

DESIGN DESIGNATION

AADT - 2024 = 100
AADT - 2044 = 130
T = 20%
V = 50 MPH

FUNCTIONAL CLASSIFICATION - RURAL LOCAL

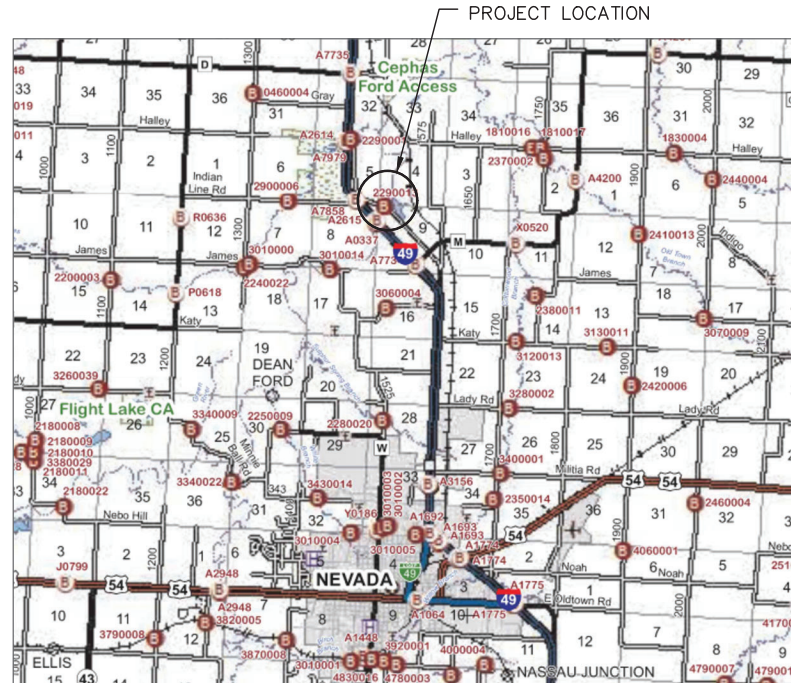
NO NEW RIGHT OF WAY

CONVENTIONAL SYMBOLS

- IRON PIN SET (TYPICAL)
- GREAT RIVER 2001011476
- IRON PIN FOUND, AS NOTED
- CUT CROSS
- RIGHT OF WAY MARKER
- STONE
- CONTROL POINT
- PERMANENT BENCHMARK
- CONTOUR MAJOR
- - - CONTOUR MINOR
- DECIDUOUS TREE, SIZE AS NOTED
- CONIFER TREE, SIZE AS NOTED
- BUSH, SIZE AS NOTED
- LIGHT POLE
- POWER POLE
- ELECTRIC RISER
- ELECTRIC BOX
- ELECTRIC METER
- GUY WIRE ANCHOR
- PEDESTAL, AS NOTED
- SANITARY SEWER CLEAN OUT
- SEPTIC TANK
- TELEPHONE RISER
- GAS VALVE
- GAS METER
- WELL
- WATER METER
- WATER VALVE
- FIRE HYDRANT
- WATER HYDRANT
- MAIL BOX
- SIGN
- POST
- FLAG POLE
- CABLE TV RISER
- SANITARY SEWER LINE
- FENCE CHAIN-LINK
- VINYL FENCE
- WOOD
- ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- TELEPHONE LINE
- UNDERGROUND TELEPHONE LINE
- CABLE TV LINE
- GAS LINE
- WATER LINE
- GAS & WATER LINE
- FIBER OPTIC LINE
- TREE LINE

CONSTRUCTION PLANS FOR INFANTRY PASS BRIDGE #22900131 OVER MARMATON RIVER SECTION 9, TOWNSHIP 36 NORTH, RANGE 31 WEST BRO-R108(001)

VERNON COUNTY, MISSOURI



SUBMITTED AND RECOMMENDED

Grand W. Wilson
PRESIDENT COMMISSIONER

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LENGTH OF PROJECT

BEGINNING OF PROJECT	STA 1+51.68
END OF PROJECT	STA 8+22.49
APPARENT LENGTH	670.81 FEET

BRO-R108(001)
VERNON COUNTY, MISSOURI
TITLE SHEET

GRE
GREAT RIVER
ENGINEERING, INC.

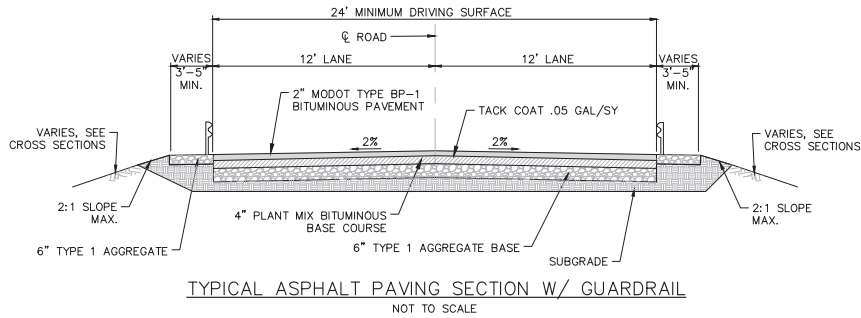
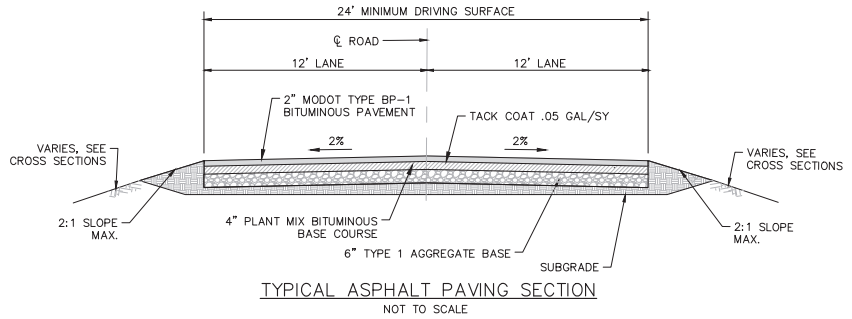
Missouri State Certificate of Authority Registered Professional Engineer
Professional Engineer License No. 000000000
Evan M. Lewis
PE-202308235
08/12/2025

C1

6/12/2025

JOB 5063

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Survey Control Point Table				
Point #	Northing	Easting	Elevation	Description
1	640382.51	2827698.18	763.35	CP 1 60D
2	639727.24	2829047.30	759.02	CP 2 MAG
3	639480.55	2829795.19	760.99	CP 3 MAG

HORIZONTAL COORDINATES ARE BASED ON THE MISSOURI COORDINATE SYSTEM OF 1983, WEST ZONE

BENCHMARK DATA

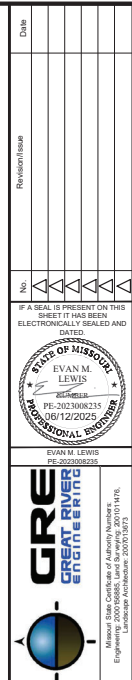
BM1: TOP OF 5/8" REBAR SET 4' WEST OF MAILBOXES ON THE NORTH SIDE OF THE ROAD, EAST OF THE BRIDGE
EL. 761.34'

(VERTICAL DATUM: NAVD88)

ROADWAY QUANTITIES

ITEM	TOTAL	UNITS
CLEARING AND GRUBBING	0.7	ACRE
REMOVAL OF IMPROVEMENTS	1	LUMP SUM
UNCLASSIFIED EXCAVATION (ROADWAY)	221	CU. YARD
EMBANKMENT IN PLACE WITH COMPACTION	7	CU. YARD
TYPE 1 AGGREGATE FOR BASE (6 IN. THICK)	697	SQ. YARD
BITUMINOUS PAVEMENT MIXTURE PG64-22, (BP-1)	65	TON
BITUMINOUS PAVEMENT MIXTURE PG64-22, (BASE)	129	TON
TACK COAT	30	GALLON
BRIDGE ANCHOR SECTION, 6.5 FT. POSTS (SAFETY BARRIER CURB)	4	EACH
TYPE A CRASHWORTHY END TERMINAL	4	EACH
ASYMMETRICAL TRANSITION SECTION, 6.5 FT. POSTS	4	EACH
TYPE 2 ROCK BLANKET	428	CU. YARD
CONSTRUCTION SIGNS	76	SQ. FOOT
TYPE III MOVEABLE BARRICADE W/LIGHTS	6	EACH
MOBILIZATION	1	LUMP SUM
SEEDING	0.6	ACRE
SILT FENCE	281	LIN. FOOT
SILT SOCK	30	LIN. FOOT

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NOTE:
BRIDGE DECK NOT SHOWN FOR CLARITY.

ROCK BLANKET LAYOUT

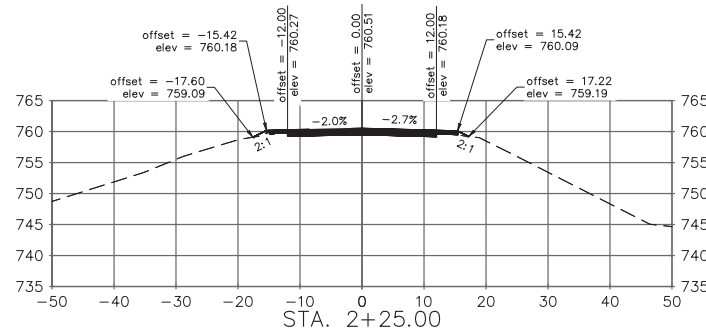
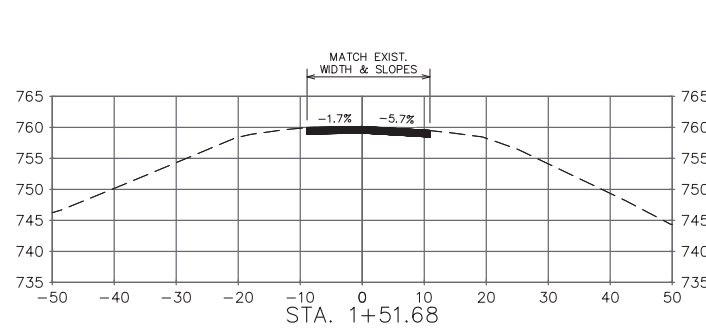
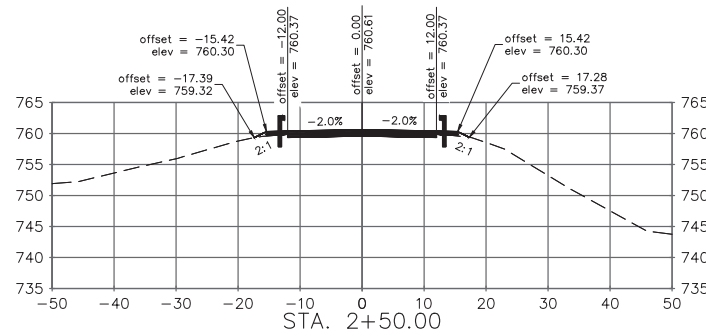
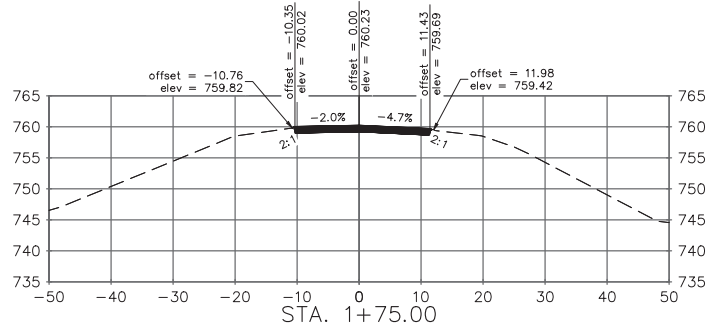
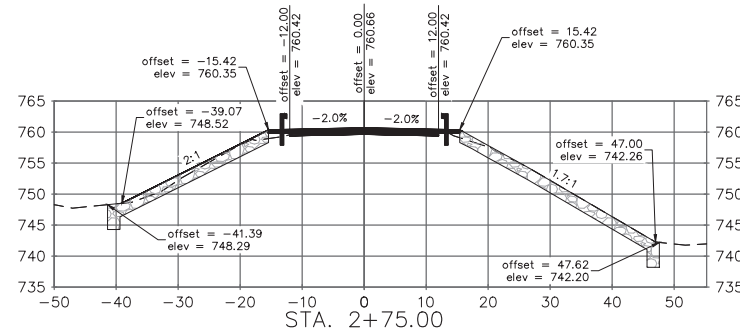
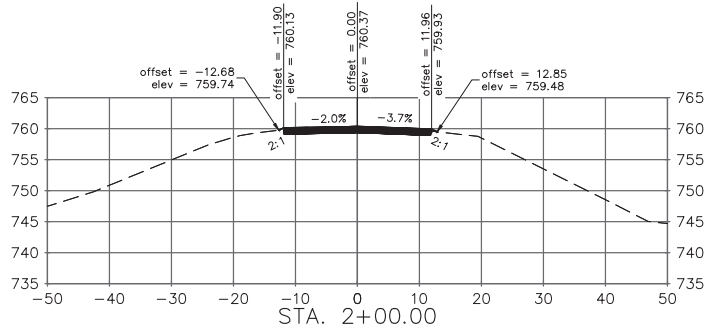
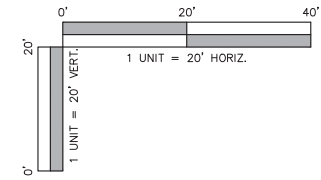
ROCK BERM

PRIOR TO FINAL PLACEMENT OF TYPE 2 ROCK BLANKET, CONTRACTOR SHALL REMOVE GEOTEXTILE FABRIC AND ANY SILT BUILDUP ALONG TOP OF ROCK BERM. ALL WORK NECESSARY FOR REMOVAL SHALL BE INCIDENTAL TO BID ITEM TYPE 2 ROCK BLANKET.

