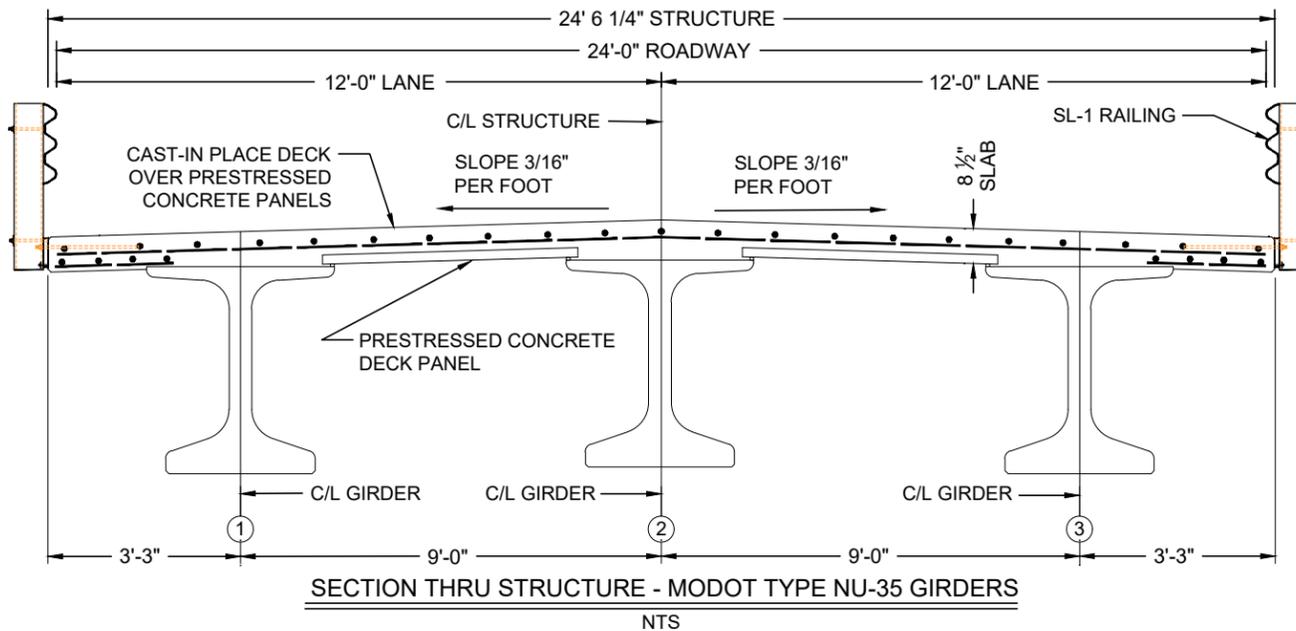


HYDROLOGIC DATA		
EXISTING BRIDGE DECK ELEV.	FT.	546.50
DRAINAGE AREA	SQ. MI.	391
DESIGN FREQUENCY	YEARS	25
DESIGN DISCHARGE	CFS.	19,900
DESIGN HIGH WATER AT THE STRUCTURE	FT.	550.22
LOW ELEVATION OF SUPERSTRUCTURE	FT.	554.00
100 YEAR DISCHARGE	CFS.	26,400
100 YEAR HIGH WATER ELEVATION AT THE STRUCTURE	FT.	552.68

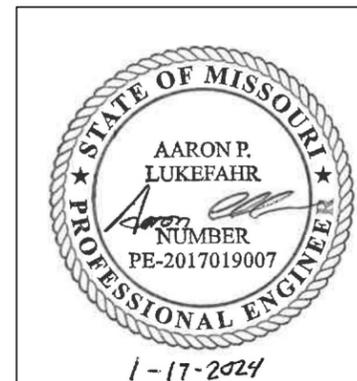
WORK TO BE PERFORMED BY CONTRACTOR			
ITEM	DESCRIPTION - ROADWAY ITEMS	UNITS	EST. QTY.
201	CLEARING AND GRUBBING	ACRE	1.95
202	REMOVAL OF IMPROVEMENTS	L.S.	1
203	UNCLASSIFIED EXCAVATION	C.Y.	3,146
203	EMBANKMENT IN PLACE	C.Y.	12,198
310	4" THICK LAYER ROADWAY AGGREGATE	S.Y.	2,407
606	MGS GUARDRAIL SYSTEM	L.F.	169
606	TYPE E GUARDRAIL SYSTEM	L.F.	25
606	GUARDRAIL TRANSITION SECTION	EACH	3
606	THRIE BEAM END SHOE	EACH	1
606/JSP	CRASHWORTHY END TERMINAL	EACH	3
607	FENCE (WOVEN WIRE)	L.F.	814
607	TEMPORARY FENCE (3 STRAND ELECTRIFIED)	L.F.	775
607	16' GATE	EACH	2
611.30	FURNISHING TYPE 2 ROCK BLANKET	C.Y.	856
611.30	PLACING TYPE 2 ROCK BLANKET	C.Y.	856
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.	1,374
627	CONTRACTOR SURVEYING & STAKING	L.S.	1
805/JSP	SEEDING	ACRE	1.86
806	SILT FENCE	L.F.	940
1020	18" C.M.P. 14 GA. ALUMINIZED	L.F.	60
JSP	STORM WATER POLLUTION PREVENTION PLAN (S.W.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.	159
501	CLASS B-2 SUPERSTRUCTURE CONCRETE	C.Y.	170
701	DRILLED SHAFTS (3'-6")	L.F.	45
701	ROCK SOCKETS (3'-0")	L.F.	105
701	FOUNDATION INSPECTION HOLES	L.F.	165
701	SONIC LOGGING TESTING	EACH	6
701	SUPPLEMENTAL TELEVISION CAMERA INSPECTION	EACH	6
702/JSP	HP12x53 PILE (GALVANIZED FULL LENGTH)	L.F.	248
702	PILE POINTS	EACH	8
702	PRE-BORING FOR PILING	L.F.	48
705	PRESTRESSED CONCRETE DECK PANELS	S.Y.	261
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.	92,148
713	SL-1 RAILING	L.F.	450
715	VERTICAL DRAIN AT END BENTS	EACH	2
716	PLAIN NEOPRENE BEARING PADS (1/2")	EACH	18

* THESE ITEMS REQUIRE CERTIFICATION/SHOP DRAWINGS/SUBMITTAL.

FOUNDATION DATA TABLE					
BENT NO.		1	2	3	4
NUMBER OF HP12x53 PILING	EACH	4			4
APPROXIMATE LENGTH	FT.	25			37
DESIGN BEARING	TONS	52			52
MINIMUM TIP ELEVATION	FT.	533.00			533.00
PRE-BORE ELEVATION	FT.	533.00			N/A
ESTIMATED TIP ELEVATION	FT.	527.49			515.49
CUT OFF ELEVATION	FT.	552.49			552.49
MINIMUM HAMMER ENERGY	FT. LBS.	11,500			11,500
ROCK SOCKETS	FOUNDATION MATERIAL	SHALE			
	TOP OF ROCK	FT.	523.00 +/-		523.00 +/-
	ALLOWABLE SKIN FRICTION		4 KSF	4 KSF	



UTILITY CONTACT:
ELECTRIC
LEWIS COUNTY REC
LEWISTOWN, MO
888-454-4485



GENERAL NOTES AND QUANTITIES SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 122, CO. RD. 429
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)
LEWIS COUNTY, MISSOURI
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

DATE: AUGUST 2024
DESIGNED BY: A. LUKEFAHR
DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
APPROVED BY: S. HOWE
JOB NO. 23H3543

NO.	DESCRIPTION	DATE	APPR.

GENERAL NOTES

THE CONTRACTOR SHALL FOLLOW THE SPECIFICATIONS AS STATED IN THE "MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION," 2024, AND CURRENT SUPPLEMENTAL SPECIFICATIONS REVISIONS.
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.
BEARINGS SHOWN ARE STATE PLANE BEARINGS, EAST ZONE.
THE CONTRACTOR SHALL NOT DISTURB TREES BEYOND GRADING LIMITS IN THE BENJAMIN W. FITSCHEN & EMILY E. FITSCHEN AND ALAN M. FITSCHEN & KATRINA L. FITSCHEN TEMPORARY EASEMENT AREA.

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'-6" DIA.)"
THE COST OF ANY EXCAVATION OR FILL REQUIRED TO REACH THE TOP OF THE DRILLED SHAFTS WILL BE CONSIDERED INCIDENTAL.

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"
AIR CONTENT= 5% MINIMUM
BRIDGE SUPERSTRUCTURE CONCRETE: MODOT CLASS B-2 or MODOT CLASS MB-2
f_c= 4000 PSI MINIMUM
MAY. 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 HP 12X53 ROLLED STEEL SECTIONS. PILING SHALL BE GALVANIZED FULL LENGTH.

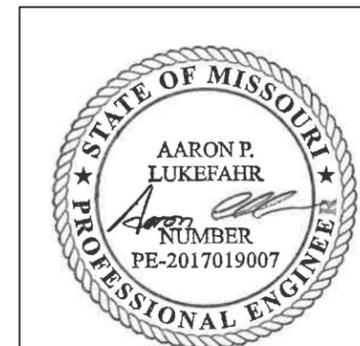
THE CONTRACTOR SHALL INSTALL CAST STEEL DRIVING POINTS ON ALL PILES. THE CAST STEEL POINTS SHALL BE ASTM A27 65-35 OR BETTER. COSTS OF PROVIDING AND INSTALLING PILE TIP REINFORCEMENT SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR ITEM, "PILE POINTS". PILE POINTS NEED NOT BE GALVANIZED.

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.

UTILITY CONTACT:

ELECTRIC
LEWIS COUNTY REC
LEWISTOWN, MO
888-454-4485



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

GENERAL NOTES AND QUANTITIES SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 122, CO. RD. 429
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)
LEWIS COUNTY, MISSOURI

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

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

JOB NO. 23H3543

NO.	DESCRIPTION	DATE	APPR.

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 PROJECT NAME Lewis County Bridge 12200071
PROJECT NUMBER G23916 PROJECT LOCATION Canton, Missouri
DATE STARTED 4/21/23 COMPLETED 4/21/23 GROUND ELEVATION 545 ft MSL HOLE SIZE 4"
DRILLING CONTRACTOR IPES GROUND WATER LEVELS:
DRILLING METHOD 4" SSA & NQ2 Diamond Bit AT TIME OF DRILLING 7.00 ft / Elev 538.00 ft
LOGGED BY Korn CHECKED BY Lidholm AT END OF DRILLING --- Not observed
NOTES Borehole backfilled upon completion 0.25hrs AFTER DRILLING --- Not observed

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		SANDY GRAVEL (6-inches)										
0.5		CLAYEY SAND: Dark brown, trace roots, trace fine gravel										
5			SPT 1	12	3-2-1 (3)	1000			13			
10			SPT 2	10	2-2-1 (3)	1500			12			
12.0		SAND: Brown										
15			SPT 3	18	1-1-1 (2)	sand			22			
20			SPT 4	18	1-1-1 (2)	sand			25			
22.0		WEATHERED SHALE: Gray, trace sand										
22.5		SHALE: Gray, trace sand										
25.0		WEATHERED LIMESTONE: Hard										
25.5		LIMESTONE: Gray, hard	SPT 5	6	1-27-50/3"	12000			13			
28.5		SHALE: Dark gray, limy										
30.5		Bottom of borehole at 30.5 feet.	RC 6	60								

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 NUMBER B-2
PAGE 1 OF 1

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

CLIENT Howe Company PROJECT NAME Lewis County Bridge 12200071
PROJECT NUMBER G23916 PROJECT LOCATION Canton, Missouri
DATE STARTED 4/21/23 COMPLETED 4/21/23 GROUND ELEVATION 543 ft MSL HOLE SIZE 4"
DRILLING CONTRACTOR IPES GROUND WATER LEVELS:
DRILLING METHOD 4" SSA & NQ2 Diamond Bit AT TIME OF DRILLING --- Not encountered
LOGGED BY Korn CHECKED BY Lidholm AT END OF DRILLING --- Not observed
NOTES Borehole backfilled upon completion 0.25hrs AFTER DRILLING --- Not observed

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		SANDY GRAVEL (6-inches)										
0.5		LEAN TO FAT CLAY: Brown, with sand and gravel										
5			SPT 1	16	7-7-7 (14)	4000			14			
6.5		WEATHERED SHALE: Light brown										
7.5		SANDY SHALE: Light brown										
10			SPT 2	9	26-50/3"	12000			10			
15		--: brown	SPT 3	9	40-50/3"	12000			10			
17.0		SHALE: Gray										
20			SPT 4	15	27-42-50/3"	12000			11			
20.3		WEATHERED LIMESTONE: Hard										
20.6		LIMESTONE: Gray, hard										
24.8		Bottom of borehole at 24.8 feet.	RC 5	54								

NOTE:
THE ELEVATIONS SHOWN IN THE SOIL BORING LOGS ARE BASED ON GOOGLE EARTH ELEVATION
PROJECT GROUND ELEVATION AT B-1 IS ABOUT 545 FT.
PROJECT GROUND ELEVATION AT B-2 IS ABOUT 544 FT.



1-17-2024



BORING LOG SHEET
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
CART ROUTE NO. 122, CO. RD. 429
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)
LEWIS COUNTY, MISSOURI
HOWE COMPANY, LLC
804 E. PATTON STREET, MACON, MO. 63552
OFFICE: 660-395-4693

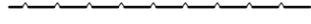
DATE: AUGUST 2024
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DRAWN BY: P. HOWE
REVIEWED BY: S. HOWE
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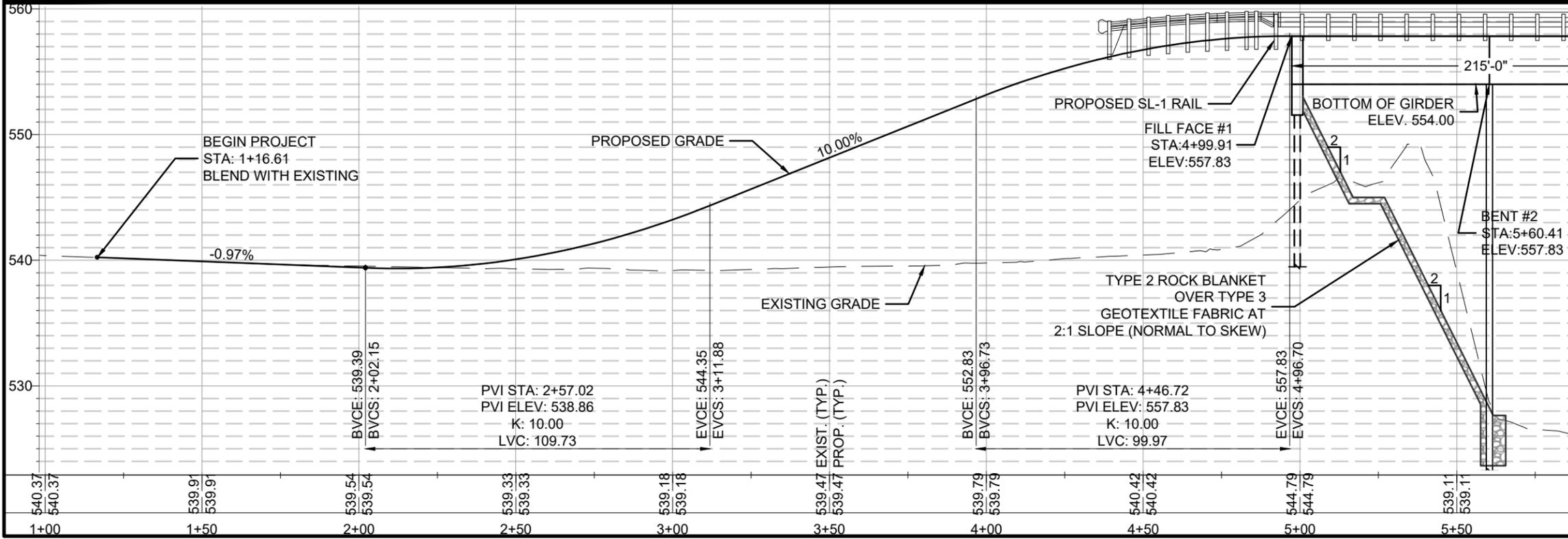
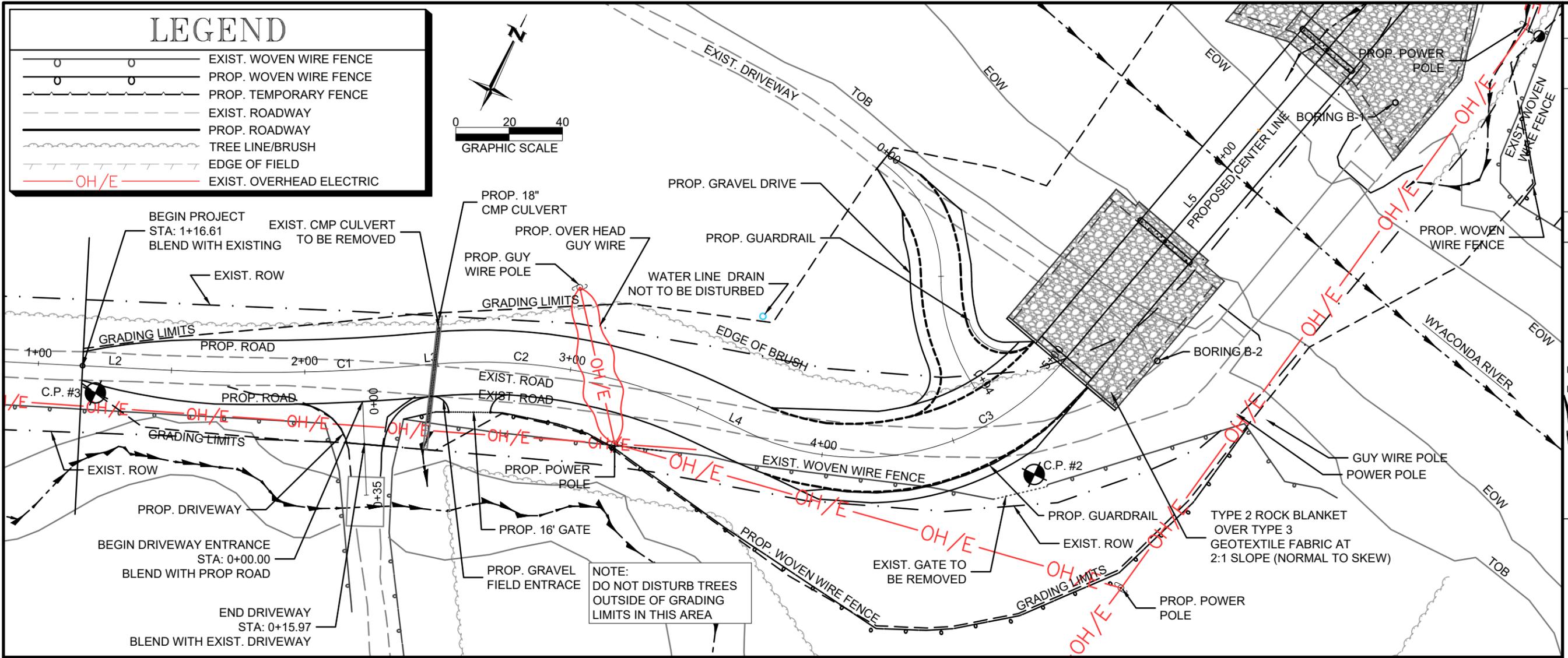
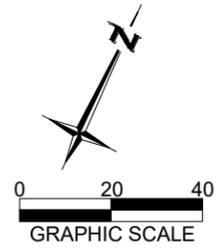
JOB NO. 23H3543

5

NO.	DESCRIPTION	DATE	APPR.

LEGEND

-  EXIST. WOVEN WIRE FENCE
-  PROP. WOVEN WIRE FENCE
-  PROP. TEMPORARY FENCE
-  EXIST. ROADWAY
-  PROP. ROADWAY
-  TREE LINE/BRUSH
-  EDGE OF FIELD
-  OH/E



PROPOSED STRUCTURE	
GIRDER TYPE:	NU-35
BRIDGE LENGTH:	215.00'(60.5-94-60.5)
GRADE:	0.00%
SKEW:	0°
HYDROLOGIC DATA	
DRAINAGE AREA:	391 SQ. MI.
Q25 =	19,900 CFS
HW ELEV. 25 =	550.22'
Q100 =	26,400 CFS
HW ELEV. 100 =	552.68'



1-17-2024

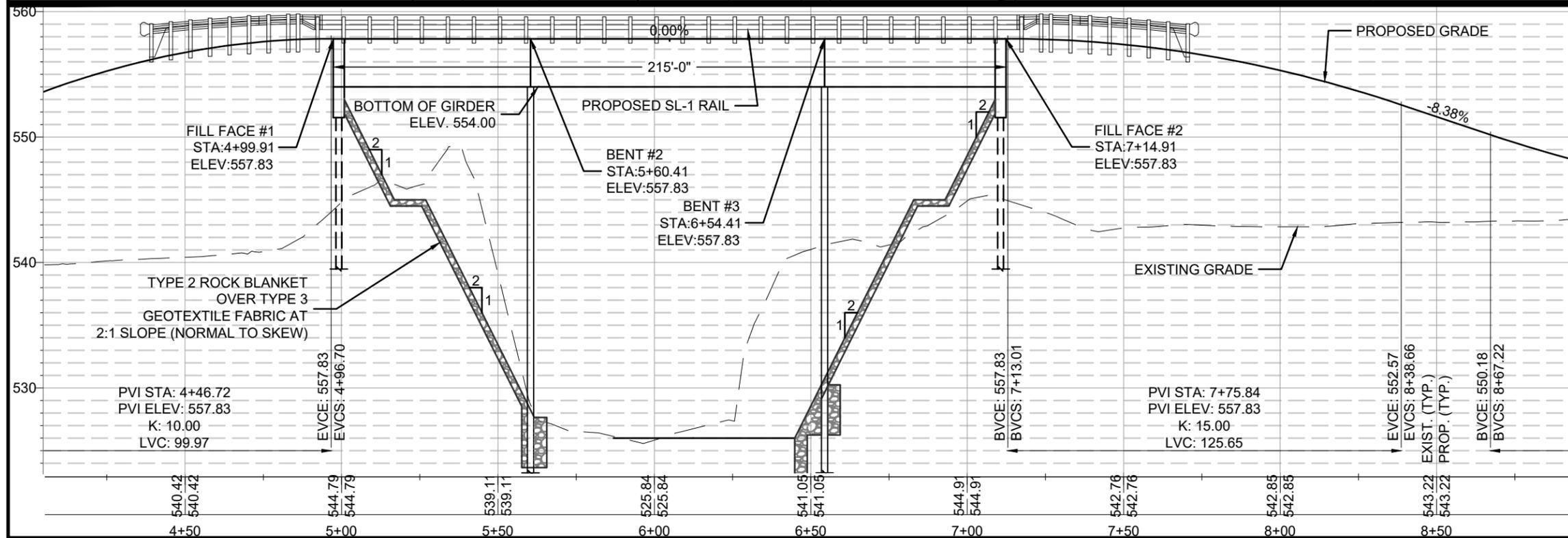
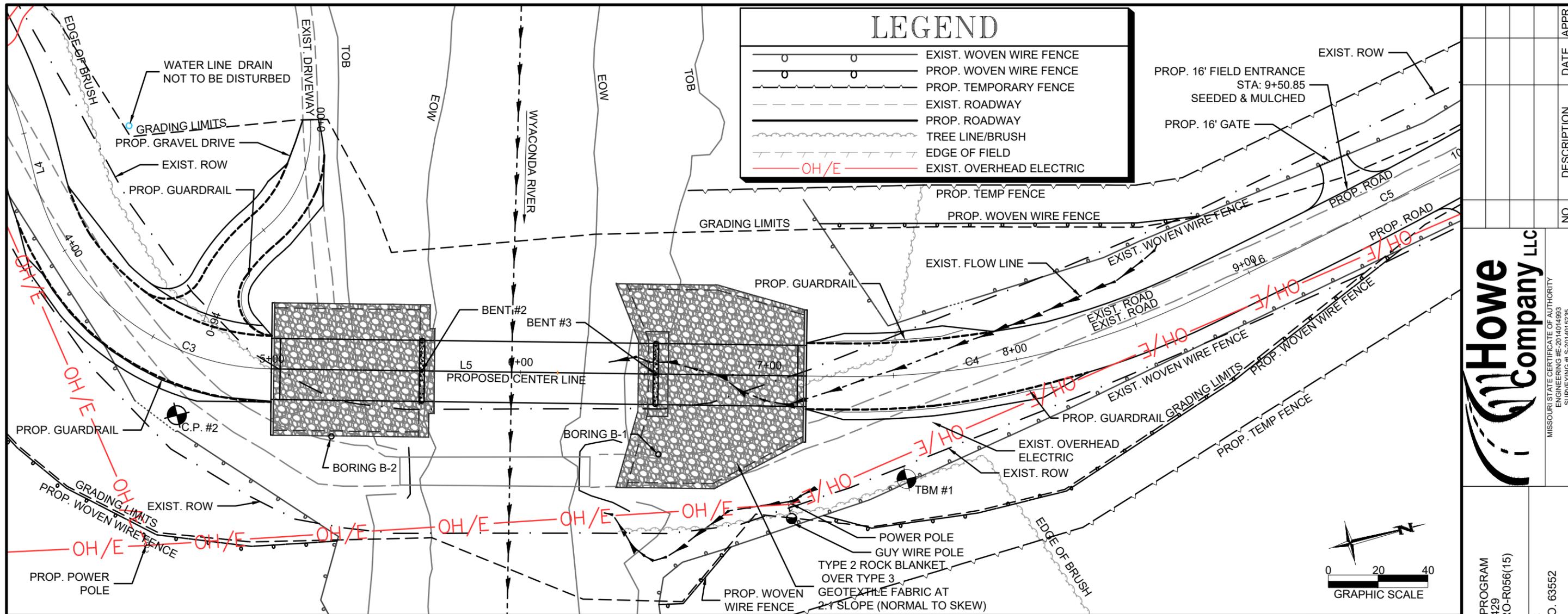


PLAN AND PROFILE SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 122, CO. RD. 429
 BRIDGE NO. 12200071, PROJECT NO. BRO-R066(15)
 LEWIS COUNTY, MISSOURI

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

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

NO.	DESCRIPTION	DATE	APPR.



PROPOSED STRUCTURE	
GIRDER TYPE:	NU-35
BRIDGE LENGTH:	215.00'(60.5-94-60.5)
GRADE:	0.00%
SKIEW:	0°

HYDROLOGIC DATA	
DRAINAGE AREA:	391 SQ. MI.
Q25 =	19,900 CFS
Q100 =	26,400 CFS
HW ELEV. 25 =	550.22'
HW ELEV. 100 =	552.68'

LEGEND

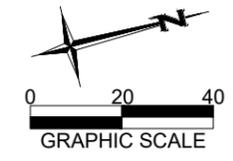
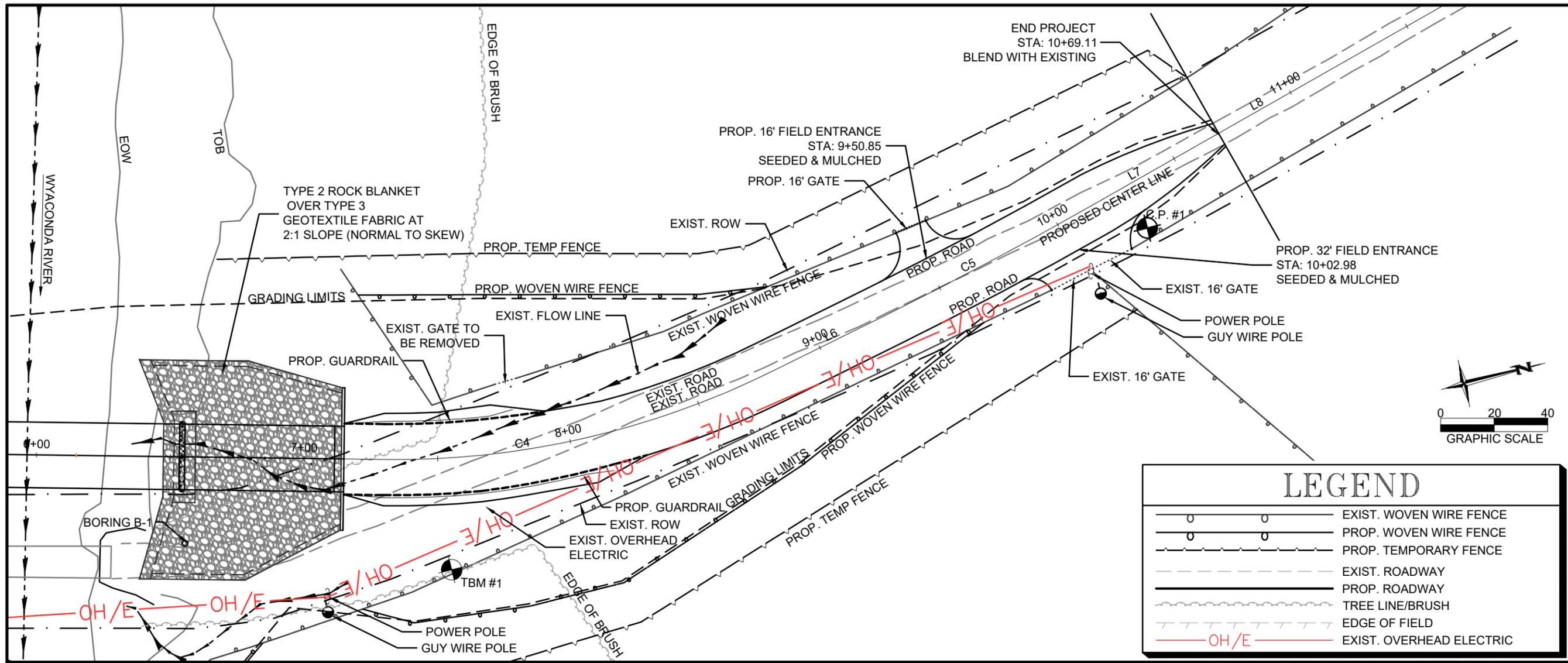
	EXIST. WOVEN WIRE FENCE
	PROP. WOVEN WIRE FENCE
	PROP. TEMPORARY FENCE
	EXIST. ROADWAY
	PROP. ROADWAY
	TREE LINE/BRUSH
	EDGE OF FIELD
	EXIST. OVERHEAD ELECTRIC
	OH/E



PLAN AND PROFILE SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
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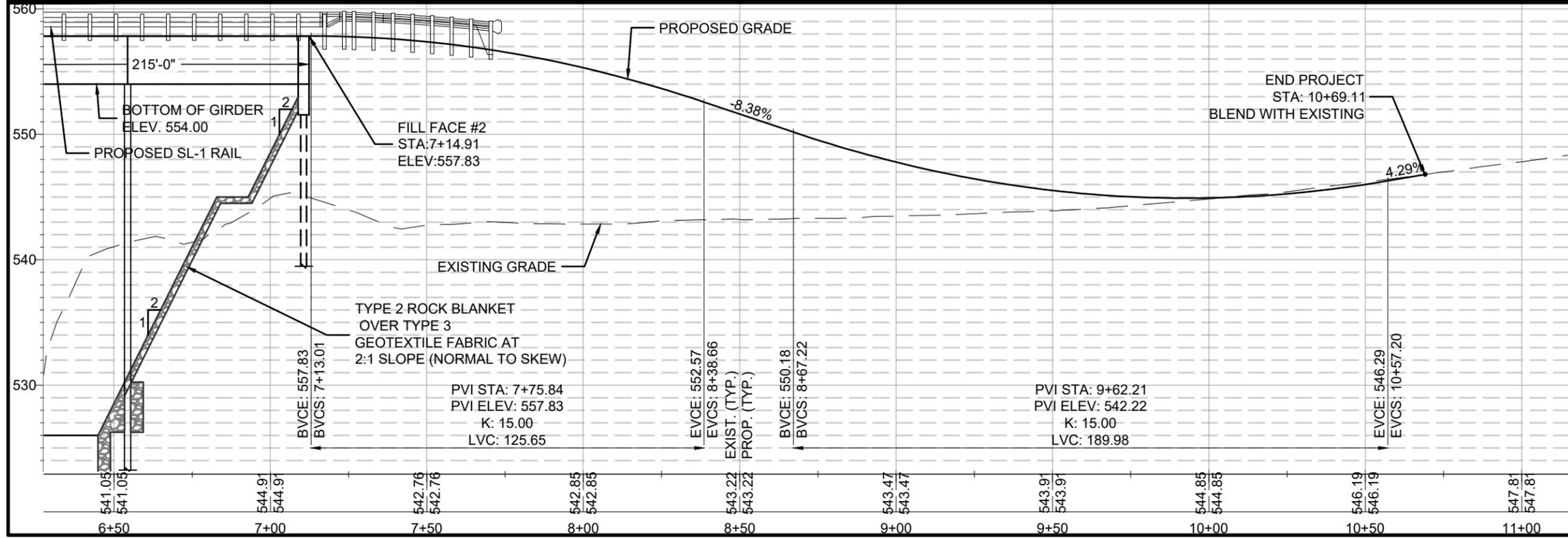
HOWE COMPANY, LLC
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LEGEND

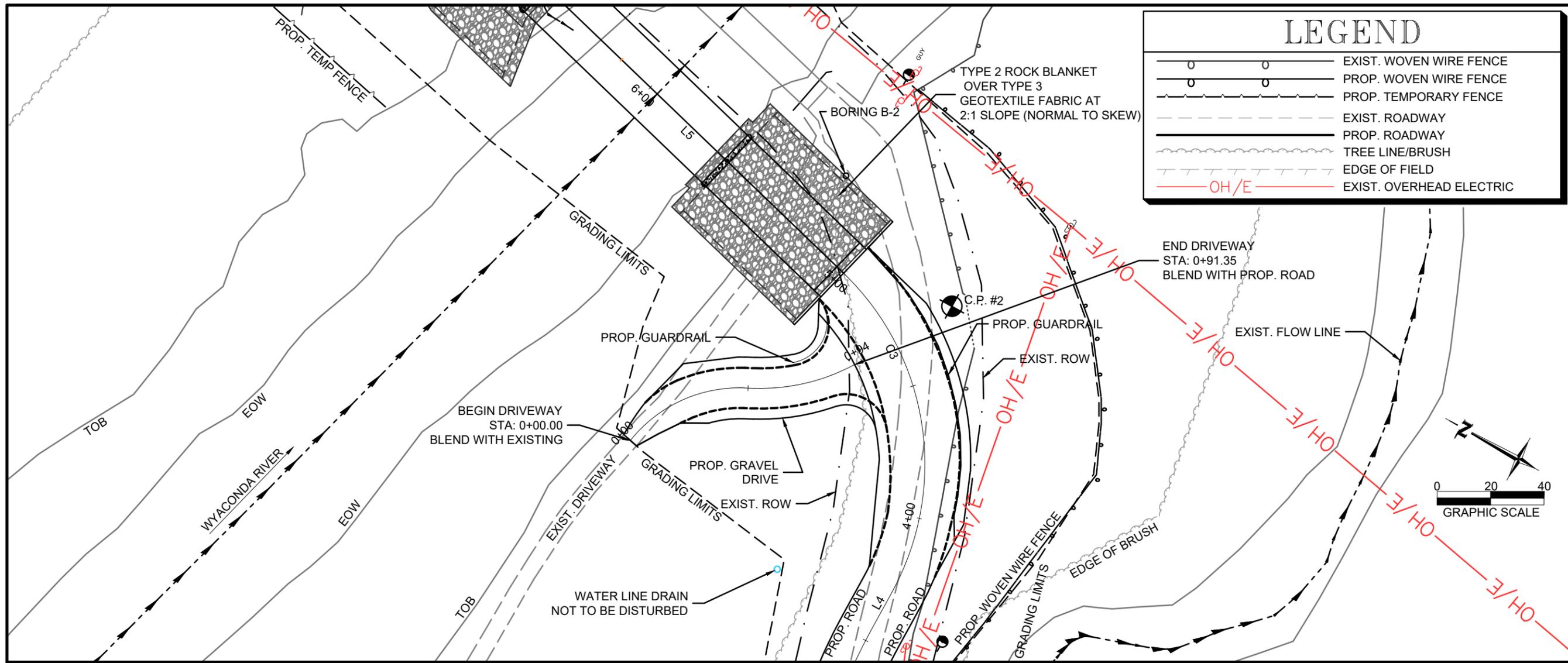
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	EXIST. ROADWAY
	PROP. ROADWAY
	TREE LINE/BRUSH
	EDGE OF FIELD
	EXIST. OVERHEAD ELECTRIC



PROPOSED STRUCTURE	
GIRDER TYPE:	NU-35
BRIDGE LENGTH:	215.00'(60.5-94-60.5)
GRADE:	0.00%
SKEW:	0°
HYDROLOGIC DATA	
DRAINAGE AREA:	391 SQ. MI.
Q25 =	19,900 CFS
HW ELEV. 25 =	550.22'
Q100 =	26,400 CFS
HW ELEV. 100 =	552.68'

