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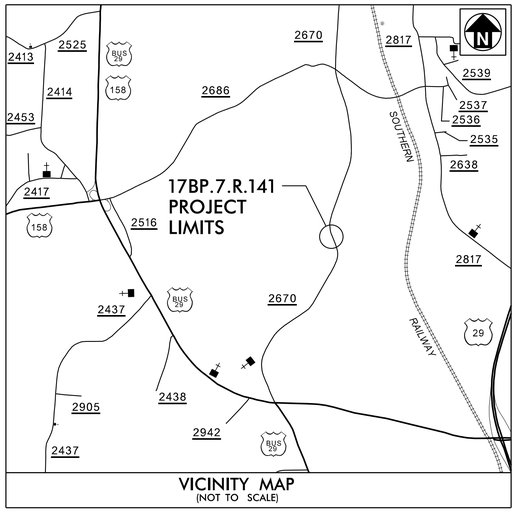
PROJECT: 17BP.7.R.141

CONTRACT: DG00675



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

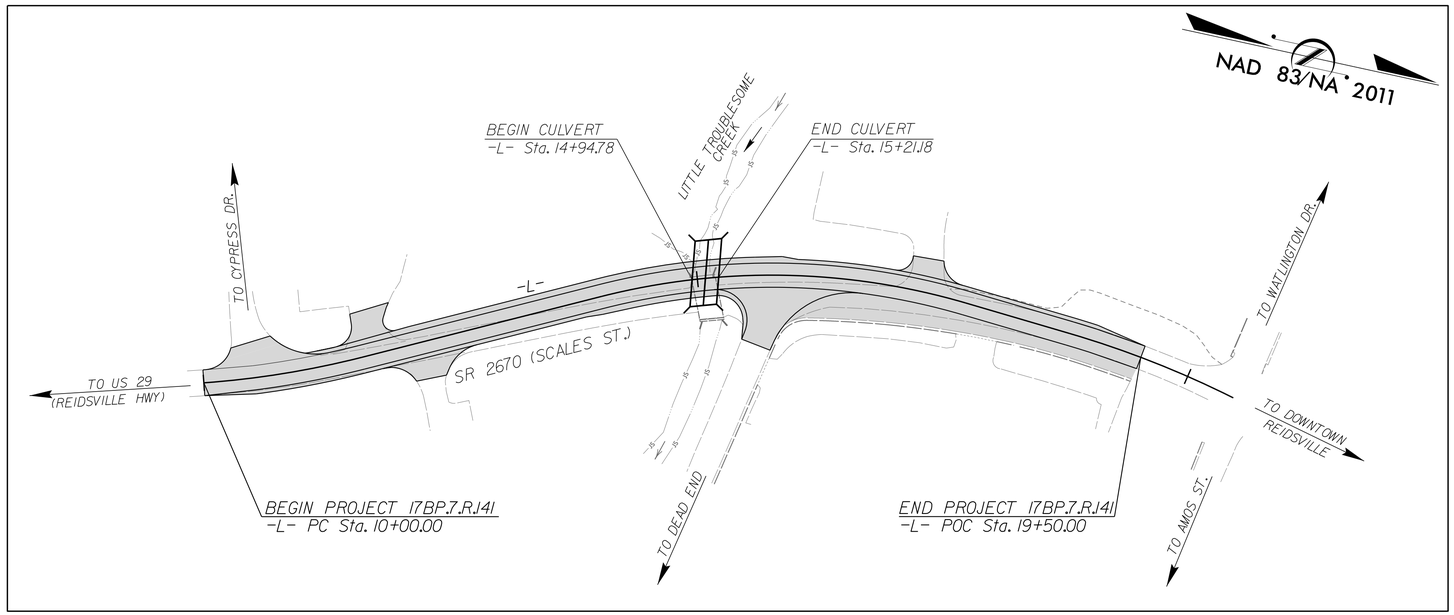
ROCKINGHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.7.R.141	1	

STATE PROJECT NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.7.PE.141		PE
17BP.7.ROW.141		ROW
17BP.7.R.141		CONSTR.

LOCATION: BRIDGE NO. 280 OVER LITTLE TROUBLESOME CREEK ON SR 2670 (SOUTH SCALES STREET)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND CULVERT



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GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 5,570

ADT 2045 = 10,170

V = 45 MPH

SUB REGIONAL TIER
MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY PROJECT = 0.175 MILES

LENGTH STRUCTURE PROJECT = 0.005 MILES

TOTAL LENGTH PROJECT = 0.180 MILES

Prepared in the Office of Mott MacDonald for

DIVISION 7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 27, 2021

LETTING DATE:
NOVEMBER 20, 2025

TIM JORDAN, PE
PROJECT ENGINEER

REID B. ROBOL, PE
HYDRAULICS ENGINEER

NCDOT CONTACT: DANIEL DAGENHART
DIVISION BRIDGE PROGRAM MANAGER

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

Signed by: James Timothy Jordan DBDB7EDB58E4F4...

23-Sep-2025

SIGNATURE: *P.E.*

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043870 ENGINEER REID B. ROBOL

Signed by: Reid B. Robol 9D4E1A5B5B0B4F4...

23-Sep-2025

SIGNATURE: *P.E.*

PLANS PREPARED BY:

MOTT MACDONALD
930 Main Campus Drive, Suite 200
Raleigh, NC 27606
(919) 552-2253
www.mottmac.com

LICENSE NO. F-0669

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

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PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER
Signed by: JAMES TIMOTHY JORDAN
17-Sep-2025

MOTT MACDONALD I & E, LLC
LICENSE NO. F–0669

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Prepared in the Office of:
MOTT MACDONALD
930 Main Campus Drive, Suite 200
Raleigh, NC 27606
www.mottmac.com

GENERAL NOTES

GENERAL NOTES: 2024 SPECIFICATIONS
EFFECTIVE: 01–16–24

GRADING AND SURFACING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY, AT&T, SPECTRUM, PIEDMONT NATURAL GAS COMPANY AND CITY OF REIDSVILLE WATER & SEWER.

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

RIGHT–OF–WAY MARKERS:

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

LIST OF ROADWAY STANDARD DRAWINGS

EFF. 01–16–2024

2024 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, 2024 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	
310.10	Driveway Pipe Construction
DIVISION 5 – SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
DIVISION 8 – INCIDENTALS	
806.01	Concrete Right–of–Way Marker
806.02	Granite Right–of–Way Marker
862.01	Guardrail Placement
862.02	Guardrail Installation
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A–1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B–1	DETOUR PLANS
2C–1 THRU 2C–2	METHOD OF PIPE INSTALLATION
2C–3 THRU 2C–4	GUARDRAIL PLACEMENT
2C–5	STRUCTURE ANCHOR UNIT TYPE III MODIFIED
2G–1	TEMPORARY SHORING DETAIL
3B–1	GUARDRAIL AND EARTHWORK SUMMARY
3D–1	DRAINAGE SUMMARY
4	PLAN AND PROFILE SHEET
RW–01 THRU RW–04	SURVEY CONTROL SHEETS
TMP–1 THRU TMP–7	TRAFFIC MANAGEMENT PLANS
PMP–1 THRU PMP–2	PAVEMENT MARKING PLANS
EC–1 THRU EC–5B	EROSION CONTROL PLANS
RF–1	REFORESTATION DETAIL SHEET
SIGN–1 THRU SIGN–3	SIGNING PLANS
UC–1 THRU UC–4	UTILITY CONSTRUCTION PLANS
UO–1 THRU UO–2	UTILITY BY OTHERS PLANS
X–1 THRU X–5	CROSS–SECTIONS
S–1 THRU S–12	CULVERT PLANS
SN	STANDARD NOTES

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9/10/2021

PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Existing Concrete Monument (ECM)
- 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 & PROJECT CONTROL:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line
- Existing Control of Access Line
- Proposed Control of Access Line
- Proposed ROW and CA Line
- 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

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:

** SUE – Subsurface Utility Engineering*
LOS – Level of Service – A,B,C or D (Accuracy)

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 Test Hole (SUE – LOS A)*
- U/G Power Line (SUE – LOS B)*
- U/G Power Line (SUE – LOS C)*
- U/G Power Line (SUE – LOS D)*

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole
- Telephone Pedestal
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole
- U/G Telephone Test Hole (SUE – LOS A)*
- U/G Telephone Cable (SUE – LOS B)*
- U/G Telephone Cable (SUE – LOS C)*
- U/G Telephone Cable (SUE – LOS D)*
- U/G Telephone Conduit (SUE – LOS B)*
- U/G Telephone Conduit (SUE – LOS C)*
- U/G Telephone Conduit (SUE – LOS D)*
- U/G Fiber Optics Cable (SUE – LOS B)*
- U/G Fiber Optics Cable (SUE – LOS C)*
- U/G Fiber Optics Cable (SUE – LOS D)*

WATER:

- Water Manhole
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line Test Hole (SUE – LOS A)*
- U/G Water Line (SUE – LOS B)*
- U/G Water Line (SUE – LOS C)*
- U/G Water Line (SUE – LOS D)*
- Above Ground Water Line

TV:

- TV Pedestal
- TV Tower
- U/G TV Cable Hand Hole
- U/G TV Test Hole (SUE – LOS A)*
- U/G TV Cable (SUE – LOS B)*
- U/G TV Cable (SUE – LOS C)*
- U/G TV Cable (SUE – LOS D)*
- U/G Fiber Optic Cable (SUE – LOS B)*
- U/G Fiber Optic Cable (SUE – LOS C)*
- U/G Fiber Optic Cable (SUE – LOS D)*

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE – LOS A)*
- U/G Gas Line (SUE – LOS B)*
- U/G Gas Line (SUE – LOS C)*
- U/G Gas Line (SUE – LOS D)*
- Above Ground Gas Line

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line
- Above Ground Sanitary Sewer
- SS Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)*
- SS Force Main Line (SUE – LOS C)*
- SS Force Main Line (SUE – LOS D)*

MISCELLANEOUS:

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

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PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	2A–1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

17-Sep-2025

MOTT MACDONALD I & E, LLC
LICENSE NO. F–0669

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930 Main Campus Drive, Suite 200
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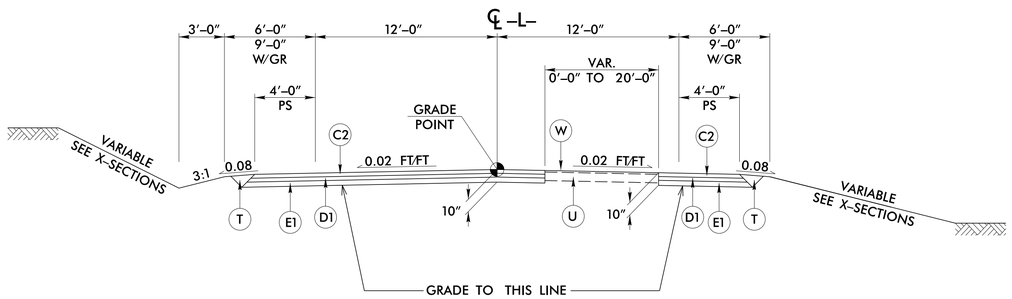
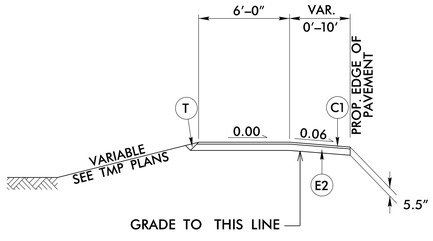


TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1:
–L– STA 10+00.00 TO 10+50.00

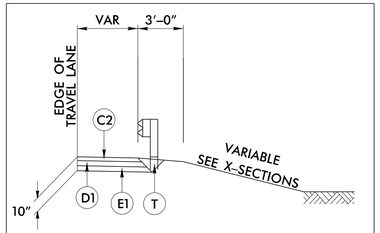
USE TYPICAL SECTION NO. 1:
–L– STA 10+50.00 TO 19+00.00

TRANSITION FROM TYPICAL SECTION NO. 1 TO EXISTING:
–L– STA 19+00.00 TO 19+50.00

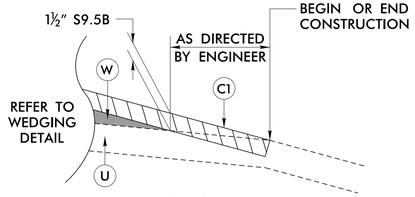


TEMPORARY PAVEMENT DETAIL

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1.
–L– STA 14+52.74 TO 16+86.52 LT
–L– STA 13+45.47 TO 15+31.85 RT
SEE TRANSPORTATION MANAGEMENT PLANS

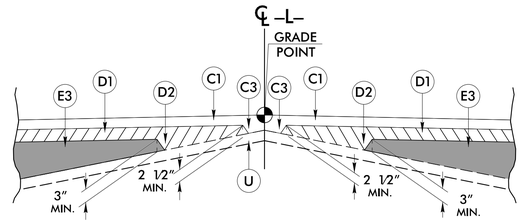


DETAIL FOR FULL DEPTH PAVED SHOULDER IN CONJUNCTION WITH GUARDRAIL



MILLING DETAIL

DETAIL SHOWING PROFILE VIEW



Detail Showing Method of Wedging

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1″ IN DEPTH OR GREATER THAN 1½″ IN DEPTH.
D1	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
E1	PROP. APPROX. 3″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E2	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3″ IN DEPTH OR GREATER THAN 5½″ IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING).

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

tsorpjordan
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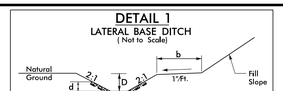
DETAIL 1
LATERAL BASE DITCH
(Not to Scale)



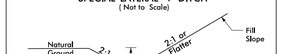
*When B is < 6.0'

Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3.0 Ft.
b = 5.0 Ft.

Type of Liner = CLASS I RIP-RAP

-L- STA. 14+60 TO 15+02 LT =
-DET- STA. 14+65 TO 15+07 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1.5 FT.
Max. d = 1.5 FT.

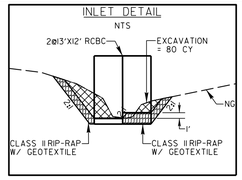
Type of Liner = CLASS B RIP-RAP

-L- STA. 15+37 TO 17+00 LT =
-DET- STA. 15+41 TO 17+02 LT

FOR CULVERT CONSTRUCTION SEQUENCE
SEE EC-5A & EC-5B

NAD 83/NA 2011

INLET DETAIL
NTS



TEMPORARY SHORING
SEE SHEET TMP-5

PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	2B-1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JOHNSON
Signed by: James Timothy Johnson
18-Sep-2025
MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 043870 ENGINEER PAUL B. ROBO
Signed by: Paul B. Robo
18-Sep-2025
VHB ENGINEERING
LICENSE NO. C-3705

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Prepared in the Office of:
MOTT MACDONALD 930 Main Campus Drive, Suite 200 Raleigh, NC 27606 www.mottmac.com

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

VERTICAL SCALE 5' 0 5' 10'
HORIZONTAL SCALE 25' 0 25' 50'

-DET- PT Sta. 11+74.88
-L- POT Sta.11+74.88

-DET- PC Sta. 14+81.74

-BL-GPS 780280-1

-DET- POT Sta. 17+74.36
-L- PT Sta.17+68.26

END PROJECT 17BP.7.R.141
-L- POC Sta. 19+50.00
-DET- POC Sta.19+56.09

-DET- PC Sta.18+81.61
-L- PC Sta. 18+75.52

-DET- PT Sta. 16+69.29

-DET- PT Sta.20+56.09
-L- PT Sta. 20+50.00

BEGIN PROJECT 17BP.7.R.141
-L- PC Sta. 10+00.00
-DET- PC Sta.10+00.00

CITY OF REIDSVILLE
NO REFERENCE FOUND

1 MELISSA ANNE MCCLARY
DB 1477 PG 2250
PB 45 PG 6

2 CITY OF REIDSVILLE
NO REFERENCE FOUND

3 WOODBRIDGE HOI LIMITED PARTNERSHIP
DB 1407 PG 527
PB 19 PG 55

4 W.B. & RUTH P. PIPKIN
DB 408 PG 39
PB 3 PG 90

5 IRENE AGAPION
DESPINA AGAPION
BASIL AGAPION
DB 823 PG 1482

HORIZON INC
DB 840 PG 1340
PB 19 PG 55

KENNETH W BRAKEFIELD
DB 1044 PG 408
PB 45 PG 39

B&J BARBARA INVESTMENTS, LLC
DB 1198 PG 1968
PB 40 PG 36

CLASS II RIP RAP
EST. 90 TONS
EST. 100 SY GEOTEXTILE

LATERAL BASE DITCH
SEE DETAIL 1
EST. 30 TONS RIP RAP
EST. 45 SY GEOTEXTILE
EST. 30 CY DDE

LATERAL V DITCH
SEE DETAIL 2
EST. 50 TONS RIP RAP
EST. 110 SY GEOTEXTILE

TEMPORARY PAVEMENT
SEE SHEET TMP-5

TEMPORARY PAVEMENT
SEE SHEET TMP-4

2@13'X12' RCBC
(STR PAY ITEM)

RETAIN

RETAIN SYSTEM

TO US 29 REIDSVILLE HWY

TO DOWNTOWN REIDSVILLE

TO DE-ICE END

TO CYPRESS DR.

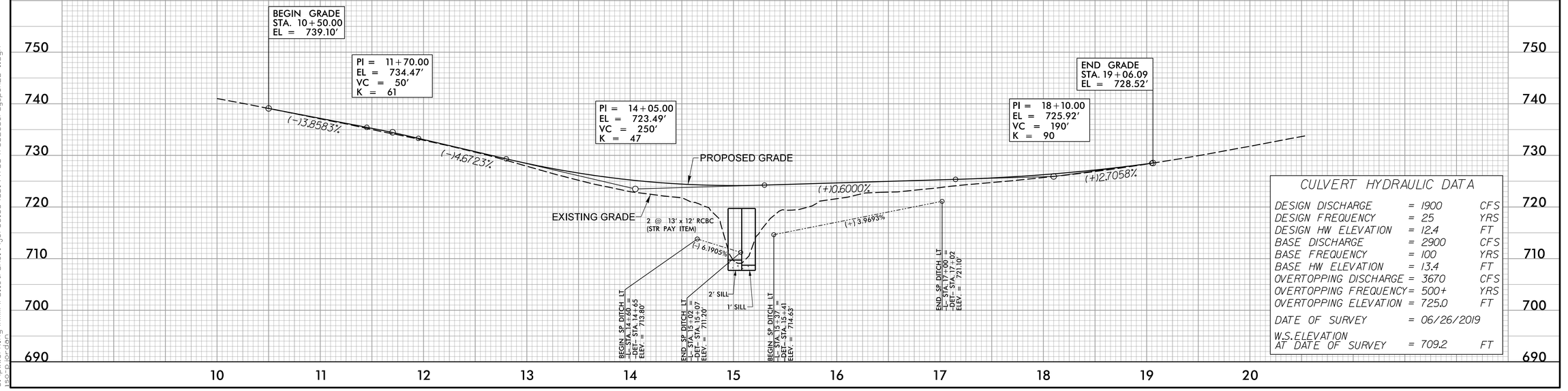
TO WATLINGTON DR.

TO AMOS ST.

-DET-

PI Sta 10+87.72	PI Sta 15+77.97	PI Sta 19+69.09
△ = 11° 08' 00.2" (LT)	△ = 31° 36' 23.2" (RT)	△ = 10° 18' 22.8" (RT)
D = 6° 21' 58.3"	D = 16° 51' 06.1"	D = 5° 54' 24.4"
L = 174.88'	L = 187.56'	L = 174.48'
T = 87.72'	T = 96.23'	T = 87.48'
R = 900.00'	R = 340.00'	R = 970.00'

-DET-



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1900	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 12.4	FT
BASE DISCHARGE	= 2900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 13.4	FT
OVERTOPPING DISCHARGE	= 3670	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 725.0	FT
DATE OF SURVEY	= 06/26/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 709.2	FT

9/18/2025
9:35:34 AM
c:\pwworking\hmm\rail-transit\jor-66165\d0199700\780280_rdy_psh2B-1.dgn
iso-p\jordan

Docusign Envelope ID: 1264B696-D87D-4A20-A840-05F7DCD67464

PROJECT REFERENCE NO.	SHEET NO.
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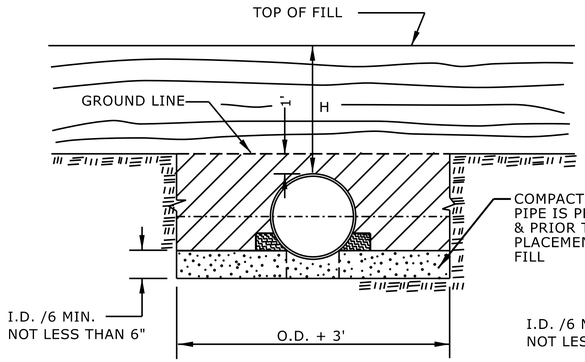
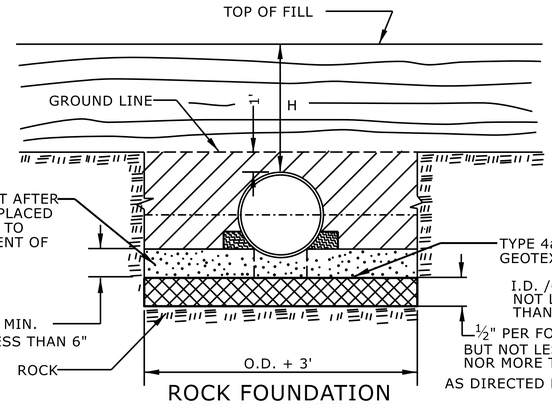
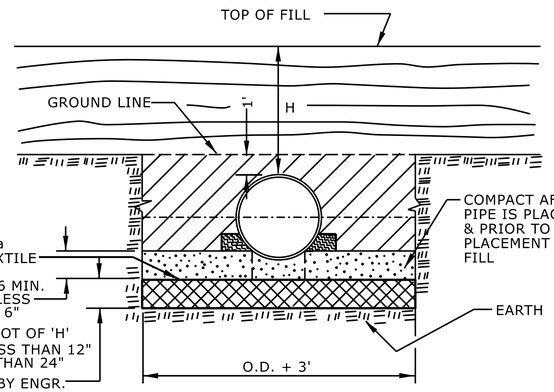


NORMAL EARTH FOUNDATION

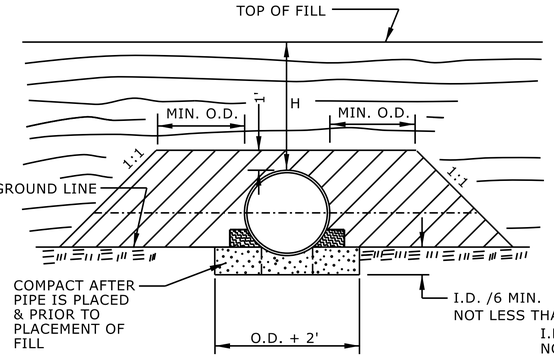


ROCK FOUNDATION

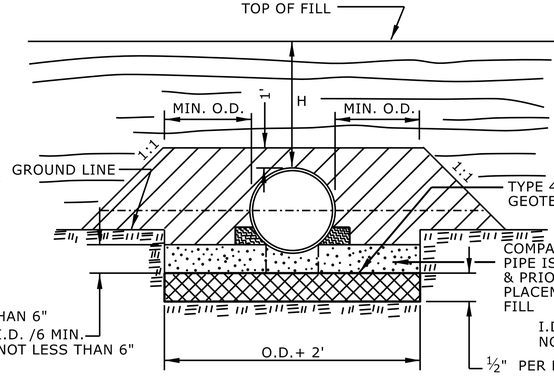


UNSUITABLE MATERIAL FOUNDATION

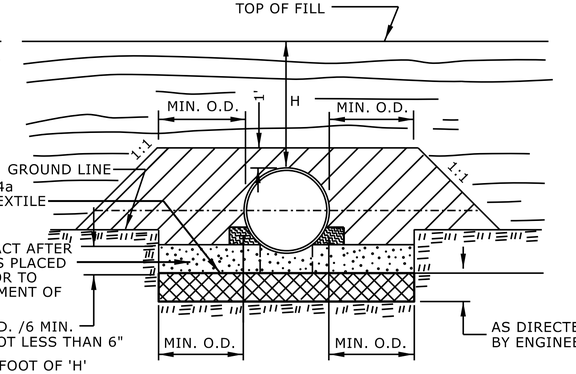
PIPE IN TRENCH



NORMAL EARTH FOUNDATION



ROCK FOUNDATION



UNSUITABLE MATERIAL FOUNDATION

PIPE ABOVE GROUND

GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

APPROVED SUITABLE LOCAL MATERIAL.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

REFER TO NCDOT PIPE MATERIAL SELECTION GUIDE AND STANDARD SPECIFICATIONS FOR ALLOWABLE PIPE FILL HEIGHTS AND PIPE SPECIFICATIONS.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE

SHEET 1 OF 2

300.01

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
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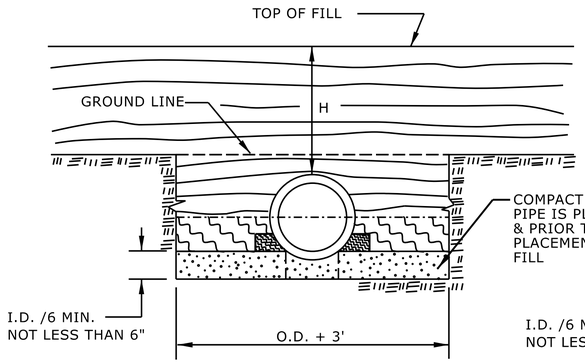

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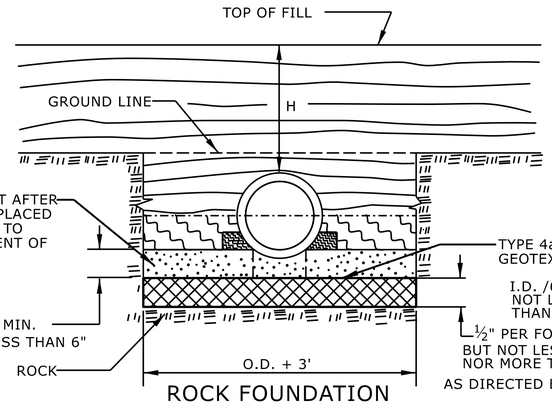
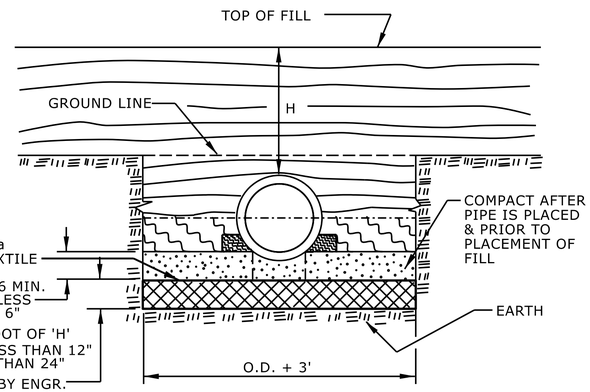
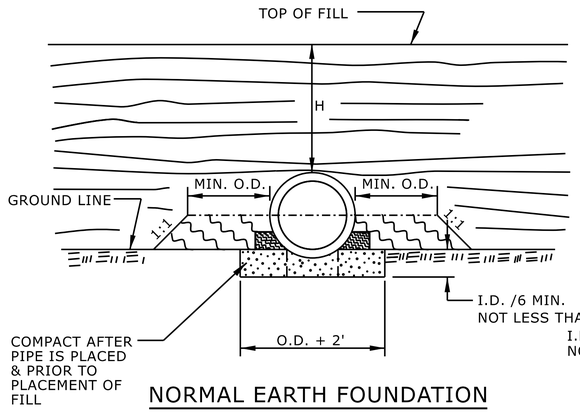


ROCK FOUNDATION

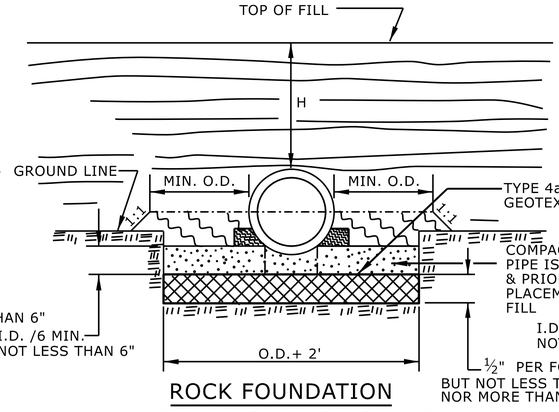


UNSUITABLE MATERIAL FOUNDATION

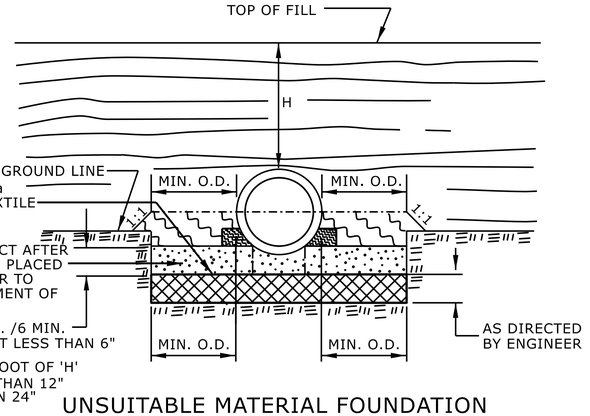
PIPE IN TRENCH



NORMAL EARTH FOUNDATION



ROCK FOUNDATION



UNSUITABLE MATERIAL FOUNDATION

PIPE ABOVE GROUND

GENERAL NOTES:

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SPRINGLINE OF PIPE

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SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH TYPE IV GEOTEXTILE AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. HACKLER
17-Sep-2025

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CONTRACTS STANDARDS AND DEVELOPMENT UNIT
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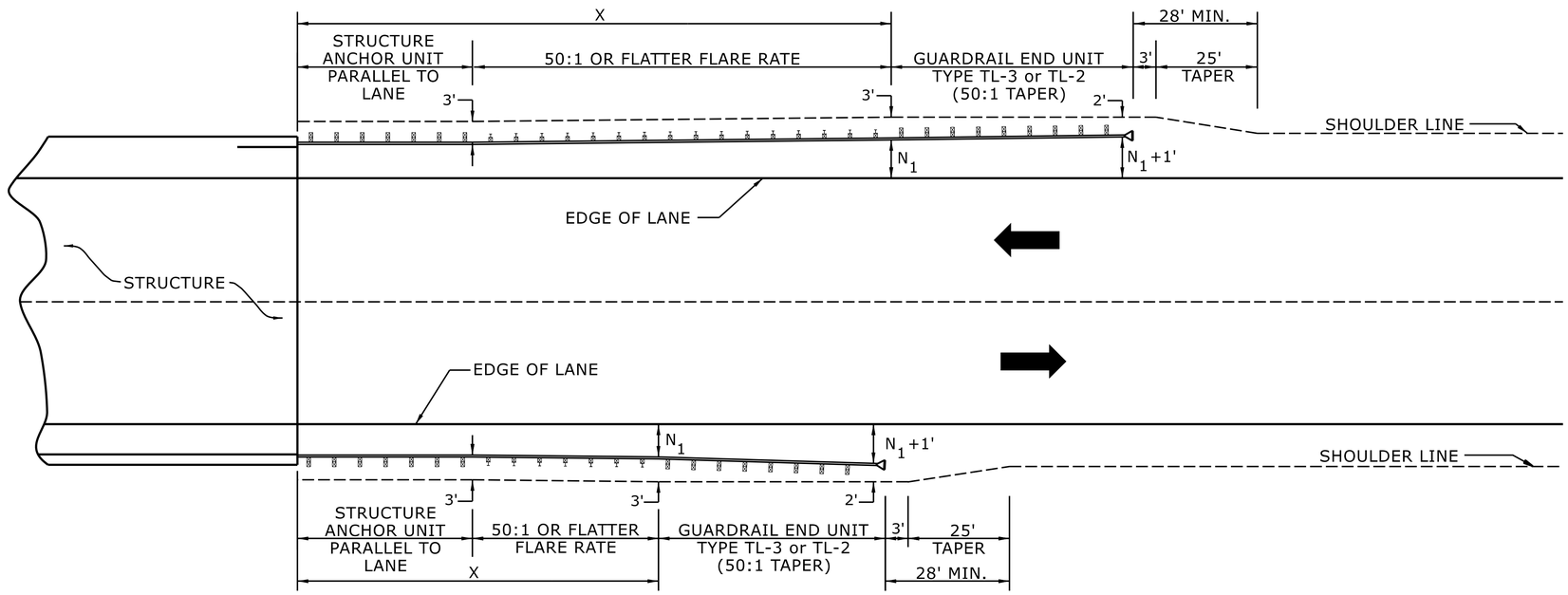

USE FLARE RATE AS THE CONTROL IF THE "N_1" DISTANCE IS NOT OBTAINED.
("N_1" IS BASED ON SHOULDER WIDTHS IN THE ROADWAY DESIGN MANUAL)

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 LENGTH OF NEED (X) IS CALCULATED BASED ON THE AASHTO ROADSIDE DESIGN GUIDE.

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

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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 15

862D01

NORTH CAROLINA PROFESSIONAL SEAL 033144 ENGINEER NICOLE M. RACKLEY
17-Sep-2025

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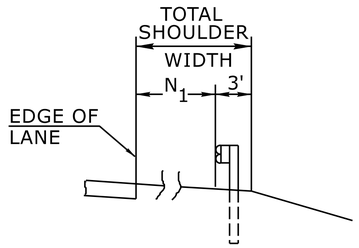
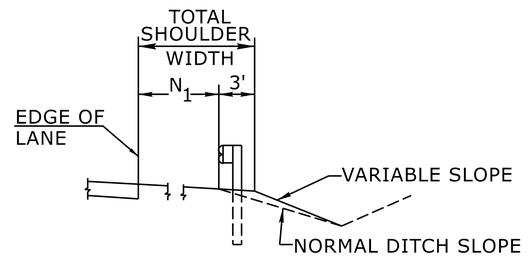
17BP.7.R.141 - ROCKINGHAM 280	2C-4

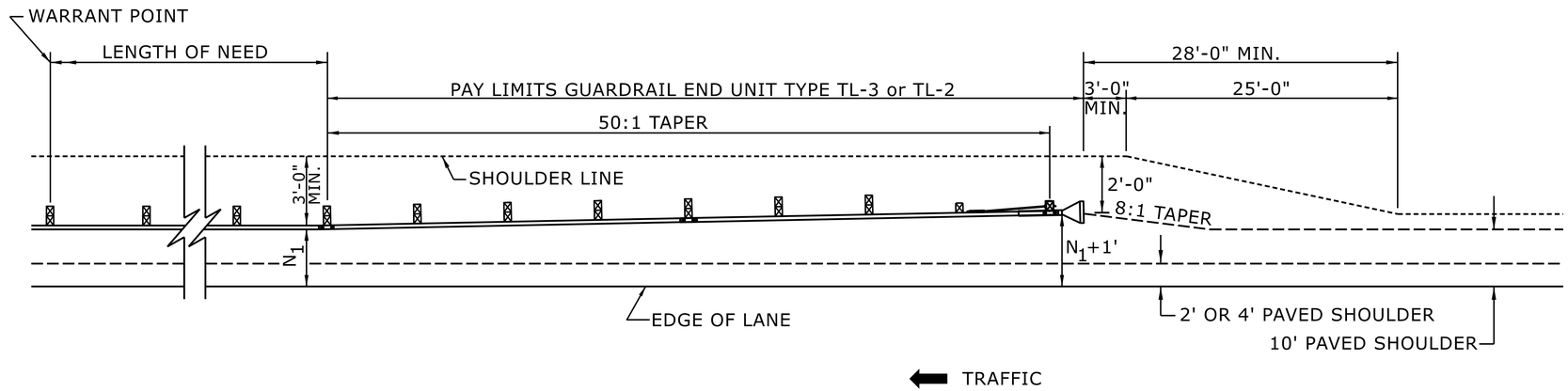


FILL SECTION



CUT SECTION

"N_1"= DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.



