B-5394

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DL00306

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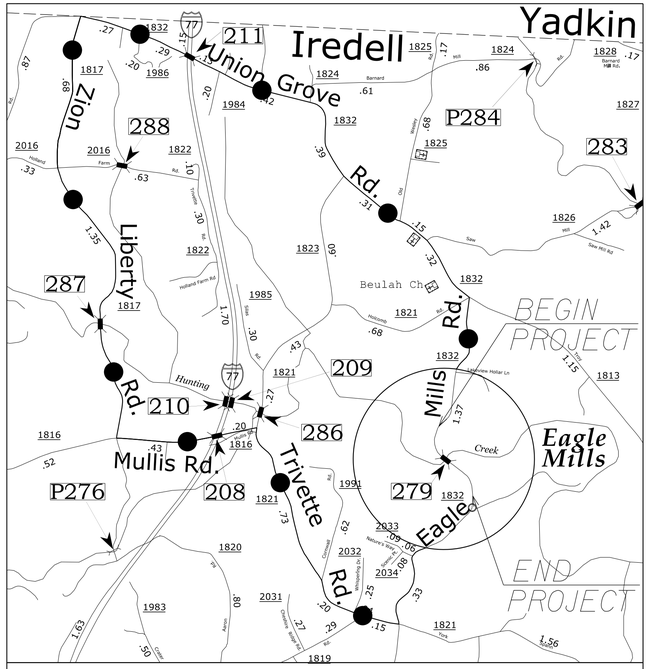
09/08/99

TIP PROJECT: B–5394

CONTRACT: DL00306

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



DETOUR

VICINITY MAP N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

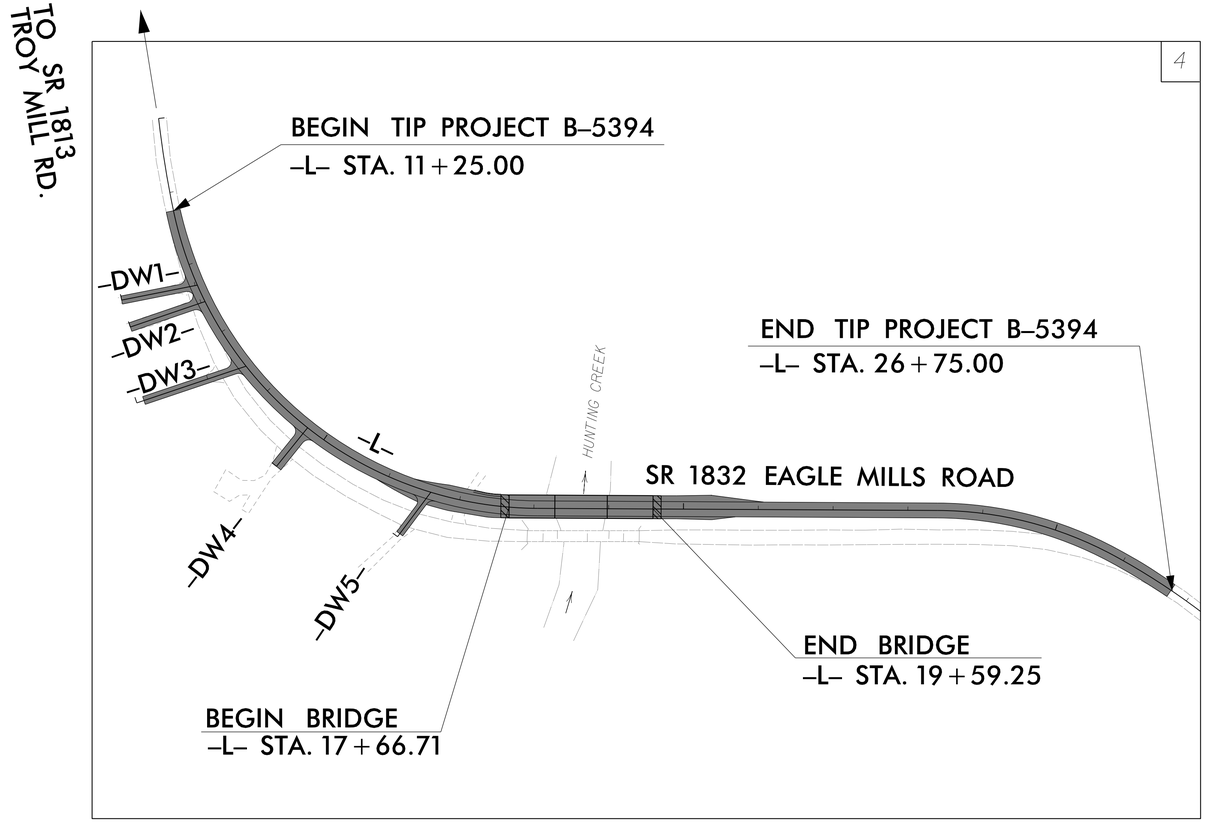
IREDELL COUNTY

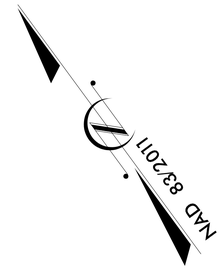
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–5394	1	

WBS PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46109.1.1	N/A	PE
46109.2.1	N/A	ROW/UTILITIES
46109.3.1	N/A	CONSTRUCTION

LOCATION: REPLACE BRIDGE 279 OVER HUNTING CREEK ON SR 1832

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE



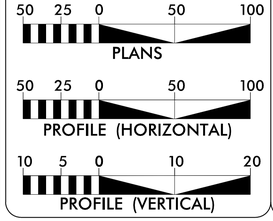


DESIGN EXCEPTION FOR MINIMUM HORIZONTAL CURVE RADIUS, STOPPING SIGHT DISTANCE FOR CREST VERTICAL CURVES AND MAXIMUM GRADE.

FINAL PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2024 = 240
ADT 2044 = 350
V = 60 MPH

FUNC CLASS =
LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B–5394 = 0.258 MILES

LENGTH STRUCTURE TIP PROJECT B–5394 = 0.036 MILES

TOTAL LENGTH TIP PROJECT B–5394 = 0.294 MILES

Prepared in the Office of:
PARRISH & PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459–8280 License No. P–1212
www.parrishandpartners.com

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
May 22, 2023

LETTING DATE:
September 23, 2025

JOSHUA WHITE, PE, PLS
NCDOT CONTACT

MATTHEW FERGUSON, PE
PROJECT ENGINEER

HYDRAULICS ENGINEER

Signature: Matthew Seale
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 056701 MATTHEW STOKE FACIANE
8/27/2025 *P.E.*
SIGNATURE:

ROADWAY DESIGN ENGINEER

Signature: Matthew Ferguson
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044480 MATTHEW B. FERGUSON
8/27/2025 *P.E.*
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

8/27/2025
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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-5394	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044480 MATTHEW B. FERGUSON

8/27/2025

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INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1	SPECIAL DETAIL - GUARDRAIL PLACEMENT
2C-2	SPECIAL DETAIL - GUARDRAIL PLACEMENT
2C-3	SPECIAL DETAIL - METHOD OF PIPE INSTALLATION
2D-1	DRAINAGE DETAILS
3B-1	ROADWAY AND DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
4 THRU 6	PLAN AND PROFILE SHEETS
RW01 THRU RW04	R/W PLAN SHEETS
TMP-1 THRU TMP-4	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-4	SIGNING PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1 THRU X-1A	CROSS-SECTION INDEX & SUMMARY SHEET
X-2 THRU X-18	CROSS-SECTIONS
S-1 THRU S-22	STRUCTURE PLANS

EFF. 01-16-2024
REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit - N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
423.01	Bridge Approach Fills - Type 1 Approach Fill for Bridge Abutment
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement (Use Details in Lieu of Standards for Sheets 4, 6, 12, and 14 of 15)
862.02	Guardrail Installation
862.03	Structure Anchor Units (Use Detail in Lieu of Standard for Sheet 8 of 9)
866.01	Chain Link Fence - 4', 5', and 6' High Fence
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES:

2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024
REVISED:

GRADE LINE:
GRADING AND SURFACING:

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

CLEARING:

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

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.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:

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

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

POWER - ENERGY UNITED

TELECOMMUNICATIONS - ZIRRUS

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

8/25/2025
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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
B-5394	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
- End of Information

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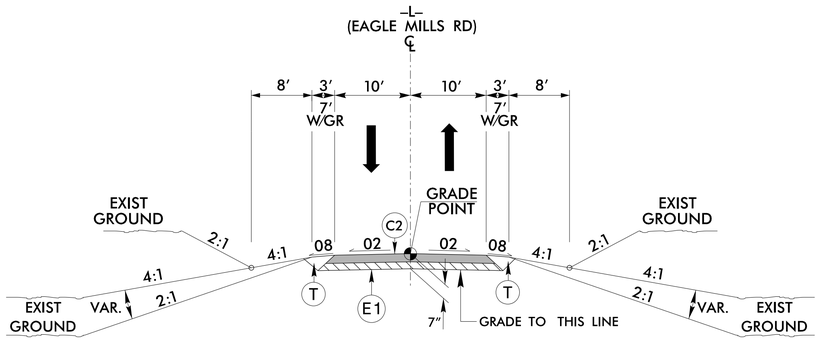
6/2/99

PAVEMENT SCHEDULE

C1	PROP. APPROX. 2″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF THE TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1.5″ OR GREATER THAN 2″ IN DEPTH.
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	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″ OR GREATER THAN 5.5″ IN DEPTH.
J1	PROP. 8″ AGGREGATE BASE COURSE
P	PRIME COAT AT A RATE OF 0.35 GALLONS PER SQUARE YARD
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

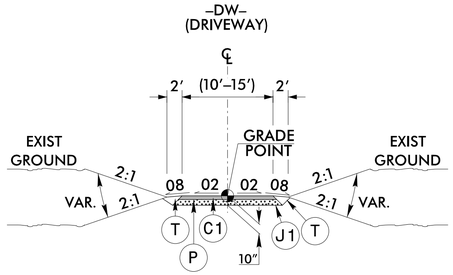
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 1

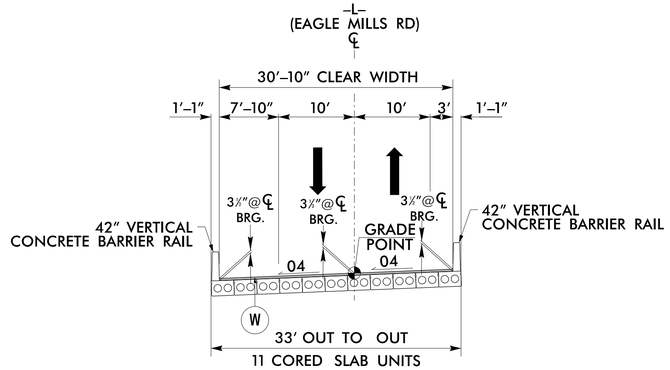
–L–

STA. 11+25.00 TO 17+66.71
STA. 19+59.25 TO 26+75.00



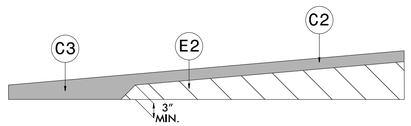
TYPICAL SECTION NO. 3

–DW1–
STA. 10+00.00 TO 10+92.91
–DW2–
STA. 10+00.00 TO 10+95.46
–DW3–
STA. 10+10.00 TO 11+43.42
–DW4–
STA. 10+00.00 TO 10+56.34
–DW5–
STA. 10+05.00 TO 10+63.64



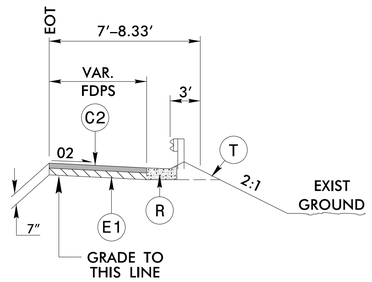
TYPICAL SECTION NO. 2

–L– BRIDGE
STA. 17+66.71 TO 19+59.25
SEE STRUCTURES PLANS FOR STRUCTURE CONSTRUCTION DETAILS
NOTE: THE PAVEMENT DESIGN ENGINEER'S SEAL DOES NOT APPLY TO TYPICAL SECTION NO. 2



Wedging Detail

DETAIL NO. 1



DETAIL NO. 2

SHOULDER BERM GUTTER
USE WITH –L– TYPICAL SECTION

17+16.00 TO 17+55.80 (BEGIN APPROACH SLAB)

PROJECT REFERENCE NO.	SHEET NO.
B–5394	2A–1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B. FERGUSON

8/21/2025

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044390 ENGINEER ANDREW D. WARGO

8/21/2025

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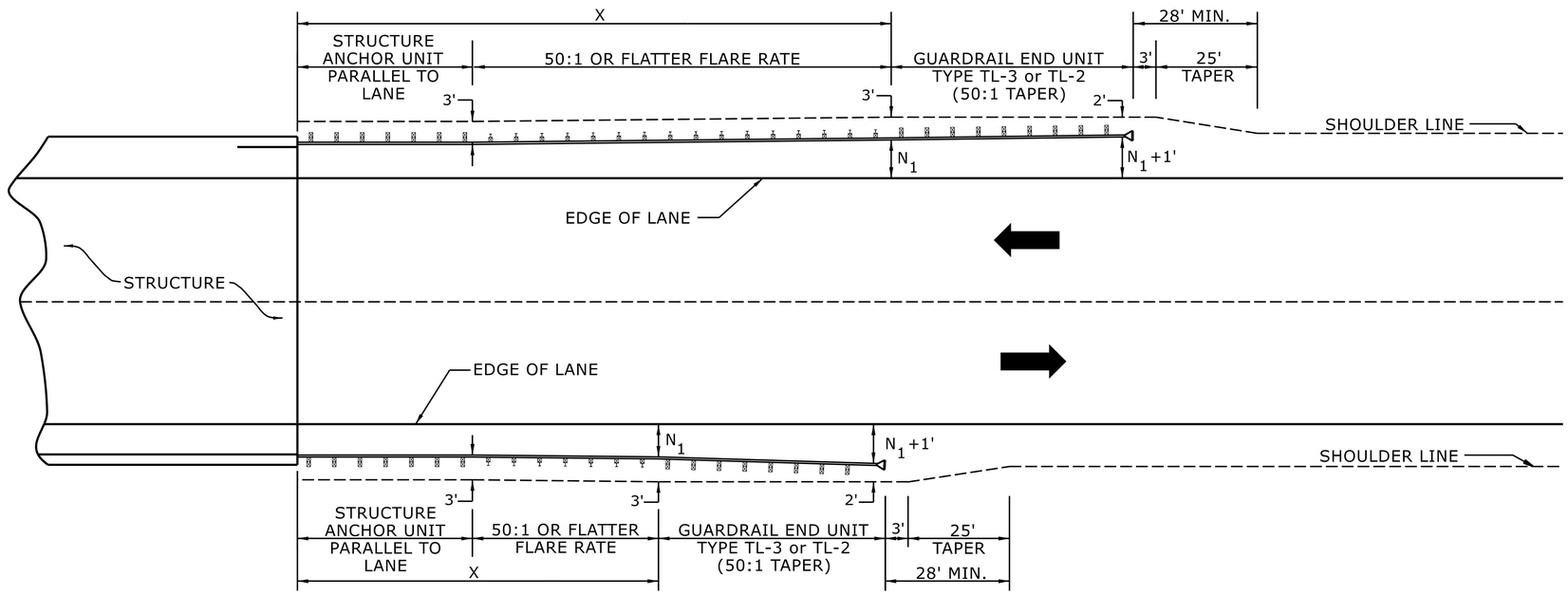

USE FLARE RATE AS THE CONTROL IF THE "N_1" DISTANCE IS NOT OBTAINED.
("N_1" IS BASED ON SHOULDER WIDTHS IN THE ROADWAY DESIGN MANUAL)

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

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 4 OF 15

862D01

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

SEE TITLE BLOCK

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FILE SPEC.: _____

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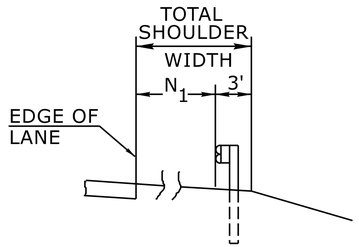
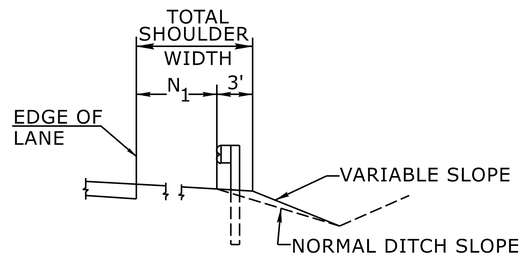
B-5394	2C-2

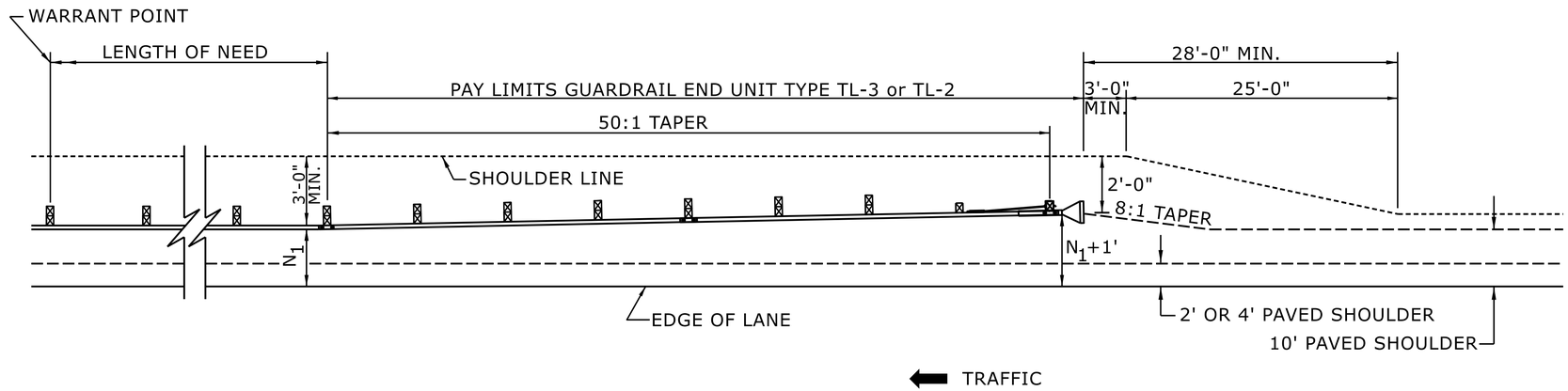


FILL SECTION



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

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT

SHEET 6 OF 15

862D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033144 NICOLE M. HACKLER
8/19/2025

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

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ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
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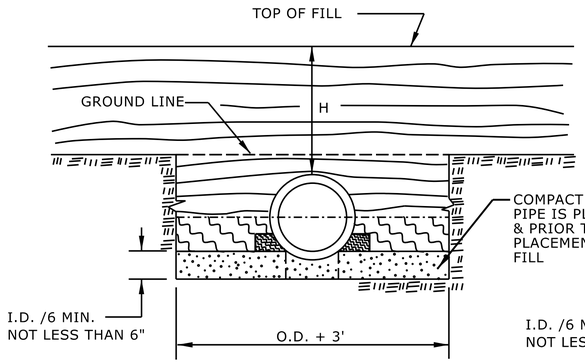
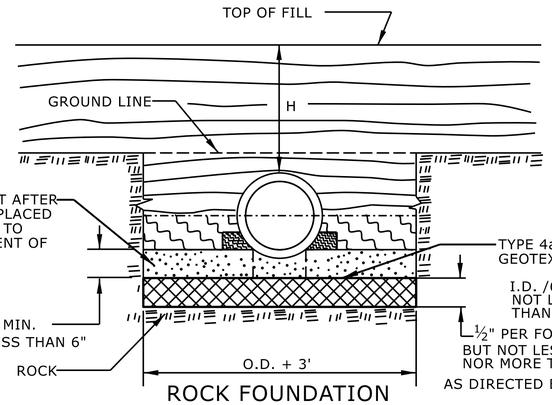
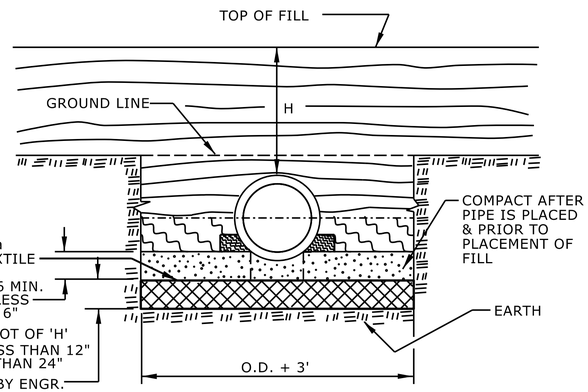
PROJECT REFERENCE NO.	SHEET NO.
B-5394	2C-3



NORMAL EARTH FOUNDATION

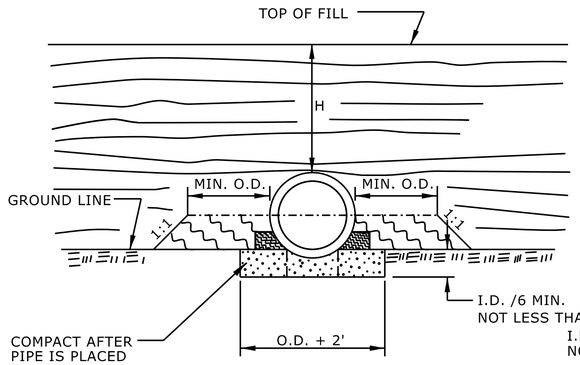


ROCK FOUNDATION

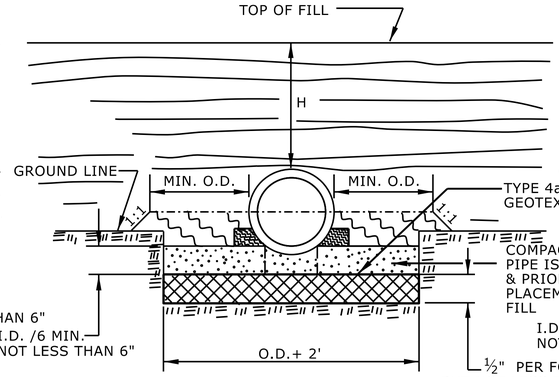


UNSUITABLE MATERIAL FOUNDATION

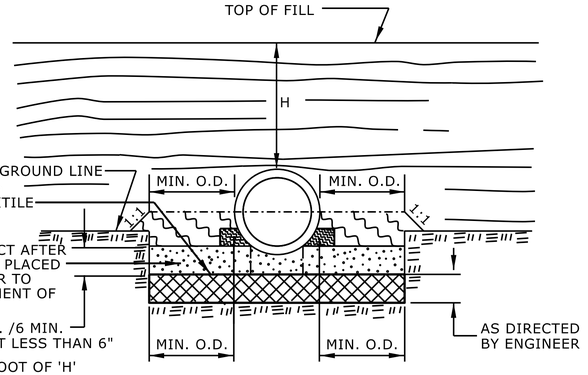
PIPE IN TRENCH



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

ROADWAY DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 2

300.01

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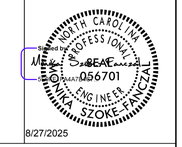
DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
B-5394	2D-1
R/W SHEET NO.	

HYDRAULICS ENGINEER



8/27/2025

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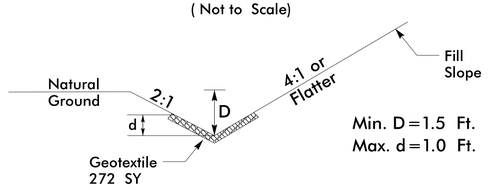
www.parrishandpartners.com

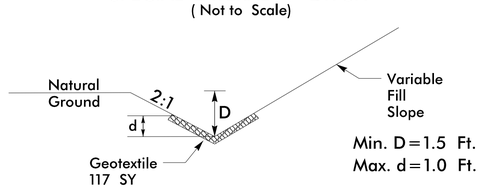
DETAIL A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= 97 TONS, CLASS B Rip–Rap

FROM STA. 15+50 TO STA. 16+30 RT
FROM STA. 16+70 TO STA. 17+00 RT
FROM STA. 20+00 TO STA. 21+00 RT

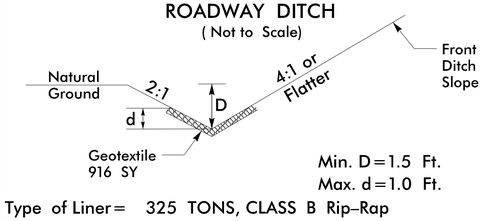
DETAIL A–2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= 41 TONS, CLASS B Rip–Rap

FROM STA. 17+00 TO STA. 17+90 LT

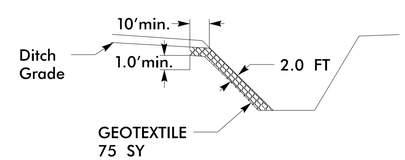
DETAIL B
ROADWAY DITCH
(Not to Scale)



Type of Liner= 325 TONS, CLASS B Rip–Rap

FROM STA. 14+00 TO STA. 15+50 RT
FROM STA. 19+70 TO STA. 20+00 LT
FROM STA. 21+00 TO STA. 26+55 RT

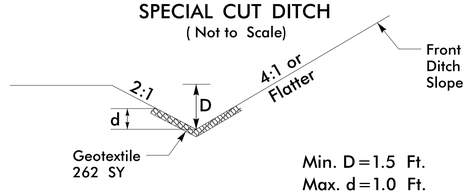
DETAIL C
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 70 TONS, CLASS I Rip–Rap

FROM STA. 17+90 TO STA. 18+20 LT
FROM STA. 19+00 TO STA. 19+70 LT
FROM STA. 17+90 TO STA. 18+35 RT

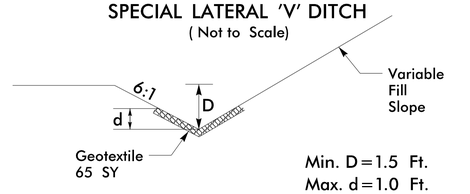
DETAIL D
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= 137 TONS, CLASS I Rip–Rap

FROM STA. 11+50 TO STA. 14+00 RT

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



Type of Liner= 31 TONS, CLASS I Rip–Rap

FROM STA. 17+00 TO STA. 17+50 RT

8/27/2025
...ms\parrishandpartners\dms14534\B-5394_RDY_2D_1.dgn
Rifenbergh

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12/06/07

COMPUTED BY: RRH DATE: 7 / 7 /25
CHECKED BY: MBF DATE: 7 / 7 /25

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-5394	3B-1

EARTHWORK SUMMARY (CY)

LOCATION	UNCLASSIFIED EXCAVATION	EMBT + %	BORROW	WASTE
SUMMARY NO. 1				
–L– STA. 11 + 25.00 TO STA. 17 + 66.71 (BEGIN BRIDGE)	4,705	1,392		3,314
–DW1– STA. 10 + 00.00 TO STA. 10 + 92.91	141	–		141
–DW2– STA. 10 + 00.00 TO STA. 10 + 95.46	193	–		193
–DW3– STA. 10 + 10.00 TO STA. 11 + 43.42	284	–		284
–DW4– STA. 10 + 00.00 TO STA. 10 + 56.34	20	13		7
–DW5– STA. 10 + 05.00 TO STA. 10 + 63.64	3	31	28	
SUBTOTAL SUMMARY NO. 1	5,346	1,436	28	3,939
SUMMARY NO. 2				
–L– STA. 19 + 59.25 (END BRIDGE) TO STA. 26 + 75.00	7,737	405		7,332
SUBTOTAL SUMMARY NO. 2	7,737	405		7,332
PROJECT SUBTOTAL	13,083	1,841	28	11,271
LOSS DUE TO CLEARING & GRUBBING	–1,150			–1,150
WASTE IN LIEU OF BORROW			–28	–28
GRAND TOTAL	11,933	1,841		10,093
SAY	12,000			

ESTIMATED UNDERCUT = 450 CY
ESTIMATED SELECT GRANULAR = 200 CY
ESTIMATED GEOTEXTILE FOR SOIL STABILIZATION = 400 SY
ESTIMATED SHALLOW UNDERCUT = 100 CY
ESTIMATED CLASS IV SUBGRADE STABILIZATION = 200 TON
ESTIMATED GEOTEXTILE FOR SUBGRADE STABILIZATION = 300 SY

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

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

PAVEMENT REMOVAL SUMMARY (SY)

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	11 + 50	17 + 92	CL	1483
–L–	19 + 41	26 + 45	CL	1573
–DW3–	10 + 24	11 + 18	CL	114
			TOTAL:	3170
			SAY:	3170

SHOULDER BERM GUTTER SUMMARY (LF)

SURVEY LINE	STATION	STATION	LENGTH
–L– (LT)	17 + 16	17 + 55.80	38
		TOTAL:	38
		SAY:	40

SUMMARY OF CHAIN LINK FENCE, 48" FABRIC

STATION TO STATION	LT OR RT	FABRIC LF	LINE POSTS EA	TERMINAL POSTS EA	GATE POSTS EA
–DRWY1– 10 + 01.83 TO 10 + 67.27	RT	65	5	2	N/A
NOTE: LT OR RT INDICATES LEFT OR RIGHT OF THE ALIGNMENT	TOTAL:	65	5	2	N/A
	SAY:	65	6	2	N/A

SUMMARY OF VINYL CHAIN LINK FENCE, 48" FABRIC

STATION TO STATION	LT OR RT	FABRIC LF	LINE POSTS EA	TERMINAL POSTS EA	GATE POSTS EA
–L– 14 + 46.88 TO 14 + 67.64	RT	40	3	3	N/A
–L– 14 + 67.64 TO 14 + 78.05	RT	DOUBLE GATE			2
–L– 14 + 78.05 TO 14 + 83.34	RT	6	1	1	N/A
–L– 15 + 94.00 TO 16 + 31.00	RT	62	5	3	N/A
–L– 16 + 31.00 TO 16 + 41.00	RT	DOUBLE GATE			2
–L– 16 + 41.00 TO 16 + 51.00	RT	10	1	1	N/A
NOTE: LT OR RT INDICATES LEFT OR RIGHT OF THE ALIGNMENT	TOTAL:	118	10	8	4
	SAY:	120	10	8	4

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

| STATION | SIZE / THICKNESS OR GAUGE | LOCATION (LT,RT, OR CL) | STRUCTURE NO. FROM | STRUCTURE NO. TO | TOP ELEVATION | INVERT ELEVATION | INVERT ELEVATION | SLOPE CRITICAL | DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12" | 15" | 18" | 24" | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | C.S. PIPE (UNLESS NOTED OTHRWISE) 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | CLASS III R.C. PIPE (UNLESS OTHERWISE NOTED) 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P. | 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. A | LIN. FT. B | 15" SIDE DRAIN PIPE | 18" SIDE DRAIN PIPE | 24" SIDE DRAIN PIPE | FRAME, GRATES AND HOOD STANDARD 840.03 PER EACH (0' THRU 5.0') | 5.0' THRU 10.0' | 10.0' AND ABOVE | C.B. STD. 840.01 OR STD. 840.02 | TYPE OF GRATE E | F | G | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME & GRATE STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR 840.26 | G.D.I. TYPE "B" STD. 840.18 OR 840.27 | G.D.I. TYPE "D" STD. 840.19 OR 840.28 | G.D.I. FRAME WITH GRATE STD. 840.22 | G.D.I. FRAME WITH TWO GRATES STD. 840.22 | G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24 | G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24 | G.D.I. (N.S. FLAT) FRAME WITH GRATE STD. 840.29 | G.D.I. (N.S. FLAT) FRAME WITH TWO GRATES STD. 840.29 | T.B.J.B. STD. 840.34 | T.B.D.J. STD. 840.35 | MODIFIED CONCRETE FLUME W/CONC. PAVED DITCH | CONC. COLLARS CL. "B" C.Y. STD. 840.72 | CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71 | PIPE REMOVAL LIN.FT. | REMARKS |
|---|---|---|---|---|---

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CHECKED BY: L. Campos DATE: 3/14/2024

(2-3-23)

PROJECT NO.	SHEET NO.
B-5394	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	200
				TOTAL LF:	200

***UD = Underdrain**
***BD = Blind Drain**
***SD = Subsurface Drain**

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU	12	100	200	300		
			TOTAL CY/TONS/SY:		100	200**	300**	0	0

***ASU(1/2) = Aggregate Subgrade (Type 1 or 2)**
***AST = Aggregate Stabilization**
****Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Subgrade Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.**

SUMMARY OF BRIDGE WAITING PERIODS

Bridge Description	End Bent/ Bent No.	MONTHS
Bridge No. 279 over Hunting Creek on SR 1832 (Eagle Mills Road)	End Bent No. 1	1

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PROJECT REFERENCE NO.	SHEET NO.
B-5394	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

Signed by: Matthew Ferguson
NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B FERGUSON
8/27/2025

HYDRAULICS ENGINEER

Signed by: Monika Szoke-Fancher
NORTH CAROLINA PROFESSIONAL SEAL 056701 ENGINEER MONIKA SZOKE-FANCHER
8/27/2025

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220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
www.parrishandpartners.com

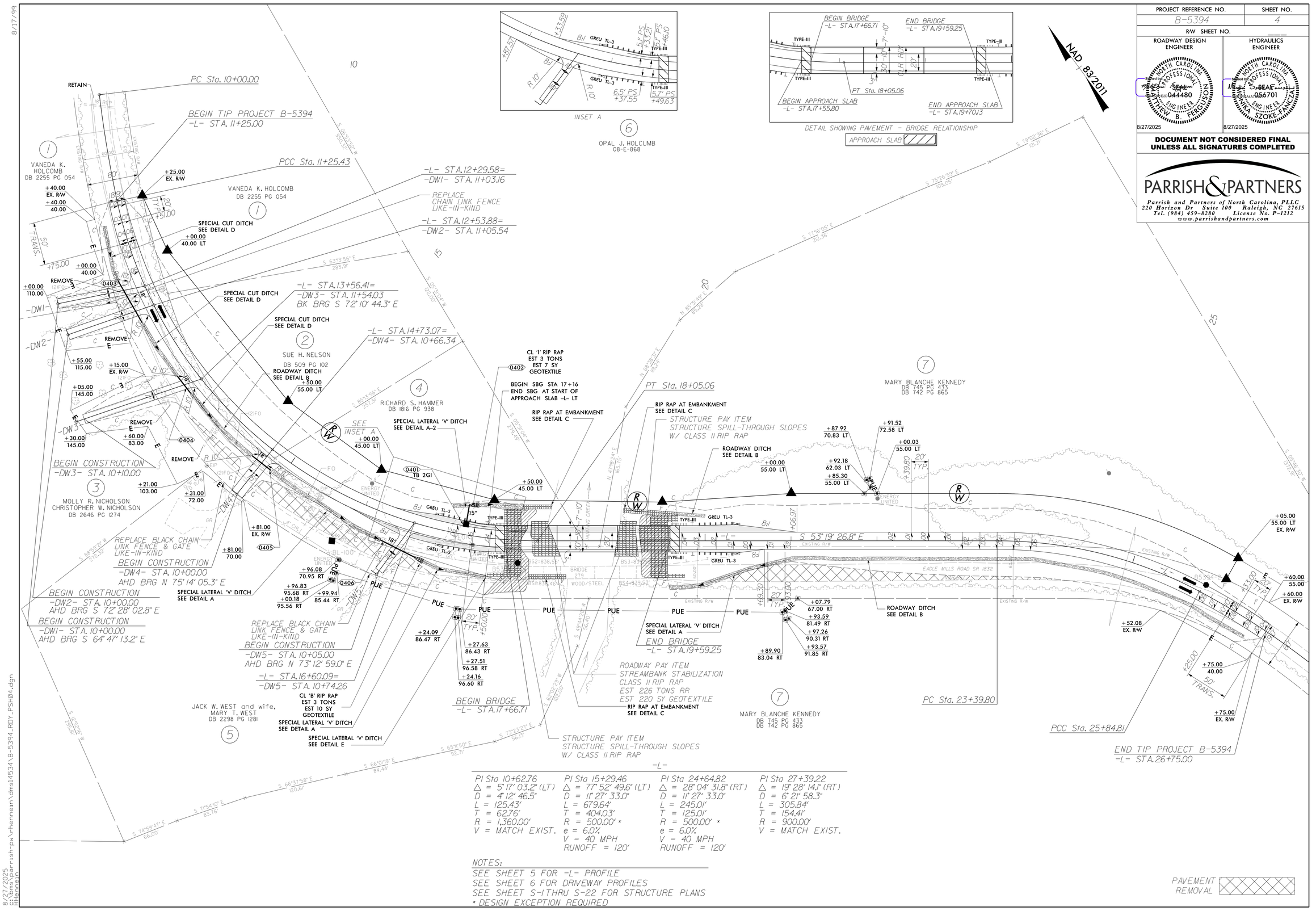
NAD 83/2011

INSET A

6 OPAL J. HOLCUMB 08-E-868

DETAIL SHOWING PAVEMENT - BRIDGE RELATIONSHIP

APPROACH SLAB



PI Sta 10+62.76	PI Sta 15+29.46	PI Sta 24+64.82	PI Sta 27+39.22
△ = 5° 17' 03.2" (LT)	△ = 77° 52' 49.6" (LT)	△ = 28° 04' 31.8" (RT)	△ = 19° 28' 14.1" (RT)
D = 4° 12' 46.5"	D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 6° 21' 58.3"
L = 125.43'	L = 679.64'	L = 245.01'	L = 305.84'
T = 62.76'	T = 404.03'	T = 125.01'	T = 154.41'
R = 1,360.00'	R = 500.00' *	R = 500.00' *	R = 900.00'
V = MATCH EXIST.	e = 6.0%	e = 6.0%	V = MATCH EXIST.
	V = 40 MPH	V = 40 MPH	
	RUNOFF = 120'	RUNOFF = 120'	

NOTES:
SEE SHEET 5 FOR -L- PROFILE
SEE SHEET 6 FOR DRIVEWAY PROFILES
SEE SHEET S-1THRU S-22 FOR STRUCTURE PLANS
* DESIGN EXCEPTION REQUIRED

PAVEMENT REMOVAL

8/27/2025
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RHennen

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-5394	5

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B. FERGUSON

8/27/2025

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 056701 ENGINEER MONIKA SZOKE-TAMCZAK

8/27/2025

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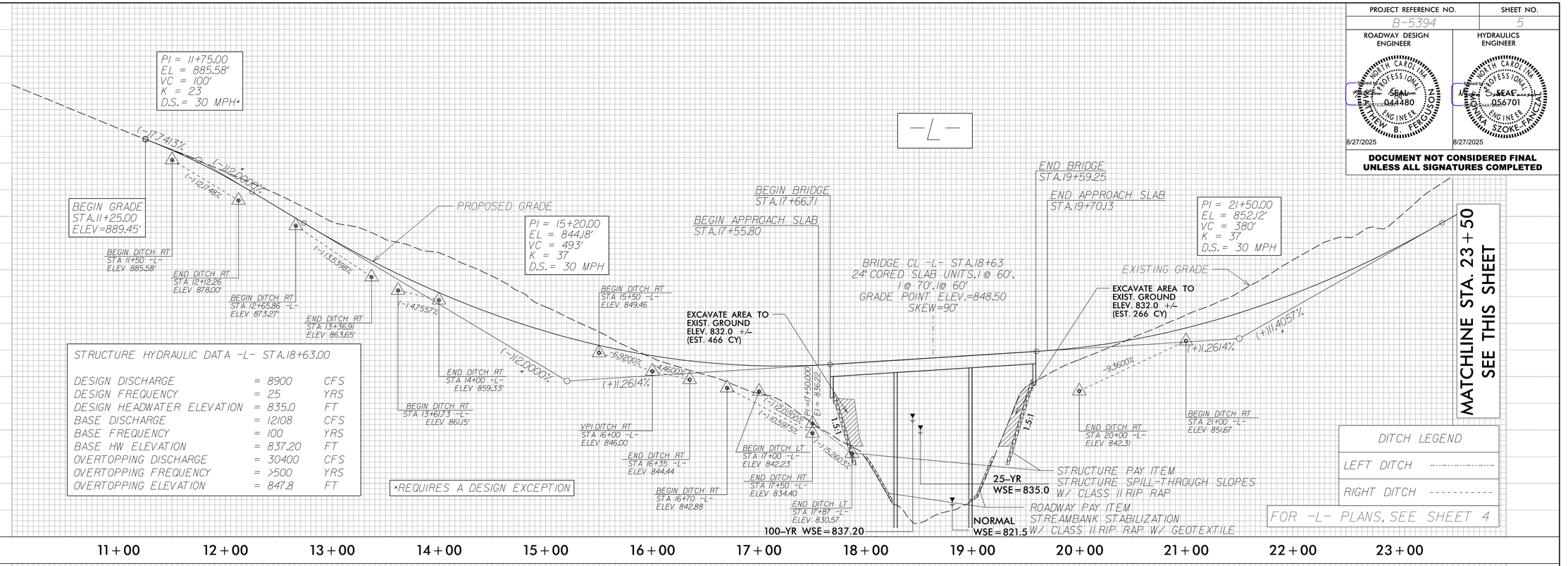

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8/27/2025
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Rhennein

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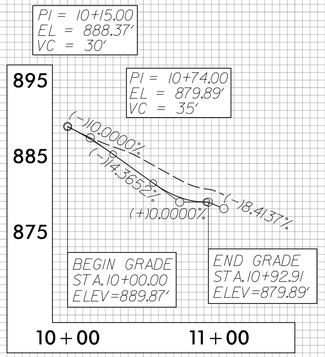
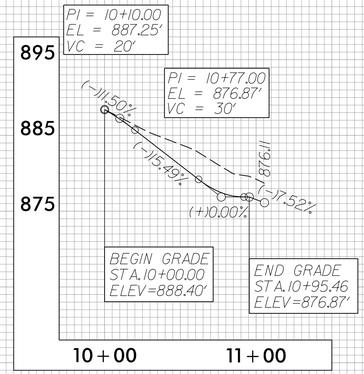
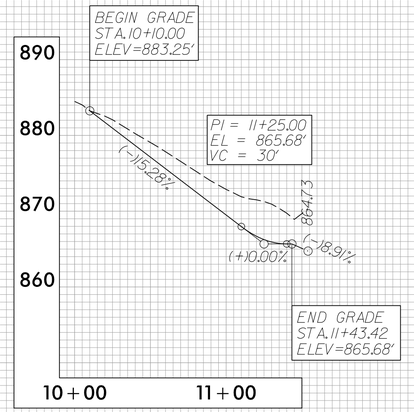


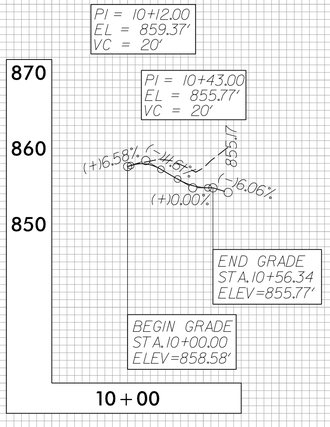
-DW1-



-DW2-



-DW3-



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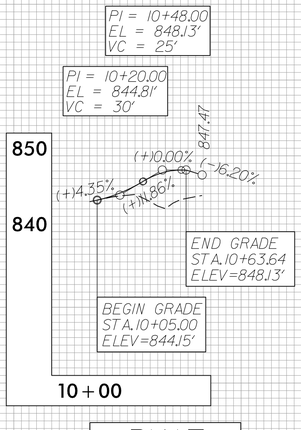

-DW5-

PROJECT REFERENCE NO.	SHEET NO.
B-5394	6

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B. FERGUSON

8/27/2025

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 056701 ENGINEER MONIKA SZOKE-TAMCZAK

8/27/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PARRISH & PARTNERS

Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
www.parrishandpartners.com

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Rhennein

1/29/24

TIP PROJECT: B-5394

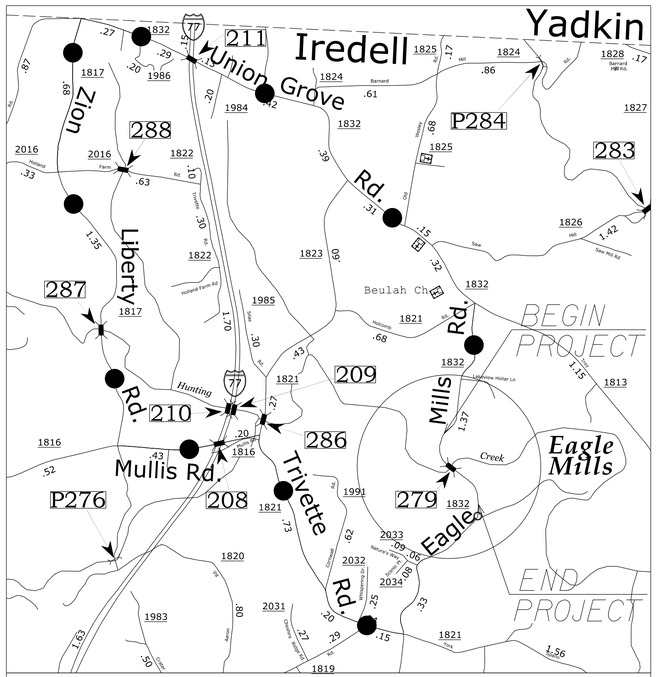
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5394	RW01	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

IREDELL COUNTY

See Sheet 1A For Index of Sheets

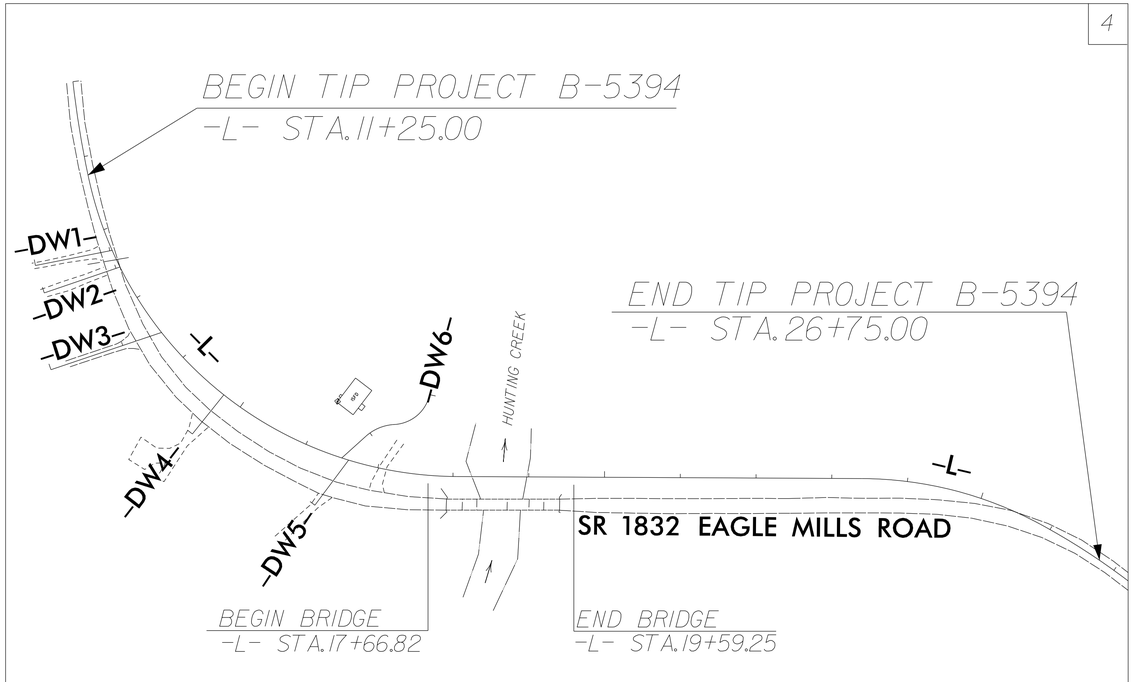


DETOUR

VICINITY MAP N.T.S.

