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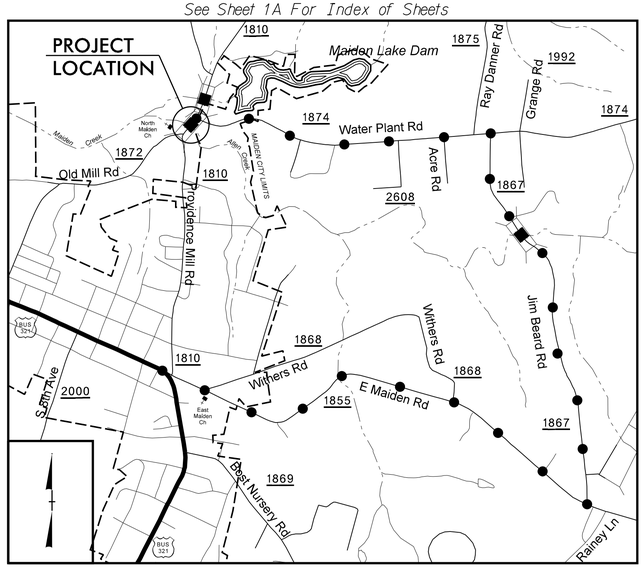
09/08/09

STATE PROJECT: 17BP.12.R.31

CONTRACT: DL00168

See Sheet 1A For Index of Sheets



DETOUR ROUTE

VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CATAWBA COUNTY

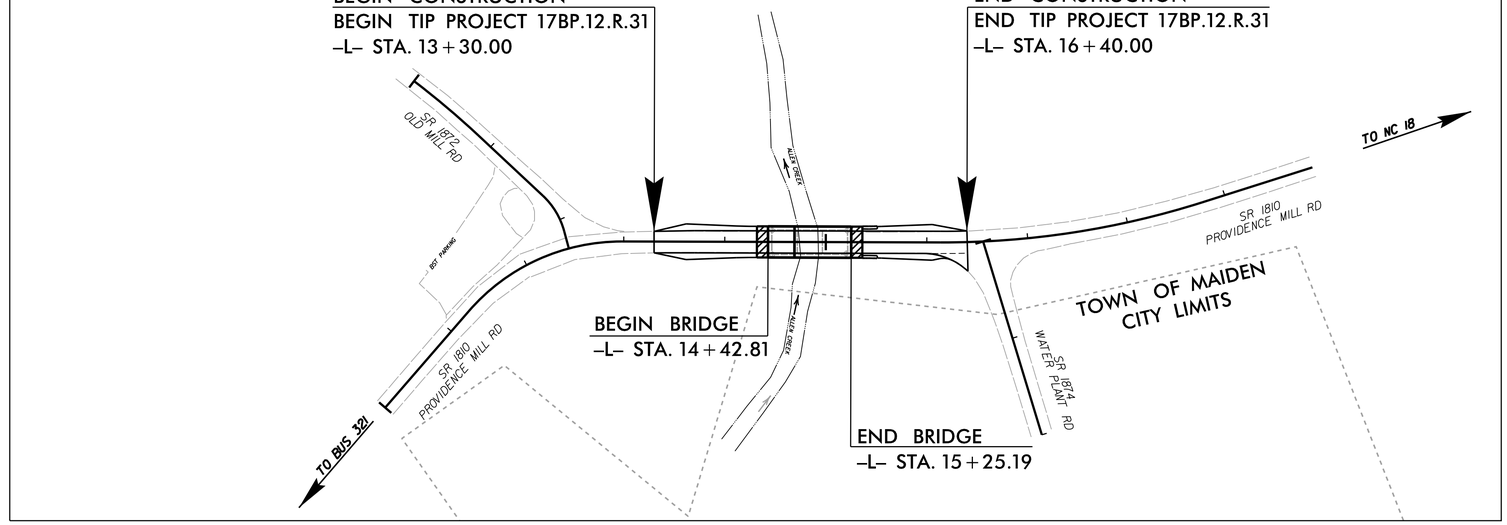
LOCATION: BRIDGE NO. 131 ON SR 1810 OVER ALLEN CREEK BETWEEN SR 1872 AND SR 1874

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, AND PAVEMENT MARKINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.31	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.12.R.31		P.E., R/W, CONSTR.

NAD 83/
NSRS 2007



LOCATION SKETCH

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 20 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2009 = 4300
ADT =
DHV = ___ %
D = ___ %
T = 6 %
V = 45 MPH

FUNC CLASS = MINOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT 17BP.12.R.31 = 0.043 MILES

LENGTH STRUCTURES STATE PROJECT TIP 17BP.12.R.31 = 0.016 MILES

TOTAL LENGTH STATE PROJECT 17BP.12.R.31 = 0.059 MILES

Prepared for the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 24, 2014

LETTING DATE:
FEBRUARY 13, 2018

DOMINIC M. WAINWRIGHT, P.E.
PROJECT ENGINEER

JAMES R. RICE, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
1/8/2018
DocuSigned by: 082E8F7759FE47A...
NORTH CAROLINA PROFESSIONAL SEAL 031986 ENGINEER JAMES R. RICE
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
1/8/2018
DocuSigned by: 7EC83DF0FAA543D...
NORTH CAROLINA PROFESSIONAL SEAL 026441 ENGINEER DOMINIC M. WAINWRIGHT
SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

MARK STAFFORD P.E.
DIVISION ENGINEER

1/8/2018
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PROJECT REFERENCE NO.	SHEET NO.
17BPJ2.R.31	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026441 ENGINEER DOMINIC M. WAINWRIGHT

1/11/2018

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1 THRU 2C-9	GUARDRAIL DETAILS
3	RIGHT-OF-WAY AREA DATA, SUMMARY OF DRAINAGE QUANTITIES, SUMMARY OF GUARDRAIL
4	PLAN AND PROFILE SHEET
TMP-1 THRU TMP-2	TRAFFIC MANAGEMENT PLAN
SD-01	DETOUR SIGN DESIGN
EC-1 THRU EC-3	EROSION CONTROL PLANS
UC-1 THRU UC-4	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1 THRU X-5	CROSS-SECTIONS
S-1 THRU S-16	STRUCTURE PLANS
	STRUCTURE STANDARD NOTES

EFF. 01-17-2012
REV. 05-24-2017

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 - MAJOR STRUCTURES	
422.11	Bridge Approach Fills - Sub Regional Tier
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
866.02	Woven Wire Fence - with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 01-24-2017

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.

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE TOWN OF MAIDEN, AT&T, CHARTER COMMUNICATIONS, AND DUKE ENERGY.

RIGHT-OF-WAY MARKERS:

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

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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	1B

04/06/15

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
- Property Corner
- Property Monument
- Parcel/Sequence Number
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary
- Proposed Wetland Boundary
- Existing Endangered Animal Boundary
- Existing Endangered Plant Boundary
- Existing Historic Property Boundary
- 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
- Well
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream
- Buffer Zone 1
- Buffer Zone 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch
- False Sump

RAILROADS:

- Standard Gauge
- RR Signal Milepost
- 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
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite R/W Marker
- Proposed Control of Access Line with Concrete C/A Marker
- Existing Control of Access
- Proposed Control of Access
- Existing Easement Line
- Proposed Temporary Construction Easement
- Proposed Temporary Drainage Easement
- Proposed Permanent Drainage Easement
- Proposed Permanent Drainage / Utility Easement
- Proposed Permanent Utility Easement
- Proposed Temporary Utility Easement
- Proposed Aerial Utility Easement
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- 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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
17BPJ2.R.31	2A-1
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

11/16/2017

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

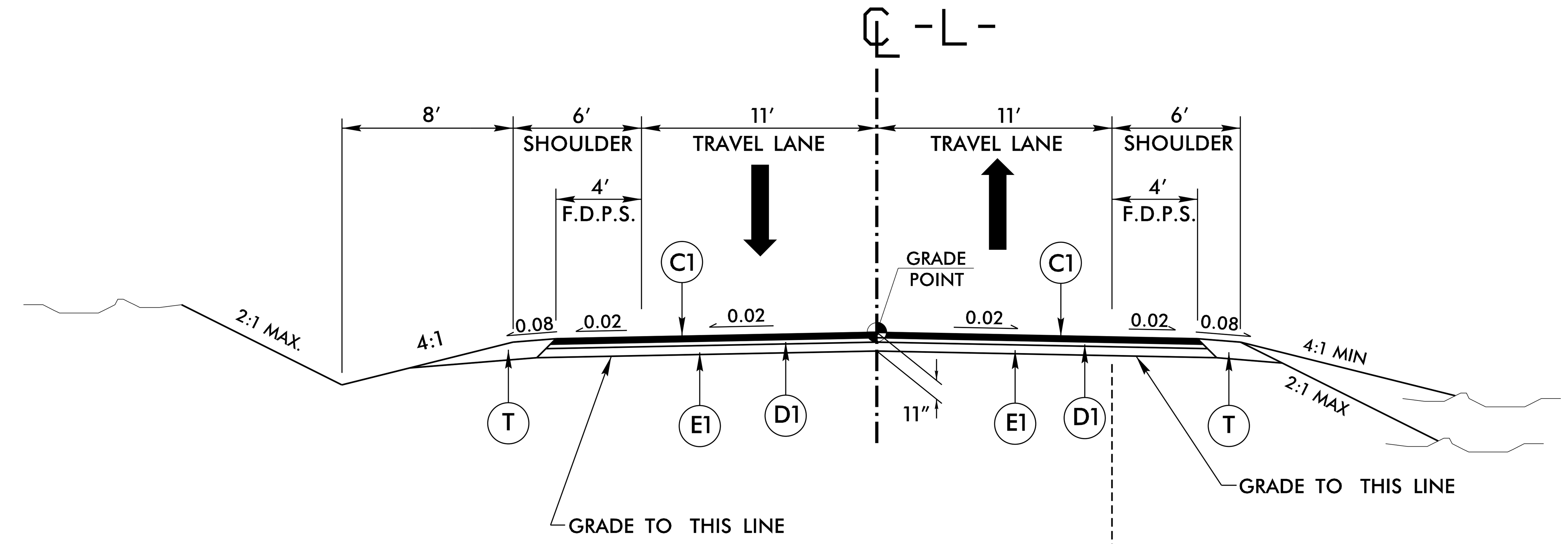
REVISIONS

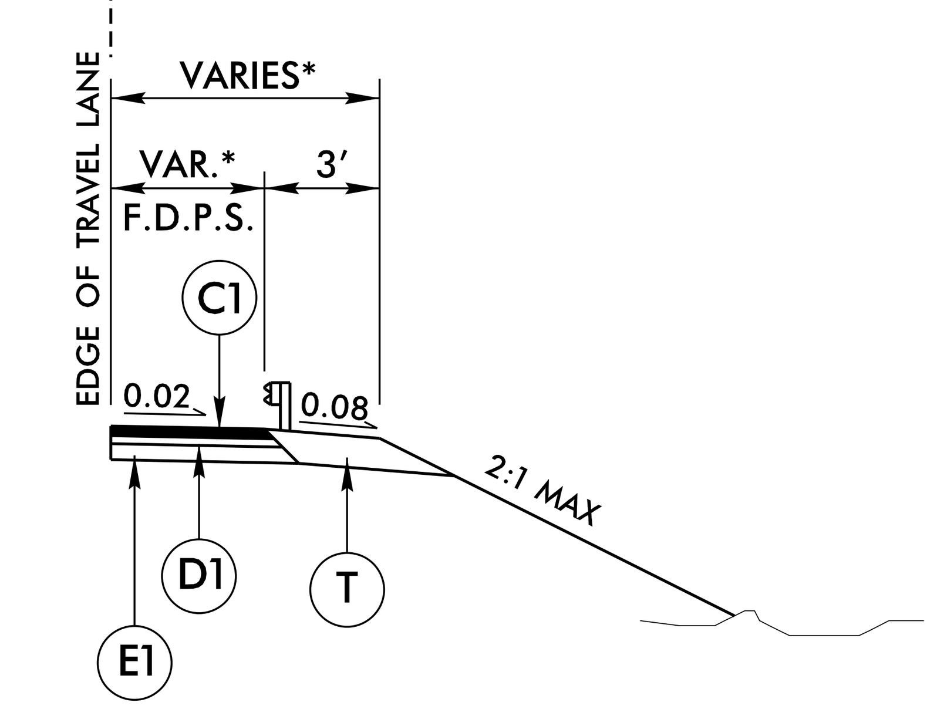
8/17/99

PAVEMENT SCHEDULE

C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 Lbs PER SQUARE YARD IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 2.0" IN DEPTH.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 Lbs PER SQUARE YARD.
E1	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 Lbs PER SQUARE YARD.
T	EARTH MATERIAL

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

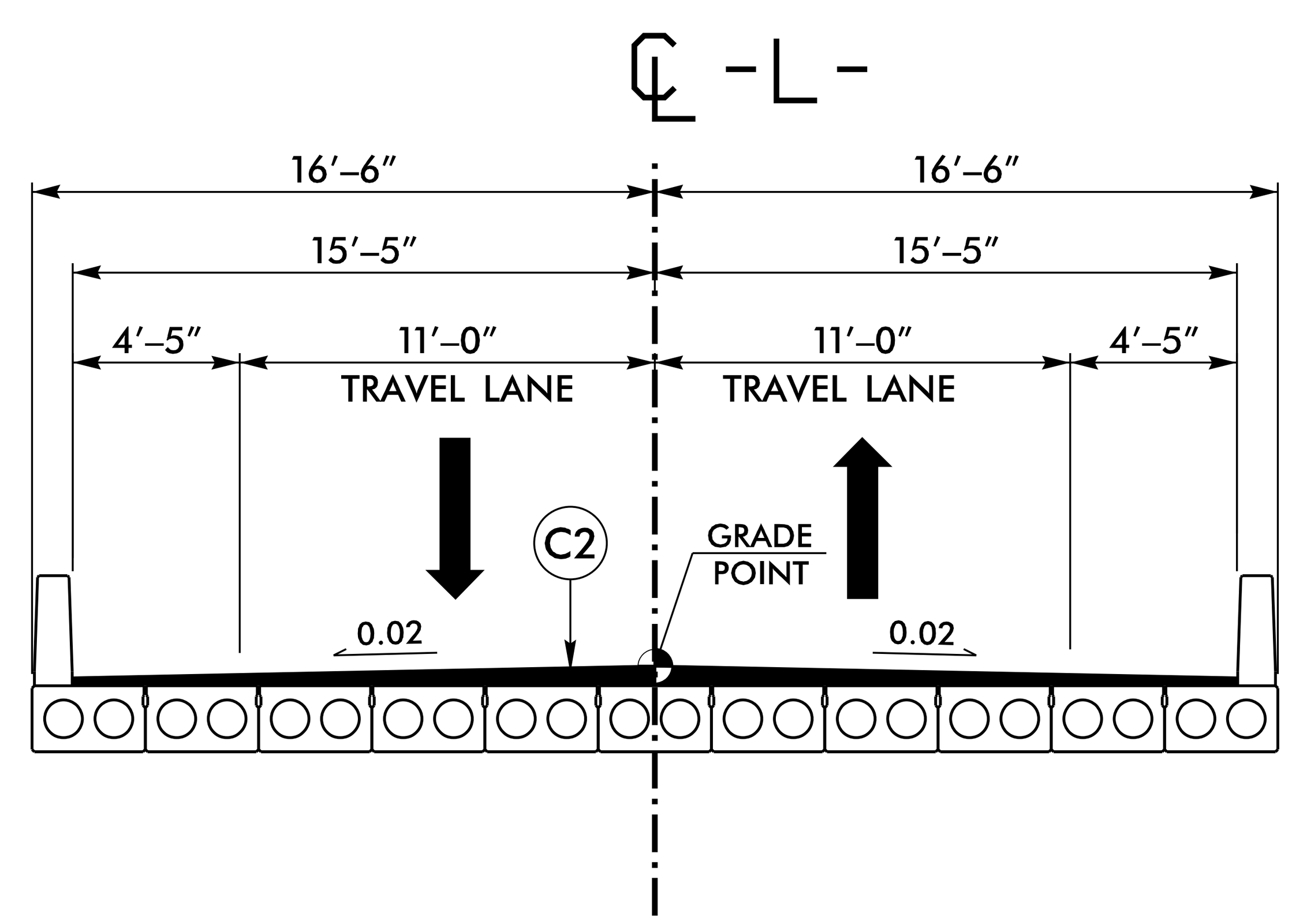




TYPICAL SECTION NO. 1

LINE	FROM STATION	TO STATION
–L–	13 + 30.00	14 + 42.81
–L–	15 + 25.19	16 + 40.00

* SEE PLAN AND CROSS-SECTIONS FOR GUARDRAIL OFFSETS AND LOCATIONS



TYPICAL SECTION NO. 2

CORED SLAB BRIDGE

LINE	FROM STATION	TO STATION
–L–	14 + 42.81	15 + 25.19

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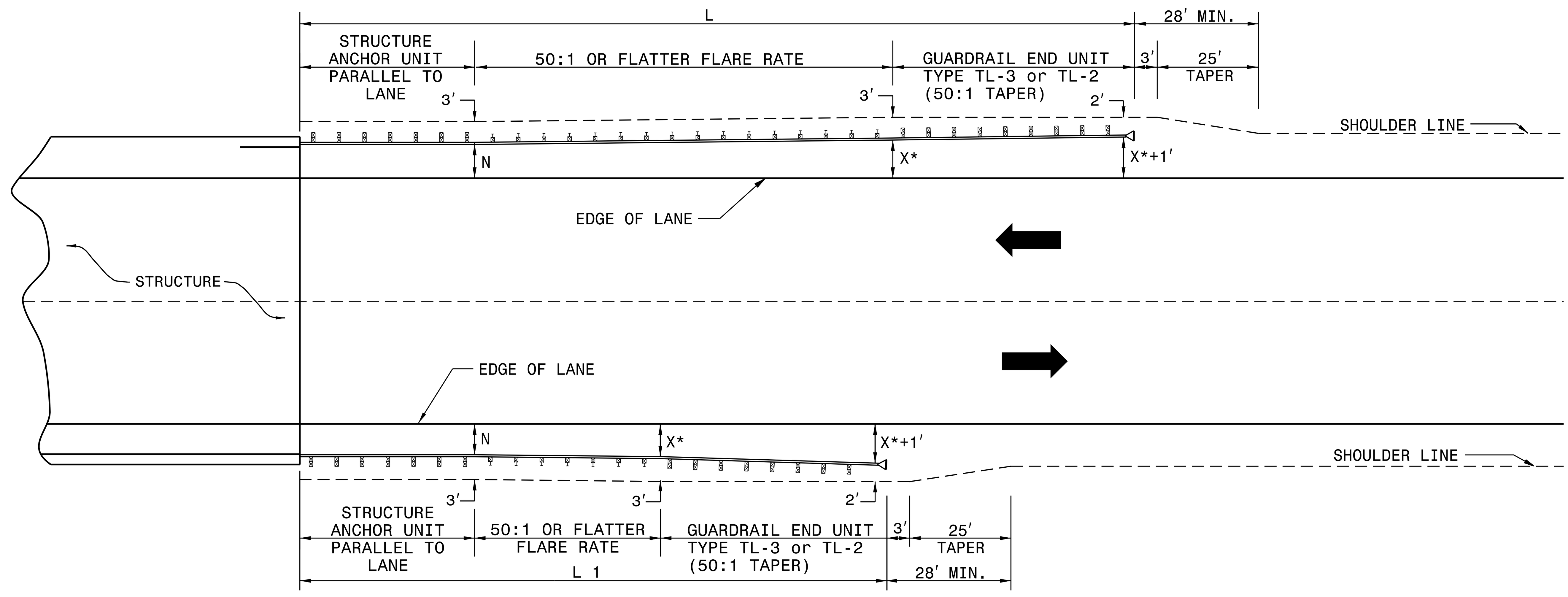
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 11
862D01



* USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1).

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

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

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

GUARDRAIL INSTALLATION AT BRIDGE APPROACHES FOR TWO-LANE, TWO-WAY TRAFFIC

DESIGN SPEED (MPH)	"L" APPROACH LENGTH (FT.)				"L1" TRAILING LENGTH (FT.)			
	DESIGN YEAR ADT		CURRENT YEAR ADT		DESIGN YEAR ADT		CURRENT YEAR ADT	
	OVER 2000	1001-2000	400-1000	UNDER 400	OVER 2000	1001-2000	400-1000	UNDER 400
70	362.5'	362.5'	350.0'	287.5'	187.5'	187.5'	175.0'	75.0'
60	300.0'	287.5	275.0'	225.0'	137.5'	137.5'	100.0'	75.0'
50	212.5'	212.5'	200.0'	162.5'	87.5'	75.0'	75.0'	75.0'
40	175.0'	150.0'	137.5'	112.5'	75.0'	75.0'	75.0'	75.0'
X *	8'	6'	4'	4'	8'	6'	4'	4'

LENGTHS AND OFFSETS FOR PROPOSED GUARDRAIL AT TWO LANE - TWO WAY LOCATIONS

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

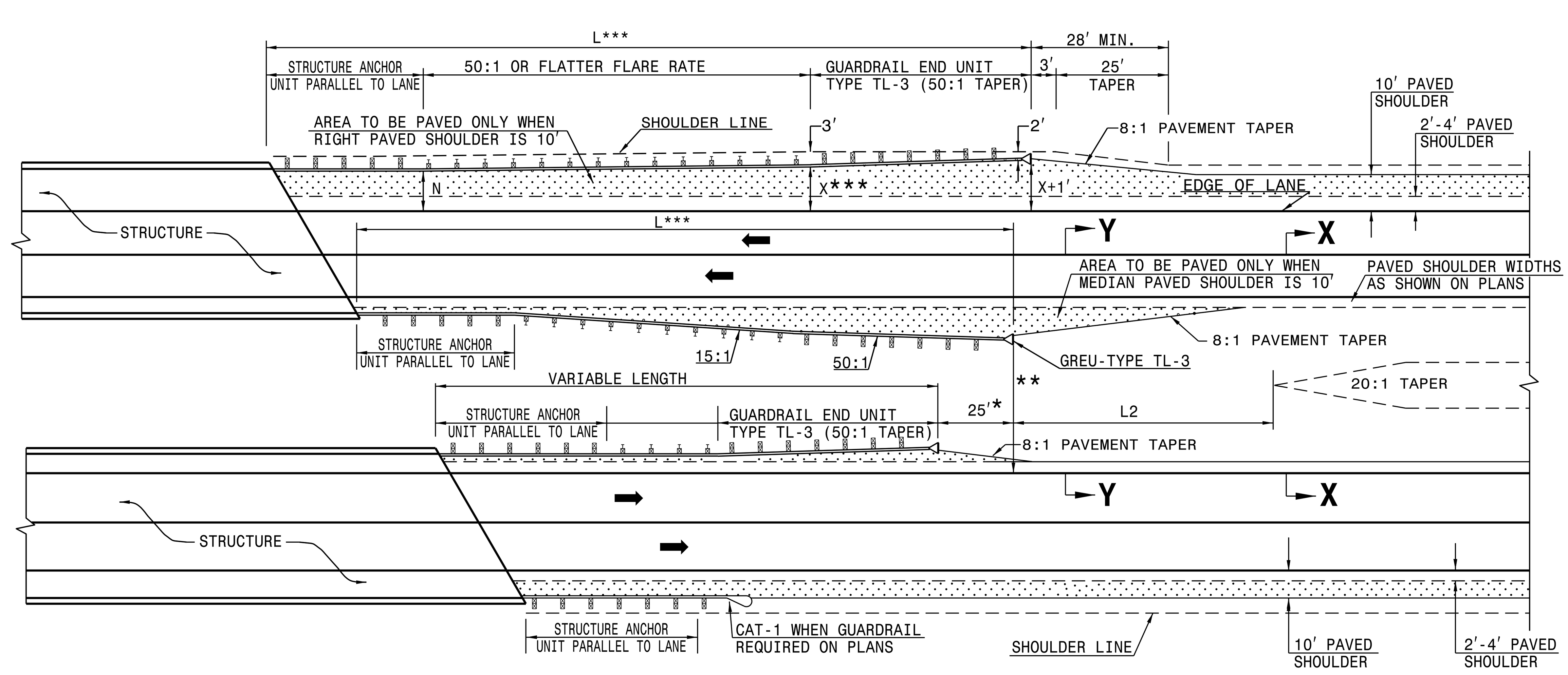
ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 11
862D01

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 3 OF 11
862D01



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

DIMENSIONS FOR LENGTH OF GUARDRAIL APPROACHING DUAL LANE BRIDGES

MEDIAN WIDTH	-L-***						-L2- DIM.
	70 MPH	60 MPH	50 MPH				
30'	300.0'	250.0'	150.0'				80.0'
36'	300.0'	250.0'	150.0'				60.0'
40' & ABOVE	300.0'	250.0'	150.0'				40.0'

NOTES: * MINOR VARIATION TO THE 25'-0" DIMENSION IS PERMISSIBLE TO ACCOMODATE THE 12'-6" IN GUARDRAIL LENGTHS.

** NO GUARDRAIL IS REQUIRED ON THE TRAILING END WHEN THIS DISTANCE EXCEEDS CLEAR ROADSIDE RECOVERY AREA FOR THE APPROPRIATE DESIGN SPEED.

*** BASED ON "X" OF 12'
USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1A).

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

THE DESIGN LAYOUT FOR LENGTHS SHOWN ON THIS STANDARD ARE MINIMUM DESIGN LENGTHS.

SEE SHEET 1 OF 12 FOR SECTIONS XX, YY

SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

DETAIL OF GUARDRAIL APPROACHING DUAL LANE BRIDGES

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 3 OF 11
862D01

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

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MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

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11/13/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton

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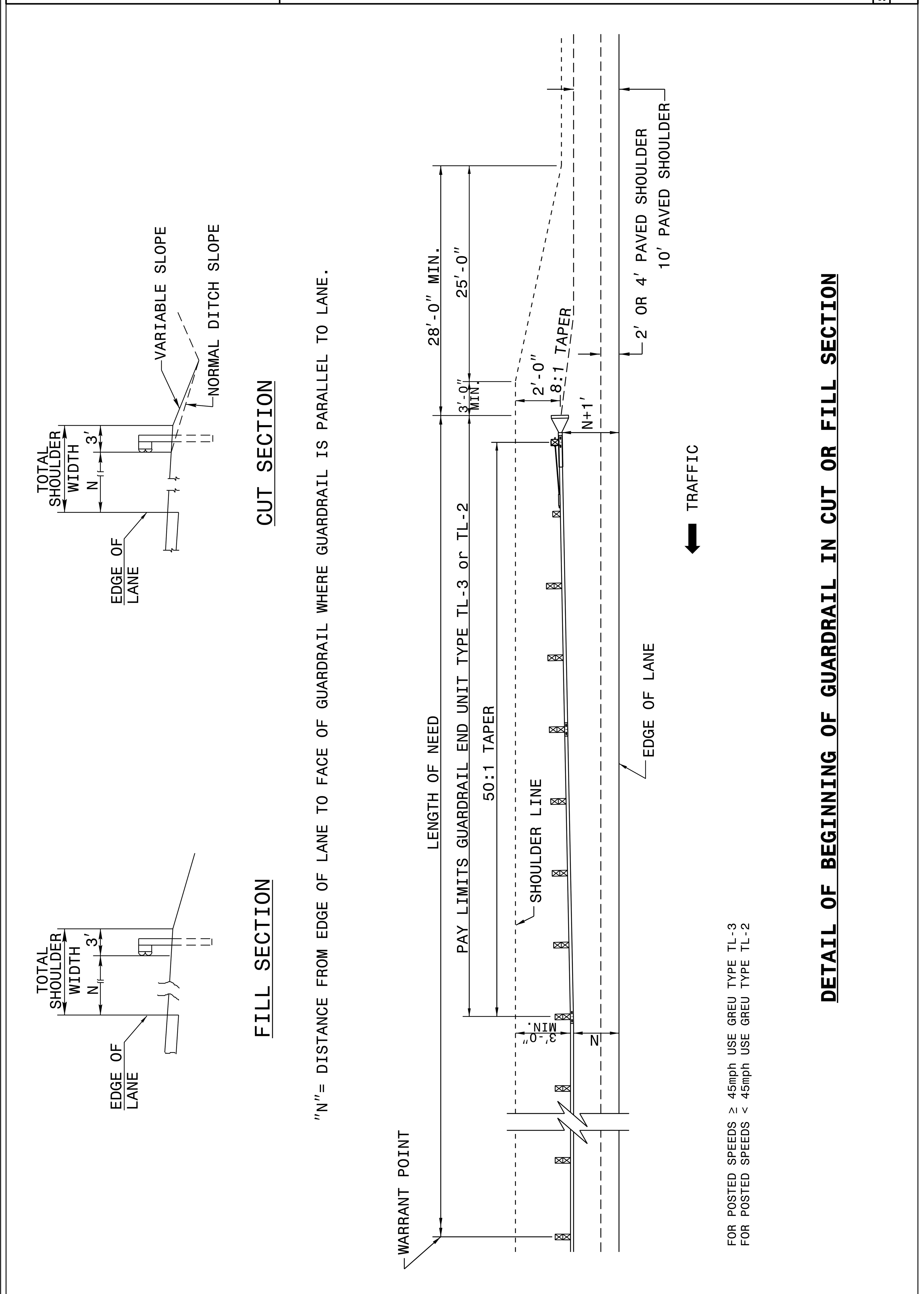
PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	2C-1

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	2C-2

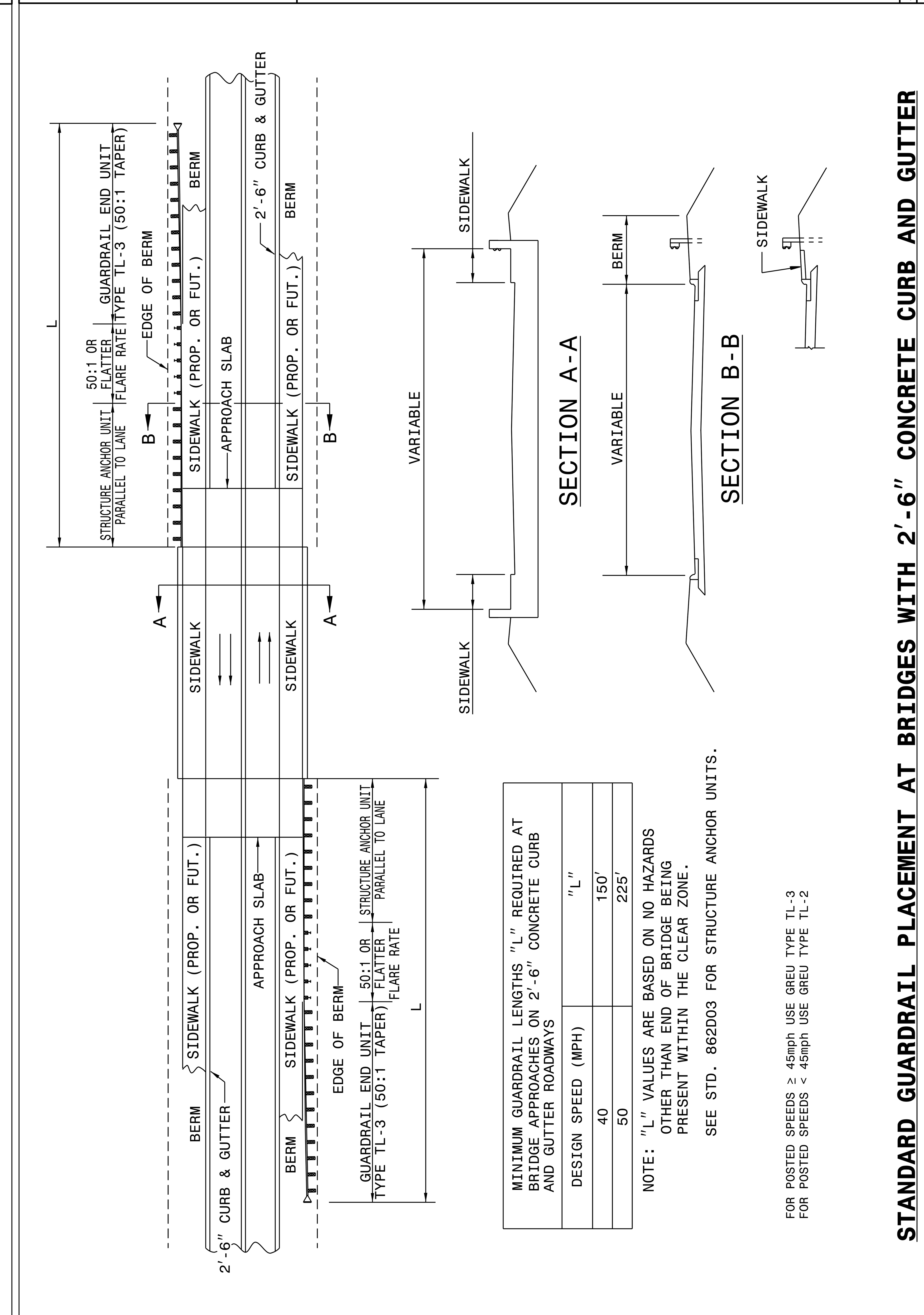
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT — SHEET 6 OF 11 862D01
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT — SHEET 5 OF 11 862D01



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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 11 **862D01**



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.