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

DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION

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RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 15

862D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER
Nicole M. Hackler
58843230-B4E9-4...
17-Sep-2025

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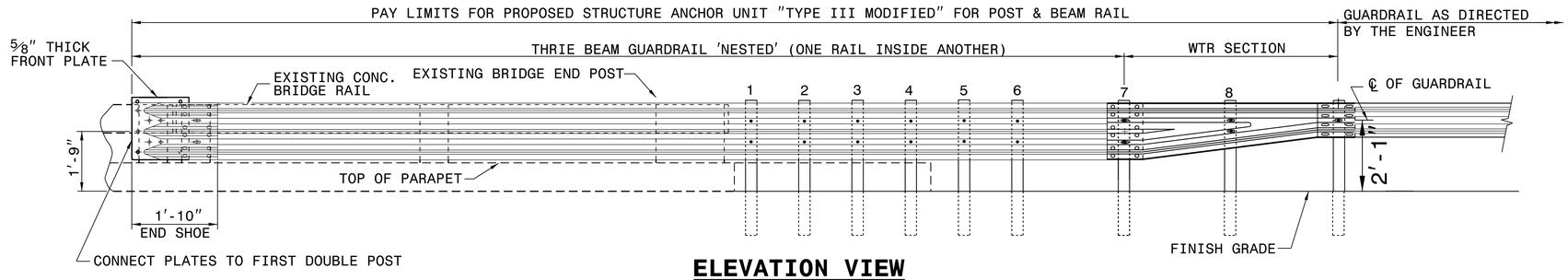
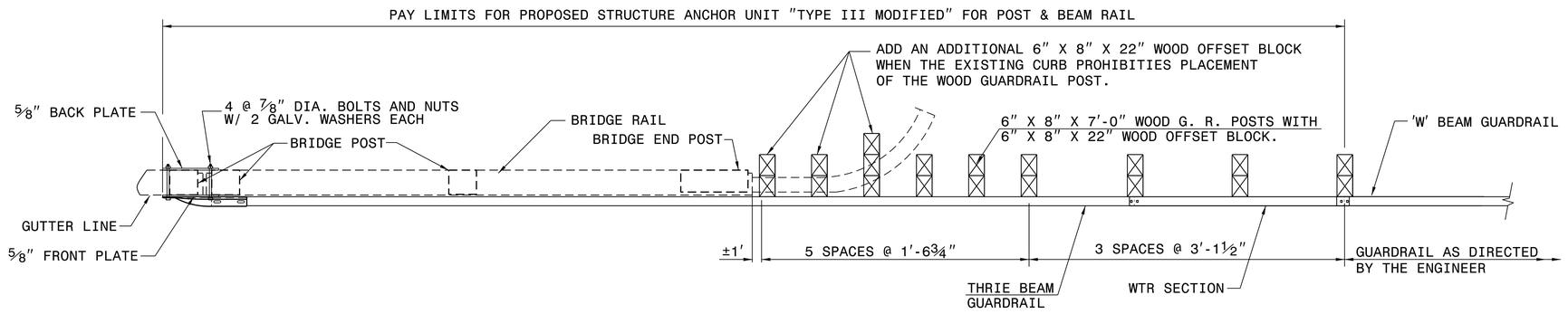
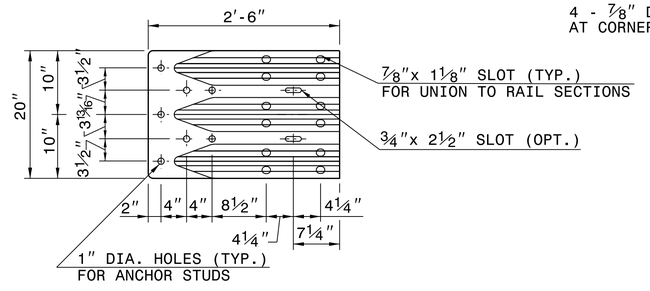
17BP.7.R.141 - ROCKINGHAM 280	2C-5



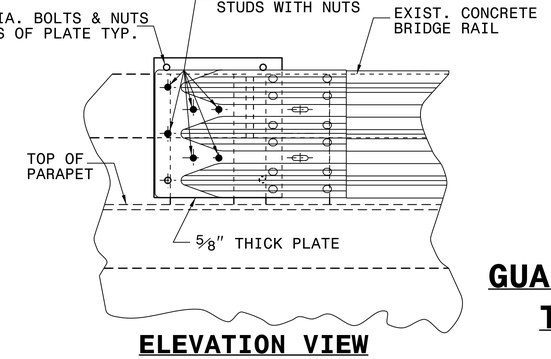
ELEVATION VIEW



PLAN VIEW

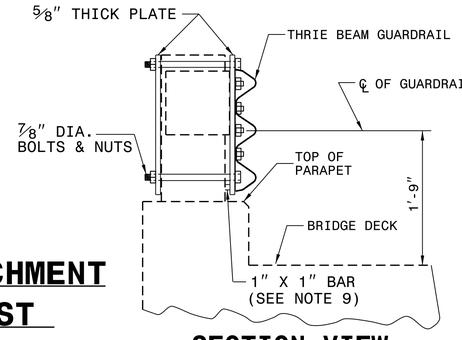


END SHOE



ELEVATION VIEW

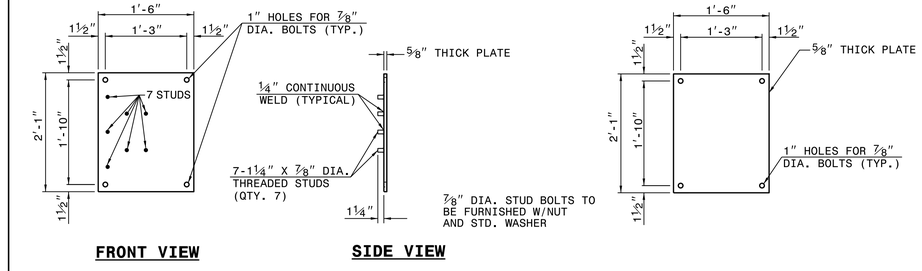
GUARDRAIL ATTACHMENT TO BRIDGE POST



SECTION VIEW

GENERAL NOTES:

1. USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
2. TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
3. USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
4. ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
5. INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE AT BRIDGE END POST SPACER TUBE LOCATION BY USING STANDARD OR ALTERED SPACER TUBES OR A COMBINATION THEREOF OR AS DIRECTED BY THE ENGINEER. FOR VERY SMALL PARAPET WIDTHS, GUARDRAIL MAY BE INSTALLED AGAINST BRIDGE RAIL WITHOUT SPACER TUBES.
6. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
7. USE THIS DETAIL ONLY FOR BRIGES WITH POST AND BEAM TYPE RAIL.
8. ATTACH 1" X 1" BAR AND THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
9. 1" X 1" BAR MAY NOT BE NEEDED ON BRIDGE RAILS WHERE FACE OF RAIL DOES NOT PROJECT BEYOND FACE OF POST.
10. PROVIDE SHOP DRAWINGS OF THE PLATES TO THE ENGINEER FOR APPROVAL BEFORE FABRICATING THE PLATES.
11. LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
12. SEE ROADWAY STARDARD DRAWING 862.03 SHEET 3 FOR ADDITIONAL INFORMATION ON THE TYPE III ANCHOR UNIT



FRONT VIEW — SIDE VIEW

FRONT PLATE — BACK PLATE

BRIDGE PLATES

17-Sep-2025

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CONTRACT STANDARDS AND DEVELOPMENT UNIT
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STRUCTURE ANCHOR UNIT TYPE III MODIFIED

ORIGINAL BY: C.O. CUEVAS DATE: 12-00
MODIFIED BY: JS HOWERTON DATE: 01-18
CHECKED BY: _____ DATE: _____
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jhowerton
AT CSD-29295

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5/26/20

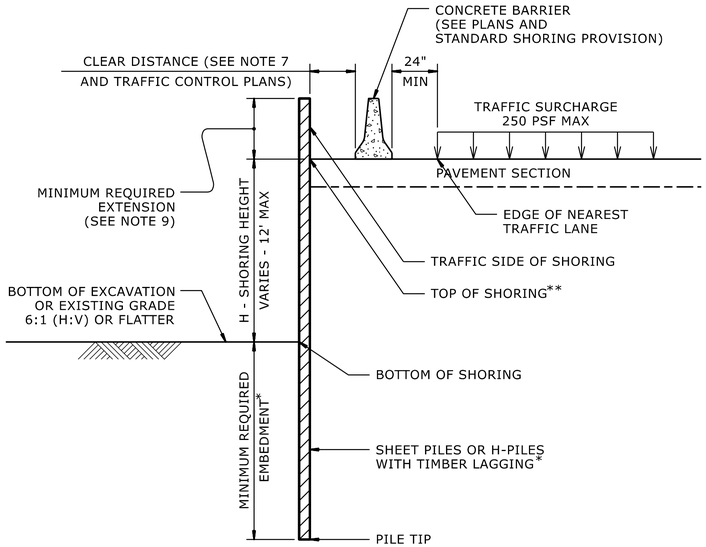
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

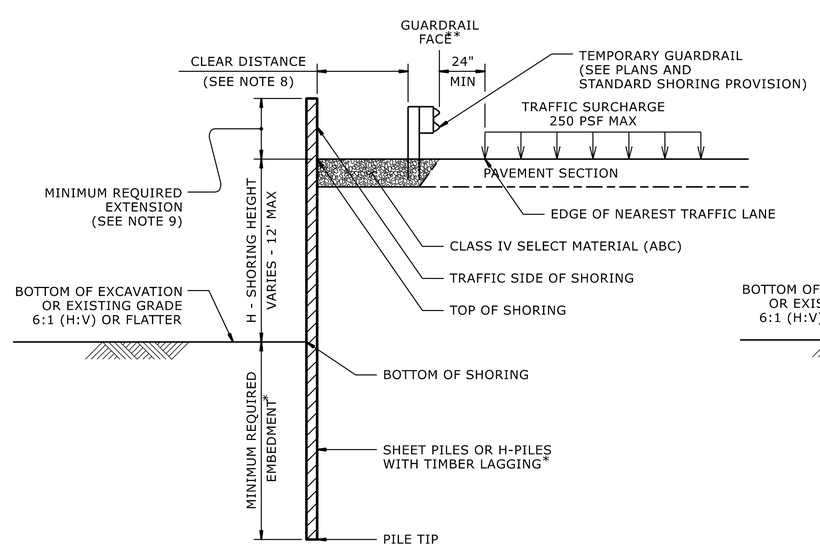
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, φ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



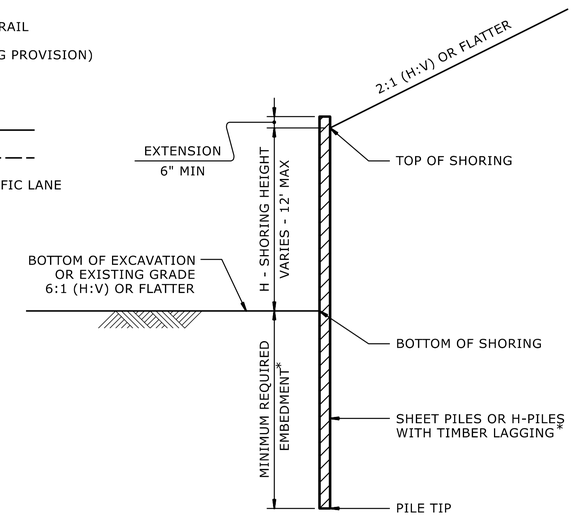
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

17BP.7.R.141
ROCKINGHAM 280

SHEET NO. 2G-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038200 ENGINEER KENNETH R. BUSSEY
9/16/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STANDARD DETAIL NO. 1801.01

GEOTECHNICAL STANDARD DETAIL FOR

TEMPORARY SHORING

DATE: 02-18-2025

Docusign Envelope ID: 1264B696-D87D-4A20-A840-05F7DCD67464

PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	3B–1

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
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 SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	AT–1	GREU TL–2	TYPE III						NO.	PERMITTED G	PERMITTED NG	
–L–	13+98.50	15+43 +/–	RT	118.75′	37.50′				6′	9′					1	1										ANCHOR ASSEMBLY SEE STR PLANS (RT SIDE ONLY)
–L–	11+95 +/–	15+85.25	LT	381.25′	12.50′				6′	9′					1	1										
		SUBTOTAL		500.00′	50.00′																					
		LESS ANCHOR DEDUCTIONS																								
		GREU TL–2 2 x 25.00′ =		–50.00′																						
		AT–1 2 x 6.25′ =		–12.50′																						
		TOTAL		437.50′	50.00′										2	2										5 ADDITIONAL GUARDRAIL POSTS

TEMPORARY GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	AT–1	GREU TL–2	TYPE III MODIFIED						NO.	PERMITTED G	PERMITTED NG	
–L–	14+41.75	15+16.75	RT	75.00 ′												1	1									SEE TMP PLANS
		SUBTOTAL		75.00′																						
		LESS ANCHOR DEDUCTIONS																								
		GREU TL–2 1 x 25.00′ =		–25.00′																						
		TYPE III 1 x 37.50′ =		–37.50′																						
		TOTAL		12.50′												1	1									

SUMMARY OF EARTHWORK
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
–L– 10+00.00 TO 19+50.00	131		3822	3691	
SUBTOTAL	131		3822	3691	
TEMPORARY –L– 14+00.00 TO 17+00.00			419	419	
SUBTOTAL			419	419	
REMOVAL OF TEMPORARY –L– 14+00.00 TO 17+00.00	349				349
SUBTOTAL	349			4529	349
WASTE IN LIEU OF BORROW					
PROJECT TOTAL	829			4529	
5% TO REPLACE BORROW				227	
GRAND TOTAL	829			4756	349
SAY	880			5000	

NOTE: Approximate quantities only. Unclassified Excavation, Fine Grading and Removal of Existing Asphalt Pavement will be paid for at the contract Lump Sum price for "Grading".

isa-pjordan
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PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	3D–1

SUB–REGIONAL & REGIONAL
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	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE	DRAINAGE PIPE THICKNESS OR GAUGE	C.S. PIPE SIZE	C.S. PIPE THICKNESS OR GAUGE	R.C. PIPE (CLASS III) SIZE	R.C. PIPE (CLASS IV) SIZE	30" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	***" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. PER EACH (0' THRU 5.0')	LIN. *FT. 5.0' THRU 10.0' A	LIN. *FT. 10.0' AND ABOVE B	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	CONCRETE TRANSITIONAL SECTION DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & GRATE STD. 840.16	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	T.B.D.I. STD. 840.35	DRAINAGE PIPE 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
10+52	LT													68'																							
11+80	LT													76'																							
TOTAL														144'																							

DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) — SIZE: 12" 15" 18" 24" 30" 36" 42" 48"

DO NOT USE RCP: 12" 15" 18" 24" 30" 36" 42" 48"

DO NOT USE PVC: 15" 18" 24" 30" 36" 42" 48"

DO NOT USE CAAP: 12" 15" 18" 24" 30" 36" 42"

DO NOT USE HDPE: 12" 15" 18" 24" 30" 36" 42" 48"

C.S. PIPE — THICKNESS OR GAUGE: 12" .064; 15" .064; 18" .064; 24" .064; 36" .079; 42" .109; 48" .109

R.C. PIPE (CLASS III): 15" 18" 24" 30" 36" 42" 48"

R.C. PIPE (CLASS IV): 12" 15" 18" 24" 30" 36" 42" 48"

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".

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

iso-pjordan
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9/17/2025
9:53:43 AM

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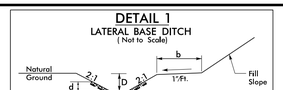
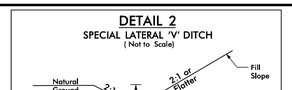
DETAIL 1
LATERAL BASE DITCH
(Not to Scale)



Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
*When B is < 6.0' B = 3.0 Ft.
b = 5.0 Ft.
Type of Liner = CLASS I RIP-RAP

–L– STA. 14+60 TO 15+02 LT =
–DET– STA. 14+65 TO 15+07 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

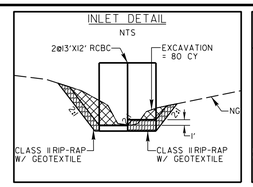


Min. D = 1.5 FT.
Max. d = 1.5 FT.
Type of Liner = CLASS B RIP-RAP

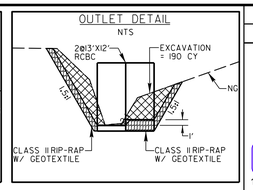
–L– STA. 15+37 TO 17+00 LT =
–DET– STA. 15+41 TO 17+02 LT

NAD 83/NA 2011

INLET DETAIL
NTS



OUTLET DETAIL
NTS



PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	4

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER MATTHEW JOSEPH ROBINSON
Signed by: MATTHEW JOSEPH ROBINSON
18-Sep-2025
MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 043870 ENGINEER KYLE RAY ROBO
Signed by: KYLE RAY ROBO
18-Sep-2025
VHB ENGINEERING
LICENSE NO. C-3705

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
MOTT MACDONALD
930 Main Campus Drive, Suite 200
Raleigh, NC 27606
www.mottmac.com

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

VERTICAL SCALE 5' 0 5' 10'
HORIZONTAL SCALE 25' 0 25' 50'

-L- PT Sta. 11+58.58
BEGIN PROJECT 17BP.7.R.141
-L- PC Sta. 10+00.00
BEGIN CULVERT
-L- Sta. 14+94.78
-L- PC Sta. 14+03.87
END CULVERT
-L- Sta. 15+21.18
-L- PC Sta. 18+75.52
END PROJECT 17BP.7.R.141
-L- POC Sta. 19+50.00
-L- PT Sta. 17+68.26
-L- PT Sta. 20+50.00
-BL-GPS 780280-1
-BL-3
-BL-4
15+00
20+00

CLASS B RIP RAP
EST. 8 TONS
EST. 21 SY GEOTEXTILE

CLASS II RIP RAP
INSTALLED FOR DETOUR
TO REMAIN IN PLACE

LATERAL BASE DITCH
SEE DETAIL 1
INSTALLED FOR DETOUR
TO REMAIN IN PLACE

LATERAL V DITCH
SEE DETAIL 2
INSTALLED FOR DETOUR
TO REMAIN IN PLACE

CLASS II RIP RAP
EST. 130 TONS
EST. 185 SY GEOTEXTILE

2@13'X12' RCBC
(STR PAY ITEM)

GREU TL-2

RETAIN

RETAIN SYSTEM

ADDITIONAL OVERLAY AREA
MILL AS NEEDED TO TIE TO
EXISTING C&G

1 MELISSA ANNE MCCLARY
DB 1477 PG 2250
PB 45 PG 6

2 CITY OF REIDSVILLE
NO REFERENCE FOUND

3 WOODBRIDGE HOI LIMITED PARTNERSHIP
DB 1407 PG 527
PB 19 PG 55

4 W.B. & RUTH P. PIPKIN
DB 408 PG 39
PB 3 PG 90

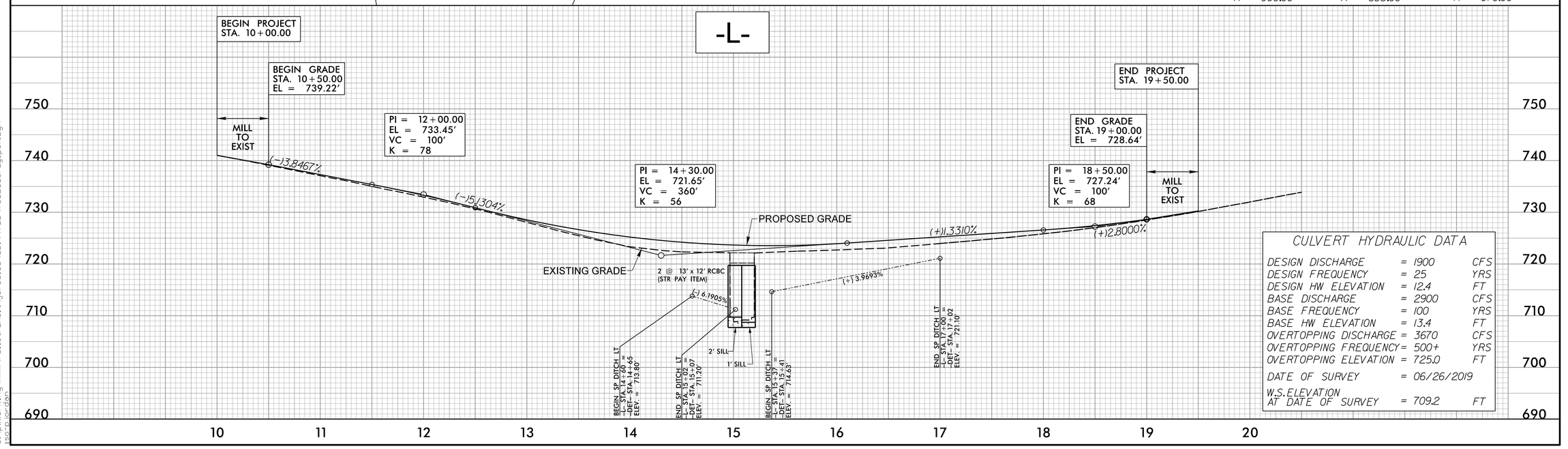
5 IRENE AGAPION
DESPINA AGAPION
BASIL AGAPION
DB 823 PG 1482

HORIZON INC
DB 840 PG 1340
PB 19 PG 55

KENNETH W BRAKEFIELD
DB 1044 PG 408
PB 45 PG 39

B&J BARBARA INVESTMENTS, LLC
DB 1198 PG 1968
PB 40 PG 36

-L-		
PI Sta 10+79.50	PI Sta 15+90.51	PI Sta 19+62.99
△ = 10° 05' 43.7" (LT)	△ = 30° 34' 06.7" (RT)	△ = 10° 18' 22.8" (RT)
D = 6° 21' 58.3"	D = 8° 23' 19.8"	D = 5° 54' 24.4"
L = 158.58'	L = 364.40'	L = 174.48'
T = 79.50'	T = 186.65'	T = 87.48'
R = 900.00'	R = 683.00'	R = 970.00'



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1900	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 12.4	FT
BASE DISCHARGE	= 2900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 13.4	FT
OVERTOPPING DISCHARGE	= 3670	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 725.0	FT
DATE OF SURVEY	= 06/26/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 709.2	FT

9/18/2025
9:35:36 AM
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iso-pjordan

DocuSign Envelope ID: 4CBD6727-1DED-4290-8C20-38656E377DDE

09/08/99

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	780280	RW01	4

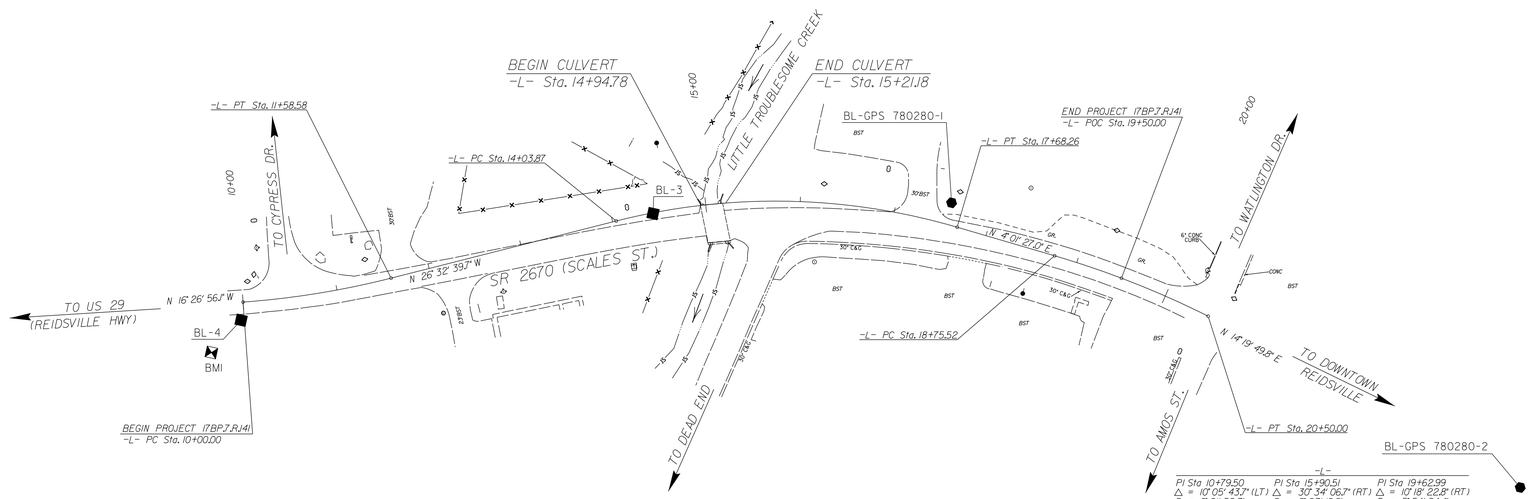
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

ROCKINGHAM COUNTY

TIP PROJECT: 780280

NAD 83/NA 2011



-L-

PI Sta 10+79.50	PI Sta 15+90.51	PI Sta 19+62.99
Δ = 107° 05' 43.7" (LT)	Δ = 30° 34' 06.7" (RT)	Δ = 107° 18' 22.8" (RT)
D = 6° 21' 58.3"	D = 8° 23' 19.8"	D = 5° 54' 24.4"
L = 158.58'	L = 364.40'	L = 174.48'
T = 79.50'	T = 186.65'	T = 87.48'
R = 900.00'	R = 683.00'	R = 970.00'

GRAPHIC SCALE

50 25 0 50 100

PLANS

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR GPS MONUMENT "780280-1" WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF NORTHING: 940,335.173(ft) EASTING: 1,803,880.133(ft) ELEVATION: 724.544(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.0000205889 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "780280-1" TO -L- STATION 10+00 IS S20°16'57.7"E 755.57(ft) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:

Allied Associates, P.A.
4720 KESTER MILL ROAD Phone (336) 765-2377
WINSTON-SALEM, N.C. 27103 FAX 760-8886
WWW.ALLIEDAPA.COM C-2198

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:	*LETTING DATE:*
JULY 1, 2021	*AUGUST 12, 2021*

PROFESSIONAL LAND SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B. OSBORNE

DocuSigned by: Clinton Osborne 0A6F6B085F6449B...

8/31/2021

SIGNATURE: *Date:*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

31-AUG-2021 16:15
Y:\Projects\PA21084\dgn\780280_ls_rw01.dgn
Owner AT OWNER-PC

6/2/99

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

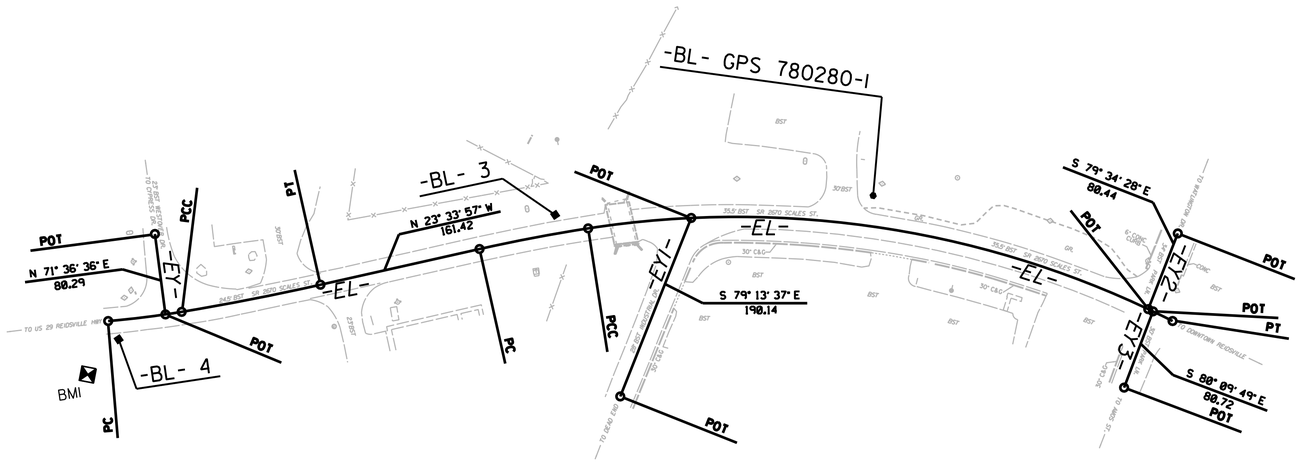
PROJECT REFERENCE NO.	SHEET NO.
78-0280	RW02C-1

Location and Surveys

ALLIED ASSOCIATES, P.A.

PROJECT SURVEYOR

NC GRID
NAD 83 NA 2011



SEE SHEET RW02C-3
FOR FURTHER
ALIGNMENT DETAILS

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

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default
$$$$USER

6/2/99

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
78-0280	RW02C-2
Location and Surveys	
ALLIED ASSOCIATES, P.A.	
PROJECT SURVEYOR	

BL

POINT	DESC.	NORTH	EAST	ELEVATION
4	BL-4	939628.5465	1804161.1364	741.61
3	BL-3	940029.6813	1803958.4137	722.61
1	GPS 780200-1	940325.1730	1803888.1338	724.54
2	GPS 780200-2	940986.8815	1804045.8715	747.81

BM1 ELEVATION = 743.57
N 939605 E 1804201
RAILROAD SPIKE SET IN 18" POPLAR TREE

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

$$$$ENGINEERING$$$$
$$$$SYSTEMS$$$$

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
78-0280	RW02C-3

Location and Surveys

ALLIED ASSOCIATES, P.A.

PROJECT SURVEYOR

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
PT	939614.475	1884145.354							
CURVE			N 18°01'19.8" W	73.31	04°48'06.3"(LT)	06°21'58.3"	73.33	36.69	900.00
PCC	939684.689	1884122.678							
CURVE			N 21°57'35.7" W	140.82	03°12'33.6"(LT)	02°17'30.6"	140.83	70.84	2500.00
PT	939814.545	1884078.316							
LINE			N 29°33'56.5" W	161.42					
PC	939952.581	1884085.781							
CURVE			N 21°39'53.6" W	189.46	03°48'05.9"(RT)	03°28'20.9"	189.48	54.76	1650.00
PCC	940084.228	1883965.371							
CURVE			N 81°54'00.1" W	585.84	35°43'25.8"(RT)	09°59'58.4"	595.44	307.75	955.00
PT	940049.744	1883545.524							

EY

POINT	N	E	BEARING	DIST
POT	939644.881	1884081.999		
LINE			N 71°38'36.1" E	88.29
POT	939689.412	1884128.148		

EY1

POINT	N	E	BEARING	DIST
POT	940152.452	1883938.317		
LINE			S 79°13'37.3" E	198.14
POT	940126.953	1884122.782		

EY2

POINT	N	E	BEARING	DIST
POT	940638.433	1883854.881		
LINE			S 79°34'27.6" E	88.44
POT	940621.876	1883938.517		

EY3

POINT	N	E	BEARING	DIST
POT	940628.887	1883948.214		
LINE			S 88°59'48.9" E	88.72
POT	940615.898	1884015.743		

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

SYSTEMS ENGINEERING

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6/2/99

PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
780280	RW02D

Location and Surveys

ALLIED ASSOCIATES, P.A.
4720 KESTER MILL ROAD
WINSTON SALEM, NC 27103
WWW.ALLIEDAPA.COM C-2198
(336)765-2377

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B. OSBORNE

8/31/2021

DocuSigned by:
Clinton Osborne
0A6F6B085F6449B...

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L

TYPE	STATION	NORTH	EAST
PC	10+00.00	939626.4548	1804142.0526
PT	11+58.58	939773.8123	1804084.0170
PC	14+03.87	939993.2429	1803974.4006
PT	17+68.26	940346.4002	1803904.0885
PC	18+75.52	940453.3917	1803911.6154
PT	20+50.00	940625.4092	1803939.4063

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED AUGUST 25, 2021 TO AUGUST 31, 2021.

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Owner: AT OWNER-PC

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6/2/99

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
780280	RW03E

Location and Surveys

ALLIED ASSOCIATES, P.A.
4720 KESTER MILL ROAD
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WWW.ALLIEDAPA.COM C-2198
(336)765-2377

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B. OSBORNE

8/31/2021

DocuSigned by: Clinton Osborne
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+00.00	-30.00	939617.9600	1804113.2805
** L	10+36.84	-50.00	939645.4528	1804083.5676
L	10+89.80	-50.00	939692.3029	1804066.0699
** L	11+58.58	-50.00	939751.4678	1804039.2875
L	14+03.87	-50.00	939970.8984	1803929.6712
L	14+55.00	-50.00	940020.8630	1803907.0067
L	15+00.00	-90.00	940053.4509	1803852.2641
L	15+50.00	-90.00	940107.7298	1803836.3069
L	16+15.00	-50.00	940185.9178	1803861.0973
L	17+68.26	-50.00	940349.9091	1803854.2118
L	18+75.52	-50.00	940456.9005	1803861.7387
L	20+26.19	-50.00	940613.4492	1803885.0625

MARKER EXCEPTIONS:
** = MAG NAIL SET

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	13+90.00	-50.00	939958.4942	1803935.8677
L	14+55.00	-90.00	940005.7139	1803869.9864
L	14+55.00	-100.00	940001.9266	1803860.7313
L	14+65.00	-100.00	940012.5682	1803856.4673
L	14+65.00	-90.00	940016.2196	1803865.7769
L	16+05.00	-95.00	940167.7654	1803818.4623
L	16+05.00	-110.00	940165.2454	1803803.6755
L	16+15.00	-110.00	940176.7048	1803801.8088
L	16+15.00	-95.00	940179.0081	1803816.6309
L	17+40.00	-90.00	940320.7727	1803812.7265

I, Clinton B. Osborne, a Professional Land Surveyor in the state of North Carolina hereby certify to the best of my knowledge and belief that the following work item(s) (Base map Compilation, R/W Staking) performed under my responsible charge meet NCDOT Survey Standards as directed in the NCDOT Location & Surveys guidelines and procedures.

I further certify that the data compiled came from available surveys/mapping performed by others and provided to me by NCDOT and do not certify to the accuracy or quality of the individual data sources.

I further certify that the right of way and permanent easement points shown herein and outlined in the tables shown hereon (localized coordinates, station/offset) have been checked and are accurate representations of the right of way and permanent easement points depicted on the corresponding highway plans. I also certify that the right of way and permanent easement points shown herein have been field monumented under my supervision from existing survey control provided by others; that the depicted property data shown herein were surveyed by others; and these monuments denote the right of way and easement boundaries at the time of staking which may be subject to change due to right of way revisions (See deeds for final determination).

Witness my original signature, registration number and seal this 31st day of August, 2021.

---------- L-3834
Professional Land Surveyor PLS # Seal

R/W MARKER NOTES:

1. UNLESS OTHERWISE NOTED, ALL ROW MARKERS AND CONTROL ACCESS MARKERS HAVE BEEN SET AS REBAR WITH ALUMINUM CAP

2. ANY MARKER EXCEPTIONS ARE LISTED BELOW THEIR RESPECTIVE TABLE

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

3. RIGHT OF WAY MONUMENTATION ESTABLISHED AUGUST 25, 2021 TO AUGUST 31, 2021.

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Owner: AI OWNER-PC

DocuSign Envelope ID: 5D83EA83-7E8A-4170-BA4C-897E89084FC3

6/2/99

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I further certify that the data compiled came from available surveys/mapping performed by others and provided to me by NCDOT and do not certify to the accuracy or quality of the individual data sources.

I further certify that the right of way and permanent easement points shown herein and outlined in the tables shown hereon (localized coordinates, station/offset) have been checked and are accurate representations of the right of way and permanent easement points depicted on the corresponding highway plans. I also certify that the right of way and permanent easement points shown herein have been field monumented under my supervision from existing survey control provided by others; that the depicted property data shown herein were surveyed by others; and these monuments denote the right of way and easement boundaries at the time of staking which may be subject to change due to right of way revisions (See deeds for final determination).

Witness my original signature, registration number and seal this 31st day of August, 2021.

DocuSigned by:
Clinton Osborne
0A6F6B085F6449B...

Professional Land Surveyor — PLS # L-3834 — Seal

PROJECT REFERENCE NO.	SHEET NO.
780280	RW04

Location and Surveys

ALLIED ASSOCIATES, P.A.
4720 KESTER MILL ROAD
WINSTON SALEM, NC 27103
WWW.ALLIEDAPA.COM C-2198
(336)765-2377

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B. OSBORNE

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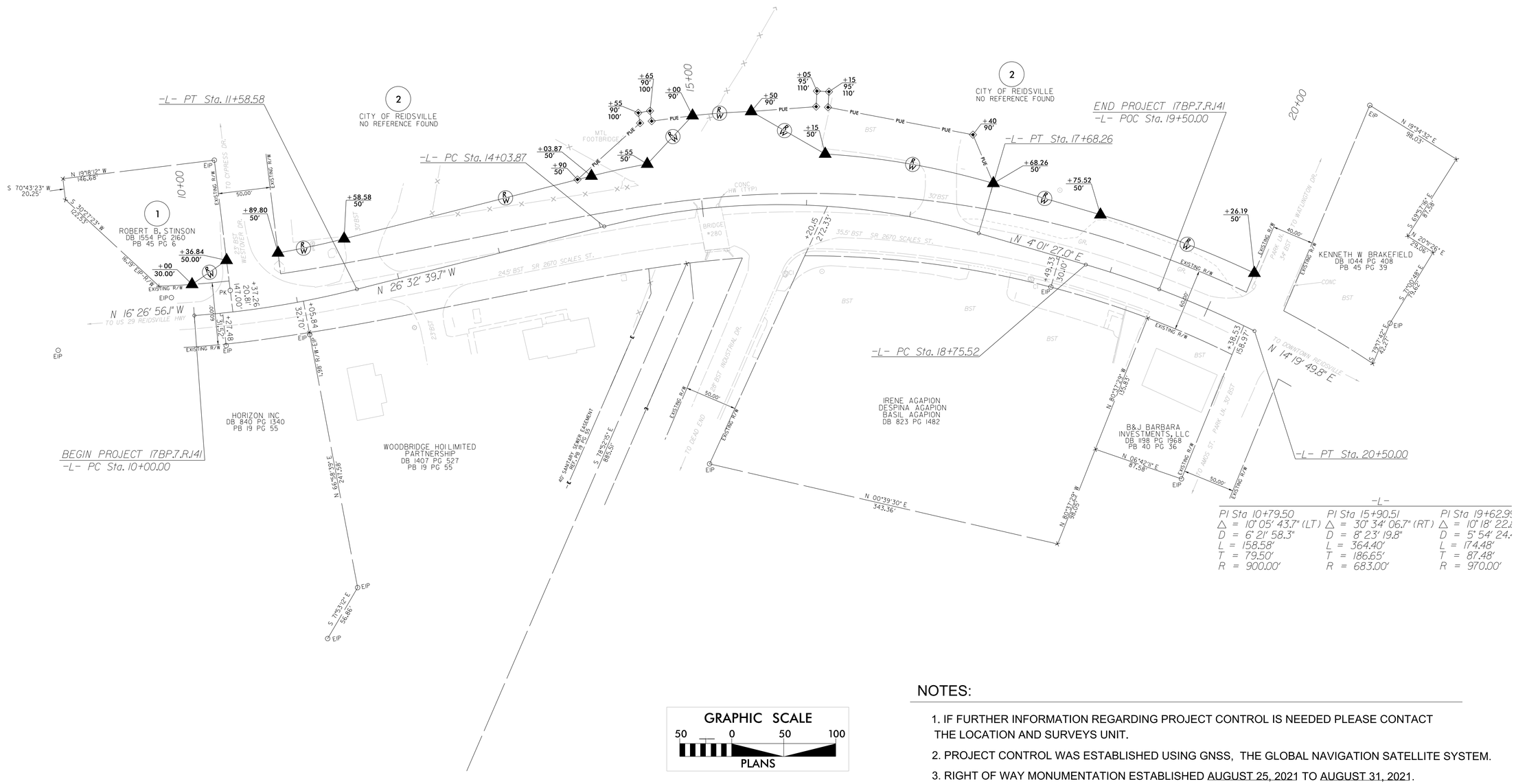

GRAPHIC SCALE
50 0 50 100
PLANS

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
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3. RIGHT OF WAY MONUMENTATION ESTABLISHED AUGUST 25, 2021 TO AUGUST 31, 2021.