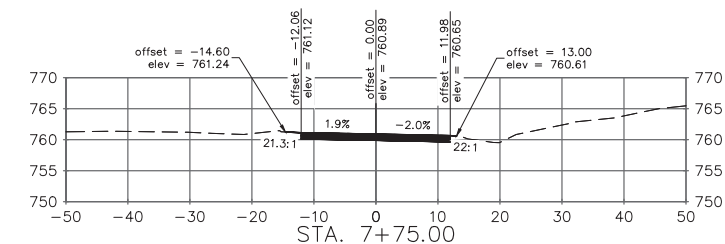
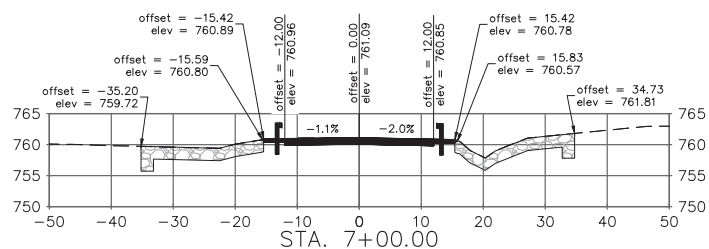
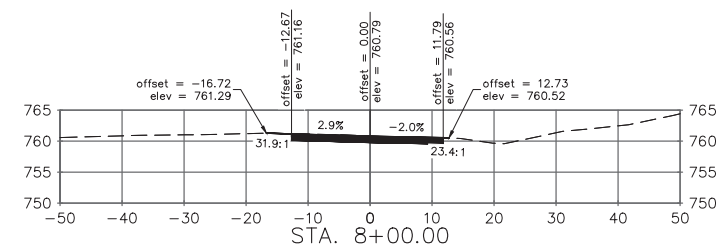
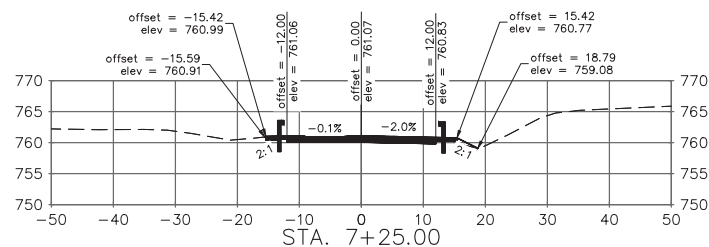
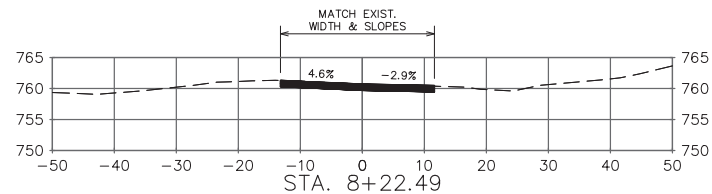
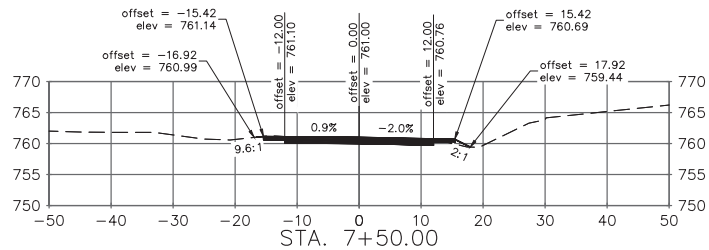
BRO-R108(001)		6/12/2025		C4
VERNON COUNTY, MISSOURI		JOB 5063		
GRADING & EROSION CONTROL PLAN				
				
EVAN M. LEWIS PE 2022088235		EVAN M. LEWIS PE 2022088235		
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SIGNED AND DATED 06/12/2025		MISSOURI PROFESSIONAL ENGINEER		
No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		Date		
Revision/Issue		Date		

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SECTIONS 2+85.53 THRU 6+89.03 NOT SHOWN DUE TO BRIDGE

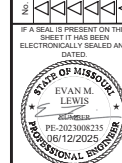
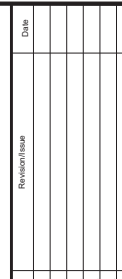
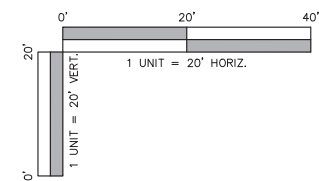


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GRE GREAT RIVER ENGINEERING EVAN M. LEWIS PE-202308235 06/12/2025 Missouri State Certificate of Authority Number 1476 Engineering Architecture 2005/1/02	
BRO-R108(001) VERNON COUNTY, MISSOURI CROSS SECTIONS	
6/12/2025	
JOB 5063	
C5	



EARTHWORK QUANTITIES

CUT = 221 CY } NO ADJUSTMENT HAS
FILL = 7 CY } BEEN MADE FOR
SHRINKAGE OR SWELL

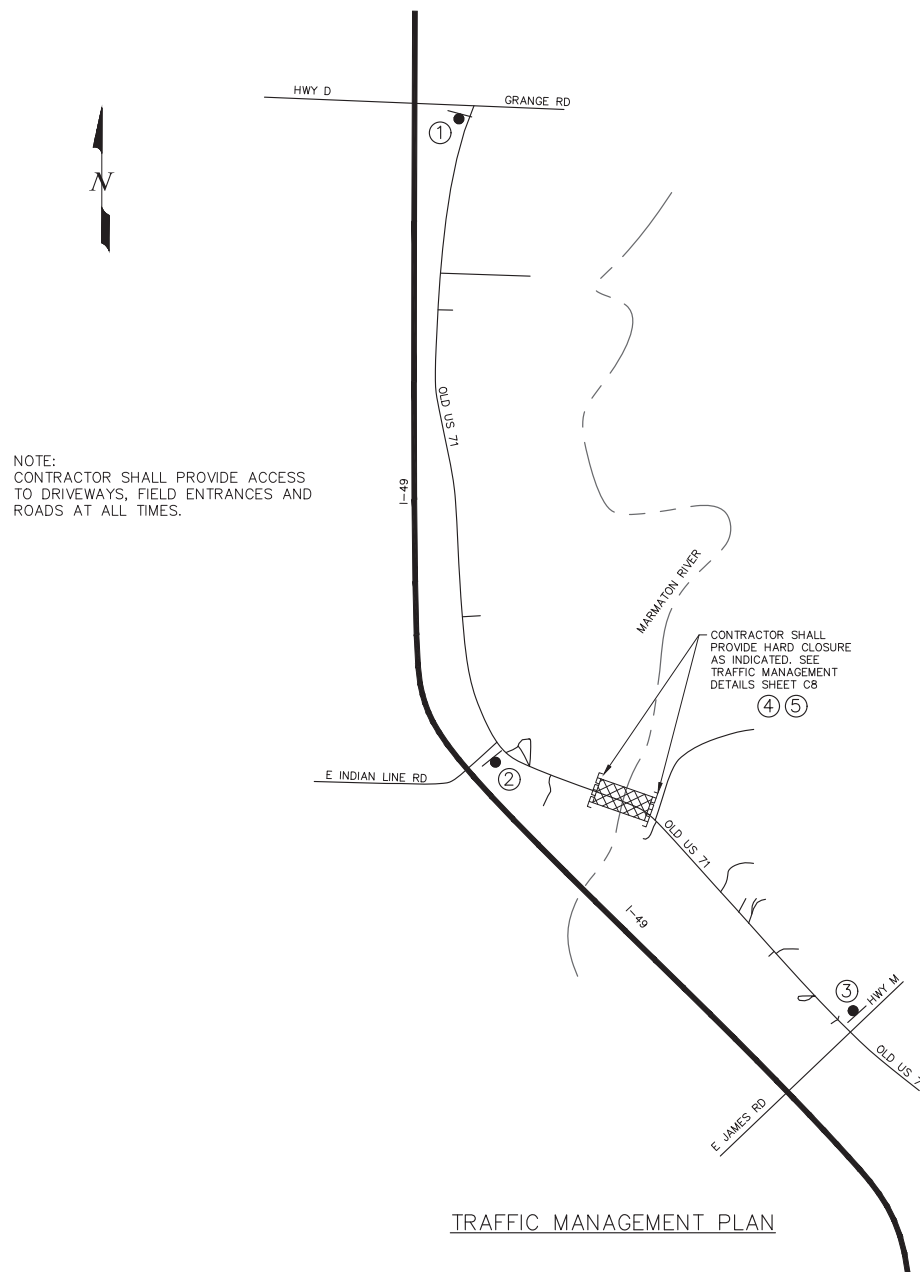


3RO-R108(001)
VERNON COUNTY, MISSOURI
CROSS SECTIONS

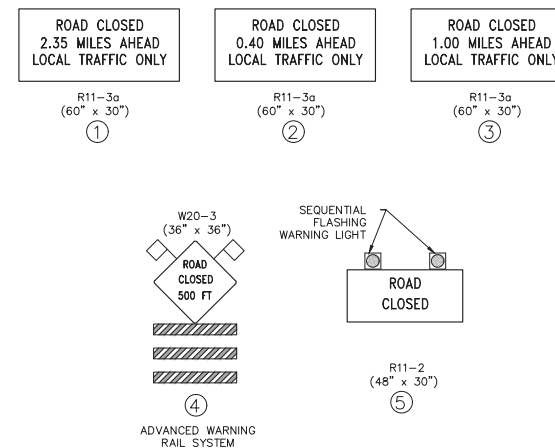
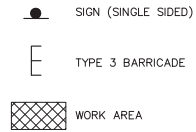
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TRAFFIC CONTROL LEGEND



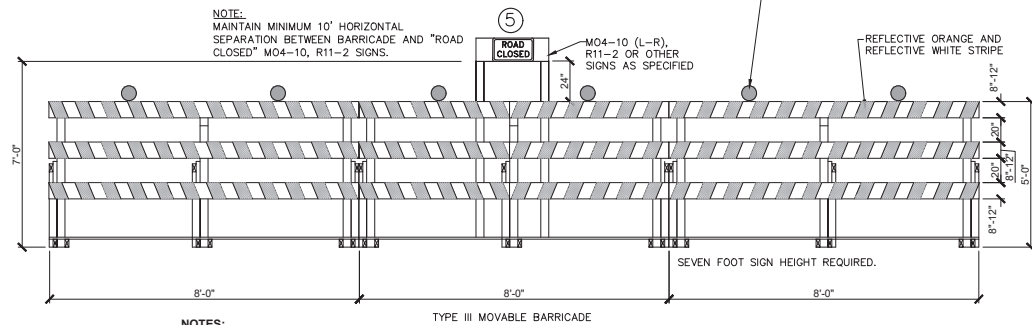
W20-3
(36" x 36")

ROAD
CLOSED
500 FT

4

ADVANCED WARNING
RAIL SYSTEM

NOTE:
MAINTAIN MINIMUM 10' HORIZONTAL
SEPARATION BETWEEN BARRICADE AND "ROAD
CLOSED" MO4-10, R11-2 SIGNS.



NOTES:

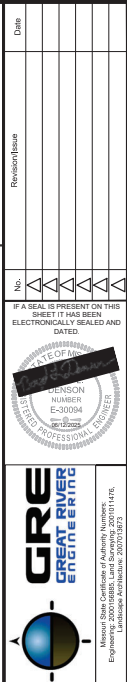
1. ALL SIGNS TO MEET MoDOT STANDARD SPECIFICATIONS FOR REFLECTIVITY AND OTHER DETAILS. ALL SIGNAGE TO MEET MUTCD REQUIREMENTS, SHOULD CONFLICTS EXIST BETWEEN MoDOT AND MUTCD FOLLOW MUTCD.
2. ALL RELOCATOR SURFACES SHALL BE TYPE 1 SHEETING UNLESS OTHERWISE INDICATED. NO DIRECT PAYMENT WILL BE MADE FOR RELOCATION OF BARRICADES. NO PAYMENT WILL BE MADE FOR RELOCATING SIGNS ON MOVABLE BARRICADES WHICH ARE TO BE RELOCATED UNLESS THE SIGN LEGEND IS TO BE CHANGED. STRIPES SHALL SLOPE DOWNWARD TOWARD THE SIDE WHICH TRAFFIC IS TO PASS.
3. ALL SEQUENTIAL FLASHING WARNING LIGHTS SHALL COMPLY WITH MoDOT STANDARD SPECIFICATION SECTION 1063.6.

TYPE 3 BARRICADE WITH SEQUENTIAL FLASHING WARNING LIGHTS

TRAFFIC CONTROL NOTES:

1. ALL CONSTRUCTION SIGNS AND BARRICADES MUST BE UTILIZED AND MAINTAINED IN COMPLIANCE WITH PART VI. OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 2000 EDITION, OR LATEST REVISION THEREOF.
2. ALL EXISTING SIGNS SHALL BE MAINTAINED AND RELOCATED WHEN NECESSARY. SIGNING SHALL BE INSTALLED PRIOR TO OPENING ANY SECTION OF THE ROADWAY FOR TRAFFIC.
3. SIGNAGE SHOWN SHALL REMAIN IN PLACE FOR THE PROJECT DURATION AND BE MODIFIED AS NECESSARY AND AS DIRECTED BY THE COUNTY.
4. ANY ALTERNATE TRAFFIC CONTROL PLAN MUST BE APPROVED IN WRITING BY THE COUNTY PRIOR TO IMPLEMENTATION.
5. SIGN  MOUNTED ON TYPE 3 BARRICADES SHALL BE LIGHTWEIGHT.
6. ACCESS TO LOCAL PROPERTIES WITHIN THE WORK ZONE SHALL BE MAINTAINED AT ALL TIMES AND COORDINATED WITH PROPERTY OWNER.

