

OFF SYSTEM BRIDGE REPLACEMENT PROGRAM

COUNTY OF GASCONADE

PROJECT NO. BRO-R037(001)

BRIDGE NO. 01900101



COUNTY OFFICIALS

PRESIDING COMMISSIONER: TIM SCHULTE
 ASSOCIATE COMMISSIONER: JIM HOLLAND
 ASSOCIATE COMMISSIONER: RON HARDECKE
 COUNTY CLERK: LESA LIETZOW

SUBMITTED & RECOMMENDED

Tim Schulte 2-13-25
 PRESIDING COMMISSIONER DATE

Lesia Lietzow 2-13-25
 COUNTY CLERK DATE



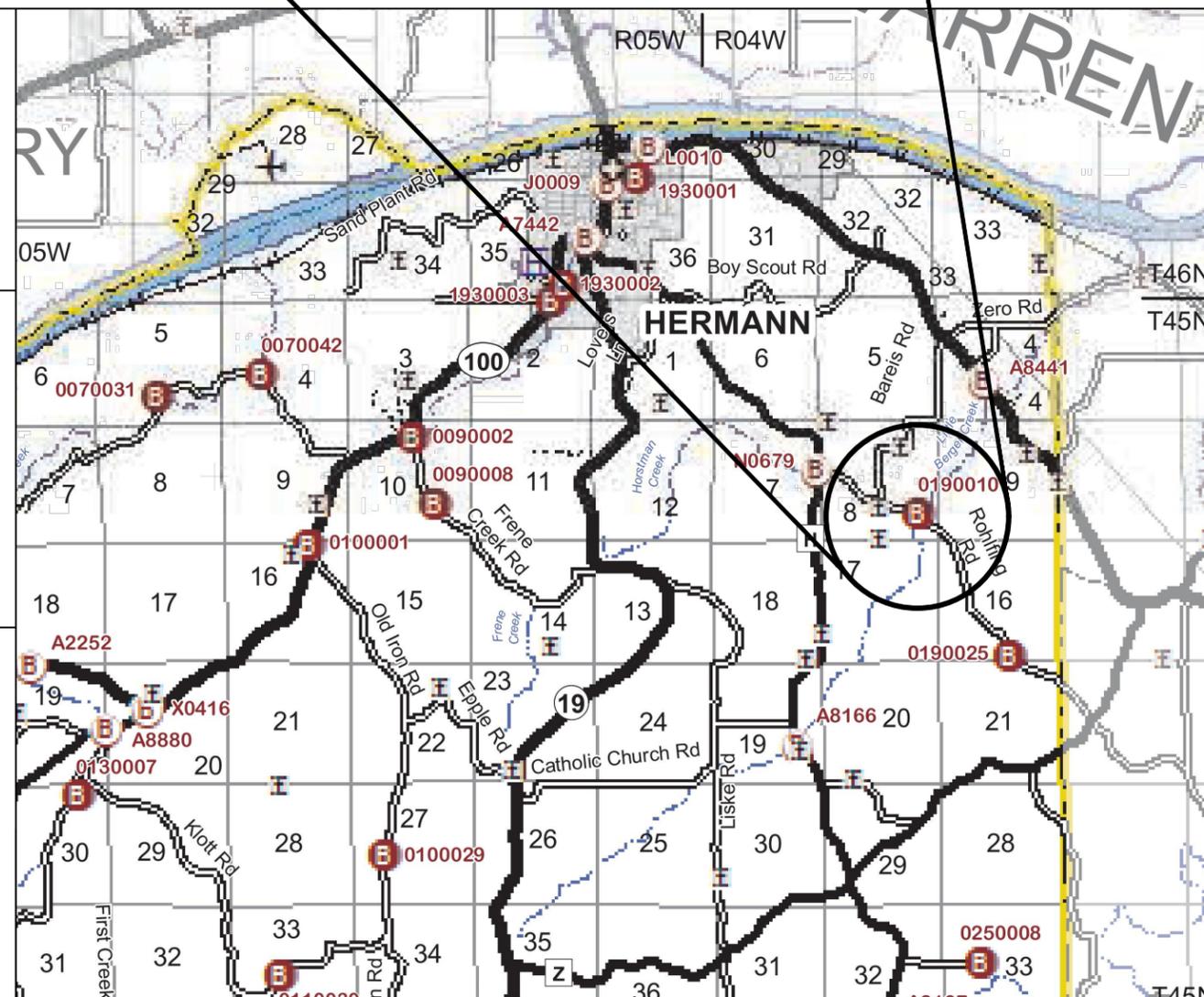
KEY MAP
 SHOWING LOCATION OF COUNTY

SECTION 8, TOWNSHIP 45 NORTH, RANGE 04 WEST
 LATITUDE 38.661465, LONGITUDE -91.390343

CART ROUTE NO. 019 - ROHLFING RD.
 OVER LITTLE BERGER CREEK

24' GRADED EARTH, BRIDGE &
 CRUSHED STONE SURFACE

IMPROVEMENTS LENGTH: 0.15 MI.



LOCATION MAP - N.T.S.

DESIGN DESIGNATION

A.D.T.-2022 = 40 A.D.T.-2042 = 48

D = 50% V = 35 mph T = 10%

FUNCTIONAL CLASSIFICATION = RURAL LOCAL

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2-14-2025



MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014893
 SURVEYING #S-2014015235

COVER SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC

804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

DATE: MARCH 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE

JOB NO. 23H3587

1

SHEET 1 OF 46

NO.	DESCRIPTION	DATE	APPR

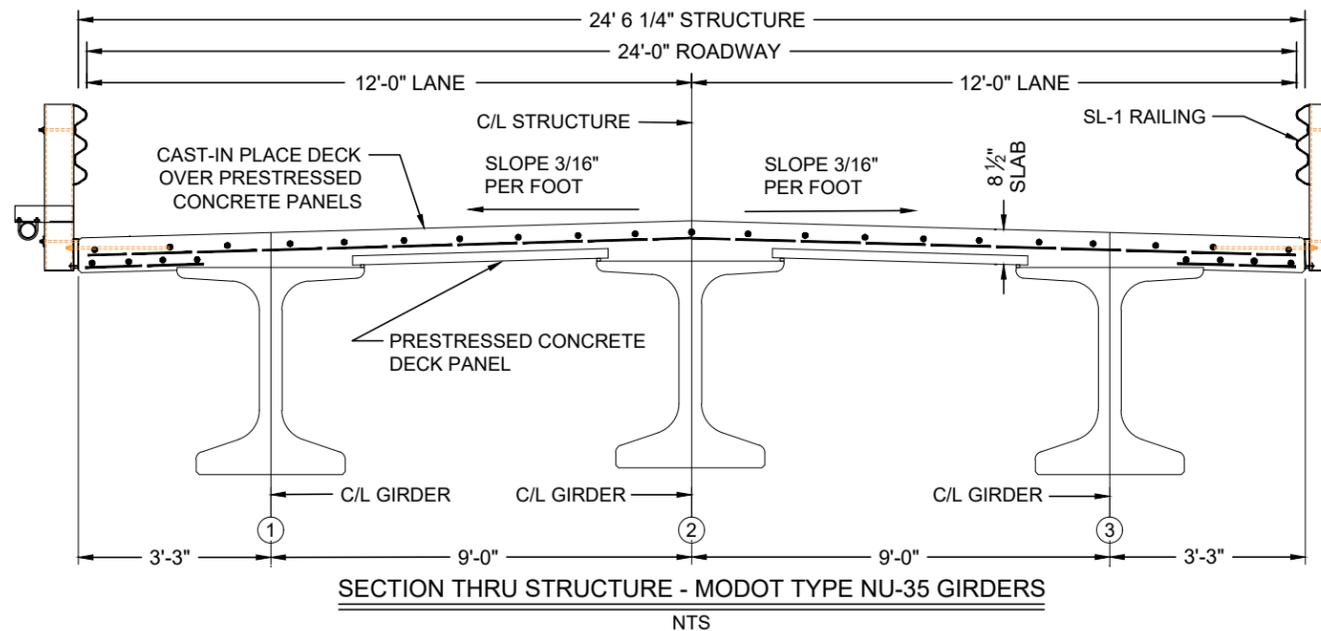
WORK TO BE PERFORMED BY CONTRACTOR			
ITEM	DESCRIPTION - ROADWAY ITEMS	UNITS	EST. QTY.
201	CLEARING AND GRUBBING	ACRE	1.9
202	REMOVAL OF IMPROVEMENTS	L.S.	1
203	UNCLASSIFIED EXCAVATION	C.Y.	618
203	EMBANKMENT IN PLACE	C.Y.	4,571
310	4" THICK LAYER ROADWAY AGGREGATE	S.Y.	2,474
606	MGS GUARDRAIL SYSTEM	L.F.	75
606	GUARDRAIL TRANSITION SECTION	EACH	4
606	ROUND NOSE END TERMINAL	EACH	1
606	MGS END ANCHOR	EACH	1
606/JSP	CRASHWORTHY END TERMINAL	EACH	3
607	TEMPORARY FENCE (3 STRAND ELECTRIFIED)	L.F.	1,483
607	FENCE (3 STRAND ELECTRIFIED)	L.F.	618
607	FENCE (5 STRAND BARBED WIRE)	L.F.	476
607	16' GATE	EACH	2
611.30	FURNISHING TYPE 2 ROCK BLANKET	C.Y.	1,496
611.30	PLACING TYPE 2 ROCK BLANKET	C.Y.	1,496
616	MOVABLE BARRICADES	EACH	4
616	CONSTRUCTION SIGNS	S.F.	45
616	CONSTRUCTION SIGN POSTS	L.F.	50
618	MOBILIZATION	L.S.	1
624	MODOT PERM. EROSION CONTROL FABRIC	S.Y.	2,362
627	CONTRACTOR SURVEYING & STAKING	L.S.	1
806	MULCHING	ACRE	1.45
805/JSP	SEEDING	ACRE	1.45
806	SILT FENCE	L.F.	1,000
806	SEDIMENT REMOVAL	C.Y.	10
1020	12" C.M.P. 14 GA. ALUMINIZED	L.F.	20
1020	18" C.M.P. 14 GA. ALUMINIZED	L.F.	82
1020	21" C.M.P. 14 GA. ALUMINIZED	L.F.	120
JSP	STORM WATER POLLUTION PREVENTION PLAN (S.W.P.P.P.)	L.S.	1
BRIDGE ITEMS		UNITS	EST. QTY.
206	EXCAVATION FOR STRUCTURE	L.S.	1
216	REMOVAL OF BRIDGE	L.S.	1
501	CLASS B-1 SUBSTRUCTURE CONCRETE	C.Y.	101
501	CLASS B-2 SUPERSTRUCTURE CONCRETE	C.Y.	165
701	DRILLED SHAFTS (3'-0")	L.F.	99
701	ROCK SOCKETS (2'-6")	L.F.	99
701	FOUNDATION INSPECTION HOLES	L.F.	159
701	SONIC LOGGING TESTING	EACH	6
701	SUPPLEMENTAL TELEVISION CAMERA INSPECTION	EACH	6
702/JSP	HP12x53 PILE (GALVANIZED FULL LENGTH)	L.F.	260
702	PILE POINTS	EACH	8
705	PRESTRESSED CONCRETE DECK PANELS	S.Y.	210
705	PRESTRESSED CONC. NU 35 GIRDERS SPAN 1-2	EACH	3
705	PRESTRESSED CONC. NU 35 GIRDERS SPAN 2-3	EACH	3
705	PRESTRESSED CONC. NU 35 GIRDERS SPAN 3-4	EACH	3
706	REINFORCING STEEL	LBS.	64,554
713	SL-1 RAILING	L.F.	384
715	VERTICAL DRAIN AT END BENTS	EACH	2
716	PLAIN NEOPRENE BEARING PADS (1/2")	EACH	18

* THESE ITEMS REQUIRE CERTIFICATION/SHOP DRAWINGS/SUBMITTAL.

HYDROLOGIC DATA		
EXISTING BRIDGE DECK ELEV.	FT.	527.50
DRAINAGE AREA	SQ. MI.	14.7
DESIGN FREQUENCY	YEARS	25
DESIGN DISCHARGE	CFS.	4,760
DESIGN HIGH WATER AT THE STRUCTURE	FT.	520.59
LOW ELEVATION OF SUPERSTRUCTURE	FT.	522.91
100 YEAR DISCHARGE	CFS.	6,490
100 YEAR HIGH WATER ELEVATION AT THE STRUCTURE	FT.	521.44

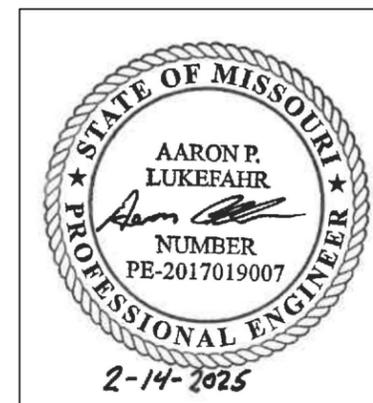
FOUNDATION DATA TABLE					
BENT NO.		1	2	3	4
NUMBER OF HP12x53 PILING	EACH	4			4
APPROXIMATE LENGTH	FT.	32			33
DESIGN BEARING	TONS	60			60
MINIMUM TIP ELEVATION	FT.	510.00			509.00
ESTIMATED TIP ELEVATION	FT.	489.41			488.41
CUT OFF ELEVATION	FT.	521.41			521.41
MINIMUM HAMMER ENERGY	FT. LBS.	13,500			13,500
ROCK SOCKETS	FOUNDATION MATERIAL	DOLOMITE/SANDSTONE			
	TOP OF ROCK	FT.	497.50	497.50	
	ALLOWABLE SKIN FRICTION		4 KSF	4 KSF	

ALL PILES SHALL BE DRIVEN TO PRACTICAL REFUSAL



GENERAL NOTES AND QUANTITIES SHEET
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 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693



DATE: DECEMBER 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE
 JOB NO. 23H3587

GENERAL NOTES

THE CONTRACTOR SHALL FOLLOW THE SPECIFICATIONS AS STATED IN THE "MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION 2024, THIRD EDITION, JANUARY 2025.
JOB SPECIAL PROVISIONS SHALL PREVAIL OVER GENERAL SPECIAL PROVISIONS WHENEVER IN CONFLICT THEREWITH.
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 2" UNLESS SHOWN OTHERWISE.
USE WRITTEN DIMENSIONS WHEN PRESENT. IF NO DIMENSIONS ARE GIVEN CONSULT WITH ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DO NOT USE SCALED DIMENSIONS UNLESS A SCALE IS PROVIDED.
DIGITAL CAD FILES WILL NOT BE PROVIDED TO THE CONTRACTOR FOR SURVEYING AND STAKING.
MoDOT AND FHWA AY INSPECT THE PROJECT AT ANY TIME. THE CONTRACTOR SHALL ALLOW UNRESTRICTED ACCESS TO ALL PARTS OF THE PROJECT.
ALL VEGETATIVE MULCH SHALL BE STABILIZED WITH A MULCH OVERSPRAY PER 802.3.2, OR SHALL BE SUBSTITUTED WITH AN EROSION CONTROL BLANKET PER 806.90.

PROJECT NOTES

THIS PROJECT HAS BEEN GRANTED VARIOUS ENVIRONMENTAL PERMITS AND CLEARANCES. THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL PERMIT CONDITIONS.
THE CONTRACTOR SHALL REMOVE THE EXISTING BRIDGE AND PROPERLY DISPOSE OF IT EXCEPT AS SHOWN.
BEARINGS SHOWN ARE STATE PLANE BEARINGS, EAST ZONE.
THE CONTRACTOR SHALL PROVIDE ACCESS TO THE EXISTING BRIDGE OR A SUITABLE LOW WATER CROSSING FOR USE BY LOCAL LANDOWNER DURING CONSTRUCTION UNTIL THE NEW BRIDGE IS OPEN. LOW WATER CROSSINGS SHALL BE MAINTAINED AND SUITABLE FOR USE BY OFF ROAD PASSENGER VEHICLES AND FARM EQUIPMENT.

DESIGN SPECIFICATIONS

AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 17TH ED. - 2002 (SUBSTRUCTURE)
AASHTO LRFD SPECIFICATIONS-2012 (SUPER STRUCTURE)

DESIGN LOADING

HS20-44
SEISMIC PERFORMANCE CATEGORY A. SEISMIC ACCELERATION COEFFICIENT 0.075
EARTH 120 PCF, EQUIVALENT FLUID PRESSURE 30 PCF
25 PSF FUTURE WEARING SURFACE

SUPERSTRUCTURE

SIMPLY SUPPORTED NON-COMPOSITE FOR DEAD LOAD. CONTINUOUS COMPOSITE FOR LIVE LOAD AND SUPERIMPOSED DEAD LOADS.

LEAD PAINT WARNING:

PAINT ON THE EXISTING STRUCTURE HAS TESTED POSITIVE FOR LEAD PAINT CONCENTRATIONS HIGH ENOUGH TO BE CONSIDERED HAZARDOUS.

DRILLED SHAFT AND ROCK SOCKET NOTES

THE ELEVATIONS FOR ENCOUNTERING ROCK ARE ESTIMATED BASED ON THE GEOTECHNICAL REPORT FROM CROCKETT, WHICH IS PROVIDED IN THE JSP. IF THE FOUNDATION INSPECTION HOLES REVEAL THAT ROCK WILL BE ENCOUNTERED AT SIGNIFICANTLY DIFFERENT ELEVATIONS THEN THE ELEVATIONS FOR THE ROCK SOCKET AND DRILLED SHAFTS WILL BE ADJUSTED BY THE ENGINEER.
COST OF 2" STEEL ASTM A53 PIPE FOR SONIC TESTING SHALL BE INCLUDED WITH THE BID ITEM "SONIC LOGGING TESTING".
COST OF STEEL CASING SHALL BE INCLUDED IN BID ITEM "DRILLED SHAFTS (3'-0" DIA.)"
THE COST OF ANY EXCAVATION OR FILL REQUIRED TO REACH THE TOP OF THE DRILLED SHAFTS WILL BE CONSIDERED INCIDENTAL.

UTILITY CONTACT:

UNDERGROUND FIBER OPTIC
BRIGHTSPEED
CHRIS MUELLER
573-259-9564

MATERIAL NOTES

BRIDGE SUBSTRUCTURE CONCRETE: MODOT CLASS B-1
f_c= 4000 PSI MINIMUM
MAX. SLUMP= 4" (6" WITH WATER REDUCER)
AIR CONTENT= 5% MINIMUM
BRIDGE SUBSTRUCTURE CONCRETE (DRILLED SHAFTS): MODOT CLASS B-2 or MODOT CLASS MB-2
f_c= 4000 PSI MINIMUM
MAX. SLUMP= 8" (WITH WATER REDUCER)
MIN. SLUMP= 6" (WITH WATER REDUCER)
AIR CONTENT= 5% MINIMUM
BRIDGE SUPERSTRUCTURE CONCRETE: MODOT CLASS B-2 or MODOT CLASS MB-2
f_c= 4000 PSI MINIMUM
MAX. SLUMP= 3" CLASS B-2, 6" CLASS B-2 (WITH WATER REDUCER), 6" CLASS MB-2
AIR CONTENT= 5% MINIMUM
REINFORCING STEEL: f_y=60,000 PSI (GRADE 60)

BOLTS (NON-ANCHOR):

ASTM A325 WITH STANDARD SIZED HOLES UNLESS NOTED OTHERWISE. BOLTS, NUTS, AND WASHERS SHALL BE HOT DIP GALVANIZED ACCORDING TO AASHTO M232/ASTM A153 OR MECHANICALLY GALVANIZED PER ASTM B695, CLASS 55.

ANCHOR BOLTS (CAST-IN-PLACE):

ASTM A307. ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE HOT DIP GALVANIZED ACCORDING TO AASHTO M232/ASTM A153.

BEARING PADS:

BEARINGS SHALL BE PLAIN, 60 DUROMETER, NEOPRENE

PILING NOTES:

MINIMUM ENERGY REQUIREMENT OF HAMMER IS BASED ON PLAN LENGTH AND DESIGN BEARING VALUES OF THE PILING.

STEEL PILING:

H-PILING, ASTM A709 (GRADE 50) FY=50,000 PSI (GALVANIZED) PER AASHTO M111/ASTM A123

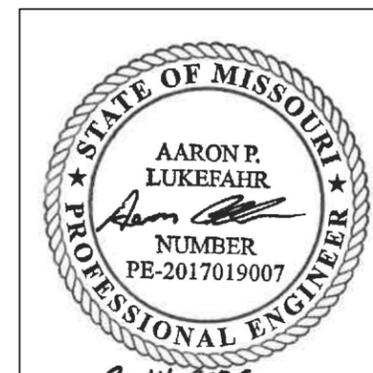
H-PILING SHALL CONSIST OF HP12X53 ROLLED STEEL SECTIONS.

PILING SHALL BE GALVANIZED FULL LENGTH.

THE CONTRACTOR SHALL INSTALL CAST STEEL DRIVING POINTS ON ALL PILES. THE CAST STEEL POINTS SHALL BE ASTM A27 65-35 OR BETTER. COSTS OF PROVIDING AND INSTALLING PILE TIP REINFORCEMENT SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR ITEM, "PILE POINTS". PILE POINTS NEED NOT BE GALVANIZED.

SPLICE LOCATIONS, IF NECESSARY, SHALL BE DETERMINED BY THE CONTRACTOR. SPLICES WITHIN THE GALVANIZED PORTION SHALL BE FIELD GALVANIZED. THE FINAL INSTALLED QUANTITY OF PILING WILL BE MEASURED FROM TIP TO CUTOFF.

(1) -- NO PAYMENT WILL BE MADE FOR SPLICES WITHIN THE PLANNED LENGTH OF THE PILING. NO PAYMENT WILL BE MADE FOR PILING DAMAGED DUE TO DRIVING OPERATIONS.

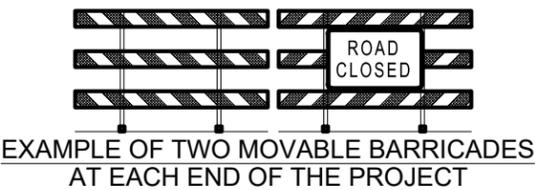
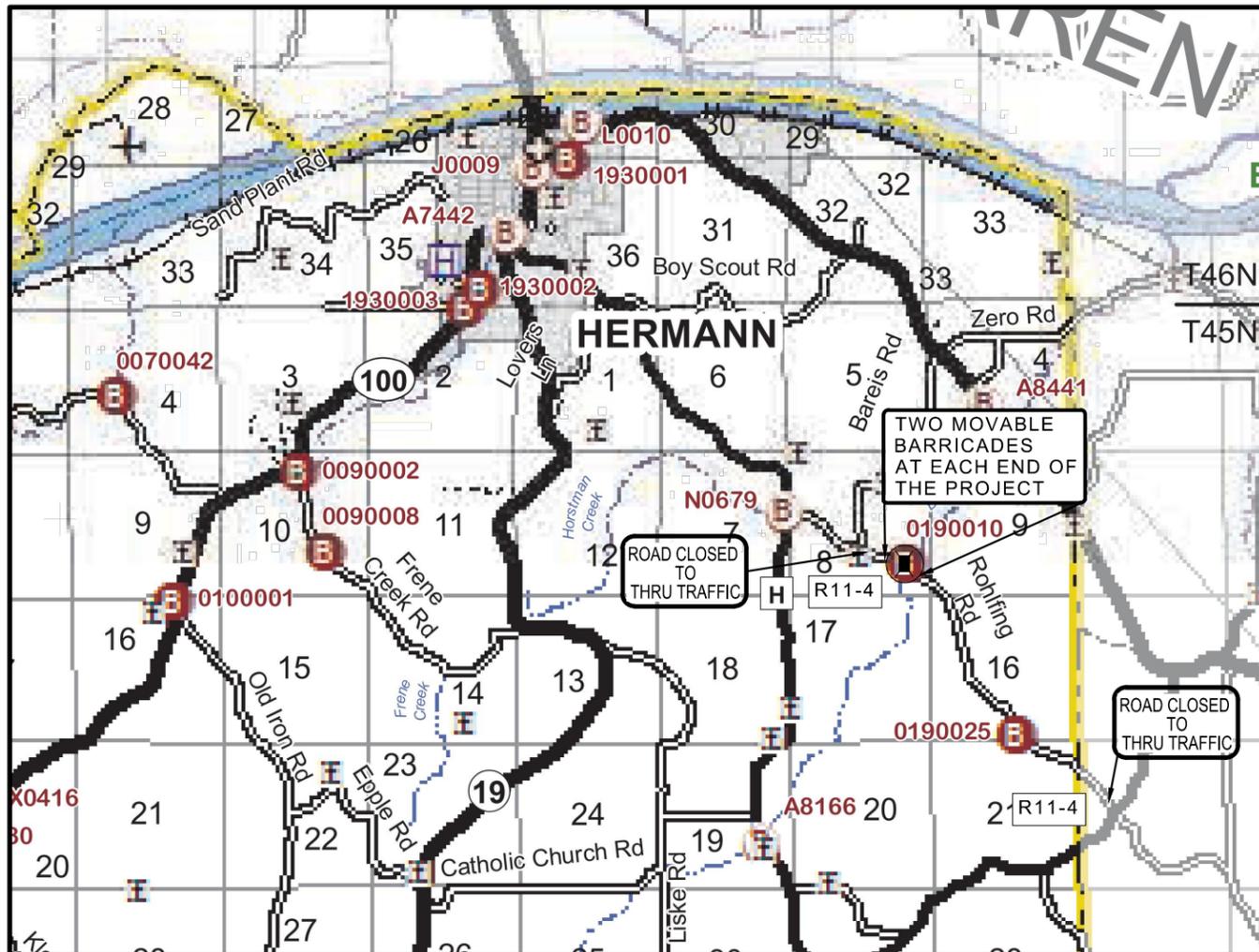


GENERAL NOTES AND QUANTITIES SHEET
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CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
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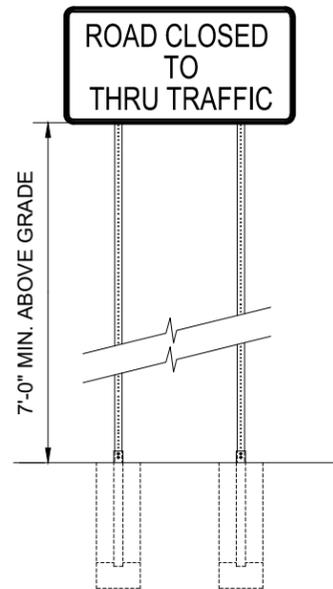
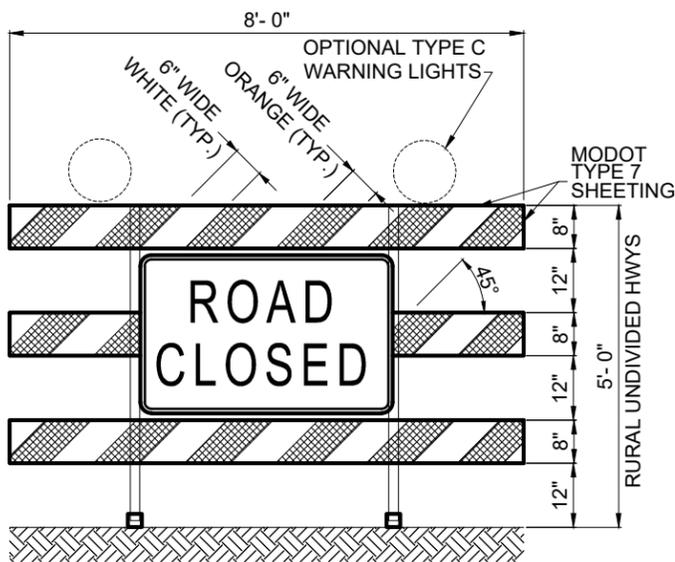
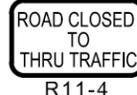
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NO.	DESCRIPTION	DATE	APPR.
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THE R11-2 SIGNS SHALL BE LOCATED AT THE BEGINNING AND END OF THE PROJECT AS SHOWN ON THE MAP - THIS SHEET



SIGN R11-4 MOUNTED ON POSTS

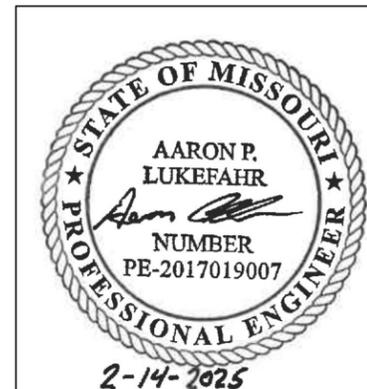
TRAFFIC CONTROL PLAN

SIGN	SIZE (IN.)	AREA (SQ. FT.)	QUANTITY	TOTAL AREA (SQ. FT.)	SIGN LEGEND	MODOT EPG ARTICLE
R11-2	48x30	10	2	20	ROAD CLOSED	903.5.33
R11-4	60x30	12.5	2	25	ROAD CLOSED TO THRU TRAFFIC	903.5.33
CONSTRUCTION SIGNS TOTAL SQ. FT.				45		

GENERAL NOTES

1. TYPE III (THREE RAIL) BARRICADE CONFIGURATIONS ARE USED ON THE STATE HIGHWAY SYSTEM.
2. WHEN A ROADWAY IS CLOSED, BUT ACCESS IS STILL ALLOWED FOR LOCAL TRAFFIC OR WORK VEHICLES, BARRICADES MAY BE OFFSET TO FACILITATE MOVEMENT INTO AND OUT OF THE CLOSED AREA.
3. ONE TYPE III MOVABLE BARRICADE WILL BE REQUIRED TO COMPLETELY CLOSE EACH 8' OF PAVEMENT. PAVED SHOULDERS SHALL BE INCLUDED IN THE AREA TO BE CLOSED.
4. SIGNS SHALL BE LIGHT WEIGHT (ROLL-UP OR PLASTIC) AND OBSCURE NO MORE THAN 50 PERCENT OF THE TOP 2 RAILS OR 33 PERCENT OF ALL THREE RAILS.
5. TYPE C WARNING LIGHTS SHALL BE LIGHT WEIGHT (3.3 LBS. OR LESS) OR HAVE BATTERY PACK MOUNTED NO HIGHER THAN 18-INCH AND SHALL NOT COVER ANY PORTION OF THE BARRICADED FACE.
6. IF SIGNS OR LIGHTS CANNOT MEET THE ABOVE REQUIREMENTS, THEY SHALL BE MOUNTED ON SEPARATE CRASHWORTHY DEVICES, LOCATED 7 TO 10 FEET BEHIND THE BARRICADE.
7. EACH BARRICADE UNIT SHALL CONTAIN RAILS AUGMENTED WITH STRIPES OF ALTERNATING ORANGE AND WHITE RETROREFLECTIVE SHEETING ON THE SIDE FACING TRAFFIC.
8. WHERE A BARRICADE ARRAY EXTENDS ENTIRELY OR PARTIALLY ACROSS A ROADWAY, THE STRIPES SHALL SLOPE DOWNWARD AT A 45° ANGLE ACROSS THE ENTIRE BARRICADE ARRAY IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN OR PASS.
9. WHERE BOTH RIGHT AND LEFT VEHICULAR MOVEMENTS ARE PROVIDED, THE STRIPES SHALL SLOPE DOWNWARD AT A 45° ANGLE ACROSS THE ENTIRE BARRICADE ARRAY IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE ARRAY.
10. WHERE NO VEHICULAR MOVEMENTS ARE PROVIDED, THE STRIPES SHALL SLOPE DOWNWARD AT A 45° ANGLE ACROSS THE ENTIRE BARRICADE ARRAY TOWARD THE CENTER OF THE BARRICADE ARRAY.
11. TYPE III MOVABLE BARRICADES SHALL BE ENTIRELY FREE STANDING AND PORTABLE. MARKING SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR MAY BE APPLIED TO BOTH THE FRONT AND THE BACK OF EACH RAIL PROVIDED THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.
12. WHERE MARKING IS NOT PROVIDED ON THE BACKSIDE, STRIPS OF 3" WIDE MODOT TYPE 7 ORANGE SHEETING MAY BE APPLIED TO THE ENDS OF EACH RAIL TO HELP DELINEATE THE DEVICE.
13. THE MATERIALS, COMPONENTS, AND INSTALLATION SHALL BE IN CONFORMANCE TO THE LATEST MUTCD.

THE ROAD WILL BE CLOSED TO THROUGH TRAFFIC BUT WILL REMAIN OPEN TO LOCAL TRAFFIC, ESPECIALLY LOCAL LANDOWNERS.



TRAFFIC CONTROL SHEET
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 APPROVED BY: S. HOWE

JOB NO. 23H3587

Crockett GTL
1000 W Nifong Blvd, Bldg 1
Columbia, MO 65203
Telephone: 573-447-0292



BORING NUMBER B-1
PAGE 1 OF 1

CLIENT Howe Company, LLC PROJECT NAME Gasconade County Bridge 01900101
PROJECT NUMBER G231005 PROJECT LOCATION Hermann, Missouri
DATE STARTED 1/2/24 COMPLETED 1/2/24 GROUND ELEVATION 525.5 ft MSL HOLE SIZE 4"
DRILLING CONTRACTOR IPES GROUND WATER LEVELS:
DRILLING METHOD 4" SSA & NQ2 Diamond Bit AT TIME OF DRILLING 14.00 ft / Elev 511.50 ft
LOGGED BY Werner CHECKED BY Lidholm AT END OF DRILLING --- Not obtained due to coring
NOTES Borehole backfilled upon completion AFTER DRILLING --- Not obtained due to coring

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY LENGTH	BLOW COUNTS (N VALUE)	PENETROMETER (psf)	UNC. COMP. (psf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0		GRAVEL (8-inches)										
0.7		LEAN CLAY: Brown, trace sand and gravel										
5			SPT 1	3	6-8-7 (15)	crumb			9			
10		--: with sand	SPT 2	11	2-4-4 (8)				15			
13.0		SAND: Brown	SPT 3	18	2-1-2 (3)	sand			21			
20			SPT 4	14	4-5-9 (14)	rocky			16			
25		--: with gravel	SPT 5	10	9-15-13 (28)	rocky			14			
26.5		WEATHERED SANDSTONE: Brownish gray, trace dolomite										
28.5		SANDSTONE: Gray, trace brown, trace dolomite	RC 6	51								
		Sandstone RQD = 54%										
32.7		DOLOMITE: Brownish gray, occasional thin shaley zones	RC 7	53								
		Dolomite RQD = 86%										
37.0		Bottom of borehole at 37.0 feet.										

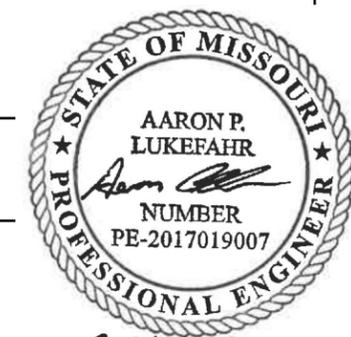
Crockett GTL
1000 W Nifong Blvd, Bldg 1
Columbia, MO 65203
Telephone: 573-447-0292



BORING NUMBER B-2
PAGE 1 OF 1

CLIENT Howe Company, LLC PROJECT NAME Gasconade County Bridge 01900101
PROJECT NUMBER G231005 PROJECT LOCATION Hermann, Missouri
DATE STARTED 1/2/24 COMPLETED 1/2/24 GROUND ELEVATION 522.4 ft MSL HOLE SIZE 4"
DRILLING CONTRACTOR IPES GROUND WATER LEVELS:
DRILLING METHOD 4" SSA & NQ2 Diamond Bit AT TIME OF DRILLING 13.00 ft / Elev 509.40 ft
LOGGED BY Werner CHECKED BY Lidholm AT END OF DRILLING --- Not obtained due to coring
NOTES Borehole backfilled upon completion AFTER DRILLING --- Not obtained due to coring

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY LENGTH	BLOW COUNTS (N VALUE)	PENETROMETER (psf)	UNC. COMP. (psf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0		GRAVEL (8-inches)										
0.7		LEAN TO FAT CLAY: Brown, trace lignite stains, trace gravel										
5			SPT 1	10	2-3-5 (8)	8000			19			
6.0		LEAN CLAY: Brown, trace gray, trace rust stains, with sand										
10		Torvane = 200 psf	SPT 2	14	0-1-1 (2)	400			29			
13.0		SAND: Brown, with gravel	SPT 3	9	3-3-5 (8)	sand			24			
20			SPT 4	13	9-12-5 (17)	rocky			18			
23.0		WEATHERED SANDSTONE: Brownish gray, trace dolomite										
23.9		SANDSTONE: Gray, trace brown, trace dolomite	RC 5	45								
		Sandstone RQD = 71%										
30.3		DOLOMITE: Brownish gray, occasional thin shaley zones	RC 6	55								
		Dolomite RQD = 55%										
33.5		Bottom of borehole at 33.5 feet.										



THE ENGINEERS SEAL ON THIS PAGE SIMPLY COVERS THE PLACEMENT OF THE SOIL BORING LOGS ONTO THIS PLAN SHEET. THE WORK ASSOCIATED WITH DRILLING, OBTAINING SOIL SAMPLES, AND DEVELOPING THE BORING LOGS IS THE RESPONSIBILITY OF PROFESSIONALS AT CROCKETT GEOTECHNICAL-TESTING LAB. THE ENGINEER THAT SEALED THIS SHEET DOES NOT CLAIM ANY CREDIT OR RESPONSIBILITY FOR THE WORK PERFORMED BY CROCKETT GEOTECHNICAL-TESTING LAB.