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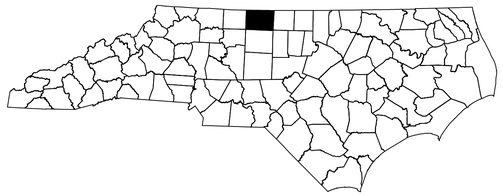
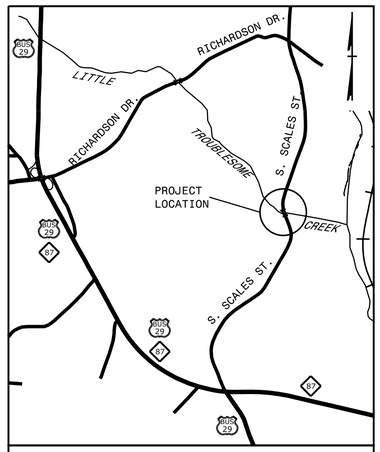
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

ROCKINGHAM COUNTY





VICINITY MAP

LOCATION: BRIDGE NO. 280 OVER LITTLE TROUBLESOME CREEK ON SR 2670 (SOUTH SCALES STREET)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B & 1C	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES AND GENERAL NOTES)
TMP-2	PORTABLE CONCRETE BARRIER AT TEMPORARY SHORING LOCATIONS
TMP-2A	TEMPORARY SHORING DATA
TMP-3	TEMPORARY TRAFFIC CONTROL PHASING
TMP-4 & 5	TEMPORARY TRAFFIC CONTROL PHASE I DETAIL
TMP-6	TEMPORARY TRAFFIC CONTROL PHASE II DETAIL
TMP-7	TEMPORARY TRAFFIC CONTROL PHASE III DETAIL

SHEET NO.
TMP-1

17BP.7.R.141

TIP PROJECT:

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

PLANS PREPARED BY:

M. RZEPKA, P.E.
TRAFFIC CONTROL PROJECT ENGINEER

J. WILES, P.E.
TRAFFIC CONTROL DESIGN ENGINEER

NCDOT CONTACTS:

D. DAGENHART
PROJECT ENGINEER

PROJECT 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

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APPROVED: Michael T. Rzepka

DATE: 8/26/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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PROJ. REFERENCE NO.	SHEET NO.
17BP.7.R.141	TMP-1A

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" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGERS
1160.01	TEMPORARY CRASH CUSHION
1165.01	TRUCK MOUNTED ATTENUATOR
1170.01	PORTABLE CONCRETE BARRIER
1180.01	SKINNY-DRUMS
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
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.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL
- TEMPORARY PAVEMENT
- WEDGING

SIGNALS

EXISTING PROPOSED TEMPORARY (TEMP)

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

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

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

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

PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS

TEMPORARY PAVEMENT MARKING

P1	PAINT 4" WHITE EDGELINE
P5	PAINT 4" 2'-6'/SP. WHITE MINI-SKIP
P13	PAINT 4" YELLOW DOUBLE CENTER

TEMPORARY RAISED MARKERS

MH	YELLOW & YELLOW

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY STANDARD DRAWINGS & LEGEND

REVISIONS

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PROJ. REFERENCE NO.	SHEET NO.
17BP.7.R.141	TMP-1B

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

MANAGEMENT STRATEGIES

PHASE 1:

MAINLINE (-L-) WILL BE MAINTAINED IN EXISTING PATTERN. USING LANE CLOSURES, RIGHT SIDE OF EXISTING PAVEMENT AT BRIDGE WILL BE WIDENED AND TRAFFIC SHIFTED TO WIDENING, MAINTAINING 2-LANE/2-WAY PATTERN.

BEHIND BARRIER, EXISTING BRIDGE WILL BE SAW-CUT AND LEFT PORTION OF CULVERT CONSTRUCTED. PROPOSED PAVEMENT WITH TEMPORARY WIDENING WILL BE CONSTRUCTED ON THE CULVERT AND APPROACHES LEFT OF -L-.

PHASE 2:

TRAFFIC WILL BE SHIFTED TO PHASE 1 CONSTRUCTION OVER CULVERT. REMAINING CULVERT PORTION WILL BE CONSTRUCTED BEHIND BARRIER, ALONG WITH ROADWAY APPROACHES. INGRESS AND EGRESS TO INDUSTRIAL DRIVE WILL BE MAINTAINED.

PHASE 3:

TRAFFIC WILL BE SHIFTED TO FINAL PATTERN. PHASE 2 TEMPORARY PAVEMENT WILL BE REMOVED AND FINAL SHOULDER CONSTRUCTED BEHIND BARRIER AND USING LANE CLOSURES.

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 OF 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.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
SR 2670 (S. SCALES ST.)	MONDAY THROUGH FRIDAY 6:00 A.M. TO 9:00 A.M. 4:00 P.M. TO 7:00 P.M.

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME

SR 2670 (S. SCALES ST.)

HOLIDAY

1. FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.
2. FOR NEW YEAR'S, BETWEEN THE HOURS OF 6:00 A.M. DECEMBER 31st TO 7:00 P.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 7:00 P.M. THE FOLLOWING TUESDAY.
3. FOR EASTER, BETWEEN THE HOURS OF 6:00 A.M. THURSDAY AND 7:00 P.M. MONDAY.
4. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY TO 7:00 P.M. TUESDAY.
5. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 6:00 A.M. THE DAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE DAY AFTER INDEPENDENCE DAY.

   IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY THEN BETWEEN THE HOURS OF 6:00 A.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE TUESDAY AFTER INDEPENDENCE DAY.
6. FOR LABOR DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY AND 7:00 P.M. TUESDAY.
7. FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 6:00 A.M. TUESDAY TO 7:00 P.M. MONDAY.
8. FOR CHRISTMAS, BETWEEN THE HOURS OF 6:00 A.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 7:00 P.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

LANE AND SHOULDER CLOSURE REQUIREMENTS

C) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

   WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

G) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

H) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

   BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

   BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

   BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

I) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 FT. IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

APPROVED: Michael T. Rzepka

DATE: 8/26/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TRANSPORTATION OPERATIONS PLAN

REVISIONS

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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 (CONT.)

TRAFFIC PATTERN ALTERATIONS

J) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

K) 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.

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

M) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) 500 FT. IN ADVANCE OF THE UNEVEN AREA, OR AS DIRECTED BY THE ENGINEER.

TRAFFIC BARRIER

N) INSTALL TEMPORARY BARRIER ACCORDING TO THE TRANSPORTATION MANAGEMENT PLANS A MAXIMUM OF TWO (2) WEEKS PRIOR TO BEGINNING WORK IN ANY LOCATION. ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION PROCEED IN A CONTINUOUS MANNER TO COMPLETE THE PROPOSED WORK IN THAT LOCATION UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS OR AS DIRECTED BY THE ENGINEER.

DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE.

ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION AND NO WORK IS PERFORMED BEHIND THE TEMPORARY BARRIER FOR A PERIOD LONGER THAN TWO (2) MONTHS, REMOVE / RESET TEMPORARY BARRIER AT NO COST TO THE DEPARTMENT UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS, TEMPORARY BARRIER IS PROTECTING A HAZARD, OR AS DIRECTED BY THE ENGINEER.

INSTALL TEMPORARY BARRIER WITH THE TRAFFIC FLOW BEGINNING WITH THE UPSTREAM SIDE OF TRAFFIC. REMOVE TEMPORARY BARRIER AGAINST THE TRAFFIC FLOW BEGINNING WITH THE DOWNSTREAM SIDE OF TRAFFIC.

INSTALL AND SPACE DRUMS NO GREATER THAN TWICE THE POSTED SPEED LIMIT (MPH) TO CLOSE OR KEEP THE SECTION OF THE ROADWAY CLOSED UNTIL THE TEMPORARY BARRIER CAN BE PLACED OR AFTER THE TEMPORARY BARRIER IS REMOVED.

O) PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER AT ALL TIMES DURING THE INSTALLATION AND REMOVAL OF THE BARRIER BY EITHER A TRUCK MOUNTED ATTENUATOR (MAXIMUM 72 HOURS) OR A TEMPORARY CRASH CUSHION.

PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER FROM ONCOMING TRAFFIC AT ALL TIMES BY A TEMPORARY CRASH CUSHION UNLESS THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER IS OFFSET FROM ONCOMING TRAFFIC AS FOLLOWS OR AS SHOWN IN THE PLANS: (SEE ALSO 1101.05)

POSTED SPEED LIMIT	MINIMUM OFFSET
40 OR LESS	15 FT
45 - 50	20 FT
55	25 FT
60 MPH or HIGHER	30 FT

TRAFFIC CONTROL DEVICES

P) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

PAVEMENT MARKINGS AND MARKERS

Q) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
SR 2670 (S. SCALES ST.)	PAINT	TEMPORARY RAISED

R) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

S) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INTIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

T) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

MISCELLANEOUS

U) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS AS DIRECTED BY THE ENGINEER.

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T RZEPKA

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TRANSPORTATION OPERATIONS PLAN

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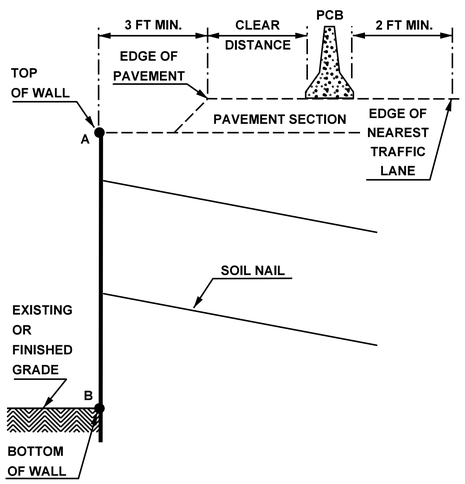
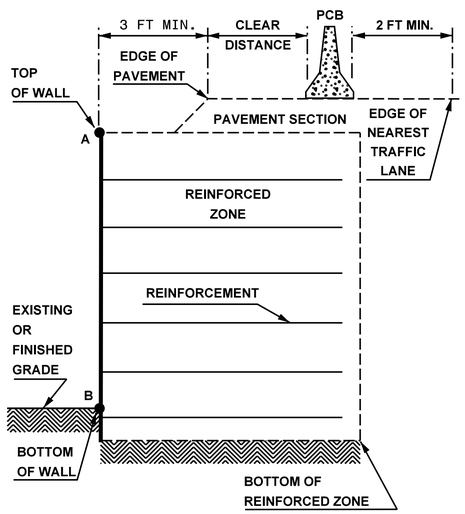
TEMPORARY SOIL NAIL WALL



TEMPORARY MSE WALL



NOTE: WALL OR SHORING HEIGHT = A-B

TEMPORARY SHORING

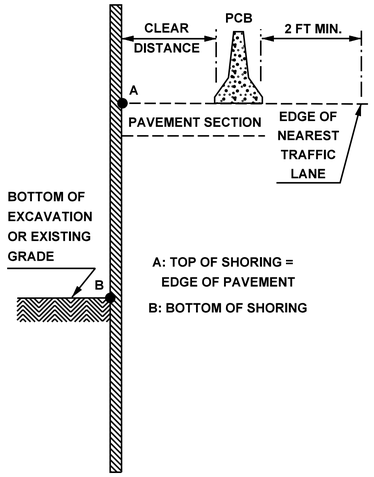


FIGURE A

NOTES

1- REFER TO THE TRAFFIC CONTROL PLANS FOR TEMPORARY SHORING LOCATIONS AND NOTES.

2- REFER TO THE "TEMPORARY SHORING" STANDARD PROVISION FOR INFORMATION ABOUT TEMPORARY SHORING AND PORTABLE CONCRETE BARRIER (PCB).

3- PCB IS REQUIRED IF TEMPORARY SHORING/WALL IS LOCATED WITHIN THE CLEAR ZONE IN ACCORDANCE WITH THE AASHTO ROADSIDE DESIGN GUIDE. DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE. (CONTACT NCDOT PAVEMENT MANAGEMENT FOR APPLICABLE PAVEMENT DESIGN).

4- BASED ON THE CLEAR DISTANCE, OFFSET, DESIGN SPEED AND PAVEMENT TYPE, CHOOSE AN UNANCHORED OR ANCHORED PCB FROM THE TABLE SHOWN IN FIGURE B. CLEAR DISTANCE IS DEFINED AS SHOWN IN FIGURE A AND OFFSET IS DEFINED AS SHOWN IN FIGURE B.

5- AT THE CONTRACTOR'S OPTION OR IF THE MINIMUM REQUIRED CLEAR DISTANCE IS NOT AVAILABLE, SET PCB NEXT TO AND UP AGAINST THE TRAFFIC SIDE OF THE TEMPORARY SHORING/WALLS EXCEPT FOR BARRIER ABOVE TEMPORARY WALLS. PCB WITH THE MINIMUM REQUIRED CLEAR DISTANCE IS REQUIRED ABOVE TEMPORARY WALLS.

6- USE NCDOT PORTABLE CONCRETE BARRIER (PCB) IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1170.01 AND SECTION 1170 OF THE STANDARD SPECIFICATIONS.

7- SET PCB WITH A MINIMUM HORIZONTAL DISTANCE OF 2 FT BETWEEN THE FRONT FACE OF THE BARRIER AND THE EDGE OF THE NEAREST TRAFFIC LANE AS SHOWN IN FIGURE A UNLESS OTHERWISE SHOWN IN THE PLANS OR APPROVED BY THE ENGINEER.

8- FOR PCB ABOVE AND BEHIND TEMPORARY WALLS, PROVIDE A MINIMUM DISTANCE OF 3 FT BETWEEN THE EDGE OF PAVEMENT AND THE WALL FACE AS SHOWN IN FIGURE A. IF THIS MINIMUM REQUIRED DISTANCE IS NOT AVAILABLE, CONTACT THE ENGINEER.

9- TABLE SHOWN IN FIGURE B IS BASED ON NCDOT RESEARCH PROJECT NO. 2005-010 WITH VEHICLE TYPE USED FOR NCHRP 350 CRASH TESTS.

MINIMUM REQUIRED CLEAR DISTANCE, inches

Barrier Type	Pavement Type	Offset * ft	Design Speed, mph <30	31-40	41-50	51-60	61-70	71-80
Unanchored PCB	Asphalt	<8	24	26	29	32	36	40
		8-14	26	28	31	35	38	42
		14-20	27	29	34	36	39	43
		20-26	28	31	35	38	40	44
		26-32	29	32	36	39	42	45
		32-38	30	34	38	41	43	46
		38-44	31	34	41	43	45	48
		44-50	31	35	41	43	46	49
		50-56	32	36	42	44	47	50
		>56	32	36	42	45	47	51
	Concrete	<8	17	18	21	22	25	26
		8-14	19	20	23	25	26	29
		14-20	22	22	24	26	28	31
		20-26	23	24	26	27	30	34
		26-32	24	25	27	28	32	35
		32-38	24	26	27	30	33	36
		38-44	25	26	28	30	34	37
		44-50	26	26	28	32	35	37
		50-56	26	26	28	32	35	38
		>56	26	27	29	32	36	38
Anchored PCB	Asphalt	All Offsets	24 for All Design Speeds					
Anchored PCB	Concrete (including bridge approach slabs)	All Offsets	12 for All Design Speeds					

* See Figure Below

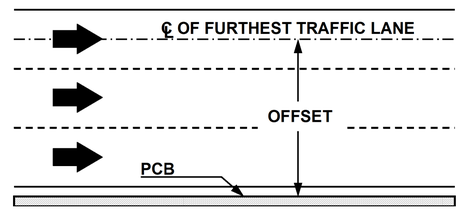


FIGURE B

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

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NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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REVISIONS

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FOR TEMPORARY SHORING AND POSITIVE PROTECTION FOR TEMPORARY SHORING, SEE PLANS AND TEMPORARY SHORING PROVISION.

BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

1

DESIGN TEMPORARY SHORING FROM STATION 14+62, 19 FT LEFT, TO STATION 14+95, 19 FT LEFT, FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

ABOVE ELEVATION 705 FT

UNIT WEIGHT γ = 120 PCF
FRICTION ANGLE ϕ = 30 DEGREES
COHESION (c) = 0 PSF
GROUNDWATER ELEVATION = 710 FT

BELOW ELEVATION 705 FT

UNIT WEIGHT γ = 120 PCF
FRICTION ANGLE ϕ = 32 DEGREES
COHESION (c) = 0 PSF

2

DESIGN TEMPORARY SHORING FROM STATION 15+19, 19 FT LEFT, TO STATION 15+50, 19 FT LEFT, FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

ABOVE ELEVATION 705 FT

UNIT WEIGHT γ = 120 PCF
FRICTION ANGLE ϕ = 30 DEGREES
COHESION (c) = 0 PSF
GROUNDWATER ELEVATION = 710 FT

BELOW ELEVATION 705 FT

UNIT WEIGHT γ = 120 PCF
FRICTION ANGLE ϕ = 32 DEGREES
COHESION (c) = 0 PSF

LIMITED SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF TEMPORARY SHORING FROM STATION 14+62, 19 FT LEFT, TO STATION 14+95, 19 FT LEFT. THE INFORMATION PROVIDED FOR TEMPORARY SHORING DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

DRIVEN PILING FOR TEMPORARY FROM STATION 14+62, 19 FT LEFT, TO STATION 14+95, 19 FT LEFT, MAY NOT PENETRATE BELOW ELEVATION 695 FT DUE TO OBSTRUCTIONS, VERY DENSE OR HARD SOIL, BOULDERS OR WEATHERED OR HARD ROCK.

LIMITED SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF TEMPORARY SHORING FROM STATION 15+19, 19 FT LEFT, TO STATION 15+50, 19 FT LEFT. THE INFORMATION PROVIDED FOR TEMPORARY SHORING DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.

DRIVEN PILING FOR TEMPORARY SHORING FROM STATION 15+19, 19 FT LEFT, TO STATION 15+50, 19 FT LEFT, MAY NOT PENETRATE BELOW ELEVATION 695 FT DUE TO OBSTRUCTIONS, VERY DENSE OR HARD SOIL, BOULDERS OR WEATHERED OR HARD ROCK.

AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING FOR TEMPORARY SHORING FROM STATION 14+94, 24 FT LEFT, TO STATION 15+21, 24 FT LEFT. SEE GEOTECHNICAL STANDARD DETAIL NO. 1801.02 FOR STANDARD TEMPORARY SHORING.

SEE SHEET TMP-5 FOR SHORING LOCATIONS

THE TEMPORARY SHORING NOTES SHOWN ON THIS SHEET WERE PROVIDED THROUGH A SEALED DOCUMENT FROM THE GEOTECHNICAL ENGINEERING UNIT. THE DOCUMENT WAS SUBMITTED TO THE WZTCU ON 11-08-2021 AND SEALED BY A PROFESSIONAL ENGINEER, KENNETH BUSSEY, PE, LICENSE #038206.

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

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NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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TEMPORARY SHORING NOTES

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PHASING

PHASE 1

STEP 1: USING ROADWAY STANDARD DRAWING (RSD) 1101.01 SHEET 3 OF 3 INSTALL ADVANCE WORK ZONE WARNING SIGNS ON SR 2670 (S. SCALES ST.).

STEP 2: USING RSD 1101.02 SHEET 1 OF 14 AND 1101.04 SHEET 1 OF 1, AS CONSTRUCT TEMPORARY PAVEMENT WIDENING AND INSTALL TEMPORARY GUARDRAIL AS SHOWN ON SHEET TMP-4.

STEP 3: USING RSD 1101.02, SHEET 1 OF 14, PLACE TEMPORARY PAVEMENT MARKINGS AND MARKERS AND SHIFT TRAFFIC TO THE PATTERN SHOWN ON TMP-5.

USING RSD 1101.02, SHEET 1 OF 14, INSTALL PORTABLE CONCRETE BARRIER (PCB) AND TEMPORARY SHORING AND CONSTRUCT THE FOLLOWING (TMP-5):

- PARTIAL REMOVAL OF EXISTING BRIDGE
- LEFT PORTION OF PROPOSED CULVERT
- LEFT SIDE OF -L- UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE
- TEMPORARY WIDENING OF PROPOSED PAVEMENT

PHASE 2

STEP 1: USING RSD 1101.02 SHEET 1 OF 14, WEDGE AS NECESSARY, INSTALL PCB, PLACE TEMPORARY PAVEMENT MARKINGS AND MARKERS, AND SHIFT TRAFFIC ONTO THE ONSITE DETOUR AS SHOWN ON SHEET TMP-6 (SEE ALSO ROADWAY PLANS). CONSTRUCT REMAINING CULVERT PORTION AND THE RIGHT SIDE OF -L- UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE.

PHASE 3

STEP 1: USE RSD 1101.02 SHEET 1 OF 14, PLACE TEMPORARY PAVEMENT MARKINGS AND MARKERS, SHIFT TRAFFIC TO THE FINAL PATTERN AS SHOWN ON SHEET TMP-6, AND INSTALL PCB.

STEP 2: BEHIND BARRIER AND USING RSD 1101.02 SHEET 1 OF 14, INSTALL PROPOSED GUARDRAIL ON THE LEFT SIDE OF -L-, DRAINAGE, AND REMOVE TEMPORARY PAVEMENT. PLACE THE FINAL LAYER OF SURFACE COURSE AND FINAL PAVEMENT MARKINGS ACCORDING TO THE PAVEMENT MARKING PLAN.

STEP 3: USING RSD 1101.02 SHEET 1 OF 14, REMOVE ALL TEMPORARY WORK ZONE TRAFFIC CONTROL DEVICES AND OPEN SR 2670 TO FINAL TRAFFIC PATTERN.

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

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NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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PHASING

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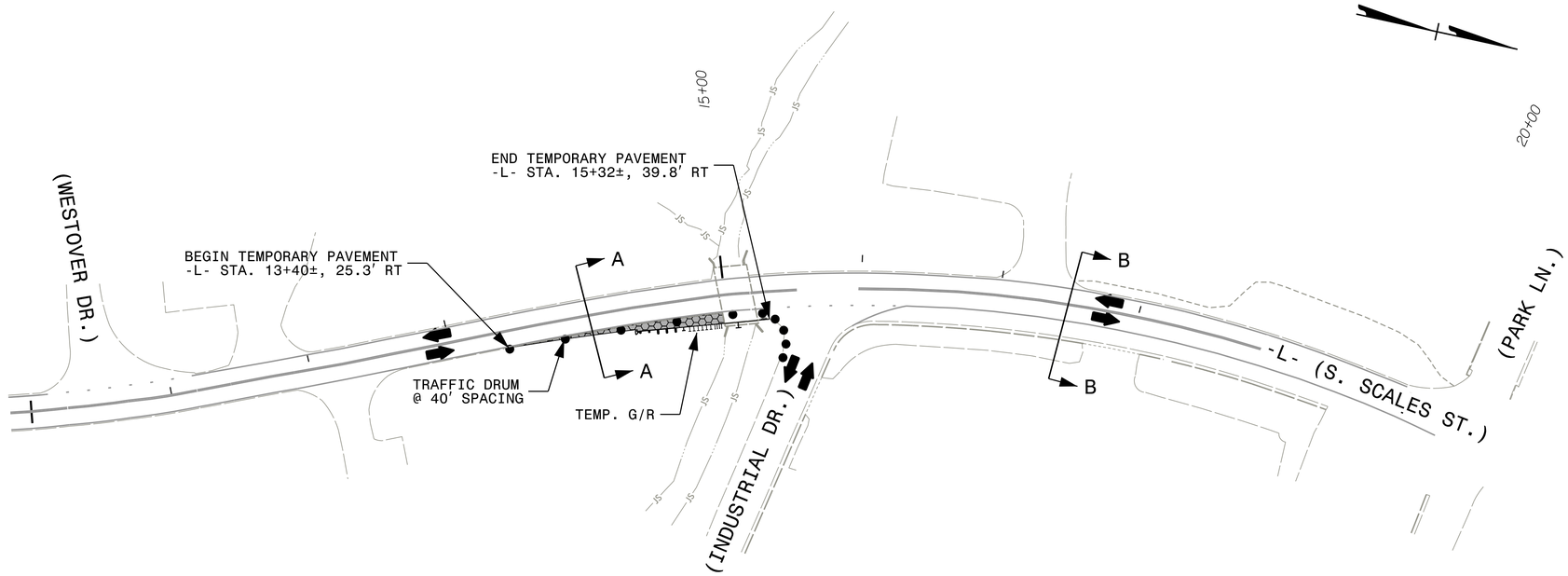

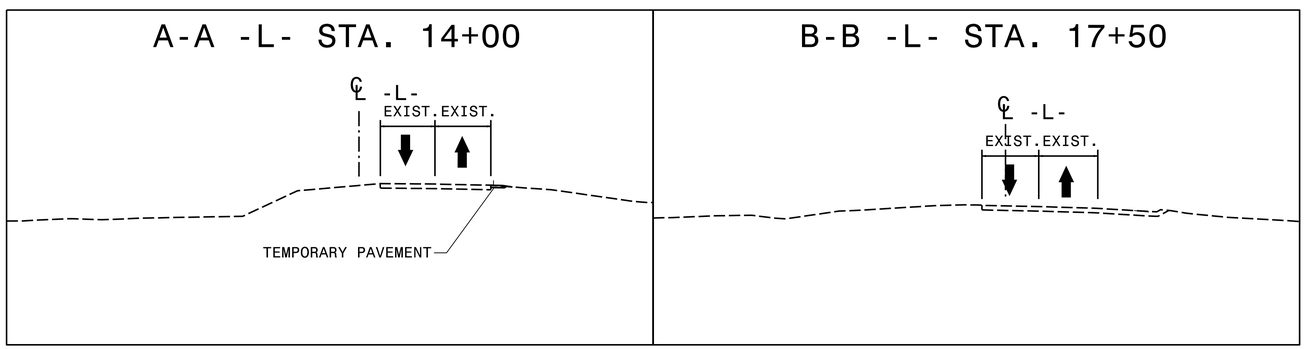

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PHASE 1
STEP 2

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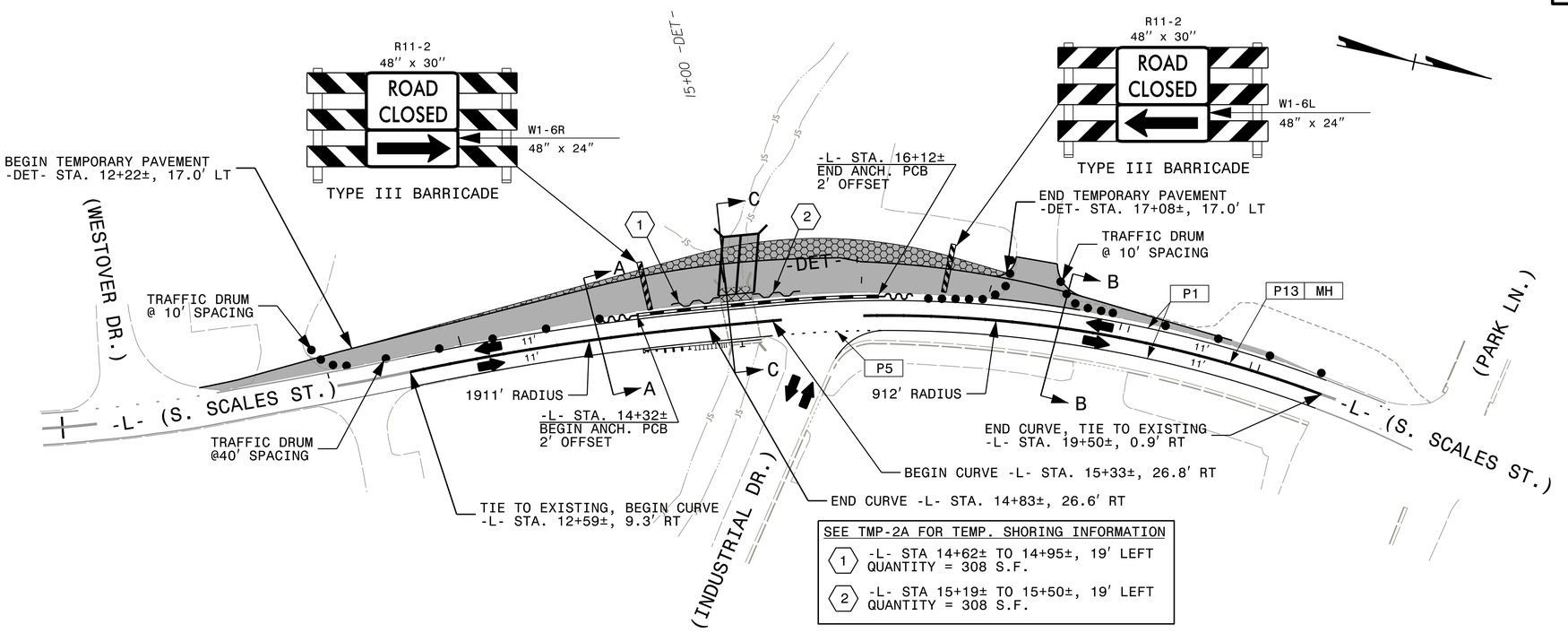
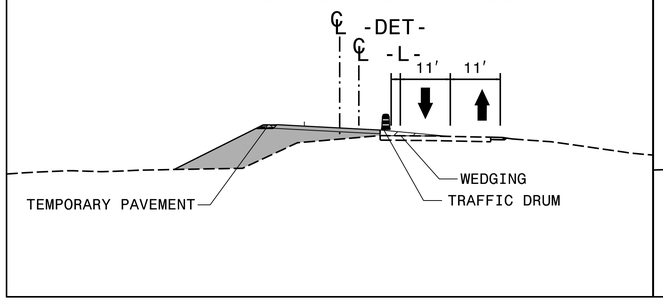


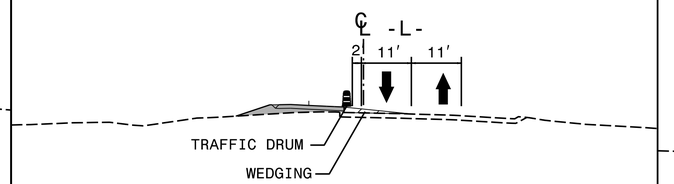
SEE TMP-2A FOR TEMP. SHORING INFORMATION

1. -L- STA 14+62± TO 14+95±, 19' LEFT
   QUANTITY = 308 S.F.
2. -L- STA 15+19± TO 15+50±, 19' LEFT
   QUANTITY = 308 S.F.

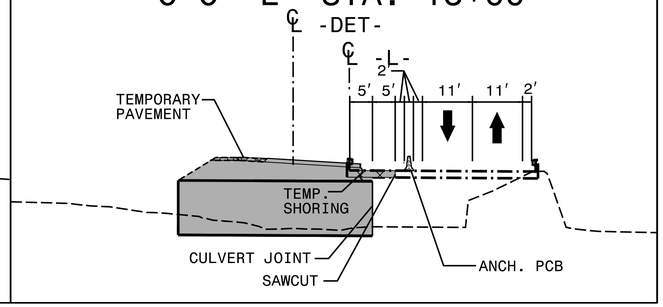
A-A -L- STA. 14+00



B-B -L- STA. 17+50



C-C -L- STA. 15+00



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DATE: 9/18/2025

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PHASE 1
STEP 3

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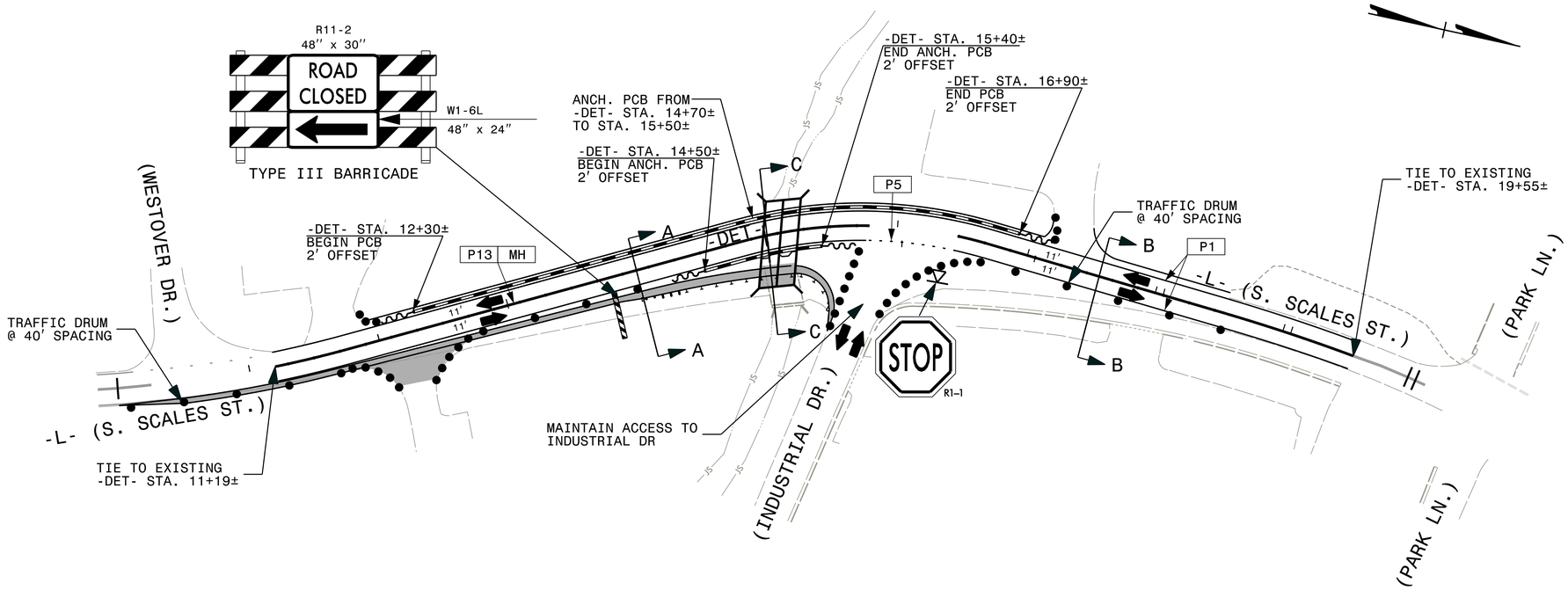
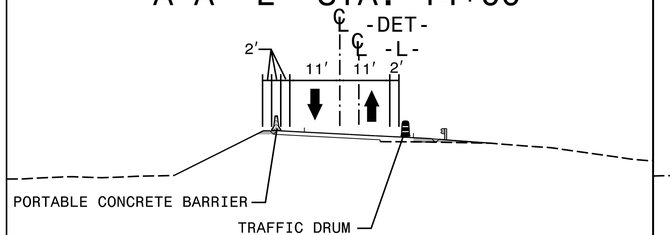
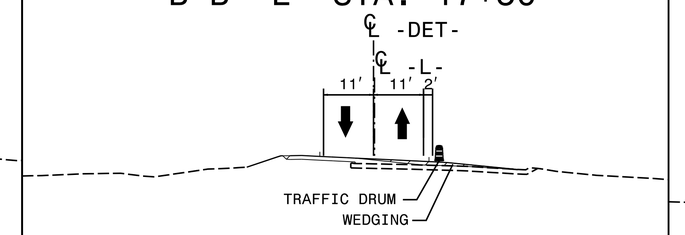


