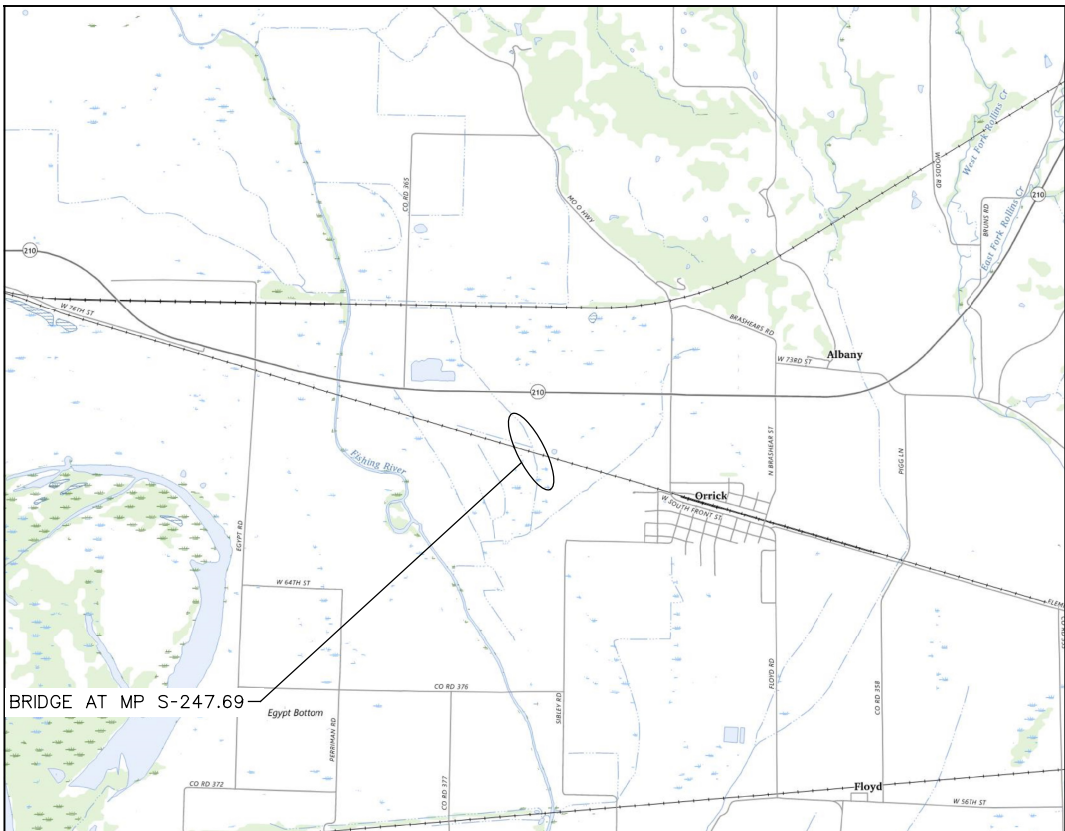




BRIDGE AT MP S-247.69
OVER UNNAMED TRIBUTARY TO THE FISHING RIVER
ORRICK, MO

ISSUE FOR CONSTRUCTION
7/15/2024



LATITUDE: 39° 13'01.77" N
LONGITUDE: 94° 08'24.95" W
LOCATION MAP
SCALE: NTS

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CONTACT INFORMATION

OWNER:
NORFOLK SOUTHERN RAILWAY COMPANY
RUTH BROWN, P.E.
CHIEF ENGINEER BRIDGES & STRUCTURES
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REV	BY	DATE	DESCRIPTION
 NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT MIDWEST DIVISION			
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY			
ORRICK, MO			
BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER — BRIDGES & STRUCTURES			ATLANTA, GA
DRAWING TITLE			
TITLE SHEET			
DGN	JRR	VAL SEC	2 MO.C MAP 25 MILE POST S-247.69
DWN	BRK	FILE No.	BR0020786 DATE 7/15/2024
CHK	SBM	SHEET NUMBER	S1 OF S23 DRAWING NUMBER S-247.69 24 01

ISSUE FOR CONSTRUCTION



FILENAME: c:\pwworking\national01\04053353\S-247.69-GN01.dgn
USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS

GENERAL NOTES:

STANDARD SPECIFICATION:

2023 EDITION OF THE AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION (AREMA) MANUAL FOR RAILWAY ENGINEERING.

NORFOLK SOUTHERN STANDARD SPECIFICATIONS FOR MATERIALS & CONSTRUCTION – JANUARY 2019.

NORFOLK SOUTHERN UNDERPASS GRADE SEPERATION DESIGN CRITERIA.

DESIGN CRITERIA:

DEAD LOAD: WEIGHT OF RAIL AND FASTENINGS, BALLAST, STEEL SPAN, HANDRAILS, AND FUTURE 6 IN BALLAST
LIVE LOAD: COOPER E-80 AND ALTERNATE LOADING
IMPACT: APPLICABLE PERCENTAGE FOR ROLLING EQUIPMENT WITHOUT HAMMER BLOW.
FATIGUE: PER AREMA 15 – 1.3.13 FATIGUE
WIND LOAD: PER AREMA 8 – 2.2.3, 15 – 1.3.7, AND 15 – 1.3.8, AS REQUIRED

CONCRETE SUBSTRUCTURE IS DESIGNED BY LOAD FACTOR METHOD.

DESIGN STRESSES:

STRUCTURAL STEEL (ASTM A709, GR. 50) F'c = 50,000 PSI fs = 27,500 PSI
CAST-IN-PLACE CONCRETE F'c = 5,000 PSI AT 28 DAYS
PRECAST CONCRETE F'c = 5,000 PSI AT 28 DAYS
REINFORCEMENT STEEL (A615) Fy = 60 KSI

STEEL PIPE PILE:

ASTM A252 GR. 3 Fy = 45,000 PSI. PILES SHALL BE 30" DIA. STEEL PIPE PILES, MINIMUM WALL THICKNESS = 5/8", (CONCRETE FILLED) WITH PILE POINTS. PILES SHALL BE DRIVEN TO REFUSAL OR A MINIMUM ULTIMATE CAPACITY OF 425 TONS (2.5 SAFETY FACTOR INCLUDED) FOR 30" DIA. PILE.

PRIOR TO DRIVING STRUCTURAL STEEL PILES, THE CONTRACTOR SHALL REVIEW THE BORING LOGS TO DETERMINE THE DEPTH AT WHICH ROCK MAY BE ANTICIPATED. THE CONTRACTOR SHALL BE ATTENTIVE TO THE PHYSICAL CONDITIONS ASSOCIATED WITH PILE REFUSAL ON HARD ROCK. WHEN INDICATION OF HARD ROCK OCCURS, IN NO CASE SHALL THE PILE BE DRIVEN MORE THAN 3 BLOWS WHEN THE HAMMER IS OPERATING AT MAXIMUM RATED ENERGY AND THE PENETRATION PER BLOW IS EQUIVALENT TO OR LESS THAN 10 BLOWS PER 0.5 INCH. DRIVING SHALL CEASE IMMEDIATELY TO AVOID DAMAGE TO THE PILE AND TO REDUCE THE RISK OF INJURY.

CONSTRUCTION NOTES

EXISTING RIGHT-OF-WAY:

SEE SITE PLAN.

CONTROL OF WORK:

ALL WORK INVOLVED IN THE CONSTRUCTION OF THE RAILWAY STRUCTURE SHALL BE PERFORMED SATISFACTORY TO THE ENGINEER AND NORFOLK SOUTHERN RAILROAD. ALL METHODS OF HANDLING WORK AFFECTING THE SAFETY OF RAIL OPERATIONS MUST BE APPROVED BY THE RAILWAY ENGINEER BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. RAIL TRAFFIC SHALL AT ALL TIMES BE MAINTAINED AND PROTECTED.

CONSTRUCTION REQUIREMENTS:

- ALL WORK SHALL BE IN ACCORDANCE WITH CURRENT AREMA "MANUAL FOR RAILWAY ENGINEERING" AND THE SPECIFICATIONS FOR THIS CONTRACT.
- THE CONTRACTOR SHALL NOT INTERFERE WITH OR PERFORM ANY CONSTRUCTION ON OR NEAR OPERATING TRACKS WITHOUT THE RAILROAD'S PERMISSION. WHEN THE CONTRACTOR IS WORKING NEAR ANY TRACK, HE WILL BE REQUIRED TO HAVE A FLAGMAN FROM THE RAILROAD ON DUTY.
- CONTRACTOR SHALL NOT SCALE DIMENSIONS FROM THE CONTRACT PLANS FOR CONSTRUCTION PURPOSES. SCALES ARE SHOWN FOR INFORMATION ONLY. NO CONSTRUCTION JOINTS, EXCEPT THOSE SHOWN ON THE PLANS, WILL BE ALLOWED UNLESS APPROVED BY THE ENGINEER.

CONTRACTOR RESPONSIBILITY

- COORDINATE ALL CONSTRUCTION ACTIVITIES WITH THE RAILROAD.
- BEFORE ORDERING ANY MATERIAL, THE CONTRACTOR SHALL MAKE A DETAILED FIELD INSPECTION OF THE SITE VERIFYING ALL PERTINENT DIMENSIONS, ELEVATIONS AND LOCATION OF PROPOSED BRIDGE. ANY VARIATIONS IN DIMENSIONS OR ELEVATIONS FROM THOSE SHOWN ON THE PLANS SHALL BE REPORTED IMMEDIATELY TO NSR.
- VERIFY THE LOCATION, RELOCATION, ABANDONMENT, AND/OR TEMPORARY SUPPORT OF ALL UTILITIES AFFECTED BY THE CONSTRUCTION OF THE STRUCTURE AND EMBANKMENT AND COORDINATE THESE ACTIVITIES WITH THE APPROPRIATE UTILITY COMPANIES, AGENCIES, AND/OR AUTHORITIES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE WHICH MIGHT OCCUR DUE TO CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE ANY AND ALL UTILITIES.
- APPLY FOR AND OBTAIN ANY CONSTRUCTION PERMITS NECESSARY TO PERFORM THE WORK.
- PROVIDE THE RAILROAD WITH A DETAILED CONSTRUCTION PLAN DETAILING THE ACTIVITY, SCHEDULE, AND PROCEDURE FOR EACH ASPECT OF THE WORK. CONSTRUCTION SHALL NOT BEGIN UNTIL THE CONSTRUCTION PLAN HAS BEEN APPROVED BY THE RAILROAD.
- CONSTRUCT THE BRIDGE IN ITS ENTIRETY.
- PROVIDE ALL TEMPORARY SHORING AND/OR BRACING AS REQUIRED TO SUPPORT AND PROTECT THE EXISTING AND PROPOSED EMBANKMENTS AND BRIDGE ABUTMENTS AFFECTED BY THE WORK. PROVIDE THE RAILROAD WITH DETAILS, DESIGN AND PROCEDURES FOR ALL TEMPORARY SHORING AND/OR BRACING.
- COORDINATE WITH TRACK CONTRACTOR ON INSTALLATION OF THE BALLAST, TIES, RAIL AND OTM FOR PROPOSED TRACK.

- PROVIDE AND REPLACE ALL FILL MATERIAL PER NSR.

- RESTORE ALL AREAS THROUGHOUT THE LENGTH OF THE BRIDGE TO ORIGINAL CONDITION OR BETTER, AND AS REQUIRED BY RELEVANT PERMITS.

FIELD WELDING:

WELDING MUST BE IN COMPLIANCE WITH REQUIREMENTS SPECIFIED IN AWS D1.5, CURRENT EDITION. WELDING MUST BE ACCOMPLISHED WITH THE SMAW PROCESS. WELDING ELECTRODES MUST BE E7018. WELDERS MUST POSSESS VALID CERTIFICATION.

STEEL BRIDGE ERECTION:

BRIDGE ERECTION SHALL COMPLY WITH AREMA CHAPTER 15, PART: 4 "ERECTION". THE CONTRACTOR SHALL SUBMIT THREE (3) COPIES OF CONSTRUCTION SEQUENCE AND PROCEDURES FOR APPROVAL TO NSR.

CONSTRUCTION TOLERANCE:

TOLERANCE FOR CONCRETE CONSTRUCTION SHALL CONFORM TO ALL REQUIREMENTS OF ACI 117, EXCEPT AS MODIFIED BELOW, IN THE SPECIAL PROVISIONS AND BY THE REQUIREMENTS OF THESE DRAWINGS. MAXIMUM ALLOWABLE DEVIATIONS FROM DIMENSIONS, ELEVATIONS, AND POSITIONS SHOWN ON THE DRAWINGS SHALL BE AS FOLLOWS.

- VERTICAL ALIGNMENT OF PILES: NOT MORE THAN 1/4" PER FOOT OF DEPTH.
- LATERAL ALIGNMENT OF PILES: 1/36 OF SHAFT DIAMETER BUT NOT MORE THAN 2".
- TOP ELEVATION OF PILES: AS NECESSARY TO JOIN BENT CAPS AND NOT MORE THAN PLUS OR MINUS 1/4".
- CROSS SECTIONAL DIMENSION OF CAPS: PLUS OR MINUS 1/4".

STRUCTURAL STEEL NOTES

GENERAL:

PRIOR TO FABRICATION, CONTRACTOR/FABRICATOR SHALL SUBMIT THE FOLLOWING FOR APPROVAL BY THE ENGINEER:

- SHOP DRAWINGS INDICATING MATERIALS, SIZES, CONNECTIONS, ANCHORS, AND PAINTING.
- PRODUCT DATA, INCLUDING MANUFACTURER'S CATALOG SHEETS ON PRE-MANUFACTURED ITEMS.

FABRICATION:

- FABRICATION OF ALL STEEL MEMBERS SHALL BE ACCORDING TO THE AREMA MANUAL FOR RAILWAY ENGINEERING, CHAPTER 15, PART 3 – FABRICATION.
- SHOP ASSEMBLY OF ALL STRUCTURAL STEEL IS REQUIRED TO ENSURE PROPER FIT AND ALIGNMENT OF THE STEEL MEMBERS. ALL MEMBERS SHALL BE MATCH MARKED WITH THE USE OF STEEL PUNCHES.
- ALL STEEL MATERIAL THAT REQUIRES CUTTING SHALL BE CUT WITH EITHER A MECHANICALLY GUIDED BURNER OR A CUT-OFF SAW. AT NO TIME WILL FREEHAND FLAME CUTTING OR FREEHAND SAWING WITH A HAND HELD SAW OR MECHANICALLY OPERATED HAND HELD SAW BE ALLOWED. THE SURFACES SHALL NOT BE ROUGHER THAN ANSI B46.1 SURFACE TEXTURE OF 1000.
- PLUMB OF TRUE VERTICAL AND HORIZONTAL MEMBERS TO MEET TOLERANCE OF +/- 1/8" IN 10 FT.

DELIVERY, STORAGE, AND HANDLING:

- TAG MISCELLANEOUS STEEL (INCLUDING ANCHOR BOLTS/RODS), CONCRETE ANCHORS, AND OTHER MISC. ITEMS, OR OTHERWISE MARK FOR EASE OF IDENTIFICATION AT PROJECT SITE.
- CONTRACTOR IS RESPONSIBLE FOR SAFELY TRANSPORTING, STORING, AND HANDLING ALL MATERIALS. ALL MATERIALS SHALL BE PROTECTED FROM DAMAGE DURING ALL PHASES OF CONSTRUCTION.

STRUCTURAL STEEL:

- ALL STRUCTURAL STEEL SHAPES AND PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50 T2 OR A709 GRADE 50 F2.
 - FABRICATE DETAILS AND CONNECTION ASSEMBLIES IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS, WITH PROJECTING CORNERS CLIPPED AND FILLER PIECES WELDED FLUSH.
 - FIT WORK TOGETHER IN FABRICATION SHOP AND DELIVER COMPLETE OR IN PARTS, READY TO BE SET IN PLACE OR ASSEMBLED IN FIELD.
 - ALL MATERIAL SHALL BE STRAIGHT AND FREE FROM SHARP KINKS OR BENDS. ANY STEEL MATERIAL EXHIBITING SUCH DEFICIENCIES SHALL BE CAUSE FOR THE REJECTION OF THE MATERIAL. STRAIGHTENING OF THE MATERIAL SHALL NOT BE ACCEPTABLE.
- GALVANIZING:
- GALVANIZE MATERIAL AS NOTED IN THE PLANS.
 - GALVANIZE AFTER FABRICATION.
 - GALVANIZE BY HOT-DIP PROCESS CONFORMING WITH ASTM A123 AND AMERICAN HOT-DIPPED GALVANIZERS ASSOCIATION SPECIFICATIONS.
 - GALVANIZE IN PLANT HAVING FACILITIES TO PRODUCE QUALITY COATINGS AND CAPACITY FOR VOLUME OF WORK.
 - SHIP AND HANDLE IN MANNER TO AVOID DAMAGE TO ZINC COATING. REPAIR GALVANIZED SURFACES DAMAGED DURING SHIPPING OR ERECTION/CONSTRUCTION OPERATIONS USING ZINC-RICH PAINT.

BOLTS:

- BOLTED CONNECTIONS SHALL BE MADE WITH 7/8" DIA. ASTM F3125, GRADE A325, HIGH STRENGTH, TYPE 1 GALVANIZED BOLTS UNLESS NOTED OTHERWISE. ALL 7/8" DIA. BOLTS SHALL BE TIGHTENED TO A MINIMUM TENSION PER BOLT OF 39,000 LBS.
- ANY BOLTS THAT REQUIRE REMOVAL AFTER BEING TIGHTENED TO THEIR PROOF LOAD SHALL BE DISCARDED AND A NEW BOLT INSTALLED.
- ALL BOLT HOLES SHALL BE SUB-DRILLED AND REAMED OR DRILLED FROM THE SOLID. AT NO TIME ARE HOLES TO BE SUB-PUNCHED AND REAMED OR PUNCHED FULL SIZE. ALL HOLES SHALL BE 1/16" LARGER THAN THE SPECIFIED BOLT SIZE UNLESS NOTED OTHERWISE.
- DRILL FIELD HOLES FOR BOLTS. DO NOT BURN HOLES. NEW OR ENLARGING HOLES BY USE OF CUTTING TORCH IS CAUSE FOR REJECTION OF ENTIRE MEMBER.
- ALL BOLTS, ANCHOR BOLTS, AND ASSOCIATED HARDWARE SHALL BE BUY AMERICAN COMPLIANT.

WELDING:

- ALL FIELD WELDS TO BE MADE WITH E7018 LOW HYDROGEN ELECTRODES WITH ON-SITE PROTECTION AND USE OF ELECTRODE HEATING UNITS PER CURRENT A.W.S. SPECIFICATIONS.
- ALL WELDS ARE TO BE SHOP WELDS UNLESS NOTED OTHERWISE. WELD SIZES SHALL BE AS SHOWN ON THE DRAWINGS.
- THERE SHALL BE THOROUGH FUSION BETWEEN WELD METAL AND BASE METAL AND BETWEEN SUCCESSIVE PASSES OF THE WELD. ALL CRATERS SHALL BE FILLED TO THE FULL CROSS SECTION OF THE WELD.
- ALL WELDING SHALL BE IN ACCORDANCE WITH CURRENT AREMA SPECIFICATIONS AND THE PROJECT SPECIFICATIONS. WELDING PRACTICES TO BE IN ACCORDANCE WITH AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE D1.5, CURRENT ISSUE. ALL WELDS TO BE CONTINUOUS UNLESS OTHERWISE SHOWN.
- QUALIFY WELDING OPERATORS IN ACCORDANCE WITH AWS D1.5. QUALIFICATION TESTS SHALL BE RUN BY RECOGNIZED TESTING LABORATORY APPROVED BY THE ENGINEER AT THE CONTRACTOR'S EXPENSE. PRIOR TO WELDING, EACH WELDER SHALL HAVE BEEN CERTIFIED IN ACCORDANCE WITH AWS REQUIREMENTS DURING A PERIOD OF ONE (1) YEAR PRIOR TO WORK ON THE BRIDGE. THE FABRICATOR SHALL FURNISH THE NSR PROJECT ENGINEER WITH AN AWS CERTIFICATE FOR EACH WELDER, COVERING THEIR ABILITY TO MAKE A COMPLETE AND SATISFACTORY WELD OF EACH KIND TO BE USED ON THE PROJECT.
- CONFORM TO CODES FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION OF AWS AND TO AISC SPECIFICATIONS. SURFACES TO BE WELDED SHALL BE FREE FROM LOOSE SCALE, RUST, GREASE, PAINT, AND OTHER FOREIGN MATERIAL, EXCEPT MILL SCALE WHICH WILL WITHSTAND VIGOROUS WIRE BRUSHING MAY REMAIN. NO WELDING SHALL BE DONE WHEN BASE METAL TEMPERATURE IS LOWER THAN 0°F.
- GRIND EXPOSED EDGES OF WELDS TO 1/8" MINIMUM RADIUS. GRIND BURRS, JAGGED EDGES, AND SURFACE DEFECTS SMOOTH.
- PREPARE WELDS AND ADJACENT AREAS SO THERE IS:
A. NO UNDERCUTTING OR REVERSE RIDGES ON WELD BEAD.
B. NO WELD SPATTER ON OR ADJACENT TO WELD OR OTHER AREA TO BE PAINTED OR COATED.
C. NO SHARP PEAKS OR RIDGES ALONG WELD BEAD.
D. GRIND EMBEDDED PIECES OF ELECTRODE OR WIRE FLUSH WITH ADJACENT SURFACE OF WELD BEAD.

