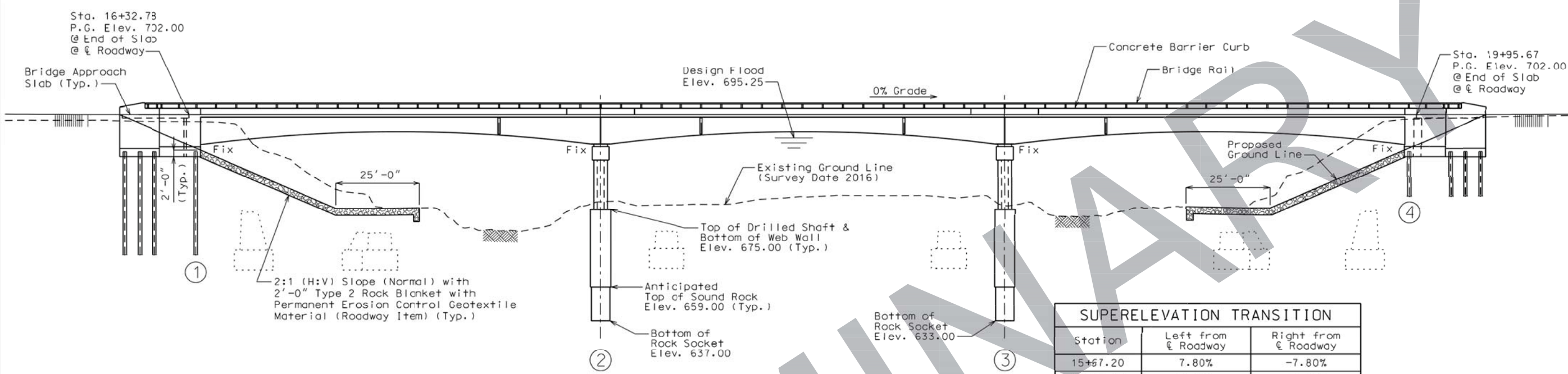


MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 (3 @ 120') Haunched Continuous Composite Steel Plate Girder Spans

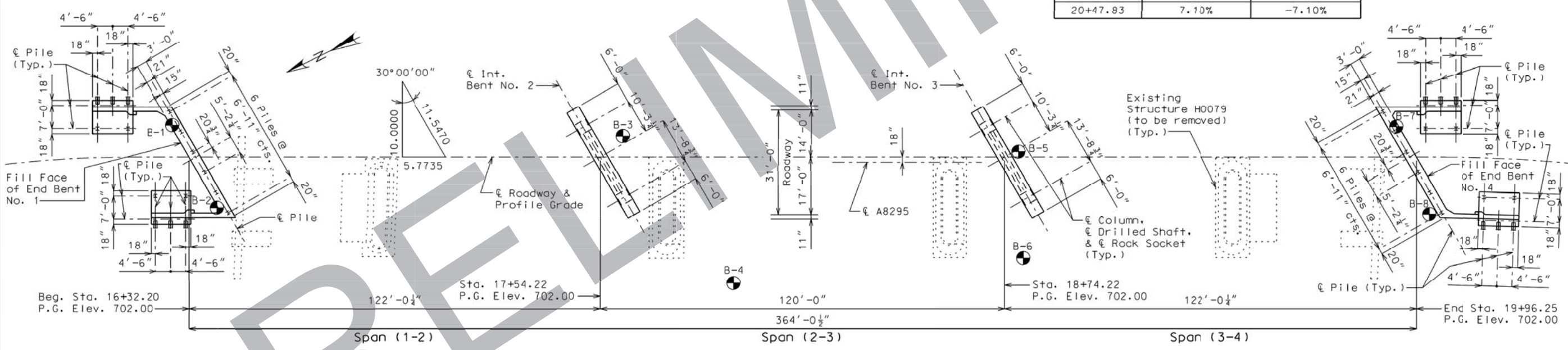
SEC/SUR 17 TWP 30N RGE 4W



DATE PREPARED	9/28/2016
ROUTE	19
STATE	MO
DISTRICT	BR
SHEET NO.	1
COUNTY	SHANNON
JOB NO.	J9P0438
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO.	A8295



Station	Left from € Roadway	Right from € Roadway
15+67.20	7.80%	-7.80%
16+72.79	2.00%	-2.00%
19+55.16	2.00%	-2.00%
20+47.83	7.10%	-7.10%



PLAN  
 Note: All bents are parallel.

⊙ Indicates location of borings.  
 Notice and Disclaimer Regarding Boring Log Data

The locations of all subsurface borings for this structure are shown on the plan sheets for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, are shown on Sheets No. 32 thru 40 or will be available from the Project Contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the district or elsewhere.

The Commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the Commission.

BRIDGE: ROUTE 19 OVER SINKING CREEK  
 STATE ROAD FROM RTE. A TO RTE. D  
 ABOUT 4.9 MILES SOUTH OF RTE. A  
 STA. 16+32.20

Designed: MAC  
 Detailed: CAB  
 Checked: MAC

STD. 706.35

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

ModOT

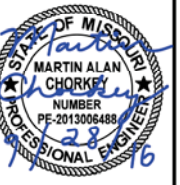
HORNER SHIFRIN  
 4011 LBNL St., Ste. 400 - Saint Louis, MO 63103-2306  
 314-331-8321 - FAX 314-531-6666 - www.horner-shifrin.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK

General Plan and Elevation







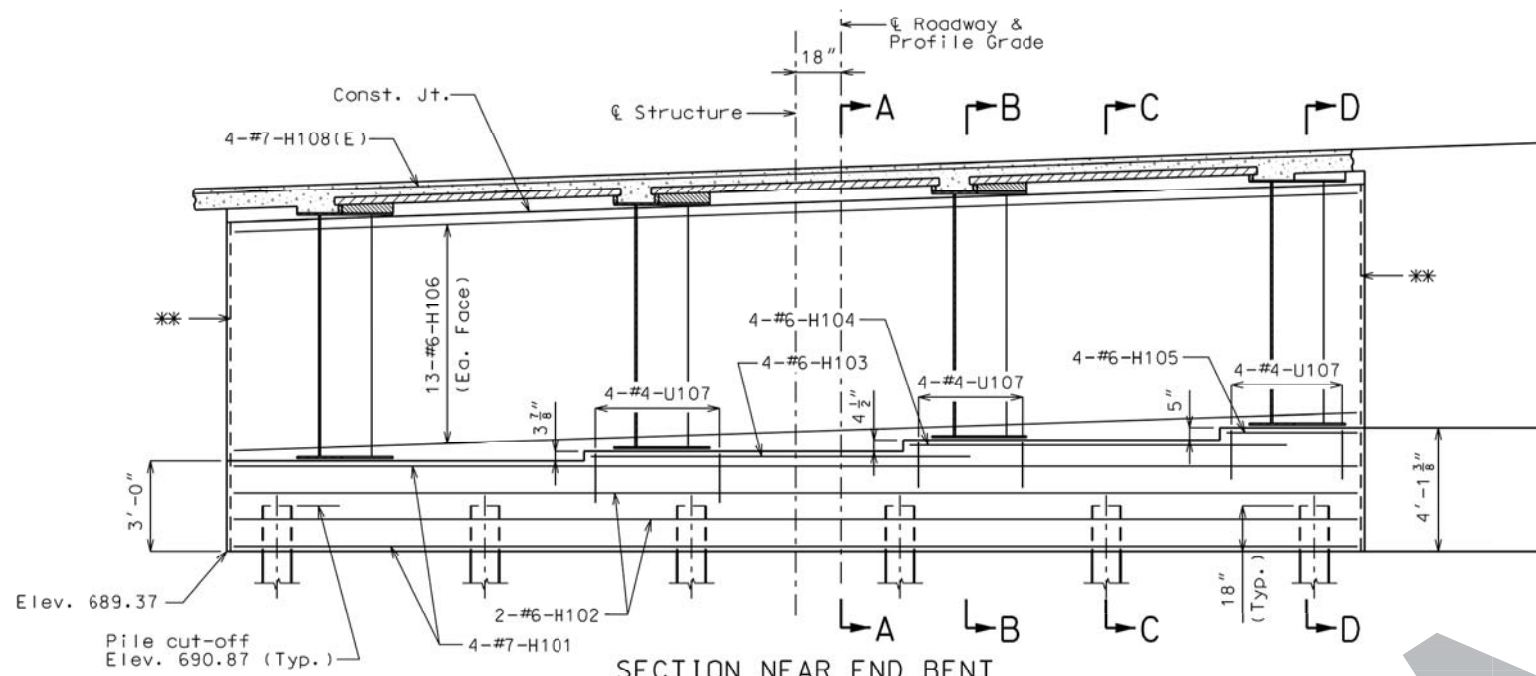
DATE PREPARED  
9/28/2016

ROUTE 19 STATE MD  
DISTRICT BR SHEET NO. 4

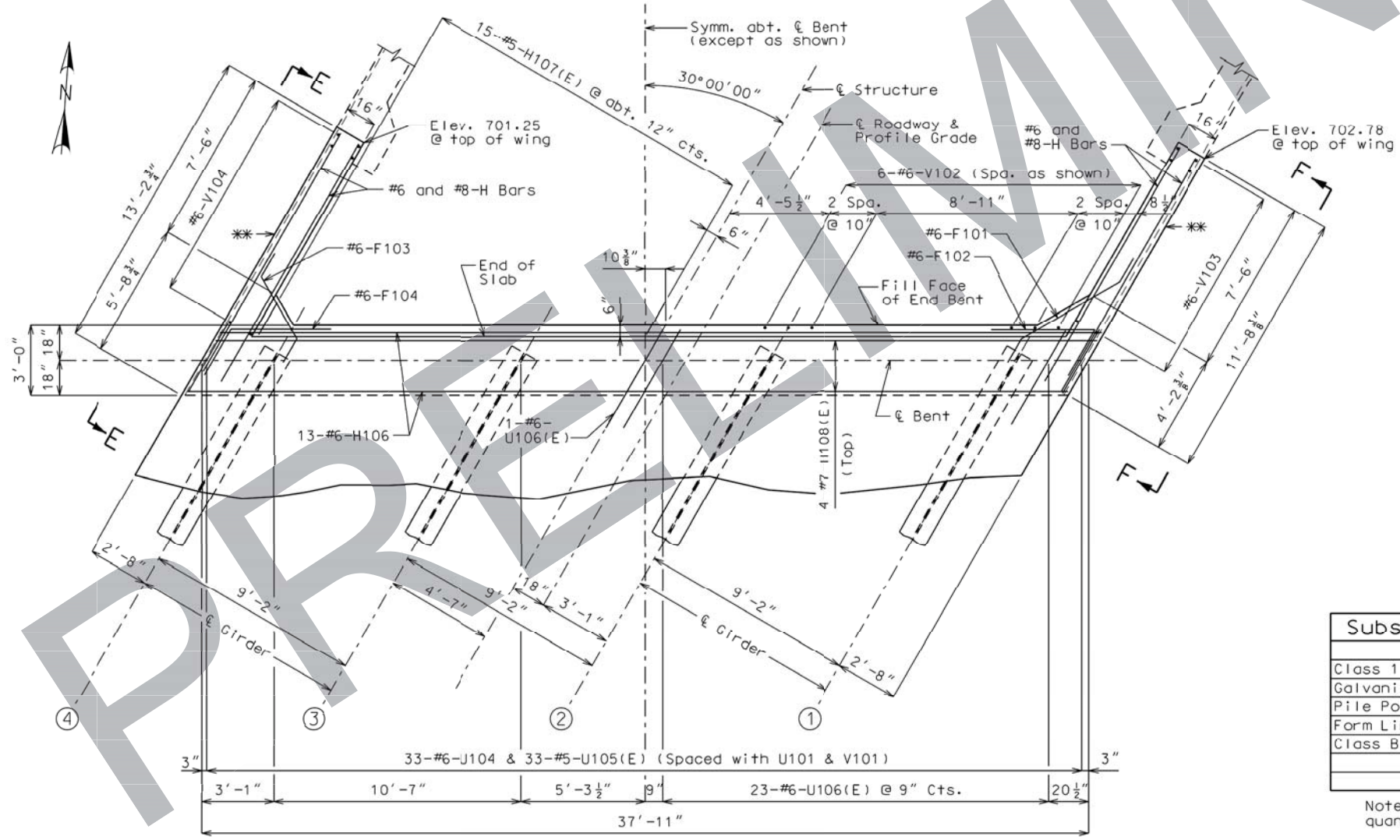
COUNTY SHANNON  
JOB NO. J9P0438  
CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8295



**SECTION NEAR END BENT**  
Note: Space #4-U107 bars with #4-U102 and #4-U103 bars.



**PART PLAN**

Note: This drawing is not to scale. Follow dimensions.

- Notes:
- Work this sheet with Sheets No. 3 & 5.
  - Bend F101 and F103 bars in field to clear girders.
  - All concrete in the End Bent above top of Beam and below top of Slab shall be Class B-2.
  - Slab reinforcement not shown for clarity, see Sheet No. 23 for details.
  - For reinforcement of the Barrier Curb at End Bents, see Sheet No. 26.
  - For details of Vertical Drain at End Bent, see Sheet No. 7.
  - For details of approach slab, see Sheet No. 28.
  - \*\* Provide Fractured Fin Form Liner. See Job Special Provisions and Sheet No. 2 for additional information.

Item	Quantity
Class 1 Excavation	cu. yard 40
Galvanized Structural Steel Piles (12 in.)	linear foot 168
Pile Point Reinforcement	each 6
Form Liners	sq. yard 10
Class B Concrete (Substructure)	cu. yard 17.9

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

Designed: MAC  
Detailed: CAB  
Checked: MAB

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

**MODOT**

**HORNER SHIFRIN**  
4011 Latta St., Ste. 400 - Saint Louis, MO 63103-2706  
314-331-8321 - FAX 314-531-6966 - www.horner-shifrin.com  
Discipline: Professional Engineering  
Expiration Date: December 31, 2016

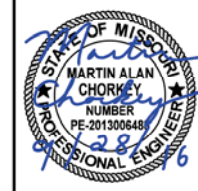
ROUTE 19 OVER SINKING CREEK

Details of End Bent No. 1









DATE PREPARED 9/28/2016	
ROUTE 19	STATE MO
DISTRICT BR	SHEET NO. 8
COUNTY SHANNON	
JOB NO. J9P0438	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8295	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

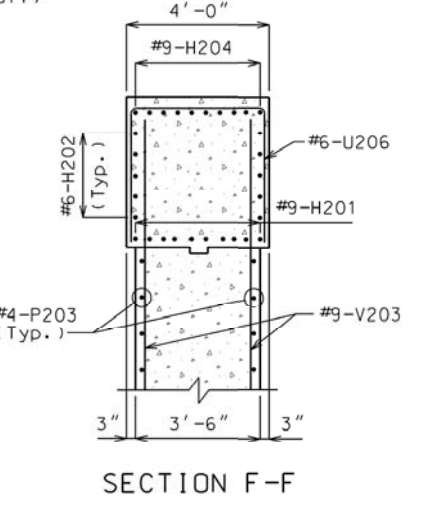
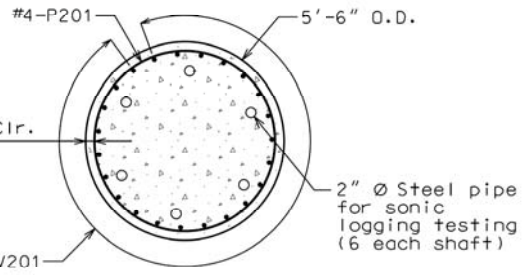
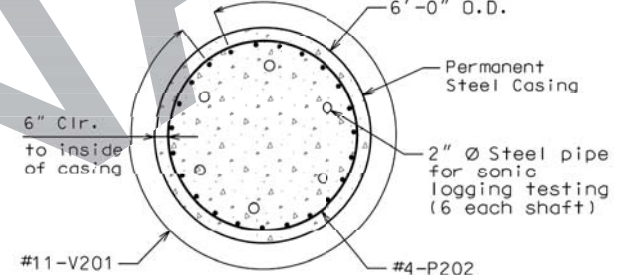
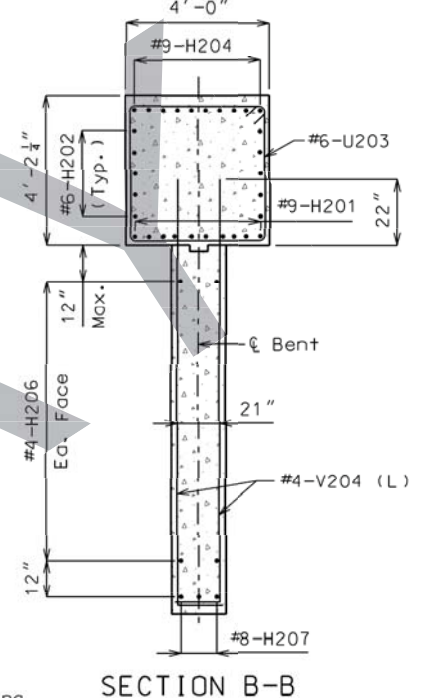
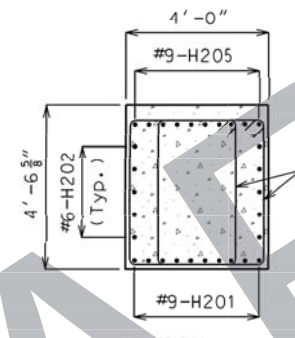
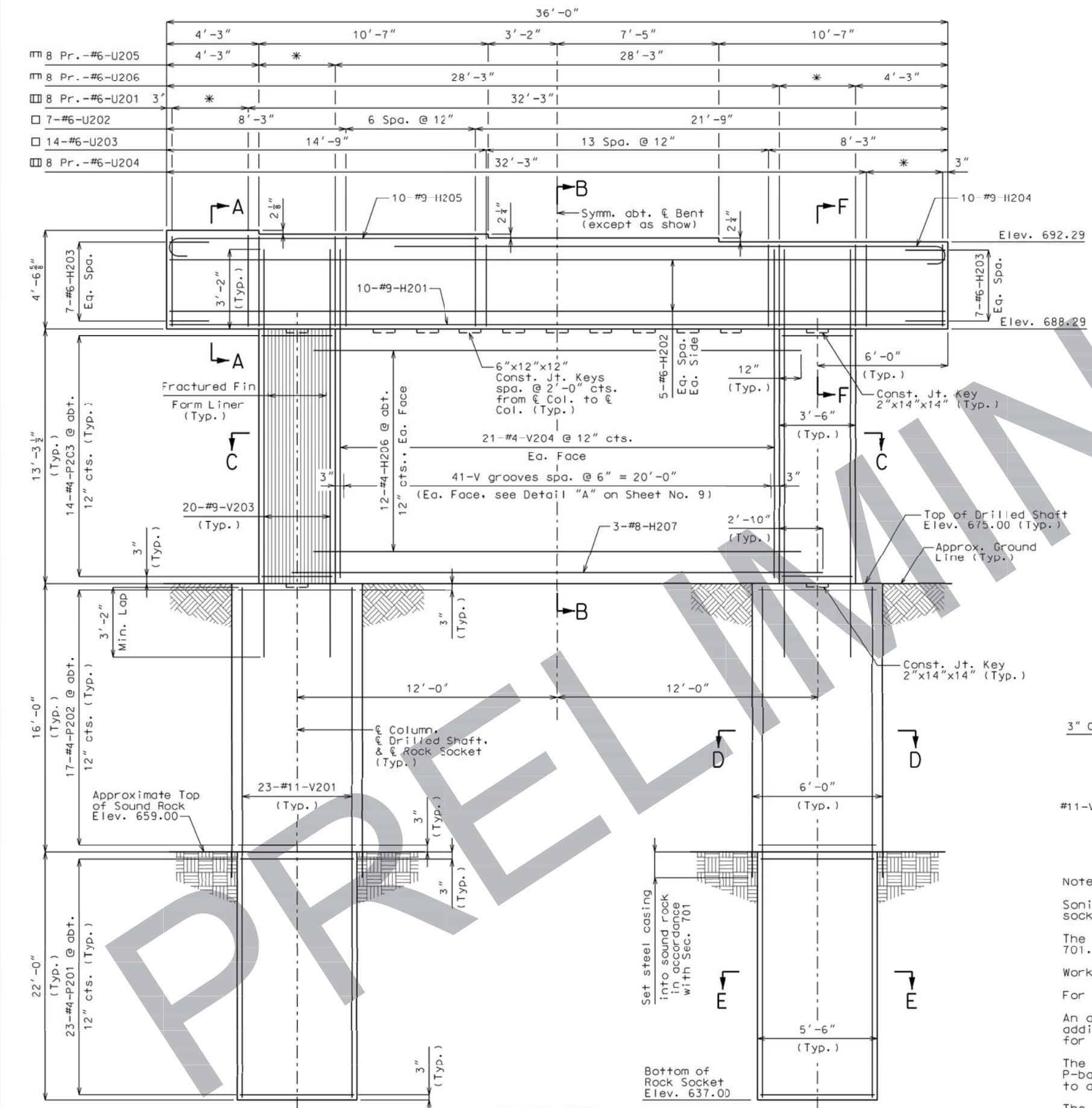
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

**HORNER SHIFRIN**

401 S. 10th St., Ste. 400 - Saint Louis, MO 63103-2306  
314-331-8321 - FAX 314-331-6966 - www.horner-shifrin.com  
Discipline: Professional Engineering  
Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK

Details of Intermediate Bent No. 2



**Notes:**

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

The thickness of the permanent steel casing shall be in accordance with Sec. 701.

Work this sheet with Sheet No. 9.

For details of Fractured Fin Form Liner, see Sheet No. 2.

An additional 4 feet has been added to the V-201 bar length and an additional (8) #4 P-202 bars have been added to the quantities, if required, for possible change in drilled shaft or rock socket lengths.

The additional V-bar length shall be cut off 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" cts.

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.