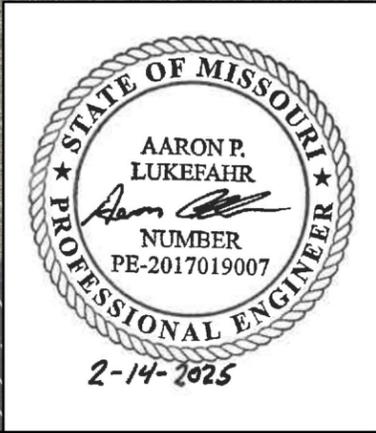
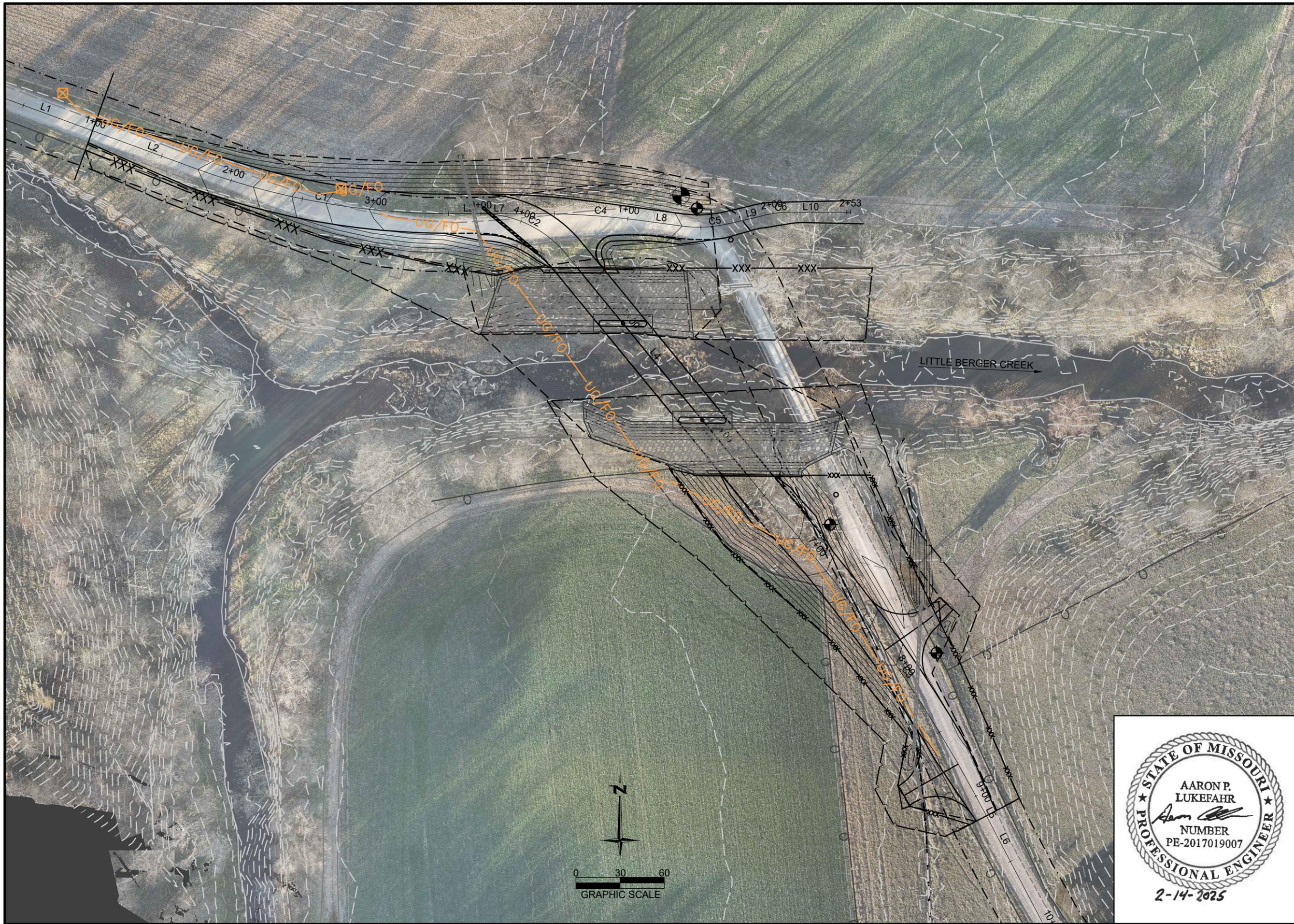


BORING LOG SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

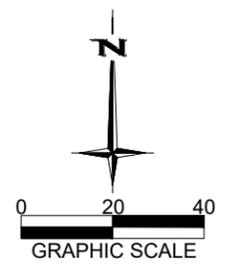
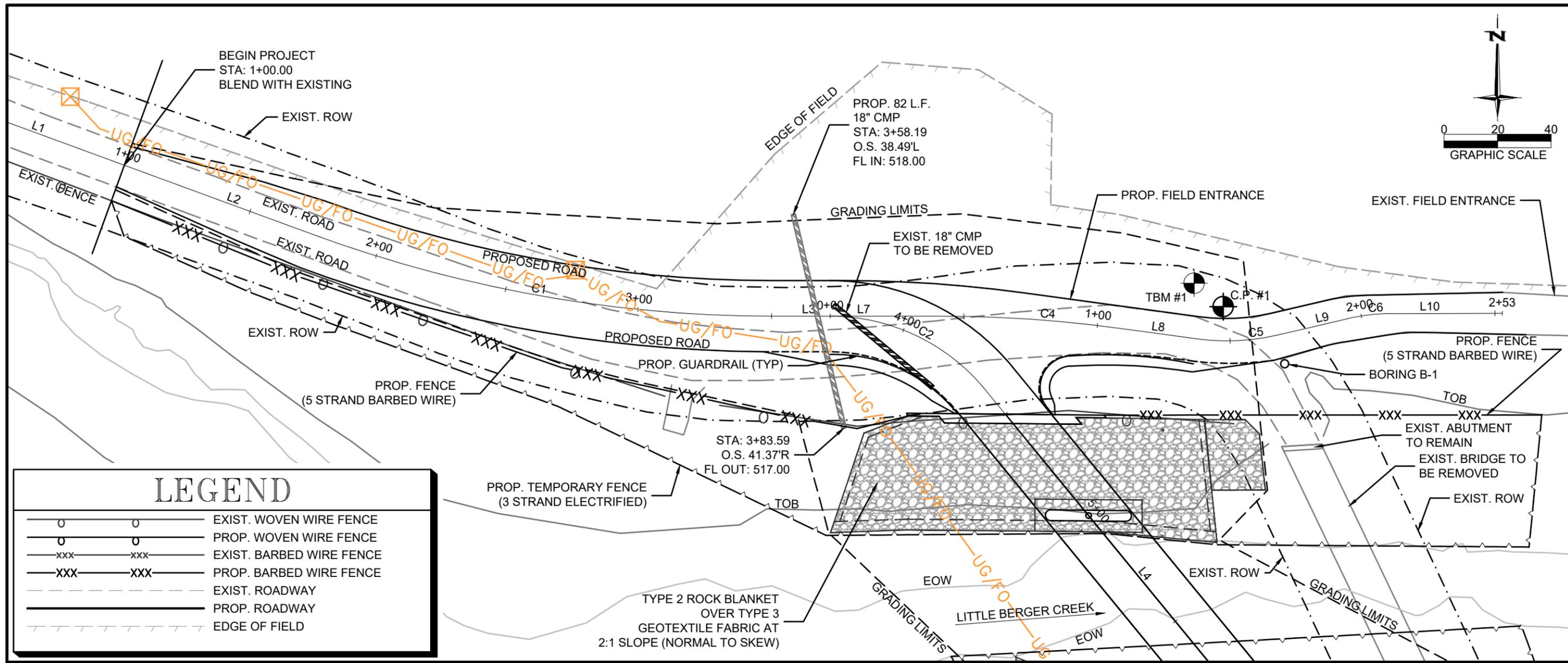
DATE: MARCH 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

JOB NO. 23H3587

NO.	DESCRIPTION	DATE	APPR

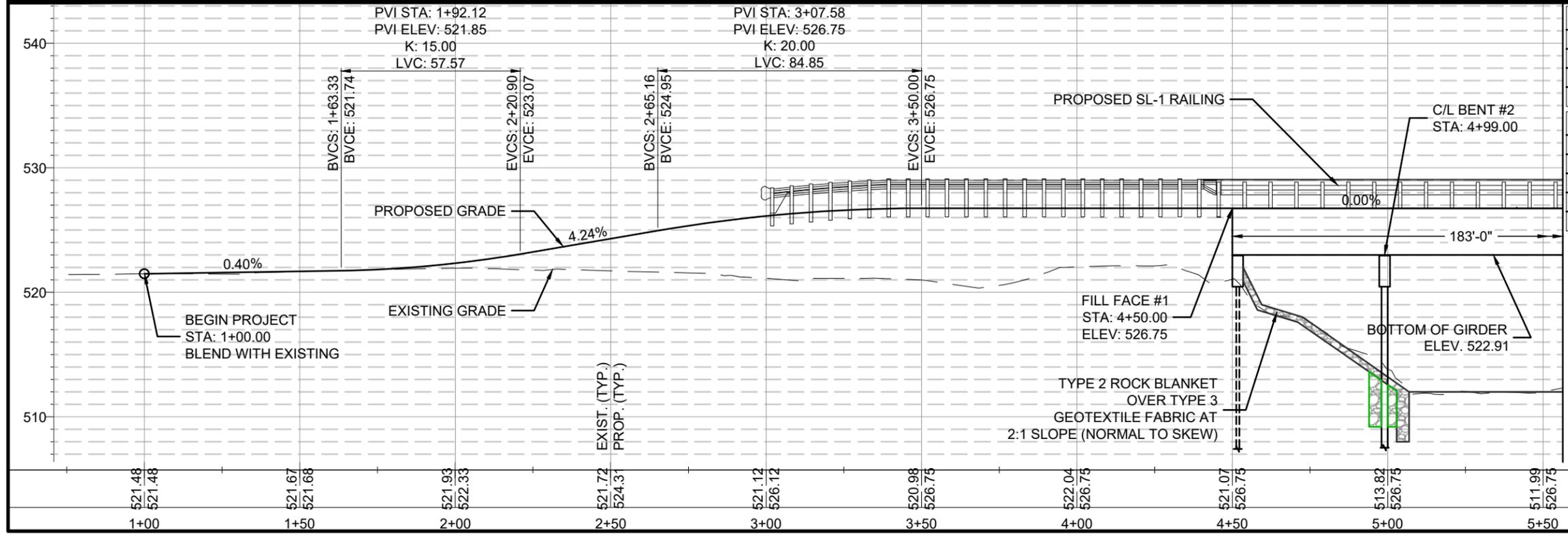


<p>Howe Company LLC</p> <p>MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014993 SURVEYING #LS-2014015235</p>		<p>NO.</p>	<p>DESCRIPTION</p>	<p>DATE</p>	<p>APPR</p>
<p>SITE MAP OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 019, ROHLFING RD. BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001) GASCONADE COUNTY, MISSOURI</p>		<p>HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693</p>			
<p>DATE: MARCH 2024</p> <p>DESIGNED BY: A. LUKEFAHR</p> <p>DRAWN BY: P. HOWE</p> <p>REVIEWED BY: S. HOWE</p> <p>APPROVED BY: S. HOWE</p>		<p>JOB NO. 23H3587</p>			
<p>6</p>		<p>SHEET 6 OF 46</p>			



LEGEND

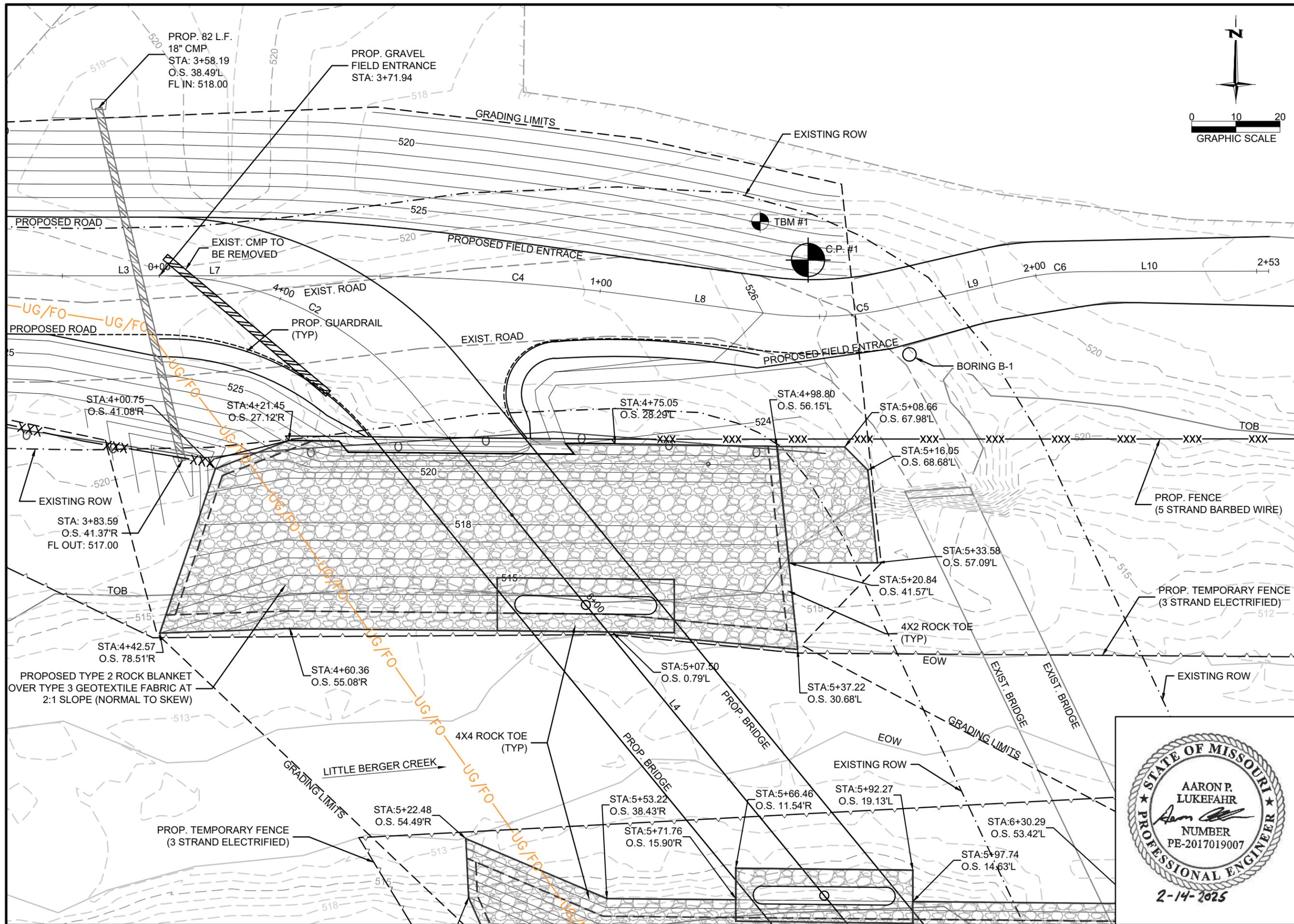
	EXIST. WOVEN WIRE FENCE
	PROP. WOVEN WIRE FENCE
	EXIST. BARBED WIRE FENCE
	PROP. BARBED WIRE FENCE
	EXIST. ROADWAY
	PROP. ROADWAY
	EDGE OF FIELD



PROPOSED STRUCTURE	
GIRDER TYPE:	NU-35
BRIDGE LENGTH:	183.00' (49'-85'-49')
GRADE:	0%
SKEW:	40° L ADVANCE
HYDROLOGIC DATA	
DRAINAGE AREA:	14.7 SQ. MI.
Q25 =	4,760 CFS
HW ELEV. 25 =	520.59
Q100 =	6,490 CFS
HW ELEV. 100 =	521.44

AARON P. LUKEFAHR
 PROFESSIONAL ENGINEER
 NUMBER PE-2017019007
 2-14-2025

Howe Company LLC	MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014693 SURVEYING #LS-2014015235	PLAN AND PROFILE SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 019, ROHLFING RD. BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001) GASCONADE COUNTY, MISSOURI	HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693	DATE: MARCH 2024 DESIGNED BY: A. LUKEFAHR DRAWN BY: P. HOWE REVIEWED BY: S. HOWE APPROVED BY: S. HOWE JOB NO. 23H3587
Howe Company LLC				7
				SHEET 7 OF 46



NO.	DESCRIPTION	DATE	APPR

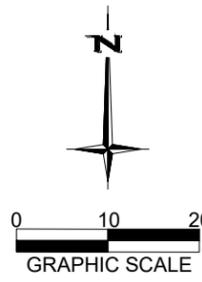
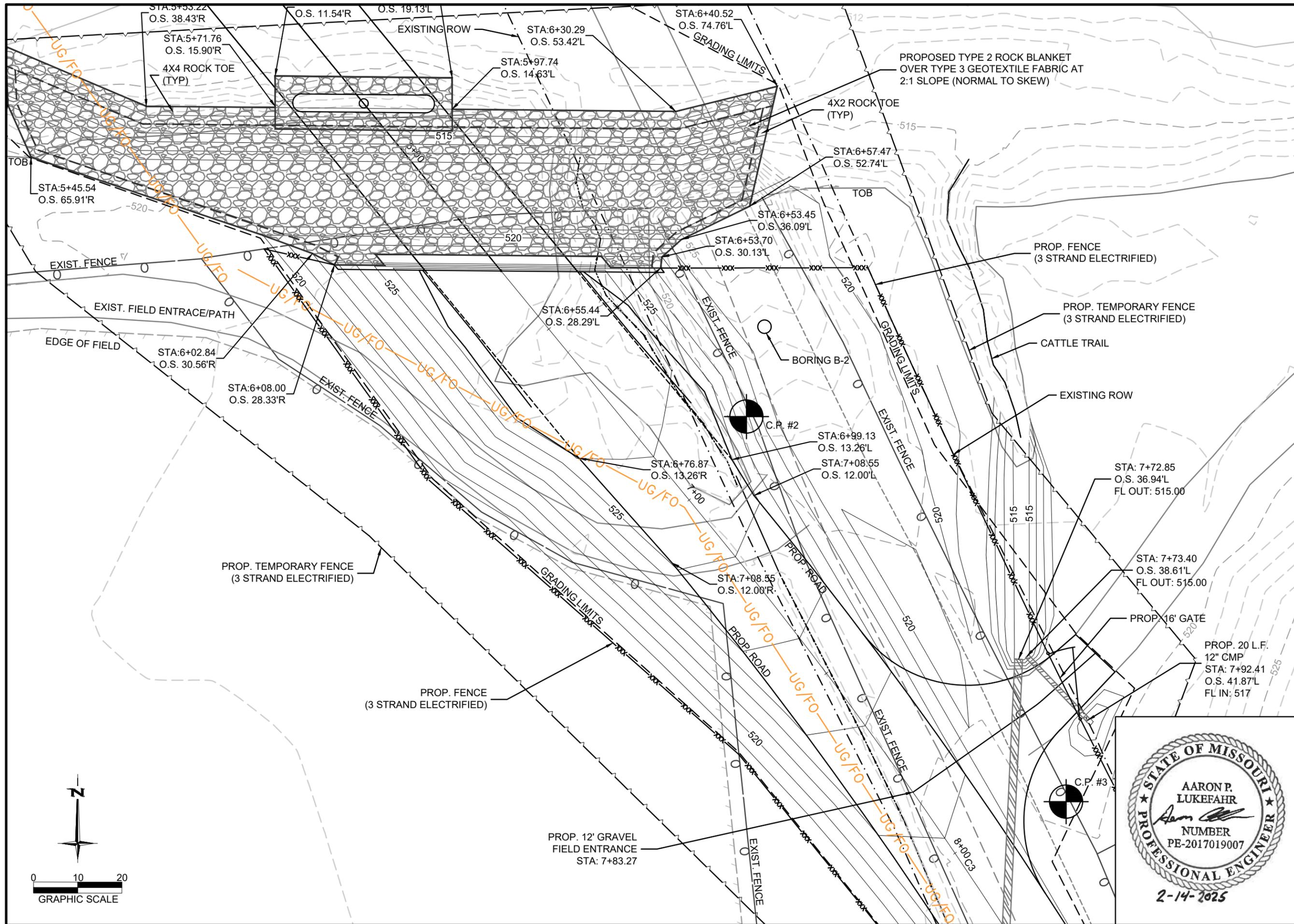
Howe Company LLC
 MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014993
 SURVEYING #LS-2014015235

GRADING SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BR-R037(001)
 GASCONADE COUNTY, MISSOURI

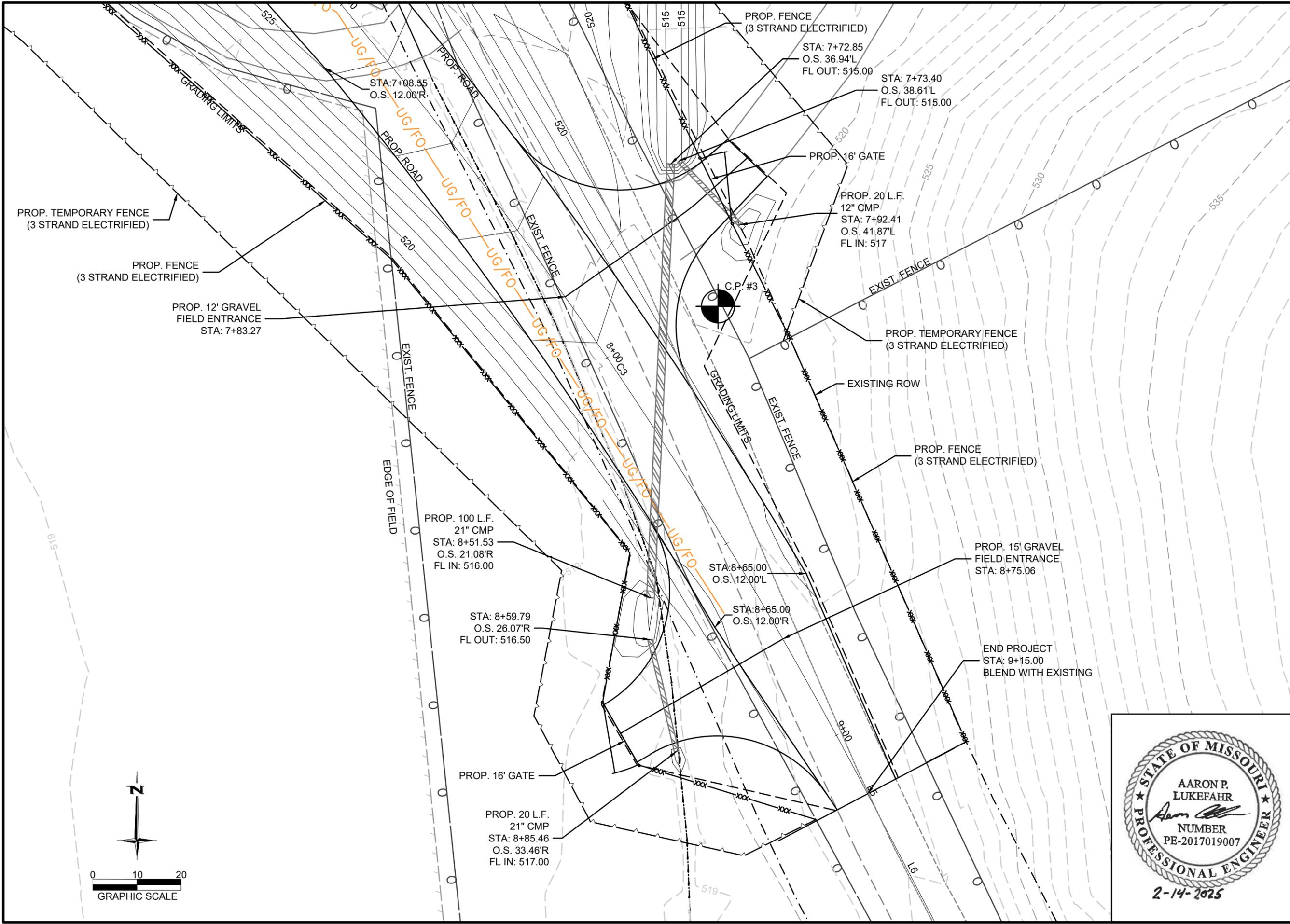
HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

STATE OF MISSOURI
AARON P. LUKEFAHR
 PROFESSIONAL ENGINEER
 NUMBER PE-2017019007
 2-14-2025

DATE:	MARCH 2024
DESIGNED BY:	A. LUKEFAHR
DRAWN BY:	P. HOWE
REVIEWED BY:	S. HOWE
APPROVED BY:	S. HOWE
JOB NO.	23H3587
11	
SHEET 11 OF 46	



		MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014993 SURVEYING #LS-2014015235
GRADING SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 019, ROHLFING RD. BRIDGE NO. 01900101, PROJECT NO. BR-R037(001) GASCONADE COUNTY, MISSOURI		HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693
DATE:	MARCH 2024	
DESIGNED BY:	A. LUKEFAHR	
DRAWN BY:	P. HOWE	
REVIEWED BY:	S. HOWE	
APPROVED BY:	S. HOWE	
JOB NO.	23H3587	
13		
SHEET 13 OF 46		



		MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014893 SURVEYING #LS-2014015235	
		NO.	DATE
GRADING SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 019, ROHLFING RD. BRIDGE NO. 01900101, PROJECT NO. BR0-R037(001) GASCONADE COUNTY, MISSOURI		HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693	
DATE: MARCH 2024 DESIGNED BY: A. LUKEFAHR DRAWN BY: P. HOWE REVIEWED BY: S. HOWE APPROVED BY: S. HOWE		JOB NO. 23H3587	
		14	
2-14-2025		SHEET 14 OF 46	

BEGIN CONSTRUCTION CENTERLINE AT A POINT THAT LIES N72° 31' 58"E, A DISTANCE OF 4181.65' FROM THE SOUTHWEST CORNER OF SECTION 8, TOWNSHIP 45 NORTH, RANGE 4 WEST OF THE FIFTH PRINCIPAL MERIDIAN, GASCONADE COUNTY, MISSOURI. STATION 1+00.00

SE 1/4, SEC 8, T45N, R4W

DAVID R. ROHLFING & DEBRA KAY ROHLFING
BK 214, PG 540
PARCEL #1, 251.75 ACRES
TEMP. CONST. EASMT. LEFT = 0.44 AC.
TEMP. CONST. EASMT. RIGHT = 0.34 AC.
PERM. EASMT. LEFT = 0.13 AC.
PERM. EASMT. RIGHT = 0.66 AC.
AREA REMAINING = 251.75 ACRES

LAND SURVEY MONUMENT:
THE SOUTHWEST CORNER OF S8, T45N, R4W,
GASCONADE COUNTY, MISSOURI: SAID POINT
LYING 4181.65', S72° 31' 58"W OF BEGINNING
POINT CONSTRUCTION CENTERLINE STATION
1+00.00 AND LYING 4663.71',
S80° 14' 11"W OF ENDING POINT
CONSTRUCTION CENTERLINE STATION 9+15.00
AS FOUND BY JOHN H. SCHAEFER ON JANUARY
17, 2024 AND FILED WITH MO DEPARTMENT OF
NATURAL RESOURCES ON DOCUMENT
#600-92211, CHARITON COUNTY, MO

END CONSTRUCTION CENTERLINE AT A POINT THAT LIES N80° 14' 11"E, A DISTANCE OF 4663.71' FROM THE SOUTHWEST CORNER OF SECTION 8, TOWNSHIP 45 NORTH, RANGE 4 WEST OF THE FIFTH PRINCIPAL MERIDIAN, GASCONADE COUNTY, MISSOURI. STATION 9+15.00

Line Table: Alignments

Line #	START STATION	START POINT	END STATION	END POINT	BEARING
L2	1+00.00	N: 1031084.7783 E: 565518.9276	1+74.85	N: 1031059.0278 E: 565589.2122	S69° 52' 42"E 74.85
L3	3+50.45	N: 1031028.5101 E: 565761.2189	3+71.94	N: 1031028.5101 E: 565782.7101	N90° 00' 00"E 21.49
L4	4+38.12	N: 1031001.1561 E: 565840.6313	7+08.50	N: 1030792.3434 E: 566012.4005	S39° 26' 26"E 270.38
L5	9+12.80	N: 1030622.4541 E: 566125.2237	9+15.00	N: 1030620.5060 E: 566126.2480	S27° 44' 08"E 2.20

Curve Table: Alignments

Curve #	PC	PI	PT	RADIUS	LENGTH	DELTA ANGLE	CHORD DIRECTION
C1	STA: 1+74.85 N: 1031059.0278 E: 565589.2122	STA: 2+63.56 N: 1031028.5101 E: 565672.5083	STA: 3+50.45 N: 1031028.5101 E: 565761.2189	500.00	175.59	20°07'18"	S79° 56' 21"E 174.69
C2	STA: 3+71.94 N: 1031028.5101 E: 565782.7101	STA: 4+07.36 N: 1031028.5101 E: 565818.1299	STA: 4+38.12 N: 1031001.1561 E: 565840.6313	75.00	66.18	50°33'34"	S64° 43' 13"E 64.06
C3	STA: 7+08.50 N: 1030792.3434 E: 566012.4005	STA: 8+11.01 N: 1030713.1812 E: 566077.5193	STA: 9+12.80 N: 1030622.4541 E: 566125.2237	1000.00	204.29	11°42'19"	S33° 35' 17"E 203.94



MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014993
SURVEYING #LS-2014015295

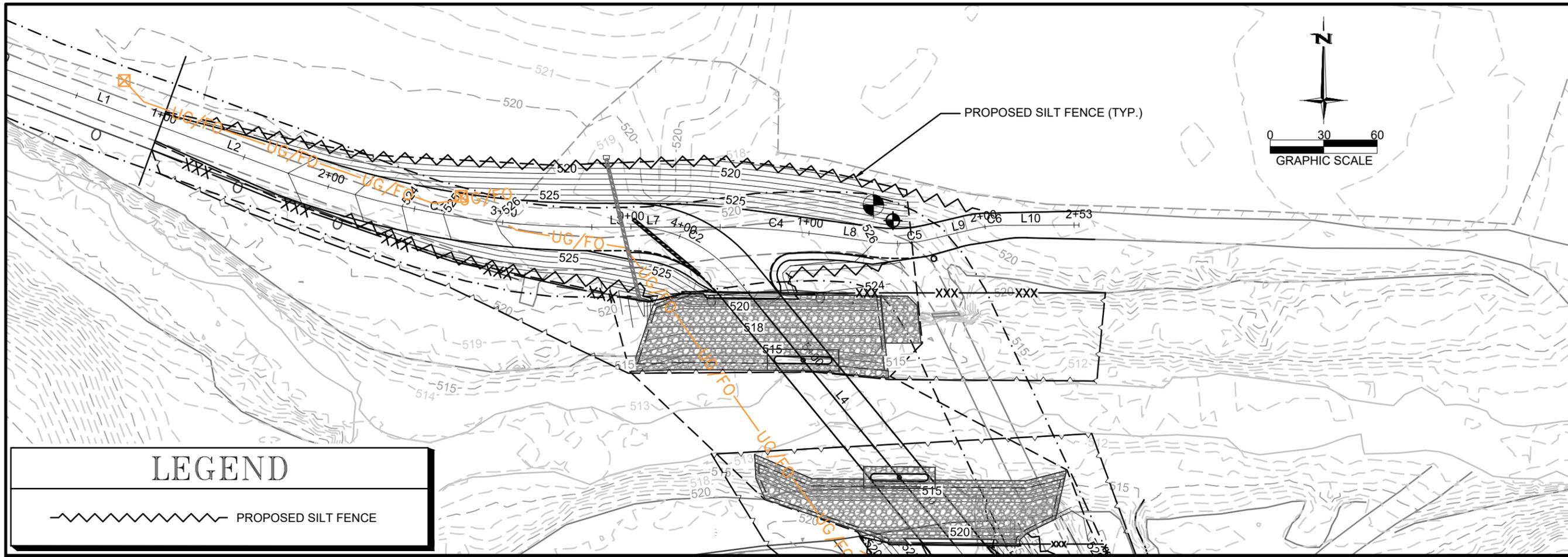
RIGHT-OF-WAY SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BR0-R037(001)
GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

DATE: MARCH 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE
JOB NO. 23H3587



NO.	DESCRIPTION	DATE	APPR.



LEGEND

~~~~~ PROPOSED SILT FENCE



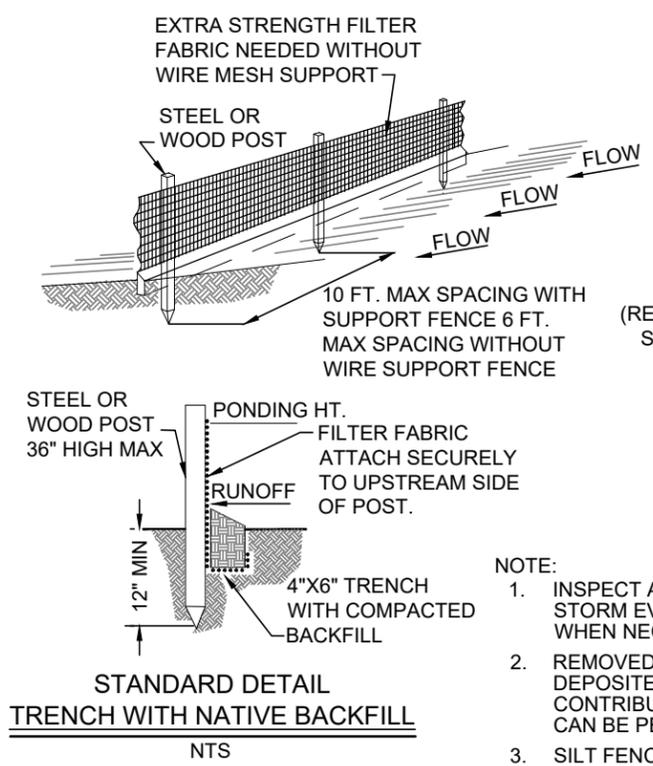
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|     |             |      |       |

EROSION CONTROL SHEET  
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
 CART ROUTE NO. 019, ROHLFING RD.  
 BRIDGE NO. 01900101, PROJECT NO. BR0-R037(001)  
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC  
 804 E. PATTON STREET, MACON, MO. 63552  
 OFFICE: 660-395-4693

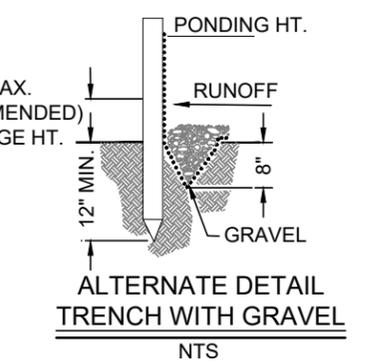
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|--------------|-------------|
| DATE:        | MARCH 2024  |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY:    | P. HOWE     |
| REVIEWED BY: | S. HOWE     |
| APPROVED BY: | S. HOWE     |
| JOB NO.      | 23H3587     |

16



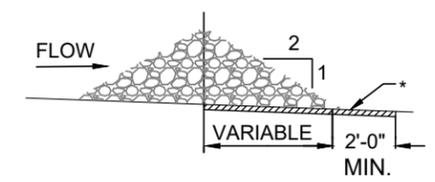
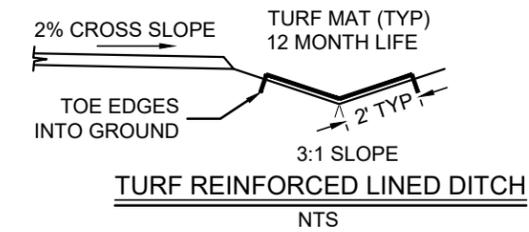
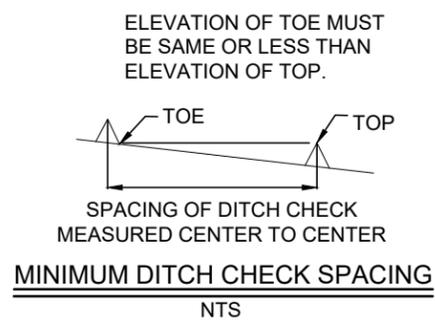
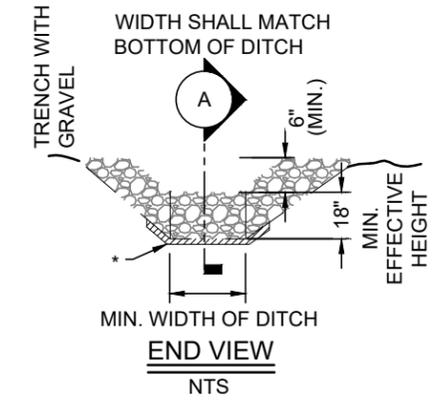
**EROSION CONTROL QUANTITIES**

SILT FENCE = 1,000 FT



- NOTE:
- INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
  - REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
  - SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

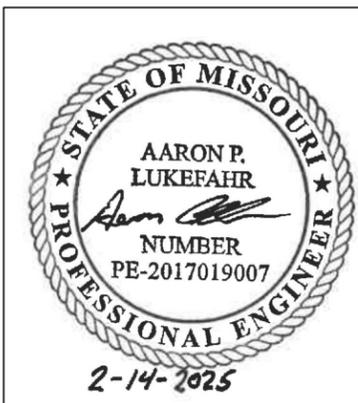
SILT FENCE

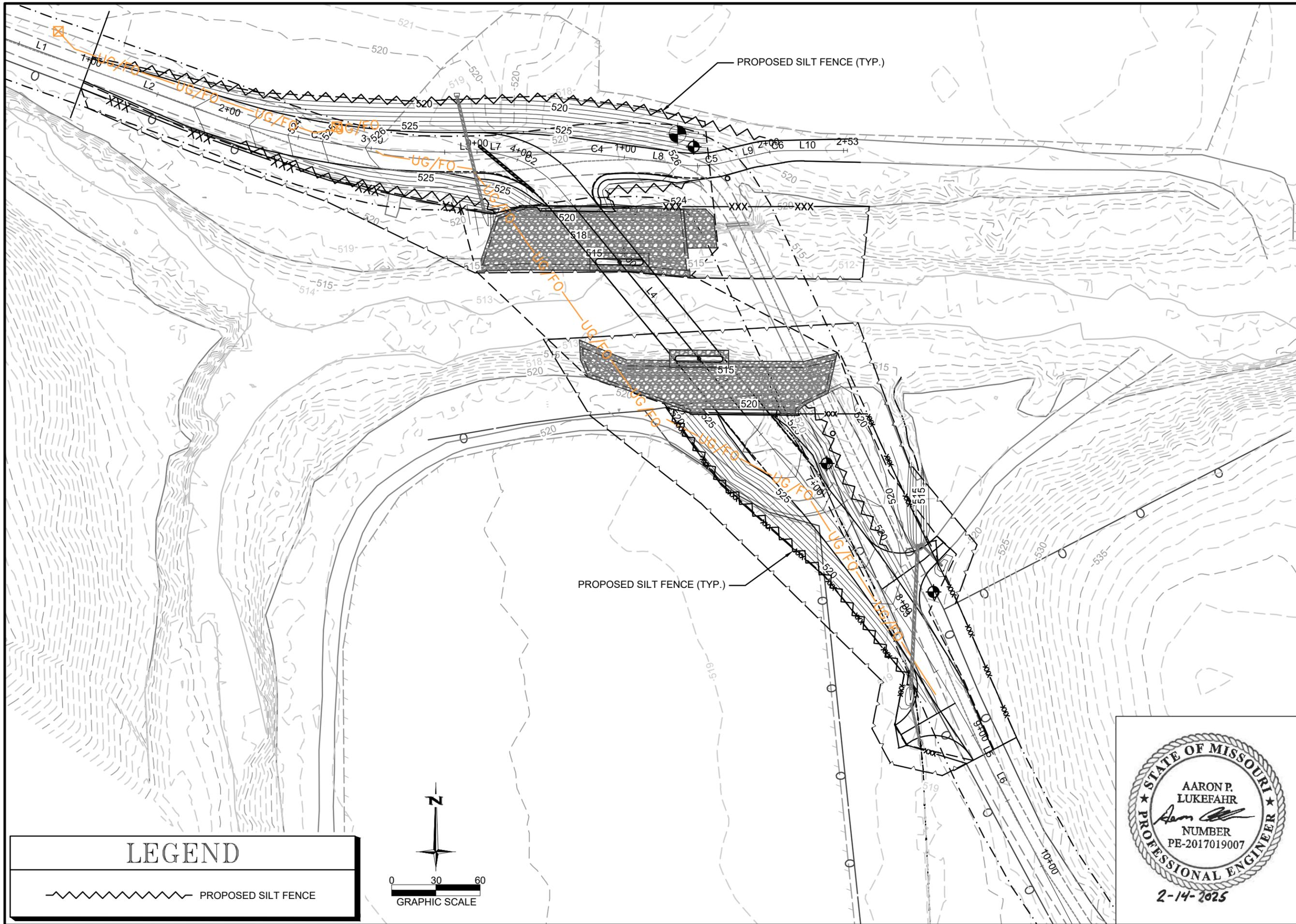


\* GEOTEXTILE LINING MAY BE INSTALLED AS REQUIRED BY THE ENGINEER.

NOTE: ROCK DITCH CHECK IN THE CLEAR ZONE SHALL BE REMOVED OR LEVELED (IF ALLOWABLE) AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE.

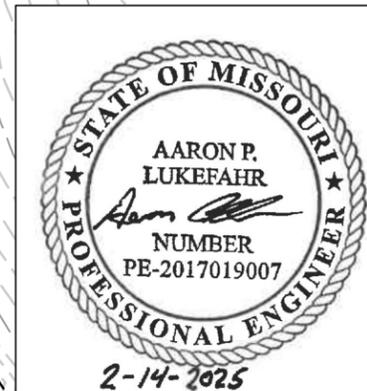
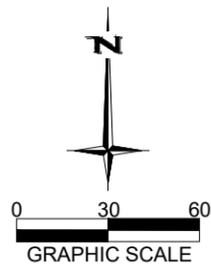
ROCK DITCH CHECK





# LEGEND

~~~~~ PROPOSED SILT FENCE



MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-201404993
SURVEYING #LS-2014015235