REV		BY	DATE	DESCRIPTION	
				NORFOLK SOUTHERN	
NORFOLK SOUTHERN RAILWAY					
KANSAS CITY DISTRICT				MIDWEST DIVISION	
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY					
ORRICK, MO					
BRIDGE REPLACEMENT					
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES				ATLANTA, GA	
DRAWING TITLE					
GENERAL NOTES (1 OF 3)					
DGN	JRR	VAL SEC	2 MO.C	MAP	25
FILE No.				DATE	
DWN	BRK	SHEET NUMBER			DRAWING NUMBER
CHK	SBM	S2 OF S23			S-247.69 24 01

ISSUE FOR CONSTRUCTION



HDR ENGINEERING, INC.
10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

FILENAME: c:\pwworking\national01\04053353\S-247.69--GN03.dgn
USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS

MONITORING EXISTING BRIDGE FOR MOVEMENT

A. PRECONSTRUCTION SURVEY MONITORING PROGRAM

1. PRECONSTRUCTION SURVEYS OF THE EXISTING ABUTMENTS AND PIERS SHALL BE CONDUCTED BY THE CONTRACTOR PRIOR TO START OF ANY CONSTRUCTION ACTIVITY WITHIN 75 FEET OF ANY OF THESE UNITS. IN ADDITION, THESE SAME LOCATIONS SHALL BE MONITORED BY THE CONTRACTOR DURING THE COURSE OF THIS CONTRACT.
2. THE REQUIRED PRECONSTRUCTION SURVEY SHALL CONSIST OF THE FOLLOWING:

A. A.THE CONTRACTOR SHALL DEVELOP AND SUBMIT TO THE ENGINEER AT LEAST 20 DAYS PRIOR TO STARTING THE PRECONSTRUCTION SURVEY MONITORING PROGRAM. THE ENGINEER WILL REVIEW THE PLAN AND RETURN COMMENTS WITHIN 10 DAYS OF RECEIPT. THE SURVEY PERIOD SHALL NOT START UNTIL THE PLAN HAS BEEN APPROVED AND ACCEPTED BY THE ENGINEER.

B. AN INSTRUMENT SURVEY SHALL BE PERFORMED BY A LICENSED PROFESSIONAL SURVEYOR DOCUMENTING THE X, Y, AND Z LOCATIONS OF AT LEAST 4 POINTS ON EACH BENT OF THE EXISTING SPANS. THE SURVEY SHALL ESTABLISH THESE POINTS AS PERMANENT REFERENCE POINTS THAT WILL BE USED THROUGHOUT THE CONSTRUCTION OF THE PROJECT TO MONITOR THE EXISTING BENTS UNTL SUCH TIME AS THE LOAD HAS BEEN TRANSFERRED TO THE NEW STRUCTURE AND THE NEED FOR MONITORING IS NO LONGER REQUIRED AS DETERMINED BY THE ENGINEER.

C. INITIAL SURVEYS SHALL BE PERFORMED OF ALL THE POINTS ON A ONCE DAILY BASIS FOR AT LEAST 5 CONSECUTIVE DAYS PRIOR TO ANY CONSTRUCTION ACTIVITIES IN THE AREA TO ESTABLISH A BASELINE SURVEY. THE ACCURACY OF THE SURVEYS SHALL BE WITHIN 0.01 FOOT BOTH VERTICAL AND HORIZONTAL. ELEVATIONS SHALL BE REPORTED TO THE DATUM NAVD 88 OR OTHER APPROVED SITE DATUM.

D. ESTABLISH THE BENCHMARKS NEEDED FOR THE MONITORING PROGRAM ON FIXED POINTS OUTSIDE OF THE AREAS OF POTENTIAL MOVEMENT, AS FAR FROM THE ADJACENT BRIDGE AS PRACTICAL. PROTECT THE MONITORING POINTS AND BENCHMARKS THROUGHOUT CONTRUCTION. INFORM THE ENGINEER OF ANY DAMAGED POINTS AND BENCHMARKS. REPLACE IMMEDIATELY ANY DAMAGED POINTS AND BENCHMARKS IN A MANNER ACCEPTABLE TO THE ENGINEER.

E. TWO COPIES OF THE PRECONSTRUCTION CONDITION AND INSTRUMENT SURVEYS SHALL BE SUBMITTED TO THE ENGINEER AT LEAST 15 DAYS PRIOR TO THE START OF CONSTRUCTION ACTIVITY WITHIN 75 FEET OF EXISTING SSTRUCTURE. IF THE CONDITION OR INSTRUMENT SURVEYS ARE NOT COMPLETE OR OF SUFFICIENT QUALITY AS DETERMINED BY THE ENGINEER, SUCH PARTS OF THE SURVEYS SHALL BE REDONE TO THE SATISFACTION OF THE ENGINEER PRIOR TO START OF CONSTRUCTION WITHIN 75 FEET OF THESE PEIRS.
- B. CONSTRUCTION SURVEY MONITORING PROGRAM
1. THE HORIZONTAL AND VERTICAL POSITION OF EACH POINT SHALL BE SURVEYED BY THE LICENSED SURVEYOR AT THE FOLLOWING FREQUENCIES:

A. THE READINGS WILL BE REQUIRED DURING PILE DRIVING AND OTHER POTENTIAL HIGH GROUND VIBRATION ACTIVITIES ARE BEING PERFORMED WITHIN 75 FEET OF THE UNIT AS FOLLOWS:

THREE TIMES DAILY: FROM THE START OF THE SPECIFIED CONSTRUCTION ACTIVITES WITHIN 75 FEET OF THE UNIT AND CONTINUE THROUGHOUT THE CONSTRUCTION ON ANY DAY WHEN THESE CONSTRUCTION ACTIVITS ARE BEING PERFORMED WIHTIN 75 FEET OF THE UNIT. MEASUREMENTS WILL BE AT THE BEGINNING OF WORK ACTIVITES, MID-DAY, AND AT THE END OF THE DAYS WORK ACTIVITES.

2. PROVIDE EACH SURVEY READING TO THE ENGINEER ON THE DAY IT IS TAKEN. ALTHOUGH THE ENGINEER WILL REVIEW READINGS AS THEY ARE PROVIDED, THE CONTRACTOR SHALL REVIEW THE MAGNITUDE OF ANY MOVEMENTS AND ACT QUICKLY TO MAINTAIN THE OPERATIONS OF THE BRIDGE IF MOVEMENTS ARE EXCESSIVE. IMMEDIATELY NOTIFY THE ENGINEER IF THE POSITION OF ANY MOVEMENT POINT IS FOUND TO BE MORE THAN 0.04 FEET OUTSIDE THE RANGE OF BASELINE READING COLLECTED FOR IT. SUSPEND CONSTRUCTION ACTIVITES AT THAT PIER AND EVALUATE POTENTIAL CONSTRUCTION RELATED ACTIVITIES WHICH MAY HAVE CONTRIBUTED TO THE MOVEMENT. PREPARE A WRITTEN REPORT OF MOVEMENT EVALUATION WITH THE RECOMMENDED CORRECTIVE CONTRUCTION METHODS AND SUBMIT TO THE ENGINEER BEFORE RESTARTING CONSTRUCTION ACTIVITES.
- PILE DRIVING NOTES
1. PILES SHALL BE INSTALLED PER NSR STANDARD SPECIFICATIONS.

2. PILES SHALL BE DRIVEN TO REFUSAL OR TO AN ULTIMATE DRIVEN CAPACITY OF 425 TONS, WHICH INCLUDES A FACTOR OF SAFETY OF 2.5.

3. JETTING OF PILES IS NOT PERMITTED.

4. ALL PILING SHALL BE DRIVEN USING DRIVING TEMPLATES AT BOTH TRACK LEVEL AND AT NATURAL GROUND OR NEAR WATER SURFACE FOR BENTS IN WATER BODIES. THE TEMPLATES SHALL BE ADEQUATELY SECURED TO ENSURE THE PILE'S PROPOSED ALIGNMENT IS MAINTAINED DURING DRIVING.

5. ALL PILES ARE TO BE DRIVEN AND NOT VIBRATED UNLESS APPROVED BY THE ENGINEER-OF-RECORD.

6. INSTALLED STEEL PILE CASING SHALL NOT BE CUT TO ELEVATION UNTIL THEY HAVE BEEN VERIFIED TO BE INSTALLED WITHIN THE TOLERANCES SPECIFIED IN THE NSR STANDARD SPECIFICATIONS.
7. THE ENGINEER-OF-RECORD SHALL BE NOTIFIED IF ANY PILES ARE INSTALLED WITH THE TOP OF PILE DISPLACED BEYOND 2" IN ANY DIRECTION OR 1/4" PER FOOT FROM VERTICAL OR BATTER LINE FROM THE LOCATION SPECIFIED IN THE PLANS. ANY PILE WHICH IS DEEMED UNACCEPTABLE BECAUSE OF THE DIVENSIONAL VARIATIONS SHALL BE REMOVED AND REPLACED OR RE-DRIVEN IN AN ACCEPTABLE POSITION OR SHALL BE CORRECTED IN A MANNER AS DIRECTED BY THE ENGINEER-OF-RECORD.

8. AFTER VERIFICATION AND APPROVAL THE PILE SHALL BE CUT OFF AND LEVELLED AT THE REQUIRED ELEVATIONS.

9. PRIOR TO CONCRETE PLACEMENT THE PIPES SHALL BE EXAMINED FOR COLLAPSED OR REDUCED DIAMETER AT ANY POINT. ANY PIPE PILE WHICH IS BROKEN OR SHOWS PARTIAL COLLAPSE TO AN EXTENT AS TO MATERIALLY DECREASE ITS CAPACITY, AS DETERMINED BY THE ENGINEER-OF-RECORD, SHALL BE REJECTED AS A DEFECTIVE PILE AND SHALL BE REMOVED AND REPLACED.

10. AN EXISTING BRIDGE MONITORING PLAN, AS DETAILED IN THE CONSTRUCTION SPECIFICATIONS, SHALL BE UTILIZED DURING PILE DRIVING AND GROUND DISTURBING ACTIVITIES.
- FIELD WELDING:
1. FIELD WELDING SHALL BE COMPLETED USING SHEILDED METAL ARC WELDING (SMAW) OR FLUX-CORED ARC WELDING (FCAW) PROCESSES AND SHOULD CONFORM TO THE REQUIREMENTS OF D1.5.

2. FIELD WELDING USING SMAW WELDING PROCESS SHALL BE COMPLETED USING E7018 LOW HYDROGEN ELECTRODES CONFORMING TO THE REQUIREMENTS OF AWS A5.5 "SPECIFICATIONS FOR LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES".

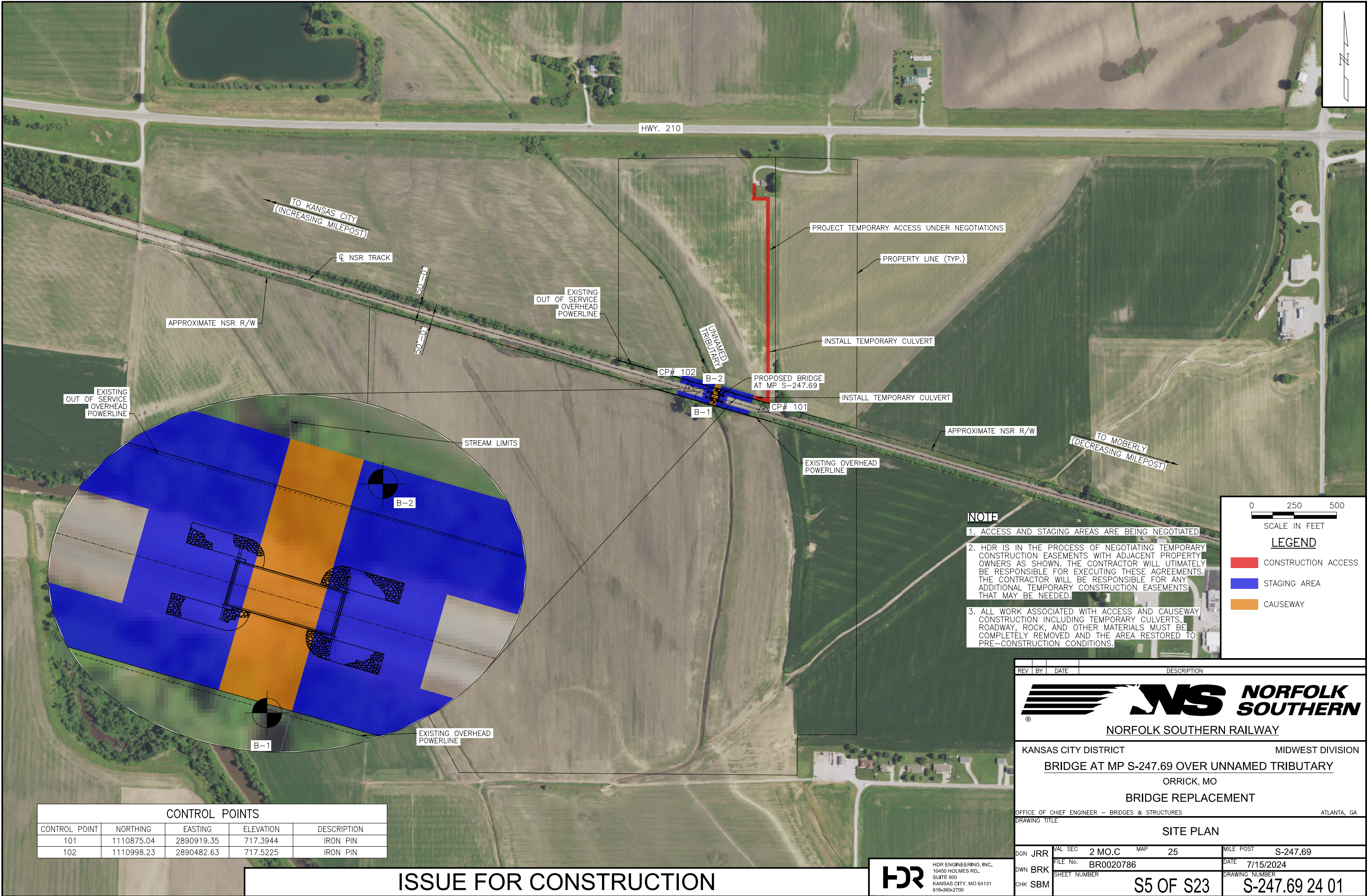
3. FIELD WELDING USING FCAW WELDING PROCESS SHOULD BE COMPLETED USING E71T-8-H16 SELF SHIELDED ELECTRODES CONFORMING TO THE REQUIREMENTS OF AWS A5-29. "SPECIFICATION FOR LOW-ALLOY STEEL ELECTRODES FOR FLUX CORED ARC WELDING".

4. ON-SITE PROTECTION AND USE OF ELECTRODE HEATING UNITS SHOULD CONFORM TO THE CURRENT AWS D1.5 SPECIFICATIONS.
- PILE SPLICES:
1. SPLICE SHOULD BE 10 FEET BELOW THE GROUND SURFACE AND THE NUMBER OF SPLICES SHOULD BE KEPT TO A MINIMUM.
- PILE TESTING:
1. THE PILES SHALL BE DRIVEN INCORPORATING PILE DRIVING ANALYZER (PDA) TECHNOLOGY. THE NUMBER OF TEST PILES SHALL BE DETERMINED BY THE ENGINEER-OF-RECORD. AT A MINIMUM ONE (1) TEST PILE SHALL BE DRIVEN FOR THE STRUCTURE.

2. THE TEST PILE DATA AND DRIVING LOG SHEETS MAY BE USED TO DEVELOP AND/OR CONFIRM THE LENGTHS FOR THE REMAINING PILES UPON APPROVAL FROM THE ENGINEER-OF-RECORD.

3. A COPY OF THE PDA TEST DATA AND ASSOICATED REPORTS SHALL BE SUBMITTED TO THE ENGINEER-OF-RECORD FOR INCLUSION INTO THE CONSTRUCTION RECORDS.
- ISSUE FOR CONSTRUCTION
- | ESTIMATED QUANTITIES | | | |
|----------------------|------|--|-----------------|
| QTY. | UNIT | DESCRIPTION | SEE DRAWING NO. |
| 1 | L.S. | REMOVAL OF EXISTING AND ERECTION OF NEW STRUCTURE | S9 |
| 1 | L.S. | EROSION AND SEDIMENT CONTROL | S9 |
| 1 | L.S. | EXISTING BRIDGE LEAD ABATEMENT (IN WORK AREAS) | S9 |
| 1 | L.S. | SITE ACCESS | S5 |
| 1 | L.S. | TEMPORARY SHORING (DESIGNED BY CONTRACTOR) (IF REQUIRED) | S6 |
| 1 | L.S. | EXISTING BRIDGE MONITORING PROGRAM | S4, S9 |
| 1 | L.S. | TCE FEE – NORTH PROPERTY | |
| 1 | L.S. | TCE IMPROVEMENTS – NORTH PROPERTY | |
| 237,000 | LBS. | STRUCTURAL STEEL AND ASSOCIATED HARDWARE, MILLED | S16-S21 |
| 237,000 | LBS. | STRUCTURAL STEEL AND ASSOCIATED HARDWARE, FABRICATED | S16-S21 |
| 237,000 | LBS. | STRUCTURAL STEEL AND ASSOCIATED HARDWARE, ERECTED | S16-S21 |
| 237,000 | LBS. | STRUCTURAL STEEL AND ASSOCIATED HARDWARE, INSTALLED | S16-S21 |
| 217 | FT. | HANDRAIL (1½" DIA. SCH. 40 PIPE) & ASSOCIATED HARDWARE | S21 |
| 4 | EACH | HANDRAIL END ASSEMBLIES & ASSOCIATED HARDWARE | S21 |
| 2 | EACH | SHOCK PAD | S19 |
| 2 | EACH | 1/2" PREMOLDED JOINT FILLER BETWEEN BACKWALL AND RISER BLOCK | S19 |
| 1,020 | S.F. | BALLAST MAT | S20 |
| 1,148 | S.F. | STEEL DECK WATERPROOFING | S20 |
| 308 | FT. | STEEL PIPE PILE (2'-6" DIA. ASTM A252 GRADE 3) | S10 |
| 2 | EACH | PRECAST CONCRETE ABUTMENT CAP | S13 |
| 2 | EACH | PRECAST CONCRETE RISER BLOCK | S14 |
| 4 | EACH | PRECAST CONCRETE BACKWALL AND WINGWALL | S15 |
| 1 | L.S. | LEVELING GROUT | S14 |
| 1 | L.S. | POROUS GRANULAR BACKFILL | S6 |
| 59 | C.Y. | CAST-IN-PLACE REINFORCED CONCRETE | S10 |
| 23,928 | LBS. | REINFORCING STEEL (PIPE PILE) | S12 |
| 8 | EACH | 1½" DIA. ANCHOR BOLT WITH 2~NUTS AND WASHER | S19 |
| 350 | C.Y. | RIPRAP (12" DIA. ABUTMENT PROTECTION) | S6 |
| 2 | EACH | DYNAMIC PILE TESTING | S4 |
- NOTE
1. STRUCTURAL STEEL AND ASSOCIATED HARDWARE INCLUDES 51'-0" SPAN, MASONRY PLATES, SPAN JOINTS, PIPE HANDRAIL, POSTS, HANDRAIL SPLICES, AND BACKER ANGLES.
- | | | | |
|---|--------------|------------------|----------------|
| REV | BY | DATE | DESCRIPTION |
| <div><div></div><div>NS</div><div>NORFOLK SOUTHERN</div></div> <div>NORFOLK SOUTHERN RAILWAY</div> | | | |
| KANSAS CITY DISTRICT | | MIDWEST DIVISION | |
| BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY | | | |
| ORRICK, MO | | | |
| BRIDGE REPLACEMENT | | | |
| OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES | | | ATLANTA, GA |
| DRAWING TITLE | | | |
| GENERAL NOTES (3 OF 3) AND QUANTITIES | | | |
| DGN JRR | VAL SEC | 2 MO.C | MAP 25 |
| | | MILE POST | S-247.69 |
| DWN BRK | FILE No. | BR0020786 | |
| CHK SBM | SHEET NUMBER | S4 OF S23 | |
| | | DATE | 7/15/2024 |
| | | DRAWING NUMBER | S-247.69 24 01 |
-
- HDR ENGINEERING, INC.
10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

FILENAME: c:\pwworking\national01\d0453353\S-247.69-SP01.dgn
USER: brkeler
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



CONTROL POINTS				
CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	1110875.04	2890919.35	717.3944	IRON PIN
102	1110998.23	2890482.63	717.5225	IRON PIN

- NOTE**
1. ACCESS AND STAGING AREAS ARE BEING NEGOTIATED
 2. HDR IS IN THE PROCESS OF NEGOTIATING TEMPORARY CONSTRUCTION EASEMENTS WITH ADJACENT PROPERTY OWNERS AS SHOWN. THE CONTRACTOR WILL ULTIMATELY BE RESPONSIBLE FOR EXECUTING THESE AGREEMENTS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL TEMPORARY CONSTRUCTION EASEMENTS THAT MAY BE NEEDED.
 3. ALL WORK ASSOCIATED WITH ACCESS AND CAUSEWAY CONSTRUCTION INCLUDING TEMPORARY CULVERTS, ROADWAY, ROCK, AND OTHER MATERIALS MUST BE COMPLETELY REMOVED AND THE AREA RESTORED TO PRE-CONSTRUCTION CONDITIONS.