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 5 OF 11 **862D01**

11/13/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton

DocuSigned by: Joel S. Howerton

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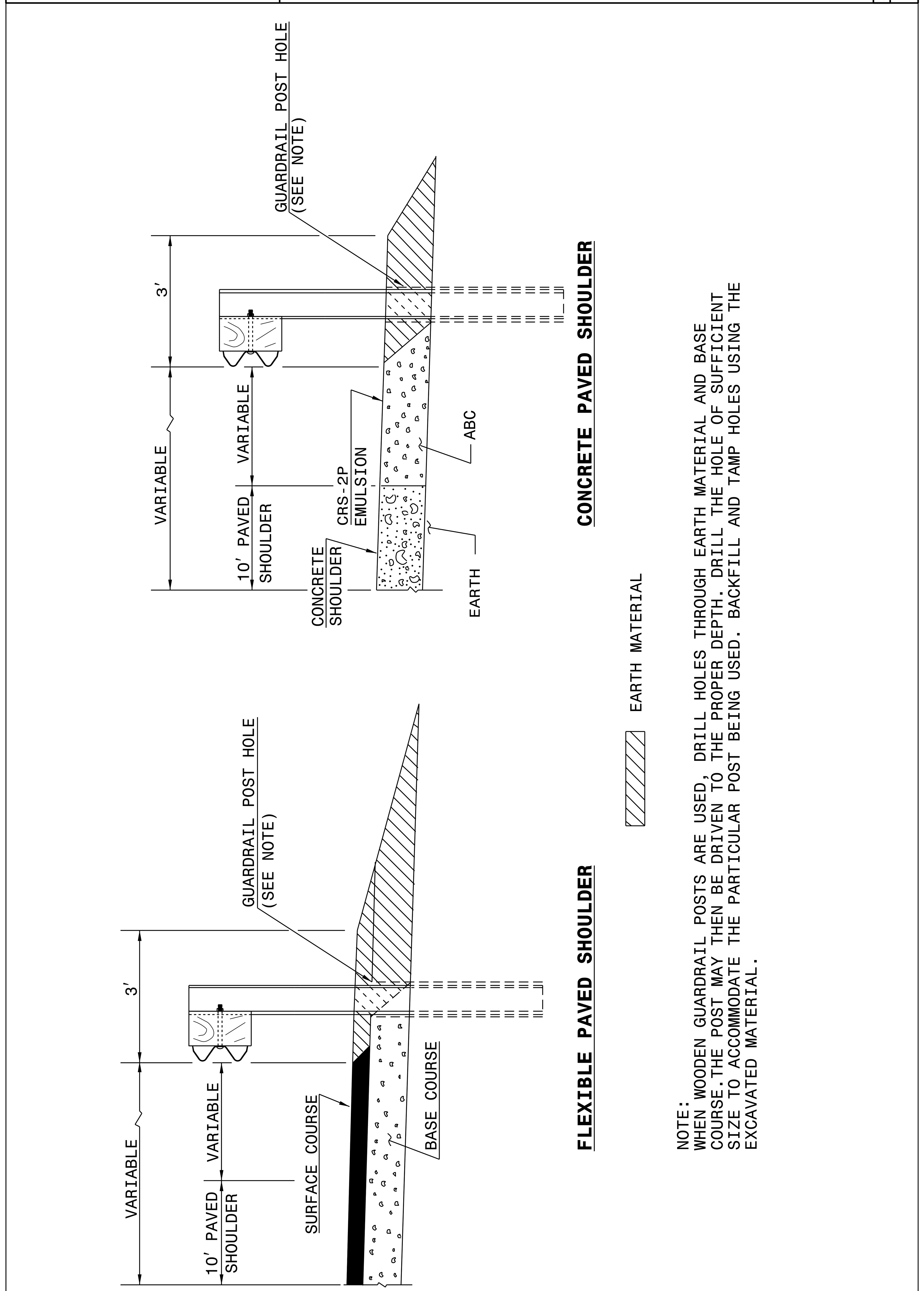
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

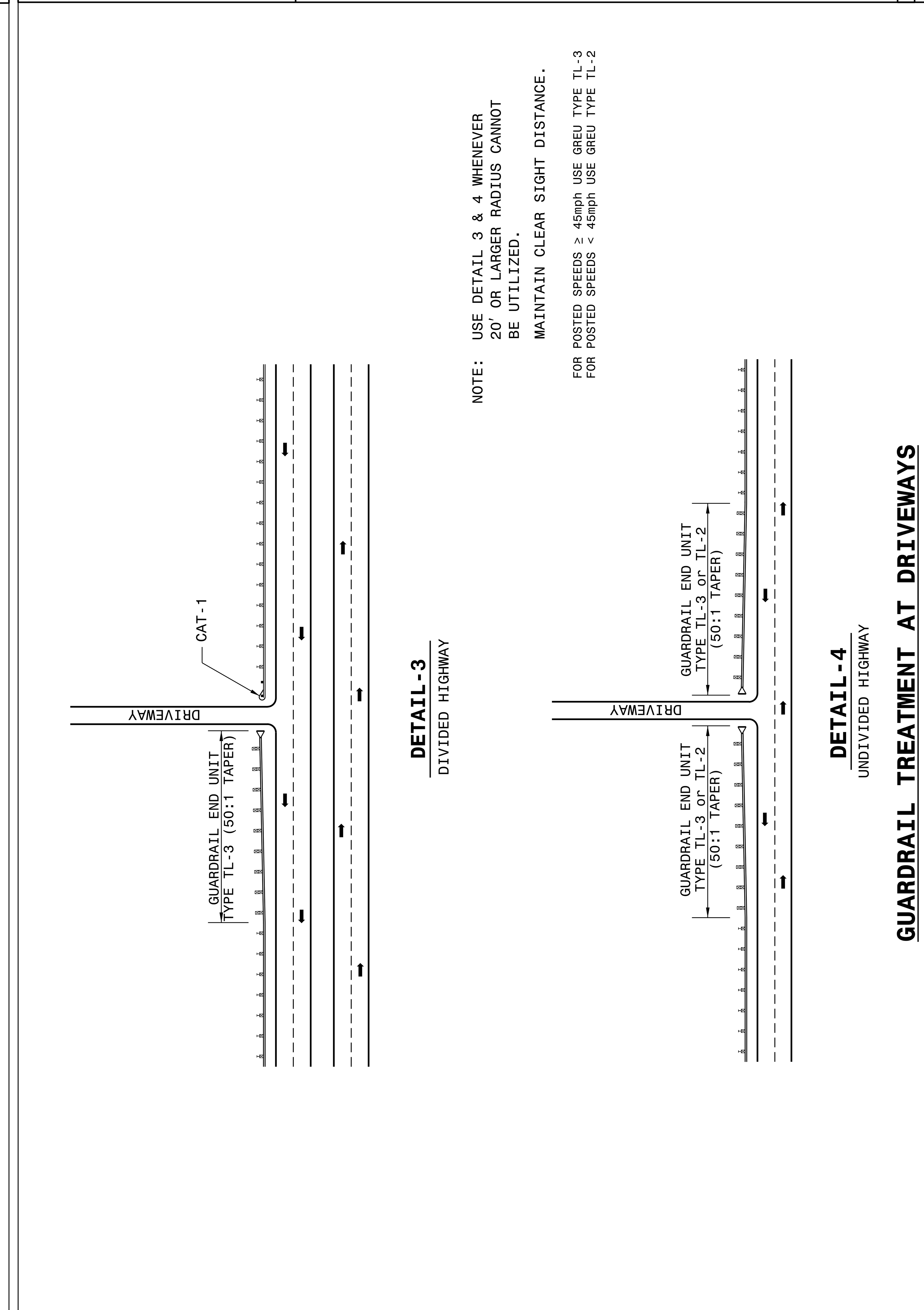
SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	2C-3

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR GUARDRAIL PLACEMENT
SHEET 10 OF 11 862D01
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT
SHEET 9 OF 11 862D01





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NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

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

ENGLISH DETAIL DRAWING FOR **GUARDRAIL PLACEMENT**

SHEET 10 OF 11 **862D01**

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

ROADWAY DETAIL DRAWING FOR **GUARDRAIL PLACEMENT**

SHEET 9 OF 11 **862D01**

CONTRACT STANDARDS AND DEVELOPMENT UNIT
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PROJECT REFERENCE NO.	SHEET NO.
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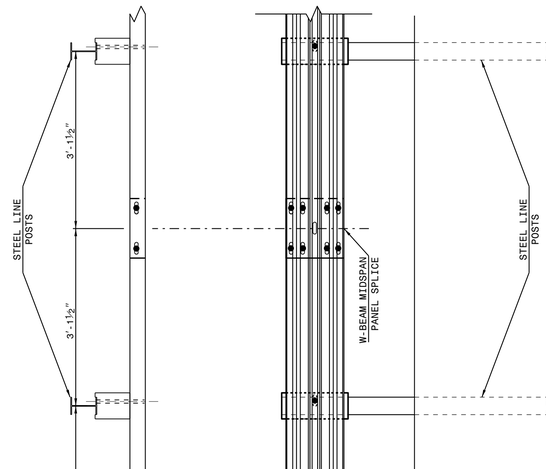
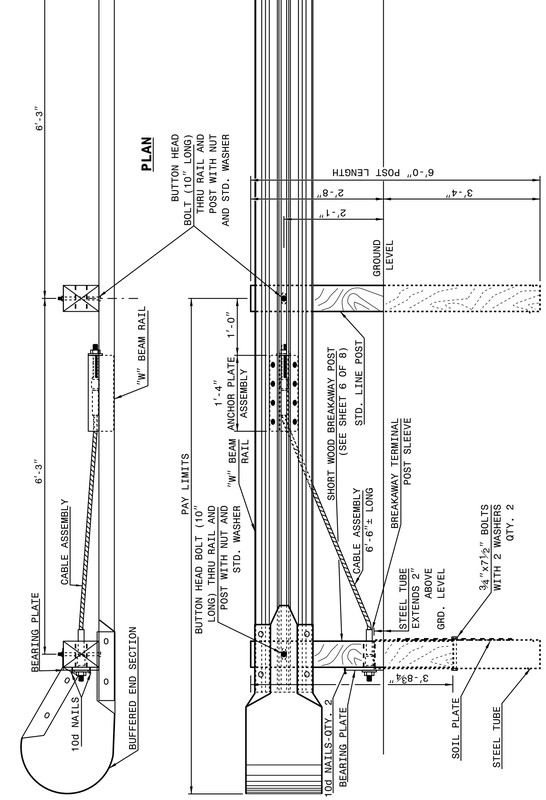
RALEIGH, N.C.

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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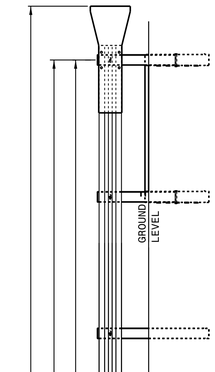
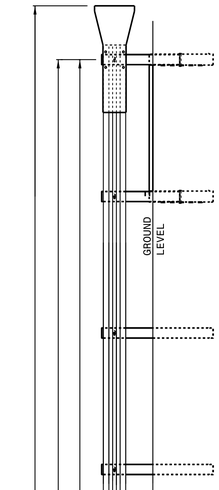
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

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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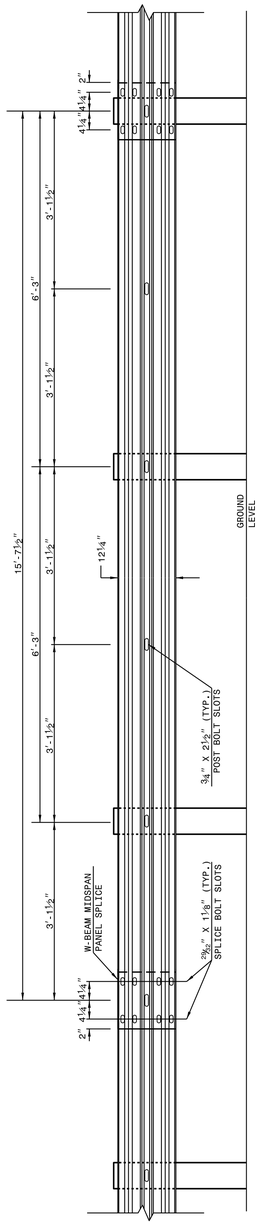
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 2 OF 8
862D02

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	2C-5



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

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NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

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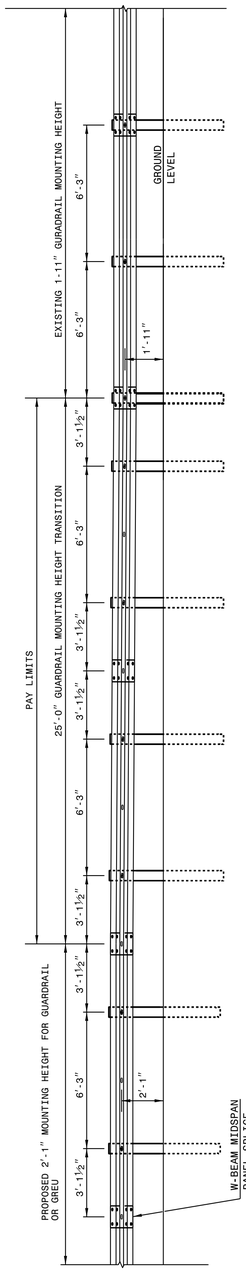
NOTE: IF EXISTING GUARDRAIL IS LOWER THAN 1'-11", USE AN ADDITIONAL 12'-6" LONG SECTION OF GUARDRAIL, FOR EVERY 1" OF HEIGHT DIFFERENCE, TO TRANSITION FROM EXISTING GUARDRAIL TO PROPOSED 2'-1" GUARDRAIL.

ELEVATION VIEW

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



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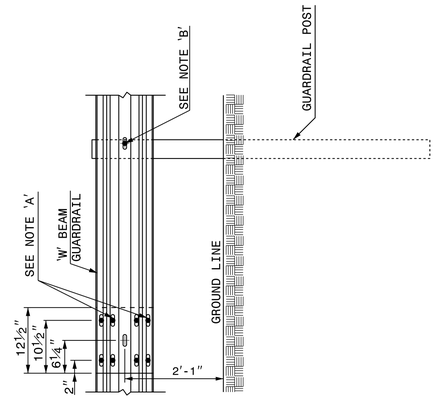
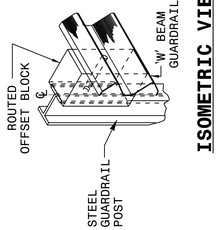
17BP.12.R.31	2C-6

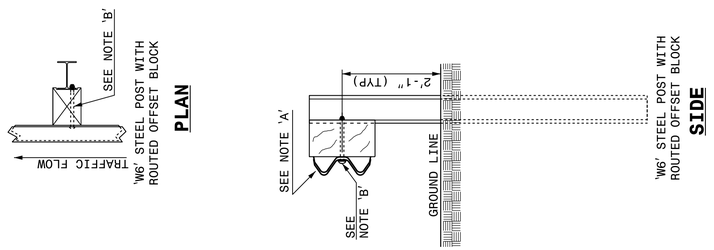
FRONT - MID SPAN SPLICE



ISOMETRIC VIEW



TYPICAL GUARDRAIL AND GUARDRAIL POST ALTERNATIVES



NOTES:
A - 5⁄8" DIA. BUTTON HEAD SPLICE BOLT 1¼" LONG (8 REQ. PER SPLICE JOINT).
B - 5⁄8" DIA. BUTTON HEAD BOLT 7½"/9" LONG WITH NUT FOR BOLTING 6"/8" ROUTED OFFSET BLOCK TO STEEL POSTS.
C - FIELD PUNCHING OF HOLES INTO GUARDRAIL AS DIRECTED BY THE ENGINEER.

11/13/2017

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

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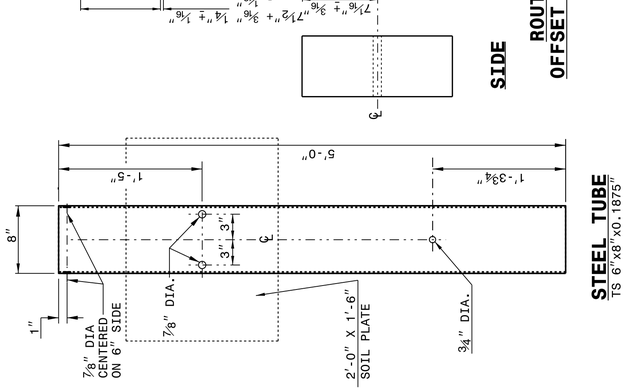
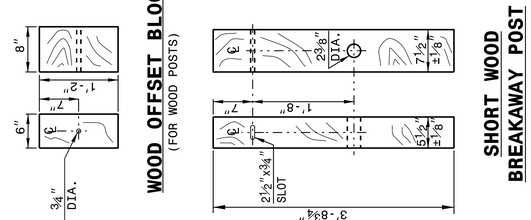
SYSTEM PARTS

STEEL TUBE
TS 6"x8"x0.1875"

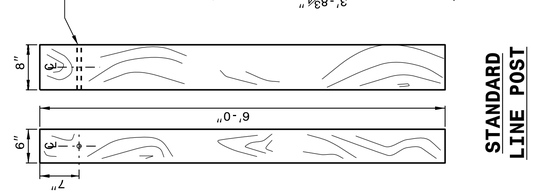


SHORT WOOD BREAKAWAY POST

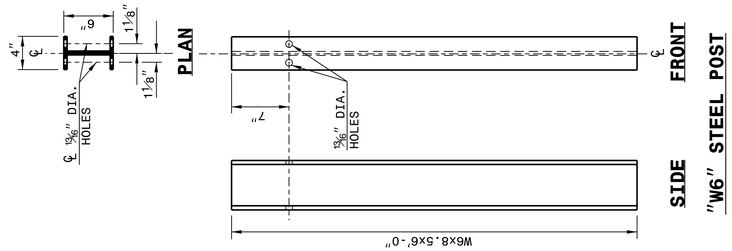


WOOD OFFSET BLOCK
(FOR WOOD POSTS)

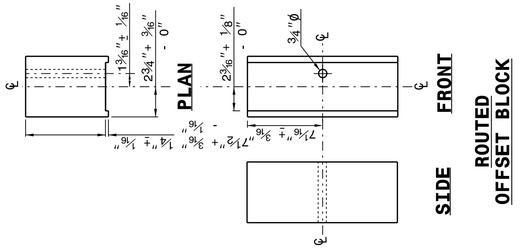
STANDARD LINE POST



"W6" STEEL POST



ROUTED OFFSET BLOCK



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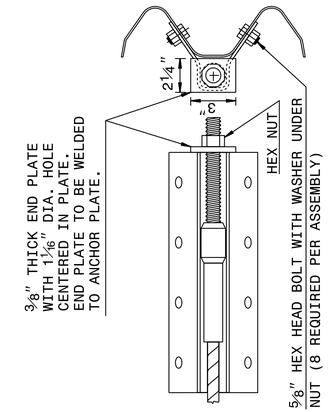
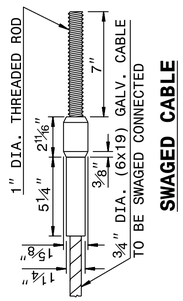
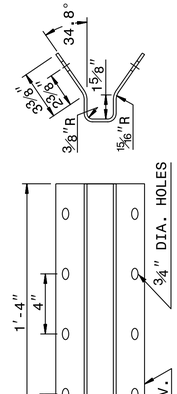


ANCHOR PLATE ASSEMBLY



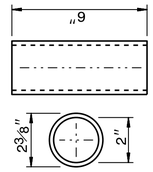
SWAGED CABLE



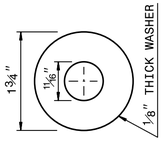
ANCHOR PLATE

CABLE ASSEMBLY

SYSTEM PARTS

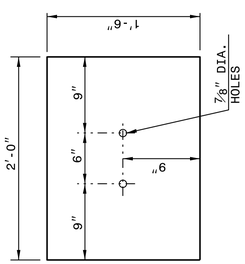


BREAKAWAY TERMINAL POST SLEEVE



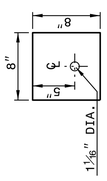
DETAIL OF STANDARD WASHER

STANDARD WASHER: TYPICAL USE UNDER NUT WITH WOOD POST



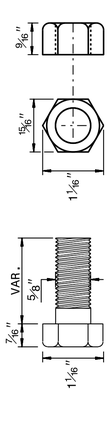
SOIL PLATE

¼" THICK PLATE

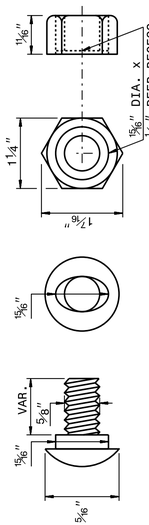


BEARING PLATE

⅝" THICK PLATE



DETAIL OF STANDARD HEX BOLT AND NUT



DETAIL OF BUTTON HEAD BOLT AND NUT

SYSTEM PARTS

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ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 7 OF 8 **862D02**

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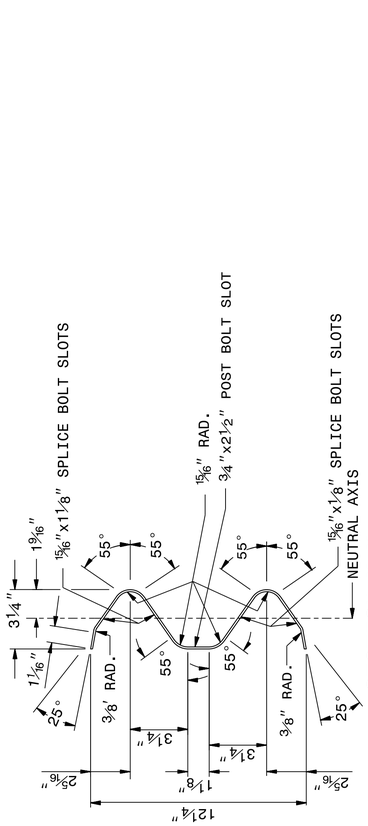
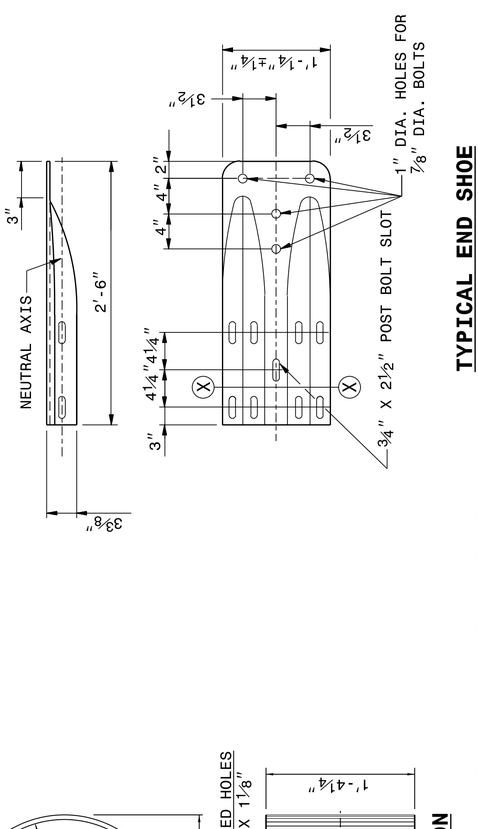
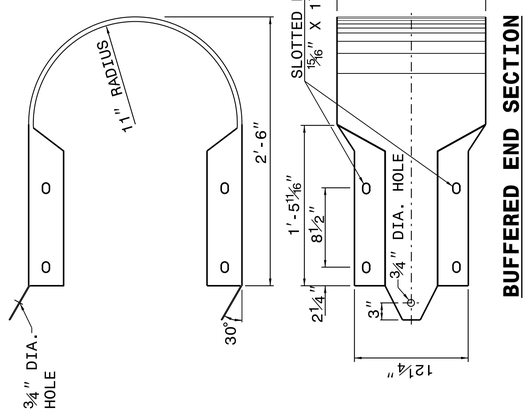


SECTION X-X



TYPICAL END SHOE

SYSTEM PARTS - GENERAL USE



BUFFERED END SECTION

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STATE OF
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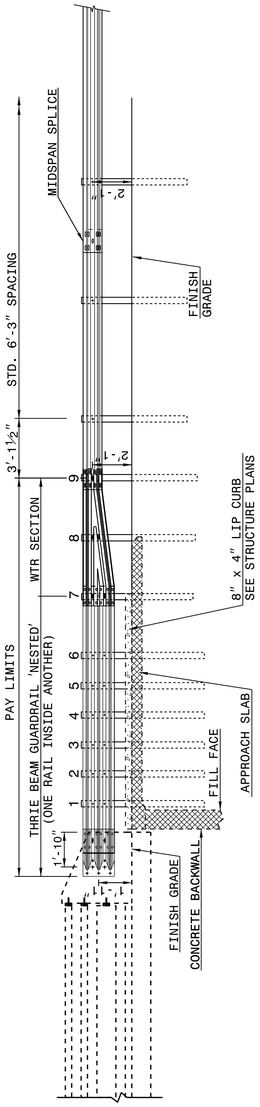
RALEIGH, N.C.

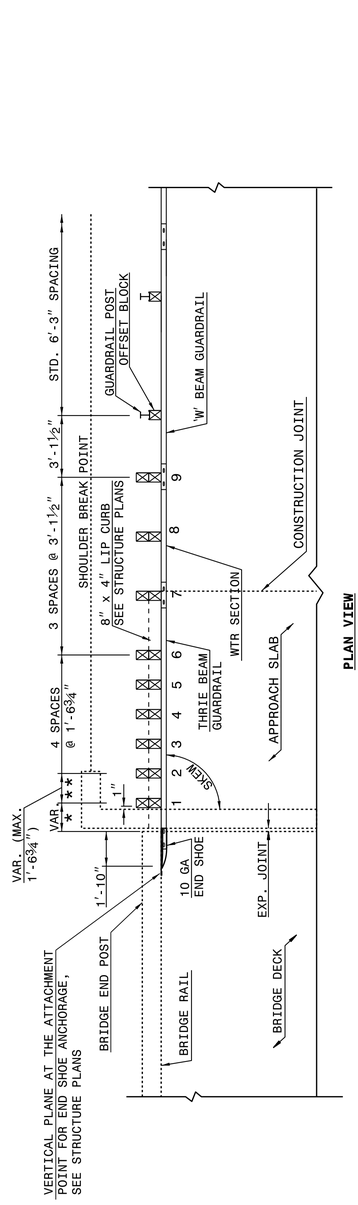
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 1½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

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

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

SHEET 2 OF 7
862D03

ELEVATION

NOTE:
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-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.

