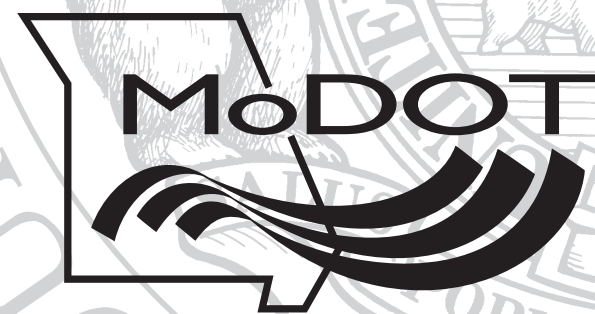


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# 2024 Missouri Standard Plans for Highway Construction

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**Missouri Department of Transportation**



This set of standard plans has been approved by the Missouri Highways and Transportation Commission for highway construction projects and constitutes a contract document in accordance with Section 101.2 of the Standard Specifications for Highway Construction.

This set of Standard Plans is effective beginning with the October 2044 bid opening.

[www.modot.org/business/standards\\_and\\_specs/standardplans.htm](http://www.modot.org/business/standards_and_specs/standardplans.htm)



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
**MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION**  
**TABLE OF CONTENTS**

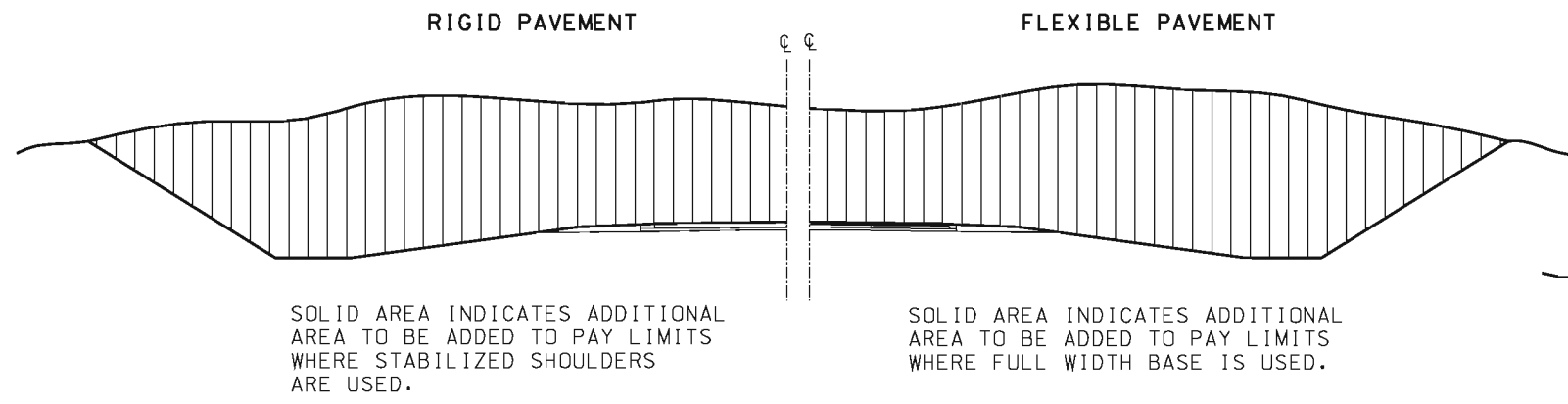
EFFECTIVE: 10/01/2024

STANDARD NO.	DRAWING TITLE	NO. OF SHEETS	EFFECTIVE DATE
703.10J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (SQUARED)	3	01/01/2021
703.11J	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (SQUARED)	3	01/01/2021
703.12J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE)	3	01/01/2021
703.13J	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)	3	01/01/2021
703.14J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE)	3	01/01/2021
703.15E	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE)	3	01/01/2021
703.16	CONCRETE SINGLE BOX CULVERT – CUT SECTIONS	1	01/01/2021
703.17A	CONCRETE SINGLE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT	14	07/01/2023
703.37C	CONCRETE BOX CULVERT – EXTERIOR WING REINFORCEMENT	2	04/01/2011
703.38A	CONCRETE BOX CULVERT – CUTTING DETAILS	2	10/01/2009
703.40H	CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (SQUARE)	3	01/01/2021
703.41H	CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (SQUARE)	3	01/01/2021
703.42H	CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE)	3	01/01/2021
703.43H	CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)	3	01/01/2021
703.44H	CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE)	3	01/01/2021
703.45C	CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE)	3	01/01/2021
703.46	CONCRETE DOUBLE BOX CULVERT – CUT SECTION	1	01/01/2021
703.47A	CONCRETE DOUBLE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT	27	07/01/2023
703.60E	CONCRETE BOX STRUCTURE – PIPE INLET	1	07/01/2001
703.80H	CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (SQUARE)	3	01/01/2021
703.81H	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (SQUARE)	3	01/01/2021
703.82H	CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE)	3	01/01/2021
703.83H	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)	3	01/01/2021
703.84H	CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE)	3	01/01/2021
703.85C	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE)	3	01/01/2021
703.86	CONCRETE TRIPLE BOX CULVERT – CUT SECTIONS	1	01/01/2021
703.87A	CONCRETE TRIPLE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT	27	07/01/2023
706.35H	BAR SUPPORTS FOR CONCRETE REINFORCEMENT	1	07/01/2004
712.40L	STEEL DAMS AT EXPANSION JOINTS	1	10/01/2019
725.00C	CORRUGATED METAL PIPE INSTALLATION METHODS	5	04/01/2011
725.31C	METAL CURTAIN WALL AND METAL INLETS	1	07/01/2004
726.30J	RIGID CULVERT INSTALLATION METHODS	2	04/01/2015
730.00E	THERMOPLASTIC PIPE INSTALLATION METHODS	1	04/01/2015
731.00U	PRECAST MANHOLES	2	07/01/2016
731.10S	PRECAST DROP INLET	8	01/01/2022
732.00S	FLARED END SECTION	3	07/01/2021
732.05D	BEVELED PIPE END TREATMENT	2	01/01/2021
732.10H	SAFETY SLOPE END SECTION	3	01/01/2021
733.00	PRECAST CONCRETE BOX CULVERT TIES	1	07/01/2021
805.00A	SEEDING	1	04/01/2024
806.10K	TEMPORARY EROSION CONTROL MEASURES	6	01/01/2023
808.00	TYPICAL PLANTING ILLUSTRATIONS	3	07/01/2004

STANDARD NO.	DRAWING TITLE	NO. OF SHEETS	EFFECTIVE DATE
901.00AB	HIGHWAY LIGHTING – POLES, FOUNDATION & APPURTENANCES FOR 30' M.H.	4	01/01/2021
901.01AJ	HIGHWAY LIGHTING – POLES, FOUNDATION & APPURTENANCES FOR 45' M.H.	6	01/01/2021
901.02B	HIGHWAY LIGHTING – CABLE, CONDUIT AND TRENCHING	1	04/01/2002
901.30F	HIGHWAY LIGHTING – BASE MOUNTED CONTROL STATION	2	04/01/2005
901.80D	HIGHWAY LIGHTING – POWER SUPPLY ASSEMBLY – SECONDARY SERVICE	2	04/01/2002
901.85B	HIGHWAY LIGHTING SYMBOLS	1	04/01/2018
902.00Q	TRAFFIC SIGNALS	2	07/01/2023
902.05	TRAFFIC SIGNALS – ACCESSIBLE PEDESTRIAN SIGNALS	2	04/01/2021
902.10Q	TRAFFIC SIGNALS – CONTROLLERS CONDUIT LOCATION	1	04/01/2005
902.15K	TRAFFIC SIGNALS – POWER SUPPLY ASSEMBLY	3	07/01/2004
902.20G	TRAFFIC SIGNALS – CONCRETE PULL BOXES	3	04/01/2019
902.21C	TRAFFIC SIGNALS – TELEPHONE INTERCONNECT	1	03/01/1996
902.30P	TRAFFIC SIGNALS – POST BASES	2	04/01/2024
902.40R	TRAFFIC SIGNALS – TUBULAR STEEL POSTS	3	04/01/2018
902.50M	TRAFFIC SIGNALS – INDUCTION LOOP DETECTORS	2	04/01/2020
902.70Q	TRAFFIC SIGNALS – RIGID SPAN WIRE DETAILS	3	01/01/2022
902.80L	TRAFFIC SIGNALS – TRAFFIC SIGNAL SYMBOLS	1	04/01/2020
903.01J	STANDARD ARROW DETAILS	2	10/01/2016
903.02AP	HIGHWAY SIGNING	8	10/01/2019
903.03BR	POST INSTALLATION AND SIGN MOUNTING DETAILS	16	07/01/2023
903.04F	HIGHWAY SIGNING – WEIGH STATION	1	02/01/2012
903.05L	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE S, ONE TUBE	2	10/01/2022
903.06L	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE S, TWO TUBE	2	10/01/2022
903.07L	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE C	2	10/01/2022
903.08K	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE B	2	10/01/2022
903.10BE	OVERHEAD SIGN TRUSSES – ALUMINUM	6	10/01/2023
903.12AA	OVERHEAD SIGN TRUSSES – BUTTERFLY AND CANTILEVER STRUCTURAL STEEL	7	01/01/2021
903.60AC	OVERHEAD SIGN TRUSSES – STRUCTURAL STEEL	5	01/01/2021

\* REVISED OR ADDED SINCE JULY 2024

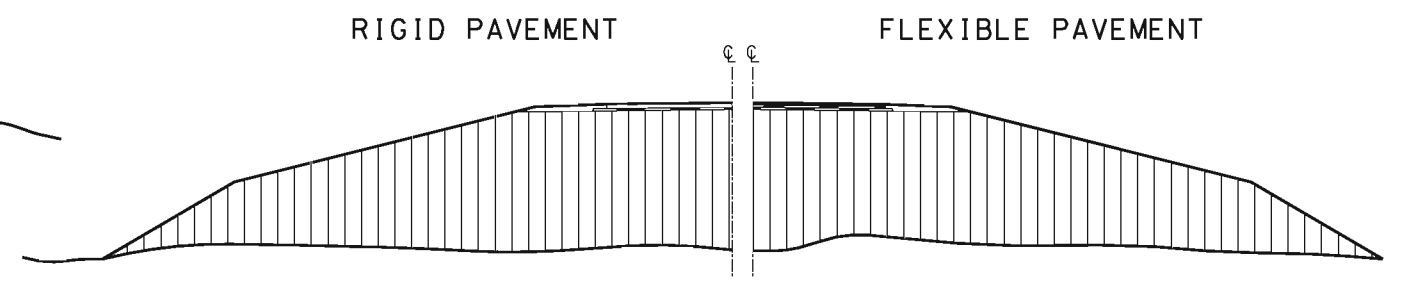
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SOLID AREA INDICATES ADDITIONAL AREA TO BE ADDED TO PAY LIMITS WHERE STABILIZED SHOULDERS ARE USED.

SOLID AREA INDICATES ADDITIONAL AREA TO BE ADDED TO PAY LIMITS WHERE FULL WIDTH BASE IS USED.

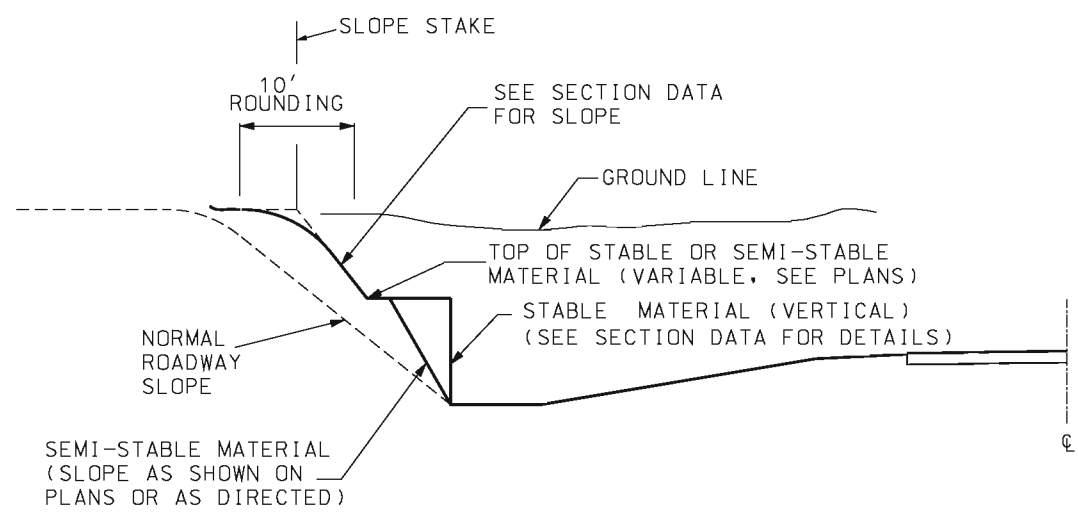
**EXCAVATION PAY LIMITS**



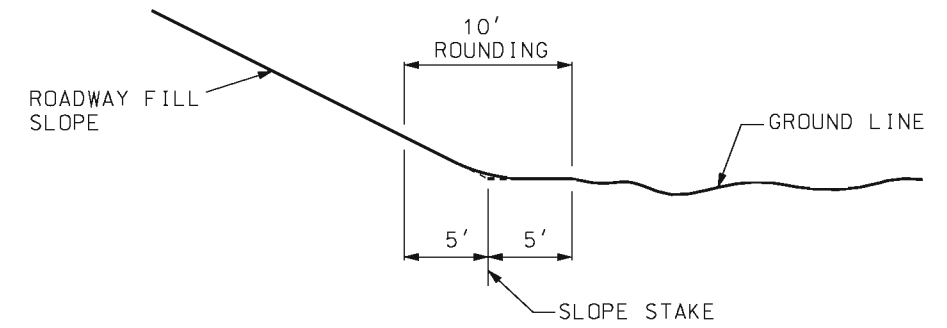
SOLID AREA INDICATES ADDITIONAL EMBANKMENT WHERE STABILIZED SHOULDERS ARE NOT USED.

SOLID AREA INDICATES ADDITIONAL EMBANKMENT WHERE FULL WIDTH BASE IS NOT USED.

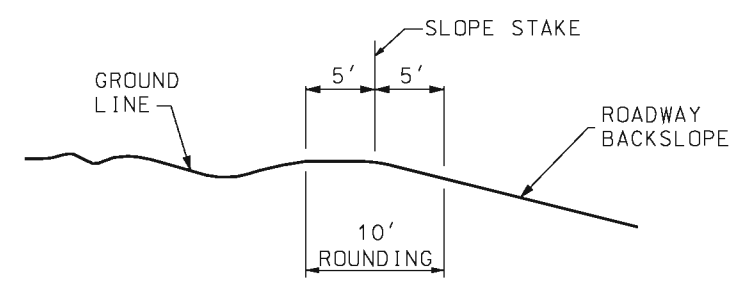
**EMBANKMENT LIMITS**



**BACKSLOPES IN STABLE AND SEMI-STABLE MATERIAL**

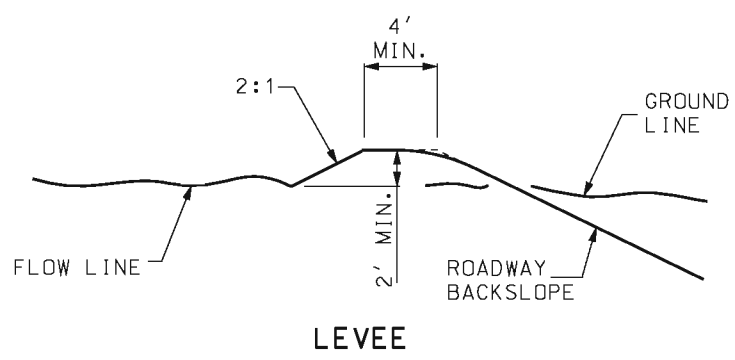


AT TOE OF ROADWAY FILL SLOPE

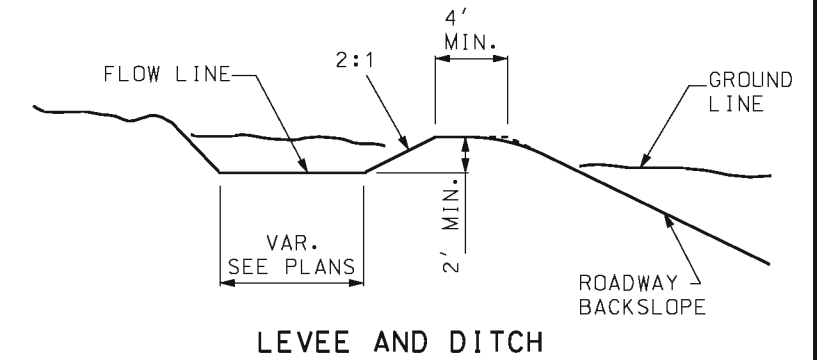


AT TOP OF ROADWAY BACKSLOPES

**PARABOLIC ROUNDING**



LEVEE



LEVEE AND DITCH

LEVEE AND/OR DITCH MAY BE LOCATED BACK OF BACKSLOPE WHEN CONDITIONS REQUIRE. USE DITCH ONLY WHERE INDICATED OR WHERE REQUIRED FOR DRAINAGE.

**INTERCEPTION DITCH AND/OR LEVEE**

GENERAL NOTES:

SUBSURFACE LOGS OF MATERIALS OBTAINED DURING THE SOIL SURVEY FOR THE PURPOSE OF CUT CLASSIFICATION MAY BE ACQUIRED FROM THE DISTRICT OFFICE UPON REQUEST.

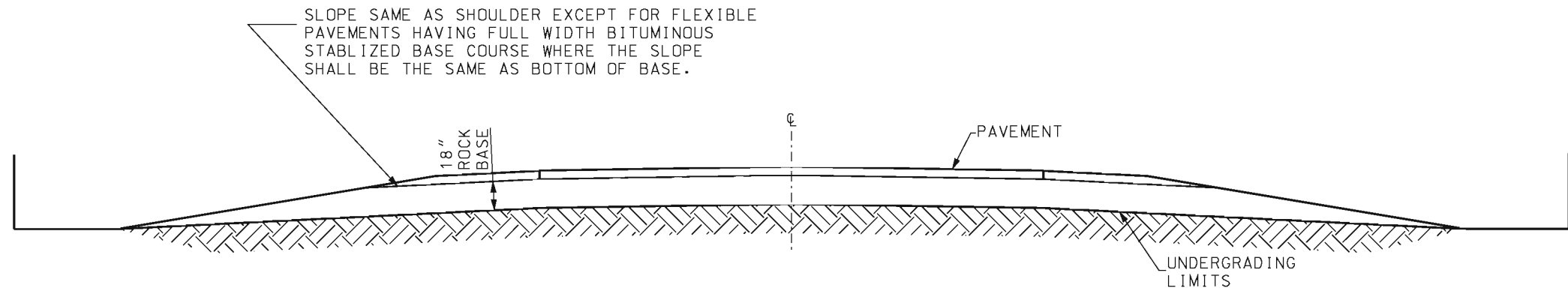
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

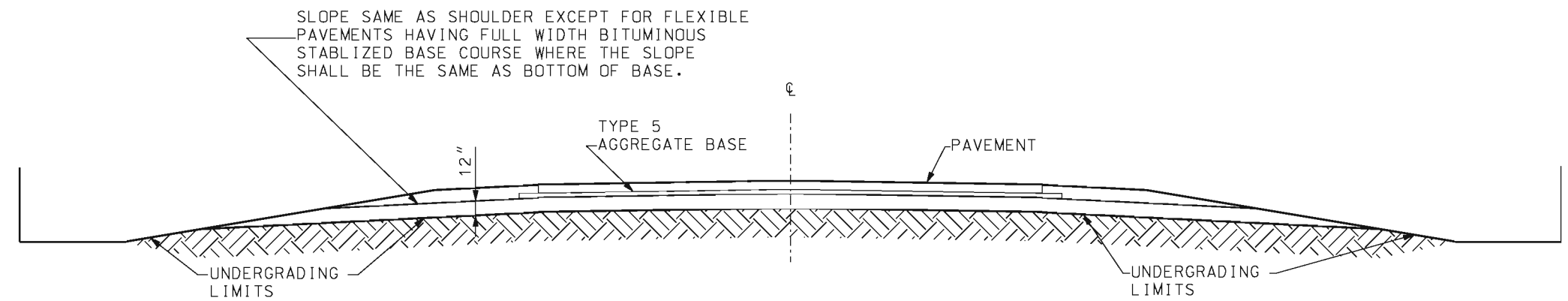
**EXCAVATION AND EMBANKMENT**  
 TYPICAL DETAILS

DATE EFFECTIVE: 08/01/1998	203.00E	SHEET NO. 1 OF 1
DATE PREPARED: 8/21/2009		

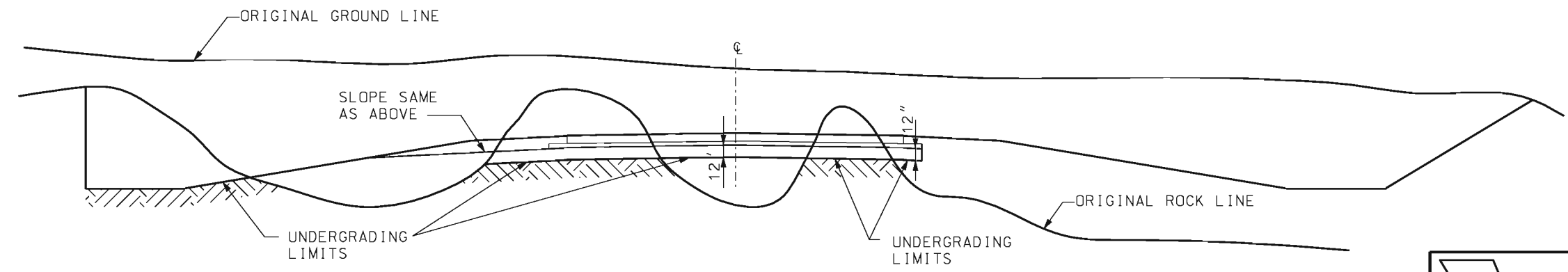
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH 18" ROCK BASE**



**IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH TYPE 5 AGGREGATE BASE**



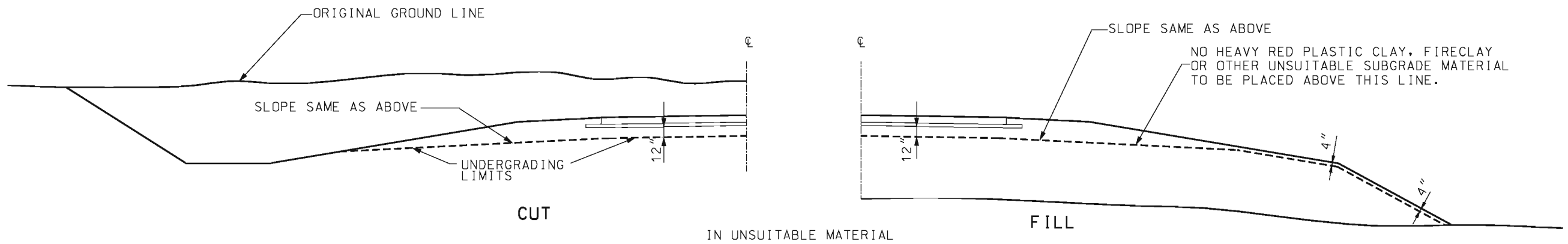
**IN ROCK OVER PARTIAL WIDTH OF ROADBED**

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

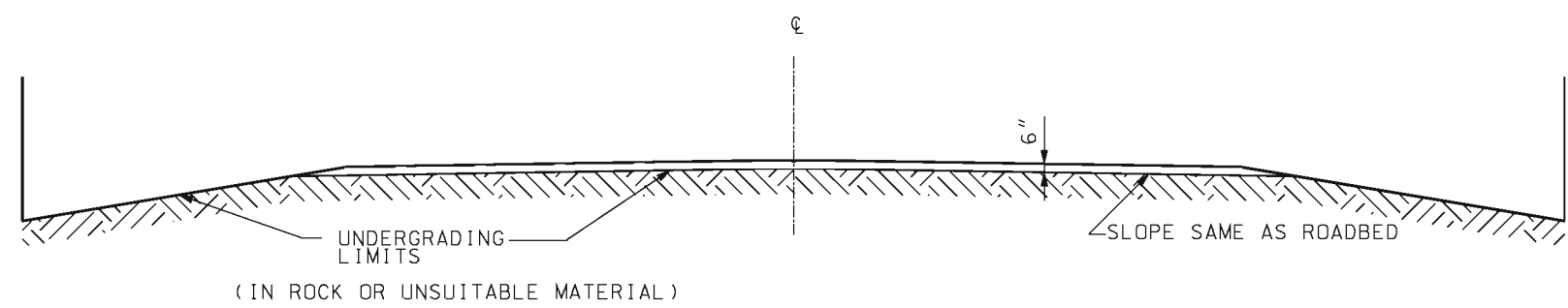
STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER

**UNDERGRADING  
TYPICAL DETAILS**

DATE EFFECTIVE: 01/01/2004  
 DATE PREPARED: 8/21/2009  
**203.02F**  
 SHEET NO. 1 OF 2





IN UNSUITABLE MATERIAL  
**UNDERGRADING LIMITS**  
 (FLEXIBLE OR RIGID PAVEMENTS)



(IN ROCK OR UNSUITABLE MATERIAL)  
**UNDERGRADING LIMITS**  
 (EARTH OR AGGREGATE TYPE SURFACE)

GENERAL NOTES:

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>UNDERGRADING</b> TYPICAL DETAILS
DATE EFFECTIVE: 01/01/2004 DATE PREPARED: 8/21/2009	<b>203.02F</b>	SHEET NO. 2 OF 2

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

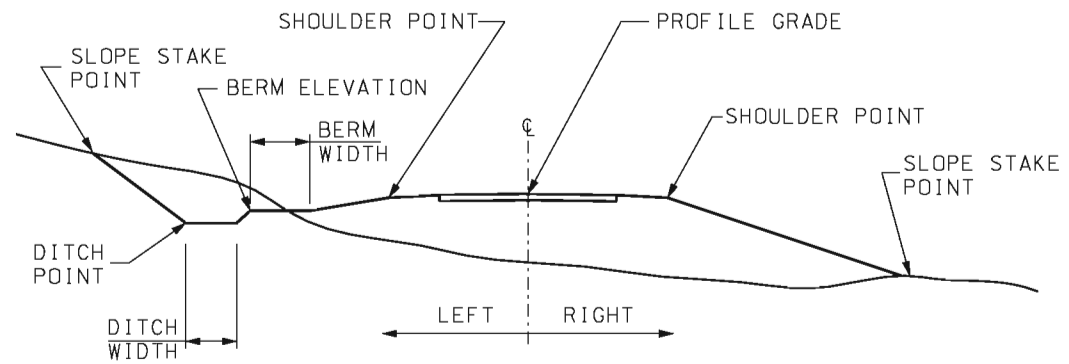


FIGURE A

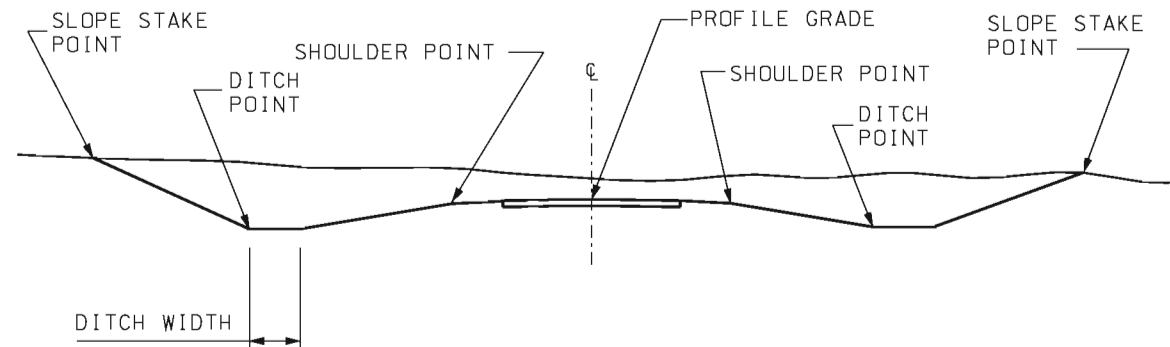


FIGURE B

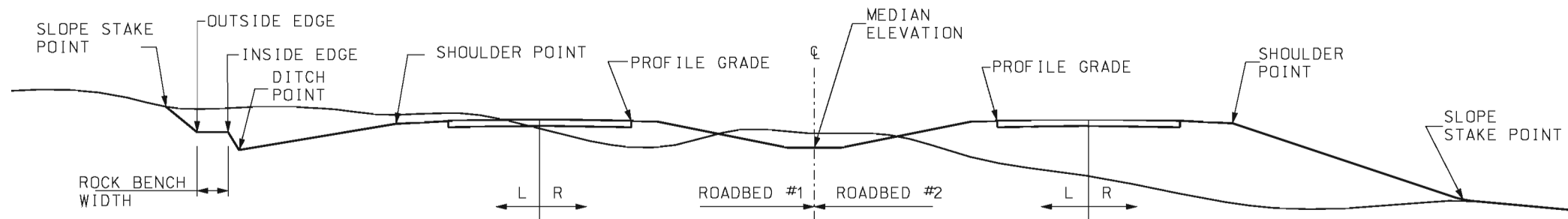


FIGURE C

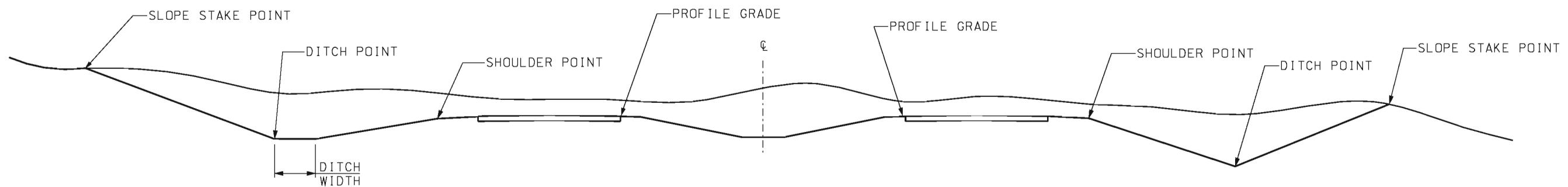


FIGURE D

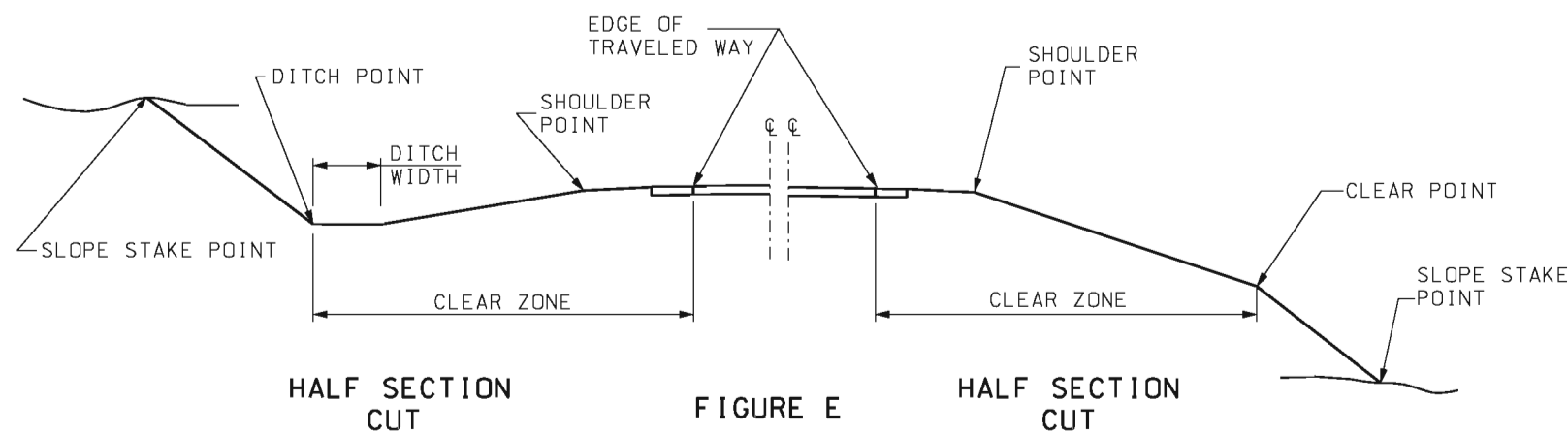




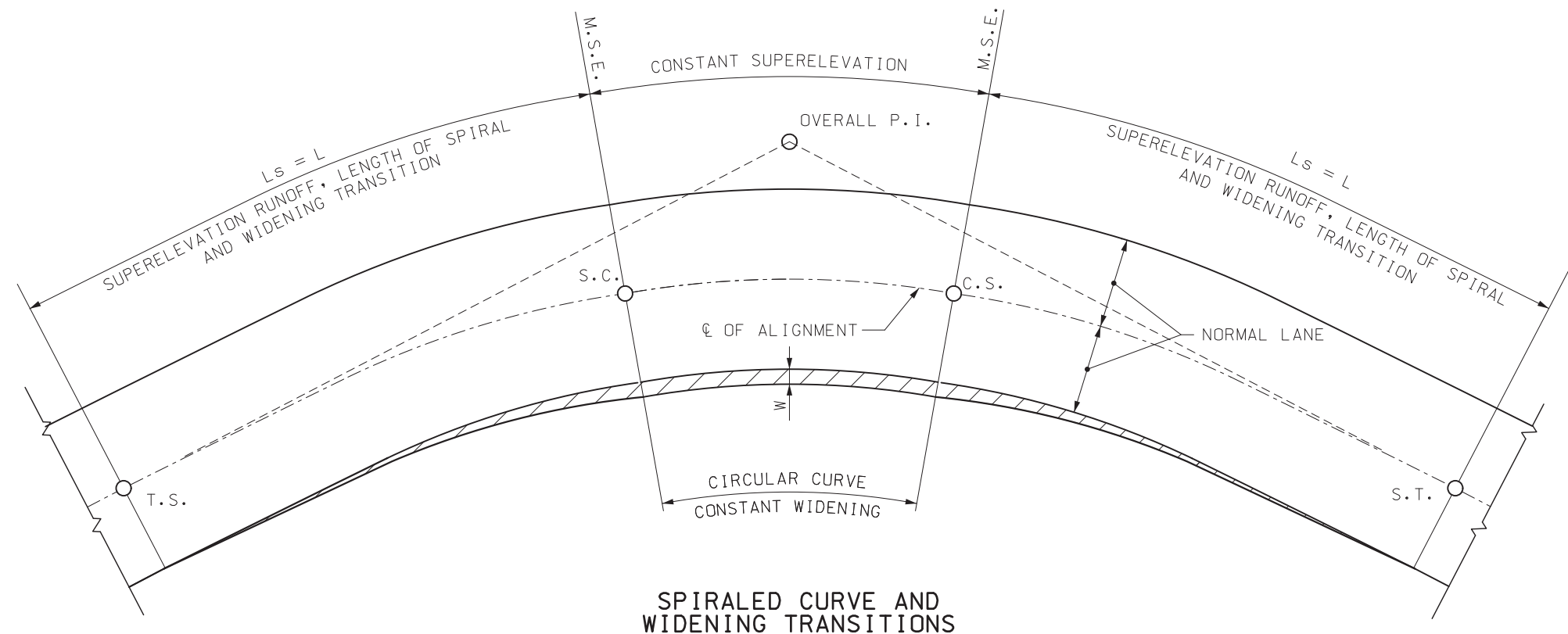
FIGURE E

HALF SECTION CUT

HALF SECTION CUT

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>TABULATED EARTHWORK AND SECTION DATA</b>
DATE EFFECTIVE: 02/01/2009 DATE PREPARED: 12/18/2008	<b>203.10D</b>	SHEET NO. 1 OF 1

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

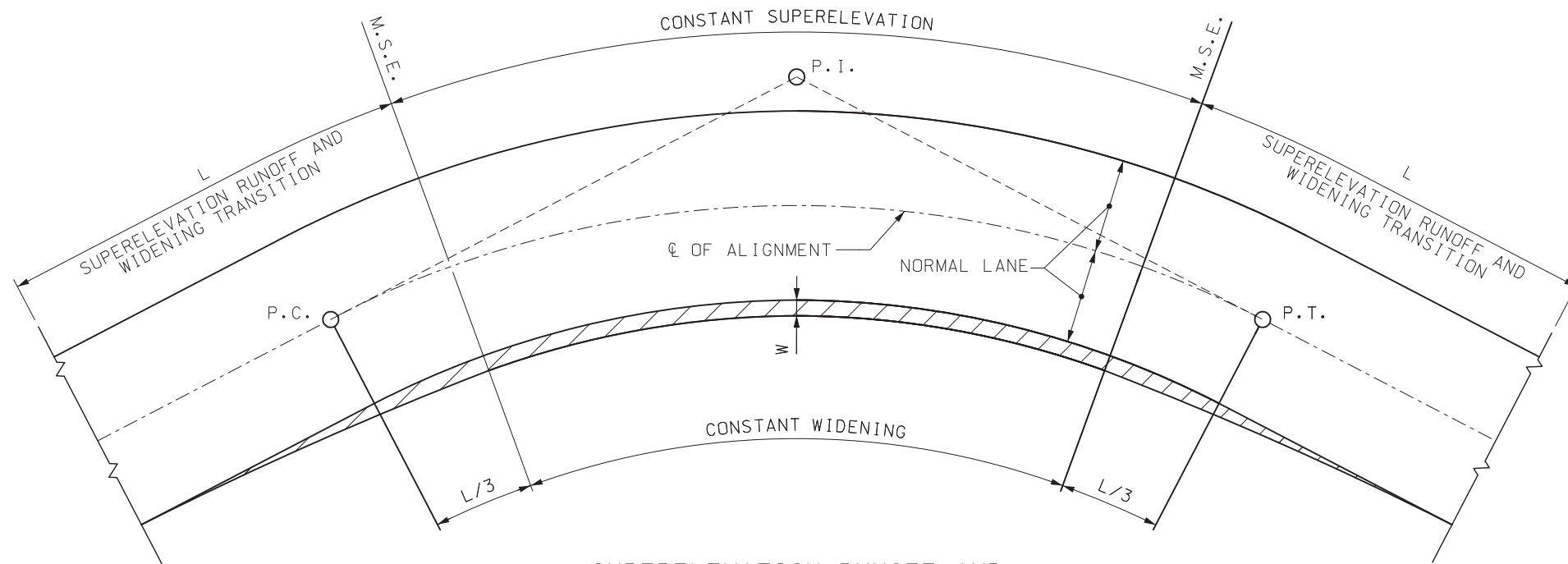


**SPIRALED CURVE AND WIDENING TRANSITIONS**

MULTILANE FACTORS FOR "L"	
1.0 LANE ROTATED (2 LANE ROADBED)	= 1.00
1.5 LANE ROTATED (3 LANE ROADBED)	= 1.25
2.0 LANE ROTATED (4 LANE ROADBED)	= 1.50
2.5 LANE ROTATED (5 LANE ROADBED)	= 1.75
3.0 LANE ROTATED (6 LANE ROADBED)	= 2.00
3.5 LANE ROTATED (7 LANE ROADBED)	= 2.25

MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION	
DESIGN SPEED	MAXIMUM RADIUS (FT)
30	456
35	620
40	810
45	1025
50	1265
55	1531
60	1822
65	2138
70	2479

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.



**SUPERELEVATION RUNOFF AND WIDENING TRANSITIONS WITHOUT SPIRALS**


**GENERAL NOTES:**

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDERS, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

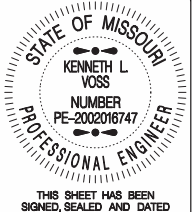
SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS**



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2017

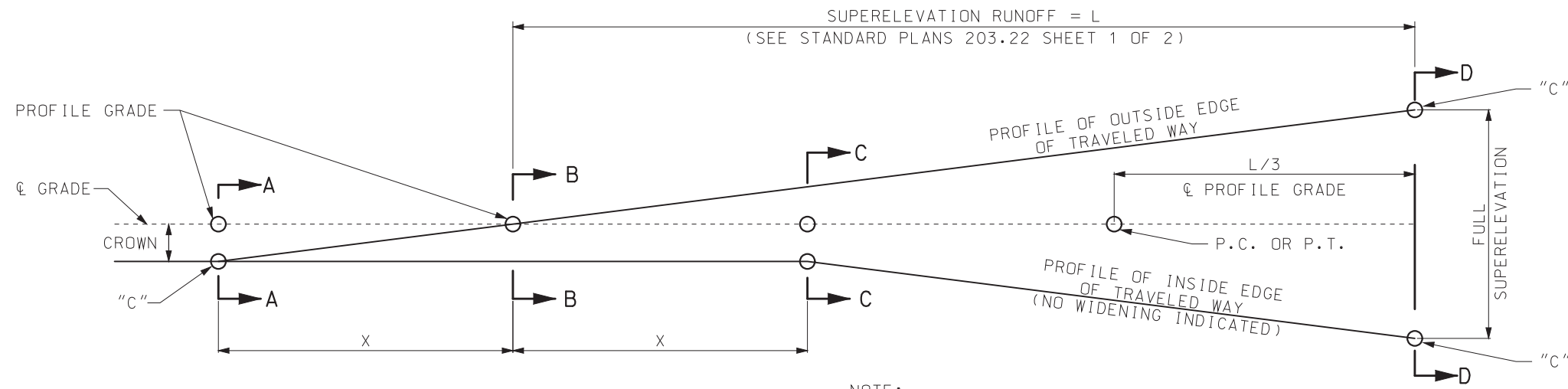
DATE PREPARED: 1/16/2024

**203.20G**

SHEET NO.  
**1 OF 4**



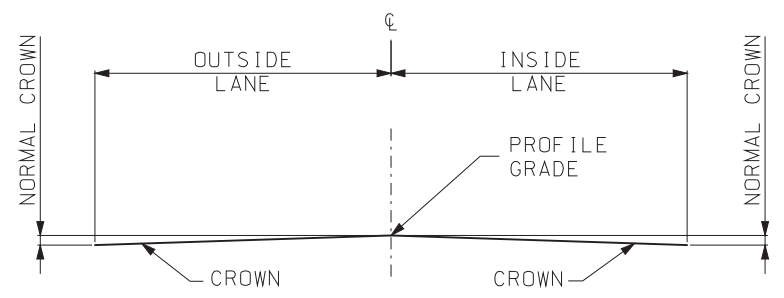
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



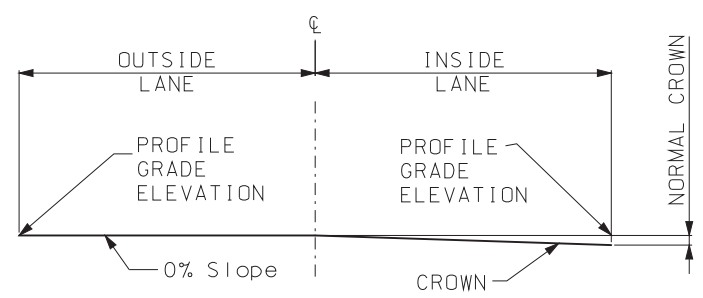
A-A TO B-B IS THE TANGENT RUNOUT.

$$X = \frac{L \times NC(\%)}{e(\%)}$$

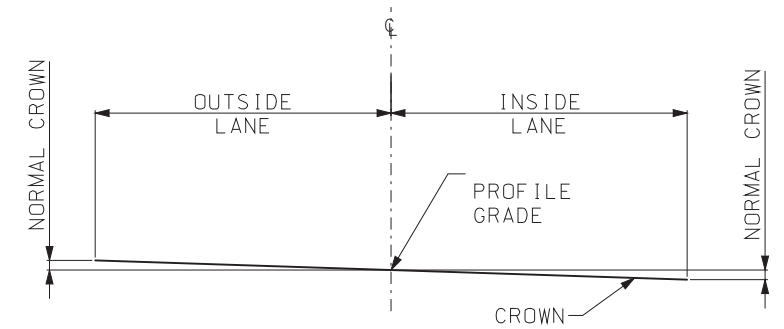
NOTE:  
SHORT VERTICAL CURVES MAY BE INSERTED AT POINTS "C" BY EYE ADJUSTMENTS OF STAKES OR FORMS IN THE FIELD.



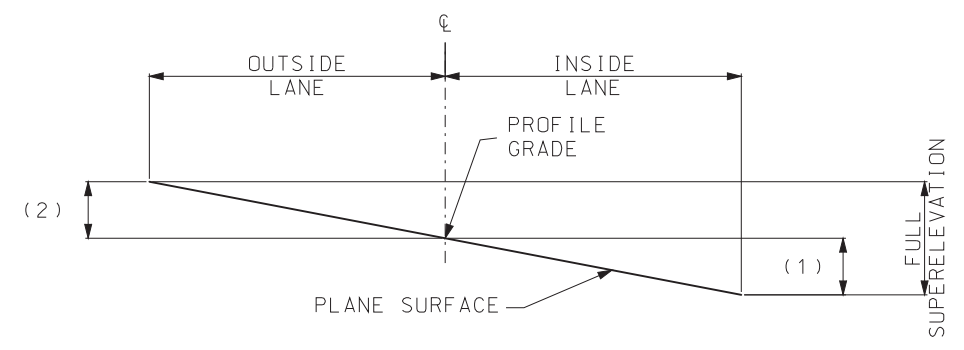
SECTION A-A



SECTION B-B



SECTION C-C


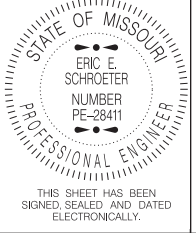


- (1) FULL S.E. FOR 1/2 PAVEMENT WIDTH IF GREATER THAN CROWN SLOPE.
- (2) FULL S.E. FOR 1/2 PAVEMENT WIDTH.

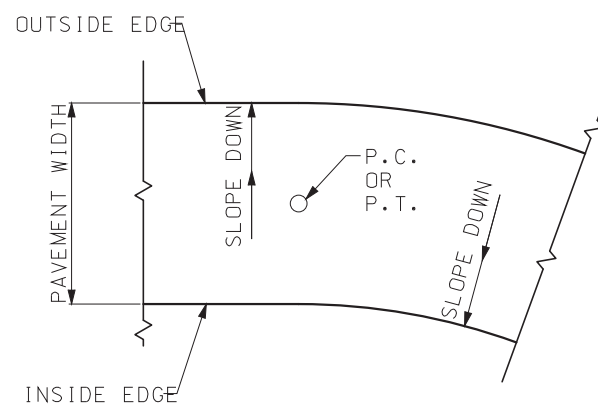
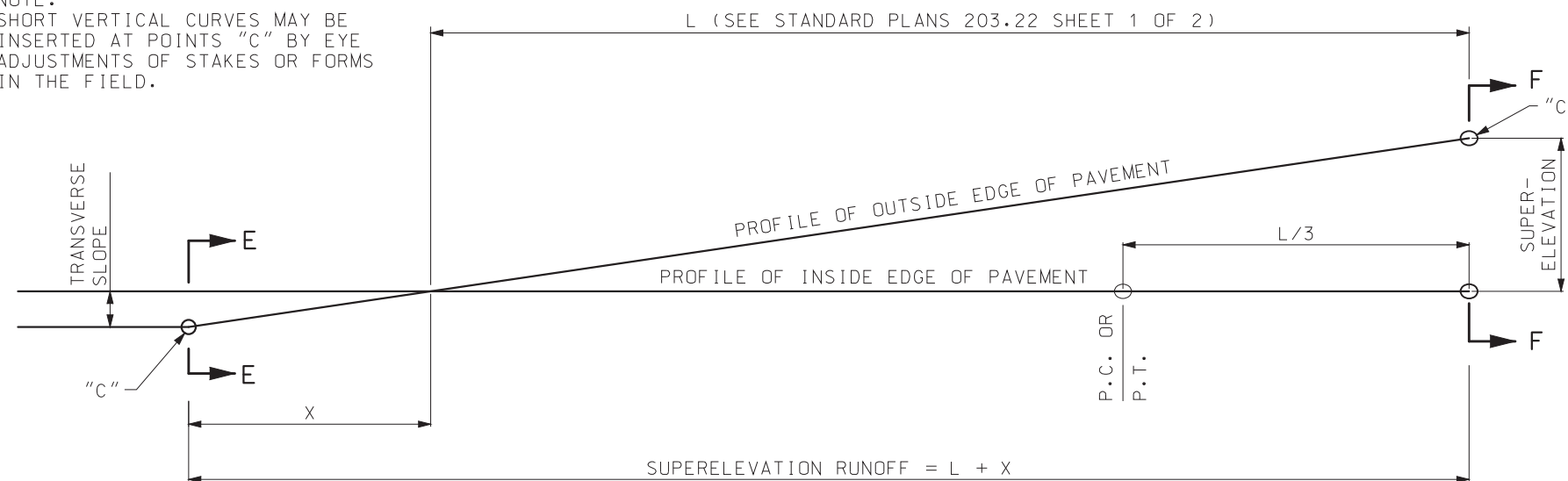
SECTION D-D

CASE NUMBER 1

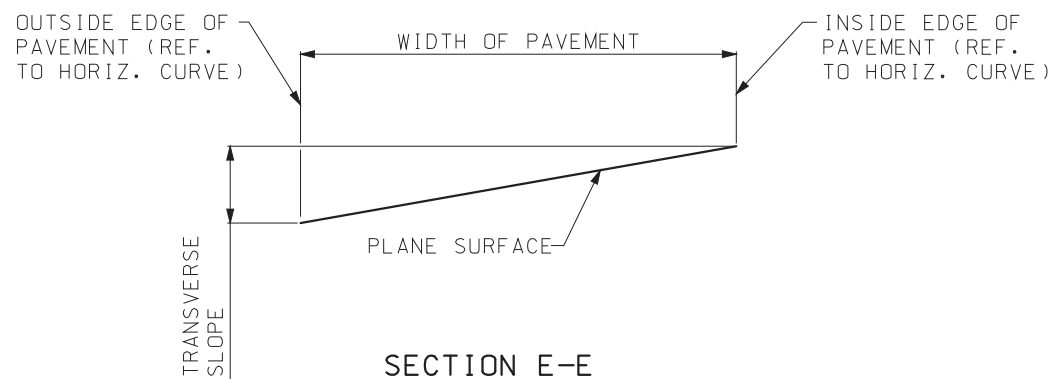
(WHERE HIGH POINT OF TRAVELED WAY IS AT CENTERLINE ON TANGENT SECTION)  
NOTE: USE FOR 2 LANE TRAFFIC ROADS ONLY. PAVEMENT REVOLVED ABOUT ITS C.

	<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p><b>SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS</b></p>	
<p>DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017</p>	<p><b>203.20G</b></p>	<p>SHEET NO. <b>2 OF 4</b></p>

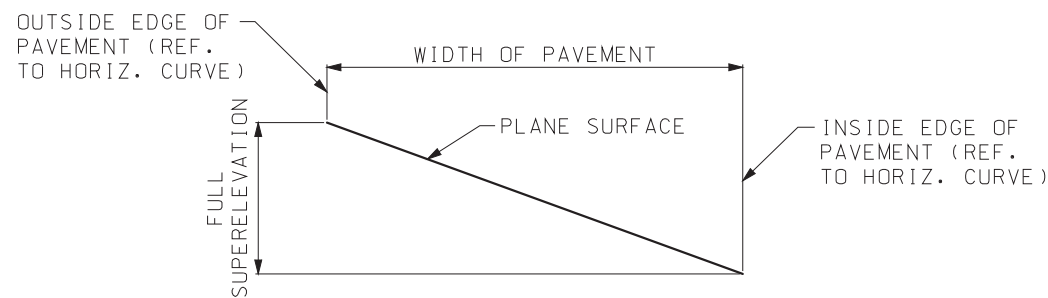
NOTE:  
SHORT VERTICAL CURVES MAY BE  
INSERTED AT POINTS "C" BY EYE  
ADJUSTMENTS OF STAKES OR FORMS  
IN THE FIELD.



PLAN OF ALIGNMENT  
FOR CASE NUMBER 2



SECTION E-E



SECTION F-F

CASE NUMBER 2

(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS OPPOSITE TO SLOPE OF SUPERELEVATION)  
NOTE: PAVEMENT REVOLVED ABOUT ITS INSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

STRAIGHT LINE METHODS OF ATTAINING SUPERELEVATION

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

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY.

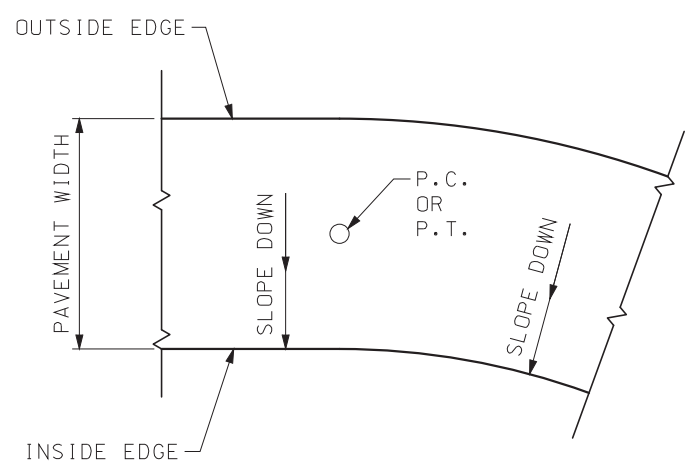
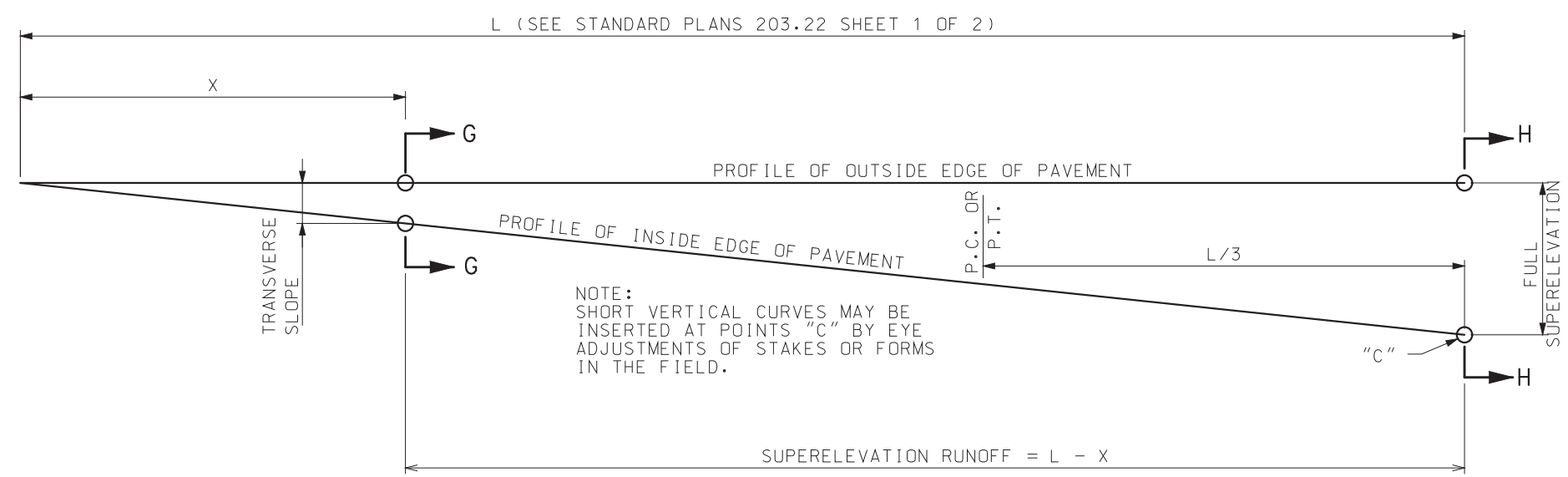
SUPERELEVATION  
SPIRALS AND WIDENING  
UNDIVIDED HIGHWAYS

DATE EFFECTIVE: 07/01/2017  
DATE PREPARED: 5/1/2017

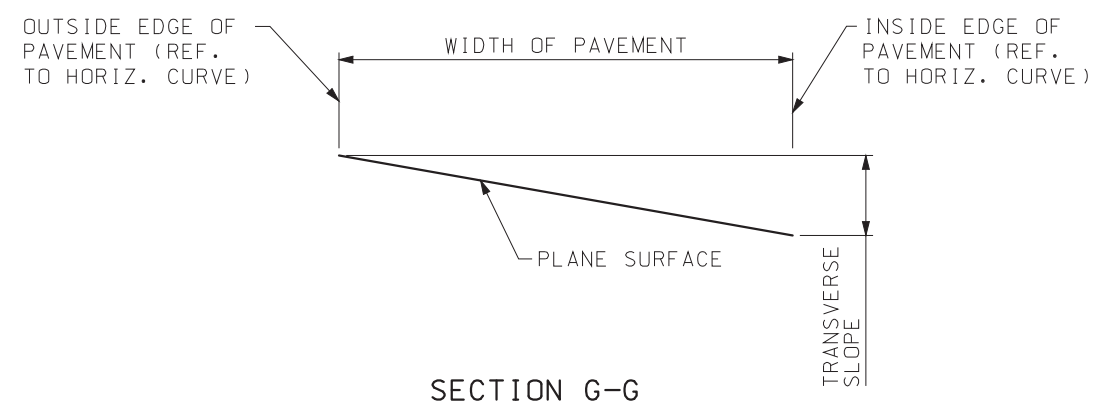
203.20G

SHEET NO.  
3 OF 4

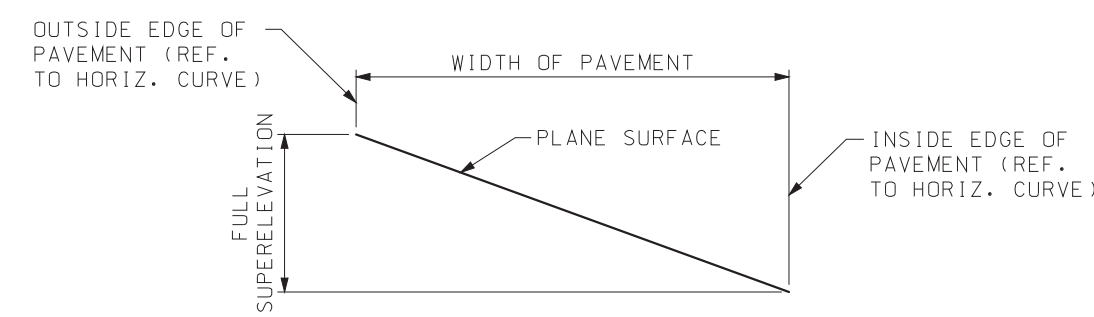
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN OF ALIGNMENT FOR CASE NUMBER 3



SECTION G-G



SECTION H-H

CASE NUMBER 3

(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS SAME DIRECTION AS SLOPE OF SUPERELEVATION)  
 NOTE: PAVEMENT REVOLVED ABOUT ITS OUTSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

STRAIGHT LINE METHOD OF ATTAINING SUPERELEVATION

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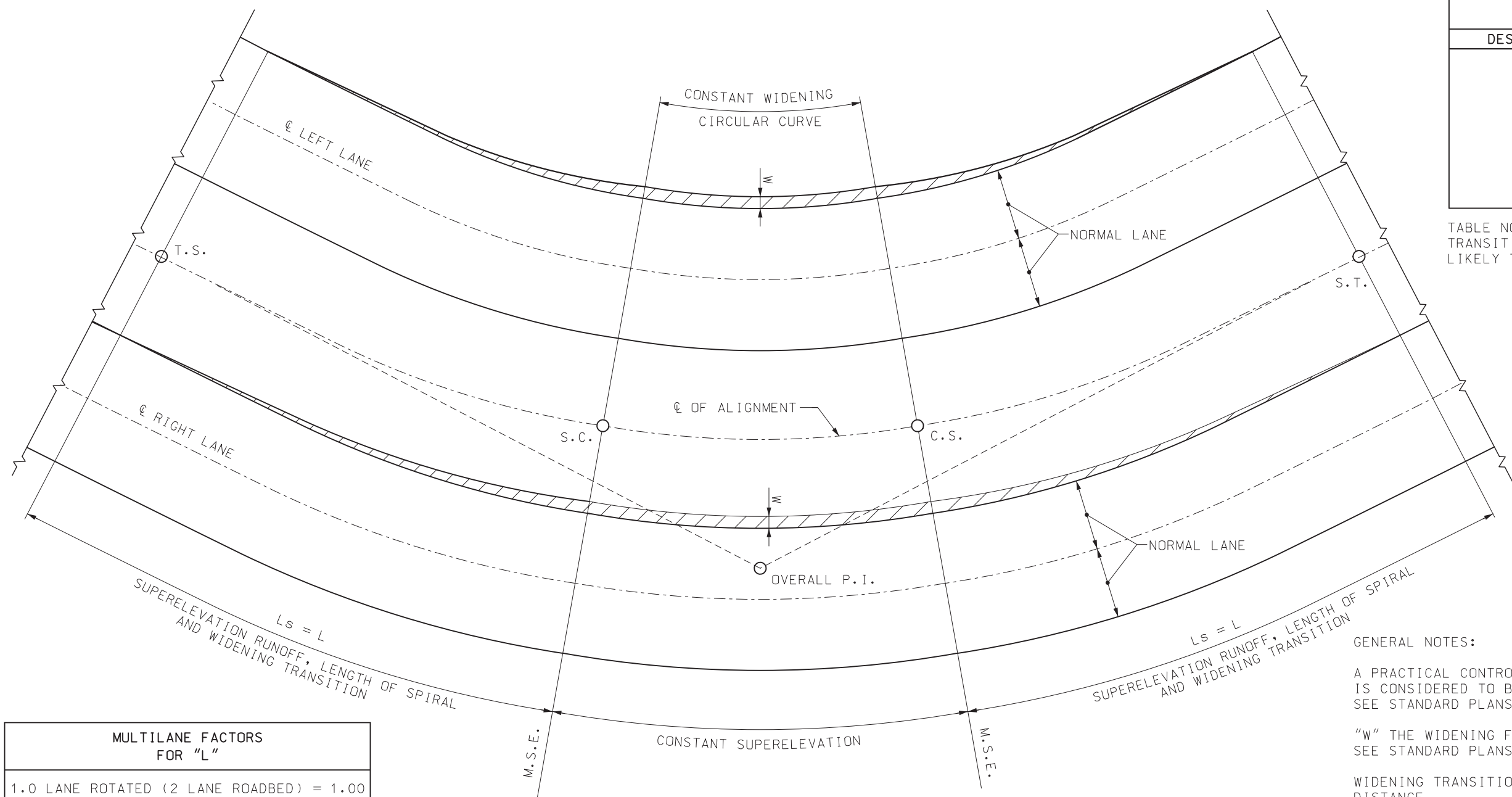
STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS

DATE EFFECTIVE: 07/01/2017	203.20G	SHEET NO. 4 OF 4
DATE PREPARED: 5/1/2017		

MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION	
DESIGN SPEED	MAXIMUM RADIUS (FT)
30	456
35	620
40	810
45	1025
50	1265
55	1531
60	1822
65	2138
70	2479

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.



GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDER, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

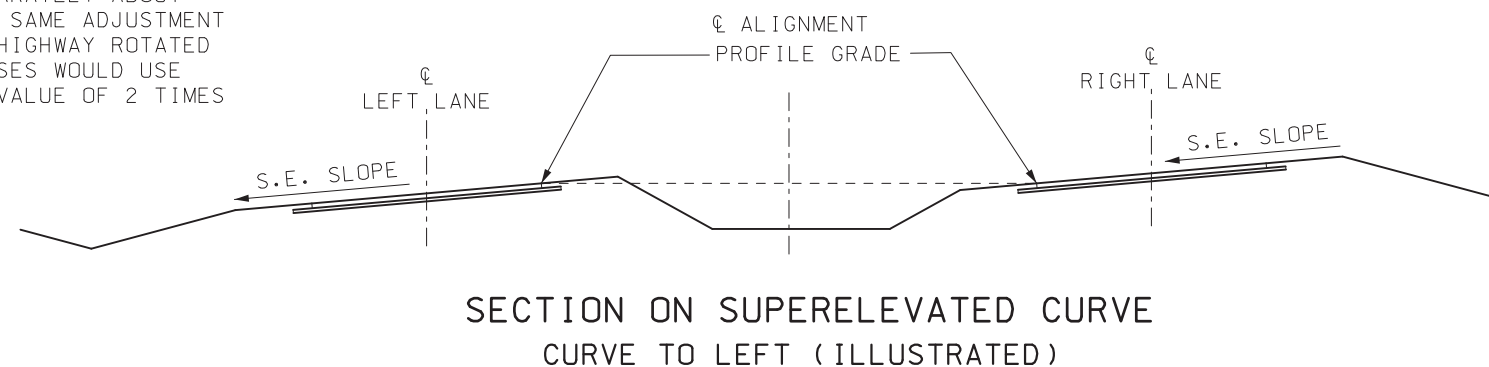
WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.


MULTILANE FACTORS FOR "L"
1.0 LANE ROTATED (2 LANE ROADBED) = 1.00
1.5 LANE ROTATED (3 LANE ROADBED) = 1.25
2.0 LANE ROTATED (4 LANE ROADBED) = 1.50
2.5 LANE ROTATED (5 LANE ROADBED) = 1.75
3.0 LANE ROTATED (6 LANE ROADBED) = 2.00
3.5 LANE ROTATED (7 LANE ROADBED) = 2.25

EXAMPLE: A SIX LANE DIVIDED HIGHWAY (3 LANES IN EACH DIRECTION) ROTATED SEPARATELY ABOUT ITS MEDIAN EDGES WOULD USE THE SAME ADJUSTMENT VALUE AS A SIX LANE UNDIVIDED HIGHWAY ROTATED ABOUT THE CENTERLINE. BOTH CASES WOULD USE THE 3 LANE ROTATED ADJUSTMENT VALUE OF 2 TIMES THE VALUE OF ONE LANE ROTATED.

SPIRALED CURVE AND WIDENING TRANSITIONS



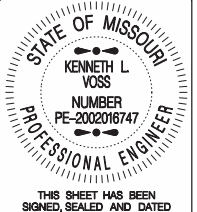
SECTION ON SUPERELEVATED CURVE  
CURVE TO LEFT (ILLUSTRATED)



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

105 WEST CAPITOL  
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**SUPERELEVATION, SPIRALS AND WIDENING DIVIDED HIGHWAYS**



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2017

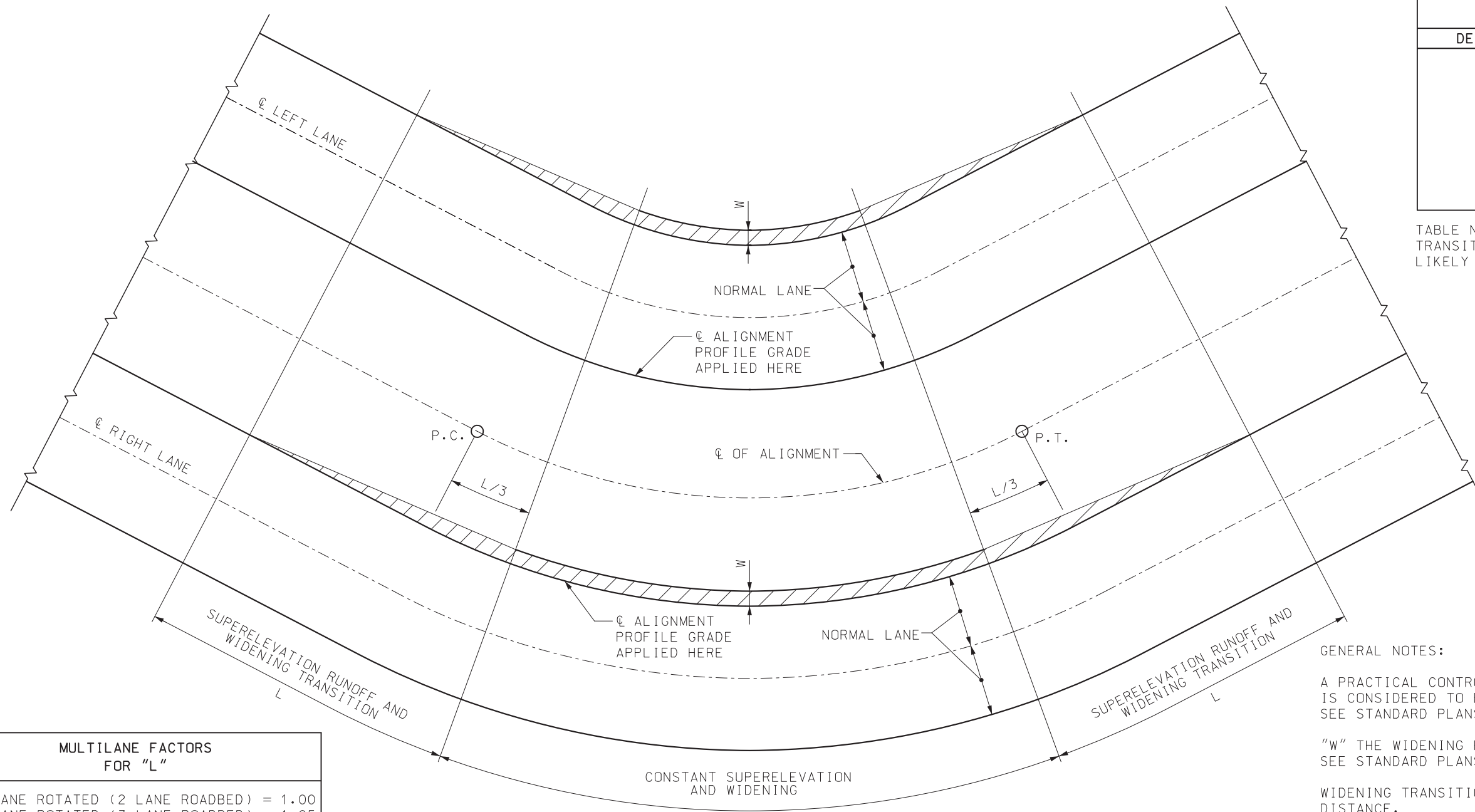
DATE PREPARED: 1/16/2024

203.21K

SHEET NO.  
1 OF 3

MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION	
DESIGN SPEED	MAXIMUM RADIUS (FT)
30	456
35	620
40	810
45	1025
50	1265
55	1531
60	1822
65	2138
70	2479

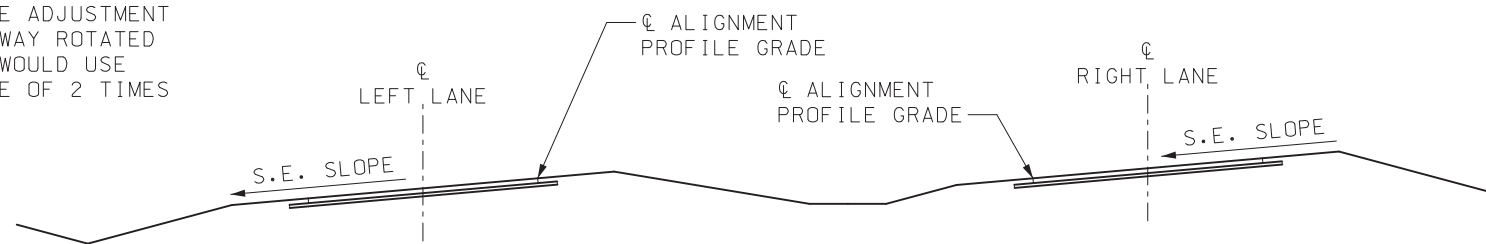
TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.



MULTILANE FACTORS FOR "L"
1.0 LANE ROTATED (2 LANE ROADBED) = 1.00
1.5 LANE ROTATED (3 LANE ROADBED) = 1.25
2.0 LANE ROTATED (4 LANE ROADBED) = 1.50
2.5 LANE ROTATED (5 LANE ROADBED) = 1.75
3.0 LANE ROTATED (6 LANE ROADBED) = 2.00
3.5 LANE ROTATED (7 LANE ROADBED) = 2.25

EXAMPLE: A SIX LANE DIVIDED HIGHWAY (3 LANES IN EACH DIRECTION) ROTATED SEPARATELY ABOUT ITS MEDIAN EDGES WOULD USE THE SAME ADJUSTMENT VALUE AS A SIX LANE UNDIVIDED HIGHWAY ROTATED ABOUT THE CENTERLINE. BOTH CASES WOULD USE THE 3 LANE ROTATED ADJUSTMENT VALUE OF 2 TIMES THE VALUE OF ONE LANE ROTATED.

### SUPERELEVATION RUNOFF AND WIDENING TRANSITIONS WITHOUT SPIRALS



SECTION ON SUPERELEVATED CURVE  
CURVE TO LEFT (ILLUSTRATED)

#### GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDER, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

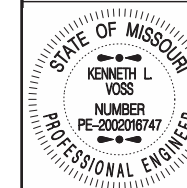
WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.



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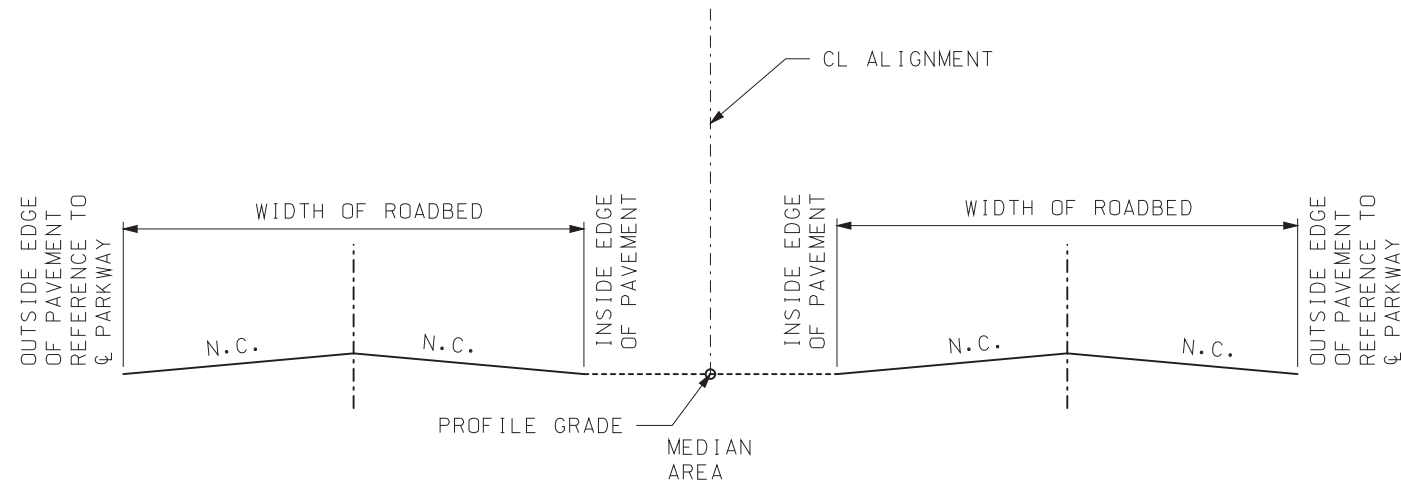
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

### SUPERELEVATION, SPIRALS AND WIDENING DIVIDED HIGHWAYS

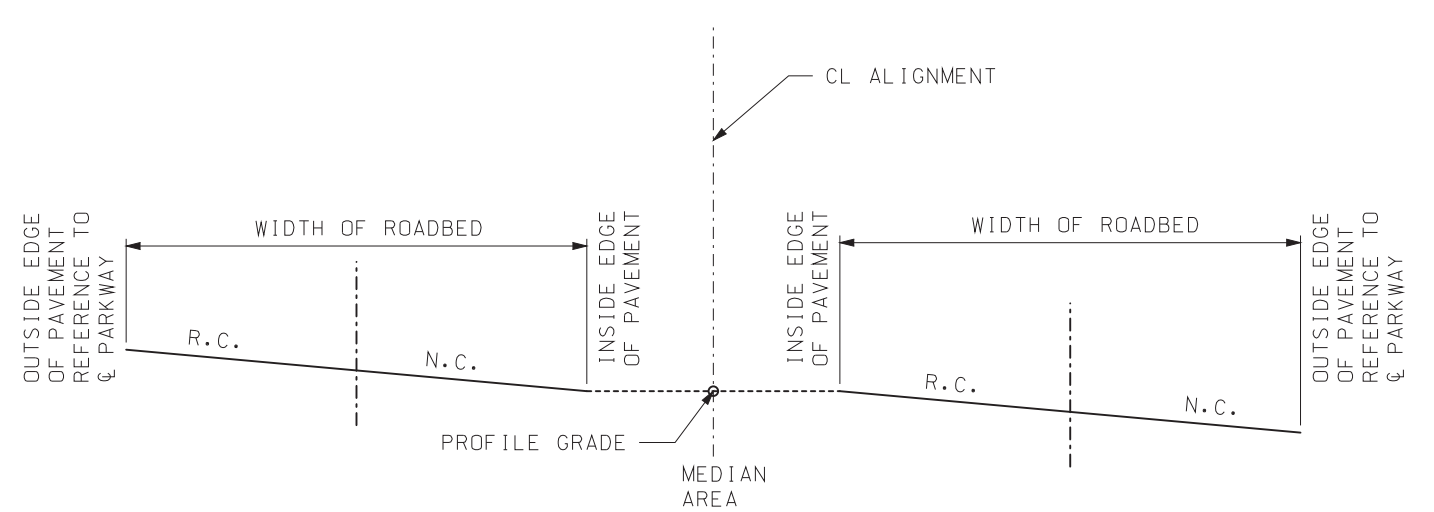
DATE EFFECTIVE: 07/01/2017  
DATE PREPARED: 1/16/2024

203.21K

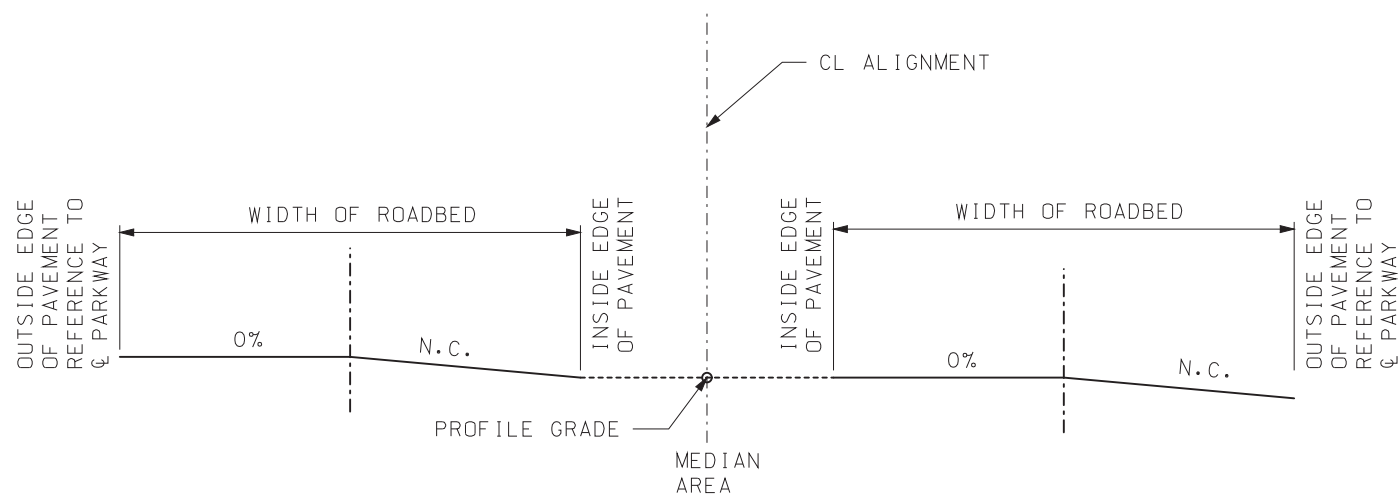
SHEET NO.  
2 OF 3



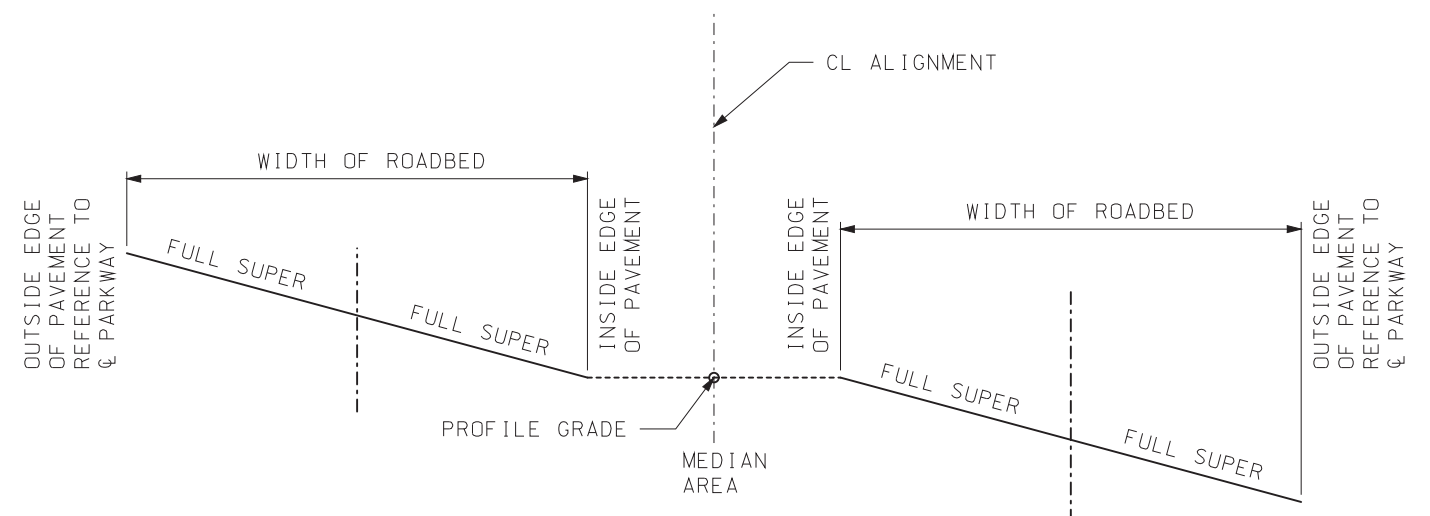
SECTION A-A



SECTION C-C  
(CURVE TO RIGHT)



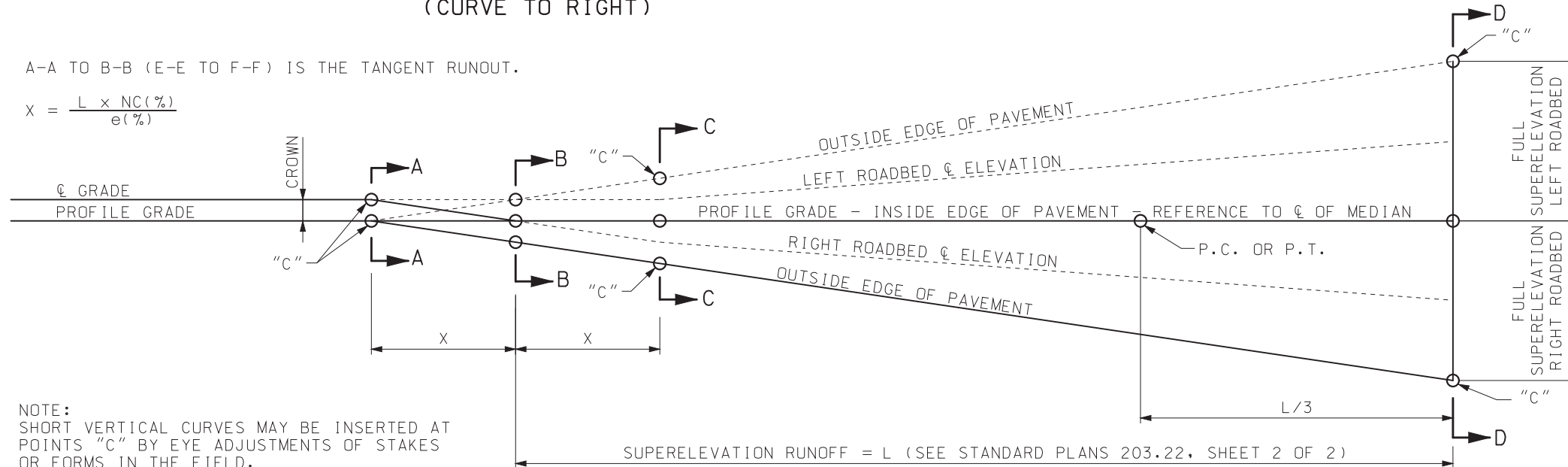
SECTION B-B  
(CURVE TO RIGHT)



SECTION D-D  
(CURVE TO RIGHT)

A-A TO B-B (E-E TO F-F) IS THE TANGENT RUNOUT.

$$x = \frac{L \times NC(\%)}{e(\%)}$$



NOTE:  
SHORT VERTICAL CURVES MAY BE INSERTED AT POINTS "C" BY EYE ADJUSTMENTS OF STAKES OR FORMS IN THE FIELD.

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STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**SUPERELEVATION,  
SPIRALS AND WIDENING  
DIVIDED HIGHWAYS**

DATE EFFECTIVE: 07/01/2017  
DATE PREPARED: 5/1/2017

203.21K

SHEET NO.  
3 OF 3

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

MINIMUM RADII FOR DESIGN SUPERELEVATION RATES,  
DESIGN SPEEDS, AND  $e_{max} = 4\%$

e%	DESIGN SPEED (MPH)																				
	30			35			40			45			50			55			60		
	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2
NC	2,830	0	0	3,730	0	0	4,770	0	0	5,930	0	0	7,220	0	0	8,650	0	0	10,300	0	0
RC	1,880	36	55	2,490	39	58	3,220	41	62	4,040	44	67	4,940	48	72	5,950	48	72	7,080	48	72
2.2	1,580	40	60	2,120	43	64	2,760	46	58	3,480	49	73	4,280	53	79	5,180	53	79	6,190	53	79
2.4	1,270	44	65	1,760	46	70	2,340	50	74	2,980	53	80	3,690	58	86	4,500	58	86	5,410	58	86
2.6	1,000	47	71	1,420	50	75	1,930	54	81	2,490	58	87	3,130	62	94	3,870	62	94	4,700	62	94
2.8	817	51	76	1,170	54	81	1,620	58	87	2,100	62	93	2,660	67	101	3,310	67	101	4,060	67	101
3.0	681	55	82	982	58	87	1,370	62	93	1,800	67	100	2,290	72	108	2,860	72	108	3,530	72	108
3.2	576	58	87	835	62	93	1,180	66	99	1,550	71	107	1,980	77	115	2,490	77	115	3,090	77	115
3.4	490	62	93	714	66	99	1,010	70	106	1,340	76	113	1,720	82	122	2,170	82	122	2,700	82	122
3.6	416	65	98	610	70	105	865	74	112	1,150	80	120	1,480	86	130	1,880	86	130	2,350	86	130
3.8	348	69	104	512	74	110	730	79	118	970	84	127	1,260	91	137	1,600	91	137	2,010	91	137
4.0	250	73	109	371	77	116	533	83	124	711	89	133	926	96	144	1,190	96	144	1,500	96	144

TABLE NOTES:

"NC" DENOTES NORMAL CROSS SLOPE.

"RC" DENOTES REMOVE ADVERSE CROSS SLOPE,  
SUPERELEVATE AT NORMAL CROSS SLOPE.

"e" DENOTES THE SUPERELEVATION IN PERCENT (%).

"L" THE LENGTH OF SUPERELEVATION RUNOFF AND  
WIDENING TRANSITION IN FEET FOR A 2 LANE  
ROADWAY.

THE L1 COLUMN IS FOR 1 LANE ROTATED  
THE L2 COLUMN IS FOR 2 LANES ROTATED

1 LANE ROTATED IS TYPICALLY FOR A 2-LANE HIGHWAY  
2 LANE ROTATED IS TYPICALLY FOR A 4-LANE HIGHWAY

WHEN USING ONE OF THE TABLES FOR A GIVEN  
RADIUS, INTERPOLATION IS NOT NECESSARY AS  
THE SUPERELEVATION RATE SHOULD BE  
DETERMINED FROM A RADIUS EQUAL TO, OR  
SLIGHTLY SMALLER THAN, THE RADII  
PROVIDED IN THE TABLE. THE RESULT IS A  
SUPERELEVATION RATE THAT IS ROUNDED UP  
TO THE NEAREST 0.2 OF A PERCENT.

EXAMPLE: A 50 MPH CURVE WITH A MAXIMUM  
SUPERELEVATION RATE OF 8 PERCENT, AND A RADIUS  
OF 1,910 FT, SHOULD USE THE RADIUS OF 1,830 FT  
TO OBTAIN A SUPERELEVATION RATE OF 5.4 PERCENT.

MINIMUM RADII FOR DESIGN SUPERELEVATION RATES,  
DESIGN SPEEDS, AND  $e_{max} = 8\%$

e%	DESIGN SPEED (MPH)																										
	30			35			40			45			50			55			60			65			70		
	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2			
NC	3,240	0	0	4,260	0	0	5,410	0	0	6,710	0	0	8,150	0	0	9,720	0	0	11,500	0	0	12,900	0	0	14,500	0	0
RC	2,370	36	55	3,120	39	58	3,970	41	62	4,930	44	67	5,990	48	72	7,150	48	72	8,440	48	72	9,510	48	72	10,700	48	72
2.2	2,130	40	60	2,800	43	64	3,570	46	58	4,440	49	73	5,400	53	79	6,450	53	79	7,620	53	79	8,600	53	79	9,660	53	79
2.4	1,930	44	65	2,540	46	70	3,240	50	74	4,030	53	80	4,910	58	86	5,870	58	86	6,930	58	86	7,830	58	86	8,810	58	86
2.6	1,760	47	71	2,320	50	75	2,960	54	81	3,690	58	87	4,490	62	94	5,370	62	94	6,350	62	94	7,180	62	94	8,090	62	94
2.8	1,610	51	76	2,130	54	81	2,720	58	87	3,390	62	93	4,130	67	101	4,950	67	101	5,850	67	101	6,630	67	101	7,470	67	101
3.0	1,480	55	82	1,960	58	87	2,510	62	93	3,130	67	100	3,820	72	108	4,580	72	108	5,420	72	108	6,140	72	108	6,930	72	108
3.2	1,370	58	87	1,820	62	93	2,330	66	99	2,900	71	107	3,550	77	115	4,250	77	115	5,040	77	115	5,720	77	115	6,460	77	115
3.4	1,270	62	93	1,690	66	99	2,170	70	106	2,700	76	113	3,300	82	122	3,970	82	122	4,700	82	122	5,350	82	122	6,050	82	122
3.6	1,180	65	98	1,570	70	105	2,020	74	112	2,520	80	120	3,090	86	130	3,710	86	130	4,400	86	130	5,010	86	130	5,680	86	130
3.8	1,100	69	104	1,470	74	110	1,890	79	118	2,360	84	127	2,890	91	137	3,480	91	137	4,140	91	137	4,700	91	137	5,350	91	137
4.0	1,030	73	109	1,370	77	116	1,770	83	124	2,220	89	133	2,720	96	144	3,270	96	144	3,890	96	144	4,450	96	144	5,050	96	144
4.2	955	76	115	1,280	81	122	1,660	87	130	2,080	93	140	2,560	101	151	3,080	101	151	3,670	101	151	4,200	101	151	4,780	101	151
4.4	893	80	120	1,200	85	128	1,560	91	137	1,960	98	147	2,410	106	158	2,910	106	158	3,470	106	158	3,980	106	158	4,540	106	158
4.6	834	84	125	1,130	89	134	1,470	95	143	1,850	102	153	2,280	110	166	2,750	110	166	3,290	110	166	3,770	110	166	4,310	110	166
4.8	779	87	131	1,060	93	139	1,390	99	149	1,750	107	160	2,160	115	173	2,610	115	173	3,120	115	173	3,590	115	173	4,100	115	173
5.0	727	91	136	991	97	145	1,310	103	155	1,650	111	167	2,040	120	180	2,470	120	180	2,960	120	180	3,410	120	180	3,910	120	180
5.2	676	95	142	929	101	151	1,230	108	161	1,560	116	173	1,930	125	187	2,350	125	187	2,820	125	187	3,250	125	187	3,740	125	187
5.4	627	98	147	870	105	157	1,160	112	168	1,480	120	180	1,830	130	194	2,230	130	194	2,680	130	194	3,110	130	194	3,570	130	194
5.6	582	102	153	813	108	163	1,090	116	174	1,390	124	187	1,740	134	202	2,120	134	202	2,550	134	202	2,970	134	202	3,420	134	202
5.8	542	105	158	761	112	168	1,030	120	180	1,320	129	193	1,650	139	209	2,010	139	209	2,430	139	209	2,840	139	209	3,280	139	209
6.0	506	109	164	713	116	174	965	124	186	1,250	133	200	1,560	144	216	1,920	144	216	2,320	144	216	2,710	144	216	3,150	144	216
6.2	472	113	169	669	120	180	909	128	192	1,180	138	207	1,480	149	223	1,820	149	223	2,210	149	223	2,600	149	223	3,020	149	223
6.4	442	116	175	628	124	186	857	132	199	1,110	142	213	1,400	154	230	1,730	154	230	2,110	154	230	2,490	154	230	2,910	154	230
6.6	413	120	180	590	128	192	808	137	205	1,050	147	220	1,330	158	238	1,650	158	238	2,010	158	238	2,380	158	238	2,790	158	238
6.8	386	124	185	553	132	197	761	141	211	990	151	227	1,260	163	245	1,560	163	245	1,910	163	245	2,280	163	245	2,690	163	245
7.0	360	127	191	518	135	203	716	145	217	933	156	233	1,190	168	252	1,480	168	252	1,820	168	252	2,180	168	252	2,580	168	252
7.2	336	131	196	485	139	209	672	149	223	878	160	240	1,120	173	259	1,400	173	259	1,720	173	259	2,070	173	259	2,470	173	259
7.4	312	135	202	451	143	215	628	153	230	822	164	247	1,060	178	266	1,320	178	266	1,630	178	266	1,970	178	266	2,350	178	266
7.6	287	138	207	417	147	221	583	157	236	765	169	253	980	182	274	1,230	182	274	1,530	182	274	1,850	182	274	2,230	182	274
7.8	261	142	213	380	151	226	533	161	242	701	173	260	901	187	281	1,140	187	281	1,410	187	281	1,720	187	281	2,090	187	281
8.0	214	145	218	314	155	232	444	166	248	587	178	267	758	192	288	960	192	288	1,200</								

"W"																					
CALCULATED AND DESIGN VALUES FOR TRAVELED WAY WIDENING ON OPEN HIGHWAY CURVES (TWOLANE HIGHWAYS, ONE-WAY OR TWO-WAY)[WB-67 ADJUSTMENT]																					
CURVE RADIUS (FT)	24' ROADWAY WIDTH						22' ROADWAY WIDTH						20' ROADWAY WIDTH								
	DESIGN SPEED (MPH)						DESIGN SPEED (MPH)						DESIGN SPEED (MPH)								
	30	35	40	45	50	55	60	30	35	40	45	50	55	60	30	35	40	45	50	55	60
7000	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.8	1.8	1.9	1.9	2.0	2.1	2.1
6500	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.8	1.9	1.9	2.0	2.1	2.1	2.2
6000	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.8	0.9	1.0	1.0	1.1	1.2	1.2	1.8	1.9	2.0	2.0	2.1	2.2	2.3
5500	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.9	1.0	1.0	1.1	1.2	1.2	1.3	1.9	2.0	2.0	2.1	2.2	2.2	2.4
5000	0.1	0.1	0.1	0.2	0.2	0.3	0.5	1.0	1.0	1.1	1.2	1.2	1.3	1.4	2.0	2.0	2.1	2.2	2.2	2.3	2.5
4500	0.1	0.1	0.2	0.2	0.3	0.4	0.6	1.0	1.1	1.2	1.2	1.3	1.4	1.5	2.0	2.1	2.2	2.2	2.3	2.4	2.6
4000	0.1	0.2	0.3	0.3	0.4	0.5	0.7	1.1	1.2	1.3	1.3	1.4	1.5	1.6	2.1	2.2	2.3	2.3	2.4	2.5	2.7
3500	0.2	0.3	0.4	0.5	0.6	0.6	0.8	1.2	1.3	1.4	1.5	1.6	1.6	1.7	2.2	2.3	2.4	2.5	2.6	2.6	2.8
3000	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.4	2.5	2.5	2.6	2.7	2.8	2.9
2500	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.7	2.8	2.9	3.0	3.1	3.2	3.3
2000	0.9	1.1	1.2	1.3	1.4	1.5	1.6	1.9	2.1	2.2	2.3	2.4	2.5	2.6	2.9	3.1	3.2	3.3	3.4	3.5	3.6
1800	1.1	1.2	1.3	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.5	3.6	3.7	3.8
1600	1.3	1.4	1.5	1.7	1.8	1.9	2.0	2.3	2.4	2.5	2.7	2.8	2.9	3.0	3.3	3.4	3.5	3.7	3.8	3.9	4.0
1400	1.6	1.8	1.9	2.0	2.2	2.3	2.4	2.6	2.8	2.9	3.0	3.2	3.3	3.4	3.6	3.8	3.9	4.0	4.4	4.3	4.4
1200	2.0	2.1	2.2	2.4	2.5	2.7	2.8	3.0	3.1	3.2	3.4	3.5	3.7	3.8	4.0	4.1	4.2	4.4	4.5	4.7	4.8
1000	2.5	2.7	2.8	3.0	3.1	3.3	3.4	3.5	3.7	3.8	4.0	4.1	4.3	4.4	4.5	4.7	4.8	5.0	5.1	5.3	5.4
900	2.8	3.0	3.1	3.3	3.5	3.6		3.8	4.0	4.1	4.3	4.5	4.6		4.8	5.0	5.1	5.3	5.5	5.6	
800	3.2	3.4	3.6	3.8	4.0	4.1		4.2	4.4	4.6	4.8	5.0	5.1		5.2	5.4	5.6	5.8	6.0	6.1	
700	3.8	4.0	4.2	4.4	4.6			4.8	5.0	5.2	5.4	5.6			5.8	6.0	6.2	6.4	6.6		
600	4.5	4.7	4.9	5.1	5.3			5.5	5.7	5.9	6.1	6.3			6.5	6.7	6.9	7.1	7.3		
500	5.4	5.7	5.9	6.1				6.4	6.7	6.9	7.1				7.4	7.7	7.9	8.1			
450	6.1	6.3	6.6					7.1	7.3	7.6					8.1	8.3	8.6				
400	6.9	7.1	7.4					7.9	8.1	8.4					8.9	9.1	9.4				
350	7.9	8.1	8.4					8.9	9.1	9.4					9.9	10.1	10.4				
300	9.2	9.5						10.2	10.5						11.2	11.5					
250	11.2							12.2							13.2						
200	14.0							15.0							16.0						

TABLE NOTES:


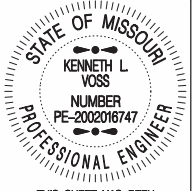
"W" THE WIDENING IN FEET FOR SURFACING AT INSIDE SHOULDERS.

VALUES SHOWN ARE FOR WB-67 DESIGN VEHICLE AND REPRESENT WIDENING IN FEET.

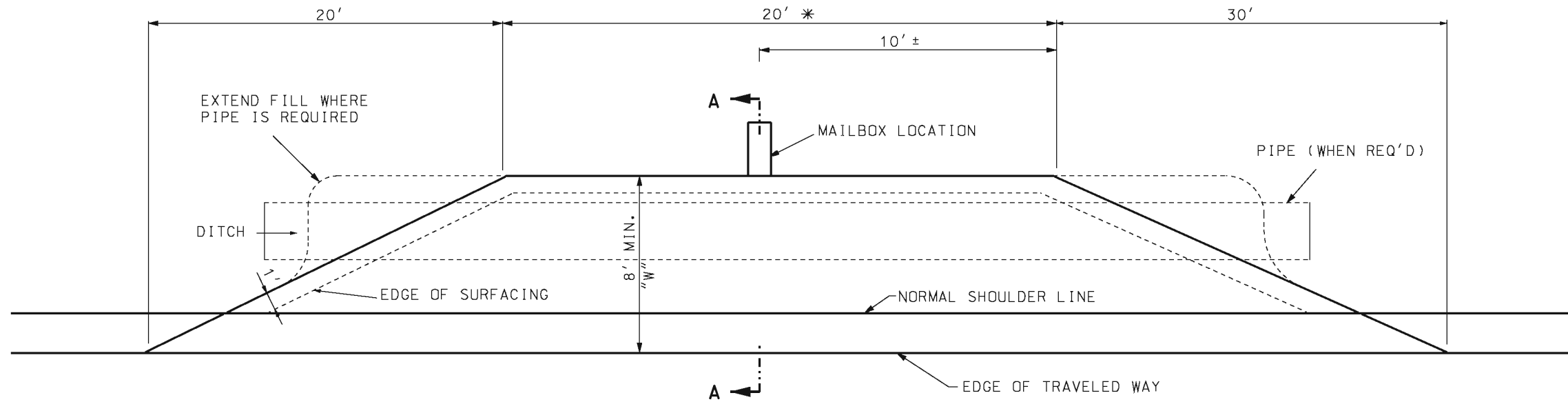
VALUES LESS THAN 2.0 FEET MAY BE DISREGARDED.

FOR 3-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 1.5.

FOR 4-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 2.0.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p align="center"><b>SUPERELEVATION, SPIRALS AND WIDENING</b></p>
DATE EFFECTIVE: 4/1/2024 DATE PREPARED: 1/16/2024	<p align="center"><b>203.22A</b></p>	SHEET NO. <p align="center"><b>2 OF 2</b></p>

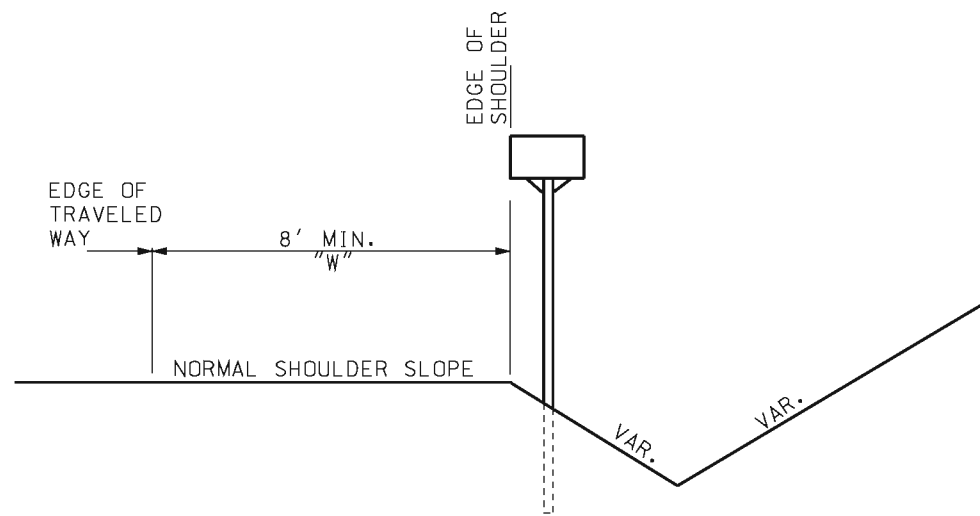




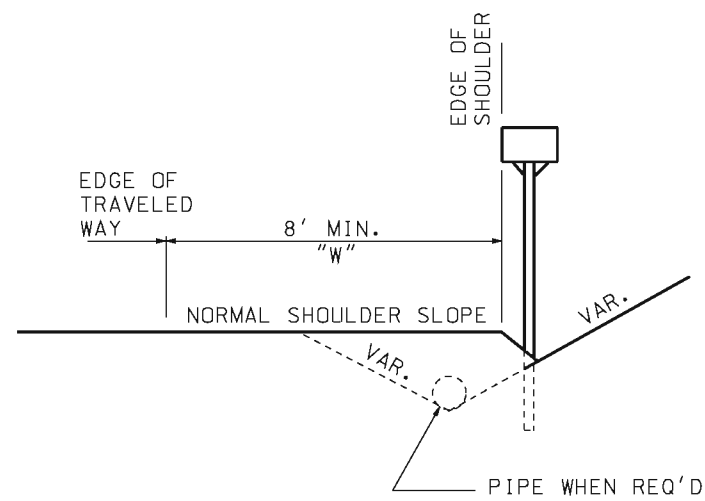
\* ADD 2' FOR EACH ADDITIONAL MAILBOX

☉ PAVEMENT

PLAN



SECTION A-A  
(WITHOUT PIPE)



SECTION A-A  
(WITH PIPE)

GENERAL NOTES:

IN NO CASE WILL "W" BE LESS THAN SHOULDER WIDTH.  
"W" WILL BE 8' UNLESS OTHERWISE NOTED ON THE PLANS.

WHEN ENTRANCES ARE ADJACENT TO MAILBOX TURNOUTS,  
THE AREA AND SURFACING OF THE ENTRANCE MAY BE USED  
FOR A PORTION OF THE MAILBOX TURNOUT.

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

STATE OF MISSOURI  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

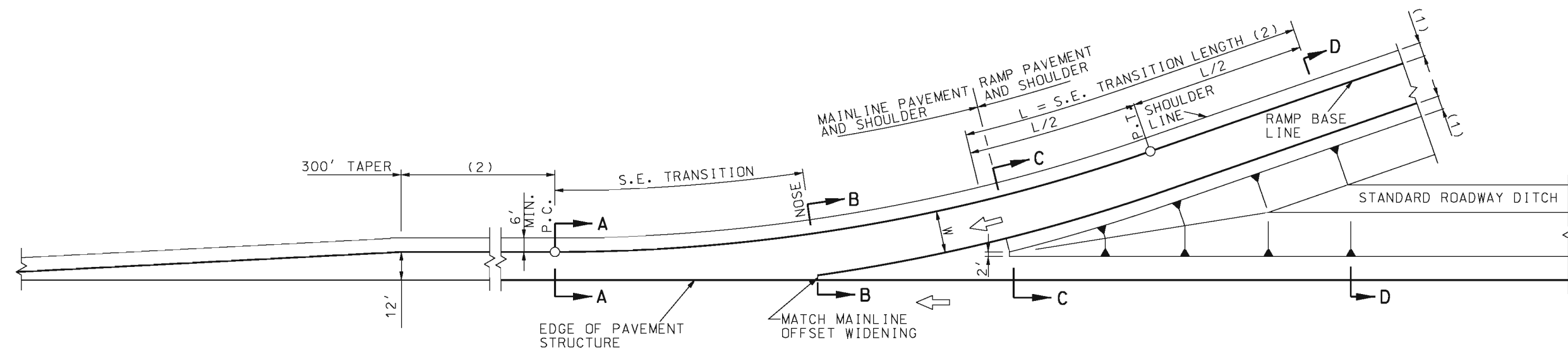
MAILBOX TURNOUTS

DATE EFFECTIVE: 08/01/1981  
DATE PREPARED: 8/21/2009

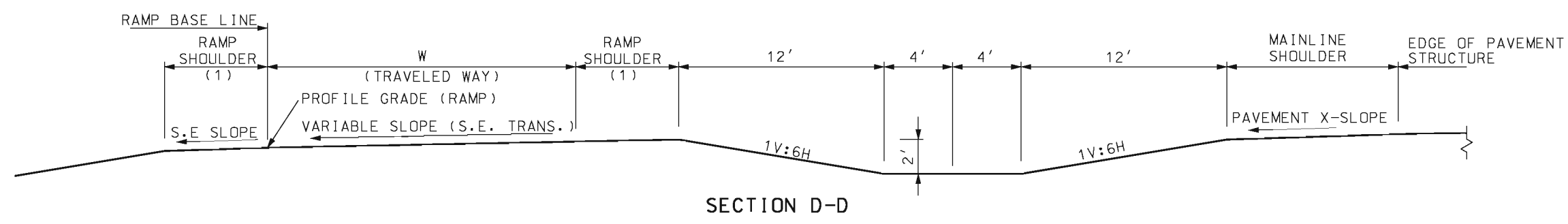
203.35A

SHEET NO.  
1 OF 1

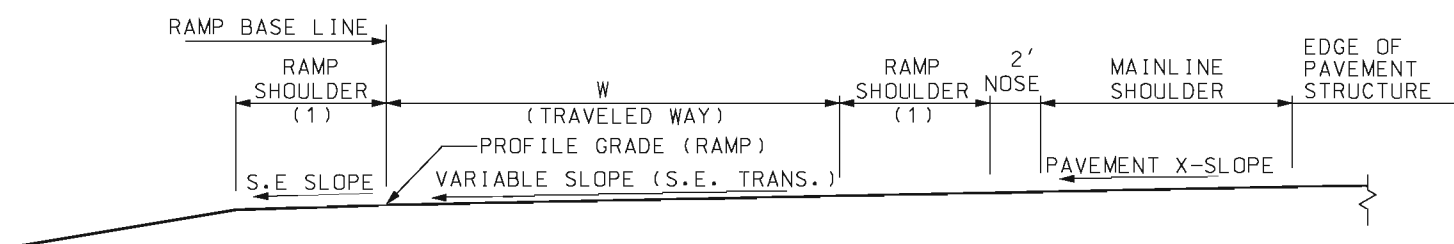
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



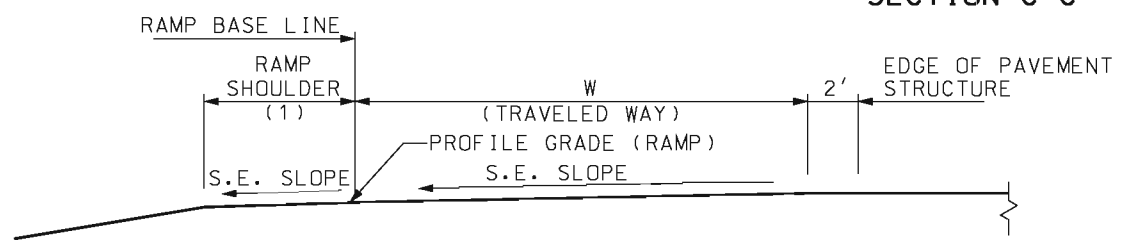
**PLAN VIEW "ON" RAMPS**



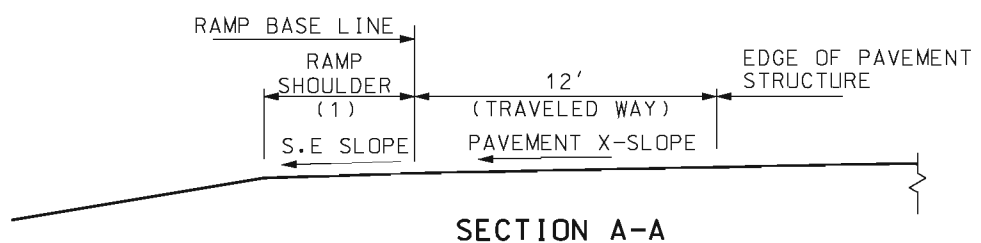
**SECTION D-D**



**SECTION C-C**



**SECTION B-B**



**SECTION A-A**


W	RAMP WIDTH
14'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES > 5%.
12'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES ≤ 5%.

**NOTES:**

- (1) FOR RAMP SHOULDER WIDTH, SEE TYPICAL SECTIONS.
- (2) SEE ROADWAY PLANS.

**GENERAL NOTES:**

SEE OTHER DRAWINGS FOR JOINT LAYOUTS AND STRIPING DETAILS.  
 THIS DRAWING IS FOR GENERAL INFORMATION ONLY. FOR ACTUAL CONSTRUCTION DETAILS AND PAVEMENT TYPES, SEE OTHER DRAWINGS.

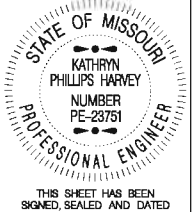


**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**TYPICAL DETAILS ON AND OFF RAMPS**

**DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES**



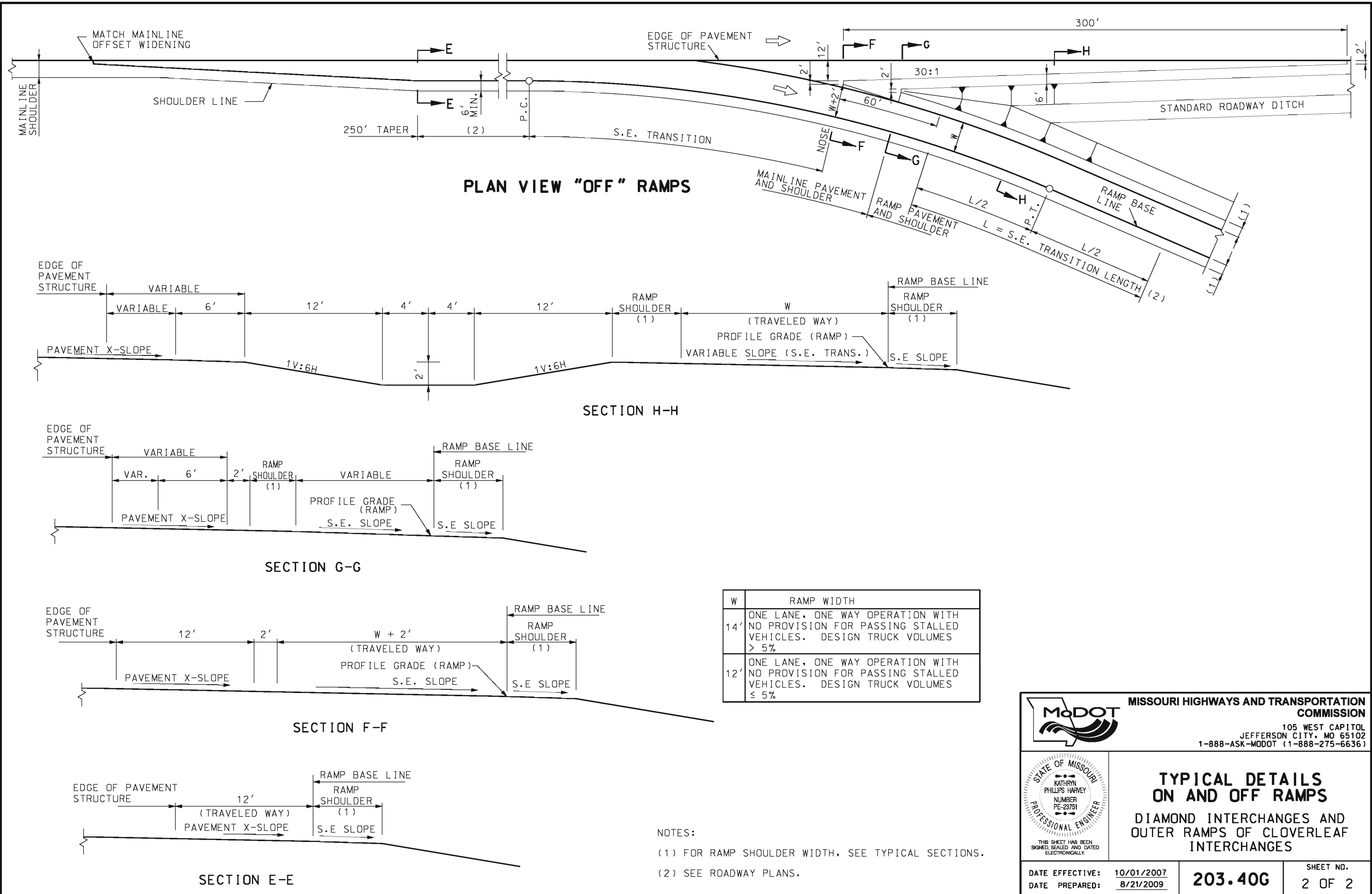
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**203.40G**

SHEET NO.  
1 OF 2

DATE EFFECTIVE: 10/01/2007

DATE PREPARED: 8/21/2009



**PLAN VIEW "OFF" RAMP**

**SECTION H-H**


**SECTION G-G**

**SECTION F-F**

**SECTION E-E**

W	RAMP WIDTH
14'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES > 5%
12'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES ≤ 5%

- NOTES:  
 (1) FOR RAMP SHOULDER WIDTH, SEE TYPICAL SECTIONS.  
 (2) SEE ROADWAY PLANS.

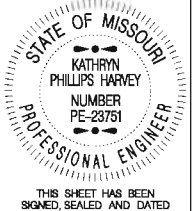


**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**TYPICAL DETAILS ON AND OFF RAMP**

**DIAMOND INTERCHANGES AND OUTER RAMP OF CLOVERLEAF INTERCHANGES**



STATE OF MISSOURI  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER

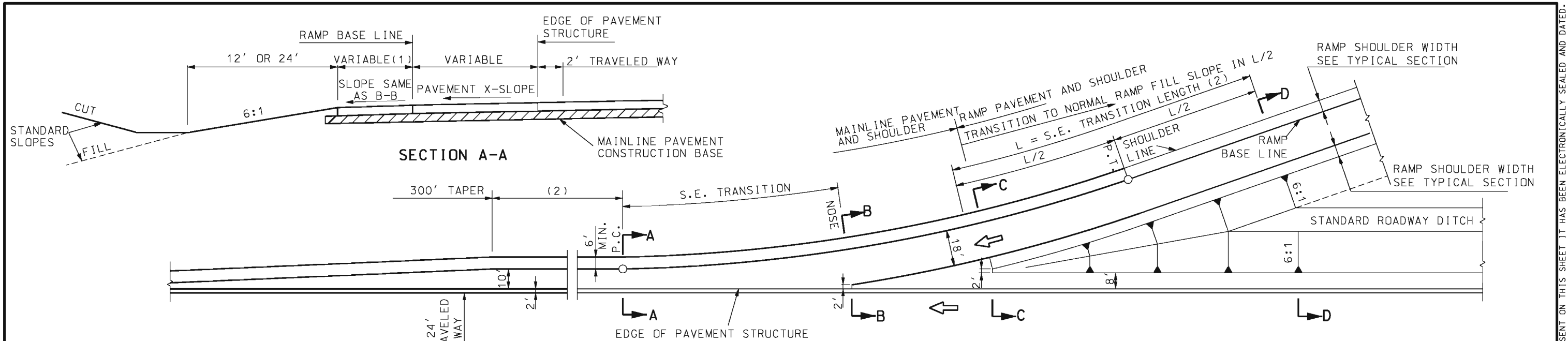
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**203.40G**

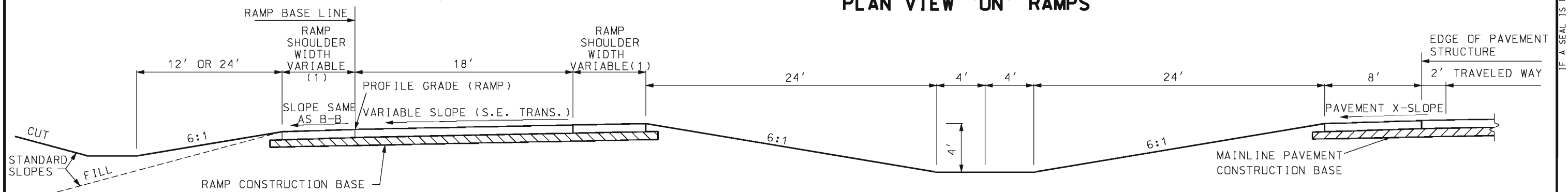
SHEET NO.  
**2 OF 2**

DATE EFFECTIVE: 10/01/2007  
DATE PREPARED: 8/21/2009

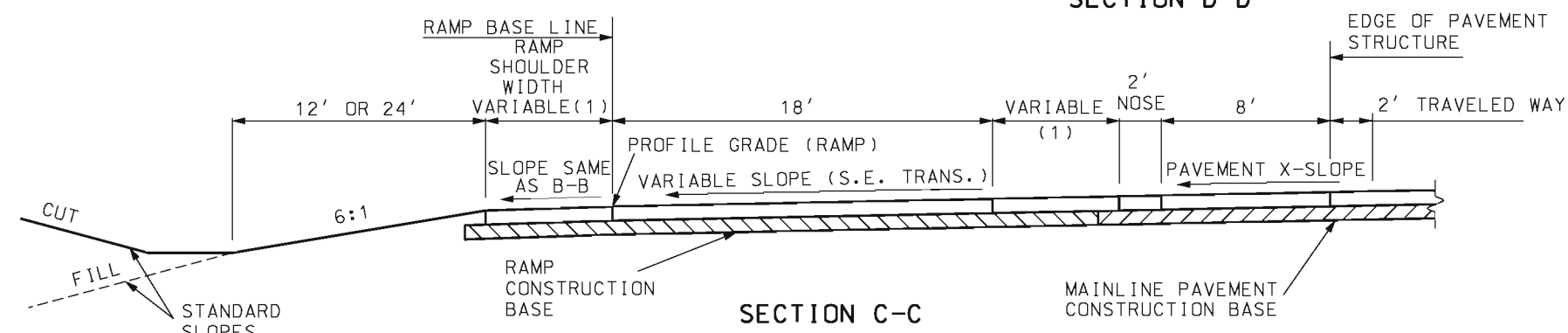
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



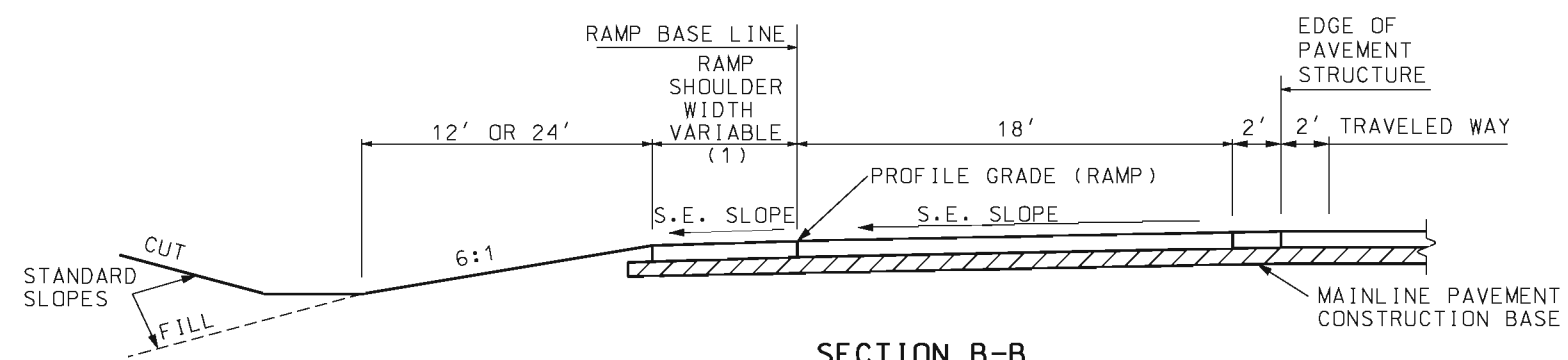
**PLAN VIEW "ON" RAMPS**



**SECTION D-D**



**SECTION C-C**



**SECTION B-B**

**GENERAL NOTES:**

SEE OTHER DRAWINGS FOR JOINT LAYOUTS AND STRIPING DETAILS.

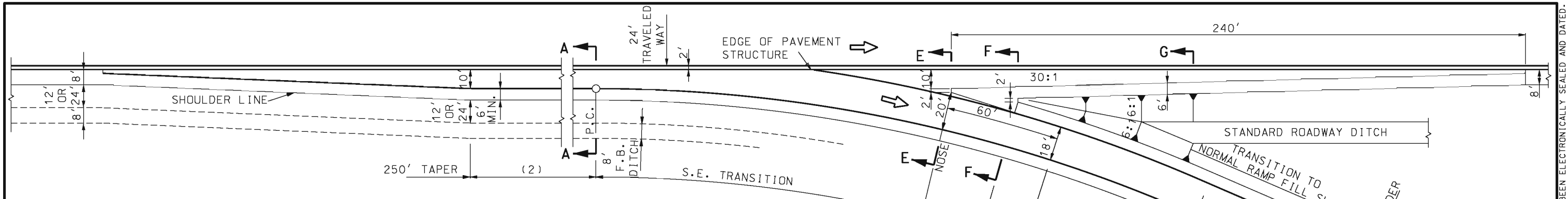
THIS DRAWING IS FOR GENERAL INFORMATION ONLY. FOR ACTUAL CONSTRUCTION DETAILS AND PAVEMENT TYPES, SEE OTHER DRAWINGS.

(1) FOR RAMP SHOULDER WIDTH, SEE TYPICAL SECTIONS.

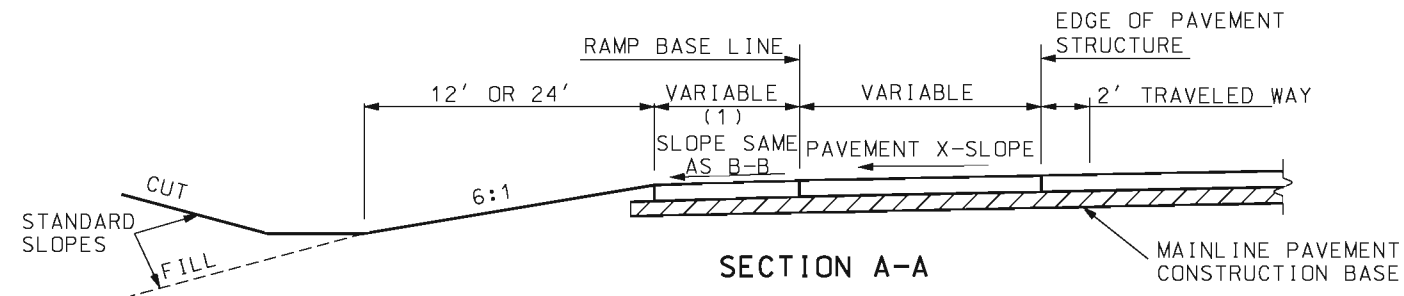
(2) SEE ROADWAY PLANS.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>TYPICAL DETAILS ON AND OFF RAMPS</b> DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES (ROADWAYS WITH 6:1 FORESLOPES) 28 FOOT PAVEMENT STRUCTURE
DATE EFFECTIVE: 01/01/1995 DATE PREPARED: 8/21/2009	<b>203.41F</b>	SHEET NO. 1 OF 2

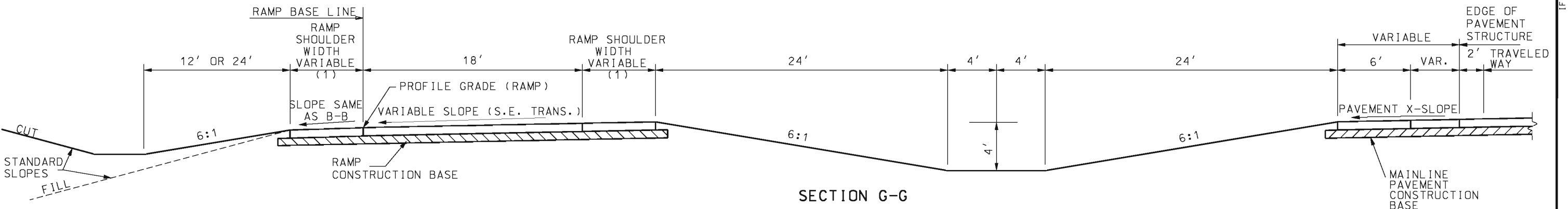
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



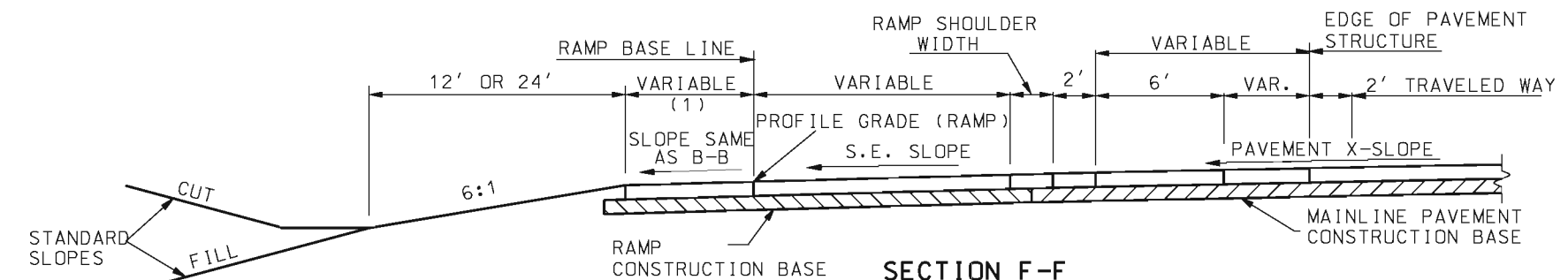
**PLAN VIEW "OFF" RAMPS**



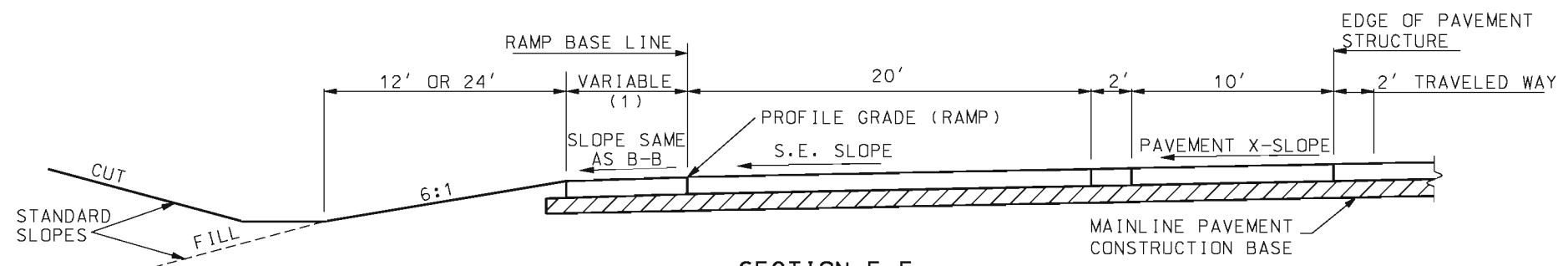
**SECTION A-A**



**SECTION G-G**



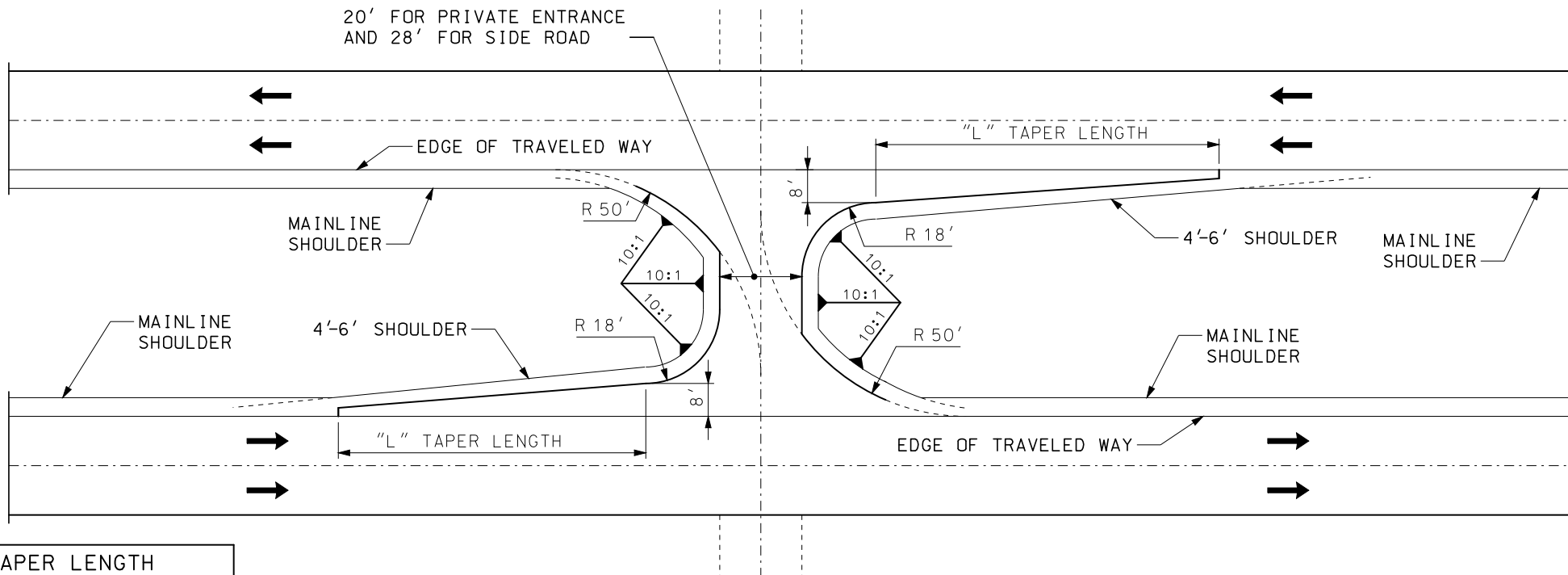
**SECTION F-F**



**SECTION E-E**

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TYPICAL DETAILS ON AND OFF RAMPS</b> DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES (ROADWAYS WITH 6:1 FORESLOPES) 28 FOOT PAVEMENT STRUCTURE	
STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small>	DATE EFFECTIVE: 01/01/1995 DATE PREPARED: 8/21/2009	<b>203.41F</b> SHEET NO. 2 OF 2

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



**NOTES FOR TYPE I MEDIAN OPENINGS:**

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

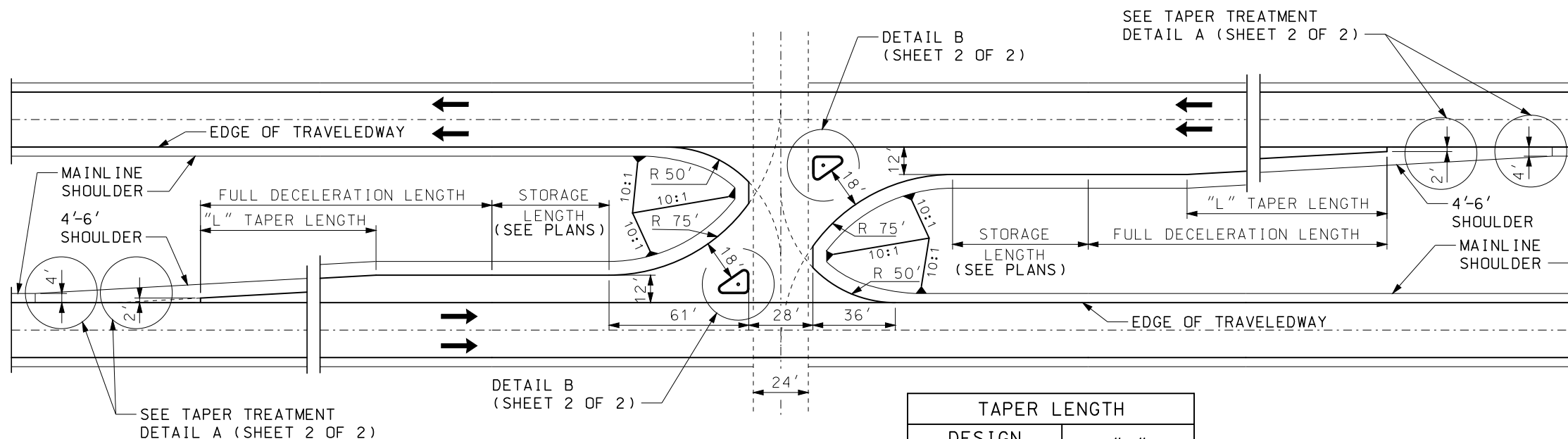
SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.

IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.

TAPER LENGTH	
DESIGN SPEED	"L"
≤ 40 MPH	112.5'
> 40 MPH	225'

FOR PRIVATE ENTRANCES, MINOR SIDE ROADS OR FIELD ENTRANCES

**TYPE I MEDIAN OPENING**



**NOTES FOR TYPE II MEDIAN OPENINGS:**

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.


IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.

FULL DECELERATION LENGTH	
DESIGN SPEED	MINIMUM LENGTH
45 MPH	385 FT.
50 MPH	435 FT.
55 MPH	480 FT.
60 MPH	530 FT.
65 MPH	570 FT.
70 MPH	615 FT.

TAPER LENGTH	
DESIGN SPEED	"L"
≤ 40 MPH	125'
> 40 MPH	250'

FOR MAJOR SIDE ROADS, STATE ROUTES AND MAJOR COMMERCIAL ENTRANCES

**TYPE II MEDIAN OPENING**



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**TYPICAL MEDIAN OPENING**

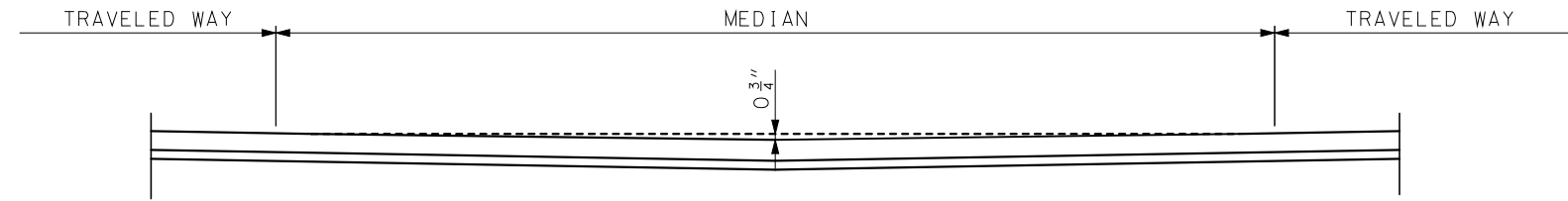
DIVIDED HIGHWAYS

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER

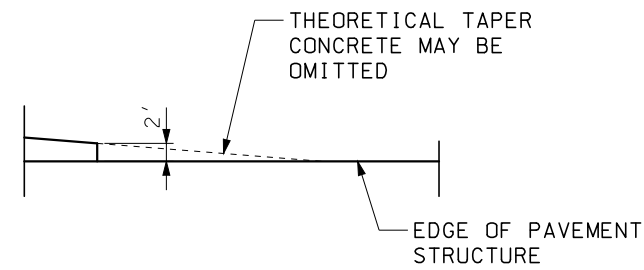
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 04/01/2016	<b>203.50N</b>	SHEET NO. 1 OF 2
DATE PREPARED: 2/11/2016		

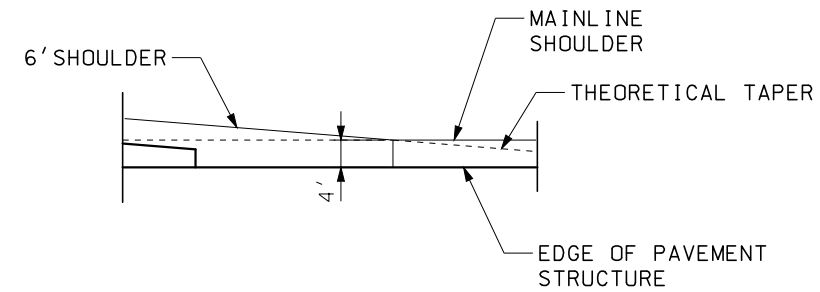
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SECTION ALONG MEDIAN OPENING  $\phi$

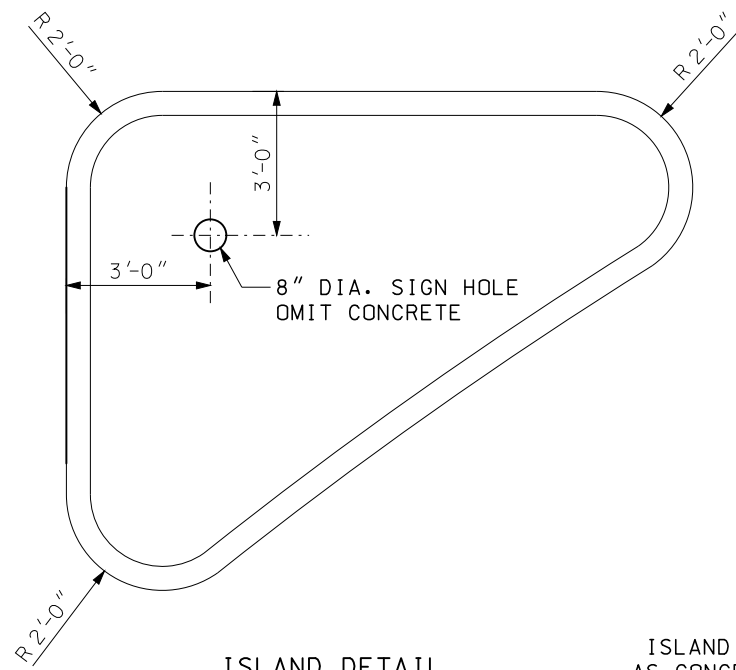


TAPER TREATMENT



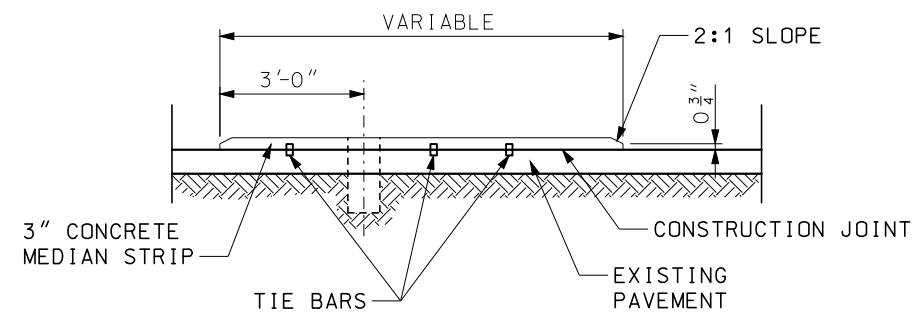
SHOULDER TAPER TREATMENT

DETAIL A



ISLAND DETAIL

ISLAND WILL BE PAID FOR AS CONCRETE MEDIAN STRIP.



LOW PROFILE ISLAND DETAIL

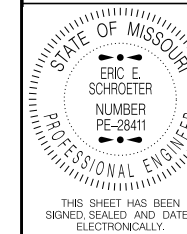
DETAIL B

GENERAL NOTES:  
FOR DETAILS ON CONCRETE MEDIAN STRIP CONSTRUCTION, SEE STANDARD PLAN 608.30.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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



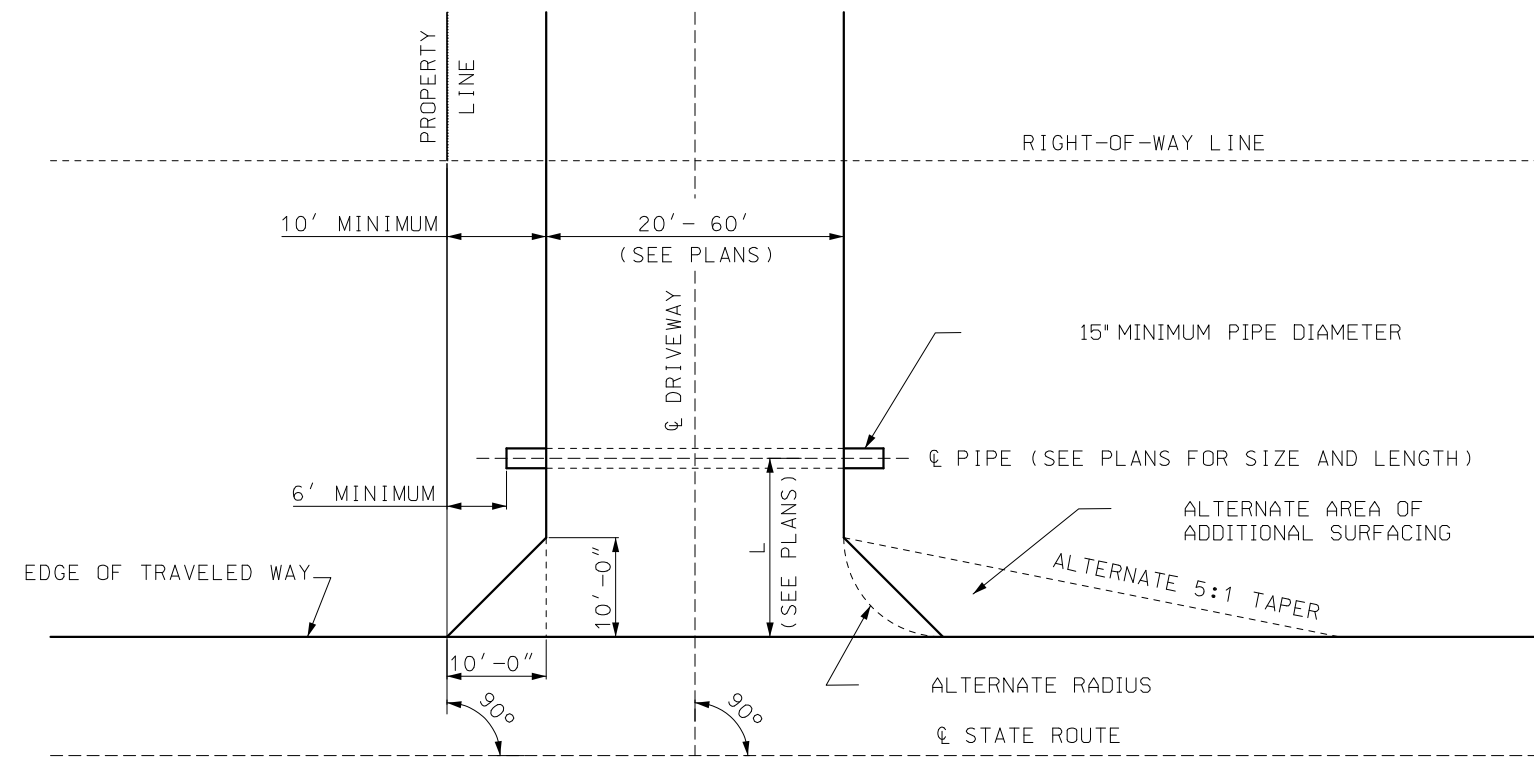
DATE EFFECTIVE: 04/01/2016  
DATE PREPARED: 2/11/2016

203.50N

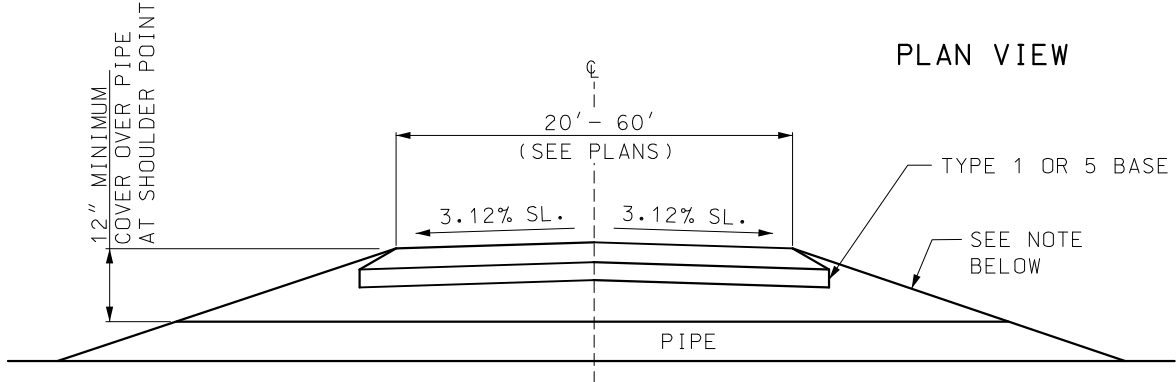
SHEET NO.  
2 OF 2

TYPICAL MEDIAN OPENING  
DIVIDED HIGHWAYS

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



PLAN VIEW



DRIVEWAY TYPICAL SECTION

DRIVEWAY SIDE SLOPES: \*

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

NOTE: RECOMMENDED WIDTH OF DRIVEWAY - 20'

\* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES. THE LOCATION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE 1988 EDITION OF "ROADSIDE DESIGN GUIDE".

GENERAL NOTES:

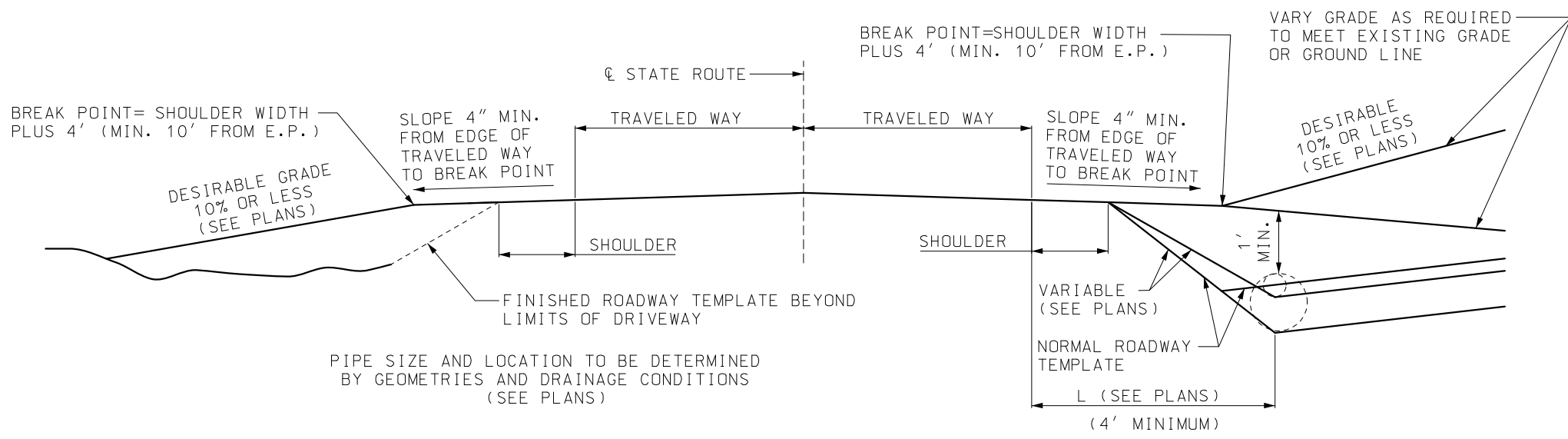
NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED BEYOND THE PROPERTY FRONTAGE.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.


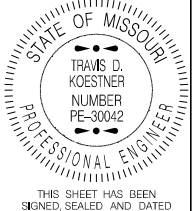
4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH. (MINIMUM 32' LENGTH OF MINIMUM 15" DIAMETER PIPE), SEE PLANS.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

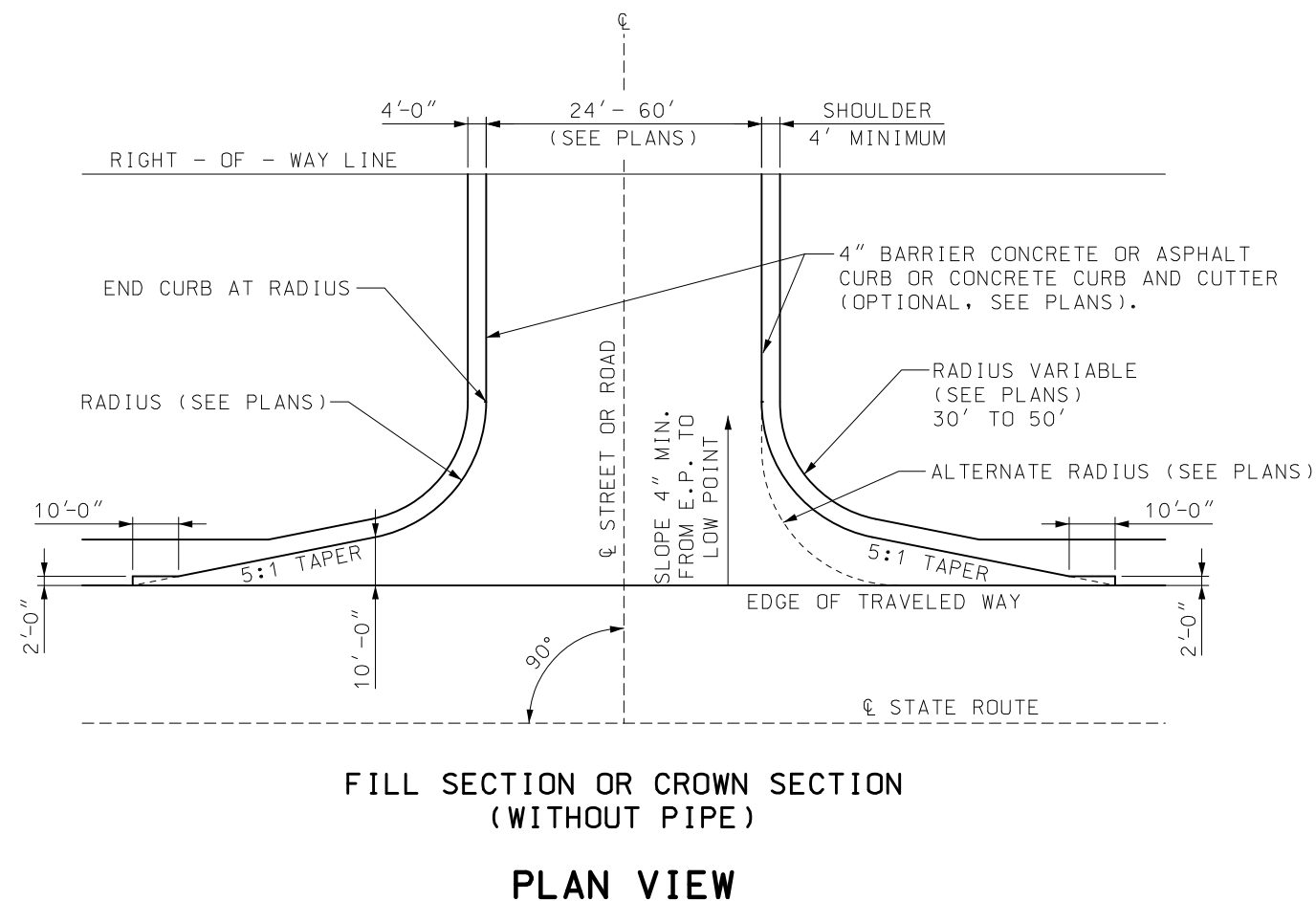
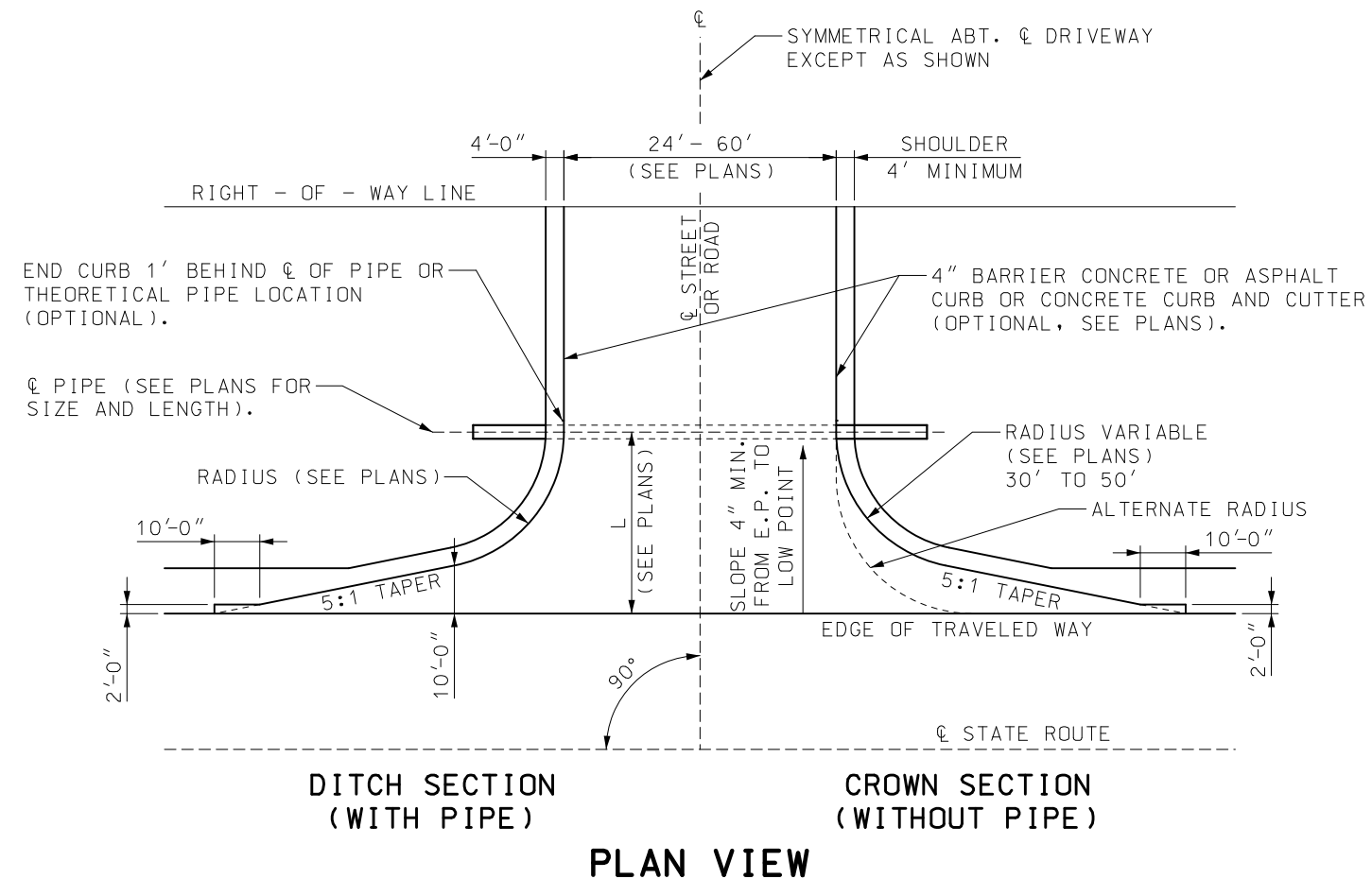


PROFILE VIEW

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>DRIVEWAY</b> TYPE I
DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020	<b>203.61B</b>
SHEET NO. 1 OF 1	

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





**GENERAL NOTES:**

RECOMMENDED WIDTH OF ROADWAY - 24' WITHOUT PARKING ON ROAD AND 32' WITH PARKING ON ROAD.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OF 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF ASPHALT AND CONCRETE DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).

IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLANS 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH, TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

THIS DRAWING ILLUSTRATES DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

A MINIMUM 100-FOOT SIGHT DISTANCE TRIANGLE, MEASURED ALONG THE CENTERLINE OF THE INTERSECTING ROADWAYS, SHOULD BE PROVIDED.

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

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**DRIVEWAY  
 TYPE II**

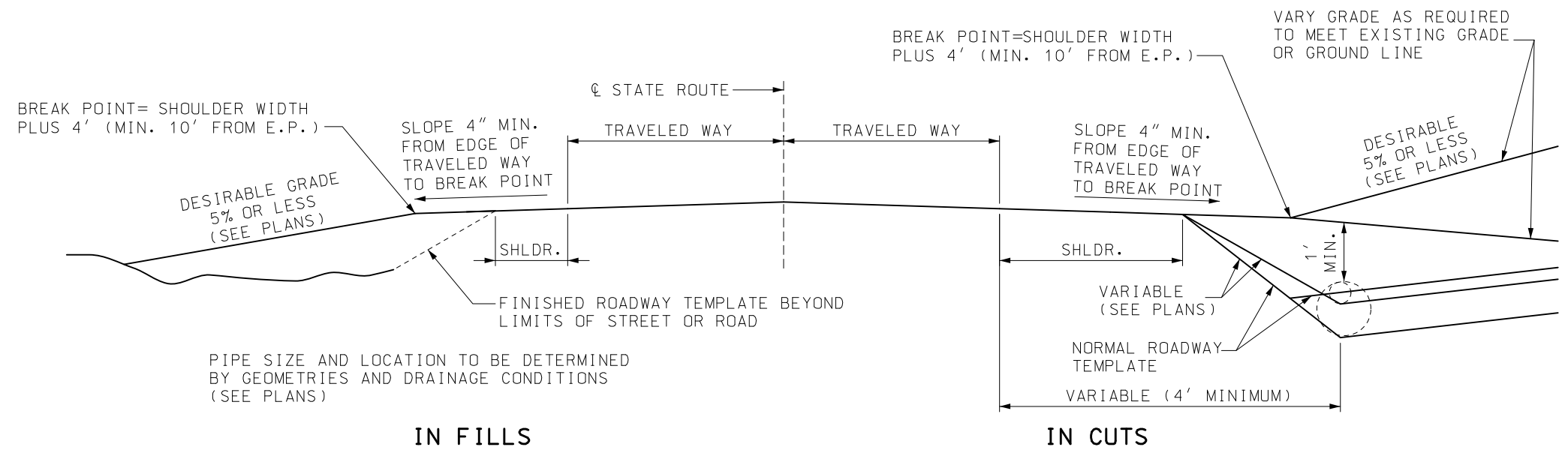
DATE EFFECTIVE: 07/01/2020  
 DATE PREPARED: 4/29/2020

**203.62E**

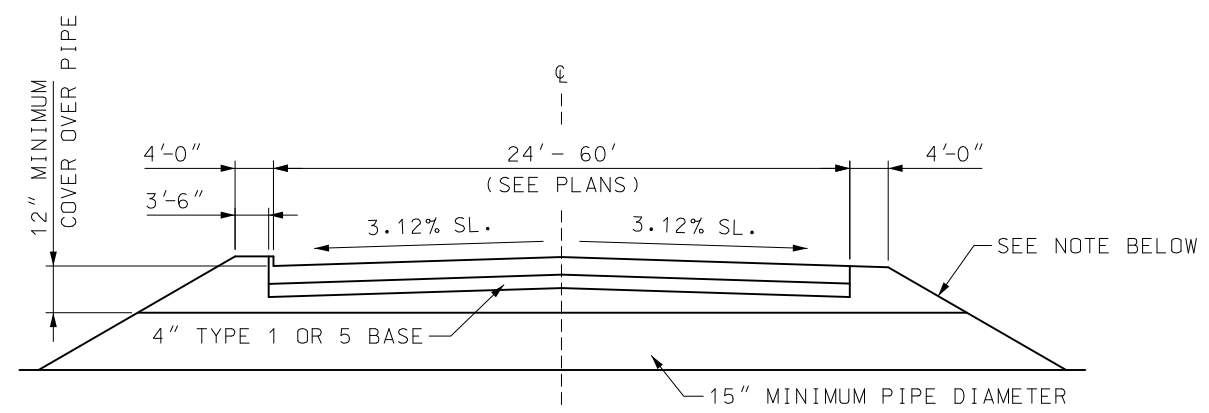
SHEET NO.  
 1 OF 2

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

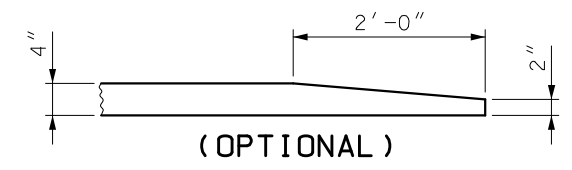
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



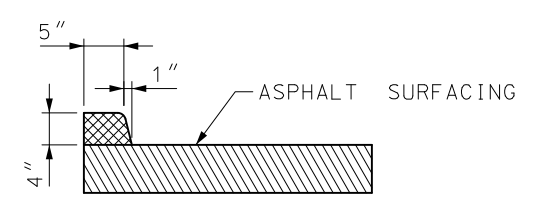
**PROFILE**



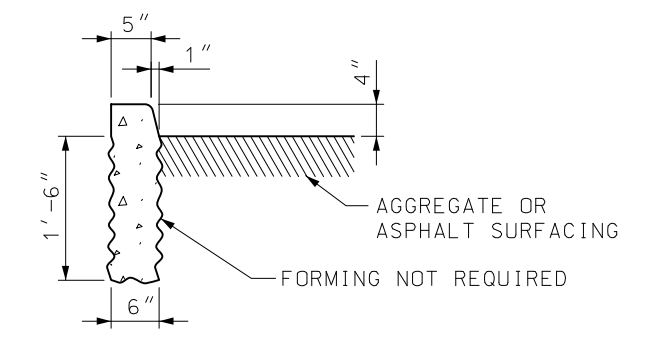
**WITH CURB                      WITHOUT CURB**  
**DRIVEWAY TYPICAL SECTION**



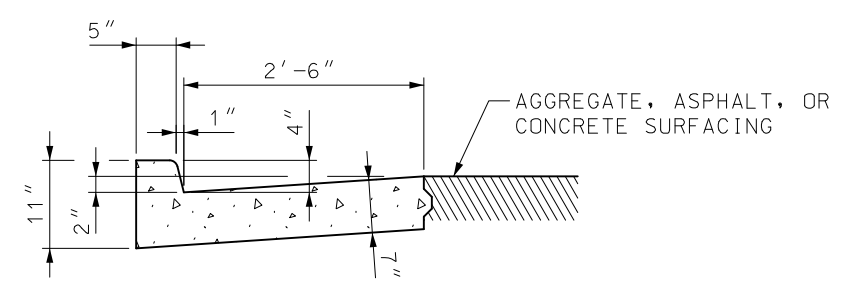
**(OPTIONAL)**  
**CURB TERMINUS DETAIL**



**SECTION THRU 4\"/>**



**SECTION THRU 4\"/>**



**SECTION THRU CONCRETE CURB AND GUTTER**

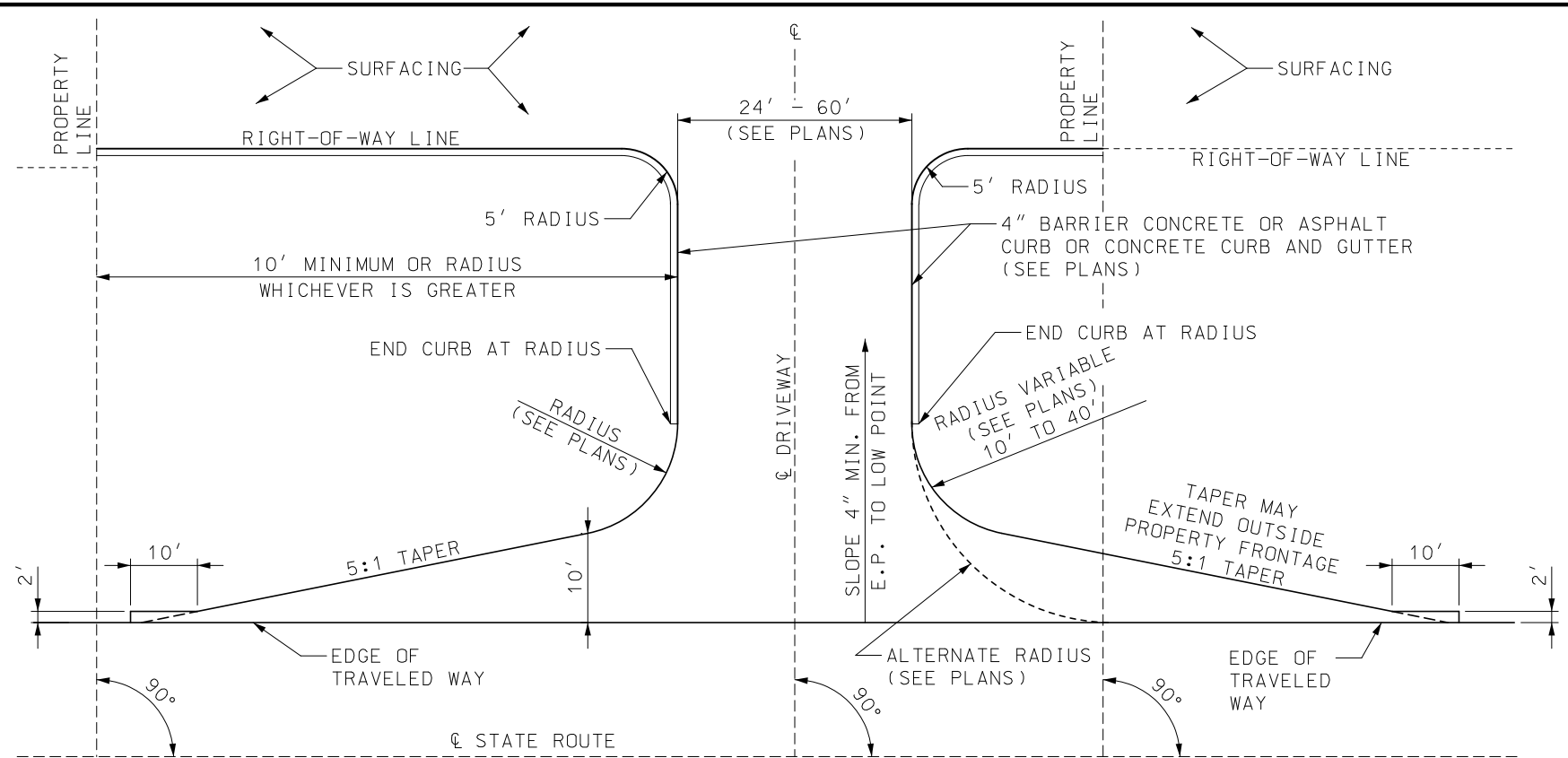
DRIVEWAY SIDE SLOPES: \*

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

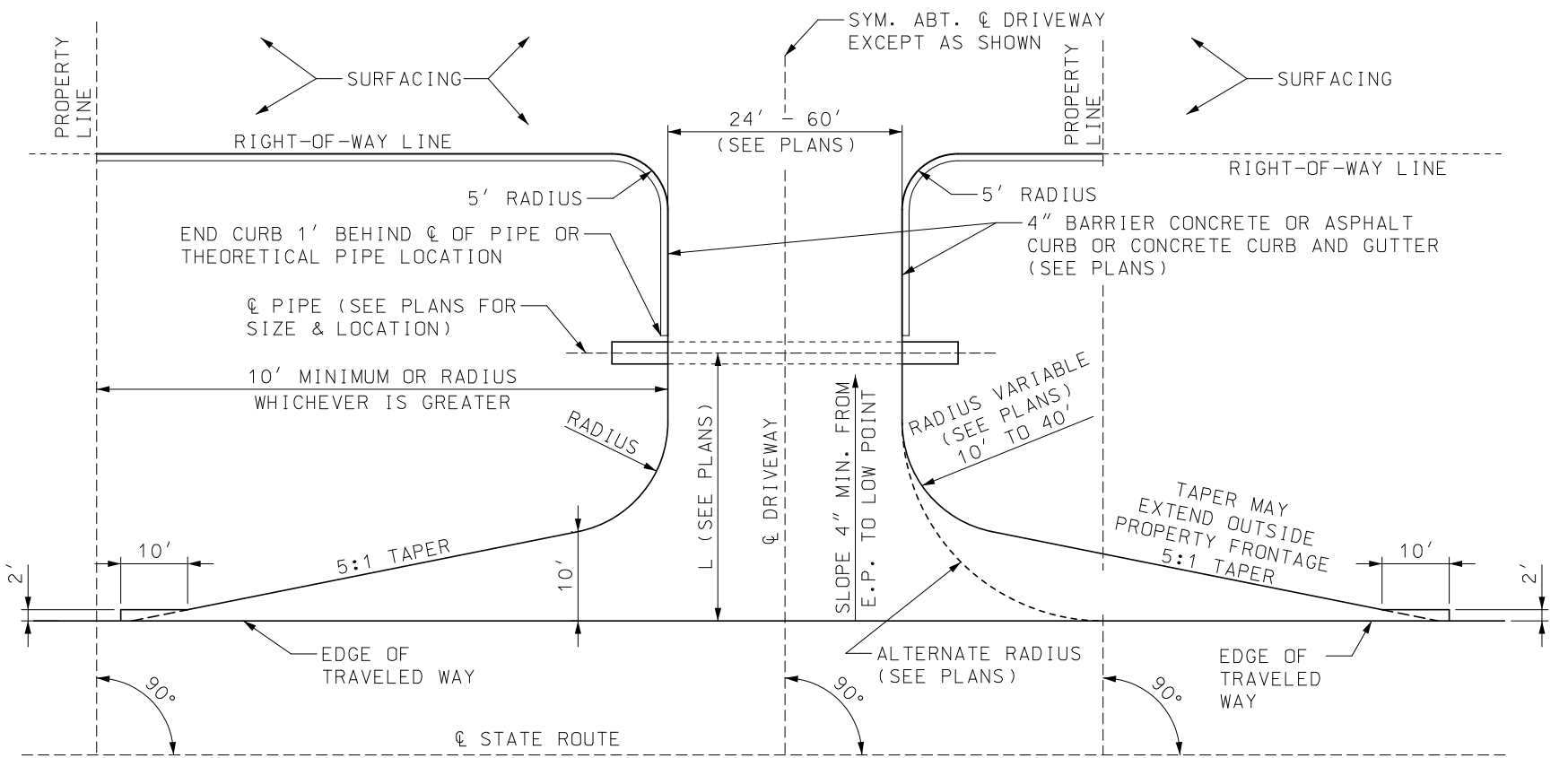
OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

\* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES, THE LOCATION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>DRIVEWAY TYPE II</b>	
DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020	<b>203.62E</b>	SHEET NO. <b>2 OF 2</b>



FILL SECTION OR CROWN SECTION  
(WITHOUT PIPE)  
PLAN VIEW




DITCH SECTION  
(WITH PIPE)  
PLAN VIEW

GENERAL NOTES:

- FOR LIGHT DUTY PAVEMENT (<3500 ADT) DRIVEWAY BEGINS AT EDGE OF PAVEMENT.
- RECOMMENDED WIDTH OF DRIVEWAY - 40'. SKETCH OR PLAN REQUIRED.
- NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED OUTSIDE OF THE PROPERTY FRONTAGE.
- SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.
- 4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.
- LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).
- IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLAN 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH. TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.
- CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.
- PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).
- THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

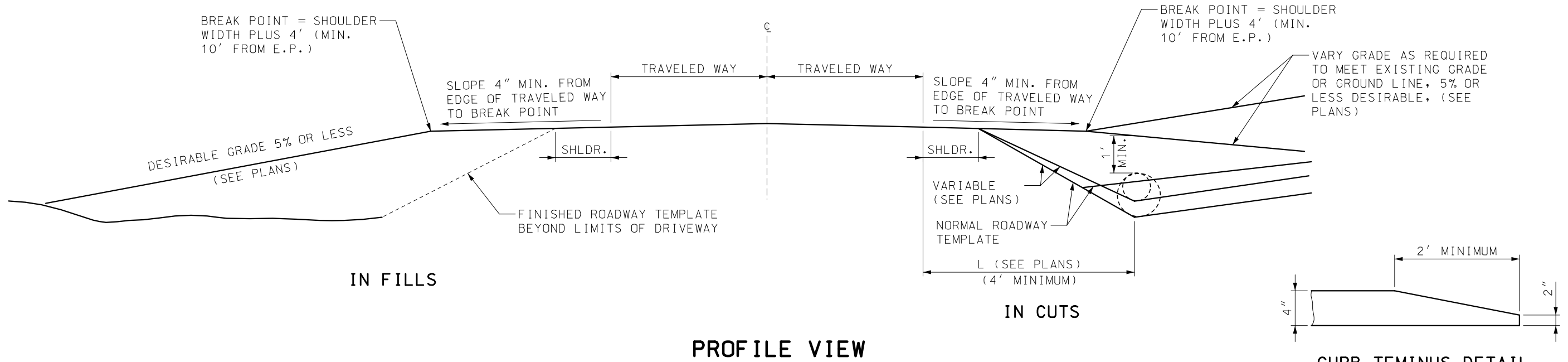
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

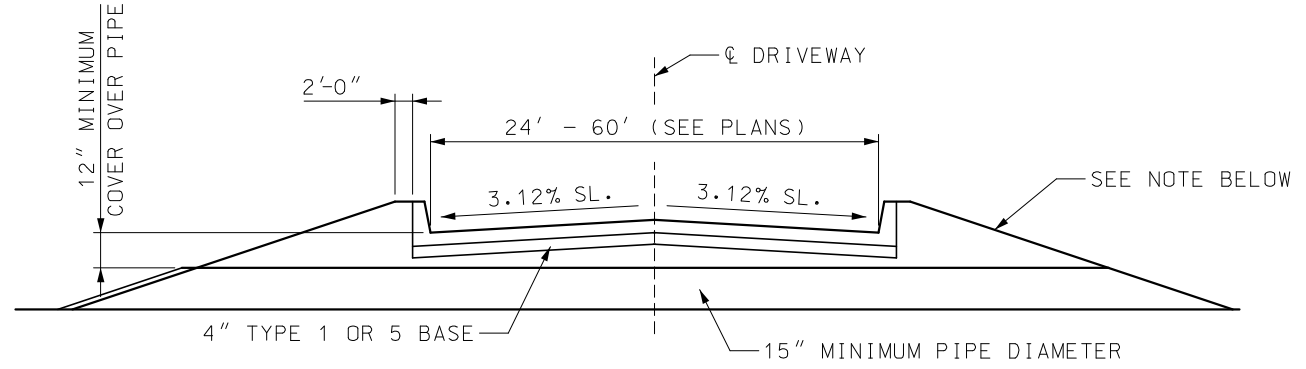
**DRIVEWAY  
TYPE III**

DATE EFFECTIVE: 07/01/2020	<b>203.63C</b>	SHEET NO.
DATE PREPARED: 4/29/2020		1 OF 2

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



**PROFILE VIEW**

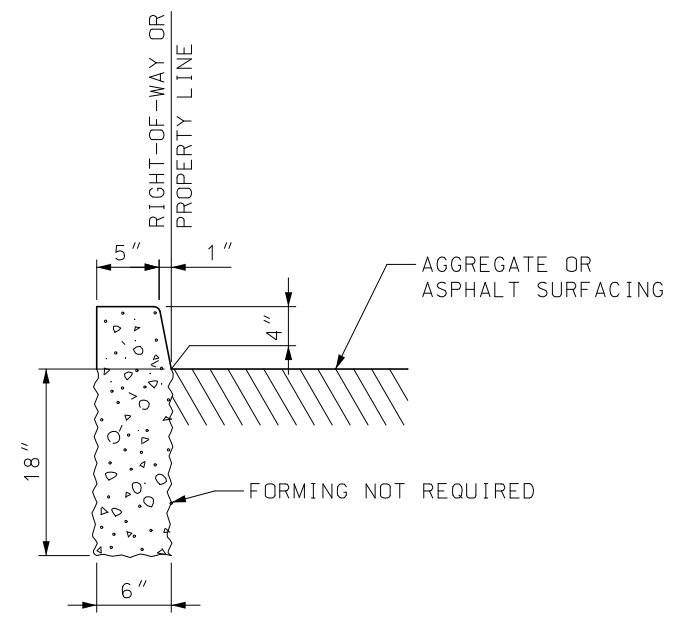


**DRIVEWAY TYPICAL SECTION**

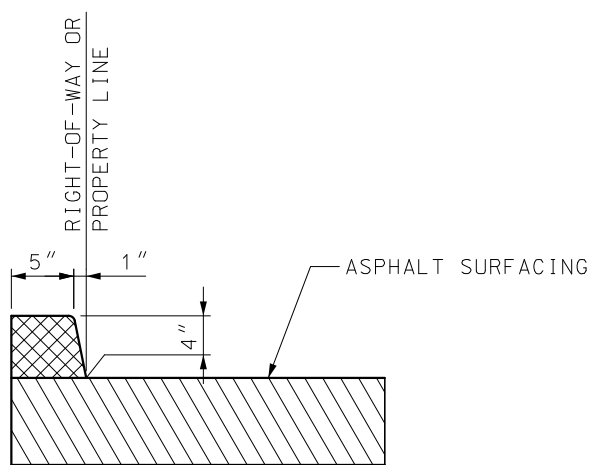
DRIVEWAY SIDE SLOPES: \*

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 WHERE PRACTICABLE).  
 OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

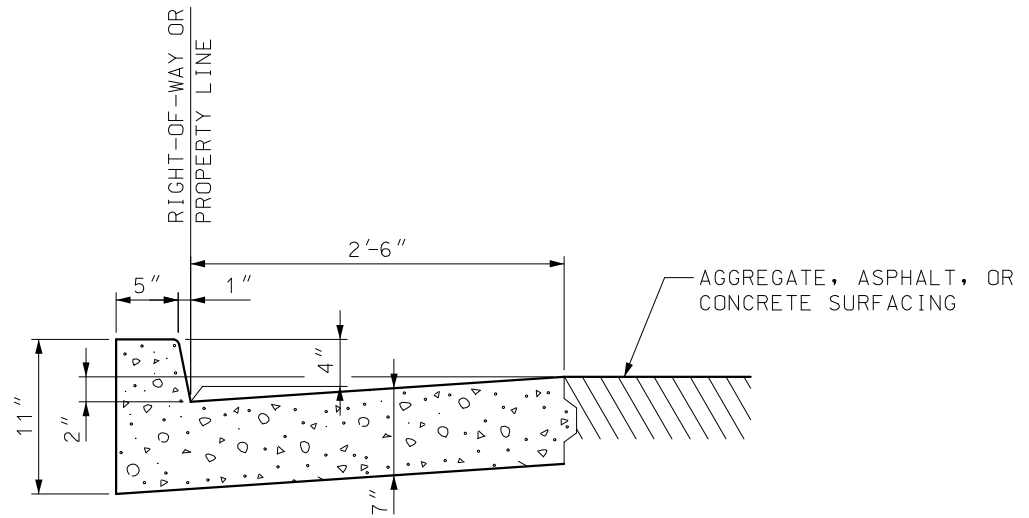
\* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES, THE LOCATION OF THE DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".



**SECTION THROUGH 4" BARRIER CURB**



**SECTION THRU 4" ASPHALT CURB**



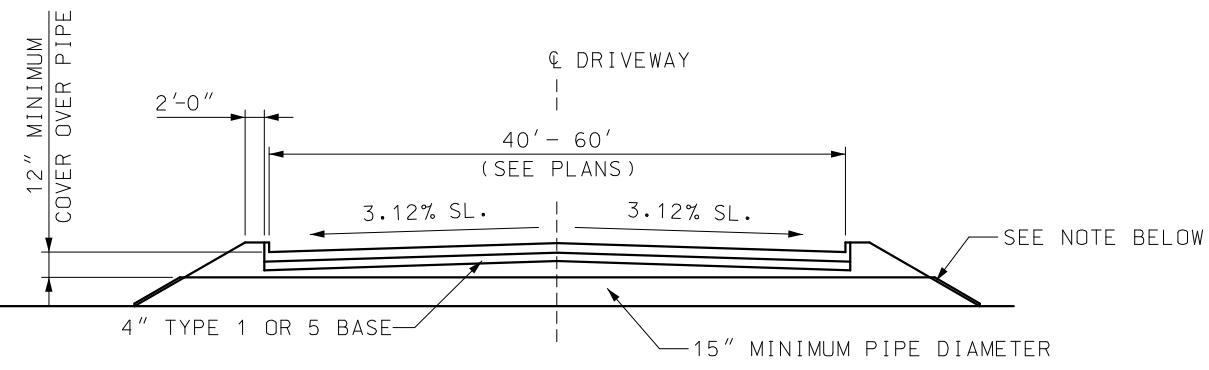
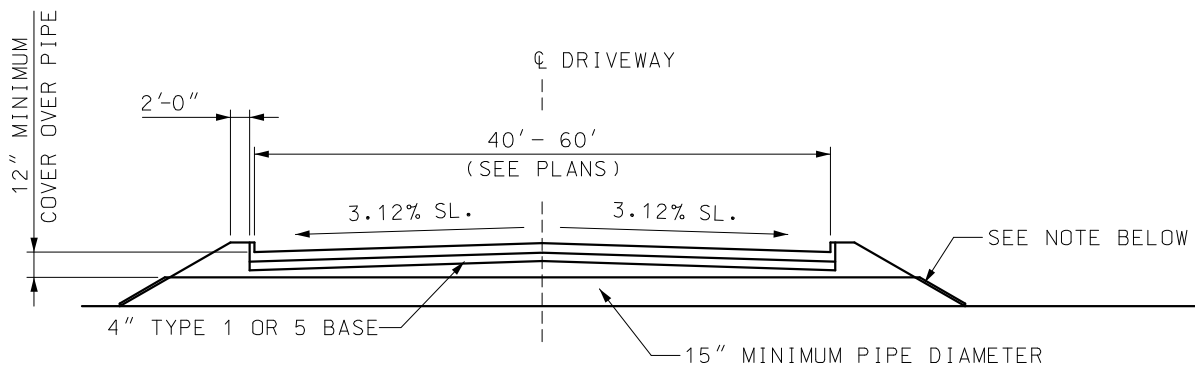
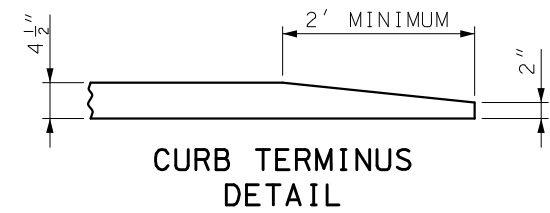
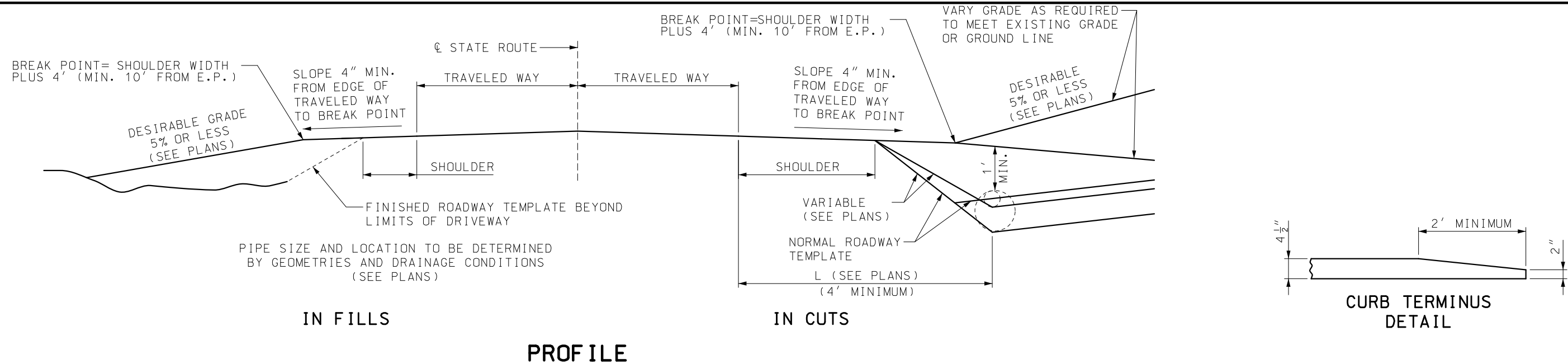
**SECTION THROUGH CONCRETE CURB AND GUTTER**

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL          JEFFERSON CITY, MO 65102          1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>TRAVIS D. KOESTNER          NUMBER PE-30042          PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>DRIVEWAY TYPE III</b></p>
<p>DATE EFFECTIVE: 07/01/2020          DATE PREPARED: 4/29/2020</p>	<p><b>203.63C</b></p>
<p>SHEET NO. 2 OF 2</p>	

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



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



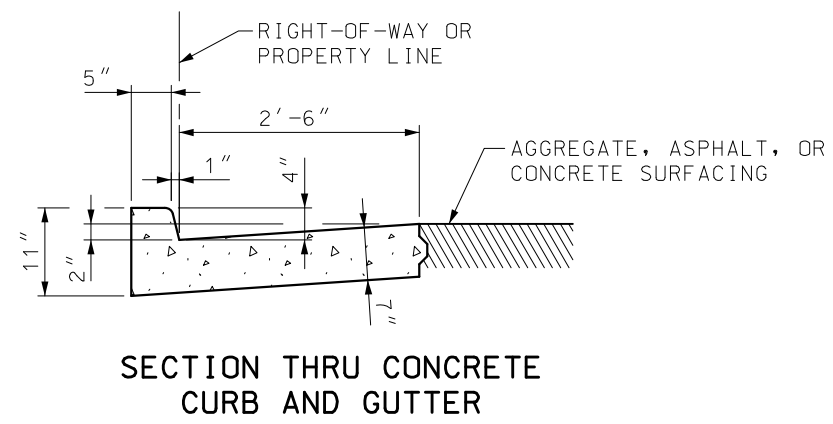
DRIVEWAY TYPICAL SECTION

DRIVEWAY SIDE SLOPES: \*

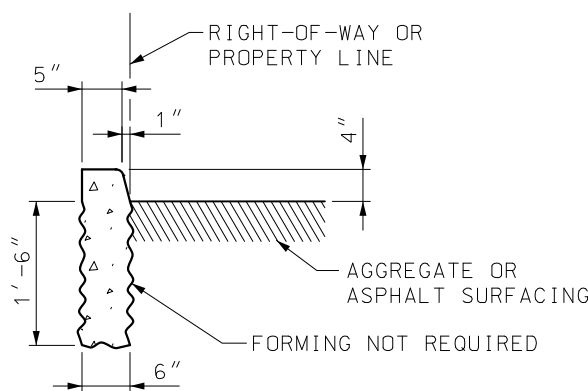
1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

\* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPE AND PIPE SECTIONS ON NEW CONSTRUCTION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".

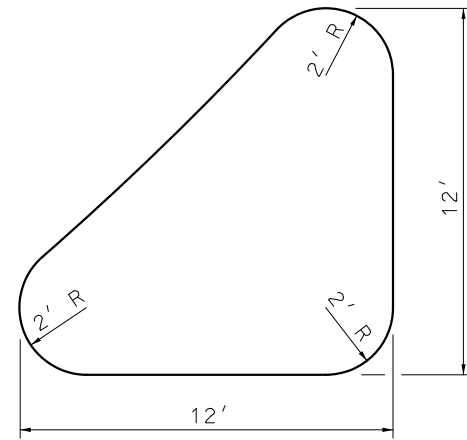


SECTION THRU CONCRETE CURB AND GUTTER



SECTION THRU 4" BARRIER CURB

		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>DRIVEWAY TYPE IV</b>	
DATE EFFECTIVE:	07/01/2020	<b>203.64E</b>	SHEET NO.
DATE PREPARED:	4/29/2020		2 OF 2



NOTE:

SEE STANDARD PLAN 203.50 FOR DETAILS OF LOW PROFILE ISLAND.

WHERE MINIMUM ISLAND CANNOT BE OBTAINED, OMIT ISLAND.

**MINIMUM ISLAND DETAILS**

	W	R	MIN. TURN LANE	TAPER
VOLUME PRODUCT	24'	90'	22'	5:1
TRUCK-SINGLE APPROACH	30'	95'	24'	5:1

NOTES:

THIS DRAWING SHALL BE USED IN CONJUNCTION WITH TYPES II AND III DRIVEWAYS WHEN TRAFFIC VOLUMES REQUIRE A VOLUME PRODUCT INTERSECTION AND TYPE IV WHEN A SINGLE APPROACH TRUCK DRIVEWAY IS DESIRED.

ALL CONTROLS PERTAINING TO GRADES, DRAINAGE, BASE, CURBING, ETC. SHALL BE AS SHOWN ON OTHER RESPECTIVE TYPE DRIVEWAY STANDARD PLANS.

THE "W" DIMENSIONS ARE RECOMMENDED WIDTH. OTHER ALLOWED WIDTHS MAY BE USED WITHIN TOLERANCES OF THE RESPECTIVE TYPE DRIVEWAY STANDARD PLANS.

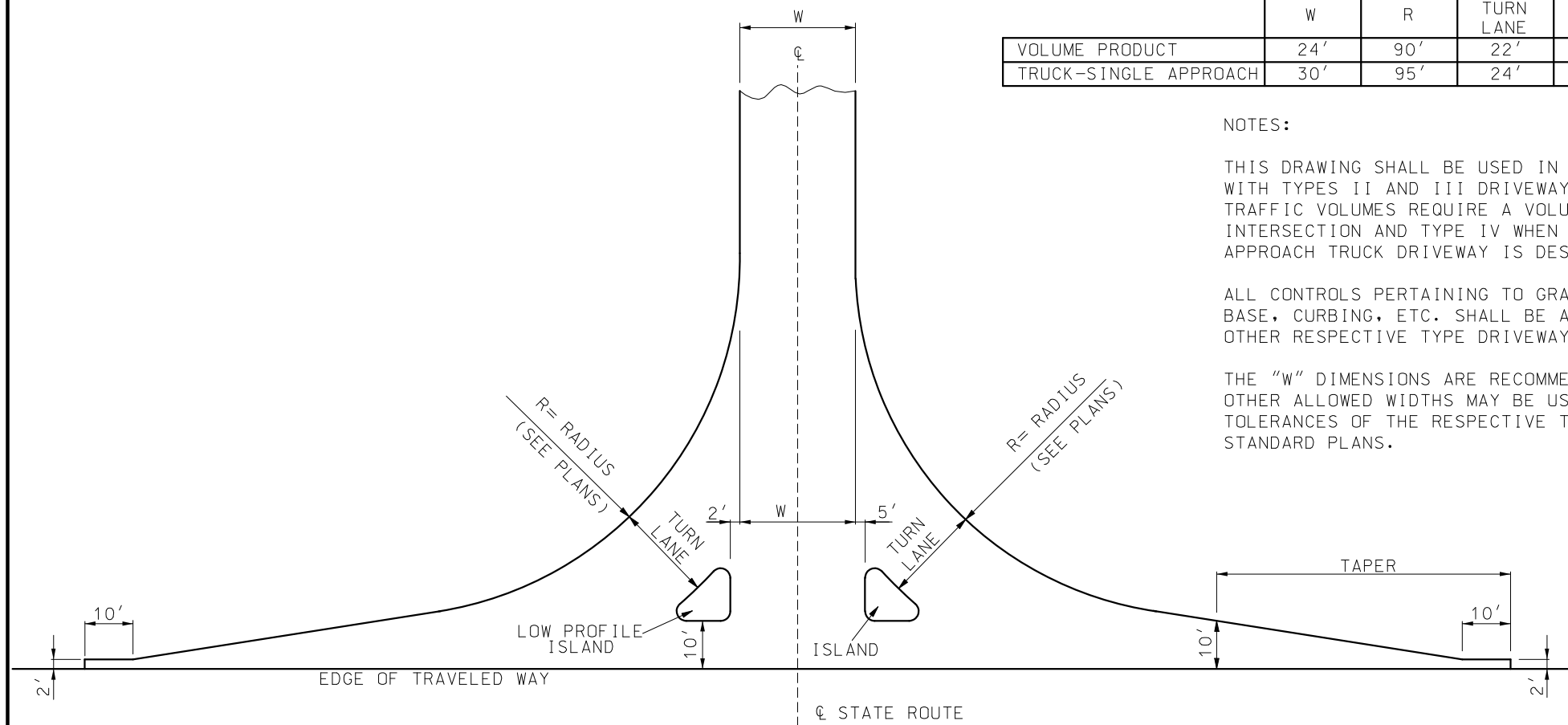
GENERAL NOTES:

DETAILS SHOWN ON THIS SHEET ARE FOR RIGHT ANGLE APPROACHES.


TAPER LENGTHS ARE NOT APPLICABLE WHEN DECELERATION LANES ARE PROVIDED.

SIGNALIZED INTERSECTIONS AND INTERSECTIONS IN DEVELOPED AREAS MAY BE MODIFIED TO MEET EXISTING CONDITIONS.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.



**PLAN VIEW**

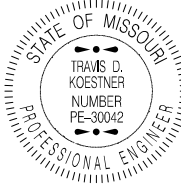


**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**DRIVEWAY**

**TYPE V**



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

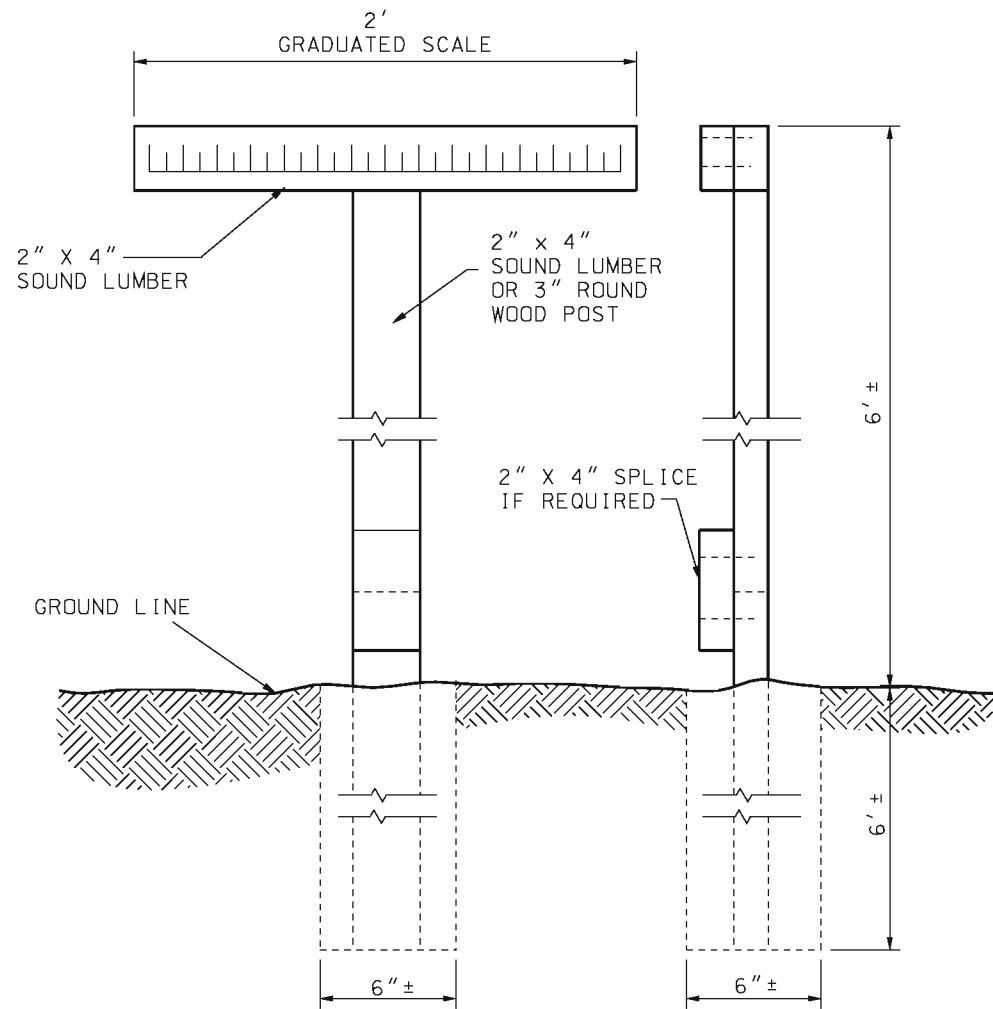
**203.65B**

SHEET NO.  
1 OF 1

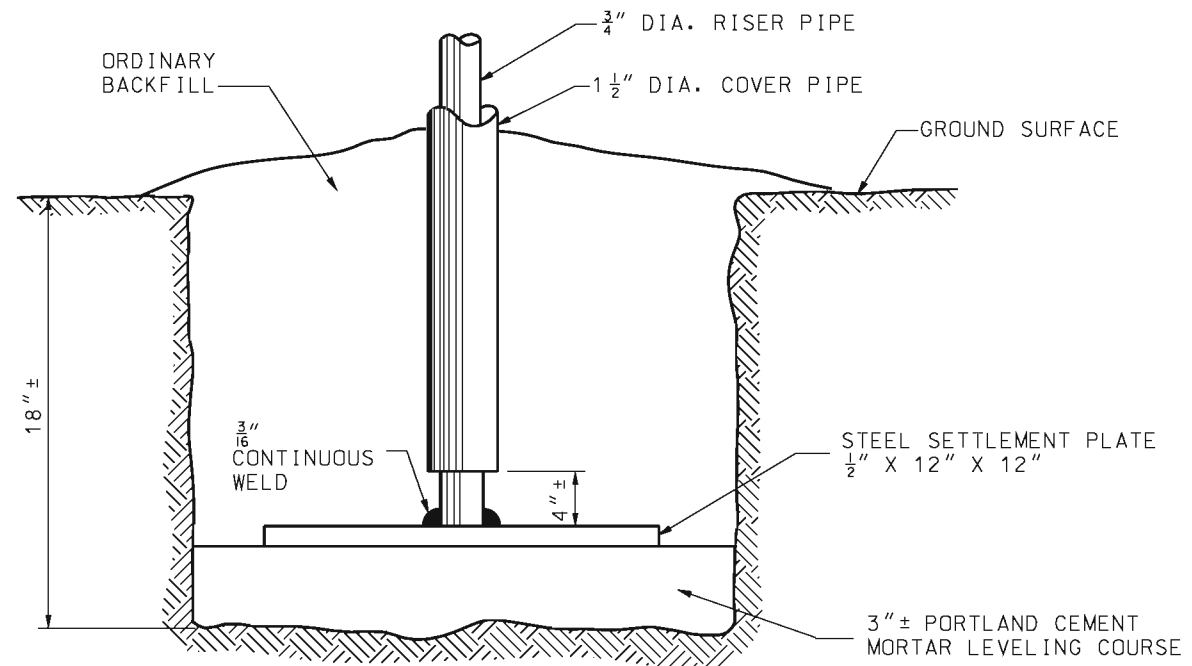
DATE EFFECTIVE: 07/01/2020

DATE PREPARED: 4/29/2020


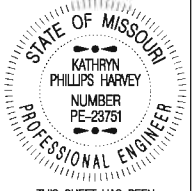
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**EMBANKMENT CONTROL STAKE**

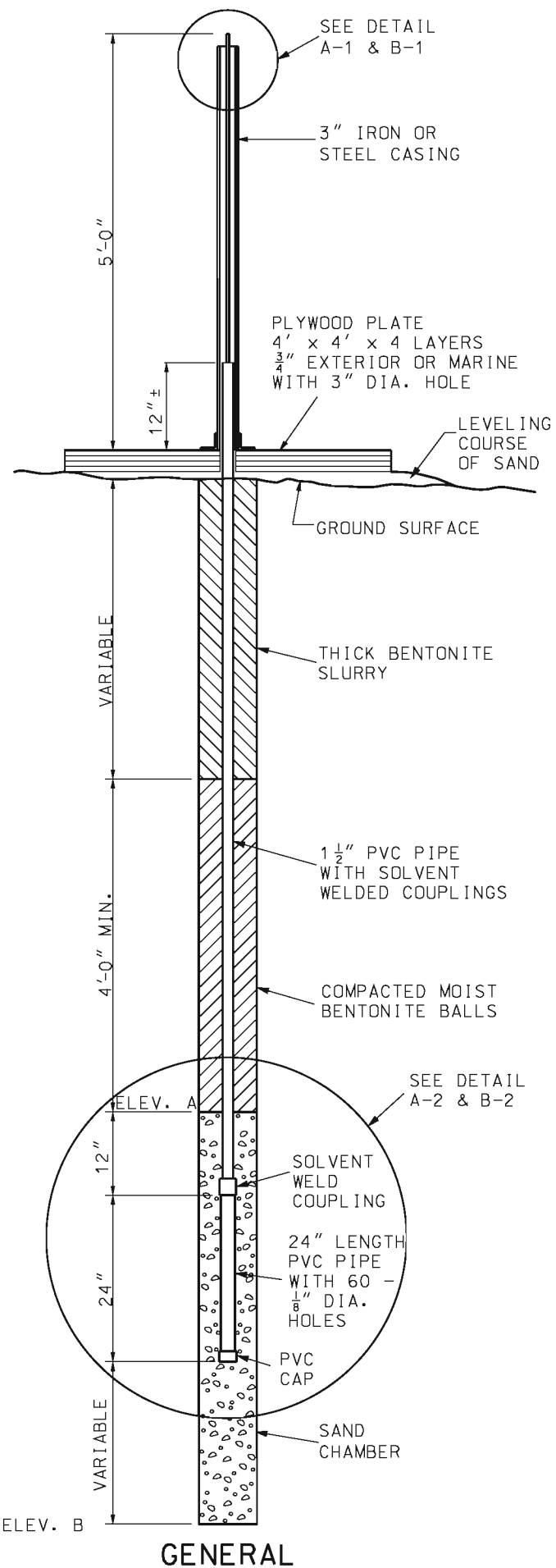


**SETTLEMENT GAUGE**

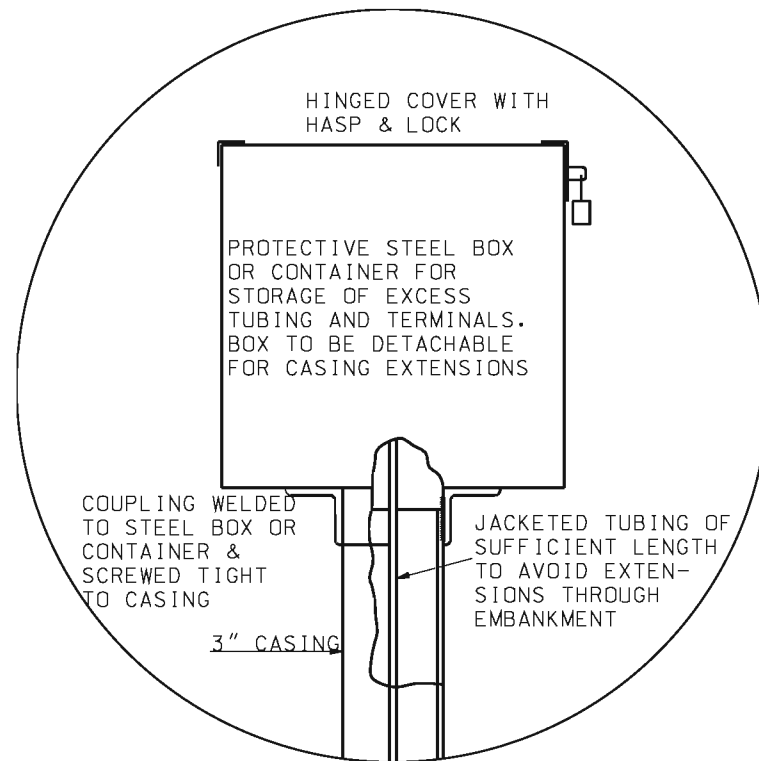
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>EMBANKMENT CONTROL MEASURING DEVICES</b>
DATE EFFECTIVE: 04/01/1983 DATE PREPARED: 8/21/2009	<b>204.00D</b>	SHEET NO. <b>1 OF 1</b>

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

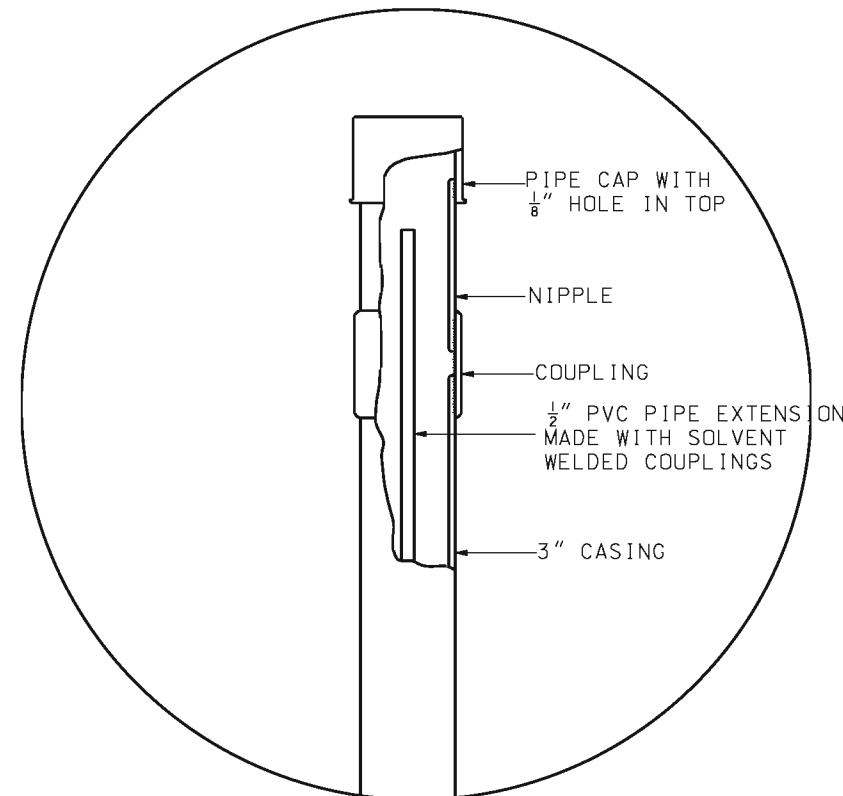




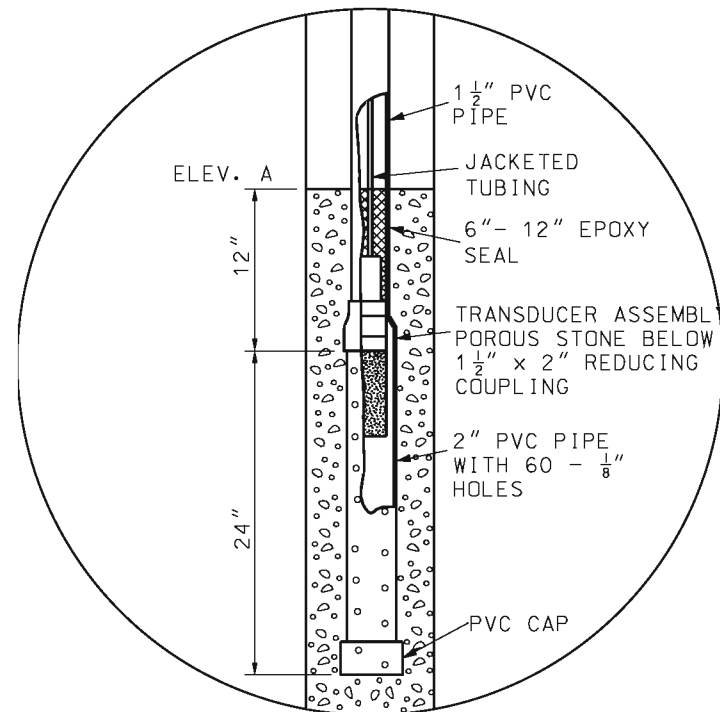
GENERAL



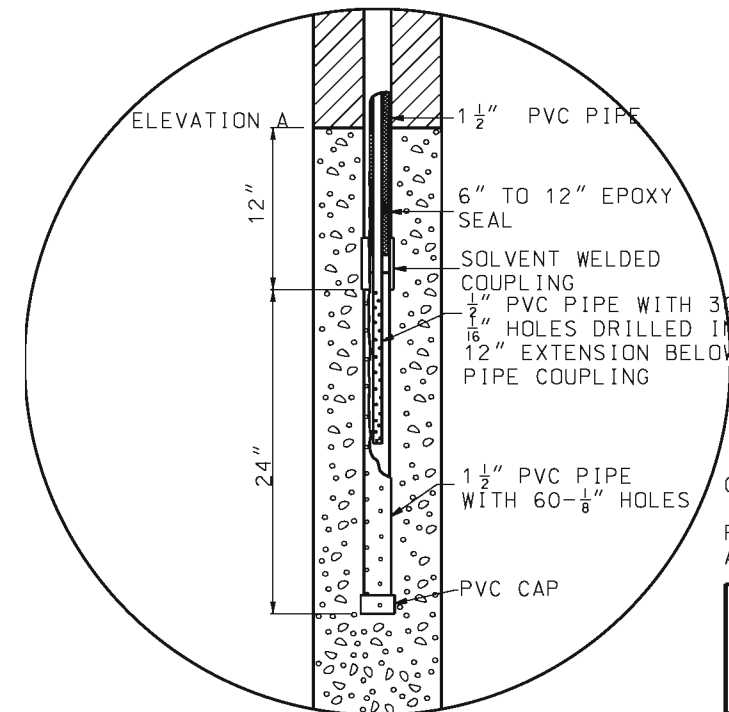
DETAIL A-1



DETAIL B-1



DETAIL A-2  
TYPE A



DETAIL B-2  
TYPE B

GENERAL NOTES:

FOR ELEVATION A AND ELEVATION B STATION, LOCATIONS AND EMBANKMENT CONTROL LIMITS, SEE ROADWAY PLANS.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

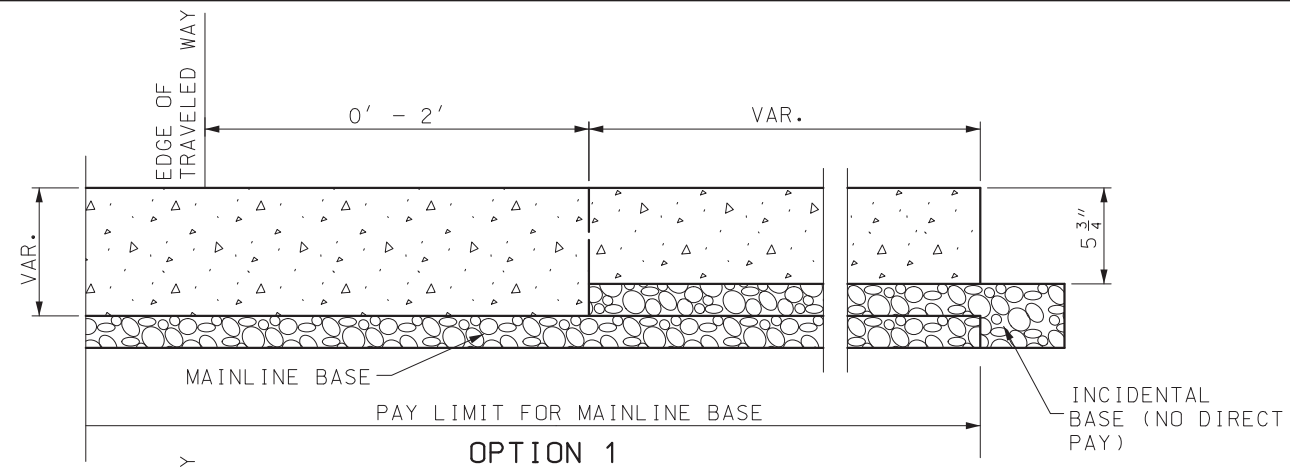
STATE OF MISSOURI  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

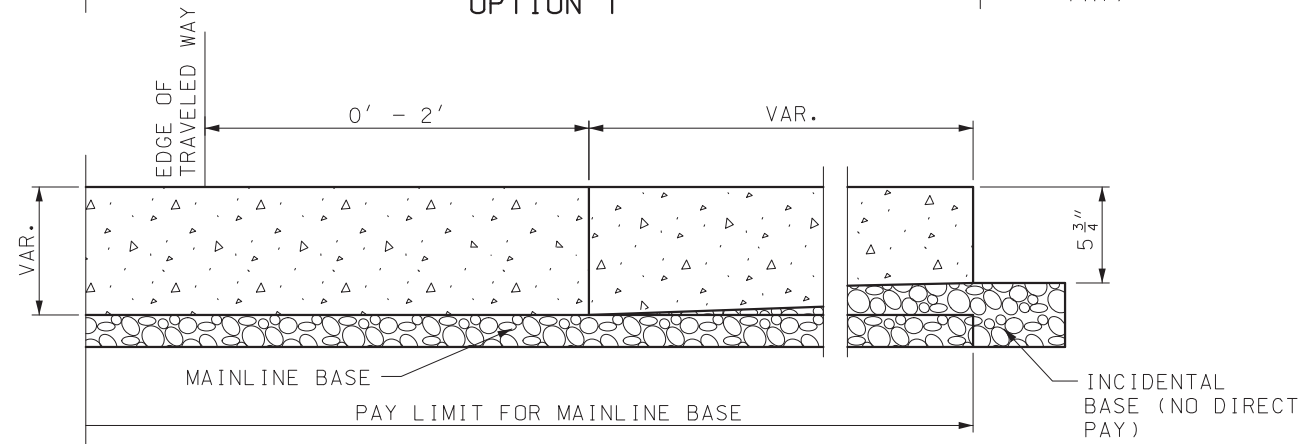
**PORE PRESSURE MEASUREMENT DEVICES**

DATE EFFECTIVE: 03/01/1996	<b>204.30</b>	SHEET NO. 1 OF 1
DATE PREPARED: 8/21/2009		

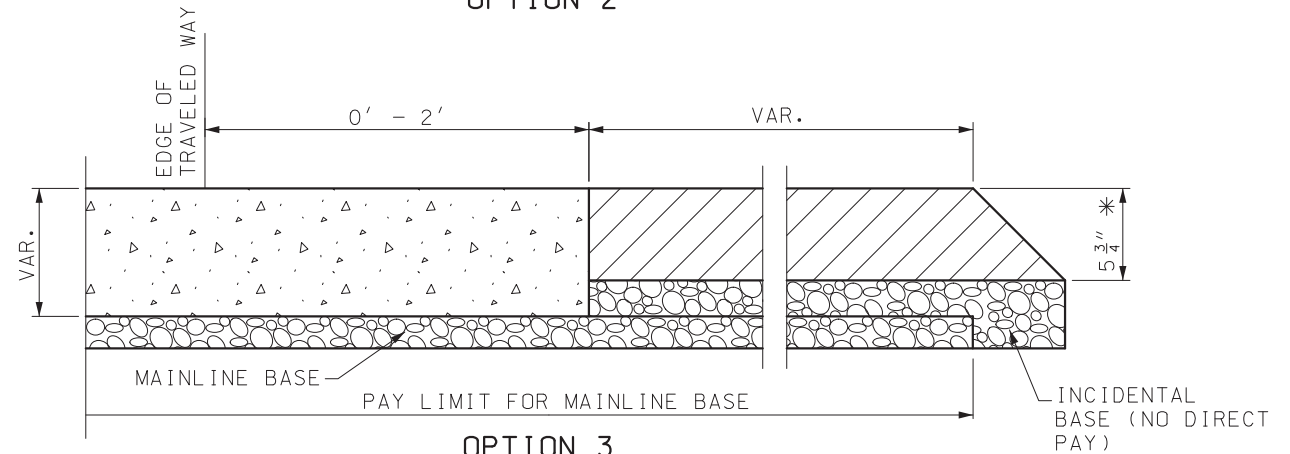
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



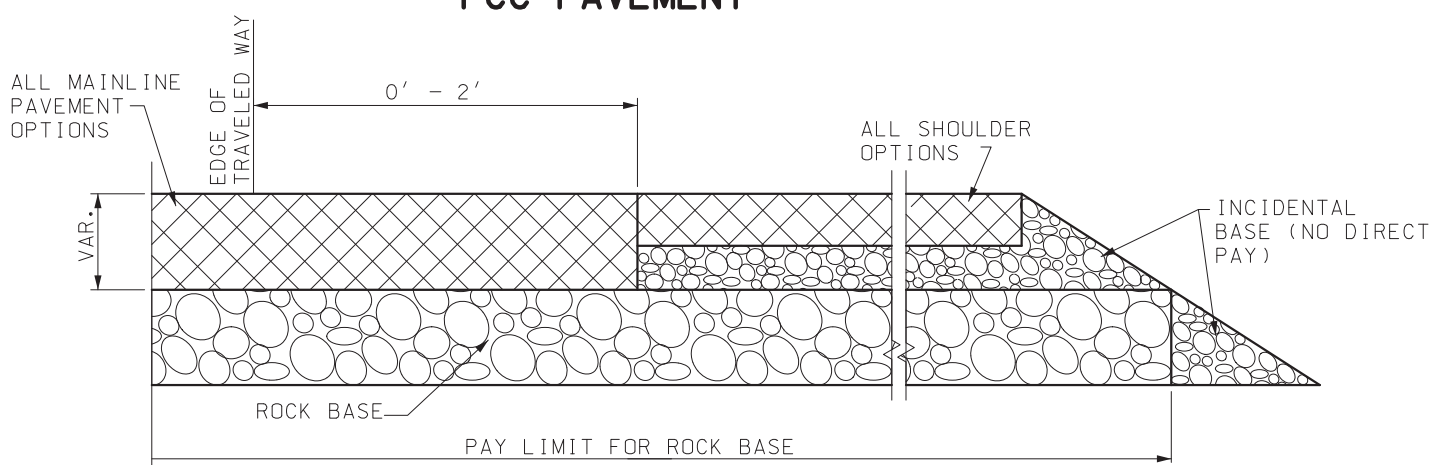
OPTION 1



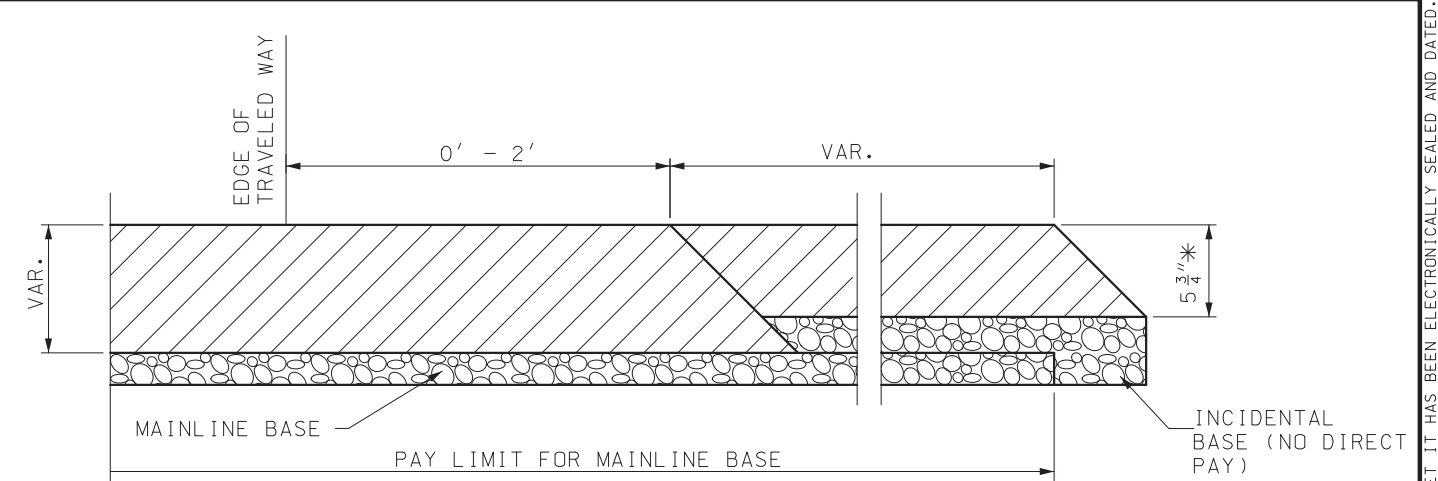
OPTION 2



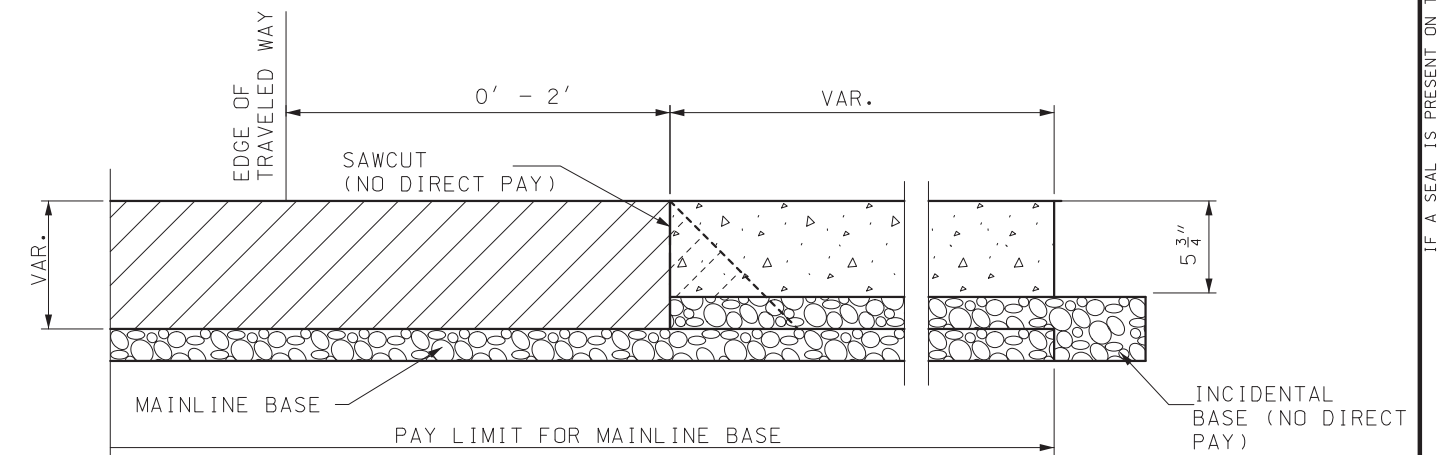
OPTION 3  
PCC PAVEMENT



PAVEMENT ON ROCK BASE



HMA PAVEMENT



HMA PAVEMENT

GENERAL NOTE:

THE FINAL FINISH ON CONCRETE SHOULDERS MAY BE OBTAINED BY THE USE OF A DRAG CONSISTING OF A SEAMLESS STRIP OF DAMP BURLAP, COTTON FABRIC, PLASTIC TURF, OR OTHER SUITABLE MATERIAL CAPABLE OF PRODUCING A UNIFORM SURFACE OF GRITTY TEXTURE.

THE QUANTITY FOR ADDITIONAL BASE MATERIAL RESULTING FROM THE VARIABLE THICKNESS MATERIAL OR CONSTRUCTION METHOD OF TYPE A2 SHOULDER WILL BE CONSIDERED INCIDENTAL.

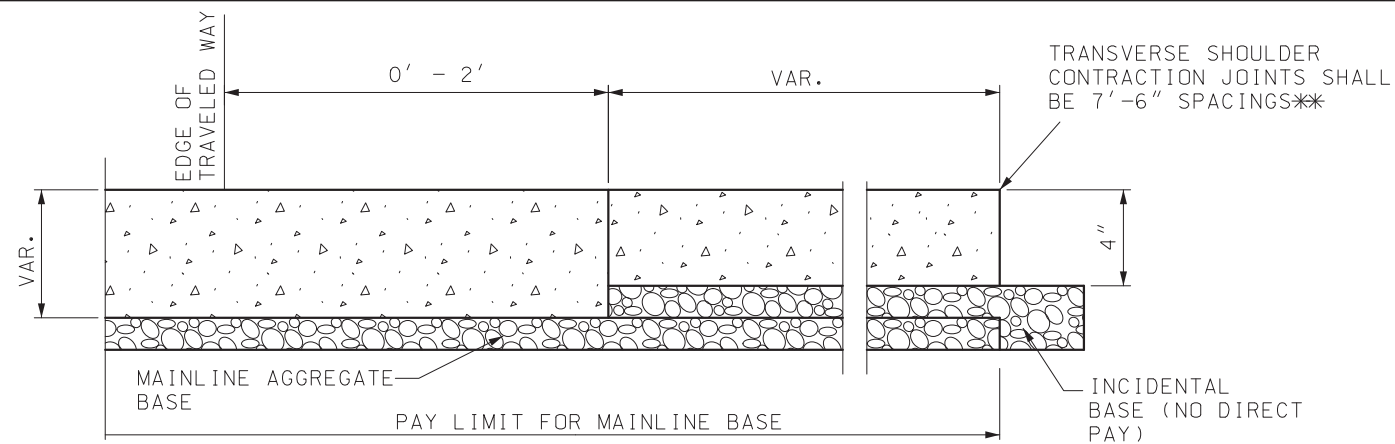
INCIDENTAL BASE SHALL CONSIST OF TYPE 1 OR 5 AGGREGATE FOR BASE, OR AN ALTERNATE MATERIAL THAT MEETS THE APPROVAL OF THE ENGINEER.

- RCC (ROLLER COMPACTED CONCRETE) OR PCC (PORTLAND CEMENT CONCRETE)
- HMA (HOT MIX ASPHALT)
- BASE

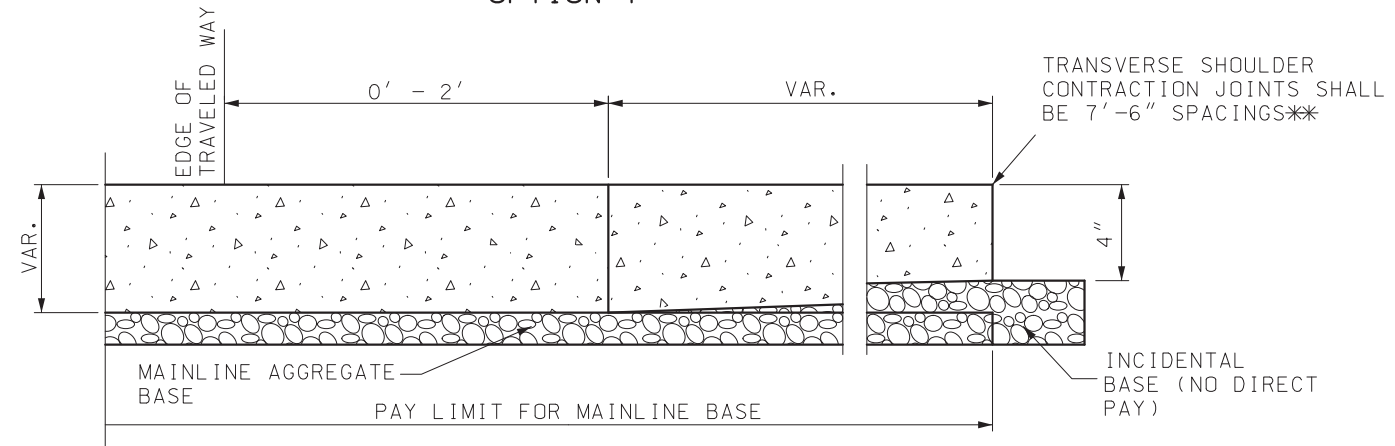
\* USE 1 3/4" BP-1 OVER 4" PMBB UNLESS OTHERWISE SPECIFIED ON THE PLANS.

		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)		<b>TYPE A2 SHOULDERS</b>	
	THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.		
DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018	<b>401.00C</b>	SHEET NO. <b>1 OF 3</b>	

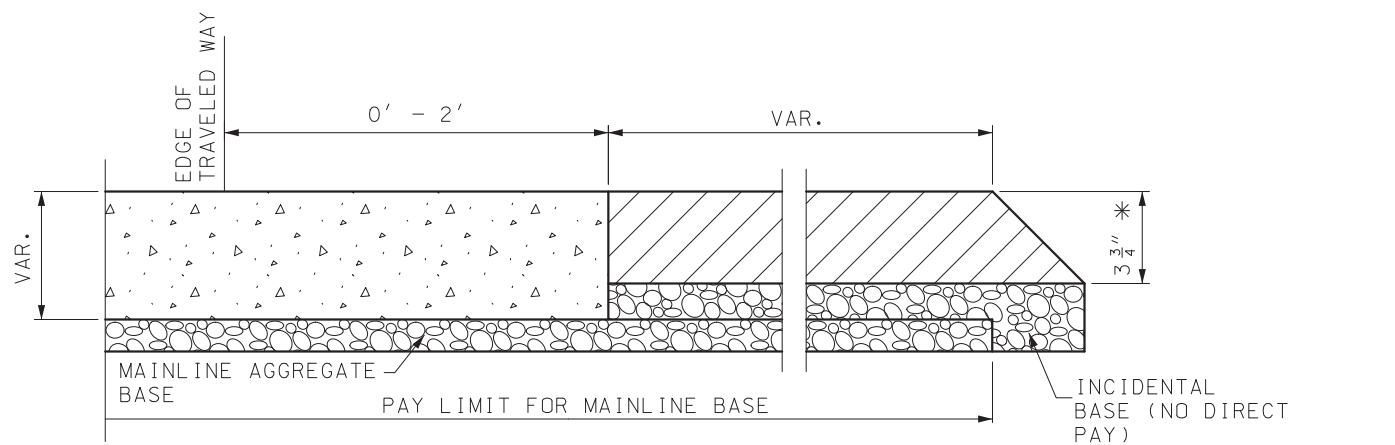
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



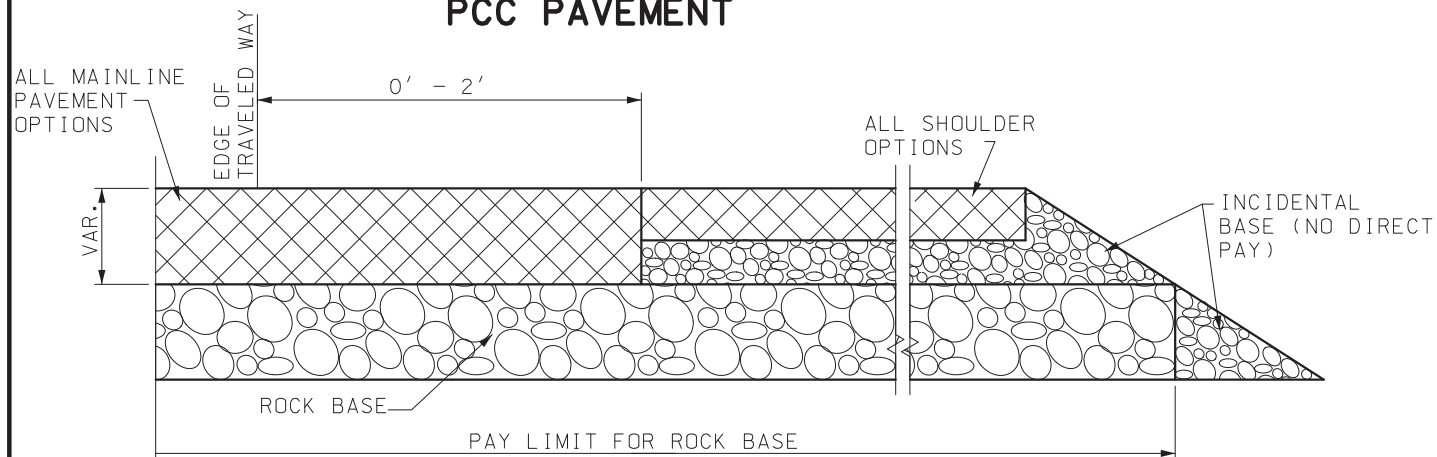
OPTION 1



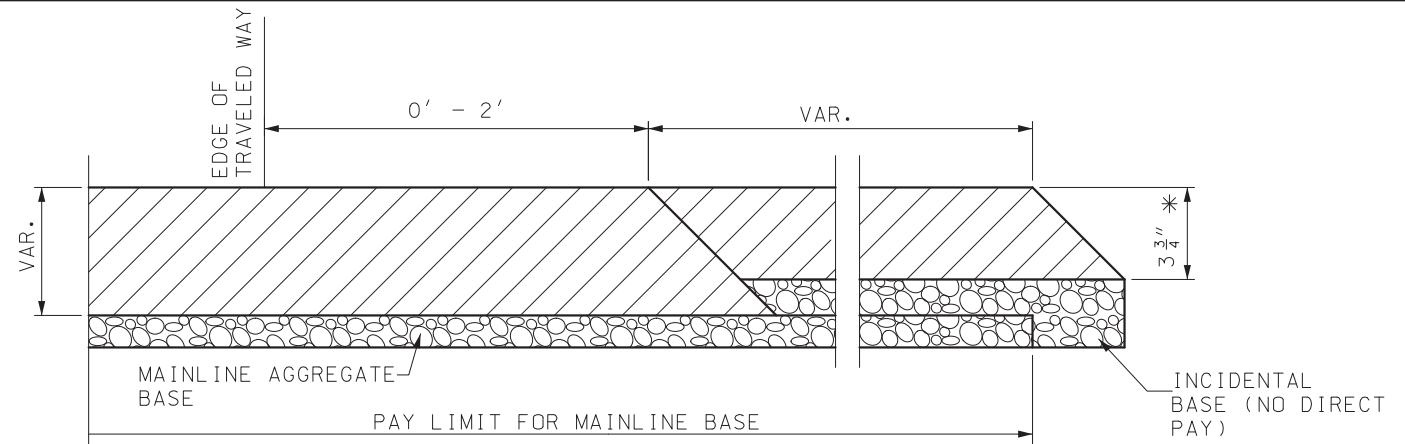
OPTION 2



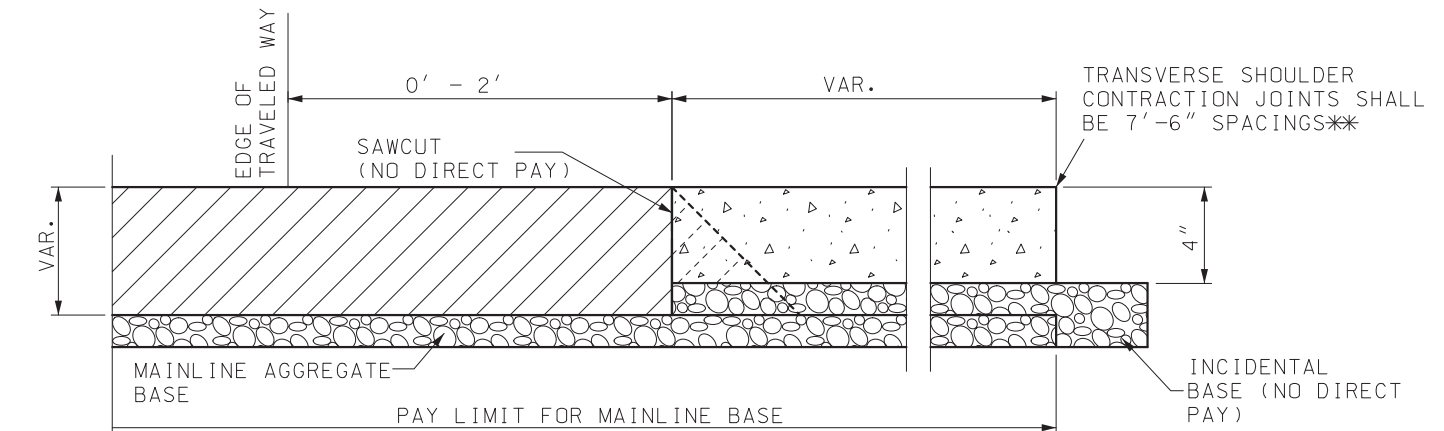
OPTION 3  
PCC PAVEMENT



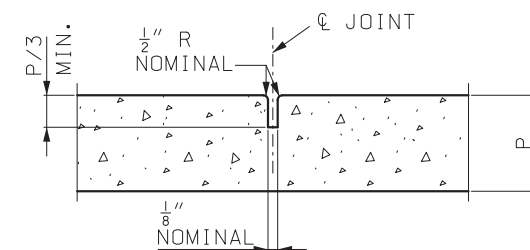
PAVEMENT ON ROCK BASE



HMA PAVEMENT



HMA PAVEMENT



TOOL JOINT

P = SHOULDER THICKNESS

GENERAL NOTE:

THE FINAL FINISH ON CONCRETE SHOULDERS MAY BE OBTAINED BY THE USE OF A DRAG CONSISTING OF A SEAMLESS STRIP OF DAMP BURLAP, COTTON FABRIC, PLASTIC FABRIC OR OTHER SUITABLE MATERIAL CAPABLE OF PRODUCING A UNIFORM SURFACE OF GRITTY TEXTURE.

THE QUANTITY FOR ADDITIONAL BASE MATERIAL RESULTING FROM THE VARIABLE THICKNESS MATERIAL OR CONSTRUCTION METHOD OF TYPE A3 SHOULDER WILL BE CONSIDERED INCIDENTAL.

INCIDENTAL BASE SHALL CONSIST OF TYPE 1 OR 5 AGGREGATE FOR BASE, OR AN ALTERNATE MATERIAL THAT MEETS THE APPROVAL OF THE ENGINEER.

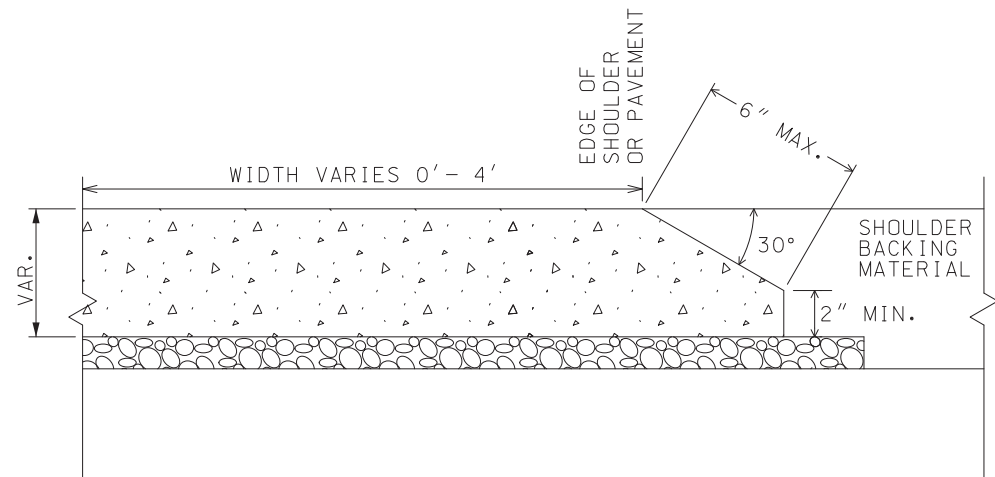
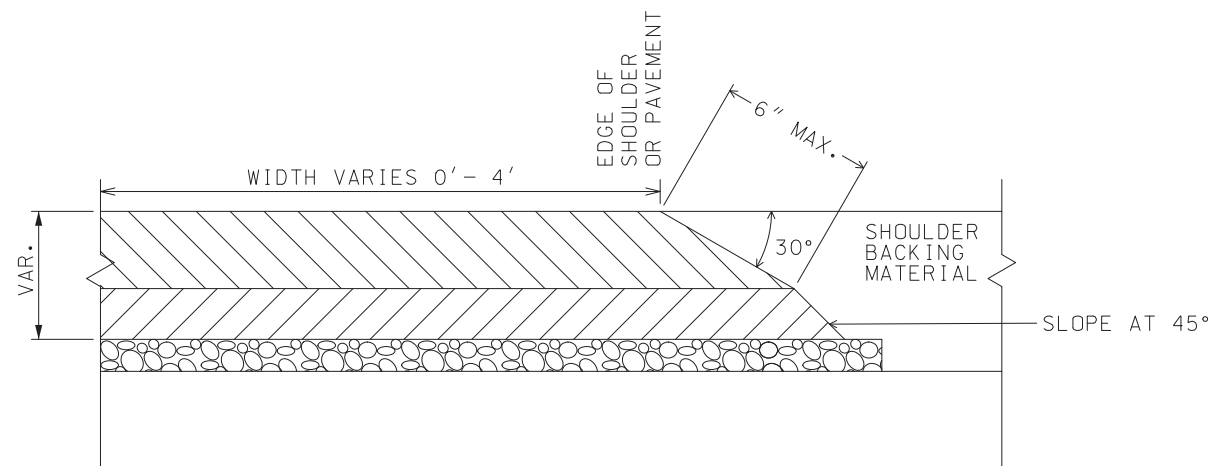
- RCC (ROLLER COMPACTED CONCRETE) OR PCC (PORTLAND CEMENT CONCRETE)
- HMA (HOT MIX ASPHALT)
- BASE

\* USE 3 3/4" BP-1 UNLESS OTHERWISE SPECIFIED ON THE PLANS.

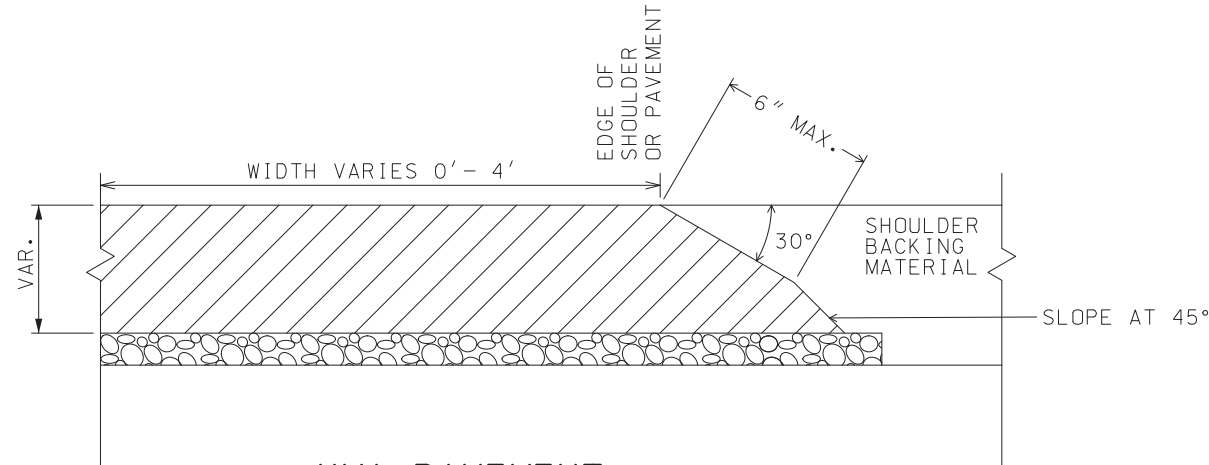
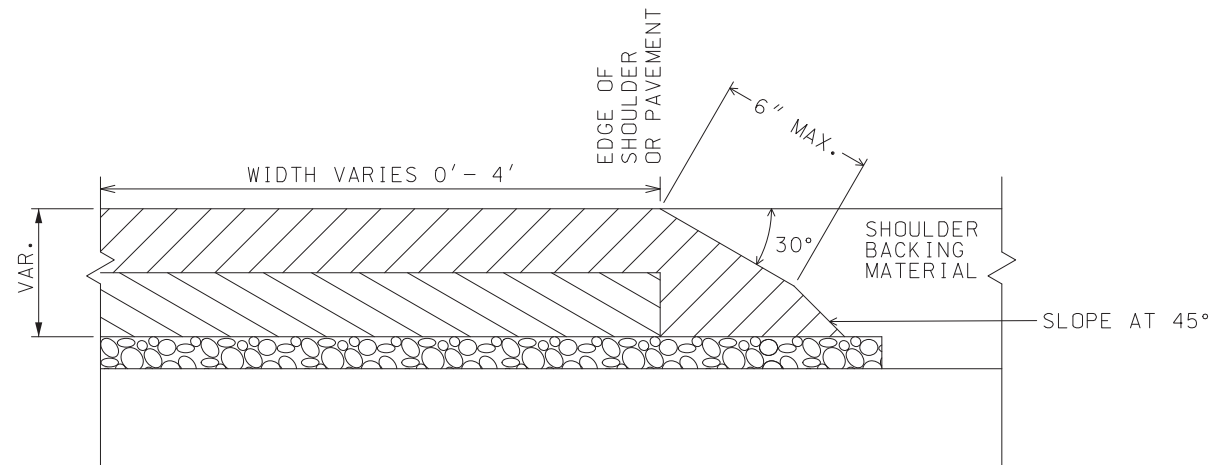
\*\* JOINT DEPTH SHALL BE P/3 AND MAY BE SAWED OR TOOLED.

		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>TYPE A3 SHOULDERS</b>	
DATE EFFECTIVE:	07/01/2018	<b>401.00C</b>	SHEET NO.
DATE PREPARED:	5/3/2018		2 OF 3




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



PCC / RCC PAVEMENT



HMA PAVEMENT

-  RCC (ROLLER COMPACTED CONCRETE) OR PCC (PORTLAND CEMENT CONCRETE)
-  HMA (HOT MIX ASPHALT)
-  BASE MATERIAL (IF APPLICABLE)

GENERAL NOTES:

THE SAFETY EDGE<sup>SM</sup> SHALL BE CONSTRUCTED AT A SLOPE OF 30° FROM THE HORIZONTAL. THE LENGTH, AS MEASURED ALONG THE SLOPE, SHALL BE APPROXIMATELY 2 TIMES THE DEPTH, UP TO A MAXIMUM LENGTH OF 6".

THE SAFETY EDGE<sup>SM</sup> SHALL BE CONSTRUCTED MONOLITHICALLY WITH THE SHOULDER OR PAVEMENT.

THE SAFETY EDGE<sup>SM</sup> SHALL BE BACKFILLED AS SHOWN.

REGARDLESS OF PAVEMENT TYPE, WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE PER SQUARE YARD, THE MATERIAL NECESSARY TO CONSTRUCT THE SAFETY EDGE<sup>SM</sup> IS CONSIDERED INCIDENTAL TO THE PAVEMENT OR SHOULDER. NO MEASUREMENT WILL BE MADE FOR THE MATERIAL USED IN THE SAFETY EDGE<sup>SM</sup> EXCEPT WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE IN VOLUME OR WEIGHT.

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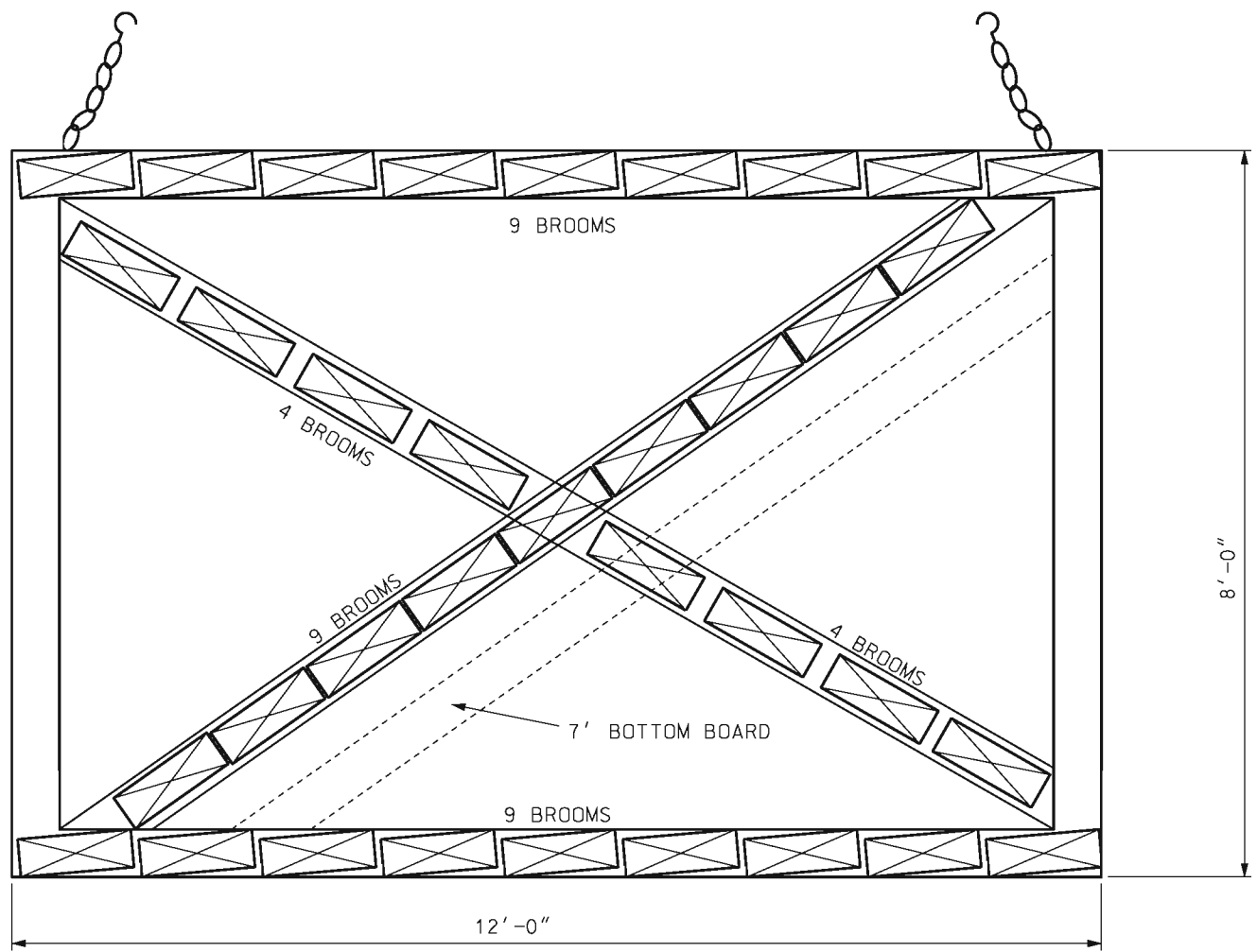
STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**SAFETY EDGE<sup>SM</sup>**


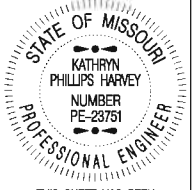
DATE EFFECTIVE: 07/01/2018	<b>401.00C</b>	SHEET NO.
DATE PREPARED: 5/3/2018		3 OF 3

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

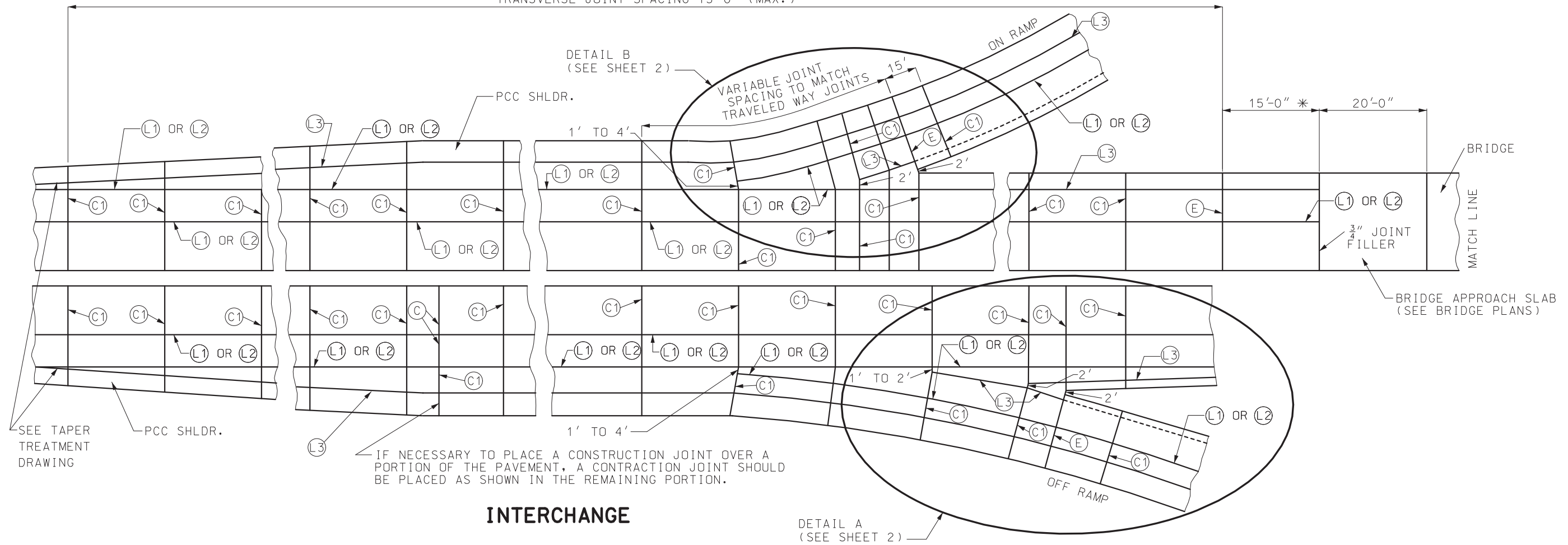


-  STREET BROOMS WITH NYLON BRISTLES
-  3/8" CHAIN WITH HOOKS

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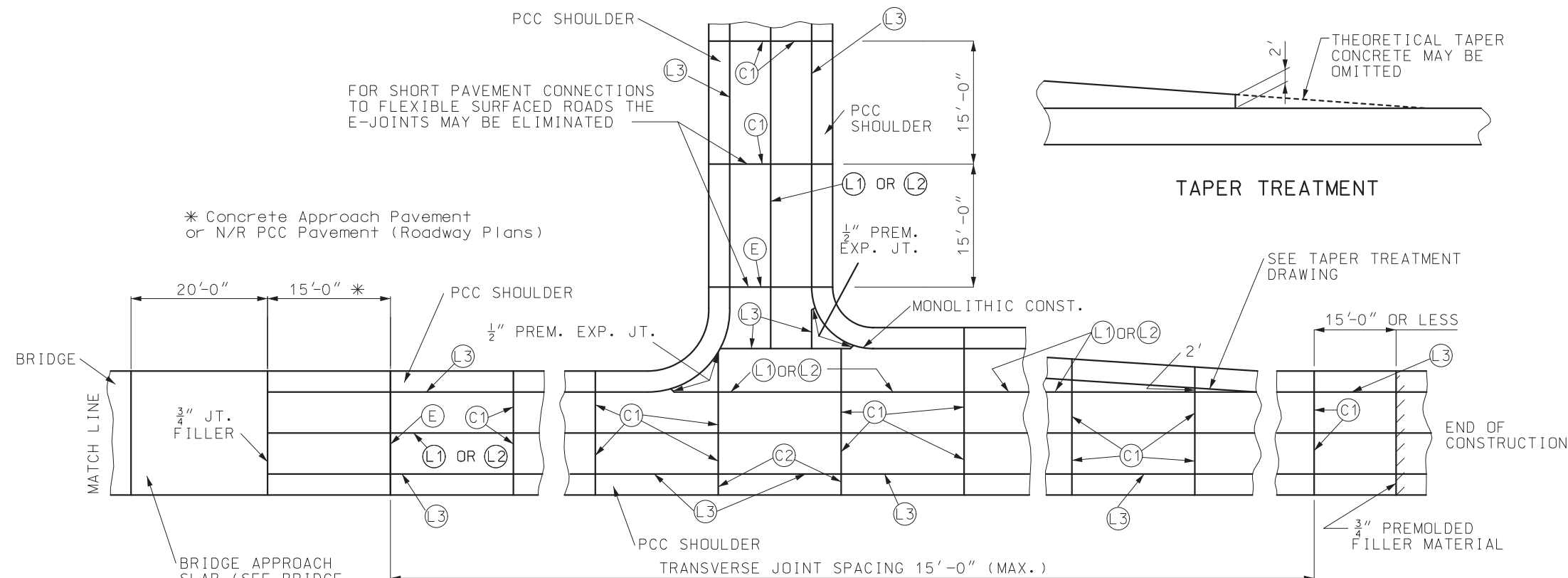
	<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>
	<p><b>SCRUB SEAL BROOM CONFIGURATION</b></p>
<p>THIS SHEET HAS BEEN SIGNED, SEALED, AND DATED ELECTRONICALLY.</p>	
<p>DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/21/2009</p>	<p><b>413.20</b></p>
	<p>SHEET NO. 1 OF 1</p>

TRANSVERSE JOINT SPACING 15'-0" (MAX.)



**INTERCHANGE**

DETAIL A (SEE SHEET 2)



**NON-INTERCHANGE**

**GENERAL NOTES:**

ALL TRANSVERSE JOINTS ON SHOULDERS SHALL BE C2. THE CONTRACTOR SHALL DETERMINE THE PAVING WIDTH.

THE INTERCHANGE WILL EXTEND FROM THE BEGINNING OF THE ACCELERATION/DECELERATION LANE TO THE GORE RETURN TAPER ON THE MAINLINE. THE INTERCHANGE WILL ALSO INCLUDE THE RAMPS UP TO THE BEGINNING OF THE RADIUS WITH THE ROAD INTERSECTING THE RAMP.

FOR JOINT DETAILS, SEE SHEETS NO. 3 & 4.

THE JOINT LAYOUT OF RAMPS IS TYPICAL FOR OUTER RAMPS OF CLOVERLEAF AND DIAMOND INTERCHANGES. SEE OTHER DRAWINGS FOR SPECIAL JOINT LAYOUTS.

JOINT SPACING SHOWN IS MAXIMUM AND IS TO BE REDUCED TO AVOID CONFLICT WITH ABUTTING STRUCTURES. JOINTS IN MULTI-LANE PAVEMENT ARE TO BE CONTINUOUS.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

STATE OF MISSOURI  
TRAVIS D. KOESTNER  
NUMBER PE-30042  
PROFESSIONAL ENGINEER

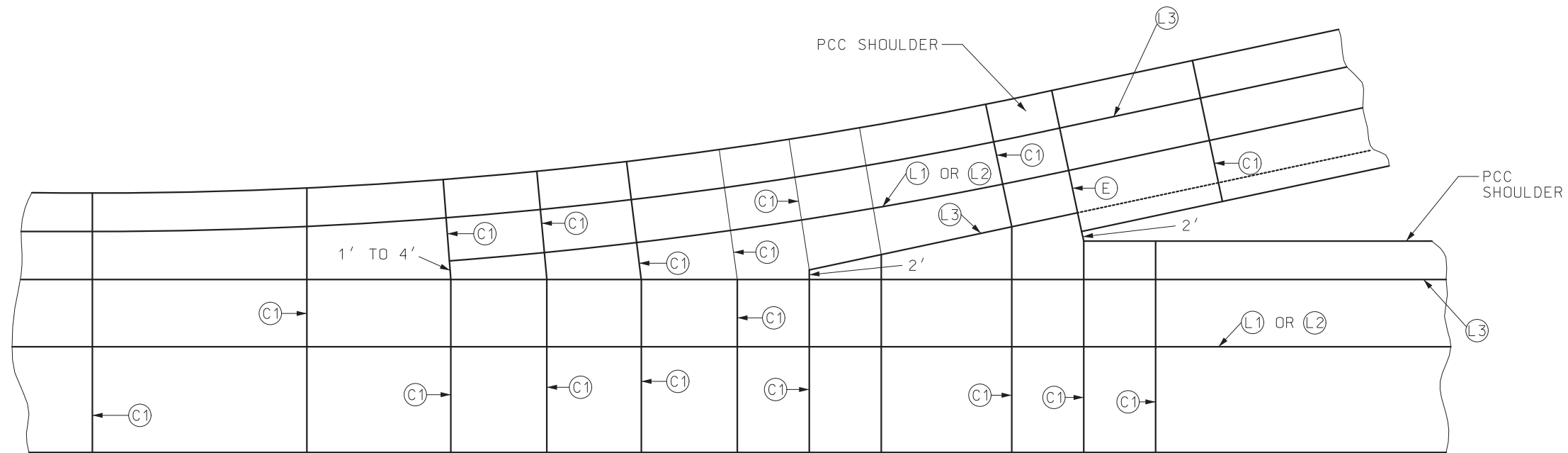
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING**

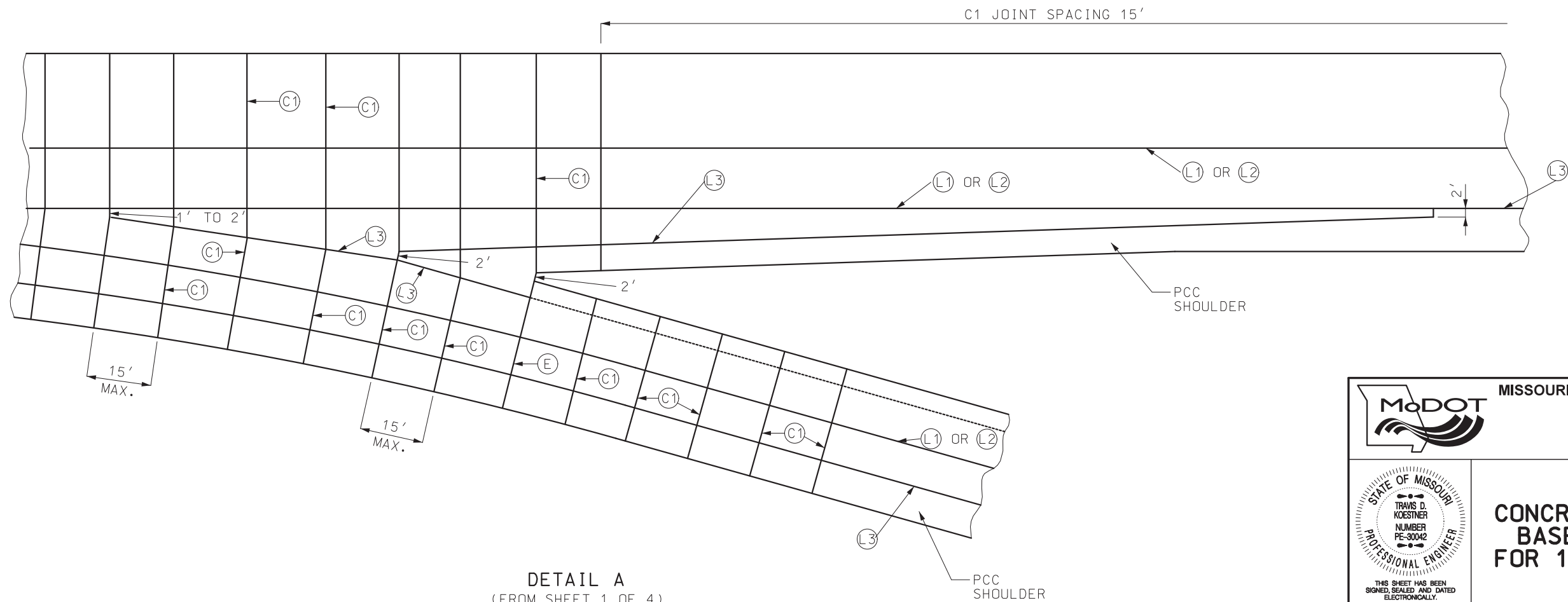
DATE EFFECTIVE: 4/1/2023	<b>502.05S</b>	SHEET NO. 1 OF 4
DATE PREPARED: 1/6/2023		

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



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

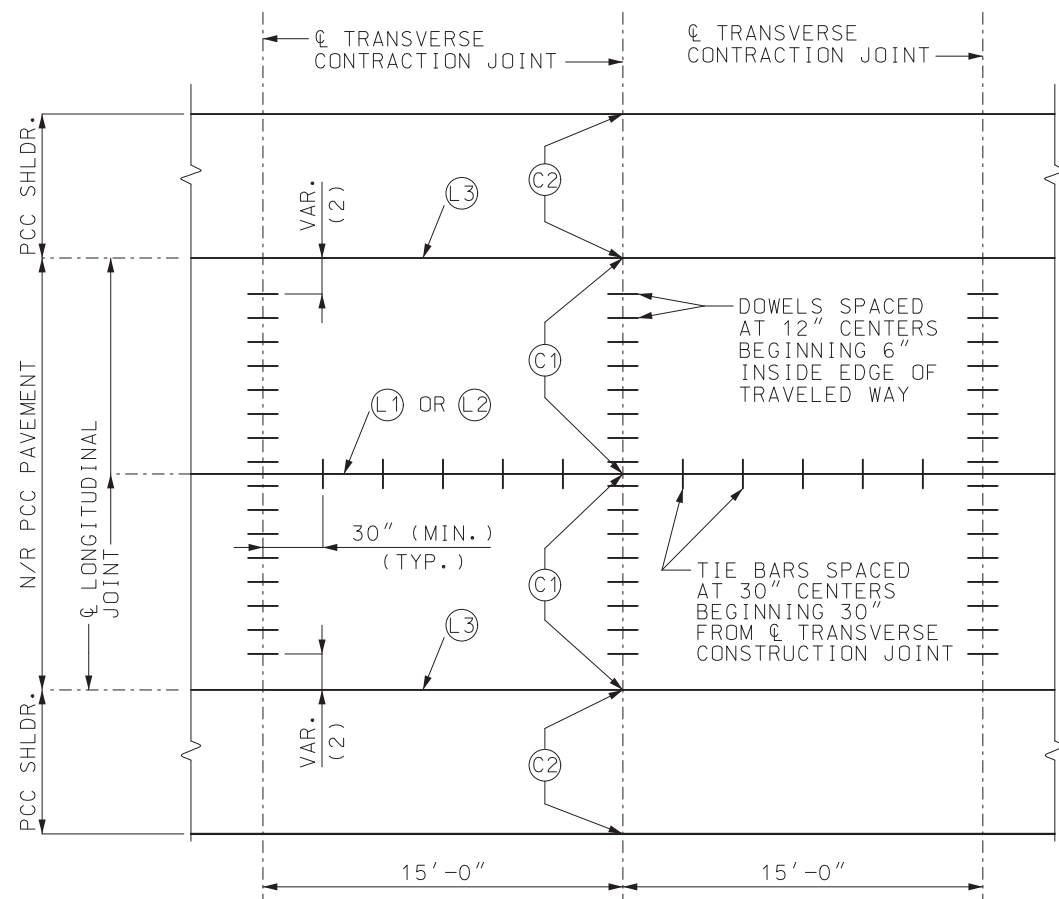


DETAIL B  
(FROM SHEET 1 OF 4)



DETAIL A  
(FROM SHEET 1 OF 4)

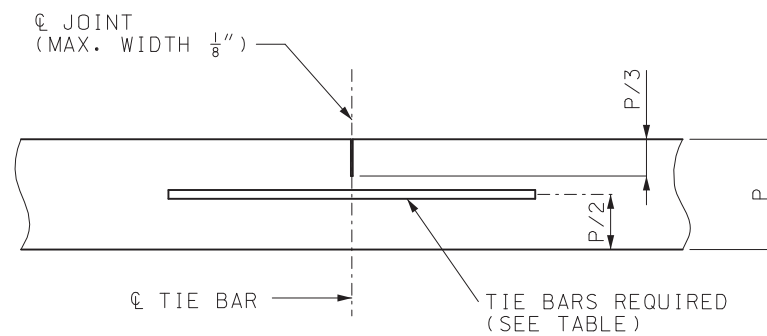
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING</b>
DATE EFFECTIVE: 4/1/2023 DATE PREPARED: 1/6/2023	<b>502.05S</b>	SHEET NO. <b>2 OF 4</b>



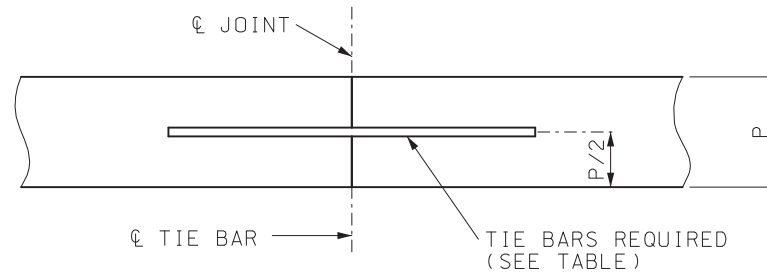
**JOINT PLAN AND SPACING FOR CONTRACTION JOINTS (1)**

- (1) LONGITUDINAL JOINT NOT REQUIRED FOR 4' OR NARROWER SHOULDER, PAVED MONOLITHICALLY WITH ADJACENT LANE AT THE SAME THICKNESS; FULL DEPTH SHOULDER WIDER THAN 4' SHALL REQUIRE (L1) OR (L2) JOINT INSTEAD OF (L3) JOINT.
- (2) DOWEL BARS BEGIN 6" INSIDE EDGE OF TRAVELED WAY.

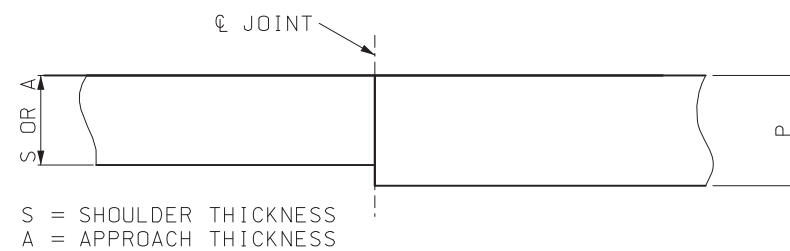
PCCP THICKNESS (P)	DOWEL		TIE BAR	
	SIZE	SPACING	SIZE	SPACING
LESS THAN 7"	NONE	NONE	#5X30"	30" CTRS.
7" TO 10"	1 1/4"X18"	12" CTRS.	#5X30"	30" CTRS.
GREATER THAN 10"	1 1/2"X18"	12" CTRS.	#6X40"	30" CTRS.



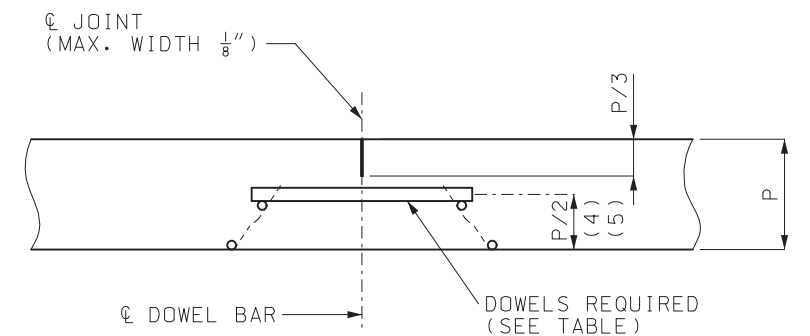
**LONGITUDINAL JOINT (L1)**



**LONGITUDINAL CONSTRUCTION JOINT (L2)**



**LONGITUDINAL CONSTRUCTION JOINT FOR SHOULDER AND APPROACHES (L3)**

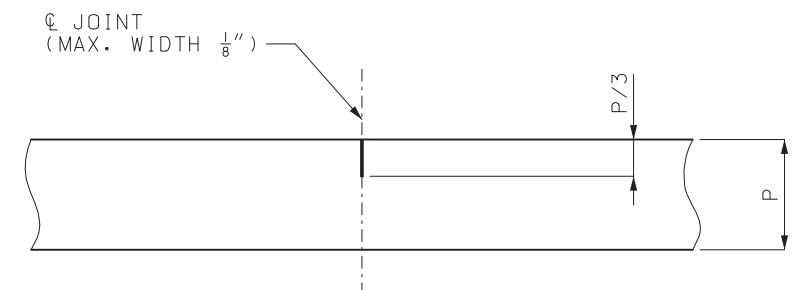


FOR PERMISSIBLE TYPES OF DOWEL SUPPORTING UNITS, SEE OTHER DRAWINGS.

TRANSVERSE CONTRACTION JOINTS FOR CONCRETE PAVEMENT OR BASE WIDENING SHALL MATCH EXISTING JOINTS.

**TRANSVERSE CONTRACTION JOINT (C1) (3)**

- (3) DOWEL BARS ARE REQUIRED FOR ALL PAVEMENTS HAVING THE SAME THICKNESS AS THE TRAVELED WAY.
- (4) FOR PAVEMENTS HAVING THICKNESS IN 1/2" INCREMENTS, DOWEL BASKETS SHALL BE (P-1/2")/2.
- (5) DOWEL BARS MAY BE PLACED BY MECHANICAL MEANS AT THE OPTION OF THE CONTRACTOR.



**TRANSVERSE CONTRACTION JOINT (C2)**

GENERAL NOTES:

THE FINAL POSITION OF ALL DOWELS AND TIE BARS SHALL BE PERPENDICULAR TO THE PLANE OF THE JOINT AND PARALLEL TO THE SURFACE OF THE PAVEMENT AND PARALLEL TO EACH OTHER.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

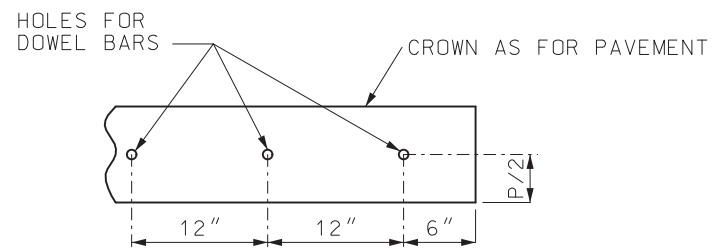
**502.05S**

SHEET NO.  
3 OF 4

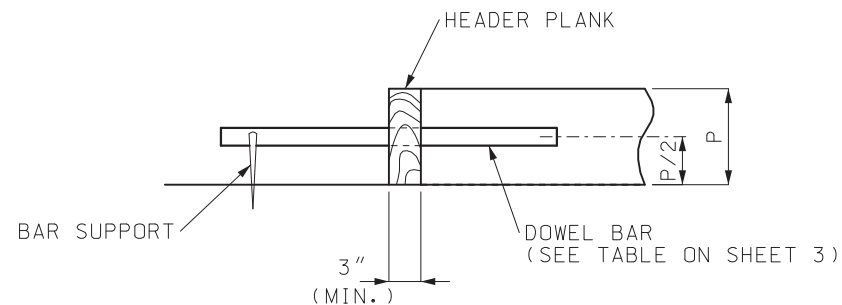
DATE EFFECTIVE: 4/1/2023  
DATE PREPARED: 1/6/2023

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

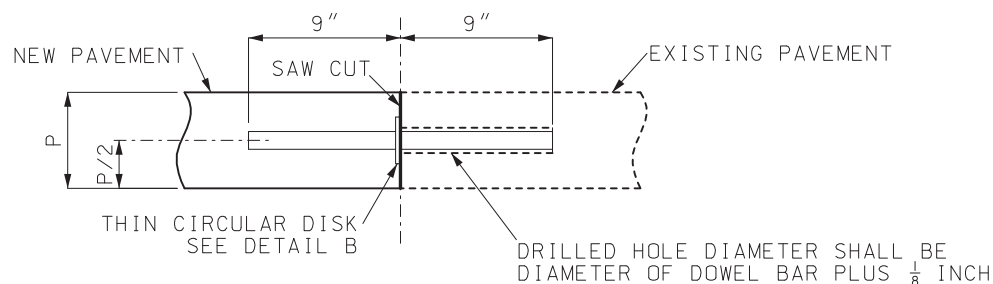




PART ELEVATION OF  
HEADER PLANK



HEADER SECTION



SAWED SECTION

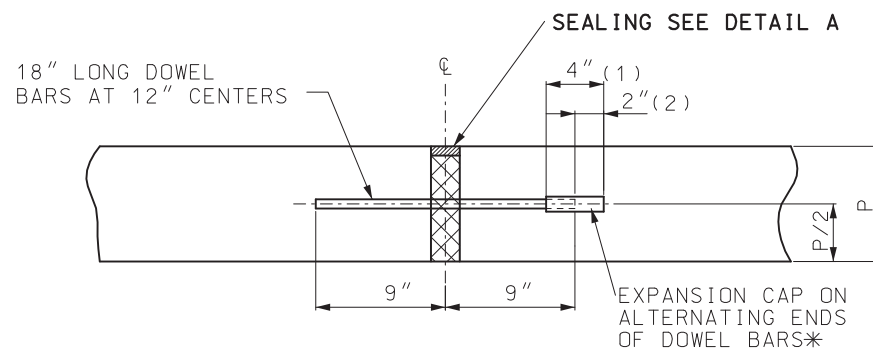
THE HEADER BOARD SHALL BE SUFFICIENTLY RIGID TO PREVENT DISTORTION FROM THE TYPICAL SECTION AND MAINTAIN A STRAIGHT LINE FROM PAVEMENT EDGE TO PAVEMENT EDGE.

THE CONSTRUCTION JOINT MAY BE SAWED FULL DEPTH. HOLES FOR DOWEL BARS SHALL BE DRILLED AFTER THE CONCRETE HAS SUFFICIENT SET TO PREVENT DAMAGE. DOWEL BARS SHALL BE BONDED INTO THE HOLES.

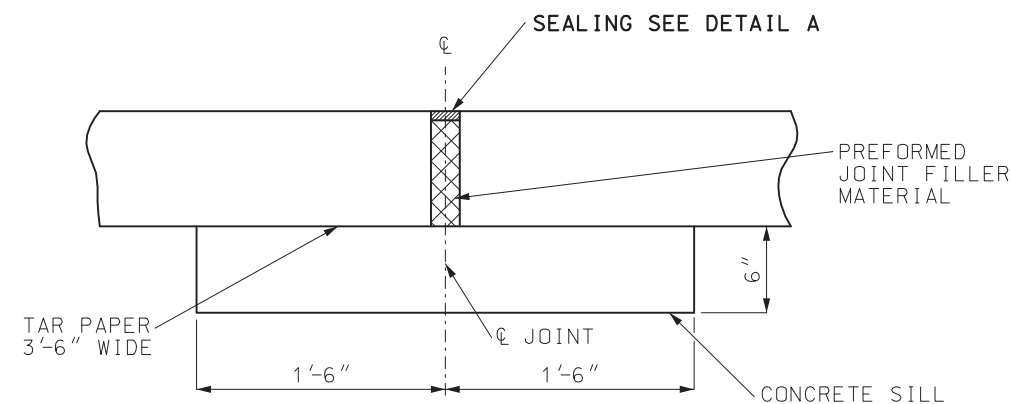
BONDING FOR DOWEL BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

THE PORTION OF THE DOWEL OUTSIDE THE HOLE SHALL BE COATED WITH AN APPROVED LUBRICANT.

**CONSTRUCTION JOINT (C)**

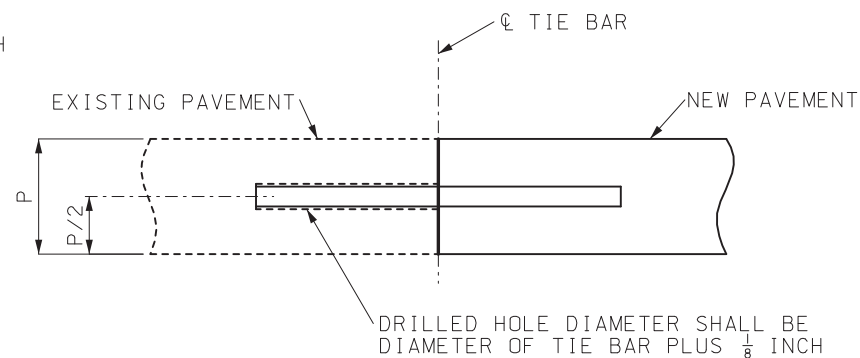


**EXPANSION JOINT (E)**



SILL SHALL EXTEND 18" BEYOND EACH EDGE OF THE PAVEMENT AND SHALL BE CONSTRUCTED OF CONCRETE REGARDLESS OF ADJACENT BASE MATERIAL.

**ALTERNATE EXPANSION JOINT (E)**  
(CONTRACTOR MAY SELECT EITHER EXPANSION JOINT (E))



**LONGITUDINAL CONSTRUCTION JOINT (L)**  
(EXISTING PAVEMENT)

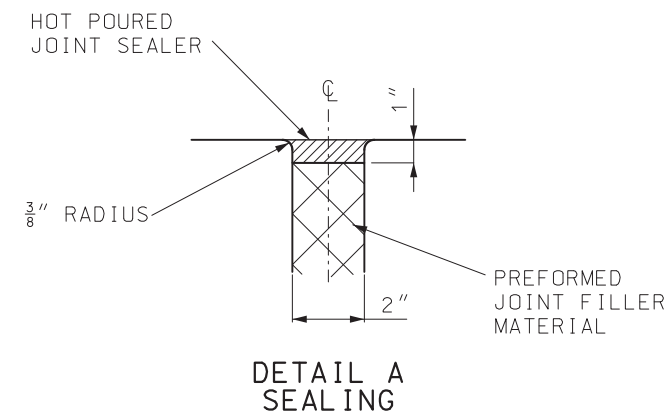
TIE BARS SHALL BE EPOXY COATED, DEFORMED REINFORCING BARS MEETING THE REQUIREMENTS OF SECTIONS 710 AND 1057.

BONDING FOR TIE BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

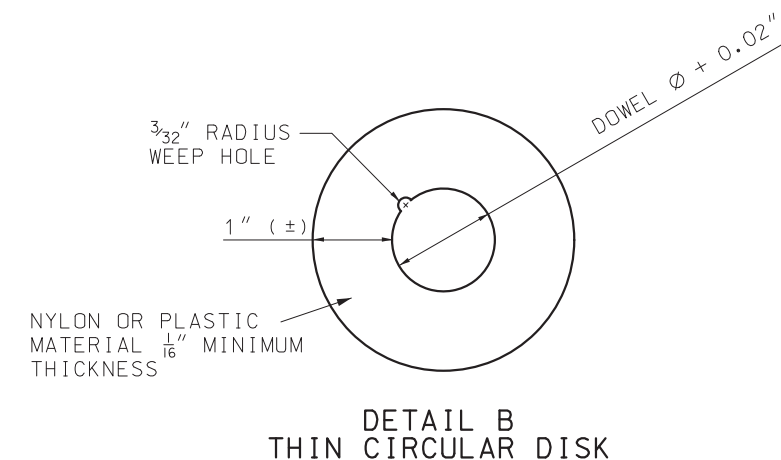
TIE BAR SIZE AND LENGTH SHALL BE BASED ON THE THICKNESS OF THE THINNER PAVEMENT OR SHOULDER TO BE TIED TOGETHER.

- (1) LENGTH OF CAP
- (2) GAP BETWEEN END OF CAP AND DOWEL.

\* FOR EXPANSION JOINTS FORMED USING A CONSTRUCTION HEADER, THE EXPANSION CAPS SHALL BE INSTALLED ON THE EXPOSED END OF EACH BAR ONCE THE HEADER HAS BEEN REMOVED AND THE JOINT FILLER MATERIAL HAS BEEN INSTALLED.



DETAIL A  
SEALING



DETAIL B  
THIN CIRCULAR DISK

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

STATE OF MISSOURI  
TRAVIS D. KOESTNER  
NUMBER PE-30042  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING**

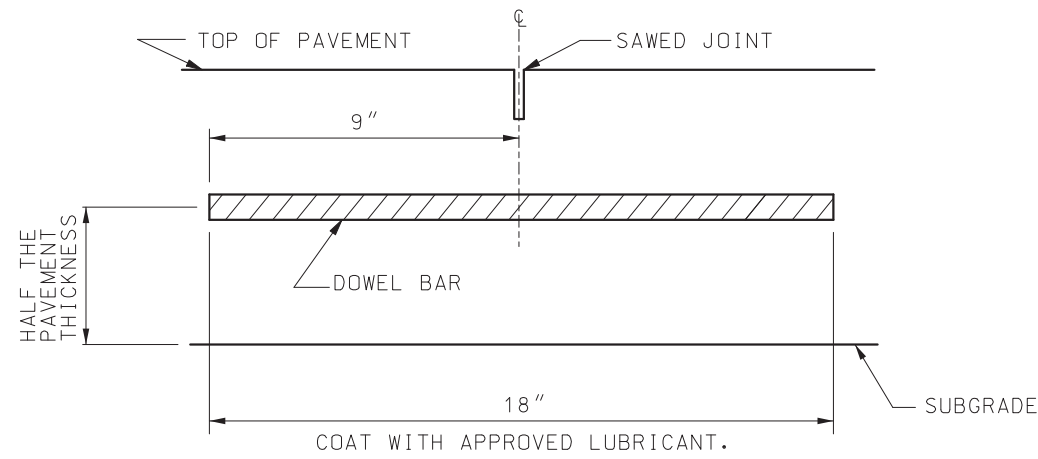
DATE EFFECTIVE: 4/1/2023  
DATE PREPARED: 1/6/2023

**502.05S**

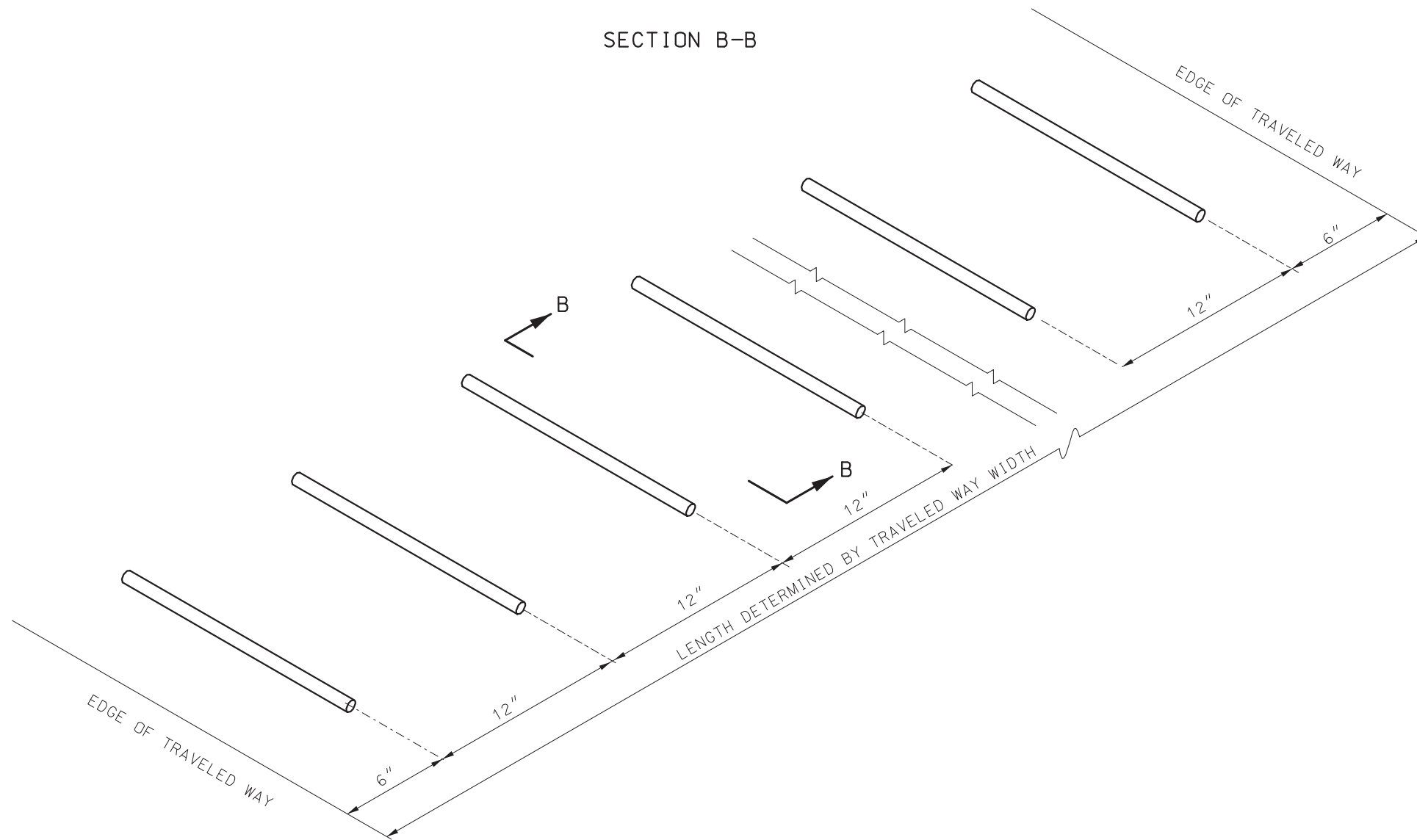
SHEET NO.  
4 OF 4

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







SECTION B-B



GENERAL NOTES:

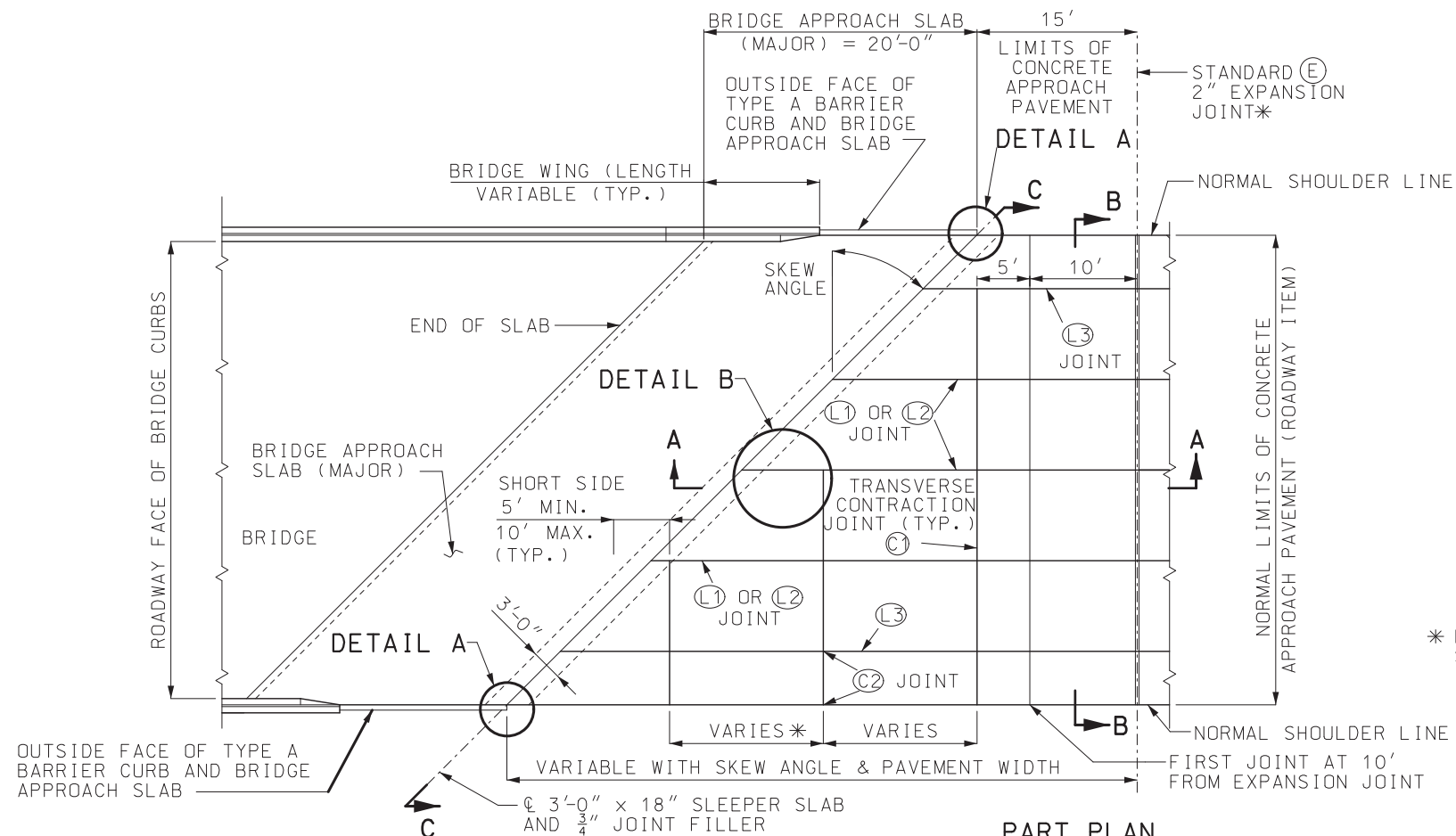
IN THE COMPLETED JOINT INSTALLATION, DOWELS SHALL BE POSITIONED WITHIN 1/2" OF THE VERTICAL AND HORIZONTAL PLANE AND IN THE LONGITUDINAL DIRECTION. THE SKEW TOLERANCE SHALL BE 1/4".

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		<b>DOWEL SUPPORTING UNITS</b> MECHANICAL PLACEMENT
DATE EFFECTIVE: 4/1/2023 DATE PREPARED: 1/6/2023	<b>502.10L</b>	SHEET NO. 2 OF 2

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

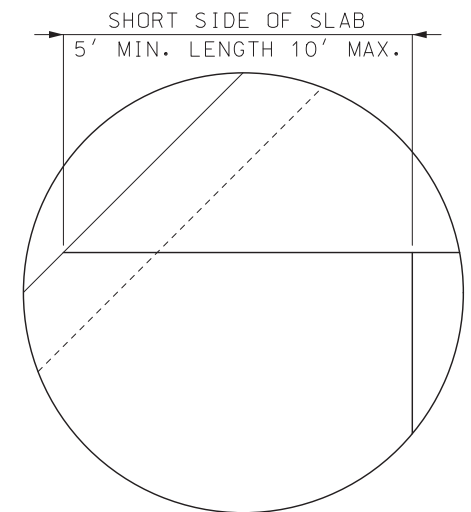


NOTE:  
SHORT SIDE OF SKEWED SLAB FOR ALL LANES NEXT TO BRIDGE APPROACH SLAB SHALL BE 5' TO 10'.

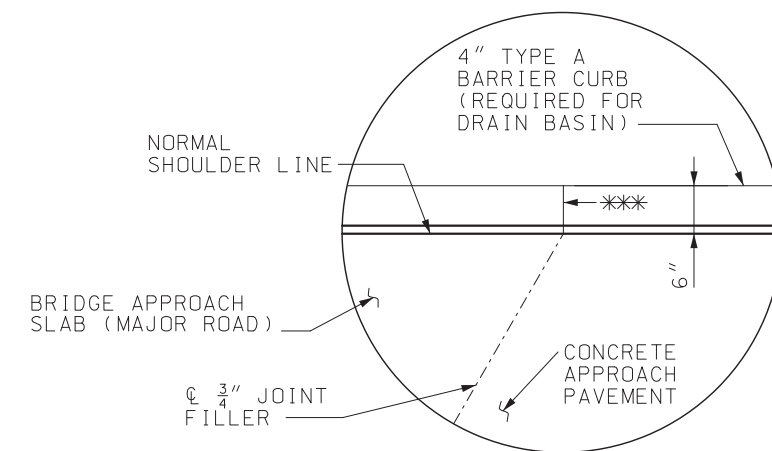


PART PLAN (SKEWED)

\* LENGTH OF RECTANGULAR SLABS BETWEEN SKEWED SLAB AND FIRST 10' SLAB SHALL BE 10' TO 15'.



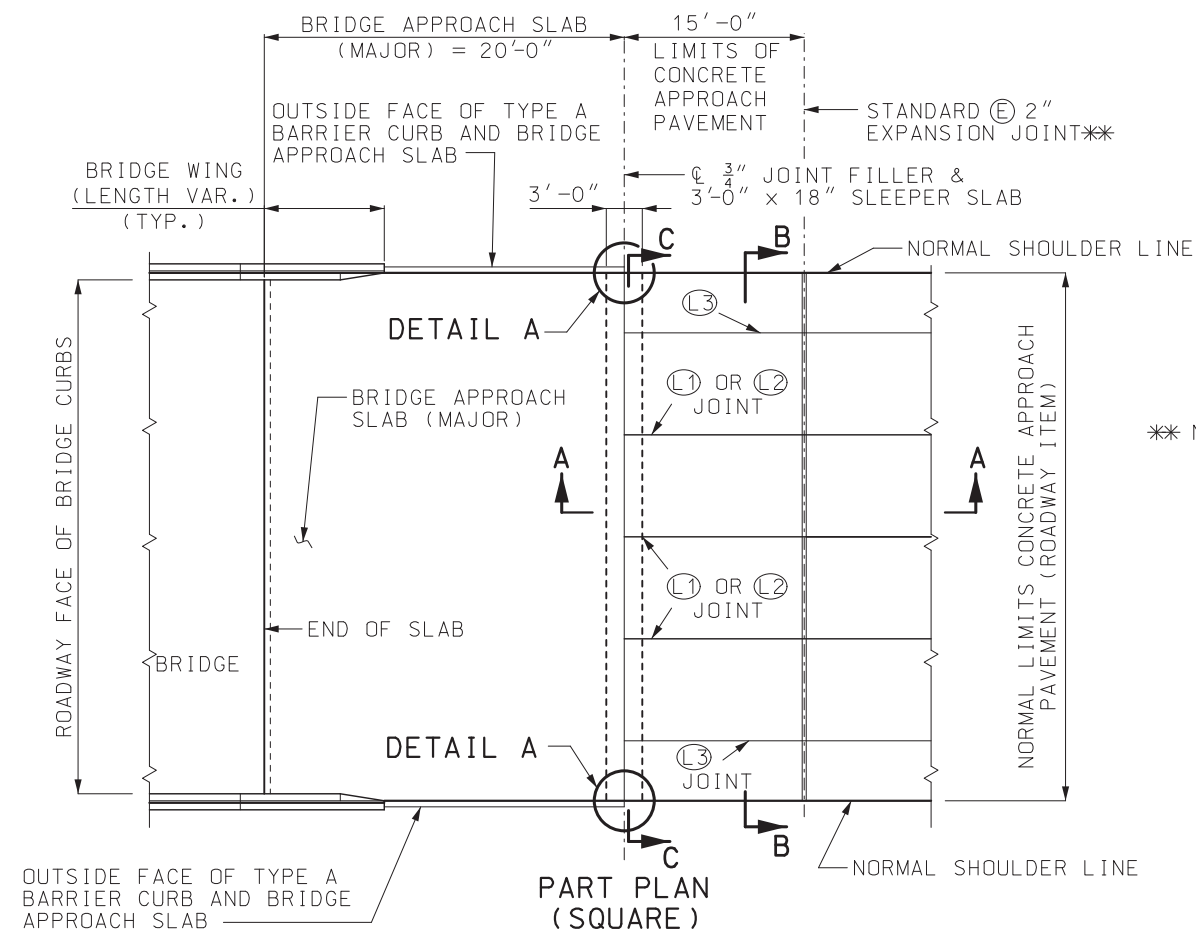
DETAIL B



DETAIL A

\*\*\* USE  $\frac{3}{4}$ " JOINT FILLER BETWEEN TYPE A CURBS

\*\* NOT REQUIRED WHEN ADJACENT PAVEMENT IS ASPHALT.



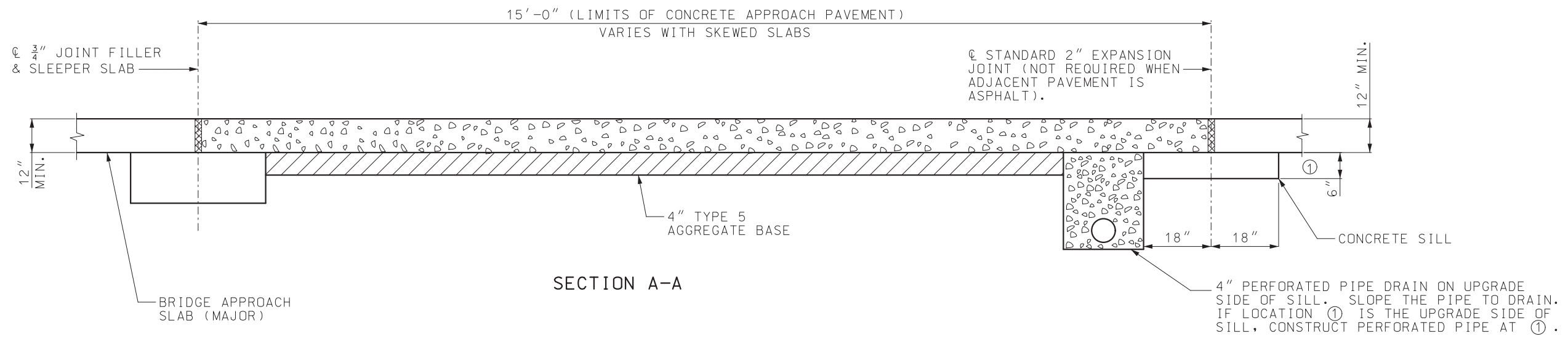
PART PLAN (SQUARE)

NOTE:  
FOR SECTIONS A-A, B-B AND C-C, SEE SHEET 3 OF 3.

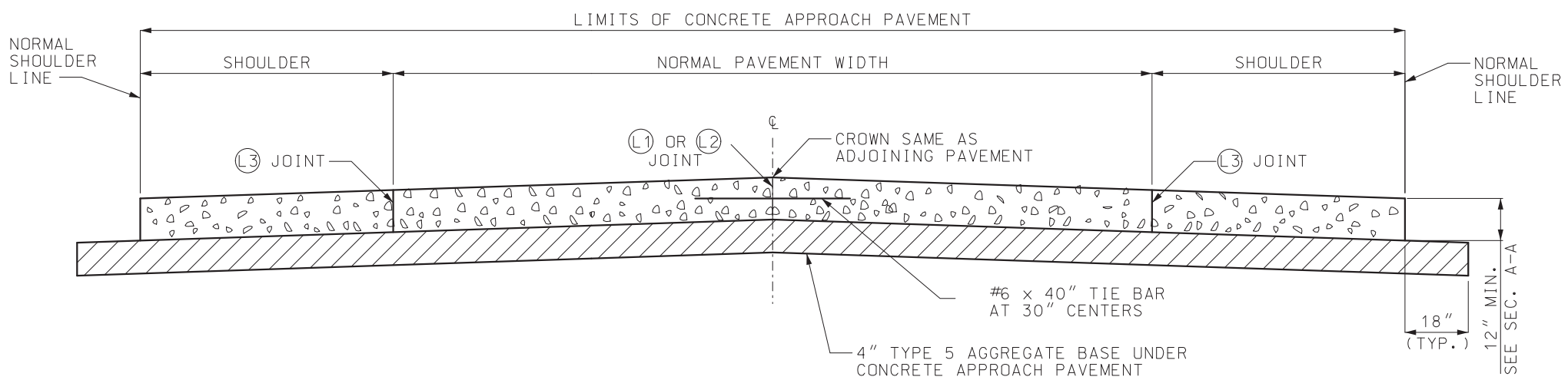
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE APPROACH PAVEMENT FOR MULTI-LANE PAVEMENTS (MAJOR ROUTE)</b>	
	DATE EFFECTIVE: 10/01/2022 DATE PREPARED: 7/19/2022	<b>504.00L</b>

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

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

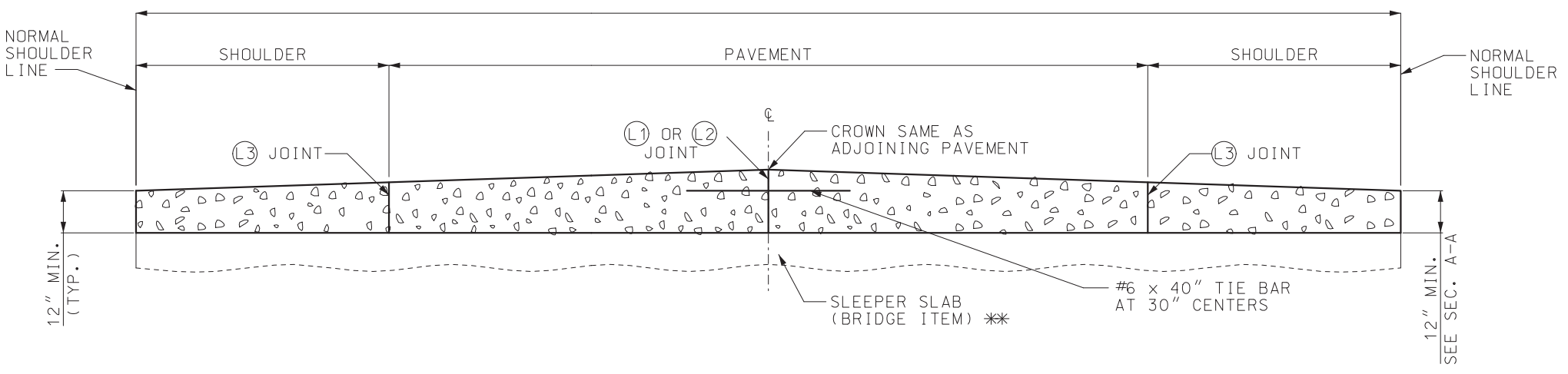


SECTION A-A



SECTION B-B

FOR LOCATIONS OF SECTIONS A-A, B-B AND C-C, SEE SHEETS 1 AND 2.



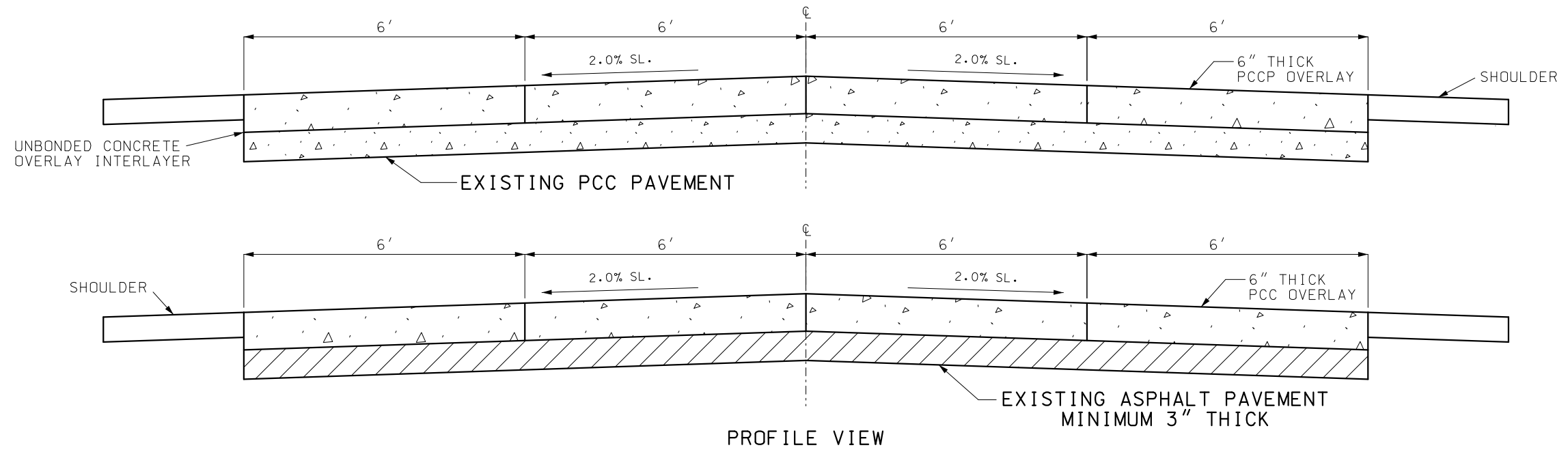
SECTION C-C

\*\* TOP OF SLEEPER SLAB MAY BE FLAT OR CROWNED. SEE BRIDGE PLANS.