EROSION CONTROL SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BR0-R037(001)
GASCONADE COUNTY, MISSOURI

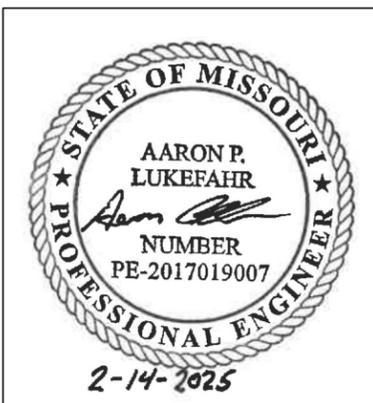
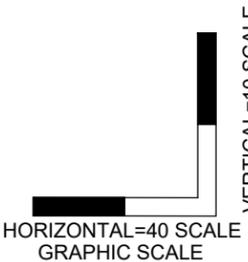
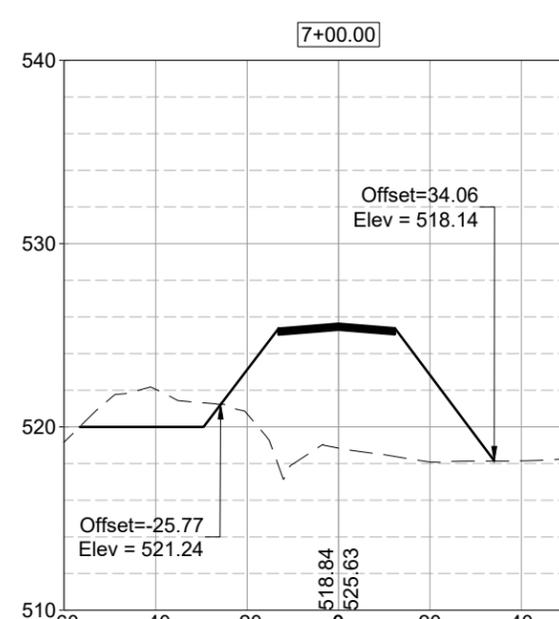
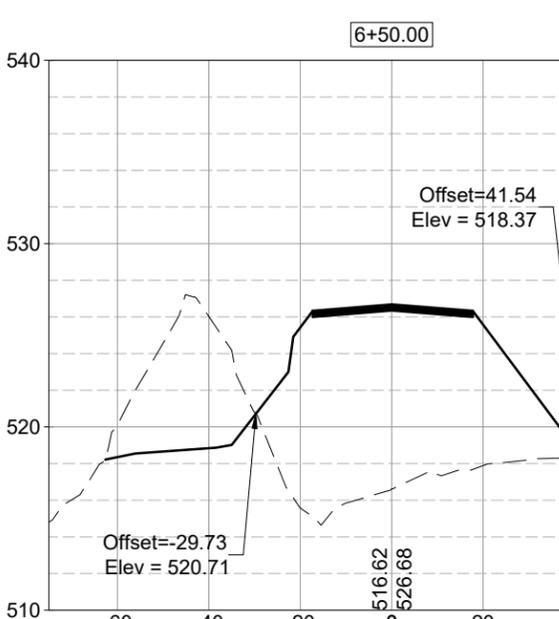
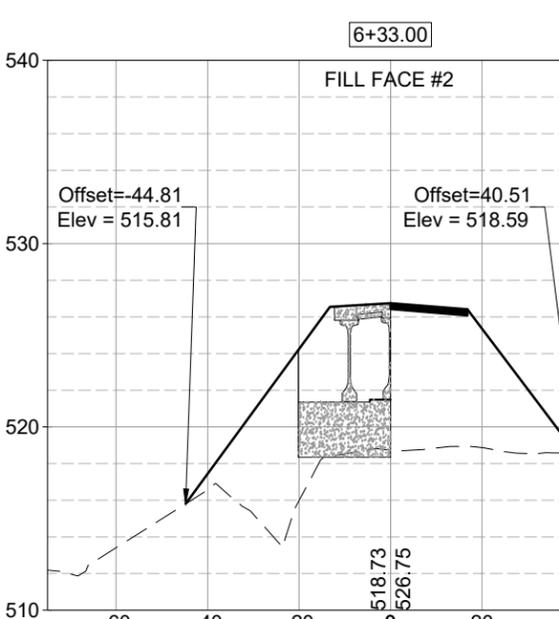
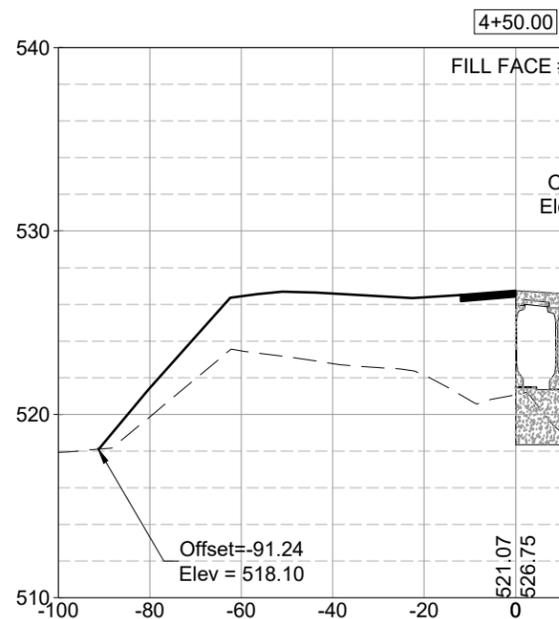
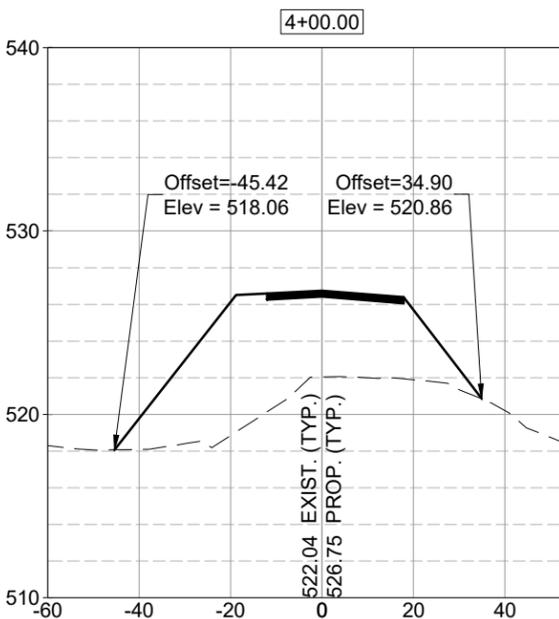
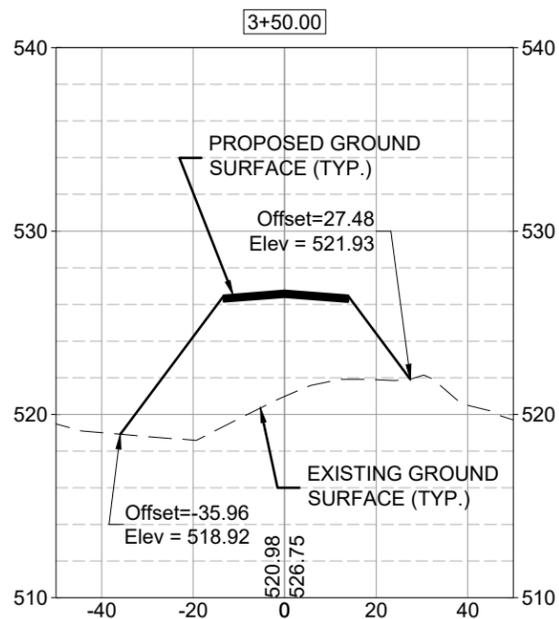
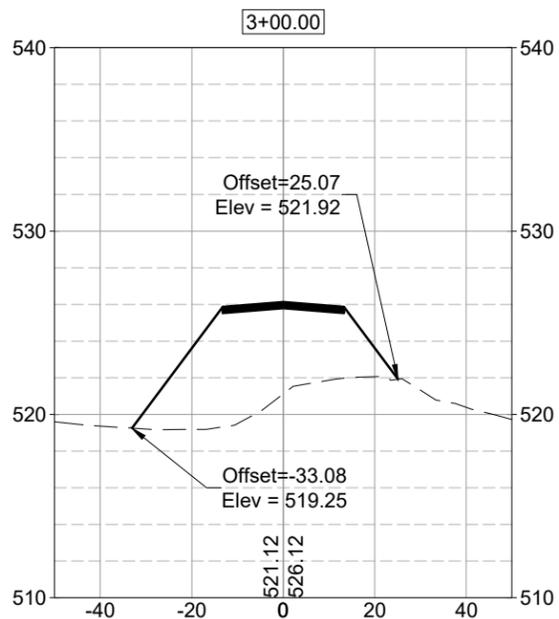
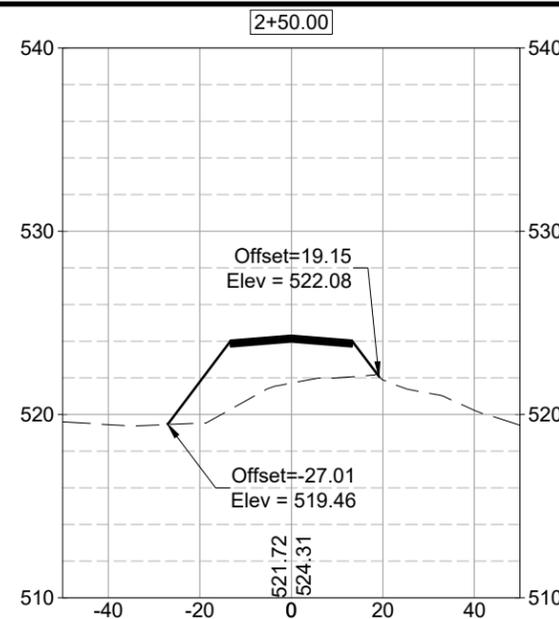
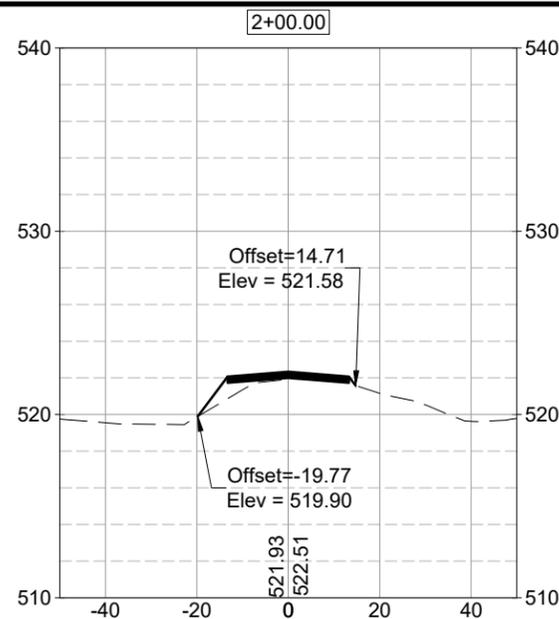
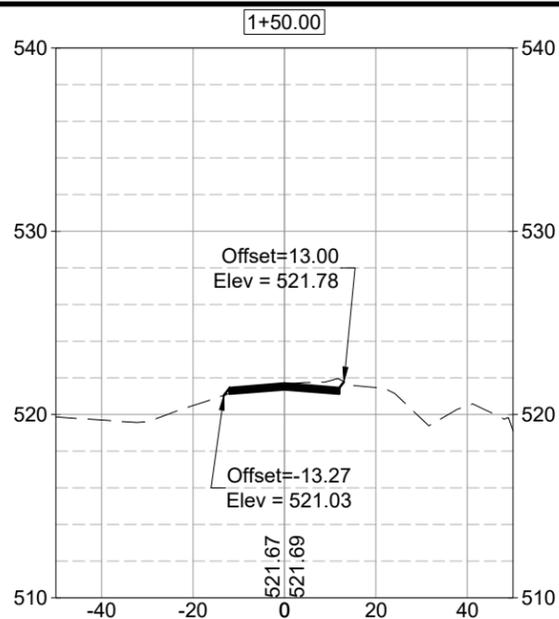
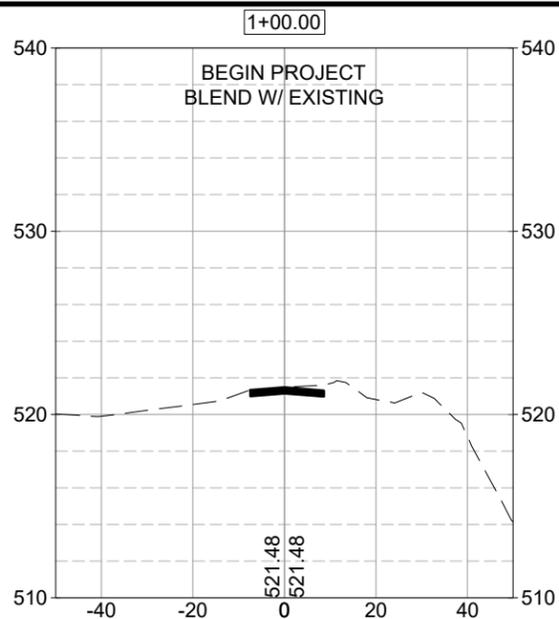
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

| | |
|--------------|-------------|
| DATE: | MARCH 2024 |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY: | P. HOWE |
| REVIEWED BY: | S. HOWE |
| APPROVED BY: | S. HOWE |

JOB NO. 23H3587

17

| NO. | DESCRIPTION | DATE | APPR. |
|-----|-------------|------|-------|
| | | | |



| | | | | | |
|---|--|-----|-------------|------|-------|
| | | NO. | DESCRIPTION | DATE | APPR. |
| | | | | | |
| MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014693
SURVEYING #S-2014015235 | | | | | |
| CROSS SECTIONS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI | | | | | |
| HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693 | | | | | |
| DATE: MARCH 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE
JOB NO. 23H3587 | | | | | |
| <h1>18</h1> | | | | | |
| SHEET 18 OF 46 | | | | | |

ROAD ALIGNMENT TABLES

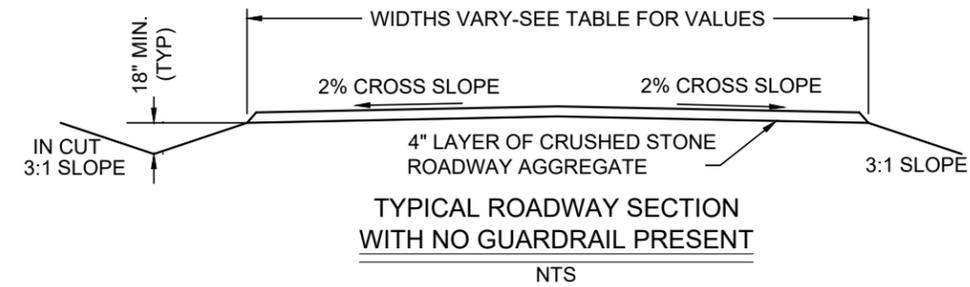
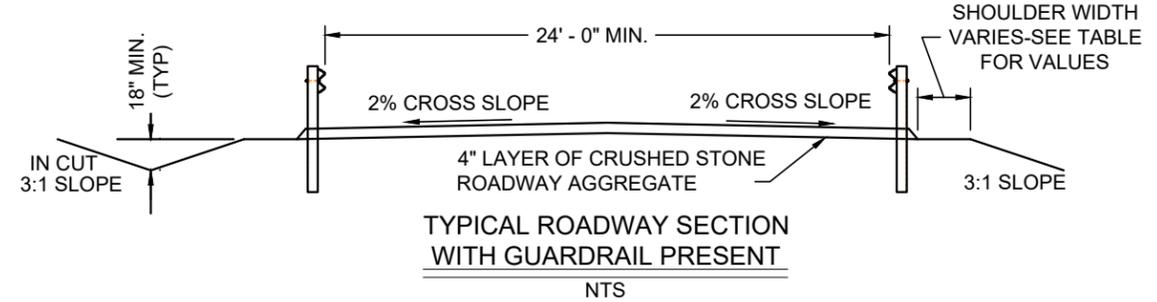
| Line Table: Alignments | | | | | |
|------------------------|---------------|-----------------------------------|-------------|-----------------------------------|-------------------------|
| Line # | START STATION | START POINT | END STATION | END POINT | BEARING |
| L2 | 1+00.00 | N: 1031084.7783
E: 565518.9276 | 1+74.85 | N: 1031059.0278
E: 565589.2122 | S69° 52' 42"E
74.85 |
| L3 | 3+50.45 | N: 1031028.5101
E: 565761.2189 | 3+71.94 | N: 1031028.5101
E: 565782.7101 | N90° 00' 00"E
21.49 |
| L4 | 4+38.12 | N: 1031001.1561
E: 565840.6313 | 7+08.50 | N: 1030792.3434
E: 566012.4005 | S39° 26' 26"E
270.38 |
| L5 | 9+12.80 | N: 1030622.4541
E: 566125.2237 | 9+15.00 | N: 1030620.5060
E: 566126.2480 | S27° 44' 08"E
2.20 |

| Curve Table: Alignments | | | | | | | |
|-------------------------|---|---|---|---------|--------|-------------|-------------------------|
| Curve # | PC | PI | PT | RADIUS | LENGTH | DELTA ANGLE | CHORD DIRECTION |
| C1 | STA: 1+74.85
N: 1031059.0278
E: 565589.2122 | STA: 2+63.56
N: 1031028.5101
E: 565672.5083 | STA: 3+50.45
N: 1031028.5101
E: 565761.2189 | 500.00 | 175.59 | 20°07'18" | S79° 56' 21"E
174.69 |
| C2 | STA: 3+71.94
N: 1031028.5101
E: 565782.7101 | STA: 4+07.36
N: 1031028.5101
E: 565818.1299 | STA: 4+38.12
N: 1031001.1561
E: 565840.6313 | 75.00 | 66.18 | 50°33'34" | S64° 43' 13"E
64.06 |
| C3 | STA: 7+08.50
N: 1030792.3434
E: 566012.4005 | STA: 8+11.01
N: 1030713.1812
E: 566077.5193 | STA: 9+12.80
N: 1030622.4541
E: 566125.2237 | 1000.00 | 204.29 | 11°42'19" | S33° 35' 17"E
203.94 |

FIELD ENTRANCE ALIGNMENT TABLES

| Line Table: Alignments | | | | | |
|------------------------|---------------|-----------------------------------|-------------|-----------------------------------|------------------------|
| Line # | START STATION | START POINT | END STATION | END POINT | BEARING |
| L7 | 0+00.00 | N: 1031028.5101
E: 565782.7101 | 0+41.24 | N: 1031028.5101
E: 565823.9516 | N90° 00' 00"E
41.24 |
| L8 | 1+08.84 | N: 1031023.9482
E: 565891.3395 | 1+37.56 | N: 1031020.0774
E: 565919.7978 | S82° 15' 16"E
28.72 |
| L9 | 1+67.86 | N: 1031021.4744
E: 565949.9046 | 1+94.66 | N: 1031027.5289
E: 565976.0064 | N76° 56' 27"E
26.79 |

| Curve Table: Alignments | | | | | | | |
|-------------------------|---|---|---|--------|--------|-------------|------------------------|
| Curve # | PC | PI | PT | RADIUS | LENGTH | DELTA ANGLE | CHORD DIRECTION |
| C4 | STA: 0+41.24
N: 1031028.5101
E: 565823.9516 | STA: 0+75.09
N: 1031028.5101
E: 565857.7999 | STA: 1+08.84
N: 1031023.9482
E: 565891.3395 | 500.00 | 67.59 | 7°44'44" | S86° 07' 38"E
67.54 |
| C5 | STA: 1+37.56
N: 1031020.0774
E: 565919.7978 | STA: 1+52.88
N: 1031018.0124
E: 565934.9794 | STA: 1+67.86
N: 1031021.4744
E: 565949.9046 | 83.46 | 30.31 | 20°48'17" | N87° 20' 36"E
30.14 |

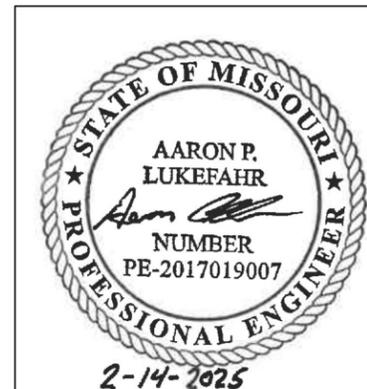


| GRAVEL ROADWAY WIDTH TABLE | | |
|----------------------------|------------|--------------------------------------|
| FROM STATION | TO STATION | ROADWAY WIDTH |
| 1+00.00 | 1+50.00 | TRANSITION FROM EXISTING TO 24'-0" |
| 1+50.00 | 1+74.85.00 | TRANSITION FROM 24'-0" TO 26'-6 1/4" |
| 1+74.85 | 4+50.00 | 26'-6 1/4" |
| 6+33.00 | 6+99.13 | 26'-6 1/4" |
| 6+99.13 | 7+08.50 | TRANSITION FROM 26'-6 1/4" TO 24'-0" |
| 7+08.50 | 8+65.00 | 24'-0" |
| 8+65.00 | 9+15.00 | TRANSITION FROM 24'-0" TO EXISTING |

TOTAL CUT= 618 C.Y.
 TOTAL FILL= 4,571 C.Y.
 NOTE: NO SHRINK/SWELL FACTORS INCLUDED IN CUT/FILL QUANTITIES

| Control Point & Bench Mark Table | | | | |
|----------------------------------|-----------|------------|-----------|-------------|
| Point # | Elevation | Northing | Easting | Description |
| CP #1 | 524.79 | 1031032.08 | 565929.65 | hvcp |
| CP #2 | 521.77 | 1030817.74 | 566019.98 | hvcp |
| CP #3 | 520.29 | 1030730.75 | 566092.37 | hvcp |
| TBM #1 | 524.08 | 1031040.76 | 565918.78 | tbm |

hvcp - HORIZONTAL VERTICAL CONTROL POINT
 tbm - TEMPORARY BENCHMARK

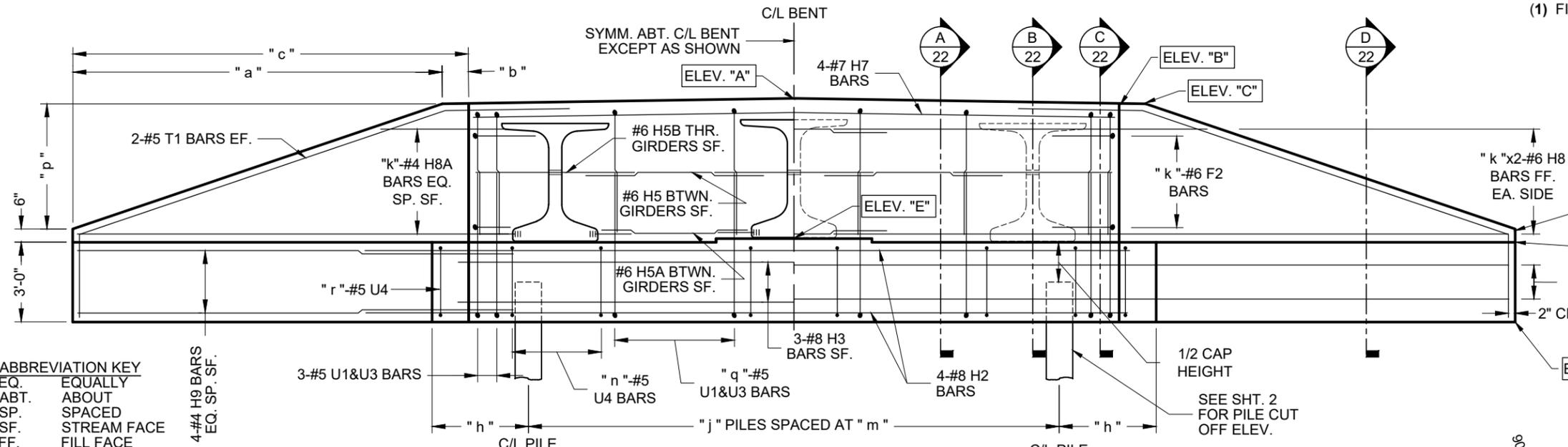


CROSS SECTIONS SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BR0-R037(001)
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

DATE: MARCH 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE

JOB NO. 23H3587



(1) FILL AREA UNDER GIRDER WITH JOINT FILLER

NOTE: SOME REBAR MAY BE OMITTED FROM SOME VIEWS FOR CLARITY

TABLE OF ELEVATIONS

| | |
|-----|--------|
| "A" | 526.75 |
| "B" | 526.56 |
| "C" | 526.54 |
| "D" | 523.41 |
| "E" | 523.01 |
| "F" | 522.91 |
| "G" | 519.91 |

3 - NU-35
(2'-11 7/16")

SEC-θ SKEW ANGLE = θ

| | |
|--------|------------|
| 1.3054 | 40° L-ADV. |
|--------|------------|

TABLE OF BENT 1&4 DIMENSION

| LABEL | VALUE |
|-------|---------------|
| "a" | 12'-6 9/16" |
| "b" | 1'-3 11/16" |
| "b2" | 3'-10 3/16" |
| "c" | 13'-10 3/16" |
| "c2" | 10'-0" |
| "d" | 31'-11 13/16" |
| "d2" | 24'-6" |
| "d3" | 39'-8 3/16" |
| "e" | 4'-2 15/16" |
| "e2" | 3'-3" |
| "f" | 11'-9" |
| "f2" | 9'-0" |
| "g" | 3'-6" |
| "h" | 4'-1 1/16" |
| "i" | 59'-8 3/16" |
| "j" | 4 |
| "k" | 4 |
| "m" | 10'-6" |
| "n" | 8 |
| "p" | 3'-1 5/8" |
| "q" | 10 |
| "r" | 5 |
| "s" | 12 |
| "y" | 2'2" |

ABBREVIATION KEY

EQ. EQUALLY

ABT. ABOUT

SP. SPACED

SF. STREAM FACE

FF. FILL FACE

EF. EACH FACE

C/L CENTER LINE

SYMM. SYMMETRICAL

ELEV. ELEVATION

TYP. TYPICAL

OPP. OPPOSITE

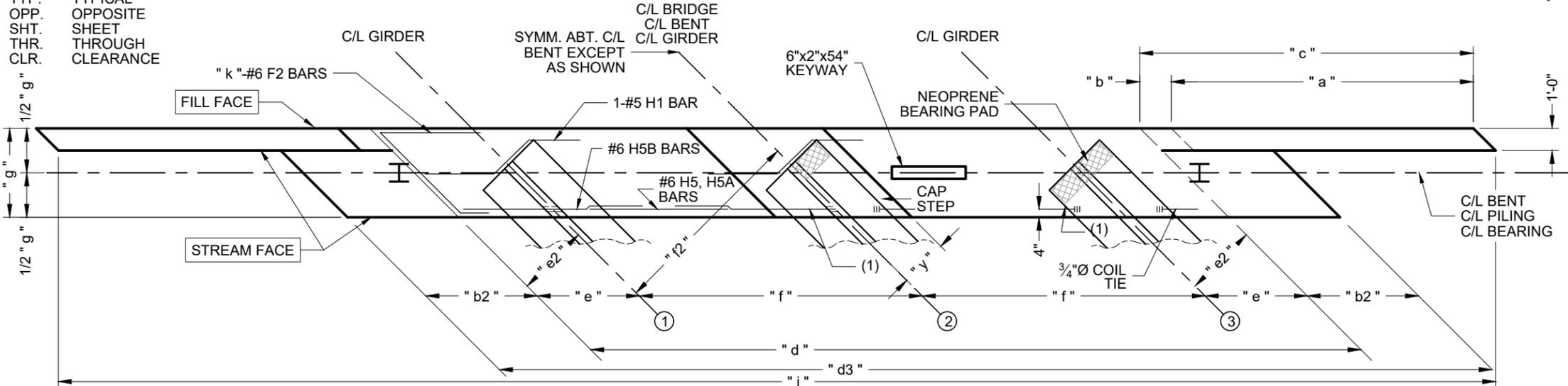
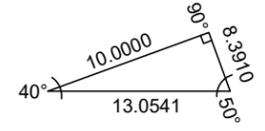
SHT. SHEET

THR. THROUGH

CLR. CLEARANCE

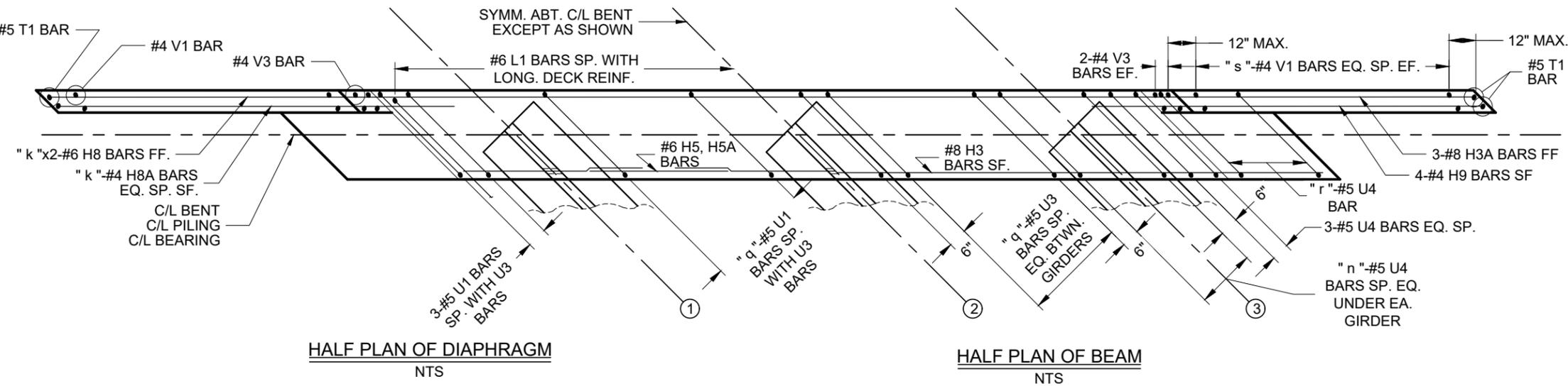
PART ELEVATION OF ABUTMENTS (STREAM FACE) NTS

PART ELEVATION OF ABUTMENTS (FILL FACE) NTS



HALF PLAN OF DIAPHRAGM NTS

HALF PLAN OF BEAM NTS



HALF PLAN OF DIAPHRAGM NTS

HALF PLAN OF BEAM NTS



HOWE COMPANY LLC

MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014693
SURVEYING #LS-2014016235

END BENT DETAIL SHEET

OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

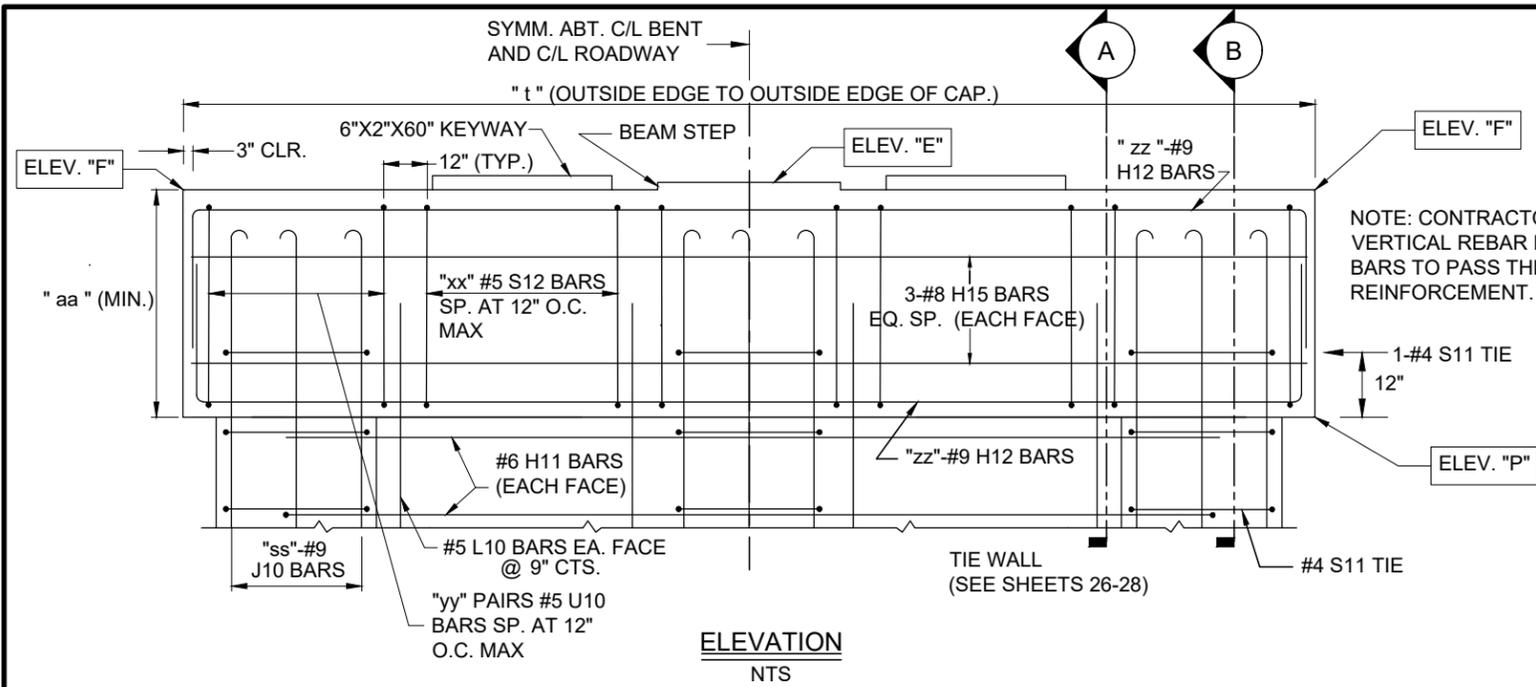
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

JOB NO. 23H3587

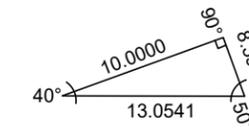
21

SHEET 21 OF 46



*(SPACE DETERMINED BY CONTRACTOR)

| | |
|---------------|-----------------------|
| 3 - NU-35 | (2'-11 7/16") |
| SEC- θ | SKEW ANGLE = θ |
| 1.3054 | 40° L-ADV. |



| TABLE OF ELEVATIONS | |
|---------------------|--------|
| "A" | 526.75 |
| "B" | 526.56 |
| "C" | 526.54 |
| "D" | 523.41 |
| "E" | 523.01 |
| "F" | 522.91 |
| "P" | 519.41 |
| "Q" | 514.00 |
| "R2" | 497.50 |
| "R3" | 497.50 |
| "S2" | 481.00 |
| "S3" | 481.00 |

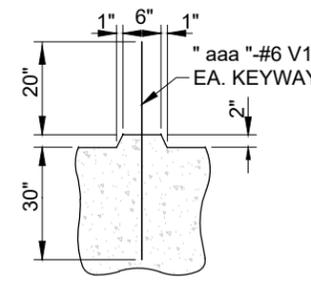
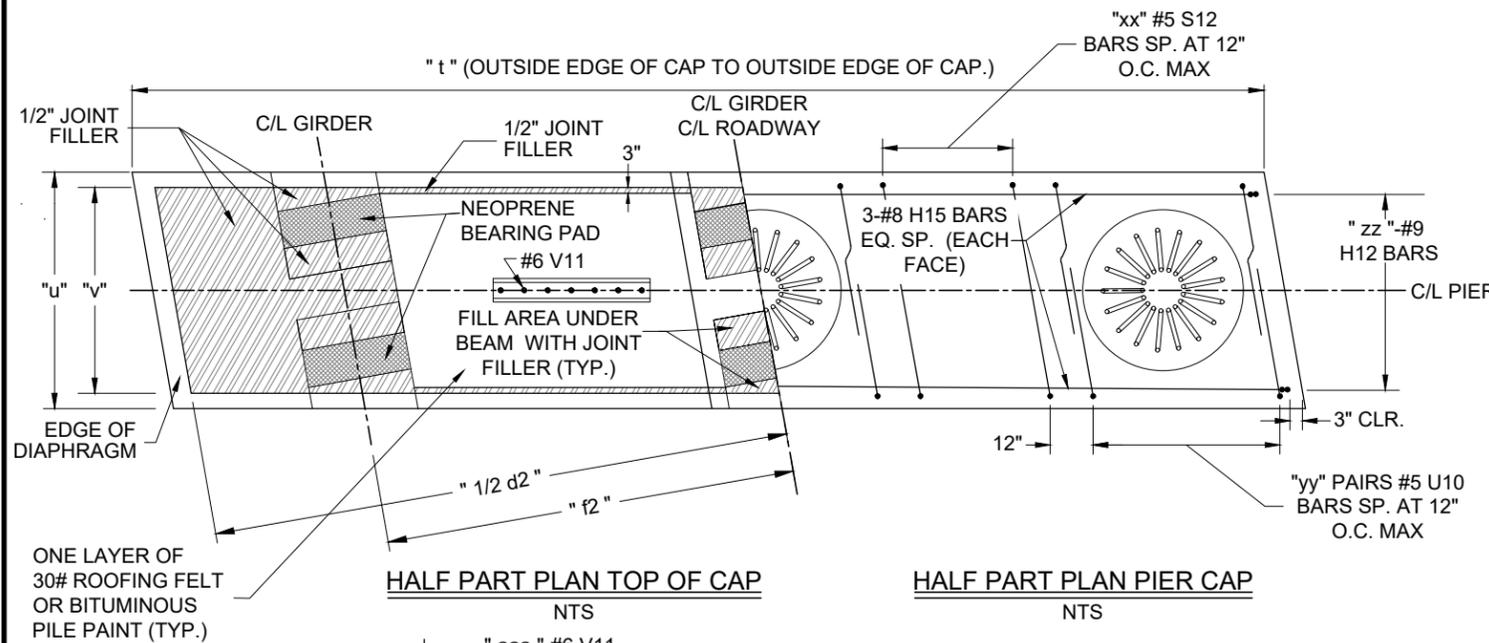
NOTES:

PLACE ADDITIONAL RUBBER JOINT FILLER BETWEEN GIRDERS AND CAP TO PREVENT CONCRETE FROM BEING PLACED UNDER LOWER GIRDER FLANGES.

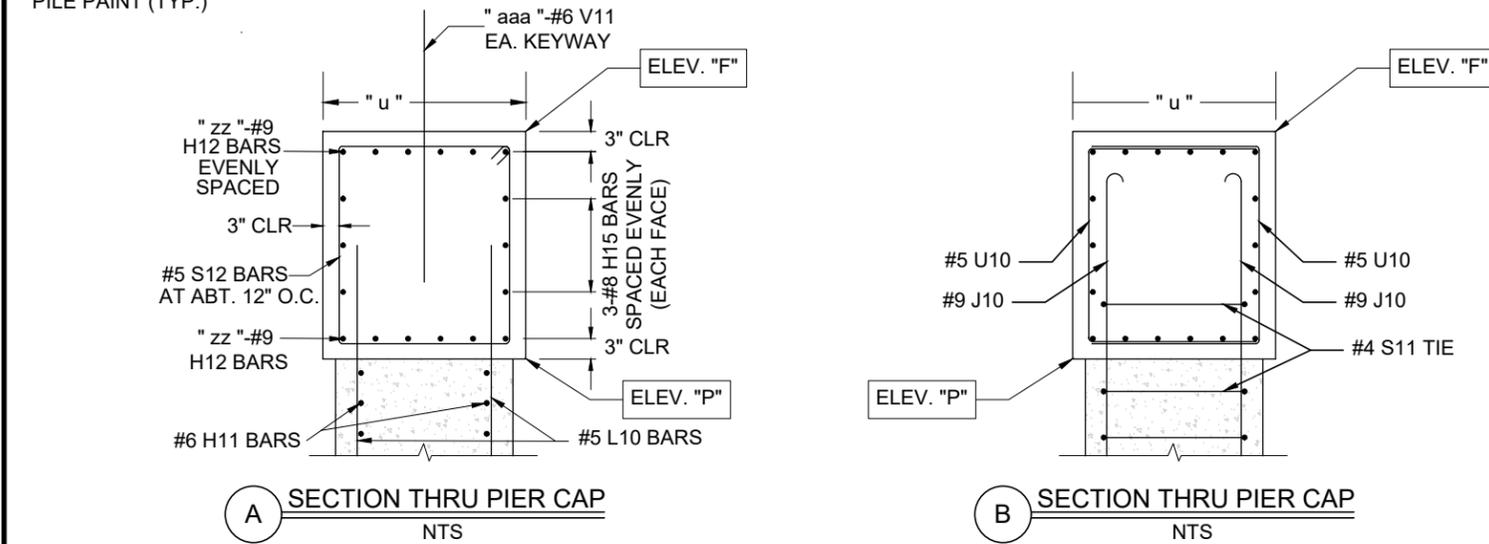
NEOPRENE BEARING PADS SHALL BE BONDED TO THE BEARING SEAT WITH AN EPOXY ADHESIVE AS APPROVED BY THE BEARING MANUFACTURERS FOR BONDING NEOPRENE TO CONCRETE.

PROVIDE 3/4" CHAMFER AROUND TOP PERIMETER, BOTTOM PERIMETER, AND AT ALL CORNERS OF PIER CAP.

| TABLE OF BENT 2&3 DIMENSION | |
|-----------------------------|-------------|
| LABEL | VALUE |
| "t" | 32'-6 1/16" |
| "u" | 4'-6" |
| "v" | 4'-0" |
| "w" | 0'-9 1/2" |
| "x" | 12'-9" |
| "z" | 2'-3" |
| "aa" | 3'-6" |
| "bb" | 5'-4 7/8" |
| "cc-2" | 16'-6" |
| "cc-3" | 16'-6" |
| "dd-2" | 16'-6" |
| "dd-3" | 16'-6" |
| "gg" | 3'-0" |
| "hh" | 2'-6" |
| "jj" | 5'-5" |
| "kk" | 2'-7 1/2" |
| "pp" | 9 |
| "qq-2" | 34 |
| "qq-3" | 34 |
| "rr" | 7 |
| "ss" | 9 |
| "tt" | 3 |
| "uu" | 6 |
| "vv" | 4 |
| "ww" | 33 |
| "xx" | 11 |
| "yy" | 5 |
| "zz" | 6 |
| "aaa" | 7 |
| "bbb" | 3 |
| "ccc" | 9 |
| "ddd" | 3 |



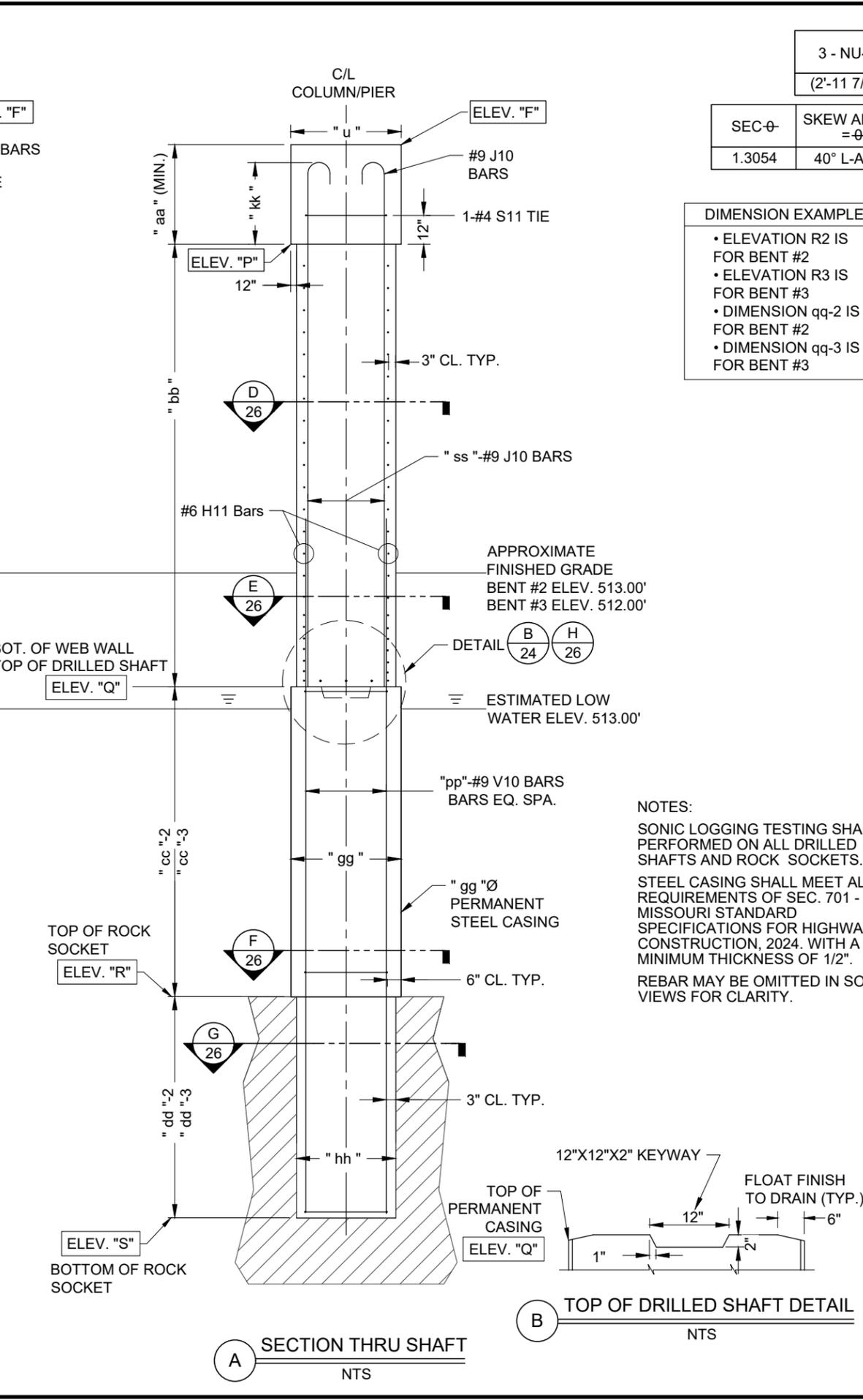
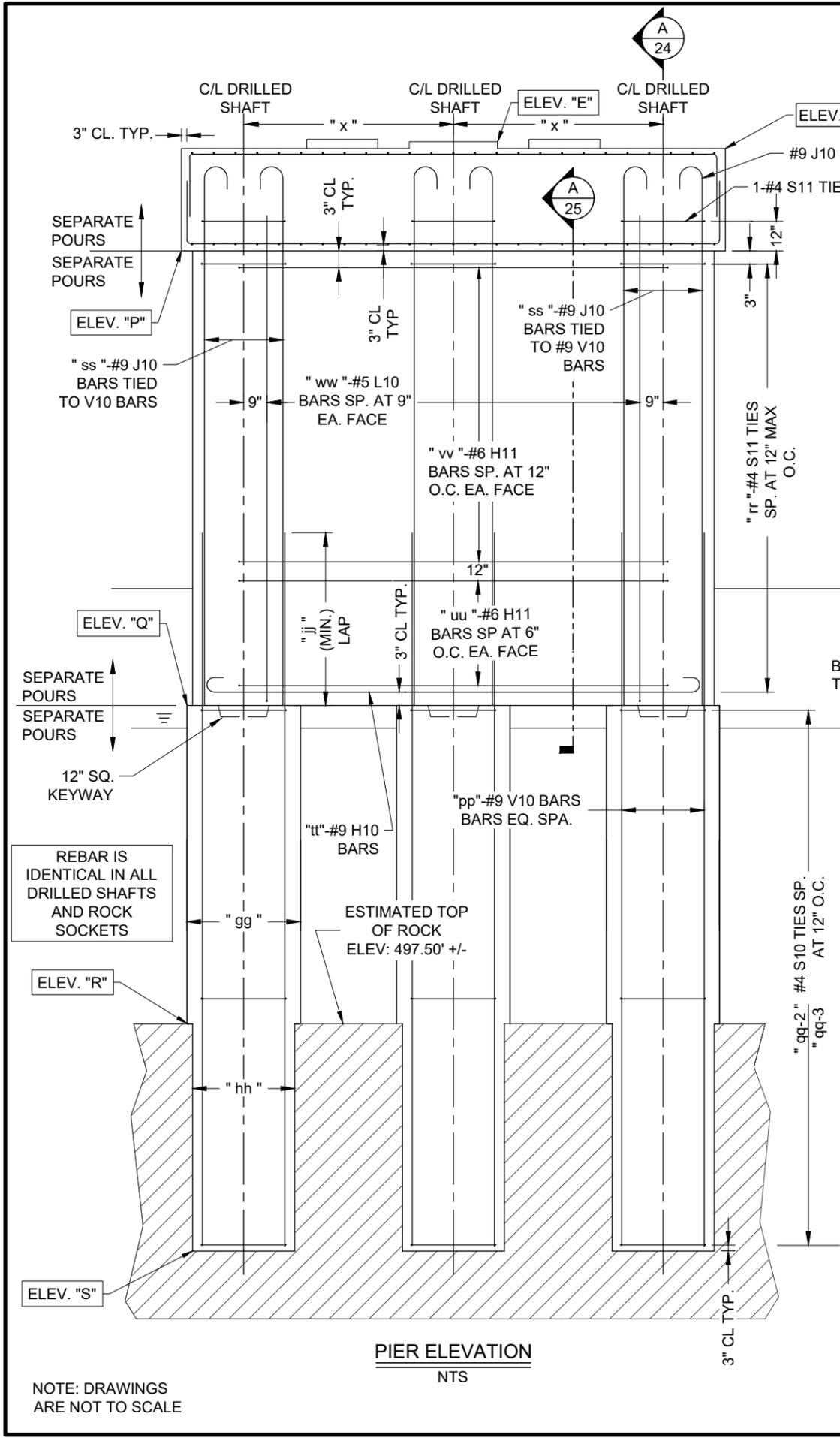
PLAIN NEOPRENE BEARING PAD SIZE ("L" x "W" x THK.)
36" x 10 1/2" x 1/2"



INTERMEDIATE BENT DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE
JOB NO. 23H3587



| | |
|----------------------------|-----------------------|
| 3 - NU-35
(2'-11 7/16") | |
| SEC- θ | SKEW ANGLE = θ |
| 1.3054 | 40° L-ADV. |

DIMENSION EXAMPLE

- ELEVATION R2 IS FOR BENT #2
- ELEVATION R3 IS FOR BENT #3
- DIMENSION qq-2 IS FOR BENT #2
- DIMENSION qq-3 IS FOR BENT #3

| | |
|------|--------|
| "A" | 526.75 |
| "B" | 526.56 |
| "C" | 526.54 |
| "D" | 523.41 |
| "E" | 523.01 |
| "F" | 522.91 |
| "P" | 519.41 |
| "Q" | 514.00 |
| "R2" | 497.50 |
| "R3" | 497.50 |
| "S2" | 481.00 |
| "S3" | 481.00 |

| LABEL | VALUE |
|--------|-------------|
| "t" | 32'-6 1/16" |
| "u" | 4'-6" |
| "v" | 4'-0" |
| "w" | 0'-9 1/2" |
| "x" | 12'-9" |
| "z" | 2'-3" |
| "aa" | 3'-6" |
| "bb" | 5'-4 7/8" |
| "cc-2" | 16'-6" |
| "cc-3" | 16'-6" |
| "dd-2" | 16'-6" |
| "dd-3" | 16'-6" |
| "gg" | 3'-0" |
| "hh" | 2'-6" |
| "jj" | 5'-5" |
| "kk" | 2'-7 1/2" |
| "pp" | 9 |
| "qq-2" | 34 |
| "qq-3" | 34 |
| "rr" | 7 |
| "ss" | 9 |
| "tt" | 3 |
| "uu" | 6 |
| "vv" | 4 |
| "ww" | 33 |
| "xx" | 11 |
| "yy" | 5 |
| "zz" | 6 |
| "aaa" | 7 |
| "bbb" | 3 |
| "ccc" | 9 |
| "ddd" | 3 |

NOTES:

SONIC LOGGING TESTING SHALL BE PERFORMED ON ALL DRILLED SHAFTS AND ROCK SOCKETS.