Designed: MAC  
Detailed: CAB  
Checked: MAB













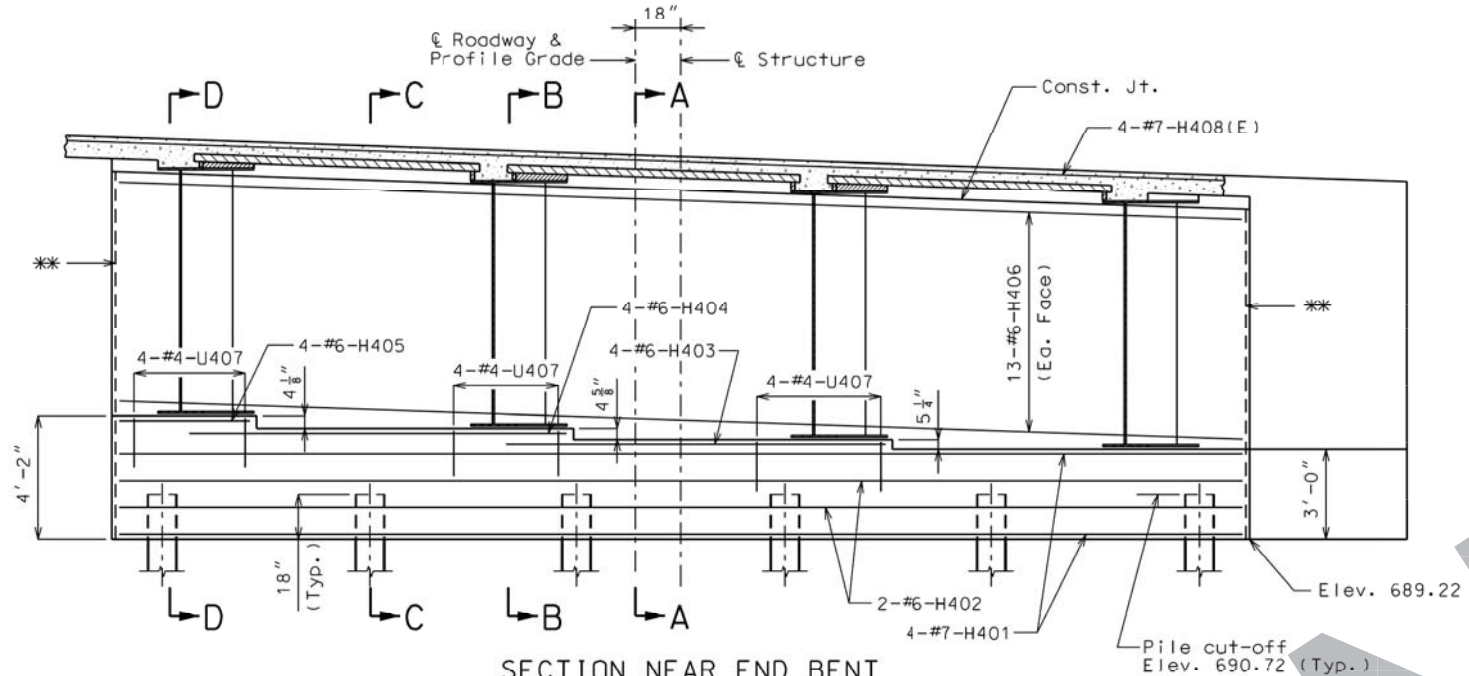
DATE PREPARED  
9/28/2016

ROUTE 19 STATE MO  
DISTRICT BR SHEET NO. 13

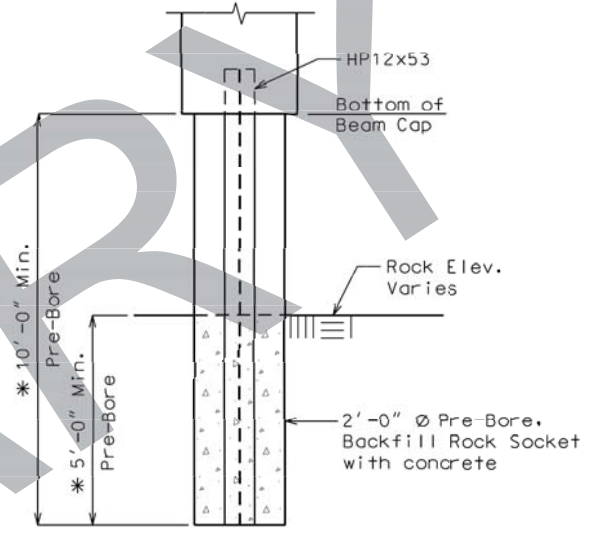
COUNTY SHANNON  
JOB NO. J9P0438  
CONTRACT ID.

PROJECT NO.

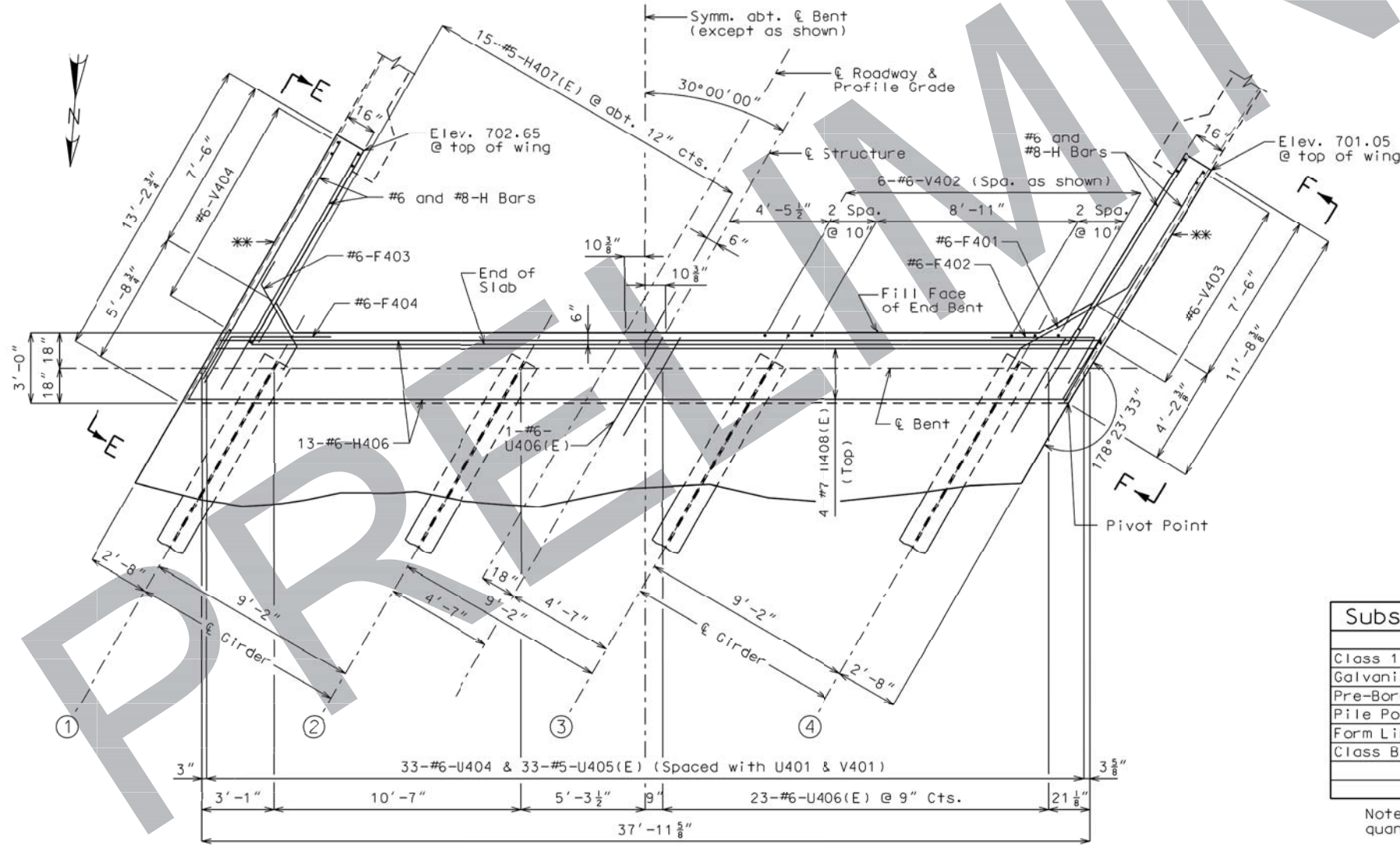
BRIDGE NO. A8295



**SECTION NEAR END BENT**  
Note: Space #4-U407 bars with #4-U402 and #4-U403 bars.



**PRE-BORE AT END BENT NO. 4**  
\* Pre-bore shall be 10'-0" minimum. If rock elevation prohibits 10-ft. length, extend a minimum 5'-0" into rock.



**PART PLAN**

Note: This drawing is not to scale. Follow dimensions.

Notes:  
Work this sheet with Sheets No. 12 & 14.  
Bent F401 and F403 bars in field to clear girders.  
All concrete in the End Bent above top of Beam and below top of Slab shall be Class B 2.  
Slab reinforcement not shown for clarity, see Sheet No. 23 for details.  
For reinforcement of the Barrier Curb at End Bents, see Sheet No. 26.  
For details of Vertical Drain at End Bent, see Sheet No. 7.  
For details of approach slab, see Sheet No. 28.  
\*\* Provide Fractured Fin Form Liner. See Job Special Provisions and Sheet No. 2 for additional information.

Item	Quantity
Class 1 Excavation	cu. yard 40
Galvanized Structural Steel Piles (12 in.)	linear foot 84
Pre-Bore for Piling	linear foot 72
Pile Point Reinforcement	each 6
Form Liners	sq. yard 10
Class B Concrete (Substructure)	cu. yard 18.2

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

Designed: MAC  
Detailed: CAB  
Checked: MAB

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



ROUTE 19 OVER SINKING CREEK

Details of End Bent No. 4













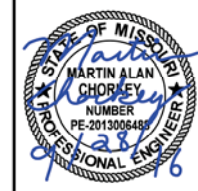












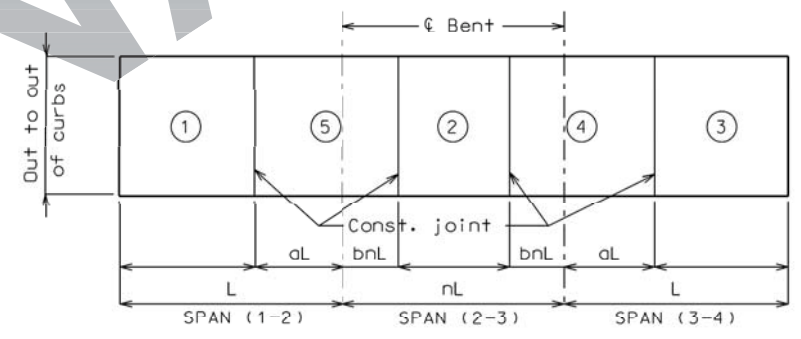
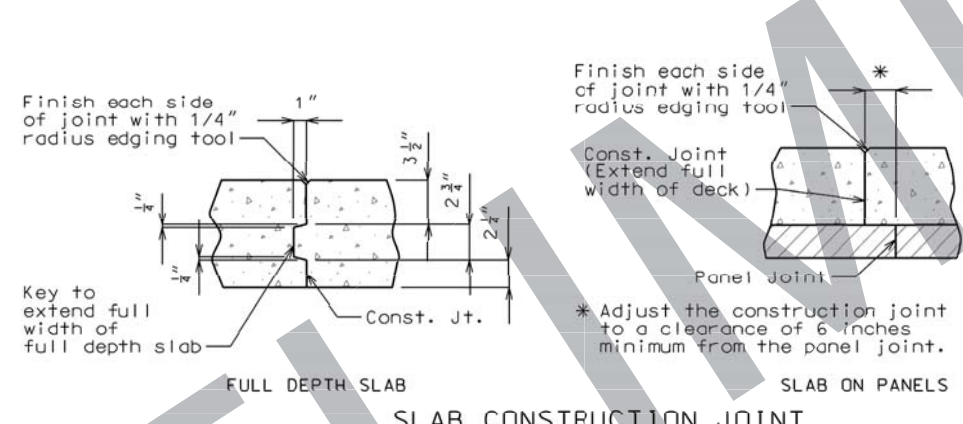
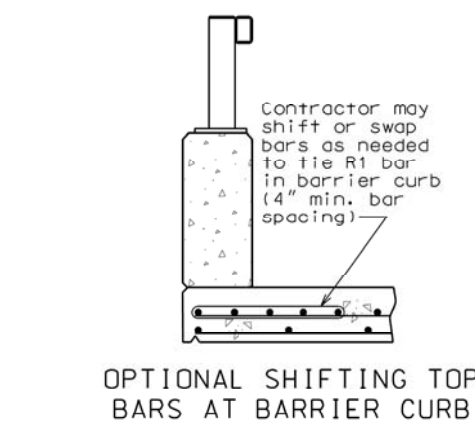
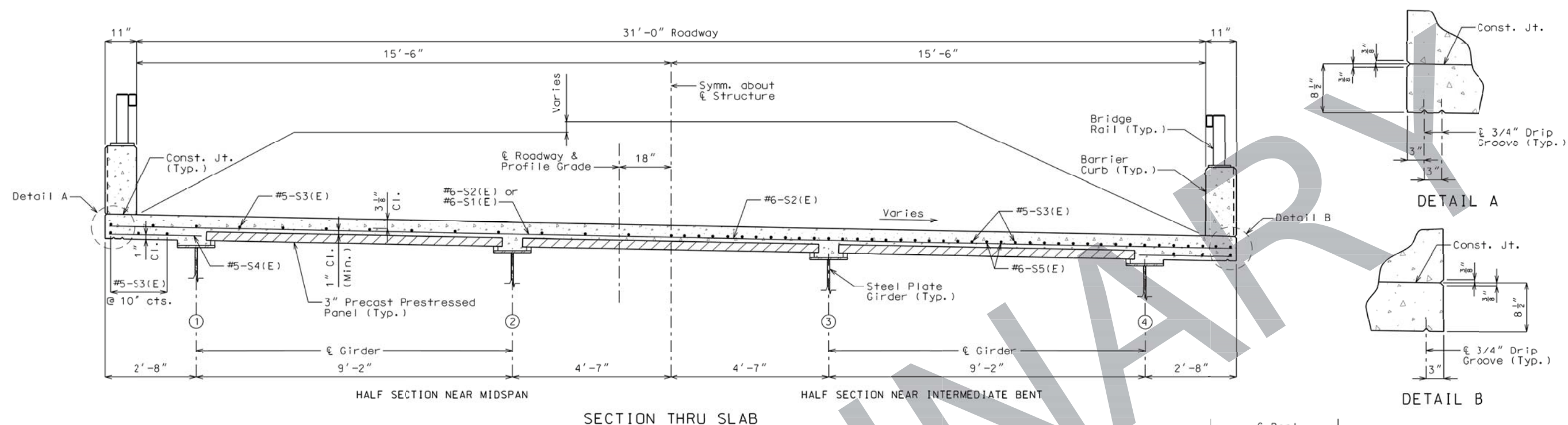
DATE PREPARED		9/28/2016	
ROUTE	19	STATE	MO
DISTRICT	BR	SHEET NO.	24
COUNTY			
SHANNON			
JOB NO.			
J9P0438			
CONTRACT ID.			
PROJECT NO.			
BRIDGE NO.			
A8295			

DESCRIPTION	
DATE	

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)



ROUTE 19 OVER SINKING CREEK  
 Slab Section • Pour Sequence and Details



	Sequence of Pours					Min. rate of pour cu. yds./hr.			
	Direction					With retarder	No retarder		
Basic sequence	1	2	3	4	5	25	25		
	Either direction								
Alternate pours to the basic skip sequence are subject to the approval of the engineer in accordance with Sec 703.									
Alternate "A" pours	1	5 + 2	4 + 3				25	39	
	End to 5	1 to 4	2 to end						
Alternate "B" pours	1 + 5 + 2	4 + 3					25	39	
	End to 4	2 to end							
Alternate "C" pours	1 + 5 + 2 + 4 + 3							25	39
	End to end								

Note: The contractor shall pour and satisfactorily finish the slab pours at the rate given. Retarder, if used, shall be an approved type and retard the set of concrete to 2.5 hours.

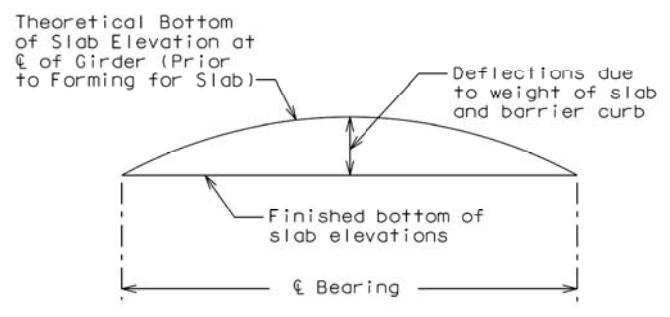
SLAB POURING SEQUENCE

- Notes:
- For details of precast prestressed panels, see Sheet No. 21.
  - For reinforcement of barrier curb not shown, see Sheet No. 25.
  - For details of bridge rail not shown, see Sheet No. 27.
  - For Girder Camber Diagram, see Sheet No. 18.
  - For Plan of Slab Showing Reinforcement, see Sheet No. 23.
  - For details of drainage system, see Sheet No. 22.
  - For superelevation transition data, see Sheet No. 1.

Theoretical Bottom of Slab Elevations at CL of Girder (Prior to Forming for Slab) \*\*

	Span (1-2) (120'-0" CL of brg - CL of brg.)										
	CL brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	CL brg.
Girder No. 1	701.84	701.86	701.78	701.74	701.69	701.69	701.67	701.64	701.60	701.56	701.54
Girder No. 2	701.42	701.46	701.50	701.52	701.54	701.54	701.52	701.48	701.43	701.39	701.35
Girder No. 3	701.05	701.15	701.25	701.33	701.36	701.36	701.33	701.29	701.25	701.20	701.17
Girder No. 4	700.74	700.89	701.04	701.12	701.14	701.14	701.12	701.09	701.05	701.01	700.99
	Span (2-3) (120'-0" CL of brg - CL of brg.)										
	CL brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	CL brg.
Girder No. 1	701.54	701.52	701.51	701.50	701.50	701.50	701.50	701.50	701.51	701.52	701.54
Girder No. 2	701.35	701.33	701.32	701.31	701.31	701.31	701.31	701.31	701.32	701.33	701.35
Girder No. 3	701.17	701.15	701.13	701.13	701.13	701.13	701.13	701.13	701.13	701.15	701.17
Girder No. 4	700.99	700.97	700.96	700.95	700.95	700.95	700.95	700.95	700.96	700.97	700.99
	Span (3-4) (120'-0" CL of brg - CL of brg.)										
	CL brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	CL brg.
Girder No. 1	701.54	701.57	701.60	701.64	701.67	701.69	701.69	701.67	701.69	701.72	701.75
Girder No. 2	701.35	701.39	701.43	701.48	701.52	701.54	701.54	701.52	701.49	701.46	701.42
Girder No. 3	701.17	701.20	701.25	701.29	701.33	701.36	701.36	701.31	701.23	701.13	701.03
Girder No. 4	700.99	701.01	701.05	701.09	701.12	701.14	701.14	701.02	700.88	700.74	700.58

\*\* Elevations are based on a constant slab thickness of 8 1/2" and include allowance for theoretical dead load deflections due to weight of slab (including precast panel) and barrier curb with bridge rail.



TYPICAL SLAB ELEVATIONS DIAGRAM

Designed: TSF  
 Detailed: CAB  
 Checked: MAC

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 24 of 40





DATE PREPARED  
9/28/2016

ROUTE 19	STATE MO
DISTRICT BR	SHEET NO. 25

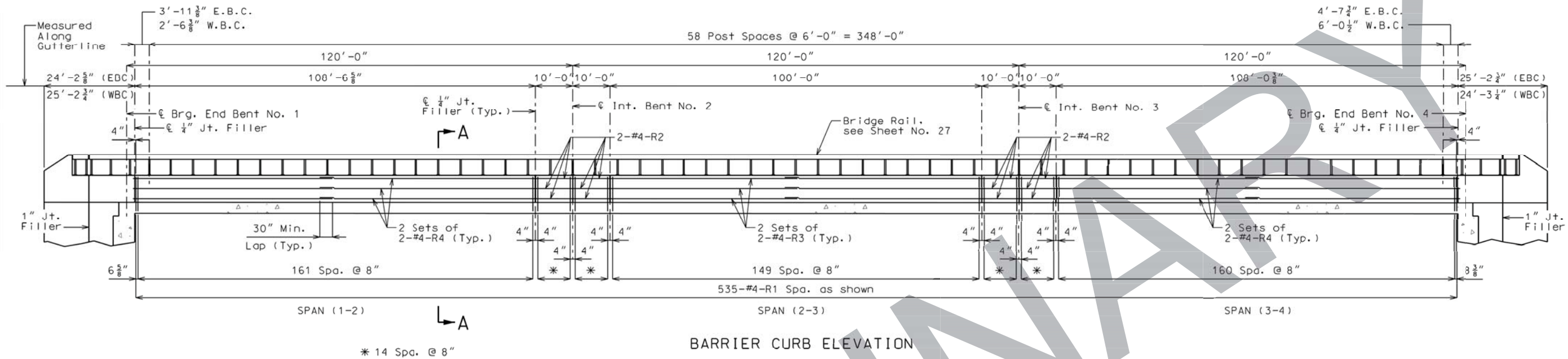
COUNTY  
SHANNON

JOB NO.  
J9P0438

CONTRACT ID.

PROJECT NO.

BRIDGE NO.  
A8295



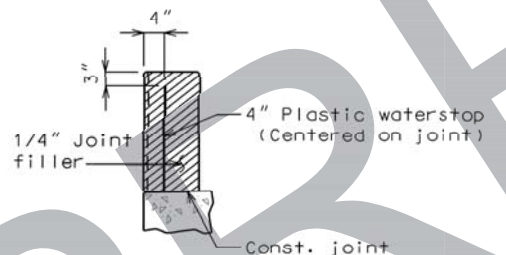
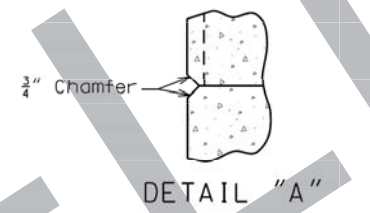
### BARRIER CURB ELEVATION

Notes:

East Barrier Curb shown, West Barrier Curb similar.