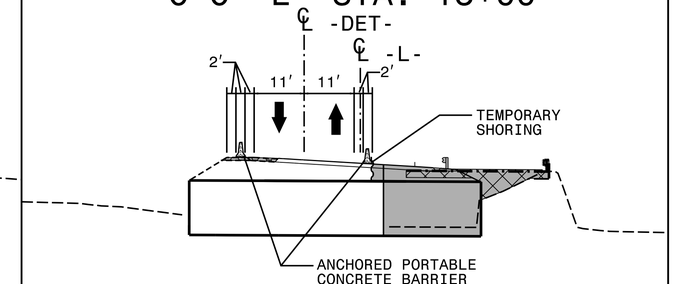
A-A -L- STA. 14+00



B-B -L- STA. 17+50



C-C -L- STA. 15+00



APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

PHASE 2

REVISIONS

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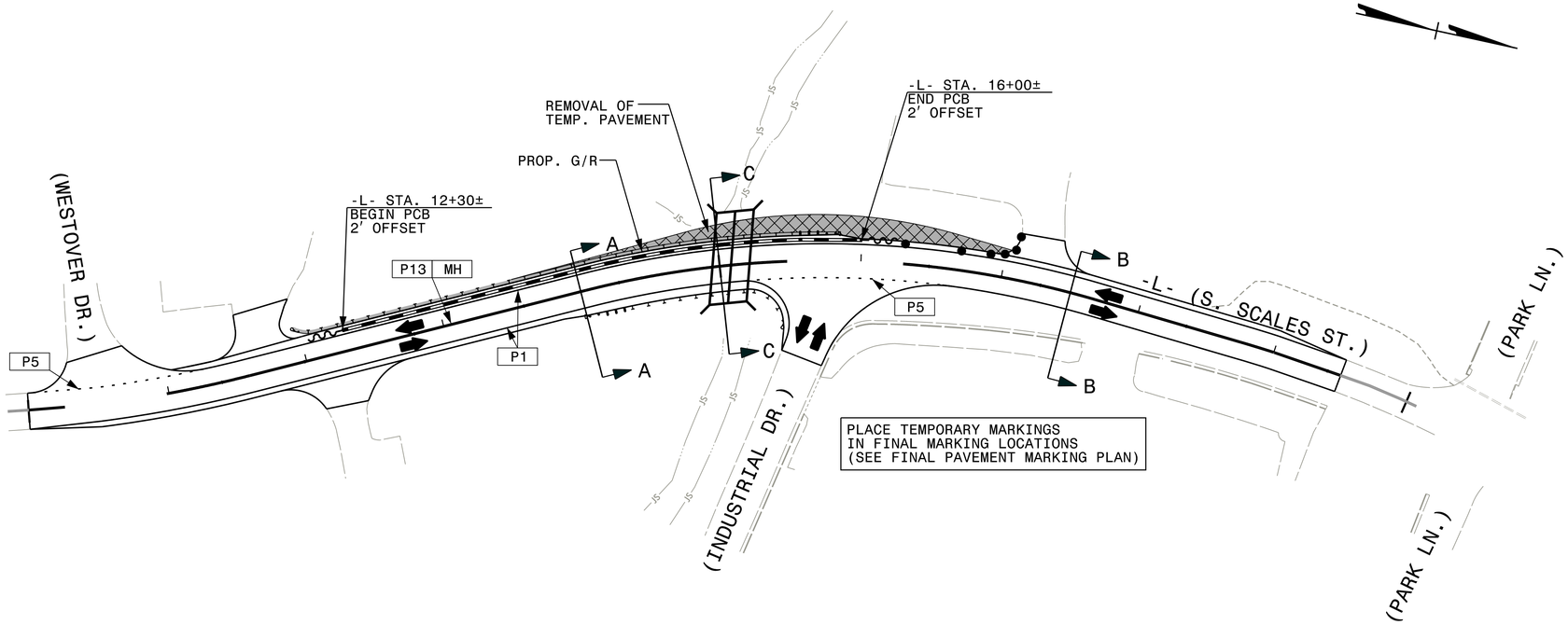
PROJ. REFERENCE NO.	SHEET NO.
17BP.7.R.141	TMP-7

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



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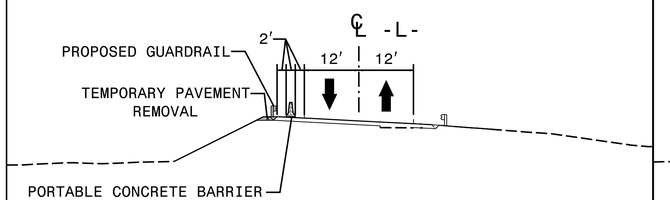
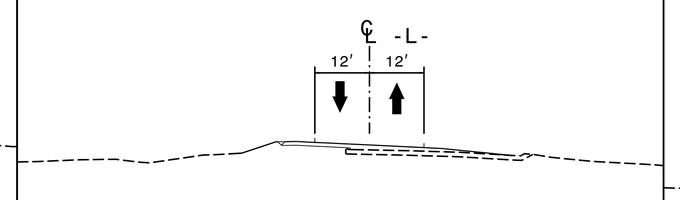
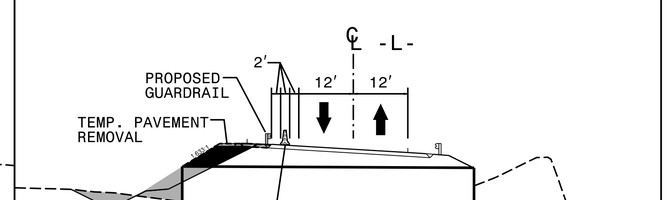


B-B -L- STA. 17+50



C-C -L- STA. 15+00



APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

PHASE 3

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T.I.P.: 17BP.7.R.141

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN

ROCKINGHAM COUNTY

LOCATION: BRIDGE NO. 280 OVER LITTLE TROUBLESOME CREEK ON SR 2670 (SOUTH SCALES STREET)

TIP NO.	SHEET NO.
17BP.7.R.141	PMP-1

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX

SHEET NO.	DESCRIPTION
PMP-1	PAVEMENT MARKING PLAN TITLE, GENERAL NOTES, ROADWAY STANDARD DRAWINGS, AND INDEX
PMP-1A	PAVEMENT MARKING DETAIL
PMP-2	PAVEMENT MARKING SHEET

GENERAL NOTES

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.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
ALL ROADS	THERMOPLASTIC	PERMANENT RAISED

B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING (SHEETS 1 AND 3 ONLY. SEE PMP-1A FOR REVISED SHEET 2)
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

PLAN SUBMITTED TO: N.C.D.O.T. SIGNING AND DELINEATION UNIT

KELVIN JORDAN — SIGNING & DELINEATION STANDARDS ENGINEER

_____ — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

PLAN PREPARED BY: HDR ENGINEERING, INC. OF THE CAROLINAS

MIKE RZEPKA, P.E. — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

CHRIS HARNDEN — SIGNING & DELINEATION PROJECT DESIGN TECHNICIAN

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

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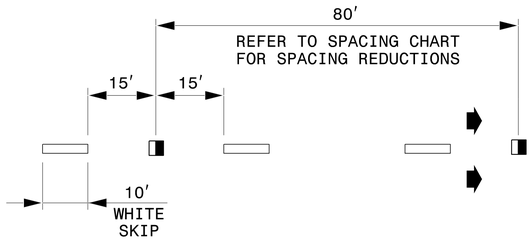
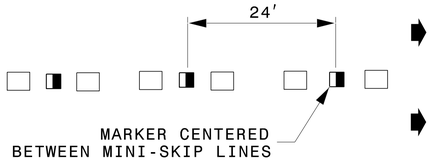
PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.141	PMP-1A

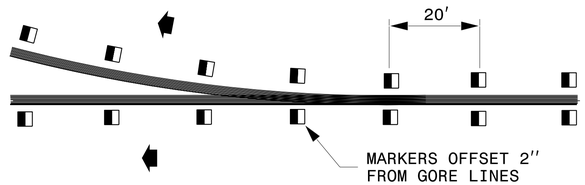
10′-30′/SP SKIP LINE



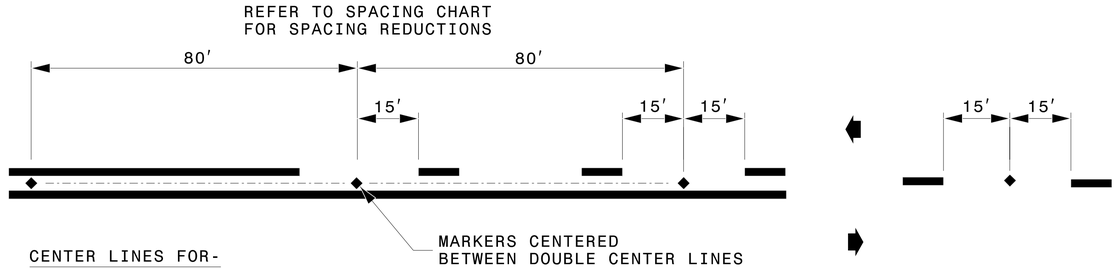
3′-9′/SP MINI-SKIP LINE



GORE LINES



YELLOW CENTER LINES

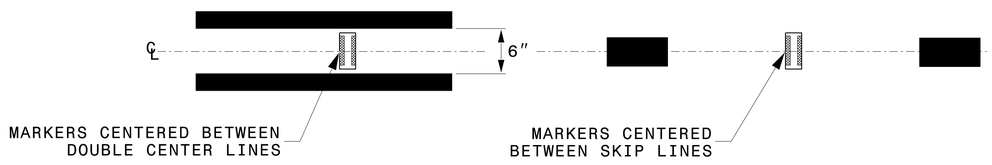


CENTER LINES FOR-

TWO-LANE, TWO-WAY ROADWAYS
UNDIVIDED ROADWAYS
TWO-WAY LEFT TURN LANES

DETAIL OF PAVEMENT MARKER PLACEMENT

RAISED REFLECTIVE PAVEMENT MARKERS



LEGEND

- CRYSTAL/RED PAVEMENT MARKER
- YELLOW/YELLOW PAVEMENT MARKER
- DIRECTION OF TRAFFIC FLOW

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

ROADWAY DETAIL DRAWING FOR

RAISED PAVEMENT MARKERS

INSTALLATION SPACING

SHEET 2 OF 3

1250D01

NORTH CAROLINA PROFESSIONAL SEAL 042546 ENGINEER MATTHEW V. SPRINGER

Matthew V. Springer, PE

8/19/2025

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-8950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: M.V. SPRINGER DATE: 2-15-24
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

Docusign Envelope ID: EE1A5731-866F-4B04-B556-CC1FF531CBF3

PAVEMENT MARKINGS SCHEDULE	
T1	THERMOPLASTIC 4″ WHITE EDGELINE (90 MIL)
T5	THERMOPLASTIC 4″ 2′-6′/SP. WHITE MINI-SKIP (90 MIL)
T13	THERMOPLASTIC 4″ YELLOW DOUBLE CENTER (90 MIL)
T41	THERMOPLASTIC 8″ WHITE DIAGONAL (90 MIL)
MA	PERMANENT RAISED MARKER - YELLOW & YELLOW

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

TIP NO.	SHEET NO.
17BP.7.R.141	PMP-2

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

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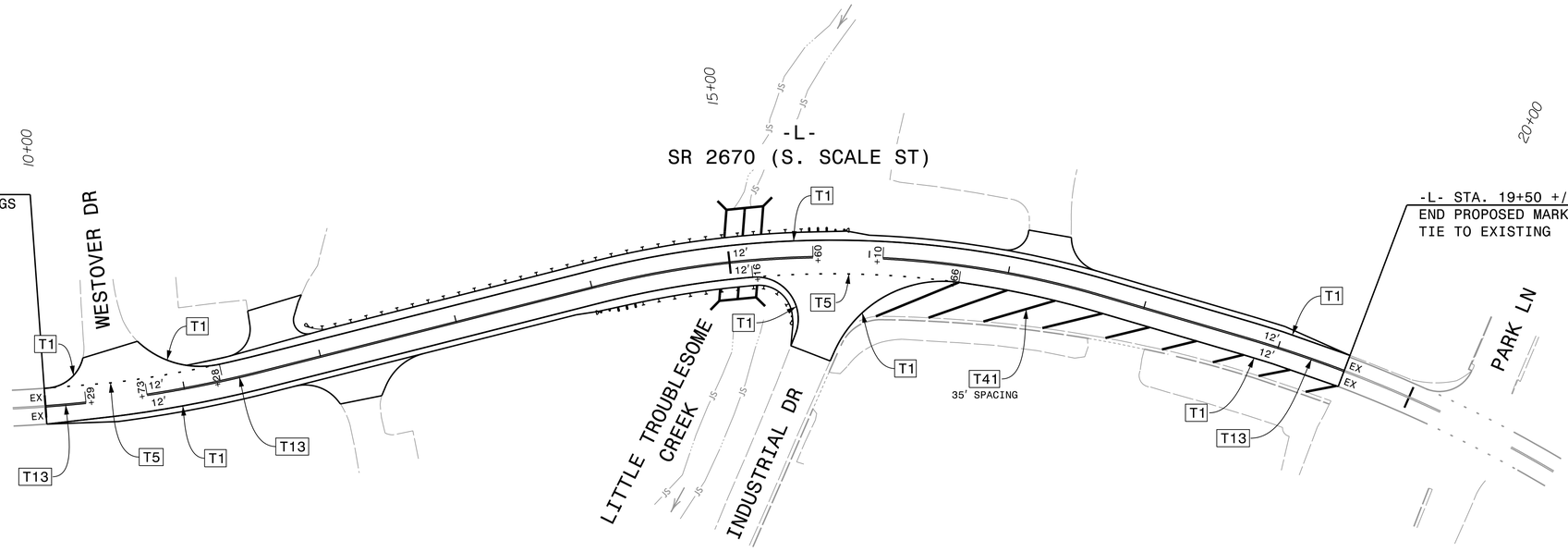

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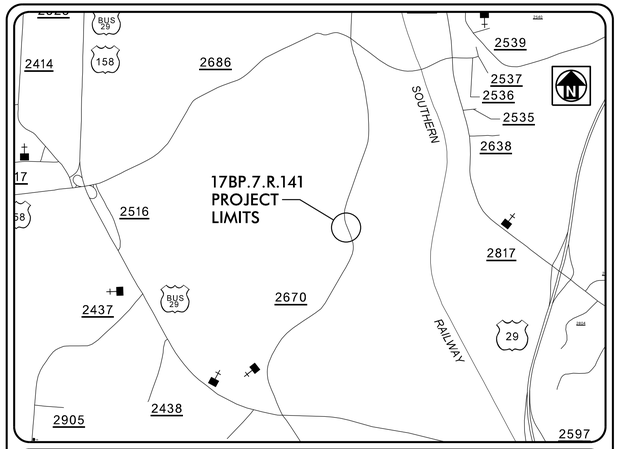
TIP PROJECT: 17BP.7.R.141



VICINITY MAP
NOT TO SCALE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.7.R.141	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

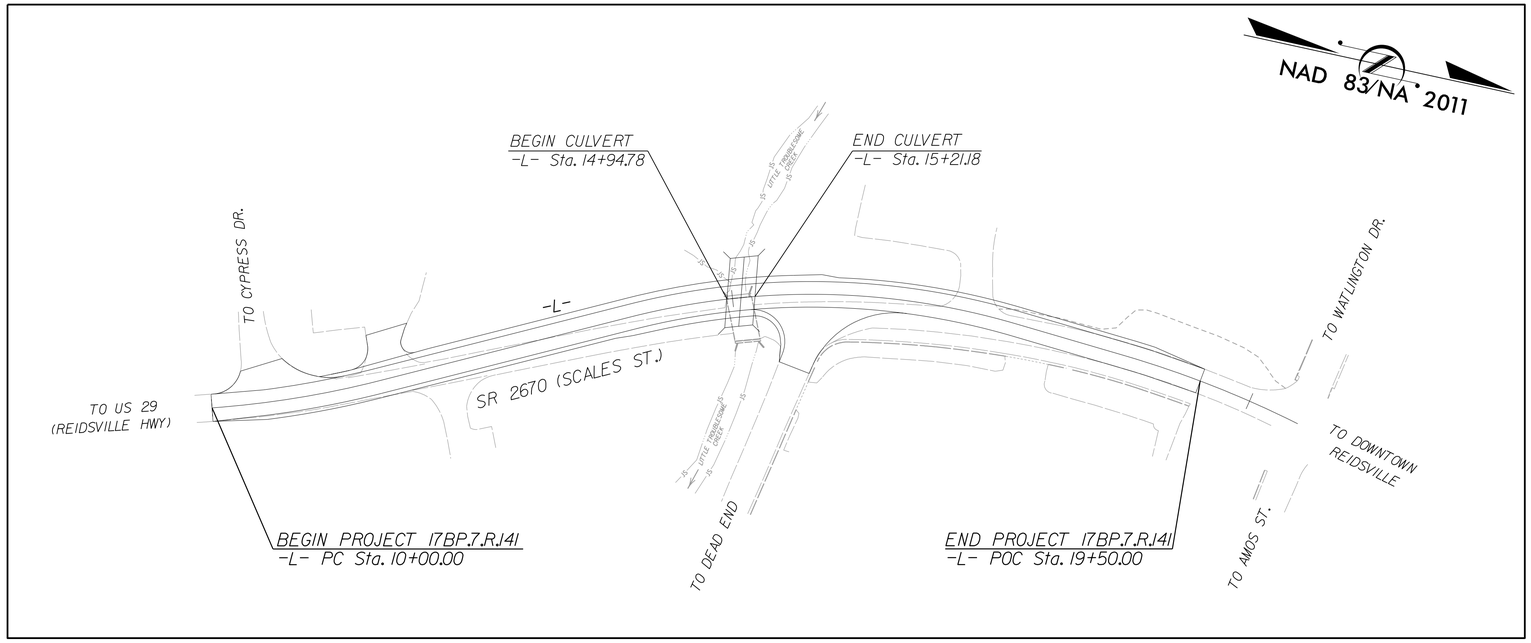
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

ROCKINGHAM COUNTY

LOCATION: BRIDGE NO. 280 OVER LITTLE TROUBLESOME CREEK ON SR 2670 (SOUTH SCALES STREET)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



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

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

GRAPHIC SCALE

50 25 0 50 100
PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE APPLICABLE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2019 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

Prepared in the Office of:

VHB ENGINEERING
9940 MAIN CAMPUS DRIVE, SUITE 500
RALEIGH, NC 27606

Designed by:

REID ROBOL — ***3409***
NAME — *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

The "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

$$$$SYSTIME$$$$
$$$$FILENAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
17.BP.7.R.141	EC-02
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

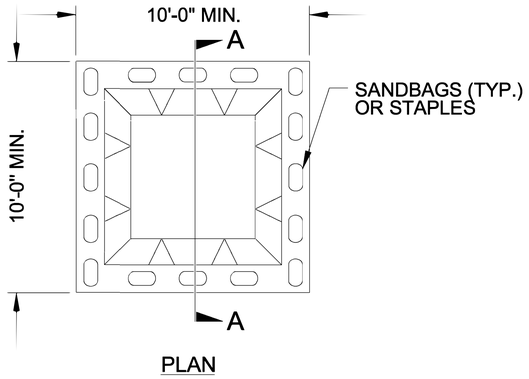
EROSION & SEDIMENT CONTROL LEGEND

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer Basin	
1630.08	Tiered Skimmer Basin	
1630.09	Earthen Dam with Skimmer	
	Infiltration Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C

Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet Sediment Trap Type A	A
1635.02	Rock Pipe Inlet Sediment Trap Type B	B
1636.01	Excelsior Wattle Check	
1636.01	Excelsior Wattle Check with Flocculant	
1636.01	Coir Fiber Wattle Check	
1636.01	Coir Fiber Wattle Check with Flocculant	
1636.02	Silt Fence Excelsior Wattle Break	EW
	Silt Fence Coir Fiber Wattle Break	CFW
1636.03	Excelsior Wattle Barrier	—EW—EW—EW—
1636.03	Coir Fiber Wattle Barrier	—CFW—CFW—CFW—

PROJECT REFERENCE NO.	SHEET NO.
17.BP.7.RJ41	EC-3A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



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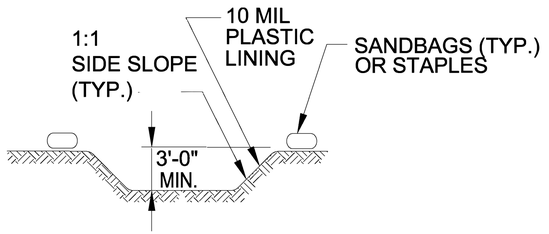
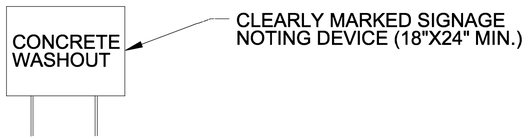


SECTION A-A



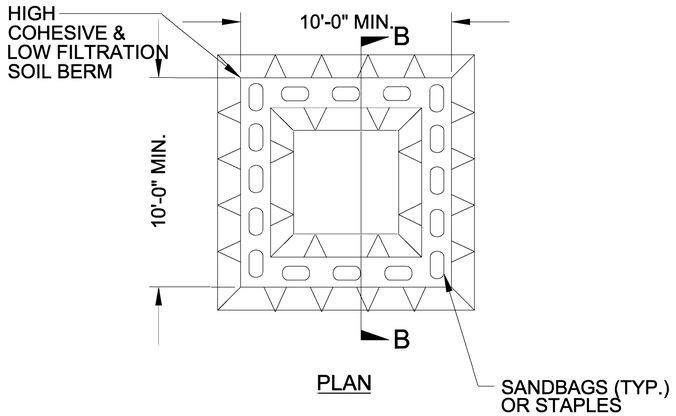
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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

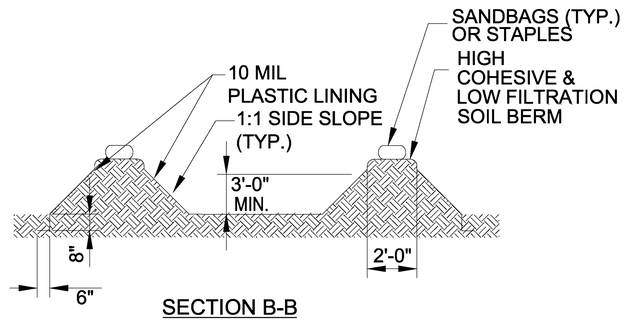
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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

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

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
17.BP.7.R.141	EC-3B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

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

DETAIL 1
LATERAL BASE DITCH
(Not to Scale)

Min. D= 1.5 Ft.
Max. d= 1.5 Ft.
B= 3.0 Ft.
b= 5.0 Ft.

*When B is < 6.0'

Type of Liner= CLASS I RIP-RAP

–L– STA. 14+60 TO 15+02 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Min. D= 1.5 FT.
Max. d= 1.5 FT.

Type of Liner= CLASS B RIP-RAP

–L– STA. 15+37 TO 17+00 LT

NAD 83/NA 2011

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 04

INLET DETAIL
NTS

OUTLET DETAIL
NTS

PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	EC-04/CONST.04
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	VHB ENGINEERING LICENSE NO. C-3705

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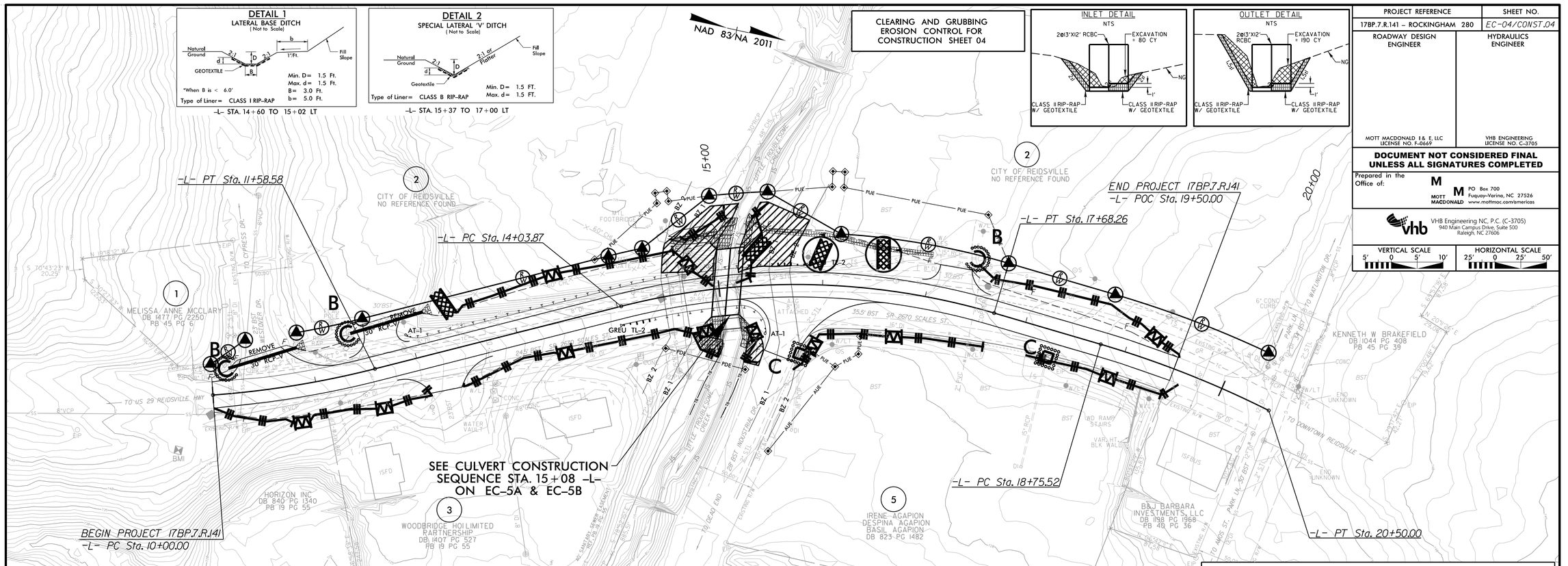
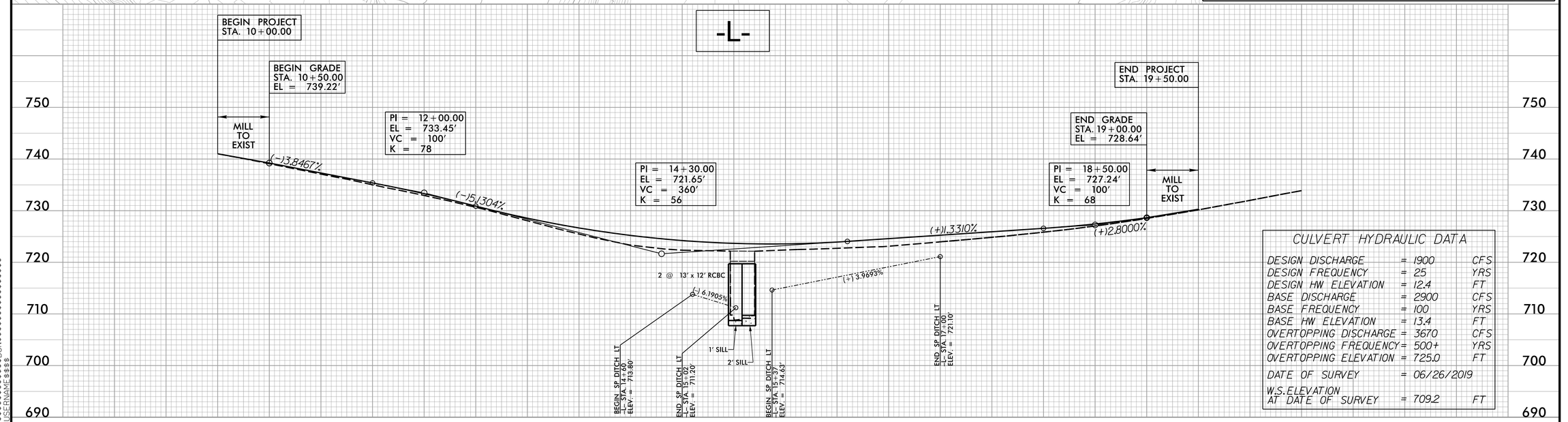
Prepared in the Office of:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
www.mottmac.com/americas

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

VERTICAL SCALE 5' 0 5' 10'
HORIZONTAL SCALE 25' 0 25' 50'



ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

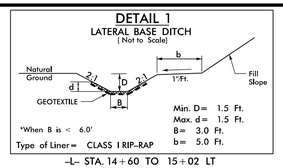


CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1900	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 12.4	FT
BASE DISCHARGE	= 2900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 13.4	FT
OVERTOPPING DISCHARGE	= 3670	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 725.0	FT
DATE OF SURVEY	= 06/26/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 709.2	FT

$$DATE$$
$$SYSTIME$$
$$DGNS$$
$$USERNAME$$

DETAIL 1
LATERAL BASE DITCH
(Not to Scale)



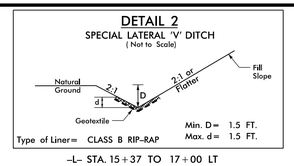
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3.0 Ft.
b = 5.0 Ft.

*When B is < 6.0'

Type of Liner = CLASS I RIP-RAP

–L– STA. 14+60 TO 15+02 LT

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



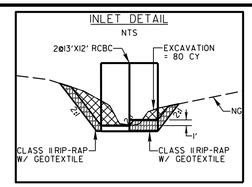
Min. D = 1.5 FT.
Max. d = 1.5 FT.

Type of Liner = CLASS B RIP-RAP

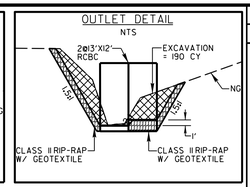
–L– STA. 15+37 TO 17+00 LT

NAD 83/NA 2011

INLET DETAIL
NTS



OUTLET DETAIL
NTS



PROJECT REFERENCE	SHEET NO.
17BP.7.R.141 – ROCKINGHAM 280	EC-05/CONST.04
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	VHB ENGINEERING LICENSE NO. C-3705

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:

MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
www.mottmac.com/americas

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

VERTICAL SCALE 5' 0 5' 10'

HORIZONTAL SCALE 25' 0 25' 50'

BEGIN CULVERT
–L– Sta. 14+94.78

END CULVERT
–L– Sta. 15+21.18

–L– PT Sta. 11+58.58

–L– PC Sta. 14+03.87

–L– PC Sta. 18+75.52

–L– PT Sta. 17+68.26

BEGIN PROJECT 17BP.7.R.141
–L– PC Sta. 10+00.00

END PROJECT 17BP.7.R.141
–L– POC Sta. 19+50.00

–L– PT Sta. 20+50.00

CLASS B RIP RAP
EST. 8 TONS
EST. 21 SY GEOTEXTILE

CLASS II RIP RAP
EST. 90 TONS
EST. 100 SY GEOTEXTILE

LATERAL BASE DITCH
SEE DETAIL 1
EST. 30 TONS RIP RAP
EST. 35 SY GEOTEXTILE
EST. 30 CY DDE

LATERAL V DITCH
SEE DETAIL 2
EST. 50 TONS RIP RAP
EST. 140 SY GEOTEXTILE

CLASS II RIP RAP
EST. 130 TONS
EST. 150 SY GEOTEXTILE

SEE CULVERT CONSTRUCTION SEQUENCE STA. 15+08 –L– ON EC-5A & EC-5B

CITY OF REIDSVILLE
NO REFERENCE FOUND

MELISSA ANNE MCCLARY
DB 1477 PG 2250
PB 45 PG 6

HORIZON INC
DB 840 PG 1340
PB 19 PG 55

WOODBRIDGE HOI LIMITED PARTNERSHIP
DB 1407 PG 527
PB 19 PG 55

IRENE AGAPION
DESPINA AGAPION
BASIL AGAPION
DB 823 PG 1482

KENNETH W BRAKEFIELD
DB 1044 PG 408
PB 45 PG 39

B&J BARBARA INVESTMENTS, LLC
DB 1198 PG 1968
PB 40 PG 36

TO US 29 REIDSVILLE HWY

TO CYPRESS DR

TO WATLINGTON DR

TO DOWNTOWN REIDSVILLE

TO DEAD END

LITTLE TROUBLESOME CREEK

SR 2670 SCALES ST

INDUSTRIAL DR

MTL FOOTBRIDGE

ISFD

ISFBUS

WATER VAULT

RETAIN

RETAIN SYSTEM

REMOVE

30" RCP

2 @ 13' x 12' RCBC

(–) 6.1905%

(+) 3.9693%

BEGIN SP DITCH LT
–L– STA. 14+60
ELEV. = 710.80'

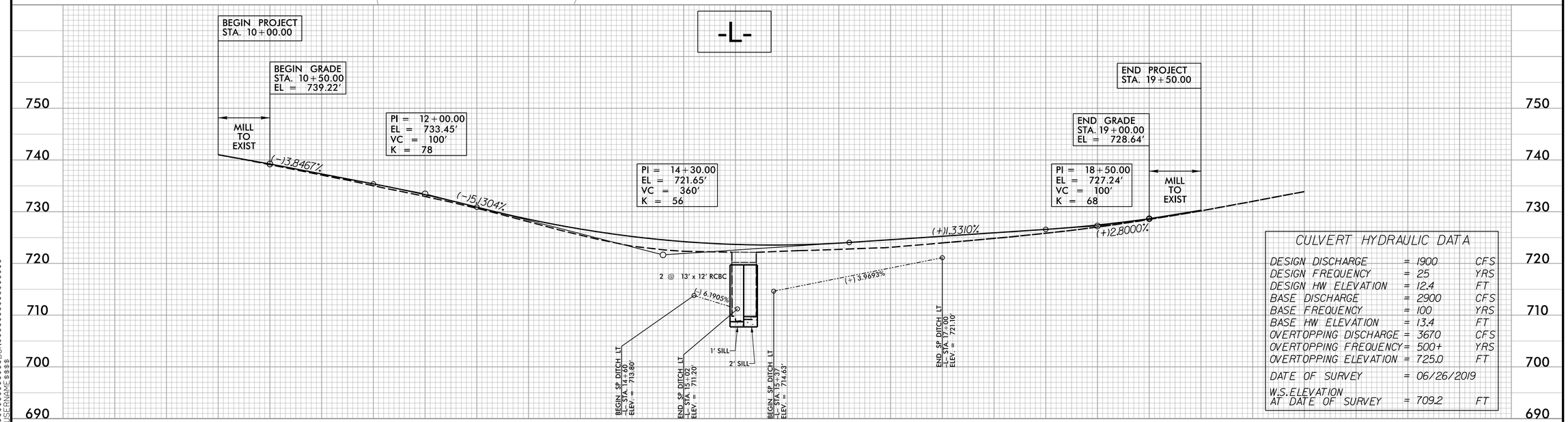
END SP DITCH LT
–L– STA. 15+02
ELEV. = 711.20'

BEGIN SP DITCH LT
–L– STA. 15+37
ELEV. = 714.43'

END SP DITCH LT
–L– STA. 17+00
ELEV. = 721.10'

1' SILL

2' SILL



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1900	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 12.4	FT
BASE DISCHARGE	= 2900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 13.4	FT
OVERTOPPING DISCHARGE	= 3670	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 725.0	FT
DATE OF SURVEY	= 06/26/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 709.2	FT

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

CULVERT CONSTRUCTION SEQUENCE STA. 15+08 –L–

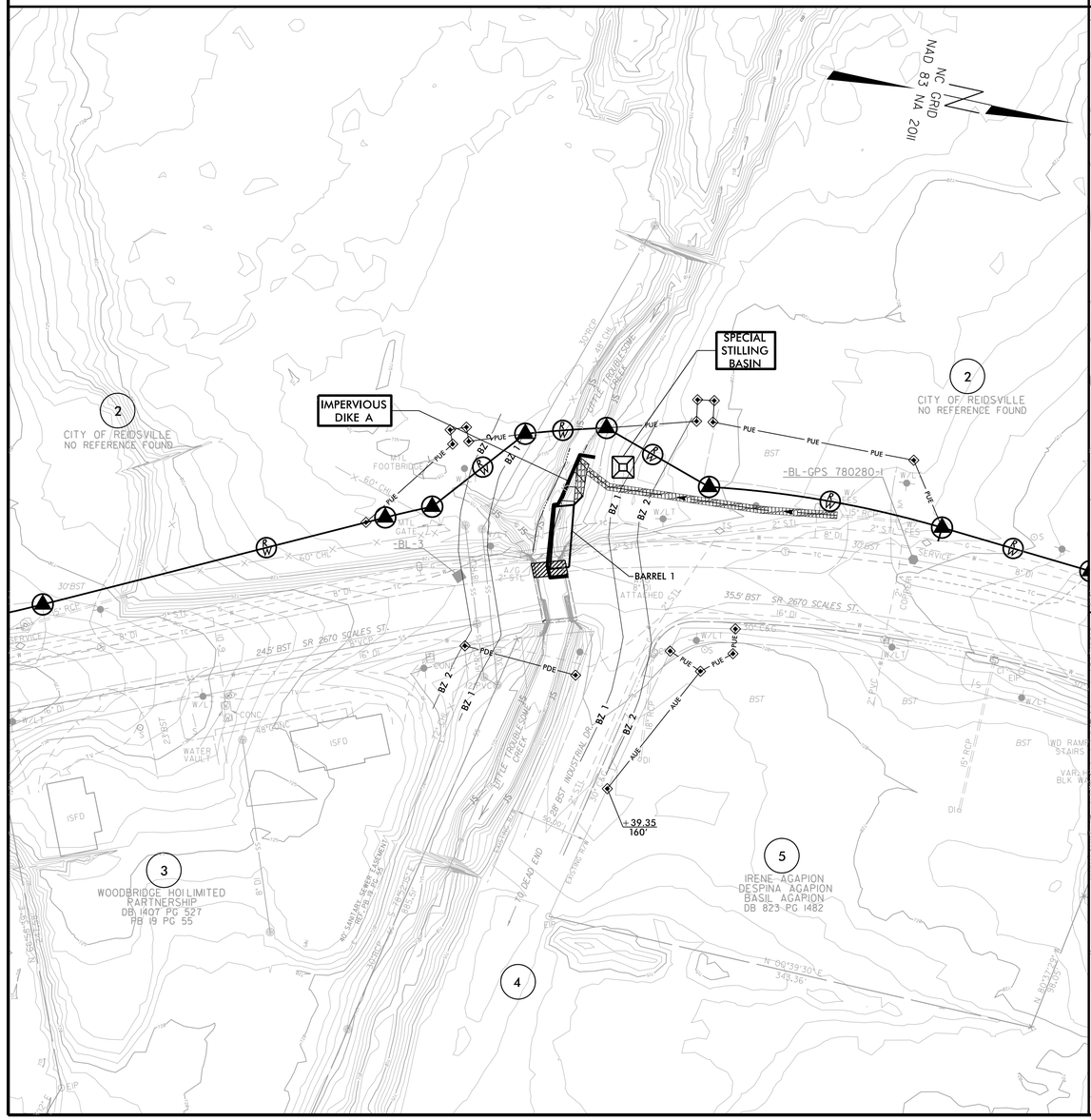
PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.141	EC-5A/CONST.04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

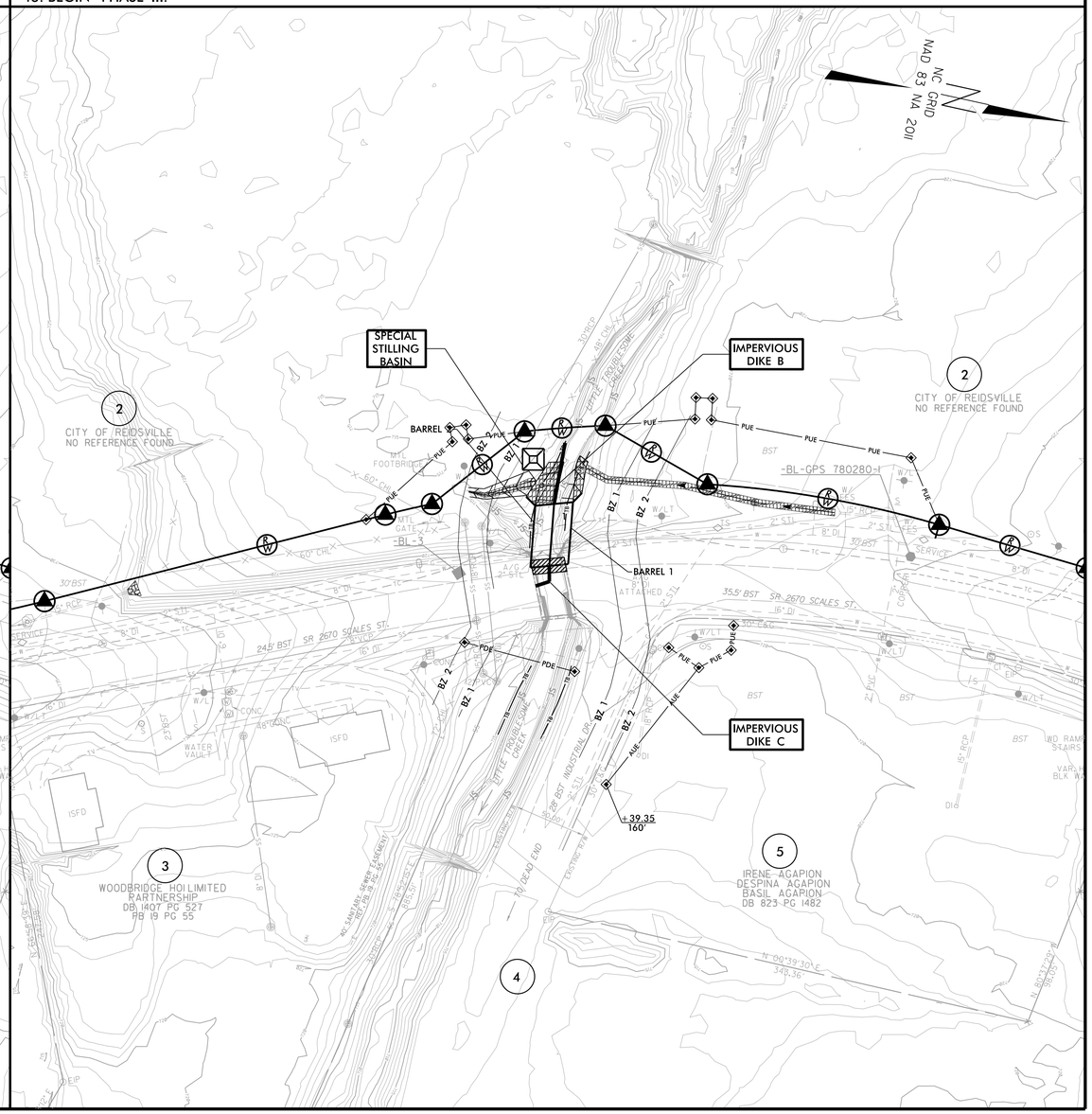
PHASE I

1. INSTALL IMPERVIOUS DIKE A.
2. DEWATER SITE USING SPECIAL STILLING BASIN.
3. REMOVE 10' +/– OF EXISTING BRIDGE ON UPSTREAM SIDE.
4. INSTALL 43' +/– OF PROPOSED RCBC BARREL 1 AND BANK STABILIZATION ON THE WEST SIDE.
5. BEGIN PHASE II.