STEEL CASING SHALL MEET ALL REQUIREMENTS OF SEC. 701 - MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, 2024. WITH A MINIMUM THICKNESS OF 1/2".

REBAR MAY BE OMITTED IN SOME VIEWS FOR CLARITY.



Howe Company LLC
 Missouri State Certificate of Authority
 Engineering #E-2014014993
 Surveying #LS-2014016235

INTERMEDIATE BENT DETAILS SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
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 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

DATE: DECEMBER 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE

JOB NO. 23H3543

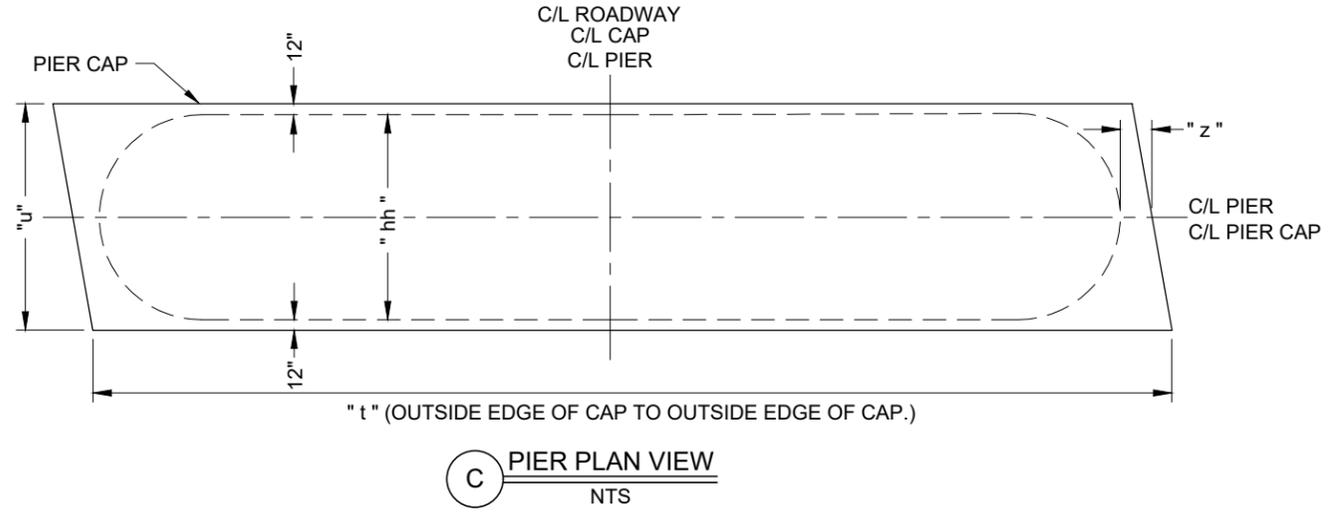
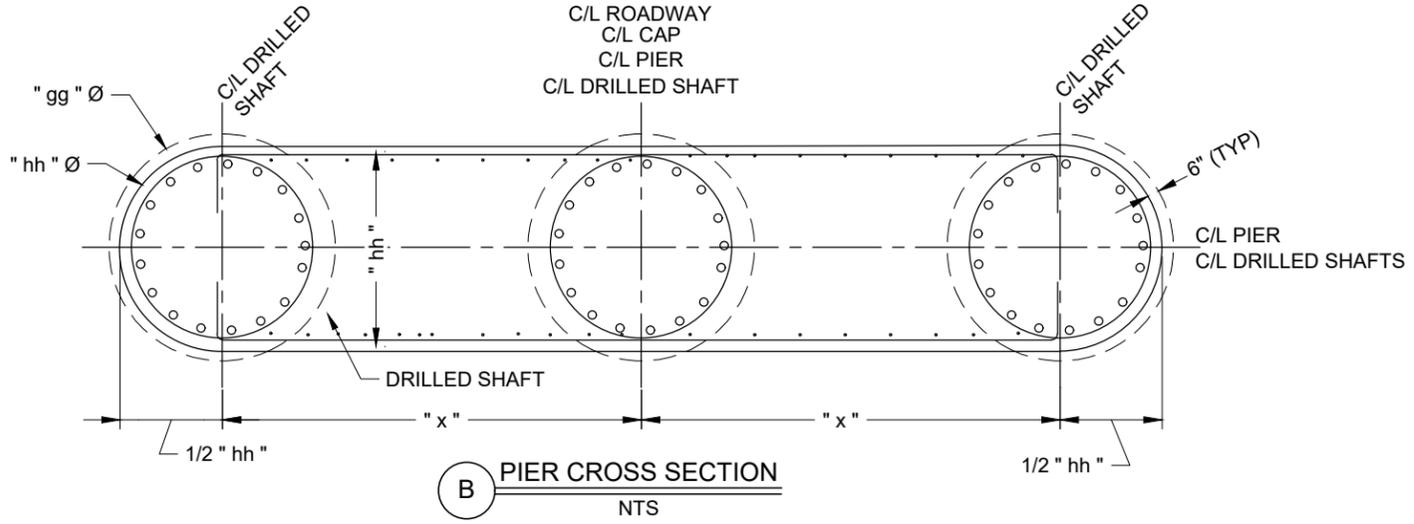
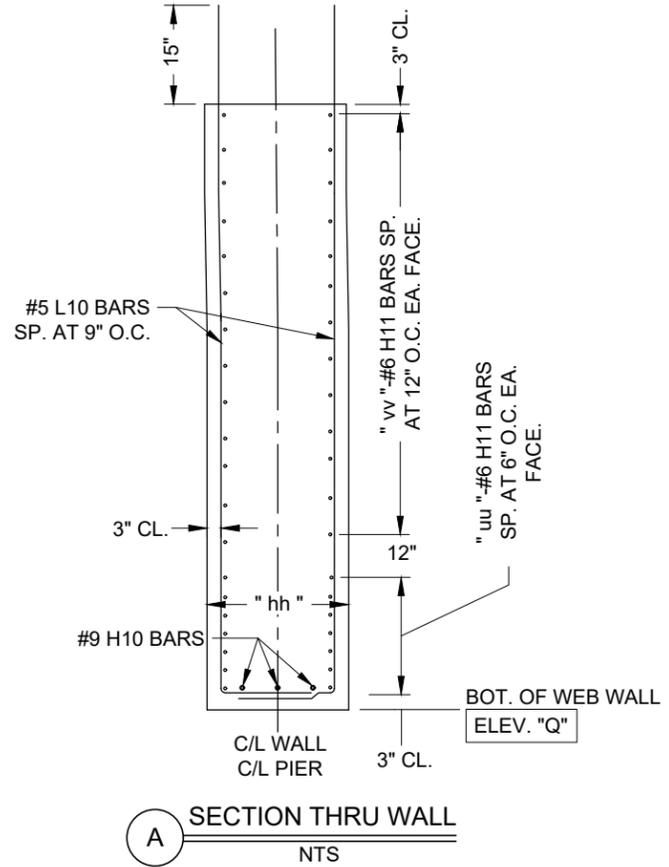
24

SHEET 24 OF 46

| | |
|----------------------------|--------------------------|
| 3 - NU-35
(2'-11 7/16") | |
| SEC- θ | SKEW ANGLE
= θ |
| 1.3054 | 40° L-ADV. |

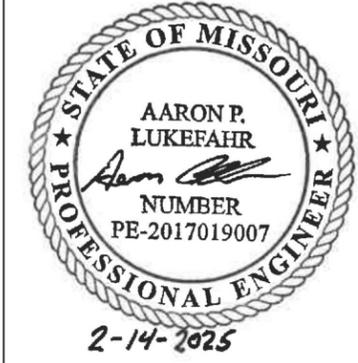
| TABLE OF ELEVATIONS | |
|---------------------|--------|
| "A" | 526.75 |
| "B" | 526.56 |
| "C" | 526.54 |
| "D" | 523.41 |
| "E" | 523.01 |
| "F" | 522.91 |
| "P" | 519.41 |
| "Q" | 514.00 |
| "R2" | 497.50 |
| "R3" | 497.50 |
| "S2" | 481.00 |
| "S3" | 481.00 |

| TABLE OF BENT 2&3 DIMENSION | |
|-----------------------------|-------------|
| LABEL | VALUE |
| "t" | 32'-6 1/16" |
| "u" | 4'-6" |
| "v" | 4'-0" |
| "w" | 0'-9 1/2" |
| "x" | 12'-9" |
| "z" | 2'-3" |
| "aa" | 3'-6" |
| "bb" | 5'-4 7/8" |
| "cc-2" | 16'-6" |
| "cc-3" | 16'-6" |
| "dd-2" | 16'-6" |
| "dd-3" | 16'-6" |
| "gg" | 3'-0" |
| "hh" | 2'-6" |
| "jj" | 5'-5" |
| "kk" | 2'-7 1/2" |
| "pp" | 9 |
| "qq-2" | 34 |
| "qq-3" | 34 |
| "rr" | 7 |
| "ss" | 9 |
| "tt" | 3 |
| "uu" | 6 |
| "vv" | 4 |
| "ww" | 33 |
| "xx" | 11 |
| "yy" | 5 |
| "zz" | 6 |
| "aaa" | 7 |
| "bbb" | 3 |
| "ccc" | 9 |
| "ddd" | 3 |

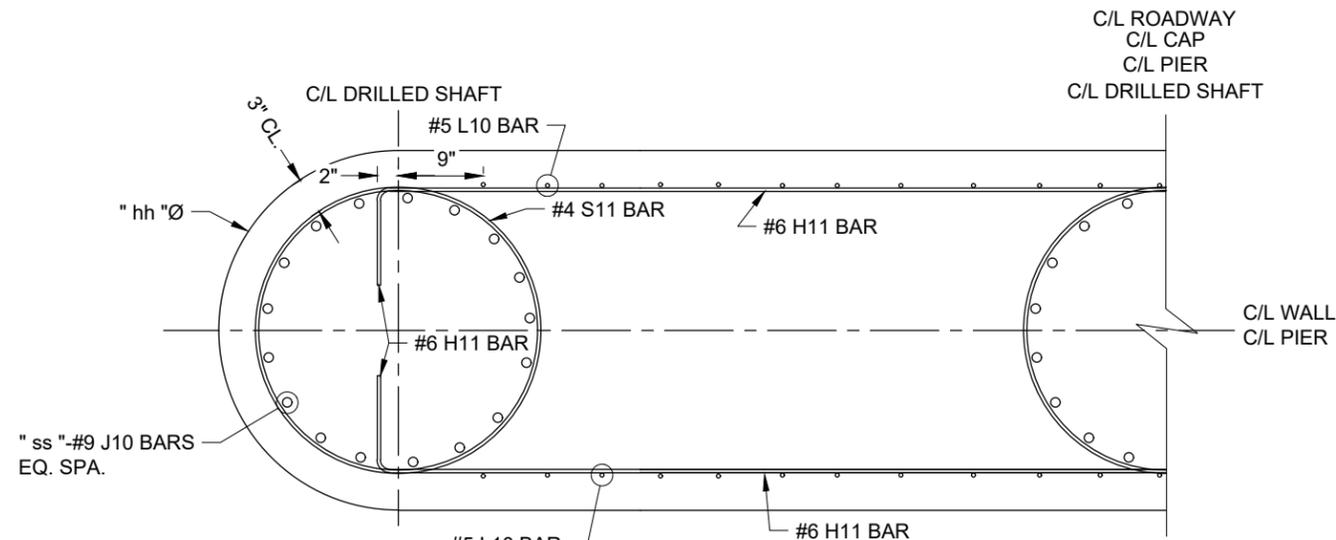


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 GASCONADE COUNTY, MISSOURI

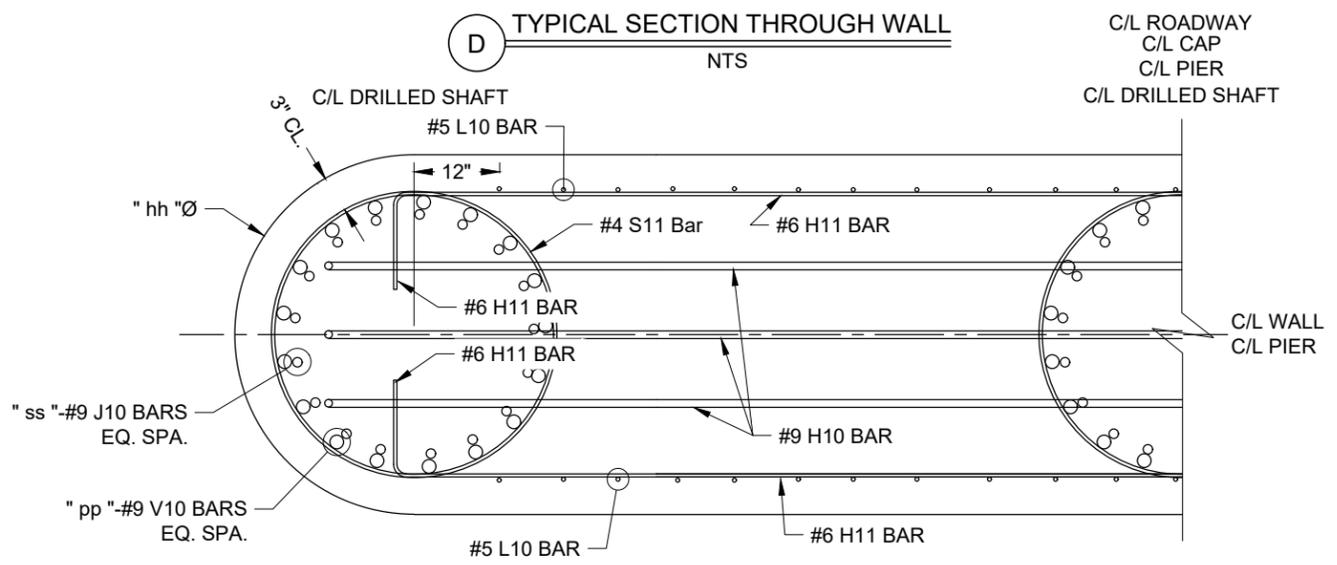
HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693



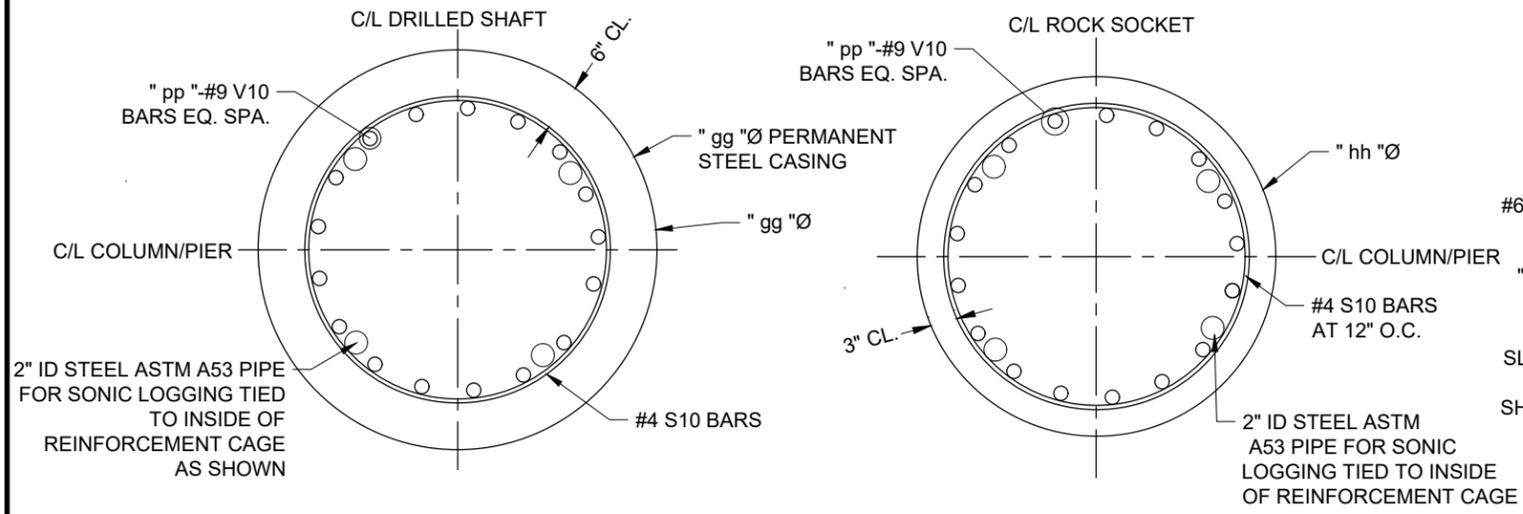
DATE: DECEMBER 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE



D TYPICAL SECTION THROUGH WALL
NTS

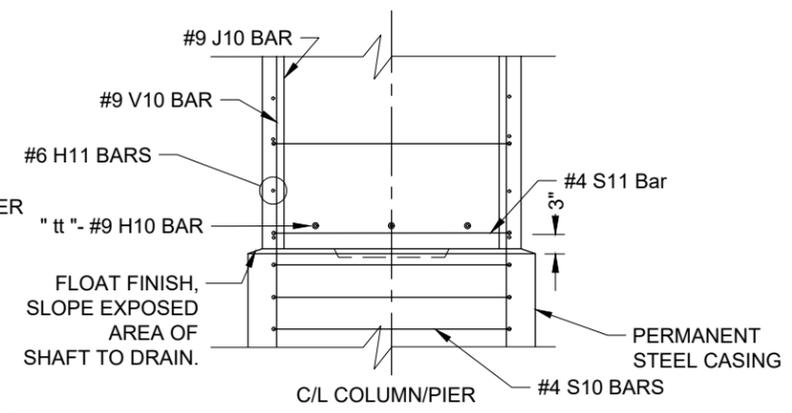


E TYPICAL SECTION THROUGH WALL
NTS



F TYPICAL SECTION THRU DRILLED SHAFT
NTS

G TYPICAL SECTION THRU ROCK SOCKET
NTS

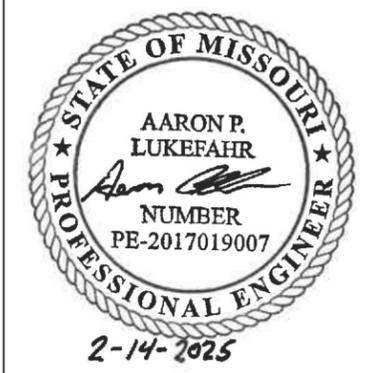


H KEYWAY DETAIL
NTS

| | |
|---------------|----------------|
| 3 - NU-35 | |
| (2'-11 7/16") | |
| SEC-Ø | SKEW ANGLE = Ø |
| 1.3054 | 40° L-ADV. |

| TABLE OF ELEVATIONS | |
|---------------------|--------|
| "A" | 526.75 |
| "B" | 526.56 |
| "C" | 526.54 |
| "D" | 523.41 |
| "E" | 523.01 |
| "P" | 519.41 |
| "Q" | 514.00 |
| "R2" | 497.50 |
| "R3" | 497.50 |
| "S2" | 481.00 |
| "S3" | 481.00 |

| TABLE OF BENT 2&3 DIMENSION | |
|-----------------------------|-------------|
| LABEL | VALUE |
| " t " | 32'-6 1/16" |
| " u " | 4'-6" |
| " v " | 4'-0" |
| " w " | 0'-9 1/2" |
| " x " | 12'-9" |
| " z " | 2'-3" |
| " aa " | 3'-6" |
| " bb " | 5'-4 7/8" |
| " cc-2 " | 16'-6" |
| " cc-3 " | 16'-6" |
| " dd-2 " | 16'-6" |
| " dd-3 " | 16'-6" |
| " gg " | 3'-0" |
| " hh " | 2'-6" |
| " jj " | 5'-5" |
| " kk " | 2'-7 1/2" |
| " pp " | 9 |
| " qq-2 " | 34 |
| " qq-3 " | 34 |
| " rr " | 7 |
| " ss " | 9 |
| " tt " | 3 |
| " uu " | 6 |
| " vv " | 4 |
| " ww " | 33 |
| " xx " | 11 |
| " yy " | 5 |
| " zz " | 6 |
| " aaa " | 7 |
| " bbb " | 3 |
| " ccc " | 9 |
| " ddd " | 3 |



Howe Company LLC
Missouri State Certificate of Authority
Engineering #E-2014014993
Surveying #LS-2014016235

| NO. | DESCRIPTION | DATE | APPR. |
|-----|-------------|------|-------|
| | | | |

INTERMEDIATE BENT DETAILS SHEET
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CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

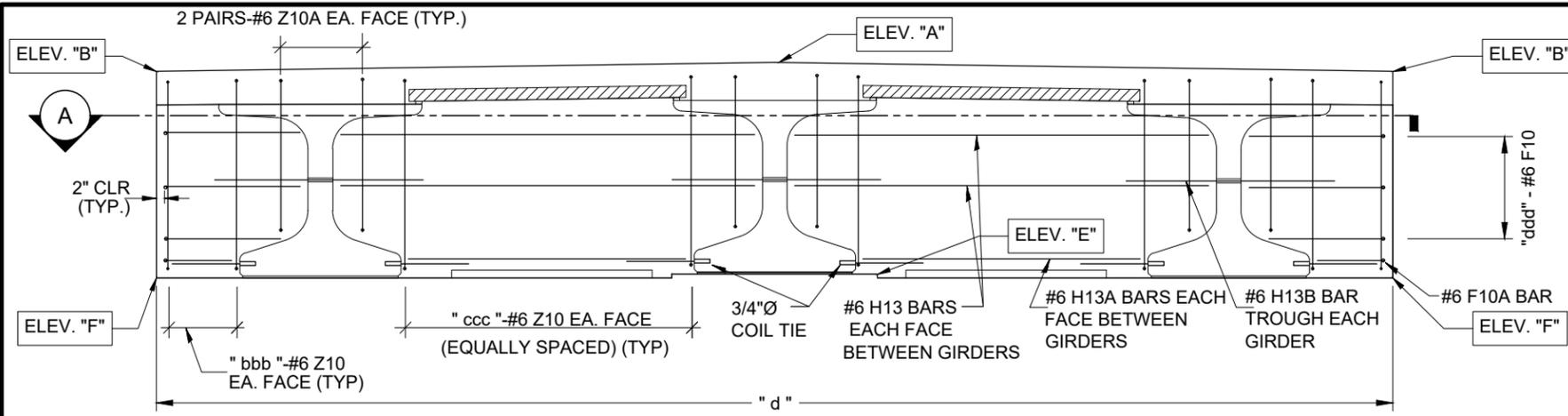
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

JOB NO. 23H3543

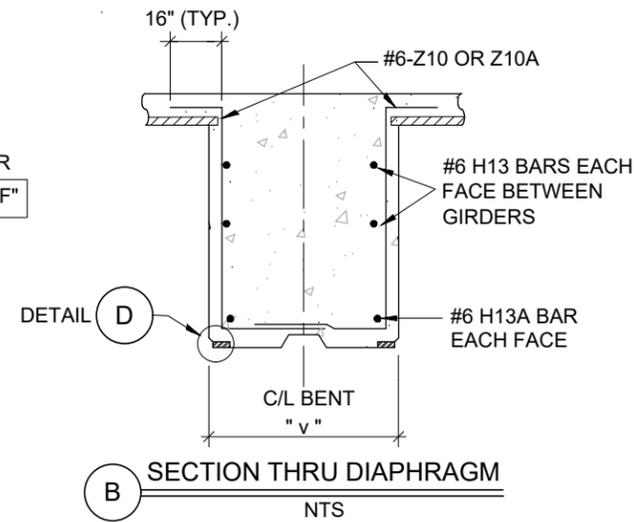
26

SHEET 26 OF 46



PROFILE VIEW INTERMEDIATE BENT DIAPHRAGM (ALONG C/L PIER)

NTS

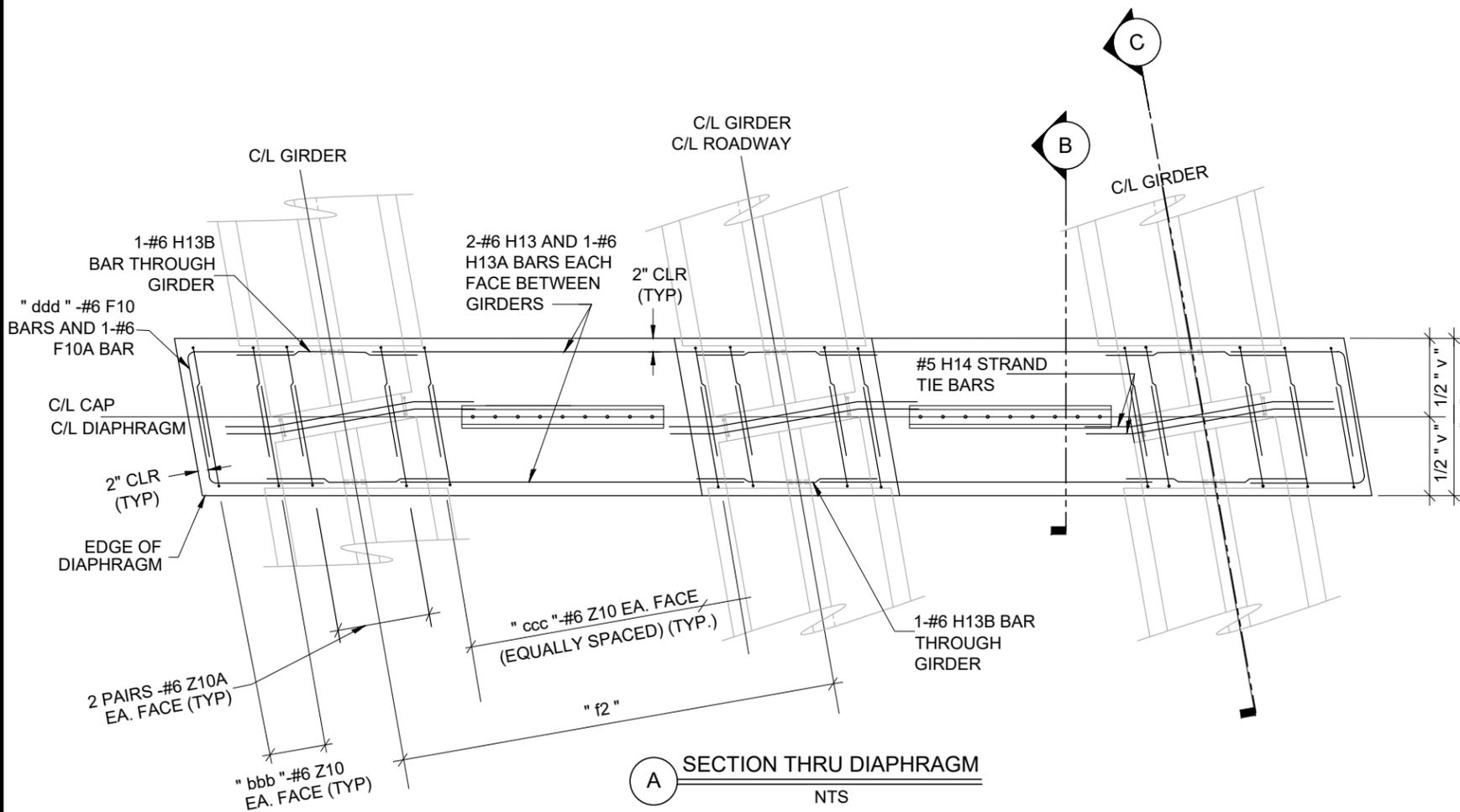


SECTION THRU DIAPHRAGM

NTS

| TABLE OF ELEVATIONS | |
|---------------------|--------|
| "A" | 526.75 |
| "B" | 526.56 |
| "C" | 526.54 |
| "D" | 523.41 |
| "E" | 523.01 |
| "F" | 522.91 |
| "P" | 519.41 |
| "Q" | 514.00 |
| "R2" | 497.50 |
| "R3" | 497.50 |
| "S2" | 481.00 |
| "S3" | 481.00 |

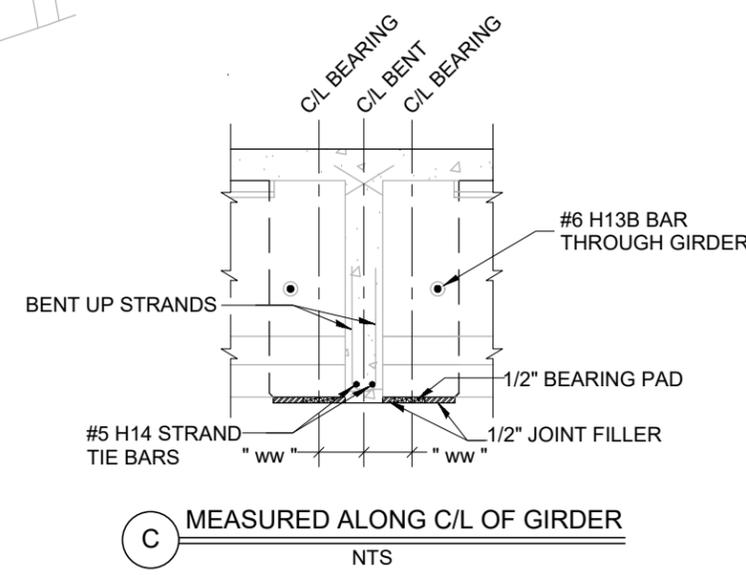
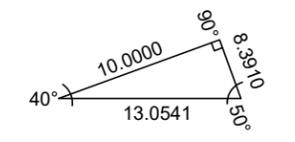
| TABLE OF BENT 2&3 DIMENSION | |
|-----------------------------|-------------|
| LABEL | VALUE |
| "t" | 32'-6 1/16" |
| "u" | 4'-6" |
| "v" | 4'-0" |
| "w" | 0'-9 1/2" |
| "x" | 12'-9" |
| "z" | 2'-3" |
| "aa" | 3'-6" |
| "bb" | 5'-4 7/8" |
| "cc-2" | 16'-6" |
| "cc-3" | 16'-6" |
| "dd-2" | 16'-6" |
| "dd-3" | 16'-6" |
| "gg" | 3'-0" |
| "hh" | 2'-6" |
| "jj" | 5'-5" |
| "kk" | 2'-7 1/2" |
| "pp" | 9 |
| "qq-2" | 34 |
| "qq-3" | 34 |
| "rr" | 7 |
| "ss" | 9 |
| "tt" | 3 |
| "uu" | 6 |
| "vv" | 4 |
| "ww" | 33 |
| "xx" | 11 |
| "yy" | 5 |
| "zz" | 6 |
| "aaa" | 7 |
| "bbb" | 3 |
| "ccc" | 9 |
| "ddd" | 3 |



SECTION THRU DIAPHRAGM

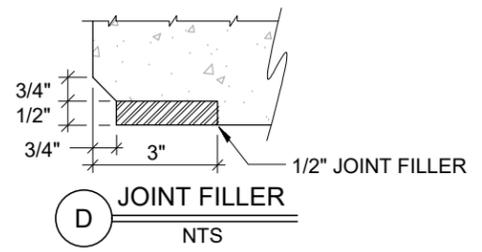
NTS

| | |
|---------------|----------------|
| 3 - NU-35 | |
| (2'-11 7/16") | |
| SEC-φ | SKEW ANGLE = φ |
| 1.3054 | 40° L-ADV. |



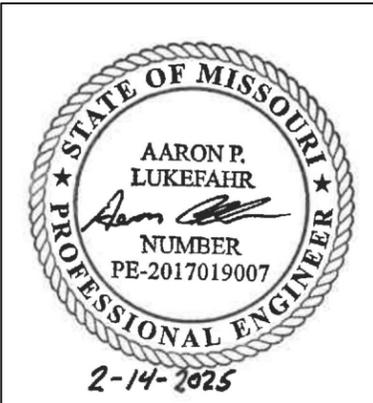
MEASURED ALONG C/L OF GIRDER

NTS



JOINT FILLER

NTS

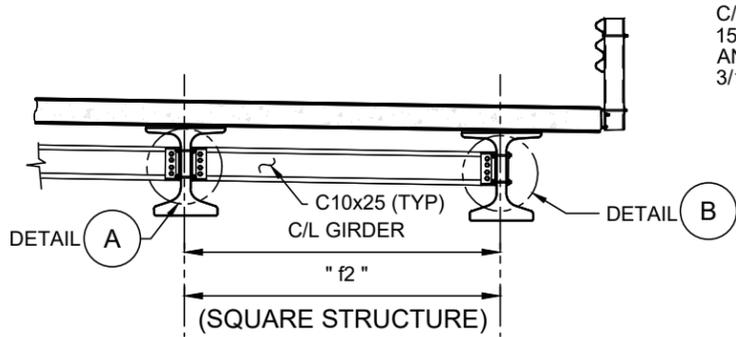


INTERMEDIATE DIAPHRAGM DETAILS SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD
 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

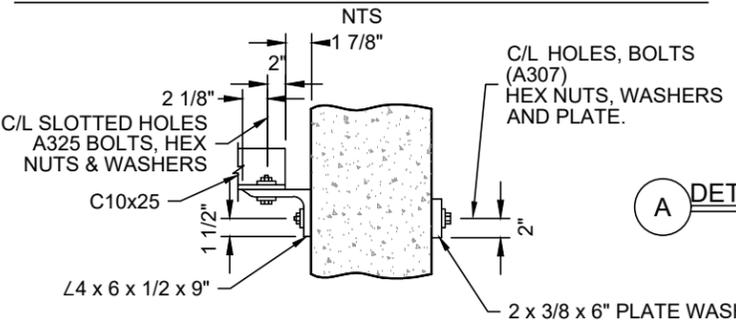
DATE: DECEMBER 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE

JOB NO. 23H3587

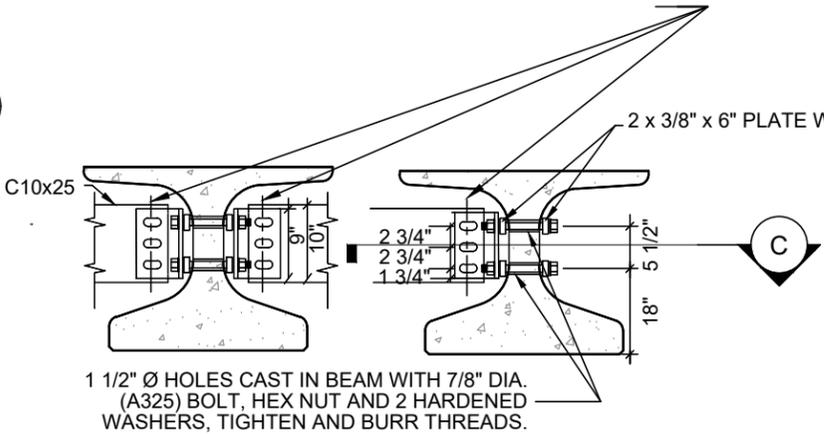


C/L THREE 1 1/16" X 2 1/4" HORIZONTAL SLOTTED HOLES IN 6" LEG OF 6 X 4 X 1/2 X 9" ANGLE. THREE 15/16" Ø HOLES IN CHANNEL, THREE 7/8" Ø A325 BOLTS WITH HEX NUTS, THREE 2 1/2" O.D. WASHERS AND 6 HARDENED WASHERS. IN LIEU OF 2 1/2" O.D. WASHERS, CONTRACTOR MAY SUBSTITUTE A 3/16" (MIN. THICKNESS) PLATE WITH THREE 15/16" Ø HOLES AND 1 HARDENED WASHER PER BOLT.

PART SECTION SHOWING INTERMEDIATE DIAPHRAGMS



SECTION DETAIL C
NTS



DETAILS OF INTERMEDIATE DIAPHRAGMS WITHIN SPANS
A: DETAIL OF INT. DIAPHRAGM NTS
B: DETAIL OF INT. DIAPHRAGM NTS

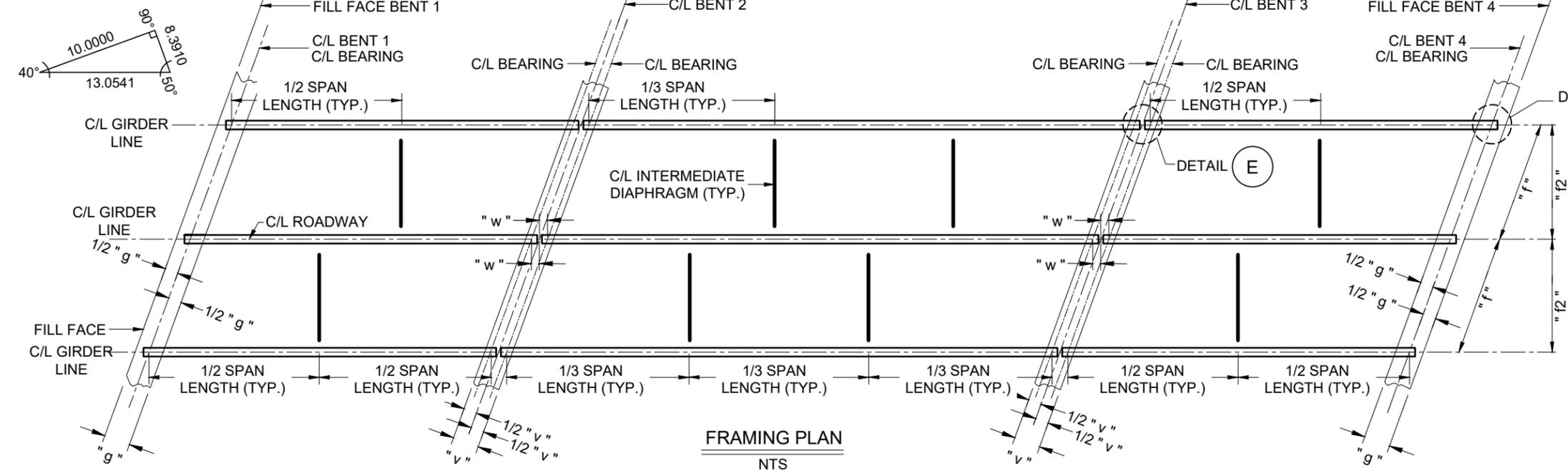
THE 1 1/2" Ø HOLES FOR CONNECTION OF STEEL INTERMEDIATE DIAPHRAGMS (WHEN REQUIRED) SHALL BE CAST IN WEB. DRILLING IS NOT ALLOWED.

TABLE OF BENT DIMENSION

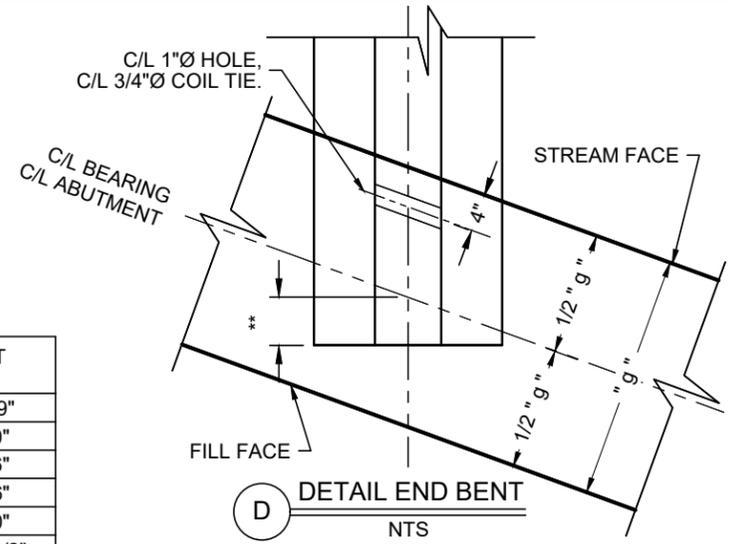
| | |
|------|-----------|
| "f" | 11'-9" |
| "f2" | 9'-0" |
| "g" | 3'-6" |
| "u" | 4'-6" |
| "v" | 4'-0" |
| "w" | 0'-9 1/2" |

- NOTES:**
- ALL BOLTS MAY BE TENSIONED BY TURN-OF-NUT METHOD.
 - ALL DIAPHRAGM MATERIALS INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.
 - FABRICATED STRUCTURAL STEEL SHALL BE AASHTO M270 GR 36 EXCEPT AS NOTED. PAYMENT FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN CONTRACT UNIT PRICE FOR PRESTRESSED CONCRETE I-GIRDERS. SHOP DRAWINGS WILL NOT BE REQUIRED FOR STEEL INTERMEDIATE DIAPHRAGMS AND ANGLE CONNECTIONS.
 - COST OF 3/4" COIL TIE RODS PLACED IN DIAPHRAGMS SHALL BE INCIDENTAL TO PRESTRESSED CONCRETE GIRDERS.