0 250 500
SCALE IN FEET

LEGEND

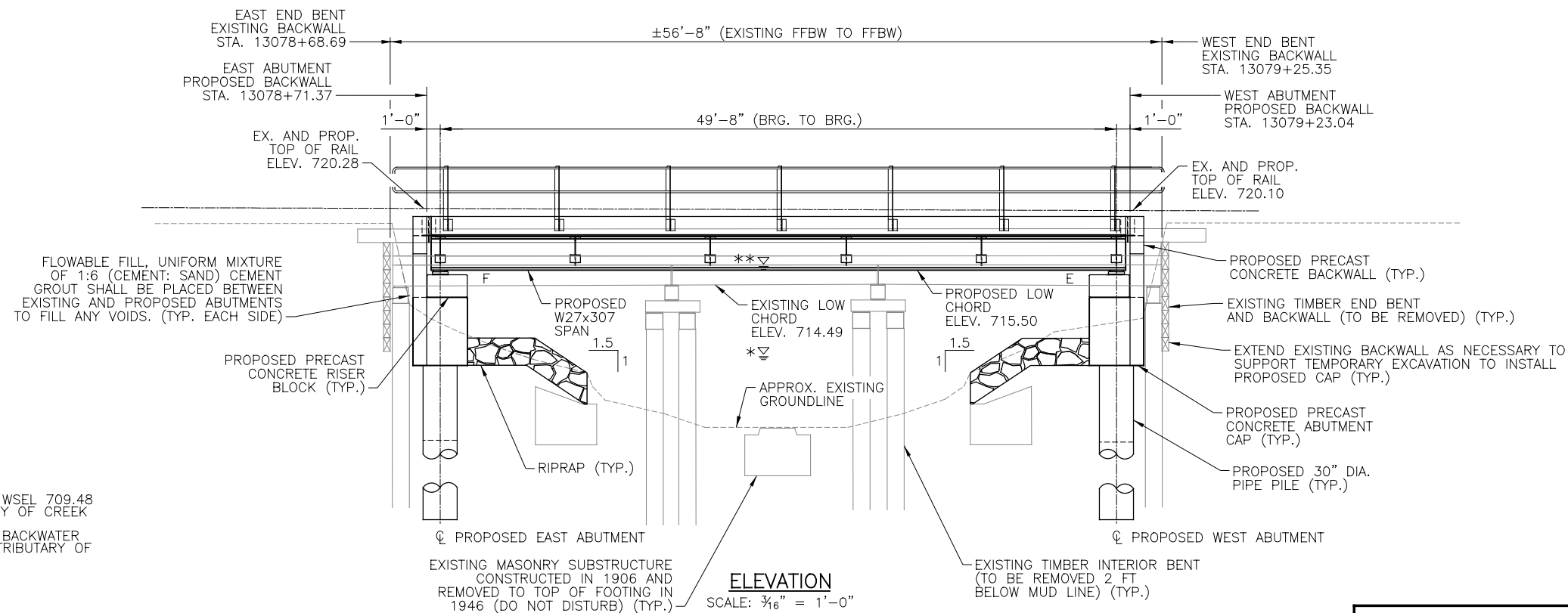
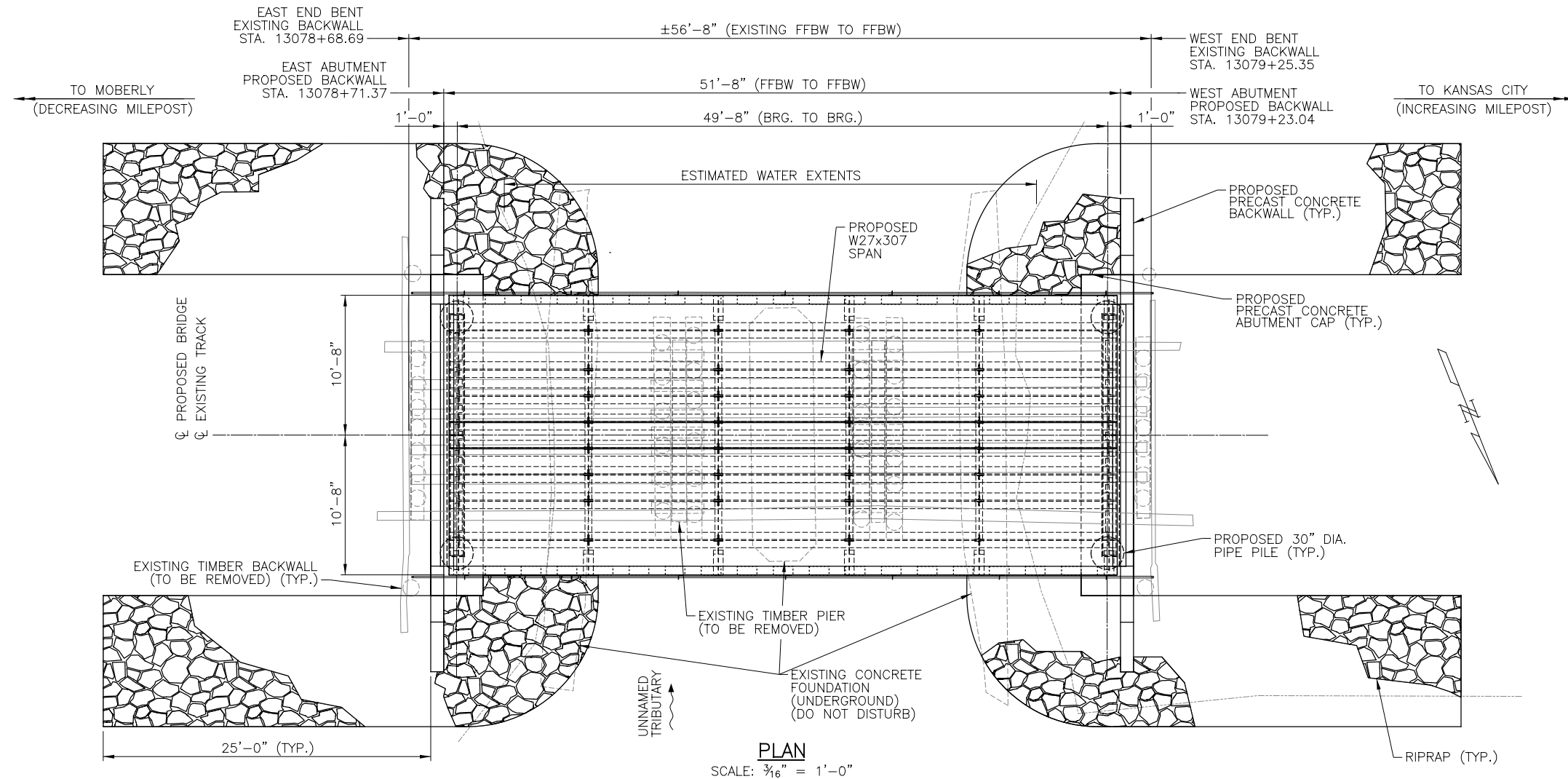
- CONSTRUCTION ACCESS
- STAGING AREA
- CAUSEWAY

REV	BY	DATE	DESCRIPTION
 NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT		MIDWEST DIVISION	
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY			
ORRICK, MO			
BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER — BRIDGES & STRUCTURES			ATLANTA, GA
DRAWING TITLE			
SITE PLAN			
DGN	JRR	VAL SEC 2 MO.C	MAP 25
DWN	BRK	FILE No. BR0020786	MILE POST S-247.69
CHK	SBM	SHEET NUMBER	DATE 7/15/2024
S5 OF S23			DRAWING NUMBER S-247.69 24 01

ISSUE FOR CONSTRUCTION

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KANSAS CITY, MO 64131
816-360-2700

FILENAME: c:\pwworking\national01\0453353\S-247.69-GP01.dgn
USER: brkeler
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



NOTE

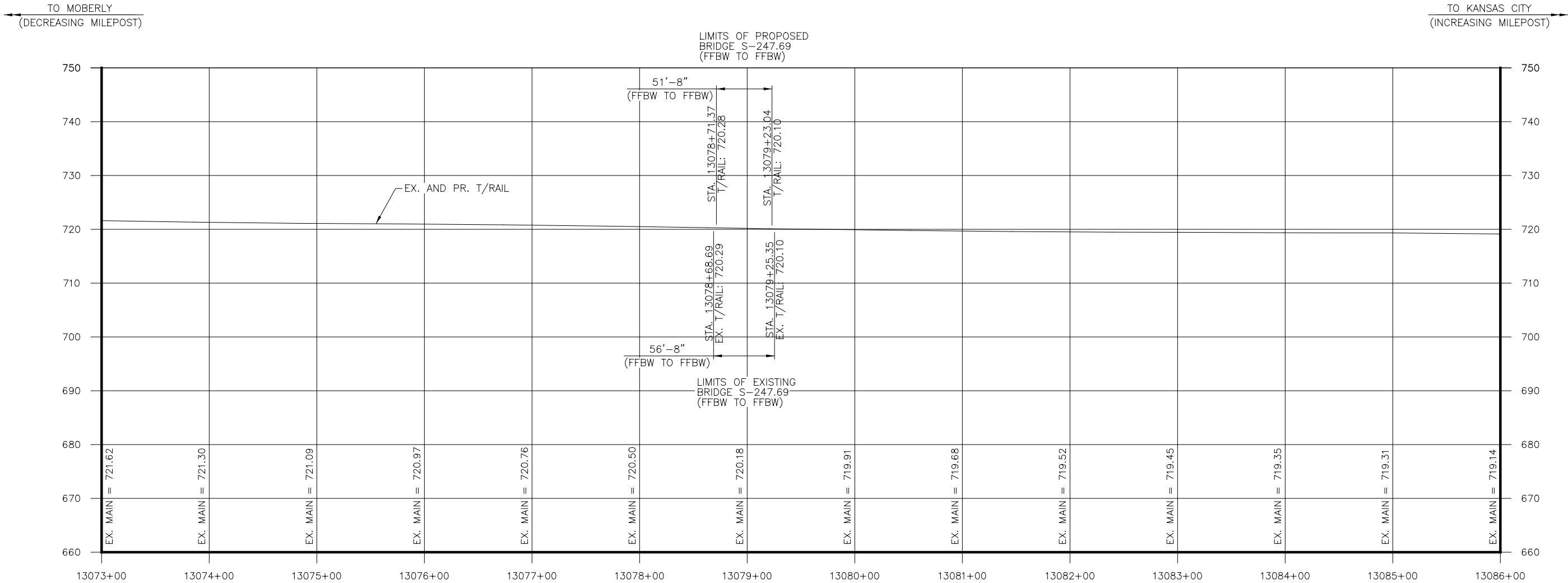
1. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.

REV	BY	DATE	DESCRIPTION
 NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY ORRICK, MO BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER - BRIDGES & STRUCTURES DRAWING TITLE			ATLANTA, GA
GENERAL PLAN AND ELEVATION			
DGN JRR	VAL SEC 2 MO.C	MAP 25	MILE POST S-247.69
DWN BRK	FILE No. BR0020786	DATE 7/15/2024	
CHK SBM	SHEET NUMBER S6 OF S23	DRAWING NUMBER S-247.69 24 01	

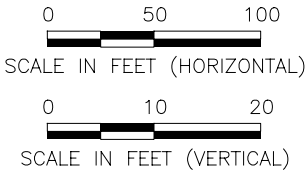
ISSUE FOR CONSTRUCTION

HDR
HDR ENGINEERING, INC.
10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

FILENAME: c:\pwworking\national01\d0453353\S-247.69-TR01.dgn USER: brkeler SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



TOP OF RAIL PROFILE

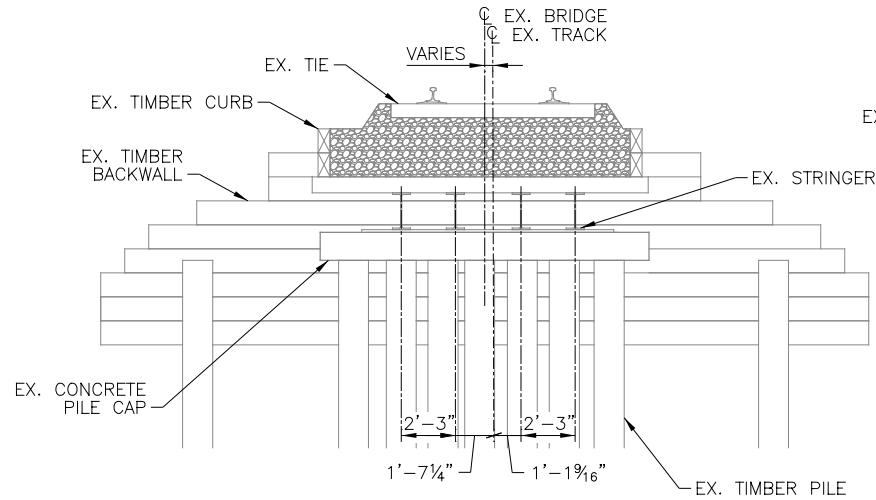


ISSUE FOR CONSTRUCTION

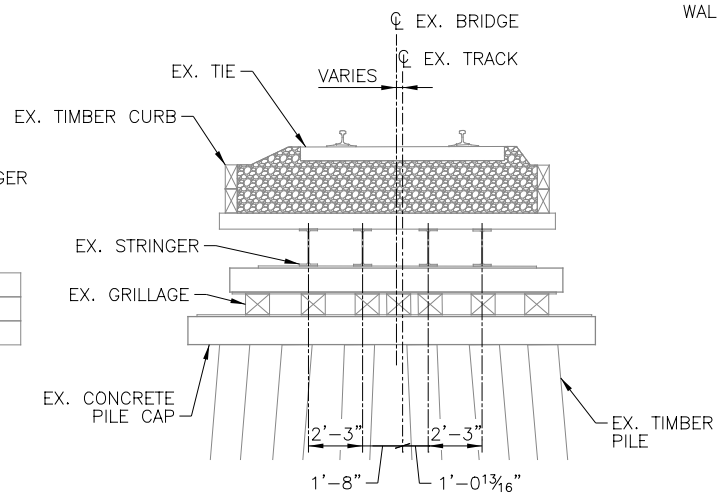
HDR ENGINEERING, INC.
10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

REV	BY	DATE	DESCRIPTION
NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT MIDWEST DIVISION			
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY			
ORRICK, MO			
BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES			ATLANTA, GA
DRAWING TITLE			
TOP OF RAIL PROFILE			
DGN JRR	VAL SEC	2 MO.C	MAP 25
DWN BRK	FILE No.	BR0020786	DATE 7/15/2024
CHK SBM	SHEET NUMBER	S7 OF S23	DRAWING NUMBER S-247.69 24 01
		MILE POST	S-247.69

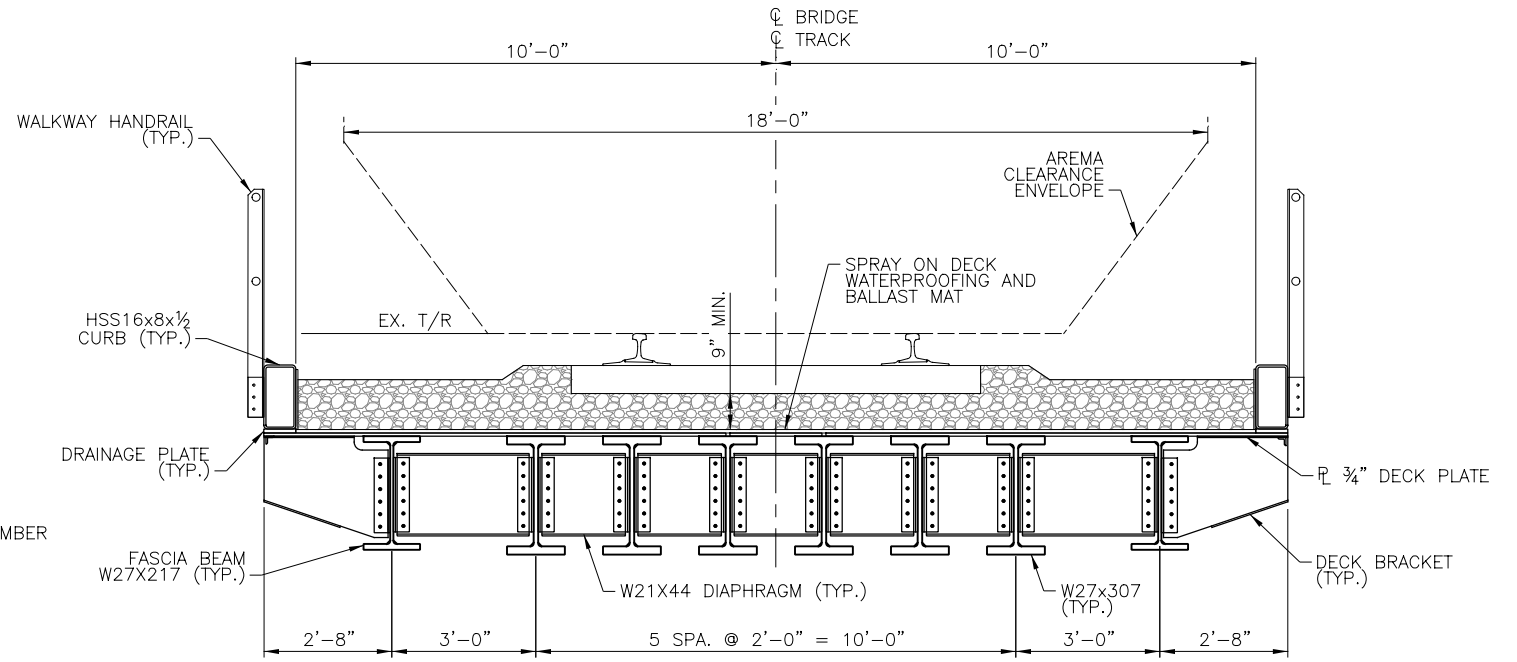
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USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



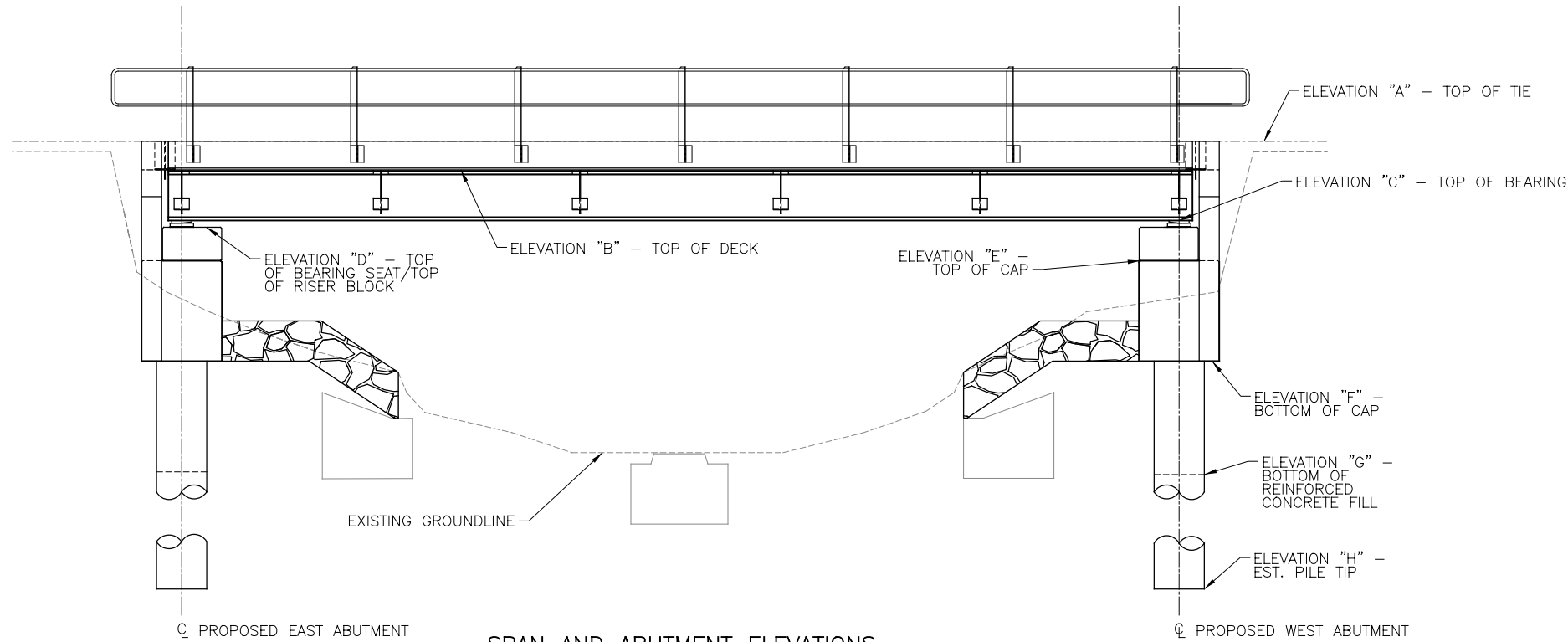
EXISTING TYPICAL SECTION
AT END BENT
SCALE: 1/4" = 1'-0"



EXISTING TYPICAL SECTION
AT INTERIOR BENT
SCALE: 1/4" = 1'-0"



PROPOSED TYPICAL SECTION
(SECTION SHOWN AT MIDSPAN LOOKING DOWN STATION)
SCALE: 1/2" = 1'-0"



SPAN AND ABUTMENT ELEVATIONS
SCALE: 1/4" = 1'-0"

NOTES
GROUNDLINE SHOWN IS AT CENTERLINE OF BRIDGE.