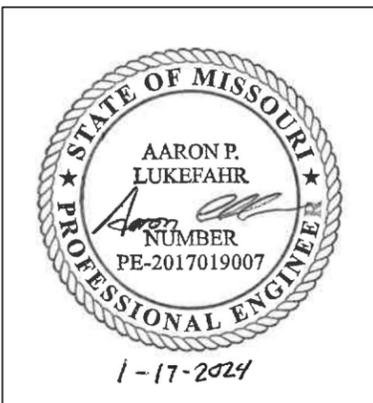
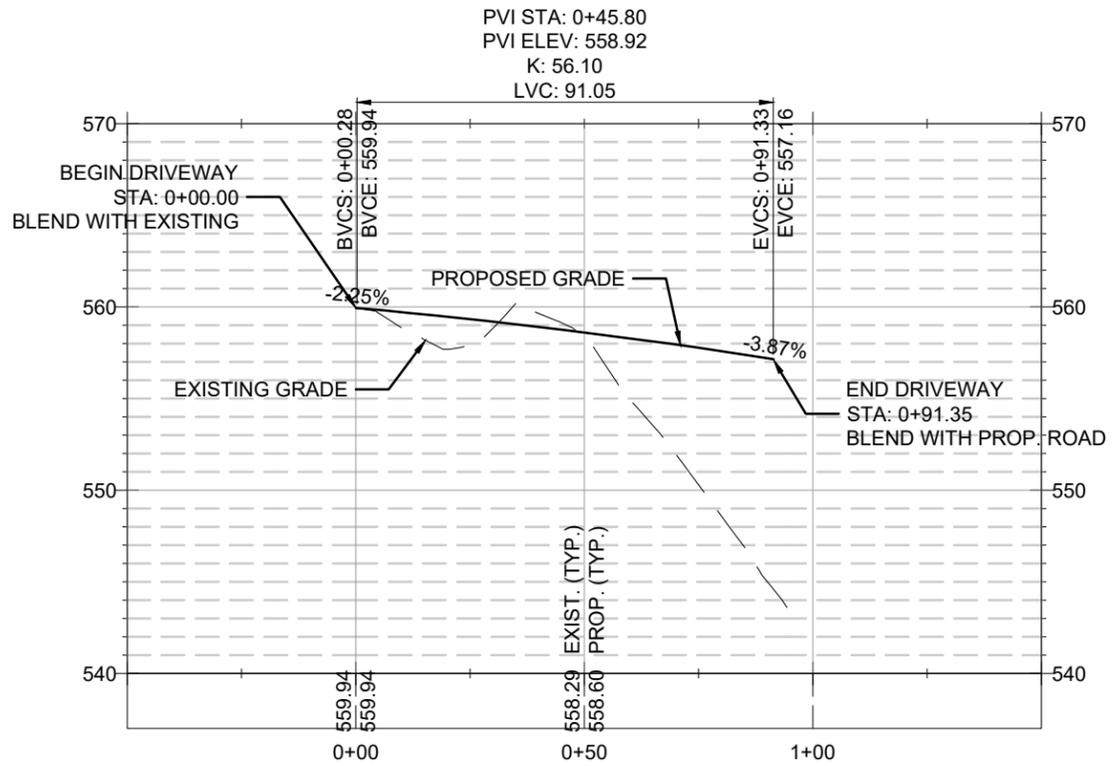
AARON P. LUKEFAHR
 PROFESSIONAL ENGINEER
 PE-2017019007
 1-17-2024

<p>MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014693 SURVEYING #LS-2014015235</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> <th>APPR.</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DESCRIPTION	DATE	APPR.				
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<p>PLAN AND PROFILE SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 122, CO. RD. 429 BRIDGE NO. 12200071, PROJECT NO. BRO-R066(15) LEWIS COUNTY, MISSOURI</p>									
<p>HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693</p>									
<p>DATE: AUGUST 2024 DESIGNED BY: A. LUKEFAHR DRAWN BY: P. HOWE REVIEWED BY: S. HOWE APPROVED BY: S. HOWE JOB NO. 23H3543</p>									
<p style="font-size: 2em; font-weight: bold;">8</p> <p>SHEET 8 OF 45</p>									

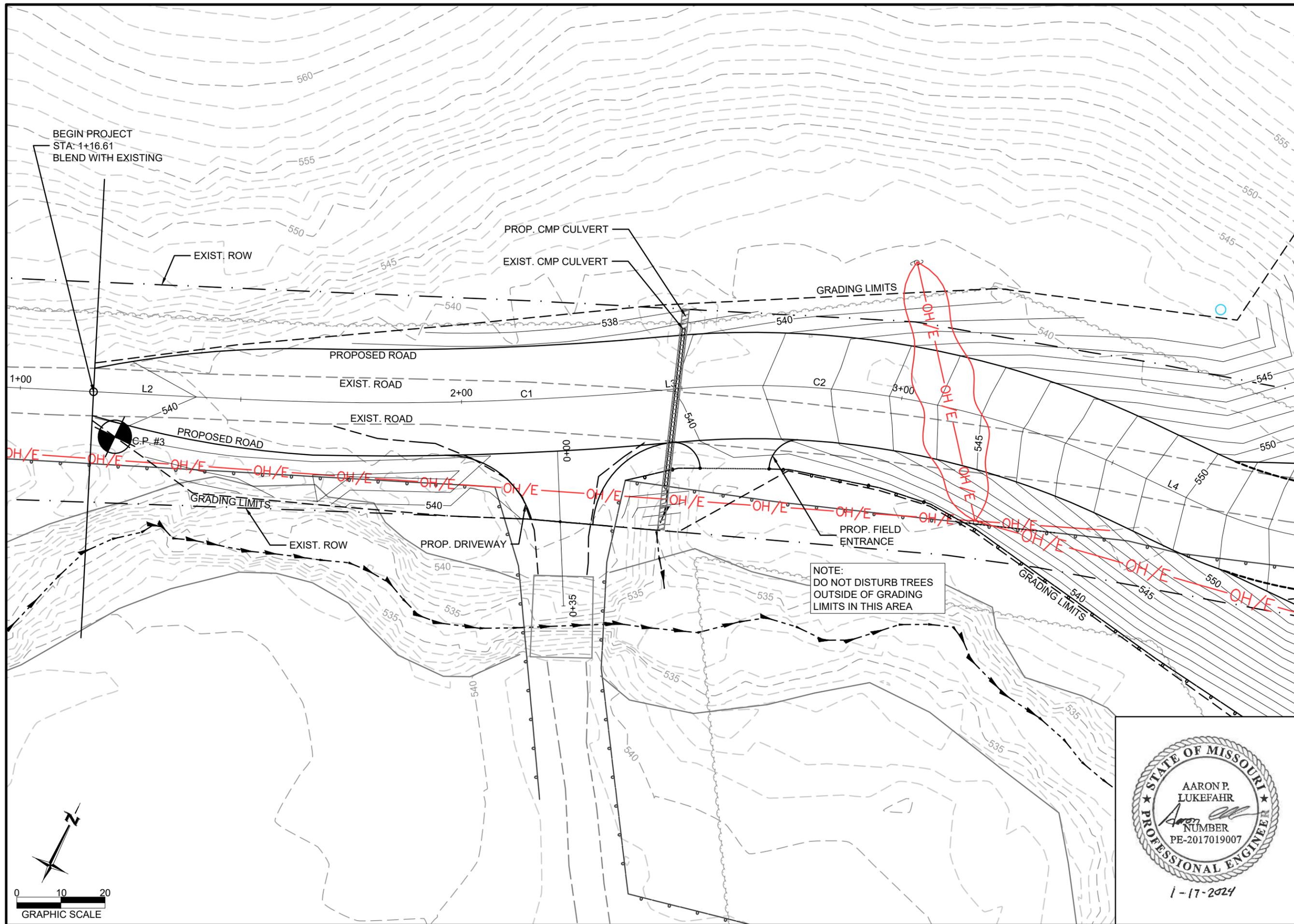


LEGEND

	EXIST. WOVEN WIRE FENCE
	PROP. WOVEN WIRE FENCE
	PROP. TEMPORARY FENCE
	EXIST. ROADWAY
	PROP. ROADWAY
	TREE LINE/BRUSH
	EDGE OF FIELD
	EXIST. OVERHEAD ELECTRIC



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. 122, CO. RD. 429 BRIDGE NO. 12200071, PROJECT NO. BRO-R066(15) LEWIS COUNTY, MISSOURI							
HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693							
DATE: AUGUST 2024		DESIGNED BY: A. LUKEFAHR		DRAWN BY: P. HOWE		REVIEWED BY: S. HOWE	
APPROVED BY: S. HOWE		JOB NO. 23H3543		9			
SHEET 9 OF 45							



NO.	DESCRIPTION	DATE	APPR.

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

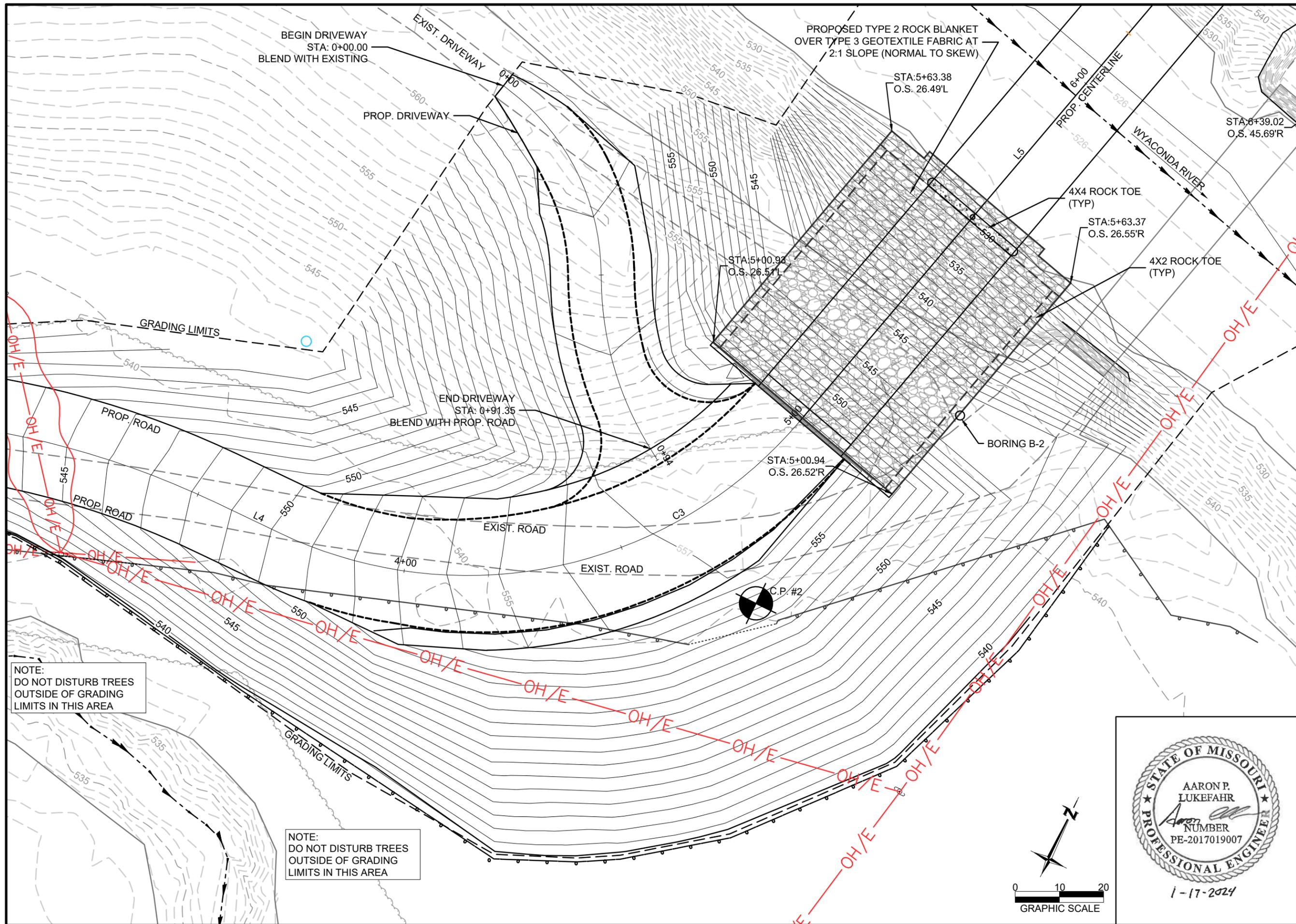
GRADING SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 122, CO. RD. 429
 BRIDGE NO. 12200071, PROJECT NO. BRO-R086 (15)
 LEWIS COUNTY, MISSOURI

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

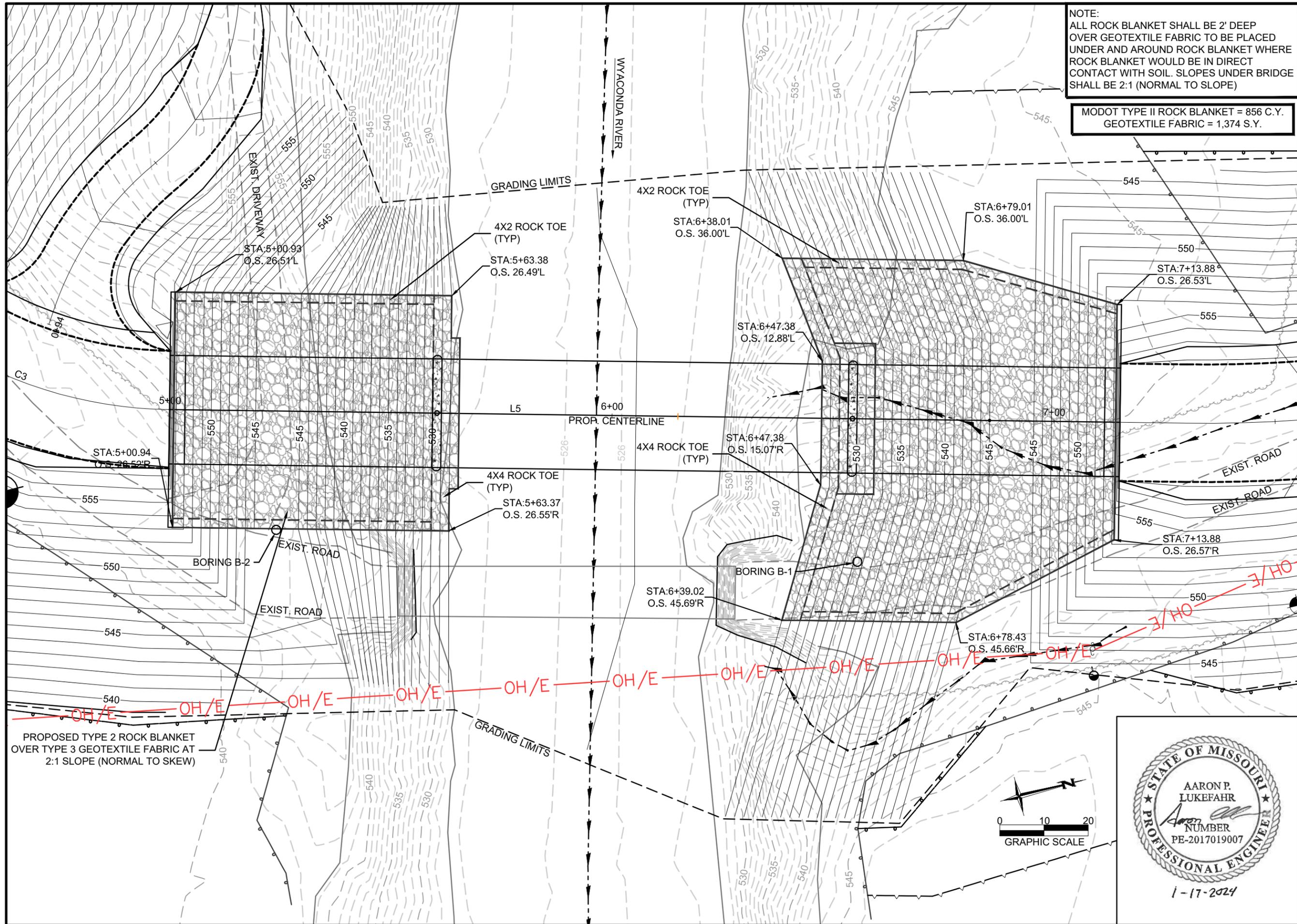


1-17-2024

DATE:	AUGUST 2024
DESIGNED BY:	A. LUKEFAHR
DRAWN BY:	P. HOWE
REVIEWED BY:	S. HOWE
APPROVED BY:	S. HOWE
JOB NO.	23H3543
10	
SHEET 10 OF 45	



 <p>MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014893 SURVEYING #LS-2014015235</p>	NO.	DESCRIPTION	DATE	APPR.
<p>GRADING SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 122, CO. RD. 429 BRIDGE NO. 12200071, PROJECT NO. BRO-R086 (15) LEWIS COUNTY, MISSOURI</p> <p>HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693</p>				
<p>DATE: AUGUST 2024 DESIGNED BY: A. LUKEFAHR DRAWN BY: P. HOWE REVIEWED BY: S. HOWE APPROVED BY: S. HOWE JOB NO. 23H3543</p>				
 <p>1-17-2024</p>				
<p>11</p> <p>SHEET 11 OF 45</p>				



NOTE:
 ALL ROCK BLANKET SHALL BE 2' DEEP
 OVER GEOTEXTILE FABRIC TO BE PLACED
 UNDER AND AROUND ROCK BLANKET WHERE
 ROCK BLANKET WOULD BE IN DIRECT
 CONTACT WITH SOIL. SLOPES UNDER BRIDGE
 SHALL BE 2:1 (NORMAL TO SLOPE)

MODOT TYPE II ROCK BLANKET = 856 C.Y.
 GEOTEXTILE FABRIC = 1,374 S.Y.



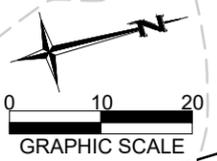
HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

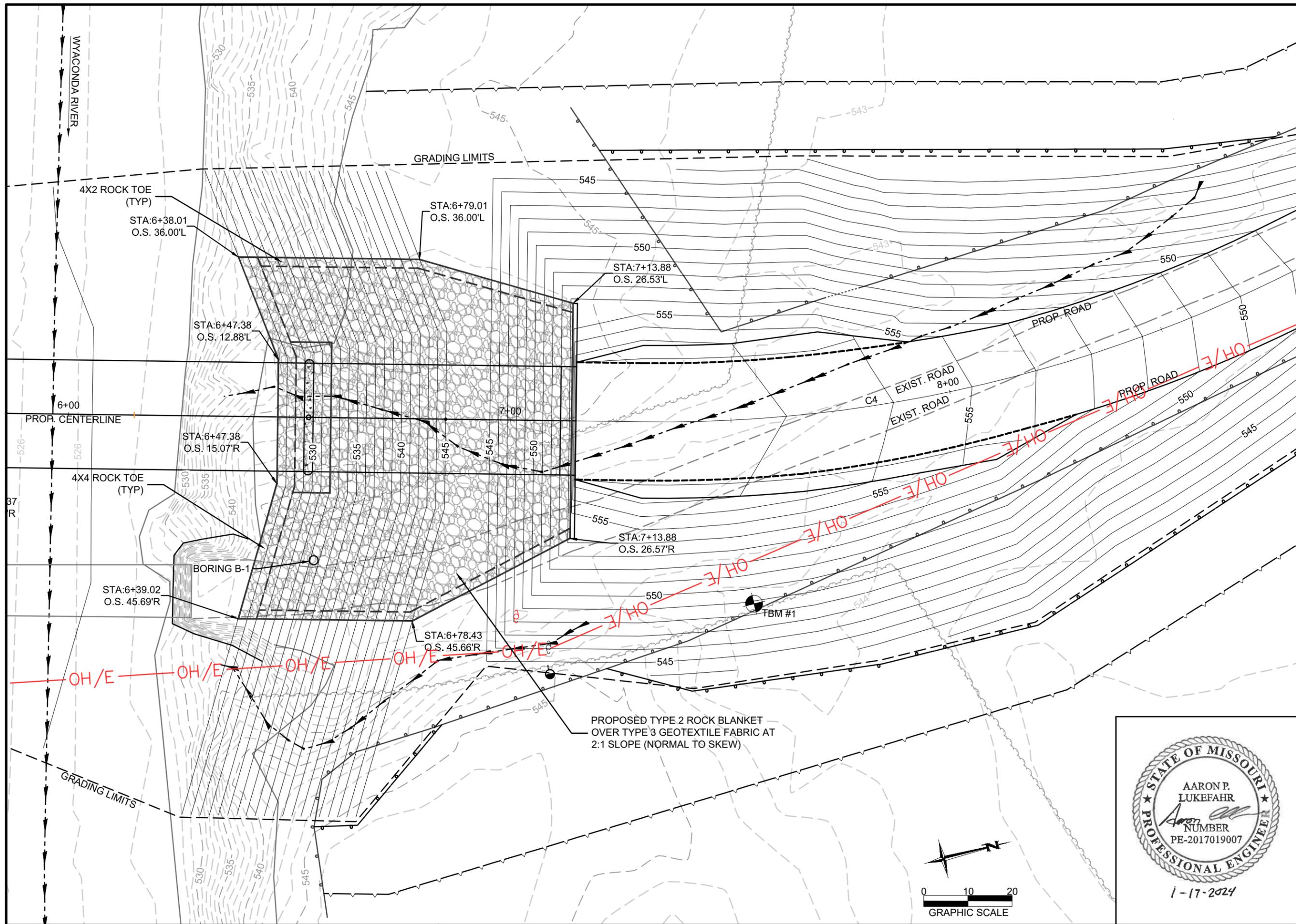
MISSOURI STATE CERTIFICATE OF AUTHORITY
 ENGINEERING #E-2014014993
 SURVEYING #LS-2014015235

NO.	DESCRIPTION	DATE	APPR.

GRADING SHEET
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM
 CART ROUTE NO. 122, CO. RD. 429
 BRIDGE NO. 12200071, PROJECT NO. BRO-R086(15)
 LEWIS COUNTY, MISSOURI

DATE: AUGUST 2024
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 DRAWN BY: P. HOWE
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 JOB NO. 23H3543





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

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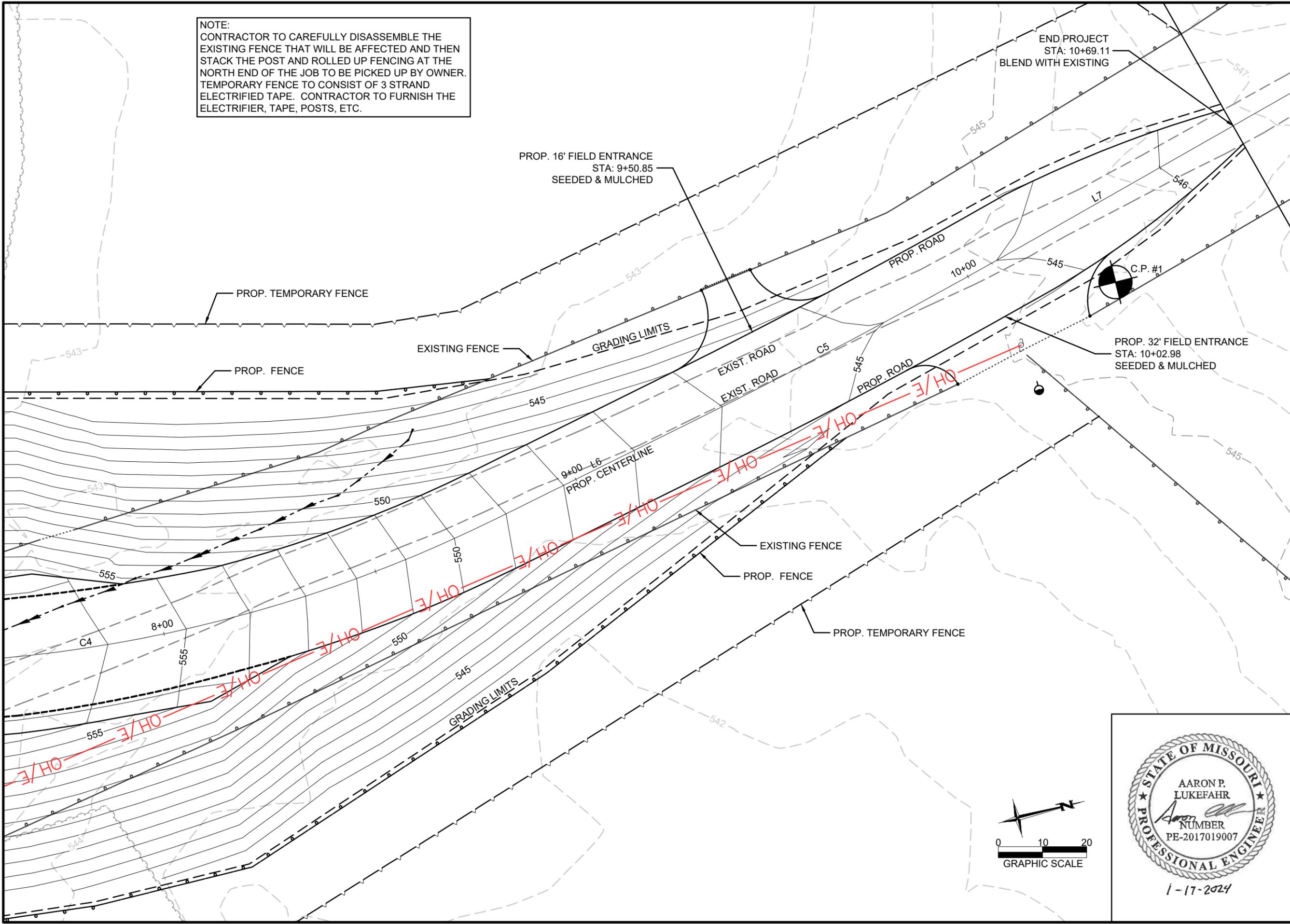
HOWE COMPANY, LLC
 804 E. PATTON STREET, MACON, MO. 63552
 OFFICE: 660-395-4693

STATE OF MISSOURI
 AARON P. LUKEFAHR
 PROFESSIONAL ENGINEER
 NUMBER PE-2017019007
 1-17-2024

DATE: AUGUST 2024
 DESIGNED BY: A. LUKEFAHR
 DRAWN BY: P. HOWE
 REVIEWED BY: S. HOWE
 APPROVED BY: S. HOWE
 JOB NO. 23H3543

13
 SHEET 13 OF 45

NOTE:
 CONTRACTOR TO CAREFULLY DISASSEMBLE THE
 EXISTING FENCE THAT WILL BE AFFECTED AND THEN
 STACK THE POST AND ROLLED UP FENCING AT THE
 NORTH END OF THE JOB TO BE PICKED UP BY OWNER.
 TEMPORARY FENCE TO CONSIST OF 3 STRAND
 ELECTRIFIED TAPE. CONTRACTOR TO FURNISH THE
 ELECTRIFIER, TAPE, POSTS, ETC.

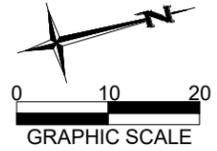


END PROJECT
 STA: 10+69.11
 BLEND WITH EXISTING

PROP. 16' FIELD ENTRANCE
 STA: 9+50.85
 SEEDED & MULCHED



PROP. 32' FIELD ENTRANCE
 STA: 10+02.98
 SEEDED & MULCHED



		MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014893 SURVEYING #LS-2014015235
GRADING SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 122, CO. RD. 429 BRIDGE NO. 12200071, PROJECT NO. BRO-R086(15) LEWIS COUNTY, MISSOURI	HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693	NO. _____ DESCRIPTION _____ DATE _____ APPR. _____
DATE: AUGUST 2024 DESIGNED BY: A. LUKEFAHR DRAWN BY: P. HOWE REVIEWED BY: S. HOWE APPROVED BY: S. HOWE	JOB NO. 23H3543	14 SHEET 14 OF 45

RANDY A PEARL & KELLY A PEARL
BK 395, PG 140
PARCEL #1, 3.99 AC.
TEMP. CONST. EASMT. LEFT = 0.29 AC.
PERM. EASMT. LEFT = 0.21 AC.
AREA REMAINING = 3.78 AC.

LEVI A YODER & MATTIE A YODER
BK 413, PG 1
PARCEL #2, 11.22 AC.
TEMP. CONST. EASMT. LEFT = 0.15 AC.
PERM. EASMT. LEFT = 0.29 AC.
AREA REMAINING = 10.93

LAND SURVEY MONUMENT:
THE NORTHEAST CORNER OF S17, T62N, R6W,
LEWIS COUNTY, MISSOURI: SAID POINT LYING
5383.04', N45° 41' 38"E OF BEGINNING POINT
CONSTRUCTION CENTERLINE STATION 1+16.61
AND LYING 4645.13',
N49° 01' 41"E OF ENDING POINT CONSTRUCTION
CENTERLINE STATION 10+69.11 AS FOUND BY
JASON D. JANES ON JUNE 15, 2006 AND FILED
WITH MO DEPARTMENT OF NATURAL
RESOURCES ON DOCUMENT #600-79665, LEWIS
COUNTY, MO

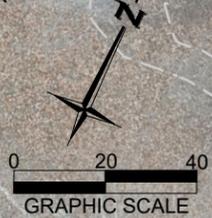
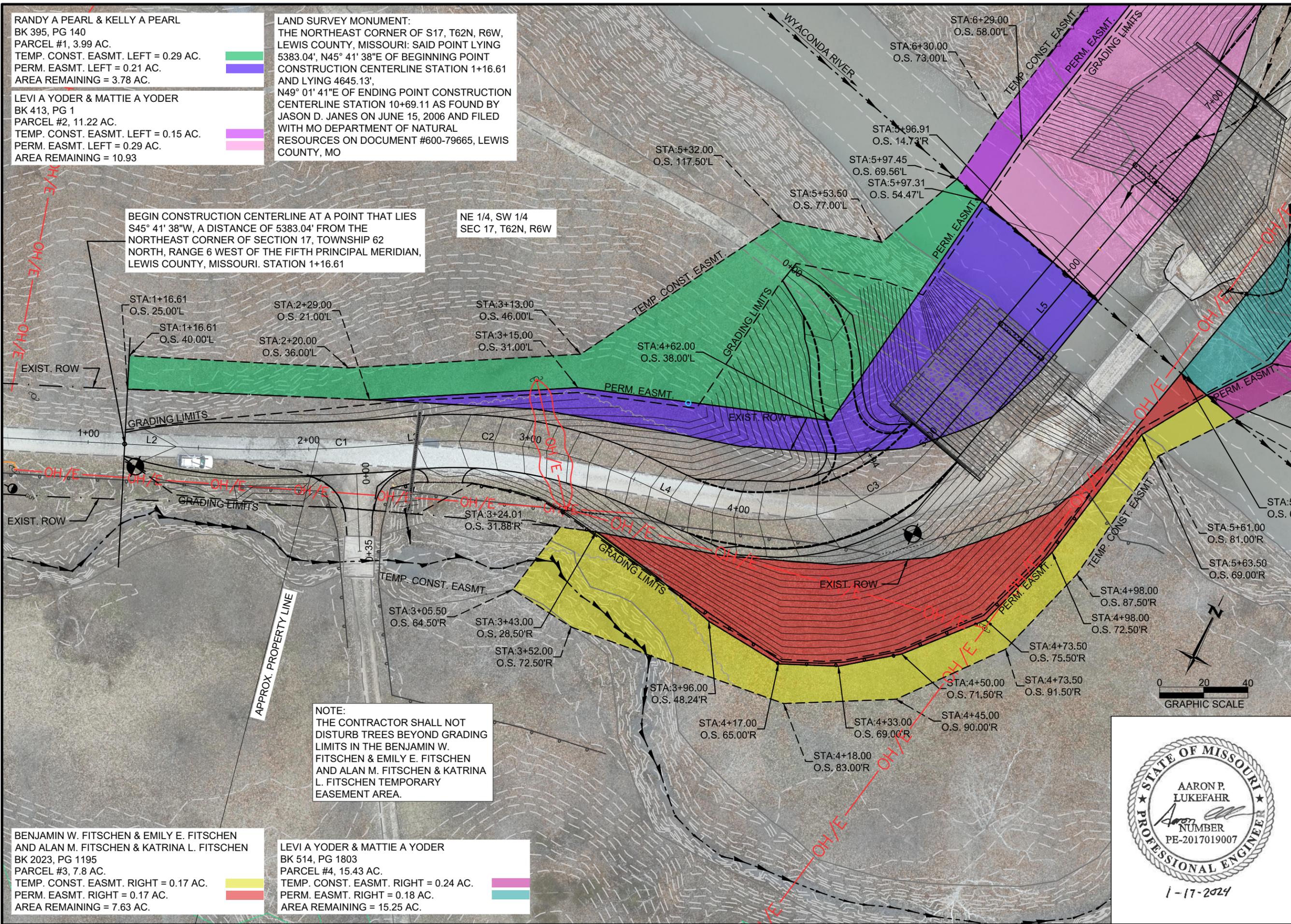
BEGIN CONSTRUCTION CENTERLINE AT A POINT THAT LIES
S45° 41' 38"W, A DISTANCE OF 5383.04' FROM THE
NORTHEAST CORNER OF SECTION 17, TOWNSHIP 62
NORTH, RANGE 6 WEST OF THE FIFTH PRINCIPAL MERIDIAN,
LEWIS COUNTY, MISSOURI. STATION 1+16.61

NE 1/4, SW 1/4
SEC 17, T62N, R6W

NOTE:
THE CONTRACTOR SHALL NOT
DISTURB TREES BEYOND GRADING
LIMITS IN THE BENJAMIN W.
FITSCHEN & EMILY E. FITSCHEN
AND ALAN M. FITSCHEN & KATRINA
L. FITSCHEN TEMPORARY
EASEMENT AREA.

BENJAMIN W. FITSCHEN & EMILY E. FITSCHEN
AND ALAN M. FITSCHEN & KATRINA L. FITSCHEN
BK 2023, PG 1195
PARCEL #3, 7.8 AC.
TEMP. CONST. EASMT. RIGHT = 0.17 AC.
PERM. EASMT. RIGHT = 0.17 AC.
AREA REMAINING = 7.63 AC.

LEVI A YODER & MATTIE A YODER
BK 514, PG 1803
PARCEL #4, 15.43 AC.
TEMP. CONST. EASMT. RIGHT = 0.24 AC.
PERM. EASMT. RIGHT = 0.18 AC.
AREA REMAINING = 15.25 AC.



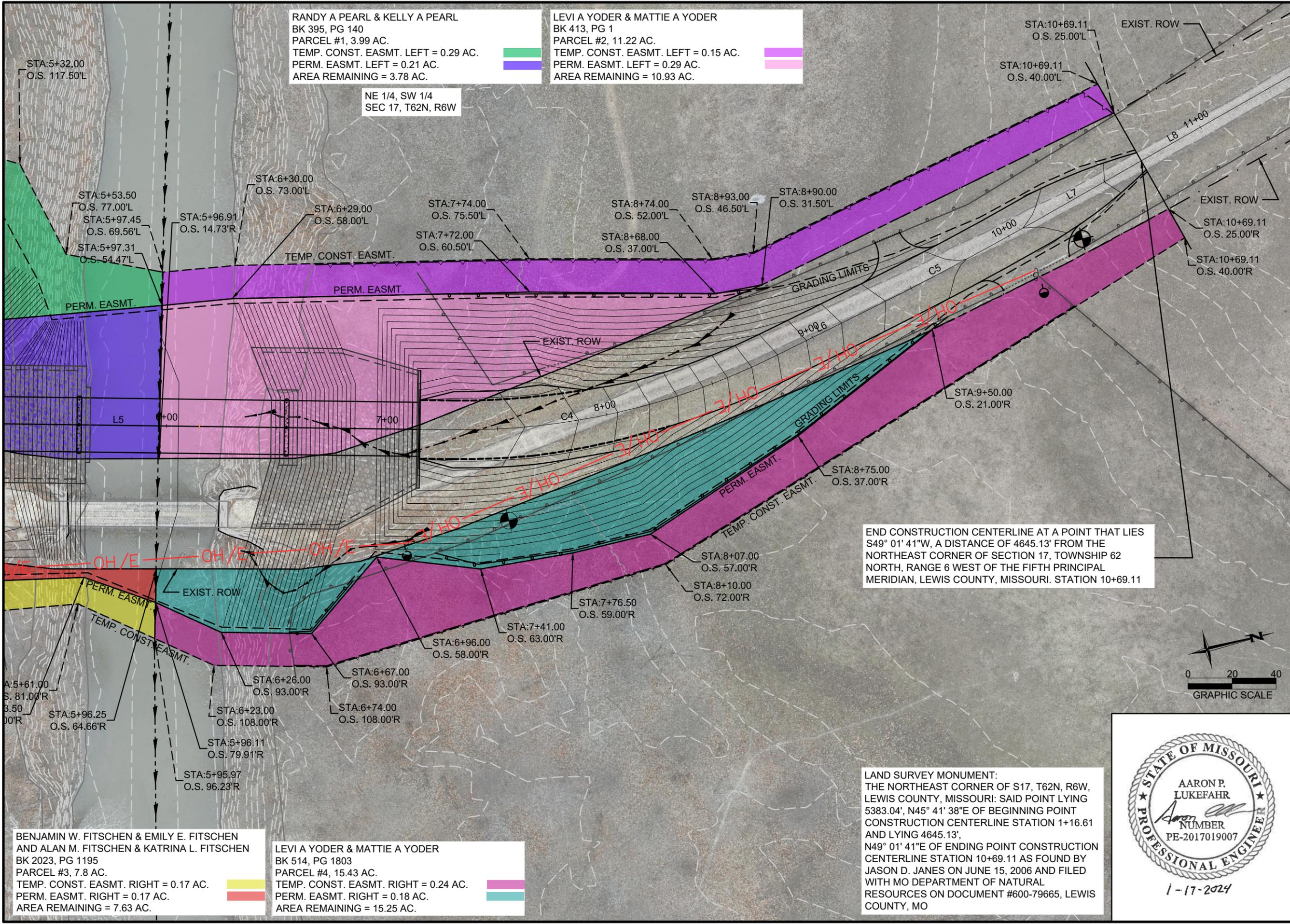
1-17-2024

		MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014993 SURVEYING #LS-2014015235
		HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693
RIGHT-OF-WAY SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 122, CO. RD. 429 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15) LEWIS COUNTY, MISSOURI	NO. _____ DESCRIPTION _____ DATE _____ APPR. _____	
DATE: AUGUST 2024 DESIGNED BY: A. LUKEFAHR DRAWN BY: P. HOWE REVIEWED BY: S. HOWE APPROVED BY: S. HOWE JOB NO. 23H3543	15	SHEET 15 OF 45

RANDY A PEARL & KELLY A PEARL
 BK 395, PG 140
 PARCEL #1, 3.99 AC.
 TEMP. CONST. EASMT. LEFT = 0.29 AC.
 PERM. EASMT. LEFT = 0.21 AC.
 AREA REMAINING = 3.78 AC.

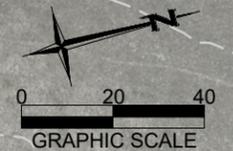
LEVI A YODER & MATTIE A YODER
 BK 413, PG 1
 PARCEL #2, 11.22 AC.
 TEMP. CONST. EASMT. LEFT = 0.15 AC.
 PERM. EASMT. LEFT = 0.29 AC.
 AREA REMAINING = 10.93 AC.