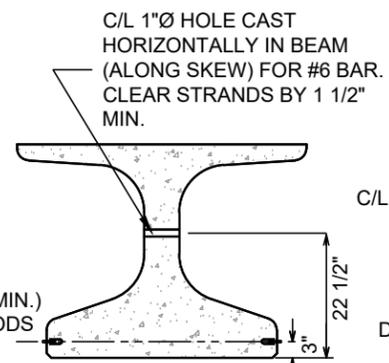
| | |
|--------|----------------|
| SEC-Ø | SKEW ANGLE = Ø |
| 1.3054 | 40° L-ADV. |



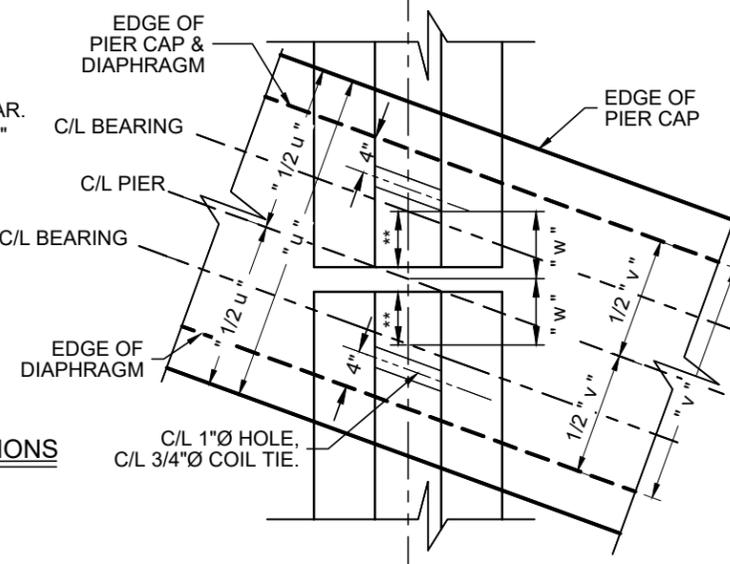
FRAMING PLAN
NTS



DETAIL END BENT D
NTS



DETAILS OF COIL TIES AT END BENTS - CROSS SECTIONS
NTS



DETAIL INT. BENT E
NTS



Howe Company LLC

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ENGINEERING #E-2014014693
SURVEYING #LS-2014015235

INTERMEDIATE DIAPHRAGM DETAILS SHEET
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CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

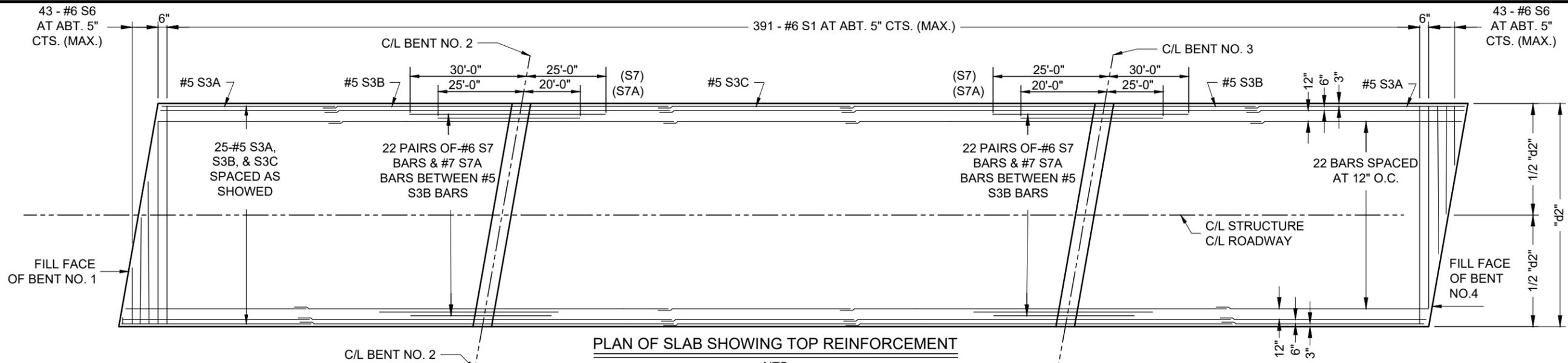
HOWE COMPANY, LLC
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OFFICE: 660-395-4693

| | | | |
|-----|-------------|------|-------|
| NO. | DESCRIPTION | DATE | APPR. |
| | | | |

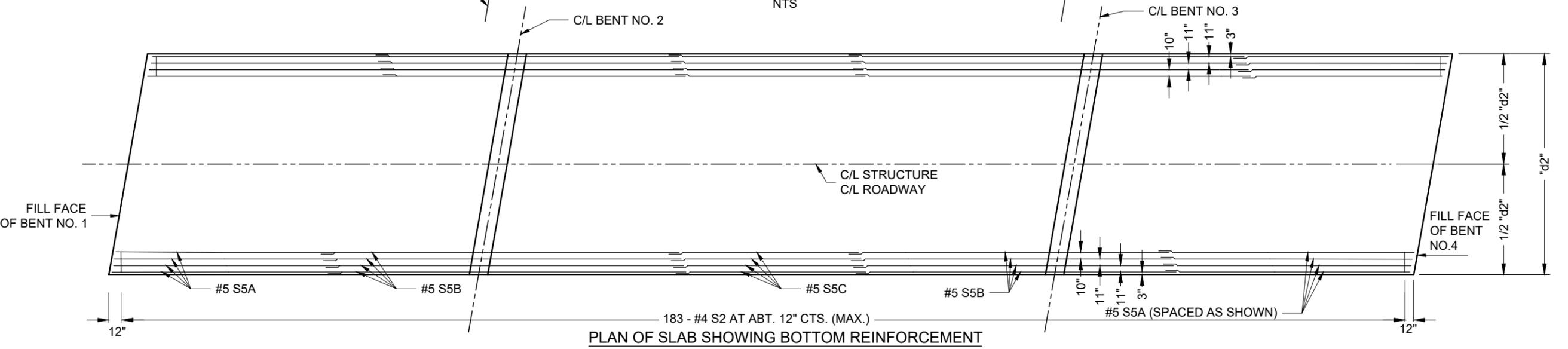
DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE
JOB NO. 23H3587

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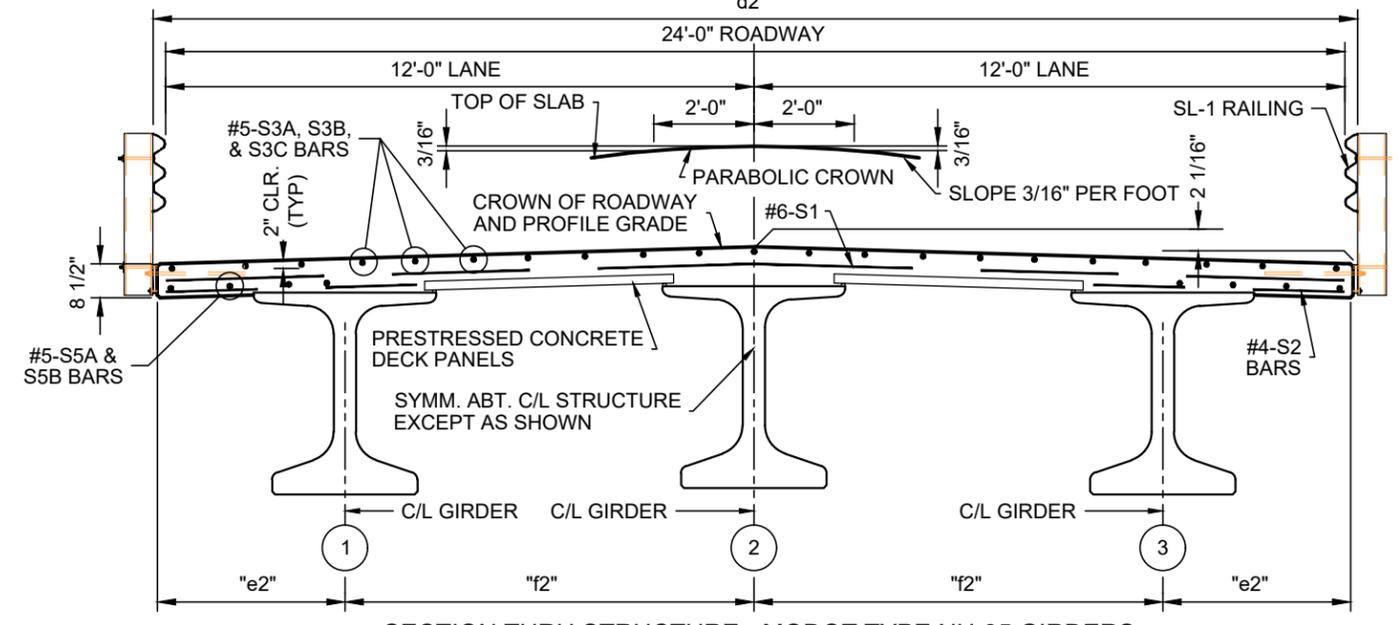
SHEET 28 OF 46



PLAN OF SLAB SHOWING TOP REINFORCEMENT



PLAN OF SLAB SHOWING BOTTOM REINFORCEMENT

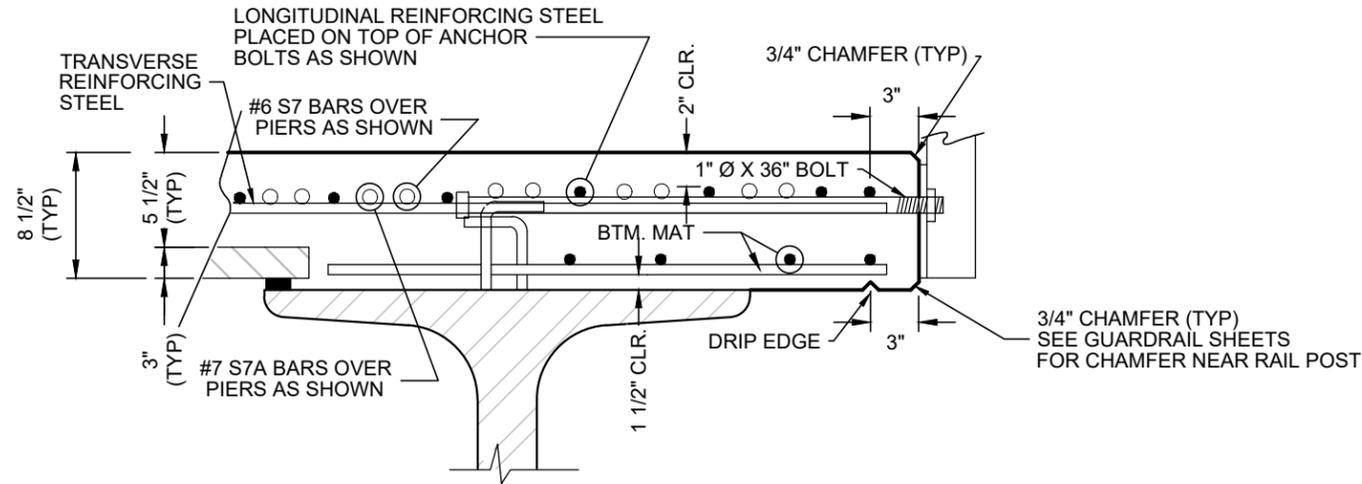


SECTION THRU STRUCTURE - MODOT TYPE NU-35 GIRDERS

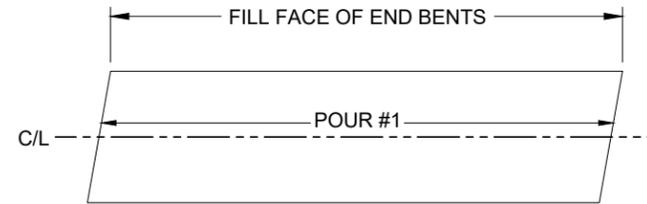
| TABLE OF BENT DIMENSION | |
|-------------------------|--------|
| "d2" | 24'-6" |
| "e2" | 3'-3" |
| "f2" | 9'-0" |



| | | | | | | | |
|--|--|--|--|---|--|--|--|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | <small>MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014693
SURVEYING #LS-2014015235</small> | | | |
| <small>SLAB DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI</small> | | | | HOWE COMPANY, LLC
<small>804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693</small> | | | |
| <small>DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE</small> | | | | <small>JOB NO. 23H3587</small> | | | |
| | | | | <p style="font-size: 24pt; margin: 0;">29</p> <p style="font-size: 12pt; margin: 0;">SHEET 29 OF 46</p> | | | |



DETAIL OF EDGE OF SLAB
NTS



| SEQUENCE OF POURS | |
|-------------------|--------|
| POUR SEQUENCE | 1 |
| DIRECTION | EITHER |

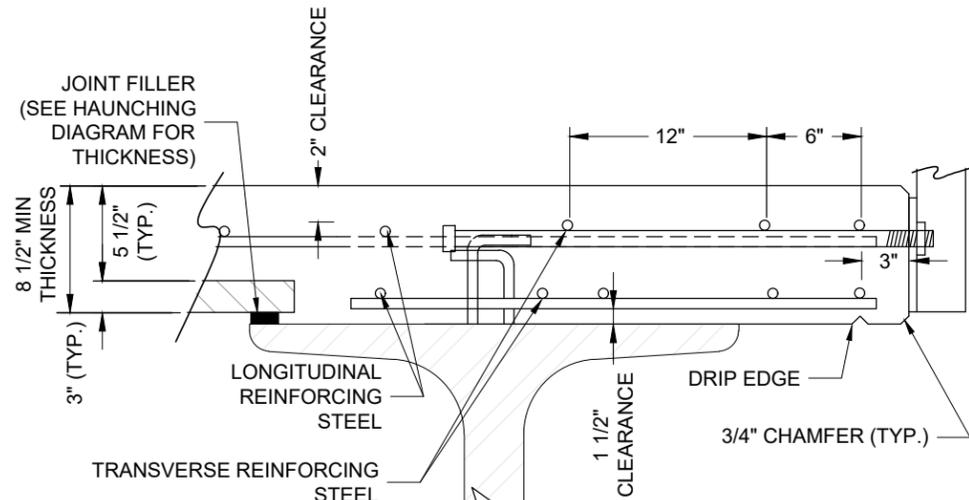
ALTERNATIVE POURS TO THE BASIC SEQUENCE ARE SUBJECT TO THE APPROVAL OF THE ENGINEER IN ACCORDANCE WITH SECTION 703.3.12.4 OF MISSOURI STANDARD SPECIFICATIONS

THE CONTRACTOR SHALL FURNISH AN APPROVED RETARDER TO RETARD THE SET OF THE CONCRETE TO 2.5 HOURS AND SHALL POUR AND SATISFACTORILY FINISH THE SLAB POURS AT THE RATE GIVEN.

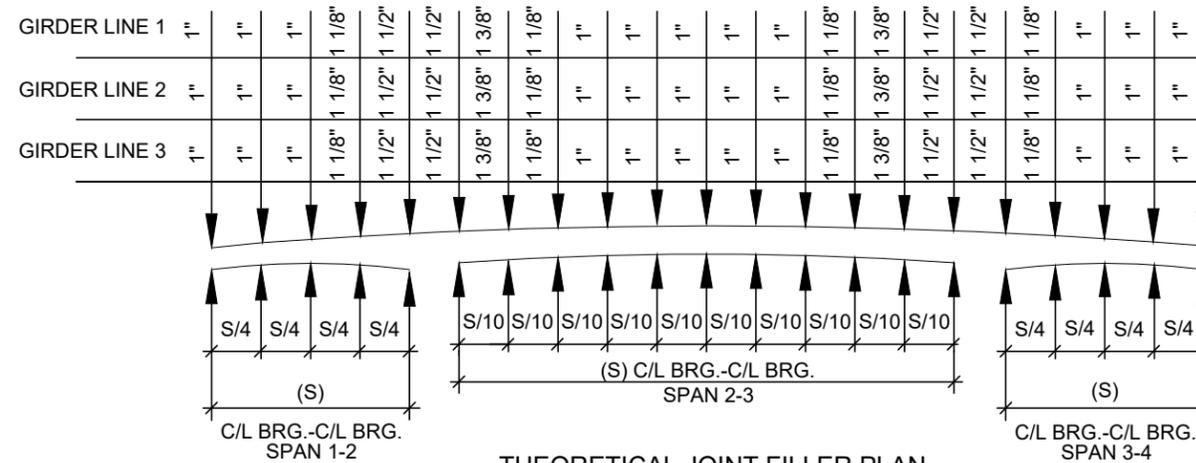
THE DIAPHRAGM AT INTEGRAL END BENTS SHALL BE POURED A MINIMUM OF 30 MINUTES AND A MAXIMUM OF 2 HOURS BEFORE THE SLAB IS POURED.

MINIMUM RATE OF POUR SHALL BE 25 CY/HOUR

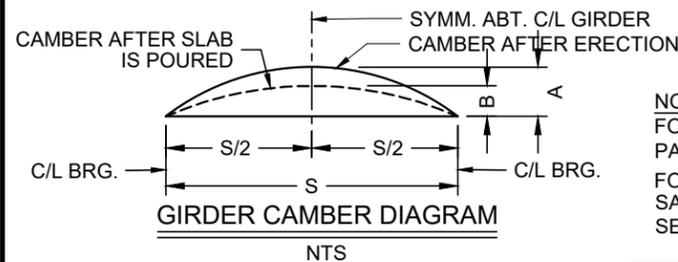
SLAB POURING SEQUENCE
NTS



DETAIL OF EDGE OF SLAB
NTS



THEORETICAL JOINT FILLER PLAN
NTS



GIRDER CAMBER DIAGRAM
NTS

NOTES: FOR DETAILS OF OPTIONAL SLAB FORMS, SEE "DETAILS OF PRESTRESS PANELS" SHEET.

FOR DETAILS AND REINFORCEMENT OF SAFETY BARRIER CURB NOT SHOWN, SEE "SAFETY BARRIER CURB DETAILS" SHEET.

NOTE: CAMBER AT 1/4 POINT OF GIRDER IS EQUAL TO 0.7125 CAMBER AT CENTERLINE OF GIRDER.

| GIRDER CAMBER DIMENSIONS | | | | | |
|--------------------------|-------------------|-----------------|------|-----------------|------|
| NU-35 (2'-11 7/16") | NUMBER OF STRANDS | EXTERIOR GIRDER | | INTERIOR GIRDER | |
| | | A | B | A | B |
| SPAN 1-2 | 14 | 5/8" | 1/2" | 5/8" | 1/2" |
| SPAN 2-3 | 26 | 2 1/2" | 3/4" | 2 1/2" | 3/4" |
| SPAN 3-4 | 14 | 5/8" | 1/2" | 5/8" | 1/2" |

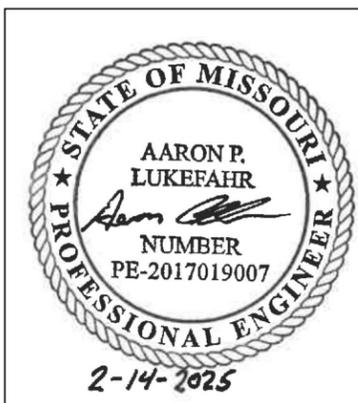
NOTES:
IF GIRDER CAMBER IS DIFFERENT FROM THAT SHOWN IN THE CAMBER DIAGRAM, IT SHALL BE NECESSARY TO ADJUST THE SLAB HAUNCHES, INCREASE THE SLAB THICKNESS OR TO RAISE THE GRADE UNIFORMLY THROUGHOUT THE STRUCTURE. NO PAYMENT WILL BE MADE FOR ADDITIONAL LABOR OR MATERIALS REQUIRED FOR VARIATION IN HAUNCHING SLAB THICKNESS OR GRADE.



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SLAB DETAILS SHEET
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GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693



DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE
JOB NO. 23H3587

CONCRETE FOR PRESTRESSED GIRDERS SHALL BE CLASS A-1 WITH $f'_c = 7000$ PSI AND $f'_ci = 6000$ PSI.

(+) INDICATES PRESTRESSING STRAND.

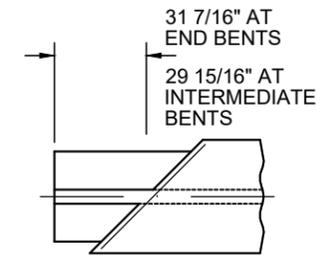
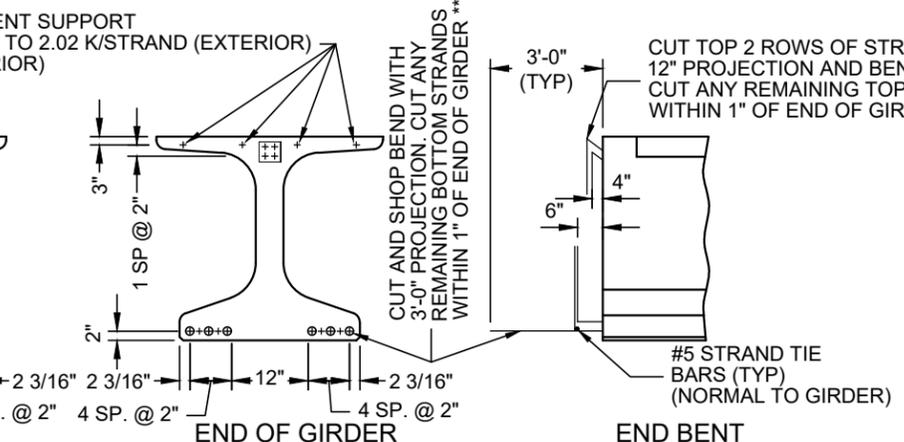
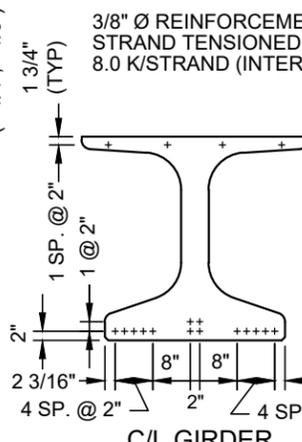
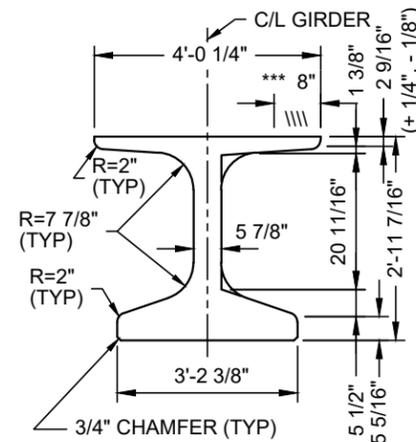
USE 14 STRANDS WITH A INITIAL PRESTRESS FORCE OF 615 KIPS.

PRESTRESSING TENDONS SHALL BE UNCOATED, SEVEN-WIRE, LOW-RELAXATION STRANDS, 0.6 INCH DIAMETER IN ACCORDANCE WITH AASHTO M 203, GRADE 270. PRETENSIONED MEMBERS SHALL BE IN ACCORDANCE WITH SEC 1029.

GIRDERS SHALL BE LIFTED BY DEVICES DESIGNED BY THE FABRICATOR.

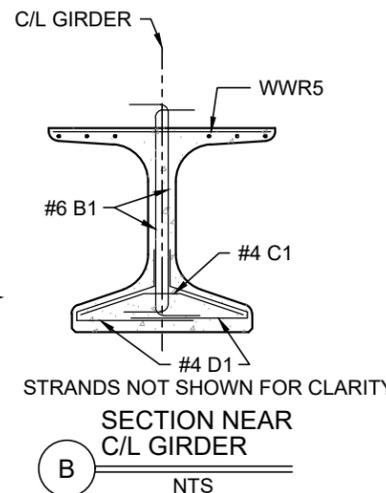
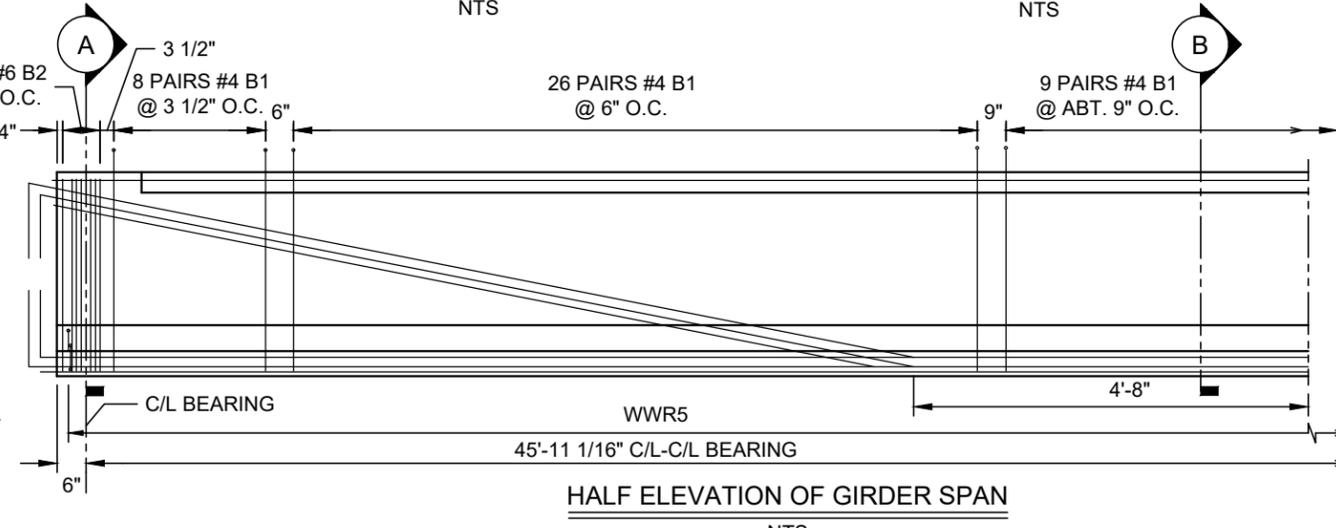
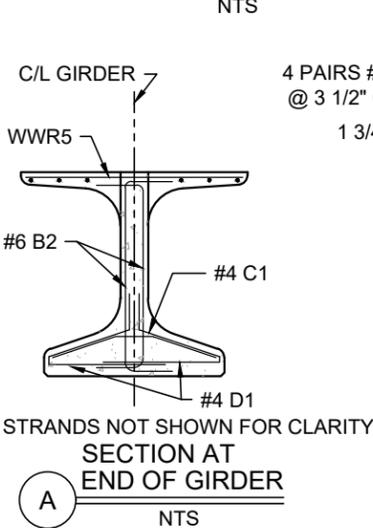
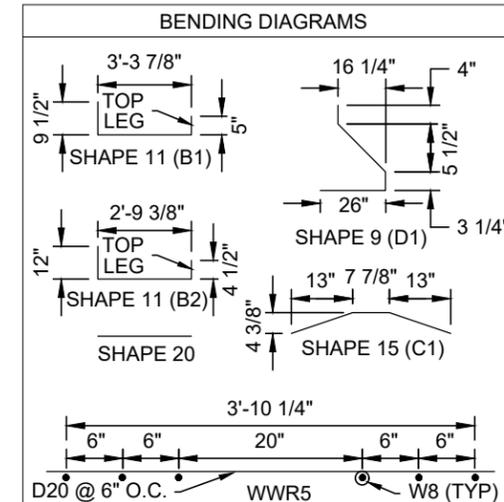
** AT THE CONTRACTOR'S OPTION THE LOCATION FOR BENT-UP STRANDS MAY BE VARIED FROM THAT SHOWN. THE TOTAL NUMBER OF BENT-UP STRANDS SHALL NOT BE CHANGED. ONE STRAND TIE BAR IS REQUIRED FOR EACH LAYER OF BENT-UP STRANDS EXCEPT AT END BENTS WHICH REQUIRE ONE BAR ON THE BOTTOM LAYER OF STRANDS ONLY. NO ADDITIONAL PAYMENT WILL BE MADE IF ADDITIONAL STRAND TIE BARS ARE REQUIRED.

*** GIRDER TOP FLANGE SHALL BE STEEL TROWELED TO A SMOOTH FINISH FOR 8" AT THE EDGES, AS SHOWN. BOND BREAKER SHALL BE APPLIED TO THIS REGION ONLY. THE CENTER PORTION SHALL BE ROUGH FINISHED BY SCARIFYING THE SURFACE TRANSVERSELY WITH A WIRE BRUSH, AND NO LAITANCE SHALL REMAIN ON THE SURFACE.



| REINFORCING STEEL (EACH 16 STRAND GIRDER) | | | |
|---|---------------|-------------|-----|
| SHAPE | ACTUAL LENGTH | SIZE & MARK | NO. |
| 11 | 4'-4" | 4-B1 | 154 |
| 11 | 3'-8" | 6-B2 | 16 |
| 15 | 2'-11 1/4" | 4-C1 | 85 |
| 9 | 4'-10 3/8" | 4-D1 | 170 |

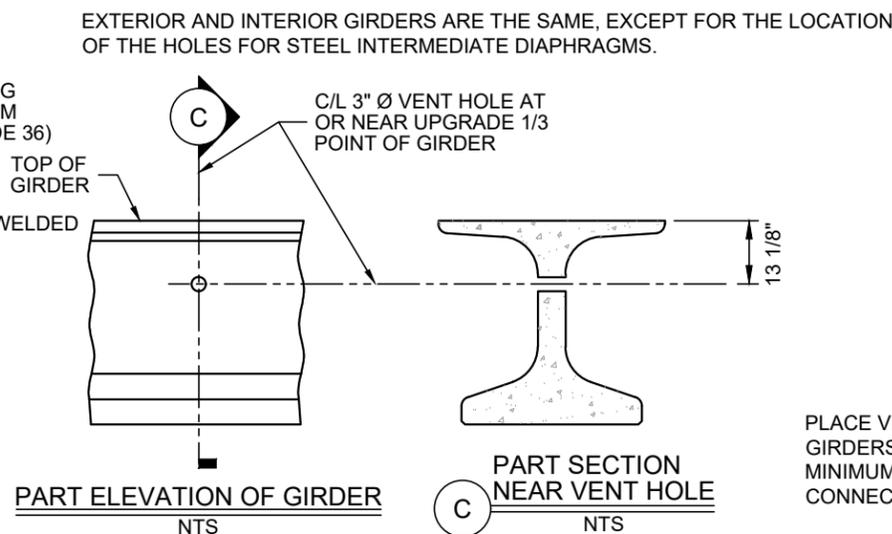
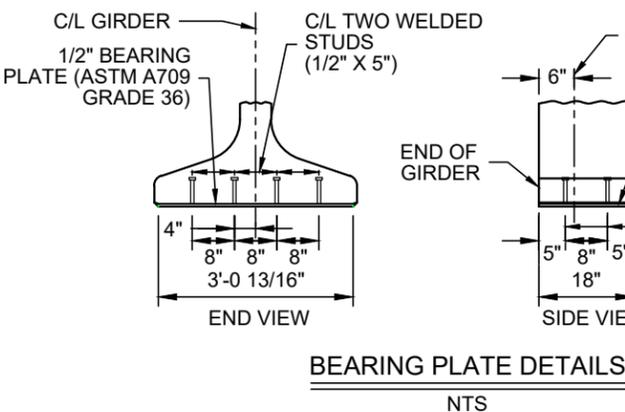
NOTE: THE TWO D1 BARS MAY BE FURNISHED AS ONE BAR AT THE FABRICATORS OPTION.



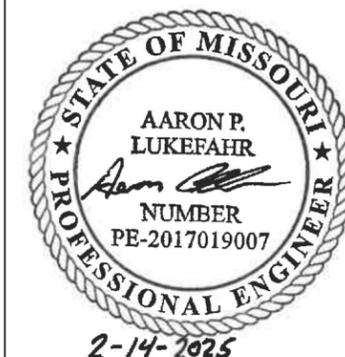
REINFORCING STEEL NOTES:
 REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31, GRADE 60. WELDED WIRE REINFORCEMENT (WWR) SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 221. ALL DIMENSIONS ARE OUT TO OUT. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, STIRRUP AND TIE DIMENSIONS. MINIMUM CLEARANCE TO REINFORCING SHALL BE 1", UNLESS OTHERWISE SHOWN. ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE OF BAR TO THE NEAREST INCH.

PLACE VENT HOLES AT OR NEAR UPGRADE 1/3 POINT OF GIRDERS AND CLEAR REINFORCING STEEL OR STRANDS BY 1 1/2" MINIMUM AND STEEL INTERMEDIATE DIAPHRAGM BOLT CONNECTIONS BY 6" MINIMUM.

NOTE: THIS DRAWING IS NOT TO SCALE. FOLLOW DIMENSIONS.



SPAN 1-2 AND 3-4



GALVANIZE THE 1/2" BEARING PLATE (ASTM A709 GRADE 36) IN ACCORDANCE WITH ASTM A123.

COST OF FURNISHING, GALVANIZING, AND INSTALLING THE 1/2" BEARING PLATE (ASTM A709 GRADE 36) AND WELDED STUDS IN THE PRESTRESSED GIRDER WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR PRESTRESSED CONCRETE NU-GIRDER.



NU-35 GIRDER DETAILS SHEET
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 APPROVED BY: S. HOWE

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31

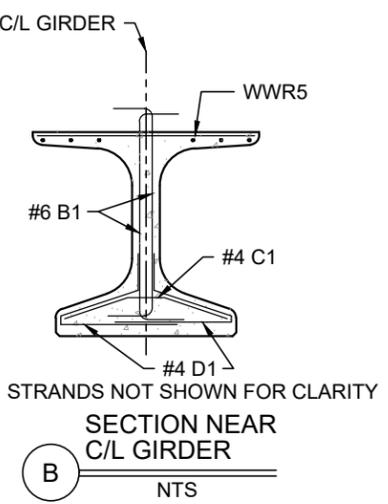
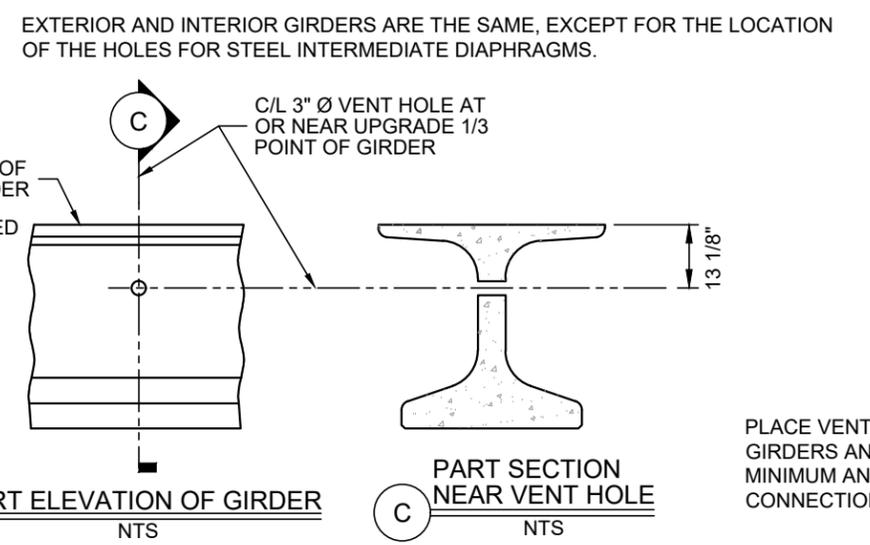
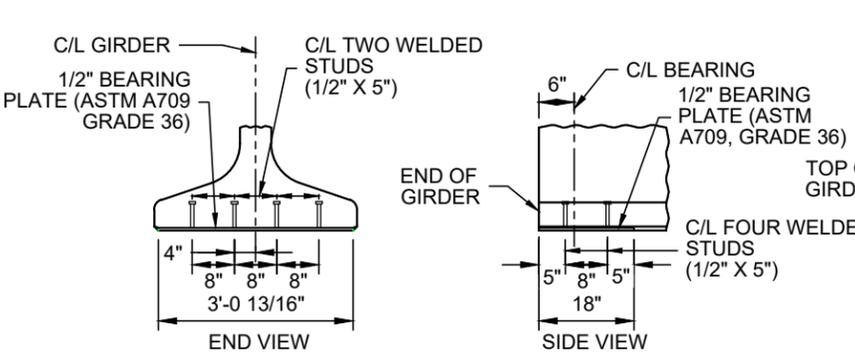
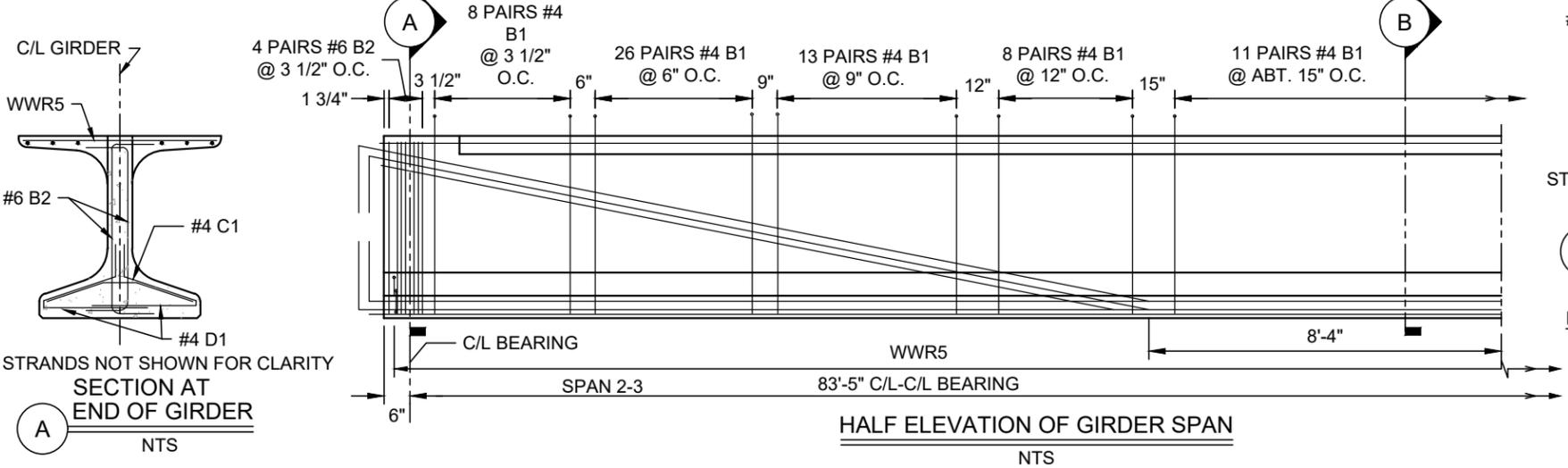
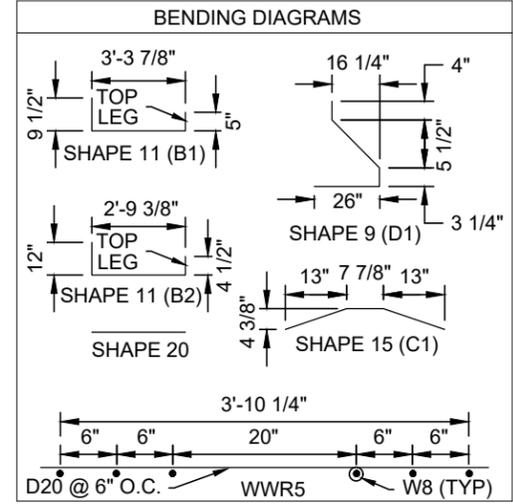
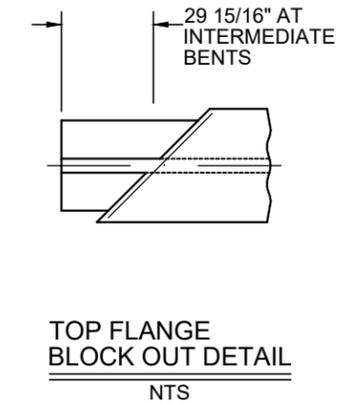
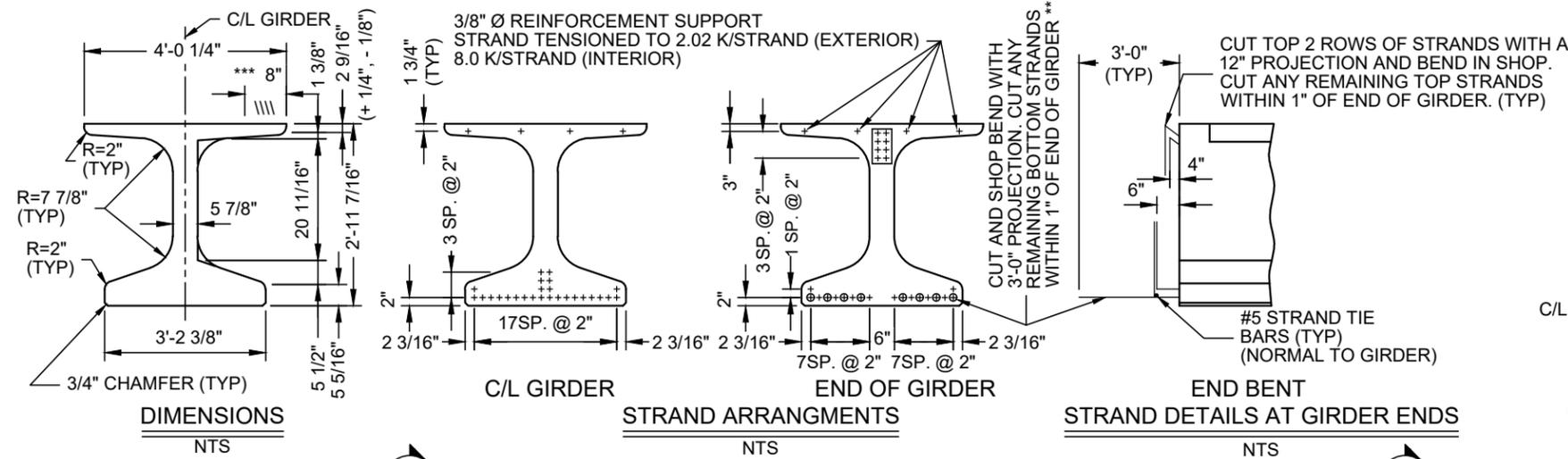
SHEET 31 OF 46

CONCRETE FOR PRESTRESSED GIRDERS SHALL BE CLASS A-1 WITH F'C = 7000 PSI AND F'CI = 6000 PSI.
 (+) INDICATES PRESTRESSING STRAND.
 USE 26 STRANDS WITH A INITIAL PRESTRESS FORCE OF 1143 KIPS.
 PRESTRESSING TENDONS SHALL BE UNCOATED, SEVEN-WIRE, LOW-RELAXATION STRANDS, 0.6 INCH DIAMETER IN ACCORDANCE WITH AASHTO M 203, GRADE 270. PRETENSIONED MEMBERS SHALL BE IN ACCORDANCE WITH SEC 1029.