EBC = East Barrier Curb, WBC = West Barrier Curb

For post spacing on Barrier Curb at End Bents, see Sheet No. 26.

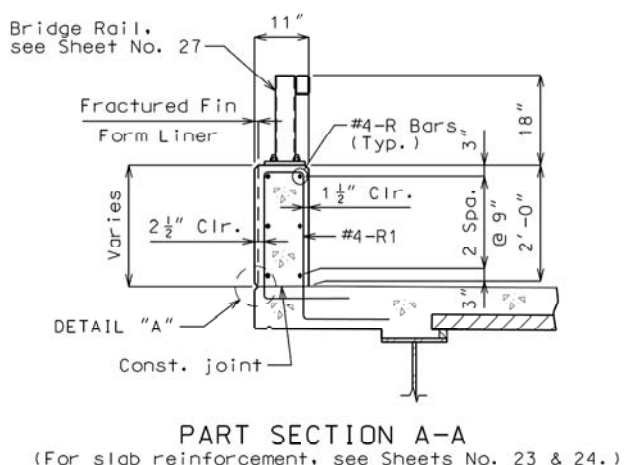
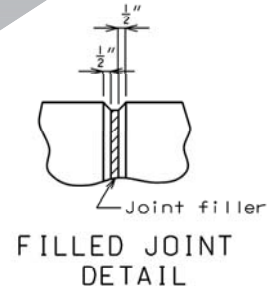


**DETAILS OF PLASTIC WATERSTOP**

Notes:

Plastic waterstop shall be placed in all barrier curb filled joints.

Cost of plastic waterstop, complete-in-place, will be considered completely covered by the contract unit price for Barrier Curb.



Notes:

Top of barrier curb shall be built parallel to grade with barrier curb joints normal to grade.

All exposed edges of barrier curb shall have a  $\frac{1}{4}$  inch bevel, unless otherwise noted.

The contract unit price for Barrier Curb shall include the cost of all concrete and reinforcement, complete-in-place.

Concrete in the barrier curb shall be Class B-1.

Measurement of barrier curb is to the nearest linear foot, measured along the gutterline from end of wing to end of wing.

Longitudinal dimensions shown are horizontal.

For reinforcement of Barrier Curb at End Bents, see Sheet No. 26.

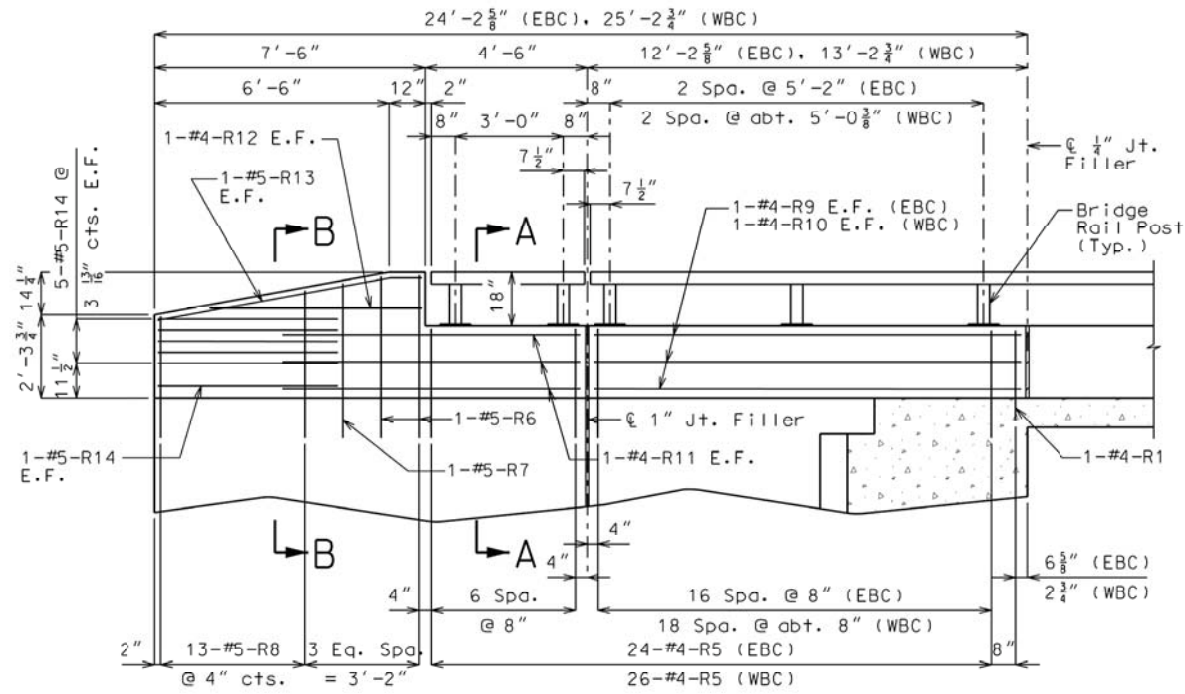
DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

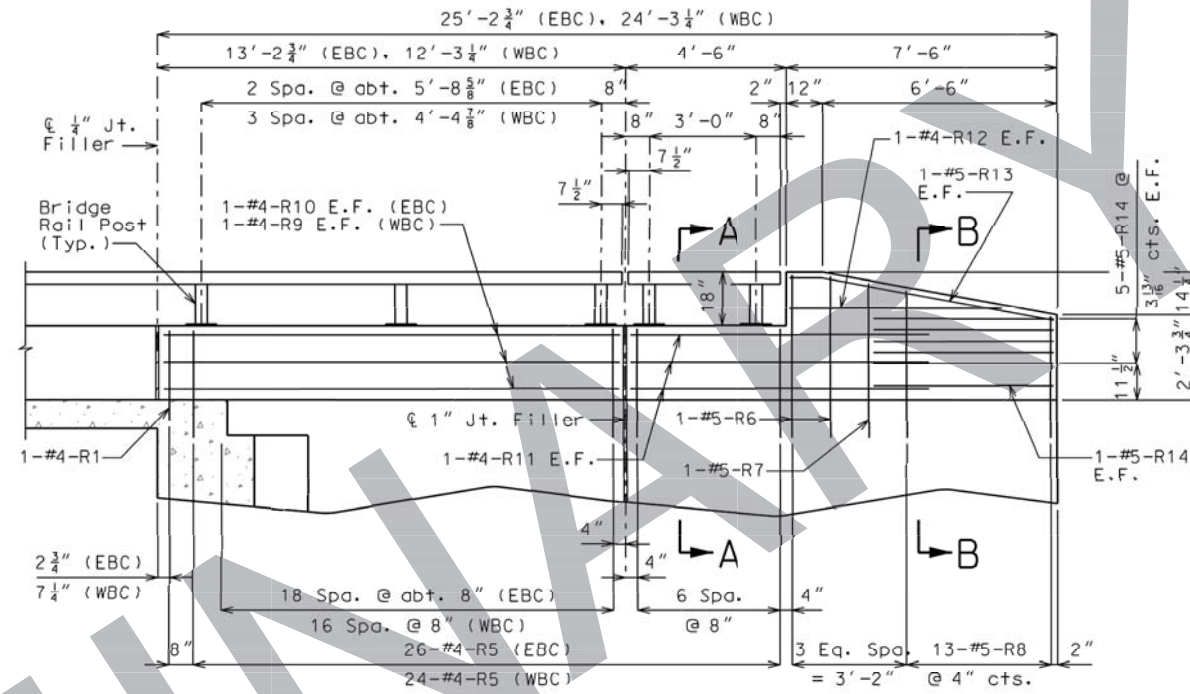
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

HORNER SHIFRIN  
4811 LBNL St., Ste. 400 - Saint Louis, MO 63109  
314-331-8321 - FAX 314-331-6666 - www.horner-shifrין.com  
Discipline: Professional Engineering  
Expiration Date: December 31, 2016

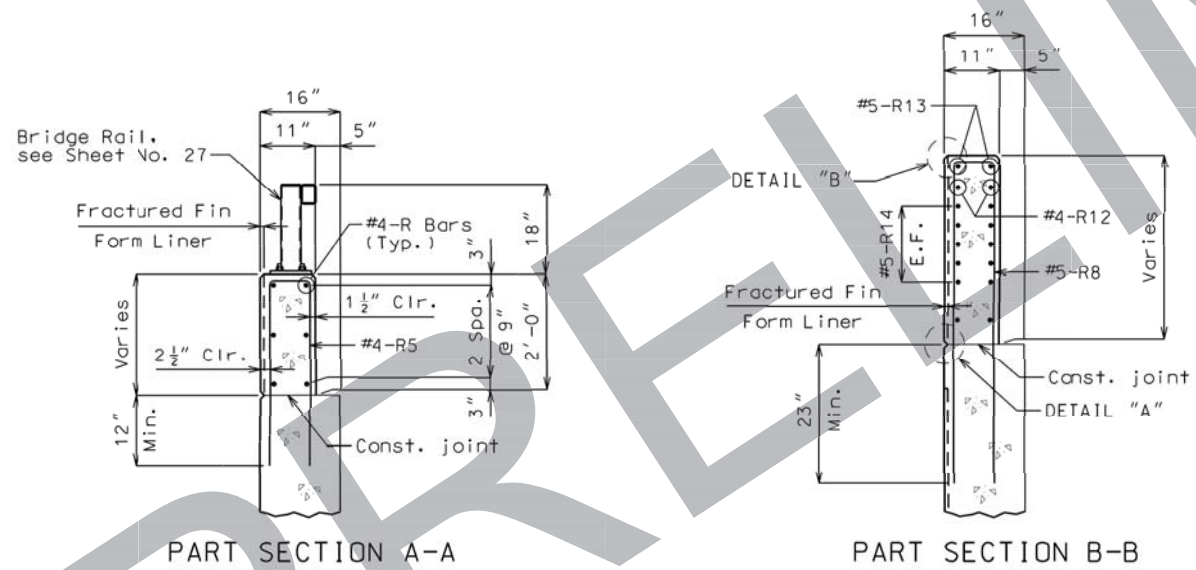
ROUTE 19 OVER SINKING CREEK  
Barrier Curb Details



PART ELEVATION @ END BENT NO. 1

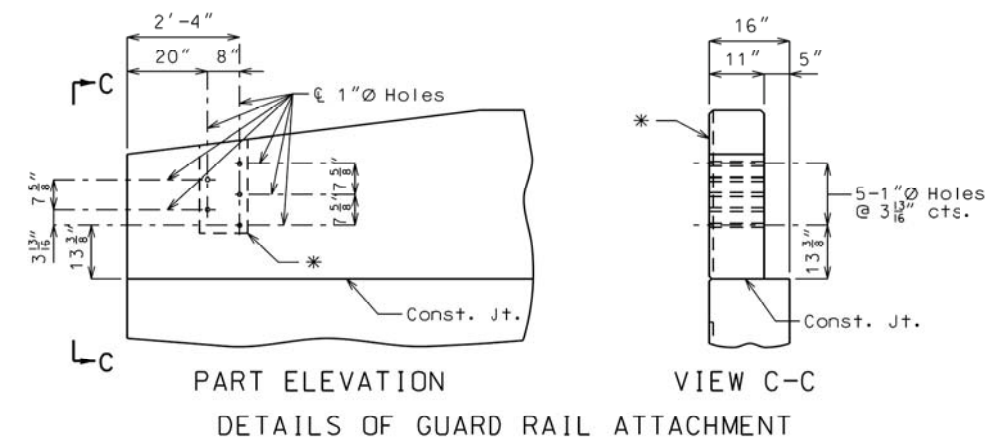


PART ELEVATION @ END BENT NO. 4



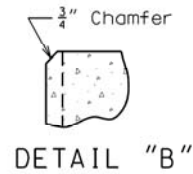
PART SECTION A-A

PART SECTION B-B



PART ELEVATION  
VIEW C-C  
DETAILS OF GUARD RAIL ATTACHMENT

\* Provide recess for anchor plates. Depth of recess to match depth of surface treatment.



DETAIL "B"

- Notes:
- For Detail "A", see Sheet No. 25.
  - For Details of Plastic Waterstop, see Sheet No. 25.
  - For Filled Joint Detail, see Sheet No. 25.



DATE PREPARED 9/28/2016	
ROUTE 19	STATE MO
DISTRICT BR	SHEET NO. 26
COUNTY SHANNON	
JOB NO. J9P0438	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8295	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

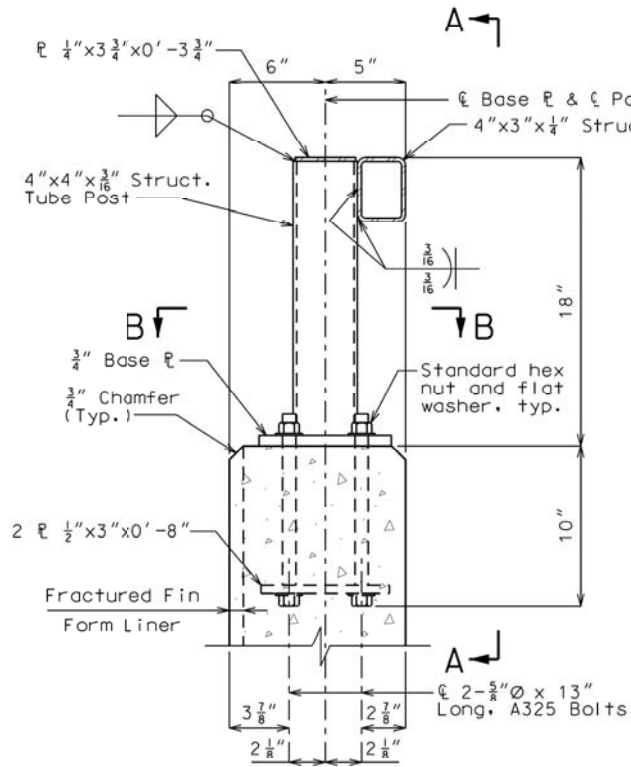
HORNER SHIFRIN

401 S. 18th St., Ste. 400 - Saint Louis, MO 63103-2306  
314-331-8321 - FAX 314-331-6866 - www.horner-shifrin.com  
Professional Engineering  
Discipline: Professional Engineering  
Expiration Date: December 31, 2016

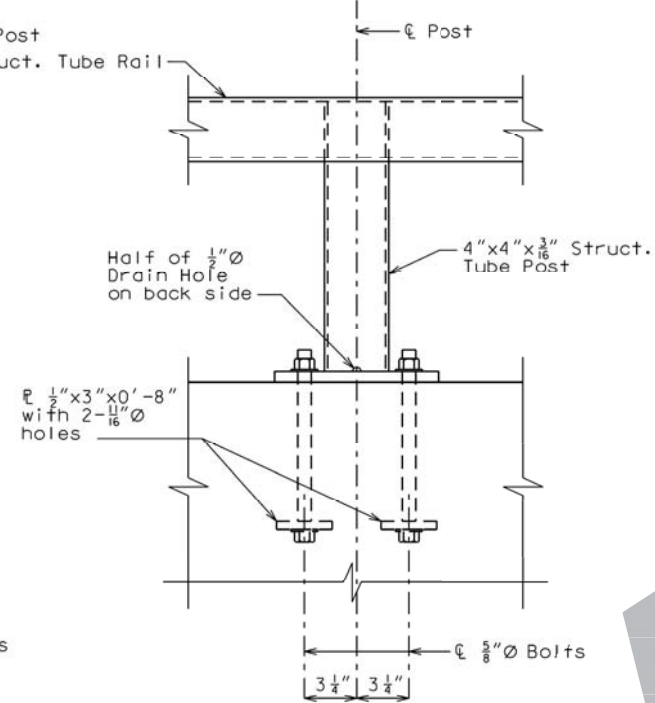
Designed: TSF  
Detailed: CAB  
Checked: MAC

Note: This drawing is not to scale. Follow dimensions.

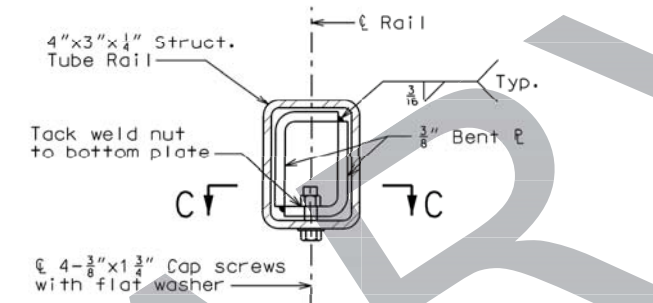
Sheet No. 26 of 40



TYPICAL SECTION THRU BRIDGE RAIL

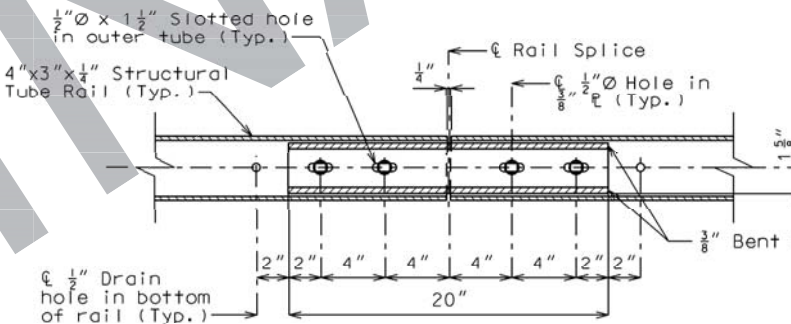


VIEW A-A

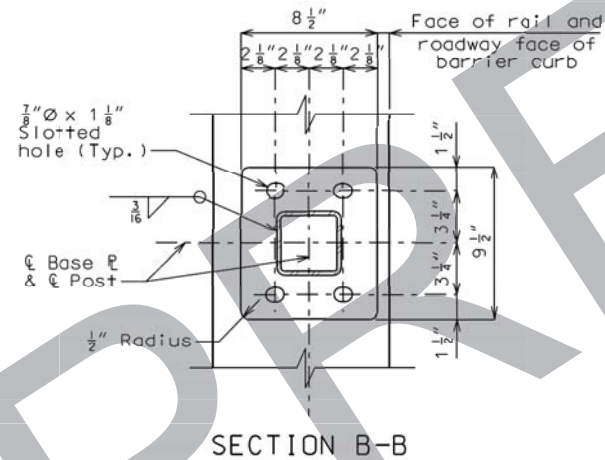


Rail Splice Detail

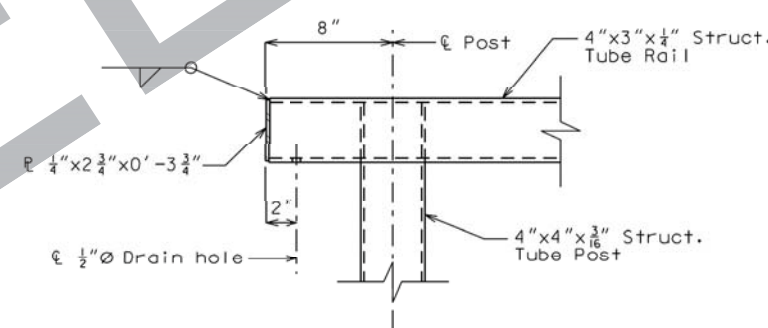
Note: Outer dimensions of inner sleeve are 2 1/4" x 3 1/4"



SECTION C-C



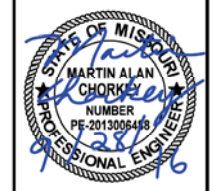
SECTION B-B



END CAP DETAIL

Note:

- All bridge rail posts shall be set normal to grade.
- See "Barrier Curb Details" sheet for bridge rail layout.
- Steel shims between top of barrier curb and post base plate may be used for adjusting bridge rail alignment. Maximum thickness of shims to be 1/8". Where filling of post is required for proper alignment, concrete bearing areas shall be ground down.
- All rail splices shall be located near a 1/4 point between rail posts.
- Structural steel tubing shall conform to ASTM A500 Grade B.
- Bridge rail shall be coated with complete System G. See "General Notes & Quantities" sheet for additional requirements.
- Minimum rail panel length between splices shall be 18 ft.
- Payment for all bridge rail components, complete-in-place, will be considered completely covered by the contract unit price for Bridge Rail per linear foot.



