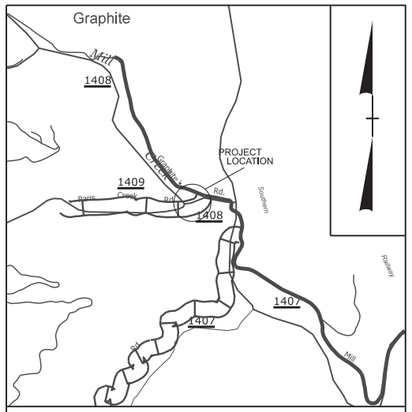
01/16/24

CONTRACT: DM00501 TIP PROJECT: DF18313.2059016.PR

See Sheet 1B for Conventional Symbols



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MCDOWELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF18313.2059016.PR	1	

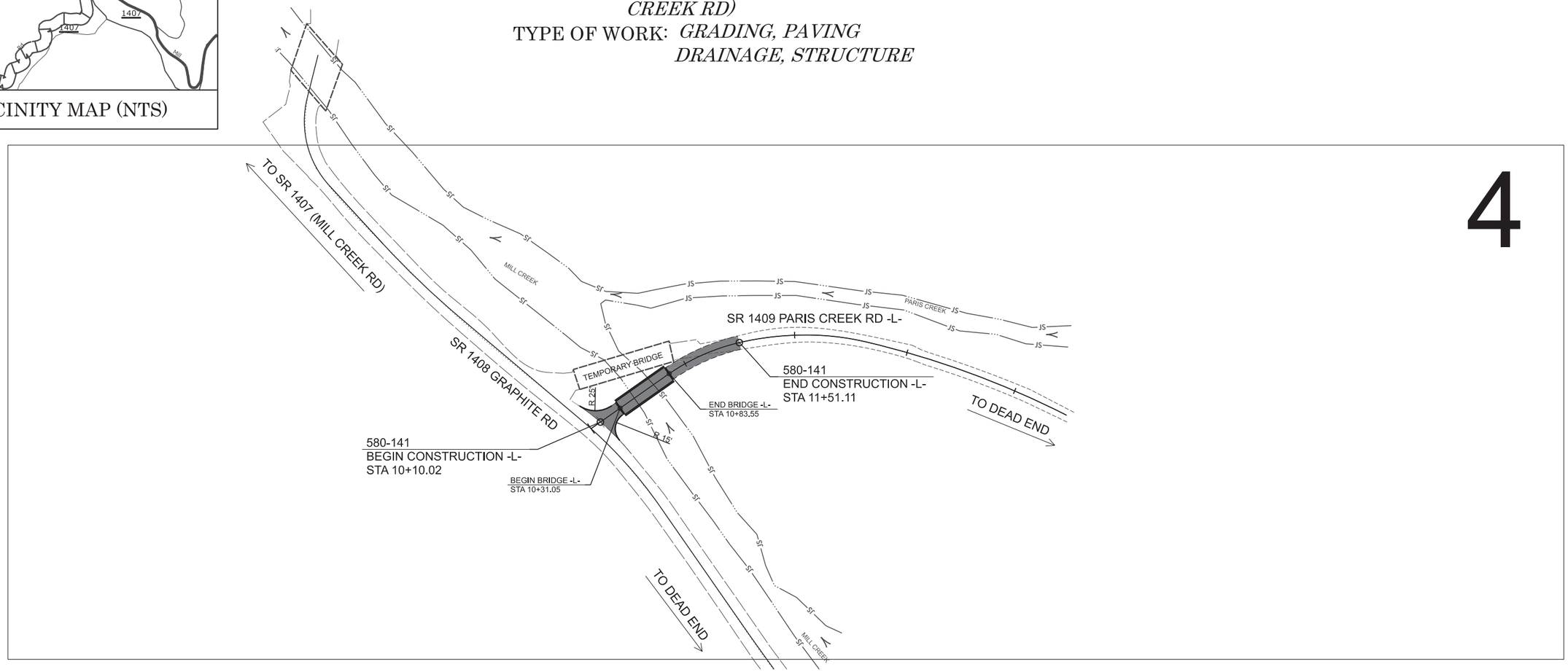
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
DF18313.2059016.PR		P.E., ROW, CONST.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION: *REPLACE BRIDGE #580141 OVER MILL CREEK ON SR 1409 (PARIS CREEK RD)*

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

NAD 83/ 2011



4

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT
DF18313.2059016.PR = 0.017 MI

LENGTH OF STRUCTURE TIP PROJECT
DF18313.2059016.PR = 0.010 MI

TOTAL LENGTH OF TIP PROJECT
DF18313.2059016.PR = 0.027 MI

Prepared In the Office of:
Michael Baker Engineering, Inc.
Michael Baker INTERNATIONAL
8000 Regency Pkwy
Suite 600
Cary, NC 27518
NC License: F-1084

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 26, 2026

LETTING DATE: MARCH 18, 2026

TODD BUCKNER, PE
PROJECT ENGINEER

ETHAN NELSON, EIT
PROJECT DESIGN ENGINEER

HANNAH K. SMITH
NCDOT CONTACT

HYDRAULICS ENGINEER

Signed by: William N. King
D6188DB15984FD...
1/30/2026
P.E.
SIGNATURE:

NORTH CAROLINA PROFESSIONAL SEAL 055550 ENGINEER WILLIAM N. KING

ROADWAY DESIGN ENGINEER

DocuSigned by: Todd Buckner
F0890B4342D843B...
1/30/2026
P.E.
SIGNATURE:

NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

NOTES:

INDEX OF SHEETS

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 PLANS:

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

END BENTS:

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

UTILITIES:

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

EFF. 08-11-2025
REV. 11-26-2025

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 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:
- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Existing Concrete Monument (ECM)
- Parcel / Sequence Number
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary
- Proposed Wetland Boundary
- Existing Endangered Animal Boundary
- Existing Endangered Plant Boundary
- Existing Historic Property Boundary
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:
- Gas Pump Vent or U/G Tank Cap
- Sign
- Well
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

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

RAILROADS:
- Standard Gauge
- RR Signal Milepost
- Switch
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line
- Existing Control of Access Line
- Proposed Control of Access Line
- Proposed ROW and CA Line
- Existing Easement Line
- Proposed Temporary Construction Easement
- Proposed Temporary Drainage Easement
- Proposed Permanent Drainage Easement
- Proposed Permanent Drainage/Utility Easement
- Proposed Permanent Utility Easement
- Proposed Temporary Utility Easement
- Proposed Aerial Utility Easement

ROADS AND RELATED FEATURES:
- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:
- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard

EXISTING STRUCTURES:
MAJOR:
- Bridge, Tunnel or Box Culvert
- Bridge Wing Wall, Head Wall and End Wall

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

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

POWER:
- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line Test Hole (SUE - LOS A)*
- U/G Power Line (SUE - LOS B)*
- U/G Power Line (SUE - LOS C)*
- U/G Power Line (SUE - LOS D)*

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

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

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

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

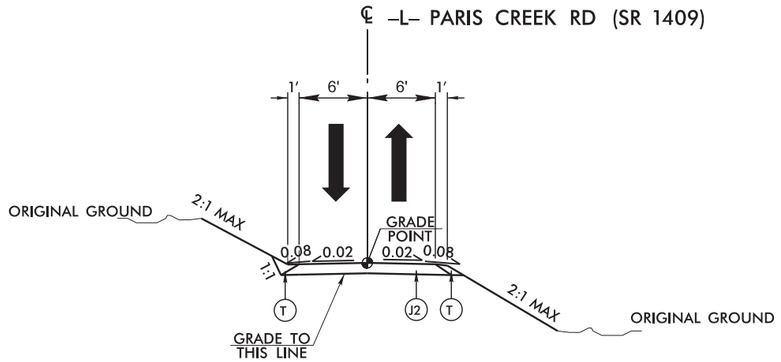
SANITARY SEWER:
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line
- Above Ground Sanitary Sewer
- SS Force Main Line Test Hole (SUE - LOS A)*
- SS Force Main Line (SUE - LOS B)*
- SS Force Main Line (SUE - LOS C)*
- SS Force Main Line (SUE - LOS D)*

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

7/12/24

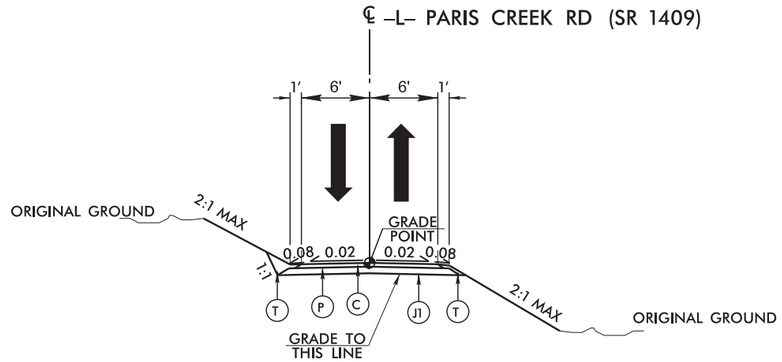
PAVEMENT SCHEDULE

C	PROP. 2" DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YARD	J2	PROP. 6" DEPTH AGGREGATE BASE COURSE
P	PRIME COAT AT A RATE OF .35 GAL. PER SQ. YARD	T	EARTH MATERIAL
J1	PROP. 4" DEPTH AGGREGATE BASE COURSE		



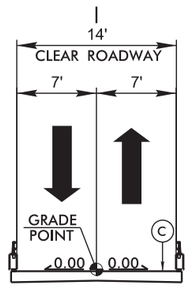
TYPICAL SECTION NO. 1

–L– STA. 10+93.55 TO 11+51.11



TYPICAL SECTION NO. 2

–L– STA. 10+10.02 TO 10+31.05 (BEGIN BRIDGE)
–L– STA. 10+83.55 (END BRIDGE) TO 10+93.55



TYPICAL SECTION NO. 3

–L– STA. 10+31.05 TO 10+83.55

DF18313.2059016.PR

TYP | 2A-1

R/W SHEET NO.

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
MCDOWELL COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD L. BUCKNER

DocuSigned by: Todd Buckner F0890B43420849B... 1/30/2026

PAVEMENT DESIGN ENGINEER

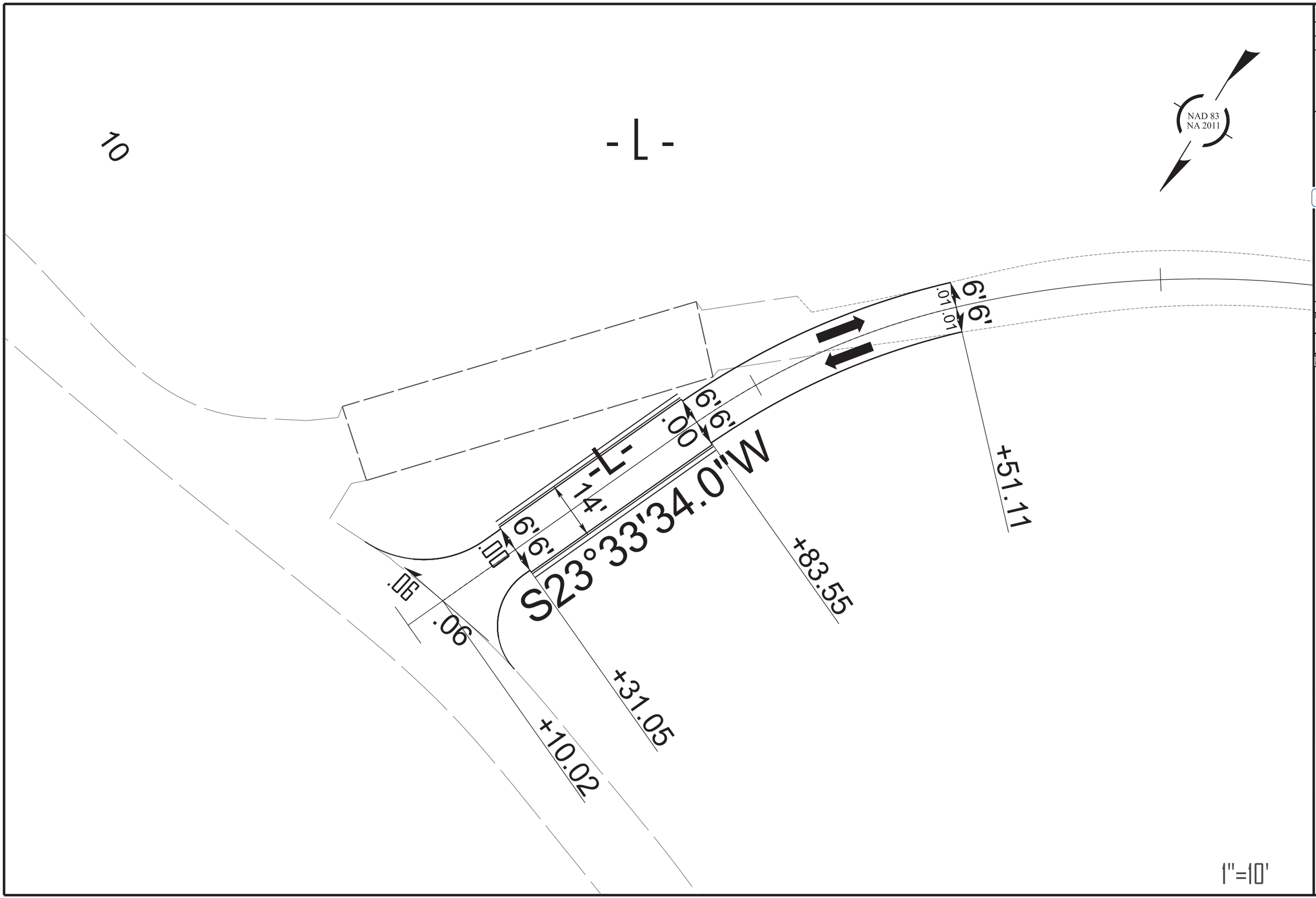
DIVISION PROVIDED

PREPARED BY

Michael Baker Engineering, Inc.
Michael Baker INTERNATIONAL
8000 Regency Pkwy Suite 600 Cary, NC 27518 NC License: P-1084

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS



580-141

DETAIL 2B-1

R/W SHEET NO.

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
MCDOWELL COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 034367 ENGINEER TODD H. BUCKNER

Docusigned by: Todd Buckner F0800B4342D843B...

1/30/2026

PREPARED BY

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Michael Baker INTERNATIONAL
8000 Regency Pkwy
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Cary, NC 27518
NC License: F-1084

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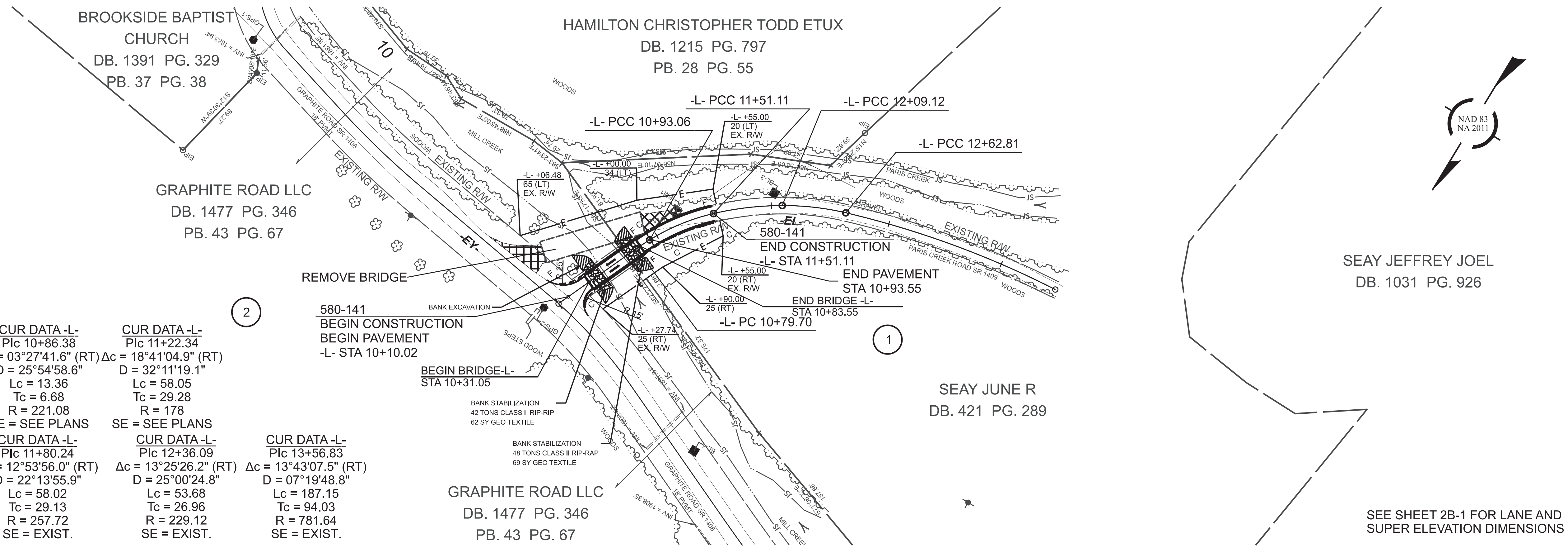
REVISIONS

STATION	STATION	EXCAVATION		EMBANK	BORROW	WASTE
		TOTAL UNCLASS.	UNDERCUT	EMBANK.		TOTAL
-L- 10+10.02	10+31.05	8		1		7
-L- 15+04.25 (END BRIDGE)	16+37.60	15		1		14
	SUBTOTAL	23		2		21
TOTAL		23		2		21
MATERIAL FOR SHOULDER CONSTRUCTION						
WASTE IN LIEU OF BORROW						
PROJECT TOTAL		23		2		21
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT						
GRAND TOTAL		23		2		20
SAY		30				

SHOULDER BORROW = 2 CUBIC YARDS

"NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, BREAKING OF EXISTING PAVEMENT, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR GRADING."

11/14/23



SEE SHEET 2B-1 FOR LANE AND SUPER ELEVATION DIMENSIONS

CUR DATA -L-	CUR DATA -L-	CUR DATA -L-
PIc 10+86.38	PIc 11+22.34	
Δc = 03°27'41.6" (RT)	Δc = 18°41'04.9" (RT)	
D = 25°54'58.6"	D = 32°11'19.1"	
Lc = 13.36	Lc = 58.05	
Tc = 6.68	Tc = 29.28	
R = 221.08	R = 178	
SE = SEE PLANS	SE = SEE PLANS	

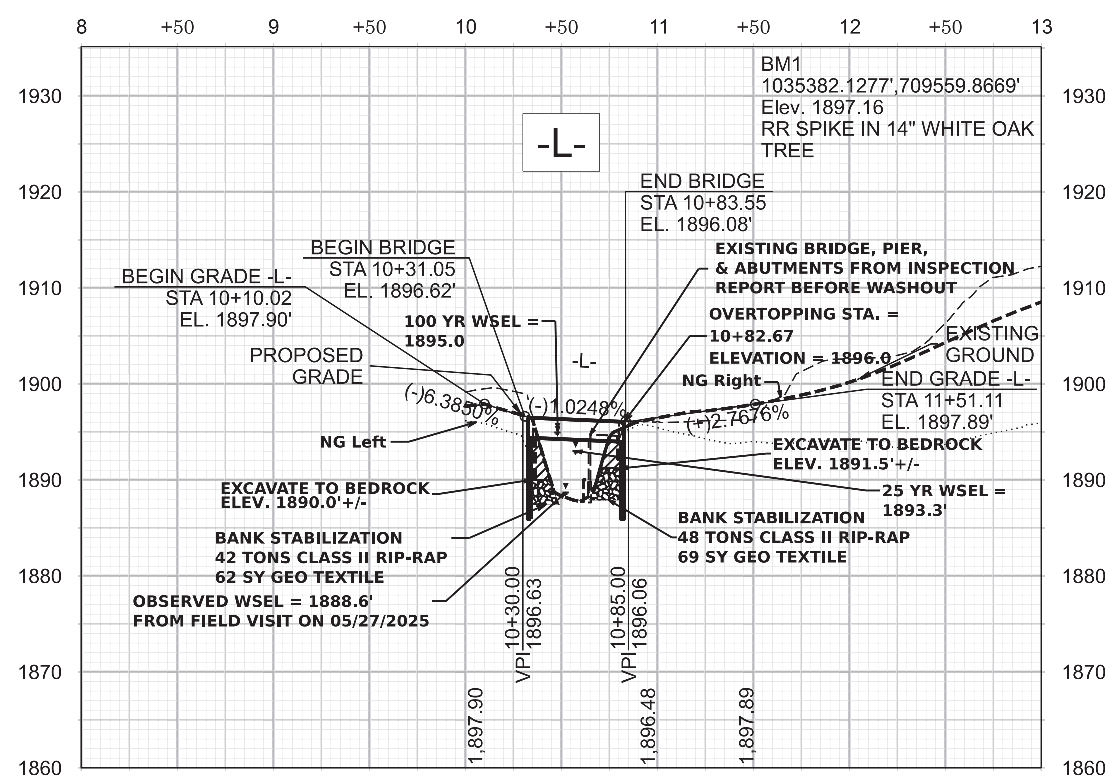
CUR DATA -L-	CUR DATA -L-	CUR DATA -L-
PIc 11+80.24	PIc 12+36.09	PIc 13+56.83
Δc = 12°53'56.0" (RT)	Δc = 13°25'26.2" (RT)	Δc = 13°43'07.5" (RT)
D = 22°13'55.9"	D = 25°00'24.8"	D = 07°19'48.8"
Lc = 58.02	Lc = 53.68	Lc = 187.15
Tc = 29.13	Tc = 26.96	Tc = 94.03
R = 257.72	R = 229.12	R = 781.64
SE = EXIST.	SE = EXIST.	SE = EXIST.

NCDOT PERFORMANCE TABLE

	10-YEAR	25-YEAR	50-YEAR	100-YEAR	500-YEAR
NATURAL	1892.0	1892.6	1893.3	1893.6	1894.9
EXISTING	1892.9	1893.6	1895.3	1895.4	1896.2
PROPOSED	1892.8	1893.3	1894.9	1895.0	1895.9

SECTION 5385.3
17.0 FEET FROM UPSTREAM FACE OF PROPOSED BRIDGE
20.2 FEET FROM UPSTREAM FACE OF EXISTING BRIDGE

OPEN SLOTS NO DECK DRAINS REQUIRED



DF18313.2059016.PR

PLAN/PFL 4

R/W SHEET NO.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION MCDOWELL COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 034367 TODD H. BUCKNER

DocuSigned by: Todd Buckner 1/30/2026

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 055550 WILLIAM N. KING

Signed by: William N. King 1/30/2026

PREPARED BY

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KCA KISINGER CAMPO & ASSOCIATES
NC FIRM LICENSE No: C-1506
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Raleigh, NC 27601
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

$$$-USER NAME-$$$ - $$$-DATE-$$$

PROJECT: 580-141

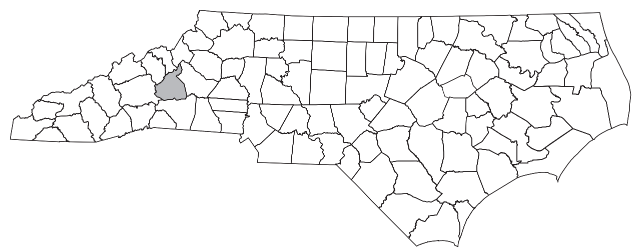
CONTRACT: DM00501

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

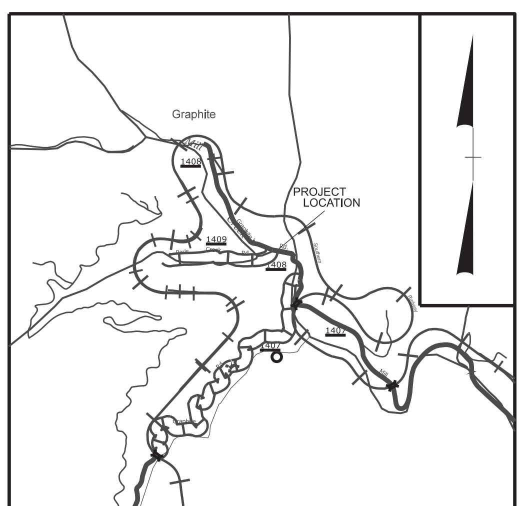
MCDOWELL COUNTY

DIVISION 13



LOCATION: SR 1409 (PARIS CREEK RD) REPLACE BRIDGE #141 OVER MILL CREEK

TYPE OF WORK: SEQUENCE OF CONSTRUCTION FOR MAINTENANCE OF TRAFFIC & TEMPORARY TRAFFIC CONTROL DEVICES.



VICINITY MAP (NTS)

INDEX OF SHEETS

NCDOT CONTACT	PLAN PREPARED BY MICHAEL BAKER ENGINEERING
HANNAH K. SMITH DIVISION 13 PROJECT MANAGER	**GEORGE M. KARAGEORGE, PE** DEPARTMENT MANAGER-TRAFFIC **CAROLINE OWINGS, PE** PROJECT MANAGER **K. READ GENTRY** TRAFFIC ENGINEER **BIRGIT MACKENZIE** SR TRANSPORTATION DESIGNER

580-141

TMP - 1

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

APPROVED: DocuSigned by: George Karageorge 5307138EF9D9446...