BRIDGE ELEVATIONS											
PIER/ABUT	SPAN	STATION	T/R	ELEVATIONS							
				A	B	C	D	E	F	G	H
EAST ABUTMENT	1	13078+72.37	720.27	719.60	718.20	715.67	715.33	713.67	708.67	644.67	632.00
WEST ABUTMENT	1	13079+22.04	720.10	719.43	718.03	715.50	715.16	713.50	708.50	644.50	632.00

EXISTING COMPONENTS – MAIN SPAN	
NAME	HEIGHT
RAIL	8"
TIE	7"
BALLAST	1'-10 1/4"
DECK	6"
BEAM	2'-0"
TOTAL	5'-7 1/4"

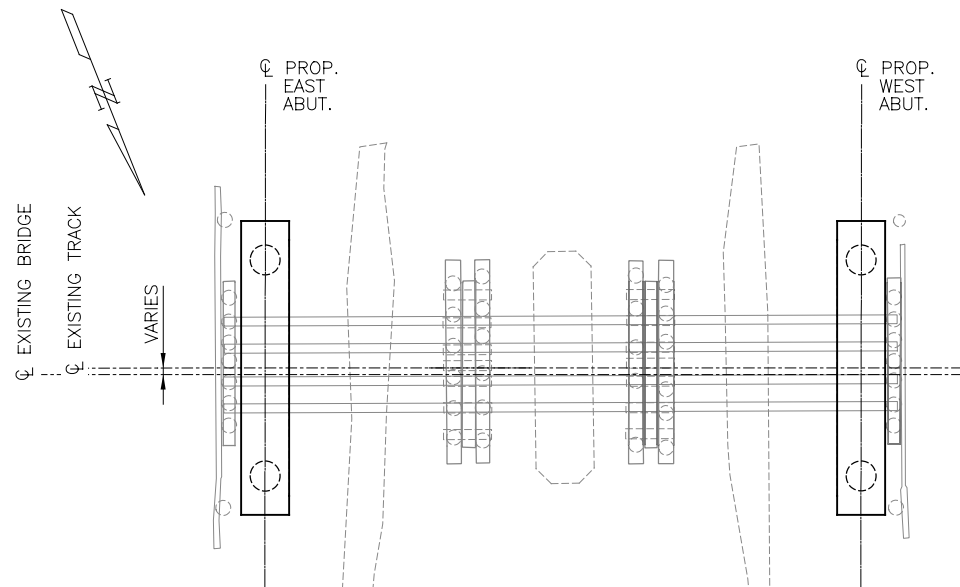
PROPOSED COMPONENTS – MAIN SPAN	
NAME	HEIGHT
RAIL + TIE PLATE	8"
TIE	7"
BALLAST	9"
WATERPROOFING	7/8"
DECK PLATE	3/4"
BEAM	2'-5 5/8"
SOLE PLATE	1 1/2"
MASONRY PLATE	2"
SHOCK PAD	1/2"
TOTAL	4'-11 1/4"

REV	BY	DATE	DESCRIPTION
 NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY ORRICK, MO BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES DRAWING TITLE TYPICAL SECTION AND BRIDGE ELEVATIONS			
DGN	JRR	VAL SEC 2 MO.C	MAP 25
DWN	BRK	FILE No. BR0020786	MILE POST S-247.69
CHK	SBM	SHEET NUMBER S8 OF S23	DATE 7/15/2024
			DRAWING NUMBER S-247.69 24 01

ISSUE FOR CONSTRUCTION

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816-360-2700

FILENAME: c:\pwworking\national01\d0453353\S-247.69-CP01.dgn
USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS

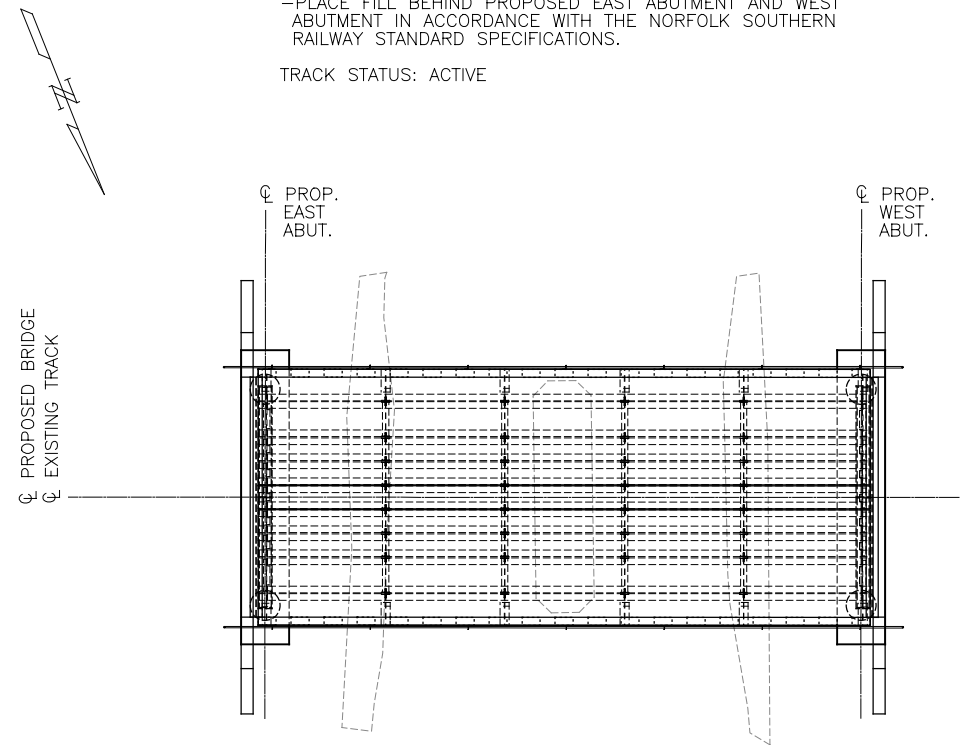


PHASE 1 PLAN
SCALE: 1/8" = 1'-0"

PHASE 1: (PRE-OUTAGE)

- INSTALL STEEL PIPE PILES OUTSIDE OF THE EXISTING SPANS. FILL WITH REINFORCED CONCRETE.
- INSTALL PROPOSED CONCRETE PRECAST ABUTMENT CAP BELOW THE EXISTING SPANS.
- PLACE FILL BEHIND PROPOSED EAST ABUTMENT AND WEST ABUTMENT IN ACCORDANCE WITH THE NORFOLK SOUTHERN RAILWAY STANDARD SPECIFICATIONS.

TRACK STATUS: ACTIVE

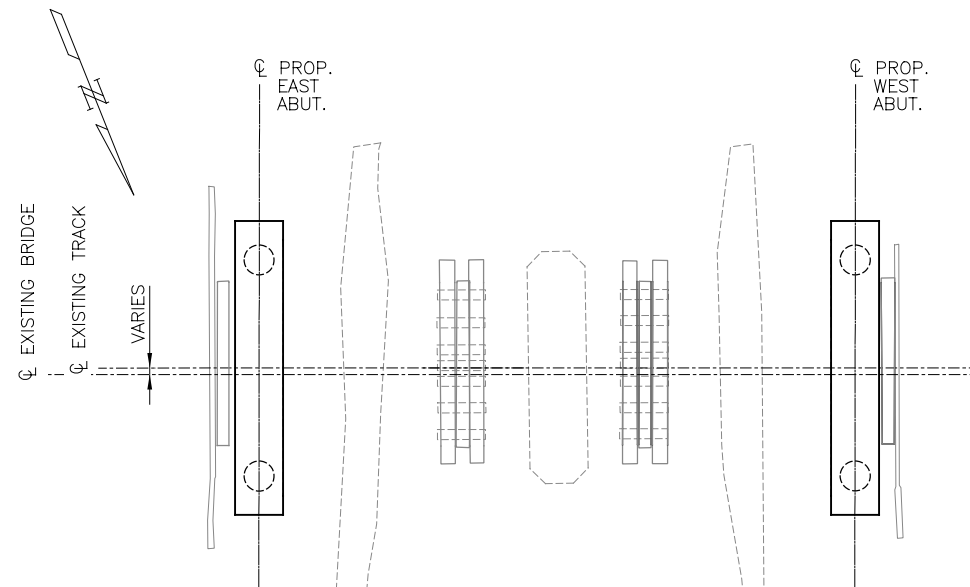


PHASE 3 PLAN
SCALE: 1/8" = 1'-0"

PHASE 3 (DURING OUTAGE):

- INSTALL PRECAST RISER BLOCKS, BACKWALLS, AND GROUT DOWELS.
- PLACE THE PROPOSED BEAM SPAN ON THE NEW ABUTMENTS.
- LEVEL BEARINGS AND INSTALL ANCHOR BOLTS. FILL IN AND COMPACT REMAINING VOID BEHIND PROPOSED ABUTMENTS.
- INSTALL BALLAST AND TRACK OVER BRIDGE (PERFORMED BY NSR).
- RELEASE TRACK INTO ACTIVE SERVICE.

TRACK STATUS: INACTIVE

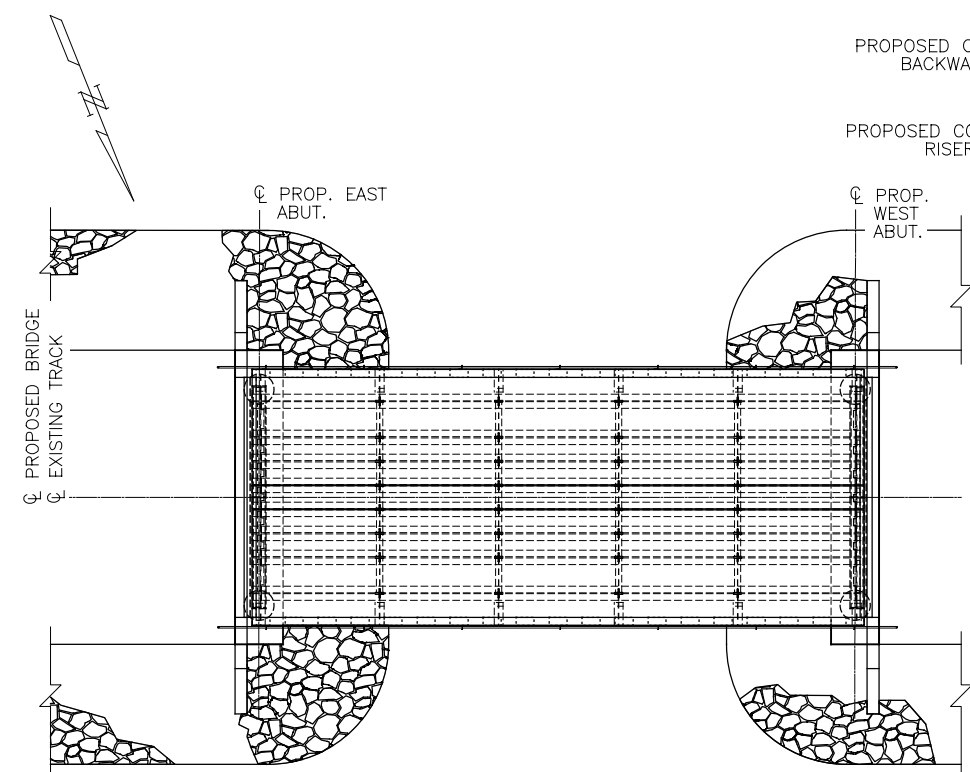


PHASE 2 PLAN
SCALE: 1/8" = 1'-0"

PHASE 2 (DURING OUTAGE):

- REMOVE TRACK AND BALLAST FROM THE EXISTING SPANS.
- REMOVE THE EXISTING BRIDGE.

TRACK STATUS: INACTIVE

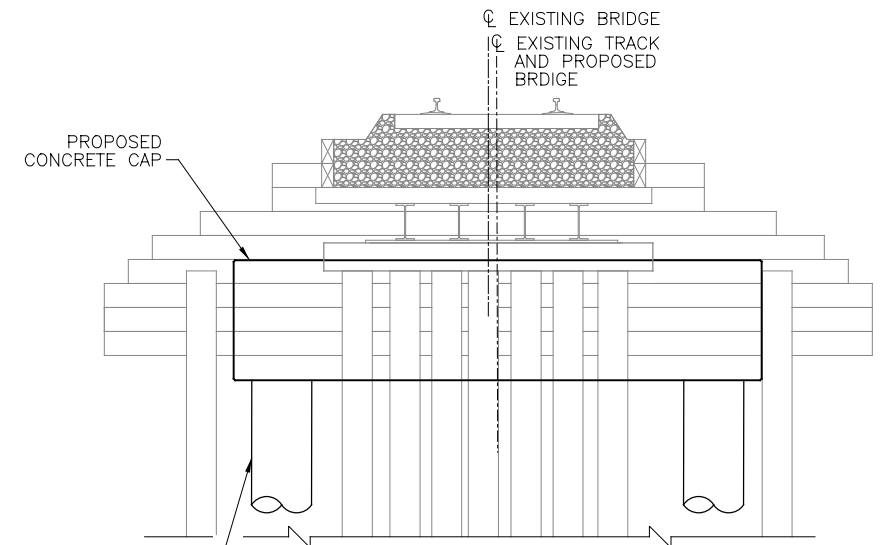


PHASE 4 PLAN
SCALE: 1/8" = 1'-0"

PHASE 4: (AFTER-OUTAGE)

- DEMOLISH AND REMOVE THE EXPOSED EXISTING PIERS AND END BENTS 2FT BELOW THE MUD LINE.
- PLACE RIPRAP AROUND EACH ABUTMENT.
- RESTORE THE SITE.

TRACK STATUS: ACTIVE



PHASE 1 SECTION
SCALE: 1/4" = 1'-0"

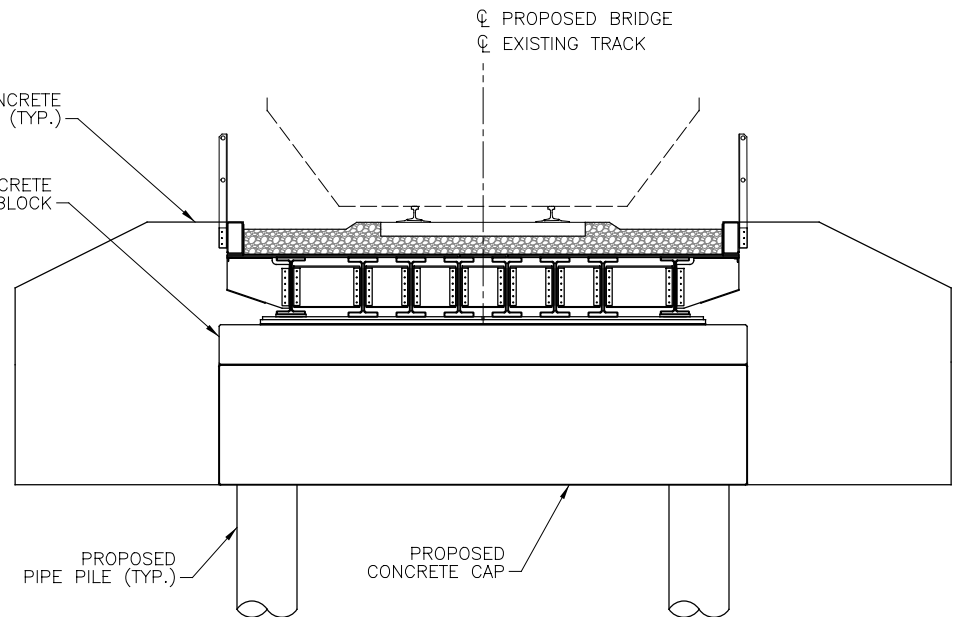
PROPOSED CONCRETE CAP
PROPOSED PIPE PILE (TYP.)

PROPOSED CONCRETE BACKWALL (TYP.)

PROPOSED CONCRETE RISER BLOCK

PROPOSED PIPE PILE (TYP.)

PROPOSED CONCRETE CAP



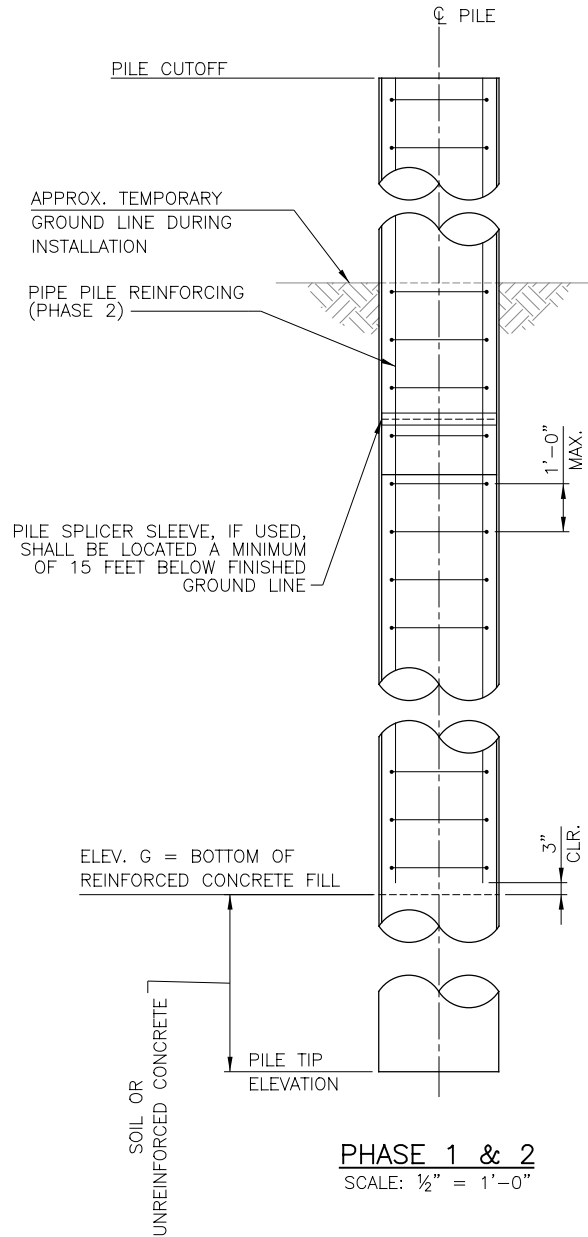
PHASE 3 SECTION
SCALE: 1/4" = 1'-0"

REV	BY	DATE	DESCRIPTION		
 NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY					
KANSAS CITY DISTRICT			MIDWEST DIVISION		
<u>BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY</u>					
ORRICK, MO					
BRIDGE REPLACEMENT					
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES				ATLANTA, GA	
DRAWING TITLE					
CONSTRUCTION PHASING					
DGN	JRR	VAL SEC	2 MO.C	MAP	25
FILE No.			BR0020786		
DWN	BRK	SHEET NUMBER		DATE	7/15/2024
CHK	SBM	S9 OF S23			DRAWING NUMBER
					S-247.69 24 01

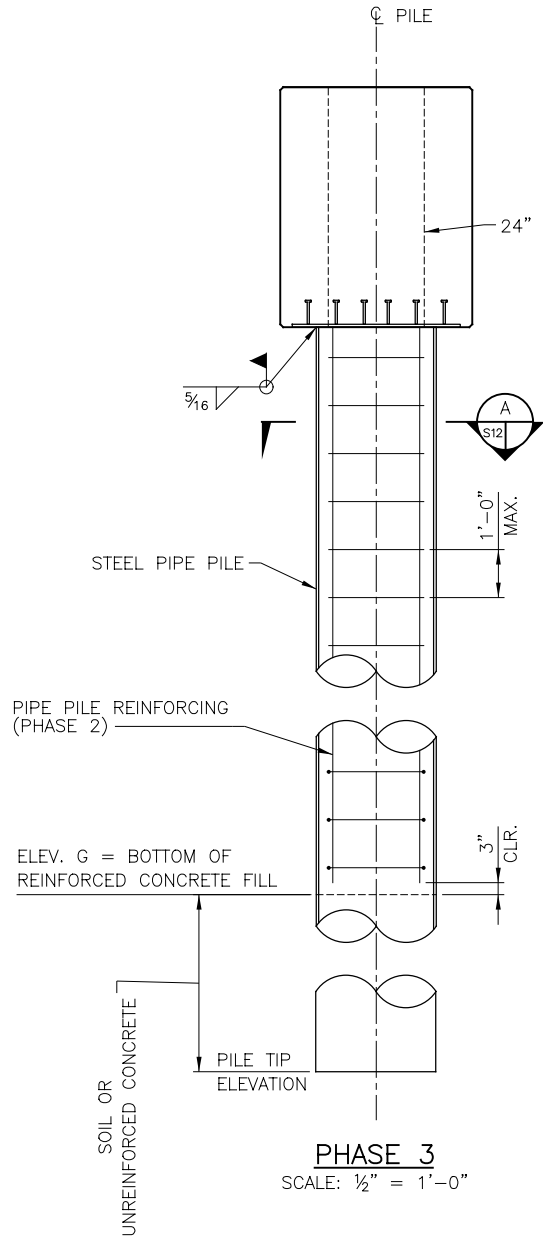
ISSUE FOR CONSTRUCTION

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HDR ENGINEERING, INC.
10450 HOLMES RD.,
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KANSAS CITY, MO 64131
816-360-2700

FILENAME: c:\pwworking\national01\d0453353\S-247.69-CP02.dgn
USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS

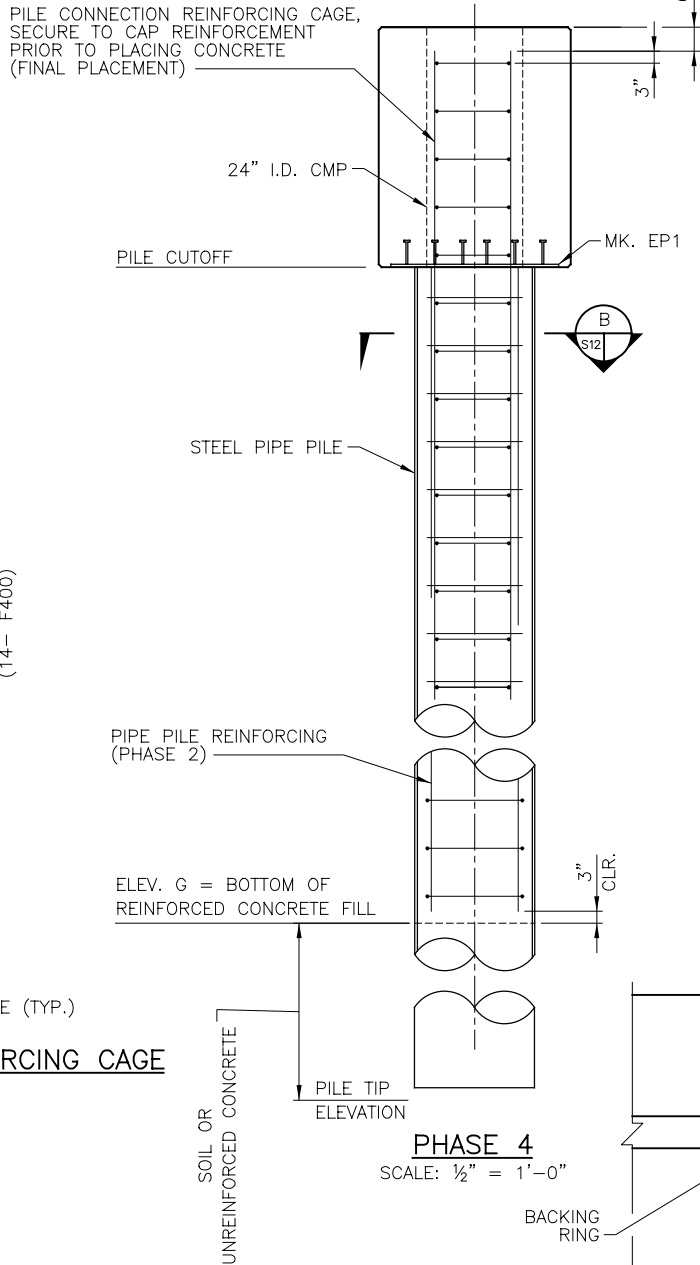
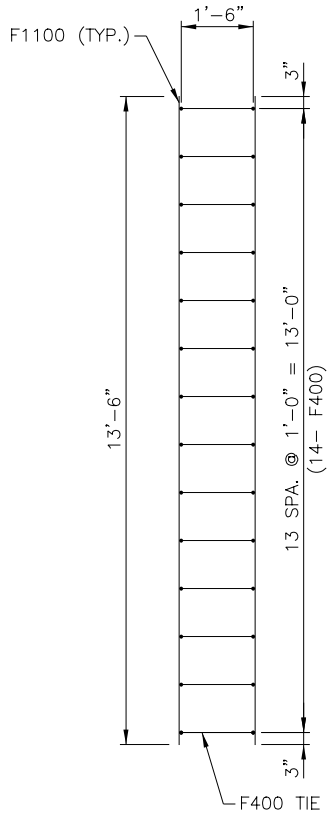


PHASE 1 & 2
SCALE: 1/2" = 1'-0"



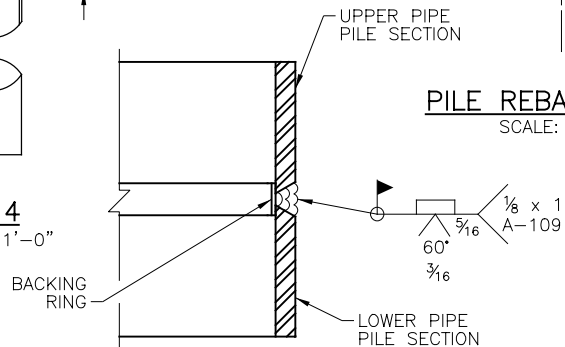
PHASE 3
SCALE: 1/2" = 1'-0"

PILE CONNECTION REINFORCING CAGE
SCALE: 1/2" = 1'-0"

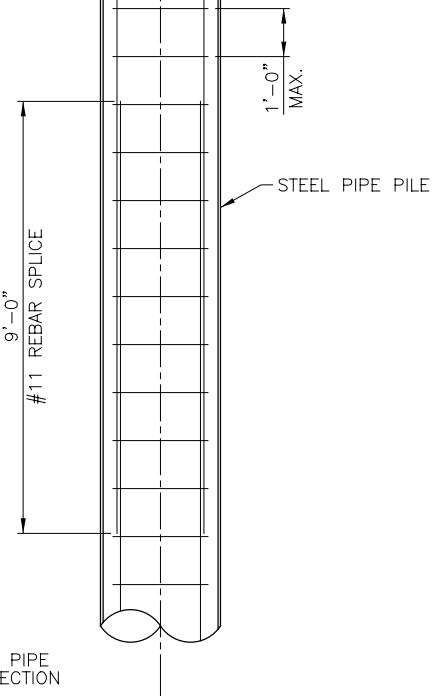


PHASE 4
SCALE: 1/2" = 1'-0"

PIPE PILE SPLICE DETAIL
SCALE: N.T.S.



