FOR GUARDRAIL LOCATIONS

**NOTE 1: USE INSET "A" FOR GUARDRAIL LOCATIONS WITHOUT SHOULDER BERM GUTTER

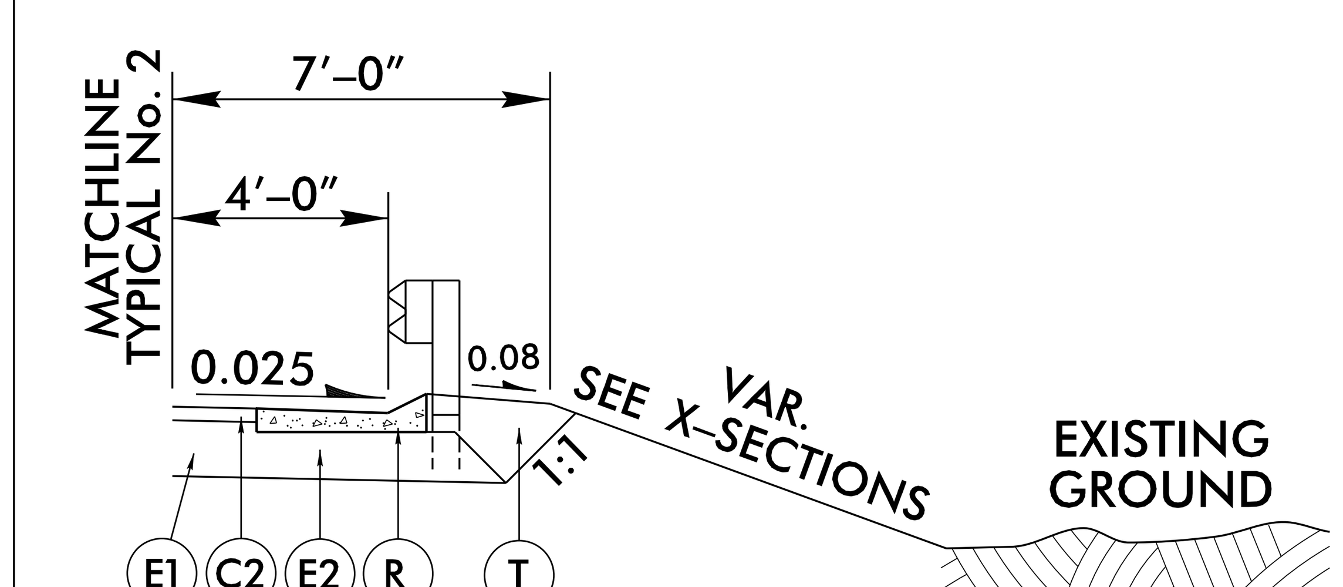
**NOTE 2: USE INSET "B" FOR GUARDRAIL LOCATIONS WITH SHOULDER BERM GUTTER

INSET "A"



INSET "B"

SHOULDER BERM LOCATIONS:
-L- STA. 14+46 TO 14+73.90 (LT.)



6/2/99
2/7/2018 R:\Roadway\Proj\Bertie 34_RDY_TYP.dgn awilliamson

6/2/99

PAVEMENT SCHEDULE

C1	1.5" SF9.5A
C2	3" SF9.5A
C3	VARIABLE DEPTH SF9.5A
E1	6" B25.0B
E2	VARIABLE DEPTH B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

NOTES:
1) SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.

2) PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.	SHEET NO.
I7BP.I.R.84	2A-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — STEPHEN C. BROWDE — 2/14/2018

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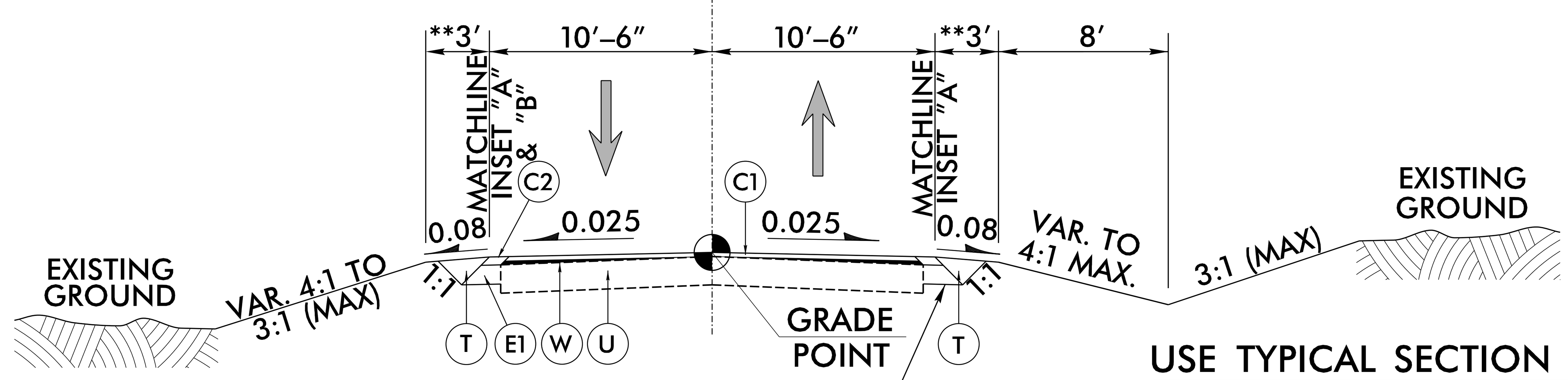
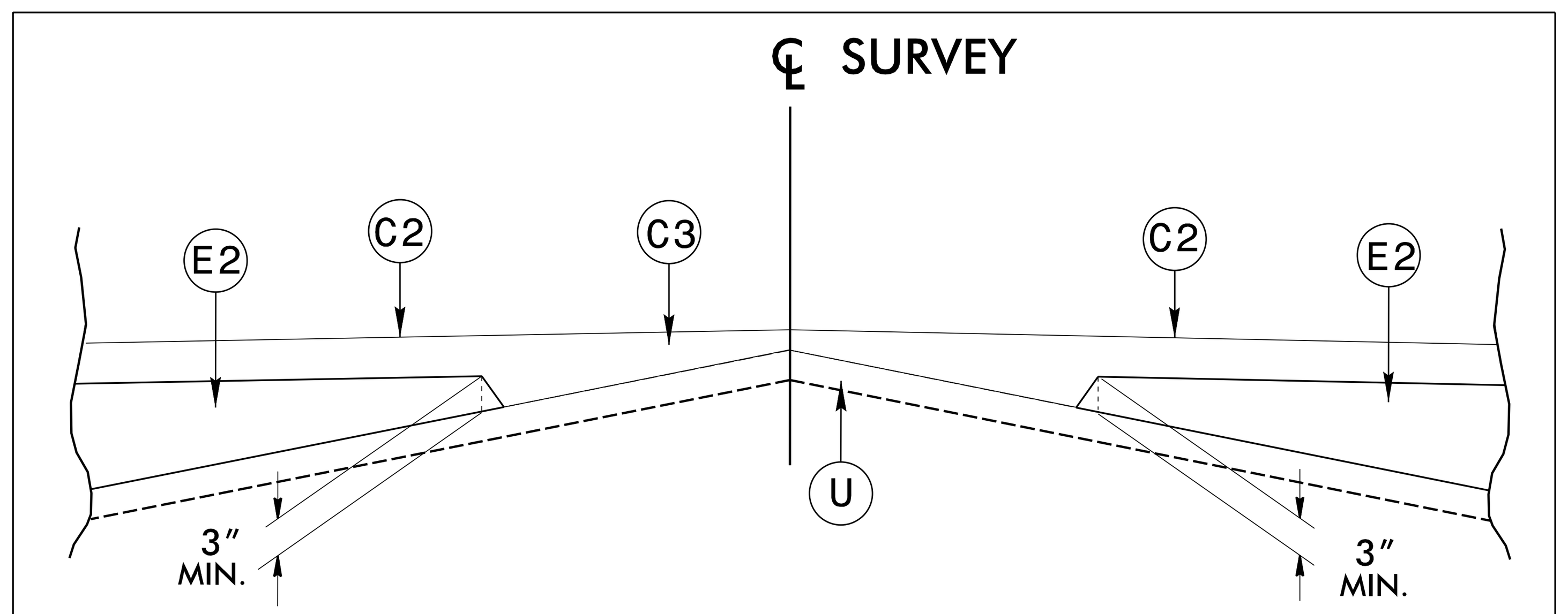
℄ -L- (SR 1361 JEFF WHITE RD.)



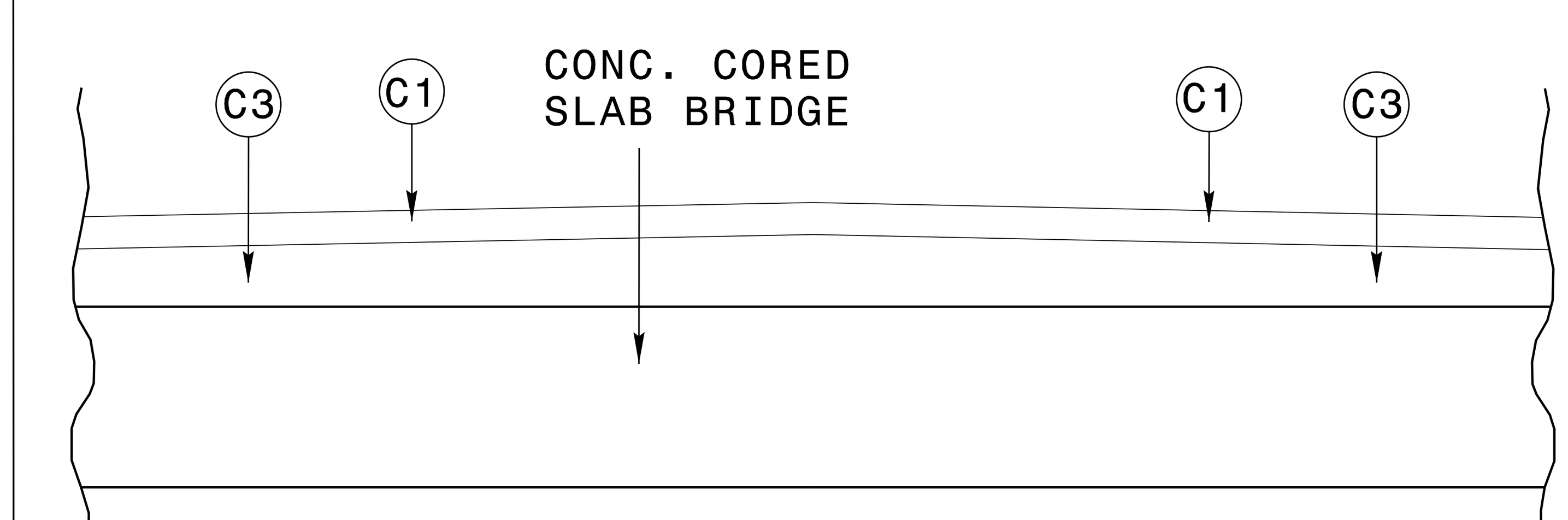
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AS FOLLOWS:

-L- STA. 11+00.00 TO 14+80.93 (BEGIN BRIDGE)
-L- STA. 15+71.07 (END BRIDGE) TO 18+00.00
**NOTE 1: USE INSET "A" FOR GUARDRAIL LOCATIONS



Detail Showing Method of Wedging on Roadway



Detail Showing Method of Bridge Wedging

2/7/2018
R:\Roadway\Proj\Bertie 34_RDY_TYP.dgn
awilliamson

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jhowerton AT CSD-292595

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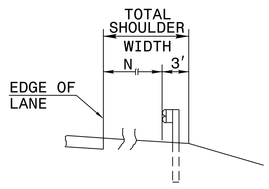
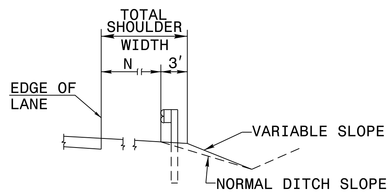
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

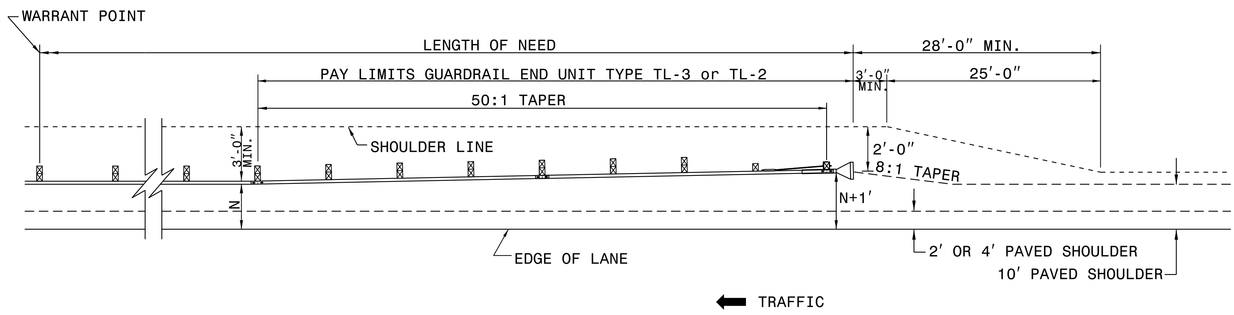


FILL SECTION



CUT SECTION

"N"= DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.



FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

SHEET 6 OF 11
862D01

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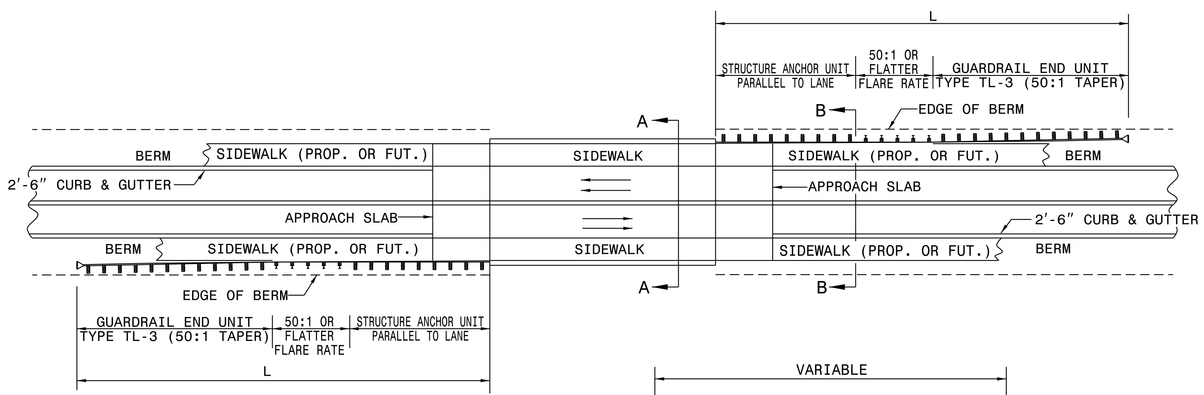
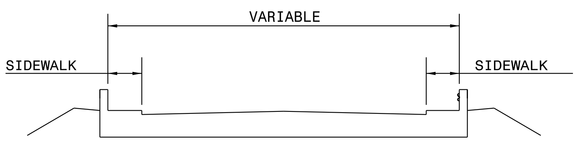
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT



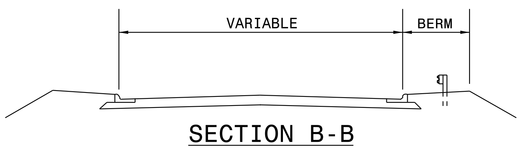
MINIMUM GUARDRAIL LENGTHS "L" REQUIRED AT BRIDGE APPROACHES ON 2'-6" CONCRETE CURB AND GUTTER ROADWAYS	
DESIGN SPEED (MPH)	"L"
40	150'
50	225'

NOTE: "L" VALUES ARE BASED ON NO HAZARDS OTHER THAN END OF BRIDGE BEING PRESENT WITHIN THE CLEAR ZONE.

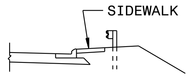
SEE STD. 862D03 FOR STRUCTURE ANCHOR UNITS.



SECTION A-A



SECTION B-B



FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

STANDARD GUARDRAIL PLACEMENT AT BRIDGES WITH 2'-6" CONCRETE CURB AND GUTTER

SHEET 5 OF 11
862D01

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SEE TITLE BLOCK

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

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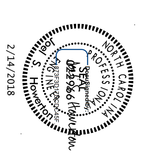

PROJECT REFERENCE NO. 17BP.1.R.84
SHEET NO. 2C-1

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	2C-2

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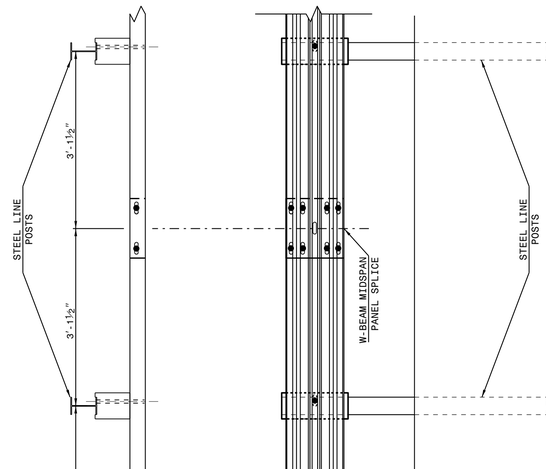
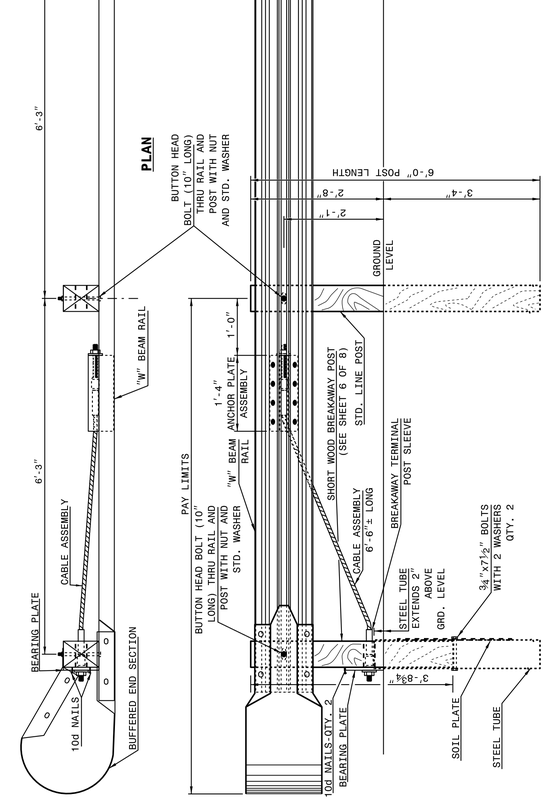
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 1 OF 8
862D02



PLAN



ELEVATION

TRAILING END UNIT ASSEMBLY
C.A.T.-1 SYSTEM

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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 8
862D02

FLARED AND TANGENT
ELEVATION VIEW

* WHEN INSTALLING GUARDRAIL END UNITS THAT ARE 2'-1" MOUNTING HEIGHT TO EXISTING GUARDRAIL, REMOVE THE EXISTING GUARDRAIL TO TRANSITION FROM THE EXISTING HEIGHT TO THE PROPOSED 2'-1" HEIGHT. SEE 862.02, SHEET 4 OF 8 FOR TRANSITION DETAILS.

FLARED AND TANGENT
ELEVATION VIEW

APPROACH END UNITS

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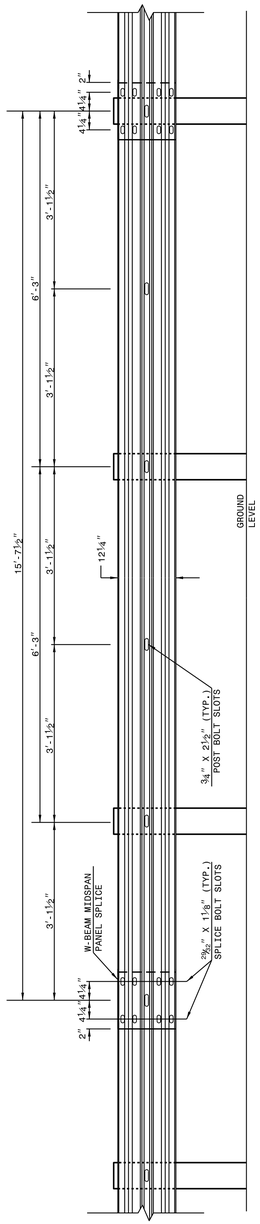
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 8
862D02

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	2C-3

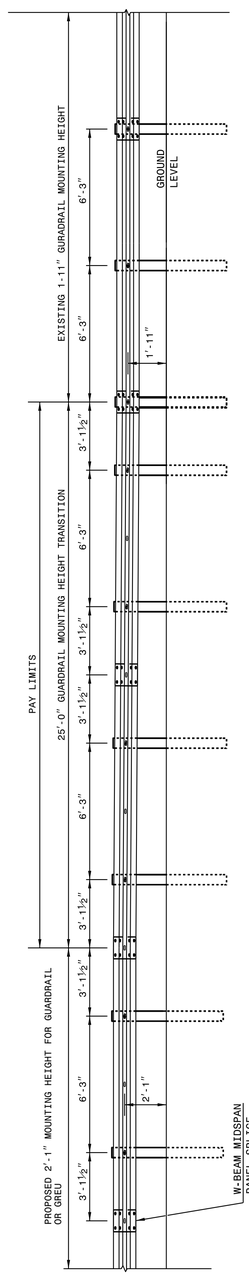


15'-7½" W-BEAM GUARDRAIL PANEL

NOTE: USE 5 SPACE 15'-7½" W-BEAM GUARDRAIL PANEL AT THE DOWNSTREAM END OF AN END UNIT OR EXISTING GUARDRAIL THAT DOES NOT OFFSET THE W-BEAM PANEL SPLICE TO MIDSPAN

TRANSITION FROM OR 1'-11" TO 2'-1" W-BEAM GUARDRAIL MOUNTING HEIGHT

ELEVATION VIEW



NOTE: IF EXISTING GUARDRAIL IS LOWER THAN 1'-11", USE AN ADDITIONAL 12'-6" LONG SECTION OF GUARDRAIL, FOR EVERY 1" OF HEIGHT DIFFERENCE, TO TRANSITION FROM EXISTING GUARDRAIL TO PROPOSED 2'-1" GUARDRAIL.

Joel S. Howerton
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966
2/14/2018

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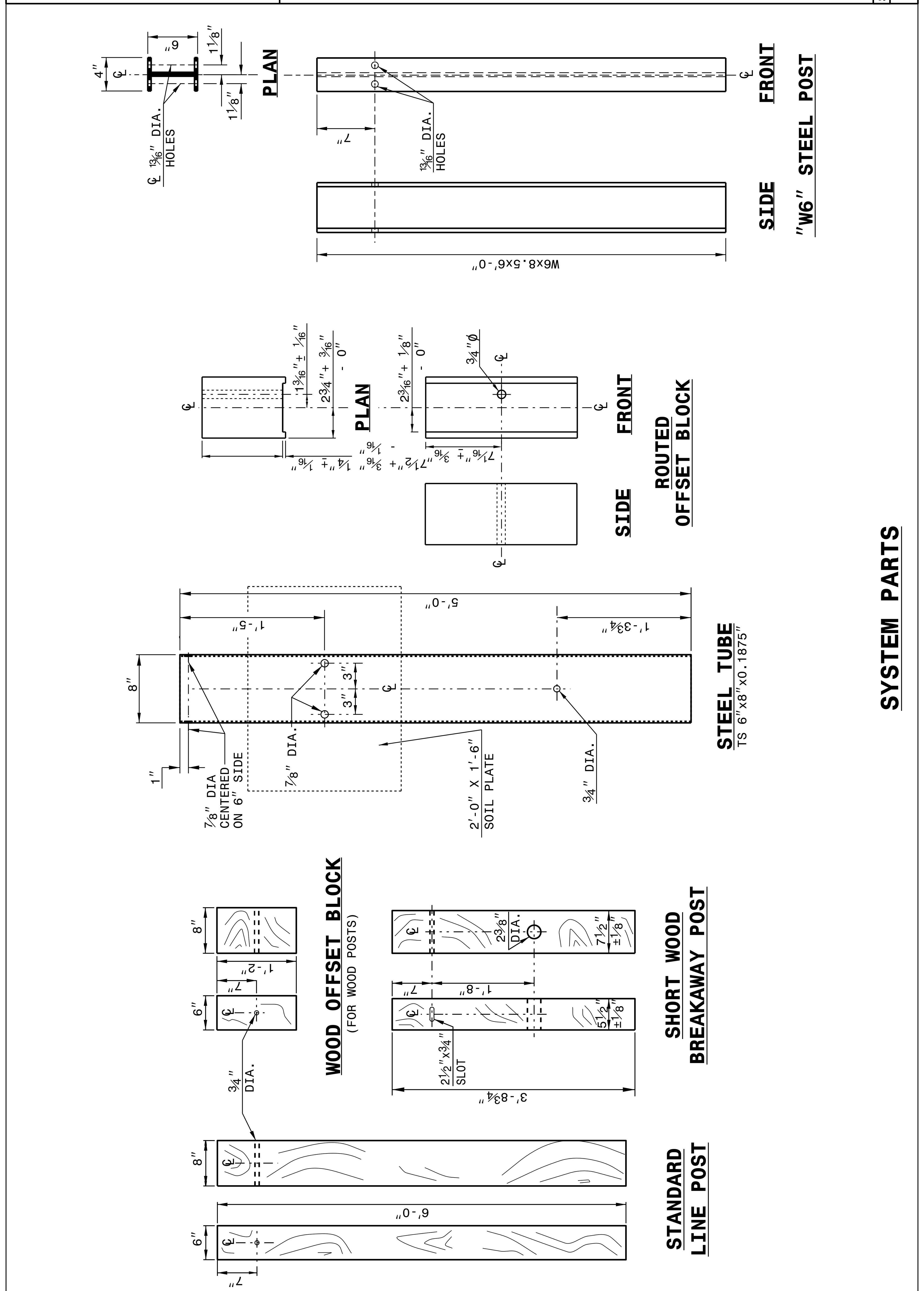
PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	2C-4



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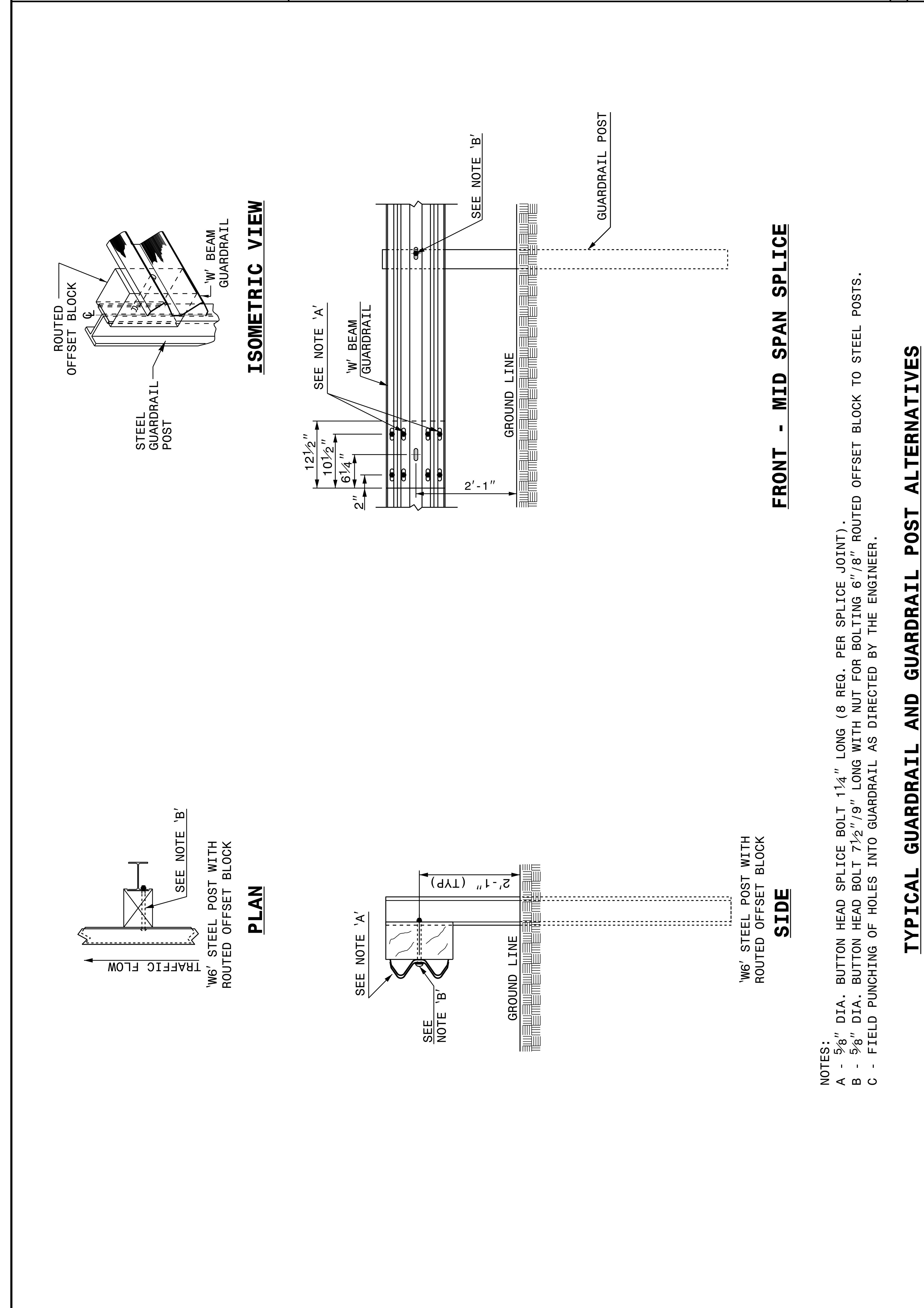
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



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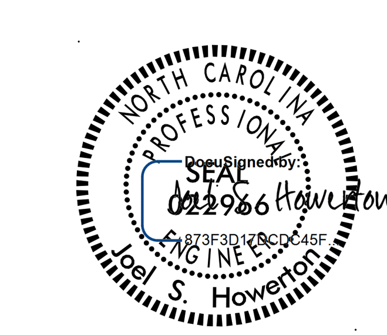
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 5 OF 8
862D02



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PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	2C-5

STATE OF
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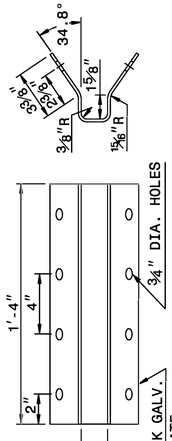
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 7 OF 8
862D02

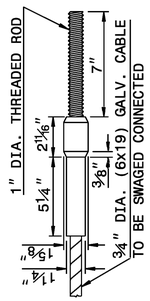
SYSTEM PARTS

CABLE ASSEMBLY

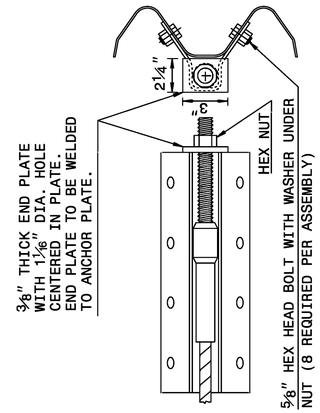


ANCHOR PLATE

SWAGED CABLE

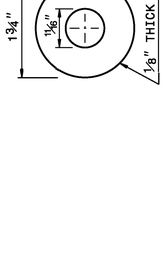


ANCHOR PLATE ASSEMBLY

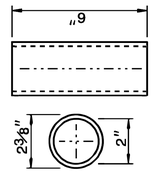


DETAIL OF STANDARD WASHER

STANDARD WASHER: TYPICAL USE UNDER NUT WITH WOOD POST

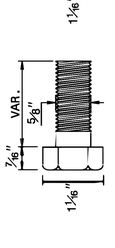


BREAKAWAY TERMINAL POST SLEEVE



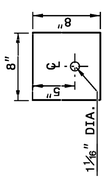
BEARING PLATE

⅝" THICK PLATE

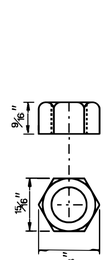


SOIL PLATE

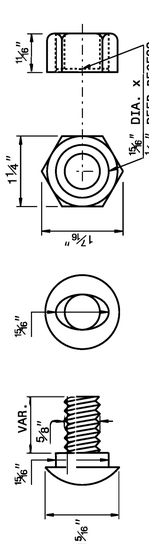
¼" THICK PLATE



DETAIL OF STANDARD HEX BOLT AND NUT

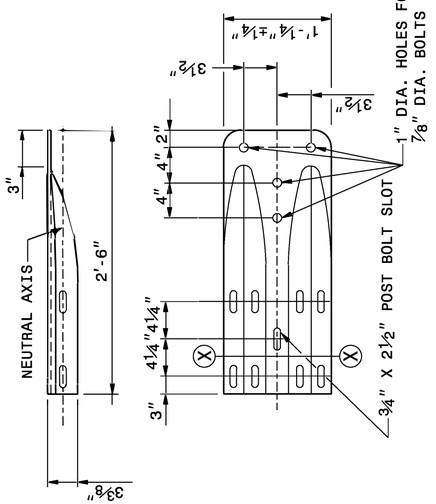


DETAIL OF BUTTON HEAD BOLT AND NUT

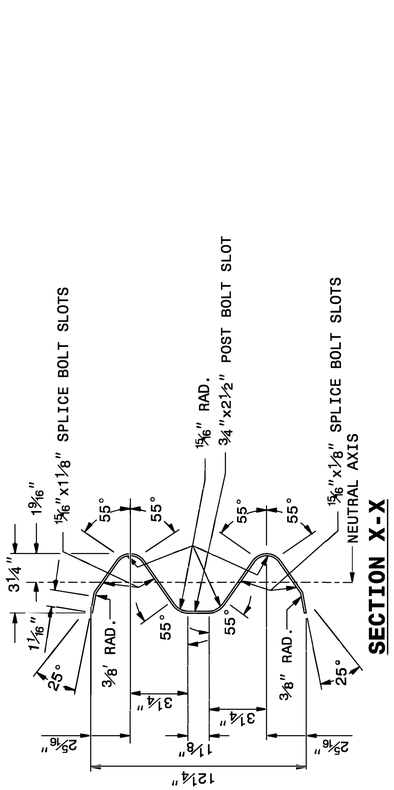


SYSTEM PARTS - GENERAL USE

TYPICAL END SHOE



SECTION X-X



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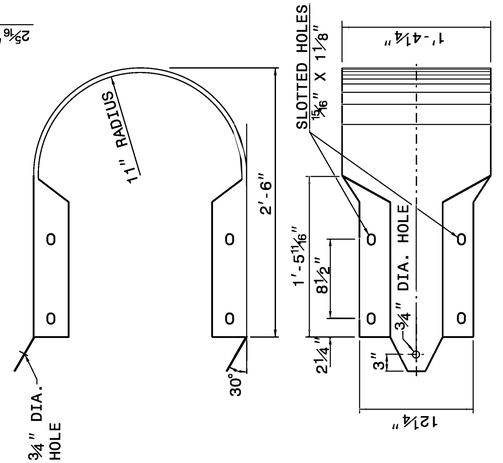