DATE PREPARED		9/28/2016	
ROUTE	STATE	19	MO
DISTRICT	SHEET NO.	BR	27
COUNTY			
SHANNON			
JOB NO.			
J9P0438			
CONTRACT ID.			
PROJECT NO.			
BRIDGE NO.			
A8295			

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

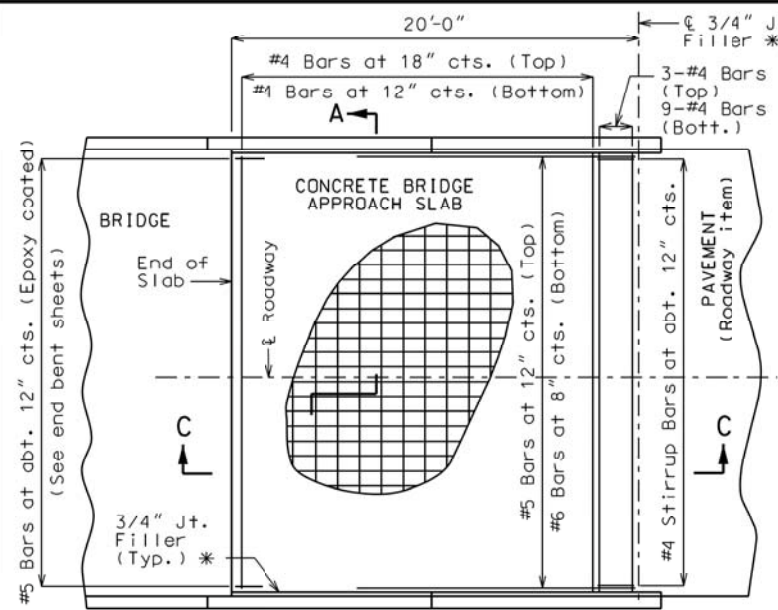
HORNER SHIFRIN

4011 LOMA ST. STE. 400 - SUITE 400, MD. 21208-2106  
301-331-8321 - FAX 301-331-6666 - www.horner-shifrin.com  
Professional Engineering  
Discipline: Professional Engineering  
Expiration Date: December 31, 2016

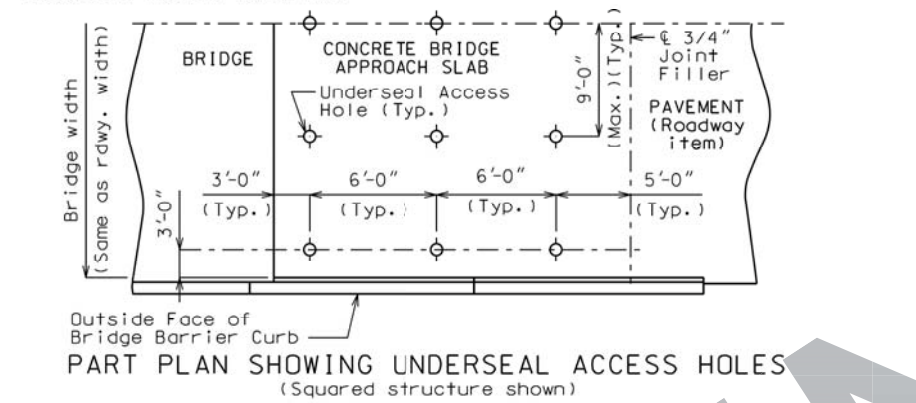
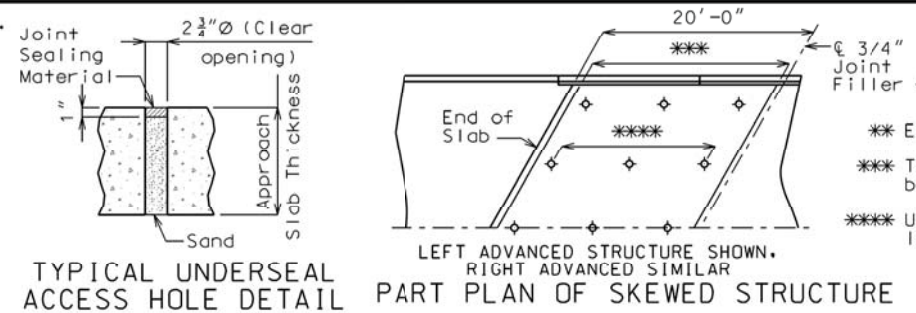
ROUTE 19 OVER SINKING CREEK

Bridge Rail Details

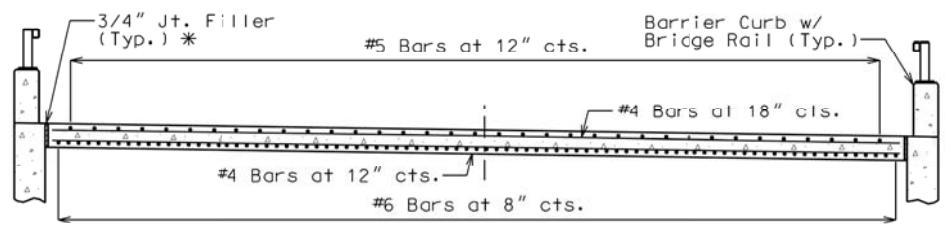
Designed: TSF  
Detailed: CAB  
Checked: MAC



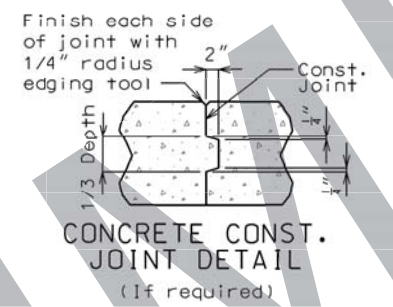
PART PLAN OF SQUARED STRUCTURE



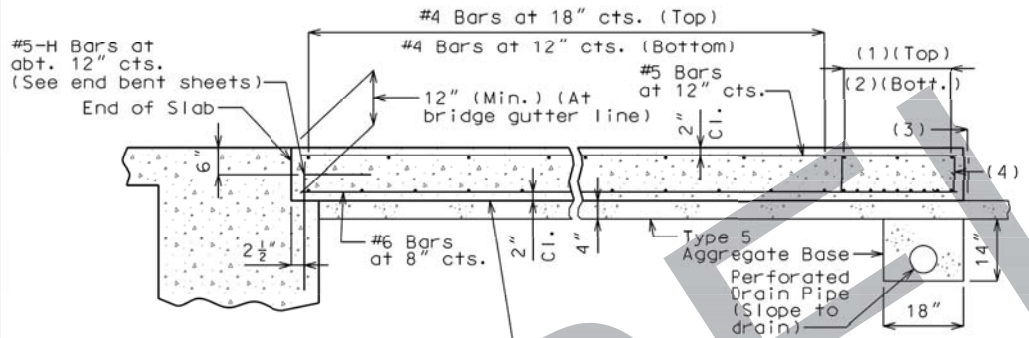
PART PLAN SHOWING UNDERSEAL ACCESS HOLES (Squared structure shown)



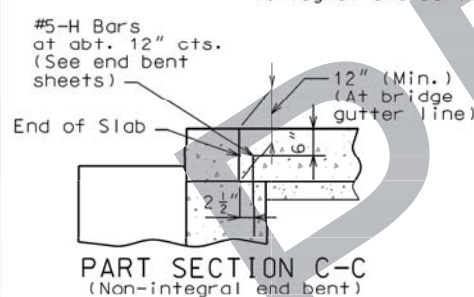
SECTION A-A



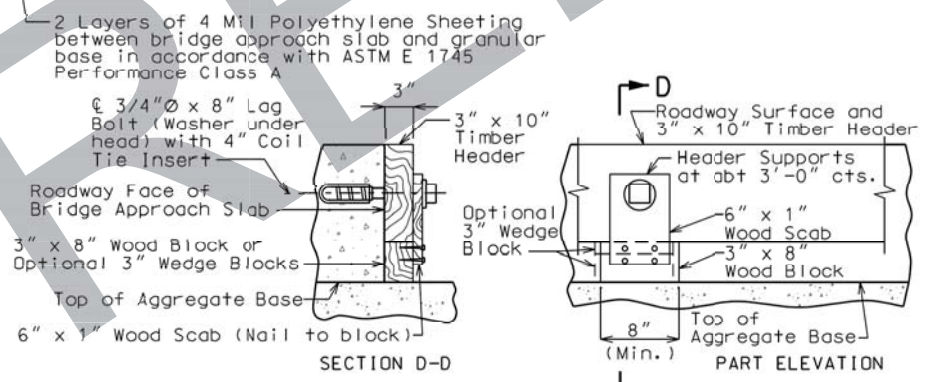
CONCRETE CONST. JOINT DETAIL (If required)



SECTION C-C (Integral end bent)

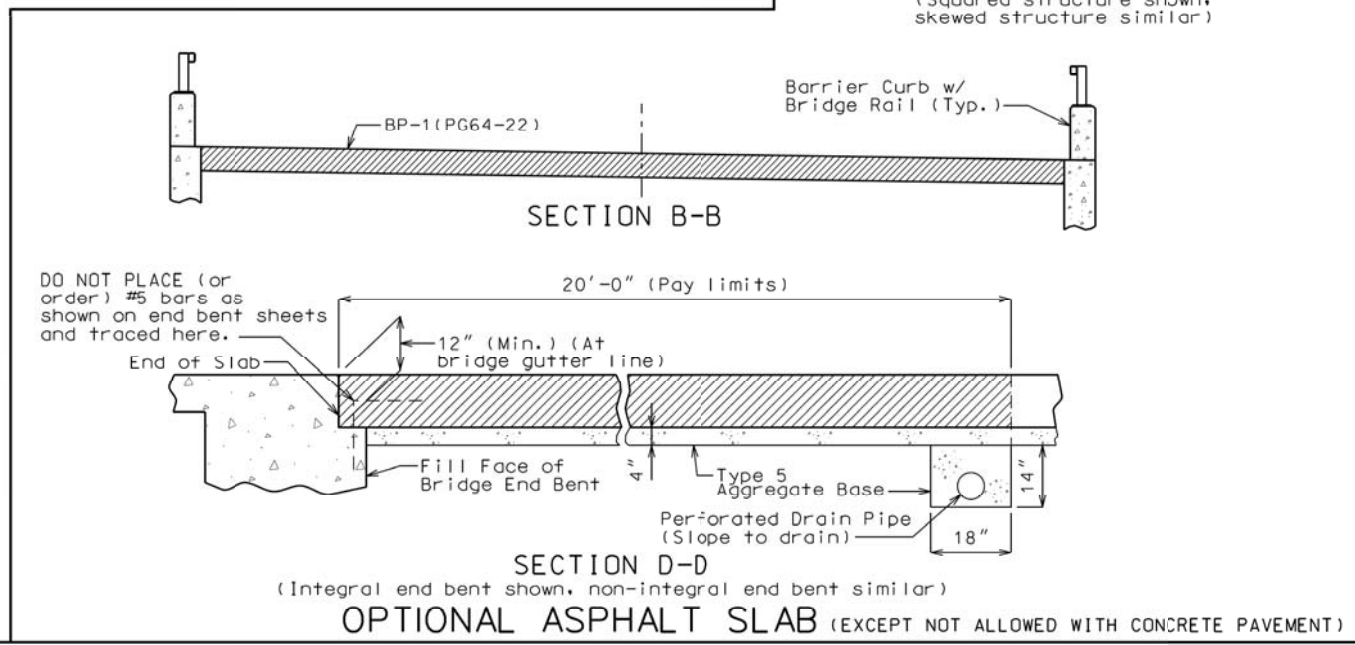


PART SECTION C-C (Non-integral end bent)



DETAILS OF TIMBER HEADER Remove timber header when concrete pavement is placed.

OPTIONAL CONCRETE SLAB



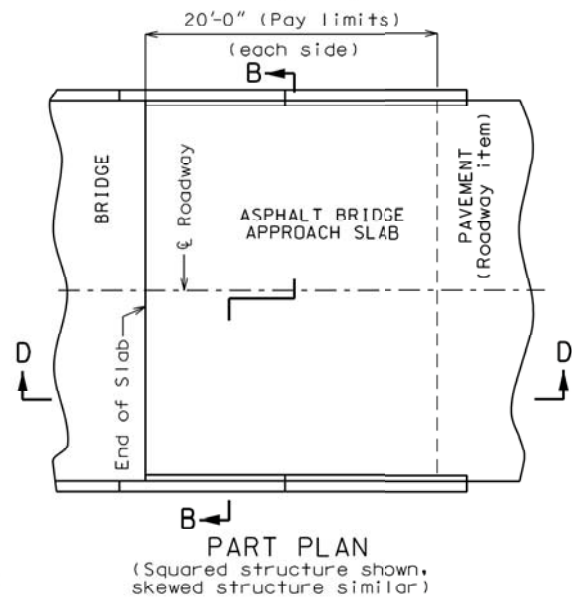
OPTIONAL ASPHALT SLAB (EXCEPT NOT ALLOWED WITH CONCRETE PAVEMENT)

**General Notes:**  
 Contractor shall have the option to construct either slab except as noted.  
 The contractor shall pour and satisfactorily finish the bridge slab before placing the bridge approach slab.  
 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.

**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 fy = 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 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 lap splicing the #4 bars 23".  
 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 Road) per square yard.  
 \* Seal joint between vertical face of bridge approach slab and wing with "Silicone Joint Sealant for Saw Cut and Formed Joints" in accordance with Sec 717.

**Notes For Asphalt Slab Only:**  
 Payment for furnishing all materials, labor and excavation necessary to construct the asphalt bridge approach slab, including underdrain 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 Road) per square yard.

MoDOT Construction personnel will indicate the bridge approach slab used for this structure:  
 Concrete Bridge Approach Slab  
 Asphalt Bridge Approach Slab



PART PLAN (Squared structure shown, skewed structure similar)

DATE PREPARED: 9/28/2016  
 ROUTE: 19 STATE: MO  
 DISTRICT: BR SHEET NO.: 28  
 COUNTY: SHANNON  
 JOB NO.: J9P0438  
 CONTRACT ID.:  
 PROJECT NO.:  
 BRIDGE NO.: A8295

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITAL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

**HORNER SHIFRIN**  
 4011 LBNL Dr., Ste. 400 - Saint Louis, MO 63103-2306  
 314-331-8321 - FAX 314-331-5566 - www.horner-shifrin.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK  
 Details of Bridge Approach Slab (Minor Road)







DATE PREPARED  
9/28/2016

ROUTE 19 STATE MO  
DISTRICT BR SHEET NO. 31

COUNTY SHANNON  
JOB NO. J9P0438  
CONTRACT ID.

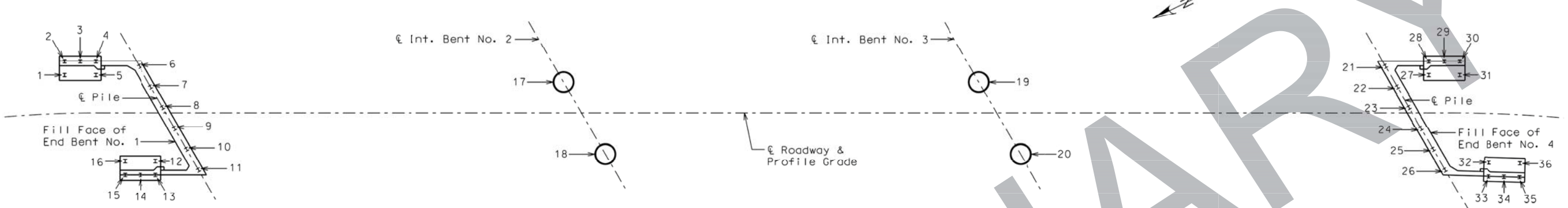
PROJECT NO.  
BRIDGE NO. A8295

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

**HORNER SHIFRIN**  
4011 LENA ST., STE. 400 • SAINT LOUIS, MO 63103-2706  
314-331-6321 • FAX 314-331-6066 • www.horner-shifrin.com  
Discipline: Professional Engineering  
Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK  
As-Built Pile Data



PART PLAN SHOWING  
PILE AND DRILLED SHAFT NUMBERING FOR RECORDING  
"AS BUILT PILE" AND "AS BUILT DRILLED SHAFT" DATA

"AS BUILT PILE" DATA				"AS BUILT DRILLED SHAFT" DATA				"AS BUILT PILE" DATA				
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED NOMINAL AXIAL COMPRESSIVE RESISTANCE (KIPS)	REMARKS	SHAFT NO.	TOP OF SOUND ROCK (ELEV.)	TIP OF CASING (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS	PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED NOMINAL AXIAL COMPRESSIVE RESISTANCE (KIPS)	REMARKS
			End Bent No. 1					Intermediate Bent No. 2				End Bent No. 4
1				17					21			
2				18					22			
3									23			
4									24			
5								Intermediate Bent No. 3	25			
6				19					26			
7				20					27			
8									28			
9									29			
10									30			
11									31			
12									32			
13									33			
14									34			
15									35			
16									36			

NOTE: Indicate in remarks column:  
A.) Pile type and grade.  
B.) Batter.  
C.) Driven to practical refusal.  
NOTE: This sheet to be completed by MoDOT construction personnel.



### BORING LOG

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-1  
 LOCATION Shannon County, Missouri SHEET 1 of 4  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 700.9 DATE DRILLED 8/9,10,11/2016  
 STATION 16+27.27 OFFSET 9.48' RT NORTHING 536431.98 EASTING 554869.76

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
					2" ASPHALTIC CONCRETE FILL: Tar									
1	SS	8/18	6	7	FILL: Brown, fat clay, with fine to coarse sandstone and dolomite gravel		15		>9.0				699	
3														
2	SS	9/18	3	5			20		7.0				696	
6														
3	ST	13/24			Becomes red, with fine to coarse dolomite gravel, trace fine sand seams		49	74	2.0				693	
9														
4	SS	8/18	2	2	Becomes red with gray, gravel becomes coarse		41		1.0					
12														
5	SS	12/18	2	3	SANDY FAT CLAY (CH): Gray, sand is fine, trace medium to coarse sand, trace fine gravel		12		2.0				687	
15														
6	SS	16/18	3	2	Becomes brown, sand becomes fine		17		3.0				684	

**WATER LEVEL:**  
 NONE OBSERVED WHILE DRILLING  
 28.5 ft WHILE DRILLING  
 \_\_\_\_\_ ft AT COMPLETION OF DRILLING  
 \_\_\_\_\_ ft \_\_\_\_\_ HRS AFTER DRILLING

**REMARKS:**



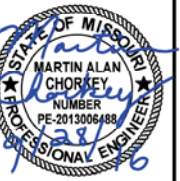
### BORING LOG

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-1  
 LOCATION Shannon County, Missouri SHEET 2 of 4  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 700.9 DATE DRILLED 8/9,10,11/2016  
 STATION 16+27.27 OFFSET 9.48' RT NORTHING 536431.98 EASTING 554869.76

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
21					SANDY FAT CLAY (CH): Brown, sand is fine, trace fine gravel (Continued)									
24	7	SS	10/18	11	SAND (SP): Brown, fine to coarse, trace fine gravel								678	
27													675	
8	SS	2/18	6	5	CLAYEY GRAVEL (GC): Brown, fine to coarse, clay is lean, with fine to coarse sand								672	
9	SS	5/18	10	10									669	
36													666	
9	SS	5/18	10	10									666	
36													663	
10	NX	36/60			SANDY DOLOMITE: Gray, hard, finely crystalline, thinly bedded, moderately to highly weathered, highly fractured								663	

**WATER LEVEL:**  
 NONE OBSERVED WHILE DRILLING  
 28.5 ft WHILE DRILLING  
 \_\_\_\_\_ ft AT COMPLETION OF DRILLING  
 \_\_\_\_\_ ft \_\_\_\_\_ HRS AFTER DRILLING

**REMARKS:**  
 1) Auger refusal on dolomite at 36.75 feet. Boring advanced using rock coring methods.  
 2) ROD = 13%



DATE PREPARED 9/28/2016  
 ROUTE 19 STATE MO  
 DISTRICT BR SHEET NO. 32

COUNTY SHANNON  
 JOB NO. J9P0438  
 CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8295

DESCRIPTION	DATE

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

**HORNER SHIFRIN**  
 4011 LBNL Dr., Ste. 400 - Saint Louis, MO 63103-2706  
 314-331-8321 - FAX 314-531-6966 - www.horner-shifrin.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK  
 Boring Data





### BORING LOG

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-1  
 LOCATION Shannon County, Missouri SHEET 3 of 4  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 700.9 DATE DRILLED 8/9,10,11/2016  
 STATION 16+27.27 OFFSET 9.48' RT NORTHING 536431.98 EASTING 554869.76

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS							ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX			
42					SANDY DOLOMITE: Gray, hard, finey crystalline, thinly bedded, moderately to highly weathered, highly fractured (Continued)											660
	11	NX	56/60		Becomes moderately weathered, with an 8" open vertical fracture		3									657
					6" closed vertical fracture, becomes massively bedded, slightly fractured, vuggy, with coarse crystals											
45					Becomes moderately fractured		4									654
48							5									651
	12	NX	60/60													
								319.3								
51					Becomes highly weathered, highly fractured, with orange fat clay in vugs and fractures											648
54	13	NX	47/60				6									645
57					Becomes medium to coarsely crystalline, highly weathered, highly fractured		7									642
	14	NX	55/60													

**WATER LEVEL:**  
 28.5 NONE OBSERVED WHILE DRILLING  
 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**  
 3) RQD = 86%  
 4) Began having small, frequent drops 33" into Run 3 that persisted throughout drilling. No water return for duration of drilling.  
 5) RQD = 50%  
 6) RQD = 0%  
 7) RQD = 0%



### BORING LOG

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-1  
 LOCATION Shannon County, Missouri SHEET 4 of 4  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 700.9 DATE DRILLED 8/9,10,11/2016  
 STATION 16+27.27 OFFSET 9.48' RT NORTHING 536431.98 EASTING 554869.76

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS							ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX			
63					SANDY DOLOMITE: Gray, hard, medium to coarsely crystalline, highly weathered, highly fractured (Continued)											639
	15	NX	55/60				8									636
66																
69							9									630
	16	NX	56/60													
72					Boring terminated at 71.75 feet.											627
75																624
78																

**WATER LEVEL:**  
 28.5 NONE OBSERVED WHILE DRILLING  
 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**  
 8) RQD = 0%  
 9) RQD = 0%



DATE PREPARED 9/28/2016  
 ROUTE 19 STATE MO  
 DISTRICT BR SHEET NO. 33  
 COUNTY SHANNON  
 JOB NO. J9P0438  
 CONTRACT ID.

PROJECT NO.  
 BRIDGE NO. A8295

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)



**HORNER SHIFRIN**  
 401 S. 18th St., Ste. 400 - Saint Louis, MO 63103-2706  
 314-333-8321 - FAX 314-333-8366 - www.hornershifrin.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK  
 Boring Data

Note: For locations of borings, see Sheet No. 1.