TO SR 1813 TROY MILL RD.

4



TO SR 1821 YORK SPANN RD.

NAD 83/2011

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 NCGS FOR MONUMENT "B5394-1" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 833,569.532(ft) EASTING: 1,467,062.643(ft) ELEVATION: 839.12(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999291 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B5394-1" TO -L- STATION 10+00 IS N 05°06'19.6" W 730.012(ft) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

Prepared In the Office of:

CES GROUP ENGINEERS, LLP

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:	*LETTING DATE:*
05/15/2023	*09/23/2025*

PROFESSIONAL LAND SURVEYOR

Michael Case

Digitally signed by Michael Case
DN: C=US, E=mcase@ces-group.net, OU=Survey, OU=Geomatics, CN=Michael Case
Date: 2025.08.18 11:01:53-04'00'

NORTH CAROLINA PROFESSIONAL SEAL L-2828 LAND SURVEYOR MICHAEL D. CASE

SIGNATURE: *Date:*

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-5394	RW02C-1

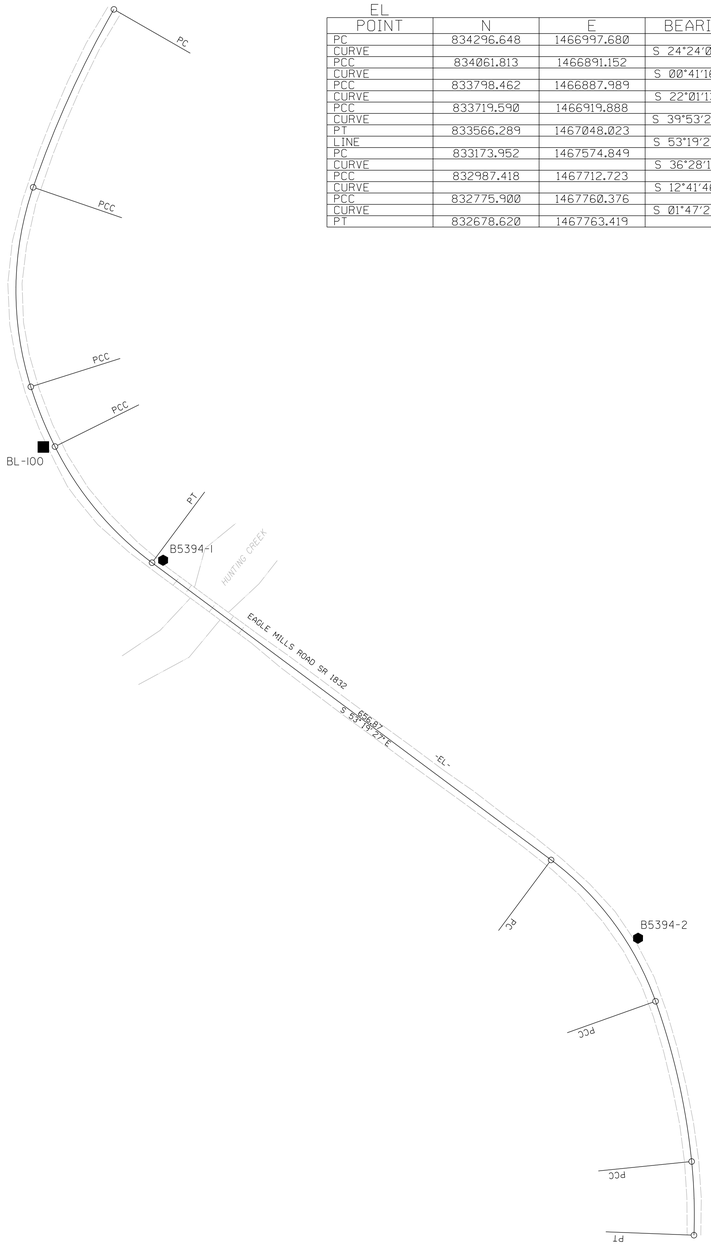
Location and Surveys

CES GROUP ENGINEERS, LLP

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

NC GRID
NAD 83 NA 2011



EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
PC	834296.648	1466997.680							
CURVE			S 24°24'01.9" W	257.87	10°52'48.3"(LT)	04°12'46.5"	258.26	129.52	1360.00
PCC	834061.813	1466891.152							
CURVE			S 00°41'16.8" W	263.37	36°32'41.8"(LT)	13°38'30.7"	267.89	138.68	420.00
PCC	833798.462	1466887.989							
CURVE			S 22°01'13.3" E	85.08	08°52'18.5"(LT)	10°25'02.7"	85.16	42.67	550.00
PCC	833719.590	1466919.888							
CURVE			S 39°53'24.9" E	199.80	26°52'04.7"(LT)	13°19'28.6"	201.64	102.71	430.00
PT	833566.289	1467048.023							
LINE			S 53°19'27.2" E	656.87					
PC	833173.952	1467574.849							
CURVE			S 36°28'10.1" E	231.96	33°42'34.2"(RT)	14°19'26.2"	235.34	121.18	400.00
PCC	832987.418	1467712.723							
CURVE			S 12°41'46.9" E	216.82	13°50'12.2"(RT)	06°21'58.3"	217.35	109.20	900.00
PCC	832775.900	1467760.376							
CURVE			S 01°47'29.7" E	97.33	07°58'22.2"(RT)	08°11'06.4"	97.41	48.78	700.00
PT	832678.620	1467763.419							

BL

POINT	DESC.	NORTH	EAST	ELEVATION
100	BL-100	833719.0540	1466904.7660	848.83
1	B5394-1	833569.5320	1467062.6430	839.12
2	B5394-2	833070.6250	1467689.6080	903.56

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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PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
B-5394	RWD2-1

Location and Surveys

CES GROUP
ENGINEERS, LLP

L

TYPE	STATION	NORTH	EAST
PC	10+00.00	834296.6476	1466997.6800
PCC	11+25.43	834185.1271	1466940.3700
PT	18+05.06	833576.3196	1467096.5026
PC	23+39.80	833256.9257	1467525.3789
PCC	25+84.81	833069.1854	1467678.9678
PCC	28+90.65	832775.9005	1467760.3763
PT	29+88.06	832678.6199	1467763.4191

DW1

TYPE	STATION	NORTH	EAST
POT	10+00.00	834130.5329	1466813.9021
POT	11+03.16	834086.5904	1466907.2297

DW2

TYPE	STATION	NORTH	EAST
POT	10+00.00	834094.5487	1466801.8559
POT	11+05.54	834062.7537	1466902.4972

DW3

TYPE	STATION	NORTH	EAST
POT	10+00.00	834007.7875	1466748.7896
POT	11+54.03	833960.6487	1466895.4250

DW4

TYPE	STATION	NORTH	EAST
POT	10+00.00	833828.6512	1466848.6780
POT	10+66.34	833845.5576	1466912.8238

DW5

TYPE	STATION	NORTH	EAST
POT	10+00.00	833656.9991	1466923.2211
POT	10+74.26	833678.4421	1466994.3172

DW6

TYPE	STATION	NORTH	EAST
PC	10+00.00	833684.6388	1467131.6441
PT	10+63.38	833679.4805	1467072.6505
PC	10+68.01	833681.8907	1467068.6887
PT	11+06.69	833690.3429	1467031.6264
POT	11+49.82	833686.1182	1466988.7060

NOTES:

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

2. THE PROPOSED ALIGNMENT 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.

REVISIONS

1/29/24

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1/29/24

REVISIONS

RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
B-5394	RW03E-1

Location and Surveys

CES GROUP
ENGINEERS, LLP

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-2828 LAND SURVEYOR MICHAEL D CASE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+25.00	-30.00	834173.0409	1466967.8310
L	12+00.00	-40.00	834104.2121	1466952.9908
L	14+50.00	-55.00	833879.9807	1466960.9259
L	16+00.00	-45.00	833751.0342	1467000.4139
L	17+50.00	-45.00	833644.4901	1467084.9199
L	19+50.00	-45.00	833525.8423	1467239.6231
L	21+00.00	-55.00	833444.2694	1467365.9001
L	23+39.80	-55.00	833301.0372	1467558.2297
L	25+84.81	-55.00	833092.6455	1467728.7134
L	26+05.00	-55.00	833073.1671	1467737.6338
L	26+05.00	-26.89	833061.7486	1467711.9432

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	15+96.08	70.95	833697.2638	1466897.6119
L	15+96.83	95.68	833684.3481	1466876.4967
L	15+99.94	85.44	833686.2157	1466887.2158
L	16+00.18	95.56	833680.9358	1466878.5839
L	17+24.09	86.47	833569.6081	1466973.5927
L	17+24.16	96.60	833562.5028	1466966.3673
L	17+27.51	96.58	833559.6507	1466969.1719
L	17+27.63	86.43	833566.6625	1466976.5195
L	20+89.90	83.04	833339.5878	1467275.3522
L	20+93.57	91.85	833330.3328	1467273.0305
L	20+93.59	81.49	833338.6259	1467279.2349
L	20+97.26	90.31	833329.3595	1467276.9102
L	21+07.79	67.00	833341.7704	1467299.2768
L	21+85.30	-55.00	833393.3237	1467434.3090
L	21+87.92	-70.83	833404.4554	1467445.8694
L	21+91.52	-72.58	833403.7036	1467449.7981
L	21+92.18	-62.03	833394.8491	1467444.0311
L	22+00.03	-55.00	833384.5222	1467446.1275

I, Michael D. Case, 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 29th day of January, 2024.

DocuSigned by: Michael Case 1/29/2024
88D8444890AB4F8...

Professional Land Surveyor — PLS # L-2828 — Seal

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 10/30/2023 TO 11/03/2023 .

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1/29/24

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-5394	RW04

Location and Surveys

CES GROUP ENGINEERS, LLP

NORTH CAROLINA PROFESSIONAL SEAL L-2828 LAND SURVEYOR MICHAEL D. CASE

I, Michael, 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.

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Witness my original signature, registration number and seal this 29th day of January, 2024.

DocuSigned by: Michael Case BBD84444890AB4F6... 1/29/2024

Professional Land Surveyor — PLS # L- 2828 — Seal

NC GRID NAD 83 NA 2011

PC Sta. 10+00.00

BEGIN TIP PROJECT B-5394
-L- STA. 11+25.00

PCC Sta. 11+25.43

1 VANEDA K. HOLCOMB DB 2255 PG 054

2 SUE H. NELSON DB 509 PG 102

3 MOLLY R. NICHOLSON CHRISTOPHER W. NICHOLSON DB 2646 PG 1274

4 RICHARD S. HAMMER DB 1816 PG 938

5 JACK W. WEST and wife, MARY T. WEST DB 2298 PG 1281

6 LEE R. HOLCOMB DB 2984 PG 981

7 CALVIN B. KENNEDY JOHNNY F. KENNEDY DB 745 PG 433 DB 742 PG 865

BRIDGE 279 WOOD/STEEL

EAGLE MILLS ROAD SR 1832 VAR.BST

EXISTING R/W 60.00'

-L- S 53° 19' 26.8" E

PC Sta. 23+39.80

PCC Sta. 25+84.81

END TIP PROJECT B-5394
-L- STA. 26+75.00

BEGIN CONSTRUCTION
-DW1- STA. 10+00.00

BEGIN CONSTRUCTION
-DW2- STA. 10+00.00

BEGIN CONSTRUCTION
-DW3- STA. 10+10.00

BEGIN CONSTRUCTION
-DW4- STA. 10+00.00

BEGIN CONSTRUCTION
-DW5- STA. 10+05.00

BEGIN CONSTRUCTION
-DW6- STA. 10+00.00

END CONSTRUCTION
-DW1- STA. 10+92.91

END CONSTRUCTION
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-L- STA. 12+29.58

END CONSTRUCTION
-DW2- STA. 10+95.46

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-DW4- STA. 10+56.34

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-L- STA. 14+73.07

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-DW5- STA. 10+63.64

END CONSTRUCTION
-DW5- STA. 10+74.26=
-L- STA. 16+60.09

END CONSTRUCTION
-DW6- STA. 11+38.24

-DW6- STA. 11+49.82=
-L- STA. 16+50.58

PT Sta. 11+06.69

PC Sta. 10+68.01

PT Sta. 10+63.38

PT Sta. 18+05.06

S 84° 22' 42.1" W

N 58° 41' 05.2" W

S 64° 47' 13.2" E

S 72° 28' 02.8" E

S 72° 10' 44.3" E

N 75° 14' 05.3" E

S 63° 13' 56" E 283.91'

S 85° 13' 56" E 257.59'

S 05° 51' 52" W 503.32'

S 05° 31' 04" W 122.00'

S 05° 31' 04" W 279.79'

N 47° 18' 24" E 165.75'

N 85° 39' 49" E 85.28'

N 64° 38' 39" E 119.24'

S 40° 44' 28" W 56.40'

S 62° 02' 29" W 102.00'

S 88° 59' 21" W 272.32'

S 10° 52' 16" W 256.81'

S 74° 59' 47" E 66.00'

S 71° 54' 10" E 83.76'

S 66° 37' 58" E 120.61'

S 66° 01' 19" E 84.44'

S 65° 11' 50" E 92.71'

S 73° 23' 27" E 56.13'

-DW6-

PI Sta 10+36.75	PI Sta 10+88.05
△ = 72° 37' 29.2" (RT)	△ = 36° 56' 12.7" (LT)
D = 114° 35' 29.6"	D = 95° 29' 34.7"
L = 63.38'	L = 38.68'
T = 36.75'	T = 20.04'
R = 50.00'	R = 60.00'

-L-

PI Sta 10+62.76	PI Sta 15+29.46	PI Sta 24+64.82	PI Sta 27+39.22
△ = 5° 17' 03.2" (LT)	△ = 77° 52' 49.6" (LT)	△ = 28° 04' 31.8" (RT)	△ = 19° 28' 14.1" (RT)
D = 4° 12' 46.5"	D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 6° 21' 58.3"
L = 125.43'	L = 679.64'	L = 245.01'	L = 305.84'
T = 62.76'	T = 404.03'	T = 125.01'	T = 154.41'
R = 1,360.00'	R = 500.00'	R = 500.00'	R = 900.00'
e = 5.0%	e = 6.0%	e = 6.0%	V = MATCH EXIST.
V = 40 MPH	V = 40 MPH	V = 40 MPH	
RUNOFF = 108'	RUNOFF = 108'	RUNOFF = 108'	

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 10/30/2023 TO 11/03/2023 .

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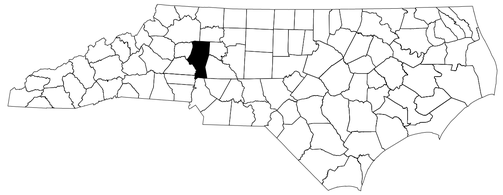
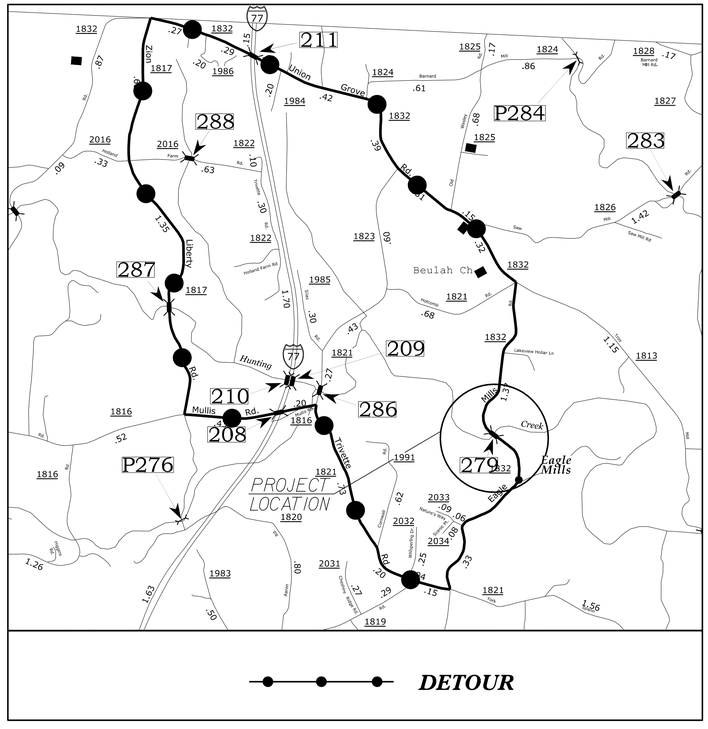
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

IREDELL





LOCATION: REPLACE BRIDGE 279 OVER HUNTING CREEK ON SR 1832

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

PLANS PREPARED BY:

MATTHEW FERGUSON, PE
PROJECT ENGINEER

NCDOT CONTACTS:

JOSH WHITE, PE
PROJECT ENGINEER

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

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	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES, AND LOCAL NOTES)
TMP-2	CLOSURE AND OFFSITE DETOUR
TMP-3	SIGN AND DEVICE LEGEND
TMP-4	SPECIAL SIGN DESIGN(S)

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PARRISH&PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
www.parrishandpartners.com

APPROVED: Signed by: Matthew Ferguson 9F942261E2D148F...

DATE: 8/22/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B FERGUSON

SHEET NO.
TMP-1

B-5394

TIP PROJECT:

8/19/2025
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PROJ. REFERENCE NO.	SHEET NO.
B-5394	TMP-1A

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Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
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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 FOR TWO-WAY UNDIVIDED FACILITIES
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1130.01	DRUMS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTI-LANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION
1264.01	OBJECT MARKERS - TYPES
1264.02	OBJECT MARKERS - INSTALLATION

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

SIGNALS

EXISTING | PROPOSED | TEMPORARY | PORTABLE

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

APPROVED: Signed by: Matthew Ferguson 9F942261E2D14B9...

DATE: 8/22/2025

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044480 MATTHEW B. FERGUSON

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

8/19/2025
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User:RHenneln

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PROJ. REFERENCE NO.	SHEET NO.
B-5394	TMP-1B

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MANAGEMENT STRATEGIES

OFF-SITE DETOURS / USE OF ALTERNATIVE ROUTES

THE OFF-SITE DETOUR WILL INCLUDE UNION GROVE RD (SR 1832), ZION LIBERTY RD (SR 1817), MULLIS RD (SR 1816), AND TRIVETTE RD (SR 1821)

PHASING

STEP 1. USING ROADWAY STANDARD DRAWINGS 1101.03, SHEET 1 AND TMP-2 INSTALL OFFSITE DETOUR SIGNS AND TRAFFIC CONTROL DEVICES AND CLOSE EAGLE MILLS RD (SR 1832) TO THROUGH TRAFFIC.MAINTAIN DRIVEWAY ACCESS (-DW1-, -DW2-, -DW3-, -DW4- AND -DW5-) AT ALL TIMES DURING THE LIFE OF THE PROJECT.

STEP 2. COMPLETE THE FOLLOW WITHIN THE ROAD CLOSURE:

A) REMOVE EXISTING BRIDGE AND BRIDGE SIGNS (SEE SIGNING PLANS). MAINTAIN EXISTING "SCHOOL BUS STOP AHEAD" SIGNS AS DIRECTED BY ENGINEER. CONTRACTOR SHALL ACCOMMODATE FOR A BUS TURNAROUND NORTH OF THE BRIDGE AT -DW1- AND -DW2-.

B) CONSTRUCT THE PROPOSED BRIDGE AND ROADWAY APPROACHES INCLUDING THE FINAL LAYER OF SURFACE COURSE AND FINAL PAVEMENT MARKINGS.

STEP 3. REMOVE ALL TRAFFIC CONTROL DEVICES AND DETOUR SIGNS AND OPEN EAGLE MILLS RD (SR 1832) TO THROUGH TRAFFIC.

GENERAL NOTES / LOCAL 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.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

B) INSTALL ADVANCE WORK ZONE WARNING SIGNS. PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

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

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

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

TRAFFIC CONTROL DEVICES

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

PAVEMENT MARKINGS

F) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE

AS FOLLOWS:

ROAD NAME	MARKING	MARKER
EAGLE MILLS RD	THERMOPLASTIC	NONE
BRIDGE	THERMOPLASTIC	NONE

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

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

APPROVED: Signed by: Matthew Fergusson 9F942261E2D1489...

DATE: 8/22/2025

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044480 MATTHEW B. FERGUSON

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSPORTATION OPERATIONS PLAN

8/19/2025
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User:RHennein

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PROJ. REFERENCE NO.	SHEET NO.
B-5394	TMP-2

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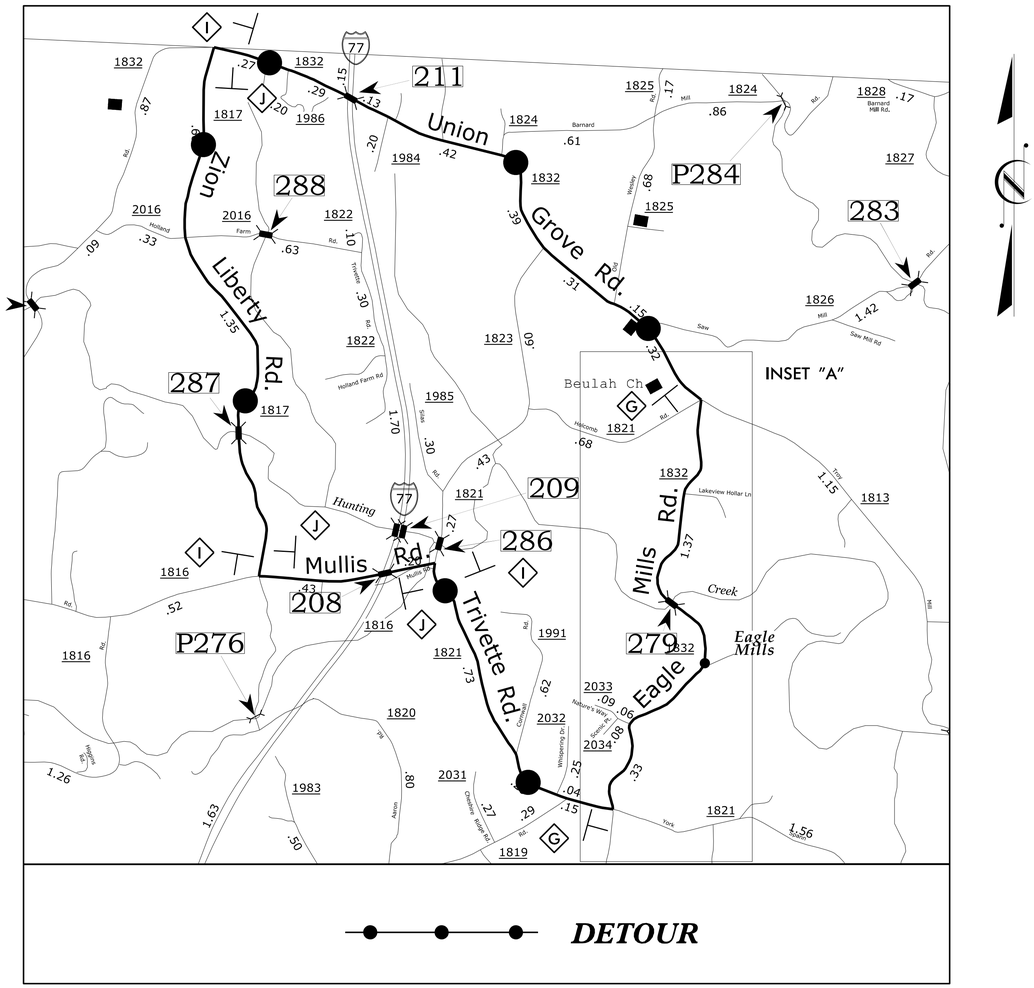
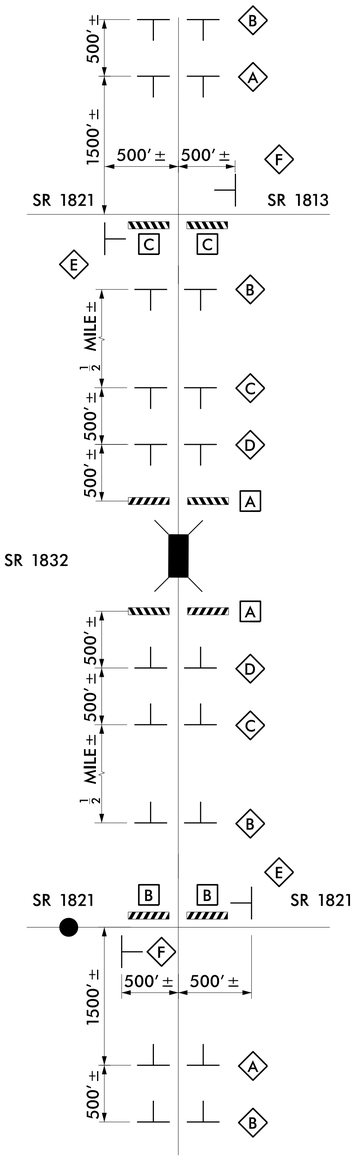


DETOUR

LOCATION: REPLACE BRIDGE 279 OVER HUNTING CREEK ON SR 1832



INSET "A"

REFER TO ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9 FOR APPLICABLE NOTES.

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DATE: 8/22/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B FERGUSON

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

TEMPORARY TRAFFIC CONTROL DETOUR

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User:RHenneln

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PROJ. REFERENCE NO.	SHEET NO.
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R11-2
48″ x 30″

TYPE III BARRICADE

A

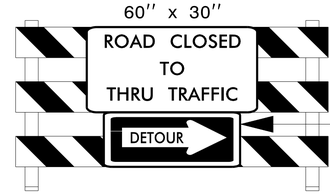
R11-4
60″ x 30″

M4-10L
48″ x 18″

TYPE III BARRICADE

B

R11-4
60″ x 30″



M4-10R
48″ x 18″

TYPE III BARRICADE

C

W20–2
48″ X 48″

A

W20–3
48″ X 48″

B

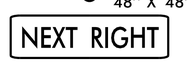
W20–3
48″ X 48″

C

W20–3
48″ X 48″

D

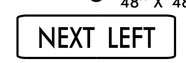
W20–3
48″ X 48″



SP–4R
42″ X 12″

E

W20–3
48″ X 48″

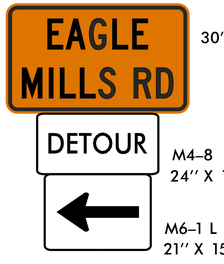


SP–4L
42″ X 12″

F

M4–8 A
24″ X 18″

G



SD–1
30″ X 18″

M4–8
24″ X 12″

M6–1 L
21″ X 15″

I

SD–1
30″ X 18″

M4–8
24″ X 12″

M6–1
21″ X 15″

J

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DATE: 8/22/2025

SEAL

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TEMPORARY TRAFFIC CONTROL
DETOUR

8/19/2025
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User:RHennein

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PROJ. REFERENCE NO.	SHEET NO.
B-5394	TMP-4

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SIGN NUMBER: SD-1
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 30"
HEIGHT: 18"
TOTAL AREA: 3.75 Sq.Ft.

BORDER TYPE: RECESSED
RADII: 1.5"
WIDTH: 0.63"
RECESS: 0.38"

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

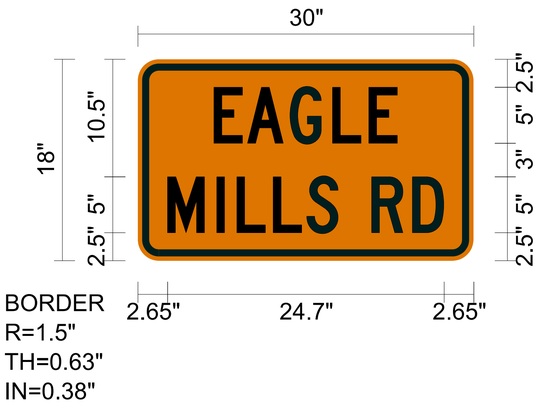
SYMBOL	X	Y	WID	HT

MAT'L: 0.063" (1.6MM) ALUMINUM

DESIGN BY: RRH CHECKED BY: MBF DATE: Jul 25, 2025
PROJECT ID: B-5394 DIV: 12

USE NOTES

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B Fluorescent Orange retroreflective sheeting.



BORDER
R=1.5"
TH=0.63"
IN=0.38"

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter																						Series/Size Text Length
	E	A	G	L	E																	C 2000
6.8"	3"	3.8"	3.8"	3.25"	2.55"	6.8"																16.4"
	M	I	L	L	S		R	D														C 2000
2.65"	4.4"	1.8"	3.25"	3"	2.8"	3"	3.65"	2.8"	2.65"													24.7"

APPROVED: Signed by: Matthew Ferguson 9F942261E2D1489...
DATE: 8/22/2025
SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044480 MATTHEW B. FERGUSON

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

TEMPORARY TRAFFIC CONTROL
SPECIAL SIGN DESIGN

8/19/2025
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T.I.P.: B-5394

CONTRACT: DL00306

$$$$$$USERNAME$$$$$$

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TIP NO.	SHEET NO.
B-5394	PMP-2

APPROVED: Signed by: Matthew Ferguson (A) 9F942261E2D14B9...

DATE: 8/22/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B. FERGUSON

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TIE TO EXISTING MARKINGS
-L- STA 11+25+/-

T1

T13

T51

T51

HUNTING CREEK

10'
10'

SR 1832 (EAGLE MILLS RD)

T1

10'

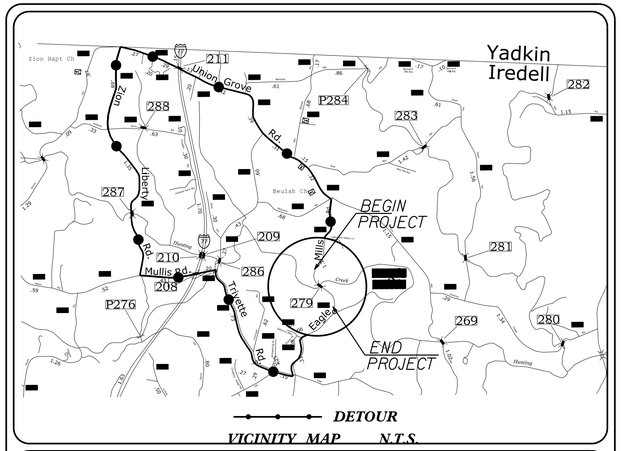
TIE TO EXISTING MARKINGS
-L- STA 26+75+/-

THERMOPLASTIC PAVEMENT MARKING LEGEND
(T1) WHITE EDGELINE (4")
(T13) YELLOW DOUBLE CENTER (4")
(T51) WHITE DIAGONAL (12")

$$$$$$$SYSTIME$$$$$
$$$$$$$

PROJECT: B-5394

TIP B-5394



VICINITY MAP N.T.S.

VICINITY MAP

NOT TO SCALE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5394	EC-1	7

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46109.1.1	N/A	P.E.
46109.1.2	N/A	R/W, UTL
46109.1.3	N/A	CONSTRUCTION

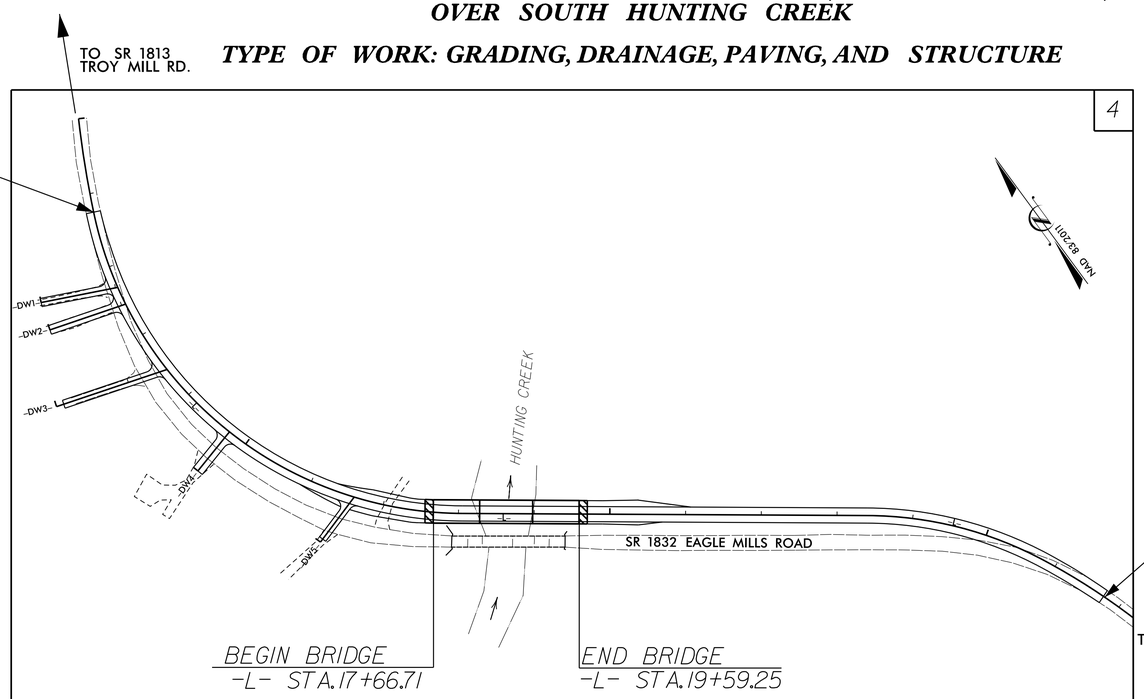
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

IREDELL COUNTY

LOCATION: REPLACE BRIDGE NO. 279 ON SR 1832 (EAGLE MILLS ROAD) OVER SOUTH HUNTING CREEK

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



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

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 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF ENVIRONMENT, MINERAL AND LAND RESOURCES.

PARRISH & PARTNERS

Prepared in the Office of:

PARRISH AND PARTNERS

6701 CARMEL ROAD
SUITE 210
CHARLOTTE, NC 28226

Designed by:

MONIKA SZOKE-FANCZAL, PE 4691

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.

25-AUG-2025 10:05
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User: LMORRIS

PROJECT REFERENCE NO.	SHEET NO.
B-5394	EC-02

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6701 CARMEL ROAD
SUITE 210
CHARLOTTE, NC 28226

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.
B-5394	EC-02A

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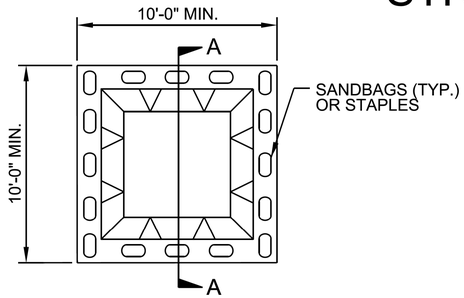
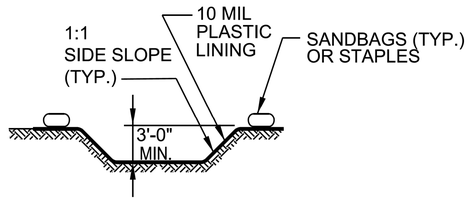
6701 CARMEL ROAD
SUITE 210
CHARLOTTE, NC 28226

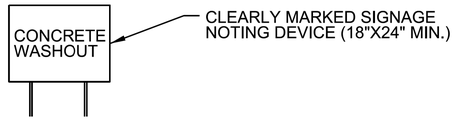
ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A



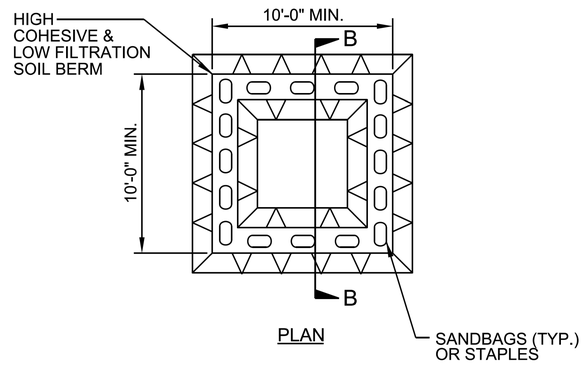
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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

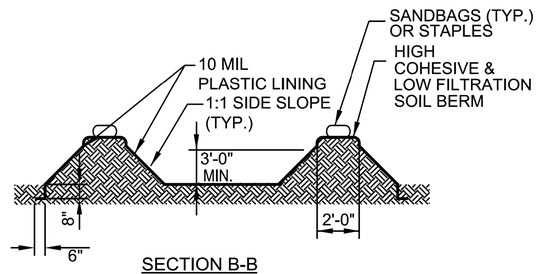
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARLY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

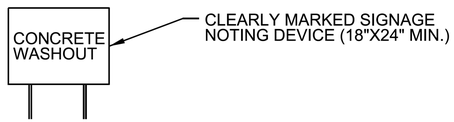
NOT TO SCALE



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 CLEARLY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
B-5394	EC-3A

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SUITE 210
CHARLOTTE, NC 28226

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

PROJECT REFERENCE NO.	SHEET NO.
B-5394	EC-3

PARRISH & PARTNERS
6701 CARMEL ROAD
SUITE 210
CHARLOTTE, NC 28226

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL IN DITCHES

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
EXCELSIOR					
4	L	11+50	17+00	LT	635
4	L	20+00	25+50	LT	635
			EXCELSIOR SUBTOTAL		1270
			MATTING SUBTOTAL		2800
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					13035
				TOTAL	13035
				SAY	13035

RIPRAP CL I FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	L	11+50	14+00	RT	137
				SUBTOTAL	137
MISCELLANEOUS RIPRAP TO BE INSTALLED AS DIRECTED BY THE ENGINEER					0
				TOTAL	137
				SAY	140

RIPRAP CL B FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (TONS)
4	L	14+00	15+50	RT	56
4	L	15+50	16+30	RT	37
4	L	16+70	17+70	RT	46
4	L	20+00	26+55	RT	301
4	L	17+00	17+90	LT	41
4	L	19+70	20+00	LT	14
				SUBTOTAL	495
MISCELLANEOUS RIPRAP TO BE INSTALLED AS DIRECTED BY THE ENGINEER					0
				TOTAL	495
				SAY	500

MATTING FOR EROSION CONTROL ON FILL SLOPES

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
EXCELSIOR					
4	L	17+25	17+75	LT	200
4	L	13+50	14+50	LT	415
4	L	17+50	17+66	RT	130
4	L	23+00	24+00	RT	390
			EXCELSIOR SUBTOTAL		1135
				TOTAL	1135
				SAY	1135
STRAW					
4	L	21+00	22+00	LT	395
			STRAW SUBTOTAL		395
				TOTAL	395
				SAY	395

PROJECT REFERENCE NO.	SHEET NO.
B-5394	EC-04/CONST.4

PARRISH & PARTNERS
6701 CARMEL ROAD
SUITE 210
CHARLOTTE, NC 28226

NAD 83/2011

REVISIONS 8/17/99

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 04

UTILIZE SPECIAL STILLING BASINS WHERE APPLICABLE

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

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

BEGIN TIP PROJECT B-5394 -L- STA. 11+25.00

END TIP PROJECT B-5394 -L- STA. 26+75.00

26 x 55 x 2 1.5 inch Skimmer with 0.75 inch Diameter Orifice 6 ft. weir ID 4.1 CG

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

Natural Ground, 2:1, d, D, 4:1 or Flatter, Fill Slope, Geotextile 272 SY
Min. D=1.5 Ft.
Max. d=1.0 Ft.

Type of Liner= 97 TONS, CLASS B Rip-Rap

FROM STA. 15+50 TO STA. 16+30 RT
FROM STA. 16+70 TO STA. 17+00 RT
FROM STA. 20+00 TO STA. 21+00 RT

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

Natural Ground, 2:1, d, D, Variable Fill Slope, Geotextile 117 SY
Min. D=1.5 Ft.
Max. d=1.0 Ft.

Type of Liner= 41 TONS, CLASS B Rip-Rap

FROM STA. 17+00 TO STA. 17+90 LT

DETAIL B
ROADWAY DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 4:1 or Flatter, Front Ditch Slope, Geotextile 916 SY
Min. D=1.5 Ft.
Max. d=1.0 Ft.

Type of Liner= 325 TONS, CLASS B Rip-Rap

FROM STA. 14+00 TO STA. 15+50 RT
FROM STA. 19+70 TO STA. 20+00 LT
FROM STA. 21+00 TO STA. 26+55 RT

DETAIL C
RIP RAP AT EMBANKMENT
(Not to Scale)

10' min., Ditch Grade, 1.0' min., 2.0 FT, GEOTEXTILE 75 SY

Type of Liner= 70 TONS, CLASS I Rip-Rap

FROM STA. 17+90 TO STA. 18+20 LT
FROM STA. 19+00 TO STA. 19+70 LT
FROM STA. 17+90 TO STA. 18+35 RT

DETAIL D
SPECIAL CUT DITCH
(Not to Scale)

2:1, d, D, 4:1 or Flatter, Front Ditch Slope, Geotextile 262 SY
Min. D=1.5 Ft.
Max. d=1.0 Ft.

Type of Liner= 137 TONS, CLASS I Rip-Rap

FROM STA. 11+50 TO STA. 14+00 RT

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

6:1, D, Variable Fill Slope, Geotextile 65 SY
Min. D=1.5 Ft.
Max. d=1.0 Ft.