PLAN VIEW

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

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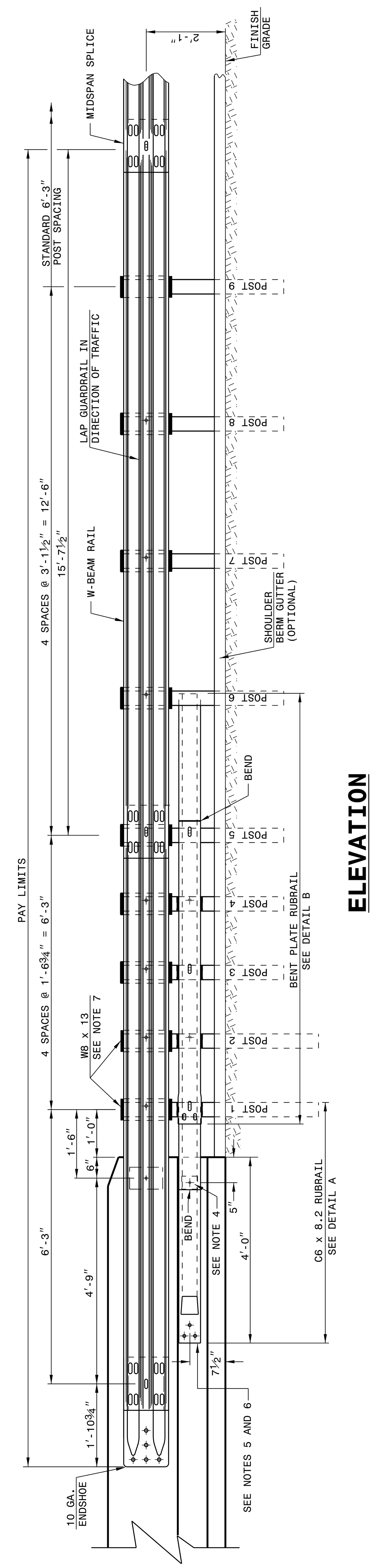
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE
- SUB REGIONAL TIER

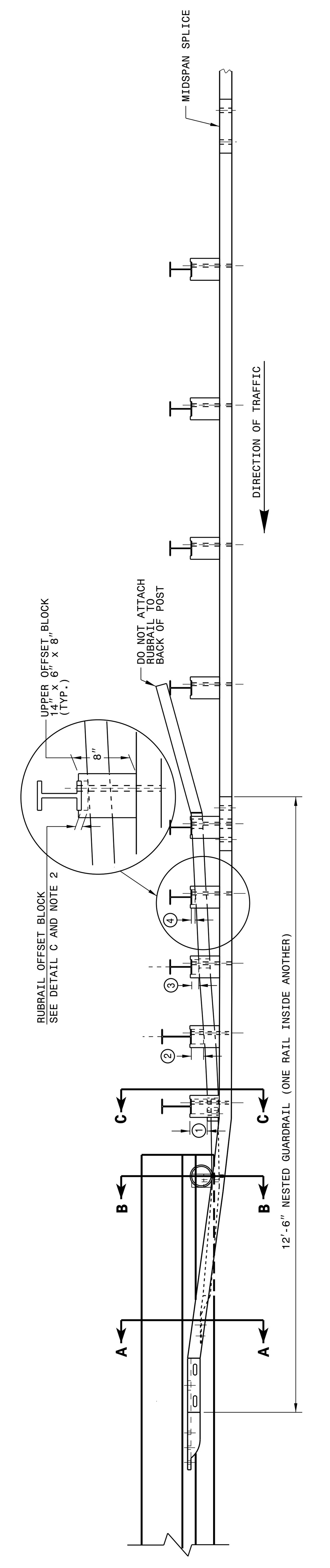
SHEET 2 OF 7
862D03

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	2C-9



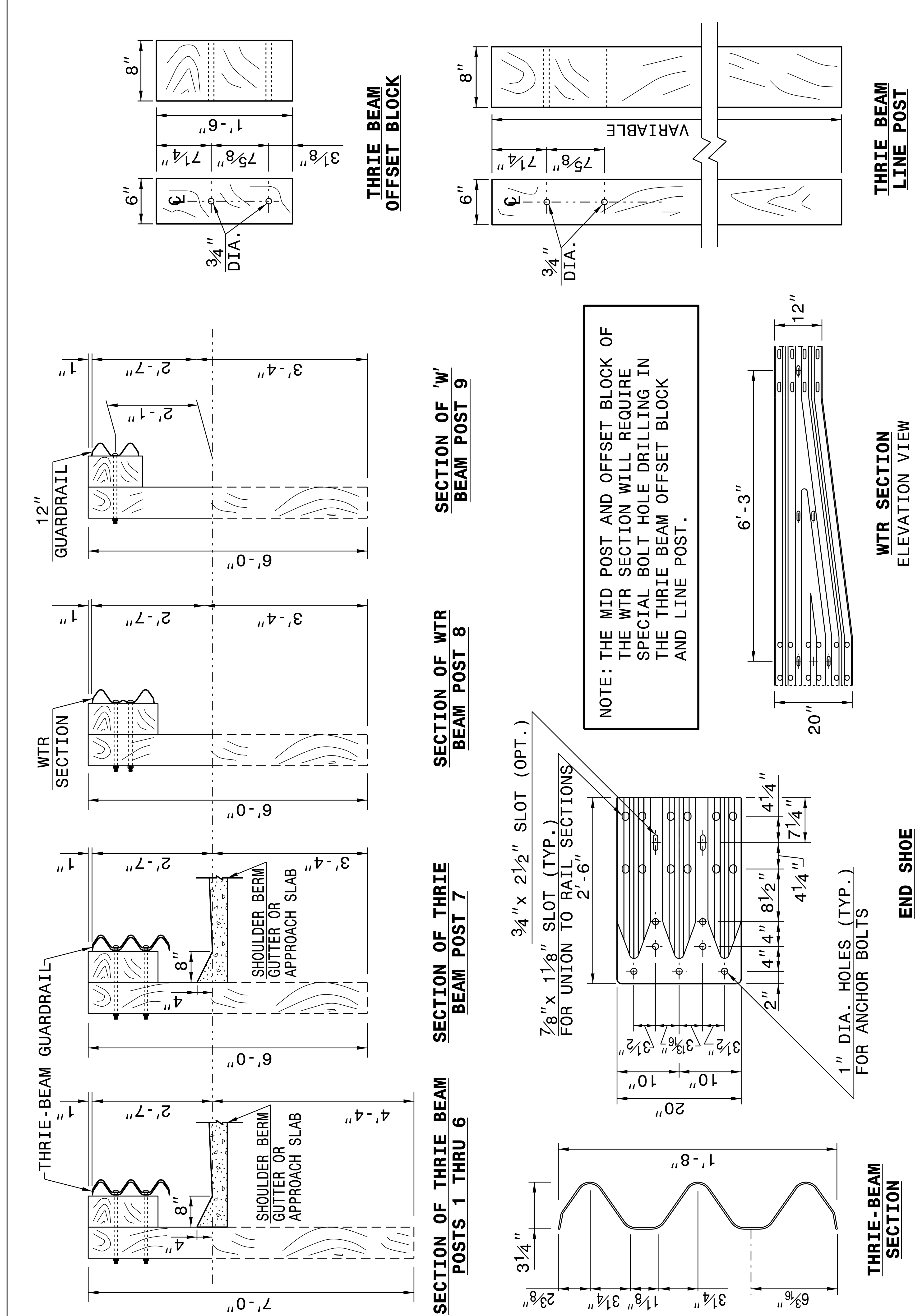
GENERAL NOTES:

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 5/8" 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 5/8" 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 5/8" 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 3/8" 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 5/8" 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.



GUARDRAIL ANCHOR UNIT TYPE B-77

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR **GUARDRAIL 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**

11/13/2017

SEAL 022966 NORTH CAROLINA PROFESSIONAL ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton 873F3D17DCDC45F...

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

SEE TITLE BLOCK

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

23-MAY-2017 12:52
S:\Contracts\Special Details\jhowerton\Standard Drawings\2012 Standard Drawings\Details in Lieu of Standards\Division 8\862d01 862d03 862d03\862d03.dgn
jhowerton AT CSD-292595

6/21/00

REVISIONS

COMPUTED BY: S.W. WEATHERLY DATE: APRIL 2013
CHECKED BY: D.M. WAINWRIGHT DATE: NOVEMBER 2017

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
17BPJ2.R.31	3

RIGHT OF WAY AREA DATA

PARCEL NO.	PROPERTY OWNERS NAMES	TOTAL ACREAGE	AREA TAKEN	AREA REMAINING RT.	AREA REMAINING LT.	CONST. EASE.	PERM. DRAINAGE / UTILITY EASEMENT	TEMP. UTILITY EASEMENT	PERM. UTILITY EASEMENT
1	LINDA JOYCE R. MORGAN	0.530	–	–	0.530	–	–	–	0.014
2	THE PROVIDENCE COTTON MILL, LLC	9.000	–	–	9.000	–	0.050	–	0.242
3	JIMMY GAITHER HEFFNER AND MOLLIE K. HEFFNER	0.690	–	0.690	–	–	–	0.002	0.002
4	AUSTIN FLYNT HOYLE	0.530	–	0.530	–	–	–	0.032	0.048
5	JOSHUA NATHAN GRANT & AMANDA CLINE–GRANT	44.090	–	44.090	–	–	–	–	0.036
6	TOWN OF MAIDEN	46.790	–	46.790	–	–	–	0.072	–

*NOTE: ALL AREAS ARE IN ACRES

SUMMARY OF PAVEMENT REMOVAL

IN SQUARE YARDS

LOCATION	ASPHALT REMOVAL	ASHPALT BREAK UP	CONCRETE REMOVAL	CONCRETE BREAK UP
–L– STA. 13+30.00 TO BRIDGE	273			
BRIDGE TO –L– STA. 16+40.00	303			
PROJECT TOTALS	576			

SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+15%	BORROW	WASTE
–L– STA. 13+30.00 TO BRIDGE	86		151		
SUBTOTAL	86		151	65	
BRIDGE TO –L– STA. 16+40.00	129		69		
SUBTOTAL	129		69		60
PROJECT TOTALS	215		220		
SAY	220				

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

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

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS IV R.C. PIPE (UNLESS OTHERWISE NOTED) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. PIPE (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"	CLASS III R.C. PIPE (UNLESS OTHERWISE NOTED) 12"	15"	18"	24"	30"	36"	42"	48"
15+46 –L–	RT	0401		828.01																																
		0401	0402		824.51	824.38																									28					
15+46 –L–	LT	0402		827.93																																
		0402	0403		824.38	820.79													20																	

(SIZE / THICKNESS OR GAUGE)

STATION	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE 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. 840.22	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	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	T.B.D.I. STD. 840.35						CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
15+46 –L–						1																		1	1											TBDI W/NARROW SLOTS & FLAT GRATE
15+46 –L–						1																		1	1											TBDI W/NARROW SLOTS & FLAT GRATE
																															2@18"					

ABBREVIATIONS

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

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

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GREU TL–3	M–350	XIII	CAT–1	VI MOD	TYPE III	AT–1	EA	G	NG				
–L–	13+61.56	14+42.81	LT	81.25			14+42.81		4.42	7.42		50.00		1			1					1								
–L–	13+61.56	14+42.81	RT	81.25				14+42.81	4.42	7.42	50.00		1				1					1								
–L–	15+25.19	16+06.44	LT	81.25				15+25.19	4.42	7.42	50.00		1				1					1								
–L–	15+25.19	16+06.44	RT	81.25			15+25.19		4.42	7.42		50.00		1			1					1								
		SUBTOTAL		325.00																										
		TYPE III @ 18.75' X4		–75																										
		GREU TL–3 @ 50'X4		–200																										
		TOTAL		50.00													4					4								

11/16/2017
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PROJECT REFERENCE NO.	SHEET NO.
17BPJ2.R.31	4

R/W SHEET NO.

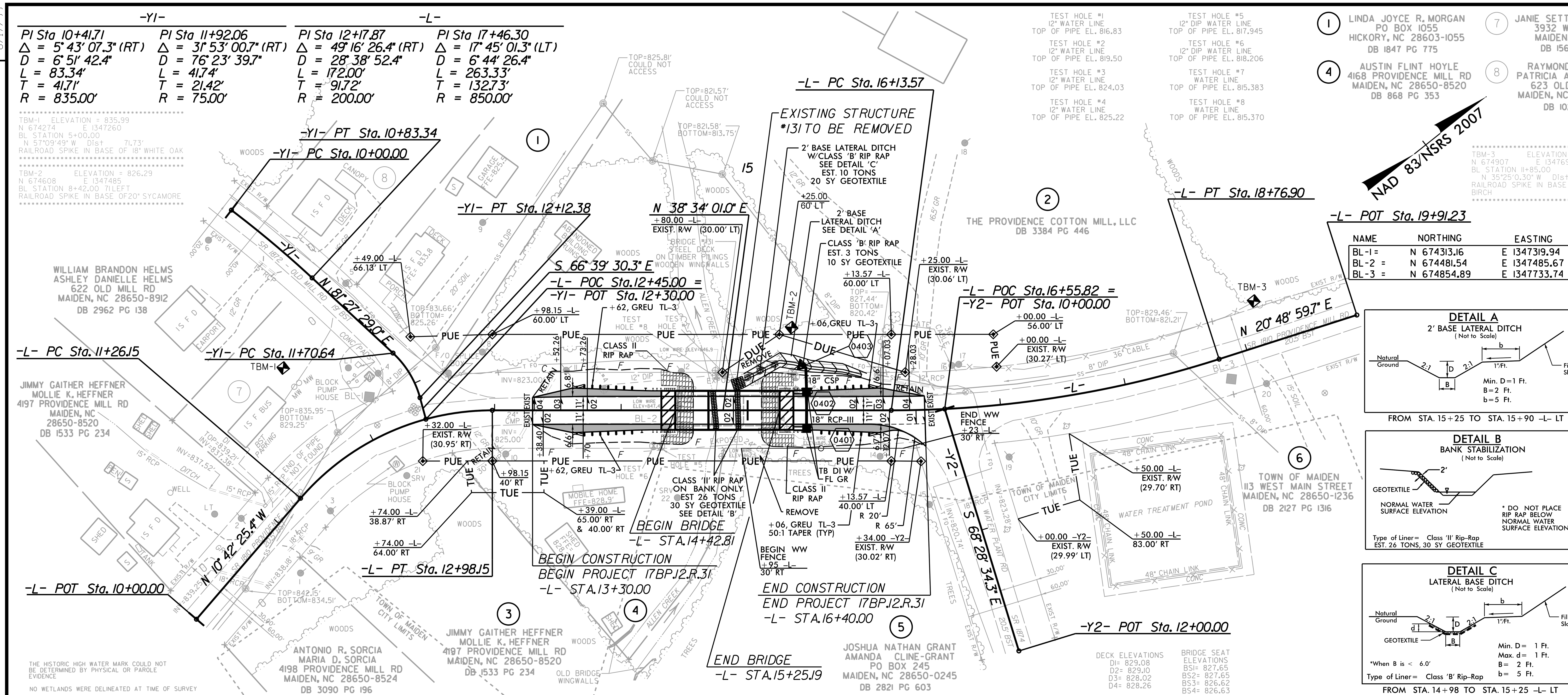
ROADWAY DESIGN ENGINEER — SEAL 026441 — DOMINIC M. WAINWRIGHT — 1/8/2018

HYDRAULICS ENGINEER — SEAL 031986 — JAMES R. RICE — 1/8/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

-Y1- PI Sta 10+41.71	-Y1- PI Sta 11+92.06	-L- PI Sta 12+17.87	-L- PI Sta 17+46.30
Δ = 5° 43' 07.3" (RT)	Δ = 31° 53' 00.7" (RT)	Δ = 49° 16' 26.4" (RT)	Δ = 17° 45' 01.3" (LT)
D = 6° 51' 42.4"	D = 76° 23' 39.7"	D = 28° 38' 52.4"	D = 6° 44' 26.4"
L = 83.34'	L = 41.74'	L = 172.00'	L = 263.33'
T = 41.71'	T = 21.42'	T = 91.72'	T = 132.73'
R = 835.00'	R = 75.00'	R = 200.00'	R = 850.00'


NAD 83/NSRS 2007
-L- PC Sta. 16+13.57
EXISTING STRUCTURE #131 TO BE REMOVED
-Y1- PT Sta. 10+83.34
-Y1- PC Sta. 10+00.00
-Y1- PT Sta. 12+12.38
-Y1- POT Sta. 12+30.00
-L- POC Sta. 12+45.00 =
-Y1- PC Sta. 11+70.64
-L- PC Sta. 11+26.15
-L- PT Sta. 12+98.15
-L- POT Sta. 10+00.00
-L- PT Sta. 18+76.90
-L- POT Sta. 19+91.23
-L- POC Sta. 16+55.82 =
-Y2- POT Sta. 10+00.00
-Y2- POT Sta. 12+00.00
BEGIN BRIDGE -L- STA. 14+42.81
END BRIDGE -L- STA. 15+25.19
BEGIN CONSTRUCTION
BEGIN PROJECT 17BPJ2.R.31
-L- STA. 13+30.00
END CONSTRUCTION
END PROJECT 17BPJ2.R.31
-L- STA. 16+40.00
LINDA JOYCE R. MORGAN PO BOX 1055 HICKORY, NC 28603-1055 DB 1847 PG 775
JANIE SETTLEMYRE BEARD 3932 WILLIAMS ST MAIDEN, NC 28650 DB 1562 PG 433
AUSTIN FLINT HOYLE 4168 PROVIDENCE MILL RD MAIDEN, NC 28650-8520 DB 868 PG 353
RAYMOND HOPPES PATRICIA ANN HOPPES 623 OLD MILL RD MAIDEN, NC 28650-8912 DB 1023 PG 1
THE PROVIDENCE COTTON MILL, LLC DB 3384 PG 446
WILLIAM BRANDON HELMS ASHLEY DANIELLE HELMS 622 OLD MILL RD MAIDEN, NC 28650-8912 DB 2962 PG 138
JIMMY GAITHER HEFFNER MOLLIE K. HEFFNER 4197 PROVIDENCE MILL RD MAIDEN, NC 28650-8520 DB 1533 PG 234
ANTONIO R. SORCIA MARIA D. SORCIA 4198 PROVIDENCE MILL RD MAIDEN, NC 28650-8524 DB 3090 PG 196
JOSHUA NATHAN GRANT AMANDA CLINE-GRANT PO BOX 245 MAIDEN, NC 28650-0245 DB 2821 PG 603
TOWN OF MAIDEN 113 WEST MAIN STREET MAIDEN, NC 28650-1236 DB 2127 PG 1316
DETAIL A 2' BASE LATERAL DITCH (Not to Scale)
FROM STA. 15+25 TO STA. 15+90 -L- LT
DETAIL B BANK STABILIZATION (Not to Scale)
DETAIL C LATERAL BASE DITCH (Not to Scale)
FROM STA. 14+98 TO STA. 15+25 -L- LT

NAME	NORTHING	EASTING	ELEVATION
BL-1 =	N 674313.16	E 1347319.94	834.45
BL-2 =	N 674481.54	E 1347485.67	828.88
BL-3 =	N 674854.89	E 1347733.74	830.26

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY JOYNER KEENY FOR MONUMENT "BL-2 " WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 674481.5380 (ft) EASTING: 1347485.6710 (ft) ELEVATION: 828.88(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999854635

LOCALIZED HORIZONTAL GROUND DISTANCE FROM "-BL-2" TO -L- STA.13+30.00 IS S 46°6'41.05" W 106.72'

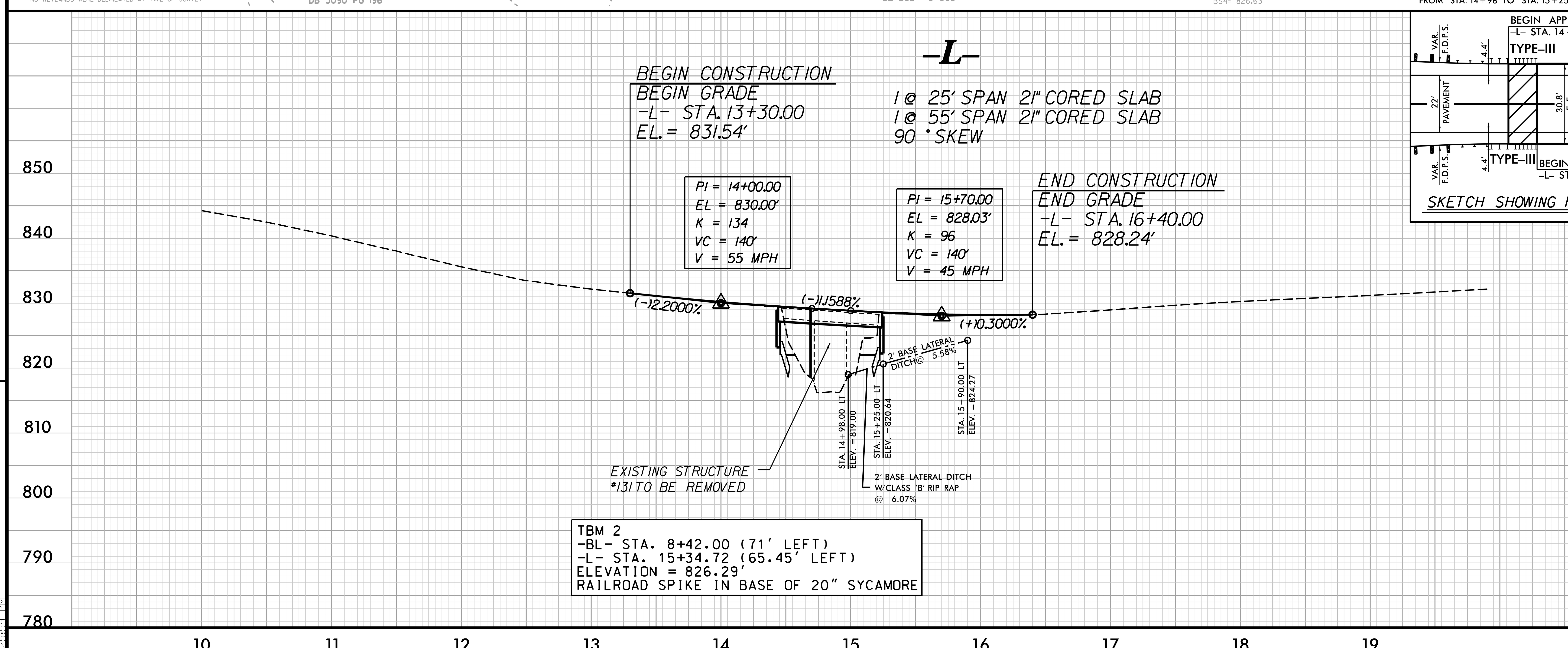
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

CATAWBA COUNTY BRIDGE: # 131 POLE DATA

#	TYPE	ALIGNMENT	STATION	OFFSET	OWNER
1	POWER POLE	-L-	10+81	38.6	DUKE ENERGY
2	POWER POLE	-L-	10+84	-25.2	DUKE ENERGY
3	POWER POLE	-L-	11+35	24.2	DUKE ENERGY
4	POWER POLE	-L-	12+23	-46.4	DUKE ENERGY
5	TELEPHONE POLE	-L-	12+24	-121.9	AT&T COMM.
6	POWER POLE	-L-	11+80	-202.8	DUKE ENERGY
7	TELEPHONE POLE	-L-	12+68	-32.1	AT&T COMM.
8	POWER POLE	-L-	12+92	-46.2	DUKE ENERGY
9	POWER POLE	-L-	12+94	-148.5	DUKE ENERGY
10	POWER POLE	-L-	13+09	34.5	DUKE ENERGY
11	POWER POLE	-L-	13+57	-31.6	DUKE ENERGY
12	TELEPHONE POLE	-L-	14+48	-30.7	AT&T COMM.
13	POWER POLE	-L-	15+09	-34.3	DUKE ENERGY
14	POWER POLE	-L-	16+05	36.4	DUKE ENERGY
15	POWER POLE	-L-	16+41	75.0	DUKE ENERGY
16	TELEPHONE POLE	-L-	16+64	-34.0	AT&T COMM.
17	POWER POLE	-L-	16+69	-34.6	DUKE ENERGY
18	POWER POLE	-L-	16+91	-208.7	DUKE ENERGY
19	POWER POLE	-L-	17+03	41.8	DUKE ENERGY
20	POWER POLE	-L-	19+07	29.8	DUKE ENERGY
21	SERVICE POLE	-L-	12+13	36.9	DUKE ENERGY
22	SERVICE POLE	-L-	14+45	69.0	DUKE ENERGY

REVISIONS

-L-


BEGIN CONSTRUCTION
BEGIN GRADE
-L- STA. 13+30.00
EL.= 831.54'
1 @ 25' SPAN 21" CORED SLAB
1 @ 55' SPAN 21" CORED SLAB
90 ° SKEW
END CONSTRUCTION
END GRADE
-L- STA. 16+40.00
EL.= 828.24'
PI = 14+00.00
EL = 830.00'
K = 134
VC = 140'
V = 55 MPH
PI = 15+70.00
EL = 828.03'
K = 96
VC = 140'
V = 45 MPH
(-)2.2000%
(-)1.1588%
(+)0.3000%
EXISTING STRUCTURE #131 TO BE REMOVED
2' BASE LATERAL DITCH W/CLASS 'B' RIP RAP @ 6.07%
TBM 2
-BL- STA. 8+42.00 (71' LEFT)
-L- STA. 15+34.72 (65.45' LEFT)
ELEVATION = 826.29'
RAILROAD SPIKE IN BASE OF 20" SYCAMORE
BEGIN APPROACH SLAB -L- STA. 14+31.81
END APPROACH SLAB -L- STA. 15+36.19
BEGIN BRIDGE -L- STA. 14+42.81
END BRIDGE -L- STA. 15+25.19
TYPE-III
SKETCH SHOWING ROADWAY IN RELATION TO STRUCTURE
850
840
830
820
810
800
790
780
10
11
12
13
14
15
16
17
18
19

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	1700	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	826.6	FT
BASE DISCHARGE	=	2603	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	828.14	FT
OVERTOPPING DISCHARGE	=	2620	CFS
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING ELEVATION	=	828.2'	FT
DATE OF SURVEY	=	08/01/11	
W.S.ELEVATION AT DATE OF SURVEY	=	817.1	FT

8/17/99

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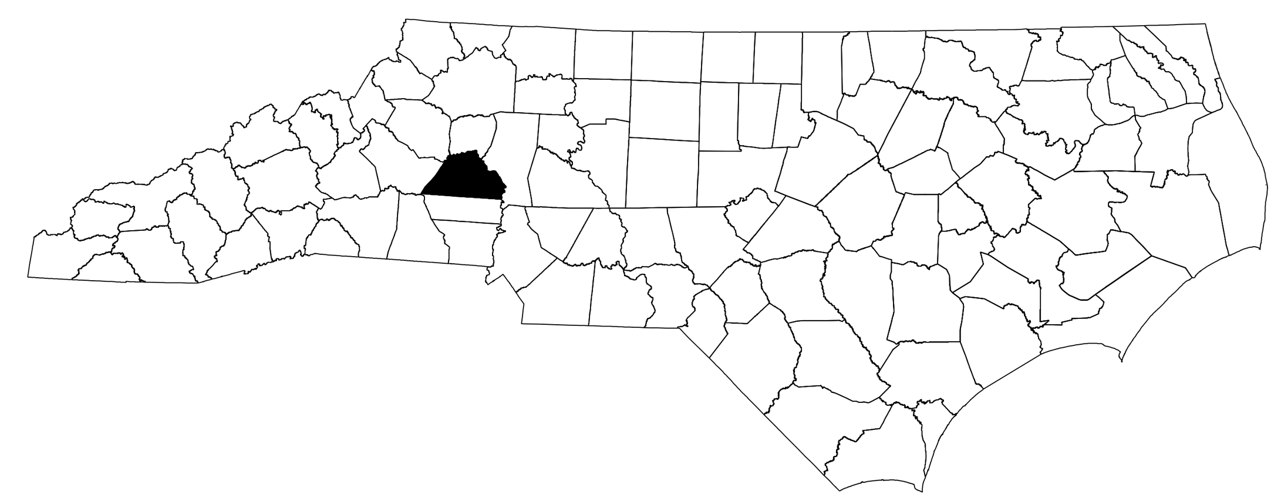
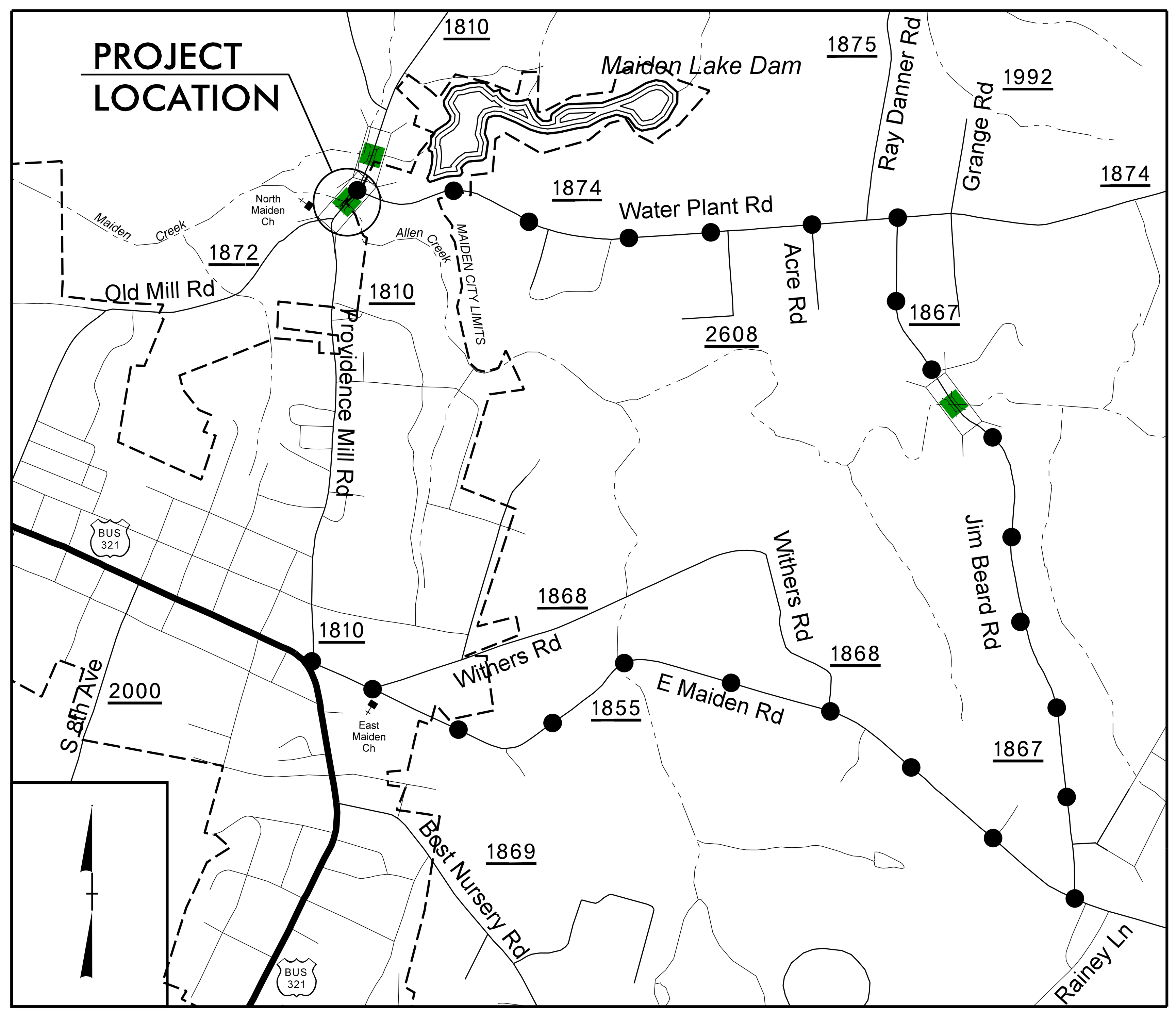
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

CATAWBA COUNTY





DETOUR ROUTE

VICINITY MAP
(NOT TO SCALE)

INDEX OF SHEETS

SHEET NO. TMP-1

STATE PROJECT: 17BP.12.R.31

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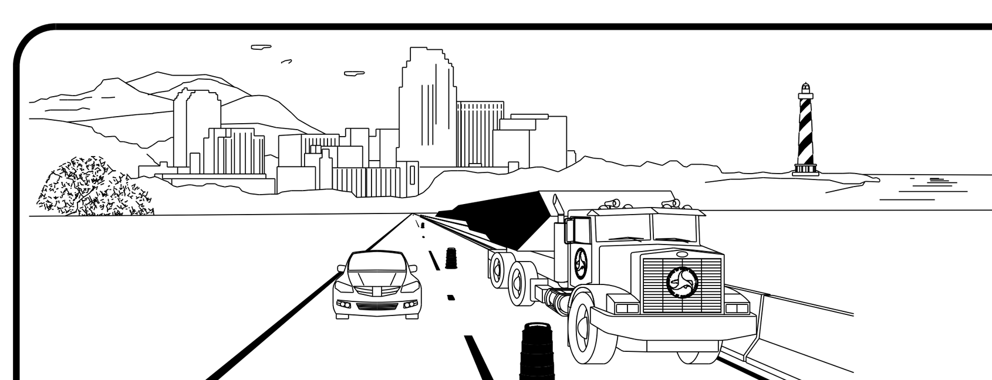

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

J. S. BOURNE, P.E.	STATE TRAFFIC MANAGEMENT ENGINEER
DOMINIC WAINWRIGHT, P.E.	PROJECT ENGINEER
R. ERSKINE BROOKS, P.E.	TRAFFIC CONTROL PROJECT DESIGN ENGINEER
T. NATHAN BEDENBAUGH, P.E.	TRAFFIC CONTROL DESIGN ENGINEER

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

PLAN PREPARED BY:

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

APPROVED: R. Erskine Brooks
DATE: 11/15/2017

NORTH CAROLINA PROFESSIONAL SEAL 032584 ENGINEER R. ERSKINE BROOKS

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PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.31	TMP-1A

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES & OFFSETS
1205.02	PAVEMENT MARKINGS - 2 LANE & MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- REMOVAL

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM
- SKINNY DRUM
- TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW PANEL (TYPE C)
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

SIGNALS

- EXISTING
- PROPOSED
- TEMP TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

APPROVED: R. Erskine Brooks DATE: 11/15/2017

NORTH CAROLINA PROFESSIONAL SEAL 032584 ENGINEER R. ERSKINE BROOKS

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.31	TMP-1B

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS, OR RESULT IN DUPLICATE, OR UNDESIRED OVERLAPPING OR DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES, AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

B) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

C) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFFSITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

D) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN THE ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFFSITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

E) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

F) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

G) UPON COMPLETION OF ALL OTHER CONSTRUCTION OPERATIONS, INSTALL 2 APPLICATIONS OF PAINT PAVEMENT MARKINGS ON THE FINAL SURFACE, ACCORDING TO RSD 1205.1, 1205.2 AND 1205.12.