C8	6/12/2025 JOB 5063	BRO-R108(001) VERNON COUNTY, MISSOURI	 Missouri State Office of Automated Mapping 1000 South College Avenue Springfield, Missouri 65803-1000 Phone: 417-866-1100 Email: ls@missouri.gov Fax: 417-866-1101 Website: www.missouri.gov	TRAFFIC MANAGEMENT PLAN DETAILS			EVAN M. LEWIS PE-2023080215 06/12/2025	IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED	No. ☐	Revision/Issue ☐	Date ☐
									Yes ☐	Revision/Issue ☐	Date ☐



BRO-R108(001)
VERNON COUNTY, MISSOURI
BRIDGE PLAN & ELEVATION



Existing structure indicated by light dashed lines, to be removed.

General Notes:

Design Specifications:

2020 AASHTO LRFD Bridge Design Specifications (9th Ed.)

2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design (2nd Ed.) and 2014 Interim Revisions (Seismic Details)

Seismic Design Category = A
Design earthquake response spectral acceleration coefficient at 1.0 second period, $S_{pi} = 0.099$
Acceleration Coefficient (effective peak ground acceleration coefficient), $A_s = 0.056$

Design Loading:

Vehicular = HL-93

Future Wearing Surface = 35 lb/sf

Earth = 120 lb/cf

Equivalent Fluid Pressure = 45 lb/cf (Min.)

Superstructure: Simply-Supported Non-Composite for dead load.
Continuous Composite for live load.

Design Unit Stresses:

Class B Concrete (Substructure) $f'_c = 3,000$ psi
Class B-1 Concrete (Type H Barrier) $f'_c = 4,000$ psi
Class B-2 Concrete (Drilled Shafts & Rock Sockets) $f'_c = 4,000$ psi
Class B-2 Concrete (Superstructure, except Prestressed Girders & Type H Barrier) $f'_c = 4,000$ psi
Reinforcing Steel (Grade 60) $f_y = 60,000$ psi
Structural Steel HP Pile (ASTM A709 Grade 50) $f_y = 50,000$ psi

For precast prestressed panel stresses, see Sheet S23.

For prestressed girder stresses, see Sheets S14 thru S19.

Neoprene Pads:

Neoprene bearing pads shall be 60 durometer and shall be in accordance with Sec 716.

Joint Filler:

All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Traffic Handling:

Structure to be closed during construction. Traffic to be maintained on other routes during construction. See roadway plans for traffic control.

Miscellaneous:

"Sec" refers to sections in the Missouri Standard Specification of Highway Construction and supplemental specifications.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Sec 106.

Estimated Quantities

Item	Substr.	Superstr.	Total
Class 1 Excavation	cu. yard	60	60
Class 1 Excavation in Rock	cu. yard	28	28
Removal of Bridges	lump sum		1
Bridge Approach Slab (Minor)	sq. yard	108	108
Drilled Shafts (4 ft. 6 in. Dia.)	linear foot	150.2	150.2
Rock Sockets (4 ft. 0 in. Dia.)	linear foot	64	64
Video Camera Inspection	each	4	4
Foundation Inspection Holes	linear foot	104	104
Sonic Logging Testing	each	4	4
Galvanized Structural Steel Piles (14 in.)	linear foot	366	366
Pre-Boring for Piling	linear foot	50	50
Pile Point Reinforcement	each	11	11
Class B Concrete (Substructure)	cu. yard	74.3	74.3
Type H Barrier	linear foot		855
Slab on Concrete NU-Girder	sq. yard		1193
NU 63, Prestressed Concrete NU-Girder	linear foot		1199
Reinforcing Steel (Bridges)	pound	32,180	32,180
Steel Intermediate Diaphragm for P/S Concrete Girders	each	12	12
Vertical Drain at End Bents	each		2
Laminated Neoprene Bearing Pad	each	18	18

All concrete above the construction joint in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

All reinforcement in the intermediate bent concrete diaphragms except reinforcement embedded in the beam cap is included in the Estimated Quantities for Slab on Concrete NU-Girder.

All concrete above the intermediate beam cap is included in the Estimated Quantities for Slab on Concrete NU-Girder.

Hydrologic Data

Drainage Area = 1110 mi ²
Design Flood Frequency = 50 years
Design Flood Discharge = 47,800 cfs
Design Flood (D.F.) Elevation = 758.6 feet
Base Flood (100-Year)
Base Flood Elevation = 760.8 feet
Base Flood Discharge = 54,200 cfs
Estimated Backwater = 0.5 feet
Average Velocity Thru Opening = 8.5 ft/s
Freeboard (50-year)
Freeboard = 0 feet
Roadway Overlapping
Overlapping Flood Discharge = 54,200 cfs
Overlapping Flood Frequency = 100 years
Overlapping Flood Elevation = 760.8 feet

Foundation Data

Type	Design Data	Bent 1	Bent 2	Bent 3	Bent 4
Load Bearing Pile	Pile Type & Size	HP 14x73	—	—	HP 14x73
	Number	ea	6	—	5
	Approximate Length Per Each	ft	51	—	12
	Pile Point Reinforcement	ea	51	—	5
	Pre-Bore for Piling Per Each	ft	—	—	10
	Min. Galvanized Penetration (Elev.)	ft	730.66	—	Full Length
	Pile Driving Verification Method	DF	—	—	HR
	Resistance Factor		0.4	—	—
	Minimum Nominal Axial Compressive Resistance	kip	515.0	—	—
	Design Bearing	kip	149.2	—	187.4
Rock Socket	Number	ea	—	2	2
	Foundation Material		—	Rock	—
	Elevation Range	ft	—	700.0–692.5	—
	Minimum Nominal Axial Compressive Resistance (Side Resistance)	ksf	—	9.4	—
	Minimum Nominal Axial Compressive Resistance (Tip Resistance)	ksf	—	45.4	52.4

DF = FHWA-modified Gates Dynamic Pile Formula

HR = Hard Rock criteria (Sec. 702)

Load Bearing Piles:

Minimum Nominal Axial Compressive Resistance = (Maximum Factored Loads) ÷ (Resistance Factor)

Rock Socket:

Minimum Nominal Axial Compressive Resistance (Side Resistance + Tip Resistance) = (Maximum Factored Loads) ÷ (Resistance Factors)

Prebore for piles at Bent 4 to elevation 740.57. The contractor shall provide a minimum 24" diameter hole at Bent 4.

All piles shall be galvanized down to the minimum galvanized penetration (elevation).

Pile point reinforcement need not be galvanized. Shop drawings will not be required for pile point reinforcement.

Piles are anticipated to be driven to refusal on rock. Review all borings for depth of rock and restrict driving as appropriate to comply with hard rock driving criteria in accordance with Sec 702. When pile refusal on rock occurs as approved by the engineer, the minimum nominal axial compression resistance is verified and no additional pile driving verification method is required.

Estimated Quantities for Slab on Concrete NU-Girder

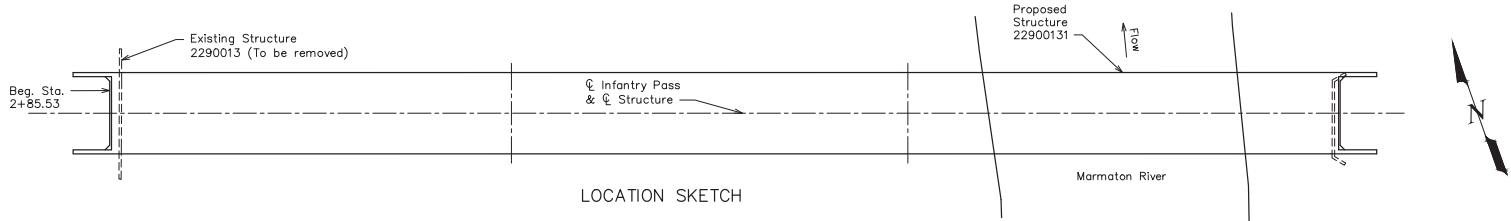
Item	Total
Class B-2 Concrete	cu. yard 337
Reinforcing Steel (Epoxy Coated)	pound 103,030

The table of Estimated Quantities for Slab on Concrete NU-Girder represents the quantities used by the county in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard longitudinally from end of slab to end of slab and transversely from out to out of bridge slab (or with the horizontal dimensions as shown on the plan of slab). Payment for prestressed panels, conventional forms, all concrete and epoxy coated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the Estimated Quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness Class SC 4 and a finish type I, II or III.

Class B-2 concrete quantity is based on minimum top flange thickness and minimum joint material thickness.

The prestressed panel quantities are not included in the table of Estimated Quantities for Slab on Concrete NU-Girder.



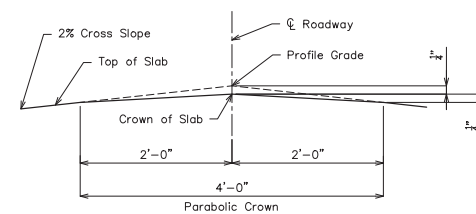
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DATE
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STATE OF MISSOURI
SEAL
KIMBERLY L. JOHNSON
E-30094
REGISTERED PROFESSIONAL ENGINEER
EXPIRATION DATE 12/31/2025

GRE
GREAT RIVER
ENGINEERING
Missouri State Certificate of Authority Number: E-30094
Engineer: Kimberly L. Johnson, EIT 1476
Licensee: Kimberly L. Johnson, EIT 1476

BRO-R108(001)
VERNON COUNTY, MISSOURI
GENERAL NOTES & ESTIMATED QUANTITIES

2025-06-11
JOB 5063
S2



General Notes:
Work this sheet with Sheets S3 & S5.

This drawing not to scale. Follow dimensions.

For details of vertical drain at end bent, see Sheet S6.

For details of Bridge Approach Slab, see Sheet S30.

For Sections A-A, B-B, C-C & D-D and Elevations E-E & F-F, see Sheet S5.

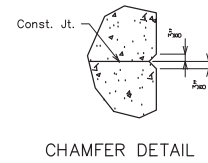
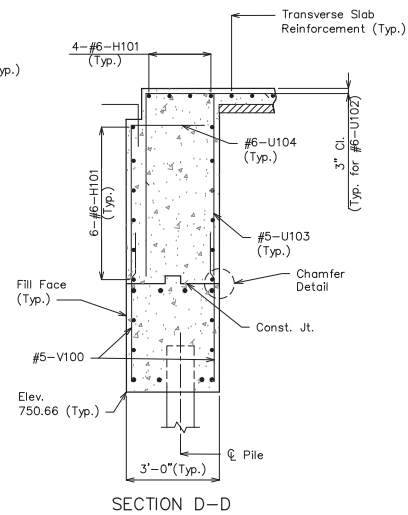
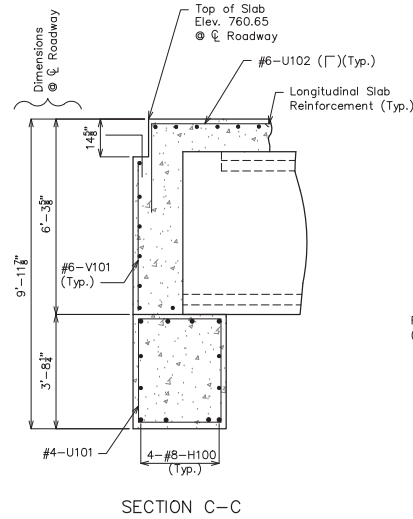
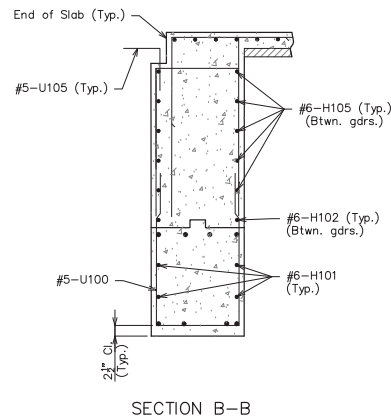
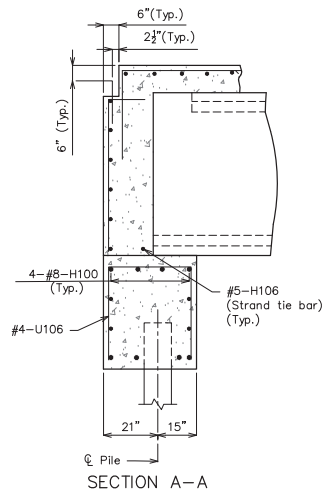
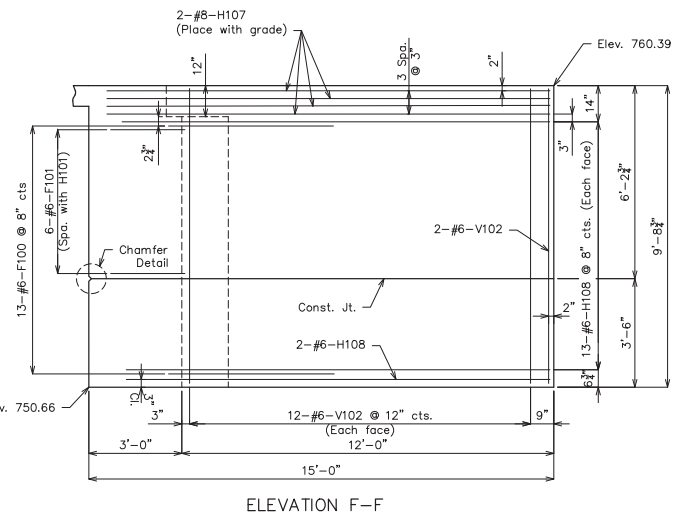
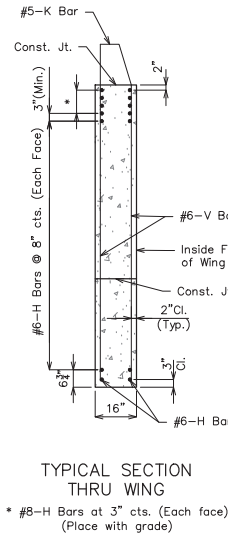
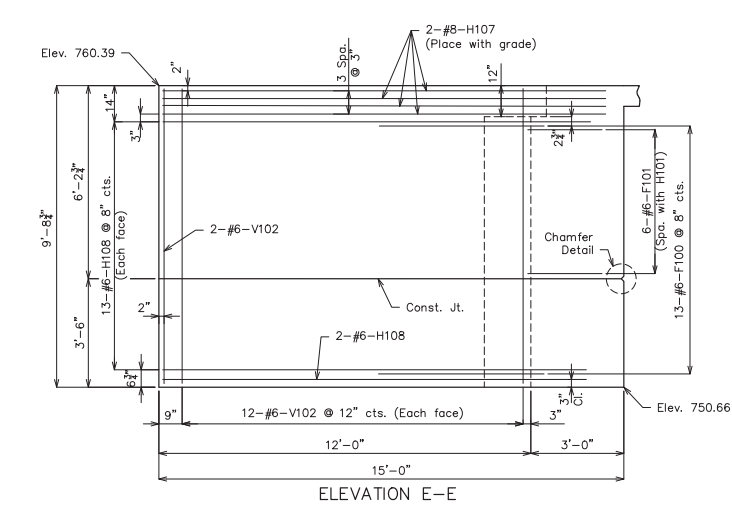
The #6-F106 bars shall be bent in the field to clear girders.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2" minimum clearance to fill face of end bent.