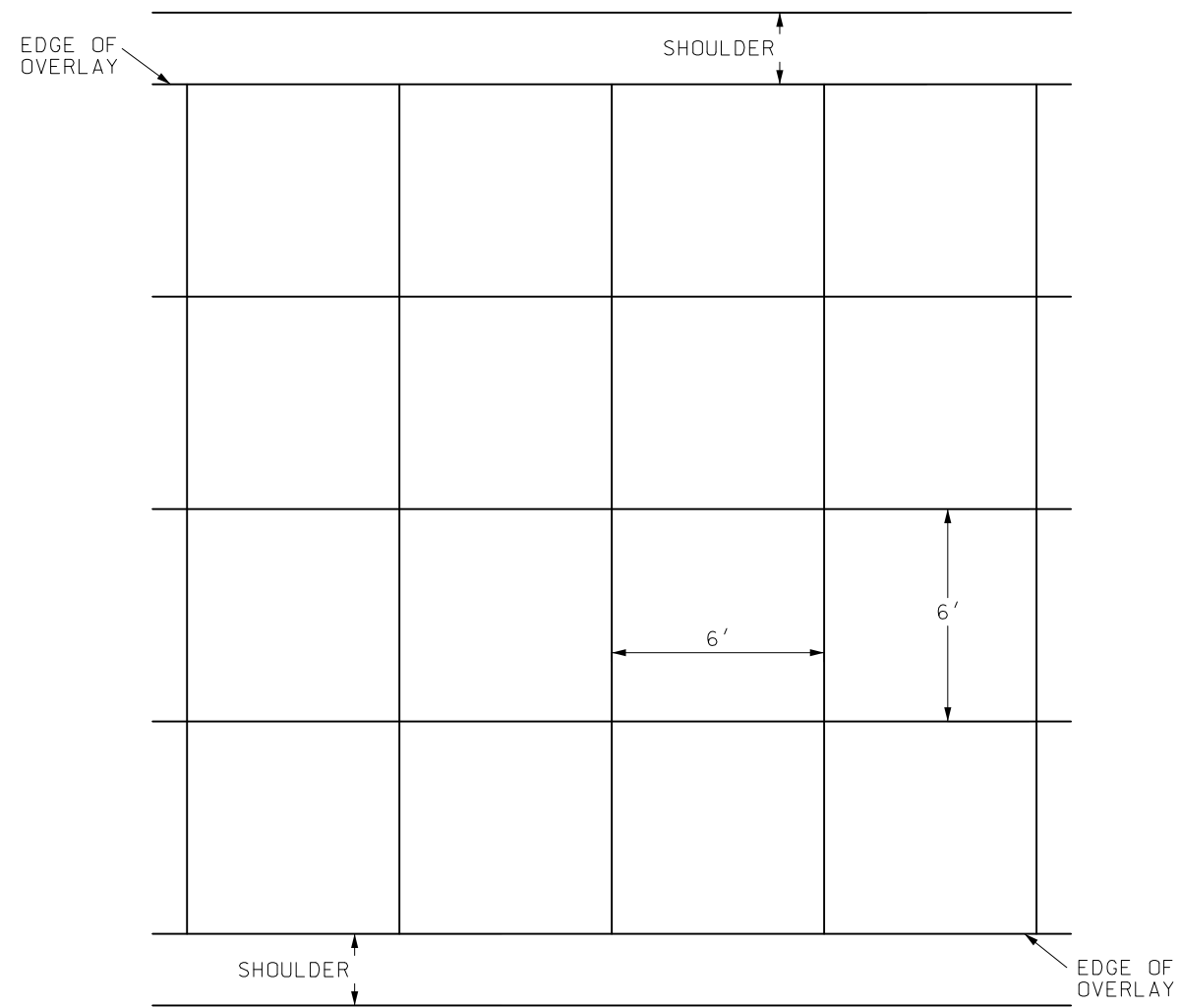
GENERAL NOTES:

SEE STANDARD DRAWING 605.10 FOR PIPE OUTLET DETAIL FROM SHOULDER POINT TO INSLOPE.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE APPROACH PAVEMENT (MAJOR ROUTE)</b>	
DATE EFFECTIVE: 10/01/2022 DATE PREPARED: 7/19/2022	<b>504.00L</b>	SHEET NO. <b>3 OF 3</b>



PROFILE VIEW



JOINT LAYOUT

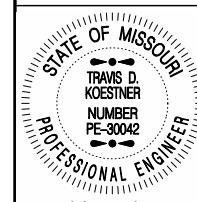
GENERAL NOTES:

CONCRETE OVERLAY DESIGN THICKNESS WILL VARY BASED ON TRAFFIC VOLUMES, BUT WILL TYPICALLY RANGE FROM 5 1/2" TO 6". THE CONSTRUCTION AND MATERIALS PAVEMENT SECTION WILL DETERMINE THE DESIGN THICKNESS.



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**BIG BLOCK UNBONDED CONCRETE OVERLAY**

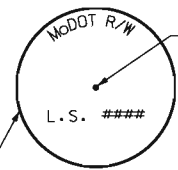
DATE EFFECTIVE: 07/01/2021  
DATE PREPARED: 4/29/2021

**506.20**

SHEET NO.  
1 OF 1

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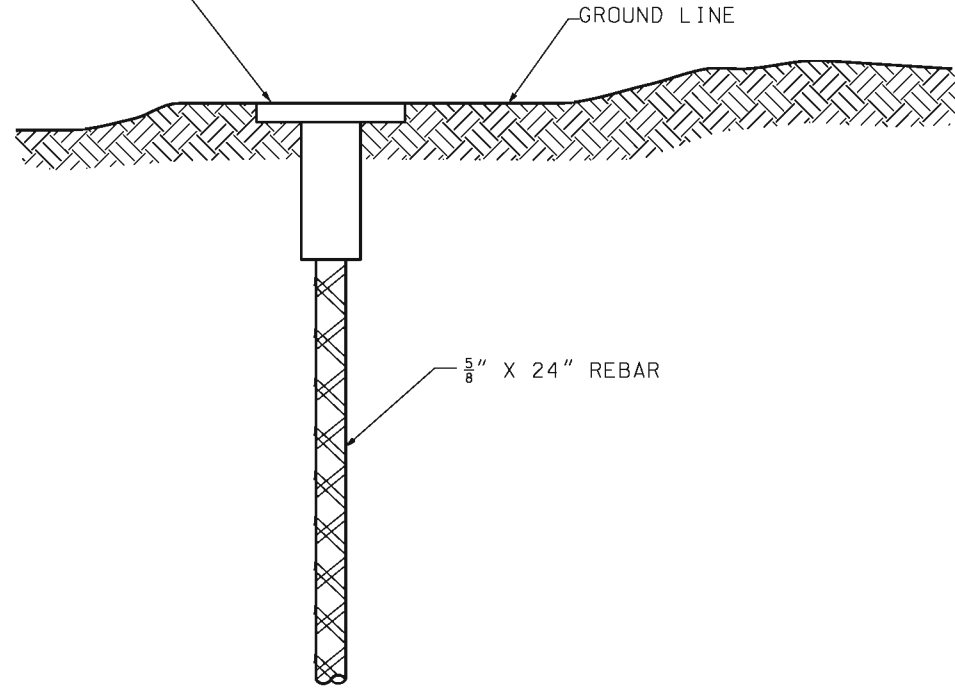
STAMP  $\frac{3}{16}$ " LETTERING INTO CAP FOR "MoDOT R/W". L.S. NUMBER AND LETTERING SHALL BE  $\frac{1}{8}$ " OR LARGER



PUNCH MARK (NOT NECESSARILY CENTERED)

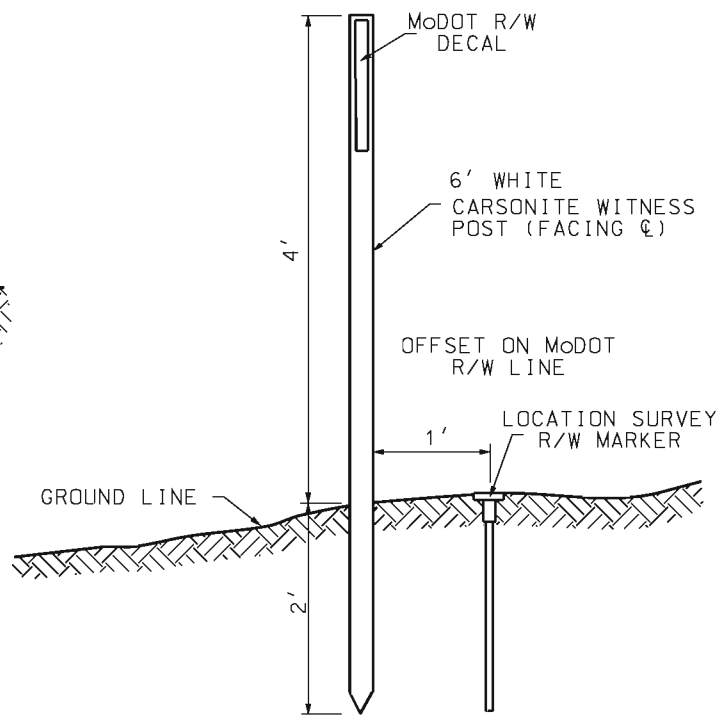
2" DIA. FLAT ALUMINUM CAP

TOP VIEW

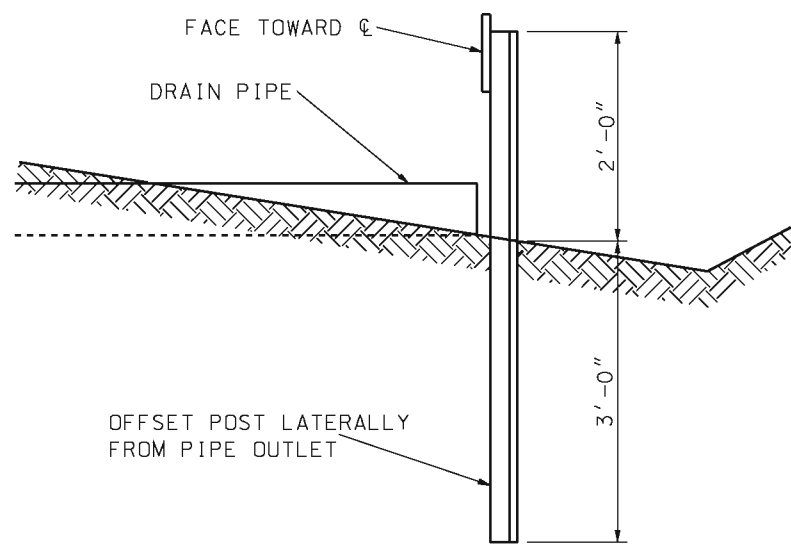


SIDE VIEW

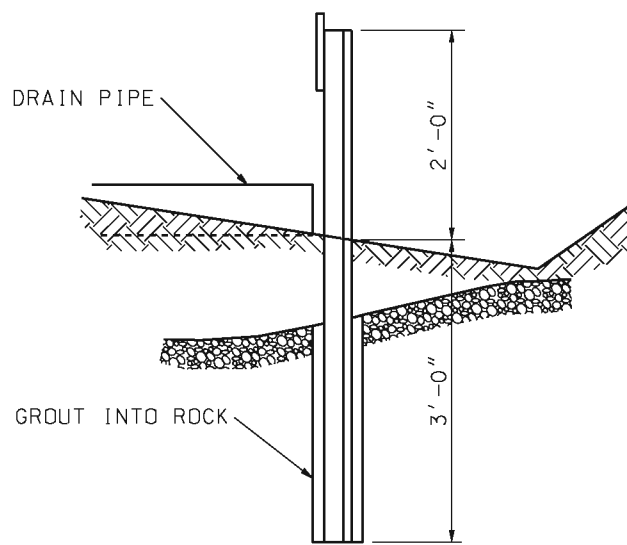
**LOCATION SURVEY RIGHT-OF-WAY MARKER**



**WITNESS POST**



IN EARTH



IN ROCK

**DRAIN MARKER**

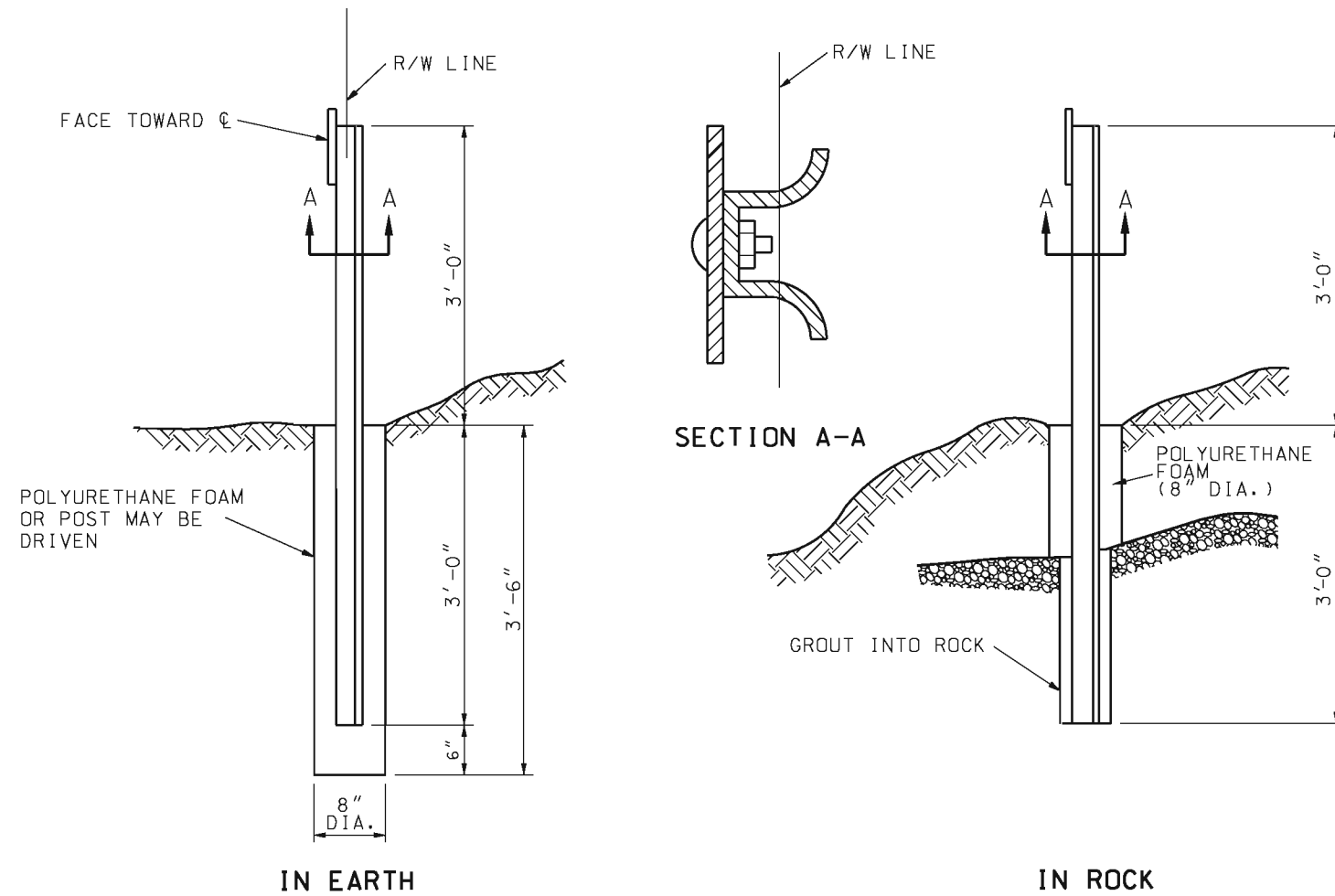
**GENERAL NOTES:**

WHEN STEEL AND LOCATION SURVEY R/W MARKERS ARE NOT SUITABLE DUE TO NATURAL GROUND FEATURES OR MAN-MADE STRUCTURES, ALTERNATIVE MONUMENTATION (IN COMPLIANCE WITH THE APPROVED MONUMENTATION, AS SPECIFIED BY THE MISSOURI MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS) MAY BE SET.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p align="center"><b>RIGHT-OF-WAY AND DRAIN MARKERS</b></p>
DATE EFFECTIVE: 01/01/2003 DATE PREPARED: 8/21/2009	<b>602.00D</b>	SHEET NO. 1 OF 2

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

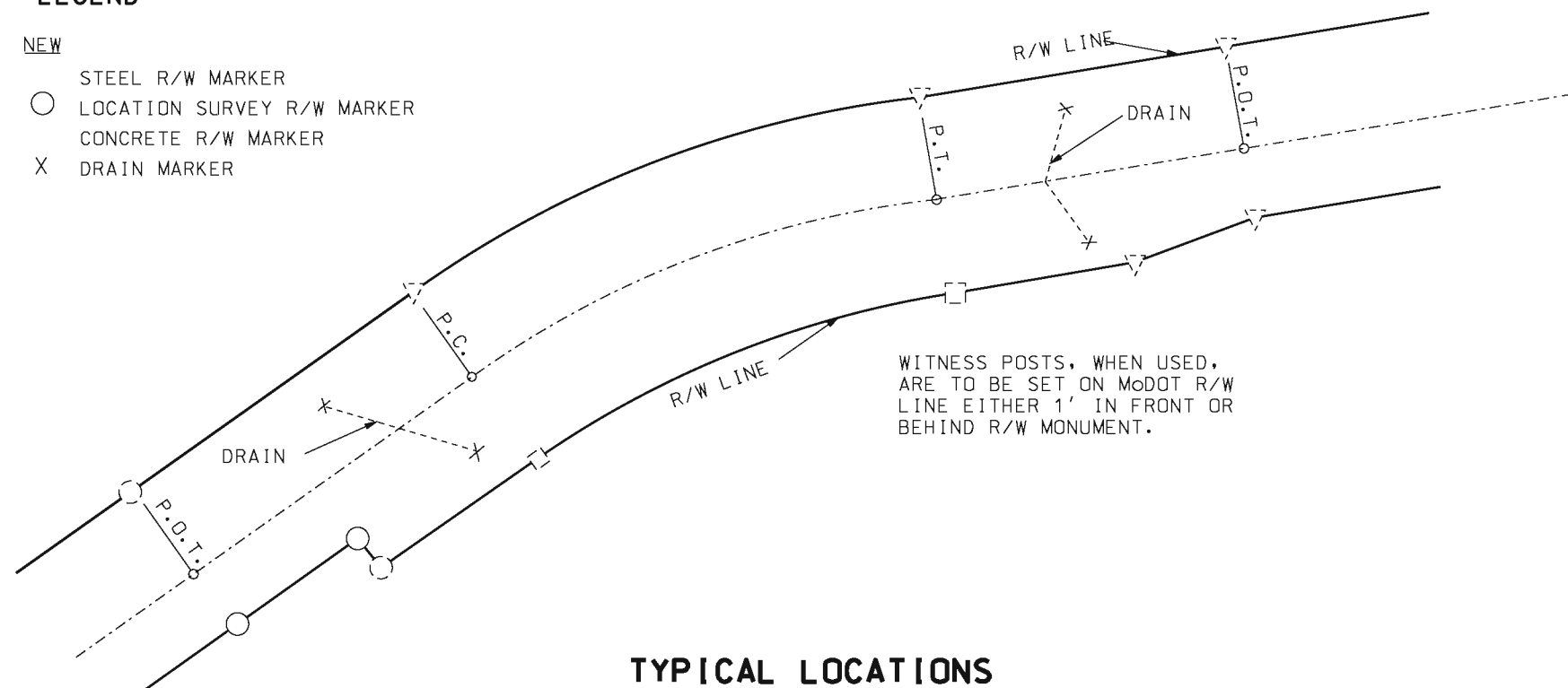





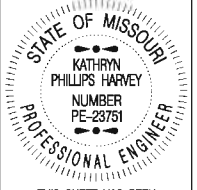
**STEEL RIGHT-OF-WAY MARKER**

**LEGEND**

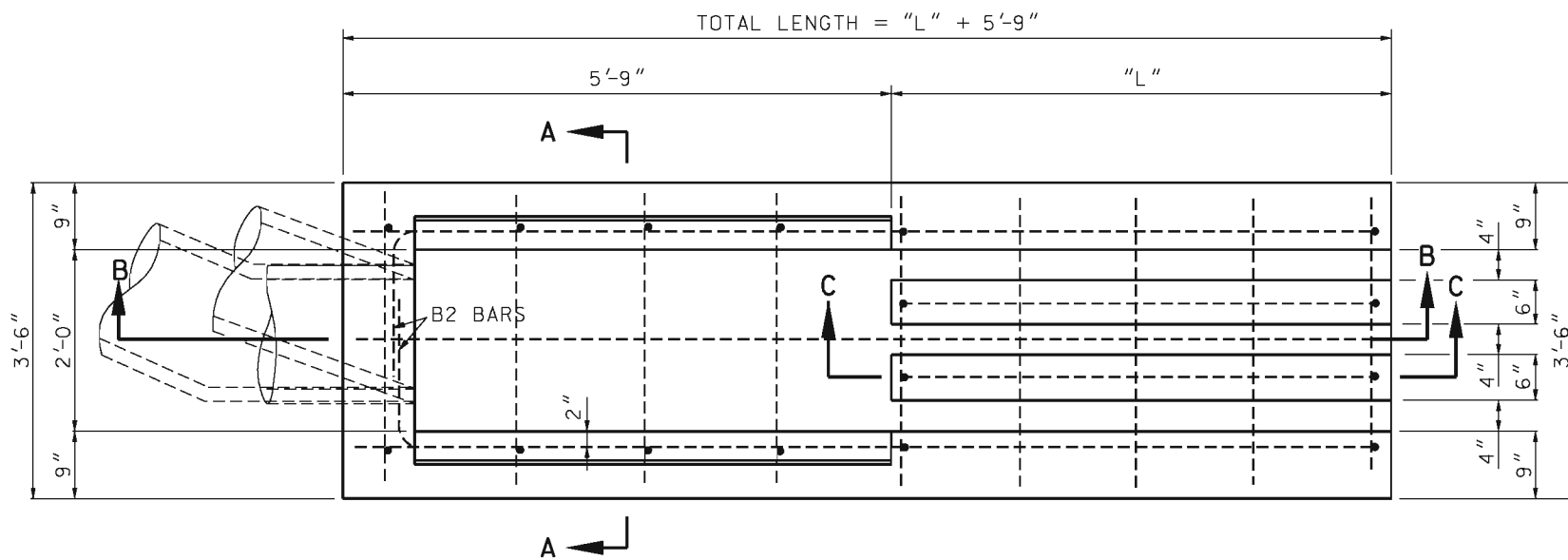
- |                 |            |                            |
|-----------------|------------|----------------------------|
| <b>EXISTING</b> | <b>NEW</b> |                            |
| ▽               | ○          | STEEL R/W MARKER           |
| ○               | ○          | LOCATION SURVEY R/W MARKER |
| □               | □          | CONCRETE R/W MARKER        |
| X               | X          | DRAIN MARKER               |



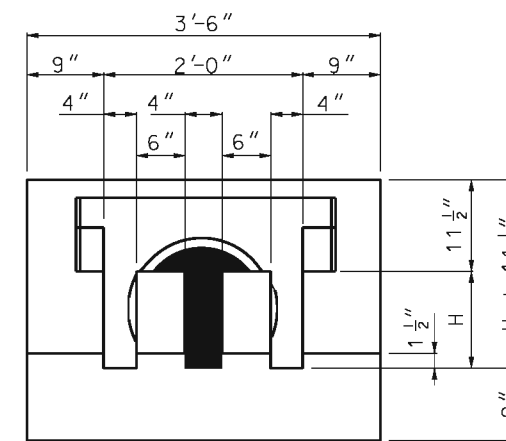
**TYPICAL LOCATIONS**

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER</p> <p><small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small></p>	<p><b>RIGHT-OF-WAY AND DRAIN MARKERS</b></p>
<p>DATE EFFECTIVE: 01/01/2003 DATE PREPARED: 8/21/2009</p>	<p><b>602.00D</b></p>
<p>SHEET NO. 2 OF 2</p>	

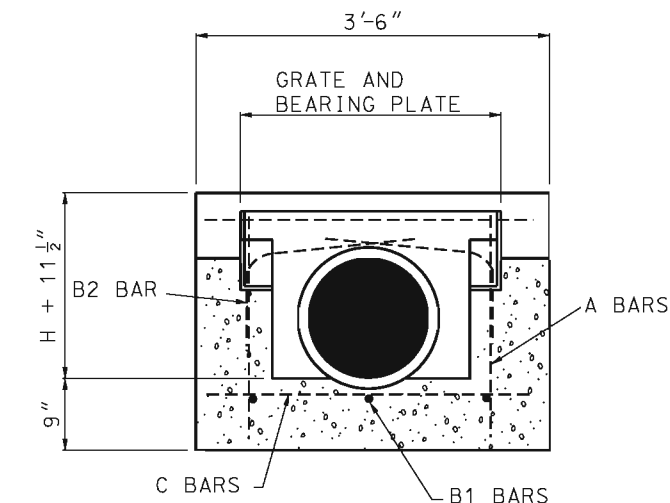
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



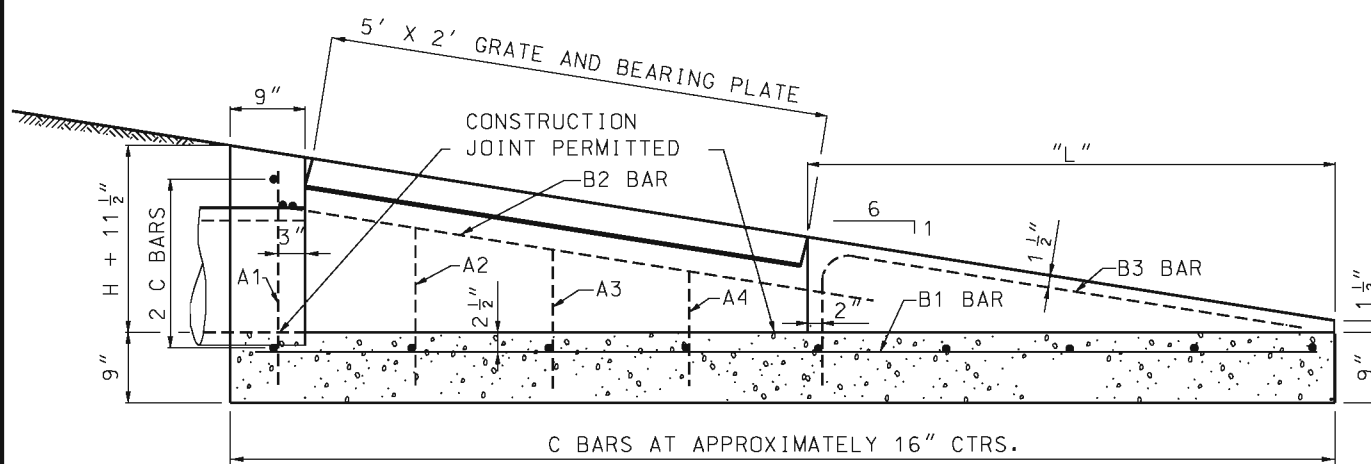
PLAN VIEW



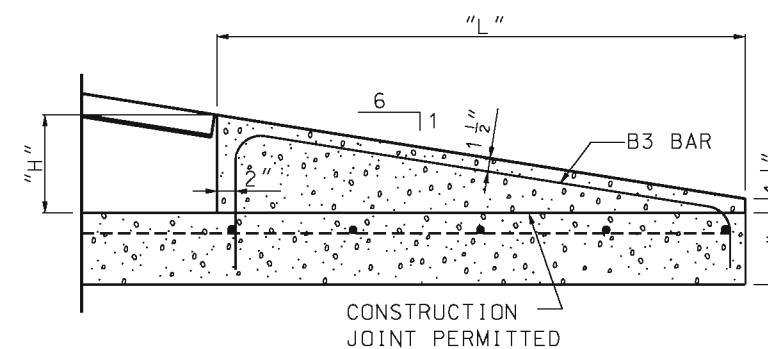
END SECTION



SECTION A-A



SECTION B-B



SECTION C-C

GENERAL NOTES:

USE RIGHT ANGLE HEADWALL FOR ALL INSTALLATIONS. SKEW PIPE BY USING A BEVELED END OR ELBOW ON PIPE. IN SPECIAL CASES, HEADWALL MAY BE TURNED TO FIT PIPE SKEW AND 1V TO 6H SLOPE WARPED TO FIT HEADWALL.

ALL CONCRETE SHALL BE CLASS "B".

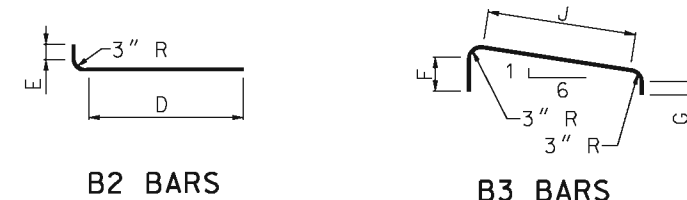
THIS DRAWING AND THE CONCRETE QUANTITIES SHOWN ARE BASED ON THE USE OF CONCRETE PIPE. QUANTITIES OF CONCRETE SHOWN WILL BE USED FOR PAYMENT REGARDLESS OF ANY QUANTITY CHANGES NECESSARY DUE TO THE USE OF ANY OTHER TYPE PIPE SPECIFIED OR PERMITTED.

FLOW LINE OF HEADWALL IS TO BE PLACED HORIZONTALLY.

PRECAST NOTES:

THE CONTRACTOR MAY, SUBJECT TO APPROVAL OF THE ENGINEER, FURNISH PRECAST UNITS IN LIEU OF CAST-IN-PLACE. IF A PRECAST UNIT IS FURNISHED, IT SHALL CONFORM IN ALL RESPECTS TO THE THE REQUIREMENTS FOR CAST-IN-PLACE UNITS INCLUDING DIMENSIONS AND REINFORCEMENT, EXCEPT THAT THE FORMS MAY BE TAPERED TO FACILITATE REMOVAL OF THE UNIT FROM THE FORMS. SHOP DRAWINGS OF THE PRECAST UNIT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FIRST USE OF THE PRECASTING FORMS.

PIPE SIZE	DIMENSIONS			QUANTITIES		REINFORCING																				
	"H"	"L"	TOTAL LENGTH	CONC. C. Y.	STEEL LBS.	#4 A1 BARS		#4 A2 BARS		#4 A3 BARS		#4 A4 BARS		#4 B1 BARS		#4 B2 BARS			#4 B3 BARS				#4 C BARS			
						NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	E	D	LENGTH	NO.	F	G	J	LENGTH	NO.	LENGTH
12"	9"	3'-9"	9'-6"	1.5	70	2	2'-0"	2	1'-6"	2	1'-3"	2	1'-0"	3	9'-3"	2	1'-5"	5'-8"	7'-6"	4	11"	5"	2'-11"	5'-0"	8	3'-3"
15"	1'-0"	5'-3"	11'-0"	1.8	80	2	2'-3"	2	1'-9"	2	1'-6"	2	1'-3"	3	10'-9"	2	1'-5"	5'-8"	7'-6"	4	1'-2"	5"	4'-5"	6'-9"	9	3'-3"
18"	1'-3"	6'-9"	12'-6"	2.2	90	2	2'-6"	2	2'-0"	2	1'-9"	2	1'-6"	3	12'-3"	2	1'-5"	5'-8"	7'-6"	4	1'-5"	5"	5'-11"	8'-6"	10	3'-3"
21"	1'-6"	8'-3"	14'-0"	2.6	100	2	2'-9"	2	2'-3"	2	2'-0"	2	1'-9"	3	13'-9"	2	1'-5"	5'-8"	7'-6"	4	1'-8"	5"	7'-5"	10'-3"	11	3'-3"
24"	1'-9"	9'-9"	15'-6"	3.0	110	2	3'-0"	2	2'-6"	2	2'-3"	2	2'-0"	3	15'-3"	2	1'-5"	5'-8"	7'-6"	4	1'-11"	5"	8'-11"	12'-0"	12	3'-3"



BENDING DETAILS

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**PIPE CULVERT HEADWALLS**

TYPE S

12" TO 24" DIAMETERS

- 1V:6H SLOPES

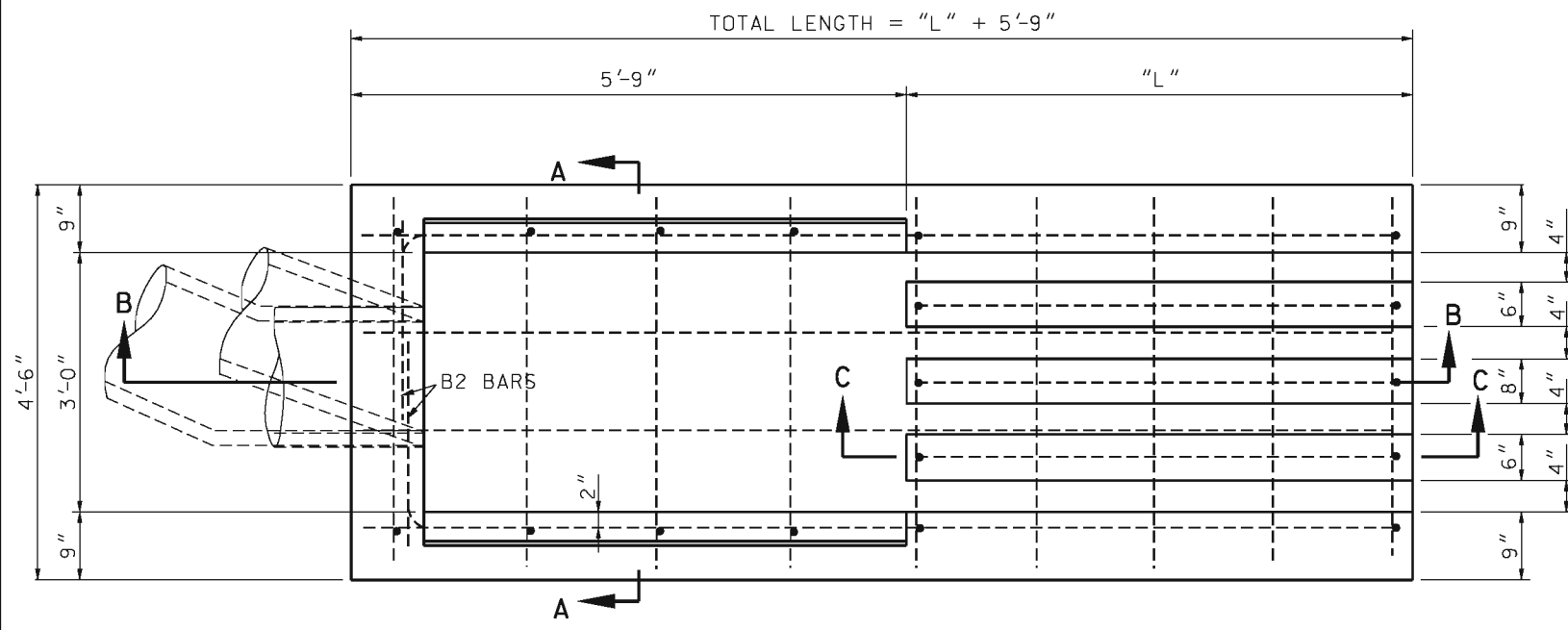
DATE EFFECTIVE: 08/01/2006

DATE PREPARED: 9/3/2009

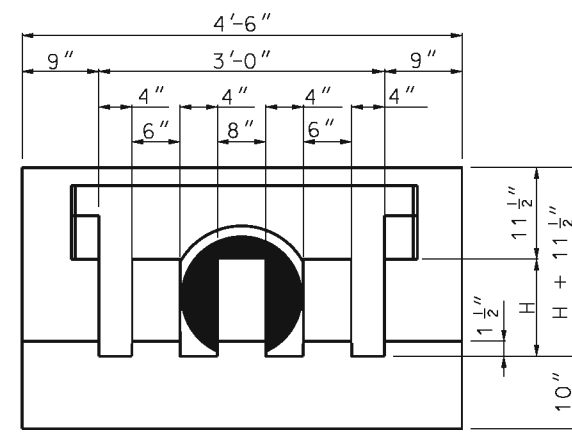
**604.05D**

SHEET NO.  
1 OF 2

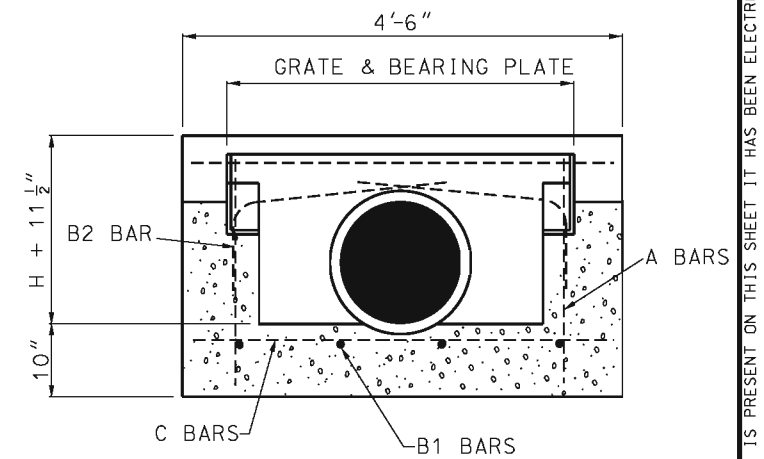
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



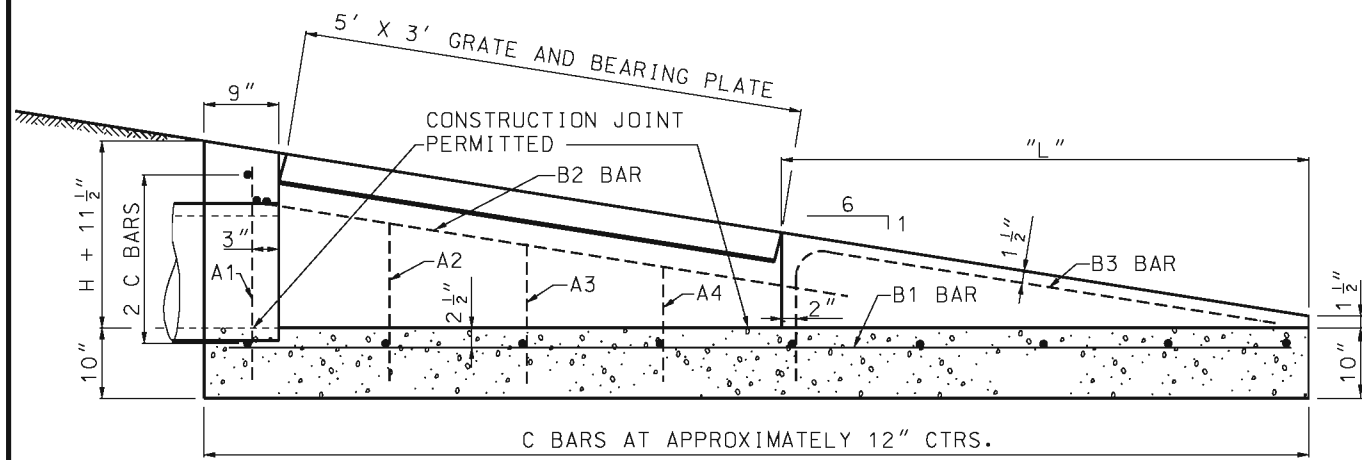
PLAN VIEW



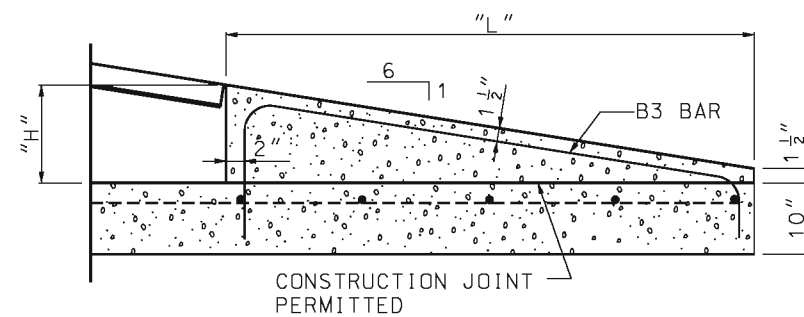
END SECTION



SECTION A-A



SECTION B-B



SECTION C-C

PIPE SIZE	DIMENSIONS			QUANTITIES		REINFORCING																				
	"H"	"L"	TOTAL LENGTH	CONC. C.	STEEL Y. LBS.	#4 A1 BARS		#4 A2 BARS		#4 A3 BARS		#4 A4 BARS		#4 B1 BARS		#4 B2 BARS			#4 B3 BARS			#4 C BARS				
						NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	E	D	LENGTH	NO.	F	G	J	LENGTH	NO.	LENGTH
27"	2'-0"	11'-3"	17'-0"	4.5	160	2	3'-3"	2	2'-9"	2	2'-6"	2	2'-3"	4	16'-9"	2	1'-11"	5'-8"	8'-0"	5	2'-2"	5"	10'-5"	13'-9"	18	4'-3"
30"	2'-3"	12'-9"	18'-6"	5.0	170	2	3'-6"	2	3'-0"	2	2'-9"	2	2'-6"	4	18'-3"	2	1'-11"	5'-8"	8'-0"	5	2'-5"	5"	11'-11"	15'-6"	19	4'-3"
36"	2'-9"	15'-9"	21'-6"	6.1	200	2	4'-0"	2	3'-6"	2	3'-3"	2	3'-0"	4	21'-3"	2	1'-11"	5'-8"	8'-0"	5	2'-11"	5"	14'-11"	19'-0"	21	4'-3"

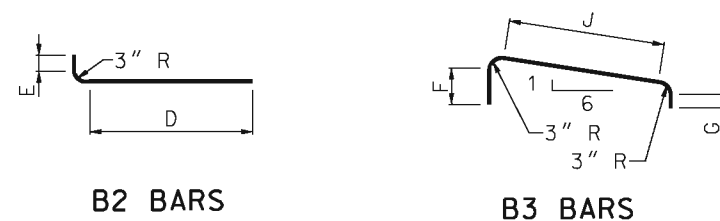
GENERAL NOTES:  
SEE GENERAL NOTES ON SHEET 1.

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

STATE OF MISSOURI  
DENNIS W. HECKMAN  
NUMBER PE-27141  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**PIPE CULVERT HEADWALLS**  
TYPE S  
27" TO 36" DIAMETERS  
- 1V:6H SLOPES

DATE EFFECTIVE: 08/01/2006  
DATE PREPARED: 9/3/2009  
**604.05D**  
SHEET NO. 2 OF 2

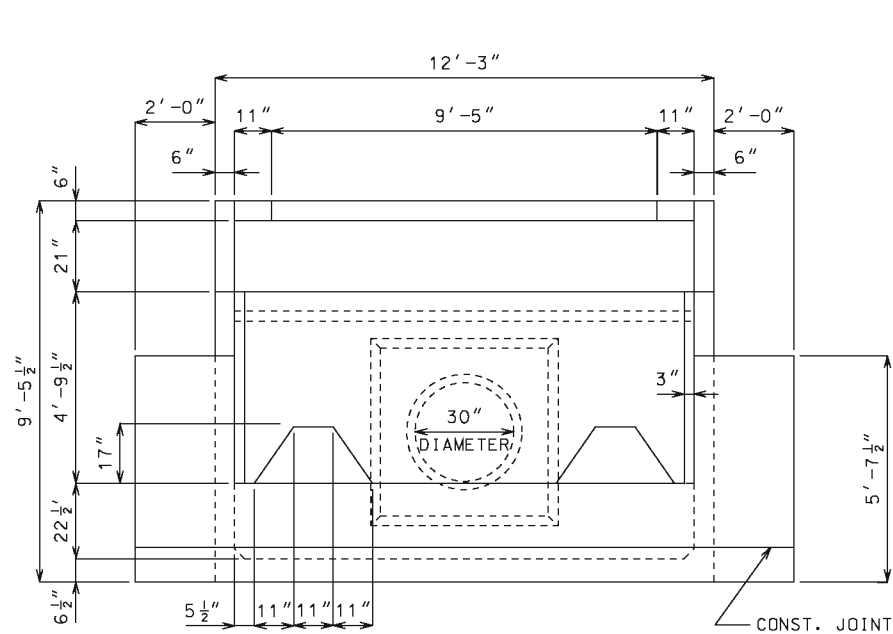


BENDING DETAILS

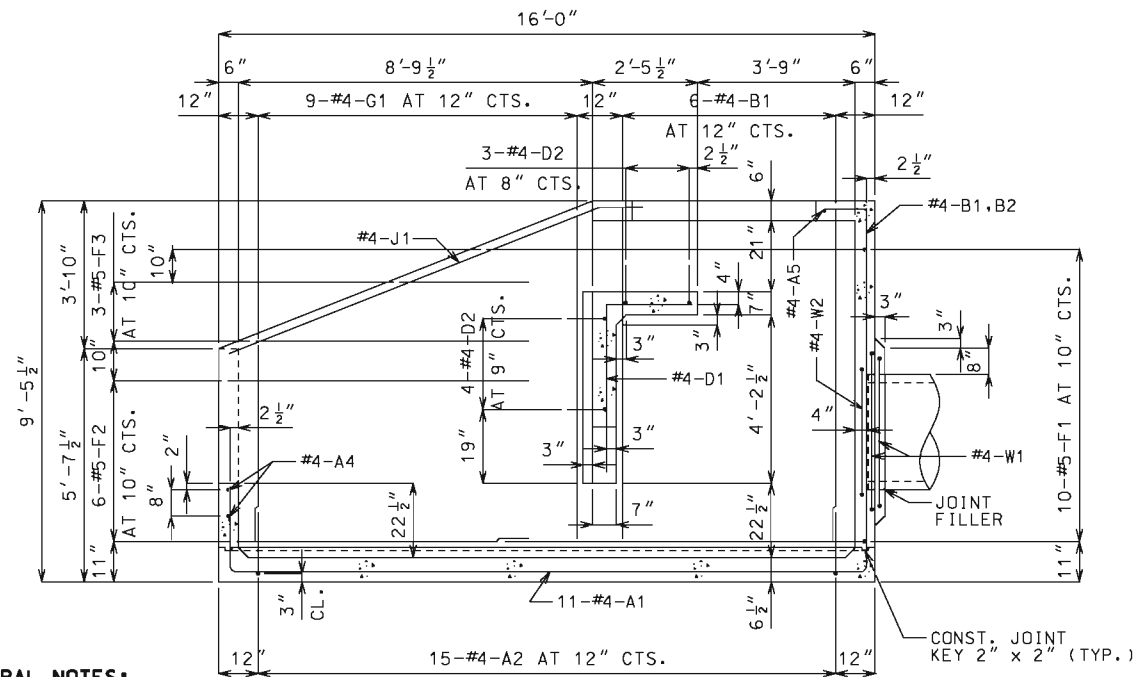
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



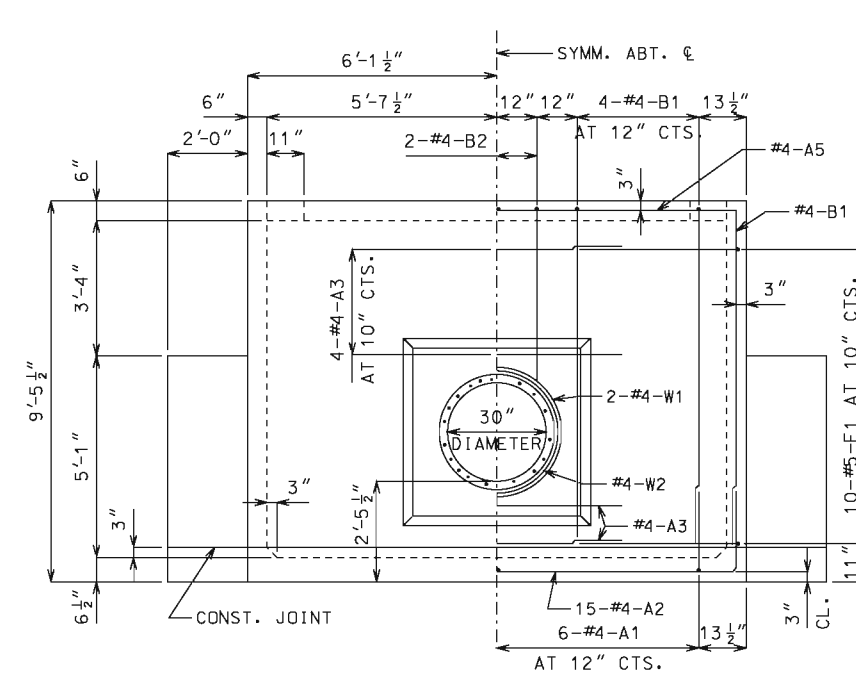




DOWNSTREAM ELEVATION

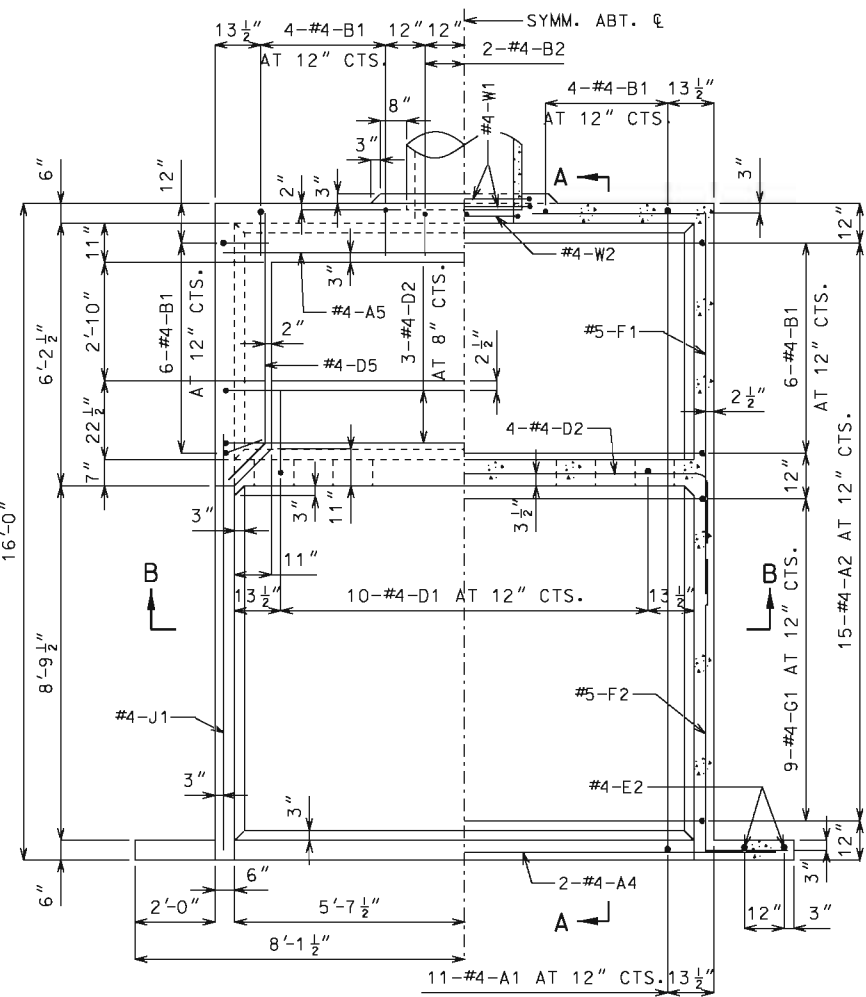


SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.



HALF PLAN HALF HORIZONTAL SECTION

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE  $f'c = 3,000$  psi  
 REINFORCING STEEL (GRADE 60)  $fy = 60,000$  psi

REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ " UNLESS SHOWN OTHERWISE.

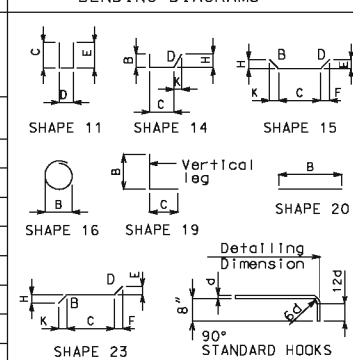
DIMENSIONS

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

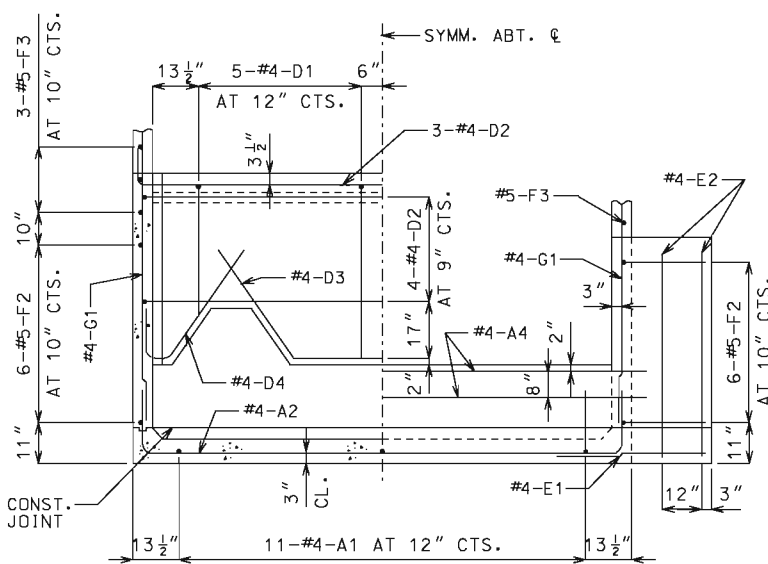
ESTIMATED QUANTITIES		
ITEM		TOTAL
CLASS B CONCRETE	CU. YD.	13.2
REINFORCING STEEL	LBS.	1,170

NO.	REQ'D	MARK NO.	SHAPE NO.	VARIES (V)	NO. EACH	DIMENSIONS								NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
						B	C	D	E	F	H	K				
						FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.				
11	4	A1	11			2-0 1/2	15-6	0-20 1/2					19-3	19-1	140	
15	4	A2	11			0-20 1/2	11-10	0-20 1/2					15-3	15-1	151	
6	4	A3	20			5-4							5-4	5-4	21	
2	4	A4	20			13-3							13-3	13-3	18	
1	4	A5	20			11-9							11-9	11-9	8	
20	4	B1	19			8-5 1/2	0-13						9-7	9-5	126	
3	4	B2	19			4-0	0-13						5-1	5-0	10	
10	4	D1	19			4-4	2-0 1/2						6-5	6-3	42	
7	4	D2	11			0-12	11-10	0-12					13-10	13-8	64	
1	4	D3	15			2-11	4-7	2-11	2-6	0-18	2-6	0-18	10-5	10-4	7	
2	4	D4	14			0-12	0-7	3-0		2-6	0-20	4-7	4-5	6		
2	4	D5	23			0-18 3/8	5-7			0-13	0-13	7-1	7-1	9		
2	4	E1	20			3-0						3-0	3-0	4		
4	4	E2	20			5-3						5-3	5-3	14		
20	5	F1	19			8-8 3/8	4-2 1/2					12-11	12-9	266		
12	5	F2	19			2-1	8-1					10-2	10-1	126		
6	5	F3	20	V	2	3-0 7/8						3-1	3-1			
						7-0 3/8						7-1	7-1	32		
						(INCREMENT = 24 INCHES)										
18	4	G1	20	V	2	5-1 3/8						5-1	5-1			
						8-5 3/8						8-5	8-5	81		
						(INCREMENT = 5 INCHES)										
2	4	J1	20			10-11						10-11	10-11	15		
2	4	W1	16			3-6						11-10	11-10	16		
1	4	W2	16			2-11						10-0	10-0	7		

BENDING DIAGRAMS



ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.  
 HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.  
 NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.  
 PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.  
 LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.  
 V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.  
 NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF ELEVATION OF LOWER BAFFLE AND WING

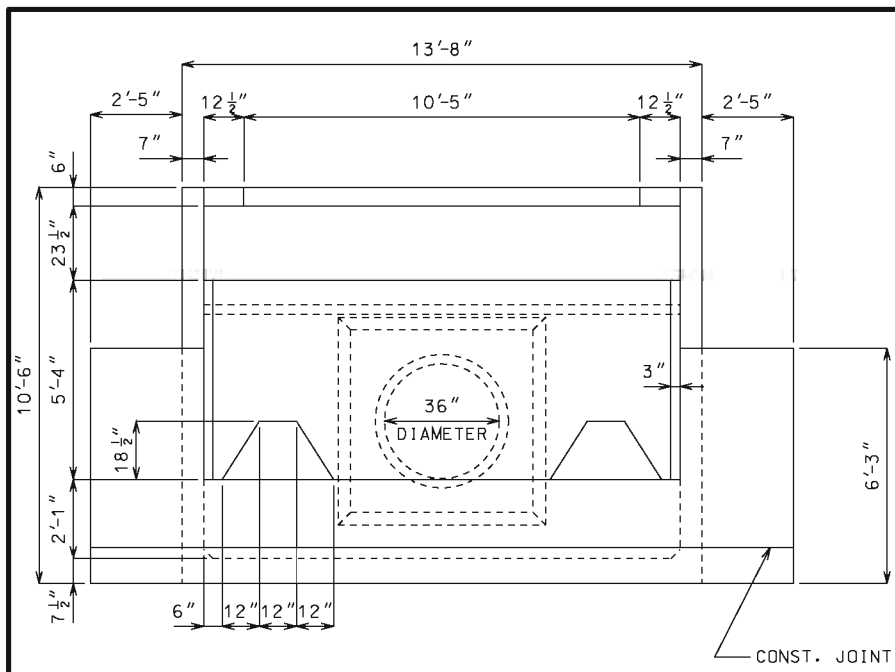
NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

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

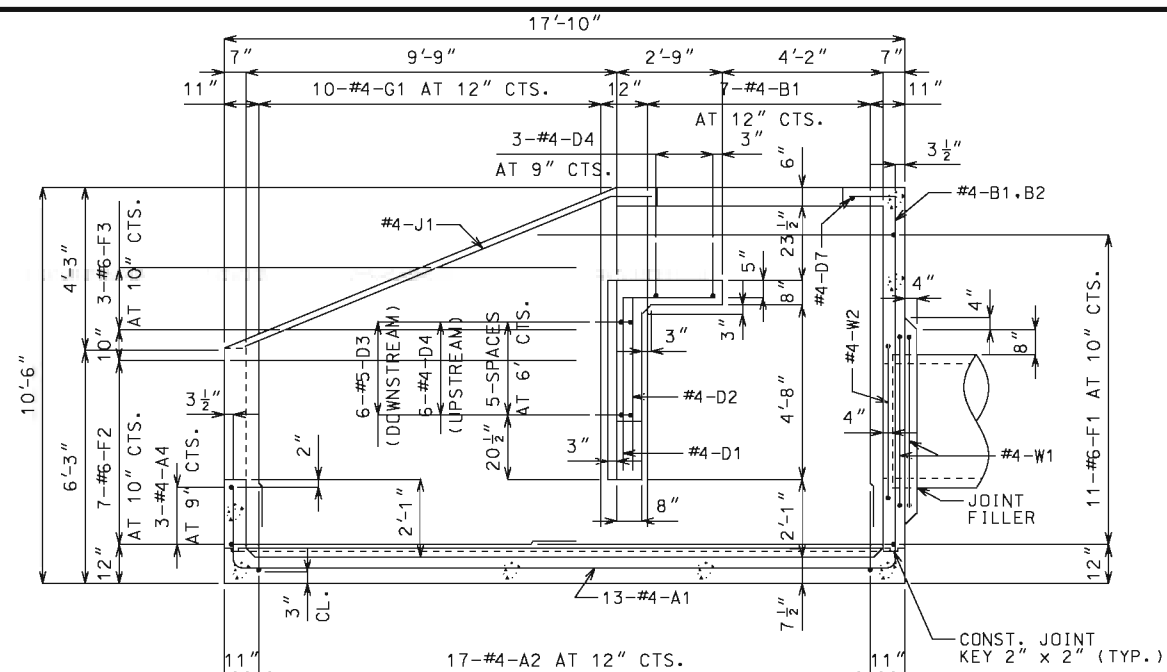
STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

**PIPE CULVERT HEADWALL ENERGY DISSIPATOR (IMPACT TYPE) FOR 30" CONCRETE PIPE**

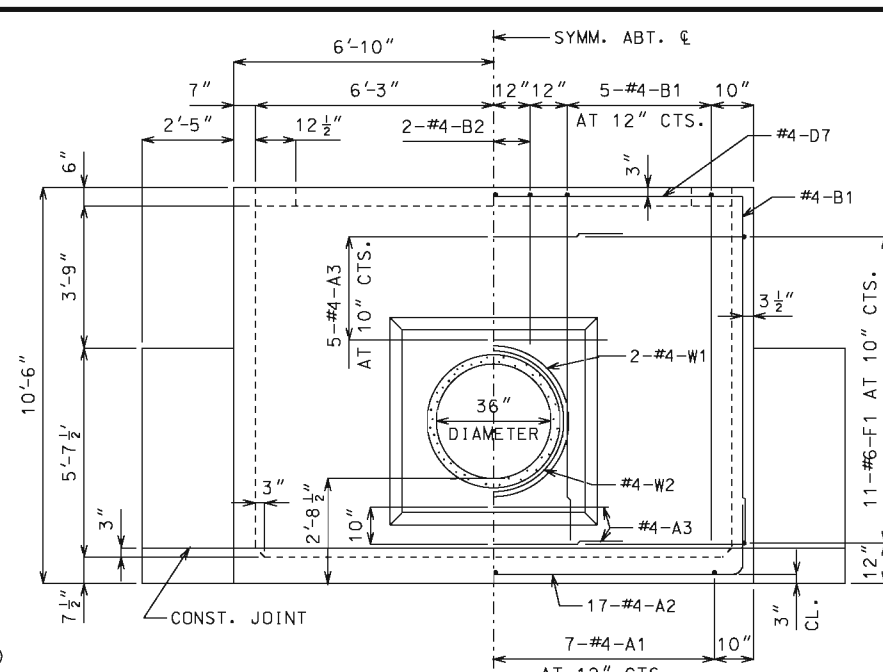
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DOWNSTREAM ELEVATION



SECTION A - A



UPSTREAM ELEVATION

**GENERAL NOTES:**

**DESIGN UNIT STRESSES**

CLASS B CONCRETE  $f'c = 3,000$  psi  
 REINFORCING STEEL (GRADE 60)  $fy = 60,000$  psi

**REINFORCING STEEL**

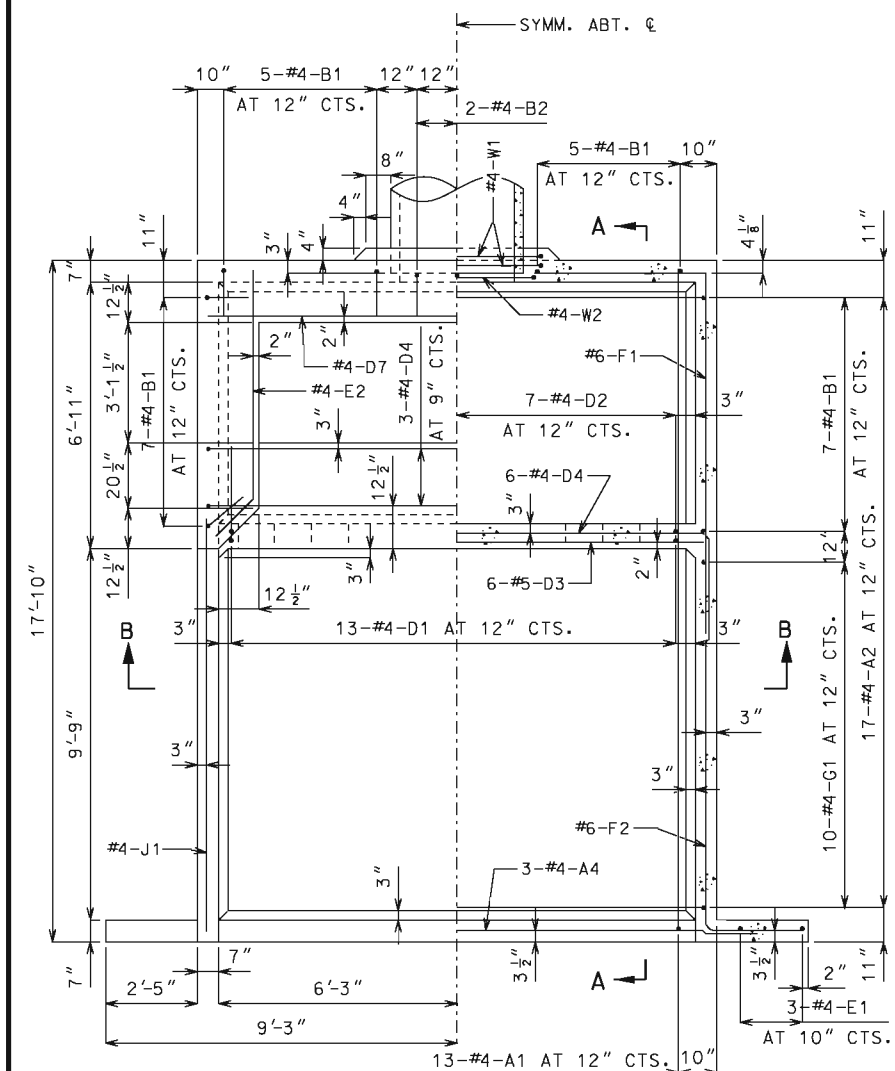
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ " UNLESS SHOWN OTHERWISE.

**DIMENSIONS**

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

**ESTIMATED QUANTITIES**

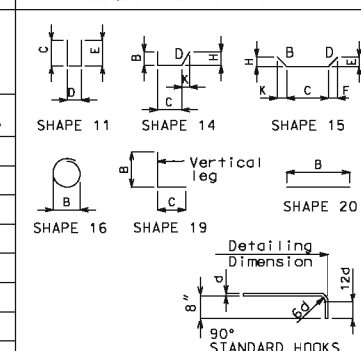
ITEM	TOTAL
CLASS B CONCRETE	CU. YD. 19.0
REINFORCING STEEL	LBS. 1,870



HALF PLAN HALF HORIZONTAL SECTION

NO.	REQ'D	MARK NO.	SHAPE NO.	VARIES (V) NO. EACH	DIMENSIONS									NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
					B	C	D	E	F	H	K					
					FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.					
13	4	A1	11		2-2 $\frac{1}{2}$	17-5 $\frac{1}{2}$	2-4						22-0	21-10	190	
17	4	A2	11		2-4	13-1	2-4						17-9	17-7	200	
7	4	A3	20	5-11									5-11	5-11	28	
3	4	A4	20	15-2									15-2	15-2	30	
24	4	B1	19	8-7 $\frac{1}{2}$	0-15								9-11	9-9	156	
3	4	B2	19	4-2 $\frac{1}{2}$	0-15								5-6	5-4	11	
13	4	D1	19	4-11	2-5 $\frac{1}{2}$								7-5	7-3	63	
13	4	D2	20	4-11									4-11	4-11	43	
6	5	D3	20	13-5									13-5	13-5	84	
9	4	D4	11		0-12	13-2	0-12						15-2	15-0	90	
4	4	D5	14	0-12	0-8 $\frac{3}{4}$	3-0		2-6	0-20				4-9	4-7	12	
2	4	D6	15	3-0	5-4 $\frac{1}{2}$	3-0	2-6	0-20	2-6	0-20			11-5	11-4	15	
1	4	D7	20	13-5									13-5	13-5	9	
6	4	E1	20	6-0									6-0	6-0	24	
2	4	E2	15	0-22 $\frac{3}{8}$	6-0			0-16	0-16				7-11	7-10	10	
2	4	E3	20	3-7									3-7	3-7	5	
22	6	F1	19	9-10 $\frac{1}{2}$	4-7 $\frac{1}{2}$								14-6	14-4	474	
14	6	F2	19	9-2 $\frac{1}{2}$	2-6 $\frac{1}{2}$								11-9	11-7	244	
6	6	F3	20	V 2	3-6								3-6	3-6	50	
					7-6	(INCREMENT = 24 INCHES)					7-6	7-6	50			
20	4	G1	20	V 2	4-9	(INCREMENT = 5 INCHES)					8-6	8-6	89			
					8-5 $\frac{1}{2}$	(INCREMENT = 5 INCHES)					8-6	8-6	89			
2	4	J1	20		12-0								12-0	12-0	16	
2	4	W1	16		4-0 $\frac{1}{2}$								13-7	13-7	18	
1	4	W2	16		3-4 $\frac{1}{2}$								11-6	11-6	8	

**BENDING DIAGRAMS**



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

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

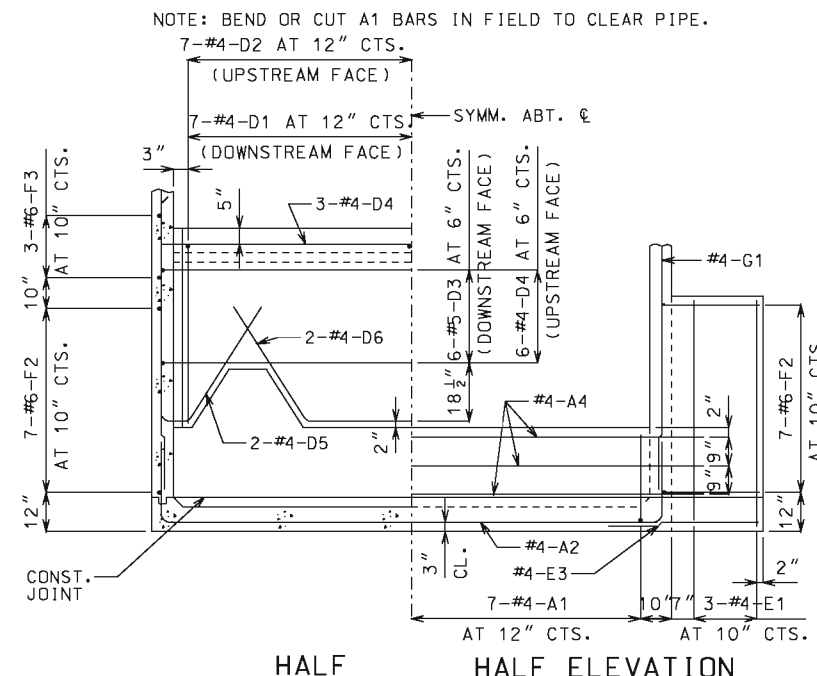
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

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

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF SECTION B-B HALF ELEVATION OF LOWER BAFFLE AND WING

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

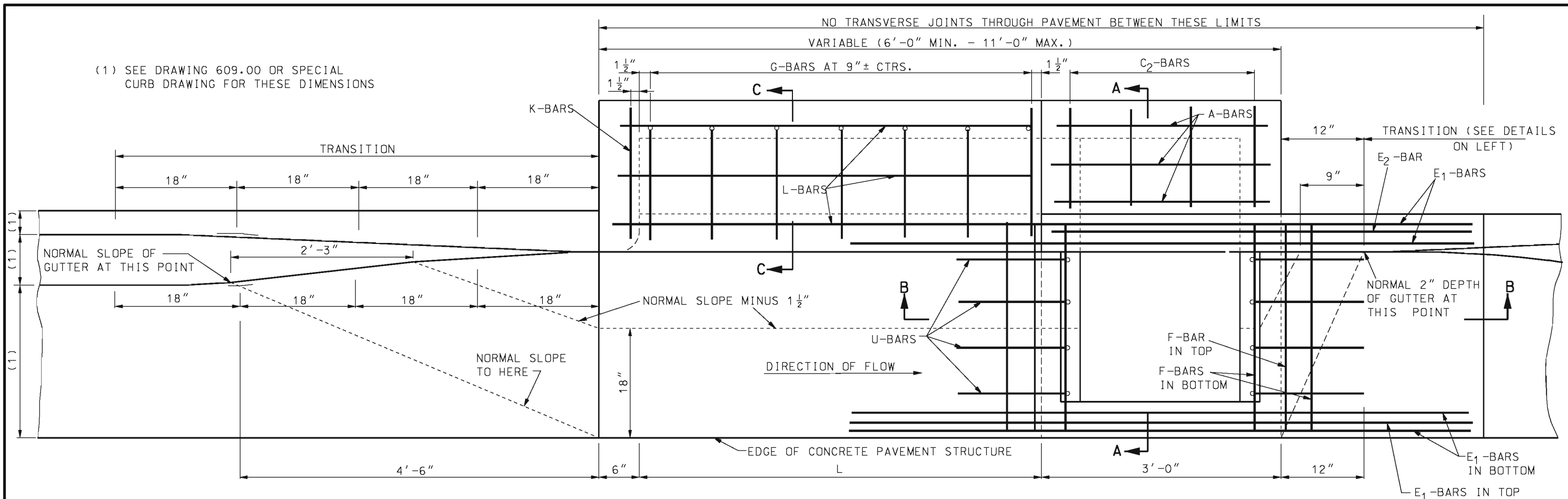
**PIPE CULVERT HEADWALL ENERGY DISSIPATOR (IMPACT TYPE) FOR 36" CONCRETE PIPE**

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









PLAN

GENERAL NOTES:

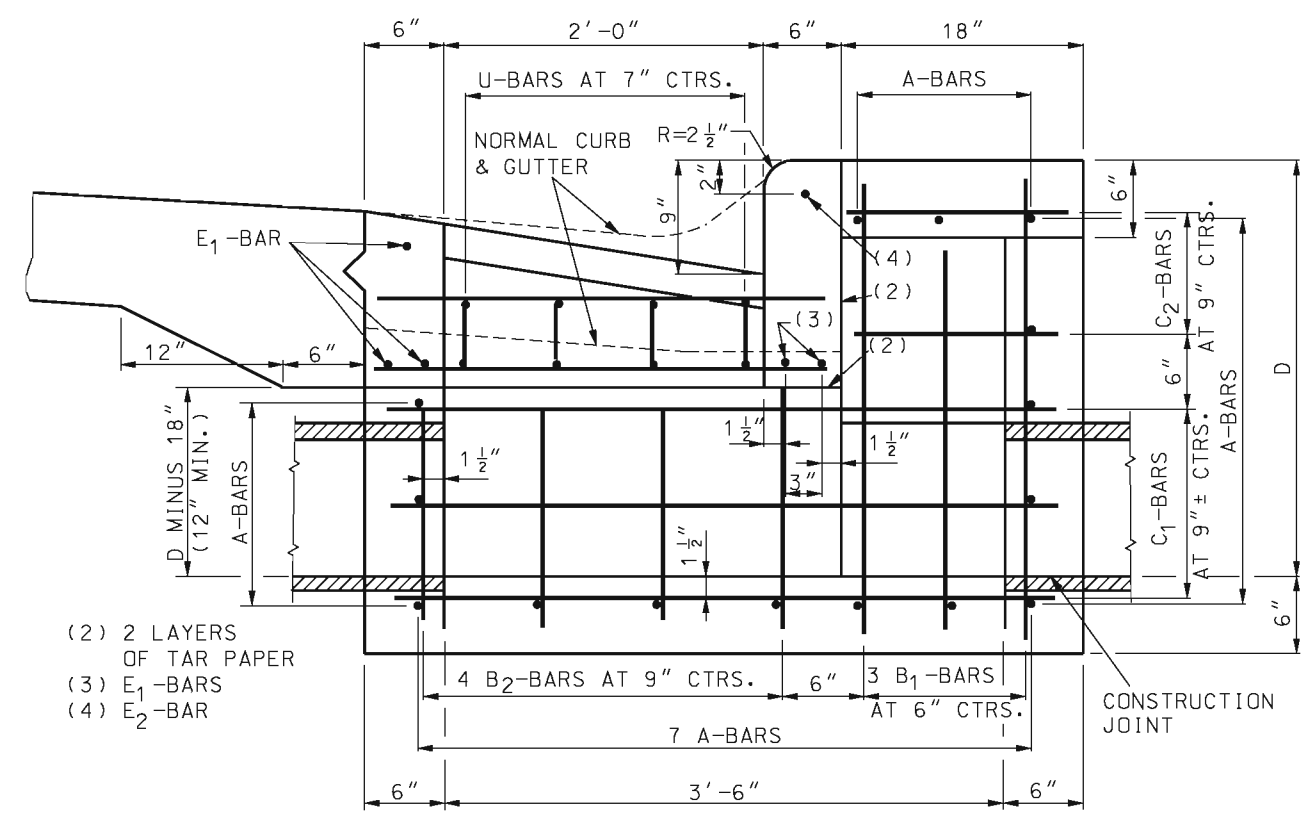
TOP OF DROP INLET WALLS SHALL BE LEVEL AND TO THE ELEVATION OF BOTTOM OF SLAB AT EDGE OF TRAVELED WAY OR BOTTOM OF CURB AND GUTTER AT DROP INLET.

ALL CONCRETE ABOVE THE TAR-PAPER SEPARATION JOINT IS TO BE CONSTRUCTED DURING PAVING OPERATIONS OR CURB AND GUTTER CONSTRUCTION; AND WILL BE PAID FOR AS SQUARE YARDS OF CONCRETE PAVEMENT OR LINEAR FEET OF CURB AND GUTTER.

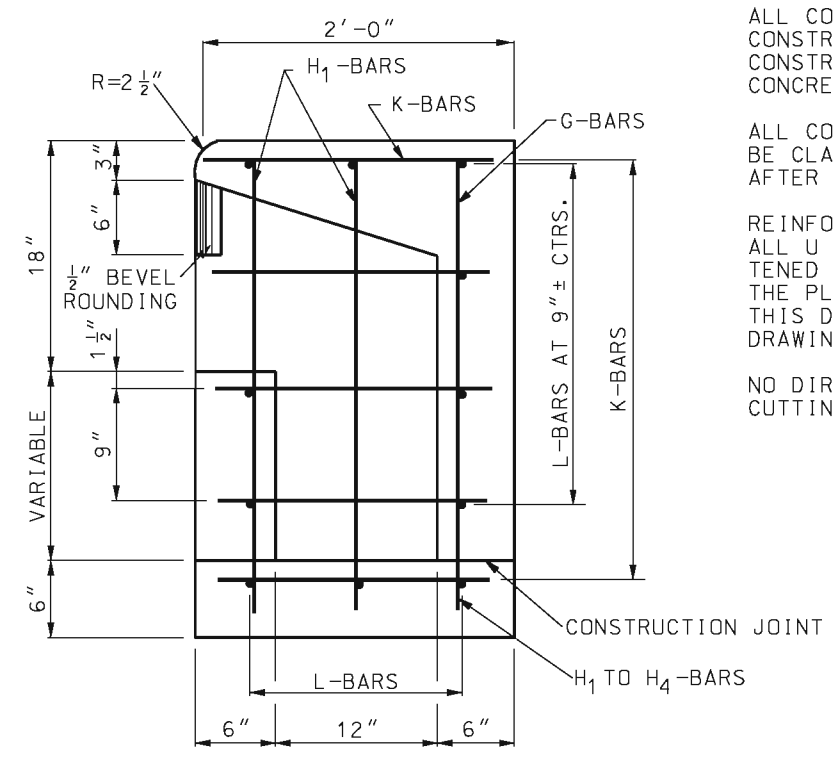
ALL CONCRETE BELOW THE TAR-PAPER SEPARATION JOINTS SHALL BE CLASS "B" CONCRETE. CONCRETE IN INVERTS SHALL BE PLACED AFTER DROP INLET HAS BEEN CONSTRUCTED.

REINFORCING BARS SHALL BE CUT AND/OR BENT AT PIPE OPENINGS. ALL U AND F-BARS SHALL BE SECURELY TIED TOGETHER AND FASTENED TO SECURE AGAINST ANY POSSIBLE DISPLACEMENT DURING THE PLACING OF CONCRETE. THE REINFORCING STEEL SHOWN ON THIS DRAWING IS IN ADDITION TO ANY REINFORCING SHOWN ON DRAWINGS FOR CONCRETE PAVEMENT OR CURB AND GUTTER.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE NOR FOR CUTTING AND BENDING REINFORCING BARS.



SECTION A-A  
(INTAKE BOX)



SECTION C-C  
(EXTENSION)

- (2) 2 LAYERS OF TAR PAPER
- (3) E<sub>1</sub>-BARS
- (4) E<sub>2</sub>-BAR

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>DROP INLET TYPE X</b>	
	DATE EFFECTIVE: 04/01/1983 DATE PREPARED: 8/21/2009	<b>604.29C</b>

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

BAR BILL - EXTENSION							
LENGTH OF EXT. L		2'-6"		5'-0"		7'-6"	
MARK	SIZE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
G	#5	4	3'-3"	7	3'-3"	10	3'-3"
H <sub>1</sub>	#4	4	2'-6"	4	2'-6"	4	2'-6"
H <sub>2</sub>	#4	2	2'-9"	3	2'-9"	3	2'-9"
H <sub>3</sub>	#4			2	3'-0"	3	3'-0"
H <sub>4</sub>	#4					2	3'-3"
H <sub>5</sub>	#4	1	1'-0"	1	1'-0"	1	1'-0"
H <sub>6</sub>	#4	2	1'-3"	3	1'-3"	3	1'-3"
H <sub>7</sub>	#4			2	1'-6"	3	1'-6"
H <sub>8</sub>	#4					2	1'-9"
K	#4	7	1'-9"	10	1'-9"	13	1'-9"
L	#4	11	2'-9"	11	5'-3"	11	7'-9"
DOWEL BAR	#4	8	1'-0"	9	1'-0"	10	1'-0"

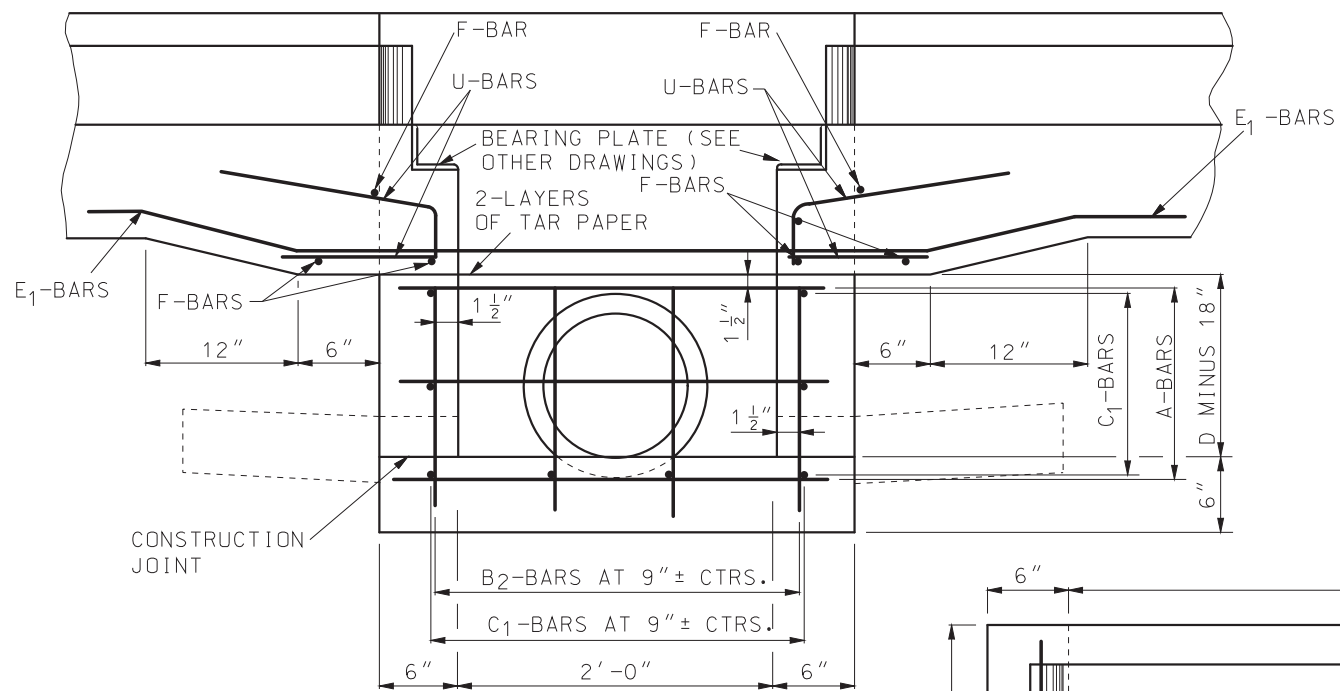
CU. YDS. & LBS. ADDITIONS TO BE MADE FOR EACH EXTENSION		
LENGTH	CU. YDS.	LBS.
2'-6"	0.39	60.0
5'-0"	0.70	101.4
7'-6"	1.04	143.8

CU. YDS. DEDUCTION TO BE MADE FOR PIPE OPENING			
12"	15"	18"	24"
0.03	0.04	0.05	0.09

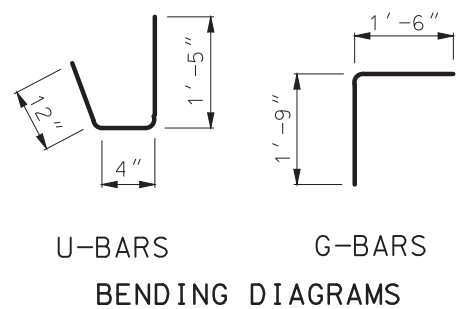
CONCRETE AND STEEL DEDUCTIONS TO BE MADE FOR EACH EXTENSION OPENING		
9" X 12"	12" X 12"	15" X 12"
0.01 C.Y.	0.02 C.Y.	0.02 C.Y.
2.5 LBS.	3.7 LBS.	4.0 LBS.

BAR BILL - INTAKE BOX																				
D	CONC. CU. YDS.	STEEL LBS.	A-BARS		B <sub>1</sub> -BARS		B <sub>2</sub> -BARS		C <sub>1</sub> -BARS		C <sub>2</sub> -BARS		E <sub>1</sub> -BARS		E <sub>2</sub> -BARS		F-BARS		U-BARS	
			TRANSVERSE IN BOTTOM WALLS & TOP		VERTICAL IN WALLS		VERTICAL IN WALLS		LONGITUDINAL IN BOTTOM AND SIDE		LONGITUDINAL IN SIDE AND TOP		LONGITUDINAL IN GUTTER		LONGITUDINAL IN GUTTER		TRANSVERSE IN GUTTER		IN GUTTER	
			NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
2'-6"	0.82	131	15	2'-9"	8	2'-9"	10	1'-3"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
2'-9"	0.88	134	15	2'-9"	8	3'-0"	10	1'-6"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-0"	0.94	137	15	2'-9"	8	3'-3"	10	1'-9"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-3"	1.00	140	15	2'-9"	8	3'-6"	10	2'-0"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-6"	1.06	152	17	2'-9"	8	3'-9"	10	2'-3"	10	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-9"	1.12	155	17	2'-9"	8	4'-0"	10	2'-6"	10	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-0"	1.18	158	17	2'-9"	8	4'-3"	10	2'-9"	10	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-3"	1.24	170	19	2'-9"	8	4'-6"	10	3'-0"	12	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-6"	1.30	173	19	2'-9"	8	4'-9"	10	3'-3"	12	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-9"	1.36	176	19	2'-9"	8	5'-0"	10	3'-6"	12	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
5'-0"	1.42	189	21	2'-9"	8	5'-3"	10	3'-9"	14	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"

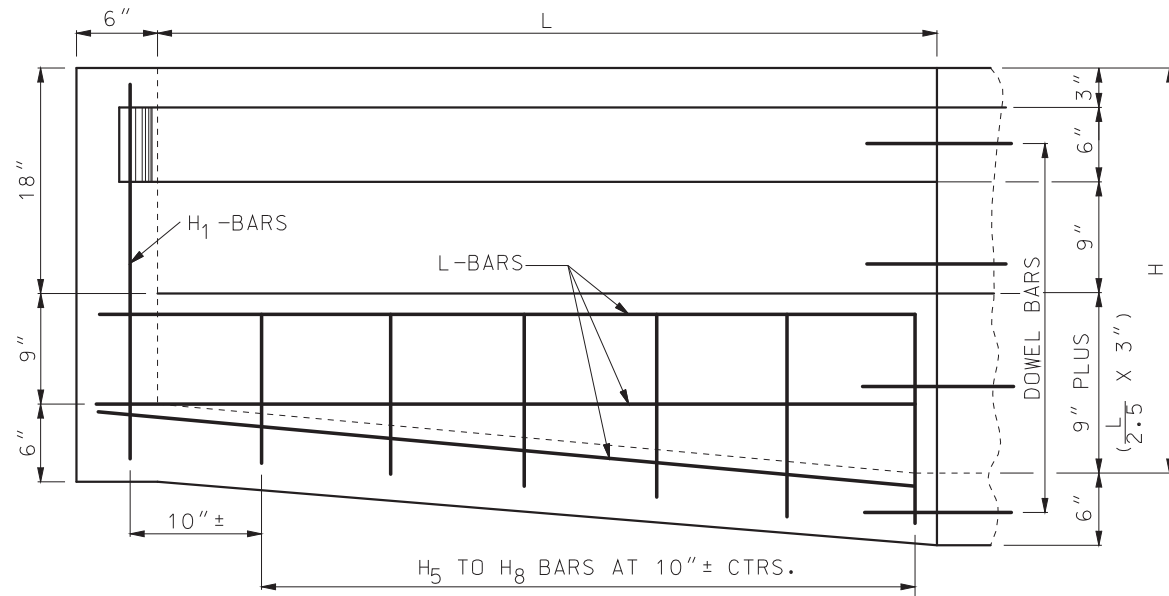
CONCRETE QUANTITIES INCLUDE 0.15 CU.YDS. FOR INVERT ALL BARS #4



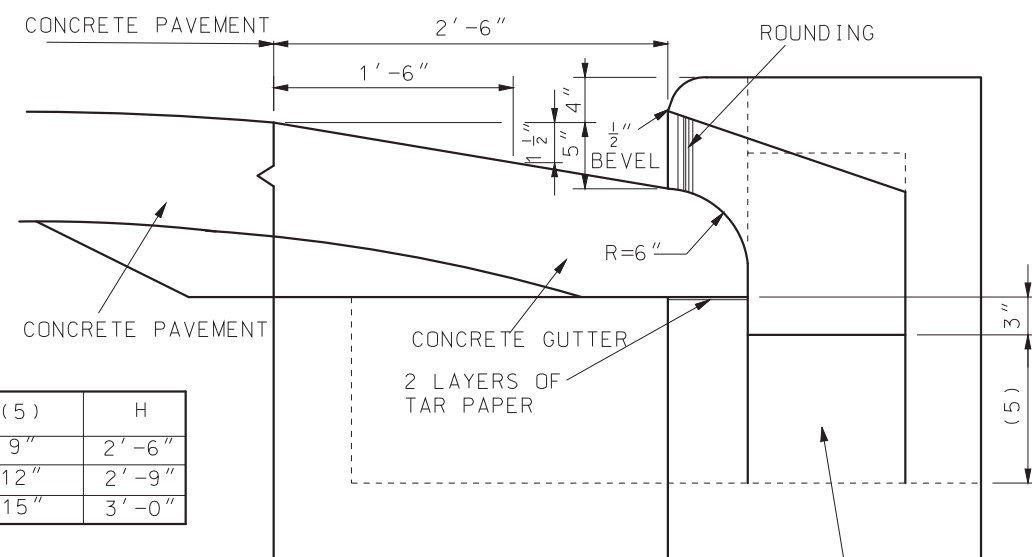
SECTION B-B



U-BARS BENDING DIAGRAMS  
G-BARS BENDING DIAGRAMS



LONGITUDINAL SECTION (EXTENSION)



SECTION SHOWING DETAILS OF OPENING AND DEPRESSION IN PAVEMENT OR GUTTER

L	(5)	H
2'-6"	9"	2'-6"
5'-0"	12"	2'-9"
7'-6"	15"	3'-0"

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

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

**DROP INLET**  
TYPE X

DATE EFFECTIVE: 04/01/1983  
 DATE PREPARED: 2/9/2018

**604.29C**

SHEET NO.  
2 OF 2

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



**FOR PIPE OPENINGS**

	PIPE SIZES							
	12"	15"	18"	24"	30"	36"	42"	48"
CUBIC YARDS CONCRETE TO DEDUCT	0.03	0.04	0.06	0.11	0.16	0.23	0.31	0.40
ADDITIONAL STEEL REQUIRED FOR PIPE OPENING								
WIDTH OF WALL REQUIRED FOR PIPE		3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
LENGTH OF #6 BAR REQUIRED		4'-0"	4'-6"	5'-0"	5'-6"	6'-0"		
WEIGHT OF BAR LBS.		6.0	6.8	7.5	8.3	9.0		

NOTE:  
CONCRETE QUANTITIES IN TABLE INCLUDE INVERT. THE QUANTITY OF STEEL FOR 3" OF "D" IS NOT 1/4 OF THAT FOR 1 FOOT OF "D". NEITHER IS THE QUANTITY FOR 6" OF "D" EQUAL TO 1/2 THAT FOR 1 FOOT OF "D". SO USE QUANTITY IN 1 FOOT COLUMN FOR FULL FEET AND IN 3" COLUMN FOR FRACTIONAL FEET.

**QUANTITIES**

SIZE (W)		TO AND INCLUDING 20' DEPTH				20' TO AND INCLUDING 30' DEPTH			
		D= 3'-3"	D= 4'-3"	ADD OR SUBTRACT FOR EACH		ADD OR SUBTRACT FOR EACH		ADDITIONAL STEEL IN BOTTOM DIFFERENCE IN #4 AND #6 BARS	
				1 FT.	3 IN.	1 FT.	3 IN.		
3'-0" X 3'-0"	C	1.62	1.93	0.31	0.08	0.31	0.08	30.14	
	S	157.90	176.80	18.60	2.00	20.64	5.16		
3'-0" X 3'-6"	C	1.77	2.11	0.33	0.08	0.33	0.08	34.85	
	S	173.80	194.60	20.60	2.30	23.12	5.78		
3'-0" X 4'-0"	C	1.93	2.28	0.35	0.09	0.35	0.09	39.56	
	S	187.10	208.60	21.30	2.30	24.27	6.07		
3'-0" X 4'-6"	C	2.16	2.53	0.38	0.09	0.38	0.09	44.26	
	S	211.20	234.70	23.30	2.70	26.75	6.69		
3'-0" X 5'-0"	C	2.32	2.71	0.40	0.10	0.40	0.10	48.97	
	S	219.60	243.80	24.00	2.70	27.90	6.97		
3'-6" X 3'-6"	C	1.94	2.29	0.35	0.09	0.35	0.09	40.27	
	S	192.40	215.10	22.70	2.70	25.60	6.40		
3'-6" X 4'-0"	C	2.10	2.48	0.38	0.09	0.38	0.09	45.69	
	S	204.30	227.70	23.40	2.70	26.75	6.69		
3'-6" X 4'-6"	C	2.35	2.75	0.40	0.10	0.40	0.10	51.11	
	S	230.00	255.50	25.30	3.00	29.23	7.31		
3'-6" X 5'-0"	C	2.53	2.95	0.42	0.10	0.42	0.10	56.53	
	S	240.90	267.10	26.00	3.00	30.38	7.60		
4'-0" X 4'-0"	C	2.28	2.68	0.40	0.10	0.40	0.10	51.83	
	S	216.70	240.80	24.10	2.70	27.90	6.97		
4'-0" X 4'-6"	C	2.55	2.97	0.42	0.10	0.42	0.10	57.96	
	S	246.40	272.60	26.00	3.00	30.38	7.60		
4'-0" X 5'-0"	C	2.74	3.18	0.44	0.11	0.44	0.11	64.10	
	S	255.60	282.50	26.70	3.00	31.53	7.88		
4'-6" X 4'-6"	C	2.75	3.19	0.44	0.11	0.44	0.11	64.81	
	S	276.80	304.90	28.00	3.30	32.86	8.22		
4'-6" X 5'-0"	C	2.94	3.41	0.46	0.12	0.46	0.12	71.66	
	S	289.40	318.20	28.70	3.30	34.01	8.50		
5'-0" X 5'-0"	C	3.15	3.64	0.48	0.12	0.48	0.12	79.23	
	S	299.80	329.30	29.40	3.30	35.16	8.79		

TO AND INCLUDING 20-FOOT DEPTH

NOTE:  
TO COMPUTE THE QUANTITIES FOR DEPTHS ("D") NOT SHOWN. REFER TO TABLE FOR THE SIZE OF MANHOLE REQUIRED. SUBTRACT THE "D" VALUE FROM THE TABLE AND THE "D" VALUE FROM THE PLANS. MULTIPLY THE VALUES SHOWN IN THE 1-FOOT COLUMN FROM THE TABLE WITH THE FULL ONE FOOT INCREMENTS FROM THE DIFFERENCE BETWEEN THE "D" FROM THE PLANS AND THE "D" FROM THE TABLE. MULTIPLY THE VALUES SHOWN IN THE 3" COLUMN FROM THE TABLE WITH THE REMAINING FRACTIONAL FOOT VALUES PER 3" INCREMENTS. FOLLOW THIS SAME PROCESS FOR THE STEEL CALCULATIONS. SEE THE EXPAMPLE BELOW:

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 6'-9" "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:  
"D" REQUIRED = 6'-9"  
"D" GIVEN IN TABLE = 4'-3"  
"D" ADDITIONAL = 2'-6"

	2.76	CONCRETE	STEEL
FROM TABLE FOR 4'-3" "D"		2.28	208.6
ADD (2 X QUANTITIES FOR 1-FOOT)		0.70	42.6
ADD (6" = 2 X 3") (2 X QUANTITIES FOR 3")		0.18	255.8
SUBTOTAL		3.16	255.8
ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL)		-0.40	+19.5
TOTAL		2.76	275.3
USE		2.80	280.0

MORE THAN 20-FOOT TO AND INCLUDING 30-FOOT DEPTH

FIRST, COMPUTE QUANTITIES FOR 20-FOOT DEPTH FROM THE TABLE "TO AND INCLUDING 20-FOOT DEPTHS".

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 20'-0", "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:


"D" REQUIRED = 20'-0"  
"D" GIVEN IN TABLE = 4'-3"  
"D" ADDITIONAL = 15'-9"

	CONCRETE	STEEL
FROM TABLE FOR 4'-3" "D"	2.28	208.6
ADD (15 X QUANTITIES FOR 1-FOOT)	5.25	319.9
ADD (9" = 3 X 3") (3 X QUANTITIES FOR 3")	0.27	6.9
SUBTOTAL	7.80	535.0
ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL)	-0.40	+19.5
TOTAL	7.40	554.5

SECOND, COMPUTE QUANTITIES FOR THE DEPTHS BEYOND 20 FEET TO A MAXIMUM OF 30 FEET, USING THE TABLE "20-FOOT TO AND INCLUDING 30-FOOT DEPTH", AND ADD TO THE QUANTITIES FOR 20-FOOT DEPTH. ALSO, ADD THE DIFFERENCE IN STEEL IN THE BOTTOM DUE TO THE INCREASE IN SIZE OF BARS FROM #4 TO #6 BARS ON 7-INCH CENTERS.

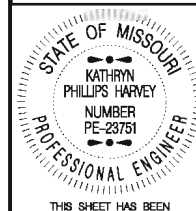
FOR EXAMPLE:  
"D" REQUIRED = 30'-0"  
"D" COMPUTED = 20'-0"  
"D" ADDITIONAL = 10'-0"

	CONCRETE	STEEL
ADD CONCRETE (10 X QUANTITIES FOR 1-FOOT)	3.50	
ADD STEEL (10 X QUANTITIES FOR 1-FOOT)	242.70	
ADD STEEL (ADDITIONAL STEEL IN BOTTOM)		39.56
TOTAL (30-FOOT DEPTH)	10.90	836.76
USE	10.9	840.0



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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



**CONCRETE MANHOLES**

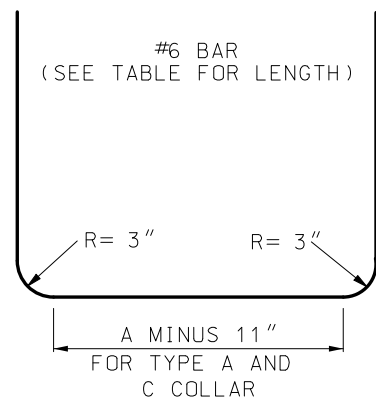
DATE EFFECTIVE: 02-01-2009  
DATE PREPARED: 8/26/2009

604.30G

SHEET NO.  
2 OF 2

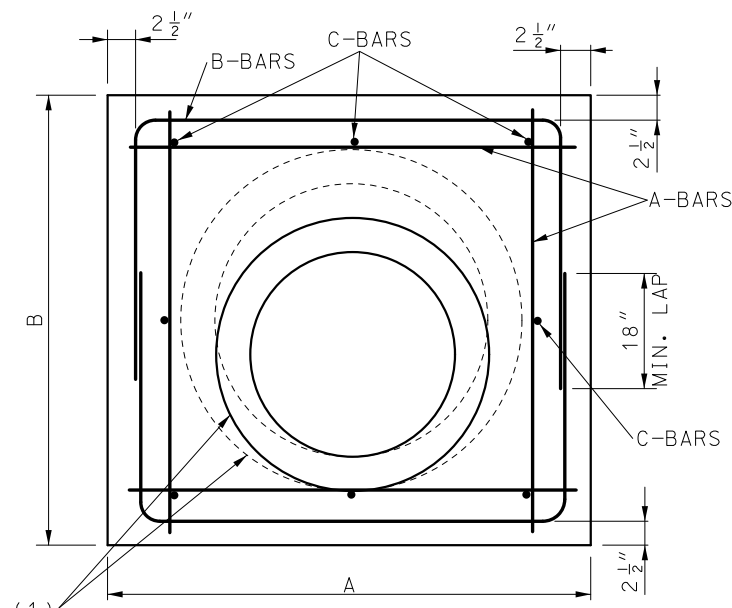
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

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

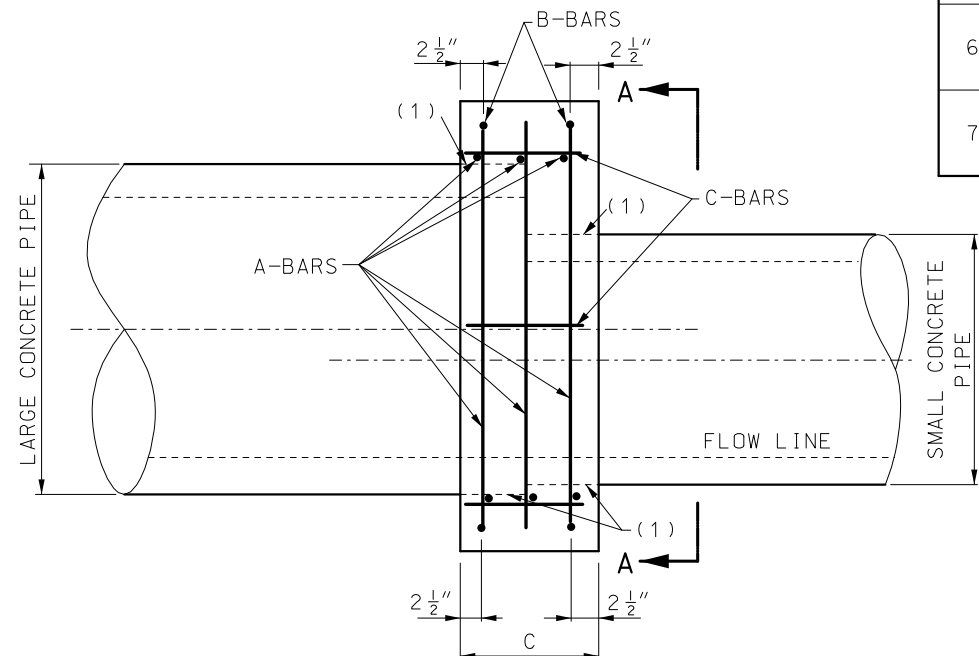


BENDING DIAGRAM FOR B-BARS

(1) ONE LAYER COMMERCIALY AVAILABLE 55-POUND ROLL ROOFING.



SECTION A-A



ELEVATION

(FOR PIPES OF DISSIMILAR SIZE OR MATERIAL)

TYPE A COLLAR

TABLE OF DIMENSIONS

SIZE OF PIPE		DIMENSIONS		LENGTH OF BARS			QUANTITIES	
LARGE (IN.)	SMALL (IN.)	A & B (FT.-IN.)	C (FT.-IN.)	A (#5) 12 REQUIRED (FT.-IN.)	B (#6) 4 REQUIRED (FT.-IN.)	C (#4) 8 REQUIRED (FT.-IN.)	CONCRETE (CU. YD.)	STEEL (LBS.)
12	12	2-8	1-0	2-5	5-10	0-9	0.21	70
15	12 15	3-0	1-0	2-9	6-6	0-9	0.27 0.25	77
18	12 15 18	3-3	1-0	3-0	7-0	0-9	0.33 0.32 0.30	84
21	12 15 18	3-6	1-0	3-3	7-6	0-9	0.36 0.34 0.33	90
24	15 18 24	3-10	1-0	3-6	8-2	0-9	0.44 0.40 0.36	97
30	18 24 30	4-5	1-4	4-2	9-4	1-0	0.71 0.66 0.60	114
36	24 30 36	5-0	1-4	4-9	10-6	1-0	0.88 0.79 0.76	128
42	30 36 42	5-7	1-4	5-4	11-8	1-0	1.05 0.98 0.89	142
48	36 42 48	6-2	1-4	6-0	12-10	1-0	1.22 1.13 1.03	158
54	42 48 54	7-1	1-8	6-9	14-8	1-6	2.02 1.90 1.76	181
60	48 54 60	7-8	1-8	7-5	15-10	1-6	2.27 2.13 1.97	196
66	54 60 66	8-3	2-0	8-0	17-0	1-9	3.04 2.85 2.65	210
72	60 66 72	8-10	2-0	7-7	18-2	1-9	3.36 3.16 2.93	225

GENERAL NOTES:

FOR PIPE EXTENSIONS THAT ARE 5 FEET IN LENGTH OR SHORTER, A SMOOTH TAPERED SLEEVE MAY BE USED IN LIEU OF A TYPE A COLLAR, IF APPROVED BY THE ENGINEER. SEE SMOOTH TAPERED SLEEVE DETAIL IN STANDARD PLAN 732.00.

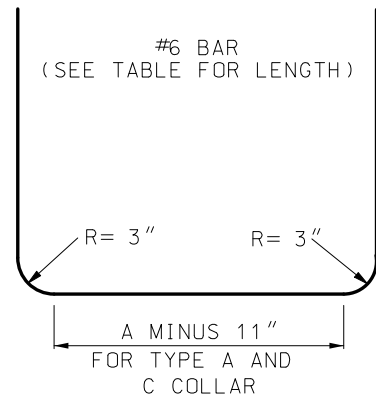
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PIPE COLLARS  
 TYPE A

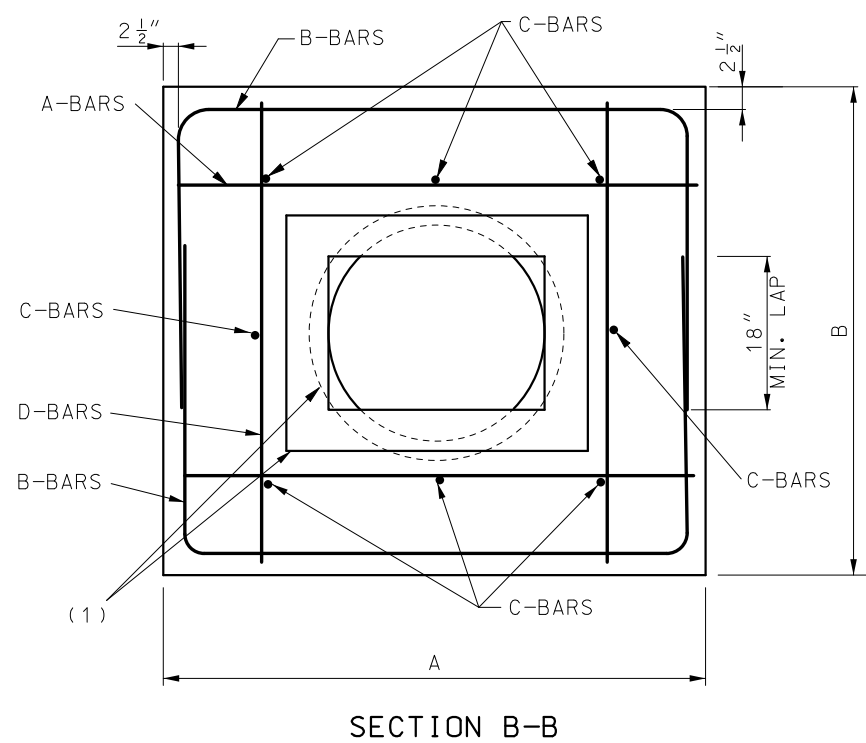
DATE EFFECTIVE: 07/01/2021	604.40G	SHEET NO. 1 OF 2
DATE PREPARED: 4/29/2021		

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

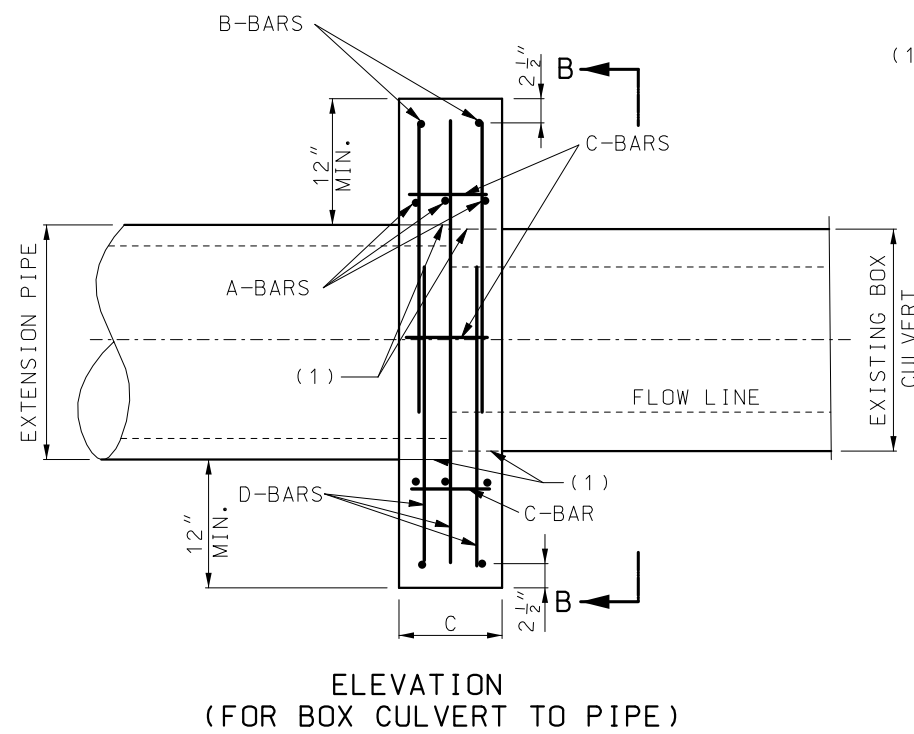


BENDING DIAGRAM FOR B-BARS

BOX SIZE (FT.)	PIPE SIZE (IN.)	DIMENSIONS			LENGTH OF BARS				QUANTITIES	
		A (FT.-IN.)	B (FT.-IN.)	C (FT.-IN.)	A (#5) 6 REQUIRED (FT.-IN.)	B (#6) 4 REQUIRED (FT.-IN.)	C (#4) 8 REQUIRED (FT.-IN.)	D (#5) 6 REQUIRED (FT.-IN.)	CONCRETE (CU.YD.)	STEEL (LBS.)
2 x 1 1/2	24	5-1	4-9	1-0	4-10	10-4	0-9	4-6	0.65	124
2 x 2	30	5-3	5-3	1-4	5-0	11-0	1-0	5-0	0.93	134
3 x 2	36	6-1	5-10	1-4	5-10	12-5	1-0	5-7	1.16	151
3 x 3	42	6-5	6-5	1-4	6-0	13-4	1-0	6-0	1.29	162



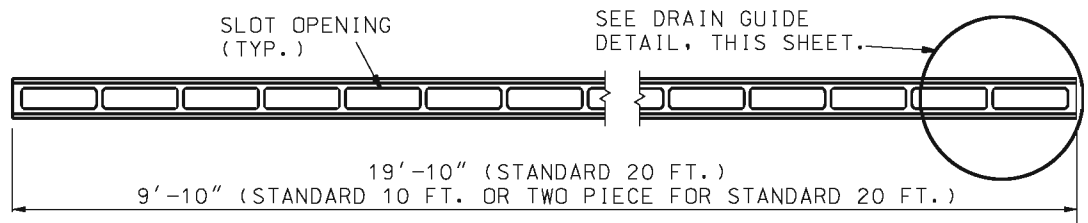
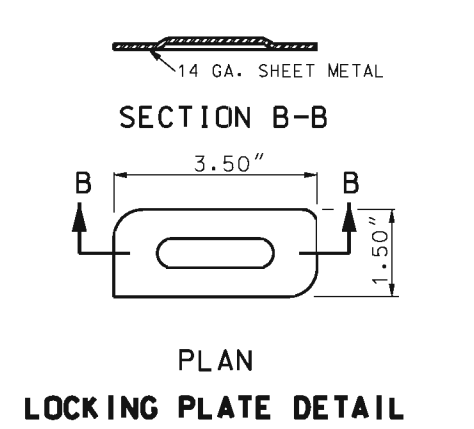
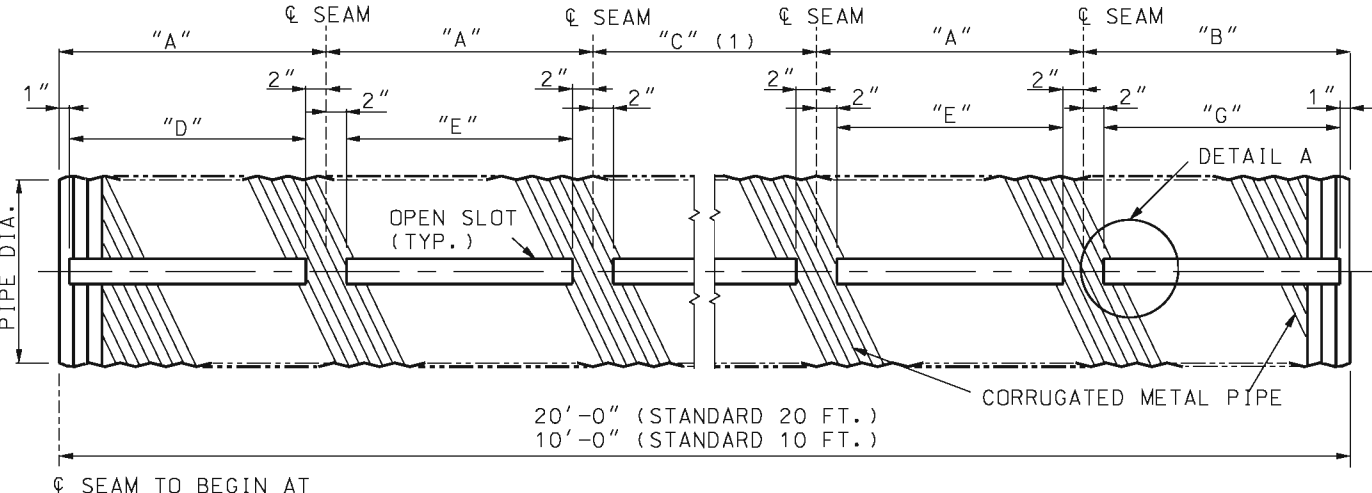
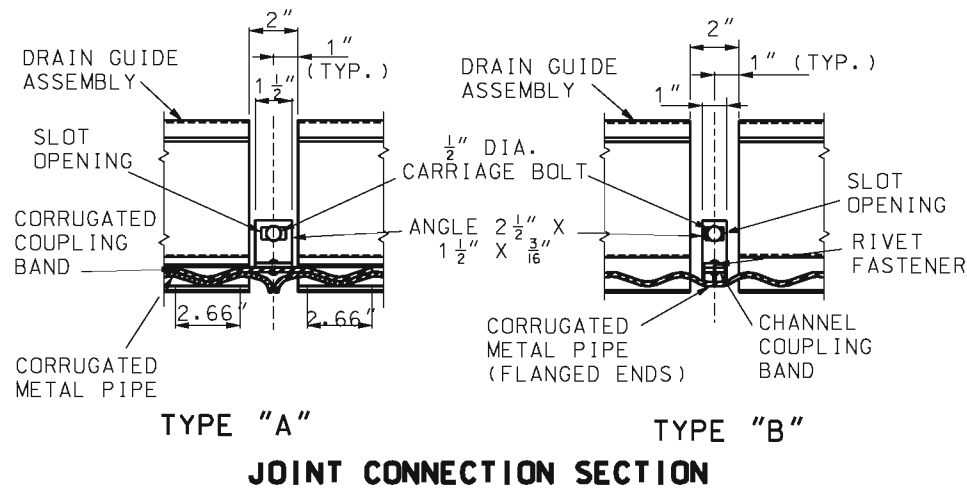
TYPE C COLLAR



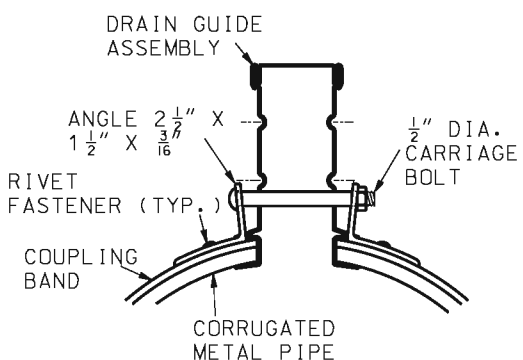
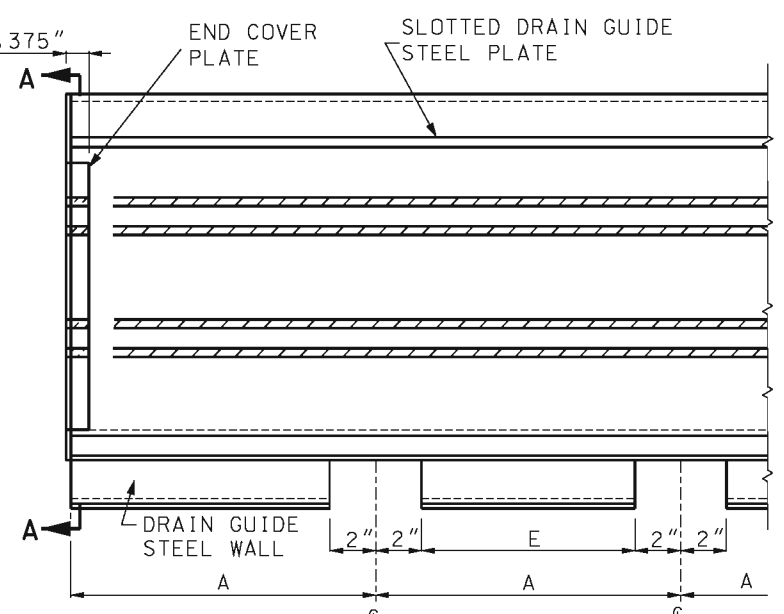
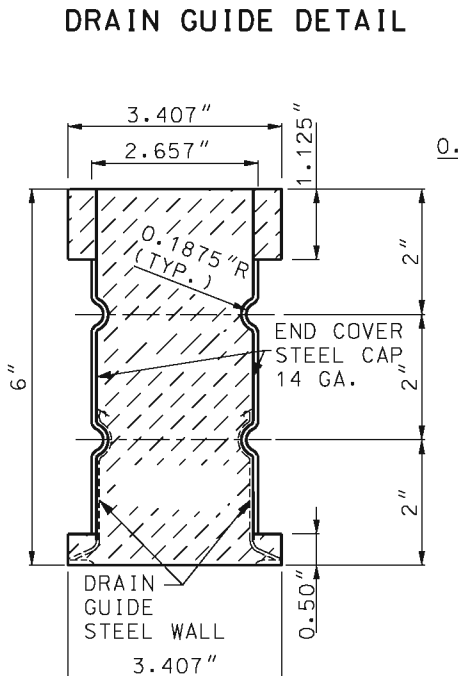
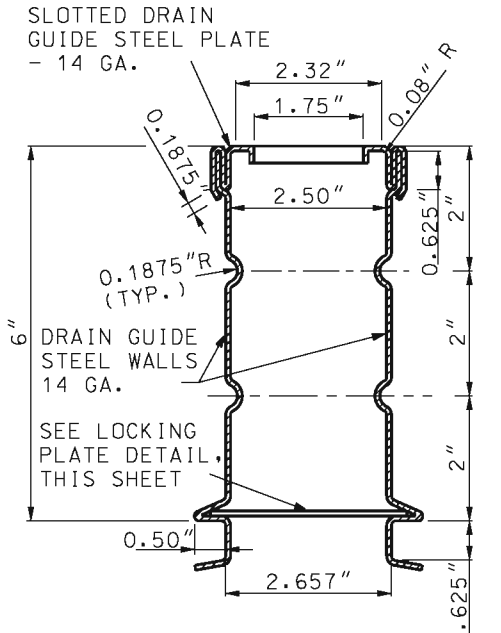
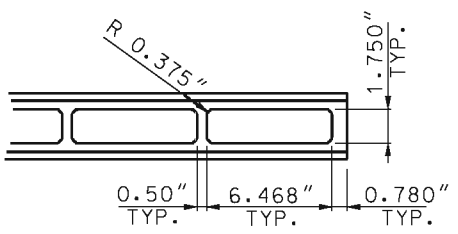
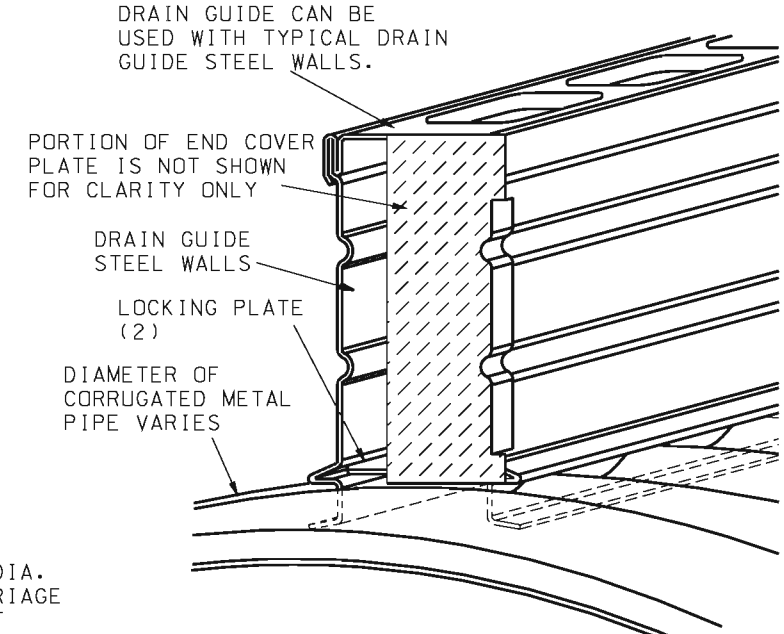
(1) ONE LAYER COMMERCIALY AVAILABLE  
55-POUND ROLL ROOFING.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p><b>PIPE COLLARS TYPE C</b></p>
DATE EFFECTIVE: 07/01/2021 DATE PREPARED: 4/29/2021	<p><b>604.40G</b></p>	SHEET NO. 2 OF 2

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



PIPE DIAMETER	DIMENSION SCHEDULE							LOCKING PLATES REQUIRED (3)	
	A	B <sub>10</sub>	G <sub>10</sub>	B <sub>20</sub>	G <sub>20</sub>	D	E	10 FT.	20 FT.
12"	31 1/2"	25 1/2"	22 1/2"	19 1/2"	16 1/2"	28 1/2"	27 1/2"	9	17
15"	27 1/2"	10"	7"	20"	17"	24 1/2"	23 1/2"	10	19
18"	26 1/4"	15"	12"	33"	3/4"	23 1/4"	22 1/4"	10	19
24"	25"	20"	17"	15"	12"	22"	21"	11	21
30"	24 3/4"	21"	18"	17 1/4"	14 1/4"	21 3/4"	20 3/4"	11	21
36"	24 5/8"	21 1/2"	18 1/2"	18 3/8"	15 3/8"	21 3/8"	20 5/8"	11	21



- (1) FOR STANDARD 10 FT., 12" DIA. PIPE, "C" = 0. FOR ALL OTHER PIPE SIZES "C" IS IN MULTIPLES OF "A".
- (2) LOCKING PLATE TO BE INSTALLED AT:
  - A. EACH END OF DRAIN GUIDE.
  - B. EACH SEAM.
  - C. EACH MID-POINT OF OPEN SLOT.
- (3) IN 20 FT. SECTION FOR TWO PIECE DRAIN GUIDE, INCREASE NUMBER OF LOCKING PLATES BY TWO.

**DRAIN GUIDE SECTION (TYP.)**

**SECTION A-A**

**END COVER PLATE DETAIL**

**SIDE ELEVATION**

**TYPE A SLOTTED DRAIN**

(FORMED SHEET)

CUT OUT SLOT FOR DRAIN GUIDE WALLS TO FIT OVER CORRUGATED METAL PIPE SEAMS (TYPICAL).

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**STATE OF MISSOURI**  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**DATE EFFECTIVE: 03/01/1994**

**DATE PREPARED: 8/21/2009**

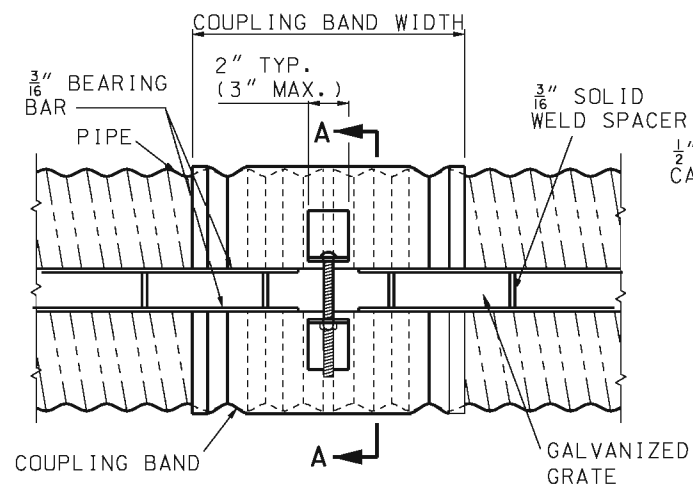
**604.70**

**SHEET NO. 1 OF 2**

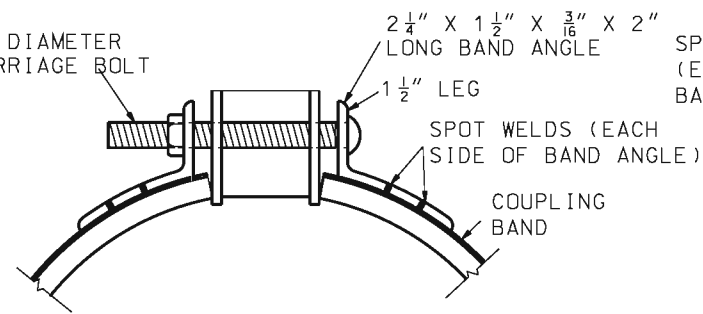
**SLOTTED DRAIN TYPE A**

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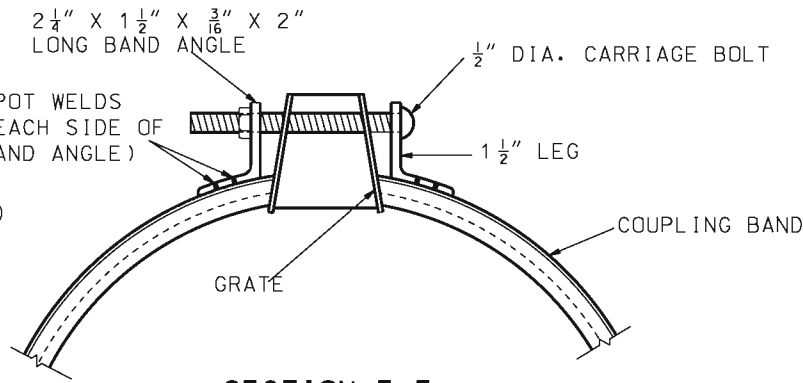




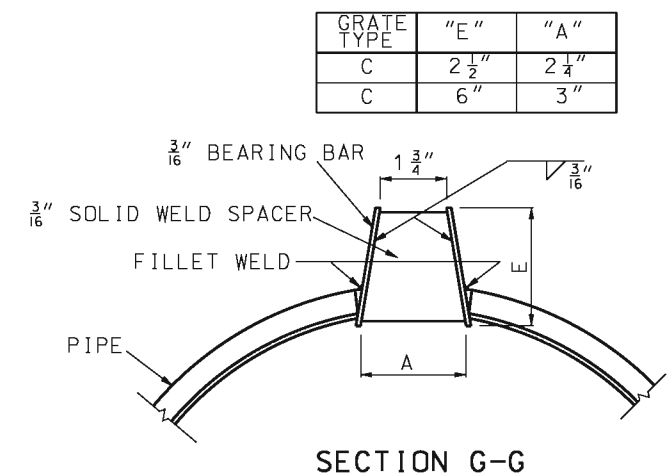
TOP VIEW



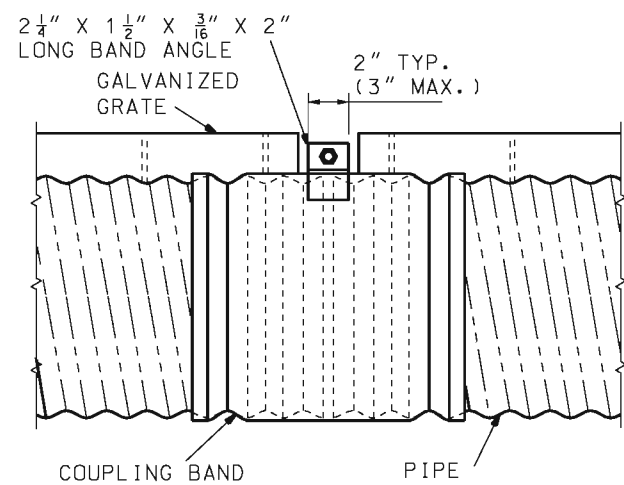
SECTION A-A



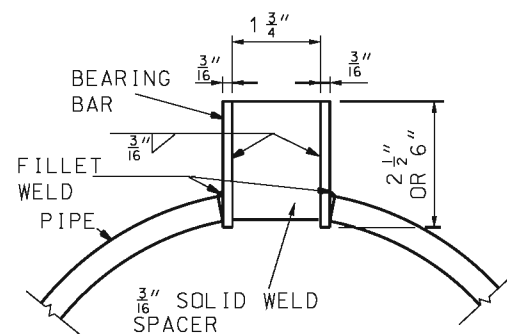
SECTION F-F



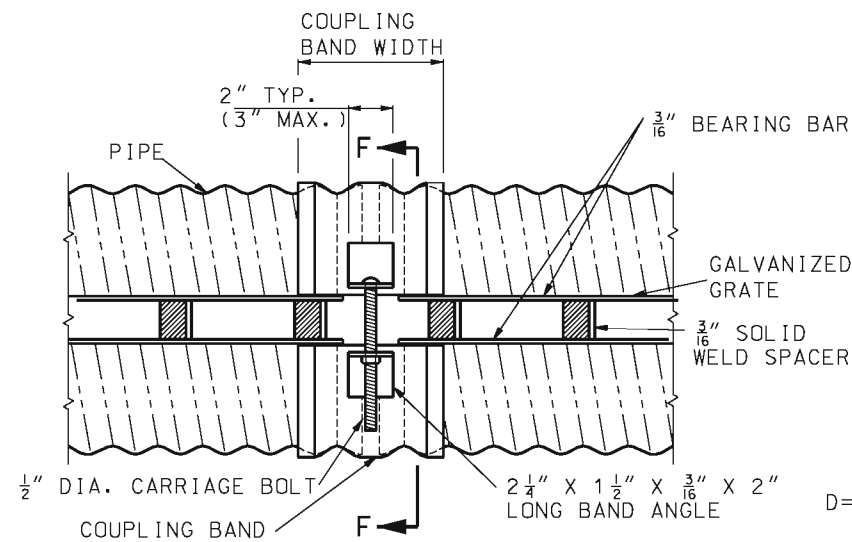
SECTION G-G



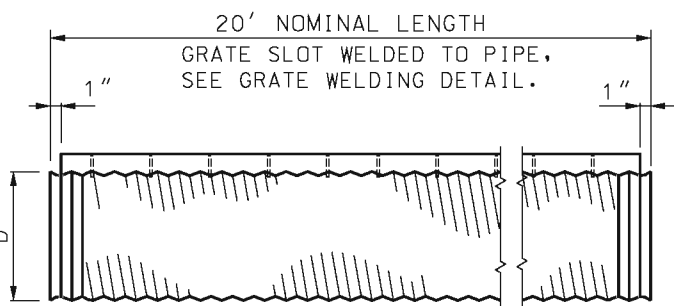
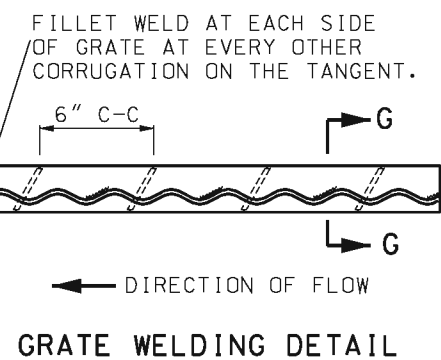
SIDE VIEW  
TYPICAL COUPLING BAND



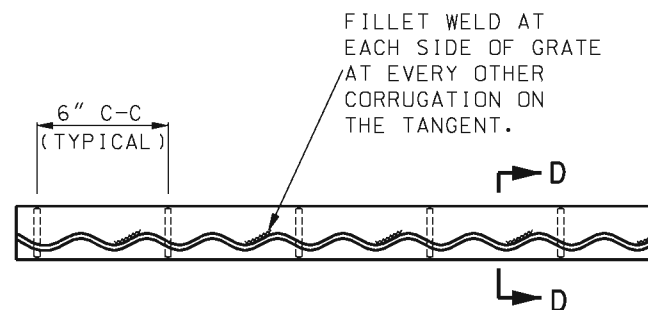
SECTION D-D



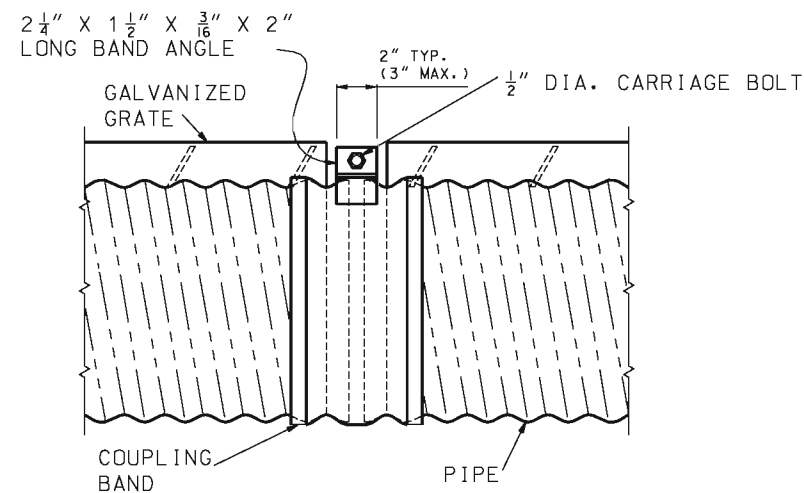
TOP VIEW



TYPICAL PIPE SECTION



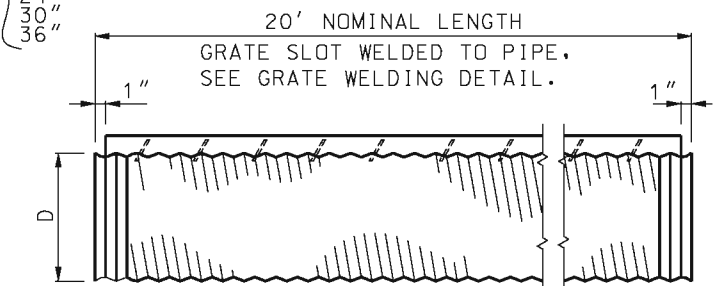
GRATE WELDING DETAIL



SIDE VIEW  
TYPICAL COUPLING BAND

STRUCTURAL STEEL SLOTTED DRAIN  
(TYPE C)

D = { 12", 15", 18", 24", 30", 36" }



TYPICAL PIPE SECTION

D = { 12", 15", 18", 24", 30", 36" }

STRUCTURAL STEEL SLOTTED DRAIN  
(TYPE B)

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JEFFERSON CITY, MO 65102  
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STATE OF MISSOURI  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER

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SLOTTED DRAIN  
TYPE B AND TYPE C

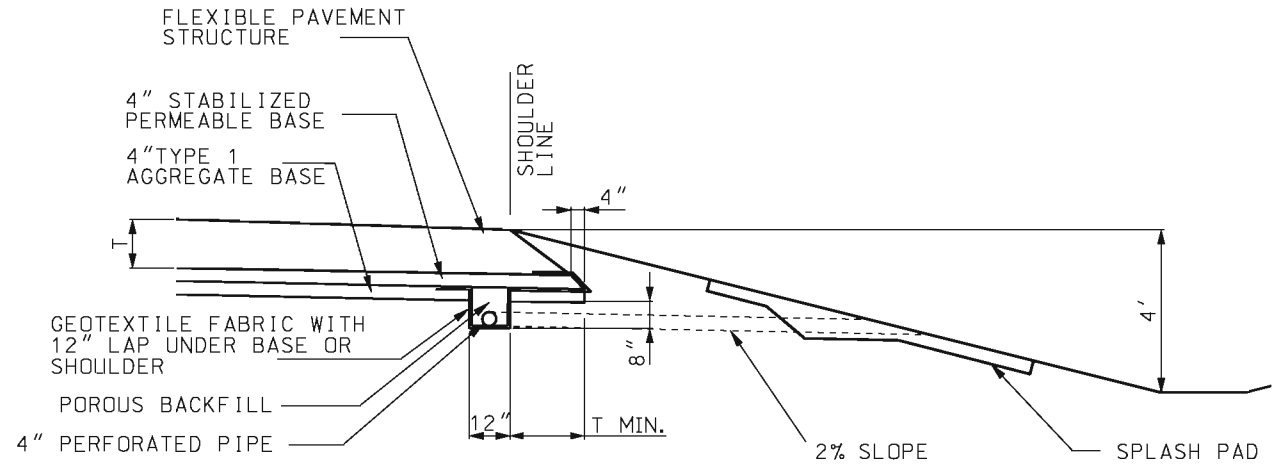
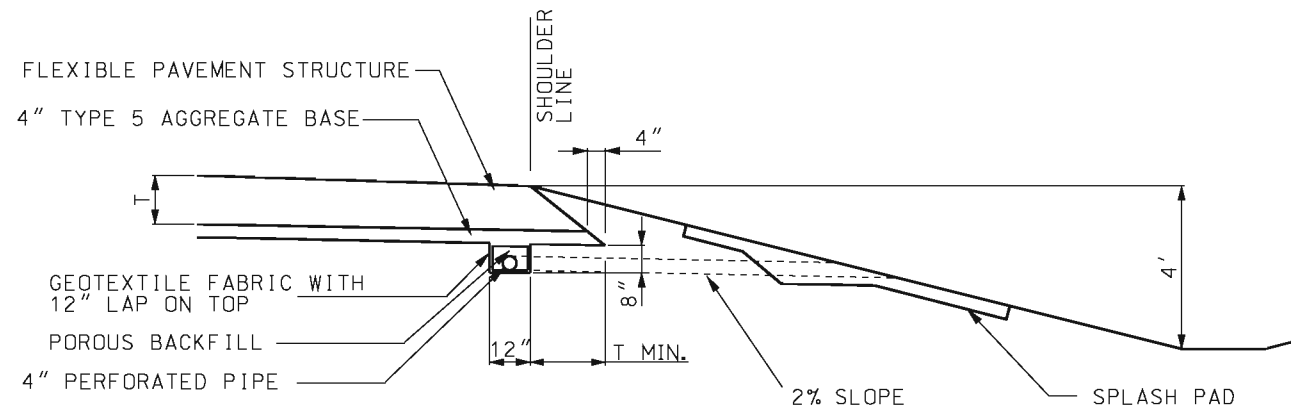
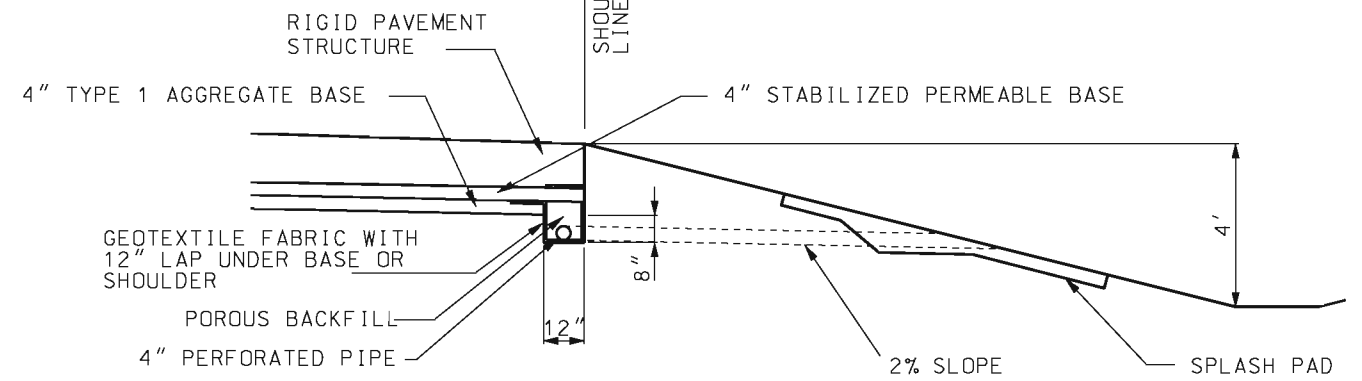
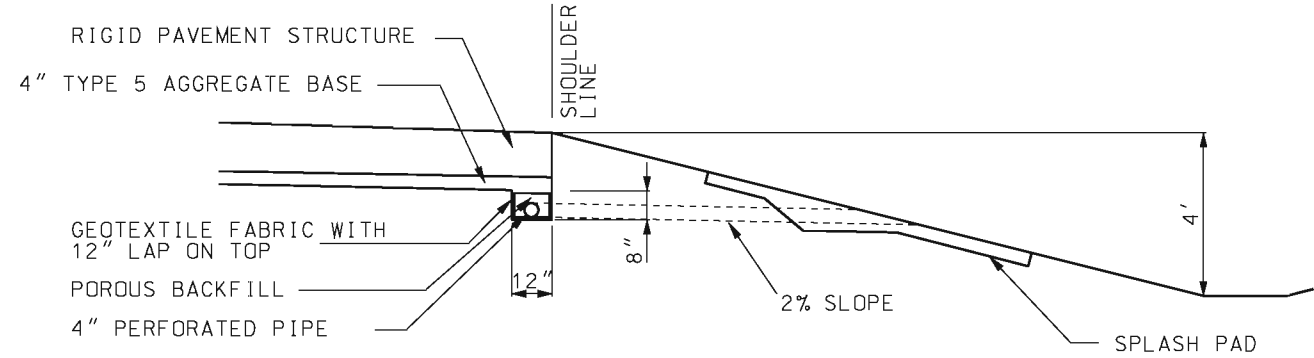
DATE EFFECTIVE: 03/01/1994  
DATE PREPARED: 8/21/2009

604.70

SHEET NO.  
2 OF 2

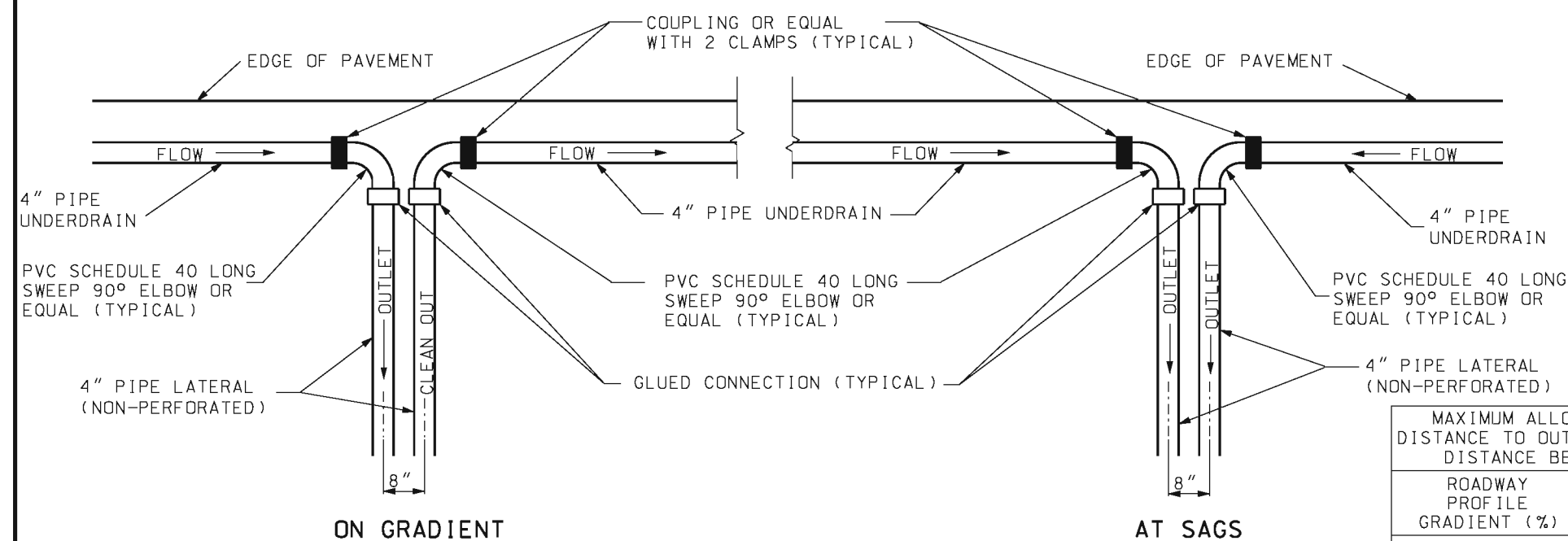
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MEDIUM DUTY

HEAVY DUTY



DETAIL OF PIPE AGGREGATE DRAIN OUTLETS

MAXIMUM ALLOWABLE DRAINAGE DISTANCE TO OUTLET OR SEPARATION DISTANCE BETWEEN OUTLETS	
ROADWAY PROFILE GRADIENT (%)	DISTANCE
≤ 1	250 FT.
> 1 AND ≤ 2	375 FT.
> 2	500 FT.

GENERAL NOTES:  
 ON SUPERELEVATED CURVES PLACE LONGITUDINAL UNDERDRAIN ON LOW SIDE ONLY.  
 CONSTRUCT OUTLETS AT LOW POINT OF SAG CURVE.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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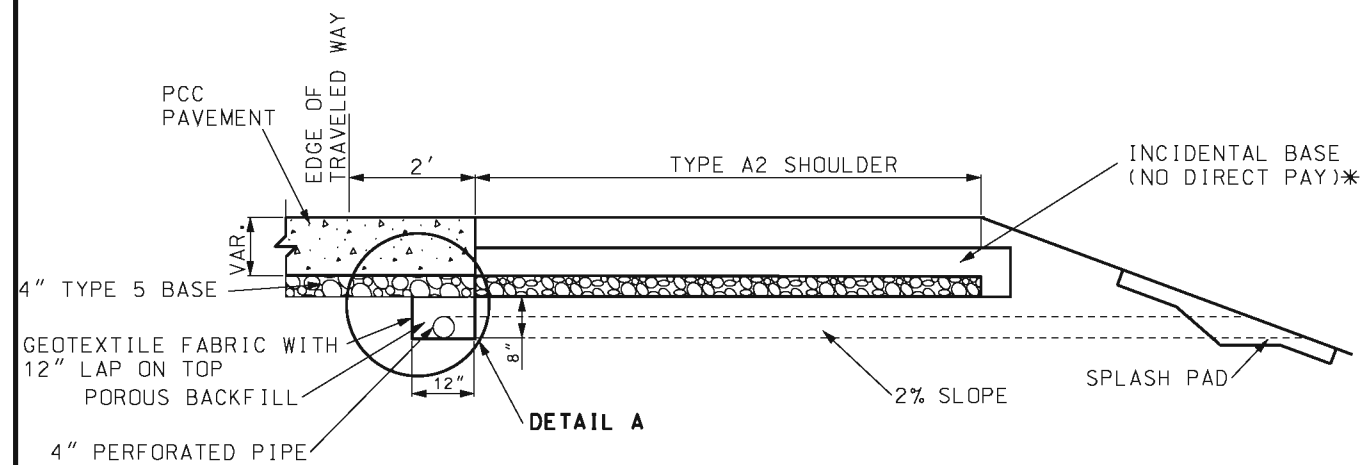
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**PAVEMENT UNDERDRAINAGE**  
 PIPE AGGREGATE PAVEMENT  
 EDGE DRAINS FOR  
 FULL DEPTH SHOULDERS

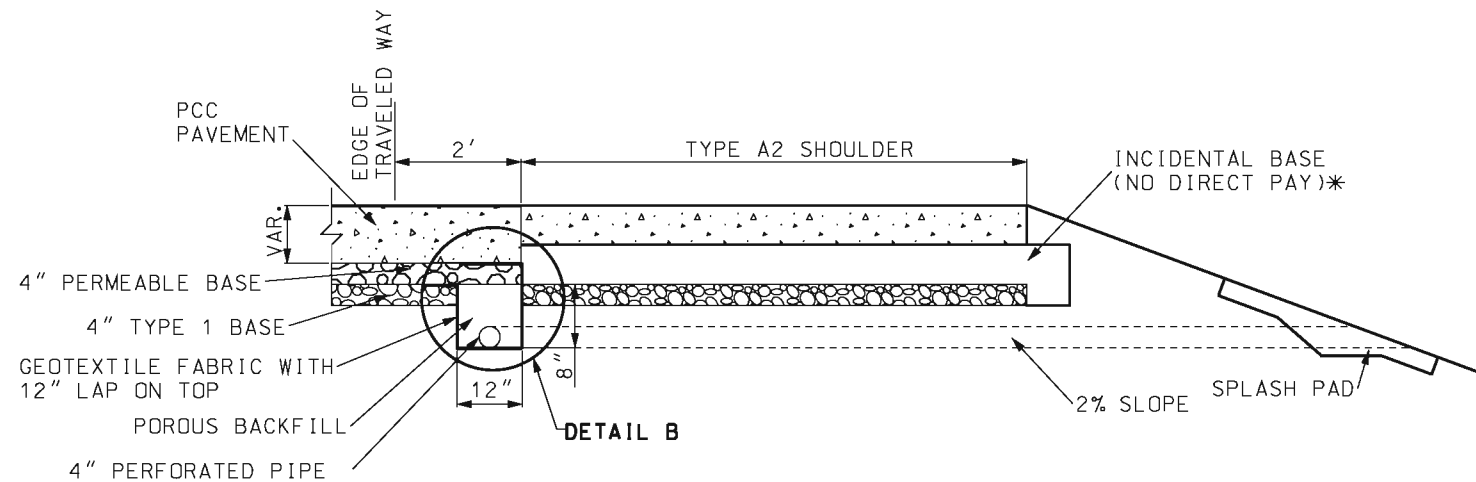
DATE EFFECTIVE: 06/01/2013  
 DATE PREPARED: 4/1/2013

605.101

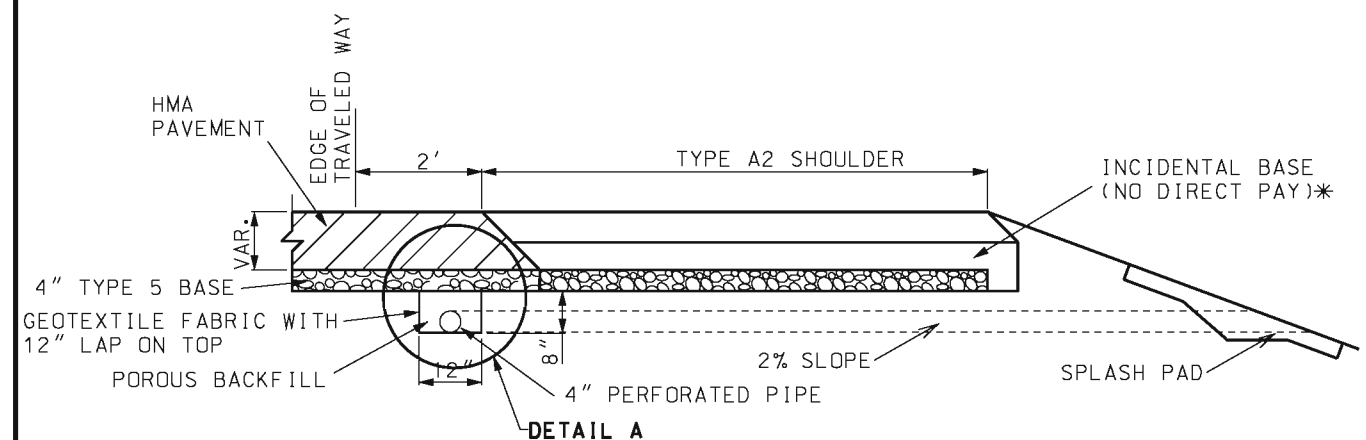
SHEET NO.  
1 OF 4



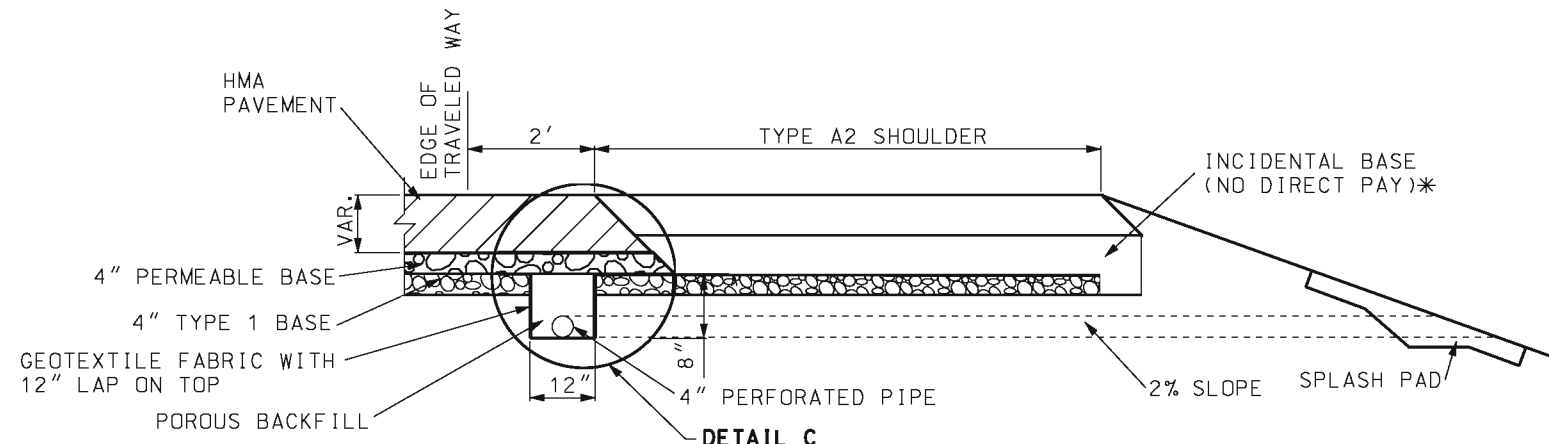
**RIGID PAVEMENT WITH TYPE 5 BASE**






**RIGID PAVEMENT WITH PERMEABLE BASE**



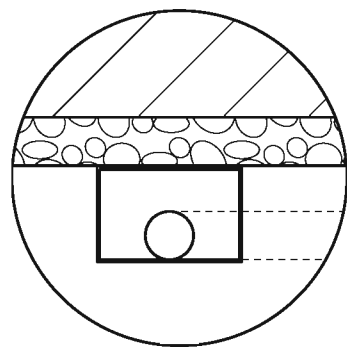
**FLEXIBLE PAVEMENT WITH TYPE 5 BASE**



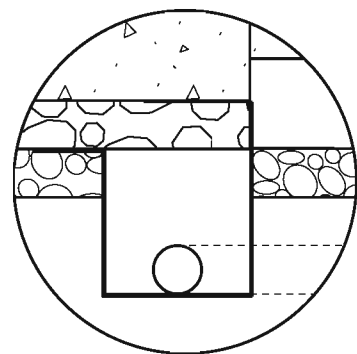
**FLEXIBLE PAVEMENT WITH PERMEABLE BASE**

-  PCC (PORTLAND CEMENT CONCRETE)
-  HMA (HOT MIX ASPHALT)
-  BASE

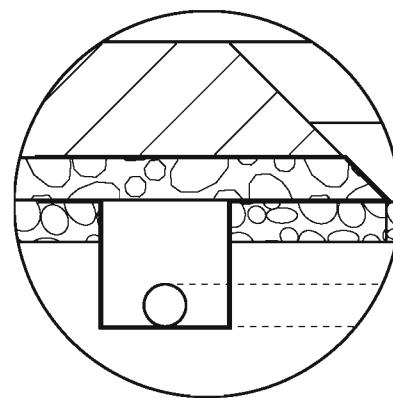
\* BASE MATERIAL (ASPHALT MILLINGS, RECYCLED CONCRETE, TYPE 1 BASE, ETC.) APPROVED BY THE ENGINEER.