Type of Liner= 31 TONS, CLASS I Rip-Rap

FROM STA. 17+00 TO STA. 17+50 RT

RETAIN
REMOVE E
SPECIAL CUT DITCH SEE DETAIL D
ROADWAY DITCH SEE DETAIL B
REPLACE CHAIN LINK FENCE LIKE-IN-KIND
REPLACE BLACK CHAIN LINK FENCE & GATE LIKE-IN-KIND
SPECIAL LATERAL 'V' DITCH SEE DETAIL A
SPECIAL LATERAL 'V' DITCH SEE DETAIL A-2
SPECIAL LATERAL 'V' DITCH SEE DETAIL E
CL 'I' RIP RAP EST 3 TONS EST 7 SY GEOTEXTILE
CL 'B' RIP RAP EST 3 TONS EST 10 SY GEOTEXTILE
RIP RAP AT EMBANKMENT SEE DETAIL C
BEGIN SBG STA 17+16 END SBG AT START OF APPROACH SLAB -L- LT
SEE INSET A
TB 2GI
GREU TL-3
TYPE-III
PUE
EAGLE MILLS ROAD SR 1832
YANCEY K. HOLCOMB DB 2255 PG 054
CHRISTOPHER W. NICHOLSON DB 2648 PG 121
JACK W. WEST and wife, MARY T. WEST DB 2298 PG 128
RICHARD S. HAMMER DB 1816 PG 939
SUE H. NELSON DB 1816 PG 902
DORALD J. HOLCOMB DB E-868
MARY BLANCHE KENNEDY DB 745 PG 435, DB 742 PG 865

PROJECT REFERENCE NO.	SHEET NO.
B-5394	EC-05/CONST.04

PARRISH & PARTNERS
6701 CARMEL ROAD
SUITE 210
CHARLOTTE, NC 28226

NAD 83/2011

8/17/99

REVISIONS

For Slopes Excavated Greater Than 10 feet Install Matting for Erosion Control on Entire Slope as Work Allows.
Sta. 13+50 to Sta. 14+50 LT
Sta. 21+00 to Sta. 22+00 LT
Sta 17+50 to Sta. 17+66 RT
Sta. 23+00 to Sta. 24+00 RT

Place Matting for Erosion Control on Slope as Work Allows.
Sta. 17+25 to Sta. 17+75 LT

UTILIZE FABRIC INSERT INLET PROTECTION IN LIEU OF ROCK INLET SEDIMENT TRAPS, TYPE-C AS DIRECTED TO AVOID IMPOUNDMENT OF RUNOFF IN ROADWAY OPEN TO TRAFFIC.

6 UTILIZE SPECIAL STILLING BASINS WHERE APPLICABLE

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

BEGIN TIP PROJECT B-5394
-L- STA. 11+25.00

RETAIN

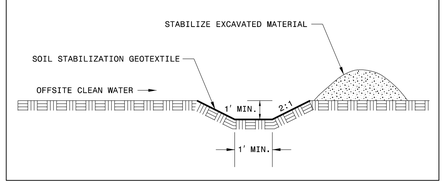
1 VANEDA K. HOLCOMB DB 2255 PG 054

+25.00 EX. R/W
+40.00 EX. R/W
+40.00 40.00
60'
18'
20' TYP.
+51.00
SPECIAL CUT DITCH SEE DETAIL D
+00.00 40.00 LT
50' TRANS.
+75.00
+00.00 40.00
REMOVE E
0403
+00.00 110.00
SPECIAL CUT DITCH SEE DETAIL D
SPECIAL CUT DITCH SEE DETAIL D
REMOVE E
+55.00 115.00
+15.00 EX. R/W
+05.00 145.00
ROADWAY DITCH SEE DETAIL B
+50.00 55.00 LT
REMOVE E
+30.00 145.00
+60.00 83.00
0404
REMOVE R 10'
+21.00 103.00
+31.00 72.00
+81.00 EX. R/W
0405
+81.00 70.00
3 MOLLY R. NICHOLSON CHRISTOPHER W. NICHOLSON DB 2646 PG 1274
REPLACE BLACK CHAIN LINK FENCE & GATE LIKE-IN-KIND
SPECIAL LATERAL 'V' DITCH SEE DETAIL A
+96.08 70.95 RT
+96.83 95.68 RT
+00.18 95.56 RT
+99.94 85.44 RT
0406
PUE
REPLACE BLACK CHAIN LINK FENCE & GATE LIKE-IN-KIND
REPLACE CHAIN LINK FENCE LIKE-IN-KIND
VANEDA K. HOLCOMB DB 2255 PG 054
1
SPECIAL CUT DITCH SEE DETAIL D
2 SUE H. NELSON DB 1591 PG 102
4 RICHARD S. HAMMER DB 1816 PG 938
SEE INSET A
+00.00 45.00 LT
SPECIAL LATERAL 'V' DITCH SEE DETAIL A-2
0401 TB 2GI
+50.00 45.00 LT
CL 'I' RIP RAP EST 3 TONS EST 7 SY GEOTEXTILE
0402
BEGIN SBG STA 17+16 END SBG AT START OF APPROACH SLAB -L- LT
RIP RAP AT EMBANKMENT SEE DETAIL C
RIP RAP AT EMBANKMENT SEE DETAIL C
ROADWAY DITCH SEE DETAIL B
+00.00 55.00 LT
+87.92 70.83 LT
+92.18 62.03 LT
+85.30 55.00 LT
+91.52 72.58 LT
+00.03 55.00 LT
20' TYP.
+39.80
7 MARY BLANCHE KENNEDY DB 745 PG 433 DB 742 PG 865
8:1 GREU TL-3
TYPE-III
GREU TL-3
TYPE-III
GREU TL-3
TYPE-III
GREU TL-3
TYPE-III
20' TYP.
+69.30
+89.90 83.04 RT
+07.79 67.00 RT
+93.59 81.49 RT
+97.26 90.31 RT
+93.57 91.85 RT
PUE
CWD ← CWD ← CWD ← CWD ← CWD ←
ROADWAY DITCH SEE DETAIL B
SPECIAL LATERAL 'V' DITCH SEE DETAIL A
+24.09 86.47 RT
+27.63 86.43 RT
+27.51 96.58 RT
+24.16 96.60 RT
20' TYP.
+50.00
CL 'B' RIP RAP EST 3 TONS EST 10 SY GEOTEXTILE
SPECIAL LATERAL 'V' DITCH SEE DETAIL A
SPECIAL LATERAL 'V' DITCH SEE DETAIL E
RIP RAP AT EMBANKMENT SEE DETAIL C
5 JACK W. WEST and wife, MARY T. WEST DB 2298 PG 1281
7 MARY BLANCHE KENNEDY DB 745 PG 433 DB 742 PG 865
+05.00 55.00 LT EX. R/W
+60.00 55.00
+60.00 EX. R/W
+53.00 50' TYP.
+52.08 EX. R/W
+25.00
+75.00 40.00
50' TRANS.
+75.00 EX. R/W
END TIP PROJECT B-5394
-L- STA. 26+75.00

CLEAN WATER DIVERSION

→ → CWD → → CWD → → CWD → → CWD → →

(Not to Scale)



DESIGN SYSTEM: 99
USERNAME:
TIME: 99

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T.I.P.: B-5394

CONTRACT: DL00306

$$$$$$SYSTIME$$$$
$$$$$$

Docusign Envelope ID: 2CD9D6E2-AE14-45AF-9DDC-626A09490783

401 QUANTITY REQ'D 2

FLUORESCENT YELLOW/GREEN BACKGROUND

36 X 36
S3-1

ONE SIGN POST PER SIGN

406 QUANTITY REQ'D 13

18 X 24
W1-8R

MOUNT BEHIND SIGN 405
IN 13 INSTALLATIONS

402 QUANTITY REQ'D 1

36 X 36
W1-2L

ONE SIGN POST PER SIGN

407 QUANTITY REQ'D 1

36 X 36
W1-2R

ONE SIGN POST PER SIGN

403 QUANTITY REQ'D 2

36 X 36
W1-5L

ONE SIGN POST PER SIGN

404 QUANTITY REQ'D 4

24 X 24
W13-1P

MOUNT BELOW SIGN 402 IN 1 INSTALLATION
MOUNT BELOW SIGN 403 IN 2 INSTALLATIONS
MOUNT BELOW SIGN 407 IN 1 INSTALLATION

405 QUANTITY REQ'D 13

18 X 24
W1-8L

INSTALL ON ONE "U" POST PER SIGN
INSTALLATION HEIGHT: BOTTOM OF SIGN SHALL BE A
MINIMUM OF 4 FT ABOVE THE EDGE OF TRAVEL LANE ELEVATION
ALL OTHER PORTIONS OF ROADWAY STANDARD DRAWING 904.50 APPLY

TIP NO.	SHEET NO.
B-5394	SIGN-2

APPROVED: Signed by: Matthew Ferguson (CR) 9F942261E2D14B9...

DATE: 8/22/2025

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044480 MATTHEW B. FERGUSON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PARRISH & PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
www.parrishandpartners.com

SIGN NUMBER: 301,302
TYPE: D
QUANTITY: 2

SIGN WIDTH: 42"
HEIGHT: 24"
TOTAL AREA: 7 Sq.Ft.

BORDER TYPE: FLUSH
RADII: 3"
WIDTH: 0.75"
RECESS: 0"

NO. Z BARS:
LENGTH:

BACKG COLOR: Green
COPY COLOR: WHITE

SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0MM) ALUMINUM

USE NOTES

1. Legend and border (except those that are colored black) shall be direct applied Grade C sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: RRH CHECKED BY: MBF DATE: Jul 25, 2025
PROJECT ID: B-5394 DIV: 12

MOUNT ON ONE U-POST PER SIGN

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	H	u	n	t	l	n	g													Series/Size Text Length
7.26"	5.34"	4.74"	4.14"	3.06"	2.16"	4.44"	3.6"	7.26"												D 2000 27.48"
	C	r	e	e	k															D 2000
10.8"	5.28"	2.76"	4.14"	4.38"	3.84"	10.8"														20.4"

TYPE 'D' & 'E' SIGNS

Docusign Envelope ID: 2CD9D6E2-AE14-45AF-9DDC-626A09490783

TIP NO.	SHEET NO.
B-5394	SIGN-3

APPROVED: Signed by: Matthew Ferguson 9F942261E2D14B9...

DATE: 8/22/2025

SEAL

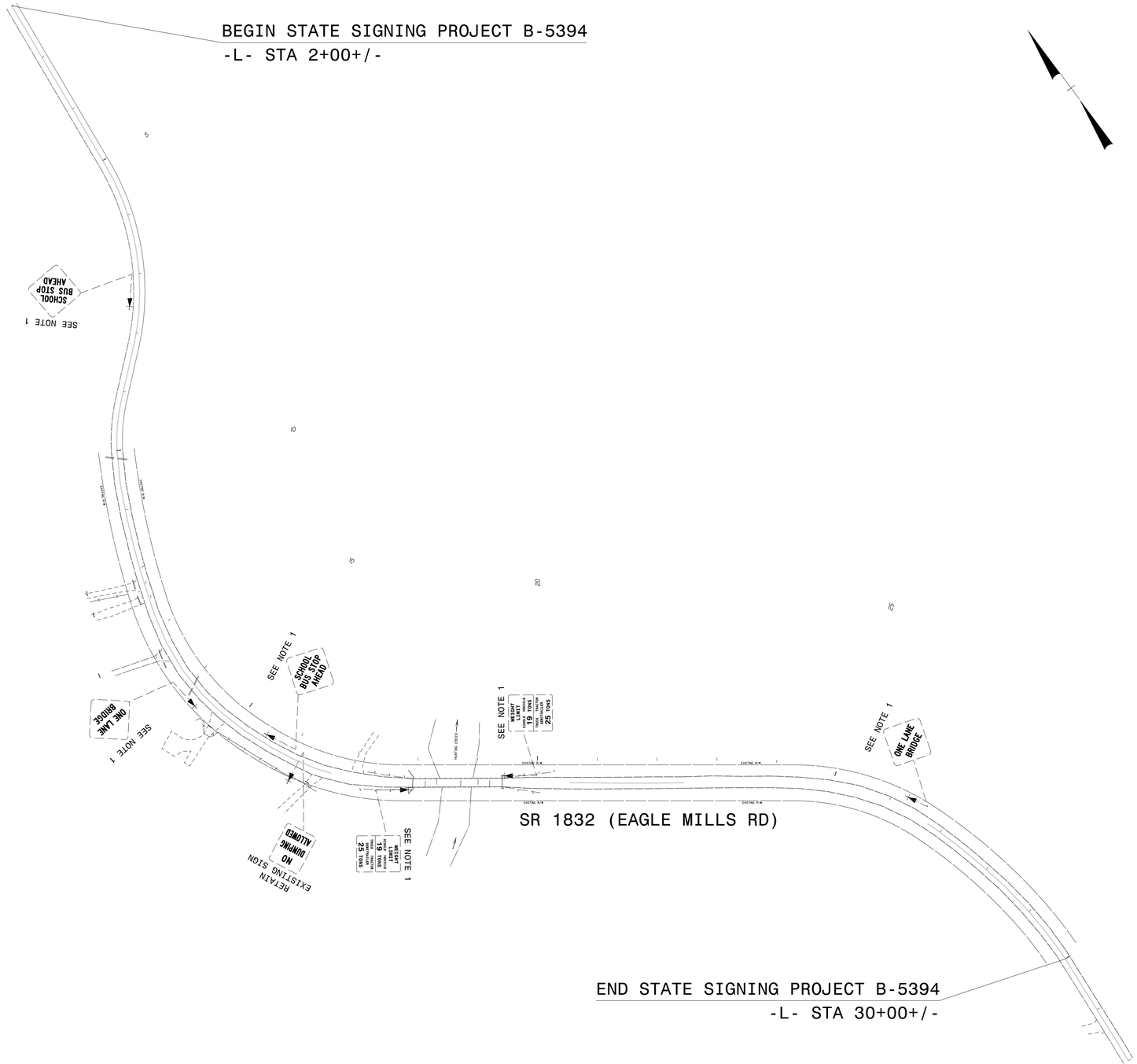
NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B. FERGUSON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PARRISH & PARTNERS

Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
www.parrishandpartners.com

BEGIN STATE SIGNING PROJECT B-5394
-L- STA 2+00+/-



END STATE SIGNING PROJECT B-5394
-L- STA 30+00+/-

PROJECT NOTE

1 DISPOSAL OF SIGN SYSTEM , U-CHANNEL

EXISTING SIGNING
SR 1832 (EAGLE MILLS RD)
-L- STA 2+00 TO 32+00

$$$$$$SYSTIME$$$$$
$$$$$$

Docusign Envelope ID: 2CD9D6E2-AE14-45AF-9DDC-626A09490783

BEGIN STATE SIGNING PROJECT B-5394
-L- STA 2+00+/-

SR 1832 (EAGLE MILLS RD)

END STATE SIGNING PROJECT B-5394
-L- STA 30+00+/-

EXISTING SIGN NO DUMPING ALLOWED

-L- STA 19+75 Hunting Creek 42" X 24" 302

-L- STA 17+55 Hunting Creek 42" X 24" 301

TIP NO.	SHEET NO.
B-5394	SIGN-4

APPROVED: Signed by: Matthew Ferguson 9F942261E2D14B9...

DATE: 8/22/2025

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 044480 ENGINEER MATTHEW B. FERGUSON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

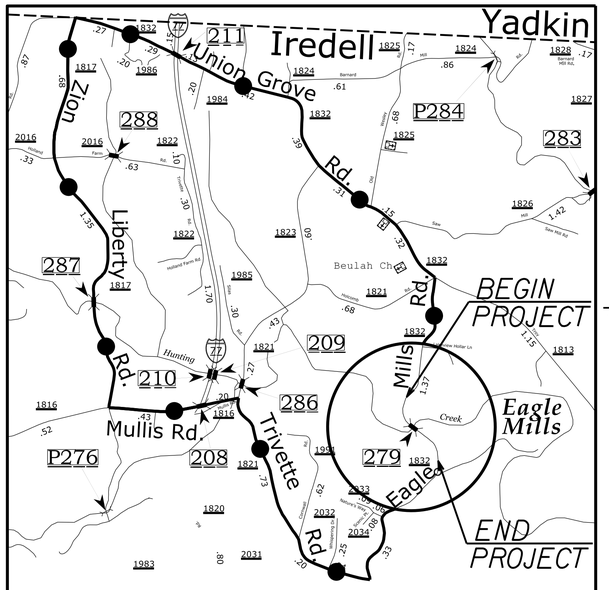
PARRISH & PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
www.parrishandpartners.com

PROPOSED SIGNING
SR 1832 (EAGLE MILLS RD)
-L- STA 2+00 TO 32+00

$$$$$$SYSTIME$$$$$
$$$$$$

12/1/23

TIP PROJECT: B-5394



DETOUR VICINITY MAP N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

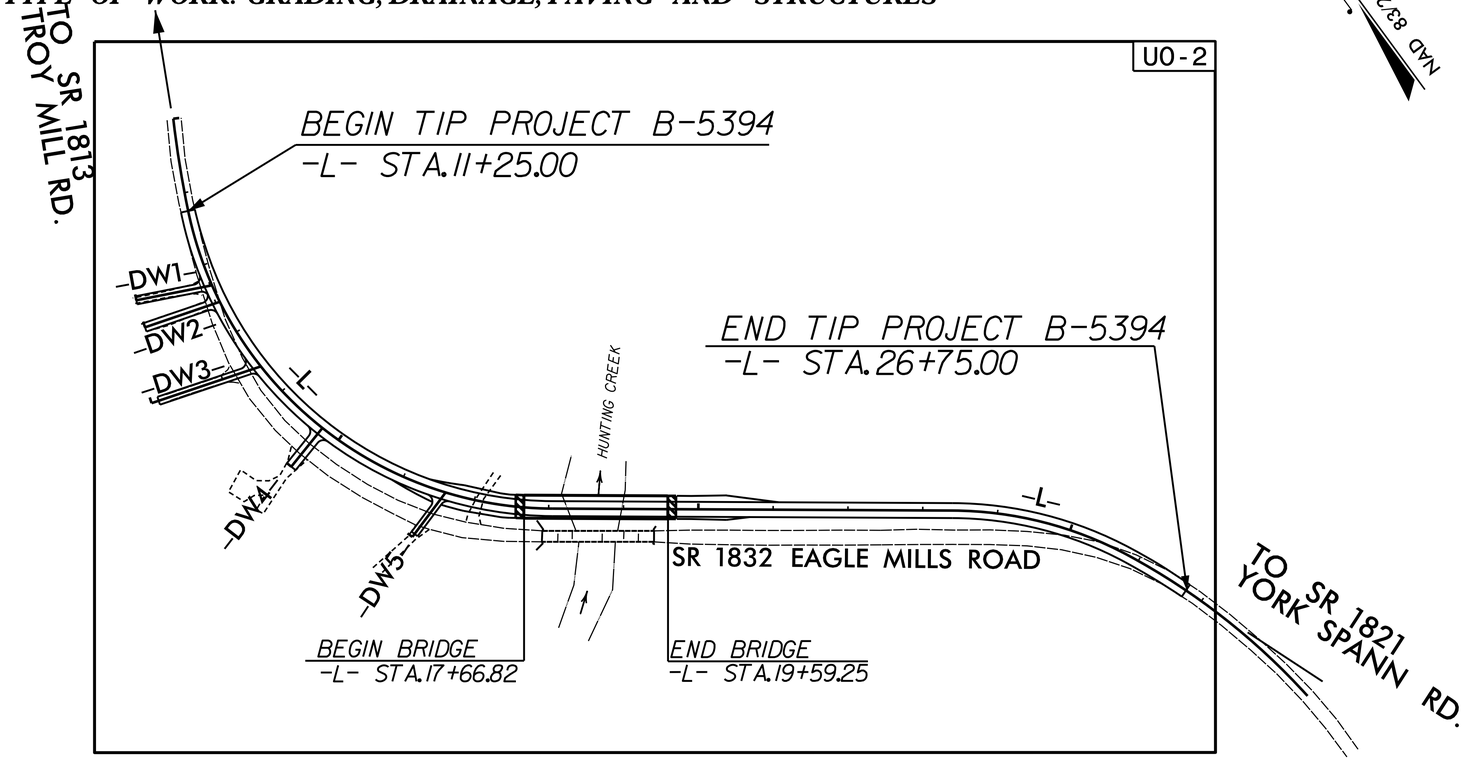
UTILITIES BY OTHERS PLANS
IREDELL COUNTY

T.I.P. NO.	SHEET NO.
B-5394	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.

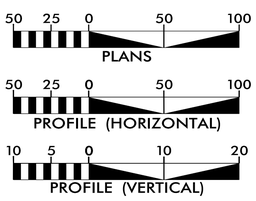
LOCATION: REPLACE BRIDGE NO. 279 ON SR 1832 (EAGLE MILLS ROAD) OVER SOUTH HUNTING CREEK

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES



NAD 83/2011

GRAPHIC SCALES



INDEX OF SHEETS

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

UTILITY OWNERS WITH CONFLICTS

(A) FIBER - ZIRRUS
(B) POWER - ENERGY UNITED

UCC
Utility Coordination Consultants
P.O.Box 450
Mineral Springs, NC 28108
704-844-9093

_____ *UTILITY PROJECT ENGINEER*
_____ *PROJECT UTILITY COORDINATOR*
JIM CARLSON *DESIGN UTILITY COORDINATOR*

DIVISION OF HIGHWAYS
DIVISION 12
1710 E. MARION ST.
SHELBY, NC 28151

WARREN ANDERSON *DIVISION UTILITY ENGINEER*
JOSH WHITE PE PLS *DIV. BRIDGE PROJ. ENGINEER*

PROJECT REFERENCE NO.	SHEET NO.
B-5394	U0-2
THIS SHEET CORRESPONDS TO RDY SHEET 4	

UTILITIES BY OTHERS

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.

Proposed Zirrus temporary underground line

Proposed Zirrus underground line to be installed after project is complete

Existing Poles
Owner: Energy United
Attached: Zirrus

Proposed Pole
Owner: Energy United
Attached: Zirrus

Removed Poles
Owner: Energy United
Attached: None

Proposed Zirrus overhead line

Existing Poles
Owner: Energy United
Attached: Zirrus

Zirrus handholes and underground lines to be abandoned

Replaced Pole
Owner: Energy United
Attached: Zirrus

Replaced Pole
Owner: Energy United
Attached: Zirrus

Proposed Poles
Owner: Energy United
Attached: None

1 VANEDA K. HOLCOMB

VANEDA K. HOLCOMB

1

2 SUE H. NELSON

3 MOLLY R. NICHOLSON
CHRISTOPHER W. NICHOLSON

4 RICHARD S. HAMMER

5 JACK W. WEST and wife,
MARY T. WEST

6 OPAL J. HOLCUMB

7 MARY BLANCHE KENNEDY

7 MARY BLANCHE KENNEDY

NC GRID
NAD 83 NA 2011

10 15 20 25

EAGLE MILLS ROAD SR 1832

HUNTING CREEK

EXISTING R/W

PROP O/H POW LINES

PUE

UCC
Utility Coordination Consultants
P.O.Box 450
Mineral Springs, NC 28108
704-844-9093
DSS

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-5394	X-1

PARRISH&PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr Suite 100 Raleigh, NC 27615
Tel. (984) 459-8280 License No. P-1212
www.parrishandpartners.com

CROSS SECTION INDEX OF SHEETS

ALIGNMENT	SHEET NO.	SHEET SUBTOTALS
-L-	X2 - X13	12
-DW1-	X14	1
-DW2-	X15	1
-DW3-	X16	1
-DW4-	X17	1
-DW5-	X18	1
TOTAL CROSS SECTION SHEETS		17

8/7/2025
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RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

PROJ. REFERENCE NO.	SHEET NO.
B-5394	X-1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
11+25.00	0	0
11+50.00	15	1
12+00.00	147	2
12+50.00	257	0
13+00.00	477	0
13+50.00	635	0
14+00.00	727	0
14+50.00	833	0
15+00.00	678	0
15+50.00	441	0
16+00.00	208	23
16+50.00	56	58
17+00.00	38	262
17+50.00	151	705
17+66.71	42	159

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
19+59.25	0	0
20+00.00	26	121
20+50.00	181	189
21+00.00	369	41
21+50.00	531	0
22+00.00	712	0
22+50.00	833	0
23+00.00	842	0
23+50.00	907	0
24+00.00	982	0
24+50.00	877	0
25+00.00	682	0
25+50.00	463	0
26+00.00	233	0
26+50.00	84	1
26+75.00	15	0

Station DW1	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+00.00	0	0
10+50.00	59	0
10+92.91	82	0

Station DW2	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+00.00	0	0
10+50.00	72	0
10+95.46	121	0

Station DW3	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+10.00	0	0
10+50.00	34	0
11+00.00	115	0
11+43.42	135	0

Station DW4	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+00.00	0	0
10+50.00	5	10
10+56.34	15	1

Station DW5	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+05.00	0	0
10+50.00	3	6
10+63.64	0	21

Approximate quantities only. Fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the lump sum price for "Grading".

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-2

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

890 885 880 875 870

0.060 876.58 0.060

2:1 4:1

SHEAR –DW2–

873.74

879.03

12 + 50.00

890 885 880

0.060 882.44 0.055

2:1 4:1 4:1 2:1

879.60 879.49

883.34

12 + 00.00

895 890 885 880 875

0.071 887.38 0.030

2:1 4:1 4:1 2:1

884.48 885.58

887.45

11 + 50.00

895 890 885 880

MATCH 889.45 EXIST.

889.45

11 + 25.00

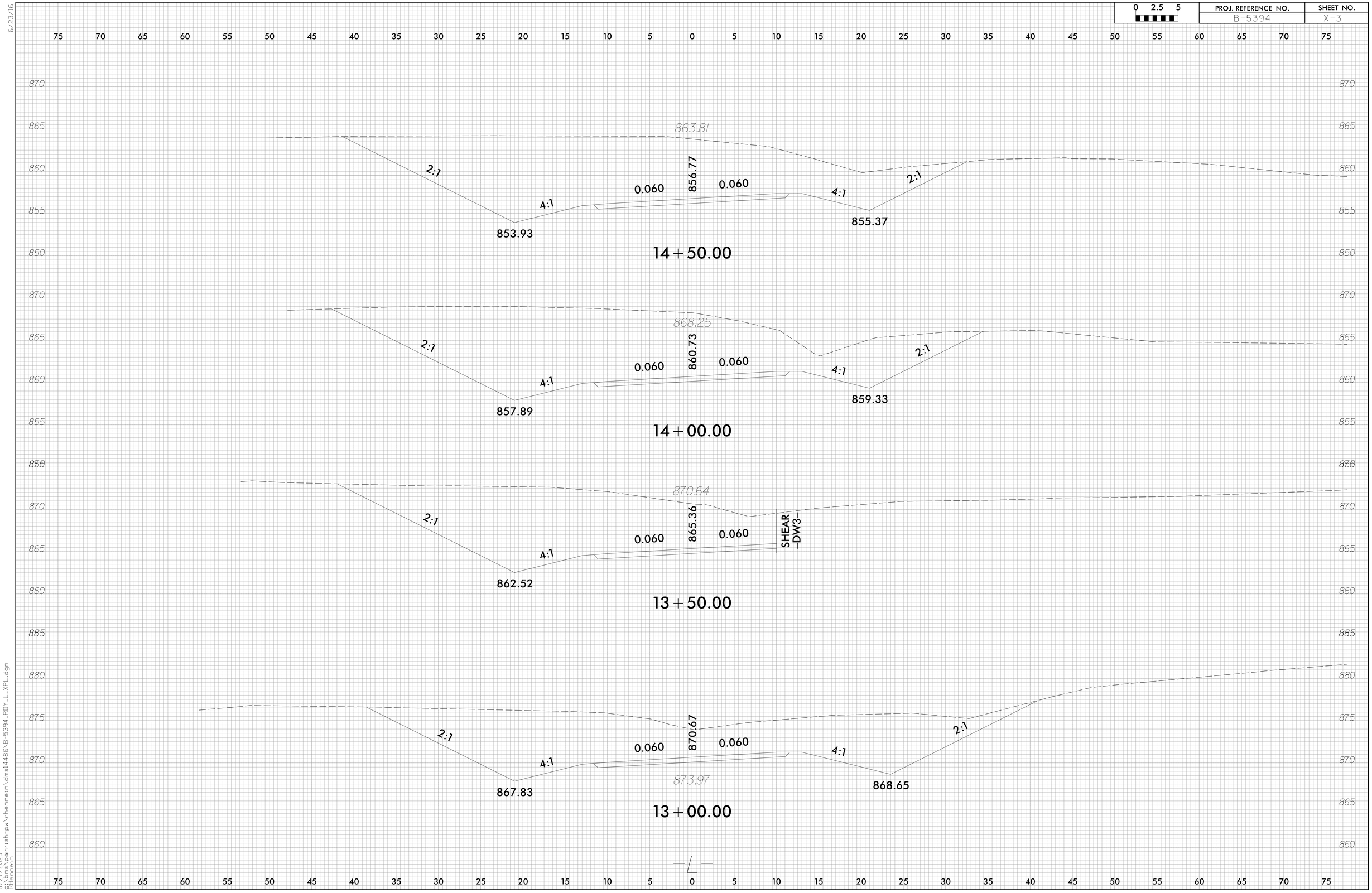
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

8/27/2025
Cummins-pw\rhennein\dms14486\B-5394_RDY_L_XPL.dgn
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-3



8/27/2025
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RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-4

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

855 850 845 840

0.060 847.64 0.060

2:1 4:1

844.58

SHEAR —DW5—

845.33

16+50.00

855 850 845

0.060 848.92 0.060

2:1 4:1 4:1 2:1

846.08 846.00

848.49

16+00.00

855 850 845

0.060 850.86 0.060

2:1 4:1 4:1 2:1

848.02 849.46

853.38

15+50.00

865 860 855 850 845

0.060 853.48 0.060

2:1 4:1 4:1 2:1

850.64 852.08

858.06

15+00.00

—L—

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

8/27/2025
C:\Users\rish-pw\rhennein\dms14486\B-5394_RDY_L_XPL.dgn
RHennein

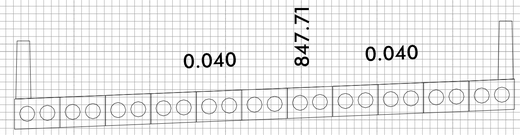
Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

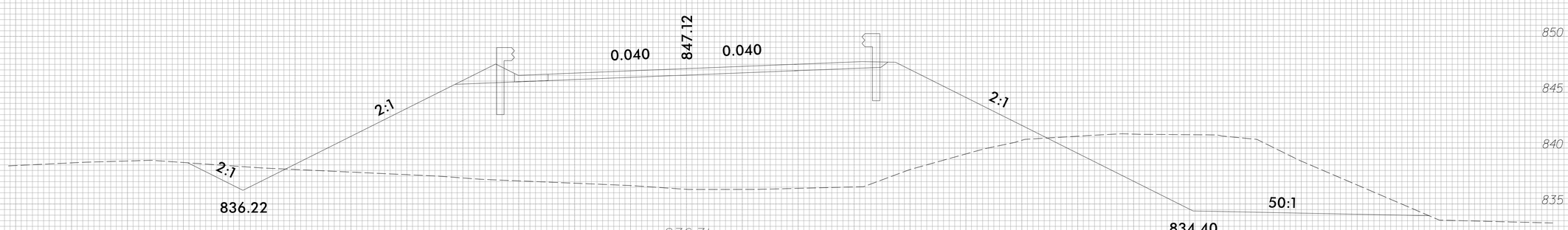
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-5

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

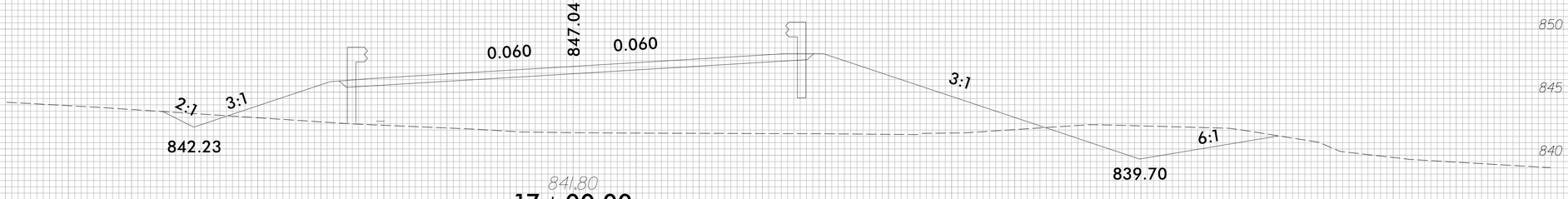
855 850 845 840 835 830 825 820



829.61
18+00.00



836.31
17+50.00



841.80
17+00.00

8/27/2025
K:\Durham\Durrish-pw\rhennein\dms14486\B-5394_RDY_L_XPL.dgn
RHennein

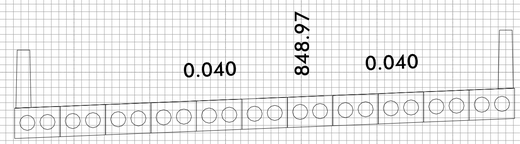
Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-6

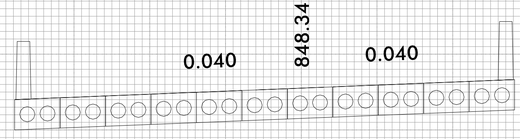
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

855 850 845 840 835 830 825 820 815



821.85
19+00.00

855 850 845 840 835 830 825 820 815



817.59
18+50.00

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

8/27/2025
C:\Users\rish-pw\rhennein\dms14486\B-5394_RDY_L_XPL.dgn
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

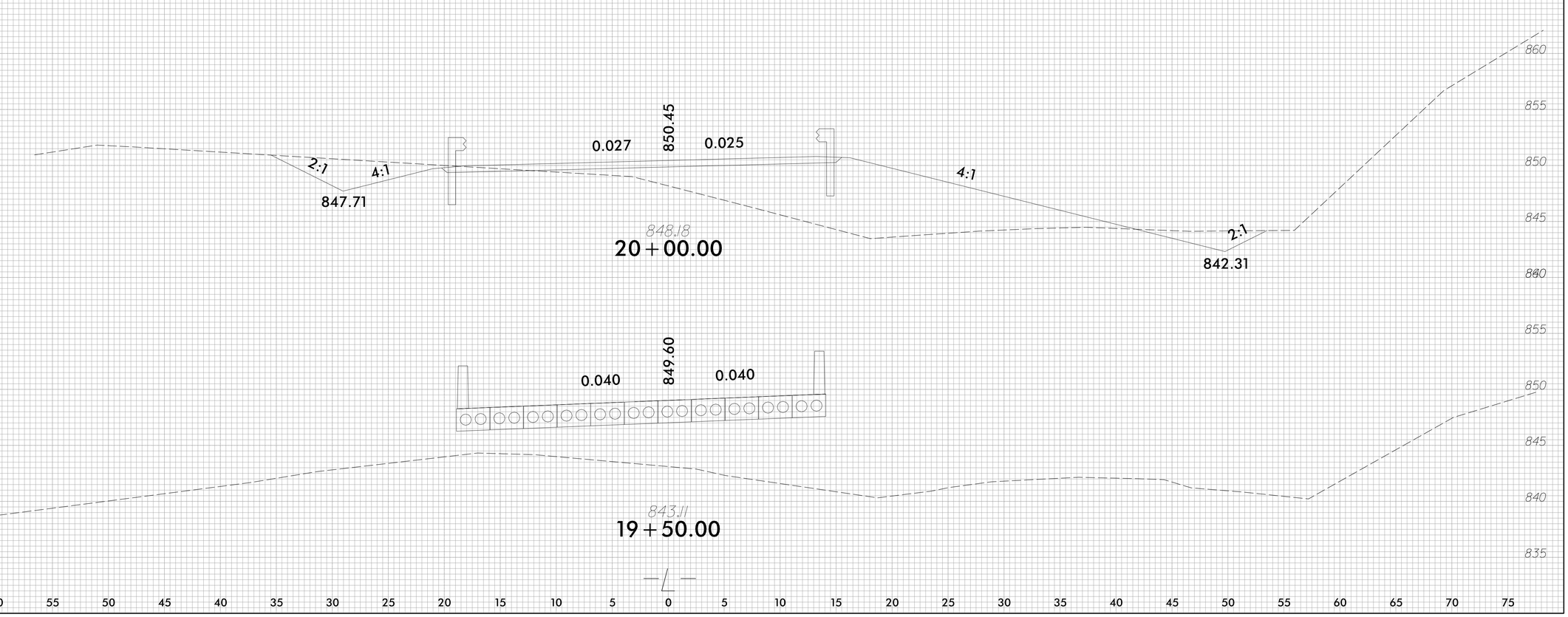
6/23/16

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
B-5394	X-7

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

880 875 870 865 860 855 850 845 840 835



8/27/2025
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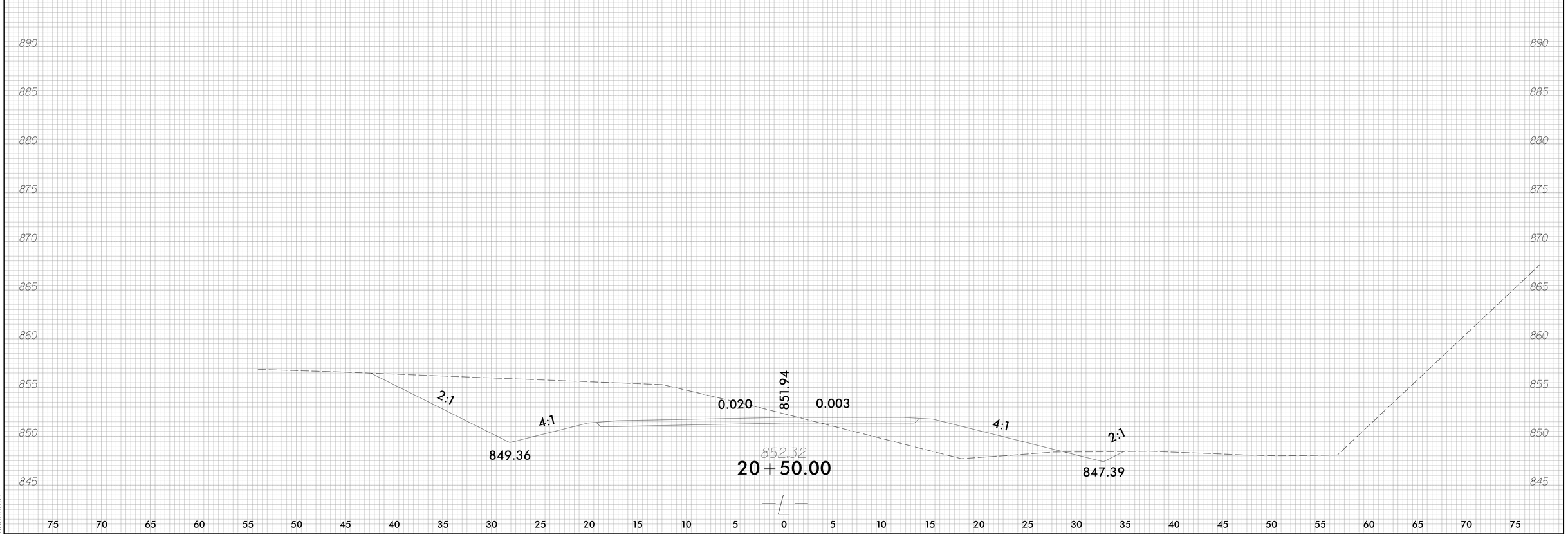
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-8



8/27/2025
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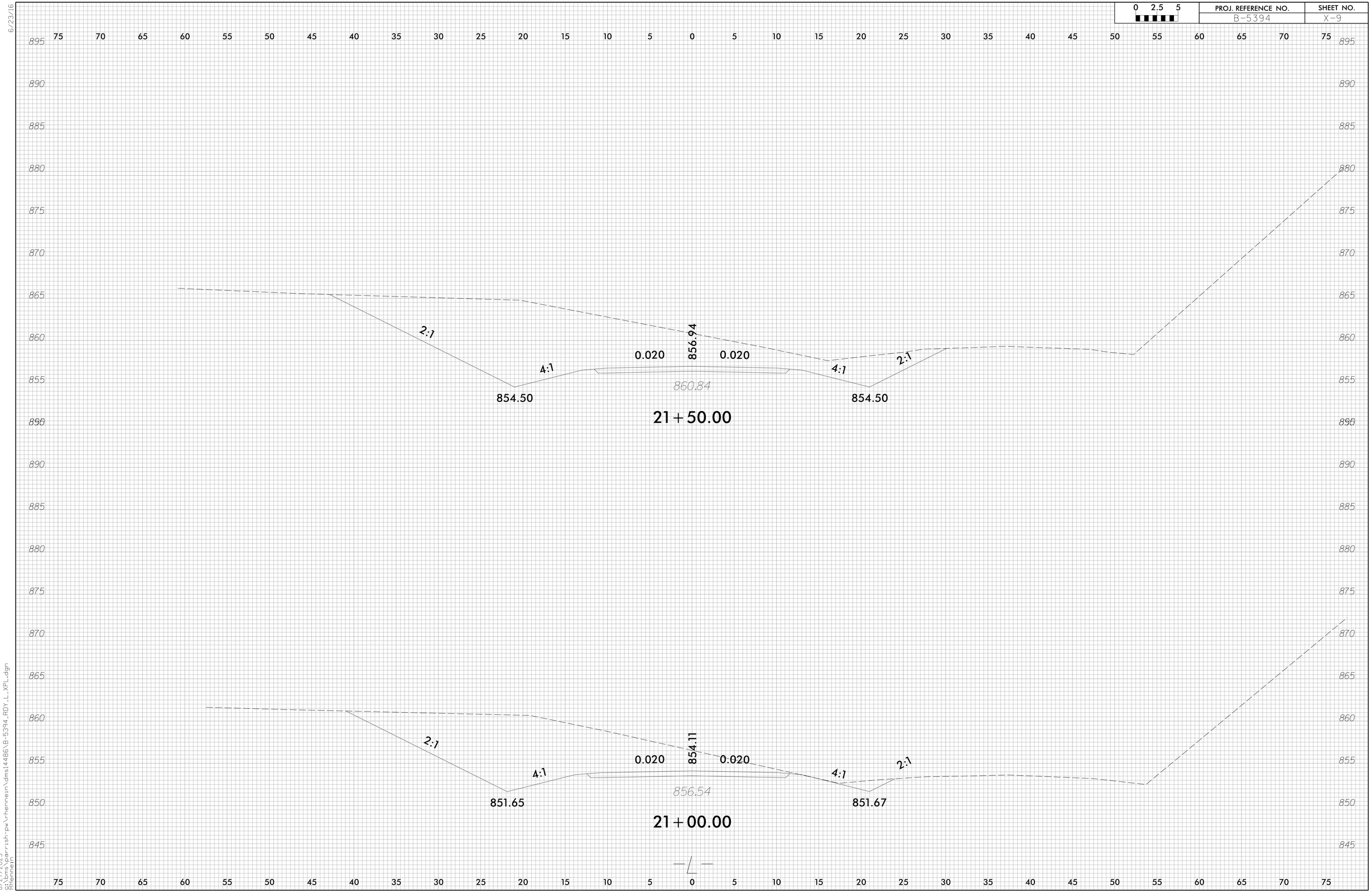
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-9



8/27/2025
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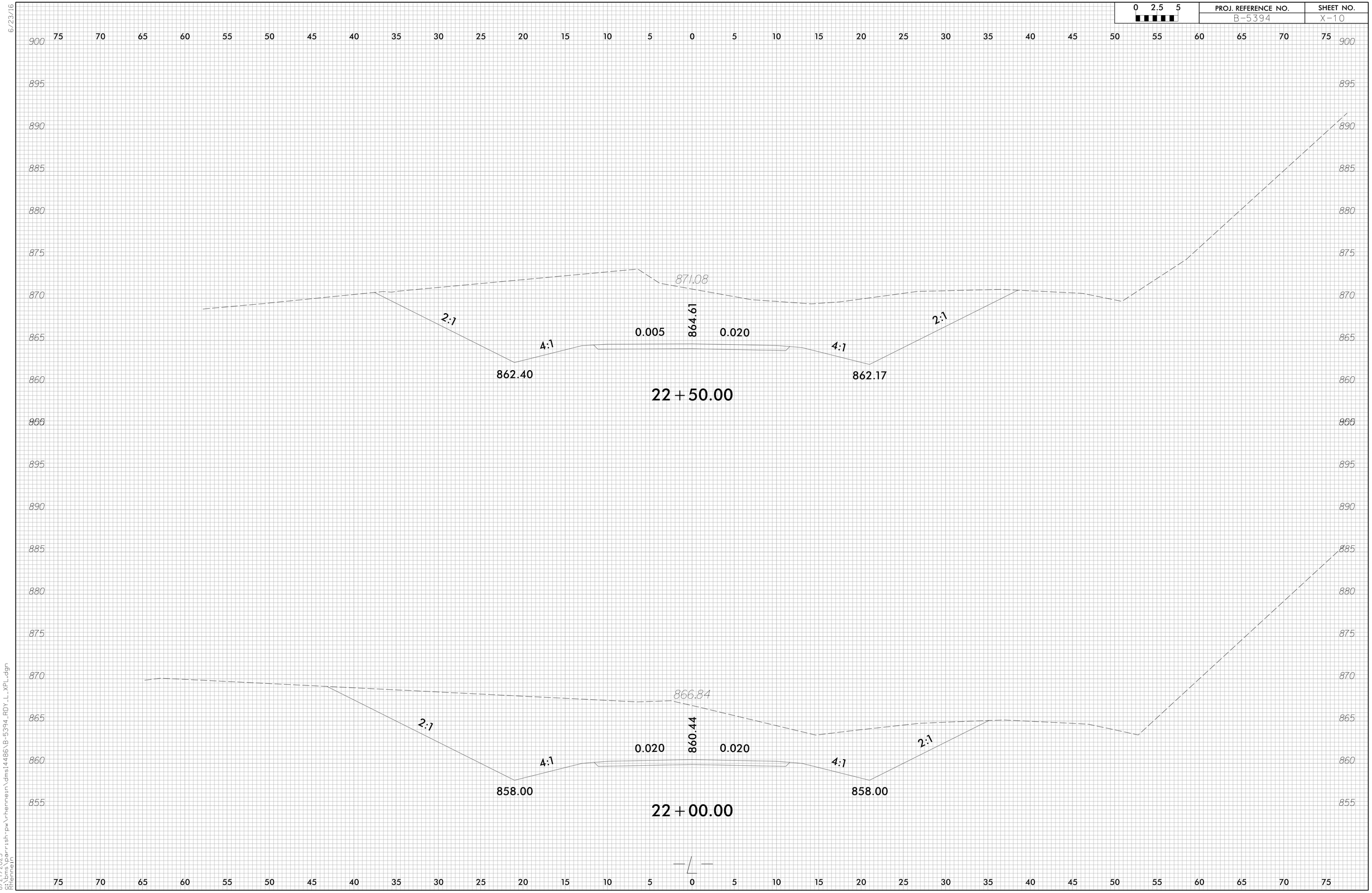
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-10