PHASING NOTES

TRAFFIC CONTROL PHASING

NOTE: COORDINATE WITH THE ENGINEER FOR INSTALLATION AND REMOVAL OF ALL SIGNING AND TRAFFIC CONTROL DEVICES.

NOTE: MAINTAIN ACCESS TO DRIVEWAYS WITHIN PROJECT LIMITS AT ALL TIMES.

STEP 1: USING RSD 1101.01, SHEET 3 OF 3, INSTALL ADVANCE WORK ZONE WARNING SIGNS ON PROVIDENCE MILL ROAD (SR 1810).

STEP 2: USING RSD 1101.03, SHEET 1 OF 9 AND SHEET TMP-2, INSTALL DETOUR SIGNS AND BARRICADES AND CLOSE PROVIDENCE MILL ROAD (SR 1810).

STEP 3: REMOVE EXISTING BRIDGE NO. 131 AND CONSTRUCT PROPOSED BRIDGE AND ROADWAY, UP TO AND INCLUDING THE FINAL LAYER OF SURFACE COURSE. PLACE FINAL PAVEMENT MARKINGS ON PROVIDENCE MILL ROAD (SR 1810) FROM -L- STA. 13+30 +/- TO STA. 16+40 +/-.

STEP 4: REMOVE ALL ADVANCE WORK ZONE DETOUR SIGNS, AND TRAFFIC CONTROL DEVICES AND OPEN PROVIDENCE MILL ROAD (SR 1810) TO TRAFFIC.

APPROVED: DocuSigned by: R. Erskine Brooks DATE: 11/15/2017

NORTH CAROLINA PROFESSIONAL SEAL 032584 ENGINEER R ERSKINE BROOKS

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

GENERAL NOTES AND PHASING

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_tcp.tbl
USER: dwalrwri DATE: 11/10/2017 TIME: 5:09:29 PM SCALE: half=1:100, full=1:50
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PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.31	TMP-2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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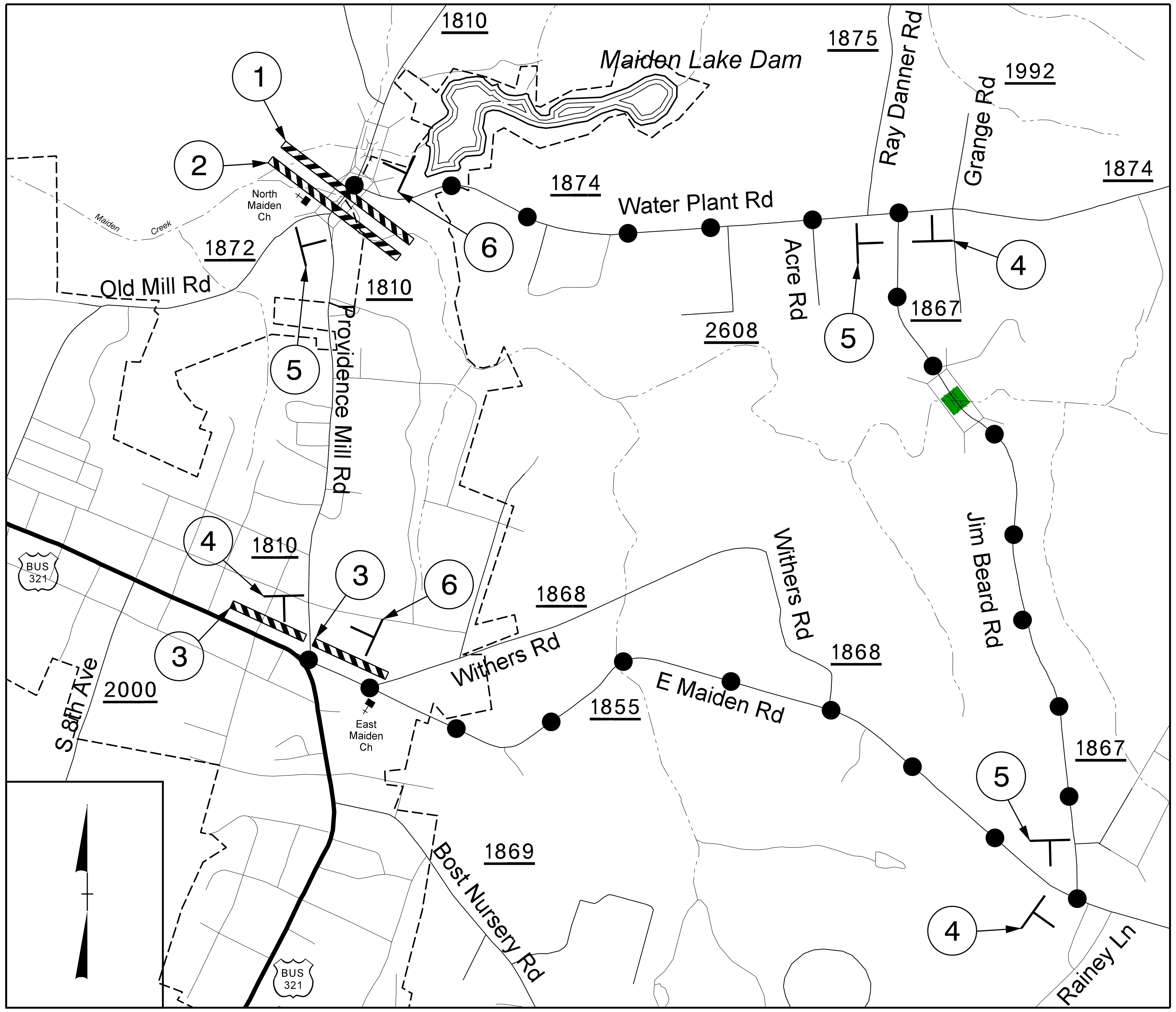
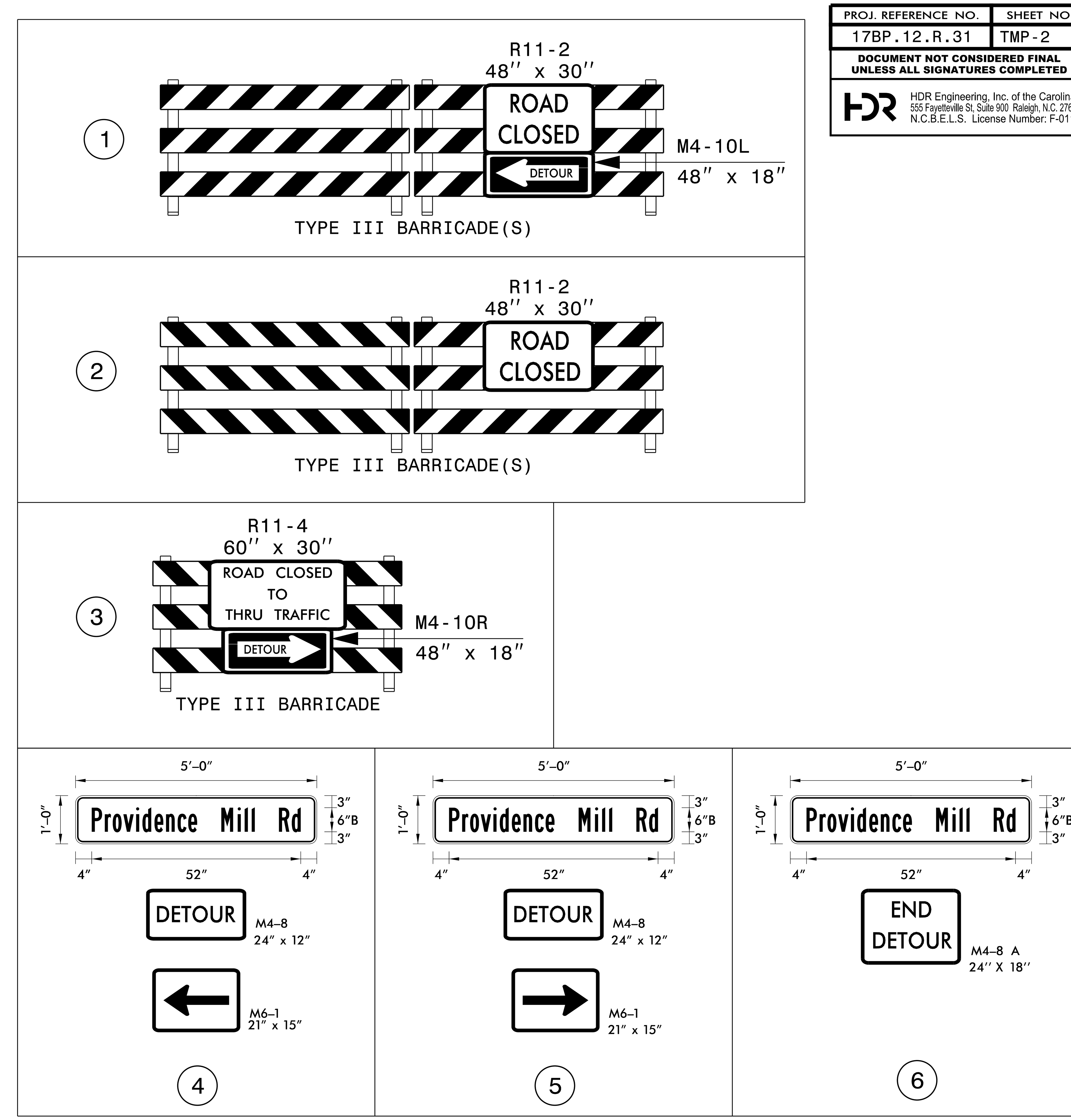
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116





SEE SHEET SD-01 FOR SIGN DESIGN DETAILS

DETOUR ROUTE

REFER TO RSD 1101.03 SHEET 1 OF 9 FOR ADDITIONAL SIGN AND BARRICADE PLACEMENT

11/10/2017
c:\pwworking\tpa\d0360951\17013L_TCP_DSN.dgn
5:09:30 PM

APPROVED: R. Erskine Brooks DATE: 11/15/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032584 R. ERSKINE BROOKS

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

OFFSITE DETOUR PLAN PROVIDENCE MILL ROAD (SR 1810)

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.31	SD-01

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N.C.B.E.L.S. License Number: F-0116

SIGN NUMBER:
TYPE: D
QUANTITY: 1

SIGN WIDTH: 5′-0″
HEIGHT: 1′-0″
TOTAL AREA: 5.0 Sq.Ft.

BORDER TYPE: RECESSED
RECESS: 0.38″
WIDTH: 0.38″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Orange
COPY COLOR: Black

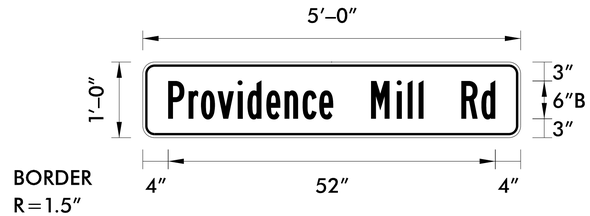
SYMBOL	X	Y	WID	HT

MAT′L: 0.125″ (3.2 mm) ALUMINUM

DESIGN BY: D KERNS
PROJECT ID: ID
CHECKED BY:
DIV: DIV
DATE: Jun 08, 2012

USE NOTES:

1. Legend and border shall be direct applied non-reflective sheeting.
2. Background shall be Grade B reflective sheeting.



BORDER
R = 1.5″
TH = 0.38″
IN = 0.38″

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

Series/Size
Text Length

		P	r	o	v	i	d	e	n	c	e		M	i	l	l		R	d								B 2000
	4	3.2	2	2.6	3.2	1.6	3	2.9	2.9	2.6	2.2	6	4.1	1.7	1.7	0.8	6	3.2	2.2	4								52

FILENAME: DWSignDesigns

NORTH CAROLINA D.O.T. SIGN DETAIL

APPROVED: David H. Kerns DocuSigned by: DATE: 11/13/2017

NORTH CAROLINA PROFESSIONAL SEAL 030881 ENGINEER DAVID H. KERNS

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

SIGN DETAIL
PROVIDENCE MILL RD

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USER: dwainwri DATE: 11/10/2017 TIME: 5:09:30 PM SCALE: half=1:100, full=1:50
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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, 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1605.01	Temporary Silt Fence	1631.01	Matting Installation
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1622.01	Slope Drain	1633.01	Temporary Rock Silt Check Type A
1630.03	Temporary Silt Ditch	1633.02	Temporary Rock Silt Check Type B

ROADSIDE ENVIRONMENTAL UNIT
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

2012 STANDARD SPECIFICATIONS

PROJECT REFERENCE NO.	SHEET NO.
17BPJ2.R.31	EC-1
R/W SHEET NO.	

JOSHUA MASSROCK, P.E.
LEVEL III-A: DESIGNER OF EROSION AND SEDIMENT CONTROL PLANS.
CERTIFICATION NUMBER: 3573

HDR Engineering, Inc. of the Carolinas
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N.C.B.E.L.S. License Number: F-0116

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

Place Matting for Erosion Control on Slope as Work Allows.

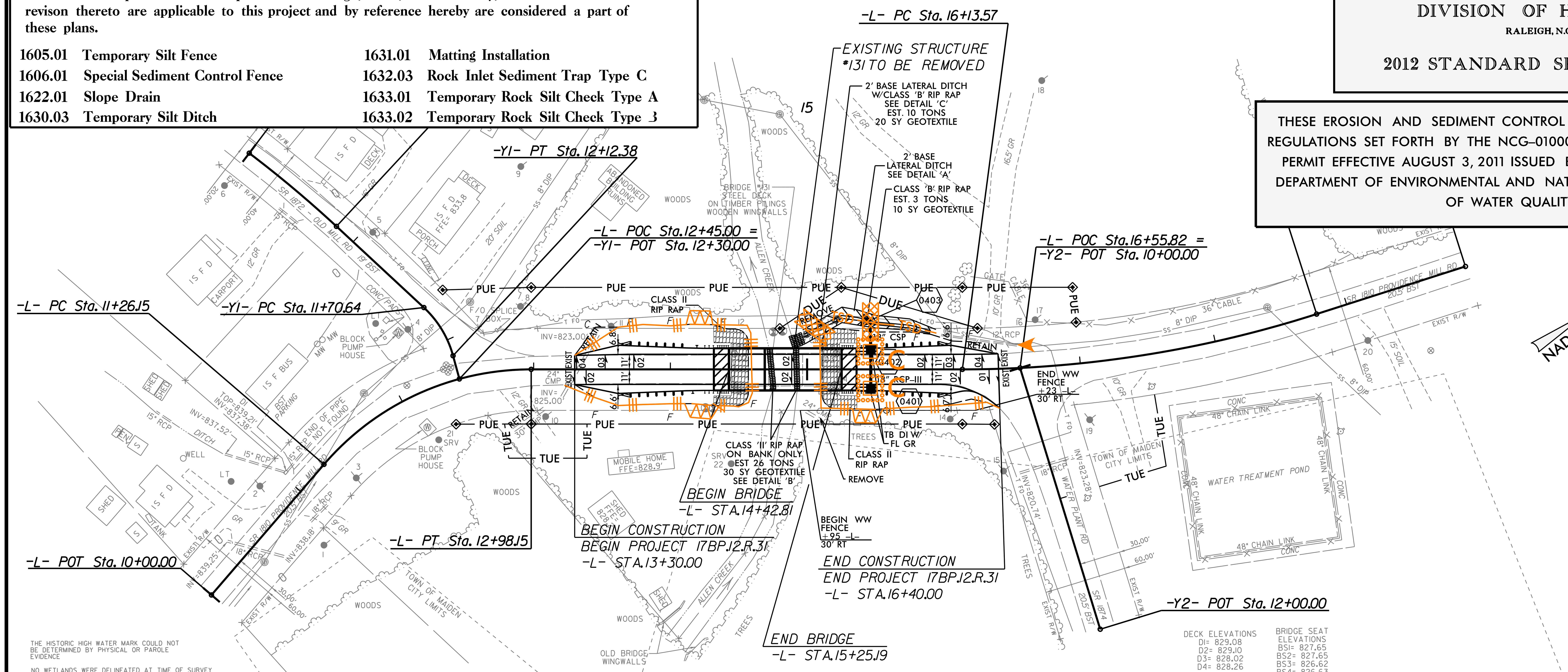
NOTES: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

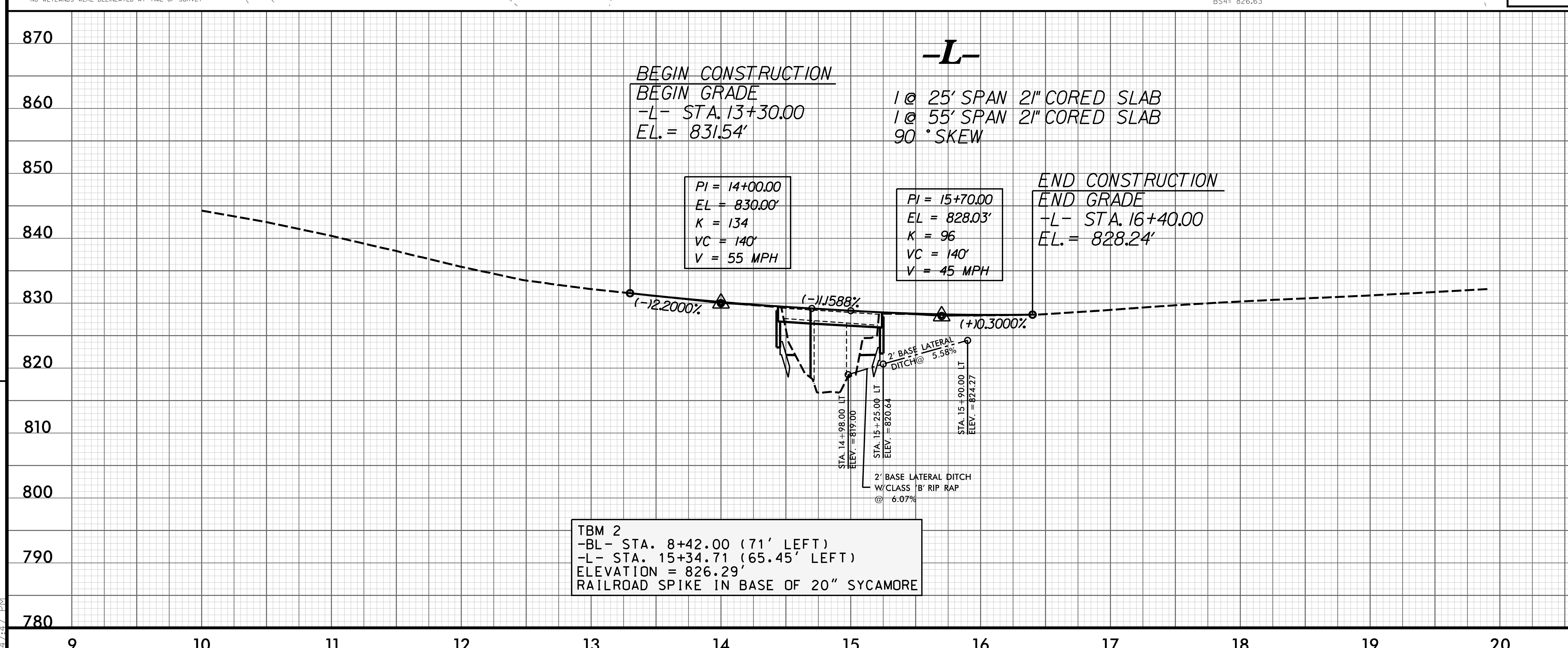
ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

NOTE: PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

NOTE: PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED DURING CLEARING AND GRUBBING PHASE.

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1630.03	Temporary Silt Ditch	TSD
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Temporary Rock Silt Check Type-B	
1632.03	Rock Inlet Sediment Trap: Type C	C





BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1700	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 826.6	FT
BASE DISCHARGE	= 2603	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 828.1	FT
OVERTOPPING DISCHARGE	= 2620	CFS
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING ELEVATION	= 828.2'	FT
DATE OF SURVEY	= 08/01/11	
W.S. ELEVATION AT DATE OF SURVEY	= 817.1	FT

TBM 2
-BL- STA. 8+42.00 (71' LEFT)
-L- STA. 15+34.71 (65.45' LEFT)
ELEVATION = 826.29'
RAILROAD SPIKE IN BASE OF 20" SYCAMORE

REVISIONS

8/17/99

1/8/2018 ...\CADD\170131_EC_PSH.dgn

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	EC-2

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DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL: SIDE SLOPES 2:1 OR STEEPER

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	13+45	14+42	LT	150
4	-L-	13+45	14+42	RT	87
4	-L-	15+25	16+06	LT	100
4	-L-	15+25	156+20	RT	116
				TOTAL	453
				SAY	460

MATTING FOR EROSION CONTROL: PSRM DITCH LINER

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	15+00	15+90	LT	30
				TOTAL	30
				SAY	30

11/16/2017
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10:02:29 AM

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N.C.B.E.L.S. License Number: F-0116

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.

11/16/2017
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TIP PROJECT: 17BP.12.R.31

T.I.P. NO.	SHEET NO.
17B.12.R.31	UC–1

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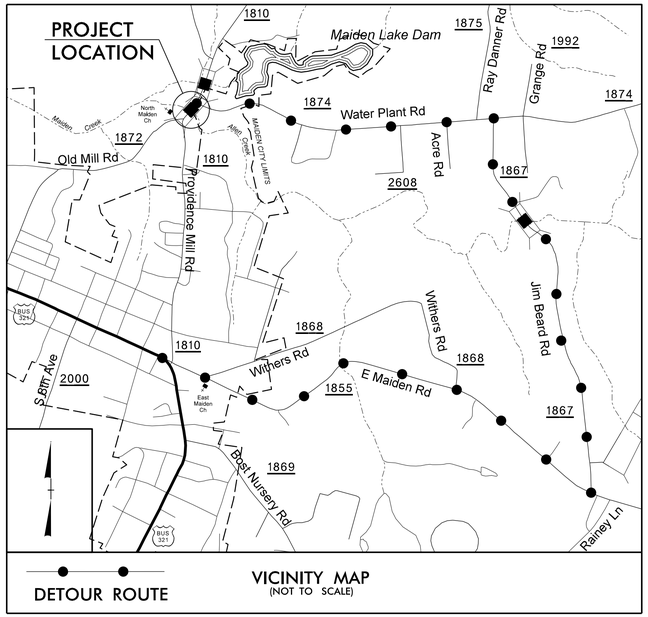
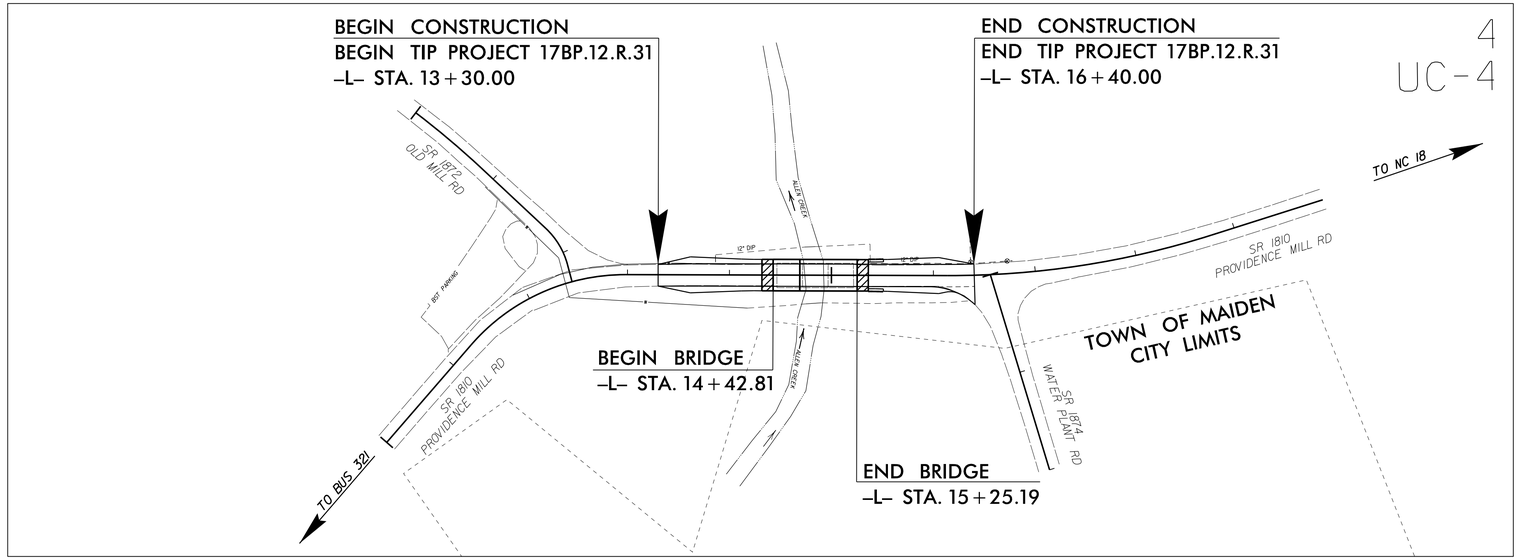
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITY CONSTRUCTION PLANS
CATAWBA COUNTY

LOCATION: BRIDGE NO. 131 ON SR 1810 OVER ALLEN CREEK BETWEEN SR 1872 AND SR 1874
TYPE OF WORK: ABANDONED WATER LINE





NAD 83/
NSRS 2007

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

WATER AND SEWER OWNERS ON PROJECT

(A) TOWN OF MAIDEN

PREPARED IN THE OFFICE OF:

HINDE ENGINEERING
License No. C-2639
401 Harrison Oaks Blvd., Suite 145 Cary, NC 27513
Ph. (919) 653-0001

R. B. Wilkins, P.E. — UTILITIES PROJECT MANAGER
R. B. Wilkins, P.E. — UTILITIES PROJECT ENGINEER
R. B. Wilkins, PE — UTILITIES PROJECT DESIGNER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 19751 ENGINEER RONALD B. WILKINS
Digitally signed by Ronald B. Wilkins
11/16/2017

DIVISION OF HIGHWAYS
UTILITIES UNIT
1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

Michael Poe, P.E. — DIVISION CONTACT #1
Thad F. Duncan, P.E. — DIVISION CONTACT #2

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HINDE ENGINEERING
License No. C-2639
401 Harrison Oaks Blvd., Suite 145 Cary, NC 27513

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	UC-2

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Symbol	Label
Water Line (Sized as Shown)	12" WL
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	GV
Butterfly Valve	BV
Tapping Valve	TGV
Line Stop	LS
Line Stop with Bypass	LS/BP
Blow Off	BO
Fire Hydrant	PFH
Relocate Fire Hydrant	RFH
Remove Fire Hydrant	REM FH
Water Meter	PWM
Relocate Water Meter	RWM
Remove Water Meter	REM WM
Water Pump Station	PS(W)
RPZ Backflow Preventer	PRPZ
DCV Backflow Preventer	PBFP
Relocate RPZ Backflow Preventer	RRPZ
Relocate DCV Backflow Preventer	RBFP

PROPOSED SEWER SYMBOLS

Symbol	Label
Gravity Sewer Line (Sized as Shown)	12" SS
Force Main Sewer Line (Sized as Shown)	12" FSS
Manhole (Sized per Note)	
Sewer Pump Station	PS(SS)

PROPOSED MISCELLANOUS UTILITIES SYMBOLS

Symbol	Label
Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	TEL PED
Utility Line by Others (Type as Shown)	PROP O/H POW LINES
Trenchless Installation	12" TL INSTALL
Encasement by Open Cut	24" ENCAS BY OC
Encasement	24" ENCASEMENT
Thrust Block	
Air Release Valve	AR
Utility Vault	UV
Concrete Pier	CP
Steel Pier	SP
Plan Note	NOTE
Pay Item Note	PAY ITEM

EXISTING UTILITIES SYMBOLS

Symbol	Label
Power Pole	
Telephone Pole	
Joint Use Pole	
Utility Pole	
Utility Pole with Base	
H-Frame Pole	
Power Transmission Line Tower	
Water Manhole	
Power Manhole	
Telephone Manhole	
Sanitary Sewer Manhole	
Hand Hole for Cable	
Power Transformer	
Telephone Pedestal	
CATV Pedestal	
Gas Valve	
Gas Meter	
Located Miscellaneous Utility Object	
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.
*Underground Power Line	P
*Underground Telephone Cable	T
*Underground Telephone Conduit	TC
*Underground Fiber Optics Telephone Cable	T FO
*Underground TV Cable	TV
*Underground Fiber Optics TV Cable	TV FO
*Underground Gas Pipeline	G
Aboveground Gas Pipeline	A/G Gas
*Underground Water Line	W
Aboveground Water Line	A/G Water
*Underground Gravity Sanitary Sewer Line	SS
Aboveground Gravity Sanitary Sewer Line	A/G Sanitary Sewer
*Underground SS Forced Main Line	FSS
Underground Unknown Utility Line	?UTL
SUE Test Hole	
Water Meter	
Water Valve	
Fire Hydrant	
Sanitary Sewer Cleanout	

*For Existing Utilities

Symbol	Label
Utility Line Drawn from Record (Type as Shown)	W
Designated Utility Line (Type as Shown)	W

REV: 2/1/2012

UTILITY CONSTRUCTION

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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	UC-3
DESIGNED BY: CDB	
DRAWN BY: JNA	
CHECKED BY: CDB	
APPROVED BY: CLS	
REVISED:	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

NORTH CAROLINA PROFESSIONAL SEAL 047579 ENGINEER RONALD B. WILKINS
DocuSigned by: Ronald B. Wilkins
A30B8F7AF145423...
11/16/2017

UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2012.

2. THE EXISTING UTILITIES BELONG TO TOWN OF MAIDEN.

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.

4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.

5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.

7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.

8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.