GIRDERS SHALL BE LIFTED BY DEVICES DESIGNED BY THE FABRICATOR.
 ** AT THE CONTRACTOR'S OPTION THE LOCATION FOR BENT-UP STRANDS MAY BE VARIED FROM THAT SHOWN. THE TOTAL NUMBER OF BENT-UP STRANDS SHALL NOT BE CHANGED. ONE STRAND TIE BAR IS REQUIRED FOR EACH LAYER OF BENT-UP STRANDS EXCEPT AT END BENTS WHICH REQUIRE ONE BAR ON THE BOTTOM LAYER OF STRANDS ONLY. NO ADDITIONAL PAYMENT WILL BE MADE IF ADDITIONAL STRAND TIE BARS ARE REQUIRED.
 *** GIRDER TOP FLANGE SHALL BE STEEL TROWELED TO A SMOOTH FINISH FOR 8" AT THE EDGES, AS SHOWN. BOND BREAKER SHALL BE APPLIED TO THIS REGION ONLY. THE CENTER PORTION SHALL BE ROUGH FINISHED BY SCARIFYING THE SURFACE TRANSVERSELY WITH A WIRE BRUSH, AND NO LAITANCE SHALL REMAIN ON THE SURFACE.

| REINFORCING STEEL (EACH 38 STRAND GIRDER) | | | |
|---|---------------|-------------|-----|
| SHAPE | ACTUAL LENGTH | SIZE & MARK | NO. |
| 11 | 4'-4" | 4-B1 | 242 |
| 11 | 3'-8" | 6-B2 | 16 |
| 15 | 2'-11 1/4" | 4-C1 | 129 |
| 9 | 4'-10 3/8" | 4-D1 | 258 |

NOTE: THE TWO D1 BARS MAY BE FURNISHED AS ONE BAR AT THE FABRICATORS OPTION.



REINFORCING STEEL NOTES:
 REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31, GRADE 60. WELDED WIRE REINFORCEMENT (WWR) SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 221. ALL DIMENSIONS ARE OUT TO OUT. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, STIRRUP AND TIE DIMENSIONS. MINIMUM CLEARANCE TO REINFORCING SHALL BE 1", UNLESS OTHERWISE SHOWN. ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE OF BAR TO THE NEAREST INCH.

PLACE VENT HOLES AT OR NEAR UPGRADE 1/3 POINT OF GIRDERS AND CLEAR REINFORCING STEEL OR STRANDS BY 1 1/2" MINIMUM AND STEEL INTERMEDIATE DIAPHRAGM BOLT CONNECTIONS BY 6" MINIMUM.

NOTE: THIS DRAWING IS NOT TO SCALE. FOLLOW DIMENSIONS.

SPAN 2-3

DATE: DECEMBER 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE
 JOB NO. 23H3587

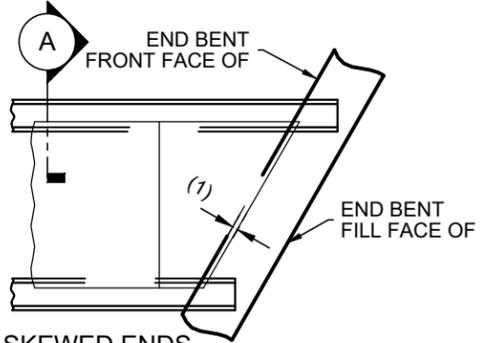
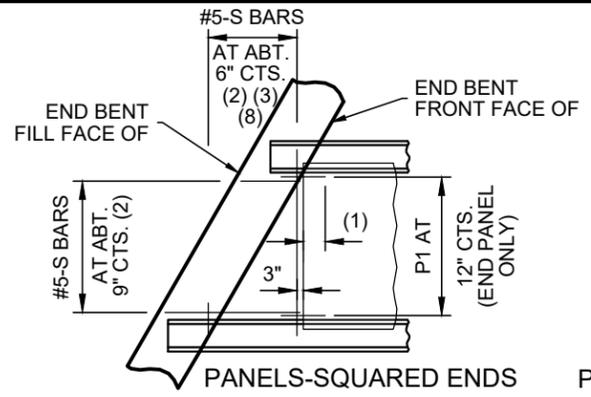
2-14-2025

GALVANIZE THE 1/2" BEARING PLATE (ASTM A709 GRADE 36) IN ACCORDANCE WITH ASTM A123.
 COST OF FURNISHING, GALVANIZING, AND INSTALLING THE 1/2" BEARING PLATE (ASTM A709 GRADE 36) AND WELDED STUDS IN THE PRESTRESSED GIRDER WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR PRESTRESSED CONCRETE NU-GIRDER.

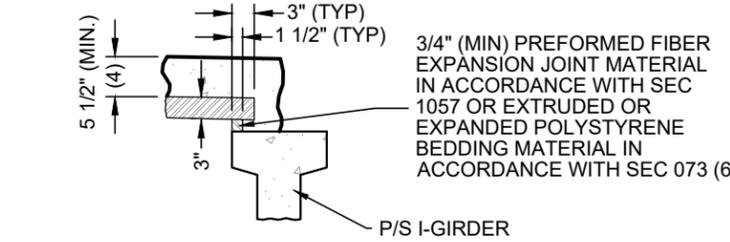
Howe Company LLC
 MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014693
 SURVEYING #LS-2014015235

NU-35 GIRDER DETAILS SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI
 HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

DATE: DECEMBER 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE
 JOB NO. 23H3587

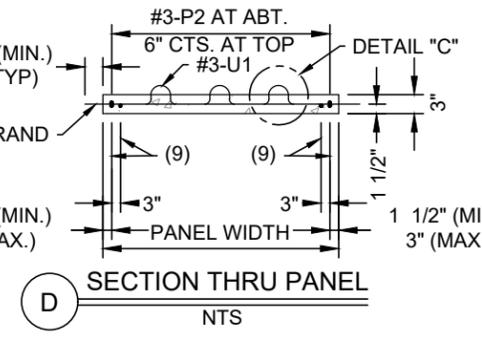
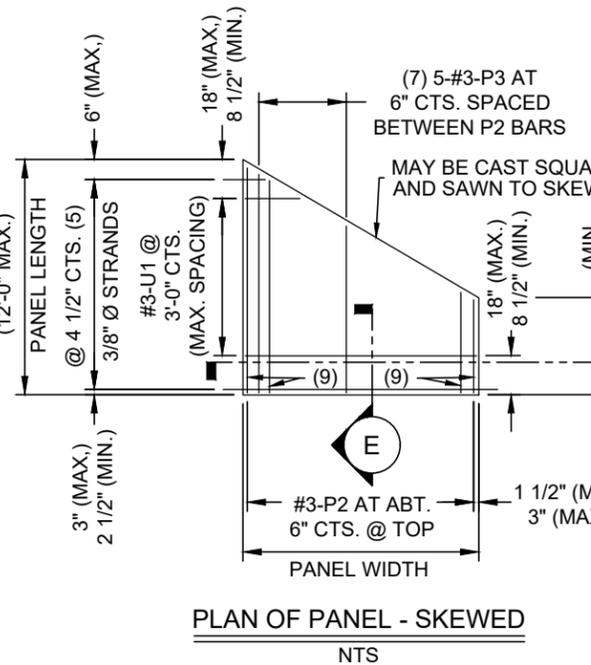
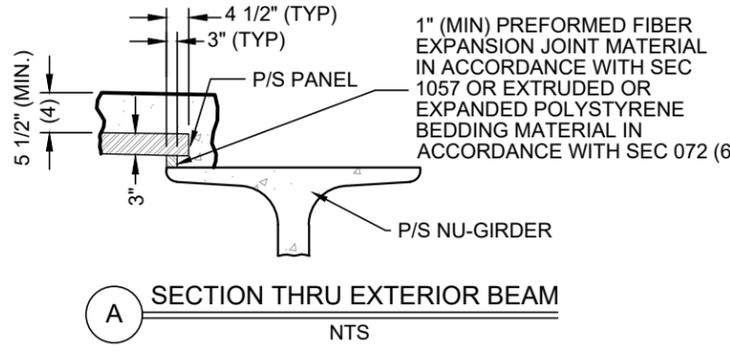
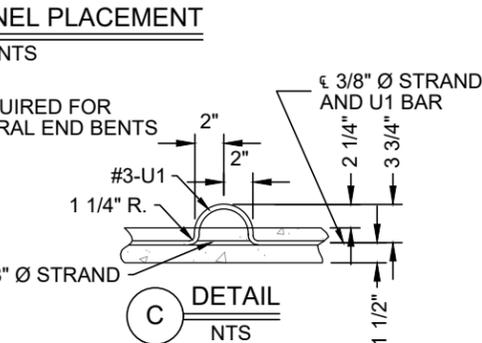
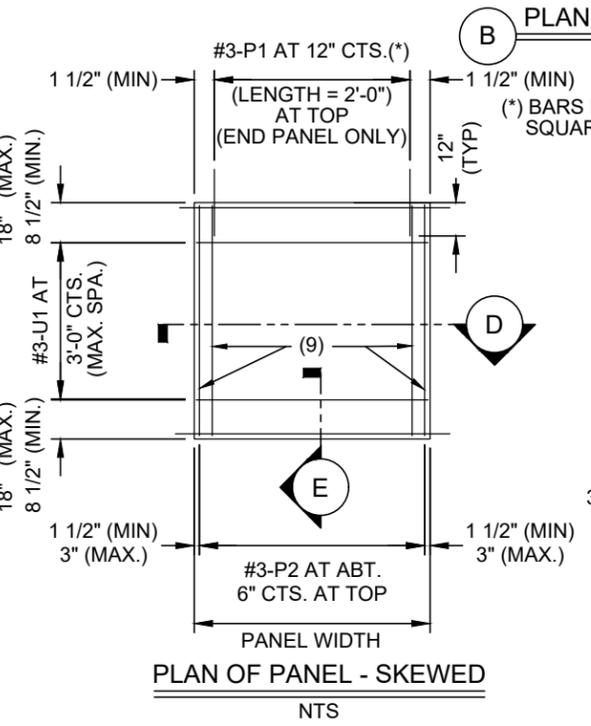


NOTE: USE SLAB HAUNCHING DIAGRAM ON SLAB DETAIL SHEET FOR DETERMINING THICKNESS OF PREFORMED FIBER EXPANSION JOINT MATERIAL OR POLYSTYRENE BEDDING MATERIAL WITHIN THE LIMITS NOTED IN GENERAL NOTES.

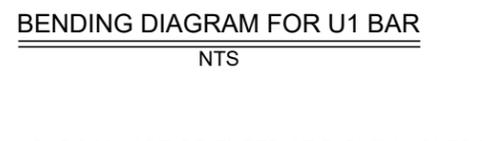
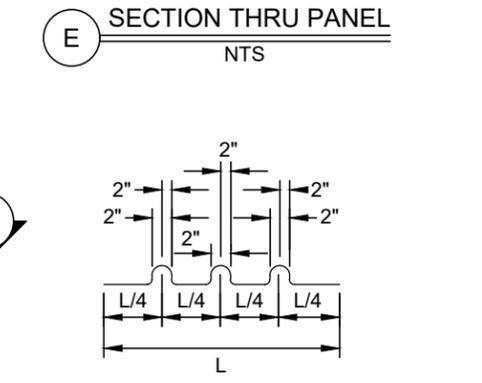
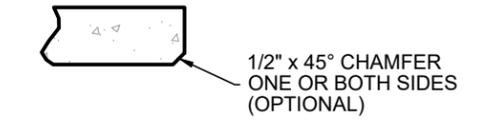


GENERAL NOTES (CONT.):

PRESTRESSED PANELS:
 CONCRETE FOR PRESTRESSED PANELS SHALL BE CLASS A-1 WITH $f_c = 6,000$ PSI, $f_{ci} = 4,000$ PSI.
 THE TOP SURFACE OF ALL PANELS SHALL RECEIVE A SCORED FINISH WITH A DEPTH OF SCORING OF 1/8" PERPENDICULAR TO THE PRESTRESSING STRANDS IN THE PANELS. PRESTRESSING TENDONS SHALL BE HIGH-TENSILE STRENGTH UNCOATED SEVEN-WIRE, LOW-RELAXATION STRANDS FOR PRESTRESSED CONCRETE IN ACCORDANCE WITH AASHTO M 203 GRADE 270, WITH NOMINAL DIAMETER OF STRAND = 3/8" AND NOMINAL AREA = 0.085 SQ. IN. AND MINIMUM ULTIMATE STRENGTH = 22.95 KIPS (270 KSI). LARGER STRANDS MAY BE USED WITH THE SAME SPACING AND INITIAL TENSION.
 INITIAL PRESTRESSING FORCE = 17.2 KIPS/STRAND.
 THE METHOD AND SEQUENCE OF RELEASING THE STRANDS SHALL BE SHOWN ON THE SHOP DRAWINGS.
 SUITABLE ANCHORAGE DEVICES FOR LIFTING PANELS MAY BE CAST IN PANELS, PROVIDED THE DEVICES ARE SHOWN ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER. PANEL LENGTHS SHALL BE DETERMINED BY THE CONTRACTOR AND SHOWN ON THE SHOP DRAWINGS.
 WHEN SQUARED END PANELS ARE USED AT SKEWED BENTS. THE SKEWED PORTION SHALL BE CAST FULL DEPTH. NO SEPARATE PAYMENT WILL BE MADE FOR ADDITIONAL CONCRETE AND REINFORCING REQUIRED.
 SUPPORT FROM DIAPHRAGM FORMS IS REQUIRED UNDER THE OPTIONAL SKEWED END UNTIL CAST-IN-PLACE CONCRETE HAS REACHED 3,000 PSI COMPRESSIVE STRENGTH.



- (1) END PANELS SHALL BE DIMENSIONED 1/2" MIN. TO 1-1/2" MAX. FROM THE INSIDE FACE OF DIAPHRAGM.
- (2) S-BARS SHOWN ARE BOTTOM STEEL IN SLAB BETWEEN PANELS AND USED WITH SQUARED END PANELS ONLY.
- (3) EXTEND S-BARS 18 INCHES BEYOND THE FRONT FACE OF END BENTS ONLY.
- (4) IN ORDER TO MAINTAIN MINIMUM SLAB THICKNESS, IT MAY BE NECESSARY TO RAISE THE GRADE UNIFORMLY THROUGHOUT THE STRUCTURE. NO PAYMENT WILL BE MADE FOR ADDITIONAL LABOR OR MATERIALS REQUIRED FOR NECESSARY GRADE ADJUSTMENT.
- (5) ANY STRAND 2'-0" OR SHORTER SHALL HAVE A #4 REINFORCING BAR ON EACH SIDE OF IT, CENTERED BETWEEN STRANDS. STRANDS 2'-0" OR SHORTER MAY THEN BE DEBONDED AT THE FABRICATOR'S OPTION.
- (6) ALL PANEL SUPPORT PADS SHALL BE GLUED TO THE GIRDER. WHEN SUPPORT THICKNESS EXCEEDS 1 1/2 INCHES, THE PADS SHALL BE GLUED TOP AND BOTTOM. THE GLUE USED SHALL BE THE TYPE RECOMMENDED BY THE PANEL SUPPORT PADS MANUFACTURER.
- (7) USE #3-P3 BARS IF PANEL IS SKEWED 45° OR GREATER.
- (8) MINIMUM REINFORCEMENT STEEL LENGTH SHALL BE 2'-0".
- (9) #3-P2 BARS NEAR EDGE OF PANEL AT BOTTOM (UNDER STRANDS).



GENERAL NOTES:

WELDED WIRE FABRIC OR WELDED DEFORMED BAR MATS PROVIDING A MINIMUM AREA OF REINFORCING PERPENDICULAR TO STRANDS OF 0.22 SQ. IN./FT., WITH SPACING PARALLEL TO STRANDS SUFFICIENT TO ENSURE PROPER HANDLING, MAY BE USED IN LIEU OF THE #3-P2 BARS SHOWN. WIRE OR BAR DIAMETER SHALL NOT BE LARGER THAN 0.375 INCHES. THE ABOVE ALTERNATIVE REINFORCEMENT CRITERIA MAY BE USED IN LIEU OF THE #3-P3 BARS, WHEN REQUIRED, AND PLACED OVER A WIDTH NOT LESS THAN 2 FEET.
 THE REINFORCING STEEL SHALL BE TIED SECURELY TO THE 3/8" Ø STRANDS WITH THE FOLLOWING MAXIMUM SPACING IN EACH DIRECTION:
 #3-P2 BARS AT 16 INCHES.
 WELDED WIRE FABRIC OR WELDED DEFORMED BAR MATS AT 2'-0".
 TIE THE #3-U1 BARS TO THE #3-P2 BARS, TO THE WELDED WIRE FABRIC OR THE WELDED DEFORMED BAR MATS AT ABOUT 3'-0" CENTERS. PRECAST PANELS MAY BE IN CONTACT WITH STIRRUP REINFORCING IN DIAPHRAGMS. COST OF S-BARS WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT
 UNIT PRICE FOR THE SLAB. S-BARS ARE NOT LISTED IN THE BILL OF REINFORCING.



| | |
|----------------|---------------|
| DATE: | DECEMBER 2024 |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY: | P. HOWE |
| REVIEWED BY: | S. HOWE |
| APPROVED BY: | S. HOWE |
| JOB NO. | 23H3587 |
| 33 | |
| SHEET 33 OF 46 | |

Howe Company LLC
 MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014693
 SURVEYING #LS-2014015235

PRESTRESSED CONCRETE PANEL DETAILS SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI
HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

BILL OF REINFORCING STEEL

| | NO. REQUIRED | SIZE | MARK | LOCATION | SHAPE NO. | STIRRUP | SUBSTRUCTURE VARIES | NO. EACH | REINFORCING STEEL | | | | | | | | | | | | | | | | | | ACTUAL LENGTH | TOTAL WEIGHT |
|-----------------|--------------|------|------|-----------|----------------|---------|---------------------|----------|-------------------|--------|-------|--------|-------|--------|-------|-------|----|--------|-------|-------|-------|-------|--------|-------|--------|-----|---------------|--------------|
| | | | | | | | | | B | | C | | D | | E | | F | | H | | K | | | | | | | |
| | | | | | | | | | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | | |
| END BENT | ② | 8 | H2 | BEAM | 6 | | | | 2 | 0.000 | 39 | 2.250 | 2 | 0.000 | | | | | | | | | 43 | 0 | 1,837 | | | |
| | ② | 3 | H3 | BEAM | 20 | | | | 39 | 2.250 | | | | | | | | | | | | | | 39 | 3 | 630 | | |
| | ② | 3 | H3A | BEAM | 20 | | | | 59 | 2.250 | | | | | | | | | | | | | | 59 | 3 | 950 | | |
| | ② | 8 | H9 | BEAM | 20 | | | | 15 | 5.250 | | | | | | | | | | | | | | 15 | 6 | 166 | | |
| | ② | 26 | 5 | U3 | BEAM | 6 | X | | 5 | 11.500 | 4 | 2.250 | 5 | 11.500 | | | | | | | | | | 16 | 0 | 868 | | |
| | ② | 34 | 5 | U4 | BEAM | 13 | X | | 4 | 2.250 | 2 | 7.500 | 4 | 2.250 | 2 | 7.500 | | | | | | | | 13 | 7 | 964 | | |
| | ② | 8 | 6 | F2 | END BENT DIAP. | 21 | | | 4 | 0.000 | 3 | 11.750 | 3 | 11.750 | | | | 3 | 1.250 | 2 | 7.000 | | | 11 | 11 | 288 | | |
| | ② | 26 | 5 | U1 | END BENT DIAP. | 6 | X | | 2 | 11.500 | 4 | 2.250 | 2 | 11.500 | | | | | | | | | | 10 | 2 | 542 | | |
| | ② | 3 | 5 | H1 | END BENT DIAP. | 23 | | | 1 | 3.000 | 2 | 10.000 | 1 | 3.000 | 0 | 9.750 | 0 | 11.500 | 0 | 9.750 | 0 | 9.750 | | | 5 | 4 | 34 | |
| | ② | 4 | 6 | H5 | END BENT DIAP. | 20 | | | 10 | 11.000 | | | | | | | | | | | | | | 10 | 11 | 132 | | |
| | ② | 2 | 6 | H5A | END BENT DIAP. | 20 | | | 6 | 11.250 | | | | | | | | | | | | | | 7 | 0 | 44 | | |
| | ② | 3 | 6 | H5B | END BENT DIAP. | 20 | | | 9 | 4.500 | | | | | | | | | | | | | | 9 | 5 | 85 | | |
| | ② | 21 | 6 | L1 | END BENT DIAP. | 19 | | | 3 | 2.500 | 6 | 4.000 | | | | | | | | | | | | 9 | 6 | 600 | | |
| | ② | 4 | 7 | H7 | END BENT DIAP. | 20 | | | 31 | 7.500 | | | | | | | | | | | | | | 31 | 8 | 518 | | |
| | SLAB | ② | 4 | 5 | T1 | WINGS | 25 | | | 3 | 2.000 | 12 | 9.250 | 5 | 0.750 | | | 3 | 1.750 | 12 | 4.500 | | | 21 | 0 | 176 | | |
| ② | | 48 | 4 | V1 | WINGS | 20 | | X | 4 | 3 | 2.000 | | | | | | | | | | | | 3 | 2 | 298 | | | |
| | | | | | INC. = 3" | 20 | | | 6 | 1.500 | | | | | | | | | | | | | 6 | 2 | --- | | | |
| ② | | 8 | 4 | V3 | WINGS | 20 | | | 6 | 4.500 | | | | | | | | | | | | | 6 | 5 | 70 | | | |
| ② | | 8 | 6 | H8 | WINGS | 20 | | X | 2 | 27 | 2.750 | | | | | | | | | | | | 27 | 3 | 744 | | | |
| | | | | | INC. = 29 3/4" | 20 | | | 34 | 8.000 | | | | | | | | | | | | | 34 | 8 | --- | | | |
| ② | | 8 | 4 | H8A | WINGS | 20 | | X | 2 | 9 | 3.000 | | | | | | | | | | | | 9 | 3 | 139 | | | |
| | | | | | INC. = 29 3/4" | 20 | | | 16 | 8.250 | | | | | | | | | | | | | 16 | 8 | --- | | | |
| | | 391 | 6 | S1 | SLAB | 20 | | | 24 | 2.000 | | | | | | | | | | | | | 24 | 2 | 14,193 | | | |
| | | 366 | 4 | S2 | SLAB | 20 | | | 4 | 8.000 | | | | | | | | | | | | | 4 | 8 | 1,141 | | | |
| | 50 | 5 | S3A | SLAB | 20 | | | 35 | 0.000 | | | | | | | | | | | | | 35 | 0 | 1,826 | | | | |
| | 50 | 5 | S3B | SLAB | 20 | | | 50 | 0.000 | | | | | | | | | | | | | 50 | 0 | 2,608 | | | | |
| | 25 | 5 | S3C | SLAB | 20 | | | 25 | 0.000 | | | | | | | | | | | | | 25 | 0 | 652 | | | | |
| | 16 | 5 | S5A | SLAB | 20 | | | 35 | 0.000 | | | | | | | | | | | | | 35 | 0 | 585 | | | | |
| | 16 | 5 | S5B | SLAB | 20 | | | 50 | 0.000 | | | | | | | | | | | | | 50 | 0 | 835 | | | | |
| | 8 | 5 | S5C | SLAB | 20 | | | 25 | 0.000 | | | | | | | | | | | | | 25 | 0 | 209 | | | | |
| SUPPLEMENTAL | ② | 86 | 6 | S6 | SLAB | 20 | | X | 2 | 2 | 8.000 | | | | | | | | | | | 2 | 8 | 3,402 | | | | |
| | | | | INC. = 6" | 23 | | | 23 | 8.000 | | | | | | | | | | | | | | 23 | 8 | --- | | | |
| | | 44 | 6 | S7 | SLAB | 20 | | | 55 | 0.000 | | | | | | | | | | | | | 55 | 0 | 3,635 | | | |
| | | 44 | 7 | S7A | SLAB | 20 | | | 45 | 0.000 | | | | | | | | | | | | | 45 | 0 | 4,048 | | | |
| | | 10 | 5 | X1 | SUPPLEMENTAL | 20 | | | 30 | 0.000 | | | | | | | | | | | | | 30 | 0 | 313 | | | |
| TOTAL THIS PAGE | | | | | | | | | | | | | | | | | | | | | | | 42,532 | | | | | |

NOTES:

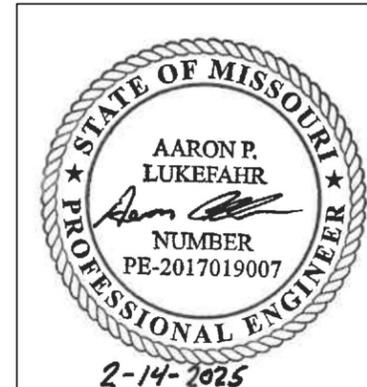
SEE FOLLOWING DETAILS SHEET FOR BENDING DIAGRAM AND ADDITIONAL DETAILS
 THE #5 - X1 BARS HAVE NO SPECIFIED LOCATION AND HAVE BEEN PROVIDED TO SUPPLEMENT THE BAR BILL SHOULD THE NEED ARISE FOR ADDITIONAL REINFORCING STEEL.



MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014893
 SURVEYING #S-2014015235

REINFORCING STEEL SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693



DATE: DECEMBER 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE

JOB NO. 23H3587

| NO. | DESCRIPTION | DATE | APPR. |
|-----|-------------|------|-------|
| | | | |

BILL OF REINFORCING STEEL

NOTES:
SEE FOLLOWING DETAILS SHEET FOR BENDING DIAGRAM AND ADDITIONAL DETAILS

| | NO. REQUIRED | SIZE | MARK | LOCATION | SHAPE NO. | STIRRUP | SUBSTRUCTURE | VARIES | NO. EACH | | | | | | | | | | | | | | | | | | | ACTUAL LENGTH | | TOTAL WEIGHT |
|----------------------|--------------|------|------|-----------------|-----------------|---------|--------------|--------|----------|----|--------------------|--------|--------|--------|-------|--------|-------|-------|-----|--------|-----|-------|-----|--------|-----|-----|-------|---------------|--|--------------|
| | | | | | | | | | | B | | C | | D | | E | | F | | H | | K | | FT | | IN. | | LBS. | | |
| | | | | | | | | | | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | FT | IN. | | | |
| INTERIOR BENTS | ② | 12 | 9 | H12 | INTERIOR BEAM | 6 | | | | | 1 | 11.000 | 31 | 6.000 | 1 | 11.000 | | | | | | | | | 35 | 4 | 2,883 | | | |
| | ② | 6 | 8 | H15 | INTERIOR BEAM | 20 | | | | | 32 | 0.000 | | | | | | | | | | | | | 32 | 0 | 1,025 | | | |
| | ② | 30 | 5 | U10 | INTERIOR BEAM | 6 | X | | | | 5 | 3.500 | 3 | 0.000 | 5 | 3.500 | | | | | | | | | 13 | 7 | 850 | | | |
| | ② | 22 | 5 | S12 | INTERIOR BEAM | 13 | X | | | | 5 | 3.500 | 3 | 0.000 | 5 | 3.500 | 3 | 0.000 | | | | | | | | 17 | 6 | 803 | | |
| | ② | 14 | 6 | V11 | INTERIOR BEAM | 20 | | | | | 5 | 4.000 | | | | | | | | | | | | | | 5 | 4 | 224 | | |
| | ① | 117 | 4 | S10-2 | DRILLED SHAFT | 16 | X | | | | 2 | 0.000 | | | | | | | | | | | | | | 2 | 9 | 215 | | |
| | ① | 27 | 9 | V10-2 | DRILLED SHAFT | 20 | | | | | 43 | 5.000 | | | | | | | | | | | | | | 43 | 5 | 3,986 | | |
| | ① | 117 | 4 | S10-3 | DRILLED SHAFT | 16 | X | | | | 2 | 0.000 | | | | | | | | | | | | | | 2 | 9 | 215 | | |
| | ① | 27 | 9 | V10-3 | DRILLED SHAFT | 20 | | | | | 43 | 5.000 | | | | | | | | | | | | | | 43 | 5 | 3,986 | | |
| | ② | 27 | 9 | J10 | SHAFT WALL | 17 | | | | | 8 | 0.500 | | | | | | | | | | | | | | 9 | 3 | 1,706 | | |
| INT. BENT DIAPHRAGMS | ② | 24 | 4 | S11 | SHAFT WALL | 16 | X | | | 2 | 0.000 | | | | | | | | | | | | | | 2 | 9 | 88 | | | |
| | ② | 66 | 5 | L10 | SHAFT WALL | 19 | | | | 6 | 11.000 | 2 | 0.000 | | | | | | | | | | | | 8 | 11 | 1,228 | | | |
| | ② | 3 | 9 | H10 | SHAFT WALL | 18 | | | | 27 | 1.000 | | | | | | | | | | | | | | 29 | 7 | 604 | | | |
| | ② | 20 | 6 | H11 | SHAFT WALL | 6 | | | | 1 | 0.000 | 25 | 10.000 | 1 | 0.000 | | | | | | | | | | 27 | 10 | 1,672 | | | |
| | ② | 8 | 6 | H13 | INTERIOR DIAPH. | 20 | | | | | 10 | 11.000 | | | | | | | | | | | | | | 10 | 11 | 262 | | |
| | ② | 4 | 6 | H13A | INTERIOR DIAPH. | 20 | | | | | 6 | 11.250 | | | | | | | | | | | | | | 6 | 11 | 83 | | |
| | ② | 6 | 6 | H13B | INTERIOR DIAPH. | 20 | | | | | 9 | 4.500 | | | | | | | | | | | | | | 9 | 5 | 169 | | |
| | ② | 6 | 5 | H14 | INTERIOR DIAPH. | 23 | | | | | 1 | 3.000 | 2 | 10.000 | 1 | 3.000 | 0 | 9.750 | 0 | 11.500 | 0 | 9.750 | 0 | 9.750 | 5 | 4 | 67 | | | |
| | ② | 6 | 6 | F10 | INTERIOR DIAPH. | 21 | | | | | 4 | 6.500 | 3 | 9.000 | 3 | 9.000 | | | | | 3 | 1.250 | 2 | 7.000 | 12 | 0 | 217 | | | |
| | ② | 2 | 6 | F10A | INTERIOR DIAPH. | 21 | | | | | 4 | 6.500 | 2 | 3.750 | 2 | 3.750 | | | | | 3 | 5.750 | 2 | 11.000 | 9 | 2 | 55 | | | |
| ② | 48 | 6 | Z10 | INTERIOR DIAPH. | 11 | | | | | | | 4 | 9.750 | 3 | 4.000 | 1 | 4.000 | | | | | | | | 9 | 6 | 1,368 | | | |
| ② | 12 | 6 | Z10A | INTERIOR DIAPH. | 11 | | | | | | | 4 | 9.750 | 2 | 7.000 | 1 | 4.000 | | | | | | | | 8 | 9 | 316 | | | |
| | | | | | | | | | | | TOTAL THIS PAGE | | 22,022 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | TOTAL FROM PAGE 34 | | 42,532 | | | | | | | | | | | | | | | | | |

JOB TOTAL = 64,554 LBS.



REINFORCING STEEL SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

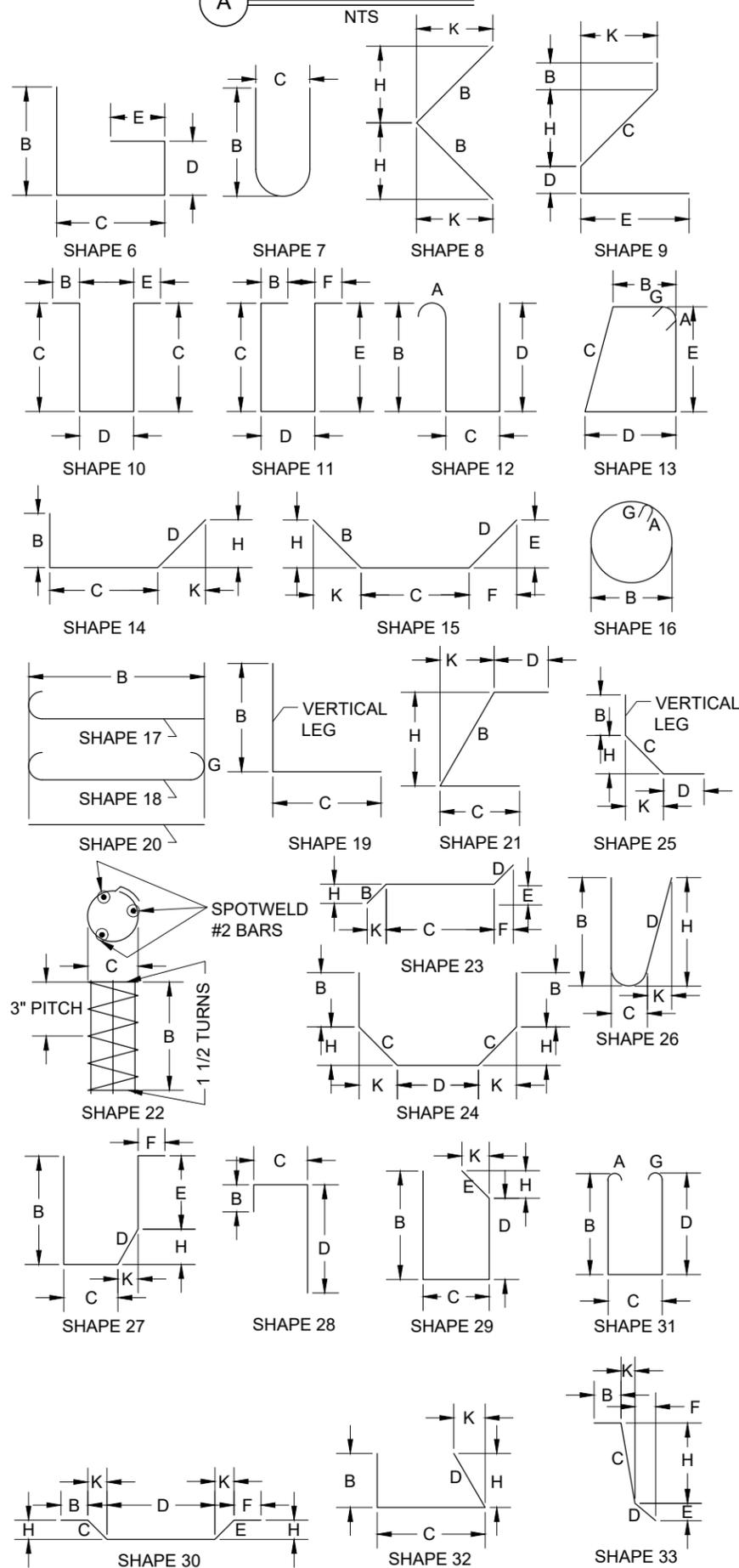
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

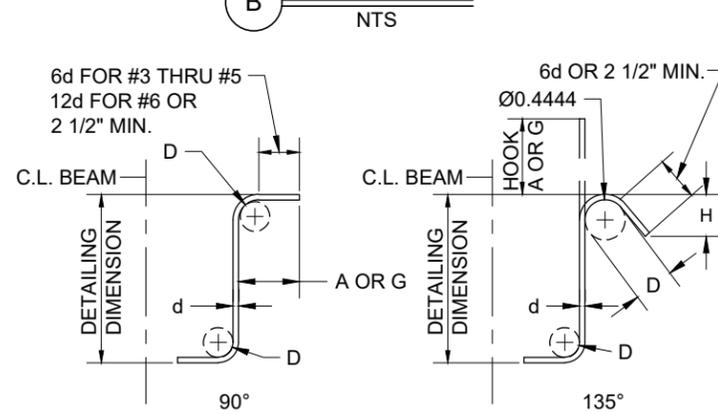
JOB NO. 23H3587

| NO. | DESCRIPTION | DATE | APPR. |
|-----|-------------|------|-------|
| | | | |

A BENDING DIAGRAMS

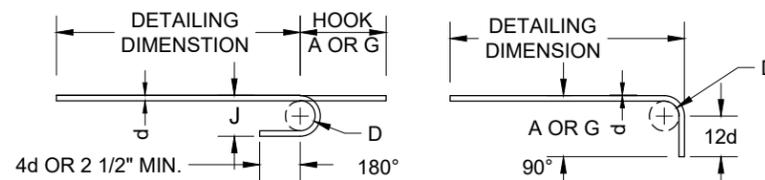


B BEND DETAILS



| STIRRUP HOOK DIMENSIONS | | | | |
|-------------------------|---------|-------------|-------------|------------|
| GRADES 40-50-60 KSI | | | | |
| BAR SIZE | D (IN.) | 90° HOOKS | | 135° HOOKS |
| | | HOOK A OR G | HOOK A OR G | APPROX. H |
| #3 | 1 1/2" | 4" | 4" | 2 1/2" |
| #4 | 2" | 4 1/2" | 4 1/2" | 3" |
| #5 | 2 1/2" | 6" | 5 1/2" | 3 3/4" |
| #6 | 4 1/2" | 12" | 7 3/4" | 4 1/2" |
| #7 | 5 1/4" | 14" | 9" | 5 1/4" |

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



SIZE OF 180° HOOKS (GRADE 40 KSI)
D=5d FOR #3 THRU #11
D=10d FOR #14 AND #18

SIZE OF 90° HOOKS ALL GRADES AND 180° HOOKS (GRADE 60 KSI)
D=6d FOR #3 THRU #8
D=8d FOR #9 AND #11
D=10d FOR #14 AND #18

| END HOOK DIMENSIONS | | | | |
|---------------------|---------|------------|---------|------------|
| BAR SIZE | D (IN.) | 180° HOOKS | | 90° HOOKS |
| | | ALL GRADES | | ALL GRADES |
| | | A OR G | J | A OR G |
| #3 | 2 1/4" | 5" | 3" | 6" |
| #4 | 3" | 6" | 4" | 8" |
| #5 | 3 3/4" | 7" | 5" | 10" |
| #6 | 4 1/2" | 8" | 6" | 12" |
| #7 | 5 1/4" | 10" | 7" | 14" |
| #8 | 6" | 11" | 8" | 16" |
| #9 | 9 1/2" | 15" | 11 3/4" | 19" |
| #10 | 10 3/4" | 17" | 13 3/4" | 22" |

NOTES:

ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E--EPOXY COATED REINFORCEMENT.

S--STIRRUP.

X--BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.

V-- BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO. EACH--NUMBER OF BARS OF EACH LENGTH.

(R)-- QUANTITY FOR ONE UNIT SHOWN, R (NUMBER IN CIRCLE) REQUIRED ACTUAL LENGTHS - ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

TOTAL WEIGHT = ACTUAL LENGTH X WEIGHT PER LINEAR FOOT X NUMBER REQUIRED X (R)

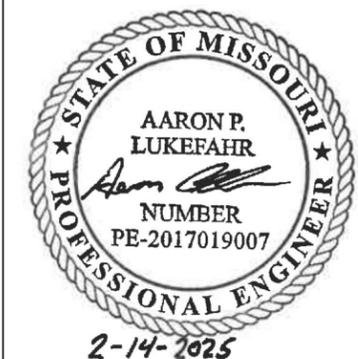
PAY WEIGHTS ARE BASED ON ACTUAL LENGTHS.

ALL REINFORCEMENT IS CONSIDERED SUPERSTRUCTURE REINFORCEMENT.

| BAR SIZE | MINIMUM LAP LENGTHS f _c =4000 psi | | | |
|----------|--|---------------------------------|--------------------------------|---------------------------------|
| | TOP BARS | | OTHER BARS | |
| | BAR SPACING: LESS THAN 6" O.C. | BAR SPACING: 6" O.C. OR GREATER | BAR SPACING: LESS THAN 6" O.C. | BAR SPACING: 6" O.C. OR GREATER |
| #4 | 29 | 23 | 21 | 17 |
| #5 | 36 | 29 | 26 | 21 |
| #6 | 43 | 35 | 31 | 25 |
| #7 | 55 | 44 | 39 | 32 |
| #8 | 71 | 57 | 51 | 41 |
| #9 | 91 | 73 | 65 | 52 |
| #10 | 115 | 92 | 82 | 66 |
| #11 | 142 | 113 | 101 | 81 |

TOP BARS: HORIZONTAL, ANGLED, OR NON-VERTICAL BARS WITH 12" OR MORE OF CONCRETE BELOW THE BOTTOM OF THE BAR.

OTHER BARS: ALL VERTICAL BARS AND BARS WITH LESS THAN 12" OF CONCRETE BELOW THE BOTTOM OF THE BAR.