DATE: 1/29/2026

NORTH CAROLINA PROFESSIONAL SEAL 042065 ENGINEER GEORGE M. KARAGEORGE

WORK ZONE TRAFFIC CONTROL ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
8000 Regency Parkway, Suite 600,
Cary, NC 27518
Phone: (919) 463-5488
MBAKERINTL.COM
PROFESSIONAL CORPORATION
LICENSE NO. F-1084

NO.	DATE	REVISION DESCRIPTION

1/29/2026
c:\users\read.gentry\appdata\local\bentley\projectwise\workingdir\mb-us-pw.bentley.com_mb-us-pw-07\read.gentry@mbakerintl.com\dms61337\580141-3 SERIES SHEETS.dgn
Read.Gentry

ROADWAY STANDARD DRAWINGS

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

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES - TYPE III
1150.01	FLAGGERS
1180.01	SKINNY - DRUM

LEGEND

WORK AREAS

- PROPOSED ROADWAY CONSTRUCTION
- PREVIOUSLY STARTED ROADWAY CONSTRUCTION
- MINIMUM PAVING FOR TRAFFIC SWITCH TIE-INS (MILLING/WEDGING AS REQUIRED)
- TEMPORARY PAVEMENT
- PAVEMENT REMOVAL
- PROPOSED BRIDGE CONSTRUCTION
- PREVIOUSLY STARTED BRIDGE CONSTRUCTION

TEMPORARY TRAFFIC CONTROL DEVICES

- TYPE III BARRICADE
- PEDESTRIAN CHANNELIZING DEVICES (ADA BARRICADE)
- CONE
- DRUM SKINNY DRUM TUBULAR MARKER
- CHANGEABLE MESSAGE SIGN (CMS)
- FLAGGER
- AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD)
- FLASHING ARROW BOARD(TYPE C)
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- WORK ZONE SIGN-PORTABLE
- WORK ZONE SIGN-STATIONARY
- WORK ZONE SIGN-STATIONARY OR PORTABLE
- TEMPORARY SHORING
- TEMPORARY CRASH CUSHION
- RESET TEMPORARY CRASH CUSHION
- UN-ANCHORED PORTABLE CONCRETE BARRIER (PCB)
- RESET UN-ANCHORED PORTABLE CONCRETE BARRIER
- ANCHORED PORTABLE CONCRETE BARRIER
- RESET ANCHORED PORTABLE CONCRETE BARRIER

GENERAL

- EXIST. PVMT.
- PROPOSED PVMT.
- DIRECTION OF TRAFFIC FLOW
- PEDESTRIAN AND OR BIKE TRAFFIC FLOW
- PROPOSED DRAINAGE
- TEMPORARY DRAINAGE

PAVEMENT MARKING LINES

- DOUBLE YELLOW CENTER LINE
- SKIP LINES
- MINI-SKIP LINES
- SOLID LINES
- EXISTING LINES

PAVEMENT MARKING SYMBOLS & CHARACTERS

- PROPOSED SYMBOLS
- EXISTING SYMBOLS
- ONLY ALPHANUMERIC CHARACTERS

SIGNALS

EXIST PROP TEMP

ABBREVIATIONS

TMP	=	TRANSPORTATION MANAGEMENT PLAN
RSD	=	ROADWAY STANDARD DRAWINGS
PCB	=	PORTABLE CONCRETE BARRIER
EOT	=	EDGE OF TRAVELWAY
EOP	=	EDGE OF PAVEMENT
EEOPE	=	EXISTING EDGE OF PAVEMENT ELEVATION
L	=	LENGTH OF TAPERED STRAIGHT LINE TRAFFIC SHIFT
W	=	WIDTH OF TAPERED STRAIGHT LINE TRAFFIC SHIFT
S	=	SPEED LIMIT
TTCM	=	TEMPORARY TRAFFIC CONTROL METHODOLOGY
ICT	=	INTERMEDIATE CONTRACT TIME

580-141

TMP-2

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

APPROVED: George Karageorge 130713EF9D9446...

DATE: 1/29/2026

NORTH CAROLINA PROFESSIONAL SEAL 042065 ENGINEER GEORGE M KARAGEORGE

WORK ZONE TRAFFIC CONTROL ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
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MBAKERINTL.COM
PROFESSIONAL CORPORATION
LICENSE NO. F-1084

REVISION DESCRIPTION | DATE | NO.

TRANSPORTATION MANAGEMENT PLAN

ROADWAY STANDARD DRAWINGS & LEGEND

GENERAL NOTES

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

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

A) DO NOT CONDUCT ANY HAULING OPERATIONS AGAINST THE FLOW OF TRAFFIC OF AN OPEN TRAVELWAY UNLESS THE HAULING OPERATION IS PROTECTED BY BARRIER OR GUARDRAIL OR AS DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

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

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

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

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

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

PAVEMENT EDGE DROP-OFF REQUIREMENTS

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

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

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

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

EXISTING AND PROPOSED SIGNING

H) MAINTAIN ALL EXISTING SIGNING ON PROJECT (WARNING, REGULATORY AND GUIDE SIGNS). WHERE CONSTRUCTION AFFECTS THE LOCATION OF A SIGN, RELOCATE AS NECESSARY, OR INSTALL A REPLACEMENT SUCH THAT THE FUNCTION OF THE SIGN IS MAINTAINED AT ALL TIMES.

I) ALL APPLICABLE PROPOSED SIGNS SHALL BE INSTALLED FOR NEW TRAFFIC PATTERNS DURING THE TRAFFIC CONTROL PHASES. IN THE EVENT THE PROPOSED SIGNS CANNOT BE INSTALLED, TEMPORARY SIGNS ON TEMPORARY SUPPORTS MAY BE USED INSTEAD. PROPOSED SIGNS ARE NOT SHOWN IN THE TRANSPORTATION MANAGEMENT PLAN; REFER TO PROPOSED SIGNING PLAN.

J) DURING RELOCATION OF STOP SIGNS PROVIDE FLAGGERS WITH "FLAGGER AHEAD" (W20-7a) AND "BE PREPARED TO STOP" (W3-4) SIGNS, TO MAINTAIN INTERSECTION TRAFFIC WHILE STOP SIGNS ARE BEING RELOCATED.

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

L) COVER SIGNS OR PORTIONS OF SIGNS THAT HAVE BEEN ERECTED, BUT THAT ARE NOT YET APPLICABLE TO TRAFFIC.

M) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) 100 FT. IN ADVANCE OF UNEVEN AREAS, OR AS DIRECTED BY THE ENGINEER.

TEMPORARY TRAFFIC CONTROL DEVICES

N) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT,10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

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

CONSTRUCTION OPERATIONS

P) IN THE EVENT A TIE-IN CANNOT BE MADE IN ONE DAY'S TIME, BRING THE TIE-IN AREA TO AN APPROPRIATE ROADWAY ELEVATION AS DETERMINED BY THE ENGINEER. PLACE BLACK ON ORANGE "LOOSE GRAVEL" SIGNS (W8-7) AND BLACK ON ORANGE "PAVEMENT ENDS" SIGNS (W8-3) LENGTH) AND RESPECTIVELY (LENGTH) IN ADVANCE OF THE UNEVEN AREAS. USE DRUMS TO DELINEATE THE EDGE OF ROADWAY ALONG UNPAVED AREAS.

Q) COMPLETE ANY PROPOSED OR TEMPORARY WIDENING IN SUCH A MANNER THAT PONDING OF WATER WILL NOT OCCUR IN THE TRAVEL LANE.

TEMPORARY CLEAR ZONES

R) AS A GENERAL GUIDELINE, MAINTAIN TEMPORARY WORK AREA CLEAR ZONES ON ALL ROADWAYS. DUE TO VARYING FIELD CONDITIONS THESE GUIDELINES MAY BE MODIFIED AS DIRECTED BY THE ENGINEER:

WHEN LANE CLOSURES ARE NOT IN EFFECT AND WORK IS NOT BEHIND BARRIER OR GUARDRAIL, MOVE EQUIPMENT, MATERIALS, STOCKPILES AND OBSTACLES CREATED BY WORK OPERATIONS OUTSIDE THE RECOMMENDED TEMPORARY CLEAR ZONE.

ROADWAY	RECOMMENDED TEMPORARY CLEAR ZONE
ALL ROADWAYS	20 FT.

MOVE OBSTACLES SUCH AS STOCKPILES AND NON-ACTIVE EQUIPMENT AT LEAST 5' AWAY FROM THE BACK OF BARRIER. IN GENERAL, IF STORING MATERIALS OR EQUIPMENT BEHIND ANY TYPE OF BARRIER THE DEFLECTION OF THE BARRIER SHOULD BE ACCOUNTED FOR AND ITEMS SHOULD NOT BE STORED IN THAT AREA.

EXCAVATIONS OR OTHER IMMOVABLE OBSTRUCTIONS SHALL BE SAFED UP USING METHODS SUCH AS BACK-FILLING, COVERS, DELINEATION, ETC. METHODS MUST BE ACCEPTABLE TO THE ENGINEER.

MISCELLANEOUS

S) ALL DIMENSIONS AND STATIONS IN THE TRANSPORTATION MANAGEMENT PLAN ARE APPROXIMATE. REFER TO ROADWAY AND STRUCTURE DESIGN PLANS FOR EXACT DIMENSIONS AND STATIONS.

WORK ZONE MANAGEMENT STRATEGIES

PROPOSED BRIDGE AND ROADWAY CONSTRUCTION WILL BE PERFORMED WITH TRAFFIC USING AN EXISTING TEMPORARY BRIDGE.

WORK ZONE ADVANCE WARNING SIGNS AND LANE CLOSURES WILL BE USED TO COMPLETE THE WORK.

580-141

TMP-3

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

DocuSigned by: George Karageorge 530713EF9D9446...

APPROVED:

DATE: 1/29/2026

NORTH CAROLINA PROFESSIONAL SEAL 042065 ENGINEER GEORGE M KARAGEORGE

WORK ZONE TRAFFIC CONTROL ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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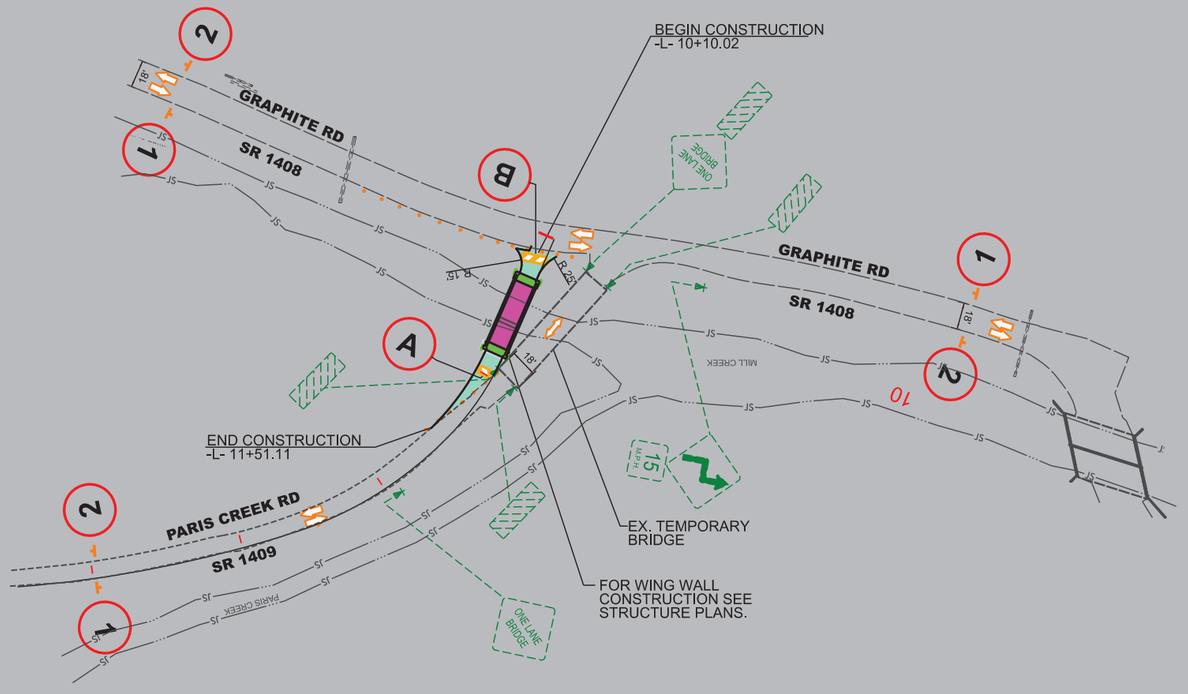
TRANSPORTATION MANAGEMENT PLAN

GENERAL NOTES

WORK ZONE SIGN LEGEND

STATIONARY MOUNTED SIGNS	BARRICADE MOUNTED SIGNS
1 — TOTAL QTY = 3, TOTAL SF = 27 ROAD WORK AHEAD W20-1 36 x 36 SF = 9	A — TOTAL QTY =1, TOTAL SF = 20.5 ROAD CLOSED R11-2 30 x 60 SF = 12.5 W1-6 48 x 24 SF = 8
2 — TOTAL QTY =3, TOTAL SF = 13.5 END ROAD WORK G20-02 36 x 18 SF = 4.5	B — TOTAL QTY =1, TOTAL SF = 12.5 ROAD CLOSED R11-2 30 x 60 SF = 12.5
PORTABLE SIGNS	
SEE RSD 1101.02 SHEET 1 — TOTAL QTY=2, TOTAL SF= 18 ONE LANE ROAD AHEAD W20-4 36 x 36 SF = 9	SEE RSD 1101.02 SHEET 1 — TOTAL QTY=2, TOTAL SF= 18 BE PREPARED TO STOP W20-7a 36 x 36 SF=9
SEE RSD 1101.02 SHEET 1 — TOTAL QTY=2, TOTAL SF= 18 W3-4 36 x 36 SF=9	



PHASE 1

STEP1:

INSTALL WORK ZONE SIGNS & DEVICES. **TTCM 1**

STEP 2:

CONSTRUCT PROPOSED ALIGNMENT -L- BRIDGE AND APPROACHES UP TO THE EEOPE. **TTCM 1**

TEMPORARY TRAFFIC CONTROL METHODOLOGY (TTCM)

TTCM 1 USE ROADWAY STANDARD 1101.02 SHEET 1 OF 19 AS NEEDED.

TRANSPORTATION MANAGEMENT PLAN

PHASE 1

580-141

TMP-4

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

APPROVED: Docusigned by: George Karageorge 5307136EF8D9446... DATE: 1/29/2026

NORTH CAROLINA PROFESSIONAL SEAL 042065 ENGINEER GEORGE M KARAGEORGE

WORK ZONE TRAFFIC CONTROL ENGINEER

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NO.	DATE	REVISION DESCRIPTION

WORK ZONE SIGN LEGEND

STATIONARY MOUNTED SIGNS	BARRICADE MOUNTED SIGNS
1 — ROAD WORK AHEAD — W20-1 36 x 36 — *RETAIN FROM PHASE 1	A — ROAD CLOSED — R11-2 30 x 60; W1-6 48 x 24 — *RELOCATE FROM PHASE 1 AND TURN W1-6 TO BE LEFT FACING
2 — END ROAD WORK — G20-02 36 x 18 — *RETAIN FROM PHASE 1	B — ROAD CLOSED — R11-2 30 x 60 — *RELOCATE FROM PHASE 1

PHASE 2

STEP1:

IN A CONTINUOUS OPERATION, PERFORM THE FOLLOWING: TTCM 1

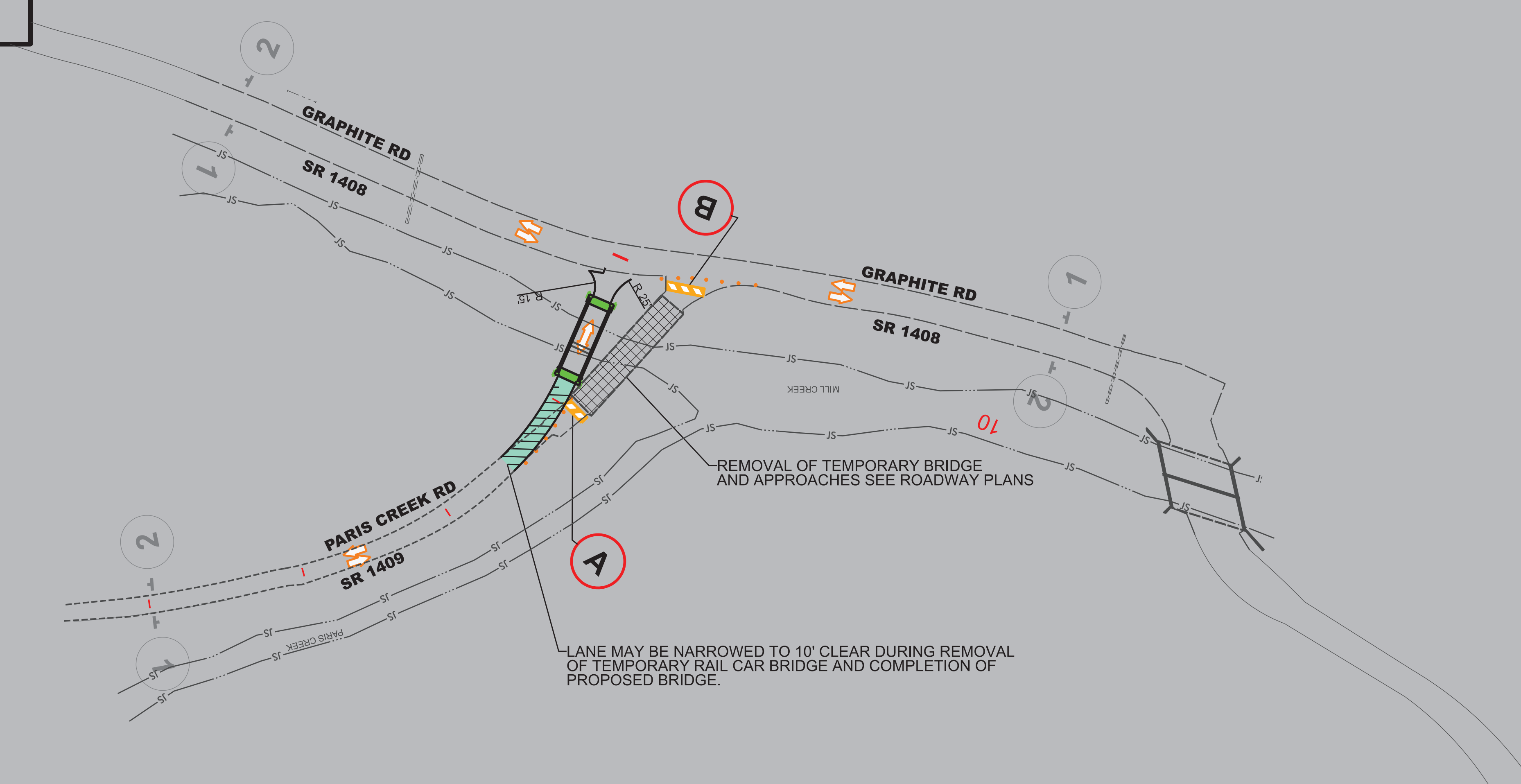
- -INSTALL PROPOSED SIGNS
- -COMPLETE/PAVE TIE-INS TO EXISTING AND SWITCH TRAFFIC TO THE PROPOSED ALIGNMENT.
- -CLOSE EXISTING BRIDGE

STEP 2:

WITH TRAFFIC ON PROPOSED BRIDGE, PERFORM THE FOLLOWING:

- -REMOVE THE EXISTING TEMPORARY RAIL CAR BRIDGE, AND RESTORE AREA TO PROPOSED EMBANKMENTS. TTCM 1

TEMPORARY TRAFFIC CONTROL METHODOLOGY (TTCM)
TTCM 1 USE ROADWAY STANDARD 1101.02 SHEET 1 OF 19 AS NEEDED.



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

APPROVED: Docusigned by: George Karageorge
DATE: 1/29/2026

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042065 GEORGE M. KARAGEORGE

WORK ZONE TRAFFIC CONTROL ENGINEER

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NO.	DATE	REVISION DESCRIPTION

TRANSPORTATION MANAGEMENT PLAN

PHASE 2

TIP PROJECT: DF18313.2059016.PR

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF18313.2059016.PR	EC-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
DF18313.2059016.PR	N/A	PE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

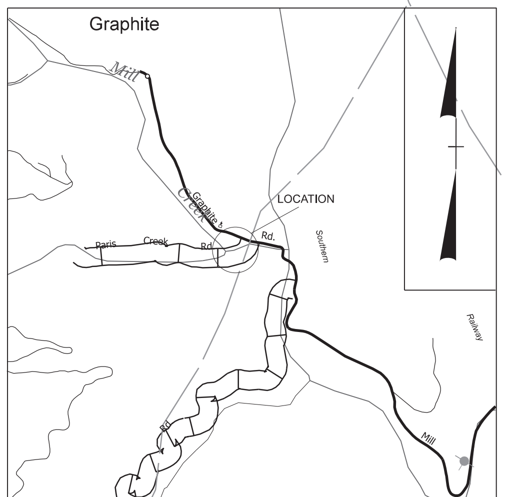
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

MCDOWELL COUNTY

LOCATION: REPLACE BRIDGE NO. 580141 ON SR-1409 OVER MILL CREEK

TYPE OF WORK: HURRICANE HELENE BRIDGE REPLACEMENT

See Sheet 1B for Conventional Symbols



VICINITY MAP (NTS)

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

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

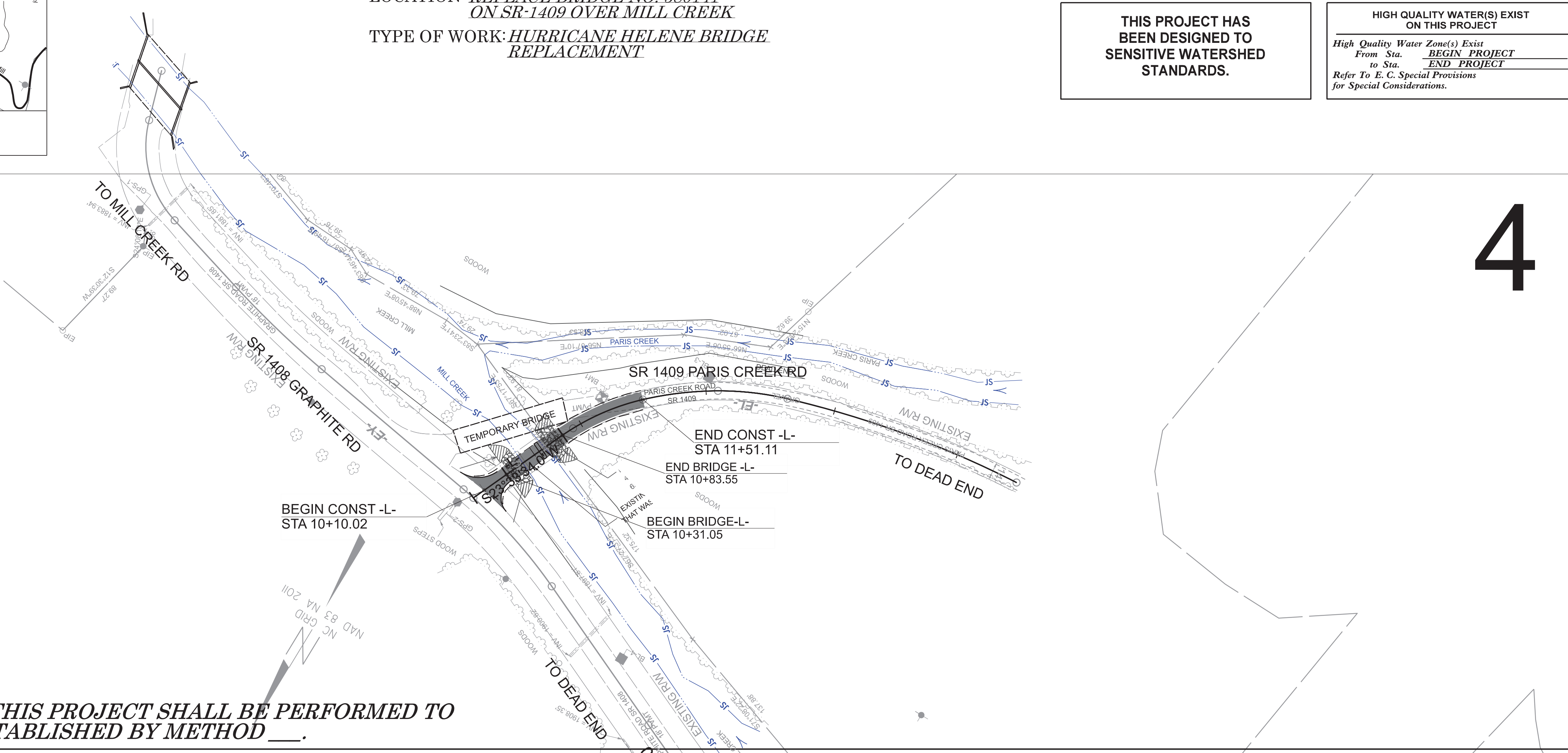
Refer To E. C. Special Provisions for Special Considerations.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

HIGH QUALITY WATER(S) EXIST ON THIS PROJECT

High Quality Water Zone(s) Exist From Sta. BEGIN PROJECT to Sta. END PROJECT
Refer To E. C. Special Provisions for Special Considerations.