9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

16-NOV-2017 17:04
C:\USERS\...\PROJECTS\2010\2010991.00 HDR_NCDOT_Div12 Bridges\2010991.16 - 17B.12.R.31.B13\Design\Utility Design\170131_RBW_ut_notes_UC03.psh.dgn

NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	UC-3A
DESIGNED BY: RBW	
DRAWN BY: RBW	
CHECKED BY: CLS	
APPROVED BY: RBW	
REVISED:	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

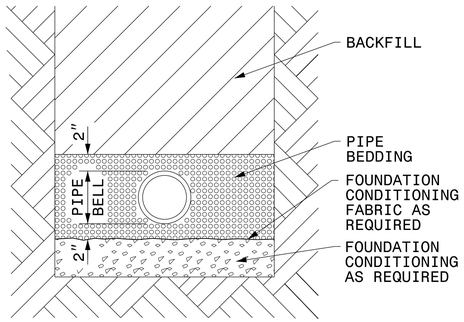
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030887AF145423 RONALD B. WILKINS 11/16/2017
DocuSigned by: Ronald B. Wilkins

UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

PROJECT TYPICAL DETAILS

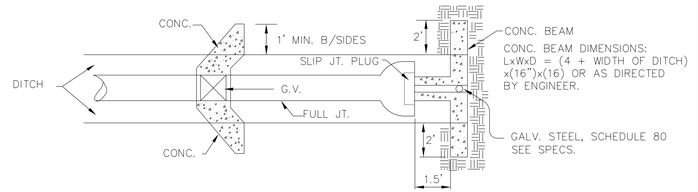
TRENCH DETAIL



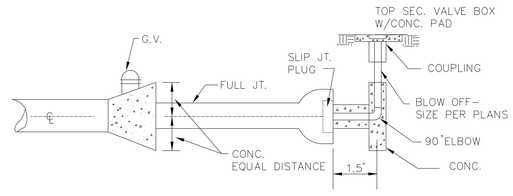
PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED, AS DIRECTED BY ENGINEER. PIPE BEDDED IN SELECT MATERIAL, CLASS II (TYPE 1) OR CLASS III. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROXIMATELY 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

MAXIMUM TRENCH WIDTH AT TOP OF PIPE

NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		



PLAN



ELEVATION

NOTES:

1. BLOCKING MUST BE KEYED INTO UNDISTURBED TRENCH WALLS.

TOWN OF MAIDEN
UTILITY DEPARTMENT

Job No. File No.
Scales
PLAN N.T.S.
PROFILE Hor. Vert.
As Built Date

BLOW-OFF DETAIL 2"

DEAD END BLOCKING 6", 8", AND 12" MAINS

No.	Date	By	Revision

Surveyed By | Designed By | Drawn By | Project-Engr | Approved By | Date | Sheet 4 Of

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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	UC-4

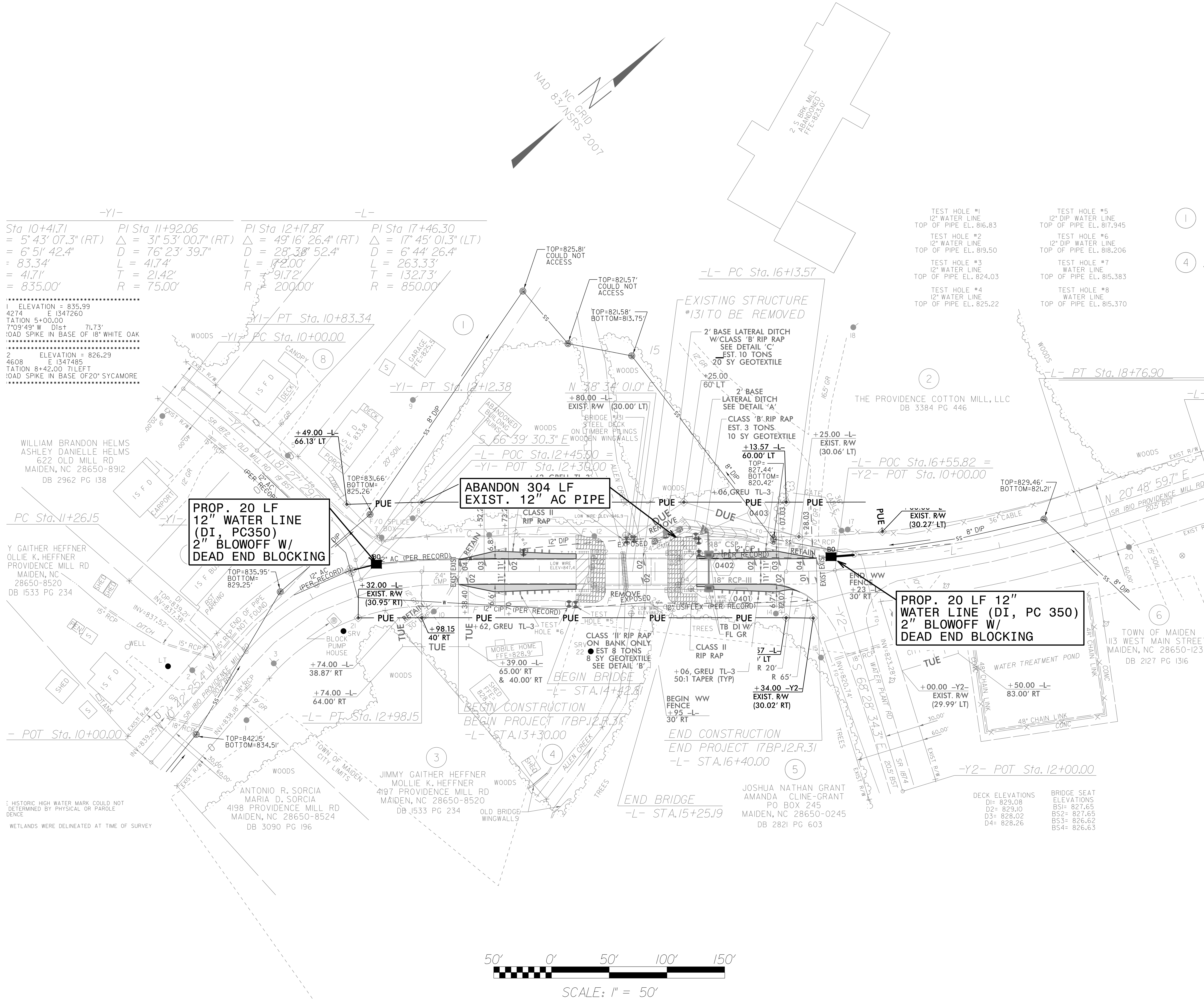
DESIGNED BY: RBW
DRAWN BY: RBW
CHECKED BY: CLS
APPROVED BY: RBW
REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE: (919)707-6690
FAX: (919)250-4151

NORTH CAROLINA PROFESSIONAL SEAL 037157 ENGINEER RONALD B. WILKINS
11/16/2017

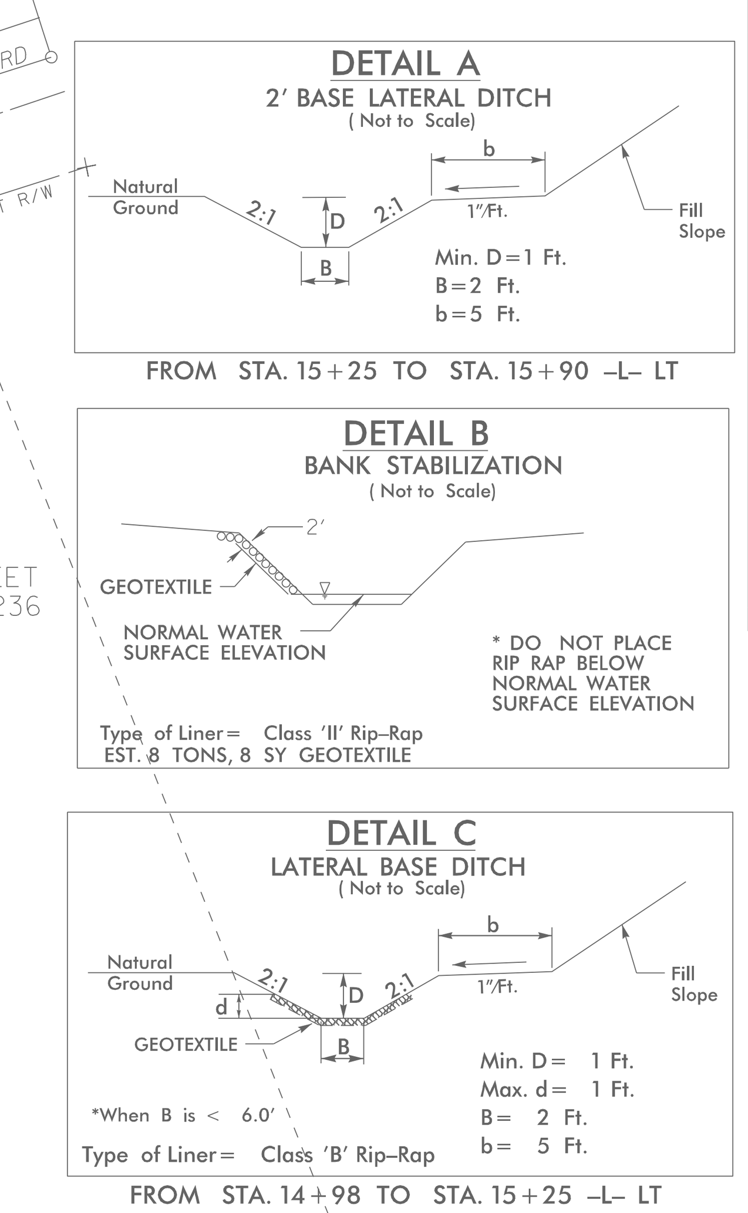
UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



NAME	NORTHING	EASTING	ELEVATION
BL-1 =	N 674313.16	E 1347319.94	834.45
BL-2 =	N 674481.54	E 1347485.67	828.88
BL-3 =	N 674854.89	E 1347733.74	830.26

SCALE: 0 50 100



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY JOYNER KEENY FOR MONUMENT "BL-2 " WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 674481.5380 (ft) EASTING: 1347485.6710 (ft) ELEVATION: 828.88(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999854635

LOCALIZED HORIZONTAL GROUND DISTANCE FROM "-BL-2" TO -L- STA.13+30.00 IS S 46°6'41.05" W 106.72'

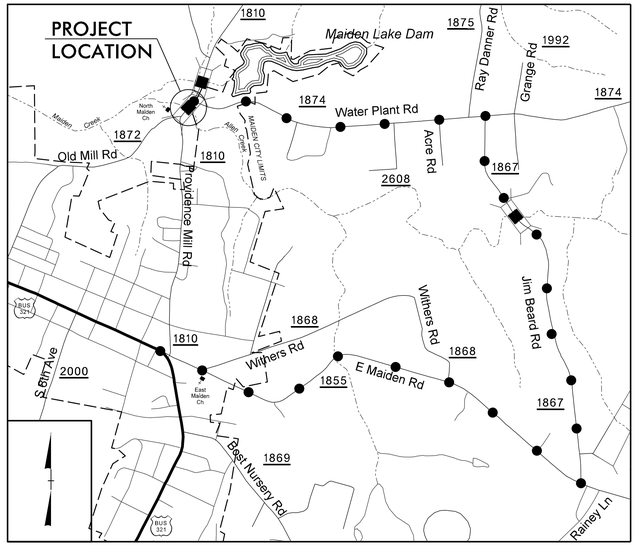
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

CATAWBA COUNTY BRIDGE: # 131 POLE DATA

#	TYPE	ALIGNMENT	STATION	OFFSET	OWNER
1	POWER POLE	-L-	10+81	38.6	DUKE ENERGY
2	POWER POLE	-L-	10+84	-25.2	DUKE ENERGY
3	POWER POLE	-L-	11+35	24.2	DUKE ENERGY
4	POWER POLE	-L-	12+23	-46.4	DUKE ENERGY
5	TELEPHONE POLE	-L-	12+24	-121.9	AT&T COMM.
6	POWER POLE	-L-	11+80	-202.8	DUKE ENERGY
7	TELEPHONE POLE	-L-	12+68	-32.1	AT&T COMM.
8	POWER POLE	-L-	12+92	-46.2	DUKE ENERGY
9	POWER POLE	-L-	12+94	-148.5	DUKE ENERGY
10	POWER POLE	-L-	13+09	34.5	DUKE ENERGY
11	POWER POLE	-L-	13+57	-31.6	DUKE ENERGY
12	TELEPHONE POLE	-L-	14+48	-30.7	AT&T COMM.
13	POWER POLE	-L-	15+09	-34.3	DUKE ENERGY
14	POWER POLE	-L-	16+05	36.4	DUKE ENERGY
15	POWER POLE	-L-	16+41	75.0	DUKE ENERGY
16	TELEPHONE POLE	-L-	16+64	-34.0	AT&T COMM.
17	POWER POLE	-L-	16+69	-34.6	DUKE ENERGY
18	POWER POLE	-L-	16+91	-208.7	DUKE ENERGY
19	POWER POLE	-L-	17+03	41.8	DUKE ENERGY
20	POWER POLE	-L-	19+07	29.8	DUKE ENERGY
21	SERVICE POLE	-L-	12+13	36.9	DUKE ENERGY
22	SERVICE POLE	-L-	14+45	69.0	DUKE ENERGY

STRUCTURE #170131, PROJECT #17BP.12.R.31
CATAWBA COUNTY
ON SR 1810 (PROVIDENCE MILL ROAD)
OVER ALLEN CREEK

TIP PROJECT: 17BP.12.R.31



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
CATAWBA COUNTY

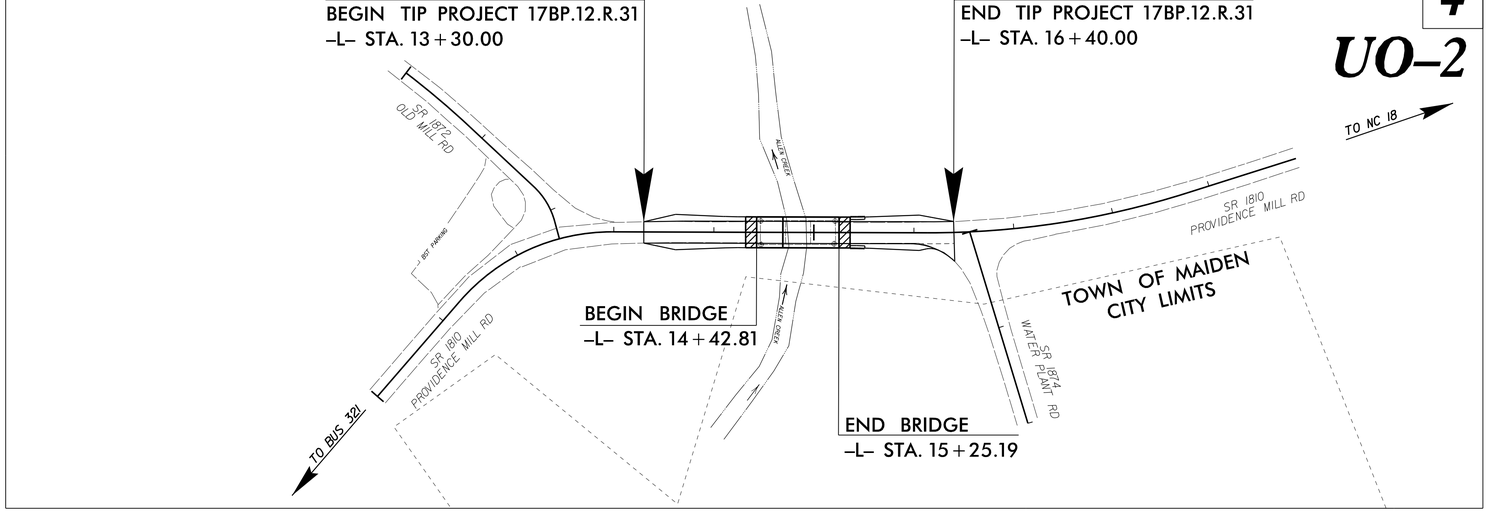
T.I.P. NO.	SHEET NO.
17BP.12.R.31	UO–1

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

LOCATION: BRIDGE NO. 131 ON SR 1810 OVER ALLEN CREEK BETWEEN SR 1872 AND SR 1874

TYPE OF WORK: POWER DISTRIBUTION & COMMUNICATIONS RELOCATIONS

NAD 83/
NSRS 2007



LOCATION SKETCH

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

UTILITY OWNERS WITH CONFLICTS

(A) POWER – DUKE ENERGY (POWER DISTRIBUTION)
(B) COMMUNICATIONS – AT&T
(C) COMMUNICATIONS – CHARTER

PREPARED IN THE OFFICE OF:

HINDE ENGINEERING
License No. C-2639
7520 E. Independence Blvd., Suite 230 Charlotte, NC 28227
(704) 814-4407

Michael E. Davis — *UTILITY COORDINATION PROJECT MANAGER*
Todd E. Butner — *PROJECT UTILITY COORDINATOR*
Clint L. Stevens, PE — *PROJECT UTILITY DESIGNER*

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.31	UO-2

UTILITIES BY OTHERS

NOTE:
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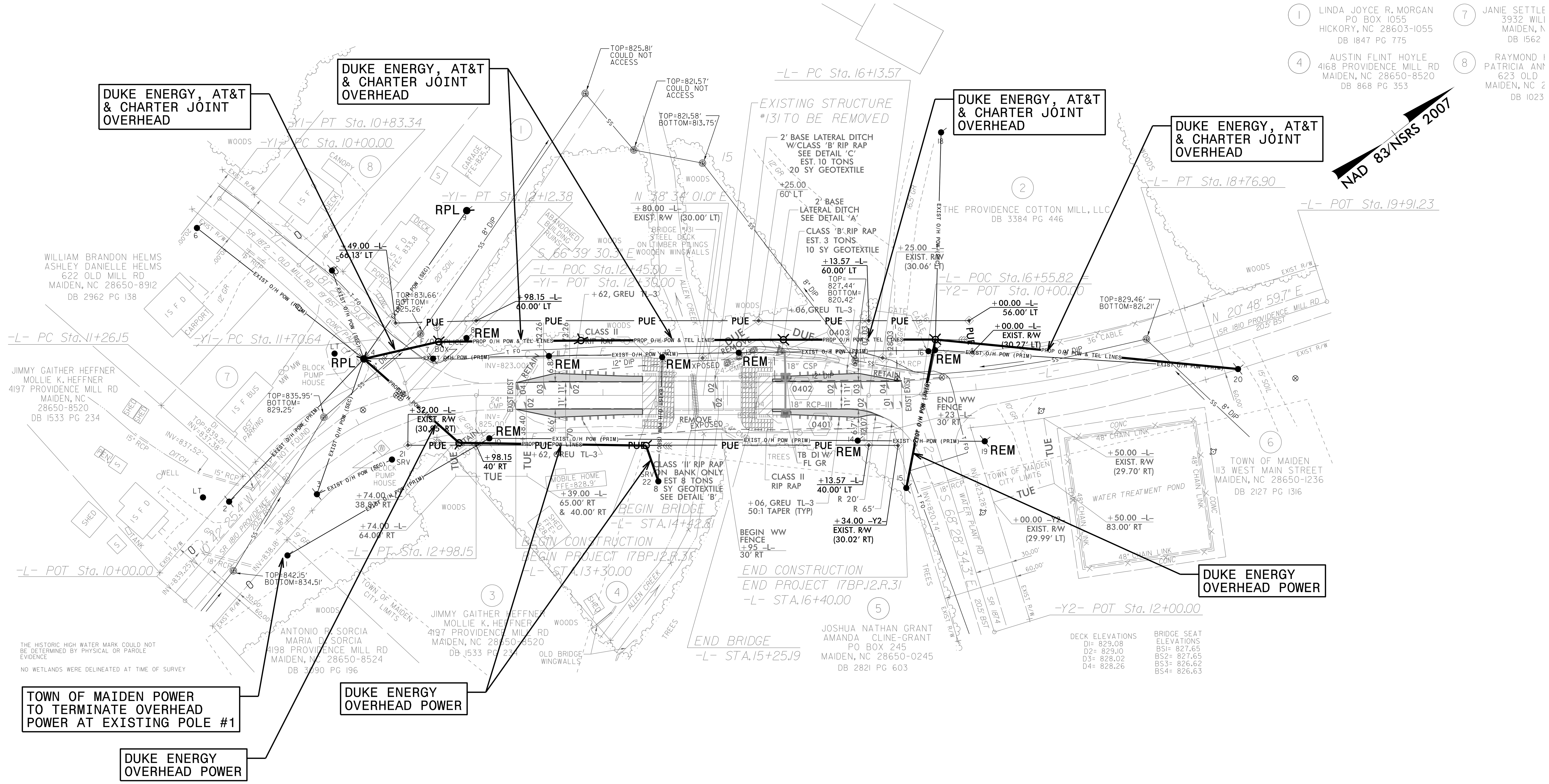

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14	POWER POLE	-L-	16+05	36.4	DUKE ENERGY
15	POWER POLE	-L-	16+41	75.0	DUKE ENERGY
16	TELEPHONE POLE	-L-	16+64	-34.0	AT&T COMM.
17	POWER POLE	-L-	16+69	-34.6	DUKE ENERGY
18	POWER POLE	-L-	16+91	-208.7	DUKE ENERGY
19	POWER POLE	-L-	17+03	41.8	DUKE ENERGY
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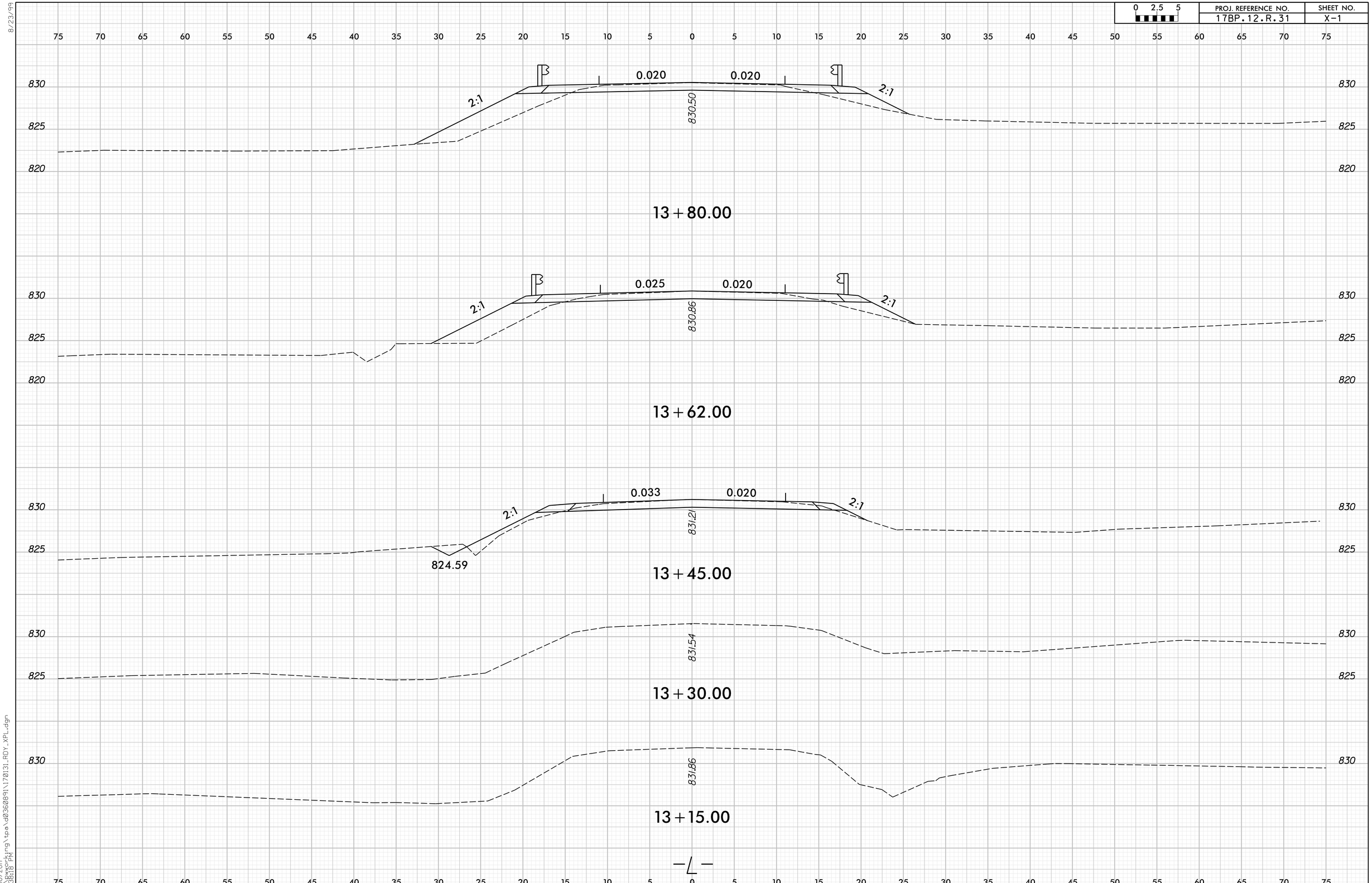
22	SERVICE POLE	-L-	14+45	69.0	DUKE ENERGY

HINDE ENGINEERING
License No. C-2639
7520 E. Independence Blvd., Suite 230 Charlotte, NC 28227

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.12.R.31	X-1



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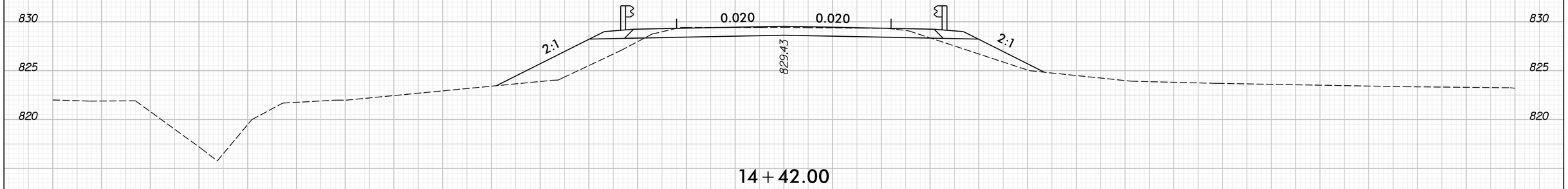
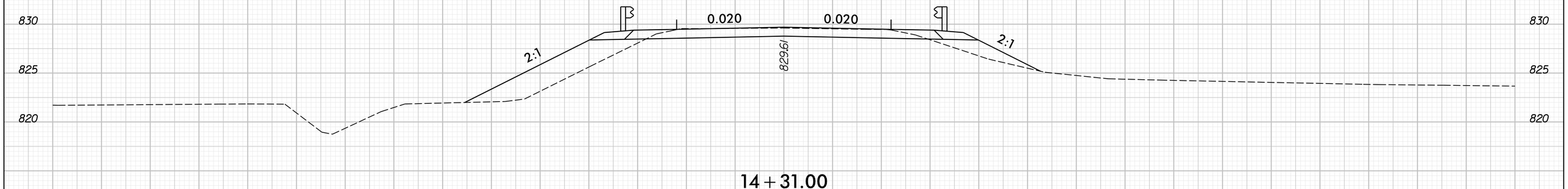
	17BP.12.R.31	X-2



14 + 42.00



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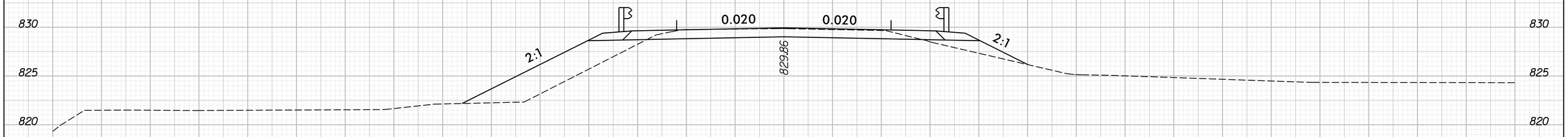

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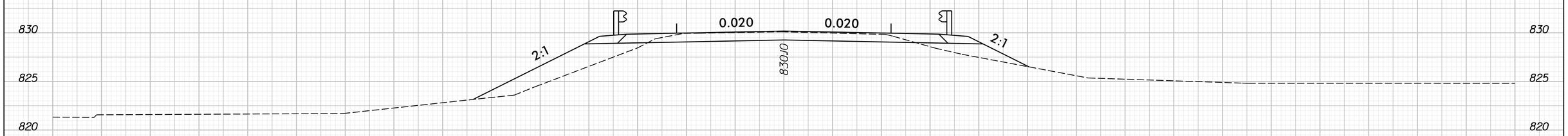

14 + 00.00
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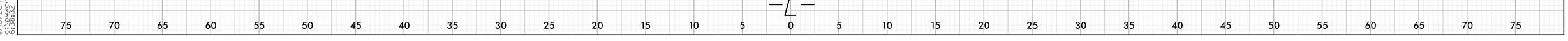


11/10/2017
c:\projects\tpk\d0360891\17013L_RDY_XPL.dgn
8:38:32 PM

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.31	X-3

PROJ. REFERENCE NO.	SHEET NO.
17BP.12.R.31	X-4

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	17BP.12.R.31	X-5

-2.2000% △ -1.1588%

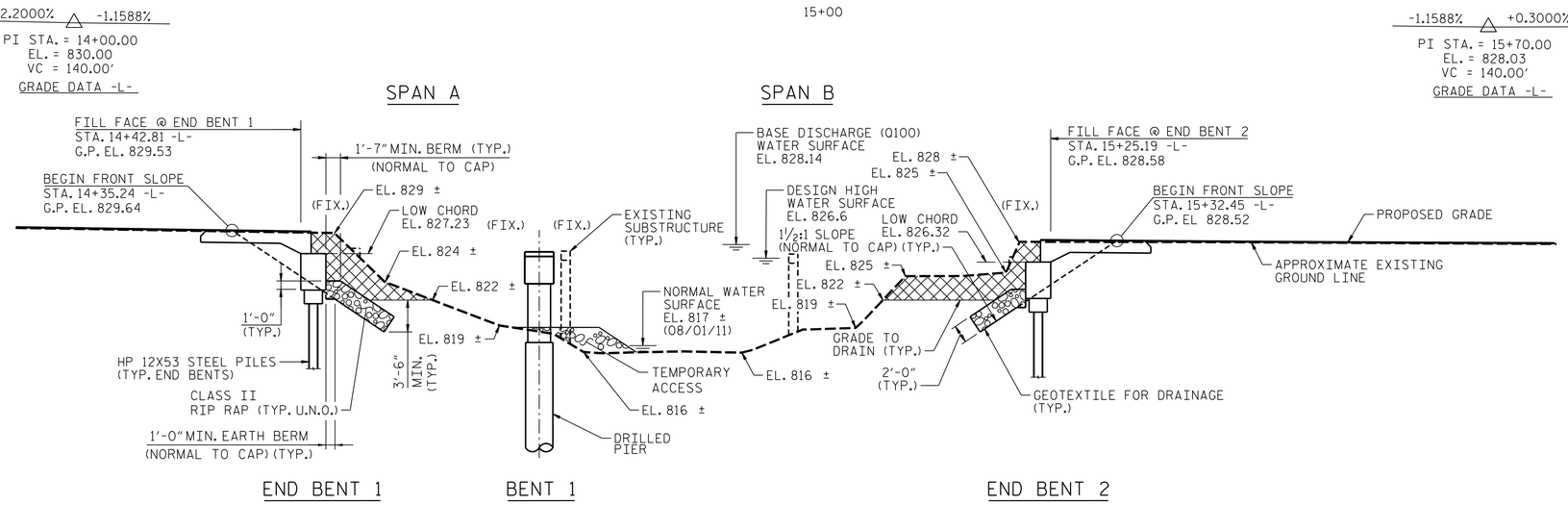
PI STA. = 14+00.00
EL. = 830.00
VC = 140.00'

GRADE DATA -L-

-1.1588% △ +0.3000%

PI STA. = 15+70.00
EL. = 828.03
VC = 140.00'