NE 1/4, SW 1/4
 SEC 17, T62N, R6W



END CONSTRUCTION CENTERLINE AT A POINT THAT LIES
 S49° 01' 41"W, A DISTANCE OF 4645.13' FROM THE
 NORTHEAST CORNER OF SECTION 17, TOWNSHIP 62
 NORTH, RANGE 6 WEST OF THE FIFTH PRINCIPAL
 MERIDIAN, LEWIS COUNTY, MISSOURI. STATION 10+69.11

LAND SURVEY MONUMENT:
 THE NORTHEAST CORNER OF S17, T62N, R6W,
 LEWIS COUNTY, MISSOURI: SAID POINT LYING
 5383.04', N45° 41' 38"E OF BEGINNING POINT
 CONSTRUCTION CENTERLINE STATION 1+16.61
 AND LYING 4645.13',
 N49° 01' 41"E OF ENDING POINT CONSTRUCTION
 CENTERLINE STATION 10+69.11 AS FOUND BY
 JASON D. JANES ON JUNE 15, 2006 AND FILED
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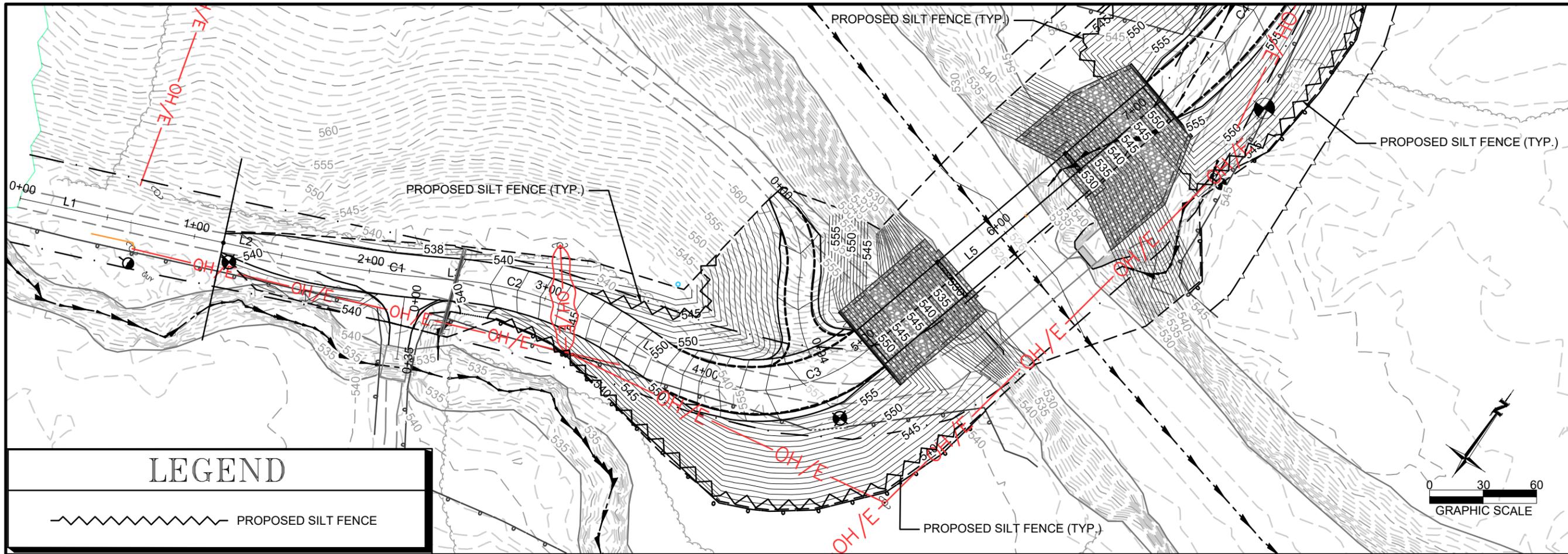


1-17-2024

BENJAMIN W. FITSCHEN & EMILY E. FITSCHEN
 AND ALAN M. FITSCHEN & KATRINA L. FITSCHEN
 BK 2023, PG 1195
 PARCEL #3, 7.8 AC.
 TEMP. CONST. EASMT. RIGHT = 0.17 AC.
 PERM. EASMT. RIGHT = 0.17 AC.
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LEVI A YODER & MATTIE A YODER
 BK 514, PG 1803
 PARCEL #4, 15.43 AC.
 TEMP. CONST. EASMT. RIGHT = 0.24 AC.
 PERM. EASMT. RIGHT = 0.18 AC.
 AREA REMAINING = 15.25 AC.

		MISSOURI STATE CERTIFICATE OF AUTHORITY ENGINEERING #E-2014014983 SURVEYING #LS-2014015235	NO.	DESCRIPTION	DATE	APPR.
		RIGHT-OF-WAY SHEET OFF SYSTEM BRIDGE REPLACEMENT PROGRAM CART ROUTE NO. 122, CO. RD. 429 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15) LEWIS COUNTY, MISSOURI	HOWE COMPANY, LLC 804 E. PATTON STREET, MACON, MO. 63552 OFFICE: 660-395-4693			
		DATE: AUGUST 2024 DESIGNED BY: A. LUKEFAHR DRAWN BY: P. HOWE REVIEWED BY: S. HOWE APPROVED BY: S. HOWE				
		JOB NO. 23H3543				
		16				
		SHEET 16 OF 45				

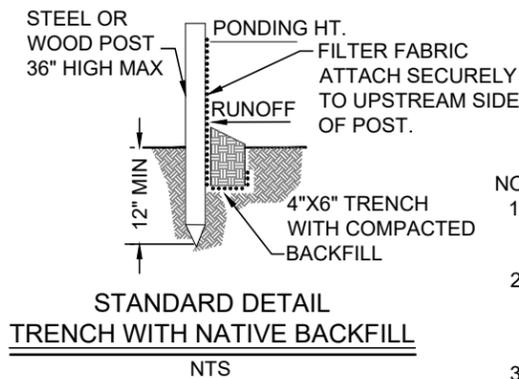
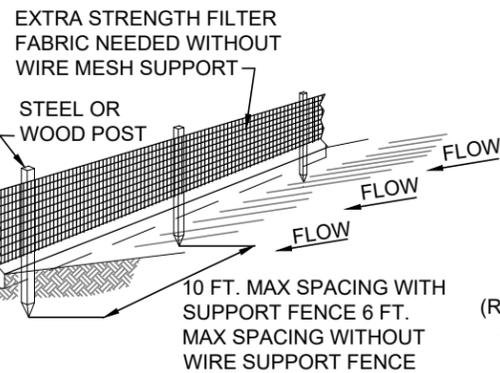