4



NOTES:

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

GRAPHIC SCALE

30 15 0 30 60

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 DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES.

Prepared In the Office of:

KCA KISINGER CAMPO & ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayetteville St., Suite 1500
Raleigh, NC 27601
(919)882-7839

Designed by:

CODY HARWARD, EI	*4600*
NAME	LEVEL III CERTIFICATION NO.

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY ENGLISH STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" – ROADWAY DESIGN UNIT – N.C. DEPARTMENT OF TRANSPORTATION – RALEIGH, N.C. DATED JANUARY 2024 AND THE LATEST REVISION THERETO ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE ARE HEREBY CONSIDERED A PART OF THESE PLANS.

PROJECT REFERENCE NO.	SHEET NO.
DF18313.2059016.PR	EC-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

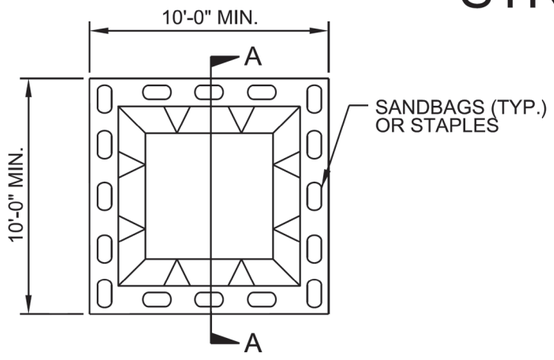
EROSION & SEDIMENT CONTROL LEGEND

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

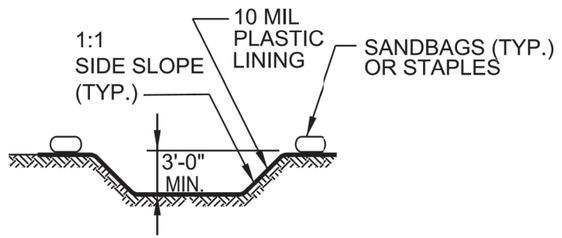
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet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

DFI8313.2059016	
EC	2A

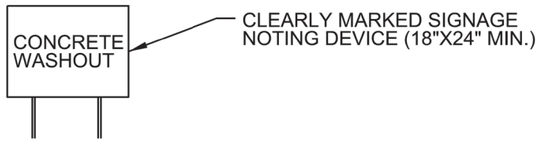
ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A



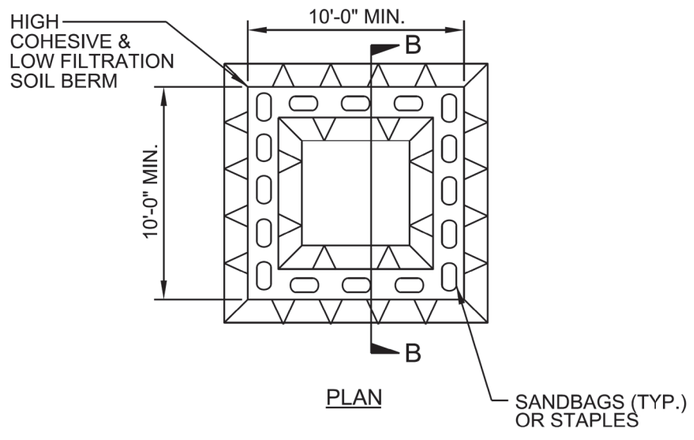
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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.

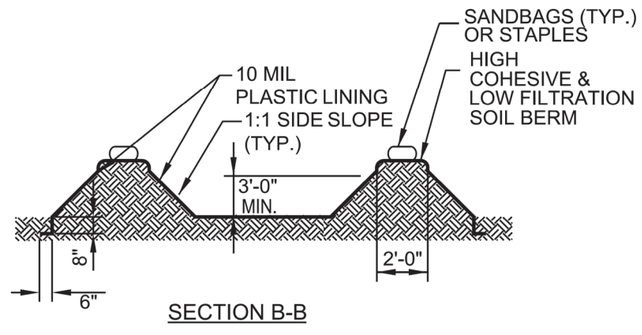
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARLY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

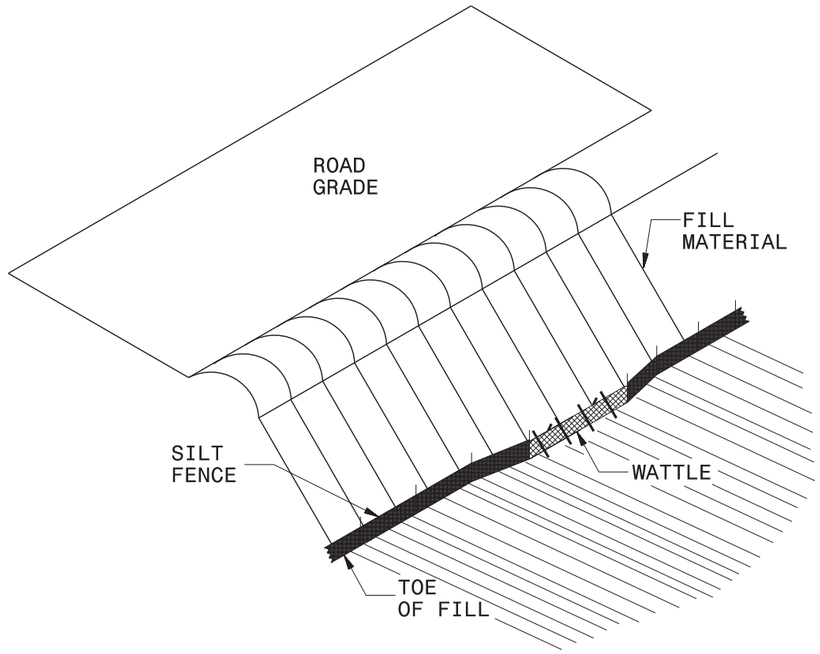
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

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

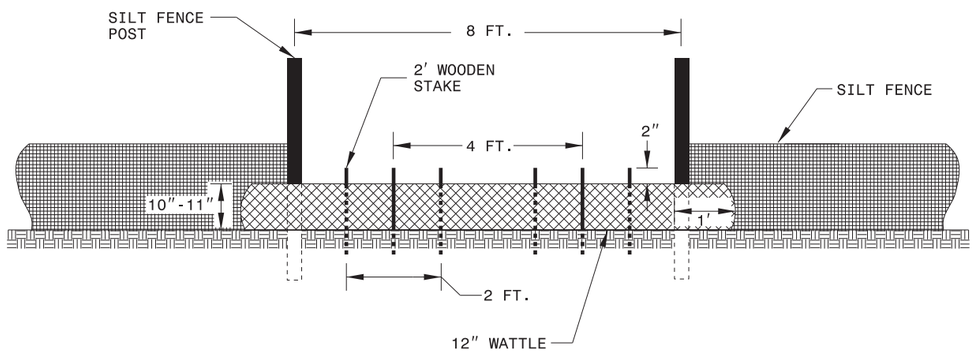
ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

SILT FENCE COIR FIBER WATTLE BREAK DETAIL



ISOMETRIC VIEW



VIEW FROM SLOPE

NOTES:

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

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

DO NOT PLACE WATTLE ON TOE OF SLOPE.

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

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

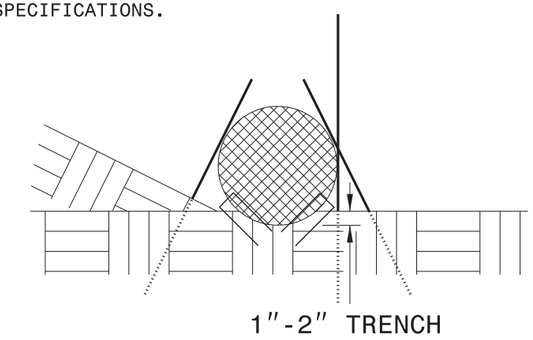
PROVIDE STAPLES MADE OF 11 GUAGE STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 6″ IN LENGTH.

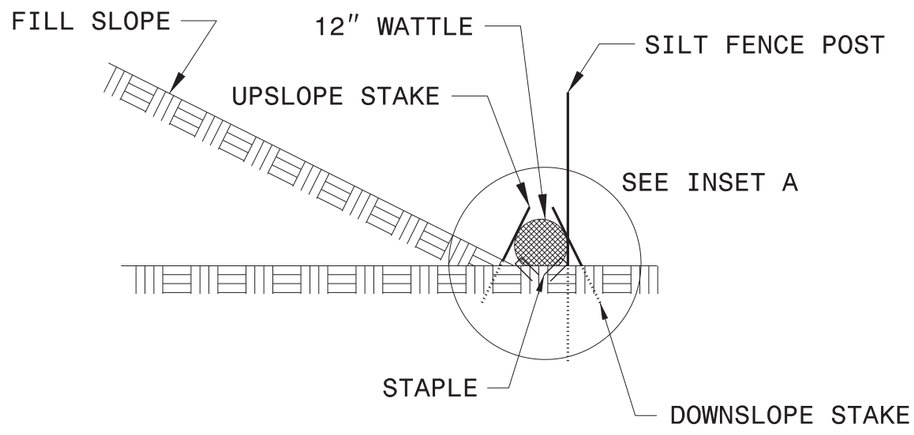
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

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

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

INSET A





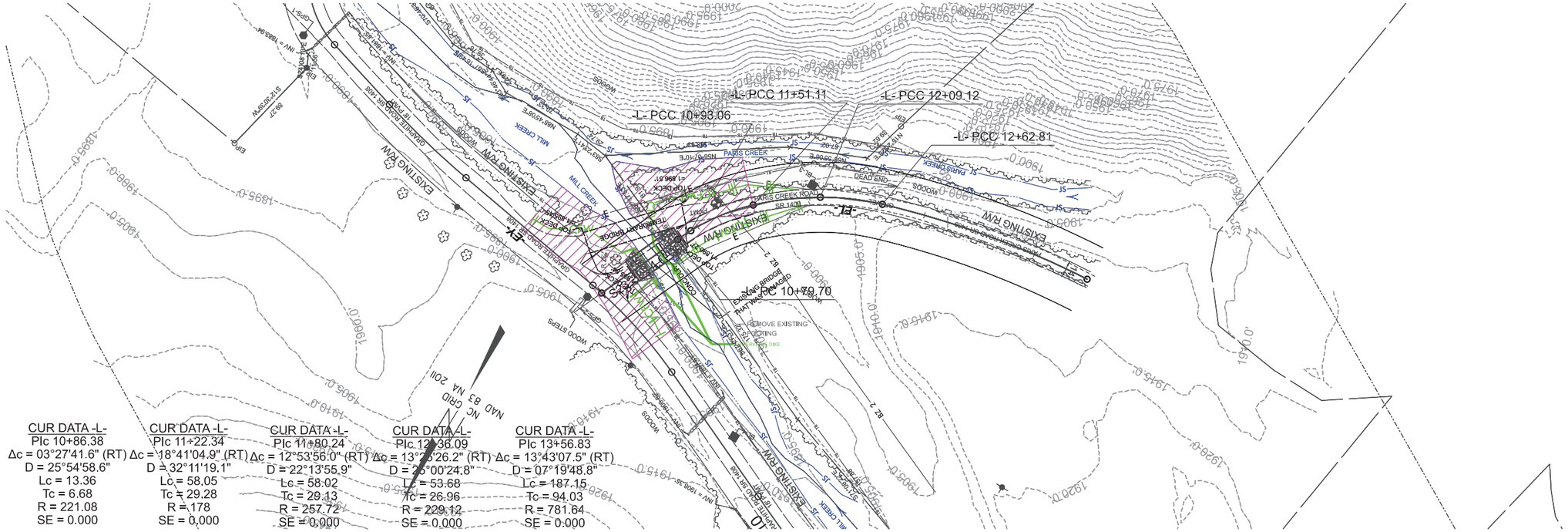
SIDE VIEW

DFI8313.2059016	
EC	3A

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



CUR DATA -L-	CUR DATA -L-	CUR DATA -L-	CUR DATA -L-	CUR DATA -L-
PIc 10+86.38	PIc 11+22.34	PIc 11+80.24	PIc 12+36.09	PIc 13+56.83
Δc = 03°27'41.6" (RT)	Δc = 18°41'04.9" (RT)	Δc = 12°53'56.0" (RT)	Δc = 13°15'26.2" (RT)	Δc = 13°43'07.5" (RT)
D = 25°54'58.6"	D = 32°11'19.1"	D = 22°13'55.9"	D = 25°00'24.8"	D = 07°19'48.8"
Lc = 13.36	Lc = 58.05	Lc = 58.02	Lc = 53.68	Lc = 187.15
Tc = 6.68	Tc = 29.28	Tc = 29.13	Tc = 26.96	Tc = 94.03
R = 221.08	R = 178	R = 257.72	R = 229.12	R = 781.64
SE = 0.000	SE = 0.000	SE = 0.000	SE = 0.000	SE = 0.000

ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 04

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

DFI8313.2059016

EC-4/CONSTR. 4

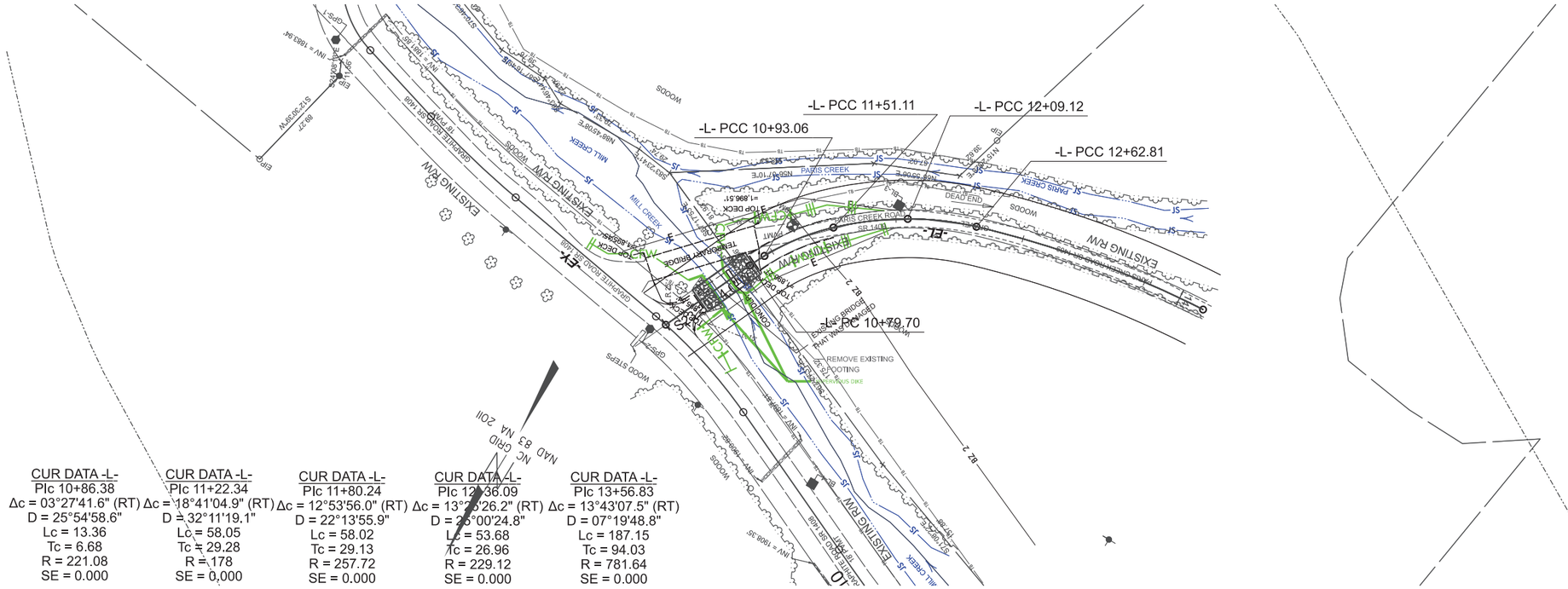
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

HIGHWAY DIVISION 14

ROADWAY DESIGN ENGINEER

PREPARED BY

KCA
KISINGER CAMPO & ASSOCIATES
NC FIRM LICENSE No: C-1506
301 Fayettville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839



CUR DATA -L-	CUR DATA -L-	CUR DATA -L-	CUR DATA -L-	CUR DATA -L-
PIc 10+86.38	PIc 11+22.34	PIc 11+80.24	PIc 12+36.09	PIc 13+56.83
Δc = 03°27'41.6" (RT)	Δc = 18°41'04.9" (RT)	Δc = 12°53'56.0" (RT)	Δc = 13°26'26.2" (RT)	Δc = 13°43'07.5" (RT)
D = 25°54'58.6"	D = 32°11'19.1"	D = 22°13'55.9"	D = 25°00'24.8"	D = 07°19'48.8"
Lc = 13.36	Lc = 58.05	Lc = 58.02	Lc = 53.68	Lc = 187.15
Tc = 6.68	Tc = 29.28	Tc = 29.13	Tc = 26.96	Tc = 94.03
R = 221.08	R = 178	R = 257.72	R = 229.12	R = 781.64
SE = 0.000	SE = 0.000	SE = 0.000	SE = 0.000	SE = 0.000

DFI8313.2059016

EC-5/CONSTR.5

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

HIGHWAY DIVISION 14

ROADWAY DESIGN
ENGINEER

PREPARED BY

KCA
KISINGER CAMPO
& ASSOCIATES

NC FIRM LICENSE No: C-1506
301 Fayettville St.,
Suite 1500
Raleigh, NC 27601
(919)882-7839

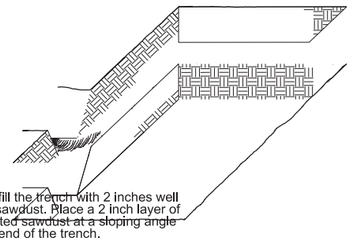
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DFI8313.2059016	RF-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

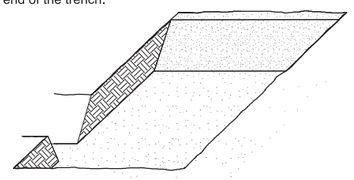
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

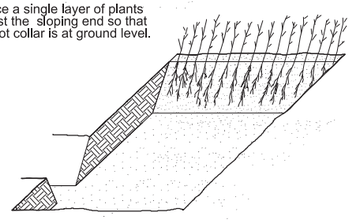
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



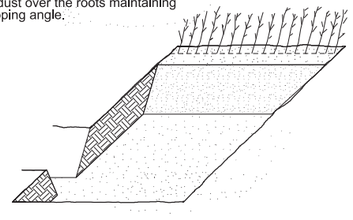
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

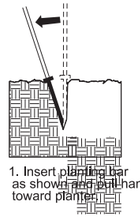


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

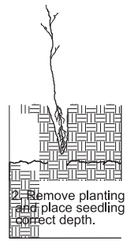


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

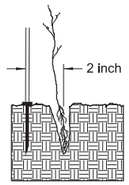
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



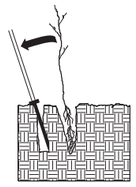
1. Insert planting bar as shown and pull handle toward planter.



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

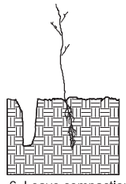


3. Insert planting bar 2 inches toward planter from seedling.



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

5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

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

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

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

REFORESTATION

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

REFORESTATION

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

34% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
33% PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in - 18 in BR
33% BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

REFORESTATION DETAIL SHEET

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

PROJECT: 580-141

CONTRACT: DM000501

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SIGNING PLAN
MCDOWELL COUNTY

DIVISION 13

LOCATION: PARIS CREEK RD (SR 1409)
REPLACE BRIDGE 141 OVER MILL CREEK

PROJECT NO. | SHEET NO.

DocuSigned by: George Karageorge

APPROVED:

DATE: 1/29/2026

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 042065 ENGINEER GEORGE M. KARAGEORGE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

ROADWAY STANDARD DRAWING

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

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

INDEX

GENERAL NOTES

- ALL SIGNS FURNISHED BY CONTRACTOR
- IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER.
- ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
- SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4025000000	901	CONTRACTOR FURNISHED, TYPE E SIGN	24.5	S.F.
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	63.5	L.F.
4102000000	904	SIGN ERECTION, TYPE E	6	EA.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	5	EA.

PAY ITEM NOTES

1 DISPOSAL OF SIGN SYSTEM, U-CHANNEL

NCDOT DIVISION 13 CONTACT:

HANNAH K. SMITH

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

PLAN PREPARED BY: MICHAEL BAKER INTERNATIONAL

GEORGE M. KARAGEORGE, PE DEPARTMENT MANAGER-TRAFFIC

BIRGIT MACKENZIE SR TRANSPORTATION DESIGNER

Michael Baker INTERNATIONAL

8000 Regency Parkwy, Suite 600
Cary, North Carolina 27518
Phone: 919-463-5488 MBAKERINTL.COM
PROFESSIONAL CORPORATION
LICENSE NO. F-1084

PROJECT NO. | SHEET NO.

APPROVED: DocuSigned by: George Karageorge

DATE: 1/29/2026

SEAL

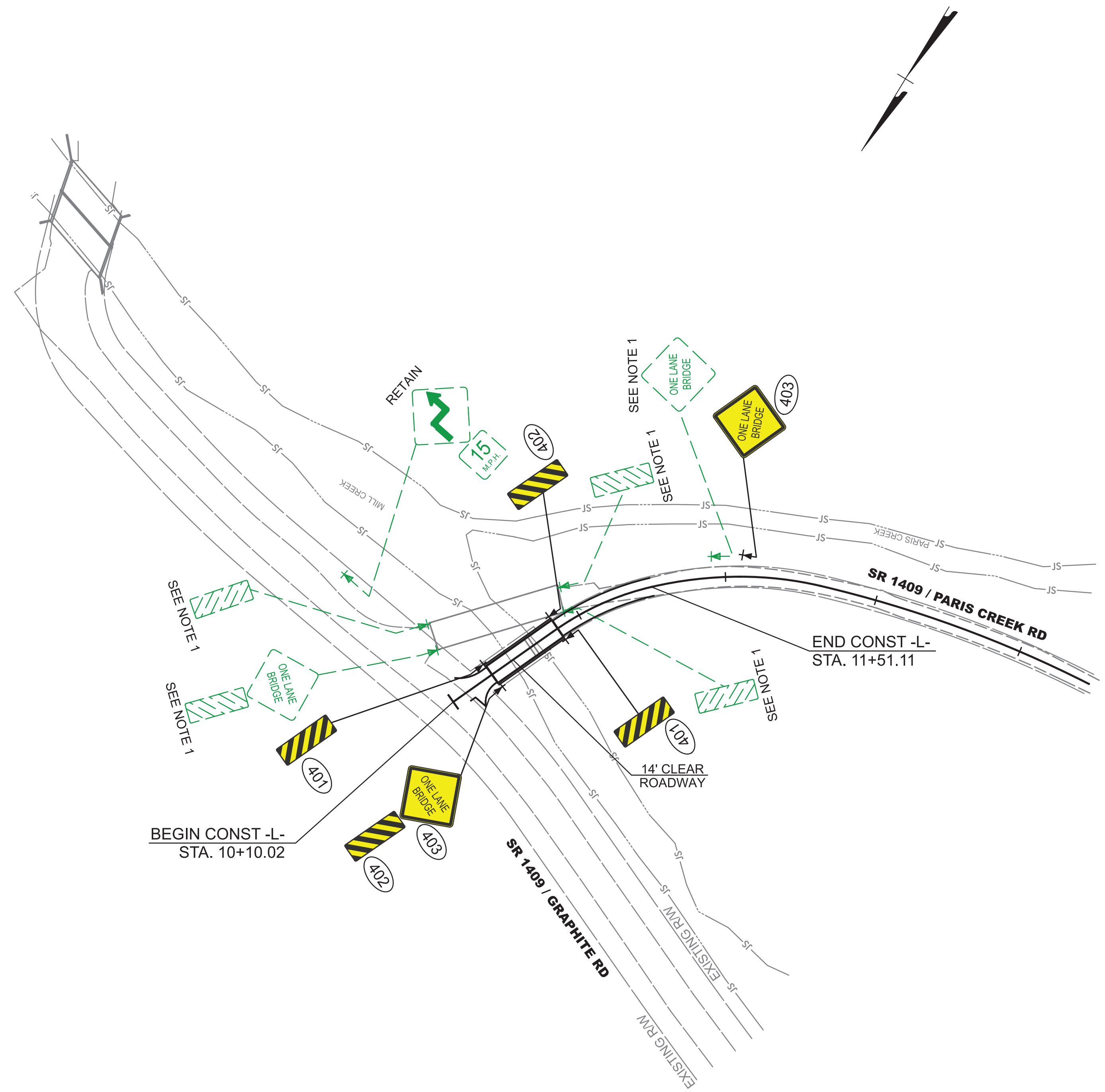
NORTH CAROLINA PROFESSIONAL SEAL 042065 ENGINEER GEORGE M. KARAGEORGE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