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 8 OF 8
862D02

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17BP.1.R.84	2C-6

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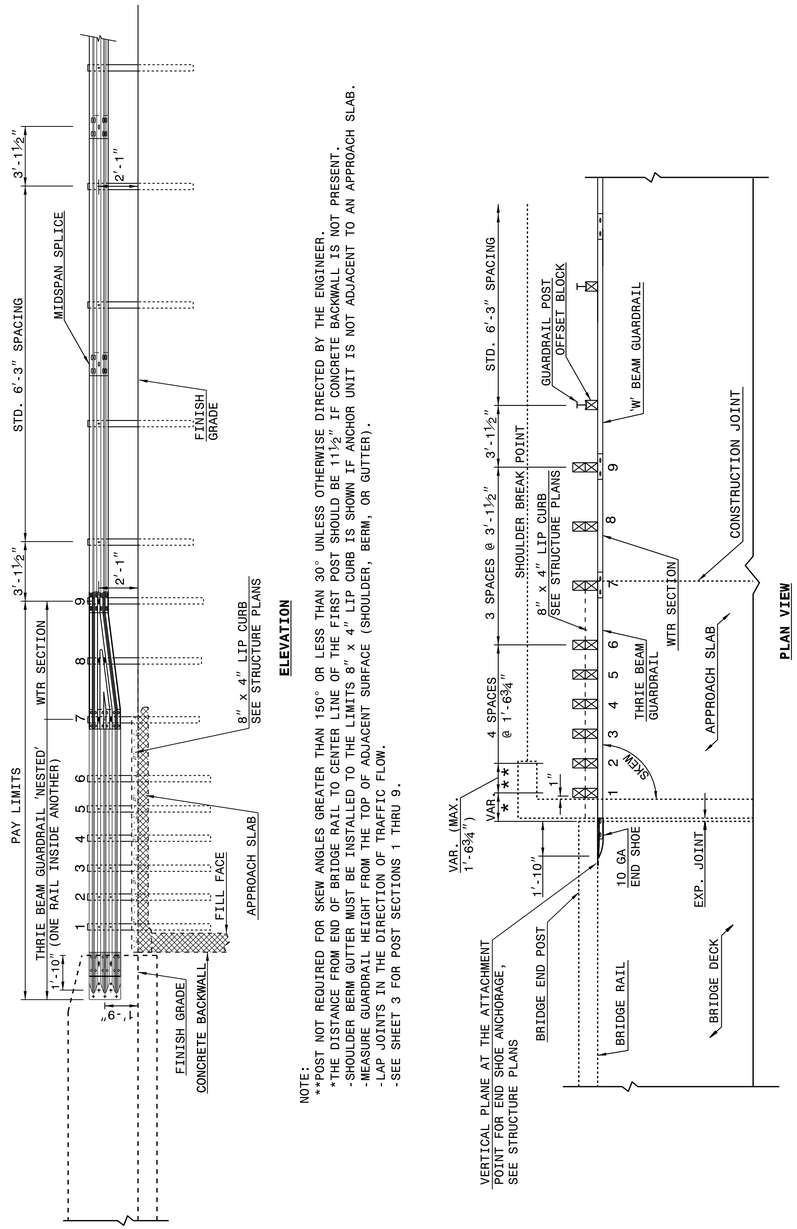
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03



ELEVATION

PLAN VIEW

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

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

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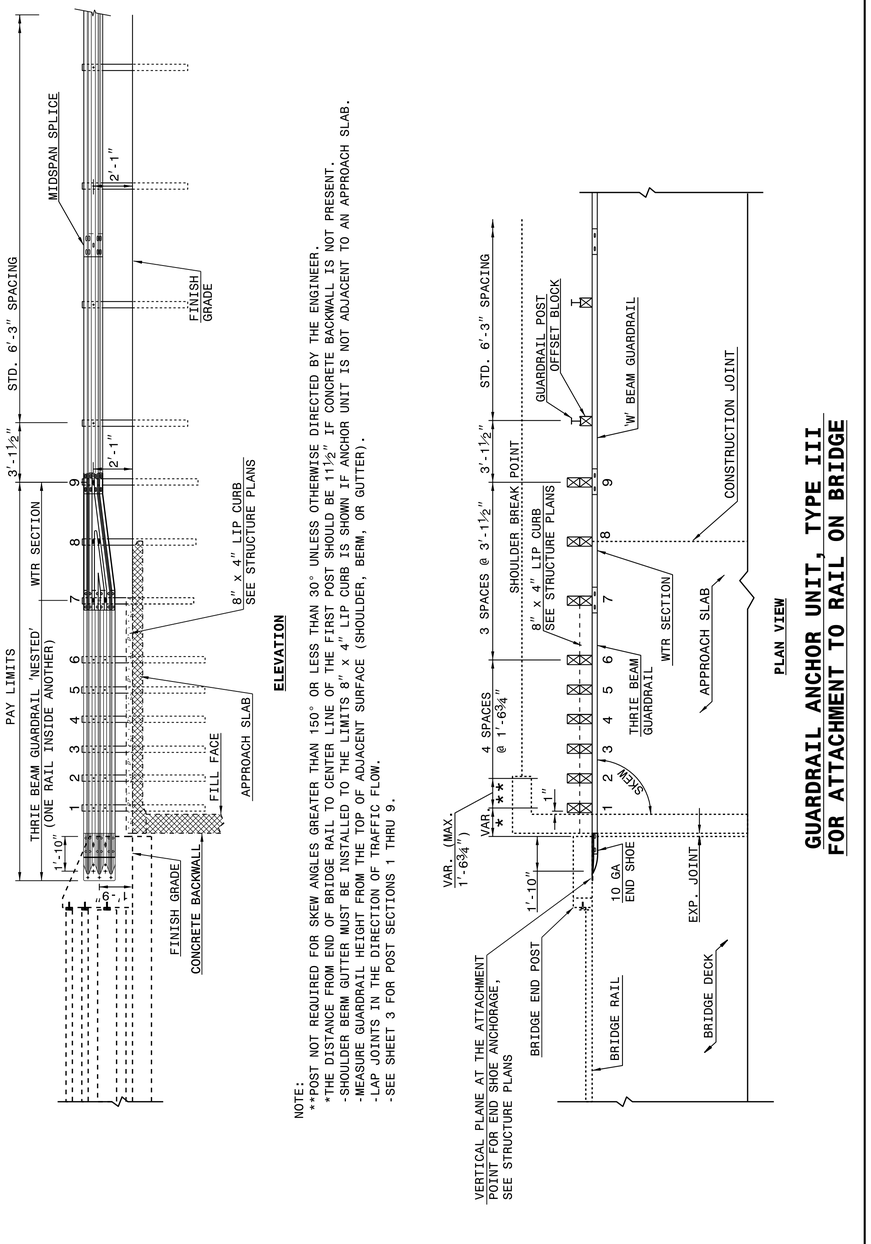
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

PLAN VIEW

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-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

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

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

SHEET 1 OF 7
862D03

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

SHEET 1 OF 7
862D03

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jhowerton AT CSD-2425965

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022986 Joel S. Howerton
2/14/2018

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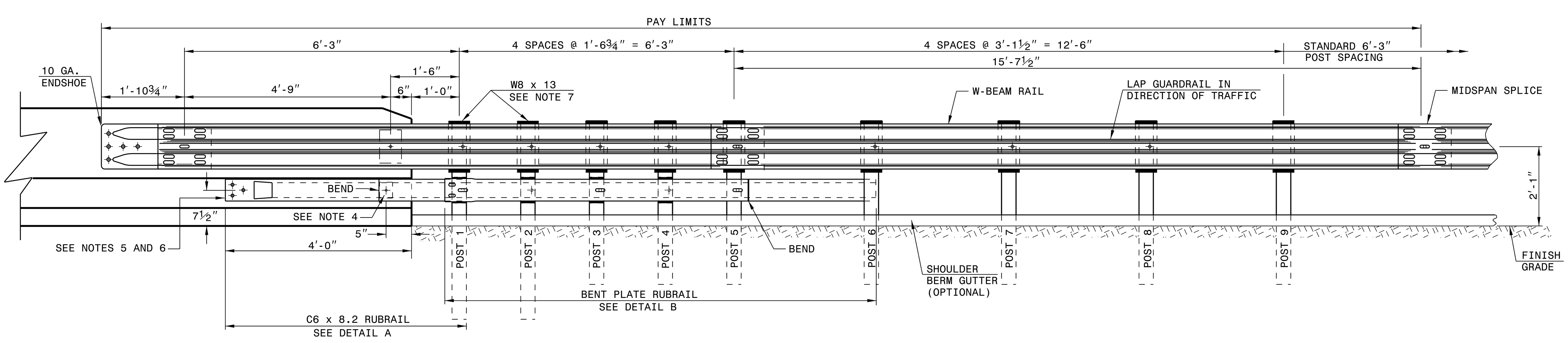
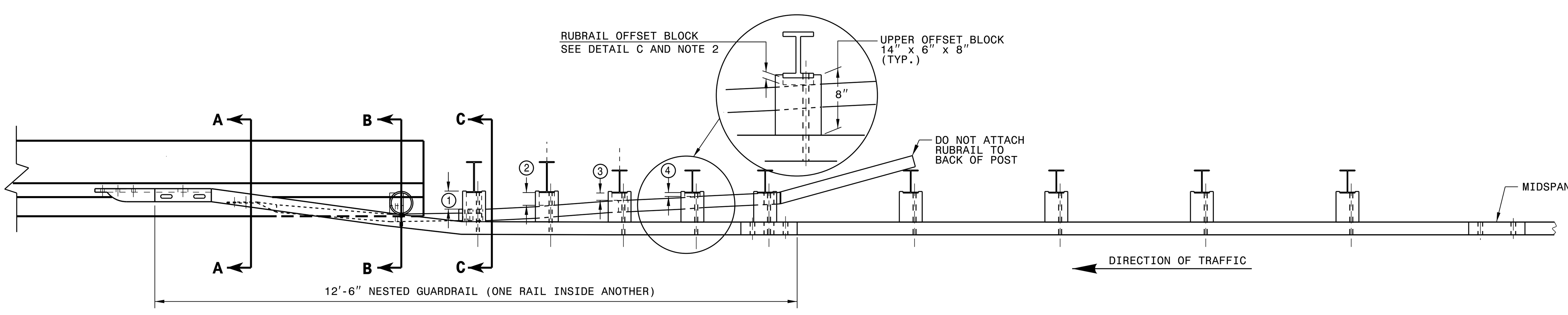
ROADWAY DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 4 OF 7
862D03



ELEVATION

GENERAL NOTES:
1) POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL.
2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH ⅝" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4. SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A ⅝" x 4½" BUTTONHEAD BOLT. RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED.
3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" INSIDE DIAMETER x 9" LONG. ATTACH TUBE TO GUARDRAIL ONLY WITH ⅝" x 1¼" LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER.
4) SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE ⅜" x 3" LAG BOLT WITH FLAT WASHER.
5) SHOP FABRICATE THE C6 x 8.2 RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE F SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
6) ANCHORAGE:
   (a) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR RUBRAIL USING THREE ⅝" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS IS ½".
   (b) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR THE W-BEAM END SHOE USING A 4 BOLT HOLD DOWN PLATE (SEE STD. DWG. 862.04). A 4 BOLT INSERT ASSEMBLY IS ALLOWED ON PRECAST REINFORCED CONCRETE BARRIER (SEE STD. DWG. 857.01). INSTALL THE W-BEAM END SHOE BEHIND THE NESTED W-BEAM ELEMENTS.
   (c) AT NEW BRIDGE RAIL, ANCHOR THE W-BEAM END SHOE AND RUBRAIL AS DETAILED ON THE STRUCTURE PLANS.
7) POSTS 1 AND 2 ARE W8 x 13, 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W6 x 8.5.



PLAN

GUARDRAIL ANCHOR UNIT TYPE B-77

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

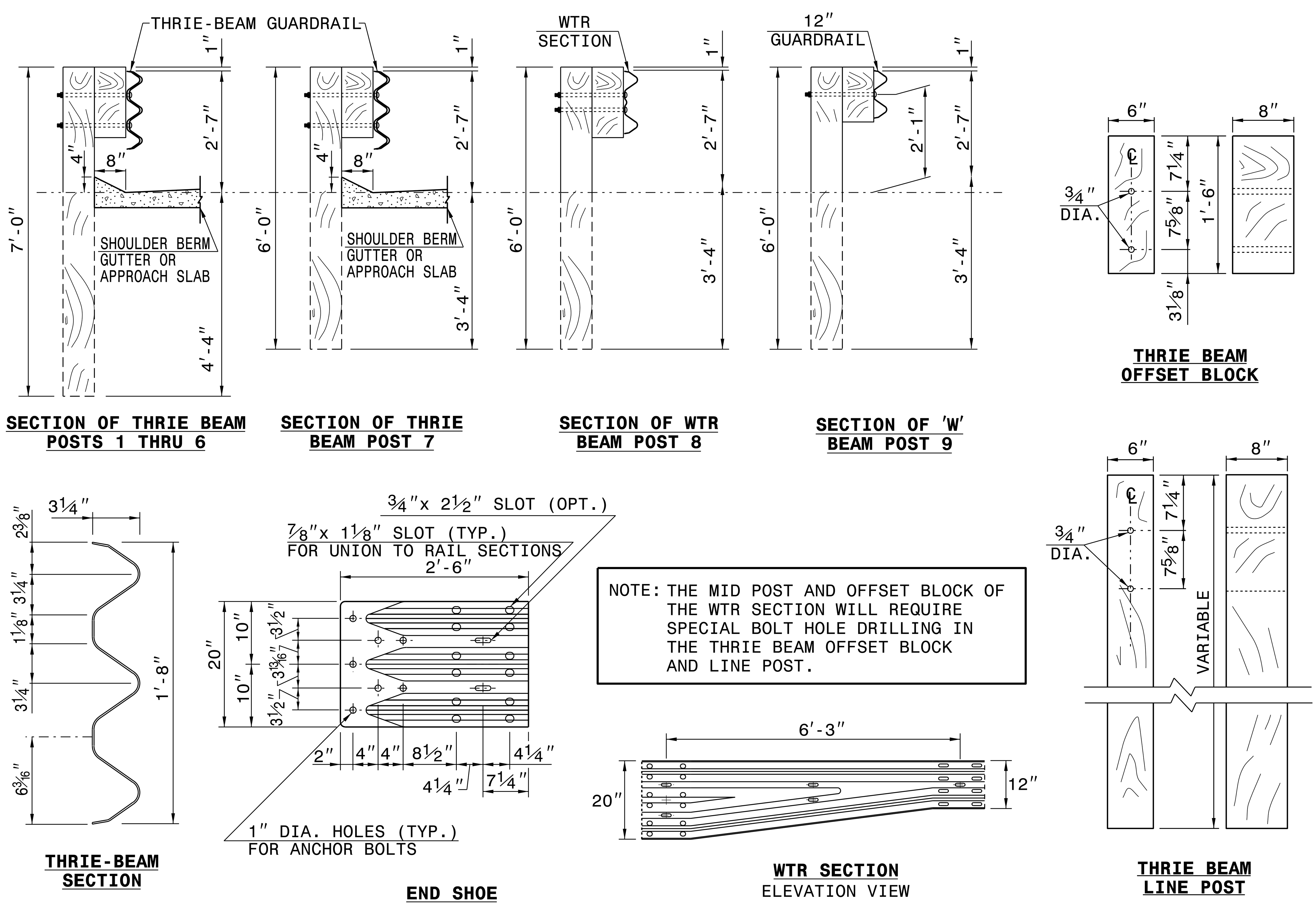
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 4 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

SHEET 3 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

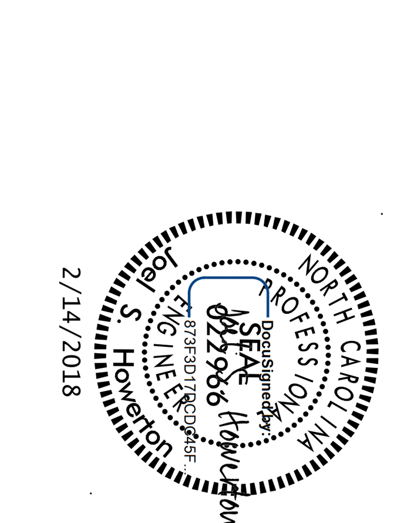
SHEET 3 OF 7
862D03

SEE TITLE BLOCK

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



COMPUTED BY:	E. Stewart	DATE:	7/31/2017
CHECKED BY:	S. Browde	DATE:	9/14/17

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	3B-1

"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

GUARDRAIL SUMMARY

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								IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	TYPE III	XI	GREU TL-3	M-350	XIII	CAT-1	VI MOD	BIC	AT-1	G	NG				
-L-	13+52.09	14+89.59	RT	137.50				13+43.32	4'	7'	50'		1'		1		1						0					50:1 FLARE TO TYPE III ANCHOR UNIT
-L-	13+59.77	14+72.27	LT	112.50			13+43.32		4'	7'		50'		1'	1		1						0					50:1 FLARE TO TYPE III ANCHOR UNIT
-L-	15+62.41	16+43.66	LT	81.25				15+48.69	4'	7'	50'		1'		1		1						0					50:1 FLARE TO TYPE III ANCHOR UNIT
-L-	15+79.73	17+17.23	RT	137.50			15+48.69		4'	7'		50'		1'	1		1						0					50:1 FLARE TO TYPE III ANCHOR UNIT
GUARDRAIL TOTALS:				**468.75**											**4**		**4**						**0**					
		ANCHOR DEDUCTIONS:																										
		TYPE III: 4 @ 18.75' EA		75.00																								
		GREU TL-3: 4 @ 50' EA		200.00																								
		CAT-1: @ 6.25' EA		0.00																								
		ANCHOR TOTALS:		**275.00**																								
		GUARDRAIL GRAND TOTALS:		**193.75**											4		4						0					
			SAY:	**200**																								
		ADDITIONAL GUARDRAIL POSTS = 5																										

ASPHALT PAVEMENT REMOVAL SUMMARY

LINE	STATION	STATION	LOCATION	AREA	SQ. YDS.
-L-	1+00.00	11+00.00	CL	2,100.00	233.33
-L-	13+31.50	13+50.27	CL	600.23	66.69
-L-	15+54.51	15+60.50	CL	376.78	41.86
-L-	15+75.00	16+00.00	CL	3,150.00	350.00
				TOTAL	691.89
				SAY	**800**

EARTHWORK SUMMARY

LINE	STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L-	9+75.00	14+80.93	97	666	569	0
-L-	15+71.07	19+75.00	113	441	328	0
PROJECT TOTALS:			210	1107	897	0
Waste in Lieu of Borrow					0	0
GRAND TOTALS:			210		897	0
SAY:			**220**		**900**	

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Asphalt Pavement will be paid for at the contract lump sum price for grading.

SHOULDER BERM GUTTER SUMMARY

LINE	STATION	STATION	LOCATION	LENGTH
-L-	14+46.00	14+61.77	LT	15.77
			TOTAL	15.77
			SAY	**16**

COMPUTED BY: Ecological Engineering, LLP DATE: 8/7/2017

CHECKED BY: Ecological Engineering, LLP DATE: 8/7/2017

PROJECT NO.	SHEET NO.
17BP.1.R.84	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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)

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO.		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC)												C.S. PIPE								R.C. PIPE CLASS III								R.C. PIPE CLASS IV							
SIZE								12"	15"	18"	24"	30"	36"	42"	48"					12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE		FROM	TO													DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	.064	.064	.064	.064	.079	.079	.109	.109																
14+51 -L-	LT	0401		9.89'	7.14'																																						
14+51 -L-	LT	0401	0402		7.14'	4.60'			20'							X		X	X																								
SHEET TOTALS									20'																																		

STATION	STRUCTURE NO.							ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS		QUANTITIES FOR DRAINAGE STRUCTURES	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT.			FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE			CONCRETE TRANSITIONAL SECTION																	
	FROM	TO	** " R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	R.C.P.	C.S.P.	PER EACH (0' THRU 5.0')	A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	E	F	G	DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	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	T.B.G.D.I. FRAME WITH TWO GRATES STD. 840.35	G.D.I. (N.S. FLAT) FRAME WITH TWO GRATES STD. 840.29	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	15" C.S. ELBOW	PIPE REMOVAL LIN. FT.	REMARKS
14+51 -L-	0401									1																			1	1				
14+51 -L-	0401	0402																														2		
SHEET TOTALS										1																			1	1		2		

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.)	(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

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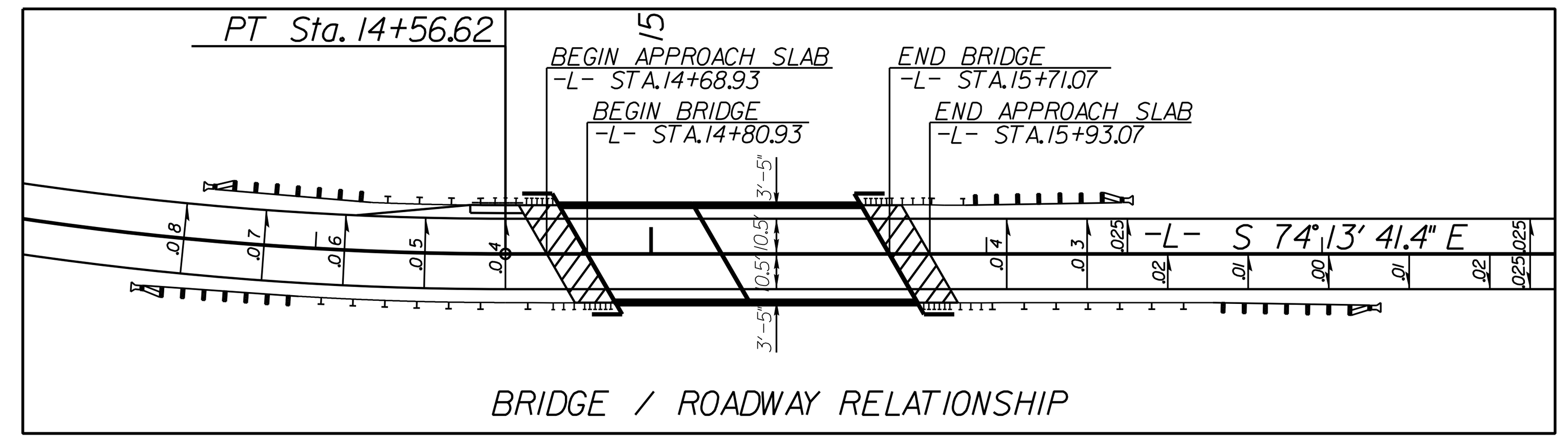
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "070034-1"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 847,705.3587(ft) EASTING: 2,660,016.5399(ft)
ELEVATION: 35.37(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999975677
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "070034-1" TO -L- STATION IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88



BRIDGE / ROADWAY RELATIONSHIP

SEE SHEET S-1 THRU S-18 FOR STRUCTURE PLANS

CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15759 STEPHEN C. BROWDE — DocuSigned by: Stephen C. Browde 0E27971E12EA42B... 2/14/2018	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043870 REID B. ROBOL — DocuSigned by: Reid B. Robol 7074FDA3E200470... 2/13/2018

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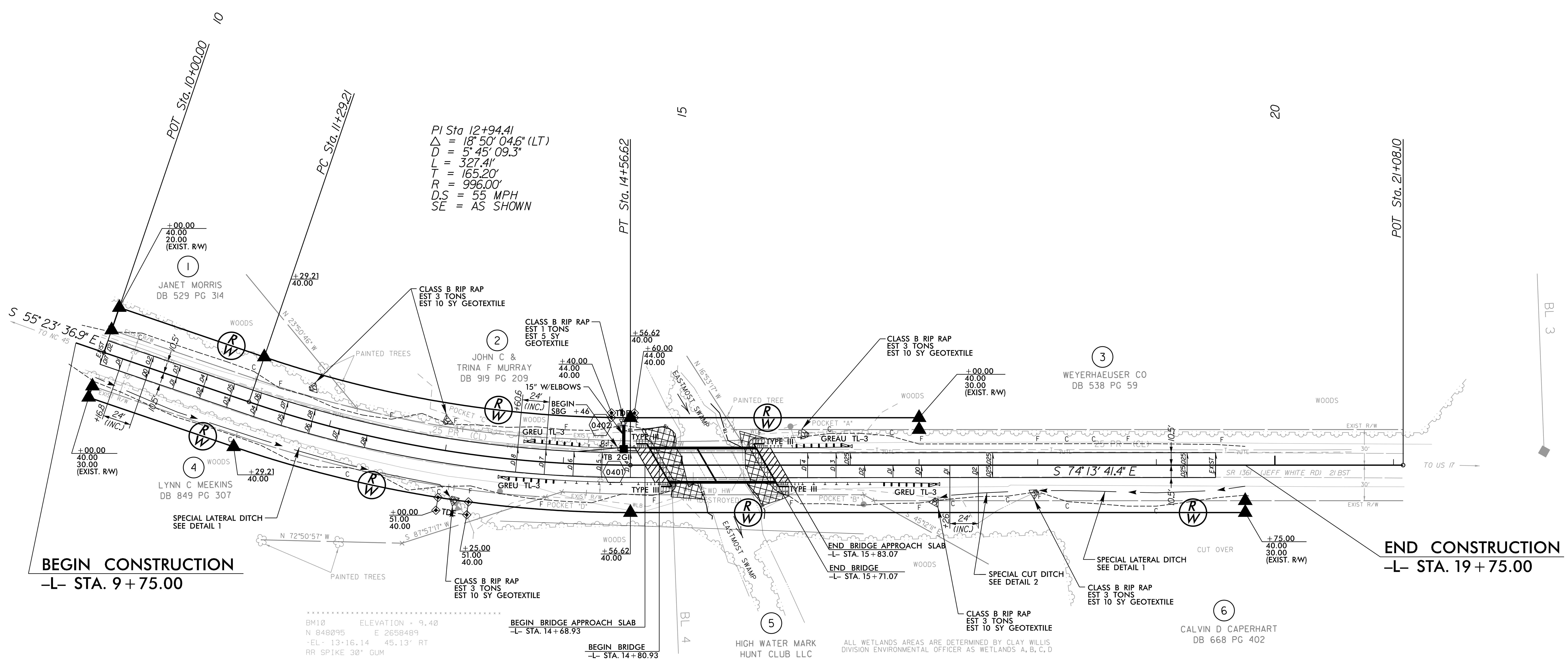
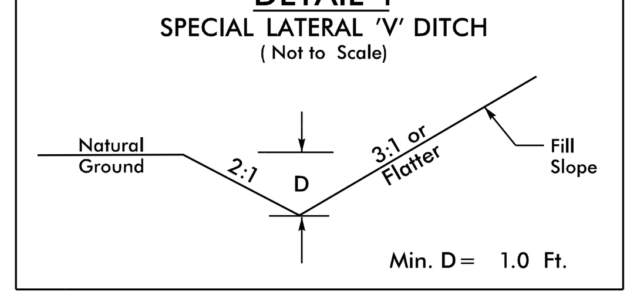
NAD 83/NA 2011

REVISIONS

8/17/99



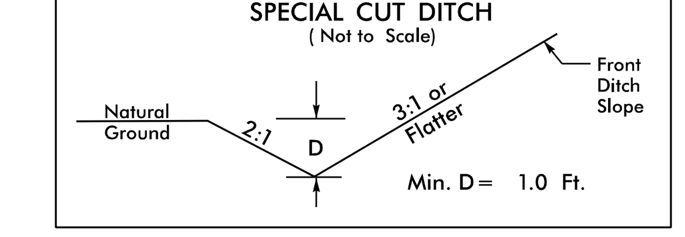
DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM STA. 10+00 TO STA. 13+10 -L- RT
FROM STA. 18+00 TO STA. 19+75 -L- RT

PARCEL NO.	PROPERTY OWNERS NAME	TOTAL AREA	AREA TAKEN	AREA REMAINING RIGHT	AREA REMAINING LEFT	CONSTRUCTION EASEMENT	PERMANENT DRAINAGE EASEMENT	TEMPORARY DRAINAGE EASEMENT
1	JANET MORRIS		4063 SF					
2	JOHN C & TRINA F MURRAY		0.15 AC					78 SF
3	WEYERHAEUSER CO		1593 SF					
4	LYNN C MEEKINS		3856 SF					286 SF
5	HIGH WATER MARKHUNT CLUB LLC		0.10 AC					
6	CALVIN D CAPERHART		3038 SF					

DETAIL 2
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 17+15 TO STA. 17+75 -L- RT

NOTE: FOR -L- PROFILE SEE SHEET 5

2/7/2018
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5/14/99

CALYX
ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333
Formerly Mulkey Engineers & Consultants

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	5

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19759 ENGINEER STEPHEN C BROWN
DocuSigned by: Stephen C Brown
2/14/2018

HYDRAULICS ENGINEER

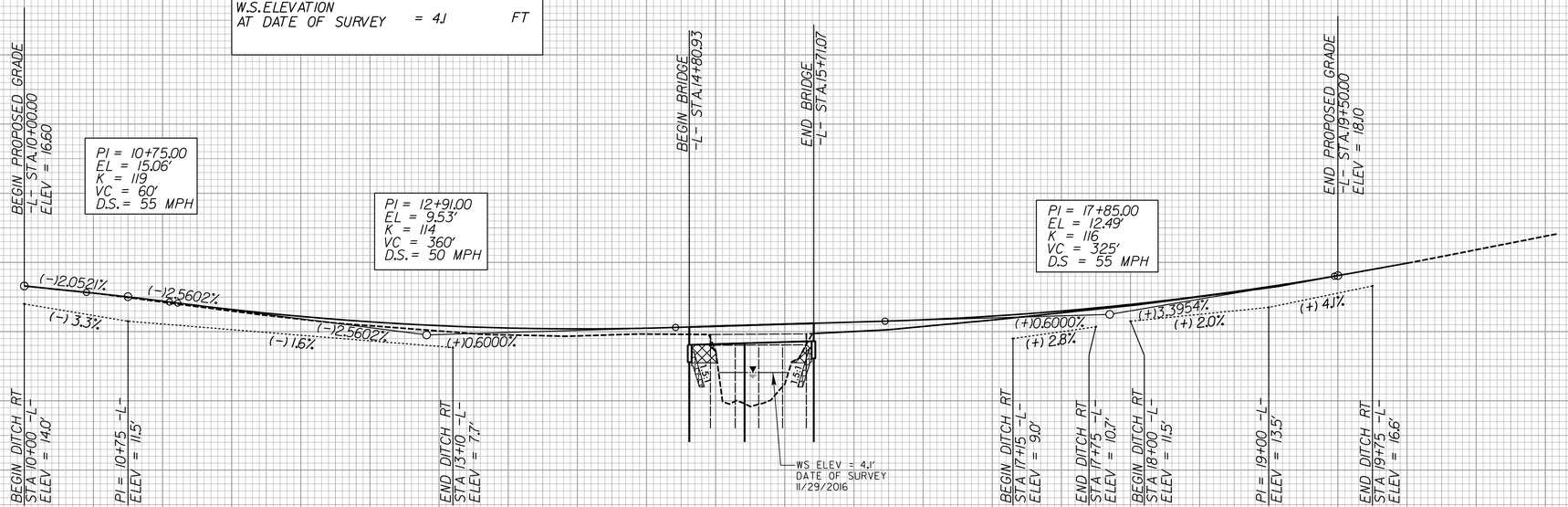
NORTH CAROLINA PROFESSIONAL SEAL 043870 ENGINEER REID B ROBOL
DocuSigned by: Reid B Robol
2/13/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BM#10
-EL- STA. 13+16.14
O/S 45.13' RT.
ELEV = 9.40'
RR SPIKE IN BASE
OF 30" GUM

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1200	CFS
DESIGN FREQUENCY	= 25	YR
DESIGN HW ELEVATION	= 7.1	FT
BASE DISCHARGE	= 1800	CFS
BASE FREQUENCY	= 100	YR
BASE HW ELEVATION	= 8.4	FT
OVERTOPPING DISCHARGE	= 3830	CFS
OVERTOPPING FREQUENCY	= 500+	YR
OVERTOPPING ELEVATION	= 11.0	FT
DATE OF SURVEY	= 11/29/2016	
W.S. ELEVATION AT DATE OF SURVEY	= 4.1	FT



NOTE: FOR -L- PLAN SEE SHEET 4

2/7/2018
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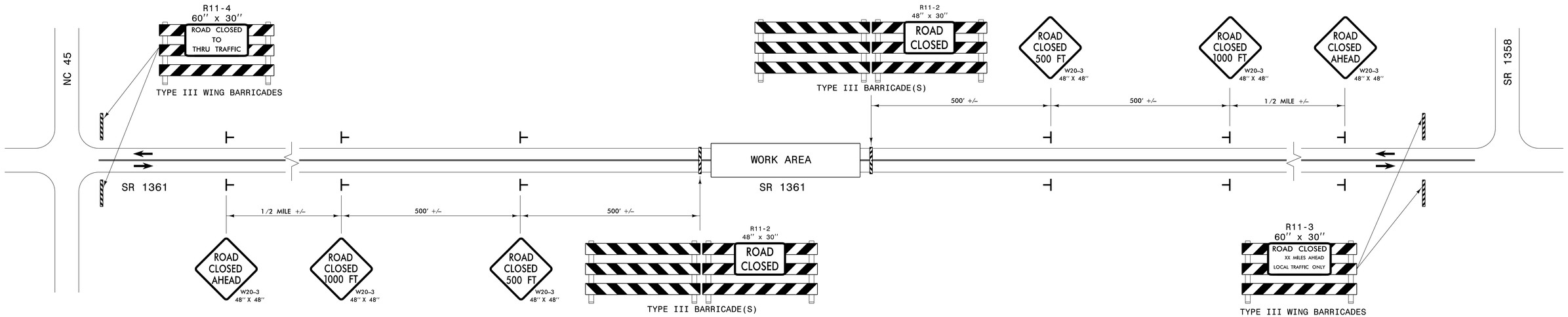
jwilliamson

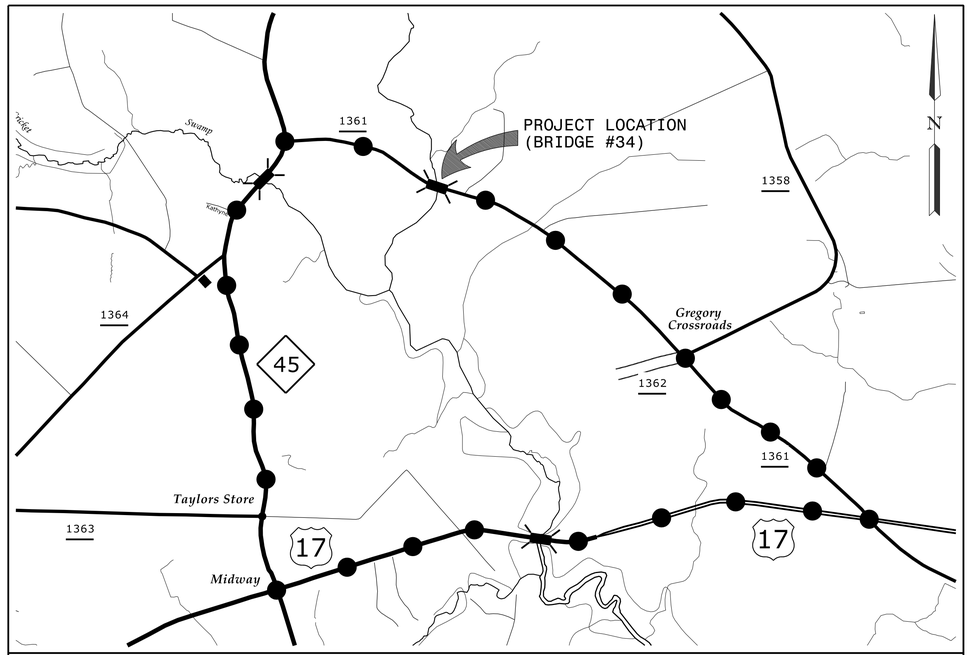
TRAFFIC CONTROL FOR TEMPORARY ROAD CLOSURE

NOTE: WING BARRICADES WITH SIGN R11-3 SHOULD ALSO BE USED AT SIDE ROADS BETWEEN THE DETOUR POINT AND THE POINT OF CLOSURE



LEGEND

- ⊢ STATIONARY SIGN
- ← DIRECTION OF TRAFFIC FLOW



VICINITY MAP

(NOT TO SCALE)

DETOUR ROUTE (APPROXIMATE LENGTH = 8 MILES)

GENERAL NOTES

1- INSTALLATION OF TEMPORARY ROUTE MARKERS, DESTINATION SIGNS AND ANY NECESSARY MODIFICATIONS TO EXISTING OR PROPOSED REGULATORY OR WARNING SIGNS WILL BE MADE BY OTHERS (STATE OR CITY FORCES) UNLESS OTHERWISE DESIGNATED IN PLANS. PROVIDE A MINIMUM 21 CALENDAR DAY NOTICE TO STATE FORCES BEFORE A ROADWAY IS CLOSED TO TRAFFIC SUCH THAT NECESSARY PROVISIONS CAN BE MADE TO INFORM LOCAL EMERGENCY AND LAW ENFORCEMENT PERSONNEL, SCHOOLS OR ANY OTHER PARTIES AFFECTED BY THE ROAD CLOSURE.