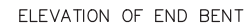
For location of coil tie rods and #5-H106 (strand tie bar), see Sheets S14 & S15.

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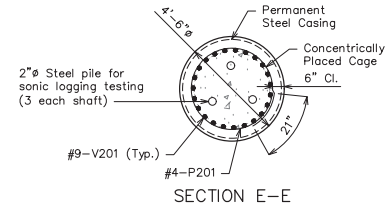
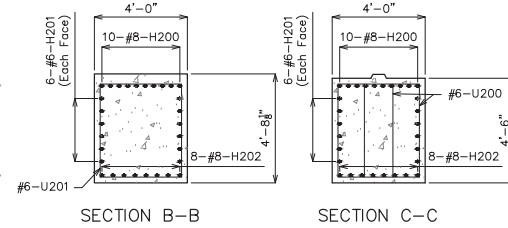
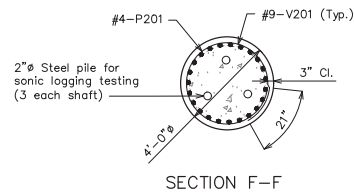
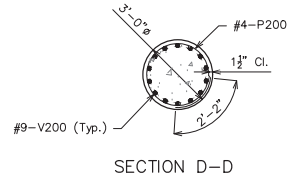
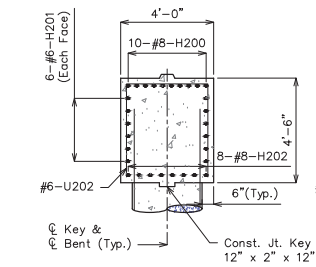
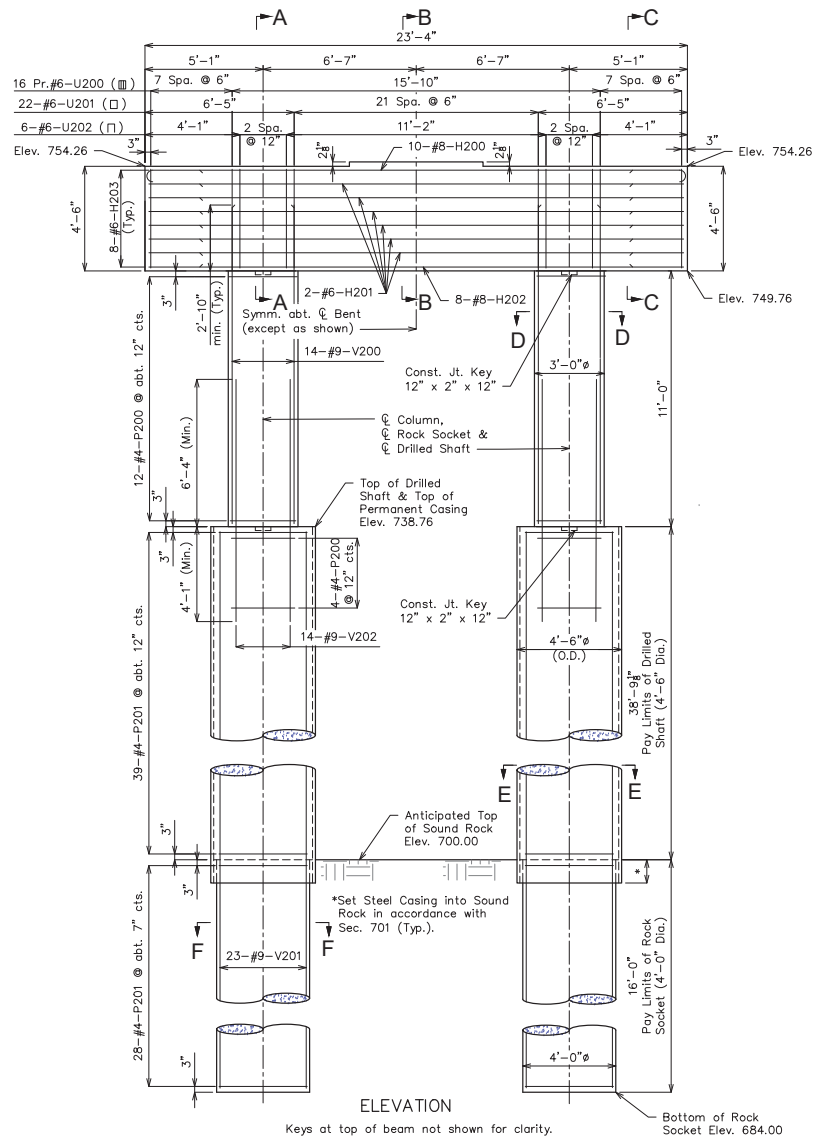


General Notes:
Work this sheet with Sheets S3 & S4.
This drawing not to scale. Follow dimensions.
For location of Sections A-A, B-B, C-C & D-D and Elevations E-E & F-F, see Sheet S4.
For reinforcement of barrier, see Sheet S29.

Revision	Date
No.	
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BRO-R108(001) VERNON COUNTY, MISSOURI BENT 1	
2025-06-11 JOB 5063	
S5	



Perforated pipe shall be placed at fill face side and inside face of wings at the bottom of end bent and plain pipe shall be used where the vertical drain ends to the exit at ground line.



General Notes:

This drawing not to scale. Follow dimensions.

Thickness of permanent steel casing shall be in accordance with Sec 701.

An additional 4 feet has been added to V-bar lengths and additional 7-#4-P201 bars have been added in the quantities, if required, for possible change in drilled shaft or rock socket length. The additional V-bar length shall be cut off or included in the reinforcement lap if not required. The additional P bars shall be spaced similarly to that shown in elevation, if required, or to a lesser spacing if not required, but not less than 6-inch centers.

Sonic logging testing shall be performed on all drilled shafts and rock sockets.

The cost of any required excavation to the top of the drilled shafts will be considered completely covered by the contract unit price for other items.

The tip of casing shall not extend into the rock socket elevation range reported in the Foundation Data table without approval by the engineer.

Column or dowel reinforcement shall be placed prior to pouring drilled shaft concrete in the area of the lap. Dowel bar or column reinforcement shall not be inserted after drilled shaft pour is complete.

For details of Intermediate Bent 2 not shown, see Sheet S8.

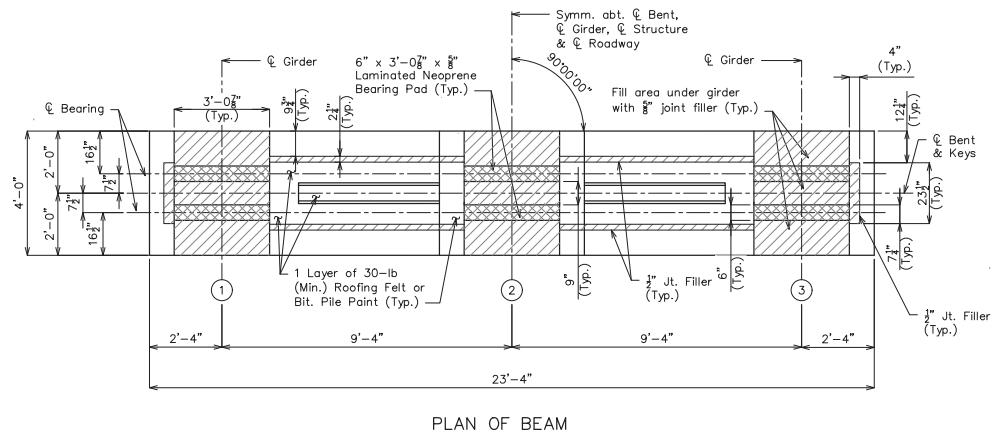
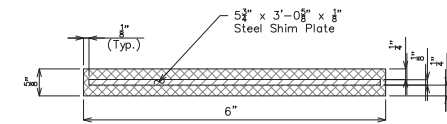
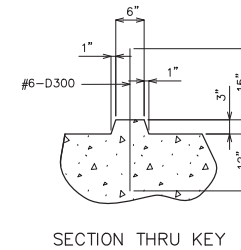
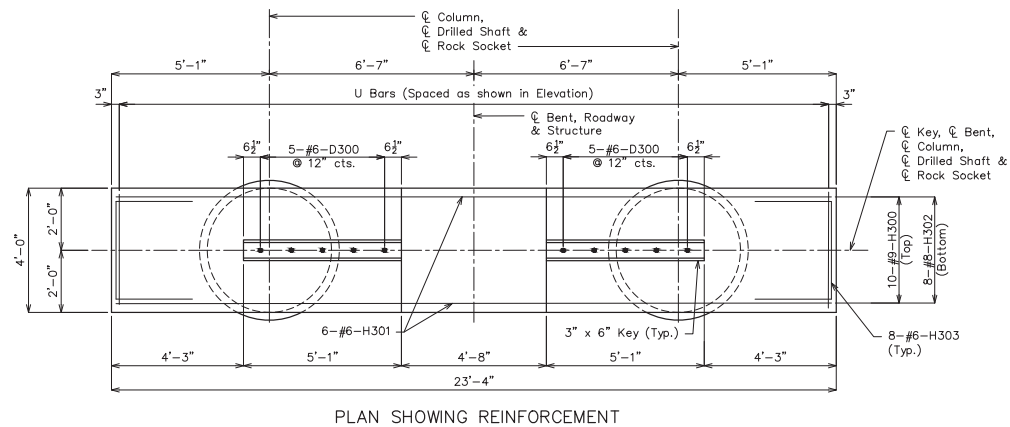
For Substructure Quantity Table for Bent 2, see Sheet S8.

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BRO-R108(001) VERNON COUNTY, MISSOURI BENT 2	
2025-06-11 JOB 5063 S7	



This drawing not to scale. Follow dimensions.

These quantities are included in the Estimated Quantities table on Sheet S2.



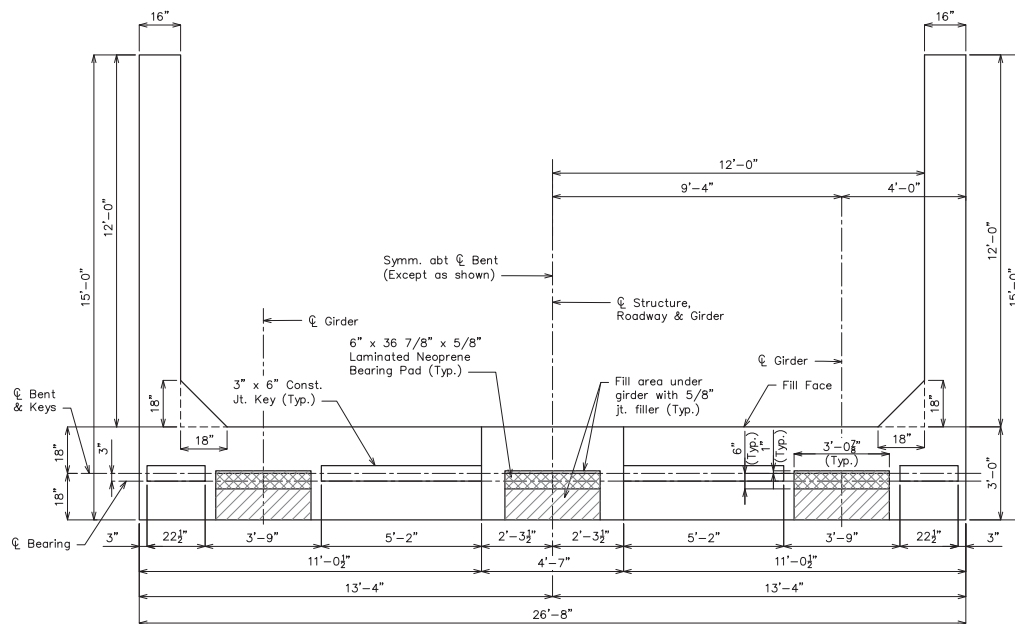
General Notes:

For details of Intermediate Bent 3 not shown, see Sheet S9.