PAY ITEM NOTES

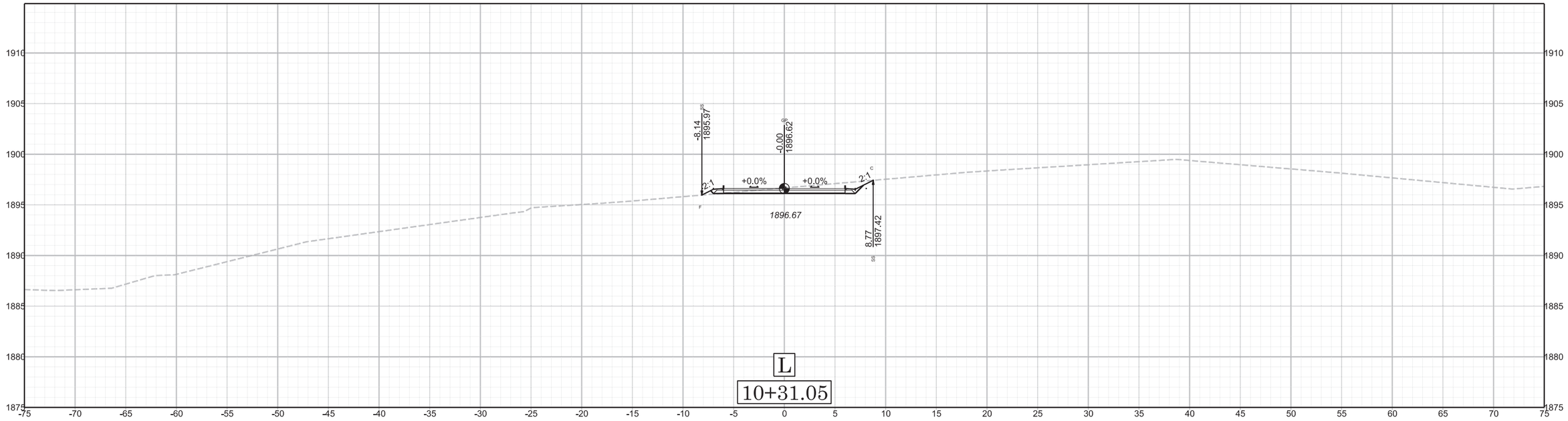
1 DISPOSAL OF SIGN SYSTEM, U-CHANNEL

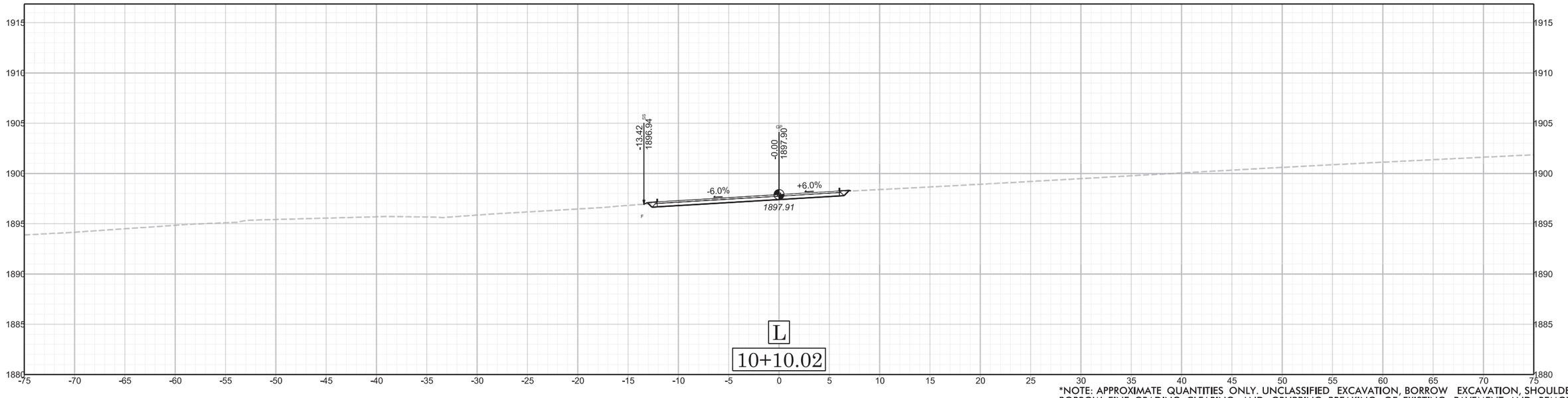


TYPE "E" SIGNS

(401) QUANTITY: 2 OM3-L 12" X 36" ONE "U" POST PER SIGN	(403) QUANTITY: 2 ONE LANE BRIDGE W5-3 30" X 30" ONE "U" POST PER SIGN
(402) QUANTITY: 2 OM3-R 12" X 36" MOUNT BELOW SIGN 403 IN ONE LOCATION ONE "U" POST PER SIGN IN ONE LOCATION	

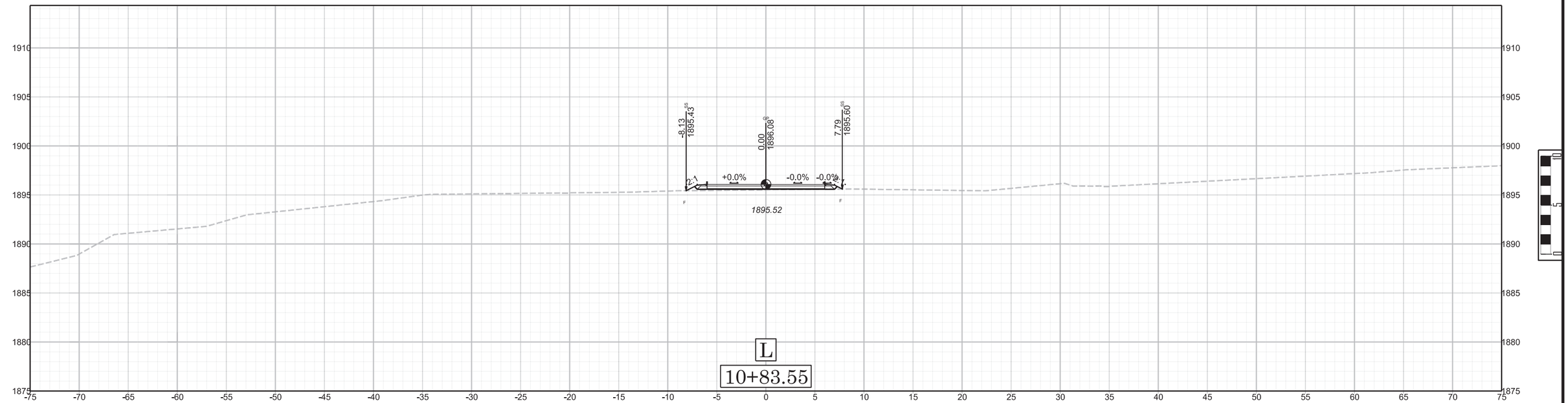
EXISTING AND PROPOSED SIGNING

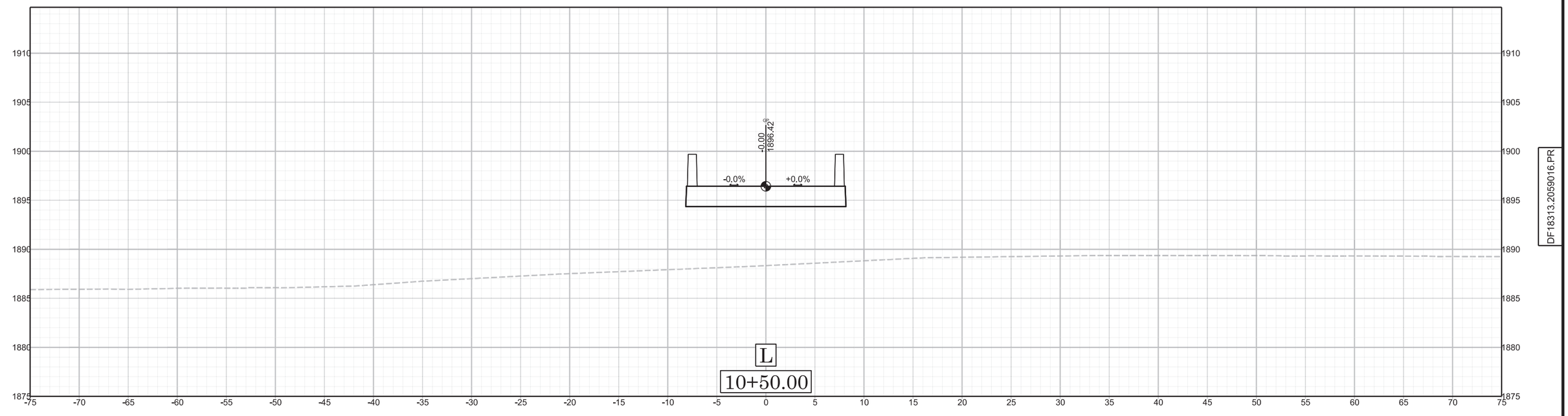




NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, BREAKING OF EXISTING PAVEMENT, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR GRADING.

DF18313.2059016.PR

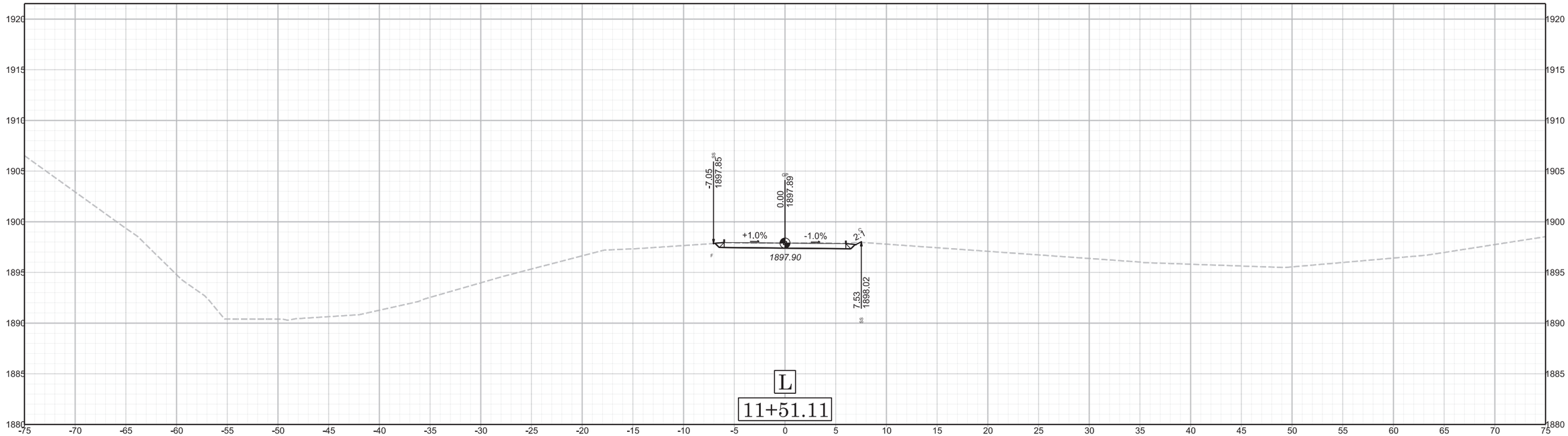


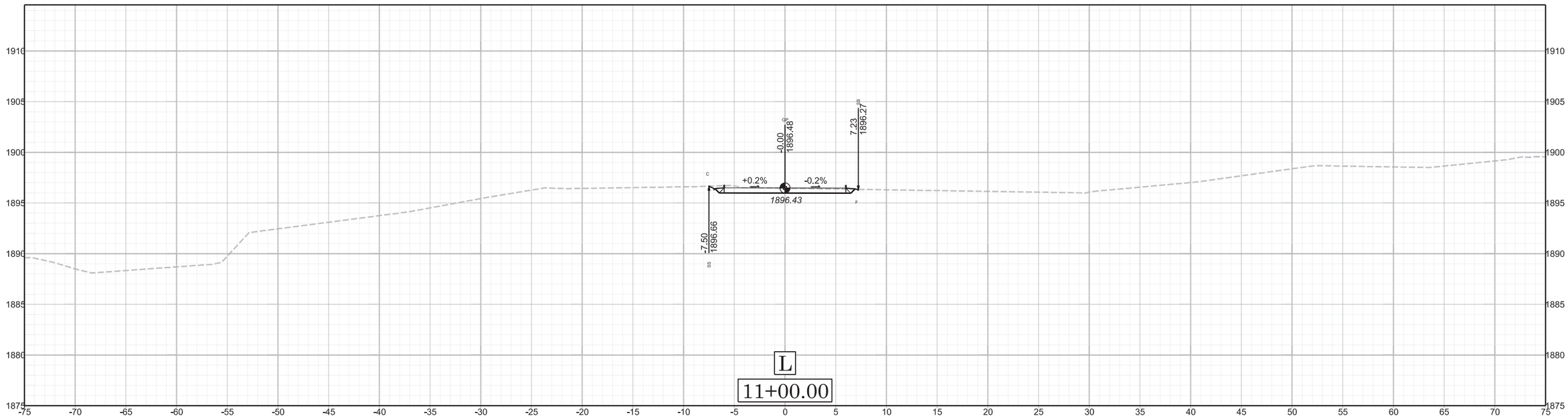


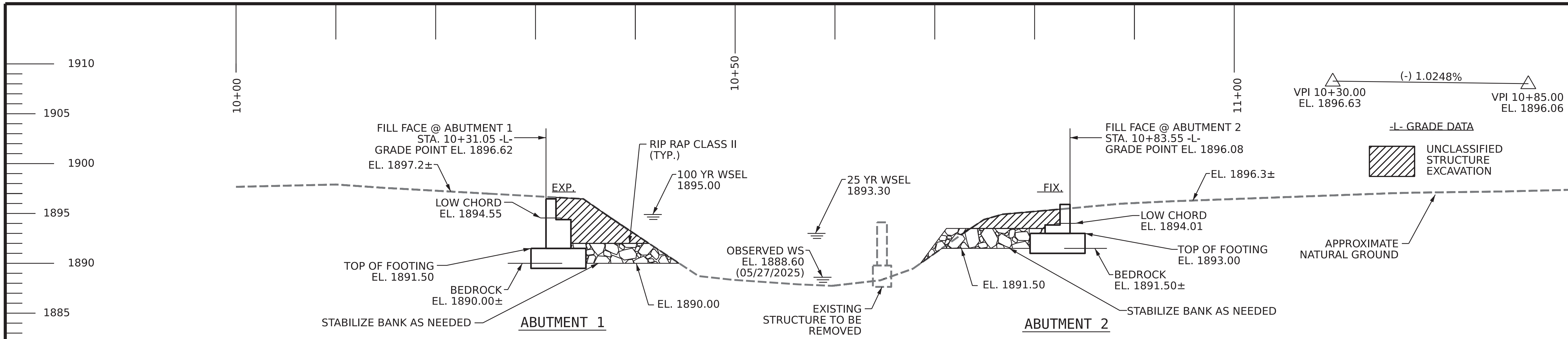
0 5 10

X 2

DF18313.2059016.PR





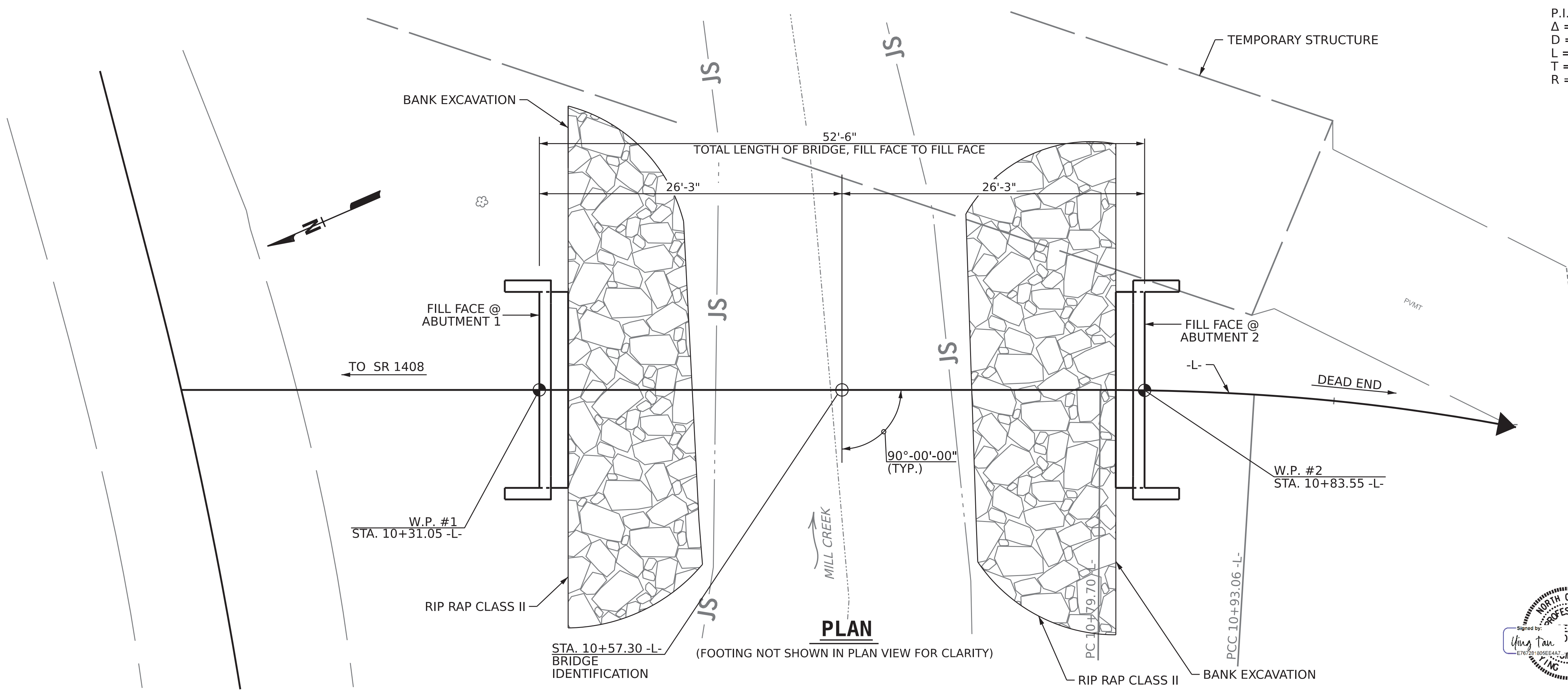


SECTION ALONG ℄ -L-

(SECTION AT ABUTMENTS ARE TAKEN AT RIGHT ANGLES)

-L- HORIZONTAL CURVE DATA

P.I. STA. 10+86.38
Δ = 03°-27'-41.6" (RT)
D = 25°-54'-58.6"
L = 13.36'
T = 6.68'
R = 221.08'



PLAN

(FOOTING NOT SHOWN IN PLAN VIEW FOR CLARITY)

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1409 (PARIS CREEK RD) OVER MILL CREEK BETWEEN SR 1408 (GRAPHITE RD) AND DEAD END

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

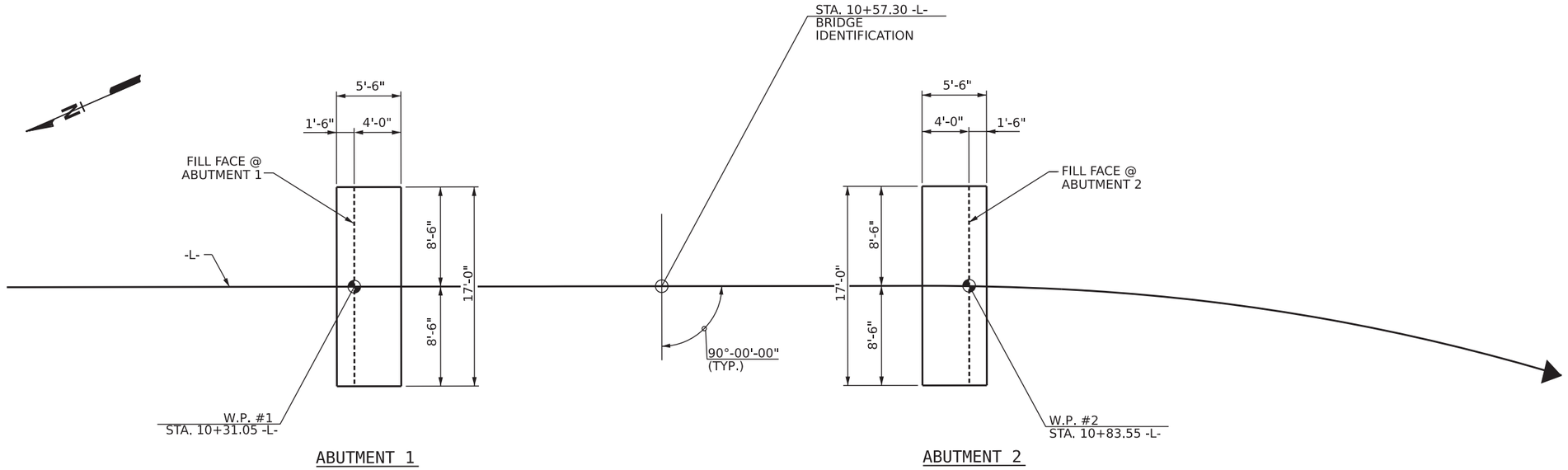
Signed by: Yang Tan — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — 1/30/2026

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1
1			3			TOTAL SHEETS
2			4			15

DRAWN BY :	R. GENTRY	DATE :	12/2025
CHECKED BY :	Y. TAN	DATE :	12/2025
DESIGN ENGINEER OF RECORD:	Y. TAN	DATE :	12/2025

NOTES

THE BOTTOM OF FOOTING ELEVATIONS ARE CONSIDERED AS THE MINIMUM EMBEDMENT. BASED ON A REVIEW OF THE AVAILABLE BRIDGE INSPECTION REPORTS, SITE CONDITIONS AND THE SUBSURFACE INVESTIGATION, THE ROCK ELEVATION IS 1890.0 AND 1891.5 FT +/- FOR EB1 AND EB2, RESPECTIVELY. FOOTINGS SHALL BE EMBEDDED A MINIMUM OF 6" INTO ROCK.



FOUNDATION LAYOUT

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
Signed By: Yang Tan
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1409
(PARIS CREEK RD) OVER MILL CREEK
BETWEEN SR 1408 (GRAPHITE RD)
AND DEAD END

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

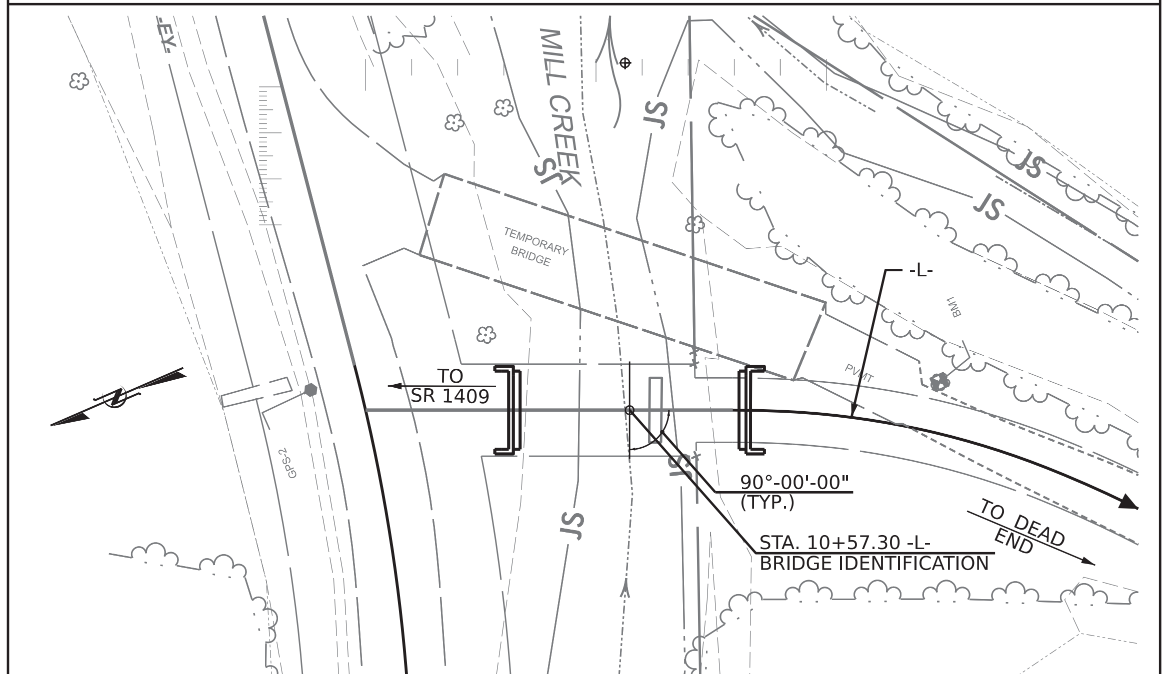
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : R. GENTRY DATE : 12/2025
CHECKED BY : Y. TAN DATE : 12/2025
DESIGN ENGINEER OF RECORD: Y. TAN DATE : 12/2025

1/30/2026
c:\users\todd.garrison\appdata\local\bentley\projectwise\workingdir\mb-us-pw.bentley.com_mb-us-pw-07\todd.garrison@mbakerintl.com\dms58093\401_003_DF18313.2059016.PR_SMU_FL_002_580141.dgn
Todd.Garrison

BENCH MARK: SPIKE IN A 14" WHITE OAK TREE AT STA. 11+24 -L-, 11' LEFT , EL. 1897.16



HYDRAULIC DATA

DESIGN DISCHARGE = 1000 C.F.S.
FREQUENCY OF DESIGN FLOOD = 25 YRS.
DESIGN HIGH WATER ELEVATION = 1893.3
DRAINAGE AREA = 5.12 SQ. MI.
BASIC DISCHARGE (Q100) = 1500 C.F.S.
BASIC HIGH WATER ELEVATION = 1895.0

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 2200+ C.F.S.
FREQUENCY OF OVERTOPPING FLOOD = 500 + YRS.
OVERTOPPING FLOOD ELEVATION = 1896.0 *
** @ STA. 10+32.30*

WS EL. TAKEN @ RIVER STATION 5385.3

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF A RAILCAR LOCATED DOWNSTREAM FROM PROPOSED STRUCTURE SHALL BE REMOVED. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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.