LEGEND

~~~~~ PROPOSED SILT FENCE

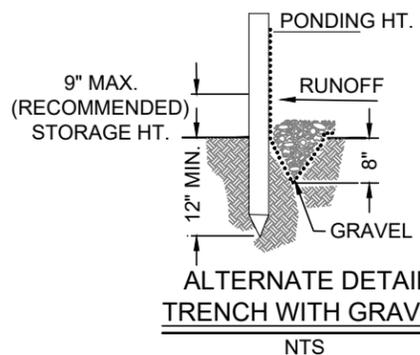


| NO. | DESCRIPTION | DATE | APPR. |
|-----|-------------|------|-------|
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## EROSION CONTROL QUANTITIES

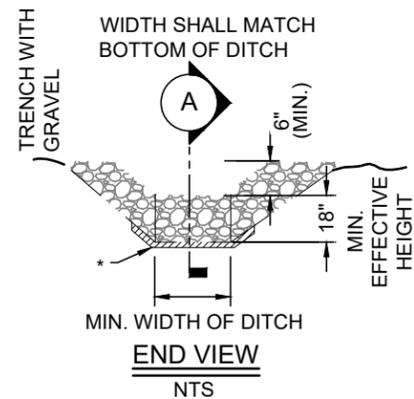
SILT FENCE = 940 FT



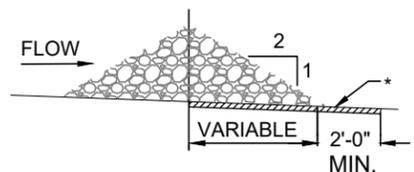
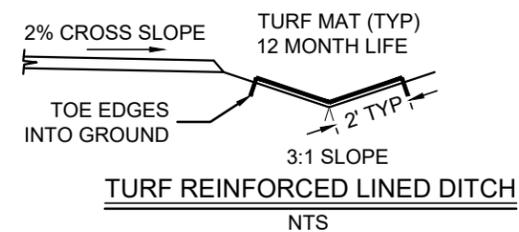
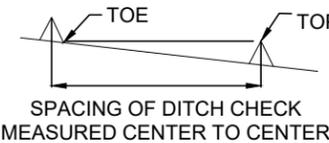
### NOTE:

- 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



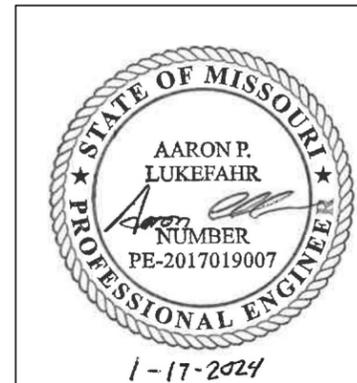
ELEVATION OF TOE MUST BE SAME OR LESS THAN ELEVATION OF TOP.



\* 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



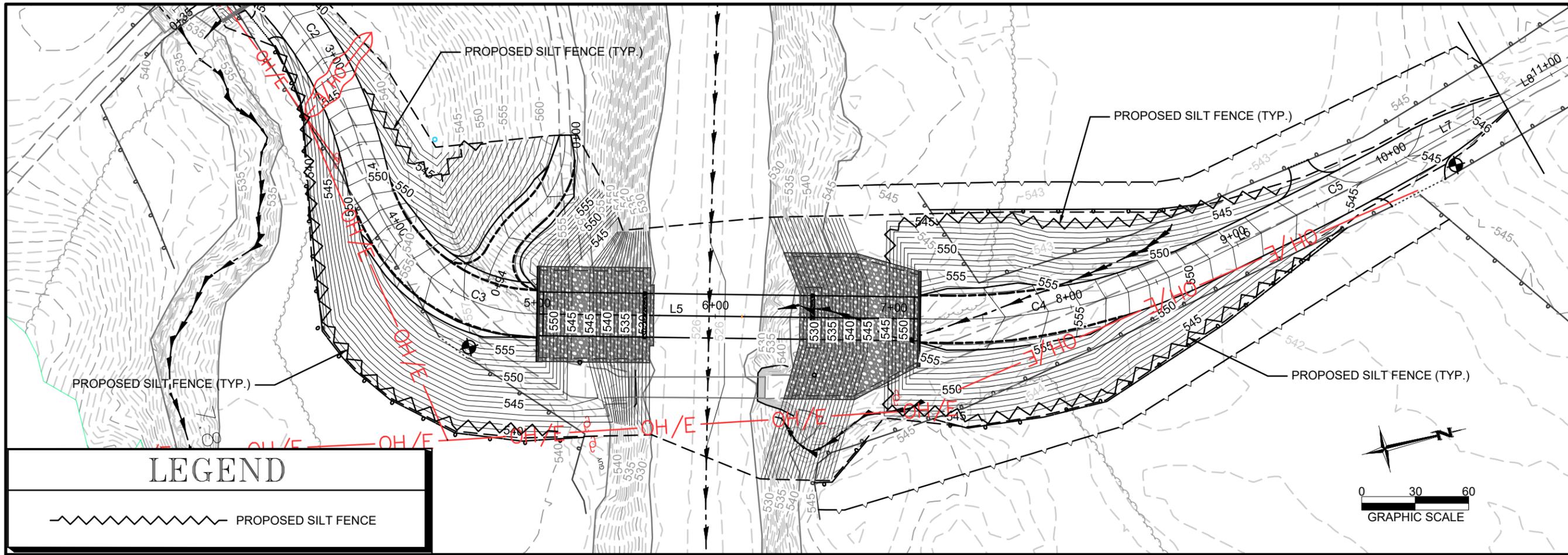
EROSION CONTROL SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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

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

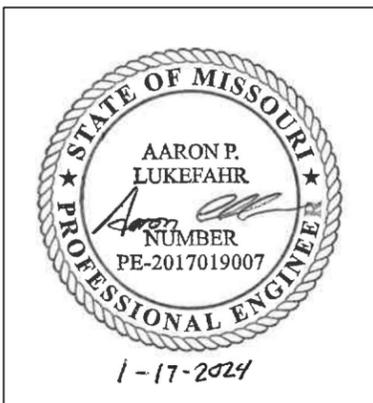
JOB NO. 23H3543

17



| LEGEND |                     |
|--------|---------------------|
|        | PROPOSED SILT FENCE |

| EROSION CONTROL QUANTITIES |
|----------------------------|
| SILT FENCE = 940 FT        |



**Howe Company LLC**  
 MISSOURI STATE CERTIFICATE OF AUTHORITY  
 ENGINEERING #E-201404993  
 SURVEYING #LS-2014015235

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

EROSION CONTROL SHEET  
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 CART ROUTE NO. 122, CO. RD. 429  
 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
 LEWIS COUNTY, MISSOURI

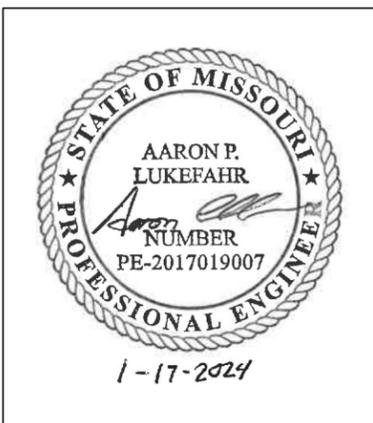
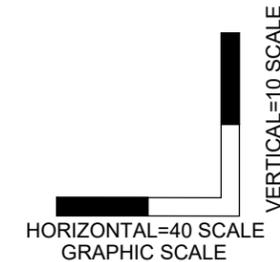
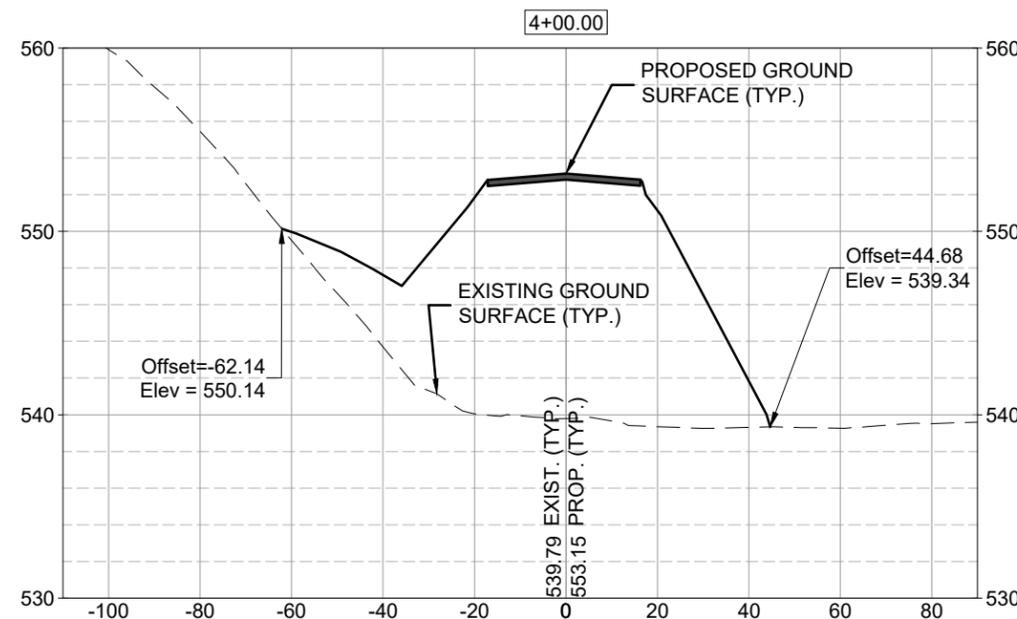
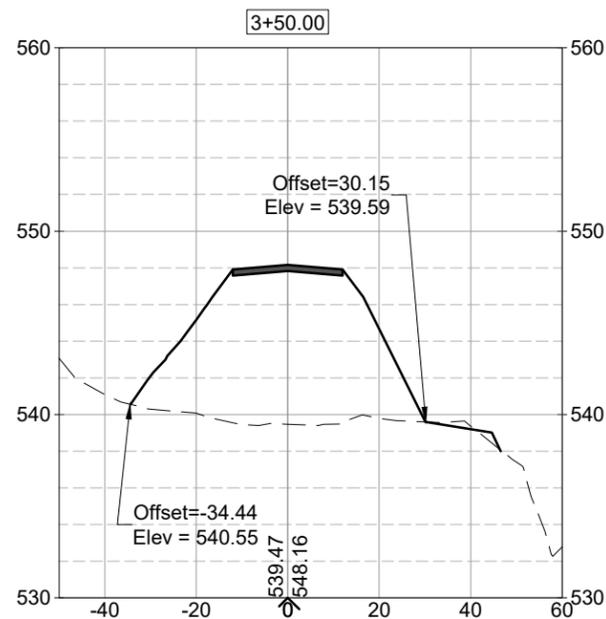
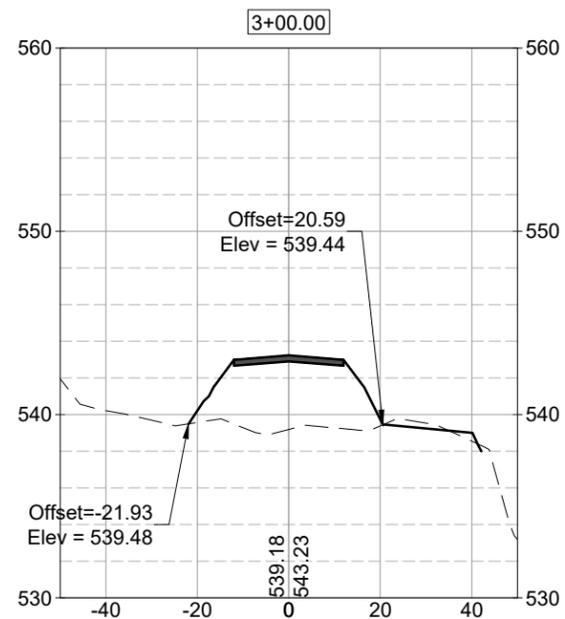
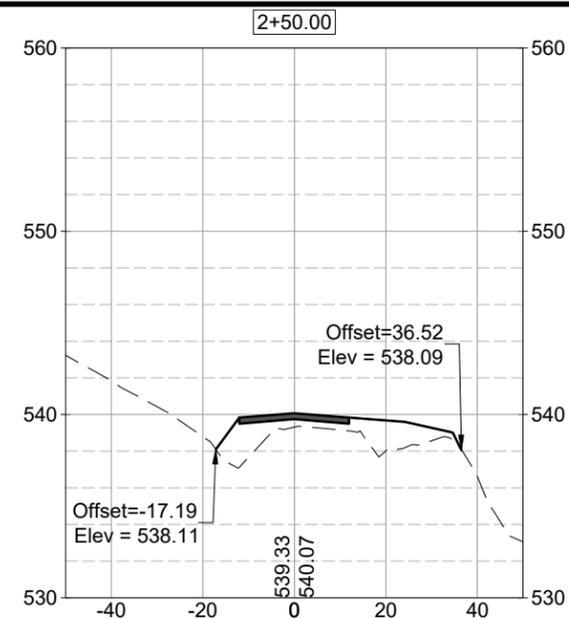
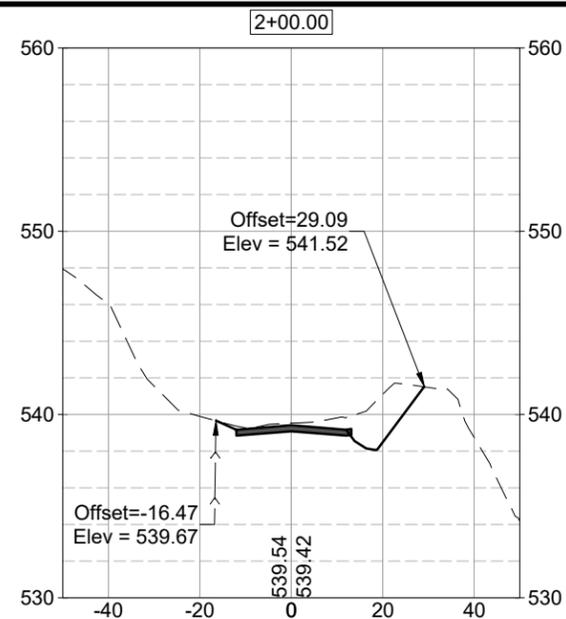
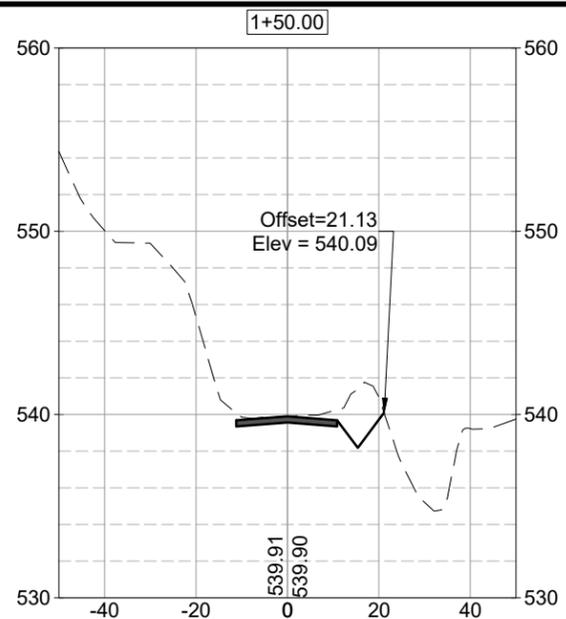
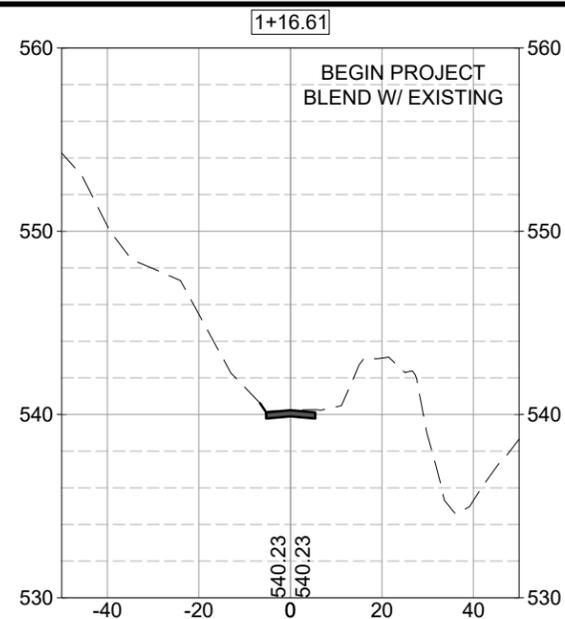
HOWE COMPANY, LLC  
 804 E. PATTON STREET, MACON, MO. 63552  
 OFFICE: 660-395-4693

|              |             |
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| DRAWN BY:    | P. HOWE     |
| REVIEWED BY: | S. HOWE     |
| APPROVED BY: | S. HOWE     |

JOB NO. 23H3543

18

SHEET 18 OF 45



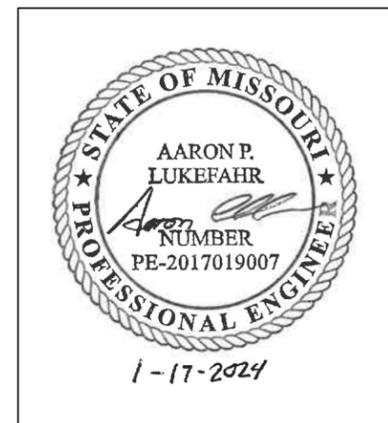
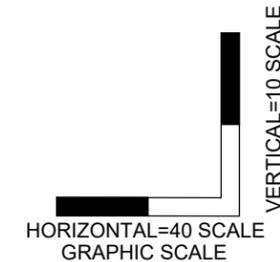
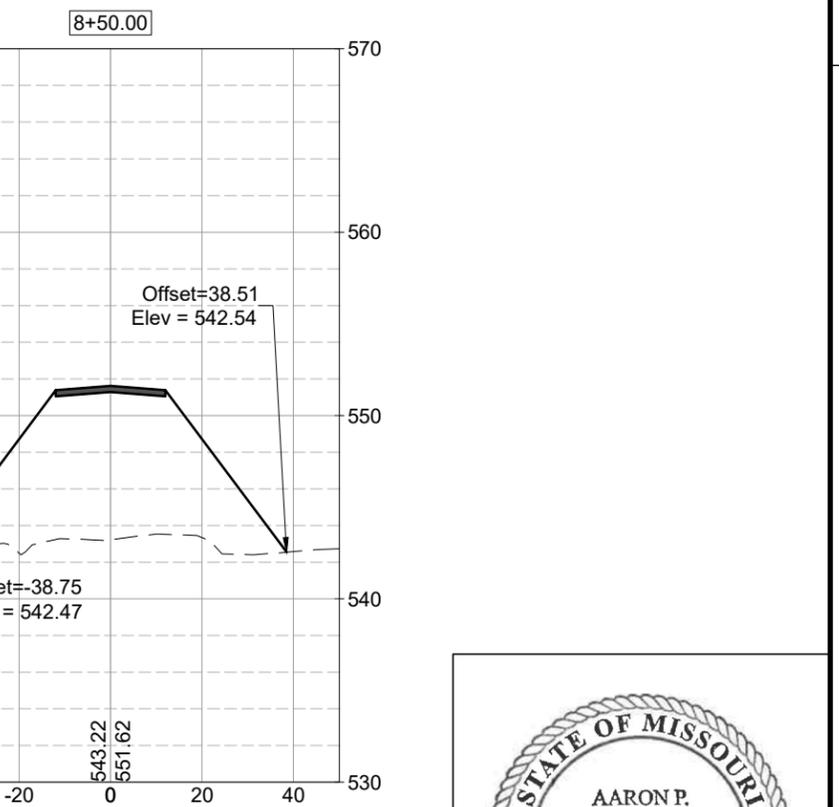
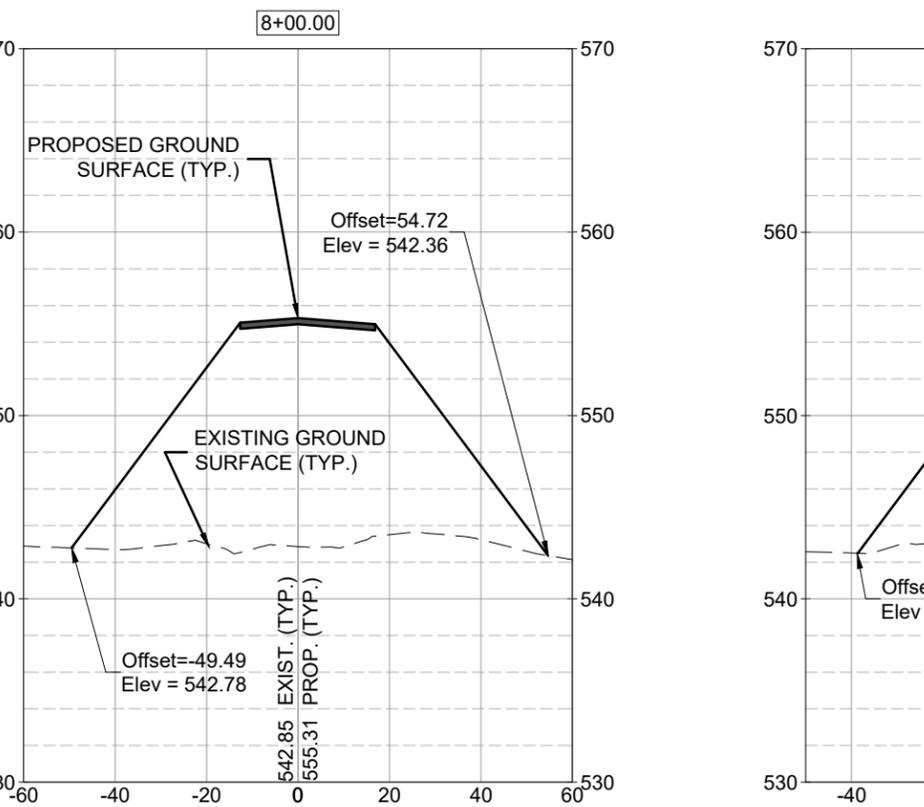
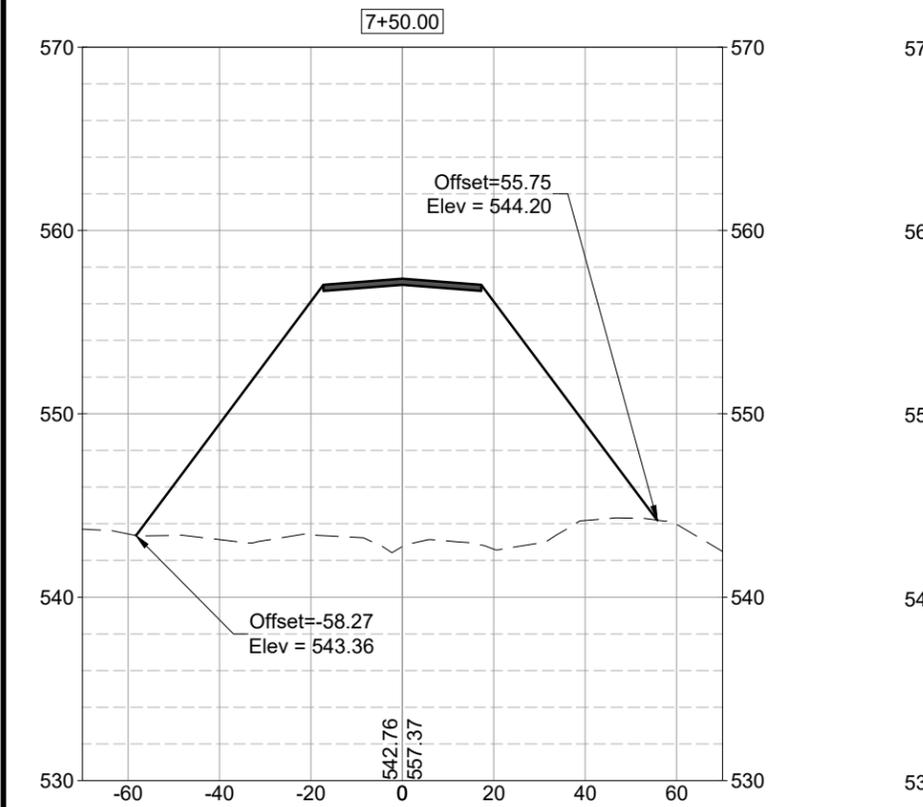
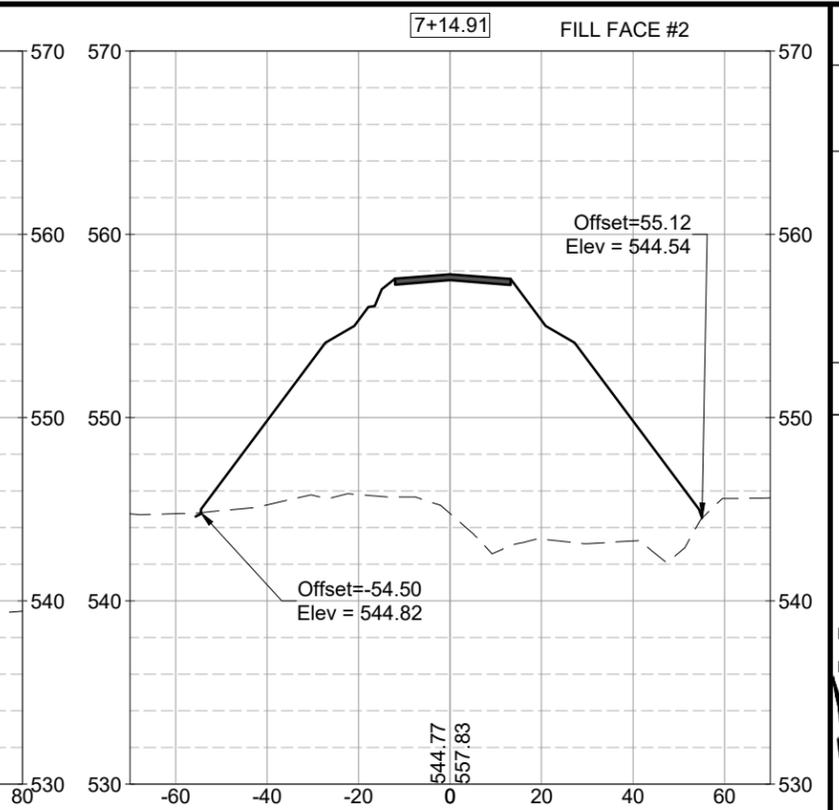
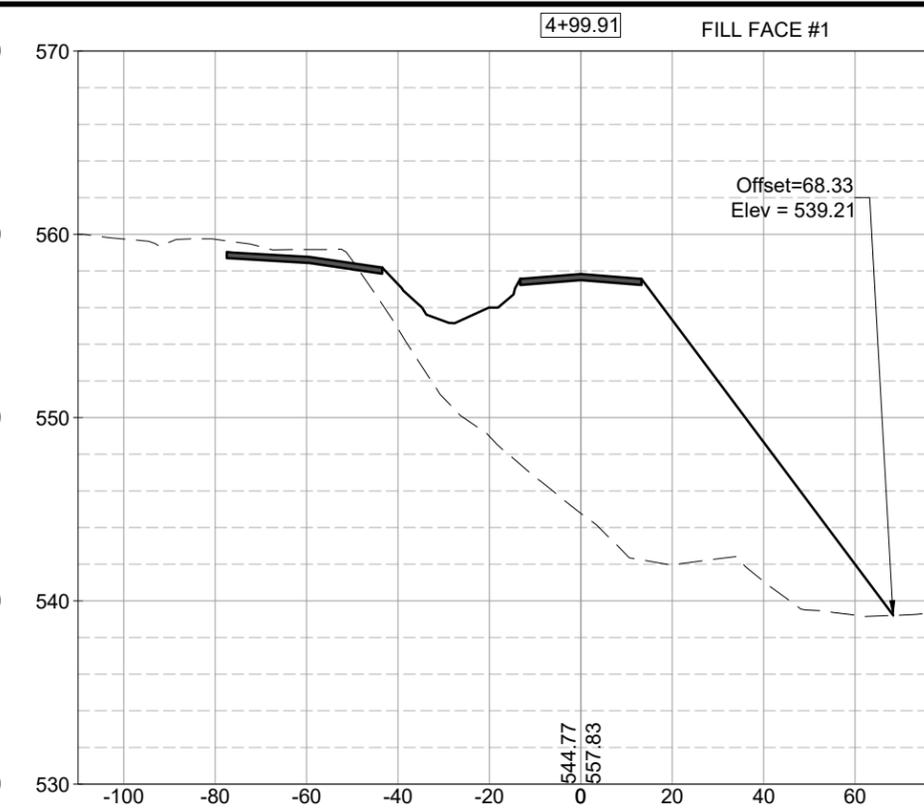
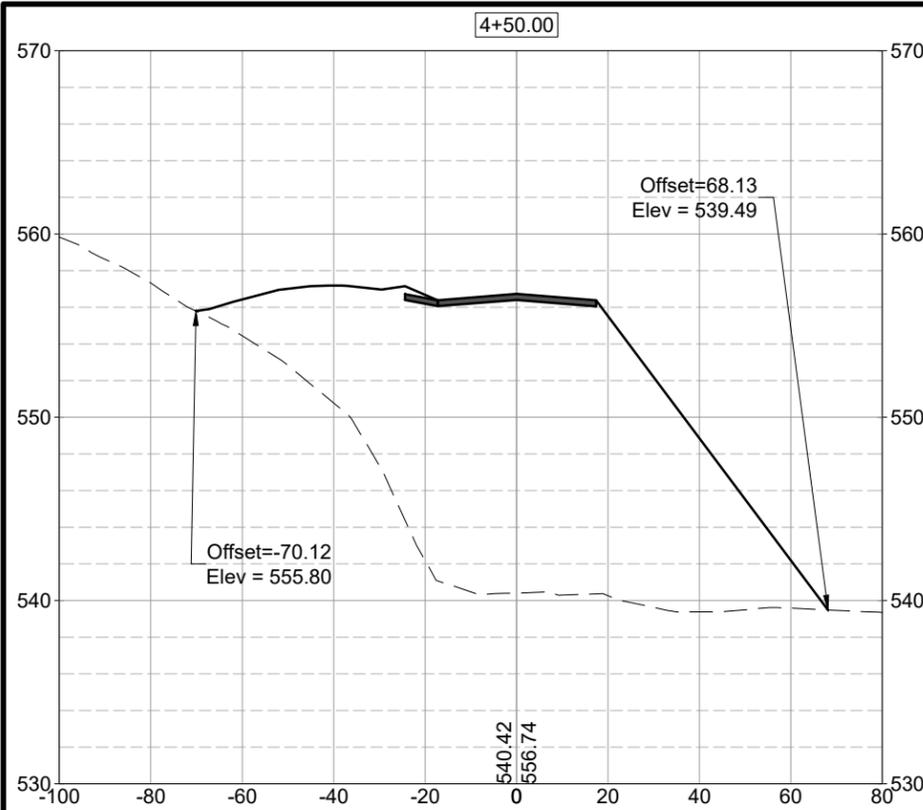
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**Howe Company LLC**  
 MISSOURI STATE CERTIFICATE OF AUTHORITY  
 ENGINEERING #E-2014014693  
 SURVEYING #S-2014015235

CROSS SECTIONS SHEET  
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
 CART ROUTE NO. 122, CO. RD. 429  
 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
 LEWIS COUNTY, MISSOURI

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

|              |             |
|--------------|-------------|
| DATE:        | AUGUST 2024 |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY:    | P. HOWE     |
| REVIEWED BY: | S. HOWE     |
| APPROVED BY: | S. HOWE     |
| JOB NO.      | 23H3543     |



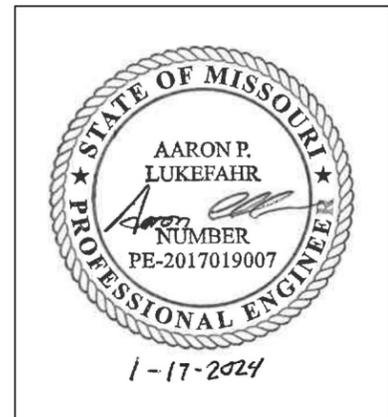
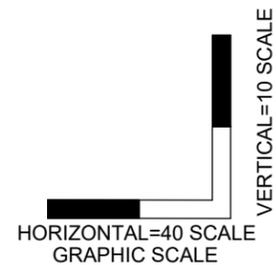
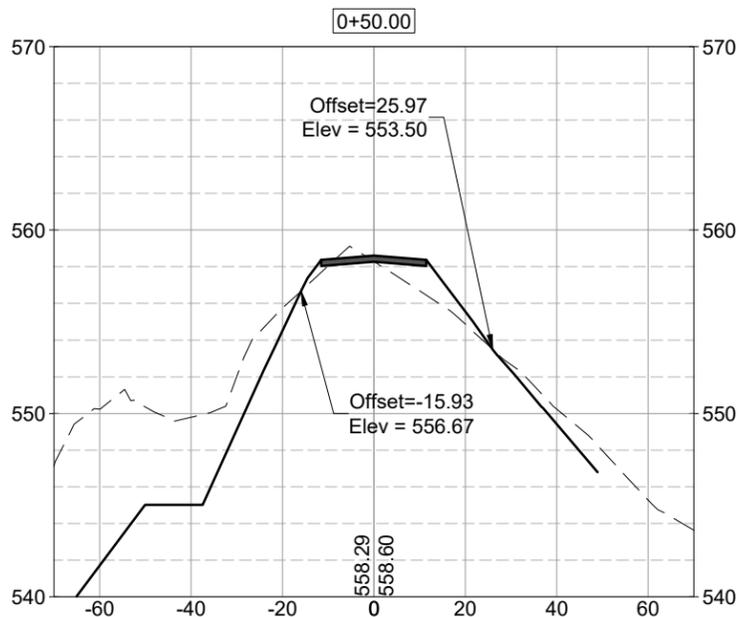
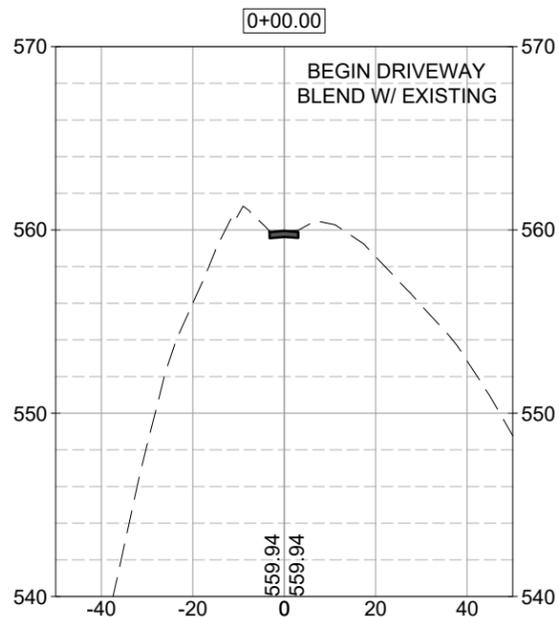
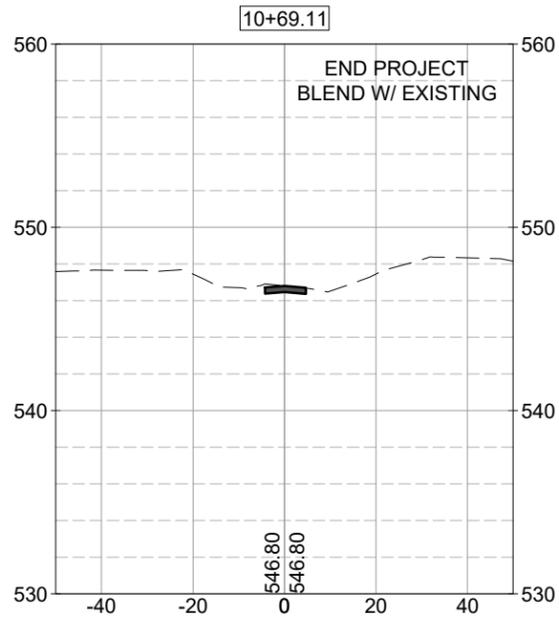
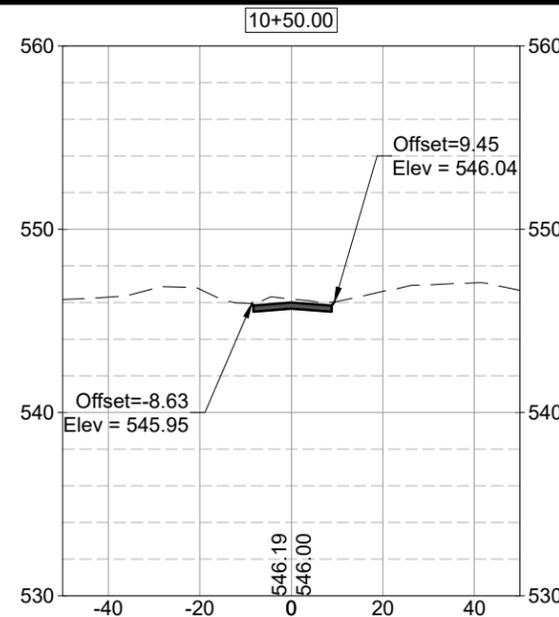
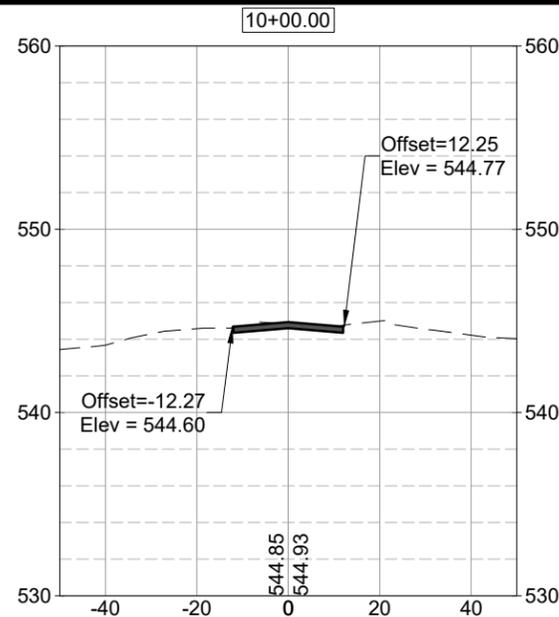
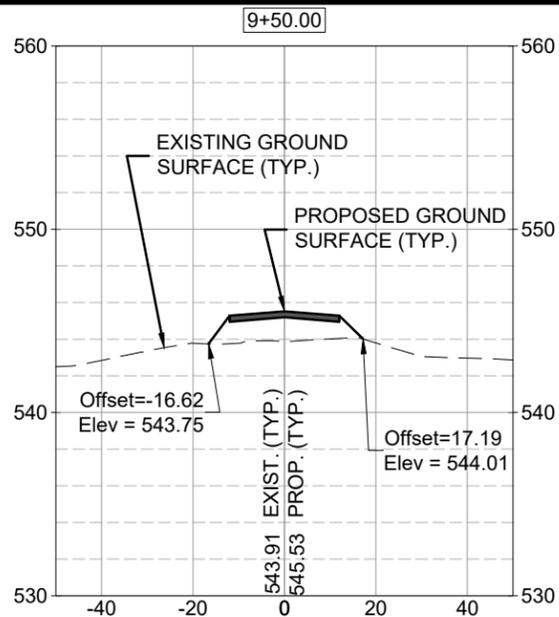
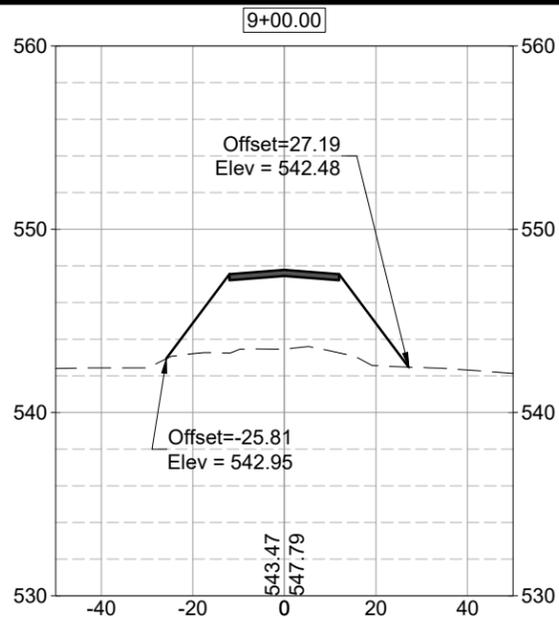
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|-----|-------------|------|-------|
|     |             |      |       |

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

CROSS SECTIONS SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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

|                |             |
|----------------|-------------|
| DATE:          | AUGUST 2024 |
| DESIGNED BY:   | A. LUKEFAHR |
| DRAWN BY:      | P. HOWE     |
| REVIEWED BY:   | S. HOWE     |
| APPROVED BY:   | S. HOWE     |
| JOB NO.        | 23H3543     |
| <b>20</b>      |             |
| SHEET 20 OF 45 |             |



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

**Howe Company LLC**

MISSOURI STATE CERTIFICATE OF AUTHORITY  
ENGINEERING #E-2014014693  
SURVEYING #S-2014015235

CROSS SECTIONS SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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

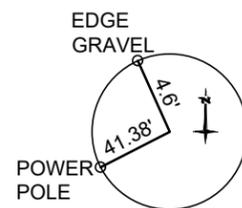
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|----------------|-------------|
| DATE:          | AUGUST 2024 |
| DESIGNED BY:   | A. LUKEFAHR |
| DRAWN BY:      | P. HOWE     |
| REVIEWED BY:   | S. HOWE     |
| APPROVED BY:   | S. HOWE     |
| JOB NO.        | 23H3543     |
| 21             |             |
| SHEET 21 OF 45 |             |

| Line Table: Alignments |               |                                   |             |                                   |                         |
|------------------------|---------------|-----------------------------------|-------------|-----------------------------------|-------------------------|
| Line #                 | START STATION | START POINT                       | END STATION | END POINT                         | BEARING                 |
| L2                     | 1+16.61       | N: 1580207.8709<br>E: 516159.5219 | 1+47.51     | N: 1580219.8316<br>E: 516188.0137 | N67° 13' 40"E<br>30.90  |
| L3                     | 2+47.48       | N: 1580265.0745<br>E: 516277.0617 | 2+47.63     | N: 1580265.1513<br>E: 516277.1891 | N58° 54' 16"E<br>0.15   |
| L4                     | 3+54.25       | N: 1580293.6435<br>E: 516378.5978 | 3+70.53     | N: 1580293.7263<br>E: 516394.8826 | N89° 42' 31"E<br>16.28  |
| L5                     | 4+99.88       | N: 1580367.5101<br>E: 516489.8776 | 7+29.86     | N: 1580590.0539<br>E: 516547.9184 | N14° 37' 03"E<br>229.99 |
| L6                     | 8+79.72       | N: 1580738.4988<br>E: 516550.7895 | 9+25.99     | N: 1580783.6906<br>E: 516540.8523 | N12° 24' 05"W<br>46.27  |
| L7                     | 10+13.92      | N: 1580868.9678<br>E: 516519.4826 | 10+69.11    | N: 1580922.0933<br>E: 516504.5149 | N15° 44' 05"W<br>55.19  |

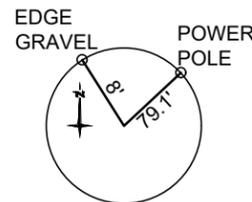
| Curve Table: Alignments |                                                   |                                                   |                                                    |         |        |             |                         |
|-------------------------|---------------------------------------------------|---------------------------------------------------|----------------------------------------------------|---------|--------|-------------|-------------------------|
| Curve #                 | PC                                                | PI                                                | PT                                                 | RADIUS  | LENGTH | DELTA ANGLE | CHORD DIRECTION         |
| C1                      | STA: 1+47.51<br>N: 1580219.8316<br>E: 516188.0137 | STA: 1+97.59<br>N: 1580239.2134<br>E: 516234.1837 | STA: 2+47.48<br>N: 1580265.0745<br>E: 516277.0617  | 688.17  | 99.97  | 8°19'24"    | N63° 03' 58"E<br>99.88  |
| C2                      | STA: 2+47.63<br>N: 1580265.1513<br>E: 516277.1891 | STA: 3+02.26<br>N: 1580293.3658<br>E: 516323.9688 | STA: 3+54.25<br>N: 1580293.6435<br>E: 516378.5978  | 198.30  | 106.61 | 30°48'15"   | N74° 18' 24"E<br>105.34 |
| C3                      | STA: 3+70.53<br>N: 1580293.7263<br>E: 516394.8826 | STA: 4+46.39<br>N: 1580294.1120<br>E: 516470.7349 | STA: 4+99.88<br>N: 1580367.5101<br>E: 516489.8776  | 98.69   | 129.34 | 75°05'28"   | N52° 09' 47"E<br>120.28 |
| C4                      | STA: 7+29.86<br>N: 1580590.0539<br>E: 516547.9184 | STA: 8+06.21<br>N: 1580663.9315<br>E: 516567.1861 | STA: 8+79.72<br>N: 1580738.4988<br>E: 516550.7895  | 317.79  | 149.86 | 27°01'08"   | N1° 06' 29"E<br>148.47  |
| C5                      | STA: 9+25.99<br>N: 1580783.6906<br>E: 516540.8523 | STA: 9+69.97<br>N: 1580826.6401<br>E: 516531.4081 | STA: 10+13.92<br>N: 1580868.9678<br>E: 516519.4826 | 1511.31 | 87.93  | 3°20'00"    | N14° 04' 05"W<br>87.91  |

| Control Point & Bench Mark Table |           |            |           |               |
|----------------------------------|-----------|------------|-----------|---------------|
| Point #                          | Elevation | Northing   | Easting   | Description   |
| CP #1                            | 545.93    | 1580887.74 | 516532.44 | hvcp          |
| TBM #1                           | 545.21    | 1580604.83 | 516593.89 | tbm /rr spike |
| CP #2                            | 539.92    | 1580326.19 | 516498.83 | hvcp          |
| CP #3                            | 540.14    | 1580200.80 | 516168.30 | hvcp          |

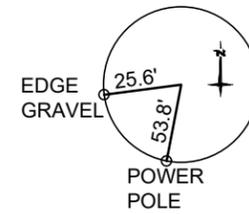
hvcp - HORIZONTAL VERTICAL CONTROL POINT  
 tbm - TEMPORARY BENCHMARK  
 rrspk - RAILROAD SPIKE



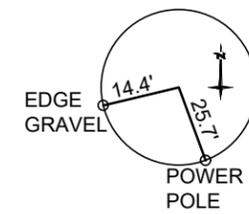
C.P. # 3  
5/8" REBAR  
STA: 1+21.97  
O.S. 9.92' R



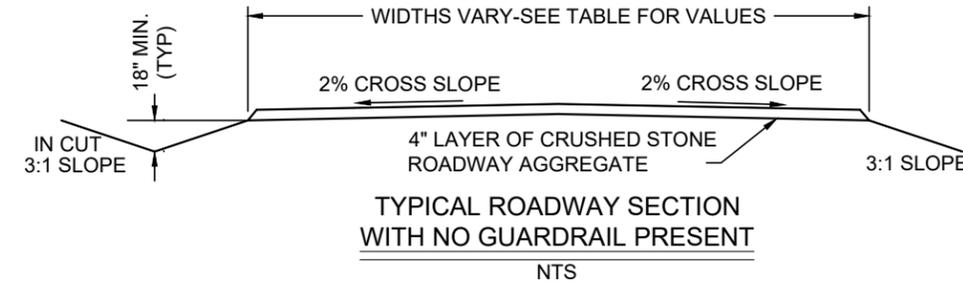
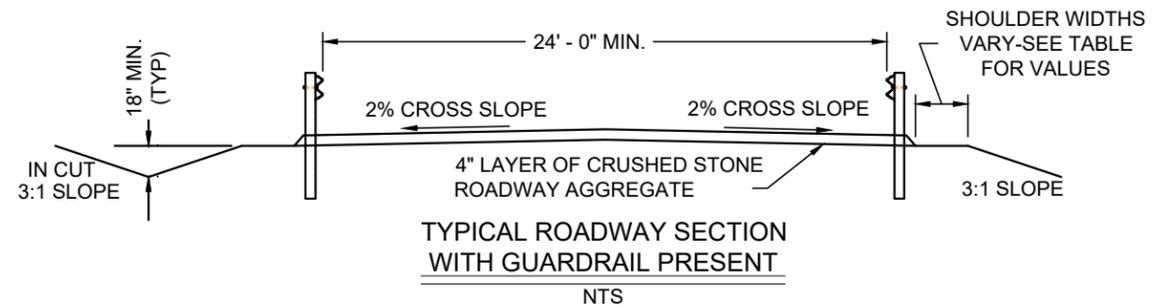
C.P. # 2  
5/8" REBAR  
STA: 4+69.28  
O.S. 26.01' R



TMB# 1  
RAIL ROAD SPIKE  
STA: 6+78.41  
O.P. 45.69' R

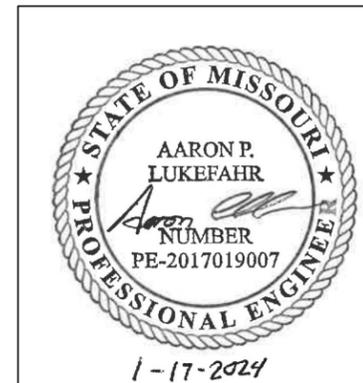


C.P. # 1  
5/8" REBAR  
STA: 10+28.48  
O.S. 17.56' R



| ROADWAY WIDTH TABLE |            |                                      |
|---------------------|------------|--------------------------------------|
| FROM STATION        | TO STATION | ROADWAY WIDTH                        |
| 1+16.61             | 1+66.61    | TRANSITION FROM EXISTING TO 24'-0"   |
| 1+66.61             | 3+99.91    | 24'-0"                               |
| 3+99.91             | 4+49.91    | TRANSITION FROM 24'-0" TO 26'-6 1/4" |
| 4+49.91             | 4+99.91    | 26'-6 1/4"                           |
| 7+14.91             | 7+64.91    | 26'-6 1/4"                           |
| 7+64.91             | 8+14.91    | TRANSITION FROM 26'-6 1/4" TO 24'-0" |
| 8+14.91             | 10+16.61   | 24'-0"                               |
| 10+16.61            | 10+69.11   | TRANSITION FROM 24'-0" TO EXISTING   |

TOTAL CUT= 3,146 C.Y.  
 TOTAL FILL= 12,198 C.Y.  
 NOTE: NO SHRINK/SWELL FACTORS INCLUDED IN CUT/FILL QUANTITIES

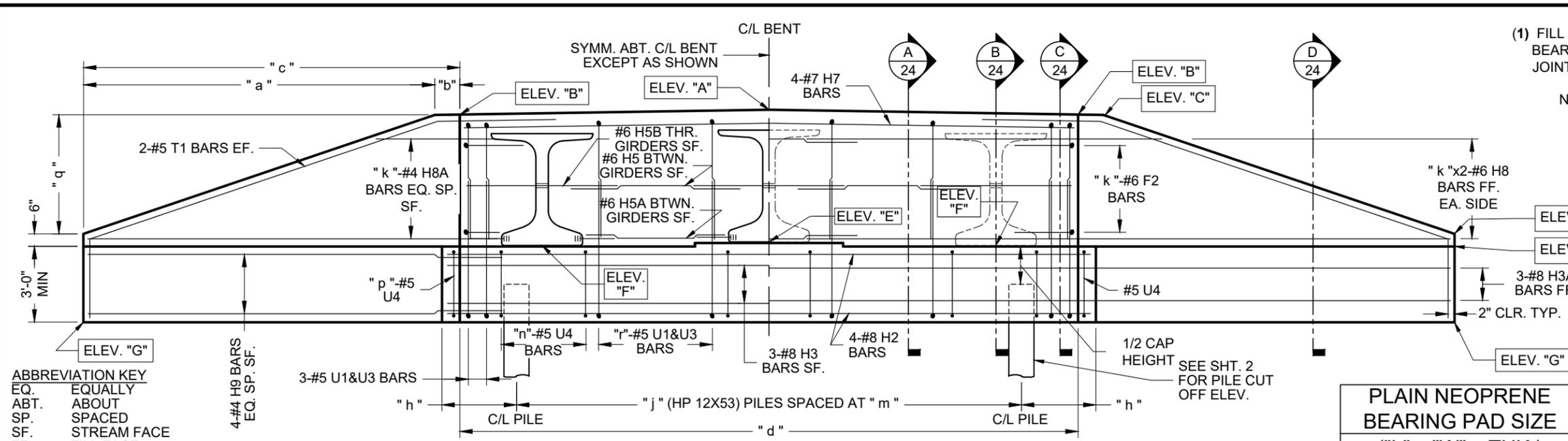


CROSS SECTIONS SHEET  
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
 CART ROUTE NO. 122, CO. RD. 429  
 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
 LEWIS COUNTY, MISSOURI

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

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

JOB NO. 23H3543



(1) FILL AREA NOT OCCUPIED BY THE BEARING PAD UNDER GIRDER WITH JOINT FILLER

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

TABLE OF ELEVATIONS

|     |        |
|-----|--------|
| "A" | 557.83 |
| "B" | 557.64 |
| "C" | 557.62 |
| "D" | 554.49 |
| "E" | 554.09 |
| "F" | 553.99 |
| "G" | 550.99 |

PLAIN NEOPRENE BEARING PAD SIZE ("L" x "W" x THK.)

36" x 10 1/2" x 1/2"

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

|        |                |
|--------|----------------|
| SEC-θ  | SKEW ANGLE = 0 |
| 1.0000 | 0              |

TABLE OF BENT 1&4 DIMENSION

| LABEL | VALUE       |
|-------|-------------|
| "a"   | 9'-7 5/16"  |
| "b"   | 1'-0"       |
| "b2"  | 0'-7 5/16"  |
| "c"   | 10'-7 5/16" |
| "c2"  | 10'-0"      |
| "d"   | 24'-6"      |
| "d3"  | 25'-8 5/8"  |
| "e"   | 3'-3"       |
| "f"   | 9'-0"       |
| "g"   | 3'-6"       |
| "h"   | 1'-7 5/16"  |
| "i"   | 45'-8 5/8"  |
| "j"   | 4           |
| "k"   | 4           |
| "m"   | 7'-6"       |
| "n"   | 8           |
| "p"   | 1           |
| "q"   | 3'-1 5/8"   |
| "r"   | 8           |
| "s"   | 9           |

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

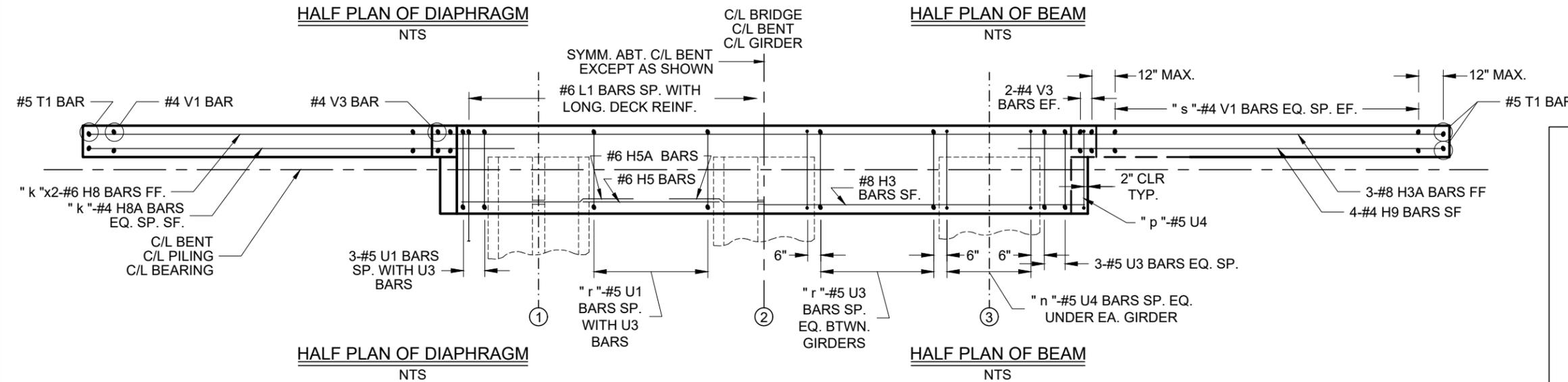
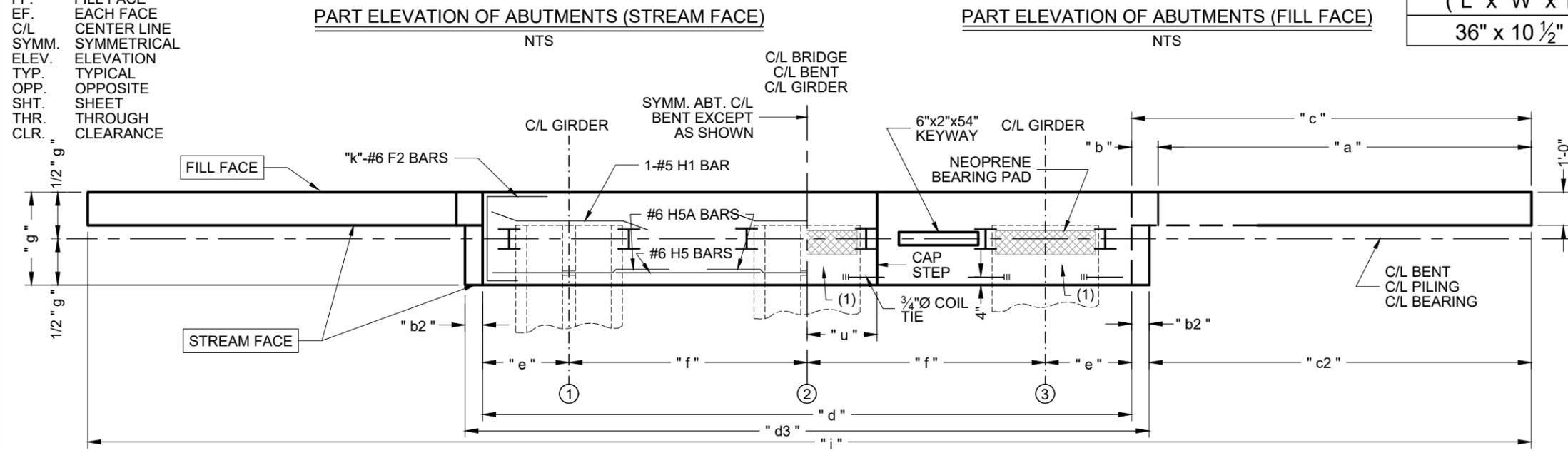
TYP. TYPICAL

OPP. OPPOSITE

SHT. SHEET

THR. THROUGH

CLR. CLEARANCE



Howe Company LLC

MISSOURI STATE CERTIFICATE OF AUTHORITY  
ENGINEERING #E-2014014693  
SURVEYING #LS-2014016285

END BENT DETAILS SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

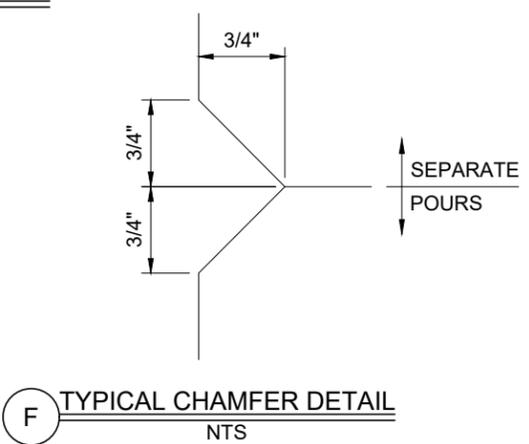
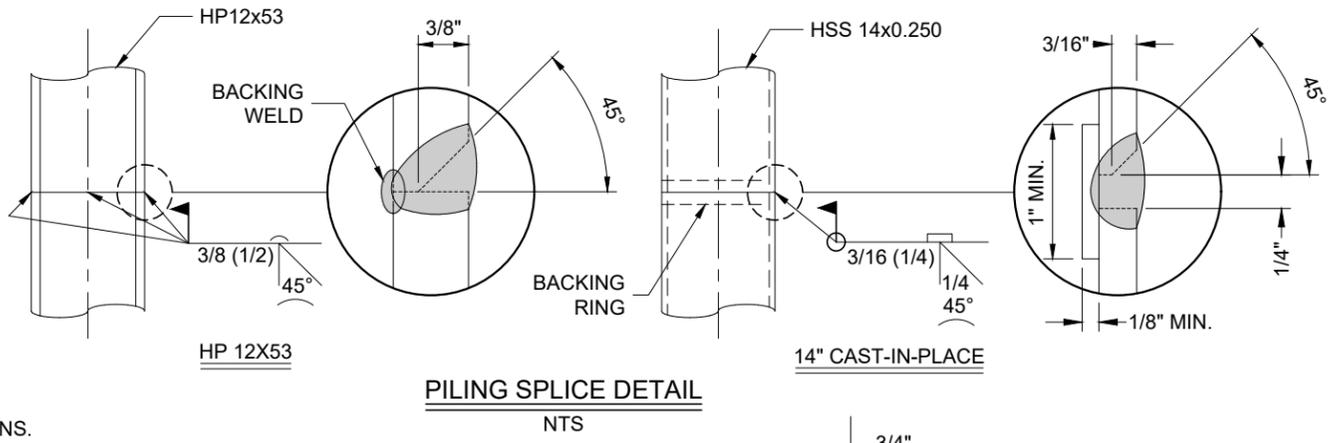
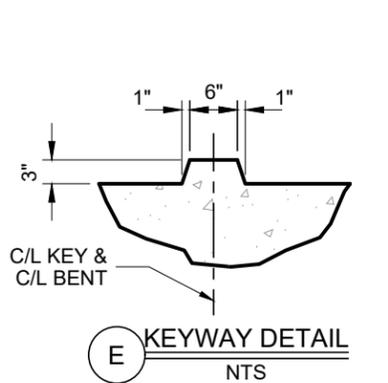
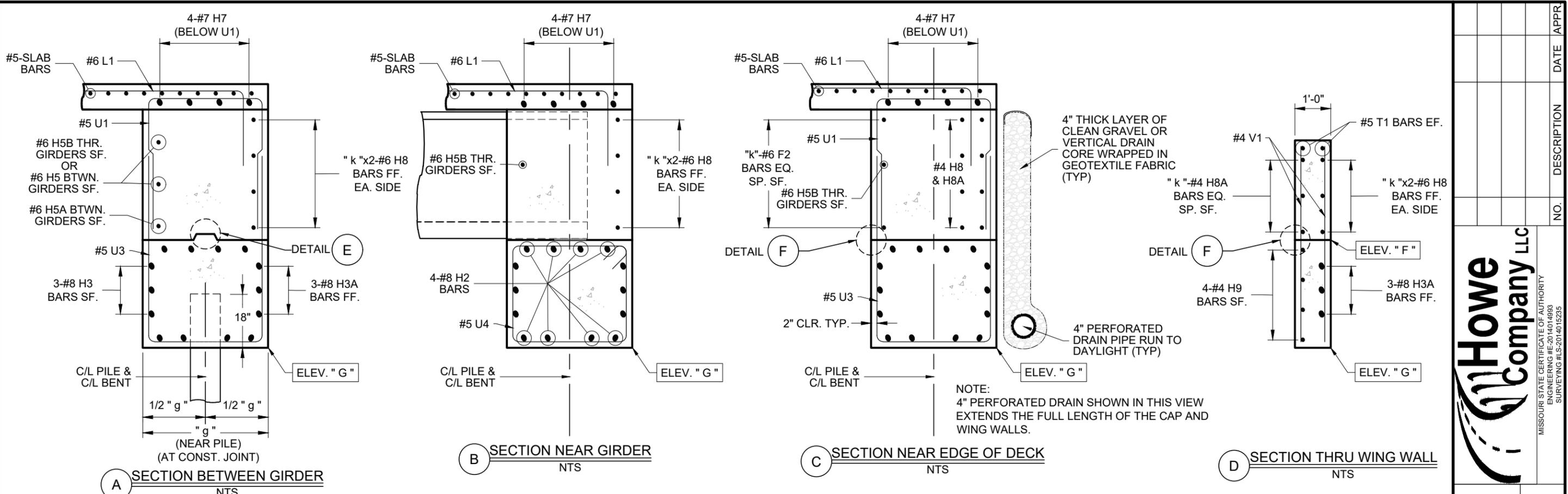
HOWE COMPANY, LLC  
804 E. PATTON STREET, MACON, MO. 63552  
OFFICE: 660-395-4693

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

JOB NO. 23H3543

23

SHEET 23 OF 45



**NOTES:**  
DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.  
ALL CONCRETE IN POUR 1 (PILE CAP & LOWER WINGS) SHALL BE SUBSTRUCTURE CONCRETE, CLASS B-1 WITH AIR ENTRAINMENT. CLASS B-2 OR MB-2 CONCRETE MAY BE PROVIDED IN LIEU OF CLASS B-1.  
ALL CONCRETE IN POUR 2 (BRIDGE DECK, C.I.P. DIAPHRAGM, AND UPPER WINGS) SHALL BE SUPERSTRUCTURE CONCRETE, CLASS B-2 OR MB-2 WITH AIR ENTRAINMENT.  
ALL U BARS SHALL BE PLACED PARALLEL TO THE C/L OF ROADWAY.  
BOTTOM LEG OF U BARS MAY BE CUT WHEN NECESSARY TO CLEAR PILES. CUT LOWER LEG AT THE MID POINT AND ROTATE LEGS TO EITHER SIDE OF THE PILING.  
POUR STEPS MONOLITHICALLY WITH CAP.  
POUR UPPER WING WALLS MONOLITHICALLY WITH THE END DIAPHRAGMS AND BRIDGE DECK.  