PHASE II

6. REMOVE IMPERVIOUS DIKE A.
7. INSTALL IMPERVIOUS DIKES B AND C AND DIVERT FLOW THROUGH BARREL 1.
8. DEWATER SITE USING SPECIAL STILLING BASIN.
9. INSTALL 43' +/– OF PROPOSED RCBC BARREL 2 AND BANK STABILIZATION ON THE WEST SIDE.
10. REMOVE IMPERVIOUS DIKE C. RETAIN IMPERVIOUS DIKE B.
11. REMOVE SPECIAL STILLING BASIN.
12. BUILD PROPOSED WEST ROADWAY EMBANKMENT AND SHIFT TRAFFIC OVER NEWLY CONSTRUCTED RCBC.
13. BEGIN PHASE III.



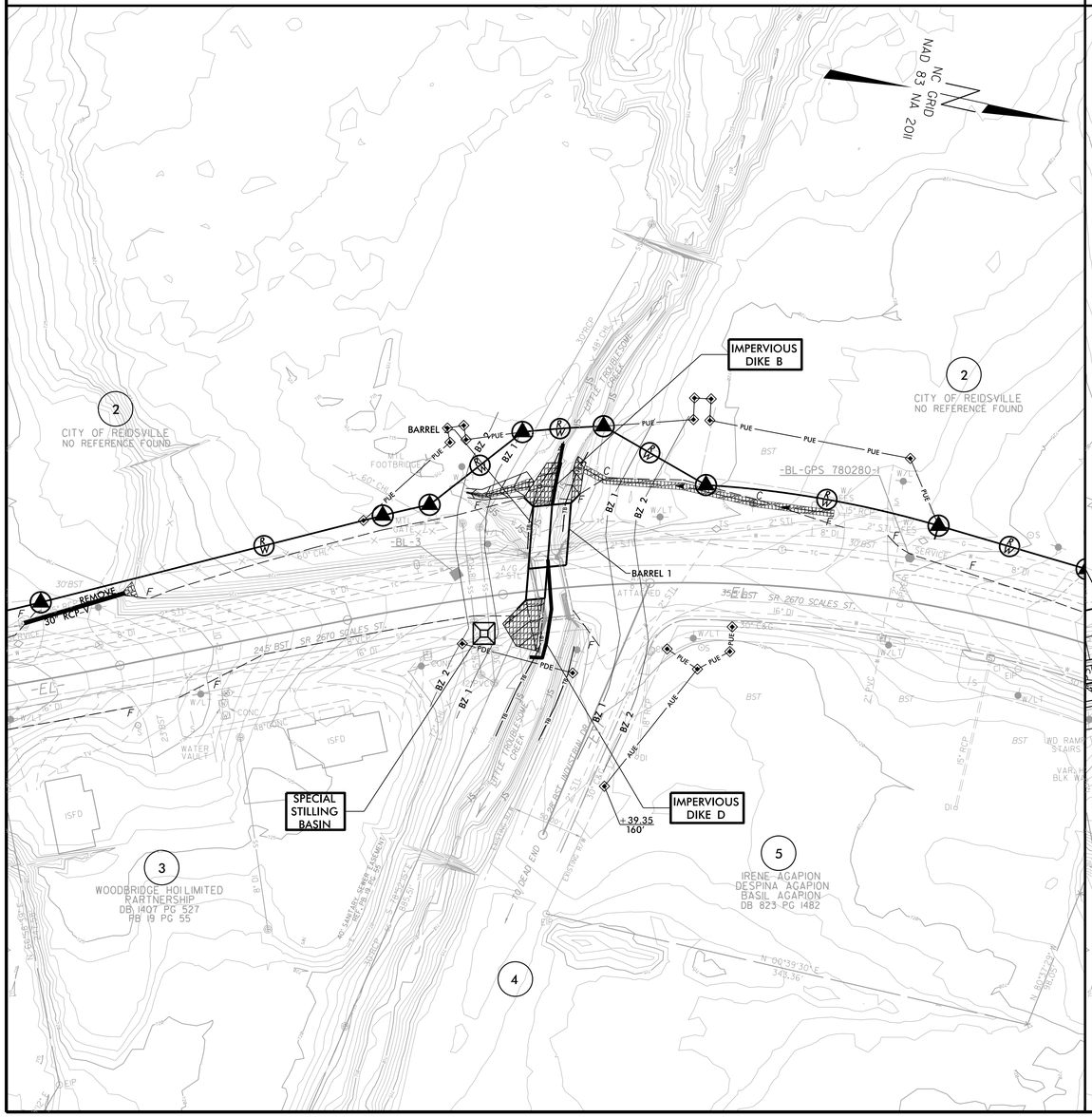


CULVERT CONSTRUCTION SEQUENCE STA. 15+08 –L–

PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.141	EC-5B/CONST.04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

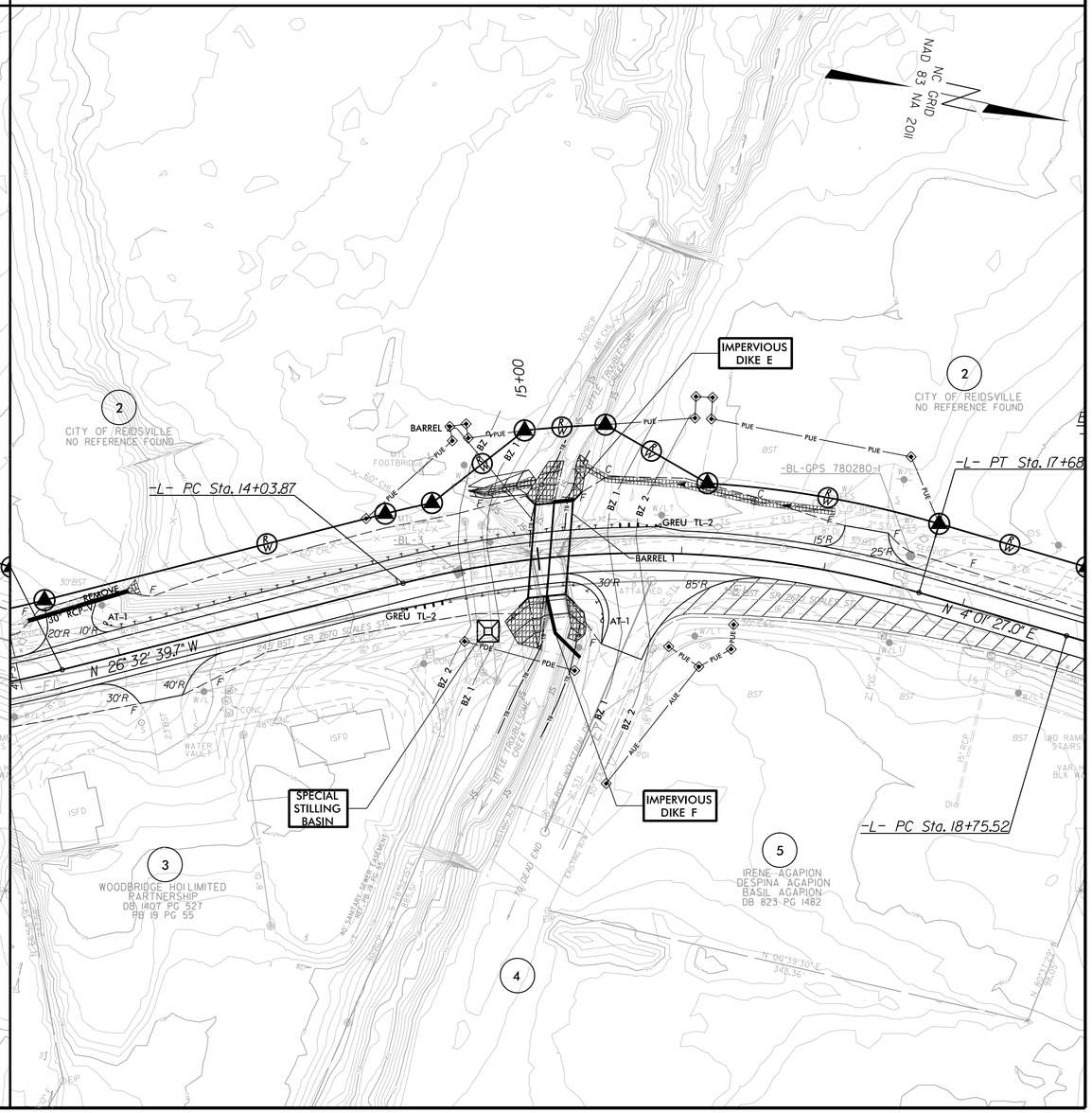
PHASE III

14. REMOVE REMAINDER OF EXISTING BRIDGE.
15. INSTALL IMPERVIOUS DIKE D.
16. DEWATER SITE USING SPECIAL STILLING BASIN.
17. INSTALL PROPOSED RCBC BARREL 2 AND BANK STABILIZATION ON THE EAST SIDE.
18. REMOVE IMPERVIOUS DIKES B AND D.
19. BEGIN PHASE IV.



PHASE IV

20. INSTALL IMPERVIOUS DIKE E AT INLET TO RCBC BARREL 1.
21. INSTALL IMPERVIOUS DIKE F AT OUTLET TO RCBC BARREL 1.
22. DIVERT FLOW INTO RCBC BARREL 2.
23. DEWATER SITE USING SPECIAL STILLING BASIN.
24. INSTALL PROPOSED RCBC BARREL 1 AND BANK STABILIZATION ON THE EAST SIDE.
25. REMOVE IMPERVIOUS DIKES E AND F.
26. CONSTRUCT NEW ROADWAY.



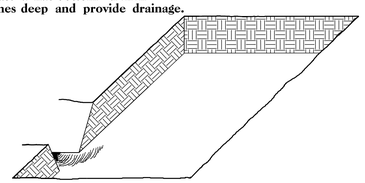
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17.BP.7.R.141	RF-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

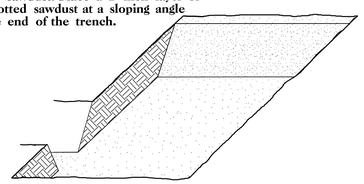
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

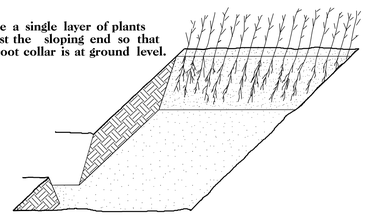
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



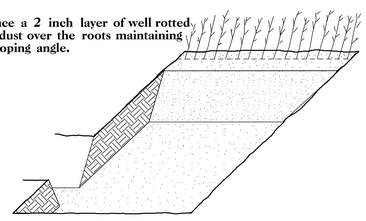
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

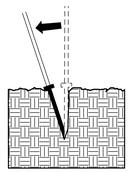


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

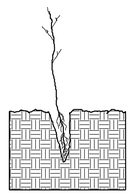


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

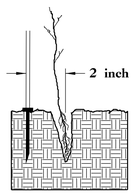
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



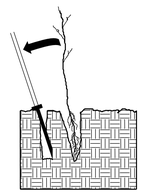
1. Insert planting bar as shown and pull handle toward planter.



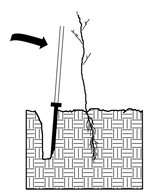
2. Remove planting bar and place seedling at correct depth.



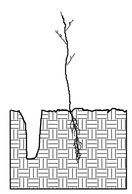
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25% PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in – 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in – 18 in BR
25% BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

Docusign Envelope ID: 4BE6F162-0220-4CBF-B9F4-E6BFCBEB05F2

T.I.P.: 17BP.7.R.141

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN

ROCKINGHAM COUNTY

LOCATION: BRIDGE NO. 280 OVER LITTLE TROUBLESOME CREEK ON SR 2670 (SOUTH SCALES STREET)

TIP NO.	SHEET NO.
17BP.7.R.141	SIGN-1

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUMMARY OF QUANTITIES

ITEM NO.		ITEM DESCRIPTION	QUANTITY	UNIT
DESC. NO.	SECT. NO.			
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	72	L.F.
4102000000	904	SIGN ERECTION, TYPE E	4	EA.
4116100000	904	SIGN ERECTION, RELOCATE SIGN TYPE E	2	EA.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	14	EA.

INDEX

SHEET NO.	DESCRIPTION
SIGN-1	TITLE SHEET
SIGN-2	TYPE "E" SIGNS SHEET
SIGN-3	SIGN DETAIL SHEET

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

GENERAL NOTES

- SIGNS FURNISHED BY STATE.
- CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.
- IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER.
- ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
- SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

PLAN REVIEWED BY: N.C.D.O.T. SIGNING AND DELINEATION UNIT

KELVIN JORDAN — SIGNING & DELINEATION STANDARDS ENGINEER

WALTER JOHNSON — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY: HDR ENGINEERING, INC. OF THE CAROLINAS

MIKE RZEPKA, P.E. — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

CHRIS HARNDEN — SIGNING & DELINEATION PROJECT DESIGN TECHNICIAN

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

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(401) QUANTITY REQ'D 2 STOP 30" X 30" R1-1 ONE "U" POST PER SIGN	(402) QUANTITY REQ'D 1 SPEED LIMIT 35 24" X 30" R2-1 ONE "U" POST PER SIGN	(403) QUANTITY REQ'D 1 SPEED LIMIT 45 24" X 30" R2-1 ONE "U" POST PER SIGN				

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

TIP NO.	SHEET NO.
17BP.7.R.141	SIGN-2

APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TYPE "E" SIGNS

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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

TIP NO.	SHEET NO.
17BP.7.R.141	SIGN-3

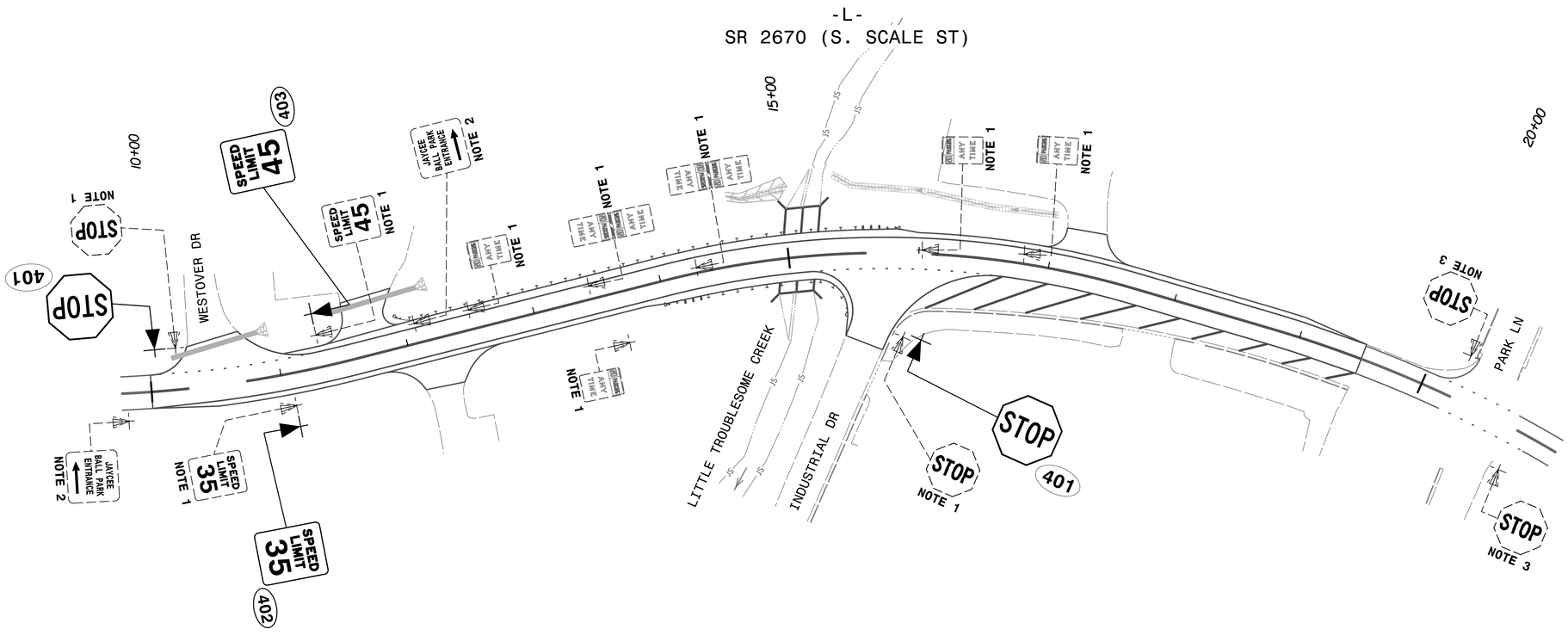
APPROVED: Michael T. Rzepka

DATE: 8/19/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 15876 ENGINEER MICHAEL T. RZEPKA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NOTES

1 DISPOSAL OF SIGN SYSTEM, U-CHANNEL
2 SIGN ERECTION, RELOCATE SIGN TYPE E
3 SIGN SYSTEM TO REMAIN

EXISTING AND PROPOSED SIGNS

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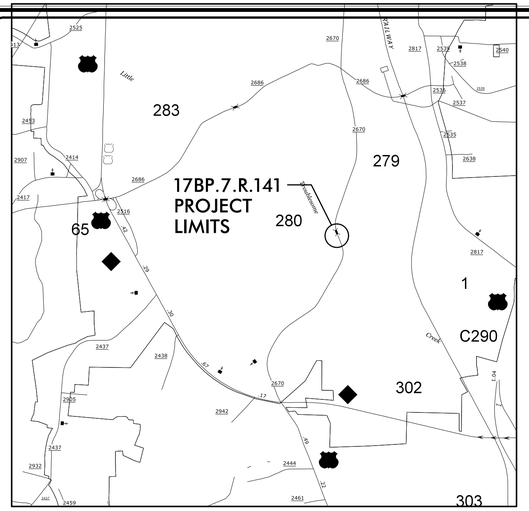
09/08/99

TIP PROJECT: 17BP.7.R.141



T.I.P. NO.	SHEET NO.
17BP.7.R.141	UC–1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

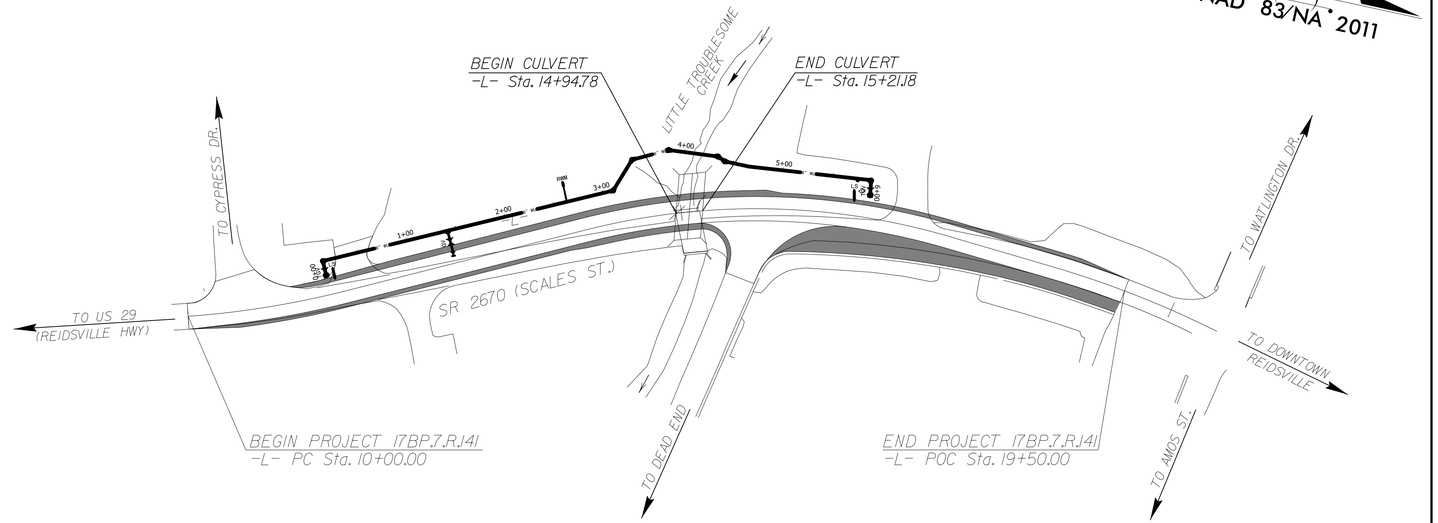
UTILITY CONSTRUCTION PLANS ROCKINGHAM COUNTY

LOCATION: BRIDGE NO. 280 OVER LITTLE TROUBLESOME CREEK ON SR 2670 (SOUTH SCALES STREET

TYPE OF WORK: WATER LINE RELOCATION

UC–4

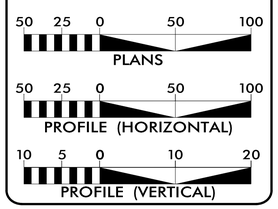
NAD 83/NA • 2011



*DESIGN EXCEPTION:
SAG VERTICAL CURVE K
VERTICAL SSD

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	*DESCRIPTION:*
UC–1	*TITLE SHEET*
UC–2	*UTILITY SYMBOLOGY*
UC–3	*NOTES*
UC–3A	*DETAILS*
UC–4	*UTILITY CONSTRUCTION AND PROFILE SHEET*

WATER AND SEWER OWNERS ON PROJECT

(A) WATER – CITY OF REIDSVILLE
(B) SANITARY SEWER – CITY OF REIDSVILLE

PREPARED IN THE OFFICE OF

Wooten

119 Brookstown Avenue, Suite 100 • Winston-Salem, NC 27101
(336) 722-5326 • thewootencompany.com
License Number : F-0115

John Grey, P.E.	*CONSULTANT CONTACT #1*
	CONSULTANT CONTACT #2
	CONSULTANT CONTACT #3

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 16097 ENGINEER JOHN C. GREY
Docusigned by:
4/14/2025

Document Not Considered Final Unless All Signatures Completed
UTILITY CONSTRUCTION PLANS ONLY

DIVISION OF HIGHWAYS
DIVISION 7

1584 YANCEYVILLE STREET
GREENSBORO NC 27405

CHRIS SMITHERMAN, PE	*PROJECT DELIVERY ENGINEER*
DANIEL R. DAGENHART	*BRIDGE PROGRAM MANAGER*
JAMES B YATES, MS, PE	*DIVISION UTILITY ENGINEER*

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

5/14/99

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Item	Symbol
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

Item	Symbol
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

Item	Symbol
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

Item	Symbol
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	
*Underground Telephone Cable	
*Underground Telephone Conduit	
*Underground Fiber Optics Telephone Cable	
*Underground TV Cable	
*Underground Fiber Optics TV Cable	
*Underground Gas Pipeline	
Aboveground Gas Pipeline	A/G Gas
*Underground Water Line	
Aboveground Water Line	A/G Water
*Underground Gravity Sanitary Sewer Line	
Aboveground Gravity Sanitary Sewer Line	A/G Sanitary Sewer
*Underground SS Forced Main Line	
Underground Unknown Utility Line	
SUE Test Hole	
Water Meter	
Water Valve	
Fire Hydrant	
Sanitary Sewer Cleanout	

*For Existing Utilities

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

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

REV: 2/1/2012

5/14/99

UTILITY CONSTRUCTION

PREPARED IN THE OFFICE OF:
Wooten
119 Brookstown Ave., Ste. 100 • Winston-Salem, NC 27101
(336) 722-5326 • thewootencompany.com
License Number : F-0115

VERTICAL SCALE 5' 0 5' 10'
HORIZONTAL SCALE 25' 0 25' 50'

WATER LINE CONSTRUCTION SHOWN ON THIS SHEET

PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.141	UC-3
DESIGNED BY: JPM	
DRAWN BY: BTH	
CHECKED BY: JCG	
APPROVED BY: JCG	
REVISED:	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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

NORTH CAROLINA PROFESSIONAL SEAL 18097 ENGINEER JOHN C. GRIFFIN
Digitally Signed by:
4B8B0E4B7BD544E...
5/14/2025
Document Not Considered Final Unless All Signatures Completed
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 2024.

2. THE EXISTING UTILITIES BELONG TO CITY OF REIDSVILLE.

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. 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 WITHOUT ENDANGERING THE UTILITY SERVICE AND IN ACCORDANCE WITH UTILITY OWNER'S REQUIREMENTS. ALL EXISTING WATER MAINS MUST REMAIN ACTIVE AT ALL TIMES DURING CONSTRUCTION. EXISTING WATER MAINS SHALL NOT BE TAKEN OUT OF SERVICE UNTIL NEW MAINS HAVE BEEN TESTED, DISINFECTED AND CERTIFIED. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ADEQUATE SEQUENCING AND BYPASS PUMPING.

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.

PROJECT SPECIFIC NOTES:

1. NEW WATER MAIN AND APPURTENANCES MUST BE CONSTRUCTED, TESTED, APPROVED FOR SERVICE PRIOR TO EXISTING WATER MAIN BEING TAKEN OUT OF SERVICE.

2. NEW WATER MAIN MAY BE CONSTRUCTED IN PHASES TO FACILITATE ROADWAY CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARATION OF A PHASING PLAN CLEARLY IDENTIFYING EACH PHASE AND SUBMIT FOR APPROVAL PRIOR TO BEGINNING CONSTRUCTION. EACH COMPLETED PHASE MUST RECEIVE NCDEQ FINAL APPROVAL PRIOR TO BEING PLACED INTO SERVICE.

3. ALL WATER MAIN CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS OF THE CITY OF REIDSVILLE MANUAL OF CITY SPECIFICATIONS FOR WATER AND SEWER.

4. PROPOSED WATER LINE TO BE AN OPEN TRENCH INSTALLATION AS PART OF NEW CULVERT CONSTRUCTION. WATER LINE PHASING SHALL BE INCLUDED WITHIN EROSION CONTROL PLANS FOR THE CULVERT WITH A PUMP AROUND OPTION FOR DEWATERING THE WORK SITE. ONCE NEW WATER LINE HAS BEEN INSTALLED, THE STREAM SHALL BE DIVERTED BY OTHER MEANS.

5. WATER LINE PIPE MATERIAL SHALL BE DUCTILE IRON.

ENGINEERING DATA SYSTEMS

5/14/99

PROJECT TYPICAL DETAILS

PREPARED IN THE OFFICE OF:

Wooten

119 Brookstown Ave., Ste. 100 • Winston-Salem, NC 27101
(336) 722-5326 • thewootencompany.com
License Number : F-0115

PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.141	UC-3A

DESIGNED BY: JPM
DRAWN BY: BTH
CHECKED BY: JCG
APPROVED BY: JCG
REVISED:

VERTICAL SCALE 5' 0 5' 10'
HORIZONTAL SCALE 25' 0 25' 50'

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

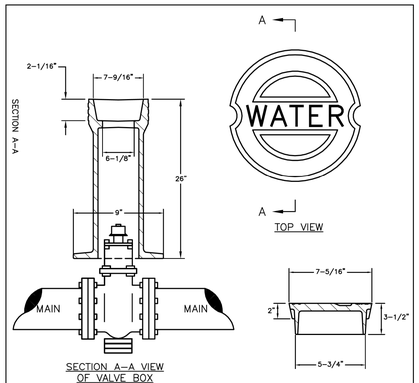
UTILITIES ENGINEERING SEC.
PHONE: (919) 707-6690
FAX: (919) 250-4151

WATER LINE CONSTRUCTION SHOWN ON THIS SHEET

NORTH CAROLINA PROFESSIONAL SEAL 18097 ENGINEER JOHN C. GRIEG

Digitally signed by:
68532FB87BD5445...
9/14/2025
Document Not Considered Final Unless All Signatures Completed
UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



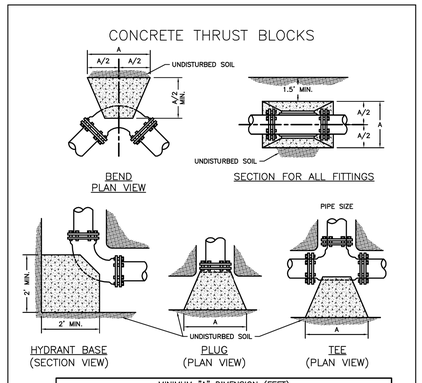
NOTES:

1. VALVE BOX EXTENSION SHALL BE 6" DIA. SOIL PIPE.
2. EXTENSION TO BE ONE SOLID PIECE OF PIPE UNLESS BURIAL DEPTH IS GREATER THAN STANDARD LENGTH OF PIPE.
3. TO BE USED IN PAVED OR NON-PAVED AREAS.
4. BOX SHALL BE AN EAST JORDAN IRON WORKS 8555 SERIES OR EQUAL CAST IRON VALVE BOX.

DATE: 3/1/14

CITY OF REIDSVILLE

WATER VALVE BOX AND EXTENSION	STD. NO.	REV.
	102	



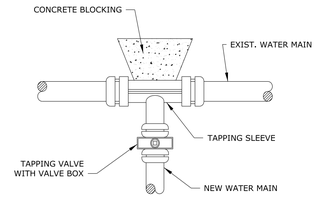
FITTING	MINIMUM "A" DIMENSION (FEET) PIPE SIZE (INCHES)										
	6	8	10	12	14	16	18	20	24	30	36
90° BEND	2.2	2.9	3.6	4.3	5.0	5.6	6.3	7.0	8.4	10.5	12.5
45° BEND	1.6	2.1	2.6	3.1	3.7	4.2	4.7	5.2	6.2	7.7	9.2
22.5° BEND	1.2	1.5	1.9	2.3	2.6	3.0	3.4	3.7	4.5	5.5	6.6
11.25° BEND	0.8	1.1	1.4	1.6	1.9	2.1	2.4	2.6	3.2	3.9	4.7
VALVE/TEE/PLUG	1.8	2.4	3.0	3.6	4.2	4.8	5.3	5.9	7.1	8.8	10.5

NOTE: ABOVE DIMENSIONS BASED ON THE FOLLOWING: 200 PSI WATER PRESSURE AND 2000 LB/SQFT SOIL BEARING CAPACITY (SOFT CLAY)

DATE: 3/1/14

CITY OF REIDSVILLE

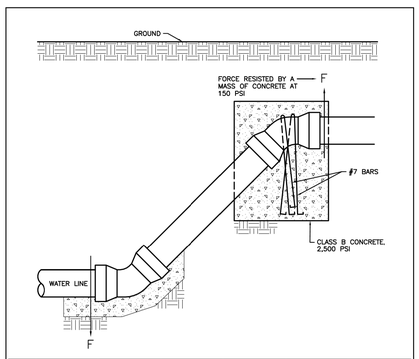
STANDARD REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS	STD. NO.	REV.
	106	



TAPPING SLEEVE & VALVE ASSEMBLY

NOT TO SCALE

NOTES:
1. TAPPING SLEEVE SHALL BE FABRICATED OF TYPE 304 OR 316 S.S. AND PROVIDE A 360° SEAL AROUND EXISTING PIPE WITH FULL CIRCUMFERENTIAL GASKET.
2. TAPPING SLEEVE SHALL BE JCM 432, MUELLER H-304, FORD FTSS, ROMAC ST III OR APPROVED EQUAL.



PIPE DIA.	6" DROP		12" DROP		18" DROP		24" DROP		30" DROP		36" DROP	
	FORCE	CONC.	FORCE	CONC.	FORCE	CONC.	FORCE	CONC.	FORCE	CONC.	FORCE	CONC.
6"	909#	1/4 CY	1496#	1/2 CY	1861#	1/2 CY	2481#	3/4 CY	3102#	3/4 CY	3722#	1.0 CY
8"	1569#	1/2 CY	2526#	3/4 CY	3175#	3/4 CY	4233#	1-1/4 CY	5291#	1-1/2 CY		
10"	2355#	3/4 CY	3716#	1.0 CY	4608#	1-1/4 CY	6143#	1-1/2 CY				
12"	2992#	3/4 CY	4522#	1-1/4 CY	5450#	1-1/2 CY	7267#	1-3/4 CY				
16"	4306#	1-1/4 CY	7235#	1-3/4 CY	9355#	2-1/2 CY	12473#	3-1/4 CY				

NOTE:

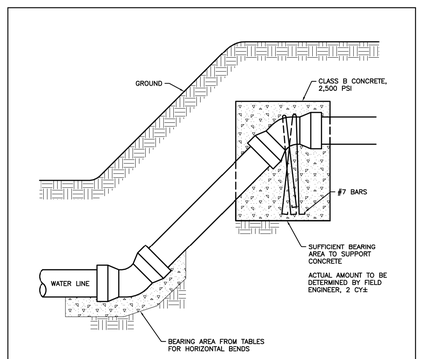
THE TABLE ABOVE SHOWS WEIGHT AND VOLUME OF CONCRETE NECESSARY TO HOLD DOWN OFFSET.