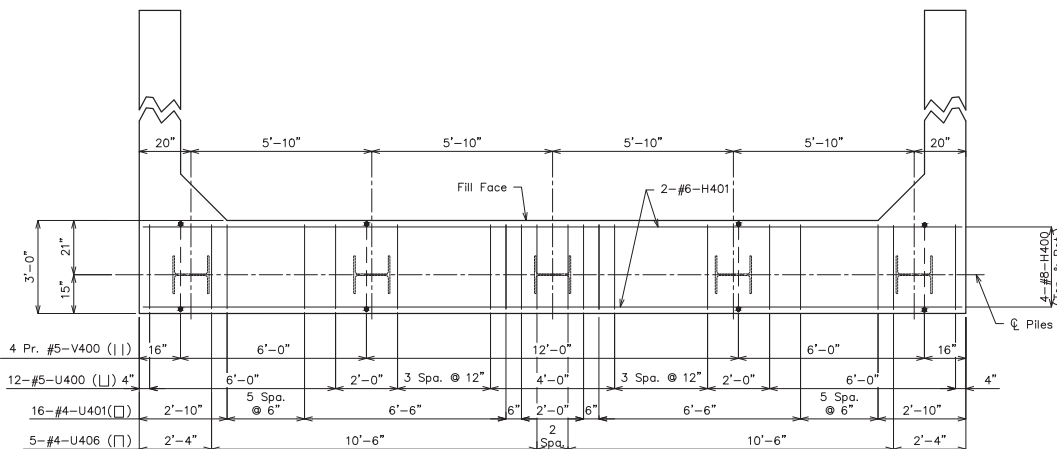
This drawing not to scale. Follow dimensions.

Item	Quantity
Drilled Shafts (4ft. 6 in. Dia.)	linear foot 72.7
Rock Sockets (4ft. 0 in. Dia.)	linear foot 32
Video Camera Inspection	each 2
Foundation Inspection Holes	linear foot 52
Sonic Logging Testing	each 2
Class B Concrete (Substructure)	cu. yard 22.8
Reinforcing Steel (Bridges)	pound 16,120

These quantities are included in the Estimated Quantities table on Sheet S2.

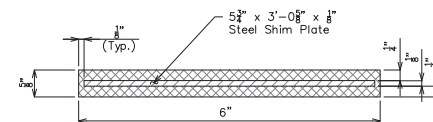


PLAN OF BEAM

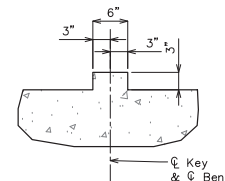


PLAN OF BEAM SHOWING REINFORCEMENT & PILES

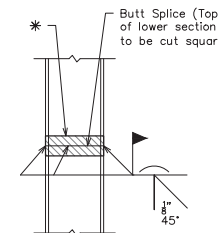
Keys and steps not shown for clarity.



SECTION THRU LAMINATED NEOPRENE BEARING PAD



SECTION THRU KEY



STEEL PILE SPLICE
(if required)

* Galvanizing material shall be omitted or removed 1 inch clear of weld locations in accordance with Sec 702.

General Notes:

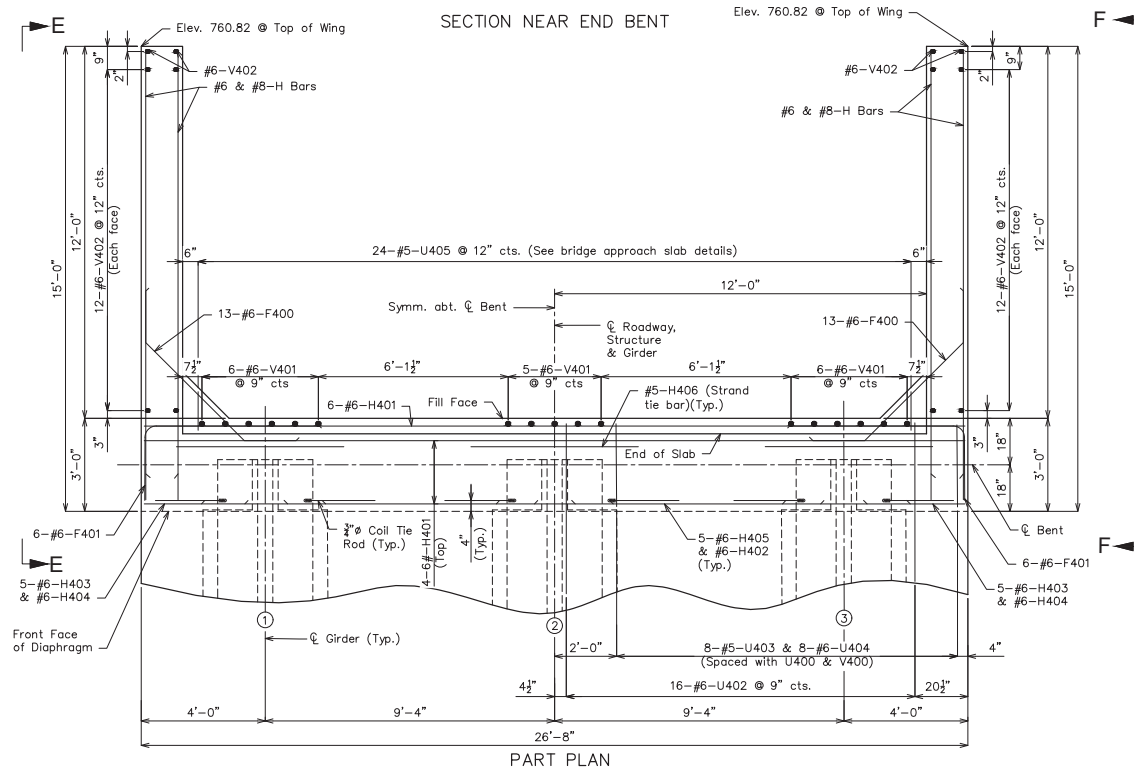
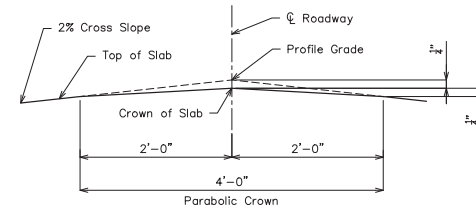
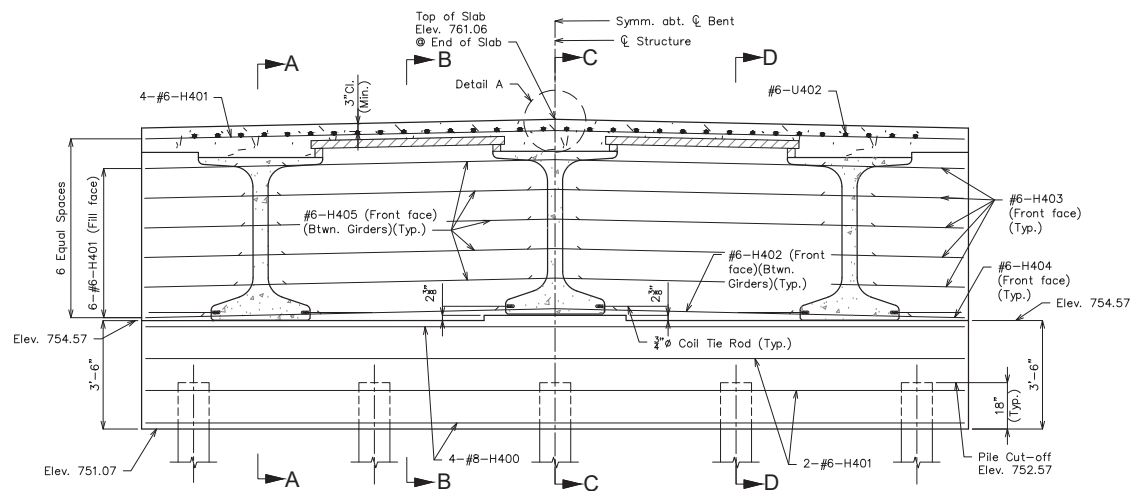
Work this sheet with Sheets S12 & S13.

This drawing not to scale. Follow dimensions.

Reinforcing steel shall be shifted to clear piles. U bars shall clear piles by at least 1 1/2".

Substructure Quantity Table for Bent 4		
Item		Quantity
Class 1 Excavation	cu. yard	10
Class 1 Excavation in Rock	cu. yard	28
Galvanized Structural Steel Piles (14 in.)	linear foot	60
Pre-Bore for Piling	linear foot	50
Pile Point Reinforcement	each	5
Class B Concrete (Substructure)	cu. yard	15.0

These quantities are included in the Estimated Quantities table on Sheet S2.



General Notes:

Work this sheet with Sheets S11 & S13.

This drawing not to scale. Follow dimensions.

For detail of vertical drain at end bent, see Sheet S6.

For details of Bridge Approach Slab, see Sheet S30.

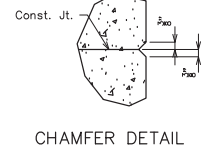
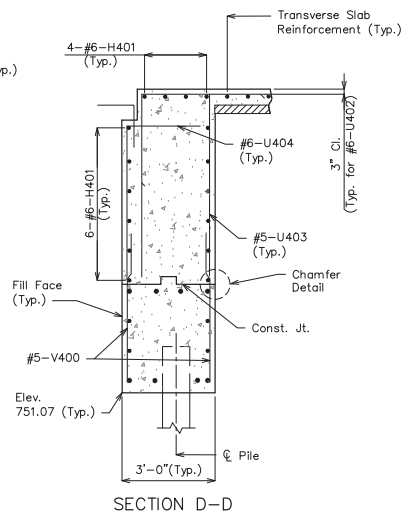
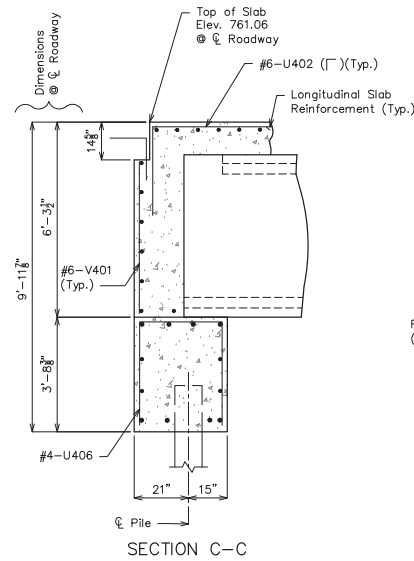
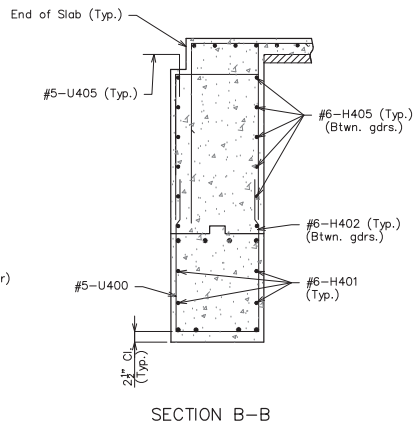
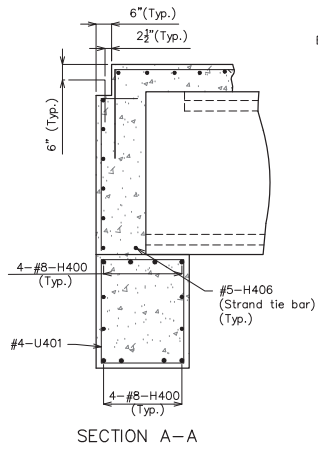
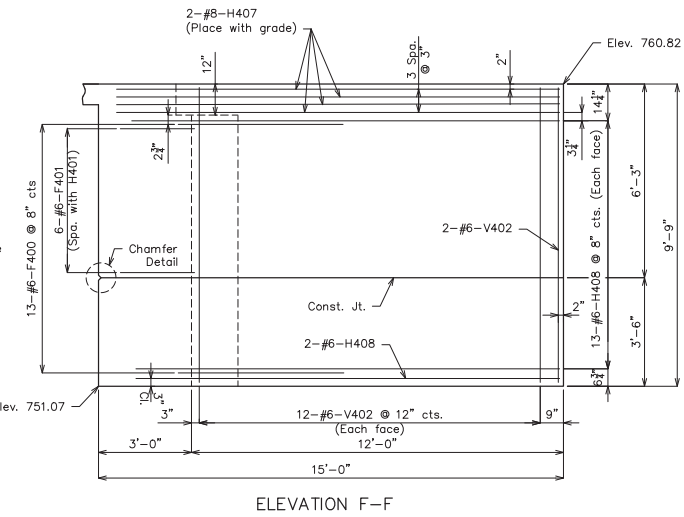
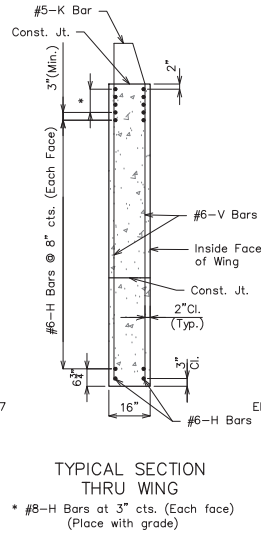
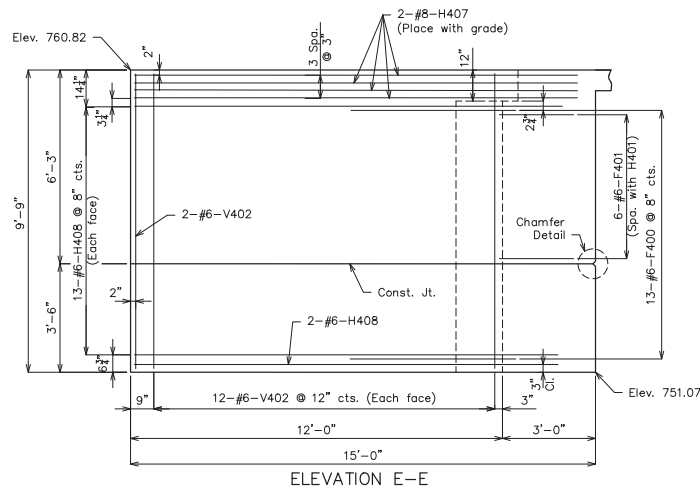
For Sections A-A, B-B, C-C & D-D and Elevations E-E & F-F, see Sheet S13.