FOR THE SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50 AND PAINTED IN ACCORDANCE WITH SYSTEM 1 OR GALVANIZED OF THE STRUCTURAL STEEL SHOP COATING PROGRAM AND ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL STRUCTURAL STEEL FIELD CONNECTIONS SHALL USE 5/8" DIA. GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

COATING APPLICATION FOR ALL STRUCTURAL STEEL SHALL NOT BE PERFORMED UNTIL SHOP FABRICATION INCLUDING CUTTING, DRILLING AND WELDING HAS BEEN COMPLETED.

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.

ALL TIMBER AND LUMBER MEMBERS SHALL BE TREATED SOUTHERN PINE AND CONFORM TO SECTION 1082 OF THE STANDARD SPECIFICATIONS.

ALL TIMBER DIMENSIONS SHOWN ON THE PLANS ARE NOMINAL DIMENSIONS.

WHEN FIELD CUTTING TIMBER MEMBERS, TREAT NEWLY EXPOSED SURFACES WITH EITHER A BITUMINOUS ASPHALT-BASED ROOFING CEMENT, COPPER NAPHTHENATE PASTE, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING.

TREAT ALL DRILLED OR NEWLY EXPOSED HOLES IN TIMBER MEMBERS BY PUMPING WITH BITUMINOUS ASPHALT-BASED ROOFING CEMENT, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING HARDWARE.

PRE-DRILL HOLES IN TIMBER AND LUMBER MEMBERS ACCEPTING BOLTS TO ELIMINATE SPLITTING.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

ALL HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATION, UNLESS OTHERWISE NOTED ON THE PLANS.

DO NOT DRIVE LAG/STRUCTURAL SCREWS WITH A HAMMER, SCREW OR TORQUE LAG/STRUCTURAL SCREWS.

SCREWS SHALL PROVIDE SUFFICIENT LENGTH SO THAT SCREW SHANK WILL PENETRATE RECEIVING MEMBERS.

FOR TIMBER BRIDGE RAIL SYSTEM INCLUDING LUMBER, DELINEATORS, HARDWARE FOR BOLT CONNECTIONS, HARDWARE FOR SCREW CONNECTIONS AND ALUMINUM DRIP EDGE, SEE TIMBER BRIDGE SUPERSTRUCTURE ON STEEL BEAMS SPECIAL PROVISION.

FOR ASBESTOS ASSESSMENT,SEE SPECIAL PROVISIONS.

FOR TIMBER BRIDGE DECK SYSTEM INCLUDING HARDWARE FOR BOLT CONNECTIONS AND HARDWARE FOR SCREW CONNECTIONS,SEE TIMBER BRIDGE SUPERSTRUCTURE ON STEEL BEAMS SPECIAL PROVISION.

TOTAL BILL OF MATERIAL

	CONSTRUCTION SURVEYING	REMOVAL OF EXISTING STRUCTURE @ STA. 10+57.30 -L-	ASBESTOS ASSESSMENTS	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	REINFORCING STEEL	APPROX. 44,662 LBS. STRUCTURAL STEEL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	TIMBER DECK SYSTEM	TIMBER BRIDGE RAIL SYSTEM
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	CU. YDS.	LBS.	LUMP SUM	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	LIN. FT.
SUPERSTRUCTURE							LUMP SUM			LUMP SUM	LUMP SUM	101.0
ABUTMENT 1					14.2	2,045		51	56			
ABUTMENT 2					10.3	1,693		52	58			
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	24.5	3,738	LUMP SUM	103	114	LUMP SUM	LUMP SUM	101.0

PROJECT NO. DF18313.2059016.PR
MCDOWELL COUNTY
STATION: 10+57.30 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1409 (PARIS CREEK RD) OVER MILL CREEK BETWEEN SR 1408 (GRAPHITE RD) AND DEAD END

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL ...0886 ... TAN
Signed by: Yong Tan

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

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

SHEET NO. S3
TOTAL SHEETS 15

DRAWN BY : R. GENTRY DATE : 12/2025
CHECKED BY : Y. TAN DATE : 12/2025
DESIGN ENGINEER OF RECORD: Y. TAN DATE : 12/2025

1/30/2026
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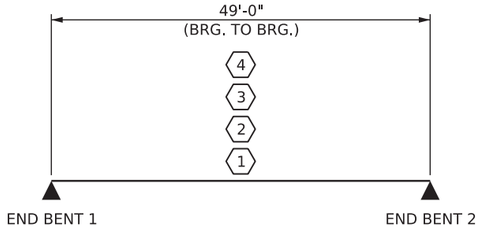
Todd.Garrison

8/26/21

LOAD AND RESISTANCE FACTOR RATING (LRFR) STEEL GIRDERS (W 14 X 145)

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE II LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ LL)	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ LL)	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.07	--	1.75	0.373	1.07	A	I	25.00	0.373	3.83	A	I	0.00	1.30	0.373	1.31	A	I	25.00	
		HL-93 (OPERATING)	N/A		1.39	--	1.35	0.373	1.39	A	I	25.00	0.373	4.96	A	I	0.00	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.33	47.88	1.75	0.373	1.33	A	I	25.00	0.373	4.62	A	I	0.00	1.30	0.373	1.63	A	I	25.00	
		HS-20 (OPERATING)	36.000		1.72	61.92	1.35	0.373	1.72	A	I	25.00	0.373	5.98	A	I	0.00	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.34	45.09	1.40	0.373	3.41	A	I	25.00	0.373	9.99	A	I	0.00	1.30	0.373	3.34	A	I	25.00	
		SNGARBS2	20.000		2.62	52.40	1.40	0.373	2.68	A	I	20.00	0.373	9.55	A	I	0.00	1.30	0.373	2.62	A	I	20.00	
		SNAGRIS2	22.000		2.51	55.22	1.40	0.373	2.57	A	I	30.00	0.373	8.93	A	I	0.00	1.30	0.373	2.51	A	I	20.00	
		SNCOTTS3	27.250		1.66	45.24	1.40	0.373	1.70	A	I	25.00	0.373	6.60	A	I	0.00	1.30	0.373	1.66	A	I	25.00	
		SNAGGRS4	34.925		1.44	50.29	1.40	0.373	1.47	A	I	25.00	0.373	5.60	A	I	0.00	1.30	0.373	1.44	A	I	25.00	
		SNS5A	35.550		1.41	50.13	1.40	0.373	1.44	A	I	25.00	0.373	5.73	A	I	0.00	1.30	0.373	1.41	A	I	25.00	
		SNS6A	39.950		1.31	52.33	1.40	0.373	1.34	A	I	25.00	0.373	5.28	A	I	0.00	1.30	0.373	1.31	A	I	25.00	
		SNS7B	42.000		1.25	52.50	1.40	0.373	1.28	A	I	25.00	0.373	5.25	A	I	0.00	1.30	0.373	1.25	A	I	25.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.61	53.13	1.40	0.373	1.64	A	I	25.00	0.373	6.24	A	I	0.00	1.30	0.373	1.61	A	I	25.00	
		TNT4A	33.075		1.62	53.58	1.40	0.373	1.66	A	I	25.00	0.373	6.03	A	I	0.00	1.30	0.373	1.62	A	I	25.00	
		TNT6A	41.600		1.35	56.16	1.40	0.373	1.38	A	I	25.00	0.373	5.72	A	I	0.00	1.30	0.373	1.35	A	I	25.00	
		TNT7A	42.000		1.37	57.54	1.40	0.373	1.40	A	I	25.00	0.373	5.39	A	I	0.00	1.30	0.373	1.37	A	I	25.00	
		TNT7B	42.000		1.43	60.06	1.40	0.373	1.46	A	I	25.00	0.373	5.08	A	I	0.00	1.30	0.373	1.43	A	I	25.00	
		TNAGRIT4	43.000		1.35	58.05	1.40	0.373	1.38	A	I	25.00	0.373	4.90	A	I	0.00	1.30	0.373	1.35	A	I	25.00	
		TNAGT5A	45.000		1.27	57.15	1.40	0.373	1.29	A	I	25.00	0.373	4.95	A	I	0.00	1.30	0.373	1.27	A	I	25.00	
		TNAGT5B	45.000	3	1.24	55.80	1.40	0.373	1.27	A	I	25.00	0.373	4.65	A	I	0.00	1.30	0.373	1.24	A	I	25.00	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.05	58.94	1.30	0.373	2.05	A	I	30.00	0.373	7.23	A	I	0.00	N/A	--	--	--	--	--	
		EV3	43.000	4	1.34	57.62	1.30	0.373	1.34	A	I	25.00	0.373	4.89	A	I	0.00	N/A	--	--	--	--	--	



LRFR SUMMARY

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

NOTES:

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

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

(#) CONTROLLING LOAD RATING

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

GIRDER LOCATION

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

PROJECT NO. DF18313.2059016.PR
MCDOWELL COUNTY
STATION: 10+57.30 -L-
SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

LRFR SUMMARY FOR 50FT STEEL GIRDERS

(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL ENGINEER — Signed by: Ying Tan 36 — 1/30/2026

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1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY:	M. CAREY	DATE :	11/2025
CHECKED BY :	Y. TAN	DATE :	11/2025
DRAWN BY :	GA 7/2024		
CHECKED BY :	AKP 7/2024		

STD. TB_LRFR_50L

NOTES

FOR TIMBER BRIDGE DECK SYSTEM DETAILS, SEE PLAN OF SPAN.

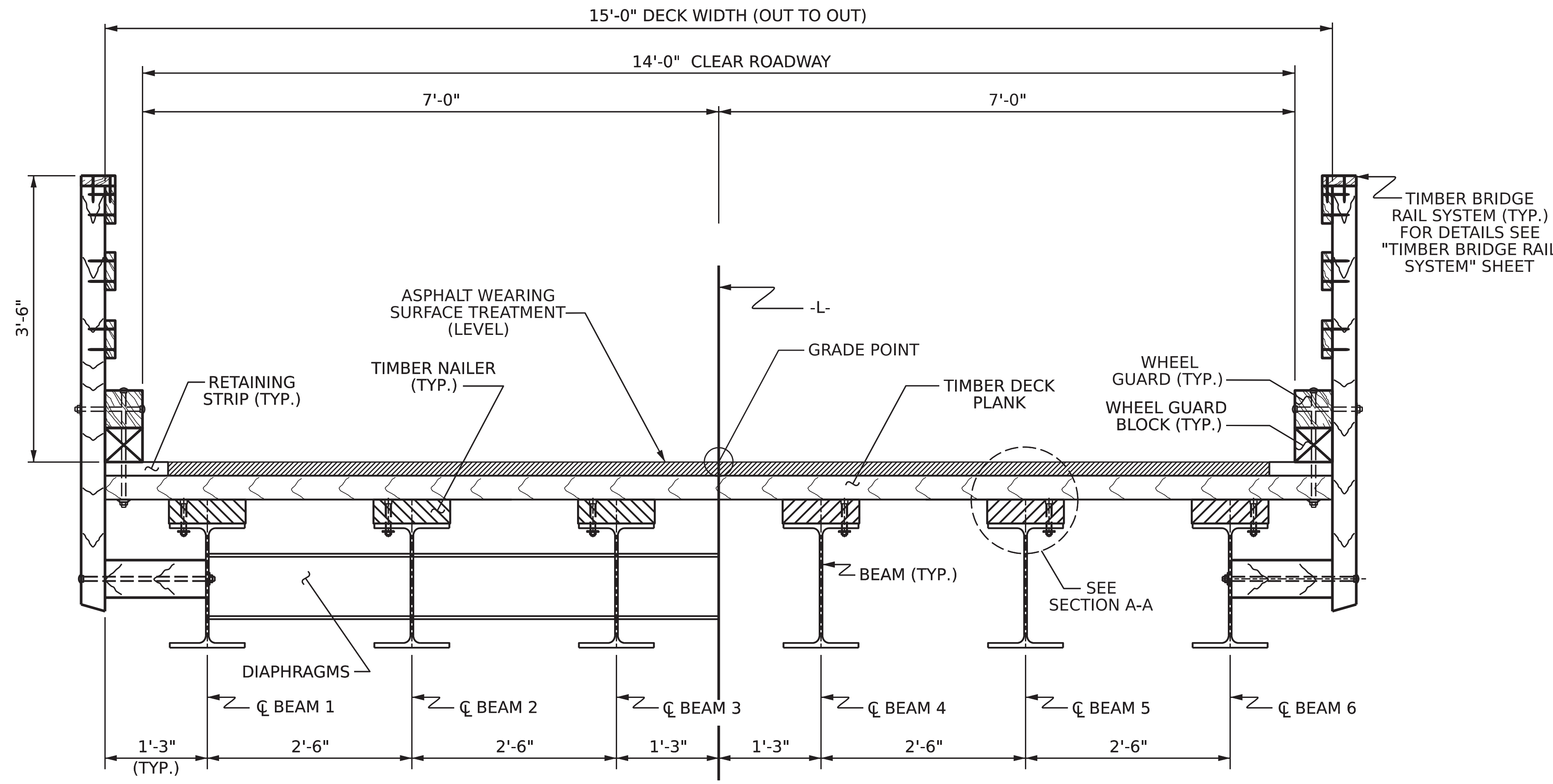
FOR TIMBER BRIDGE RAIL SYSTEM DETAILS, SEE TIMBER BRIDGE RAIL SYSTEM PLAN SHEET.

PRIOR TO PLACING TIMBER BEAM NAILER AND EDGE NAILER MEMBERS, PLACE A FLASHING MEMBRANE ON THE TOP SIDE OF THE STEEL BEAMS.

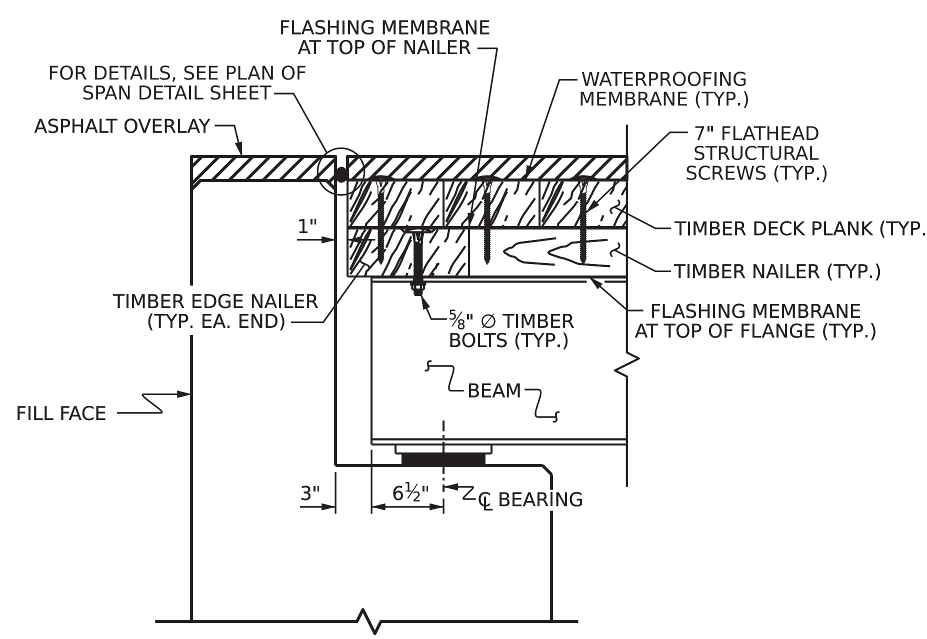
PRIOR TO PLACING TIMBER PLANK MEMBERS, PLACE A SELF-ADHERING FLASHING MEMBRANE ON THE TOP SIDE OF THE TIMBER NAILERS.

FOR BEAM AND DIAPHRAGM DETAILS, SEE FRAMING PLAN SHEET.

FOR SECTION A-A, SEE "PLAN OF SPAN DETAILS" SHEET



TYPICAL SECTION



SECTION AT ABUTMENT

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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DESIGN ENGINEER OF RECORD: Y. TAN	DATE : 12/2025

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Todd.Garrison

STD. TB_TS

NOTES

FOR ADDITIONAL NOTES, SEE TYPICAL SECTION AND GENERAL DRAWING SHEETS.

STAGGER TIMBER DECK PLANKS BUTT JOINTS AT 4FT MINIMUMS FROM ADJACENT RUNS.

ATTACH TIMBER DECK PLANKS TO NAILERS WITH TWO STRUCTURAL SCREWS PER TIMBER DECK PLANK.

AVOID HITTING NAILER BOLT WHEN DRIVING TIMBER DECK SCREWS.

SEE BEAM DETAILS FOR SPACING OF TIMBER BOLTS IN TOP FLANGE OF ROLLED BEAM.

COUNTERSINK TIMBER BOLT AND STRUCTURAL SCREW HEADS TO BE FLUSH WITH TIMBER SURFACE.

TRIM THE EDGE NAILER FLUSH WITH THE EDGE OF DECK.

DECK PLANK WIDTH MAY BE CUT TO 6" (MIN.) TO FIT WITHIN LIMITS OF TIMBER DECK. ALL DECK PLANKS ATTACHED TO THE EDGE NAILER SHALL BE FULL WIDTH. CUT BOARDS WILL NOT BE PERMITTED TO BE PLACED ADJACENT TO ONE ANOTHER.

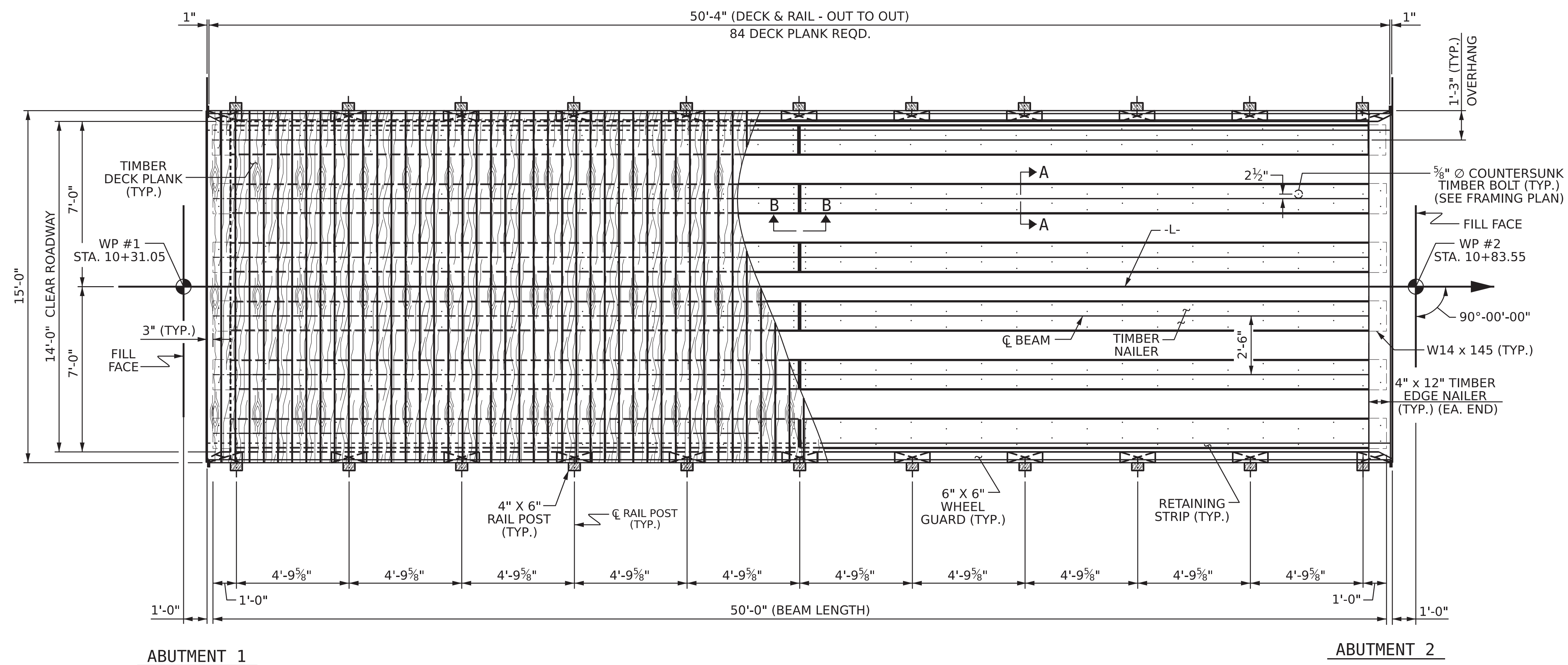
FINAL JOINT SEALS SHALL NOT BE INSTALLED UNTIL THE OVERLAY IS COMPLETE.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE BACKER ROD FOR THE SIZE OF THE OPENING ON THE PLANS AND ACCOMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

POURABLE SILICONE JOINT SEALANT SHALL BE INSTALLED AS PER THE MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

FOR POURABLE SILICONE JOINT SEALANT, SEE SPECIAL PROVISIONS.



DECK LAYOUT

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF 50' BEAM
14'-0" CLEAR ROADWAY
90° SKEW

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — Signed by: Ying Tan — 1/30/2026

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1			3					TOTAL SHEETS
2			4					15

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DESIGN ENGINEER OF RECORD:	Y. TAN	DATE :	12/2025

1/30/2026
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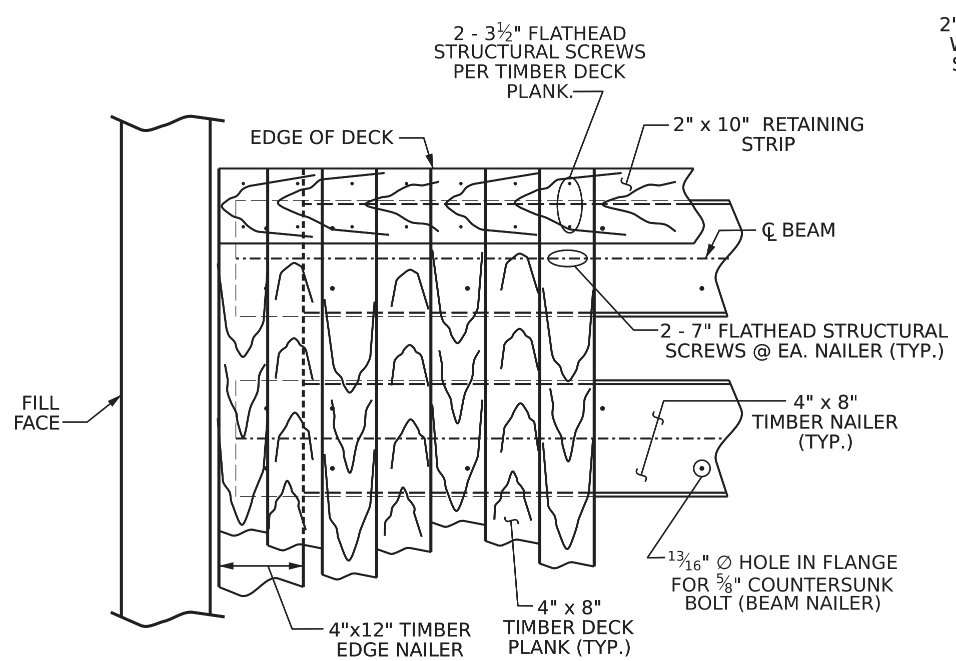
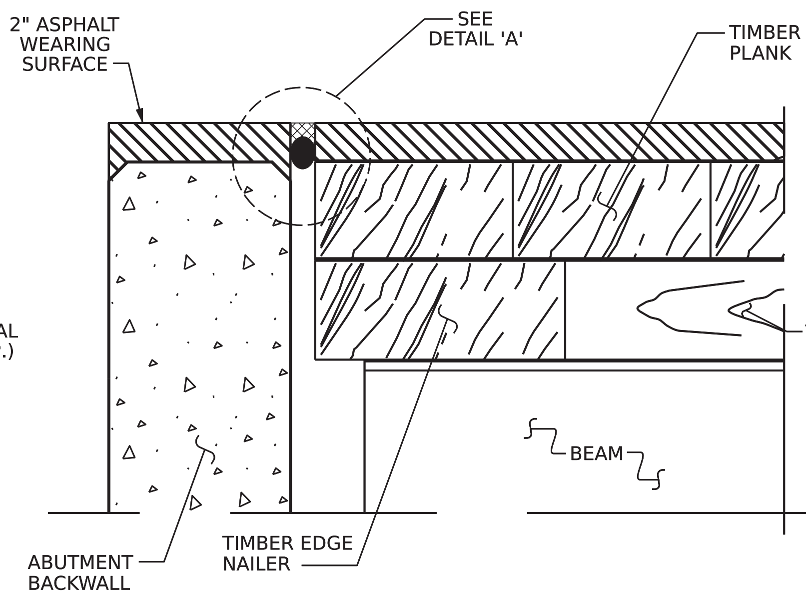
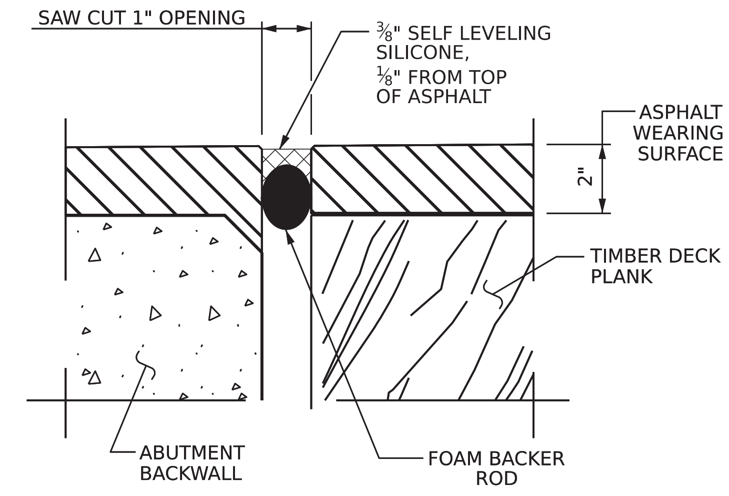


TYPICAL DECK DETAIL AT ABUTMENT



PROPOSED POURABLE SILICONE JOINT DETAIL



DETAIL 'A'

BILL OF MATERIAL FOR 50 FT. SPAN

TREATED LUMBER

ITEM	SIZE	LIN. FT.
TIMBER DECK PLANKS	4"x8"	1260.0
TIMBER NAILERS	4"x8"	290.0
TIMBER EDGE NAILERS	4"x12"	30.0

TOTAL TREATED LUMBER 1580.0 LIN. FT.