2- DO NOT INSTALL ADVANCE WARING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINING OF WORK.

3- INSTALL SIGNS BEFORE THE BARRICADES WHEN CLOSING THE ROADWAY TO TRAFFIC. REMOVE BARRICADES BEFORE SIGNS WHEN OPENING THE ROADWAY TO TRAFFIC. INSTALL/REMOVE SIGNS AND BARRICADES WITHIN THE SAME CALENDAR DAY.

4- POSITION WING BARRICADES ON THE SHOULDERS AND SLOPE THE STRIPES DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING.

5- USE ADDITIONAL TYPE III BARRICADES IN STAGGERED LOCATIONS SUPPLEMENTED WITH SIGN R11-4 "ROAD CLOSED TO THRU TRAFFIC" IN THE EVENT THAT TRAFFIC MUST BE MAINTAINED BEYOND THE DETOUR POINT.

6- DO NOT DISPLAY FRACTIONS OR DECIMALS ON SIGN R11-3 "ROAD CLOSED XX MILES AHEAD".

7- USE PORTABLE SIGNS IF ROAD CLOSURE IS TO BE IMPLEMENTED FOR LESS THAN ONE DAY OR FOR EMERGENCIES.

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

REPLACES BRIDGE NO. 34

$TIME$ $FILE$

DRAWN BY : W. B. ALLEN DATE : 2/17
CHECKED BY : L. K. AUSTIN DATE : 2/17
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 6/17

NORTH CAROLINA PROFESSIONAL SEAL 039011 ENGINEER KEVIN AUSTIN
DocuSigned by: Kevin Austin 72F7B372C6AA4BB...
2/13/2018

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

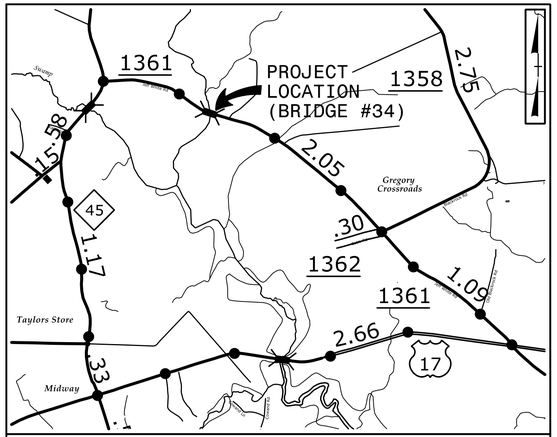
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRAFFIC MANAGEMENT PLAN

27'-10" CLEAR ROADWAY - 60°SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TMP-1
1			3			TOTAL SHEETS
2			4			

TIP PROJECT: 17BP.1.R.84



VICINITY MAP
(NOT TO SCALE)

DETOUR ROUTE (APPROXIMATE LENGTH = 8 MILES)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

BERTIE COUNTY

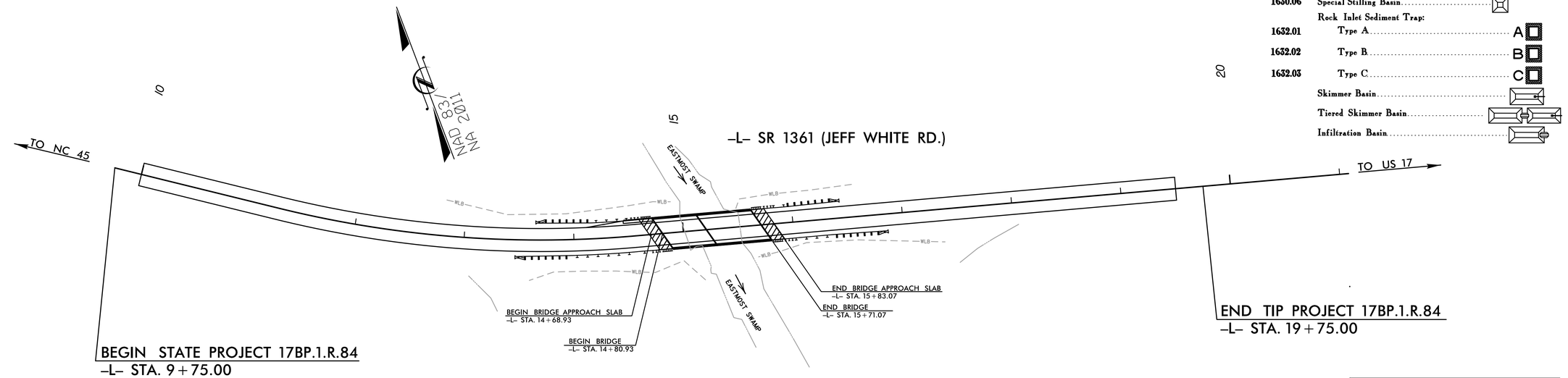
LOCATION: ***REPLACEMENT OF BRIDGE 34 OVER EASTMOST SWAMP ON SR 1361 (JEFF WHITE RD.)***

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.1.R.84	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.1.R.84		PE	

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	SW CFW
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

GRAPHIC SCALE

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 1, 2016 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER RESOURCES.

Prepared In the Office of:

ECOLOGICAL ENGINEERING

NC FIRM LICENSE No: F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0929

Designed by:

Reid B. Robol, PE — ***3409***
NAME — *LEVEL III CERTIFICATION NO.*

Reviewed In the Office of:

ROADSIDE ENVIRONMENTAL UNIT
1 South Wilmington St.
Raleigh, NC 27611

2018 STANDARD SPECIFICATIONS

Reviewed by:

Andy Blankenship, PE

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2018 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

PROJECT REFERENCE NO.	SHEET NO.
17BP.1.R.84	EC-2A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	*STABILIZATION TIME*	*TIMEFRAME EXCEPTIONS*
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

PROJECT REFERENCE NO.	SHEET NO.
17BPJ.R.84	EC-2B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

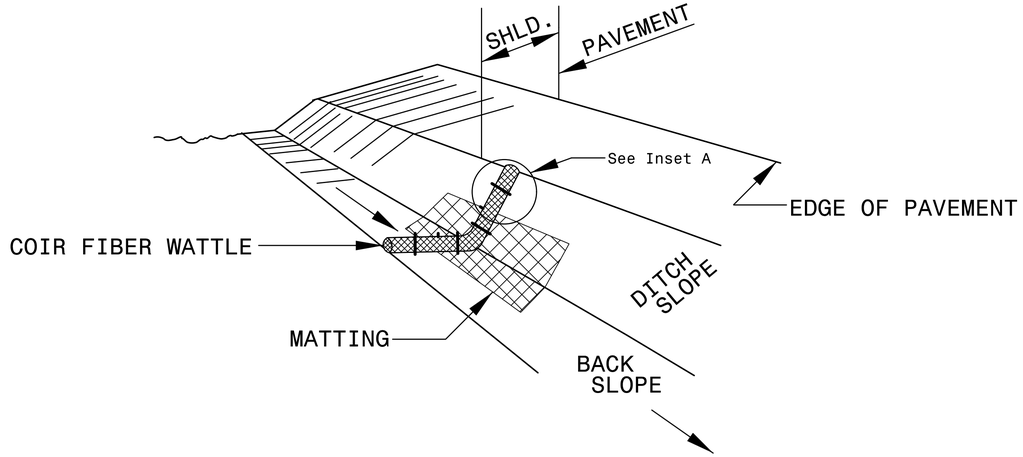
CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	10+00	13+10	RT	195
4	-L-	17+15	17+75	RT	40
4	-L-	18+00	19+75	RT	105
			SUBTOTAL		340
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					0
				TOTAL	340
				SAY	390

MATTING FOR EROSION CONTROL

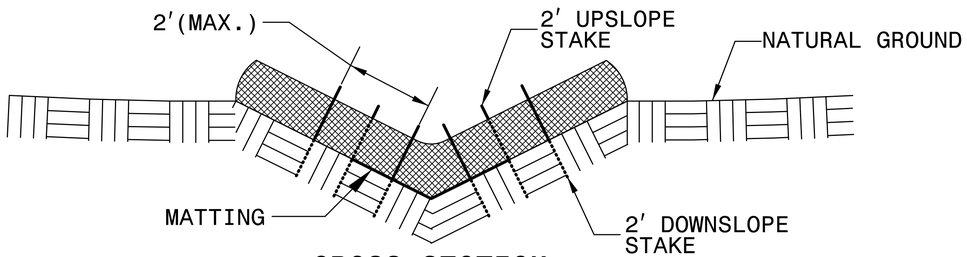
CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)

PROJECT REFERENCE NO.	SHEET NO.
17BPJ.R.84	EC-3A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

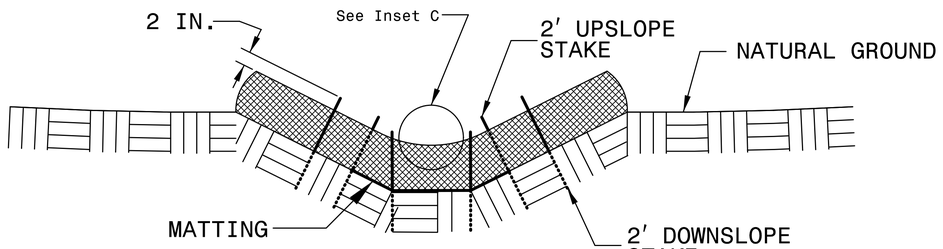
COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

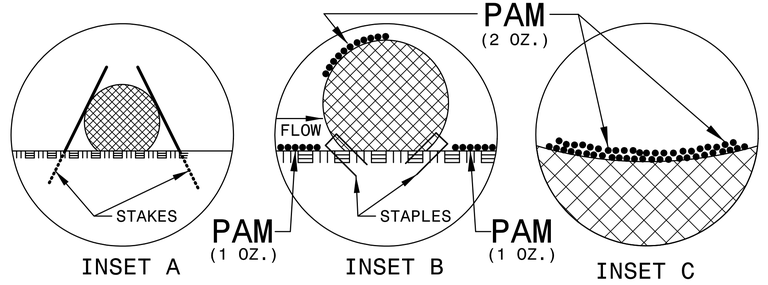
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

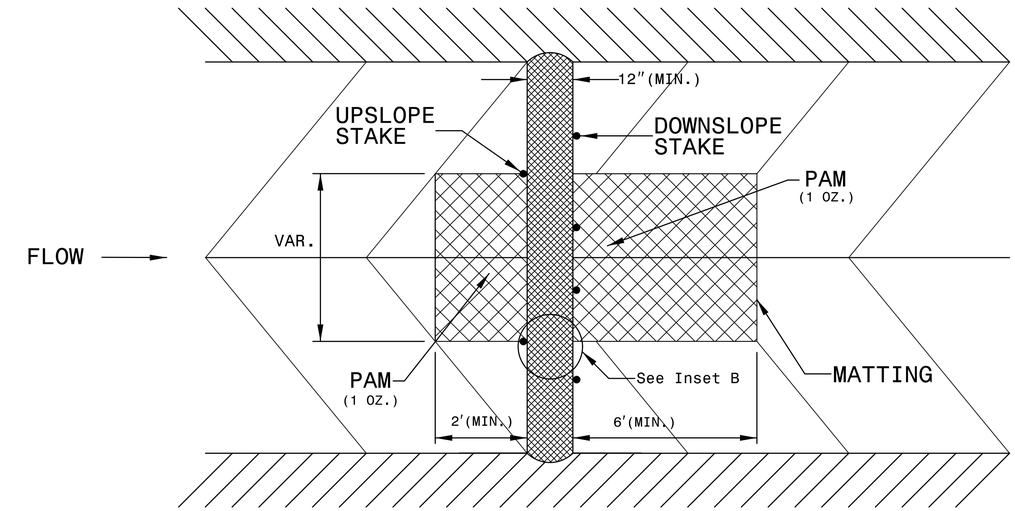
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.

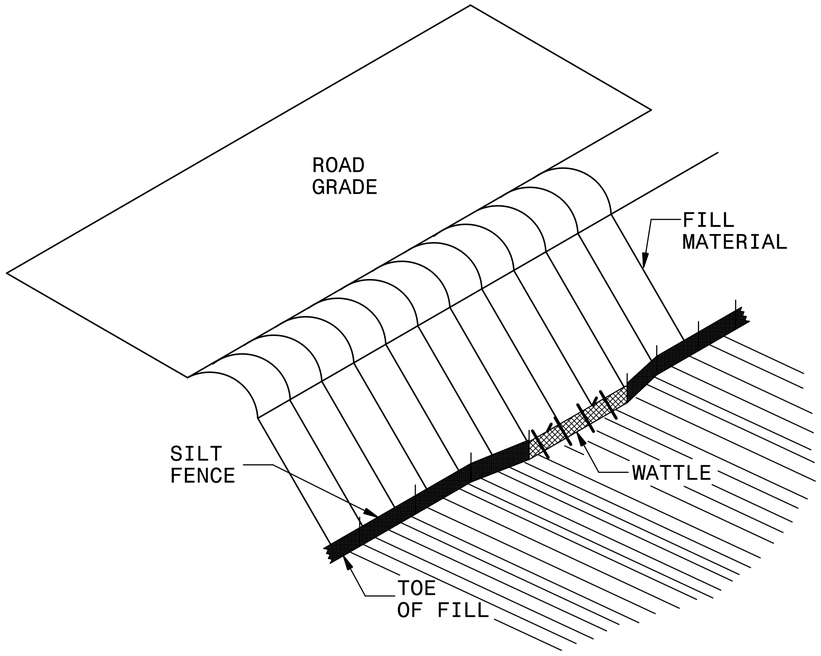




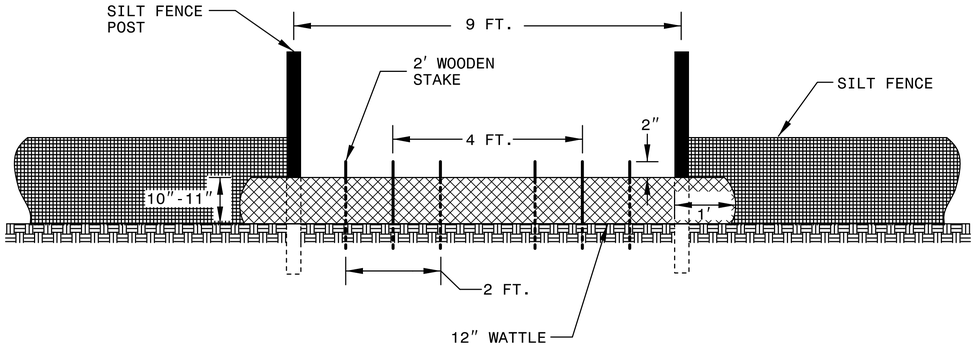
TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BPJ.R.84	EC-3B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SILT FENCE COIR FIBER WATTLE BREAK DETAIL



ISOMETRIC VIEW



VIEW FROM SLOPE

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLE ON TOE OF SLOPE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

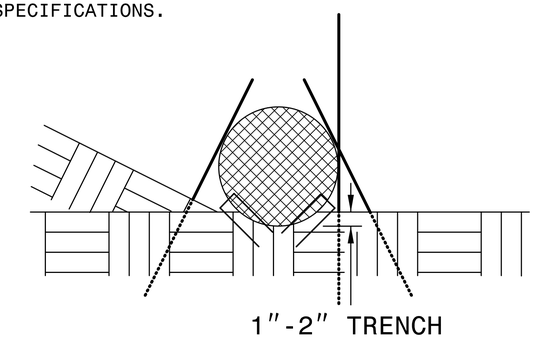
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

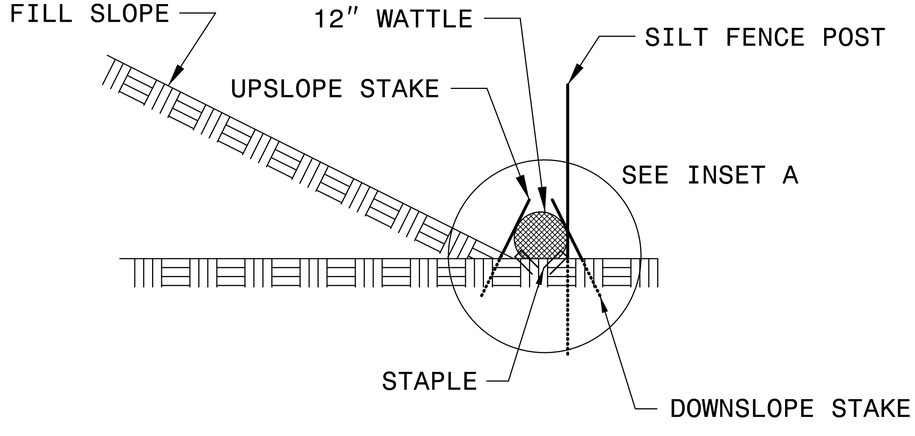
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.

INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

INSET A

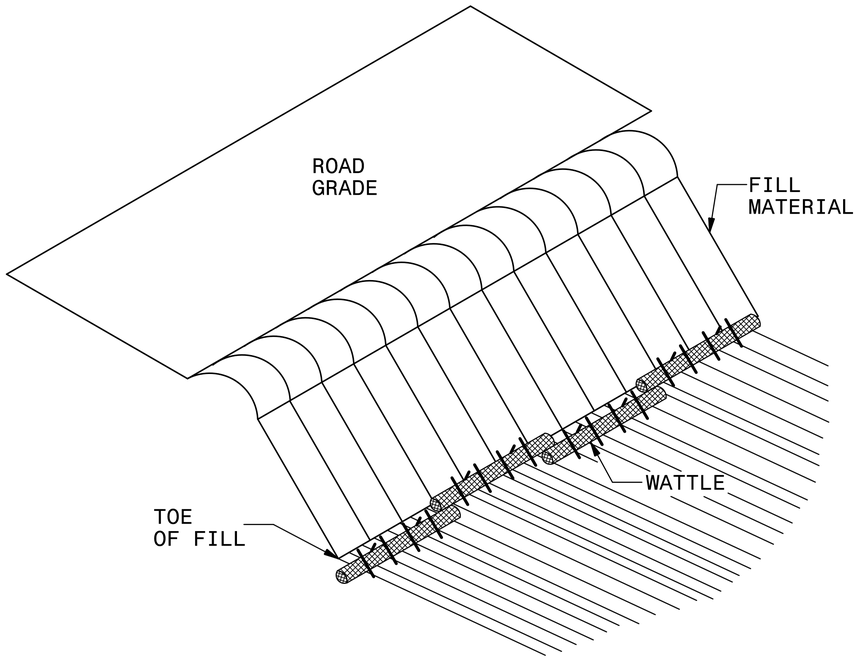




SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BPJR.84	EC-3C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

COIR FIBER WATTLE BARRIER DETAIL



ISOMETRIC VIEW

NOTES:

USE MINIMUM 18 IN. NOMINAL DIAMETER COIR FIBER (COCONUT) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 2 TO 3 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLES ON TOE OF SLOPE.

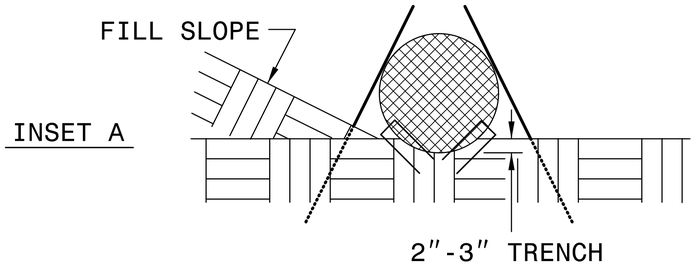
USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

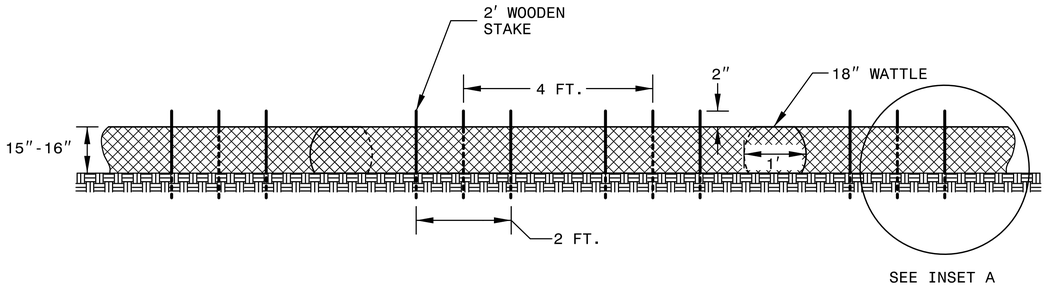
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

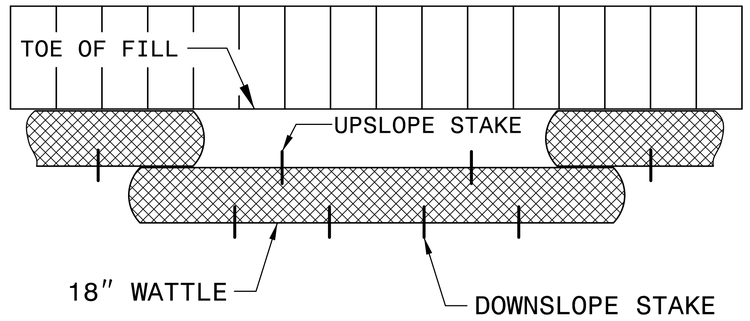
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

FOR BREAKS ALONG LARGE SLOPES, USE MAXIMUM SPACING OF 25 FT.





FRONT VIEW



TOP VIEW

8/17/99

REVISIONS

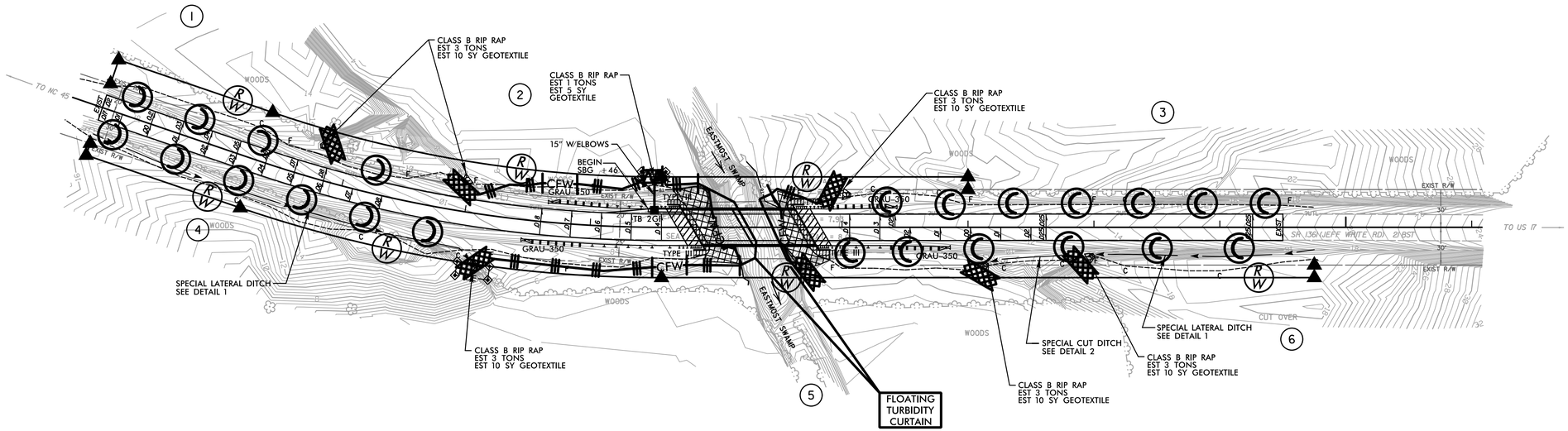
CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

CALYX
ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333
Formerly Mulkey Engineers & Consultants

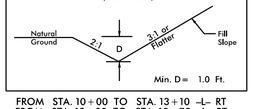
PROJECT REFERENCE NO.	SHEET NO.
17BPJ.R.84	EC-4/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NC GRID
NAD 83 NA 2011

PI Sta 12+94.41
△ = 18° 50' 04.6" (LT)
D = 5° 45' 09.3"
L = 327.41'
T = 165.20'
R = 996.00'
D.S = 55 MPH
SE = AS SHOWN

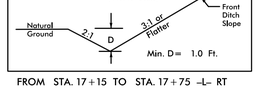


DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM STA. 10+00 TO STA. 13+10 –L– RT
FROM STA. 18+00 TO STA. 19+75 –L– RT

DETAIL 2
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 17+15 TO STA. 17+75 –L– RT

NOTE: FOR –L– PROFILE SEE SHEET 5

8:54:59 AM
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erichberger

8/17/99

REVISIONS

Place Matting for Erosion Control on Slopes Adjacent to Permitted Wetlands as Work Allows.

CALYX
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6750 TRYON ROAD
CARY, NC 27518
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CALYXengineers.com
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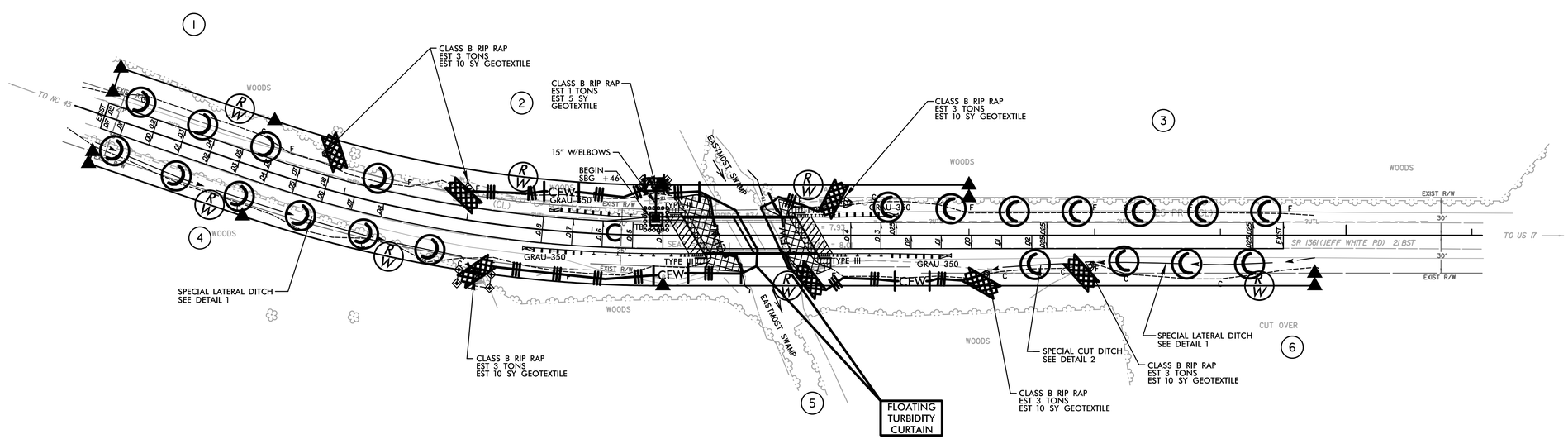
Formerly Mulkey Engineers & Consultants

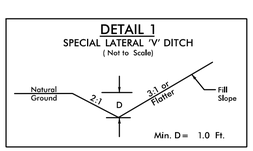
PROJECT REFERENCE NO.	SHEET NO.
17BPJ.R.84	EC-5/CONST.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NC GRID
NAD 83 NA 2011

PI Sta 12+94.41
△ = 18° 50' 04.6" (LT)
D = 5° 45' 09.3"
L = 327.41'
T = 165.20'
R = 996.00'
D.S = 55 MPH
SE = AS SHOWN

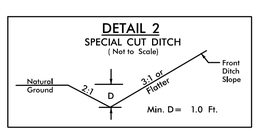


DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM STA. 10+00 TO STA. 13+10 –L– RT
FROM STA. 18+00 TO STA. 19+75 –L– RT

DETAIL 2
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 17+15 TO STA. 17+75 –L– RT

NOTE: FOR –L– PROFILE SEE SHEET 5

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aniberger

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.I.R.84	X-1

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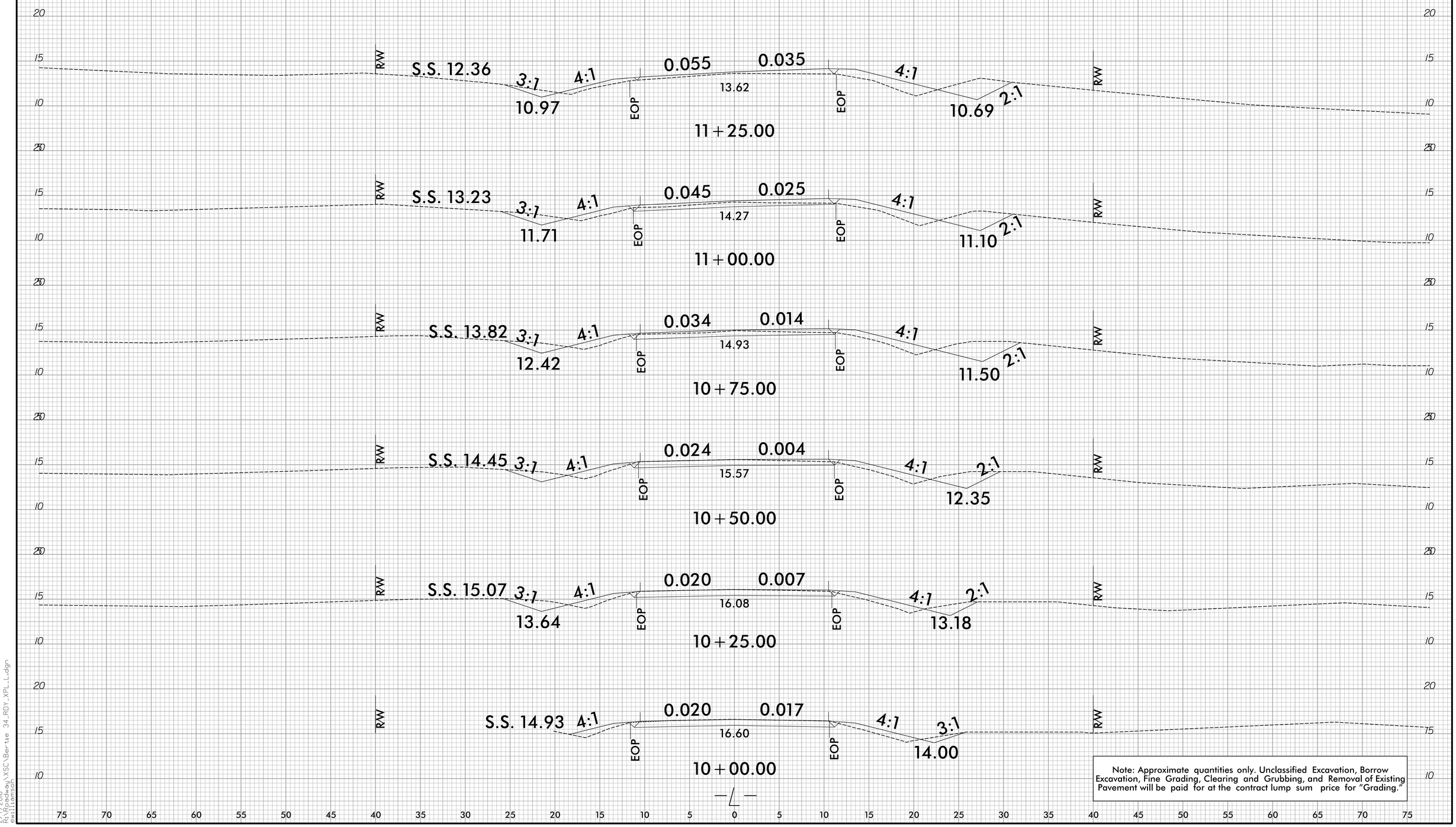

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."