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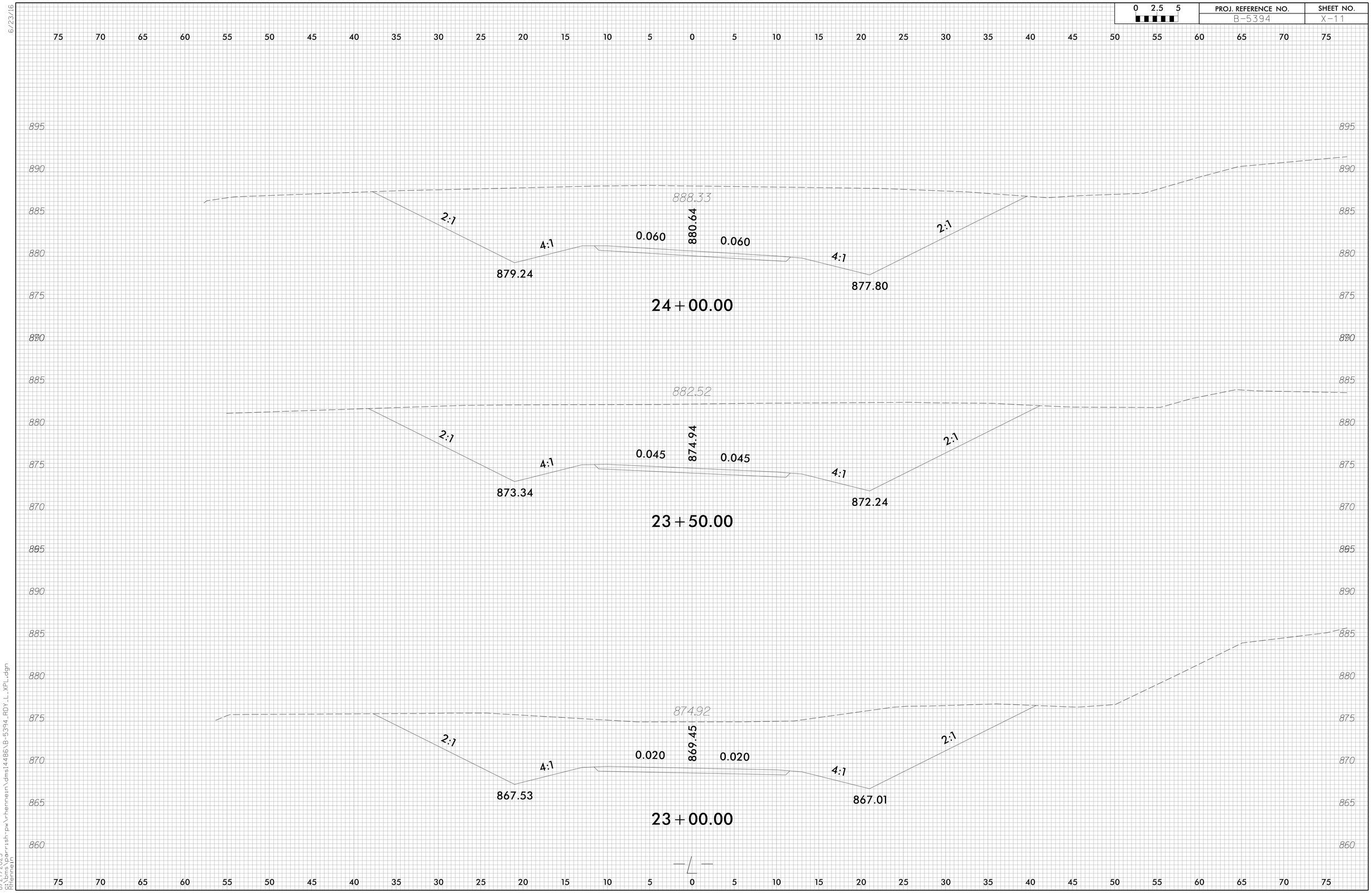
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-11



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RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-12

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

915
910
905
900
895
890
885
880

901.09

897.75

2:1 4:1 0.060 0.060 4:1 2:1

896.35 894.91

25+50.00

896.99

892.04

2:1 4:1 0.060 0.060 4:1 2:1

890.64 889.20

25+00.00

892.71

886.34

2:1 4:1 0.060 0.060 4:1 2:1

884.94 883.50

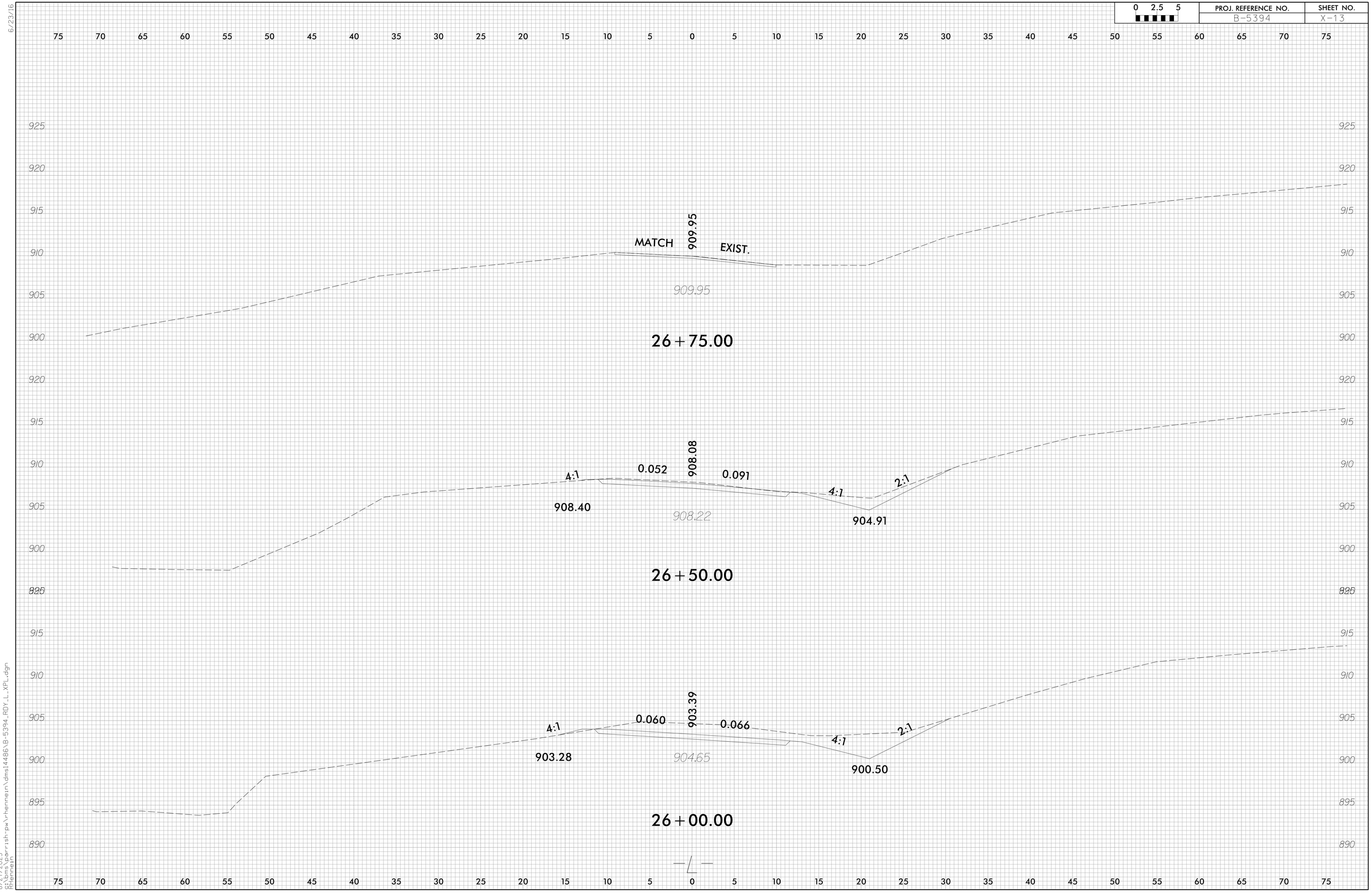
24+50.00

8/27/2025
C:\Users\garrish-pw\rhennein\dms14486\B-5394_RDY_L_XPL.dgn
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-13



8/27/2025
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rhennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-14

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

890
885
880
881.15
875

11+00.00

890
885
880
875

2:1 883.34 2:1
0.020 0.020
885.48

10+50.00

900
895
889.87
MATCH EXIST.
890
889.87
885

10+00.00

880

—DW1—

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

8/27/2025
Kimley»Horn
C:\Users\rish-pa\rhennein\dms14486\B-5394_RDY_DW1_XPL.dgn
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-15

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

890
885
880
875

879.22

11+00.00

890
885
880
875

2:1 0.020 881.05 0.020 2:1

883.81

10+50.00

895
890
885
880

MATCH 888.40 EXIST.

888.40

10+00.00

-DW2-

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

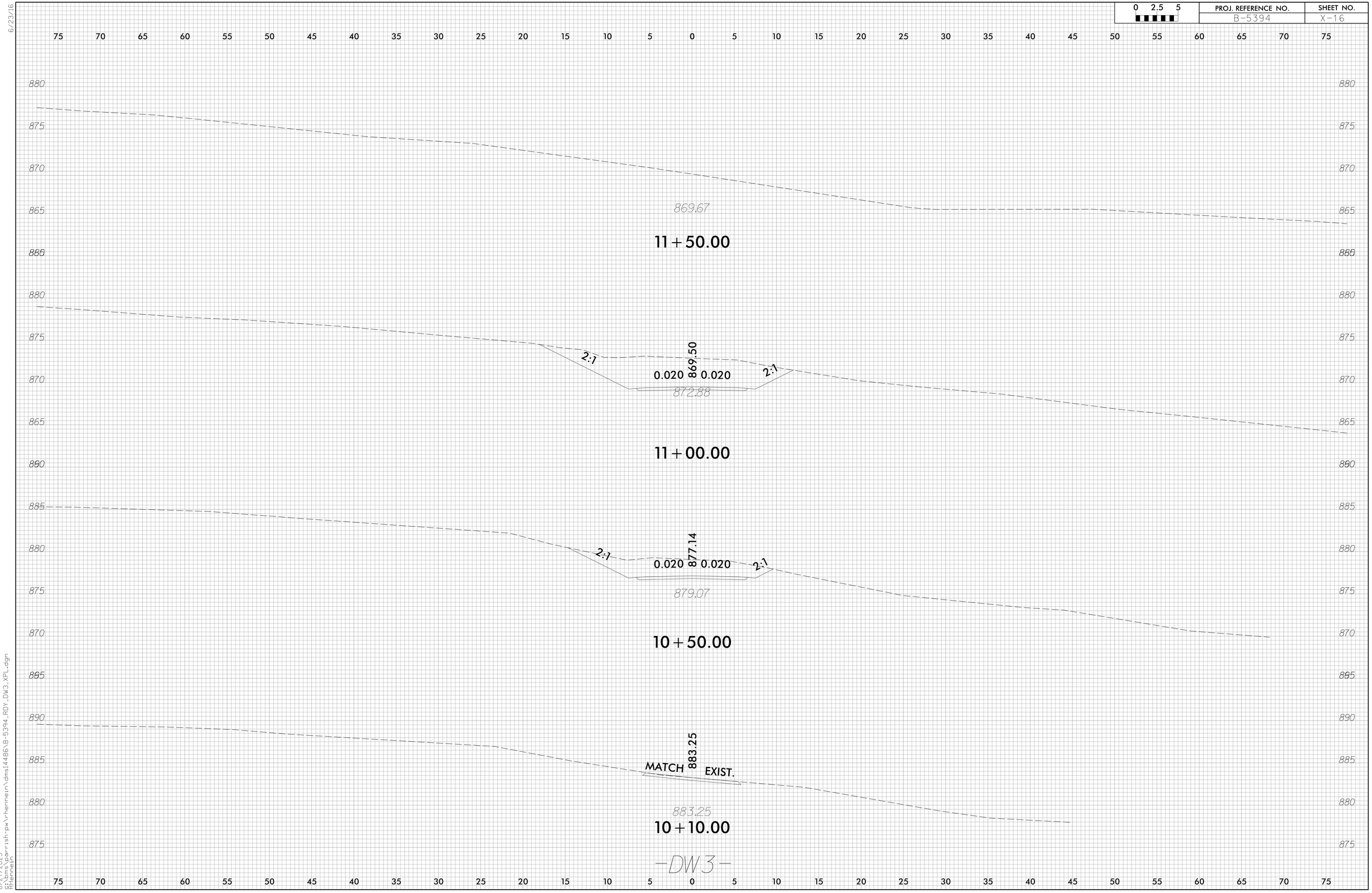
8/27/2025
Kimley-Horn
Rhennein

I:\projects\harrish-pa\rhennein\dms\44486\B-5394_RDY_DW2_XPL.dgn

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-16



8/27/2025
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RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
B-5394	X-17

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

865
860
855
850
845

855.80
0.020
0.020
2:1
858.40
10.82:1

10+50.00

858.58
MATCH EXIST.
858.58

10+00.00

-DW4-

8/27/2025
C:\Users\rish-pw\rhennein\dms14486\B-5394_RDY_DW4_XPL.dgn
RHennein

Docusign Envelope ID: 30834C10-59F1-4A0C-92FA-0EA0B0837C77

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	X-18

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

855
850
845
840
835

847.86
2:1 0.020 0.020 2:1

843.03

10 + 50.00

MATCH EXIST. 844.15

844.15

10 + 05.00

843.94

10 + 00.00

-DW5-

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

8/27/2025
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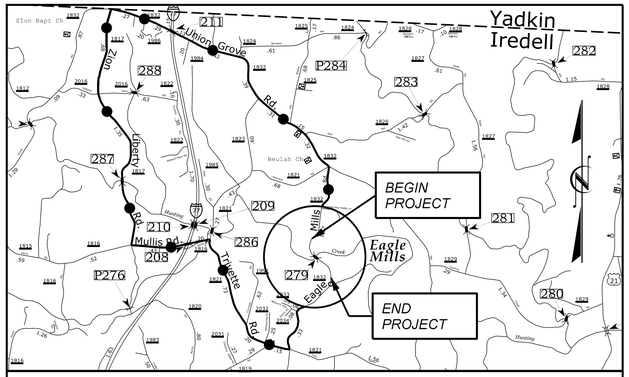
RHennein

TIP PROJECT: B-5394

CONTRACT: DL00306



DETOUR

VICINITY MAP N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

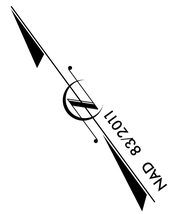
IREDELL COUNTY

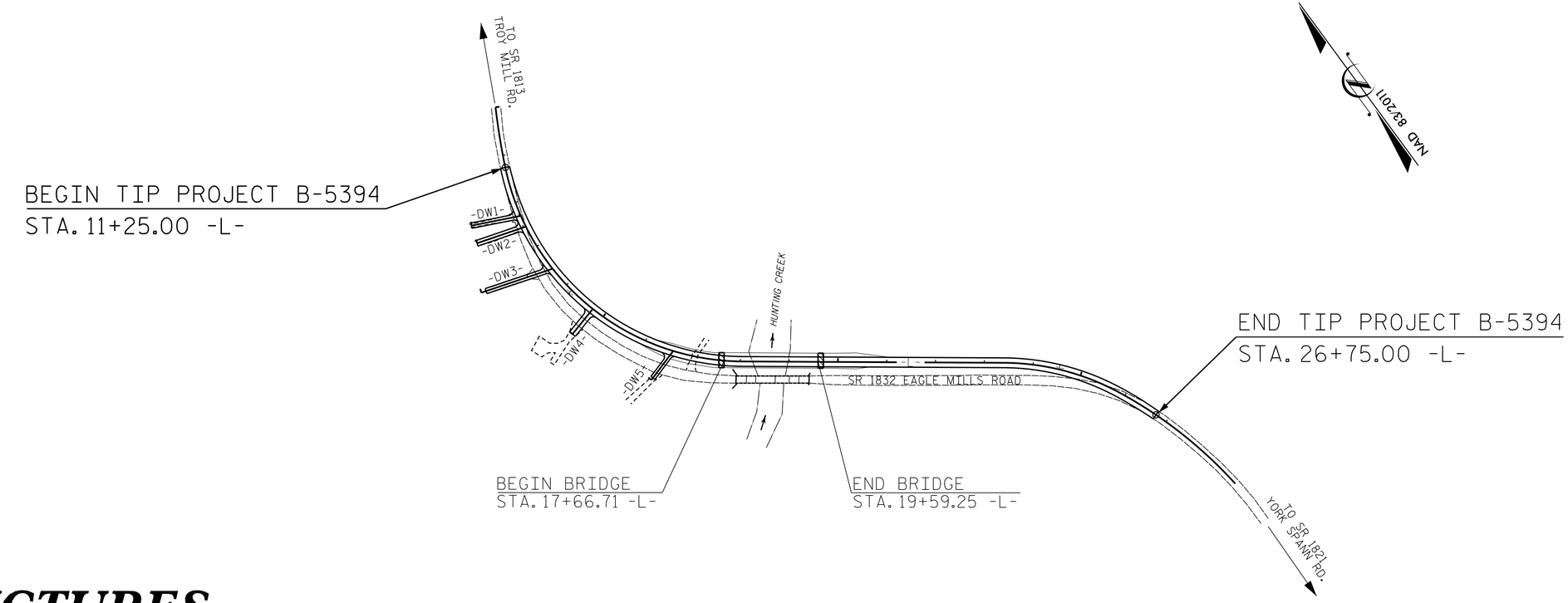
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5394		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46109.1.1	N/A	P.E.
46109.1.2	N/A	ROW
46109.1.3	N/A	CONST.

LOCATION: REPLACE BRIDGE No. 279 ON SR 1832 (EAGLE MILLS ROAD) OVER SOUTH HUNTING CREEK

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE





STRUCTURES

DESIGN DATA

ADT 2024 = 240
ADT 2044 = 350
V = 60 MPH
FUNC CLASS = LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5394 = 0.258 MILES
LENGTH STRUCTURE TIP PROJECT B-5394 = 0.036 MILES

TOTAL LENGTH TIP PROJECT B-5394 = 0.294 MILES

Prepared By:
PARRISH & PARTNERS
220 Horizon Dr.
Suite 100
Raleigh, N.C. 27615

2018 STANDARD SPECIFICATIONS

LETTING DATE :

SEPTEMBER 23, 2025

Prepared For:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

ADAM PARRISH, PE
PROJECT ENGINEER

WAEL ARAFAT, PE
PROJECT DESIGN ENGINEER

Docusign Envelope ID: 0C6251F1-5AD3-40DD-9CF2-7D9DFEA94164

(-)12.0000% (+)1.2614%

PI = 15+20.00
EL = 844.18
VC = 493'

GRADE DATA -L-

(+)1.2614% (+)11.4057%

PI = 21+50.00
EL = 852.12
VC = 380'

GRADE DATA -L-

17+50 18+00 18+50 19+00 19+50 20+00

870 860 850 840 830 820 810

BEGIN FRONT SLOPE
STA. 17+59.80 -L-
OFFSET RIGHT 2'-0 11/16" (RADIAL)
EL. 847.21

1'-7" MIN. BERM
NORMAL TO CAP (TYP.)

FILL FACE @ END BENT #1
STA 17+66.82 -L-
OFFSET RIGHT 1'-5 9/16" (RADIAL)
EL. 847.29

FIX.

LOW CHORD EL. 844.33

SPAN A SPAN B SPAN C

FIX. FIX. FIX. FIX. FIX.

EL. 836.0±

1'-0" MIN. EARTH BERM (TYP.)

EXCAVATE TO EL. 832.0± GRADE TO DRAIN (TYP.)

1½:1 SLOPE NORMAL TO CAP (TYP. EXCEPT WHERE NOTED)

3'-6" TYP.

EL. 831.0±

APPROX. NATURAL GROUND

TOP OF DRILLED PIER EL. 822.5

EL. 837.20 (Q100)

EL. 835.0 (Q25)

TEMP. WORK PAD EL. 823.5 (TYP.)

1.5:1

EL. 818.0±

NORMAL WATER SURFACE EL. 821.5

EL. 819.0±

1.5:1

TOP OF DRILLED PIER EL. 822.5

EL. 822.0±

EL. 820.0±

1'-6" TO LIMITS OF UNCLASSIFIED STRUCTURE EXCAVATION (TYP.)

LOW CHORD EL. 846.64

EL. 842.0±

2'-0" TYP.

CLASS II RIP RAP (TYP.)

STREAMBANK STABILIZATION 2'-0" THICK CLASS II RIP RAP W/ GEOTEXTILE (ROADWAY PAY ITEM) (TYP.)

FILL FACE @ END BENT #2
STA 19+59.25 -L-
GRADE PT. EL. 849.72

BEGIN FRONT SLOPE
STA. 19+66.74 -L-
GRADE PT. EL. 849.82

EL. 847.0±

HP 12X53 STEEL PILES (TYP.)

END BENT 1 BENT 1 BENT 2 END BENT 2

SECTION ALONG -L-

UNCLASSIFIED STRUCTURE EXCAVATION

FILL FACE @ END BENT #1
STA 17+66.71 -L-

1'-1½"

BEGIN APPROACH SLAB
STA 17+55.80 -L-

-L-

EXTENDED TANGENT

BEGIN APPROACH SLAB
STA 17+56.03 -L-
OFFSET RIGHT
2'-4 15/16" (RADIAL)

PT STA 18+05.06 -L-

85°36'19" TAN. TO CURVE

90°0'0"

FRONT FACE OF APPROACH SLAB

W.P. #1
STA 17+66.82 -L-
OFFSET RIGHT
1'-5 9/16" (RADIAL)

DETAIL "A"

192'-6" (FILL FACE TO FILL FACE ALONG EXTENDED TANGENT)

96'-3" 96'-3"

61'-2¼" 35'-0¾" 35'-0¾" 61'-2¼"

N49°28'00"W

1'-0" MIN. EARTH BERM EL. 839.11 LT. EL. 840.67 RT.

BENT 1 CONTROL LINE

BENT 2 CONTROL LINE

1'-0" MIN. EARTH BERM EL. 841.45 LT. EL. 843.01 RT.

HUNTING CREEK

FILL FACE @ END BENT 1

TO SR 1813

STA 17+66.71 -L-

BEGIN APPROACH SLAB
STA. 17+55.80 -L-

EXTENDED TANGENT

BEGIN FRONT SLOPE
STA. 17+59.80 -L-

W.P. #1
STA 17+66.82 -L-

SEE DETAIL "A"

W.P. #2
STA 18+27.94 -L-

5'-0" TYP.

1.5:1 TYP.

PT STA 18+05.06 -L-

TEMP. WORK PAD (TYP.)

W.P. #3
STA 18+98.06 -L-

BRIDGE I.D.
STA 18+63.00 -L-

90°0'0" (TYP. TO -L- AND EXTENDED TANGENT)

W.P. #4
STA 19+59.25 -L-

END APPROACH SLAB
STA 19+70.13 L-

TO SR 1821

BEGIN FRONT SLOPE
STA. 19+66.74 -L-

FILL FACE @ END BENT 2

HORIZONTAL CURVE DATA -L-

PI Sta 15+29.46
△ = 77°52' 49.6" (LT)
D = 11°27' 33.0"
L = 679.64'
T = 404.03'
R = 500.00'

EXISTING STRUCTURE

STREAMBANK STABILIZATION 2'-0" THICK CLASS II RIP RAP W/ GEOTEXTILE (ROADWAY PAY ITEM) (TYP.)

CLASS II RIP RAP (TYP.)

PLAN

PILES, COLUMNS AND DRILLED PIERS NOT SHOWN FOR CLARITY.

BENT

CLASS B RIP RAP

1'-0"

STREAMBANK STABILIZATION

CLASS II RIP RAP

SECTION A-A

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

DocuSigned by: Wael Arafat 7807F1ACBAB54A2...

8/28/2025

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I HERE BY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PARRISH & PARTNERS

Parrish and Partners of North Carolina, PLLC
220 Horizon Dr., Suite 100
Raleigh, NC 27615

NC License #P-1212

PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 1 OF 4 REPLACES BRIDGE #480279

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER HUNTING CREEK ON SR 1832 (EAGLE MILLS ROAD) BETWEEN SR 1813 AND SR 1821

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : G.C. MORRIS DATE : 06-23
CHECKED BY : W.S. ARAFAT DATE : 09-23
DESIGN ENGINEER OF RECORD: O. PUIGCERVER DATE : 07-23

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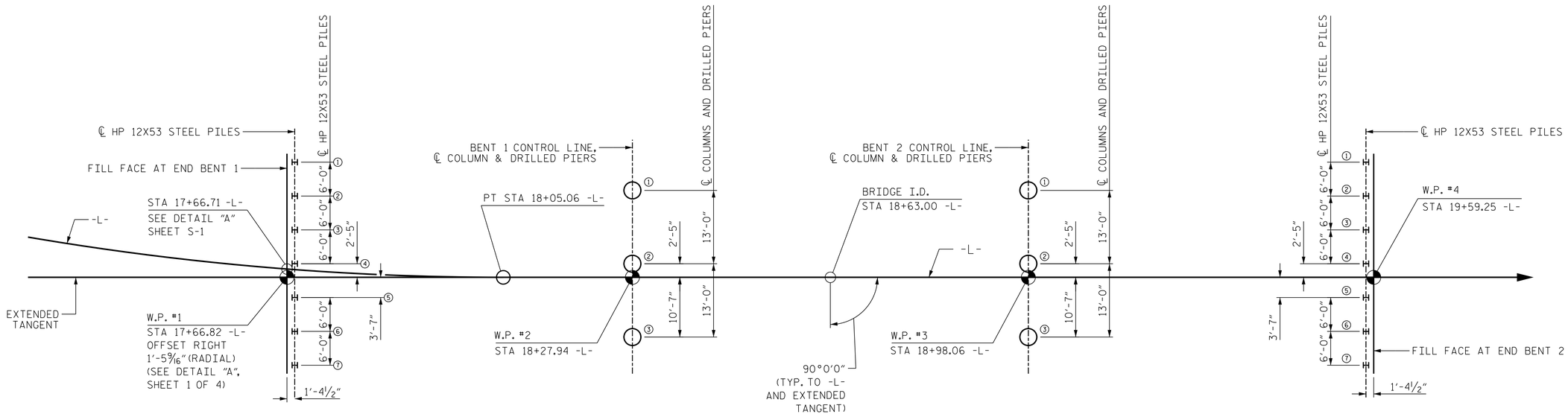
NAD 83/2011

(#) INDICATES PILE OR DRILLED PIER NUMBER



NOTES:

1 FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

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

3 DRILLED PIERS AT BENT NO. 1 AND BENT NO. 2 REQUIRE PILOT BORINGS THAT WILL BE USED TO DETERMINE THE REQUIRED TIP NO HIGHER THAN ELEVATION. EACH PILOT BORING SHALL BE ADVANCED TO AN ELEVATION OF 785 FEET. THE ENGINEER WILL REVIEW THE RESULTS INCLUDING ROCK CORES TO DETERMINE THE TIP ELEVATION FOR EACH DRILLED PIER. SEE GEOTECHNICAL SPECIAL PROVISION FOR PILOT BORINGS.

4 OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND BRIDGE APPROACH FILL BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NO. 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS. BEFORE BEGINNING THE WAITING PERIOD, INSTALL HUBS IN THE SUBGRADE AT LOCATIONS CORRESPONDING TO THE CENTER OF THE APPROACH SLAB AND AT EACH CORNER OF THE END OF THE APPROACH SLAB. SURVEY THE HUBS INITIALLY AND EVERY 3 TO 4 DAYS THEREAFTER FOR RELATIVE MOVEMENT AND SUBMIT THE DATA TO THE ENGINEER WEEKLY. THE ENGINEER WILL DETERMINE WHEN THE WAITING PERIOD ENDS AND BRIDGE APPROACH SLAB CONSTRUCTION CAN BEGIN.

FOR OTHER FOUNDATION NOTES, SEE SHEET 3 OF 4

FOUNDATION LAYOUT

DIMENSIONS LOCATING DRILLED PIERS ARE SHOWN TO THE DRILLED PIER CENTERLINE.

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

DocuSigned by: Wael Arafat 7807F1ACBAB54A2...

8/28/2025

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IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER HUNTING CREEK ON SR 1832 (EAGLE MILLS ROAD) BETWEEN SR 1813 AND SR 1821

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			22

DRAWN BY :	G.C. MORRIS	DATE :	06-23
CHECKED BY :	W.S. ARAFAT	DATE :	08-25
DESIGN ENGINEER OF RECORD:	O. PUIGCERVER	DATE :	07-23

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SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent 1, Piles 1-7	7	148	See Substructure Plans	40			250							
End Bent 2, Piles 1-7	7	148	See Substructure Plans	25			250							
TOTAL QUANTITY:														

$^{*}\ RDR = \frac{Factored\ Resistance\ +\ Factored\ Drag\ Load\ +\ Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance\ +\ Nominal\ Resistance\ from\ Scourable\ Material$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent 1, Piles 1-7	148			0.6		
End Bent 2, Piles 1-7	148			0.6		

* Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Number of Piers per Line	Factored Resistance per Pier KIPS	*** Estimated Drilled Pier Tip Elevation FT	Required Tip Resistance per Pier KSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier LIN FT	*** Drilled Pier Length* per Pier LIN FT	Drilled Pier Length Not In Soil* per Pier LIN FT	Drilled Pier Length In Soil* per Pier LIN FT	Permanent Steel Casing Required? YES	*** Permanent Steel Casing Tip Elevation (Elevation Not To Extend Casing Below) FT	*** Permanent Steel Casing Length** per Pier LIN FT
Bent 1, Piers 1-3	3	718	796.50	80	807.00	6	26			YES	807.70	14.8
Bent 2, Piers 1-3	3	717	796.50	80	807.00	6	26			YES	807.70	14.8
TOTAL QUANTITY:							156					88.8

* Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "36-inch Dia. Drilled Piers" or "36-inch Dia. Drilled Piers Not in Soil" and "36-inch Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications. For bents with a not in soil pay item, drilled piers through air or water will be paid at the contract unit price for "36-inchDia. Drilled Piers in Soil."

** Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation and is measured and paid for as "Permanent Steel Casing for 36-inch Dia. Drilled Pier" in accordance with Article 411-7 of the NCDOT Standard Specifications.

*** Estimated Drilled Piers Tip Elevations and Other Quantities Marked with *** Provided for Bidding Purposes Only. Actual Tip Elevations and Quantities will be Based on Results of Pilot Borings. See Special Provision for Pilot Borings.

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) EACH	Crosshole Sonic Logging (CSL) EACH	Thermal Integrity Profiler (TIP) EACH	Shaft Inspection Device (SID) EACH	Pile Integrity Test (PIT) EACH
Bent 1, Piers 1-3		3			
Bent 2, Piers 1-3		3			
TOTAL QUANTITY:		6			

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Stacie E. Mitchell, PE, #032125) on 08-06-2025.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, TIPs, CSL Testing, SID Inspections and PITs when necessary.

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

DocuSigned by: Wael Arafat 780F1ACBAB54A2...

8/29/2025

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PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER HUNTING CREEK ON SR 1832 (EAGLE MILLS ROAD) BETWEEN SR 1813 AND SR 1821

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : G.C. MORRIS DATE : 06-23
CHECKED BY : W.S. ARAFAT DATE : 08-25
DESIGN ENGINEER OF RECORD: O. PUIGCERVER DATE : 07-23

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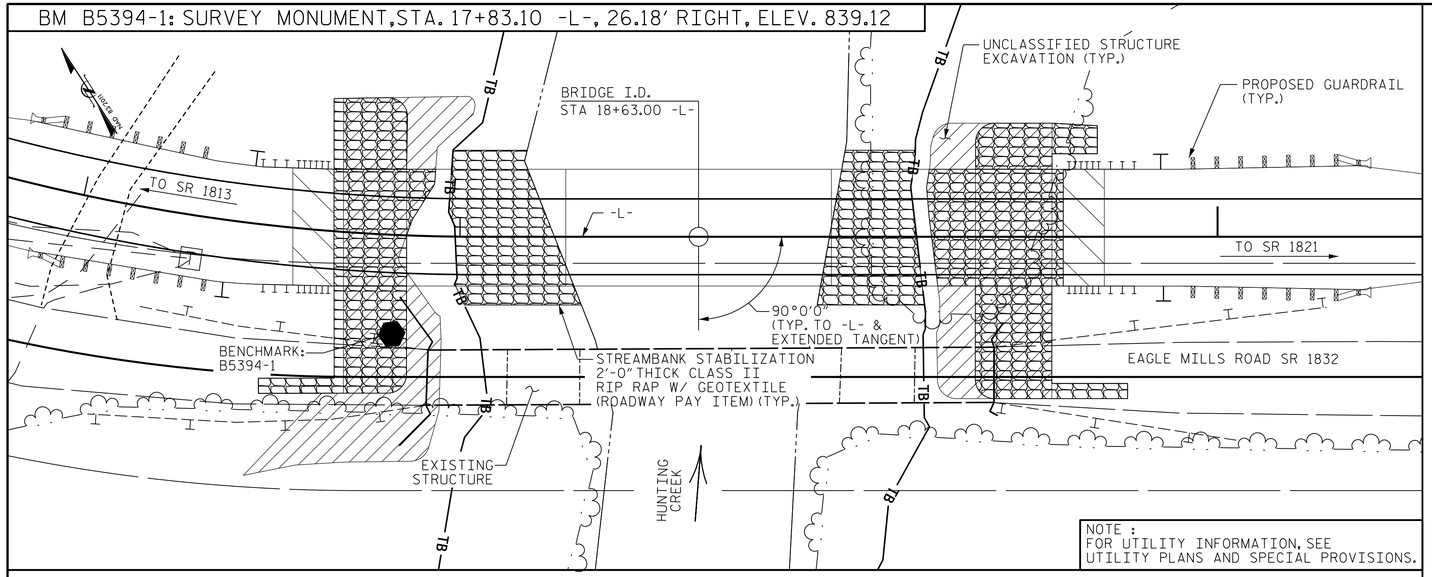

LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	8900 CFS
FREQUENCY OF DESIGN FLOOD	25 YRS.
DESIGN HIGH WATER ELEVATION	835.0 FT.
DRAINAGE AREA	86.5 SQ. MILES
BASE DISCHARGE (Q100)	12108 CFS
BASE HIGH WATER ELEVATION	837.20 FT

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	30400 CFS
FREQUENCY OF OVERTOPPING FLOOD	500+ YRS
OVERTOPPING FLOOD ELEVATION	847.8 FT. *

* OT OCCURS AT ROADWAY SAG, STA. 17+19.61 RT. SHOULDER

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	*** 3'-0" DRILLED PIER	*** PERMANENT STEEL CASING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	EACH	LUMP SUM	CU. YDS.	LUMP SUM
SUPERSTRUCTURE									LUMP SUM
END BENT 1								21.8	
BENT 1				78	44.4	3		23.5	
BENT 2				78	44.4	3		24.0	
END BENT 2								21.8	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	156	88.8	6	LUMP SUM	91.1	LUMP SUM

TOTAL BILL OF MATERIAL

	*** REINFORCING STEEL	*** SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB		DRILLED PIER PILOT BORINGS
	LBS.	LBS.	EACH	No.	LIN. FT.	LIN. FT.	TON	SY	LUMP SUM	No.	LIN. FT.	EACH
SUPERSTRUCTURE						380.75			LUMP SUM	33	2090	
END BENT 1	2639		7	7	280		200	285				
BENT 1	12503	2442										3
BENT 2	12645	2490										3
END BENT 2	2639		7	7	175		250	350				
TOTAL	30426	4932	14	14	455	380.75	450	635	LUMP SUM	33	2090	6

*** QUANTITIES ARE SUBJECT TO CHANGE AFTER EVALUATION OF PILOT BORINGS AS DIRECTED BY THE ENGINEER. SEE NOTE 3 ON THE FOUNDATION LAYOUT SHEET S-2.

DRAWN BY : G.C. MORRIS DATE : 06-23
CHECKED BY : W.S. ARAFAT DATE : 08-25
DESIGN ENGINEER OF RECORD: O. PUIGCERVER DATE : 07-23

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 18+63.00 -L-."

THE MATERIAL IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF APPROXIMATELY 38' LEFT AND 59' RIGHT OF CENTERLINE ROADWAY AT END BENT 1 AND 30' LEFT AND 43' RIGHT OF CENTERLINE ROADWAY AT END BENT 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 6 SPANS (21.0', 20.0', 29.0', 40.0', 20.0', AND 21.0') OF TIMBER FLOORS ON CONTINUOUS I BEAMS WITH 15' CLEAR ROADWAY WIDTH ON MASS CONCRETE AT ABUTMENTS AND INTERIOR BENTS 2 & 4 AND TIMBER CAP & TIMBER PILES ENCASED IN CONCRETE AT INTERIOR BENTS 1, 3, & 5 AND LOCATED APPROXIMATELY 37' UPSTREAM FROM PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS CLOSED TO ALL TRAFFIC. THE CONTRACTOR SHALL NOT DRIVE ANY VEHICLES OR EQUIPMENT ACROSS THE BRIDGE.

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

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.

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

THE SCOUR CRITICAL ELEVATION FOR BENTS No. 1 AND 2 IS ELEVATION 807.0. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
DocuSigned by: Wael Arafat 7807F1ACBAB544A2...
8/29/2025

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IREDELL COUNTY
STATION: 18+63.00 -L-
SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER HUNTING CREEK ON SR 1832 (EAGLE MILLS ROAD) BETWEEN SR 1813 AND SR 1821

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			22

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (Y LL)	DISTRIBUTION FACTOR (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (Y LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	⟨1⟩	1.33	--	1.75	0.275	1.33	60′	EL	29.5	0.52	**1.33**	60′	EL	**5.9**	0.80	0.275	1.37	60′	EL	29.5	
		HL-93 (OPERATING)	N/A	--	1.725	--	1.35	0.275	1.73	60′	EL	29.5	0.52	1.72	60′	EL	5.9	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.601	57.643	1.75	0.275	1.69	60′	EL	29.5	0.52	**1.6**	60′	EL	**5.9**	0.80	0.275	1.74	60′	EL	29.5	
		HS-20 (OPERATING)	36.000	--	2.076	74.723	1.35	0.275	2.19	60′	EL	29.5	0.52	2.08	60′	EL	5.9	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.745	50.557	1.4	0.275	4.55	60′	EL	29.5	0.52	4.63	60′	EL	5.9	0.80	0.275	3.74	60′	EL	29.5	
		SNGARBS2	20.000	--	2.867	57.338	1.4	0.275	3.48	60′	EL	29.5	0.52	3.33	60′	EL	5.9	0.80	0.275	2.87	60′	EL	29.5	
		SNAGRIS2	22.000	--	2.748	60.46	1.4	0.275	3.34	60′	EL	29.5	0.52	3.11	60′	EL	5.9	0.80	0.275	2.75	60′	EL	29.5	
		SNCOTTS3	27.250	--	1.866	50.841	1.4	0.275	2.27	60′	EL	29.5	0.52	2.31	60′	EL	5.9	0.80	0.275	1.87	60′	EL	29.5	
		SNAGGRS4	34.925	--	1.588	55.465	1.4	0.275	1.93	60′	EL	29.5	0.52	1.95	60′	EL	5.9	0.80	0.275	1.59	60′	EL	29.5	
		SNS5A	35.550	--	1.551	55.139	1.4	0.275	1.89	60′	EL	29.5	0.52	1.99	60′	EL	5.9	0.80	0.275	1.55	60′	EL	29.5	
		SNS6A	39.950	--	1.435	57.347	1.4	0.275	1.74	60′	EL	29.5	0.52	1.83	60′	EL	5.9	0.80	0.275	1.44	60′	EL	29.5	
		SNS7B	42.000	--	1.367	57.434	1.4	0.275	1.66	60′	EL	29.5	0.52	1.81	60′	EL	5.9	0.80	0.275	1.37	60′	EL	29.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.754	57.887	1.4	0.275	2.13	60′	EL	29.5	0.52	2.17	60′	EL	5.9	0.80	0.275	1.75	60′	EL	29.5	
		TNT4A	33.075	--	1.765	58.389	1.4	0.275	2.15	60′	EL	29.5	0.52	2.1	60′	EL	5.9	0.80	0.275	1.77	60′	EL	29.5	
		TNT6A	41.600	--	1.456	60.551	1.4	0.275	1.77	60′	EL	29.5	0.52	1.96	60′	EL	5.9	0.80	0.275	1.46	60′	EL	29.5	
		TNT7A	42.000	--	1.469	61.714	1.4	0.275	1.79	60′	EL	29.5	0.52	1.88	60′	EL	5.9	0.80	0.275	1.47	60′	EL	29.5	
		TNT7B	42.000	--	1.535	64.463	1.4	0.275	1.87	60′	EL	29.5	0.52	1.76	60′	EL	5.9	0.80	0.275	1.53	60′	EL	29.5	
		TNAGRIT4	43.000	--	1.45	62.329	1.4	0.275	1.76	60′	EL	29.5	0.52	1.7	60′	EL	5.9	0.80	0.275	1.45	60′	EL	29.5	
		TNAGT5A	45.000	--	1.361	61.247	1.4	0.275	1.65	60′	EL	29.5	0.52	1.71	60′	EL	5.9	0.80	0.275	1.36	60′	EL	29.5	
		TNAGT5B	45.000	⟨3⟩	1.34	60.282	1.4	0.275	1.63	60′	EL	29.5	0.52	1.61	60′	EL	5.9	0.80	0.275	**1.34**	60′	EL	**29.5**	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.218	63.776	1.3	0.275	2.65	60′	EL	29.5	0.52	2.50	60′	EL	5.9	0.80	0.275	2.22	60′	EL	29.5	
		EV3	43.000	⟨4⟩	1.444	62.085	1.3	0.275	1.73	60′	EL	29.5	0.52	1.69	60′	EL	5.9	0.80	0.275	**1.44**	60′	EL	**29.5**	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

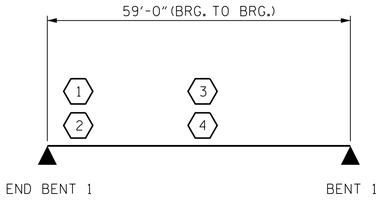
⟨3⟩ LEGAL LOAD RATING **

⟨4⟩ EMERGENCY VEHICLE LOAD RATING **

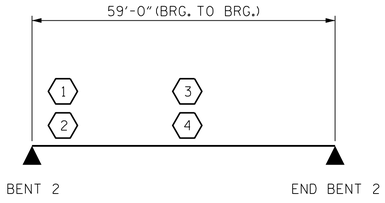
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
FOR SPAN 'A'



LRFR SUMMARY
FOR SPAN 'C'

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
DocuSigned by: Wael Arafat 7807F1ACBAB54A2...
8/28/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PARRISH & PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr., Suite 100
Raleigh, NC 27615
NC License #P-1212

PROJECT NO. B-5394
IREDELL COUNTY
STATION: 18+63.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 60′ CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY : G.C. MORRIS DATE : 06-23
CHECKED BY : O. PUIGCERVER DATE : 07-23
DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10
REV. BY : BNB/AKP 06/23

STD. NO. 24LRFR1_90S_60L

pw:\\parrish-pw.bentley.com:parrish-pw\Documents\Surface Transportation\B-5394\Project Design\Structures\DRAWINGS\FINAL\B5394_FINAL_SS 8/28/2025 11:41:47 PM

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γLL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γLL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	(1)	1.006	--	1.75	0.273	1.03	70′	EL	34.5	0.507	1.32	70′	EL	6.9	0.80	0.273	**1.01**	70′	EL	**34.5**	
		HL-93 (OPERATING)	N/A	--	1.341	--	1.35	0.273	1.34	70′	EL	34.5	0.507	1.72	70′	EL	6.9	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	(2)	1.306	47.02	1.75	0.273	1.34	70′	EL	34.5	0.507	1.65	70′	EL	6.9	0.80	0.273	**1.31**	70′	EL	**34.5**	
		HS-20 (OPERATING)	36.000	--	1.74	62.64	1.35	0.273	1.74	70′	EL	34.5	0.507	2.14	70′	EL	6.9	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500	--	2.917	39.379	1.4	0.273	3.75	70′	EL	34.5	0.507	4.87	70′	EL	6.9	0.80	0.273	2.92	70′	EL	34.5	
		SNGARBS2	20.000	--	2.187	43.741	1.4	0.273	2.81	70′	EL	34.5	0.507	3.47	70′	EL	6.9	0.80	0.273	2.19	70′	EL	34.5	
		SNAGRIS2	22.000	--	2.077	45.69	1.4	0.273	2.67	70′	EL	34.5	0.507	3.23	70′	EL	6.9	0.80	0.273	2.08	70′	EL	34.5	
		SNCOTTS3	27.250	--	1.452	39.565	1.4	0.273	1.87	70′	EL	34.5	0.507	2.43	70′	EL	6.9	0.80	0.273	1.45	70′	EL	34.5	
		SNAGGRS4	34.925	--	1.218	42.554	1.4	0.273	1.57	70′	EL	34.5	0.507	2.03	70′	EL	6.9	0.80	0.273	1.22	70′	EL	34.5	
		SNS5A	35.550	--	1.191	42.346	1.4	0.273	1.53	70′	EL	34.5	0.507	2.06	70′	EL	6.9	0.80	0.273	1.19	70′	EL	34.5	
		SNS6A	39.950	--	1.095	43.747	1.4	0.273	1.41	70′	EL	34.5	0.507	1.88	70′	EL	6.9	0.80	0.273	1.10	70′	EL	34.5	
		SNS7B	42.000	--	1.043	43.801	1.4	0.273	1.34	70′	EL	34.5	0.507	1.85	70′	EL	6.9	0.80	0.273	1.04	70′	EL	34.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.336	44.087	1.4	0.273	1.72	70′	EL	34.5	0.507	2.23	70′	EL	6.9	0.80	0.273	1.34	70′	EL	34.5	
		TNT4A	33.075	--	1.342	44.401	1.4	0.273	1.72	70′	EL	34.5	0.507	2.17	70′	EL	6.9	0.80	0.273	1.34	70′	EL	34.5	
		TNT6A	41.600	--	1.1	45.746	1.4	0.273	1.41	70′	EL	34.5	0.507	1.98	70′	EL	6.9	0.80	0.273	1.10	70′	EL	34.5	
		TNT7A	42.000	--	1.106	46.462	1.4	0.273	1.42	70′	EL	34.5	0.507	1.94	70′	EL	6.9	0.80	0.273	1.11	70′	EL	34.5	
		TNT7B	42.000	--	1.147	48.18	1.4	0.273	1.47	70′	EL	34.5	0.507	1.8	70′	EL	6.9	0.80	0.273	1.15	70′	EL	34.5	
		TNAGRIT4	43.000	--	1.089	46.838	1.4	0.273	1.4	70′	EL	34.5	0.507	1.74	70′	EL	6.9	0.80	0.273	1.09	70′	EL	34.5	
		TNAGT5A	45.000	--	1.026	46.175	1.4	0.273	1.32	70′	EL	34.5	0.507	1.74	70′	EL	6.9	0.80	0.273	1.03	70′	EL	34.5	
		TNAGT5B	45.000	(3)	1.013	45.579	1.4	0.273	1.3	70′	EL	34.5	0.507	1.66	70′	EL	6.9	0.80	0.273	**1.01**	70′	EL	**34.5**	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.816	52.212	1.3	0.273	2.11	70′	EL	34.5	0.507	2.59	70′	EL	6.9	0.80	0.273	1.82	70′	EL	34.5	
		EV3	43.000	(4)	1.188	51.068	1.3	0.273	1.38	70′	EL	34.5	0.507	1.75	70′	EL	6.9	0.80	0.273	**1.19**	70′	EL	**34.5**	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

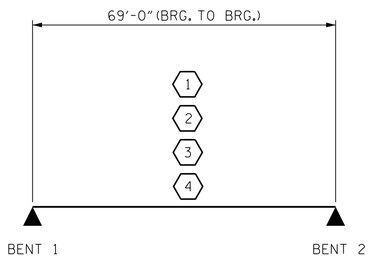
(3) LEGAL LOAD RATING **

(4) EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPAN 'B'

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

DocuSigned by: Wael Arafat 7807F1ACBAB54A2...