DETAIL A





DETAIL B



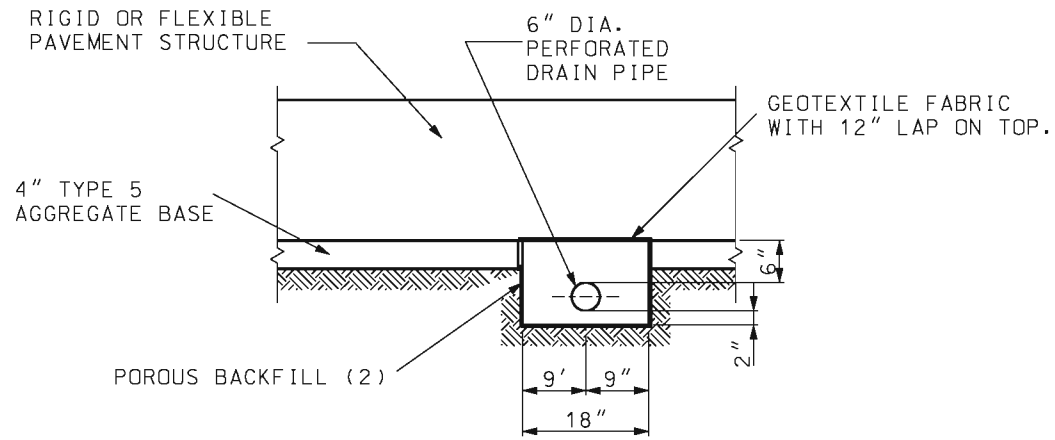
DETAIL C

GENERAL NOTES:

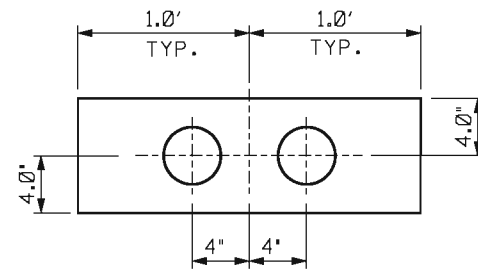
SEE DETAIL OF PIPE AGGREGATE DRAIN OUTLETS ON SHEET 1.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>PAVEMENT UNDERDRAINAGE</b> PIPE AGGREGATE PAVEMENT EDGE DRAINS FOR TYPE A2 SHOULDERS
DATE EFFECTIVE: 06/01/2013 DATE PREPARED: 4/1/2013	<b>605.101</b>	SHEET NO. 2 OF 4

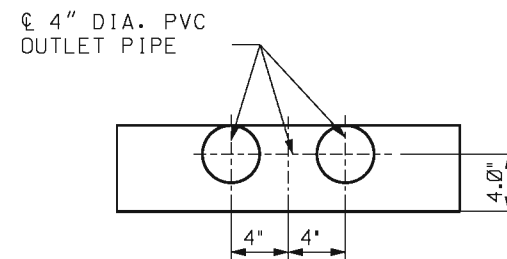
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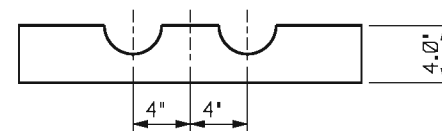
SECTION D-D  
WITHOUT PERMEABLE BASE



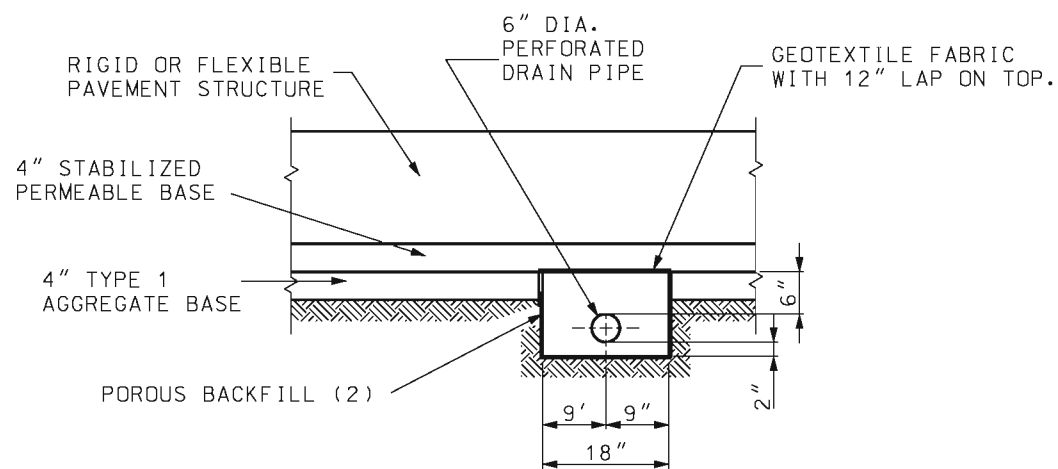
SECTION A-A



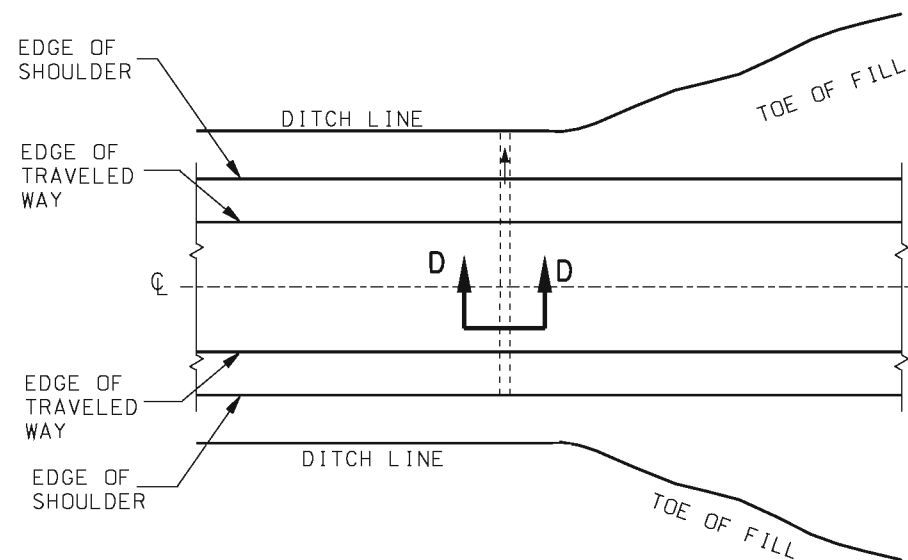
SECTION B-B



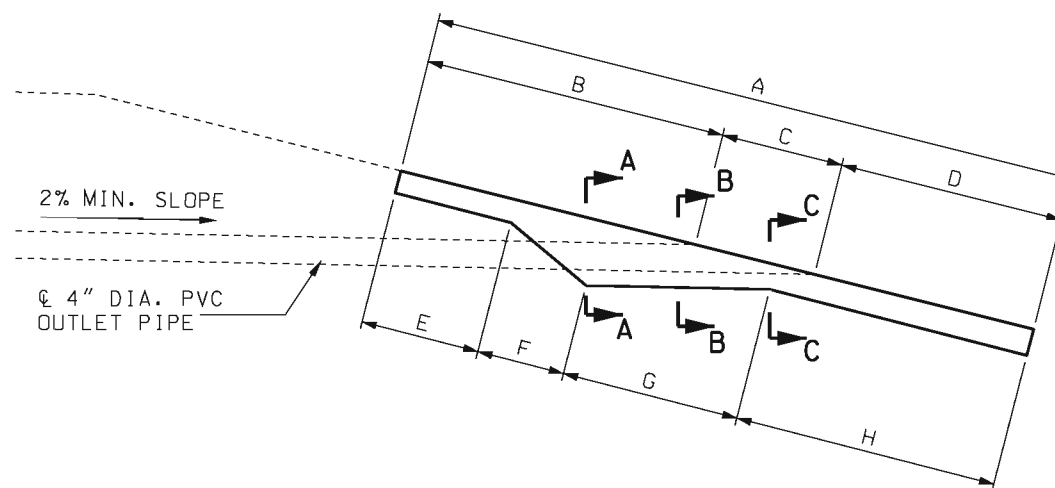
SECTION C-C



SECTION D-D  
WITH PERMEABLE BASE



CROSS DRAIN



CONCRETE SPLASH PADS

ITEM	2:1	3:1	4:1	6:1
A	5.48'	6.19'	6.95'	8.58'
B	2.70'	3.07'	3.46'	4.28'
C	0.78'	1.12'	1.49'	2.30'
D	2.00'	2.00'	2.00'	2.00'
E	2.00'	2.00'	2.00'	2.00'
F	0.46'	0.61'	0.78'	1.18'
G	0.71'	1.07'	1.46'	2.27'
H	2.31'	2.51'	2.71'	3.13'
CONC.	0.15 C.Y.	0.17 C.Y.	0.20 C.Y.	0.25 C.Y.

GENERAL NOTES:

PRECAST CONCRETE SPLASH PADS MAY BE INSTALLED AS APPROVED BY THE ENGINEER.

TOP OF SPLASH PAD SHALL MATCH EXISTING CROSS SLOPE. CONSTRUCT BEND IN SPLASH PAD WHERE CROSS SLOPE CHANGES.

DIMENSIONS ARE APPROXIMATE AND CAN BE ADJUSTED AS DIRECTED BY THE ENGINEER.

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

STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
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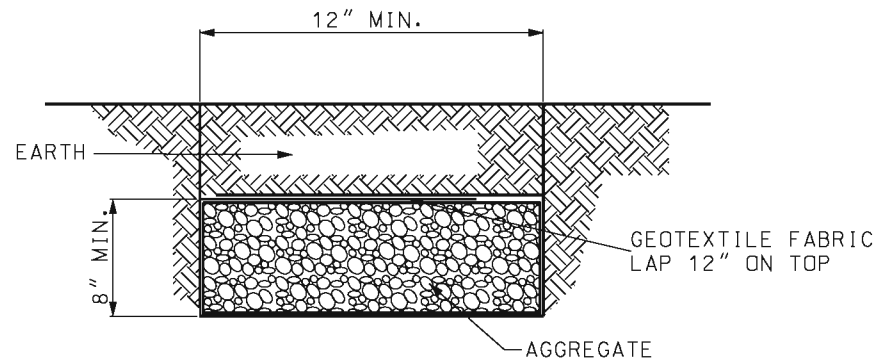
**PAVEMENT UNDERDRAINAGE CROSS DRAINS**

DATE EFFECTIVE: 06/01/2013  
 DATE PREPARED: 4/1/2013

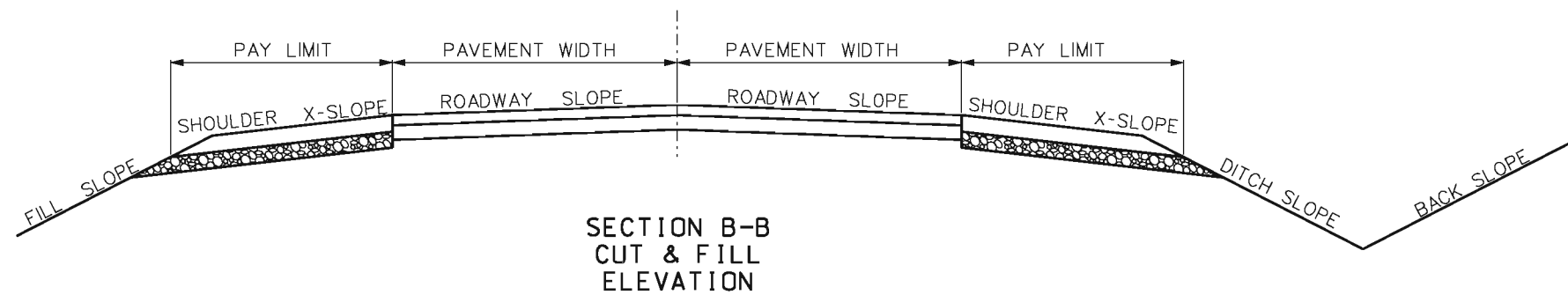
**605.101**

SHEET NO.  
 3 OF 4

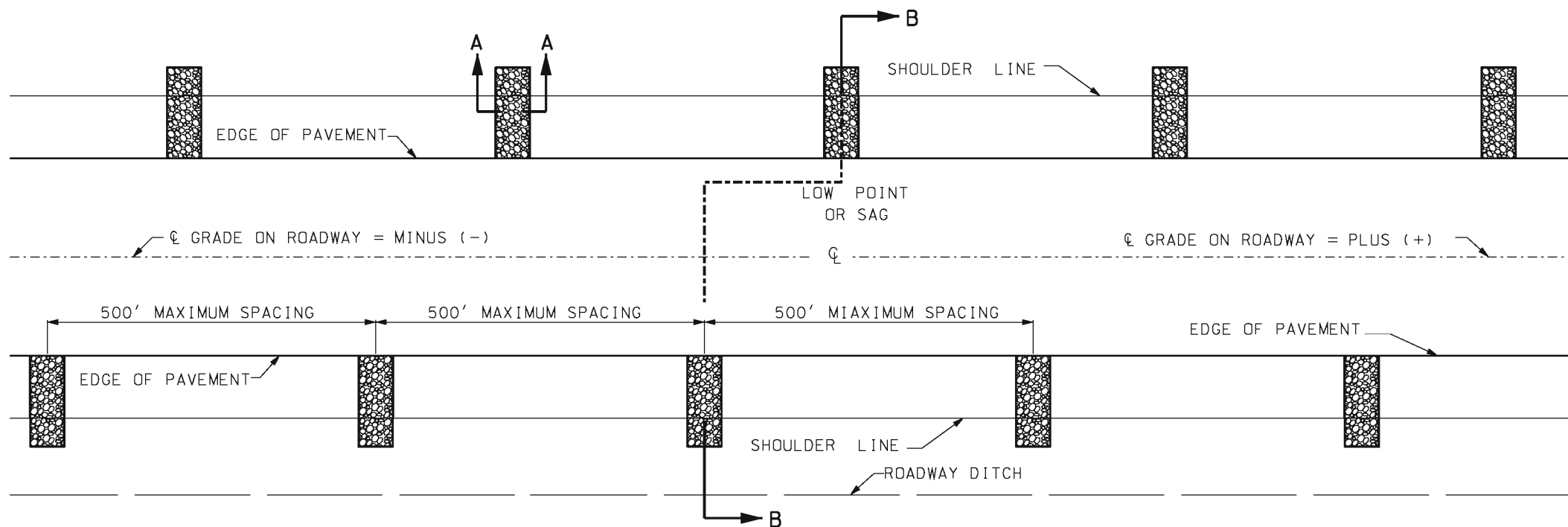
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SECTION A-A



SECTION B-B  
CUT & FILL  
ELEVATION



PLAN

GENERAL NOTES:

AGGREGATE UNDERDRAIN TO BE USED ONLY WHERE DESIGNATED ON PLANS.

AGGREGATE UNDERDRAIN SHALL BE PLACED AT THE LOW POINT OF THE SAG AND THE SPACING OF AGGREGATE UNDERDRAIN SHALL BE APPROX. 500'. AGGREGATE UNDERDRAINS WILL BE OMITTED ON THE CREST VERTICAL CURVES AND ON THE HIGH SIDE OF SUPERELEVATION. THE LOW SIDE OF SUPER-ELEVATION SPACING MAY BE DECREASED AS DIRECTED BY ENGINEER.

THE BOTTOM OF THE AGGREGATE DRAINS SHALL BE AT OR BELOW THE BOTTOM OF THE PAVEMENT'S AGGREGATE SUBBASE AT THE POINT OF CONTACT. THE TOP OF THE AGGREGATE DRAINS SHALL BE NO HIGHER THAN THE BOTTOM OF THE SHOULDER'S AGGREGATE BASE.

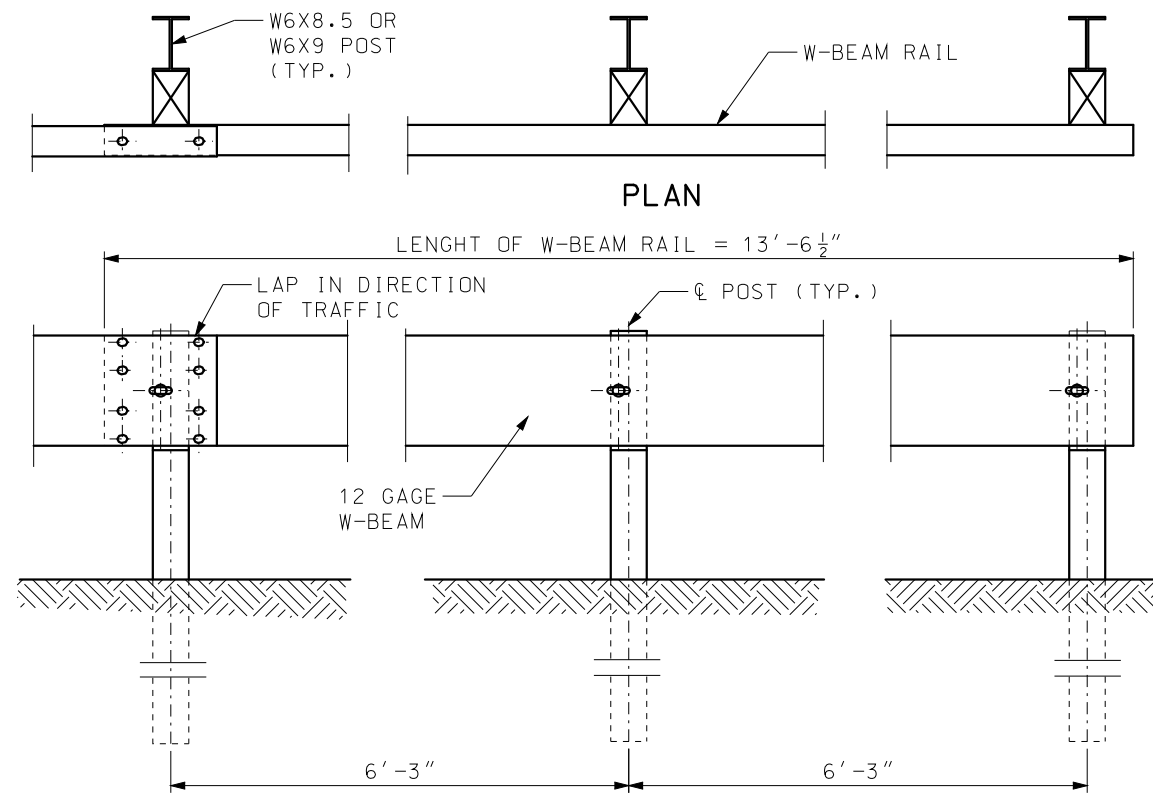
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STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
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 PROFESSIONAL ENGINEER  
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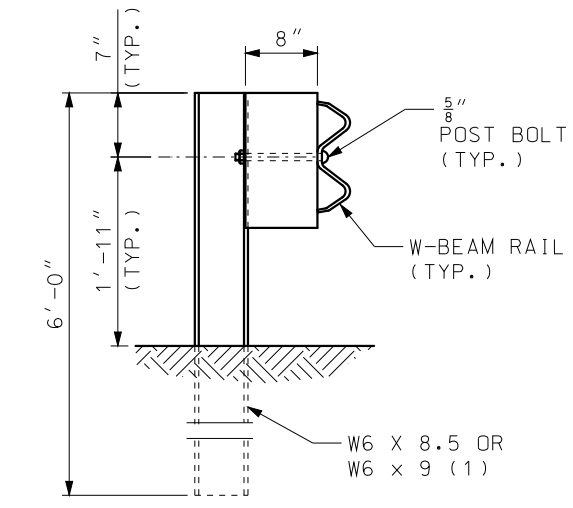
**PAVEMENT UNDERDRAINAGE  
 AGGREGATE UNDERDRAINS**

DATE EFFECTIVE: 06/01/2013	605.101	SHEET NO. 4 OF 4
DATE PREPARED: 4/1/2013		

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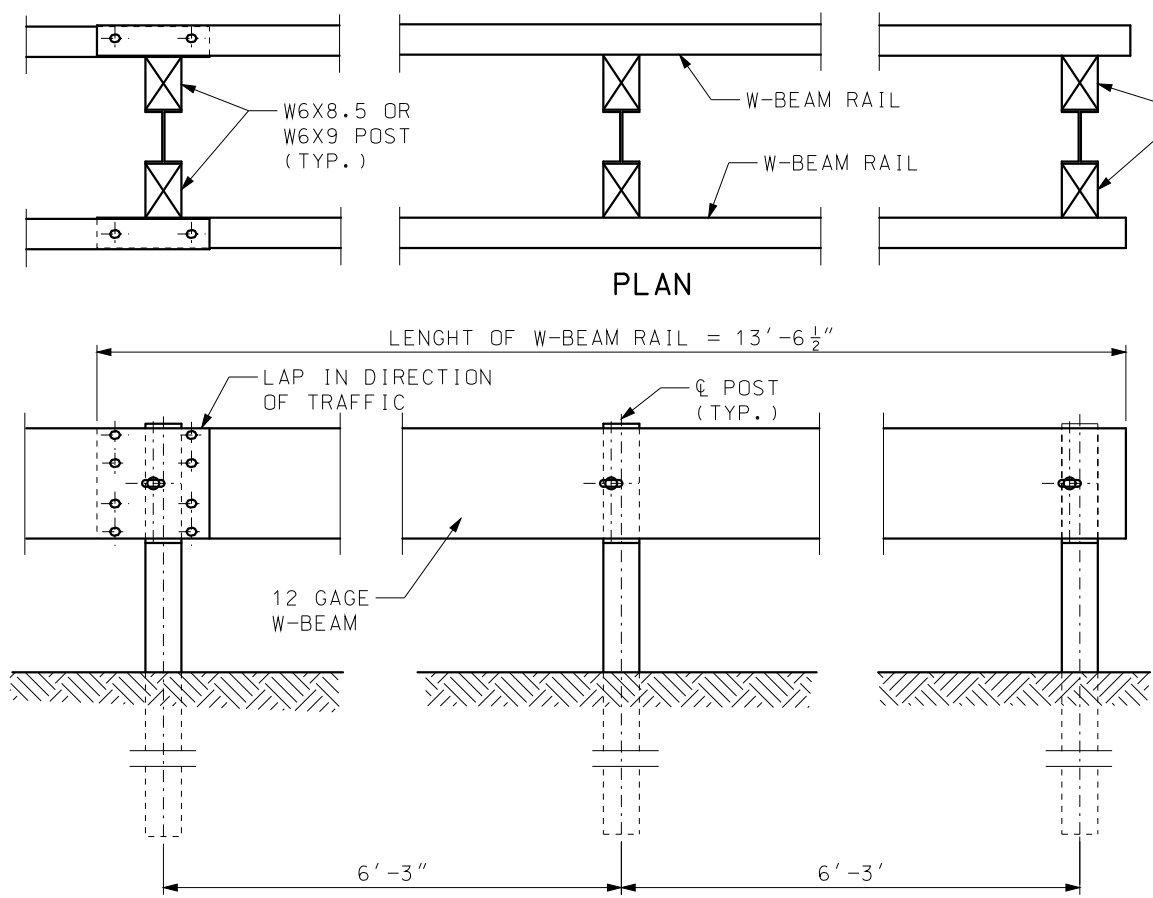


ELEVATION

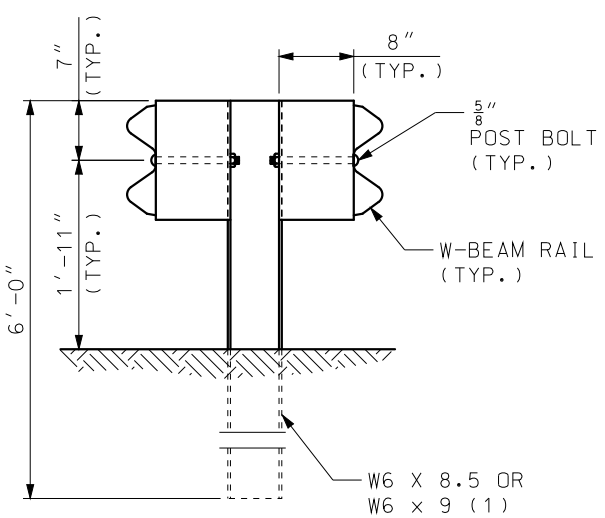


STEEL POST & WOOD OR PLASTIC BLOCK

TYPE A GUARDRAIL



ELEVATION



STEEL POST & WOOD OR PLASTIC BLOCKS

TYPE B GUARDRIAL

(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SECTION 1040.

GENERAL NOTES:  
SEE SHEET NO. 5 OF 7 FOR POST AND BLOCK DETAILS.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
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JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

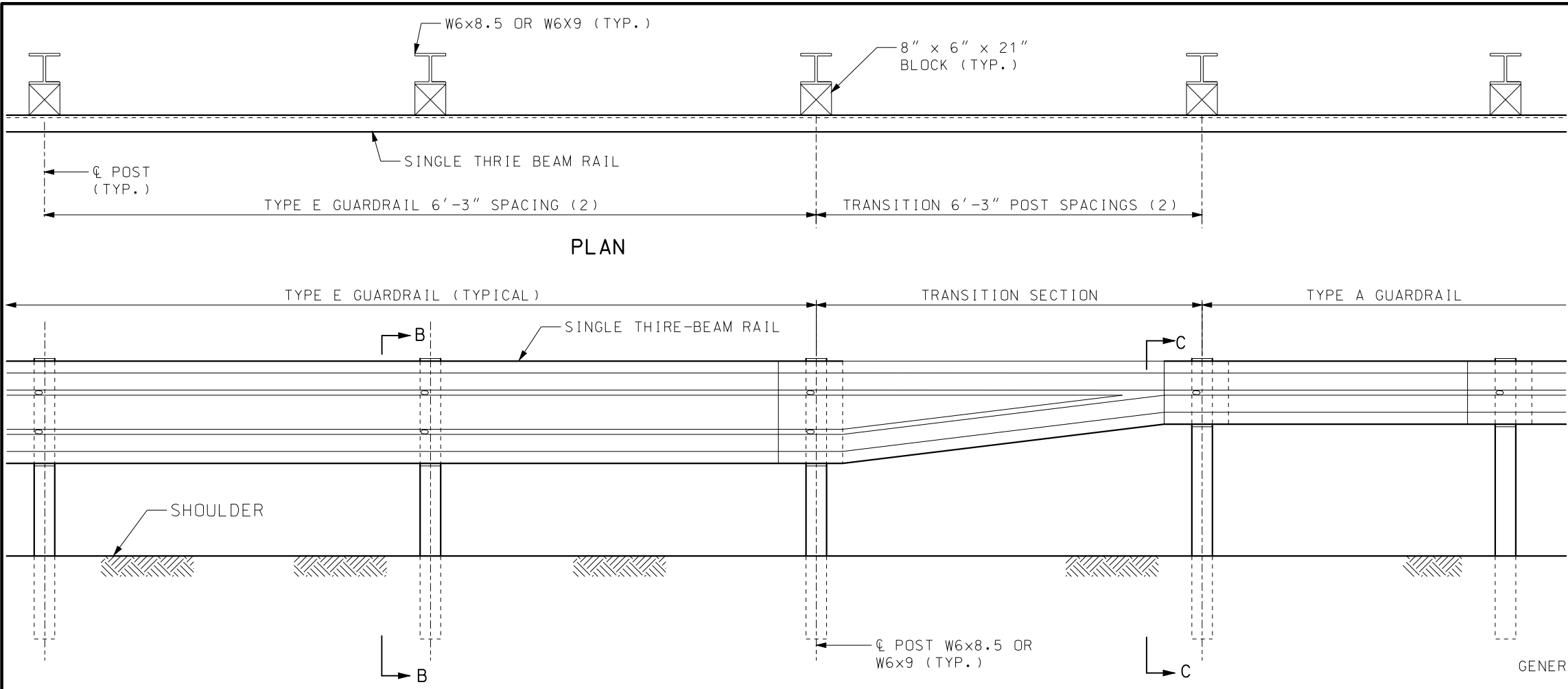
STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

GUARDRAIL  
TYPE A AND TYPE B

DATE EFFECTIVE: 01/01/2017	606.00AY	SHEET NO. 1 OF 7
DATE PREPARED: 10/28/2016		

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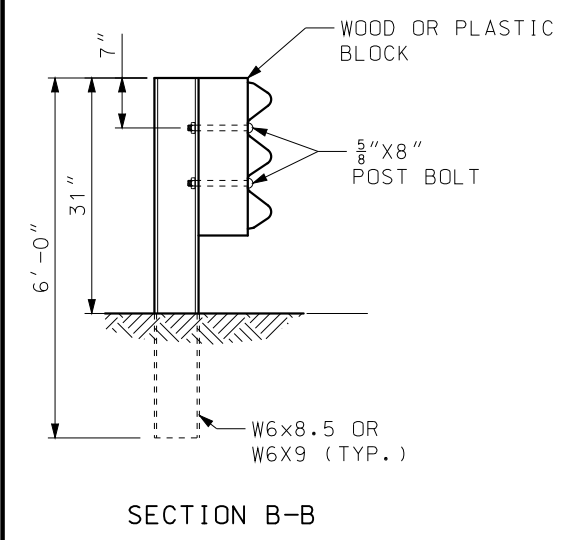
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



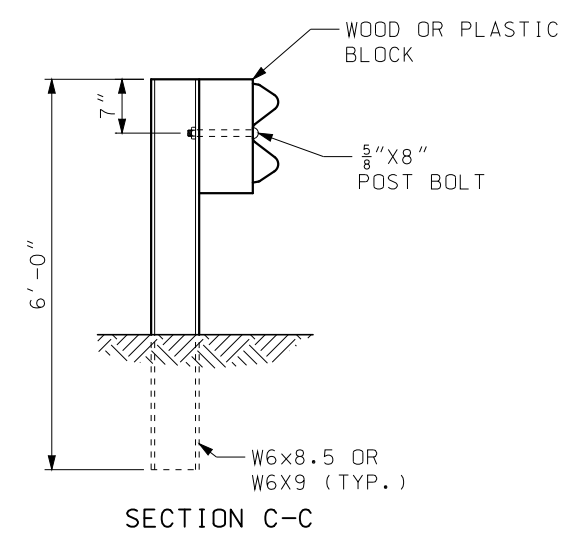
PLAN

PART SECTION SHOWING TYPE E TO TYPE A GUARDRAIL TRANSITION

THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE  $\frac{7}{8}'' \pm \frac{1}{4}''$  FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.



SECTION B-B



SECTION C-C

- (1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SEC 1040.
- (2) IF THE TRANSITION IS CONNECTED TO A BRIDGE ANCHOR SECTION, POST SPACING FOR TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE  $3'-1\frac{1}{2}''$ . FOR ALL OTHER CASES, POST SPACING SHALL BE 6'-3".
- (3) TRANSITION FROM 31" TO 29" HEIGHT OVER 2-12.5' W-BEAMS OR 25'.

GENERAL NOTES:

TYPE E GUARDRAIL SHALL USE 6'-3" POST SPACING UNLESS  $3'-1\frac{1}{2}''$  POST IS SPECIFIED.

THE THRIE BEAM RAIL FOR THE TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 12 GAGE.

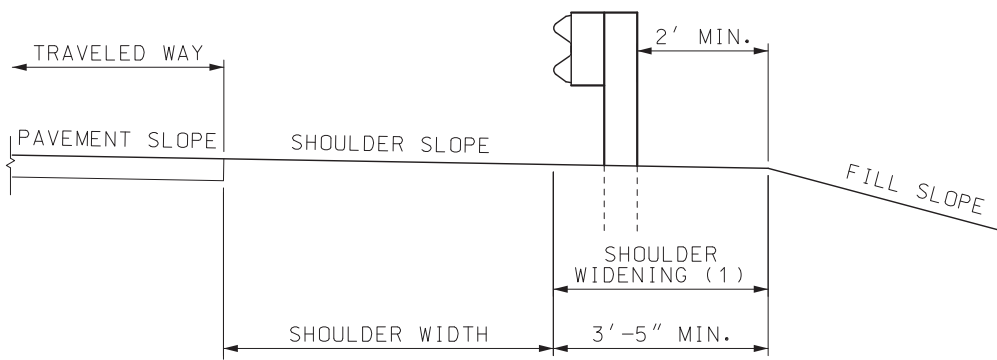
FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

SEE SHEET 7 OF 7 FOR REQUIREMENTS FOR SPECIAL INSTALLATIONS.

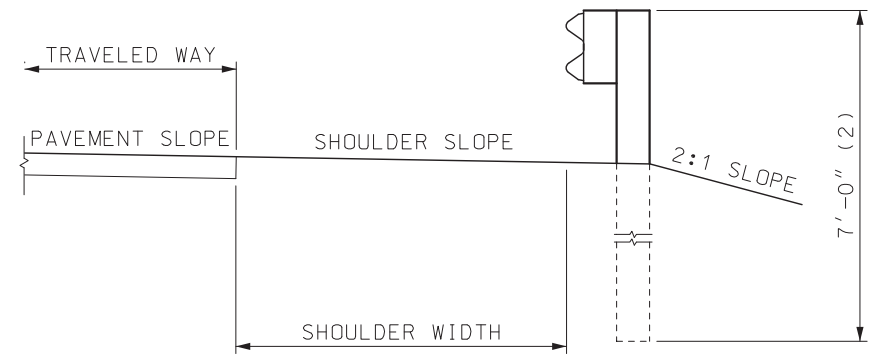
ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES EXCEPT WHERE ALLOWABLE TOLERANCES ARE SHOWN.

FOR DETAILS NOT SHOWN, SEE OTHER SHEETS OF THIS DRAWING.

<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<h2 style="margin: 0;">GUARDRAIL TYPE E</h2>
DATE EFFECTIVE: 01/01/2017 DATE PREPARED: 10/28/2016	<b>606.00AY</b>
SHEET NO. <b>2 OF 7</b>	

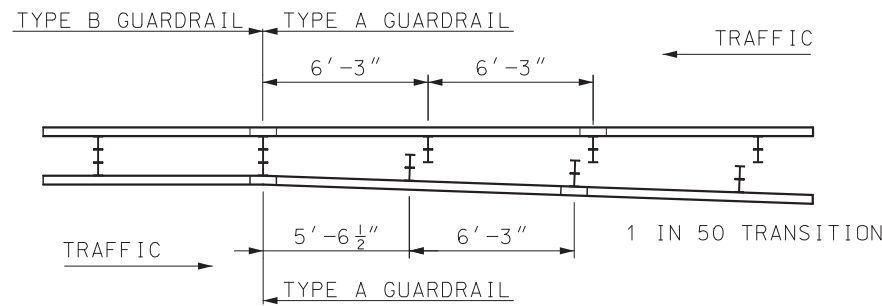


TYPICAL SECTION

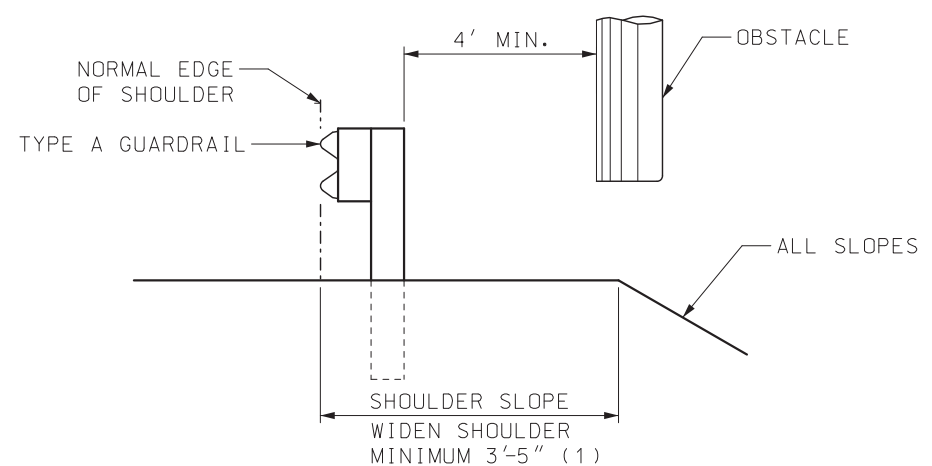


ALTERNATE TYPICAL SECTION AT SLOPE BREAKPOINT

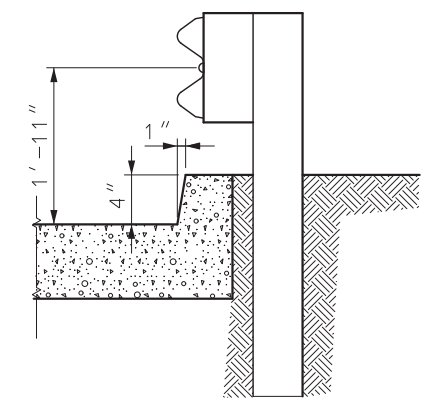
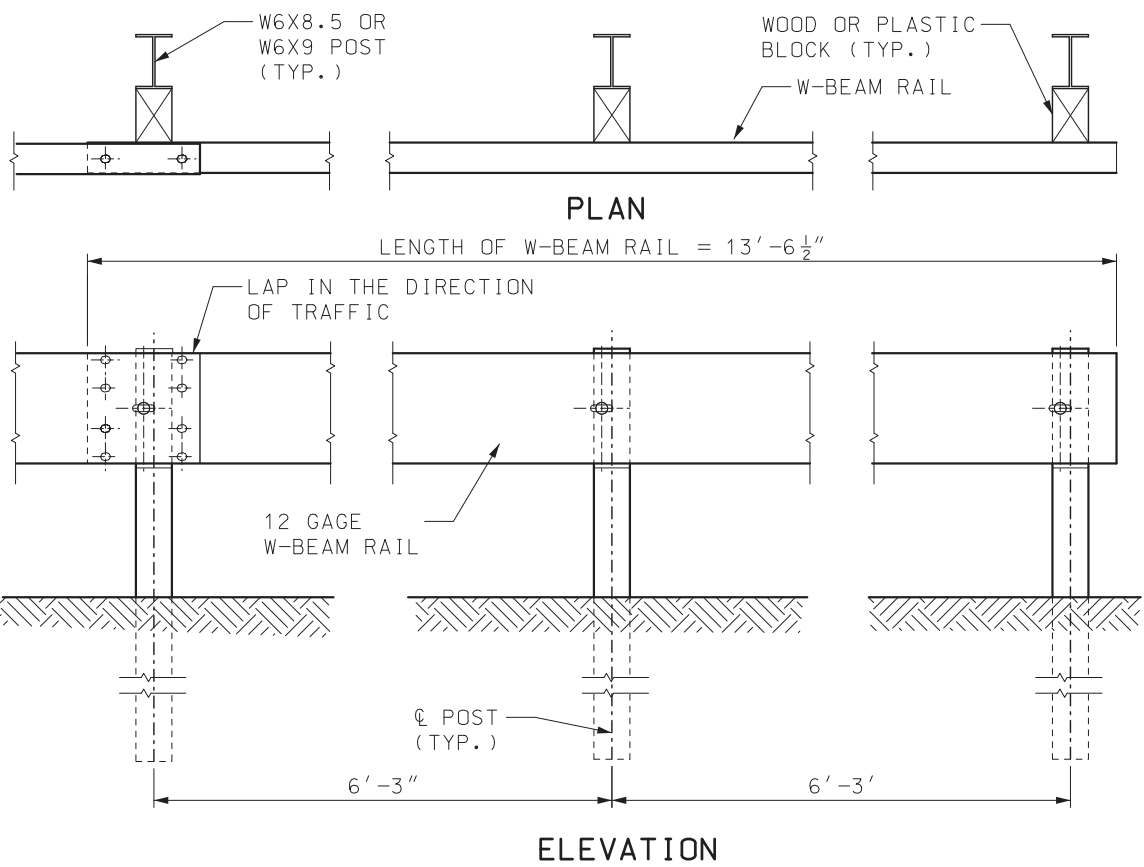
- (1) SHOULDER WIDENING SHALL CONSIST OF EMBANKMENT MATERIAL COMPACTED IN ACCORDANCE WITH SEC 203.4 OF THE STANDARD SPECIFICATIONS.
- (2) POST SHALL BE SPACED AT 3'-1 1/2" ON CENTER.
- (3) WHEN GUARDRAIL IS CONSTRUCTED OVER CURBS, THE CURBS SHALL BE CONSTRUCTED AS SHOWN.



DETAIL FOR TRANSITIONING BETWEEN TYPE A AND TYPE B GUARDRAIL



LOCATION OTHER THAN MEDIAN LATERAL PLACEMENT OF GUARDRAIL FOR SHOULDER INSTALLATION



GUARDRAIL AT CURBS (3)

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

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**GUARDRAIL LAYOUT**

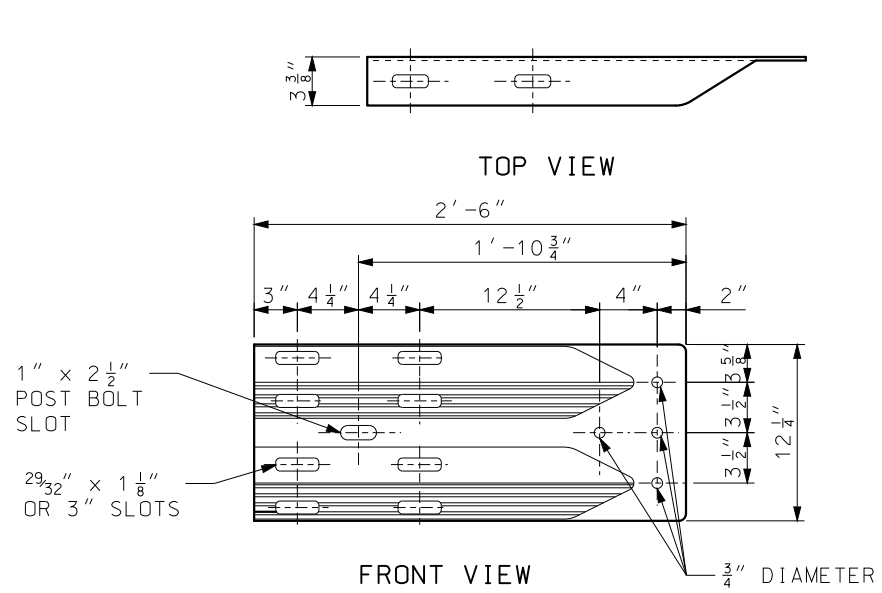
DATE EFFECTIVE: 01/01/2020	606.00AY	SHEET NO. 3 OF 7
DATE PREPARED: 10/21/2019		

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

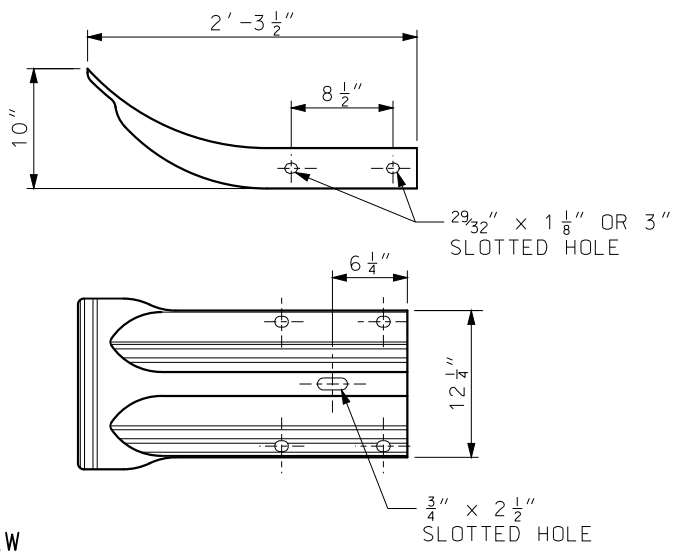




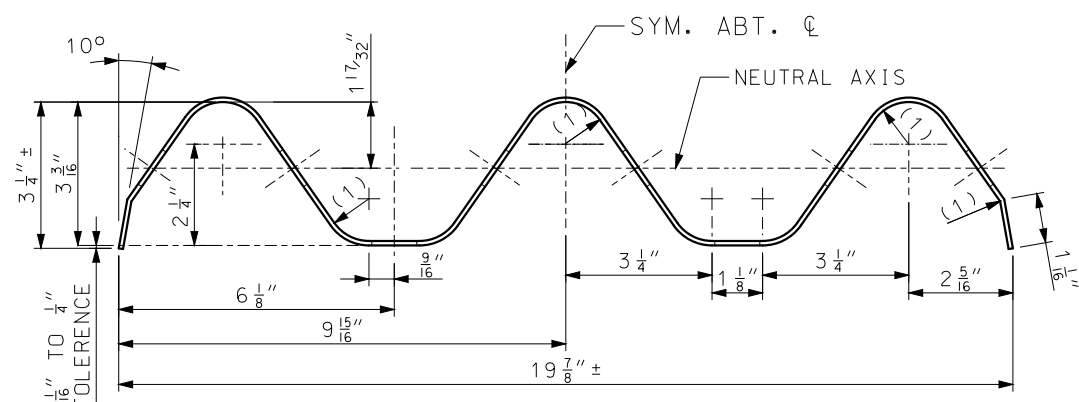
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



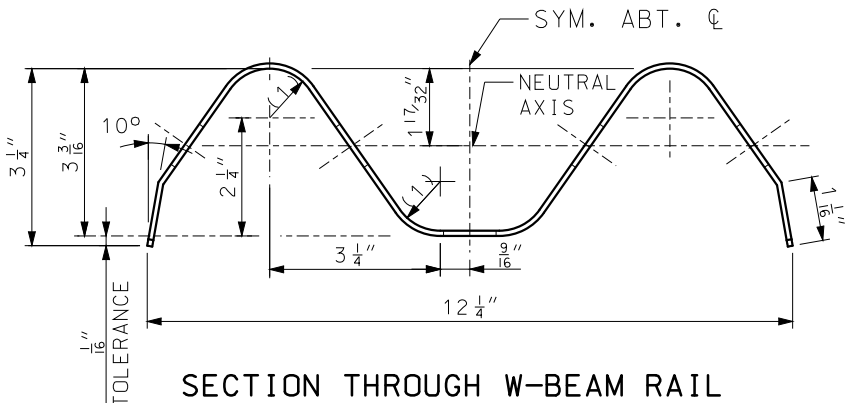
TERMIANL CONNECTOR



END SECTION  
12 GAGE

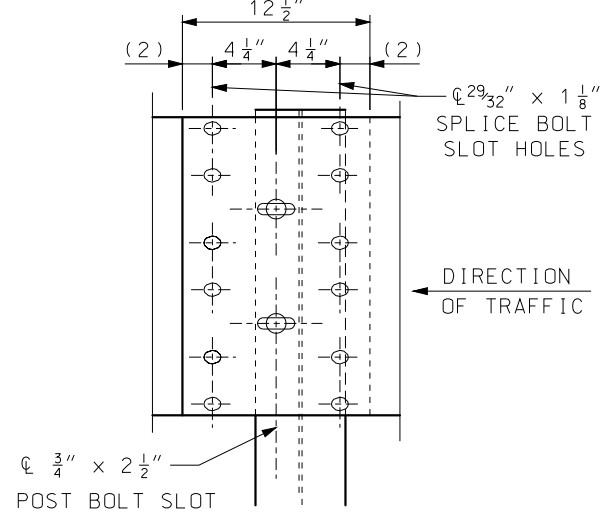


SECTION THROUGH THRIE BEAM RAIL

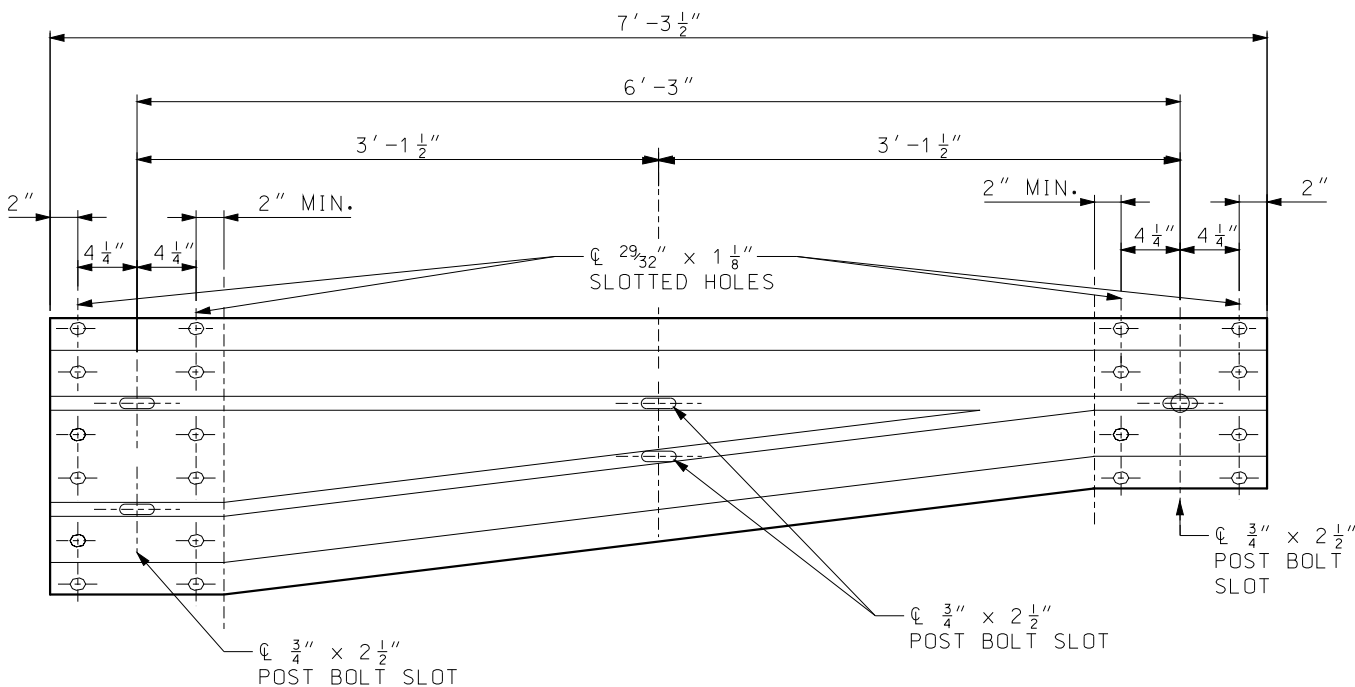


SECTION THROUGH W-BEAM RAIL

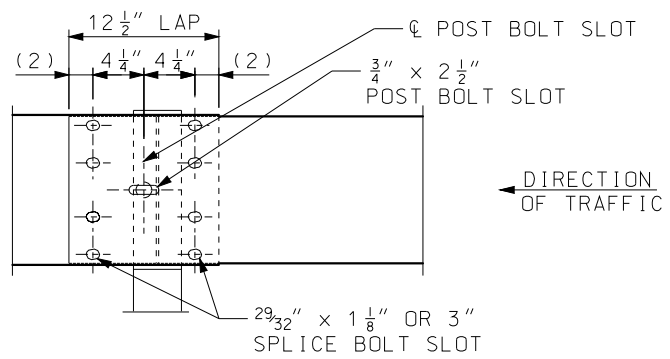
- (1) 1 5/16" RADIUS
- (2) 2" (TOLERANCE +1/4", -1/4")



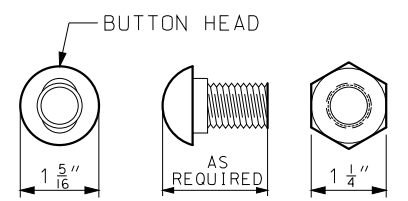
THRIE-BEAM SPLICE AT POST



ELEVATION OF ASYMMETRICAL TRANSITION SECTION

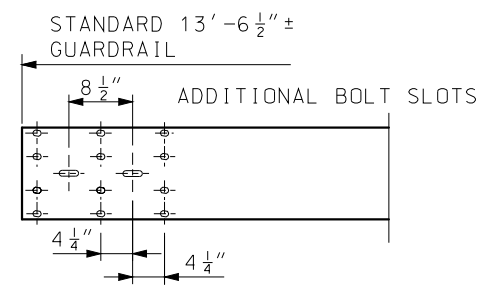


W-BEAM RAIL SPLICE AT POST



5/8" POST OR SPLICE BOLT

OVAL SHOULDER SHALL BE OF ADEQUATE HEIGHT, LENGTH & SHAPE TO PREVENT TURNING DURING INSTALLATION OR REMOVAL OF BOLT.



NOTE: PORTIONS OF BEAM WITH UNUSED BOLT SLOTS TO BE LAPPED BEHIND.

BEAM DETAILS SHOWING LOCATION OF ADDITIONAL BOLT SLOTS NECESSARY TO OBTAIN GUARDRAIL OFFSET.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

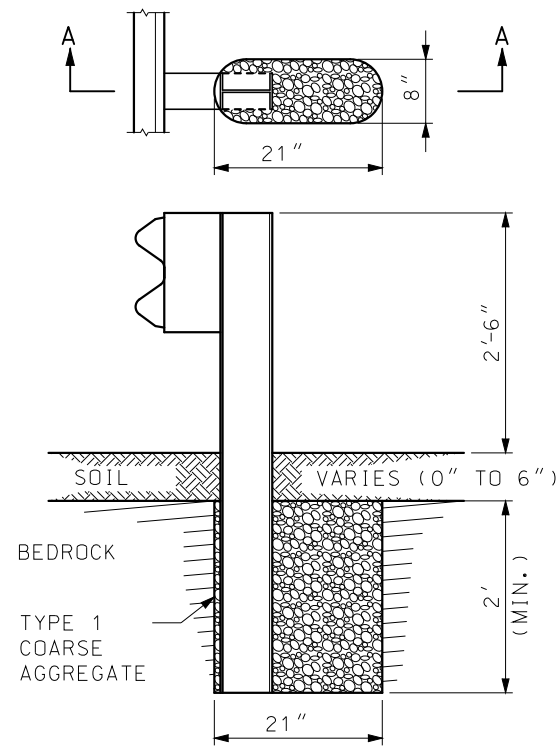
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER

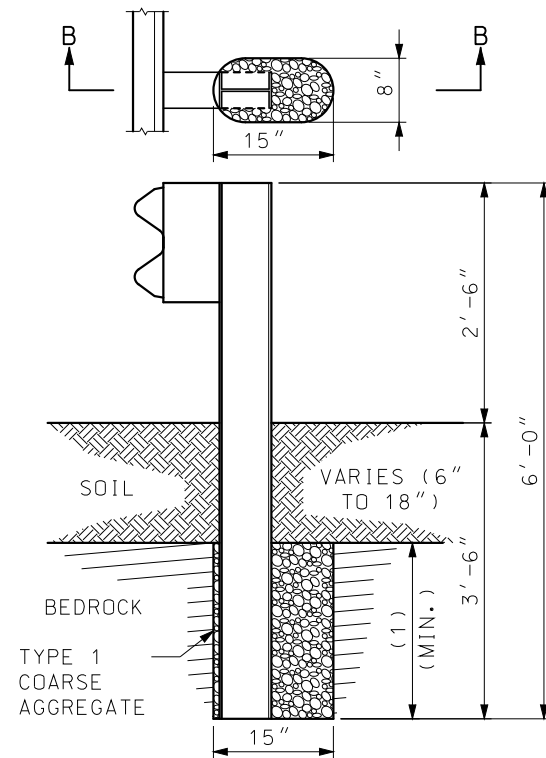
THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

GUARDRAIL RAIL ELEMENTS

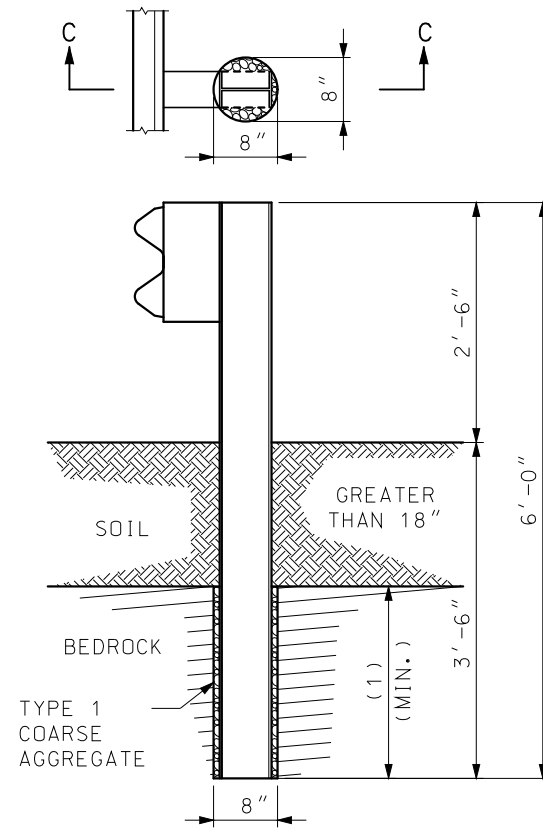
DATE EFFECTIVE: 01/01/2017	606.00AY	SHEET NO. 5 OF 7
DATE PREPARED: 10/28/2016		



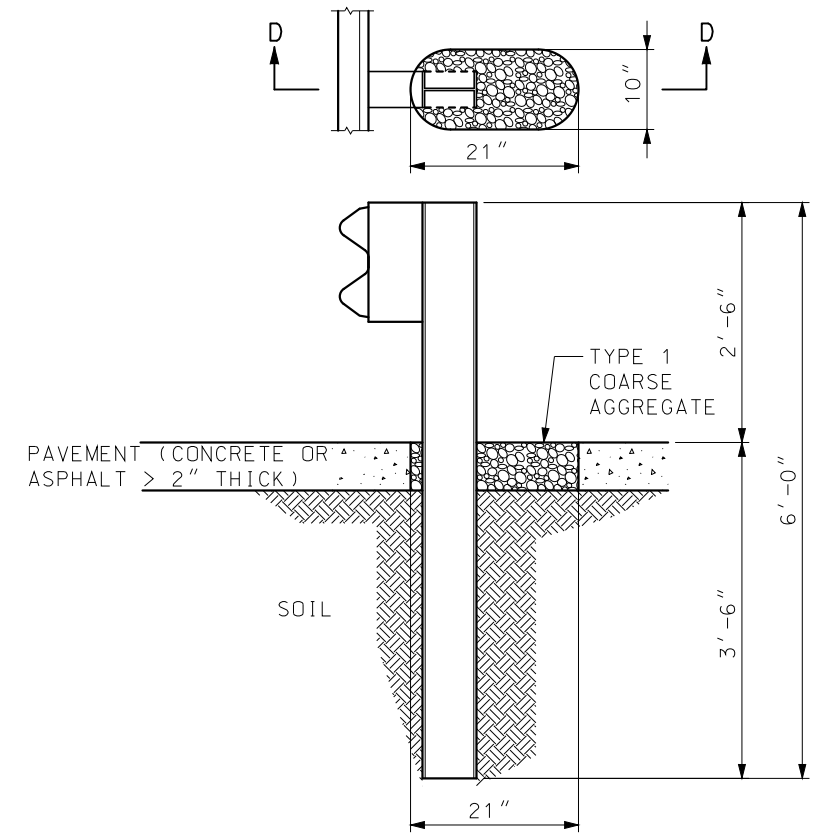
SECTION A-A  
ROCK ENCOUNTERED  
UP TO 6" BENEATH SURFACE



SECTION B-B  
ROCK ENCOUNTERED  
6" TO 18" BENEATH SURFACE



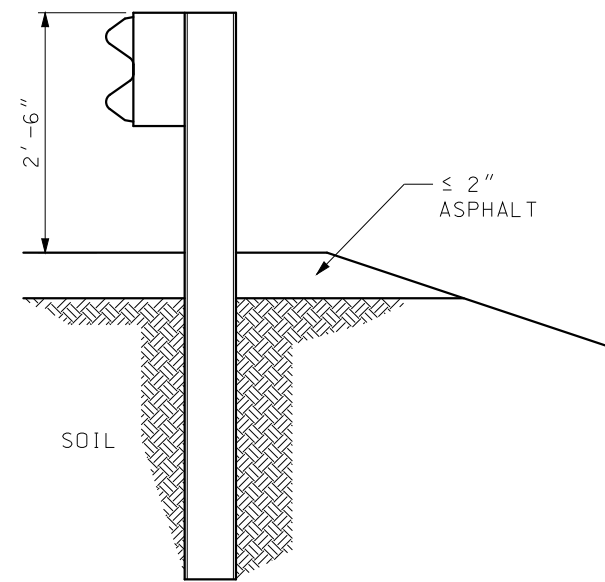
SECTION C-C  
ROCK ENCOUNTERED MORE  
THAN 18" BENEATH SURFACE



SECTION D-D  
SETTING POST THROUGH PAVEMENT  
(CONCRETE OR ASPHALT > 2" THICK)

SETTING POST IN SOLID ROCK

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



SETTING POST THROUGH ASPHALT  $\leq$  2" THICK

GENERAL NOTES:

HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 4 INCHES GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN A MINIMUM 2 FEET OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SEC 712 OF THE STANDARD SPECIFICATIONS.

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

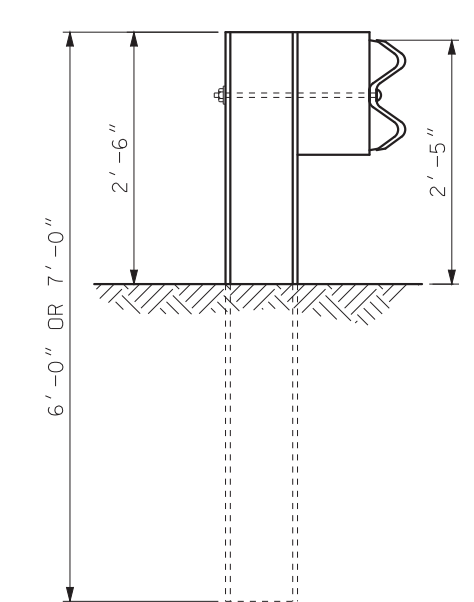
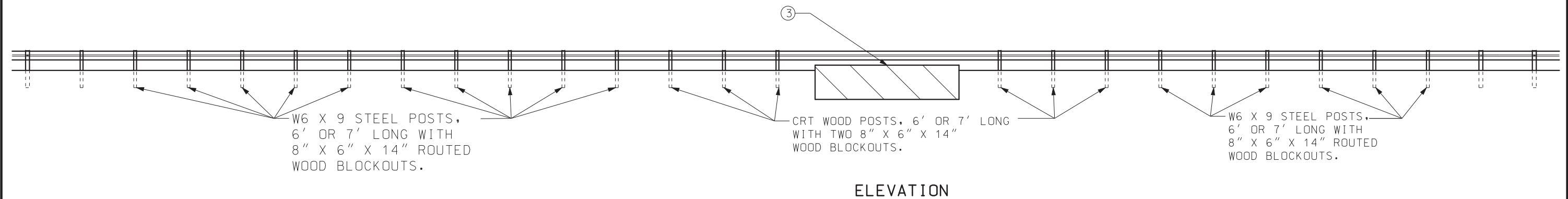
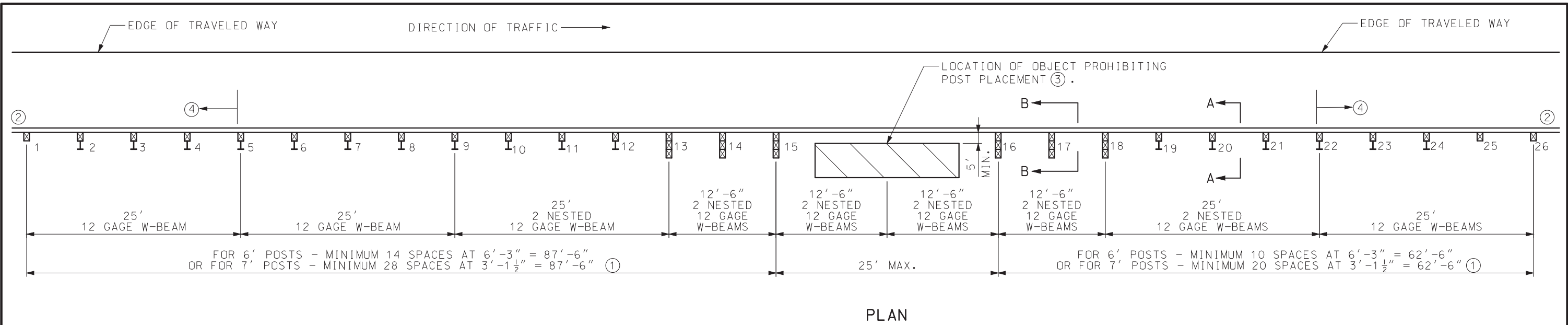
STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

GUARDRAIL  
SPECIAL INSTALLATIONS

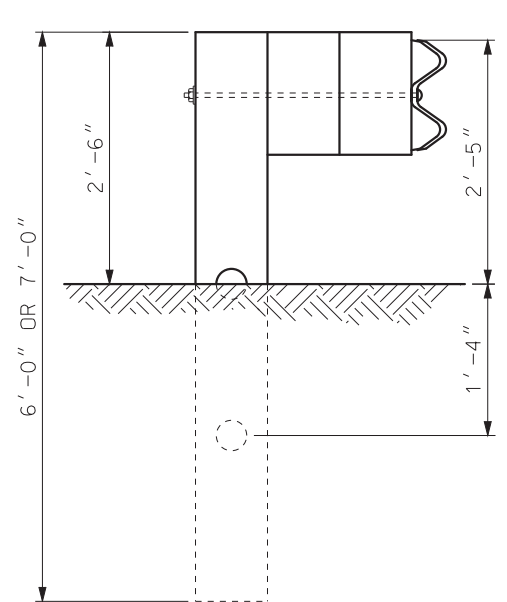
DATE EFFECTIVE: 01/01/2017  
DATE PREPARED: 10/28/2016

606.00AY

SHEET NO.  
6 OF 7



W6 X 9 STEEL POSTS, 6' OR 7' LONG WITH 8" X 6" X 14" ROUTED WOOD BLOCKOUTS POSTS 3 THROUGH 12 AND 19 THROUGH 24.

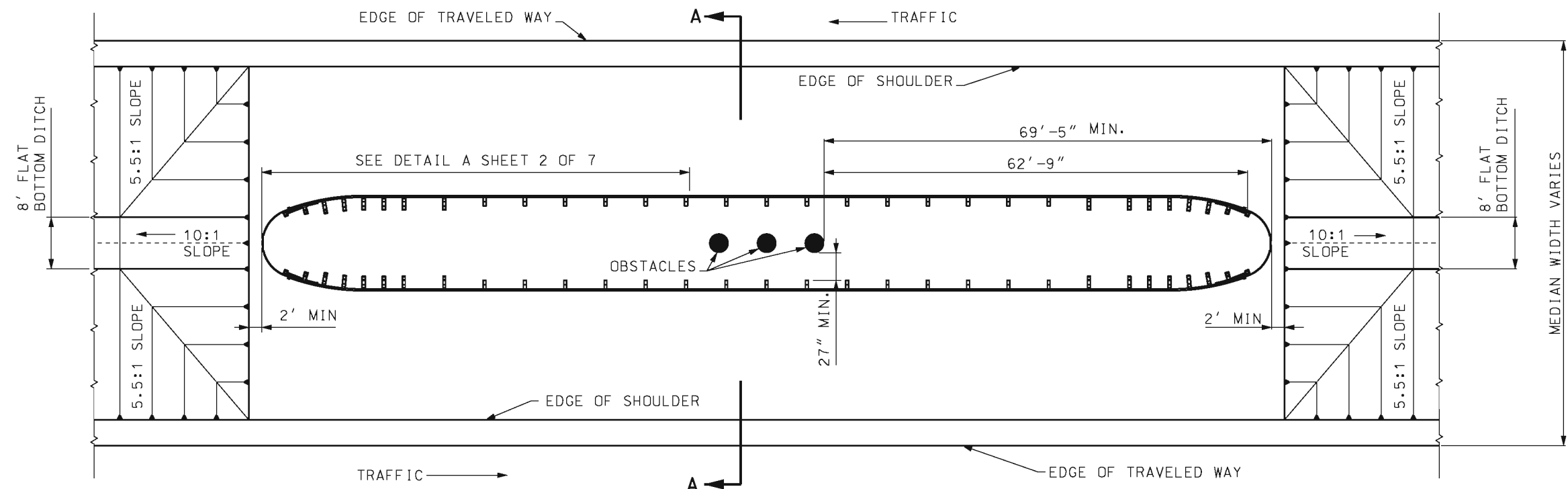


CRT WOOD POSTS, 6' OR 7' LONG WITH TWO 8" X 6" X 14" WOOD BLOCKOUTS POSTS 13 THROUGH 18.

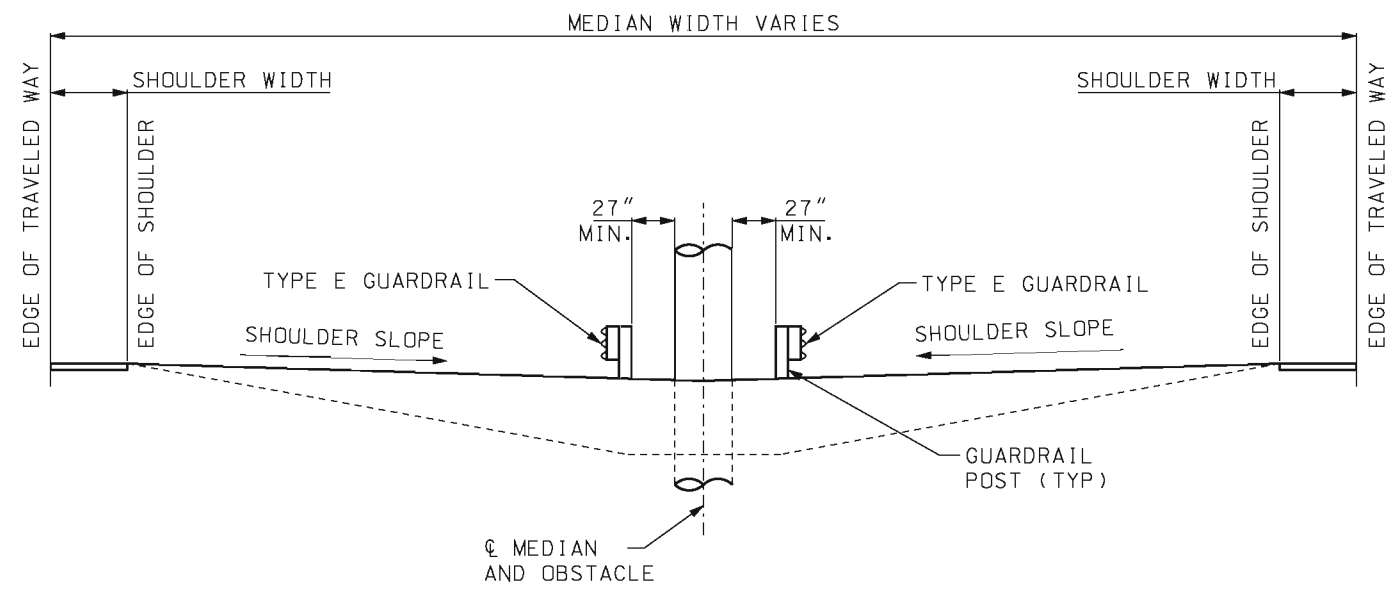
- ① IF LOCATED WITHIN THE CLEAR ZONE OF A TWO-WAY ROADWAY, THE MINIMUM LENGTH IS 87'-6".
- ② ADDITIONAL GUARDRAIL AS REQUIRED, INCLUDING END TREATMENT.
- ③ THE POST MAY BE SKIPPED DUE TO THE PRESENCE OF AN OBSTACLE SUCH AS A CULVERT.
- ④ PLACE END TREATMENT NO CLOSER TO THE SKIPPED POST THAN POSTS 5 AND 22.

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>GUARDRAIL LONG-SPAN NESTED W-BEAM</b></p>
<p>DATE EFFECTIVE: 10/01/2017 DATE PREPARED: 8/8/2017</p>	<p>606.00AY</p> <p>SHEET NO. 7 OF 7</p>

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



**PIER AT C OF MEDIAN  
PLAN VIEW**



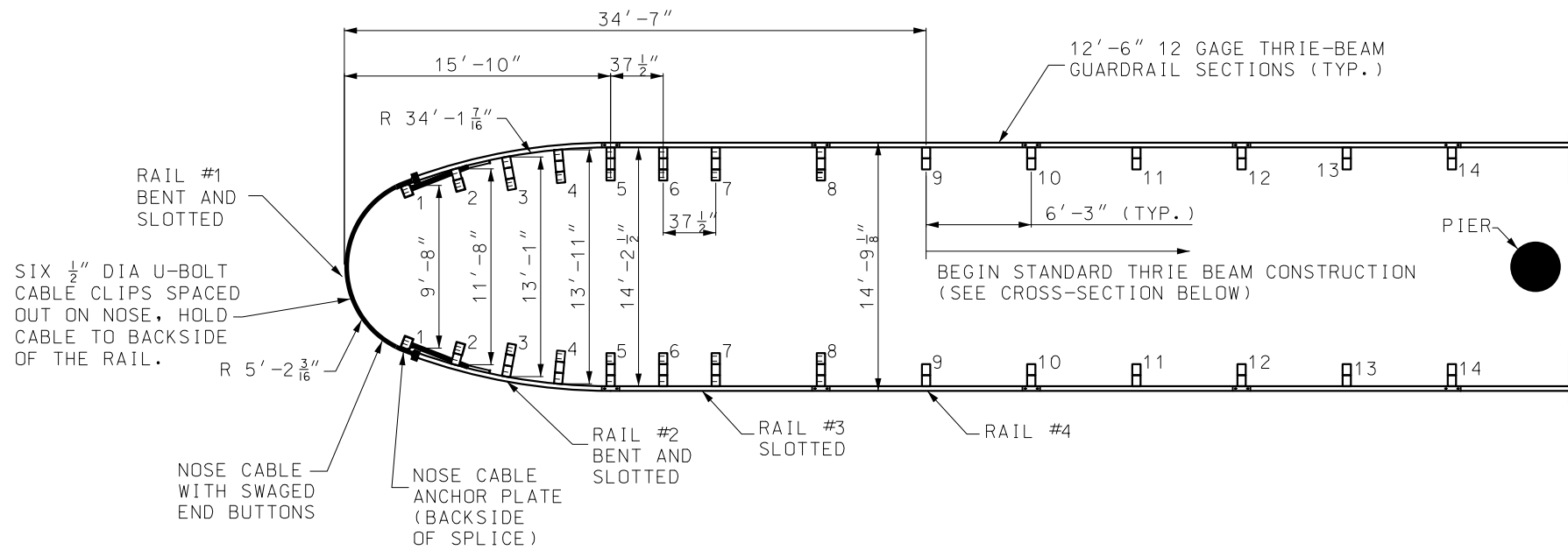
**SECTION A-A**

**GENERAL NOTES:**

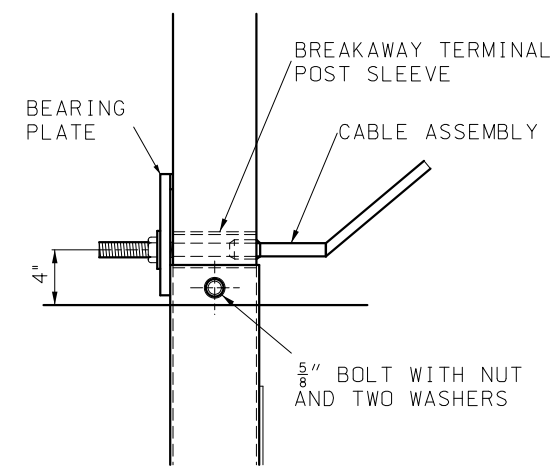
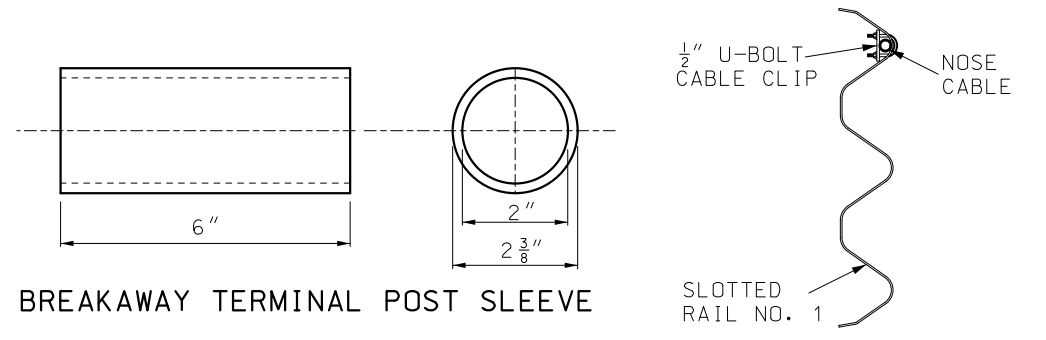
- WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E GUARDRAIL.
- THE BULLNOSE GUARDRAIL PAY ITEM INCLUDES THE STRUCTURE BETWEEN POST 10 AND THE NOSE. THE REMAINING GUARDRAIL WILL BE PAID FOR AS STANDARD GUARDRAIL ITEMS.
- SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MEDIAN PIER PROTECTION BULLNOSE GUARDRAIL SYSTEM</b>
DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012	<b>606.01F</b>	SHEET NO. 1 OF 9

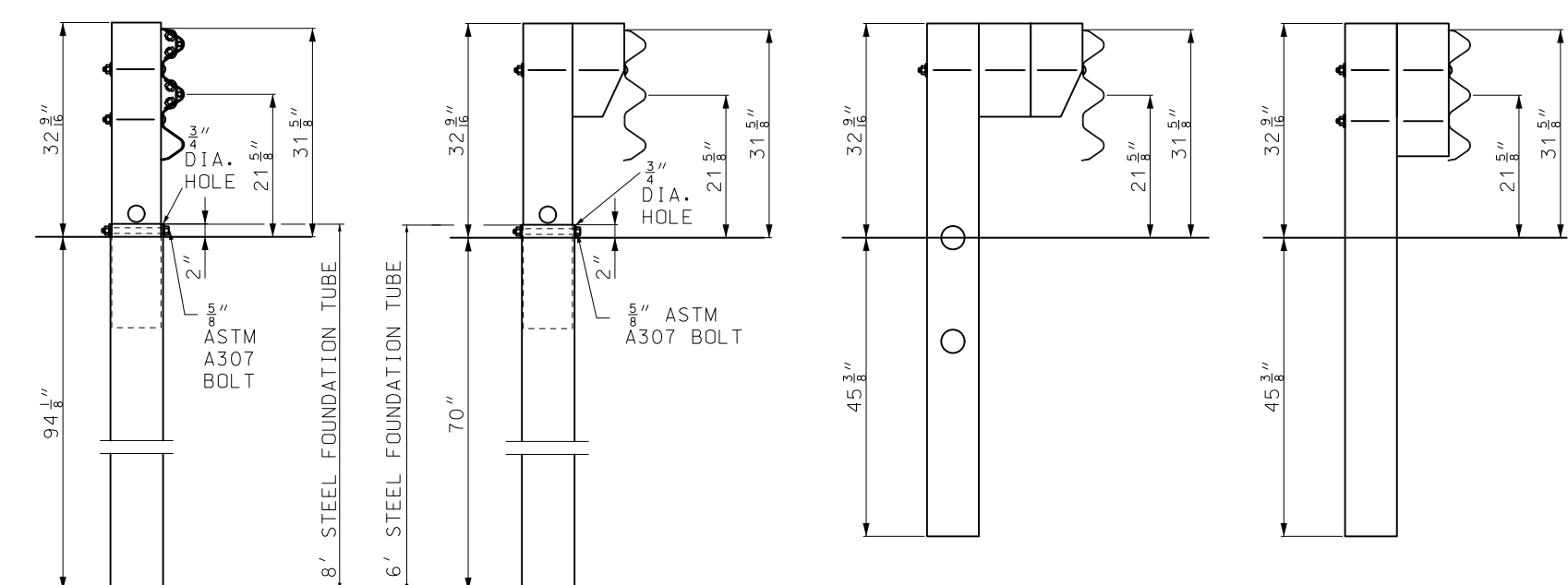
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DETAIL A



POST 1 DETAIL



POST DETAILS

GENERAL NOTE:

RAILS NUMBERS 1, 2, 3 AND 4 ARE TYPE E GUARDRAIL. RAIL NUMBER 4 IS A STANDARD THRIE BEAM, NOT SLOTTED.

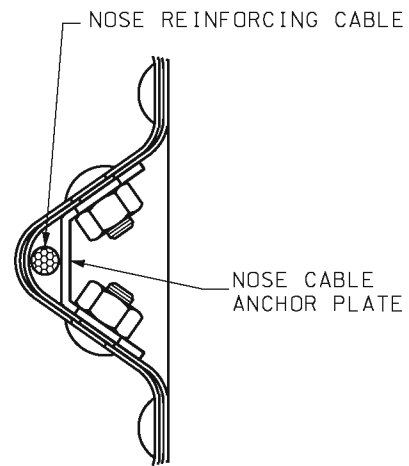
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

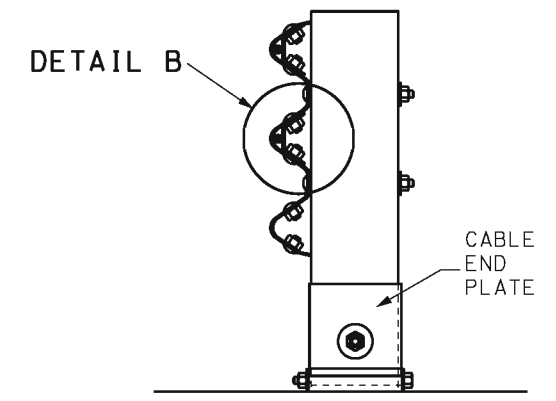
**MEDIAN PIER PROTECTION BULLNOSE GUARDRAIL SYSTEM**

DATE EFFECTIVE: 04/01/2021	<b>606.01F</b>	SHEET NO. 2 OF 9
DATE PREPARED: 1/27/2021		

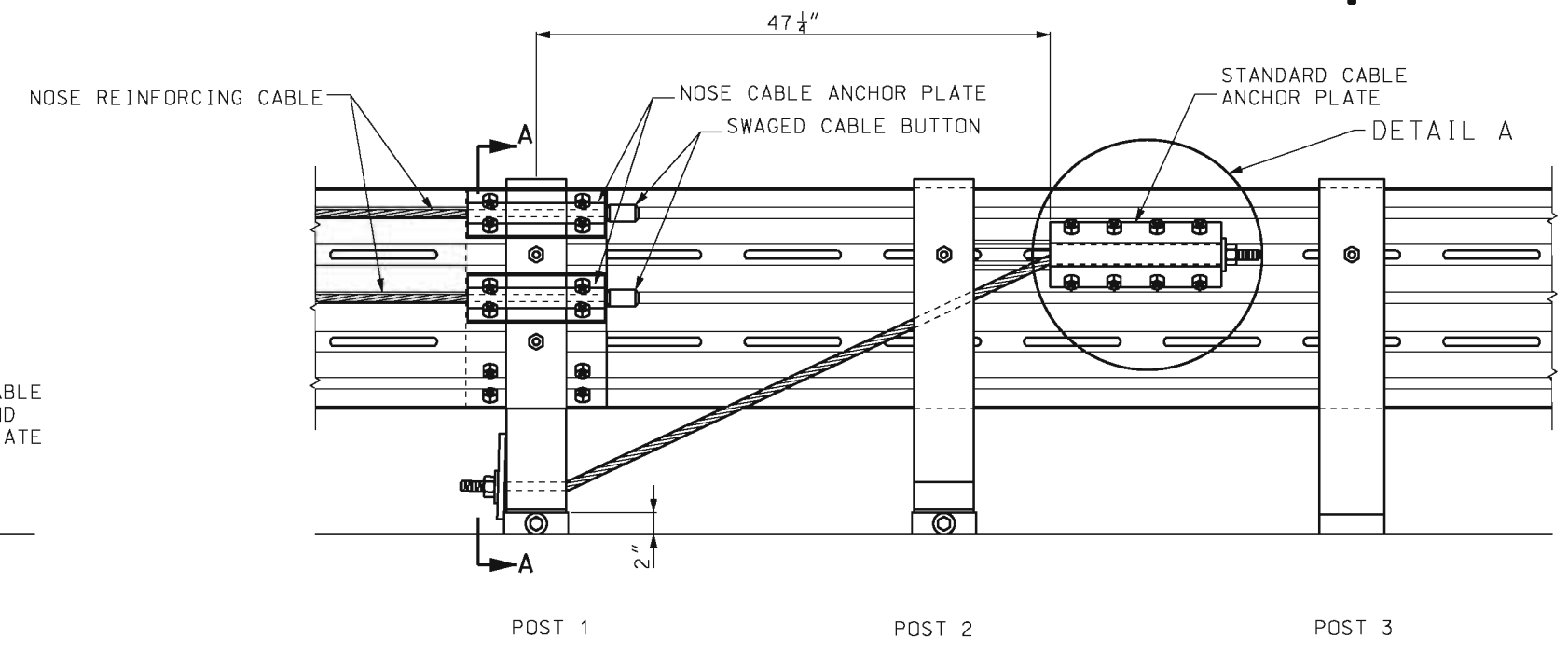
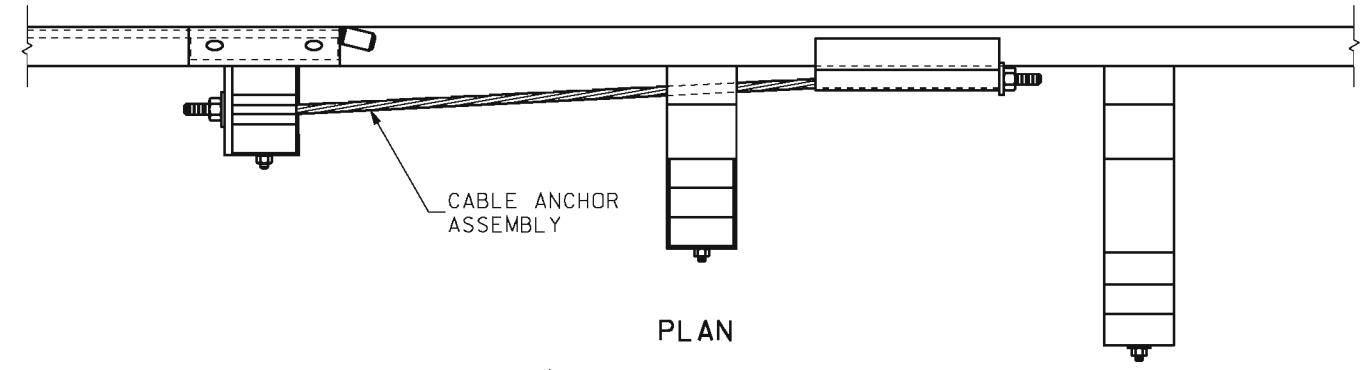
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



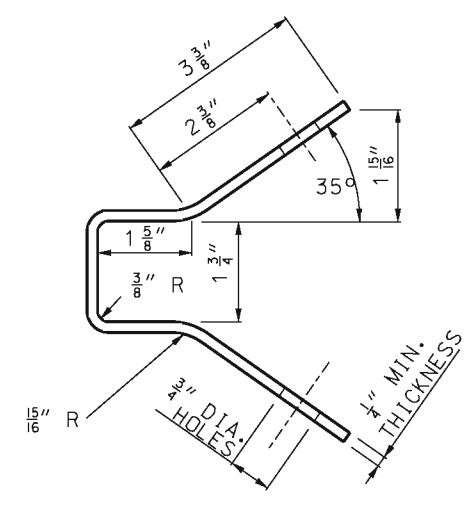
DETAIL B



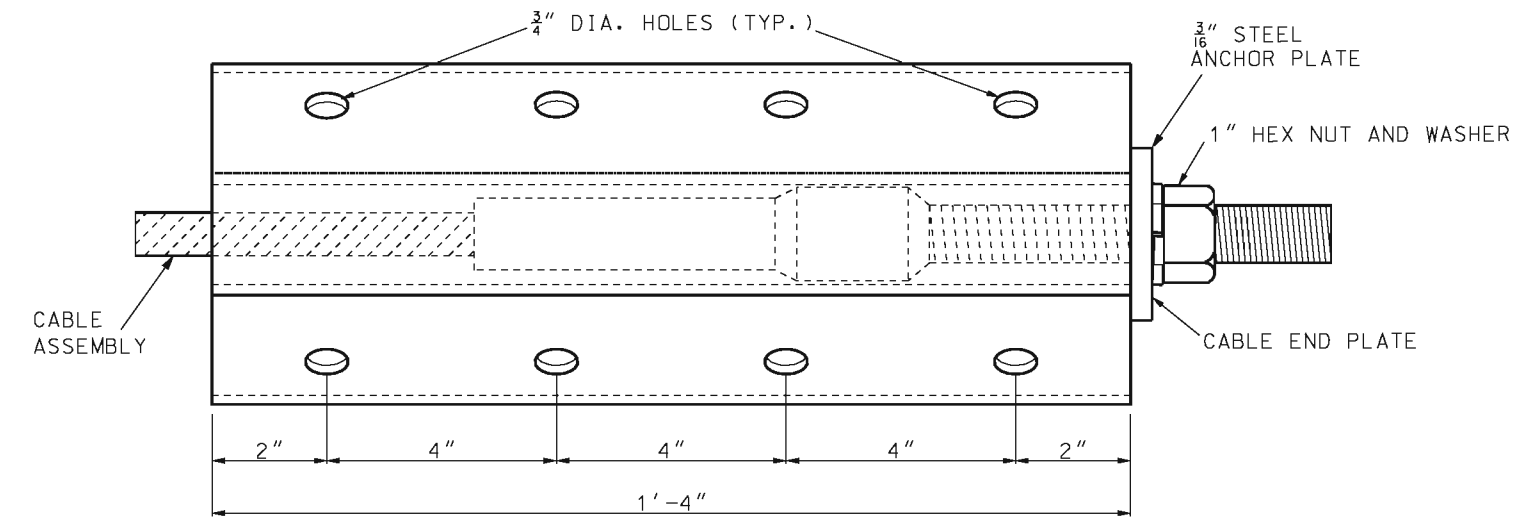
SECTION A-A



ELEVATION  
CABLE ANCHOR ASSEMBLY



END VIEW



DETAIL A

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

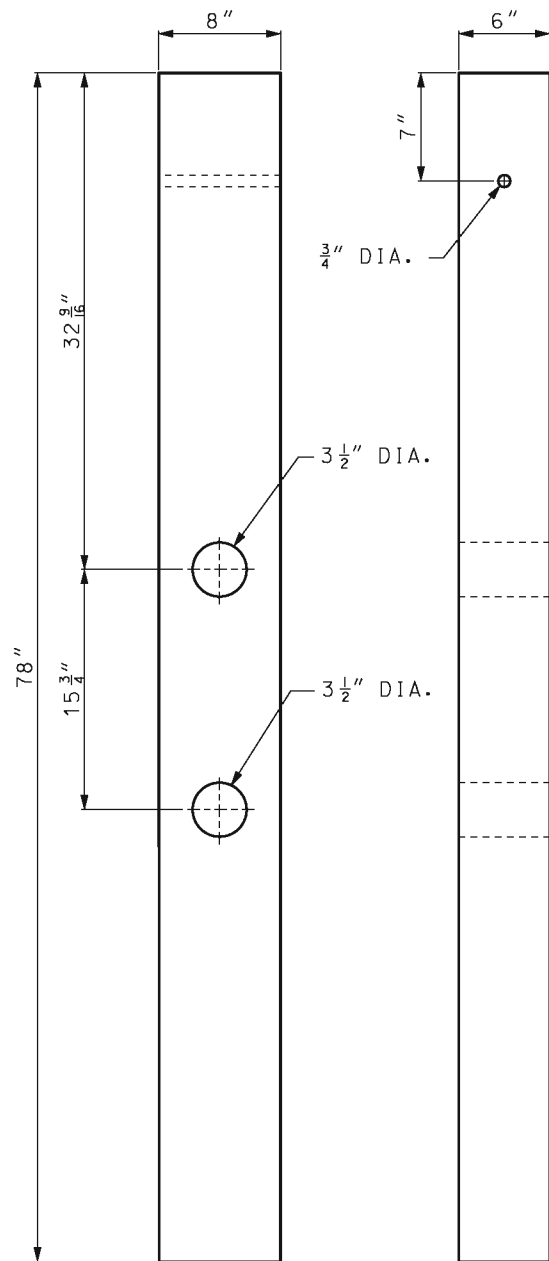
STATE OF MISSOURI  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

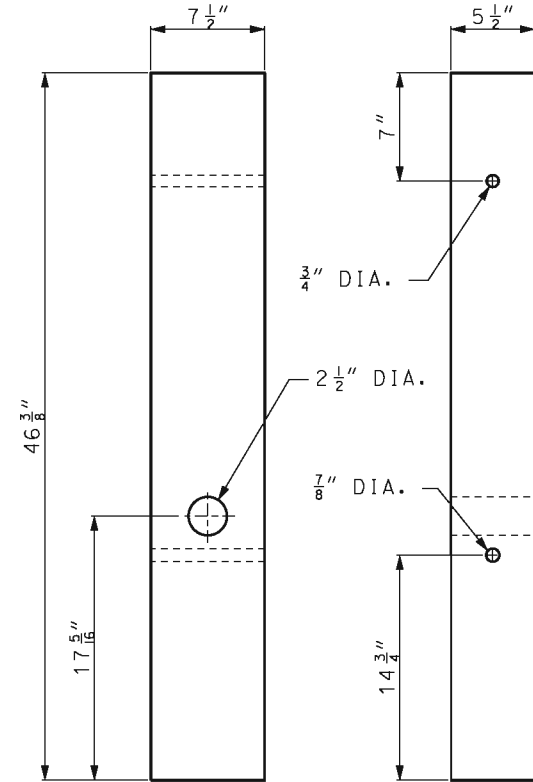
**MEDIAN PIER PROTECTION  
BULLNOSE GUARDRAIL SYSTEM  
CABLE ANCHOR**

DATE EFFECTIVE: 08/01/2012	<b>606.01F</b>	SHEET NO. 3 OF 9
DATE PREPARED: 7/27/2012		

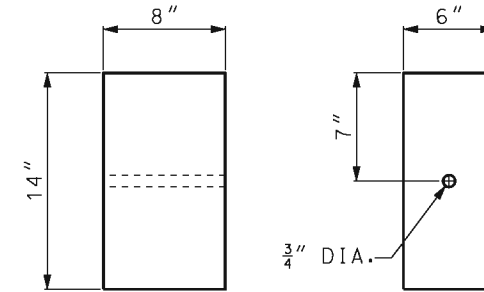
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



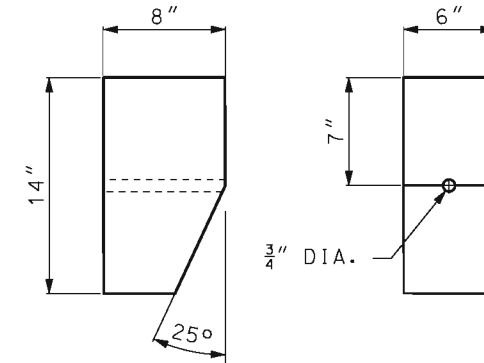
**THRIE BEAM CRT POSTS**



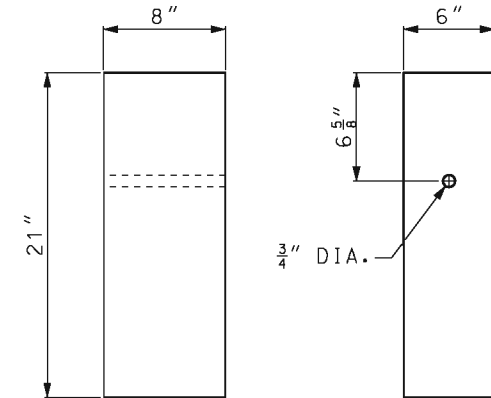
**THRIE BEAM ANCHOR POSTS**





**POSTS 2 THROUGH 8  
STANDARD BLOCKS**



**TAPERED BLOCK**

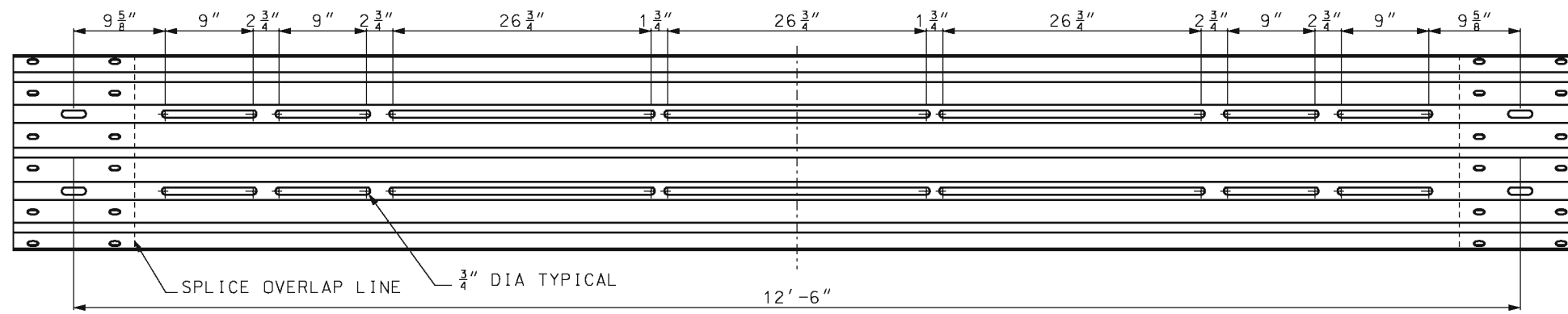


**BLOCKS FOR POSTS 9 AND 10  
STANDARD BLOCKS**

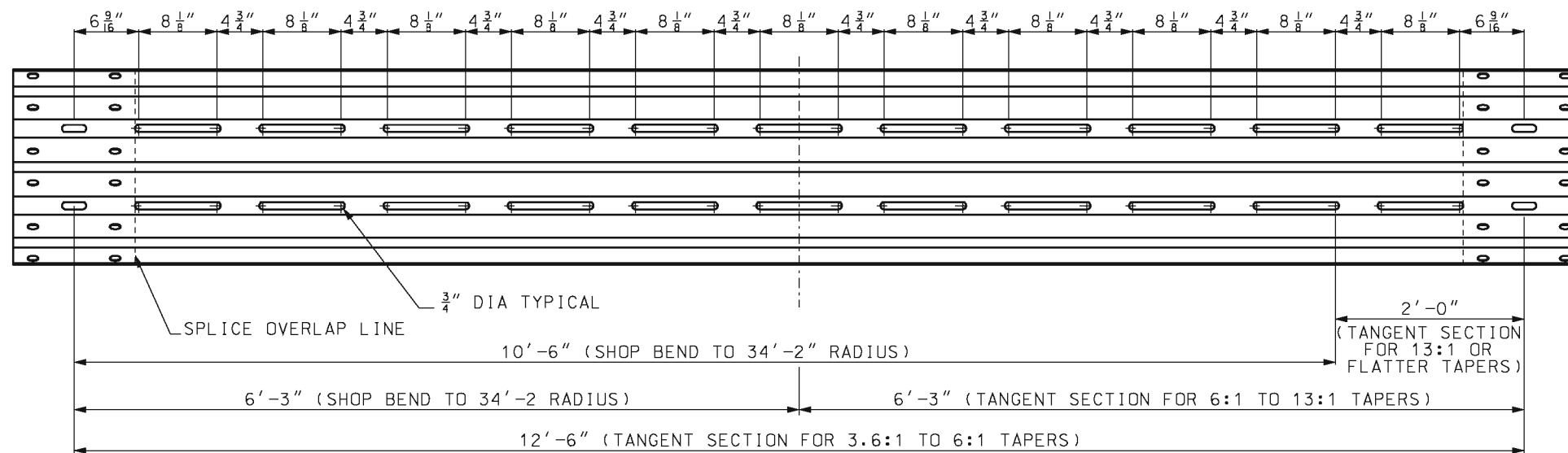
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MEDIAN PIER PROTECTION BULLNOSE GUARDRAIL SYSTEM POST AND BLOCKS</b>
DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012	<b>606.01F</b>	SHEET NO. 4 OF 9

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

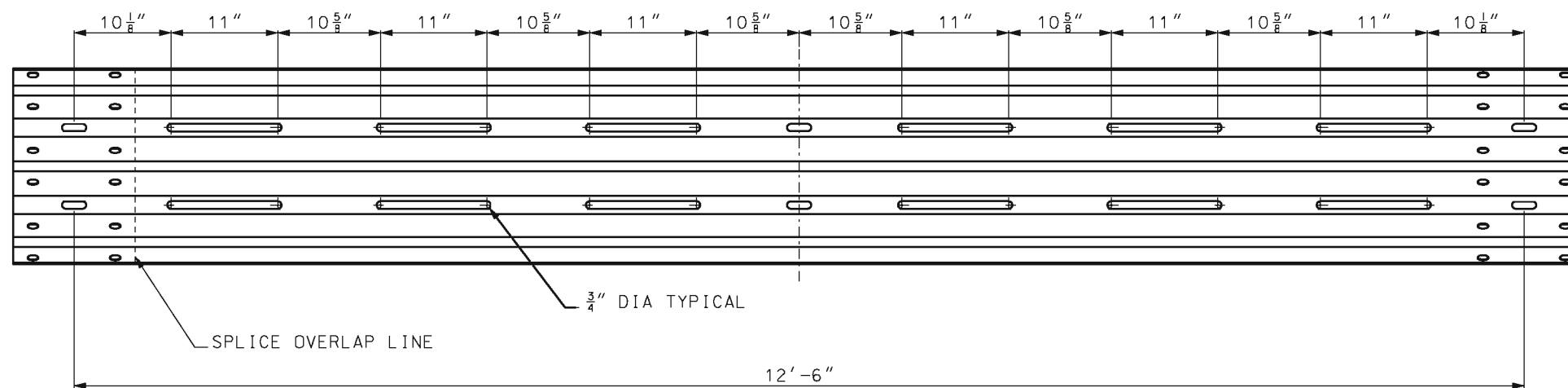






**RAIL SECTION 1 (NOSE SECTION)**



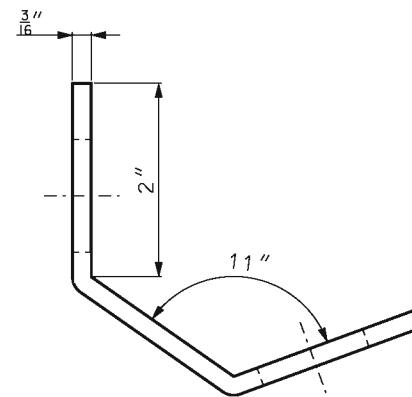
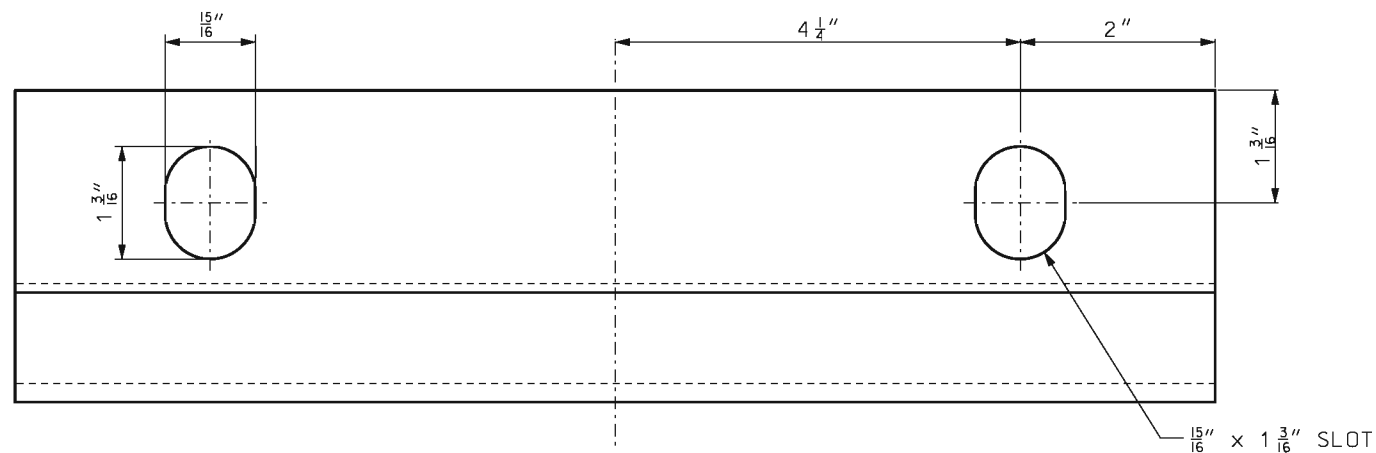
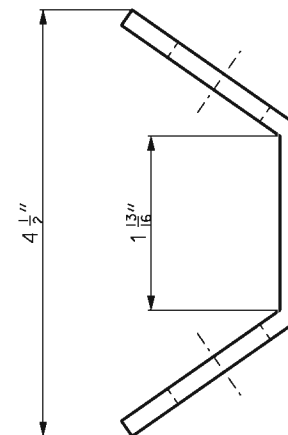
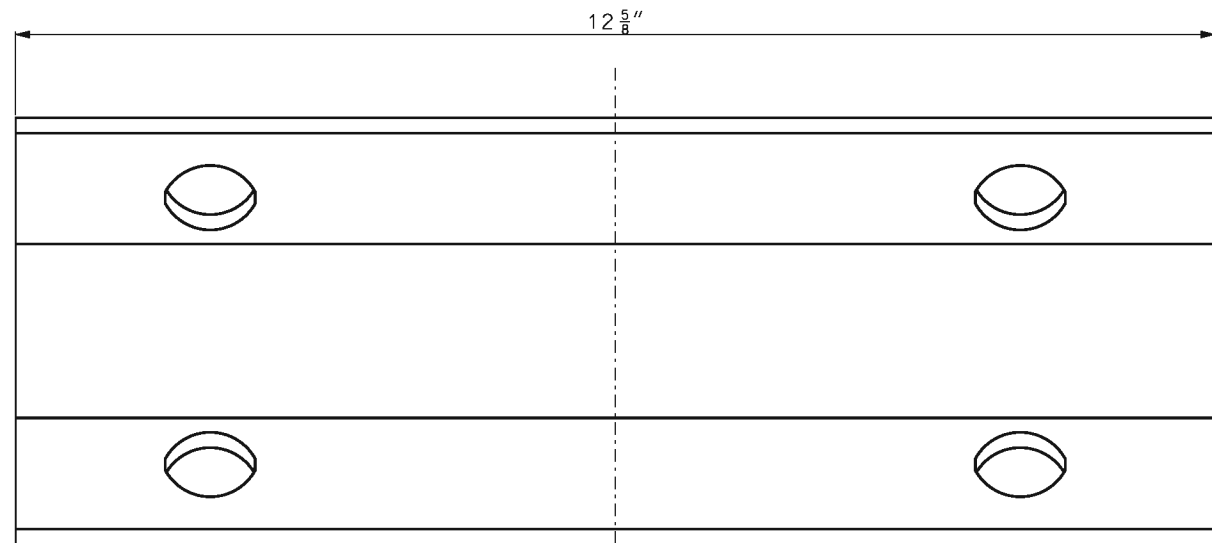
**RAIL SECTION 2**



**RAIL SECTION 3**

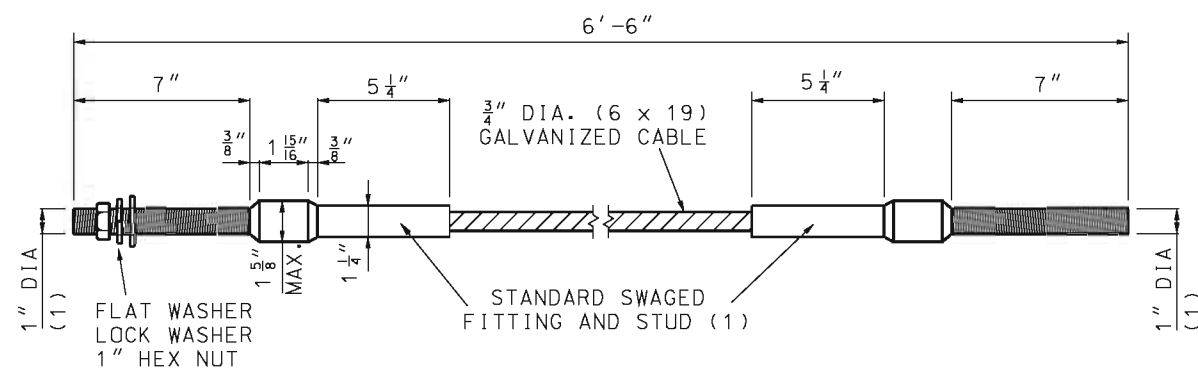
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MEDIAN PIER PROTECTION</b> <b>BULLNOSE GUARDRAIL SYSTEM</b> <b>RAIL SECTION 1, 2 AND 3</b>
DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012	<b>606.01F</b>	SHEET NO. 5 OF 9

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

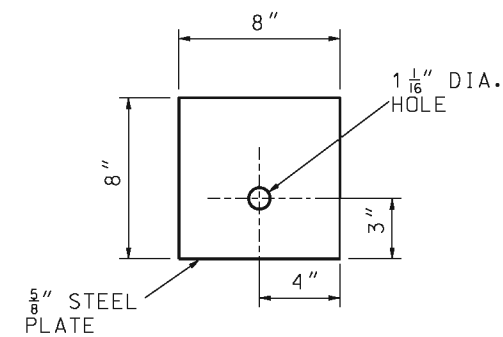


**STEEL PLATE, A306**  
**12 5/8" x 5 7/8" x 3/16"**

(1) STUD, THREADED ENTIRE LENGTH.



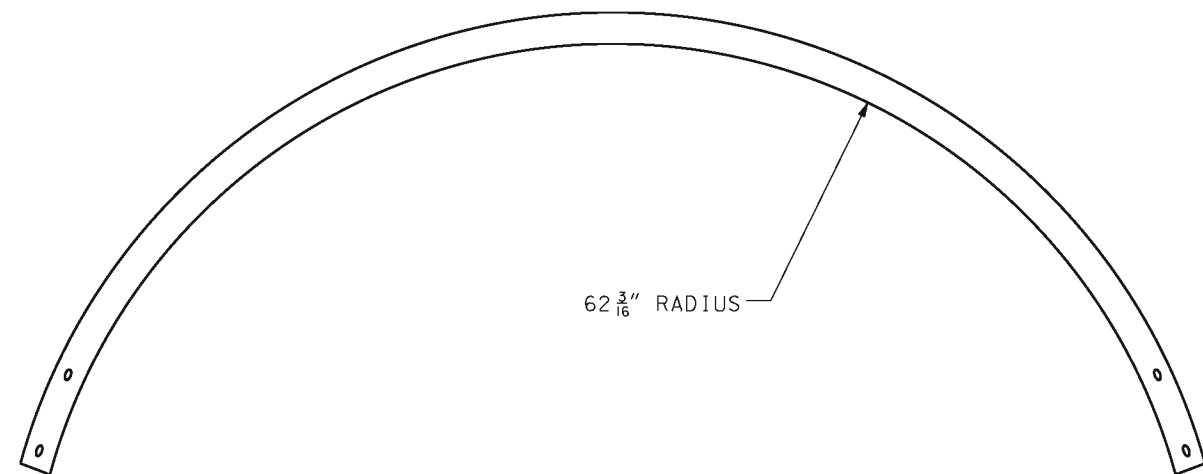
**DETAIL OF CABLE ASSEMBLY**



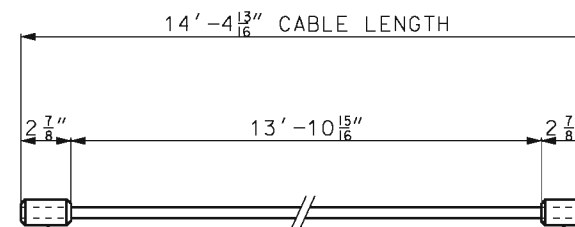
**DETAIL OF STEEL BEARING PLATE**

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MEDIAN PIER PROTECTION</b> <b>BULLNOSE GUARDRAILS SYSTEM</b> <b>PLATES AND CABLE ASSEMBLY</b>
DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012	<b>606.01F</b>	SHEET NO. <b>6 OF 9</b>

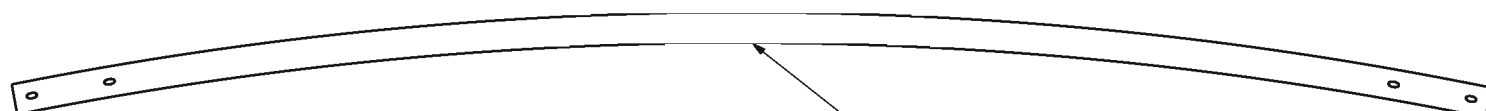
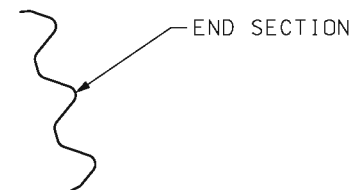
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



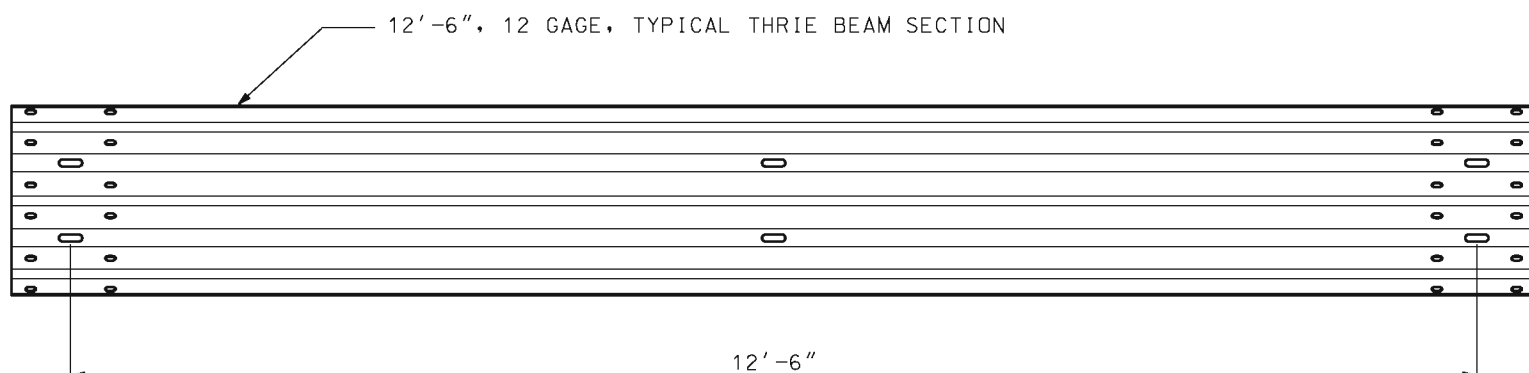
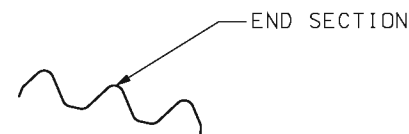
TOP VIEW, RAIL #1



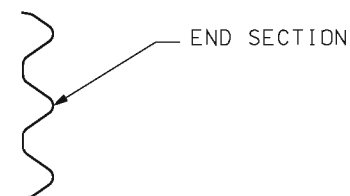
"COLD TUFF" BUTTON, S-409 SIZE NO. 12 SB 2  $\frac{7}{8}$ "  
 STOCK NO. 1040395 FOR  $\frac{5}{8}$ " DIA (6 x 25) WIRE ROPE  
 (OR ANY SIMILARLY SIZED SWAGE-GRIP BUTTON FERRULES)



TOP VIEW, RAIL #2



FRONT VIEW (UNBENT)



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

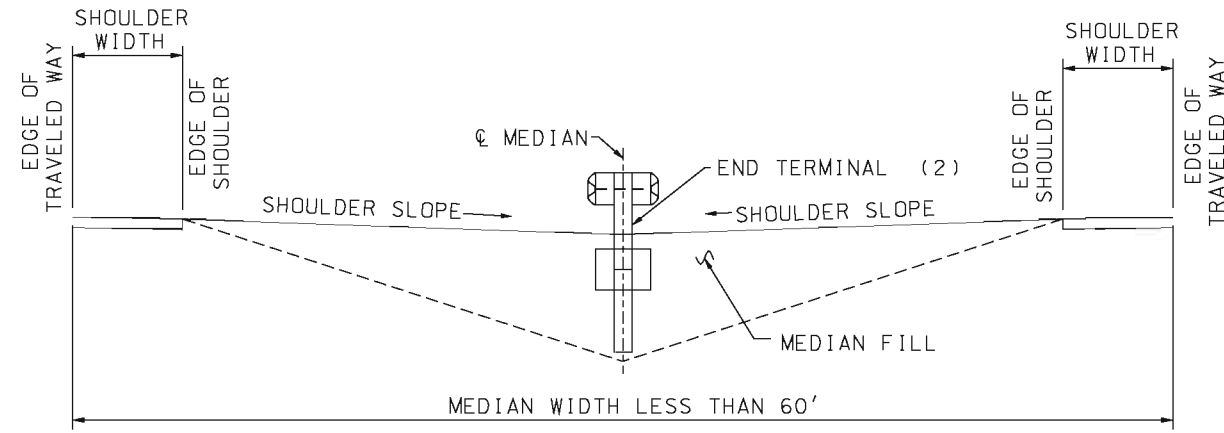
STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**MEDIAN PIER PROTECTION**  
 BULLNOSE GUARDRAIL SYSTEM  
 THRIE BEAM AND  
 CABLE LENGTH

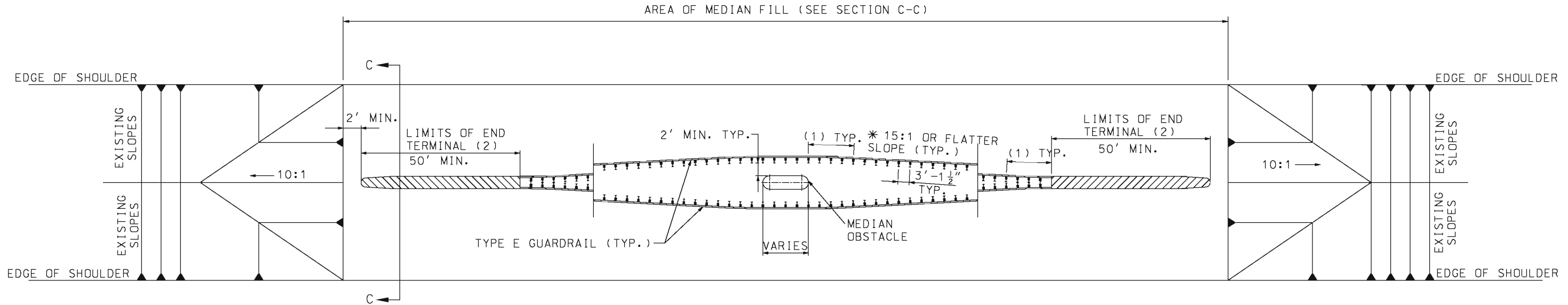
DATE EFFECTIVE: 08/01/2012	<b>606.01F</b>	SHEET NO. 7 OF 9
DATE PREPARED: 7/27/2012		

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

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



SECTION C-C

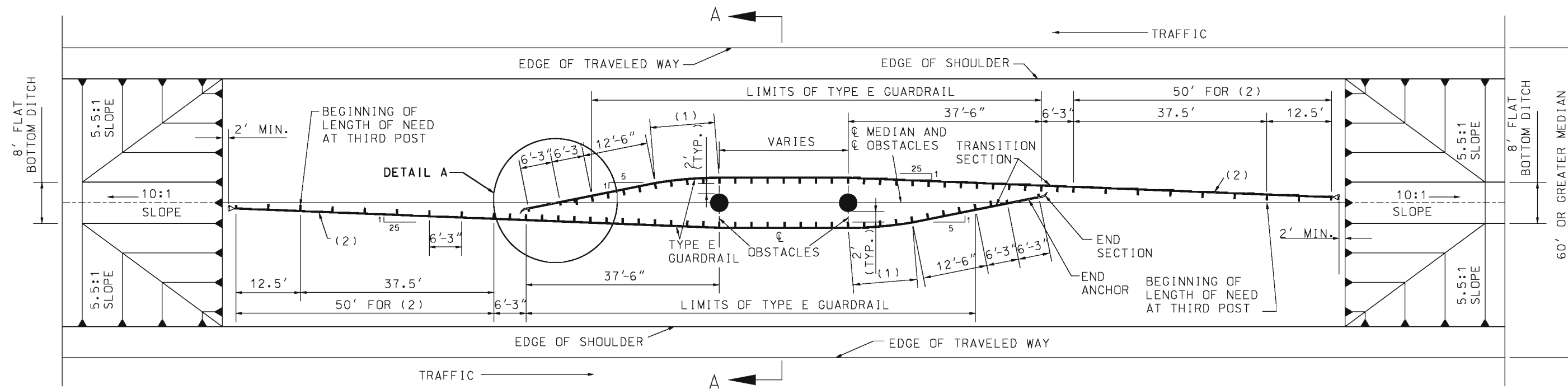


- (1) TYPE E GUARDRAIL 12'-6" IN LENGTH AND FACTORY FORMED TO THE REQUIRED RADIUS.
- (2) PAYMENT FOR THE END TERMINAL WILL BE CONSIDERED FULL COMPENSATION FOR ANY TRANSITION SECTIONS, BACKUP ASSEMBLIES, OR OTHER ITEMS NECESSARY FOR PROPER INSTALLATION AS REQUIRED BY THE MANUFACTURER.
- \* VARY SLOPE NO STEEPER THAN 15:1 TO UTILIZE A FULL 12.5' LENGTH OF GUARDRAIL WHEN ATTACHING TO THE CRASHWORTHY END TERMINAL.

GENERAL NOTES:  
 TYPE B CRASHWORTHY END TERMINAL SHALL BE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMENDATIONS.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> <small>105 WEST CAPITOL        JEFFERSON CITY, MO 65102        1-888-ASK-MODOT (1-888-275-6636)</small>
	<h2 style="margin: 0;">TYPE E MEDIAN PIER PROTECTION</h2> <p style="margin: 0;">MEDIAN LESS THAN 60'</p>
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.	DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012
606.01F	SHEET NO. <b>8 OF 9</b>

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



**PIER AT  $\phi$  OF MEDIAN**

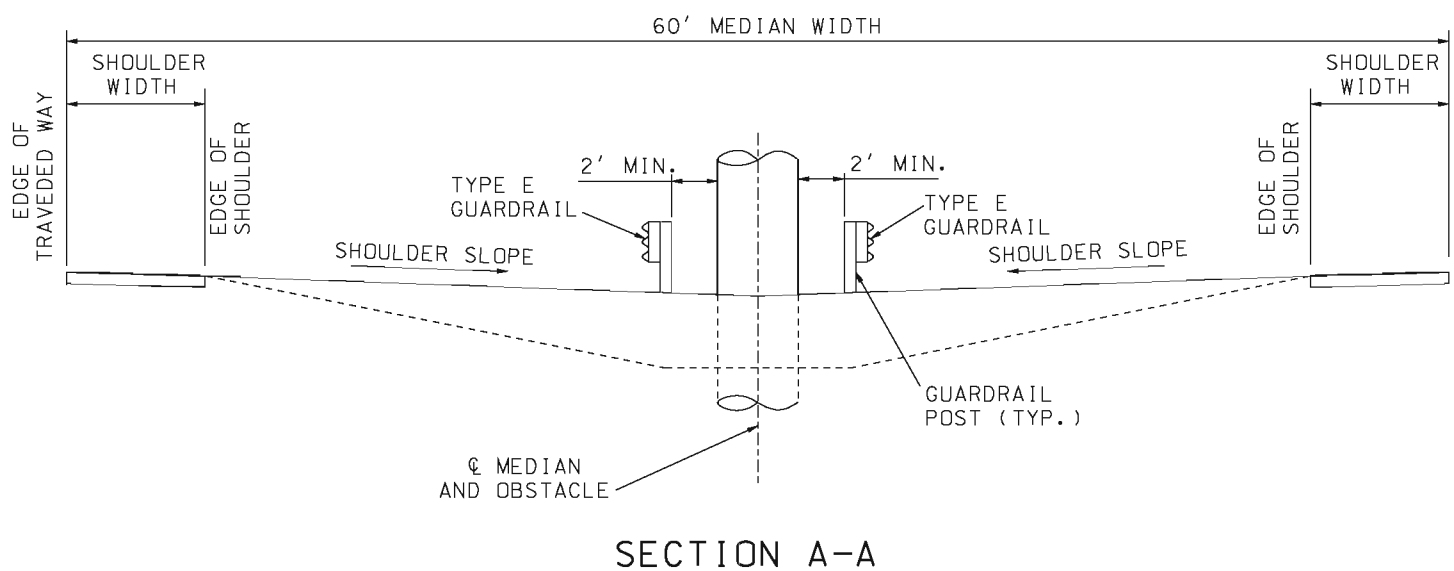
- (1) TYPE E GUARDRAIL IN THIS REGION SHALL BE 12'6" IN LENGTH AND FACTORY FORMED TO A 75' RADIUS.
- (2) TYPE A NON-FLARED CRASHWORTHY END TREATMENT.

**GENERAL NOTES:**

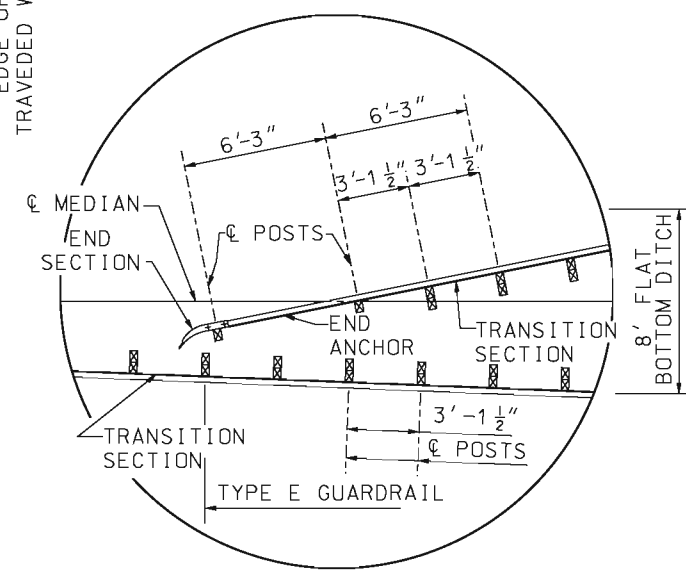
WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E GUARDRAIL. END ANCHOR SECTION TO BE USED ON TERMINAL END OF TYPE E GUARDRAIL.

END ANCHOR TO BE LOCATED BEYOND THE LONGITUDINAL LIMITS OF TYPE A NON-FLARED CRASHWORTHY END TERMINAL.

TYPE A NON-FLARED CRASHWORTHY END TERMINAL SHALL BE THE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.



**SECTION A-A**



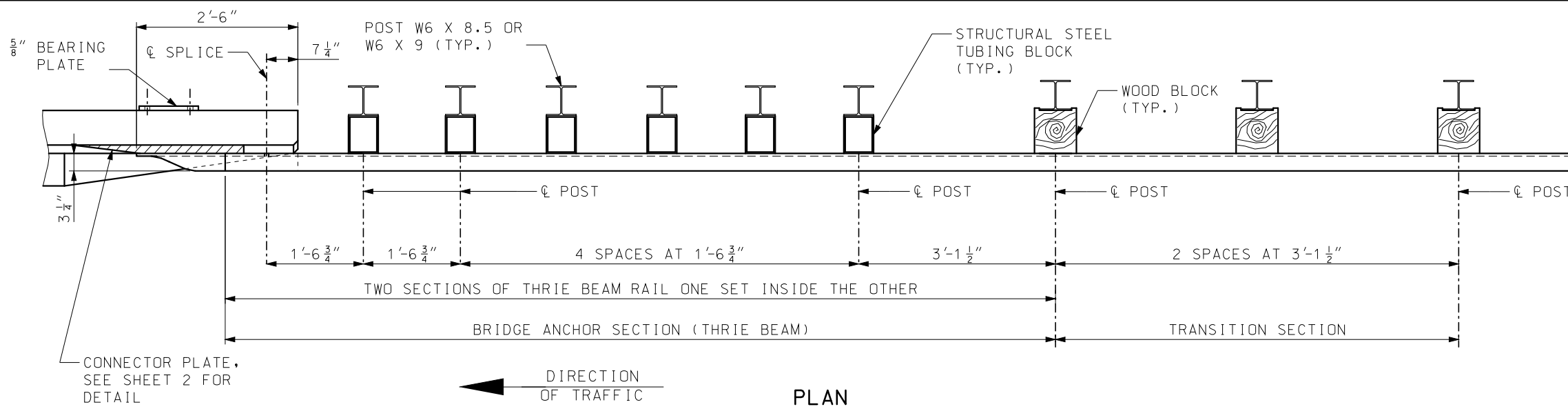
**DETAIL A**

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

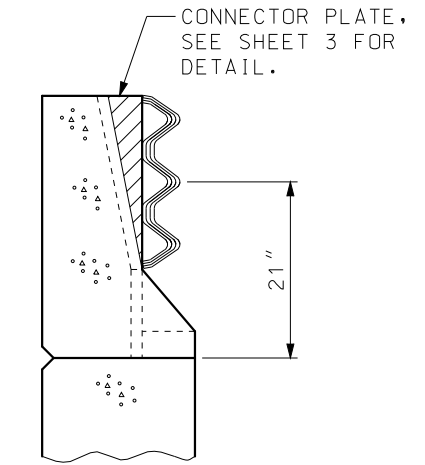
STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TYPE E MEDIAN PIER PROTECTION**  
 60' MEDIAN OR GREATER

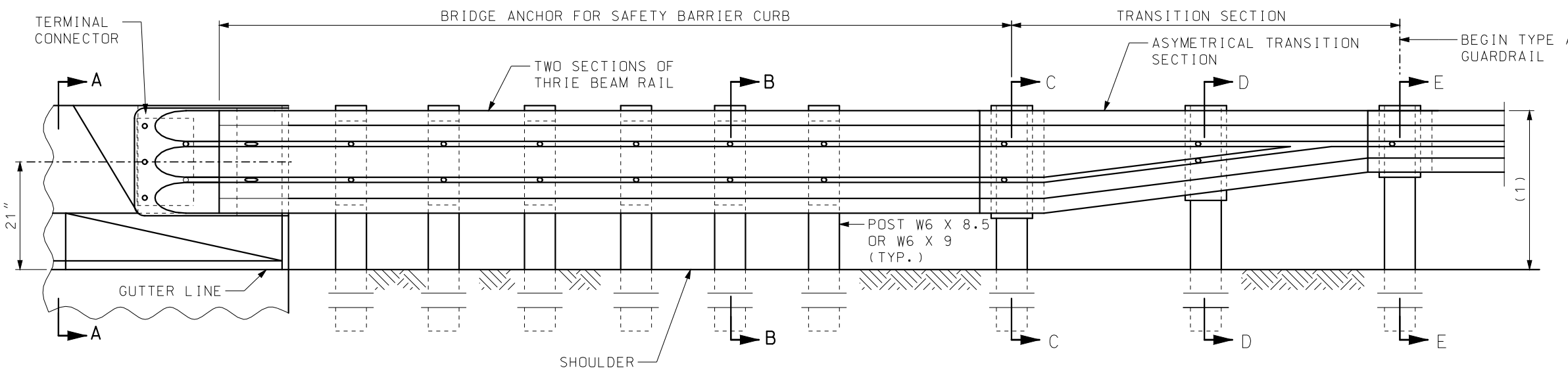
DATE EFFECTIVE: 08/01/2012	606.01F	SHEET NO. 9 OF 9
DATE PREPARED: 7/27/2012		



PLAN

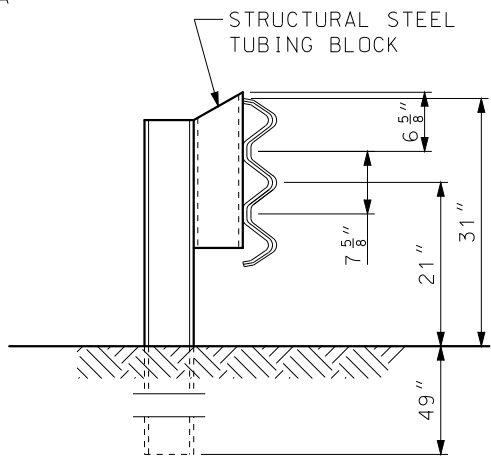


SECTION A-A

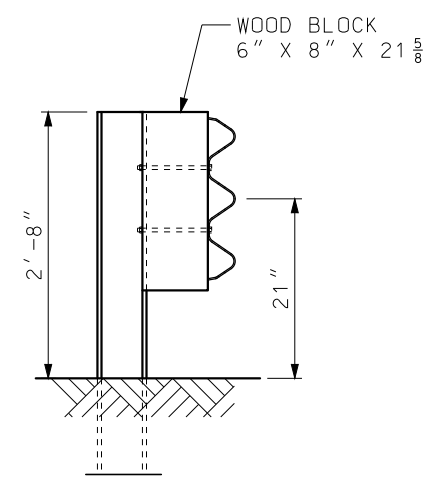


PART SECTION THRU SLAB AT END OF WING

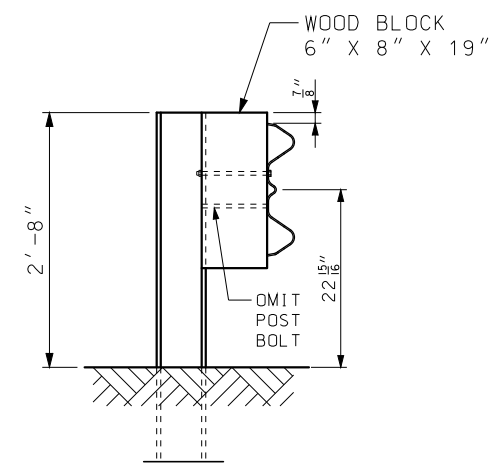
(1) TRANSITION FROM 31" TO 29" HEIGHT OVER NEXT TWO UPSTREAM 12'-6" W-BEAM RAILS.



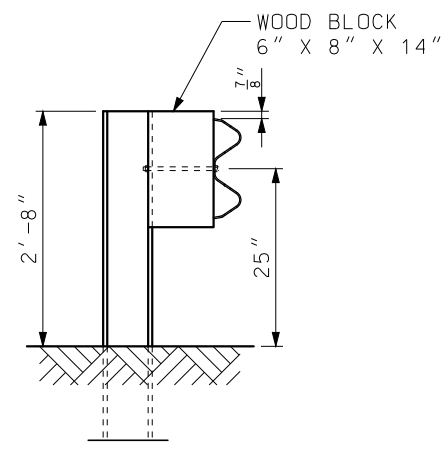
SECTION B-B



SECTION C-C



SECTION D-D



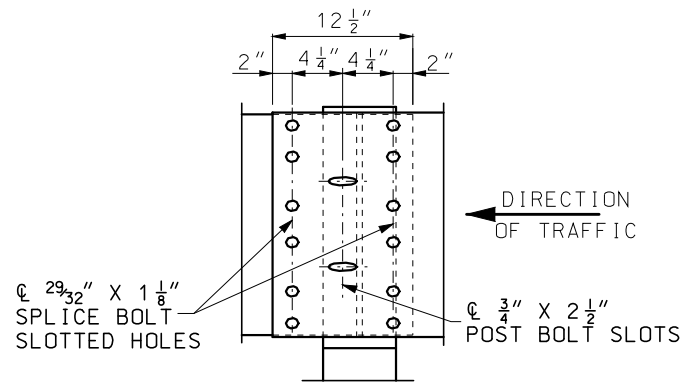
SECTION E-E

NOTES:  
 FOR GENERAL NOTES, SEE SHEET 3 OF 6  
 FOR DETAILS OF BLOCK ON STEEL POSTS, SEE SHEET 2 OF 6.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>BRIDGE ANCHOR SECTION</b> SAFETY BARRIER CURB ON BRIDGE	
	DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016	SHEET NO. <b>606.22U</b> 1 OF 6

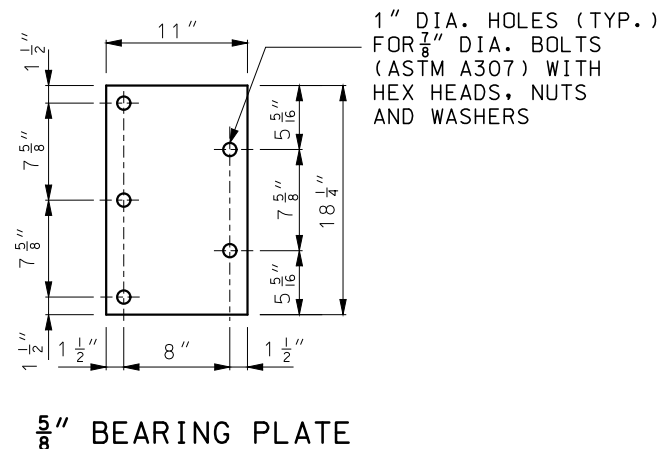
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



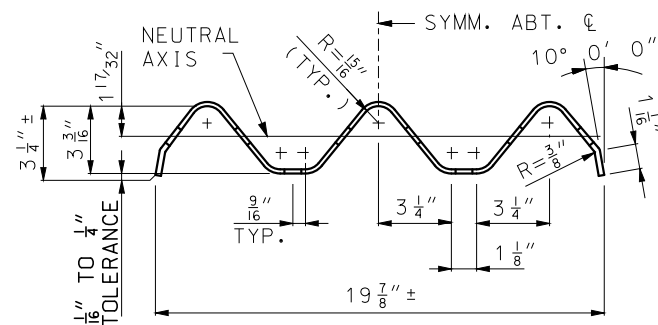


**THRIE BEAM RAIL SPLICE AT POST**

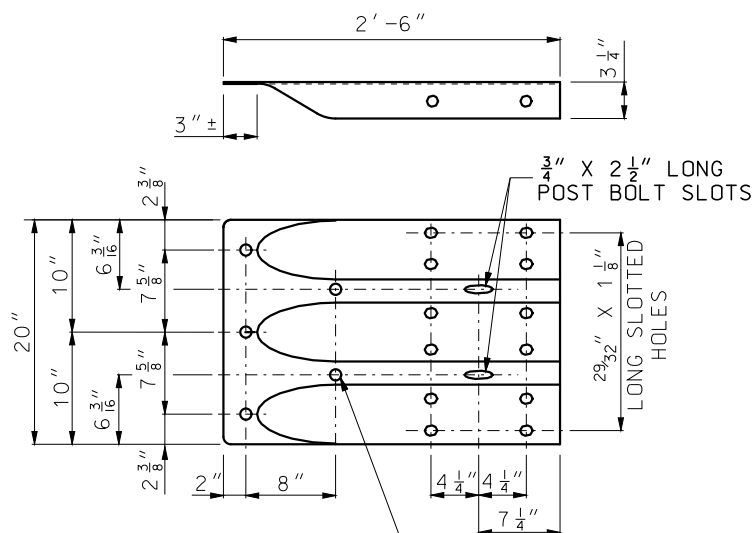
(1) THE CONTRACTOR MAY, AT HIS OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.



**5/8" BEARING PLATE**

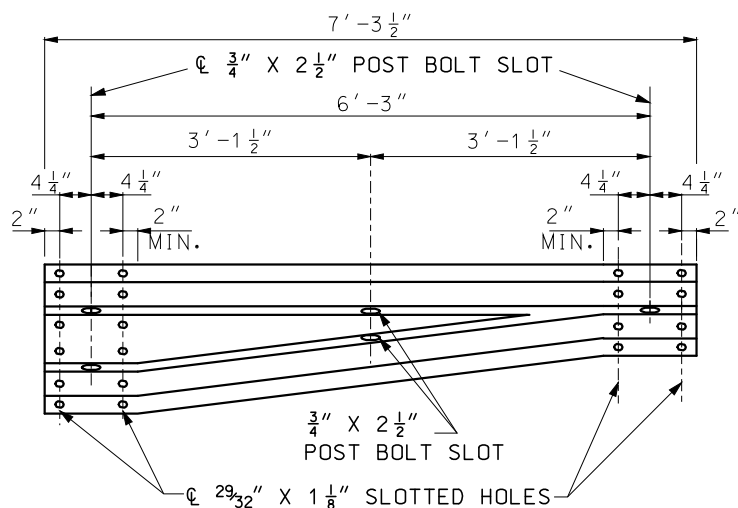


**SECTION THROUGH THRIE BEAM RAIL**



**TERMINAL CONNECTOR**

1" DIA. HOLES (TYP.) (FOR 7/8" DIA. BOLTS (ASTM A307) WITH HEX HEADS, NUTS AND WASHERS)



**ASYMMETRICAL TRANSITION SECTION**

**GENERAL NOTES:**

DESIGN BASED ON NCHRP REPORT 350 TEST LEVEL 3.

THE THRIE BEAM RAIL, TERMINAL CONNECTOR AND THE TRANSITION SECTION FOR THE BRIDGE ANCHOR SECTION SHALL BE MADE OF STEEL AND SHLL BE 12 GAGE.

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

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

STRUCTURAL TUBING BLOCK SHALL BE FABRICATED FROM ASTM A500 GRADE B STEEL AND GALVANIZED.

USE 5/8" BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = 3/8" MIN.).



THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.

ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

SEE STANDARD PLAN 606.00 FOR DETAILS NOT SHOWN.

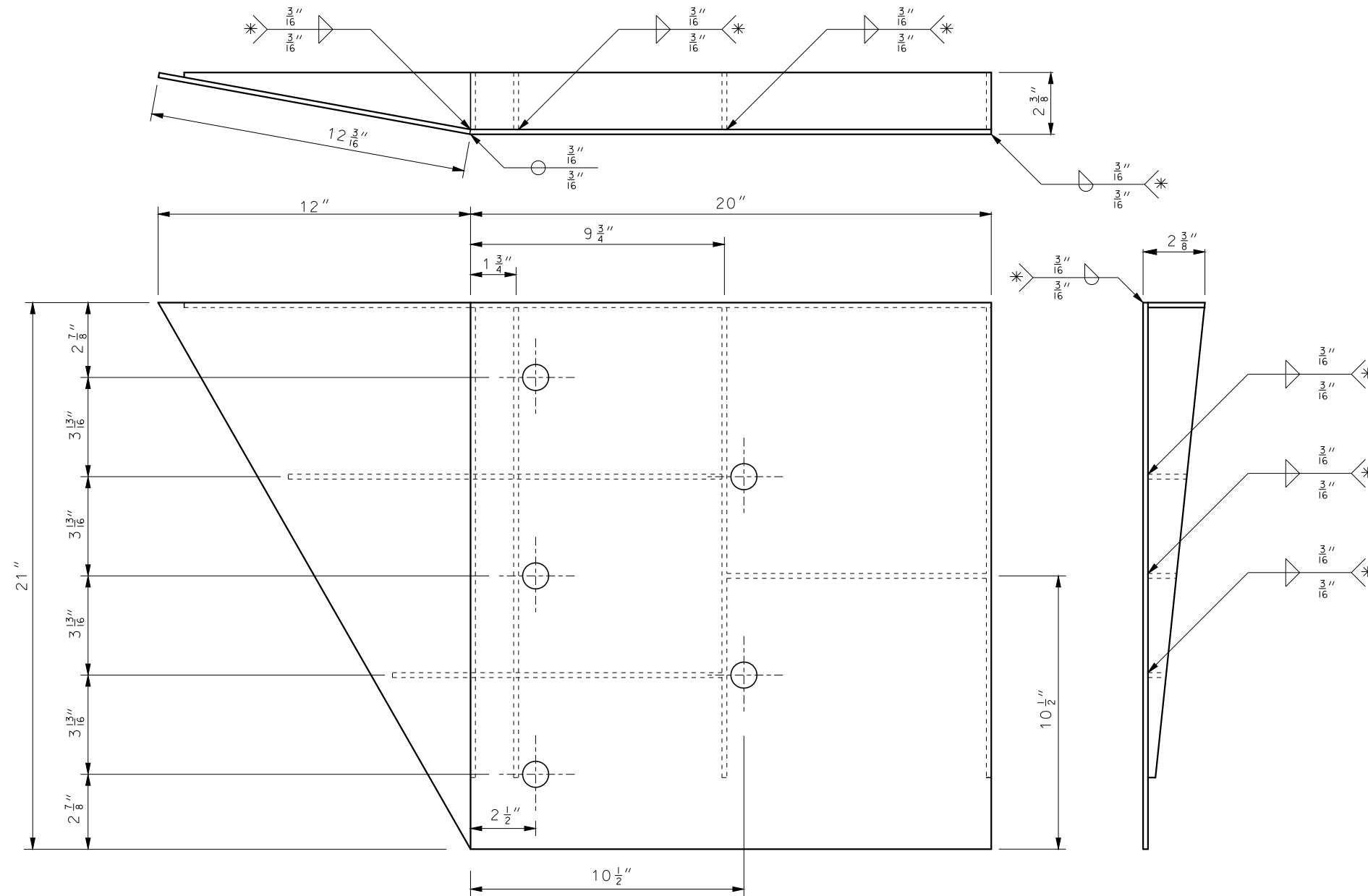
THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COplete IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (SAFETY BARRIER CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>BRIDGE ANCHOR SECTION</b> <b>SAFETY BARRIER CURB ON BRIDGE</b>
DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016	SHEET NO. <b>606.22U</b> <b>3 OF 6</b>

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





**WELDING INSTRUCTION**

\* ALL FILLET WELDS SHALL BE 1" LONG SPACED AT 2".

**GENERAL NOTES:**

COVER PLATE PANELS ARE 4. <sup>3</sup>/<sub>16</sub>" THICK.