2/7/2018
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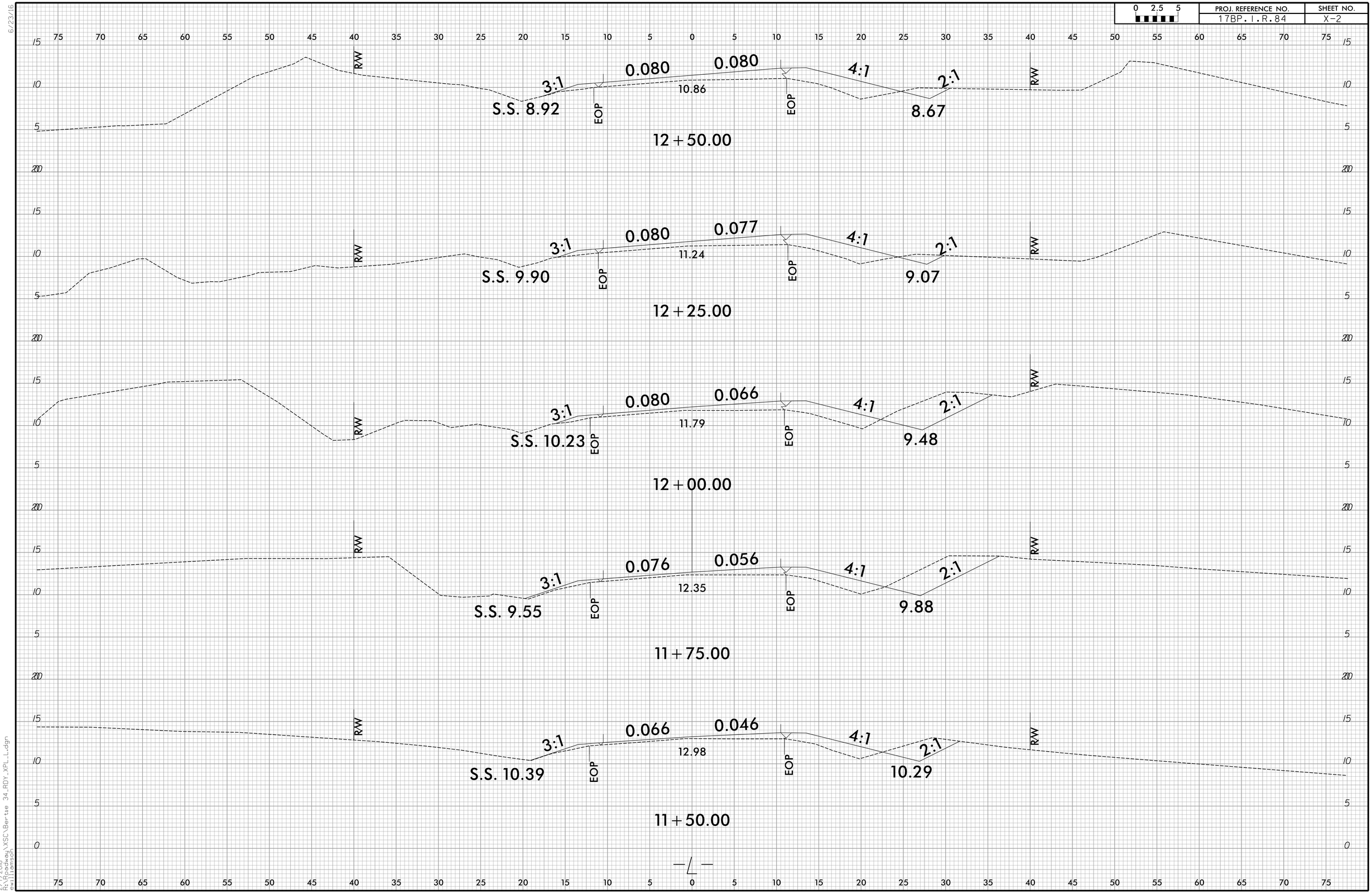
ewilliamson

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.1.R.84	X-2



2/7/2018
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ewilliamson

6/23/16

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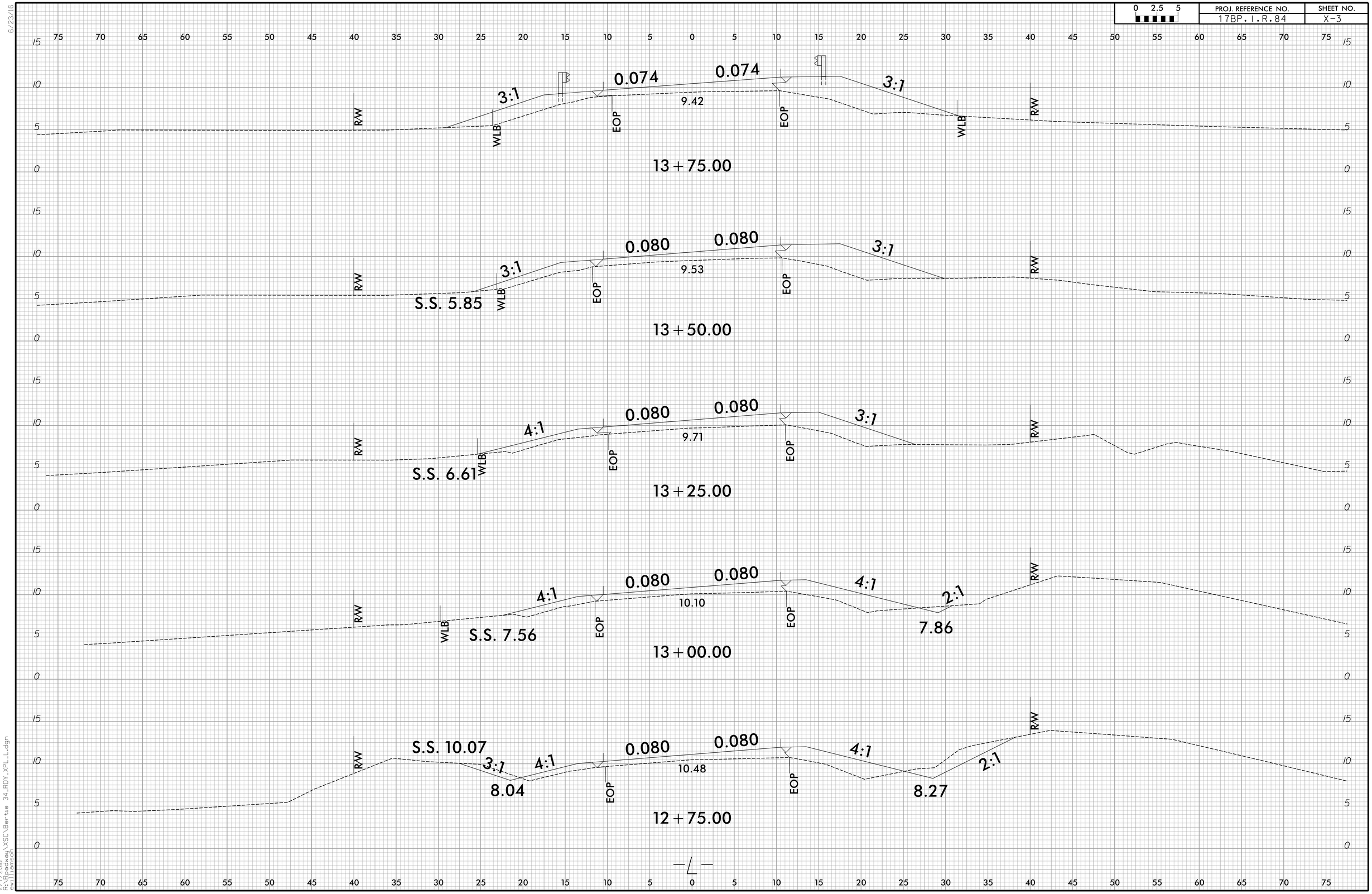

2/7/2018
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esilliamson

6/23/16

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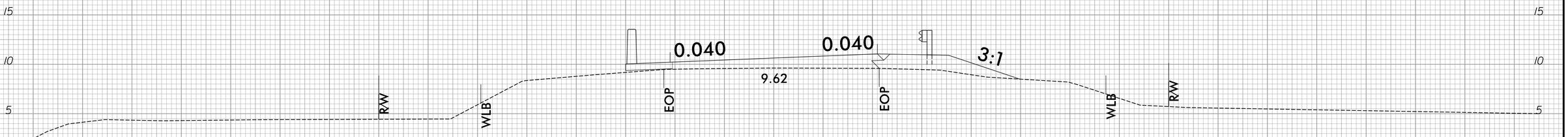
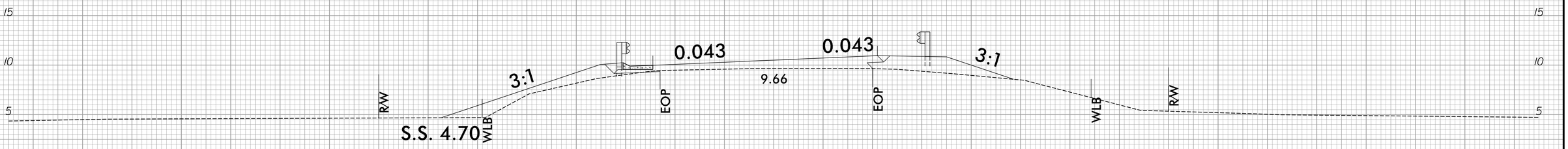
15 10 5 0

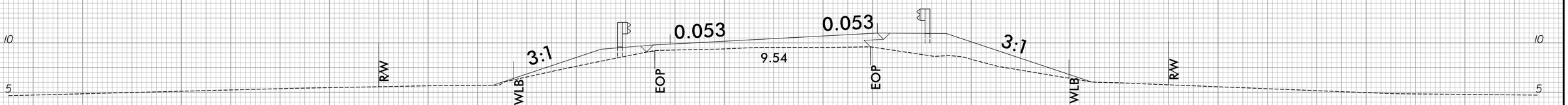


14+75.00

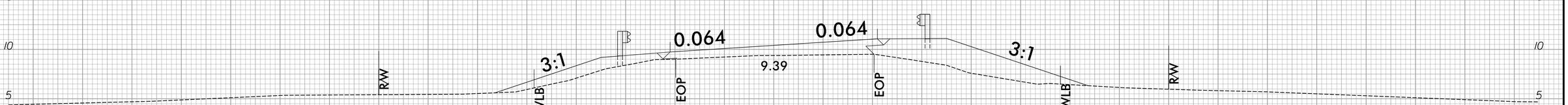


S.S. 4.70

14+50.00



14+25.00



14+00.00

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2/7/2018
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ewilliamson

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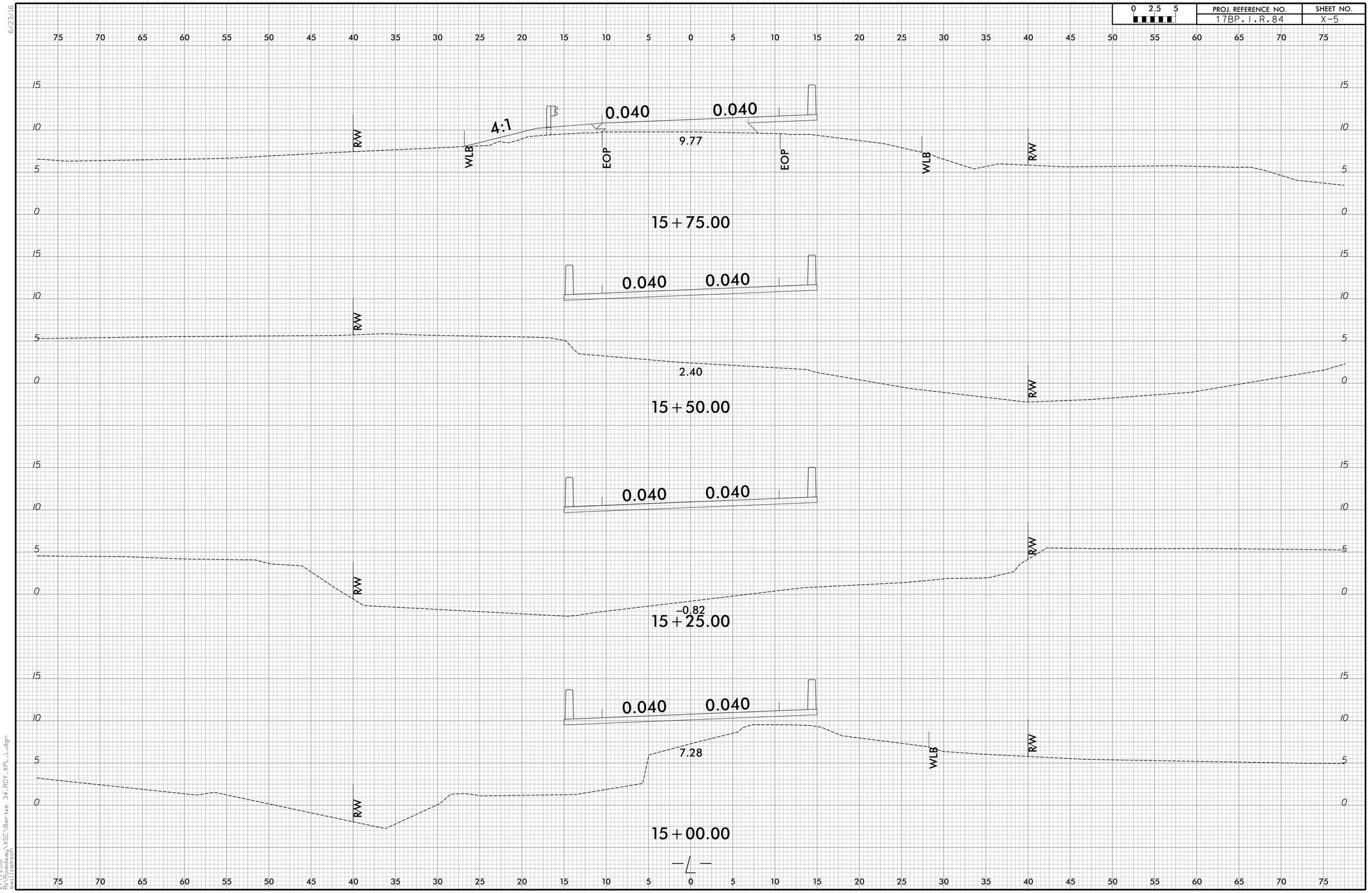

6/23/16

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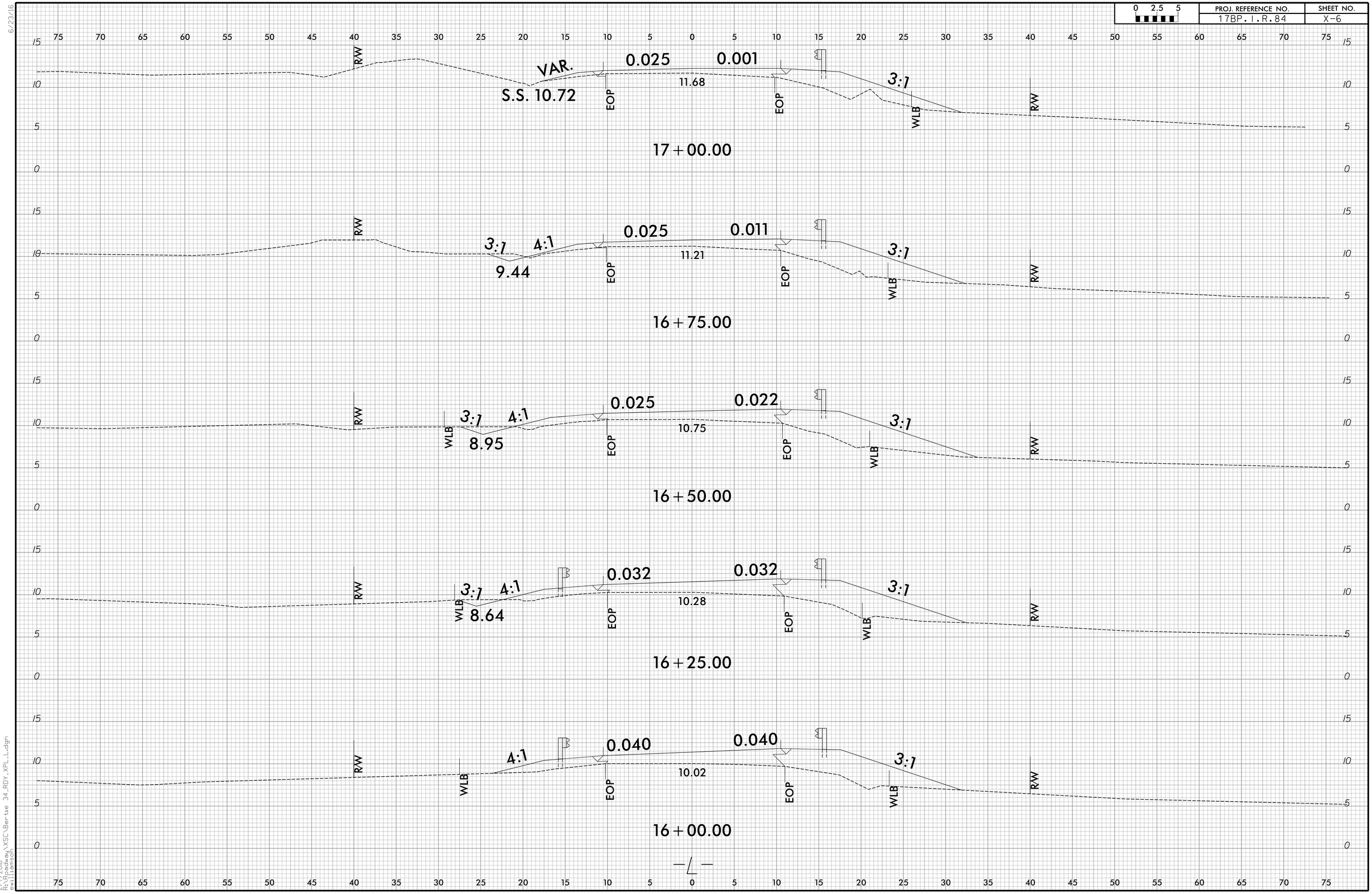

2/7/2018
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ewilliamson

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.1.R.84	X-7

6/23/16

18+50.00

VAR. S.S. 13.94 | 0.025 | 0.025 | 15.05 | EOP | EOP | 4:1 | 2:1 | 12.50 | R/W

18+25.00

VAR. S.S. 13.39 | 0.025 | 0.025 | 14.40 | EOP | EOP | 4:1 | 2:1 | 12.00 | R/W

18+00.00

VAR. S.S. 12.85 | 0.025 | 0.025 | 13.76 | EOP | EOP | 4:1 | 3:1 | S.S. 11.75 | 11.44 | R/W

17+75.00

VAR. S.S. 12.31 | 0.025 | 0.025 | 13.24 | EOP | EOP | 4:1 | 2:1 | 10.70 | R/W

17+50.00

VAR. S.S. 11.78 | 0.025 | 0.020 | 12.72 | EOP | EOP | 4:1 | 2:1 | 9.99 | R/W

17+25.00

VAR. S.S. 11.25 | 0.025 | 0.010 | 12.20 | EOP | EOP | 4:1 | 2:1 | 9.28 | WLB | R/W

—℄—

2/7/2018
R:\Roadway\XSC\Bertie 34_RDY_XPL_L.dgn
ewilliamson

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.I.R.84	X-8

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

25 20 25 20 25 20 25 20 15 10 20 15 10 20 15 10 20 15 10 20

20.85
20+25.00

19.90
20+00.00

19.00
19+75.00
EOP EOP RW

VAR. 0.025 0.025 4:1 2:1
S.S. 16.72 18.10 15.62
EOP EOP RW
19+50.00

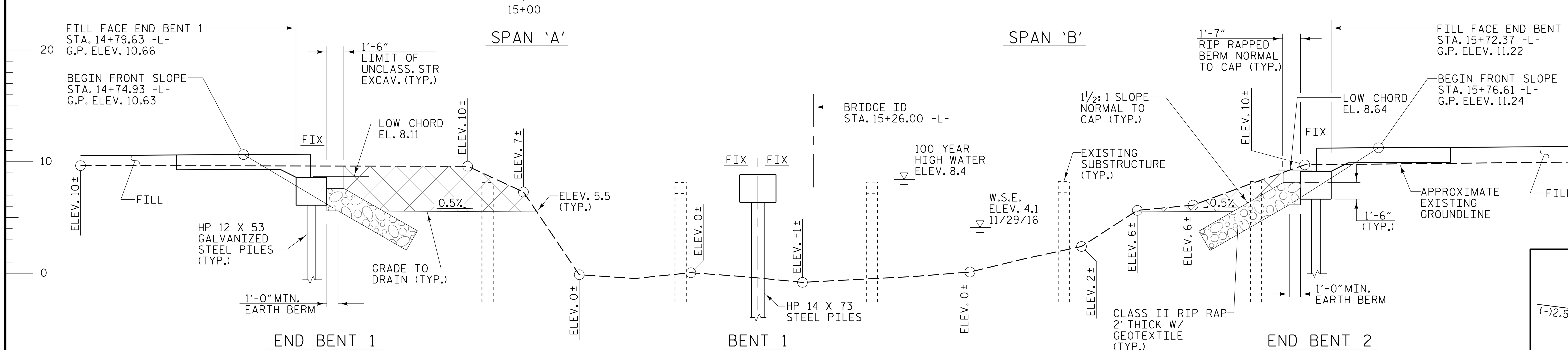
VAR. 0.025 0.025 4:1 2:1
S.S. 15.92 17.19 14.53
EOP EOP RW
19+25.00

VAR. 0.025 0.025 4:1 2:1
S.S. 15.12 16.35 13.50
EOP EOP RW
19+00.00

VAR. 0.025 0.025 4:1
S.S. 14.49 15.70 13.00
EOP EOP RW
18+75.00

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2/7/2018
R:\Roadway\XSC\Bertie 34_RDY_XPL_L.dgn
ewilliamson

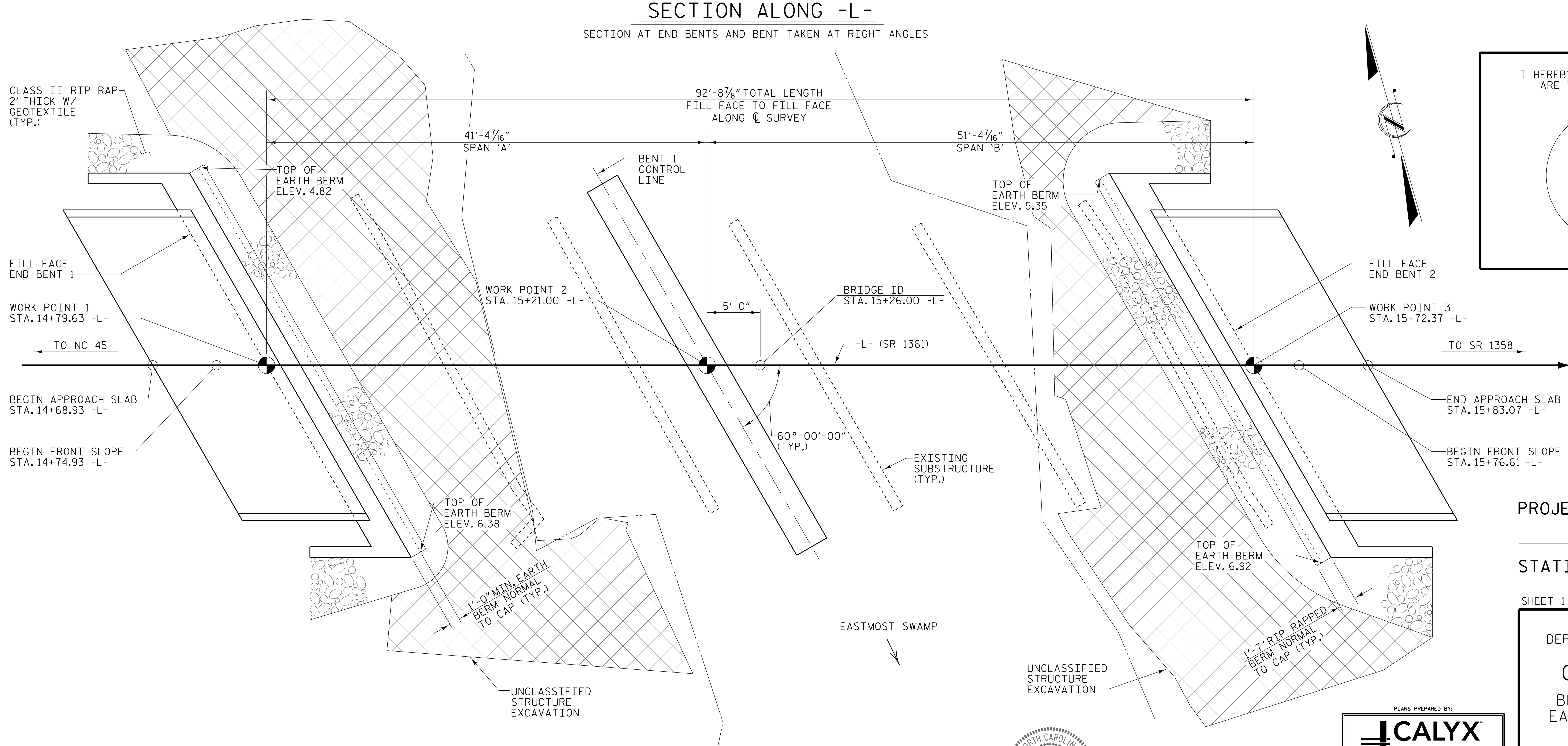


PI = 12+91.00	PI = 17+85.00
EL = 9.53'	EL = 12.49'
VC = 360'	VC = 325'
(-)2.5602% (+)0.6000%	(+)0.6000% (+)3.3954%

GRADE DATA
-L- (SR 1361)

SECTION ALONG -L-

SECTION AT END BENTS AND BENT TAKEN AT RIGHT ANGLES



PLAN

PILES NOT SHOWN FOR CLARITY

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.1.R.84
BERTIE COUNTY
STATION: 15+26.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 34

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 1361 OVER
EASTMOST SWAMP BETWEEN
NC 45 & SR 1358
27'-10" CLEAR ROADWAY - 60° SKEW

REVISIONS

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

SHEET NO. S-1
TOTAL SHEETS 18

PLANS PREPARED BY:
CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

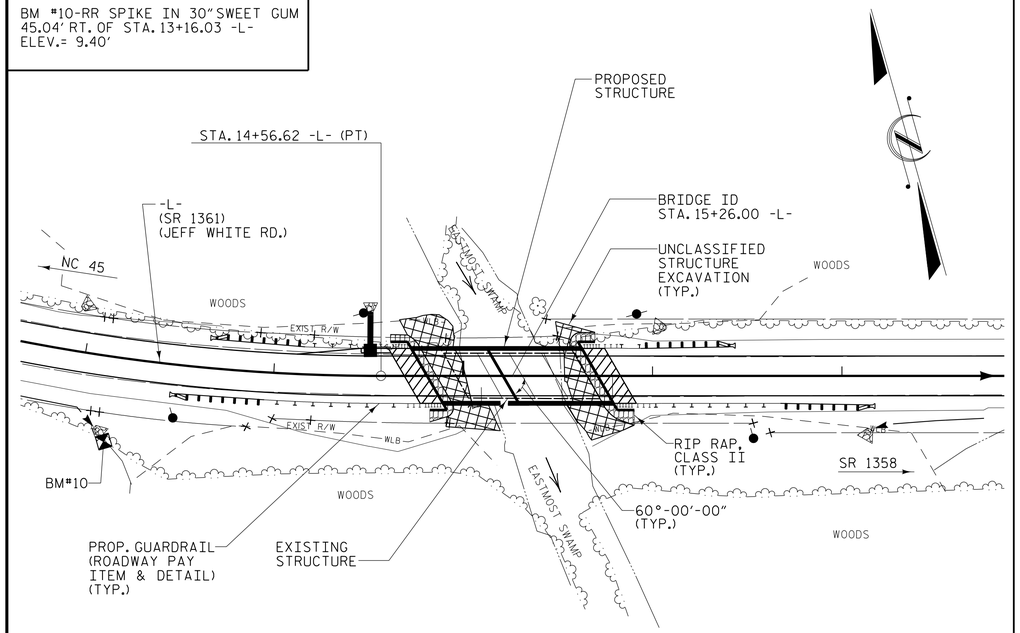
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
2/13/2018

DRAWN BY :	W. B. ALLEN	DATE :	3/17
CHECKED BY :	Z. H. BROWN	DATE :	4/17
DESIGN ENGINEER OF RECORD:	L. K. AUSTIN	DATE :	6/17

8:05:58 AM R:\Structures\17BP.1.R.84_SMU_GDI_070034.dgn

BM #10-RR SPIKE IN 30" SWEET GUM
45.04' RT. OF STA. 13+16.03 -L-
ELEV.= 9.40'



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR THE DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN ON SHEET 1 OF 2 IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A MAX. DISTANCE OF 34 FT. RT. AND 33 FT. LT. OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF ONE 17'-6" SPAN, TWO 17'-0" SPANS AND ONE 17'-6" SPAN WITH A 23'-11" CLEAR ROADWAY WIDTH AND REINF. CONC. FLOOR ON TIMBER BEAMS SUPPORTED ON TIMBER CAPS & TIMBER PILES SHALL BE REMOVED. THE BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES".

GALVANIZED STEEL PILES ARE REQUIRED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATIONS ACTIVITIES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

NO DECK DRAINS REQUIRED.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

FOUNDATION NOTES

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 81 TONS PER PILE.

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 135 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

INSTALL PILES AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN -45 FT.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION -11 FT. SCOUR ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 20 TO 30 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1, END BENT NO. 2, AND BENT NO. 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCEWITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT NO. 1 AND END BENT NO. 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

HYDRAULIC DATA:

DESIGN DISCHARGE -	1200 CFS
FREQUENCY OF DESIGN FLOOD -	25 YEAR
DESIGN HIGH WATER ELEVATION -	7.1
DRAINAGE AREA -	13.3 SQ. MI.
BASE DISCHARGE (Q 100) -	1800 CFS
BASE HIGH WATER ELEVATION -	8.4

OVERTOPPING DATA:

OVERTOPPING DISCHARGE -	3830 CFS
FREQUENCY OF OVERTOPPING-	500+ YEAR
OVERTOPPING FLOOD ELEVATION -	11.0

OVERTOPPING OCCURS AT ROADWAY STA. 14+57.00 -L- AT RIGHT SHOULDER

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 GALVANIZED STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 GALVANIZED STEEL PILES	HP 12 X 53 GALVANIZED STEEL PILES		HP 14 X 73 GALVANIZED STEEL PILES		PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
	LUMP SUM	EACH	LUMP SUM	CU. YARDS	LUMP SUM	LBS.	EACH	EACH	NO.	LIN. FT.	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YARDS	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE					LUMP SUM									180.58			LUMP SUM	20	900.00	LUMP SUM
END BENT 1			LUMP SUM	13.7		2206	5		5	300			3		55	62				
BENT 1				11.8		2317		7			7	700	4							
END BENT 2			LUMP SUM	13.7		2206	5		5	375			3		65	72				
TOTAL	LUMP SUM	2	LUMP SUM	39.2	LUMP SUM	6729	10	7	10	675	7	700	10	180.58	120	134	LUMP SUM	20	900.00	LUMP SUM

DRAWN BY : W. B. ALLEN DATE : 3/17
CHECKED BY : Z. H. BROWN DATE : 6/17
DESIGN ENGINEER OF RECORD: L. K. AUSTIN DATE : 6/17

NORTH CAROLINA PROFESSIONAL SEAL 19081 ENGINEER L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin 72F7B3726EAA4BB...
2/13/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT NO. 17BP.1.R.84
BERTIE COUNTY
STATION: 15+26.00 -L-

SHEET 2 OF 2 REPLACES BRIDGE NO. 34

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 1361
OVER EASTMOST SWAMP
BETWEEN NC 45 & SR 1458

27'-10" CLEAR ROADWAY - 60°SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			18

9:45:49 AM R:\Structures\17BP.1.R.84_SMU_G02_070034.dgn

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT					
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.352	--	1.75	0.252	1.95	40′	EL	19.423	0.653	1.35	40′	EL	7.769	0.80	0.252	1.72	40′	EL	19.423	
		HL-93(Opr)	N/A	--	1.753	--	1.35	0.252	2.52	40′	EL	19.423	0.653	1.75	40′	EL	7.769	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.544	55.583	1.75	0.252	2.45	40′	EL	19.423	0.653	1.54	40′	EL	7.769	0.80	0.252	2.14	40′	EL	19.423	
		HS-20(Opr)	36.000	--	2.001	72.053	1.35	0.252	3.17	40′	EL	19.423	0.653	2	40′	EL	7.769	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.929	53.037	1.4	0.252	5.64	40′	EL	19.423	0.653	3.93	40′	EL	7.769	0.80	0.252	3.99	40′	EL	19.423	
		SNGARBS2	20.000	--	2.985	59.708	1.4	0.252	4.63	40′	EL	15.538	0.653	2.99	40′	EL	7.769	0.80	0.252	3.28	40′	EL	19.423	
		SNAGRIS2	22.000	--	2.852	62.746	1.4	0.252	4.53	40′	EL	15.538	0.653	2.85	40′	EL	7.769	0.80	0.252	3.23	40′	EL	15.538	
		SNCOTTS3	27.250	--	1.98	53.947	1.4	0.252	2.82	40′	EL	19.423	0.653	1.98	40′	EL	7.769	0.80	0.252	1.99	40′	EL	19.423	
		SNAGGRS4	34.925	--	1.782	62.222	1.4	0.252	2.54	40′	EL	19.423	0.653	1.78	40′	EL	7.769	0.80	0.252	1.79	40′	EL	19.423	
		SNS5A	35.550	--	1.746	62.059	1.4	0.252	2.47	40′	EL	19.423	0.653	1.89	40′	EL	7.769	0.80	0.252	1.75	40′	EL	19.423	
		SNS6A	39.950	--	1.662	66.381	1.4	0.252	2.35	40′	EL	19.423	0.653	1.79	40′	EL	7.769	0.80	0.252	1.66	40′	EL	19.423	
		SNS7B	42.000	--	1.585	66.556	1.4	0.252	2.24	40′	EL	19.423	0.653	1.86	40′	EL	7.769	0.80	0.252	1.58	40′	EL	19.423	
	TTST	TNAGRIT3	33.000	--	2.045	67.476	1.4	0.252	2.89	40′	EL	19.423	0.653	2.07	40′	EL	7.769	0.80	0.252	2.04	40′	EL	19.423	
		TNT4A	33.075	--	1.951	64.52	1.4	0.252	2.93	40′	EL	19.423	0.653	1.95	40′	EL	7.769	0.80	0.252	2.07	40′	EL	19.423	
		TNT6A	41.600	--	1.757	73.106	1.4	0.252	2.49	40′	EL	19.423	0.653	1.91	40′	EL	7.769	0.80	0.252	1.76	40′	EL	19.423	
		TNT7A	42.000	--	1.795	75.386	1.4	0.252	2.55	40′	EL	19.423	0.653	1.79	40′	EL	7.769	0.80	0.252	1.80	40′	EL	19.423	
		TNT7B	42.000	--	1.729	72.638	1.4	0.252	2.61	40′	EL	19.423	0.653	1.73	40′	EL	7.769	0.80	0.252	1.84	40′	EL	19.423	
		TNAGRIT4	43.000	--	1.661	71.441	1.4	0.252	2.53	40′	EL	15.538	0.653	1.66	40′	EL	7.769	0.80	0.252	1.79	40′	EL	19.423	
		TNAGT5A	45.000	--	1.659	74.644	1.4	0.252	2.35	40′	EL	19.423	0.653	1.77	40′	EL	7.769	0.80	0.252	1.66	40′	EL	19.423	
		TNAGT5B	45.000	3	1.568	70.561	1.4	0.252	2.28	40′	EL	19.423	0.653	1.57	40′	EL	7.769	0.80	0.252	1.61	40′	EL	19.423	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING
(1) DESIGN LOAD RATING (HL-93)
(2) DESIGN LOAD RATING (HS-20)
(3) LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER

LRFR SUMMARY

FOR SPAN 'A'

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER KEVIN AUSTIN

2/13/2018

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS

6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com

NC License # F-1333

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 40′ CORED SLAB UNIT 60° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-3
1			3				TOTAL SHEETS
2			4				18

ASSEMBLED BY : W. B. ALLEN DATE : 3/17
CHECKED BY : Z. H. BROWN DATE : 6/17

DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10

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STD. NO. 21LRFR1_60&120S_40L