WEIGHT OF OFFSET, WEIGHT OF PIPE, AND TRENCH LOADS ARE IGNORED IN CALCULATIONS.

DATE: 3/1/14

CITY OF REIDSVILLE

STANDARD VERTICAL OFFSET ANCHORS	STD. NO.	REV.
	111	

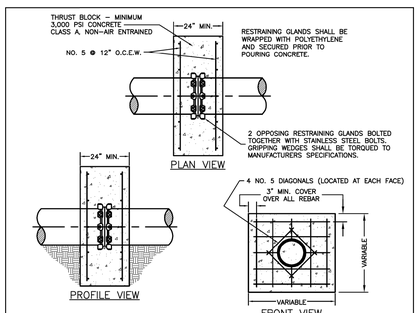


CUBIC YARDS OF CONCRETE TO ANCHOR VERTICAL BEND						
PIPE DIA.	11-1/4° BEND		22-1/2° BEND		45° BEND	
	FORCE	CONC.	FORCE	CONC.	FORCE	CONC.
6"	812 #	1/2 CY	1653 #	1/2 CY	3247 #	1.0 CY
8"	1444 #	1/2 CY	2939 #	3/4 CY	5773 #	1.5 CY
12"	3248 #	1.0 CY	6612 #	1-3/4 CY	12988 #	3.5 CY
16"	5775 #	1-1/2 CY	11756 #	3.0 CY	23090 #	6.0 CY

DATE: 3/1/14

CITY OF REIDSVILLE

STANDARD VERTICAL BEND ANCHORS	STD. NO.	REV.
	110	



NOTES:

1. THRUST BLOCK SHALL BE ORIENTED APPROXIMATELY CENTER OF PIPE JOINT.
2. *OPTIONAL* A WELDED COLLAR (INSTALLED BY PIPE MANUFACTURER) MAY BE USED IN LIEU OF RESTRAINING GLANDS. ALL OTHER DESIGN REQUIREMENTS SHALL APPLY AS SHOWN.
3. FOR PIPES LARGER THAN 12" DIAMETER, THE DEADMAN THRUST RESTRAINT WITH BLOCKING MUST BE DESIGNED AND SEALED BY A N.C. PROFESSIONAL ENGINEER.
4. ANY PROPOSED MODIFICATIONS TO THIS STANDARD BASED ON THE FIELD CONDITIONS MUST BE PRE-APPROVED BY THE CITY OF REIDSVILLE FIELD INSPECTOR AND/OR THE ENGINEER OF RECORD.
5. QUANTITIES SHOWN BELOW ARE TO THE NEAREST QUARTER YARD AND ARE BASED ON MINIMUM MASS WEIGHT REQUIREMENTS OF THE TEST PRESSURES SHOWN.

MINIMUM CUBIC YARDS OF CONCRETE REQUIRED			
PIPE DIAMETER	150 PSI TEST PRES.	200 PSI TEST PRES.	250 PSI TEST PRES.
6"	1.00	1.50	1.75
8"	2.00	2.50	3.25
10"	3.00	4.00	5.00
12"	4.25	5.50	7.00

DATE: 3/1/14

CITY OF REIDSVILLE

DEADMAN THRUST RESTRAINT WITH MASS WEIGHT BLOCKING FOR DUCTILE IRON PIPE	STD. NO.	REV.
	118	

STANDARD DETAILS

PREPARED IN THE OFFICE OF:
Wooten
300 S. Main Street • Winston-Salem, NC 27101
(803) 722-5326 • thewootencompany.com
License Number : F-0115

PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.141	UC-4
DESIGNED BY: JCG	
DRAWN BY: BTH	
CHECKED BY: JCG	
APPROVED BY: JCG	
REVISED:	

VERTICAL SCALE 5' 0 5' 10' | HORIZONTAL SCALE 25' 0 25' 50'

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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

NORTH CAROLINA PROFESSIONAL SEAL 18097 ENGINEER JOHN C. GREY
DocuSigned by: 5/11/2025
Document Not Considered Final Unless All Signatures Completed
UTILITY CONSTRUCTION PLANS ONLY

WATER LINE CONSTRUCTION SHOWN ON THIS SHEET

UTILITY CONSTRUCTION

1–8″ TAPPING SLEEVE & VALVE
+42.96 (–L–)
WL STA 0+00
28.00′ LT

+42.96 (–L–)
WL STA 0+15
34.00′ LT
8″ 90 DEGREE RJDI BEND

1–8″ LINE STOP

INSET A
(2X SCALE)

PROP. 604±LF 8″ DI WATER LINE (1)
SEE PROFILE THIS SHEET

+94.77 (–L–) SY GEOTEXTILE
WL STA 3+82
63.00′ LT
8″ 22.5 DEGREE VERTICAL RJDI BEND

+60.27 (–L–)
WL STA 3+42
59.00′ LT
8″ 45 DEGREE HORIZ RJDI BEND

+38.28 (–L–)
WL STA 3+11
32.00′ LT
8″ 45 DEGREE HORIZ RJDI BEND

HORIZONTAL OFFSET OF 10′ MIN. FROM EDGE OF CULVERT WING WALL TO PROP. 8″ WATER LINE.

+39.22 (–L–)
WL STA 4+33
53.00′ LT
8″ 22.5 DEGREE VERTICAL RJDI BEND

+45.04 (–L–)
WL STA 4+41
48.00′ LT
8″ 22.5 DEGREE ROTATED RJDI BEND

+07.52 (–L–)
WL STA 4+02
59.00′ LT
8″ 22.5 DEGREE VERTICAL RJDI BEND

+70.98 (–L–)
WL STA 1+42
33.00′ LT
1–8″x6″ TEE

+70.98 (–L–)
9.00′ LT
1–6″x6″ SLEEVE

1–6″ GATE VALVE
+70.98 (–L–)
22.00′ LT

+82.68 (–L–)
WL STA 5+90
37.00′ LT
8″ 90 DEGREE RJDI BEND

1–8″ LINE STOP

1–8″ TAPPING SLEEVE & VALVE
+83.66 (–L–)
26.00′ LT

INSET B
(2X SCALE)

INSET C
(2X SCALE)

PROP. 25±LF 6″ DI WATER LINE TO PASS OVER PROP. GAS LINE (NOT SHOWN IN PROFILE)

RELOCATE WATER METER 10′ WATER SERVICE LINE

WATER LINE INSTALLED BY OPEN CUT

ABANDON AND GROUT FILL 520±LF OF 8″ DI WATER LINE

SEE INSET A THIS SHEET

SEE INSET B THIS SHEET

SEE INSET C THIS SHEET

-L- PT Sta. 11+58.58

-L- PC Sta. 14+03.87

-L- PT Sta. 17+68.26

-L- PC Sta. 18+75.52

-L- PT Sta. 20+50.00

BEGIN PROJECT 17BP.7.RJ41
-L- PC Sta. 10+00.00

CITY OF REIDSVILLE
NO REFERENCE FOUND

MELISSA ANNE MCCLARY
DB 1477 PG 2250
PB 45 PG 6

KENNETH W BRAKEFIELD
DB 1044 PG 408
PB 45 PG 39

HORIZON INC
DB 840 PG 1340
PB 19 PG 55

IRENE AGAPION
DESPINA AGAPION
BASIL AGAPION
DB 823 PG 1482

B&J BARBARA INVESTMENTS, LLC
DB 1198 PG 1968
PB 40 PG 36

CLASS B RIP RAP
EST. 8 TONS
EST. 21 SY GEOTEXTILE

CLASS II RIP-RAP
W/ GEOTEXTILE

LATERAL V DITCH
SEE DETAIL 2
EST. 50 TONS RIP RAP
EST. 140 SY GEOTEXTILE

RETAIN SYSTEM

SR 2670 SCALES ST.

TO CYPRESS DR.

TO US 29 REIDSVILLE HWY.

TO DEAD END

TO DOWNTOWN REIDSVILLE

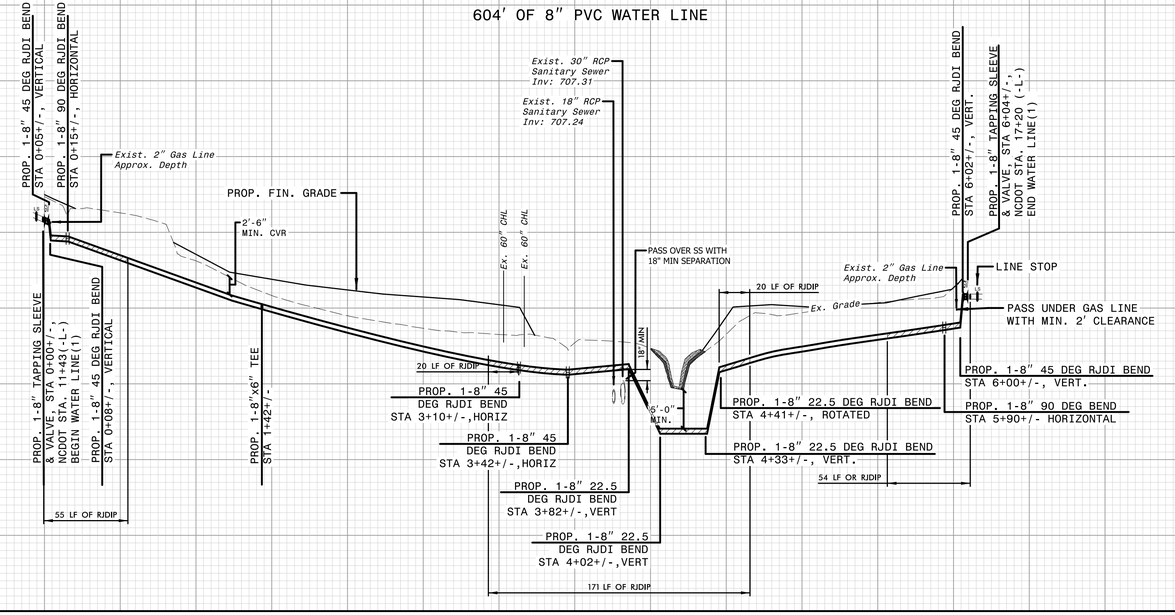
TO WALKINGTON

PROFILE SHOWN IS BASED ON STATIONING ALONG PROPOSED WATER LINE ALIGNMENT ALONG ROADWAY ALIGNMENT -L- (SEE SHEET UC-4)

NOTE:
THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 1,765 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

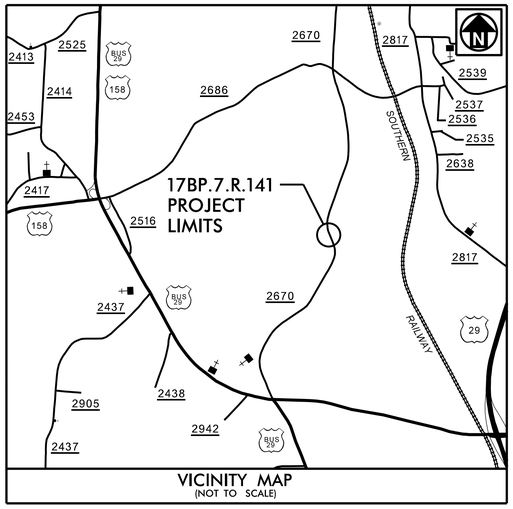
8″ Water Line (1)

604′ OF 8″ PVC WATER LINE



09/08/99

TIP PROJECT: 17BP.7.R.141



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

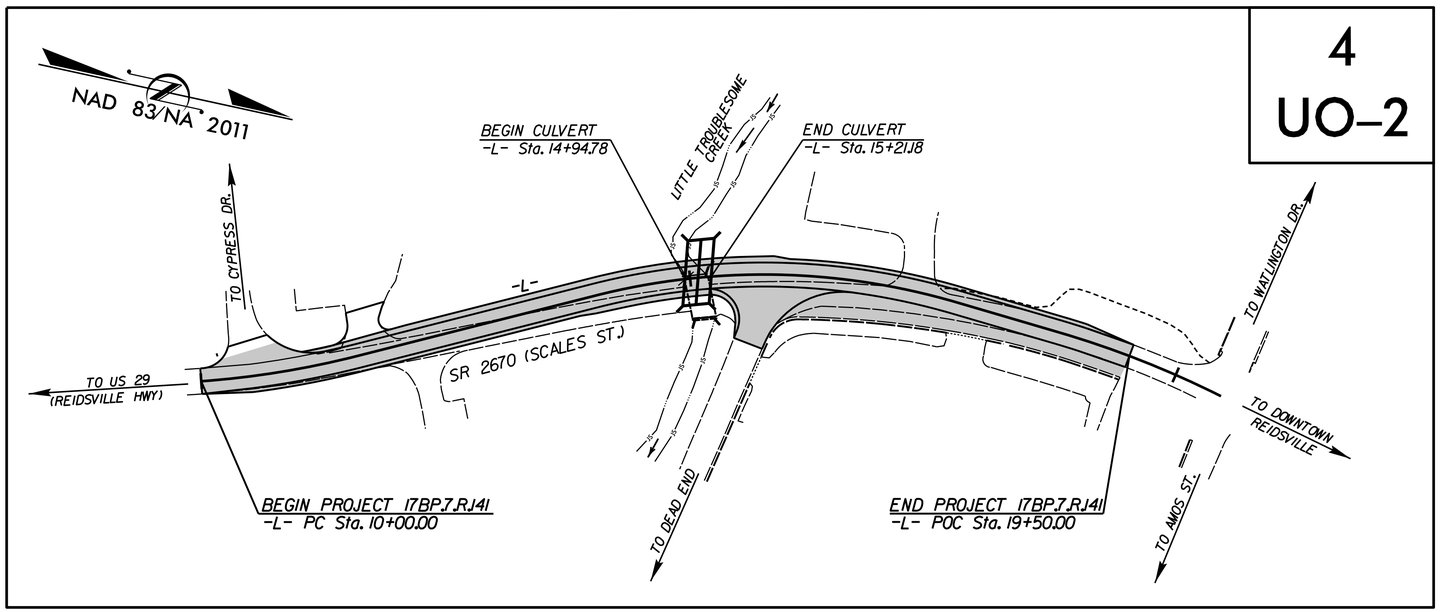
UTILITIES BY OTHERS PLANS
ROCKINGHAM COUNTY

T.I.P. NO.	SHEET NO.
17BP.7.R.141	UO–1

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

LOCATION: BRIDGE NO. 280 OVER LITTLE TROUBLESOME CREEK ON SR 2670 (SOUTH SCALES STREET)

TYPE OF WORK: RELOCATION OF POWER (DISTRIBUTION), COMMUNICATIONS AND GAS



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

SHEET NO.:	*DESCRIPTION:*
UO–1	*TITLE SHEET*
UO–2	*UBO PLAN SHEET*

UTILITY OWNERS WITH CONFLICTS

(A) POWER (DISTRIBUTION) – DUKE ENERGY
(B) COMMUNICATIONS – AT&T
(C) COMMUNICATIONS – SPECTRUM
(D) GAS – PIEDMONT NATURAL GAS

PREPARED IN THE OFFICE OF:

SAM™
2641 Sumner Boulevard
Suite 116
Raleigh, NC 27616
(919) 878–7466

MATTHEW WARD *PROJECT UTILITY COORDINATOR*

DIVISION OF HIGHWAYS
DIVISION 7
1584 YANCEYVILLE ST
GREENSBORO, NC 27415

DANIEL R. DAGENHART	*DIV. BRIDGE PROGRAM MANAGER*
WRIGHT P. ARCHER, III, PE	*DIV. ENGINEER*
KELVIN S. MARTIN	*DIV. UTILITY ENGINEER*

11/21/2024
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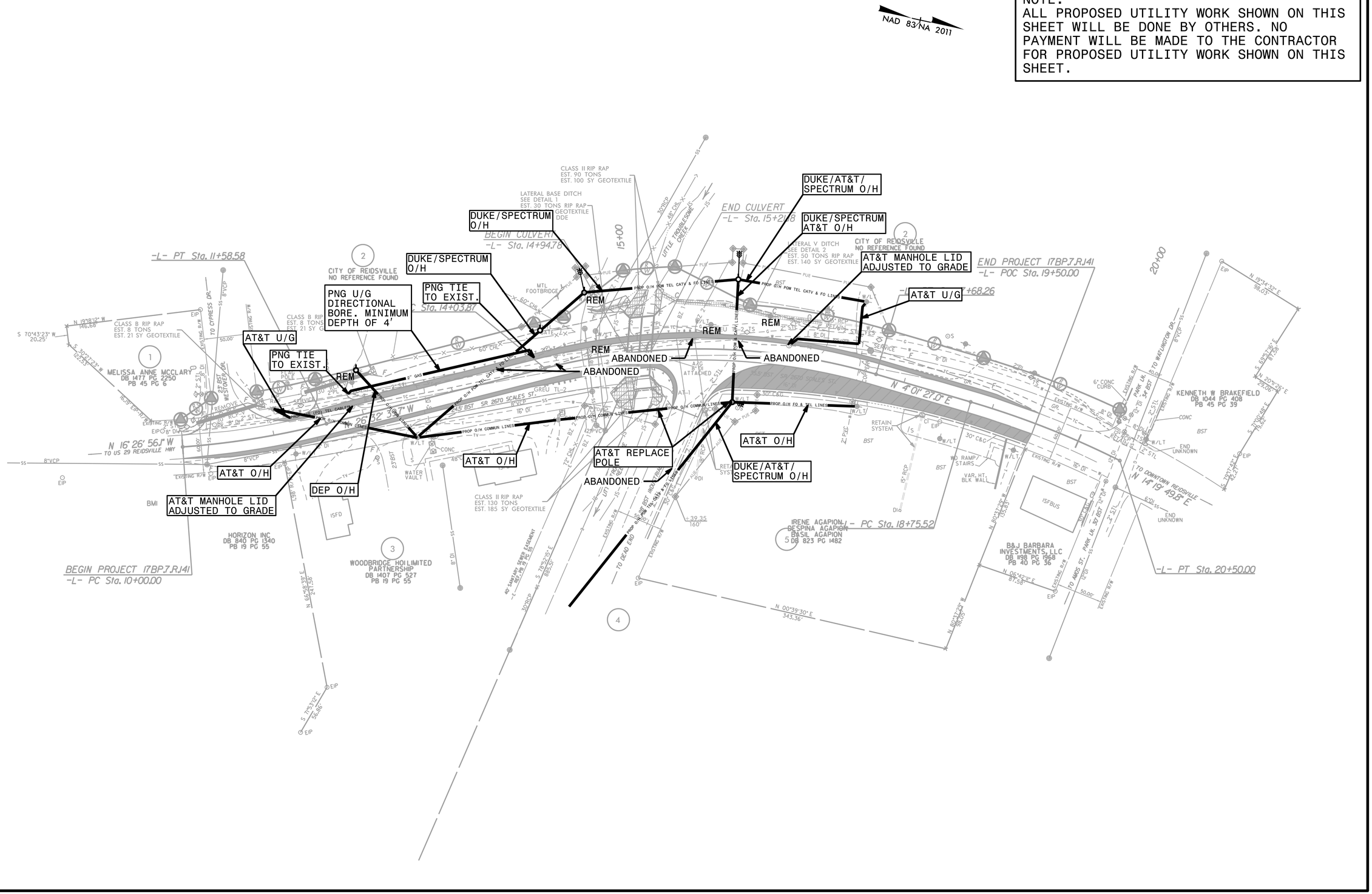
9:41:41 AM

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
17BP.7.RJ41	U0-02
THIS SHEET CORRESPONDS TO RDY- 4	

UTILITIES BY OTHERS

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



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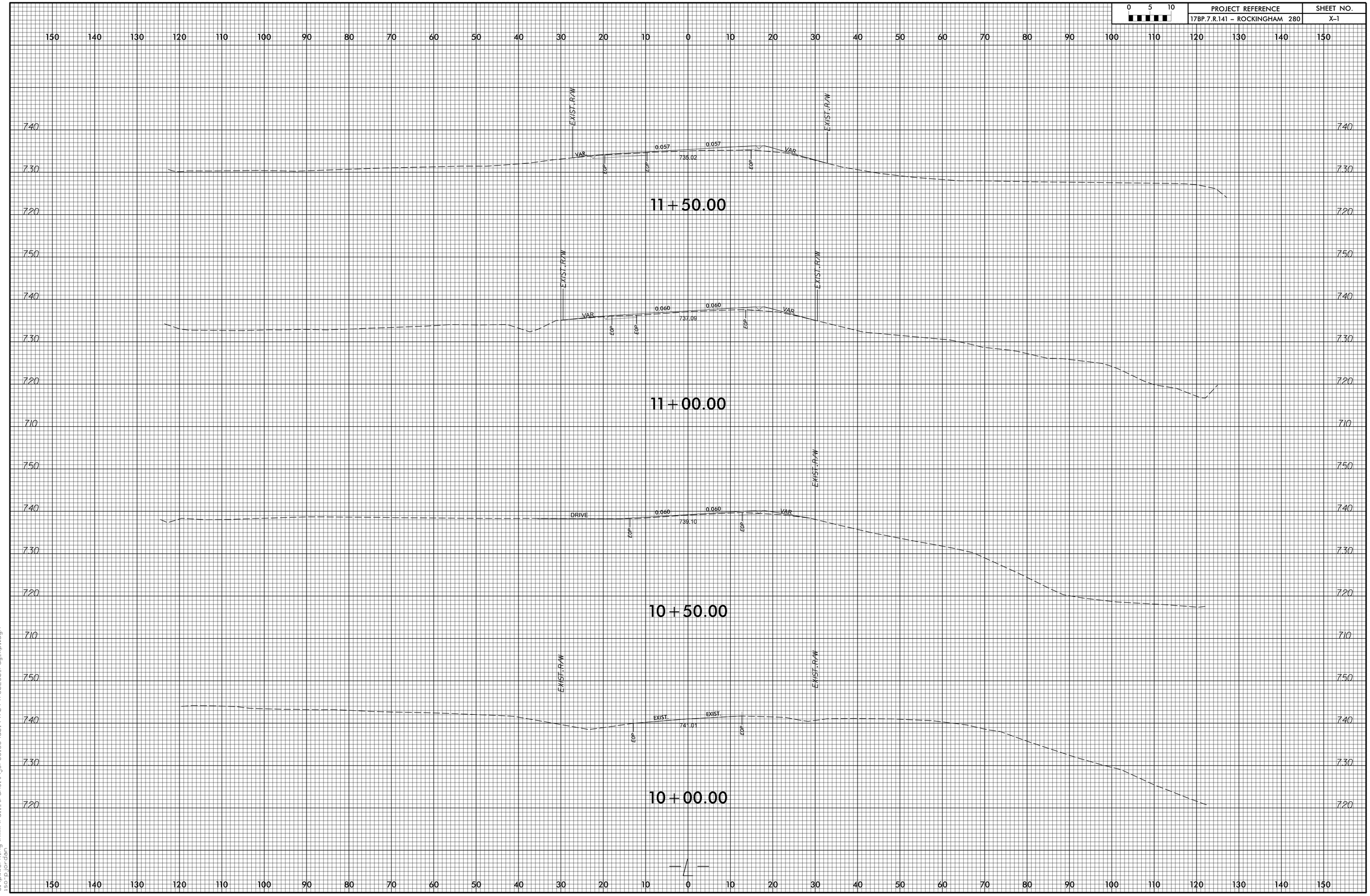
	17BP.7.R.141 – ROCKINGHAM 280	X–1



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iso_p_jordan

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	17BP.7.R.141 – ROCKINGHAM 280	X–2

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

730 720 710 740

EXIST. R/W

DET 14+00.04

0.052 0.052 VAR

723.33

EOP EOP

2:1

14+00.00

EXIST. R/W

DET 13+50.03

0.030 0.030 VAR

725.48

EOP EOP

2:1

13+50.00

EXIST. R/W

DET 13+00.02

0.008 0.008 VAR

728.04

EOP EOP

2:1

13+00.00

EXIST. R/W

DET 12+50.01

0.013 0.013 DRIVE

730.65

EOP EOP

2:1

12+50.00

EXIST. R/W

DET 12+02.71

0.035 0.035 DRIVE

732.94

EOP EOP

2:1

12+00.00

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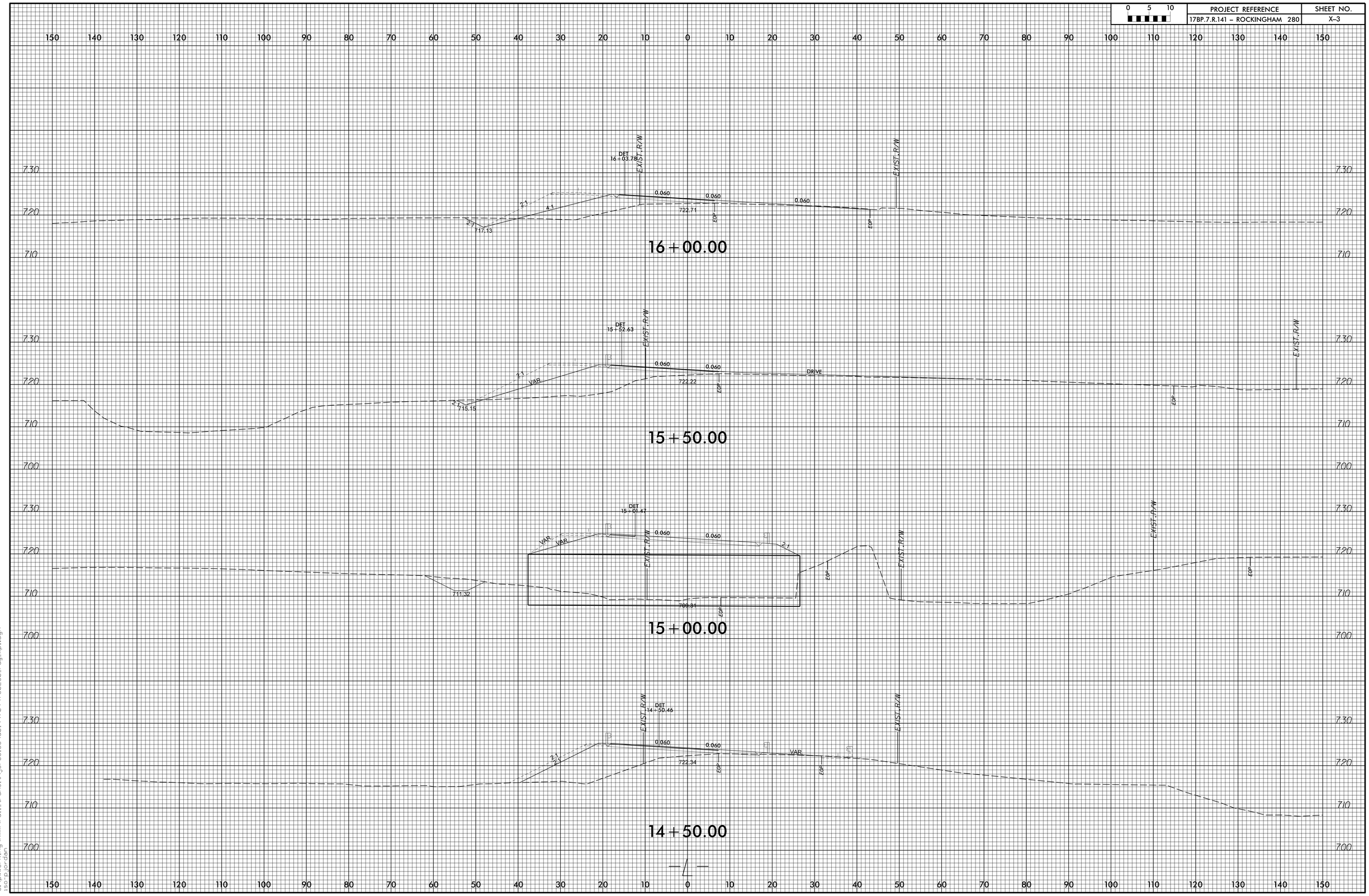
	17BP.7.R.141 – ROCKINGHAM 280	X–3



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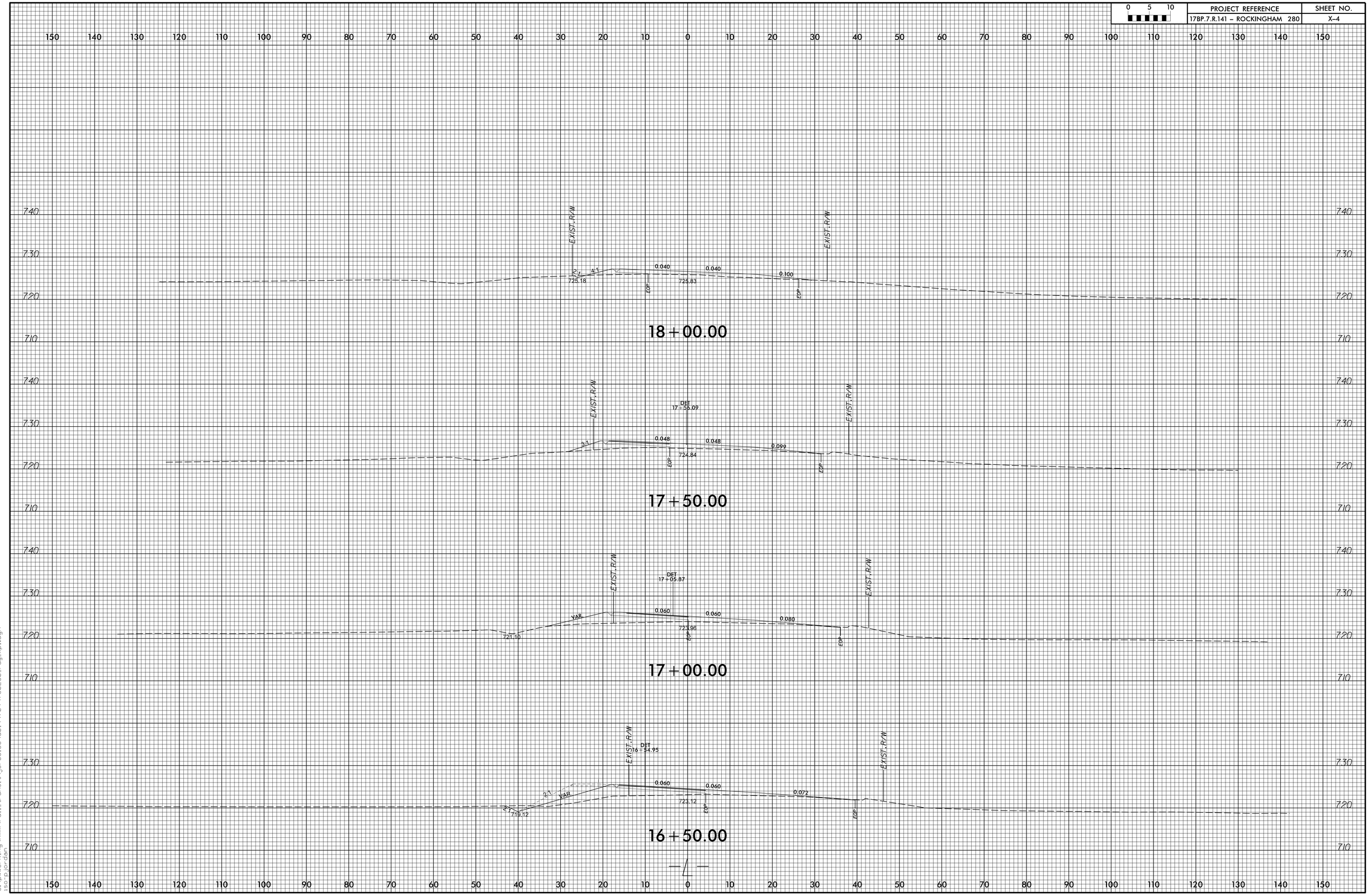
	17BP.7.R.141 – ROCKINGHAM 280	X–4



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isotp_jordan

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	17BP.7.R.141 – ROCKINGHAM 280	X–5

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740
730
720

EXIST. R/W

EXIST.

EXIST.

EXIST

730.15

EOP

EOP

EXIST. R/W

19+50.00

EXIST. R/W

EXIST. R/W

0.030

0.030

0.070

728.51

EOP

EOP

19+00.00

EXIST. R/W

EXIST. R/W

0.040

0.040

0.100

727.04

EOP

EOP

18+50.00

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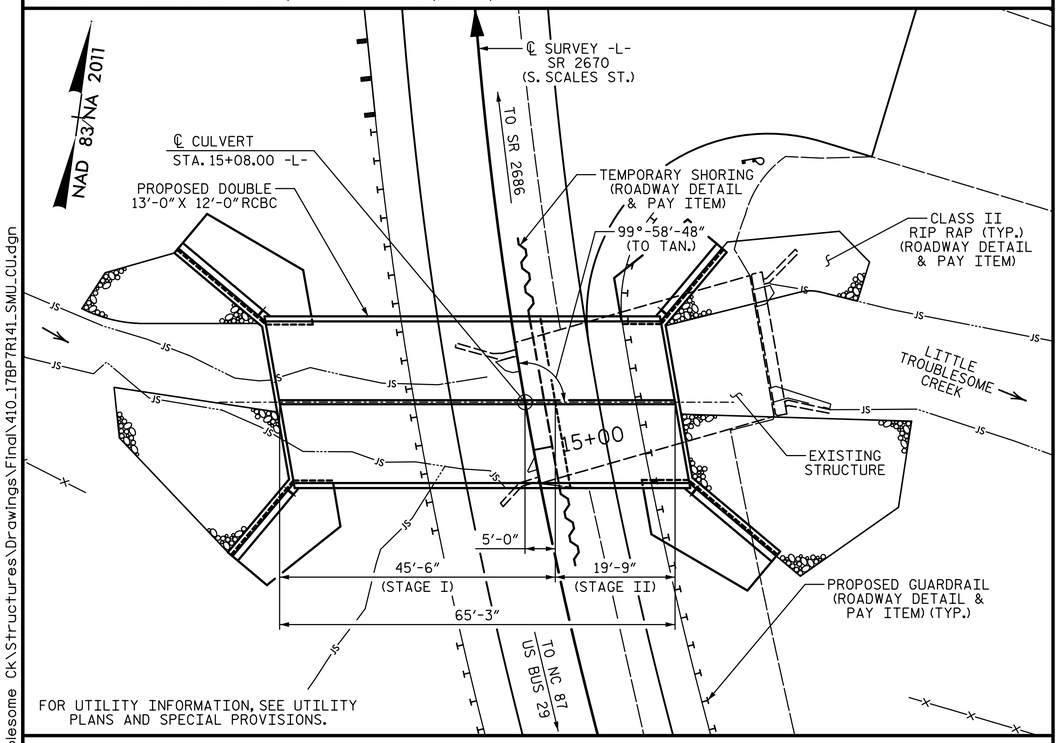
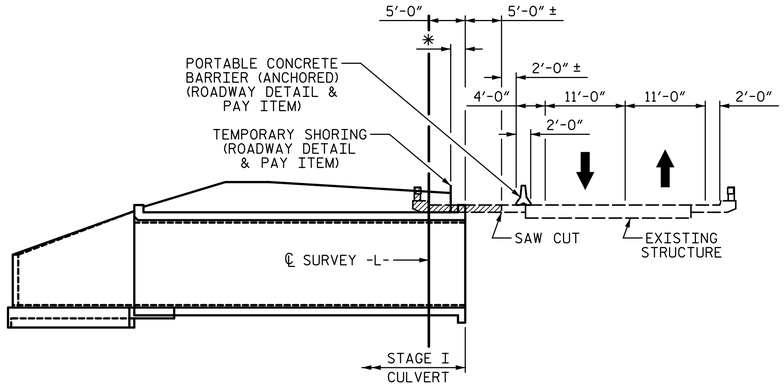


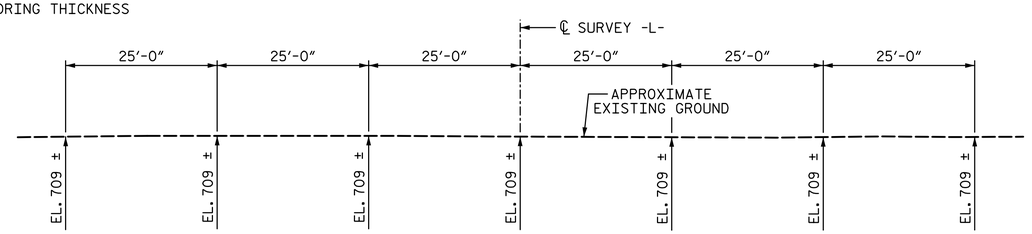
LOCATION SKETCH



STAGING SEQUENCE

FOR PARTIAL REMOVAL OF EXISTING STRUCTURE FOR MAINTENANCE OF TRAFFIC

* 2'-0" INCLUDING SHORING THICKNESS



PROFILE ALONG ℄ CULVERT

HYDRAULIC DATA:

DESIGN DISCHARGE	= 1900 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 720.30
DRAINAGE AREA	= 3.7 SQ. MI.
BASE DISCHARGE (Q 100)	= 2300 CFS
BASE HIGH WATER ELEVATION	= 721.30

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 3670 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEAR
OVERTOPPING FLOOD ELEVATION	= 724.50 **

** OVERTOPPING OCCURS AT ROADWAY SAG AT STA. 15+35.85 -L-

HORIZONTAL CURVE DATA

PI STA. 15+90.51 -L-
Δ = 30°-34'-06.7" (RT.)
D = 8°-23'-19.8"
L = 364.40'
T = 186.65'
R = 683.00'

GRADE DATA:

GRADE POINT EL. @ STA. 15+08.00 -L- = EL. 723.62
BED EL. @ STA. 15+08.00 -L- = EL. 707.70
ROADWAY SLOPE 2:1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
STAGE I	194.5 C.Y.
STAGE II	109.1 C.Y.
TOTAL	303.6 C.Y.
REINFORCING STEEL	
STAGE I	29,477 LBS.
STAGE II	15,505 LBS.
TOTAL	44,982 LBS.
BOX CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	
STAGE I	208 TONS
STAGE II	92 TONS
TOTAL	300 TONS
REMOVAL OF EXISTING STRUCTURE	LUMP SUM
ASBESTOS ASSESSMENT	LUMP SUM

FOUNDATION NOTES:

BACKFILL WITH SELECT MATERIAL CLASS VI OR V MEETING THE REQUIREMENTS OF SECTION 1016 OF THE STANDARD SPECIFICATIONS.