ALL STIFFENERS ARE <sup>1</sup>/<sub>4</sub>" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

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

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**BRIDGE ANCHOR SECTION  
 SAFETY BARRIER CURB ON BRIDGE  
 (CONNECTOR PLATE DETAIL)**

DATE EFFECTIVE: 07/01/2016	606.22U	SHEET NO. 4 OF 6
DATE PREPARED: 5/13/2016		

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

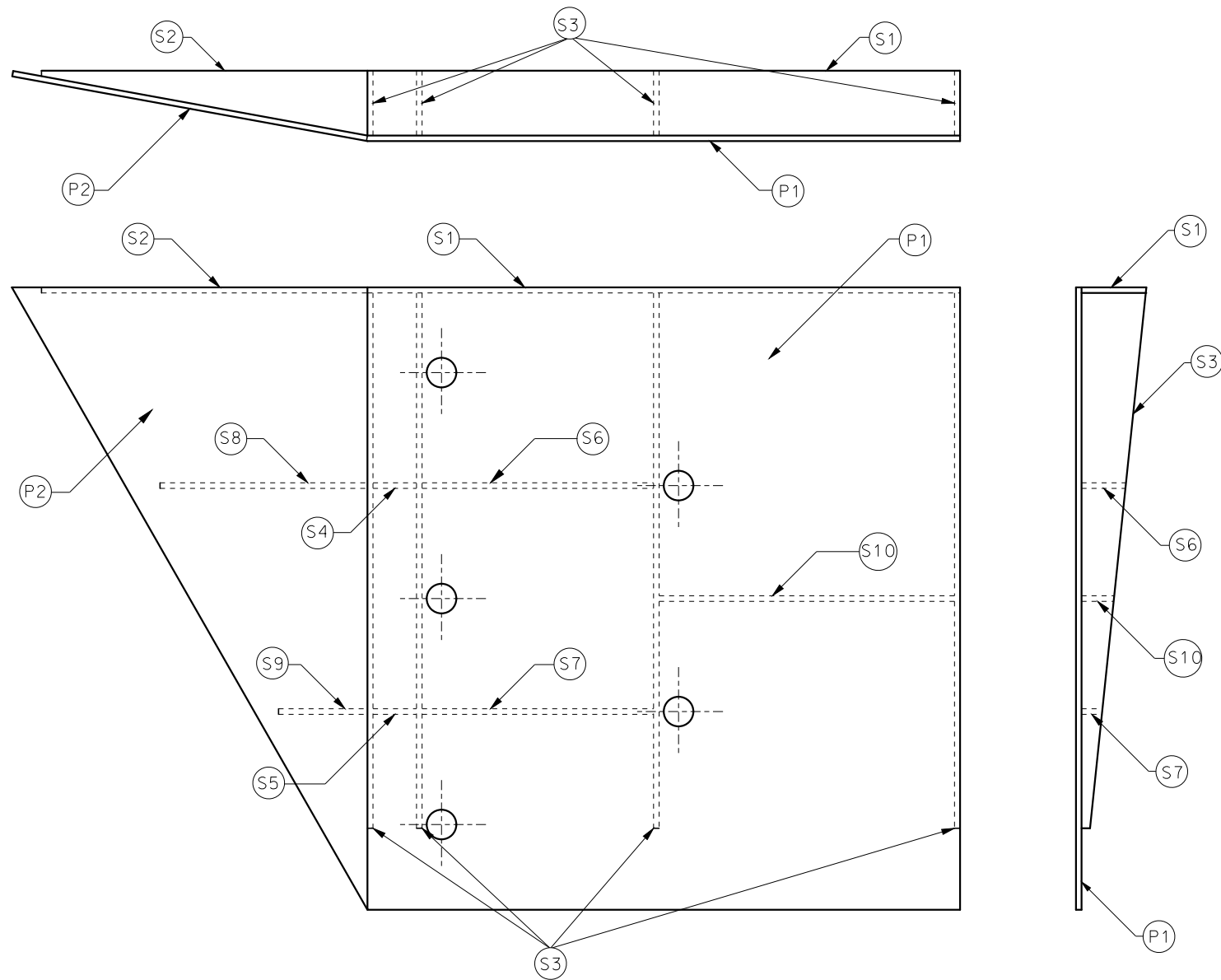
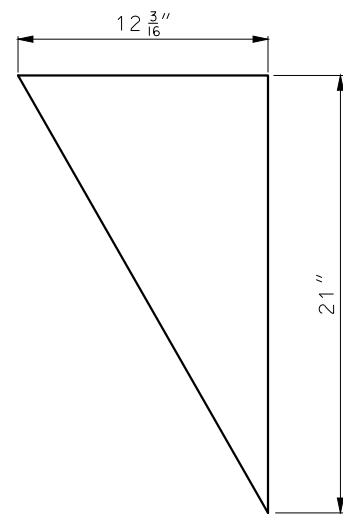
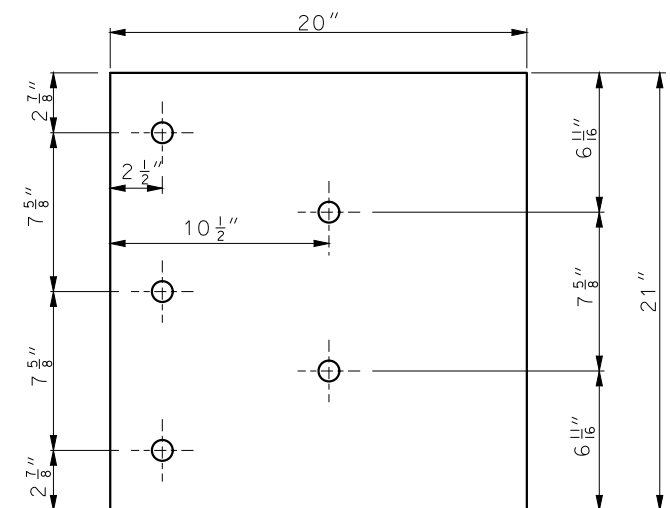


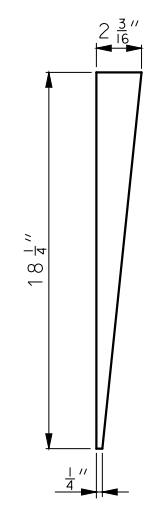
PLATE AND STIFFENER IDENTIFICATION



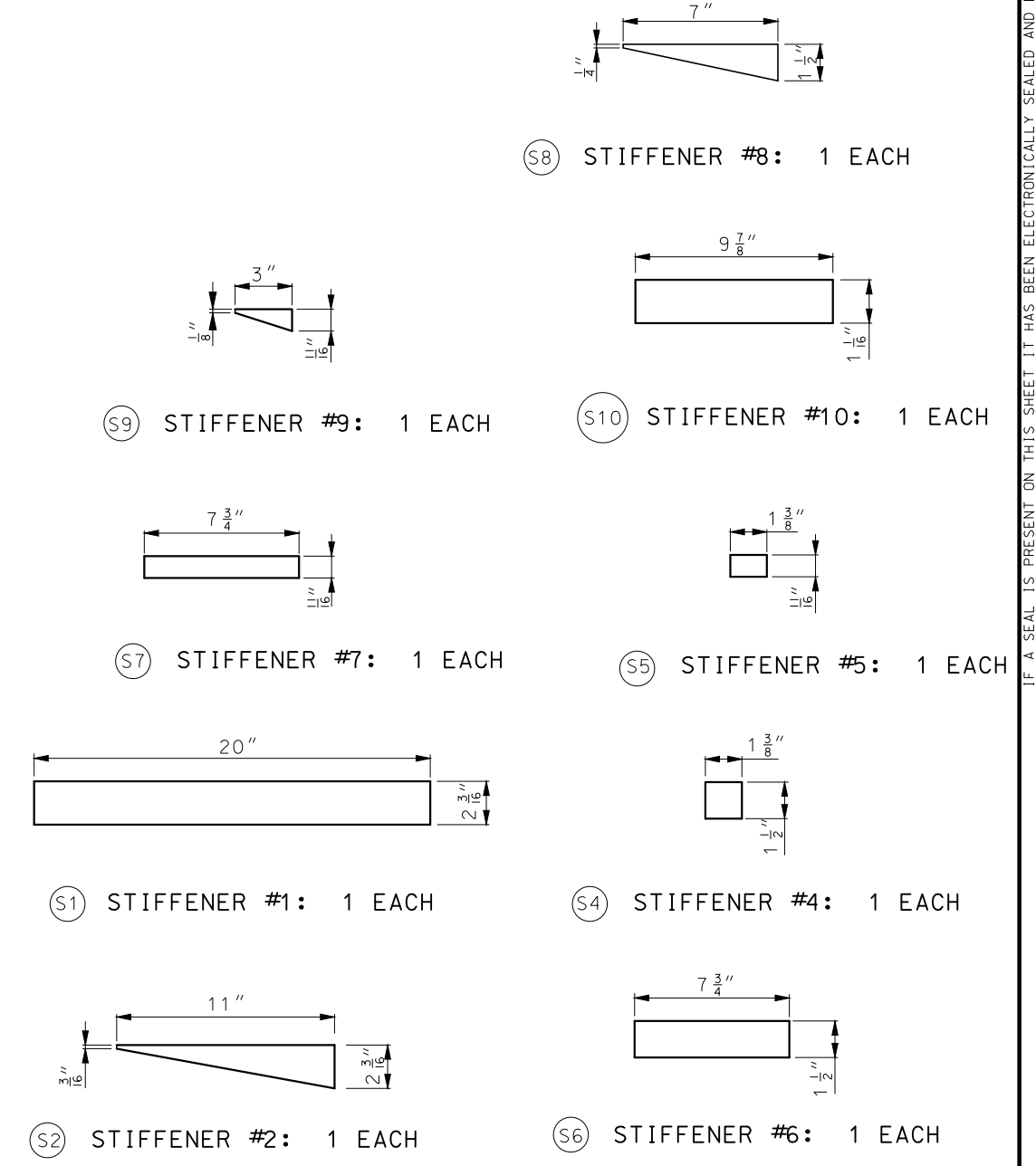
(P2) COVER PLATE #2



(P1) COVER PLATE #1



(S3) STIFFENER #3: 4 EACH



(S2) STIFFENER #2: 1 EACH

(S1) STIFFENER #1: 1 EACH

(S7) STIFFENER #7: 1 EACH

(S9) STIFFENER #9: 1 EACH


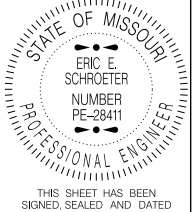
(S6) STIFFENER #6: 1 EACH

(S4) STIFFENER #4: 1 EACH

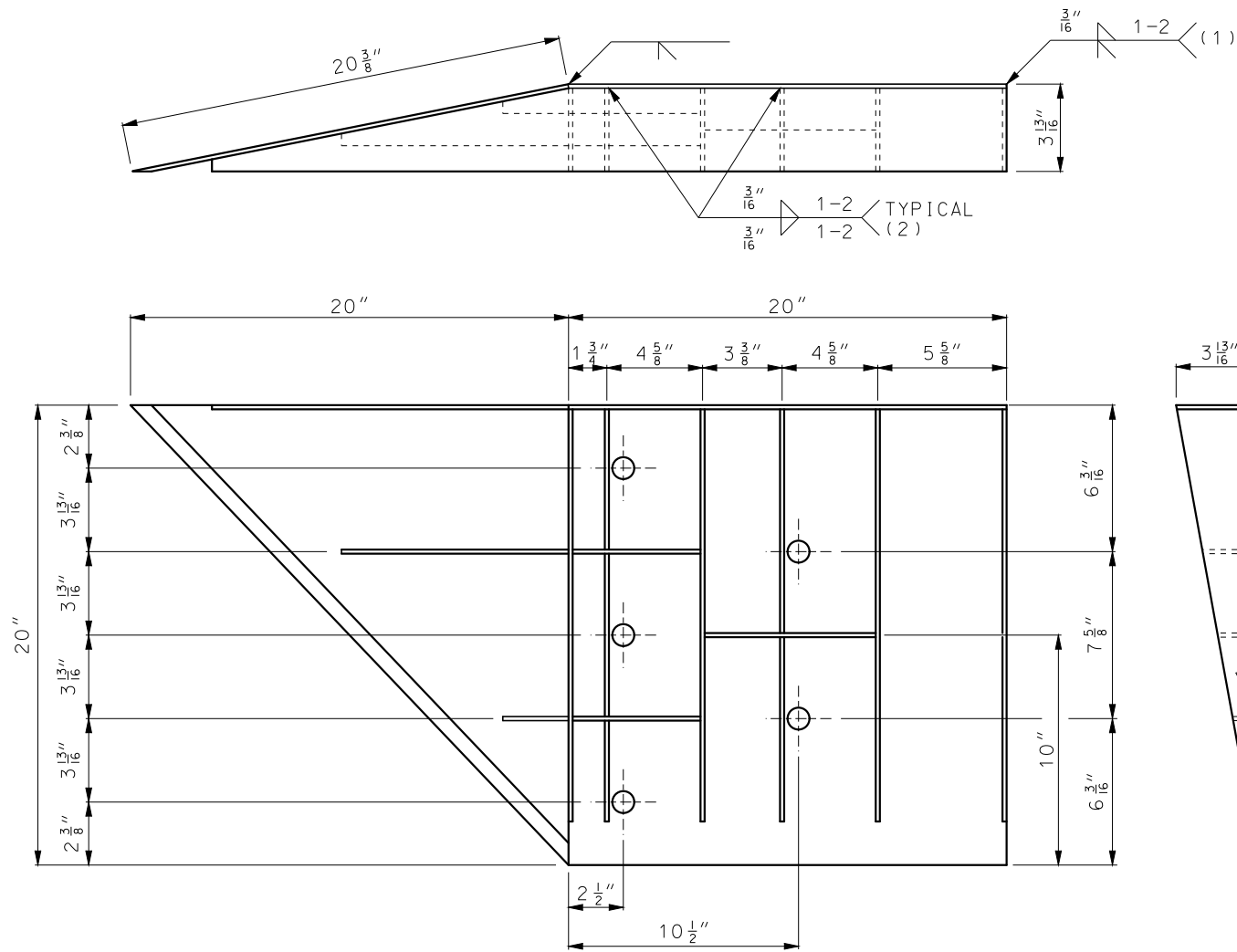
(S5) STIFFENER #5: 1 EACH

(S10) STIFFENER #10: 1 EACH

(S8) STIFFENER #8: 1 EACH

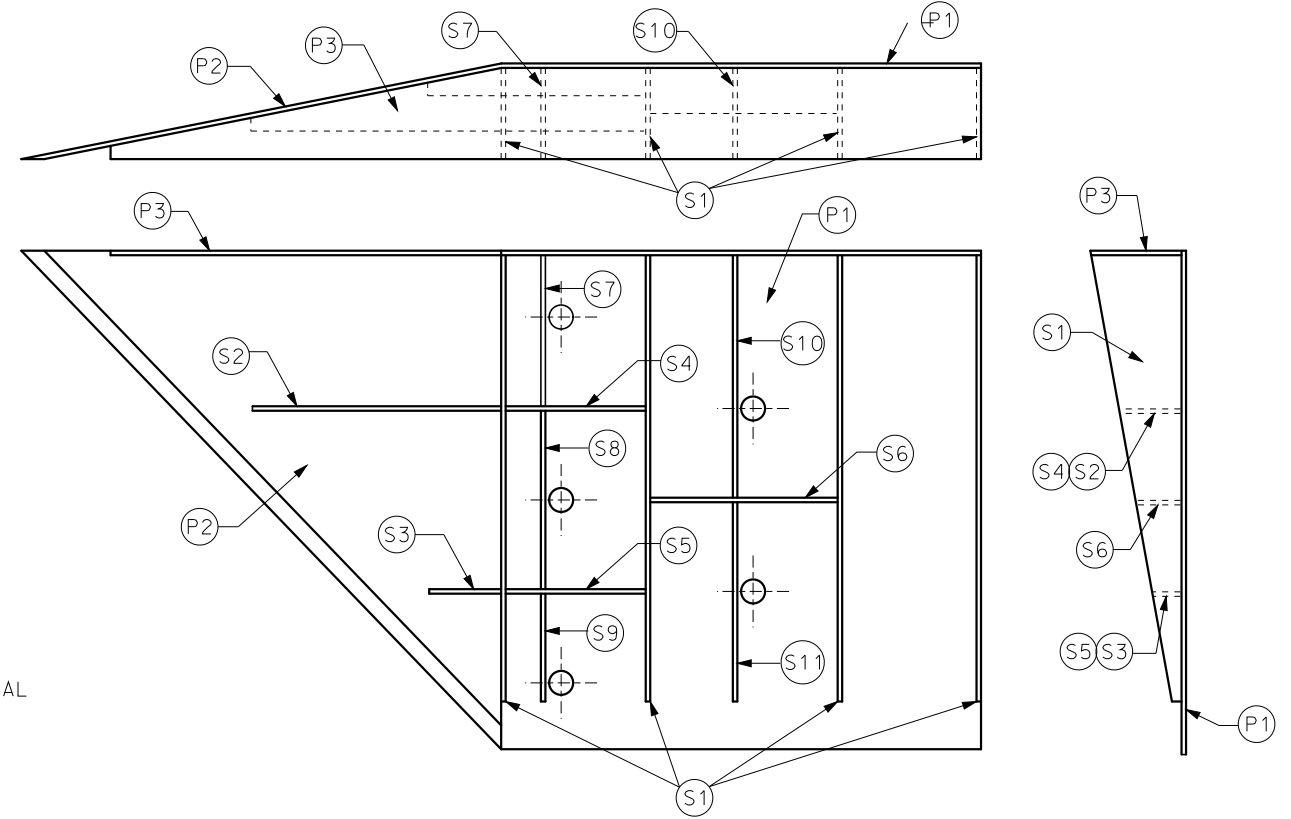
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>BRIDGE ANCHOR SECTION</b> <b>SAFETY BARRIER CURB ON BRIDGE</b> <b>(CONNECTOR PLATE DETAIL)</b>
DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016	SHEET NO. <b>606.22U</b> <b>5 OF 6</b>

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



**WELDING INSTRUCTION**

- (1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:  
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- (2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:  
3/16" FILLET WELD BY 1" LONG SPACED AT 2".



**PLATE AND STIFFENER IDENTIFICATION**

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE	QUANTITY	SHAPE	SIZE (A x B x C x D)	THICKNESS
P1	1	B	20" x 20"	3/16"
P2	1	B	20" x 20" x 28 3/16"	3/16"
P3	1	B	39" x 3 5/8" x 20" x 19 5/16"	3/16"
S1	4	B	18 7/16" x 3 5/8" x 18 3/4"	1/4"
S2	1	B	10 1/4" x 2 7/16" x 10 3/8" x 1/2"	1/4"
S3	1	B	3" x 1 1/16" x 3 1/8" x 1/2"	1/4"
S4	1	B	6 1/8" x 2 7/16"	1/4"
S5	1	B	6 1/8" x 1 1/16"	1/4"
S6	1	B	7 3/4" x 1 3/4"	1/4"
S7	1	A	2 3/16" x 6" x 3 5/8" x 5 7/8"	1/4"
S8	1	A	1 5/32" x 7 1/2" x 2 1/2" x 7 3/8"	1/4"
S9	1	C	6 1/16" x 6 3/16" x 1 3/32"	1/4"
S10	1	A	1 7/8" x 9 7/8" x 3 5/8" x 9 11/16"	1/4"
S11	1	C	8 1/2" x 8 3/4" x 1 13/16"	1/4"

**GENERAL NOTES:**

- COVER PLATE PANELS ARE 3/16" THICK.
- ALL STIFFENERS ARE 1/4" THICK.
- CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.
- FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.
- ALL HOLE DIAMETERS SHALL BE 1".

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**BRIDGE ANCHOR SECTION**  
**SAFETY BARRIER CURB ON BRIDGE**  
**(CONNECTOR PLATE DETAIL)**  
**SINGLE SLOPE BARRIERS**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

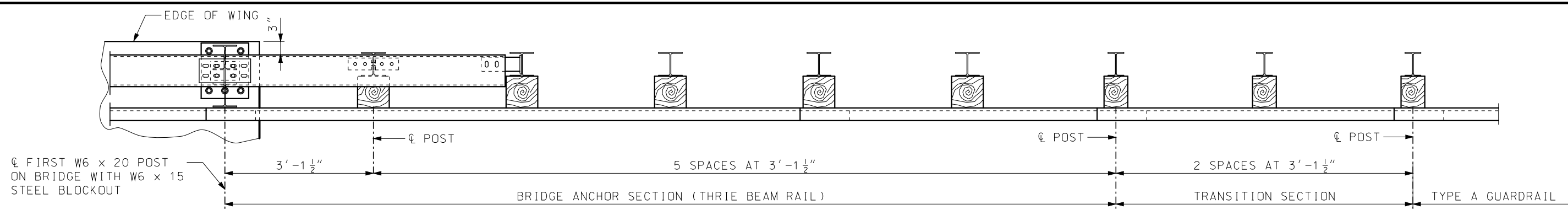
DATE EFFECTIVE: 07/01/2016  
DATE PREPARED: 5/13/2016

606.22U

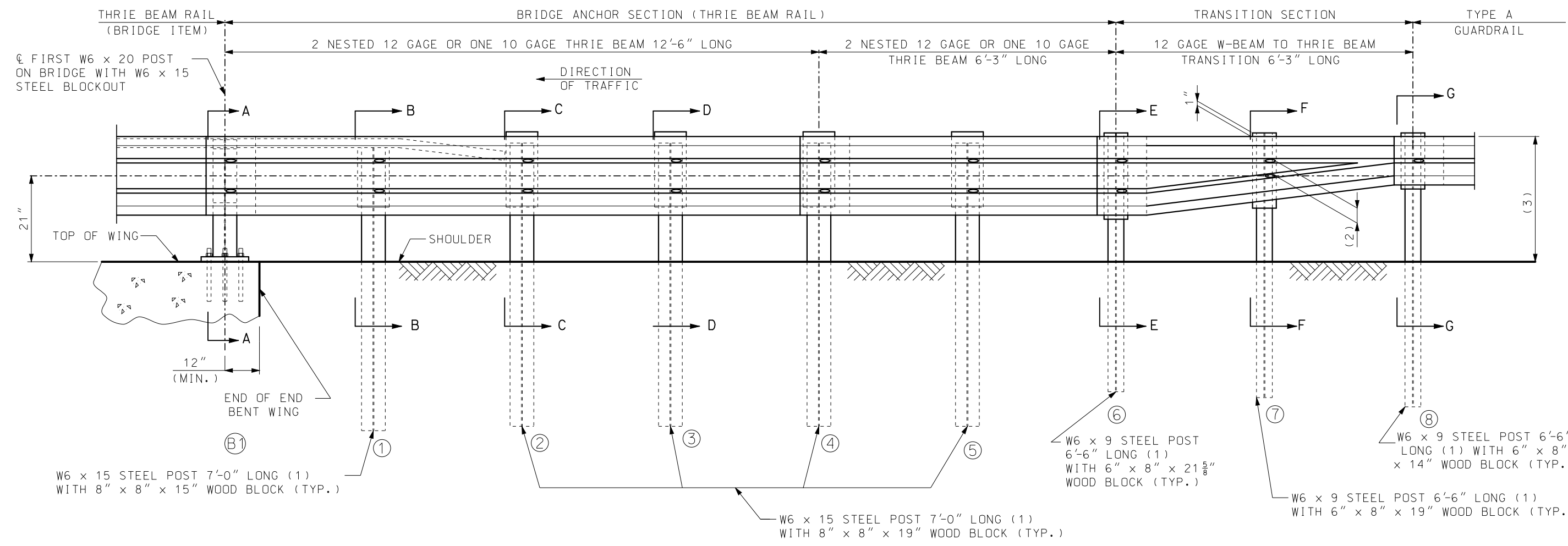
SHEET NO.  
6 OF 6

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

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



PLAN

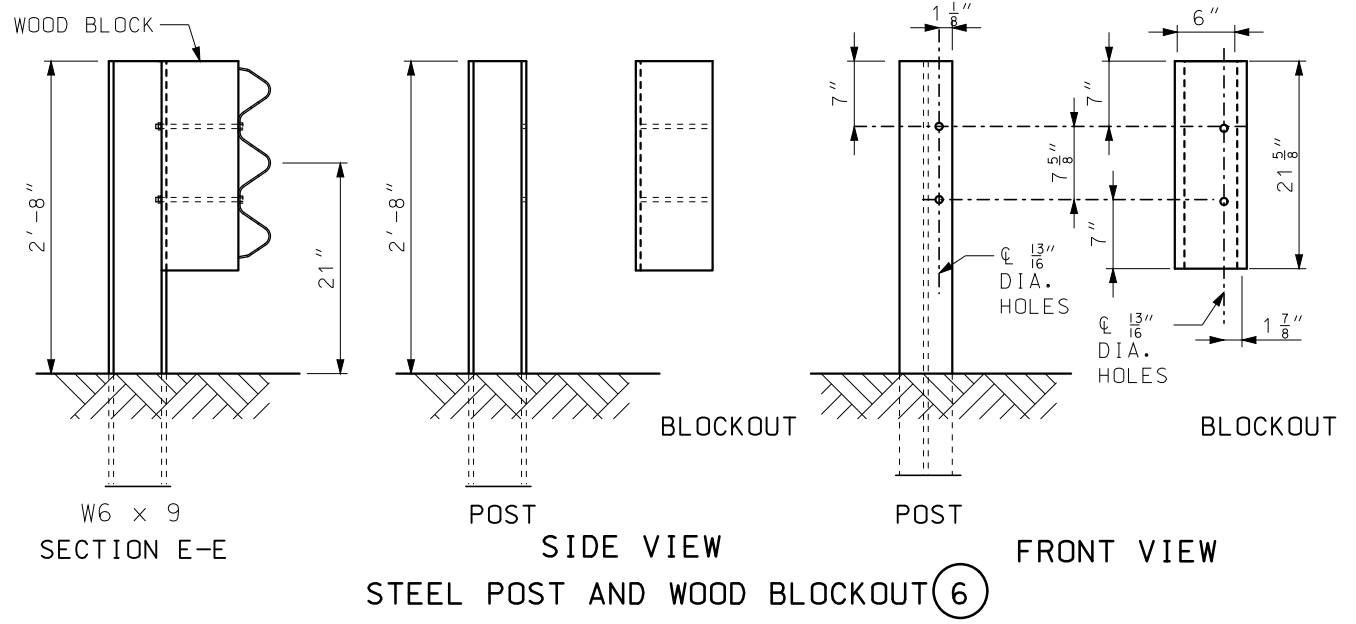
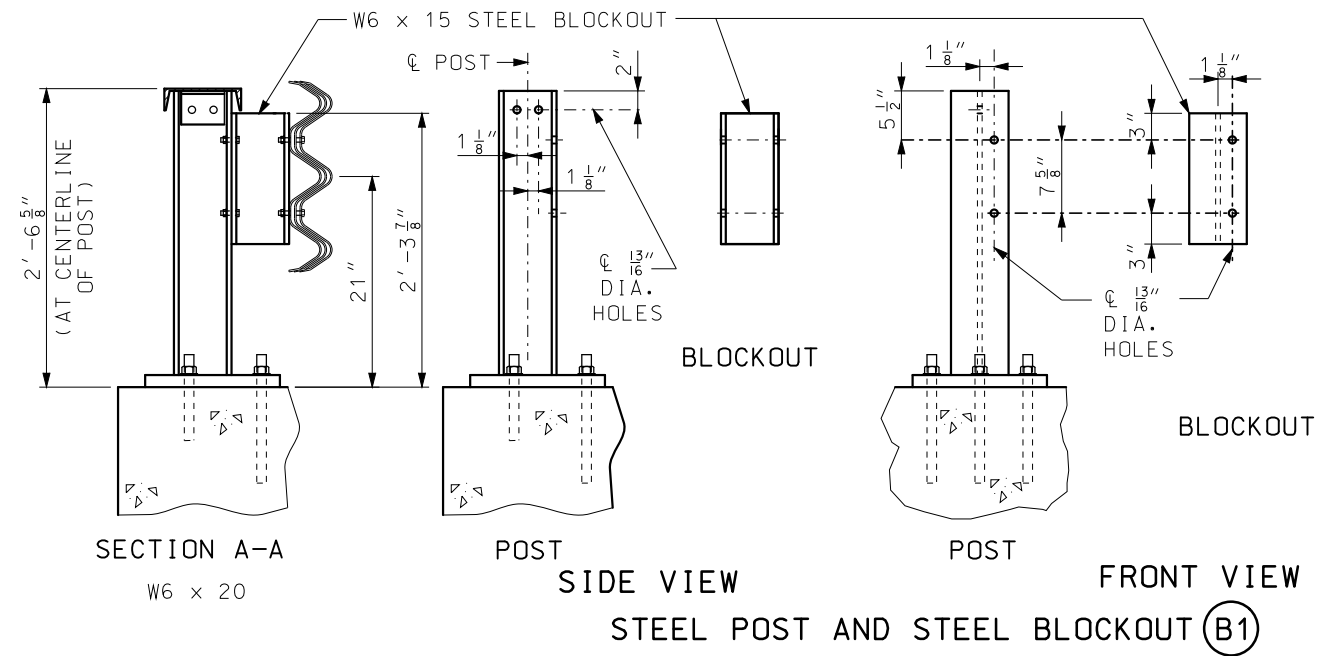


PART SECTION THROUGH SLAB AT END OF WING

NOTES:  
 FOR GENERAL NOTES, SEE SHEET 2 OF 5.  
 FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

- (1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.
- (2) VERIFY BY RAIL TRANSITION PRODUCER.
- (3) TRANSITION FROM 31" TO 29" HEIGHT OVER NEXT TWO UPSTREAM 12'-6" W-BEAM RAILS.

<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>BRIDGE ANCHOR SECTION</b> (THRIE BEAM RAIL ON BRIDGE)
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.	
DATE EFFECTIVE: 7/01/016 DATE PREPARED: 5/13/2016	<b>606.23J</b>
	SHEET NO. <b>1 OF 5</b>



GENERAL NOTES:

DESIGN BASED UPON NCHRP REPORT 350 TEST LEVEL 3 (TL-3).

THE THRIE BEAM RAIL FOR THE BRIDGE ANCHOR SECTION SHALL BE 12 GAGE OR 10 GAGE AT THE CONTRACTOR'S OPTION, AND THE TRANSITION SECTION SHALL BE 12 GAGE.

FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.

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

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

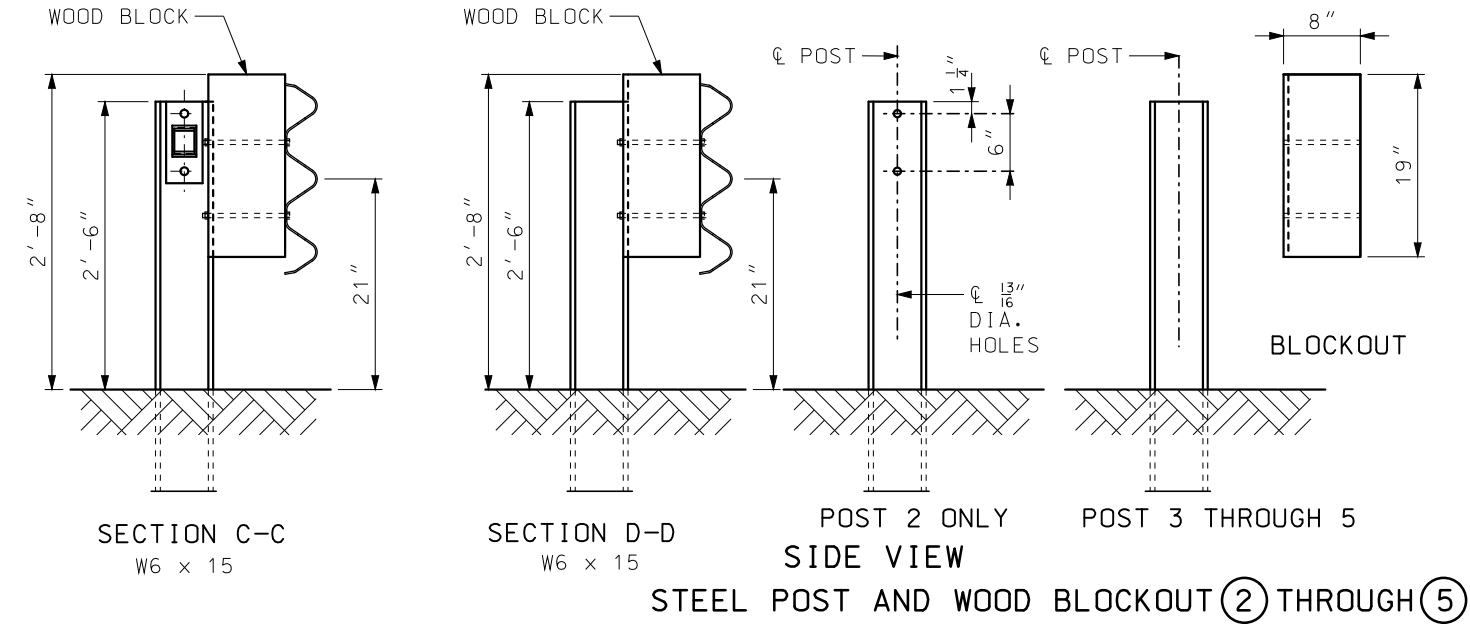
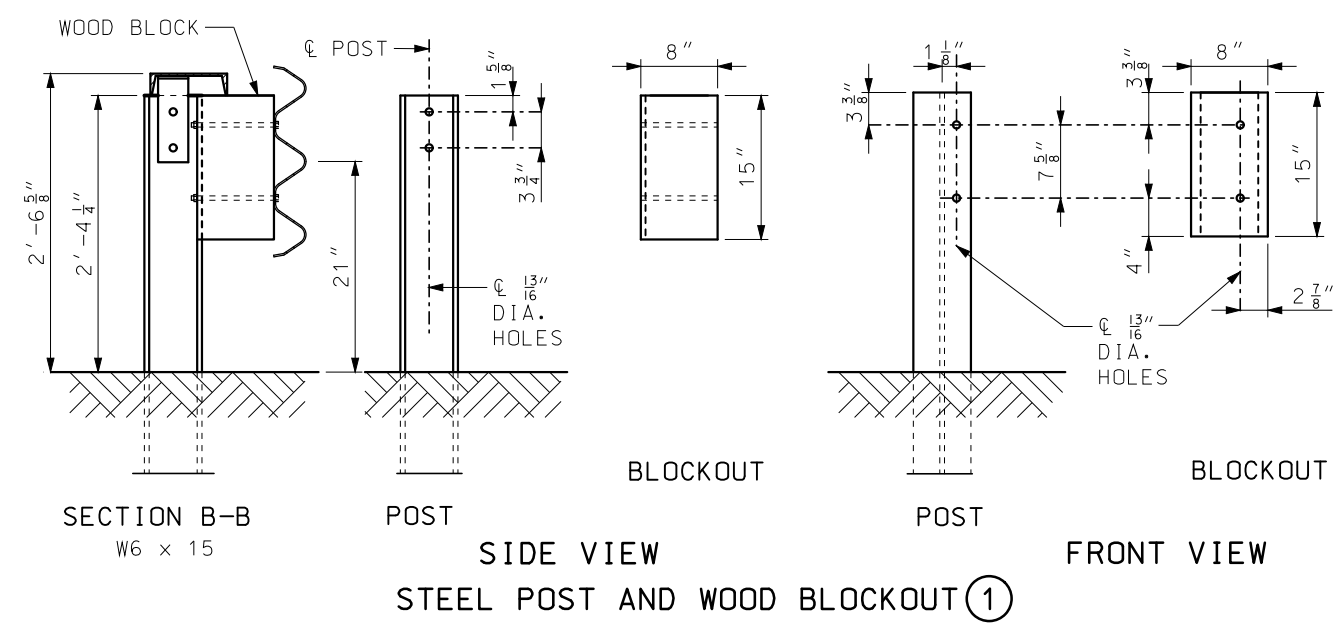
USE 5/8" BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS = 3/8" MIN.) AT ALL SLOTS.

ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL SHEET.



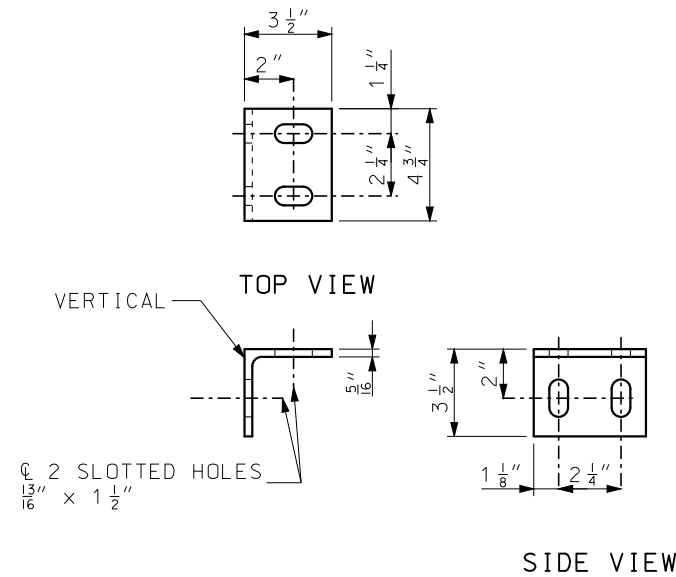
<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.</p>	<p><b>BRIDGE ANCHOR SECTION</b> (THRIE BEAM RAIL ON BRIDGE)</p>
<p>DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016</p>	<p>606.23J</p>
<p>SHEET NO. 2 OF 5</p>	

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

(2) VERIFY BY RAIL TRANSITION PRODUCER.

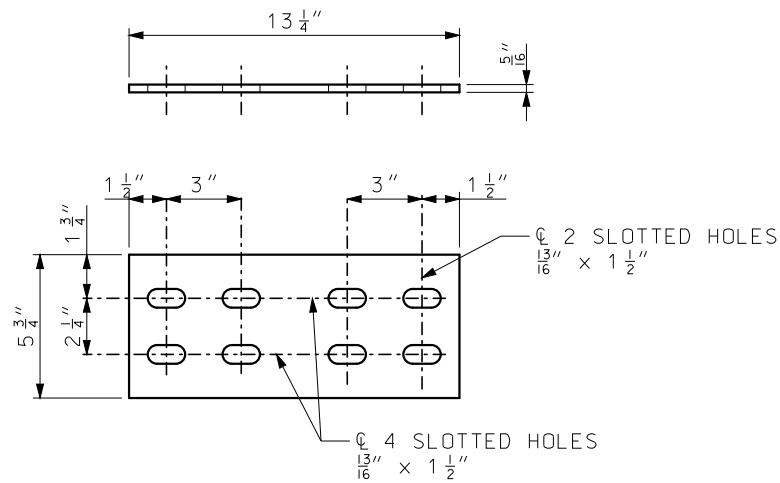




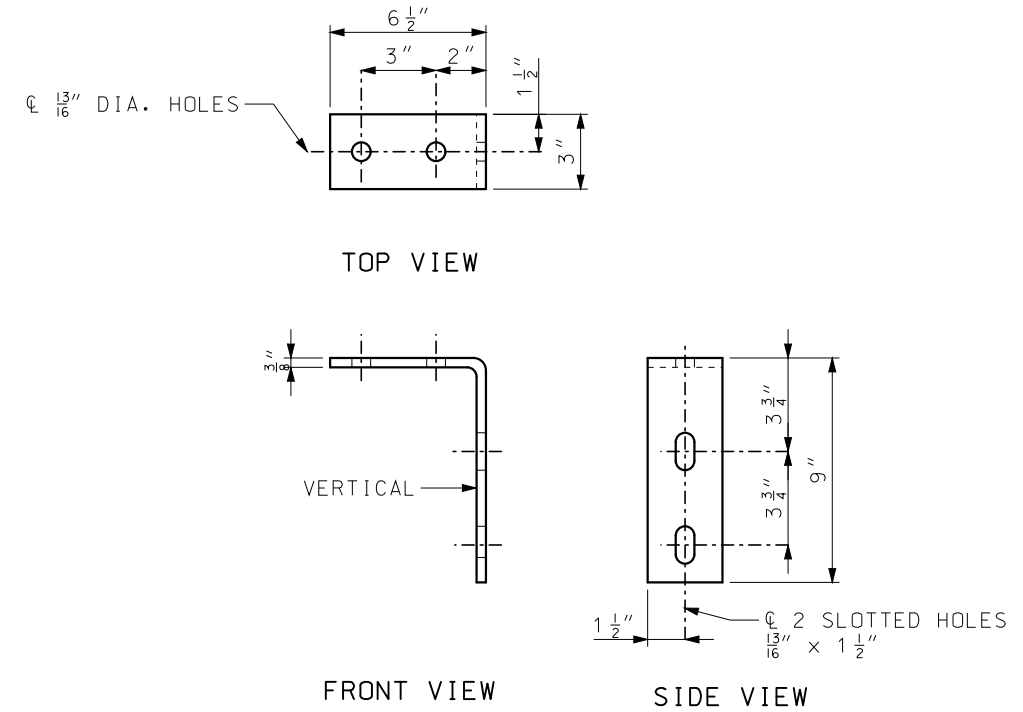


CAP RAIL ANGLE

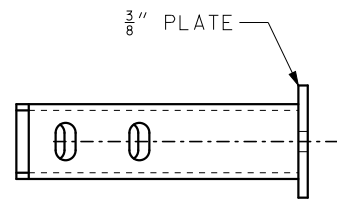
∠ 3 1/2" x 3 1/2" x 5/16"



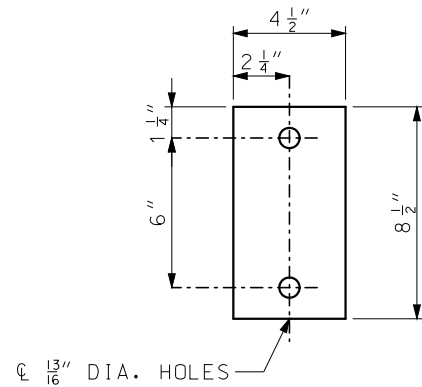
SPLICE PLATE



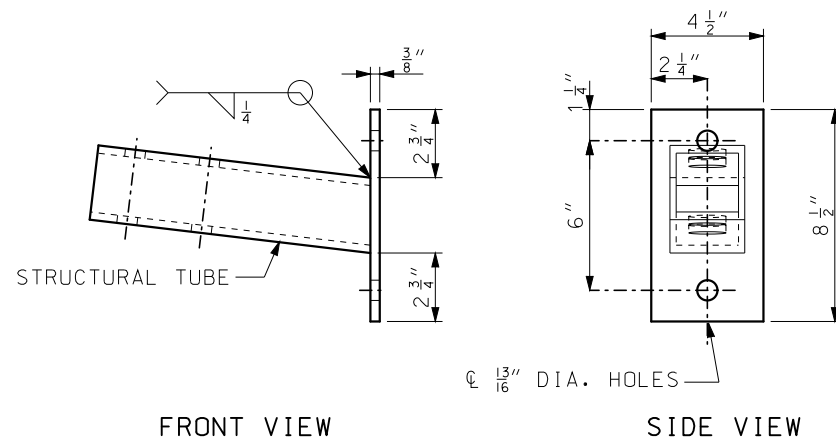
BENT PLATE CONNECTOR



TOP VIEW



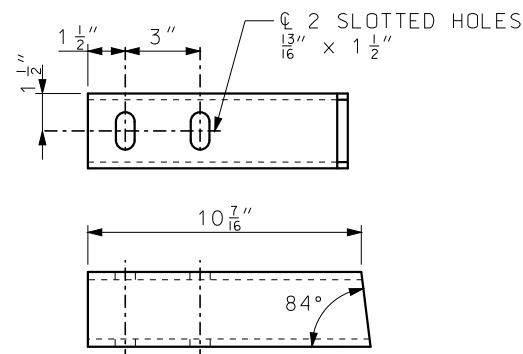
3/8" PLATE



FRONT VIEW



SIDE VIEW

TERMINATOR ASSEMBLY



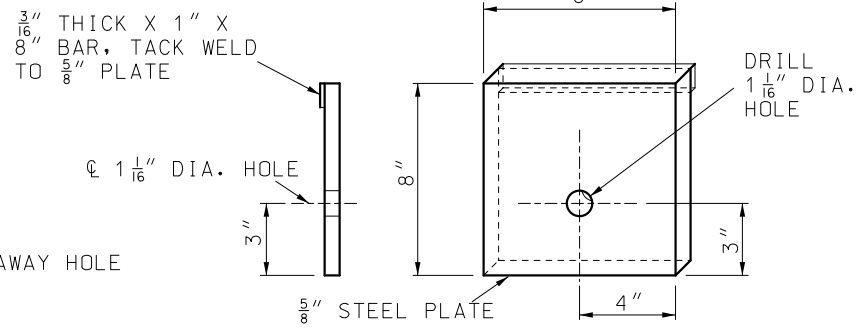
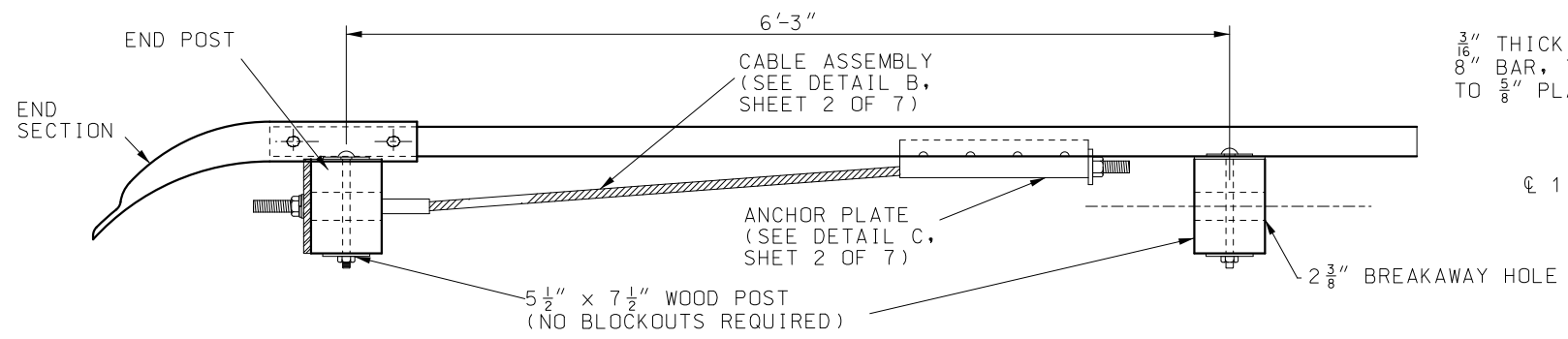
STRUCTURAL TUBE

TS 3" x 3" x 5/16"

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI          ERIC E. SCHROETER          NUMBER PE-28411          PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>BRIDGE ANCHOR SECTION</b>          (THREE BEAM RAIL ON BRIDGE)</p>
DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016	606.23J
SHEET NO. 5 OF 5	

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

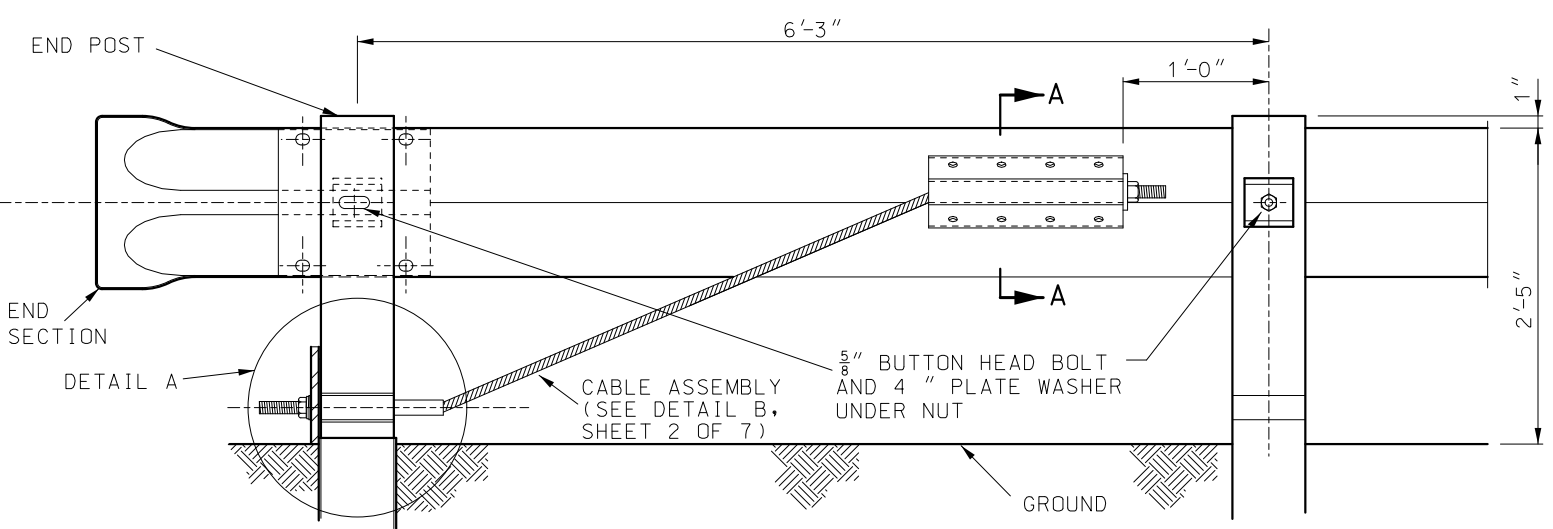




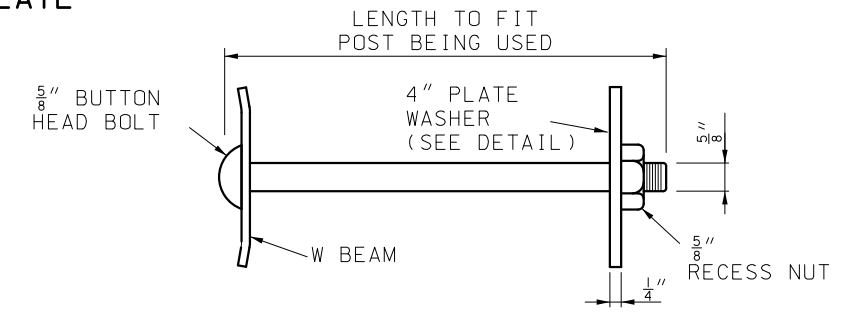
DETAIL OF STEEL BEARING PLATE

NOTE: FOR DETAILS OF END SECTION, SEE STD PLANS 606.00.

PLAN



END ANCHOR DETAILS



POST BOLT ASSEMBLY

GENERAL NOTES:

END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON DOWN STREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR IS REQUIRED.

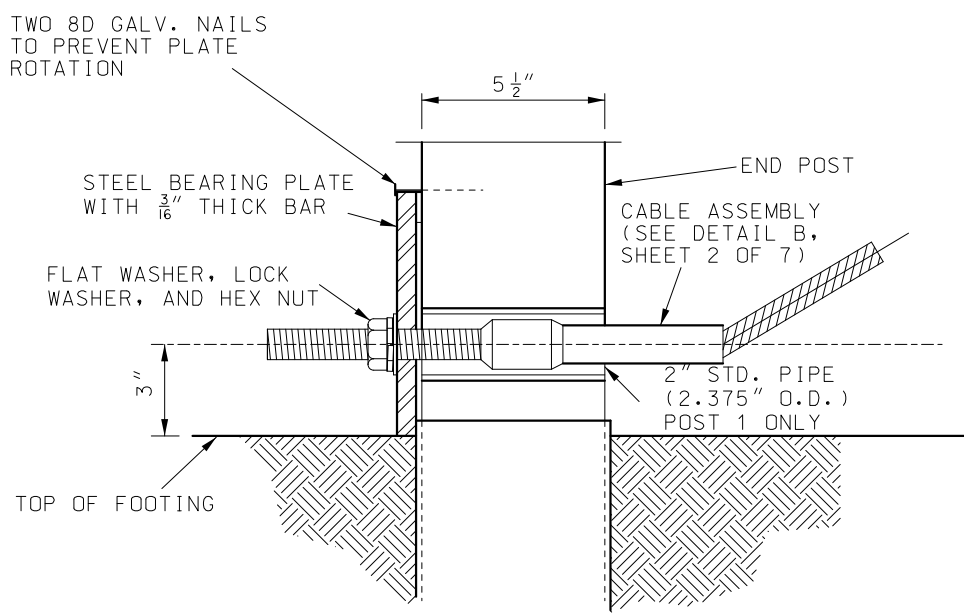
THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM FOR GUARDRAIL. GUARDRAIL AND POSTS ARE PAID FOR SEPARATELY.

CABLE ASSEMBLY AND ANCHOR PLATE SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER AND SHALL HAVE A MINIMUM BREAKING STRENGTH OF 20 TONS.

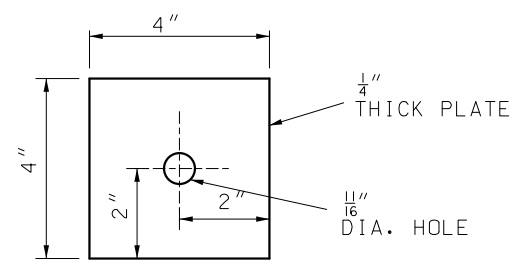
ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED AFTER FABRICATION, SEE SECTION 1040 STANDARD SPECIFICATION.

WOOD POSTS 1 AND 2 SHALL BE 5 1/2" X 7 1/2".

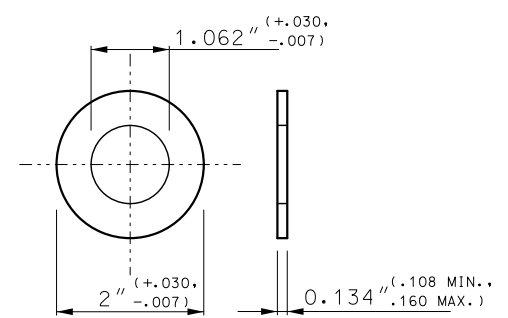
SEE SHEET 3 FOR WOOD POST DETAILS.



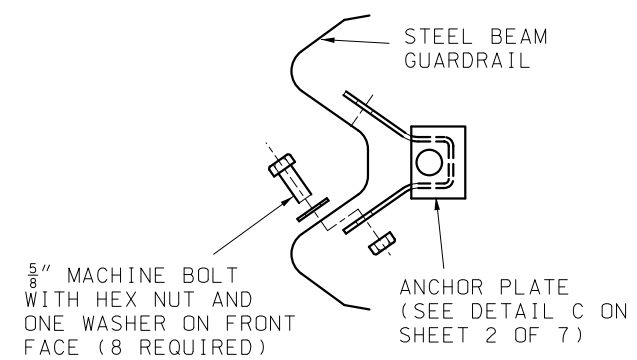
DETAIL A (END POST DETAIL)



4" PLATE WASHER

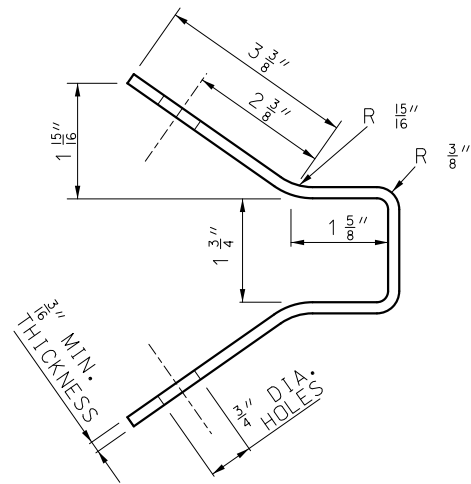


TYPE A WASHER

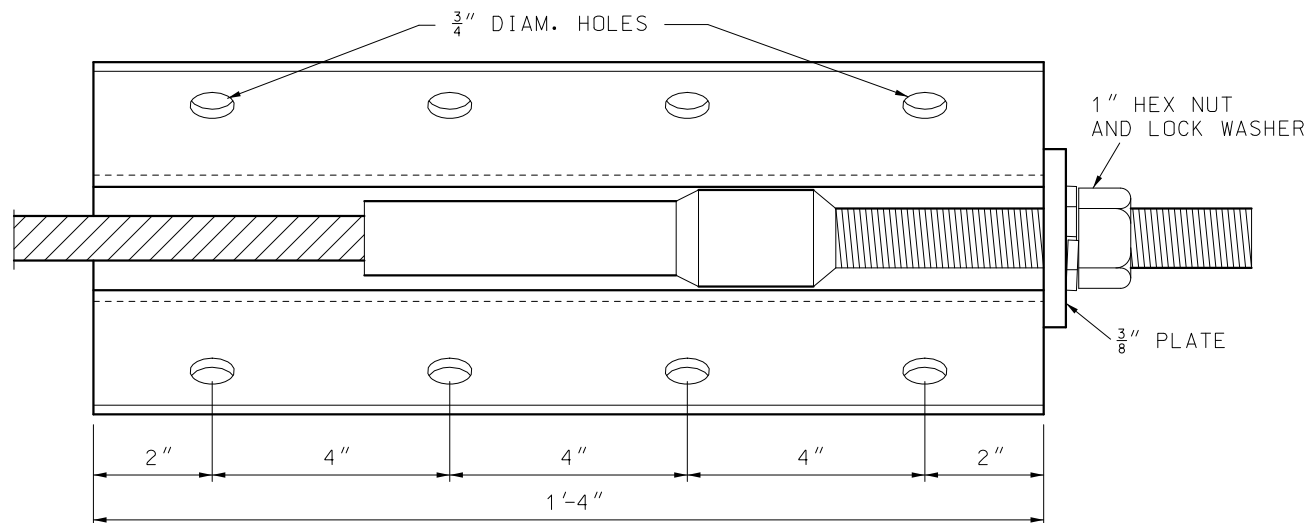


<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>GUARDRAIL</b></p> <p>TERMINAL ANCHOR ENDS</p>
<p>DATE EFFECTIVE: 04/01/2021</p> <p>DATE PREPARED: 1/27/2021</p>	<p>606.30L</p> <p>SHEET NO. 1 OF 7</p>

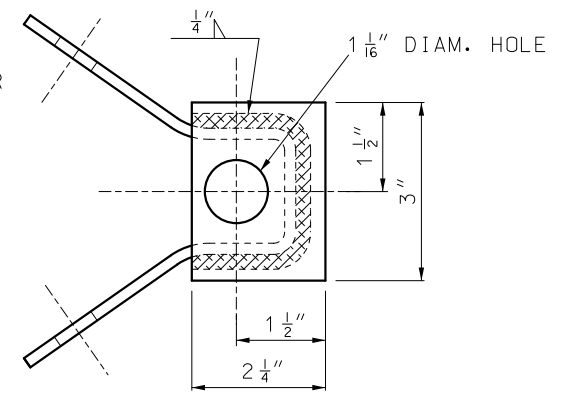
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



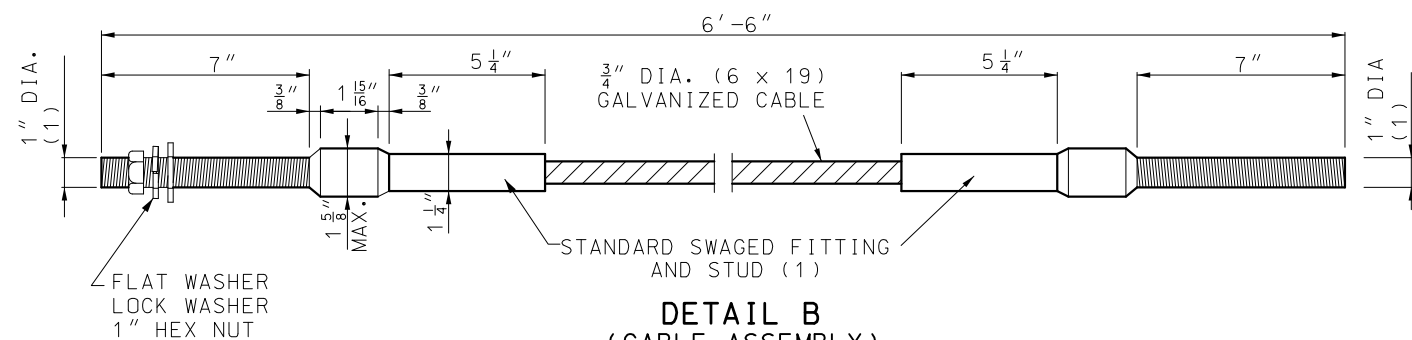
FABRICATION DETAIL



DETAIL C  
ASSEMBLED VIEW  
(ANCHOR PLATE)

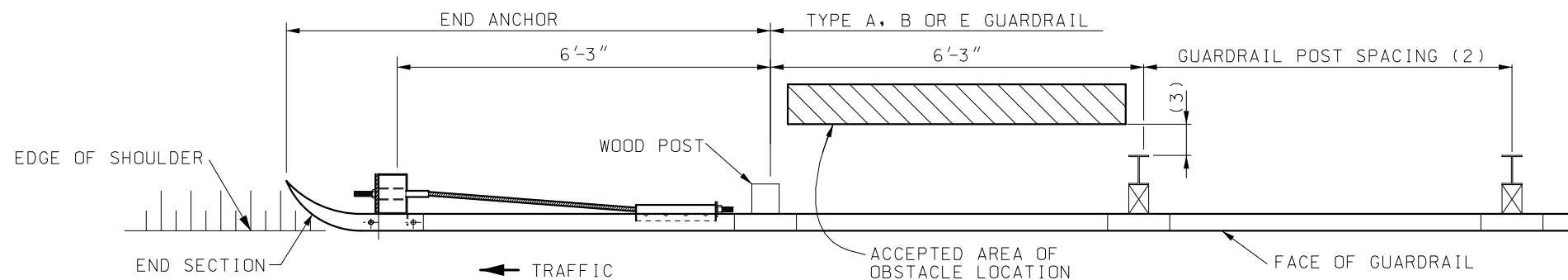


END VIEW

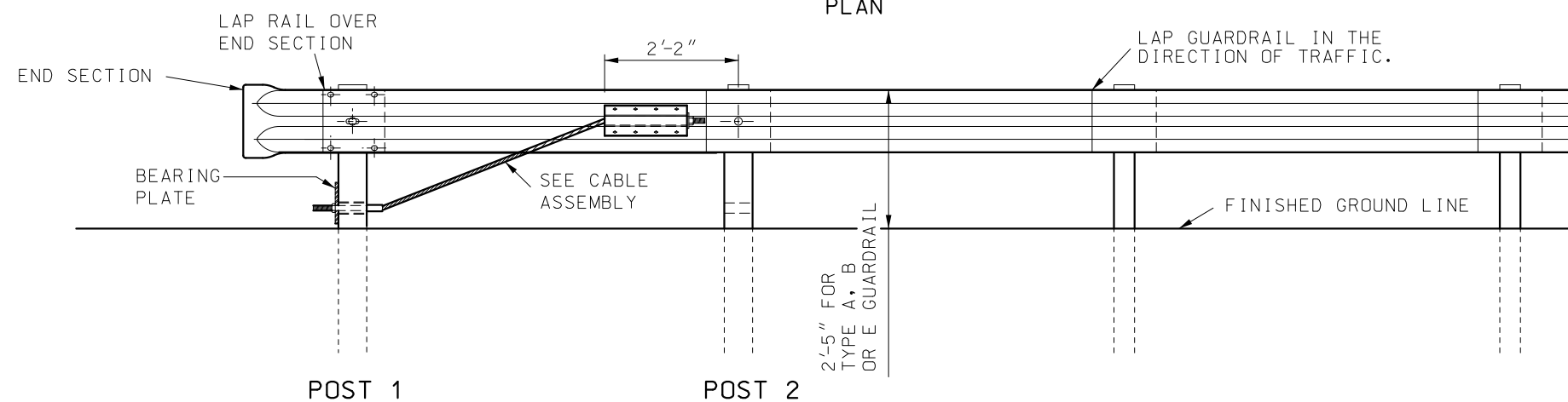


DETAIL B  
(CABLE ASSEMBLY)

- (1) STUD, THREADED ENTIRE LENGTH.
- (2) 6'-3" SPACING FOR TYPE A OR B GUARDRAIL; 3'-1 1/2" SPACING FOR TYPE E GUARDRAIL.
- (3) 27" MINIMUM BUT LESS THAN 4' FOR TYPE E GUARDRAIL; 4' MINIMUM FOR TYPE A GUARDRAIL.



PLAN

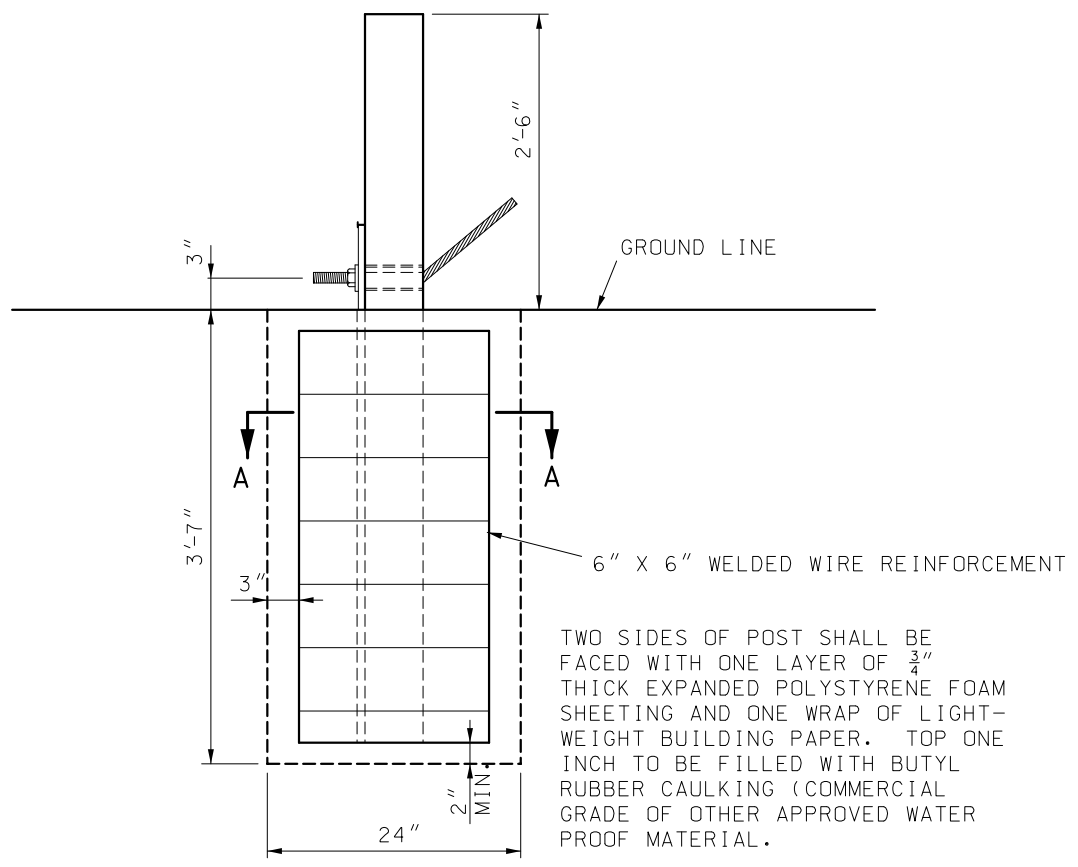


ELEVATION  
END ANCHOR

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>GUARDRAIL</b> TERMINAL ANCHOR ENDS	
	DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021	SHEET NO. <b>606.30L</b> 2 OF 7

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

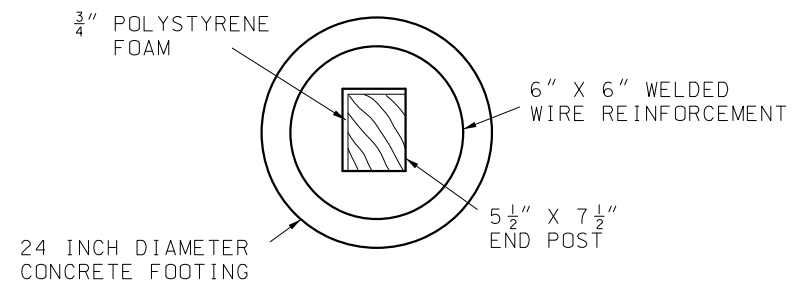
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



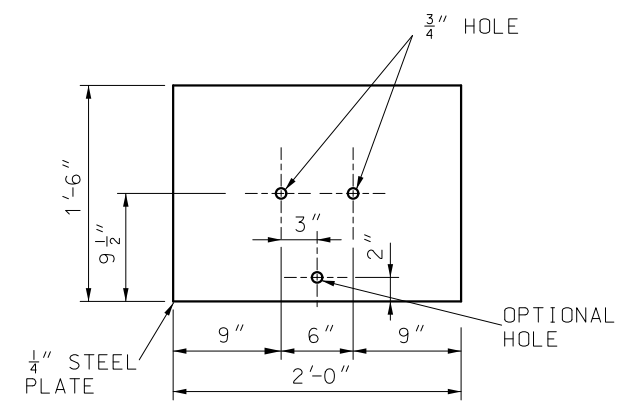
POST 1

**CONCRETE FOUNDATION FOR END ANCHORS**

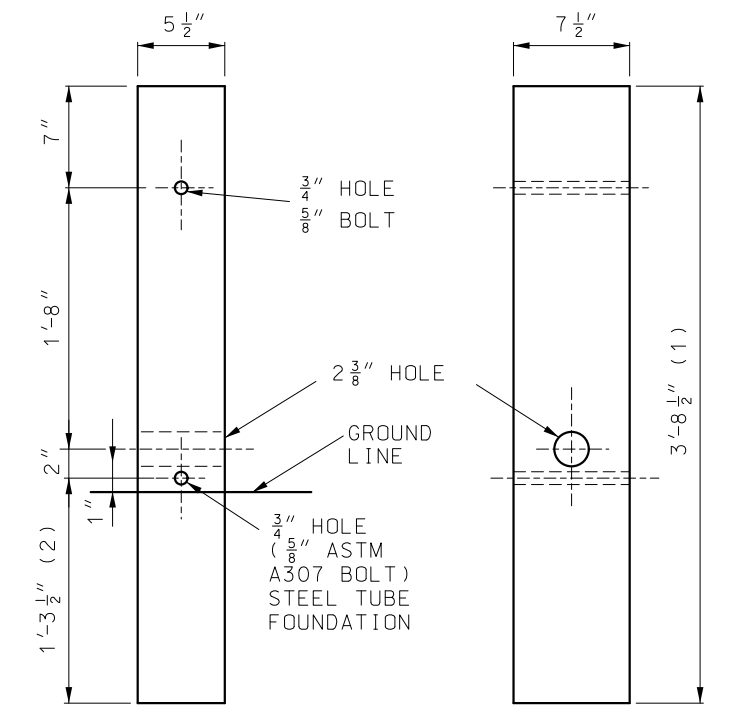
TWO SIDES OF POST SHALL BE FACED WITH ONE LAYER OF  $\frac{3}{4}$ " THICK EXPANDED POLYSTYRENE FOAM SHEETING AND ONE WRAP OF LIGHT-WEIGHT BUILDING PAPER. TOP ONE INCH TO BE FILLED WITH BUTYL RUBBER CAULKING (COMMERCIAL GRADE OF OTHER APPROVED WATER PROOF MATERIAL).



**SECTION A-A  
EXPANDED POLYSTYRENE FOAM  
INSTALLATION DETAIL**



**SOIL PLATE**

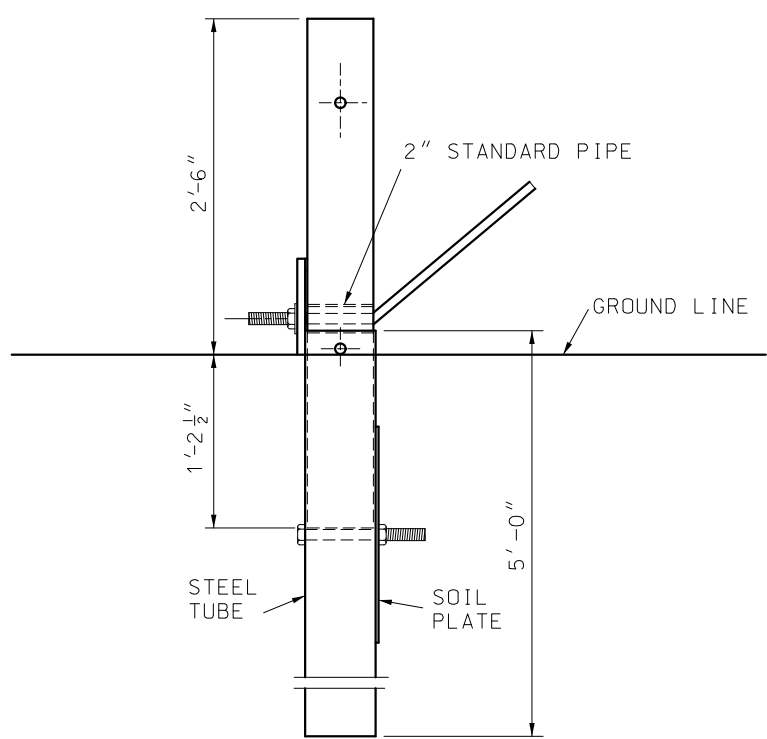


FRONT VIEW

SIDE VIEW

**WOOD BREAKAWAY POST  
SEE SECTION 1050**

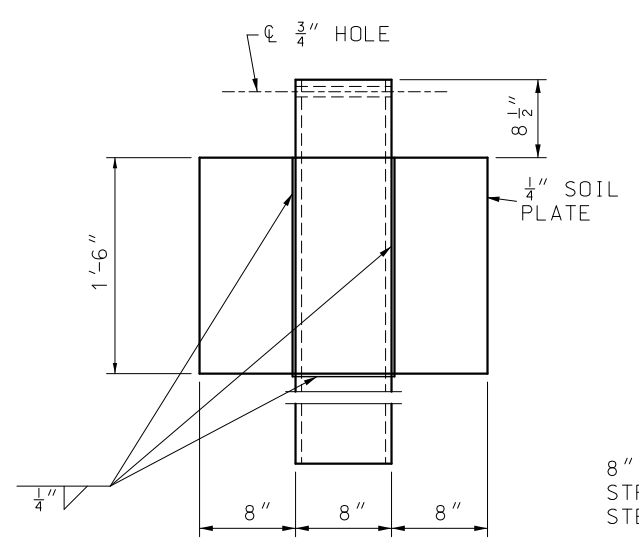
- (1) 5'-11 1/2" FOR CONCRETE FOUNDATION ALTERNATE.
- (2) 3'-8 1/2" FOR CONCRETE FOUNDATION ALTERNATE.



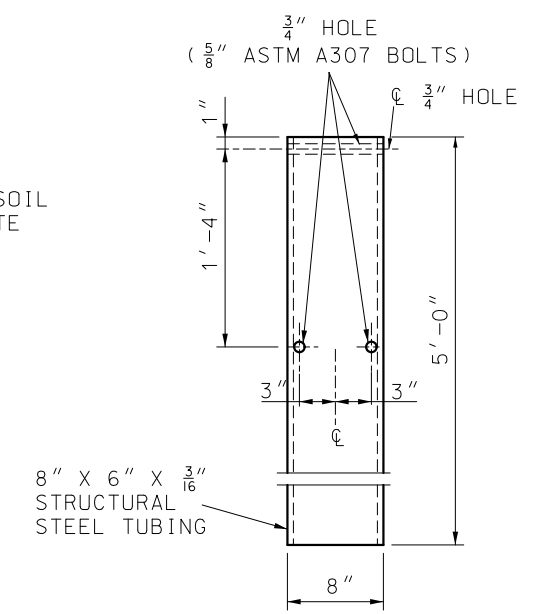
POST 1

**STEEL TUBE FOUNDATION FOR END ANCHORS**

BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1080 OF THE MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.



**SHOP WELDED  
SOIL PLATE CONNECTION**



**STEEL TUBE**

**GENERAL NOTES:**

THE CONTRACTOR HAS THE OPTION TO INSTALL WOOD POST 1 AND 2 IN STEEL TUBE OR CONCRETE FOUNDATION.

TRIMMING OF WOOD POST MAY BE NECESSARY FOR STEEL TUBE FOUNDATION.

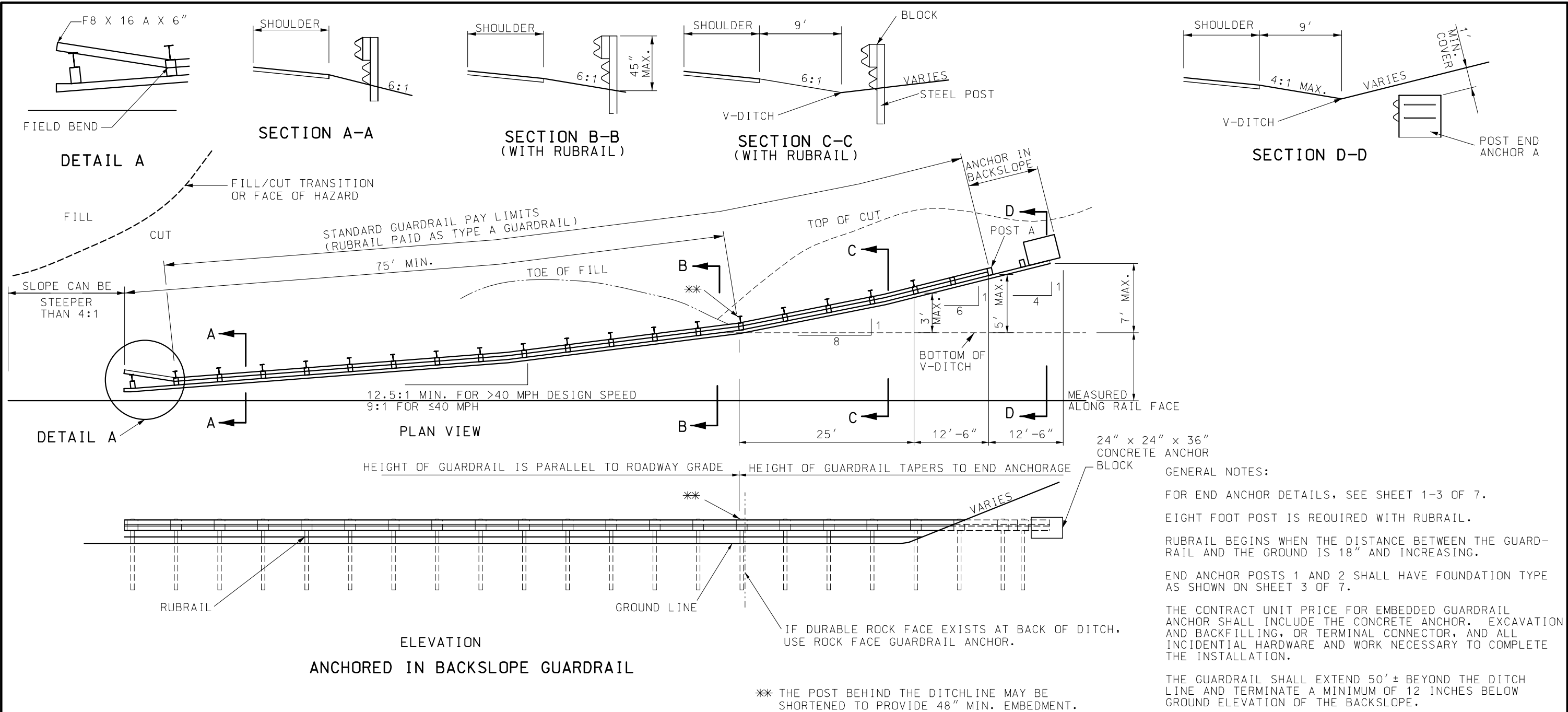
STEEL TUBE FOUNDATIONS SHALL BE DRILLED AND BACK-FILLED WITH A SUITABLE MATERIAL WHEN THE SOIL PLATE IS BOLTED, AS SHOWN, TO THE STEEL TUBE. STEEL TUBE FOUNDATION MAY BE DRIVEN WHEN THE SOIL PLATE IS WELDED, AS SHOWN, TO THE STEEL TUBE.

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

STATE OF MISSOURI  
TRAVIS D. KOESTNER  
NUMBER PE-30042  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**GUARDRAIL  
TERMINAL ANCHOR ENDS**

DATE EFFECTIVE: 04/01/2021	606.30L	SHEET NO. 3 OF 7
DATE PREPARED: 1/27/2021		



**ANCHORED IN BACKSLOPE GUARDRAIL**

**GENERAL NOTES:**

FOR END ANCHOR DETAILS, SEE SHEET 1-3 OF 7.

EIGHT FOOT POST IS REQUIRED WITH RUBRAIL.

RUBRAIL BEGINS WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.

END ANCHOR POSTS 1 AND 2 SHALL HAVE FOUNDATION TYPE AS SHOWN ON SHEET 3 OF 7.

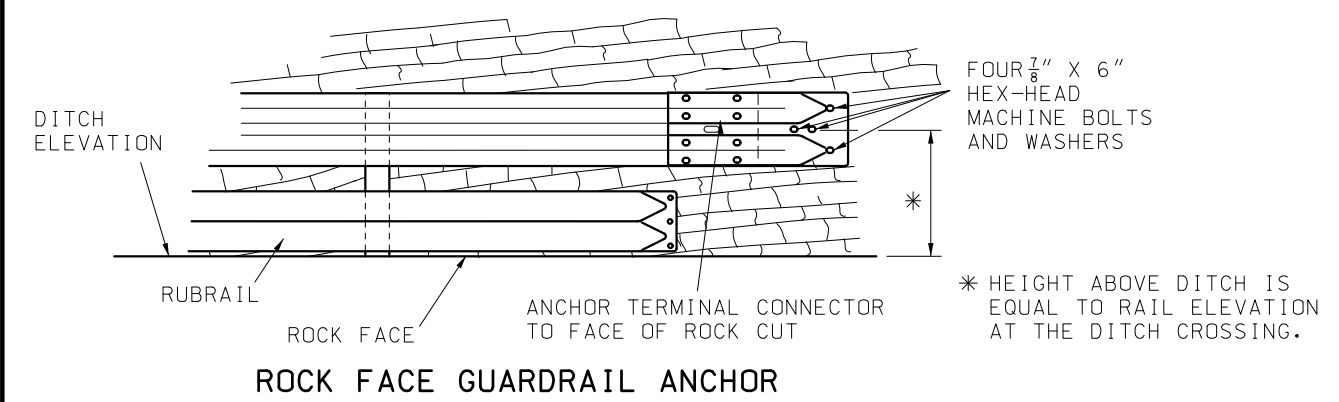
THE CONTRACT UNIT PRICE FOR EMBEDDED GUARDRAIL ANCHOR SHALL INCLUDE THE CONCRETE ANCHOR, EXCAVATION AND BACKFILLING, OR TERMINAL CONNECTOR, AND ALL INCIDENTAL HARDWARE AND WORK NECESSARY TO COMPLETE THE INSTALLATION.

THE GUARDRAIL SHALL EXTEND 50' ± BEYOND THE DITCH LINE AND TERMINATE A MINIMUM OF 12 INCHES BELOW GROUND ELEVATION OF THE BACKSLOPE.


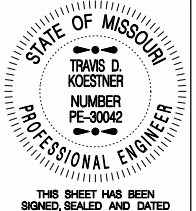
BLOCKOUTS WILL NOT BE REQUIRED FOR ANY POST WHICH WILL BE COMPLETELY BELOW GROUND. THE ALIGNMENT OF SUCH POSTS SHALL BE APPROVED BY THE ENGINEER.

SEE OTHER DRAWINGS AND STANDARD SPECIFICATIONS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS NOT SHOWN.

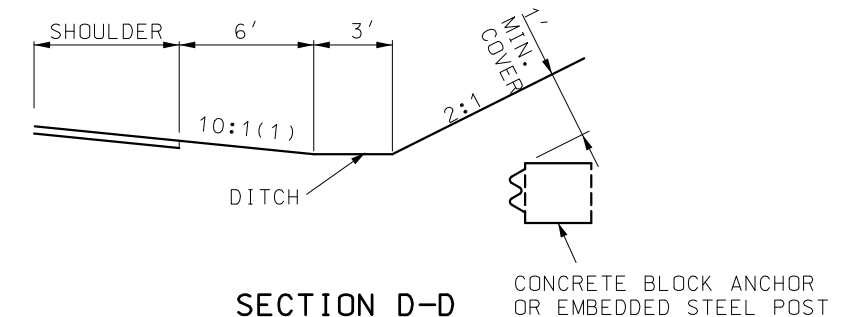
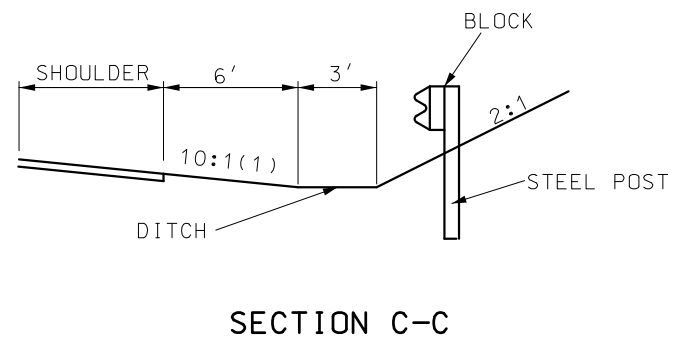
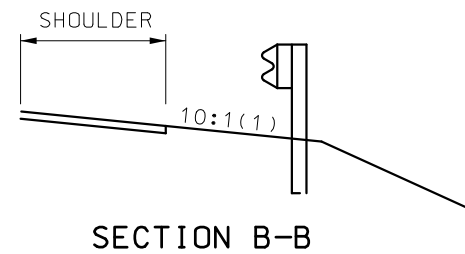
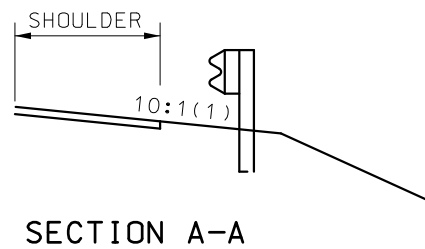
COST OF SHAPING ROCK FACE FOR PLACING OF TERMINAL CONNECTOR, DRILLING HOLES, FURNISHING AND PLACING BOLTS, WASHERS, CAULKING, ANCHORS AND END SHOE TO BE INCLUDED IN THE PRICE OF GUARDRAIL ANCHOR, ROCK FACE.



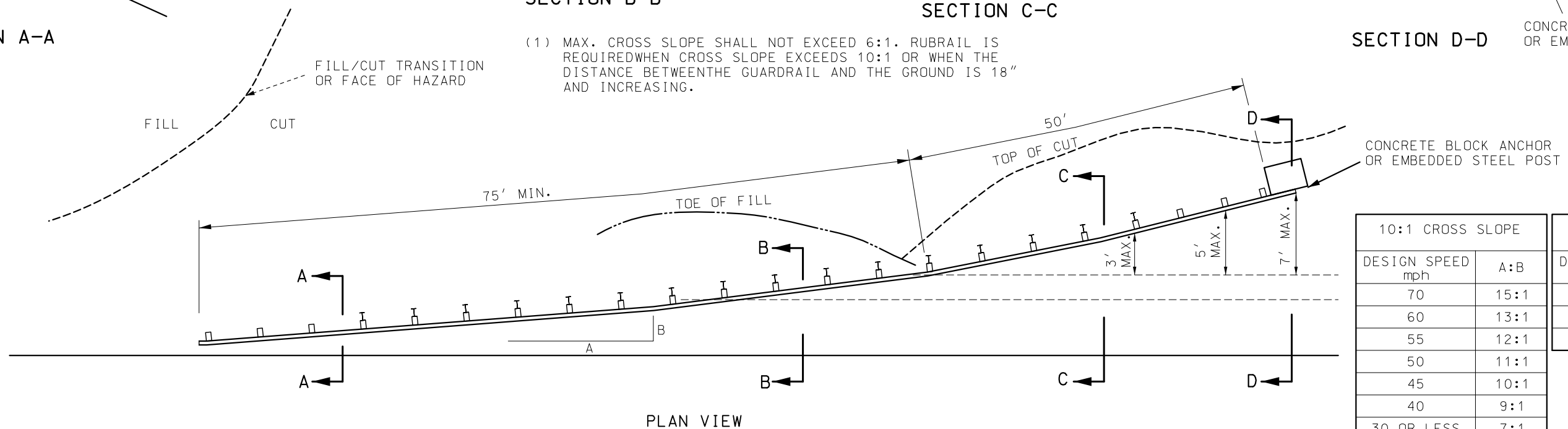
**ROCK FACE GUARDRAIL ANCHOR**

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>GUARDRAIL</b> TERMINAL ENDS EMBEDDED AND ROCK FACE (V-DITCH STEEPER THAN 10:1, 4:1 MAX. FORESLOPE)</p>
<p>DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021</p>	<p>606.30L</p>
<p>SHEET NO. 4 OF 7</p>	

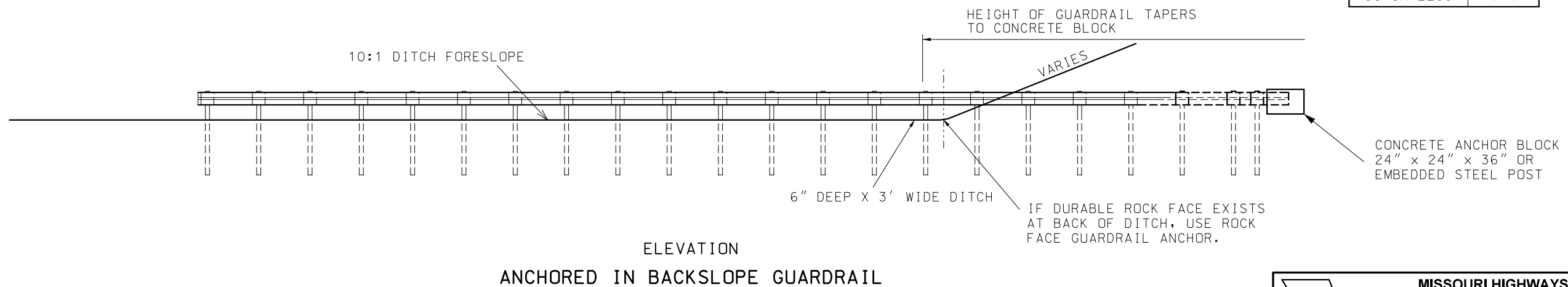
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



(1) MAX. CROSS SLOPE SHALL NOT EXCEED 6:1. RUBRAIL IS REQUIRED WHEN CROSS SLOPE EXCEEDS 10:1 OR WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.



10:1 CROSS SLOPE		STEEPER THAN 10:1 CROSS SLOPE (1)	
DESIGN SPEED mph	A:B	DESIGN SPEED mph	A:B
70	15:1	45-70	12.5:1
60	13:1	40	9:1
55	12:1	30 OR LESS	7:1
50	11:1		
45	10:1		
40	9:1		
30 OR LESS	7:1		



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**GUARDRAIL  
EMBEDDED TERMINAL  
ENDS (FLAT DITCH)**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 04/01/2021  
DATE PREPARED: 1/27/2021

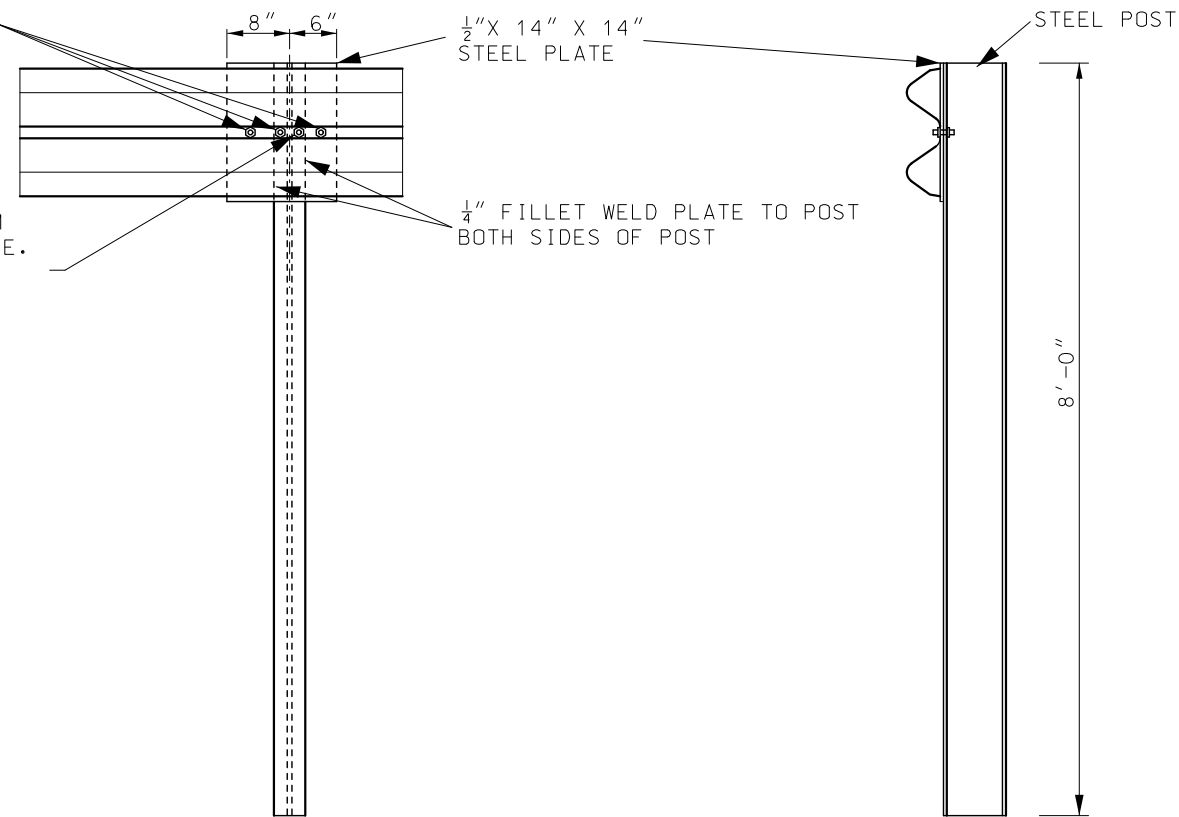
**606.30L**

SHEET NO.  
**5 OF 7**

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

3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH 7/8" Ø HEX HEAD BOLTS 1 7/16" LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

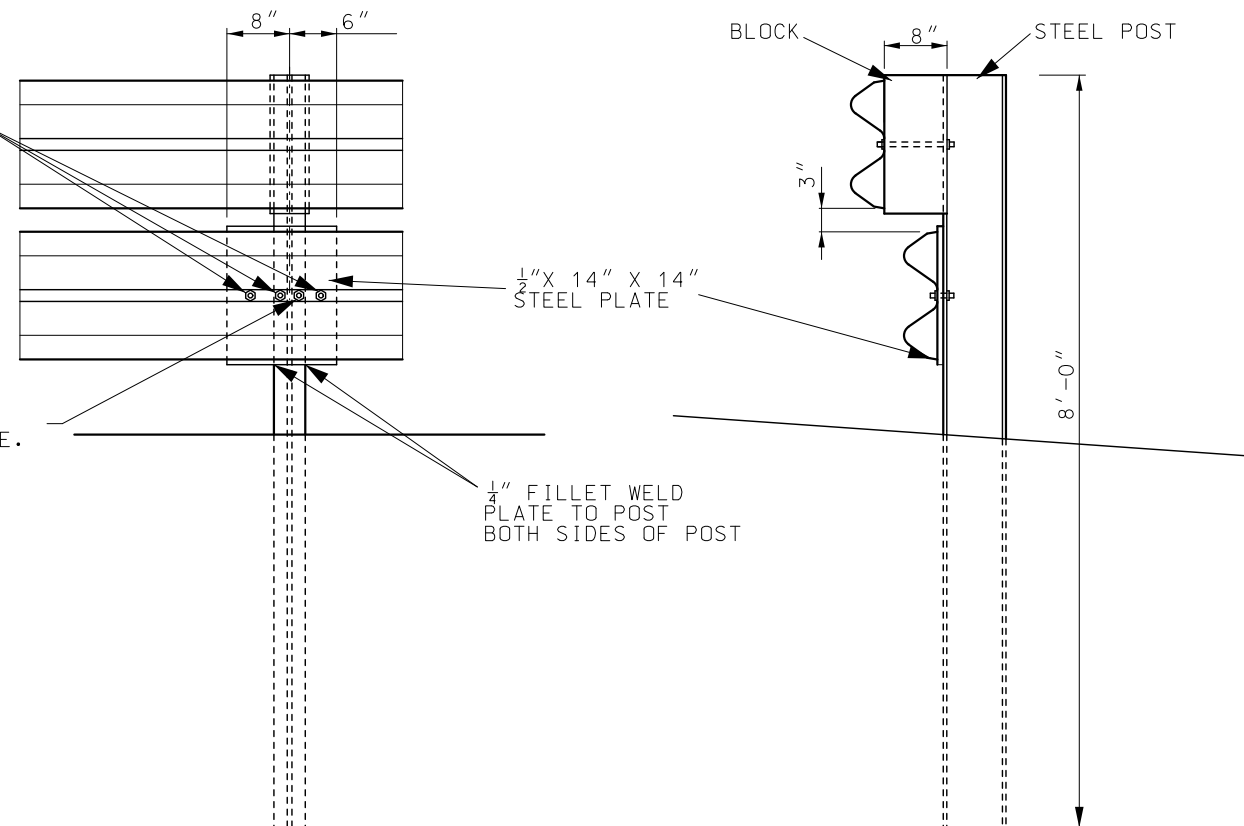
1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH 7/8" Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.




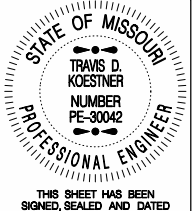
EMBEDDED STEEL POST

3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH 7/8" Ø HEX HEAD BOLTS 1 7/16" LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH 7/8" Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.



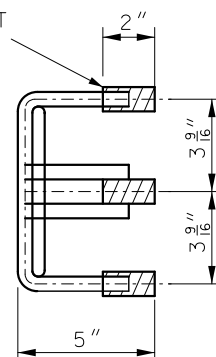
SPECIAL RUBRAIL TO POST CONNECTION AT POST A

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>GUARDRAIL</b> <b>EMBEDDED ANCHOR TERMINAL ENDS</b> <b>(STEEL POST OPTION)</b>
DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021	SHEET NO. <b>606.30L</b> <b>6 OF 7</b>

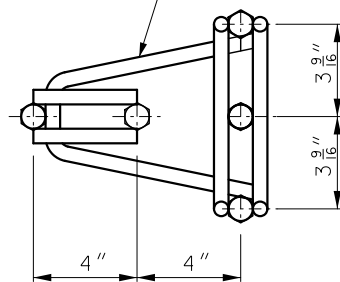
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

THREADED INSERTS FOR  $\frac{15}{16}$ " X 2" GALVANIZED HEX HEAD CAP SCREWS. CAP SCREWS TO BE THREADED A MINIMUM  $1\frac{7}{8}$ ". INSERTS THREADED MINIMUM OF  $1\frac{3}{4}$ ".

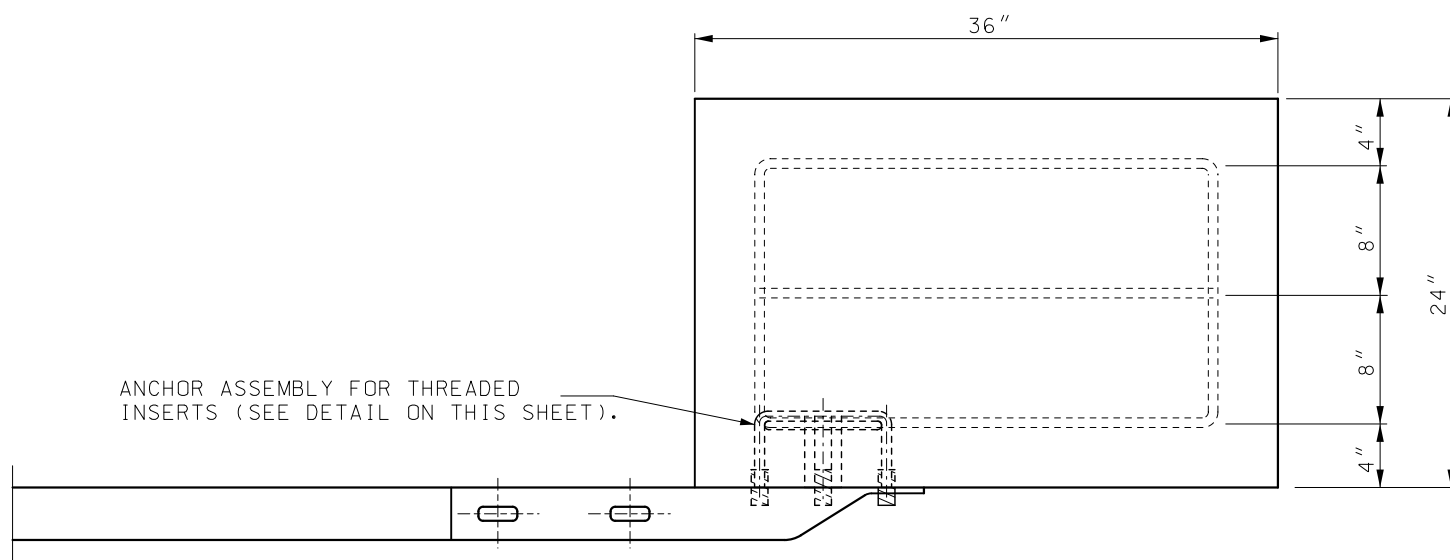
END OF INSERT TO BE CLOSED



$\frac{3}{16}$ " Ø BARS TO BE WELDED TO INSERTS

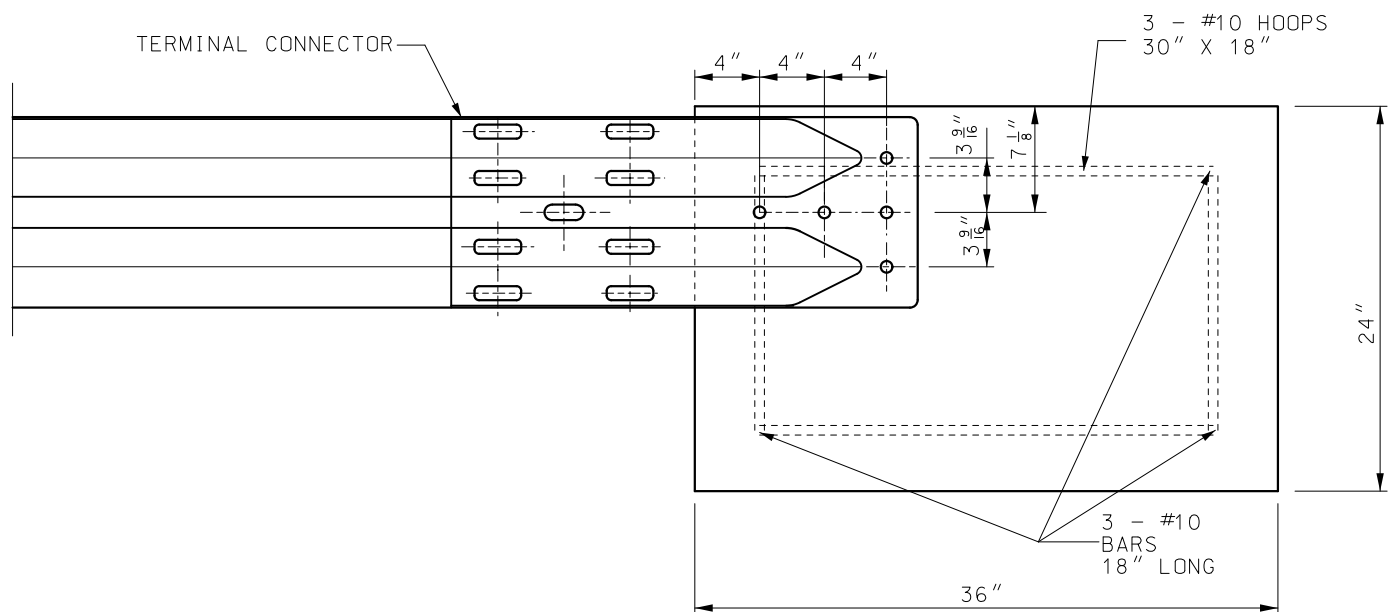


CONCRETE BLOCK ANCHOR ANCHOR ASSEMBLY

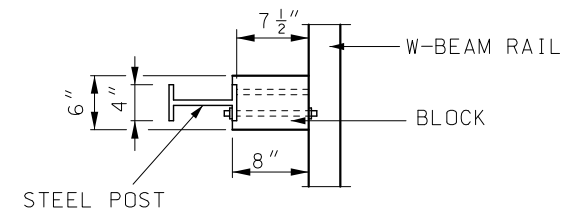


ANCHOR ASSEMBLY FOR THREADED INSERTS (SEE DETAIL ON THIS SHEET).

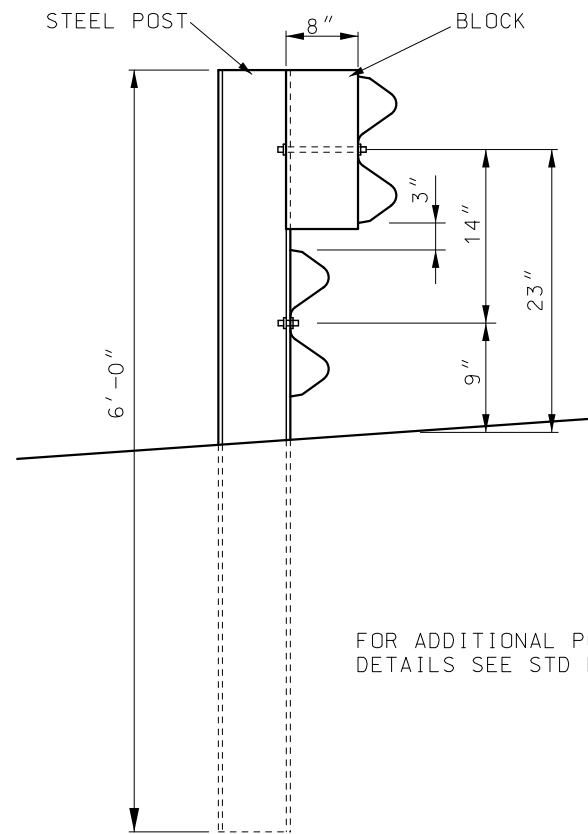
TOP VIEW



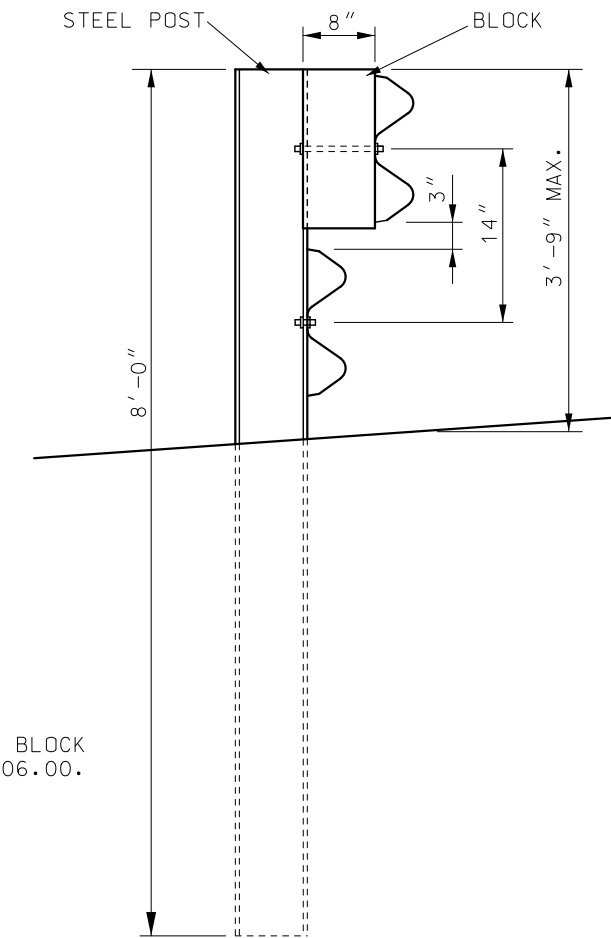
ELEVATION CONCRETE BLOCK ANCHOR (24" X 24" X 36")



PLAN



ELEVATION OF 6' POST



ELEVATION 8' POST

FOR ADDITIONAL POST AND BLOCK DETAILS SEE STD PLANS 606.00.

STEEL POST AND BLOCK DETAIL

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

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER

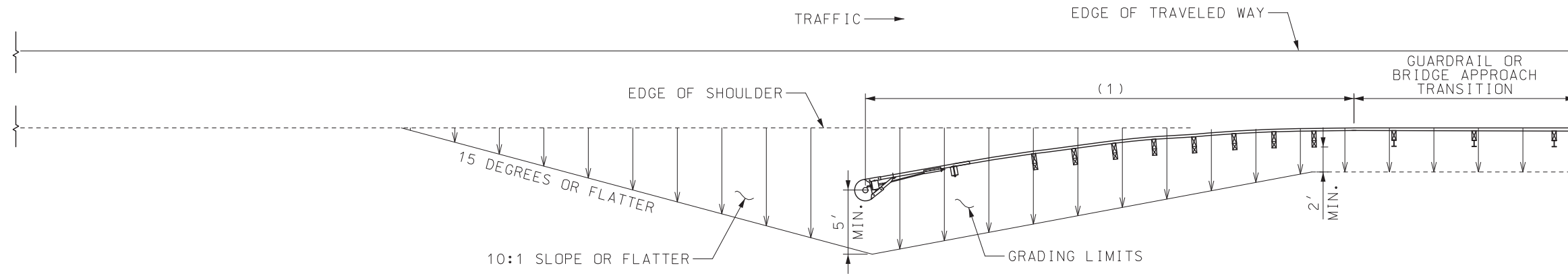
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

GUARDRAIL EMBEDDED TERMINAL ENDS GENERAL DETAILS

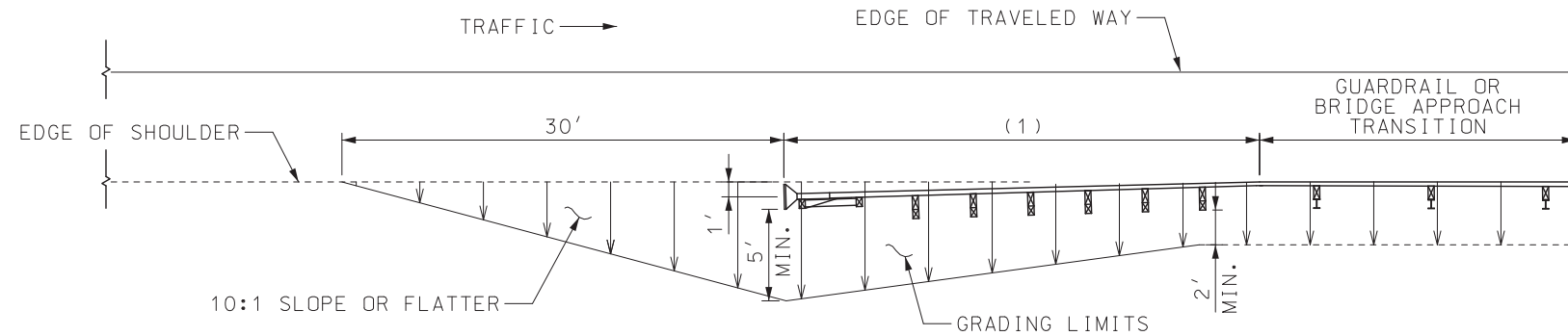
DATE EFFECTIVE: 04/01/2021  
 DATE PREPARED: 1/27/2021

606.30L

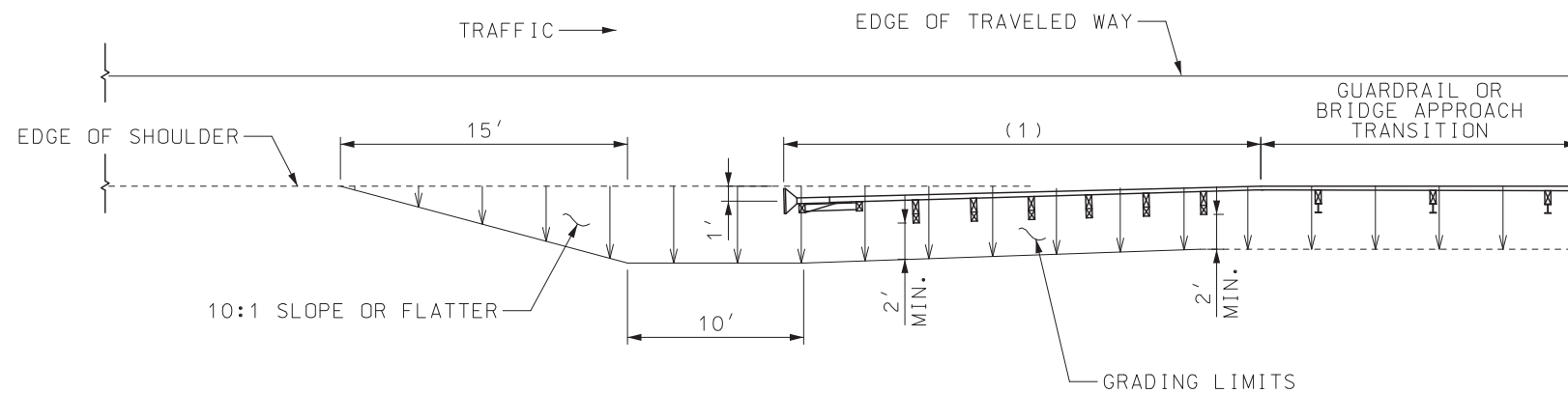
SHEET NO. 7 OF 7



GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS



ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS


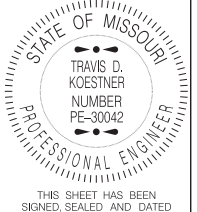
(1) APPROVED CRASHWORTHY END TERMINAL

GENERAL NOTES:

STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

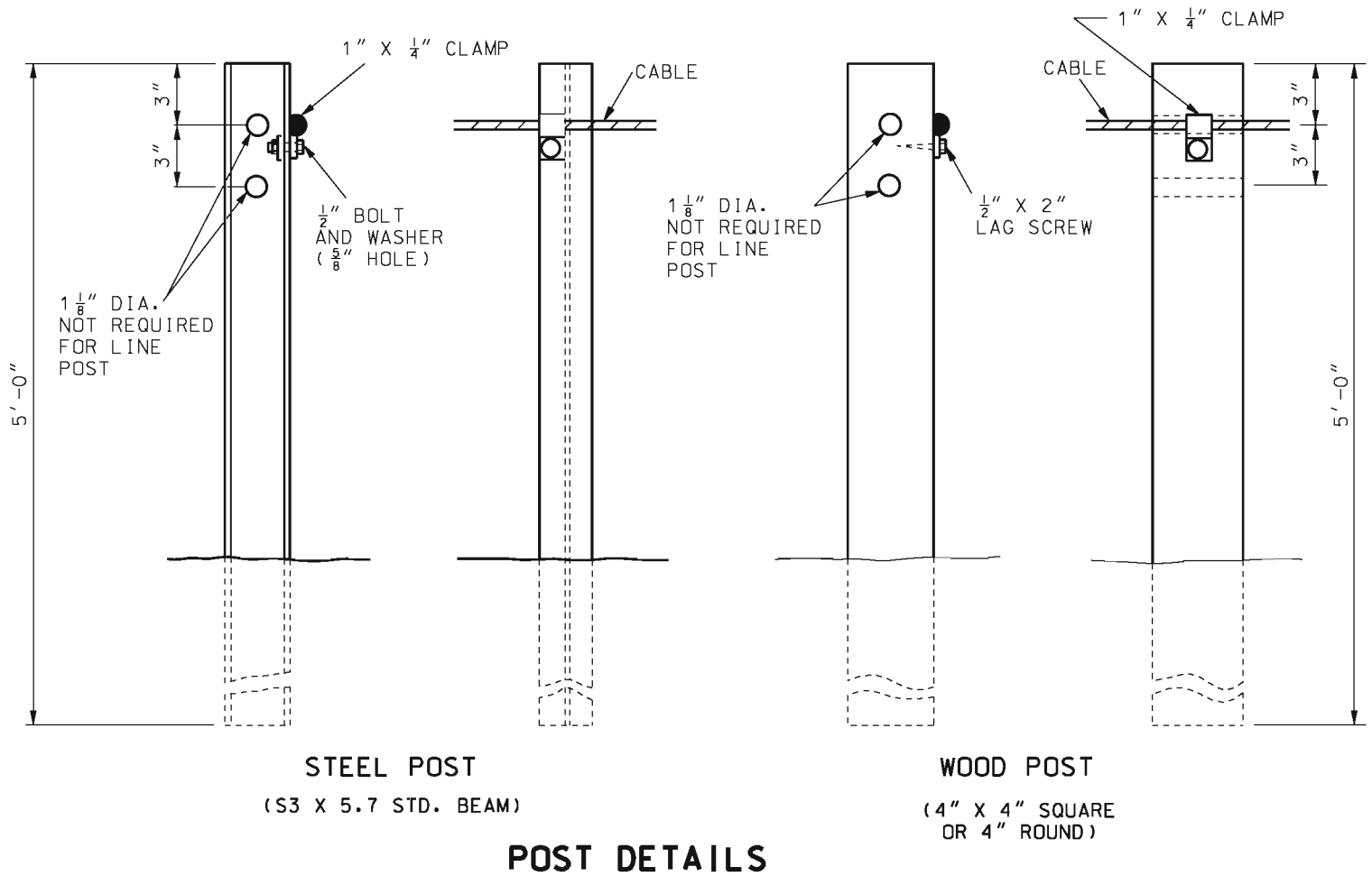
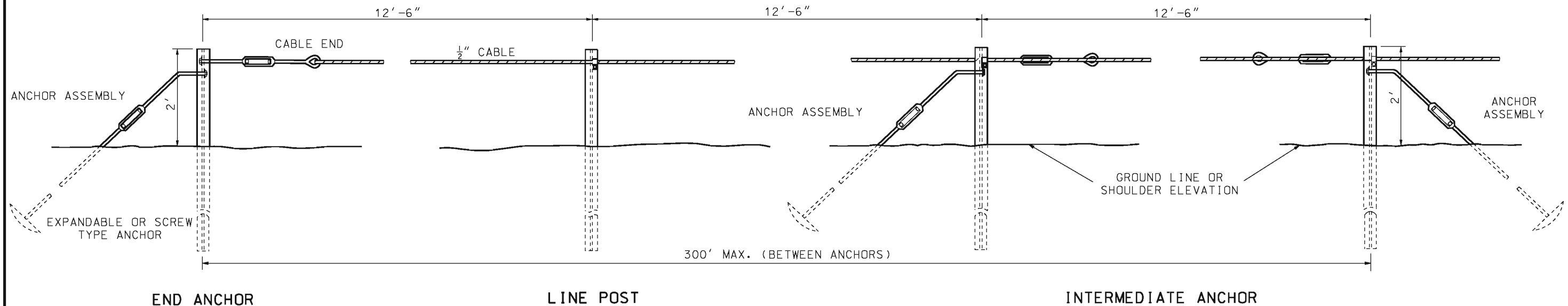
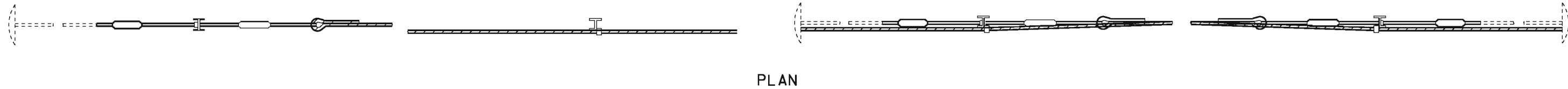
THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE APPROVED CRASHWORTHY END TERMINAL.

END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED.

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		<b>CRASHWORTHY END TERMINALS TYPE A GRADING LIMITS</b>
DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	<b>606.31B</b>	SHEET NO. <b>1 OF 1</b>

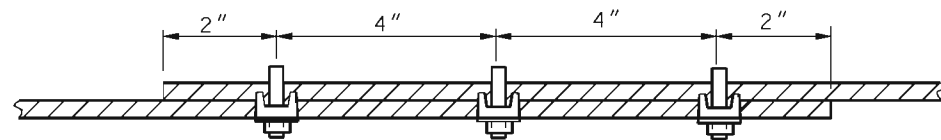
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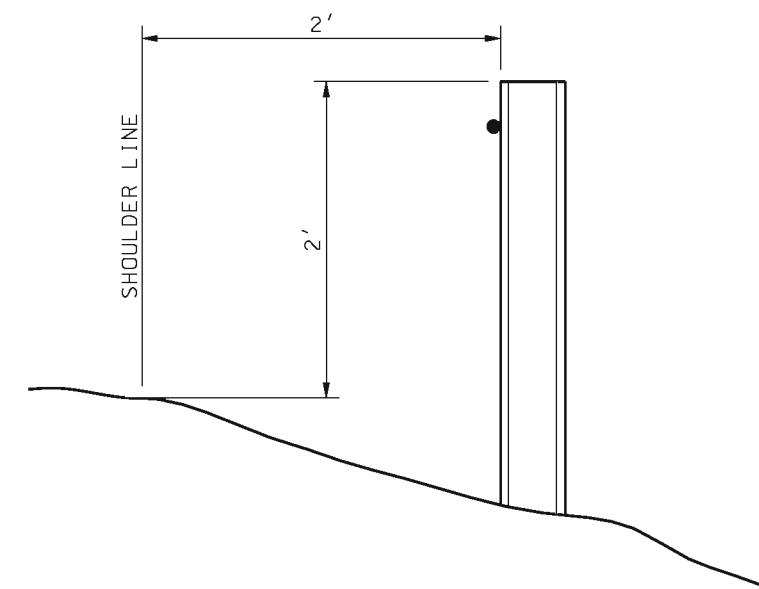
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>ONE-STRAND ACCESS RESTRAINT CABLE</b>
DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/21/2009	<b>606.40D</b>	SHEET NO. 1 OF 2

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

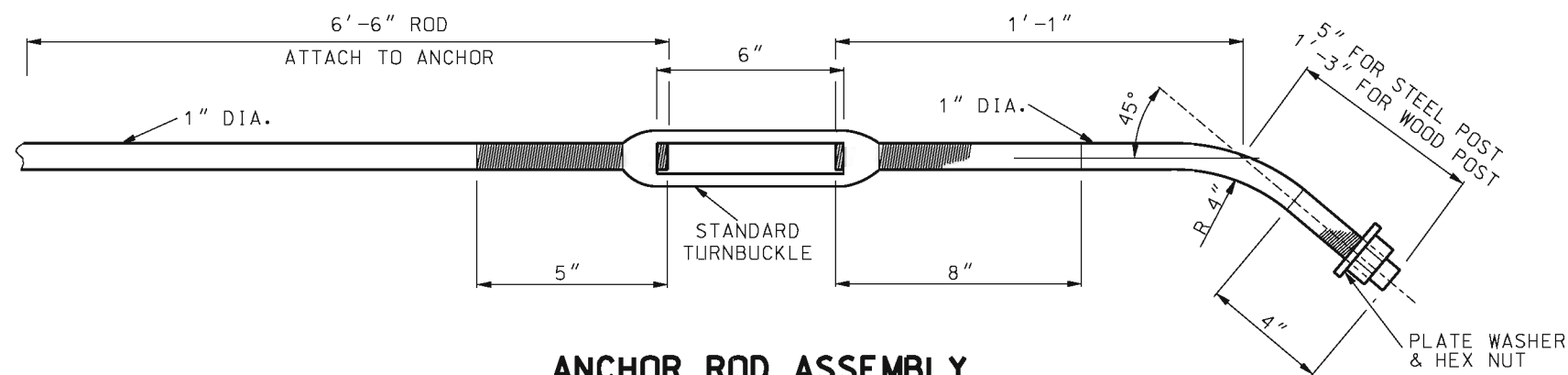


ACCESS-RESTRAINT CABLE GREATER THAN 300 FEET IN LENGTH REQUIRES AN INTER-MEDIATE ANCHOR AS SHOWN.

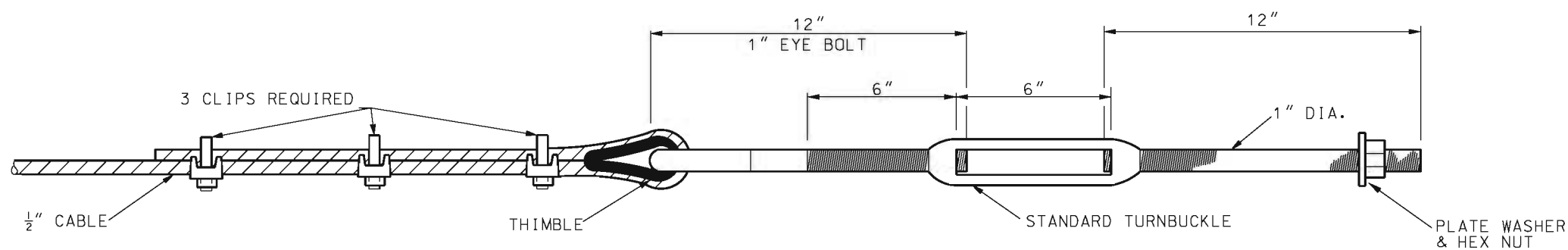
**SPLICE DETAIL**



**TYPICAL LOCATION SHOULDER INSTALLATION**



**ANCHOR ROD ASSEMBLY**



**CABLE END**

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
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STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
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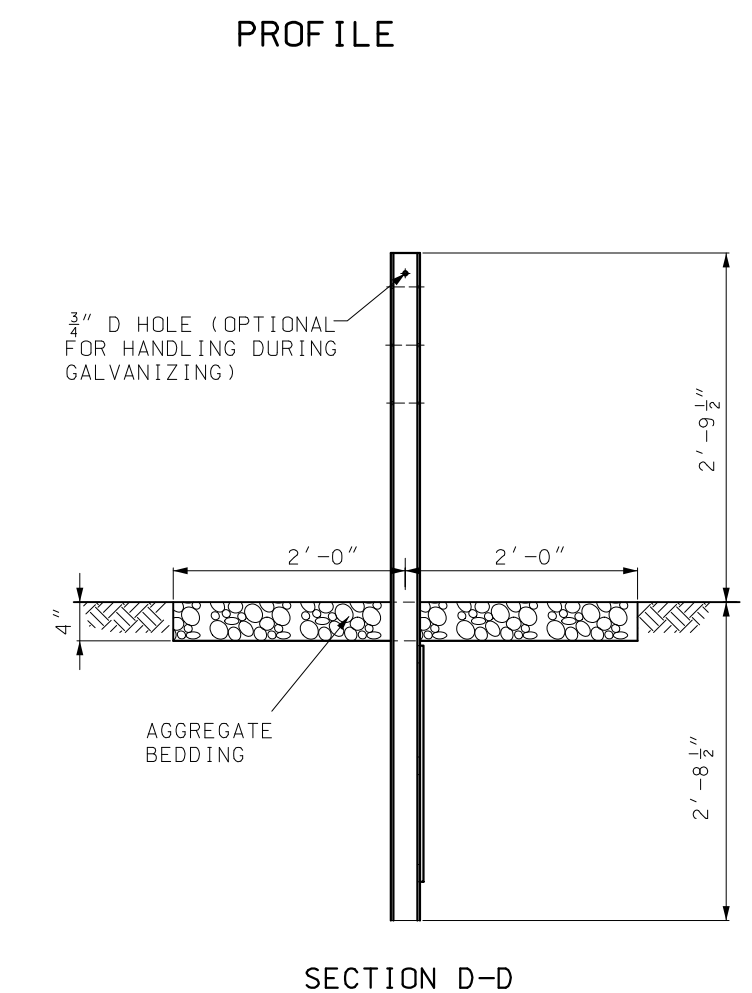
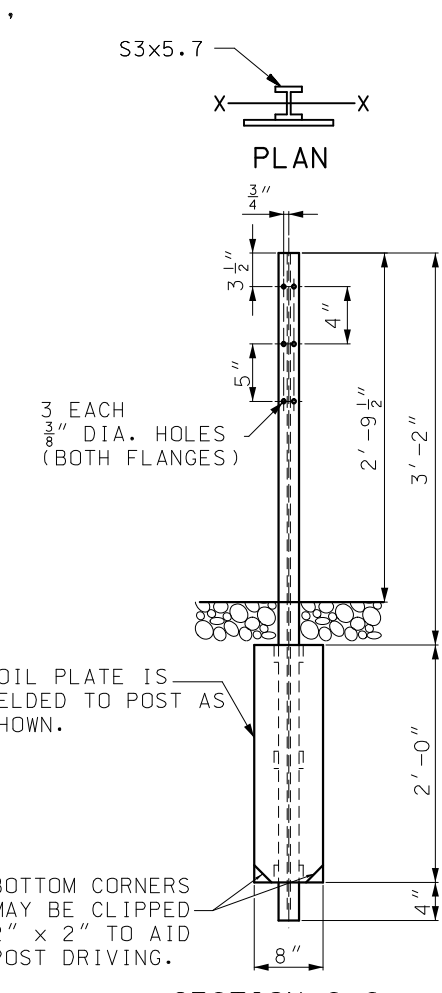
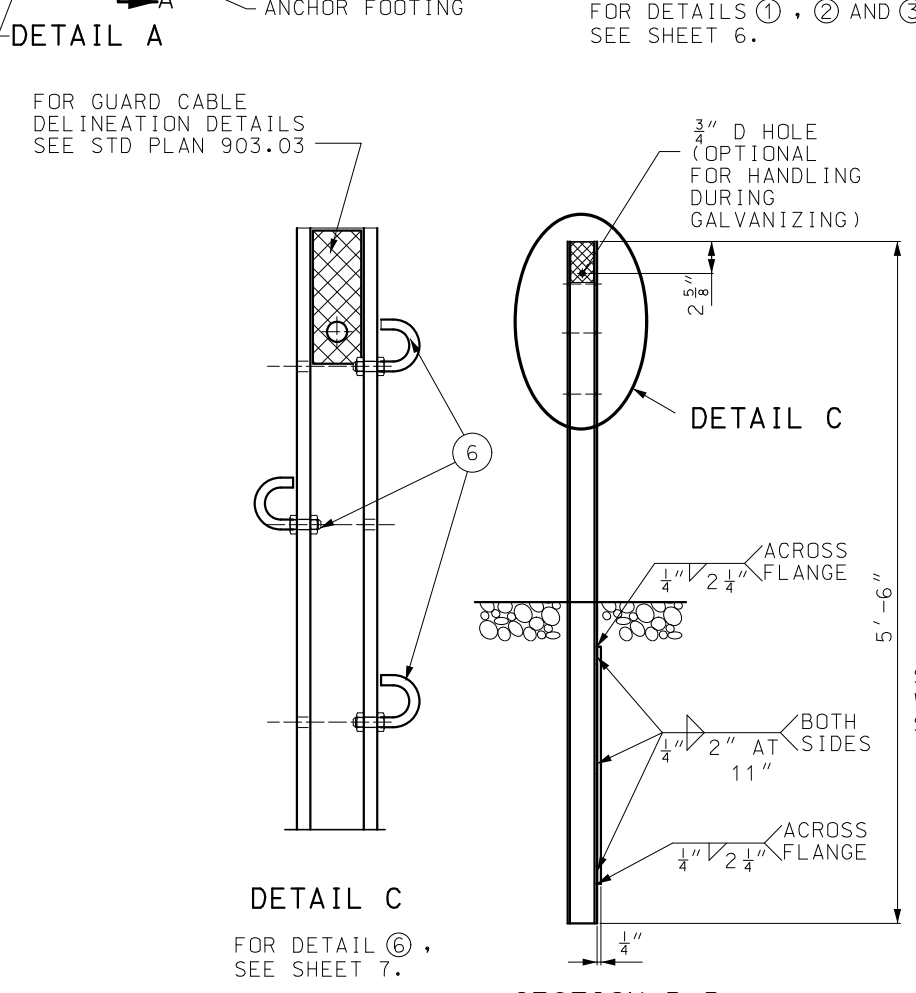
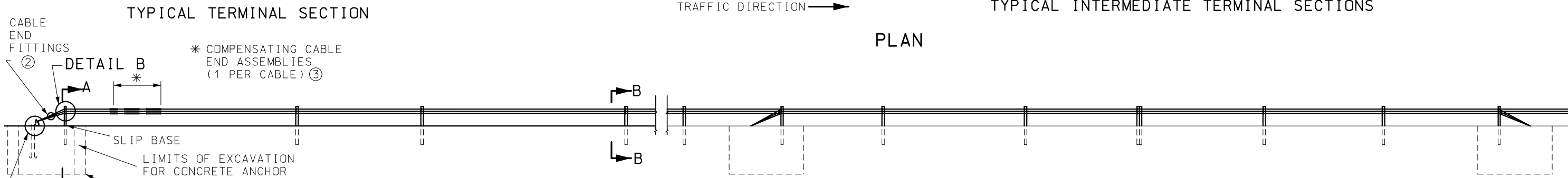
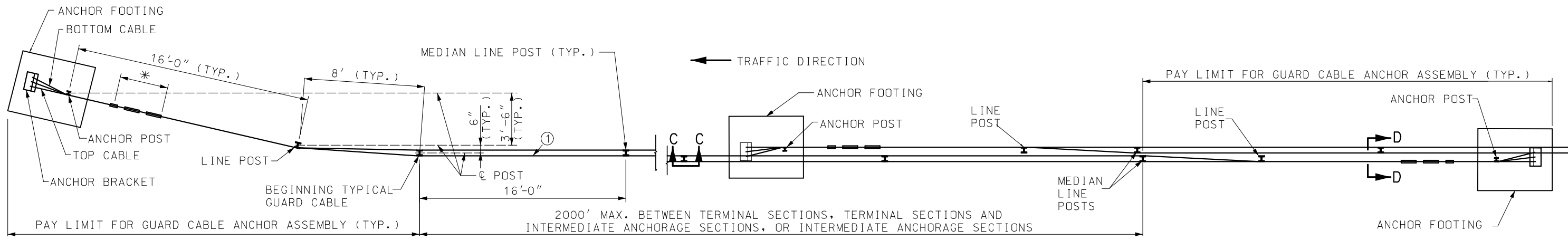
**ONE-STRAND ACCESS RESTRAINT CABLE**

DATE EFFECTIVE: 07/01/2004  
 DATE PREPARED: 8/21/2009

**606.40D**

SHEET NO.  
 2 OF 2

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



**GENERAL NOTES:**

IN THE EVENT THE NORMAL 16' POST SPACING WOULD PLACE A POST ON A DROP INLET, THE SPACING OF THE TWO POSTS IMMEDIATELY PRECEDING THE INLET SHALL BE REDUCED SUCH THAT THE FOLLOWING POST CLEARS THE INLET. EACH SUBSEQUENT POST SHALL BE SPACED AT 16'. IN NO CASE SHALL THE SPACING EXCEED 16'.

IN THE EVENT A LONGITUDINAL MEDIAN PIPE IS ENCOUNTERED THE CABLE SHALL BE PLACED PARALLEL TO THE PIPE AT A MINIMUM OFFSET OF 12". THE OFFSET SHALL BE ACHIEVED BY A MINIMUM 16:1 TAPER ON THE UPSTREAM AND DOWNSTREAM END OF THE PIPE.

FOR SECTION A-A, AND DETAILS A AND B, SEE SHEET 5.

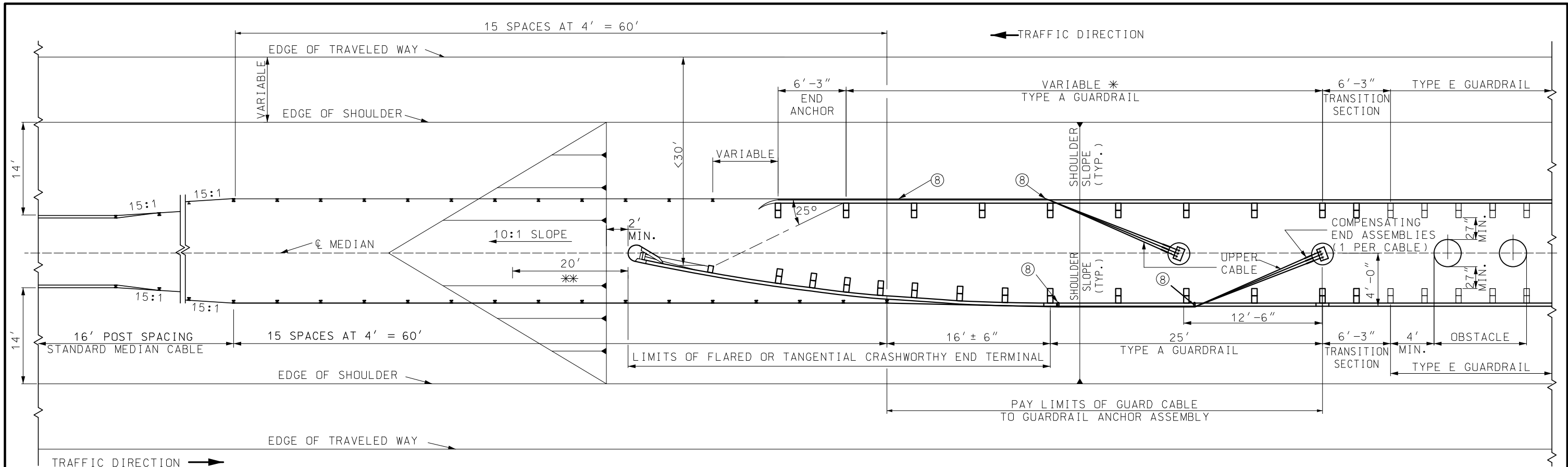
FOR GUARD CABLE DELINEATION DETAILS SEE STD PLAN 903.03.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
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STATE OF MISSOURI  
 KENNETH L. VOSS  
 NUMBER PE-2002016747  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**REPAIR ONLY:  
 LOW-TENSION  
 GUARD CABLE**

DATE EFFECTIVE: 7/1/2024	606.41N	SHEET NO. 1 OF 7
DATE PREPARED: 4/10/2024		



GUARD CABLE TO GUARDRAIL TRANSITION AT MEDIAN OBSTACLE

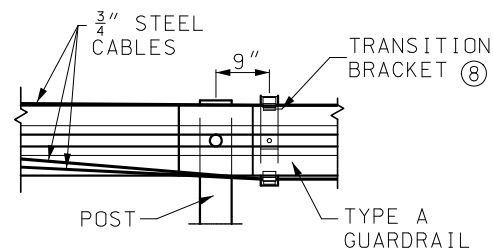
\* VARY LENGTH TO ACHIEVE 25° DEFLECTION TO SECOND POST OF FLARED OR TANGENTIAL CRASHWORTHY END TERMINAL.

GENERAL NOTES:

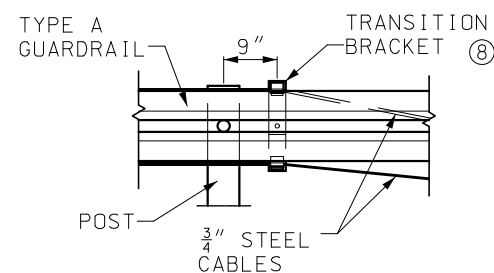
WHEN GUARD CABLE IS LOCATED ALONG THE MEDIAN CENTERLINE NEAR A BRIDGE END OR CONCRETE BARRIER, IT SHALL BE ANCHORED BEHIND THE GUARDRAIL ASSEMBLY WITH THE GUARD CABLE ANCHOR ASSEMBLY. THE GUARD CABLE ANCHOR SHALL BE PROTECTED BY THE GUARDRAIL.

THIS DRAWING DEPICTS THE ATTACHMENT OF GUARD CABLE TO GUARDRAIL. IT DOES NOT INDICATE THAT TWO RUNS OF CABLE ARE REQUIRED.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

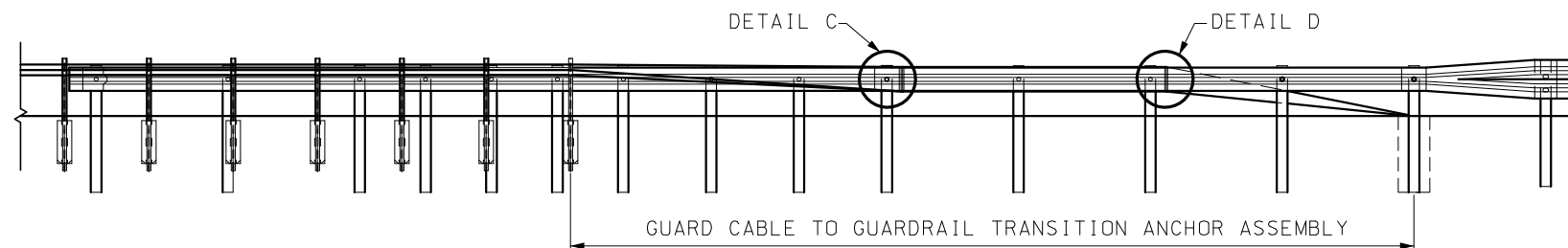


DETAIL C





DETAIL D

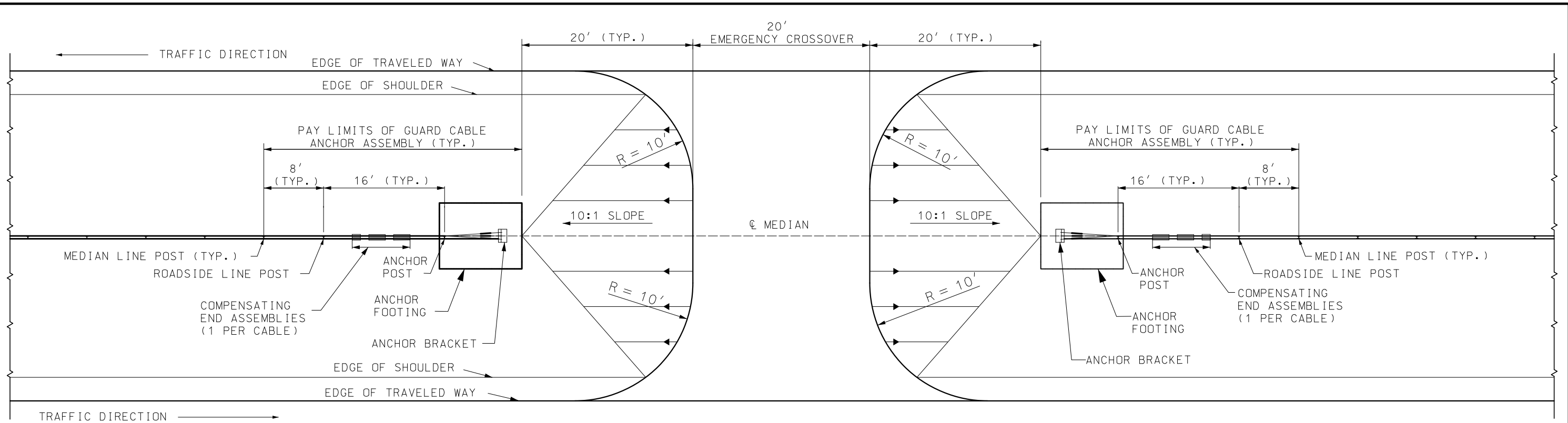
FOR DETAIL (8) SEE SHEET 7.



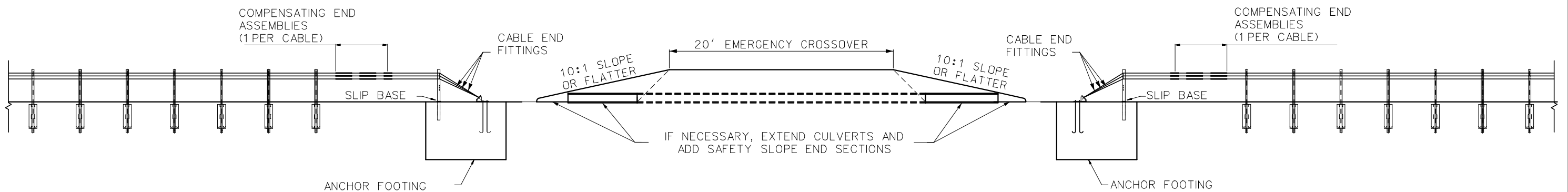
TYPICAL GUARD CABLE TO GUARDRAIL TRANSITION ELEVATION

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>REPAIR ONLY: LOW-TENSION GUARD CABLE</b>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	<b>606.41N</b>
SHEET NO. <b>2 OF 7</b>	

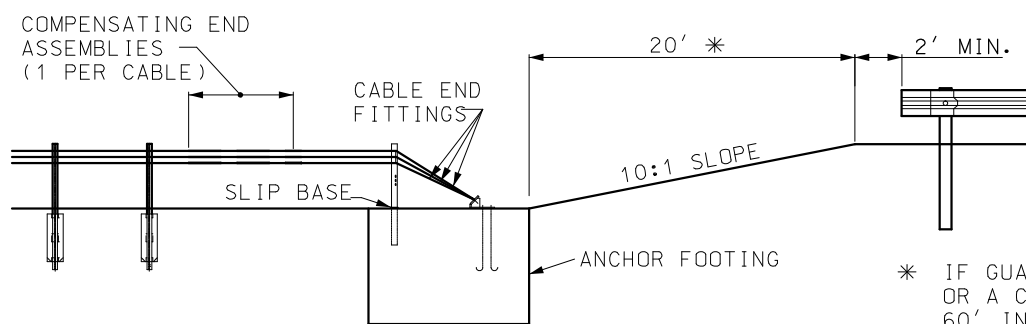




PLAN



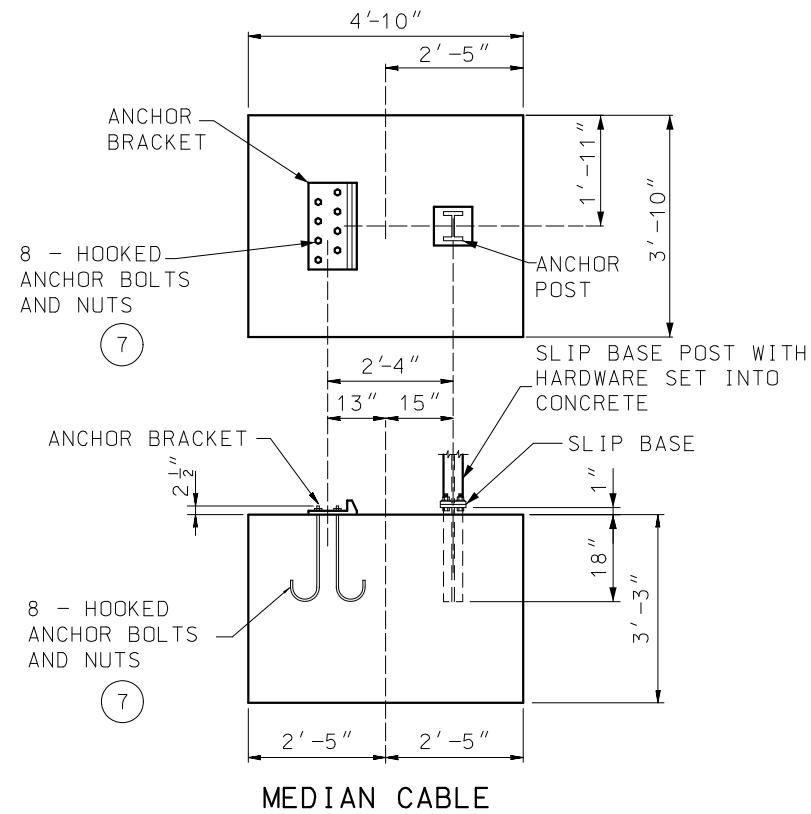
ELEVATION



PROFILE AT MEDIAN OBSTACLE WITH BULLNOSE OR IN A MEDIAN LESS THAN 60'

\* IF GUARD CABLE IS USED WITH BULLNOSE GUARDRAIL SYSTEM, OR A CRASHWORTHY END TERMINAL ON A MEDIAN LESS THAN 60' IN WIDTH, THE CABLE ANCHORAGE SHALL BE PLACED ON THE MEDIAN CENTERLINE 20' FROM THE NOSE OF THE CRASHWORTHY END TERMINAL OR BULLNOSE GUARDRAIL SYSTEM.

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	<b>REPAIR ONLY:          LOW-TENSION          GUARD CABLE          TRANSITION AT MEDIAN OPENING</b>	
	DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	SHEET NO. <b>606.41N</b> <b>4 OF 7</b>

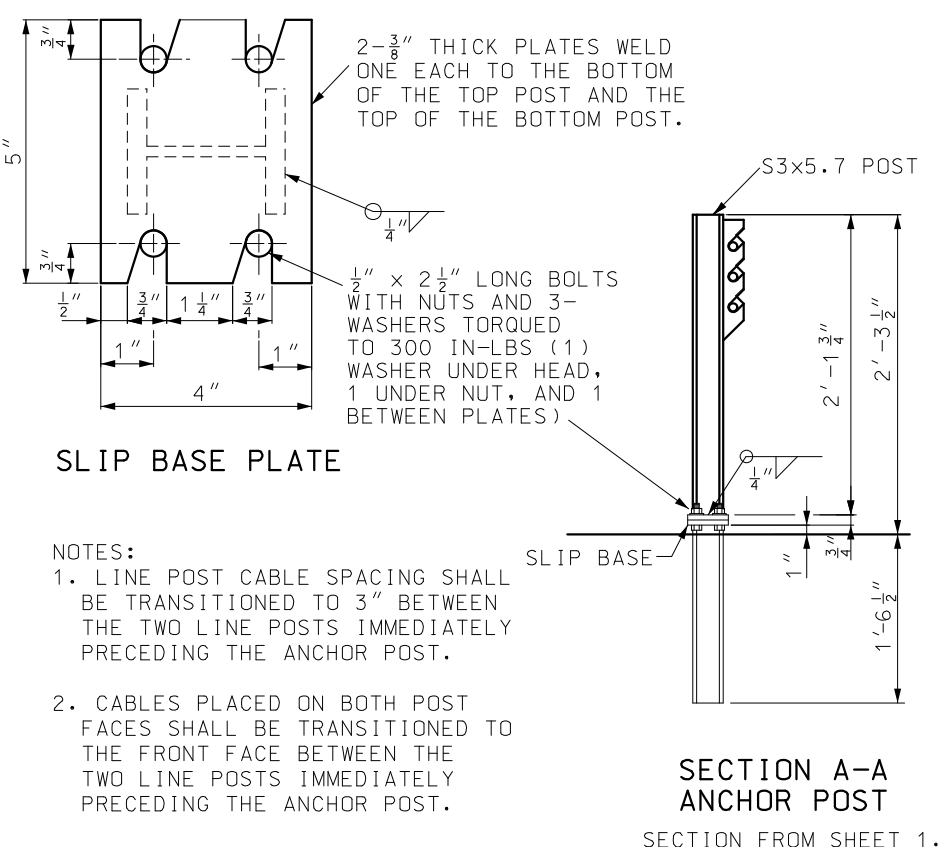


NOTES:  
 1. REINFORCEMENT CONSISTS OF NO. 3 BARS PLACED AS SHOWN.  
 2. TOP SLOPE TO MATCH ADJACENT CROSS SLOPE.

NOTES:  
 1. PLACE ANCHORS SO THE TOPS ARE LEVEL; WARP SLOPE TO FIT.  
 2. THE CONCRETE ANCHOR BLOCK DOES NOT REQUIRE REINFORCEMENT.

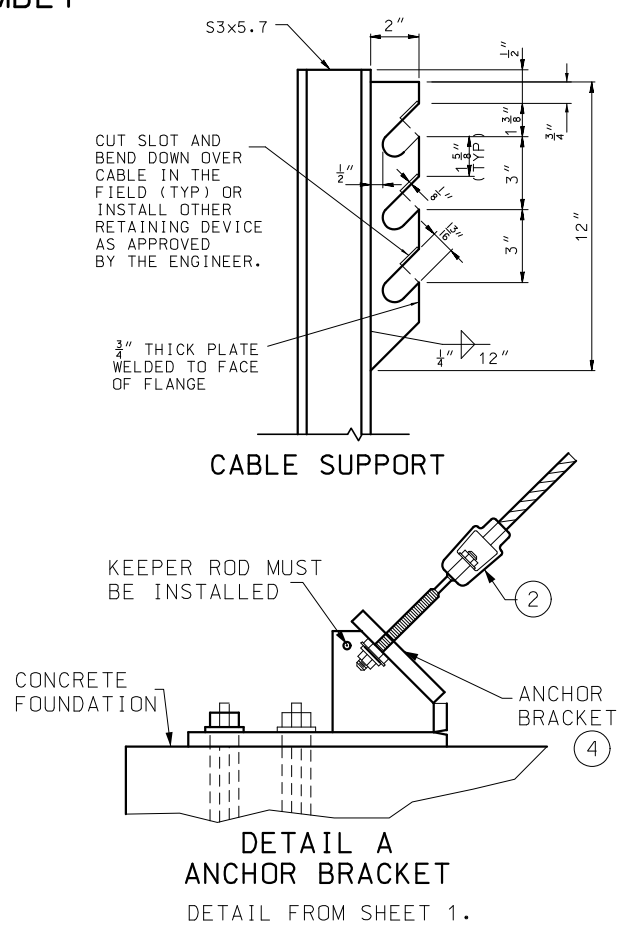
GUARD CABLE TO GUARDRAIL TRANSITION

TERMINAL ANCHOR ASSEMBLY

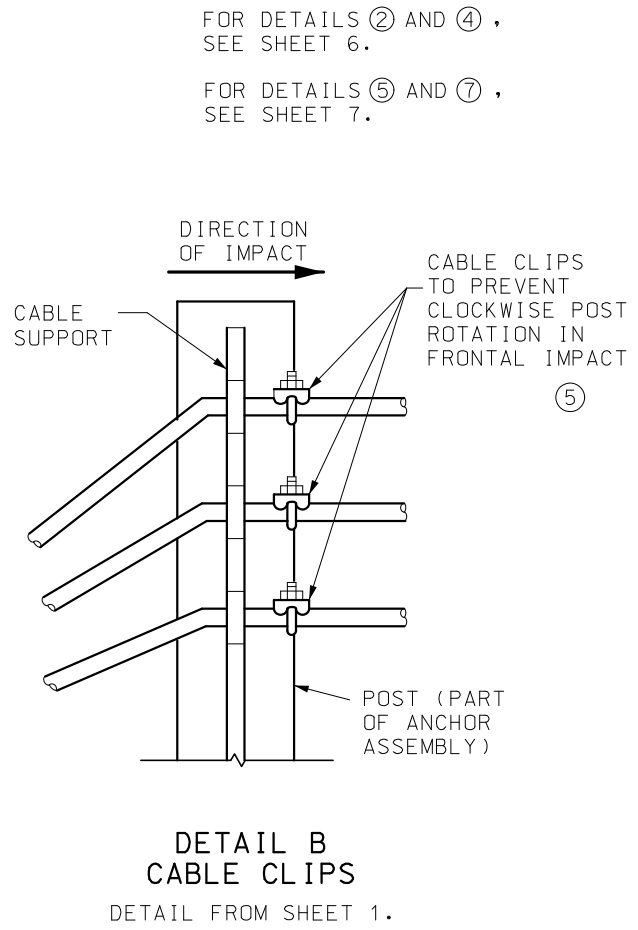


NOTES:  
 1. LINE POST CABLE SPACING SHALL BE TRANSITIONED TO 3" BETWEEN THE TWO LINE POSTS IMMEDIATELY PRECEDING THE ANCHOR POST.  
 2. CABLES PLACED ON BOTH POST FACES SHALL BE TRANSITIONED TO THE FRONT FACE BETWEEN THE TWO LINE POSTS IMMEDIATELY PRECEDING THE ANCHOR POST.

SECTION A-A ANCHOR POST  
SECTION FROM SHEET 1.



DETAIL A ANCHOR BRACKET  
DETAIL FROM SHEET 1.



DETAIL B CABLE CLIPS  
DETAIL FROM SHEET 1.

FOR DETAILS ② AND ④, SEE SHEET 6.  
 FOR DETAILS ⑤ AND ⑦, SEE SHEET 7.

STANDARDIZED HARDWARE	
①	WIRE ROPE
②	CABLE END FITTING
③	COMPENSATING CABLE END ASSEMBLY
④	ANCHOR BRACKET
⑤	U-BOLT CABLE CLIPS
⑥	CABLE HOOK BOLT AND NUT
⑦	HOOKEED ANCHOR BOLT AND NUTS
⑧	CABLE TRANSITION BRACKET

GENERAL NOTES:

FOR ARRANGEMENT OF SPRING AND COMPENSATING CABLE END ASSEMBLIES AND TURNBUCKLE CABLE END ASSEMBLIES, THE FOLLOWING CRITERIA SHALL APPLY: LENGTH OF CABLE RUNS TO 1000' - USE COMPENSATING CABLE END ASSEMBLY ON ONE END AND THE TURNBUCKLE CABLE END ASSEMBLY ON THE OTHER END OF EACH INDIVIDUAL CABLE. FOR LENGTHS LONGER THAN 1000' AND UP TO AND INCLUDING 2000' - USE COMPENSATING CABLE END ASSEMBLY ON EACH END OF THE INDIVIDUAL CABLE.

PRIOR TO FINAL ACCEPTANCE BY THE ENGINEER, THE FOLLOWING PROCEDURES SHALL BE USED TO TIGHTEN THE TURNBUCKLES. DEPENDING ON THE TEMPERATURE AT THE TIME OF THE ADJUSTMENT IN ACCORDANCE WITH THE FOLLOWING TABLE:

TEMPERATURE (°F)	SPRING COMPRESSION FROM UNLOADED POSITION IN EACH SPRING
120 TO 100	1"
99 TO 80	1 1/2"
79 TO 60	2"
59 TO 40	2 1/2"
39 TO 20	3"
19 TO 0	3 1/2"
-1 TO -20	4"

THE SPECIFICATIONS AND DIMENSIONS OF ALL HARDWARE AND FITTINGS SHALL COMPLY WITH AASHTO-AGC-ARTBA JOINT TASK FORCE 13 REPORT, A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.