FLASHING MEMBRANE

ITEM	SIZE	LIN. FT.
TOP OF BEAM	25 MILS	300.0
TOP OF TIMBER NAILERS	25 MILS	290.0
TOP OF TIMBER EDGE NAILERS	25 MILS	30.0

FLASHING MEMBRANE 620.0 LIN. FT.

HARDWARE

ITEM	Nos.	SIZE	LBS.
5/8" ∅ TIMBER BOLTS	480	5/8"	707.4
HEAVY HEX NUTS	480	5/8"	60.6
STANDARD WASHER	480	5/8"	39.2
LOCK WASHER	480	5/8"	39.2
FLAT HEAD STR. SCREWS	1216	7"	12.2

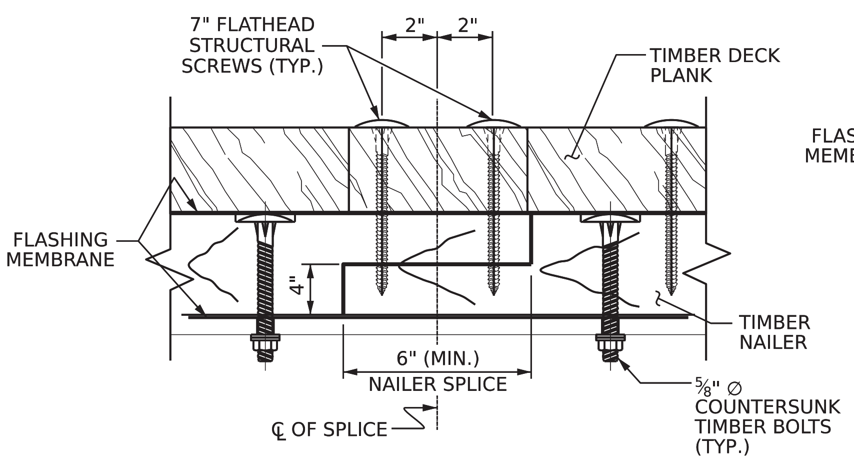
HARDWARE FOR CONNECTIONS 858.5 LBS.

DECK WATERPROOFING MEMBRANE

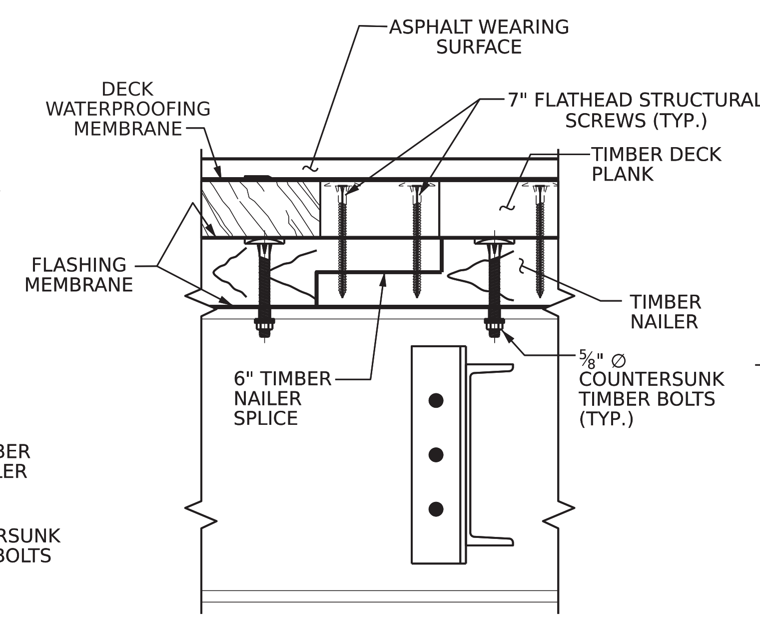
ITEM	SIZE	SQ. YDS
DECK WATERPROOFING MEMBRANE	65 MILS.	83.9

DRIP EDGE

ITEM	SIZE	LIN. FT.
22 GA. ALUMINIUM DRIP EDGE	1'-0"	101.0

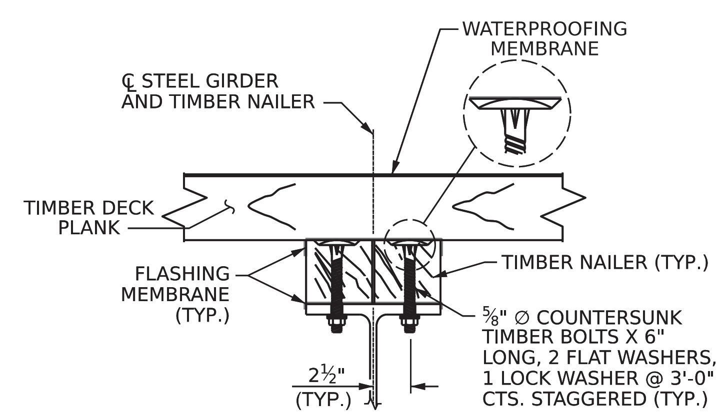


NAILER SPLICE DETAILS



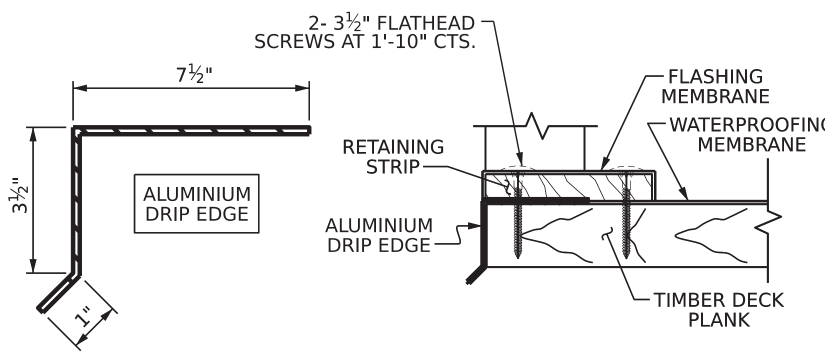
SECTION B-B

NAILER SPLICE & TIMBER PLANK ATTACHMENT DETAILS



SECTION A-A

DOUBLE TIMBER NAILER ATTACHMENT DETAILS



DRIP EDGE DETAILS

POST AND BOLTS NOT SHOWN FOR CLARITY

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

STANDARD SUPERSTRUCTURE

PLAN OF SPAN DETAILS

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SHEET NO. S7
TOTAL SHEETS 15

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Todd.Garrison

NOTES

NO SALVAGED BEAMS SHALL BE USED, UNLESS OTHERWISE NOTED ON THE PLANS.

NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.

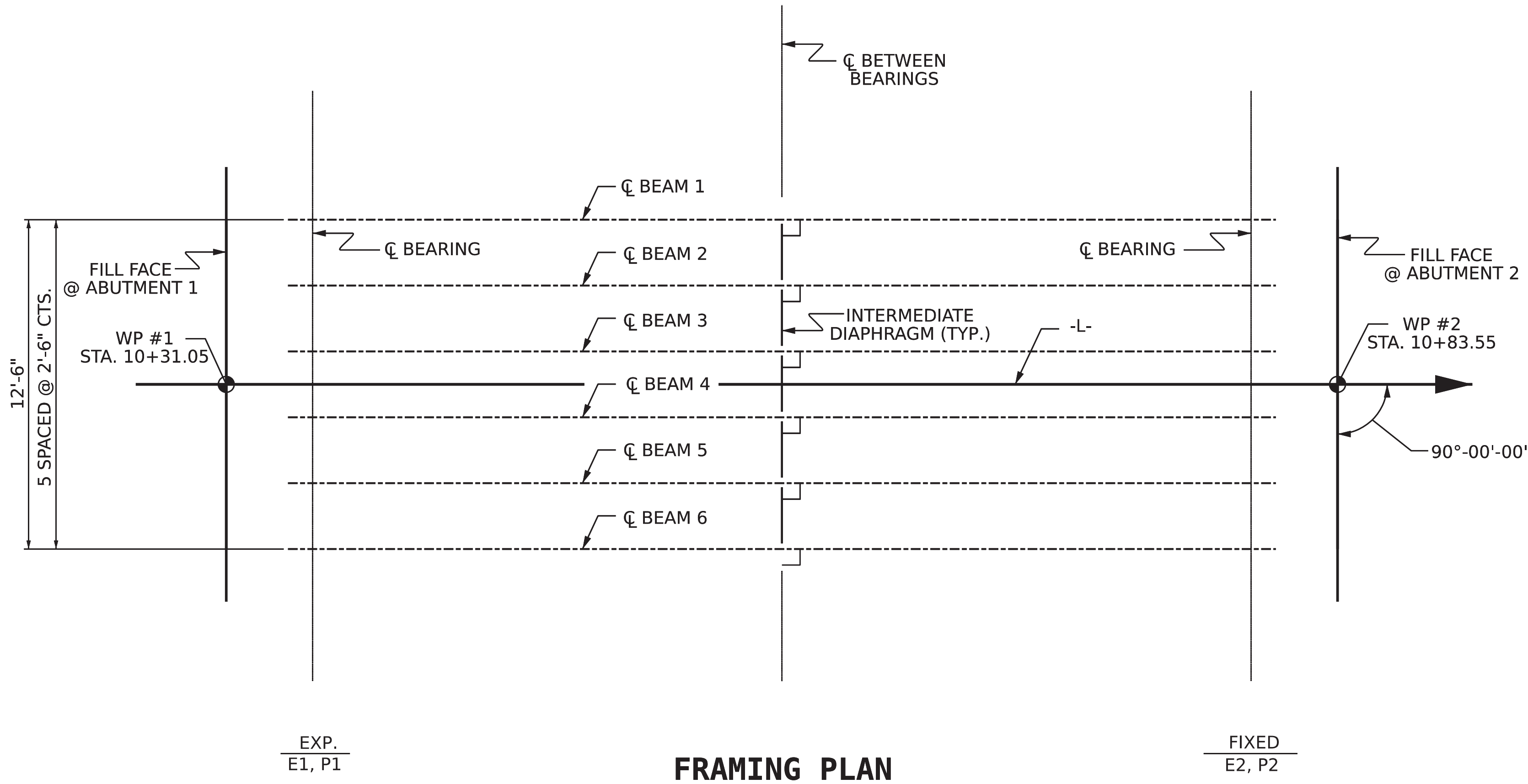
ALL STRUCTURAL STEEL FIELD CONNECTIONS SHALL BE ⅝" DIA. GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

A CHARPY V-NOTCH TEST IS REQUIRED ON ALL BEAM SECTIONS, AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

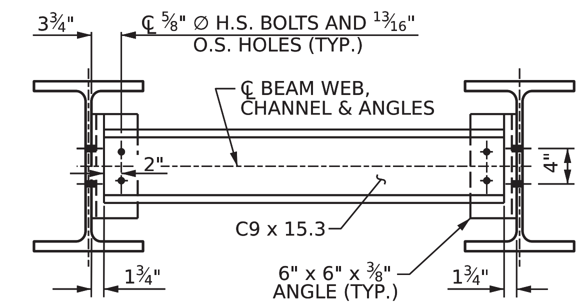
CONTRACTORS OPTION TO WELD CONNECTOR TO BEAM PRIOR TO SHOP COATING.

SEE GENERAL DRAWING NOTES FOR COATING.

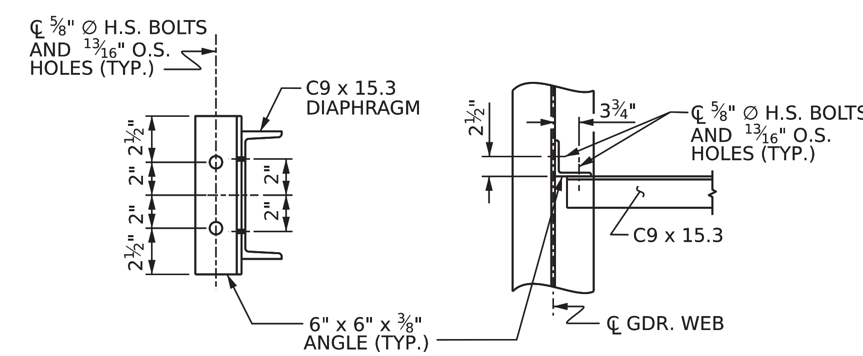
✻ FOR SIZE AND LOCATION OF OPTIONAL BOLTED SOLE PLATE, SEE BEARING DETAILS SHEET.



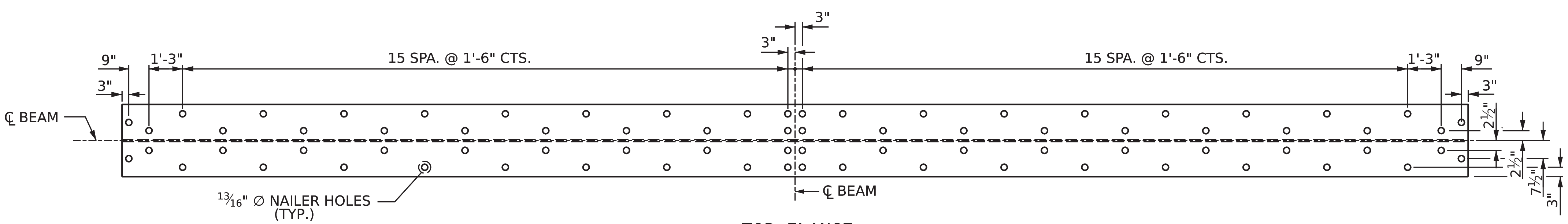
FRAMING PLAN



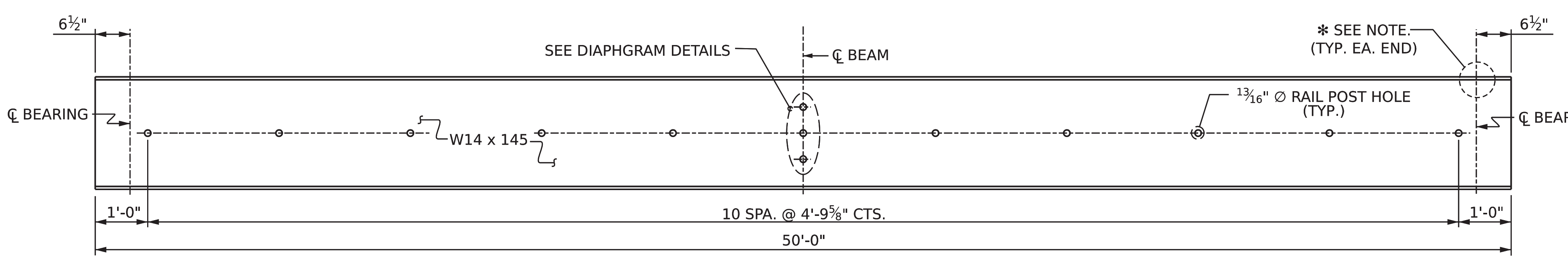
INTERIOR DIAPHRAGM DETAIL



ANGLE DETAIL



TOP FLANGE



ELEVATION
(SHOWING RAIL POST HOLES FOR EXTERIOR BEAMS
INTERIOR BEAMS ARE SIMILAR BUT WITHOUT RAIL POST HOLES)

BEAM DETAILS

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
FRAMING PLAN FOR 50' BEAM LENGTH 90° SKEW

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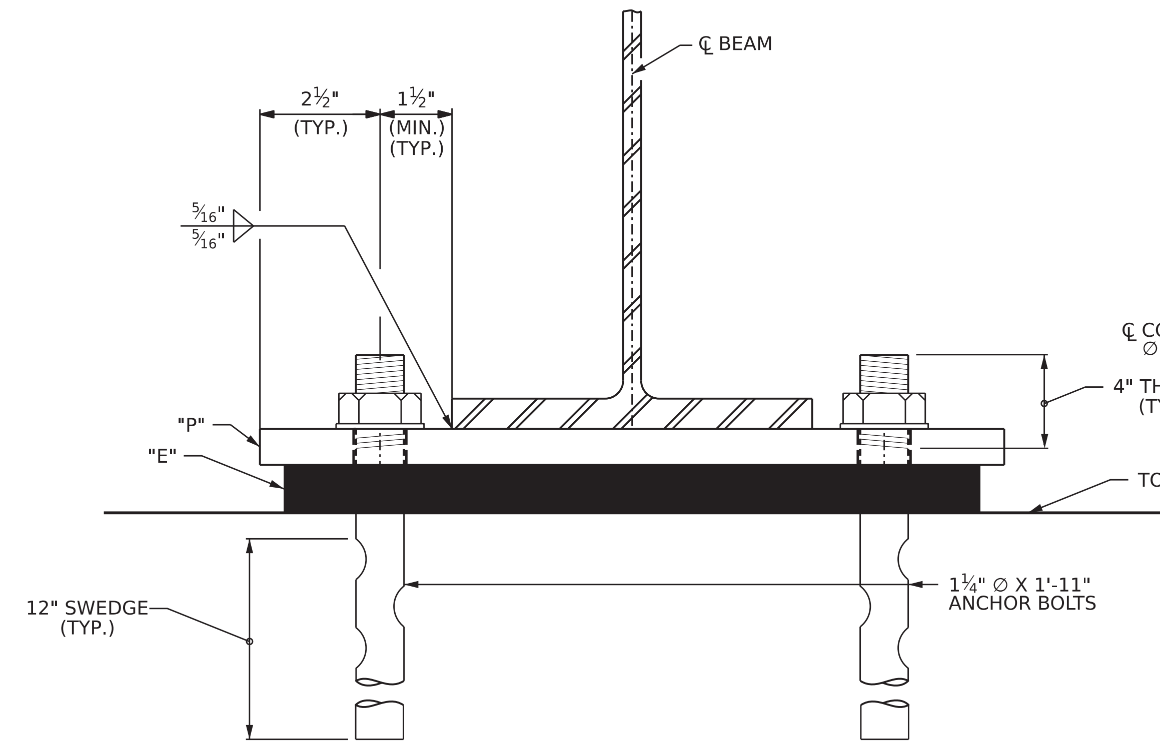
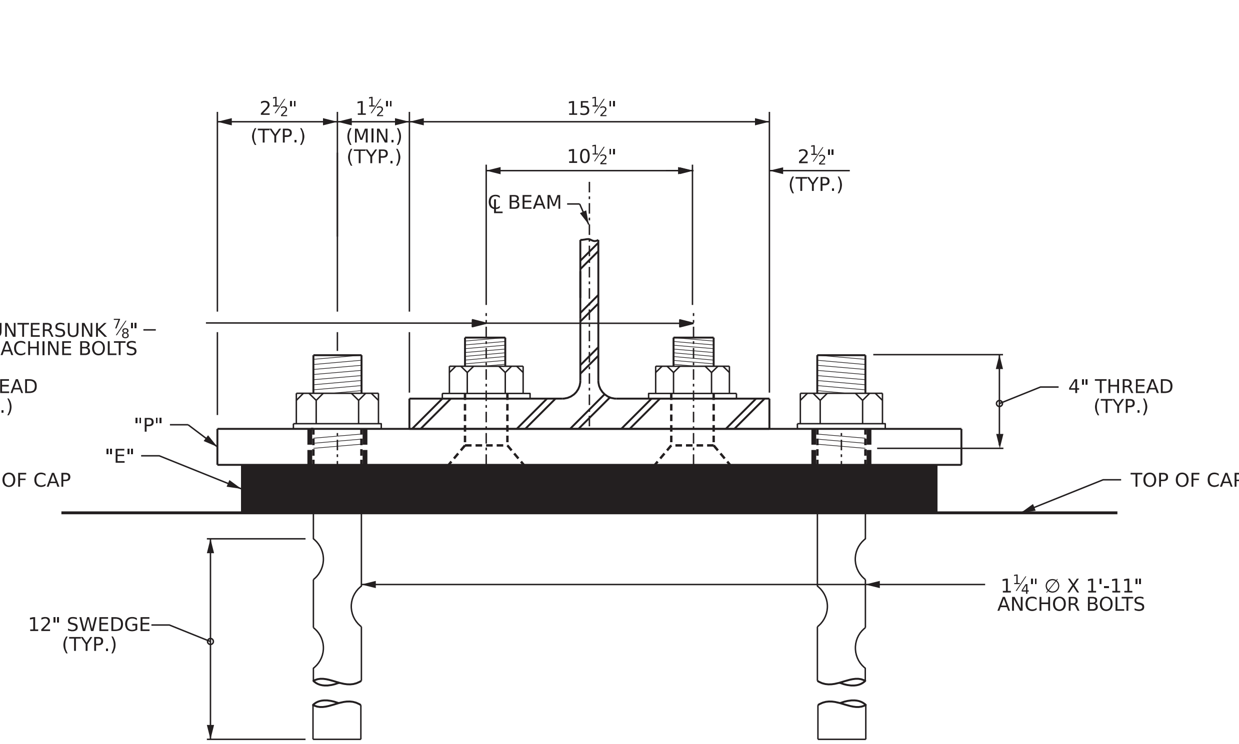
8/26/21



END VIEW

WELDED



END VIEW

OPTIONAL BOLTED

NOTES

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT ALL SUPPORTS, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS, AND WASHERS. SHOP INSPECTION IS REQUIRED.

AT THE APPROVAL OF THE ENGINEER, SOLE PLATES AT THE EXPANSION END MAY BE FIELD WELDED.

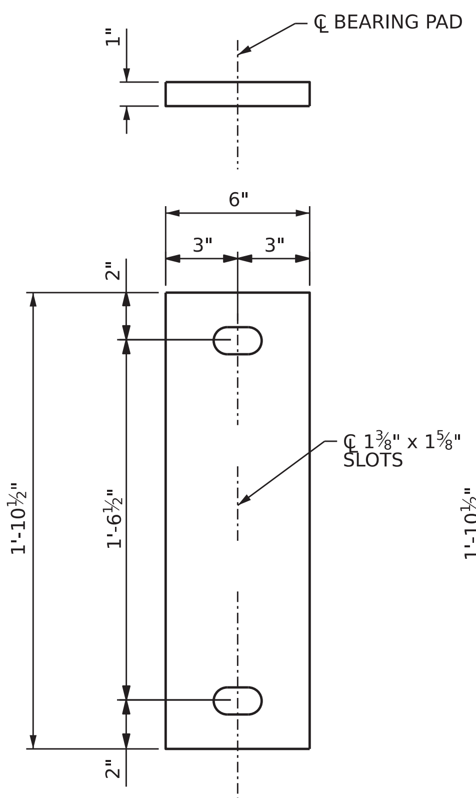
WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300° F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

AT NO ADDITIONAL COST TO THE DEPARTMENT, THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CAST-IN-PLACE ANCHORS. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ANCHOR BOLT IS 30 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

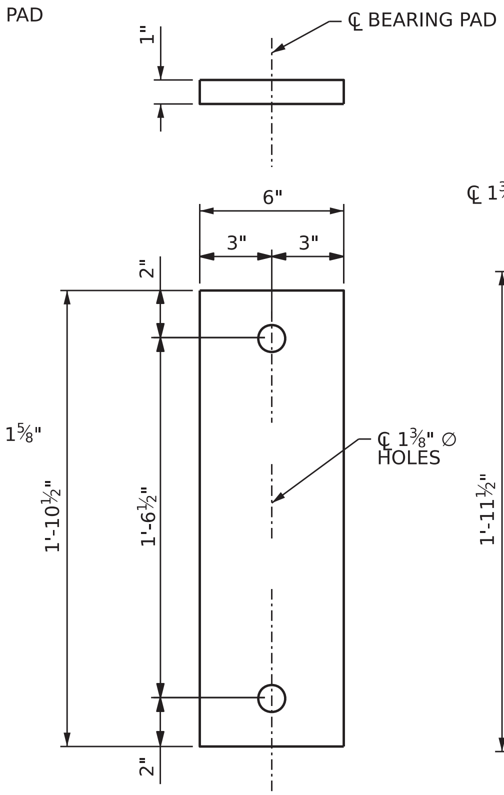
ADHESIVELY ANCHORED ANCHOR BOLTS SHALL BE THREADED FULL LENGTH.