Designed: MAC  
 Detailed: CAB  
 Checked: MAC

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 33 of 40



**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-2  
 LOCATION Shannon County, Missouri SHEET 1 of 2  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 700.8 DATE DRILLED 08/09/16  
 STATION 16+40.48 OFFSET 14.97' RT NORTHING 536422.49 EASTING 554859.06

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
					2" ASPHALTIC CONCRETE FILL: Tar									
1	SS	8/18	10	10	FILL: Reddish-brown, fat clay, with fine to coarse sand, dolomite and sandstone gravel			14						699
3				5										
2	SS	10/18	3	5	Gravel becomes fine sandstone			16						696
6				5										
3	SS	10/18	2	3	Becomes red, with fine to coarse chert and sandstone gravel			22	1.0					693
9				5										
4	SS	9/18	3	4	Gravel becomes fine to coarse dolomite, trace chert			34	1.0					690
12				4										
5	SS	10/18	2	2	Becomes red trace gray, with fine to coarse sandstone and chert gravel			42	1.5					687
15				3										
6	SS	14/18	3	2	SANDY FAT CLAY (CH): Dark brown, sand is fine to coarse, trace fine gravel			17	2.5					681
18				3										

**WATER LEVEL:**  
 NONE OBSERVED WHILE DRILLING  
 28.5 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**



**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-2  
 LOCATION Shannon County, Missouri SHEET 2 of 2  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 700.8 DATE DRILLED 08/09/16  
 STATION 16+40.48 OFFSET 14.97' RT NORTHING 536422.49 EASTING 554859.06

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
21					SANDY FAT CLAY (CH): Dark brown, sand is fine to coarse, trace fine gravel (Continued)									
24	7	SS	6/18	10	SAND (SP): Brown and gray, fine to coarse, with fine to coarse gravel									678
				8										
27					CLAYEY GRAVEL (GC): Brown, fine to coarse, with lean clay and fine to coarse sand									675
8	SS	8/18	4	7										672
30				5										
9	SS	6/18	6	6	Gravel becomes coarse, with weathered dolomite									666
36				14										
39					Auger refusal on dolomite at 37.5 feet.									663

**WATER LEVEL:**  
 NONE OBSERVED WHILE DRILLING  
 28.5 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**  
 1) Percent finer than the No. 200 = 6.2%.



DATE PREPARED 9/28/2016  
 ROUTE 19 STATE MO  
 DISTRICT BR SHEET NO. 34

COUNTY SHANNON  
 JOB NO. J9P0438  
 CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8295

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)



HORNER SHIFRIN  
 4011 LOMA ST. Ste. 400 - Saint Louis, MO 63103-2706  
 314-331-8321 - FAX 314-331-6966 - www.horner-shifrin.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK

Boring Data

Note: For locations of borings, see Sheet No. 1.





**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-4  
 LOCATION Shannon County, Missouri SHEET 2 of 3  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-750 w/HSA ELEVATION 677.7 DATE DRILLED 08/23/16  
 STATION 17+93.83 OFFSET 37.37' RT NORTHING 536294.37 EASTING 554771.79

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS							ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX			
21	6	NX	32/60		DOLOMITE: Light gray and tan, moderately hard, finely crystalline, banded to thin bedded, moderately weathered, moderately to highly fractured, trace pitting (Continued)	[Pattern]	4									657
24																654
27	7	NX	36/60				5									651
30	8	NX	14/60				6									648
33																645
36	9	NX	43/60				7									642
39					SANDY DOLOMITE: Light gray and tan, moderately hard, fine to medium crystalline, thinly bedded, moderately weathered, moderately fractured, moderately pitted	[Pattern]										639

WATER LEVEL:  
 NONE OBSERVED WHILE DRILLING  
 6.0 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

REMARKS:  
 4) RQD = 0%  
 5) RQD = 13%  
 6) RQD = 0%  
 7) RQD = 0%



**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-4  
 LOCATION Shannon County, Missouri SHEET 3 of 3  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-750 w/HSA ELEVATION 677.7 DATE DRILLED 08/23/16  
 STATION 17+93.83 OFFSET 37.37' RT NORTHING 536294.37 EASTING 554771.79

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS							ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX			
42	10	NX	55/60		SANDY DOLOMITE: Light gray and tan, moderately hard, fine to medium crystalline, thinly bedded, moderately weathered, moderately fractured, moderately pitted (Continued)	[Pattern]	8									636
45	11	NX	58/60		Becomes vuggy No vugs, trace pitting		9									633
48					Becomes highly fractured											630
51	12	NX	60/60		Becomes slightly fractured		10									627
54					Trace siltstone seams Boring terminated at 52.75 feet.											624
57																621
																618

WATER LEVEL:  
 NONE OBSERVED WHILE DRILLING  
 6.0 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

REMARKS:  
 8) RQD = 15%  
 9) RQD = 13%  
 10) RQD = 37%



DATE PREPARED 9/28/2016  
 ROUTE 19 STATE MO  
 DISTRICT BR SHEET NO. 36  
 COUNTY SHANNON  
 JOB NO. J9P0438  
 CONTRACT ID.

PROJECT NO.  
 BRIDGE NO. A8295

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

HORNER SHIFRIN  
 4011 LBNL St., Ste. 400 - Saint Louis, MO 63103-2706  
 314-331-8321 - FAX 314-331-6966 - www.horner-shifrin.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK  
 Boring Data

Note: For locations of borings, see Sheet No. 1.

Designed: MAC  
 Detailed: CAB  
 Checked: MAC

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 36 of 40





**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-5  
 LOCATION Shannon County, Missouri SHEET 3 of 3  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-750 w/HSA ELEVATION 677.6 DATE DRILLED 08/23/16  
 STATION 18+70.14 OFFSET 1.59' LT NORthing 536208.57 EASTING 554773.86

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS							ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
42	10	NX	37/60		SANDY DOLOMITE: Light gray, hard finely crystalline, thin to medium bedded, moderately weathered, highly fractured (Continued)		7								636
45	11	NX	54/60		With fine, sub-rounded gravel No gravel, becomes moderately fractured Becomes highly fractured		8								633
48	12	NX	60/60		4.5" open fracture infilled with completely weathered siltstone Becomes slightly weathered, slightly fractured, no siltstone		9								630
54	13	NX	60/60		Becomes moderately fractured, with open vertical fracturing Becomes slightly weathered Becomes fine to medium crystalline		10								624
57					Boring terminated at 58 feet.										621

**WATER LEVEL:**  
 NONE OBSERVED WHILE DRILLING  
 5.0 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**  
 7) ROD = 15%  
 8) ROD = 13%  
 9) ROD = 65%  
 10) ROD = 28%



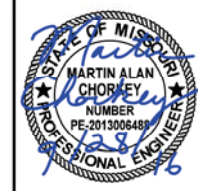
**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-6  
 LOCATION Shannon County, Missouri SHEET 1 of 1  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/HSA ELEVATION 677.6 DATE DRILLED 08/23/16  
 STATION 18+79.72 OFFSET 29.91' RT NORthing 536213.68 EASTING 554741.33

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS							ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
3	1	SS		3	GRAVEL (GW): Brown, fine to coarse, with fine to coarse sand		1								675
3	2	SS		2			4								672
6	3	SS		3	SAND (SP): Brown, fine to coarse, with fine to coarse gravel		6								669
9	4	SS		4			9								666
12	5	SS		5			11								663
15	6	SS	0/0	50/0"	WEATHERED DOLOMITE		2								660

**WATER LEVEL:**  
 NONE OBSERVED WHILE DRILLING  
 5.5 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**  
 1) Grain Size Distribution test performed. Percent finer than the No. 200 = 0.5%.  
 2) Driller's observation.



DATE PREPARED 9/28/2016  
 ROUTE 19 STATE MO  
 DISTRICT BR SHEET NO. 38

COUNTY SHANNON  
 JOB NO. J9P0438  
 CONTRACT ID.

PROJECT NO.  
 BRIDGE NO. A8295

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

**HORNER SHIFFRIN**  
 4011 Lorain St., Ste. 400 - Saint Louis, MO 63103-2706  
 314-331-8221 - FAX 314-531-6966 - www.horner-shiff.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK  
 Boring Data





**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-8  
 LOCATION Shannon County, Missouri SHEET 2 of 3  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 701.2 DATE DRILLED 8/11,12/2016  
 STATION 20+00.04 OFFSET 16.88' RT NORTHING 536099.71 EASTING 554700.62

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
21	6	NX	46/60		SANDY DOLOMITE: Gray, hard, finey crystalline, thickly bedded, highly weathered, highly fractured, pitted (Continued)	[Hatched Pattern]	2								681
24															678
27	7	NX	40/60		Becomes moderately weathered, moderately fractured, trace pitting	[Hatched Pattern]	3								675
30	8	NX	60/60			[Hatched Pattern]	4								672
33															669
36	9	NX	60/60		Trace stylolites	[Hatched Pattern]	5				1010.3				666
39					Becomes very hard, slightly fractured, slightly weathered	[Hatched Pattern]									663

**WATER LEVEL:**  
 X NONE OBSERVED WHILE DRILLING  
 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**  
 2) ROD = 13%  
 3) ROD = 7%  
 4) ROD = 42%  
 5) ROD = 37%



**BORING LOG**

PROJECT Highway 19 Over Sinking Creek BORING NUMBER B-8  
 LOCATION Shannon County, Missouri SHEET 3 of 3  
 DRILLER Midwest Drilling, Inc. HAMMER Auto PROJECT NO. 2016-7033.10  
 EQUIPMENT CME-75 w/CFA,HSA ELEVATION 701.2 DATE DRILLED 8/11,12/2016  
 STATION 20+00.04 OFFSET 16.88' RT NORTHING 536099.71 EASTING 554700.62

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
42	10	NX	60/60		SANDY DOLOMITE: Gray, very hard, finely crystalline, thickly bedded, slightly fractured, slightly weathered (Continued)	[Hatched Pattern]	6								660
45	11	NX	60/60		Becomes highly fractured, pitted	[Hatched Pattern]	7						939.6		657
48					Boring terminated at 48 feet.										654
51															651
54															648
57															645

**WATER LEVEL:**  
 X NONE OBSERVED WHILE DRILLING  
 ft WHILE DRILLING  
 ft AT COMPLETION OF DRILLING  
 ft HRS AFTER DRILLING

**REMARKS:**  
 6) ROD = 95%  
 7) ROD = 30%



DATE PREPARED 9/28/2016  
 ROUTE 19 STATE MO  
 DISTRICT BR SHEET NO. 40

COUNTY SHANNON  
 JOB NO. J9P0438  
 CONTRACT ID.

PROJECT NO.  
 BRIDGE NO. A8295

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

4011 18th St., Ste. 400 - Saint Louis, MO 63103-2706  
 314-331-8321 - FAX 314-331-6966 - www.hornorshifrin.com  
 Discipline: Professional Engineering  
 Expiration Date: December 31, 2016

ROUTE 19 OVER SINKING CREEK  
 Boring Data

Note: For locations of borings, see Sheet No. 1.

Designed: MAC  
 Detailed: CAB  
 Checked: MAC

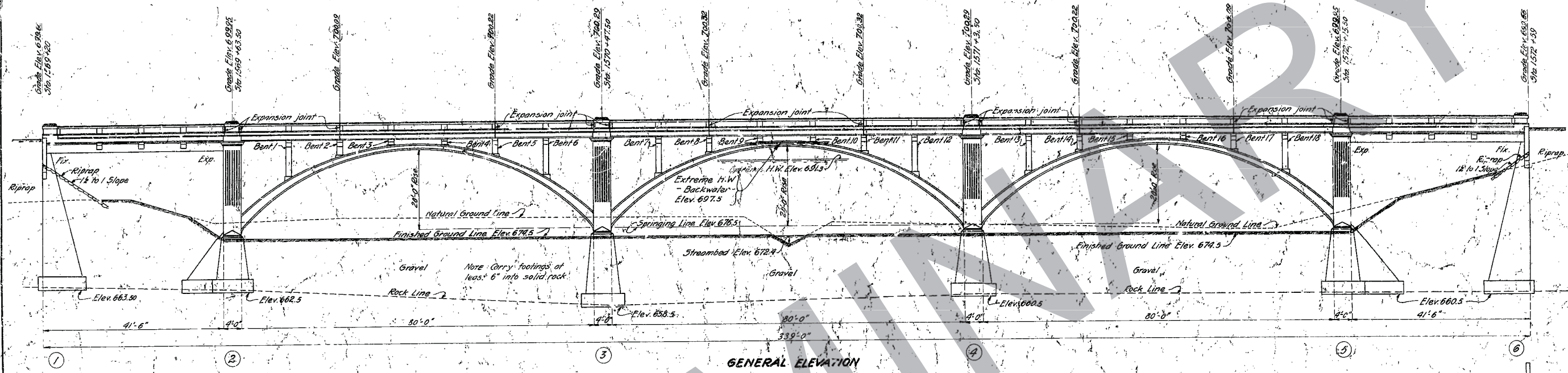
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 40 of 40

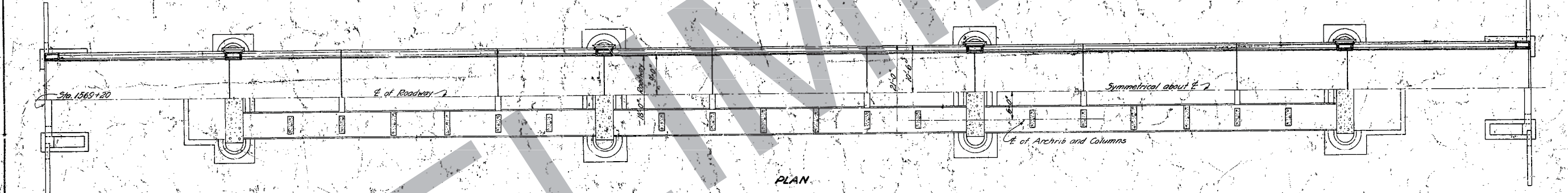


## MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO	R19-532	19		



GENERAL ELEVATION



PLAN



LONGITUDINAL SECTION THRU ARCH RIBS AND PIERS

BRIDGE OVER SINKING CREEK  
 STATE ROAD FROM SALEM TO EMINENCE  
 ABOUT 14 MILES N. OF EMINENCE  
 PROJECT NO. R19-532 STA 1569+20

SHANNON COUNTY

Submitted by: *[Signature]* DATE: 6/11/25  
 Approved by: *[Signature]* DATE: June 1925  
 FINISH ENGINEER

Sheet 1 of 5

H-79

Drawn April 1925 by H.S.P.  
 Check May 1925 by R.J.J.

250

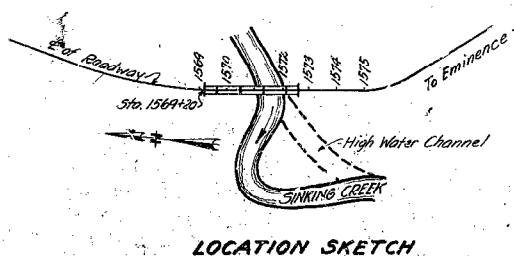
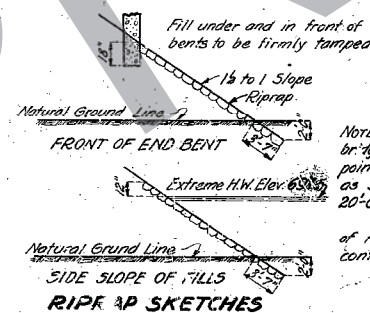
## MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	R19-532	19		

BILL OF REINFORCING STEEL									
No	Size	Length	Mark	Bending Sketches	No	Size	Length	Mark	Bending Sketches
<b>Handrail</b>									
32	3/4"	21'-9"	R1		<b>Spandrel Beams</b>				
490	3/4"	18"	R2		78	3/4"	19'-9"	G1	
116	2"	7'-0"	R3		72	3/4"	16'-0"	G2	
16	3/4"	3'-6"	R4		78	3/4"	5'-3"	G3	
3208	3/4"	18"	R5		132	3/4"	5'-6"	G4	
28	3/4"	2'-0"	R6		194	3/4"	5'-0"	K1	
27	3/4"	3'-6"	R7		148	3/4"	14'-0"	K2	
48	2"	22'-5"	R8		96	3/4"	7'-3"	K3	
<b>Deck Girders</b>									
344	5"	7'-6"	B1		<b>Arch Ribs</b>				
32	2"	21'-6"	B2		28	3/4"	32'-8"	A1	
32	1 1/2"	44'-3"	B3		28	3/4"	5'-6"	A2	
16	1 1/2"	45'-0"	B4		<b>Piers</b>				
16	1 1/2"	45'-0"	B5		32	3/4"	27'-6"	A4	
56	3/4"	20'-9"	S1		32	3/4"	20'-0"	A5	
56	3/4"	21'-9"	S2		30	3/4"	17'-9"	A6	
54	3/4"	23'-0"	S3		32	3/4"	25'-6"	A7	
12	3/4"	23'-9"	S4		32	3/4"	24'-0"	A8	
12	3/4"	7'-0"	S5		16	3/4"	27'-0"	A9	
24	3/4"	5'-9"	S6		16	3/4"	24'-0"	A10	
24	3/4"	21'-9"	S7		16	3/4"	23'-6"	A11	
24	3/4"	22'-0"	C1		16	3/4"	23'-3"	A12	
12	3/4"	19'-9"	W1		<b>End Bents</b>				
24	3/4"	12"	D2		50	3/4"	11'-9"	U1	
<b>Curbs and Slabs over Arches</b>									
34	3/4"	20'-6"	S9		12	3/4"	3'-3"	V1	
34	3/4"	18'-6"	S9		12	3/4"	23'-9"	V2	
386	3/4"	44'-9"	S10		12	3/4"	36'-9"	V3	
387	3/4"	11'-6"	S11		24	3/4"	6'-9"	D1	
149	3/4"	20'-0"	S12		8	3/4"	17'-9"	T1	
18	3/4"	24'-6"	C2		12	3/4"	24'-6"	T2	
36	3/4"	22'-3"	C3		16	3/4"	9'-3"	F1	
<b>Pier Bents</b>									
22	3/4"	3'-3"	P1		12	3/4"	17'-0"	H1	
18	3/4"	3'-9"	P2		4	3/4"	16'-3"	H2	
20	3/4"	22'-3"	P3		6	3/4"	28'-0"	H3	
50	3/4"	6'-9"	P4		12	3/4"	20'-9"	H4	
32	3/4"	5'-0"	P5		10	3/4"	20'-9"	H5	
132	3/4"	23'-6"	P6		4	3/4"	20'-9"	H6	
28	3/4"	12'-3"	P7		8	3/4"	20'-9"	H7	
16	3/4"	10'-0"	P8		<b>End Bents</b>				
32	3/4"	5'-0"	A2		12	3/4"	20'-9"	H7	
42	3/4"	4'-6"	P9		<b>End Bents</b>				

R6 to be a plain, smooth bar.

	ESTIMATED QUANTITIES			Reinforcing Steel - Lbs.
	1:2:3 mix	1:2 1/2:3 1/2 mix	1:3:5 mix	
Handrail	33.9			3800
Deck Girders		97.3		24060
Slab and Curb over Arches		164.6		20880
Pier Bents			232.7	7810
Spandrel Beams			32.2	10620
Arch Ribs			174.9	22370
Piers below Elev. 675.50			501.4	10310
End Bents			22.5	4280
<b>Total</b>	<b>33.9</b>	<b>261.9</b>	<b>488.3</b>	<b>102630</b>
Excavation				1310 Cu.Yds



**GENERAL NOTES.** Concrete in end bents below Elev. 638.06 and in piers below Elev. 675.50 to be 1:3:5 mix; concrete in handrail to be 1:2:3 mix; concrete in slab and curb over arches and slab, curbs and girders in deck girder spans to be 1:2:3 1/2 mix; all other concrete to be 1:2:4 mix.

Exposed edges to be beveled 3", where no other bevel is noted.

Exposed surfaces to be rubbed to a smooth and uniform appearance; no plastering permitted.

Arch rings shall be poured in radial blocks in the order indicated on the detail drawings. The centering shall not be removed from the span until the concrete over it has been in place at least 21 days, nor until the concrete in the adjacent span has been in place at least 14 days.

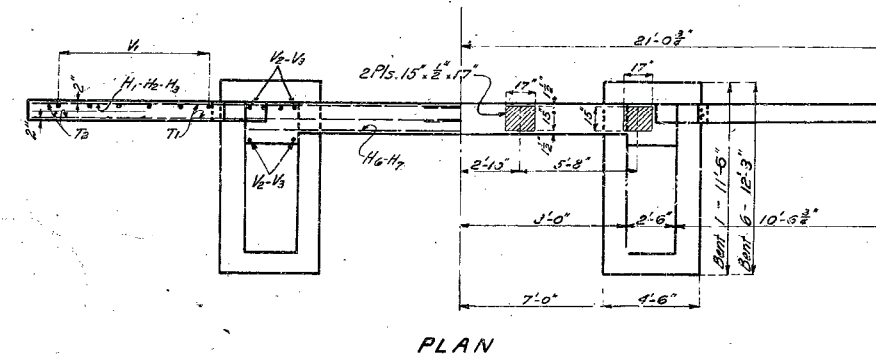
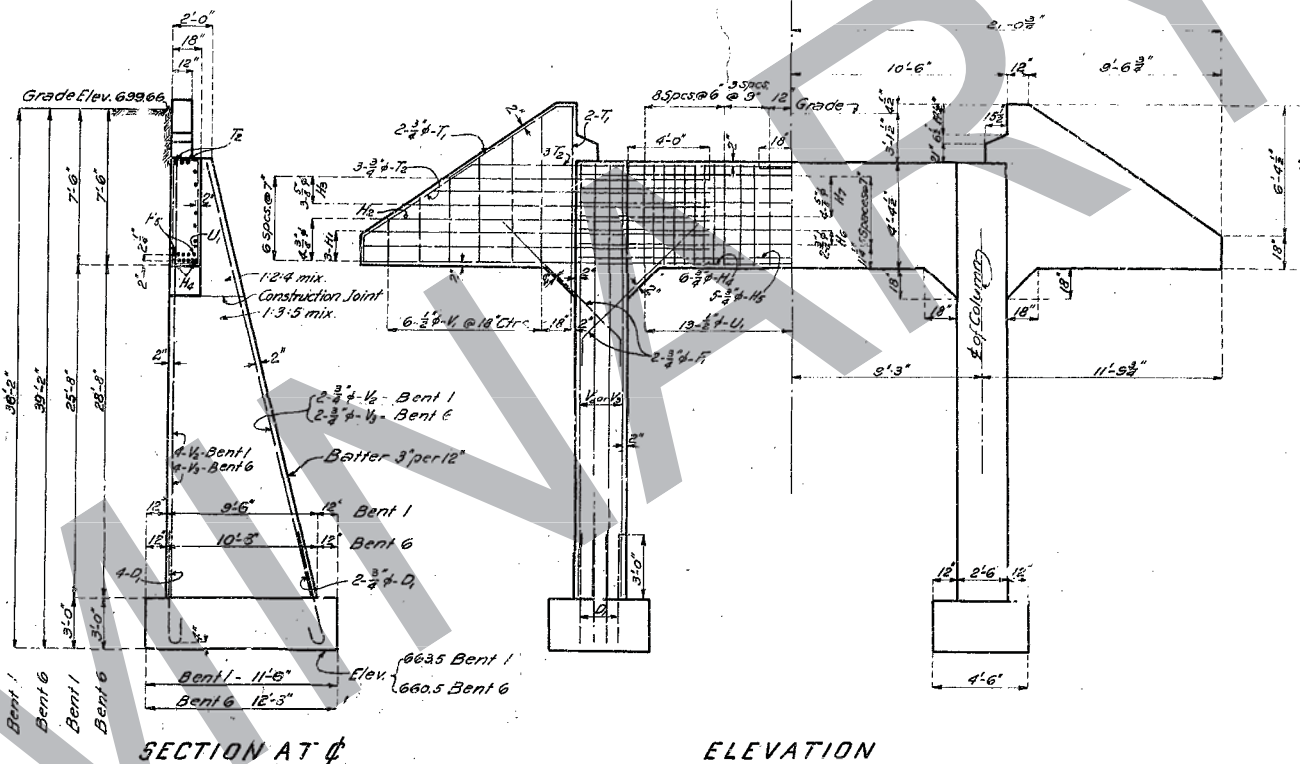
The contractor shall submit details of proposed centering to the State Highway Department for approval before work is begun.