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 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
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**STATE OF MISSOURI**  
 KENNETH L. VOSS  
 NUMBER PE-2002016747  
 PROFESSIONAL ENGINEER

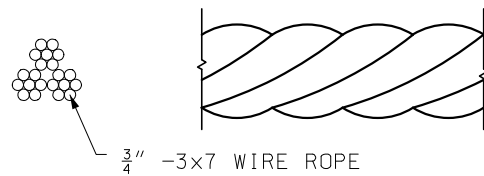
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**REPAIR ONLY: LOW-TENSION GUARD CABLE**

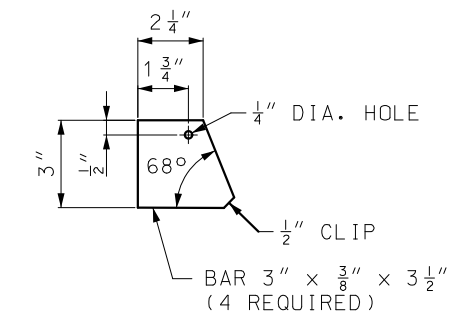
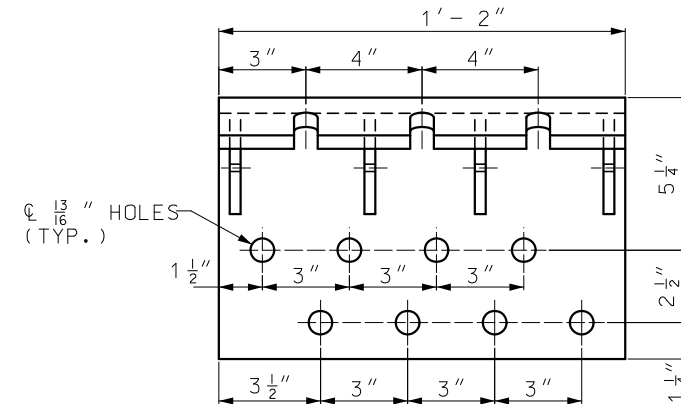
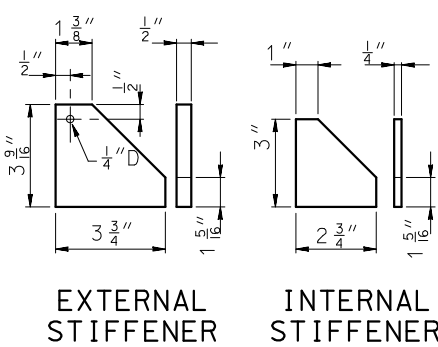
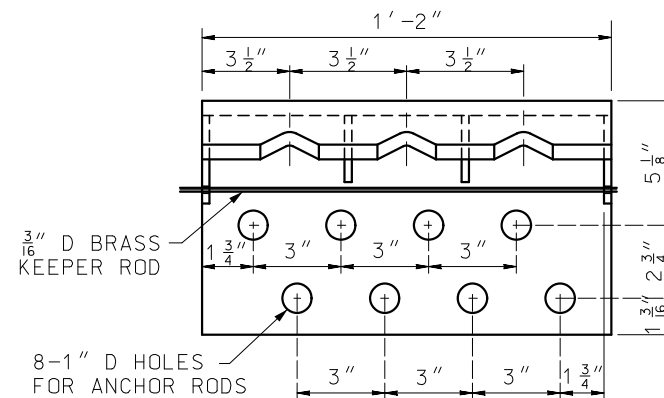
DATE EFFECTIVE: 7/1/2024  
 DATE PREPARED: 4/10/2024

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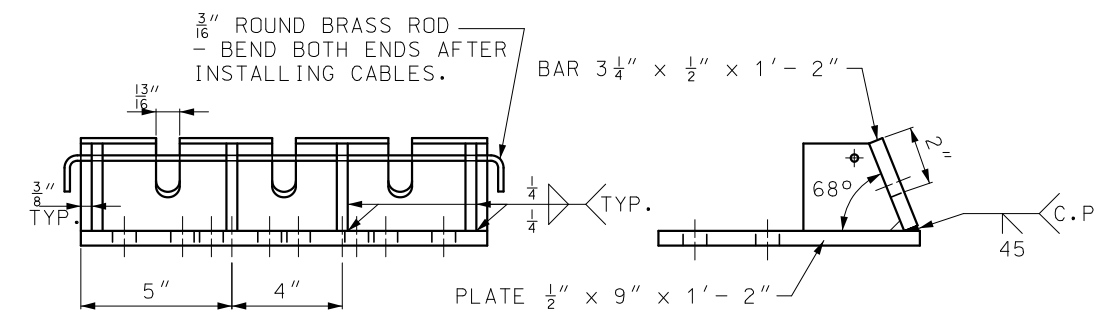
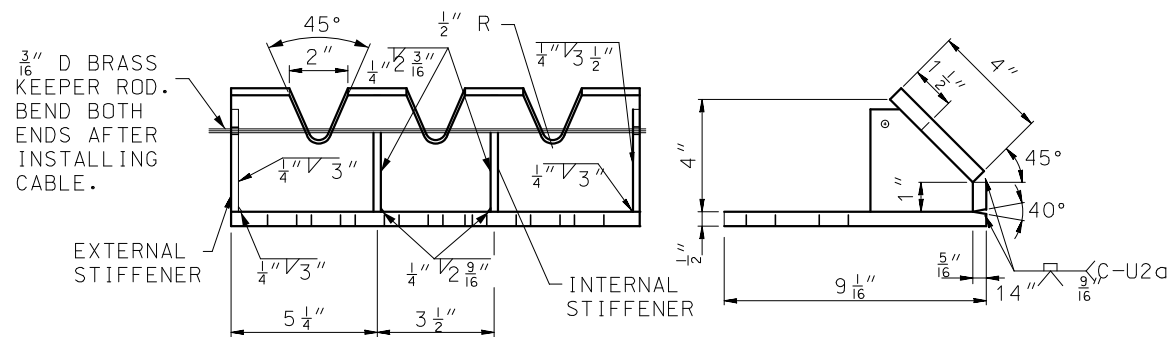
SHEET NO. 5 OF 7



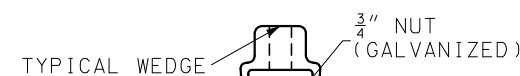
① WIRE ROPE



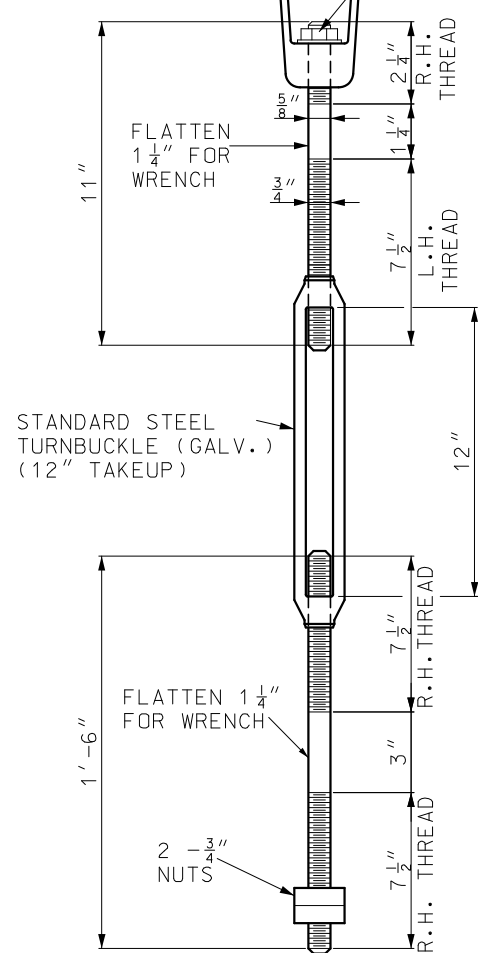
STIFFENER



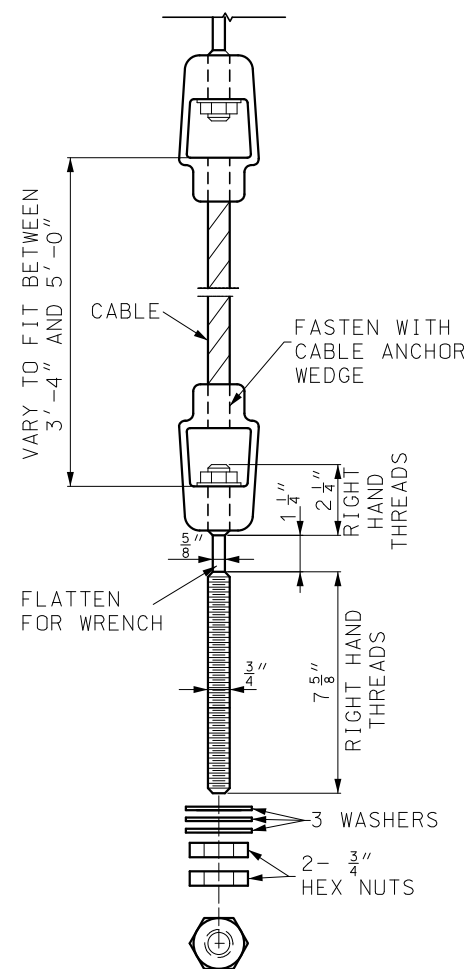
GUARD CABLE TO GUARDRAIL TRANSITION



④ ANCHOR BRACKET

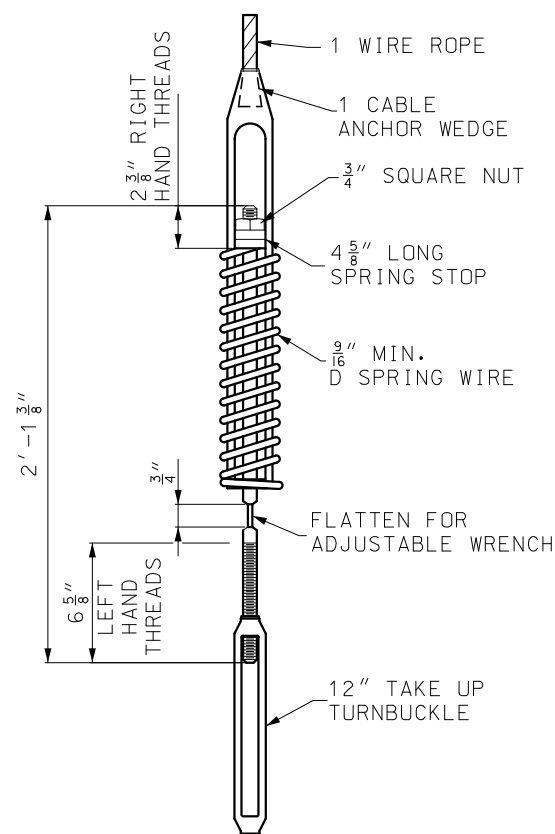


TURNBUCKLE CABLE END ASSEMBLY



CABLE END FITTING

② CABLE END FITTINGS



③ COMPENSATING CABLE END ASSEMBLY

GENERAL NOTES:

THE SPECIFICATIONS AND DIMENSIONS OF ALL HARDWARE AND FITTINGS SHALL COMPLY WITH AASHTO-AGC-ARTBA JOINT TASK FORCE 13 REPORT, A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.

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

STATE OF MISSOURI  
KENNETH L. VOSS  
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PROFESSIONAL ENGINEER  
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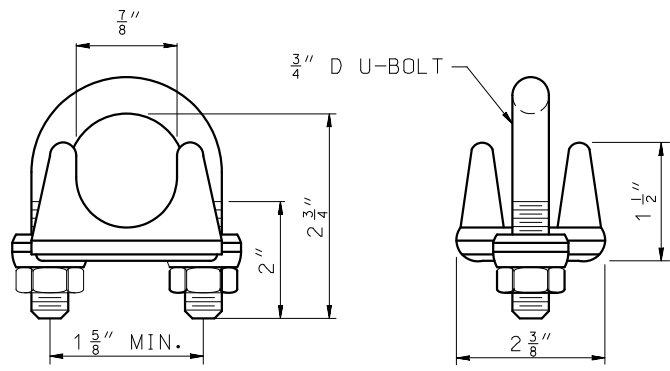
REPAIR ONLY:  
LOW-TENSION  
GUARD CABLE

DATE EFFECTIVE: 7/1/2024  
DATE PREPARED: 4/10/2024

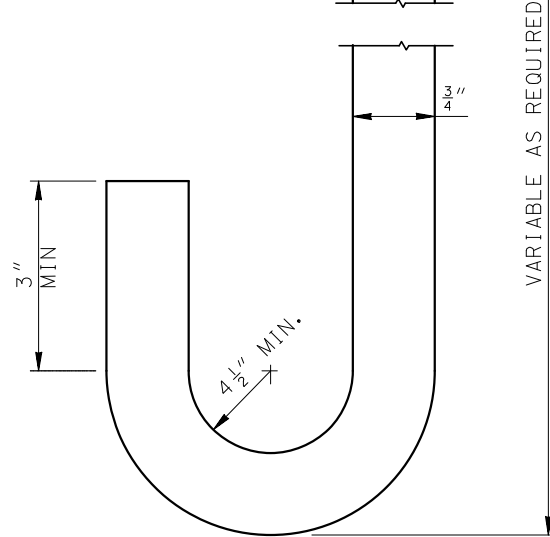
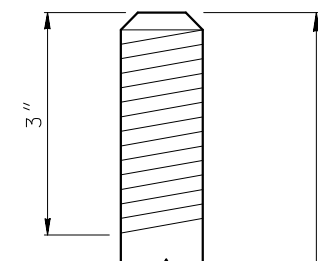
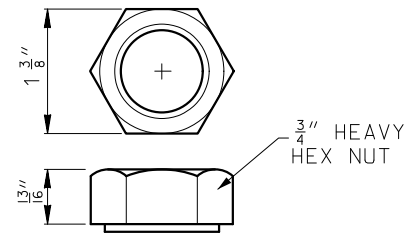
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SHEET NO.  
6 OF 7

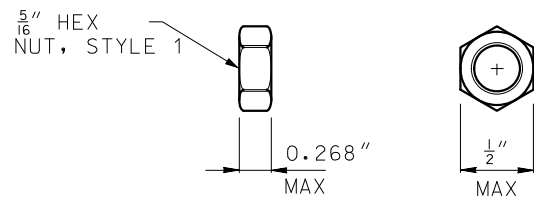




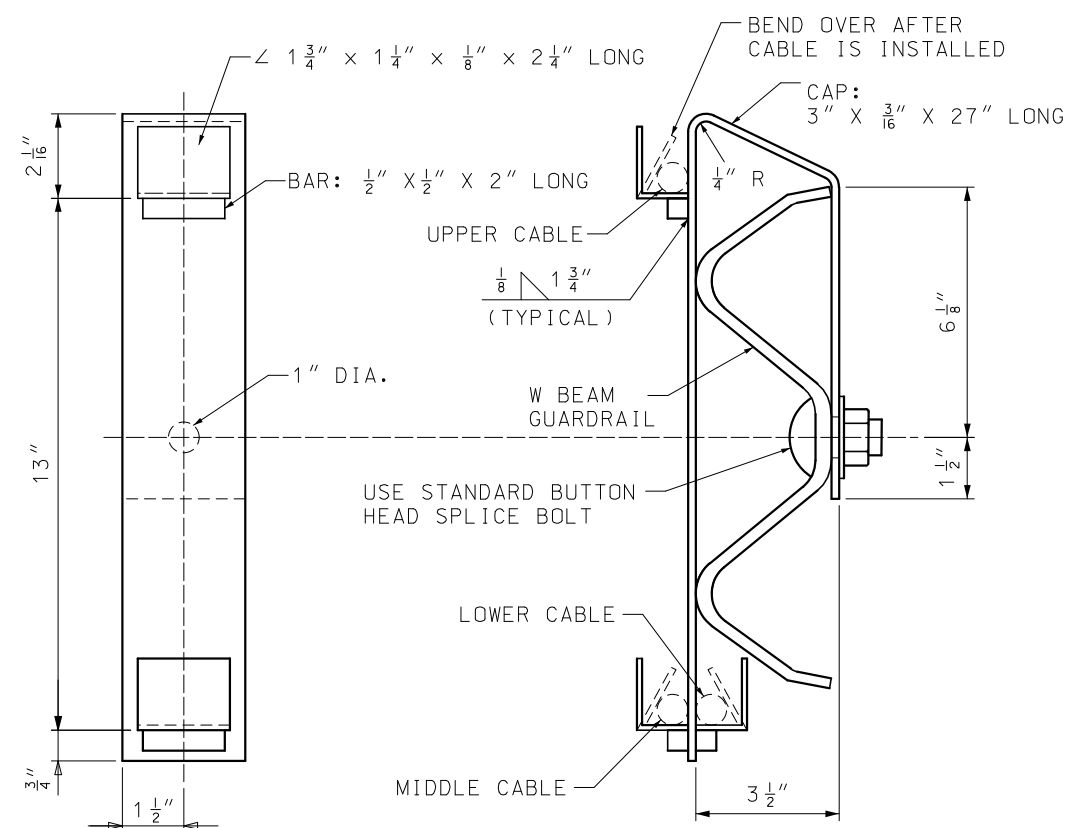
⑤ U-BOLT CABLE CLIPS



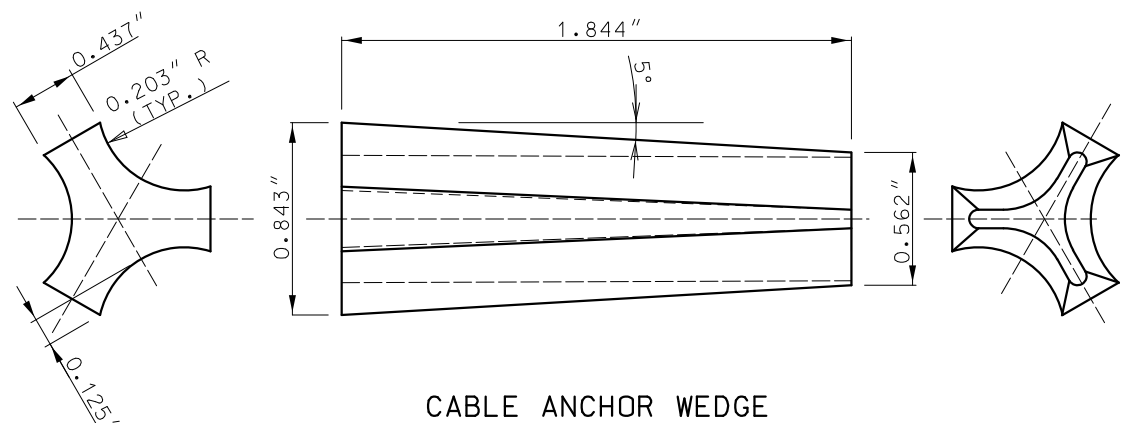
⑦ 25" HOOKED ANCHOR BOLT AND NUT



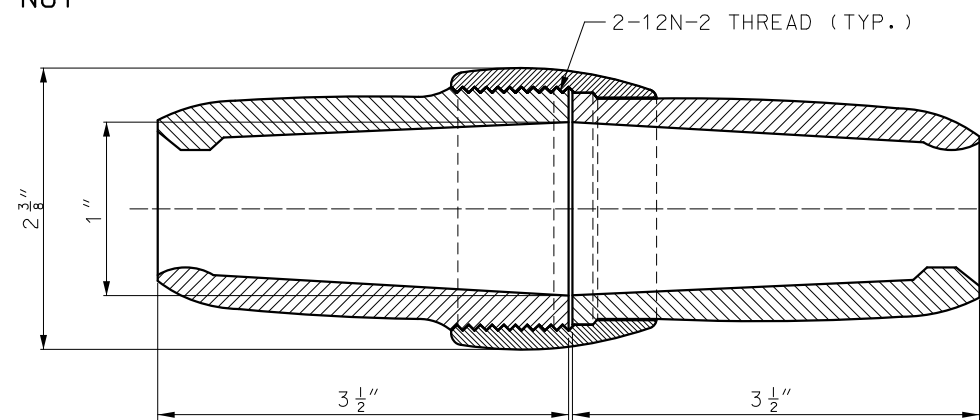
⑥ CABLE HOOK BOLT AND NUT



⑧ CABLE TRANSITION BRACKET



CABLE ANCHOR WEDGE



NOTE:  
FITTING SPLICE SHALL DEVELOP THE FULL  
STRENGTH OF THE CABLE (25,000 LBS).

CABLE SPLICE

GENERAL NOTES:

REPAIR SPLICES FOR LOW-TENSION SYSTEMS SHALL BE NO CLOSER THAN 400' AND NO MORE THAN FOUR SPLICES PER CABLE WITHIN A 2,000' RUN. WHEN REPAIR TO A LOW-TENSION CABLE REQUIRES SPLICES CLOSER THAN 400' OR MORE THAN FOUR SPLICES PER CABLE WITHIN A 2,000' RUN, THE FULL 2,000' CABLE LENGTH MAY BE REPLACED WITH THE ENGINEER'S APPROVAL.

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

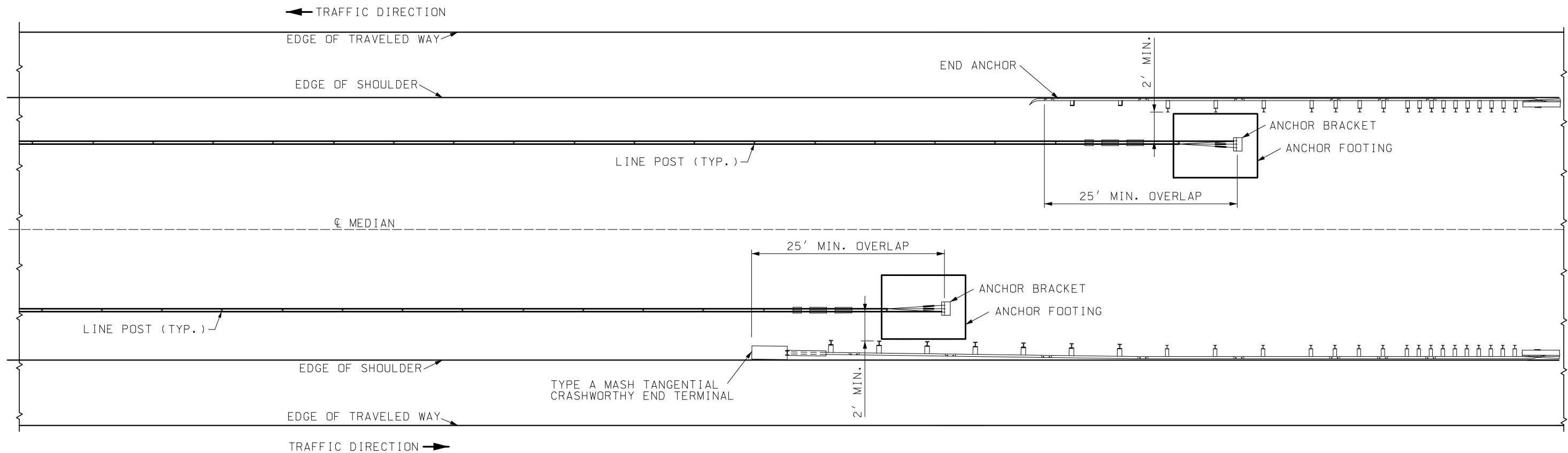
STATE OF MISSOURI  
KENNETH L. VOSS  
NUMBER PE-2002016747  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY.

REPAIR ONLY:  
LOW-TENSION  
GUARD CABLE

DATE EFFECTIVE: 7/1/2024  
DATE PREPARED: 4/10/2024

606.41N

SHEET NO.  
7 OF 7


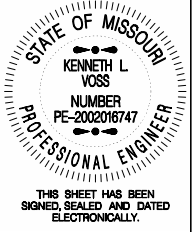


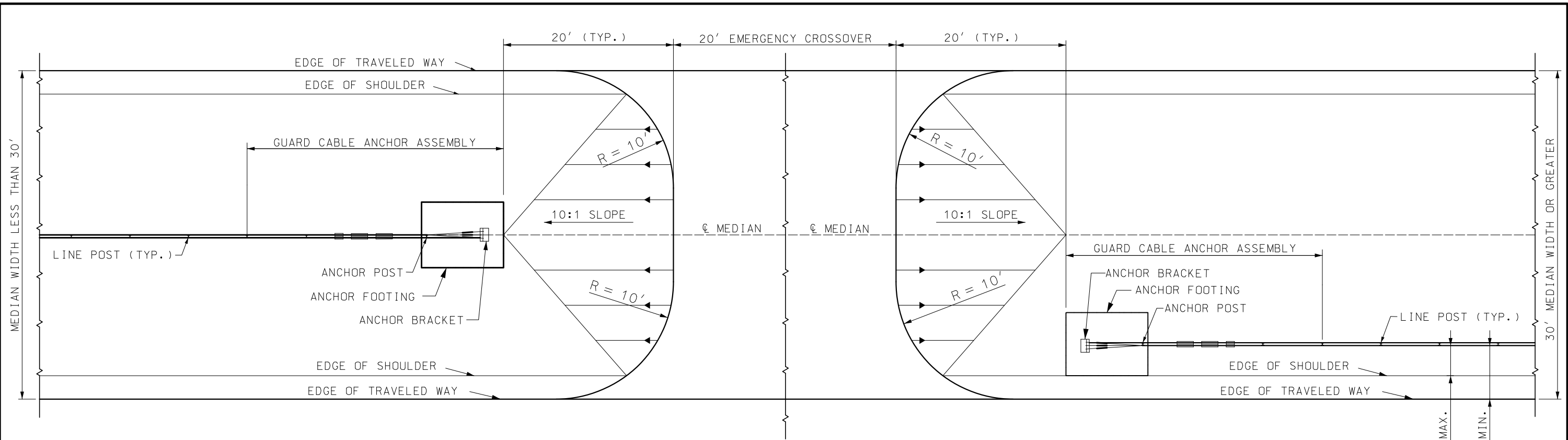
**GENERAL NOTES:**

LINE POST SPACING SHOULD NOT EXCEED 20' OR THE MANUFACTURER'S RECOMMENDATION.

THIS DRAWING DEPICTS THE OVERLAP OF GUARD CABLE AND GUARDRAIL. IT DOES NOT INDICATE THAT TWO RUNS OF CABLE ARE REQUIRED.

REPAIR SPLICES FOR HIGH-TENSION SYSTEMS SHALL BE NO CLOSER THAN 200' PER CABLE WITHIN A 1,000' RUN. WHEN A REPAIR TO A HIGH-TENSION CABLE REQUIRES SPLICES CLOSER THAN 200', A LONGER SECTION MAY BE REPLACED TO REDUCE THE NUMBER OF SPLICES FROM TURNBUCKLE TO TURNBUCKLE WITH THE ENGINEER'S APPROVAL.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p style="text-align: center;"><b>HIGH-TENSION GUARD CABLE</b></p> <p style="text-align: center;">TANGENTIAL GUARDRAIL OVERLAP</p>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	<b>606.42</b>	SHEET NO. <b>1 OF 2</b>

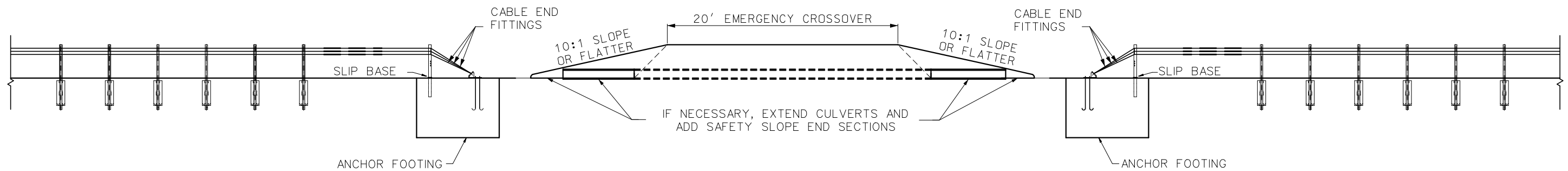


MEDIAN APPLICATION FOR  
MEDIAN WIDTH LESS THAN 30'



ROADSIDE APPLICATION FOR  
30' MEDIAN WIDTH OR GREATER\*

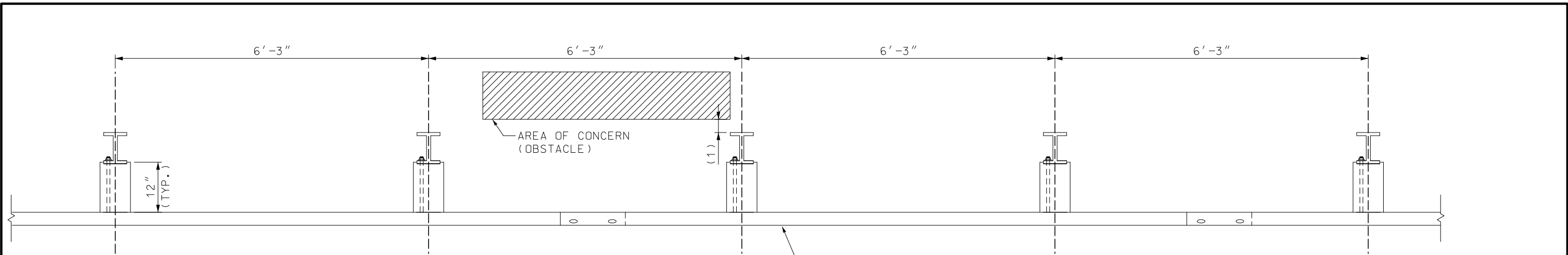
PLAN

\* GUARD CABLE CAN BE ON  
EITHER SIDE OF MEDIAN

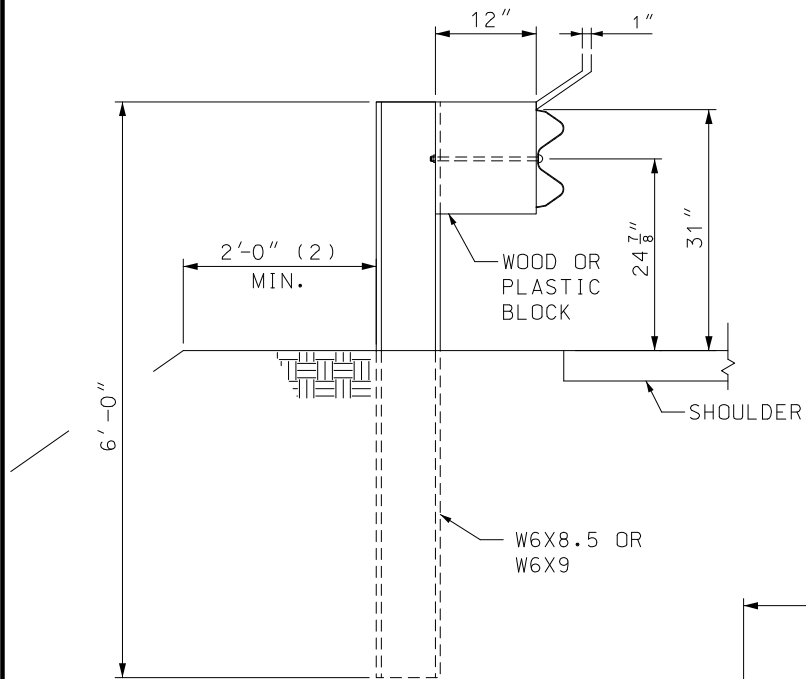


PROFILE

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>HIGH-TENSION GUARD CABLE TRANSITION AT MEDIAN OPENING</b>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	<b>606.42</b>	SHEET NO. <b>2 OF 2</b>

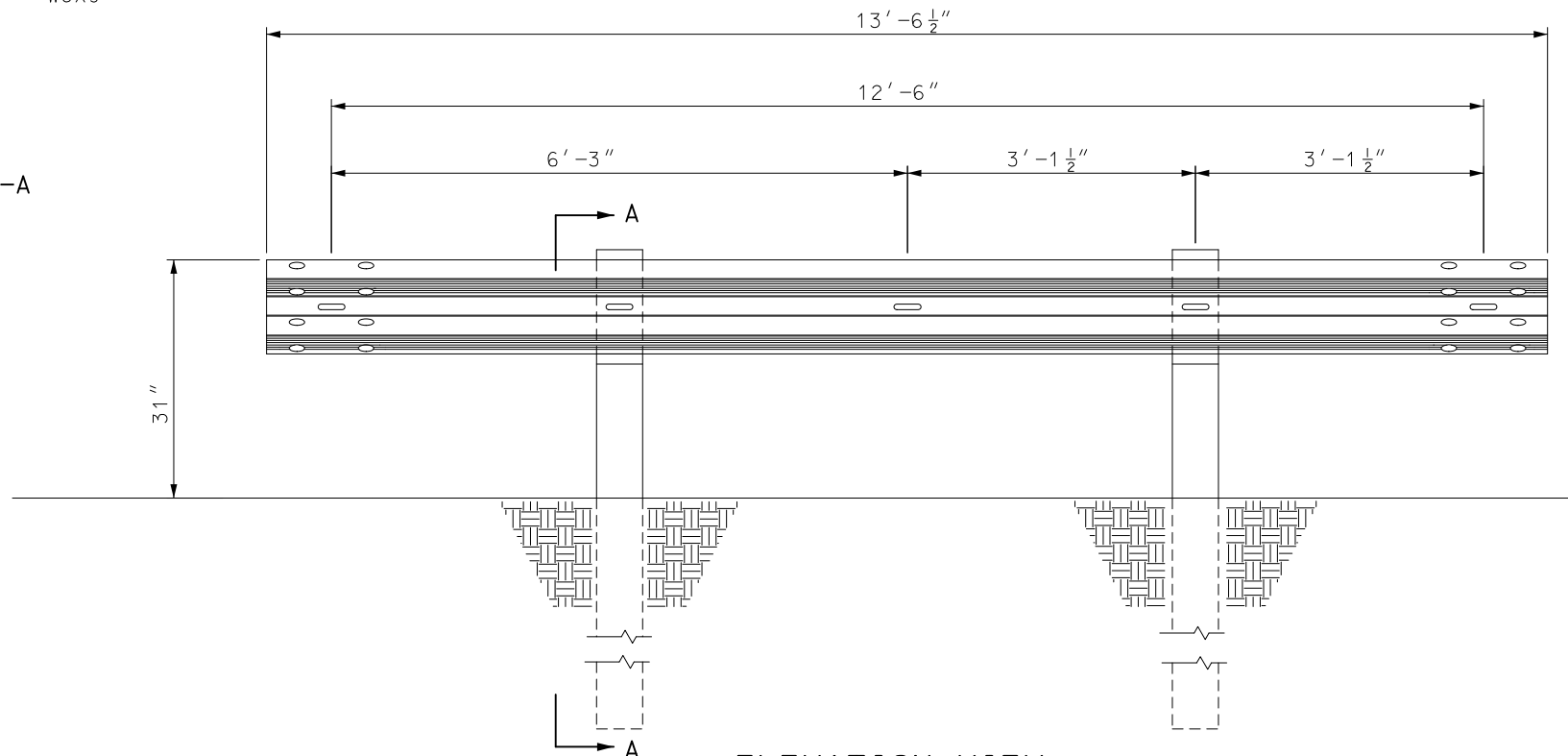


PLAN VIEW



SECTION A-A

- (1) 2'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACINGS, 2'-0" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 3'-1 1/2" POST SPACINGS, 1'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 1'-6 3/4" POST SPACINGS. SEE SHEET 4 FOR POST SPACING DETAILS.
- (2) WHEN SITE CONSTRAINTS PROHIBIT OR EMBANKMENT CANNOT BE CONSTRUCTED TO PROVIDE A MINIMUM OF 2 FEET BETWEEN THE BACK OF THE GUARDRAIL POST AND SLOPE BREAK POINT, 8-FOOT POSTS SHALL BE USED (SEE SHEET 6).



ELEVATION VIEW

GENERAL NOTES:

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

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

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

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

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

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

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

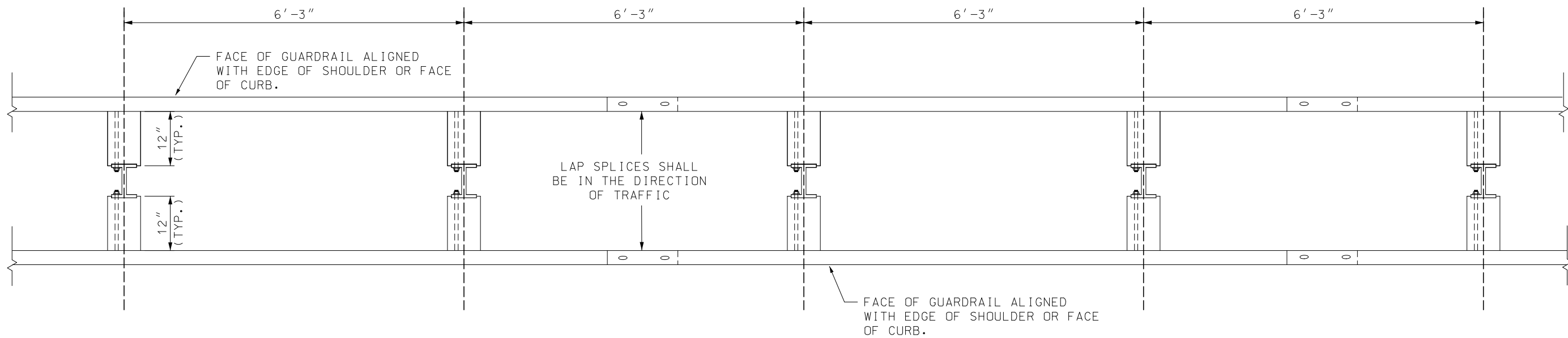
LAP SPLICES BETWEEN TWO RAILS OR BETWEEN A RAIL AND TERMINAL CONNECTOR IN THE DIRECTION OF TRAFFIC. LAP THE FLARED END SECTIONS IN THE DIRECTION OF TRAFFIC.

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

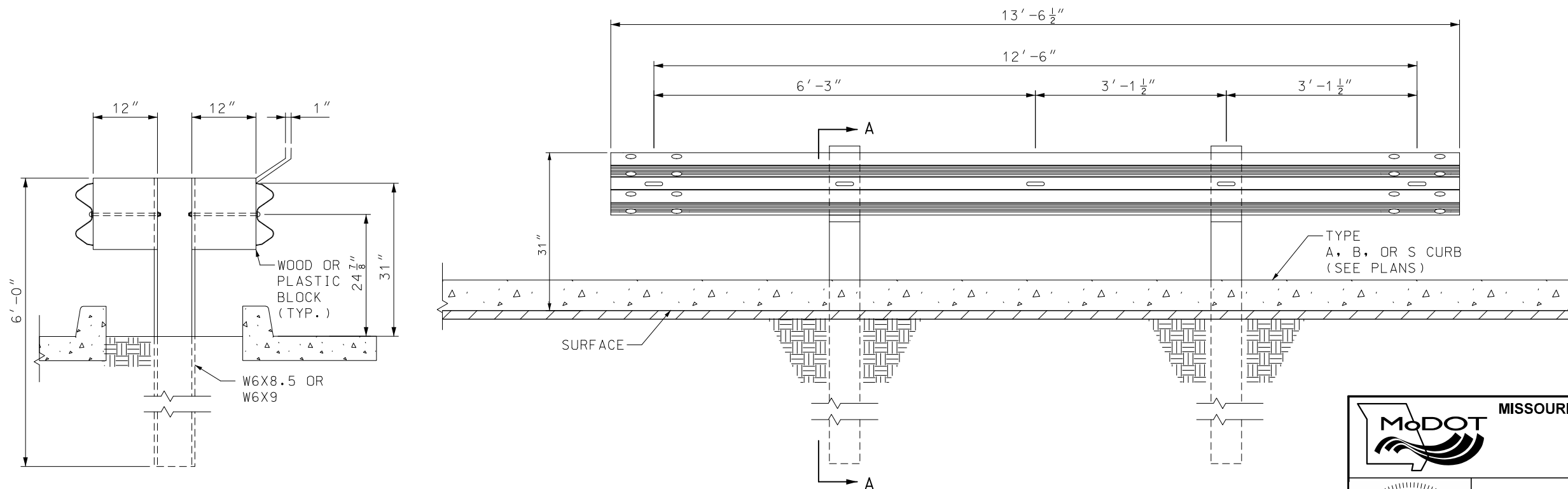
STATE OF MISSOURI  
 KENNETH L. VOSS  
 NUMBER PE-2002016747  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS)

DATE EFFECTIVE: 7/1/2024	606.50F	SHEET NO. 1 OF 9
DATE PREPARED: 4/10/2024		



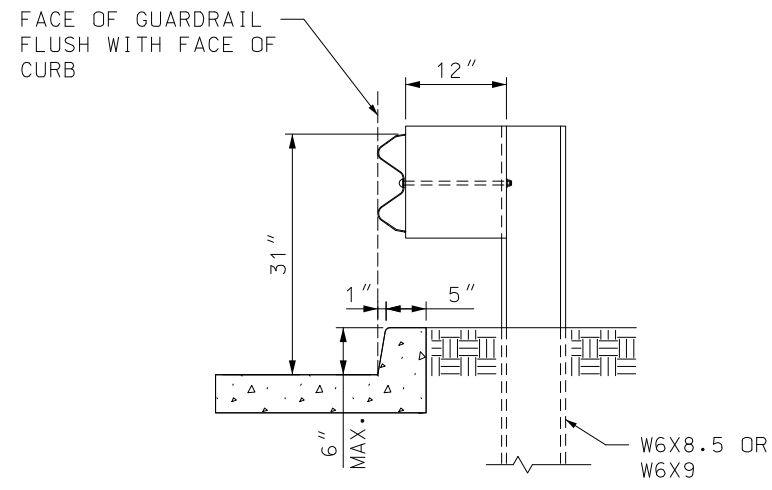
PLAN VIEW



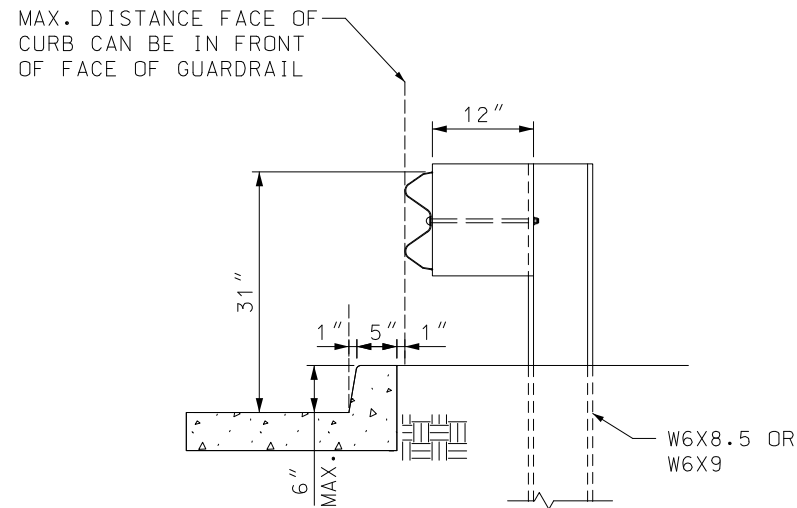
ELEVATION VIEW

SECTION A-A

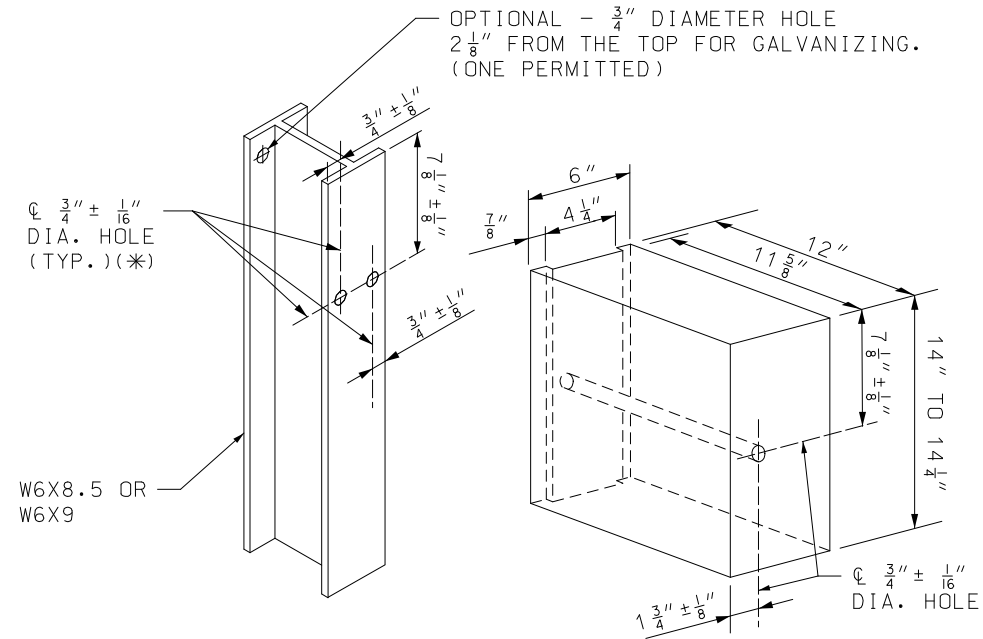
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>DOUBLE FACED GUARDRAIL</b>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	<b>606.50F</b>	SHEET NO. <b>2 OF 9</b>



MGS GUARDRAIL AT CURB



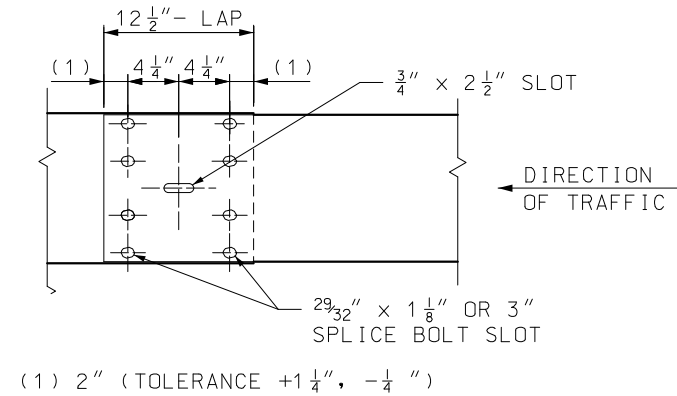
ALTERNATE MGS AT CURB



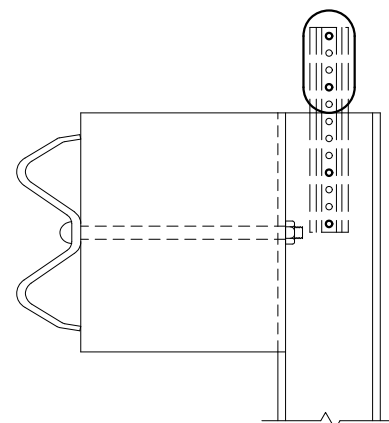
FOR STEEL POST AND NOTCHED WOOD OR PLASTIC BLOCK

HOLE PUNCHING DETAIL

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




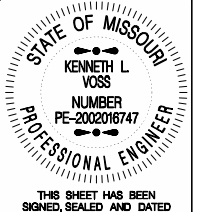
RAIL ELEMENT SPLICE DETAIL



DELINEATORS ON GUARDRAIL

GENERAL NOTES:

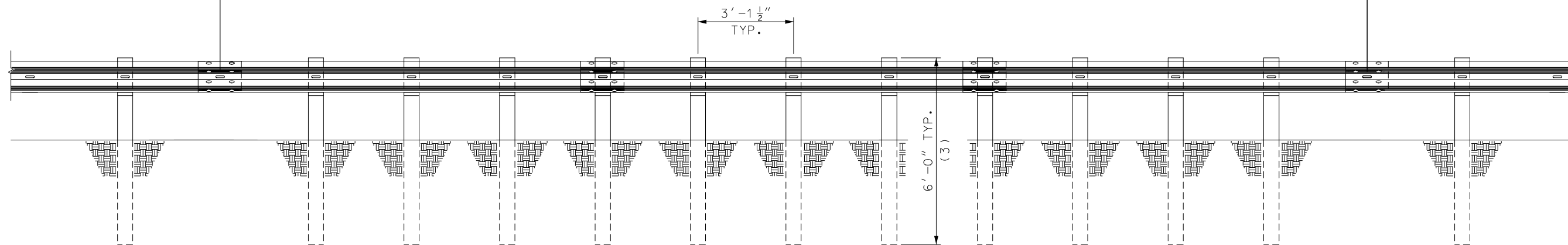
FOR GUARDRAIL DELINEATION DETAILS SEE STD PLAN 903.03.

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI KENNETH L. VOSS NUMBER PE-2002016747 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>MIDWEST GUARDRAIL SYSTEM (MGS)</b></p> <p><b>POST AND BLOCK</b></p>
<p>DATE EFFECTIVE: 7/1/2024</p> <p>DATE PREPARED: 4/10/2024</p>	<p>606.50F</p>
<p>SHEET NO. 3 OF 9</p>	

MGS GUARDRAIL 6'-3" SPACINGS OR MASH END TERMINAL OR BRIDGE APPROACH TRANSITION

MGS GUARDRAIL WITH 3'-1 1/2" POST SPACINGS (2)

MGS GUARDRAIL 6'-3" SPACINGS OR MASH END TERMINAL OR BRIDGE APPROACH TRANSITION



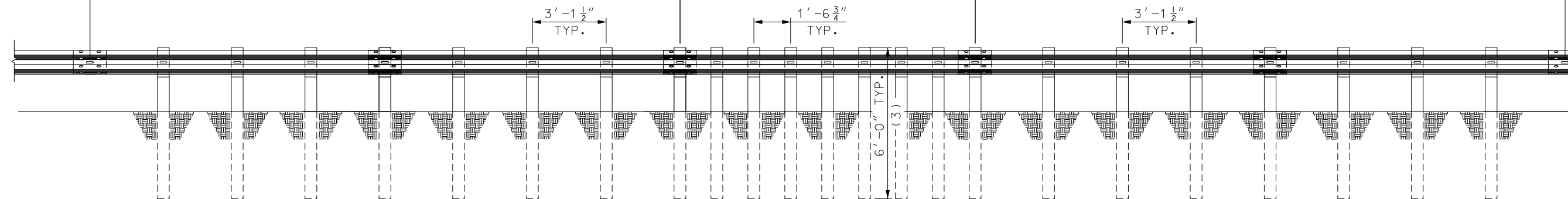
MGS GUARDRAIL WITH 3'-1 1/2" POST SPACING

MGS GUARDRAIL 6'-3" SPACINGS OR MASH END TERMINAL OR BRIDGE APPROACH TRANSITION

MGS GUARDRAIL 3'-1 1/2" POST SPACING (1)  
25' MIN.



MGS GUARDRAIL 1'-6 3/4" POST SPACINGS (2)

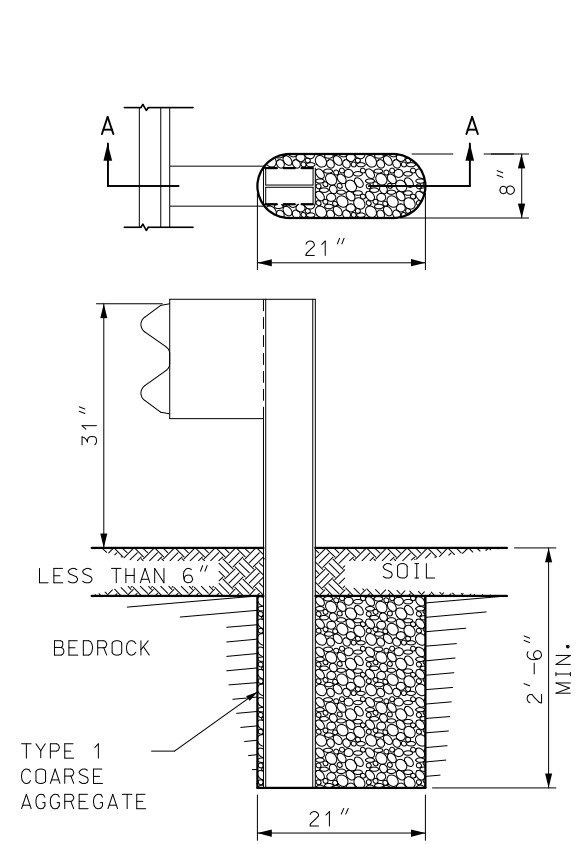
MGS GUARDRAIL 3'-1 1/2" POST SPACINGS (1)  
25' MIN.



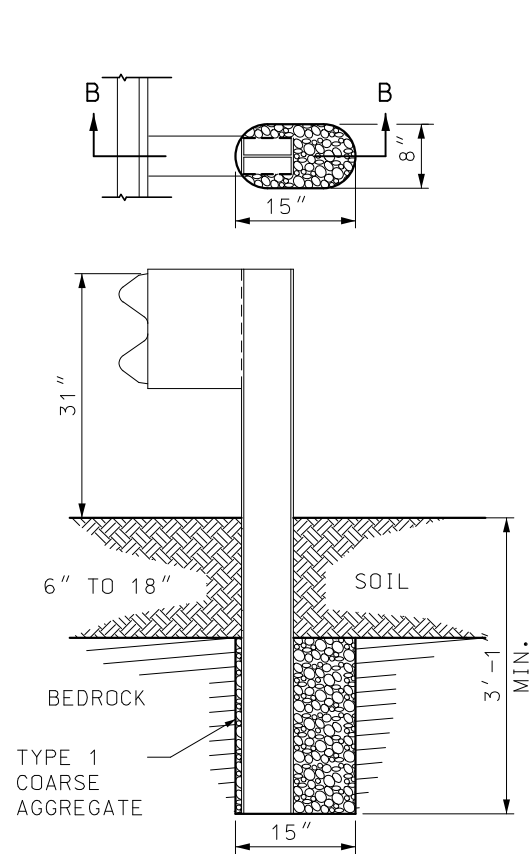
MGS GUARDRAIL WITH 1'-6 3/4" POST SPACING

- (1) 25 FEET OF MGS 3'-1 1/2" POST SPACING GUARDRAIL IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF 1'-6 3/4" POST SPACING MGS GUARDRAIL.
- (2) USE AS MANY SEGMENTS AS NECESSARY TO SHIELD THE AREA OF CONCERN.
- (3) REDUCED POST SPACING SHALL USE 6'-0" POSTS MAX. ANY DEVIATION OF 6'-0" POSTS WILL ONLY BE ALLOWED IN ACCORDANCE WITH SPECIAL INSTALLATIONS AS SHOWN ON SHEET 5.

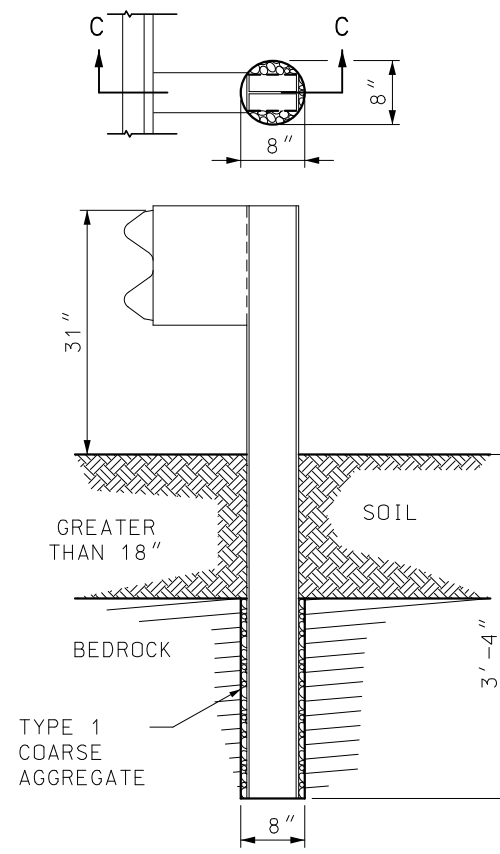
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>REDUCED POST SPACINGS</b>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	<b>606.50F</b>	SHEET NO. <b>4 OF 9</b>



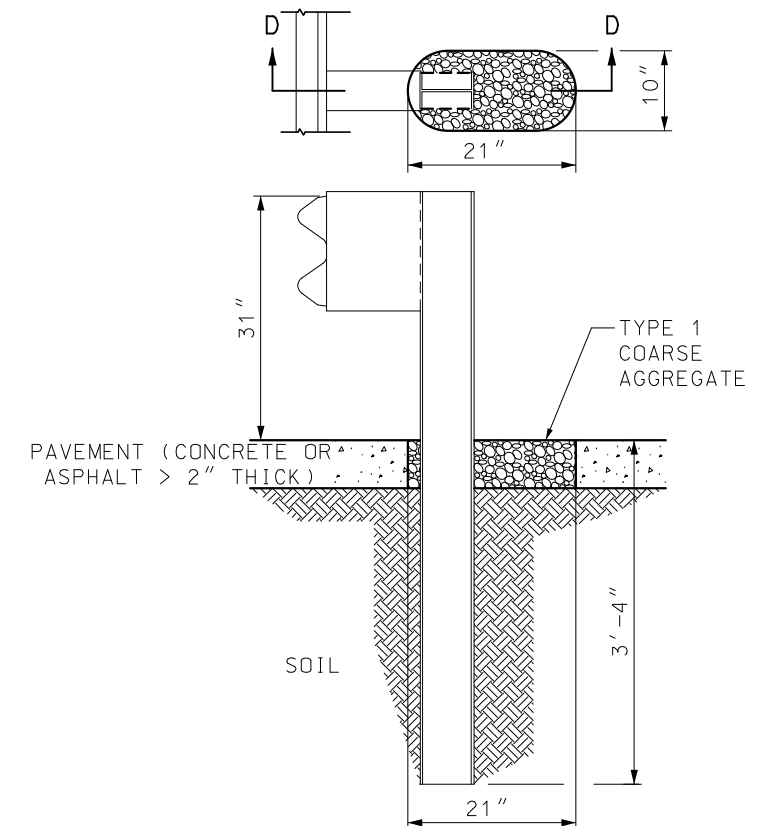
SECTION A-A  
ROCK ENCOUNTERED  
UP TO 6" BENEATH SURFACE



SECTION B-B  
ROCK ENCOUNTERED  
6" TO 18" BENEATH SURFACE

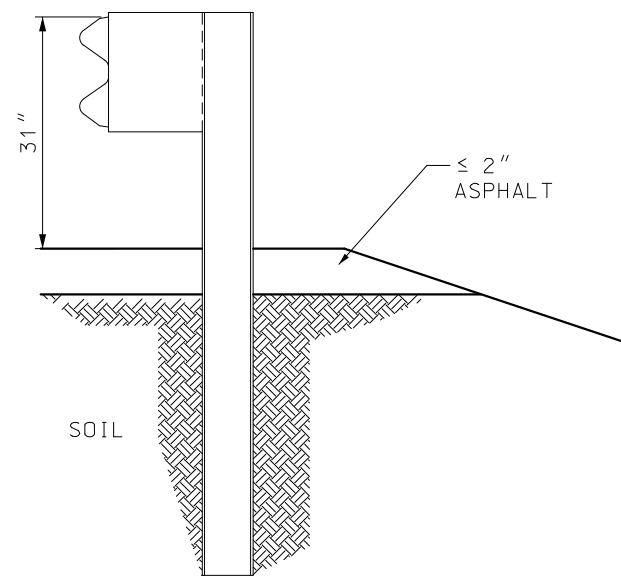


SECTION C-C  
ROCK ENCOUNTERED MORE  
THAN 18" BENEATH SURFACE



SECTION D-D  
SETTING POST THROUGH PAVEMENT  
(CONCRETE OR ASPHALT > 2" THICK)

SETTING POST IN SOLID ROCK




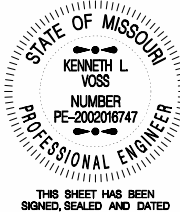
SETTING POST THROUGH ASPHALT  $\leq 2"$  THICK

GENERAL NOTES:

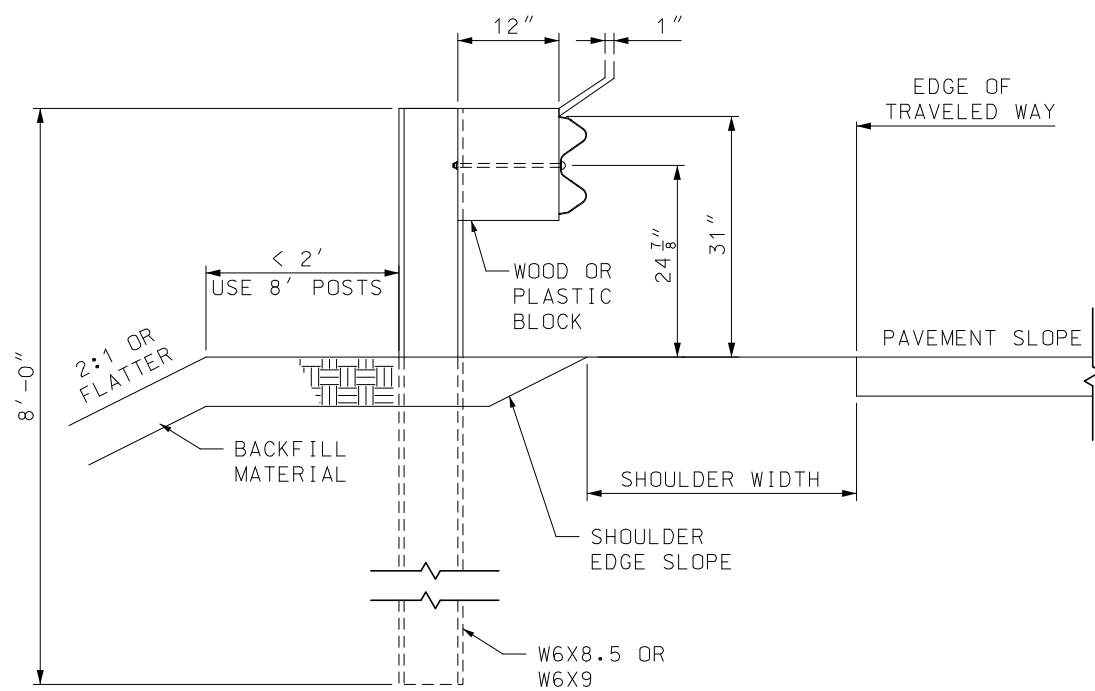
HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 4 INCHES GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN 2 FEET OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SEC 712 OF THE STANDARD SPECIFICATIONS.

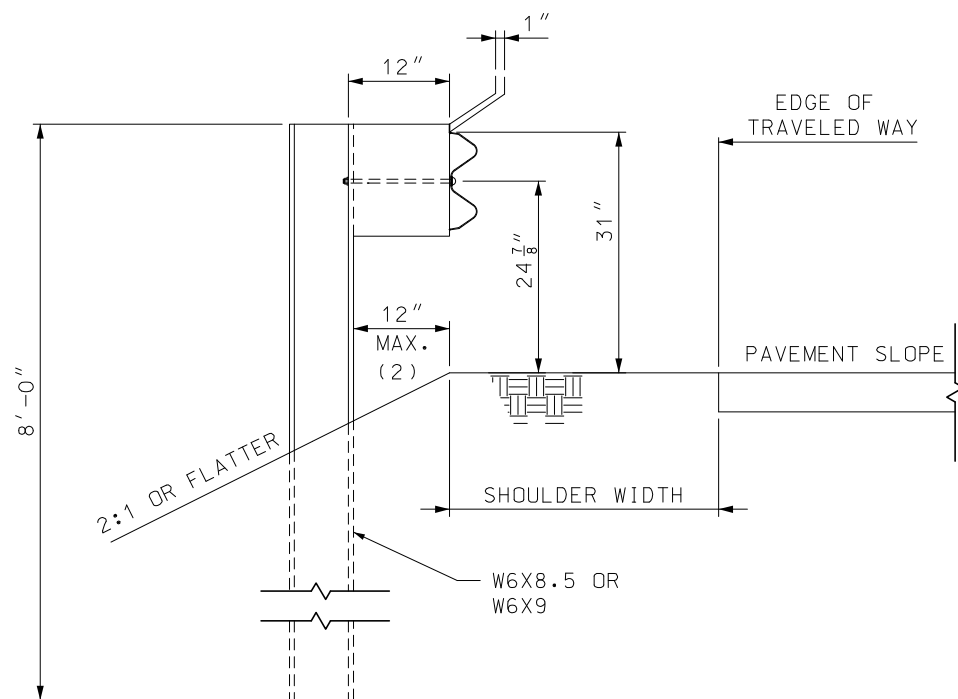
NO ADDITIONAL PAYMENT WILL BE MADE FOR CUTTING THE OVERSIZED HOLES OR PLACING AGGREGATE IN THE HOLES, AS INDICATED IN THIS PLAN.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI KENNETH L. VOSS NUMBER PE-2002016747 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> SPECIAL INSTALLATIONS</p>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	SHEET NO. <b>606.50F</b> 5 OF 9

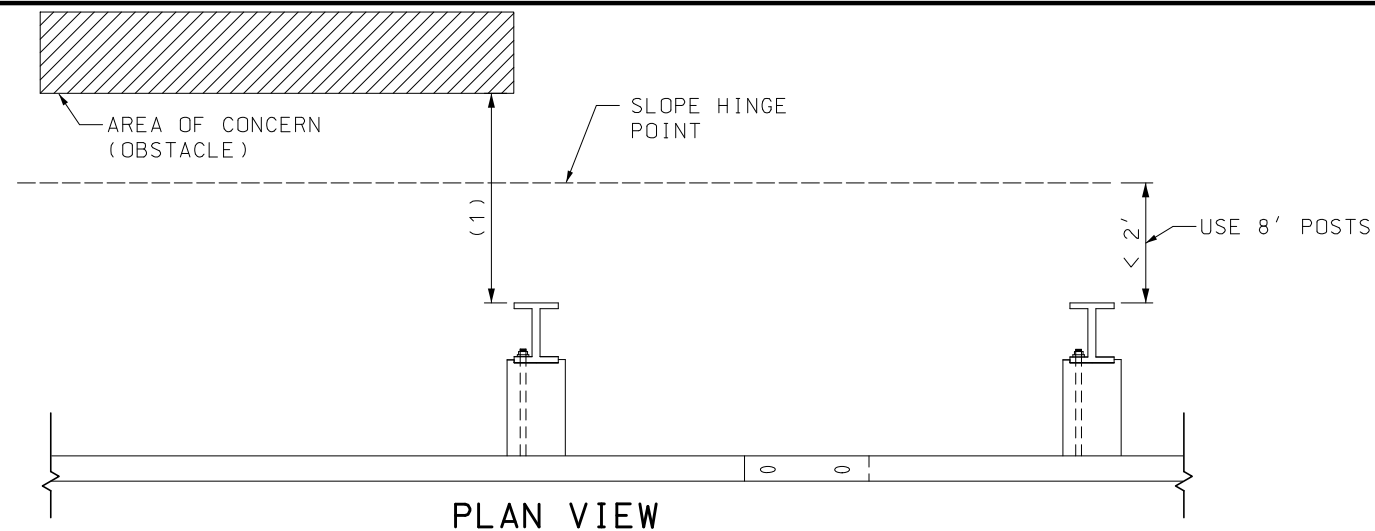




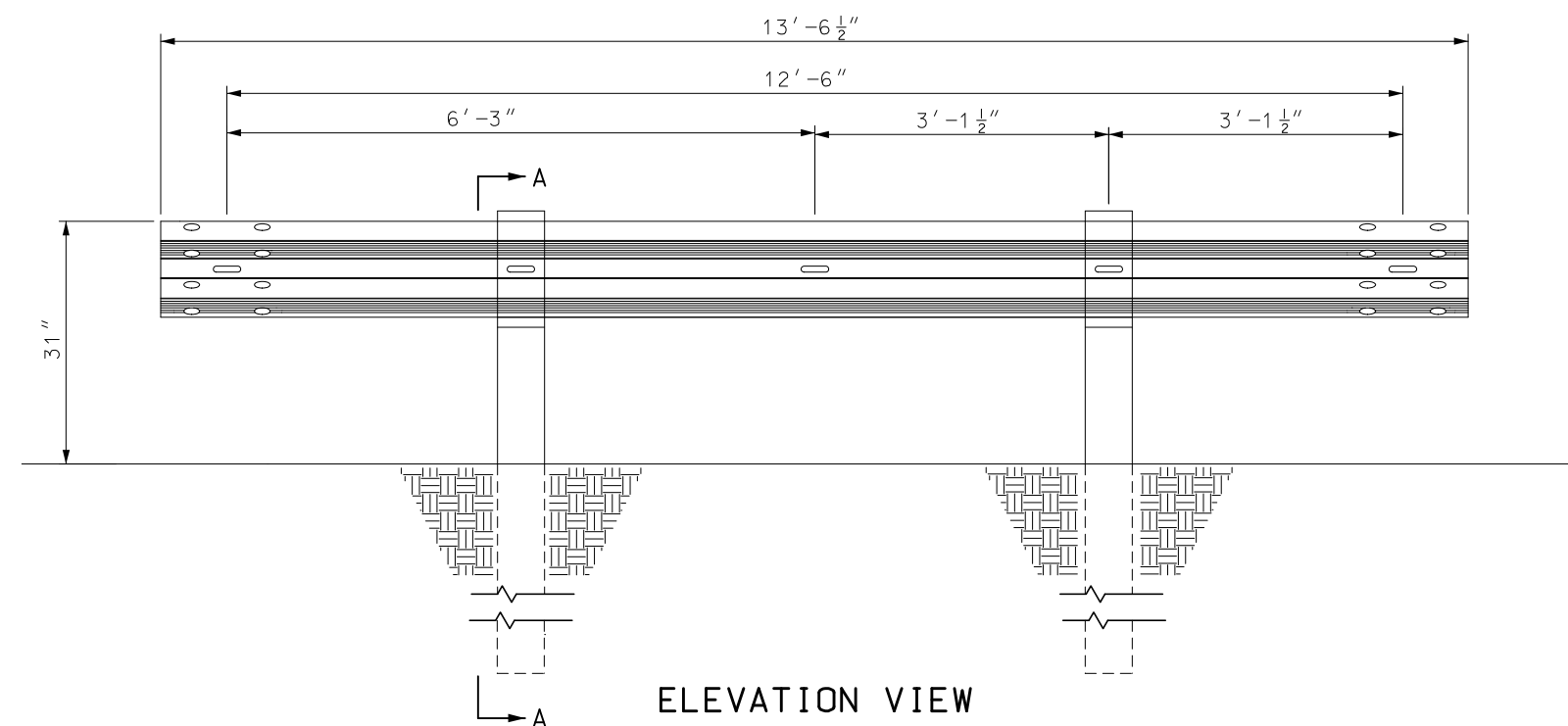
SECTION A-A  
8' STEEL POST



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



PLAN VIEW



ELEVATION VIEW

- (1) 3'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 8' POSTS AND A 2:1 OR FLATTER SLOPE.
- (2) WHERE THERE IS NOT SUFFICIENT EMBANKMENT BEYOND THE SHOULDER TO PLACE THE GUARDRAIL POST, THE POST MAY BE PLACED A MAXIMUM OF 12" BEYOND THE SLOPE BREAK POINT OF A 2:1 OR FLATTER SLOPE.

GENERAL NOTES:

8-FOOT POSTS SHALL BE USED WHEN LESS THAN 2 FEET OF EMBANKMENT IS PRESENT BETWEEN THE BACK OF THE GUARDRAIL POST AND THE SLOPE BREAK POINT. THE SUBSTITUTION OF 8-FOOT POSTS IN LIEU OF REQUIRED GRADING, TO CONSTRUCT LESS THAN THE DESIGNED TYPICAL SECTION, SHALL NOT BE ALLOWED.

8-FOOT POSTS CANNOT BE USED WHEN POST SPACING IS LESS THAN 6'-3", WITHIN VERTICAL BARRIER OR BRIDGE APPROACH TRANSITIONS, OR WITHIN CRASHWORTHY END TERMINALS.

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

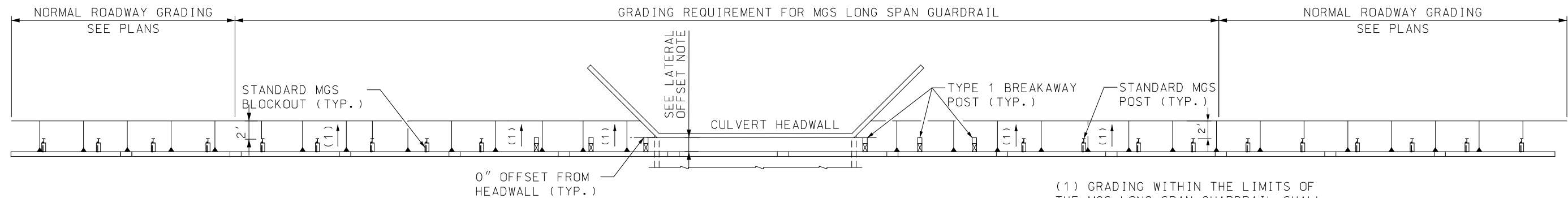
STATE OF MISSOURI  
KENNETH L. VOSS  
NUMBER PE-2002016747  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS)  
8-FOOT POST

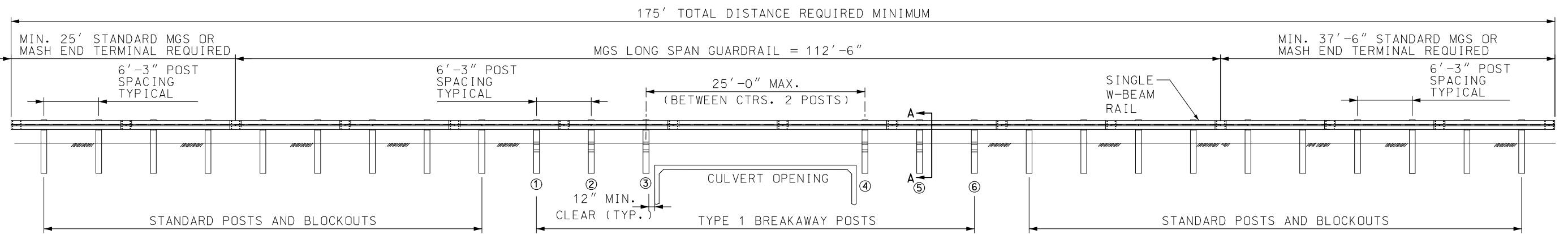
DATE EFFECTIVE: 7/1/2024  
DATE PREPARED: 4/10/2024

606.50F

SHEET NO.  
6 OF 9



PLAN VIEW



ELEVATION VIEW

GENERAL NOTES:

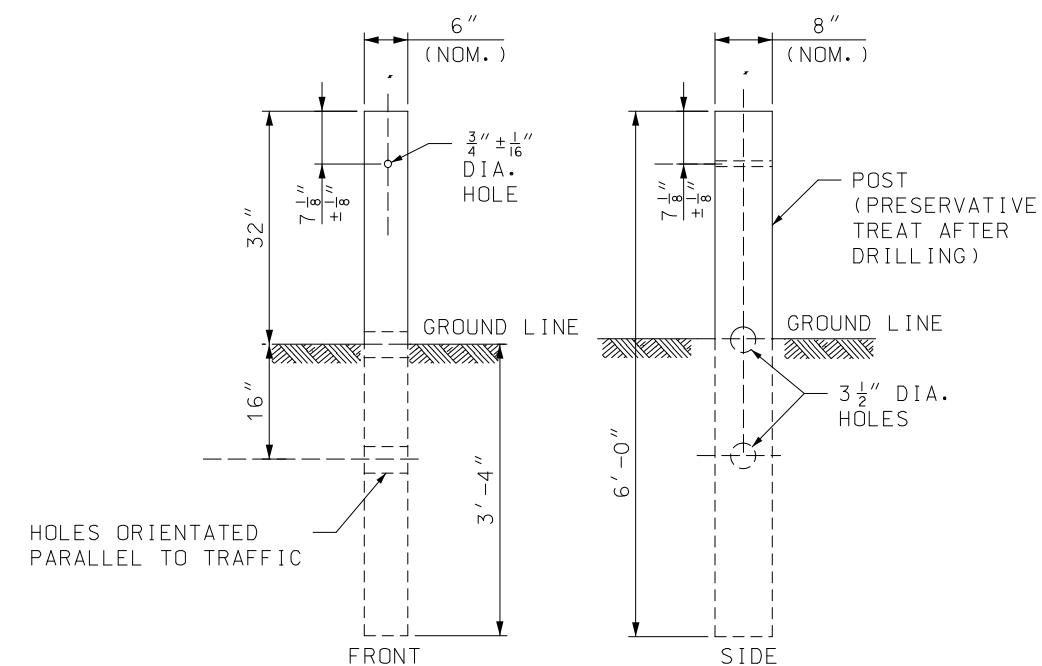
A MINIMUM LENGTH OF STANDARD MGS GUARDRAIL OR AN END TERMINAL IS REQUIRED BEFORE AND AFTER THE 112'-6" OF MGS LONG SPAN TO MAINTAIN STABILITY IN THE SYSTEM. 8' POSTS MAY BE USED OUTSIDE THE GRADING LIMITS SHOWN.

USE TYPE 1 BREAKAWAY WOOD POST FOR POSTS NO. 1-6. ALL OTHER POSTS SHALL BE W6X8.5 OR W6X9 STEEL POSTS.

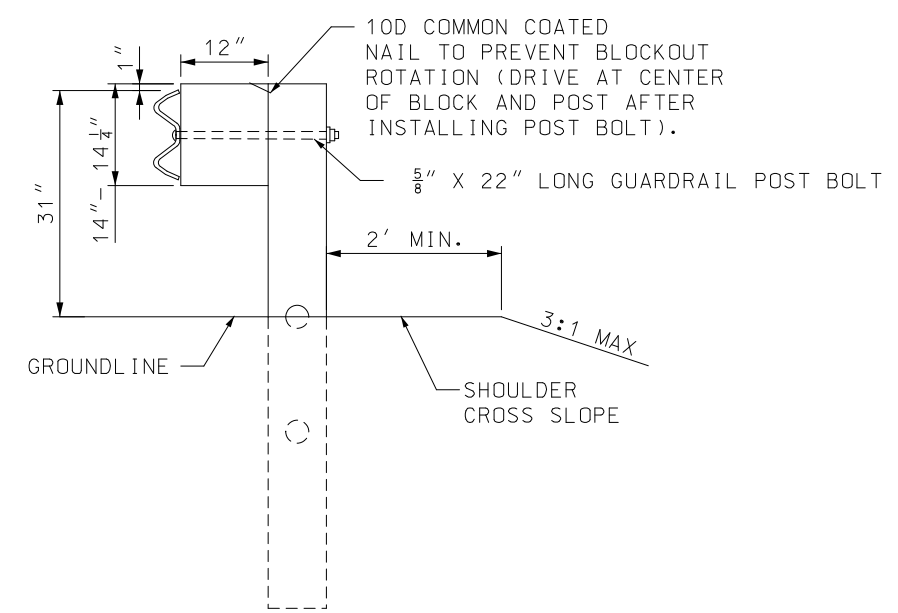
WHEN THE HEADWALL IS FLUSH WITH THE GRADE, THE BACK OF THE POST CAN BE ALIGNED WITH THE NEAR SIDE OF THE HEADWALL. BUT IF THE HEADWALL CONTINUES ABOVE GRADE, THE SYSTEM SHOULD BE OFFSET 8' FROM THE FIXED OBJECT.

FOR LOCATIONS WHERE A GUARDRAIL FLARE IS DESIRED, THE SYSTEM SHOULD REMAIN TANGENT FOR 50'-0" BEFORE POST 1 OR AFTER POST 6, AT WHICH POINT THE GUARDRAIL MAY FLARE AT A MAXIMUM TAPER RATE OF 7:1.

ALL POSTS, BLOCK, RAILS, AND HARDWARE SHALL COMPLY WITH SEC 606 AND AS DETAILED ON THIS STANDARD.

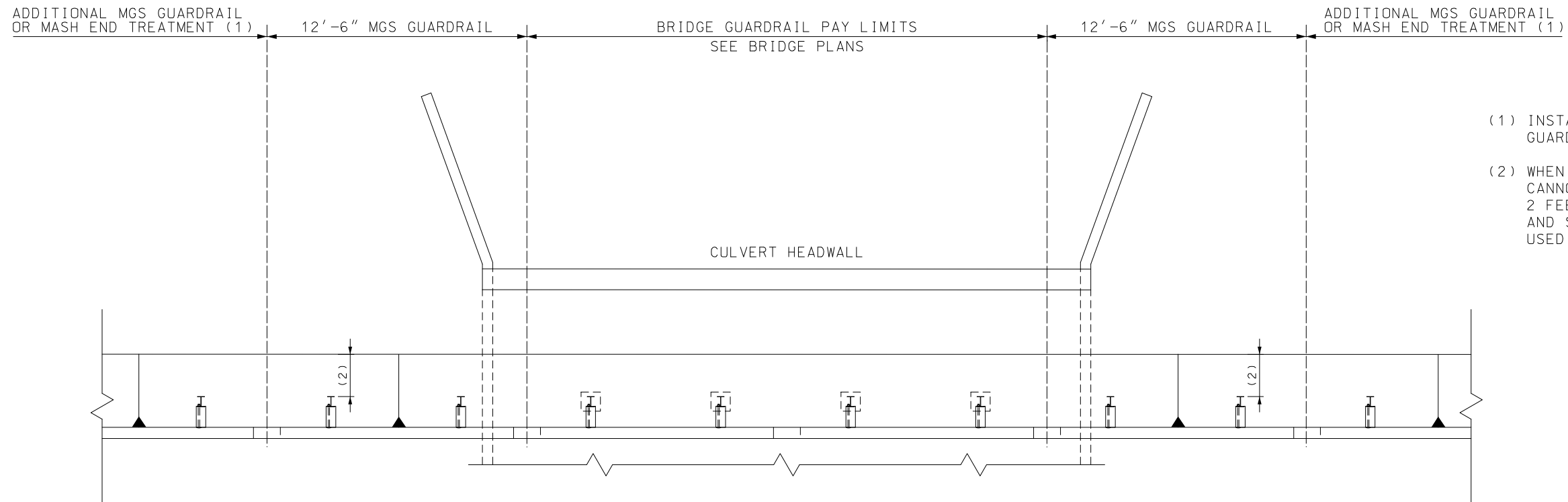


TYPE 1 BREAKAWAY WOOD POST



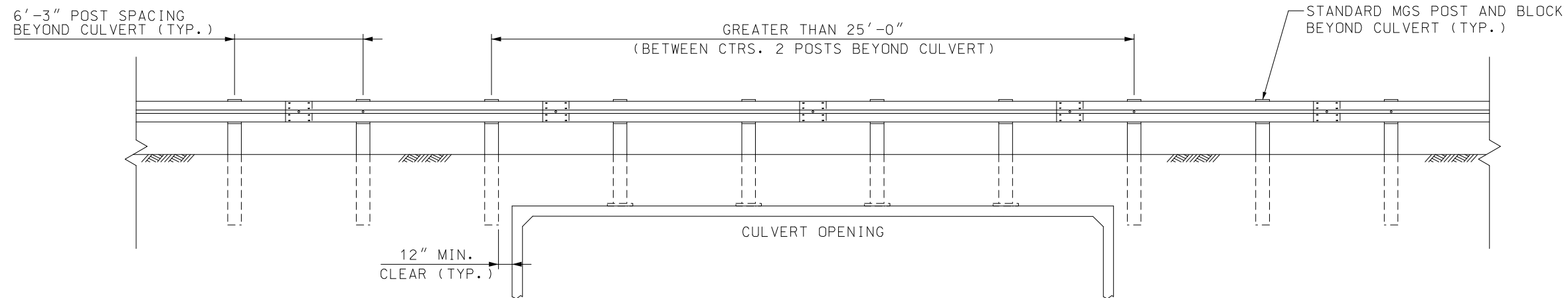
SECTION A-A

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p><b>MIDWEST GUARDRAIL SYSTEM (MGS) LONG SPAN GUARDRAIL</b></p>
<p>DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024</p>	<p>606.50F</p>
<p>SHEET NO. 7 OF 9</p>	


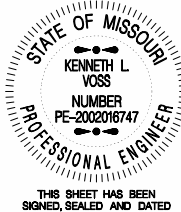


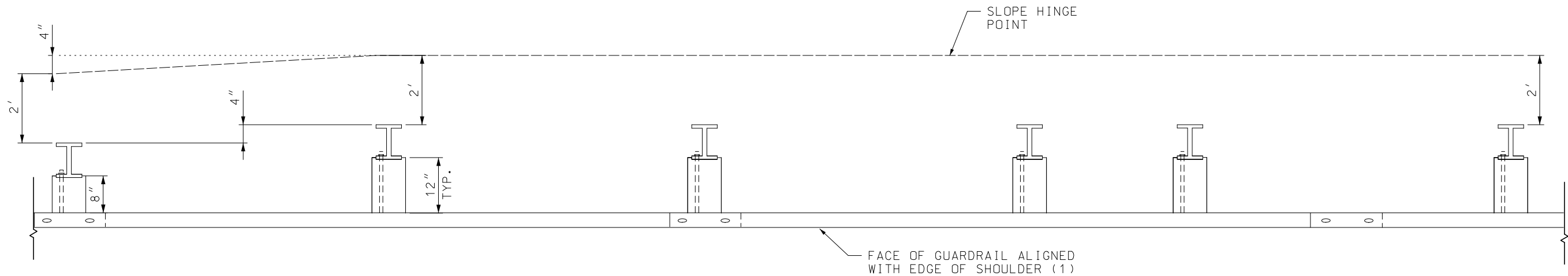
- (1) INSTALL A MINIMUM OF 37'-6" OF ADDITIONAL MGS GUARDRAIL BEFORE STARTING A TAPER OR RADIUS.
- (2) WHEN SITE CONSTRAINTS PROHIBIT OR EMBANKMENT CANNOT BE CONSTRUCTED TO PROVIDE A MINIMUM OF 2 FEET BETWEEN THE BACK OF THE GUARDRAIL POST AND SLOPE BREAK POINT, 8 FOOT POSTS SHALL BE USED (SEE SHEET 6).

PLAN VIEW

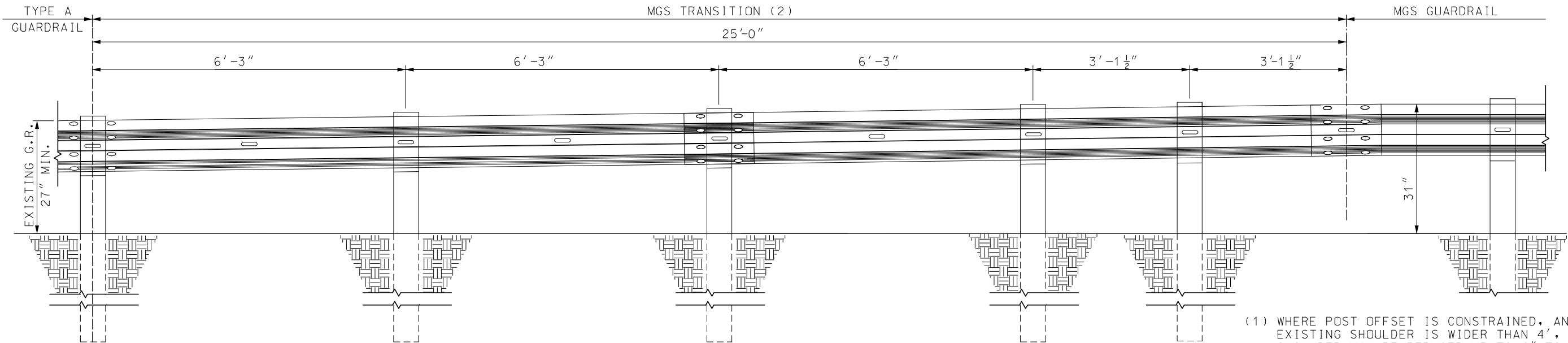


ELEVATION VIEW

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> <small>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</small>
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>ON CONCRETE BOX CULVERT</b>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/10/2024	<b>606.50F</b>
SHEET NO. <b>8 OF 9</b>	



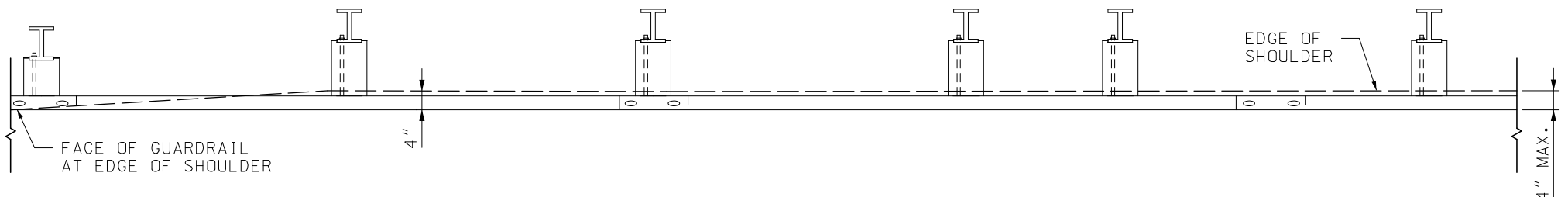
PLAN VIEW



MGS BLOCK AND HEIGHT TRANSITION FROM TYPE A GUARDRAIL TO MGS GUARDRAIL

(1) WHERE POST OFFSET IS CONSTRAINED, AND WHEN THE EXISTING SHOULDER IS WIDER THAN 4', THE EXISTING SHOULDER MAY BE REDUCED UP TO 4" TO ACCOMMODATE THE 12" BLOCKS OF THE MGS GUARDRAIL. WHERE SITE CONSTRAINTS PROHIBIT OR EMBANKMENT CANNOT BE CONSTRUCTED TO PROVIDE A MINIMUM OF 2' BETWEEN THE BACK OF THE GUARDRAIL POST AND SLOPE BREAK POINT, 8' POSTS SHALL BE USED (SEE SHEET 6). THE SUBSTITUTION OF 8' POSTS IN LIEU OF REQUIRED GRADING SHALL NOT BE ALLOWED.

(2) MGS TRANSITION FROM TYPE A GUARDRAIL SHALL BE COMPLETED OUTSIDE THE 50' MGS END TERMINAL LIMITS.



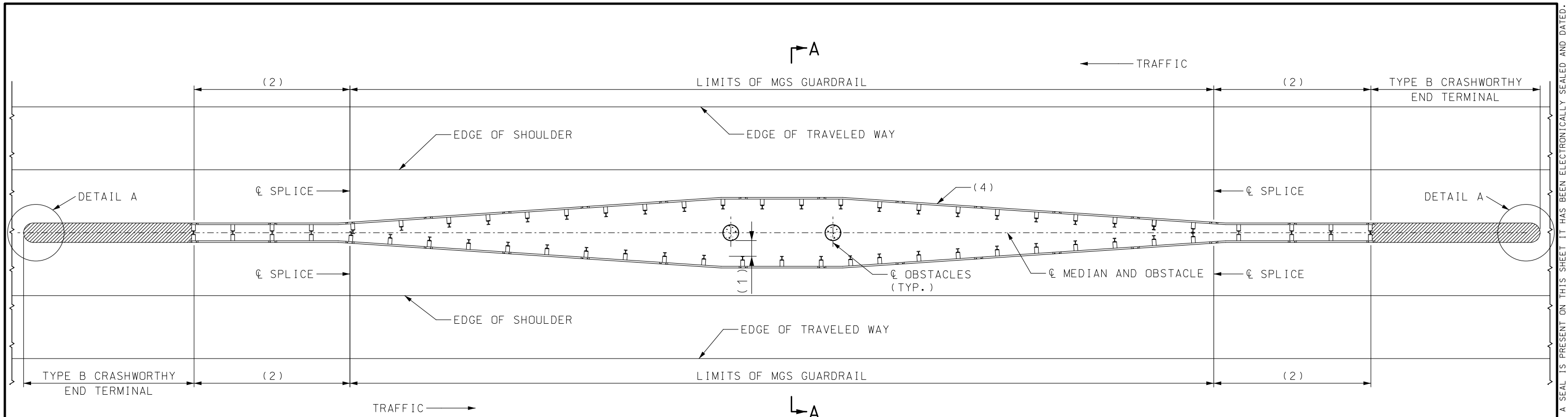
ALTERNATE PLAN VIEW - ALIGNMENT TAPER  
SEE NOTE (1)

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

STATE OF MISSOURI  
 KENNETH L. VOSS  
 NUMBER PE-2002016747  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

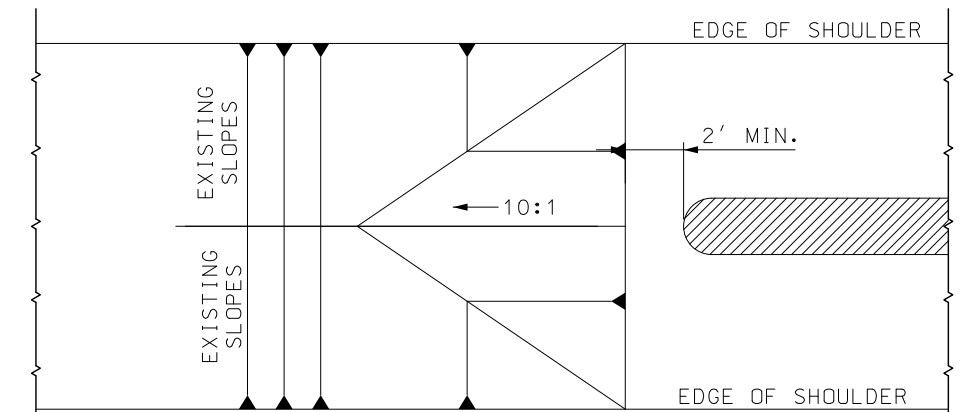
MIDWEST GUARDRAIL SYSTEM (MGS)  
 BLOCK AND HEIGHT TRANSITION

DATE EFFECTIVE: 7/1/2024	606.50F	SHEET NO. 9 OF 9
DATE PREPARED: 4/10/2024		

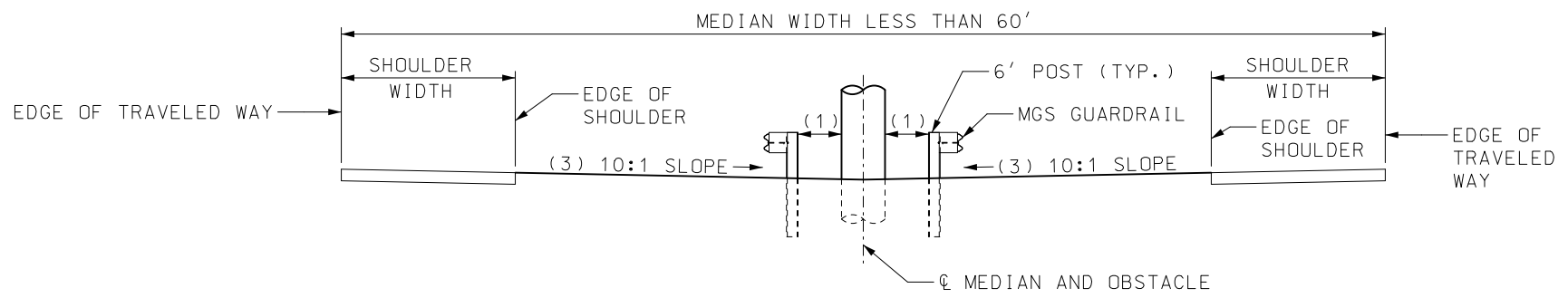


PIER AT Ø MEDIAN

- (1) 2'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACING IS PREFERRED  
 2'-0" MINIMUM CLEARANCE USE 3'-1 1/2" POST SPACING  
 1'-6" MINIMUM CLEARANCE USE 1'-6 3/4" POST SPACING  
 SEE STD. PLANS 606.50 FOR POST SPACING DETAILS.
- (2) TRANSITION DOUBLE FACED GUARDRAIL HEIGHT AND WIDTH IF NEEDED FOR TYPE B CRASHWORTHY END TERMINAL PER MANUFACTURER'S REQUIREMENTS. SEE STD. PLANS 606.50 FOR HEIGHT TRANSITION DETAILS.
- (3) CONTINUE 10:1 SLOPE TO OBSTACLE OR A MINIMUM OF 2' PAST THE BACK OF THE GUARDRAIL POST.
- (4) 15:1 FLARE RATE OR AS RECOMMENDED BY TABLE 5-9 OF THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE".



DETAIL A  
(GRADING LIMITS)



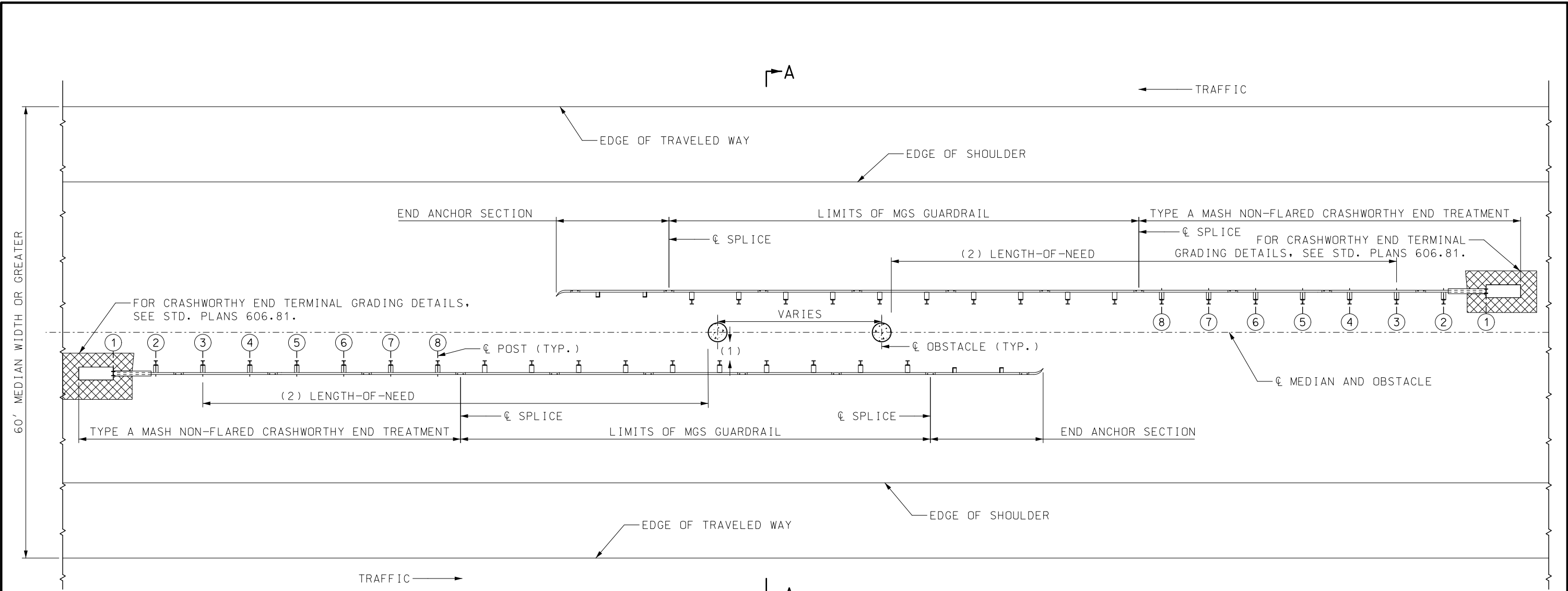
SECTION A-A

GENERAL NOTE:

TYPE B CRASHWORTHY END TERMINAL SHALL BE MGS COMPATIBLE, LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MGS GUARDRAIL          MEDIAN PIER          PROTECTION</b> MEDIAN LESS THAN 60'
DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021	<b>606.51</b>	SHEET NO. 1 OF 2

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

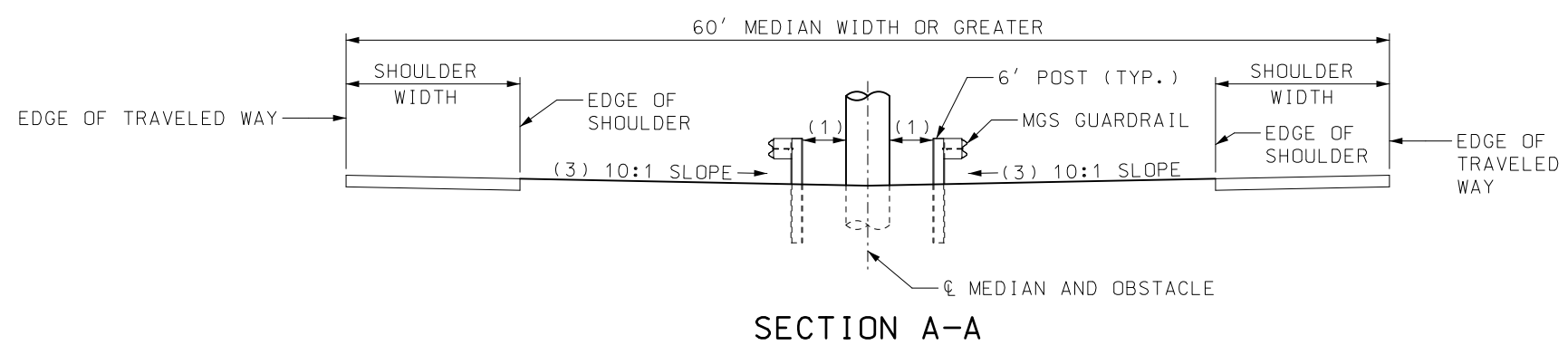


**PIER AT CL MEDIAN**


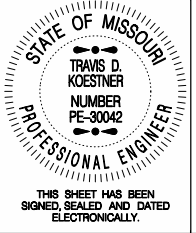
- (1) 2'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACING IS PREFERRED  
 2'-0" MINIMUM CLEARANCE USE 3'-11#2" POST SPACING  
 1'-6" MINIMUM CLEARANCE USE 1'-63#4" POST SPACING  
 SEE STD. PLANS 606.50 FOR POST SPACING DETAILS.
- (2) FOR LENGTH-OF-NEED, SEE THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE 5.6.4 LENGTH-OF-NEED".
- (3) CONTINUE 10:1 SLOPE TO OBSTACLE OR A MINIMUM OF 2' PAST THE BACK OF THE GUARDRAIL POST.

**GENERAL NOTE:**  
 MEDIAN WIDTHS GREATER THAN 60' THAT THE PIER OBSTACLES ARE BEYOND THE CLEAR-ZONE DO NOT REQUIRE MEDIAN PIER PROTECTION. FOR CLEAR-ZONE DISTANCES, SEE THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE 3.1 THE CLEAR-ZONE CONCEPT".

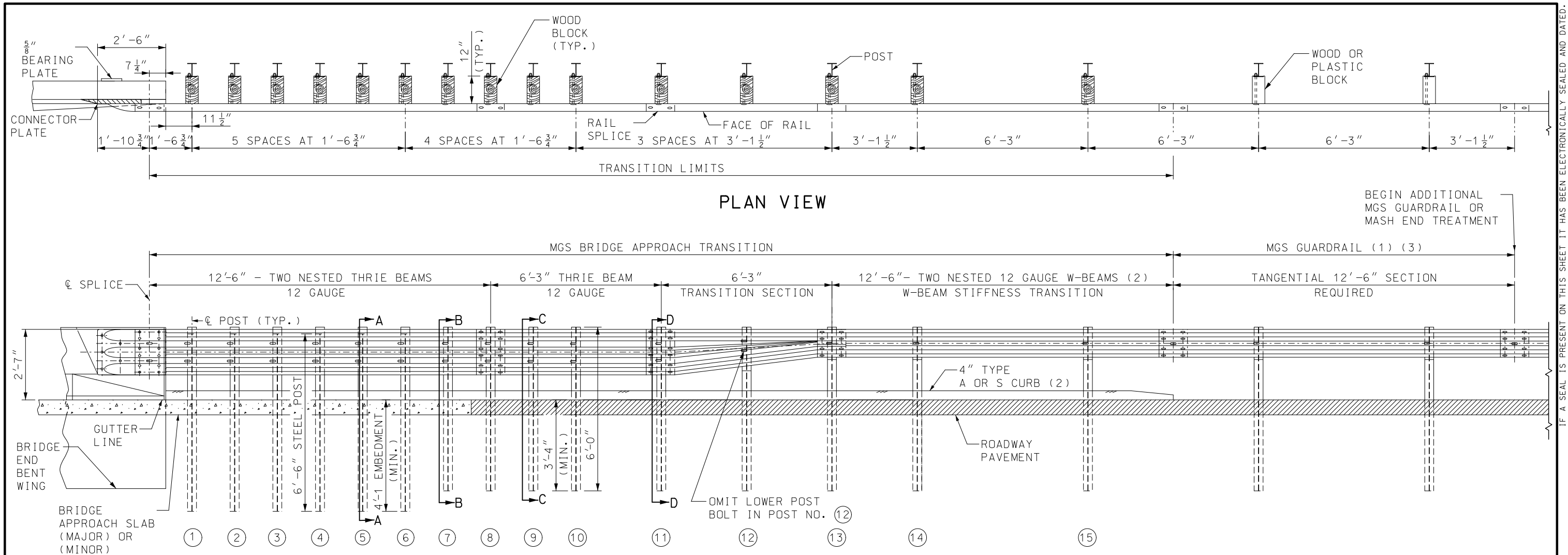
TYPE A NON-FLARED CRASHWORTHY END TERMINAL SHALL BE THE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.



**SECTION A-A**

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p><b>MGS GUARDRAIL MEDIAN PIER PROTECTION</b></p> <p>60' MEDIAN OR GREATER</p>
DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021	<p><b>606.51</b></p>
SHEET NO. 2 OF 2	

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



PLAN VIEW

BRIDGE APPROACH TRANSITION (EXTENDED CURB)(2)

GENERAL NOTES:

MGS GUARDRAIL SHALL BE TANGENTIAL WITH BRIDGE APPROACH TRANSITION FOR 12'-6" BEYOND THE TWO NESTED W-BEAM STIFFNESS TRANSITION AND 25'-0" BEYOND THRIE BEAM TRANSITION SECTION.

AT THE CONTRACTORS OPTION, A SINGLE 18'-9" PIECE OF THRIE BEAM MAY BE SUBSTITUTED FOR ONE OF THE 12'-6" PANELS AND THE 6'-3" SECTION AS SHOWN.

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

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE 5/8" BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = 3/8" MIN.).



THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.

ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

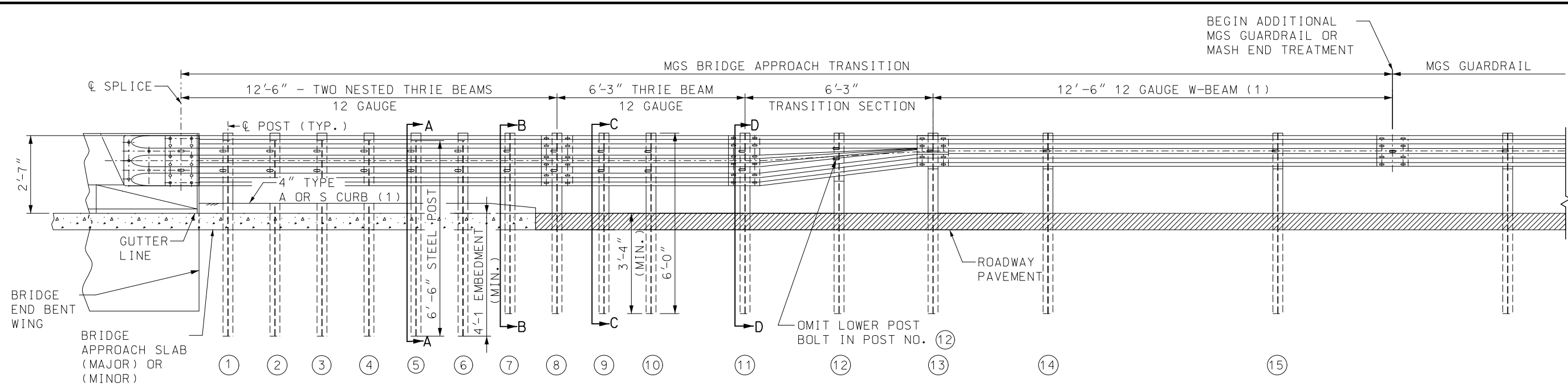
THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (EXTENDED CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE CONTRACTOR MAY, AT THEIR OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.

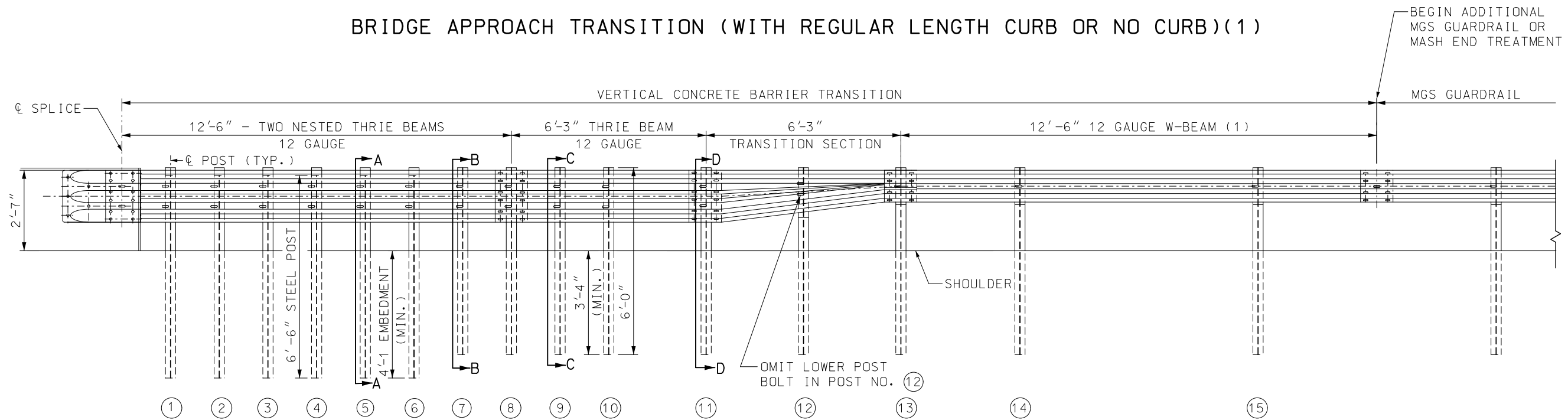
- (1) PLACE THE FIRST POST OF THE MGS 6'-3" PAST THE LAST POST OF THE BRIDGE APPROACH TRANSITION TO KEEP POSTS OFFSET FROM THE RAIL SPLICES.
- (2) WHERE CURB EXTENDS UPSTREAM OF POST NO. (11) FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. (13)). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. WHEN CURBS DO NOT EXTEND UPSTREAM OF POST NO. (11), PAY FOR A BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB). FOR DETAILS OF BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB), SEE SHEET 2 OF 6.
- (3) THE ADDITIONAL REQUIRED MGS GUARDRAIL IS INCLUDED IN THE TOTAL LENGTH OF NEED AND SHALL BE PAID FOR AS A GUARDRAIL PAY ITEM.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS</b>
DATE EFFECTIVE: 07/01/2021 DATE PREPARED: 4/29/2021	SHEET NO. 606.60B 1 OF 6

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



BRIDGE APPROACH TRANSITION (WITH REGULAR LENGTH CURB OR NO CURB)(1)



VERTICAL CONCRETE BARRIER TRANSITION (REGULAR LENGTH CURB OR NO CURB)(1)  
(VIEW SHOWN WITHOUT CURB)

GENERAL NOTES:  
SEE SHEET 1 FOR ADDITIONAL NOTES NOT INCLUDED ON THIS SHEET.

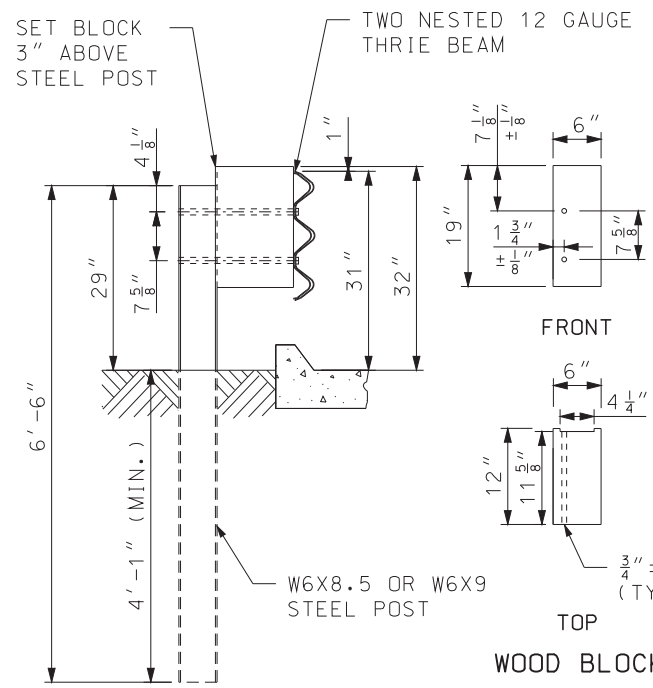
THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (REGULAR/NO CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

(1) WHERE CURB EXTENDS UPSTREAM OF POST NO. (11) FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. (13)). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. IF CURB EXTENDS BEYOND POST NO. (11), PAY FOR A BRIDGE APPROACH TRANSITION (EXTENDED CURB).

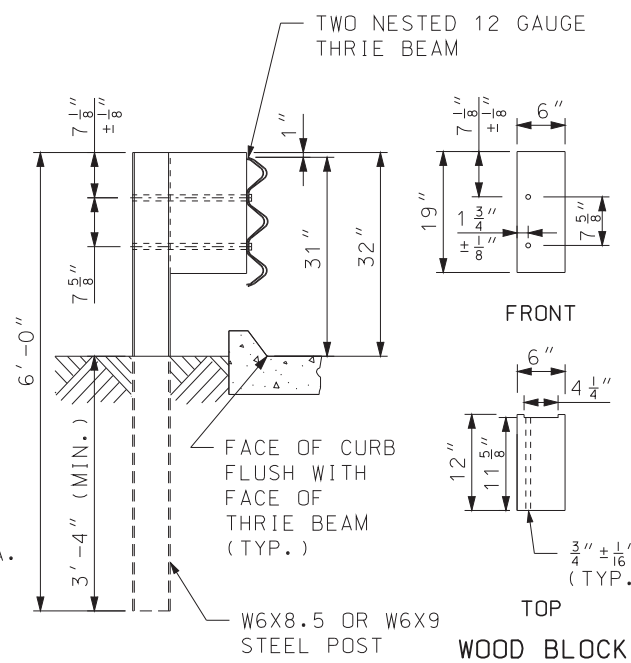
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS</b>
DATE EFFECTIVE: 07/01/2021 DATE PREPARED: 5/5/2021	<b>606.60B</b>	SHEET NO. <b>2 OF 6</b>

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

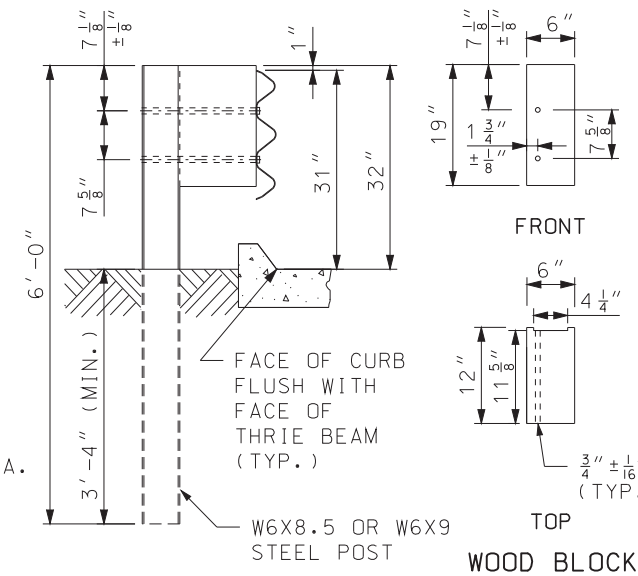




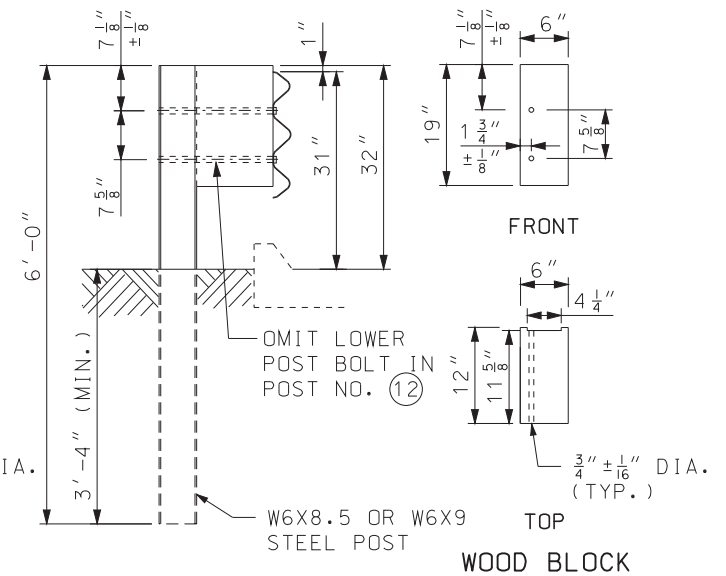
SECTION A-A



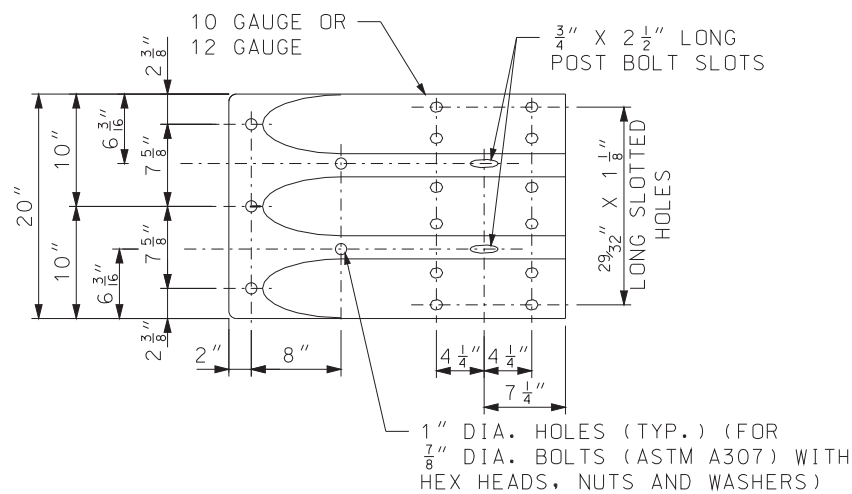
SECTION B-B



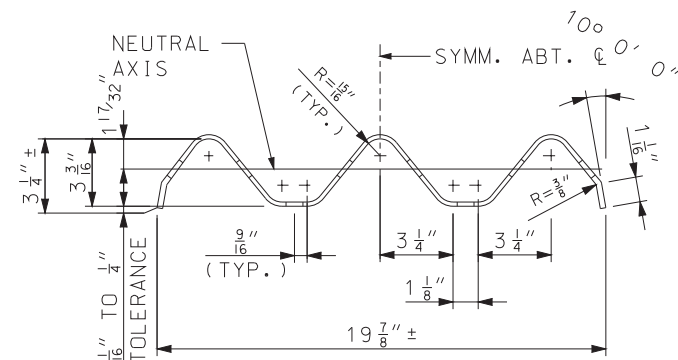
SECTION C-C



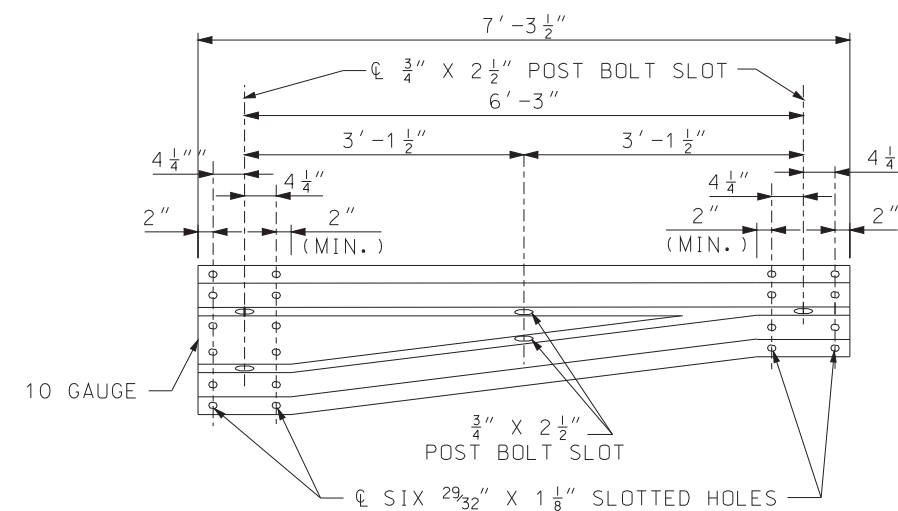
SECTION D-D



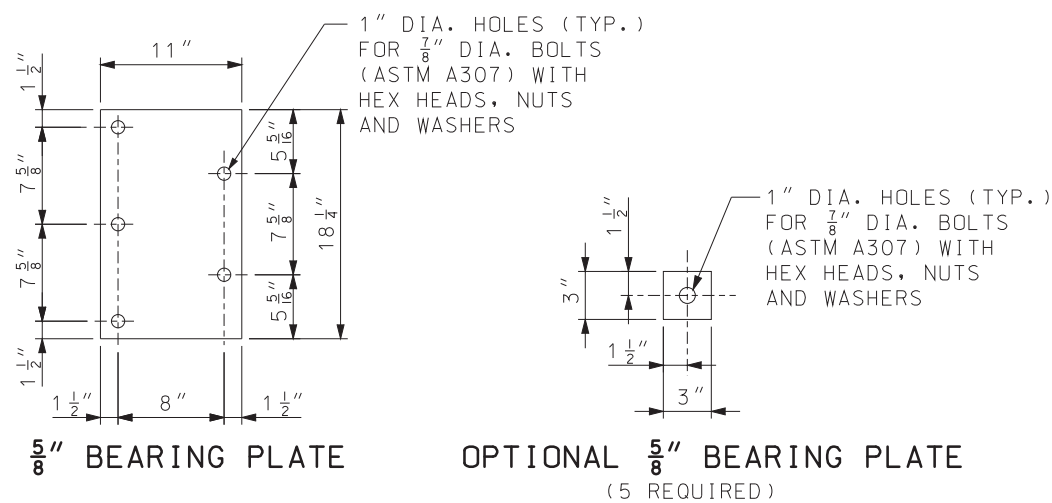
TERMINAL CONNECTOR



SECTION THROUGH THRIE BEAM RAIL

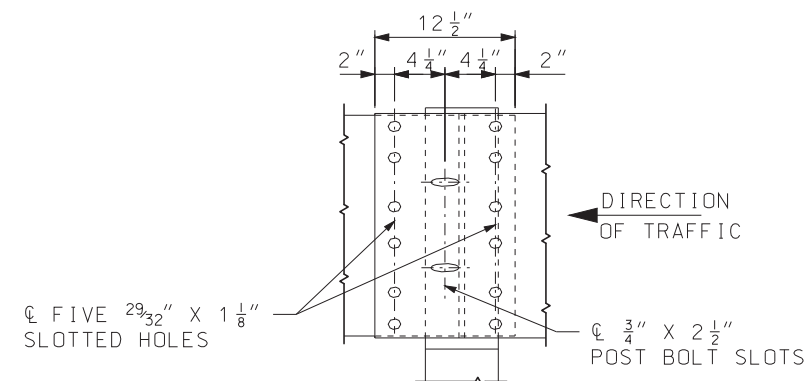


TRANSITION SECTION


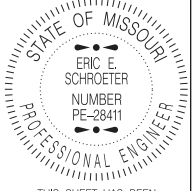


5/8" BEARING PLATE

OPTIONAL 5/8" BEARING PLATE (5 REQUIRED)



THRIE BEAM RAIL SPLICE AT POST

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>  <b>VERTICAL BARRIER TRANSITIONS</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	SHEET NO. <b>606.60B</b> <b>3 OF 6</b>

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

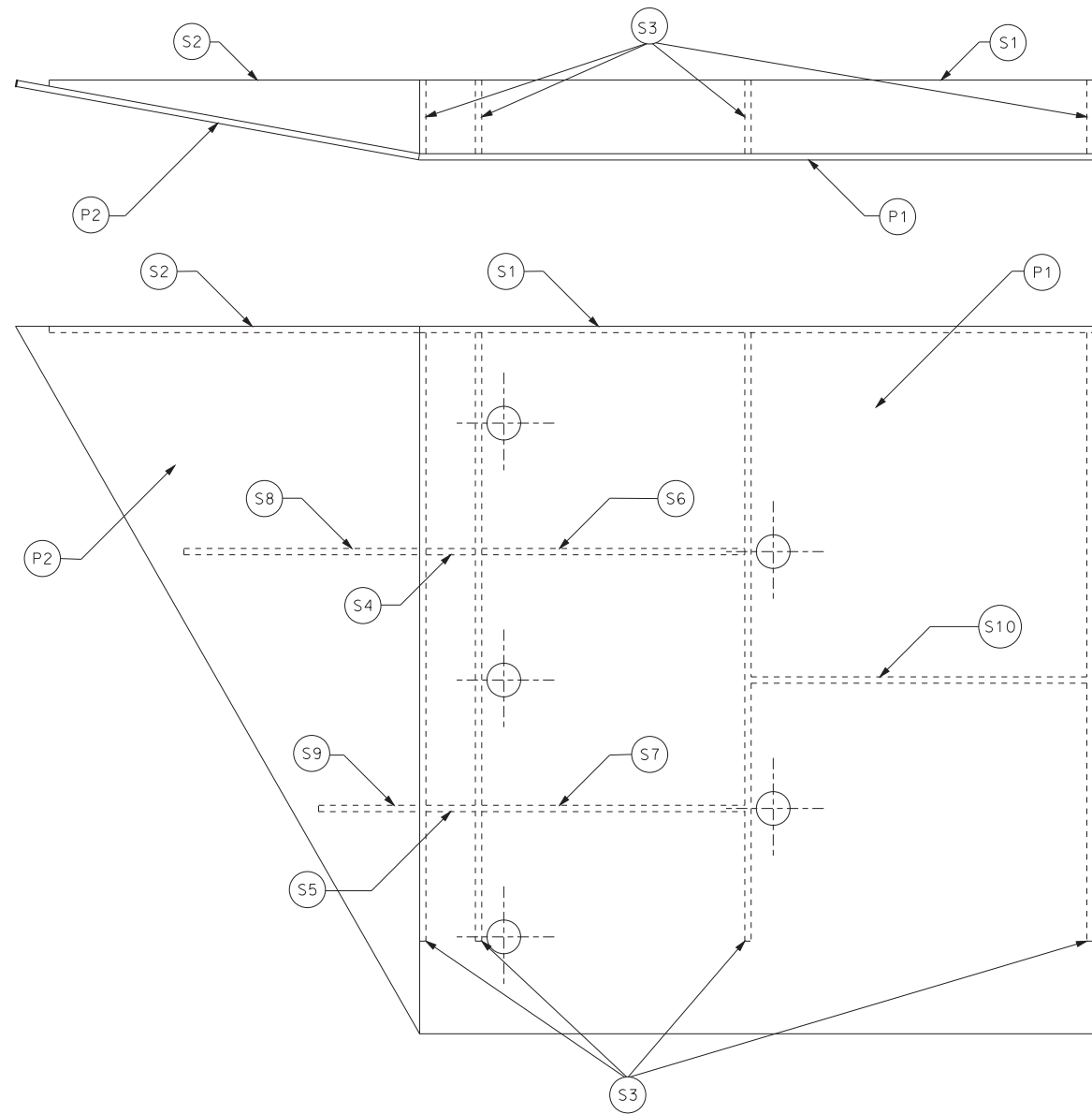
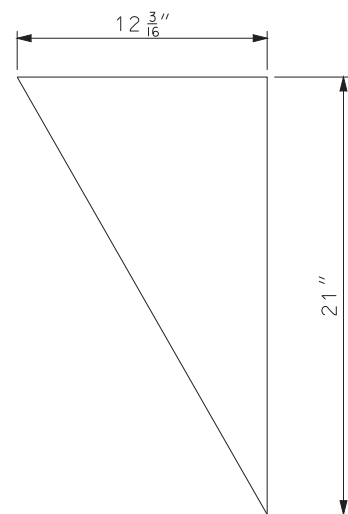
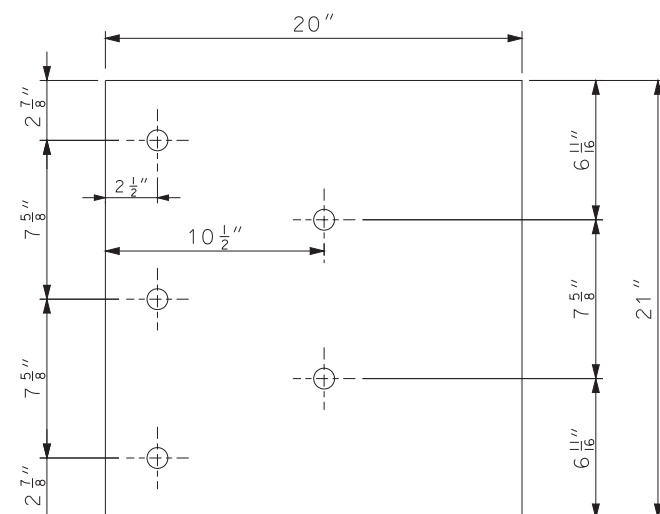


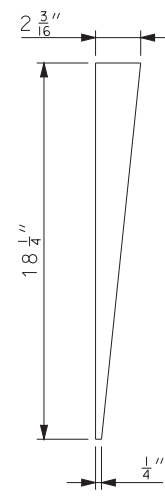
PLATE AND STIFFENER IDENTIFICATION



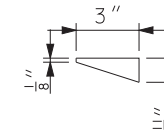
(P2) COVER PLATE #2



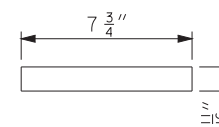
(P1) COVER PLATE #1



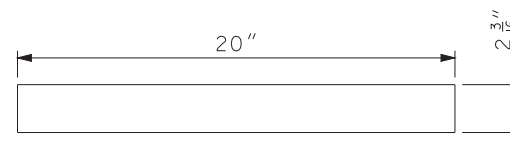
(S3) STIFFENER #3: 4 EACH



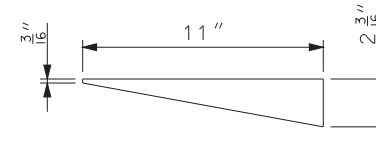
(S9) STIFFENER #9: 1 EACH



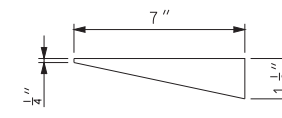
(S7) STIFFENER #7: 1 EACH



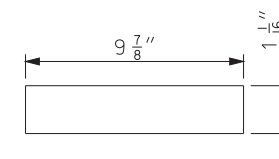
(S1) STIFFENER #1: 1 EACH



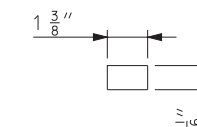
(S2) STIFFENER #2: 1 EACH



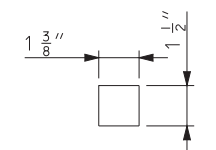
(S8) STIFFENER #8: 1 EACH



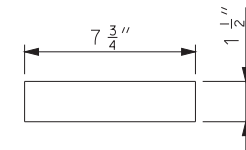
(S10) STIFFENER #10: 1 EACH




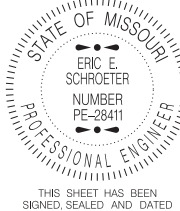
(S5) STIFFENER #5: 1 EACH



(S4) STIFFENER #4: 1 EACH

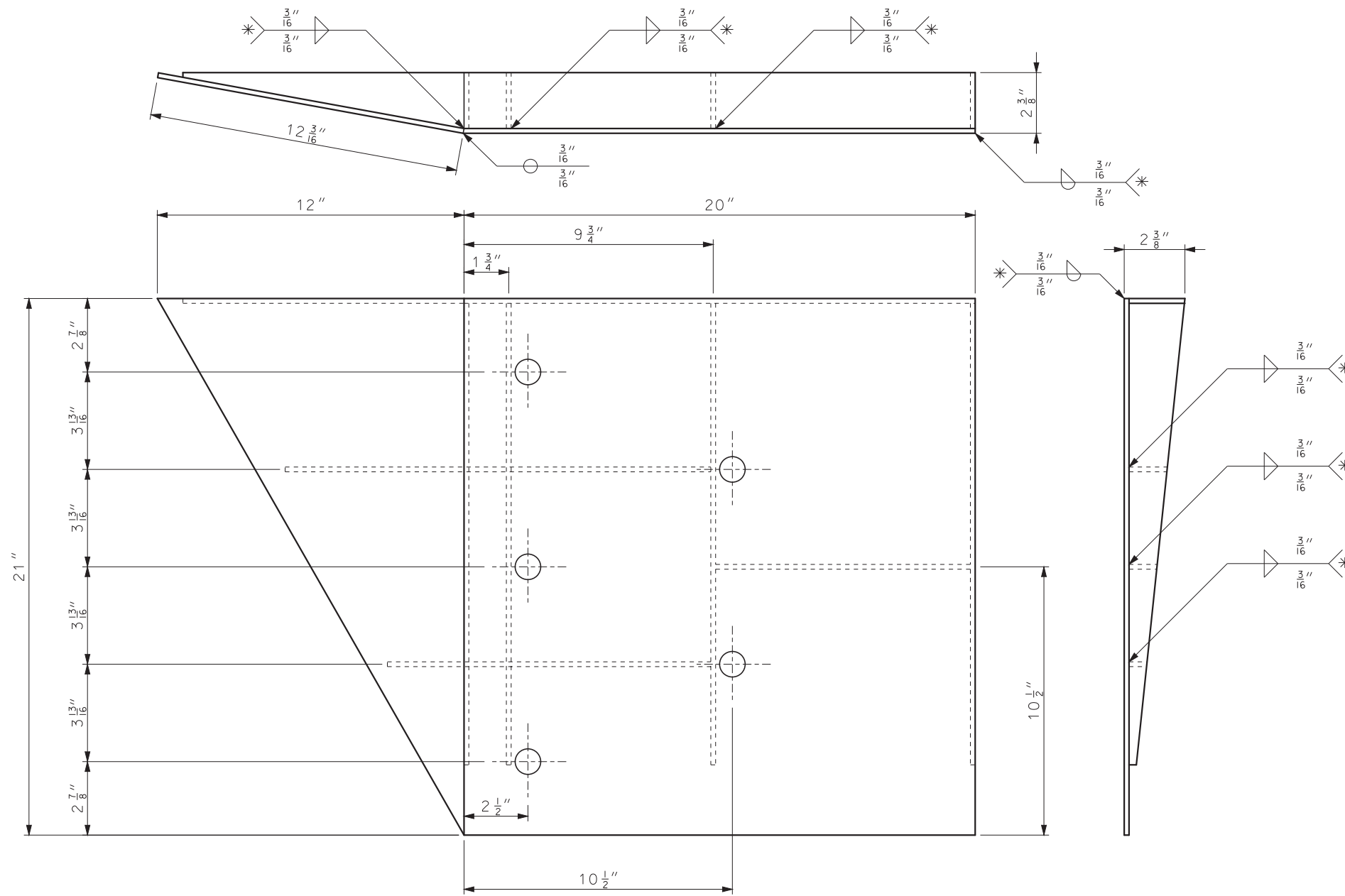


(S6) STIFFENER #6: 1 EACH

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>VERTICAL BARRIER TRANSITIONS</b> <b>(CONNECTOR PLATE DETAIL)</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	SHEET NO. <b>606.60B</b> <b>4 OF 6</b>

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

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



**WELDING INSTRUCTION**

\* ALL FILLET WELDS SHALL BE 1" LONG SPACED AT 2".

**GENERAL NOTES:**


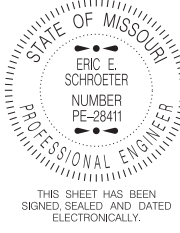
COVER PLATE PANELS ARE  $\frac{3}{16}$ " THICK.

ALL STIFFENERS ARE  $\frac{1}{4}$ " THICK.

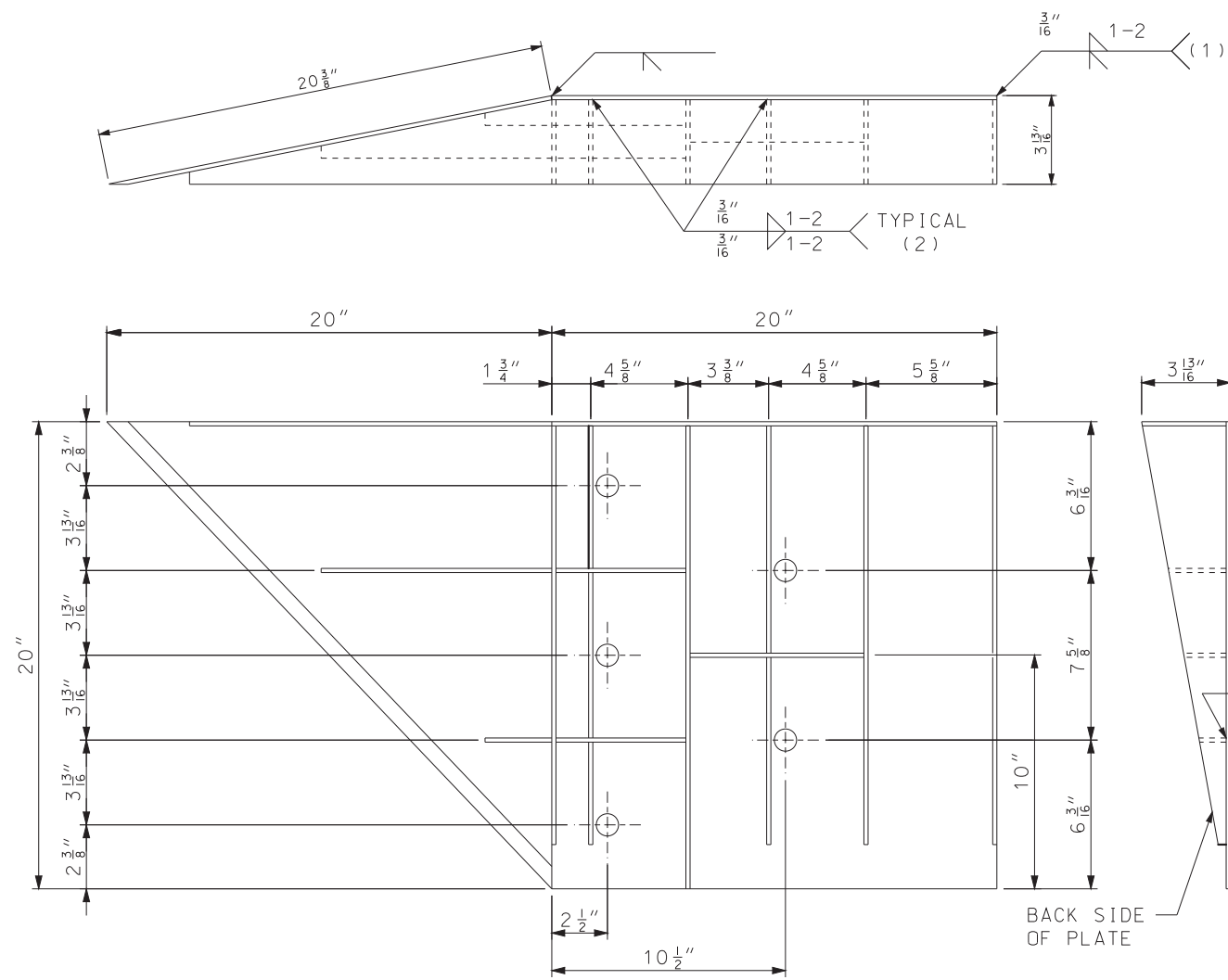
CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

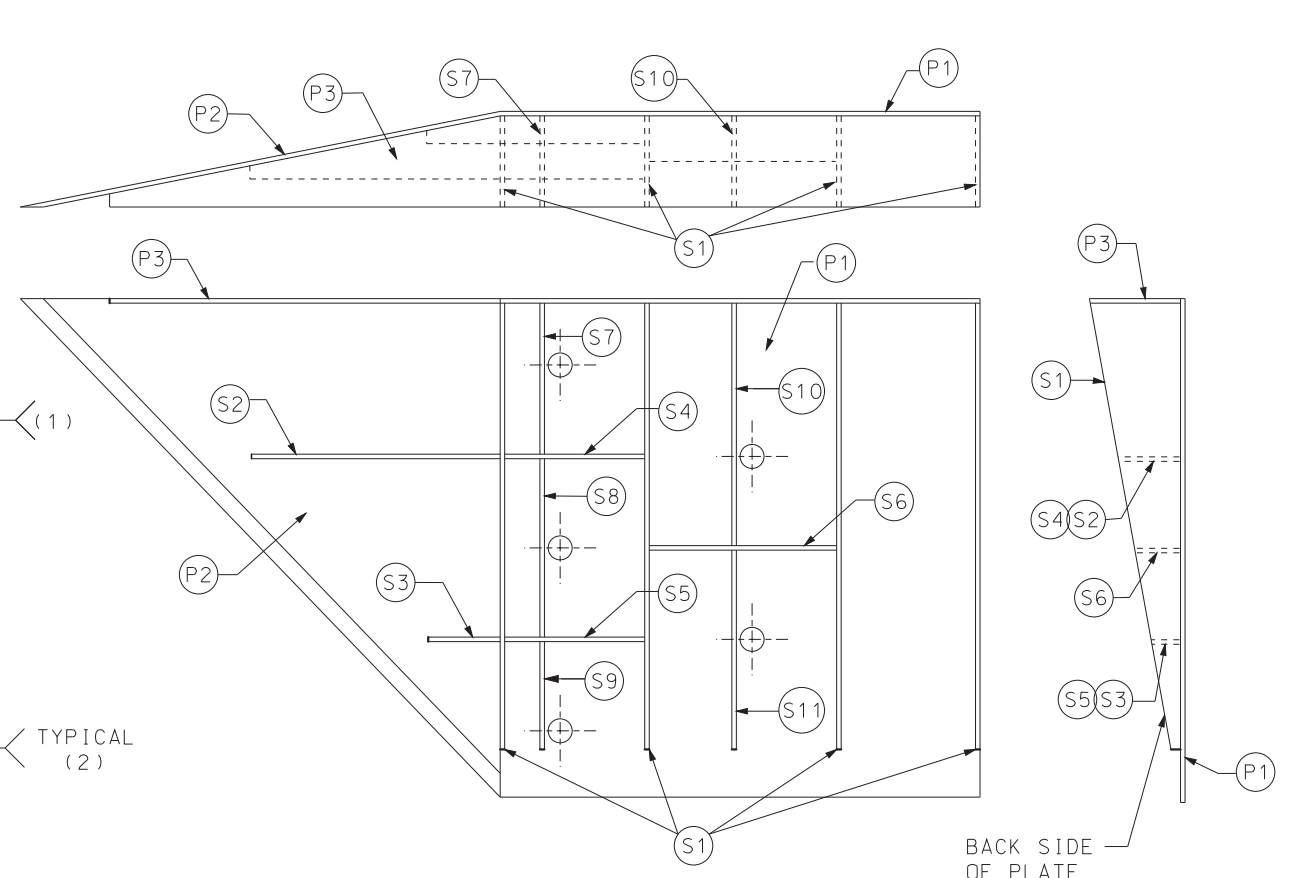
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>VERTICAL BARRIER TRANSITIONS</b> <b>(CONNECTOR PLATE DETAIL)</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	<b>606.60B</b>	SHEET NO. <b>5 OF 6</b>

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



**WELDING INSTRUCTION**  
(VIEWED FROM BACK SIDE OF PLATE)

- (1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:  
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND  $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- (2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:  
 $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2".



**PLATE AND STIFFENER IDENTIFICATION**  
(VIEWED FROM BACK SIDE OF PLATE)

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE	QUANTITY	SHAPE	SIZE (A x B x C x D)	THICKNESS
P1	1		20" x 20"	$\frac{3}{16}$ "
P2	1		20" x 20" x 28 $\frac{3}{16}$ "	$\frac{3}{16}$ "
P3	1		39" x 3 $\frac{5}{8}$ " x 20" x 19 $\frac{5}{16}$ "	$\frac{3}{16}$ "
S1	4		18 $\frac{7}{16}$ " x 3 $\frac{5}{8}$ " x 18 $\frac{3}{4}$ "	$\frac{1}{4}$ "
S2	1		10 $\frac{1}{4}$ " x 2 $\frac{7}{16}$ " x 10 $\frac{3}{8}$ " x $\frac{1}{2}$ "	$\frac{1}{4}$ "
S3	1		3" x 1 $\frac{1}{16}$ " x 3 $\frac{1}{8}$ " x $\frac{1}{2}$ "	$\frac{1}{4}$ "
S4	1		6 $\frac{1}{8}$ " x 2 $\frac{7}{16}$ "	$\frac{1}{4}$ "
S5	1		6 $\frac{1}{8}$ " x 1 $\frac{1}{16}$ "	$\frac{1}{4}$ "
S6	1		7 $\frac{3}{4}$ " x 1 $\frac{3}{4}$ "	$\frac{1}{4}$ "
S7	1		2 $\frac{3}{16}$ " x 6" x 3 $\frac{5}{8}$ " x 5 $\frac{7}{8}$ "	$\frac{1}{4}$ "
S8	1		1 $\frac{5}{32}$ " x 7 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " x 7 $\frac{3}{8}$ "	$\frac{1}{4}$ "
S9	1		6 $\frac{1}{16}$ " x 6 $\frac{3}{16}$ " x 1 $\frac{3}{32}$ "	$\frac{1}{4}$ "
S10	1		1 $\frac{7}{8}$ " x 9 $\frac{7}{8}$ " x 3 $\frac{5}{8}$ " x 9 $\frac{11}{16}$ "	$\frac{1}{4}$ "
S11	1		8 $\frac{1}{2}$ " x 8 $\frac{3}{4}$ " x 1 $\frac{13}{16}$ "	$\frac{1}{4}$ "

GENERAL NOTES:  
 COVER PLATE PANELS ARE  $\frac{3}{16}$ " THICK.  
 ALL STIFFENERS ARE  $\frac{1}{4}$ " THICK.  
 CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.  
 FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.  
 ALL HOLE DIAMETERS SHALL BE 1".

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**MIDWEST GUARDRAIL SYSTEM (MGS)**

**VERTICAL BARRIER TRANSITIONS**

**(CONNECTOR PLATE DETAIL)**

**SINGLE SLOPE BARRIERS**

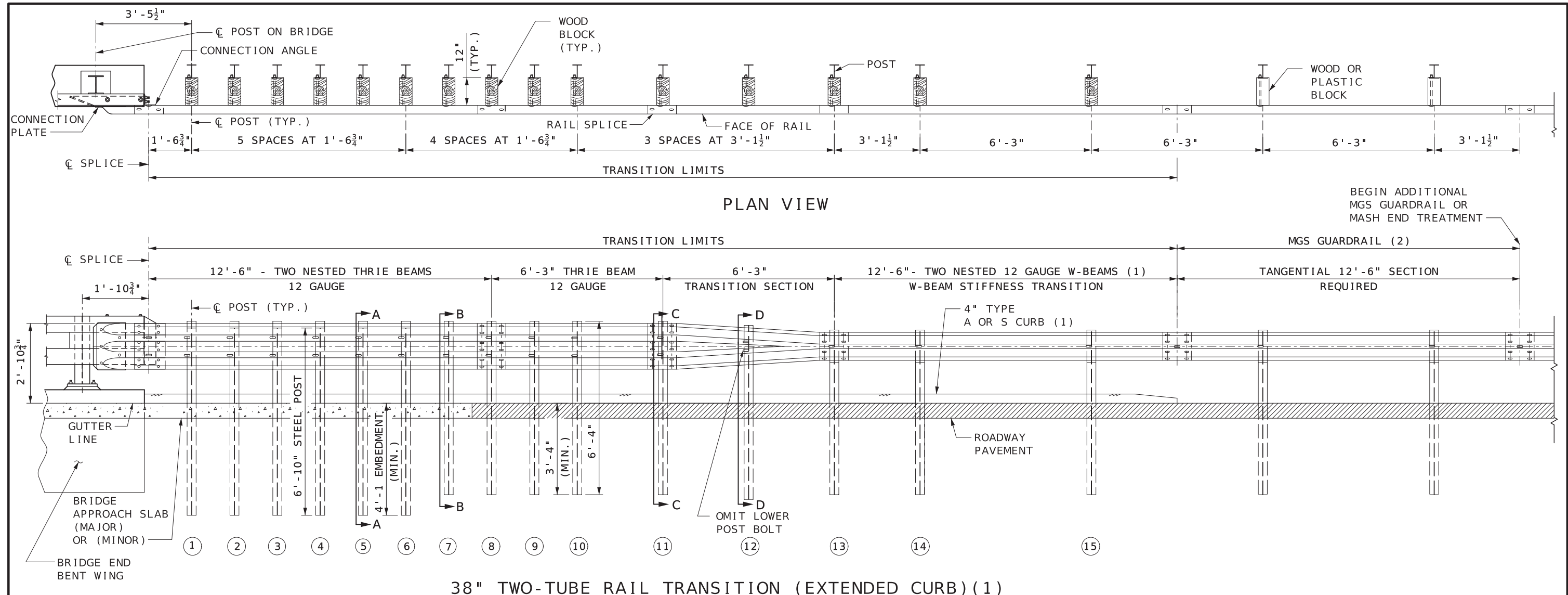
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2017

DATE PREPARED: 5/1/2017

SHEET NO.

**6 OF 6**



38" TWO-TUBE RAIL TRANSITION (EXTENDED CURB) (1)

GENERAL NOTES:

MGS GUARDRAIL SHALL BE TANGENTIAL WITH BRIDGE APPROACH TRANSITION FOR 12'-6" BEYOND THE TWO NESTED W-BEAM STIFFNESS TRANSITION AND 25'-0" BEYOND THRIE BEAM TRANSITION SECTION.

AT THE CONTRACTORS OPTION, A SINGLE 18'-9" PIECE OF THRIE BEAM MAY BE SUBSTITUTED FOR ONE OF THE 12'-6" PANELS AND THE 6'-3" SECTION AS SHOWN.

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

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE 5/8" BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = 3/8" MIN.).

THE CONNECTION PLATE AND ANGLE SHALL BE FABRICATED FROM ASTM A709 GRADE 50 STEEL AND GALVANIZED.

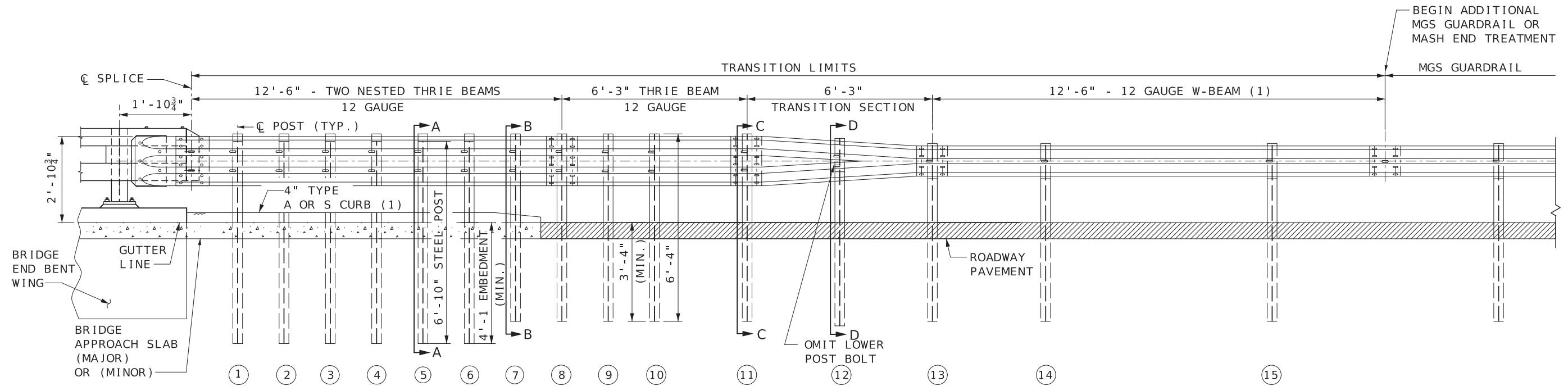
ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (EXTENDED CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

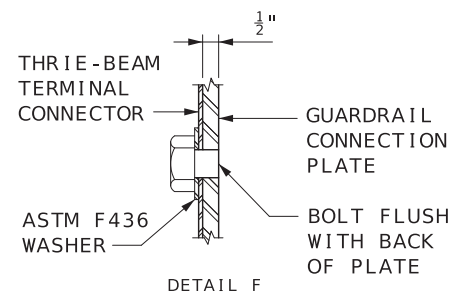
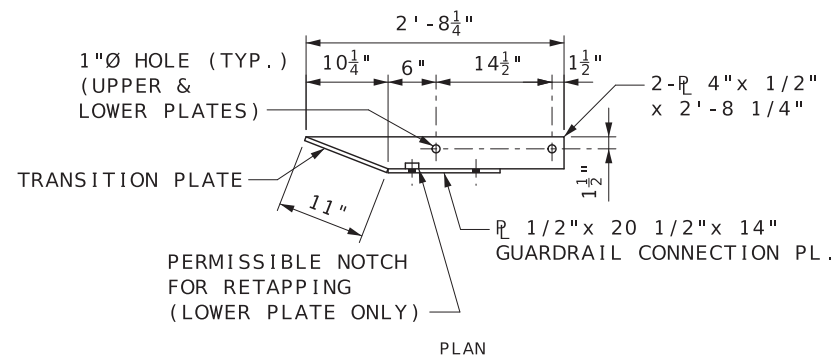
THE CONTRACTOR MAY, AT THEIR OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.

- (1) WHERE CURB EXTENDS UPSTREAM OF POST NO. (11) FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. (13)). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. WHEN CURBS DO NOT EXTEND UPSTREAM OF POST NO. (11), PAY FOR A TWO-TUBE RAIL TRANSITION (REGULAR CURB/NO CURB). FOR DETAILS OF TWO-TUBE RAIL TRANSITION (REGULAR CURB/NO CURB), SEE SHEET 2 OF 3.
- (2) THE ADDITIONAL REQUIRED MGS GUARDRAIL IS INCLUDED IN THE TOTAL LENGTH OF NEED AND SHALL BE PAID FOR AS A GUARDRAIL PAY ITEM.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>38-INCH TWO-TUBE RAIL TRANSITIONS</b>
DATE EFFECTIVE: 4/1/2024 DATE PREPARED: 1/9/2024	<b>606.61</b>	SHEET NO. <b>1 OF 3</b>



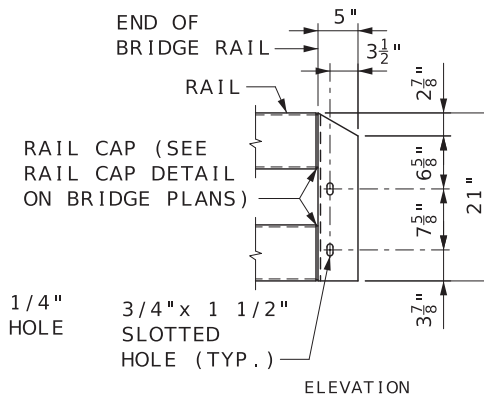
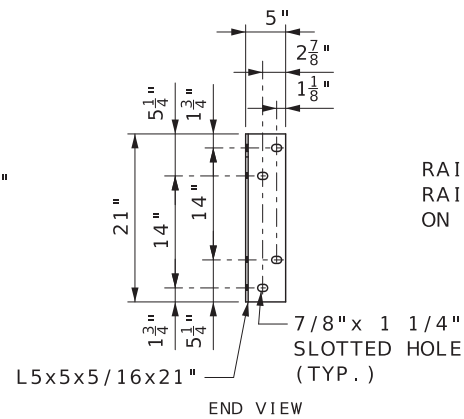
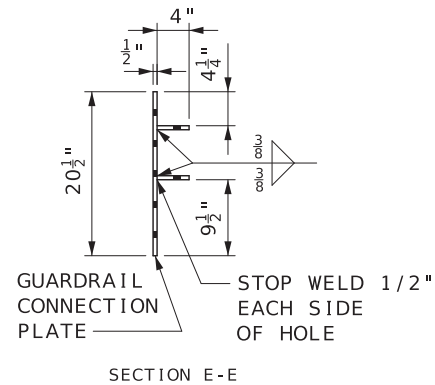
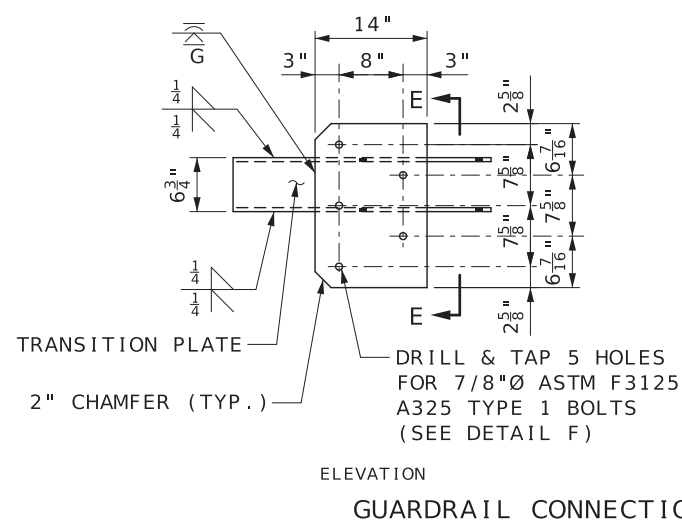
38" TWO-TUBE RAIL TRANSITION (WITH REGULAR LENGTH CURB OR NO CURB) (1)



GENERAL NOTES:  
SEE SHEET 1 FOR ADDITIONAL NOTES NOT INCLUDED ON THIS SHEET.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (REGULAR/NO CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

(1) WHERE CURB EXTENDS UPSTREAM OF POST NO. (11) FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. (13)). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. IF CURB EXTENDS BEYOND POST NO. (11), PAY FOR A TWO-TUBE RAIL TRANSITION (EXTENDED CURB). FOR DETAILS OF TWO-TUBE RAIL TRANSITION (EXTENDED CURB), SEE SHEET 1 OF 3.