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
							LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.35	--	1.75	0.25	1.74	50′	EL	24.423	0.656	1.35	50′	EL	9.769	0.80	0.25	1.59	50′	EL	24.423	
		HL-93(Opr)	N/A	--	1.75	--	1.35	0.25	2.25	50′	EL	24.423	0.656	1.75	50′	EL	9.769	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.586	57.108	1.75	0.25	2.15	50′	EL	24.423	0.656	1.59	50′	EL	9.769	0.80	0.25	1.97	50′	EL	24.423	
		HS-20(Opr)	36.000	--	2.056	74.028	1.35	0.25	2.79	50′	EL	24.423	0.656	2.06	50′	EL	9.769	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.009	54.117	1.4	0.25	5.47	50′	EL	24.423	0.656	4.31	50′	EL	9.769	0.80	0.25	4.01	50′	EL	24.423	
		SNGARBS2	20.000	--	3.168	63.352	1.4	0.25	4.32	50′	EL	24.423	0.656	3.19	50′	EL	9.769	0.80	0.25	3.17	50′	EL	24.423	
		SNAGRIS2	22.000	--	3.009	66.192	1.4	0.25	4.18	50′	EL	19.538	0.656	3.01	50′	EL	9.769	0.80	0.25	3.07	50′	EL	24.423	
		SNCOTTS3	27.250	--	2	54.493	1.4	0.25	2.73	50′	EL	24.423	0.656	2.16	50′	EL	9.769	0.80	0.25	2.00	50′	EL	24.423	
		SNAGGRS4	34.925	--	1.739	60.742	1.4	0.25	2.37	50′	EL	24.423	0.656	1.88	50′	EL	9.769	0.80	0.25	1.74	50′	EL	24.423	
		SNS5A	35.550	--	1.696	60.292	1.4	0.25	2.31	50′	EL	24.423	0.656	1.96	50′	EL	9.769	0.80	0.25	1.70	50′	EL	24.423	
		SNS6A	39.950	--	1.586	63.364	1.4	0.25	2.16	50′	EL	24.423	0.656	1.82	50′	EL	9.769	0.80	0.25	1.59	50′	EL	24.423	
		SNS7B	42.000	--	1.512	63.487	1.4	0.25	2.06	50′	EL	24.423	0.656	1.85	50′	EL	9.769	0.80	0.25	1.51	50′	EL	24.423	
	TTST	TNAGRIT3	33.000	--	1.943	64.127	1.4	0.25	2.65	50′	EL	24.423	0.656	2.14	50′	EL	9.769	0.80	0.25	1.94	50′	EL	24.423	
		TNT4A	33.075	--	1.96	64.837	1.4	0.25	2.67	50′	EL	24.423	0.656	2.04	50′	EL	9.769	0.80	0.25	1.96	50′	EL	24.423	
		TNT6A	41.600	--	1.633	67.938	1.4	0.25	2.23	50′	EL	24.423	0.656	2	50′	EL	9.769	0.80	0.25	1.63	50′	EL	24.423	
		TNT7A	42.000	--	1.658	69.634	1.4	0.25	2.26	50′	EL	24.423	0.656	1.86	50′	EL	9.769	0.80	0.25	1.66	50′	EL	24.423	
		TNT7B	42.000	--	1.728	72.595	1.4	0.25	2.36	50′	EL	24.423	0.656	1.76	50′	EL	9.769	0.80	0.25	1.73	50′	EL	24.423	
		TNAGRIT4	43.000	--	1.64	70.537	1.4	0.25	2.24	50′	EL	24.423	0.656	1.69	50′	EL	9.769	0.80	0.25	1.64	50′	EL	24.423	
		TNAGT5A	45.000	--	1.532	68.95	1.4	0.25	2.09	50′	EL	24.423	0.656	1.75	50′	EL	9.769	0.80	0.25	1.53	50′	EL	24.423	
		TNAGT5B	45.000	3	1.501	67.548	1.4	0.25	2.05	50′	EL	24.423	0.656	1.6	50′	EL	9.769	0.80	0.25	1.50	50′	EL	24.423	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

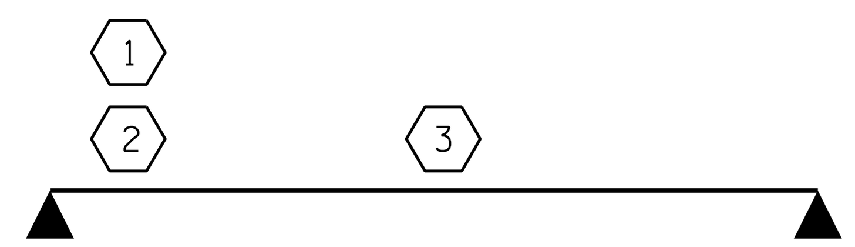
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING ✱✱

✱✱ SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN 'B'

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19661 L. KEVIN AUSTIN
2/13/2018

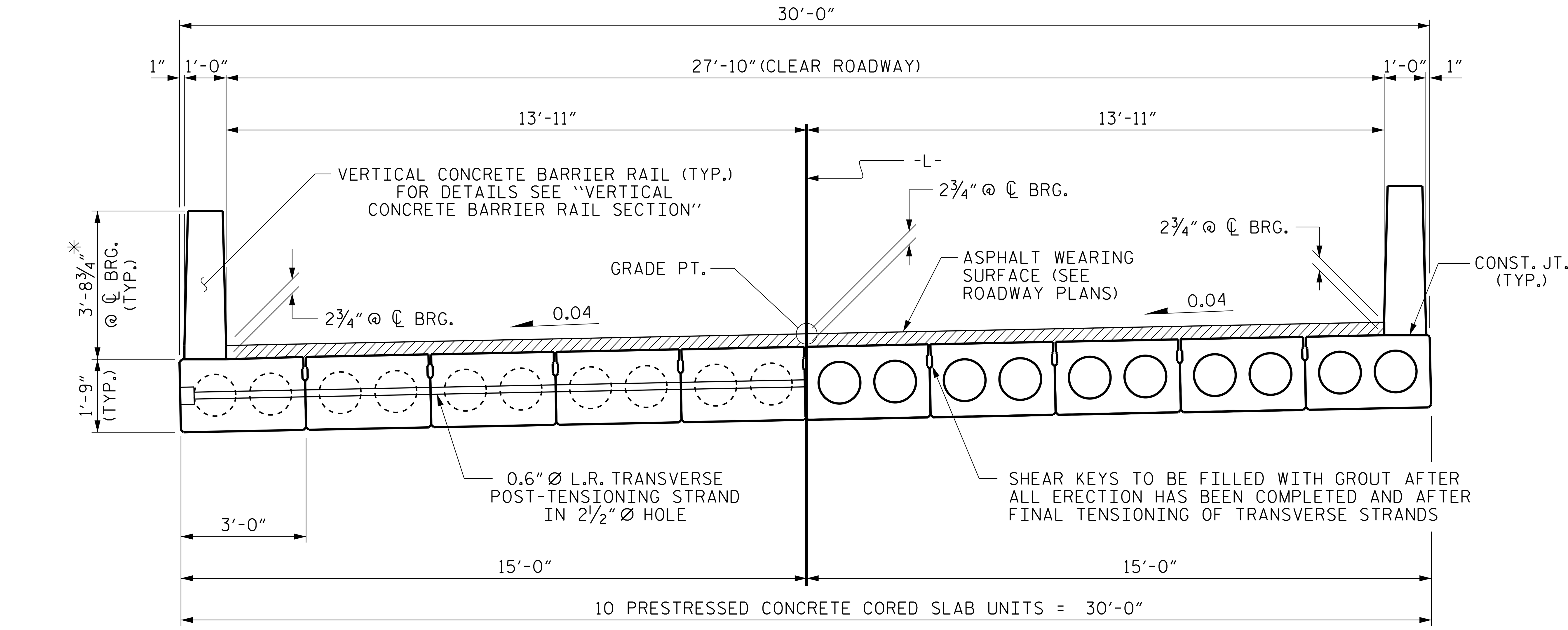
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 50′ CORED SLAB UNIT 60° SKEW
(NON-INTERSTATE TRAFFIC)

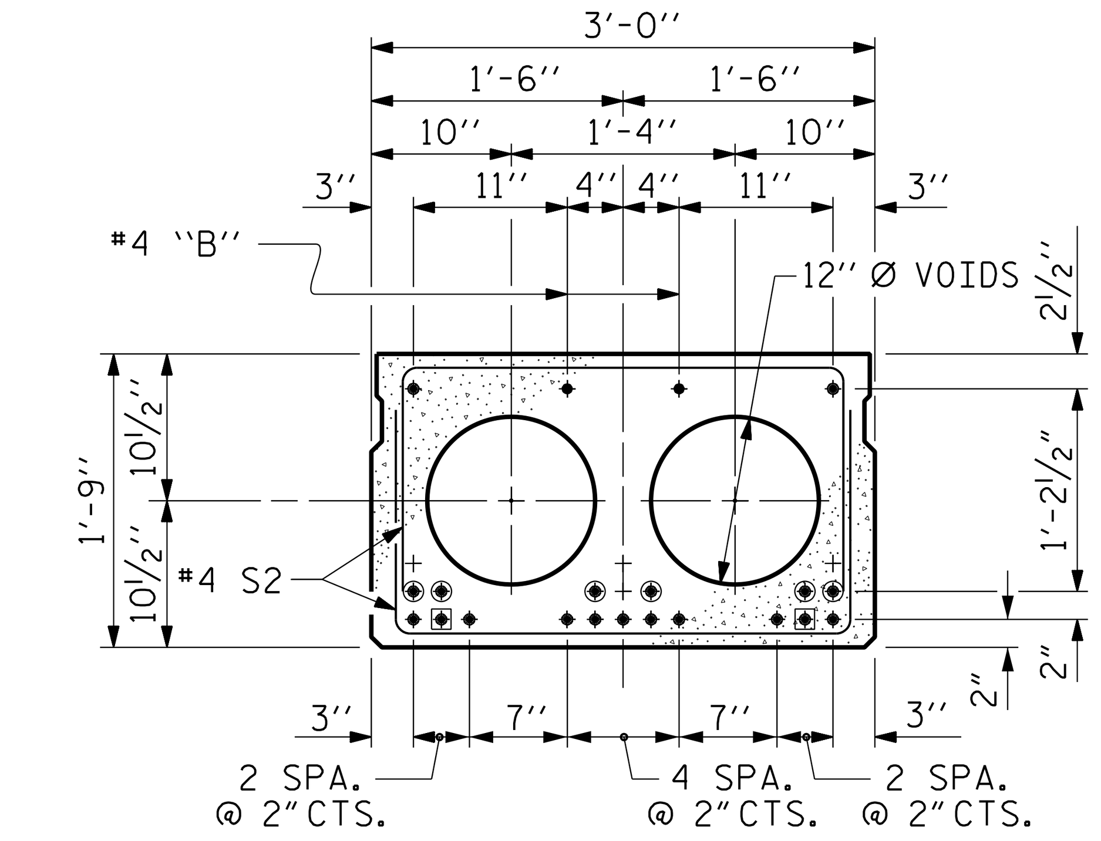
REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-4
1				3				TOTAL SHEETS
2				4				18

ASSEMBLED BY :	W. B. ALLEN	DATE :	3/17
CHECKED BY :	Z. H. BROWN	DATE :	6/17
DRAWN BY :	CVC	6/10	
CHECKED BY :	DNS	6/10	



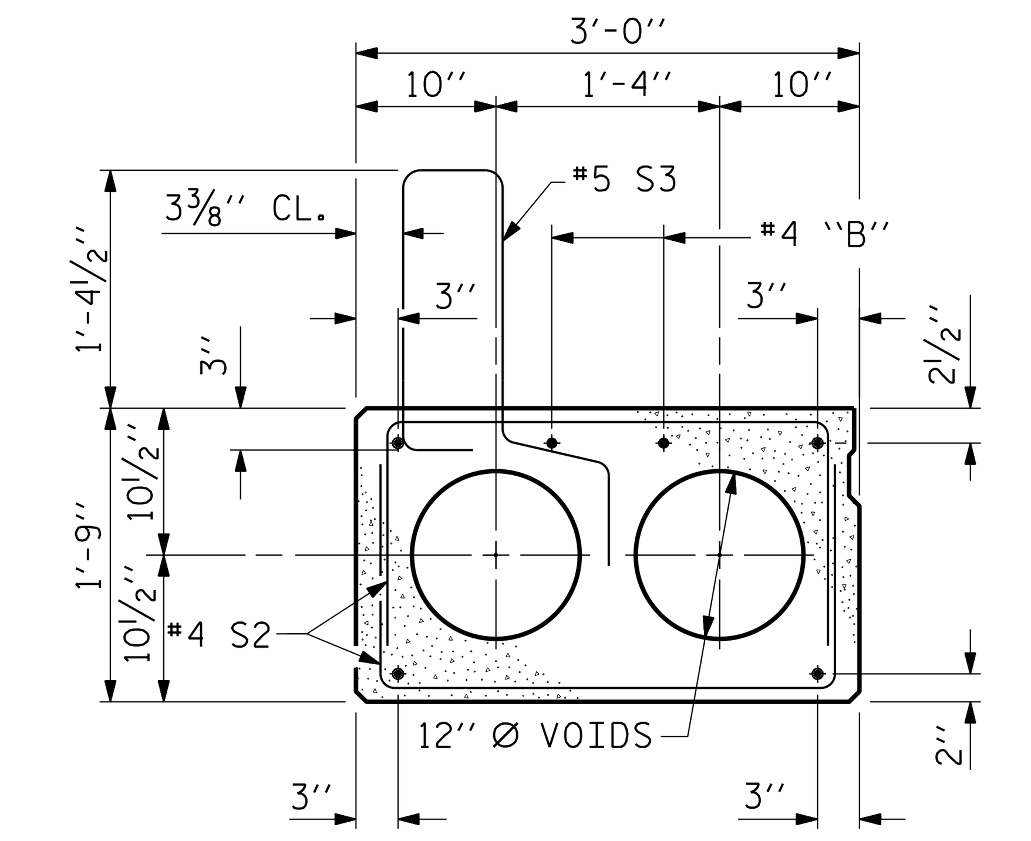
TYPICAL SECTION

* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



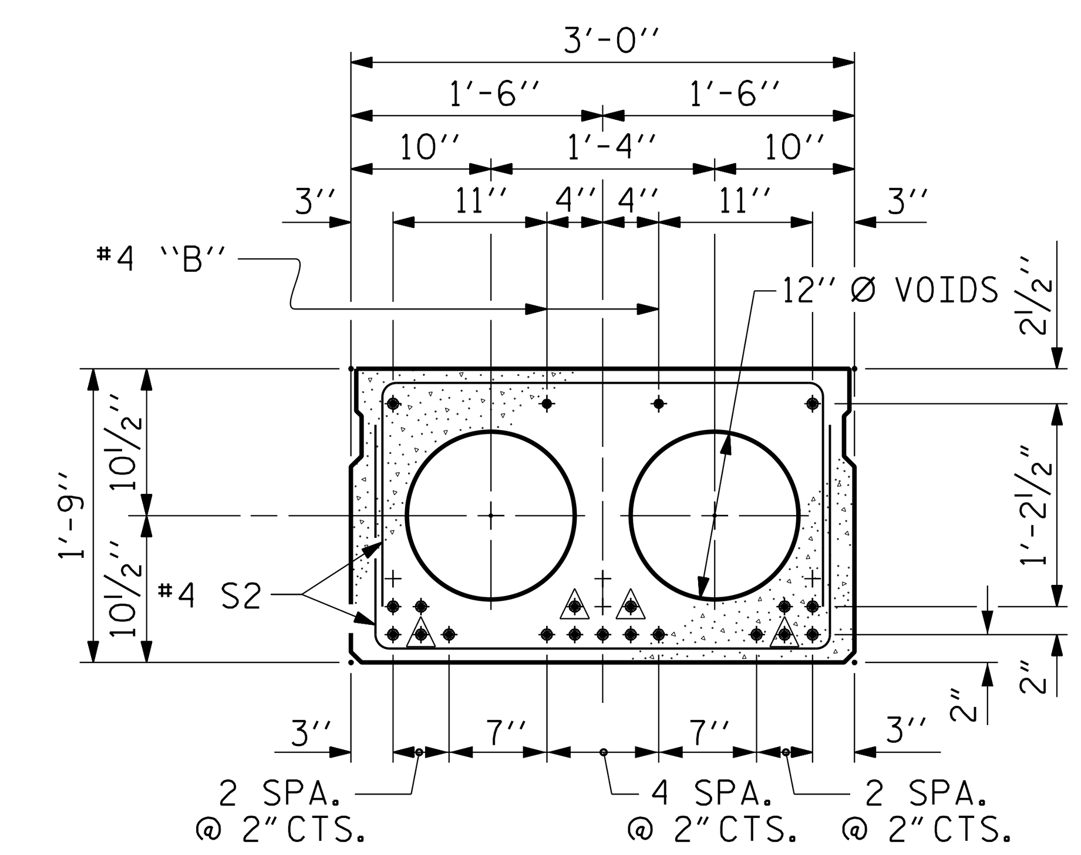
INTERIOR SLAB SECTION (40' UNIT)

(13 STRANDS REQUIRED)



EXT. SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



INTERIOR SLAB SECTION (50' UNIT)

(19 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

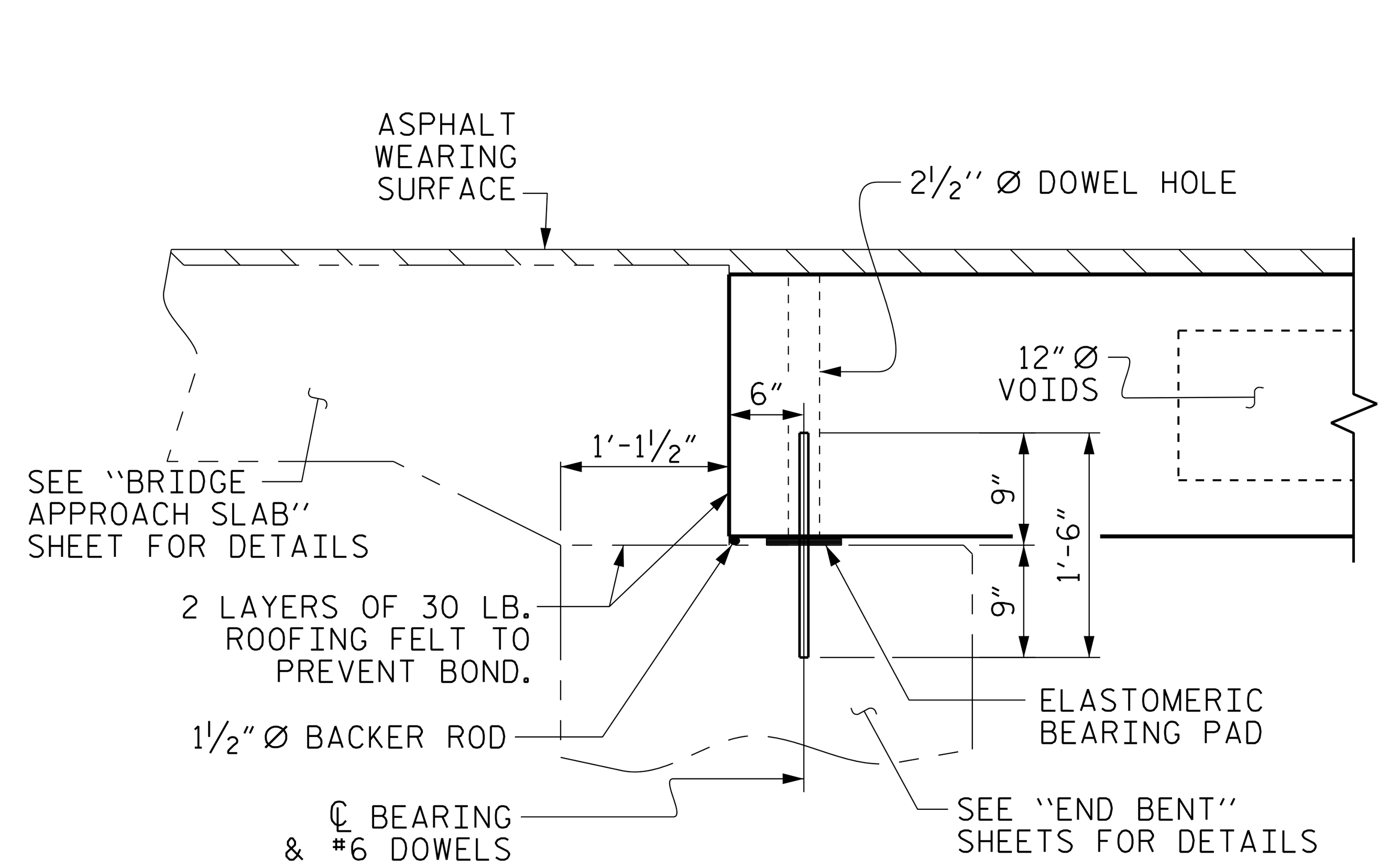
△ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

▣ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

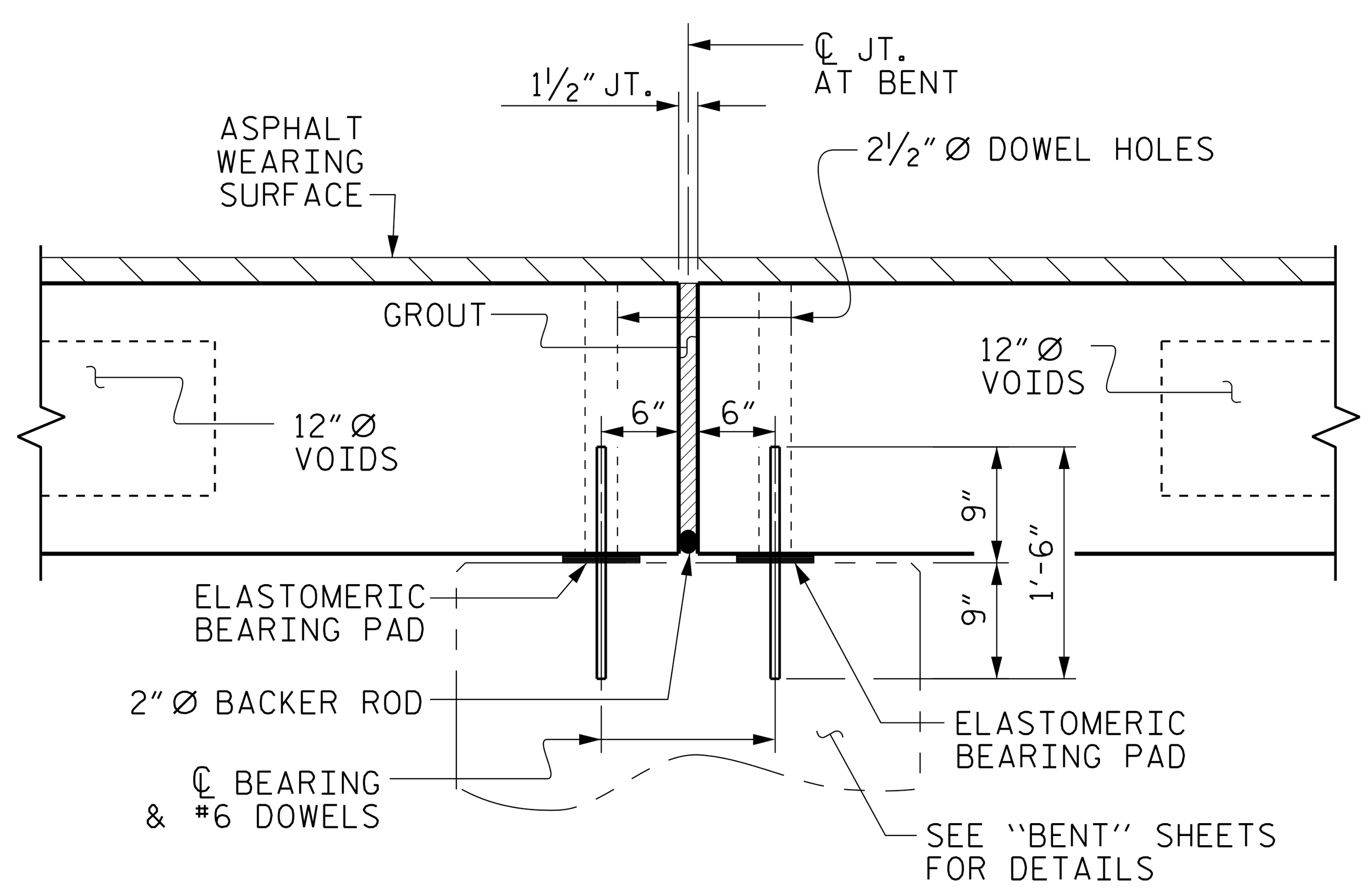
DEBONDING LEGEND

FIXED END

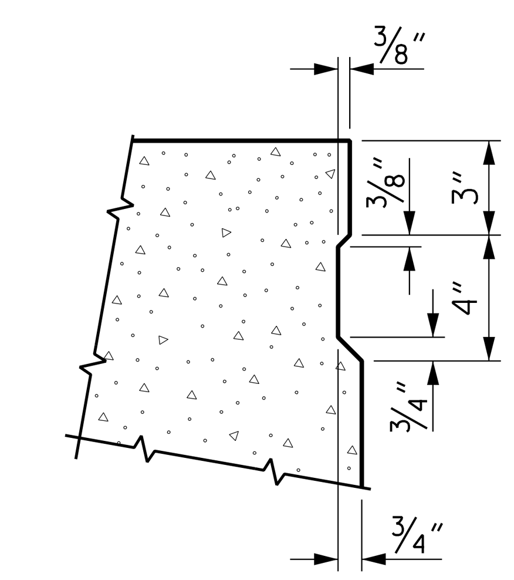


SECTION AT END BENT

FIXED END FIXED END

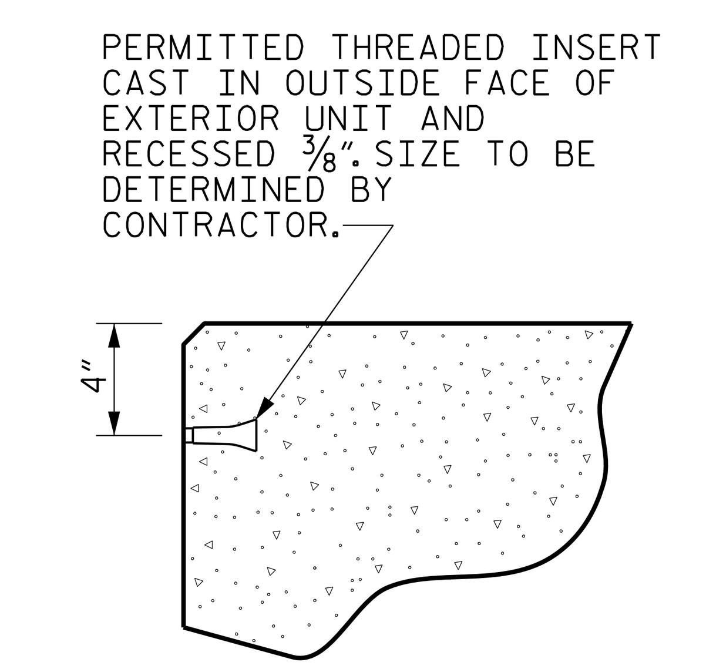


SECTION AT BENT

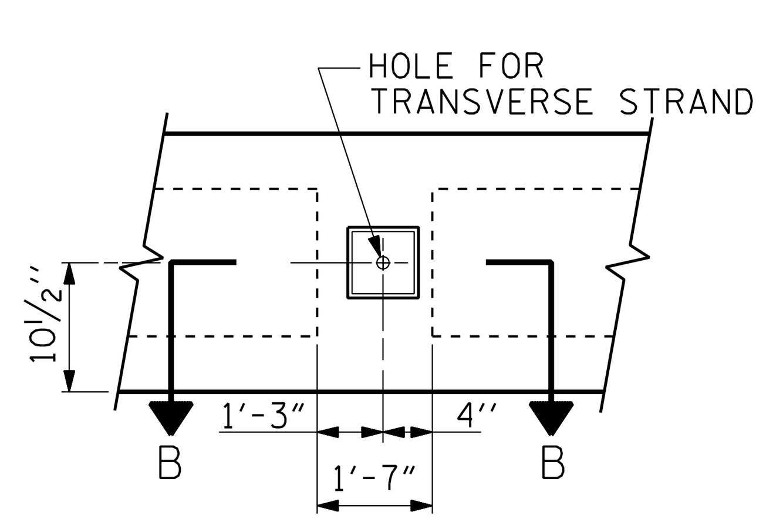


SHEAR KEY DETAIL

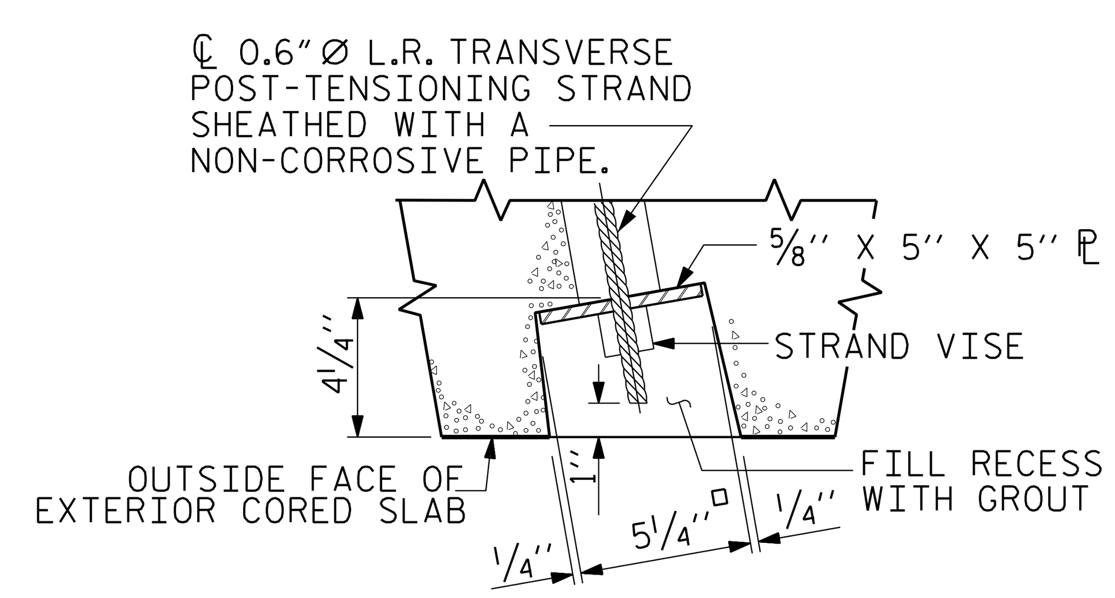
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



THREADED INSERT DETAIL

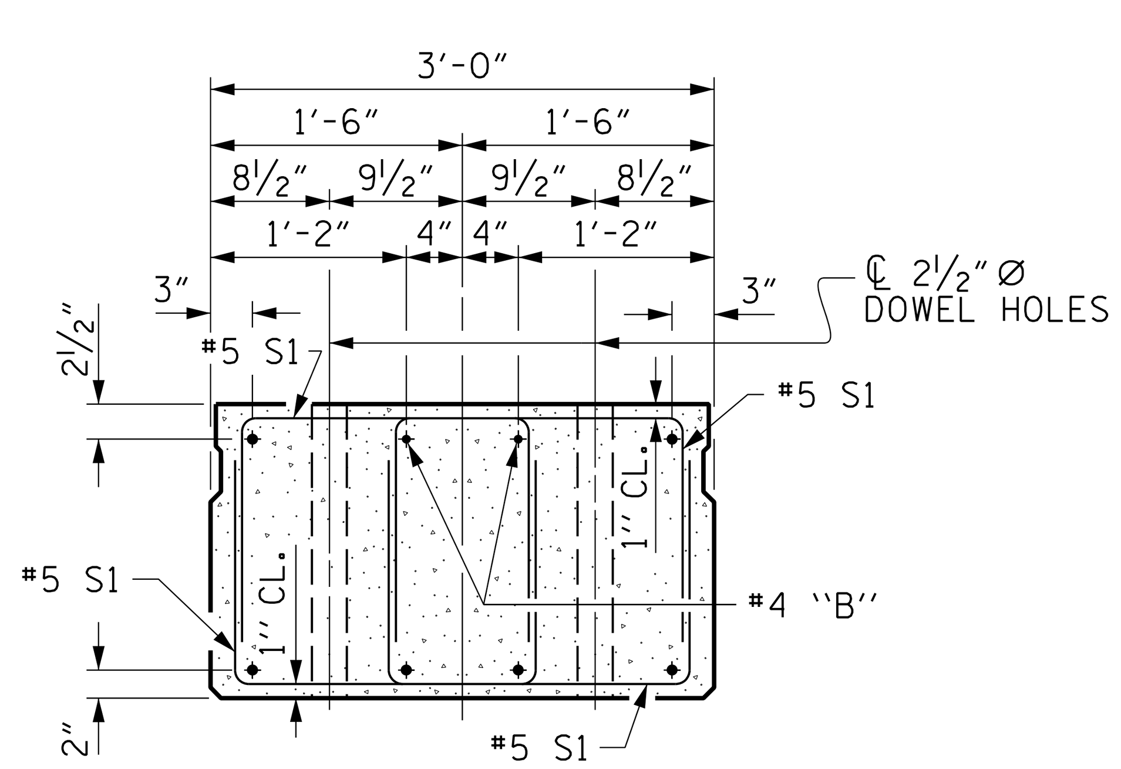


ELEVATION VIEW



SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS



END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 1 OF 4

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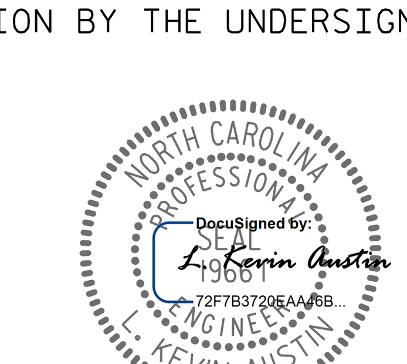

2/13/2018

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
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phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 60° SKEW

ASSEMBLED BY :	W. B. ALLEN	DATE :	3/17
CHECKED BY :	Z. H. BROWN	DATE :	6/17
DRAWN BY : DGE 5/09	CHECKED BY : BCH 6/09	REV. 8/14	MAA/TMG