A MINIMUM OF 1 FT. UNDERCUT TO BE REPLACED WITH FOUNDATION CONDITIONING MATERIAL.

NOTES:

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL---------- 2'-6" (MIN.) AND 5'-3" (MAX.)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER IN EACH STAGE:

1. PHASE I OR III WING FOOTING, EDGE BEAM AND FLOOR SLAB AND 4" OF INTERIOR AND EXTERIOR VERTICAL WALLS. FOLLOWED BY REMAINING PORTION OF WALLS AND WING FULL HEIGHT.
2. PHASE II OR IV WING FOOTING, EDGE BEAM AND FLOOR SLAB AND 4" OF EXTERIOR VERTICAL WALL. FOLLOWED BY REMAINING PORTION OF WALL AND WING FULL HEIGHT.
3. ROOF SLAB, EDGE BEAM, AND HEADWALL.

THE ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

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 EXISTING STRUCTURE, WHICH SERVES AS A TEMPORARY STRUCTURE, CONSISTS OF 1 SPAN @ 23'-0" WITH A CLEAR ROADWAY WIDTH OF 40'-0". THE SUPERSTRUCTURE CONSISTS OF REINFORCED CONCRETE SLAB. THE SUBSTRUCTURE CONSISTS OF MASS CONCRETE ABUTMENTS. THE EXISTING STRUCTURE, WHICH IS LOCATED DOWNSTREAM OF THE PROPOSED STRUCTURE, SHALL BE REMOVED IN STAGES. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED CULVERT, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

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.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

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

CULVERT MUST BE CAST-IN-PLACE, PRECAST OPTION WILL NOT BE ALLOWED.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 1 OF 12 REPLACES BRIDGE #780280

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 13 FT. X 12 FT. CONCETE BOX CULVERT

100° SKEW

DRAWN BY: T. BANKOVICH DATE: 3-22
CHECKED BY: B.S. COX DATE: 3-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 3-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 19831 ENGINEER DAVID B. SIMPSON, JR.
3/28/2024 | 9:00 AM EDT

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1			3			TOTAL SHEETS
2			4			12

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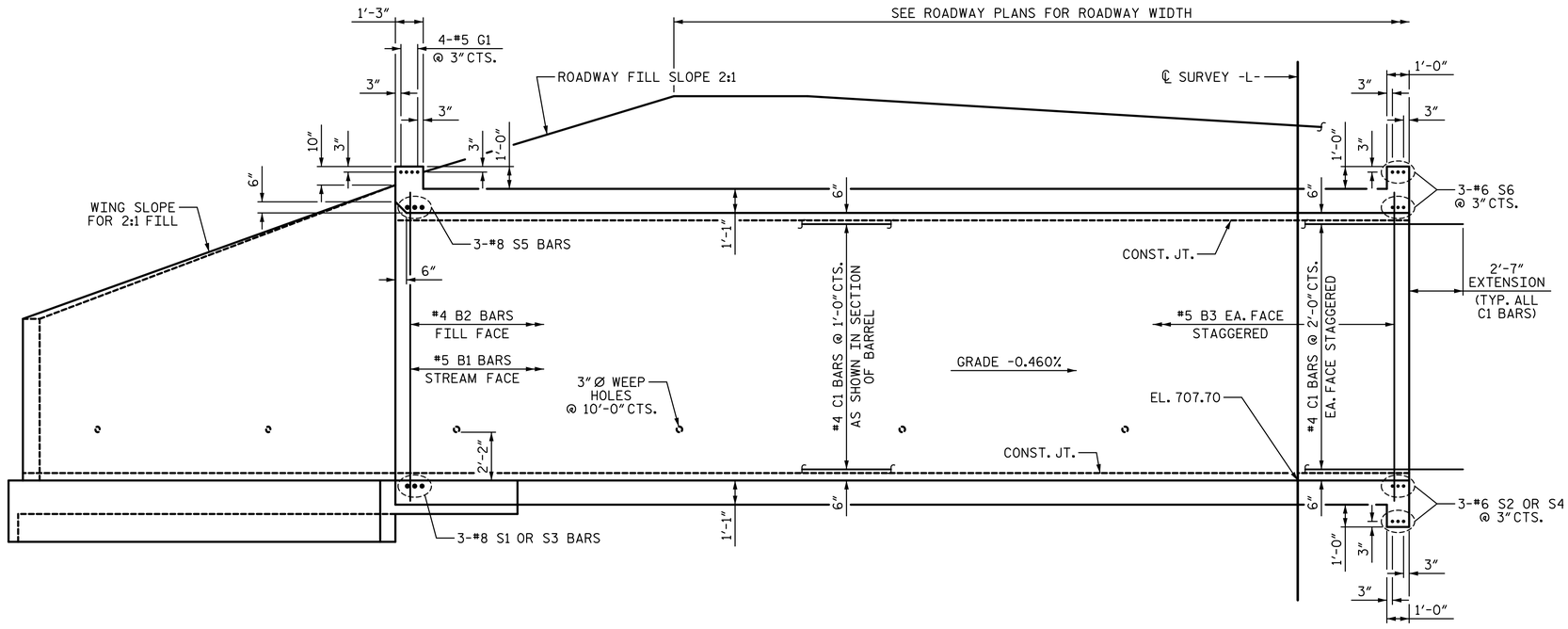
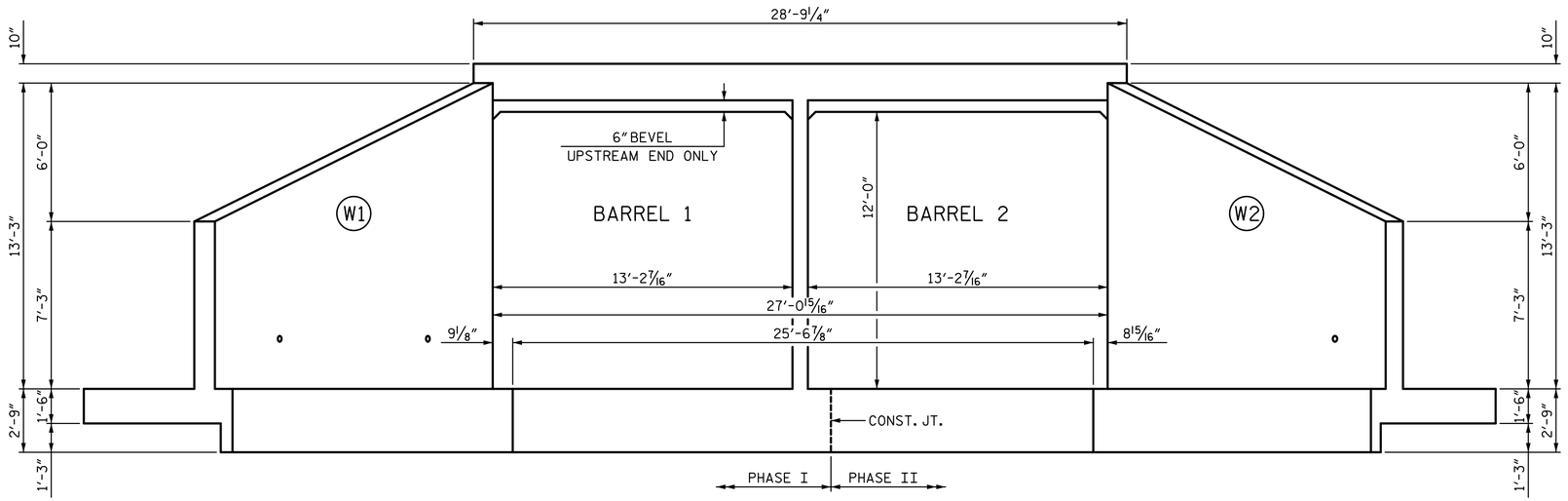


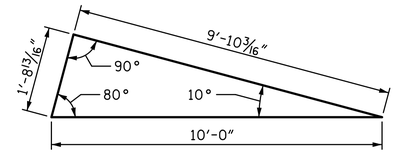
CULVERT SECTION NORMAL TO ROADWAY

(CONCRETE SILLS NOT SHOWN)



END ELEVATION

LOOKING DOWNSTREAM, NORMAL TO SKEW



SKEW TRIANGLE

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 2 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE I
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE I AND II
100° SKEW

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

DRAWN BY: T. BANKOVICH DATE: 3-22
CHECKED BY: B.S. COX DATE: 3-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 3-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 19831 ENGINEER DAVID B. SIMPSON, JR.
3/28/2024 | 9:00 AM PDT

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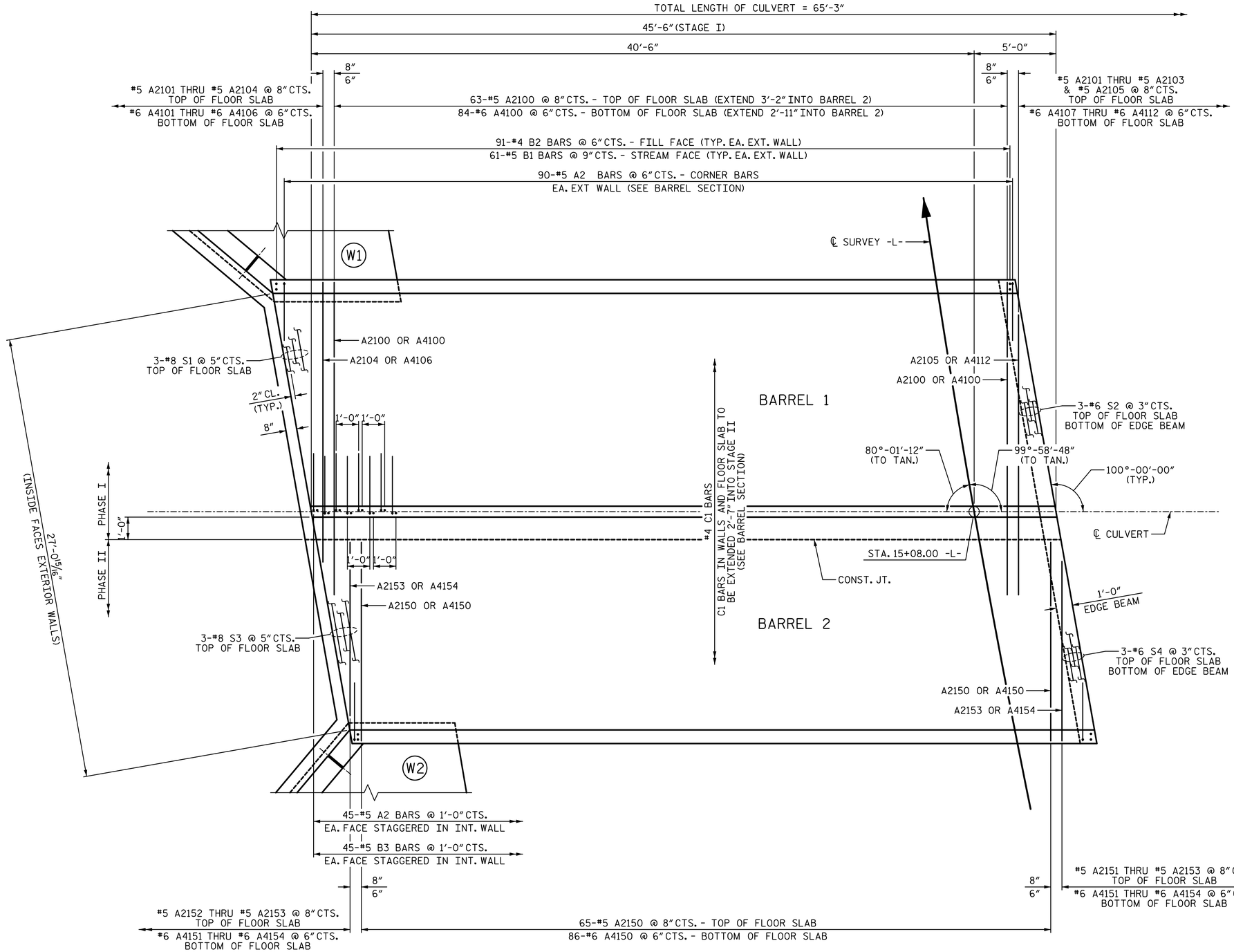

PLAN OF FLOOR SLAB

C1 BARS IN WALLS AND FLOOR SLAB TO
BE EXTENDED 2'-7" INTO STAGE II

C1 BARS ARE 2 BAR RUNS

DRAWN BY: T. BANKOVICH DATE: 3-22
CHECKED BY: B.S. COX DATE: 3-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 3-22

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PROJECT NO. 17BP.7.R.141
ROCKINGHAM COUNTY
STATION: 15+08.00 -L-

SHEET 3 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE I
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE I AND II
100° SKEW

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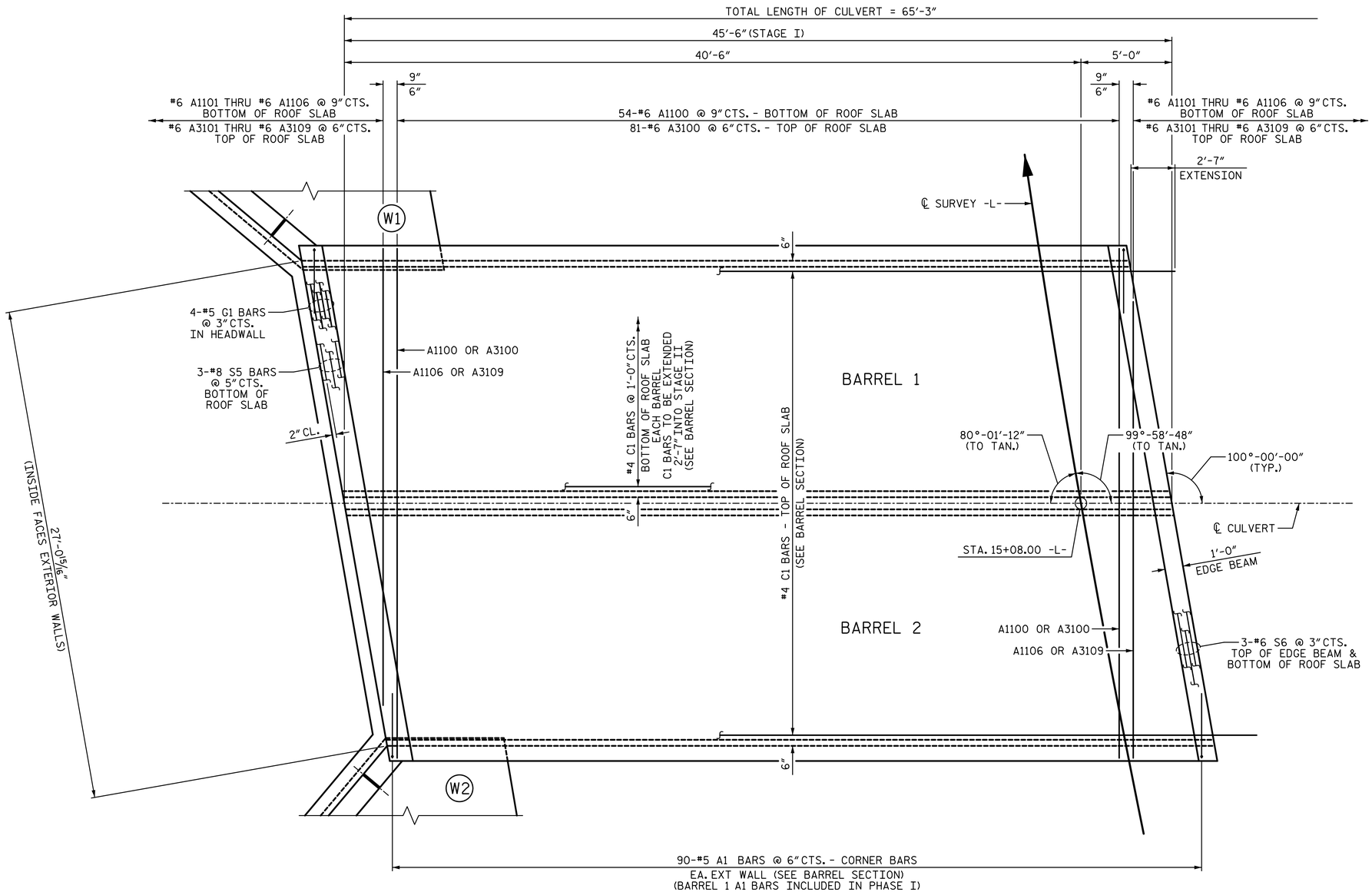

PLAN OF ROOF SLAB

C1 BARS TO BE EXTENDED 2'-7" INTO STAGE II

C1 BARS ARE 2 BAR RUNS

PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 4 OF 12

DRAWN BY: T. BANKOVICH	DATE: 3-22
CHECKED BY: B.S. COX	DATE: 3-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON	DATE: 3-22

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5640 Dillard Drive, Suite 200
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE I
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE I AND II
100° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
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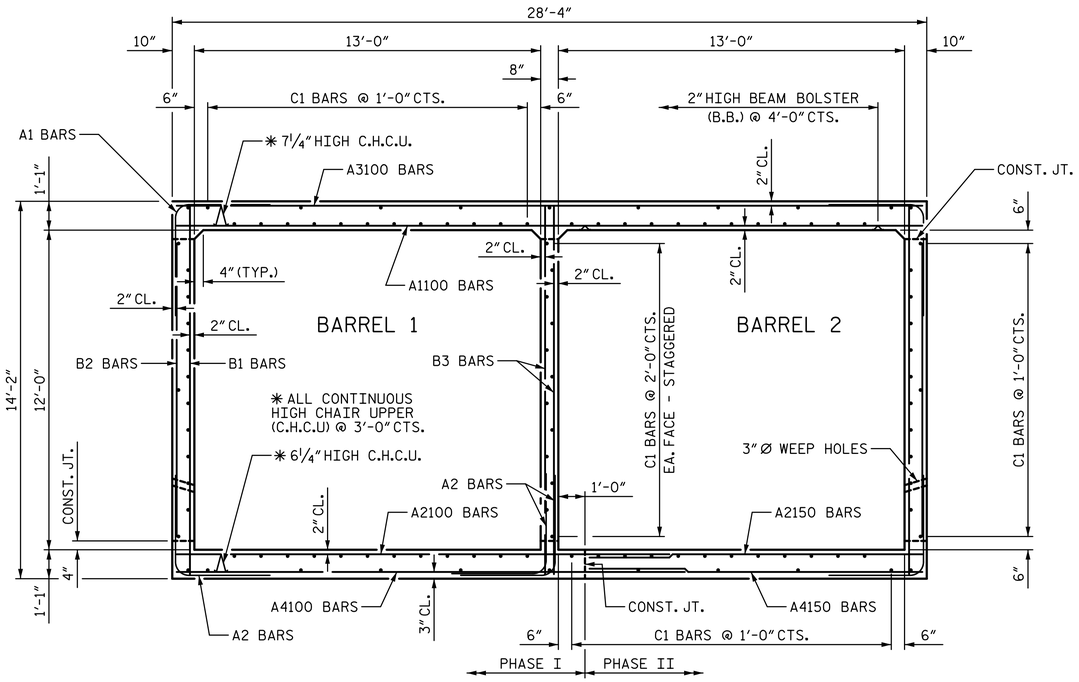
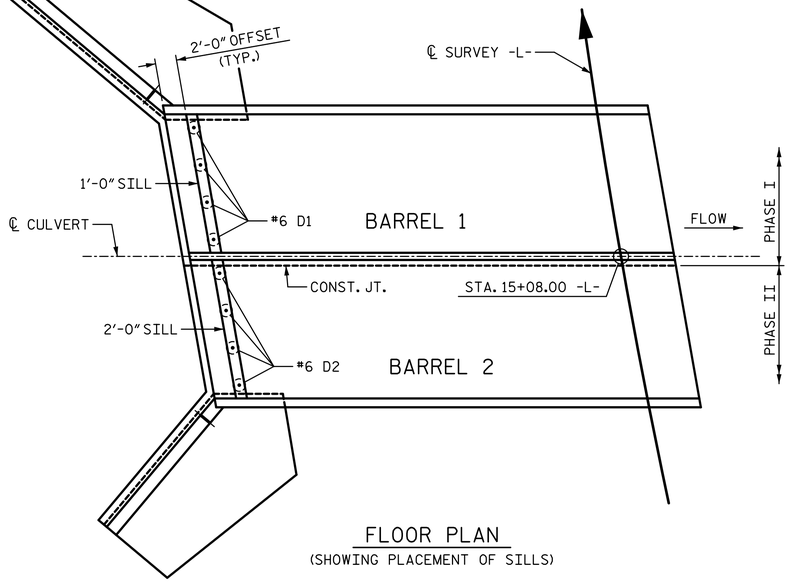


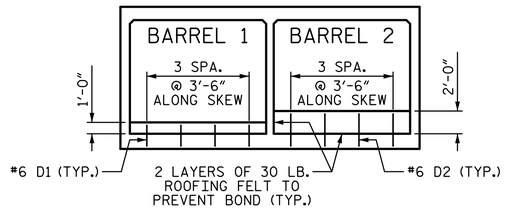
RIGHT ANGLE SECTION OF BARREL

(THERE ARE 108 "C" BARS IN SECTION OF BARREL)
(C1 BARS ARE 2 BAR RUNS)
LOOKING DOWNSTREAM

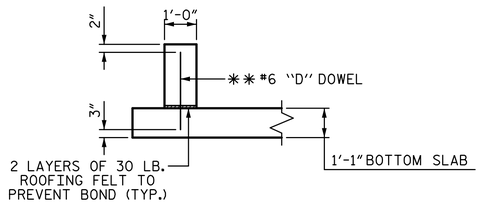


FLOOR PLAN

(SHOWING PLACEMENT OF SILLS)



ELEVATION - LOOKING DOWNSTREAM

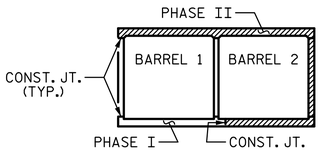


SECTION THROUGH SILL

✳✳ DOWELS MAY BE PUSHED INTO GREEN
CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

CULVERT SILL DETAILS

BACKFILL WITH NATIVE MATERIAL TO SILL HEIGHT. NATIVE MATERIAL CONSIST OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING THE CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

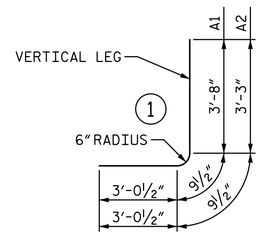


PHASE I CONSTRUCTION PHASE II CONSTRUCTION

CONSTRUCTION PHASING

LOOKING DOWNSTREAM

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SPLICE CHART

#5 B1 SPLICE LENGTH = 2′-4″
#5 B3 SPLICE LENGTH = 2′-4″
#4 C1 SPLICE LENGTH = 2′-5″
#5 A2100 SPLICE LENGTH = 3′-0″
#6 A4100 SPLICE LENGTH = 2′-9″

BILL OF MATERIAL - STAGE I

PHASE I						PHASE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	90	#5	1	7′-6″	704	A1	90	#5	1	7′-6″	704
A2	180	#5	1	7′-1″	1330	A2	90	#5	1	7′-1″	665
A2100	63	#5	STR	18′-6″	1216	A1100	54	#6	STR	28′-0″	2271
A2101	2	#5	STR	4′-11″	10	A1101	2	#6	STR	3′-10″	12
A2102	2	#5	STR	8′-9″	18	A1102	2	#6	STR	8′-1″	24
A2103	2	#5	STR	12′-6″	26	A1103	2	#6	STR	12′-4″	37
A2104	1	#5	STR	16′-1″	17	A1104	2	#6	STR	16′-7″	50
A2105	1	#5	STR	16′-3″	17	A1105	2	#6	STR	20′-10″	63
						A1106	2	#6	STR	25′-1″	75
A4100	84	#6	STR	18′-3″	2303						
A4101	1	#6	STR	2′-10″	4	A2150	65	#5	STR	12′-6″	847
A4102	1	#6	STR	5′-8″	9	A2151	1	#5	STR	1′-11″	2
A4103	1	#6	STR	8′-6″	13	A2152	2	#5	STR	5′-9″	12
A4104	1	#6	STR	11′-4″	17	A2153	2	#5	STR	9′-6″	20
A4105	1	#6	STR	14′-2″	21						
A4106	1	#6	STR	17′-0″	26	A3100	81	#6	STR	28′-0″	3407
A4107	1	#6	STR	2′-1″	3	A3101	2	#6	STR	3′-1″	9
A4108	1	#6	STR	4′-11″	7	A3102	2	#6	STR	5′-11″	18
A4109	1	#6	STR	7′-9″	12	A3103	2	#6	STR	8′-9″	26
A4110	1	#6	STR	10′-7″	16	A3104	2	#6	STR	11′-7″	35
A4111	1	#6	STR	13′-5″	20	A3105	2	#6	STR	14′-5″	43
A4112	1	#6	STR	16′-3″	24	A3106	2	#6	STR	17′-3″	52
						A3107	2	#6	STR	20′-1″	60
B1	61	#5	STR	13′-9″	875	A3108	2	#6	STR	22′-11″	69
B2	91	#4	STR	11′-4″	689	A3109	2	#6	STR	25′-9″	77
B3	90	#5	STR	13′-9″	1291						
						A4150	86	#6	STR	12′-6″	1615
C1	88	#4	STR	25′-2″	1479	A4151	2	#6	STR	2′-5″	7
						A4152	2	#6	STR	5′-3″	16
D1	4	#6	STR	1′-8″	10	A4153	2	#6	STR	8′-1″	24
						A4154	2	#6	STR	10′-11″	33
S1	3	#8	STR	19′-6″	156						
S2	6	#6	STR	18′-6″	167	B1	61	#5	STR	13′-9″	875
						B2	91	#4	STR	11′-4″	689
TOTAL REINFORCING STEEL					10480 LB						
						C1	128	#4	STR	25′-2″	2152
CLASS A CONCRETE BREAKDOWN											
BARREL & EDGE BEAM					58.4 CY	D2	4	#6	STR	2′-8″	16
SILL					0.5 CY						
						G1	4	#5	STR	28′-5″	119
						S3	3	#8	STR	12′-8″	101
						S4	6	#6	STR	12′-8″	114
						S5	3	#8	STR	28′-5″	228
						S6	6	#6	STR	28′-5″	256
						TOTAL REINFORCING STEEL					14823 LB
						CLASS A CONCRETE BREAKDOWN					
						BARREL & EDGE BEAMS					94.8 CY
						SILL					1.0 CY

STRUCTURE BARREL QUANTITIES (STAGE I)

CLASS A CONCRETE	
PHASE I	58.9 C.Y.
PHASE II	95.8 C.Y.
TOTAL	154.7 C.Y.
REINFORCING STEEL	
PHASE I	10,480 LBS.
PHASE II	14,823 LBS.
TOTAL	25,303 LBS.

PROJECT NO. 17BP.7.R.141
ROCKINGHAM COUNTY
STATION: 15+08.00 -L-

SHEET 5 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE I
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE I AND II
100° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			12

DRAWN BY: T. BANKOVICH DATE: 3-22
CHECKED BY: B.S. COX DATE: 3-22
DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 3-22

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 19831 ENGINEER DAVID B. SIMPSON, JR.
3/28/2024 | 9:00 AM PDT

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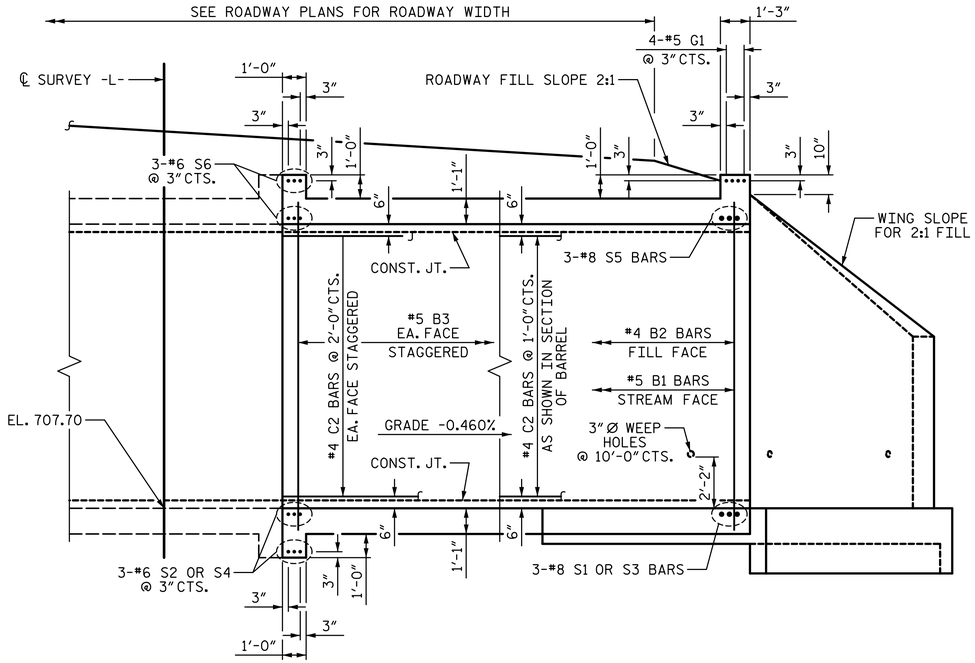
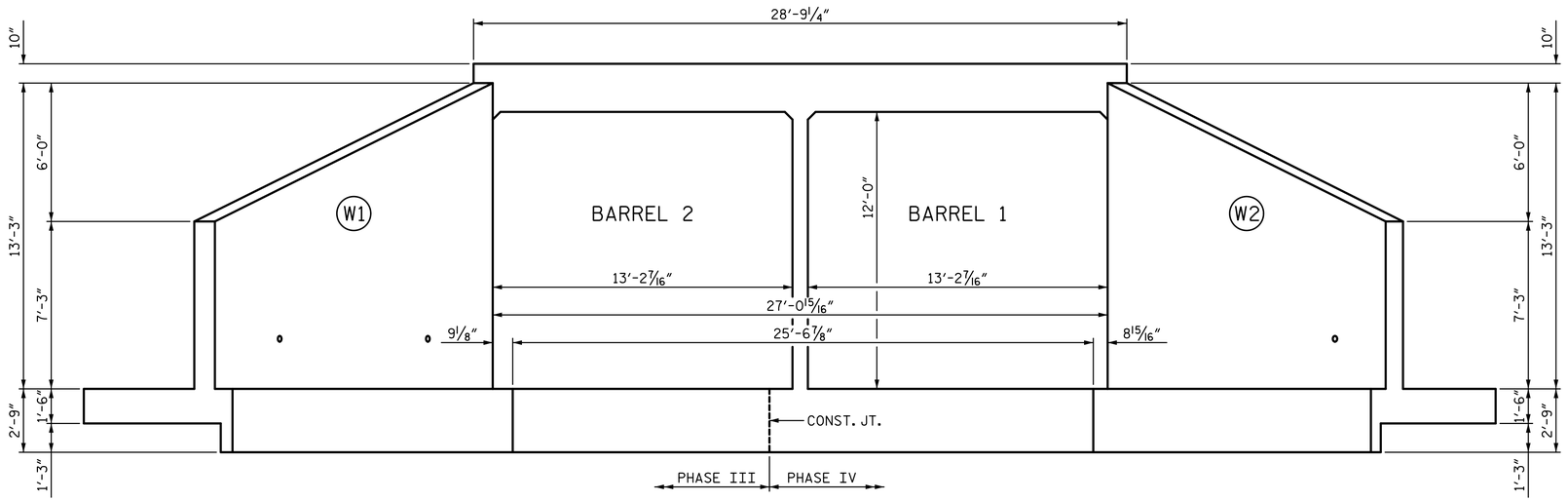


INTERIOR WALL EXTERIOR WALL

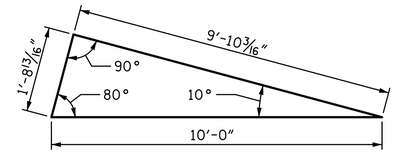
CULVERT SECTION NORMAL TO ROADWAY

(CONCRETE SILLS NOT SHOWN)



END ELEVATION

LOOKING UPSTREAM, NORMAL TO SKEW



SKEW TRIANGLE

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 6 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE II
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE III AND IV
100° SKEW

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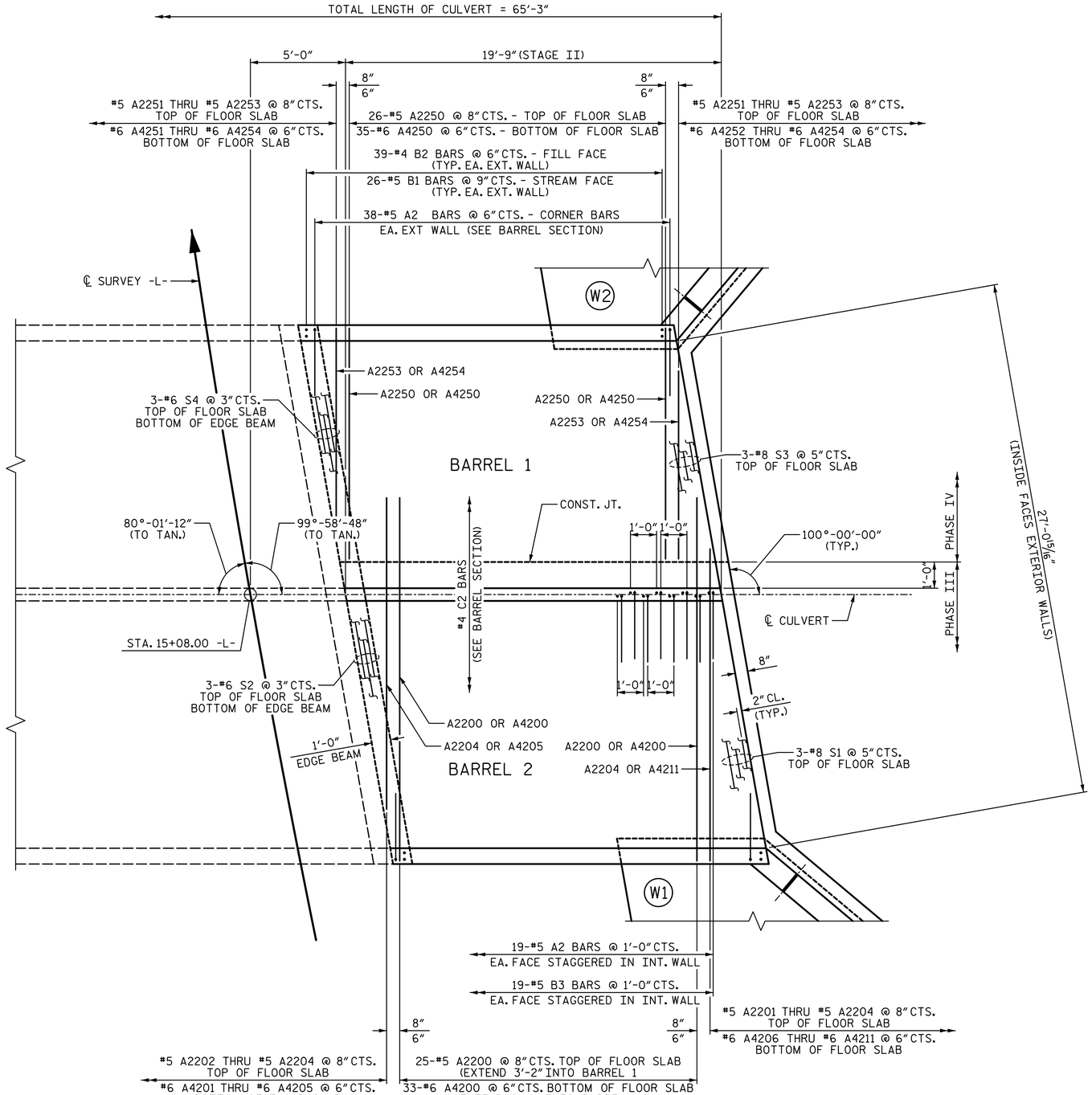

PLAN OF FLOOR SLAB

PROJECT NO. 17BP.7.R.141
ROCKINGHAM COUNTY
STATION: 15+08.00 -L-

SHEET 7 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE II
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE III AND IV
100° SKEW