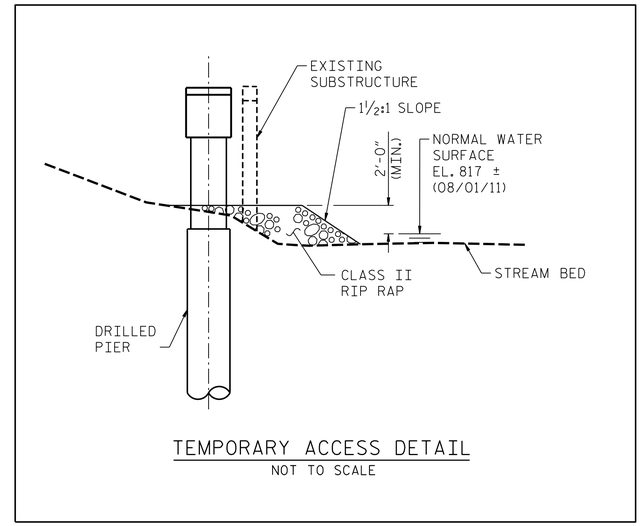
GRADE DATA -L-



SECTION ALONG -L-

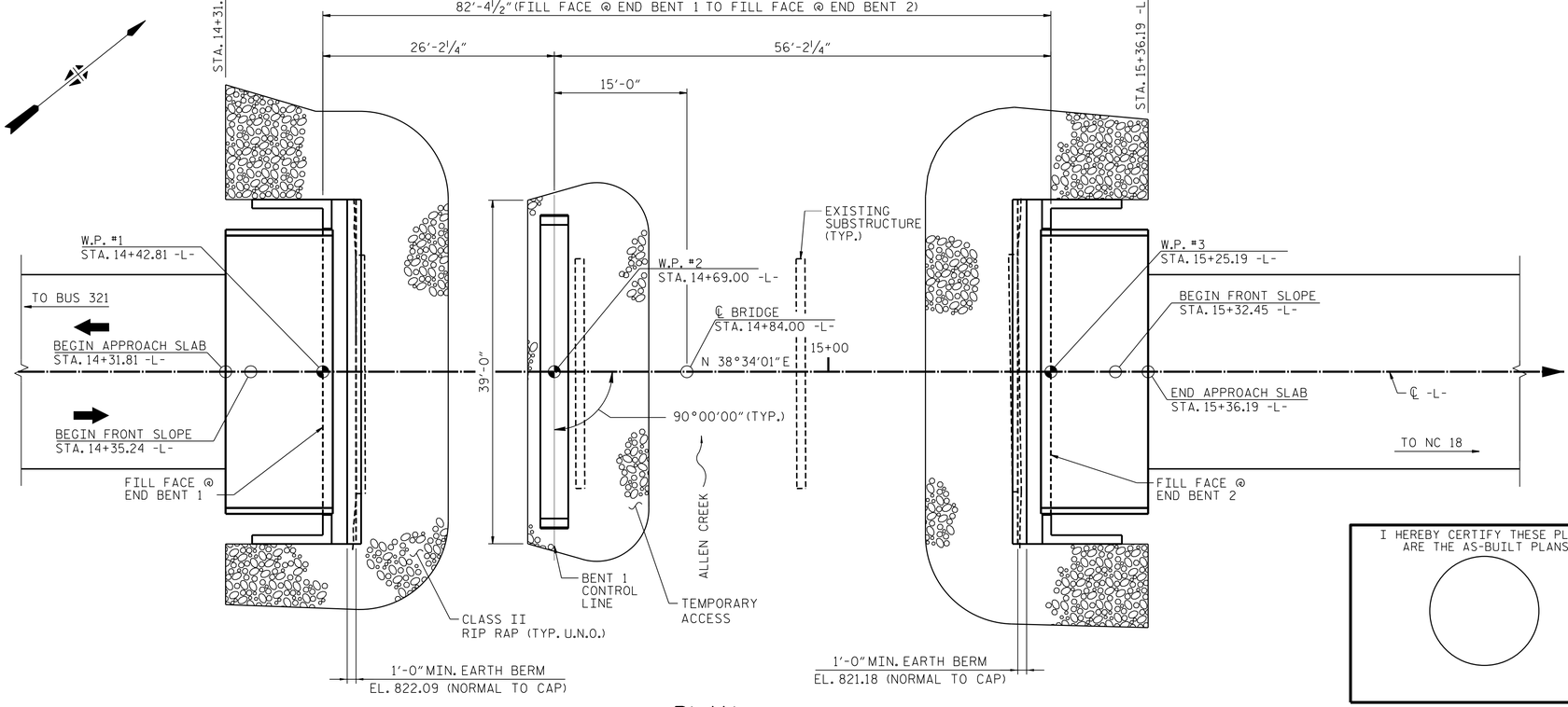
SECTION TAKEN AT RIGHT ANGLE TO -L-

UNCLASSIFIED STRUCTURE EXCAVATION



TEMPORARY ACCESS DETAIL

NOT TO SCALE



PLAN

RIP RAP DETAIL

NOT TO SCALE

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

DocuSigned by: Anna C. Teague 823068847A6B415...

11/2/2017

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 1810
OVER ALLEN CREEK

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 131

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

DRAWN BY : A. TEAGUE DATE : 03/13
CHECKED BY : J. MCCAUL DATE : 03/13

BENCHMARK: TBM 2, RAILROAD SPIKE IN BASE OF 20" SYCAMORE, 65.45' LT. OF STA. 15+34.72 -L-, EL. = 826.29'

HYDRAULIC DATA

DESIGN DISCHARGE	= 1700 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YR
DESIGN HIGH WATER ELEVATION	= 826.6
DRAINAGE AREA	= 6.4 SQ. MI.
BASE DISCHARGE (Q100)	= 2603 CFS
BASE HIGH WATER ELEVATION	= 828.14

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 2620 CFS
FREQUENCY OF OVERTOPPING FLOOD	= > 100 YR
OVERTOPPING FLOOD ELEVATION	= 828.2

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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.

FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 14+84.00 -L-, SEE SPECIAL PROVISIONS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 20 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. 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.

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS (1 @ 25'-4", 1 @ 25'-0", 1 @ 25'-4") WITH A STEEL PLANK DECK ON I-BEAMS AND A CLEAR ROADWAY OF 24'-0" ON TIMBER CAPS AND PILES AND TIMBER BULKHEADS, AND LOCATED AT THE PROPOSED SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 50 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 85 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1 AND END BENT 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS (AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION).

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 290 TONS PER PIER. DRILLED PIERS AT BENT NO. 1 ARE DESIGNED FOR SIDE RESISTANCE ONLY.

INSTALL DRILLED PIERS AT BENT NO. 1 THAT EXTEND TO A TIP ELEVATION NO HIGHER THAN 798.0 FT AND WITH A PENETRATION OF AT LEAST 8.2 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 810 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 75 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 125 TONS PER PILE.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 14+84.00 -L-".

FOR UTILITY INFORMATION, SEE ROADWAY PLANS.

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

FOR PILE DRIVING EQUIPMENT SETUP FOR HP12x53 STEEL PILES, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMPORARY ACCESS AT STA. 14+84.00 -L-	REMOVAL OF EXISTING STRUCTURE AT STA. 14+84.00 -L-	3'-0" DIA. DRILLED PIERS IN SOIL	3'-0" DIA. DRILLED PIERS NOT IN SOIL	PDA TESTING	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STA. 14+84.00 -L-	CLASS A CONCRETE	BRIDGE APPROACH SLABS STA. 14+84.00 -L-	REINFORCING STEEL
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE											
											2636
END BENT NO. 1									21.6		7604
BENT NO. 1			27.5	33.0					15.7		2636
END BENT NO. 2									21.6		
											12876
TOTAL	LUMP SUM	LUMP SUM	27.5	33.0	1	1	1	LUMP SUM	58.9	LUMP SUM	

	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 x 53 STEEL PILES		STEEL PILE POINTS	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
	LBS.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE						160.25				22	880	
END BENT NO. 1		7	7	105	7		137	152				
BENT NO. 1	1353											
END BENT NO. 2		7	7	105	7		142	157				
TOTAL	1353	14	14	210	14	160.25	279	309	LUMP SUM	22	880	LUMP SUM

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

DocuSigned by: Anna C. Teague 82306B847A6B415... 11/2/2017

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 1810 OVER ALLEN CREEK

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

DRAWN BY : M. SELLS DATE : 03/13
CHECKED BY : A. TEAGUE DATE : 03/13

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

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**	1.018	--	1.75	0.284	2.53	25'	EL	12	0.591	**1.02**	25'	EL	**1.2**	0.80	0.284	2.34	25'	EL	12	
		HL-93(Opr)	N/A	--	1.319	--	1.35	0.284	3.29	25'	EL	12	0.591	1.32	25'	EL	1.2	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	**2**	1.178	42.397	1.75	0.284	3.76	25'	EL	12	0.591	**1.18**	25'	EL	**1.2**	0.80	0.284	3.46	25'	EL	12	
		HS-20(Opr)	36.000	--	1.527	54.959	1.35	0.284	4.87	25'	EL	12	0.591	1.53	25'	EL	1.2	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.728	36.833	1.40	0.284	6.83	25'	EL	12	0.591	2.73	25'	EL	1.2	0.80	0.284	5.04	25'	EL	12	
		SNGARBS2	20.000	--	2.186	43.718	1.40	0.284	6.39	25'	EL	12	0.591	2.19	25'	EL	1.2	0.80	0.284	4.72	25'	EL	12	
		SNAGRIS2	22.000	--	2.141	47.107	1.40	0.284	6.83	25'	EL	12	0.591	2.14	25'	EL	1.2	0.80	0.284	5.04	25'	EL	12	
		SNCOTTS3	27.250	--	1.385	37.731	1.40	0.284	3.57	25'	EL	12	0.591	1.38	25'	EL	1.2	0.80	0.284	2.64	25'	EL	12	
		SNAGGRS4	34.925	--	1.332	46.511	1.40	0.284	3.56	25'	EL	12	0.591	1.33	25'	EL	1.2	0.80	0.284	2.62	25'	EL	12	
		SNS5A	35.550	--	1.392	49.477	1.40	0.284	3.45	25'	EL	12	0.591	1.39	25'	EL	1.2	0.80	0.284	2.54	25'	EL	12	
		SNS6A	39.950	--	1.334	53.31	1.40	0.284	3.23	25'	EL	12	0.591	1.33	25'	EL	1.2	0.80	0.284	2.39	25'	EL	12	
		SNS7B	42.000	--	1.344	56.455	1.40	0.284	3.23	25'	EL	12	0.591	1.34	25'	EL	1.2	0.80	0.284	2.37	25'	EL	12	
	TTST	TNAGRIT3	33.000	--	1.634	53.934	1.40	0.284	4.55	25'	EL	12	0.591	1.63	25'	EL	1.2	0.80	0.284	3.36	25'	EL	12	
		TNT4A	33.075	--	1.483	49.049	1.40	0.284	3.95	25'	EL	12	0.591	1.48	25'	EL	1.2	0.80	0.284	2.92	25'	EL	12	
		TNT6A	41.600	--	1.398	58.138	1.40	0.284	3.71	25'	EL	12	0.591	1.40	25'	EL	1.2	0.80	0.284	2.74	25'	EL	12	
		TNT7A	42.000	--	1.391	58.419	1.40	0.284	3.84	25'	EL	12	0.591	1.39	25'	EL	1.2	0.80	0.284	2.83	25'	EL	12	
		TNT7B	42.000	--	1.343	56.385	1.40	0.284	3.46	25'	EL	12	0.591	1.34	25'	EL	1.2	0.80	0.284	2.55	25'	EL	12	
		TNAGRIT4	43.000	--	1.340	57.604	1.40	0.284	3.71	25'	EL	12	0.591	1.34	25'	EL	1.2	0.80	0.284	2.73	25'	EL	12	
		TNAGT5A	45.000	--	1.367	61.501	1.40	0.284	3.71	25'	EL	12	0.591	1.37	25'	EL	1.2	0.80	0.284	2.73	25'	EL	12	
		TNAGT5B	45.000	**3**	1.239	55.766	1.40	0.284	3.65	25'	EL	9.6	0.591	**1.24**	25'	EL	**1.2**	0.80	0.284	2.71	25'	EL	9.6	

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.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

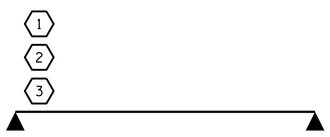
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
SPAN A

PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR 25' CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY :	R. P. PATEL	DATE :	4/8/13
CHECKED BY :	T. H. CARROLL	DATE :	4/16/13
DRAWN BY :	CVC		6/10
CHECKED BY :	DNS		6/10

18-SEP-2017 08:08
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mcheek

STD. NO. 21LRFR1_90S_25L

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

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	1.055	--	1.75	0.275	1.23	55′	EL	27	0.523	1.23	55′	EL	5.4	0.80	0.275	**1.05**	55′	EL	**27**	
		HL-93(Opr)	N/A	--	1.591	--	1.35	0.275	1.59	55′	EL	27	0.523	1.59	55′	EL	5.4	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.322	47.585	1.75	0.275	1.54	55′	EL	27	0.523	1.47	55′	EL	5.4	0.80	0.275	**1.32**	55′	EL	**27**	
		HS-20(Opr)	36.000	--	1.900	68.396	1.35	0.275	1.99	55′	EL	27	0.523	1.90	55′	EL	5.4	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.776	37.476	1.40	0.275	4.04	55′	EL	27	0.523	4.17	55′	EL	5.4	0.80	0.275	2.78	55′	EL	27	
		SNGARBS2	20.000	--	2.155	43.095	1.40	0.275	3.14	55′	EL	27	0.523	3.02	55′	EL	5.4	0.80	0.275	2.15	55′	EL	27	
		SNAGRIS2	22.000	--	2.079	45.734	1.40	0.275	3.03	55′	EL	27	0.523	2.83	55′	EL	5.4	0.80	0.275	2.08	55′	EL	27	
		SNCOTTS3	27.250	--	1.384	37.708	1.40	0.275	2.01	55′	EL	27	0.523	2.09	55′	EL	5.4	0.80	0.275	1.38	55′	EL	27	
		SNAGGRS4	34.925	--	1.189	41.527	1.40	0.275	1.73	55′	EL	27	0.523	1.77	55′	EL	5.4	0.80	0.275	1.19	55′	EL	27	
		SNS5A	35.550	--	1.160	41.255	1.40	0.275	1.69	55′	EL	27	0.523	1.82	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		SNS6A	39.950	--	1.079	43.102	1.40	0.275	1.57	55′	EL	27	0.523	1.68	55′	EL	5.4	0.80	0.275	1.08	55′	EL	27	
		SNS7B	42.000	--	1.028	43.175	1.40	0.275	1.50	55′	EL	27	0.523	1.67	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
	TTST	TNAGRIT3	33.000	--	1.320	43.556	1.40	0.275	1.92	55′	EL	27	0.523	1.98	55′	EL	5.4	0.80	0.275	1.32	55′	EL	27	
		TNT4A	33.075	--	1.330	43.979	1.40	0.275	1.94	55′	EL	27	0.523	1.91	55′	EL	5.4	0.80	0.275	1.33	55′	EL	27	
		TNT6A	41.600	--	1.101	45.811	1.40	0.275	1.60	55′	EL	27	0.523	1.83	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNT7A	42.000	--	1.114	46.804	1.40	0.275	1.62	55′	EL	27	0.523	1.71	55′	EL	5.4	0.80	0.275	1.11	55′	EL	27	
		TNT7B	42.000	--	1.163	48.848	1.40	0.275	1.69	55′	EL	27	0.523	1.62	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		TNAGRIT4	43.000	--	1.101	47.330	1.40	0.275	1.60	55′	EL	27	0.523	1.56	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNAGT5A	45.000	--	1.031	46.405	1.40	0.275	1.50	55′	EL	27	0.523	1.58	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
		TNAGT5B	45.000	3	1.013	45.582	1.40	0.275	1.47	55′	EL	27	0.523	1.48	55′	EL	5.4	0.80	0.275	**1.01**	55′	EL	**27**	

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.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

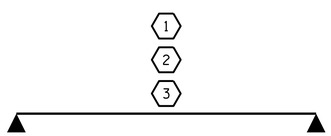
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
SPAN B

PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Docusigned by: Marshall G. Cheek, Jr.
65490D6EBAA3B405...
9/18/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR 55′ CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY :	R. P. PATEL	DATE : 4/8/13
CHECKED BY :	T. H. CARROLL	DATE : 4/16/13
DRAWN BY :	CVC	6/10
CHECKED BY :	DNS	6/10

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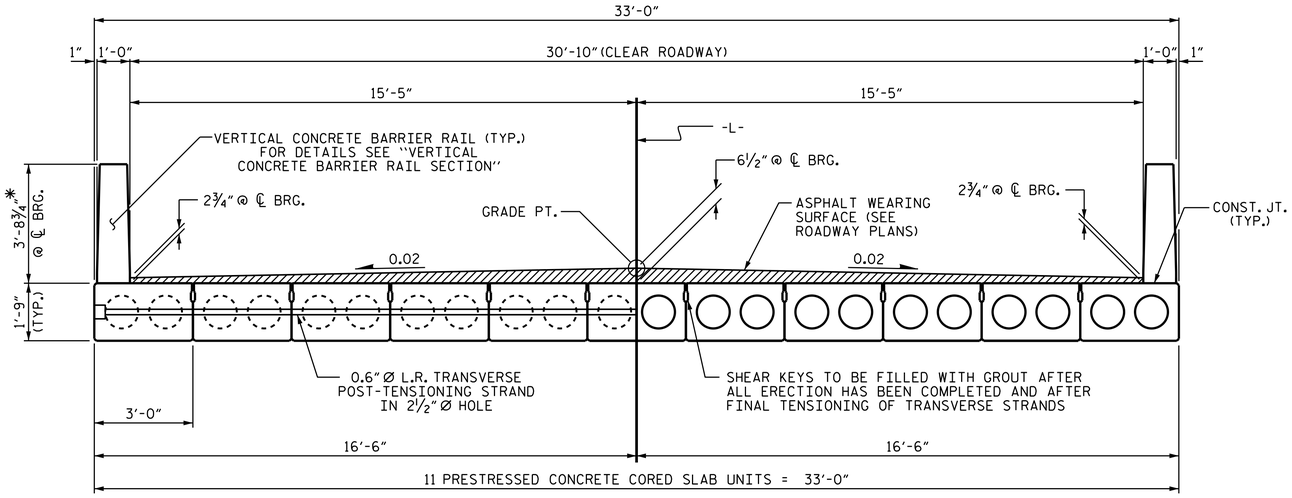
mcheek

STD. NO. 21LRFR1_90S_55L



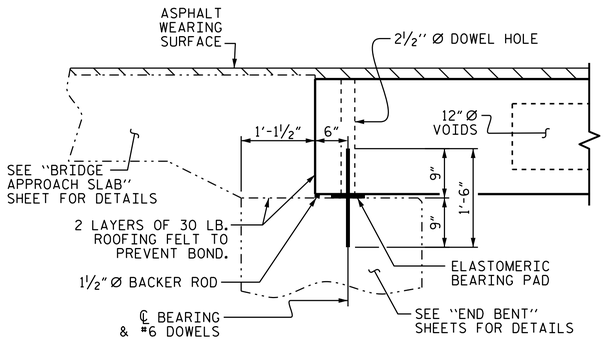
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

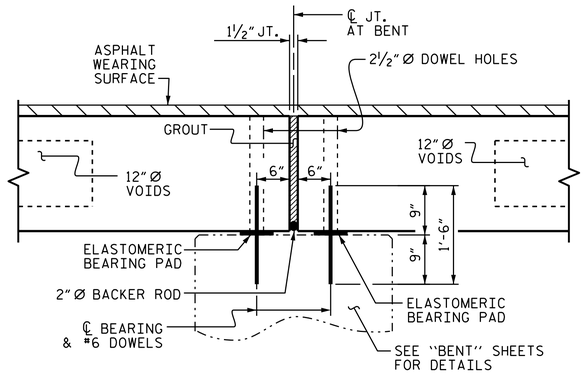
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

FIXED END

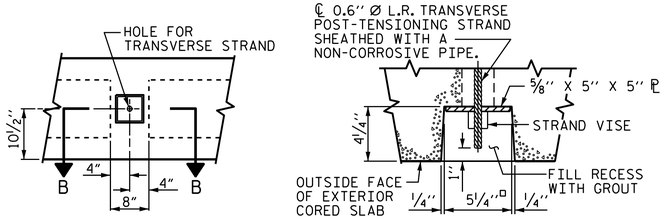


SECTION AT END BENT

FIXED END FIXED END



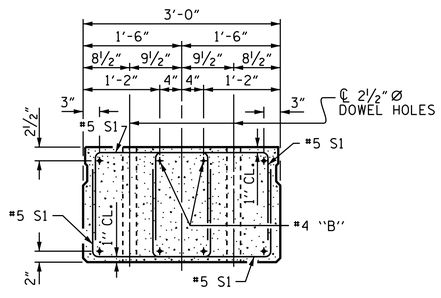
SECTION AT BENT



ELEVATION VIEW

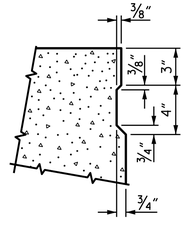
SECTION B-B

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



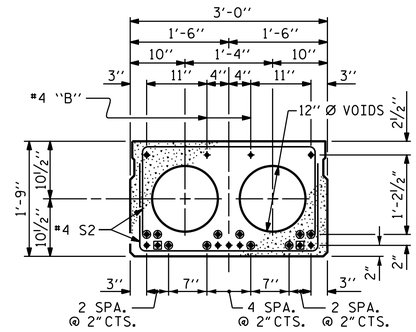
END ELEVATION

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.

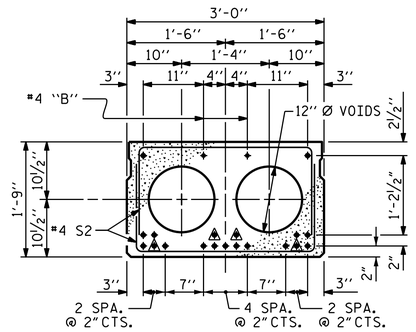


SHEAR KEY DETAIL

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

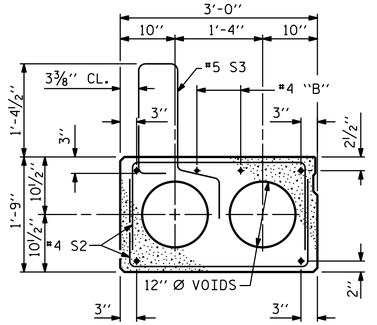


INTERIOR SLAB SECTION
(25' UNIT)
(9 STRANDS REQUIRED)



INTERIOR SLAB SECTION
(55' UNIT)
(19 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT



EXT. SLAB SECTION

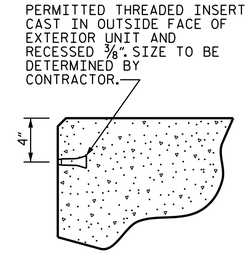
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

△ 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



THREADED INSERT DETAIL

PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE CORED SLAB UNIT
90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
6549D6EBAA3B405...
9/18/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			16

ASSEMBLED BY : G. KOUCHEKI	DATE : 9-17		
CHECKED BY : M. G. CHEEK	DATE : 9-17		
DRAWN BY : DGE 5/09	REV. 9/14	MAA/TMG	
CHECKED BY : BCH 6/09			

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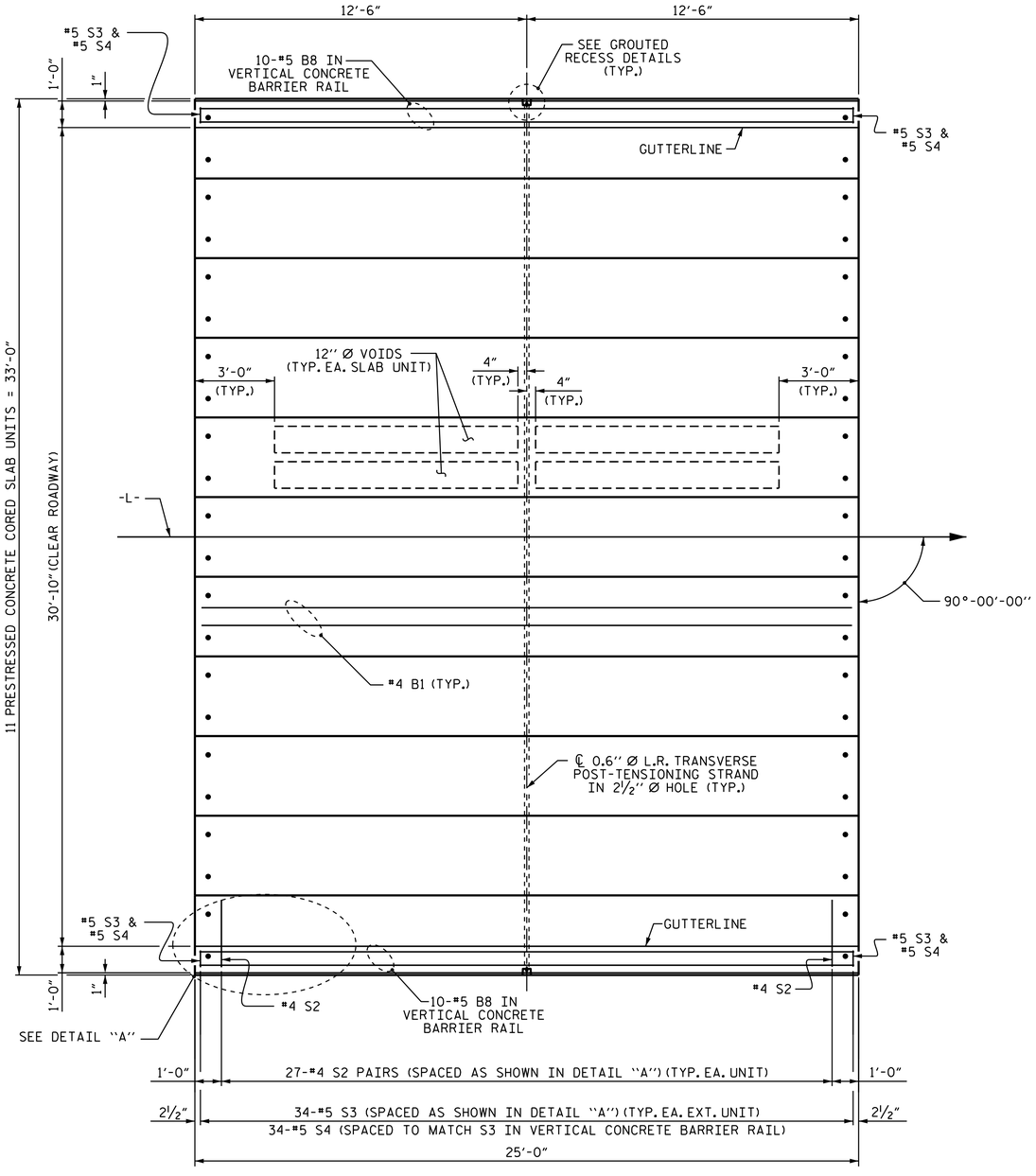
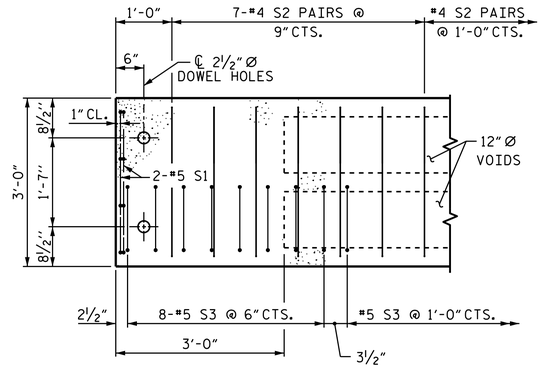
mcheek

STD. NO. 21"PCS2_33_90S



PLAN OF UNIT
SPAN A



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

PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 25' UNIT 30'-10" CLEAR ROADWAY 90° SKEW
(SPAN A)

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Digitally signed by: Marshall G. Cheek, Jr.
6549D6EBAA384D5...
9/18/2017

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : G. KOUCHEKI	DATE : 9-17		
CHECKED BY : M. G. CHEEK	DATE : 9-17		
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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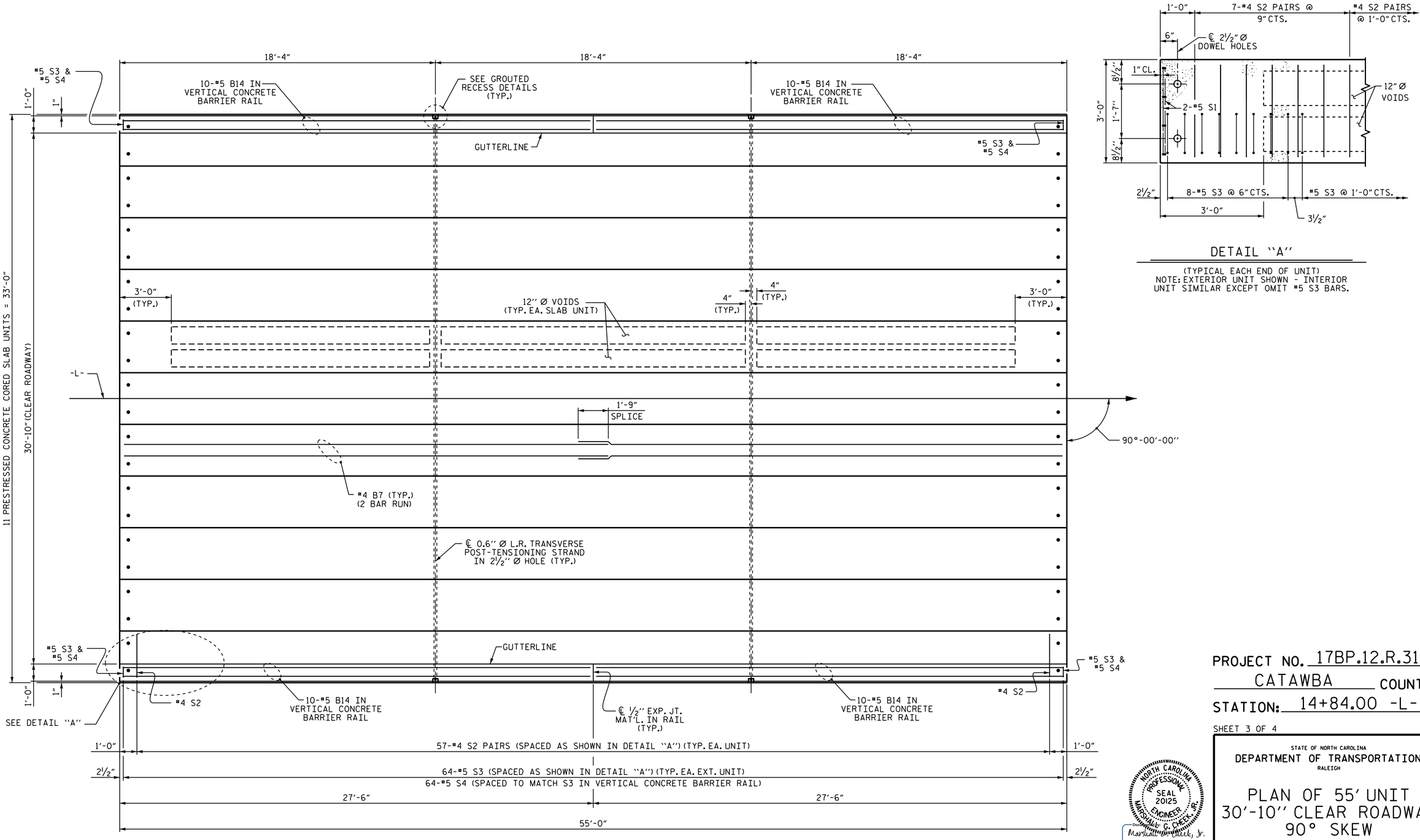
mcheek

STD. NO. 21"PCS_33_90S_25L



PLAN OF UNIT
SPAN B

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

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Digitally signed by G. Cheek, Jr.
6549D6EBAA3B405...
9/18/2017

PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 55' UNIT 30'-10" CLEAR ROADWAY 90° SKEW
(SPAN B)

ASSEMBLED BY : G. KOUCHEKI	DATE : 9-17
CHECKED BY : M. G. CHEEK	DATE : 9-17
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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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			16

STD. NO. 21"PCS_33_90S_55L

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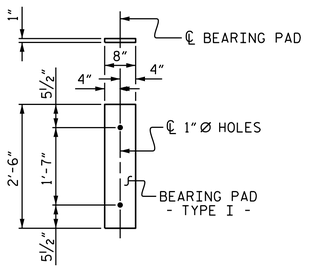
mcheek



FIXED END
(TYPE I - 44 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS		TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	25' UNIT	55' UNIT					
✳ B8	20		20	#5	STR	24'-7"	513
✳ B14		40	40	#5	STR	27'-1"	1130
✳ S4	68	128	196	#5	2	7'-2"	1465
✳ EPOXY COATED REINFORCING STEEL						LBS.	3,108
CLASS AA CONCRETE						CU.YDS.	21.0
TOTAL VERTICAL CONCRETE BARRIER RAIL						LIN. FT.	160.25

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

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
25' UNIT			
EXTERIOR C.S.	2	25'-0"	50'-0"
INTERIOR C.S.	9	25'-0"	225'-0"
55' UNIT			
EXTERIOR C.S.	2	55'-0"	110'-0"
INTERIOR C.S.	9	55'-0"	495'-0"
TOTAL	22		880'-0"

DEAD LOAD DEFLECTION AND CAMBER

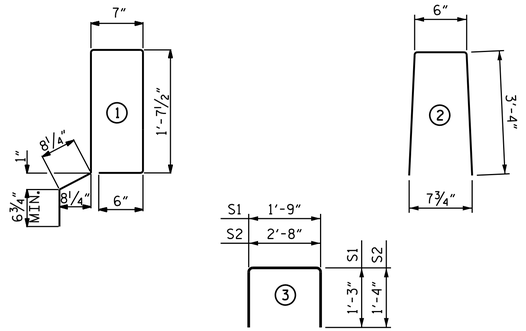
	3'-0"x 1'-9"
25' UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	⅛" ↓
FINAL CAMBER	⅛" ↑
55' UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1½" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	⅜" ↓
FINAL CAMBER	1⅛" ↑

✳✳ INCLUDES FUTURE WEARING SURFACE

CONCRETE RELEASE STRENGTH

UNIT	PSI
25' UNITS	4000
55' UNITS	4900

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE 25' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B1	2	#4	STR	24'-8"	33	24'-8"	33
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	54	#4	3	5'-4"	192	5'-4"	192
✳ S3	34	#5	1	5'-7"	198		
REINFORCING STEEL			LBS.		260		260
✳ EPOXY COATED REINFORCING STEEL			LBS.		198		
5000 P.S.I. CONCRETE			CU. YDS.		3.7		3.7
0.6"Ø L.R. STRANDS			No.		9		9

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	114	#4	3	5'-4"	406	5'-4"	406
✳ S3	64	#5	1	5'-7"	373		
REINFORCING STEEL			LBS.		516		516
✳ EPOXY COATED REINFORCING STEEL			LBS.		373		
6500 P.S.I. CONCRETE			CU. YDS.		7.8		7.8
0.6"Ø L.R. STRANDS			No.		19		19

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.