ALL EXPOSED CONSTRUCTION JOINTS SHALL USE CHAMFERED EDGES AS SHOWN IN DETAIL E.  
ALL EXPOSED EDGES SHALL USE 3/4" CHAMFERS.  
ALL CONCRETE ABOVE THE BOTTOM OF GIRDER ELEVATION SHALL BE CONSIDERED SUPERSTRUCTURE CONCRETE.  
SOME REBAR MAY BE OMITTED FROM SOME VIEWS FOR CLARITY, SECTIONS ARE TAKEN NORMAL TO CENTERLINE OF BENT.  
SEE BILL OF REINFORCING STEEL FOR BAR DETAILS.

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

| TABLE OF BENT 1&4 DIMENSION |             |
|-----------------------------|-------------|
| LABEL                       | VALUE       |
| "a"                         | 9'-7 5/16"  |
| "b"                         | 1'-0"       |
| "b2"                        | 0'-7 5/16"  |
| "c"                         | 10'-7 5/16" |
| "c2"                        | 10'-0"      |
| "d"                         | 24'-6"      |
| "d3"                        | 25'-8 5/8"  |
| "e"                         | 3'-3"       |
| "f"                         | 9'-0"       |
| "g"                         | 3'-6"       |
| "h"                         | 1'-7 5/16"  |
| "i"                         | 45'-8 5/8"  |
| "j"                         | 4           |
| "k"                         | 4           |
| "m"                         | 7'-6"       |
| "n"                         | 8           |
| "p"                         | 1           |
| "q"                         | 3'-1 5/8"   |
| "r"                         | 8           |
| "s"                         | 9           |

| TABLE OF ELEVATIONS |        |
|---------------------|--------|
| "A"                 | 557.83 |
| "B"                 | 557.64 |
| "C"                 | 557.62 |
| "D"                 | 554.49 |
| "E"                 | 554.09 |
| "F"                 | 553.99 |
| "G"                 | 550.99 |

|                            |                |
|----------------------------|----------------|
| 3 - NU-35<br>(2'-11 7/16") |                |
| SEC-θ                      | SKEW ANGLE = θ |
| 1.0000                     | 0              |



**Howe Company LLC**  
MISSOURI STATE CERTIFICATE OF AUTHORITY  
ENGINEERING #E-2014014983  
SURVEYING #LS-2014016235

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

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END BENT DETAILS SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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

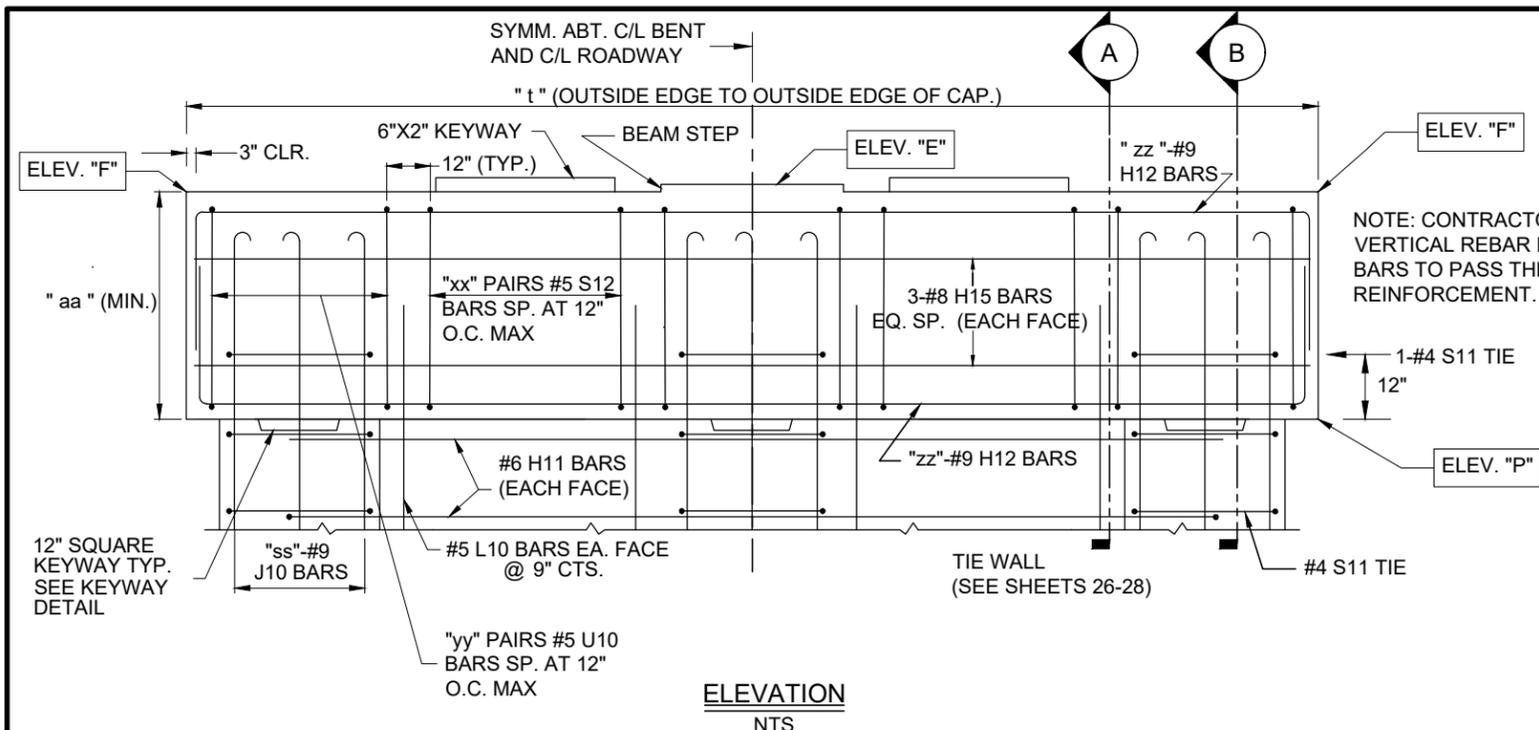
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DATE: AUGUST 2024  
DESIGNED BY: A. LUKEFAHR  
DRAWN BY: P. HOWE  
REVIEWED BY: S. HOWE  
APPROVED BY: S. HOWE

JOB NO. 23H3543

**24**

SHEET 24 OF 45



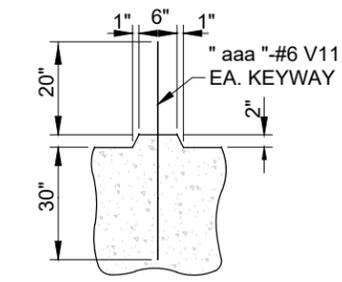
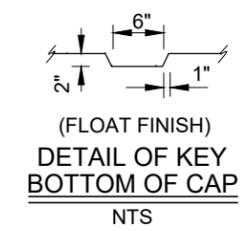
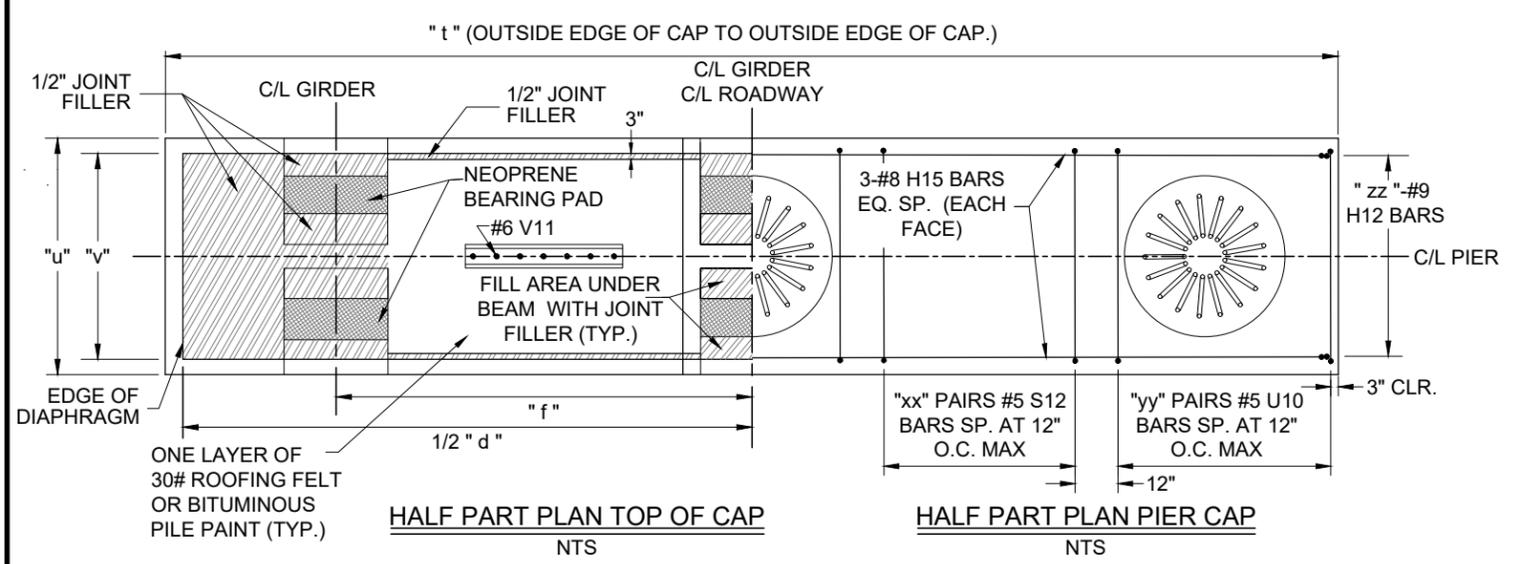
\*(SPACE DETERMINED BY CONTRACTOR)

|                            |                               |
|----------------------------|-------------------------------|
| 3 - NU-35<br>(2'-11 7/16") |                               |
| SEC- $\theta$<br>1.0000    | SKEW ANGLE<br>= $\theta$<br>0 |

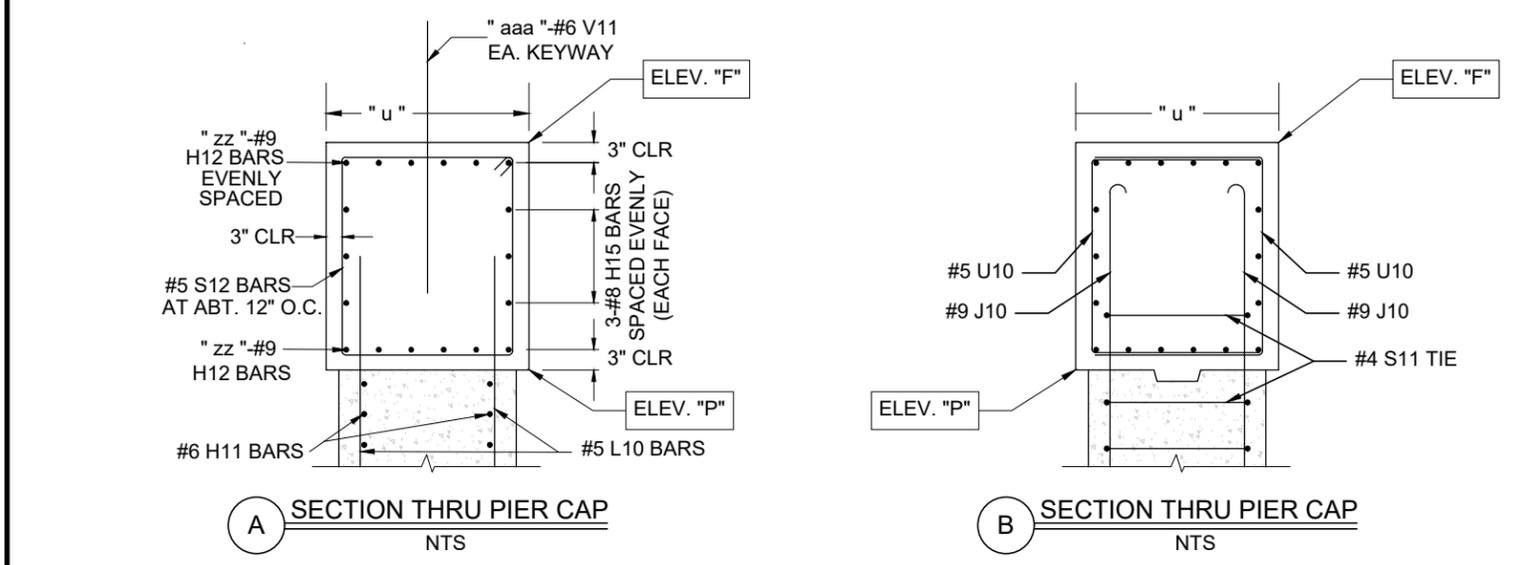
| TABLE OF ELEVATIONS |        |
|---------------------|--------|
| "A"                 | 557.83 |
| "B"                 | 557.64 |
| "C"                 | 557.62 |
| "D"                 | 554.49 |
| "E"                 | 554.09 |
| "F"                 | 553.99 |
| "P"                 | 550.49 |
| "Q"                 | 529.00 |
| "R2"                | 521.50 |
| "R3"                | 521.50 |
| "S2"                | 504.00 |
| "S3"                | 504.00 |

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.

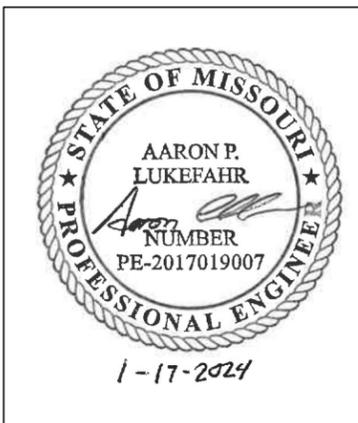
| TABLE OF BENT 2&3 DIMENSION |              |
|-----------------------------|--------------|
| LABEL                       | VALUE        |
| " t "                       | 25'-0"       |
| " u "                       | 4'-0"        |
| " v "                       | 3'-6"        |
| " w "                       | 0'-9 1/2"    |
| " x "                       | 10'-6"       |
| " z "                       | 0'-6"        |
| " aa "                      | 3'-6"        |
| " bb "                      | 21'-5 13/16" |
| " cc-2 "                    | 7'-6"        |
| " cc-3 "                    | 7'-6"        |
| " dd-2 "                    | 17'-6"       |
| " dd-3 "                    | 17'-6"       |
| " gg "                      | 3'-6"        |
| " hh "                      | 3'-0"        |
| " jj "                      | 8'-5"        |
| " kk "                      | 2'-7 1/2"    |
| " pp "                      | 17           |
| " qq-2 "                    | 26           |
| " qq-3 "                    | 26           |
| " rr "                      | 23           |
| " ss "                      | 17           |
| " tt "                      | 3            |
| " uu "                      | 7            |
| " vv "                      | 19           |
| " ww "                      | 27           |
| " xx "                      | 8            |
| " yy "                      | 5            |
| " zz "                      | 6            |
| " aaa "                     | 7            |
| " bbb "                     | 3            |
| " ccc "                     | 7            |
| " 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. 122, CO. RD. 429  
 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
 LEWIS COUNTY, MISSOURI  
 HOWE COMPANY, LLC  
 804 E. PATTON STREET, MACON, MO. 63552  
 OFFICE: 660-395-4693



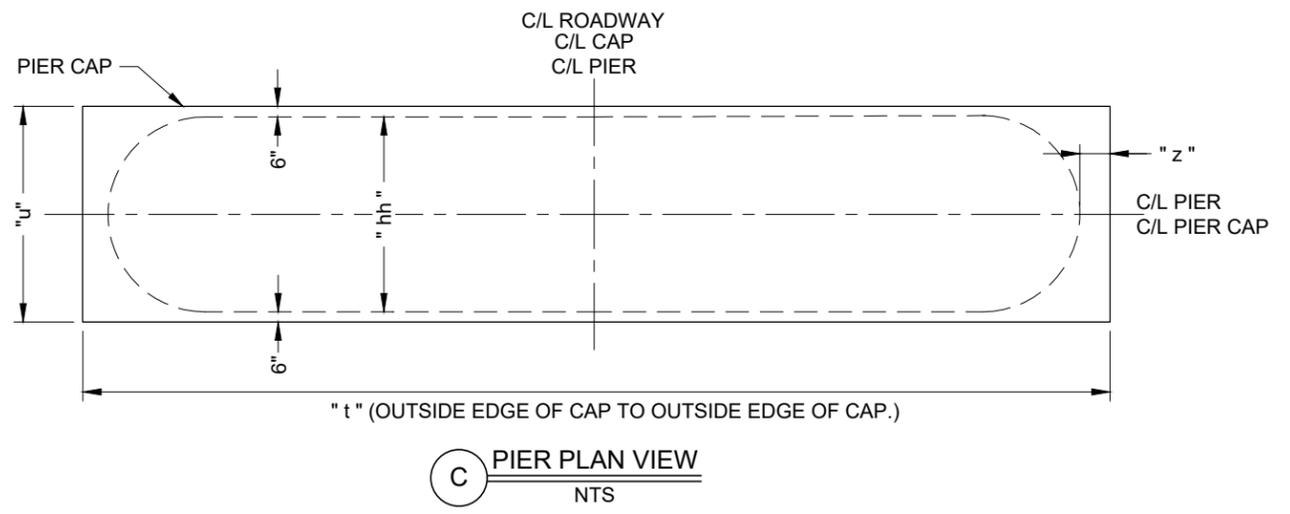
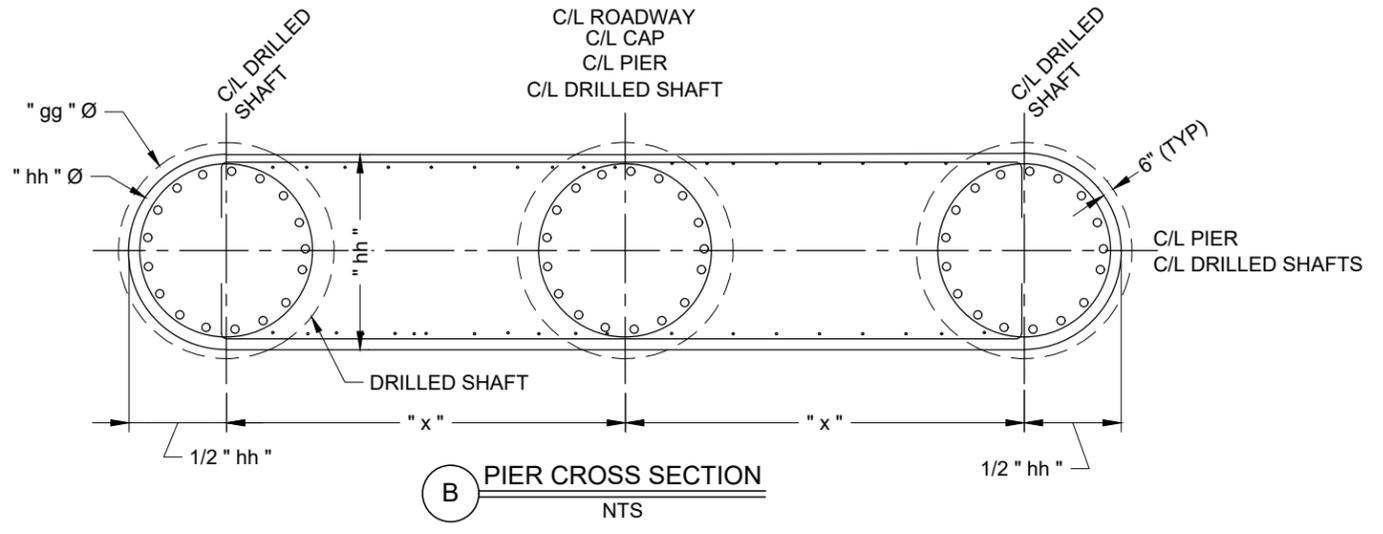
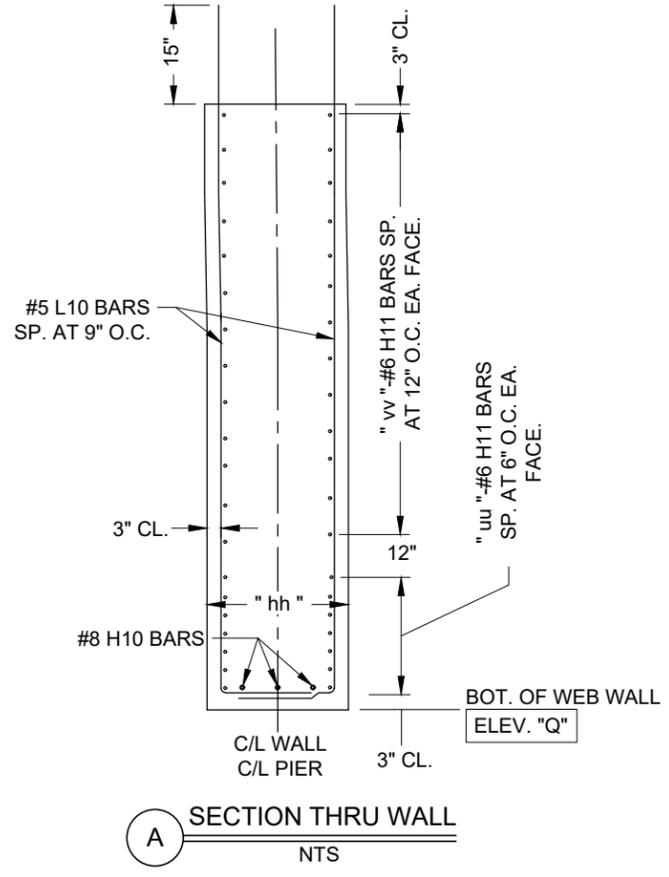
DATE: AUGUST 2024  
 DESIGNED BY: A. LUKEFAHR  
 DRAWN BY: P. HOWE  
 REVIEWED BY: S. HOWE  
 APPROVED BY: S. HOWE  
 JOB NO. 23H3543



|                            |                          |
|----------------------------|--------------------------|
| 3 - NU-35<br>(2'-11 7/16") |                          |
| SEC- $\theta$              | SKEW ANGLE<br>= $\theta$ |
| 1.0000                     | 0                        |

| TABLE OF ELEVATIONS |        |
|---------------------|--------|
| "A"                 | 557.83 |
| "B"                 | 557.64 |
| "C"                 | 557.62 |
| "D"                 | 554.49 |
| "E"                 | 554.09 |
| "F"                 | 553.99 |
| "P"                 | 550.49 |
| "Q"                 | 529.00 |
| "R2"                | 521.50 |
| "R3"                | 521.50 |
| "S2"                | 504.00 |
| "S3"                | 504.00 |

| TABLE OF BENT 2&3 DIMENSION |              |
|-----------------------------|--------------|
| LABEL                       | VALUE        |
| "t"                         | 25'-0"       |
| "u"                         | 4'-0"        |
| "v"                         | 3'-6"        |
| "w"                         | 0'-9 1/2"    |
| "x"                         | 10'-6"       |
| "z"                         | 0'-6"        |
| "aa"                        | 3'-6"        |
| "bb"                        | 21'-5 13/16" |
| "cc-2"                      | 7'-6"        |
| "cc-3"                      | 7'-6"        |
| "dd-2"                      | 17'-6"       |
| "dd-3"                      | 17'-6"       |
| "gg"                        | 3'-6"        |
| "hh"                        | 3'-0"        |
| "jj"                        | 8'-5"        |
| "kk"                        | 2'-7 1/2"    |
| "pp"                        | 17           |
| "qq-2"                      | 26           |
| "qq-3"                      | 26           |
| "rr"                        | 23           |
| "ss"                        | 17           |
| "tt"                        | 3            |
| "uu"                        | 7            |
| "vv"                        | 19           |
| "ww"                        | 27           |
| "xx"                        | 8            |
| "yy"                        | 5            |
| "zz"                        | 6            |
| "aaa"                       | 7            |
| "bbb"                       | 3            |
| "ccc"                       | 7            |
| "ddd"                       | 3            |

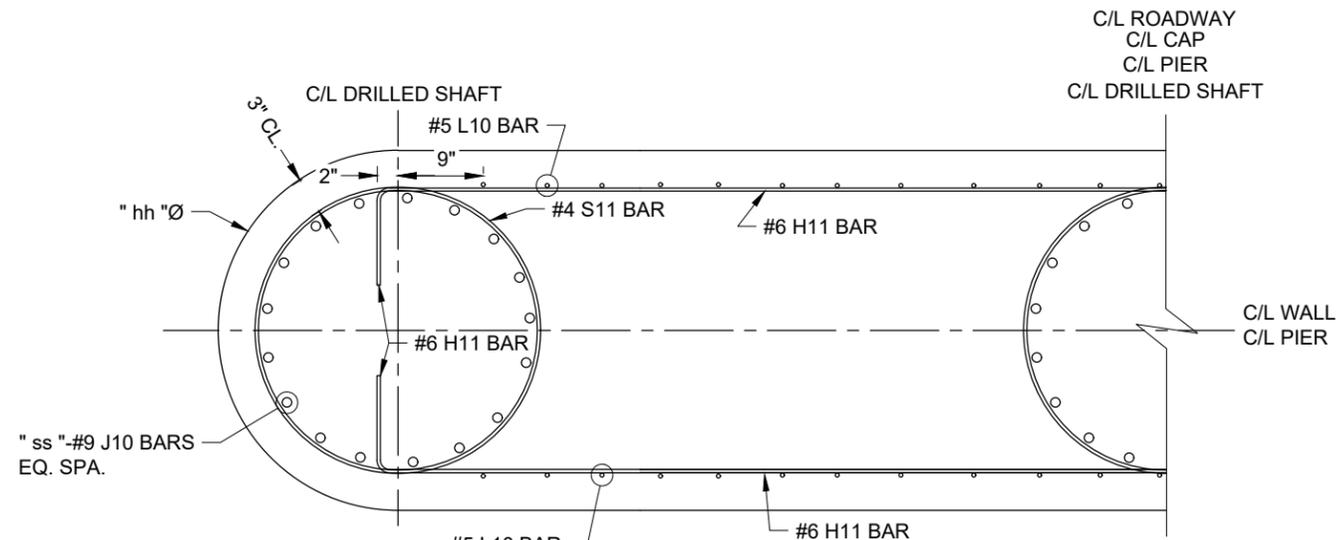


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 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
 LEWIS COUNTY, MISSOURI

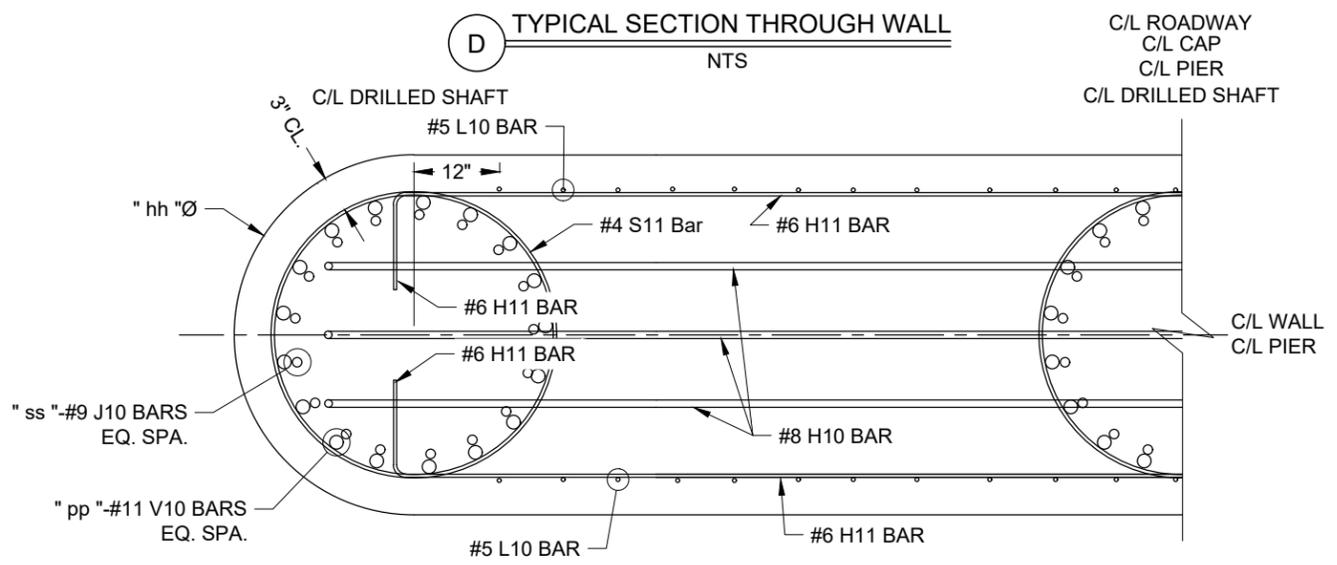
HOWE COMPANY, LLC  
 804 E. PATTON STREET, MACON, MO. 63552  
 OFFICE: 660-395-4693



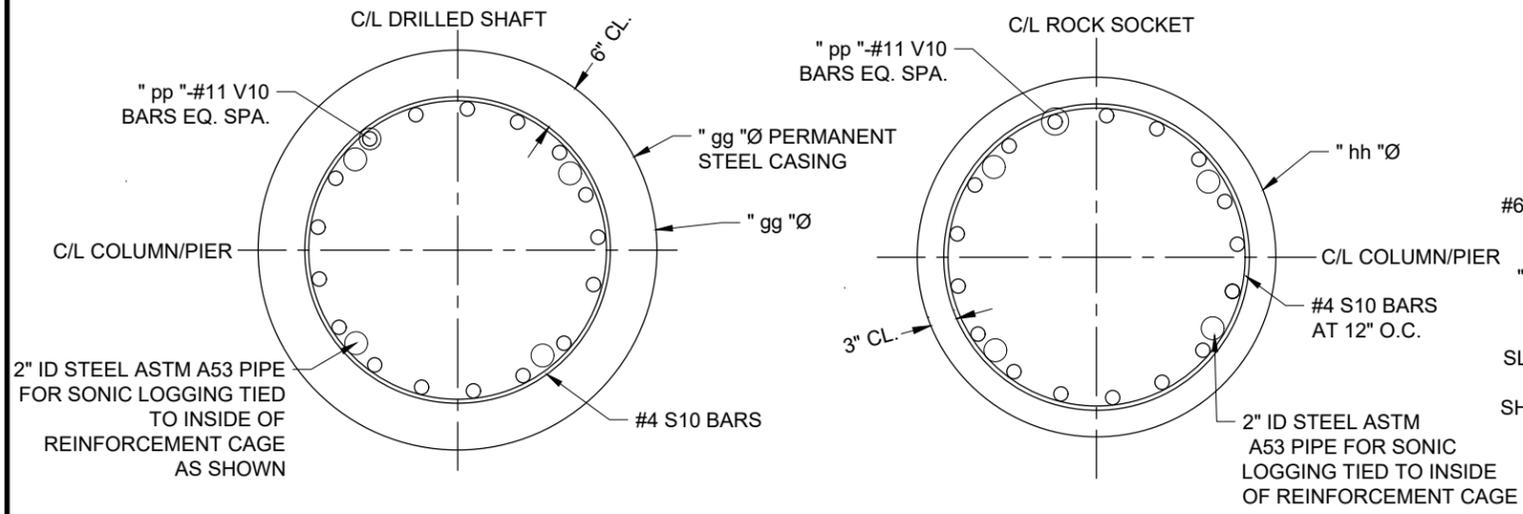
|              |             |
|--------------|-------------|
| DATE:        | AUGUST 2024 |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY:    | P. HOWE     |
| REVIEWED BY: | S. HOWE     |
| APPROVED BY: | S. HOWE     |



**D** TYPICAL SECTION THROUGH WALL  
NTS

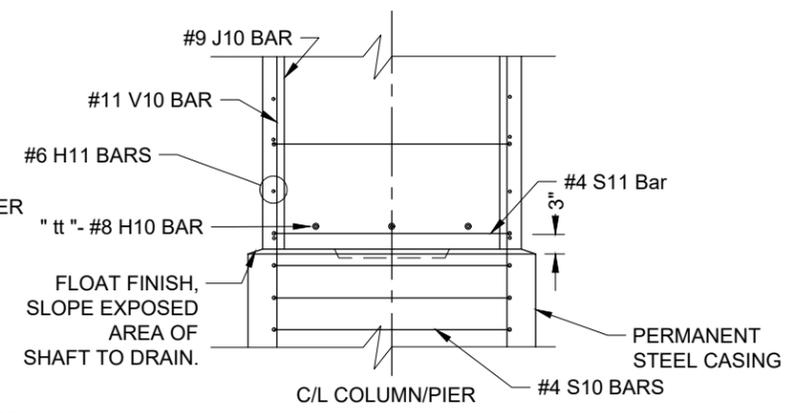


**E** TYPICAL SECTION THROUGH WALL  
NTS



**F** TYPICAL SECTION THRU DRILLED SHAFT  
NTS

**G** TYPICAL SECTION THRU ROCK SOCKET  
NTS



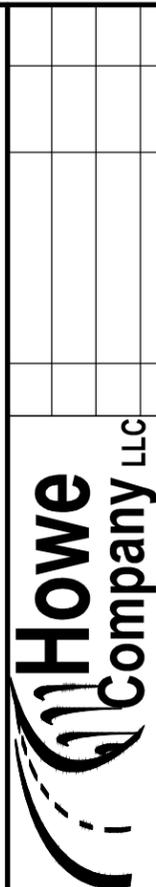
**H** KEYWAY DETAIL  
NTS

|                            |                |
|----------------------------|----------------|
| 3 - NU-35<br>(2'-11 7/16") |                |
| SEC-Ø                      | SKEW ANGLE = Ø |
| 1.0000                     | 0              |

| TABLE OF ELEVATIONS |        |
|---------------------|--------|
| "A"                 | 557.83 |
| "B"                 | 557.64 |
| "C"                 | 557.62 |
| "D"                 | 554.49 |
| "E"                 | 554.09 |
| "F"                 | 553.99 |
| "P"                 | 550.49 |
| "Q"                 | 529.00 |
| "R2"                | 521.50 |
| "R3"                | 521.50 |
| "S2"                | 504.00 |
| "S3"                | 504.00 |

| TABLE OF BENT 2&3 DIMENSION |              |
|-----------------------------|--------------|
| LABEL                       | VALUE        |
| " t "                       | 25'-0"       |
| " u "                       | 4'-0"        |
| " v "                       | 3'-6"        |
| " w "                       | 0'-9 1/2"    |
| " x "                       | 10'-6"       |
| " z "                       | 0'-6"        |
| " aa "                      | 3'-6"        |
| " bb "                      | 21'-5 13/16" |
| " cc-2 "                    | 7'-6"        |
| " cc-3 "                    | 7'-6"        |
| " dd-2 "                    | 17'-6"       |
| " dd-3 "                    | 17'-6"       |
| " gg "                      | 3'-6"        |
| " hh "                      | 3'-0"        |
| " jj "                      | 8'-5"        |
| " kk "                      | 2'-7 1/2"    |
| " pp "                      | 17           |
| " qq-2 "                    | 26           |
| " qq-3 "                    | 26           |
| " rr "                      | 23           |
| " ss "                      | 17           |
| " tt "                      | 3            |
| " uu "                      | 7            |
| " vv "                      | 19           |
| " ww "                      | 27           |
| " xx "                      | 8            |
| " yy "                      | 5            |
| " zz "                      | 6            |
| " aaa "                     | 7            |
| " bbb "                     | 3            |
| " ccc "                     | 7            |
| " ddd "                     | 3            |





Missouri State Certificate of Authority  
Engineering #E-2017014993  
Surveying #LS-2017015235

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

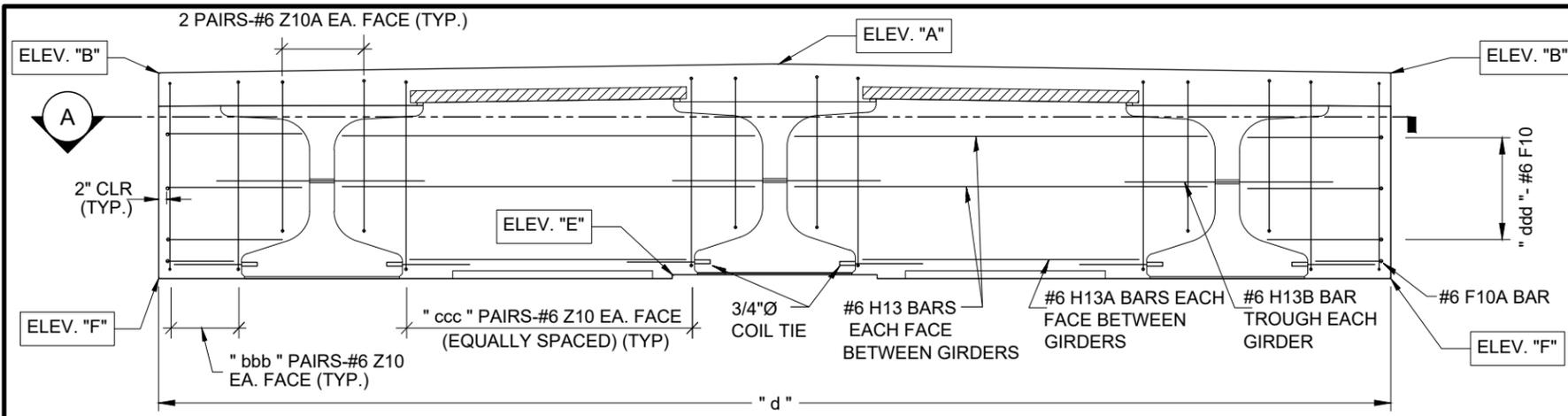
INTERMEDIATE BENT DETAILS SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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

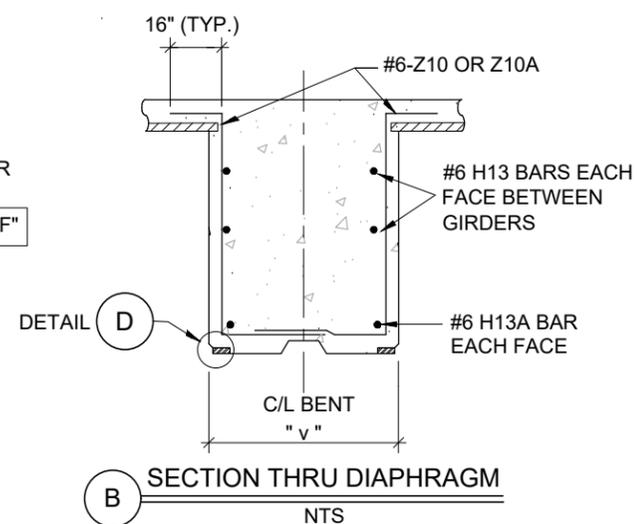
JOB NO. 23H3543

28

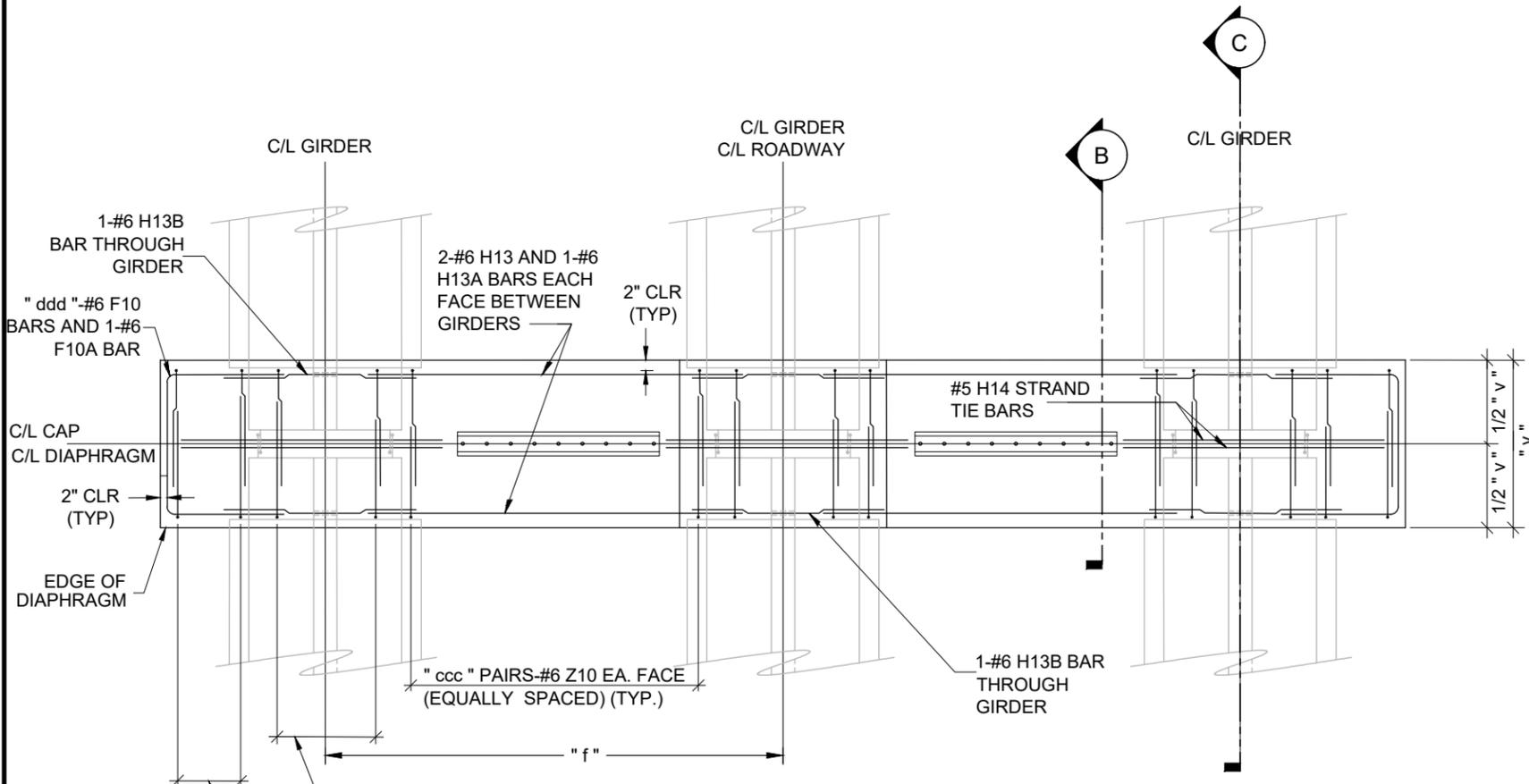
SHEET 28 OF 45



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



SECTION THRU DIAPHRAGM  
NTS

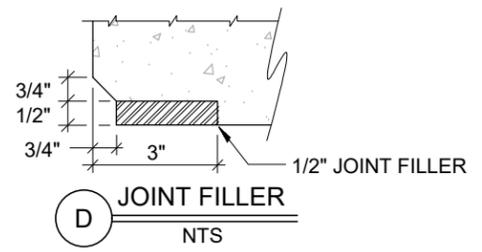


SECTION THRU DIAPHRAGM  
NTS

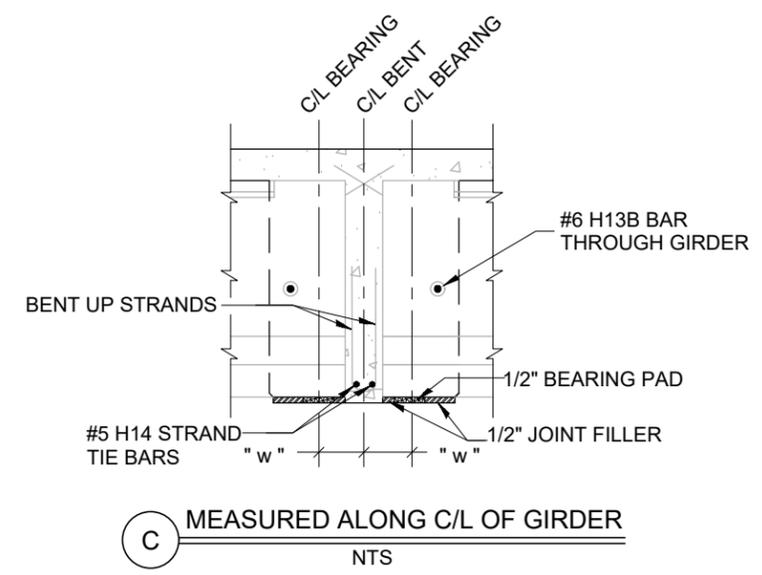
| TABLE OF ELEVATIONS |        |
|---------------------|--------|
| "A"                 | 557.83 |
| "B"                 | 557.64 |
| "C"                 | 557.62 |
| "D"                 | 554.49 |
| "E"                 | 554.09 |
| "F"                 | 553.99 |

|               |                          |
|---------------|--------------------------|
| SEC- $\theta$ | SKEW ANGLE<br>= $\theta$ |
| 1.0000        | 0                        |

| TABLE OF BENT 2&3 DIMENSION |              |
|-----------------------------|--------------|
| LABEL                       | VALUE        |
| "t"                         | 25'-0"       |
| "u"                         | 4'-0"        |
| "v"                         | 3'-6"        |
| "w"                         | 0'-9 1/2"    |
| "x"                         | 10'-6"       |
| "z"                         | 0'-6"        |
| "aa"                        | 3'-6"        |
| "bb"                        | 21'-5 13/16" |
| "cc-2"                      | 7'-6"        |
| "cc-3"                      | 7'-6"        |
| "dd-2"                      | 17'-6"       |
| "dd-3"                      | 17'-6"       |
| "gg"                        | 3'-6"        |
| "hh"                        | 3'-0"        |
| "jj"                        | 8'-5"        |
| "kk"                        | 2'-7 1/2"    |