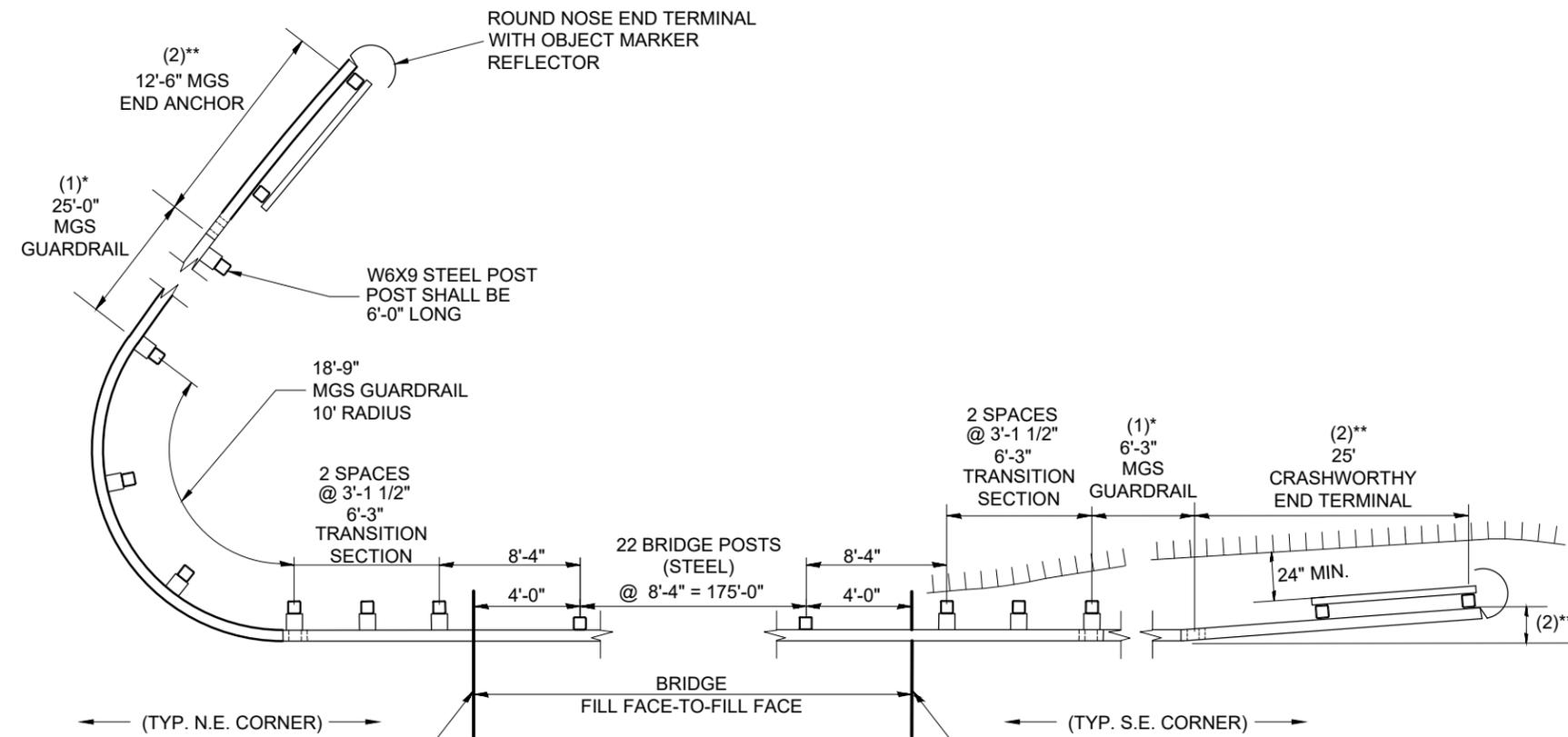


REINFORCING STEEL SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

DATE: DECEMBER 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

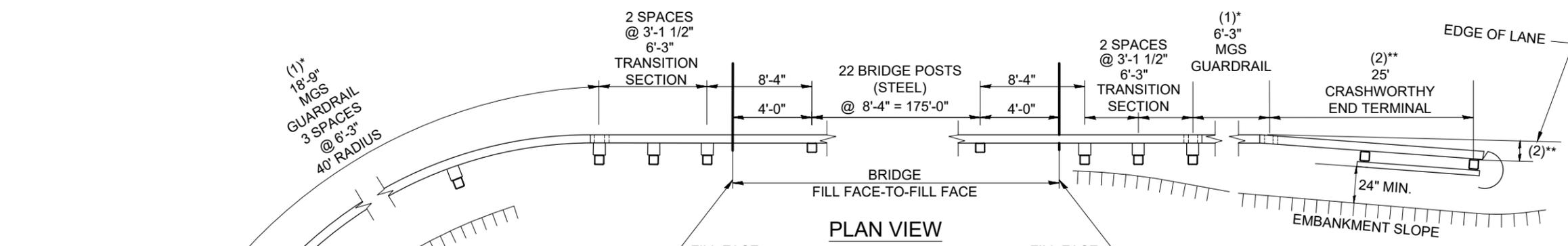
JOB NO. 23H3587



PLAN VIEW

FILL FACE SL-1 RAIL POST SPACING (TO C/L POST) NTS

(1)* SEE GUARDRAIL DETAIL SHEETS FOR POST AND SPACING DETAILS
 (2)** SEE MANUFACTURER RECOMMENDATIONS AND INSTALLATION GUIDE.



PLAN VIEW

FILL FACE SL-1 RAIL POST SPACING (TO C/L POST) NTS



2-14-2025

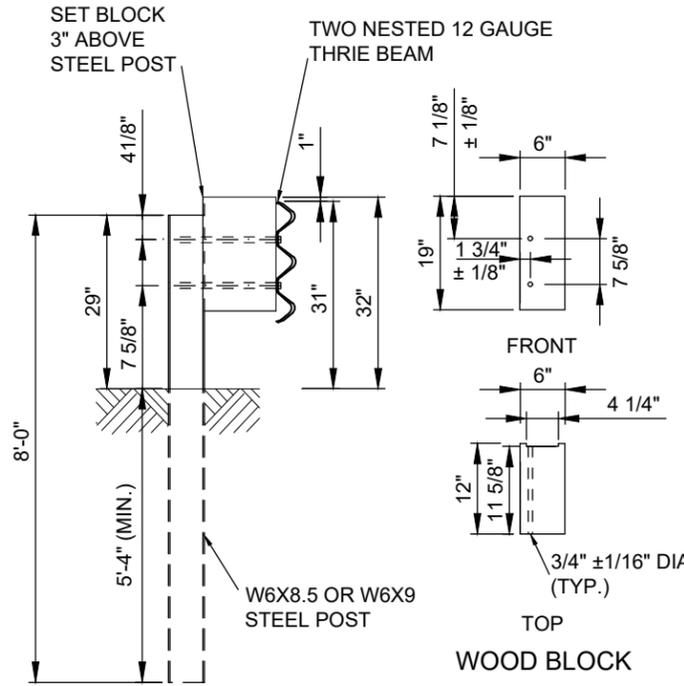
| NO. | DESCRIPTION | DATE | APPR. |
|-----|-------------|------|-------|
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Howe Company LLC
 MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014893
 SURVEYING #S-2014015235

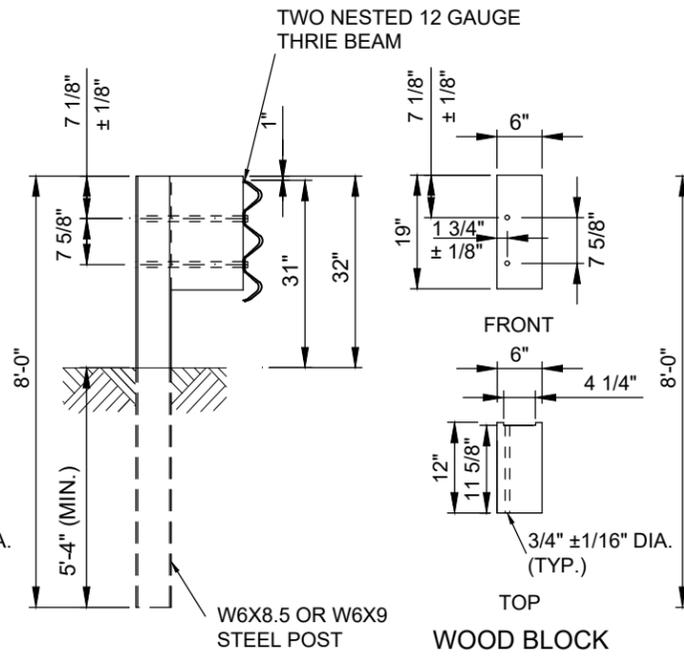
RAILING DETAILS SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
 GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

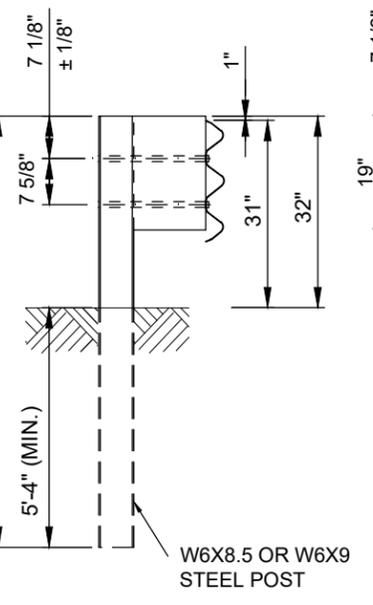
| | |
|--------------|---------------|
| DATE: | DECEMBER 2024 |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY: | P. HOWE |
| REVIEWED BY: | S. HOWE |
| APPROVED BY: | S. HOWE |



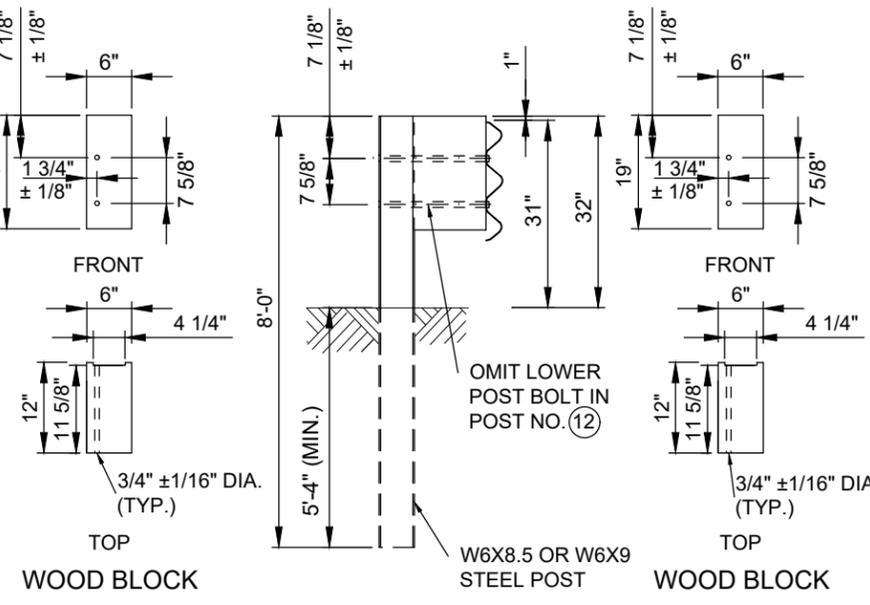
A SECTION
NTS



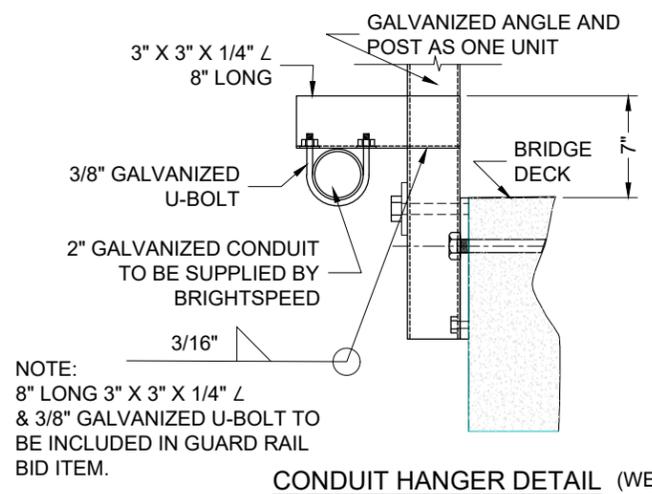
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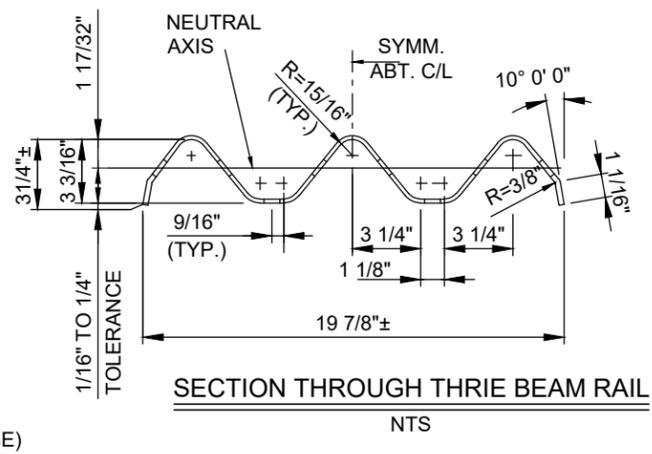
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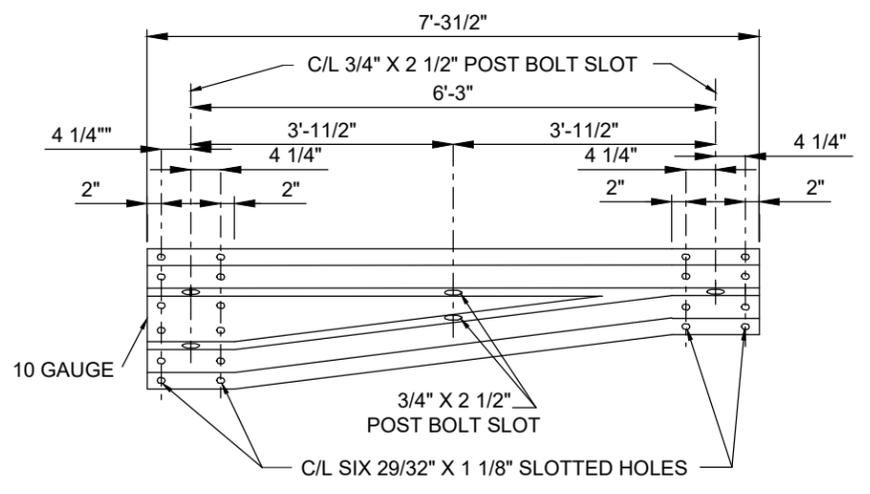
D SECTION
NTS



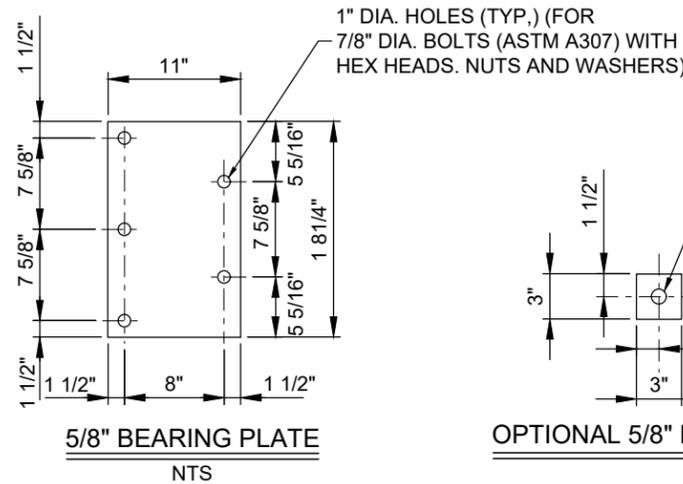
CONDUIT HANGER DETAIL (WEST SIDE OF BRIDGE)
NTS



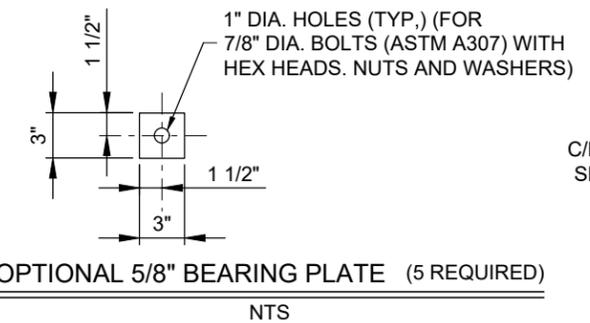
SECTION THROUGH THRIE BEAM RAIL
NTS



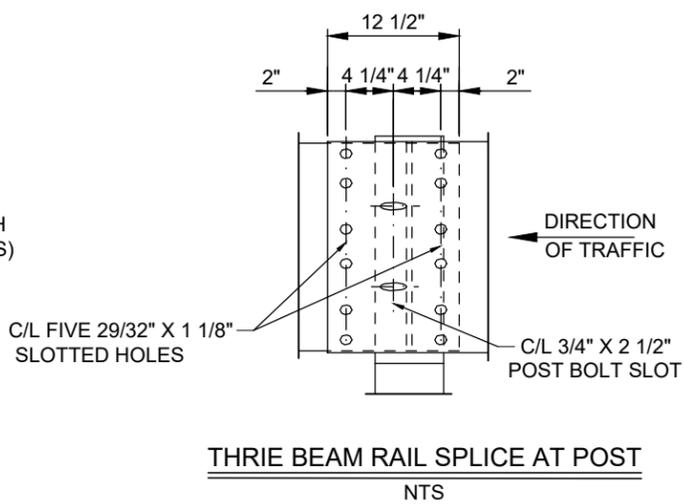
TRANSITION SECTION
NTS



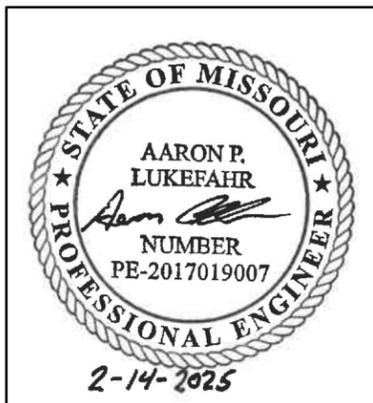
5/8" BEARING PLATE
NTS



OPTIONAL 5/8" BEARING PLATE (5 REQUIRED)
NTS



THRIE BEAM RAIL SPLICE AT POST
NTS

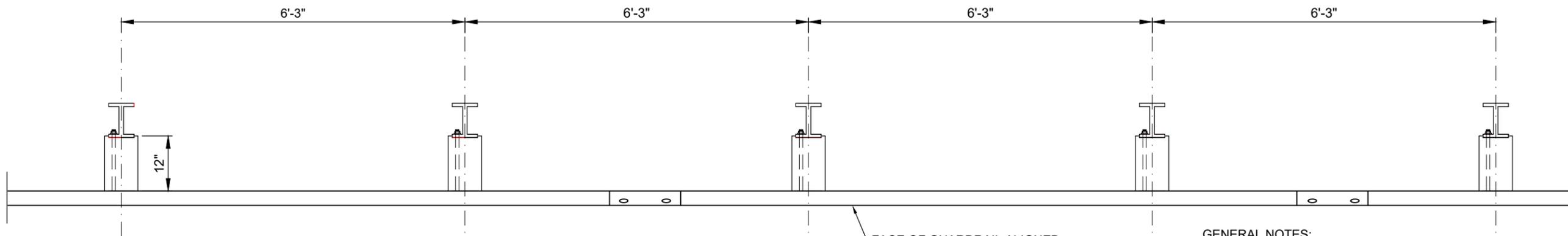


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|---------------------|--------------------------|-------------------|----------------------|----------------------|
| DATE: FEBRUARY 2025 | DESIGNED BY: A. LUKEFAHR | DRAWN BY: P. HOWE | REVIEWED BY: S. HOWE | APPROVED BY: S. HOWE |
| JOB NO. 23H3587 | | | | |
| 39 | | | | |
| SHEET 39 OF 46 | | | | |

Howe Company LLC
MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014983
SURVEYING #LS-2014015235

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

RAILING DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI



PLAN VIEW
NTS

(1) 2'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACINGS,
2'-0" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 3'-1 1/2" POST SPACINGS, OR
1'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 1'-6 3/4" POST SPACINGS.

(2) WHEN SITE CONSTRAINTS PROHIBIT OR EMBANKMENT CANNOT BE CONSTRUCTED TO PROVIDE A MINIMUM OF 2 FEET BETWEEN THE BACK OF THE GUARDRAIL POST AND SLOPE BREAK POINT, 8 FOOT POSTS SHALL BE USED.

GENERAL NOTES:

FOR INITIAL INSTALLATION, CONSTRUCT THE GUARDRAIL WITHIN 1" OF THE STANDARD 31" HEIGHT TO THE TOP OF W-BEAM RAIL. WHEN SUBSEQUENT PROJECTS, SUCH AS RESURFACINGS, AFFECT THE HEIGHT OF EXISTING GUARDRAIL, ADJUSTMENT IS NOT REQUIRED IF THE FINISHED HEIGHT IS WITHIN 3" OF THE STANDARD HEIGHT.

THE STANDARD POST LENGTH IS 6'-0" (+3", -0" TOLERANCE).

THE SUBSTITUTION OF 8 FOOT POSTS IN LIEU OF REQUIRED GRADING, TO CONSTRUCT LESS THAN THE DESIGNED TYPICAL SECTION, SHALL NOT BE ALLOWED.

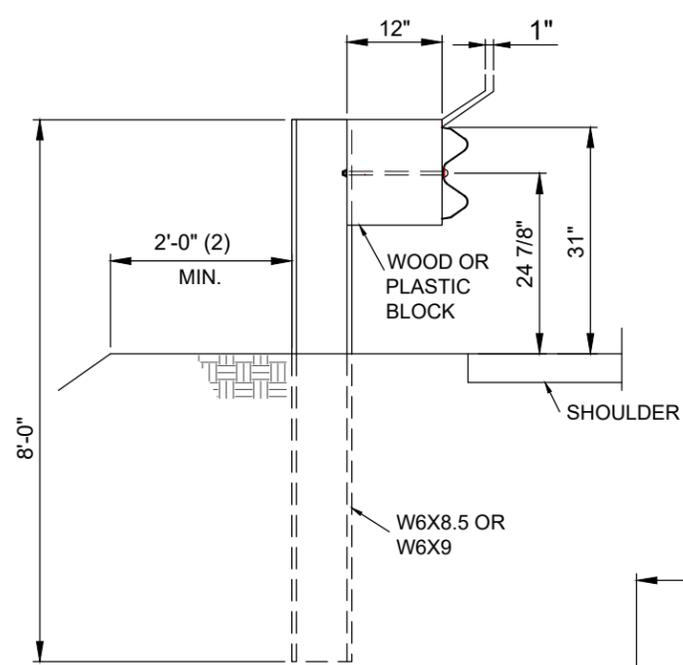
REFER TO AASHTO M 180 FOR DIMENSIONAL DETAILS OF W-BEAM, RELATED BUFFER AND END SECTIONS, BEAM SPLICES, POST AND SPLICE BOLTS, NUTS, AND TYPE 1 W-BEAM TO THRIE BEAM TRANSITION SECTIONS.

BEAM WASHERS ARE NOT TO BE USED. BOLT GRADE SHALL BE ASTM A307.

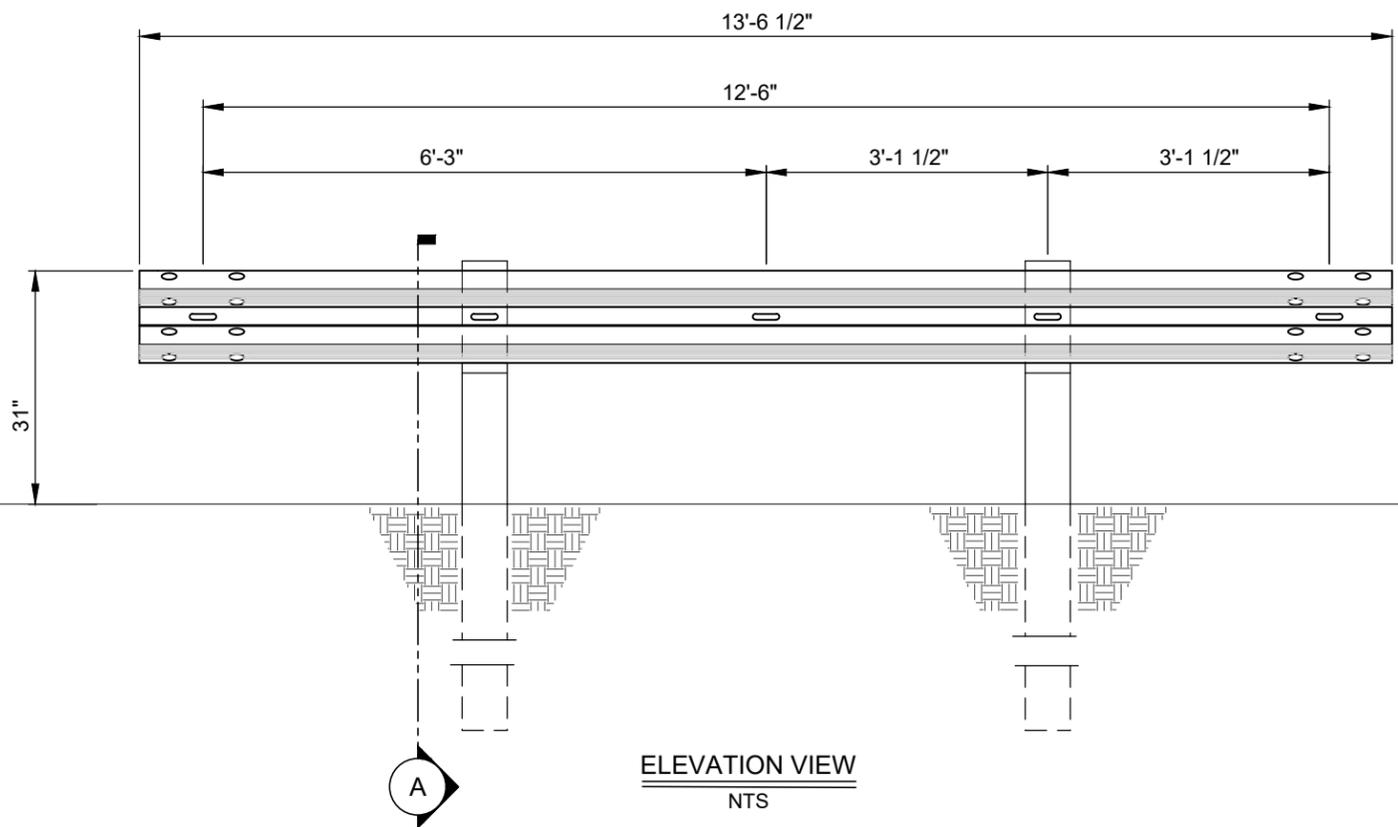
UNLESS OTHERWISE SPECIFIED, W-BEAM RAIL IS 12 GAUGE STEEL WITH AN EFFECTIVE LENGTH OF 12'-6" OR 25'-0", WITH 29/32" X 11/8" SPLICE BOLT SLOTS, AND 3/4" X 1/2" POST BOLT SLOTS ON 3'-1 1/2" CENTERS REGARDLESS OF POST SPACING.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

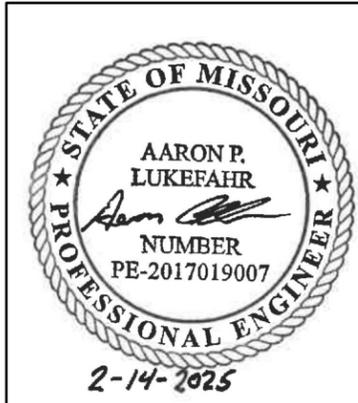
LAP SPLICES BETWEEN TWO RAILS OR BETWEEN A RAIL AND TERMINAL CONNECTOR IN THE DIRECTION OF TRAFFIC. LAP THE FLARED END SECTIONS IN THE DIRECTION OF TRAFFIC.



A SECTION
NTS



ELEVATION VIEW
NTS



MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014893
SURVEYING #L.S.-2014015235

RAILING DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

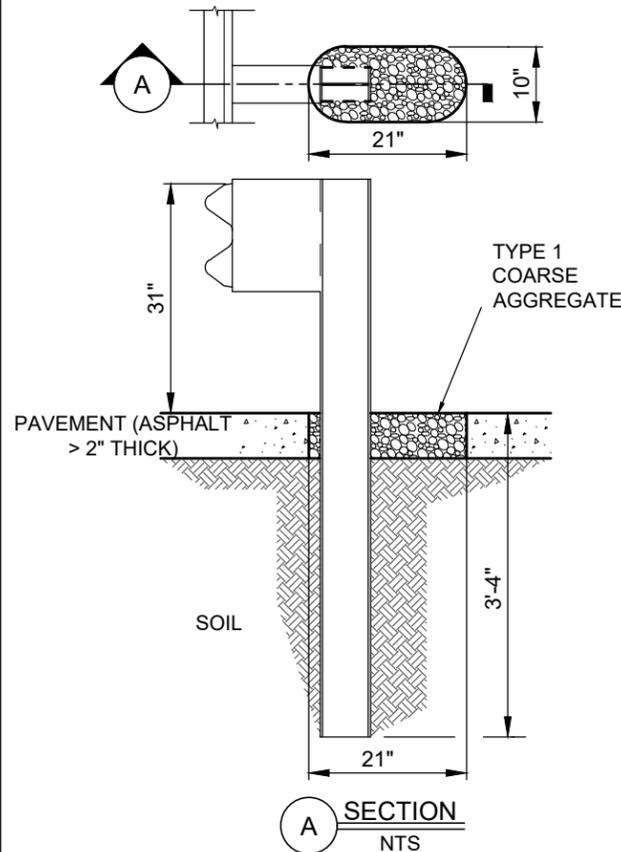
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63352
OFFICE: 660-395-4693

DATE: FEBRUARY 2025
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

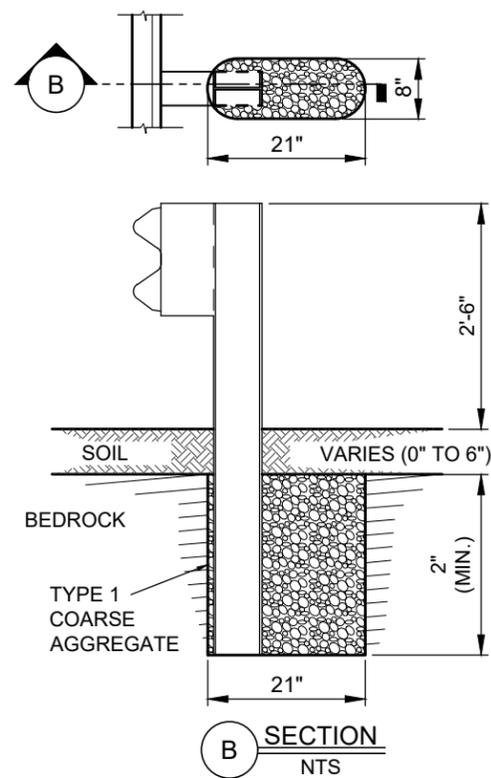
JOB NO. 23H3587

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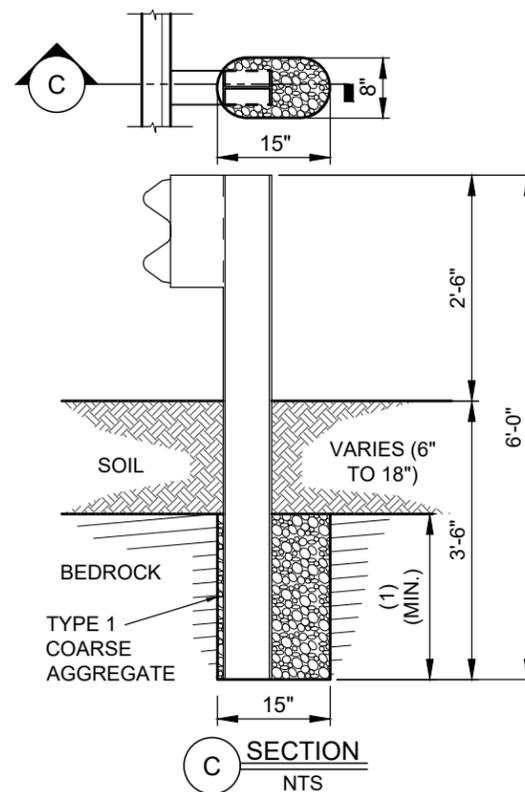
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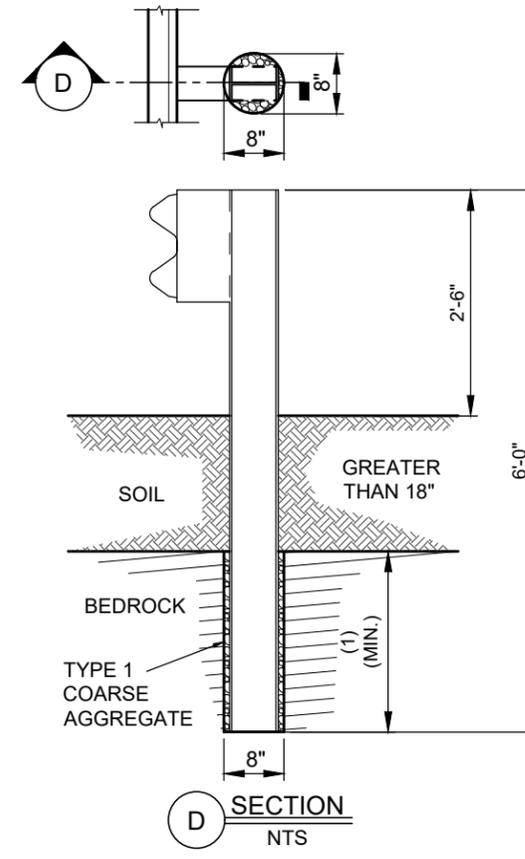
A SECTION
NTS
SETTING POST THROUGH PAVEMENT
(ASPHALT > 2" THICK)



B SECTION
NTS
ROCK ENCOUNTERED
UP TO 6" BENEATH SURFACE



C SECTION
NTS
ROCK ENCOUNTERED
6" TO 18" BENEATH SURFACE



D SECTION
NTS
ROCK ENCOUNTERED MORE
THAN 18" BENEATH SURFACE

(1) MINIMUM ROCK EMBEDMENT IS EQUAL TO FULL DEPTH POST EMBEDMENT MINUS SOIL DEPTH.

SETTING POST IN SOLID ROCK

(1) 3'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 8' POSTS ADJACENT TO A 2:1 SLOPE.

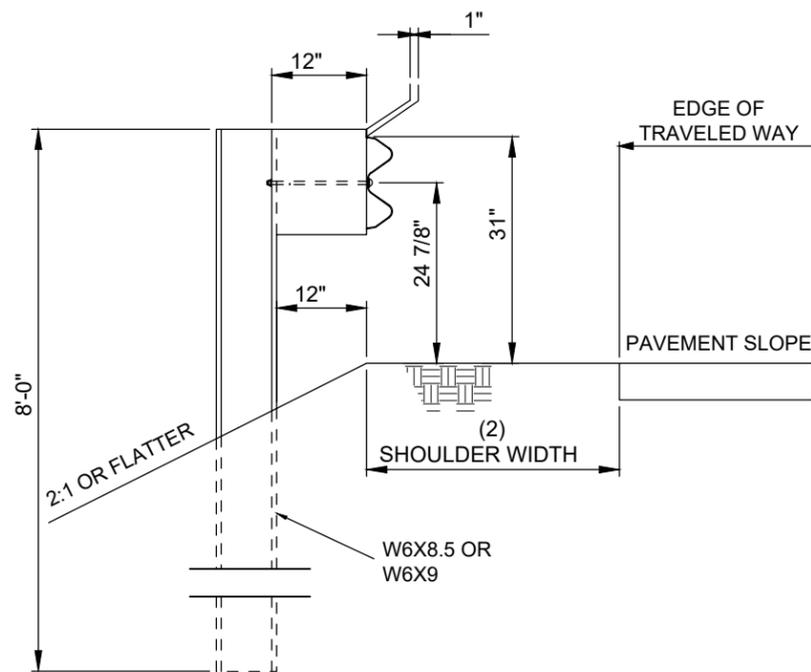
(2) WHERE THERE IS NOT SUFFICIENT EMBANKMENT BEYOND THE SHOULDER TO PLACE THE GUARDRAIL POST, THE POSTS MAY BE PLACED A MAXIMUM OF 12" BEYOND THE SLOPE BREAK POINT OF A 2:1 OR FLATTER SLOPE.

GENERAL NOTES:

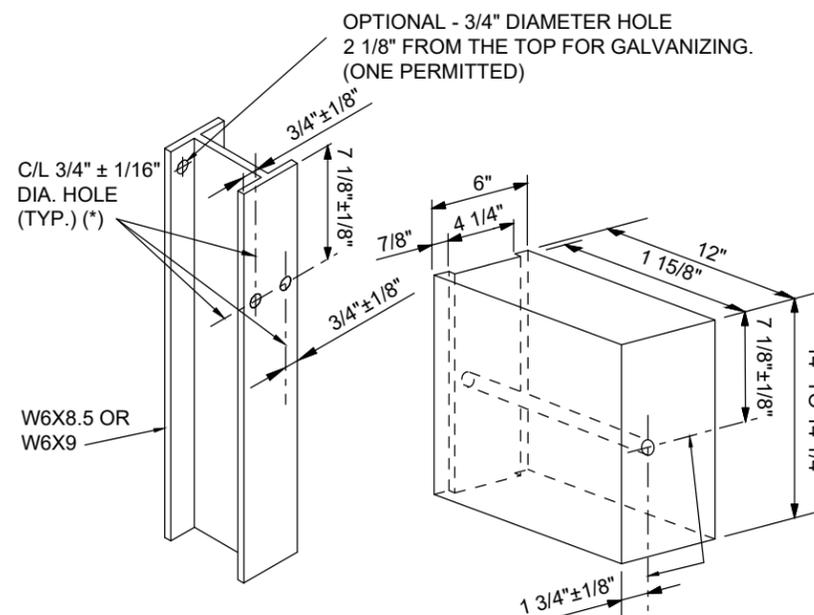
SEE STD. PLAN 606.81 FOR SITE GRADING REQUIREMENTS FOR CRASHWORTHY END TERMINALS.

8 FOOT POSTS SHALL BE USED WHEN LESS THAN 2 FEET OF EMBANKMENT IS PRESENT BETWEEN THE BACK OF THE GUARDRAIL POST AND THE SLOPE BREAK POINT. THE

SUBSTITUTION OF 8 FOOT POSTS IN LIEU OF REQUIRED GRADING, TO CONSTRUCT LESS THAN THE DESIGNED TYPICAL SECTION, SHALL NOT BE ALLOWED.



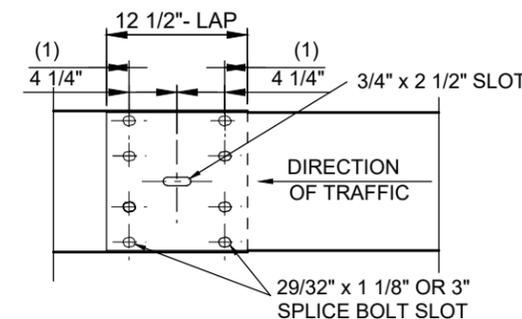
ALTERNATE SECTION A-A
MAXIMUM LATERAL PLACEMENT OF
8' STEEL POSTS ADJACENT TO
SLOPES



FOR STEEL POST AND NOTCHED WOOD OR PLASTIC BLOCK

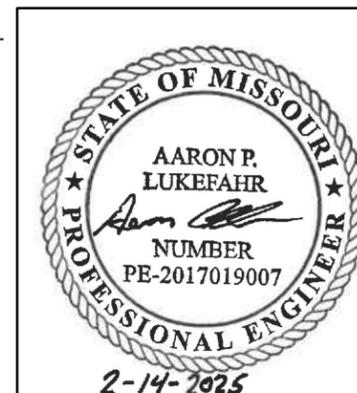
HOLE PUNCHING DETAIL
NTS

(*) TWO HOLES CAN BE PROVIDED ON EACH FLANGE OF POST, ONLY ONE IS REQUIRED FOR FLANGE OF POST THAT HAS A BLOCK ATTACHMENT.