The #6-F400 shall be bent in the field to clear girders.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

Strands at end of girders shall be field bent or, if necessary, cut in field to maintain 1 1/2" minimum clearance to fill face of end bent.

For location of coil tie rods and #5-H406 (strand tie bar), see Sheets S18 & S19.



General Notes:

Work this sheet with Sheets S11 & S12.

This drawing not to scale. Follow dimensions.

For location of Sections A-A, B-B, C-C & D-D and Elevations E-E & F-F, see Sheet S12.

For reinforcement of barrier, see Sheet S29.

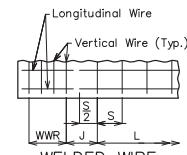
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BRO-R108(001) VERNON COUNTY, MISSOURI BENT 4	
2025-06-11 JOB 5063 S13	

[illegible]

+ Indicates prestressing strand. ○ Indicates cut & shop bend with 3'-0" projection.

END BENT INT. BENT

STRANDS AT GIRDER ENDS



WELDED WIRE
PLACEMENT

S = Vertical wire spacing

L = Length of WWR mats

J = Distance between WWR mats

Bill of Reinforcing Steel

Bars Each Girder					
No.	Size	Mark	Length	Shape	
152	3	G1	2'-10"	8"	
2	4	G3	3'-10"	20	
2	4	G4	2'-3"	8"	
2	4	G5	2'-8"	20	
Welded Wire Each Girder					
Mark	Size	S	W	L	J
WWR1	D18	4"	W8	10'-0"	8"
WWR2	D18	8"	W8	10'-0"	8"
WWR3	D18	12"	W8	84'-0"	--
WWR6	D31	2"	W12	16'-0"	2 1/2"

Bending Diagrams

Shape 8

Shape 20

Shape 20

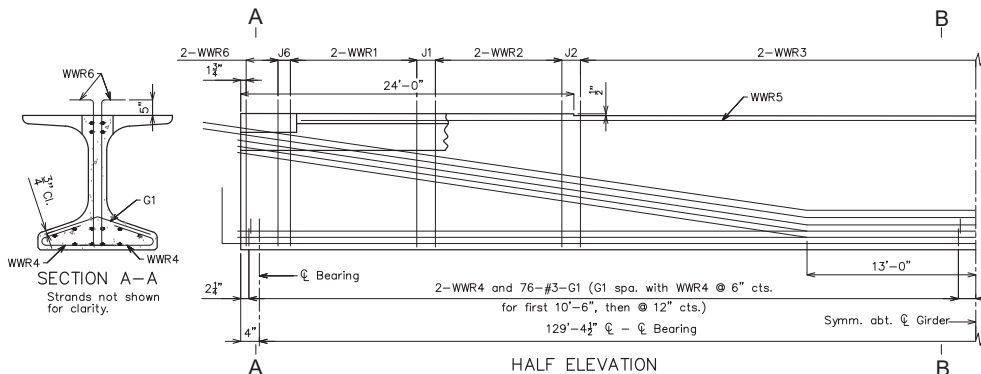
Shape 20

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.

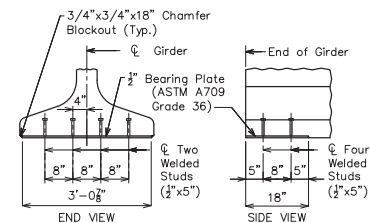
WWR shall not be epoxy coated.

G4 and G5 not required for interior girders. Half no. of G3, G4 and G5 not required for ext. girders.

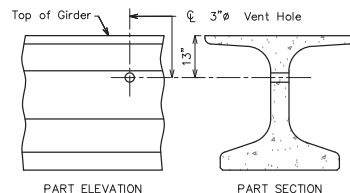


HALF ELEVATION

Reinforcement support strands not shown for clarity.



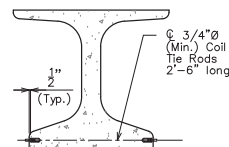
BEARING PLATE



PART ELEVATION

VENT HOLE

Place vent holes at or near upgrade $1/3$ point of girders and clear reinforcing steel or strands by $1\frac{1}{2}$ " minimum and steel intermediate diaphragm bolt connections by 6" minimum.



ROSED DIAFRAGMA
D INTEGRAL BEN
C.M. - F.T.T.

Exclude coil tie at exterior face of exterior girders except at integral end bents.

This drawing is not to scale. Follow dimensions.

Concrete for prestressed beams shall be Class A-1 with $f'_c = 9000$ psi and $f'_{ci} = 7000$ psi.

Use 46 strands, 0.6"Ø Grade 270, with an initial prestress force of 2021 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: coil ties, top flange blockout, application of bond breaker, coil inserts for slab drains, holes for steel intermediate diaphragms.

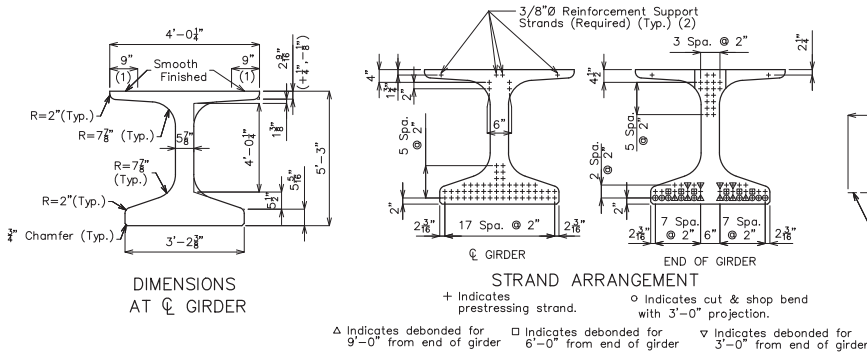
For Girder Camber Diagram, see Sheet S25.

The 1 1/2"Ø holes shall be cast in the web for steel intermediate diaphragms. Drilling is not allowed. For location of holes and details of steel intermediate diaphragms, see Sheets S20 and S21.

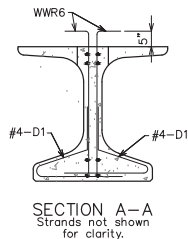
For location of coil inserts at slab drains, see Sheet S24.

For location of coil ties at concrete diaphragms and integral bents, see Sheets S4 and S22.

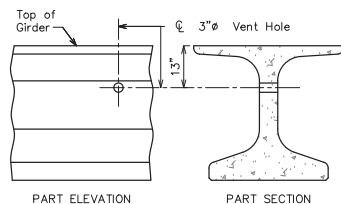
Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.



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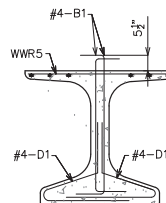
SECTION A-A
Strands not shown
for clarity.



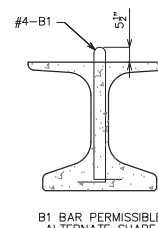
PART ELEVATION

VENT HOLE

Place vent holes at or near upgrade $1/3$ point of girders and clear reinforcing steel or strands by $1\frac{1}{2}$ " minimum and steel intermediate diaphragm bolt connections by 6" minimum.



SECTION B-B
Strands not shown
for clarity.

B1 BAR PERMISSIBLE
ALTERNATE SHAPE

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practices for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1".

All bar reinforcement shall be Grade 60.

The two D1 bars may be furnished as one bar at fabricator's option.

All B1 and B2 bars shall be epoxy coated.

G4 and G5 not required for interior girders. G3 not required for exterior girders.

General Notes:

This drawing is not to scale. Follow dimensions.

Concrete for prestressed beams shall be Class A-1 with $f'_c = 9000$ psi and $f'_{ci} = 7000$ psi.

Use 58 strands, 0.6"Ø Grade 270, with an initial prestress force of 2549 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: coil ties, top flange blockout, application of bond breaker, coil inserts for slab drains, holes for steel intermediate diaphragms.

For Girder Camber Diagram, see Sheet S25.

The 1 1/2"Ø holes shall be cast in the web for steel intermediate diaphragms. Drilling is not allowed. For location of holes and details of steel intermediate diaphragms, see Sheets S20 and S21.

For location of coil inserts at slab drains, see Sheet S24.

For location of coil ties at concrete diaphragms,
see Sheet S22.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

[illegible][illegible]

+ Indicates prestressing strand. ○ Indicates cut & shop bend with 3'-0" projection.

Δ Indicates debonded for 9'-0" from end of girder
 □ Indicates debonded for 6'-0" from end of girder
 ▽ Indicates debonded for 3'-0" from end of girder

Bill of Reinforcing Steel

Bars Each Girder				Bending	Diagrams
No.	Size/Mark	Length	Shape		
134	4 B1	6'-6"	11S		
192	4 B2	6'-10"	11S		
346	4 D1	4'-0"	9S		
2	4 G3	3'-10"	20		
2	4 G4	2'-3"	20		
2	4 G5	2'-8"	20		

Shape 9S Shape 11S

Welded Wire Each Girder

WWR6 **WWR5**

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1".

All bar reinforcement shall be Grade 60.

The two D1 bars may be furnished as one bar at the fabricator's option.

All B1 and B2 bars shall be epoxy coated.

G4 and G5 not required for interior girders.
Half no. of G3, G4 and G5 not required for exterior girders.

This drawing is not to scale. Follow dimensions.

Concrete for prestressed beams shall be Class A-1 with $f'_c = 9000$ psi and $f'_{ci} = 7000$ psi.

Use 56 strands, 0.6"Ø Grade 270, with an initial prestress force of 2461 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

Exterior and interior girders are the same except: coil ties, top flange blockout, application of bond breaker, coil inserts for slab drains, holes for steel intermediate diaphragms.

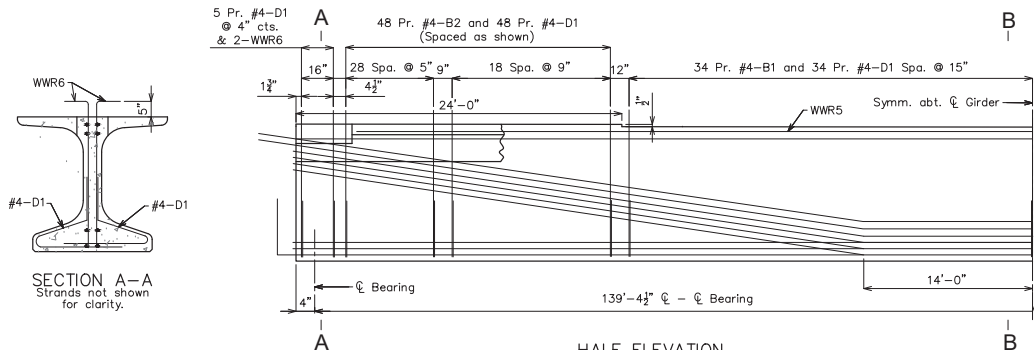
For Girder Camber Diagram, see Sheet S25.

The 1 1/2"Ø holes shall be cast in the web for steel intermediate diaphragms. Drilling is not allowed. For location of holes and details of steel intermediate diaphragms, see Sheets S20 and S21.

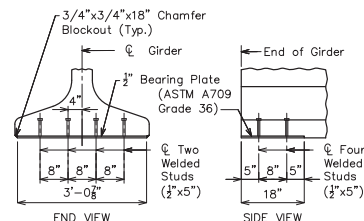
For location of coil inserts at slab drains, see Sheet S24.

For location of coil ties at concrete diaphragms,
see Sheets S12 and S22.

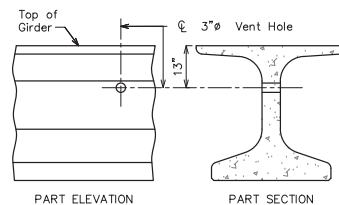
Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.



Reinforcement support strands not shown for clarity.

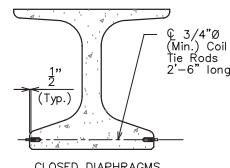


BEARING PLATE



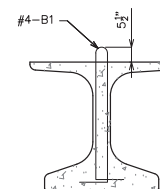
VENT HOLE

Place vent holes at or near upgrade $1/3$ point of girders and clear reinforcing steel or strands by $1\frac{1}{2}$ " minimum and steel intermediate diaphragm bolt connections by 6" minimum.



CLOSED DIAPHRAGMS
AND INTEGRAL BENTS
COIL TIES

Exclude coil tie at exterior face of exterior girders except at integral end bents.

B1 BAR PERMISSIBLE
ALTERNATE SHAPE

PLAN SHOWING LOCATION OF STEEL INTERMEDIATE DIAPHRAGMS
Longitudinal dimensions are horizontal.

General Notes:
This drawing not to scale. Follow dimensions.
Work this sheet with Sheet S20.