| "pp"                        | 17           |
| "qq-2"                      | 26           |
| "qq-3"                      | 26           |
| "rr"                        | 23           |
| "ss"                        | 17           |
| "tt"                        | 3            |
| "uu"                        | 7            |
| "vv"                        | 19           |
| "ww"                        | 27           |
| "xx"                        | 8            |
| "yy"                        | 5            |
| "zz"                        | 6            |
| "aaa"                       | 7            |
| "bbb"                       | 3            |
| "ccc"                       | 7            |
| "ddd"                       | 3            |



JOINT FILLER  
NTS



MEASURED ALONG C/L OF GIRDER  
NTS



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

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

INTERMEDIATE DIAPHRAGM SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

HOWE COMPANY, LLC  
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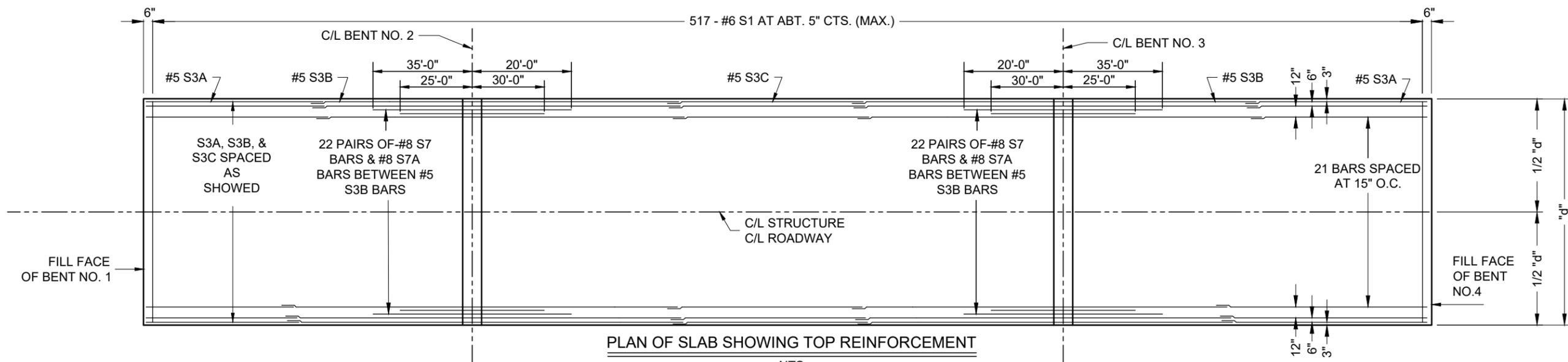
DATE: AUGUST 2024  
DESIGNED BY: A. LUKEFAHR  
DRAWN BY: P. HOWE  
REVIEWED BY: S. HOWE  
APPROVED BY: S. HOWE

JOB NO. 23H3543

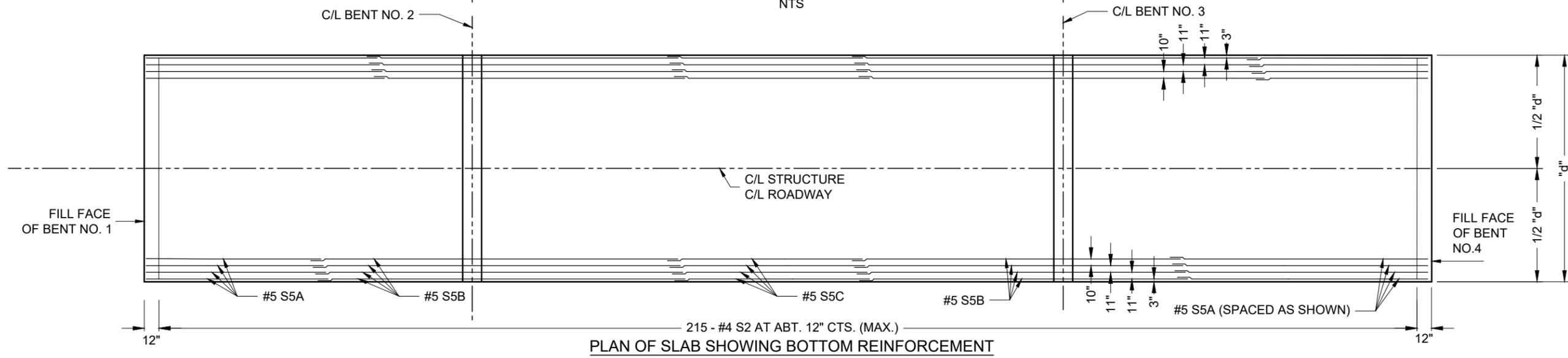
29

SHEET 29 OF 45

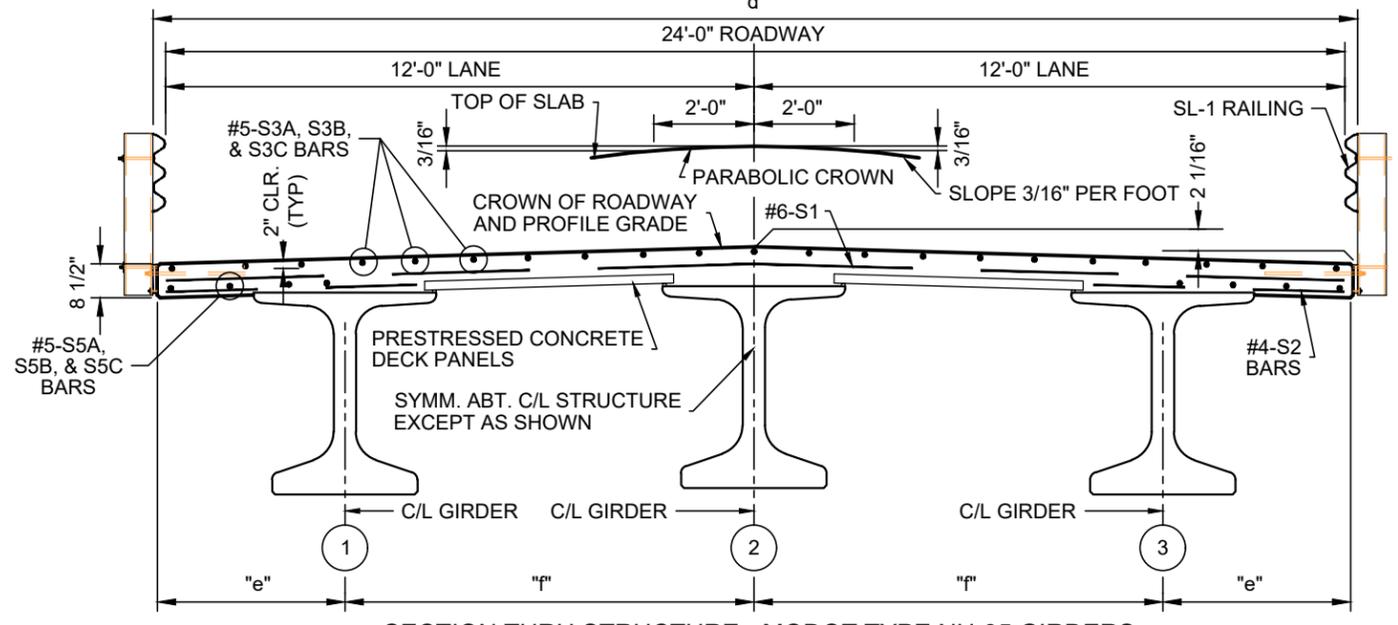




PLAN OF SLAB SHOWING TOP REINFORCEMENT  
NTS



PLAN OF SLAB SHOWING BOTTOM REINFORCEMENT  
NTS



SECTION THRU STRUCTURE - MODOT TYPE NU-35 GIRDERS  
NTS

| TABLE OF BENT DIMENSION |          |
|-------------------------|----------|
| "d"                     | 24' - 6" |
| "e"                     | 3' - 3"  |
| "f"                     | 9' - 0"  |



1-17-2024

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

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

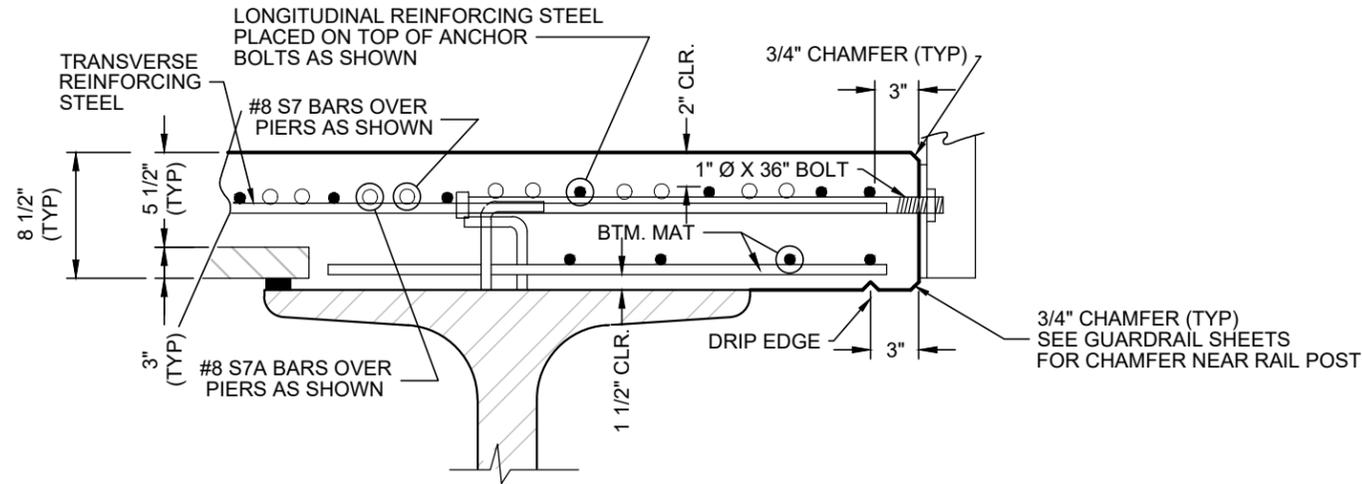
SLAB DETAILS SHEET  
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
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 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
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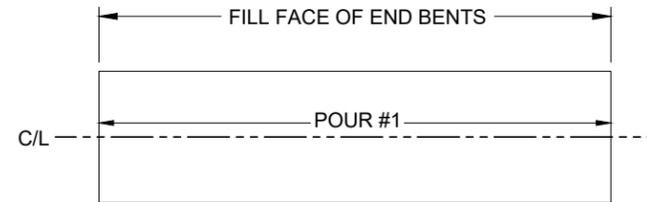
|              |             |
|--------------|-------------|
| DATE:        | AUGUST 2024 |
| DESIGNED BY: | A. LUKEFAHR |
| DRAWN BY:    | P. HOWE     |
| REVIEWED BY: | S. HOWE     |
| APPROVED BY: | S. HOWE     |

JOB NO. 23H3543

31



DETAIL OF EDGE OF SLAB  
NTS



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

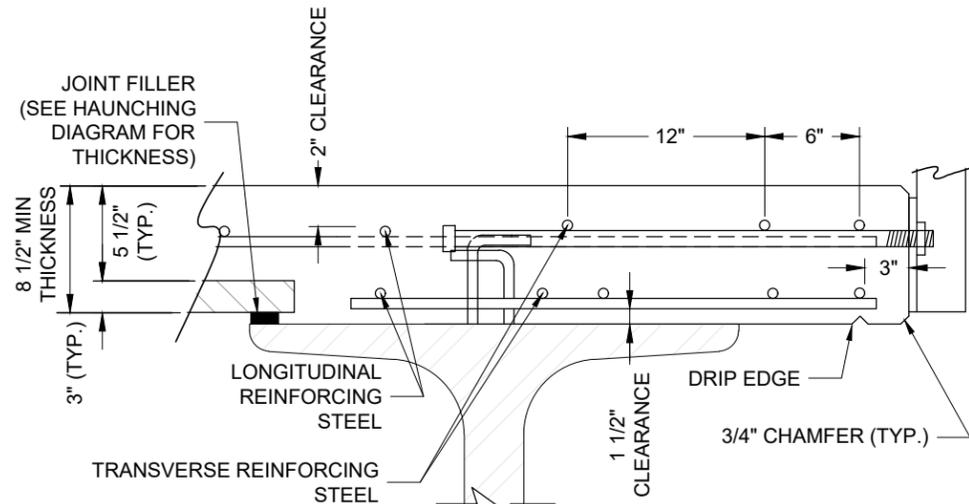
ALTERNATIVE POURS TO THE BASIC SEQUENCE ARE SUBJECT TO THE APPROVAL OF THE ENGINEER IN ACCORDANCE WITH SECTION 703.3.12.4 OF MISSOURI STANDARD SPECIFICATIONS

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.

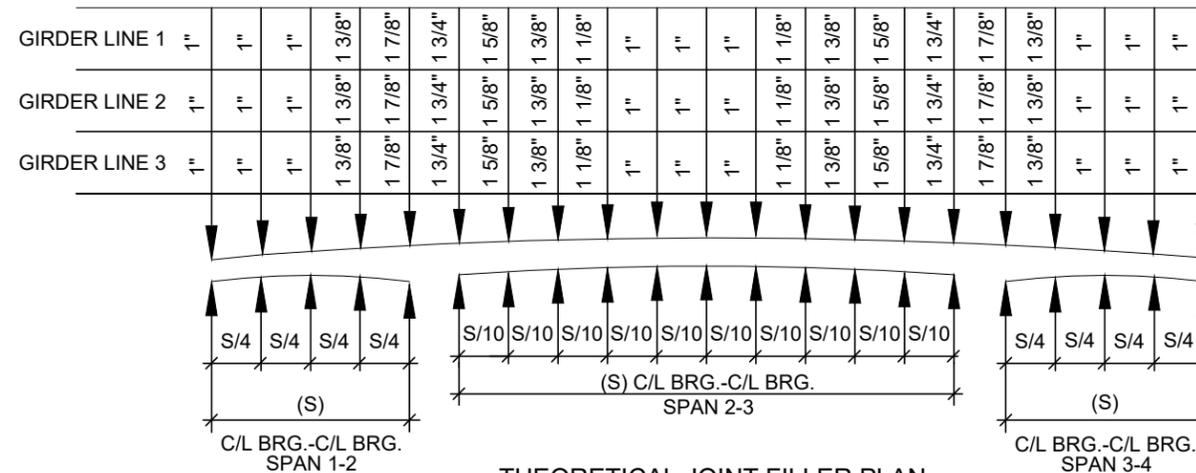
THE DIAPHRAGM AT INTEGRAL END BENTS SHALL BE POURED A MINIMUM OF 30 MINUTES AND A MAXIMUM OF 2 HOURS BEFORE THE SLAB IS POURED.

MINIMUM RATE OF POUR SHALL BE 25 CY/HOUR

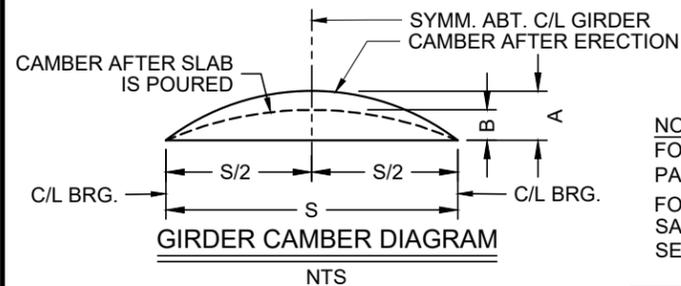
SLAB POURING SEQUENCE  
NTS



DETAIL OF EDGE OF SLAB  
NTS



THEORETICAL JOINT FILLER PLAN  
NTS



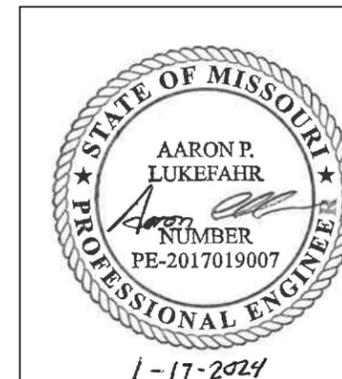
GIRDER CAMBER DIAGRAM  
NTS

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

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.

| NU-35<br>(2'-11 7/16") | NUMBER OF STRANDS | GIRDER CAMBER DIMENSIONS |        |                 |        |
|------------------------|-------------------|--------------------------|--------|-----------------|--------|
|                        |                   | EXTERIOR GIRDER          |        | INTERIOR GIRDER |        |
|                        |                   | A                        | B      | A               | B      |
| SPAN 1-2               | 16                | 7/8"                     | 1/2"   | 7/8"            | 1/2"   |
| SPAN 2-3               | 36                | 4 3/8"                   | 1 7/8" | 4 3/8"          | 1 1/2" |
| SPAN 3-4               | 16                | 7/8"                     | 1/2"   | 7/8"            | 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.



SLAB DETAILS SHEET  
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LEWIS COUNTY, MISSOURI

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

DATE: AUGUST 2024  
DESIGNED BY: A. LUKEFAHR  
DRAWN BY: P. HOWE  
REVIEWED BY: S. HOWE  
APPROVED BY: S. HOWE  
JOB NO. 23H3543

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



CONCRETE FOR PRESTRESSED GIRDERS SHALL BE CLASS A-1 WITH  $f'_c = 8000$  PSI AND  $f'_ci = 7000$  PSI.

(+) INDICATES PRESTRESSING STRAND.

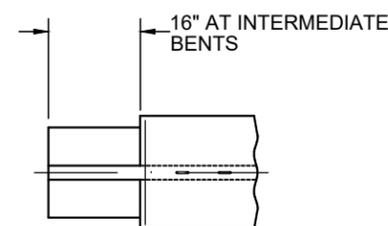
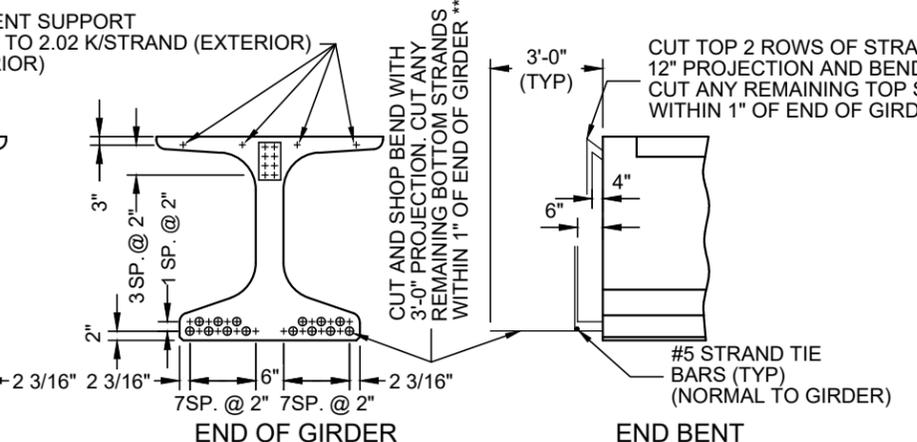
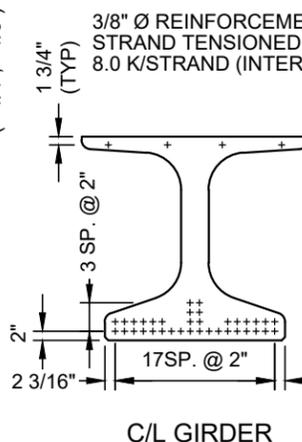
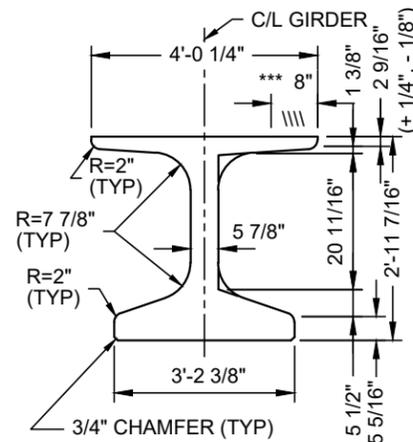
USE 36 STRANDS WITH A INITIAL PRESTRESS FORCE OF 1582 KIPS.

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.

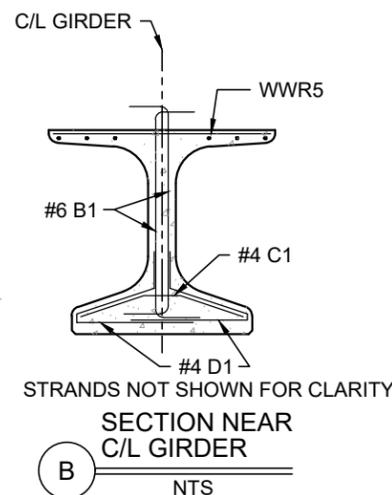
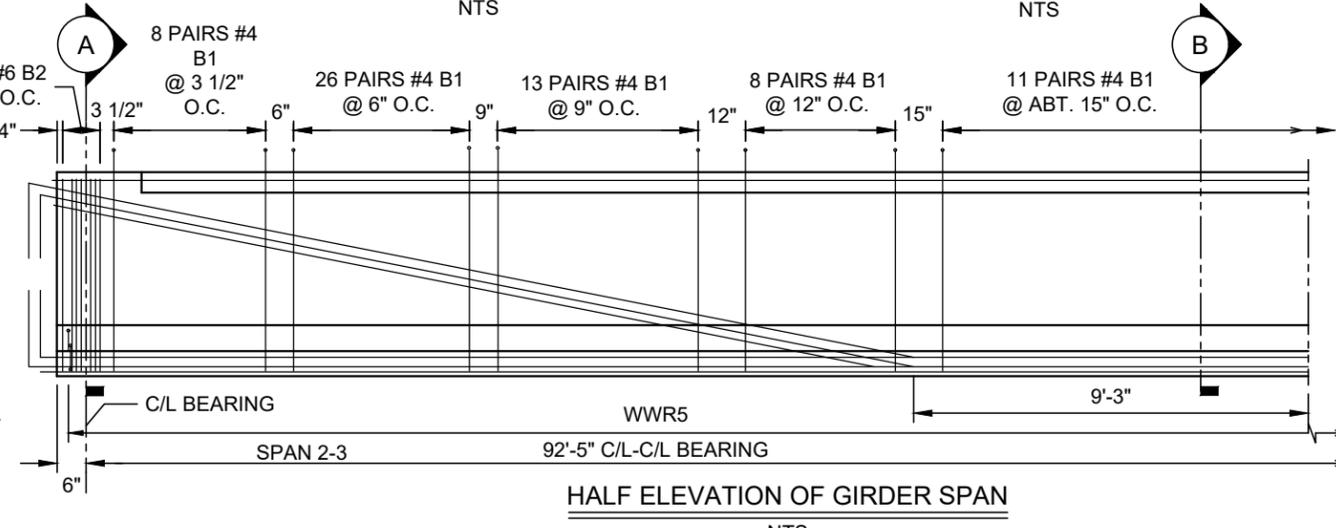
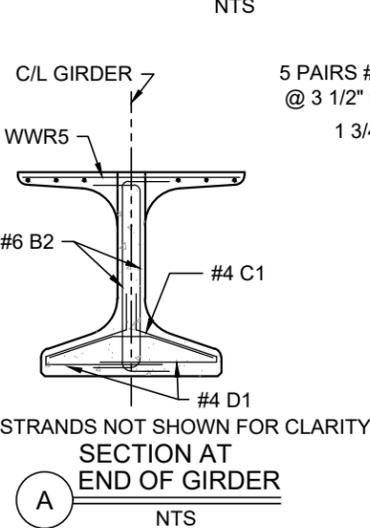
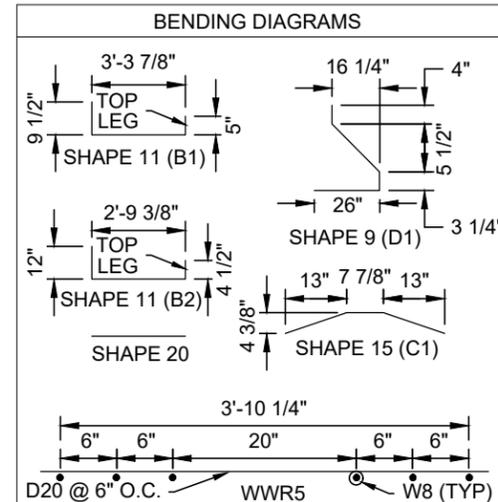
\*\* AT THE CONTRACTOR'S OPTION THE LOCATION FOR BENT-UP STRANDS MAY BE VARIED FROM THAT SHOWN. THE TOTAL NUMBER OF BENT-UP STRANDS SHALL NOT BE CHANGED. ONE STRAND TIE BAR IS REQUIRED FOR EACH LAYER OF BENT-UP STRANDS EXCEPT AT END BENTS WHICH REQUIRE ONE BAR ON THE BOTTOM LAYER OF STRANDS ONLY. NO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



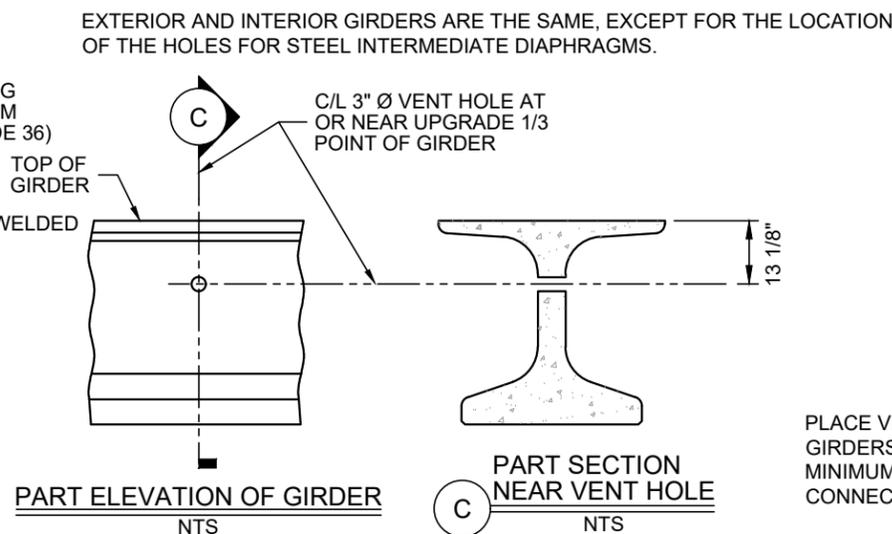
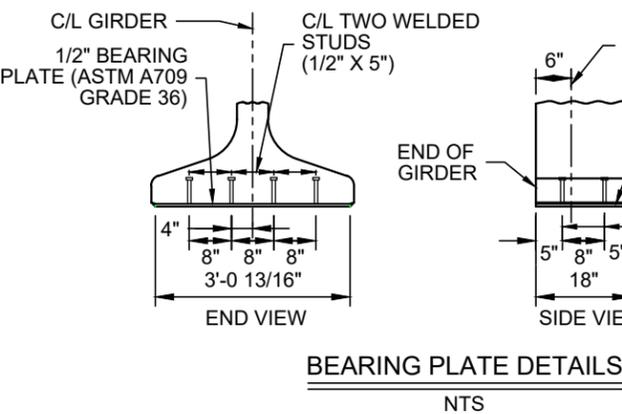
| REINFORCING STEEL (EACH 36 STRAND GIRDER) |               |             |     |
|-------------------------------------------|---------------|-------------|-----|
| SHAPE                                     | ACTUAL LENGTH | SIZE & MARK | NO. |
| 11                                        | 4'-4"         | 4-B1        | 242 |
| 11                                        | 3'-8"         | 6-B2        | 20  |
| 15                                        | 2'-11 1/4"    | 4-C1        | 131 |
| 9                                         | 4'-10 3/8"    | 4-D1        | 262 |

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.



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.

**SPAN 2-3**

**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. 122, CO. RD. 429  
 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
 LEWIS COUNTY, MISSOURI  
**HOWE COMPANY, LLC**  
 804 E. PATTON STREET, MACON, MO. 63552  
 OFFICE: 660-395-4693

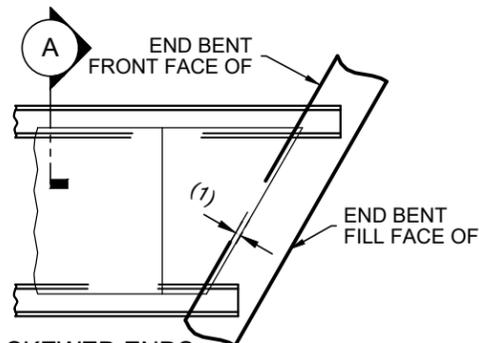
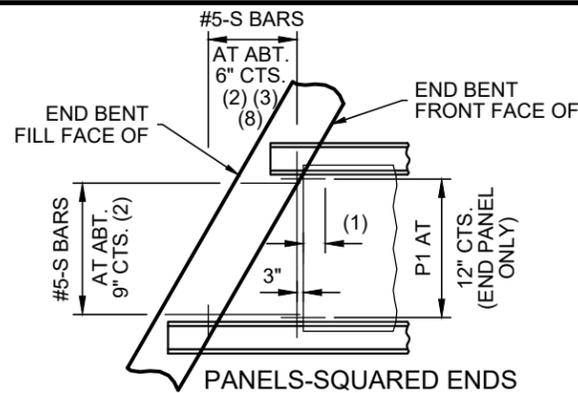
DATE: AUGUST 2024  
 DESIGNED BY: A. LUKEFAHR  
 DRAWN BY: P. HOWE  
 REVIEWED BY: S. HOWE  
 APPROVED BY: S. HOWE

JOB NO. 23H3543

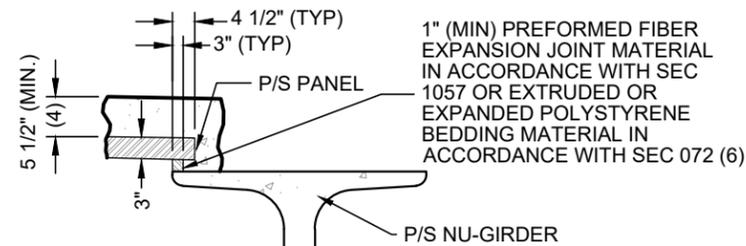
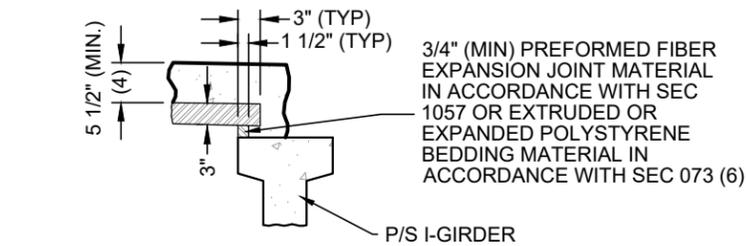
34

SHEET 34 OF 45

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



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.



A SECTION THRU EXTERIOR BEAM  
NTS

- (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.

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.

THE SAME THICKNESS OF PREFORMED FIBER EXPANSION JOINT MATERIAL SHALL BE USED UNDER ANY ONE EDGE OF ANY PANEL EXCEPT AT LOCATIONS WHERE TOP FLANGE THICKNESS MAY BE STEPPED. THE MAXIMUM CHANGE IN THICKNESS BETWEEN ADJACENT PANELS SHALL BE 1/4 INCH. THE POLYSTYRENE BEDDING MATERIAL MAY BE CUT WITH A TRANSITION TO MATCH HAUNCH HEIGHT ABOVE TOP OF FLANGE.

SLAB THICKNESS OVER PRESTRESSED PANELS VARIES DUE TO GIRDER CAMBER.

AT THE CONTRACTOR'S OPTION, THE VARIATION IN SLAB THICKNESS OVER PRESTRESSED PANELS MAY BE ELIMINATED OR REDUCED BY INCREASING AND VARYING THE GIRDER TOP FLANGE THICKNESS. DIMENSIONS SHALL BE SHOWN ON THE SHOP DRAWINGS.

EDGES OF PANELS SHALL BE BROUGHT TO SATURATED SURFACE-DRY (SSD) CONDITION JUST PRIOR TO THE DECK POUR. THERE SHALL BE NO FREE STANDING WATER ON THE PANELS OR IN THE AREA TO BE CAST.

REINFORCING STEEL NOTES:

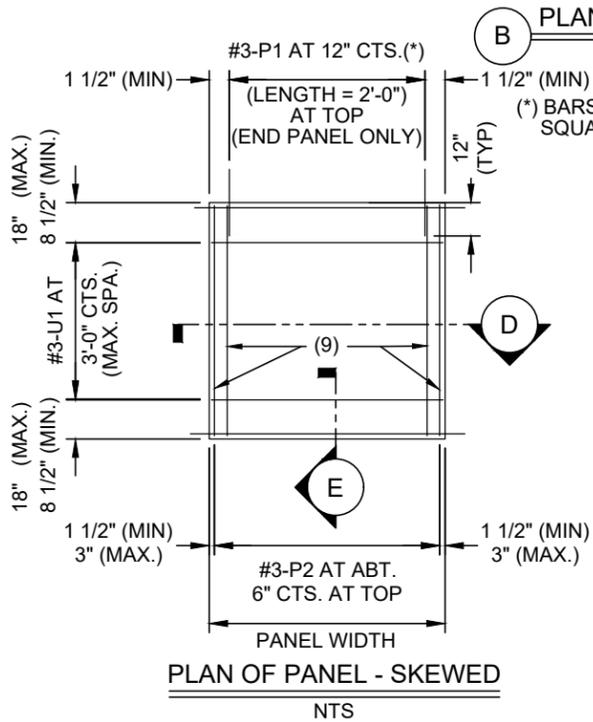
ALL DIMENSIONS ARE OUT TO OUT.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1-1/2", UNLESS OTHERWISE SHOWN.

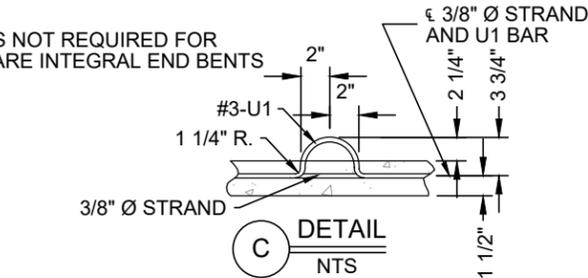
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, STIRRUP AND TIE DIMENSIONS.

ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE OF BAR TO THE NEAREST INCH.

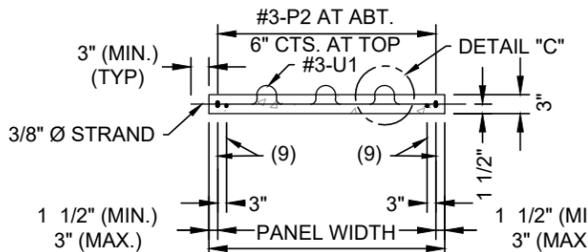
U1 BARS MAY BE BENT OVER, AS NECESSARY, TO CLEAR SLAB STEEL.



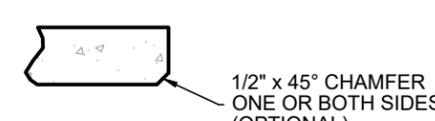
B PLAN OF PANEL PLACEMENT  
NTS



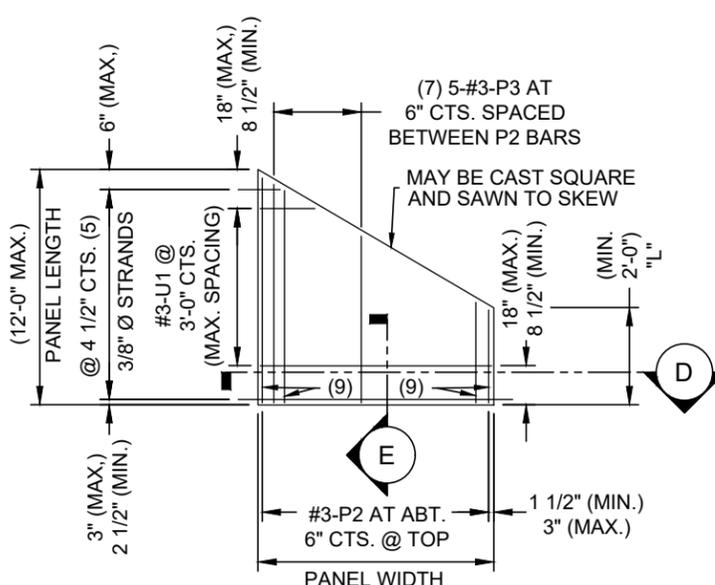
C DETAIL  
NTS



D SECTION THRU PANEL  
NTS



E SECTION THRU PANEL  
NTS



PLAN OF PANEL - SKEWED  
NTS



BENDING DIAGRAM FOR U1 BAR  
NTS

(U1 BARS MAY BE ORIENTED AT RIGHT ANGLES TO LOCATION AND SPACING SHOWN. U1 BARS SHALL BE PLACED BETWEEN P1 BARS).



PRESTRESSED CONCRETE PANEL DETAILS SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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



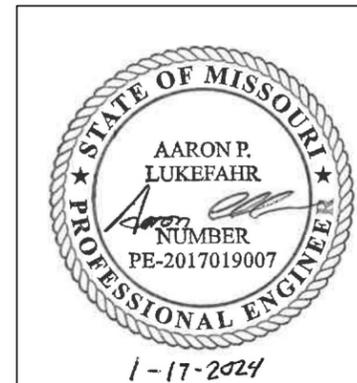
DATE: AUGUST 2024  
DESIGNED BY: A. LUKEFAHR  
DRAWN BY: P. HOWE  
REVIEWED BY: S. HOWE  
APPROVED BY: S. HOWE

# BILL OF REINFORCING STEEL

|              | 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.    | FT    | IN.    | FT     | IN.    | FT    | IN.   | FT    | IN.   | FT     | IN.   | FT            | IN. | FT           |
| END BENT     | ②               | 8    | H2   | BEAM         | 6              |         |                     |          | 2     | 0.000  | 25    | 2.750  | 2      | 0.000  |       |       |       |       | 29     | 0     | 1,239         |     |              |
|              | ②               | 3    | H3   | BEAM         | 20             |         |                     |          | 25    | 2.750  |       |        |        |        |       |       |       |       | 25     | 3     | 406           |     |              |
|              | ②               | 3    | H3A  | BEAM         | 20             |         |                     |          | 45    | 2.750  |       |        |        |        |       |       |       |       | 45     | 3     | 726           |     |              |
|              | ②               | 8    | H9   | BEAM         | 20             |         |                     |          | 12    | 2.750  |       |        |        |        |       |       |       |       | 12     | 3     | 132           |     |              |
|              | ②               | 22   | 5    | U3           | BEAM           | 6       | X                   |          | 5     | 11.500 | 3     | 1.500  | 5      | 11.500 |       |       |       |       | 14     | 11    | 685           |     |              |
|              | ②               | 26   | 5    | U4           | BEAM           | 13      | X                   |          | 3     | 1.500  | 2     | 7.500  | 3      | 1.500  | 2     | 7.500 |       |       | 11     | 6     | 624           |     |              |
|              | ②               | 8    | 6    | F2           | END BENT DIAP. | 21      |                     |          | 2     | 11.250 | 2     | 11.750 | 2      | 11.750 |       | 3     | 1.250 |       | 8      | 10    | 214           |     |              |
|              | ②               | 22   | 5    | U1           | END BENT DIAP. | 6       | X                   |          | 2     | 11.500 | 3     | 1.500  | 2      | 11.500 |       |       |       |       | 8      | 11    | 409           |     |              |
|              | ②               | 3    | 5    | H1           | END BENT DIAP. | 20      |                     |          | 5     | 4.000  |       |        |        |        |       |       |       |       | 5      | 4     | 34            |     |              |
|              | ②               | 4    | 6    | H5           | END BENT DIAP. | 20      |                     |          | 8     | 2.000  |       |        |        |        |       |       |       |       | 8      | 2     | 100           |     |              |
|              | ②               | 2    | 6    | H5A          | END BENT DIAP. | 20      |                     |          | 5     | 5.000  |       |        |        |        |       |       |       |       | 5      | 5     | 34            |     |              |
|              | ②               | 6    | 6    | H5B          | END BENT DIAP. | 20      |                     |          | 7     | 0.000  |       |        |        |        |       |       |       |       | 7      | 0     | 128           |     |              |
|              | 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      |                     |          | 24    | 1.750  |       |        |        |        |       |       |       |       | 24     | 2     | 396           |     |              |
|              | SLAB            | ②    | 4    | 5            | T1             | WINGS   | 25                  |          |       | 3      | 2.000 | 9      | 11.250 | 4      | 9.000 |       | 3     | 1.750 | 9      | 5.250 | 17            | 11  | 150          |
| ②            |                 | 36   | 4    | V1           | WINGS          | 20      |                     | X 4      | 3     | 2.000  |       |        |        |        |       |       |       |       | 3      | 2     | 223           |     |              |
|              |                 |      |      |              | INC. = 4"      |         |                     |          | 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      | 20    | 3.000  |       |        |        |        |       |       |       |       | 20     | 3     | 576           |     |              |