(1) 2" (TOLERANCE +1 1/4", -1/4")

RAIL ELEMENT SPLICE DETAIL
NTS



MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014893
SURVEYING #S-2014016296

RAILING DETAILS SHEET
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CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
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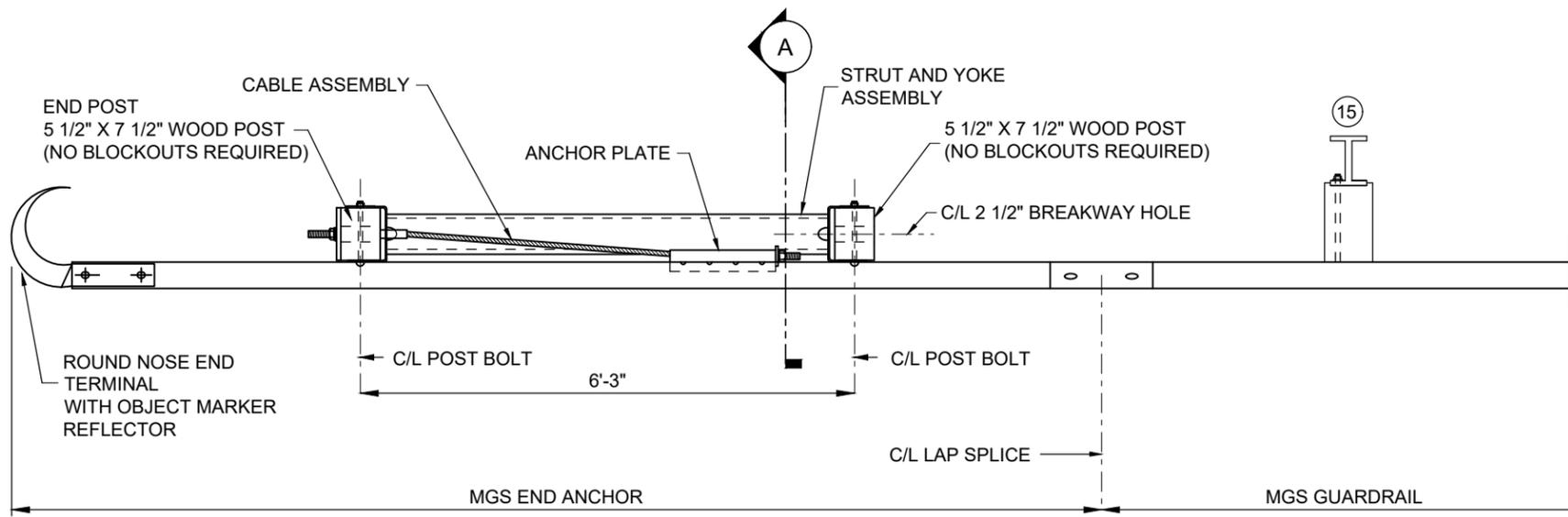
DATE: FEBRUARY 2025
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

JOB NO. 23H3587

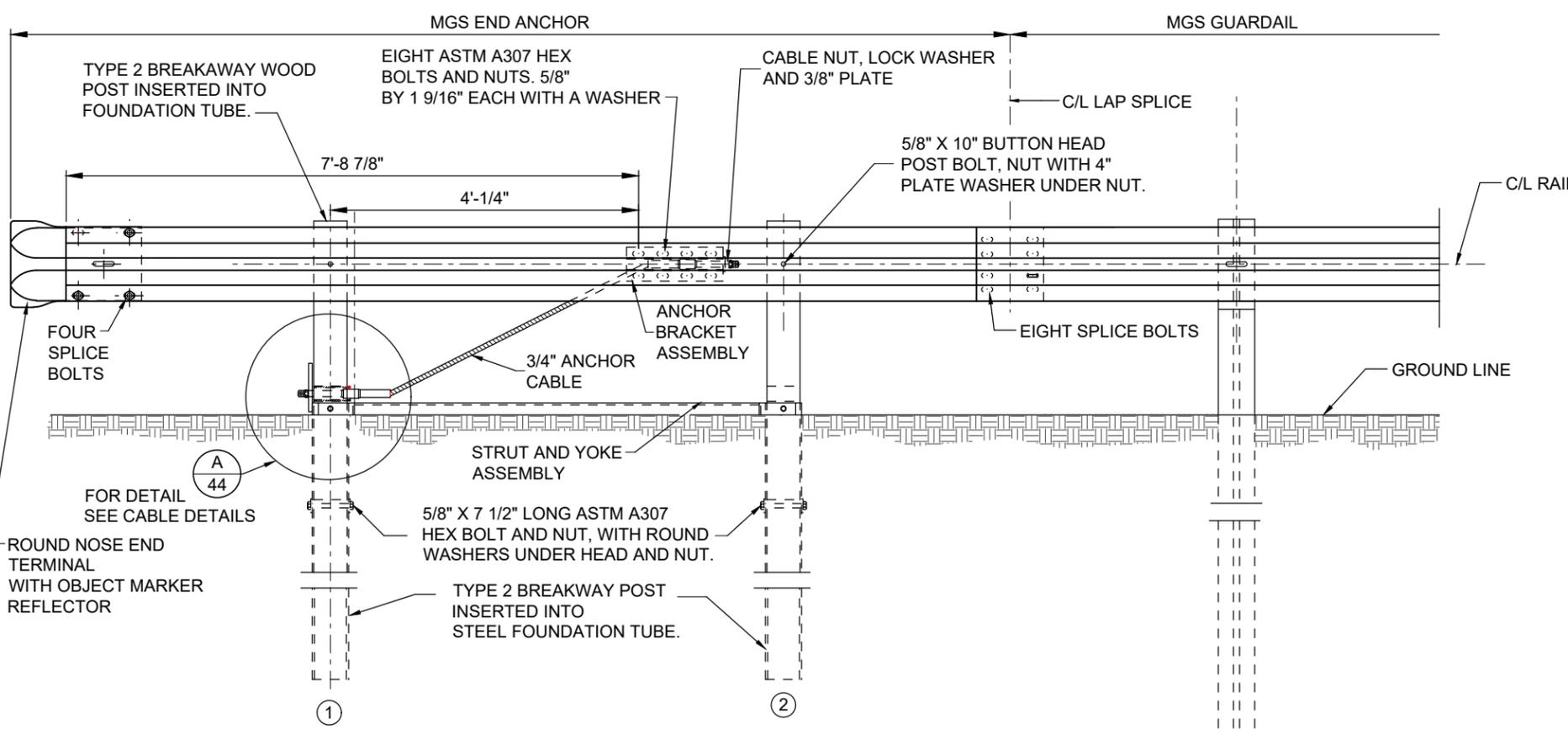
41

SHEET 41 OF 46

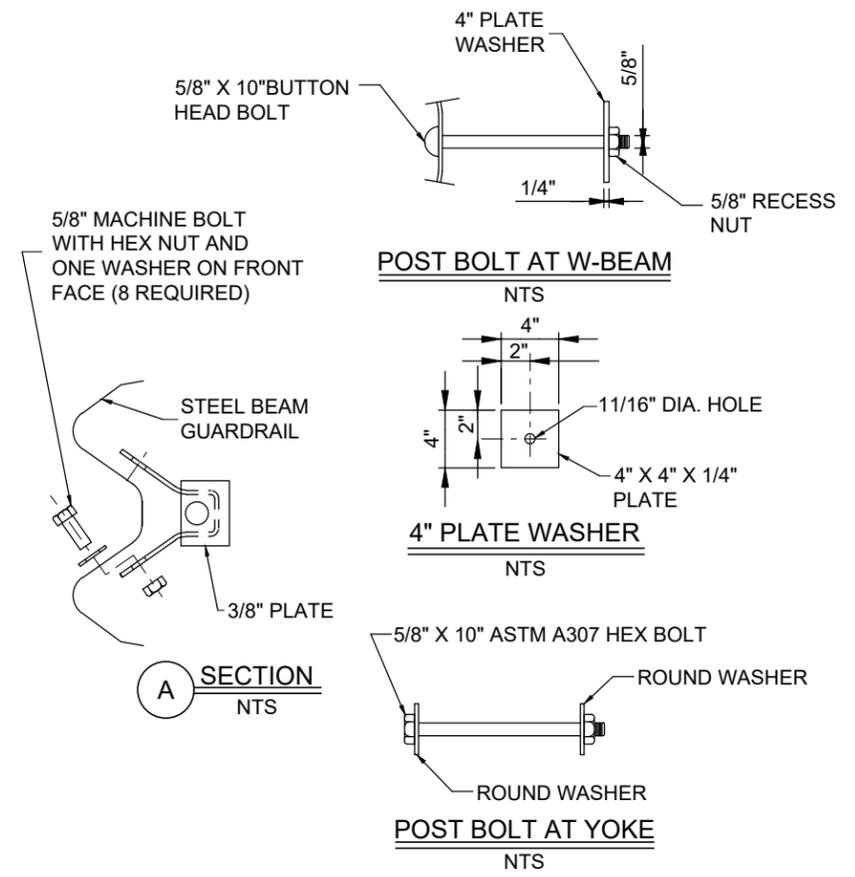
| NO. | DESCRIPTION | DATE | APPR |
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PLAN VIEW
NTS

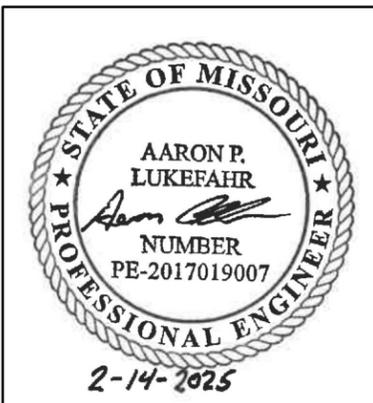


ELEVATION VIEW
NTS

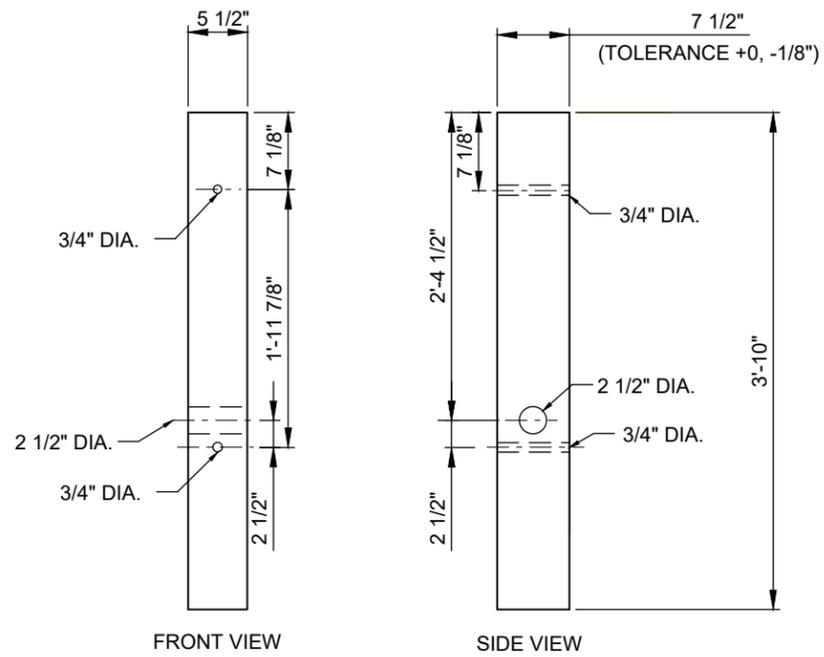


GENERAL NOTES:

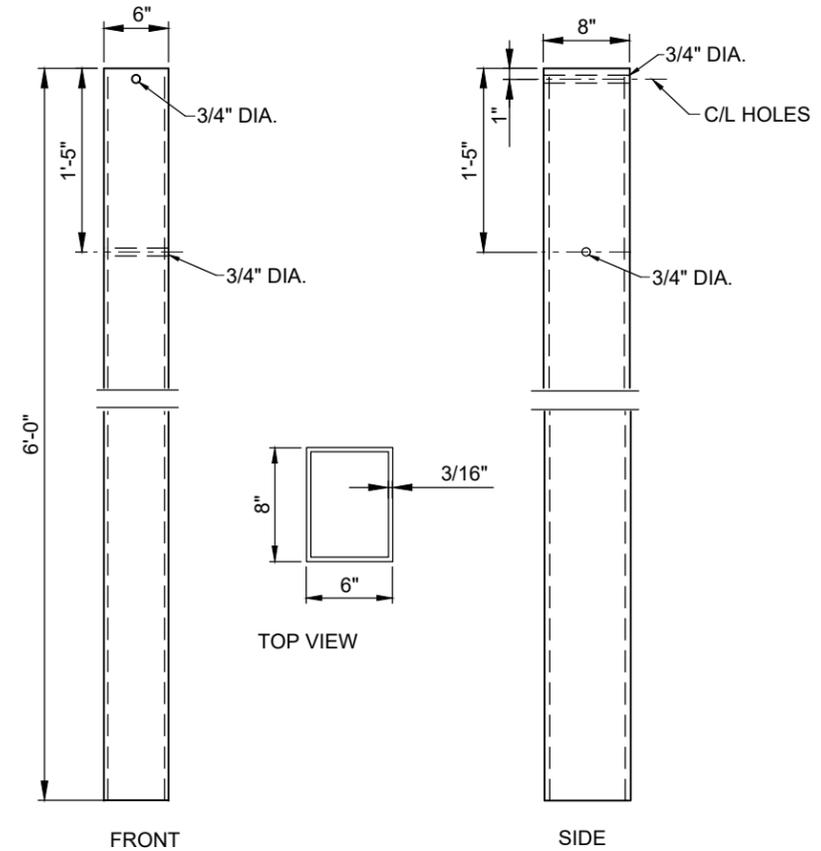
END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON DOWNSTREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR IS REQUIRED.
 THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM FOR GUARDRAIL.
 CABLE ASSEMBLY AND ANCHOR PLATE SHALL HAVE A MINIMUM BREAKING STRENGTH OF 20 TONS.
 ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1040.
 WOOD POSTS ① AND ② SHALL BE 5 1/2\"/>



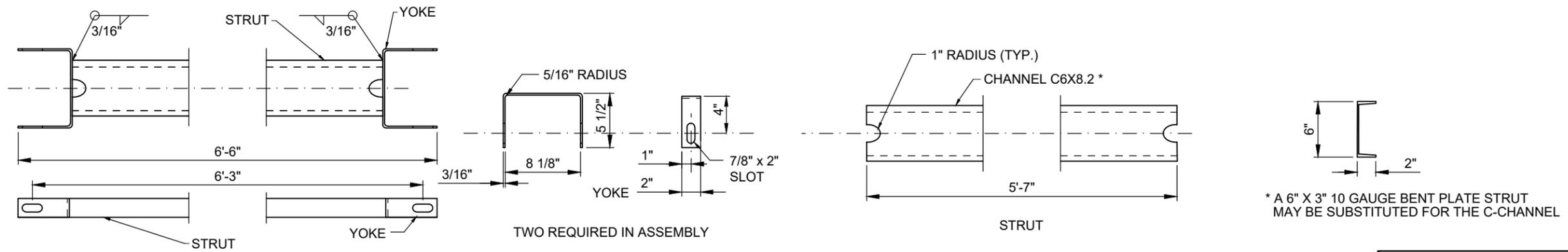
| | | |
|---|--|---|
| <p>Howe Company LLC
 <small>MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014993
 SURVEYING #LS-2014015235</small></p> | | <p>DATE: FEBRUARY 2025
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE</p> |
| <p>RAILING DETAILS SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 019, ROHLFING RD.
 BRIDGE NO. 01900101, PROJECT NO. BR-037(001)
 GASCONADE COUNTY, MISSOURI</p> | <p>HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693</p> | <p>NO. _____
 DESCRIPTION _____
 DATE _____
 APPR _____</p> |
| <p>JOB NO. 23H3587</p> | | <p>42</p> |
| <p>SHEET 42 OF 46</p> | | |



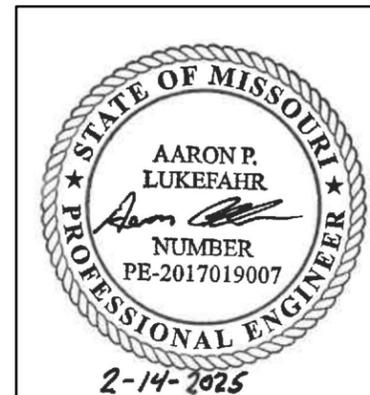
**TYPE 2 BREAKWAY
WOOD POST**
NTS



**STEEL GROUND
FOUNDATION TUBE**
NTS



STRUT AND YOKE ASSEMBLY
NTS



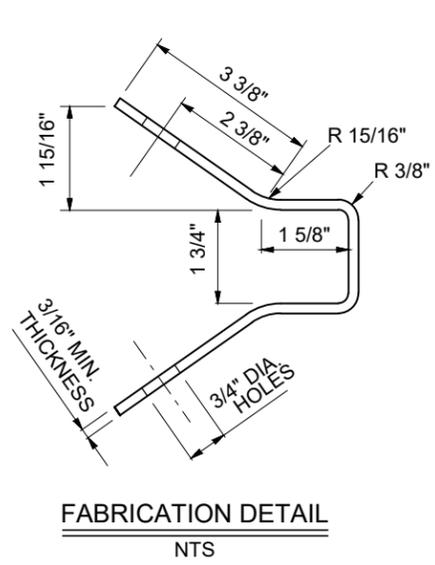
RAILING DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

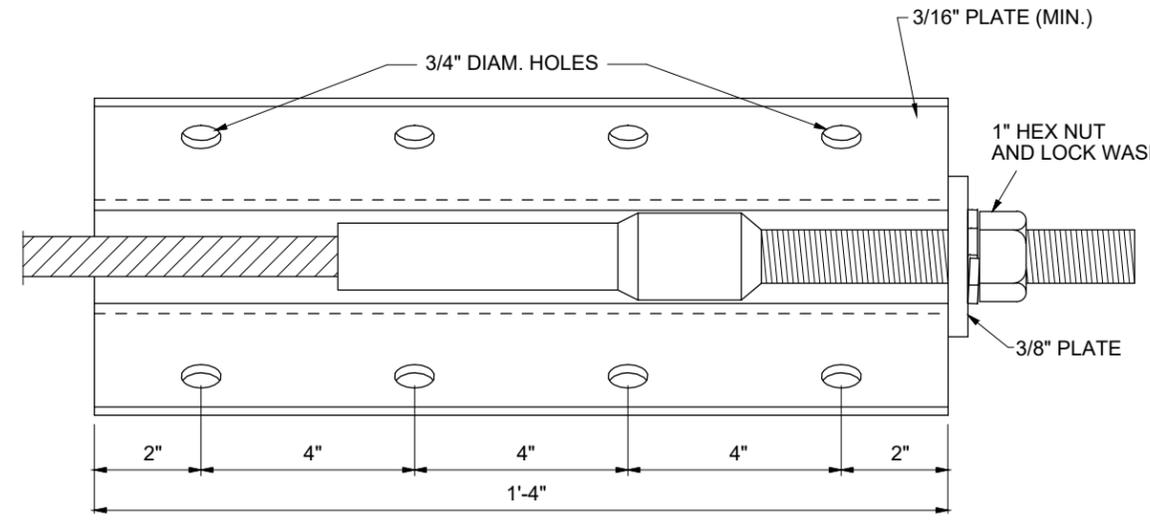
DATE: FEBRUARY 2025
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE

JOB NO. 23H3587

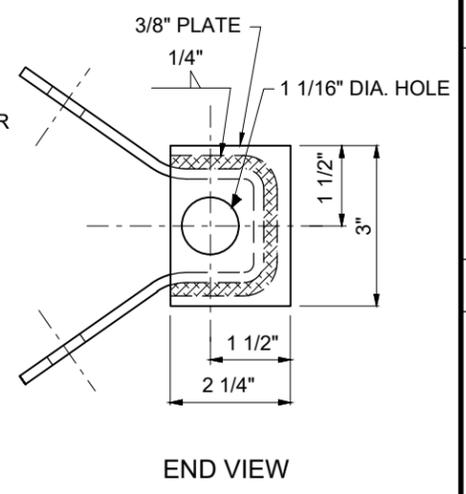
| NO. | DESCRIPTION | DATE | APPR |
|-----|-------------|------|------|
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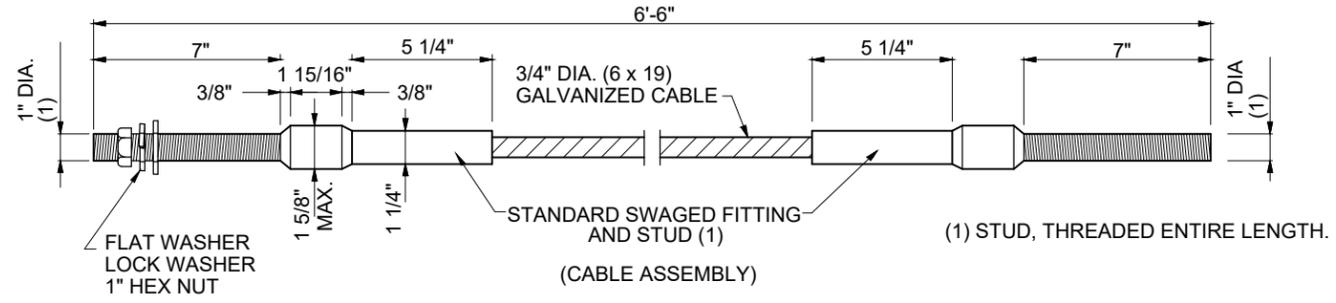
FABRICATION DETAIL
NTS



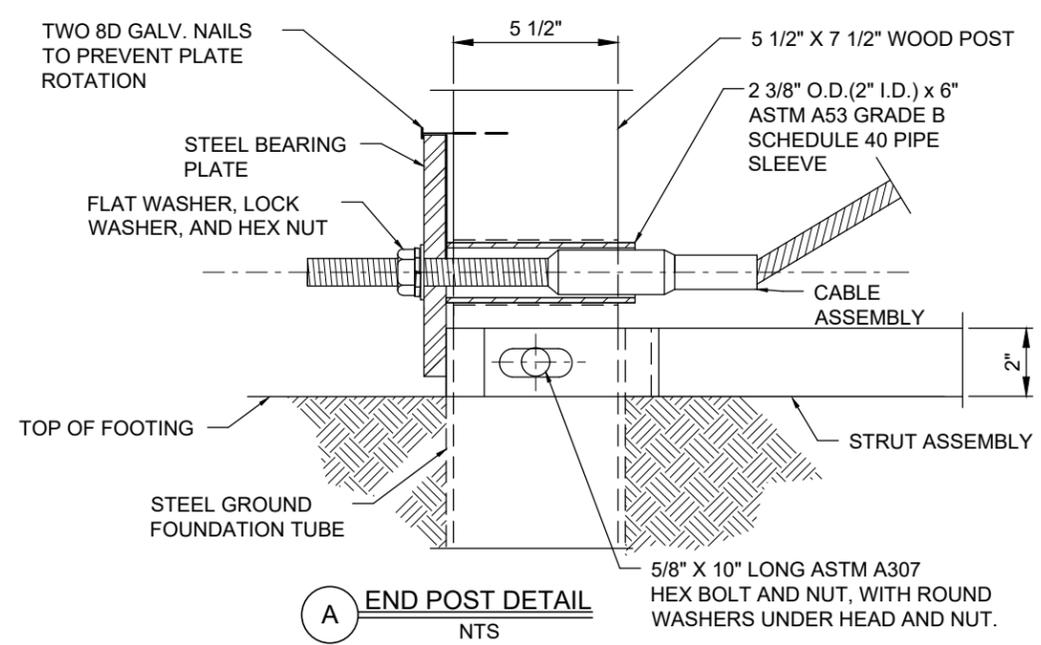
ASSEMBLED VIEW
ANCHOR BRACKET
NTS



END VIEW

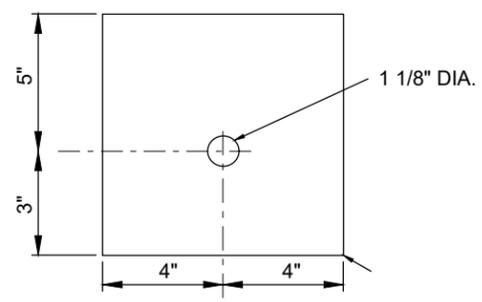


(CABLE ASSEMBLY)

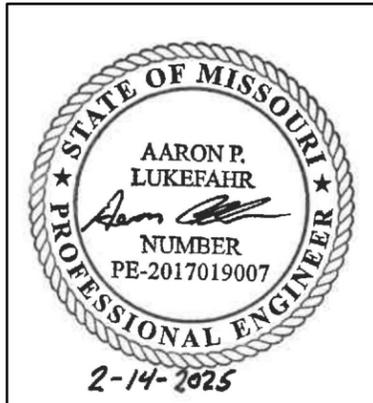


A END POST DETAIL
NTS

FOR LOCATION OF DETAIL A, SEE PAGE 42



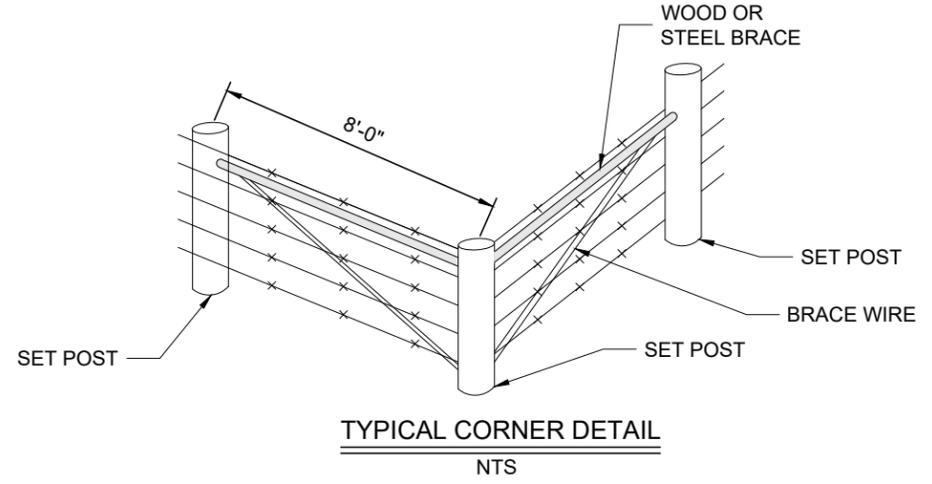
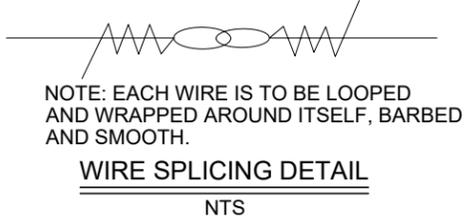
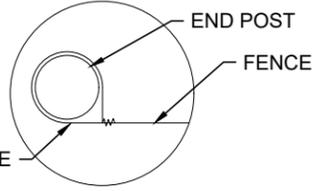
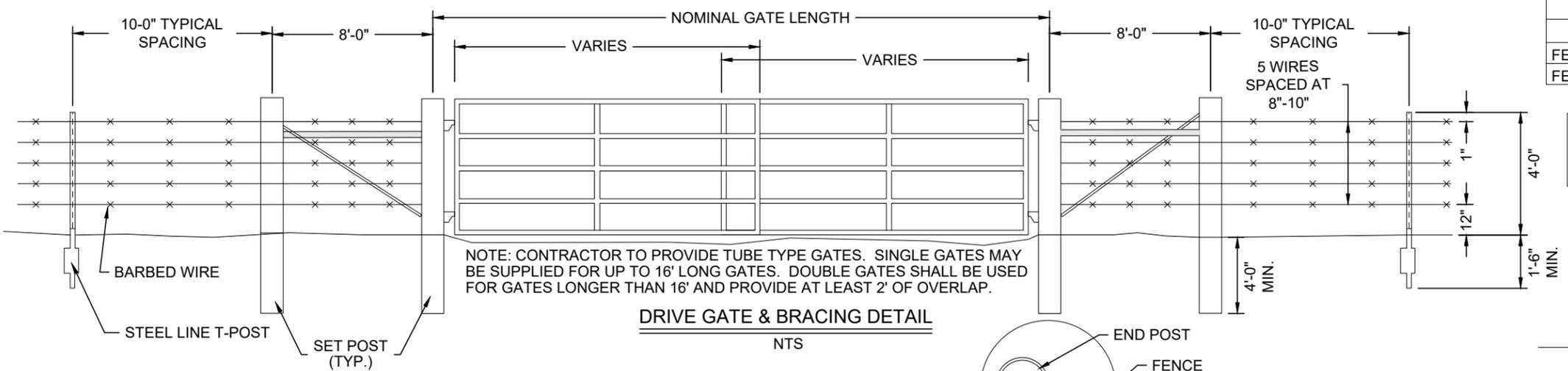
STEEL BEARING PLATE
NTS



| | | |
|--|---------------|--|
| APR | DATE | |
| | DESCRIPTION | |
| | NO. | |
| | | |
| <small>MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014893
SURVEYING #LS-2014015235</small> | | |
| RAILING DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI | | |
| HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693 | | |
| DATE: | FEBRUARY 2025 | |
| DESIGNED BY: | A. LUKEFAHR | |
| DRAWN BY: | P. HOWE | |
| REVIEWED BY: | S. HOWE | |
| APPROVED BY: | S. HOWE | |
| JOB NO. 23H3587 | | |
| 44 | | |
| SHEET 44 OF 46 | | |

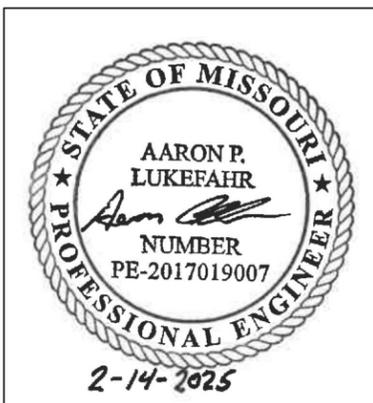
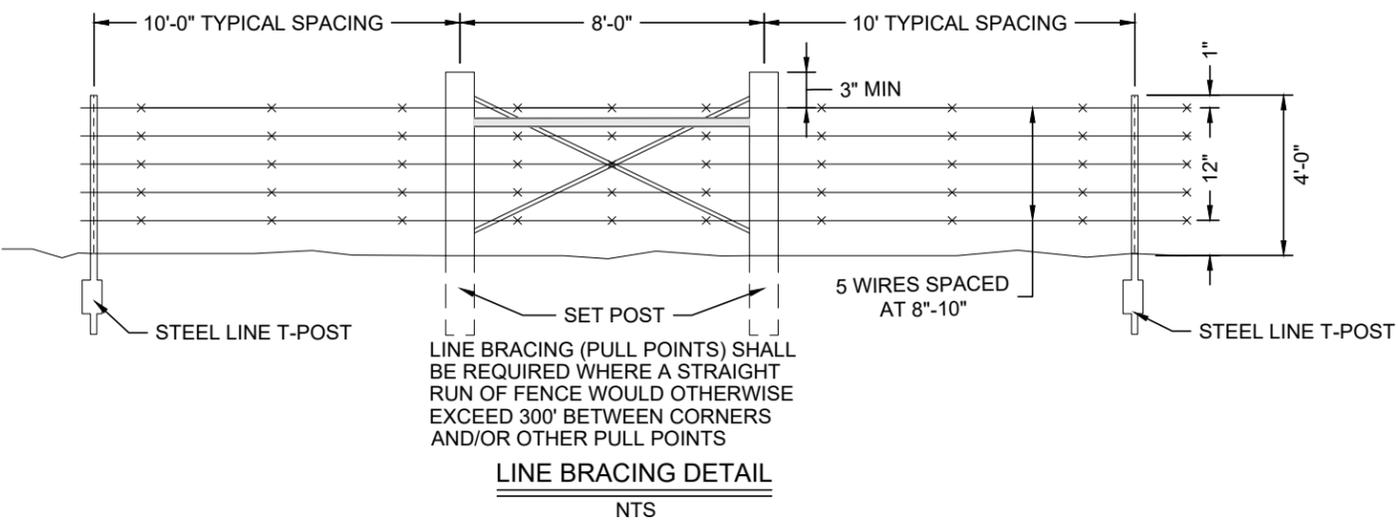
| PARTIAL LIST OF ESTIMATED QUANTITIES | | |
|--------------------------------------|----------|----------|
| ITEM | QUANTITY | TOTAL |
| FENCE (BARBED WIRE) | 476 L.F. | 476 L.F. |
| FENCE (TEMPORARY)* | - | - |

* TEMPORARY FENCE SHALL CONSIST OF A 5 STRAND BARBED WIRE FENCE AS SHOWN ON THIS SHEET UNLESS DIRECTED OTHERWISE BY THE LANDOWNER.



GENERAL NOTES:

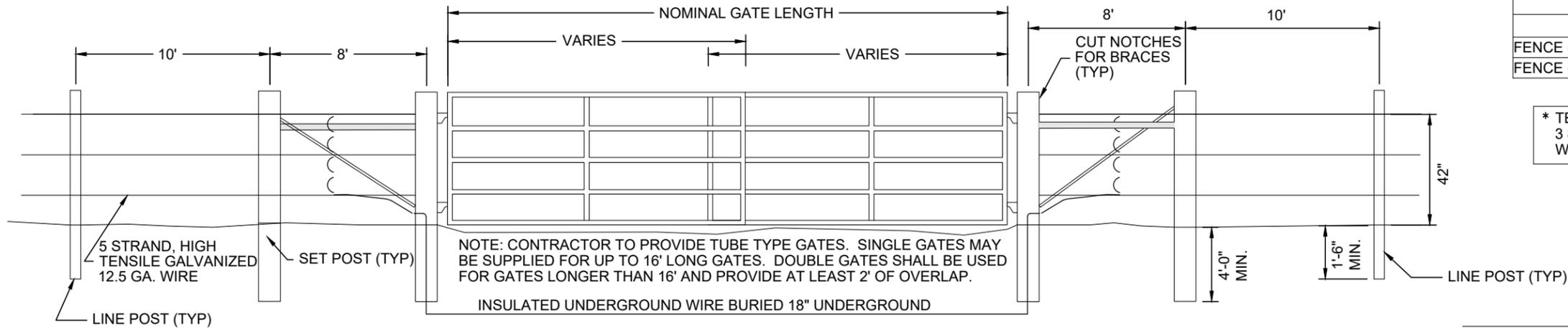
- ALL FENCING MATERIALS SHALL BE WITHIN THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, BUT MUST SATISFY THE NEEDS OF EACH LANDOWNER REQUIRING NEW FENCING WITHIN THE PROJECT AREA.
- BARBED WIRE SHALL BE 12 1/2 MIN GAGE ZINC-COATED STEEL MEETING THE REQUIREMENTS OF SECTION 1043.2.10 OF THE STANDARD SPECIFICATIONS. ALUMINUM COATED STEEL, ALUMINUM ALLOY OR GOUCHO WIRE WILL NOT BE ACCEPTED.
- ALL SET POSTS SHALL BE 6" MINIMUM DIAMETER HEDGE POSTS SET IN AN 18" MINIMUM DIAMETER HOLE, BACKFILLED WITH SUITABLE MATERIAL THOROUGHLY TAMPED. ALL WOOD LINE POSTS SHALL BE 4" MINIMUM DIAMETER. HEDGE IN A 10" MINIMUM DIAMETER HOLE, BACKFILLED WITH SUITABLE MATERIAL THOROUGHLY TAMPED.
- SINGLE GATES MAY BE SUPPLIED FOR ENTRANCES UP TO 16 FEET WIDE. DOUBLE GATES SHALL BE REQUIRED FOR ENTRANCES OVER 16 FEET WIDE. GATES SHALL BE HEAVY TUBULAR STEEL AND PROVIDE AT LEAST 2' OF OVERLAP.
- STEEL LINE POSTS SHALL BE OF AN APPROVED "T" SECTION, STUDDED, AND WITH AN ANCHOR PLATE. MINIMUM LENGTH SHALL BE 7 FEET.
- IF THE OPTIONAL STEEL LINE POSTS ARE USED, THE FIRST LINE POST NEXT TO A SET POST AND AT LEAST EVERY FIFTH LINE POST SHALL BE A WOOD POST.
- STAPLES SHALL BE SCREW SHANK TYPE OR EQUIVALENT, 1 1/4 INCH MINIMUM LENGTH.
- STRETCH FABRIC AND BARBED WIRE ON OUTSIDE OF POST ON CORNERS AND CURVES.
- FOR BRACE WIRES, USE 2 LOOPS OF WIRE TWISTED TIGHT WITH A SHORT STICK OR BOARD. LEAVE IN PLACE FOR FUTURE TIGHTENING.
- AT ALL END POSTS, EACH WIRE IS TO BE WRAPPED AROUND THE POST, TIED TO ITSELF AND STAPLED.
- ALL WOOD CORNER, END, PULL AND APPROACH POSTS SHALL BE NOTCHED TO SUPPORT ENDS OF WOOD BRACES. BRACES SHALL BE TOENAILED TO THE POSTS WITH 2-10D NAILS (GALVANIZED) IN EACH END OF THE BRACE.
- THE ALIGNMENT LAYOUTS SHOWN ARE TYPICAL, BUT ARE NOT REPRESENTATIVE OF ALL SITUATIONS THAT MAY OCCUR.
- CONSTRUCTION MAY BE VARIED AS REQUIRED TO MEET FIELD CONDITIONS AND/OR AS DIRECTED BY THE ENGINEER OR LANDOWNER.



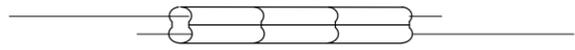
| | | | | | |
|--|---|--|-------------|------|-------|
| | MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014993
SURVEYING #S-2014015235 | NO. | DESCRIPTION | DATE | APPR. |
| | HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693 | FENCE DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900101, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI | | | |
| DATE: FEBRUARY 2025
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE | | JOB NO. 23H3587 | | | |
| | | 45 | | | |
| | | SHEET 45 OF 46 | | | |

| PARTIAL LIST OF ESTIMATED QUANTITIES | | |
|--------------------------------------|------------|------------|
| ITEM | QUANTITY | TOTAL |
| FENCE (3 STRAND ELEC) | 618 L.F. | 618 L.F. |
| FENCE (TEMPORARY)* | 1,269 L.F. | 1,483 L.F. |

* TEMPORARY FENCE SHALL CONSIST OF A 3 STRAND ELECTRIC WIRE FENCE LIKE WHAT IS SHOWN ON THIS SHEET.

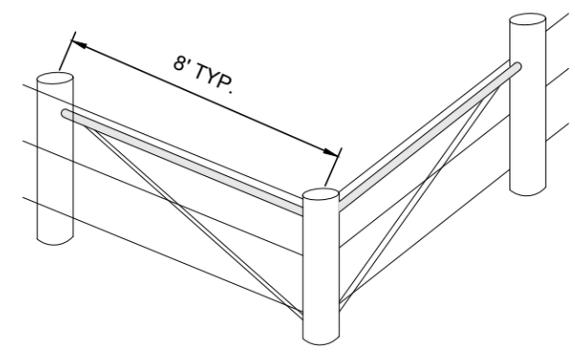


DRIVE GATE & BRACING DETAIL
NTS



EACH WIRE IS TO BE SPLICED WITH (3) 12.5 GA. SPLICING SLEEVES OR PER MANUFACTURERS RECOMMENDATIONS

WIRE SPLICING DETAIL
NTS

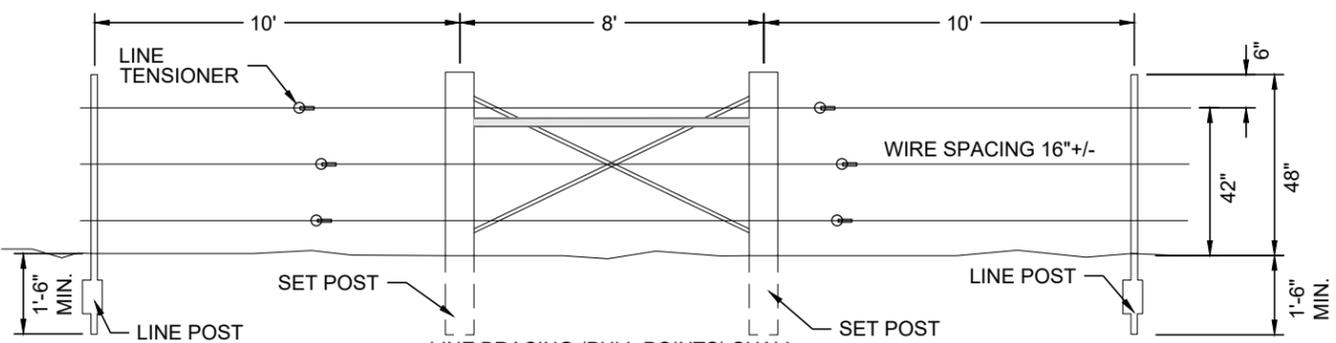


TYPICAL CORNER DETAIL
NTS

GENERAL NOTES:

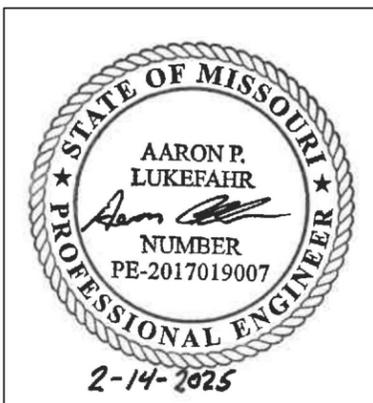
- SET POSTS SHALL BE 8" MINIMUM DIAMETER - HEDGE - POSTS SET IN AN 18" MINIMUM DIAMETER HOLE, BACKFILLED WITH SUITABLE MATERIAL THOROUGHLY TAMPED.
- FENCING STAPLES SHALL BE GALVANIZED, SCREW SHANK TYPE OR EQUIVALENT, 1 1/2" INCH MINIMUM LENGTH.
- BRACE WIRES SHALL CONSIST OF 2 LOOPS OF 9 GAUGE WIRE, OR 12.5 GAUGE HIGH TENSILE, TWISTED TIGHT WITH A STEEL ROD OR TREATED LUMBER. LEAVE IN PLACE FOR FUTURE TIGHTENING.
- ALL WOOD CORNER, END, PULL AND APPROACH POSTS SHALL BE NOTCHED TO SUPPORT ENDS OF WOOD BRACES. BRACES SHALL BE TOENAILED TO THE POSTS WITH 2-10D NAILS IN EACH END OF THE BRACE OR PINED WITH A STEEL ROD.
- GATES SHALL BE HEAVY TUBULAR STEEL AND PROVIDE AT LEAST 2' OF OVERLAP.
- SINGLE GATES MAY BE SUPPLIED FOR ENTRANCES UP TO 16 FEET WIDE. DOUBLE GATES SHALL BE REQUIRED FOR ENTRANCES OVER 16 FEET WIDE.
- LINE POSTS SHALL BE WOOD, STEEL, COMPOSITE, OR FIBERGLASS.
- WOODEN LINE POSTS SHALL BE 4" MINIMUM DIAMETER - HEDGE - IN A 10" MINIMUM DIAMETER HOLE, BACKFILLED WITH SUITABLE MATERIAL THOROUGHLY TAMPED. WOODEN LINE POSTS SHALL BE SET AT LEAST 18" BELOW GRADE.
- STEEL LINE POSTS SHALL BE OF AN APPROVED "T" SECTION AT LEAST 1.25 LB/FT, STUDDED, PAINTED OR GALVANIZED, AND WITH AN ANCHOR PLATE. MINIMUM LENGTH SHALL BE 5'-6".
- COMPOSITE OR FIBERGLASS LINE POSTS SHALL BE A NON-CONDUCTIVE APPROVED "T" SECTION OR ROUND WITH A DIAMETER OF AT LEAST 1 1/4". MINIMUM LENGTH SHALL BE 5'-6".

- INSULATORS FOR ATTACHING TO CONDUCTIVE LINE POSTS SHALL FEATURE A PIN-LOCK CONNECTION TO RETAIN THE WIRE. TUBULAR, CERAMIC, AND PLASTIC INSULATORS SHALL BE PERMITTED. INSULATORS SHALL BE INSTALLED PER THEIR MANUFACTURERS RECOMMENDATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR PREVENTING AND OR ELIMINATING ALL SHORTS WITHIN PORTIONS OF THE FENCE THEY CONSTRUCT.
- THE CONTRACTOR SHALL NOT BE RESPONSIBLE FOR PROVIDING ENERGIZERS FOR THE NEW FENCE.
- FENCE WIRE SHALL CONSIST OF 12.5 GAUGE, 200 KSI, CLASS 3 GALVANIZED HIGH TENSILE WIRE.
- ALL WIRES OF ELECTRIC FENCE SHALL BE CONNECTED AND CARRY VOLTAGE UNLESS REQUESTED OTHERWISE BY THE LANDOWNER. THE CONTRACTOR SHALL CONNECT ALL NEW FENCE TO EXISTING FENCE.
- ANY FENCING MATERIAL NOT IDENTIFIED SHALL BE WITHIN THE REQUIREMENTS OF THE PROJECT STANDARD SPECIFICATIONS OR APPROVED BY THE ENGINEER.
- CONSTRUCTION MAY BE VARIED AS REQUIRED TO MEET FIELD CONDITIONS AND/OR AS DIRECTED BY THE ENGINEER, OR LANDOWNER. THE CONTRACTOR SHALL FOLLOW ANY NON-COST CHANGES REQUESTED BY EACH LANDOWNER WITHIN THE PROJECT LIMITS. CHANGES THAT WOULD ADD QUANTITY OR COST TO THE PROJECT SHALL BE BROUGHT TO AND APPROVED BY THE ENGINEER.



LINE BRACING (PULL POINTS) SHALL BE REQUIRED WHERE A STRAIGHT RUN OF FENCE WOULD OTHERWISE EXCEED 300' BETWEEN CORNERS AND/OR OTHER PULL POINTS

LINE BRACING DETAIL
NTS



| | |
|----------------|---------------|
| DATE | FEBRUARY 2025 |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY: | P. HOWE |
| REVIEWED BY: | S. HOWE |
| APPROVED BY: | S. HOWE |
| JOB NO. | 23H3587 |
| 46 | |
| SHEET 46 OF 46 | |

Howe Company LLC
MISSOURI STATE CERTIFICATE OF AUTHORITY
ENGINEERING #E-2014014893
SURVEYING #S-2014015235

FENCE DETAILS SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 019, ROHLFING RD.
BRIDGE NO. 01900701, PROJECT NO. BRO-R037(001)
GASCONADE COUNTY, MISSOURI

HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
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