AT THE APPROVAL OF THE ENGINEER, THE OPTIONAL BOLTED SOLE PLATE MAY BE USED AT NO ADDITIONAL COST TO THE DEPARTMENT.



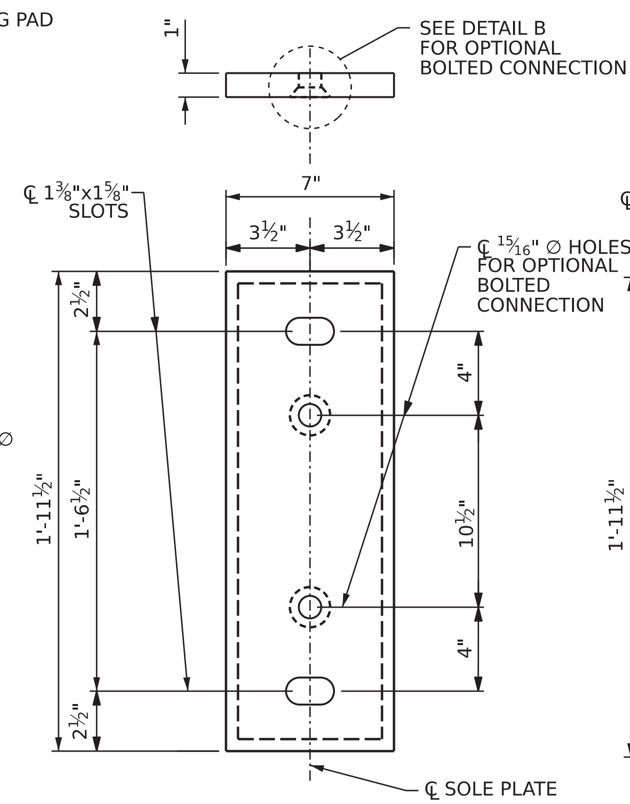
E1 ELASTOMERIC BEARING DETAILS

(6 REQ'D)
EXPANSION



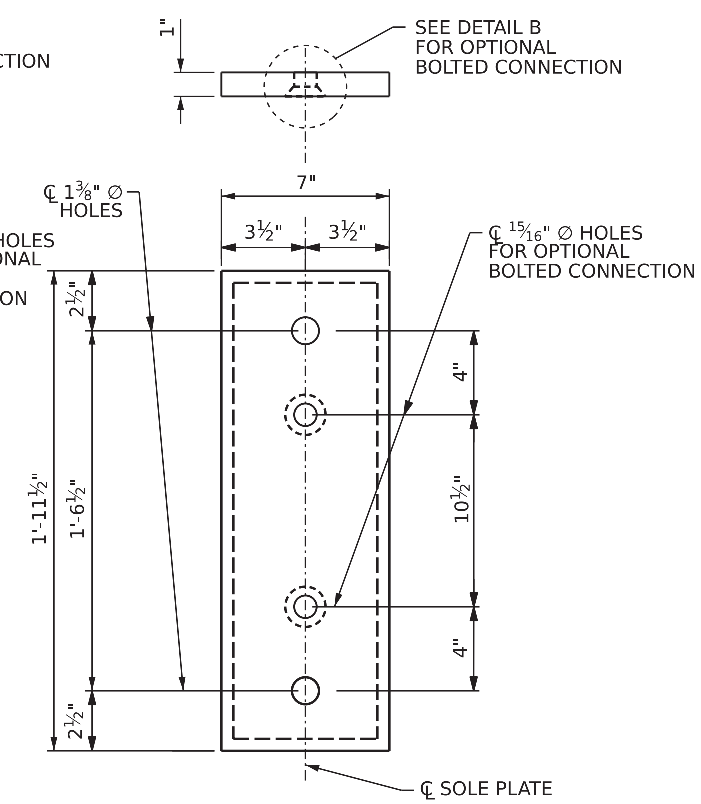
E2 ELASTOMERIC BEARING DETAILS

(6 REQ'D)
FIXED



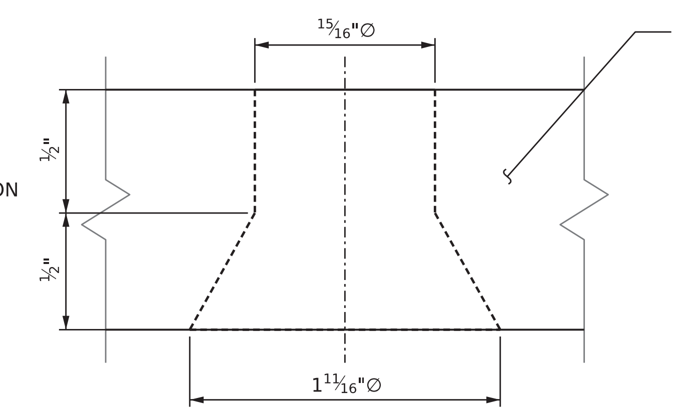
P1 SOLE PLATE DETAILS

(6 REQ'D)
EXPANSION



P2 SOLE PLATE DETAILS

(6 REQ'D)
FIXED



DETAIL B

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BEARING DETAILS TYPE V

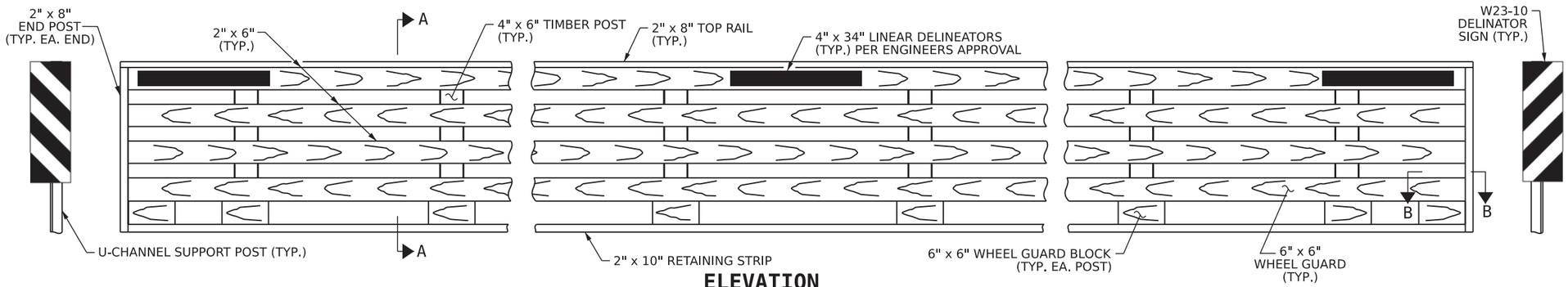
NORTH CAROLINA PROFESSIONAL ENGINEER AL 886 YING TAN
Signed by: Ying Tan

ASSEMBLED BY: M. CAREY	DATE : 11/2025
CHECKED BY : Y. TAN	DATE : 11/2025
DRAWN BY : GA	10/2024
CHECKED BY : JDH	11/2024

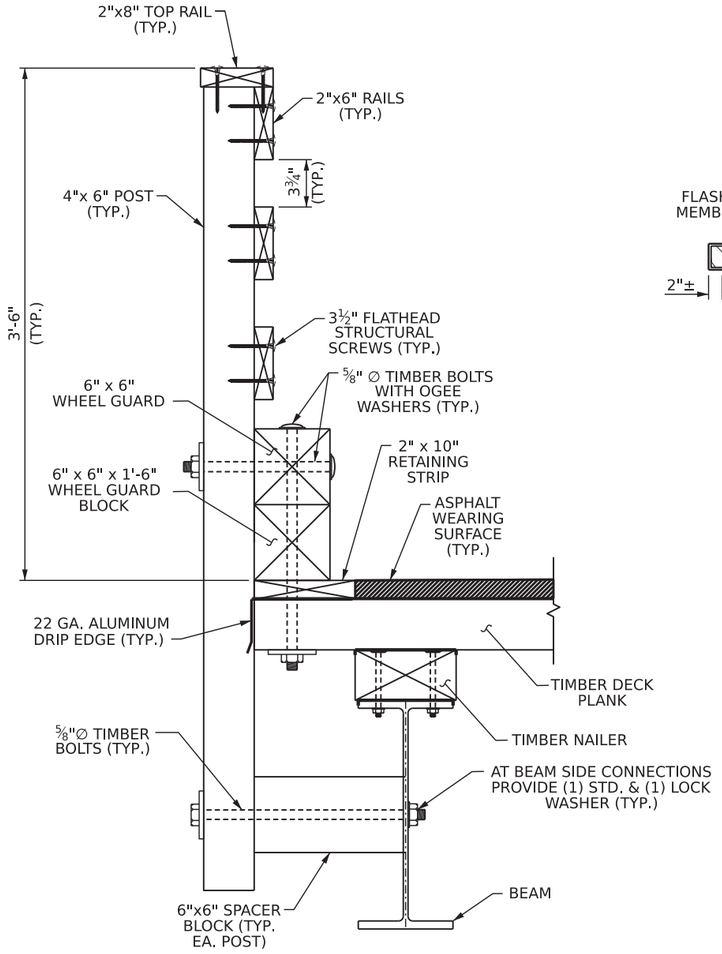
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9
1			3			TOTAL SHEETS
2			4			15

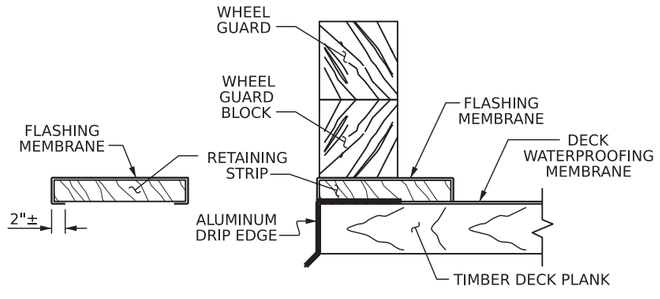
8/26/21



ELEVATION

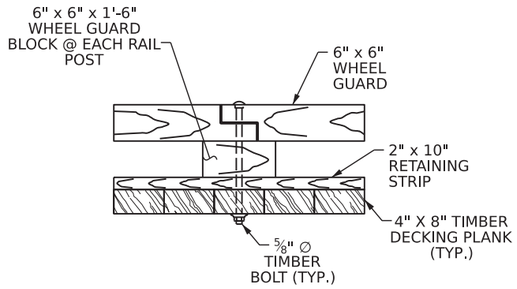


SECTION A-A

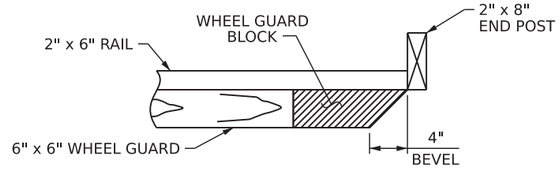


RETAINING STRIP DETAILS

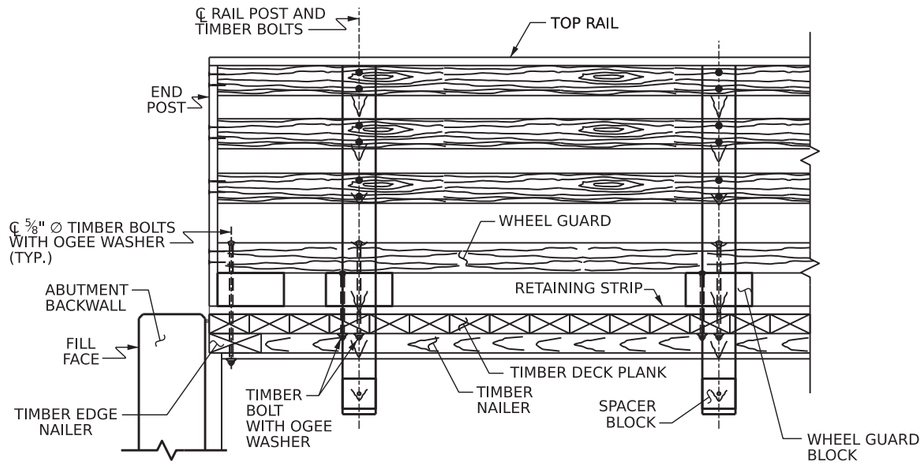
POST AND BOLTS NOT SHOWN FOR CLARITY



WHEEL GUARD SPLICE DETAIL



VIEW B-B



RAIL DETAIL AT ABUTMENTS

BILL OF MATERIAL FOR ONE RAIL 50 FT (2 REQ.D)

TREATED LUMBER

ITEM	SIZE	LIN. FT.
RAILS	2"x 6"	150.00
RAIL POSTS	4"x6"	66.00
TOP RAIL	2"x8"	50.50
WHEEL GUARD	6"x6"	50.50
WHEEL GUARD BLOCK	6"x6"	16.50
RETAINER STRIP	2"x10"	50.50
END POSTS	2"x8"	12.00
SPACER BLOCK	6"x6"	11.00

FLASHING MEMBRANE

ITEM	SIZE	LIN. FT.
MEMBRANE FOR RETAINER STRIP	1'-6"	50.50

HARDWARE

ITEM	Nos.	SIZE	LBS.
TIMBER BOLTS (WHEEL GUARD)	11	⅝" ∅	15.40
TIMBER BOLTS (SPACE BLOCK)	11	⅝" ∅	15.40
TIMBER BOLTS (RAIL)	11	⅝" ∅	25.30
HEAVY HEX NUTS	33	⅝" ∅	3.96
FLATHEAD STR. SCREWS	256	3½"	3.00
STANDARD WASHER	11	⅝" ∅	1.00
LOCK WASHER	11	⅝" ∅	1.00
OGEE WASHERS	22	⅝" ∅	13.64

HARDWARE FOR CONNECTIONS_____ APPROX. 78.70 LBS.

PAY LENGTH = 50.5 LIN. FT.

NOTES

THE TIMBER BRIDGE RAIL SYSTEM SHALL NOT BE ATTACHED TO THE TIMBER BRIDGE DECK SYSTEM PRIOR TO THE TIMBER DECK WATERPROOFING MEMBRANE BEING INSTALLED.

BRIDGE RAILS SHALL BE CONTINUOUS FROM END POST TO END POST WITH NO GAPS. RAIL LUMBER LENGTHS SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

TREAT ALL DRILLED OR NEWLY EXPOSED HOLES IN TIMBER MEMBERS BY PUMPING WITH BITUMINOUS ASPHALT-BASED ROOFING CEMENT, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING HARDWARE.

SEE PLAN OF SPAN SHEET FOR NUMBER OF POSTS AND POST SPACING.

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

NORTH CAROLINA PROFESSIONAL SEAL 86 ENGINEER — Signed by: Yiming Tan — 1/30/2026

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

TIMBER BRIDGE RAIL SYSTEM

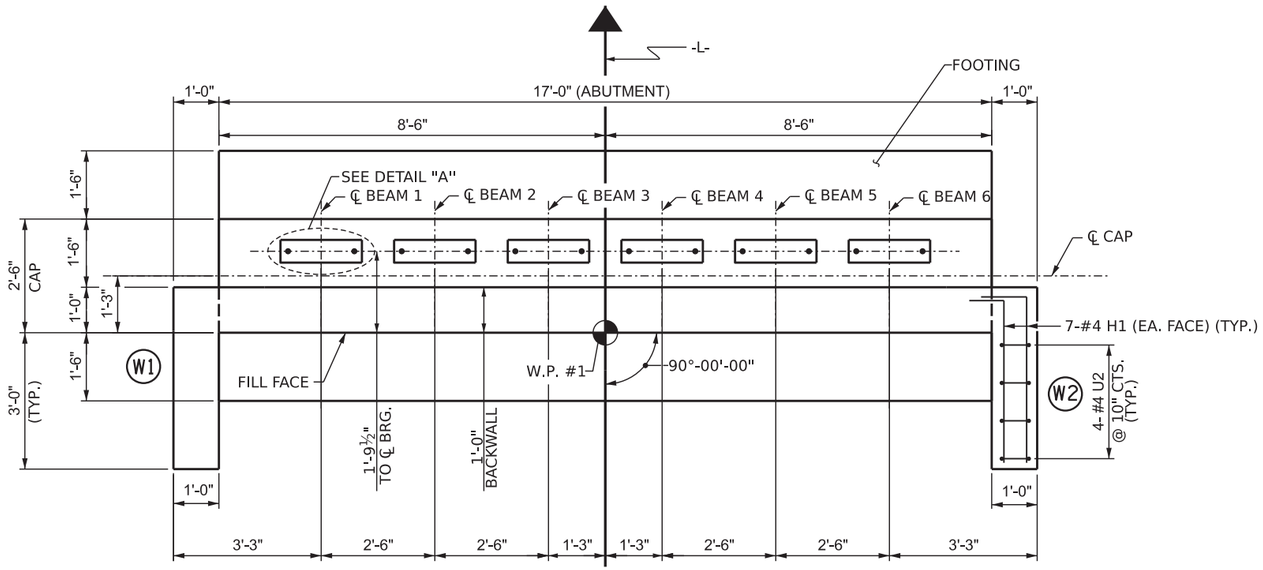
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S10
1			3			TOTAL SHEETS
2			4			15

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY:	M. CAREY	DATE : 11/2025
CHECKED BY :	Y. TAN	DATE : 11/2025
DRAWN BY :	BNB 4/24	
CHECKED BY :	JDH 10/24	

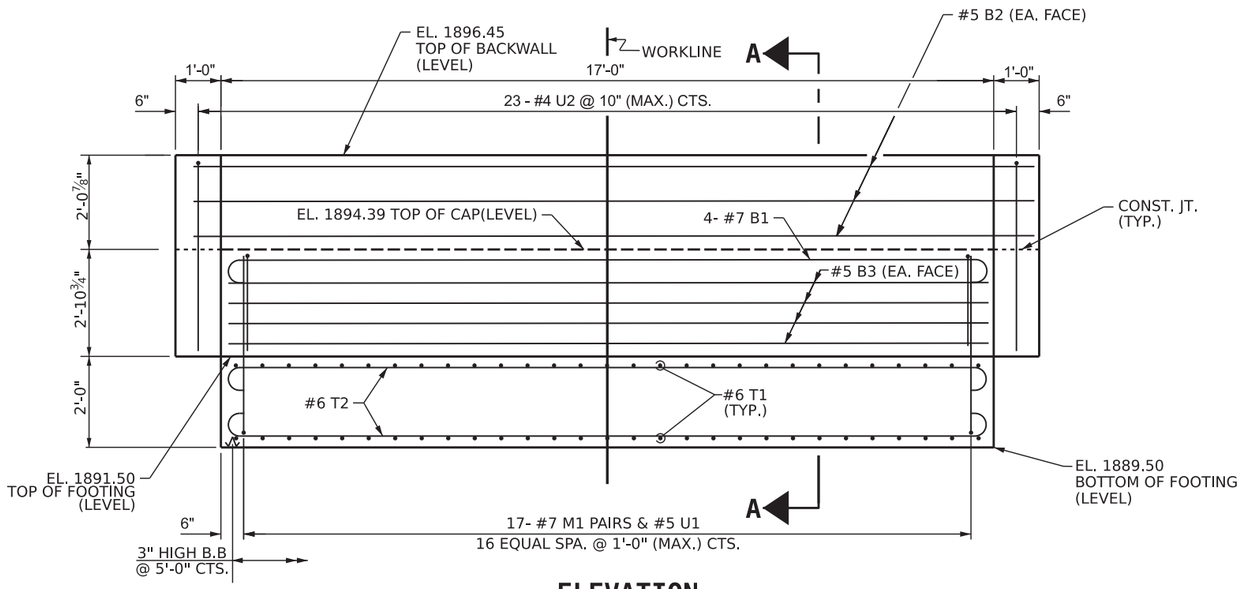
1/30/2026
c:\users\todd.garrison\appdata\local\bentley\projectwise\workingdir\mb-us-pw.bentley.com_mb-us-pw-07\todd.garrison@mbakerintl.com\dms58093\401_019_DF18313.2059016_PR_SMU_TR_010_580141.dgn
Todd.Garrison

STD. TB_BRS



PLAN

(FOR FOOTING DIMENSIONS, SEE SHEET 2 OF 2)

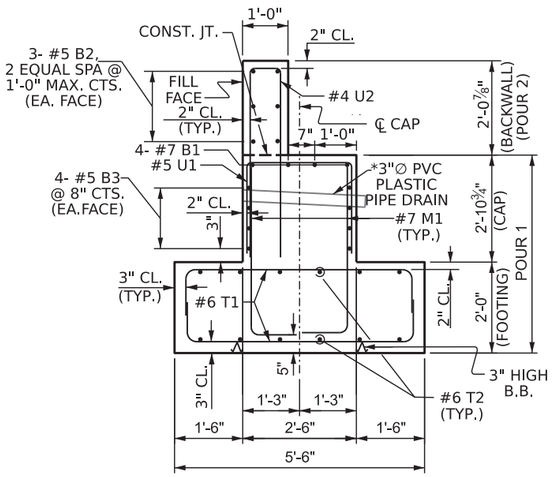


ELEVATION

(FOR FOOTING DIMENSIONS SEE SHEET 2 OF 2)

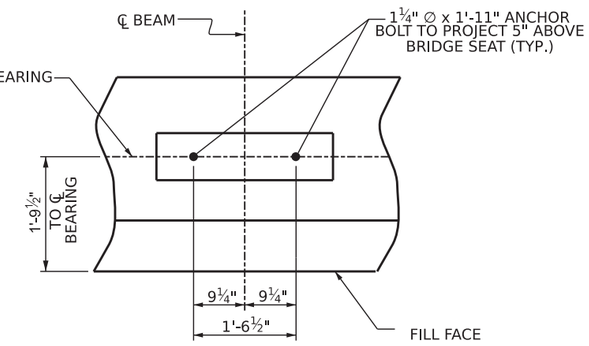
NOTES

EMBED FOOTING A MINIMUM OF 6" INTO ROCK.



SECTION A-A

*FOR PIPE DRAIN DETAILS, SEE SHEET 2 OF 2.



DETAIL "A"

(FOR BEARING TYPE SEE BEARING SHEET)

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 86 ENGINEER
Signed by: Ying Tan
E76731-B5EE447...
1/30/2026

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

ABUTMENT 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11
1			3			TOTAL SHEETS
2			4			15

DRAWN BY : R. GENTRY DATE : 12/2025
CHECKED BY : Y. TAN DATE : 12/2025
DESIGN ENGINEER OF RECORD: Y. TAN DATE : 12/2025

1/30/2026
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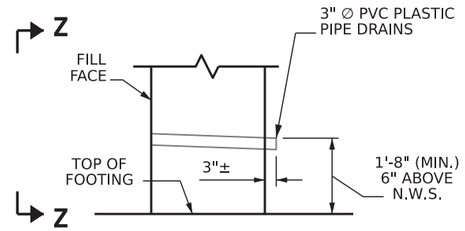
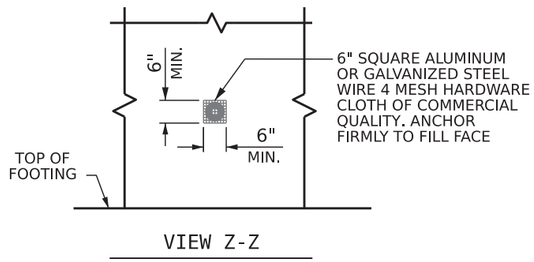
Todd.Garrison



SECTION THRU ABUTMENT



VIEW Z-Z

PIPE DRAIN DETAILS

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE PVC PLASTIC PIPE DRAINS, HARDWARE CLOTH AND FASTNERS. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

NOTES

ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

U1 STIRRUPS MAY BE SHIFTED AS NECESSARY TO CLEAR "ANCHOR BOLTS."

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

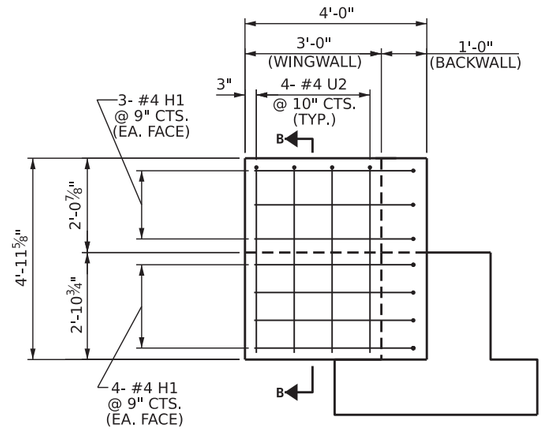
THE TOP SURFACE AREAS OF THE ABUTMENT SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

KEY SPREAD FOOTINGS AT THE ABUTMENT AT LEAST 6" INTO ROCK OR WEATHERED ROCK WITH A MINIMUM THICKNESS AS SHOWN ON THE PLANS.