8/28/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PARRISH & PARTNERS

Parrish and Partners of North Carolina, PLLC
220 Horizon Dr., Suite 100
Raleigh, NC 27615

NC License #P-1212

PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 70′ CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY : G.C. MORRIS	DATE : 06-23	
CHECKED BY : O. PUIGCERVER	DATE : 07-23	
DRAWN BY : CVC 6/10		
CHECKED BY : DNS 6/10		

STD. NO. 24LRFR1_90S_70L

pw:\\parrish-pw.bentley.com:parrish-pw\Documents\Surface Transportation\B-5394\Project Design\Structures\DRAWINGS\FINAL\B5394_FINAL_S6
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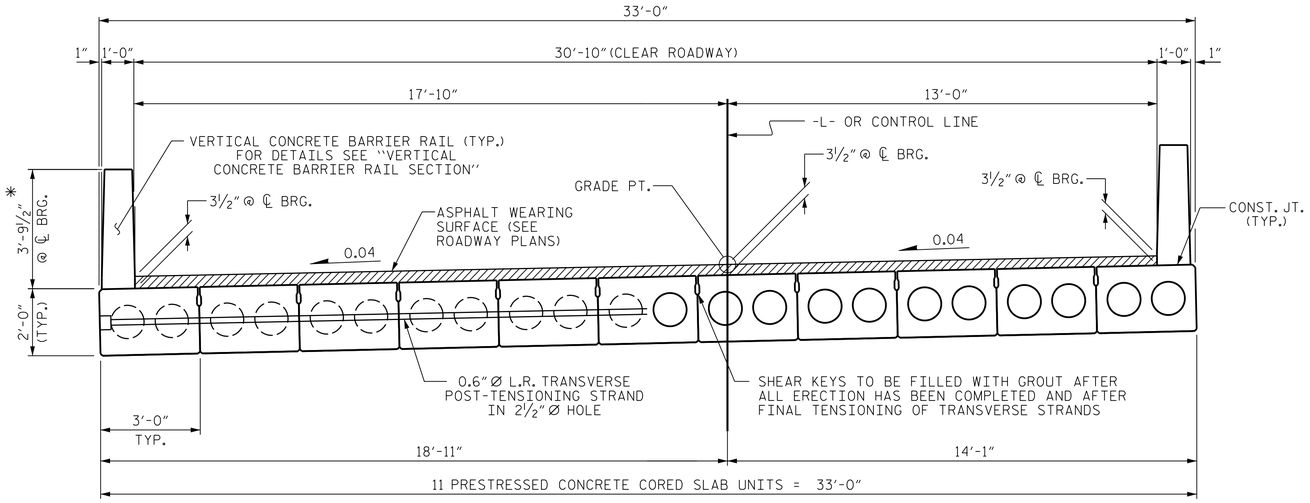


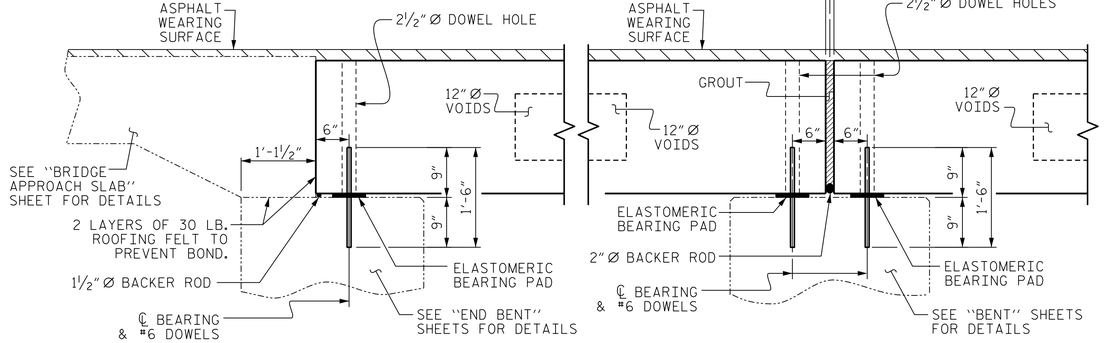
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

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

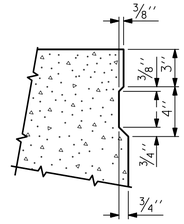
FIXED END



SECTION AT END BENT

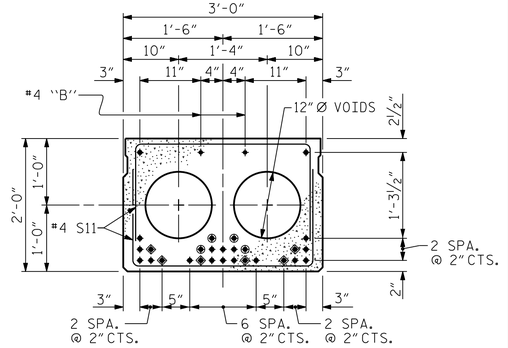
FIXED END FIXED END

SECTION AT BENT



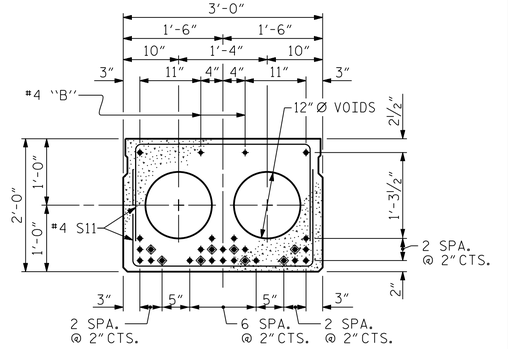
SHEAR KEY DETAIL

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



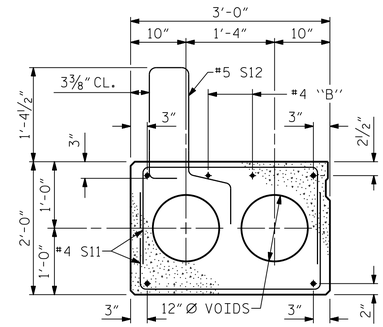
INTERIOR SLAB SECTION (60' UNIT)

(24 STRANDS REQUIRED)



INTERIOR SLAB SECTION (70' UNIT)

(28 STRANDS REQUIRED)



EXTERIOR SLAB SECTION

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

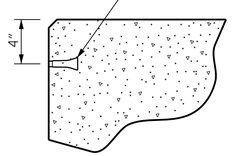
0.6'' Ø LOW RELAXATION STRAND LAYOUT

◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

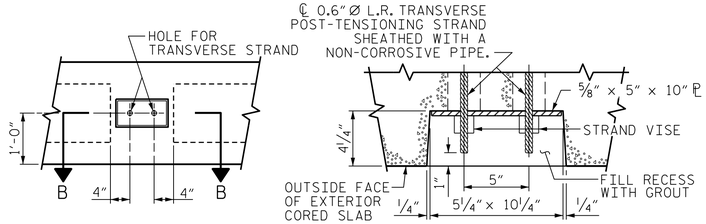
◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED ⅜". SIZE TO BE DETERMINED BY CONTRACTOR.

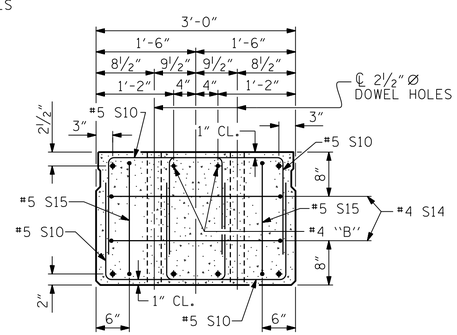


THREADED INSERT DETAIL



ELEVATION VIEW SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS



END ELEVATION

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

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
DocuSigned by: Wael Arafat 7807F1ACBAB54A2...
8/28/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PARRISH & PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr., Suite 100
Raleigh, NC 27615
NC License #P-1212

PROJECT NO. B-5394
IREDELL COUNTY
STATION: 18+63.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

3'-0'' X 2'-0'' PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY :	G.C. MORRIS	DATE :	06-23
CHECKED BY :	O. PUIGCERVER	DATE :	07-23
DRAWN BY :	CVC 6/10		
CHECKED BY :	DNS 6/10		

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8/28/2025 1:16:18 PM

STD. NO. 24PCS4_33_90S

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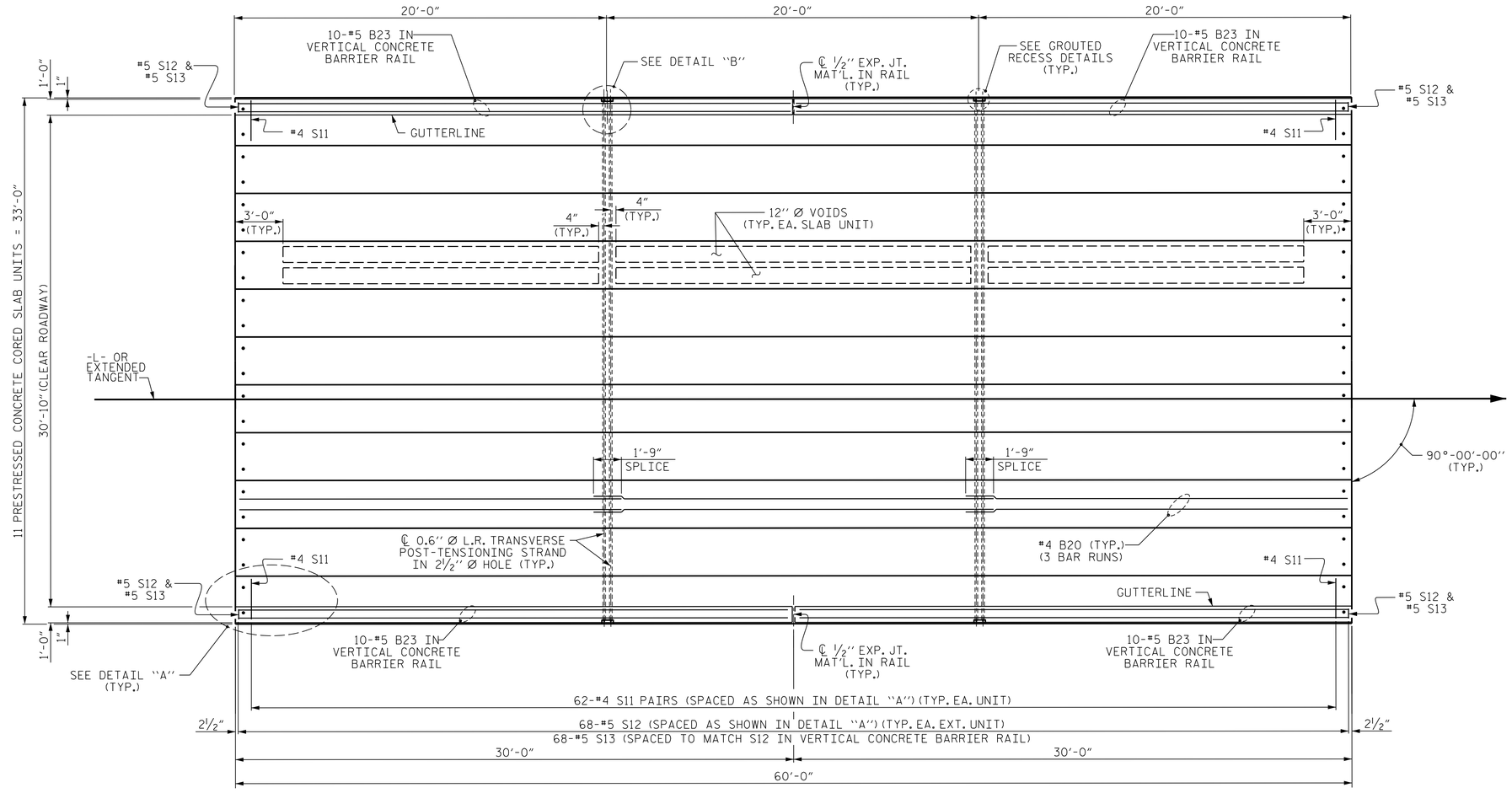
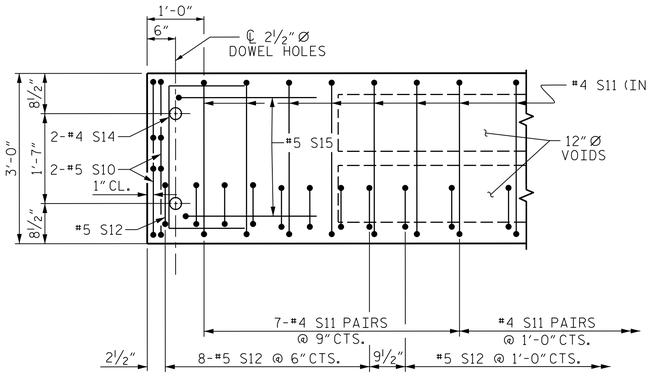
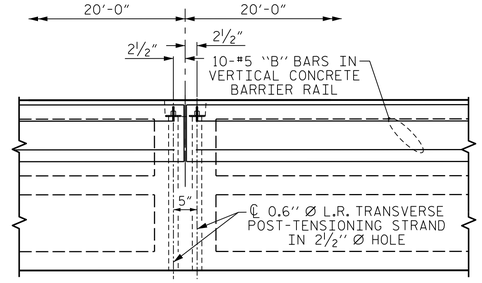


PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

ASSEMBLED BY : G.C. MORRIS	DATE : 06-23	REV. 12/5/11	MAA/AAC
CHECKED BY : O. PUIGCERVER	DATE : 07-23	REV. 8/14	MAA/TMG
DRAWN BY : MAA 6/10			
CHECKED BY : MKT 7/10			

DocuSigned by: Wael Arafat 7807F1ACBA854A2... 8/28/2025

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PARRISH & PARTNERS
Parrish and Partners of North Carolina, PLLC
220 Horizon Dr., Suite 100
Raleigh, NC 27615
NC License #P-1212

PROJECT NO. B-5394
IREDELL COUNTY
STATION: 18+63.00 -L-
SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 60' UNIT 30'-10" CLEAR ROADWAY 90° SKEW SPANS A & C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			22

STD. NO. 24PCS_33_90S_60L

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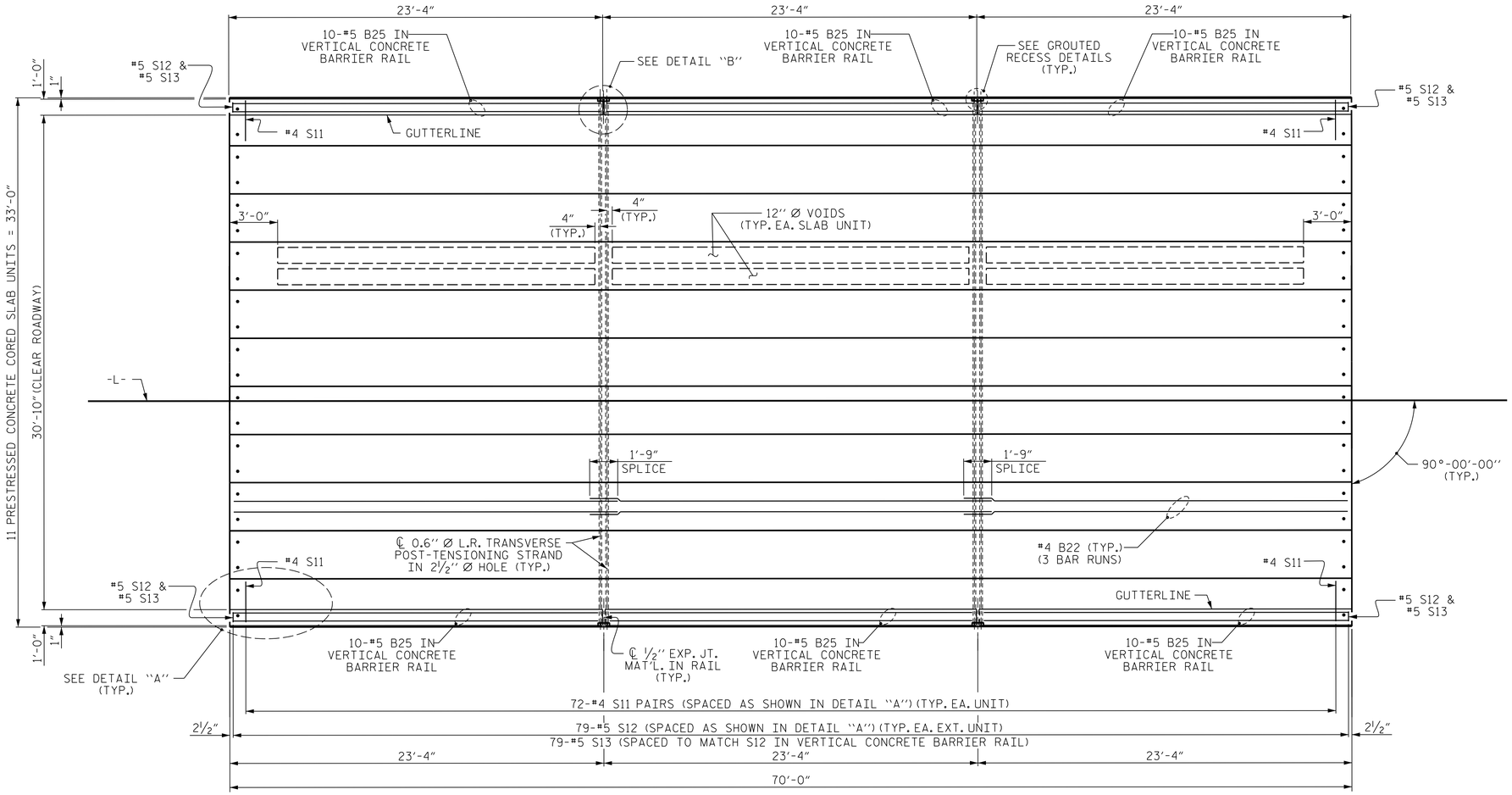
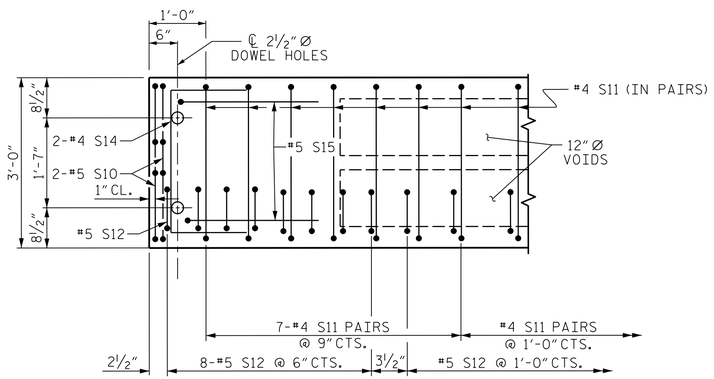
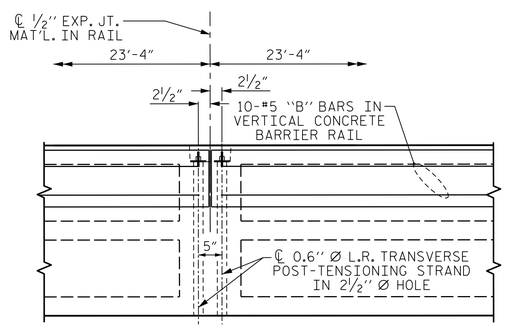


PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

ASSEMBLED BY : G.C. MORRIS	DATE : 06-23		
CHECKED BY : O. PUIGCERVER	DATE : 07-23		
DRAWN BY : MAA	6/10	REV. 12/5/11	MAA/AAC
CHECKED BY : MKT	7/10	REV. 8/14	MAA/TMG

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

DocuSigned by: Wael Arafat 7807F1ACBAB54A2...

8/28/2025

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PARRISH & PARTNERS

Parrish and Partners of North Carolina, PLLC
220 Horizon Dr., Suite 100
Raleigh, NC 27615

NC License #P-1212

PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 70' UNIT 30'-10" CLEAR ROADWAY 90° SKEW SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			22

STD. NO. 24PCS_33_90S_70L

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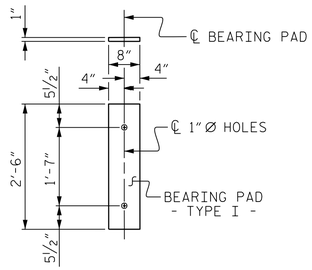


FIXED END
(TYPE I - 66 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

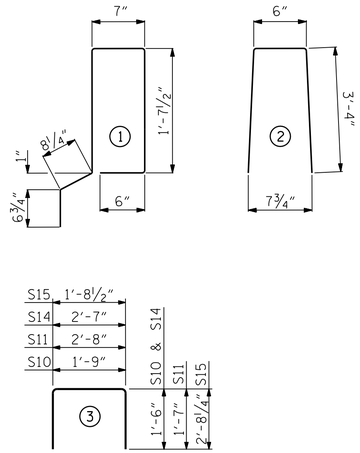
DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
60' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1⅞" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	½" ↓
FINAL CAMBER	1⅜" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
70' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	¾" ↓
FINAL CAMBER	1½" ↑

** INCLUDES FUTURE WEARING SURFACE

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

GRADE 270 STRANDS	
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

CONCRETE RELEASE STRENGTH	
UNIT	PSI
60' UNITS	4800
70' UNITS	5500

NOTES

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

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

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

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

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

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

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

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

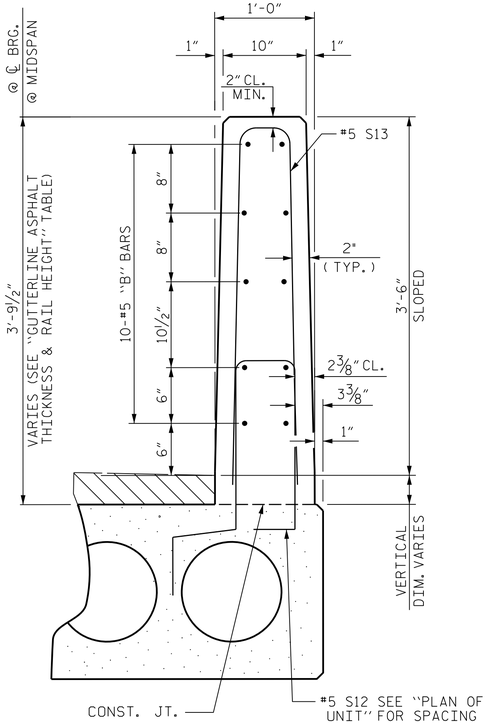
THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

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

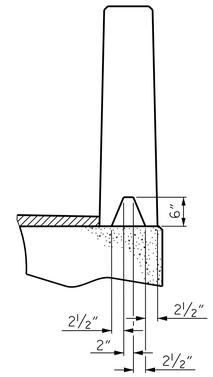
THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

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

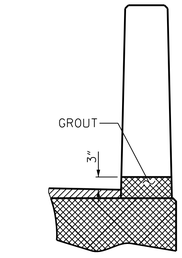
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED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



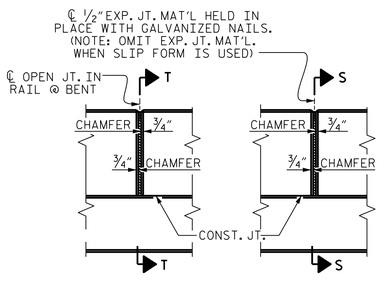
SECTION THRU RAIL



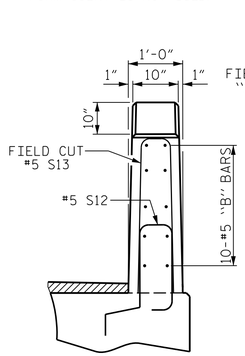
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



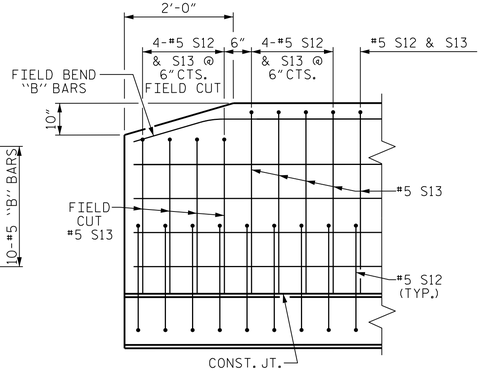
SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

VERTICAL CONCRETE BARRIER RAIL DETAILS

ASSEMBLED BY : G.C. MORRIS		DATE : 06-23	
CHECKED BY : O. PUIGCERVER		DATE : 07-23	
DRAWN BY : MAA	6/10	REV: 5/18 MAA/THC	
CHECKED BY : MKT	7/10		

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PROJECT NO. B-5394
IREDELL COUNTY
STATION: 18+63.00 -L-
SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
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CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
60' UNIT			
EXTERIOR C.S.	4	60'-0"	240'-0"
INTERIOR C.S.	18	60'-0"	1080'-0"
TOTAL	22		1320'-0"

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR C.S.	2	70'-0"	140'-0"
INTERIOR C.S.	9	70'-0"	630'-0"
TOTAL	11		770'-0"

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	60' UNIT					
✳B23	40	80	#5	STR	29'-7"	2468
✳S13	136	272	#5	2	7'-2"	2033
✳EPOXY COATED REINFORCING STEEL				LBS.		4501
CLASS AA CONCRETE				CU.YDS.		31.0
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		240.5

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	70' UNIT					
✳B25	60	60	#5	STR	22'-11"	1434
✳S13	158	158	#5	2	7'-2"	1181
✳EPOXY COATED REINFORCING STEEL				LBS.		2615
CLASS AA CONCRETE				CU.YDS.		18.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		140.25

BILL OF MATERIAL FOR ONE 60' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B20	6	#4	STR	21'-2"	85	21'-2"	85
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	124	#4	3	5'-10"	483	5'-10"	483
✳S12	68	#5	1	5'-7"	396		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		653		653
✳EPOXY COATED REINFORCING STEEL			LBS.		396		
6000 P.S.I. CONCRETE			CU. YDS.		10.2		10.2
0.6" Ø L.R. STRANDS			No.		24		24

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	144	#4	3	5'-10"	561	5'-10"	561
✳S12	79	#5	1	5'-7"	460		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		744		744
✳EPOXY COATED REINFORCING STEEL			LBS.		460		
7000 P.S.I. CONCRETE			CU. YDS.		11.8		11.8
0.6" Ø L.R. STRANDS			No.		28		28

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
60' UNITS	2⅛"	3'-8⅛"
70' UNITS	2"	3'-8"

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PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD 3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

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1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY : G.C. MORRIS DATE : 06-23
CHECKED BY : O. PUIGCERVER DATE : 07-23

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

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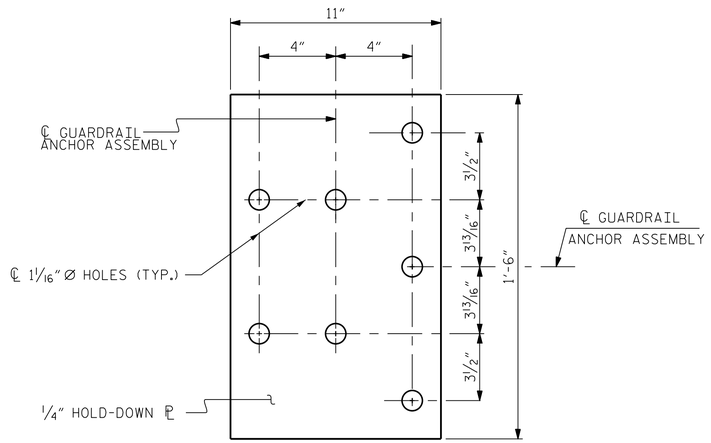
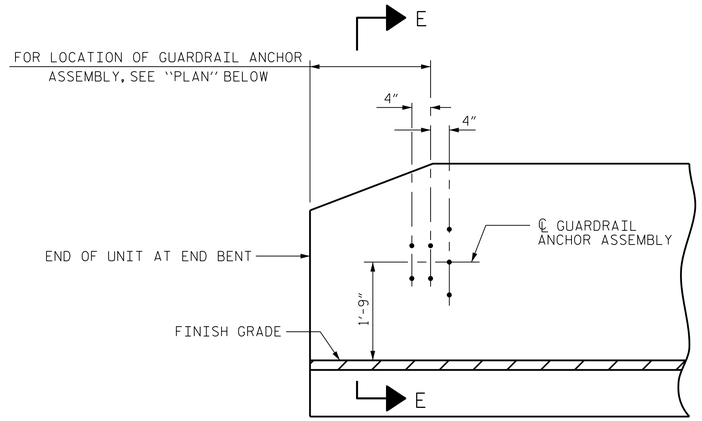


PLAN



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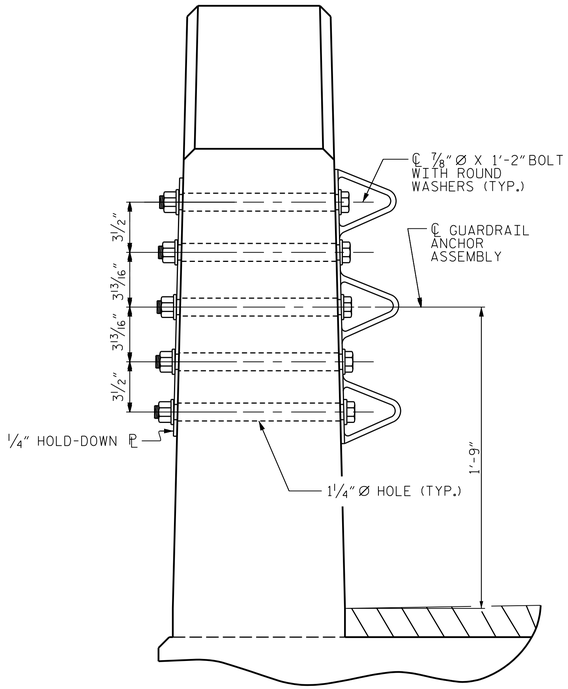
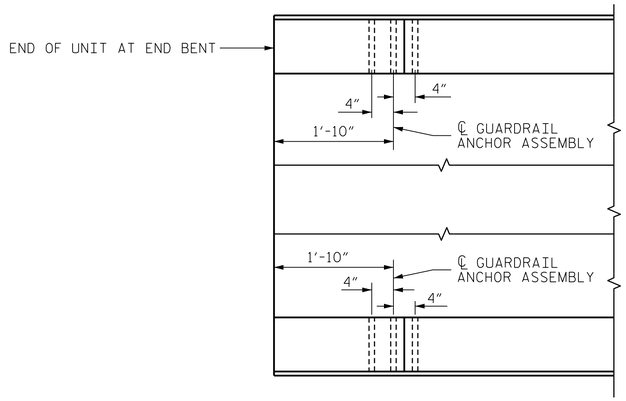


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8'' Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

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

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

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

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

THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

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PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR VERTICAL CONCRETE BARRIER RAIL

PARRISH & PARTNERS
Parrish and Partners of North Carolina, PLLC
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Raleigh, NC 27615
NC License #P-1212

ASSEMBLED BY : G.C. MORRIS	DATE : 06-23
CHECKED BY : O. PUIGCERVER	DATE : 07-23
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

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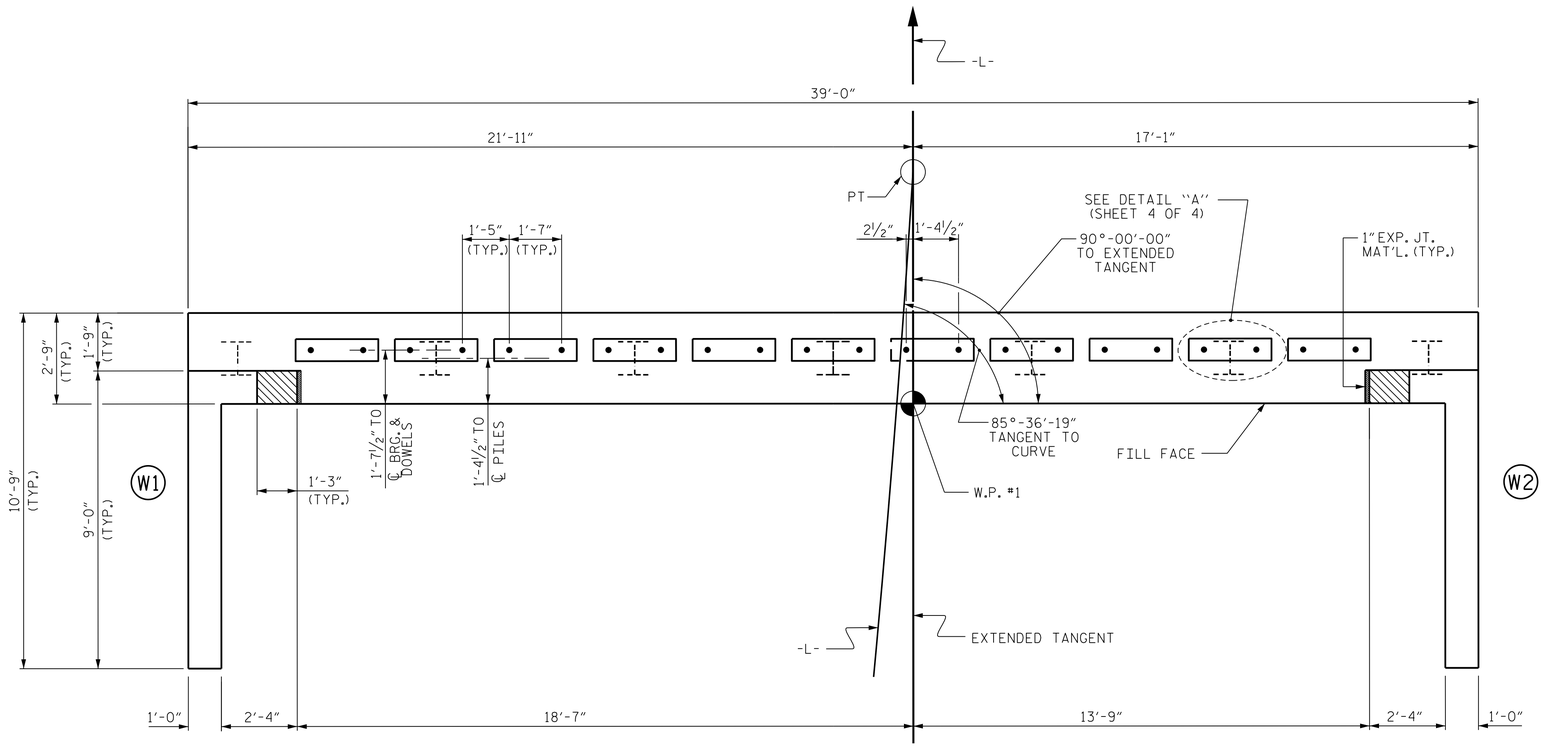
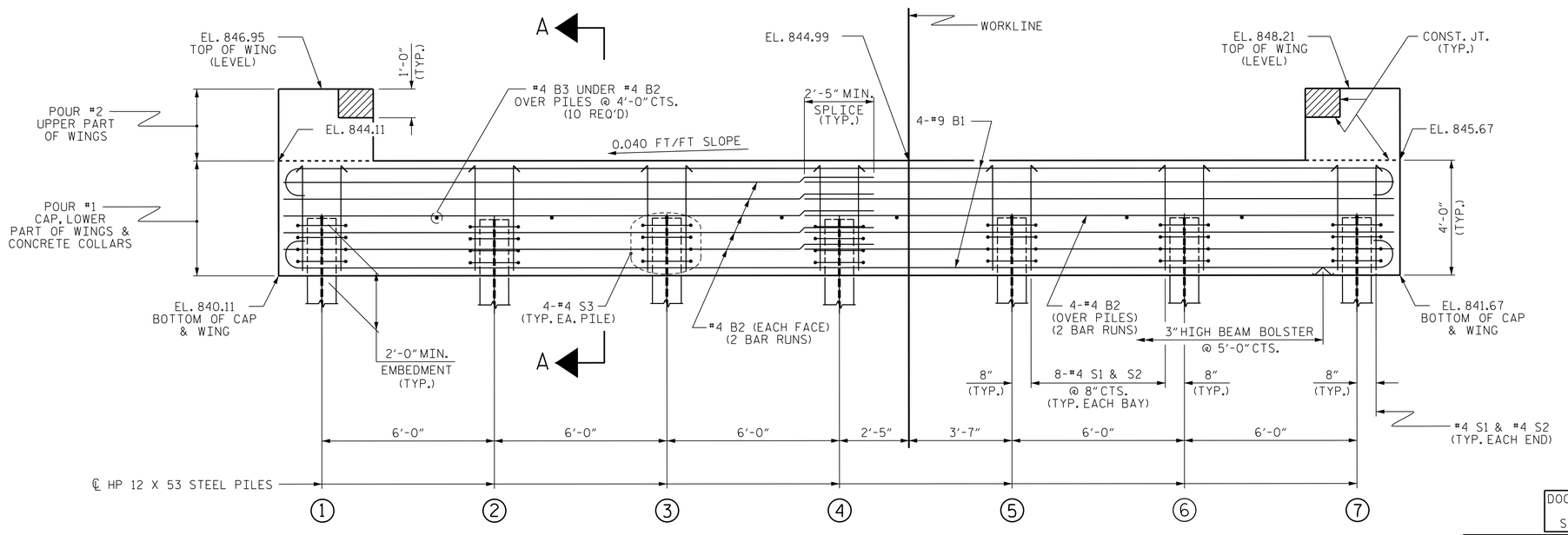


PLAN



ELEVATION

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

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS

1	842.19
2	842.43
3	842.67
4	842.91
5	843.15
6	843.39
7	843.63

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
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SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

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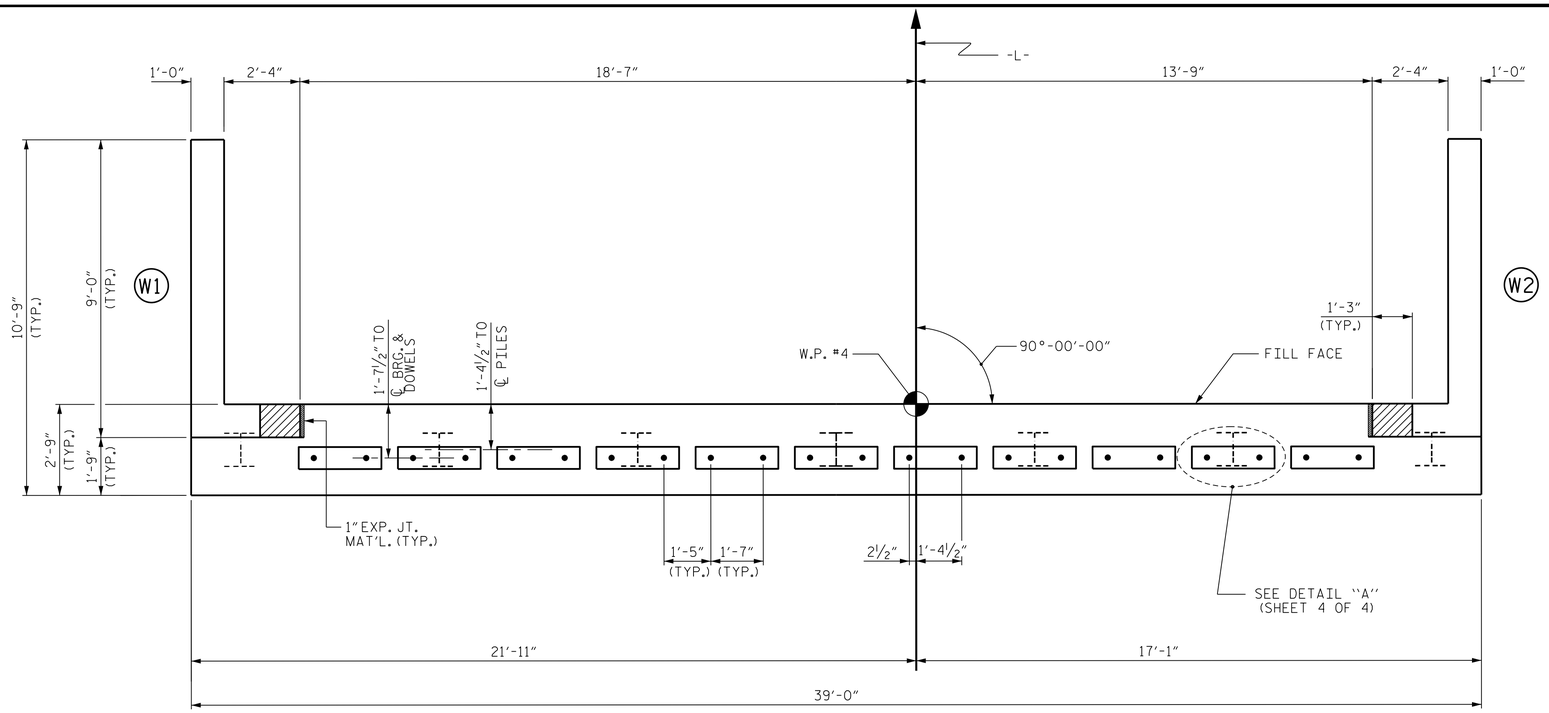