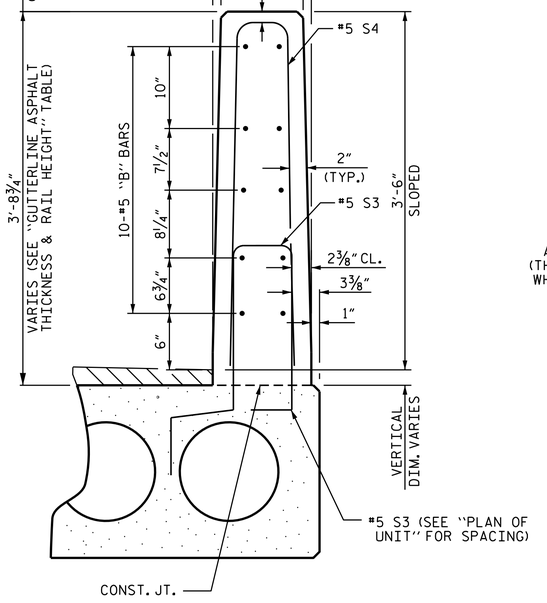
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

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

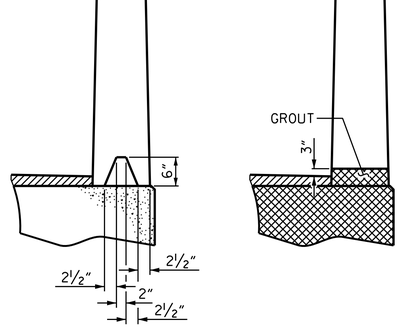
THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

30'-10" CLEAR ROADWAY	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
25' UNITS	2⅝"	3'-8⅝"
55' UNITS	1⅝"	3'-7⅝"

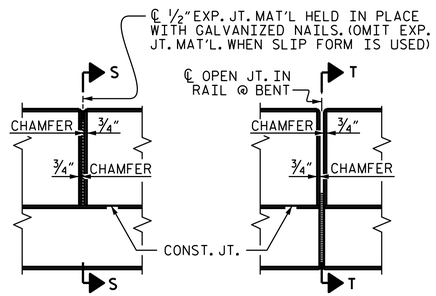


VERTICAL CONCRETE BARRIER RAIL DETAILS

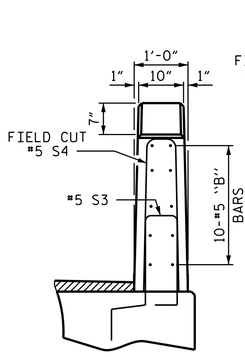


SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

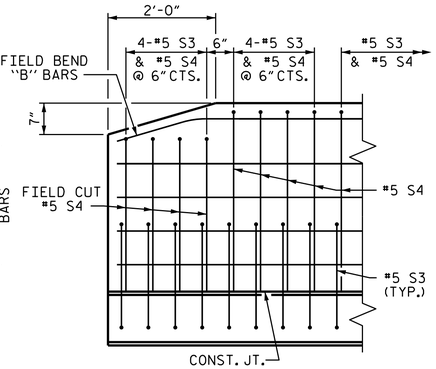
SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
9/18/2017

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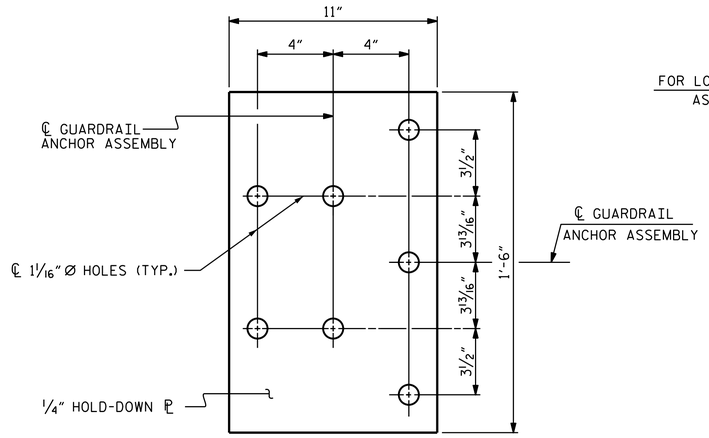
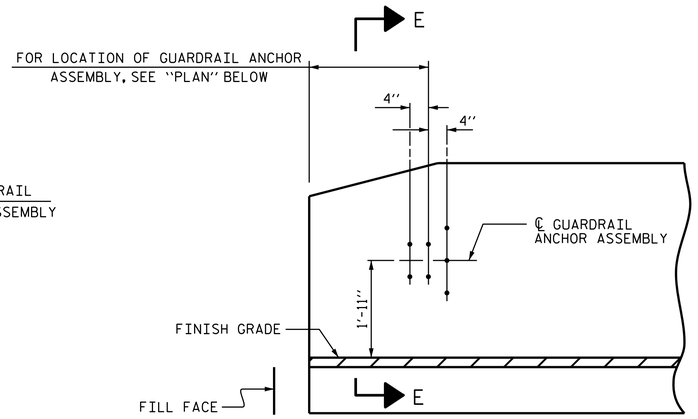


PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" 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 7/8" 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.)

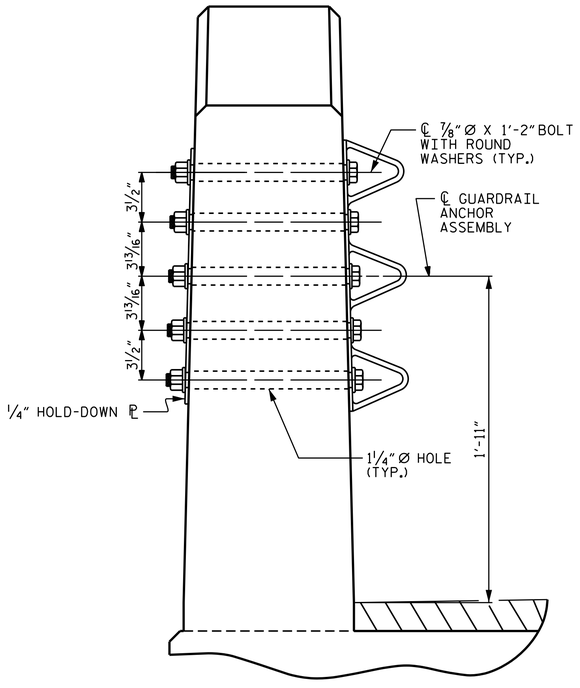
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

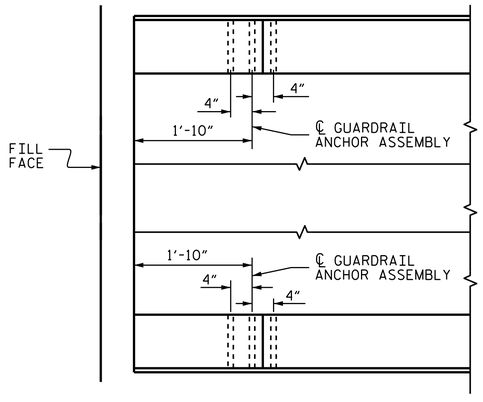
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

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

THE 1 1/4" 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.



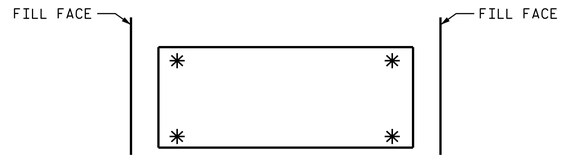
SECTION E-E



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

GUARDRAIL ANCHOR ASSEMBLY DETAILS

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE FOR VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

DocuSigned by: Marshall G. Cheek, Jr. 6549D8EBAA3B405...

9/18/2017

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CHECKED BY : M. G. CHEEK	DATE : 9-17	REV. 6/13	MAA/GM
DRAWN BY : MAA 5/10		REV. 1/15	MAA/TMG
CHECKED BY : GM 5/10			

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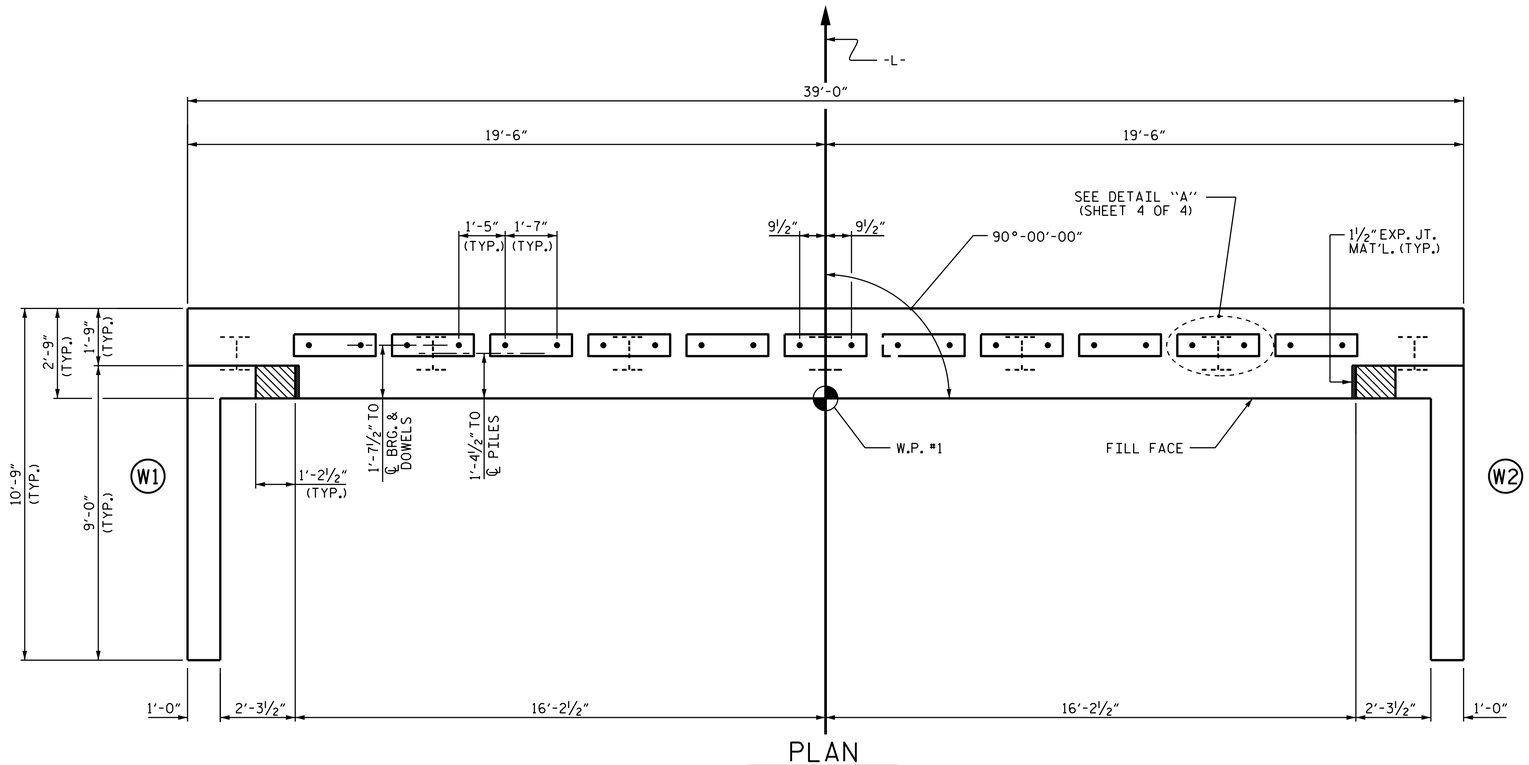

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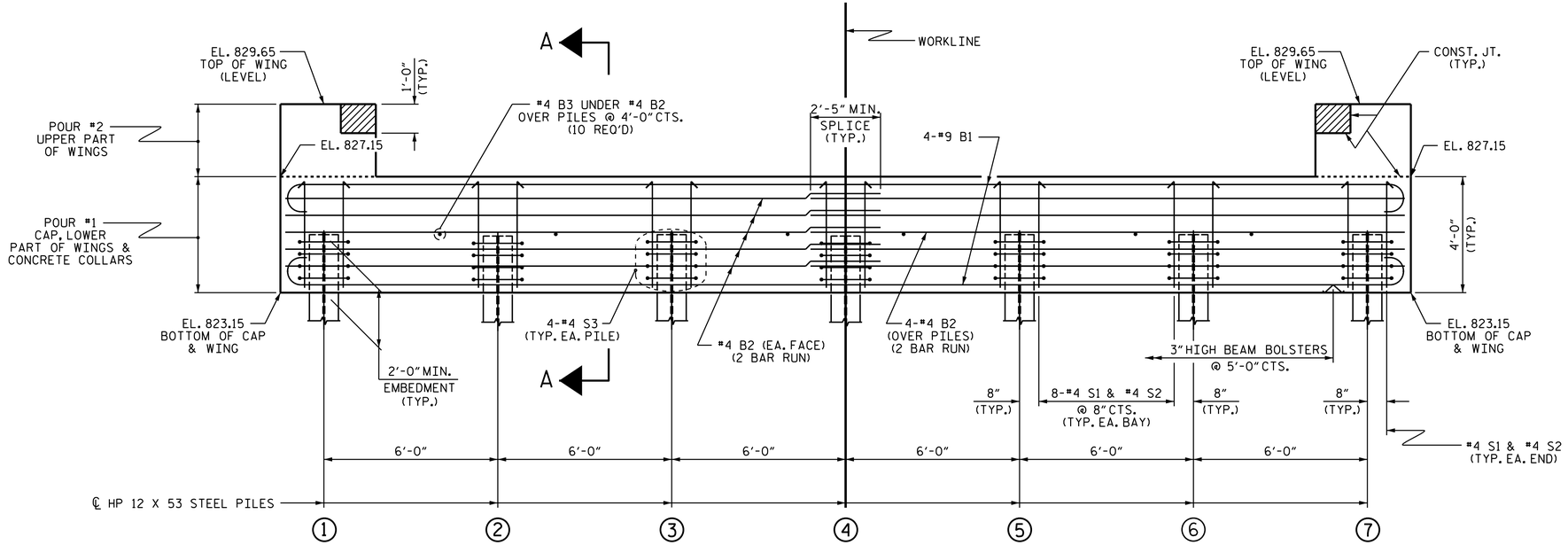

ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", 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.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
DocuSigned by: Marshall G. Cheek, Jr.
6549D6EBAA3B405...
9/18/2017

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1			3		
2			4		

SHEET NO. S-10
TOTAL SHEETS 16

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CHECKED BY :	M. G. CHEEK	DATE :	9-17
DRAWN BY :	WJH 12/11	REV. 4/15	MAA/TMG
CHECKED BY :	AAC 12/11		

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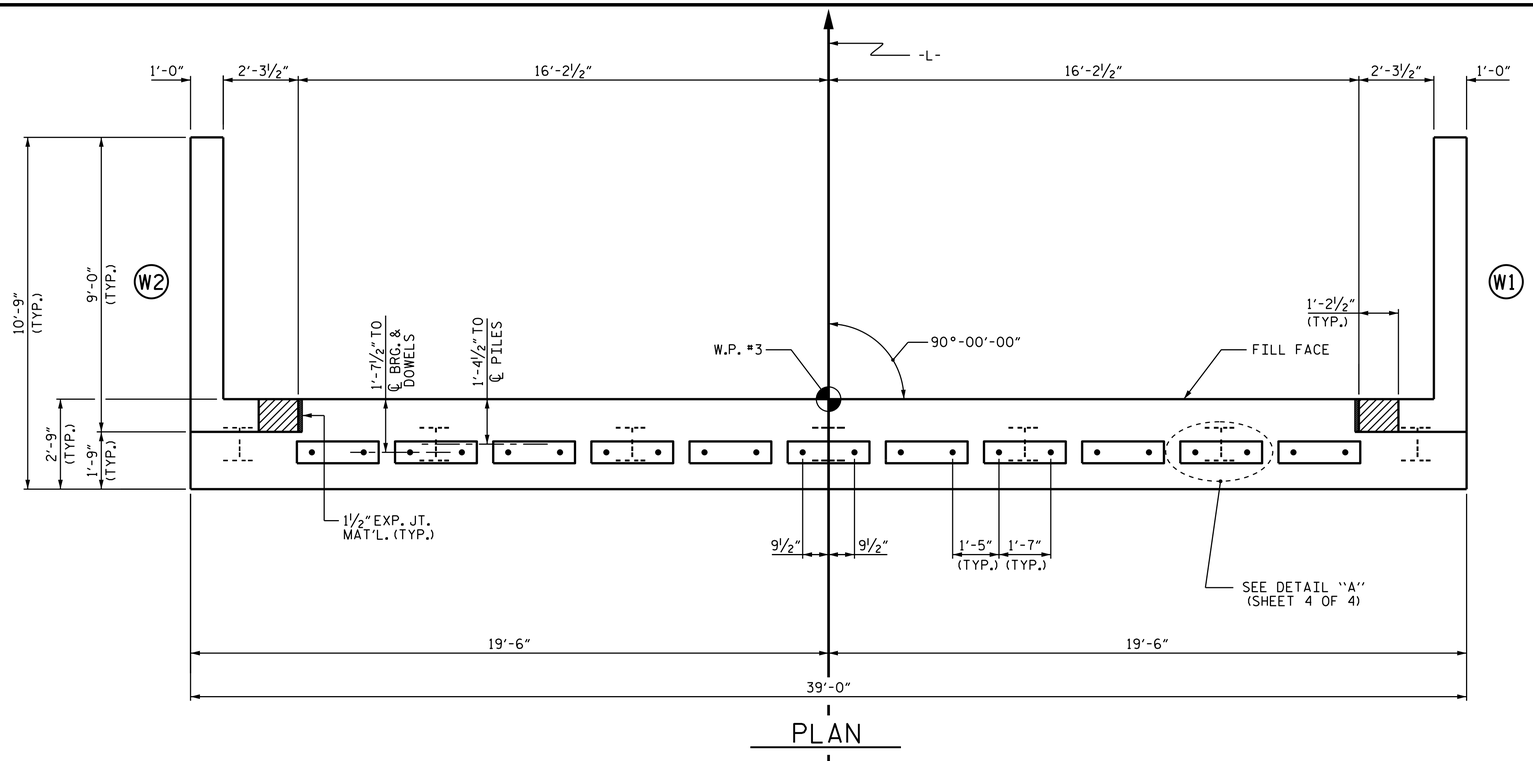

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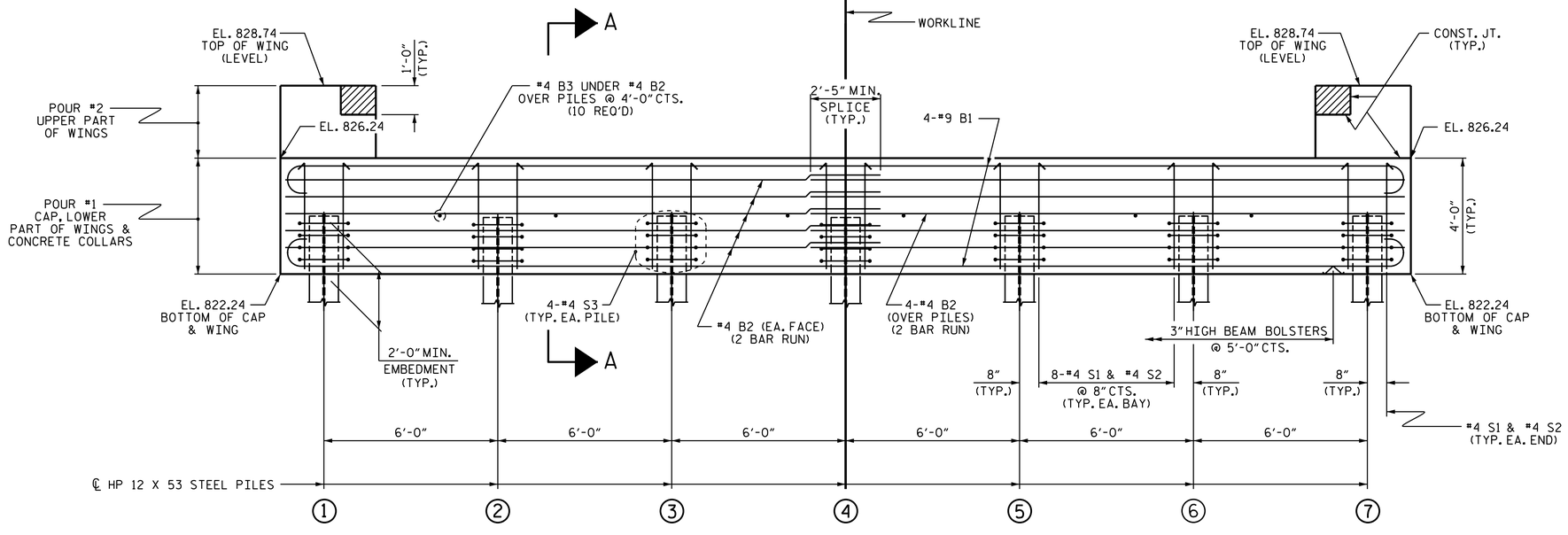

ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", 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.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

ASSEMBLED BY : G. KOUCHEKI	DATE : 9-17		
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DRAWN BY : WJH 12/11	REV. 4/15	MAA/TMG	
CHECKED BY : AAC 12/11			

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mcheek

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

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6549D8EBAA3B405...

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PROJECT NO. 17BP.12.R.31
CATAWBA COUNTY
STATION: 14+84.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			16

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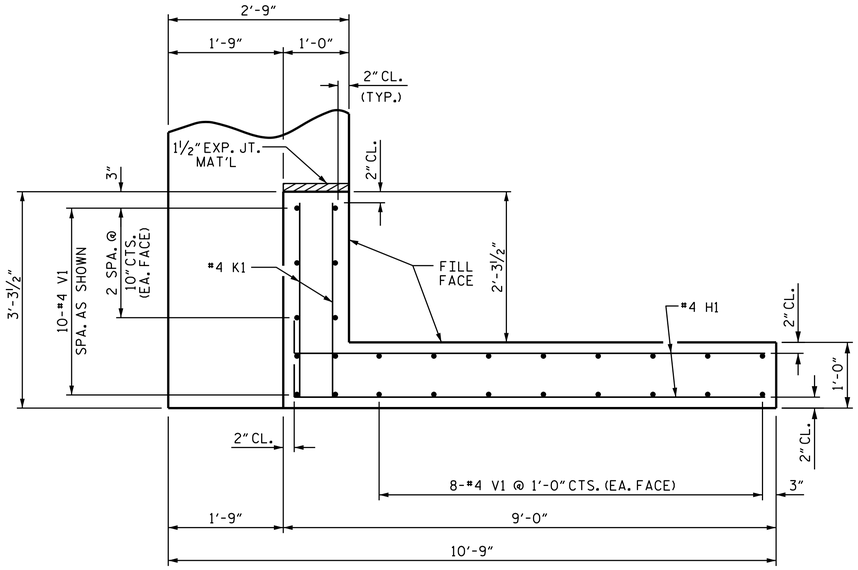
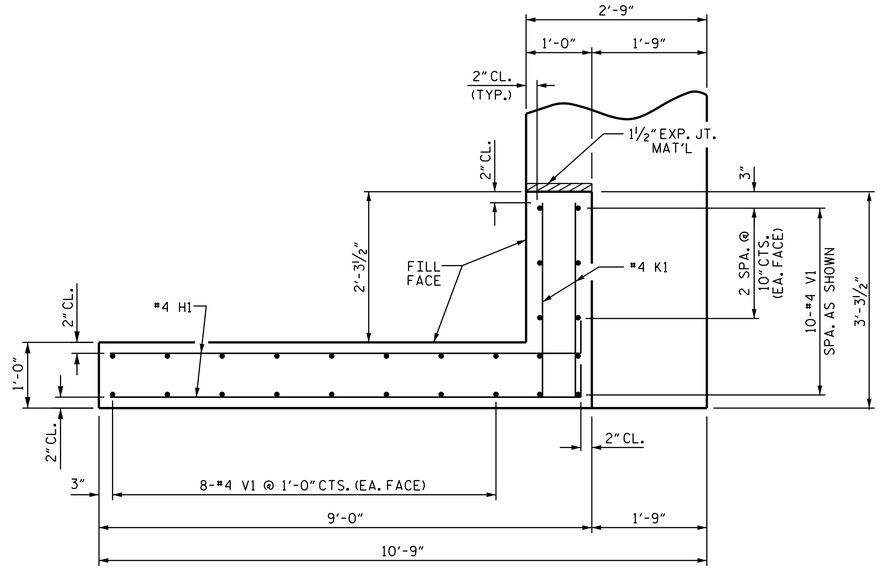
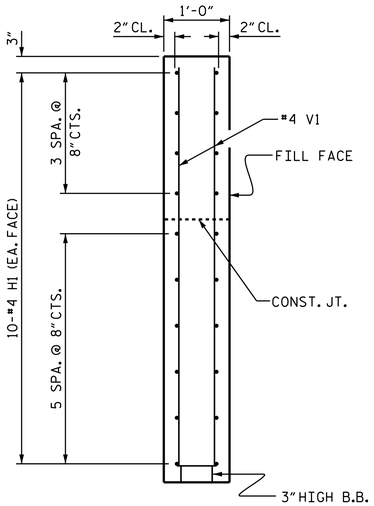


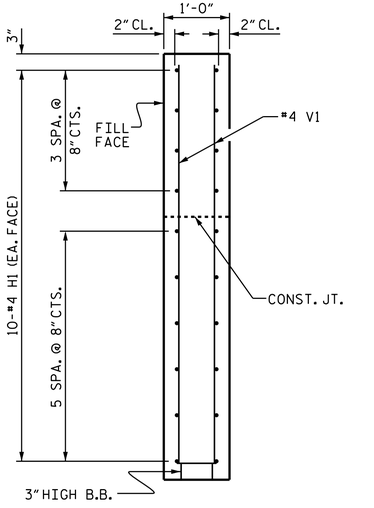
PLAN OF WING (W1)



PLAN OF WING (W2)