REVISIONS

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

SHEET NO. S-5

TOTAL SHEETS 18

STD. NO. 21"PCS2_30_60S

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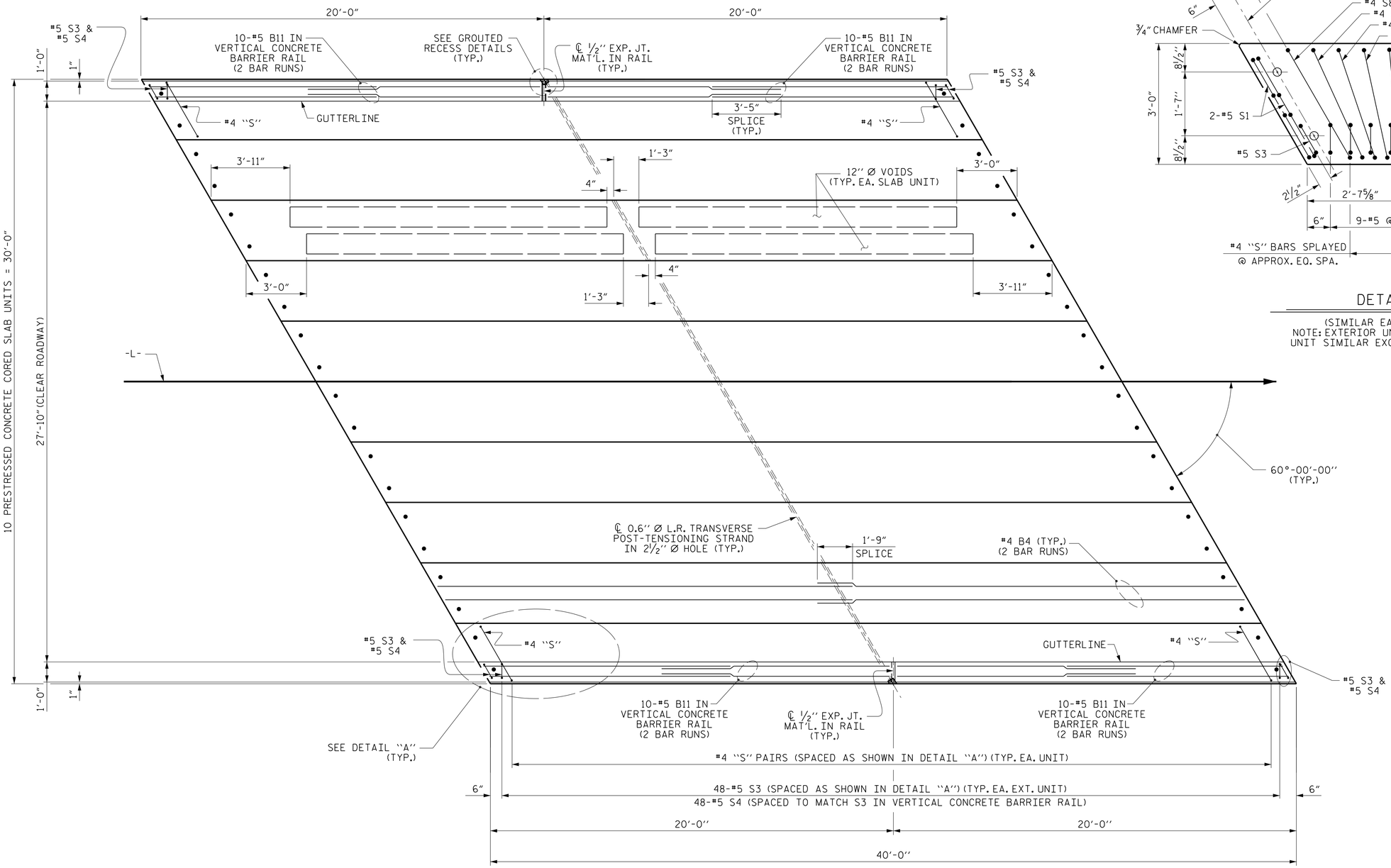

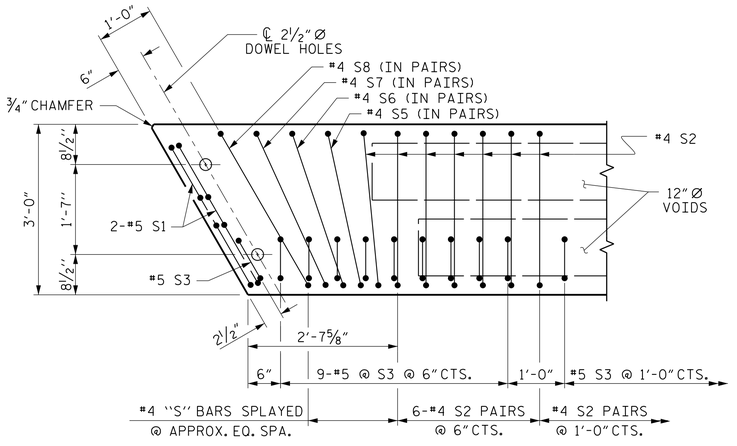

DETAIL "A"

(SIMILAR EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PLAN OF UNIT

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 40' UNIT 27'-10" CLEAR ROADWAY 60° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			18

PLANS PREPARED BY:
CALYX ENGINEERS + CONSULTANTS
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CALYXengineers.com
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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL KEVIN AUSTIN
DocuSigned by: Kevin Austin
2/13/2018

ASSEMBLED BY :	W. B. ALLEN	DATE :	3/17
CHECKED BY :	Z.H. BROWN	DATE :	6/17
DRAWN BY : DGE	3/09	REV.	12/5/11 MAA/AAC
CHECKED BY : BCH	3/09	REV.	8/14 MAA/TMG

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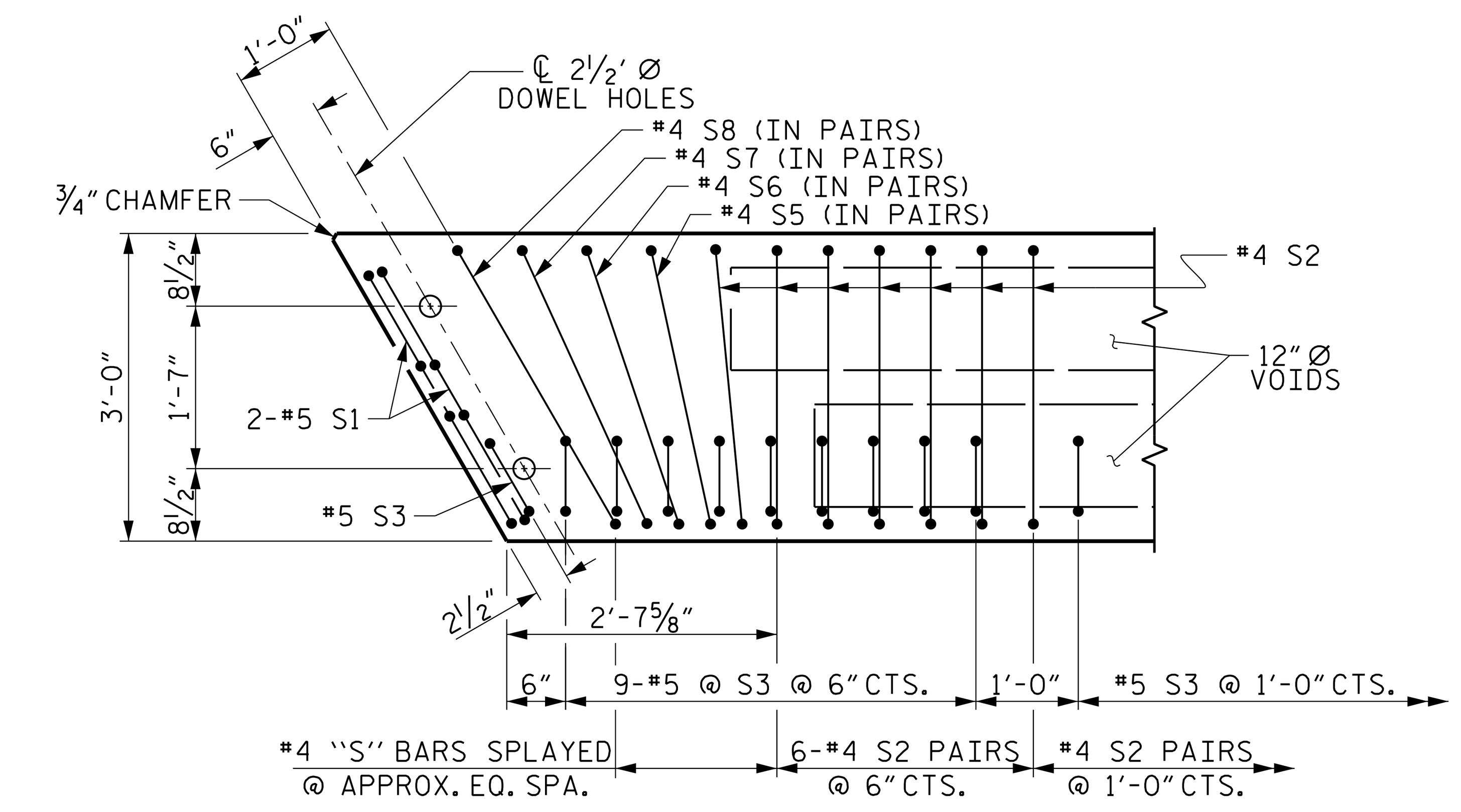
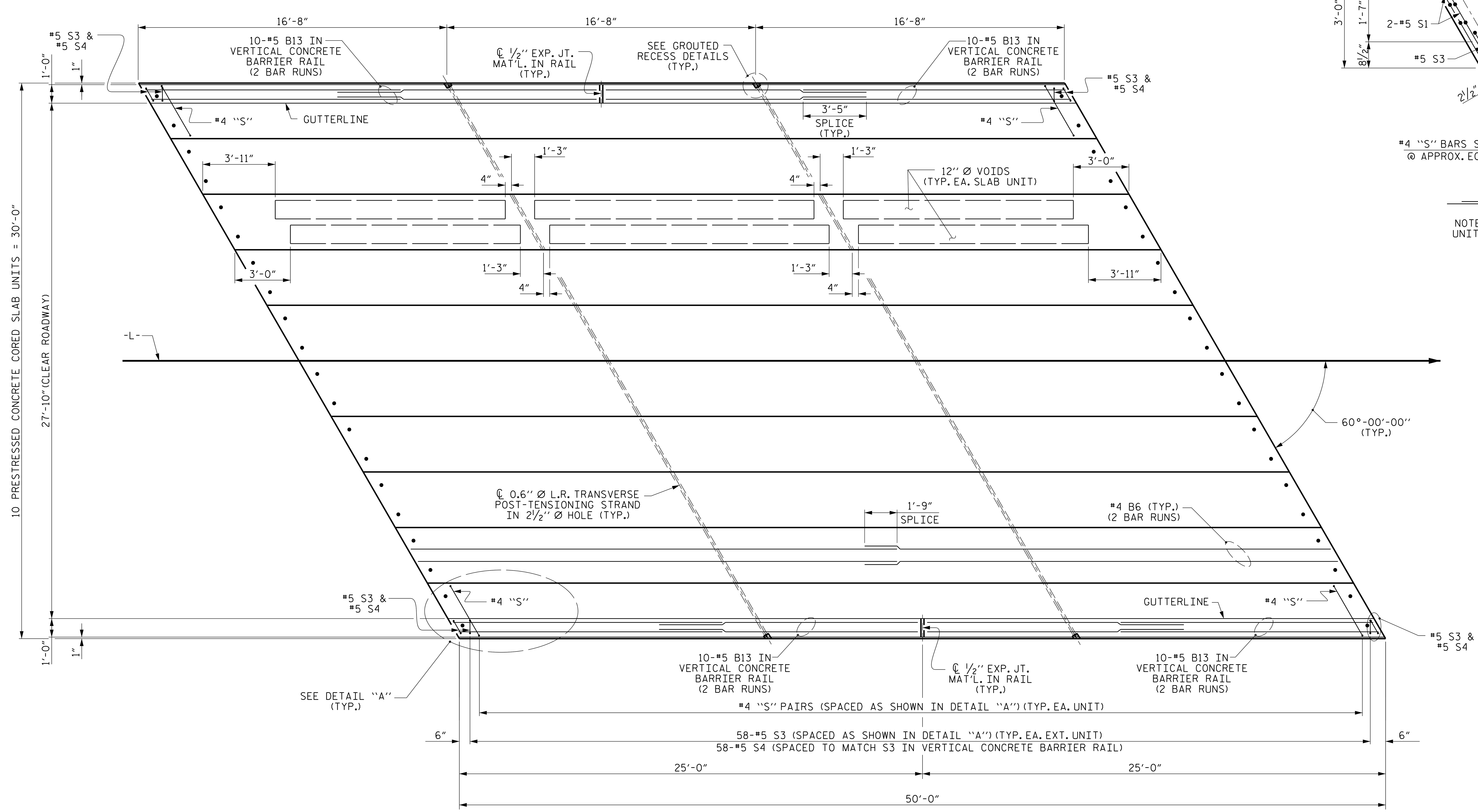
STD.NO. 21"PCS_30_60S_40L



DETAIL "A"

(SIMILAR EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.



PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 3 OF 4

PLAN OF UNIT

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS
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CALYXengineers.com
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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19801 L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
2/13/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 50′ UNIT
27′-10″ CLEAR ROADWAY
60° SKEW

ASSEMBLED BY :	W. B. ALLEN	DATE :	3/17	
CHECKED BY :	Z. H. BROWN	DATE :	6/17	
DRAWN BY : DGE 3/09	REV. 12/5/11	MAA/AAC		
CHECKED BY : BCH 3/09	REV. 8/14	MAA/TMG		

REVISIONS

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

SHEET NO. S-7
TOTAL SHEETS 18

STD. NO. 21″ PCS_30_60S_50L

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BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	40′ UNIT					
✳B11	80	80	#5	STR	11′-9″	980
✳S4	100	100	#5	2	7′-2″	747
✳EPOXY COATED REINFORCING STEEL				LBS.		1727
CLASS AA CONCRETE				CU.YDS.		10.2
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN.FT.		80.29

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	50′ UNIT					
✳B13	80	80	#5	STR	14′-3″	1189
✳S4	120	120	#5	2	7′-2″	897
✳EPOXY COATED REINFORCING STEEL				LBS.		2086
CLASS AA CONCRETE				CU.YDS.		12.8
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN.FT.		100.29

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
40′ UNITS	2″	3′-8″
50′ UNITS	1⅝″	3′-7⅝″

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
40′ UNIT			
EXTERIOR C.S.	2	40′-0″	80′-0″
INTERIOR C.S.	8	40′-0″	320′-0″
TOTAL	10		400′-0″

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
50′ UNIT			
EXTERIOR C.S.	2	50′-0″	100′-0″
INTERIOR C.S.	8	50′-0″	400′-0″
TOTAL	10		500′-0″

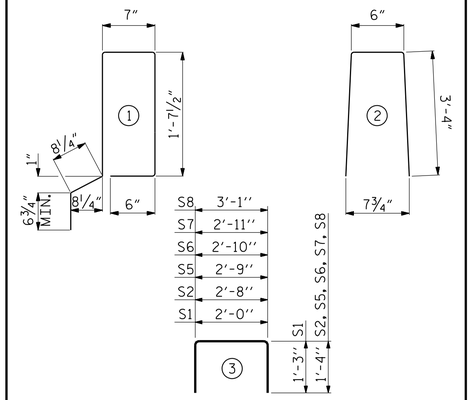
BILL OF MATERIAL FOR ONE 40′ CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B4	4	#4	STR	20′-9″	55	20′-9″	55
S1	8	#5	3	4′-6″	38	4′-6″	38
S2	82	#4	3	5′-4″	292	5′-4″	292
✳S3	50	#5	1	5′-7″	291		
S5	4	#4	3	5′-5″	14	5′-5″	14
S6	4	#4	3	5′-6″	15	5′-6″	15
S7	4	#4	3	5′-7″	15	5′-7″	15
S8	4	#4	3	5′-9″	15	5′-9″	15
REINFORCING STEEL				LBS.	444		444
✳EPOXY COATED REINFORCING STEEL				LBS.	291		
5000 P.S.I. CONCRETE				CU. YDS.	5.9		5.9
0.6″ Ø L.R. STRANDS				No.	13		13

BILL OF MATERIAL FOR ONE 50′ CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B6	4	#4	STR	25′-9″	69	25′-9″	69
S1	8	#5	3	4′-6″	38	4′-6″	38
S2	102	#4	3	5′-4″	363	5′-4″	363
✳S3	60	#5	1	5′-7″	349		
S5	4	#4	3	5′-5″	14	5′-5″	14
S6	4	#4	3	5′-6″	15	5′-6″	15
S7	4	#4	3	5′-7″	15	5′-7″	15
S8	4	#4	3	5′-9″	15	5′-9″	15
REINFORCING STEEL				LBS.	529		529
✳EPOXY COATED REINFORCING STEEL				LBS.	349		
6500 P.S.I. CONCRETE				CU. YDS.	7.3		7.3
0.6″ Ø L.R. STRANDS				No.	19		19

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

DEAD LOAD DEFLECTION AND CAMBER

	3′-0″ × 1′-9″
40′ CORED SLAB UNIT	0.6″ Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	⅞″ ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	⅛″ ↓
FINAL CAMBER	¾″ ↑
	3′-0″ × 1′-9″
50′ CORED SLAB UNIT	0.6″ Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1½″ ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	⅜″ ↓
FINAL CAMBER	1⅛″ ↑

✳✳ INCLUDES FUTURE WEARING SURFACE

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½″Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½″ IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

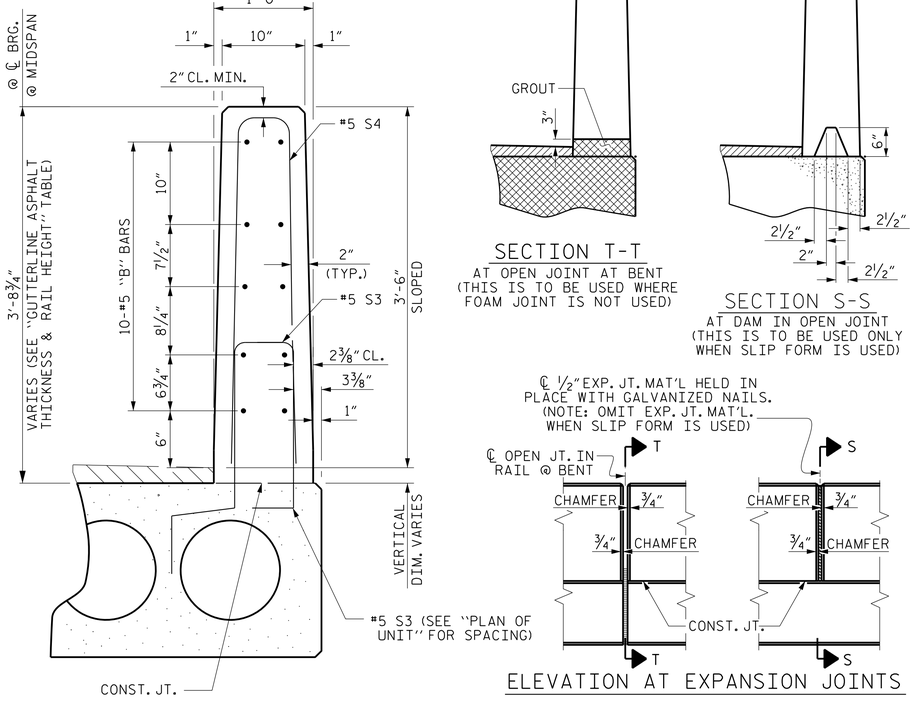
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

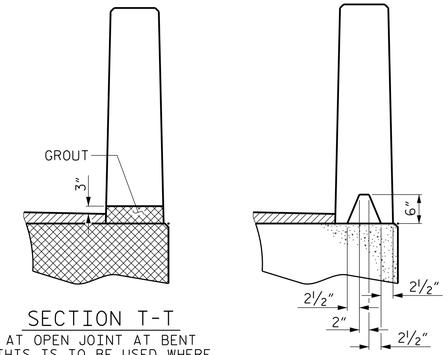
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4′-0″ CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.



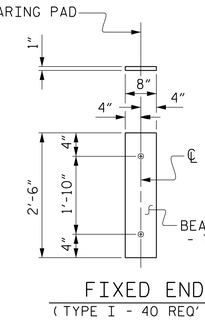
VERTICAL CONCRETE BARRIER RAIL SECTION



SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

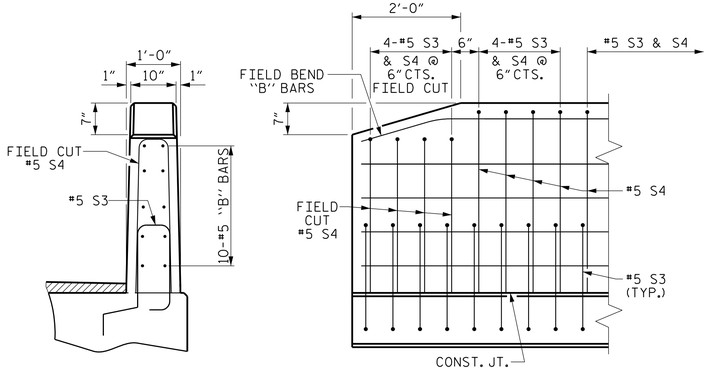
ELEVATION AT EXPANSION JOINTS



FIXED END
(TYPE I - 40 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.



END VIEW

SIDE VIEW

END OF RAIL DETAILS

GRADE 270 STRANDS

	0.6″Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

CONCRETE RELEASE STRENGTH

UNIT	PSI
40′ UNITS	4000
50′ UNITS	4900

PLANS PREPARED BY:

CALYX
ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 4 OF 4

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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL SEAL 037787 ENGINEER L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
2/13/2018

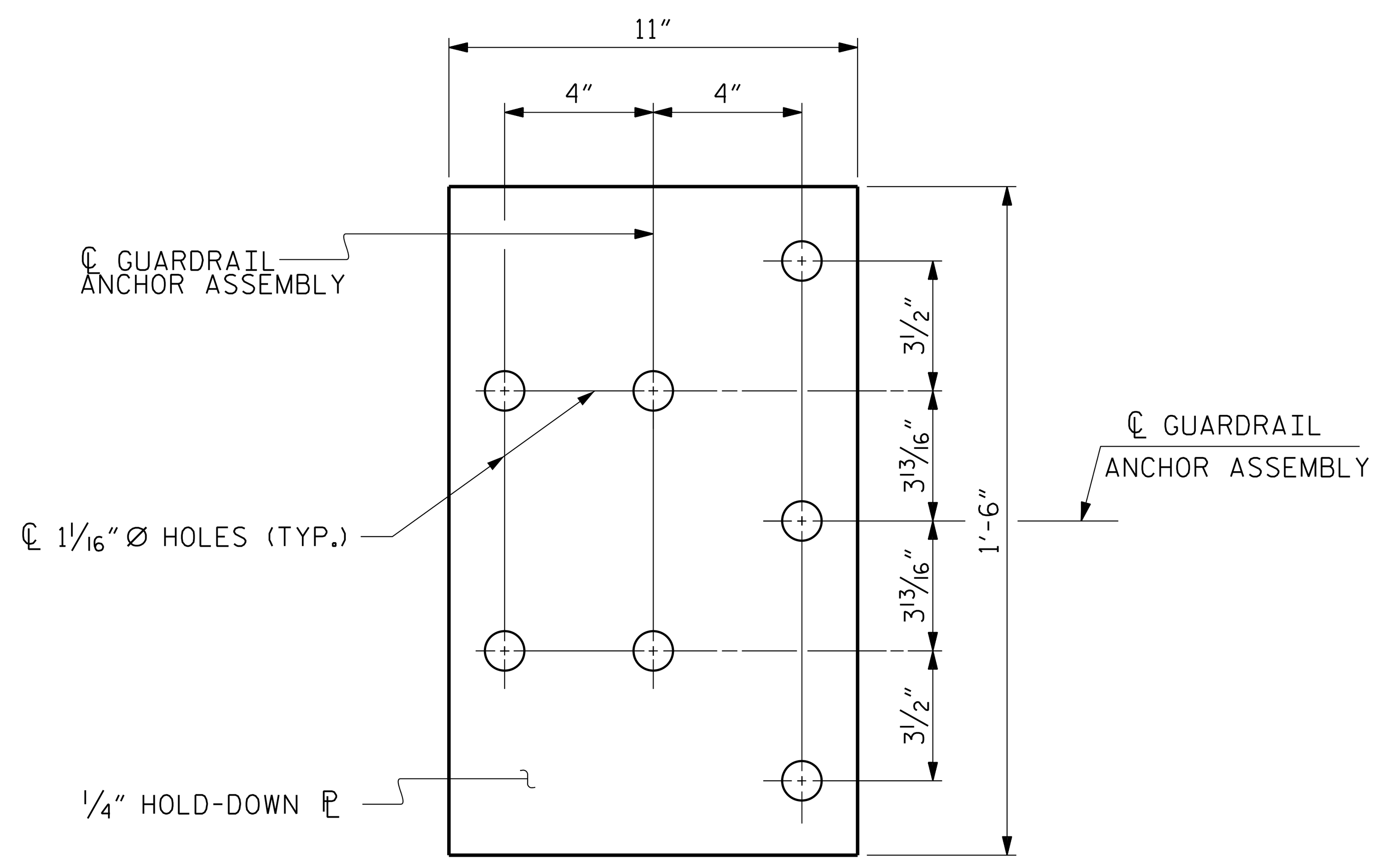
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3′-0″ X 1′-9″
PRESTRESSED CONCRETE
CORED SLAB UNIT
60° SKEW

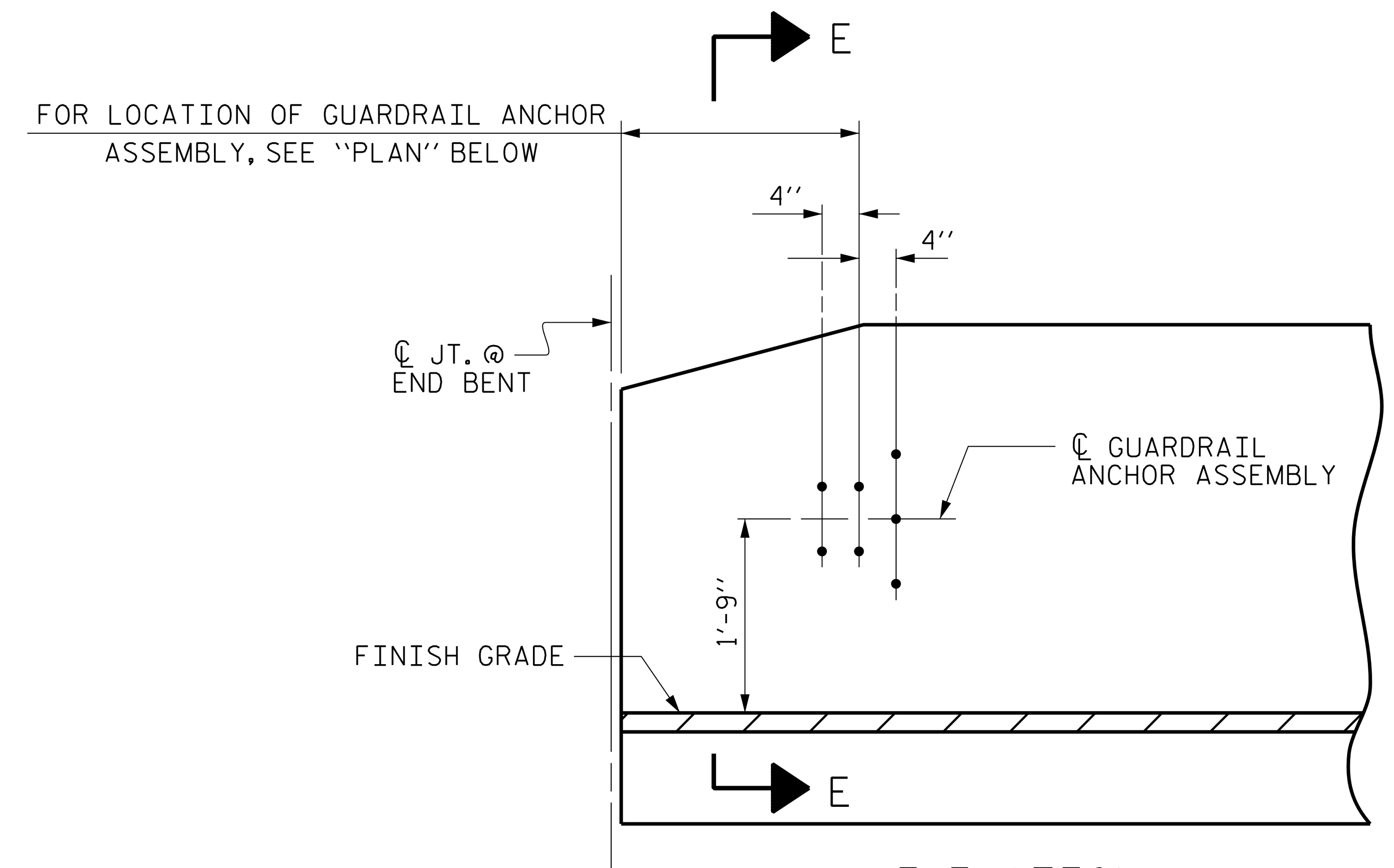
ASSEMBLED BY : W. B. ALLEN	DATE : 3/17
CHECKED BY : Z. H. BROWN	DATE : 6/17
DRAWN BY : DGE 5/09	REV. 11/14 MAA/TMG
CHECKED BY : BCH 6/09	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			18

STD. NO. 21′ PCS3_30_60S



PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD DOWN PLATE AND 7 - ⅞" Ø 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.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

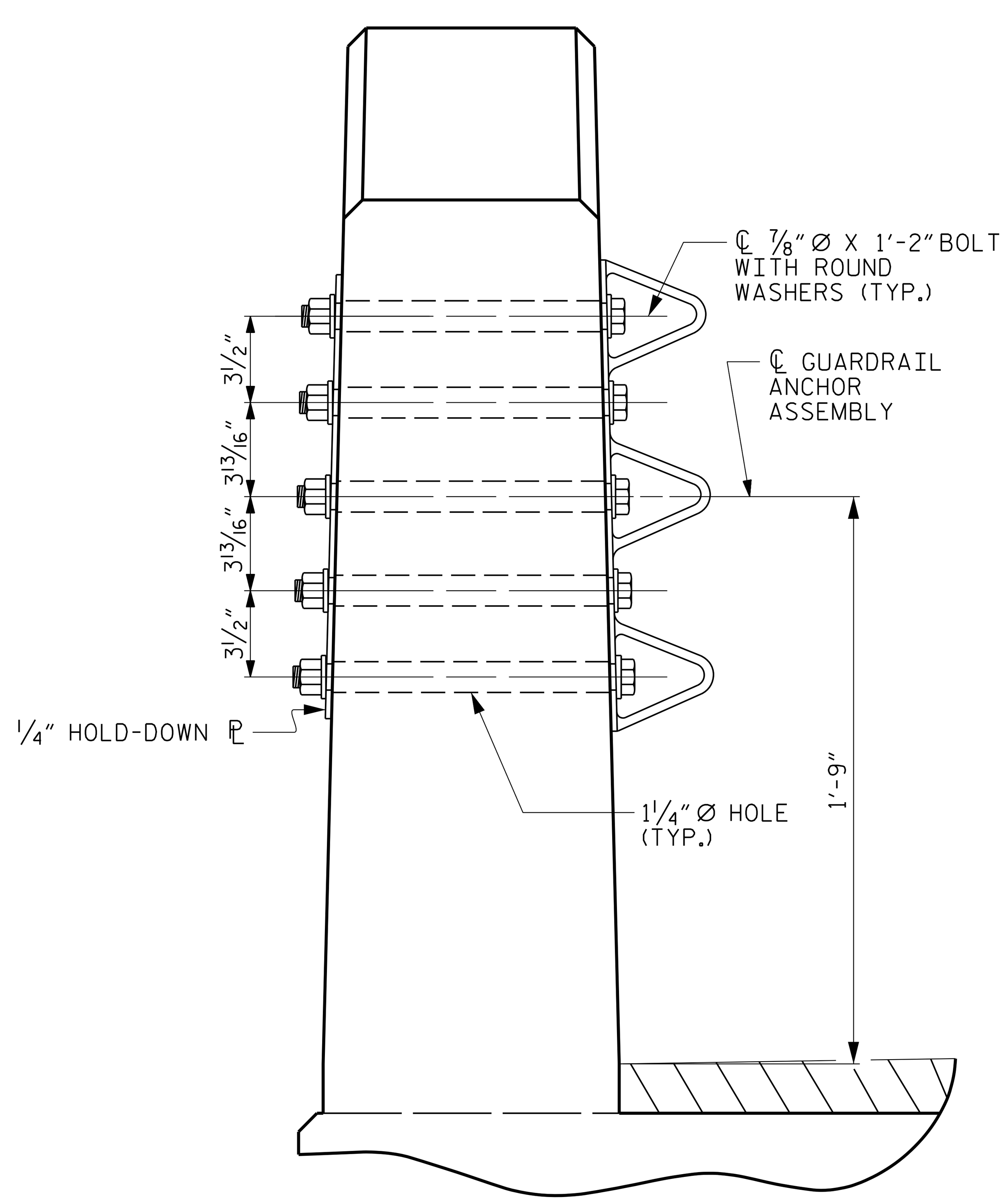
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

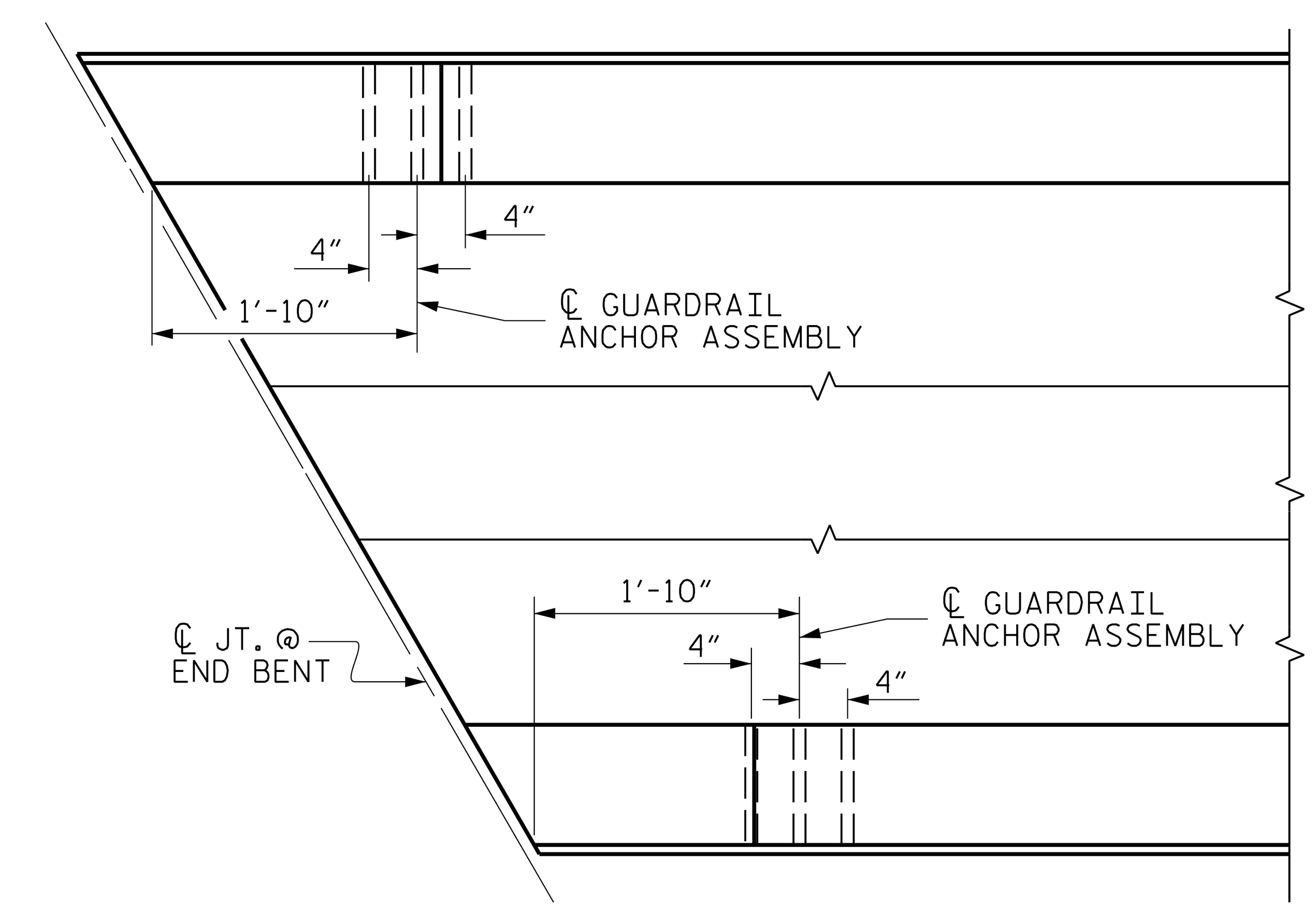
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 ¼" Ø 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.