[illegible]

GRE
GREAT RIVER
ENGINEERING

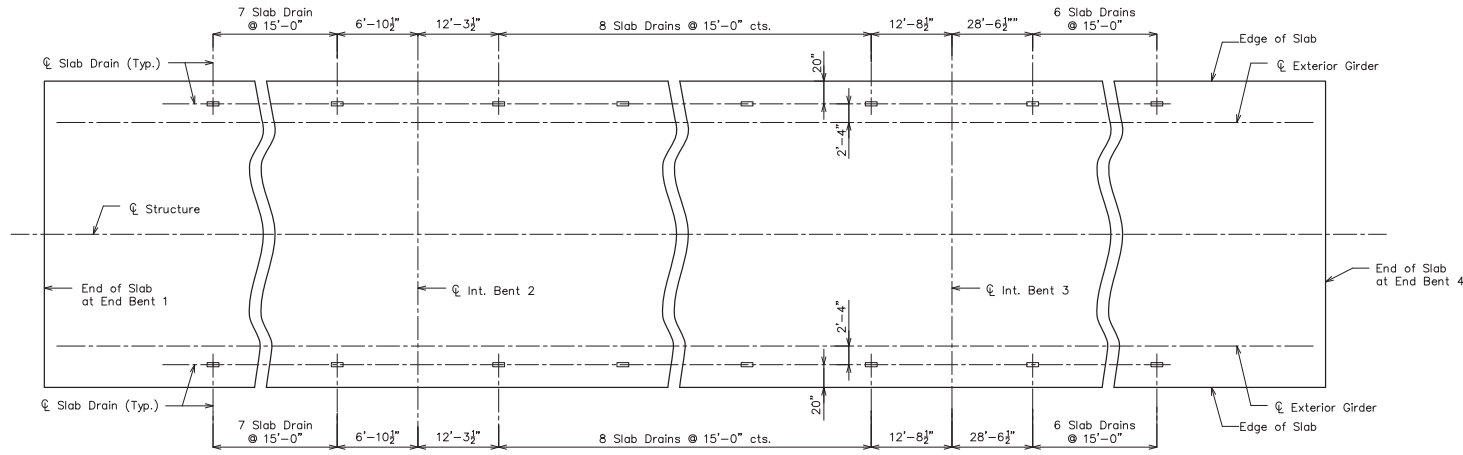
Figure 10 is an elevation view of a bridge deck showing reinforcement details. The diagram illustrates the layout of reinforcement bars (Pr. #6-U53, Pr. #6-U52, Pr. #6-U51, #5-H54, #5-H53, #5-H50, #4-H51, #6-H52) and the placement of bent-up bars (Bent & Diaphragm) and tie rods (3/8" Coll Tie Rod (Typ.)). Dimensions include 9'-4" for the girder length, 9" for the bent-up bar length, and 12" for the tie rod length. A note indicates "Symm. obt. C. Bent, C. Structure & C. Roadway".

[illegible]

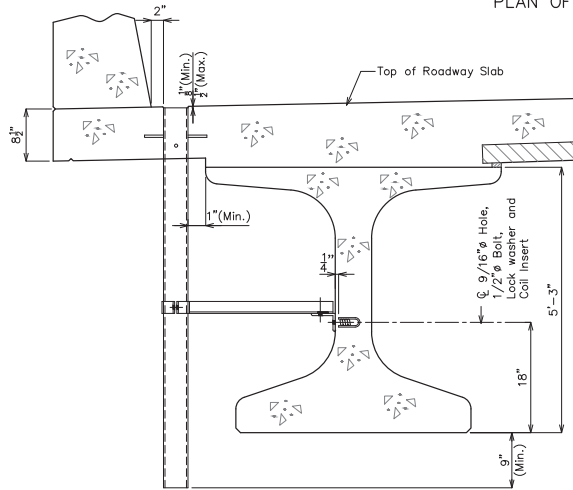
EDGE DETAIL

Technical drawings of a composite steel girder. The left drawing is a side elevation showing a 2'-2" wide top flange with #6-U53 reinforcement, a 3" concrete deck, and a 2'-1" wide bottom flange with #5-U54 reinforcement. The web is reinforced with #5-U55 (each face) and #5-V50. The right drawing is an "END DETAIL" showing the "End of Diaphragm" with a 4 3/4" gap, 1" joint filler under the girder, 1/2" joint filler, and 3" bevels on the concrete deck.

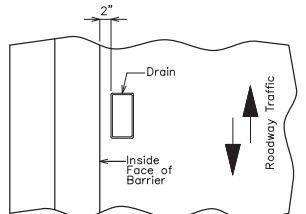
S22



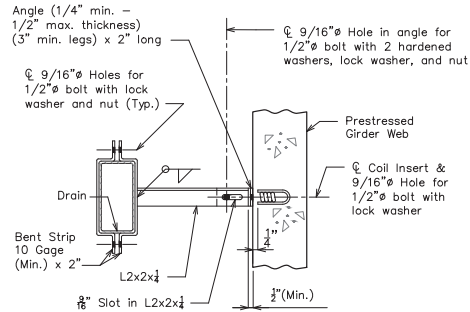
PLAN OF SLAB SHOWING SLAB DRAIN LOCATIONS



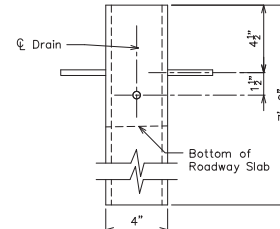
PART SECTION NEAR DRAIN



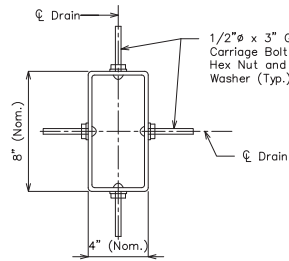
PART PLAN OF SLAB AT DRAIN



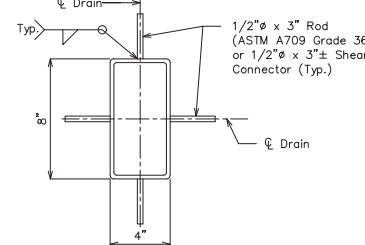
PART SECTION SHOWING BRACKET ASSEMBLY



ELEVATION OF DRAIN



PLAN OF FRP DRAIN OPTION



PLAN OF STEEL DRAIN OPTION

General Notes:

This drawing is not to scale. Follow dimensions.
Contractor shall have the option to construct either steel or FRP slab drains. All drains shall be of same type.

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Locate drains in slab by dimensions shown in Part Section Near Drain.

Reinforcing steel shall be shifted to clear drains.

The coil inserts and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

All 1/2" bolts shall be ASTM A307.

Shop drawings will not be required for the slab drains and the bracket assembly.

The coil insert required for the bracket assembly attachment shall be located on the prestressed girder shop drawings.

Coil inserts shall have a concrete pull-out strength (ultimate load) of at least 2,500 pounds in 5,000 psi concrete.

The bolt required to attach the slab drain bracket assembly to the prestressed girder web shall be supplied by the prestressed girder fabricator.

Notes for Steel Drain:

Slab drains may be fabricated of either 1/4" welded sheets of ASTM A709 Grade 36 steel or from 1/4" structural steel tubing ASTM A500 or A501.

Outside dimensions of drains are 8" x 4".

The drains shall be galvanized in accordance with ASTM A123.

Notes for FRP Drain:

Drains shall be machine filament-wound thermosetting resin tubing meeting the requirements of ASTM D2996 with the following exceptions:

Shape of drains shall be rectangular with outside nominal dimensions of 8" x 4".

Minimum reinforced wall thickness shall be 1/4 inch.

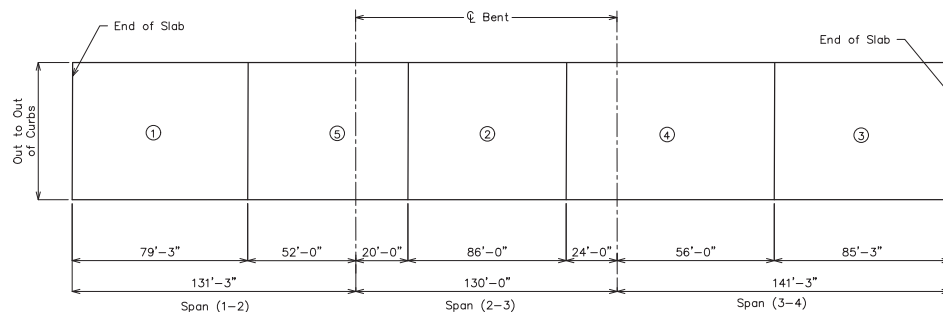
The resin used shall be ultraviolet (UV) resistant and/or have UV inhibitors mixed throughout. Drains may have an exterior coating for additional UV resistance.

The color of the slab drain shall be gray (Federal Standard 26373). The color shall be uniform throughout the resin and any coating used.

The combination of materials used in the manufacture of the drains shall be tested for UV resistance in accordance with ASTM D4329 Cycle A. The representative material shall withstand at least 500 hours of testing with only minor discoloration and without any physical deterioration. The contractor shall furnish the results of the required ultraviolet testing prior to acceptance of the slab drains.

At the contractor's option, drains may be field cut. The method of cutting FRP slab drain shall be as recommended by the manufacturer to ensure a smooth, chip free cut.

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Checked	
Reviewed	
Approved	
Scale	
North Arrow	
Revision	
No.	
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED:	
STATE OF MISSOURI BOYD DENSON NUMBER E-30094 REGISTERED PROFESSIONAL ENGINEER	
GRE GREAT RIVER ENGINEERING	
Missouri State Certificate of Authority Number: E-30094 Engineering Discipline: Civil Licensee Expiration Date: 2025/06/11	
BRO-R108(001)	SLAB DRAINS
VERNON COUNTY, MISSOURI	
2025-06-11	
JOB 5063	
S24	



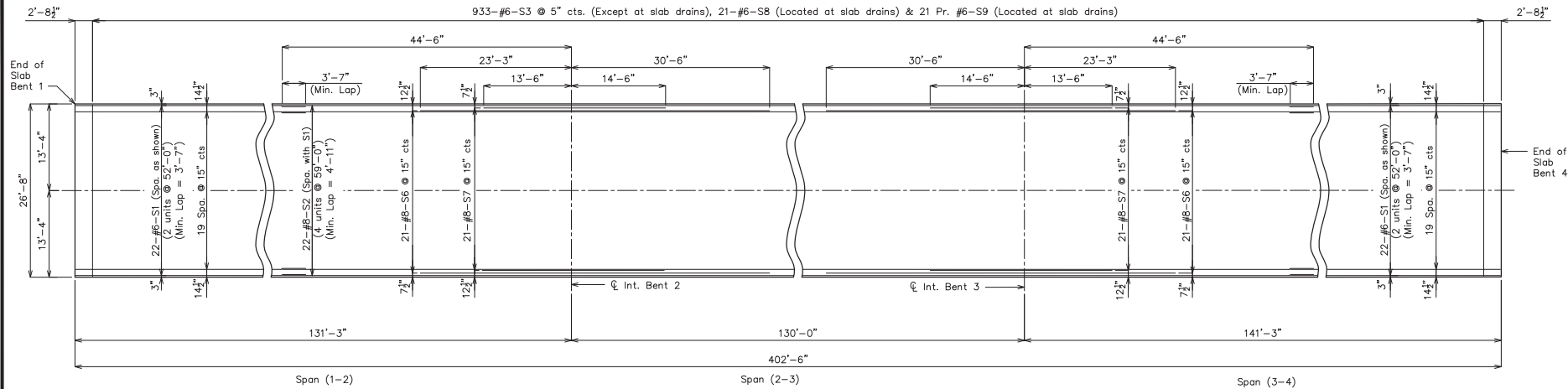
The concrete diaphragm at the intermediate bents and integral end bents shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

The diagram shows a cross-section of a girder with a parabolic camber profile. The following labels and dimensions are present:

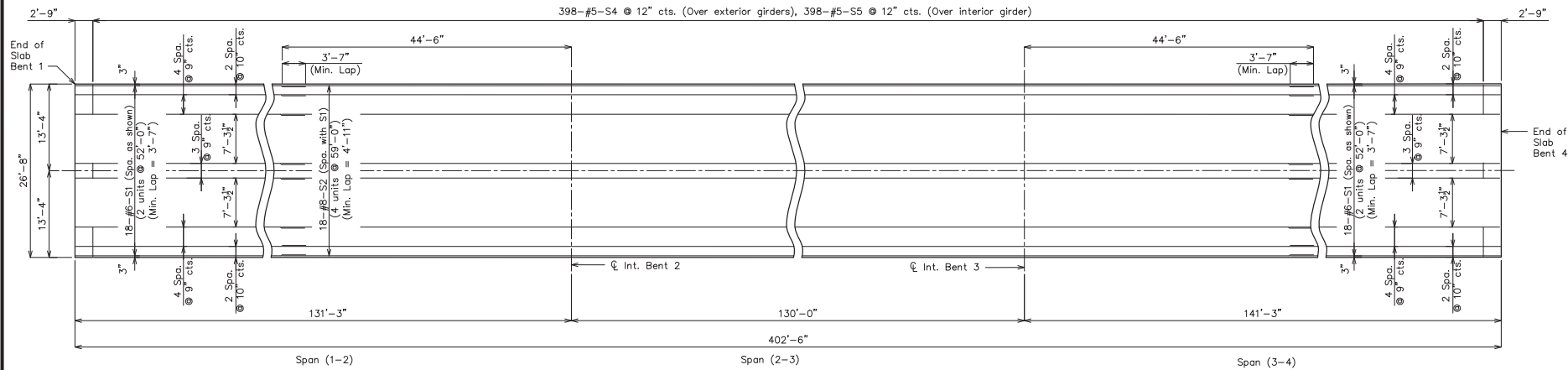
- Girder**: Points to the vertical axis of the girder.
- Theoretical camber after erection (Estimated at 90 days)**: Points to the highest dashed parabolic curve.
- Theoretical final camber after strand release (Estimated at 7 days)**: Points to the middle dashed parabolic curve.
- Theoretical final camber after slab is poured (Estimated at 90 days)**: Points to the lowest solid parabolic curve.
- Bearing**: Points to the base of the camber profile.
- Dimensions**:
 - B : Total height of the girder.
 - C : Height from the bearing to the top of the girder.
 - A : Height from the bearing to the bottom of the camber profile.
 - C : Total width of the camber profile at the base.