PILE REBAR SPLICE
SCALE: N.T.S.



ABUTMENT PILE INSTALLATION

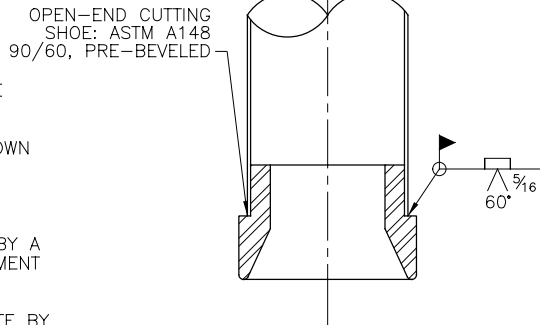
PHASE 1: EACH PILE SHALL BE DRIVEN TO THE ESTIMATED PILE TIP ELEVATION PROVIDED IN THE FINAL FOUNDATION DESIGN ANALYSIS, AT THE MINIMUM ESTIMATED PILE TIP ELEVATION DRIVING SHALL CONTINUE UNTIL AN ULTIMATE AXIAL CAPACITY IS ACHIEVED. PILES SHALL BE DRIVEN TO REFUSAL OR A MINIMUM ULTIMATE CAPACITY OF 425 TONS (2.5 SAFETY FACTOR INCLUDED) FOR 30" DIA. PILE.

THE ULTIMATE AXIAL LOAD CAPACITY SHALL INCLUDE A FACTOR OF SAFETY OF 2.5. IF A PILE HITS REFUSAL PRIOR TO THE ESTIMATED PILE TIP ELEVATION, THE BUILDER SHALL STOP DRIVING, NOTIFY THE ENGINEER AND AWAIT FURTHER INSTRUCTIONS. IF THE ULTIMATE AXIAL CAPACITY IS NOT ACHIEVED WITHIN FIVE (5) FEET BELOW THE ESTIMATED PILE TIP ELEVATION, PROVIDED IN THE REQUIRED SITE AND PERFORM A SET CHECK TO ASSESS THE SOIL FREEZE (SOIL SET) AROUND THE PILE AND POSSIBLE INCREASE IN CAPACITY CAUSED BY PORE PRESSURE DISSIPATION. PDA TEST AND RESTRIKE RESULTS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO FURTHER DRIVING. PILES SHALL BE DRIVEN PLUMB IN ACCORDANCE WITH THESE PLANS AND CUT OFF LEVEL AT THE ELEVATION SHOWN. THE EARTHEN PLUG SHALL BE REMOVED TO ELAVTION SHOWN ON PLANS PRIOR TO PLACING THE PILE REINFORCING CAGE IN PLACE.

PHASE 2: LOWER THE REINFORCING CAGE INTO THE CASINGS FOR THE PILE.

PHASE 3: TYPICAL ABUTMENT CAP INSTALLATION: SLIDE PRECAST CAP ONTO THE PILE CASINGS, FOLLOWED BY A COMPLETE WELD AROUND THE PILE TO MK. EP1. THEN LOWER THE CAP CONNECTION REINFORCEMENT CAGE INTO POSITION.

PHASE 4: LOWER A TREMIE PIPE TO THE BOTTOM OF THE CASING OR SOIL PLUG AND PLACE THE CONCRETE BY THE TREMIE METHOD IN ACCORDANCE WITH THE NORFOLK SOUTHERN RAILWAY STANDARD SPECIFICATIONS.



OPEN END INSIDE FLANGE
CUTTING SHOE DETAIL
SCALE: N.T.S.

NOTES

- ALL WELDS SHALL BE MADE BY WITHER THE SHIELDED METAL ARCH WELDING (SMAW) PROCESS OR THE FLUX CORED ARC WELDING (FCAW) PROCESS. SMAW WELDS SHALL BE MADE WITH E7018 ELECTRODES. FCAW WELDS SHALL BE MADE WITH E71T-8-H16 SELF SHIELDED ELECTRODE WIRE FOR USE IN ALL POSITION WELDING.
- OPEN-END CUTTING SHOE INSIDE FLANGE ATTACHMENT PROCEDURE:
 - INSERT FLANGE OF OPEN-END CUTTING SHOE INTO END OF PIPE PILE, PUTTING SHOE INTO CLOSE CONTACT WITH END OF PIPE PILE.
 - PLACE 5/16" PARTIAL PENETRATING DOUBLE-BEVEL GROVE WELD ALONG THE ENTIRE CIRCUMFERENCE OF THE PIPE PILE AND CONICAL POINT INTERFACE.
 - FILL-IN REMAINING RING WITH TWO 5/16" HOT PASSES AND CAP OFF WITH THREE TO FOUR 5/16" STRINGER WELDS OR UNTIL RING IS FULL.
- FOR PIPE PILE DETAILS AND SECTIONS A-A AND B-B SEE SHEET S12.

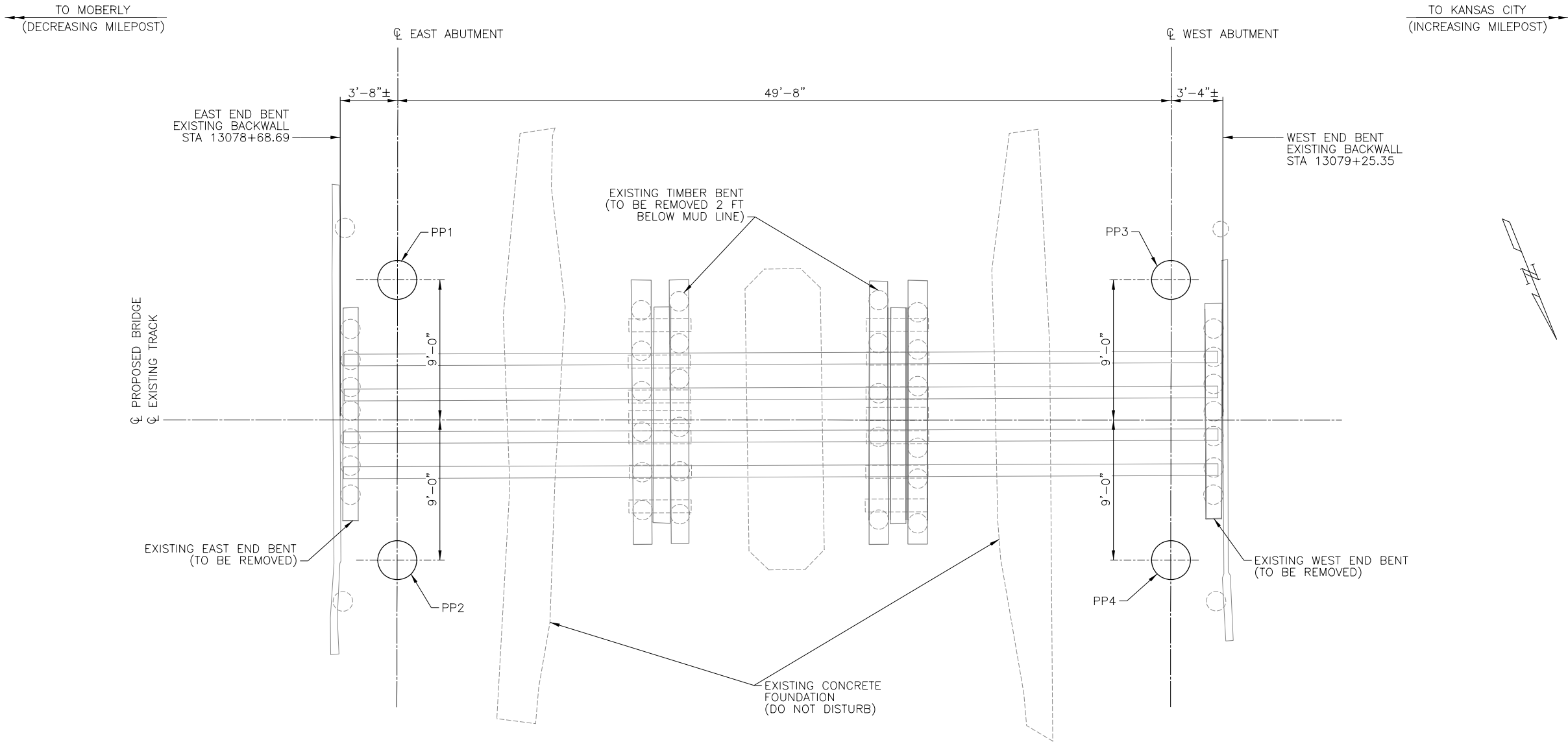
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HDR ENGINEERING, INC.
10450 HOLMES RD.,
SUITE 600
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816-360-2700

REV	BY	DATE	DESCRIPTION	
 NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY				
KANSAS CITY DISTRICT		MIDWEST DIVISION		
<u>BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY</u>				
ORRICK, MO				
BRIDGE REPLACEMENT				
OFFICE OF CHIEF ENGINEER - BRIDGES & STRUCTURES		ATLANTA, GA		
DRAWING TITLE				
PILE INSTALLATION				
DGN	JRR	VAL SEC	2 MO.C	
		MAP	25	
		MILE POST	S-247.69	
FILE No.	BR0020786		DATE	7/15/2024
DWN	BRK	SHEET NUMBER	DRAWING NUMBER	
CHK	SBM	S10 OF S23	S-247.69 24 01	

FILENAME: c:\pwworking\national01\0453353\S-247.69-FL01.dgn USER: brkeller SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



FOUNDATION LAYOUT
SCALE: 1/4" = 1'-0"

NOTE
1. CONTRACTOR TO CONFIRM LOCATION OF EXISTING FOUNDATION COMPONENTS VIA EXPLORATORY EXCAVATION.

PILE BOTTOM ELEVATIONS					
PIER/ABUT.	PILE	STATION	EASTING	NORTHING	ELEVATIONS
EAST ABUTMENT	PP1	13078+72.37	2890656.04	1110930.75	
	PP2	13078+72.37	2890661.03	1110948.06	
WEST ABUTMENT	PP3	13079+22.04	2890608.32	1110944.50	
	PP4	13079+22.04	2890613.30	1110961.80	

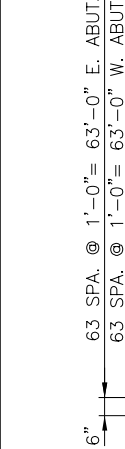
FINAL PILE BOTTOM ELEVATIONS TO BE PROVIDED BY CONTRACTORS FOR AS-BUILTS

REV	BY	DATE	DESCRIPTION
 NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT MIDWEST DIVISION			
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY			
ORRICK, MO			
BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER — BRIDGES & STRUCTURES ATLANTA, GA			
DRAWING TITLE			
FOUNDATION LAYOUT			
DGN	JRR	VAL SEC 2 MO.C	MAP 25
		FILE No. BR0020786	MILE POST S-247.69
DWN	BRK	DATE 7/15/2024	
CHK	SBM	SHEET NUMBER S11 OF S23	DRAWING NUMBER S-247.69 24 01

ISSUE FOR CONSTRUCTION



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10450 HOLMES RD.,
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KANSAS CITY, MO 64131
816-360-2700

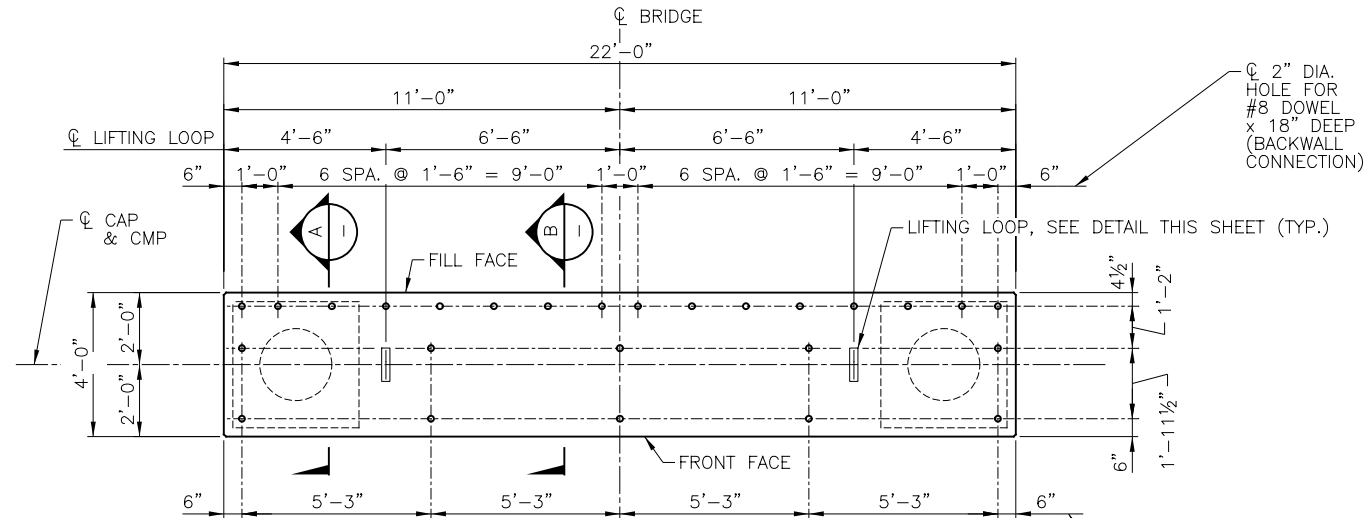


ESTIMATED QUANTITIES PIPE PILES – WEST ABUTMENT		
QTY.	UNIT	DESCRIPTION
29.2	C.Y.	CONCRETE
11,964	LBS.	REINFORCING STEEL, ASTM A615 OR A706, GRADE 60

- ## NOTES
1. FOR ABUTMENT CAP REINFORCEMENT AND DETAILS, SEE SHEET S13.
 2. FOR BACKWALL REINFORCEMENT AND DETAILS, SEE SHEET S15.
 3. FOR RISER BLOCK REINFORCEMENT AND DETAILS, SEE SHEET S14.
 4. FOR PIPE PILE CONNECTION REINFORCING CAGE, SEE SHEET S10.
 5. FOR RISER BLOCK DOWEL QUANTITY SEE SHEET S14, FOR BACKWALL DOWEL QUANTITY SEE SHEET S15.

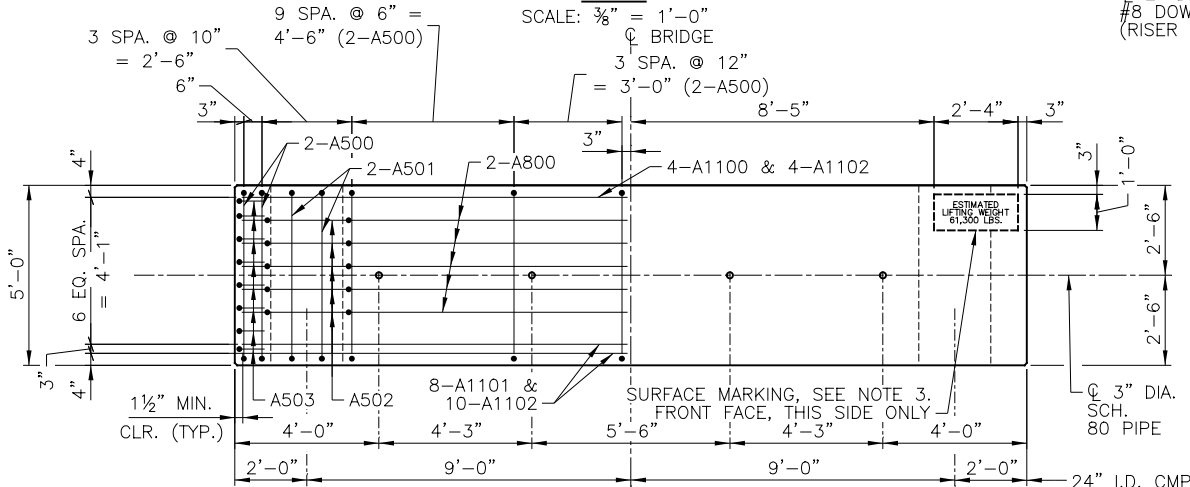


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USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



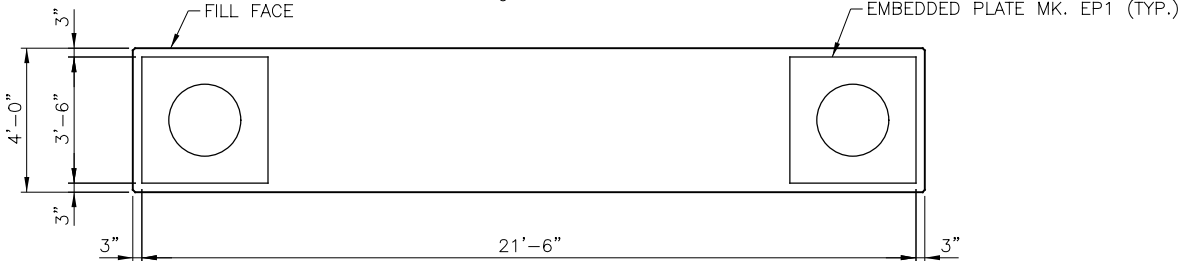
PLAN

SCALE: $\frac{3}{8}$ " = 1'-0"



ELEVATION

SCALE: $\frac{3}{8}$ " = 1'-0"



BOTTOM VIEW

SCALE: $\frac{3}{8}$ " = 1'-0"

WATER REPELLENT:

BASF MASTERPROTECT H400; INSTALL PER MANUFACTURER'S RECOMMENDATIONS. FOR PRODUCT INFORMATION, CONTACT BASF BUILDING SYSTEMS CUSTOMER SERVICE AND TECHNICAL SUPPORT AT:

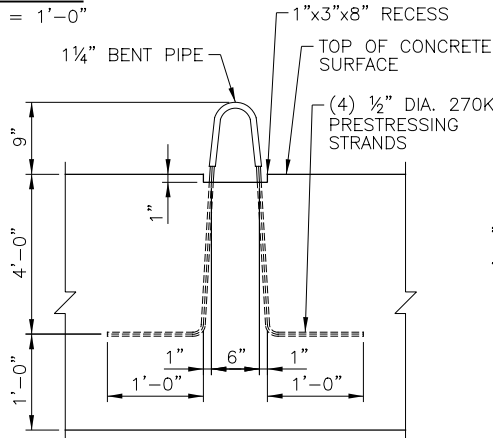
889 VALLEY PARK DRIVE
SHAKOPEE, MN 55379
TELEPHONE: 800-243-6739

LIFTING LOOP NOTE:

LIFTING LOOPS SHALL CONSIST OF (4) $\frac{1}{2}$ " DIA. 270K STRANDS AND SHALL HAVE A BREAKING STRENGTH OF NOT LESS THAN 30 TONS. THE STRANDS SHALL BE THOROUGHLY STEAM CLEANED OF ALL MATTER THAT WOULD PREVENT BONDING STRANDS AND CONCRETE. ONCE PIER CAP IS IN PLACE, LIFTING LOOPS SHALL BE CUT OFF AS LOW AS POSSIBLE. 1" RECESS SHALL BE FILLED WITH EPOXY GROUT.

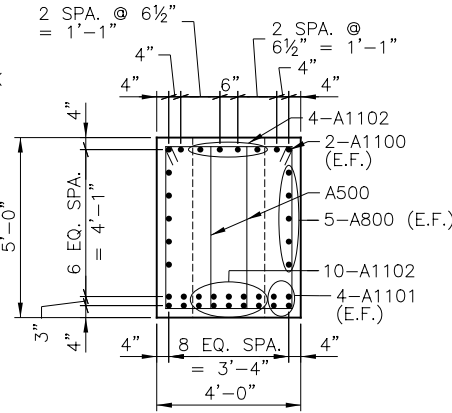
CORRUGATED METAL PIPE NOTE:

24" I.D. 16 GAGE LOCK SEAM WITH HELICAL CORRUGATED STEEL PIPE, ASTM A760, STANDARD SPECIFICATION FOR CORRUGATED STEEL PIPE, METALLIC COATED FOR SEWERS AND DRAINS.



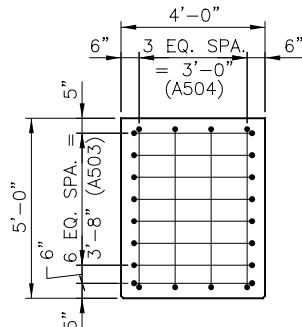
LIFTING LOOP DETAIL

N.T.S.