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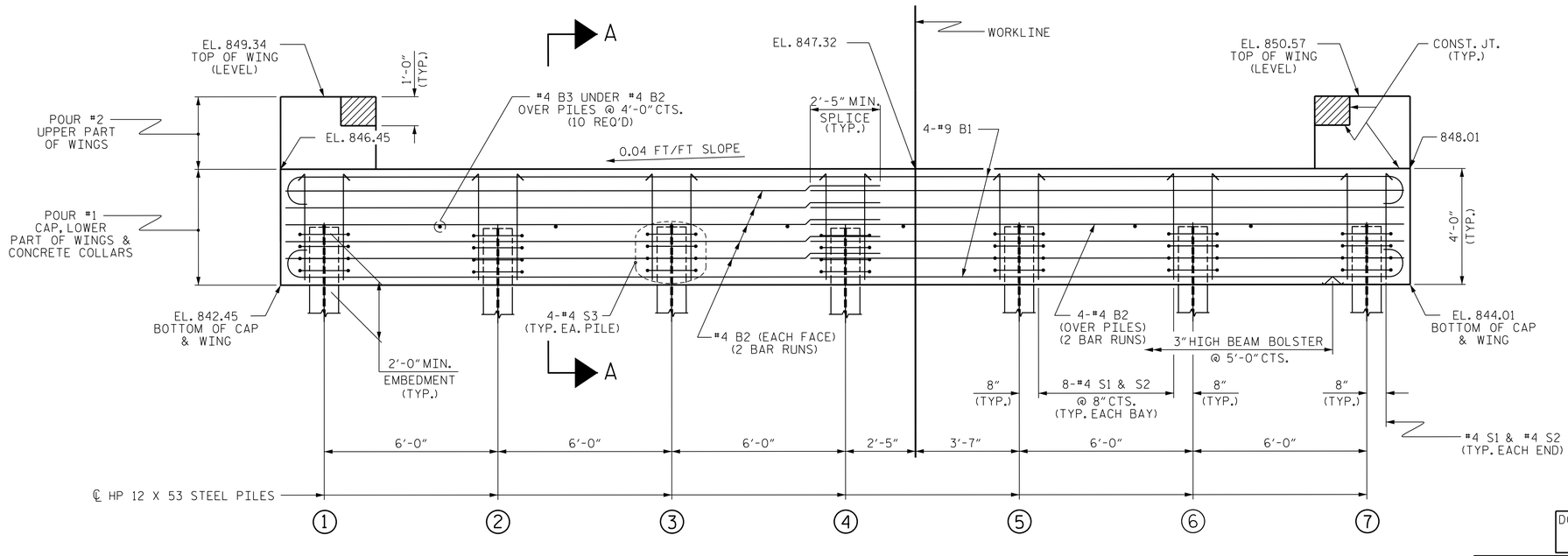

ELEVATION

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

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS

1	844.53
2	844.77
3	845.01
4	845.25
5	845.49
6	845.73
7	845.97

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
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Raleigh, NC 27615
NC License #P-1212

DRAWN BY : G.C. MORRIS DATE : 06-23
CHECKED BY : O. PUIGCERVER DATE : 07-23
DESIGN ENGINEER OF RECORD: O. PUIGCERVER DATE : 07-23

PROJECT NO. B-5394
IREDELL COUNTY
STATION: 18+63.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

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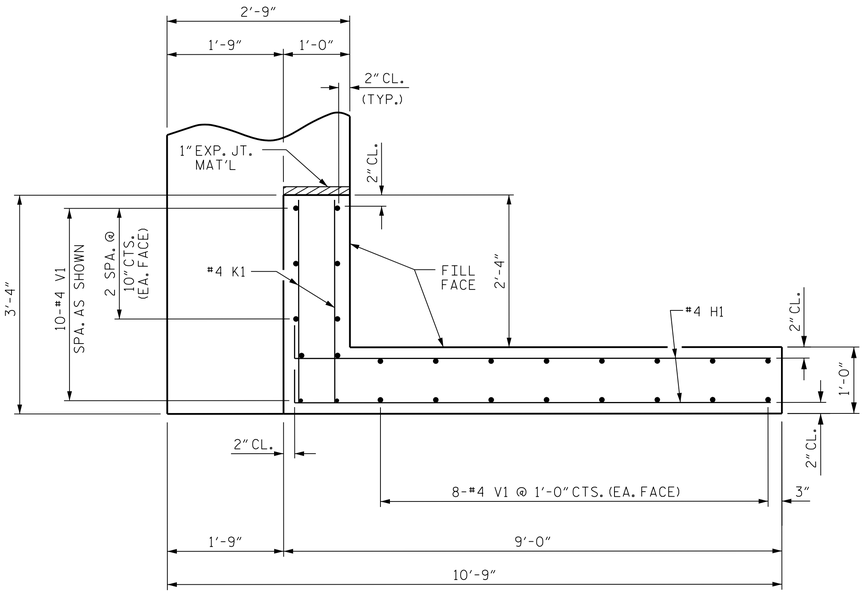
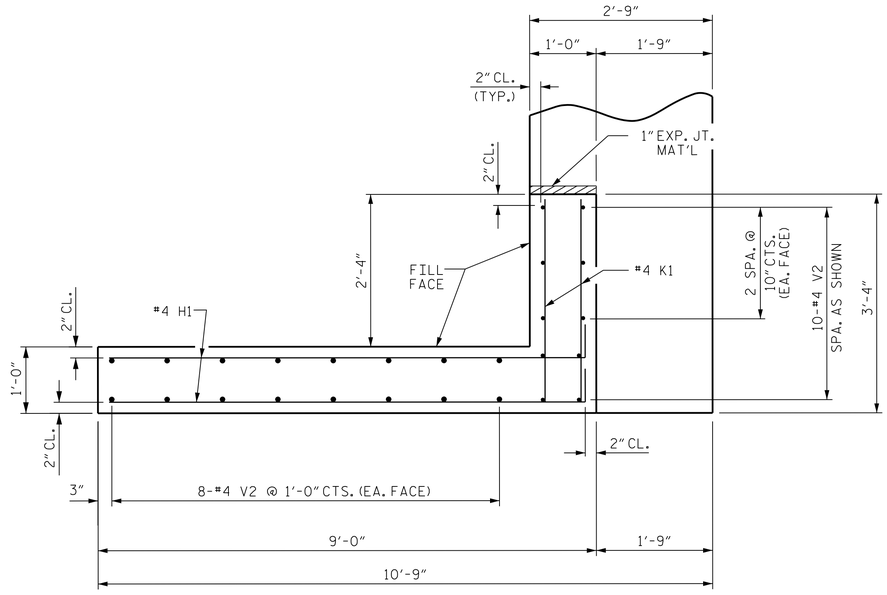
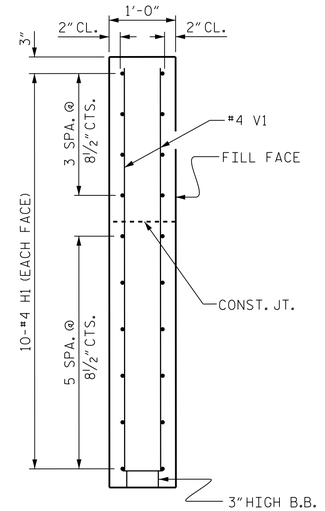


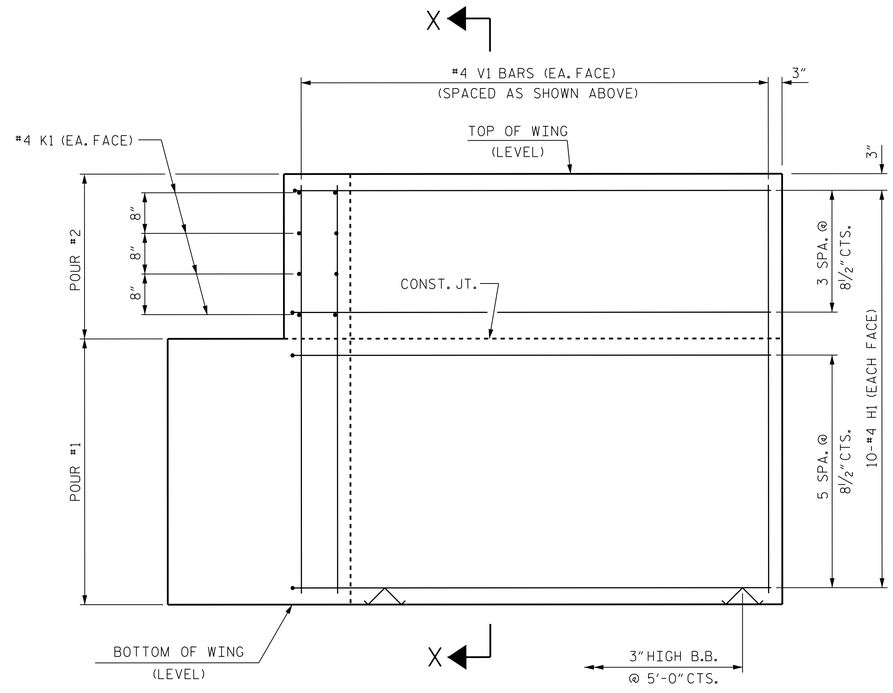
PLAN OF WING (W1)



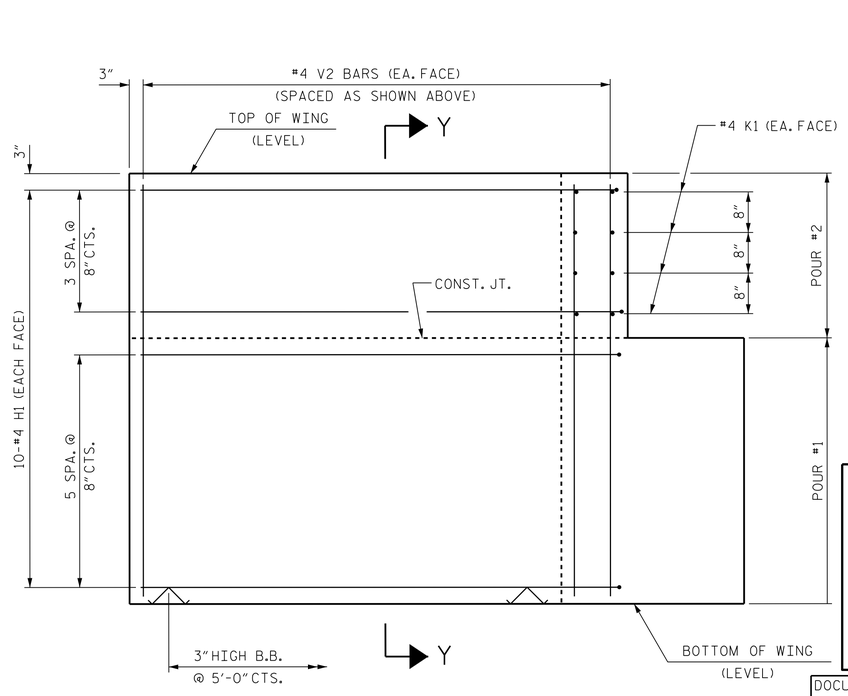
PLAN OF WING (W2)



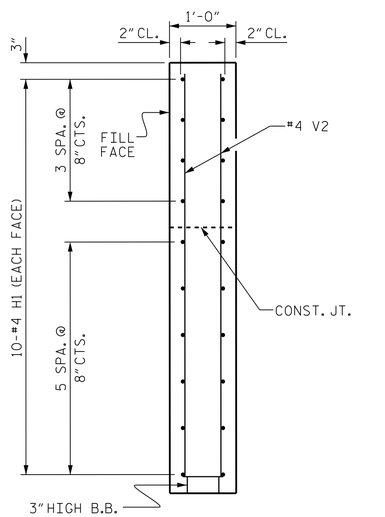
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

ASSEMBLED BY :	G.C. MORRIS	DATE :	06-23
CHECKED BY :	O. PUIGCERVER	DATE :	07-23
DRAWN BY :	WJH	12/11	
CHECKED BY :	AAC	12/11	
REV. 4/15			MAA/TMG

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

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NC License #P-1212

PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

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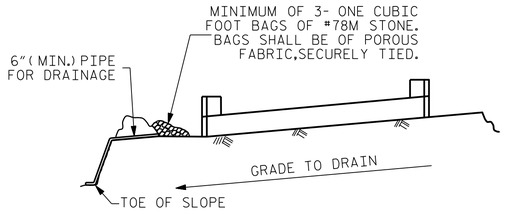
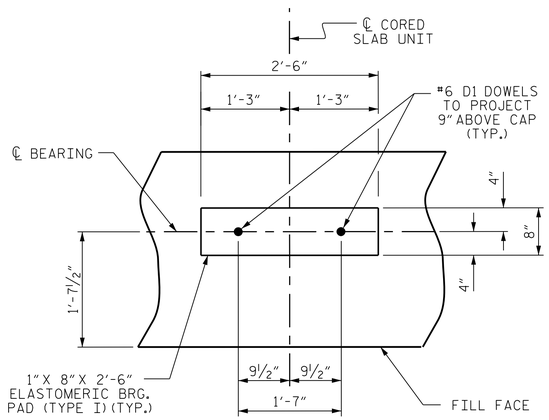


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

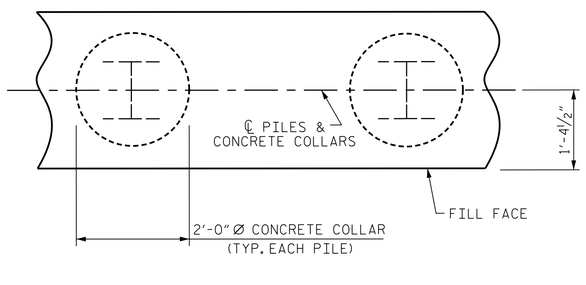
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

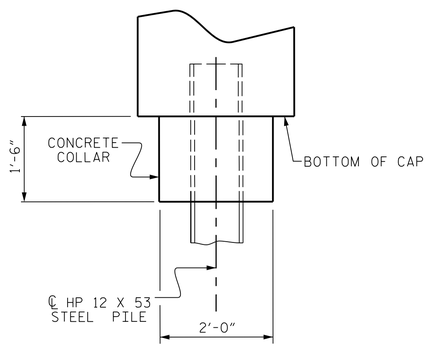


DETAIL "A"

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



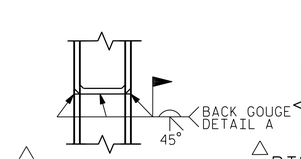
PLAN



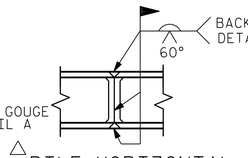
ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

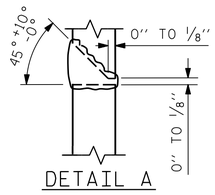
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



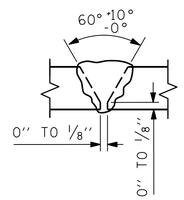
△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL



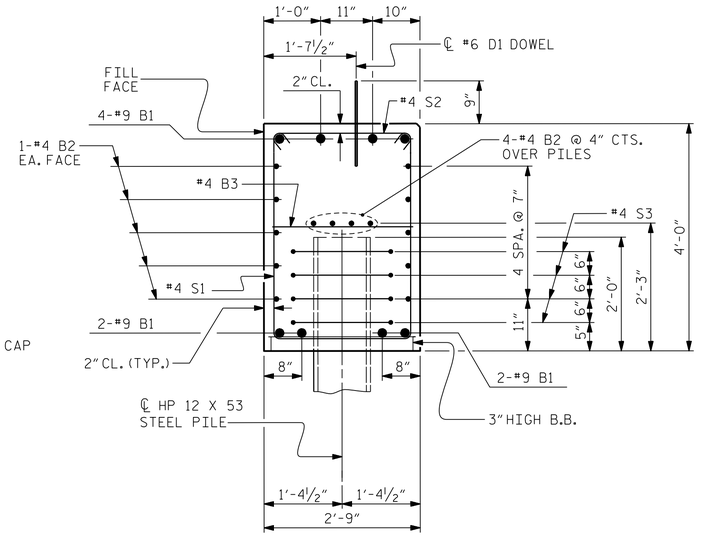
DETAIL A



DETAIL B

△ POSITION OF PILE DURING WELDING.

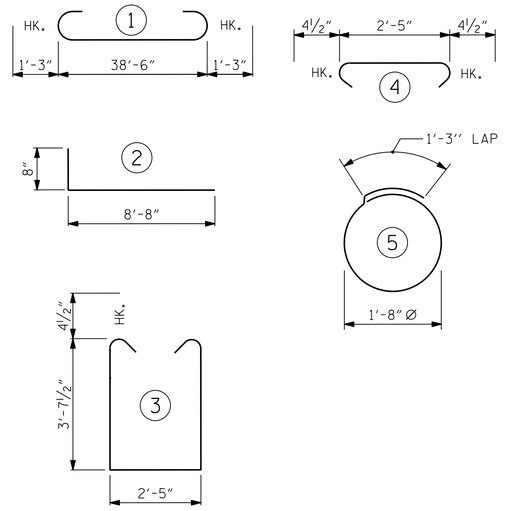
PILE SPLICE DETAILS



SECTION A-A

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
V1	26	#4	STR	6'-5"	111
V2	26	#4	STR	6'-1"	106

REINFORCING STEEL (FOR ONE END BENT) 2639 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	19.5 C.Y.
POUR #2	UPPER PART OF WINGS	2.3 C.Y.
TOTAL CLASS A CONCRETE		21.8 C.Y.

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

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Raleigh, NC 27615

NC License #P-1212

PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

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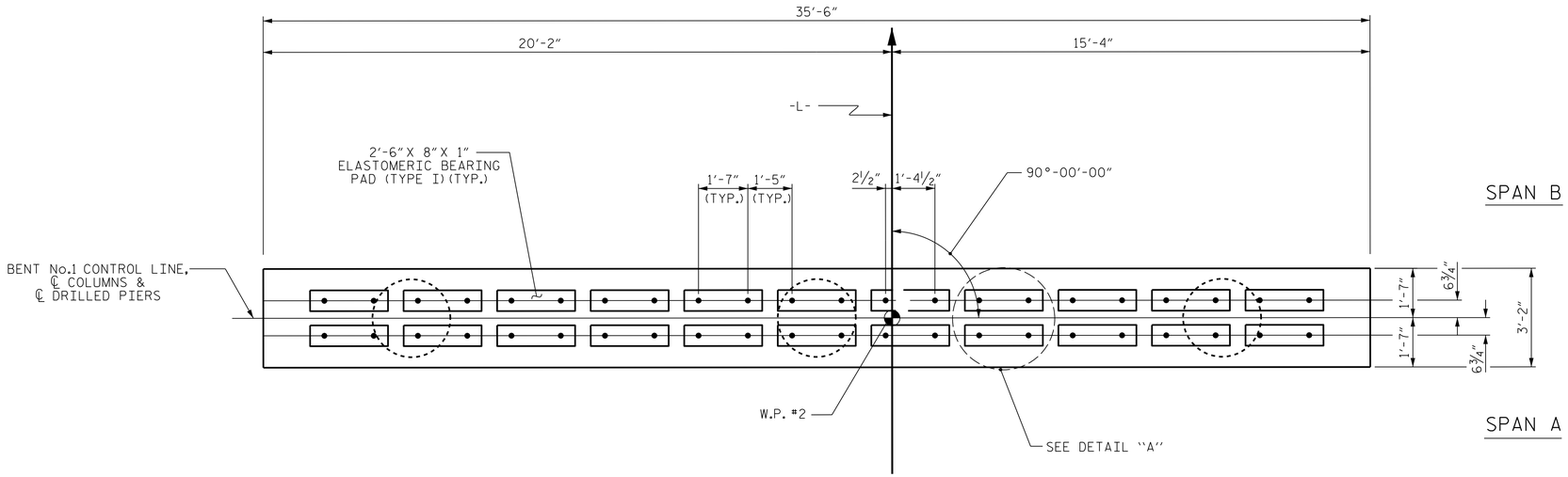
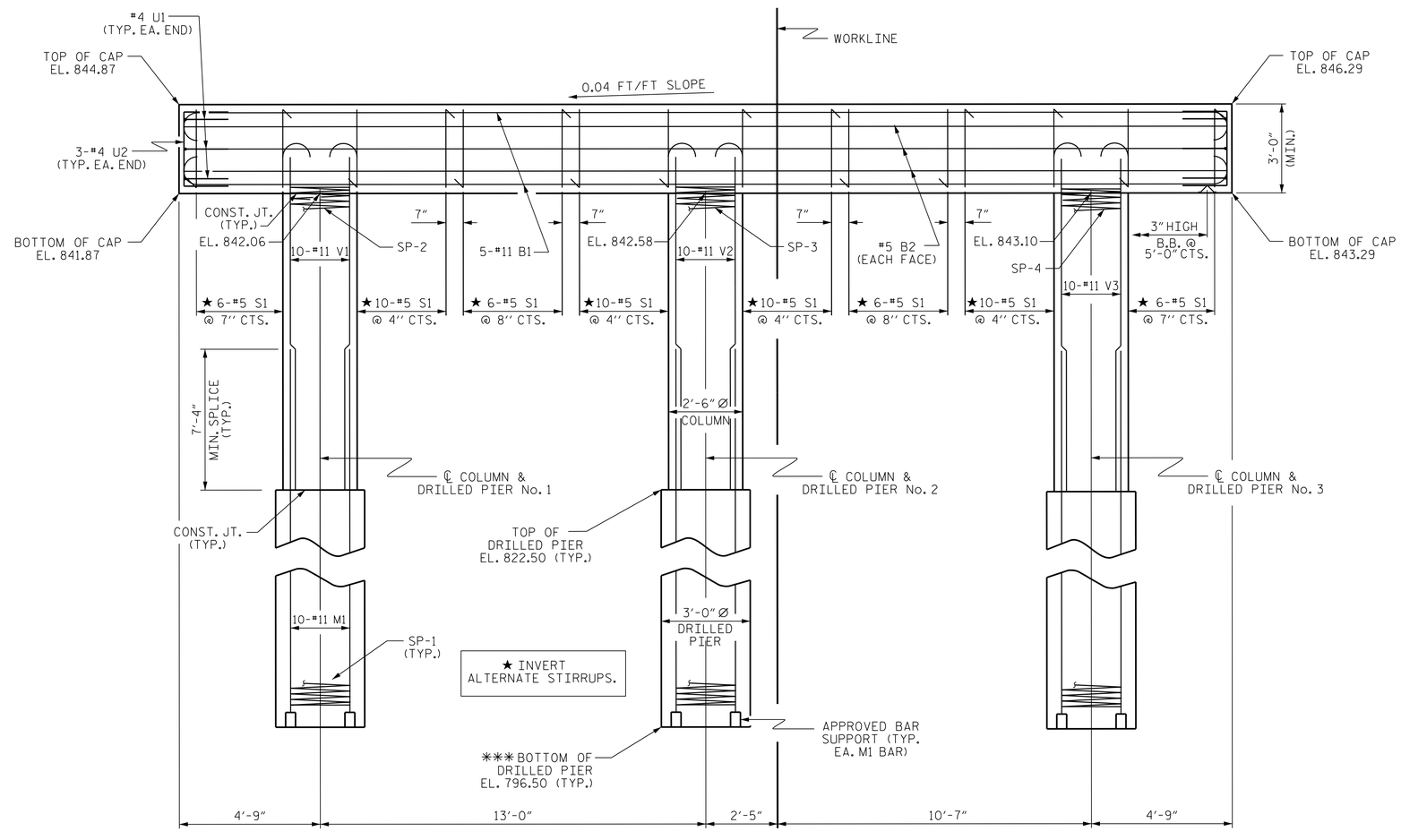


PLAN



ELEVATION

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

NOTES

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

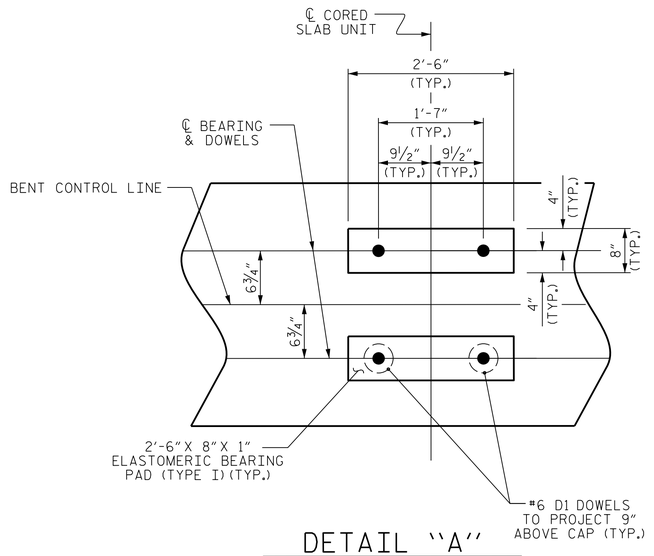
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

✱✱✱ BOTTOM OF DRILLED PIER ELEVATION SUBJECT TO CHANGE AFTER EVALUATION OF PILOT BORINGS AS DIRECTED BY THE ENGINEER, SEE NOTE 3 ON THE FOUNDATION LAYOUT SHEET S-2.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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CHECKED BY : O. PUIGCERVER	DATE : 07-23
DESIGN ENGINEER OF RECORD: O. PUIGCERVER	DATE : 07-23

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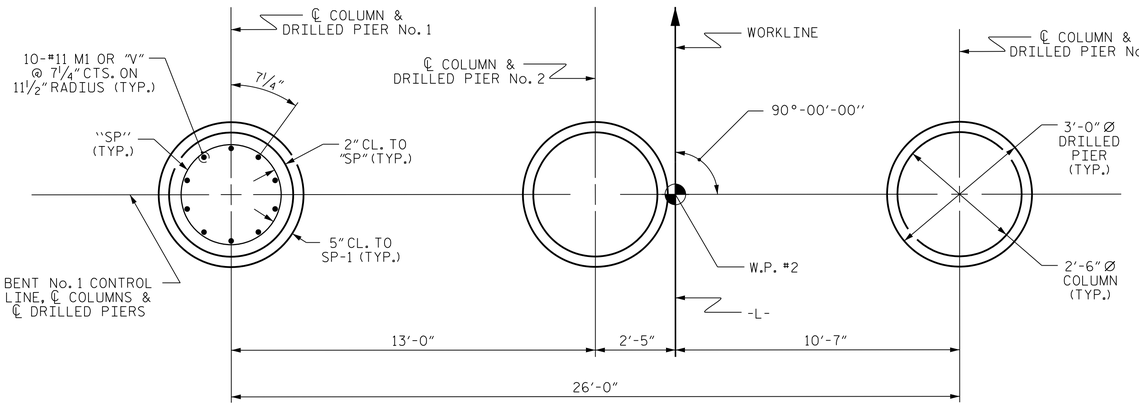
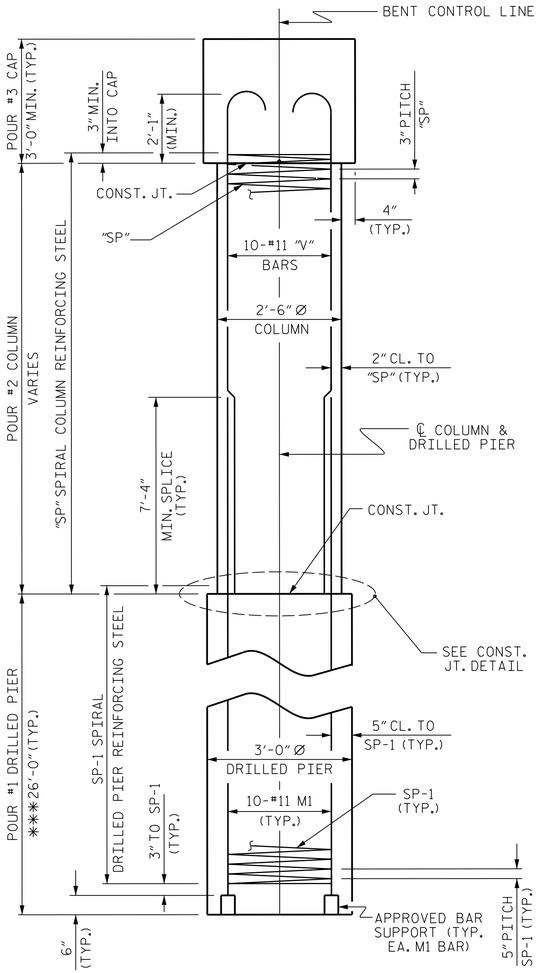
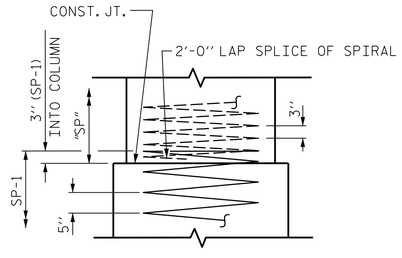


PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION



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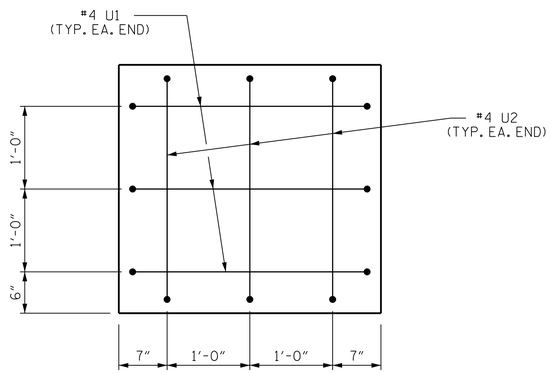
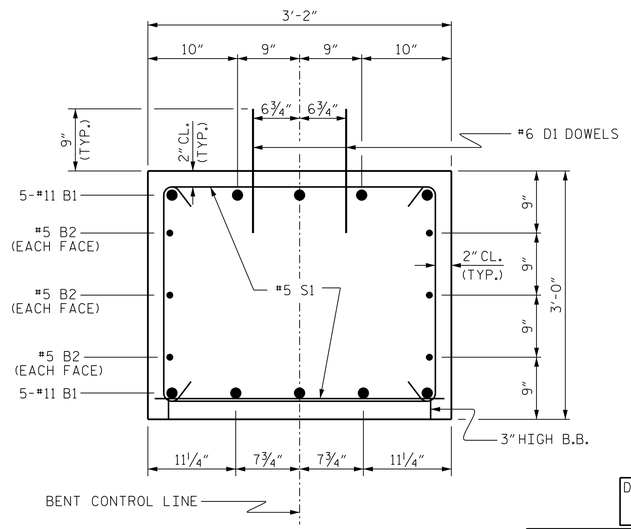


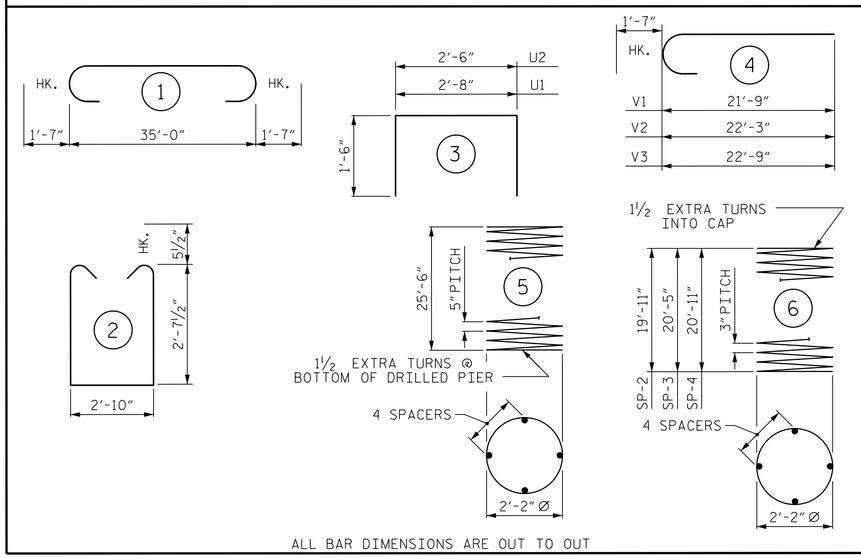
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	38'-2"	2028
B2	6	#5	STR	35'-2"	220
D1	44	#6	STR	1'-6"	99
*** M1	30	#11	STR	35'-10"	5711
S1	64	#5	2	9'-0"	601
U1	6	#4	3	5'-8"	23
U2	6	#4	3	5'-6"	22
V1	10	#11	4	23'-4"	1240
V2	10	#11	4	23'-10"	1266
V3	10	#11	4	24'-4"	1293

REINFORCING STEEL (FOR ONE BENT) 12503 LBS.

***SP-1	3	*	5	422'-9"	1323
SP-2	1	**	6	544'-6"	364
SP-3	1	**	6	557'-10"	373
SP-4	1	**	6	571'-3"	382

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 2442

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

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

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	11.0 C.Y.
POUR #3 (CAP)	12.5 C.Y.
TOTAL CLASS A CONCRETE	23.5 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	***20.4 C.Y.

*** QUANTITIES SUBJECT TO CHANGE AFTER EVALUATION OF PILOT BORINGS AS DIRECTED BY THE ENGINEER, SEE NOTE 3 ON THE FOUNDATION LAYOUT SHEET S-2.

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
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STATION: 18+63.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 1

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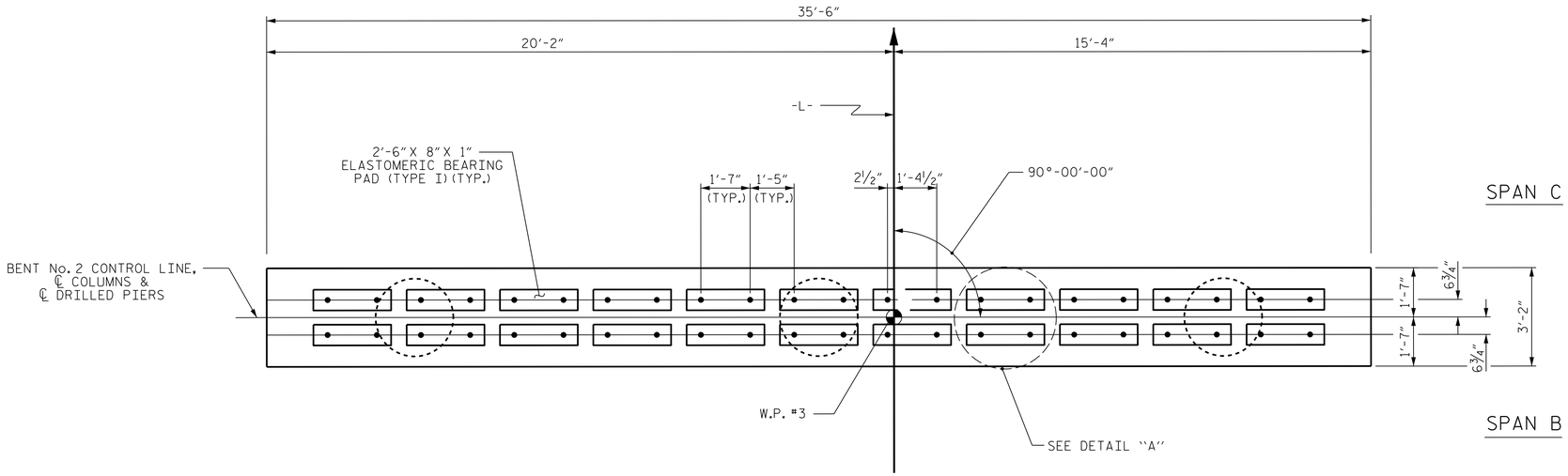
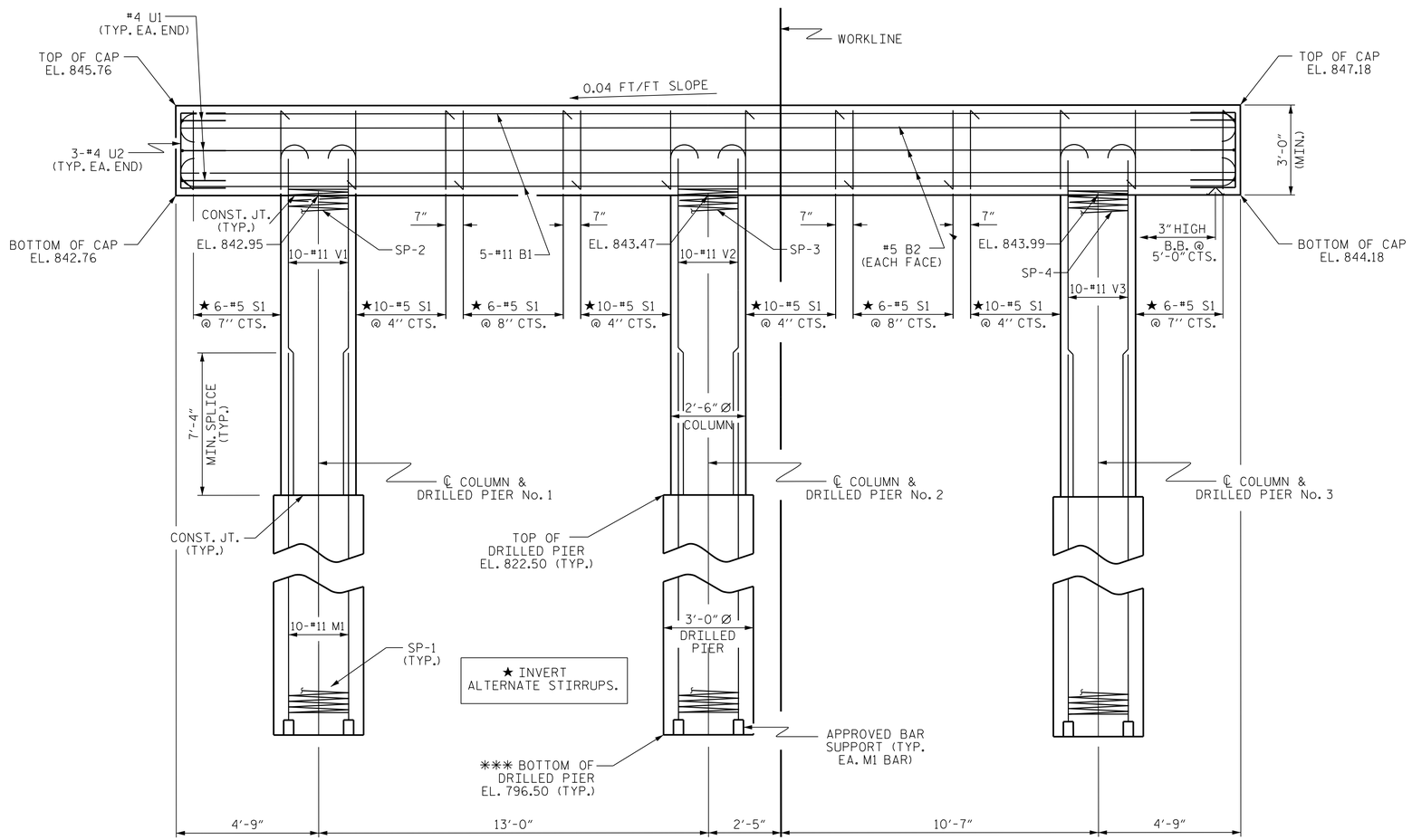


PLAN



ELEVATION

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

NOTES

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

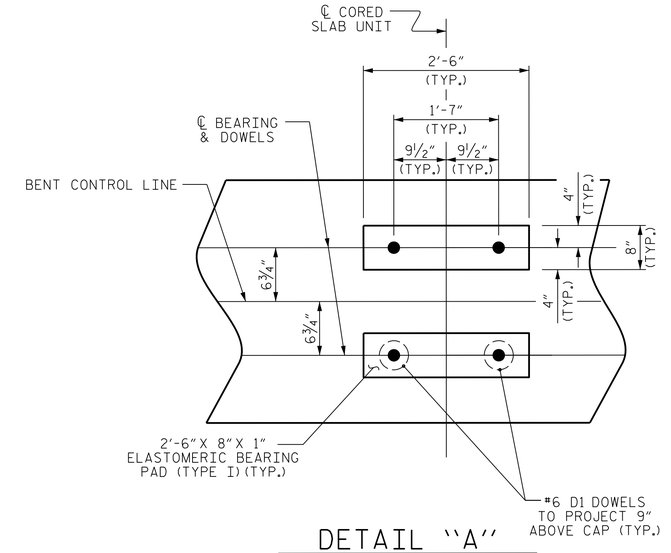
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

*** BOTTOM OF DRILLED PIER ELEVATION SUBJECT TO CHANGE AFTER EVALUATION OF PILOT BORINGS AS DIRECTED BY THE ENGINEER, SEE NOTE 3 ON THE FOUNDATION LAYOUT SHEET S-2.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

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PARRISH & PARTNERS

Parrish and Partners of North Carolina, PLLC
220 Horizon Dr., Suite 100
Raleigh, NC 27615

NC License #P-1212

PROJECT NO. B-5394

IREDELL COUNTY

STATION: 18+63.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : G.C. MORRIS DATE : 06-23
CHECKED BY : O. PUIGCERVER DATE : 07-23
DESIGN ENGINEER OF RECORD: O. PUIGCERVER DATE : 07-23

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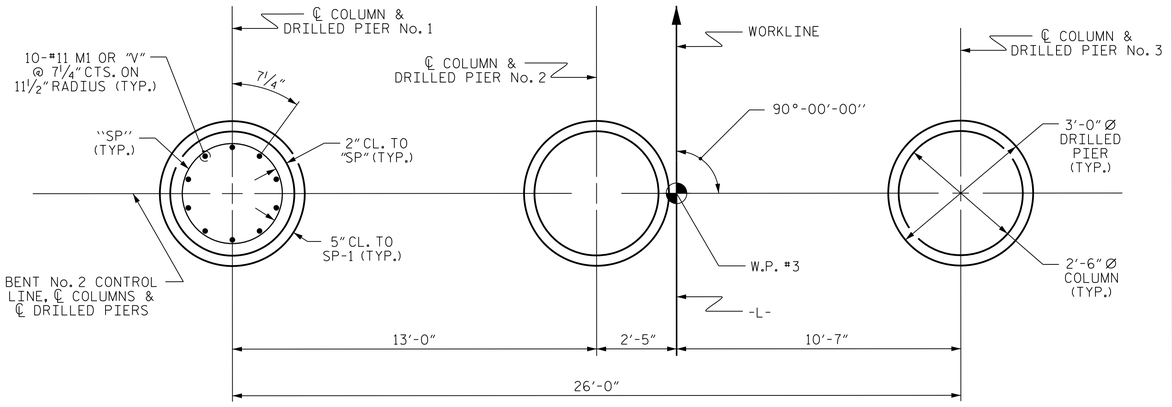
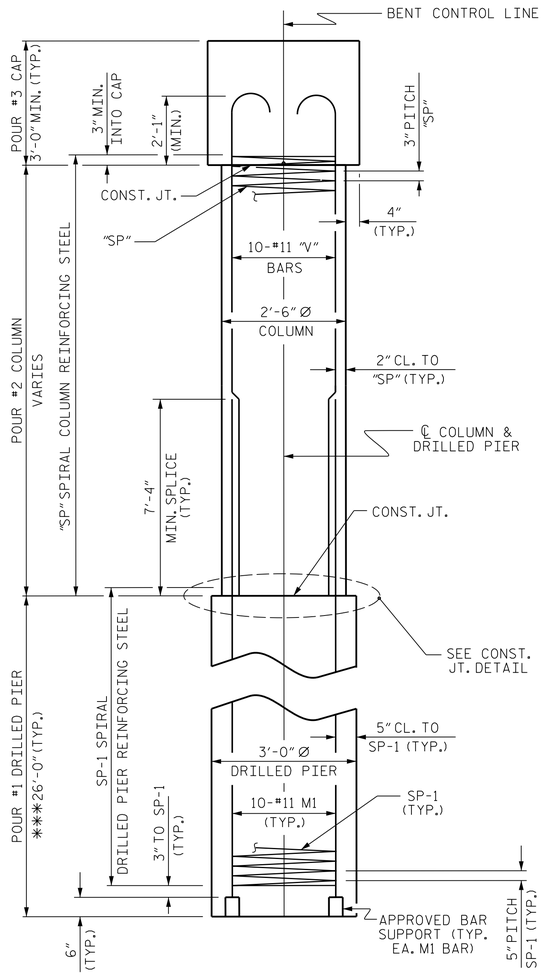
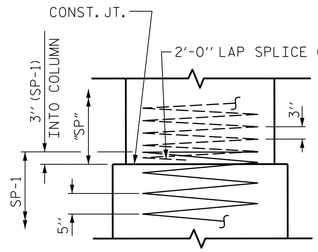


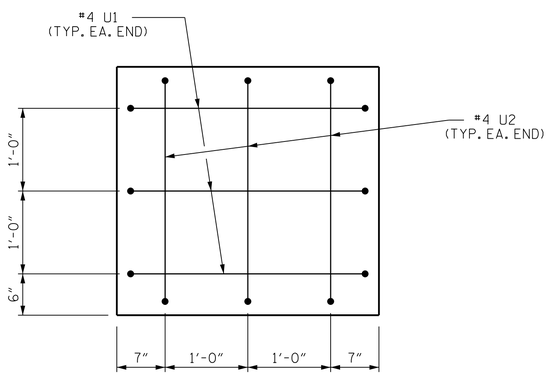
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

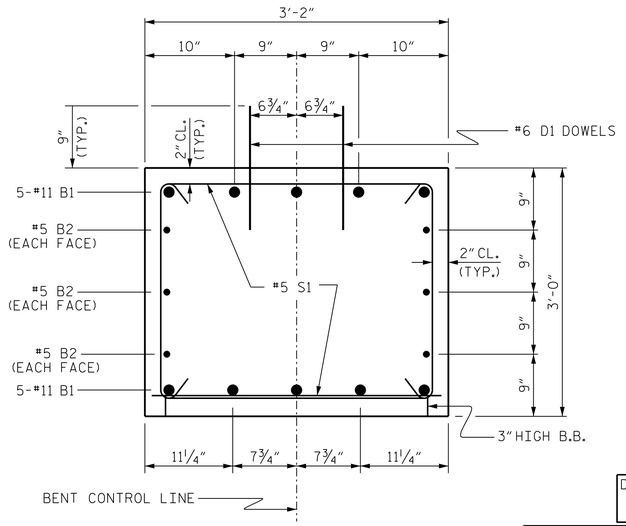


CONSTRUCTION JOINT DETAIL



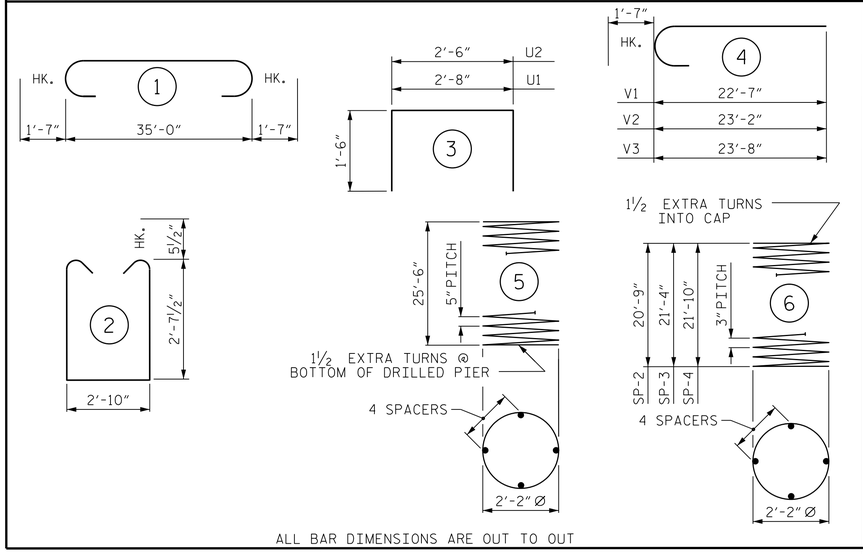
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

*** QUANTITIES SUBJECT TO CHANGE AFTER EVALUATION OF PILOT BORINGS AS DIRECTED BY THE ENGINEER, SEE NOTE 3 ON THE FOUNDATION LAYOUT SHEET S-2.