|              |                 |      |      |              | INC. = 29 3/4" |         |                     |          | 27    | 8.250  |       |        |        |        |       |       |       |       | 27     | 8     | ---           |     |              |
| ②            |                 | 8    | 4    | H8A          | WINGS          | 20      |                     | X 2      | 6     | 0.000  |       |        |        |        |       |       |       |       | 6      | 0     | 104           |     |              |
|              |                 |      |      |              | INC. = 29 3/4" |         |                     |          | 13    | 5.250  |       |        |        |        |       |       |       |       | 13     | 5     | ---           |     |              |
|              |                 | 517  | 6    | S1           | SLAB           | 20      |                     |          | 24    | 2.000  |       |        |        |        |       |       |       |       | 24     | 2     | 18,767        |     |              |
|              |                 | 430  | 4    | S2           | SLAB           | 20      |                     |          | 4     | 8.000  |       |        |        |        |       |       |       |       | 4      | 8     | 1,341         |     |              |
|              | 50              | 5    | S3A  | SLAB         | 20             |         |                     | 45       | 0.000 |        |       |        |        |        |       |       |       | 45    | 0      | 2,347 |               |     |              |
|              | 50              | 5    | S3B  | SLAB         | 20             |         |                     | 50       | 0.000 |        |       |        |        |        |       |       |       | 50    | 0      | 2,608 |               |     |              |
|              | 25              | 5    | S3C  | SLAB         | 20             |         |                     | 35       | 0.000 |        |       |        |        |        |       |       |       | 35    | 0      | 913   |               |     |              |
|              | 16              | 5    | S5A  | SLAB         | 20             |         |                     | 45       | 0.000 |        |       |        |        |        |       |       |       | 45    | 0      | 751   |               |     |              |
|              | 16              | 5    | S5B  | SLAB         | 20             |         |                     | 50       | 0.000 |        |       |        |        |        |       |       |       | 50    | 0      | 835   |               |     |              |
|              | 8               | 5    | S5C  | SLAB         | 20             |         |                     | 35       | 0.000 |        |       |        |        |        |       |       |       | 35    | 0      | 293   |               |     |              |
|              | 44              | 8    | S7   | SLAB         | 20             |         |                     | 55       | 0.000 |        |       |        |        |        |       |       |       | 55    | 0      | 6,462 |               |     |              |
|              | 44              | 8    | S7A  | SLAB         | 20             |         |                     | 55       | 0.000 |        |       |        |        |        |       |       |       | 55    | 0      | 6,462 |               |     |              |
| SUPPLEMENTAL | 10              | 5    | X1   | SUPPLEMENTAL | 20             |         |                     | 30       | 0.000 |        |       |        |        |        |       |       |       | 30    | 0      | 313   |               |     |              |
|              | TOTAL THIS PAGE |      |      |              |                |         |                     |          |       |        |       |        |        |        |       |       |       |       | 47,942 |       |               |     |              |

**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.



REINFORCING STEEL SHEET  
 OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
 CART ROUTE NO. 122, CO. RD. 429  
 BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
 LEWIS COUNTY, MISSOURI  
 HOWE COMPANY, LLC  
 804 E. PATTON STREET, MACON, MO. 63552  
 OFFICE: 660-395-4693

DATE: AUGUST 2024  
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 DRAWN BY: P. HOWE  
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 APPROVED BY: S. HOWE

JOB NO. 23H3543

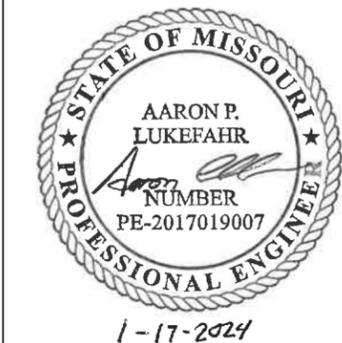
| NO. | DESCRIPTION | DATE | APPR. |
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|     |             |      |       |

# 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. | LBS.   |     |
| INTERIOR BENTS     | ②                    | 12   | 9    | H12      | INTERIOR BEAM   | 6               |              |        |          | 1  | 11.000 | 24    | 0.000 | 1      | 11.000 |    |       |    |        |    |     |               |     | 27           | 10  | 2,271  |     |
|                    | ②                    | 6    | 8    | H15      | INTERIOR BEAM   | 20              |              |        |          | 24 | 6.000  |       |       |        |        |    |       |    |        |    |     |               |     | 24           | 6   | 785    |     |
|                    | ②                    | 30   | 5    | U10      | INTERIOR BEAM   | 6               | X            |        |          | 3  | 5.000  | 3     | 0.000 | 3      | 5.000  |    |       |    |        |    |     |               |     | 9            | 10  | 615    |     |
|                    | ②                    | 16   | 5    | S12      | INTERIOR BEAM   | 13              | X            |        |          | 3  | 5.000  | 3     | 0.000 | 3      | 5.000  | 3  | 0.000 |    |        |    |     |               |     | 13           | 9   | 459    |     |
|                    | ②                    | 14   | 6    | V11      | INTERIOR BEAM   | 20              |              |        |          | 5  | 4.000  |       |       |        |        |    |       |    |        |    |     |               |     | 5            | 4   | 224    |     |
|                    | ①                    | 93   | 4    | S10-2    | DRILLED SHAFT   | 16              | X            |        |          | 2  | 6.000  |       |       |        |        |    |       |    |        |    |     |               |     | 3            | 3   | 202    |     |
|                    | ①                    | 51   | 11   | V10-2    | DRILLED SHAFT   | 20              |              |        |          | 38 | 5.000  |       |       |        |        |    |       |    |        |    |     |               |     | 38           | 5   | 10,809 |     |
|                    | ①                    | 93   | 4    | S10-3    | DRILLED SHAFT   | 16              | X            |        |          | 2  | 6.000  |       |       |        |        |    |       |    |        |    |     |               |     | 3            | 3   | 202    |     |
|                    | ①                    | 51   | 11   | V10-3    | DRILLED SHAFT   | 20              |              |        |          | 38 | 5.000  |       |       |        |        |    |       |    |        |    |     |               |     | 38           | 5   | 10,809 |     |
|                    | ②                    | 51   | 9    | J10      | SHAFT WALL      | 17              |              |        |          | 24 | 1.250  |       |       |        |        |    |       |    |        |    |     |               |     | 25           | 4   | 8,793  |     |
|                    | ②                    | 72   | 4    | S11      | SHAFT WALL      | 16              | X            |        |          | 2  | 6.000  |       |       |        |        |    |       |    |        |    |     |               |     | 3            | 3   | 313    |     |
|                    | ②                    | 54   | 5    | L10      | SHAFT WALL      | 19              |              |        |          | 22 | 11.750 | 2     | 6.000 |        |        |    |       |    |        |    |     |               |     | 25           | 6   | 2,870  |     |
|                    | ②                    | 3    | 8    | H10      | SHAFT WALL      | 18              |              |        |          | 22 | 0.000  |       |       |        |        |    |       |    |        |    |     |               |     | 23           | 10  | 382    |     |
|                    | ②                    | 52   | 6    | H11      | SHAFT WALL      | 6               |              |        |          | 1  | 0.000  | 21    | 4.000 | 1      | 0.000  |    |       |    |        |    |     |               |     | 23           | 4   | 3,645  |     |
|                    | INT. BENT DIAPHRAGMS | ②    | 8    | 6        | H13             | INTERIOR DIAPH. | 20           |        |          |    | 8      | 2.000 |       |        |        |    |       |    |        |    |     |               |     | 8            | 2   | 196    |     |
|                    |                      | ②    | 4    | 6        | H13A            | INTERIOR DIAPH. | 20           |        |          |    | 5      | 5.000 |       |        |        |    |       |    |        |    |     |               |     |              | 5   | 5      | 65  |
|                    |                      | ②    | 6    | 6        | H13B            | INTERIOR DIAPH. | 20           |        |          |    | 7      | 0.000 |       |        |        |    |       |    |        |    |     |               |     |              | 7   | 0      | 126 |
| ②                  |                      | 6    | 5    | H14      | INTERIOR DIAPH. | 20              |              |        |          | 5  | 4.000  |       |       |        |        |    |       |    |        |    |     |               |     | 5            | 4   | 67     |     |
| ②                  |                      | 6    | 6    | F10      | INTERIOR DIAPH. | 21              |              |        |          | 2  | 11.750 | 2     | 9.000 | 2      | 9.000  |    |       | 3  | 1.250  |    |     |               |     | 8            | 6   | 153    |     |
| ②                  |                      | 2    | 6    | F10A     | INTERIOR DIAPH. | 21              |              |        |          | 2  | 11.750 | 1     | 3.750 | 1      | 3.750  |    |       | 2  | 11.750 |    |     |               |     | 5            | 7   | 34     |     |
| ②                  |                      | 40   | 6    | Z10      | INTERIOR DIAPH. | 11              |              |        |          |    |        | 3     | 1.000 | 3      | 4.000  | 1  | 4.000 |    |        |    |     |               |     | 7            | 9   | 932    |     |
| ②                  |                      | 12   | 6    | Z10A     | INTERIOR DIAPH. | 11              |              |        |          |    |        | 3     | 1.000 | 2      | 7.000  | 1  | 4.000 |    |        |    |     |               |     | 7            | 0   | 254    |     |
| TOTAL THIS PAGE    |                      |      |      |          |                 |                 |              |        |          |    |        |       |       | 44,206 |        |    |       |    |        |    |     |               |     |              |     |        |     |
| TOTAL FROM PAGE 35 |                      |      |      |          |                 |                 |              |        |          |    |        |       |       | 47,942 |        |    |       |    |        |    |     |               |     |              |     |        |     |

JOB TOTAL = 92,148 LBS.



REINFORCING STEEL SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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

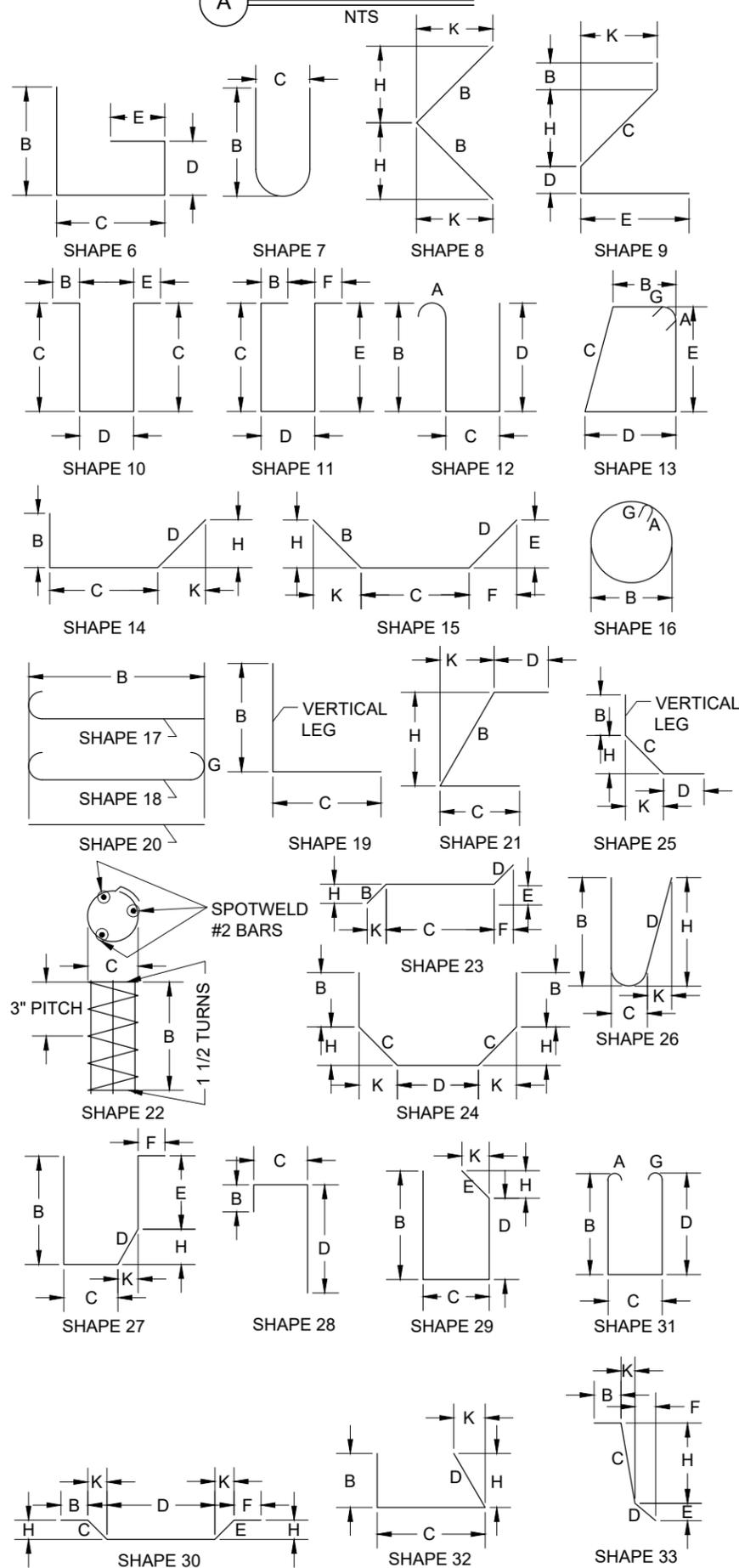
DATE: AUGUST 2024  
DESIGNED BY: A. LUKEFAHR  
DRAWN BY: P. HOWE  
REVIEWED BY: S. HOWE  
APPROVED BY: S. HOWE

JOB NO. 23H3543

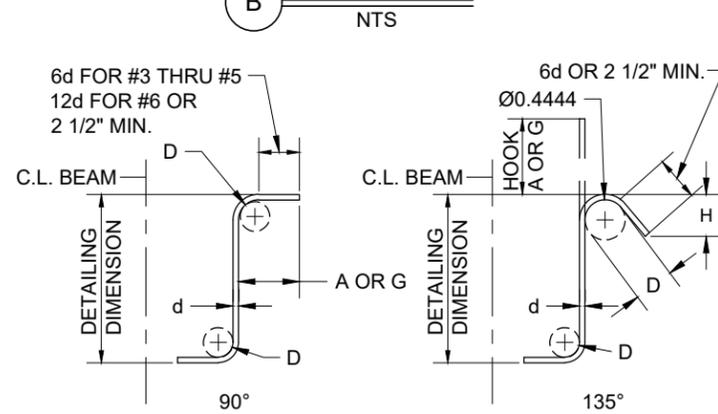
37

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

**A BENDING DIAGRAMS**

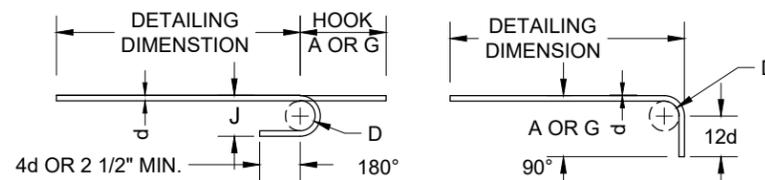


**B BEND DETAILS**



| 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 <sub>c</sub> =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.



1-17-2024



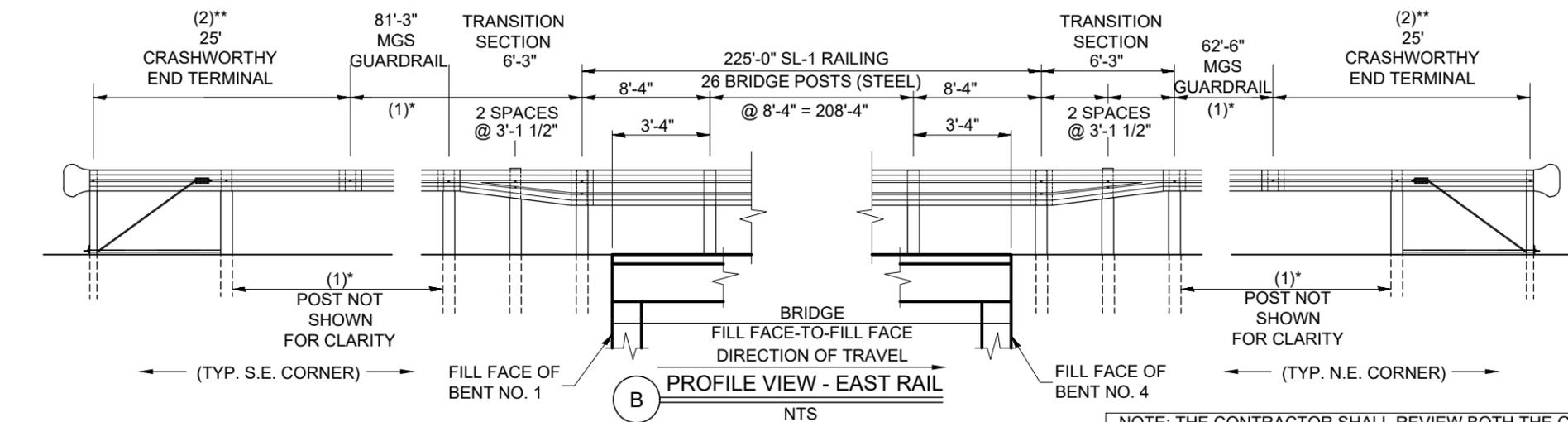
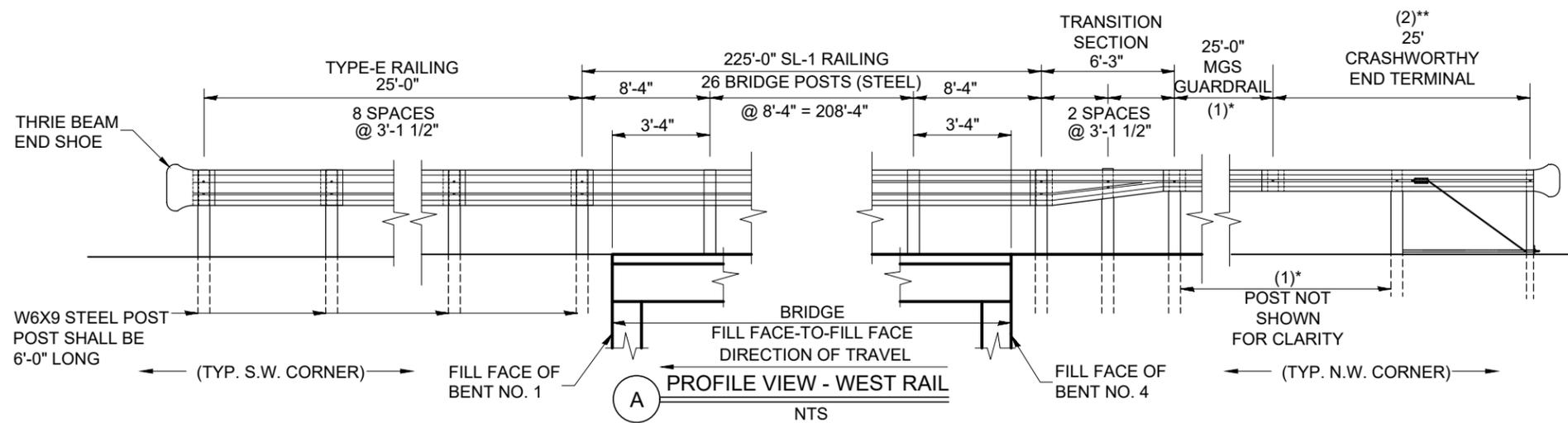
MISSOURI STATE CERTIFICATE OF AUTHORITY  
ENGINEERING PE-2014014993  
SURVEYING #LS-2014015235

REINFORCING STEEL SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

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

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

JOB NO. 23H3543



**NOTES:**

- 1.) FOR OTHER DETAILS, CONSTRUCTION PROCEDURES AND MATERIAL SPECIFICATIONS, SEE THE FOLLOWING RAILING DETAIL SHEETS.
- 2.) DECK ANCHORAGE OF THE POST ASSEMBLY SHALL BE PROVIDED BY TWO 1" DIA. ANCHOR BOLTS, 36" LONG.
- 3.) TYPE A POSTS SHALL BE W6 X 8.5 OR W6 X 9, 6' LONG. TRANSITION POSTS SHALL BE W6 X 8.5 OR W6 X 9, 6'-6" LONG.
- 4.) ALL SL-1 RAIL POSTS SHALL BE GALVANIZED ACCORDING TO SECTION 1040 OF THE MISSOURI STANDARD SPECIFICATIONS.
- 5.) RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.