Corresponding sections in both ribs of each span shall be poured at the same time.

Bridge excavation to be paid for below line shown as finished ground line.

B.M. - Elev 621.37 - Nail in 12" Walnut 40' Rt. of Sta. 1570+00.

Backfill is to be placed around piers before rings are poured. Rings shall be subjected to no loading until they have been poured at least 28 days.



BRIDGE OVER SINKING CREEK

STATE ROAD FROM SALEM TO EMINENCE

ABOUT 14 MILES NORTH OF EMINENCE

PROJECT NO. R19-532 STA 1569+20

SHANNON COUNTY

DATE 6/11/25

APPROVED BY [Signature]

DATE June 19 25

H-79

FINISHED 10-8

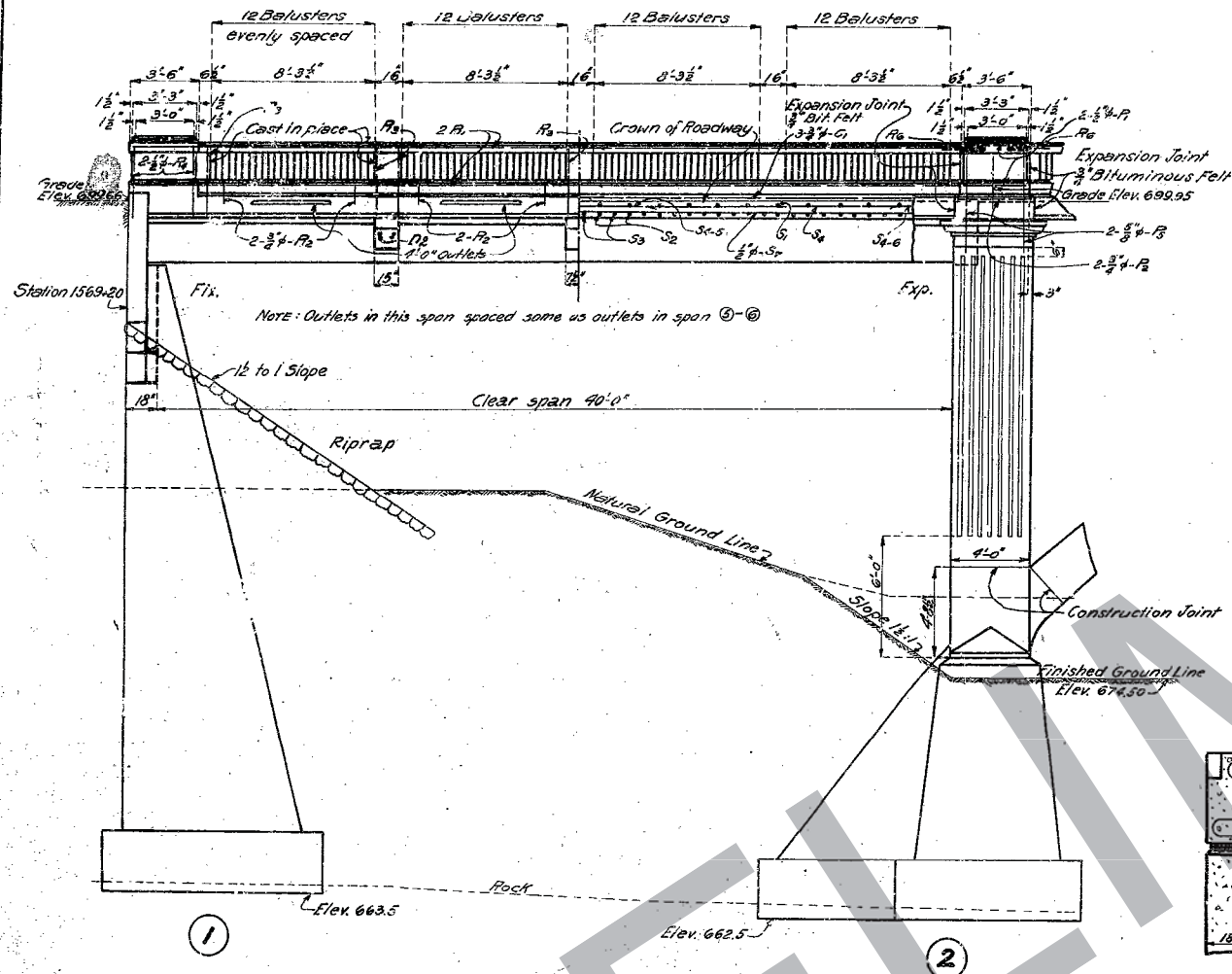
Sheet 2 of 5

251

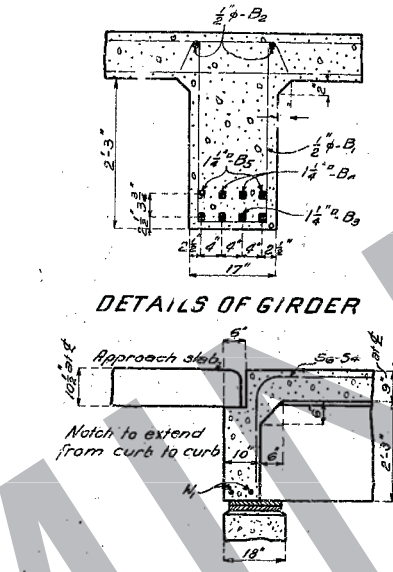
Drawn May 1925 by J.A.J. and H.G.P.  
Checked May 1925 by B.J.O.

MISSOURI STATE HIGHWAY DEPARTMENT

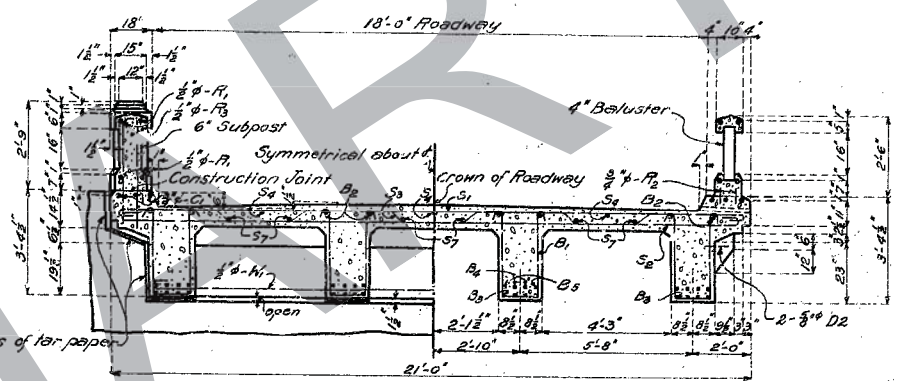
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO	R19-532	19		



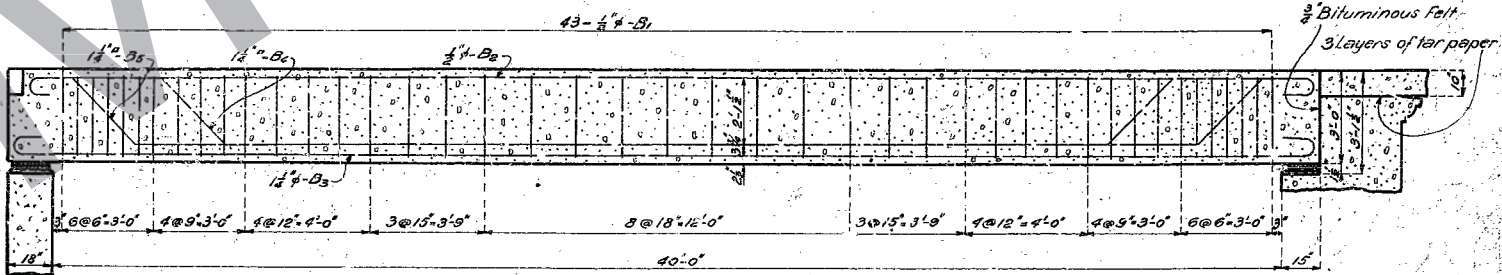
ELEVATION OF GIRDER



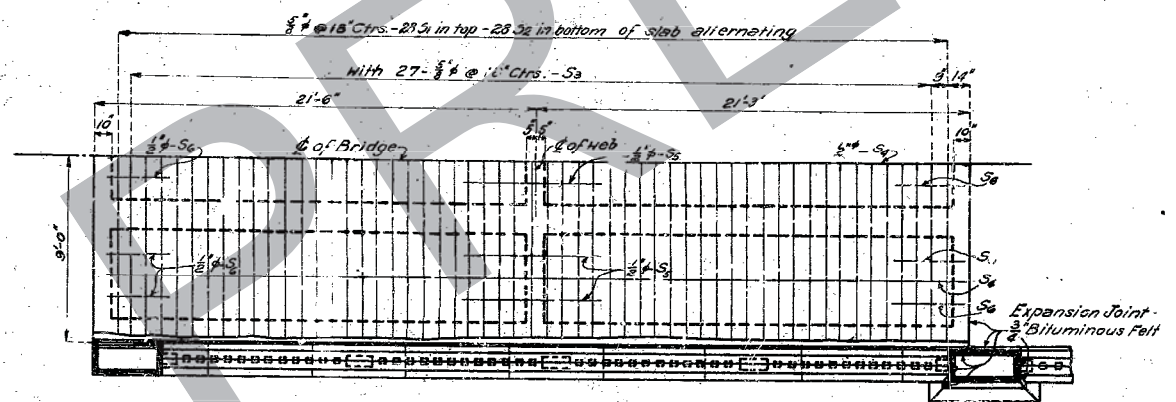
DETAILS OF NOTCH FOR APPROACH SLAB



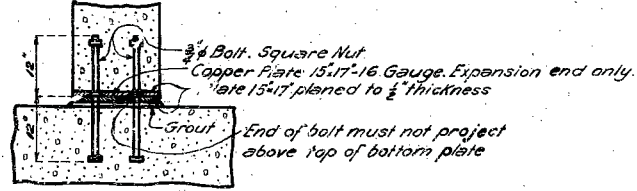
SECTION AT END BENT SECTION THRU SPAN



GIRDER REINFORCEMENT



HALF PLAN



DETAILS OF BEARING PLATES

- Required
- 32- Plates 15, 17, 16
- 32- 3/4" Bolts 12" long - Sq. Nuts - GSK. Hds.
- 32- 3/4" Bolts 12" long - No Threads - 1/2" Nuts
- 8- Copper Plates 15, 17-16 Gauge

BRIDGE OVER SINKING CREEK  
 STATE ROAD FROM SALEM TO EMINENCE  
 ABOUT 14 MILES NORTH OF EMINENCE  
 PROJECT NO. R.19-532 STA. 1169+20

SHANNON COUNTY  
 SUBMITTED BY *J. A. J.* DATE 6/11/25  
 APPROVED BY *W. J. ...* DATE June 19 25  
 BRIDGE ENGINEER  
 CHIEF ENGINEER

Drawn May 1925 By J. A. J.  
 Checked May 1925 By *...*

Sheet # 3 of 5

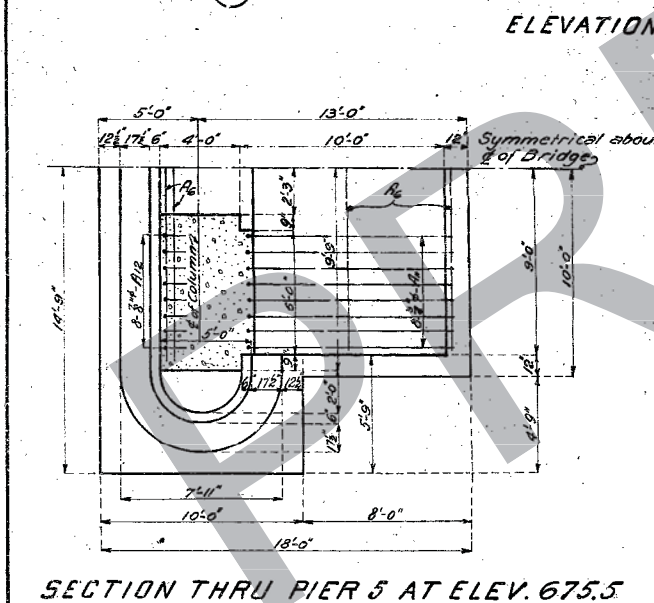
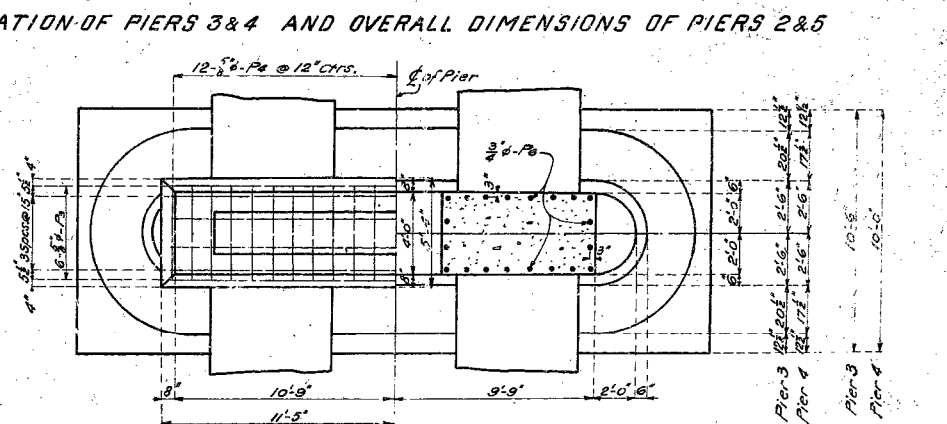
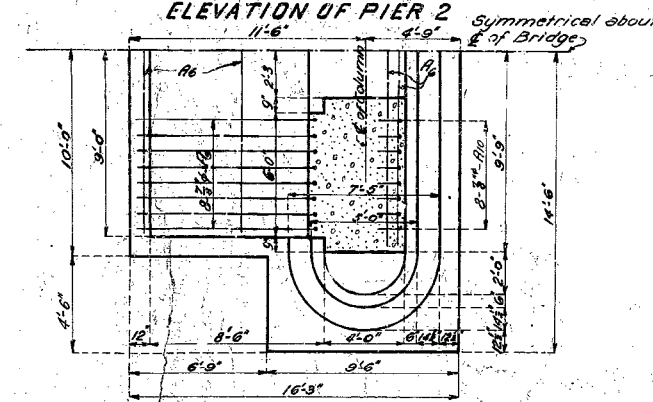
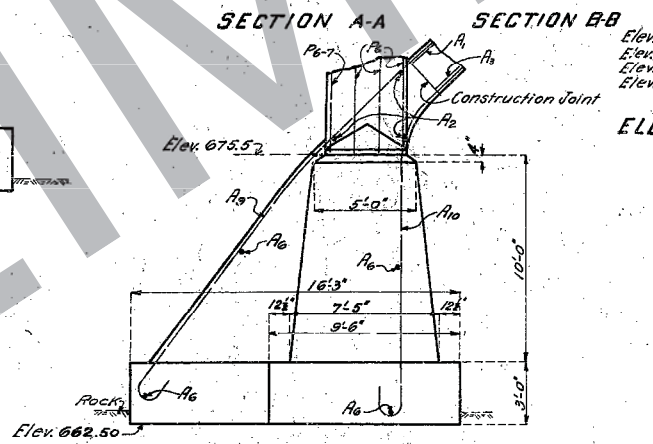
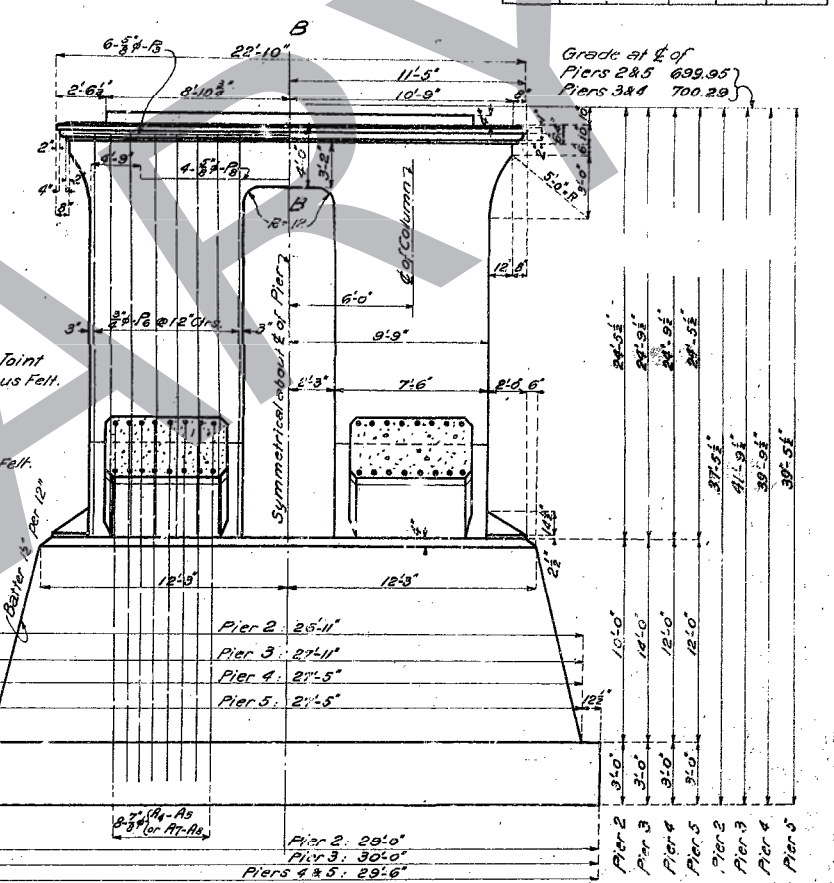
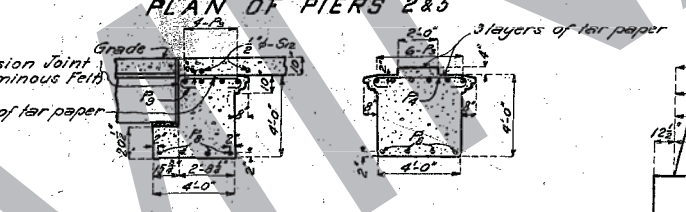
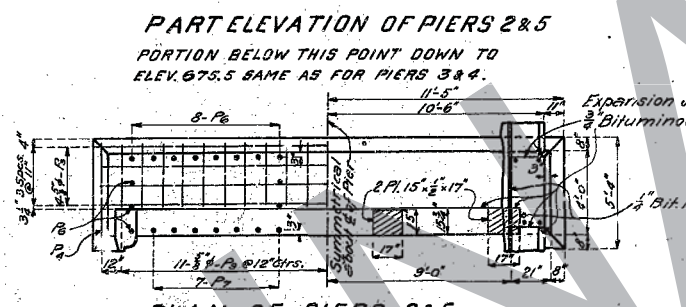
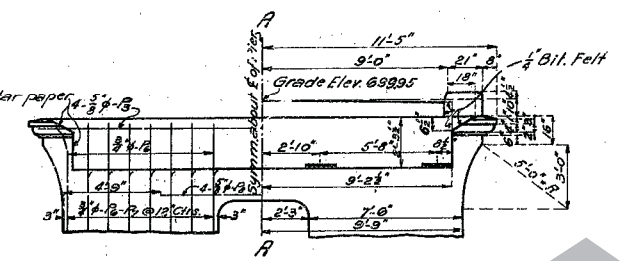
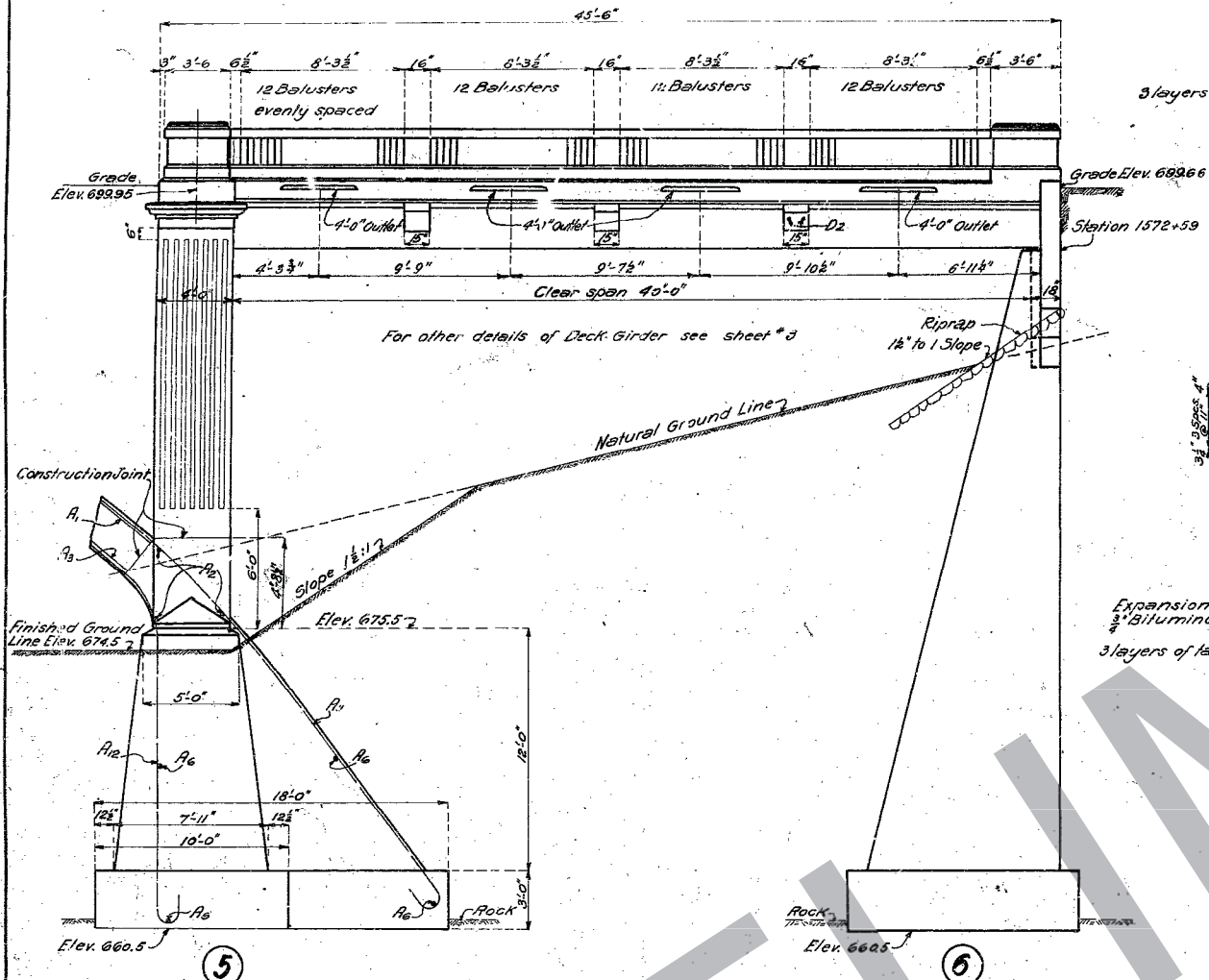
H-79

FINISHED

252

## MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO	R19-532	19		



Drawn May 1925 By J.A.T.  
Checked May 1925 By R.J.D.