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	38'-2"	2028
B2	6	#5	STR	35'-2"	220
D1	44	#6	STR	1'-6"	99
*** M1	30	#11	STR	35'-10"	5711
S1	64	#5	2	9'-0"	601
U1	6	#4	3	5'-8"	23
U2	6	#4	3	5'-6"	22
V1	10	#11	4	24'-2"	1284
V2	10	#11	4	24'-9"	1315
V3	10	#11	4	25'-3"	1342

REINFORCING STEEL (FOR ONE BENT) 12645 LBS.

*** SP-1	3	*	5	422'-9"	1323
SP-2	1	**	6	564'-7"	377
SP-3	1	**	6	584'-7"	391
SP-4	1	**	6	597'-11"	399

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 2490

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

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

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	11.5 C.Y.
POUR #3 (CAP)	12.5 C.Y.
TOTAL CLASS A CONCRETE	24.0 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE
POUR #1 (DRILLED PIERS) *** 20.4 C.Y.

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
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PROJECT NO. B-5394
IREDELL COUNTY
STATION: 18+63.00 -L-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			22

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CHECKED BY : O. PUIGCERVER DATE : 07-23
DESIGN ENGINEER OF RECORD: O. PUIGCERVER DATE : 07-23

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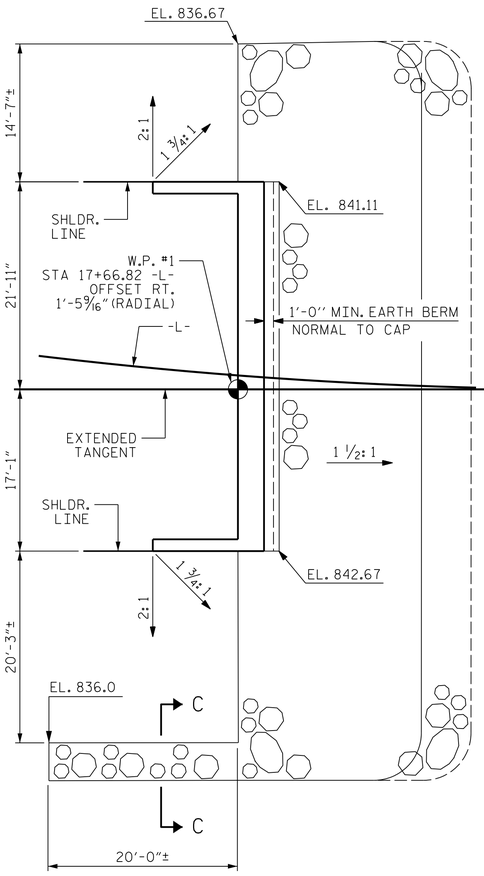
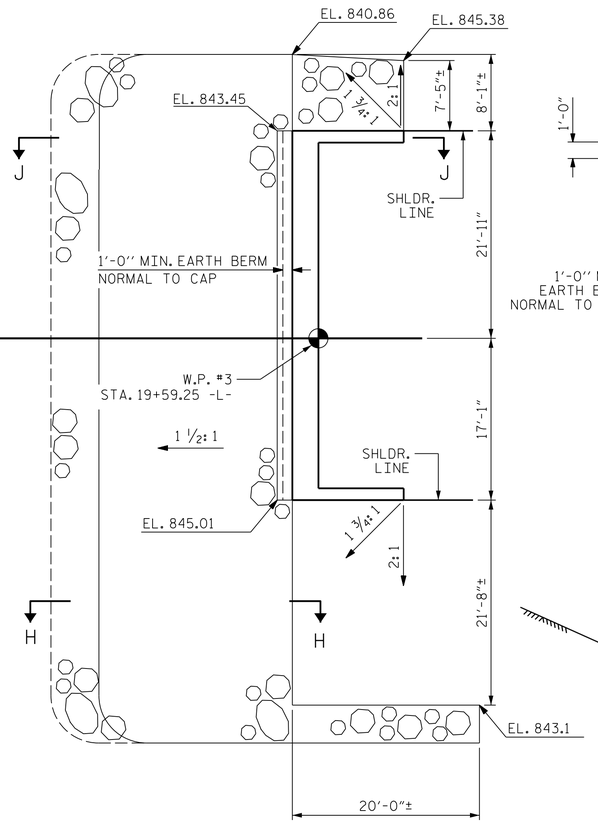
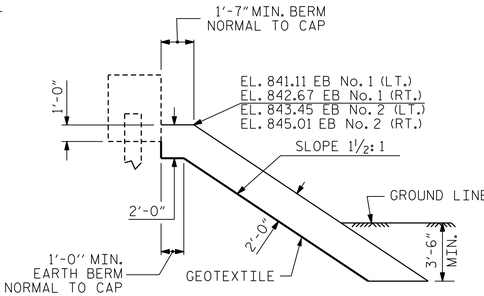


END BENT No. 1

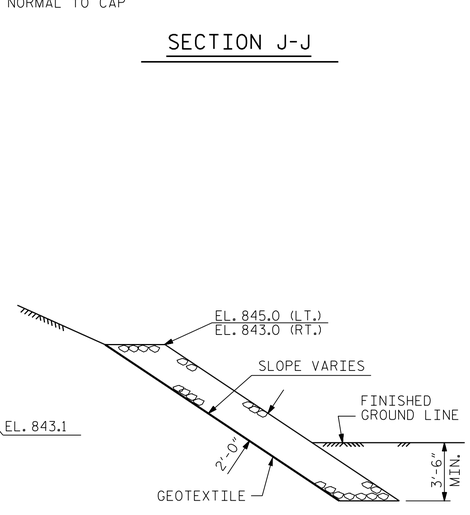
ESTIMATED QUANTITIES		
BRIDGE @ STA. 18+63.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	200	285
END BENT 2	250	350
TOTAL	450	635



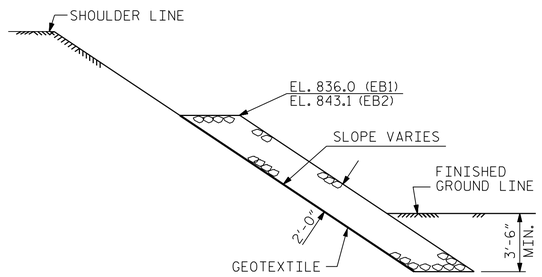
END BENT No. 2



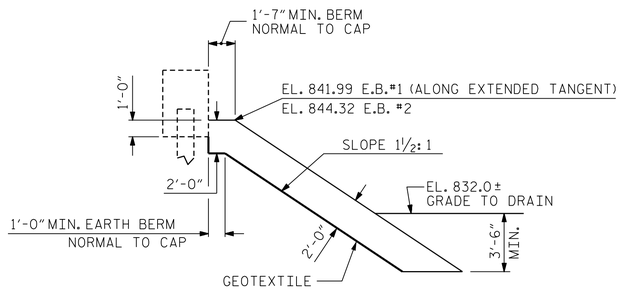
SECTION J-J



SECTION H-H



SECTION C-C



℄ SECTION BERM RIP RAPPED

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NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT
DocuSigned by: Wael Arafat 7807F1ACBAB54A2...
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IREDELL COUNTY
STATION: 18+63.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

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

SHEET NO. S-21
TOTAL SHEETS 22

(Sht 2)

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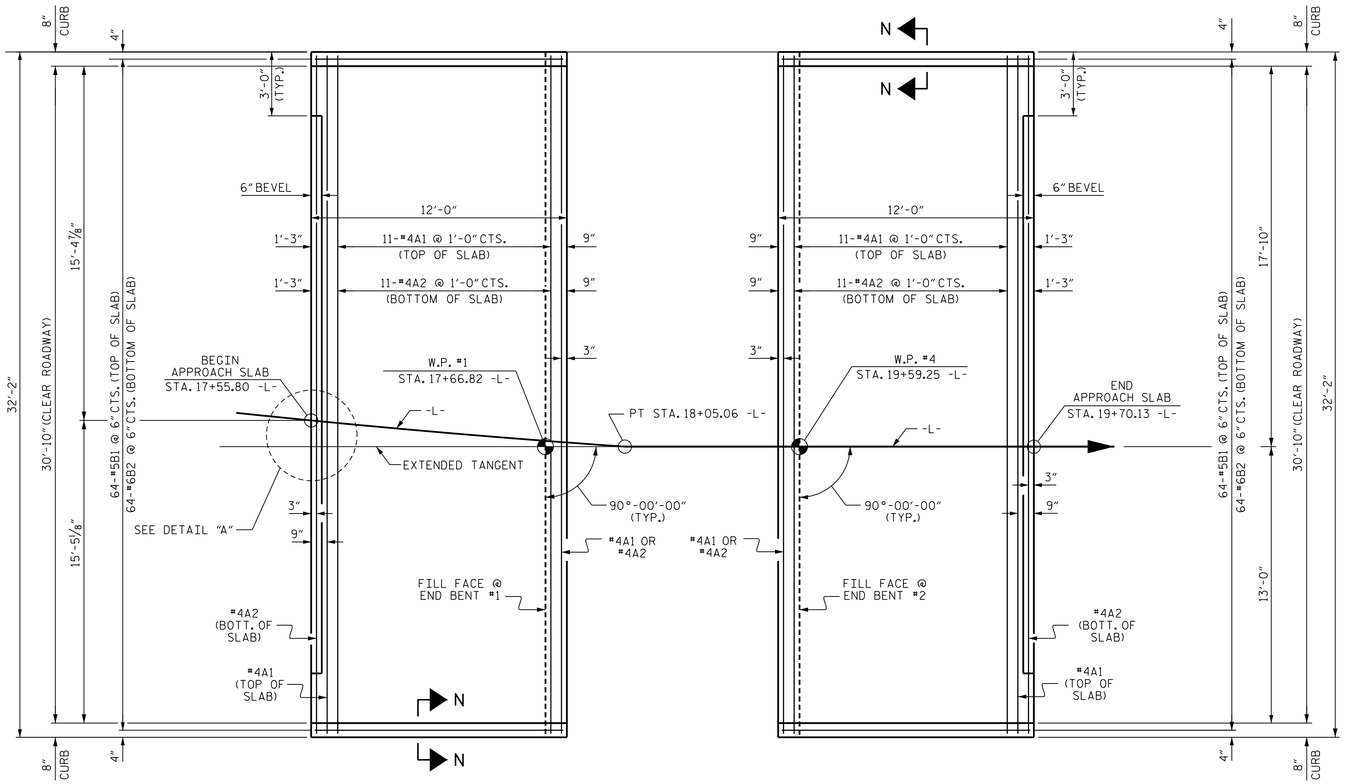


PLAN @ END BENT #1

PLAN @ END BENT #2

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

APPROACH SLAB GROOVING IS NOT REQUIRED.

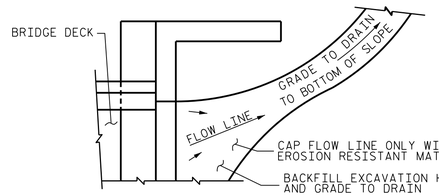
BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	13	#4	STR	31'-10"	276
A2	13	#4	STR	31'-10"	276
✳ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1397
✳ EPOXY COATED REINFORCING STEEL				LBS.	1021
CLASS AA CONCRETE				C. Y.	19.5

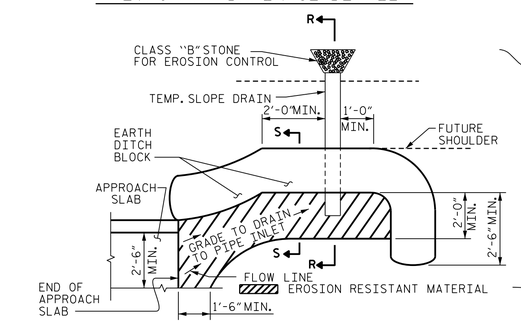
APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	13	#4	STR	31'-10"	276
A2	13	#4	STR	31'-10"	276
✳ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1397
✳ EPOXY COATED REINFORCING STEEL				LBS.	1021
CLASS AA CONCRETE				C. Y.	19.5



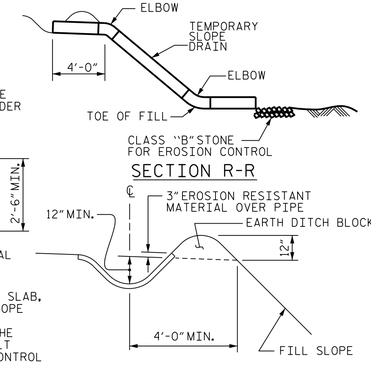
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



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

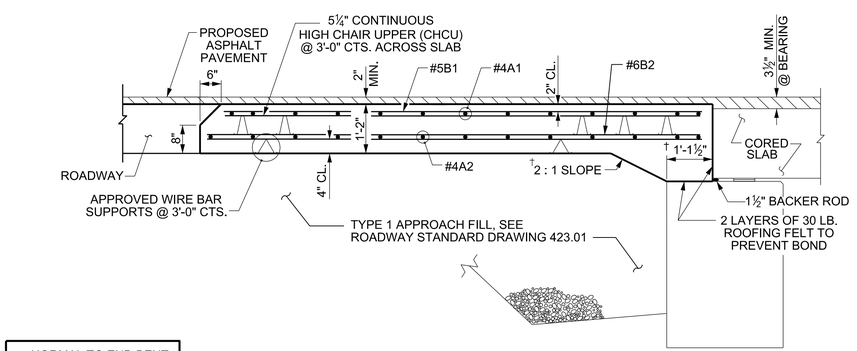
PLAN VIEW



SECTION S-S

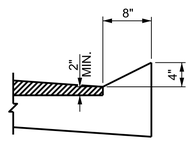
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

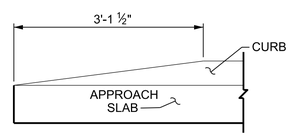


† NORMAL TO END BENT

SECTION THRU SLAB

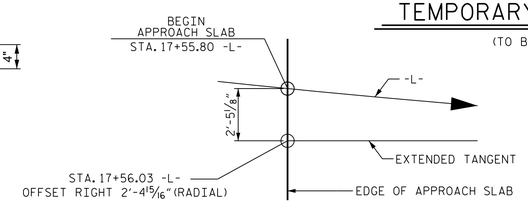


SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS



DETAIL "A"

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

NORTH CAROLINA PROFESSIONAL SEAL 17230 ENGINEER WAEL S. ARAFAT

DocuSigned by: Wael Arafat 7807F1ACBAB54A2...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT

(SUB-REGIONAL TIER)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : G.C. MORRIS DATE : 06-23
CHECKED BY : O. PUIGCERVER DATE : 08-25
DESIGN ENGINEER OF RECORD: O. PUIGCERVER DATE : 08-25

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8/26/21

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
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 AASHTO
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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{5}{16}$" 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 $\frac{1}{16}$" OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

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REFERENCE: B-5394

PROJECT: 46109

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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LINE	STATION	PLAN	PROFILE
-L-	11+25-24+50	4	5
-L-	24+50-26+75	4	6

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LINE	STATION	SHEETS
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-L-	17+50	9
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-L-	22+00	11
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SHEET NO.	DESCRIPTION
13	SOIL TEST RESULTS

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *IREDELL*

PROJECT DESCRIPTION *BRIDGE NO. 279 ON EAGLE MILLS RD (SR 1832) OVER SOUTH HUNTING CREEK*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5394	1	13

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

J. LITTLE

L. SHRADER

M. HARTMAN

B. KEBEA

F&R, Inc.

INVESTIGATED BY *S&ME, Inc.*

DRAWN BY *J. SWARTLEY*

CHECKED BY *J. DAILY*

SUBMITTED BY *S&ME, Inc.*

DATE *DECEMBER 2023*

8848 RED OAK BLVD, SUITE A
CHARLOTTE, NC 28217
(704) 523-4726

NORTH CAROLINA PROFESSIONAL SEAL 045672 ENGINEER THOMAS J. DAILY

DocuSigned by:
Thomas J. Daily
F29CA6BB83F449F...

12/1/2023

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PROJECT REFERENCE NO.	SHEET NO.
B-5394	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / DPT / DMT / VST / PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] CME-550X
- [ ] _____

ADVANCING TOOLS:
- [X] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [X] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [X] -N Q3 [ ] -H _____
- [X] -N Q2

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: B5394-1 N: 833569.5 E: 1467062.6

ELEVATION: 839.12 FEET

NOTES: FIAD: FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

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PROJECT REFERENCE NO.	SHEET NO.
B–5394	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

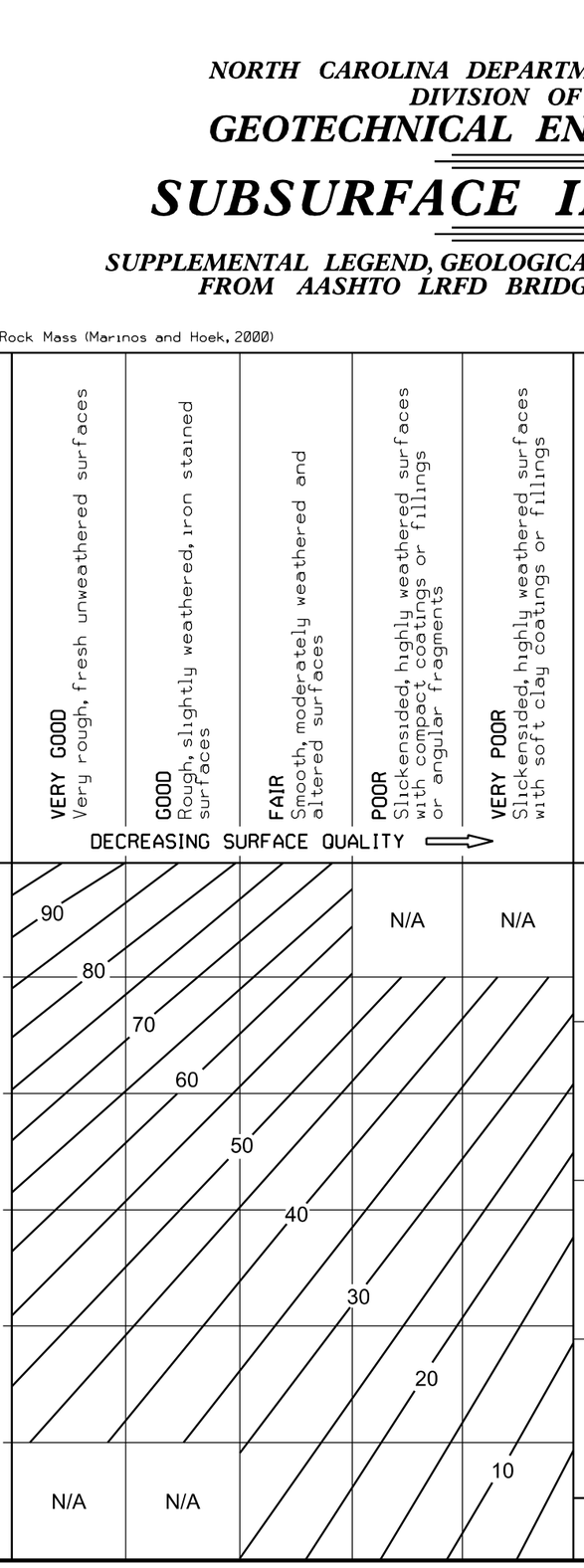
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

STRUCTURE

- INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities
- BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets
- VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets
- BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity
- DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces
- LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

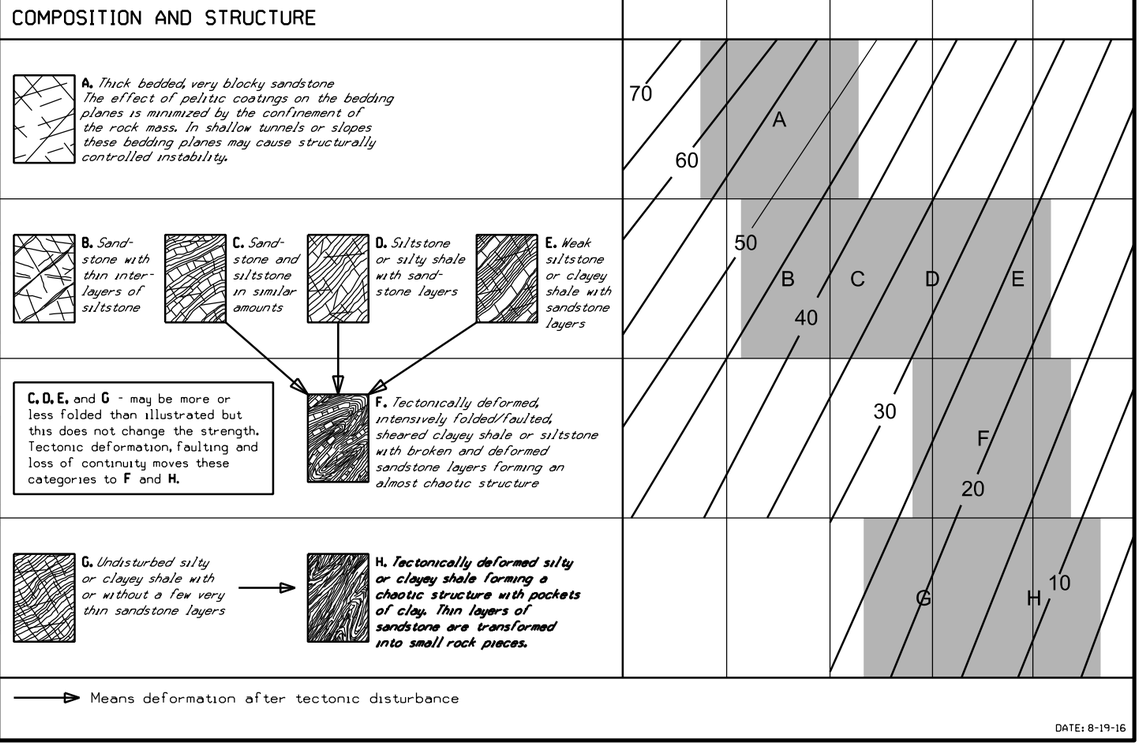


AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

COMPOSITION AND STRUCTURE



DATE: 8-19-16

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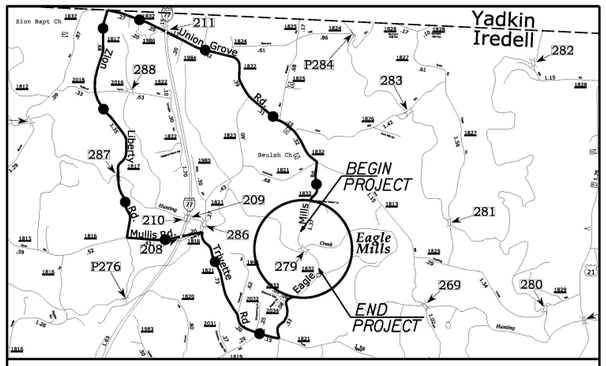
TIP PROJECT: B-5394

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

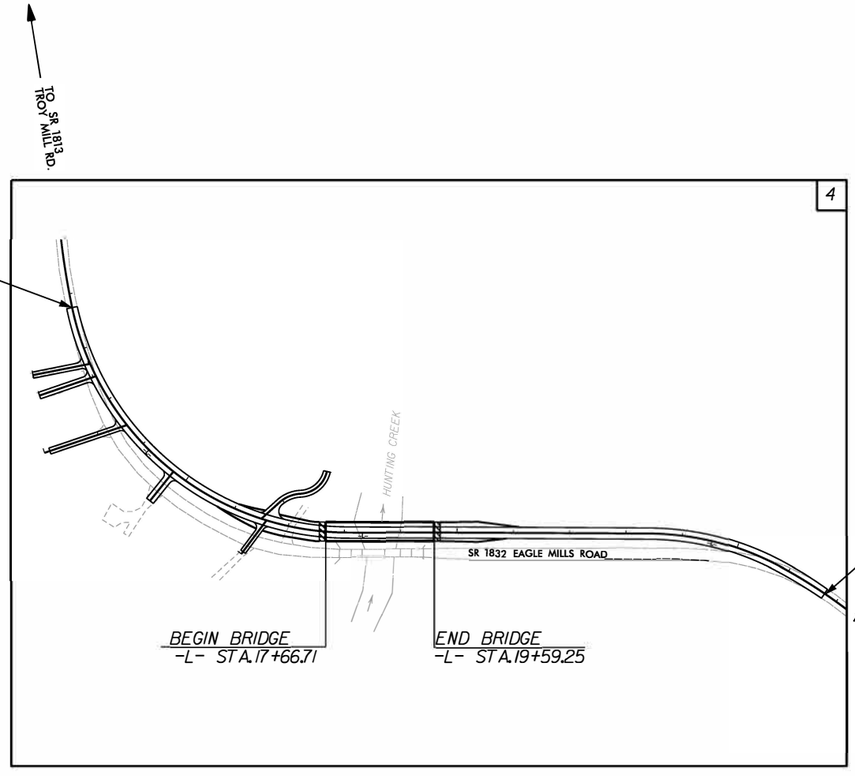
IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5394	3	

WBS PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46109.1.1	N/A	PE
46109.1.2	N/A	R/W
46109.1.3	N/A	CONSTRUCTION

LOCATION: REPLACE BRIDGE NO. 279 ON SR 1832 (EAGLE MILLS ROAD) OVER SOUTH HUNTING CREEK

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

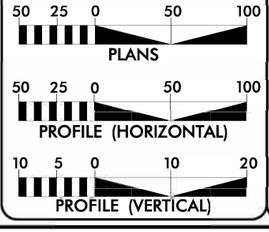


THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF EAGLE MILLS.

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

25% PLANS SUBMITTAL
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2016 = 200
ADT 2040 = 325
K = – %
D = – %
T = – % *
V = 50 MPH
* TTST =–% DUAL –%
FUNC CLASS = LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5394 = 0.257 MILES

LENGTH STRUCTURE TIP PROJECT B-5394 = 0.037 MILES

TOTAL LENGTH TIP PROJECT B-5394 = 0.294 MILES

Prepared in the Office of:
PARRISH & PARTNERS
11325 N COMMUNITY HOUSE RD SUITE 260 CHARLOTTE, NC 28277

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: 07/08/2022

LETTING DATE: 07/18/2023

STEVE RACKLEY, PE
NCDOT CONTACT

CHAD ROGERS, PE
PROJECT ENGINEER

CURTIS HALL, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

12/22/2021
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December 1, 2023

STATE PROJECT: 46109.1.1 (B-5394)
FEDERAL PROJECT: N/A
COUNTY: Iredell
DESCRIPTION: Bridge No. 279 on SR 1832 over South Hunting Creek

SUBJECT: Geotechnical Report – Inventory

S&ME, Inc. has completed a reconnaissance and subsurface investigation for the above roadway project and presents the following inventory. Plans, profiles and cross-sections are included in this report.

Project Description

The project corridor is located in Iredell County along SR 1832 (Eagle Mills Rd) approximately 18 miles north of the town of Statesville, NC. Minor widening, grading, drainage, paving and bridge replacement is proposed for this site. The project consists of the partial realignment and minor widening of SR 1832 to accommodate the new bridge that is replacing Bridge No. 279 over South Hunting Creek. The bridge will be a non-direct replacement so no off-site detour will be needed. The mainline (-L-) starts at the northern end of the project and continues for approximately 0.29 miles to the south. The bridge was investigated during this investigation with additional borings and was submitted as a separate report.

The geotechnical field investigation was conducted in April 2022. One S&ME drill crew was used to drill and sample the borings in this report. An S&ME rig Geologist/Engineer was present to log all the borings. S&ME used an ATV-mounted CME-550X drilling rig equipped with an automatic hammer. Standard Penetration Tests were performed at selected locations along the project. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the S&ME soils lab. A past geotechnical field investigation was conducted by F&R during April 2016 as part of an Express Design Build package. Those four SPT borings are also included in this report.s

The following alignment, totaling 0.29 miles, was investigated. Subsurface profiles and cross-sections of this alignment are included in this report.

Line	Station
-L-	11+25 to 26+75

Physiography and Geology

The project is located in the piedmont physiographic province of North Carolina near the town of Statesville, NC. A mixture of creeks and wooded areas lie within the project corridor. The project corridor is predominately rural with few single-family homes and farmland. Topography along the project consists of gently to steeply rolling hills. Elevations along the project range from 820± to 910± feet above sea level.

Geologically the project area is located within the Inner Piedmont Block. The rocks are composed primarily of Biotite Gneiss, Schists and Amphibolites. These rocks were formed around the Precambrian era as a composite stack of thrust sheets and later experienced metamorphism from subsequent mountain building episodes approximately 300-400 million years ago during the Paleozoic Era.

Water Bodies

There is one major body of water that flows through the project corridor. South Hunting Creek flows underneath Bridge No. 279 from south to north.

Soil Properties

Soils encountered during this investigation are separated into 4 categories: Roadway Embankment, Artificial Fill, Alluvial and Residual soils.

Roadway Embankment soils were encountered near the vicinity of the bridge and underneath the bridge approaches. Roadway Embankment consists of brown, very loose, silty sand (A-2-4), and medium stiff, silty clay (A-7-6).

Artificial Fill soils were encountered near the stream banks. Artificial Fill consists of brown, loose, moderately organic, coarse sand (A-1-b) and medium stiff to stiff, sandy silt (A-4) and silty clay (A-7-6).

Residual soils were formed by the in-place weathering of the underlying bedrock in the area. These soils consist of tan, brown, red and gray, soft to stiff, sandy silt (A-4), clayey silt (A-5), sandy clay (A-6) silty clay (A-7-6), and loose to very dense, silty sand (A-2-4) and coarse sand (A-1-b).

Alluvial soils were found near South Hunting Creek. These soils consist of red and brown, very loose, silty sand (A-2-4).

Rock Properties

Weathered rock and crystalline rock occur throughout the project. The weathered rock is derived from the underlying bedrock (gneiss). The weathered rock along SR 1832 begins at elevations ranging from 808± feet to 892± feet and ranges from 1± to 5± feet in thickness. Crystalline rock along SR 1832 occurs at elevations ranging from 803± to 890± feet. Rock coring was performed near the bridge. Recovery and RQD values of rock range from 90-98% and 76-93% respectively. **Weathered rock and crystalline rock may require blasting and specialized excavation techniques where necessary.**

Groundwater

Groundwater was not encountered in any of the upland borings. Groundwater is anticipated to be near the elevation of South Hunting Creek. Groundwater is not expected to cause any significant impacts to construction.

Respectfully Submitted,

Jarett Swartley, PG
Senior Geologist

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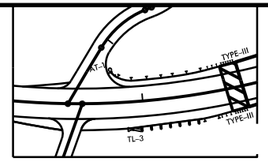
PROJECT REFERENCE NO.	SHEET NO.
B-5394	4

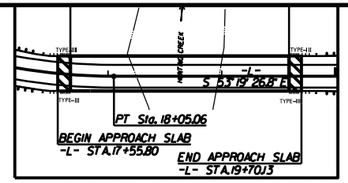
SITE PLAN

0 100 200

FEET

SKEW = 90 DEGREES

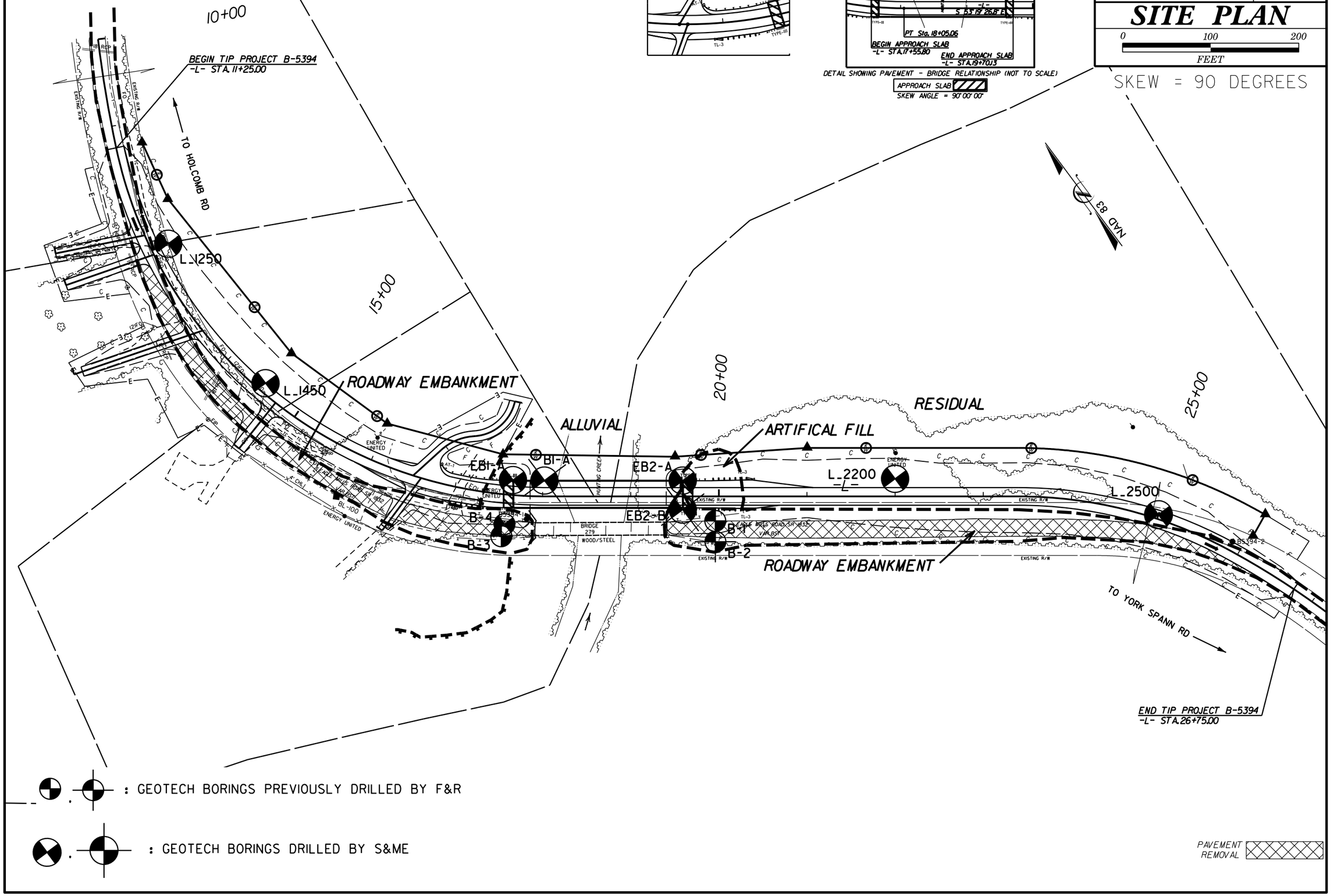




DETAIL SHOWING PAVEMENT - BRIDGE RELATIONSHIP (NOT TO SCALE)

APPROACH SLAB

SKEW ANGLE = 90°00'00"



: GEOTECH BORINGS PREVIOUSLY DRILLED BY F&R

: GEOTECH BORINGS DRILLED BY S&ME

PAVEMENT REMOVAL

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PROJECT REFERENCE NO.	SHEET NO.
B-5394	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

(A) ALLUVIAL, RED AND BROWN, MOIST, VERY LOOSE, SILTY SAND, A-2-4
(B) ROADWAY EMBANKMENT, BROWN, MOIST, MEDIUM STIFF, SILTY CLAY, A-7-5/6
(C) RESIDUAL, RED AND BROWN, MOIST, STIFF TO VERY STIFF, SILTY CLAY, SANDY CLAY AND CLAYEY SILT, A-7-5/6, A-6 & A-5
(D) RESIDUAL, BROWN, MOIST TO SATURATED, VERY SOFT, SANDY SILT AND MED. DENSE TO VERY DENSE, SILTY SAND, A-4 & A-2-4
(E) WEATHERED ROCK, GNEISS

-L-

BEGIN GRADE
STA.11+25.00
ELEV=889.45'

L_1250
20' LT
SS-32
SS-33
SS-34

BT
FIAD
04/22

L_1450
10' LT
SS-37
SS-38
SS-39
SS-40

BT
FIAD
04/22

RESIDUAL,
BROWN, GRAY AND TAN, MOIST,
STIFF, SANDY SILT AND VERY DENSE,
SILTY SAND, A-4 & A-2-4

EXISTING GROUND
PROPOSED GRADE

BEGIN BRIDGE
STA.17+66.71

BEGIN APPROACH SLAB
STA.17+55.67'

EBI-A
17+65
17' LT

BI-A
18+02
18' LT

BRIDGE NO. 279

END BRIDGE
STA.19+59.25

END APPROACH SLAB
STA.19+70.25

EB2-B
19+59
15' RT

RESIDUAL,
GRAY, BROWN AND RED, MOIST, STIFF,
SANDY SILT AND MEDIUM DENSE TO VERY
DENSE, SILTY SAND, A-4 & A-2-4

L_2200
20' LT

BT
FIAD
04/22

CRYSTALLINE ROCK,
GNEISS

WEATHERED ROCK,
GNEISS

RESIDUAL,
BROWN, GRAY AND TAN, MOIST,
STIFF, SANDY SILT, A-4

WATER SURFACE
(APPROXIMATE)

CRYSTALLINE ROCK,
GNEISS

REC. = 98 %
RQD = 93 %
GSI = 75-80

CT
04/22

BT
FIAD
04/22

CRYSTALLINE ROCK,
GNEISS

REC. = 90 %
RQD = 76 %
GSI = 65-70

CT
FIAD
04/22

900 890 880 870 860 850 840 830 820 810 800 790 780 770

11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

$$$$$$$$SYSTIME$$$$$$
$$$$$$$$

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PROJECT REFERENCE NO.	SHEET NO.
B-5394	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

930
920
910
900
890
880
870
860
850
840

EXISTING GROUND

RESIDUAL, BROWN AND RED, MOIST, STIFF, SANDY SILT, A-4

L-2500
5' LT
SS-29

12
100/0.8
60/0.0
BT
FIAD
04/22

CRYSTALLINE ROCK, GNEISS

WEATHERED ROCK, GNEISS

END GRADE
STA. 26+75.00
ELEV.=909.95'

-L-

25+00 26+00 27+00 28+00

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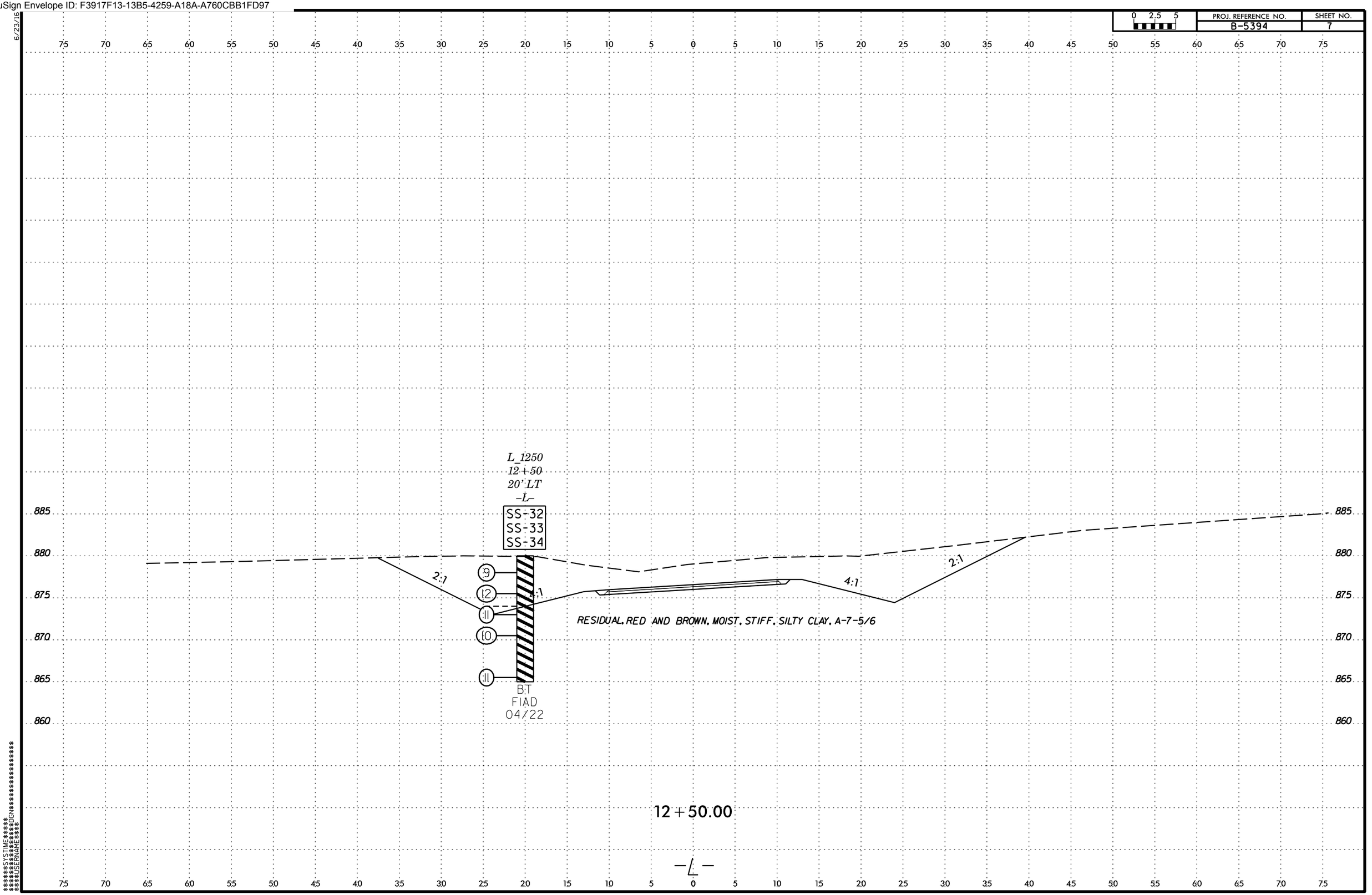