- 6.) WASHERS SHALL BE USED AT ALL POST BOLTS (BETWEEN BOLTHEAD AND BEAM.) THEY SHALL BE RECTANGULAR IN SHAPE (3" X 1 3/4" X 3/16" MIN.) AND FLAT, OR WHEN NECESSARY OF SUCH DESIGN AS TO FIT THE CONTOUR OF THE BEAM. WASHERS SHALL HAVE A SLOTTED HOLE THAT IS 1/16" WIDER THAN THE BOLT DIAMETER X 1" LONG.
- 7.) ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.
- 8.) TYPE E GUARDRAIL SHALL USE 3'-1 1/2" POST SPACING.
- 9.) THE THRIE BEAM RAIL FOR THE TYPE E GUARDRAIL SHALL BE MAKE OF STEEL AND SHALL BE 12 GAUGE.

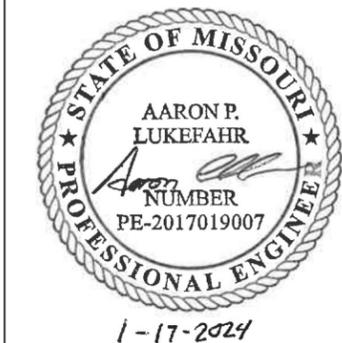
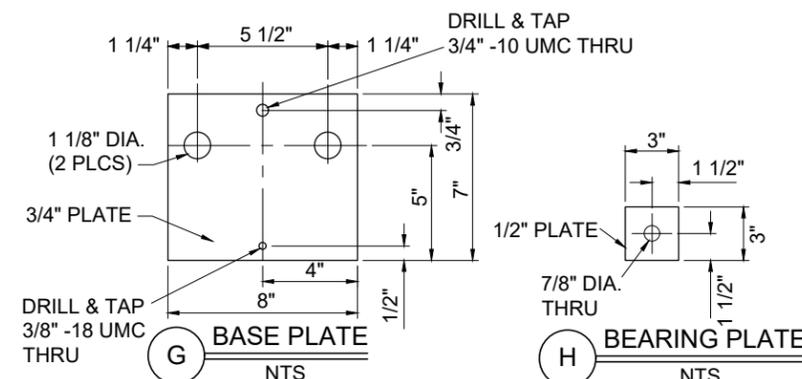
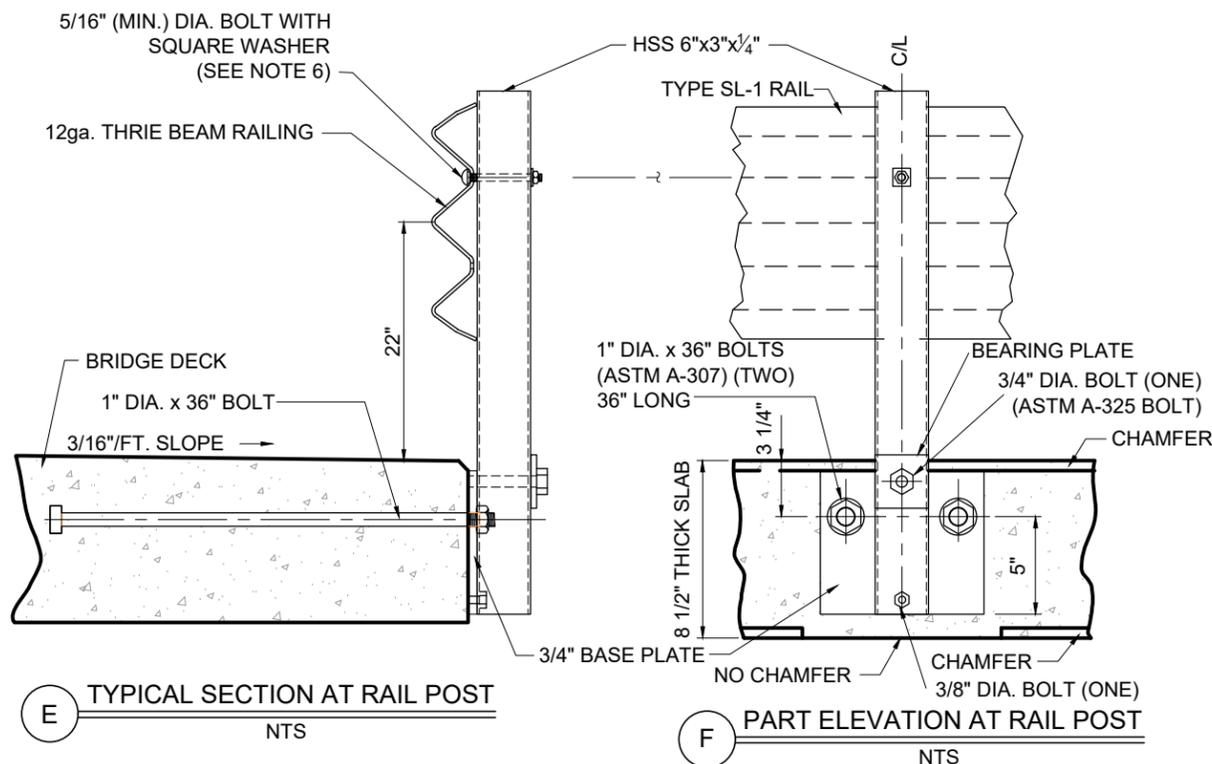
(1)\* SEE GUARDRAIL DETAIL SHEETS FOR POST AND SPACING DETAILS

(2)\*\* SEE MANUFACTURER RECOMMENDATIONS AND INSTALLATION GUIDE.

NOTE: THE CONTRACTOR SHALL REVIEW BOTH THE GUARDRAIL LAYOUT AND THE ALIGNMENT OF THE ROADWAY PRIOR TO FURNISHING RAILING. IF THE PLAN AND PROFILE OF THE ROADWAY PLANS SHOW GUARDRAIL POSITIONED ADJACENT TO CURVED SECTIONS OF ROADWAY, THEN IT MAY BE NECESSARY TO PROVIDE CURVED SECTIONS OF RAILING. THE CONTRACTOR SHALL INCLUDE THE COST OF FURNISHING AND INSTALLING ANY CURVED RAIL SECTIONS IN THEIR BID. NO ADDITIONAL COMPENSATION WILL BE MADE TO THE CONTRACTOR FOR CURVED RAIL, EVEN IF STANDARDIZED. STRAIGHT SECTIONS ARE SHOWN IN THE PLANS. IF CLARIFICATION IS NEEDED BY THE CONTRACTOR/FABRICATOR THEN IT SHALL BE REQUESTED AND PROVIDED AT THE SHOP DRAWING STAGE OF THE PROJECT.

AT LEAST TWO WEEKS PRIOR TO INSTALLATION, THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND SUBMITTALS ON GUARDRAIL INCLUDING:

- PLAN AND PROFILE VIEWS OF THE RAILING DETAILING THE LOCATION OF COMPONENTS AND ANY RADIUS PIECES THE CONTRACTOR INTENDS TO INSTALL.
- SUBMITTALS, INCLUDING DIMENSIONAL SKETCHES OF INDIVIDUALLY FABRICATED COMPONENTS, RAILING, TRANSITIONS, END TERMINALS, ECT.
- TECHNICAL DATA AND INSTALLATION INSTRUCTIONS ON CRASHWORTHY END TERMINALS THE CONTRACTOR INTENDS TO INSTALL.
- MILL CERTIFICATIONS FROM ORIGINAL PRODUCING STEEL MILLS SATISFYING BUY AMERICA REQUIREMENTS FOR ALL STEEL COMPONENTS.



|                                                                                                                                                                                      |      |             |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|-----|
| APPR.                                                                                                                                                                                | DATE | DESCRIPTION | NO. |
|                                                                                                                                                                                      |      |             |     |
|                                                                                                                                                                                      |      |             |     |
| <small>MISSOURI STATE CERTIFICATE OF AUTHORITY<br/>ENGINEERING #E-2014014893<br/>SURVEYING #S-2014015235</small>                                                                     |      |             |     |
| <b>RAILING DETAILS SHEET</b><br>OFF SYSTEM BRIDGE REPLACEMENT PROGRAM<br>CART ROUTE NO. 122, CO. RD. 429<br>BRIDGE NO. 12200071, PROJECT NO. BRO-R056 (15)<br>LEWIS COUNTY, MISSOURI |      |             |     |
| <b>HOWE COMPANY, LLC</b><br>804 E. PATTON STREET, MACON, MO. 63552<br>OFFICE: 660-395-4693                                                                                           |      |             |     |
| DATE: AUGUST 2024<br>DESIGNED BY: A. LUKEFAHR<br>DRAWN BY: P. HOWE<br>REVIEWED BY: S. HOWE<br>APPROVED BY: S. HOWE<br>JOB NO. 23H3543                                                |      |             |     |
| <b>39</b><br>SHEET 39 OF 45                                                                                                                                                          |      |             |     |



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

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

RAILING DETAILS SHEET  
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 CART ROUTE NO. 122, CO. RD. 429  
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 LEWIS COUNTY, MISSOURI

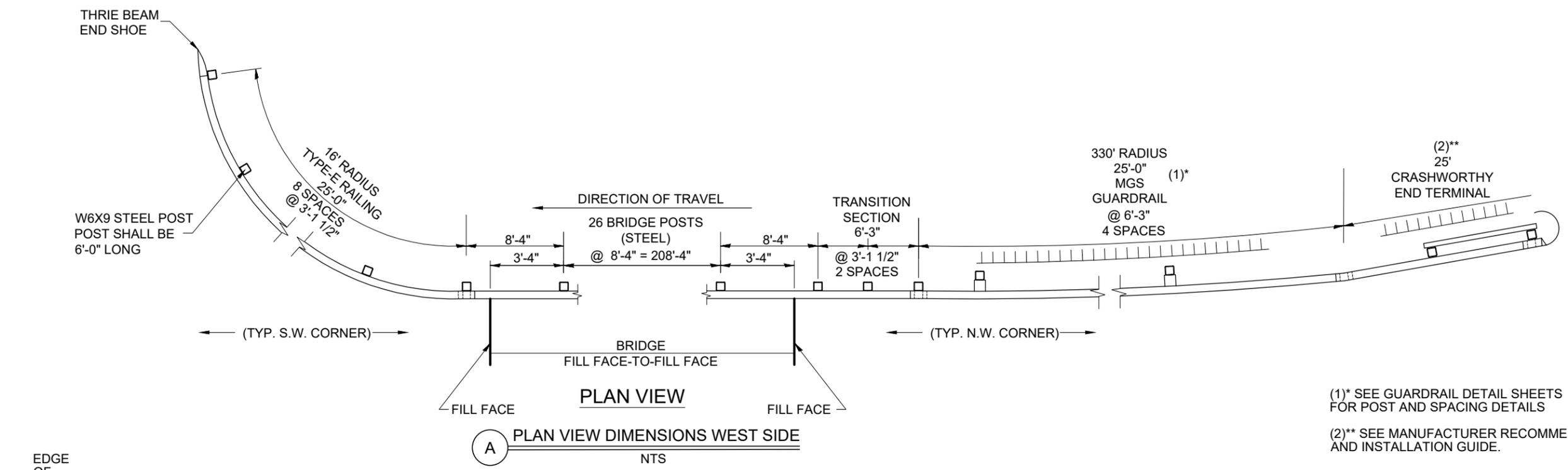
HOWE COMPANY, LLC  
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 OFFICE: 660-395-4693

|              |             |
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| DRAWN BY:    | P. HOWE     |
| REVIEWED BY: | S. HOWE     |
| APPROVED BY: | S. HOWE     |

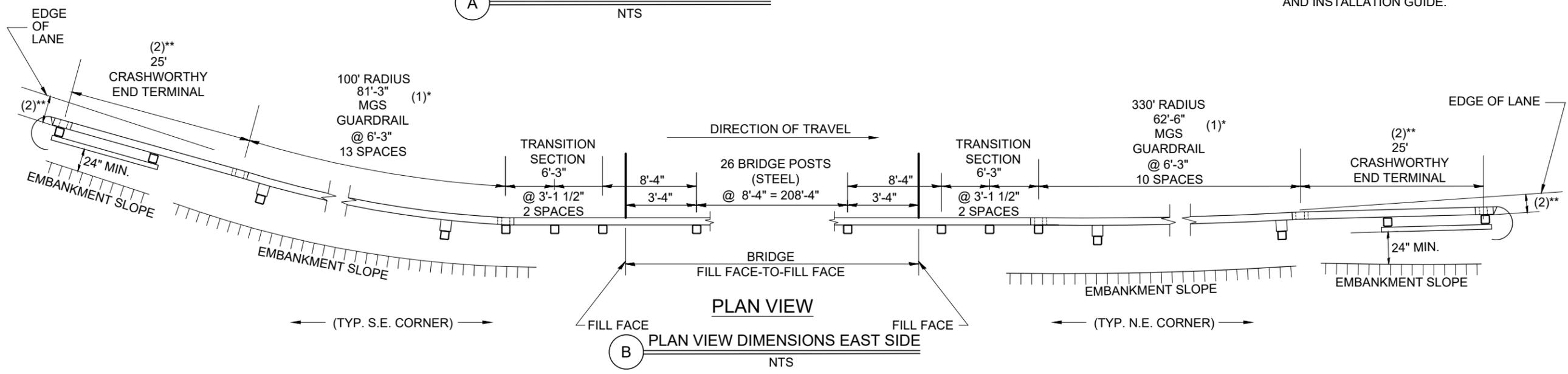
JOB NO. 23H3543

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SHEET 40 OF 45



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



THREE BEAM END SHOE

W6X9 STEEL POST POST SHALL BE 6'-0" LONG

16' RADIUS TYPE-E RAILING 25'-0" @ 3'-1 1/2"

DIRECTION OF TRAVEL

26 BRIDGE POSTS (STEEL)

8'-4" @ 8'-4" = 208'-4"

TRANSITION SECTION 6'-3"

@ 3'-1 1/2" 2 SPACES

330' RADIUS 25'-0" MGS (1)\* GUARDRAIL @ 6'-3" 4 SPACES

(2)\*\* 25' CRASHWORTHY END TERMINAL

(TYP. S.W. CORNER)

(TYP. N.W. CORNER)

BRIDGE FILL FACE-TO-FILL FACE

PLAN VIEW

A PLAN VIEW DIMENSIONS WEST SIDE

NTS

EDGE OF LANE

(2)\*\* 25' CRASHWORTHY END TERMINAL

100' RADIUS 81'-3" (1)\* MGS GUARDRAIL @ 6'-3" 13 SPACES

DIRECTION OF TRAVEL

26 BRIDGE POSTS (STEEL)

8'-4" @ 8'-4" = 208'-4"

TRANSITION SECTION 6'-3"

@ 3'-1 1/2" 2 SPACES

330' RADIUS 62'-6" MGS (1)\* GUARDRAIL @ 6'-3" 10 SPACES

(2)\*\* 25' CRASHWORTHY END TERMINAL

EMBANKMENT SLOPE

EMBANKMENT SLOPE

EMBANKMENT SLOPE

EDGE OF LANE

24" MIN.

24" MIN.

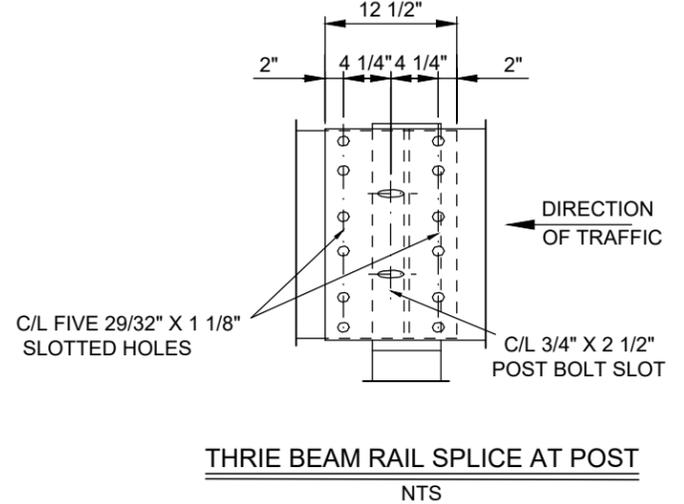
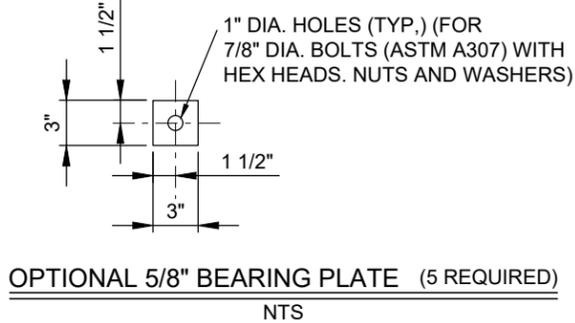
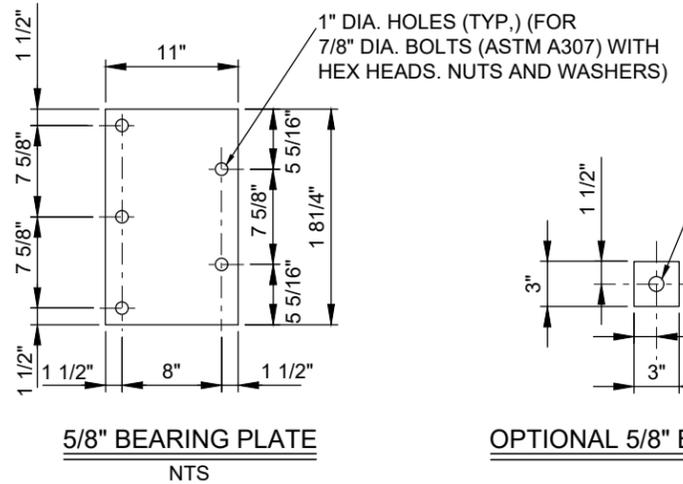
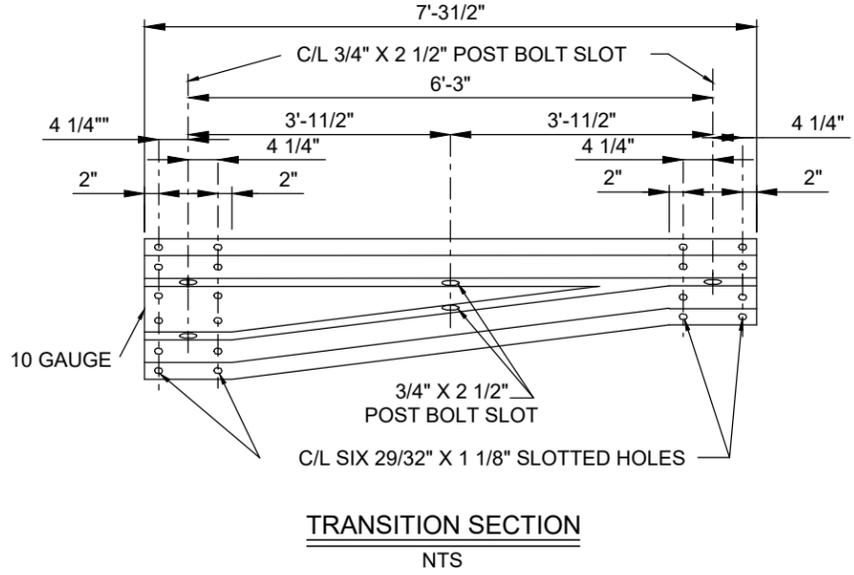
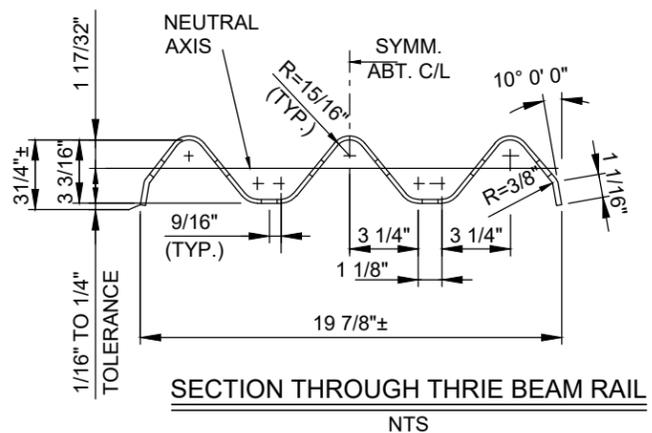
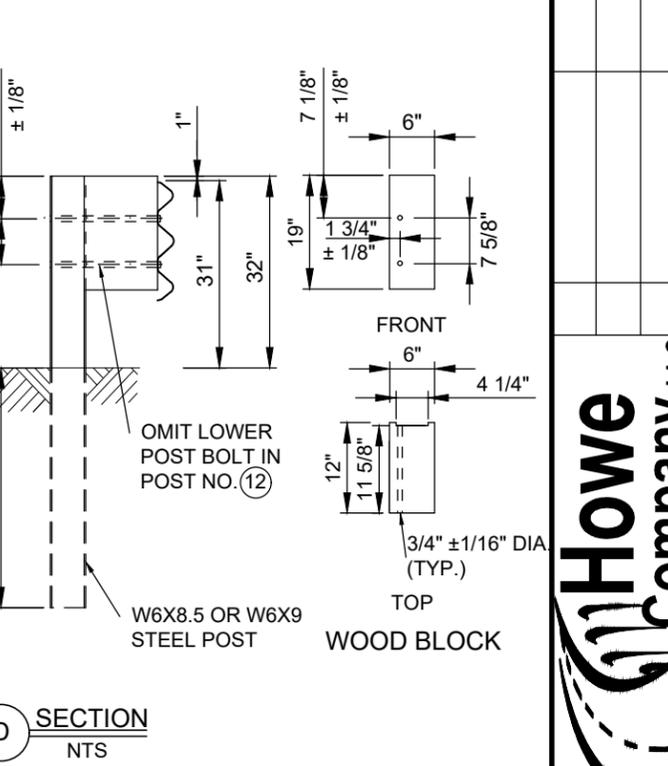
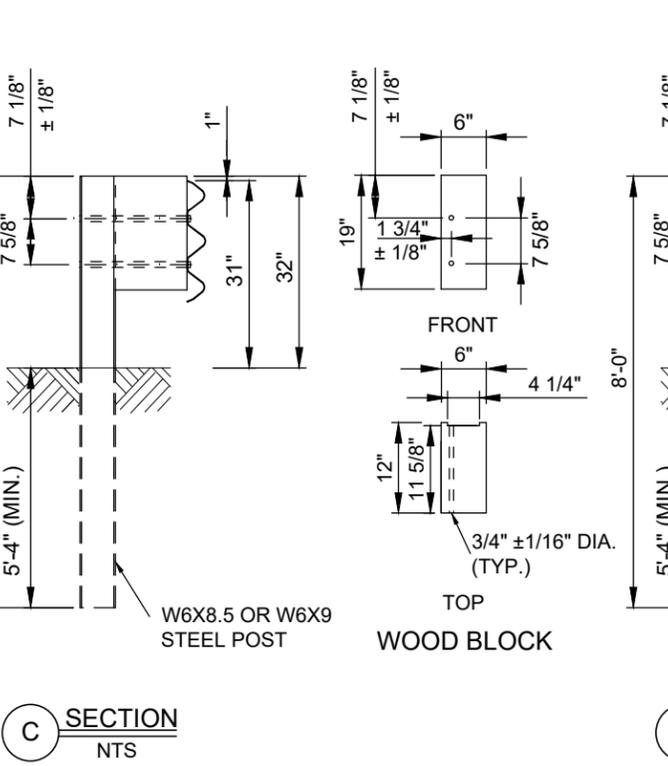
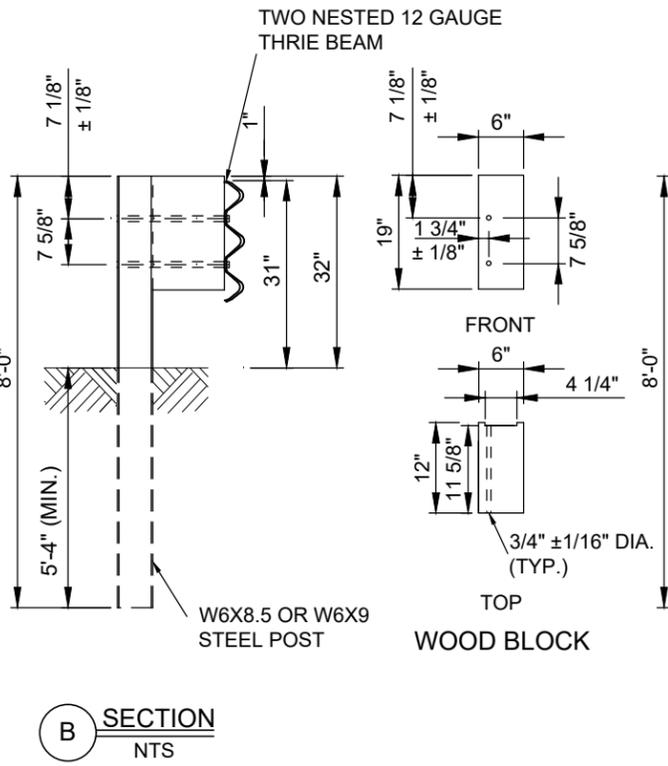
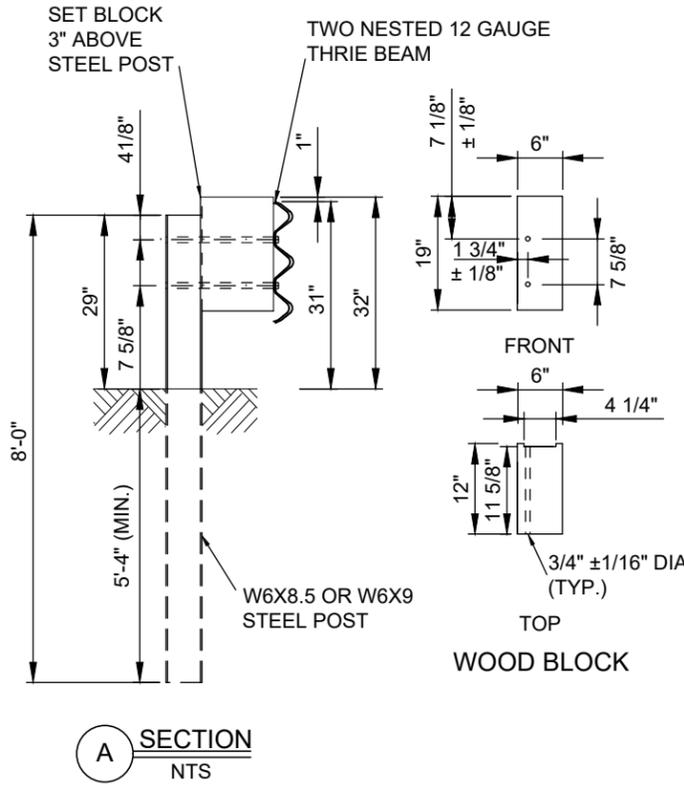
(TYP. S.E. CORNER)

(TYP. N.E. CORNER)

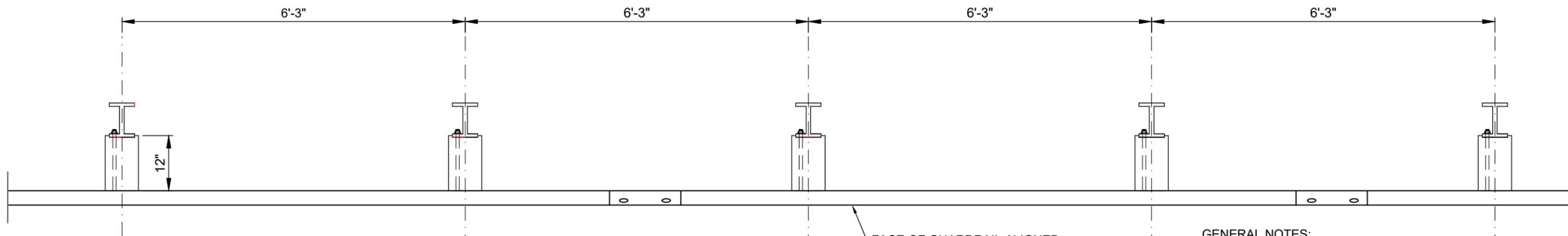
PLAN VIEW

B PLAN VIEW DIMENSIONS EAST SIDE

NTS



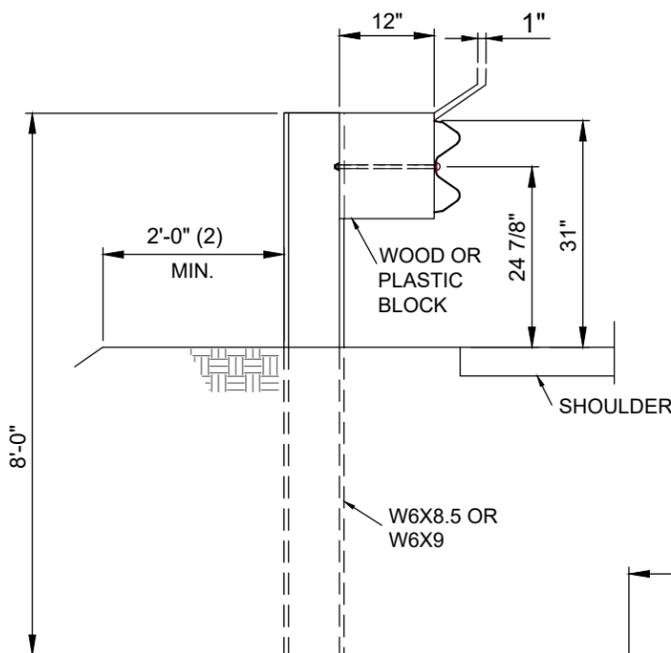
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|                                                                                                                                                                              |                                                                                     | MISSOURI STATE CERTIFICATE OF AUTHORITY<br>ENGINEERING #E-201404993<br>SURVEYING #LS-2014015235                                       |
| RAILING DETAILS SHEET<br>OFF SYSTEM BRIDGE REPLACEMENT PROGRAM<br>CART ROUTE NO. 122, CO. RD. 429<br>BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)<br>LEWIS COUNTY, MISSOURI | HOWE COMPANY, LLC<br>804 E. PATTON STREET, MACON, MO. 63552<br>OFFICE: 660-395-4693 | DATE: AUGUST 2024<br>DESIGNED BY: A. LUKEFAHR<br>DRAWN BY: P. HOWE<br>REVIEWED BY: S. HOWE<br>APPROVED BY: S. HOWE<br>JOB NO. 23H3543 |
| NO.                                                                                                                                                                          | DESCRIPTION                                                                         | DATE                                                                                                                                  |
| APPR.                                                                                                                                                                        |                                                                                     |                                                                                                                                       |



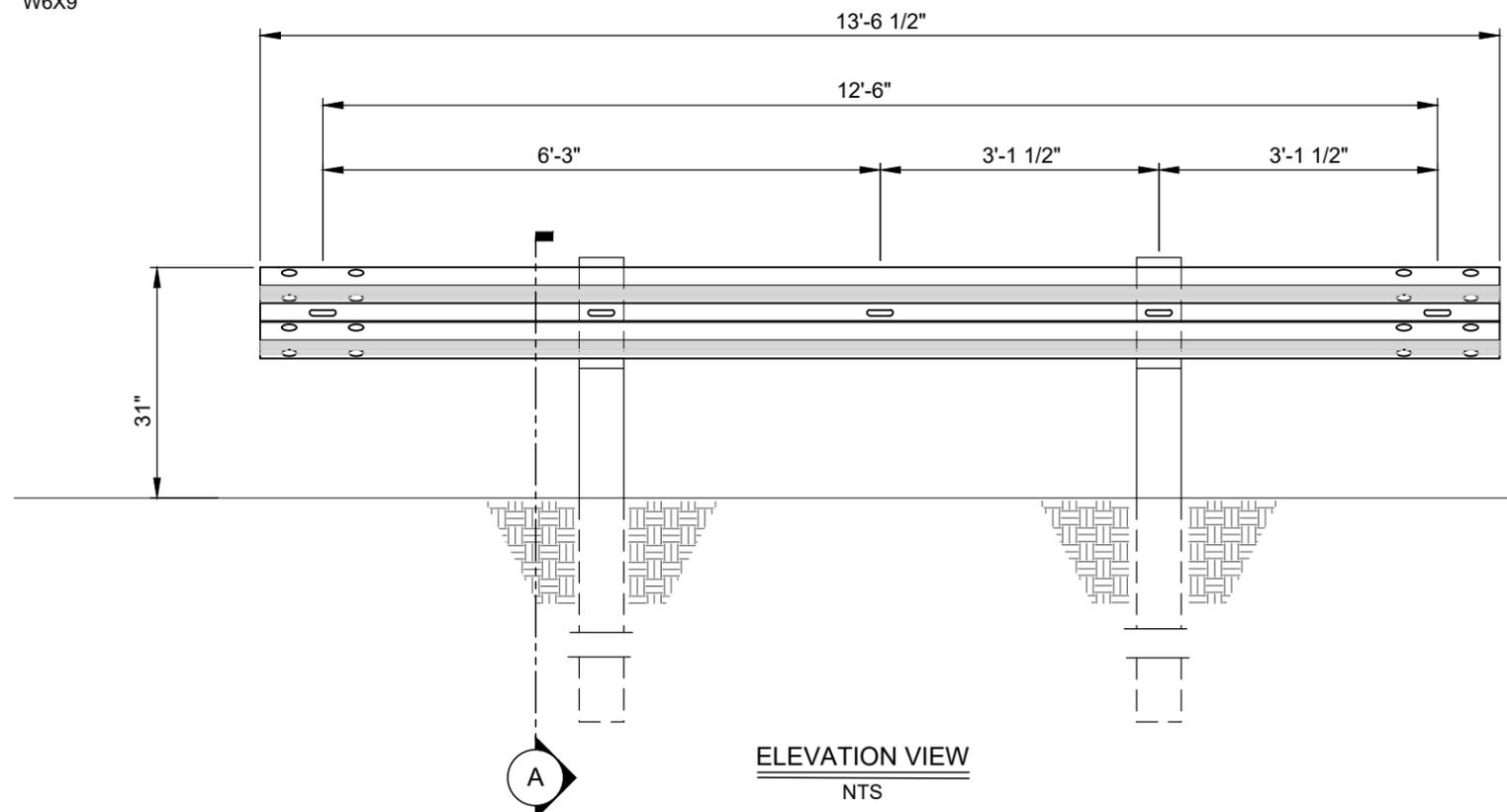
**PLAN VIEW**  
NTS

(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.



**A SECTION**  
NTS



**ELEVATION VIEW**  
NTS

**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.

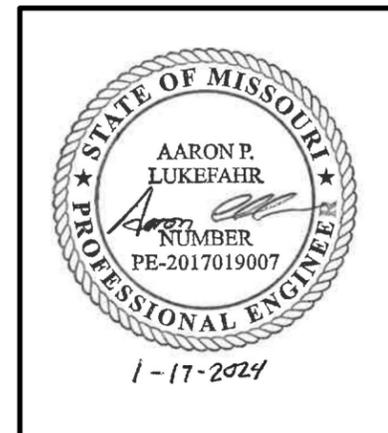
REFER TO AASHTO M 180 FOR DIMENSIONAL DETAILS OF W-BEAM, RELATED BUFFER AND END SECTIONS, BEAM SPLICES, POST AND SPLICE BOLTS, NUTS, AND TYPE 1 W-BEAM TO THRIE BEAM TRANSITION SECTIONS.

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.



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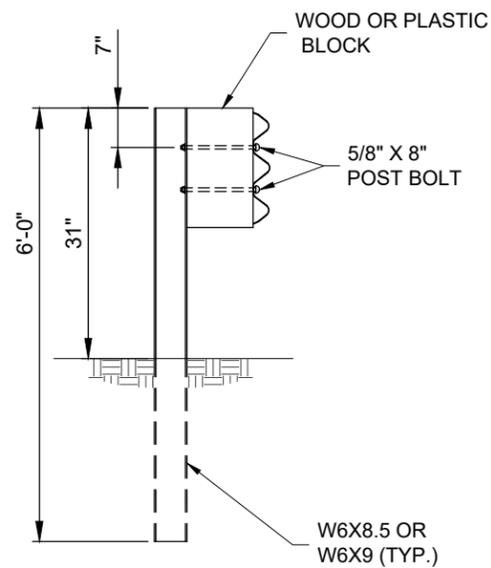
JOB NO. 23H3543

42

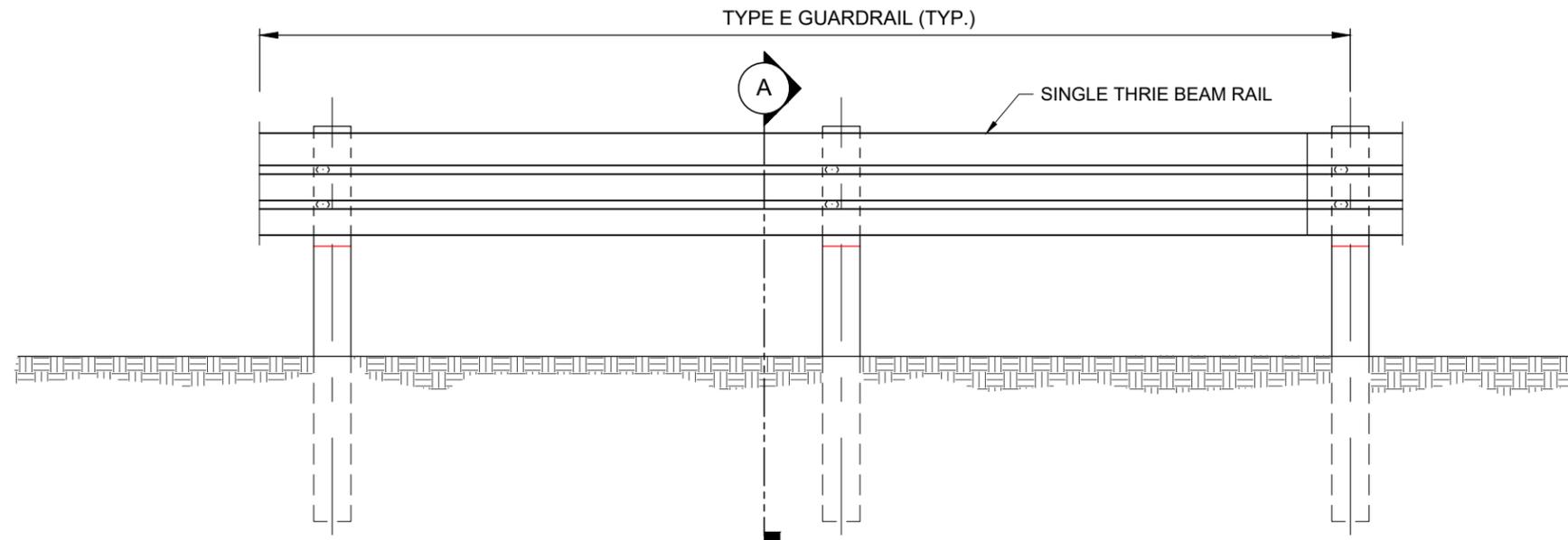
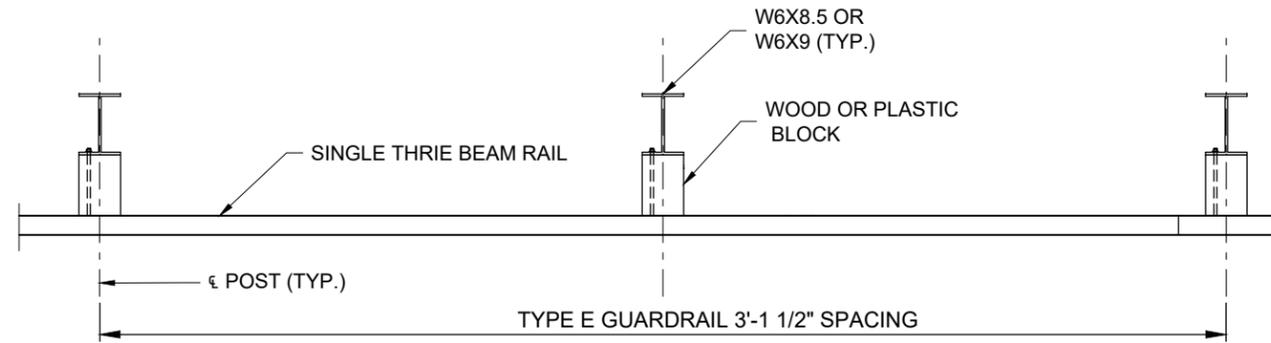
SHEET 42 OF 45

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

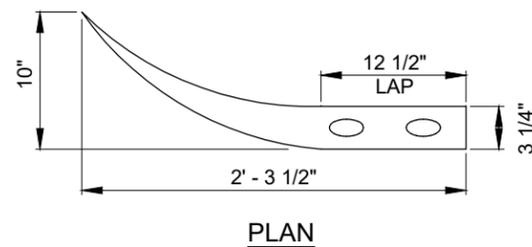
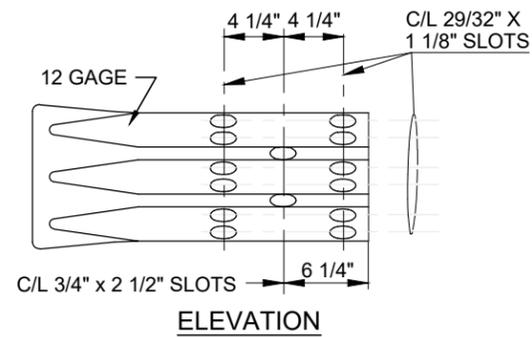




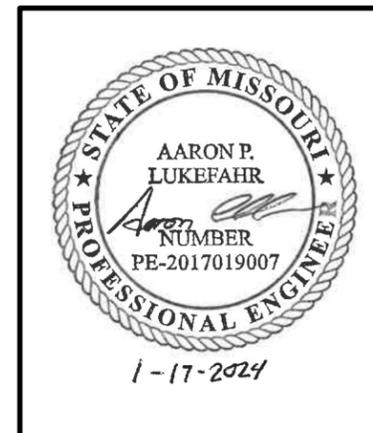
**A** SECTION THROUGH POST  
NTS



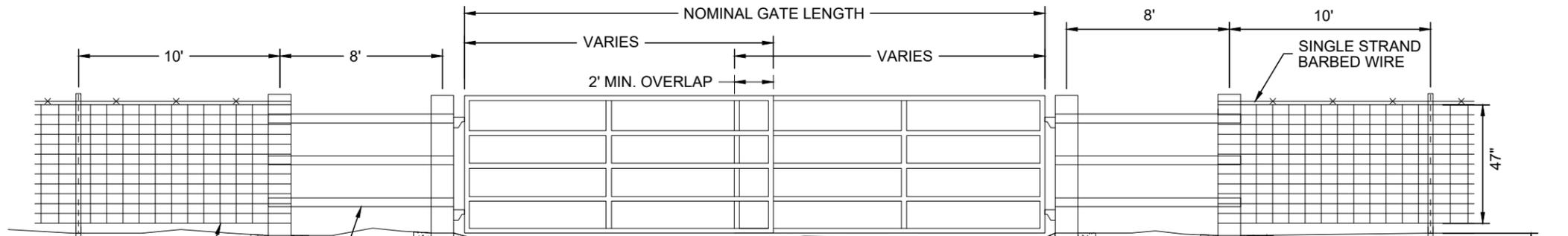
**B** PART SECTION SHOWING TYPE E RAILING  
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**C** END SHOE DETAILS  
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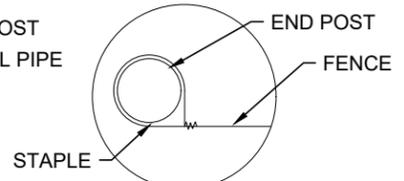
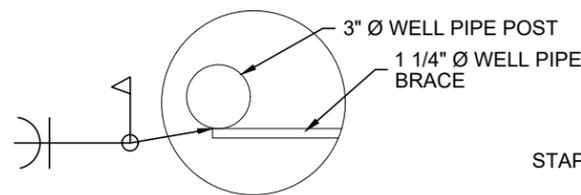
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| <p>RAILING DETAILS SHEET<br/>OFF SYSTEM BRIDGE REPLACEMENT PROGRAM<br/>CART ROUTE NO. 122, CO. RD. 429<br/>BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)<br/>LEWIS COUNTY, MISSOURI</p> |  | <p>NO.</p>                                                                                                | <p>DESCRIPTION</p> | <p>DATE</p> | <p>APPR.</p> |
| <p>HOWE COMPANY, LLC<br/>804 E. PATTON STREET, MACON, MO. 63552<br/>OFFICE: 660-395-4693</p>                                                                                            |  | <p>MISSOURI STATE CERTIFICATE OF AUTHORITY<br/>ENGINEERING #E-2014014993<br/>SURVEYING #LS-2014015235</p> |                    |             |              |
| <p>DATE: AUGUST 2024<br/>DESIGNED BY: A. LUKEFAHR<br/>DRAWN BY: P. HOWE<br/>REVIEWED BY: S. HOWE<br/>APPROVED BY: S. HOWE</p>                                                           |  |                                                                                                           |                    |             |              |
| <p>JOB NO. 23H3543</p>                                                                                                                                                                  |  |                                                                                                           |                    |             |              |
| <p>44</p>                                                                                                                                                                               |  |                                                                                                           |                    |             |              |
| <p>SHEET 44 OF 45</p>                                                                                                                                                                   |  |                                                                                                           |                    |             |              |



NOTE: CONTRACTOR TO PROVIDE TUBE TYPE GATES. SINGLE GATES MAY BE SUPPLIED FOR UP TO 16' LONG GATES. DOUBLE GATES SHALL BE USED FOR GATES LONGER THAN 16' AND PROVIDE AT LEAST 2' OF OVERLAP.

**A DRIVE GATE & BRACING DETAIL**  
NTS

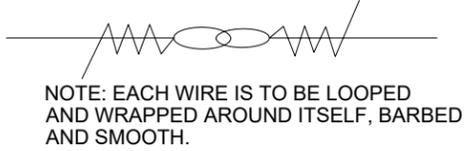
WOVEN WIRE  
3" Ø WELL PIPE POSTS  
1 1/4" Ø WELL PIPE BRACES



NOTE: EACH WIRE IS TO BE WRAPPED AROUND END POST AND TIED TO ITSELF.

| PARTIAL LIST OF ESTIMATED QUANTITIES |          |          |
|--------------------------------------|----------|----------|
| ITEM                                 | QUANTITY | TOTAL    |
| FENCE (WOVEN WIRE)                   | 814 L.F. | 814 L.F. |
| FENCE (TEMPORARY)*                   | 775 L.F. | 775 L.F. |

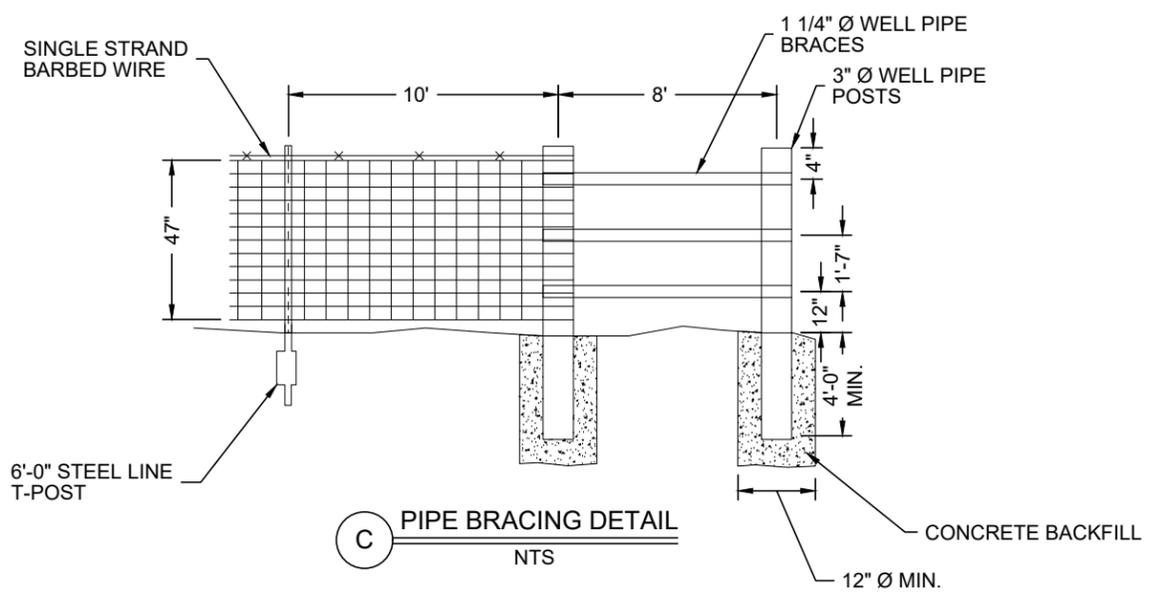
\* TEMPORARY FENCE SHALL CONSIST OF A 5 STRAND BARBED WIRE FENCE AS SHOWN ON THIS SHEET UNLESS DIRECTED OTHERWISE BY THE LANDOWNER.



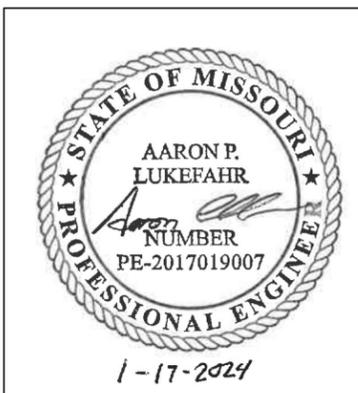
**B WIRE SPLICING DETAIL**  
NTS

**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.
- AT LANDOWNER'S OPTION, 5 STRAND BARBED WIRE SHALL BE USED IN PLACE OF WOVEN WIRE FENCE.
- WOVEN WIRE SHALL BE AT LEAST 47" TALL, 9 GAUGE MIN. TOP/BOTTOM WIRE, 11 GAUGE MIN. OTHERWISE TOPPED WITH A SINGLE STRAND 13 1/2 MIN. GAUGE ZINC-COATED STEEL MEETING THE REQUIREMENTS OF SECTION 1043.2.18 OF THE STANDARD SPECIFICATIONS. ALUMINUM COATED STEEL, ALUMINUM ALLOY, OR GOUCHO WIRE WILL NOT BE ACCEPTED.
- ALL SET POSTS SHALL BE 3" MINIMUM DIAMETER WELL PIPE, BACKFILLED WITH CONCRETE. ALL LINE POSTS SHALL BE 1 1/4" DIAMETER WELL PIPE.
- 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 6'-0".
- STRETCH FABRIC AND BARBED WIRE ON OUTSIDE OF POST ON CORNERS AND CURVES.
- AT ALL END POSTS, EACH WIRE IS TO BE WRAPPED AROUND THE POST, TIED TO ITSELF.
- 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.



**C PIPE BRACING DETAIL**  
NTS



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

WOVEN WIRE FENCE SHEET  
OFF SYSTEM BRIDGE REPLACEMENT PROGRAM  
CART ROUTE NO. 122, CO. RD. 429  
BRIDGE NO. 12200071, PROJECT NO. BRO-R056(15)  
LEWIS COUNTY, MISSOURI

**HOWE COMPANY, LLC**  
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