**BRIDGE OVER SINKING CREEK**  
STATE ROAD FROM SALEM TO EMINENCE  
ABOUT 14 MILES NORTH OF EMINENCE  
PROJECT NO. R19-532 STA. 1569+20

SHANNON COUNTY  
SUBMITTED BY [Signature] DATE 6/10/25  
APPROVED BY [Signature] DATE June 19, 25

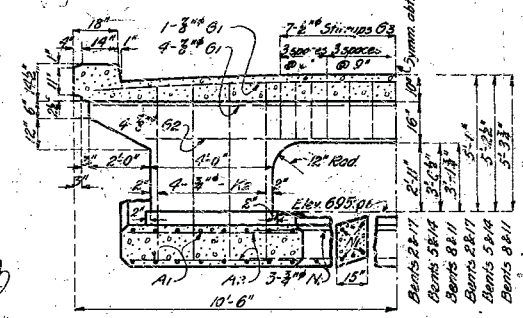
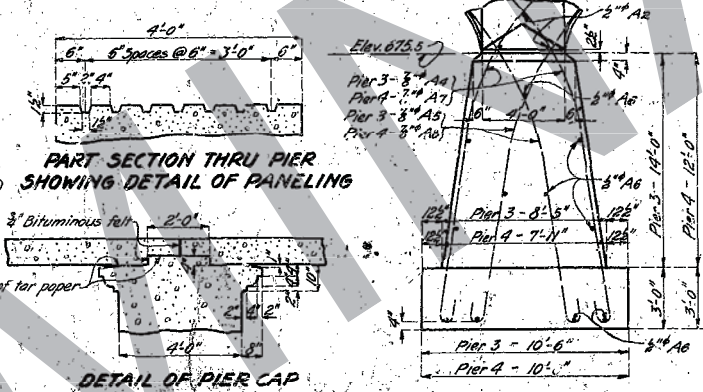
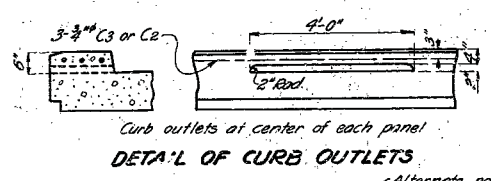
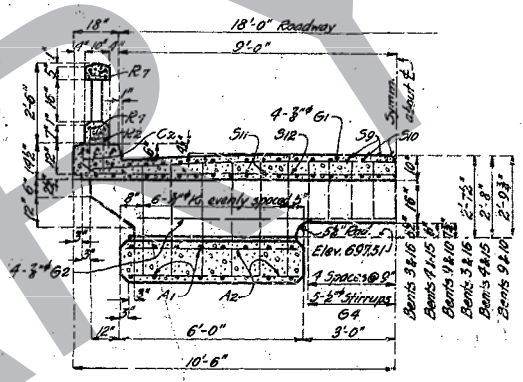
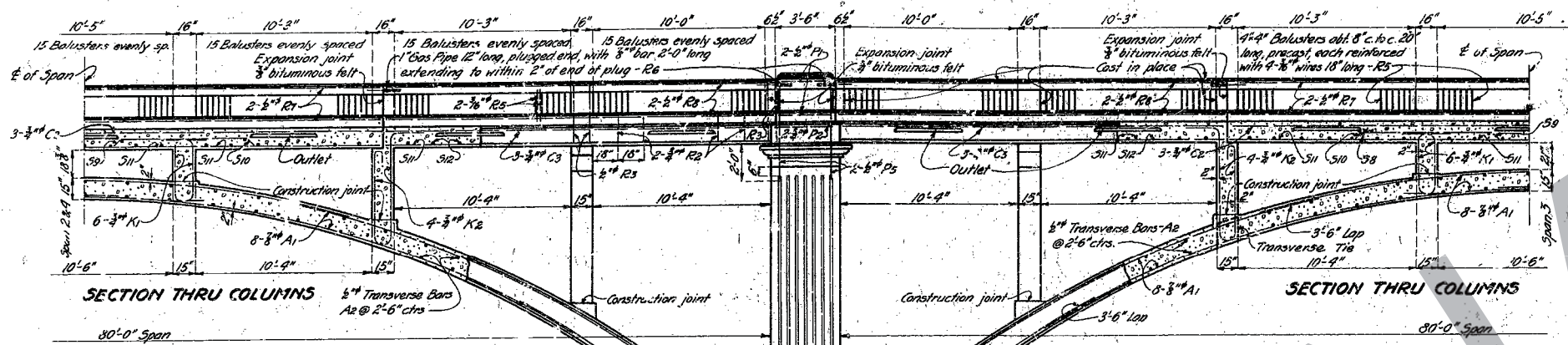
H-79

FINISHED 10/1-10

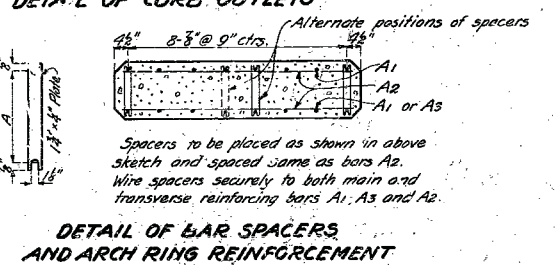
253

## MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
S	MO	R19-534	19		



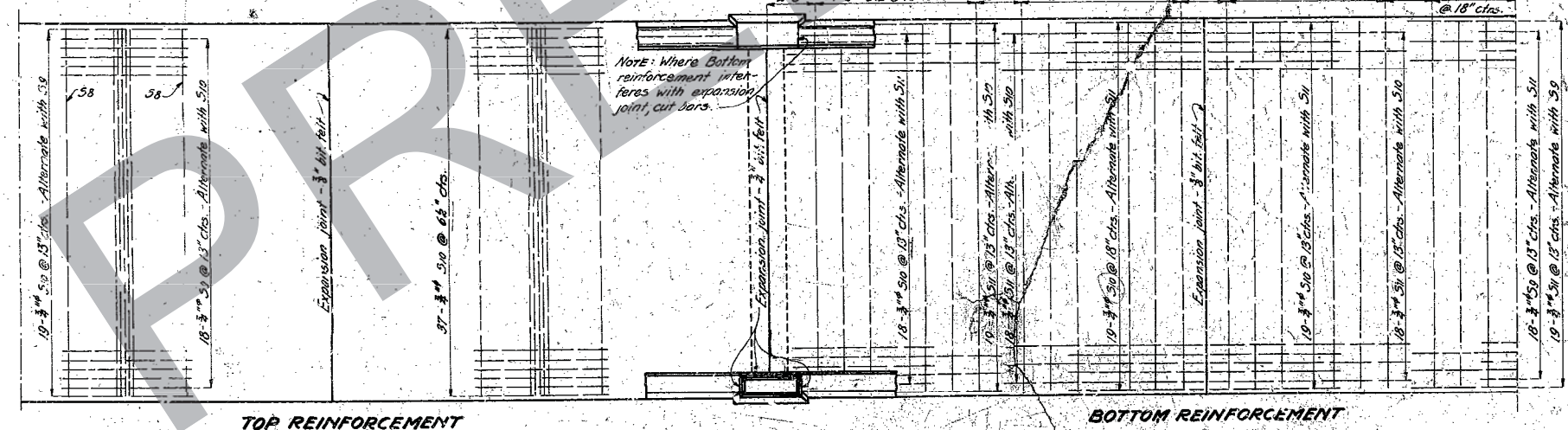
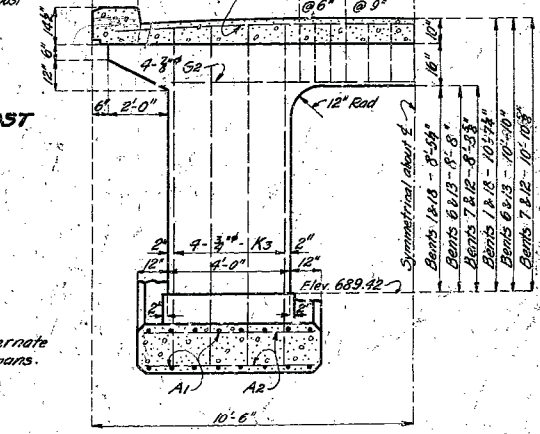
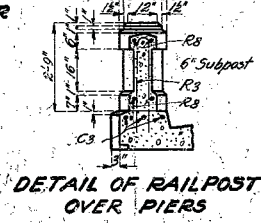
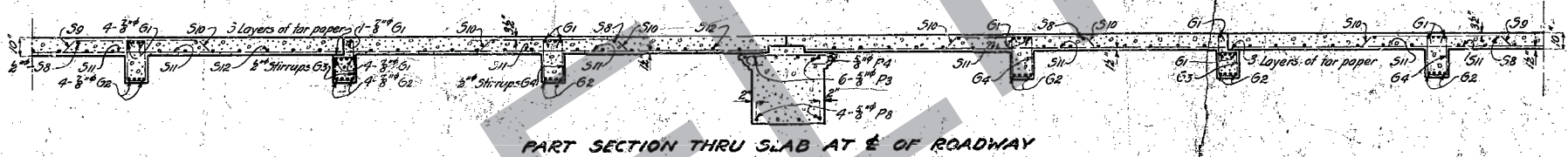
Variable Dimension A	No. of Bars	Dim. A	No. of Bars	Dim. A
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'
36	2	2'	36	12'



PART ELEVATION

ELEVATION OF PIER

HALF SECTION NEAR BENTS 2, 5, 8, 11, 14, 17



PART PLAN OF SLAB SHOWING REINFORCEMENT

BRIDGE OVER SINKING CREEK  
STATE ROAD FROM SALEM TO EMINENCE  
ABOUT 14 MILES N. OF EMINENCE  
PROJECT NO. R19-534 STA. 1569+20

SHANNON COUNTY  
SUBMITTED BY: [Signature] DATE: 6/11/25  
APPROVED BY: [Signature] DATE: June 19, 25  
BRIDGE ENGINEER  
CHIEF ENGINEER

Sheet #5 of 5

H-79

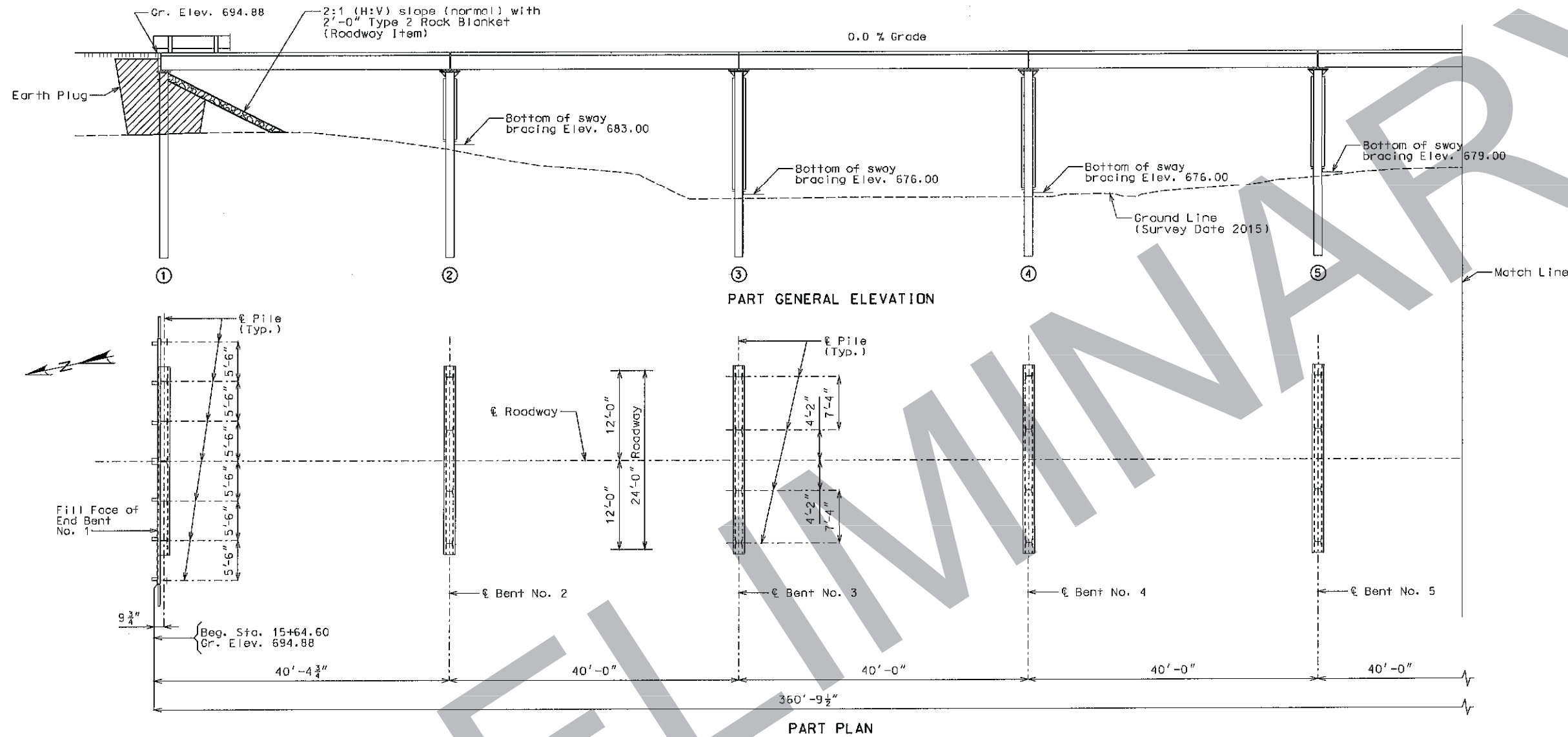
FINISHED 101-11

254

Drawn M.C. 1925 by H.G.P.  
Checked May 1925 by R.J.O.

## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

(9 @ 40') PREFABRICATED SIMPLE SEGMENTED WIDE FLANGE BEAM SPANS



**GENERAL NOTES:**

Design Specifications:  
2002 - AASHTO 17th Edition

**Design Loading:**

H20-44  
Earth 120 #/Cu. Ft., Equivalent Fluid Pressure 45#/Cu. Ft.

**Design Unit Stresses:**

Structural Steel (ASTM A709 Grade 50W)  $f_y = 50,000$  psi  
 Structural Steel (ASTM A709 Grade 36)  $f_y = 36,000$  psi  
 Steel Pile (ASTM A709 Grade 50)  $f_b = 9,000$  psi,  $f_y = 50,000$  psi  
 Structural Steel Tubing (ASTM A500)  $f_y = 46,000$  psi

**Timber:**

All timber shall be standard rough sawn. At the contractor's option, timber may be untreated or protected with commercially applied timber preservatives. All timber shall have a minimum strength of 1500 psi and shall be either douglas fir in accordance with paragraph 123B (MC-19), 124B (MC-19) and 130BB of the current edition of Standard Grading Rules for West Coast Lumber, southern pine in accordance with paragraphs 312 (MC-19), 342 (MC-19) and 405.1 of the current edition of Southern Pine Inspection Bureau Grading Rules, or a satisfactory grade of sound native oak.

**Bolts:**

All bolts shall be high strength ASTM A325 except as noted.

**Structural Steel:**

All structural steel shall be ASTM A709 Grade 50W except piles, sway bracing, trile beam rail assembly and structural tubing. Structural tubing coating shall be in accordance with Sec 718.

**Misc:**

The superstructure only, beam cap units & bolts will be provided by the State and shall be transported from Alton, Stikeston & Van Buren Maintenance Lots.

**Traffic:**

Use existing bridge H0079 during construction.

ESTIMATED QUANTITIES		
ITEM		TOTAL
Structural Steel Piles (14")	Linear Foot	1840
Pile Point Reinforcement	Each	46
Transporting and Erecting Superstructure	Lump Sum	1

B.M. - Elev. 681.37 - Nail in 12" Walnut  
 40' Rt. of Sta. 1570+00.  
 (From existing plans)

**TEMPORARY BRIDGE OVER SINKING CREEK**

STATE ROAD FROM SALEM TO EMINENCE

ABOUT 14 MILES NORTH OF EMINENCE

STA. 15+64.60

STD. 606.23



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED  
4/17/2015

ROUTE 19 STATE MD  
 DISTRICT BR SHEET NO. 1

COUNTY SHANNON

JOB NO. J9P3101

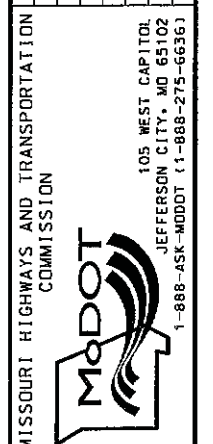
CONTRACT NO.

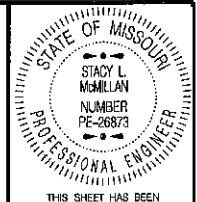
PROJECT NO.

BRIDGE NO. H0079T

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION





THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE PREPARED 4/17/2015

ROUTE 19 STATE MO DISTRICT BR SHEET NO. 2 COUNTY SHANNON

JOB NO. J9P3101 CONTRACT ID.