SECTION E-E

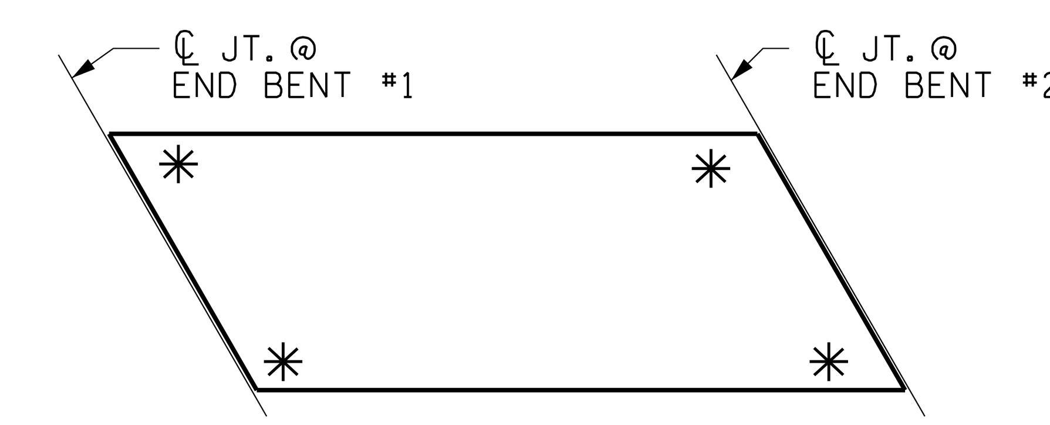
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

2/13/2018

PLANS PREPARED BY:
CALYX
ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-9
1			3				TOTAL SHEETS
2			4				18

STD. NO. GRA3

ASSEMBLED BY : W. B. ALLEN	DATE : 2/18		
CHECKED BY : Z. H. BROWN	DATE : 2/18		
DRAWN BY : MAA 5/10	REV. 6/13	MAA/GM	
CHECKED BY : GM 5/10	REV. 1/15	MAA/TMG	
	REV. 12/17	MAA/THC	

2/6/2018 8:11:46 AM R:\Structures\17BP.1.R.84_SMU_GR_070034.dgn

NOTES

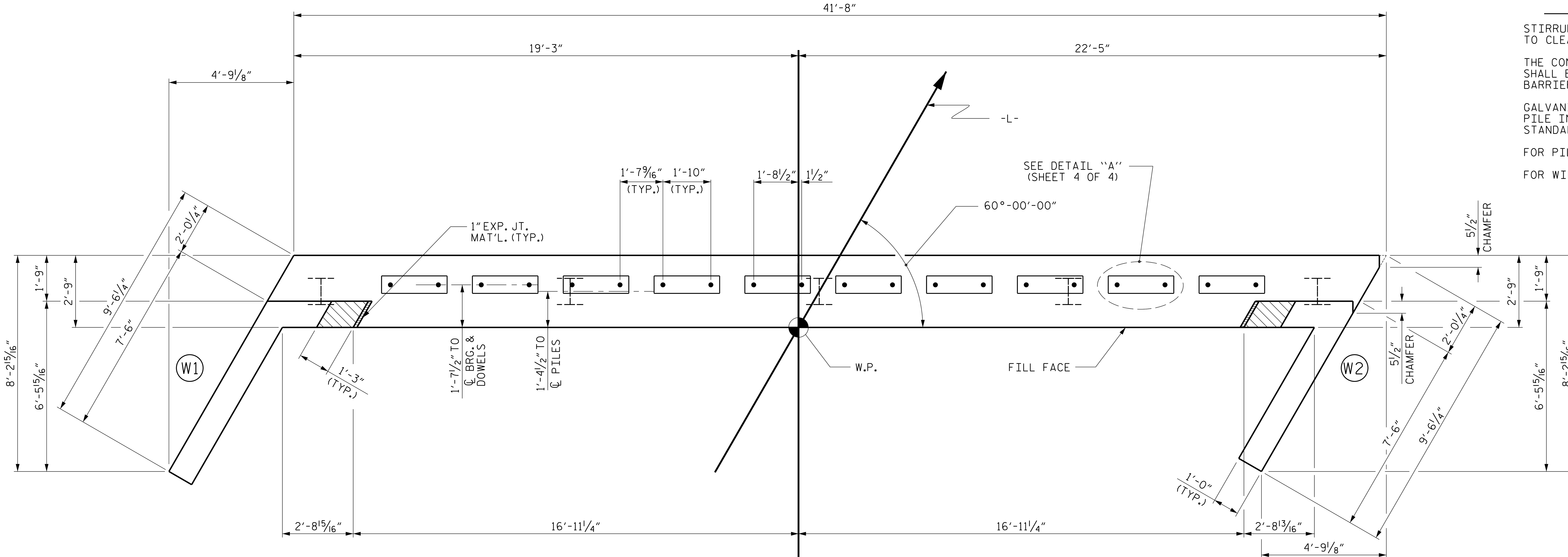
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

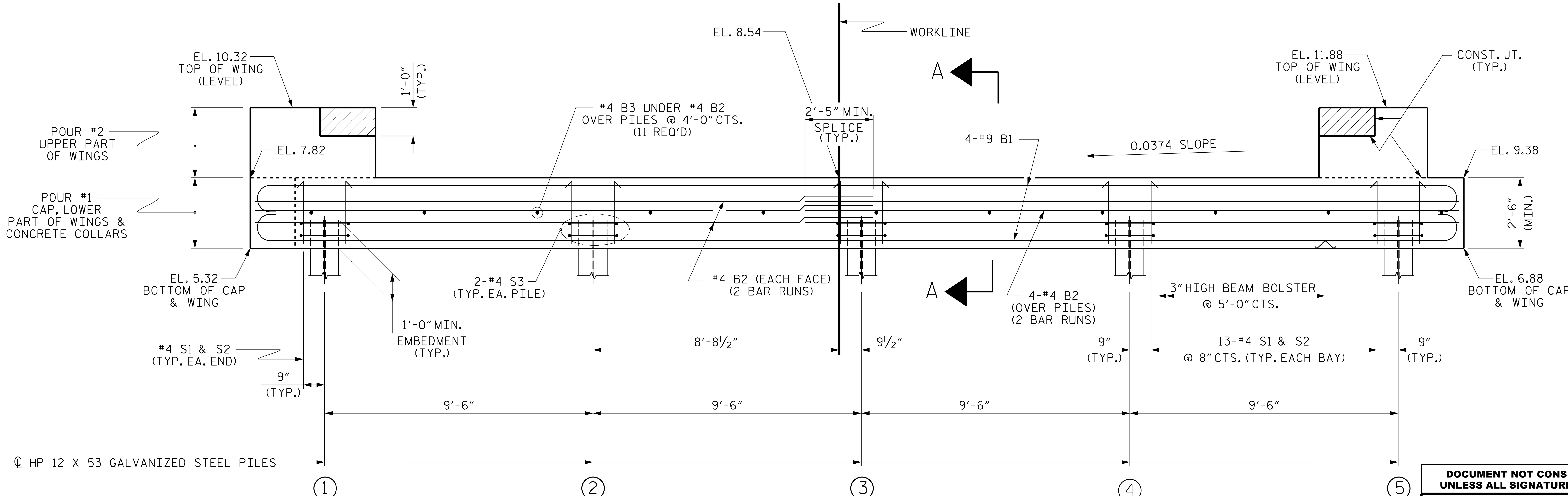
GALVANIZE THE FULL LENGTH OF EACH END BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.

TOP OF PILE ELEVATIONS	
1	6.41
2	6.76
3	7.12
4	7.47
5	7.83

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15067 L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
72F7B37...
2/13/2018

PLANS PREPARED BY:
CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-10
1			3			TOTAL SHEETS	18
2			4				

ASSEMBLED BY : W. B. ALLEN	DATE : 3/17		
CHECKED BY : Z. H. BROWN	DATE : 6/17		
DRAWN BY : DGE 01/10	REV. 4/15	MAA/TMG	
CHECKED BY : MKT 01/10			

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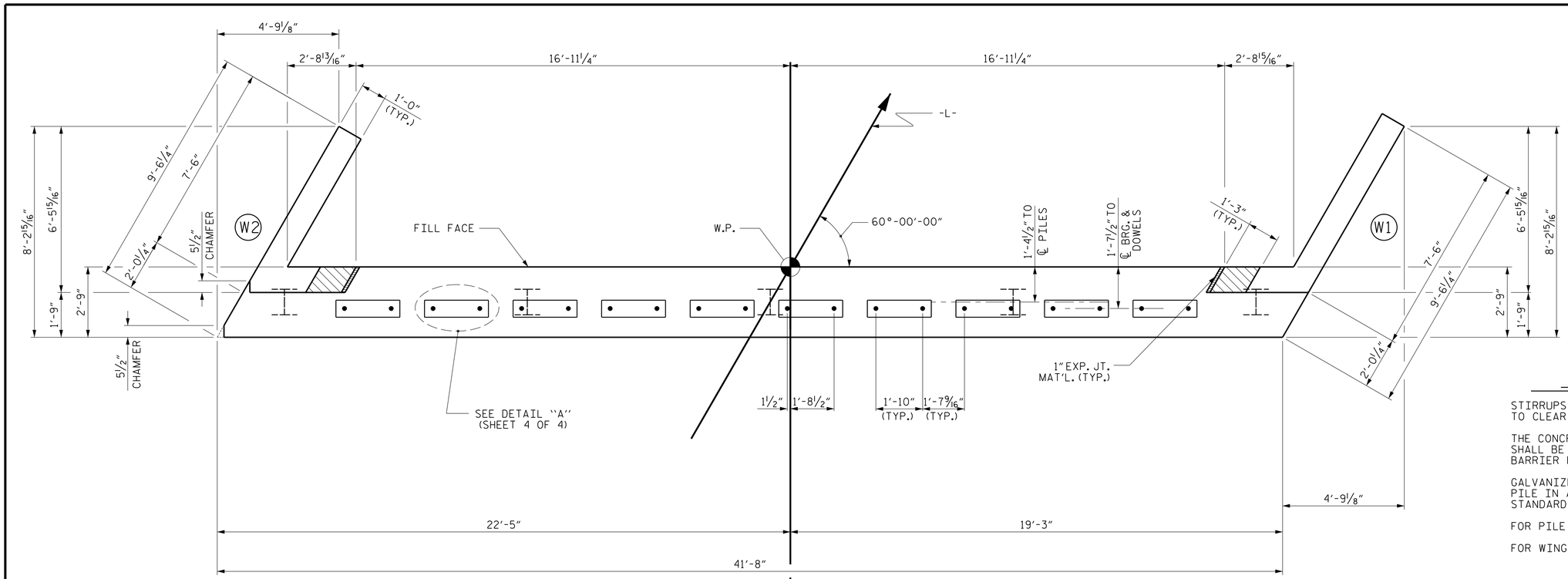
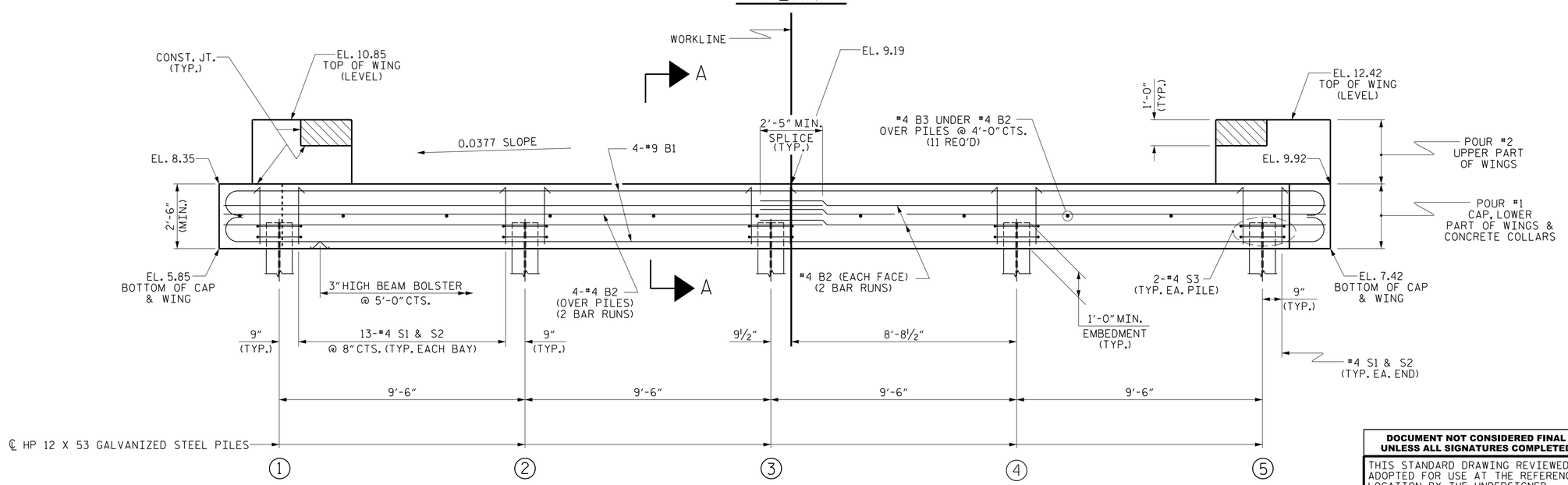
STD. NO. EB_30_60S



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

GALVANIZE THE FULL LENGTH OF EACH END BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS	
1	6.94
2	7.30
3	7.65
4	8.01
5	8.37

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 2 OF 4

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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN
Docusigned by: L Kevin Austin
2/13/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			18

ASSEMBLED BY :	W. B. ALLEN	DATE :	3/17
CHECKED BY :	Z. H. BROWN	DATE :	6/17
DRAWN BY :	DGE 01/10	REV. 4/15	MAA/TMG
CHECKED BY :	MKT 01/10		

2/6/2018 8:06:15 AM R:\Structures\17BP.1.R.84_SMU_E2_070034.dgn

STD. NO. EB_30_60S

WING DETAILS

ASSEMBLED BY : W. B. ALLEN	DATE : 3/17		
CHECKED BY : Z. H. BROWN	DATE : 6/17		
DRAWN BY : DGE 12/09	REV. 4/15	MAA/TMG	
CHECKED BY : MKT 01/10			

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — L. KEVIN AUSTIN
DocuSigned by: L. Kevin Austin
2/13/2018

PROJECT NO. 17BP.1.R.84
BERTIE COUNTY
STATION: 15+26.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT
WING DETAILS

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-12
1			3			TOTAL SHEETS	18
2			4				

STD. NO. EB_30_60S

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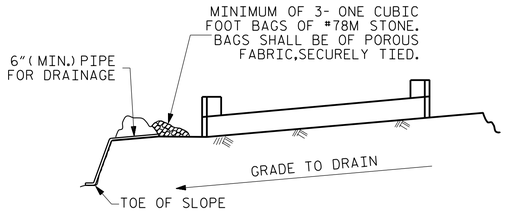
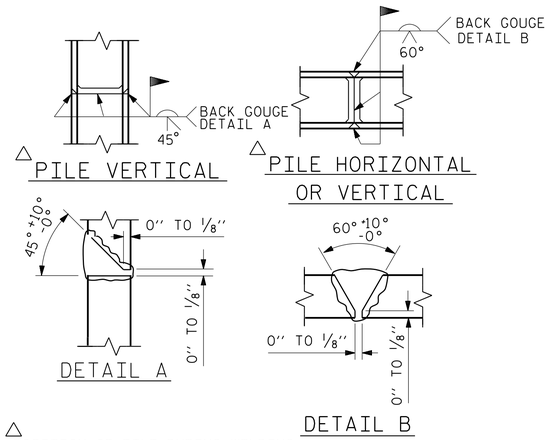


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

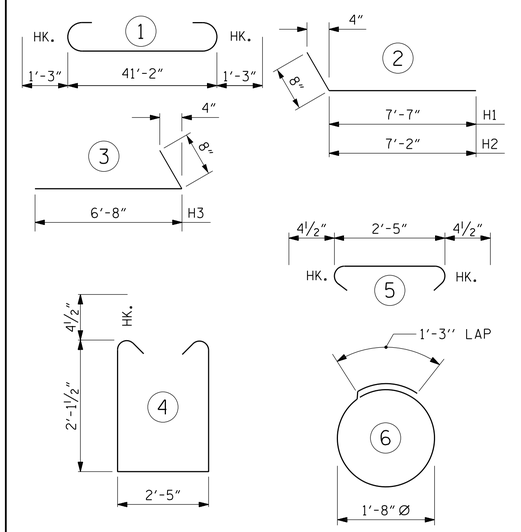
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 GALVANIZED STEEL PILES NO: 5 LIN. FT.= 300	HP 12 X 53 GALVANIZED STEEL PILES NO: 5 LIN. FT.= 375
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 GALVANIZED STEEL PILES NO: 5	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 GALVANIZED STEEL PILES NO: 5
PILE REDRIVES NO: 3	PILE REDRIVES NO: 3

BILL OF MATERIAL

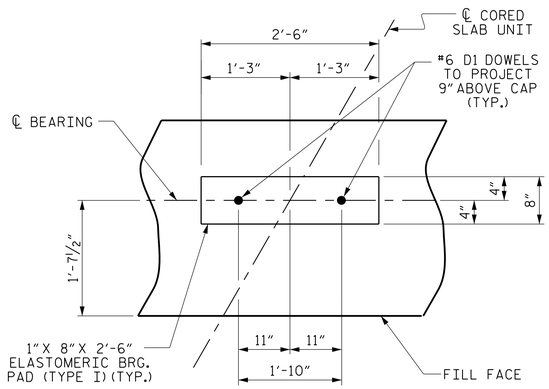
FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	43'-8"	1188
B2	16	#4	STR	21'-11"	234
B3	11	#4	STR	2'-5"	18
D1	20	#6	STR	1'-6"	45
H1	6	#4	2	8'-3"	33
H2	6	#4	2	7'-10"	31
H3	12	#4	3	7'-4"	59
K1	12	#4	STR	3'-3"	26
S1	54	#4	4	7'-5"	268
S2	54	#4	5	3'-2"	114
S3	10	#4	6	6'-6"	43
V1	47	#4	STR	4'-8"	147

REINFORCING STEEL (FOR ONE END BENT) 2206 LBS.

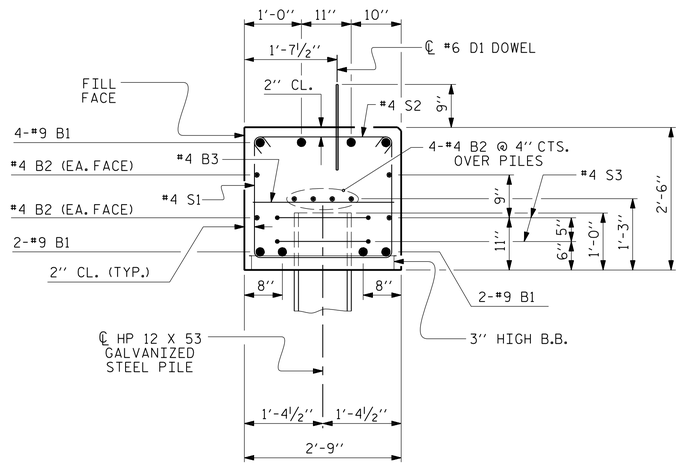
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1	CAP & LOWER PART OF WINGS	11.8 C.Y.
POUR #2	UPPER PART OF WINGS	1.9 C.Y.
TOTAL CLASS A CONCRETE		13.7 C.Y.



DETAIL "A"

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



SECTION A-A

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			18

STD. NO. EB_30_60S

PLANS PREPARED BY:
CALYX ENGINEERS + CONSULTANTS
6750 TRYON ROAD
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phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027878 KEVIN AUSTIN
Designed by: Kevin Austin
2/13/2018

ASSEMBLED BY :	W. B. ALLEN	DATE :	3/17
CHECKED BY :	Z. H. BROWN	DATE :	6/17
DRAWN BY :	DGE 12/09	REV. 4/17	MAA/THC
CHECKED BY :	MKT 01/10		

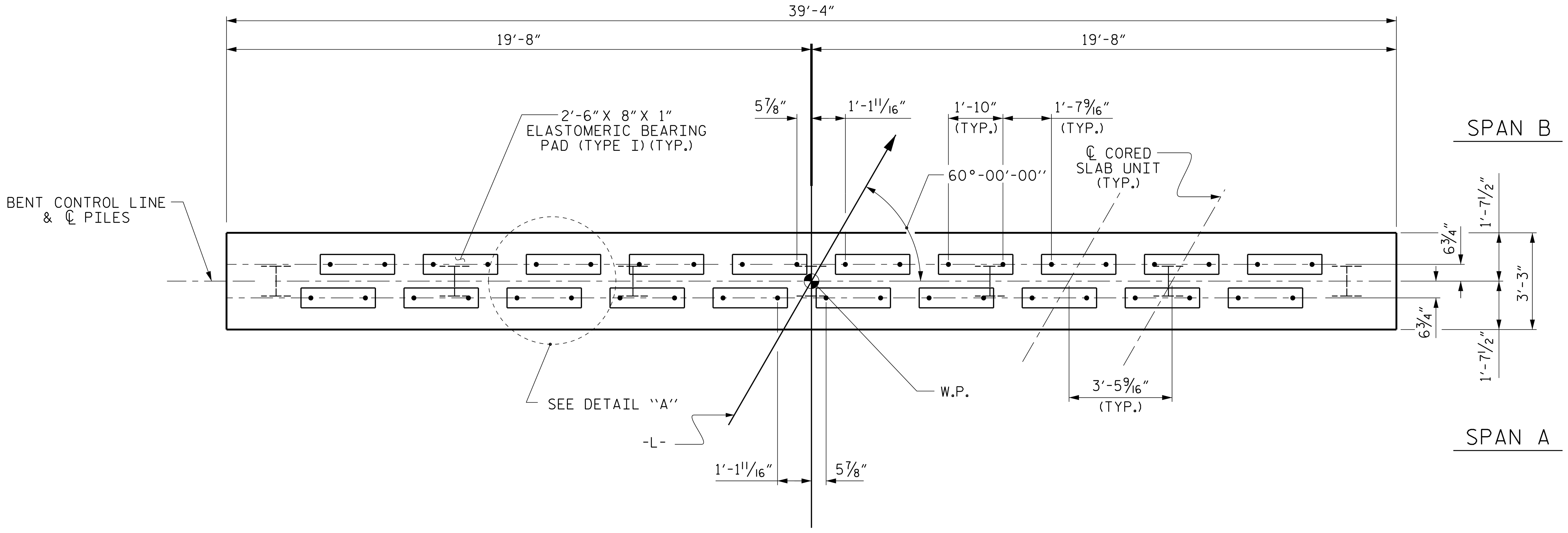
2/6/2018 8:06:18 AM R:\Structures\17BP.1.R.84_SMU.E4.070034.dgn

NOTES

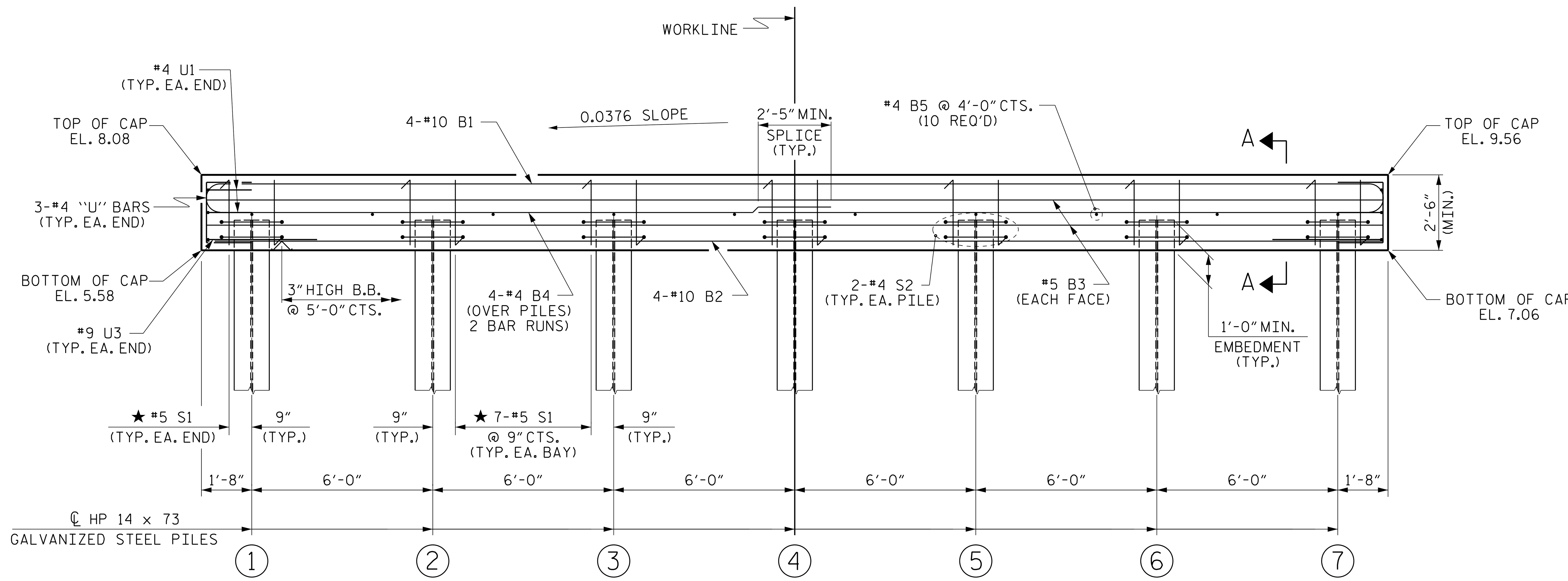
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE FULL LENGTH OF EACH INTERIOR BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

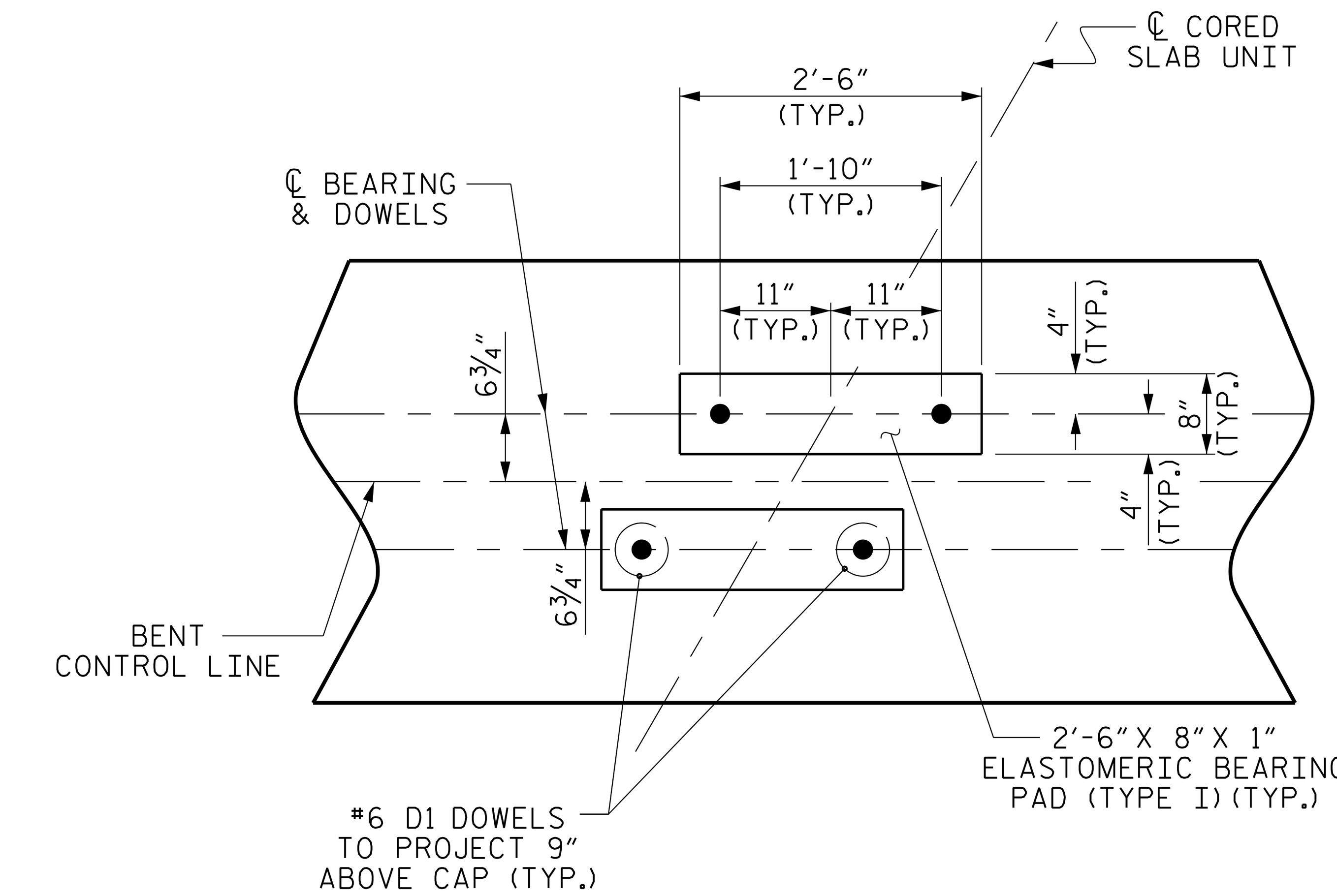


PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

TOP OF PILE ELEVATIONS	
1	6.67
2	6.89
3	7.12
4	7.34
5	7.57
6	7.79
7	8.02

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

SHEET 1 OF 2

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NORTH CAROLINA PROFESSIONAL ENGINEER KEVIN AUSTIN — DocuSigned by: Kevin Austin

2/13/2018

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS
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phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

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

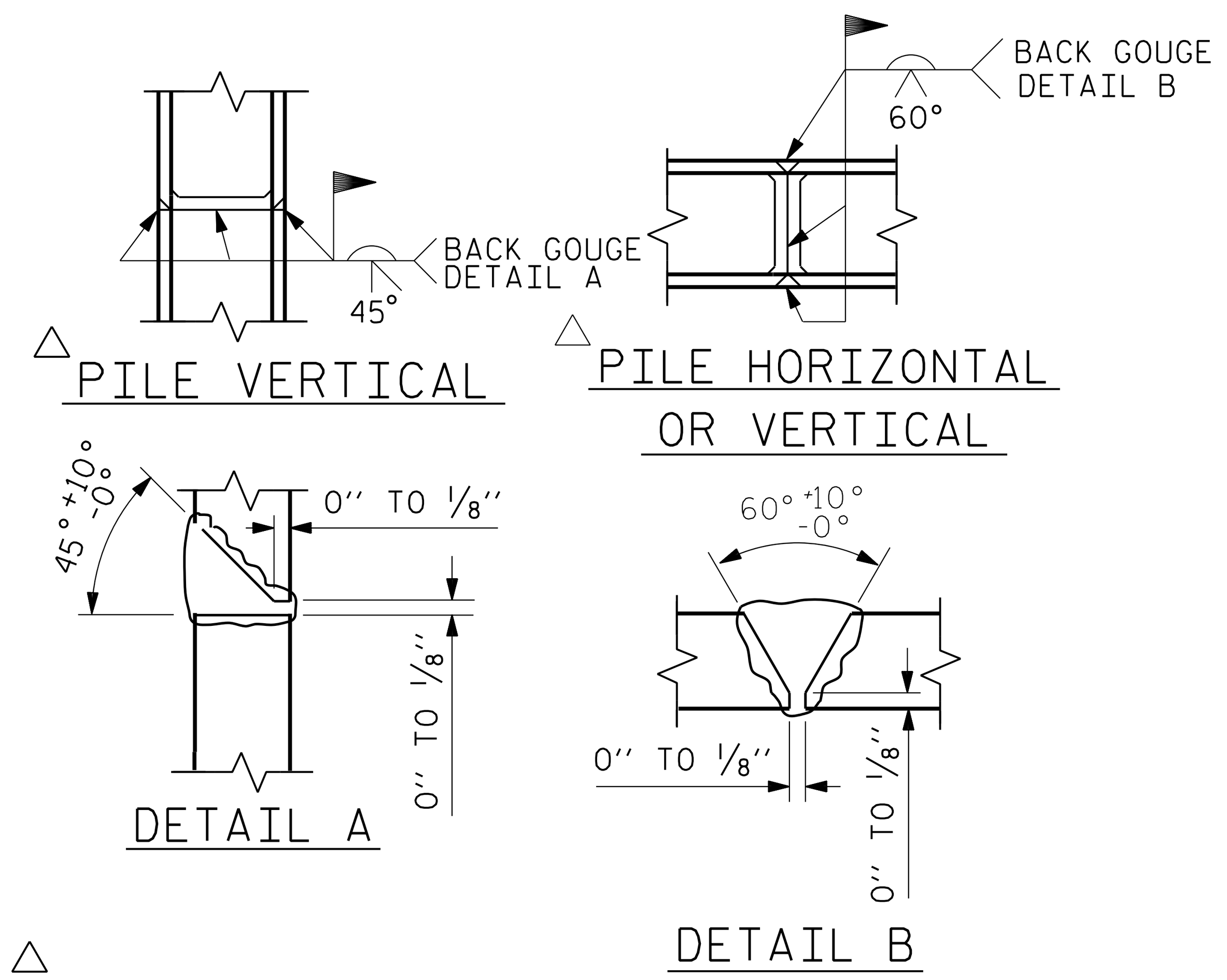
SHEET NO. S-14

TOTAL SHEETS 18

ASSEMBLED BY : W. B. ALLEN	DATE : 6/17		
CHECKED BY : Z. H. BROWN	DATE : 6/17		
DRAWN BY : DGE 05/10	REV. 6/17	MAA/THC	
CHECKED BY : MKT 05/10			