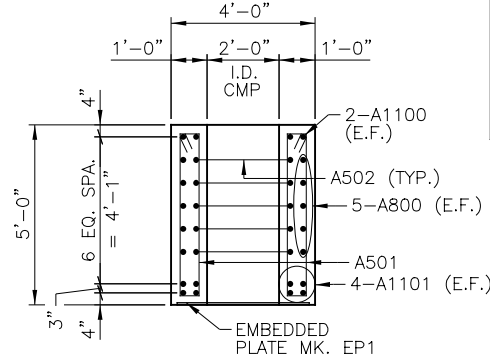
SECTION B-B

SCALE: $\frac{3}{8}$ " = 1'-0"



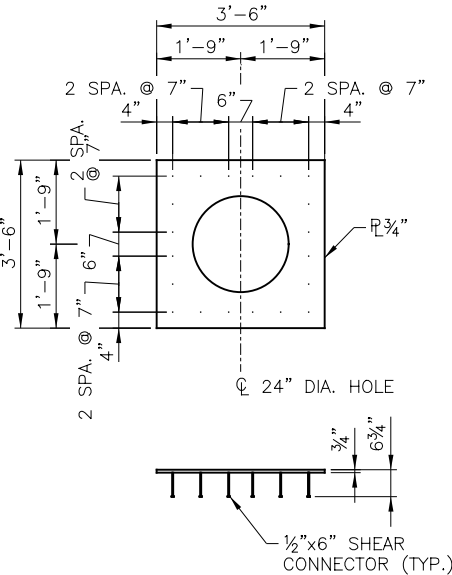
END VIEW

SCALE: $\frac{3}{8}$ " = 1'-0"
EMBEDDED PLATE
NOT SHOWN FOR CLARITY



SECTION A-A

SCALE: $\frac{3}{8}$ " = 1'-0"



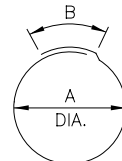
EMBEDDED PLATE MK. EP1

SCALE: $\frac{1}{2}$ " = 1'-0"
ESTIMATED WEIGHT = 287 LBS. EA.
(2 REQ'D. AT EACH 2-PILE CAP)

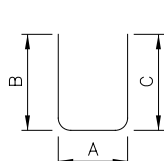
REINFORCING STEEL SCHEDULE - 1 EA. CAP

MARK	BAR NO.	NO. REQ'D	LENGTH (FT.)	TYPE	A	B	C	LOCATION	WEIGHT (LBS.)
A500	#5	60	17'-7"	3	3'-8"	4'-8"	0'-5 $\frac{1}{2}$ "	STIRRUP	1,100
A501	#5	8	11'-7"	3	0'-8"	4'-8"	0'-5 $\frac{1}{2}$ "	STIRRUP	97
A502	#5	10	9'-11"	10	2'-8"	1'-6"	-	CONFINEMENT	103
A503	#5	16	5'-4"	2	3'-8"	0'-10"	0'-10"	EACH END	89
A504	#5	8	6'-4"	2	4'-8"	0'-10"	0'-10"	EACH END	53
A800	#8	10	21'-8"	STR	-	-	-	EACH FACE HORIZONTAL	579
A1100	#11	4	21'-8"	STR	-	-	-	TOP HORIZONTAL	460
A1101	#11	8	21'-8"	STR	-	-	-	BOTTOM HORIZONTAL	921
A1102	#11	14	19'-8"	2	15'-8"	2'-0"	2'-0"	TOP & BOTTOM HORIZONTAL	1,463
TOTAL									4,865

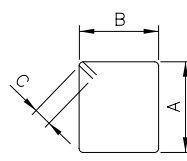
BENDING DIAGRAM



TYPE 10



TYPE 2



TYPE 3

ESTIMATED QUANTITIES - 1 EA. CAP

QTY.	UNIT	DESCRIPTION
15.1	C.Y.	CONCRETE
4,865	LBS.	REINFORCING STEEL, ASTM A615 OR A706, GRADE 60
2	EACH	LIFTING LOOPS
10	LIN. FT.	24" I.D., 16 GAGE ASTM A706 LOCK SEAM HELICAL CORRUGATED STEEL PIPE
7	GAL.	CONCRETE WATER REPELLENT
7	GAL.	CONCRETE CURING COMPOUND
2	EACH	EMBED PLATE, MK EP1
16	FT.	3" DIA., ASTM D1785 SCHEDULE 80 PIPE

LIFTING WEIGHTS (LBS.)

ITEM	WEIGHT (LBS.)
1 PC CONCRETE BENT CAP	61300

NOTES

- (E.F.) DENOTES EACH FACE,
(F.F.) DENOTES FAR FACE,
(N.F.) DENOTES NEAR FACE.
- ALL CONCRETE CORNERS OF 90 DEGREES OR GREATER SHALL HAVE A $\frac{3}{4}$ " CHAMFER PROVIDED UNLESS OTHERWISE NOTED ON THE PLANS. EXCEPT WHERE PLATES ARE LOCATED IN THE CORNER.
- SURFACE MARKINGS SHALL BE MADE USING BLACK INDUSTRIAL STRENGTH, FADE RESISTANT PAINT, STENCIL LETTERING SHALL BE 2" IN HEIGHT.

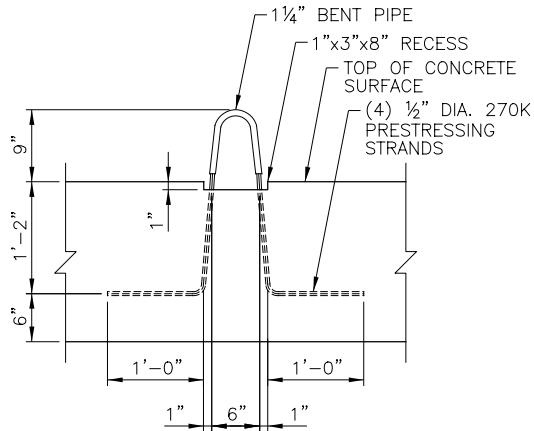
REV	BY	DATE	DESCRIPTION
 NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT		MIDWEST DIVISION	
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY			
ORRICK, MO			
BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES			ATLANTA, GA
DRAWING TITLE			
ABUTMENT SECTION AND DETAILS			
DGN JRR	VAL SEC 2 MO.C	MAP 25	MILE POST S-247.69
DWN BRK	FILE No. BR0020786	DATE 7/15/2024	DRAWING NUMBER
CHK SBM	S13 OF S23		S-247.69 24 01

ISSUE FOR CONSTRUCTION

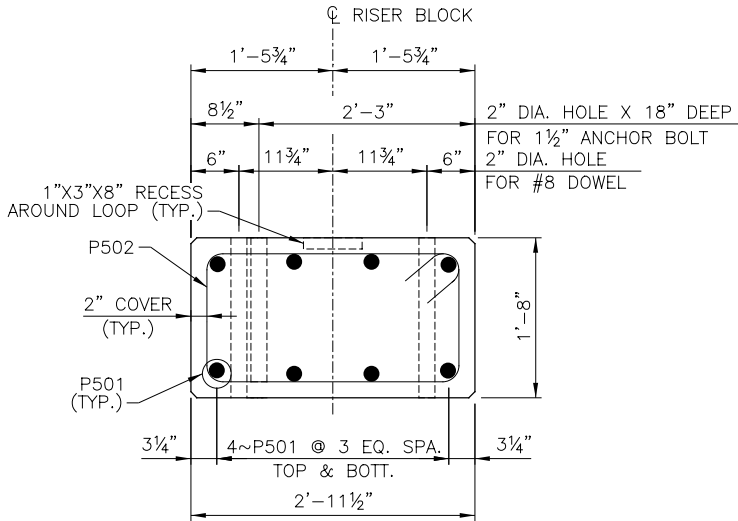


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10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

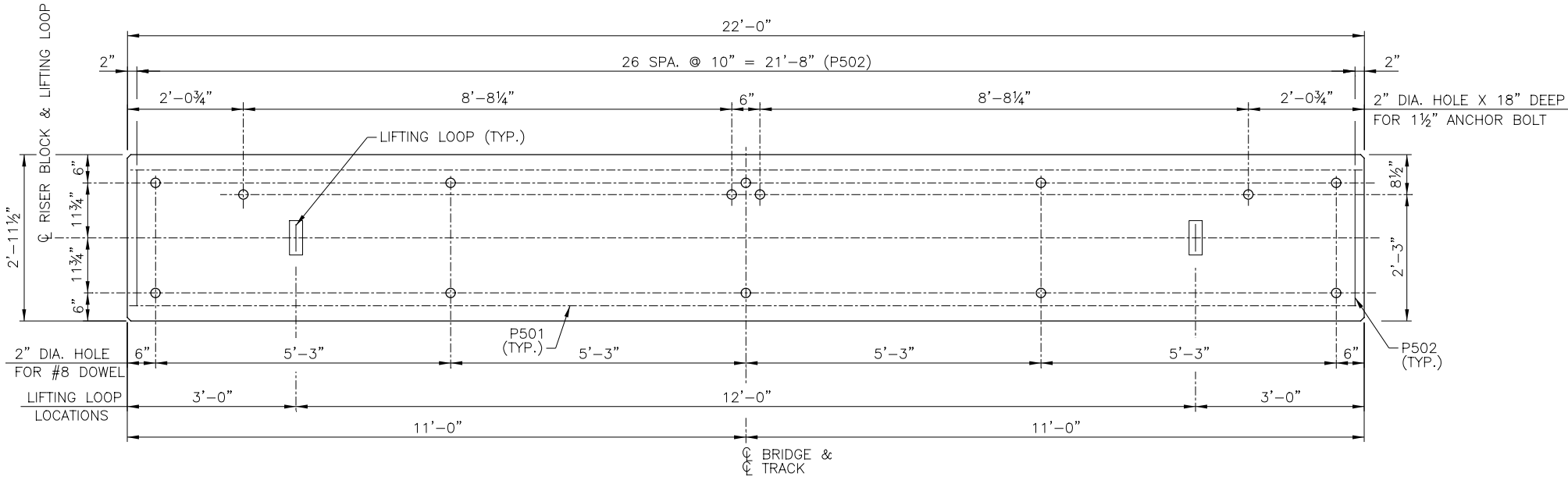
FILENAME: c:\pwworking\national01\0453353\S-247.69-AF01.dgn
USER: brkeler
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



LIFTING LOOP DETAIL
SCALE: 1" = 1'-0"



PRECAST CONCRETE RISER BLOCK ELEVATION
SCALE: 1" = 1'-0"



PRECAST CONCRETE RISER BLOCK PLAN
SCALE: 3/4" = 1'-0"

NOTES

1. INSTALL #8 DOWELS THROUGH HOLES AND FILL WITH GROUT.
2. APPLY GROUT BED TO PRECAST CAP PRIOR TO RISER BLOCK INSTALLATION TO ENSURE CONSISTENT CONTACT BETWEEN THE PRECAST PIECES.

REINFORCING STEEL SCHEDULE – 1 EA. RISER BLOCK									
MARK	BAR NO.	NO. REQ'D	LENGTH (FT.)	TYPE	A	B	C	LOCATION	WEIGHT (LBS.)
P501	#5	8	21'-8"	STR	–	–	–	TOP & BOTT. HORIZONTAL	181
P502	#5	27	8'-10"	3	2'-7½"	1'-4"	0'-5½"	STIRRUP	249
TOTAL									430
BENDING DIAGRAM									

ESTIMATED QUANTITIES – 1 EA. RISER BLOCK		
QTY.	UNIT	DESCRIPTION
4.00	C.Y.	CONCRETE
430	LBS.	REINFORCING STEEL, ASTM A615 OR A706, GRADE 60
2	EACH	LIFTING LOOP
4	GAL.	CONCRETE WATER REPELLENT
4	GAL.	CONCRETE CURING COMPOUND
10	EACH	#8 DOWEL BARS (10~3'-0"), REQUIRE FOR PRECAST RISER BLOCK TO CAP CONNECTION
1	EACH	GROUT FOR DOWELS AND LEVELING

LIFTING WEIGHTS (LBS.)	
ITEM	WEIGHT (LBS.)
1 PC RISER BLOCK	16,200

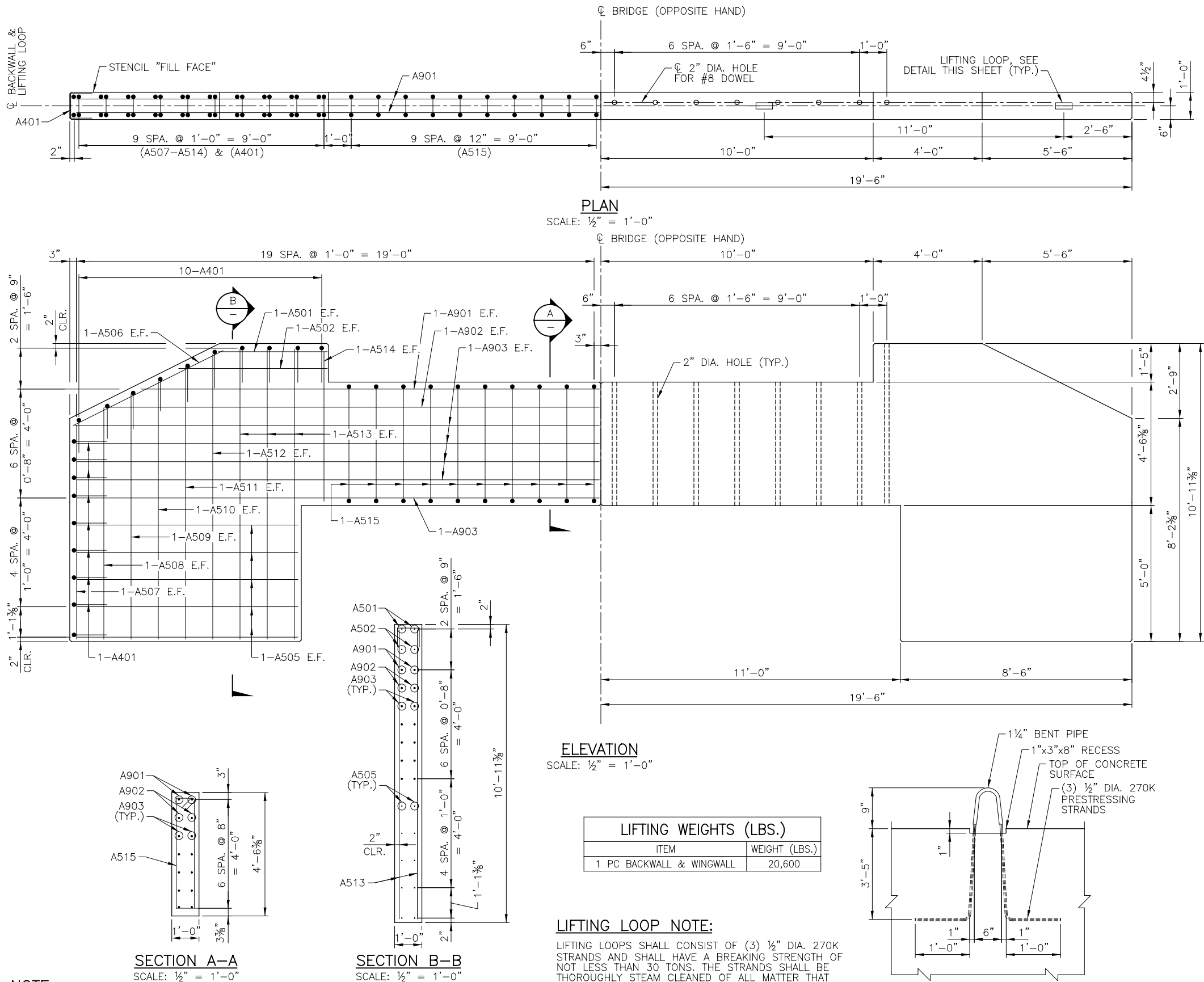
REV	BY	DATE	DESCRIPTION	
NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY				
KANSAS CITY DISTRICT			MIDWEST DIVISION	
<u>BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY</u>				
ORRICK, MO				
BRIDGE REPLACEMENT				
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES			ATLANTA, GA	
DRAWING TITLE				
PRECAST RISER BLOCK				
DGN	JRR	VAL SEC	2 MO.C	MAP 25
DWN	BRK	FILE No.	BR0020786	MILE POST S-247.69
CHK	SBM	SHEET NUMBER	S14 OF S23	DATE 7/15/2024
				DRAWING NUMBER S-247.69 24 01

ISSUE FOR CONSTRUCTION



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10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

FILENAME: c:\pwworking\national01\04053353\S-247.69-AF02.dgn
USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



- NOTE:
- CONCRETE WATER REPELLEND AND CURING COMPOUND MUST ADHERE TO THE NSR STANDARD SPECIFICATIONS FOR MATERIALS AND CONSTRUCTION, THE PROJECT SPECIAL SPECIFICATIONS AND PLAN NOTES.
 - SURFACE MARKINGS SHALL BE MADE USING BLACK INDUSTRIAL STRENGTH, FADE RESISTANT PAINT, STENCIL LETTERING SHALL BE 2" IN HEIGHT.

REINFORCING STEEL SCHEDULE — 1 EA. BACKWALL AND WINGWALL

MARK	BAR NO.	NO. REQ'D	LENGTH (FT.)	TYPE	A	B	C	LOCATION	WEIGHT (LBS.)
A501	#5	2	3'-9 1/2"	STR	-	-	-	EACH FACE HORIZONTAL	8
A502	#5	2	5'-3 1/2"	STR	-	-	-	EACH FACE HORIZONTAL	11
A901	#9	2	16'-9 1/2"	STR	-	-	-	EACH FACE HORIZONTAL	114
A902	#9	2	18'-1 1/2"	STR	-	-	-	EACH FACE HORIZONTAL	123
A903	#9	10	19'-2"	STR	-	-	-	EACH FACE HORIZONTAL	652
A505	#5	10	8'-2"	STR	-	-	-	EACH FACE HORIZONTAL	85
A506	#5	2	6'-0"	STR	-	-	-	EACH FACE DIAGONAL	13
A507	#5	2	7'-11 1/2"	STR	-	-	-	EACH FACE VERTICAL	17
A508	#5	2	8'-5 1/2"	STR	-	-	-	EACH FACE VERTICAL	18
A509	#5	2	8'-11 1/2"	STR	-	-	-	EACH FACE VERTICAL	19
A510	#5	2	9'-5 1/2"	STR	-	-	-	EACH FACE VERTICAL	20
A511	#5	2	9'-11 1/2"	STR	-	-	-	EACH FACE VERTICAL	21
A512	#5	2	10'-5 1/2"	STR	-	-	-	EACH FACE VERTICAL	22
A513	#5	6	10'-7"	STR	-	-	-	EACH FACE VERTICAL	66
A514	#5	2	5'-7"	STR	-	-	-	EACH FACE VERTICAL	12
A515	#5	10	10'-5"	3	4'-1"	0'-8"	0'-5 1/2"	VERTICAL	109
A401	#4	19	2'-0"	2	0'-8"	0'-8"	0'-8"	U BARS	25
TOTAL									1,335

BENDING DIAGRAM



ESTIMATED QUANTITIES — 1 EA. BACKWALL AND WINGWALL

QTY.	UNIT	DESCRIPTION
5.07	C.Y.	CONCRETE
1,335	LBS.	REINFORCING STEEL, ASTM A615 OR A706, GRADE 60
2	EACH	LIFTING LOOP
5	GAL.	CONCRETE WATER REPELLENT
5	GAL.	CONCRETE CURING COMPOUND
8	EACH	#8 DOWEL BARS (7~5'-11" AND 1~7'-4"), REQUIRE FOR PRECAST BACKWALL & WINGWALL TO CAP CONNECTION
1	EACH	GROUT FOR DOWELS



KANSAS CITY DISTRICT
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY
ORRICK, MO
BRIDGE REPLACEMENT

OFFICE OF CHIEF ENGINEER — BRIDGES & STRUCTURES			ATLANTA, GA	
DRAWING TITLE				
PRECAST BACKWALL AND WINGWALL				
DGN JRR	VAL SEC	2 MO.C	MAP 25	MILE POST S-247.69
DWN BRK	FILE No.	BR0020786		DATE 7/15/2024
CHK SBM	SHEET NUMBER	S15 OF S23		DRAWING NUMBER S-247.69 24 01

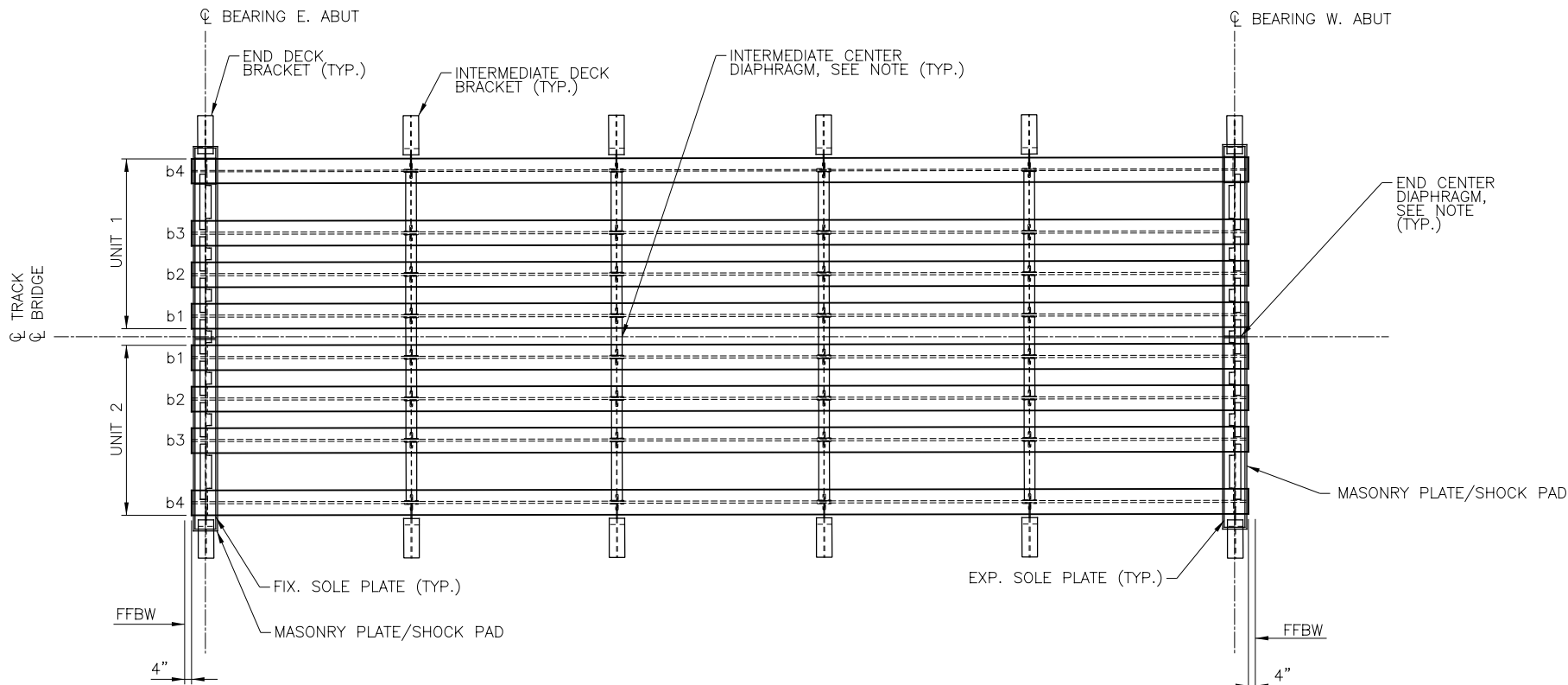
ISSUE FOR CONSTRUCTION



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SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS

← TO MOBERLY
(DECREASING MILEPOST)

TO KANSAS CITY
→ (INCREASING MILEPOST)



ERECTION PLAN
SCALE: 1/4" = 1'-0"
(DECK PLATE NOT SHOWN FOR CLARITY)

LIFTING WEIGHTS (LBS.)	
UNIT NO.	SPAN 1
UNIT 1	98,800
UNIT 2	98,800

*LIFTING WEIGHTS INCLUDE A 20% CONTINGENCY

NOTES

SHIP END AND INTERMEDIATE CENTER
DIAPHRAGMS LOOSE AND ATTACH IN
FIELD PRIOR COMBINING UNITS

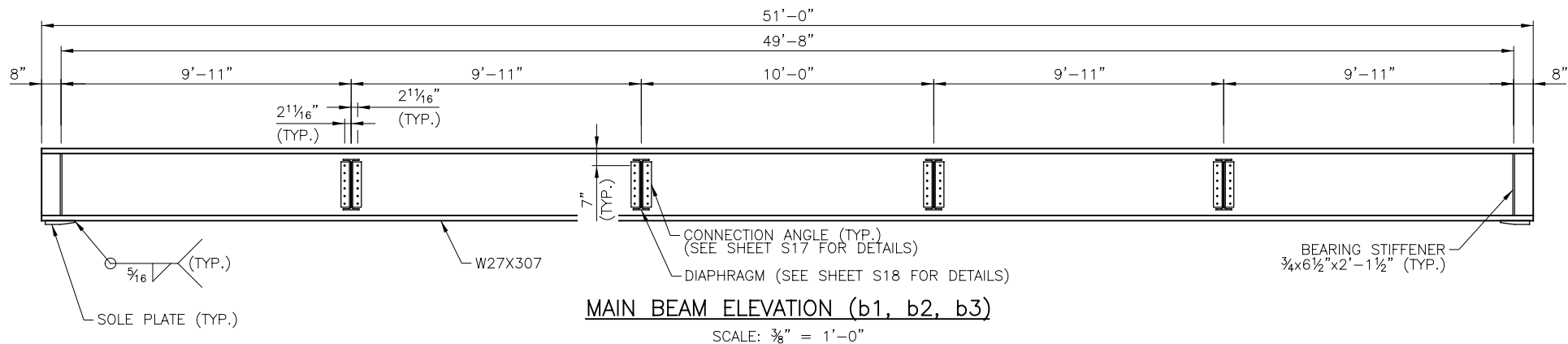
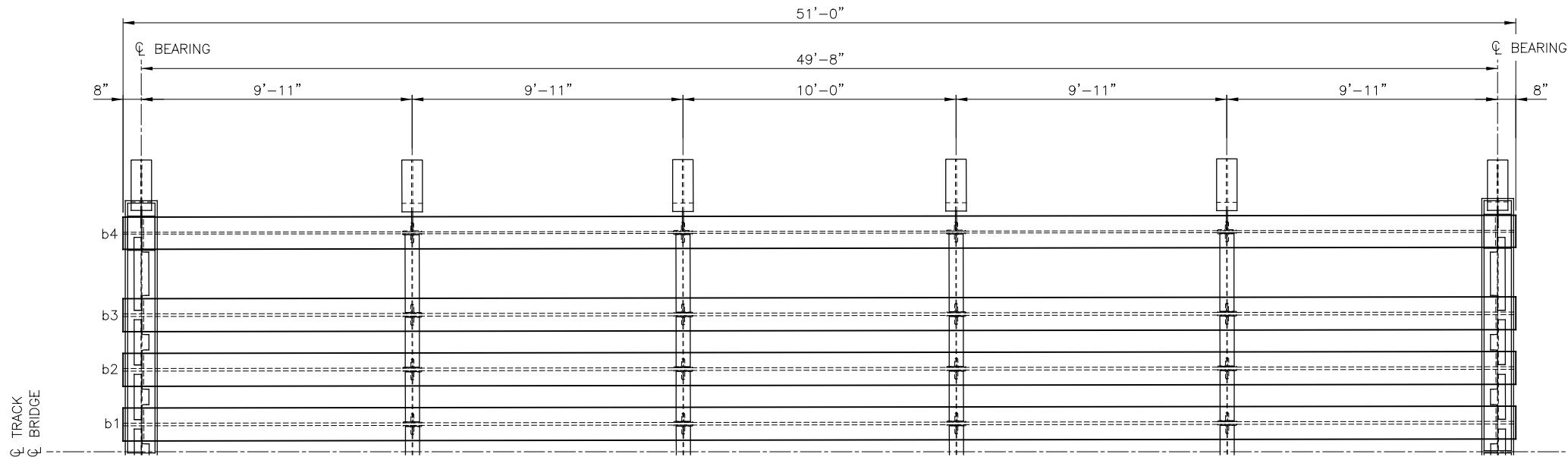
REV	BY	DATE	DESCRIPTION	
NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY				
KANSAS CITY DISTRICT			MIDWEST DIVISION	
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY				
ORRICK, MO				
BRIDGE REPLACEMENT				
OFFICE OF CHIEF ENGINEER - BRIDGES & STRUCTURES			ATLANTA, GA	
DRAWING TITLE				
ERECTION PLAN				
DGN	JRR	VAL SEC	2 MO.C	MAP 25
FILE No.			BR0020786	MILE POST S-247.69
DWN	BRK	SHEET NUMBER		DATE 7/15/2024
CHK	SBM	S16 OF S23		DRAWING NUMBER S-247.69 24 01

ISSUE FOR CONSTRUCTION



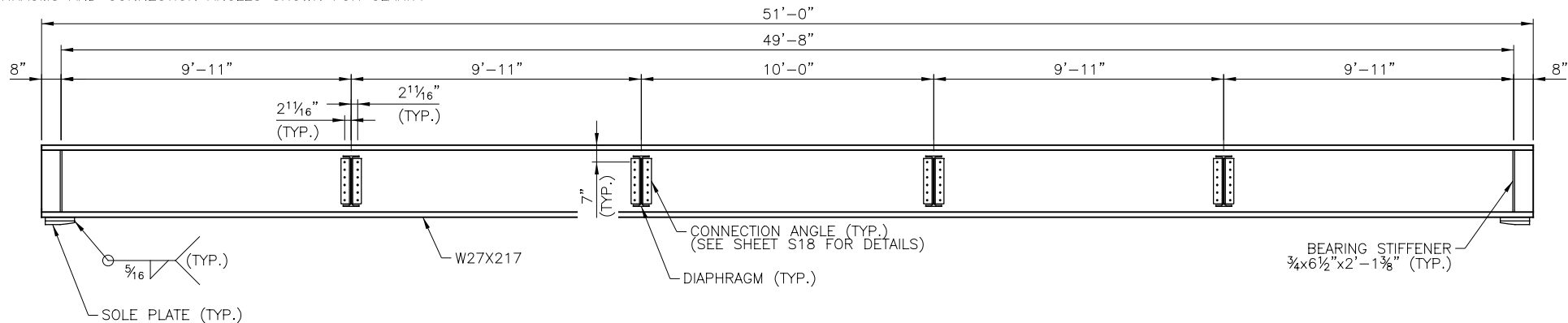
HDR ENGINEERING, INC.
10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

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SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



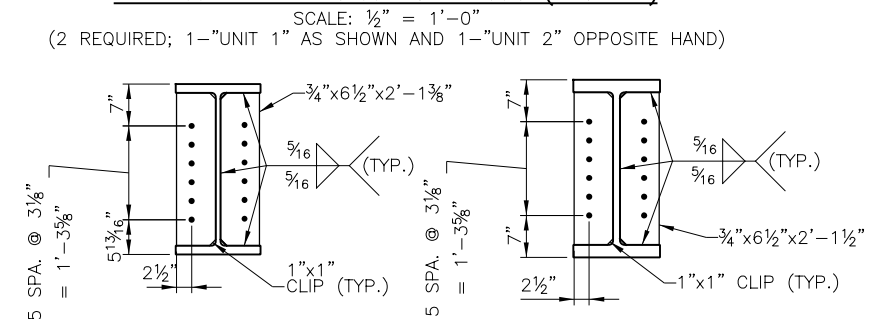
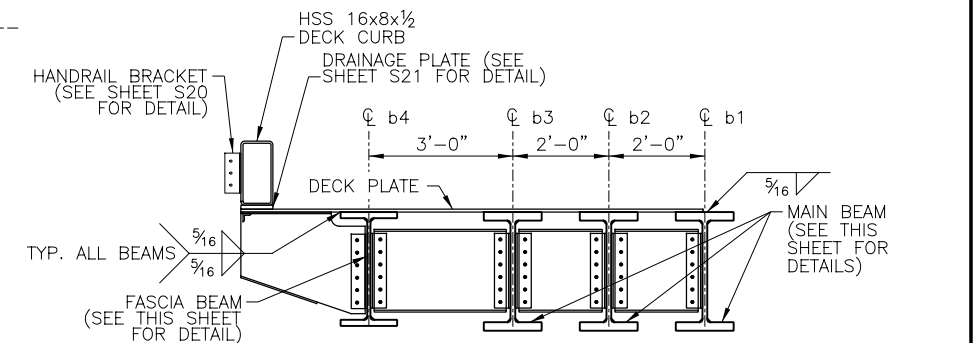
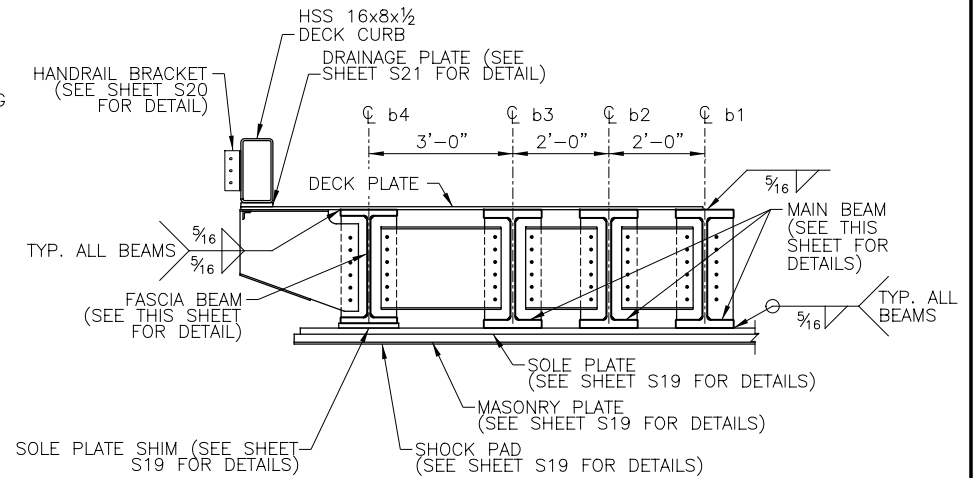
NOTES

DIAPHRAGMS AND CONNECTION ANGLES SHOWN FOR CLARITY



NOTES

DIAPHRAGMS AND CONNECTION ANGLES SHOWN FOR CLARITY



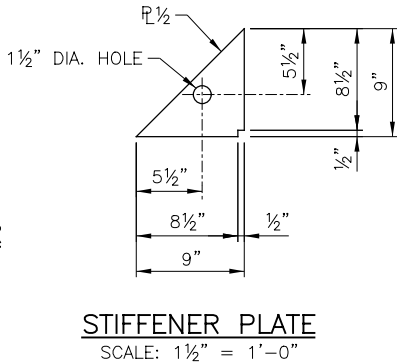
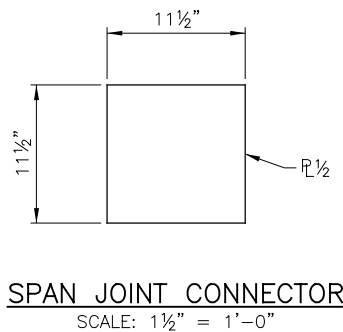
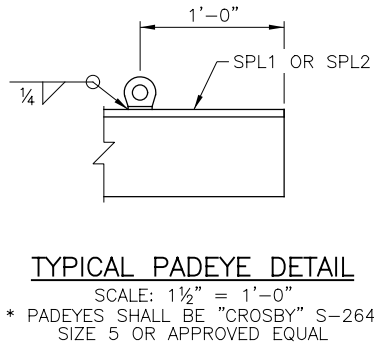
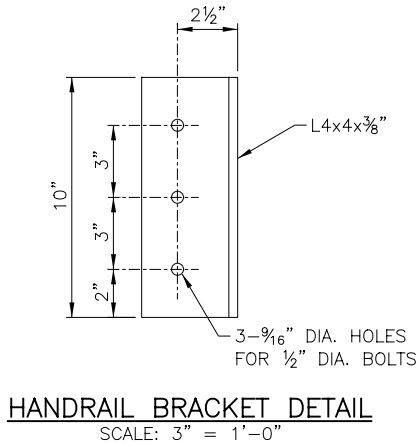
REV	BY	DATE	DESCRIPTION	
 NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY				
KANSAS CITY DISTRICT			MIDWEST DIVISION	
<u>BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY</u>				
ORRICK, MO				
BRIDGE REPLACEMENT				
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES			ATLANTA, GA	
DRAWING TITLE				
FRAME PLAN AND BEAM ELEVATIONS				
DGN JRR	VAL SEC	2 MO.C	MAP 25	FILE POST S-247.69
DWN BRK	FILE No.	BR0020786		DATE 7/15/2024
CHK SBM	SHEET NUMBER	S17 OF S23		DRAWING NUMBER S-247.69 24 01

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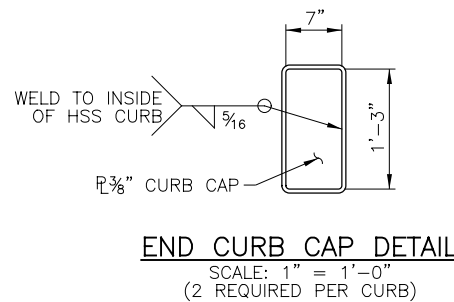
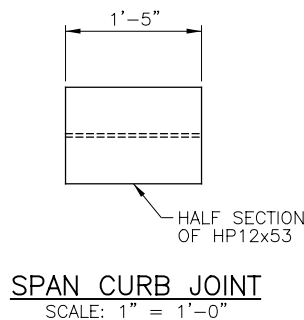
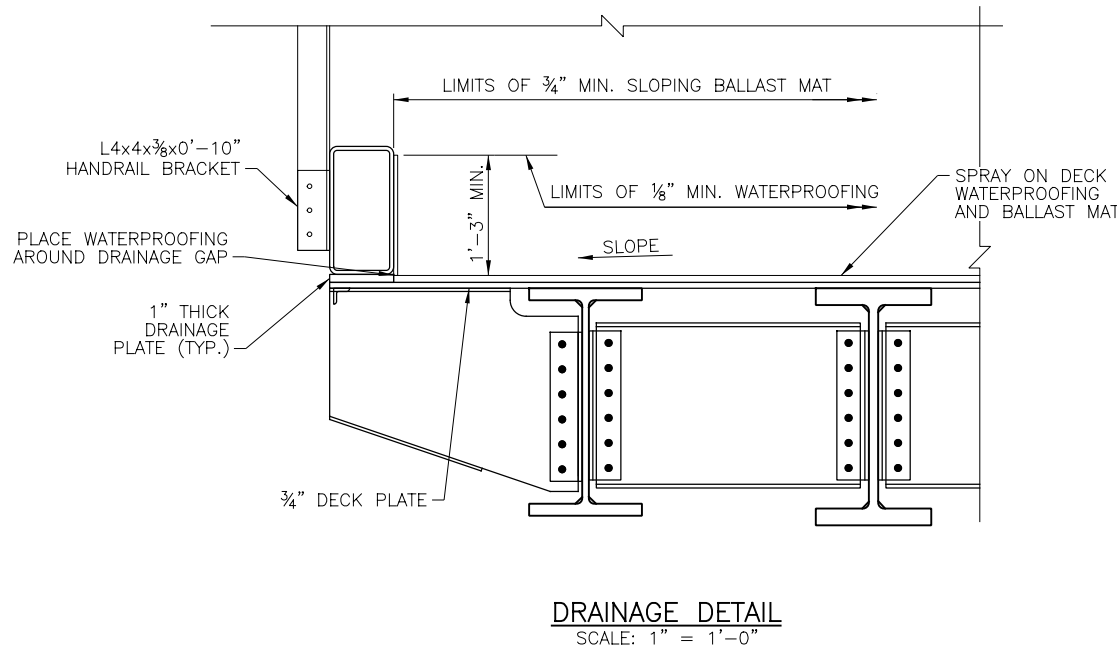
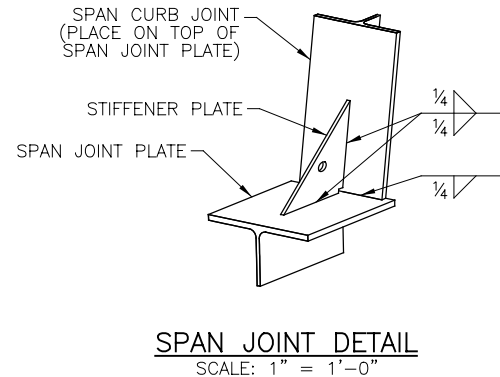
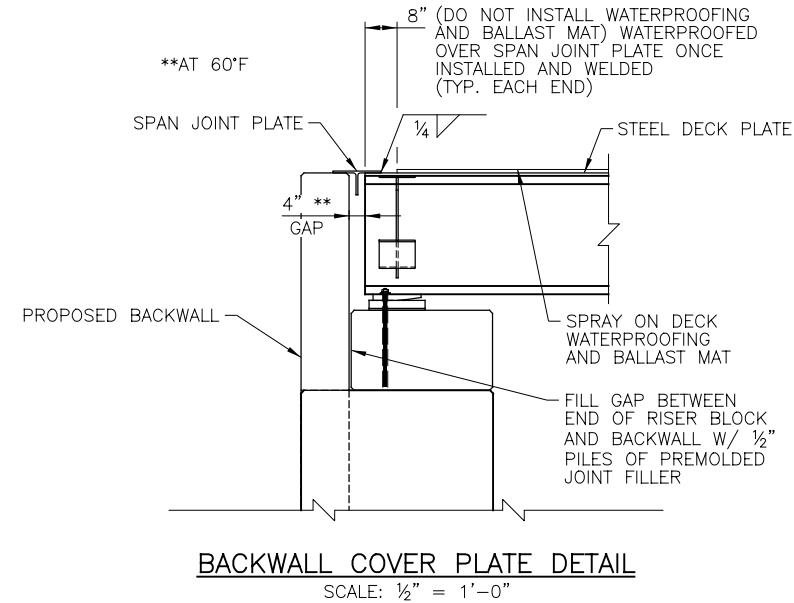
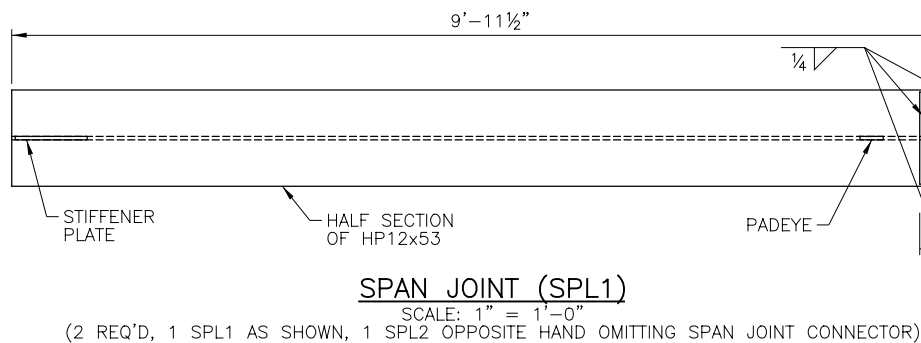


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10450 HOLMES RD.,
SUITE 600
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816-360-2700

FILENAME: c:\pwworking\national01\d0453353\S-247.69-SD02.dgn
USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



DECK PLATE LAYOUT
SCALE: 3/16" = 1'-0"



NOTES

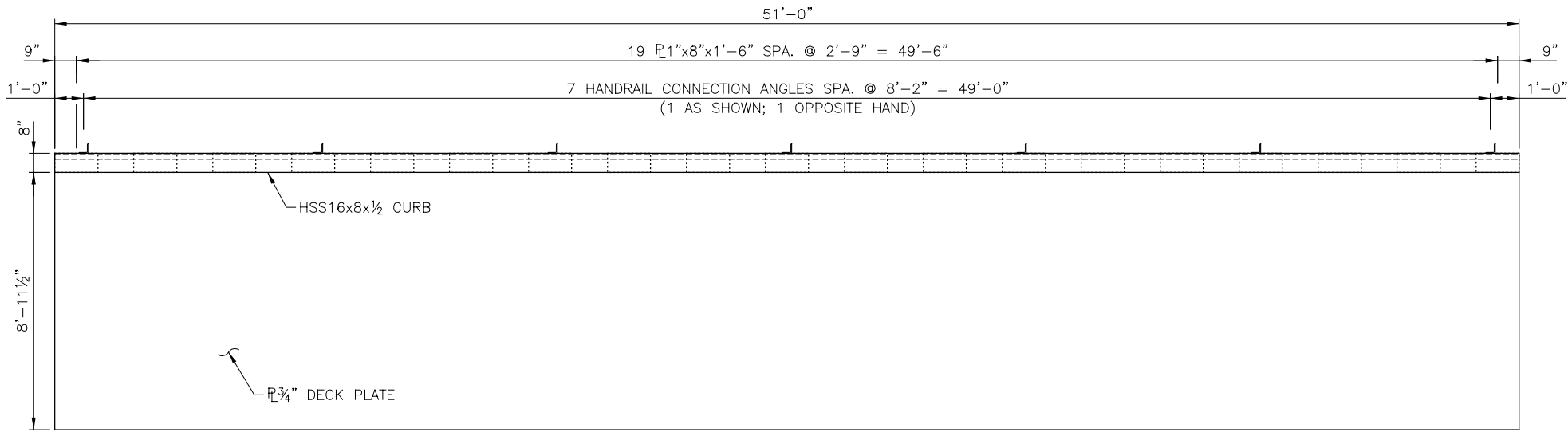
- TOP SURFACE OF THE DECK AND SIDE WALLS ARE TO BE PROTECTED WITH A COLD SPRAY MEMBRANE WATERPROOFING SYSTEM PER MANUFACTURER'S REQUIREMENTS:
A. WASSER* POLYFLEX 311, 4118 PLACE NW SUITE, AUBURN, WA 98001, USA. TEL: 253-850-2967
B. ELIMINATOR BY STERLING LLOYD PRODUCTS, INC. 152 ROCKWELL ROAD, BUILDING A, NEWINGTON, CT 06111. USA, TEL: 860-666-5008
C. BRIDGE DECK MEMBRANE BY BRIDGE PRESERVATION, 686 S. ADAMS ST., KANSAS CITY, KS 66105, TEL: (913) 321-9000
- SPRAY ON WATERPROOFING SHALL BE APPLIED IN STRICT ACCORDANCE TO THE MANUFACTURE'S INSTRUCTIONS AND RECOMMENDED THICKNESS.
- BALLAST MAT SHALL BE BRIDGE PRESERVATION (PPG) SPRAY APPLIED, SLOPED BALLAST MAT, OR AN ENGINEER APPROVED EQUAL.