REVISIONS						SHEET NO.
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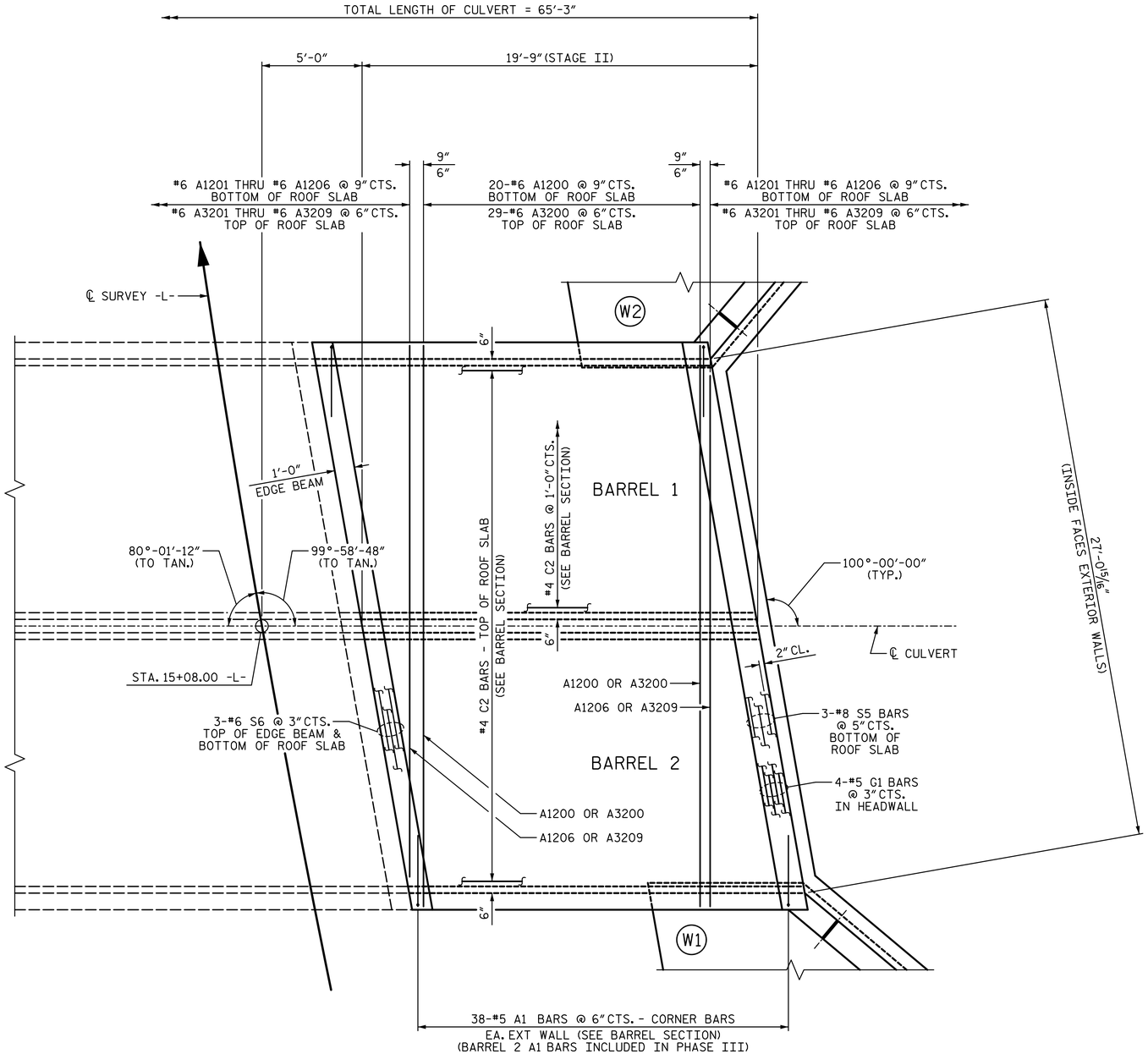

PLAN OF ROOF SLAB

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PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 8 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE II
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE III AND IV
100° SKEW

REVISIONS						SHEET NO.
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2			4			12

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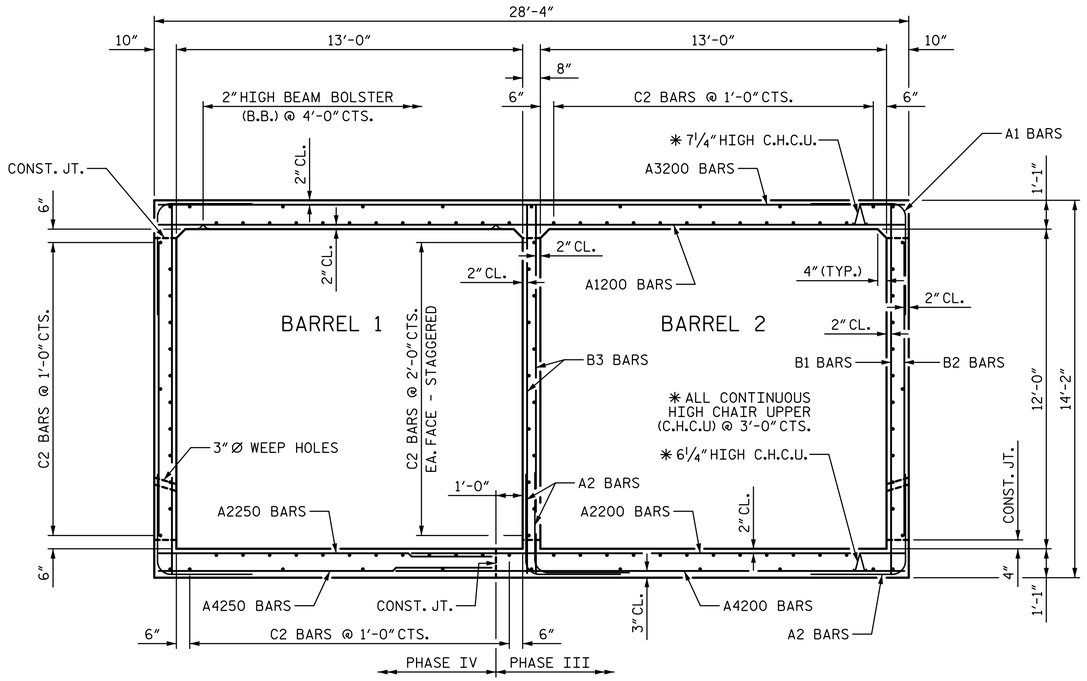
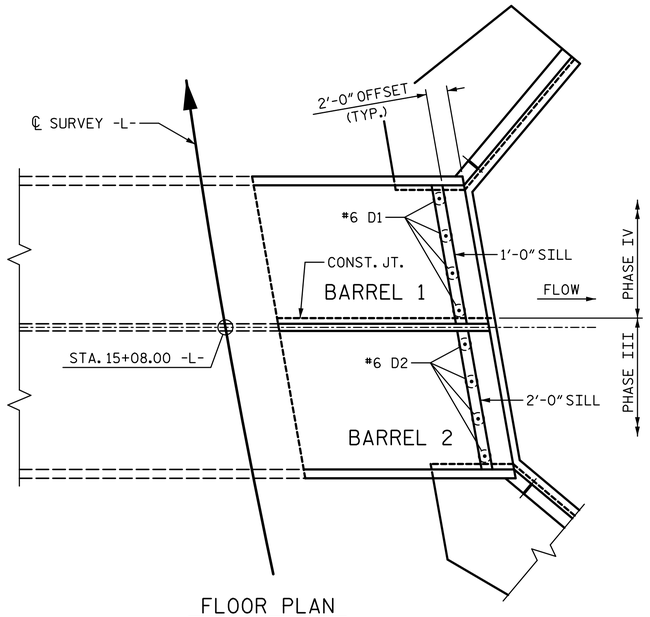


RIGHT ANGLE SECTION OF BARREL

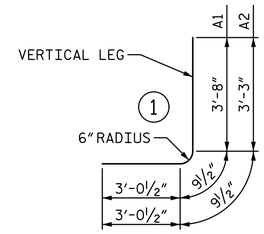
(THERE ARE 108 "C" BARS IN SECTION OF BARREL)
LOOKING DOWNSTREAM



FLOOR PLAN

(SHOWING PLACEMENT OF SILLS)

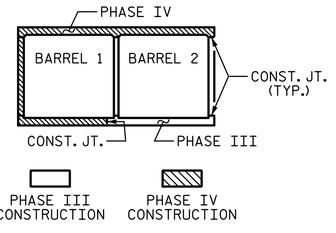
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SPLICE CHART

#5 B1 SPLICE LENGTH = 2'-4"
#5 B3 SPLICE LENGTH = 2'-4"
#4 C2 SPLICE LENGTH = 2'-5"
#5 A2200 SPLICE LENGTH = 3'-0"
#6 A4200 SPLICE LENGTH = 2'-9"



CONSTRUCTION PHASING

LOOKING DOWNSTREAM

BILL OF MATERIAL - STAGE II

PHASE III

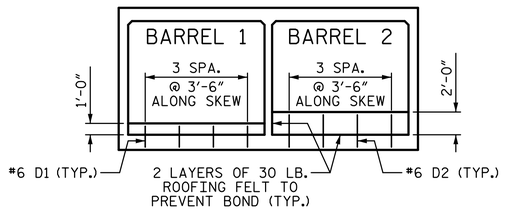
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	38	#5	1	7'-6"	297
A2	76	#5	1	7'-1"	561
A2200	25	#5	STR	18'-6"	482
A2201	1	#5	STR	3'-9"	4
A2202	2	#5	STR	7'-6"	16
A2203	2	#5	STR	11'-4"	24
A2204	2	#5	STR	15'-1"	31
A4200	33	#6	STR	18'-3"	905
A4201	1	#6	STR	4'-2"	6
A4202	1	#6	STR	7'-0"	11
A4203	1	#6	STR	9'-10"	15
A4204	1	#6	STR	12'-8"	19
A4205	1	#6	STR	15'-6"	23
A4206	1	#6	STR	2'-2"	3
A4207	1	#6	STR	5'-0"	8
A4208	1	#6	STR	7'-10"	12
A4209	1	#6	STR	10'-8"	16
A4210	1	#6	STR	13'-6"	20
A4211	1	#6	STR	16'-4"	25
B1	26	#5	STR	13'-9"	373
B2	39	#4	STR	11'-4"	295
B3	38	#5	STR	13'-9"	545
C2	44	#4	STR	19'-5"	571
D2	4	#6	STR	2'-8"	16
S1	3	#8	STR	19'-6"	156
S2	6	#6	STR	18'-6"	167
TOTAL REINFORCING STEEL					4601 LB
CLASS A CONCRETE BREAKDOWN					
BARREL & EDGE BEAM					25.7 CY
SILL					1.0 CY

PHASE IV

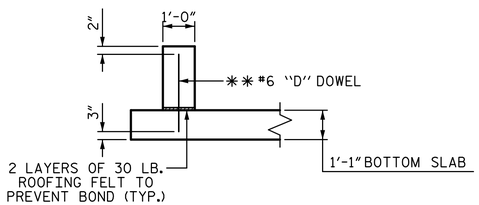
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	38	#5	1	7'-6"	297
A2	38	#5	1	7'-1"	281
A1200	20	#6	STR	28'-0"	841
A1201	2	#6	STR	3'-1"	9
A1202	2	#6	STR	7'-4"	22
A1203	2	#6	STR	11'-7"	35
A1204	2	#6	STR	15'-10"	48
A1205	2	#6	STR	20'-1"	60
A1206	2	#6	STR	24'-4"	73
A2250	26	#5	STR	12'-6"	339
A2251	2	#5	STR	2'-8"	6
A2252	2	#5	STR	6'-5"	13
A2253	2	#5	STR	10'-3"	21
A3200	29	#6	STR	28'-0"	1220
A3201	2	#6	STR	3'-10"	12
A3202	2	#6	STR	6'-8"	20
A3203	2	#6	STR	9'-6"	29
A3204	2	#6	STR	12'-4"	37
A3205	2	#6	STR	15'-2"	46
A3206	2	#6	STR	18'-0"	54
A3207	2	#6	STR	20'-10"	63
A3208	2	#6	STR	23'-8"	71
A3209	2	#6	STR	26'-6"	80
A4250	35	#6	STR	12'-6"	657
A4251	1	#6	STR	1'-9"	3
A4252	2	#6	STR	4'-7"	14
A4253	2	#6	STR	7'-5"	22
A4254	2	#6	STR	10'-3"	31
B1	26	#5	STR	13'-9"	373
B2	39	#4	STR	11'-4"	295
C2	64	#4	STR	19'-5"	830
D1	4	#6	STR	1'-8"	10
G1	4	#5	STR	28'-5"	119
S3	3	#8	STR	12'-8"	101
S4	6	#6	STR	12'-8"	114
S5	3	#8	STR	28'-5"	228
S6	6	#6	STR	28'-5"	256
TOTAL REINFORCING STEEL					6730 LB
CLASS A CONCRETE BREAKDOWN					
BARREL & EDGE BEAMS					42.1 CY
SILL					0.5 CY

STRUCTURE BARREL QUANTITIES (STAGE II)

CLASS A CONCRETE	
PHASE III	26.7 C.Y.
PHASE IV	42.6 C.Y.
TOTAL	69.3 C.Y.
REINFORCING STEEL	
PHASE III	4,601 LBS.
PHASE IV	6,730 LBS.
TOTAL	11,331 LBS.



ELEVATION - LOOKING DOWNSTREAM



SECTION THROUGH SILL

✳✳ DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

CULVERT SILL DETAILS

BACKFILL WITH NATIVE MATERIAL TO SILL HEIGHT. NATIVE MATERIAL CONSIST OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING THE CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

PROJECT NO. 17BP.7.R.141
ROCKINGHAM COUNTY
STATION: 15+08.00 -L-

SHEET 9 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGE II
DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT PHASE III AND IV
100° SKEW

REVISIONS						SHEET NO.
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2			4			12

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DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 3-22

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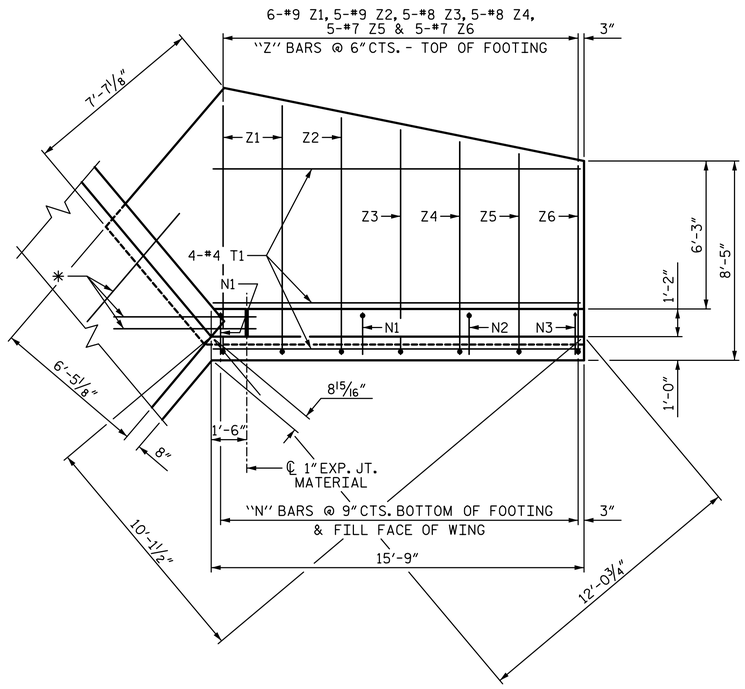
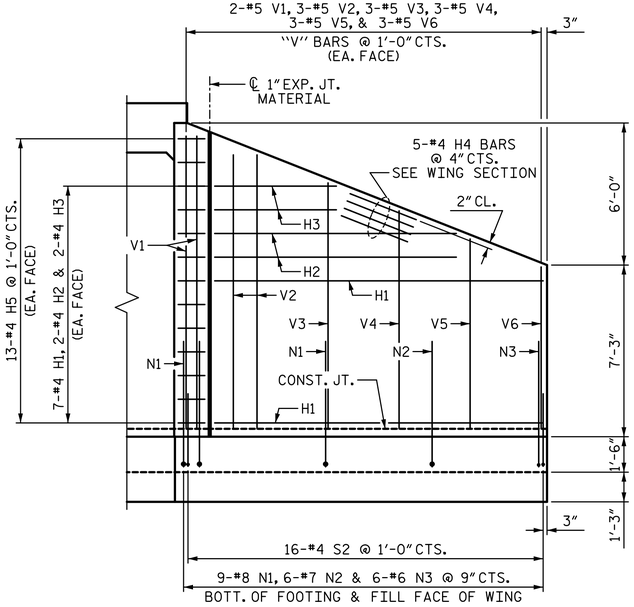
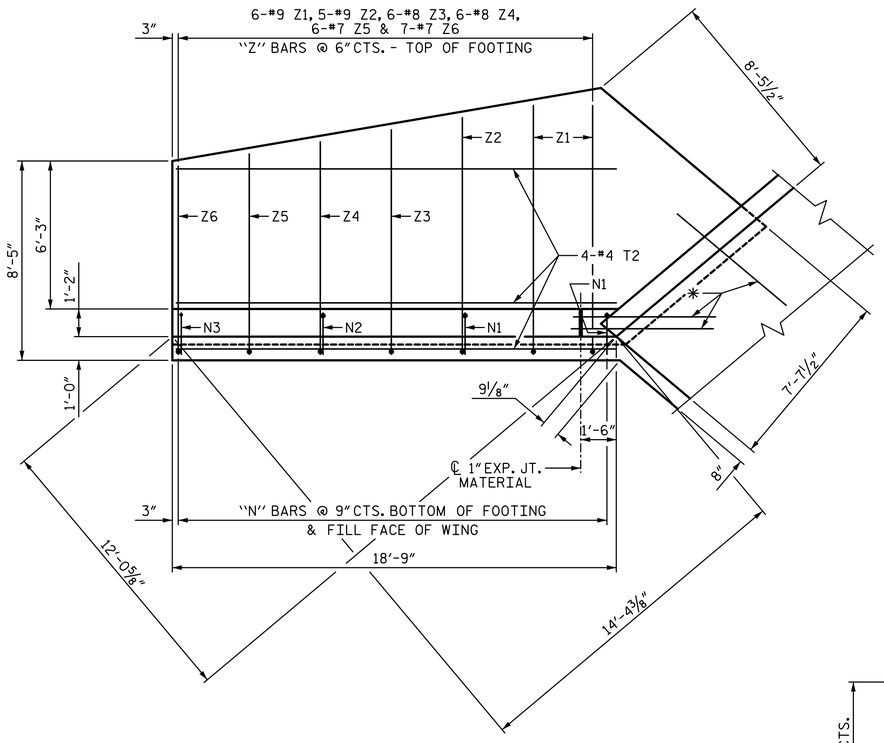


PLAN - W2

✱ 3-#6 S1 BOTTOM OF FLOOR SLAB & FOOTING

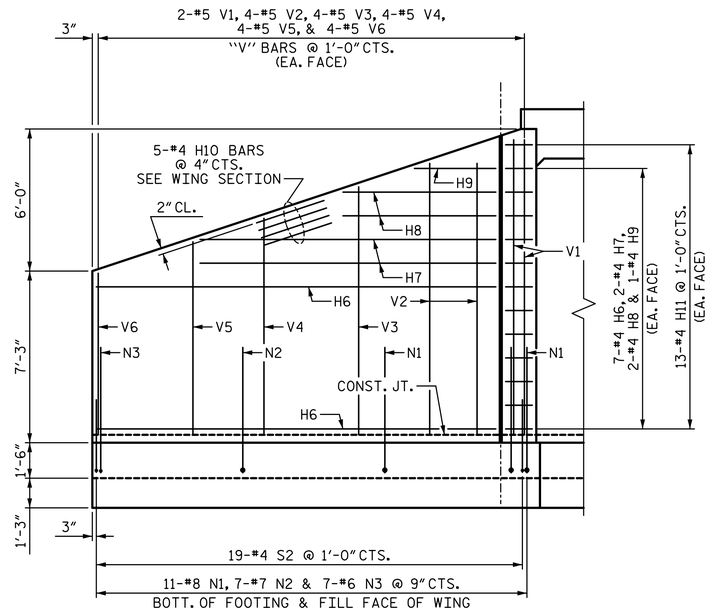


ELEVATION - W2



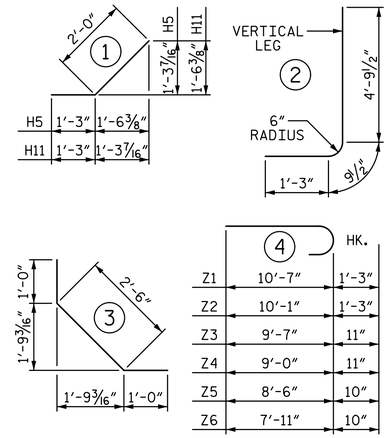
PLAN - W1

✱ 3-#6 S1 BOTTOM OF FLOOR SLAB & FOOTING



ELEVATION - W1

BAR TYPES



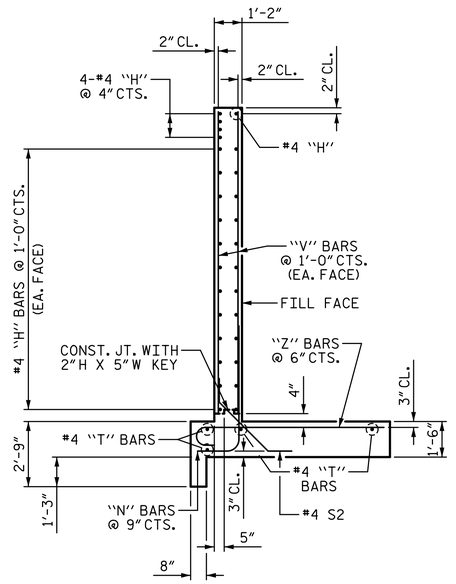
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	14	#4	STR	13'-10"	129
H2	4	#4	STR	10'-3"	27
H3	4	#4	STR	5'-1"	14
H4	5	#4	STR	14'-6"	48
H5	26	#4	1	3'-3"	56
H6	14	#4	STR	16'-10"	157
H7	2	#4	STR	12'-8"	17
H8	2	#4	STR	6'-5"	9
H9	2	#4	STR	3'-5"	5
H10	5	#4	STR	17'-5"	58
H11	26	#4	1	3'-3"	56
N1	20	#8	2	6'-10"	365
N2	13	#7	2	6'-10"	182
N3	13	#6	2	6'-10"	133
S1	6	#6	STR	6'-0"	54
S2	35	#4	3	4'-6"	105
T1	4	#4	STR	15'-6"	41
T2	4	#4	STR	18'-7"	50
V1	8	#5	STR	12'-9"	106
V2	14	#5	STR	11'-6"	168
V3	14	#5	STR	10'-4"	151
V4	14	#5	STR	9'-2"	134
V5	14	#5	STR	8'-0"	117
V6	14	#5	STR	6'-10"	100
Z1	12	#9	4	11'-10"	483
Z2	10	#9	4	11'-4"	385
Z3	11	#8	4	10'-6"	308
Z4	11	#8	4	9'-11"	291
Z5	11	#7	4	9'-4"	210
Z6	12	#7	4	8'-9"	215

REINFORCING STEEL FOR 2 WINGS ✱✱	4174 LB
CLASS A CONCRETE ✱✱	
WING W1	20.1 CY
WING W2	17.6 CY
1 HEADWALL	1.3 CY
CURTAIN WALL	
PHASE I OR PHASE III	0.4 CY
PHASE II OR IV	0.4 CY
TOTAL ✱✱	39.8 CY

✱✱ QUANTITIES GIVEN FOR ONE STAGE, TWO STAGES REQUIRED.



TYPICAL WING SECTION

PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 10 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 13 FT. X 12 FT. CONCRETE BOX CULVERT

100° SKEW

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 19831 ENGINEER DAVID B. SIMPSON
3/28/2024 | 9:00 AM PDT

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DRAWN BY: T. BANKOVICH DATE: 3-22
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DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 3-22

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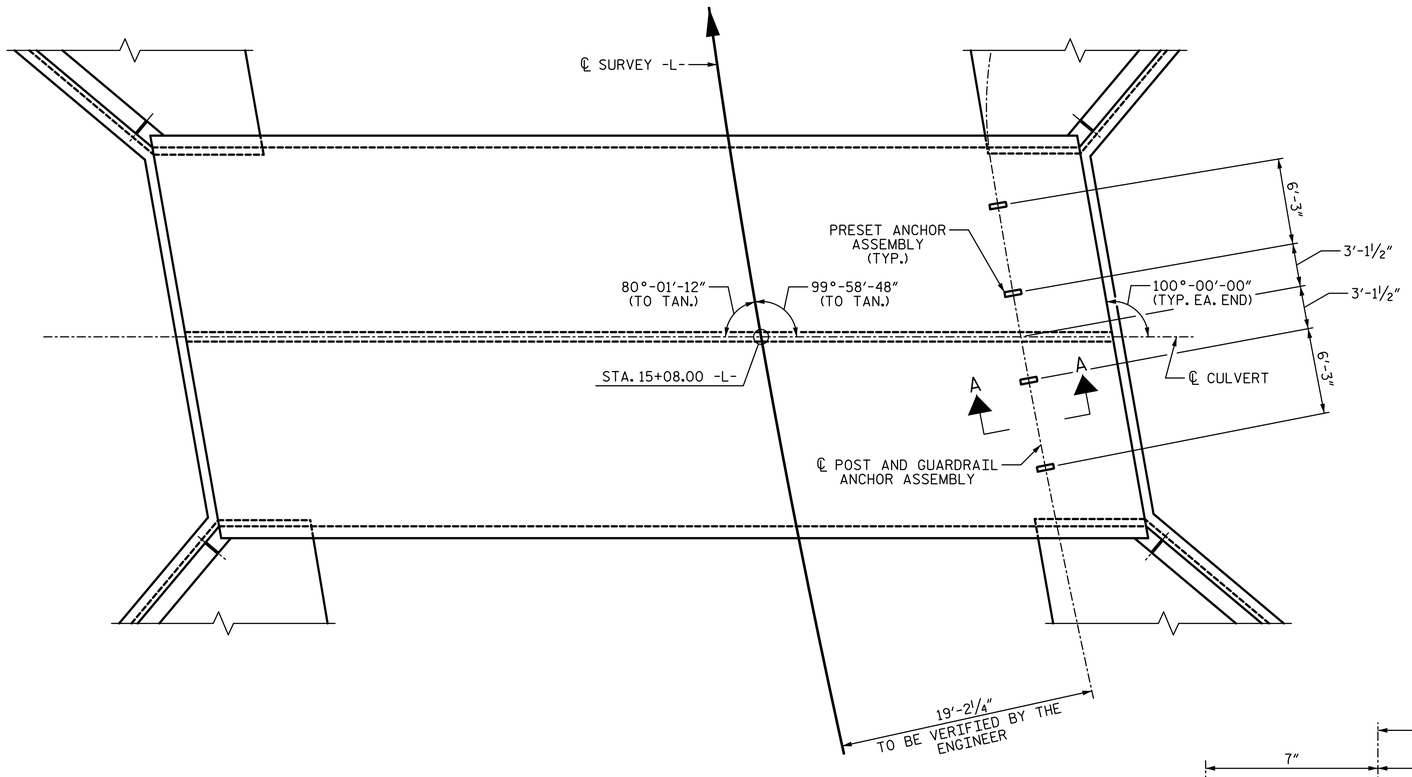


PLAN

(SHOWING GUARDRAIL ANCHOR ASSEMBLY SPACING)

NOTES:

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1" Ø X 2 ¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2¼" GALVANIZED BOLTS 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.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

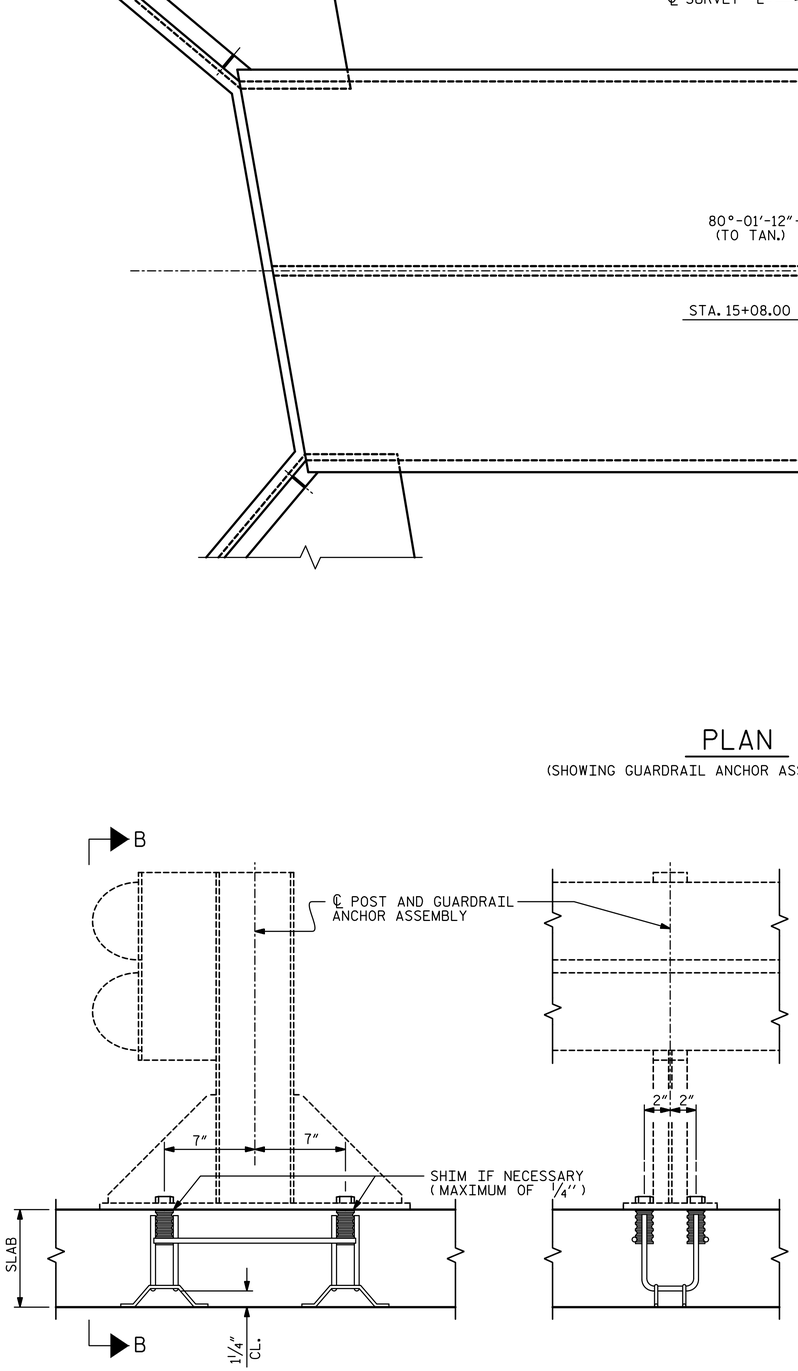
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

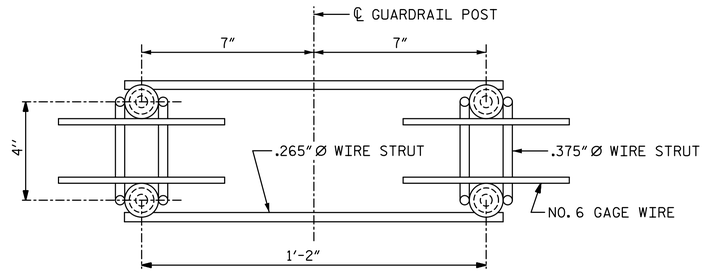
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1"Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

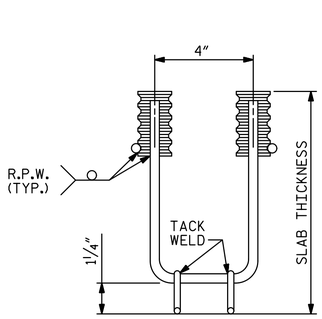


SECTION A-A

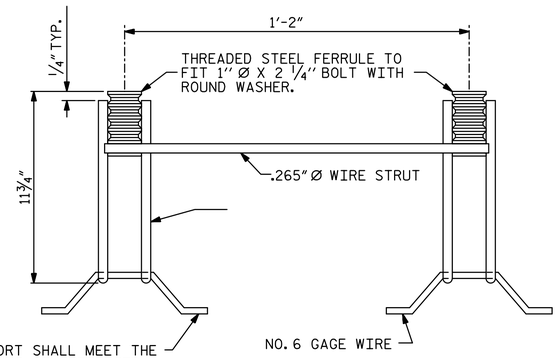
SECTION B-B



PLAN



ELEVATION



SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 11 OF 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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CHECKED BY: B.S. COX DATE: 3-22
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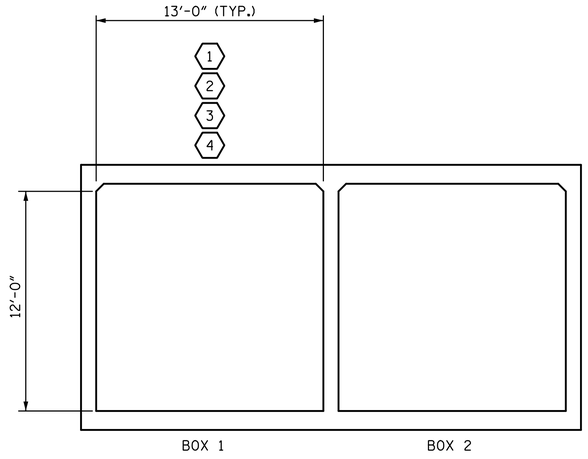
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.08	- -	1.75	1.08	1	ROOF SLAB - MID	6.5	1.29	1	ROOF SLAB - RT END		
		HL-93 (OPERATING)	N/A		1.40	- -	1.35	1.40	1	ROOF SLAB - MID	6.5	1.67	1	ROOF SLAB - RT END		
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.12	40.3	1.75	1.12	1	ROOF SLAB - MID	6.5	1.34	1	ROOF SLAB - RT END		
		HS-20 (OPERATING)	36.000		1.45	52.3	1.35	1.45	1	ROOF SLAB - MID	6.5	1.74	1	ROOF SLAB - RT END		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.12	28.6	1.40	2.49	1	ROOF SLAB - MID	6.5	2.12	1	EXT WALL - BOTTOM		
		SNGARBS2	20.000		2.11	42.2	1.40	2.33	1	ROOF SLAB - MID	6.5	2.11	1	EXT WALL - BOTTOM		
		SNAGRIS2	22.000		2.12	46.6	1.40	2.49	1	ROOF SLAB - MID	6.5	2.12	1	EXT WALL - BOTTOM		
		SNCOTTS3	27.250	⟨3⟩	1.40	38.2	1.40	1.40	1	ROOF SLAB - MID	6.5	1.68	1	ROOF SLAB - RT END		
		SNAGGRS4	34.925		1.64	57.3	1.40	1.64	1	ROOF SLAB - MID	6.5	1.93	1	ROOF SLAB - RT END		
		SNS5A	35.550		1.56	55.5	1.40	1.56	1	ROOF SLAB - MID	6.5	1.83	1	ROOF SLAB - RT END		
		SNS6A	39.950		1.56	62.3	1.40	1.56	1	ROOF SLAB - MID	6.5	1.81	1	ROOF SLAB - RT END		
		SNS7B	42.000		1.60	67.2	1.40	1.60	1	ROOF SLAB - MID	6.5	1.81	1	ROOF SLAB - RT END		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.08	68.6	1.40	2.23	1	FLOOR SLAB - RT END	13	2.08	1	EXT WALL - BOTTOM		
		TNT4A	33.075		1.67	55.2	1.40	1.67	1	ROOF SLAB - MID	6.5	1.93	1	ROOF SLAB - RT END		
		TNT6A	41.600		1.69	70.3	1.40	1.69	1	ROOF SLAB - MID	6.5	1.79	1	ROOF SLAB - RT END		
		TNT7A	42.000		1.67	70.1	1.40	1.67	1	ROOF SLAB - MID	6.5	1.83	1	ROOF SLAB - RT END		
		TNT7B	42.000		1.59	66.8	1.40	1.59	1	ROOF SLAB - MID	6.5	1.87	1	ROOF SLAB - RT END		
		TNAGRIT4	43.000		1.67	71.8	1.40	1.67	1	ROOF SLAB - MID	6.5	1.73	1	FLOOR SLAB - RT END		
		TNAGT5A	45.000		1.82	81.9	1.40	1.82	1	ROOF SLAB - MID	6.5	1.84	1	FLOOR SLAB - RT END		
		TNAGT5B	45.000		1.59	71.6	1.40	1.61	1	ROOF SLAB - MID	6.5	1.59	1	FLOOR SLAB - RT END		
EMERGENCY VEHICLE (EV)		EV2	45.000		1.63	46.9	1.30	1.63	1	ROOF SLAB - MID	6.5	2.01	1	ROOF SLAB - RT END		
		EV3	45.000	⟨4⟩	1.13	48.6	1.30	1.13	1	ROOF SLAB - MID	6.5	1.34	1	ROOF SLAB - RT END		



LRFR SUMMARY

(LOOKING DOWNSTREAM)

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

PROJECT NO. 17BP.7.R.141

ROCKINGHAM COUNTY

STATION: 15+08.00 -L-

SHEET 12 OF 12

DRAWN BY: T. BANKOVICH DATE: 3-22

CHECKED BY: B.S. COX DATE: 3-22

DESIGN ENGINEER OF RECORD: D.B. SIMPSON DATE: 3-22

WGI
5640 Dillard Drive, Suite 200
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LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL SEAL 19831 ENGINEER DAVID B. SIMPSON, JR.

3/28/2024 | 9:00 AM EDT

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

(NON-INTERSTATE TRAFFIC)

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1			3			TOTAL SHEETS
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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 2024 "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.