2/6/2018 8:06:09 AM R:\Structures\17BP.1.R.84_SMU_Bi_070034.dgn

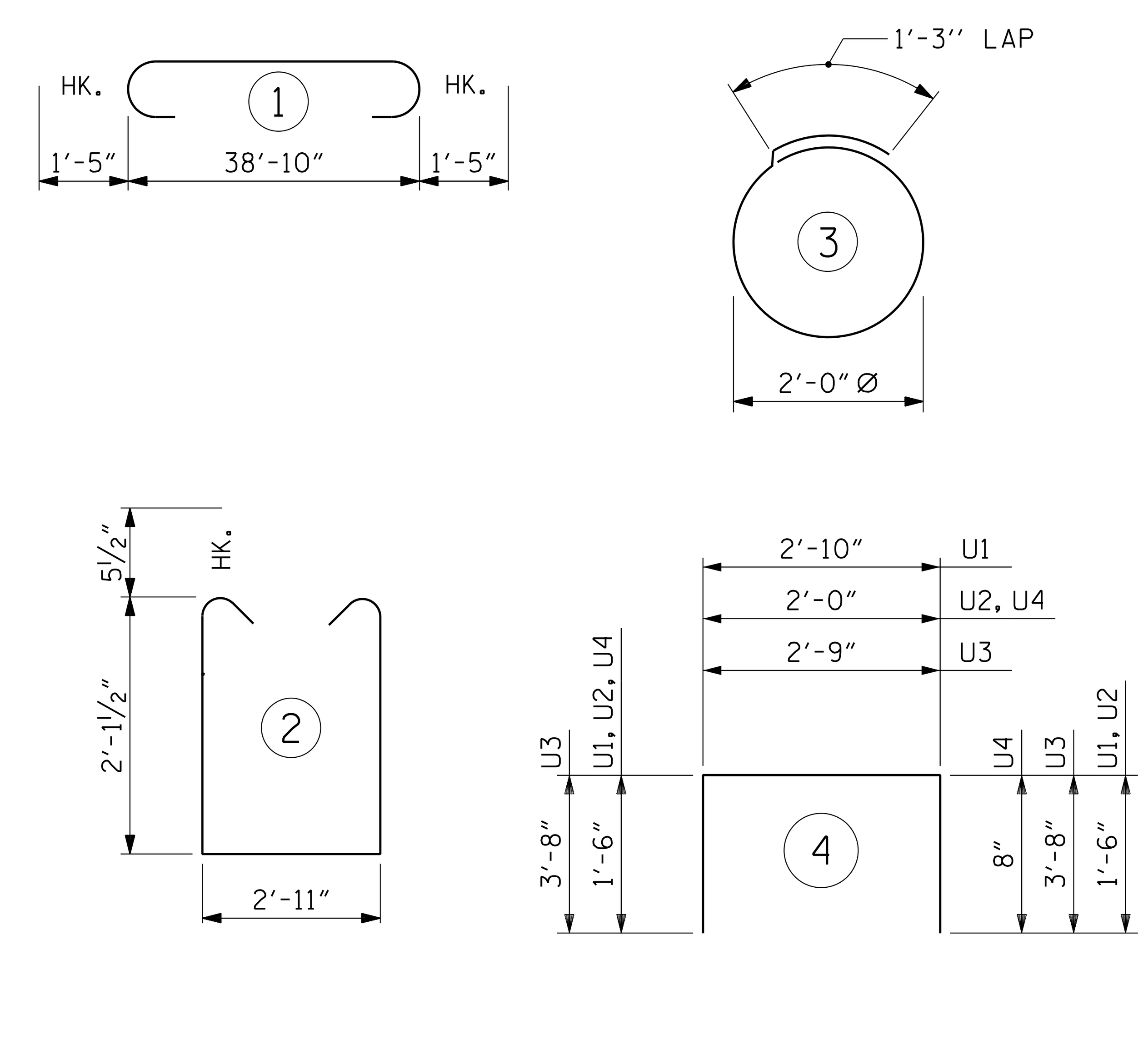
STD. NO. 14″HP_BT_30_60S_<60′



POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	41'-8"	717
B2	4	#10	STR	39'-0"	671
B3	4	#5	STR	39'-0"	163
B4	8	#4	STR	20'-9"	111
B5	10	#4	STR	2'-11"	19
D1	40	#6	STR	1'-6"	90
S1	44	#5	2	8'-1"	371
S2	14	#4	3	7'-7"	71
U1	4	#4	4	5'-10"	16
U2	4	#4	4	5'-0"	13
U3	2	#9	4	10'-1"	69
U4	2	#4	4	4'-2"	6

REINFORCING STEEL
(FOR ONE BENT) 2317 LBS

CLASS A CONCRETE BREAKDOWN
(FOR ONE BENT)

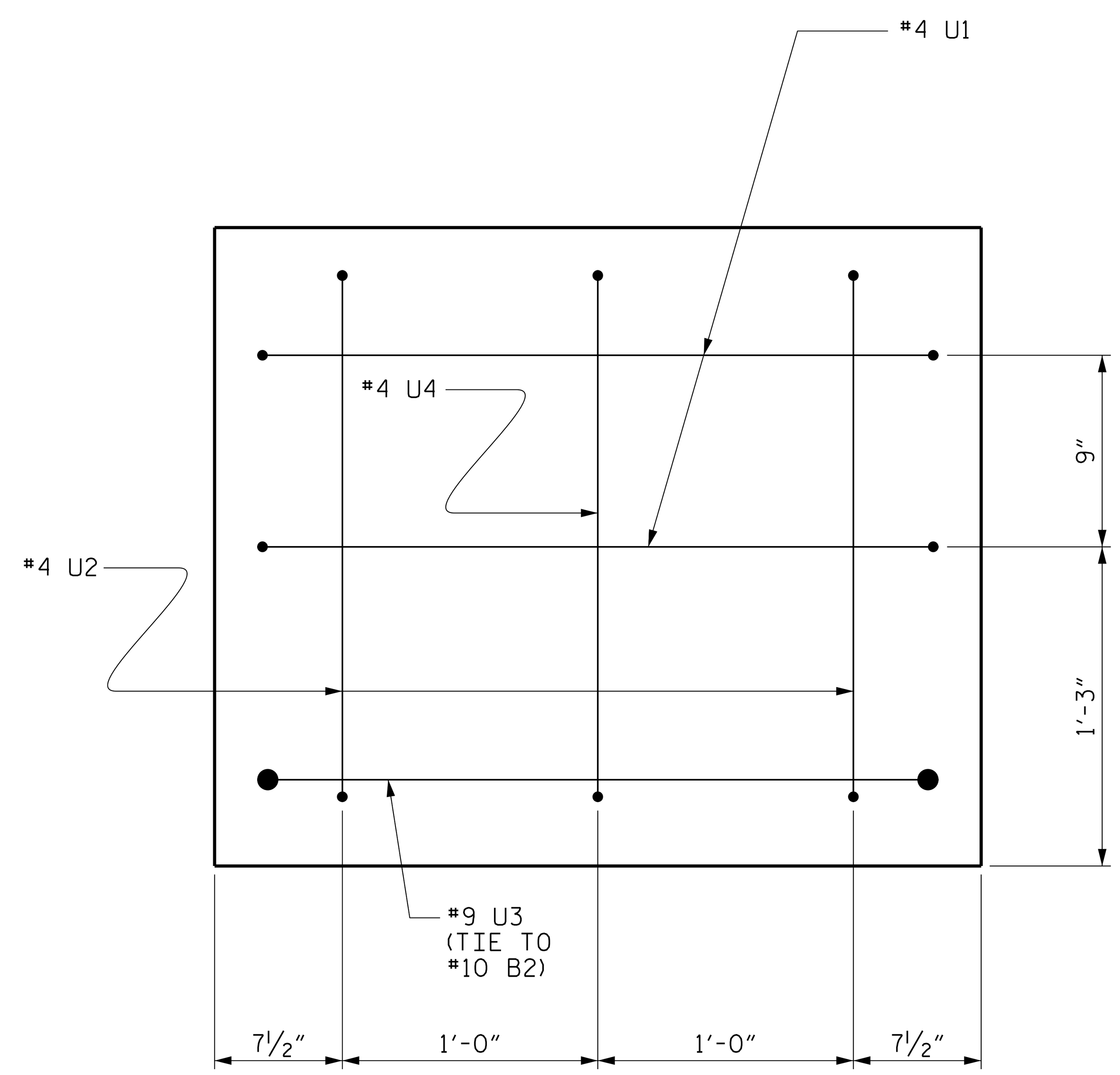
TOTAL CLASS A CONCRETE 11.8 C.Y.

HP 14 X 73 GALVANIZED STEEL PILES
(FOR ONE BENT)

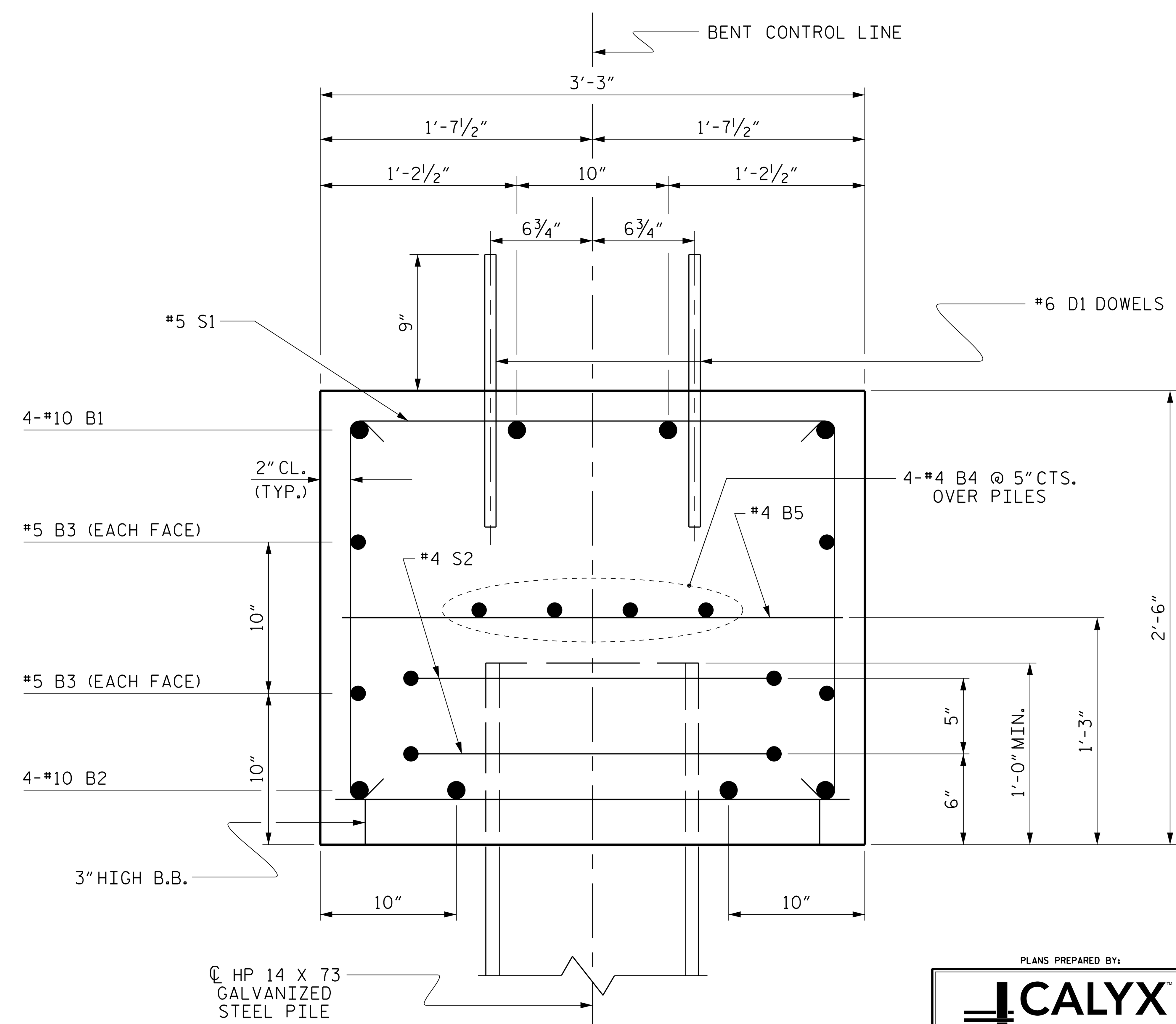
No. 7 LIN. FT. 700

PILE DRIVING EQUIPMENT SETUP FOR
HP 14 X 73 GALVANIZED STEEL PILES
(FOR ONE BENT)
NO: 7

PILE REDRIVES NO: 4



END OF CAP VIEW
(TYPICAL BOTH ENDS)



SECTION A-A

PROJECT NO. 17BP.1.R.84
BERTIE COUNTY
STATION: 15+26.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

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UNLESS ALL SIGNATURES COMPLETED

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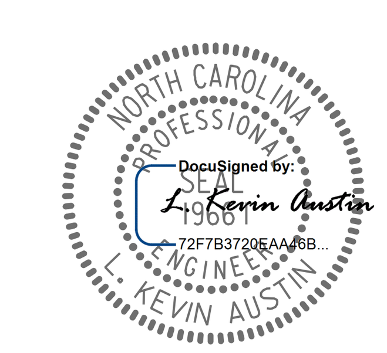

2/13/2018

PLANS PREPARED BY:
CALYX
ENGINEERS + CONSULTANTS
6750 TRYON ROAD
CARY, NC 27518
phone: 919.851.1912
CALYXengineers.com
NC License # F-1333

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

SHEET NO. S-15
TOTAL SHEETS 18

ASSEMBLED BY : W. B. ALLEN DATE : 6/17
CHECKED BY : Z. H. BROWN DATE : 6/17
DRAWN BY : DGE 05/10
CHECKED BY : MKT 05/10
REV. 6/17 MAA/THC

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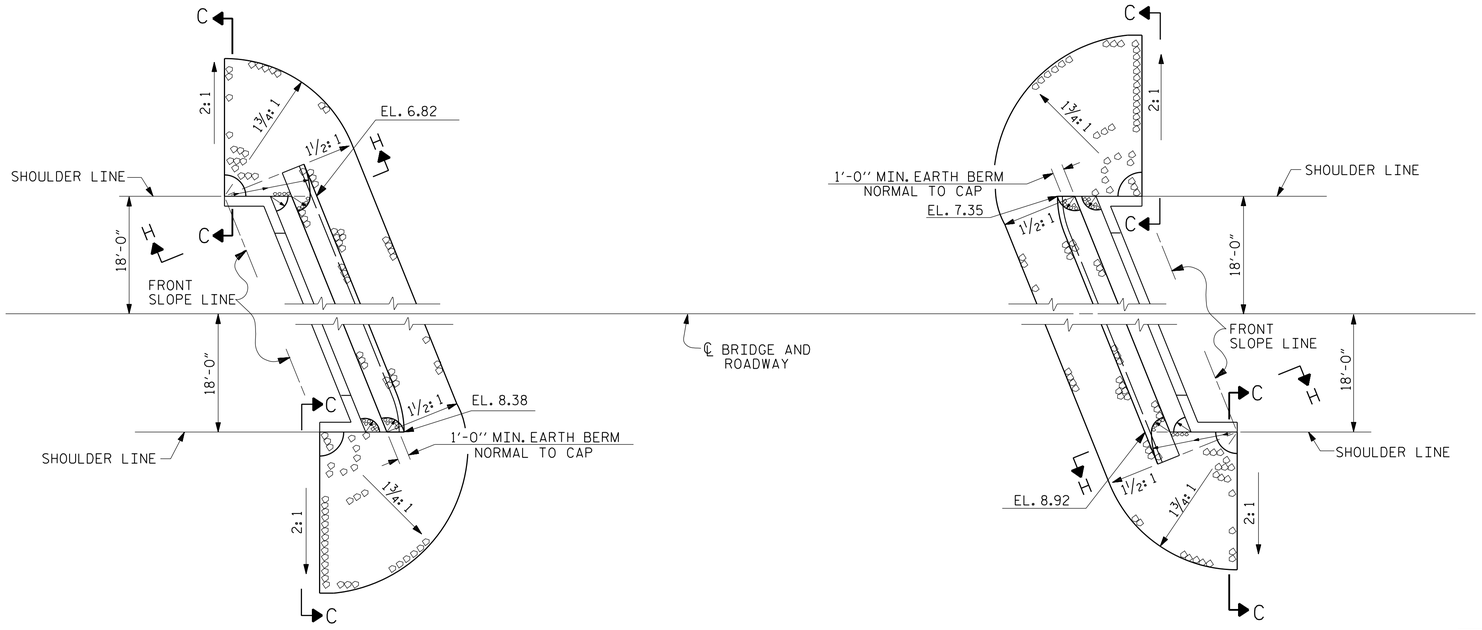
STD. NO. 14" HP_BT_30_60&120S_<60'

NOTES :

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



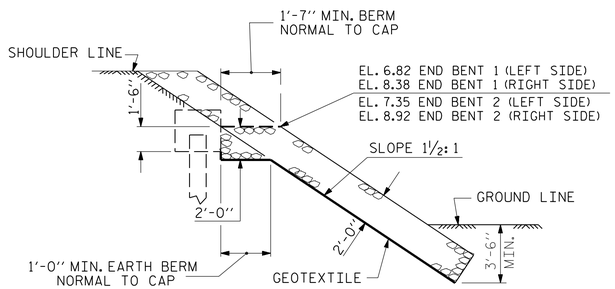
ESTIMATED QUANTITIES

BRIDGE @ STA. 15+26.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	55	62
END BENT 2	65	72

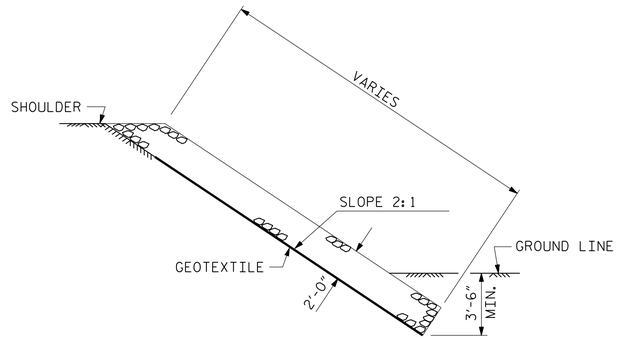
END BENT 1

END BENT 2

SHOULDER RIP RAP IS HIGHER THAN BERM RIP RAP



SECTION H-H



SECTION C-C

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

PLANS PREPARED BY:

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THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL SEAL 047781 ENGINEER KEVIN AUSTIN
Digitally signed by
2/13/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			18

ASSEMBLED BY : W. B. ALLEN	DATE : 6/17		
CHECKED BY : Z. H. BROWN	DATE : 6/17		
DRAWN BY : REK 1/84	REV. 5/1/06R	TLA/GM	
CHECKED BY : RDU 1/84	REV. 10/1/11	MAA/GM	
	REV. 12/21/11	MAA/GM	

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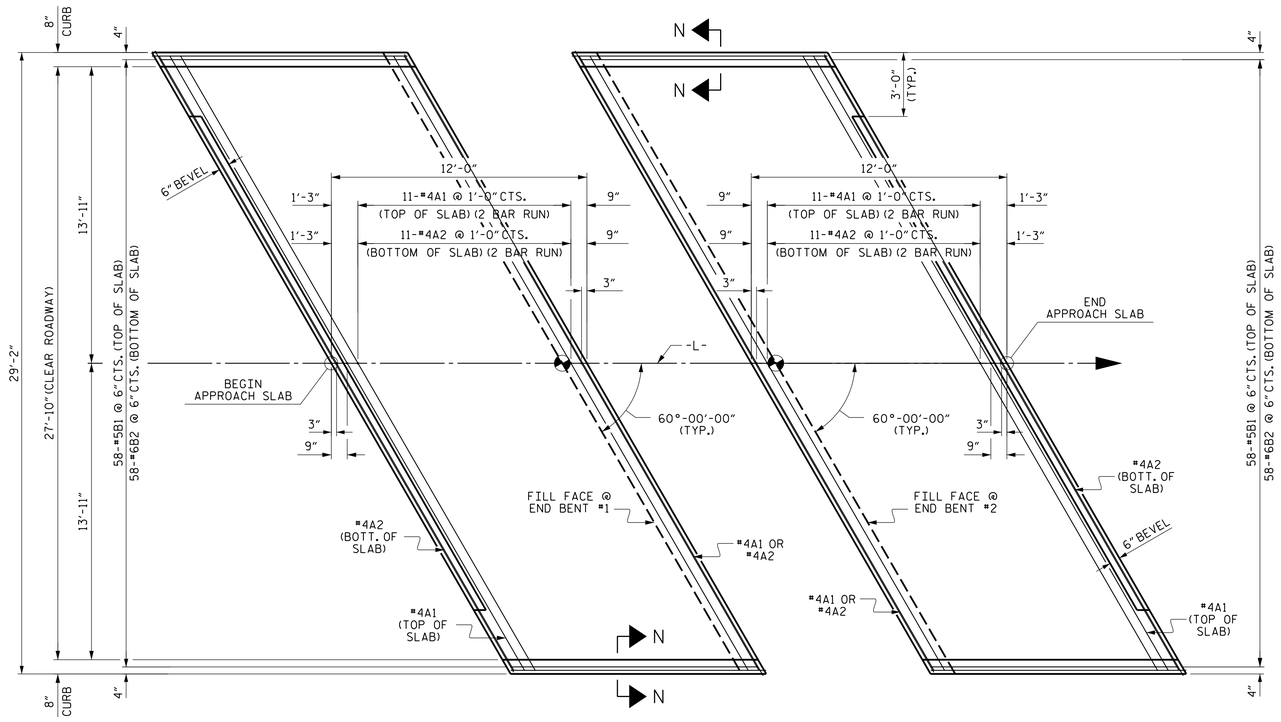
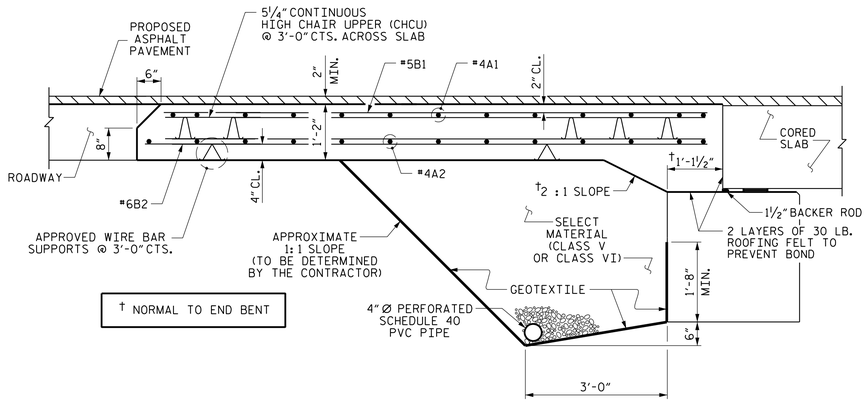
STD. NO. RR1



PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

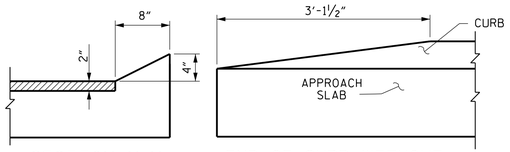
SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)



SECTION N-N END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

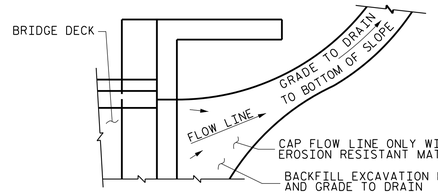
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

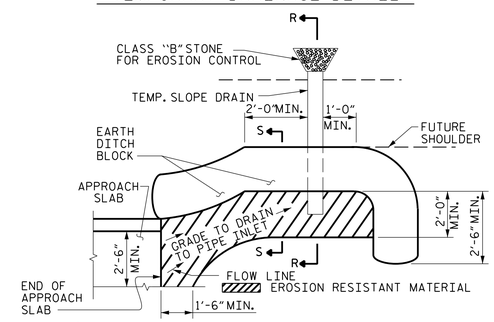
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



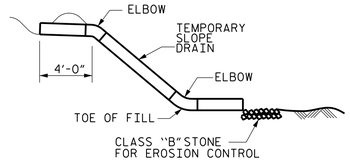
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

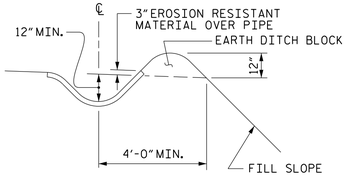


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	17'-8"	307
A2	26	#4	STR	17'-7"	305
* B1	58	#5	STR	11'-1"	670
B2	58	#6	STR	11'-7"	1009
REINFORCING STEEL				LBS.	1314
* EPOXY COATED REINFORCING STEEL				LBS.	977
CLASS AA CONCRETE				C.Y.	16.9

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	17'-8"	307
A2	26	#4	STR	17'-7"	305
* B1	58	#5	STR	11'-1"	670
B2	58	#6	STR	11'-7"	1009
REINFORCING STEEL				LBS.	1314
* EPOXY COATED REINFORCING STEEL				LBS.	977
CLASS AA CONCRETE				C.Y.	16.9

PROJECT NO. 17BP.1.R.84

BERTIE COUNTY

STATION: 15+26.00 -L-

PLANS PREPARED BY:

CALYX ENGINEERS + CONSULTANTS

6750 TRYON ROAD
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CALYXengineers.com

NC License # F-1333

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:

NORTH CAROLINA PROFESSIONAL ENGINEER L. KEVIN AUSTIN

Docusigned by: L. Kevin Austin

2/13/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 60° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			18

ASSEMBLED BY :	W. B. ALLEN	DATE :	3/17
CHECKED BY :	Z. H. BROWN	DATE :	6/17
DRAWN BY : SHS/MAA 5-09		REV. 12-17	MAA/THC
CHECKED BY : BCH 5-09			

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STD. NO. BAS_30_60S

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5⁄16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1⁄16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

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REV. 6-16-95 EEM (/) RGW REV. 5-7-03 RWW (/) JTE REV. 10-1-11 MAA (/) GM
REV. 8-16-99 RWW (/) LES REV. 5-1-06 TLA (/) GM REV. 12-17 MAA (/) THC

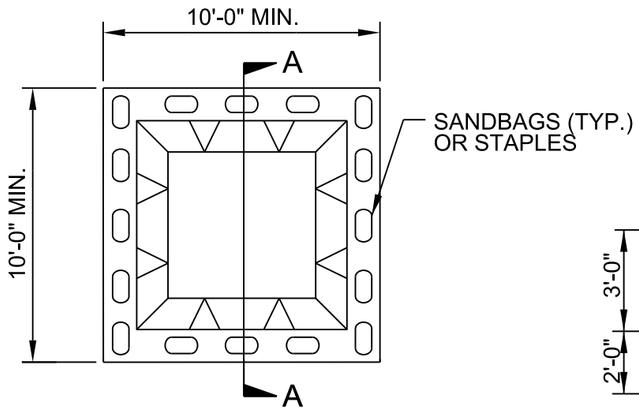
ENGLISH
JANUARY, 1990

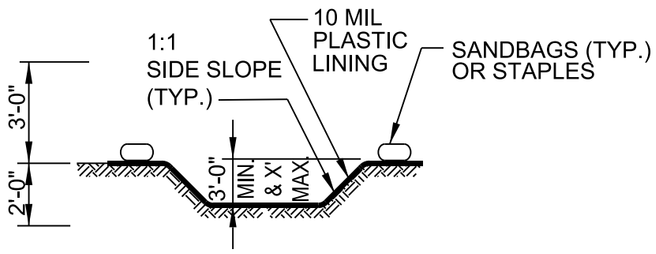
SHEET NO. S-18
TOTAL SHEETS 18

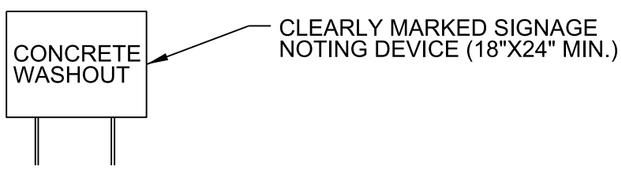
STD. NO. SN

WITH LINER, NO GRAVEL APPROACH

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER







PLAN

SECTION A-A

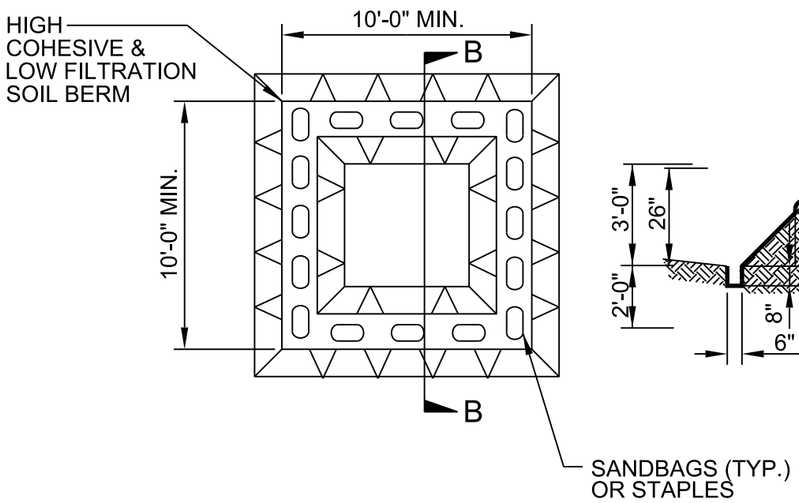
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

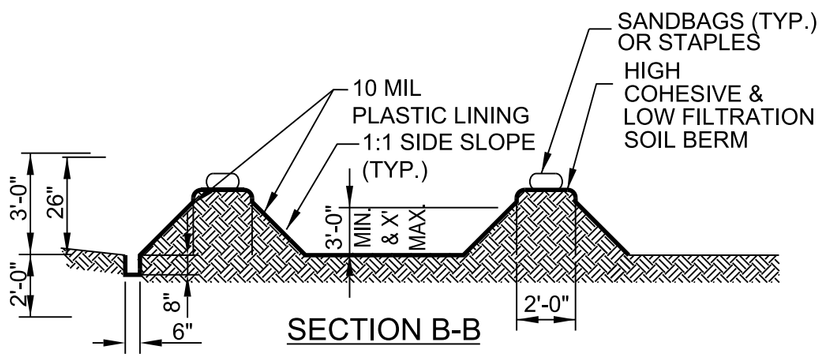
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

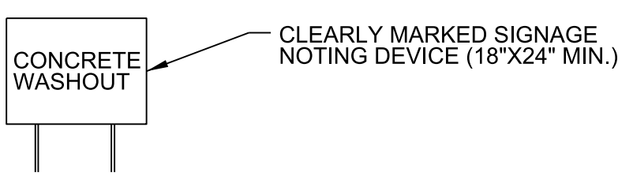
BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE





SECTION B-B



PLAN

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

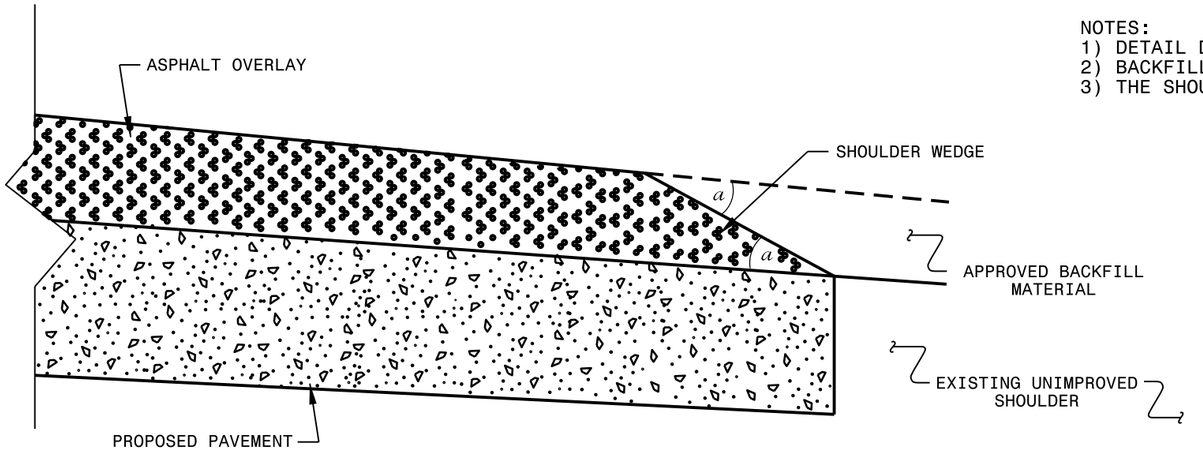
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

		PRELIMINARY DESIGN NOT FOR CONSTRUCTION

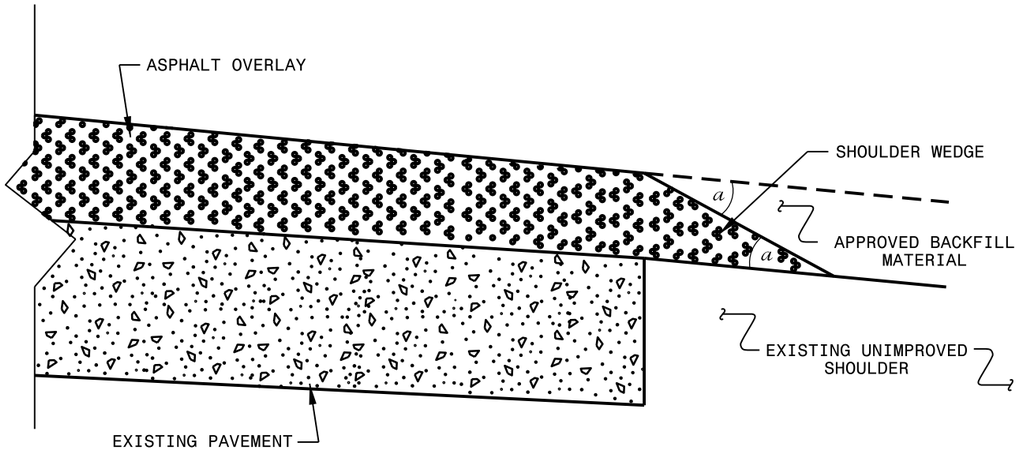
PROJECT REFERENCE NO.	SHEET NO.



NOTES:
1) DETAIL DOES NOT APPLY TO OGAFC AND ULTRA-THIN BONDED WEARING COURSE.
2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS AND SIDE STREETS.

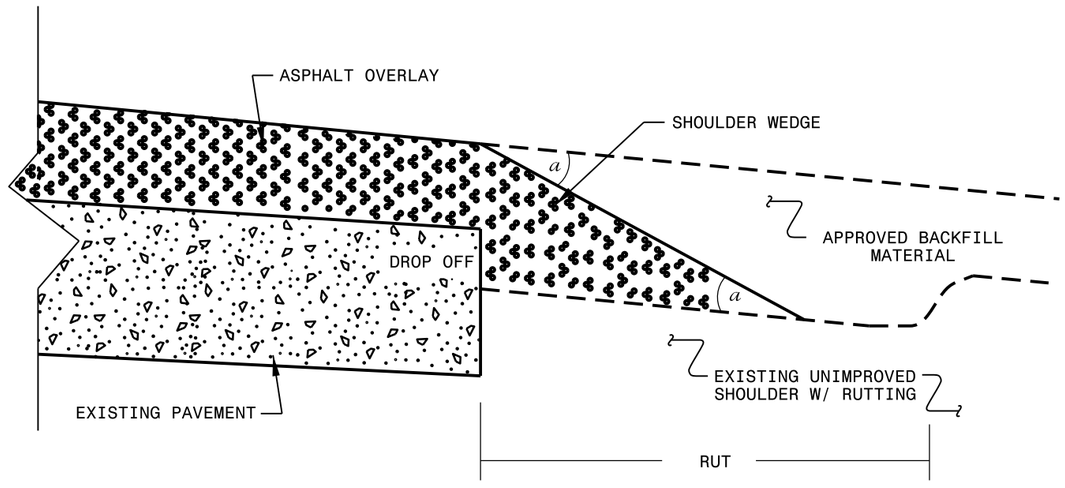
SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ Widening or with Existing Paved Shoulder having no dropoffs)



SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ NO Widening)



SHOULDER WEDGE DETAIL

(Resurfacing Adjacent to Rutted Shoulder)

- SHOULDER WEDGE ANGLE = 30°

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

SHOULDER WEDGE DETAILS

ORIGINAL BY:	T.SPELL	DATE:	7-19-11
MODIFIED BY:		DATE:	10/16/12
CHECKED BY:		DATE:	
FILE SPEC.:	s:usr/details/stand/shoulderwedgedetail.dgn		

$$$$$$SYSTIME$$$$$
$$$$$$USERNAME$$$$$DGN$$$$$$$$$$$$$$$$$$$$