0.1 pt. = 0.314 x 0.5 pt.
0.2 pt. = 0.593 x 0.5 pt.
0.3 pt. = 0.813 x 0.5 pt.
0.4 pt. = 0.952 x 0.5 pt.

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PLAN OF SLAB SHOWING TOP REINFORCEMENT



PLAN OF SLAB SHOWING BOTTOM REINFORCEMENT

General Notes:

This drawing not to scale. Follow dimensions.

For details of and location of slab drains not shown, see Sheet S24.

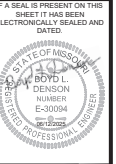
For section thru slab, see Sheet S27.

Longitudinal dimensions are horizontal.

For theoretical bottom of slab elevations, girder camber diagram, theoretical slab haunching diagram and slab pouring sequence, see Sheet S25.

For details and reinforcement of barrier not shown, see Sheets S28 & S29.

Revision	Issue	Date
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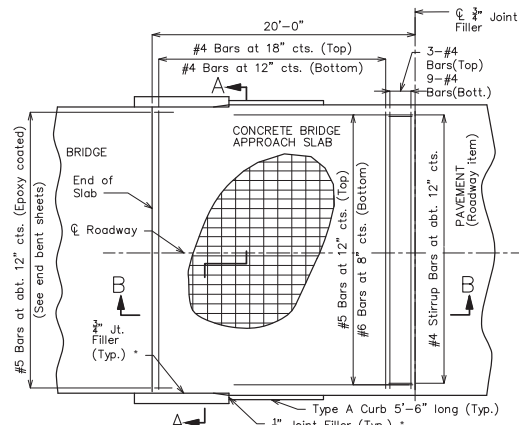


BRO-R108(001)
VERNON COUNTY, MISSOURI
PLAN OF SLAB SHOWING REINFORCEMENT

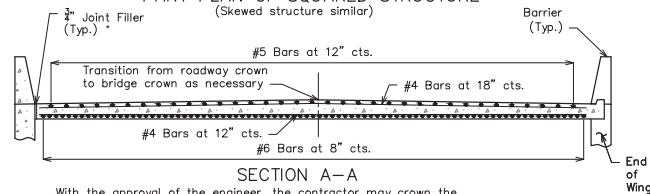
2025-06-11
JOB 5063
S26



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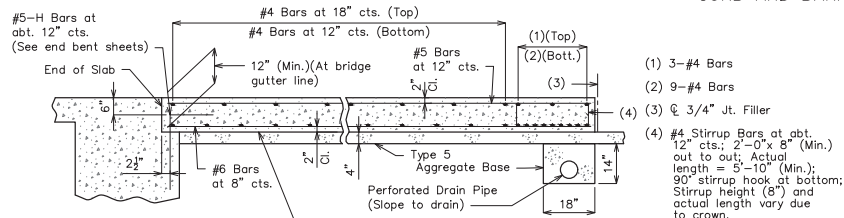


PART PLAN OF SQUARED STRUCTURE
(Skewed structure similar)

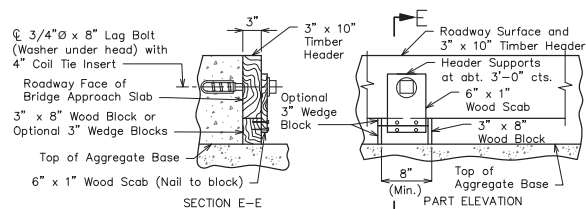


SECTION A-A

With the approval of the engineer, the contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



SECTION B-B
(Integral end bent)

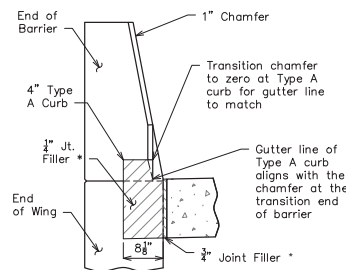


Remove timber header when concrete pavement is placed.

CONCRETE SLAB

UNDERSEAL ACCESS
HOLE DETAIL
(If required)

CONSTRUCTION
JOINT DETAIL



SECTION BETWEEN
CURB AND BARRIER

Notes For Concrete Slab Only:

All concrete for the bridge approach slab shall be in accordance with Sec 503 ($f_c = 4,000$ psi).

The reinforcing steel in the bridge approach slab shall be epoxy coated Grade 60 with $f_y = 60,000$ psi.

Longitudinal construction joints in bridge approach slab shall be aligned with longitudinal construction joints in bridge slab.

Minimum clearance to reinforcing steel shall be $1\frac{1}{2}$ ", unless otherwise shown.

The reinforcing steel in the bridge approach slab shall be continuous. The transverse reinforcing steel may be made continuous by providing a minimum lap splice of 26 inches for #4 bars, or by mechanical bar splice.

Mechanical bar splices shall be in accordance with Sec 710.

All joint filler shall be in accordance with Sec 1057 for preformed fiber expansion joint filler except as noted.

Payment for furnishing all materials, labor and excavation necessary to construct the concrete bridge approach slab, including the timber header, underdrain, Type 5 aggregate base, joint filler, and all other appurtenances and incidental work as shown on this sheet, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Minor) per square yard.

See Missouri Standard Plan 609.00 for details of Type A curb.

Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

* Seal joint between vertical face of approach slab and wing with sealant in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

General Notes:

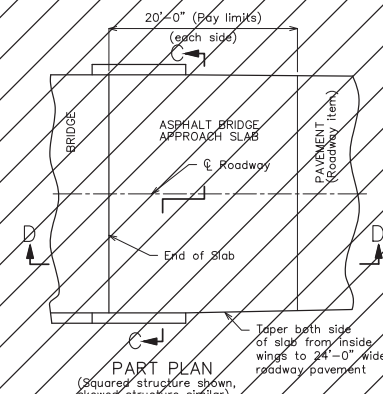
This drawing is not to scale. Follow dimensions.

The contractor shall pour and satisfactorily finish the bridge slab before placing the bridge approach slab.

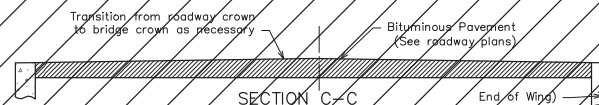
Notes For Asphalt Slab Only:

Payment for furnishing all materials, labor and excavation necessary to construct the asphalt bridge approach slab, including tack coat, and Type 5 aggregate base within the pay limits shown, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Minor) per square yard.

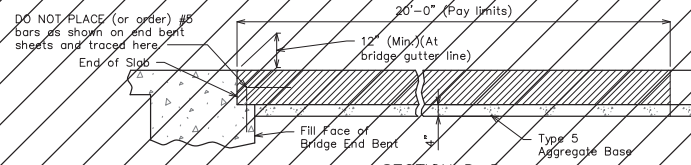
Application of tack is required between lifts per Sec 403.



PART PLAN
(Squared structure shown,
skewed structure similar)



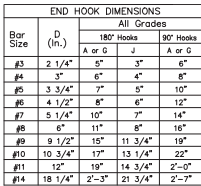
With the approval of the engineer, the contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



SECTION D-D

OPTIONAL ASPHALT SLAB (NOT ALLOWED WITH CONCRETE PAVEMENT)

Date	
Revision/Issue	
No.	
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED	
Missouri State Certificate of Authority Number: E-30094 Engineer: David L. Denison Licensee: David L. Denison, 2005/07/24/25	
BRO-R108(001) VERNON COUNTY, MISSOURI	
BRIDGE APPROACH SLAB (MINOR)	
2025-06-11	
JOB 5063	
S30	

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SHAPE 30

SHAPE 31

SHAPE 32

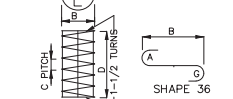
SHAPE 33

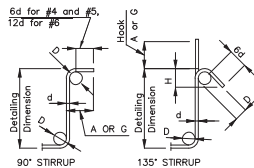
SHAPE 34
135° HOOK
(SHAPE 33 must be a deformed or plain spiral bar or wire.)

SHAPE 35
C PITCH
1-1/2 TURNS

SHAPE 36

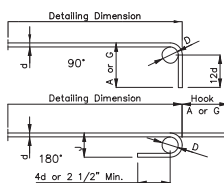
BENDING DIAGRAMS



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STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
Bar Size	D (In.)	90° Hook		135° Hook
		Hook A or G	Hook A or G	Approx. H
#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"	8"	4 1/2"

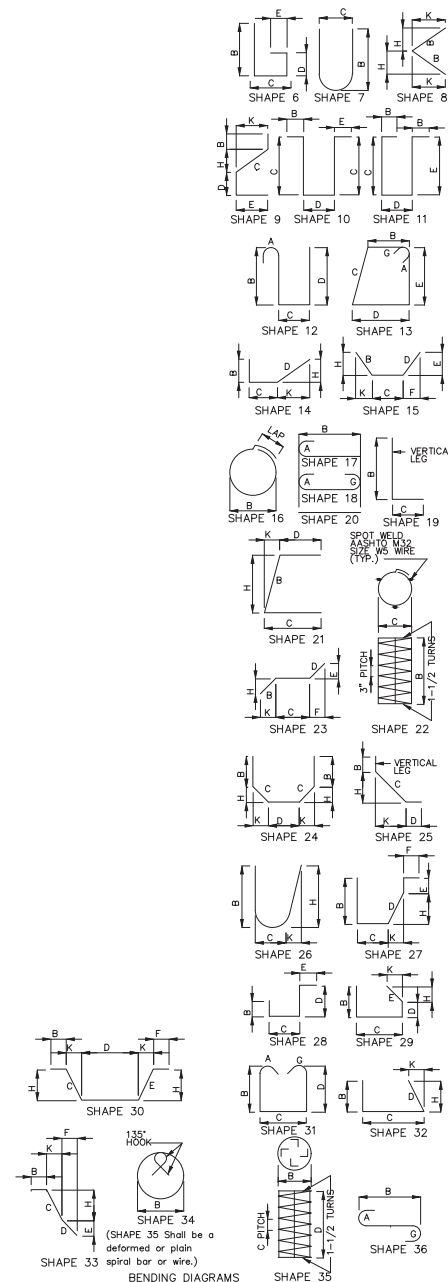
Note: Unless otherwise noted diameter "D" is the same for all bends and hooks on a bar.

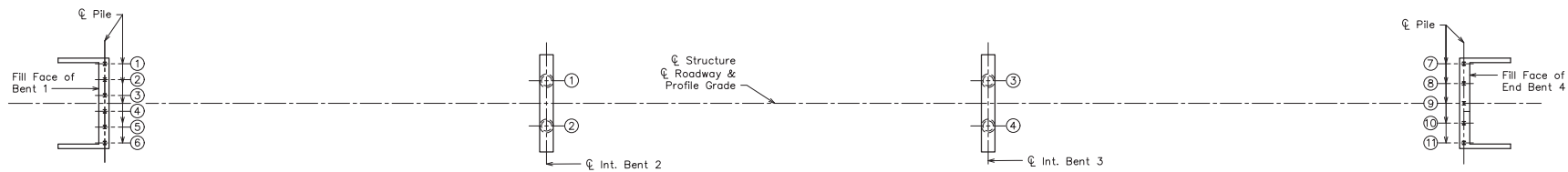


END HOOK DIMENSIONS					
Bar Size	D (in.)	All Grades			
		180° Hooks		90° Hooks	
		A or G	J	A or G	J
#3	2 1/4"	5"	3"	6"	6"
#4	3"	6"	4"	8"	8"
#5	3 3/4"	7"	5"	10"	10"
#6	4 1/2"	8"	6"	12"	12"
#7	5 1/4"	10"	7"	14"	14"
#8	6"	11"	8"	16"	16"
#9	9 1/2"	15"	11 3/4"	19"	19"
#10	10 3/4"	17"	13 1/4"	22"	22"
#11	12"	19"	14 3/4"	2-0"	2-0"
#14	18 1/4"	2-3"	2-3"	2-7"	2-7"

NOTE:
 All standard hooks and bends other than 180 degree are to be bent with same procedure as for 90 degree standard hook.
 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.
 All dimensions vary in equal increments between dimensions shown on this line and the following V. line.
 No. La = Number of bars of each length.
 All dimensions are based on out to out dimensions shown in bending diagrams and are listed for fabricators use. (Nearest inch)
 Payweights are based on actual lengths.
 Four angle or channel spacers are required for each column spiral. Spacers are to be placed on inside of spirals. Length and Weight of column spirals do not include spacers or spacers.

Note: This drawing not to scale. Follow dimensions.





PART PLAN SHOWING PILE & DRILLED SHAFT NUMBERING FOR RECORDING
AS-BUILT PILE DATA & AS-BUILT DRILLED SHAFT DATA

AS-BUILT PILE DATA

Pile	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
			End Bent 1
1			
2			
3			
4			
5			
6			
			End Bent 4
7			
8			
9			
10			
11			

AS-BUILT DRILLED SHAFT DATA

Shaft	Top of Sound Rock (Elev.)	Tip of Casing (Elev.)	Bottom of Rock Socket (Elev.)	Remarks
				Intermediate Bent 2
1				
2				
				Intermediate Bent 3
3				
4				

Note:
Indicate in remarks column:
A. Pile type & grade
B. Batter
C. Driven to practical refusal

		BRO-R108(001) VERNON COUNTY, MISSOURI AS-BUILT PILE AND DRILLED SHAFT DATA
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