SECTION X-X



SECTION Y-Y

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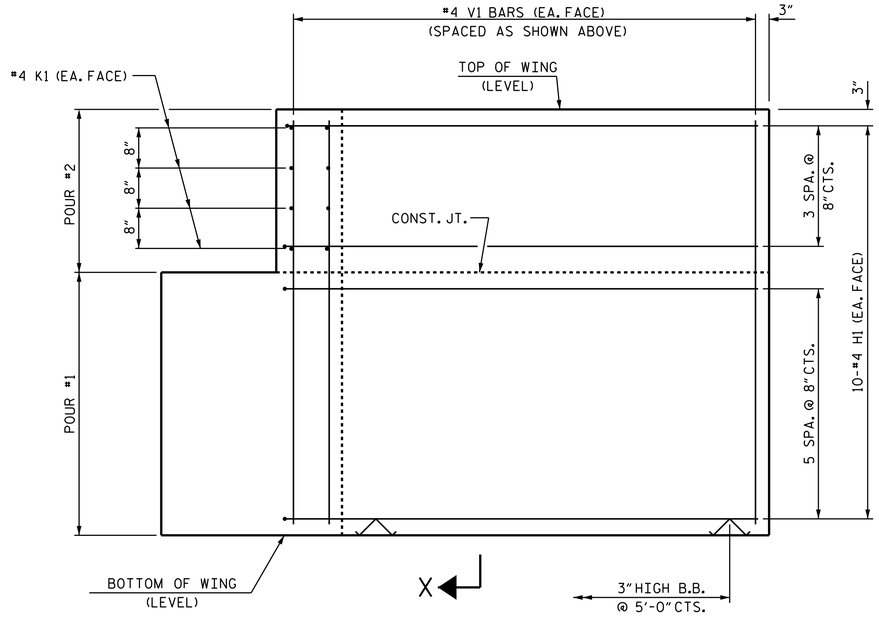
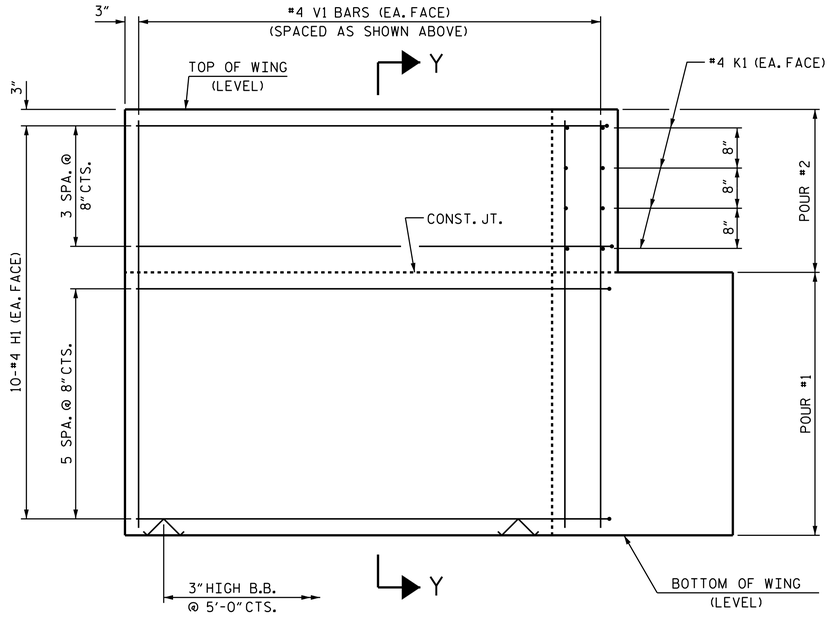


ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
9/18/2017

ASSEMBLED BY : G. KOUCHEKI	DATE : 9-17
CHECKED BY : M. G. CHEEK	DATE : 9-17
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY : AAC 12/11	

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

SHEET NO. S-12

TOTAL SHEETS 16

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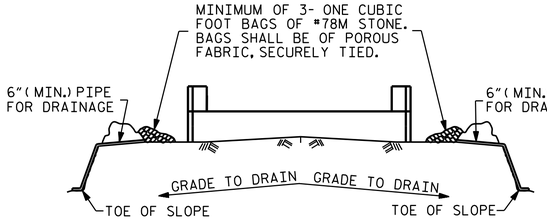
mcheek

STD. NO. EB_33_90S4

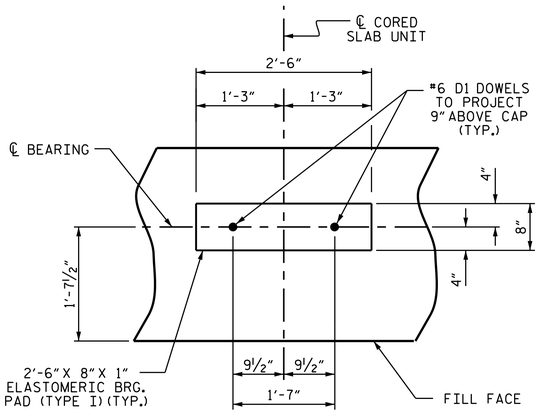


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

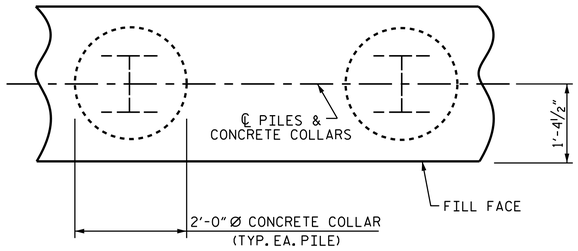
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

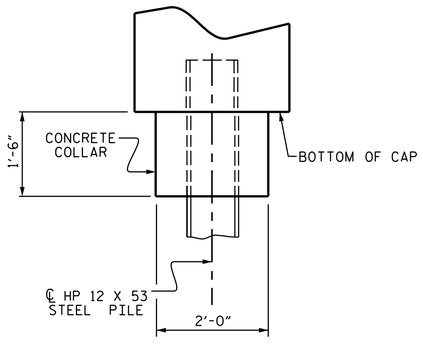


DETAIL "A"

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



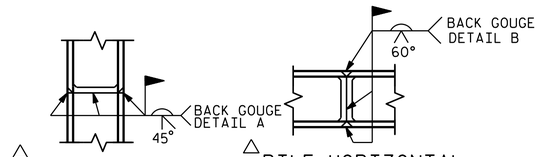
PLAN



ELEVATION

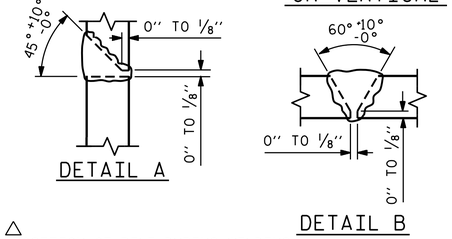
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



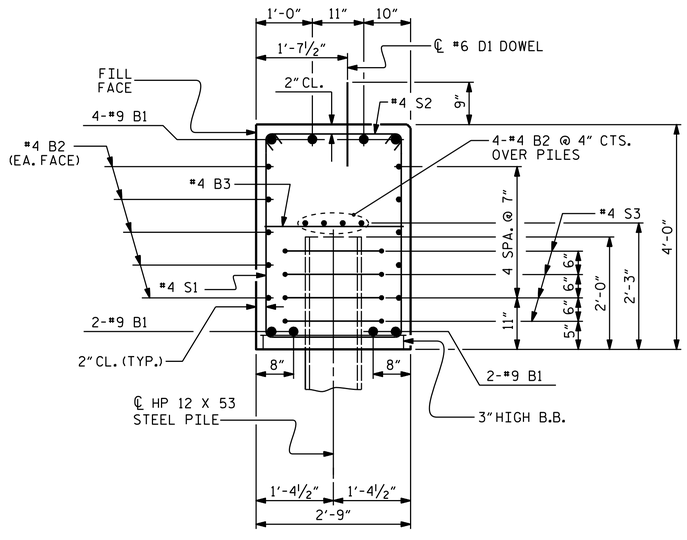
△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

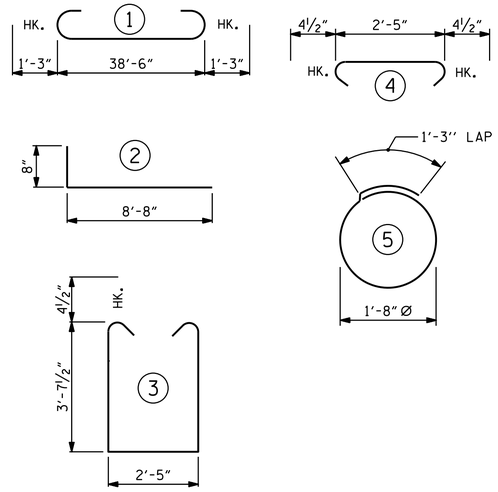
PILE SPLICE DETAILS



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT 1	END BENT 2
HP 12 X 53 STEEL PILES NO.: 7 LIN. FT. 105	HP 12 X 53 STEEL PILES NO.: 7 LIN. FT. 105
STEEL PILE POINTS EA. 7	STEEL PILE POINTS EA. 7
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO.: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO.: 7

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	2	#6	STR	1'-6"	50
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-2"	214

REINFORCING STEEL (FOR ONE END BENT) LBS. 2,636

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS C.Y. 19.5

POUR #2 UPPER PART OF WINGS C.Y. 2.1

TOTAL CLASS A CONCRETE C.Y. 21.6

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 & 2 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Document: Marshall G. Cheek, Jr.
6549D6EBAA3B405...

9/18/2017

ASSEMBLED BY : G. KOUCHEKI	DATE : 9-17		
CHECKED BY : M. G. CHEEK	DATE : 9-17		
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG		
CHECKED BY : AAC 12/11			

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2			4			16

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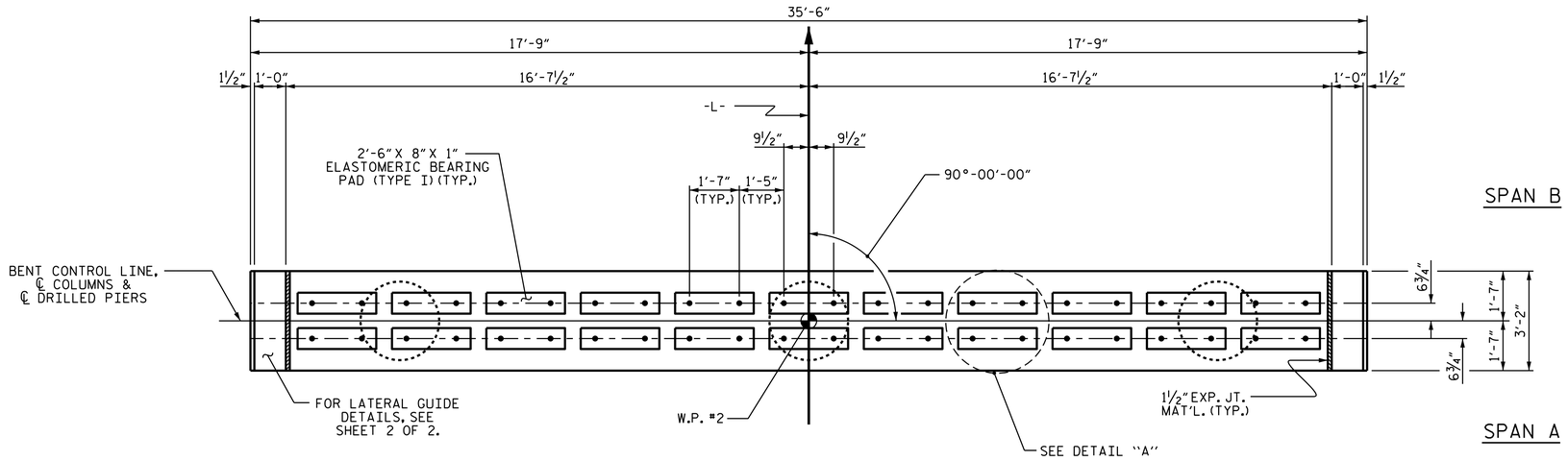

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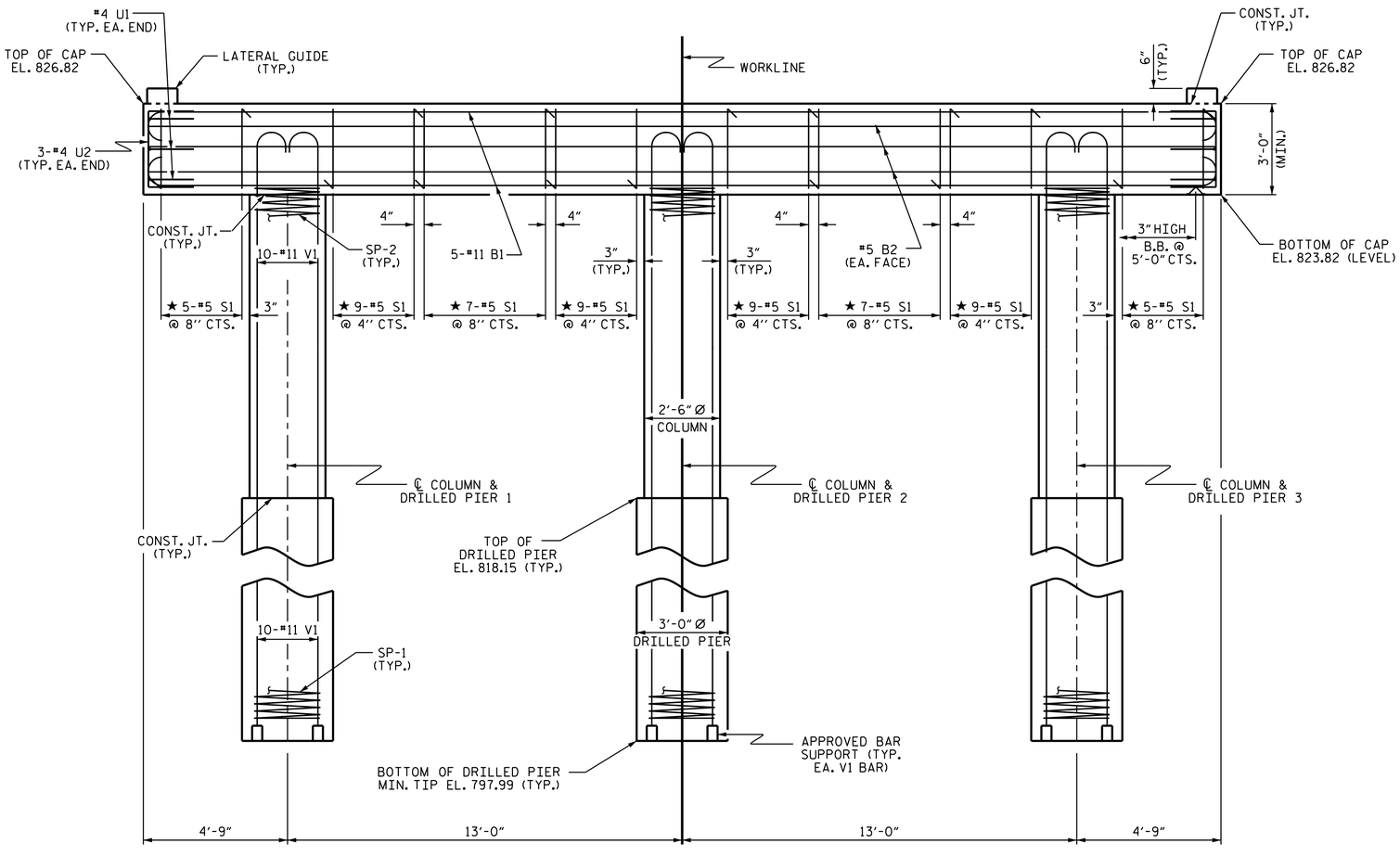


ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

NOTES

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

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

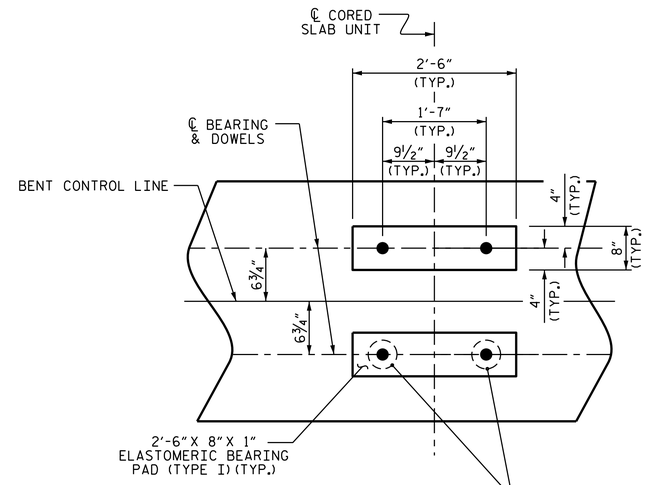
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
6549D6EBAA3B405...

9/18/2017

ASSEMBLED BY :	R. P. PATEL	DATE :	5-20-13
CHECKED BY :	T. H. CARROLL	DATE :	5-20-13
DRAWN BY : DGE 4/10	REV. 11/14 MAA/TMG		
CHECKED BY : MKT 4/10			

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2			4			16

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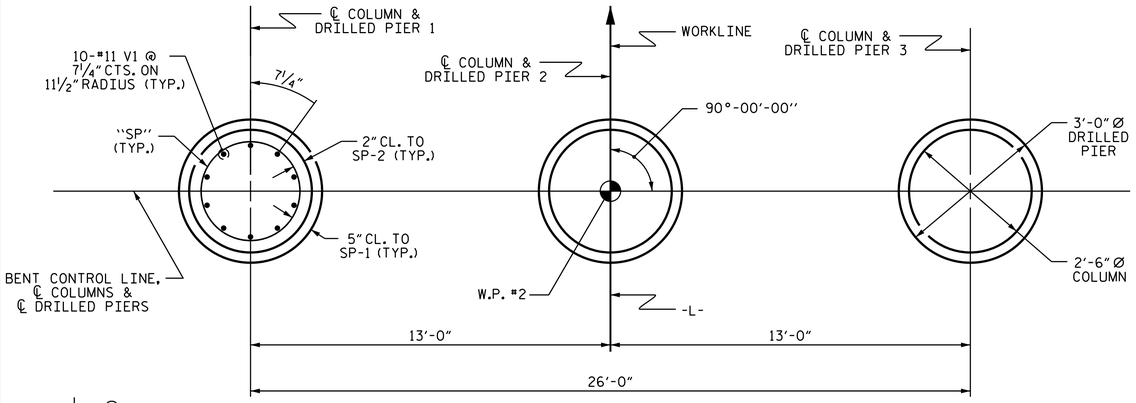
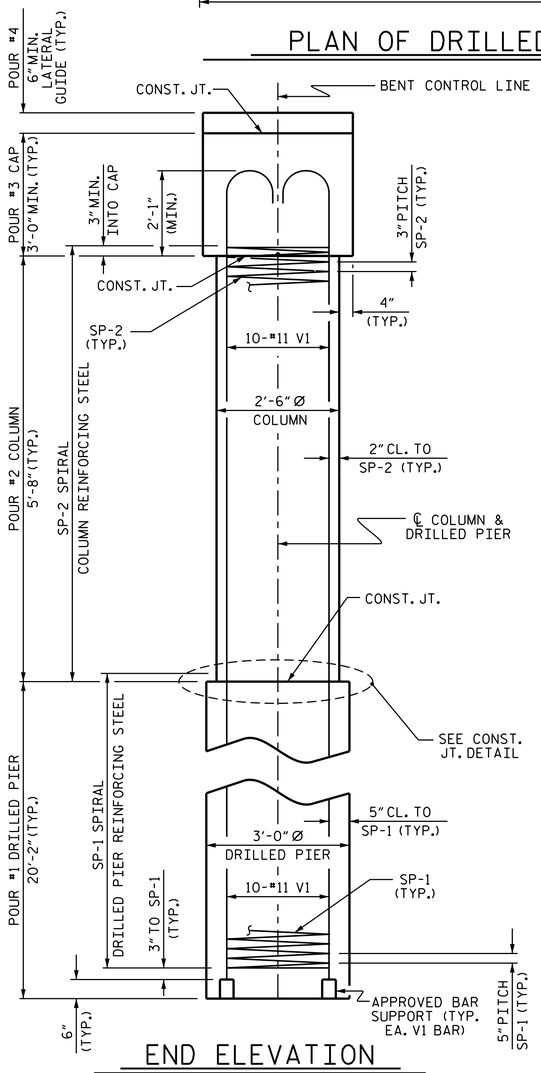
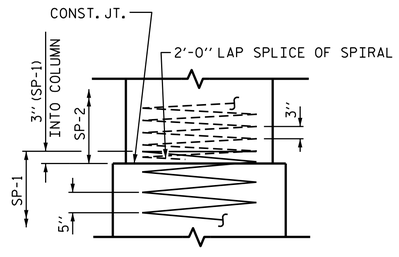


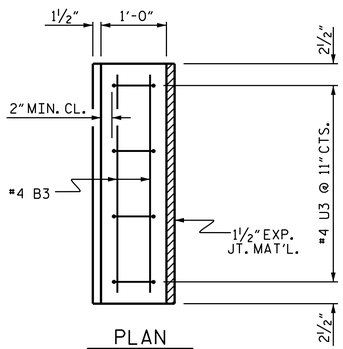
PLAN OF DRILLED PIERS & COLUMNS



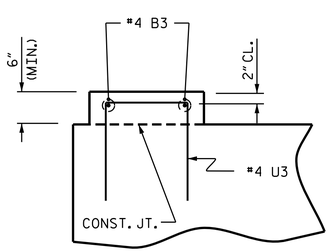
END ELEVATION



CONSTRUCTION JOINT DETAIL



PLAN

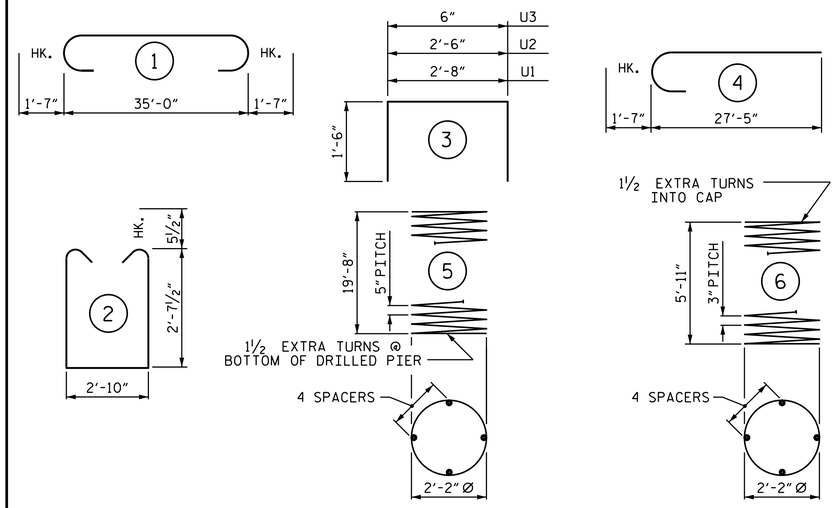


ELEVATION

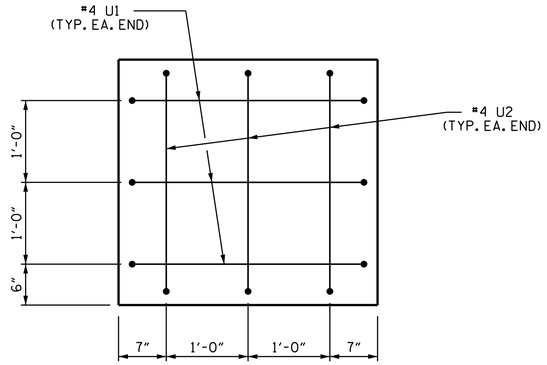
LATERAL GUIDE DETAILS

(LEFT LATERAL GUIDE SHOWN, RIGHT SIDE SIMILAR)

BAR TYPES

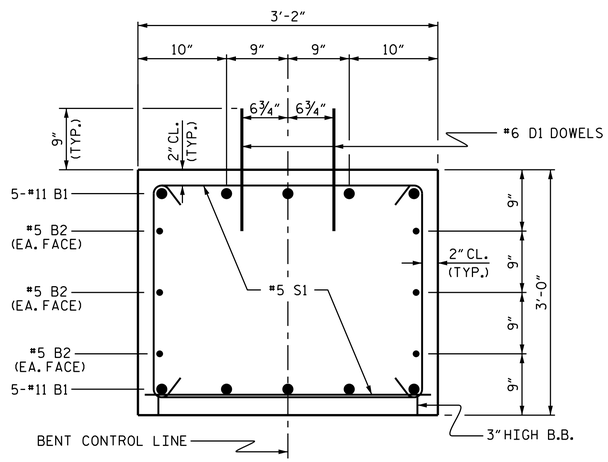


ALL BAR DIMENSIONS ARE OUT TO OUT



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	38'-2"	2028
B2	6	#5	STR	35'-2"	220
B3	4	#4	STR	2'-10"	8
D1	44	#6	STR	1'-6"	99
S1	60	#5	2	9'-0"	563
U1	6	#4	3	5'-8"	23
U2	6	#4	3	5'-6"	22
U3	8	#4	3	3'-6"	19
V1	30	#11	4	29'-0"	4622
REINFORCING STEEL				LBS.	7,604
SP-1	3	*	5	324'-6"	1015
SP-2	3	**	6	168'-9"	338
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,353

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	C.Y.	3.1
POUR #3 (CAP)	C.Y.	12.5
POUR #4 (LATERAL GUIDES)	C.Y.	0.1
TOTAL CLASS A CONCRETE	C.Y.	15.7

DRILLED PIERS

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	C.Y.	15.8
3'-0" Ø DRILLED PIERS IN SOIL	LIN. FT.	27.50
3'-0" Ø DRILLED PIERS NOT IN SOIL	LIN. FT.	33.00
CSL TUBES	LIN. FT.	264.60

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

DocuSigned by: Marshall G. Cheek, Jr. 6549D6EBAA3B405...

9/18/2017

ASSEMBLED BY :	R. P. PATEL	DATE :	5-20-13
CHECKED BY :	T. H. CARROLL	DATE :	5-20-13
DRAWN BY : DGE 03/10	REV. 11/14	MAA/TMG	
CHECKED BY : MKT 03/10			

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2			4			16

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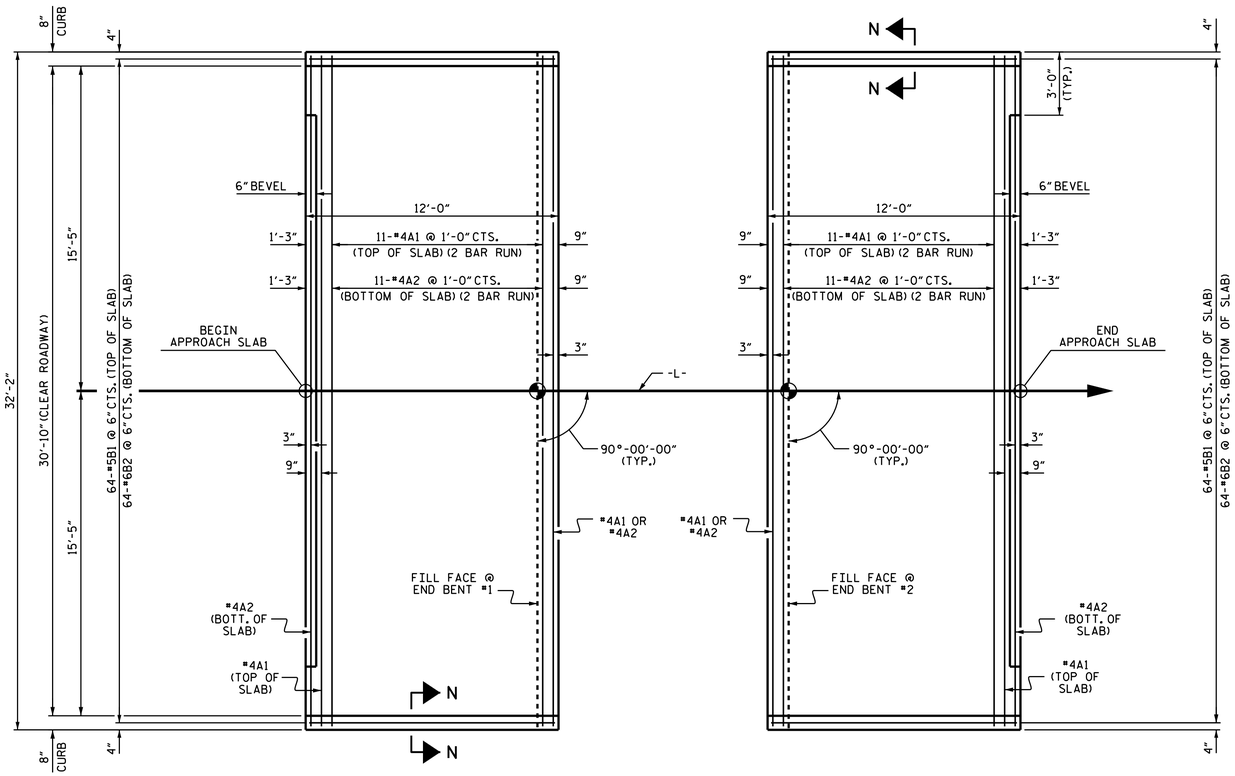
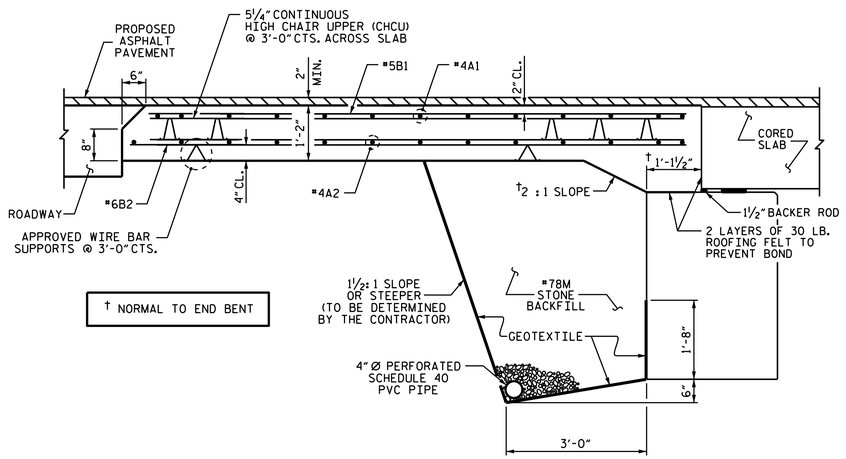
STD. NO. DP_BT_33_90S_<50'



PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

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

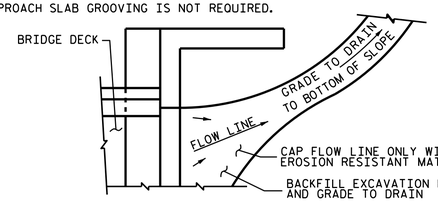
#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE 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.

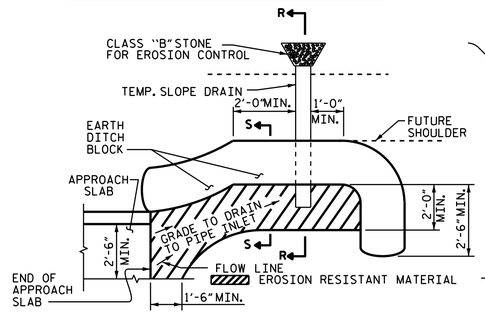
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



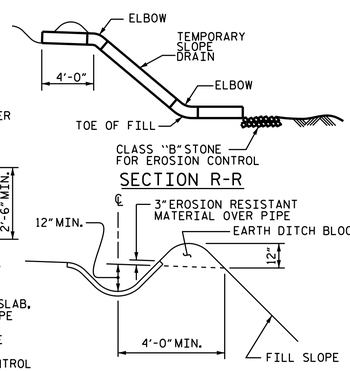
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT 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

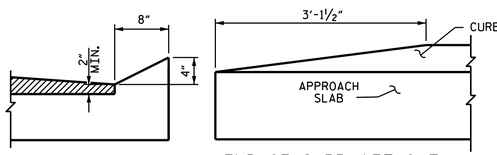


SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

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

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	18.4
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	18.4

PROJECT NO. 17BP.12.R.31

CATAWBA COUNTY

STATION: 14+84.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Docusigned by: Marshall G. Cheek, Jr. 6549D6EBAA3B405...

9/18/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ASSEMBLED BY : G. KOUCHEKI DATE : 9-17
CHECKED BY : M. G. CHEEK DATE : 9-17

DRAWN BY : SHS/MAA 5-09
CHECKED BY : BCH 5-09

REV. 9-15 MAA/TMG

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STD. NO. BAS_33_90S

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 2012 "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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" 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 1/4" 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 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" 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.

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

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JANUARY, 1990

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