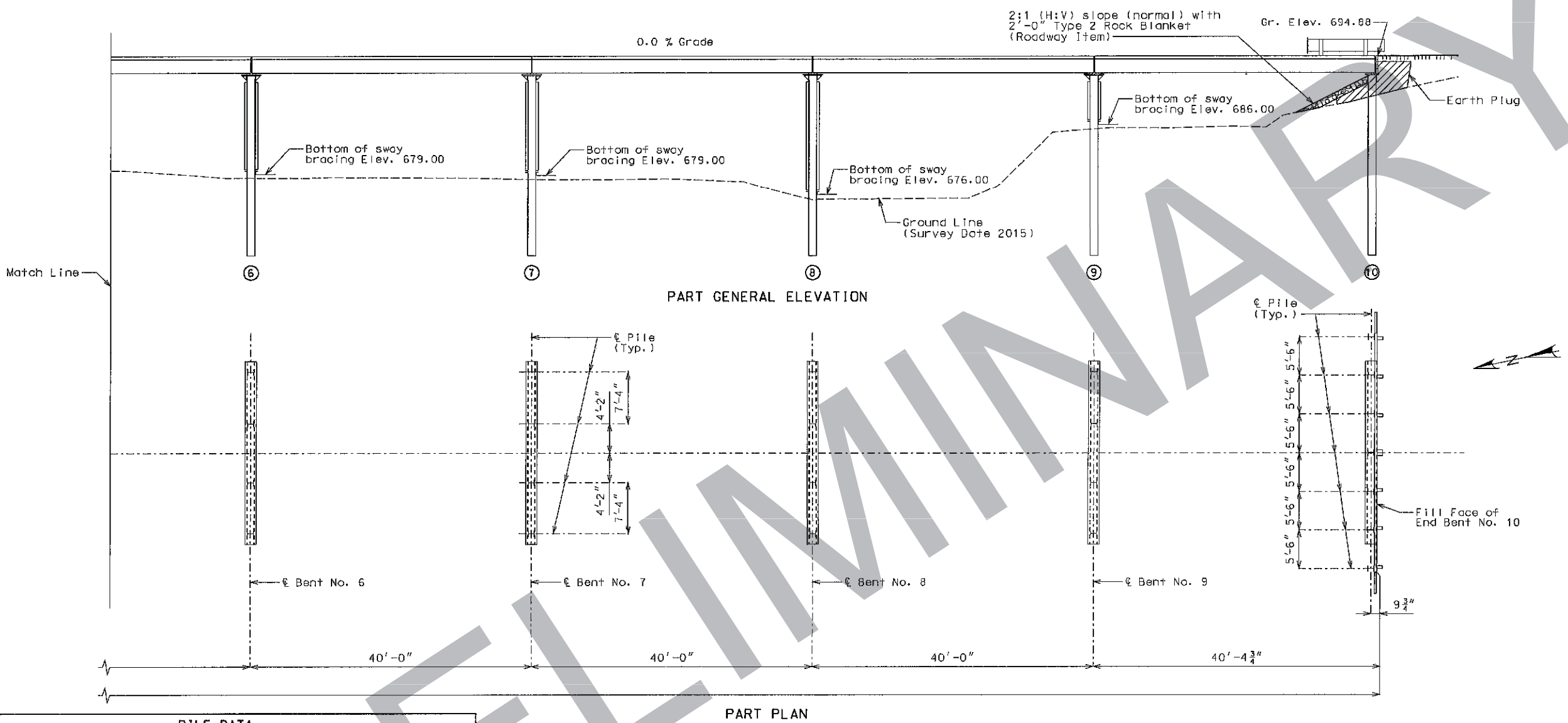
PROJECT NO. BRIDGE NO. H0079T

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MIDDOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



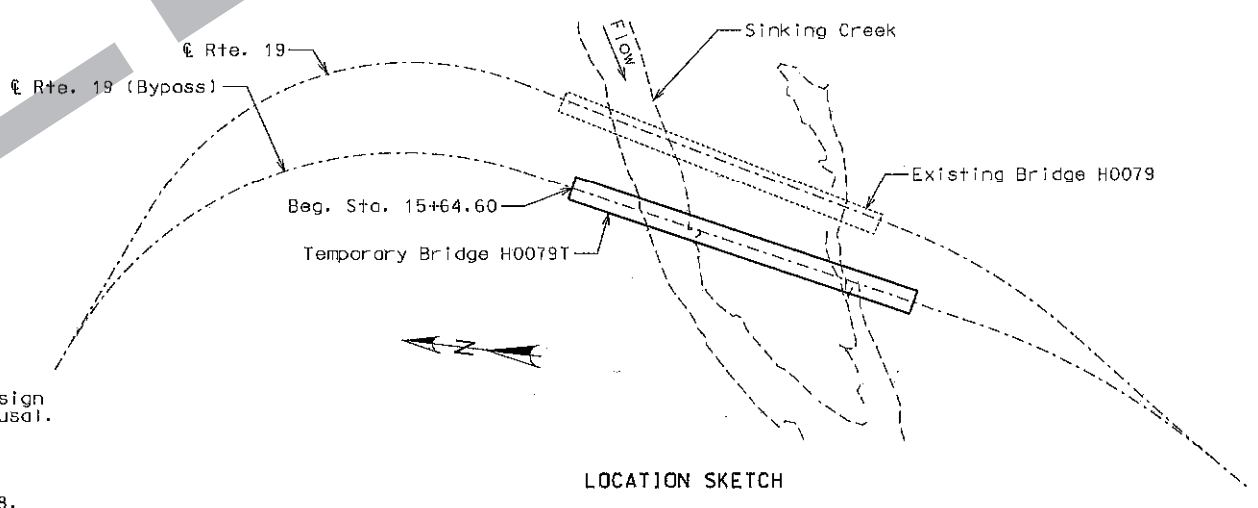
PILE DATA					
BENT NO.	1	2	3	4	5
Pile Type and Size	HP 14 x 73				
Number	7	4	4	4	4
Approximate Length Ft.	40	40	40	40	40
Pile Driving Verification Method	*	*	*	*	*
Prebore Elev.	677.00	**	**	**	**
Design Bearing Tons	11	19	19	19	19
Hammer Energy Required Ft.-Lbs.	9,000	9,000	9,000	9,000	9,000
BENT NO.	6	7	8	9	10
Pile Type and Size	HP 14 x 73				
Number	4	4	4	4	7
Approximate Length Ft.	40	40	40	40	40
Pile Driving Verification Method	*	*	*	*	*
Prebore Elev.	**	**	**	**	677.00
Design Bearing Tons	19	19	19	19	11
Hammer Energy Required Ft.-Lbs.	9,000	9,000	9,000	9,000	9,000

Notes: Minimum energy requirement of hammer is based on plan length and design bearing value of piles. All piles shall be driven to practical refusal.

\* Dynamic Bearing Formula for all bents. See Sec 702 of 2004 Missouri Standard Specifications for Highway Construction for formula.

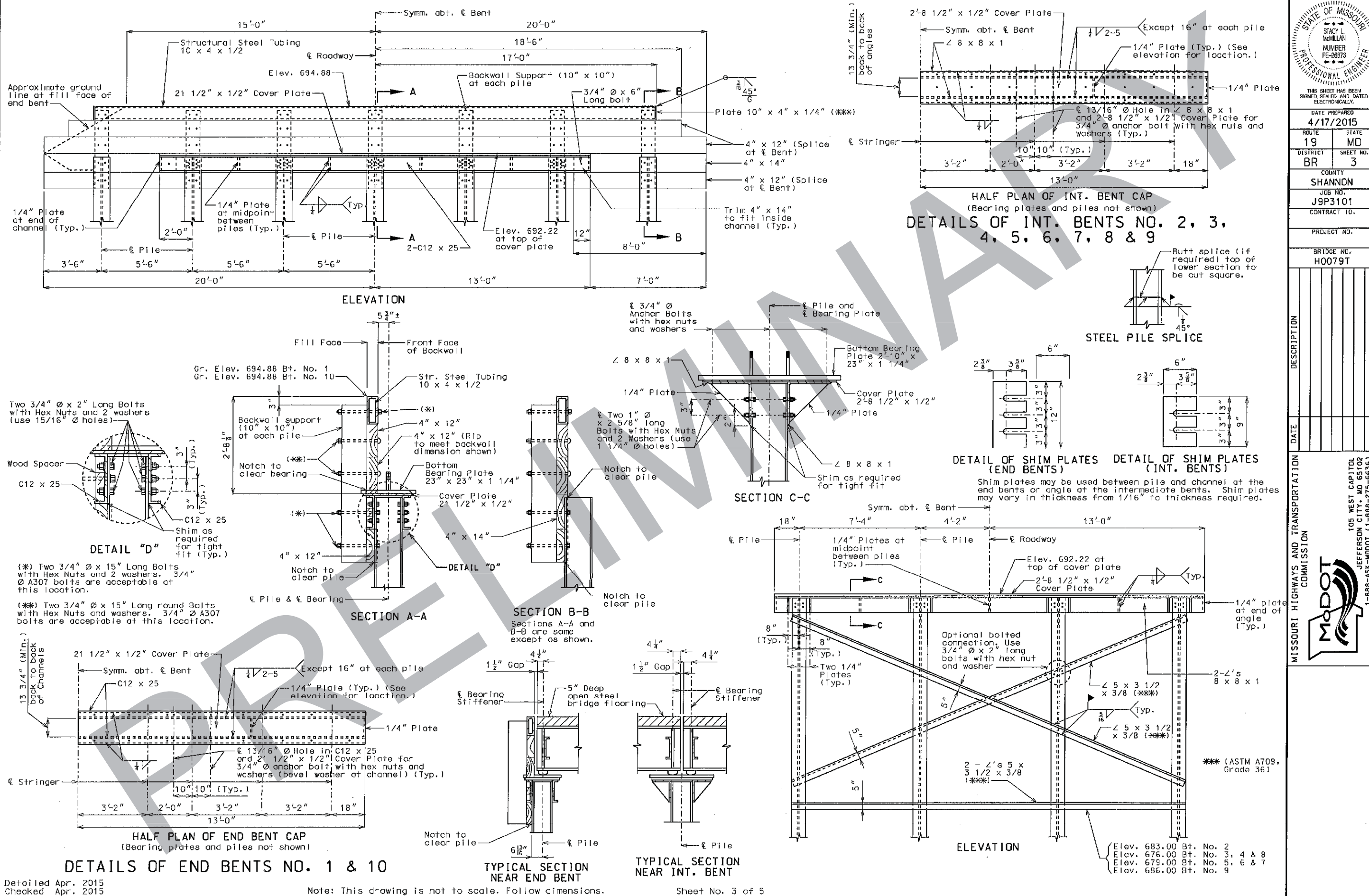
\*\* Prebore pile 5' below top of solid rock, minimum, for Bents 2 thru 8.

All piles shall have pile point reinforcement.



Hydrologic Data	
Drainage Area =	___ mi <sup>2</sup>
Design Flood Frequency =	___ years
Design Flood Discharge =	___ cfs
Design Flood (D.F.) Elevation =	_____
Base Flood (100-year)	
Base Flood Elevation =	_____
Base Flood Discharge =	___ cfs
Estimated Backwater =	__ ft
Average Velocity thru Opening =	__ ft/s
Freeboard (50-year)	
Freeboard =	__ ft
Roadway Overtopping	
Overtopping Flood Discharge =	___ cfs
Overtopping Flood Frequency =	___ years
_____ Flood Elevation =	_____

tem2\_bent\_sht Effective: Aug. 2008 Supercodes: Feb. 2, 2004



STATE OF MISSOURI  
 STACY L. McMLLAN  
 PROFESSIONAL ENGINEER  
 NUMBER PE-26873

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.  
 DATE PREPARED: 4/17/2015  
 ROUTE: 19 STATE: MO  
 DISTRICT: BR SHEET NO.: 3  
 COUNTY: SHANNON  
 JOB NO.: J9P3101  
 CONTRACT NO.:  
 PROJECT NO.:

BRIDGE NO.
H0079T

DESCRIPTION	DATE

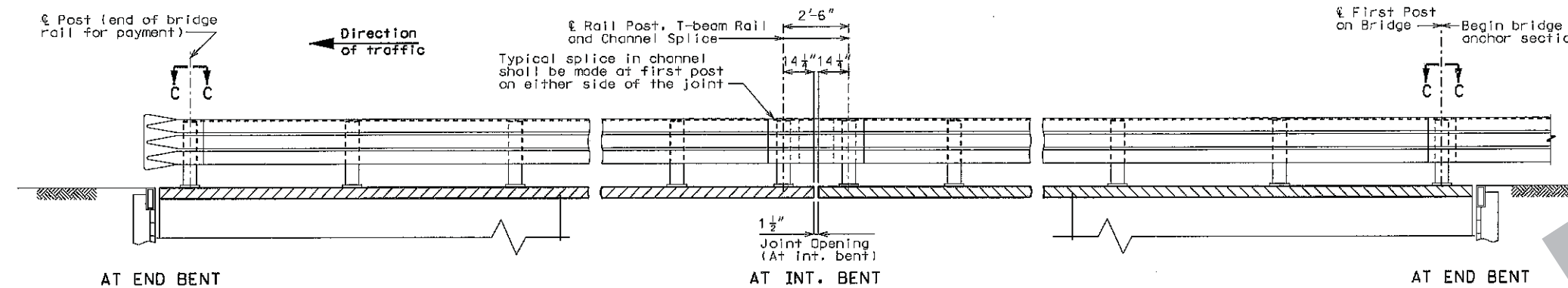
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITAL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.







**PART SECTION SHOWING THRIE BEAM RAIL**

Note: At the bridge ends for head to head traffic, guardrail shall be used at all four corners and for single directional traffic, guardrail shall be used at the entrance ends only unless required at the exit.

**GENERAL NOTES:**  
 Design Specification: 2002 - AASHTO 17th Edition  
 Panel lengths of channel members shall be attached continuously to a minimum of four posts and a maximum of six posts (except at end bents).  
 All bolts, nuts, washers and plates will be considered completely covered by the contract unit price for Bridge Guardrail (Thrie Beam).  
 All steel connecting bolts and fasteners for posts and railing, and all anchor bolts, nuts, washers and plates shall be galvanized after fabrication except for the bottom plate. Protective coating and material requirement of steel railing shall be in accordance with Sec 1040.  
 Rail posts shall be set perpendicular to roadway profile grade, vertically in cross section and aligned in accordance with Sec 713 except that the rail posts shall be aligned by the use of shims such that the post deviates not more than 1/2 inch from true horizontal alignment after final adjustment. The shims shall be 3" x 1 3/4" and placed between the post and the thrie beam rail. The thickness of the shims shall be determined by the contractor and verified by the engineer before ordering material for this work.  
 At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

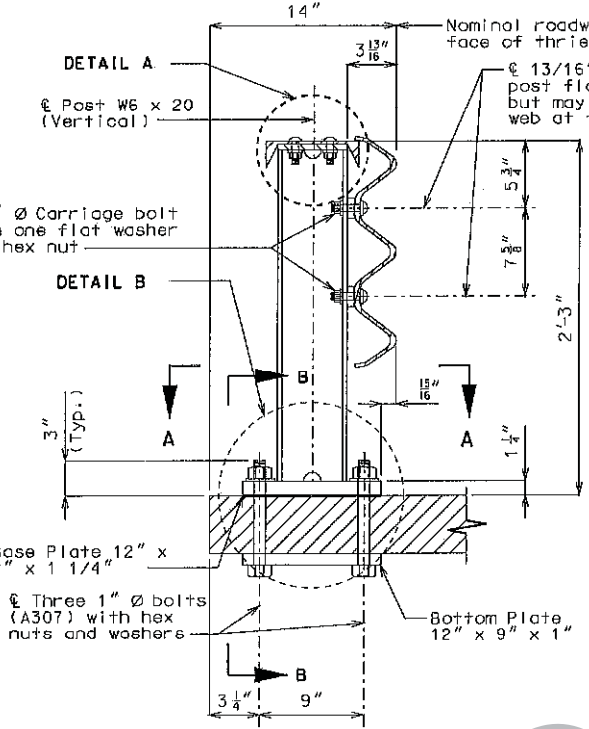
At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.

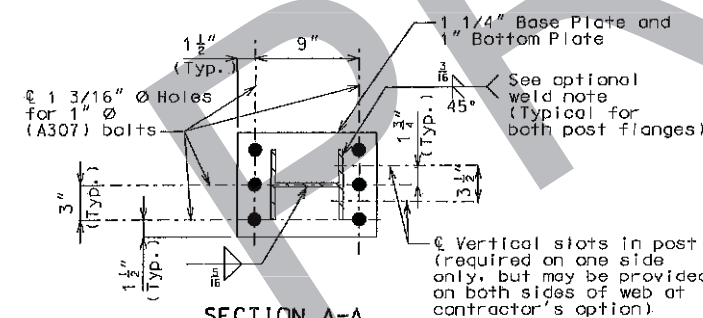
At the expansion slots in the thrie beam rails and channels, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 At the thrie beam connection to posts on wings, the bolts shall be tightened and backed off one-half turn and the threads shall be burred.  
 Minimum length of thrie beam sections is equal to one post space.  
 5/8" button head, oval shoulder bolts with 3/8" minimum hex nuts shall be used at all slots.  
 Posts, top plates, base plates, channels and channel splice plates shall be fabricated from ASTM A709 Grade 36 steel and galvanized.  
 Washers shall be used at all post bolts between the bolt head and beam. The flat washers shall be rectangular in shape, 3" x 1 3/4" x 3/16" minimum and with a 11/16" x 1" slot, or when necessary of such design as to fit the contour of the beam. A 3" x 1 3/4" x 5/8" rectangular washer shall be used between the post and the thrie beam rail.  
 Special drilling of the thrie beam may be required at the splices. All drilling details shall be shown on the shop drawings.  
 Fabrication of structural steel shall be accordance with Sec 1080.  
 If type "A" guardrail is not attached to ends of the temporary structure, flared ends shall be required. The existing thrie beam rails shall be modified to accept flared ends. Cost for furnishing and installing flared ends will be considered completely covered by the contract unit price for other items.  
 Contractor shall verify all dimensions in field before ordering materials.



**PART SECTION AT RAIL POST**

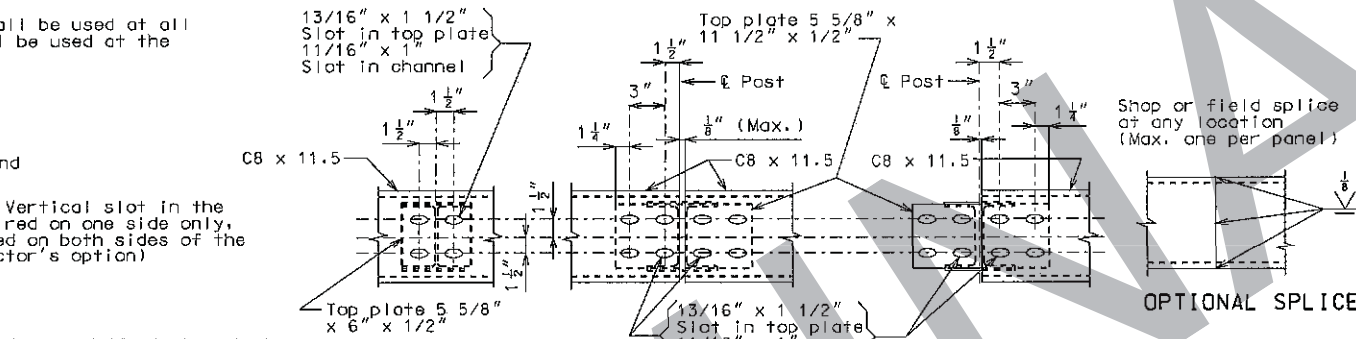
Note: The size of base and bottom plate may be increased depending on which grid option is used.

Note: See preceding sheet for post spacing.

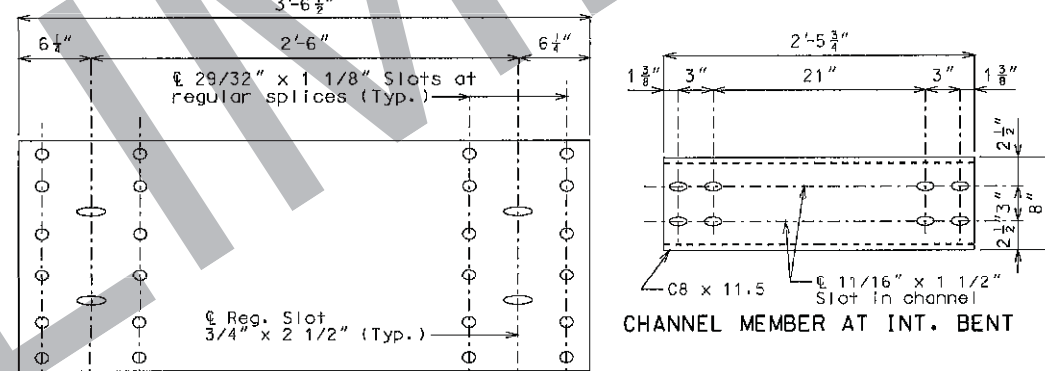


**SECTION A-A**

Note: Optional welding of the post to the base plate, in lieu of the weld shown, is a 5/16" fillet weld all around, including the edges of the post flanges.

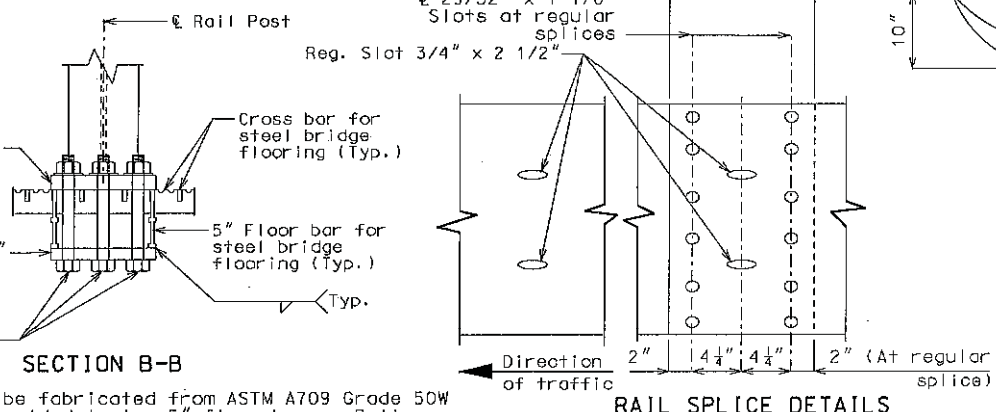


**CHANNEL MEMBER DETAILS**



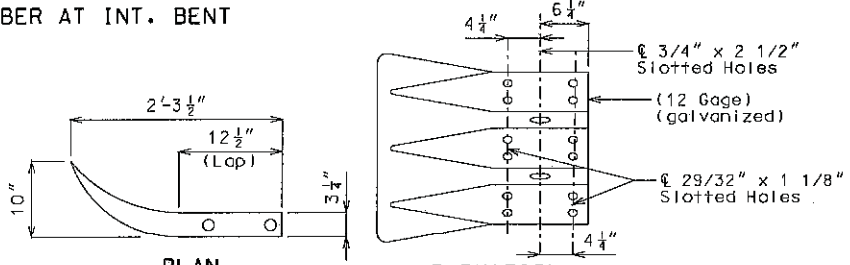
**THRIE BEAM MEMBER AT INT. BENT**

**CHANNEL MEMBER AT INT. BENT**

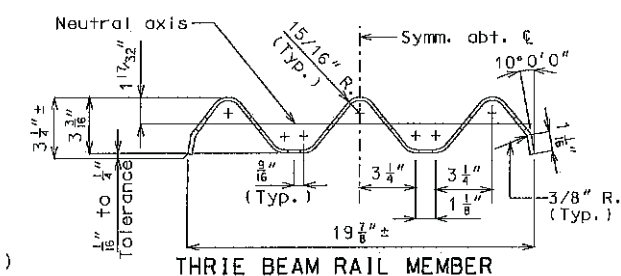


**RAIL SPLICE DETAILS**

(Part Elevation Thrie Beam Member)



**PLAN and ELEVATION DETAIL OF FLARED END**



**THRIE BEAM RAIL MEMBER**

Note: Bottom plate shall be fabricated from ASTM A709 Grade 50W steel and shall be welded to two 5" floor bars. Bottom plate shall not be galvanized.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 5 of 5



DATE PREPARED: 4/17/2015

ROUTE 19	STATE MO
DISTRICT BR	SHEET NO. 5
COUNTY SHANNON	
JOB NO. J9P3101	
CONTRACT ID.	

PROJECT NO. BRIDGE NO. H0079T

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITAL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