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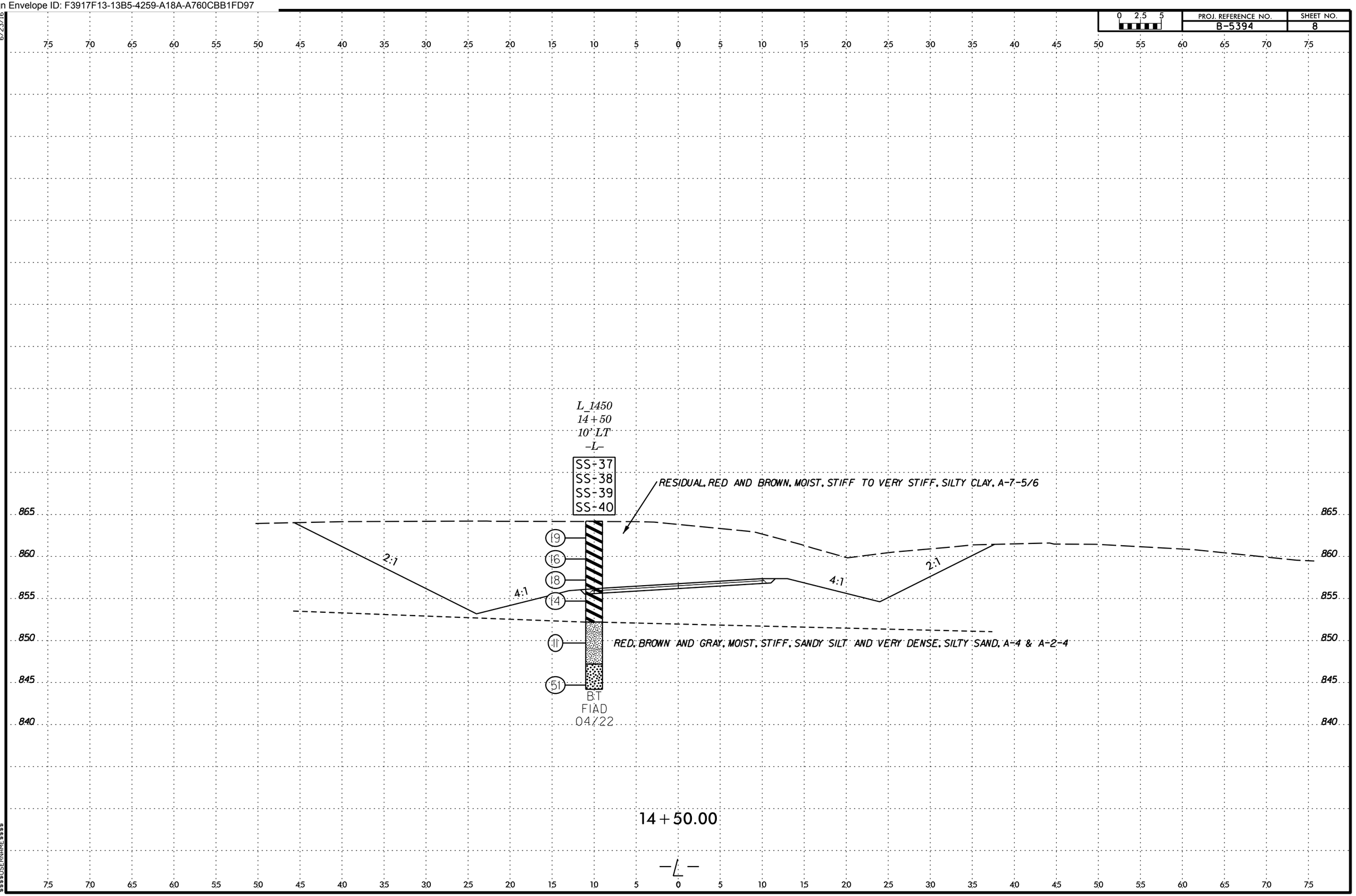

$$$$$$$$SYSTIME$$$$$$
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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	9

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

845 840 835 830 825 820 815 810 805

EB1–A
17+65
17' LT
–L–

B–4 (F&R)
17+60
34' RT
–L–

B–3 (F&R)
17+58
48' RT
–L–

2:1

2:1

ROADWAY EMBANKMENT.
RED AND BROWN, MOIST.
MEDIUM STIFF TO VERY STIFF.
SANDY CLAYEY SILT. A-5

RED AND BROWN, MOIST.
VERY LOOSE TO MEDIUM DENSE.
SILTY FINE SAND. A-2-4

ALLUVIAL.
BROWN, MOIST, VERY LOOSE, SILTY SAND, A-2-4

RESIDUAL, RED AND BROWN, MOIST, STIFF, SANDY CLAY, A-6

RED AND BROWN, MOIST TO WET, MEDIUM STIFF TO STIFF,
CLAYEY SILT, A-5

BROWN, GRAY, AND TAN, MOIST TO SATURATED, MEDIUM STIFF TO STIFF,
SANDY SILT, AND LOOSE TO MEDIUM DENSE SILTY FINE TO COARSE
SAND AND GRAVEL, A-4, A-2-4 AND A-1-a

ALLUVIAL.
BROWN, MOIST, VERY LOOSE
SILTY FINE SAND, A-2-4

WEATHERED ROCK,
GNEISS

CRYSTALLINE ROCK,
GNEISS

	EB1–A	B–4 (F&R)	B–3 (F&R)
	2	21	6
	9	18	2
	8	2	2
	8	8	6
	9	6	27 ▽ 03/16
▽	04/22		
	8	19	19
	10	100/0.9	100/0.3
	60/0.0	60/0.0	60/0.0
	BT FIAD 04/22	AR FIAD 03/16	AR FIAD 03/16

17+50.00

–L–

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

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

Ⓐ ARTIFICIAL FILL.
BROWN, MOIST, STIFF, BROWN, SANDY SILT, A-4

Ⓑ ARTIFICIAL FILL.
BROWN, MOIST, LOOSE, MODERATELY ORGANIC, CLAYEY, COARSE SAND, A-1-b

Ⓒ RESIDUAL.
RED AND BROWN, MOIST, MEDIUM STIFF, CLAYEY SILT AND SILTY CLAY, A-5 & A-7-5/6

Ⓓ RESIDUAL.
BROWN, MOIST, SOFT TO MEDIUM STIFF, SILTY CLAY, A-7-5/6

860 855 850 845 840 835 830 825 820 815 810

EB2-A
19+59
18' LT
-L-
SS-7

EB2-B
19+59
15' RT
-L-

B-1 (F&R)
19+96
28' RT
-L-

B-2 (F&R)
19+96
51' RT
-L-

2:1 4:1 4:1

ROADWAY EMBANKMENT, BROWN, MOIST, MEDIUM STIFF, SILTY CLAY, A-7-5/6

RESIDUAL, RED AND BROWN, MOIST, MEDIUM DENSE TO VERY DENSE, SILTY SAND, A-2-4

BROWN, MOIST TO WET, SOFT TO MED. STIFF, SANDY SILT AND MED. DENSE TO V. DENSE, SILTY SAND AND SAND WITH GRAVEL, A-4, A-2-4, & A-1-b

WEATHERED ROCK, GNEISS

CRYSTALLINE ROCK, GNEISS

REC. = 98 %
RQD = 93 %
GSI = 75-80

WEATHERED ROCK, GNEISS

CRYSTALLINE ROCK, GNEISS

REC. = 90 %
RQD = 64 %

10 8 3 4 5 17 60/0.0 — BT 04/22

7 8 8 11 2 60/0.0 — 04/22 — CT 04/22

12 90 100/0.5 60/0.0 — AR FIAD 03/16

15 64 60/0.0 — CT FIAD 03/16

20+00.00

—L—

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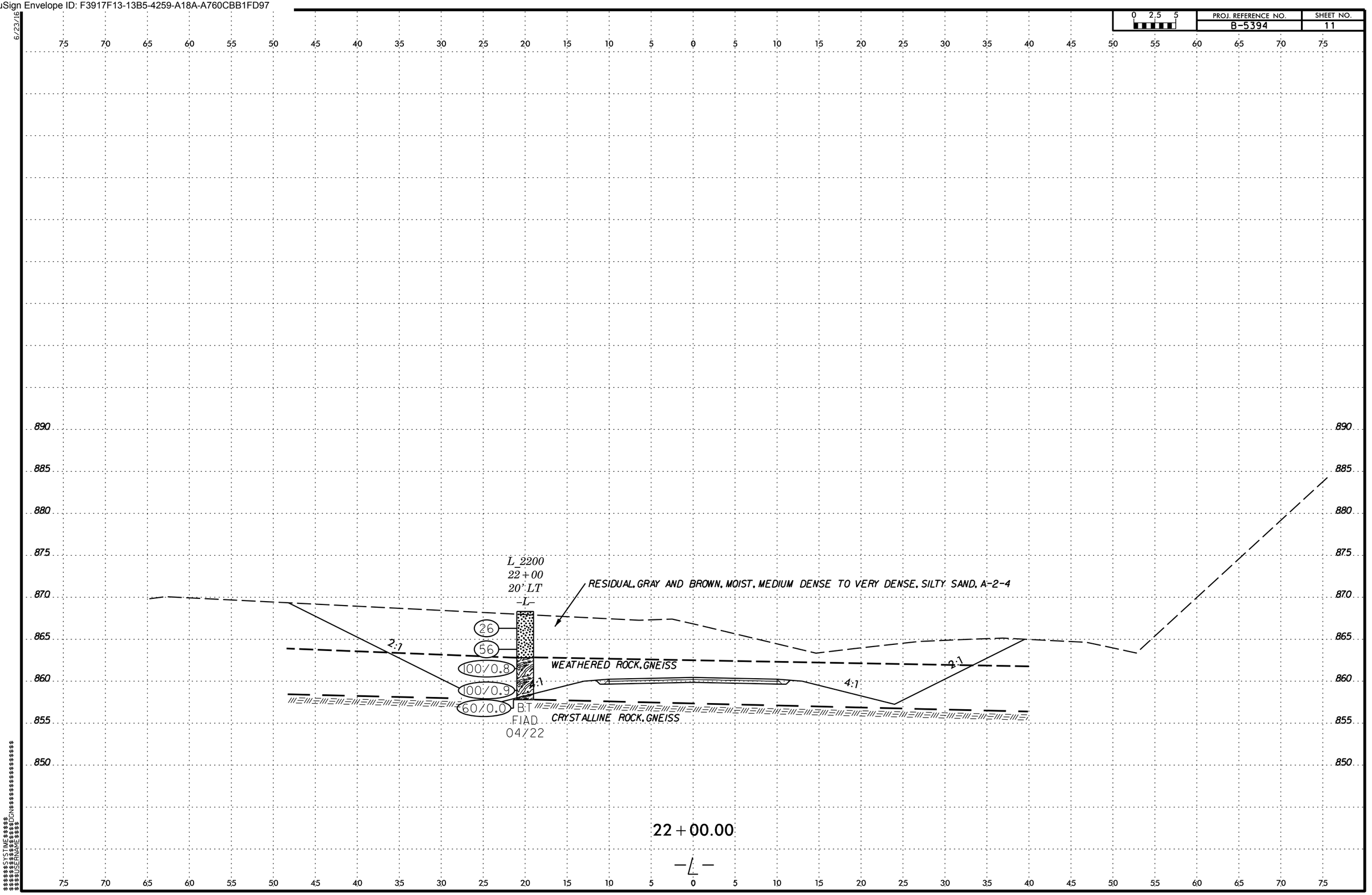
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	11



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6/23/16

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
B-5394	12

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

910 905 900 895 890 885 880

L_2500
25+00
5' LT
-L-

SS-29

12

100/0.8

60/0.0

BT

FIAD
04/22

RESIDUAL. *BROWN AND RED, MOIST, MEDIUM DENSE, SILTY SAND, A-2-5*

WEATHERED ROCK. *GNEISS*

CRYSTALLINE ROCK. *GNEISS*

2:1 4:1 4:1 2:1

25+00.00

-L-

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SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	210182			Date Report:	9/10/2022
State Project No.:	46109.1.2	County:	Iredell	Date Tested:	8/9/22-9/1/22
Federal ID No.:	NA	TIP No.:	B-5394		
Project Name:	Bridge No. 279 on Eagle Mills Rd (SR 1832) over South Hunting Creek				
Client Name:	Parrish	Client Address:	Raleigh, NC		

Sample No.	Boring No.	Station No.	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing Sieve #				Total Mortar Fraction (%)				LL	PL	PI	Organic	Moist. %
								10	40	60	200	Coarse Sand	Fine Sand	Silt	Clay					
SS-7	EB2-A	19+59	5' LT	-L-	3.6-5.1	A-1-b	(0)	50	37	32	18	37	31	17	15	NP	NP	NP	9.2	32.0
SS-29	L_2500	25+00	5' LT	-L-	1.0-2.5	A-2-5	(0)	99	82	65	26	35	43	10	12	42	37	5	-	21.0
SS-32	L_1250	12+50	20' LT	-L-	1.0-2.5	A-7-5	(9)	95	82	74	58	22	19	12	47	50	32	18	-	22.9
SS-33	L_1250	12+50	20' LT	-L-	3.5-5.0	A-7-5	(19)	96	87	82	69	14	16	12	58	65	40	25	-	26.5
SS-34	L_1250	12+50	20' LT	-L-	6.0-7.5	A-7-5	(11)	99	91	83	57	16	30	17	37	60	39	21	-	29.5
SS-37	L_1450	14+50	10' LT	-L-	1.0-2.5	A-7-6	(10)	98	84	76	58	22	21	12	45	50	29	21	-	21.5
SS-38	L_1450	14+50	10' LT	-L-	3.5-5.0	A-7-6	(5)	95	82	71	47	25	28	9	38	45	27	18	-	16.4
SS-39	L_1450	14+50	10' LT	-L-	6.0-7.5	A-7-6	(8)	98	83	75	54	24	24	12	40	45	27	18	-	14.9
SS-40	L_1450	14+50	10' LT	-L-	8.5-10.0	A-7-5	(5)	96	81	73	54	24	22	11	43	43	30	13	-	13.7

References / Comments / Deviations: ND=Not Detemined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Karen Warner		NCDOT 118-06-0305	Joey Daily	Project Manager
Technician Name:	Signature	Certification #	Technical Responsibility:	Position

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5394	1	15

REFERENCE: B-5394

PROJECT: 46109

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *IREDELL*

PROJECT DESCRIPTION *BRIDGE NO. 279 ON EAGLE MILLS RD (SR 1832) OVER SOUTH HUNTING CREEK*

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-12	BORE LOGS & CORE REPORTS
13	SOIL TEST RESULTS
14	CORE PHOTOGRAPHS
15	SITE PHOTOGRAPH

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

J. LITTLE

L. SHRADER

M. HARTMAN

B. KEBEA

F & R

INVESTIGATED BY *S&ME, Inc.*

DRAWN BY *J. SWARTLEY*

CHECKED BY *K. HILL*

SUBMITTED BY *S. MITCHELL*

DATE *JANUARY 2023*

9751 SOUTHERN PINE BLVD
CHARLOTTE, NC 28273
(704) 523-4726

NORTH CAROLINA PROFESSIONAL SEAL 032125 ENGINEER STACIE E. MITCHELL

DocuSigned by:
Stacie Mitchell 1/20/2023
BBC611B64F19458...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-5394	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40														
LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	< 4	
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	N/A
	DENSE	30 TO 50	
	VERY DENSE	> 50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	< 2	< 0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	> 30	> 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] CME-550X
- [ ] _____

ADVANCING TOOLS:
- [X] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [X] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [X] -N Q

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: B5394-1 N: 833569.5 E: 1467062.6

ELEVATION: 839.12 FEET

NOTES: FIAD: FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
B-5394	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

STRUCTURE

- INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities
- BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets
- VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets
- BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity
- DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces
- LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES ⇩

SURFACE CONDITIONS

VERY GOOD	GOOD	FAIR	POOR	VERY POOR
Very rough, fresh unweathered surfaces	Rough, slightly weathered, iron stained surfaces	Smooth, moderately weathered and altered surfaces	Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	Slickensided, highly weathered surfaces with soft clay coatings or fillings

DECREASING SURFACE QUALITY ⇨

90			N/A	N/A
80				
70				
60				
50				
40				
30				
20				
10				
N/A	N/A			

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

COMPOSITION AND STRUCTURE

- **A.** *Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.*
- **B.** *Sandstone with thin interlayers of siltstone*
- **C.** *Sandstone and siltstone in similar amounts*
- **D.** *Siltstone or silty shale with sandstone layers*
- **E.** *Weak siltstone or clayey shale with sandstone layers*
- **C, D, E,** and **G** - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H.**
- **F.** *Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure*
- **G.** *Undisturbed silty or clayey shale with or without a few very thin sandstone layers* → **H.** ***Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.***

→ Means deformation after tectonic disturbance

SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)

VERY GOOD - Very Rough, fresh unweathered surfaces	GOOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings
70				
60	A			
50		B	C	D E
40				
30				F
20				
		G	H	10

DATE: 8-19-16

PROJECT REFERENCE NO.	SHEET NO.
B-5394	3

SITE PLAN

0 50 100
FEET

SKEW = 90 DEGREES

15+00

20+00

S 05°31'04" W
122.00'

S 85°13'56" E
257.51'

N 85°31'49" E
85.28'

N 68°38'31" E
119.24'

N 47°18'24" E
165.75'

S 05°31'04" W
279.49'

S 49°44'28" W
56.40'

S 62°02'29" W
102.00'

NAD 83

END BENT 1 LINE

BENT 1 LINE

END BENT 2 LINE

BENT 2 LINE

+50.00
55.00 LT

+58.00
49.85

+40.00
115.00

+00.00
45.00 LT

+84.00
110.00

+50.00
45.00 LT

+50.00
45.00 LT

+00.00
55.00 LT

EBI-A

BI-A

EB2-A

EB2-B

B-4

TO HOLCOMB RD

TO YORK SPANN RD

EAGLE MILLS ROAD SR 1832
VAR.BST

EOP

EOP

EOP

EOP

4' CHLI

BL-100

HUNTING CREEK

BRIDGE
279
WOOD/STEEL

EXISTING R/W

EXISTING R/W

60.00'

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-5394	4

PROFILE PROJECTED ALONG CENTERLINE OF –L–

0 50 100
FEET
VE = 5

–L–

EXISTING GROUND
PROPOSED GRADE
BEGIN BRIDGE STA. 17+66.71
BEGIN APPROACH SLAB STA. 17+55.67
END BRIDGE STA. 19+59.25
END APPROACH SLAB STA. 19+70.25
EB1-A 17+65 17' LT
B1-A 18+02 18' LT
EB2-B 19+59 15' RT
BRIDGE NO. 279
WATER SURFACE [APPROXIMATE]

RESIDUAL, BROWN, GRAY, RED AND TAN, MOIST, STIFF, SANDY CLAY, A-6, AND SANDY SILT, A-4

CRYSTALLINE ROCK, GNEISS

REC. = 98 %
RQD = 93 %
GSI = 75-80

CT 04/22

BT FIAD 04/22

REC. = 90 %
RQD = 76 %
GSI = 65-70

CT FIAD 04/22

(A) **ALLUVIAL,** RED AND BROWN, MOIST, VERY LOOSE, SILTY SAND, A-2-4
(B) **ROADWAY EMBANKMENT,** BROWN, MOIST, MEDIUM STIFF, SILTY CLAY A-7
(C) **ARTIFICIAL FILL,** RED AND BROWN, MOIST, STIFF TO MEDIUM STIFF, SILTY CLAY, A-7, SANDY CLAY A-6
(D) **ALLUVIAL,** BROWN, SATURATED, SOFT, SANDY SILT A-4
(E) **RESIDUAL,** GRAY, BROWN, MOIST, MEDIUM DENSE TO VERY DENSE, SILTY SAND, A-2-4
(F) **WEATHERED ROCK,** GNEISS

860 850 840 830 820 810 800 790 780

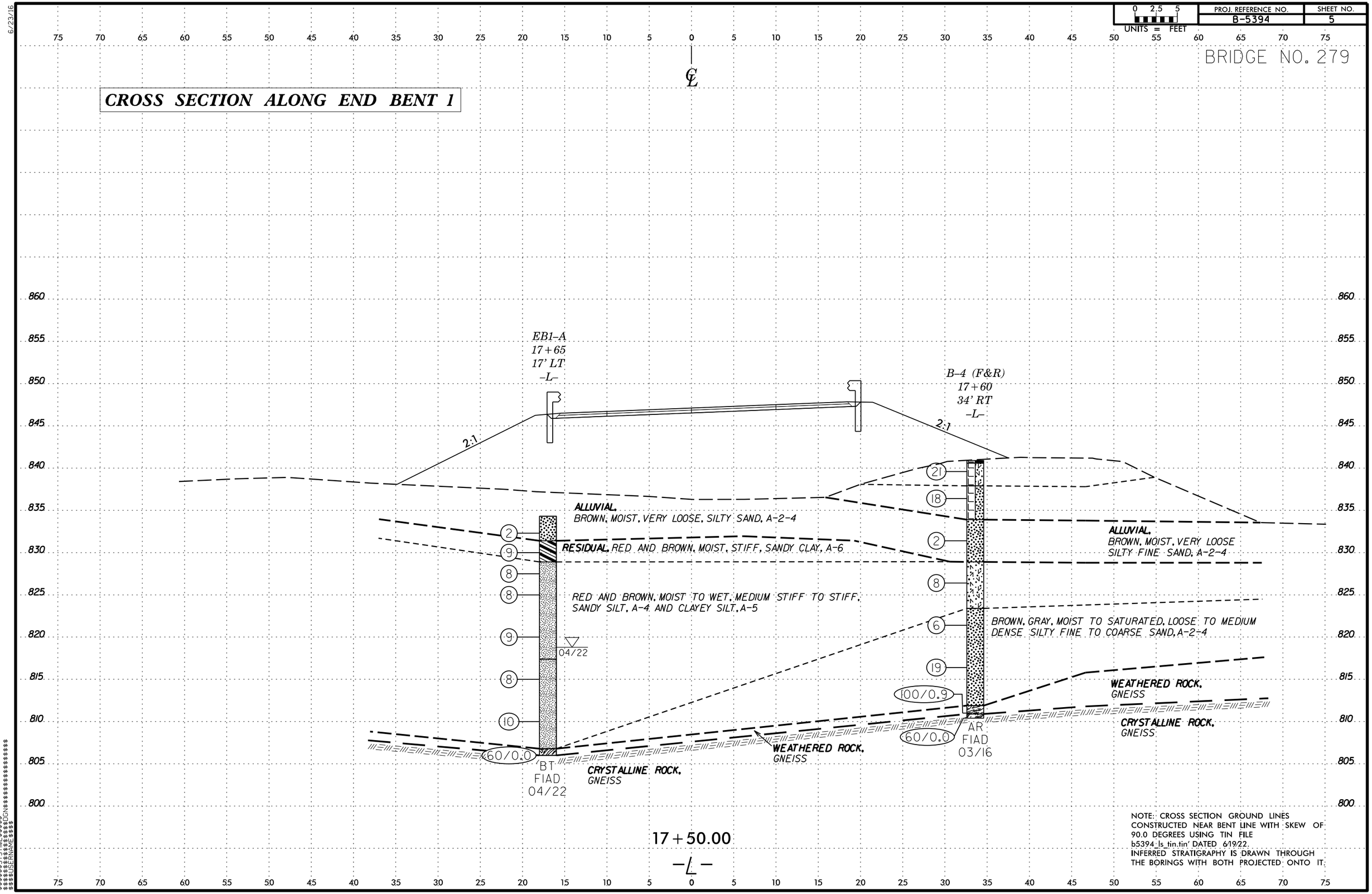
16+00 17+00 18+00 19+00 20+00 21+00

6/23/16

0 2.5 5 UNITS = FEET	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	5

BRIDGE NO. 279

CROSS SECTION ALONG END BENT 1



NOTE: CROSS SECTION GROUND LINES CONSTRUCTED NEAR BENT LINE WITH SKEW OF 90.0 DEGREES USING TIN FILE b5394_ls_tin.tin' DATED 6/19/22.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

$$$$$$$$SYSTIME$$$$$$
$$$$$$$$

6/23/16

0 2.5 5 UNITS = FEET	PROJ. REFERENCE NO.	SHEET NO.
	B-5394	6

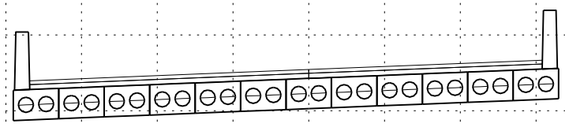
BRIDGE NO. 279

CROSS SECTION ALONG BENT 1

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

℄

855 850 845 840 835 830 825 820 815 810 805 800 795 790 785 780 775



B1–A
18+02
18' LT
–L–

3
3
4
3
8
11
13
60/0.0

04/22

ALLUVIAL, RED AND BROWN, MOIST, VERY LOOSE, SILTY SAND, A-2-4

RESIDUAL, RED AND BROWN, MOIST, SOFT TO STIFF, SANDY SILT, A-4

WEATHERED ROCK, GNEISS

CRYSTALLINE ROCK, GNEISS

REC. = 90 %
ROD = 76 %
GSI = 65-70

CT
FIAD
04/22

18+00.00

–℄–

NOTE: CROSS SECTION GROUND LINES CONSTRUCTED NEAR BENT LINE WITH SKEW OF 90.0 DEGREES USING TIN FILE b5394_ls_tin.tin' DATED 6/9/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

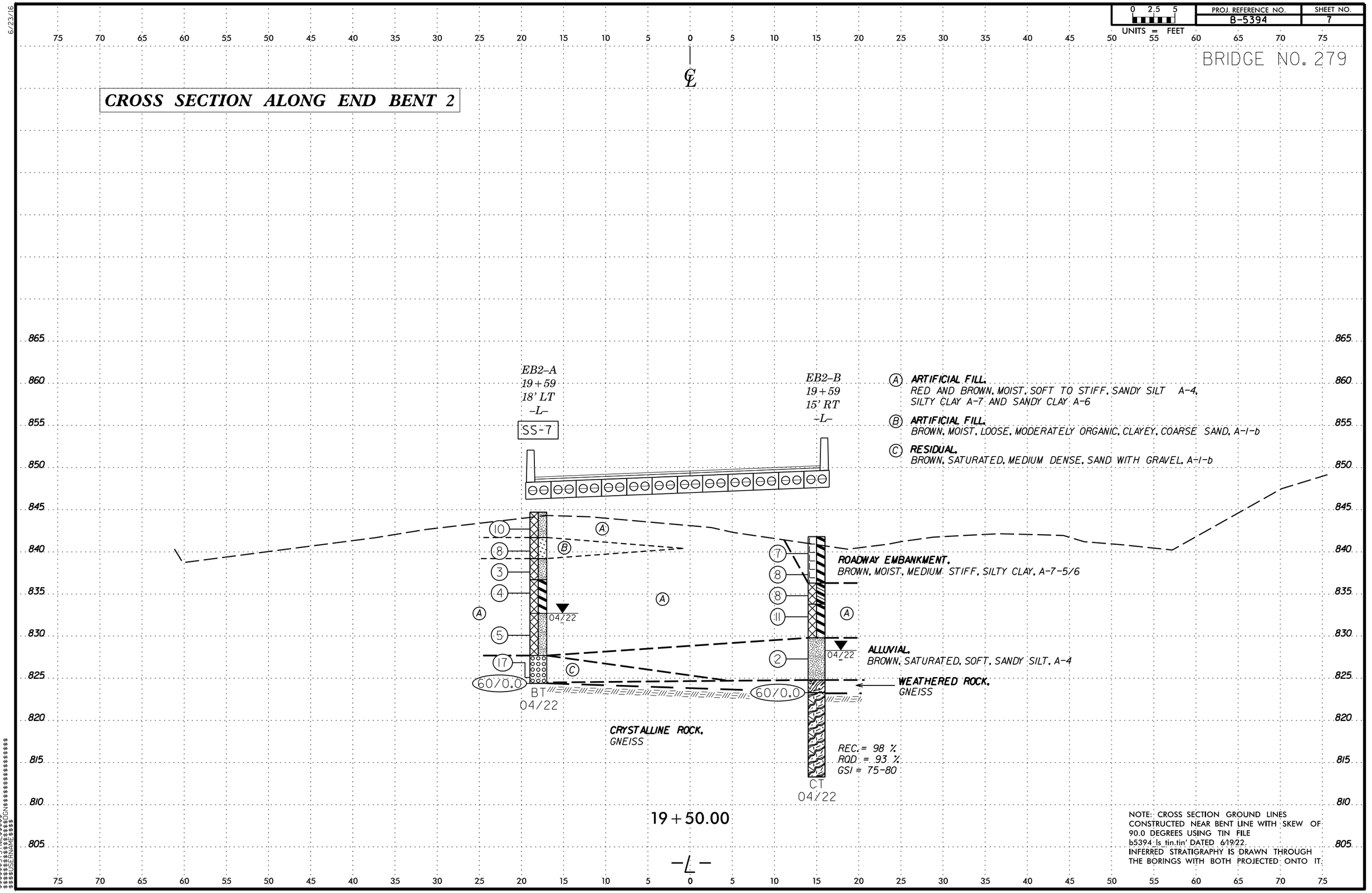
$$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$

6/23/16

UNITS = FEET	PROJ. REFERENCE NO.	SHEET NO.
0 2.5 5	B-5394	7

BRIDGE NO. 279

CROSS SECTION ALONG END BENT 2



NOTE: CROSS SECTION GROUND LINES CONSTRUCTED NEAR BENT LINE WITH SKEW OF 90.0 DEGREES USING TIN FILE b5394_ls_tin.tin' DATED 6/19/22.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

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

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46109.1.1	**TIP** B-5394	**COUNTY** IREDELL	**GEOLOGIST** Hartman, M.	
SITE DESCRIPTION BRIDGE NO. 279 ON SR 1832 OVER SOUTH HUNTING CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 17+65	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** 15.5
COLLAR ELEV. 834.3 ft	**TOTAL DEPTH** 28.3 ft	**NORTHING** 833,614	**EASTING** 1,467,077	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Little, J.	**START DATE** 04/15/22	**COMP. DATE** 04/15/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
835										834.3 GROUND SURFACE	0.0
	833.3	1.0	2	1	1	2		M		**ALLUVIAL** VERY LOOSE, BROWN, SILTY SAND, A-2-4	
	831.0	3.3								831.4	2.9
830			3	4	5	9		M		**RESIDUAL** STIFF, RED AND BROWN, SANDY CLAY, A-6	
	828.5	5.8	2	4	4	8		M		828.9	5.4
	826.0	8.3								MEDIUM STIFF TO STIFF, RED AND BROWN, SANDY SILT, A-4, TRACE MICA	
825			3	4	4	8		M			
										BROWN, TRACE GRAVEL	
820	821.0	13.3	2	2	7	9					
										817.4	16.9
	816.0	18.3								MEDIUM STIFF TO STIFF, BROWN AND TAN, SANDY SILT, A-4	
815			4	3	5	8		W			
	811.0	23.3									
810			3	4	6	10		W			
										806.8	27.5
	806.0	28.3	60/0.0			60/0.0				806.0 **WEATHERED ROCK** (GNEISS)	28.3
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 806.0 ft ON CRYSTALLINE ROCK (GNEISS)	

NCDOT BORE DOUBLE B5394_GEO_BRIDGE0279.GPJ NC_DOT.GDT 1/20/23

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46109.1.1	**TIP** B-5394	**COUNTY** IREDELL	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 279 ON SR 1832 OVER SOUTH HUNTING CREEK				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 18+02	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 15.1
COLLAR ELEV. 833.3 ft	**TOTAL DEPTH** 45.6 ft	**NORTHING** 833,592	**EASTING** 1,467,105	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Little, J.	**START DATE** 04/26/22	**COMP. DATE** 04/27/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
835										833.3 GROUND SURFACE	0.0
	832.3	1.0	1	1	2	3		M		**ALLUVIAL** VERY LOOSE, RED AND BROWN, SILTY SAND, A-2-4	
830	829.8	3.5	1	2	1	3		M			
	827.3	6.0	2	2	2	4		M		825.3	8.0
825	824.8	8.5	1	1	2	3		M		**RESIDUAL** SOFT, RED AND BROWN, SANDY SILT, A-4, TRACE MICA	
820	819.8	13.5	3	3	5	8				821.3 MEDIUM STIFF TO STIFF, BROWN, SANDY SILT, A-4, TRACE MICA, TRACE ROCK FRAGMENTS	12.0
815	814.8	18.5	3	5	6	11		M			
810	809.8	23.5	3	6	7	13		M		808.0	25.3
	807.7	25.6	60/0.0			60/0.0				807.7 **WEATHERED ROCK** (GNEISS)	25.6
805										**CRYSTALLINE ROCK** BLUE AND WHITE AND BROWN, HARD TO VERY HARD, MODERATE TO FRESH WEATHERING, WIDE TO VERY CLOSE FRACTURE SPACING, GNEISS	
800										REC. = 90% RQD = 76% GSI = 65-70	
795										-QUARTZITE LENS FROM DEPTHS 41.1' TO 43.6'-	
790										787.7	45.6
										Boring Terminated at Elevation 787.7 ft IN CRYSTALLINE ROCK (GNEISS)	

NCDOT BORE DOUBLE B5394_GEO_BRIDGE0279.GPJ NC_DOT.GDT 1/20/23

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 46109.1.1	**TIP** B-5394	**COUNTY** IREDELL	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 279 ON SR 1832 OVER SOUTH HUNTING CREEK				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 18+02	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 15.1
COLLAR ELEV. 833.3 ft	**TOTAL DEPTH** 45.6 ft	**NORTHING** 833,592	**EASTING** 1,467,105	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Little, J.	**START DATE** 04/26/22	**COMP. DATE** 04/27/22	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 20.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
807.7											Begin Coring @ 25.6 ft	
805	807.7	25.6	5.0	1:30/1.0 1:45/1.0 3:00/1.0 2:00/1.0 1:30/1.0	(3.6) 72%	(1.5) 30%		(17.9) 90%	(15.1) 76%		807.7 **CRYSTALLINE ROCK** BLUE AND WHITE AND BROWN, HARD TO VERY HARD, MODERATE TO FRESH WEATHERING, WIDE TO VERY CLOSE FRACTURE SPACING, GNEISS	25.6
	802.7	30.6	5.0	1:30/1.0 1:30/1.0 2:00/1.0 2:00/1.0 2:00/1.0	(4.3) 86%	(3.6) 72%					GSI = 65-70	
800	797.7	35.6	5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0 2:15/1.0	(5.0) 100%	(5.0) 100%						
795	792.7	40.6	5.0	2:00/1.0 2:30/1.0 3:30/1.0 2:30/1.0 2:00/1.0	(5.0) 100%	(5.0) 100%					-QUARTZITE LENS FROM DEPTHS 41.1' TO 43.6'-	
790	787.7	45.6									787.7 Boring Terminated at Elevation 787.7 ft IN CRYSTALLINE ROCK (GNEISS)	45.6

NCDOT CORE DOUBLE B5394_GEO_BRIDGE0279.GPJ NC_DOT.GDT 1/20/23

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46109.1.1	**TIP** B-5394	**COUNTY** IREDELL	**GEOLOGIST** Hartman, M.	
SITE DESCRIPTION BRIDGE NO. 279 ON SR 1832 OVER SOUTH HUNTING CREEK				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 19+59	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 12.0
COLLAR ELEV. 844.7 ft	**TOTAL DEPTH** 20.3 ft	**NORTHING** 833,499	**EASTING** 1,467,231	**24 HR.** 12.0
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Little, J.	**START DATE** 04/14/22	**COMP. DATE** 04/14/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
845										844.7 GROUND SURFACE	0.0
	843.7	1.0	3	4	6	10		M		**ARTIFICIAL FILL** STIFF, BROWN, SANDY SILT, A-4, TRACE MICA, TRACE TO LITTLE GRAVEL	
	841.1	3.6								841.7	3.0
840			6	4	4	8	SS-7	32%		LOOSE, BROWN, MODERATELY ORGANIC, CLAYEY, COARSE SAND A-1-b, TRACE TO LITTLE WOOD, TRACE GRAVEL	
	838.6	6.1								839.2	5.5
			2	2	1	3		M		SOFT, BROWN, SANDY SILT, A-4, TRACE GRAVEL	
	836.1	8.6								836.7	8.0
835			2	2	2	4				SOFT, BROWN, SILTY CLAY, A-7, TRACE GRAVEL	
										832.7	12.0
	831.1	13.6								MEDIUM STIFF, BROWN, SANDY SILT, A-4, TRACE GRAVEL	
830			2	3	2	5		Sat.			
										827.7	17.0
	826.1	18.6								**RESIDUAL** MEDIUM DENSE, BROWN, SILTY SAND WITH GRAVEL, A-1-b	
825	824.4	20.3	5	9	8	17		Sat.		824.4	20.3
			60/0.0			60/0.0				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 824.4 ft ON CRYSTALLINE ROCK (GNEISS)	

NCDOT BORE DOUBLE B5394_GEO_BRIDGE0279.GPJ NC_DOT.GDT 1/20/23

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46109.1.1	**TIP** B-5394	**COUNTY** IREDELL	**GEOLOGIST** Hartman, M.	
SITE DESCRIPTION BRIDGE NO. 279 ON SR 1832 OVER SOUTH HUNTING CREEK				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 19+59	**OFFSET** 15 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 841.8 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 833,472	**EASTING** 146,721	**24 HR.** 13.5
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Little, J.	**START DATE** 04/14/22	**COMP. DATE** 04/14/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
845											
										841.8 GROUND SURFACE	0.0
	840.8	1.0								**ROADWAY EMBANKMENT** MEDIUM STIFF, BROWN, SILTY CLAY, A-7-5, LITTLE TO SOME GRAVEL	
840			5	4	3	7		M			
	838.3	3.5	5	5	3	8		M			
	835.8	6.0								836.3	5.5
835			3	5	3	8		M		**ARTIFICIAL FILL** MEDIUM STIFF, RED AND BROWN, SANDY CLAY, A-6, TRACE TO LITTLE GRAVEL	
	833.3	8.5	3	6	5	11		M		833.8	8.0
										STIFF, RED AND BROWN, SILTY CLAY, A-7-5, LITTLE TO SOME GRAVEL	
830										829.8	12.0
	828.3	13.5	2	1	1	2		Sat.		**ALLUVIAL** SOFT, BROWN, SANDY SILT, A-4, TRACE TO LITTLE GRAVEL	
825										824.8	17.0
	823.3	18.5	60/0.0			60/0.0				**WEATHERED ROCK** (GNEISS)	
820										823.3	18.5
										CRYSTALLINE ROCK BLACK AND WHITE AND TAN, HARD, VERY SLIGHT TO SLIGHT WEATHERING, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, GNEISS REC. = 98% RQD = 93% GSI = 75-80	
815										813.3	28.5
										Boring Terminated at Elevation 813.3 ft IN CRYSTALLINE ROCK (GNEISS)	

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 46109.1.1	**TIP** B-5394	**COUNTY** IREDELL	**GEOLOGIST** Hartman, M.	
SITE DESCRIPTION BRIDGE NO. 279 ON SR 1832 OVER SOUTH HUNTING CREEK				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 19+59	**OFFSET** 15 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 841.8 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 833,472	**EASTING** 146,721	**24 HR.** 13.5
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Little, J.	**START DATE** 04/14/22	**COMP. DATE** 04/14/22	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 10.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
823.3											Begin Coring @ 18.5 ft	
	823.3	18.5	2.0	2:00/1.0	(1.8)	(1.3)		(9.8)	(9.3)		823.3 **CRYSTALLINE ROCK**	18.5
	821.3	20.5		2:00/1.0	90%	65%		98%	93%		BLACK AND WHITE AND TAN, HARD, VERY SLIGHT TO SLIGHT WEATHERING, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, GNEISS	
820			5.0	2:30/1.0	(5.0)	(5.0)						
				4:00/1.0	100%	100%					GSI = 75-80	
				4:15/1.0							-HARD TO VERY HARD, FRESH WEATHERING, WIDE FRACTURE SPACING FROM DEPTHS 20.5' TO 28.5'-	
				5:00/1.0								
	816.3	25.5		8:45/1.0								
815			3.0	8:30/1.0	(3.0)	(3.0)						
				10:00/1.0	100%	100%						
	813.3	28.5		17:00/1.0							813.3	28.5
											Boring Terminated at Elevation 813.3 ft IN CRYSTALLINE ROCK (GNEISS)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 46109.1.1	**TIP** B-5394	**COUNTY** IREDELL	**GEOLOGIST** C. Wang	
SITE DESCRIPTION BRIDGE NO. 279 ON SR 1832 OVER SOUTH HUNTING CREEK				**GROUND WTR (ft)**
BORING NO. B-4	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** N/A	**0 HR.** N/A
COLLAR ELEV. 840.9 ft	**TOTAL DEPTH** 30.5 ft	**NORTHING** 833,580	**EASTING** 1,467,039	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 90% 02/16/2016		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER D. Tignor	**START DATE** 03/21/16	**COMP. DATE** 03/21/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
845											
840	840.6	0.3	3	6	15	21		M		840.9 GROUND SURFACE	0.0
										840.6 **ROADWAY EMBANKMENT** ASPHALT	0.3
	837.4	3.5	12	11	7	18		M		837.9 RED-BROWN, FINE SANDY CLAYEY SILT (A-5)	3.0
835										GRAY-BROWN, SILTY FINE SAND (A-2-4)	
	832.4	8.5	1	1	1	2		M		833.9 **ALLUVIAL** BROWN, SILTY FINE SAND (A-2-4)	7.0
830											
	827.4	13.5	4	3	5	8		M		828.9 **RESIDUAL** RED-BROWN, CLAYEY SILT (A-5), TRACE QUARTZ	12.0
825											
	822.4	18.5	8	4	2	6		M		823.4 GRAY-BROWN, SILTY FINE TO COARSE SAND (A-2-4), TRACE TO SOME QUARTZ GRAVEL	17.5
820											
	817.4	23.5	8	7	12	19		Sat.			
815											
	812.4	28.5	15	13	87/0.4					811.9	29.0
	810.4	30.5	60/0.0			60/0.0				810.9 **WEATHERED ROCK** GRAY-BROWN (BIOTITE GNEISS)	30.0
										810.4 **CRYSTALLINE ROCK** GRAY-BROWN (BIOTITE GNEISS)	30.5

Boring Terminated with Standard Penetration Test Refusal at Elevation 810.4 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

-Auger refusal at 30.5'

(Drilled by F&R)

NCDOT BORE DOUBLE F&R_B5394_GEO_BRIDGE0279.GPJ NC_DOT.GDT 1/4/23

SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	210182			Date Report:	5/23/2022
State Project No.:	46109.1.2	County:	Iredell	Date Tested:	5/9/22-5/17/22
Federal ID No.:	NA	TIP No.:	B-5394		
Project Name:	Bridge No. 279 on Eagle Mills Rd over South Hunting Creek				
Client Name:	Parrish	Client Address:	Raleigh, NC		

Sample No.	Boring No.	Station No.	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing Sieve #				Total Mortar Fraction (%)				LL	PL	PI	Organic	Moist. %
								10	40	60	200	Coarse Sand	Fine Sand	Silt	Clay					
SS-7	EB2-A	19+59	18' LT	-L-	3.6-5.1	A-1-b	(0)	50	37	32	18	37	31	17	15	NP	NP	NP	9.2	32.0

References / Comments / Deviations: ND=Not Detemined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Karen Warner		NCDOT 118-06-0305	Joey Daily	Project Manager
Technician Name:	Signature	Certification #	Technical Responsibility:	Position

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CORE PHOTOGRAPHS

B1-A

BOXES 1 & 2: 25.6 – 45.6 FEET

EB2-B

BOX 1: 18.5 – 28.5 FEET

SITE PHOTOGRAPHS

Bridge No. 279 on –L– (SR 1832) over South Hunting Creek

Looking Northwest towards End Bent 1