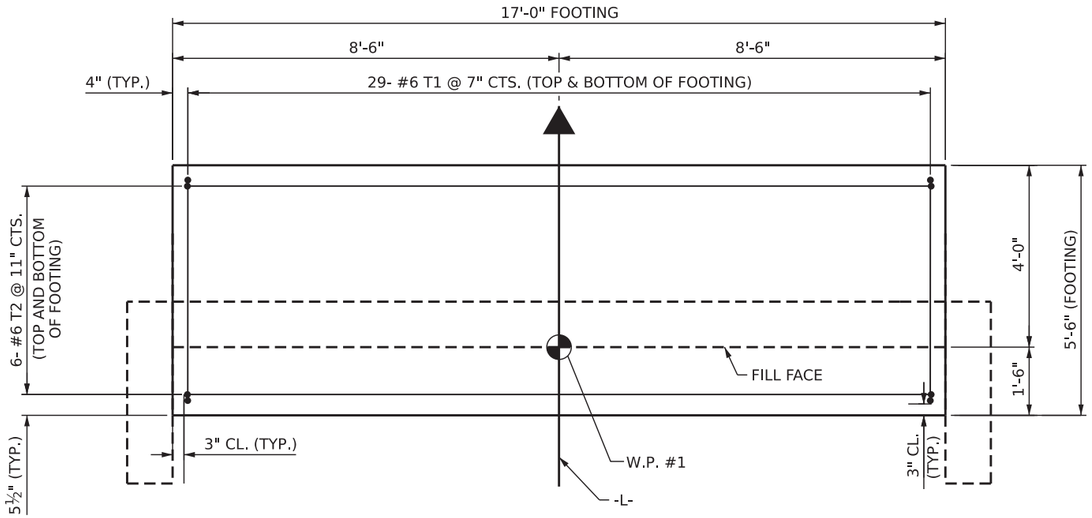
WITH APPROVAL FROM THE ENGINEER, THE CONTRACTOR MAY OPT TO USE #6 BARS DOWELED INTO ROCK AT A MINIMUM OF 18 INCHES AT 3'-0" CTS. STAGGERED IN ANY DIRECTION IN LIEU OF KEYING THE SPREAD FOOTING.

FOR "TEMPORARY DRAINAGE AT END BENT", SEE ABUTMENT 2 SHEET 2 OF 2.

THE 3"∅ PVC PLASTIC DRAIN PIPE SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM D1785, AND SHALL BE SLOTTED FOR PROPER DRAINAGE.

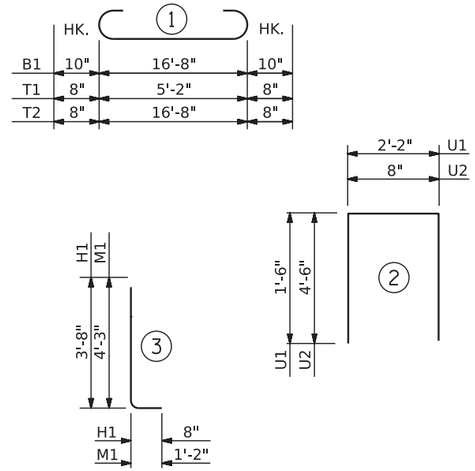


ELEVATION OF WING



PLAN OF FOOTING

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

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

IF STAGED CONSTRUCTION IS REQUIRED, USE THIS SPLICE TABLE.

BILL OF MATERIAL

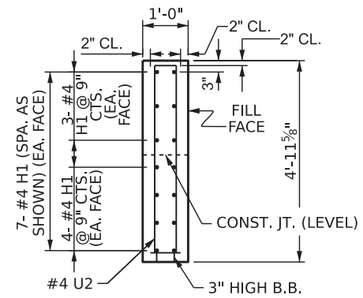
ABUTMENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#7	1	18'-4"	150
B2	6	#5	STR	18'-8"	117
B3	8	#5	STR	16'-8"	139
H1	28	#4	3	4'-4"	81
M1	34	#7	3	5'-5"	376
T1	58	#6	1	6'-6"	566
T2	12	#6	1	18'-0"	324
U1	17	#5	2	5'-2"	92
U2	31	#4	2	9'-8"	200

REINFORCING STEEL 2,045 LBS.

CLASS A CONCRETE BREAKDOWN

POUR 1 FOOTING, CAP AND LOWER PART OF WINGWALLS	12.3 C.Y.
POUR 2 BACKWALL AND UPPER PART OF WINGWALLS	1.9 C.Y.
TOTAL CLASS A CONCRETE	14.2 C.Y.



SECTION B-B

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

ABUTMENT 1

DRAWN BY : R. GENTRY DATE : 12/2025
CHECKED BY : A.H. SHARPE DATE : 12/2025
DESIGN ENGINEER OF RECORD: Y. TAN DATE : 12/2025

1/30/2026
c:\users\todd.garrison\appdata\local\bentley\projectwise\workingdir\mb-us-pw.bentley.com_mb-us-pw-07\todd.garrison@mbakerintl.com\dms58093\401_023_DF18313.2059016.PR_SMU_ABI_012_580141.dgn
Todd.Garrison

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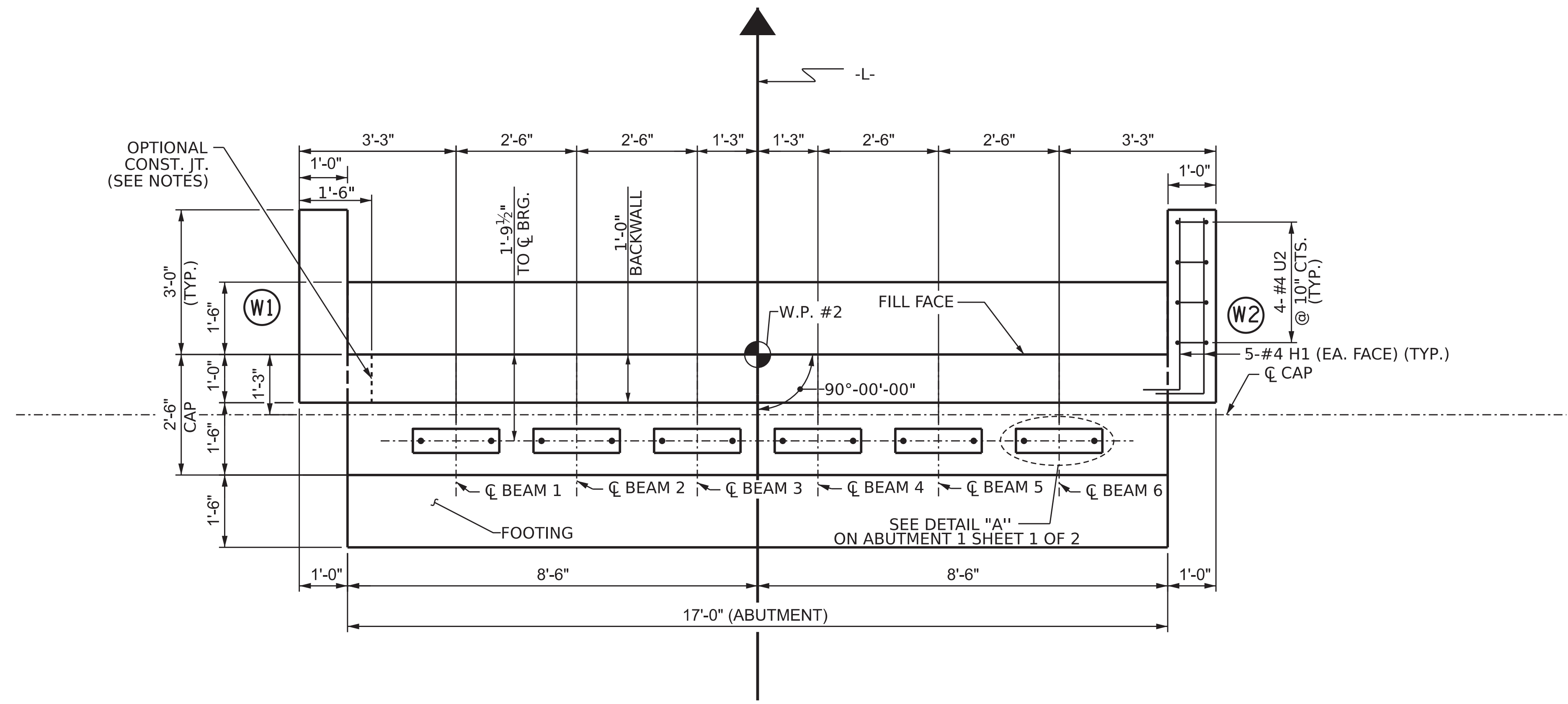
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S12
1			3			TOTAL SHEETS
2			4			15

NOTES

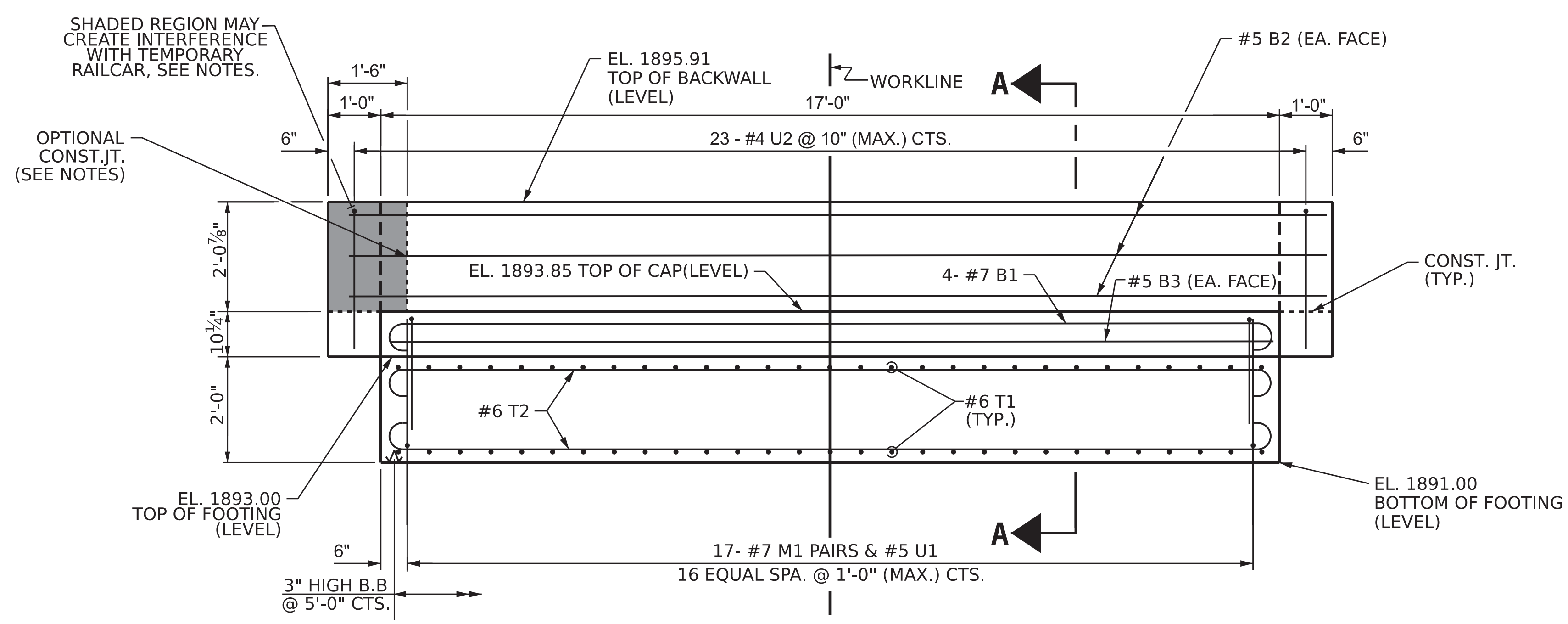
IF THE WINGWALL INTERFERES WITH THE TEMPORARY RAILCAR AN OPTIONAL CONSTRUCTION JOINT MAY BE PLACED IN THE DESIGNATED LOCATION IN THE BACKWALL.

EMBED FOOTING A MINIMUM OF 6" INTO ROCK.



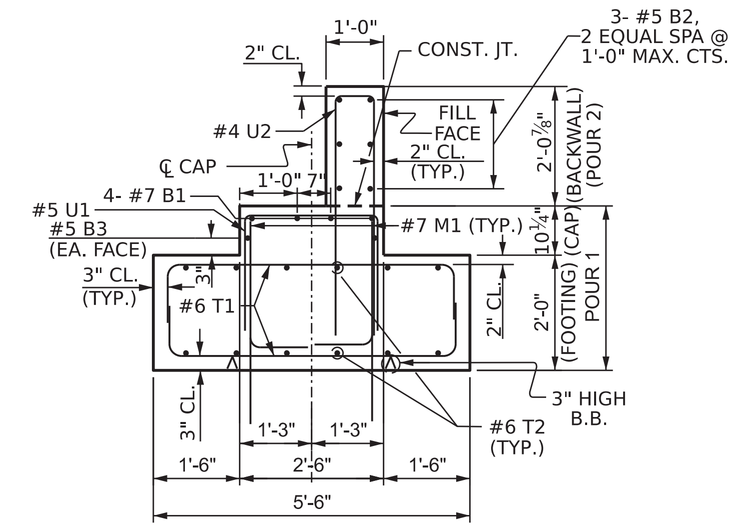
PLAN

(FOR FOOTING DIMENSIONS, SEE SHEET 2 OF 2)



ELEVATION

(FOR FOOTING DIMENSIONS SEE SHEET 2 OF 2)



SECTION A-A

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

ABUTMENT 2

NORTH CAROLINA PROFESSIONAL ENGINEER AL 886 YING TAN
Signed by: Ying Tan
1/30/2026

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Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S13
1				3				TOTAL SHEETS
2				4				15

DRAWN BY : R. GENTRY DATE : 12/2025
CHECKED BY : Y. TAN DATE : 12/2025
DESIGN ENGINEER OF RECORD: Y. TAN DATE : 12/2025

1/30/2026
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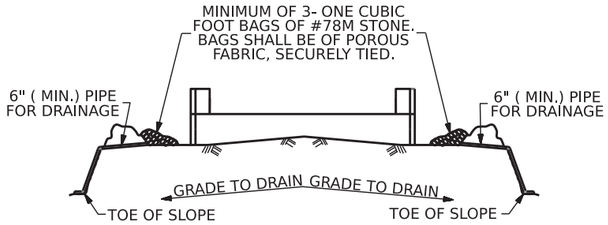
Todd.Garrison



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

NOTES

ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

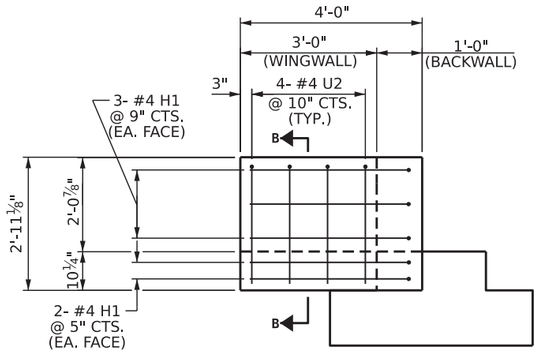
U1 STIRRUPS MAY BE SHIFTED AS NECESSARY TO CLEAR "ANCHOR BOLTS."

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

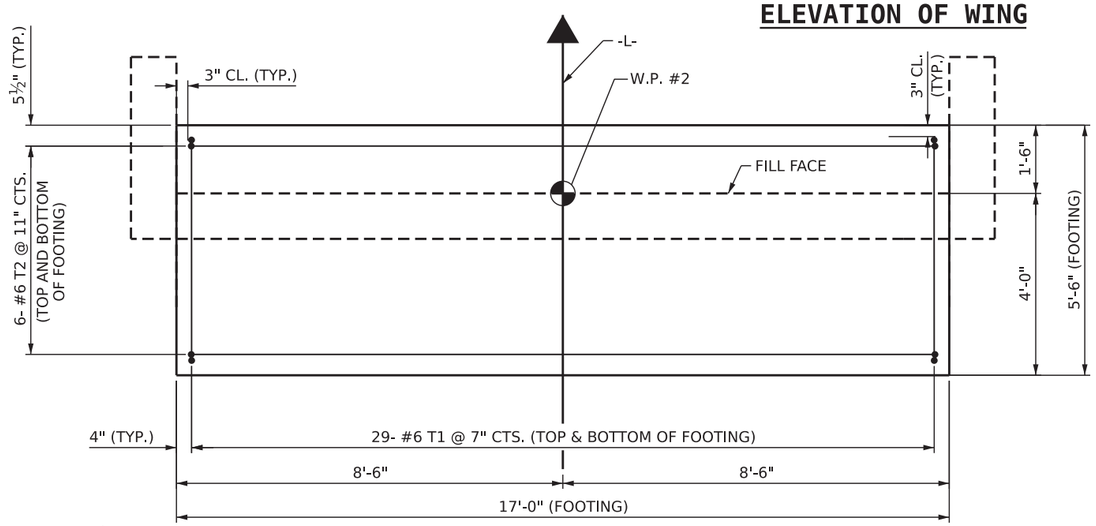
THE TOP SURFACE AREAS OF THE ABUTMENT SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

KEY SPREAD FOOTINGS AT THE ABUTMENT AT LEAST 6" INTO ROCK OR WEATHERED ROCK WITH A MINIMUM THICKNESS AS SHOWN ON THE PLANS.

WITH APPROVAL FROM THE ENGINEER, THE CONTRACTOR MAY OPT TO USE #6 BARS DOWELED INTO ROCK AT A MINIMUM OF 18 INCHES AT 3'-0" CTS. STAGGERED IN ANY DIRECTION IN LIEU OF KEYING THE SPREAD FOOTING.

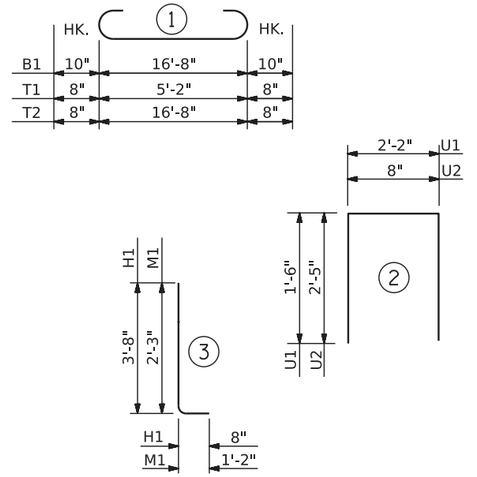


ELEVATION OF WING



PLAN OF FOOTING

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

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

IF STAGED CONSTRUCTION IS REQUIRED, USE THIS SPLICE TABLE.

BILL OF MATERIAL

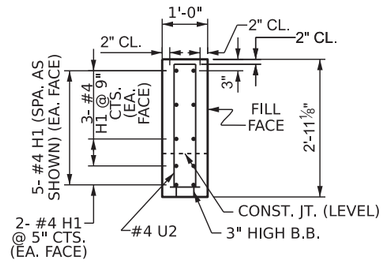
ABUTMENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#7	1	18'-4"	150
B2	6	#5	STR	18'-8"	117
B3	2	#5	STR	16'-8"	35
H1	20	#4	3	4'-4"	58
M1	34	#7	3	3'-5"	237
T1	58	#6	1	6'-6"	566
T2	12	#6	1	18'-0"	324
U1	17	#5	2	5'-2"	92
U2	31	#4	2	5'-6"	114

REINFORCING STEEL 1,693 LBS.

CLASS A CONCRETE BREAKDOWN

POUR 1 FOOTING, CAP AND LOWER PART OF WINGWALLS	8.5 C.Y.
POUR 2 BACKWALL AND UPPER PART OF WINGWALLS	1.8 C.Y.
TOTAL CLASS A CONCRETE	10.3 C.Y.



SECTION B-B

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

ABUTMENT 2

DRAWN BY : R. GENTRY DATE : 12/2025
CHECKED BY : A.H. SHARPE DATE : 12/2025
DESIGN ENGINEER OF RECORD: Y. TAN DATE : 12/2025

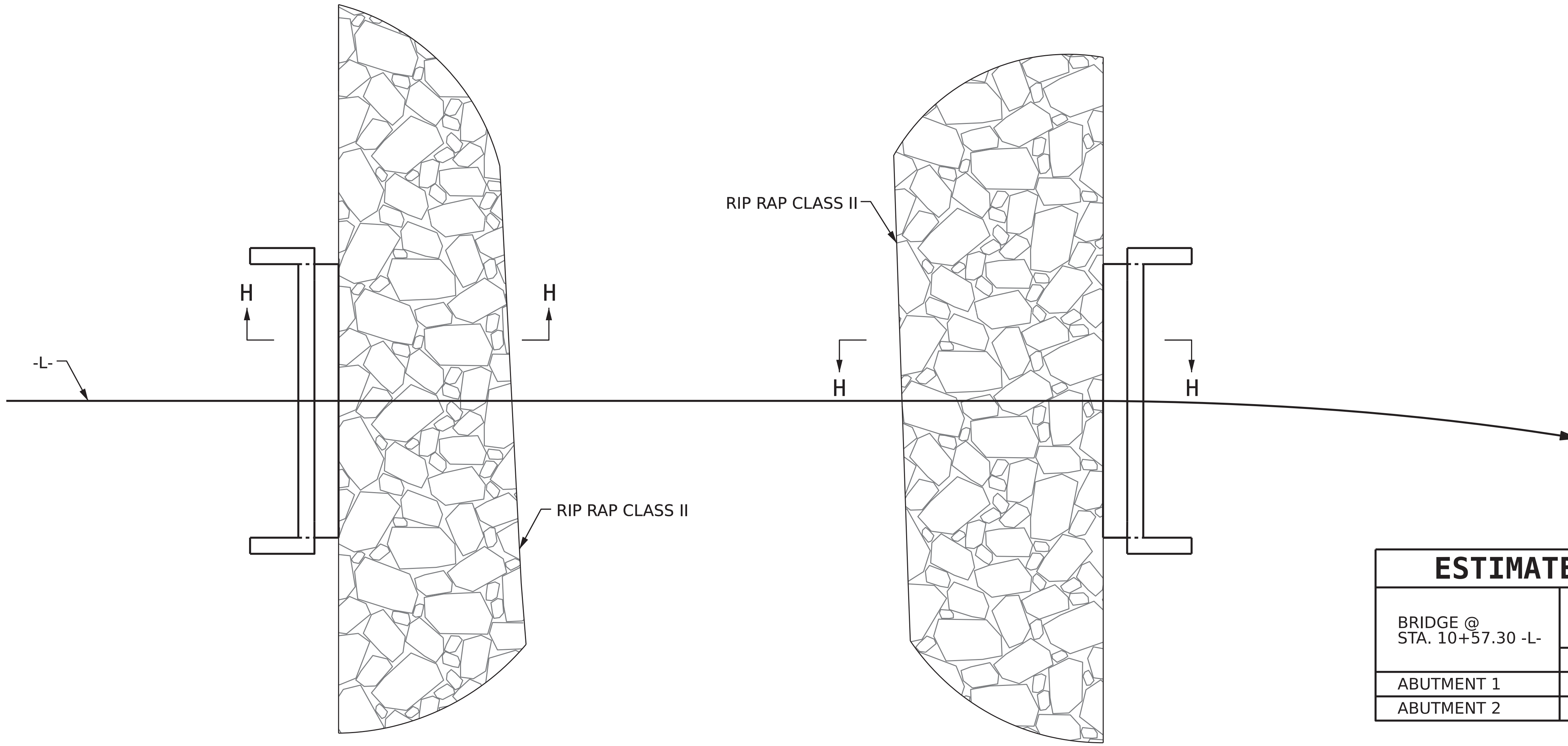
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S14
1			3			TOTAL SHEETS
2			4			15

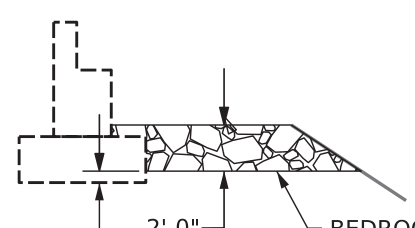
1/30/2026
c:\users\todd.garrison\appdata\local\bentley\projectwise\workingdir\mb-us-pw.bentley.com_mb-us-pw-07\todd.garrison@mbakerintl.com\dms58093\401_027_DF18313.2059016.PR_SMU_AB2_014_580141.dgn
Todd.Garrison

8/26/21



PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 10+57.30 -L-	RIP RAP CLASS II (2' 0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
ABUTMENT 1	51	56
ABUTMENT 2	52	58



SECTION H-H

PROJECT NO. DF18313.2059016.PR

MCDOWELL COUNTY

STATION: 10+57.30 -L-

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER

Signed by: Yang Tan

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S15
TOTAL SHEETS 15

DRAWN BY : R. GENTRY DATE : 12/2025
CHECKED BY : A. H. SHARPE DATE : 12/2025
DESIGN ENGINEER OF RECORD: Y. TAN DATE : 12/2025

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

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

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" 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.