REV	BY	DATE	DESCRIPTION		
 NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY					
KANSAS CITY DISTRICT			MIDWEST DIVISION		
<u>BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY</u>					
ORRICK, MO					
BRIDGE REPLACEMENT					
OFFICE OF CHIEF ENGINEER - BRIDGES & STRUCTURES				ATLANTA, GA	
DRAWING TITLE					
STEEL DECK DETAILS (1 OF 2)					
DGN	JRR	VAL SEC	2 MO.C	MAP	25
			MILE POST S-247.69		
DWN	BRK	FILE No.	BR0020786		DATE 7/15/2024
		SHEET NUMBER		DRAWING NUMBER	
CHK		SBM		S20 OF S23	
				S-247.69 24 01	

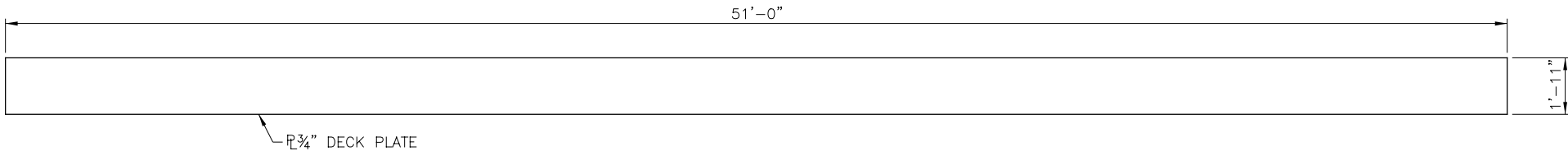
ISSUE FOR CONSTRUCTION



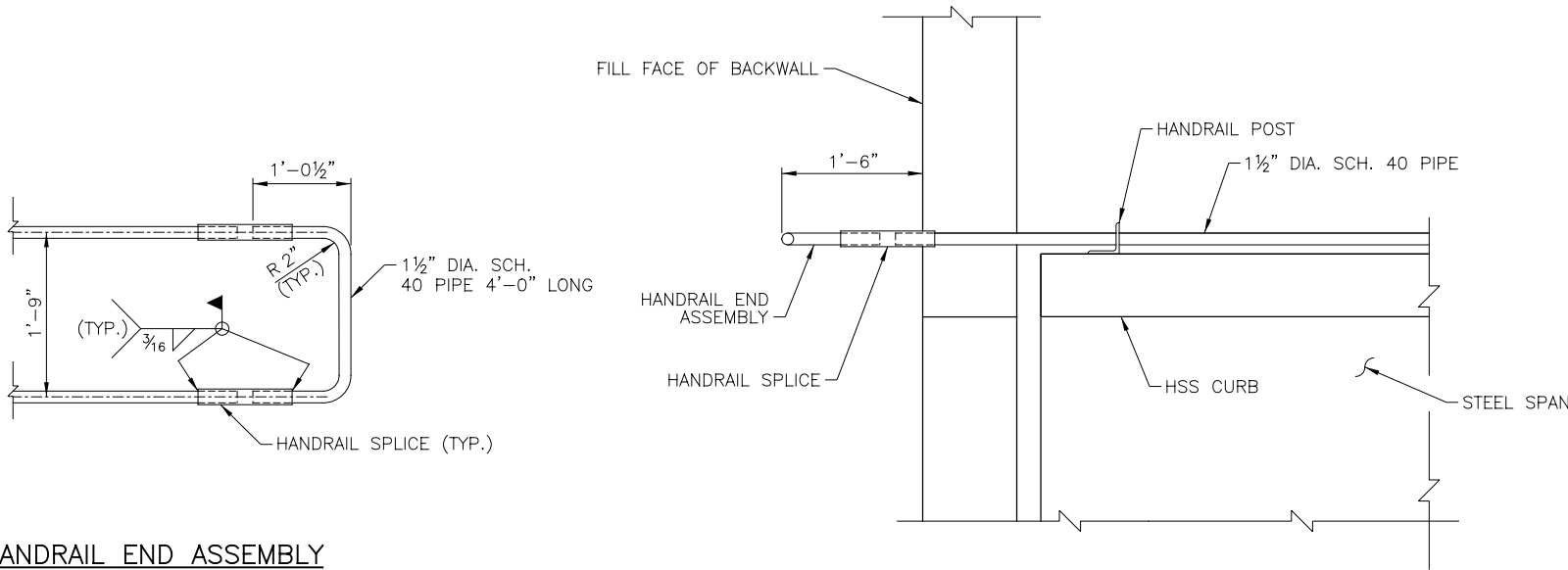
FILENAME: c:\pwworking\national01\d0453353\S-247.69-SD03.dgn
USER: brkeller
SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



DECK PLATE & CURB (DP1)
SCALE: 3/8" = 1'-0"
(2 REQ'D; 1 DP1 AS SHOWN, AND 1 DP3 OPPOSITE HAND)

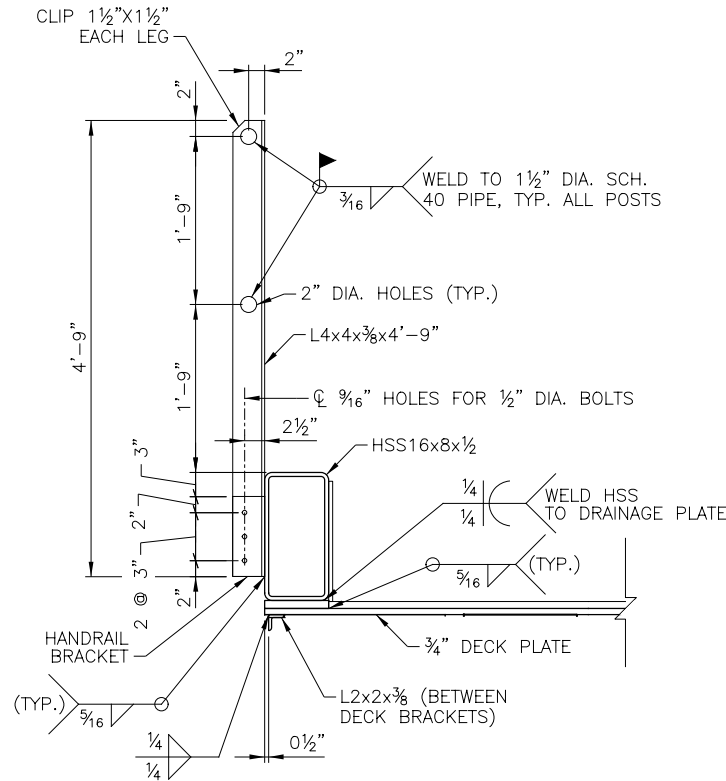


DECK PLATE (DP2)
SCALE: 3/8" = 1'-0"
(1 REQ'D, WT. 2,995 LBS. EACH)

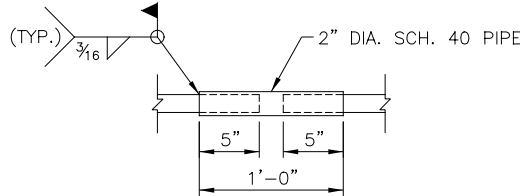


HANDRAIL END ASSEMBLY
SCALE: 1" = 1'-0"
4 REQ'D

HANDRAIL LAYOUT
SCALE: 1" = 1'-0"



CURB & WALKWAY DETAIL
SCALE: 1" = 1'-0"
(14 HANDRAIL POST REQ.; 7 AS SHOWN, 7 OPPOSITE HAND)
(SEE NSR STANDARD PLANS FOR 1 1/2" DIA. PIPE DETAILS)



HANDRAIL SPLICE
SCALE: 1 1/2" = 1'-0"

NOTES

- STEEL PIPE FOR HANDRAILS SHALL CONFORM TO ASTM A53, GRADE B OR A501 ANGLES FOR HANDRAIL SHALL CONFORM TO ASTM A36.
- BOLTS, NUTS, WASHERS, CLIPS, HANDRAIL POSTS, AND HANDRAIL PIPE SHALL BE HOT-DIPPED GALVANIZED. HANDRAIL POSTS SHALL BE PAINT COATED AFTER FABRICATION.

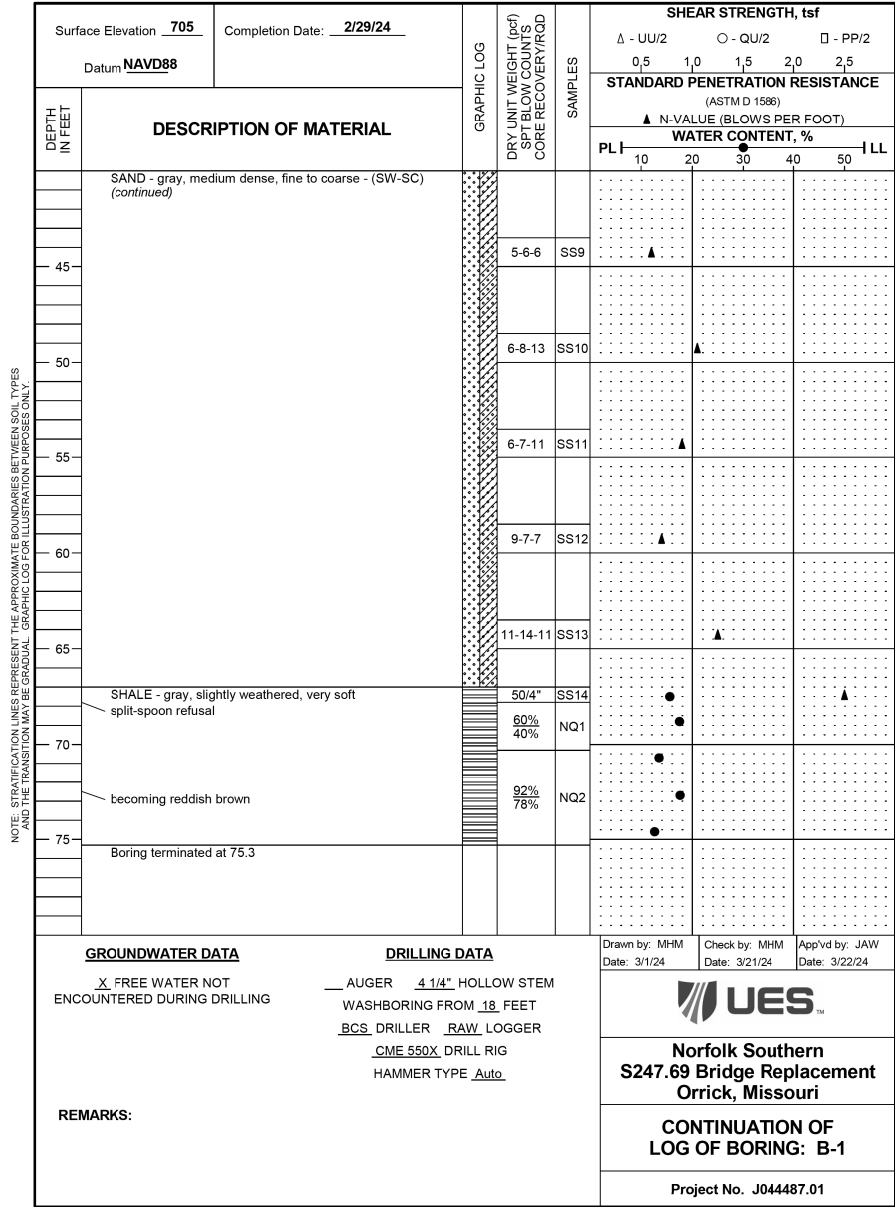
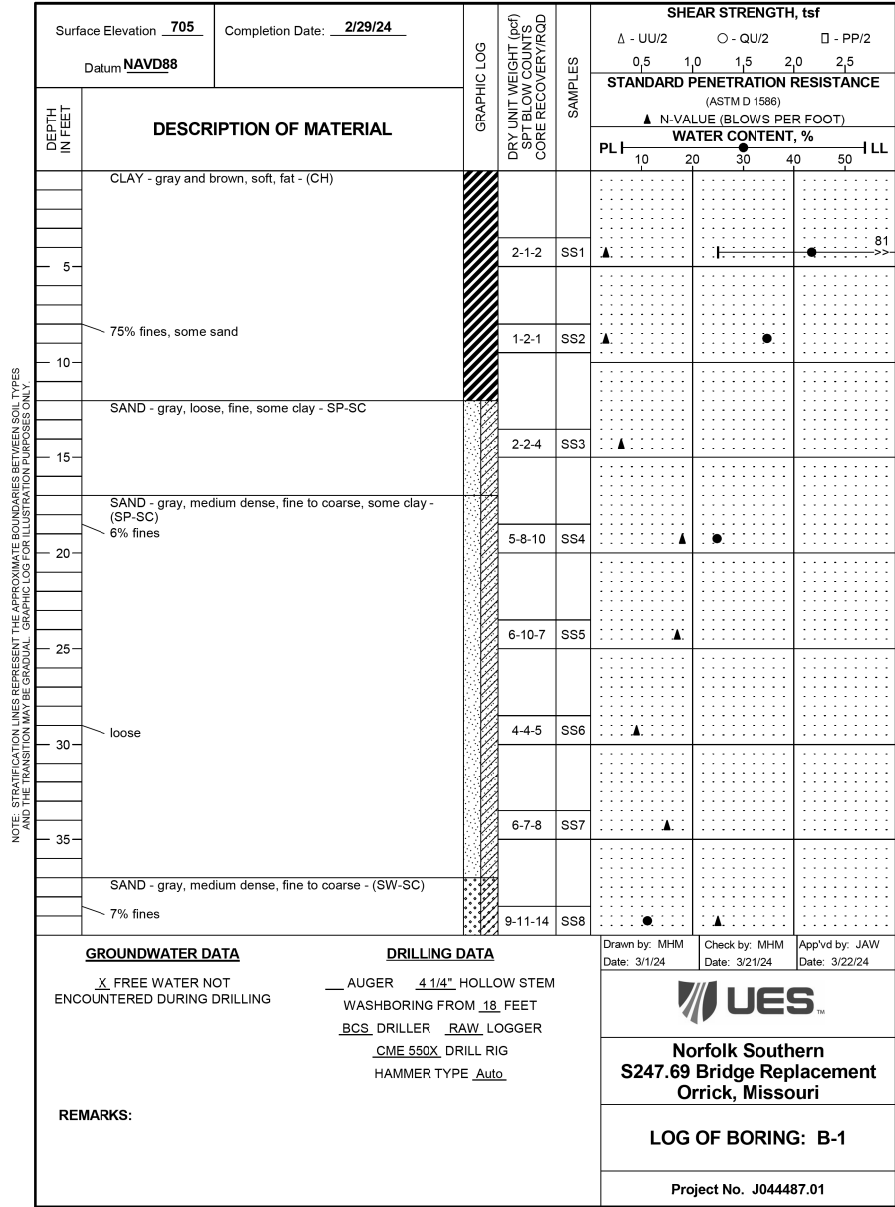
REV	BY	DATE	DESCRIPTION	
NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY				
KANSAS CITY DISTRICT			MIDWEST DIVISION	
<u>BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY</u>				
ORRICK, MO				
BRIDGE REPLACEMENT				
OFFICE OF CHIEF ENGINEER - BRIDGES & STRUCTURES			ATLANTA, GA	
DRAWING TITLE				
STEEL DECK DETAILS (2 OF 2)				
DGN	JRR	VAL SEC	2 MO.C	MAP 25
DWN	BRK	FILE No.	BR0020786	MILE POST S-247.69
CHK	SBM	SHEET NUMBER	S21 OF S23	DATE 7/15/2024
				DRAWING NUMBER
				S-247.69 24 01

ISSUE FOR CONSTRUCTION



HDR ENGINEERING, INC.
10450 HOLMES RD.,
SUITE 600
KANSAS CITY, MO 64131
816-360-2700

FILENAME: c:\pwworking\national01\04053353\S-247.69-B001.dgn USER: brkeller SCALE FACTORS CORRESPOND WITH FULL SIZE (22"x34") DRAWINGS



REV	BY	DATE	DESCRIPTION
			
NORFOLK SOUTHERN RAILWAY			
KANSAS CITY DISTRICT		MIDWEST DIVISION	
BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY			
ORRICK, MO			
BRIDGE REPLACEMENT			
OFFICE OF CHIEF ENGINEER — BRIDGES & STRUCTURES			ATLANTA, GA
DRAWING TITLE			
BORING LOGS (1 OF 2)			
DGN	JRR	VAL SEC 2 MO.C	MAP 25
DWN	BRK	FILE No. BR0020786	DATE 7/15/2024
CHK	SBM	SHEET NUMBER S22 OF S23	DRAWING NUMBER S-247.69 24 01

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KANSAS CITY, MO 64131
816-360-2700

Surface Elevation <u>704</u>		Completion Date: <u>3/4/24</u>		GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/ROD	SAMPLES	SHEAR STRENGTH, tsf						
Datum <u>NAVD88</u>							Δ - UU/2	○ - QU/2	□ - PP/2				
							0,5	1,0	1,5 2,0 2,5				
							STANDARD PENETRATION RESISTANCE (ASTM D 1586)						
							▲ N-VALUE (BLOWS PER FOOT)						
DEPTH IN FEET	DESCRIPTION OF MATERIAL						WATER CONTENT, %						
							PL	10 20 30 40 50	LL				
	CLAY - gray and brown to gray, very soft to soft, lean - (CL)												
5			87	ST1	▲								
10			2-2-2	SS2	▲								
15	SAND - gray to brown, very loose to medium dense, very fine to fine, some clay - (SP-SC)		3-2-1	SS3	▲								
20			6-4-6	SS4	▲								
25	7% fines		3-4-8	SS5	▲								
30	SAND - gray, medium dense, fine to coarse - SW-SC		3-6-8	SS6	▲								
35			6-10-9	SS7	▲								
40	some clay, loose		4-5-4	SS8	▲								
	SAND - gray, medium dense, fine to coarse - (SP)												
			9-11-11	SS9	▲								
GROUNDWATER DATA				DRILLING DATA				Drawn by: MHM Date: 3/4/24		Check by: MHM Date: 3/21/24		App'vd by: JAW Date: 3/22/24	
ENCOUNTERED AT <u>18.5</u> FEET ±				___ AUGER <u>4 1/4"</u> HOLLOW STEM WASHBORING FROM <u>23.5</u> FEET <u>BCS</u> DRILLER <u>RAW</u> LOGGER <u>CME 550X</u> DRILL RIG HAMMER TYPE <u>Auto</u>									
REMARKS:				Norfolk Southern S247.69 Bridge Replacement Orrick, Missouri									
				LOG OF BORING: B-2									
				Project No. J044487.01									

Surface Elevation <u>704</u>		Completion Date: <u>3/4/24</u>		GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/ROD	SAMPLES	SHEAR STRENGTH, tsf					
Datum <u>NAVD88</u>							Δ - UU/2	○ - QU/2	□ - PP/2			
							0,5	1,0	1,5 2,0 2,5			
							STANDARD PENETRATION RESISTANCE (ASTM D 1586)					
							▲ N-VALUE (BLOWS PER FOOT)					
DEPTH IN FEET	DESCRIPTION OF MATERIAL						WATER CONTENT, %					
							PL	10 20 30 40 50	LL			
	SAND - gray, medium dense, fine to coarse - (SP) <i>(continued)</i>											
	4% fines					6-11-13	SS10		▲			
50												
	SAND - gray, dense, fine to coarse, some gravel - SW					14-16-17	SS11		▲			
55												
						16-18-20	SS12		▲			
60												
						8-8-10	SS13		▲			
65												
	LIMESTONE Boulders and SAND					50/5"	SS14		▲			
70	split-spoon refusal											
						36% 10%	NQ1					
75	SHALE - brown and gray to gray and black, extremely soft to very soft, moderately weathered					100%/100%	NQ2		●			
						100% 77%	NQ3		●			
80						67% 56%	NQ4		●			
85	Rotary bit refusal at 71 feet. Boring terminated at 83.5 feet.											
		</										

REV	BY	DATE	DESCRIPTION	
 NORFOLK SOUTHERN NORFOLK SOUTHERN RAILWAY				
KANSAS CITY DISTRICT			MIDWEST DIVISION	
<u>BRIDGE AT MP S-247.69 OVER UNNAMED TRIBUTARY</u>				
ORRICK, MO				
BRIDGE REPLACEMENT				
OFFICE OF CHIEF ENGINEER – BRIDGES & STRUCTURES			ATLANTA, GA	
DRAWING TITLE				
BORING LOGS (2 OF 2)				
DGN	JRR	VAL SEC	2 MO.C	MAP 25
DWN	BRK	FILE No.	BR0020786	MILE POST S-247.69
CHK	SBM	SHEET NUMBER	S23 OF S23	DATE 7/15/2024
				DRAWING NUMBER S-247.69 24 01

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