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

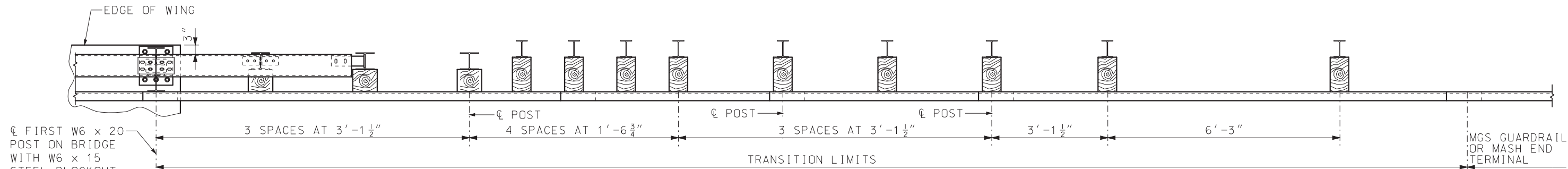
**MIDWEST GUARDRAIL SYSTEM (MGS)**  
**38-INCH TWO-TUBE RAIL TRANSITIONS**

STATE OF MISSOURI  
KENNETH L. VOSS  
NUMBER PE-2002016747  
PROFESSIONAL ENGINEER

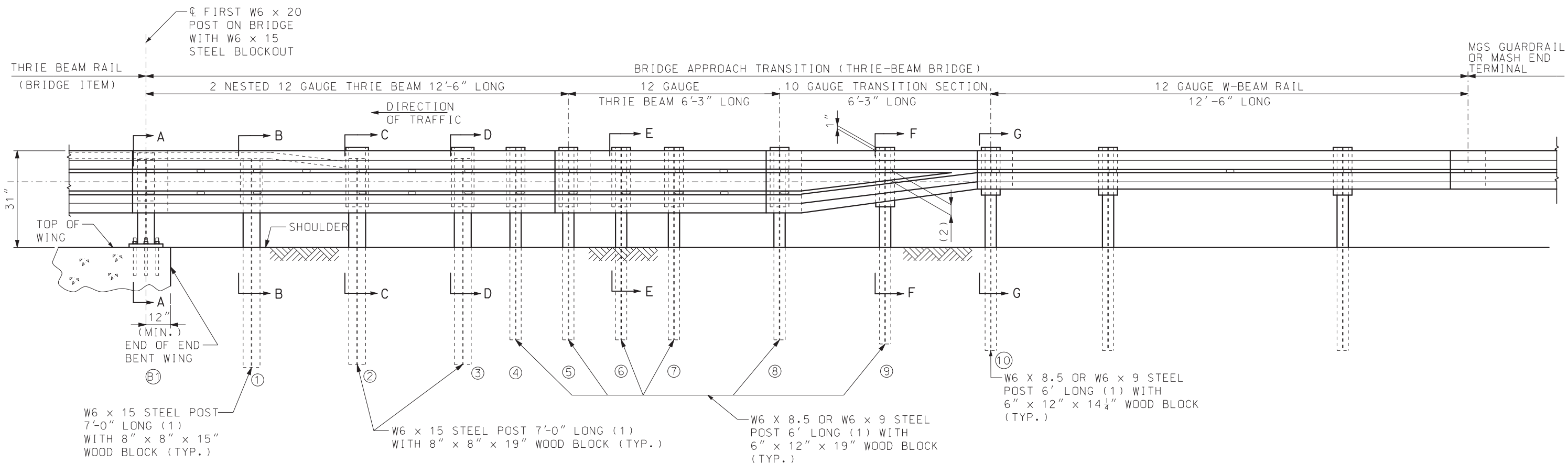
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.



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



PLAN



PART SECTION THROUGH SLAB AT END OF WING

NOTES:

FOR GENERAL NOTES, SEE SHEET 2 OF 5.

FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

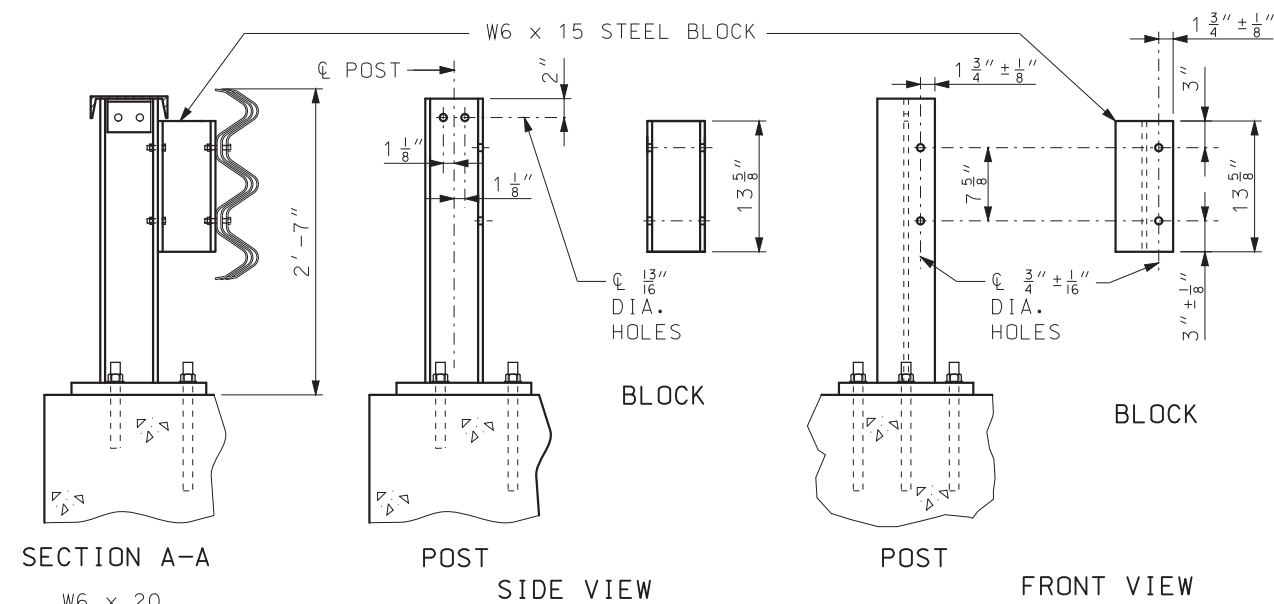
(1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.

(2) VERIFY BY RAIL TRANSITION PRODUCER.

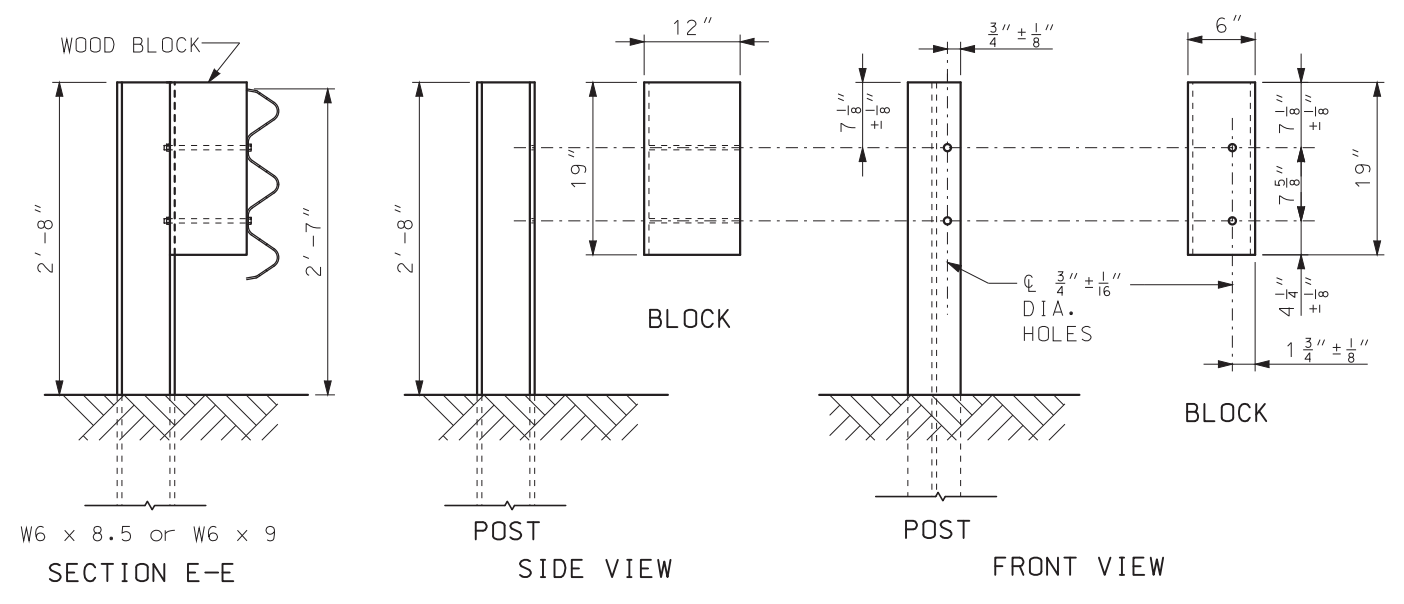
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS) BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE)</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	606.70B	SHEET NO. 1 OF 5



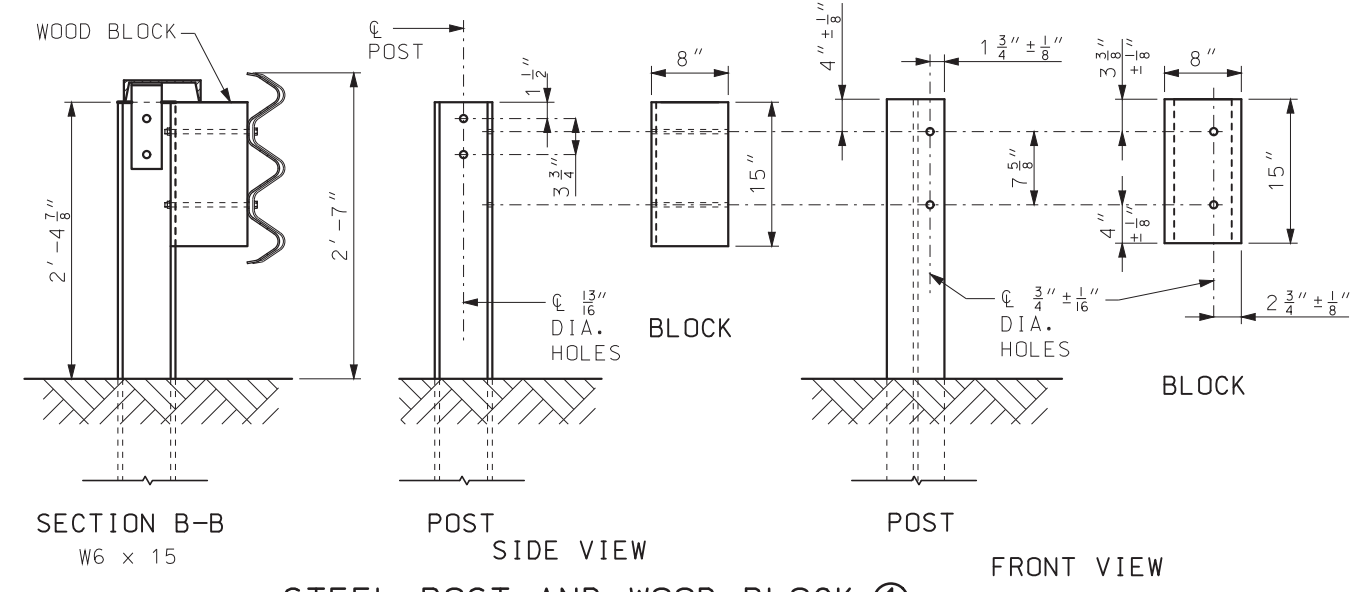
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



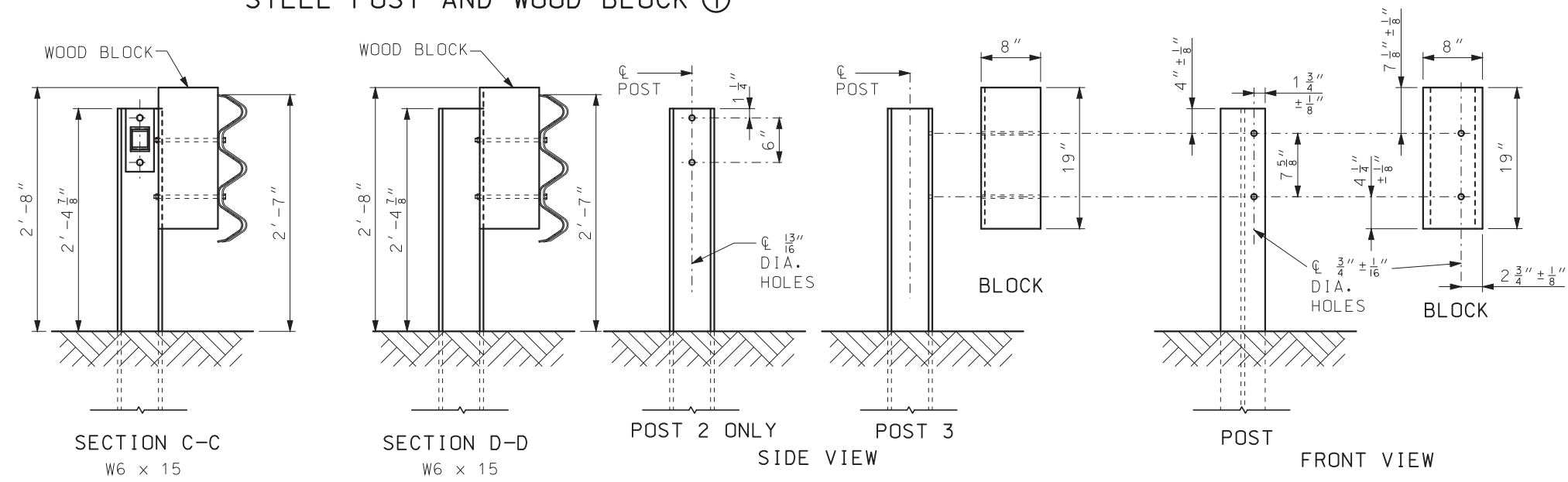
STEEL POST AND STEEL BLOCK (B1)



STEEL POST AND WOOD BLOCK (4) THROUGH (8)



STEEL POST AND WOOD BLOCK (1)

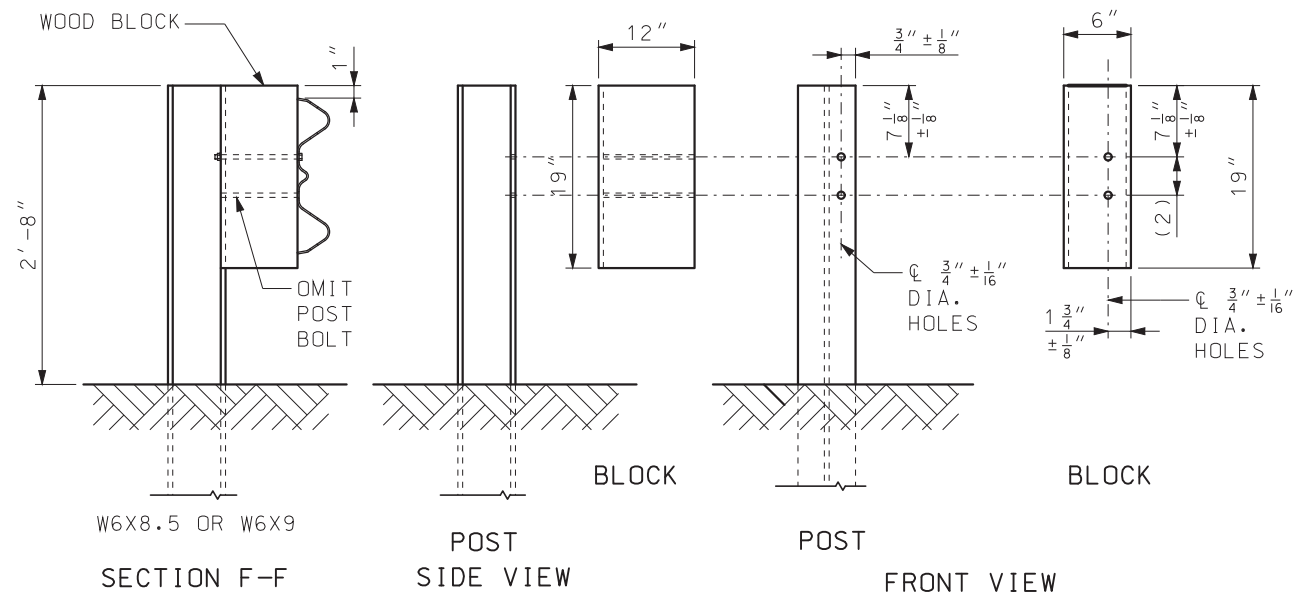


STEEL POST AND WOOD BLOCK (2) and (3)

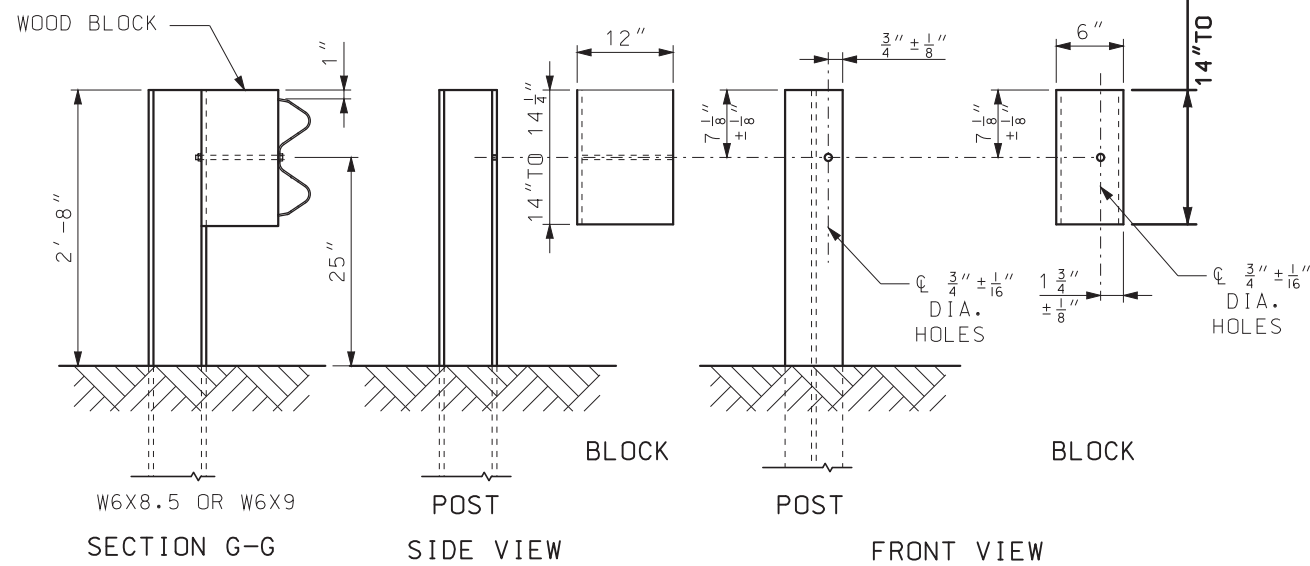
GENERAL NOTES:

- DESIGN BASED UPON MASH TEST LEVEL 3 (TL-3).
- FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.
- FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.
- RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.
- USE 5/8" BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS = 3/8" MIN.) AT ALL SLOTS.
- ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.
- THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.
- THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.
- FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL SHEET.

<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>BRIDGE APPROACH TRANSITION</b> <b>(THRIE BEAM ON BRIDGE)</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	<b>606.70B</b>
SHEET NO. <b>2 OF 5</b>	

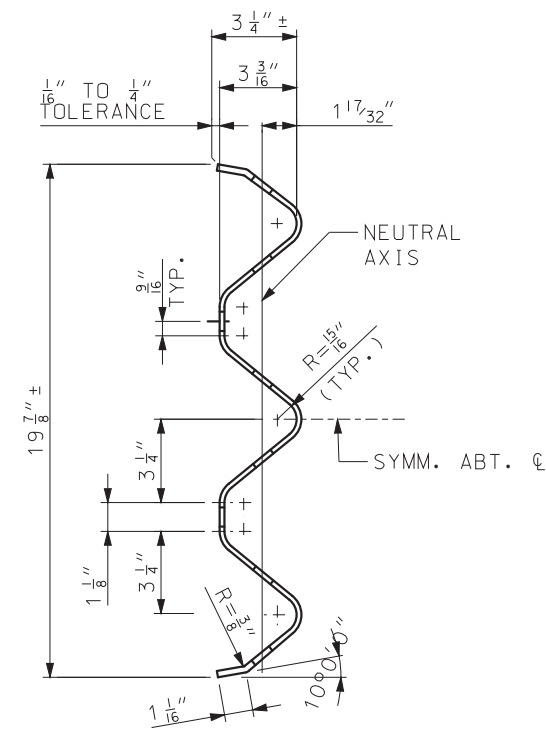


STEEL POST AND WOOD BLOCK (9)

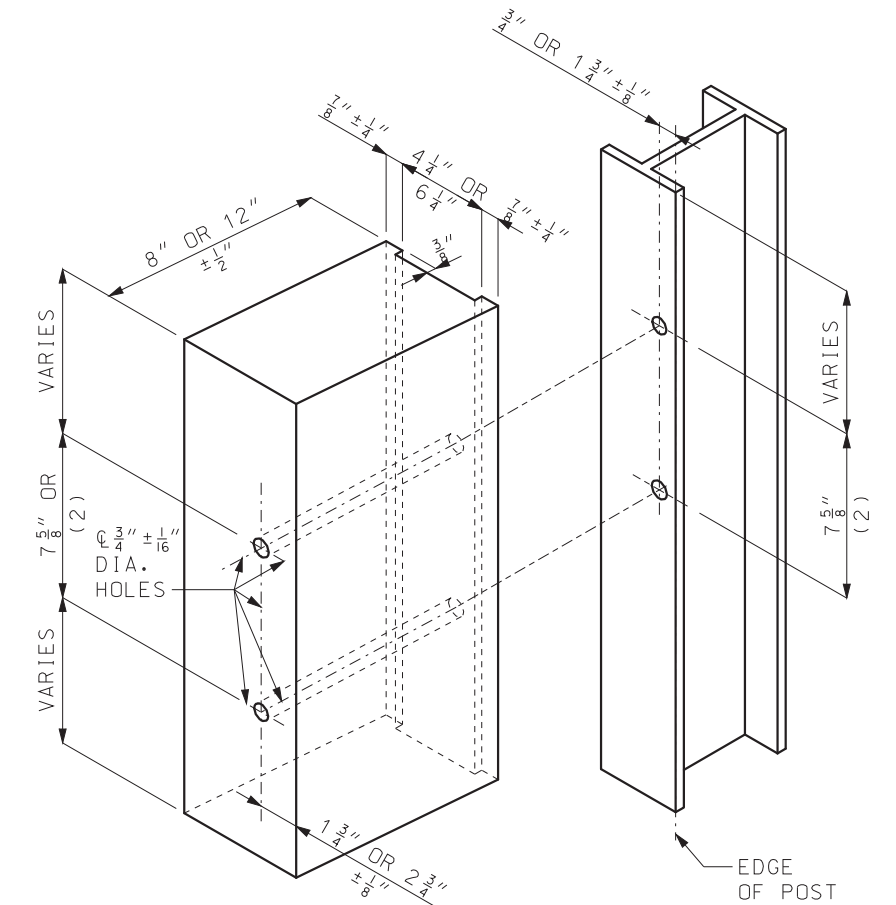


STEEL POST AND WOOD BLOCK (10)

(2) VERIFY BY RAIL TRANSITION PRODUCER.

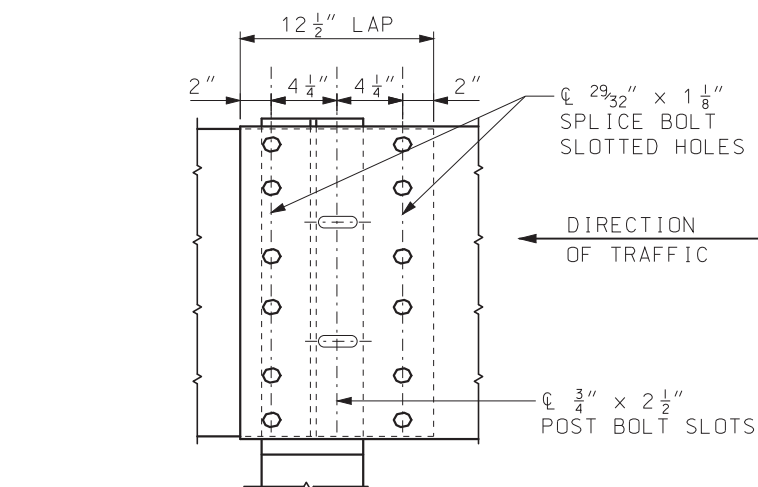


SECTION H-H  
THROUGH THRIE BEAM RAIL

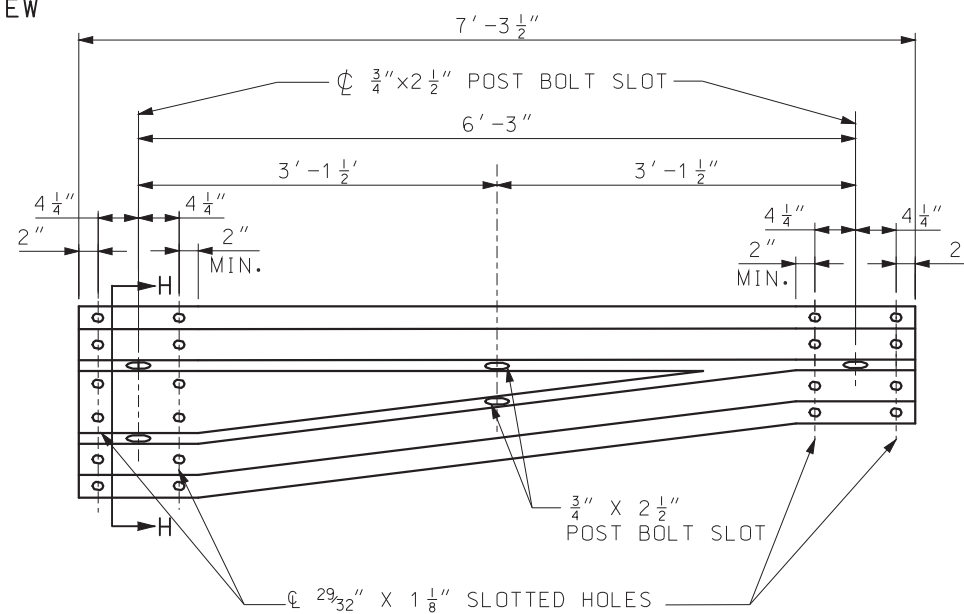


POST (9) - (2) VERIFY BY RAIL TRANSITION PRODUCER (SEE FRONT SHEET)  
 POST (10) - ONLY 1 HOLE REQUIRED  
 ALL HOLES 3/4" ± 1/16" DIAMETER EXCEPT AS NOTED

HOLE PUNCHING DETAIL  
FOR STEEL POST & WOOD BLOCKS (6" AND 8")



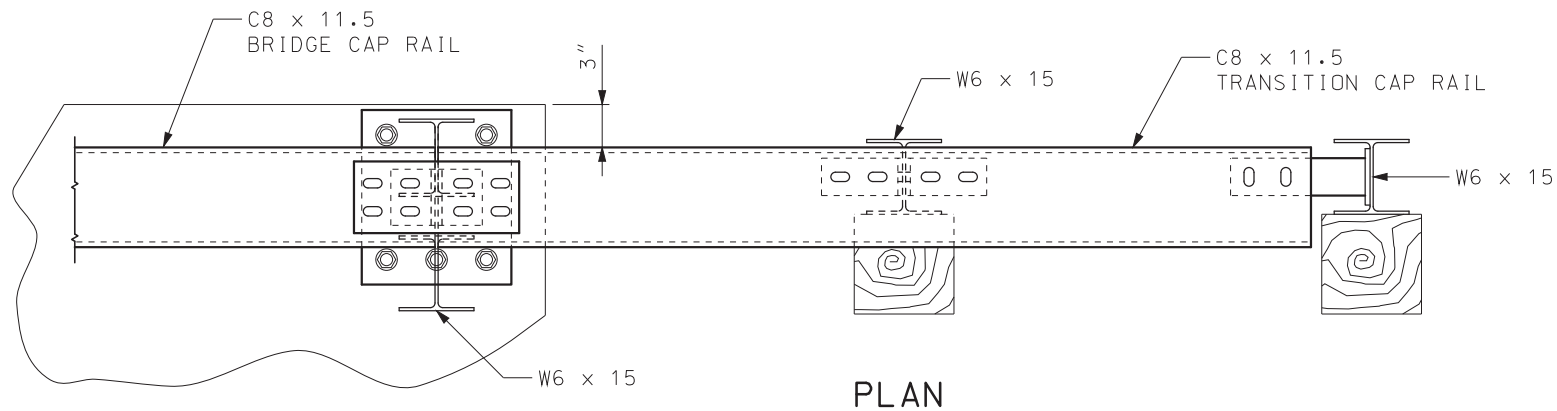
THRIE BEAM RAIL SPLICE AT POST



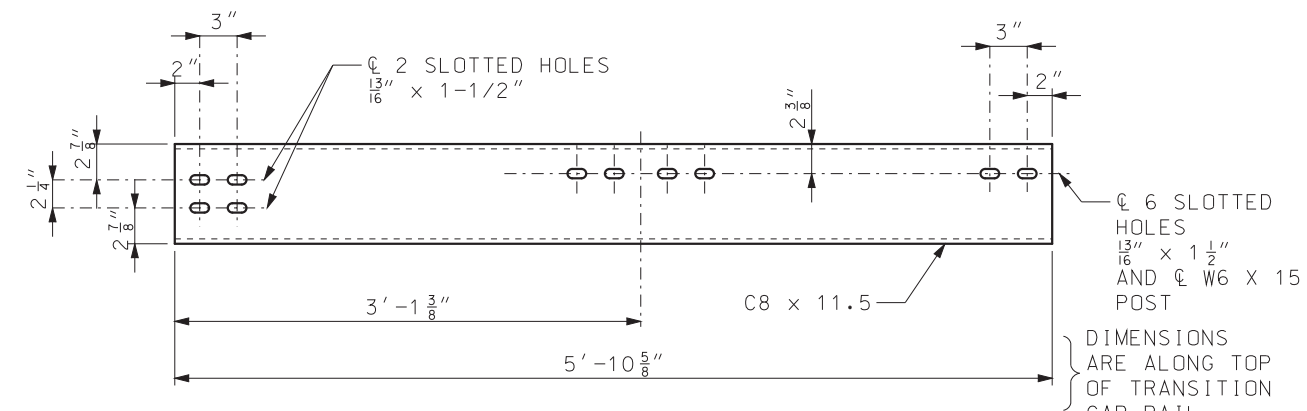
ASYMMETRICAL TRANSITION SECTION

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p><small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small></p>	<p><b>MIDWEST GUARDRAIL SYSTEM (MGS)</b></p> <p><b>BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE)</b></p>
<p>DATE EFFECTIVE: 04/01/2018</p> <p>DATE PREPARED: 2/9/2018</p>	<p>606.70B</p> <p>SHEET NO. 3 OF 5</p>

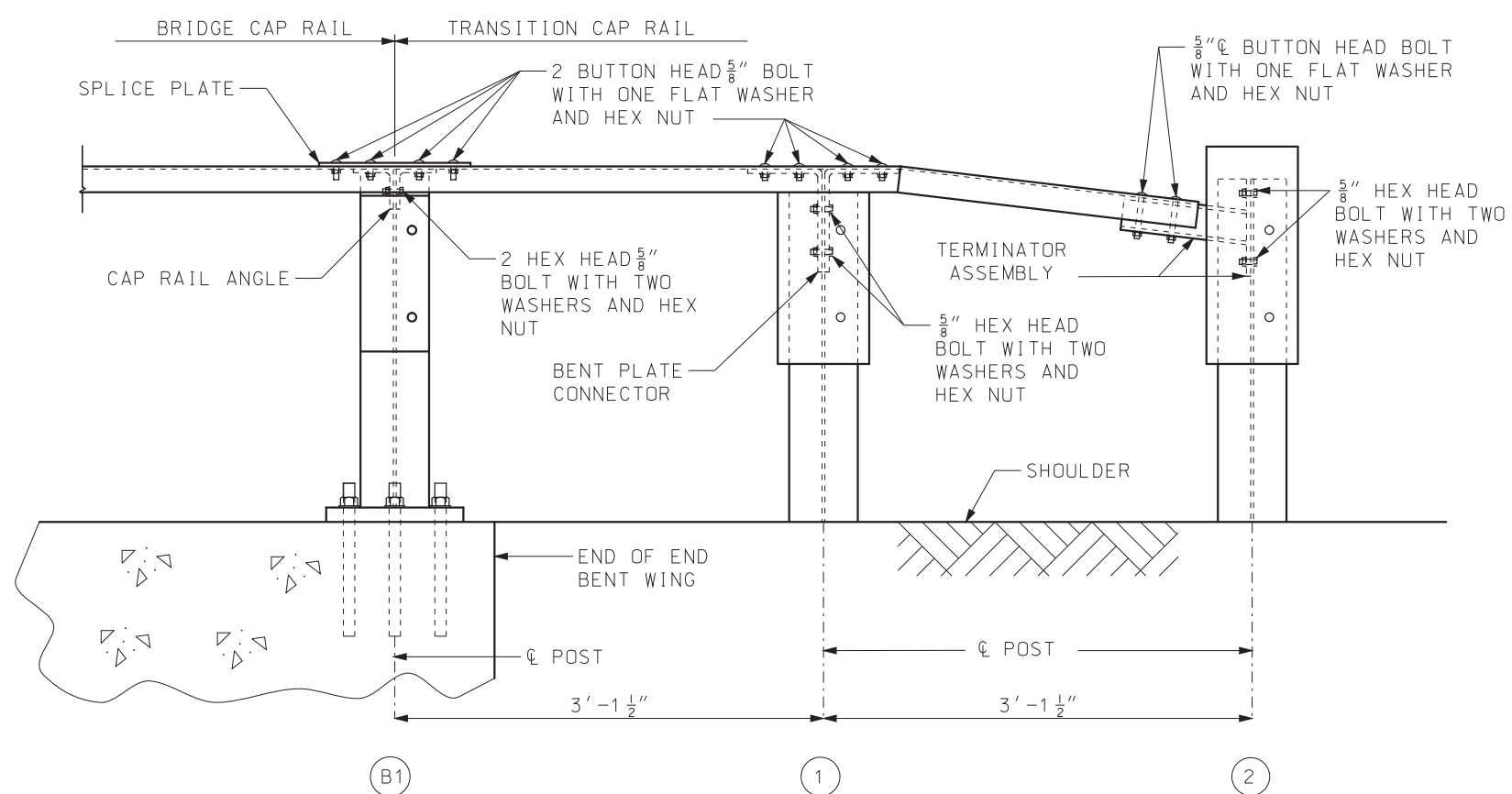
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



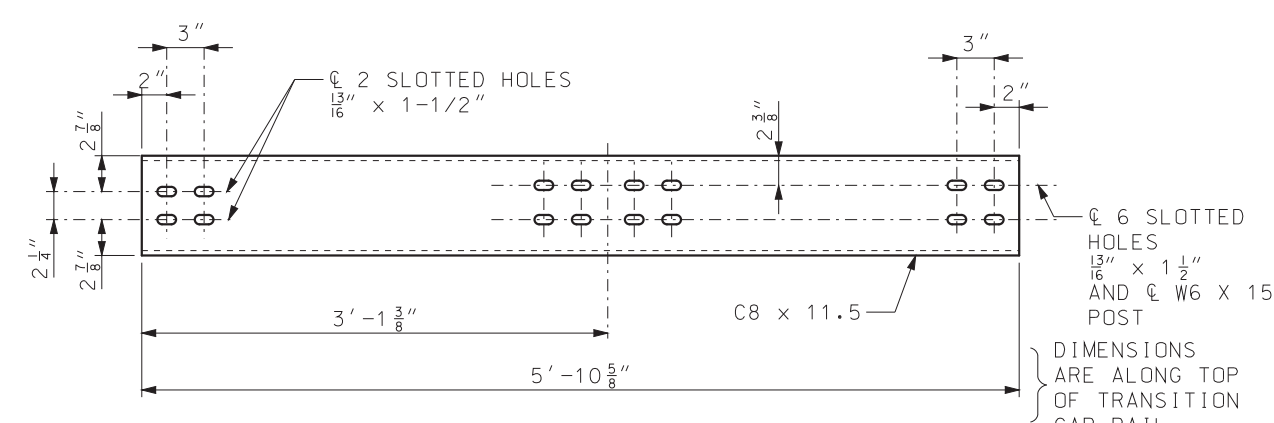
PLAN



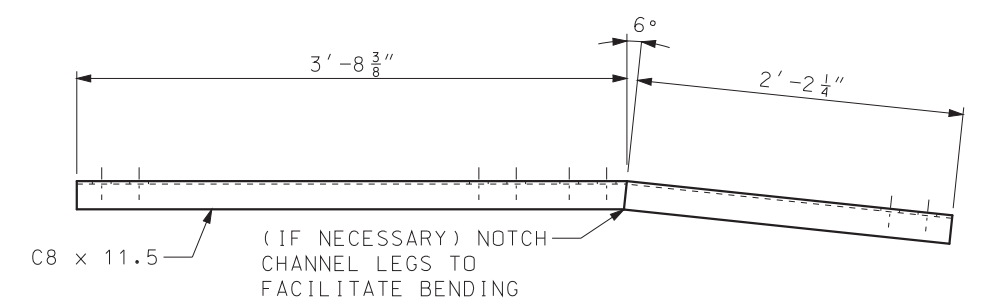
TOP VIEW (ALTERNATE 1)



ELEVATION  
(THRIE BEAM RAIL NOT SHOWN)



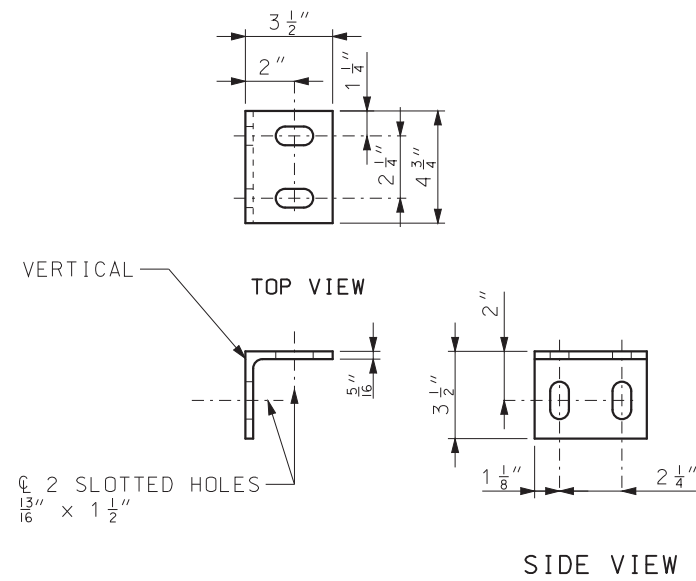
TOP VIEW (ALTERNATE 2)



ELEVATION  
TRANSITION CAP RAIL

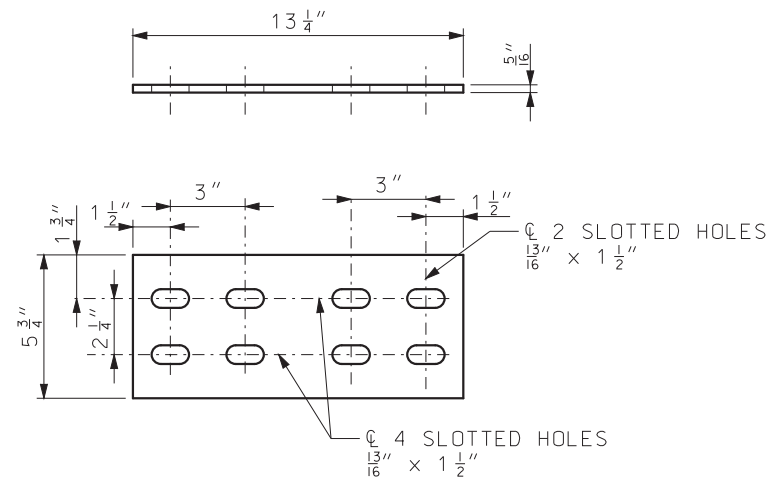
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>BRIDGE APPROACH TRANSITION</b> <b>(THRIE BEAM ON BRIDGE)</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	606.70B	SHEET NO. 4 OF 5

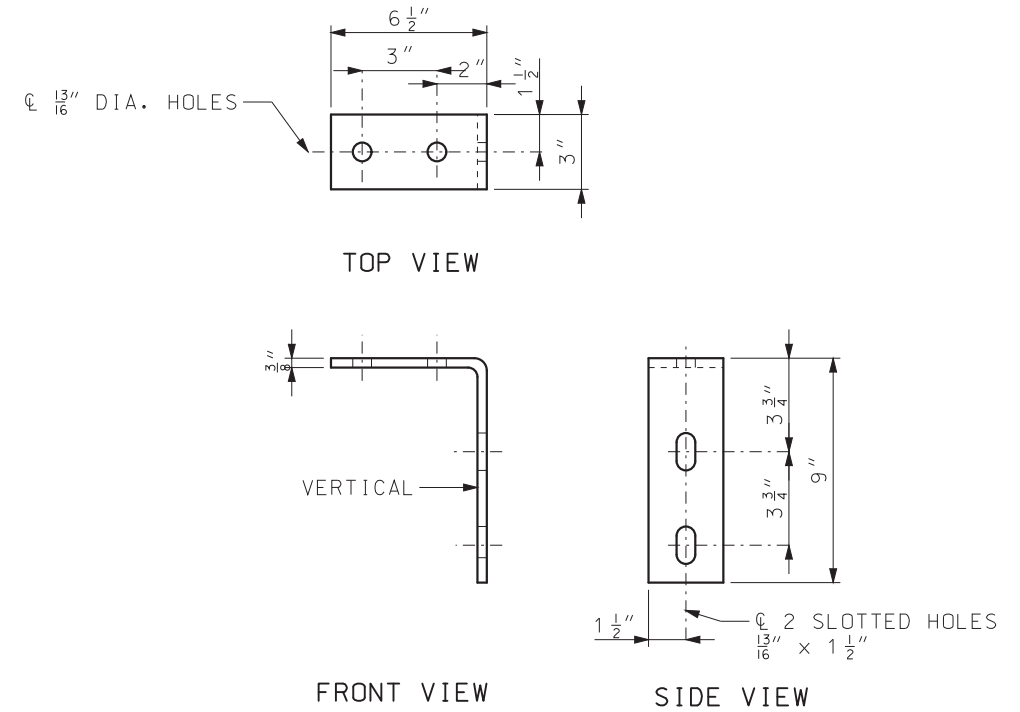


CAP RAIL ANGLE

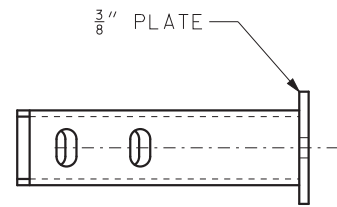
∠ 3 1/2" x 3 1/2" x 5/16"



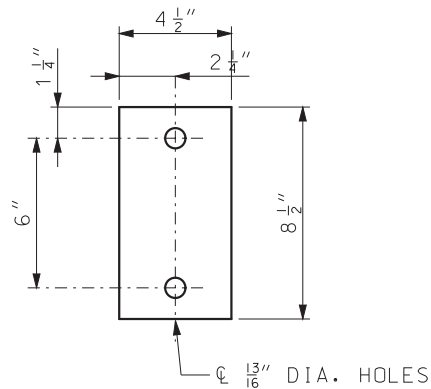
SPLICE PLATE



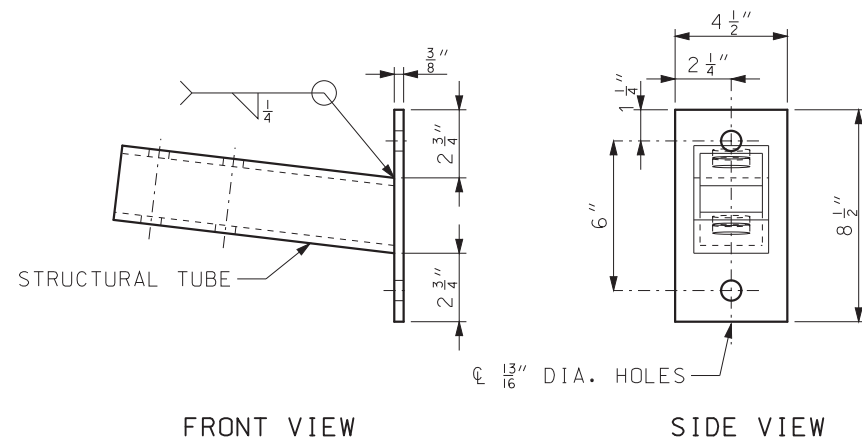
BENT PLATE CONNECTOR



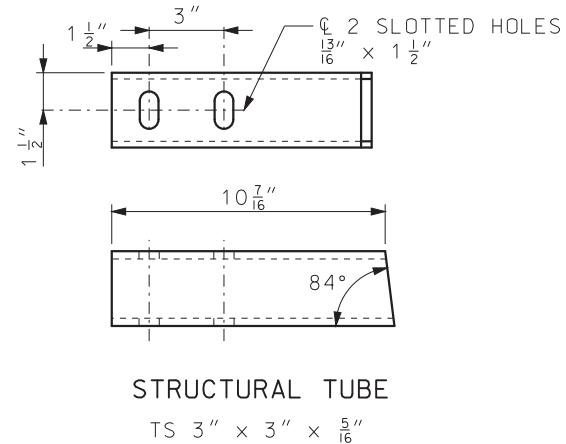
TOP VIEW



3/8" PLATE


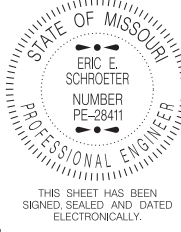


TERMINATOR ASSEMBLY

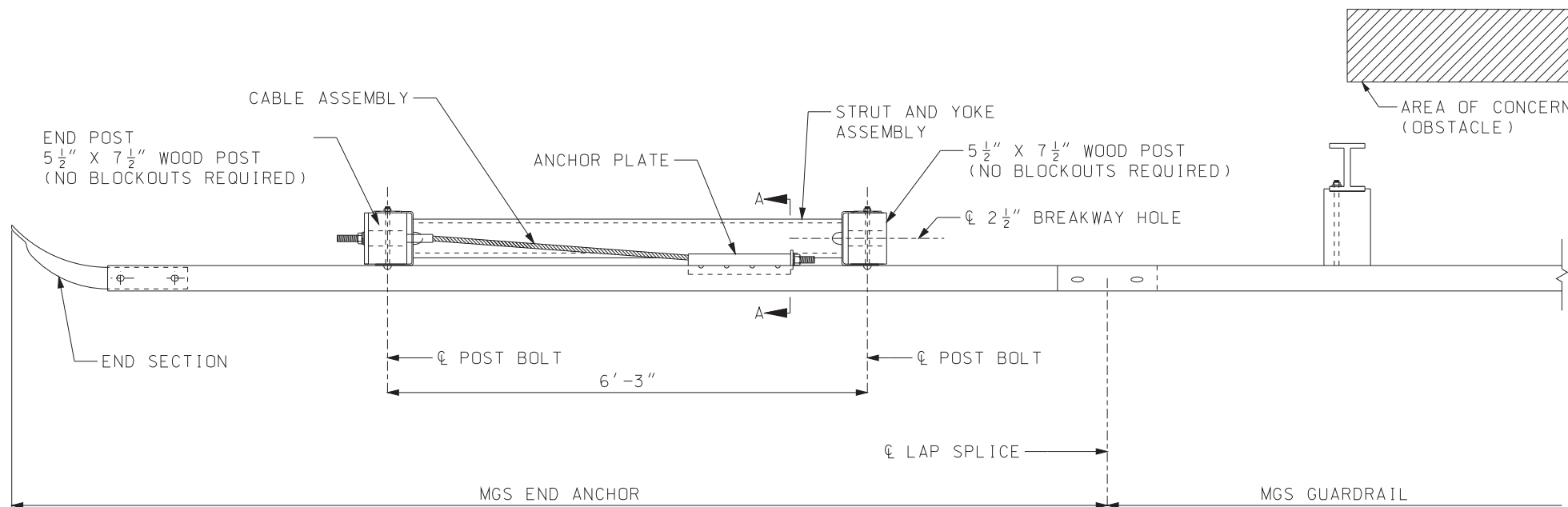


STRUCTURAL TUBE

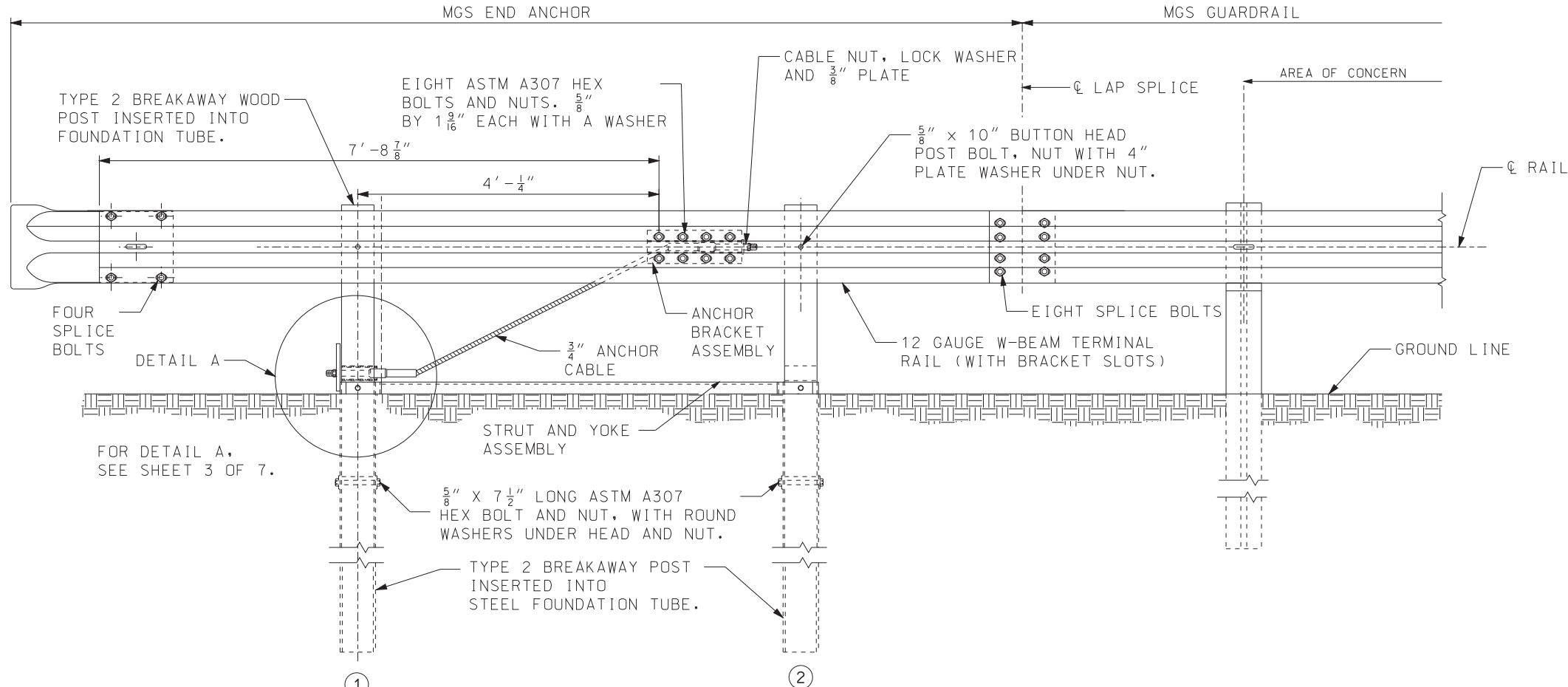
TS 3" x 3" x 5/16"

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>BRIDGE APPROACH TRANSITION</b> <b>(THREE BEAM ON BRIDGE)</b>
	DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017
606.70B	SHEET NO. 5 OF 5

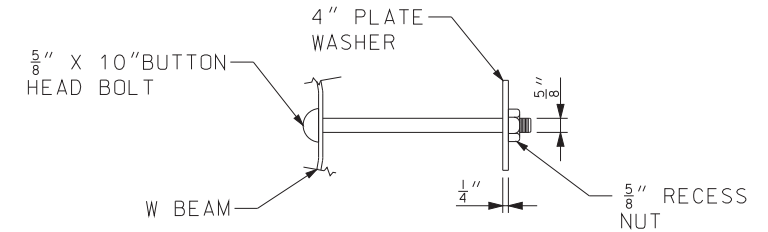
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



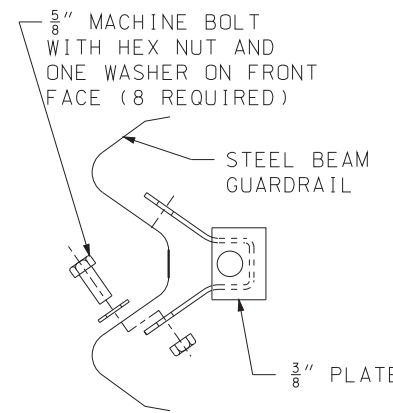
PLAN VIEW



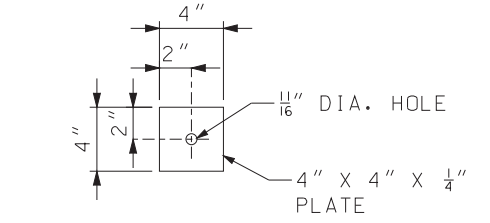
ELEVATION VIEW



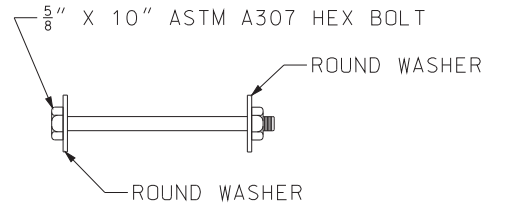
POST BOLT AT W-BEAM



SECTION A-A



4\"/>



POST BOLT AT YOKE

GENERAL NOTES:

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

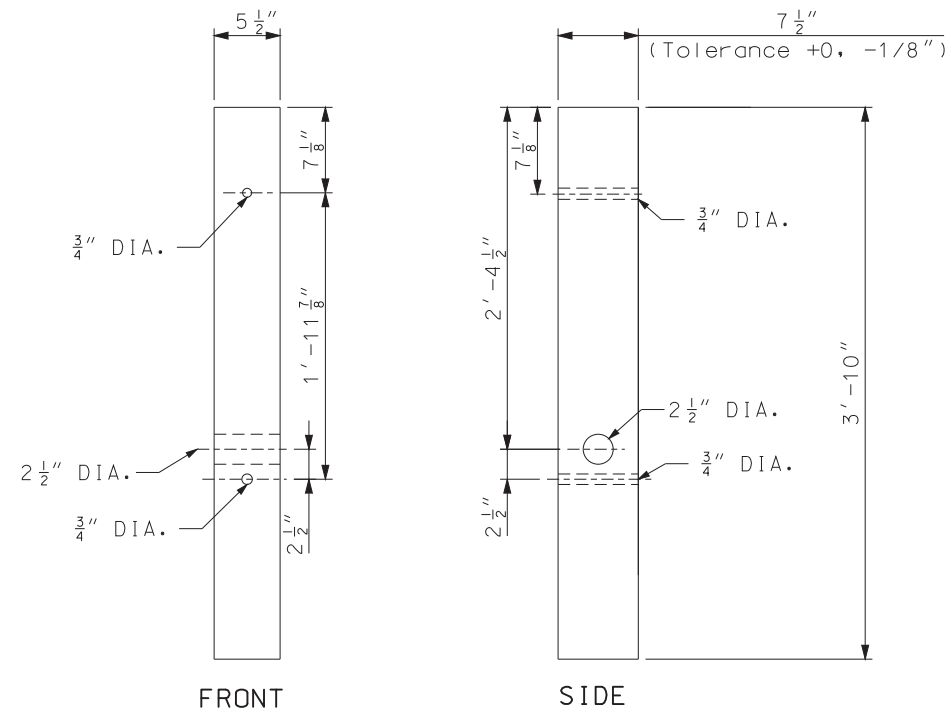
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

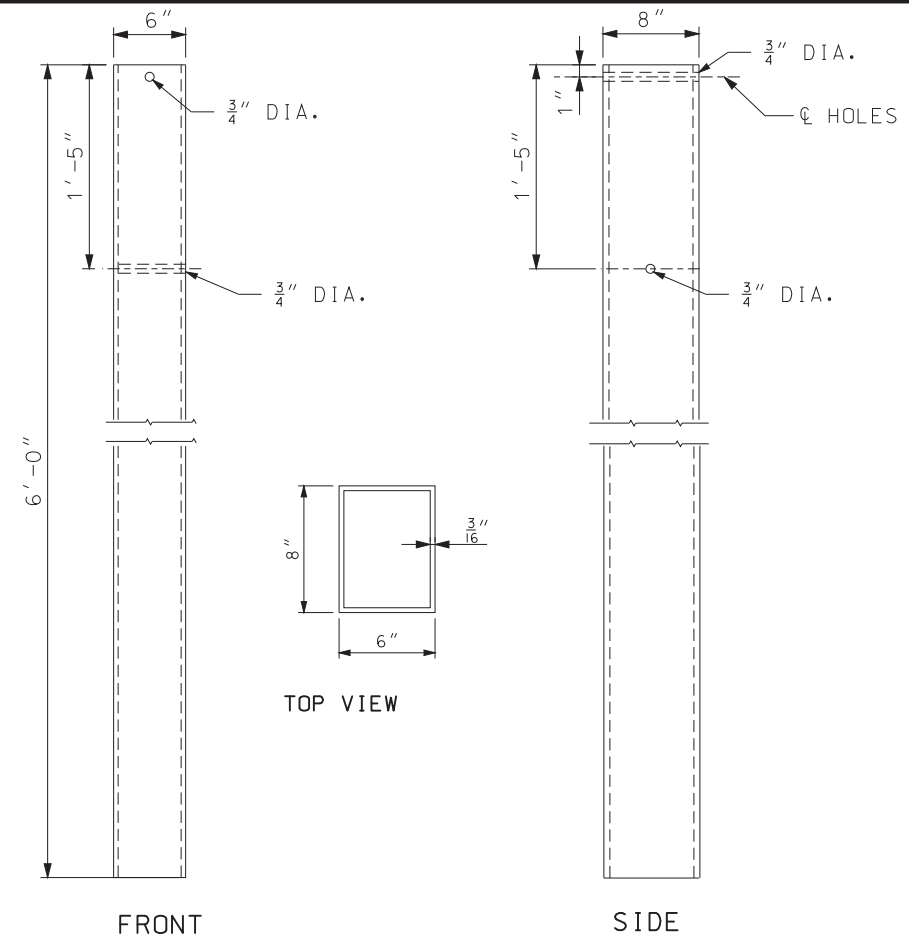
MIDWEST GUARDRAIL SYSTEM (MGS)  
 TERMINAL ANCHOR ENDS

DATE EFFECTIVE: 07/01/2017	606.80C	SHEET NO. 1 OF 7
DATE PREPARED: 5/1/2017		

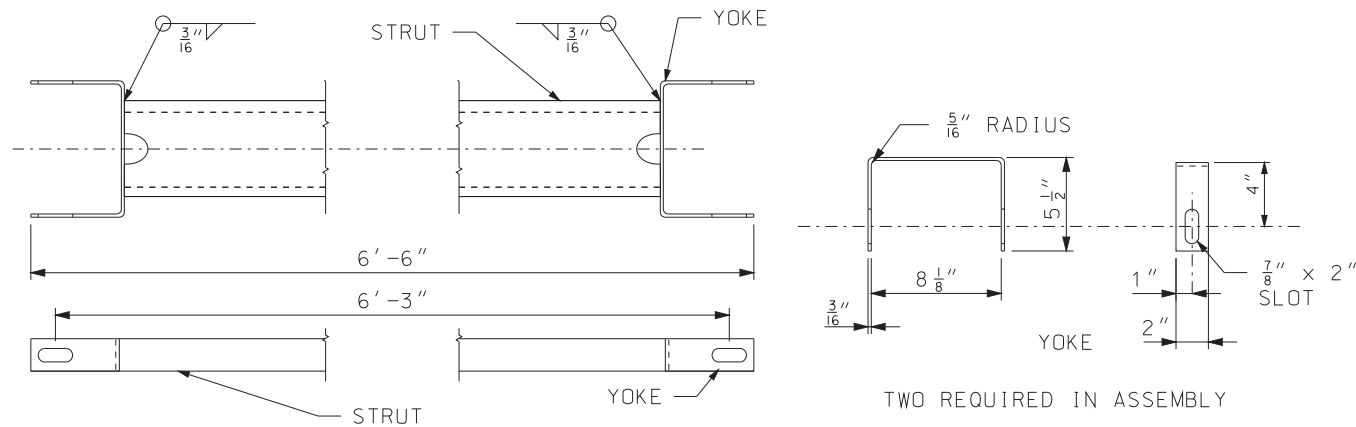
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



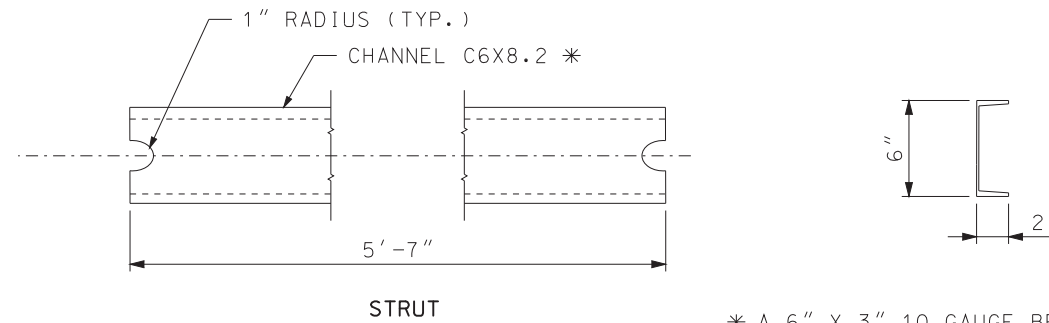
TYPE 2 BREAKAWAY  
WOOD POST



STEEL GROUND  
FOUNDATION TUBE



STRUT AND YOKE ASSEMBLY



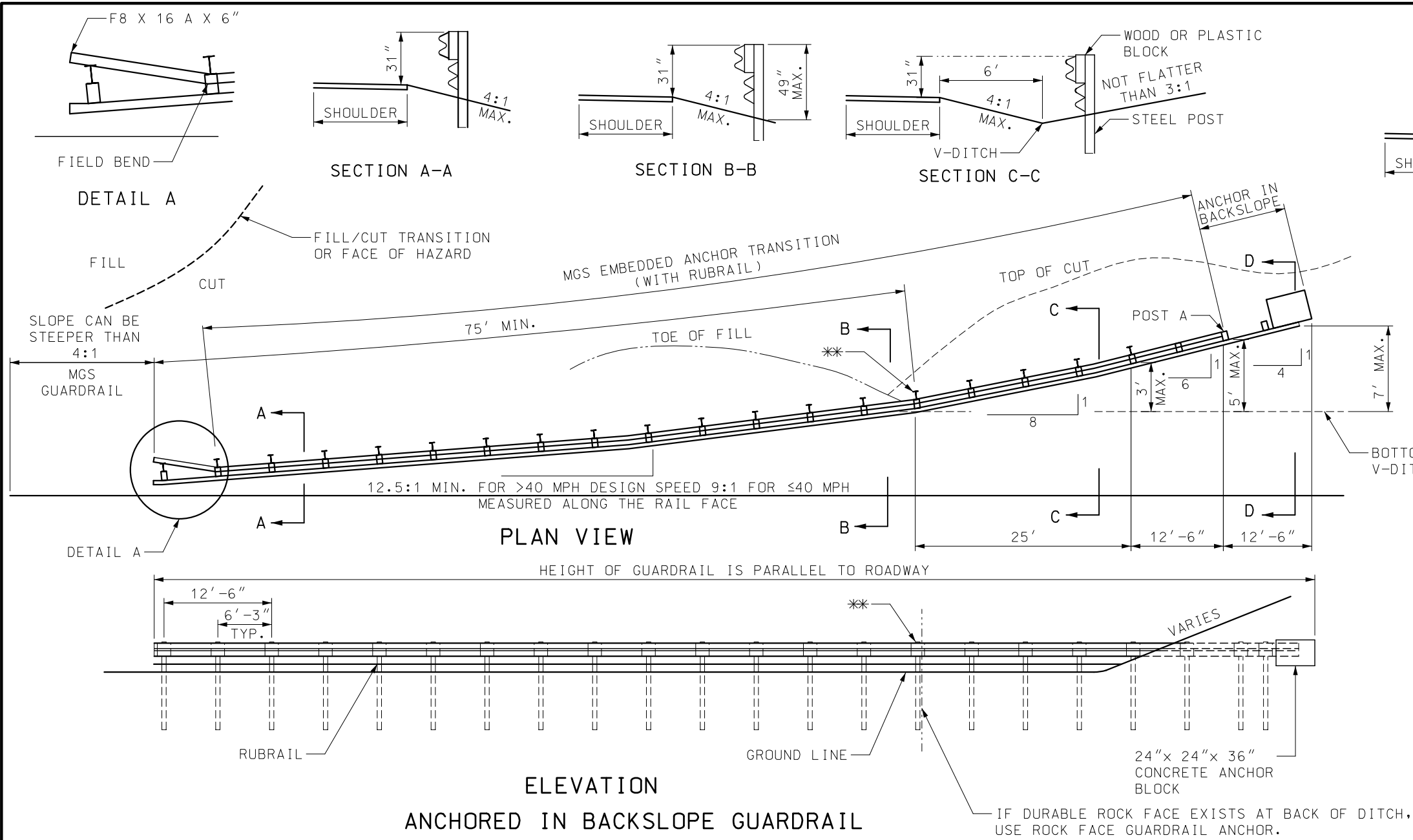
\* A 6" X 3" 10 GAUGE BENT PLATE STRUT  
MAY BE SUBSTITUTED FOR THE C-CHANNEL

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>TERMINAL ANCHOR ENDS</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	<b>606.80C</b>	SHEET NO. <b>2 OF 7</b>

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



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



**GENERAL NOTES:**

FOR END ANCHOR DETAILS, SEE SHEET 1-3 OF 7.

RUBRAIL BEGINS WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.

END ANCHOR POSTS 1 AND 2 SHALL HAVE FOUNDATION TYPE AS SHOWN ON SHEET 3 OF 7.

THE CONTRACT UNIT PRICE FOR EMBEDDED GUARDRAIL ANCHOR SHALL INCLUDE THE CONCRETE ANCHOR, EXCAVATION AND BACKFILLING, OR TERMINAL CONNECTOR, AND ALL INCIDENTAL HARDWARE AND WORK NECESSARY TO COMPLETE THE INSTALLATION.

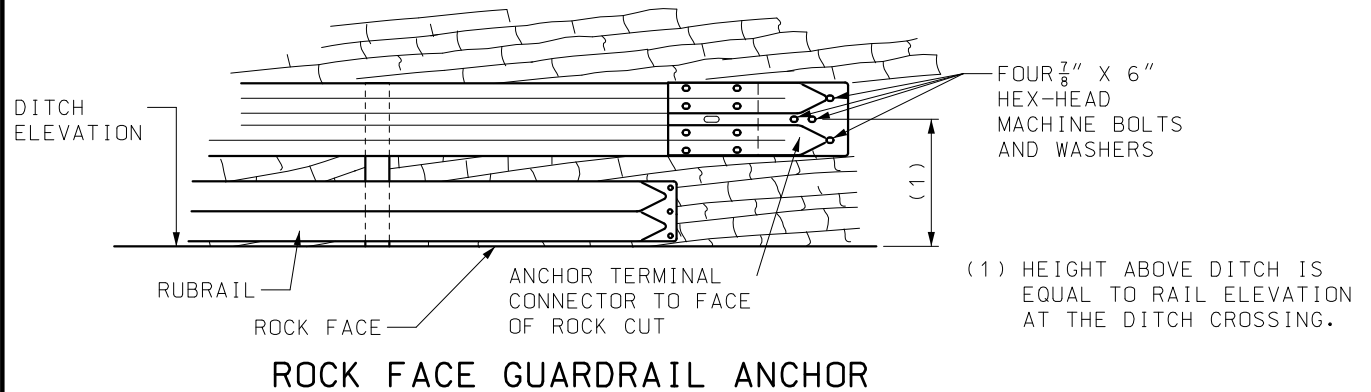
THE EMBEDDED ANCHOR TRANSITION SHALL EXTEND 50' ± BEYOND THE DITCH LINE AND TERMINATE A MINIMUM OF 12 INCHES BELOW GROUND ELEVATION OF THE BACKSLOPE.

BLOCKOUTS WILL NOT BE REQUIRED FOR ANY POST WHICH WILL BE COMPLETELY BELOW GROUND. THE ALIGNMENT OF SUCH POSTS SHALL BE APPROVED BY THE ENGINEER.

SEE OTHER DRAWINGS AND STANDARD SPECIFICATIONS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS NOT SHOWN.

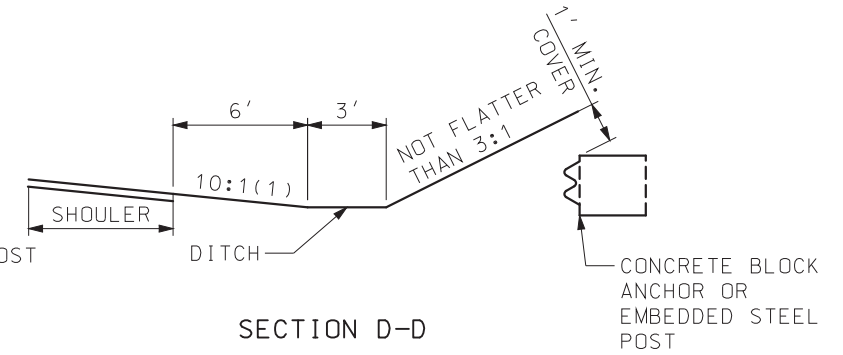
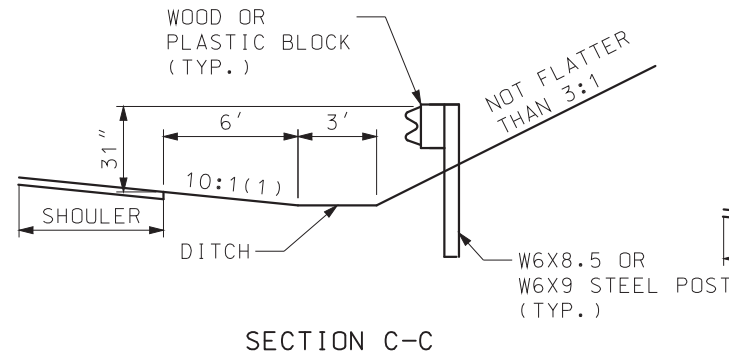
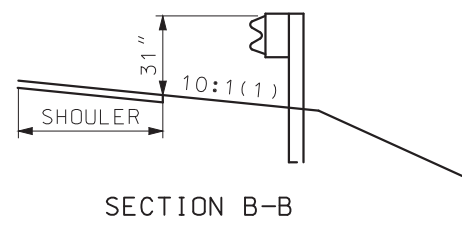
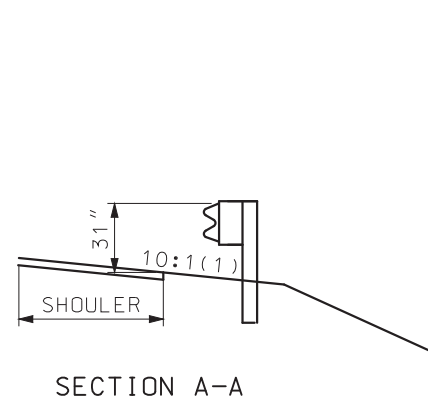
COST OF SHAPING ROCK FACE FOR PLACING OF TERMINAL CONNECTOR, DRILLING HOLES, FURNISHING AND PLACING BOLTS, WASHERS, EPOXY, ANCHORS AND END SHOE TO BE INCLUDED IN THE PRICE OF GUARDRAIL ANCHOR, ROCK FACE.

\* THE POST BEHIND THE DITCHLINE MAY BE SHORTENED TO PROVIDE 48" MIN. EMBEDMENT.

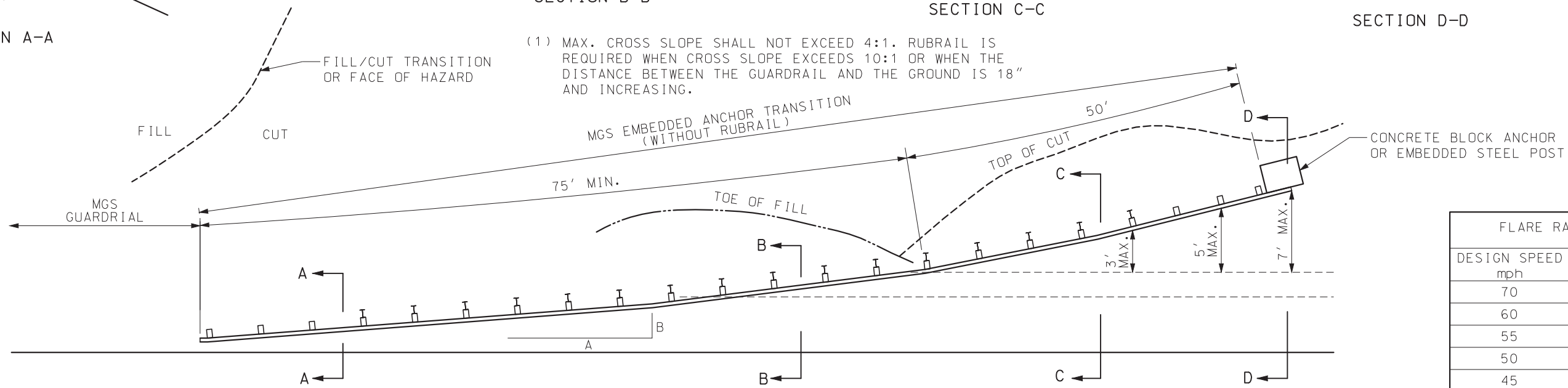


<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p><b>MIDWEST GUARDRAIL SYSTEM (MGS) TERMINAL ENDS EMBEDDED AND ROCK FACE (V-DITCH STEEPER THAN 10:1, 4:1 MAX. FORESLOPE)</b></p>
<p>DATE EFFECTIVE: 07/01/2021 DATE PREPARED: 4/29/2021</p>	<p>606.80C</p> <p>SHEET NO. 4 OF 7</p>

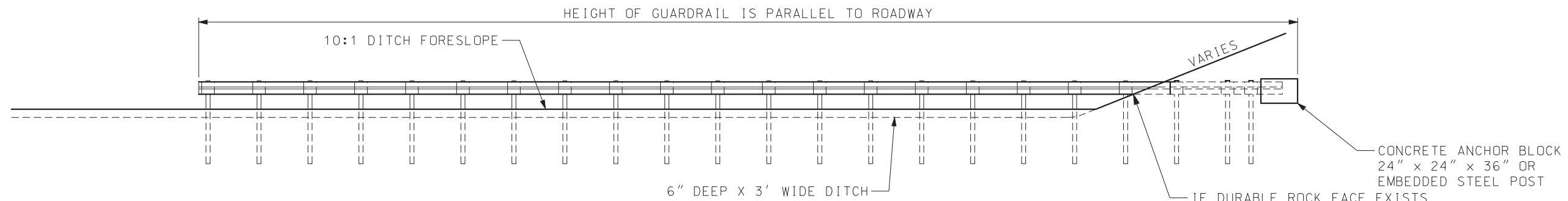




(1) MAX. CROSS SLOPE SHALL NOT EXCEED 4:1. RUBRAIL IS REQUIRED WHEN CROSS SLOPE EXCEEDS 10:1 OR WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.



FLARE RATE	
DESIGN SPEED mph	A:B
70	15:1
60	13:1
55	12:1
50	11:1
45	10:1
40	9:1
30 OR LESS	7:1



ELEVATION ANCHORED IN BACKSLOPE GUARDRAIL

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**MIDWEST GUARDRAIL SYSTEM (MGS)**

**EMBEDDED ANCHOR TRANSITION**

**EMBEDDED TERMINAL ENDS (FLAT DITCH)**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2017

DATE PREPARED: 5/1/2017

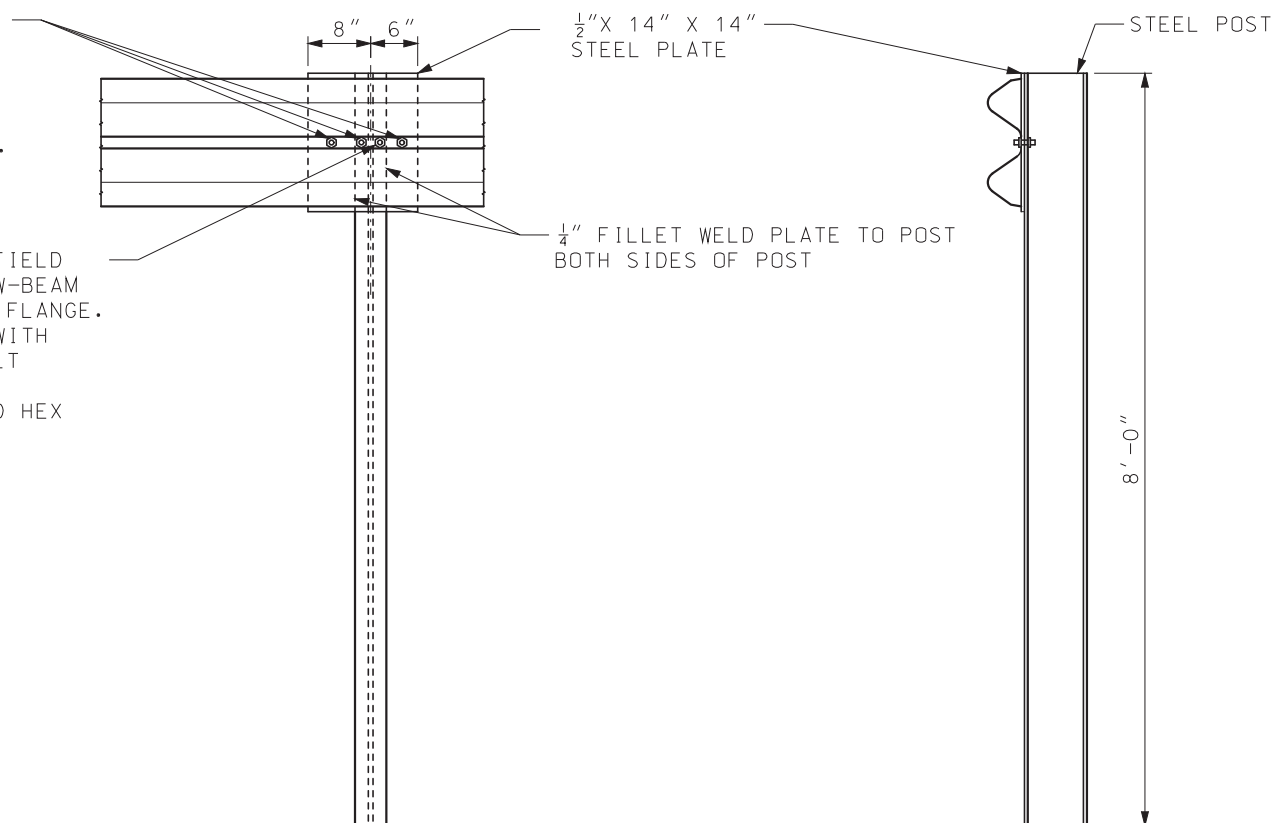
606.80C

SHEET NO.  
5 OF 7

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

3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH  $\frac{7}{8}$ " Ø HEX HEAD BOLTS  $1\frac{7}{16}$ " LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

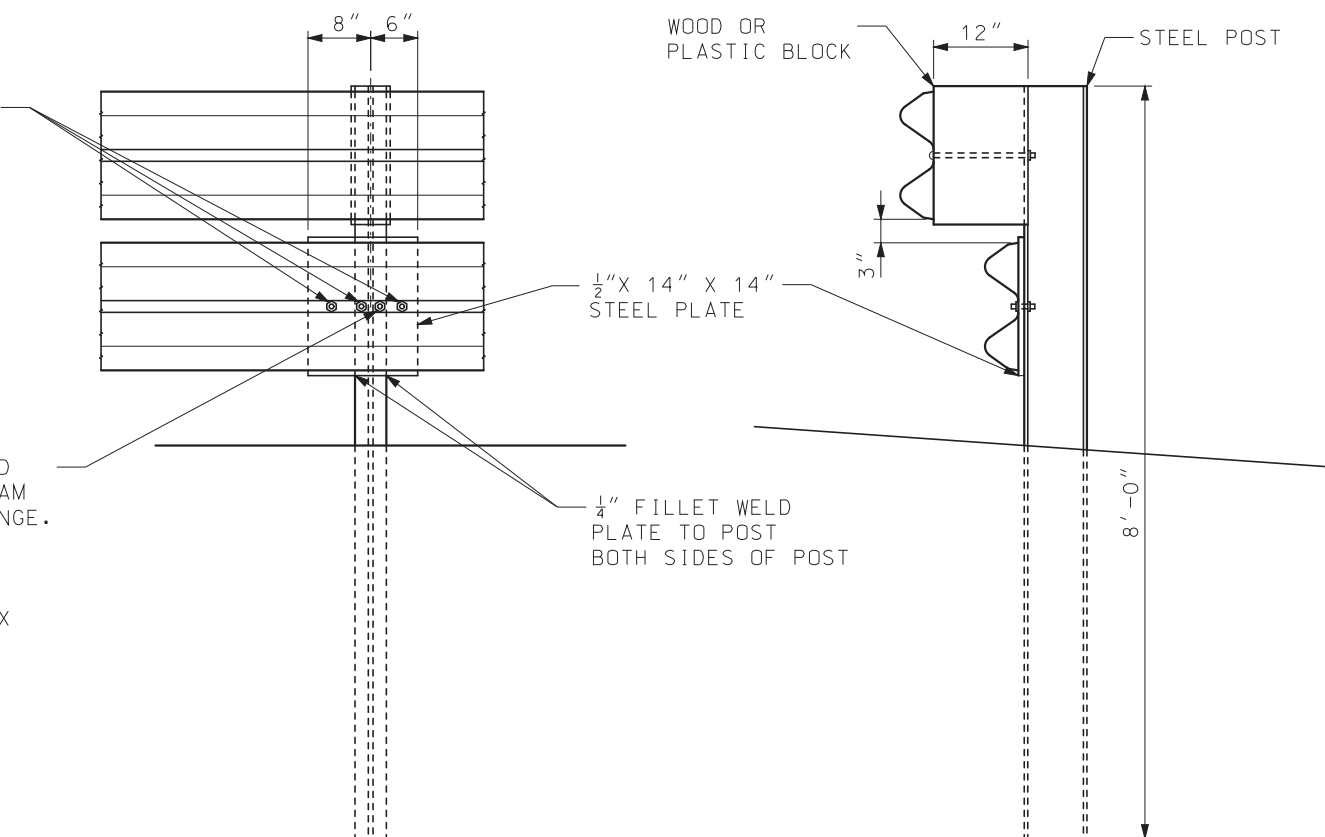
1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH  $\frac{7}{8}$ " Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.



EMBEDDED STEEL POST

3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH  $\frac{7}{8}$ " Ø HEX HEAD BOLTS  $1\frac{7}{16}$ " LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

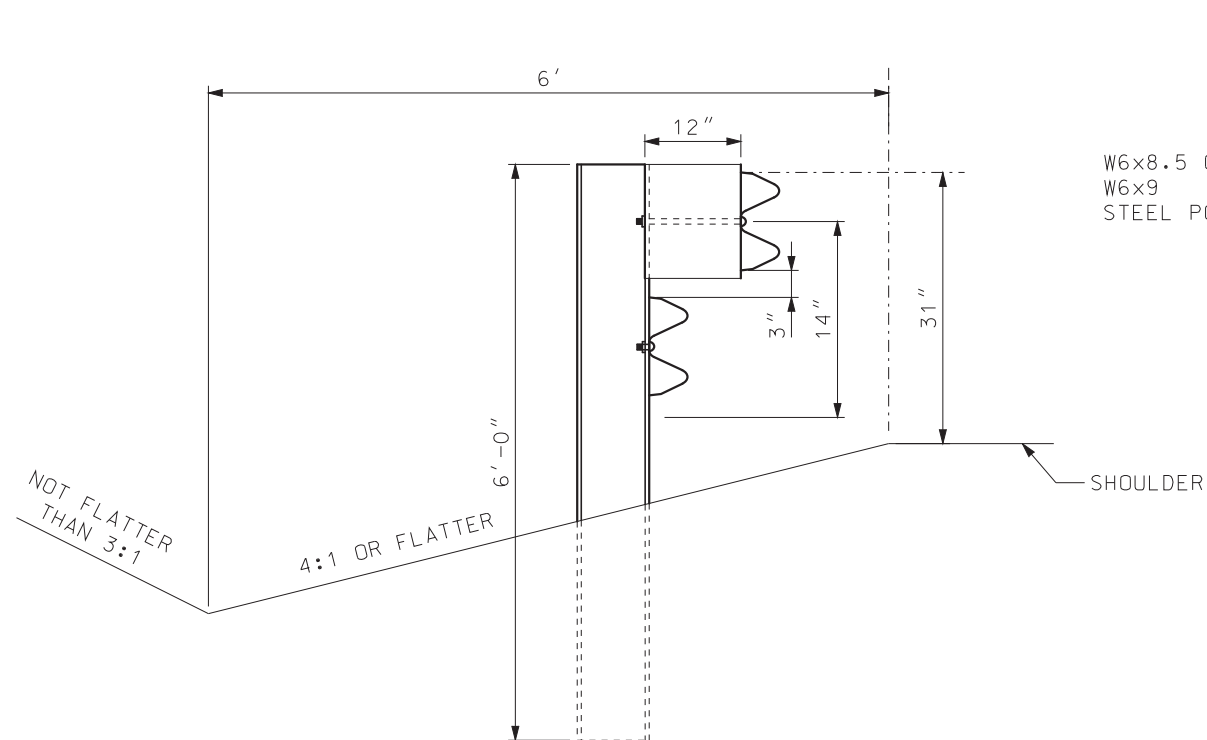
1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH  $\frac{7}{8}$ " Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.



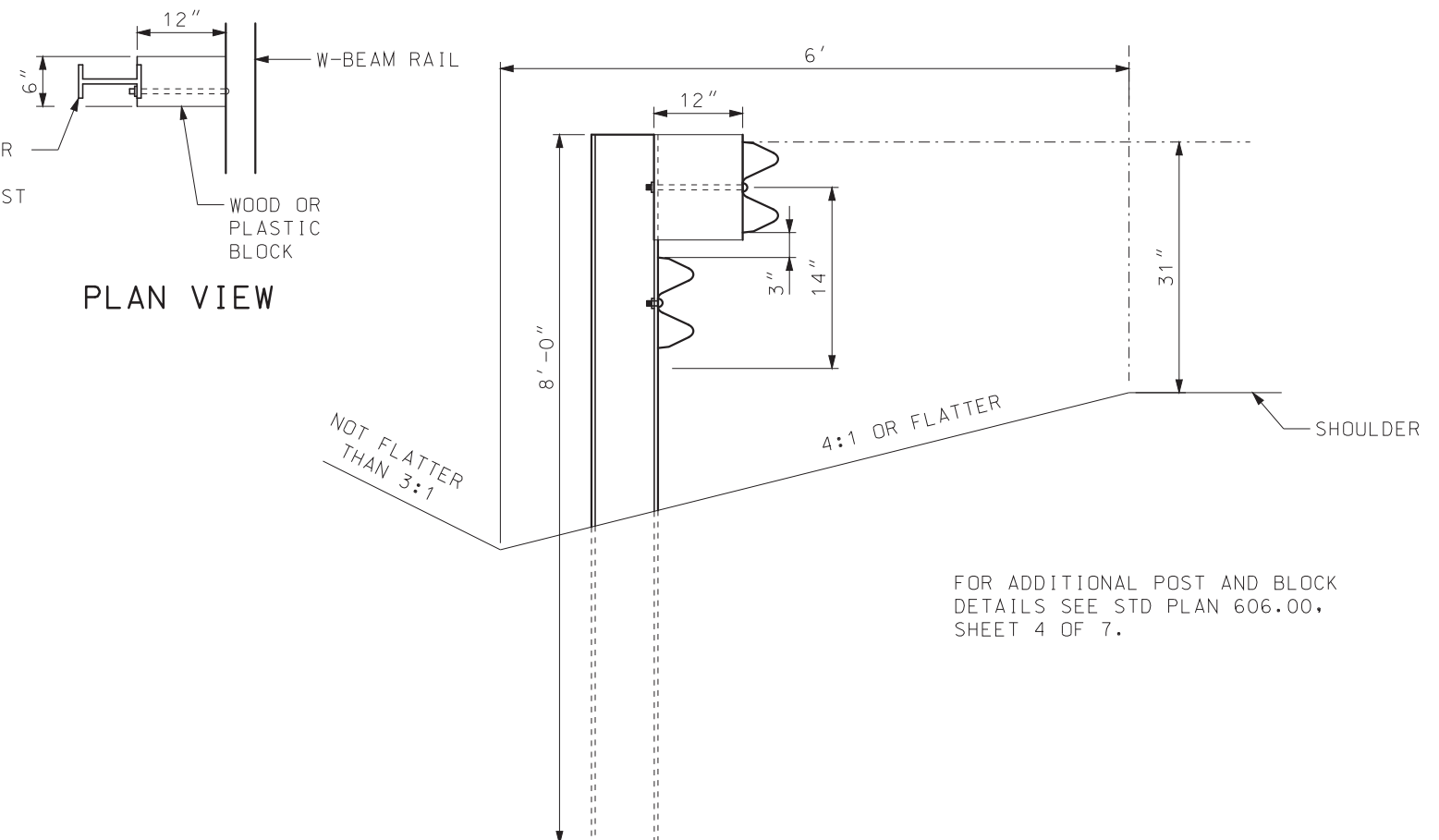
SPECIAL RUBRAIL TO POST CONNECTION AT POST A

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>EMBEDDED ANCHOR TERMINAL ENDS (STEEL POST OPTION)</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	606.80C
SHEET NO. 6 OF 7	

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

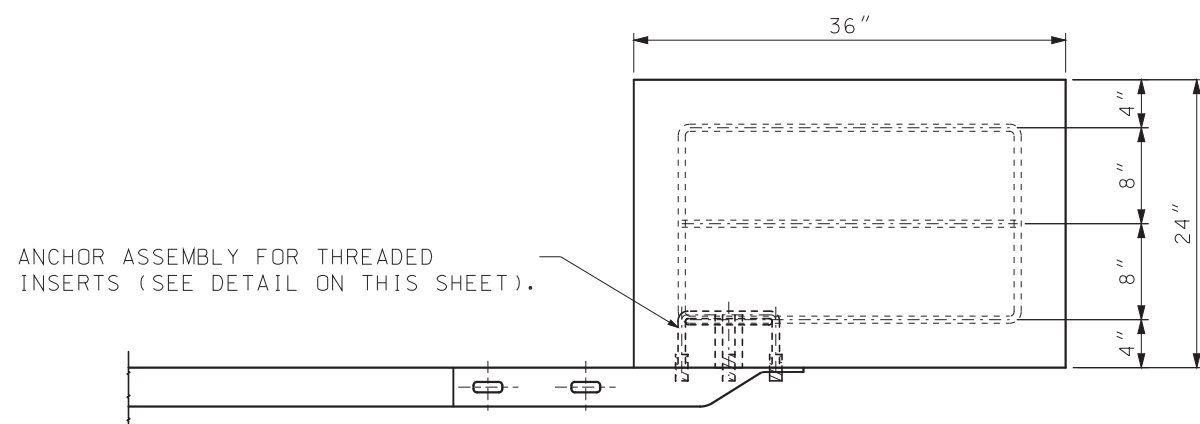


ELEVATION OF 6' STEEL POST AND BLOCK

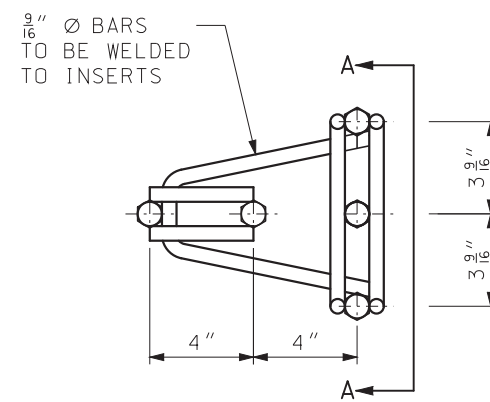


ELEVATION 8' STEEL POST AND BLOCK

FOR ADDITIONAL POST AND BLOCK DETAILS SEE STD PLAN 606.00, SHEET 4 OF 7.

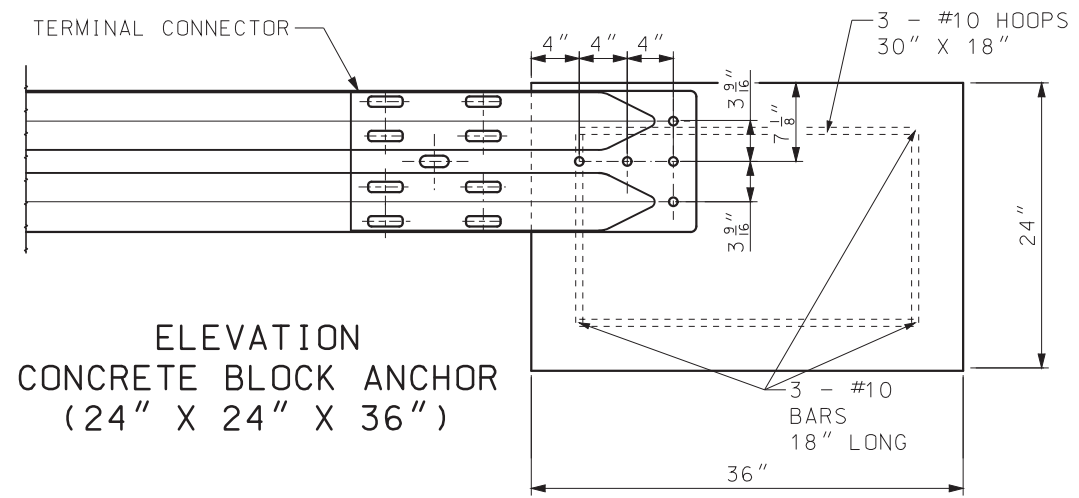


TOP VIEW

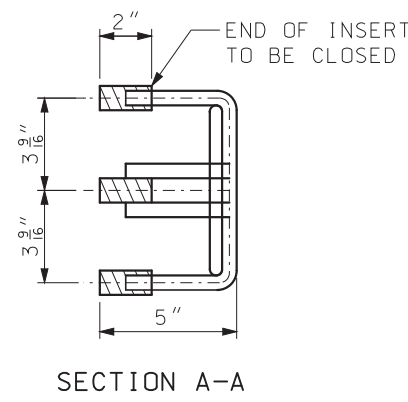


CONCRETE BLOCK ANCHOR ANCHOR ASSEMBLY

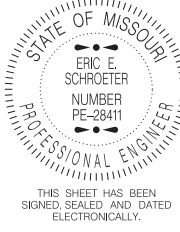
THREADED INSERTS FOR 1/8" X 2" GALVANIZED HEX HEAD CAP SCREWS. CAP SCREWS TO BE THREADED A MINIMUM 1 7/8". INSERTS THREADED MINIMUM OF 1 3/4".



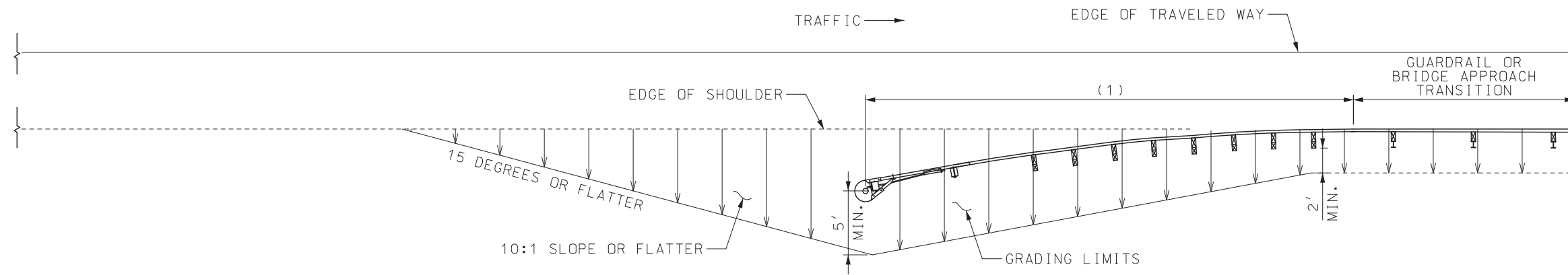
ELEVATION CONCRETE BLOCK ANCHOR (24" X 24" X 36")



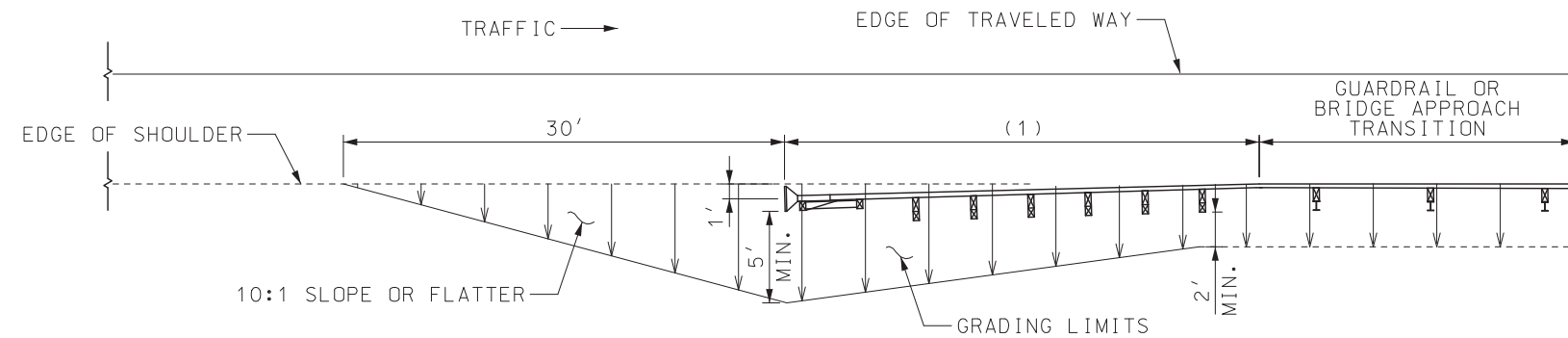
SECTION A-A

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>EMBEDDED TERMINAL ENDS</b> <b>GENERAL DETAILS</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	<b>606.80C</b>
SHEET NO. <b>7 OF 7</b>	

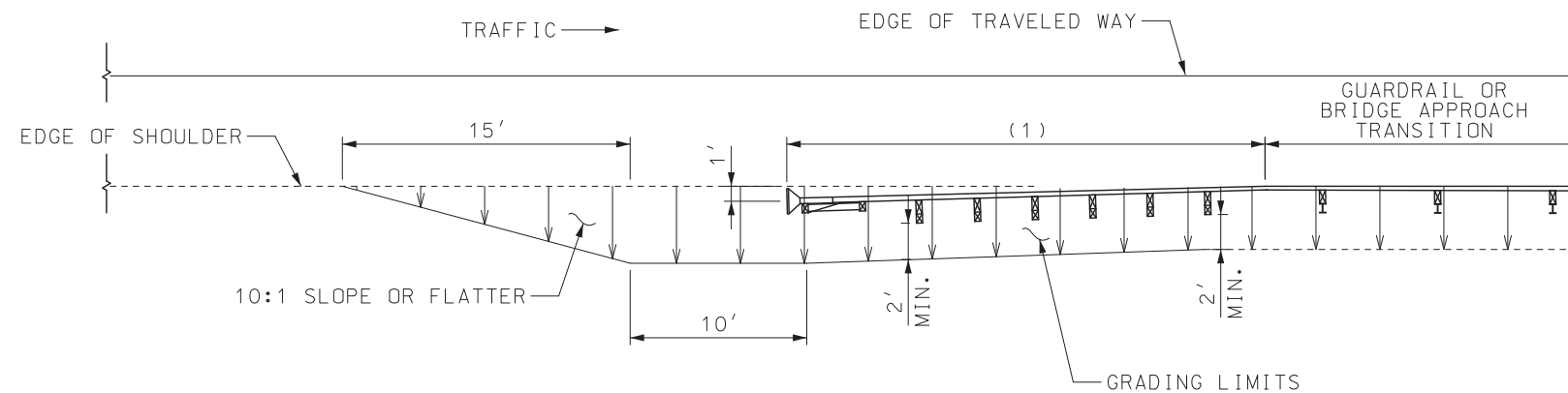
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS



ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS


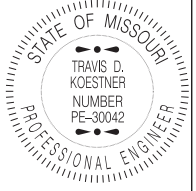
GENERAL NOTES:

STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

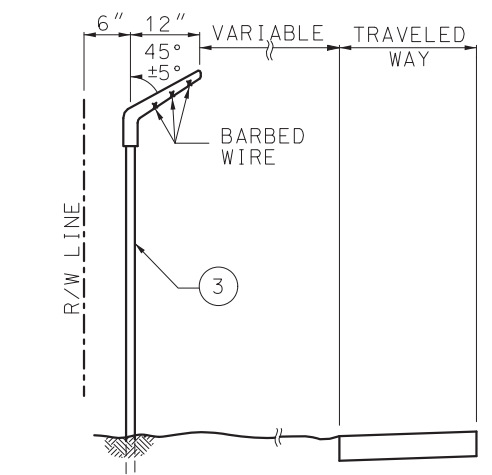
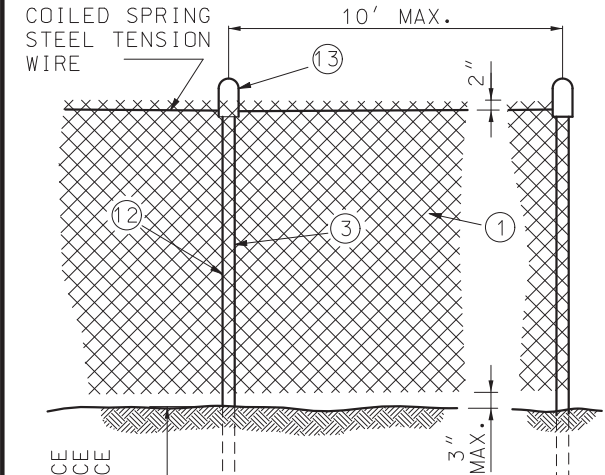
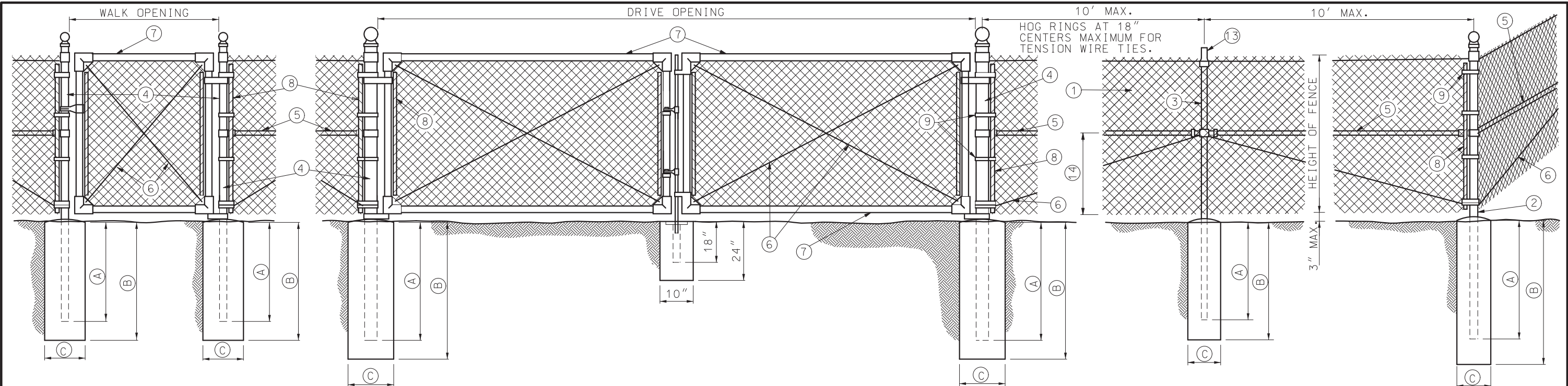
THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE MASH APPROVED CRASHWORTHY END TERMINAL.

END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED.

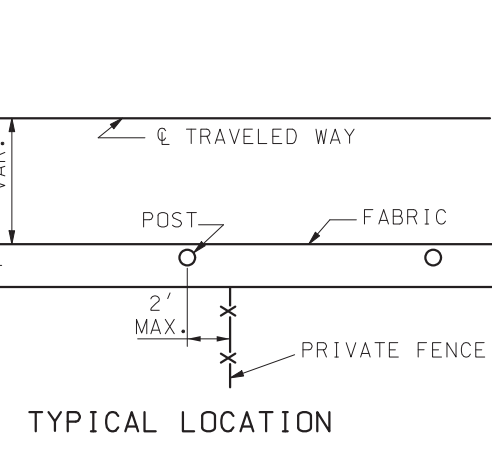
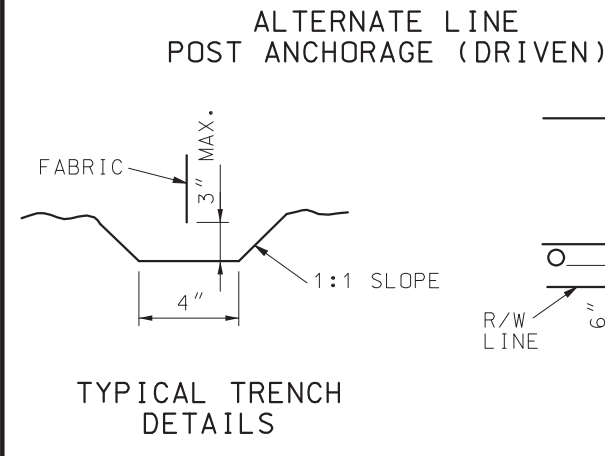
(1) APPROVED CRASHWORTHY END TERMINAL

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>MASH CRASHWORTHY END TERMINALS TYPE A GRADING LIMITS</b>
DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	<b>606.81B</b>	SHEET NO. <b>1 OF 1</b>

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



NOTE: IF POSTS CANNOT BE DRIVEN TO DEPTHS INDICATED BECAUSE OF ROCKY SOILS OR OTHER CONDITIONS, THEY SHALL BE REMOVED AND REPLACED IN FOOTINGS. POST TOPS SHALL BE PROTECTED AGAINST DAMAGE AND ALL POSTS WHICH ARE DAMAGED DURING INSTALLATION SHALL BE REMOVED AND REPLACED.



MINIMUM DEPTH FOR SETTING POSTS

DESCRIPTION	HEIGHT OF FENCE		
	48" SIZE (IN.)	60" SIZE (IN.)	72" SIZE (IN.)
② ENDCORNER & PULLPOST	(A) 30	36	36
	(B) 36	42	42
	(C) 10	12	12
③ LINE POST	(A) 24	27	36
	(B) 30	36	42
	(C) 10	12	12
④ GATE POST	(A) 30	36	36
	(B) 36	42	42
	(C) 10	12	12

WIRE SIZE AND HEIGHT OF FABRIC

INCHES	GAGE	MESH INCHES	HEIGHT OF FABRIC INCHES	
			SPECIFIED DIAMETER	HEIGHT OF FABRIC INCHES
0.120	11	2	36, 42	
0.148	9	2	48, 60	
0.192	6	2	72, 84	

GENERAL NOTES:

WEIGHTS OF MATERIALS SHOWN IN TABLE ARE FOR ASTM F 1043, GROUP IA. NOMINAL INSIDE DIAMETER SIZES SHOWN ARE FOR STEEL AND ALUMINUM. EQUIVALENT ASTM F 1043 ALTERNATIVES MAY BE USED.

PULL POSTS SHALL BE USED AT SHARP BREAKS IN VERTICAL GRADE OR AT APPROXIMATE 500' CENTERS ON STRAIGHT RUNS OR AS DIRECTED BY THE ENGINEER.

DRILLED HOLES © IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 2" GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

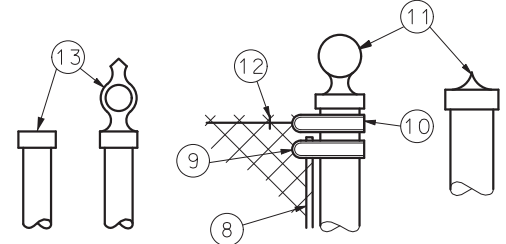
ALL POSTS SHALL HAVE PROVISIONS TO SECURELY HOLD THE TOP TENSION WIRE IN POSITION AND ALLOW FOR REMOVAL AND REPLACEMENT OF A POST WITHOUT DAMAGING THE TOP TENSION WIRE.

THE MESH SIZE SHALL BE 2 INCHES ± 1/8 IN. MEASURED IN EITHER DIRECTION AS THE MINIMUM CLEAR DISTANCE BETWEEN THE WIRES FORMING THE PARALLEL SIDES OF THE MESH.

- LEGEND
- ① FABRIC
  - ② END, CORNER OR PULL POST
  - ③ LINE POST
  - ④ GATE POST
  - ⑤ BRACE
  - ⑥ TRUSS ROD
  - ⑦ GATE FRAME
  - ⑧ STRETCHER BAR 1/4" X 3/4" PLATE
  - ⑨ STRETCHER BAR BAND
  - ⑩ END OR CORNER CLAMP
  - ⑪ POST TOPS (OTHER THAN LINE POSTS)
  - ⑫ FABRIC TIES
  - ⑬ LINE POST TOPS WITH OR WITHOUT TOP RAILS
  - ⑭ ONE-HALF FABRIC HEIGHT OR AS RECOMMENDED BY MANUFACTURER

MINIMUM SIZE FOR FENCE HARDWARE

	WIDTH	DIA. (IN.)	LBS/FT
② END CORNER OR PULL POST	N/A	2 1/2	5.79
③ LINE POST	N/A	2	3.65
④ GATE POST (SINGLE GATE OR 1 LEAF OF DOUBLE)	≤ 6'	2 1/2	5.79
	≤ 13'	3 1/2	9.10
	≤ 18'	6	18.97
	> 18'	8	24.70
⑤ BRACE	N/A	1 1/4	2.27
⑥ TRUSS ROD	N/A	3/8	-
⑦ GATE FRAME	N/A	1 1/2	2.72



POST TOPS TO BE PRESSURE FITTED OR SCREWED. POST TOPS MAY BE ELIMINATED FOR ALL POSTS EXCEPT PIPE POSTS. IF POST TOPS ARE ELIMINATED, POST LENGTH SHALL BE INCREASED 3".

POST TOPS

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**CHAIN-LINK FENCE**

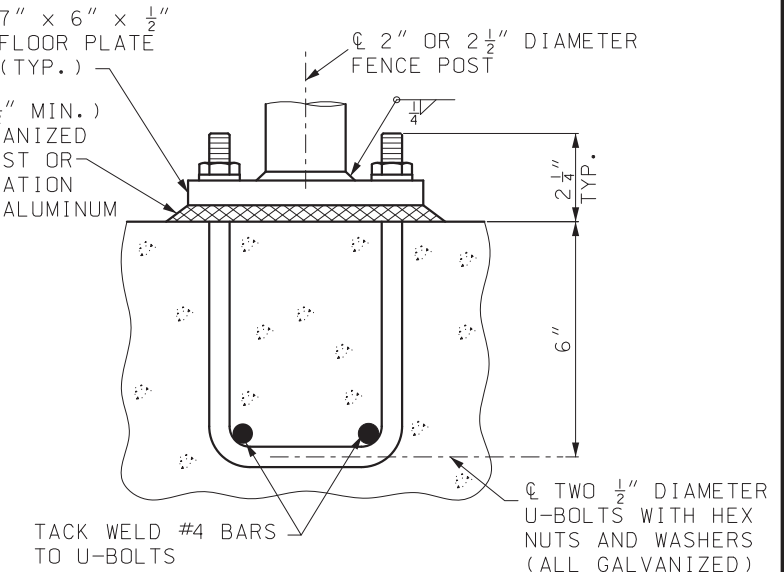
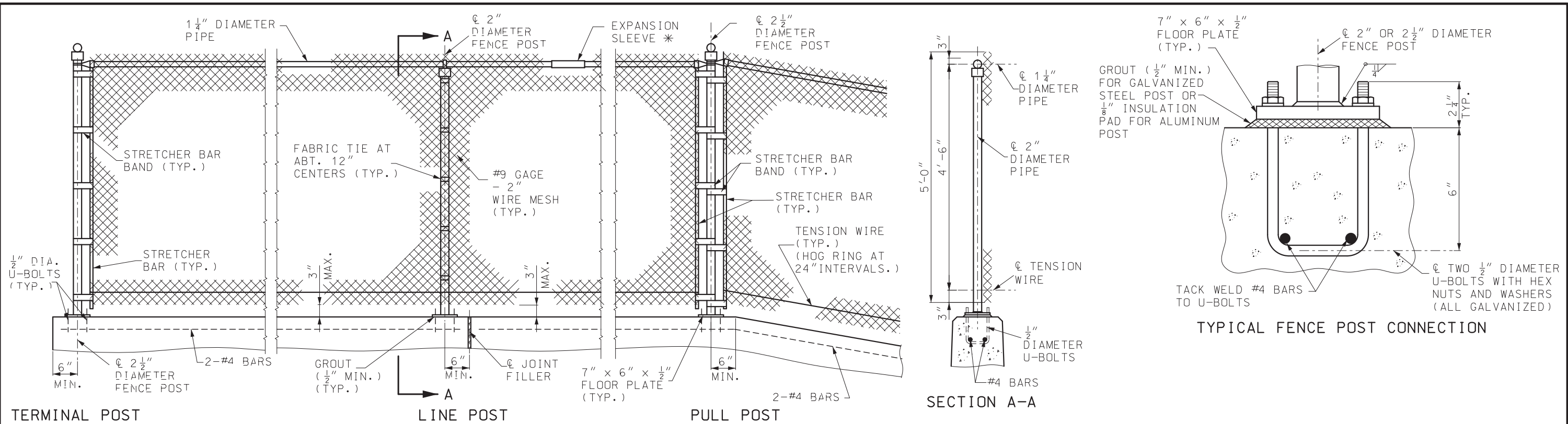
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**607.10W**

SHEET NO.  
1 OF 1

DATE EFFECTIVE: 4/1/2024

DATE PREPARED: 1/16/2024



TERMINAL POST

LINE POST

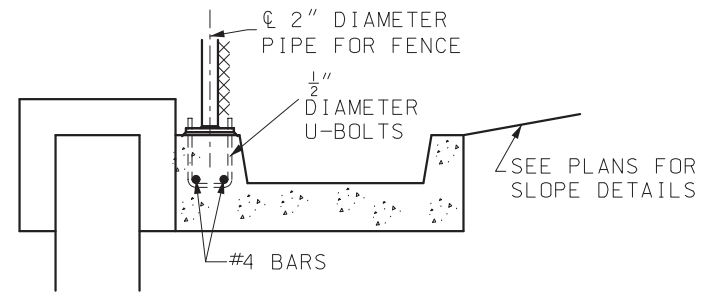
PULL POST

SECTION A-A

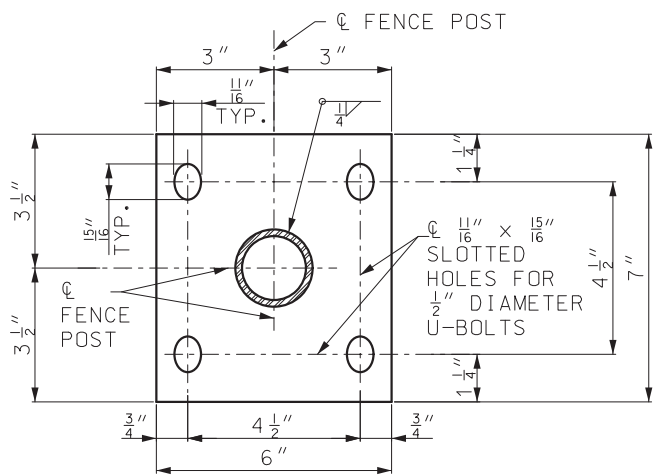
TYPICAL FENCE POST CONNECTION

\* PLACE EXPANSION SLEEVE AT ABOUT 30'-0" CENTERS WITH AT LEAST ONE EXPANSION SLEEVE BETWEEN PULL POSTS.

**PART ELEVATION (TYPICAL)**



ALTERNATE SECTION A-A FOR MSE WALLS



PLAN OF FLOOR PLATE

**GENERAL NOTES:**

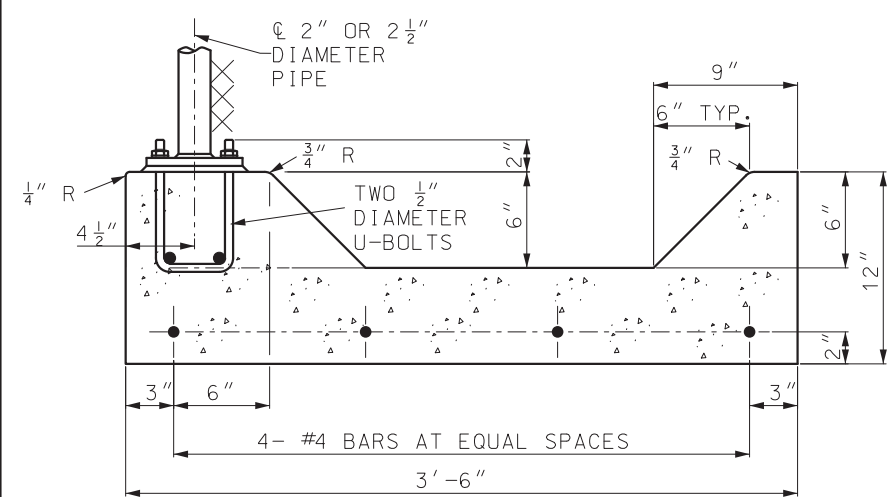
PAYMENT FOR U-BOLTS WITH NUTS, WASHERS, AND #4 BARS WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR CHAIN-LINK FENCE (RETAINING WALLS).

PULL POST SHALL BE USED AT SHARP BREAKS IN VERTICAL GRADE OR AT APPROXIMATE 100'-0" CENTERS ON STRAIGHT RUNS.

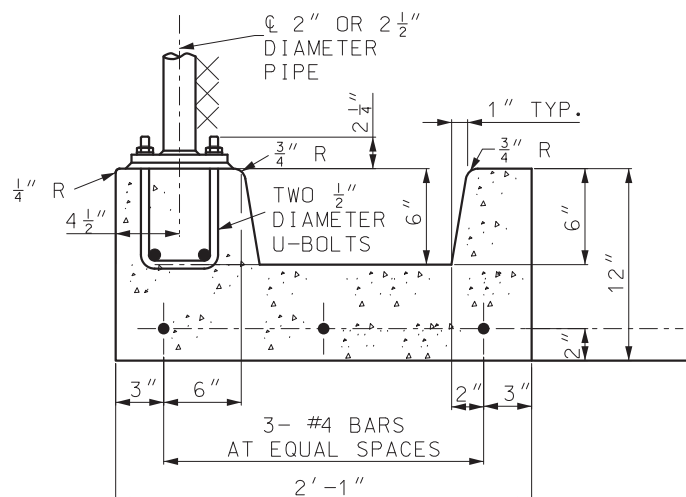
THE CHAIN-LINK FENCE SHALL BE IN ACCORDANCE WITH APPLICABLE PARTS OF SEC 607.

MAXIMUM POST SPACING IN HORIZONTAL DIRECTION SHALL BE 10'-0".

PIPE POST SIZES ARE NOMINAL INSIDE DIAMETERS.



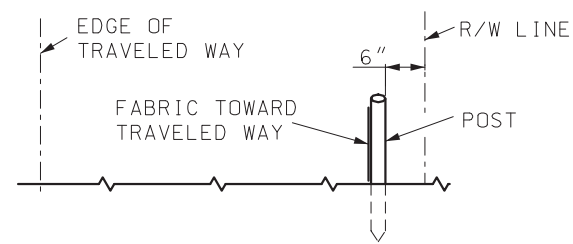
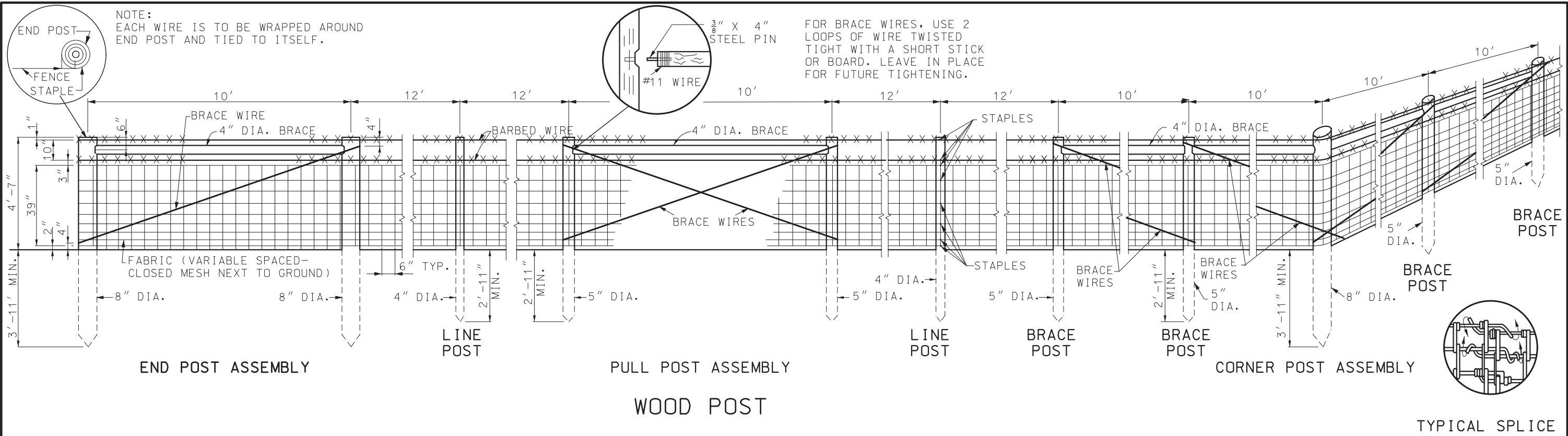
MODIFIED TYPE A GUTTER



MODIFIED TYPE B GUTTER

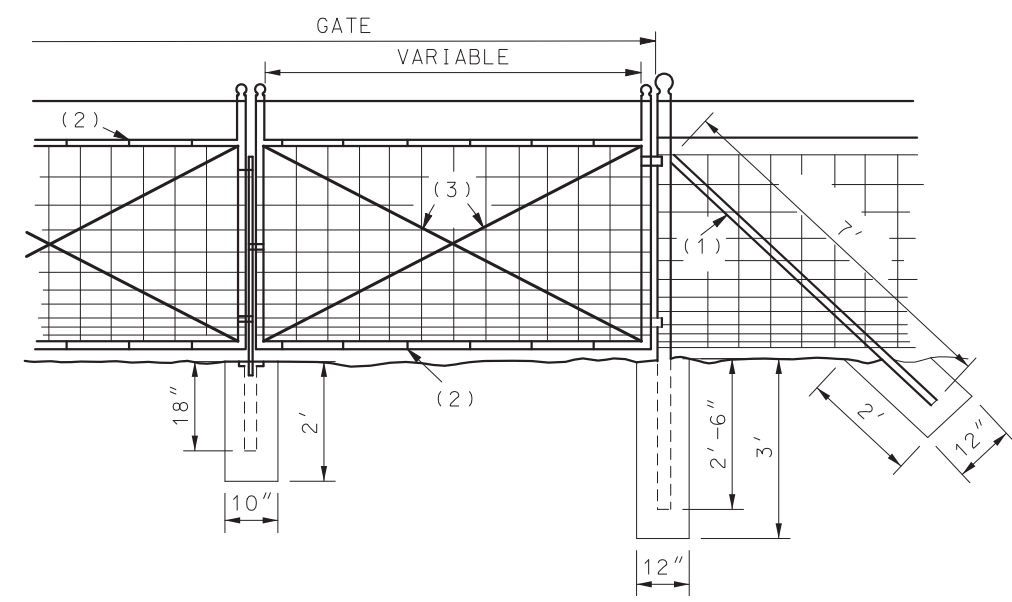
**FENCE CONNECTION FOR MSE WALLS**

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CHAIN-LINK FENCE FOR RETAINING WALLS</b>
DATE EFFECTIVE: 4/1/2024 DATE PREPARED: 1/16/2024	<b>607.11J</b>	SHEET NO. <b>1 OF 1</b>



TYPICAL FENCE LOCATION

GATE OPENING	GATE POST SIZE (NOM. I.D.)	LBS/FT
≤ 6'	2"	3.65
≤ 13'	2 1/2"	5.79
≤ 18'	3 1/2"	9.10
> 18'	6"	18.97
GATE FRAME	1 1/2"	2.72



1. BRACES
2. WIRE TIES
3. 3.8" ADJUSTABLE TRUSS RODS.

GENERAL NOTES:

STEEL LINE POSTS SHALL BE OF AN APPROVED "U", "Y", "T" OR CHANNEL SECTION, NOTCHED OR STUDDED WITH AN ANCHOR PLATE. POST PUNCHED WITH HOLES OR SELF FASTENING LUGS WILL NOT BE PERMITTED.

STAPLES SHALL BE SCREW SHANK TYPE OR EQUIVALENT (1 1/4" MINIMUM LENGTH).

STRETCHED FABRIC AND BARBED WIRE ON OUTSIDE OF POST ON CORNERS AND CURVES.

ATTACHMENT OF FABRIC TO STEEL LINE POSTS IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATION.

GATES FOR WOVEN WIRE FENCE SHALL BE IN ACCORDANCE WITH SEC 607.20 AND 1043.3.6 OF THE STANDARD SPECIFICATIONS. EXCEPT THE FILLER SHALL BE WOVEN WIRE FABRIC OF THE SAME KIND AS USED FOR THE FENCE.

SINGLE LEAF GATES REQUIRE UP TO 12" OPENING. DOUBLE LEAF GATES REQUIRE OVER 12" OPENING. DIRECTION OF SWING OF GATES SHALL BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

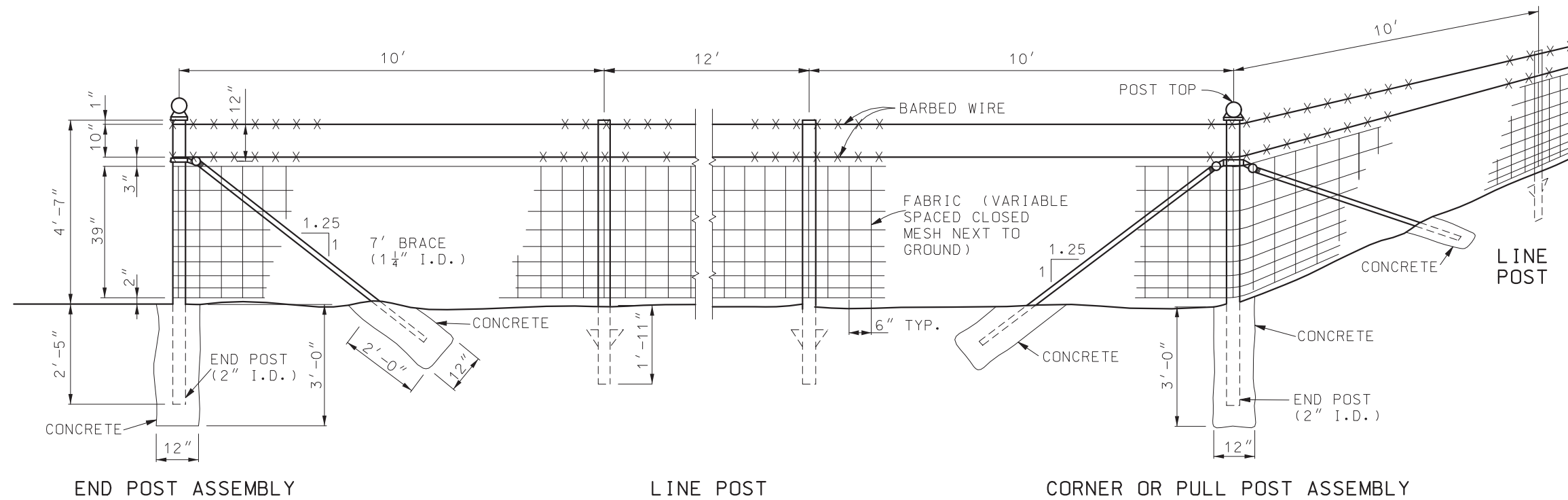
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
KENNETH L. VOSS  
NUMBER PE-2002016747  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

WOVEN WIRE FENCE

DATE EFFECTIVE:	4/1/2024	607.20H	SHEET NO. 1 OF 2
DATE PREPARED:	1/16/2024		

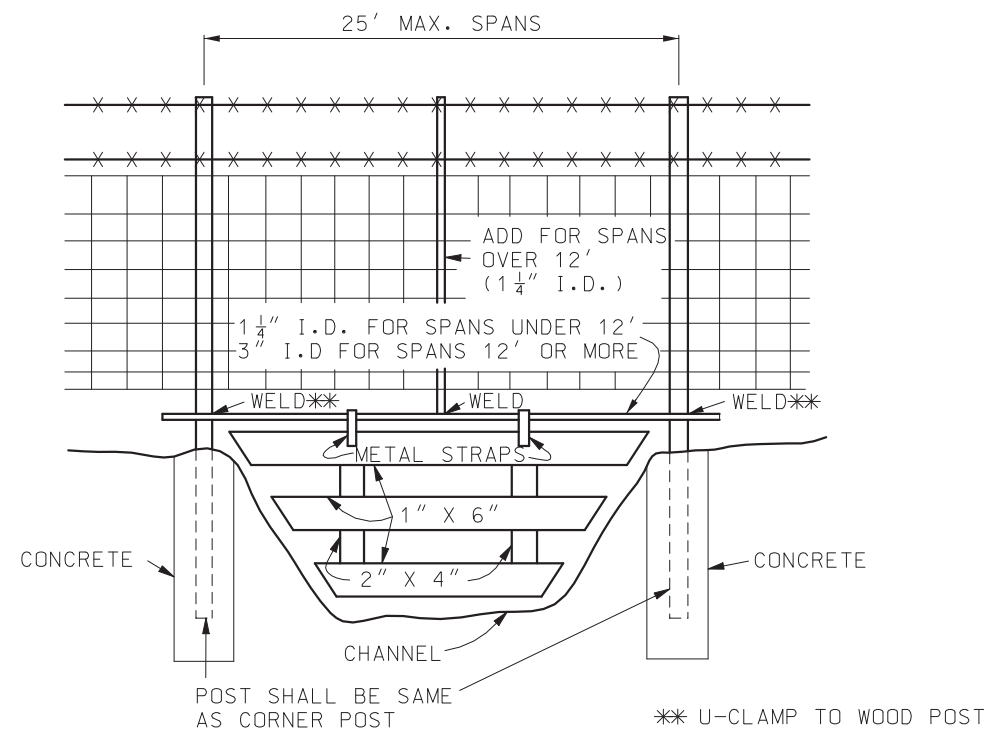


END POST ASSEMBLY

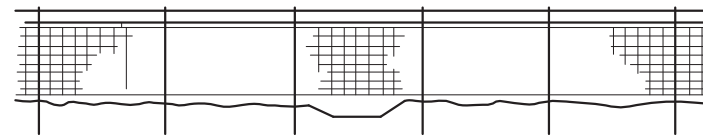
LINE POST

CORNER OR PULL POST ASSEMBLY

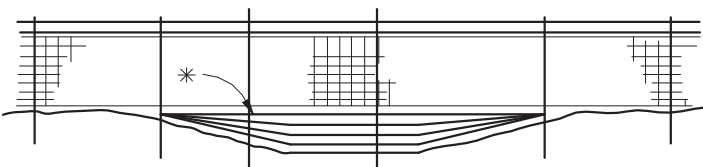
STEEL POST



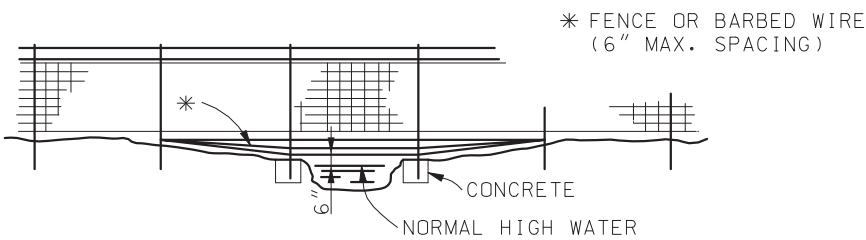
TYPICAL WATER CROSSING GATE



ROADWAY DITCHES OR SMALL SHALLOW CHANNELS (SPAN WITH NORMAL LINE POST SPACING)





POORLY DEFINED CHANNELS (SMALL DRAINAGE AREAS)

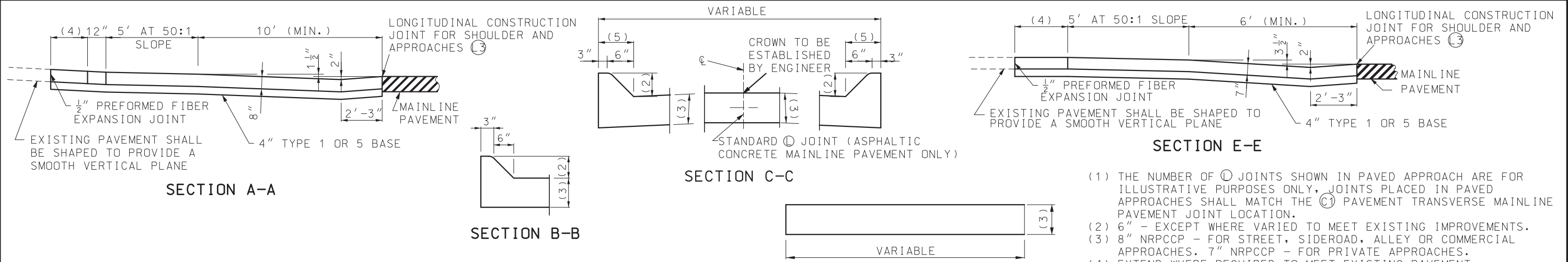


WELL DEFINED CHANNELS (LARGE DRAINAGE AREAS)

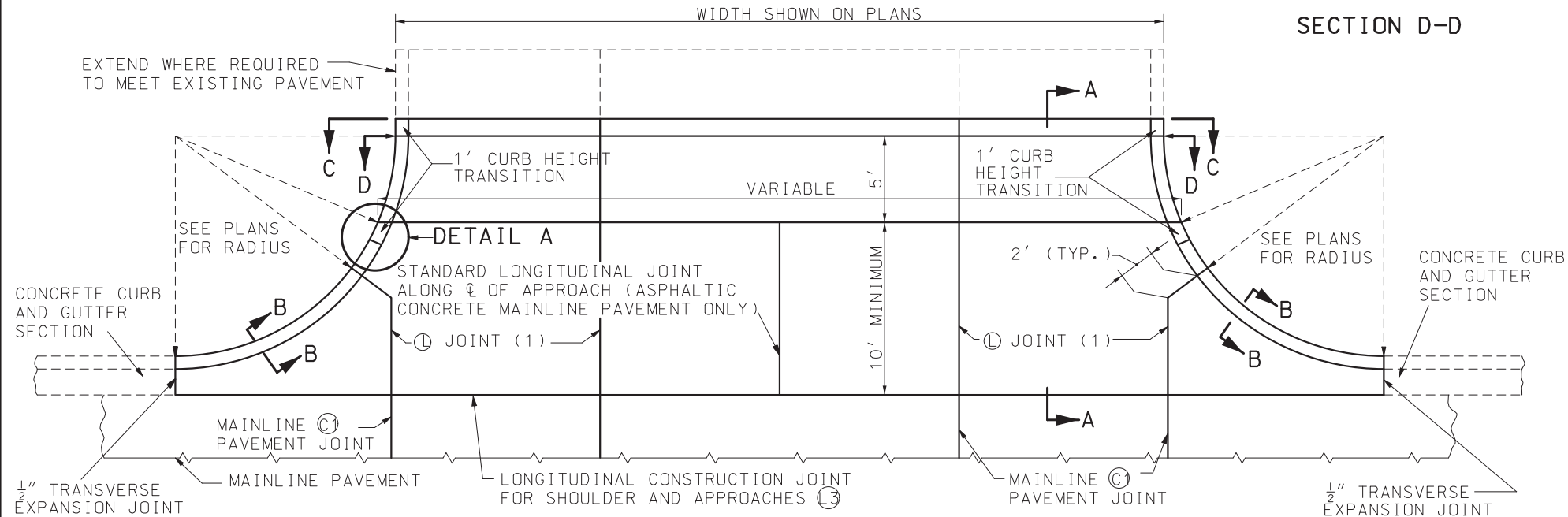
TYPICAL FENCING AT CHANNEL CROSSING

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p><b>WOVEN WIRE FENCE</b></p>
DATE EFFECTIVE: 4/1/2024 DATE PREPARED: 1/16/2024	SHEET NO. <b>607.20H</b> 2 OF 2





- (1) THE NUMBER OF (C) JOINTS SHOWN IN PAVED APPROACH ARE FOR ILLUSTRATIVE PURPOSES ONLY, JOINTS PLACED IN PAVED APPROACHES SHALL MATCH THE (C) PAVEMENT TRANSVERSE MAINLINE PAVEMENT JOINT LOCATION.
- (2) 6" - EXCEPT WHERE VARIED TO MEET EXISTING IMPROVEMENTS.
- (3) 8" NRPPCC - FOR STREET, SIDEROAD, ALLEY OR COMMERCIAL APPROACHES. 7" NRPPCC - FOR PRIVATE APPROACHES.
- (4) EXTEND WHERE REQUIRED TO MEET EXISTING PAVEMENT.
- (5) VARY TO MEET EXISTING IMPROVEMENTS.



**GENERAL NOTES:**

WHERE PAVED APPROACH MEETS EXISTING CONCRETE PAVEMENT OR SIDEWALK, PLACE 1/2" PREFORMED FIBER EXPANSION JOINT, CUT TO TEMPLATE, THROUGH NEW CONCRETE AND 1' FROM JUNCTION WITH EXISTING CONCRETE, OR ALONG INSIDE EDGE OF SIDEWALK. WHERE PAVED APPROACH MEETS EXISTING BITUMINOUS CONSTRUCTION, OMIT JOINT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF PAVED APPROACHES.

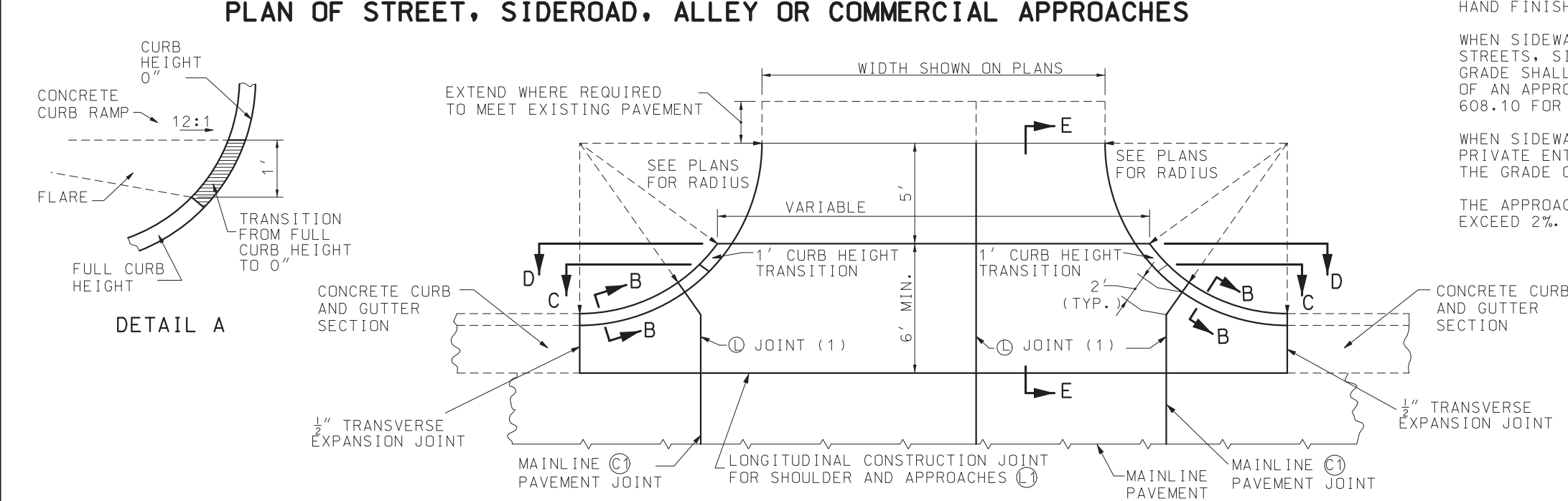
SEE STANDARD PLAN 608.10 FOR CONCRETE CURB RAMPS.

SEE STANDARD PLAN 502.05 FOR JOINT DETAILS.

SEE STANDARD PLAN 609.00 FOR TRANSVERSE EXPANSION JOINT DETAILS.

WHERE DRAINAGE IS NOT TO BE CARRIED ACROSS THE PAVED APPROACH, SECTION A-A SHALL BE MODIFIED TO ELIMINATE THE GUTTER LINE AND SHALL BE CROWNED AS DIRECTED BY THE ENGINEER.

IF SIDEWALKS ARE NOT INCLUDED IN CONSTRUCTION OF PAVED APPROACH, PLACE GROUND COVER, AS SHOWN ON PLANS, BEHIND CURB THROUGH RADIUS. GROUND COVER SHALL CONFORM TO FINISHED GRADING FOR CURB RAMP.


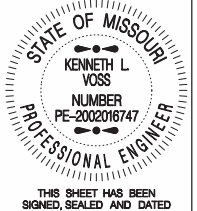


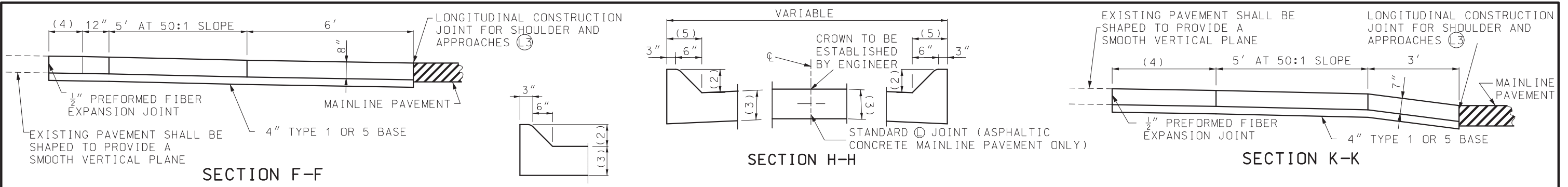
HAND FINISHING PERMITTED ON PAVED APPROACH.

WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF STREETS, SIDEROADS, ALLEYS OR COMMERCIAL ENTRANCES, THE SIDEWALK GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE APPROACH BY WAY OF AN APPROPRIATE RAMP AS SHOWN ON THE PLANS. SEE STANDARD PLAN 608.10 FOR RAMP DETAILS.

WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF PRIVATE ENTRANCES, THE APPROACH GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE SIDEWALK.

THE APPROACH GRADE THROUGH THE LIMITS OF A SIDEWALK SHALL NOT EXCEED 2%.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PAVED APPROACHES ADJOINING CURB AND GUTTER SECTIONS</b>
DATE EFFECTIVE: 4/1/2024 DATE PREPARED: 1/10/2024	<b>608.00L</b>
SHEET NO. 1 OF 2	



- (1) THE NUMBER OF (L) JOINTS SHOWN IN PAVED APPROACH ARE FOR ILLUSTRATIVE PURPOSES ONLY, JOINTS PLACED IN PAVED APPROACHES SHALL MATCH THE (C) PAVEMENT TRANSVERSE MAINLINE PAVEMENT JOINT LOCATION.
- (2) 6" - EXCEPT WHERE VARIED TO MEET EXISTING IMPROVEMENTS.
- (3) 8" NRPPCCP - FOR STREET, SIDEROAD, ALLEY OR COMMERCIAL APPROACHES. 7" NRPPCCP - FOR PRIVATE APPROACHES.
- (4) EXTEND WHERE REQUIRED TO MEET EXISTING PAVEMENT.
- (5) VARY TO MEET EXISTING IMPROVEMENTS.

**GENERAL NOTES:**

WHERE PAVED APPROACH MEETS EXISTING PCC PAVEMENT OR SIDEWALK, PLACE 1/2" PREFORMED FIBER EXPANSION JOINT, CUT TO TEMPLATE, THROUGH NEW CONCRETE AND 1' FROM JUNCTION WITH EXISTING CONCRETE, OR ALONG INSIDE EDGE OF SIDEWALK. WHERE PAVED APPROACH MEETS EXISTING BITUMINOUS CONSTRUCTION, OMIT JOINT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF PAVED APPROACHES.

SEE STANDARD PLAN 608.10 FOR CONCRETE CURB RAMPS.

SEE STANDARD PLAN 502.05 FOR JOINT DETAILS.

(SECTION F-F) ELEVATION OF CENTER OF PAVED APPROACH, AT A POINT 6' FROM EDGE OF NORMAL PAVEMENT SHALL NOT VARY MORE THAN 2" FROM ELEVATION OF MAINLINE PAVEMENT AT CENTERLINE OF PAVED APPROACH.

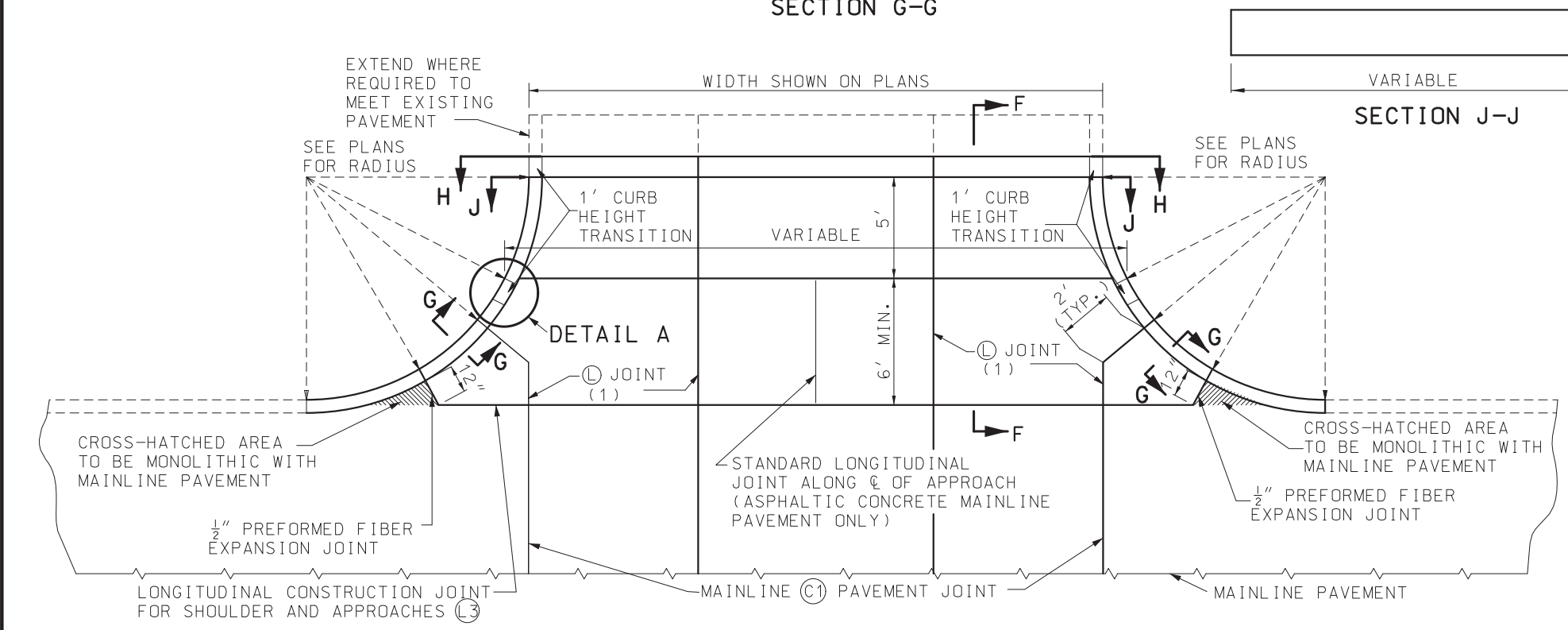
IF SIDEWALKS ARE NOT INCLUDED IN CONSTRUCTION OR PAVED APPROACH, PLACE GROUND COVER, AS SHOWN ON PLANS, BEHIND CURB THROUGH RADIUS. GROUND COVER SHALL CONFORM TO FINISHED GRADING FOR CURB RAMP.

HAND FINISHING PERMITTED ON PAVED APPROACH.

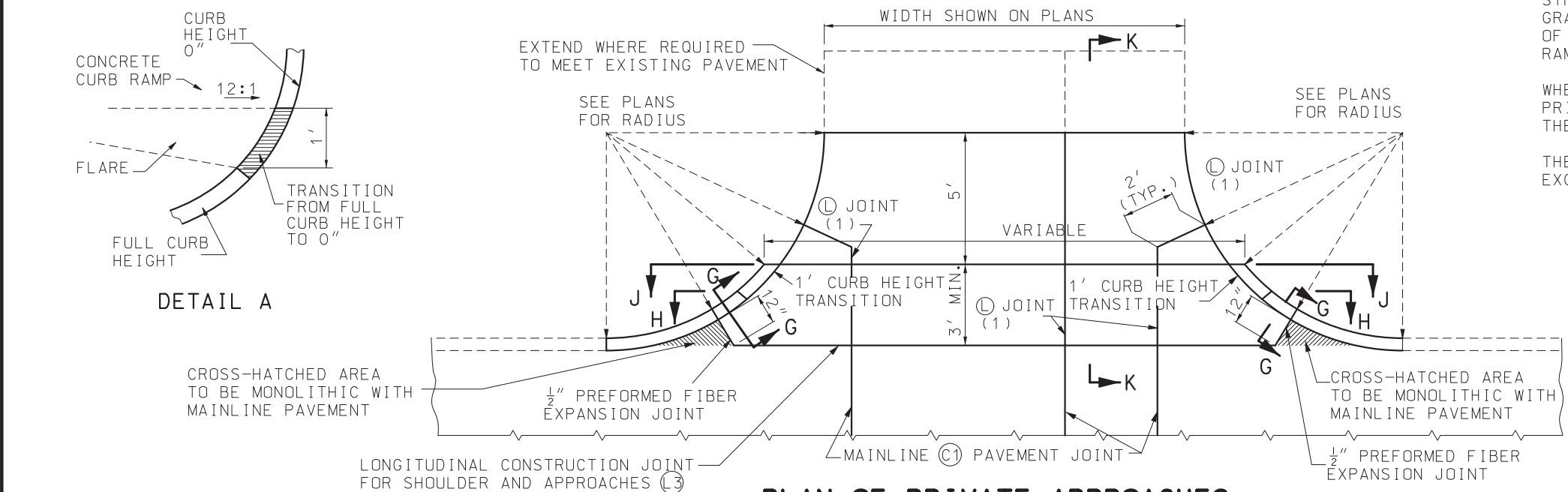
WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF STREETS, SIDEROADS, ALLEYS OR COMMERCIAL ENTRANCES, THE SIDEWALK GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE APPROACH BY WAY OF AN APPROPRIATE RAMP AS SHOWN ON THE PLANS. SEE 608.10 FOR RAMP DETAILS.

WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF PRIVATE ENTRANCES, THE APPROACH GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE SIDEWALK.

THE APPROACH GRADE THROUGH THE LIMITS OF A SIDEWALK SHALL NOT EXCEED 2%.

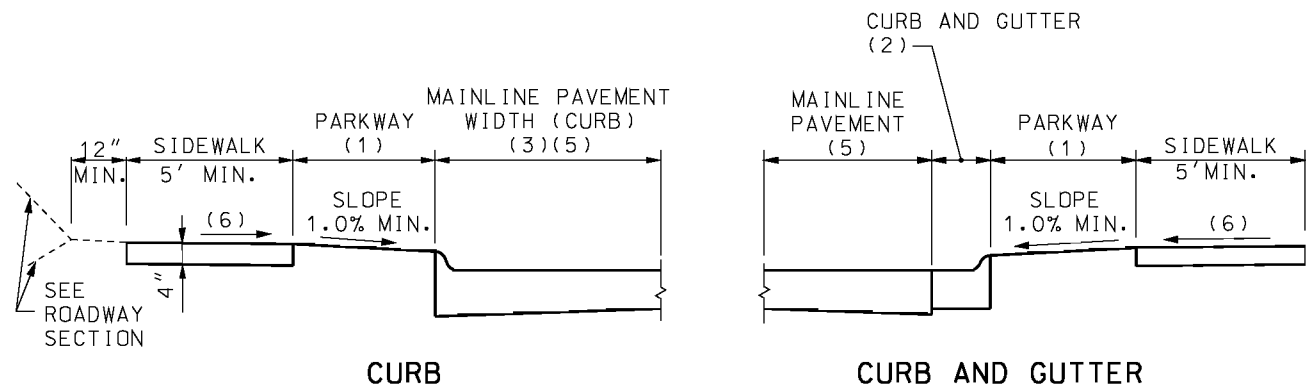


**PLAN OF STREET, SIDEROAD, ALLEY OR COMMERCIAL APPROACHES**

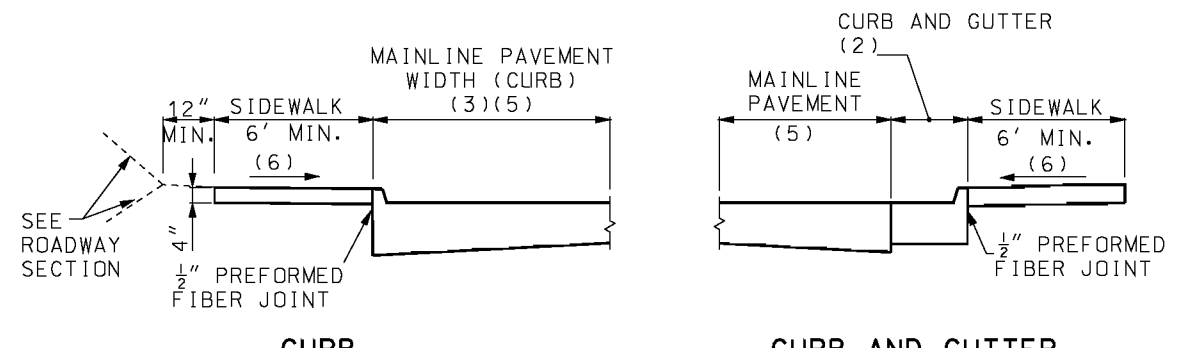


**PLAN OF PRIVATE APPROACHES**

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI KENNETH L. VOSS NUMBER PE-2002016747 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>PAVED APPROACHES ADJOINING CURB WITHOUT GUTTER SECTIONS</b></p>
<p>DATE EFFECTIVE: 4/1/2024 DATE PREPARED: 1/10/2024</p>	<p><b>608.00L</b></p>
<p>SHEET NO. 2 OF 2</p>	



**TYPICAL SIDEWALK WITH PARKWAY 2' OR MORE**



**TYPICAL SIDEWALK WITH NO PARKWAY**

**GENERAL NOTES:**

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABILITIES ACT - GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY. EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT POND WATER.

WHERE SIDEWALKS ARE LESS THAN 5 FT., 5 FT. X 5 FT. PASSING SPACES EVERY 200 FT. SHALL BE PROVIDED AND ARE PERMITTED TO OVERLAP PEDESTRIAN ACCESS ROUTES.

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

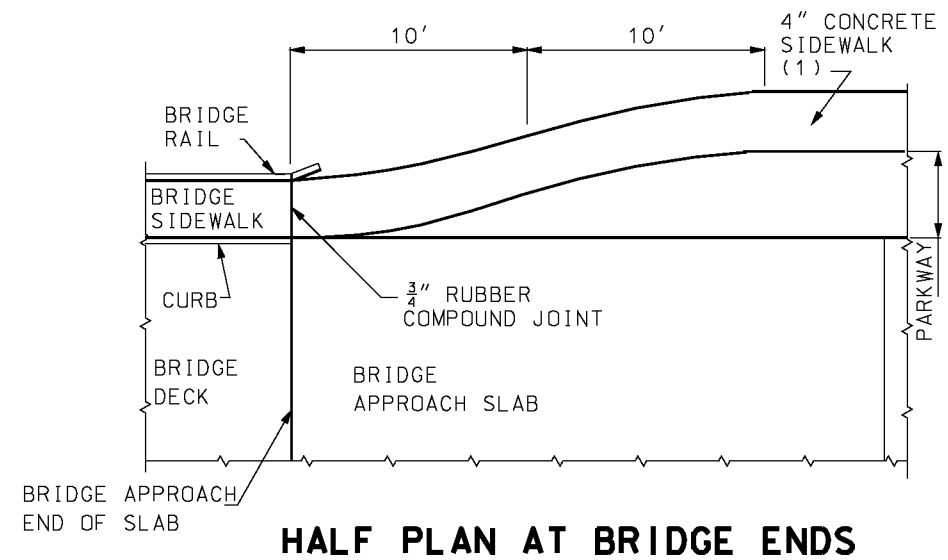
WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE 5.00% MAXIMUM.

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

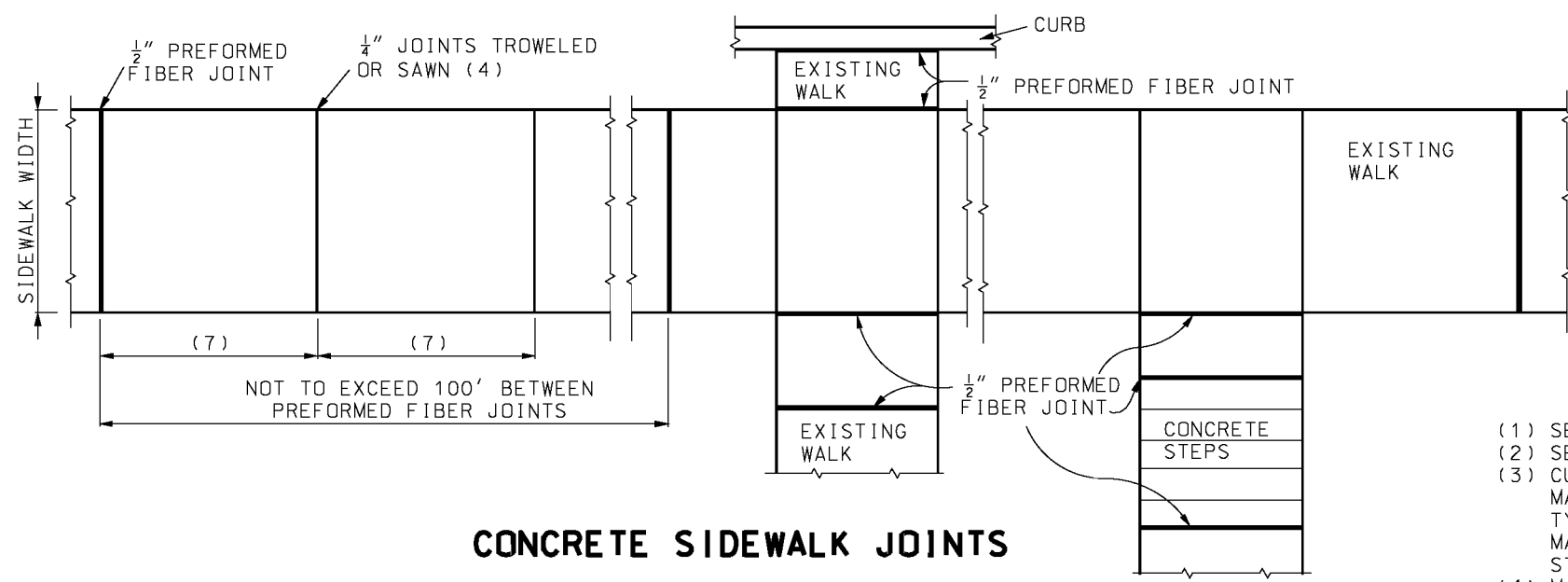
STORMWATER INLETS, SIGNS, POSTS, MANHOLE COVERS, PULL BOXES AND OTHER ACCESS LIDS SHOULD BE AVOIDED WITHIN THE SIDEWALK. IF SUCH A LOCATION IS NECESSARY, THE FEATURE MUST MEET ADA STANDARDS.

THE RUNNING GRADE OF A SIDEWALK SHALL NOT EXCEED 5.0% UNLESS IT IS MATCHING THE GRADE OF THE ADJACENT ROADWAY.

PEDESTRIAN ACCESS ROUTE SHALL CONTINUE ACROSS RESIDENTIAL AND COMMERCIAL ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS.





**HALF PLAN AT BRIDGE ENDS**

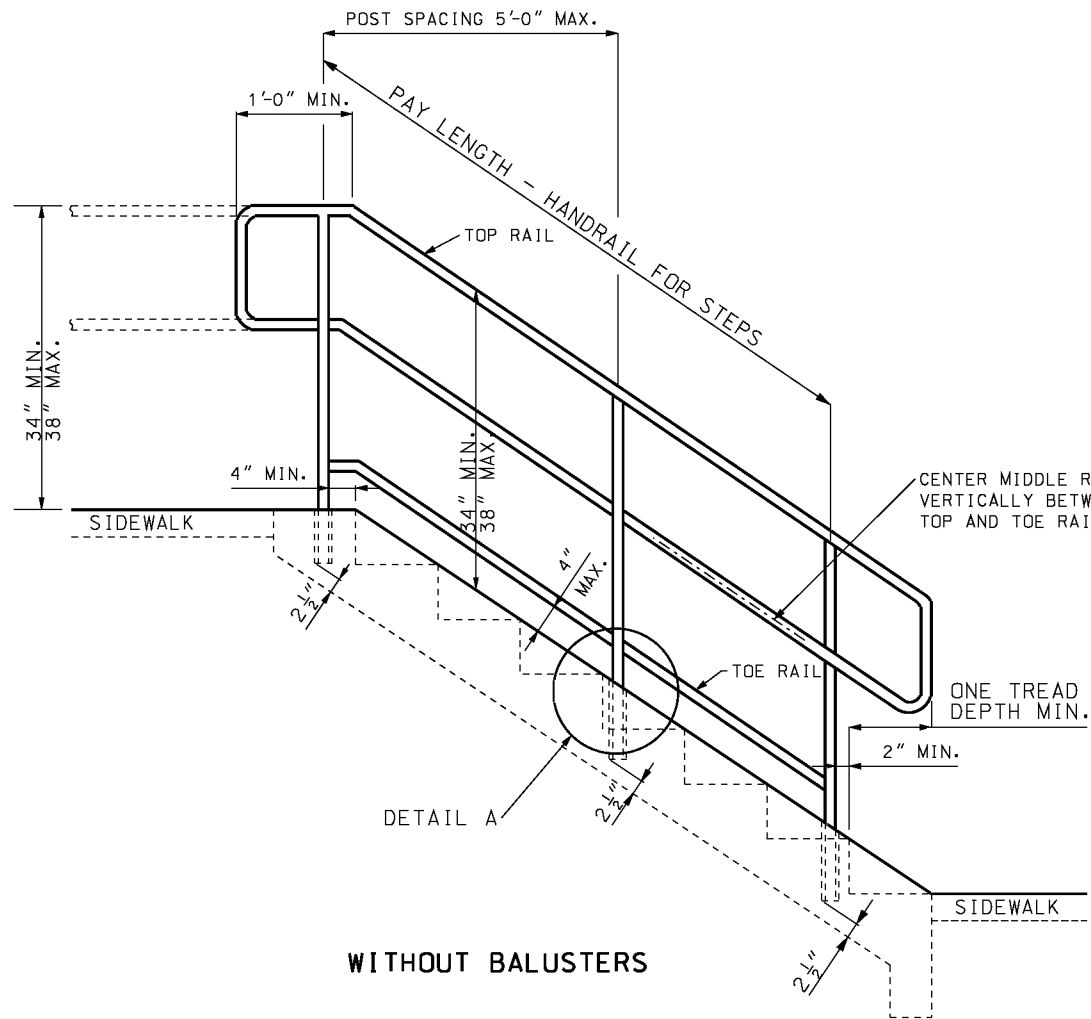


**CONCRETE SIDEWALK JOINTS**

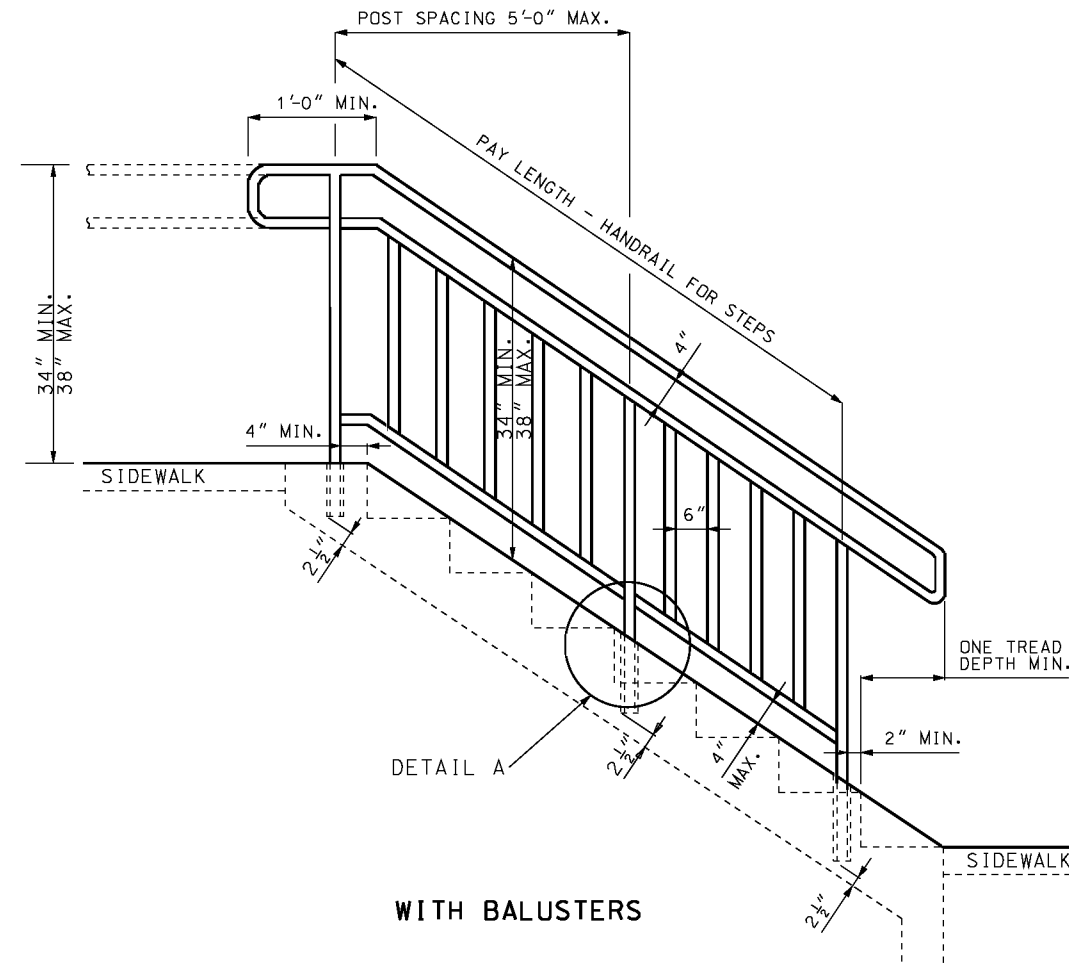
- (1) SEE PLANS FOR WIDTH
- (2) SEE STANDARD 608.00
- (3) CURB TO BE MONOLITHIC WITH PCC MAINLINE PAVEMENT. CURB TO BE TYPE S WITH ASPHALT CONCRETE MAINLINE PAVEMENT. SEE STANDARD PLAN 609.00.
- (4) MIN. 1/2" DEPTH JOINT.
- (5) SEE TYPICAL PAVEMENT SECTION
- (6) SLOPE 1.0% (2.0% MAX.)
- (7) SPACING EQUAL TO WIDTH OF WALK

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SIDEWALK</b>
DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015	<b>608.10P</b>
	SHEET NO. <b>1 OF 1</b>

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



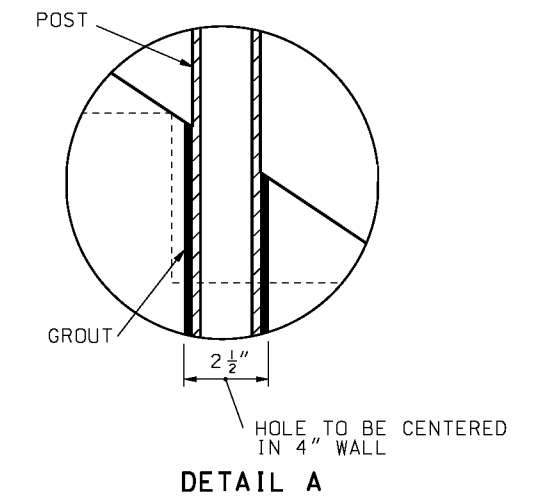
WITHOUT BALUSTERS



WITH BALUSTERS

RAILING & POST SPECIFICATIONS			
TYPE	SIZE (DIA.)	WEIGHT (LBS./FT.)	
		ALUM.	STEEL
ROUND	1 1/2"	0.940	2.72
SQUARE	2" X 2"	1.3094	4.31

STEP DIMENSIONS				
SLOPE	TREAD	RISE	X	Y
1:1.5	10 1/2"	7"	10 3/16"	5 1/4"
1:2	12"	6"	10 3/8"	5 9/16"
1:3	14 1/4"	4 3/4"	9 1/2"	5 1/4"



**SAFETY RAIL DETAILS**

**GENERAL NOTES:**

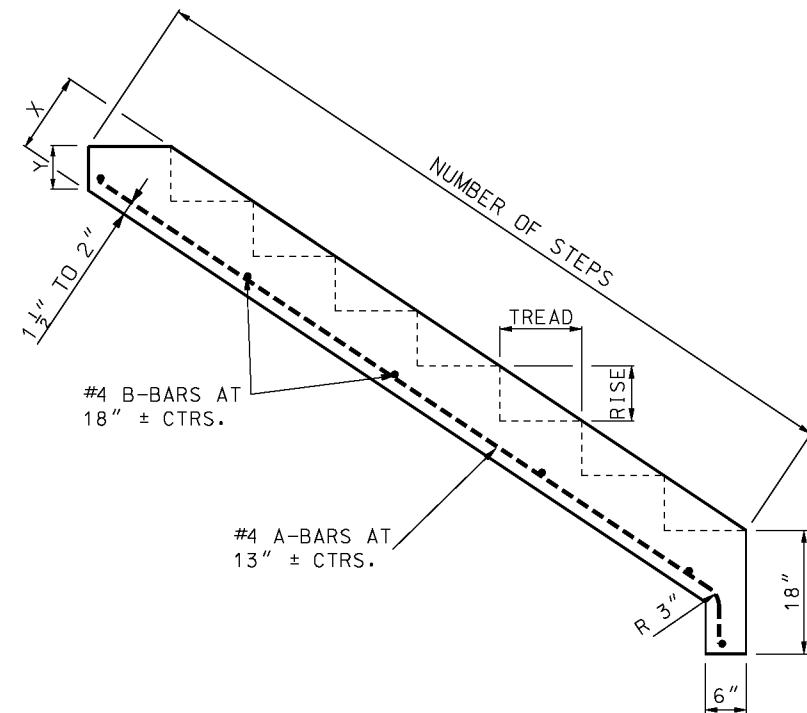
STAIRWAY SHALL HAVE SAFETY RAILS AT BOTH SIDES OF ALL STEPS.

RAILINGS AND POSTS MAY BE EITHER ROUND OR SQUARE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

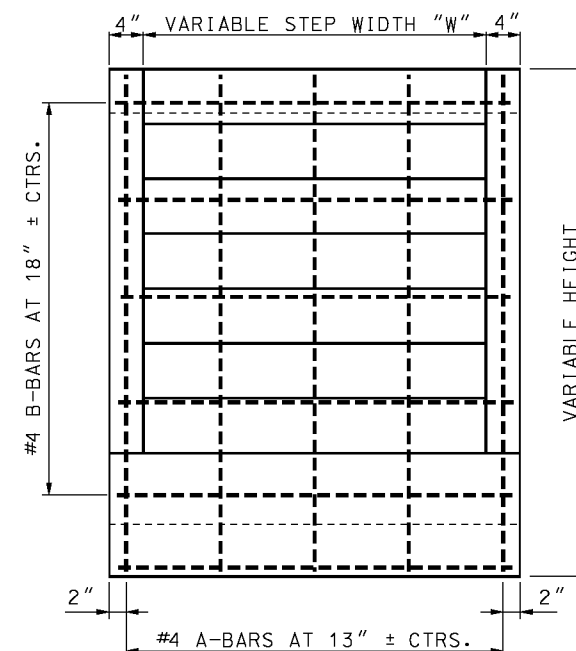
STEEL RAILINGS AND POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

ALL JOINTS SHALL BE CONTINUOUS WELDED AND GROUND SMOOTH.

ALL RAILING SHALL HAVE A 1/4" WEEP HOLE NEAR ALL INTERSECTING RAILING CONNECTIONS.



SIDE ELEVATION



FRONT ELEVATION

**STAIRWAY STEP DETAILS**

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CONCRETE STAIRS**

DATE EFFECTIVE: 04/01/2015  
DATE PREPARED: 2/20/2015



608.20E

SHEET NO.  
1 OF 2

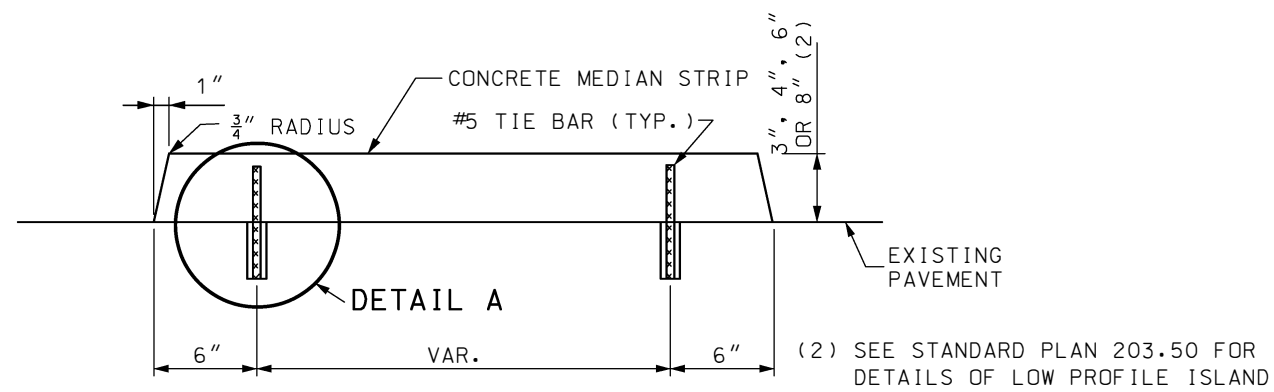
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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

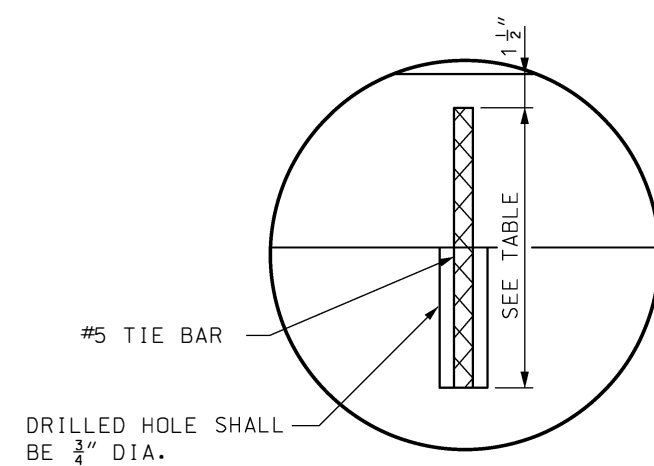
QUANTITIES FOR CONCRETE STEPS														
CONCRETE C.Y.    STEEL LB.														
		10 1/2" TREAD					1:1.5 SLOPE					7" RISE		
W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2'	CONC.	0.20	0.29	0.38	0.47	0.56	0.65	0.74	0.83	0.92	1.01	1.10	1.19	1.28
	STEEL	10	13	16	20	24	28	30	34	38	42	46	48	52
3'	CONC.	0.27	0.39	0.51	0.63	0.75	0.88	1.00	1.12	1.24	1.36	1.48	1.60	1.73
	STEEL	13	18	21	27	32	38	41	46	52	57	63	65	71
4'	CONC.	0.34	0.49	0.64	0.80	0.95	1.10	1.25	1.40	1.56	1.71	1.86	2.01	2.17
	STEEL	17	23	27	34	41	48	52	59	66	73	80	83	90
5'	CONC.	0.41	0.59	0.78	0.96	1.14	1.33	1.51	1.69	1.88	2.06	2.24	2.42	2.61
	STEEL	21	28	33	42	50	59	63	71	80	88	97	101	109
6'	CONC.	0.48	0.70	0.91	1.12	1.34	1.55	1.77	1.98	2.19	2.41	2.62	2.84	3.05
	STEEL	24	33	39	49	59	69	74	84	94	104	114	118	128
		12" TREAD					1:2 SLOPE					6" RISE		
W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2'	CONC.	0.18	0.26	0.33	0.41	0.49	0.56	0.64	0.72	0.80	0.87	0.95	1.03	1.10
	STEEL	10	12	16	19	23	25	29	33	36	39	42	46	50
3'	CONC.	0.25	0.35	0.45	0.56	0.66	0.76	0.87	0.97	1.07	1.18	1.28	1.38	1.49
	STEEL	13	16	21	26	32	34	39	45	50	53	58	63	68
4'	CONC.	0.31	0.44	0.57	0.70	0.83	0.96	1.09	1.22	1.35	1.48	1.61	1.74	1.87
	STEEL	17	20	27	33	40	44	50	57	63	67	73	81	87
5'	CONC.	0.38	0.53	0.69	0.85	1.00	1.16	1.31	1.47	1.63	1.78	1.94	2.10	2.25
	STEEL	21	25	33	41	49	53	61	69	77	82	89	98	105
6'	CONC.	0.44	0.62	0.81	0.99	1.17	1.36	1.54	1.72	1.90	2.09	2.27	2.45	2.64
	STEEL	24	29	39	48	58	62	71	81	90	96	105	115	124
		14 1/4" TREAD					1:3 SLOPE					4 3/4" RISE		
W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2'	CONC.	0.19	0.27	0.35	0.43	0.51	0.59	0.68	0.76	0.84	0.92	1.00	1.08	1.16
	STEEL	10	14	18	21	25	29	33	37	41	43	47	51	55
3'	CONC.	0.26	0.37	0.48	0.59	0.70	0.80	0.91	1.02	1.13	1.24	1.35	1.46	1.56
	STEEL	14	19	25	28	34	39	45	50	56	59	65	70	76
4'	CONC.	0.33	0.47	0.61	0.74	0.88	1.02	1.15	1.29	1.42	1.56	1.70	1.83	1.97
	STEEL	18	25	32	36	43	50	57	64	71	75	82	89	96
5'	CONC.	0.40	0.57	0.73	0.90	1.06	1.22	1.39	1.55	1.72	1.88	2.05	2.21	2.38
	STEEL	22	30	39	44	52	61	69	78	86	91	100	108	117
6'	CONC.	0.47	0.66	0.86	1.05	1.24	1.43	1.63	1.82	2.01	2.21	2.40	2.59	2.78
	STEEL	25	35	45	51	61	71	81	91	101	107	117	127	137

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p style="text-align: center; font-size: 1.2em;"><b>CONCRETE STAIRS</b></p>
DATE EFFECTIVE: <u>04/01/2015</u> DATE PREPARED: <u>2/20/2015</u>	<p style="font-size: 1.2em; font-weight: bold;">608.20E</p>	SHEET NO. <p style="font-size: 1.2em;">2 OF 2</p>

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

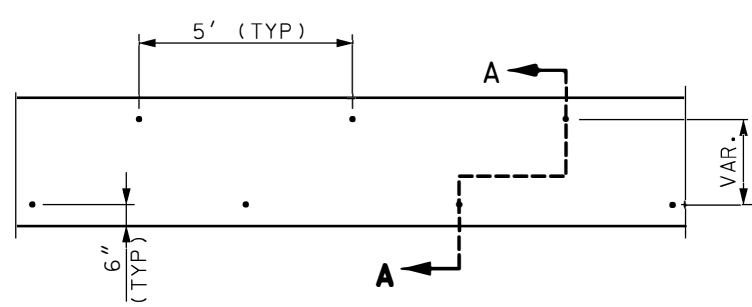


**SECTION A-A  
CONCRETE MEDIAN STRIP**

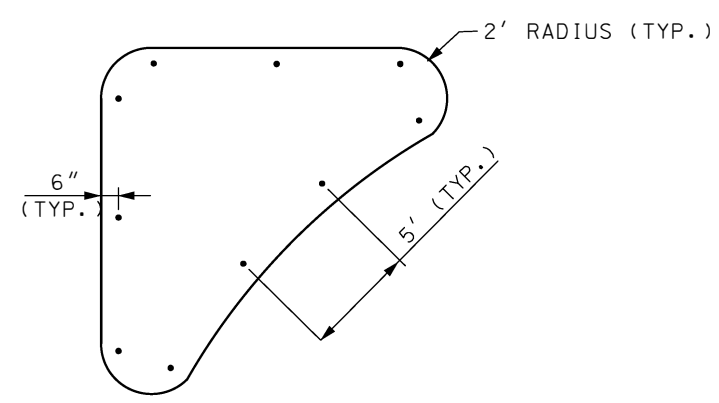


**DETAIL A**

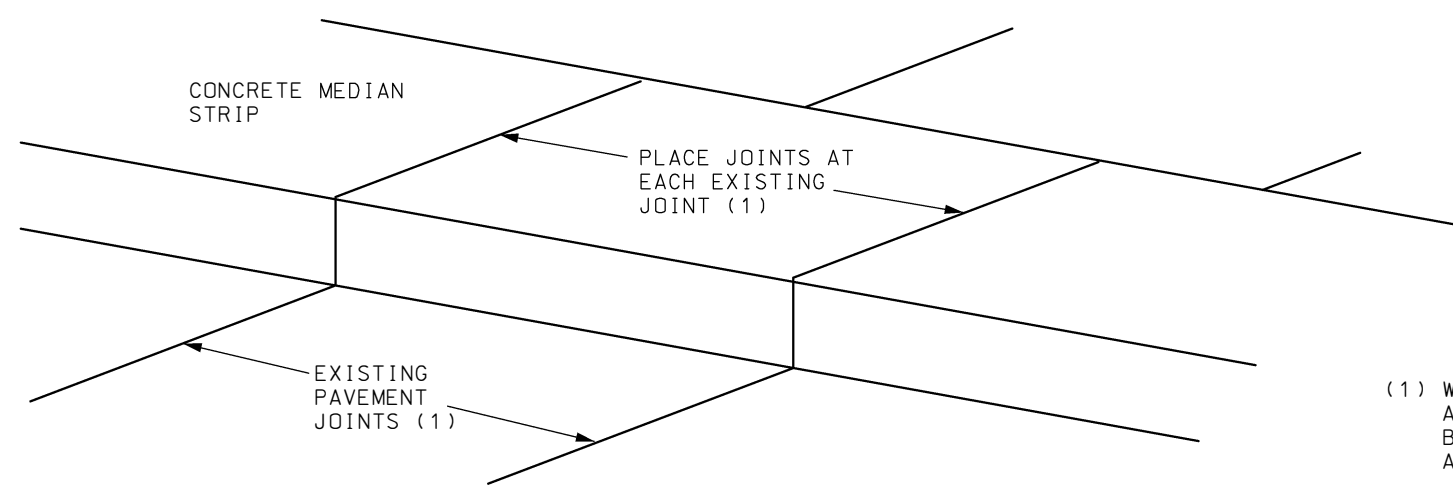
MEDIAN HEIGHT	BAR LENGTH
3"	8"
4"	9"
6"	11"
8"	13"



**TIE BAR LOCATIONS FOR  
CONCRETE MEDIAN STRIP**



**TIE BAR LOCATIONS FOR  
CONCRETE MEDIAN STRIP (ISLAND)**



**CONCRETE MEDIAN STRIP JOINT LOCATION**

(1) WHEN THERE ARE NO VISIBLE JOINTS IN THE ADJACENT PAVEMENT, THE JOINT SPACING WILL BE EQUAL TO THE MEDIAN STRIP WIDTH, WITH A MINIMUM SPACING OF 10'.

**GENERAL NOTES:**

TIE BARS SHALL BE EPOXY COATED, DEFORMED REINFORCING BARS MEETING THE REQUIREMENTS OF SECTION 710 AND 1057.

BONDING FOR TIE BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

THE FACE OF THE MEDIAN MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6' OR LESS.

WHEN CONCRETE MEDIANS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, THE MEDIAN HEIGHT WILL BE 4".

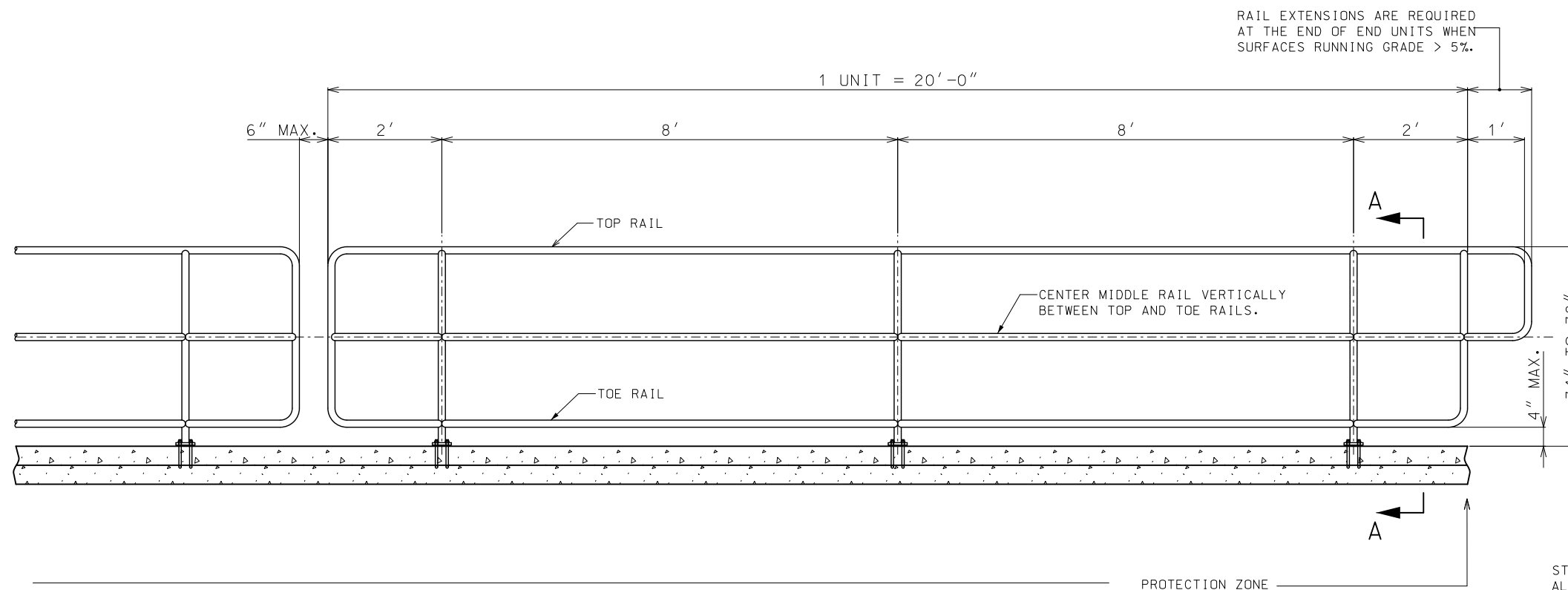
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CONCRETE MEDIAN STRIP**

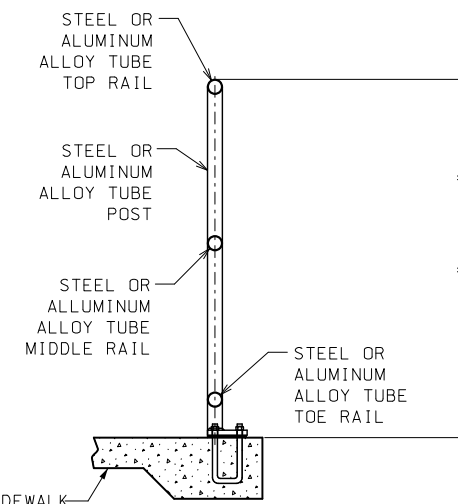
DATE EFFECTIVE: 10/01/2020	<b>608.30A</b>	SHEET NO.
DATE PREPARED: 7/21/2020		1 OF 1

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

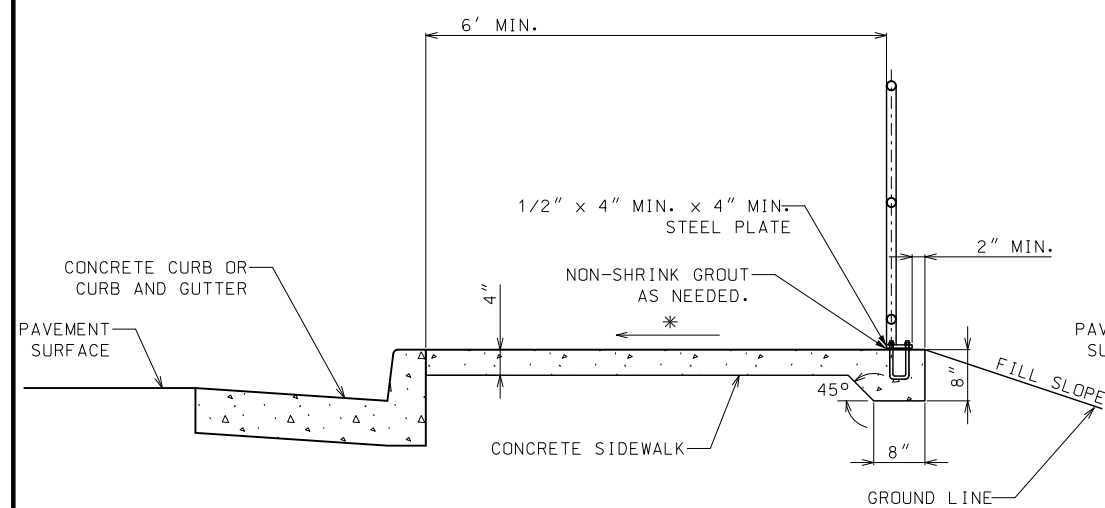


### SIDEWALK HANDRAILING WITHOUT BALUSTERS

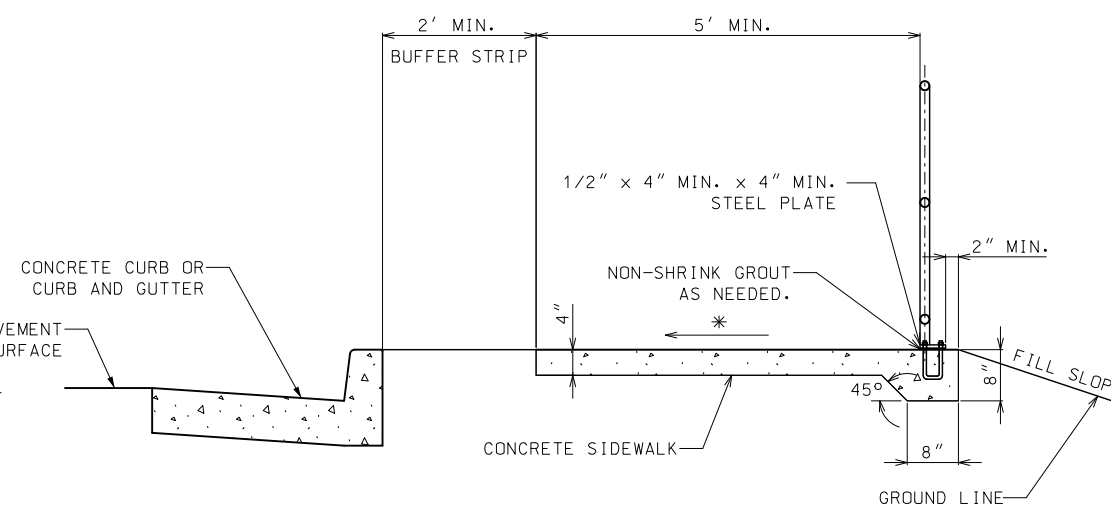
\* CROSS SLOPE: 1.0 % MIN. - 2.0 % MAX.



HANDRAILING





SIDEWALK WITHOUT BUFFER STRIP (SECTION A-A)

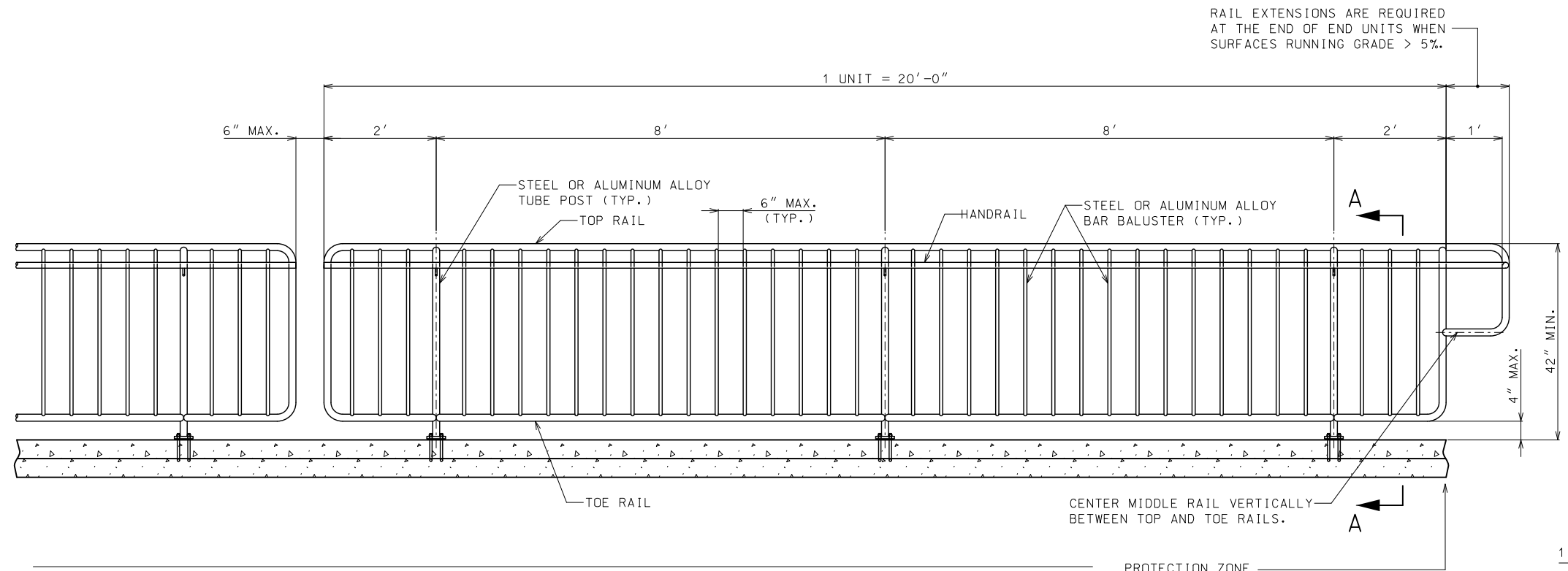


SIDEWALK WITH BUFFER STRIP (SECTION A-A)

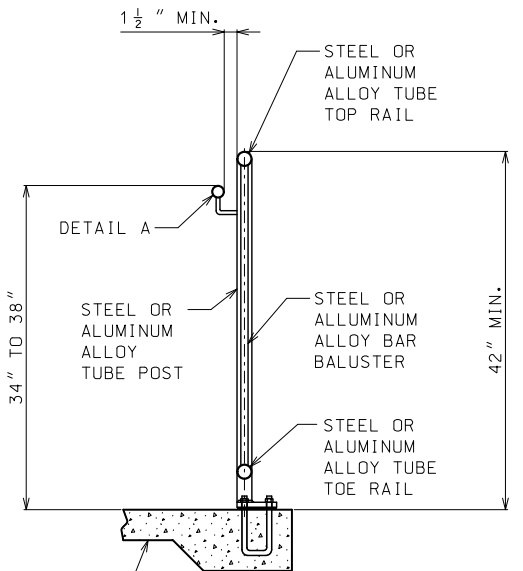
FOR GENERAL NOTES AND HANDRAILING REQUIREMENTS ON FILL SLOPES SEE SHEET 3 OF 4

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>HANDRAILING</b></p>
<p>DATE EFFECTIVE: 01/01/2021</p> <p>DATE PREPARED: 10/14/2020</p>	<p><b>608.40A</b></p>
<p>SHEET NO. 1 OF 4</p>	

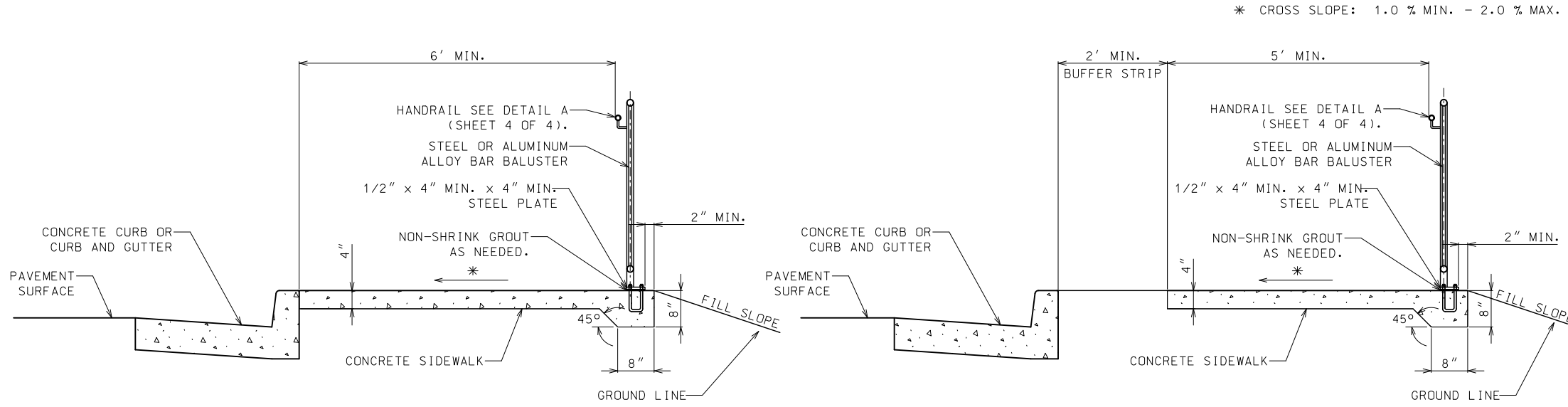
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**SIDEWALK SAFETY RAIL WITH BALUSTERS AND HANDRAIL**





**SAFETY RAIL WITH HANDRAIL**



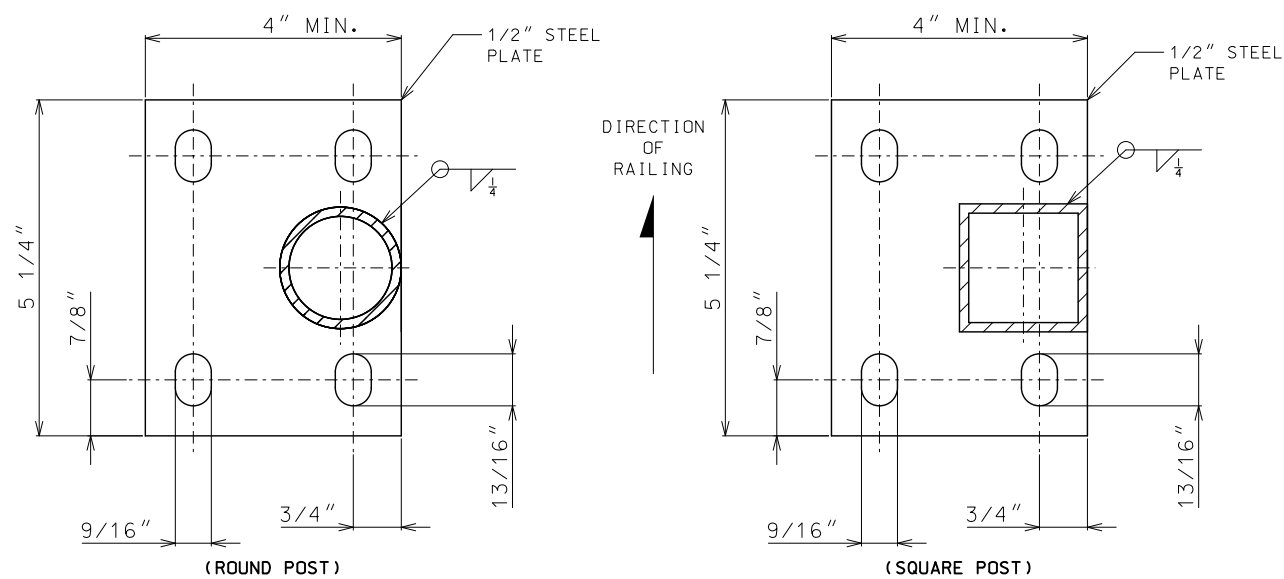
**SIDEWALK WITHOUT BUFFER STRIP (SECTION A-A)**

**SIDEWALK WITH BUFFER STRIP (SECTION A-A)**

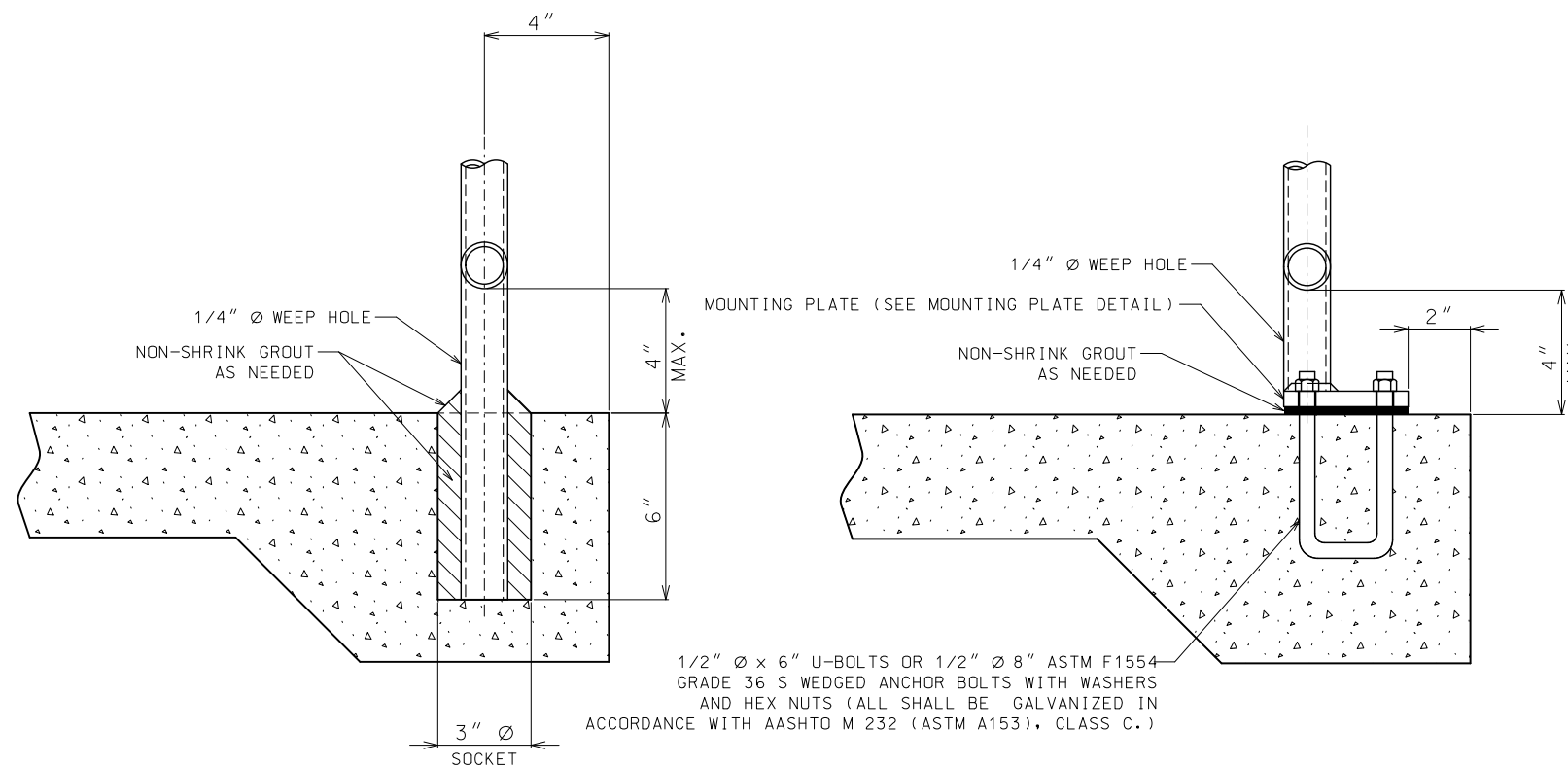
FOR GENERAL NOTES AND HANDRAIL REQUIREMENTS ON FILL SLOPES SEE SHEET 3 OF 4.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p><b>HANDRAILING</b></p>
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<p><b>608.40A</b></p>
SHEET NO. 2 OF 4	





**MOUNTING PLATE DETAIL  
(PLAN VIEW)**



**SOCKET MOUNTING DETAIL**

**PLATE MOUNTING DETAIL**

1/2" Ø x 6" U-BOLTS OR 1/2" Ø 8" ASTM F1554 GRADE 36 S WEDGED ANCHOR BOLTS WITH WASHERS AND HEX NUTS (ALL SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 232 (ASTM A153), CLASS C.)

**GENERAL NOTES:**

RAILINGS AND POSTS MAY BE EITHER ROUND OR SQUARE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

STEEL RAILINGS AND POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

ALL JOINTS SHALL BE CONTINUOUS WELDED AND GROUND SMOOTH.

METAL SAFETY RAIL MUST BE COMPLIANT WITH THE "AMERICAN'S WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG)". EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

ALL POSTS SHALL HAVE A 1/4" WEEP HOLE IMMEDIATELY ABOVE THE MOUNTING PLATE.

WHEN INSTALLED THE POSTS SHALL BE PLUMB AND RAILINGS SHALL MATCH THE SLOPE OF THE SIDEWALK.

HANDRAIL REQUIREMENTS		
FILL SLOPE	FILL HEIGHT	HANDRAIL
(1V:3H) OR FLATTER	—	NOT REQUIRED
(1V:3H) OR STEEPER	≥ 6 FT.	REQUIRED
(1V:2H) OR STEEPER	≥ 4 FT.	REQUIRED
(1V:1H) OR STEEPER	≥ 1 FT.	REQUIRED

RAILING AND POST SPECIFICATION				
DESCRIPTION	TYPE	SIZE ( DIA. )	WEIGHT (LBS. / FT.)	
			ALUM.	STEEL
RAILING & POST	ROUND	1 1/2"	0.940	2.720
	SQUARE	2" X 2"	1.3094	4.310
BALUSTER	ROUND	1/2"	0.2312	0.668
	RECT.	3/8" X 1/2" STL.	—	0.6375
	SQUARE	1/2" X 1/2" ALUM.	0.2944	—

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
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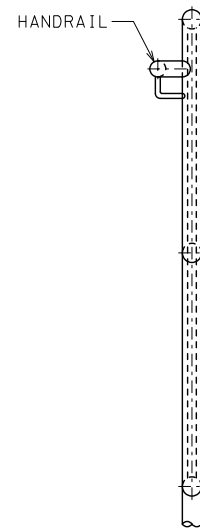
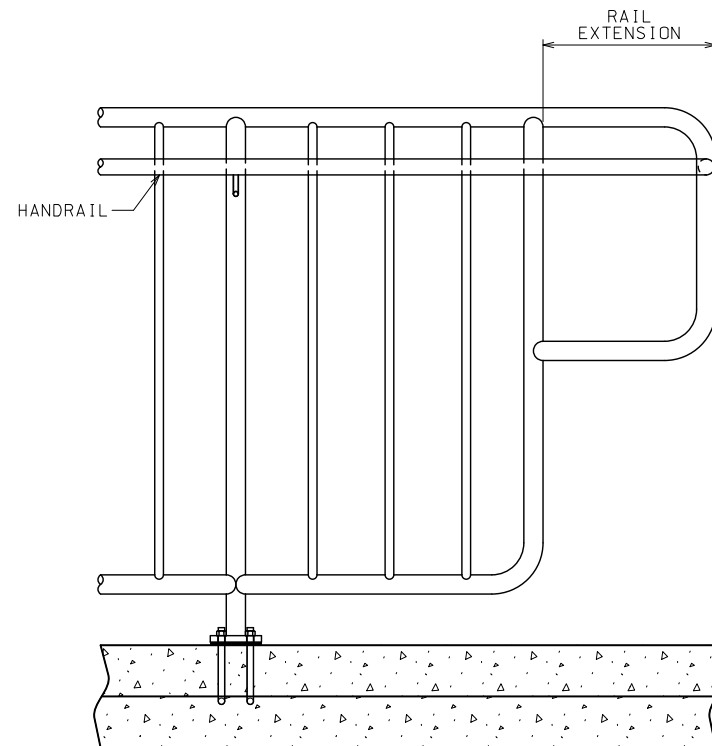
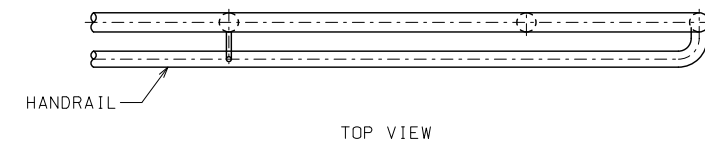
**HANDRAILING**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 01/01/2021  
DATE PREPARED: 10/14/2020

SHEET NO.  
**608.40A**  
3 OF 4

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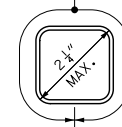
HANDRAIL AND EXTENSION CONNECTION

1 1/4" - 2" O.D. MAX.

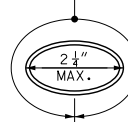


CIRCULAR CROSS SECTION

4" - 6 1/4" PERIMETER MAX.



4" - 6 1/4" PERIMETER MAX.



NON-CIRCULAR CROSS SECTION

HANDRAIL GRIPPING SURFACES

HANDRAIL NOTES:

HANDRAILS SHALL BE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

HANDRAILS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

HANDRAILS SHALL BE AT A CONSISTENT HEIGHT ABOVE WALKING SURFACES.

HANDRAIL GRIPPING SURFACES SHALL BE CONTINUOUS ALONG THEIR LENGTH AND SHALL NOT BE OBSTRUCTED ALONG THEIR TOPS OR SIDES.

THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL NOT BE OBSTRUCTED FOR MORE THAN 20 PERCENT OF THEIR LENGTH.

WHERE HANDRAILS ARE PROVIDED ALONG WALKING SURFACES WITH SLOPES NOT STEEPER THAN 1:20, THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL BE PERMITTED TO BE OBSTRUCTED ALONG THEIR ENTIRE LENGTH WHERE THEY ARE INTEGRAL TO CRASH RAILS OR BUMPER GUARDS.

THE DISTANCE BETWEEN HORIZONTAL PROJECTIONS AND THE BOTTOM OF THE GRIPPING SURFACE SHALL BE PERMITTED TO BE REDUCED BY 1/8" FOR EACH 1/2" OF ADDITIONAL HANDRAIL PERIMETER DIMENSION THAT EXCEEDS 4".

HANDRAIL SURFACES AND ANY SURFACES ADJACENT TO THEM SHALL BE FREE OF SHARP OR ABRASIVE ELEMENTS AND SHALL HAVE ROUNDED EDGES.

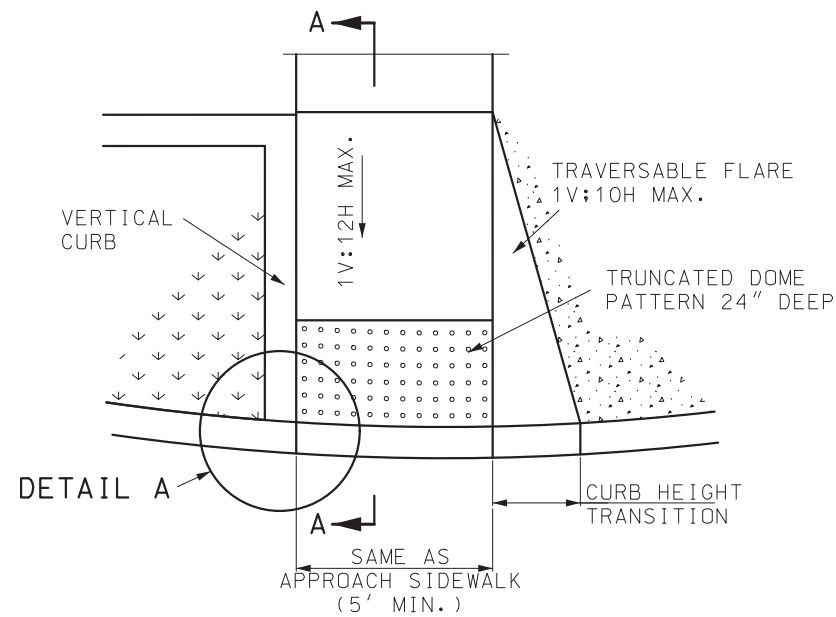
HANDRAILS SHALL NOT ROTATE WITHIN THEIR FITTINGS.

DETAIL A - HANDRAIL

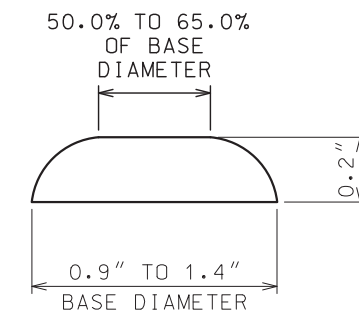
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p align="center"><b>HANDRAILING</b></p>
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<p align="center"><b>608.40A</b></p>	SHEET NO. 4 OF 4

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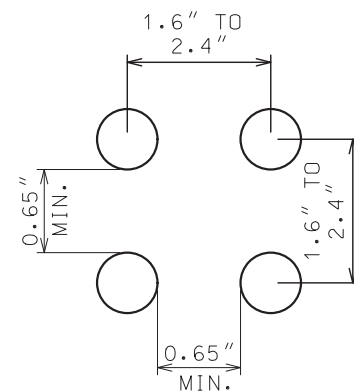
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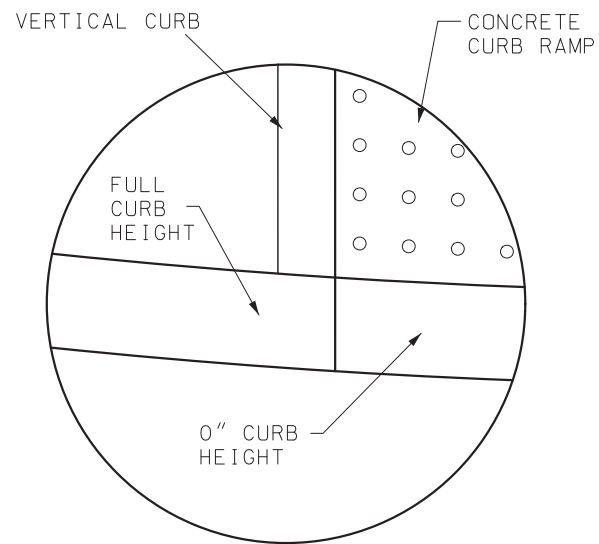
**CURB RAMP DETAIL**



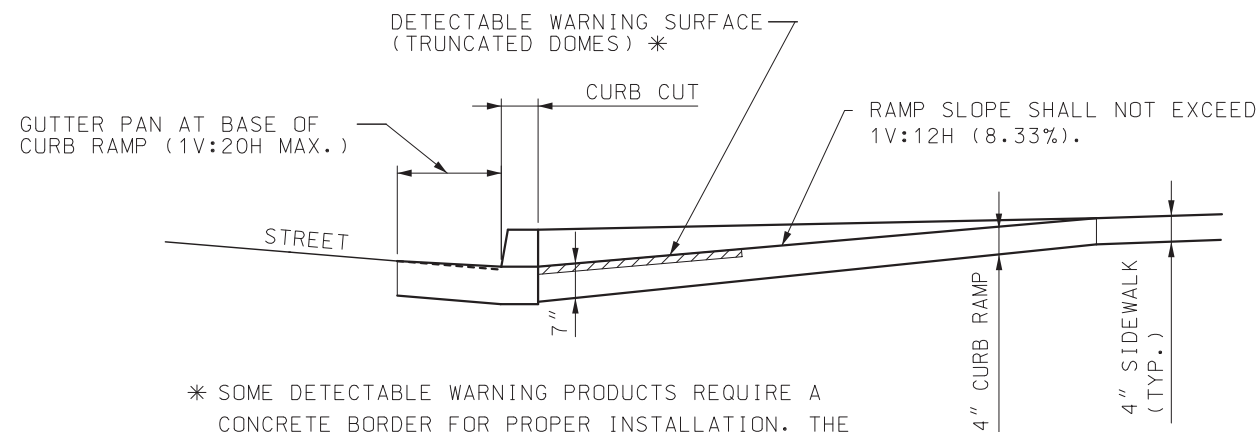
**TRUNCATED DOMES CROSS SECTION**



**TRUNCATED DOMES SPACING**



**DETAIL A**



**SECTION A-A**

\* SOME DETECTABLE WARNING PRODUCTS REQUIRE A CONCRETE BORDER FOR PROPER INSTALLATION. THE CONCRETE BORDER SHALL NOT EXCEED 2" PER SIDE.

**GENERAL NOTES:**

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABILITIES ACT - GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY. EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT POND WATER.

SIDEWALK, RAMP AND LANDING CROSS SLOPES SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDE ROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE 5.00% MAXIMUM.

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

30" x 48" CLEAR SPACE SHALL BE PROVIDED CENTERED ON THE PEDESTRIAN PUSH BUTTON.

BEYOND THE BOTTOM GRADE BREAK OF A CURB RAMP, A CLEAR SPACE 4' MINIMUM BY 4' MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.

SIDE FLARES OF CURB RAMPS, IN THE PATH OF PEDESTRIAN TRAVEL (TRAVERSABLE), SHALL NOT EXCEED A SLOPE OF 1V:10H. SIDE FLARES OUTSIDE THE PEDESTRIAN PATH (NONTRAVERSABLE) MAY BE VERTICAL.



TRANSITION FROM SIDEWALK OR CURB RAMP TO GUTTER TO ROADWAY SHALL BE FLUSH.

DETECTABLE WARNING SURFACES (TRUNCATED DOMES) SHALL BE PREFORMED AND INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS. STAMPED CONCRETE WILL NOT BE ACCEPTED.

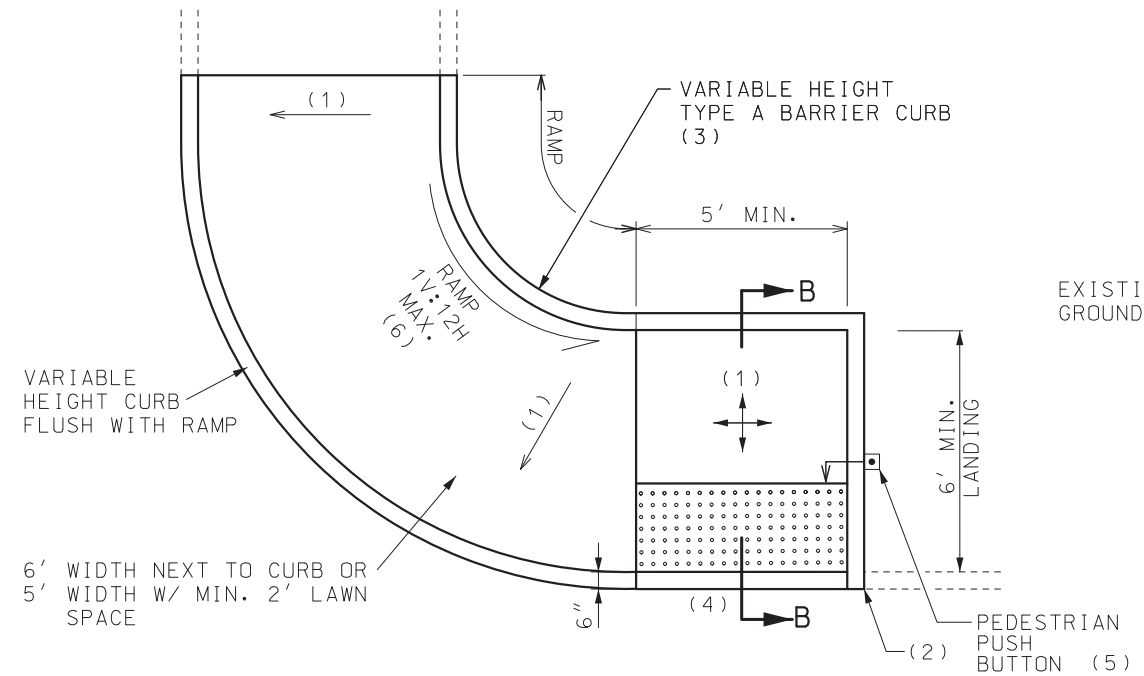
THE DETECTABLE WARNING SURFACE SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT. TRUNCATED DOMES SHALL SPAN THE FULL WIDTH OF THE RAMP OR LANDING 24" DEEP.

DETECTABLE WARNING SURFACES SHALL BE ALIGNED PERPENDICULAR OR RADIAL TO THE BREAK BETWEEN THE RAMP, LANDING OR BLENDED TRANSITION, AND THE STREET.

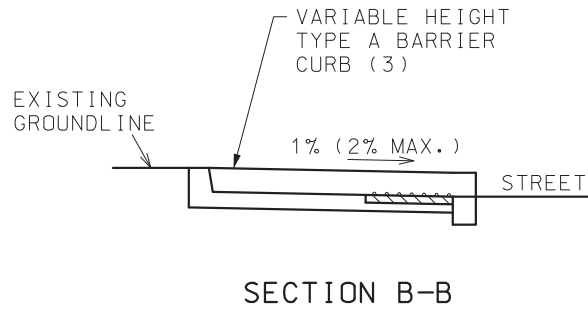
WHERE THE BOTTOM GRADE BREAK OF A CURB RAMP IS LESS THAN 5' FROM THE BACK OF CURB, DETECTABLE WARNINGS SHALL BE LOCATED ON THE RAMP SURFACE AT THE BACK OF THE CURB. WHERE THE GRADE BREAK IS GREATER THAN 5' FROM THE BACK OF CURB, THE DETECTABLE WARNING SHALL BE LOCATED ON THE LOWER LANDING.

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 <p>STATE OF MISSOURI          TRAVIS D. KOESTNER          NUMBER PE-30042          PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<h2>CURB RAMPS</h2>
DATE EFFECTIVE: 01/01/2023 DATE PREPARED: 10/6/2022	<h1>608.50A</h1>
SHEET NO. 1 of 4	

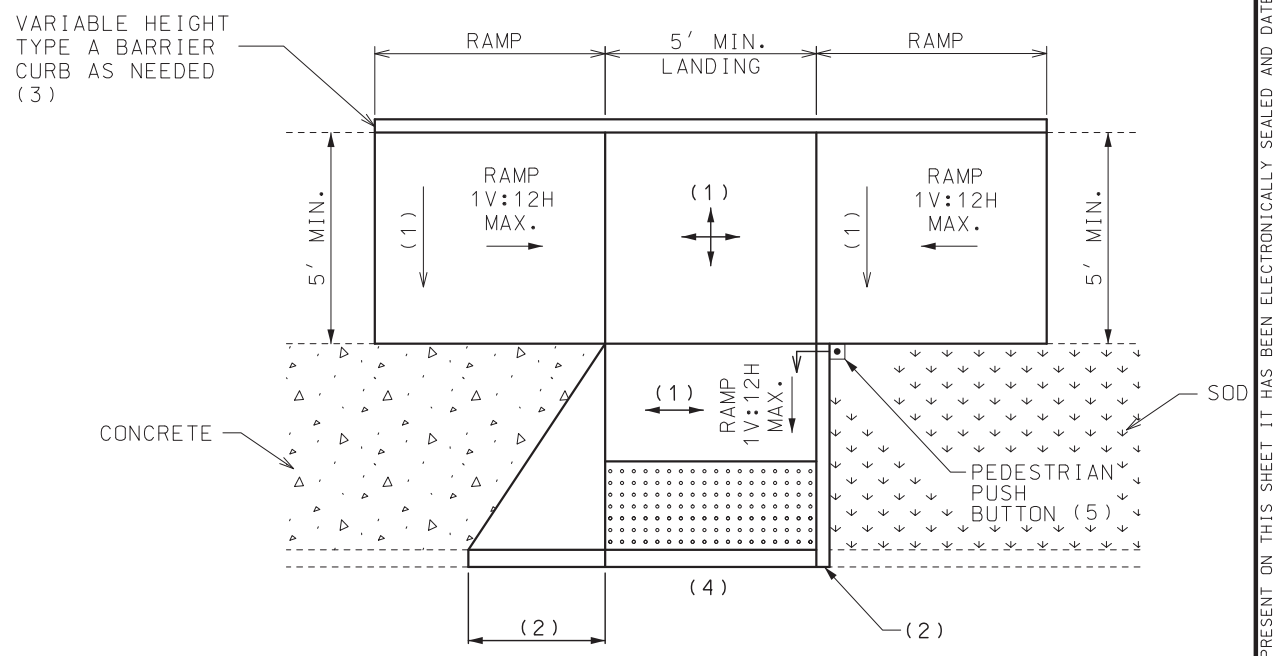
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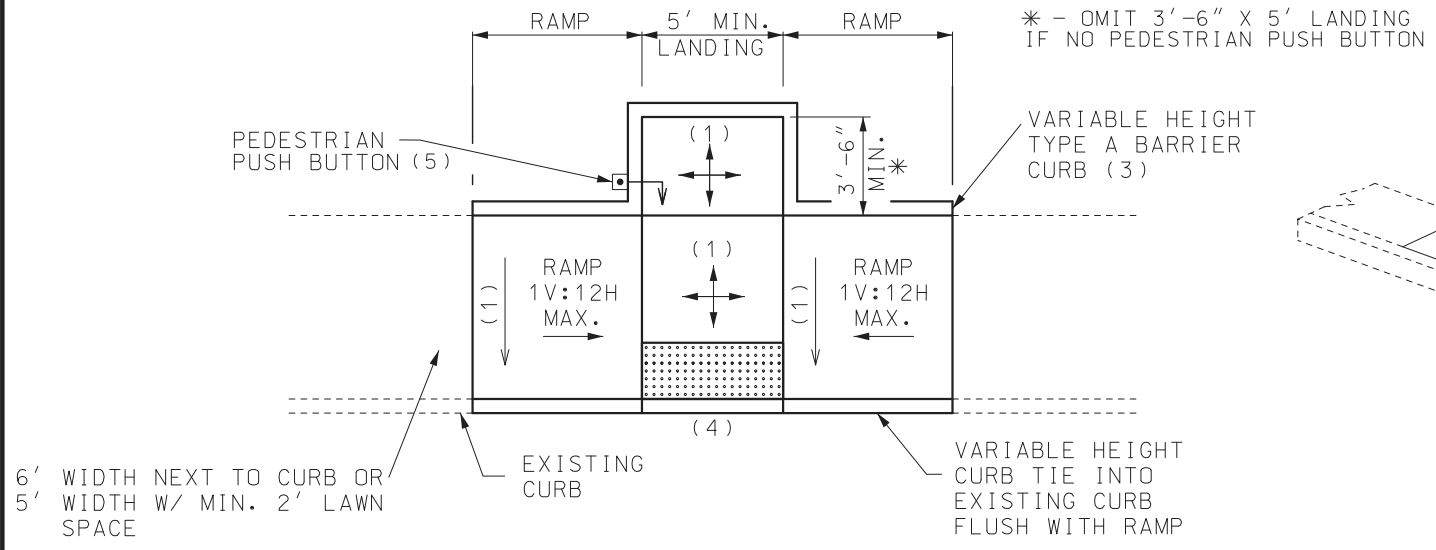
**TYPE 1 PARALLEL**



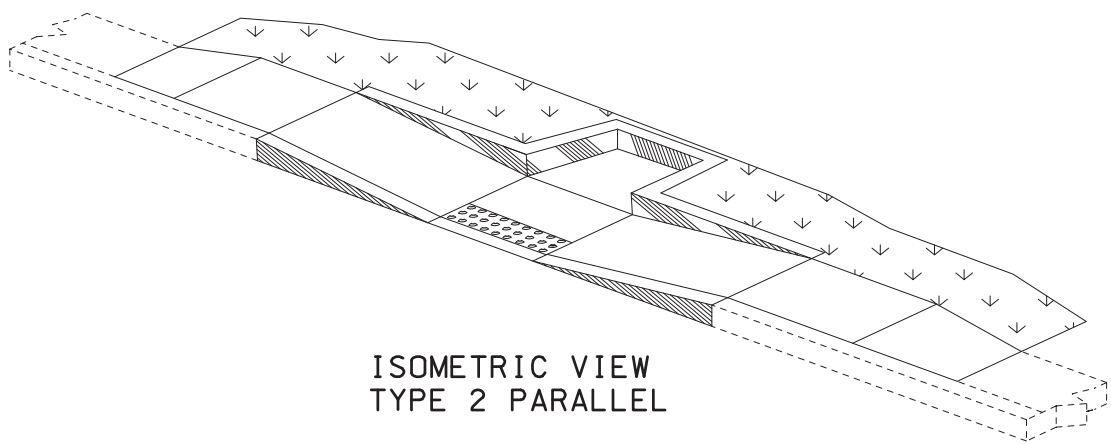
**SECTION B-B**



**COMPOUND PERPENDICULAR**

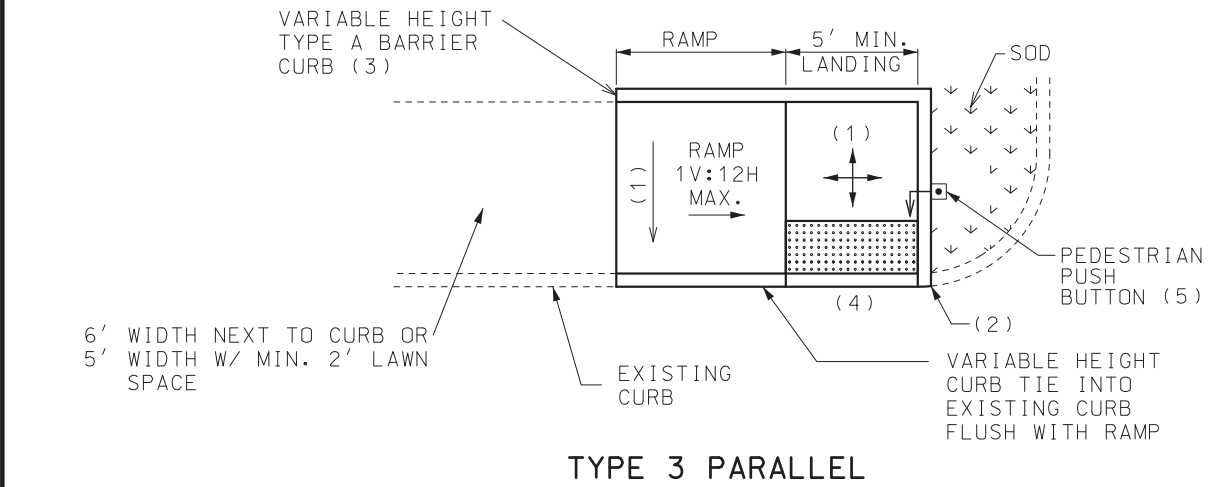


**TYPE 2 PARALLEL**



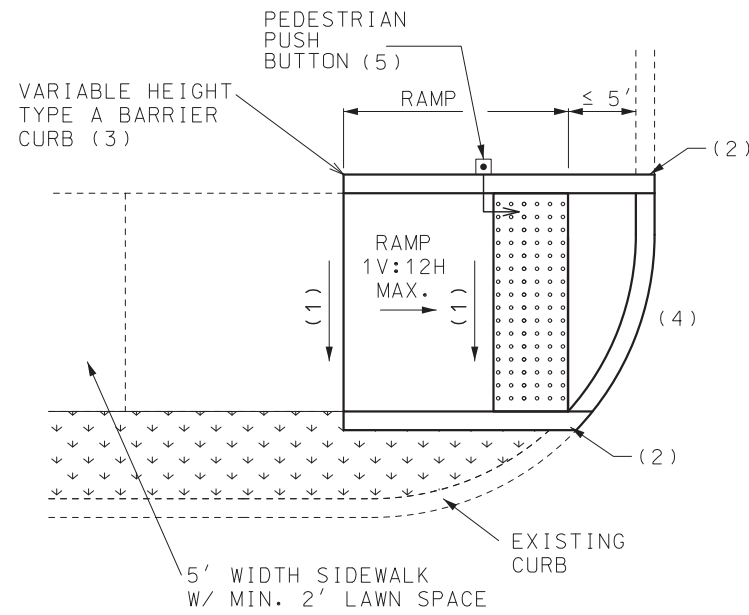
**ISOMETRIC VIEW  
TYPE 2 PARALLEL**

- GENERAL NOTES:**
- (1) 1.0% (2.0% MAX.) CROSS SLOPE OR ROAD GRADE EXCEPTION.
  - (2) VARIABLE HEIGHT VERTICAL CURB. IF TRAVERSABLE USE A MAXIMUM 1V:10H FLARE MEASURED PARALLEL TO THE CURB LINE.
  - (3) HEIGHT VARIES TO MEET EXISTING GROUND.
  - (4) THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMP RUNS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 5% MAXIMUM.
  - (5) THE FACE OF PEDESTRIAN PUSH BUTTONS SHALL BE OFFSET 0" FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.
  - (6) ENSURE THAT THE INSIDE EDGE OF CURVED RAMPS MAINTAIN AN 8.3% (1V:12H) MAXIMUM SLOPE.

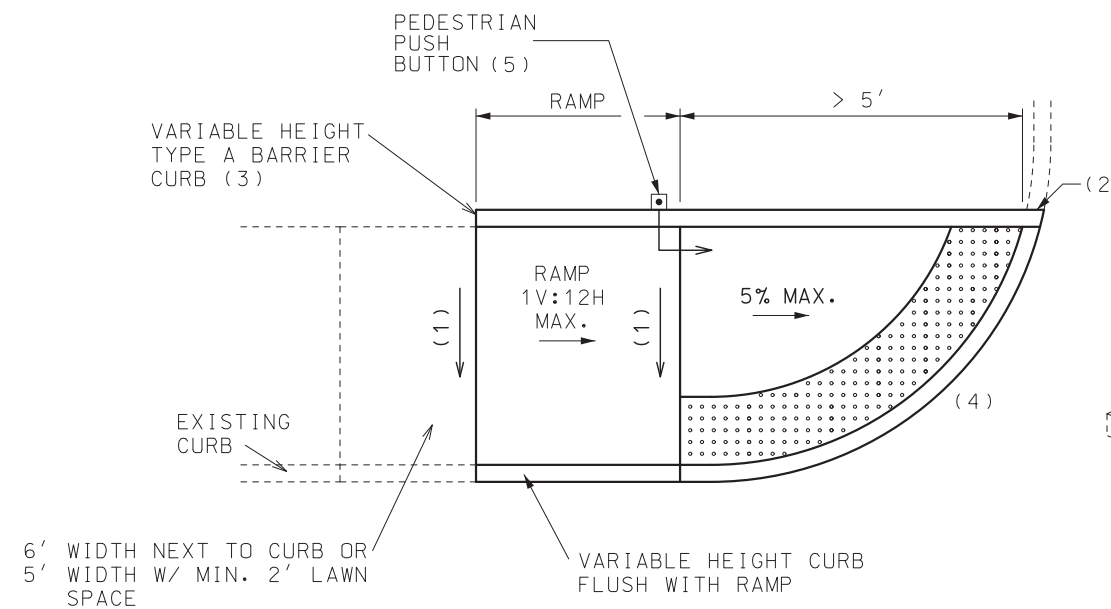


**TYPE 3 PARALLEL**

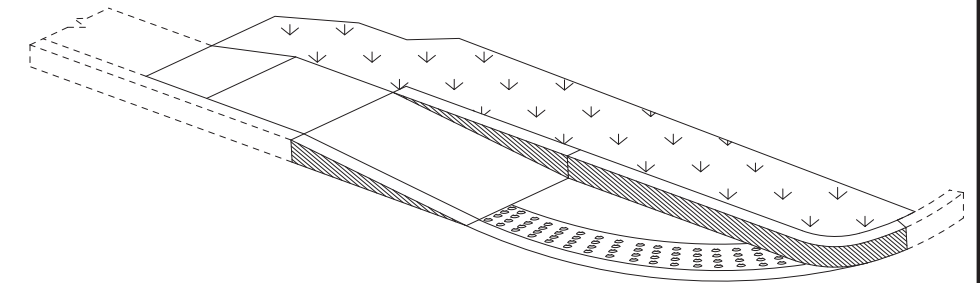
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<h2 style="margin: 0;">CURB RAMPS</h2>	
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.	DATE EFFECTIVE: 01/01/2023 DATE PREPARED: 10/6/2022	<b>608.50A</b>
		SHEET NO. <b>2 of 4</b>



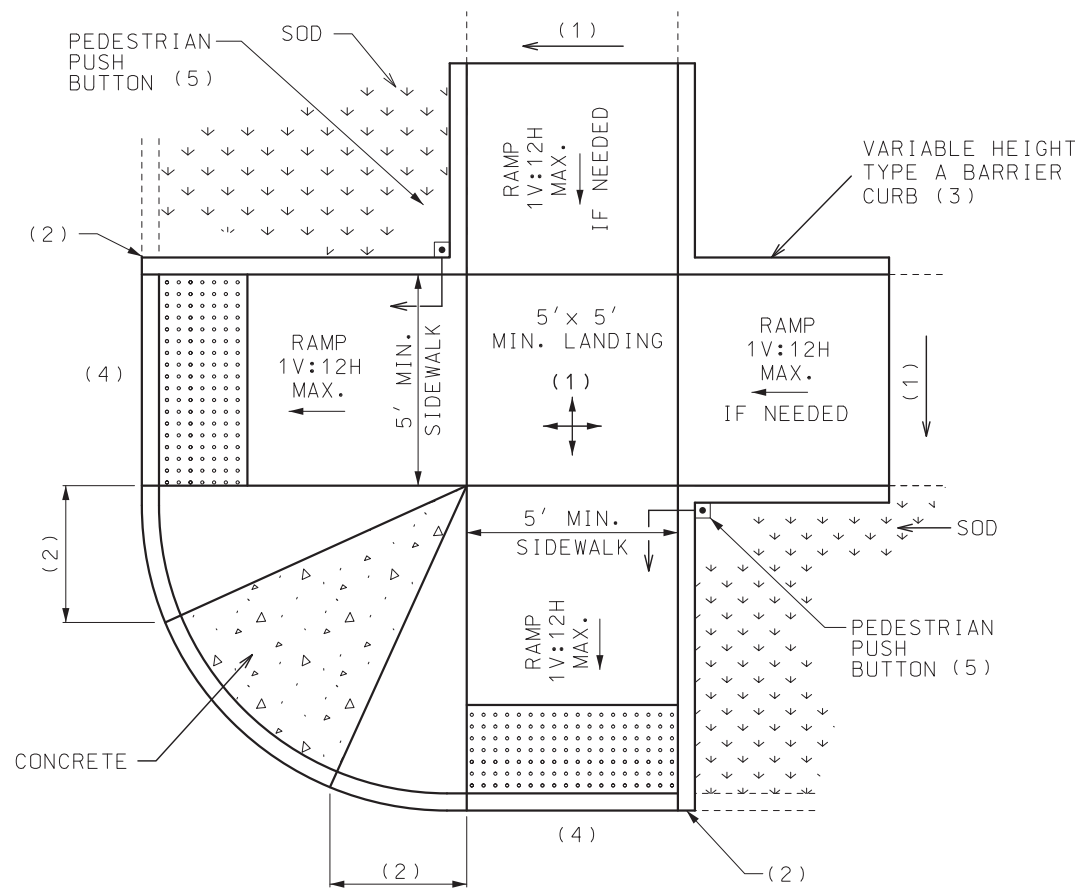
SMALL RADIUS PERPENDICULAR



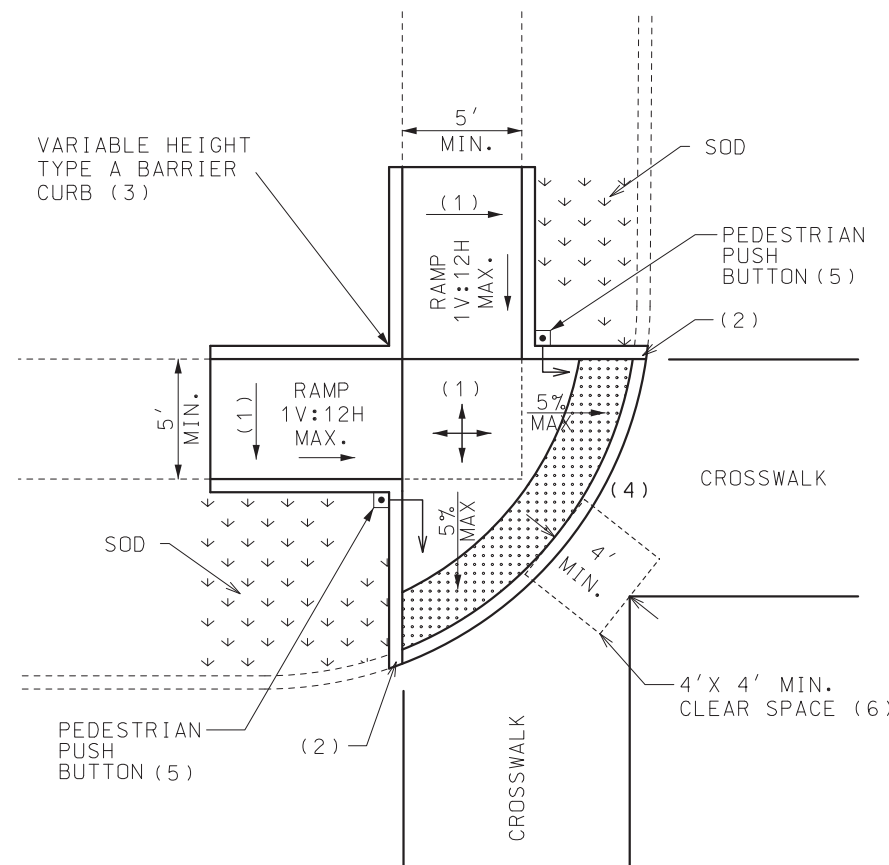
LARGE RADIUS PERPENDICULAR



ISOMETRIC VIEW  
LARGE RADIUS PERPENDICULAR




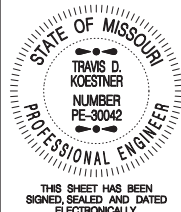
DUAL PERPENDICULAR



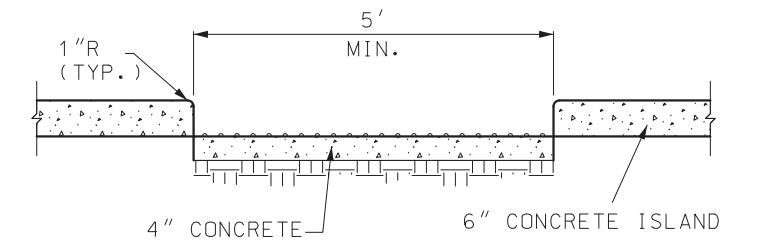
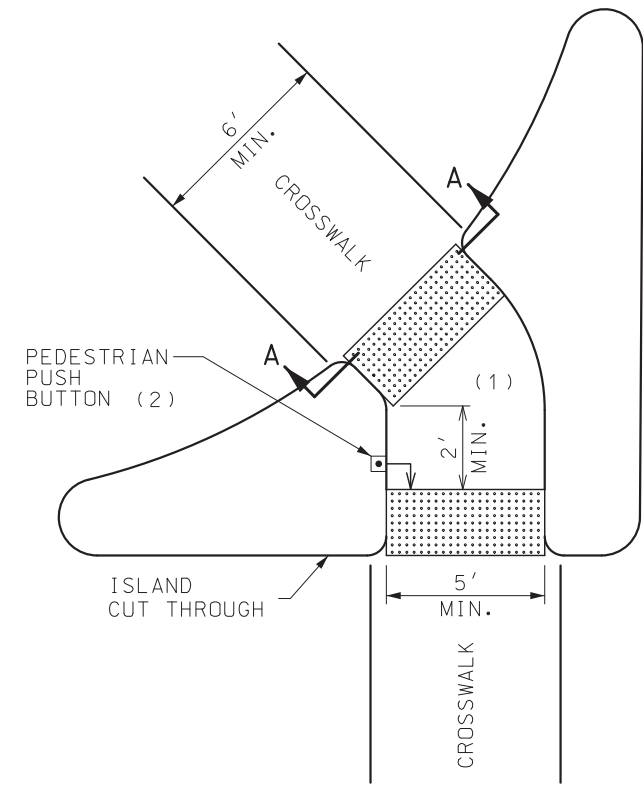
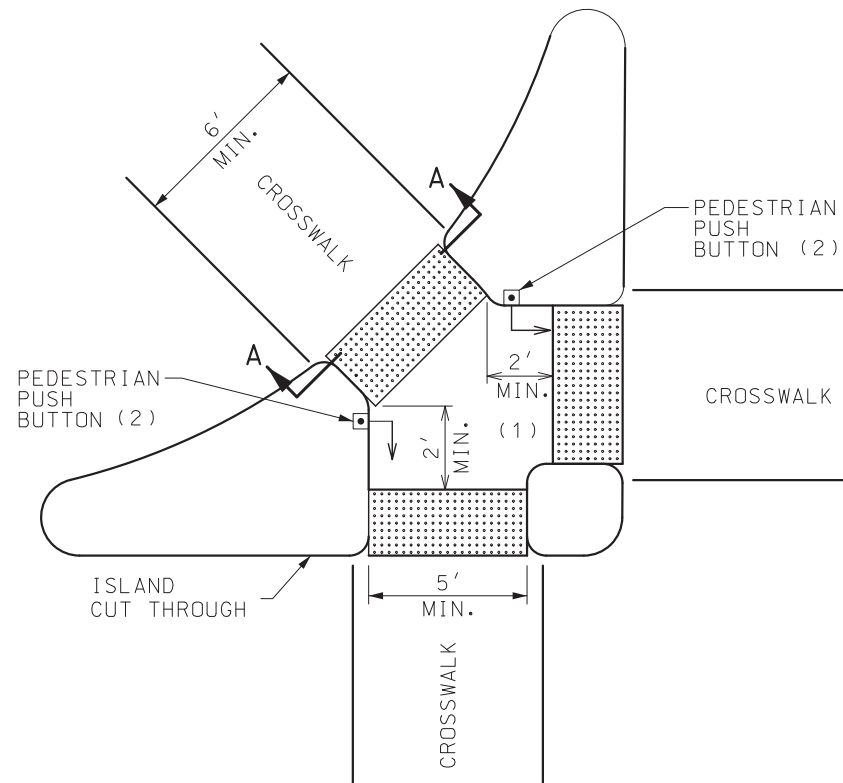
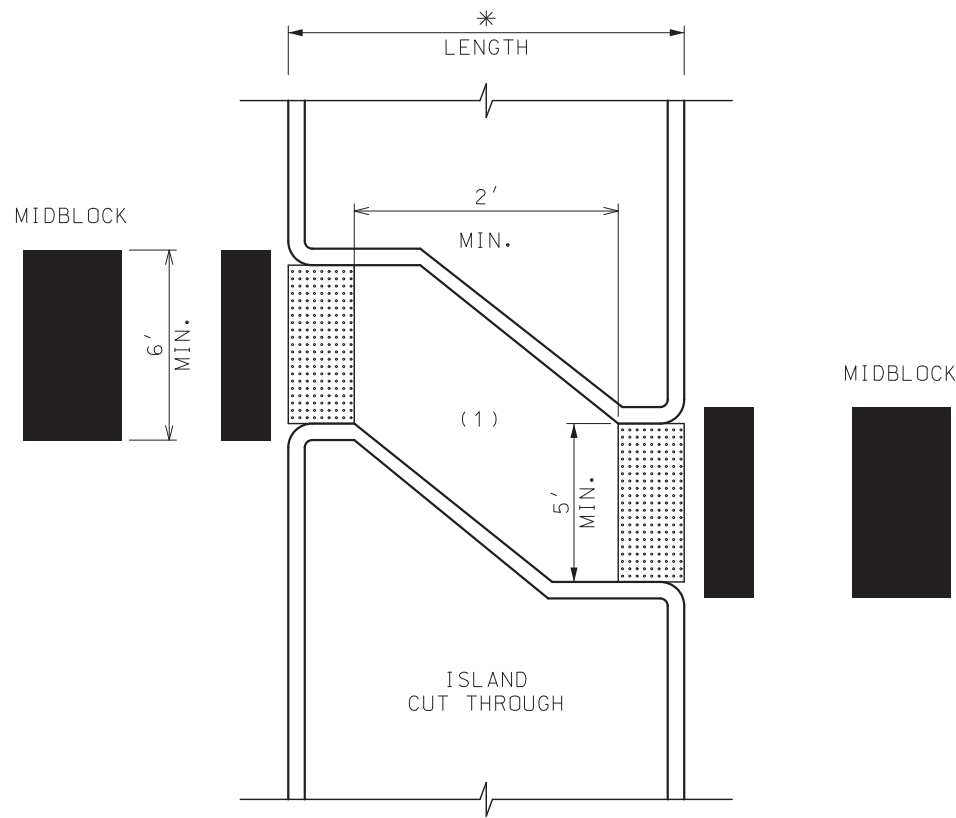
BLENDED TRANSITION

GENERAL NOTES:

- (1) 1.0% MINIMUM, 2.0% MAXIMUM CROSS SLOPE.
- (2) VARIABLE HEIGHT VERTICAL CURB. IF TRAVERSABLE USE A MAX. 1V:10H FLARE MEASURED PARALLEL TO THE CURB LINE.
- (3) HEIGHT VARIES TO MEET EXISTING GROUND.
- (4) THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMP RUNS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 5% MAXIMUM.
- (5) THE FACE OF PEDESTRIAN PUSH BUTTONS SHALL BE OFFSET 0" FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.
- (6) BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE 4' X 4' MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.

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	<h2>CURB RAMPS</h2>
DATE EFFECTIVE: 01/01/2023 DATE PREPARED: 10/6/2022	<h1>608.50A</h1>
	SHEET NO. <b>3 of 4</b>

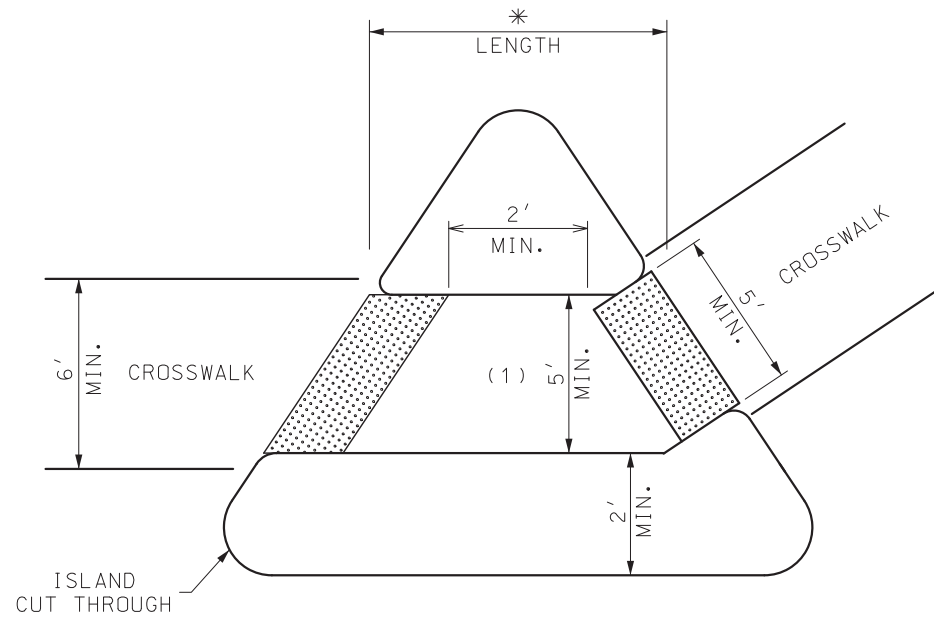
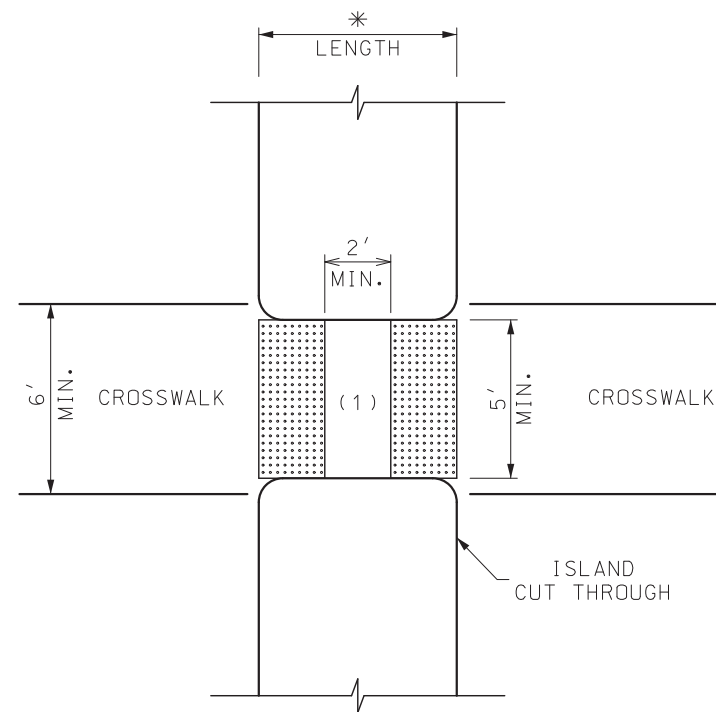
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SECTION A-A  
ISLAND CUT THROUGH TYPICAL

RAMP OR CUT-THROUGH DEPENDING ON ISLAND WIDTH. IF RAMPED, PROVIDE 4' MINIMUM LANDING AND SLOPE RAMPS AT 1V:12H MAX.

RAMP MUST BE CONSTRUCTED TO DRAIN TO THE OUTSIDE.



ISLAND CUT THROUGHS

- (1) DETECTABLE WARNING SURFACES SHALL BE PLACED AT THE EDGES OF THE PEDESTRIAN ISLAND AND SHALL BE SEPARATED BY 2' MIN. LENGTH OF SURFACE WITHOUT DETECTABLE WARNINGS.
- (2) PEDESTRIAN PUSH BUTTONS SHALL BE OFFSET 0" FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.

\* DETECTABLE WARNING SURFACES SHALL BE OMITTED IF LENGTH IS < 6', BECAUSE REFUGE SPACE IS DEEMED TOO SMALL.

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

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

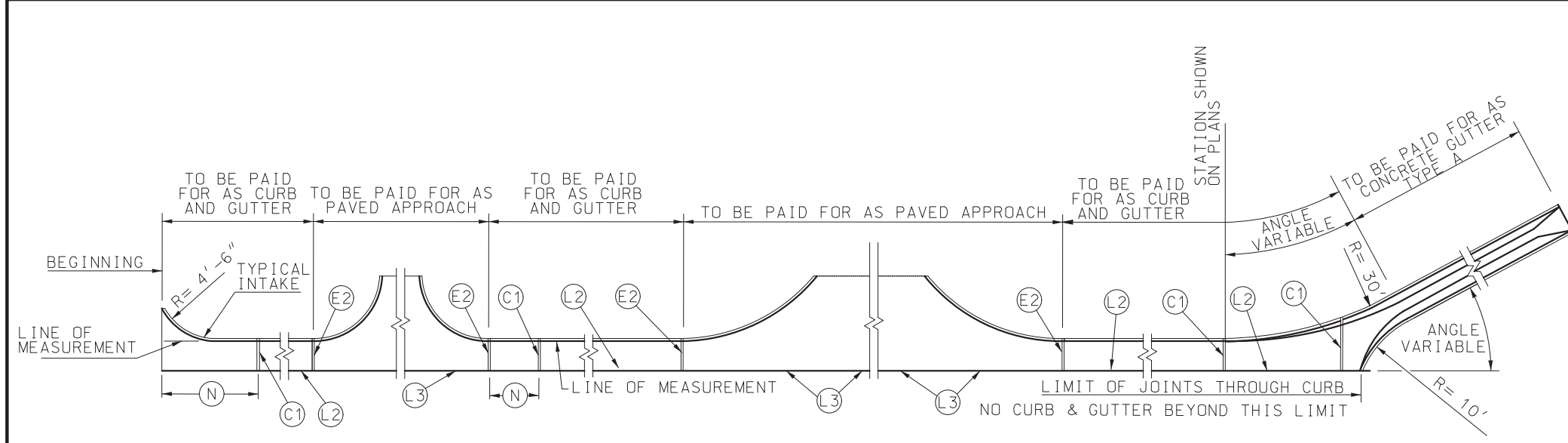
**CURB RAMPS**

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 DATE PREPARED: 10/6/2022

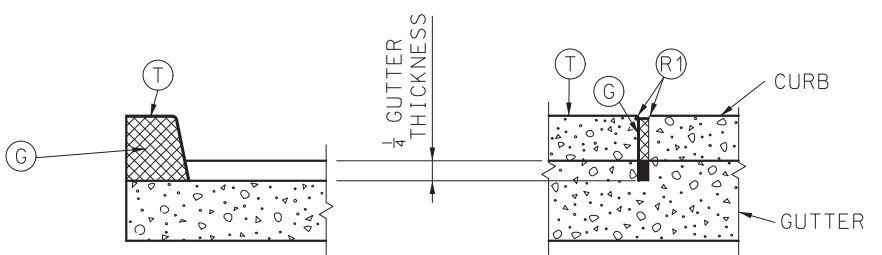
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SHEET NO.  
 4 of 4

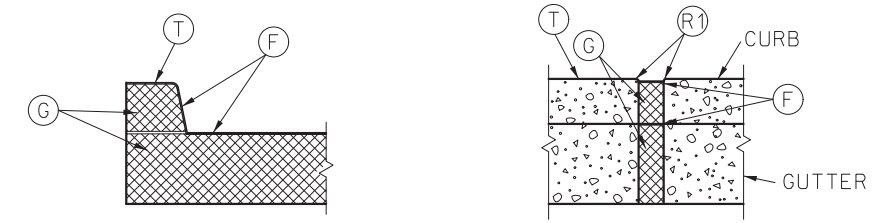
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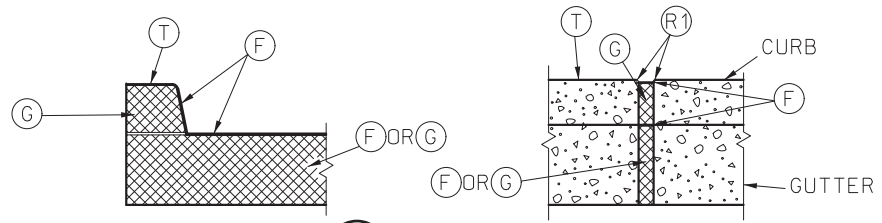
**PLAN OF MEASUREMENT OF CURB & GUTTER AND JOINT PLAN**



**C1 JOINT**



**E1 JOINT**



**E2 JOINT**

**LEGEND**

- C1 1/8" MAXIMUM WIDTH TRANSVERSE CONTRACTION JOINT (PREFORMED OR SAWED).
- E1 2" TRANSVERSE EXPANSION JOINT (PREFORMED OR SAWED).
- E2 1/2" TRANSVERSE EXPANSION JOINT (PREFORMED OR SAWED).
- F FILLER FOR JOINTS - HOT POURED.
- G PREFORMED JOINT FILLER MATERIAL.
- L2 LONGITUDINAL JOINT WITH TIE BARS.
- L3 LONGITUDINAL JOINT WITHOUT TIE BARS.
- N NOT LESS THAN 10' OR MORE THAN 30'.
- T TOP OF CURB.
- R1 ROUND TO 1/4" RADIUS (EXCEPT FOR SAWED JOINTS).

**GENERAL NOTES:**

A MINIMUM 4" TYPE 1 OR 5 AGGREGATE BASE SHALL BE PLACED BENEATH ALL CURB AND GUTTER SECTIONS AND INCLUDED WITHIN THE MAINLINE BASE PAY LIMITS.

WHEN CURBS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, CURB HEIGHT SHALL BE 4 INCH BARRIER CURB, AS SHOWN ON STANDARD PLAN 606.00.

CURB, GUTTER AND CURB AND CUTTER CONSTRUCTED ALONG AND ATTACHED TO CONCRETE PAVEMENT OR BASE SHALL HAVE:

1. JOINT C1 ONE-QUARTER DEPTH OF CURB AND GUTTER THICKNESS AS A CONTINUATION OF EACH CONTRACTION JOINT IN THE BASE OR PAVEMENT.
2. JOINT E1 AS CONTINUATION OF 2" EXPANSION JOINT E IN THE CONCRETE BASE OR PAVEMENT SHALL EXTEND AND CONTINUE THROUGH THE CURB, CUTTER AND CURB AND GUTTER.
3. JOINT E2 THROUGH CURB AND CURB AND CUTTER AT THE BEGINNING AND END OF EACH PAVED APPROACH.

CURB, CURB AND GUTTER AND GUTTER CONSTRUCTED APART OR SEPARATED FROM CONCRETE BASE OR PAVEMENT OR AS A FORM FOR ASPHALTIC CONCRETE PAVEMENT SHALL HAVE A JOINT E2 ENTIRELY THROUGH THE CURB, CURB AND GUTTER AND GUTTER, AT THE BEGINNING AND END OF EACH "PAVED APPROACH" AND A JOINT C1 TO 1/4 DEPTH OF CURB AND GUTTER THICKNESS AT INTERVALS OF 30 FEET BETWEEN APPROACHES.

JOINTS E1 AND E2 THROUGH CURB SHALL BE FILLED WITH PREFORMED FILLER MATERIAL AND SEALED WITH HOT POURED FILLER FOR JOINTS.

JOINT E1 IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH HOT FILLER MATERIAL.


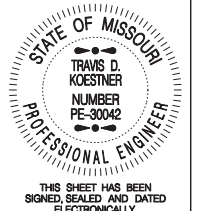
JOINT E2 IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH FILLER OR FILLED WITH HOT POURED FILLER.

PREFORMED FILLER MATERIAL SHALL BE PLACED TO PROVIDE 1" HOT POURED FILLER FOR JOINTS.

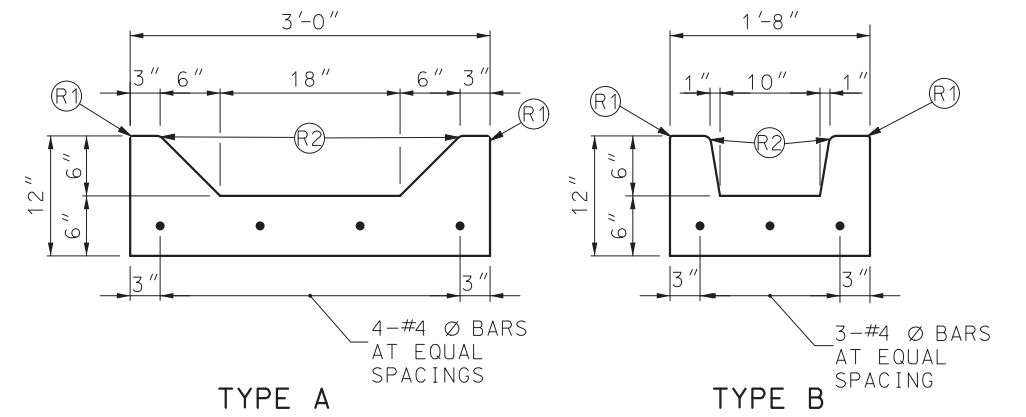
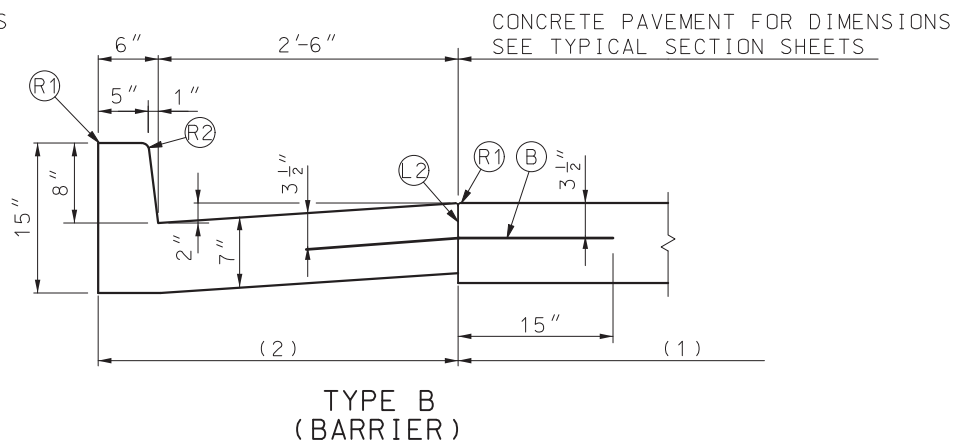
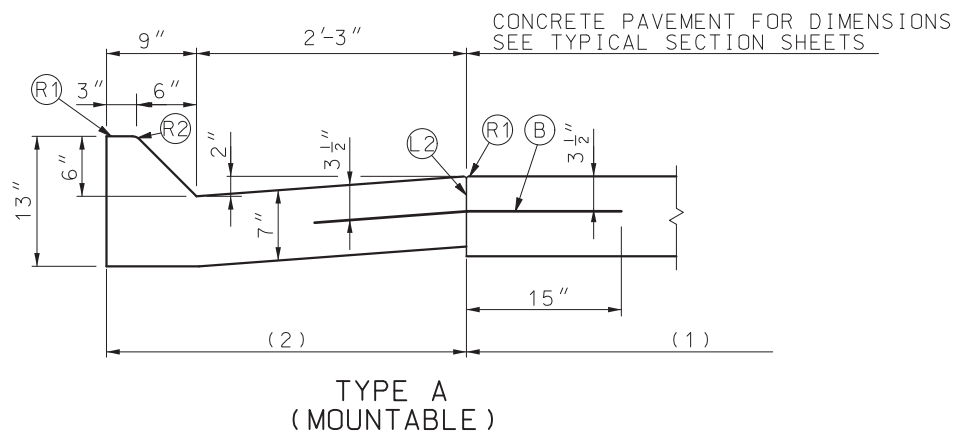
THE BARRIER CLASS CURBS MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6 FEET OR LESS. THE R2 WILL BE REQUIRED.

WHERE A SIDEWALK INTERSECTS A CURB, THE SIDEWALK SHALL BE RAMPED NO STEEPER THAN 12:1 SLOPE TO PROVIDED ACCESS FOR WHEELCHAIR ACROSS APPROACHES.

PRECAST TYPE A AND B GUTTER ARE ONLY ALLOWED WHEN CONSTRUCTABILITY ISSUES MAKE CAST IN PLACE NOT PRACTICAL. PRECAST IS ONLY ALLOWED WITH THE APPROVAL OF THE ENGINEER. WHEN ALLOWED BY THE ENGINEER, TYPES A AND B GUTTER MAY BE PRECAST TO CONFORM TO THE DIMENSIONS SHOWN. THE PRECASTER SHALL SUBMIT SHOP DRAWINGS INDICATING THE SECTION LENGTH, SECTION CONNECTION, AND PROPOSED JOINT SEALING SYSTEM. WHEN PRECAST SECTIONS CANNOT CONFORM TO ANY VERTICAL OR HORIZONTAL CURVE THEN CAST IN PLACE IS THE ONLY OPTION. A COMBINATION OF CAST IN PLACE AND PRECAST GUTTER MAY BE PERMITTED.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE CURB, CURB AND GUTTER AND GUTTER</b>
DATE EFFECTIVE: 10/01/2022 DATE PREPARED: 7/19/2022	<b>609.00Q</b>
SHEET NO. 1 OF 2	

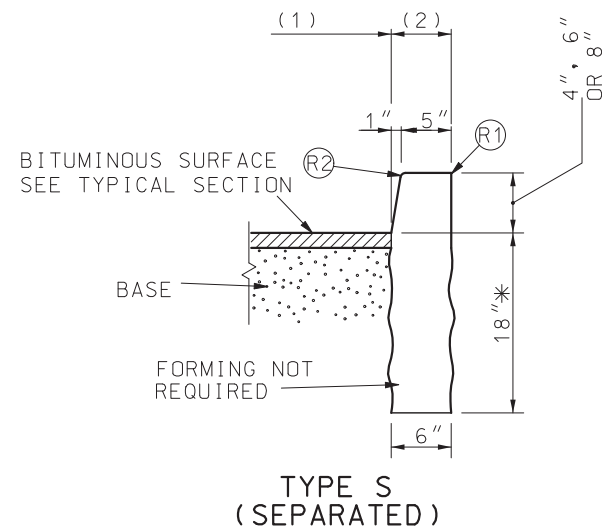
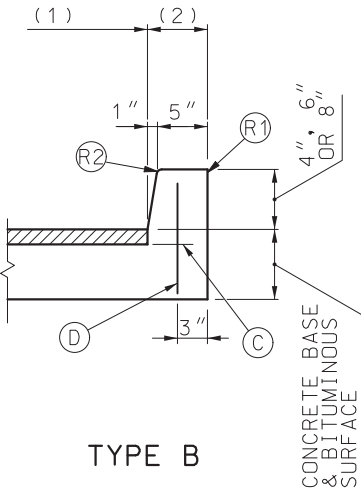
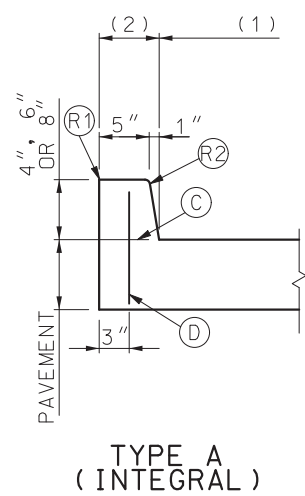
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**CURB & GUTTER**

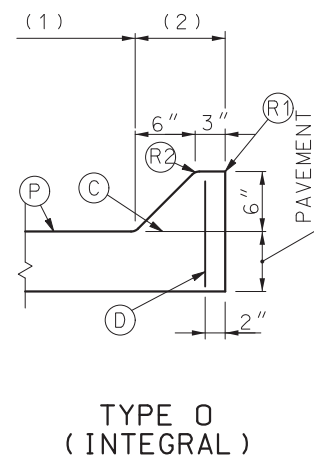
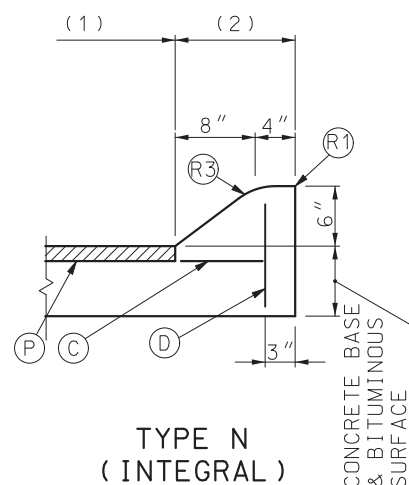
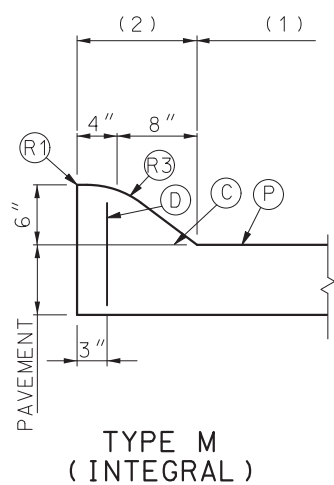
**GUTTERS**

SEE STANDARD PLAN 607.11 FOR MODIFIED TYPE A AND B GUTTERS

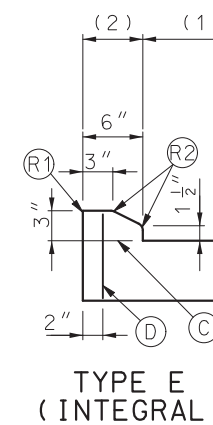
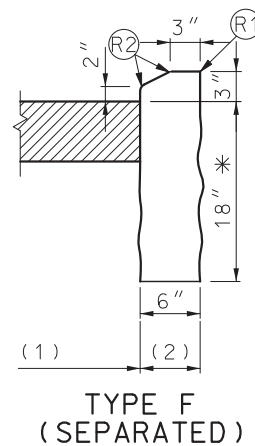


**BARRIER CURBS**

- LEGEND**
- (B) TIE BARS - 30" X #5 Ø AT 30" CTRS.
  - (C) PERMISSIBLE CONSTRUCTION JOINT. IF CONSTRUCTED IN THIS MANNER TIE BARS MUST BE USED.
  - (D) #4 Ø TIE BAR AT 24" CENTERS LENGTH OF THE TIE BARS EQUALS THICKNESS OF PAVEMENT PLUS HEIGHT OF CURB, LESS 3 INCHES.
  - (L2) LONGITUDINAL JOINT WITH TIE BARS.
  - (P) TOP OF PAVEMENT OR CONCRETE BASE.
  - (R1) ROUND TO 1/4" RADIUS (EXCEPT FOR SAWED JOINTS).
  - (R2) ROUND TO 3/4" RADIUS.
  - (R3) CONSTRUCT TO 9" RADIUS.
  - (1) PAY LIMIT FOR PAVEMENT
  - (2) PAY LIMIT FOR CURB, OR CURB & GUTTER.



**MOUNTABLE CURBS**



**LOW PROFILE CURB**

BEGINNING AND ENDING OF INTRODUCED LOW PROFILE CURB SHALL UTILIZE CURB HEIGHT RUNOUT FORM 0 INCHES TO 3 INCHES IN 5 FEET. PAYMENT LENGTH SHALL INCLUDE TAPERS.

\* DEPTH MAY BE REDUCED IF KEYED 6" IN ROCK.

**MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

STATE OF MISSOURI  
TRAVIS D. KOESTNER  
NUMBER PE-30042  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

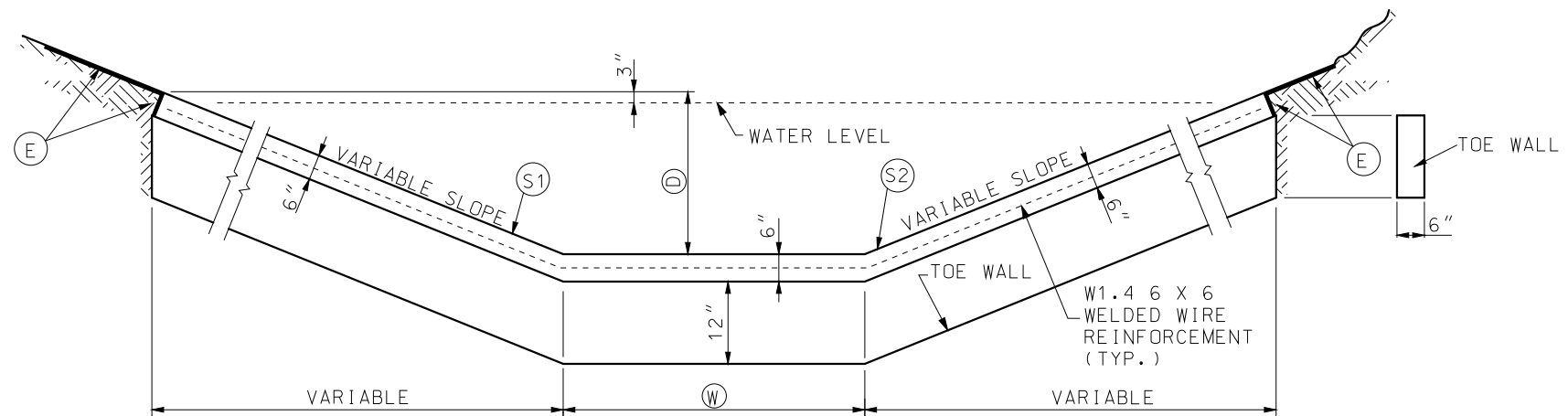
**CONCRETE CURB, CURB AND GUTTER AND GUTTER**

DATE EFFECTIVE: 10/01/2022	609.00Q	SHEET NO. 2 OF 2
DATE PREPARED: 7/19/2022		

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



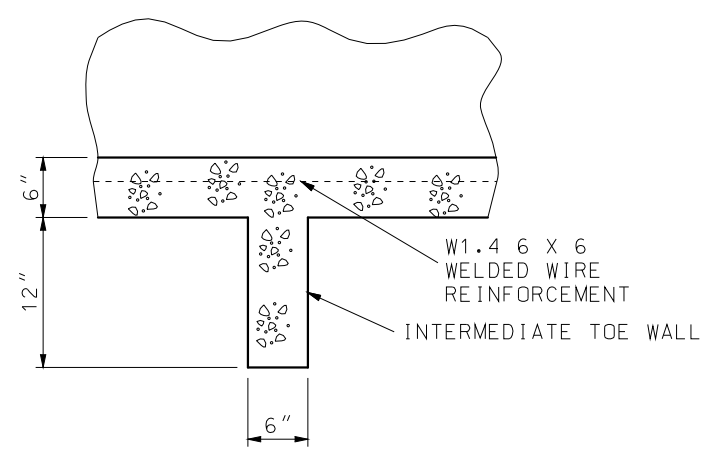
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



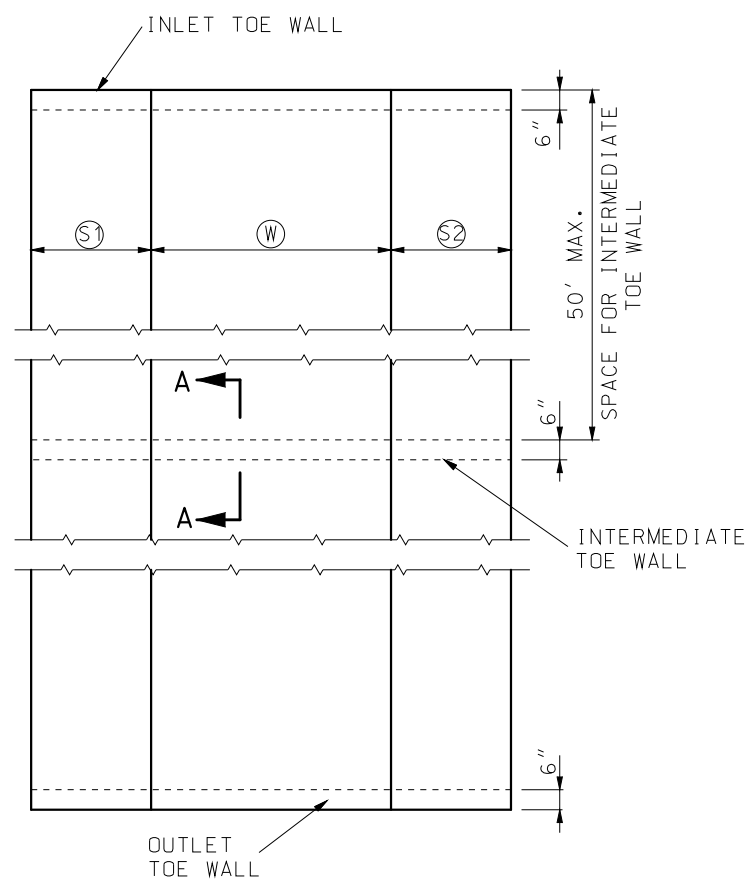
SECTION THROUGH DITCH  
(SHOWING TOE WALL)

LEGEND

- ⓓ VERTICAL PAVED DITCH HEIGHT.
- ⓔ SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MAT, IF REQUIRED.
- Ⓢ1 THE WIDTH OF THE STEEPER SIDEWALL OF ALL DITCHES.
- Ⓢ2 THE WIDTH OF THE FLATTER SIDEWALL OF ALL DITCHES.
- Ⓦ THE WIDTH OF THE BOTTOM OF A FLAT BOTTOM DITCH




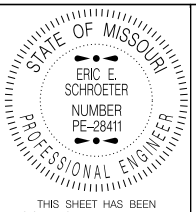
SECTION A-A



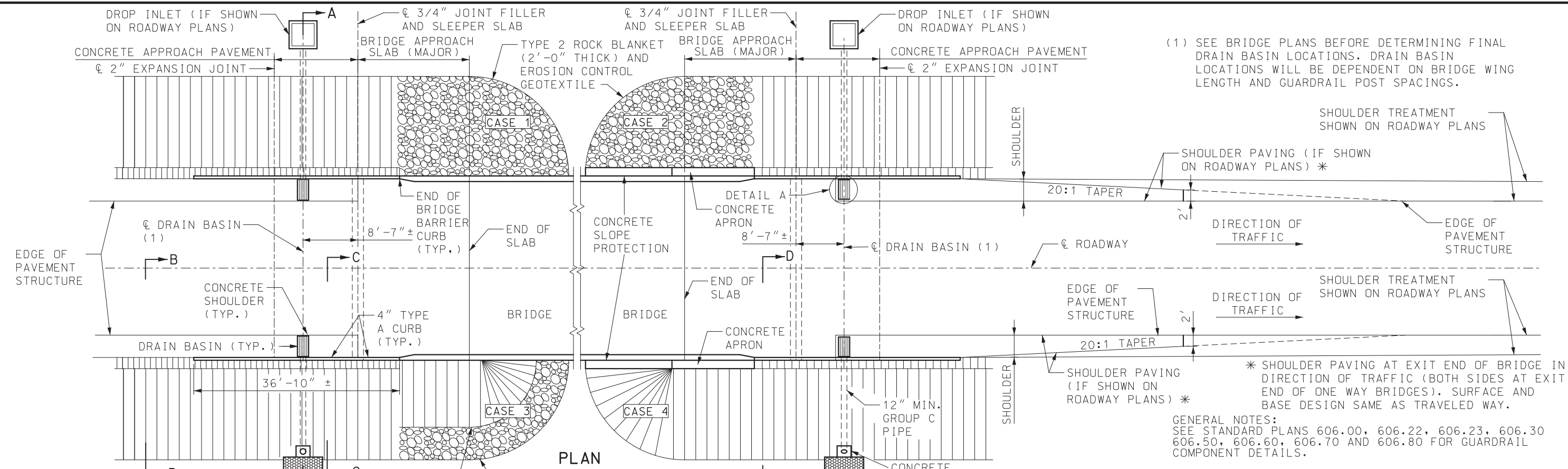
PLAN

GENERAL NOTES:

- STEEL WELDED WIRE REINFORCEMENT SHALL BE IN ACCORDANCE WITH SEC 1036.3.3.
- SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MATS SHALL BE USED ALONG THE SIDES IF SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
- TOE WALLS SHALL BE CONSTRUCTED AT INLET AND OUTLET ENDS OF PAVED DITCHES AND AT 50' MAXIMUM SPACING FOR INTERMEDIATE TOE WALLS.

	<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>
	<p><b>PAVED DITCHES</b></p>
<p>DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016</p>	<p>609.15D</p>
<p>SHEET NO. 1 OF 1</p>	

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



(1) SEE BRIDGE PLANS BEFORE DETERMINING FINAL DRAIN BASIN LOCATIONS. DRAIN BASIN LOCATIONS WILL BE DEPENDENT ON BRIDGE WING LENGTH AND GUARDRAIL POST SPACINGS.

\* SHOULDER PAVING AT EXIT END OF BRIDGE IN DIRECTION OF TRAFFIC (BOTH SIDES AT EXIT END OF ONE WAY BRIDGES). SURFACE AND BASE DESIGN SAME AS TRAVELED WAY.

GENERAL NOTES:  
SEE STANDARD PLANS 606.00, 606.22, 606.23, 606.30, 606.50, 606.60, 606.70 AND 606.80 FOR GUARDRAIL COMPONENT DETAILS.

FOR DETAILS OF BRIDGE APPROACH SLAB (MAJOR), SEE BRIDGE PLANS.

CONSTRUCT DRAIN BASINS WHEN SHOWN ON ROADWAY PLANS. IF DRAIN BASINS ARE OMITTED OR TYPE A CURB DOES NOT EXTEND BEYOND GUARDRAIL POST NO. 11 USE BRIDGE APPROACH TRANSITION (MINOR ROUTE), SEE STD. PLAN 606.60 SHEET 2 OF 6.

TYPE A CURB IS TO BE CONSTRUCTED TO THE END OF THE BRIDGE APPROACH TRANSITION WHEN DRAIN BASINS ARE REQUIRED. SEE STANDARD PLAN 609.00 FOR TYPE A CURB.

SEE STANDARD PLAN 504.00 FOR DETAILS OF CONCRETE APPROACH PAVEMENT.

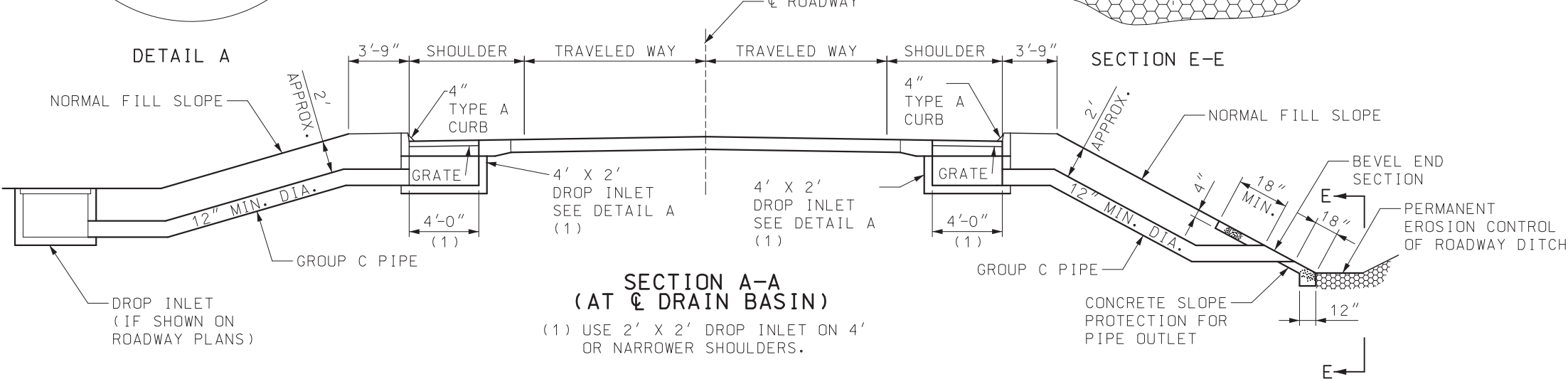
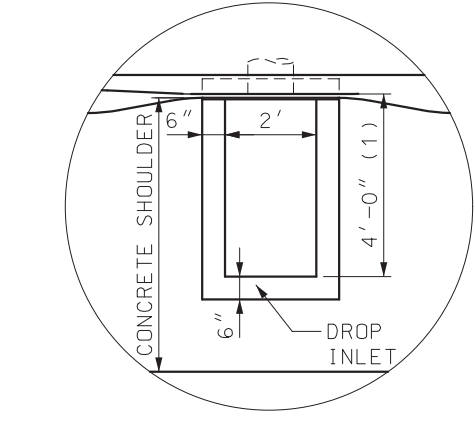
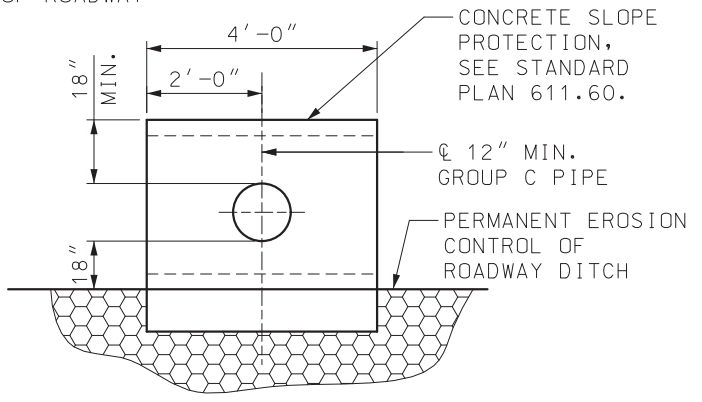
FOR DETAILS OF GRATES AND BEARING PLATES FOR DROP INLET, SEE STANDARD PLANS 614.10 AND 614.11.

FOR DETAILS OF DROP INLET FOR ROADWAY SURFACE, SEE STANDARD PLAN 731.10. USE TYPE A DROP INLET AND USE DEPTH OF DROP INLET AS SHOWN ON ROADWAY PLANS.

PAYMENT FOR DROP INLET, GRATE, GROUP C PIPE, CONCRETE SLOPE PROTECTION AT PIPE OUTLETS, MATERIAL AND INSTALLATION WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR DRAIN BASIN PER EACH.

FOR DETAILS OF SECTION B-B, C-C AND D-D, SEE SHEET 2 OF 3.

CASE	FILL SLOPE PROTECTION
1	ROCK BLANKET FILL SLOPE
2	ROCK BLANKET FILL SLOPE WITH CONCRETE SLOPE PROTECTION
3	FILL SLOPE WITH PARTIAL ROCK BLANKET
4	FILL SLOPE WITH CONCRETE SLOPE PROTECTION

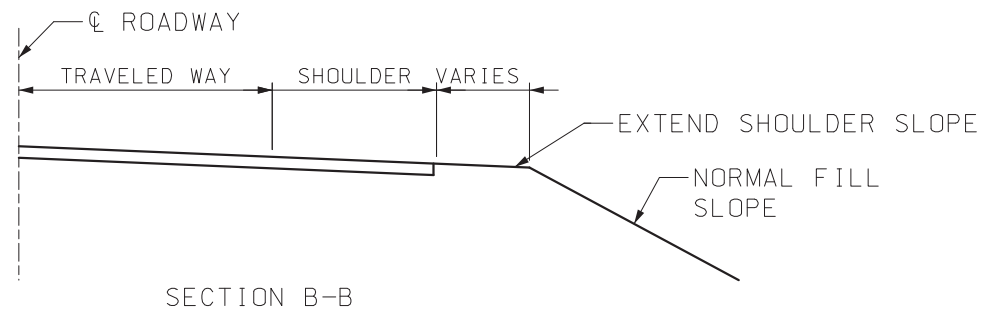


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105 WEST CAPITOL JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

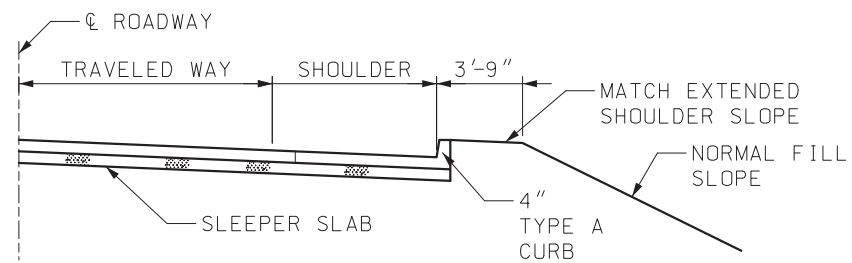
STATE OF MISSOURI  
TRAVIS D. KOESTNER  
NUMBER PE-30042  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**DRAIN BASIN, SHOULDER PAVING AND FILL SLOPE AT BRIDGE ENDS**  
**(MAJOR ROUTE)**

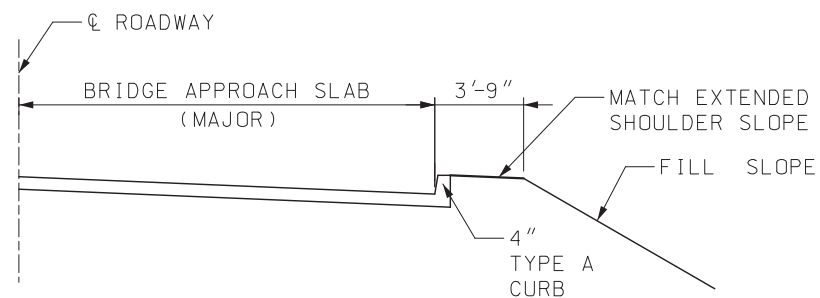
DATE EFFECTIVE: 10/1/2023	609.40U	SHEET NO. 1 OF 3
DATE PREPARED: 7/6/2023		



SECTION B-B

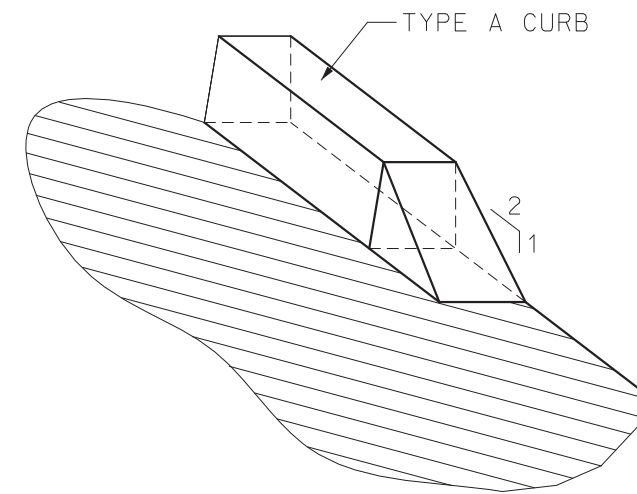


SECTION C-C



SECTION D-D

NOTE: FOR DETAILS NOT SHOWN,  
SEE OTHER SECTIONS.



TYPE A CURB  
TRANSITION DETAIL

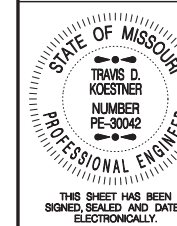
GENERAL NOTE:

FOR LOCATION OF SEC. B-B, C-C AND D-D, SEE  
SHEET 1 OF 3.



MISSOURI HIGHWAYS AND TRANSPORTATION  
COMMISSION

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
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THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY.

DRAIN BASIN, SHOULDER  
PAVING AND FILL SLOPE  
AT BRIDGE ENDS

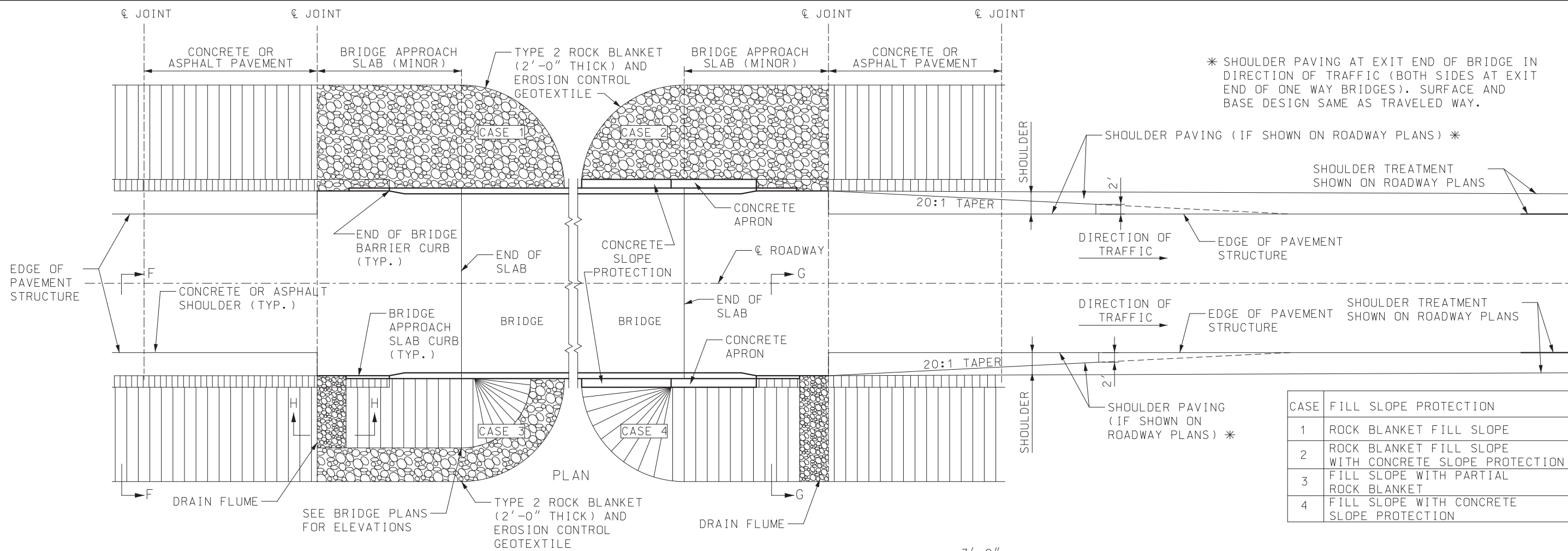
(MAJOR ROUTE)

DATE EFFECTIVE: 10/1/2023  
DATE PREPARED: 7/6/2023

609.40U

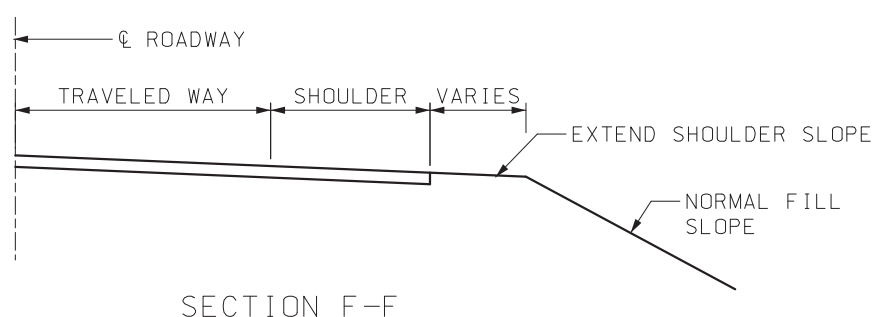
SHEET NO.  
2 OF 3

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

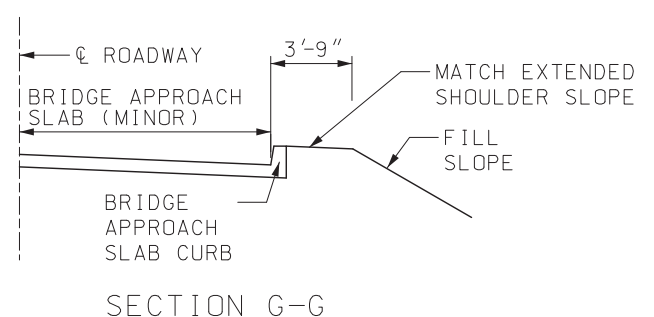


\* SHOULDER PAVING AT EXIT END OF BRIDGE IN DIRECTION OF TRAFFIC (BOTH SIDES AT EXIT END OF ONE WAY BRIDGES). SURFACE AND BASE DESIGN SAME AS TRAVELED WAY.

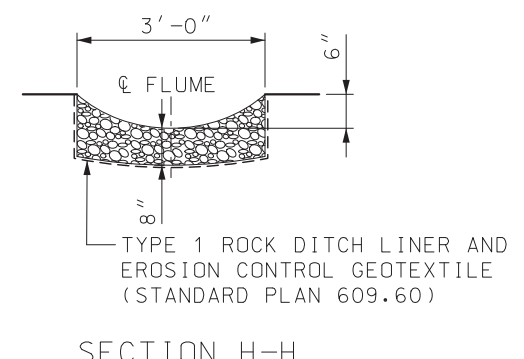
CASE	FILL SLOPE PROTECTION
1	ROCK BLANKET FILL SLOPE
2	ROCK BLANKET FILL SLOPE WITH CONCRETE SLOPE PROTECTION
3	FILL SLOPE WITH PARTIAL ROCK BLANKET
4	FILL SLOPE WITH CONCRETE SLOPE PROTECTION



SECTION F-F



SECTION G-G



SECTION H-H

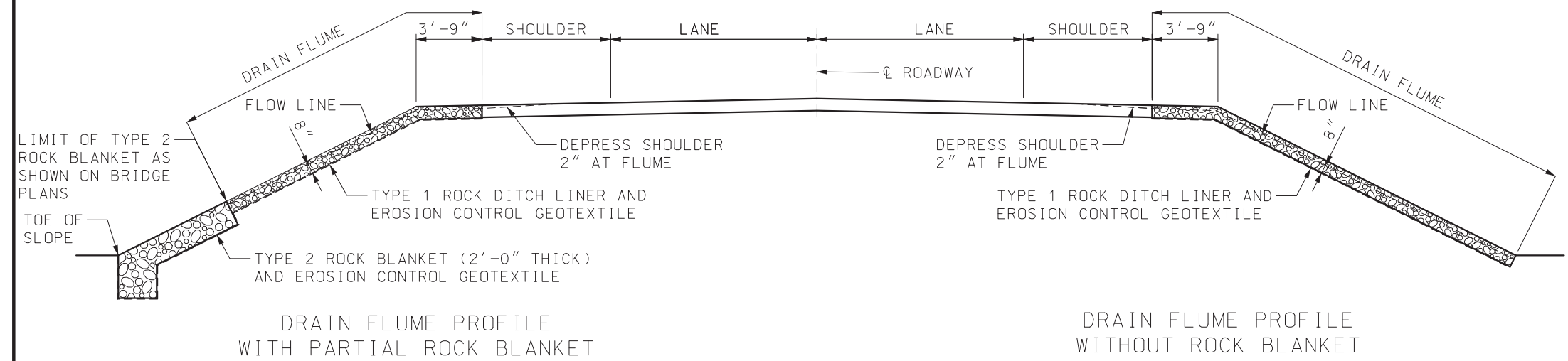
GENERAL NOTES:

SEE STANDARD PLANS 606.00, 606.22, 606.23, 606.30, 606.50, 606.60, 606.70 AND 606.80 FOR DETAILS OF GUARDRAILS AND BRIDGE ANCHOR SECTIONS.

FOR DETAILS OF BRIDGE APPROACH SLAB (MINOR ROAD), SEE BRIDGE PLANS.

CONSTRUCT DRAIN FLUMES AND/OR FILL SLOPE PROTECTION WHEN SHOWN ON ROADWAY PLANS.

PAYMENT FOR DRAIN FLUMES, COMPLETE IN PLACE, INCLUDING EXCAVATION, WILL BE PAID FOR AS TYPE 1 ROCK DITCH LINER. GEOTEXTILE WILL BE PAID SEPARATELY.



DRAIN FLUME PROFILE WITH PARTIAL ROCK BLANKET

DRAIN FLUME PROFILE WITHOUT ROCK BLANKET

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**DRAIN FLUME, SHOULDER PAVING AND FILL SLOPE AT BRIDGE ENDS**

**(MINOR AND LOW VOLUME ROUTES)**

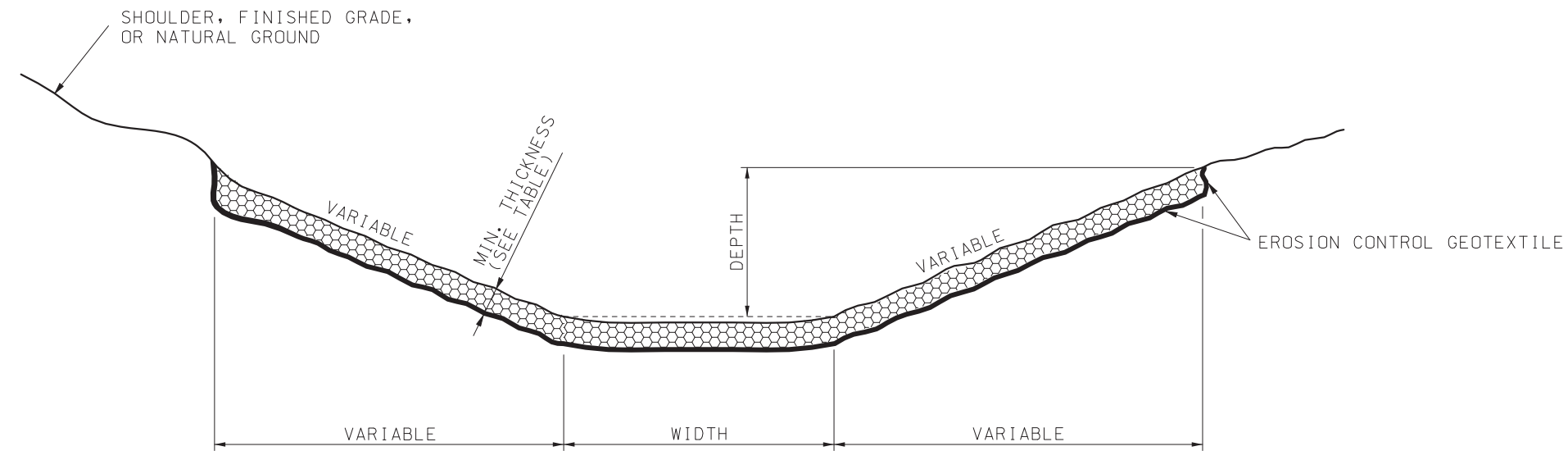
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**DATE EFFECTIVE:** 10/1/2023

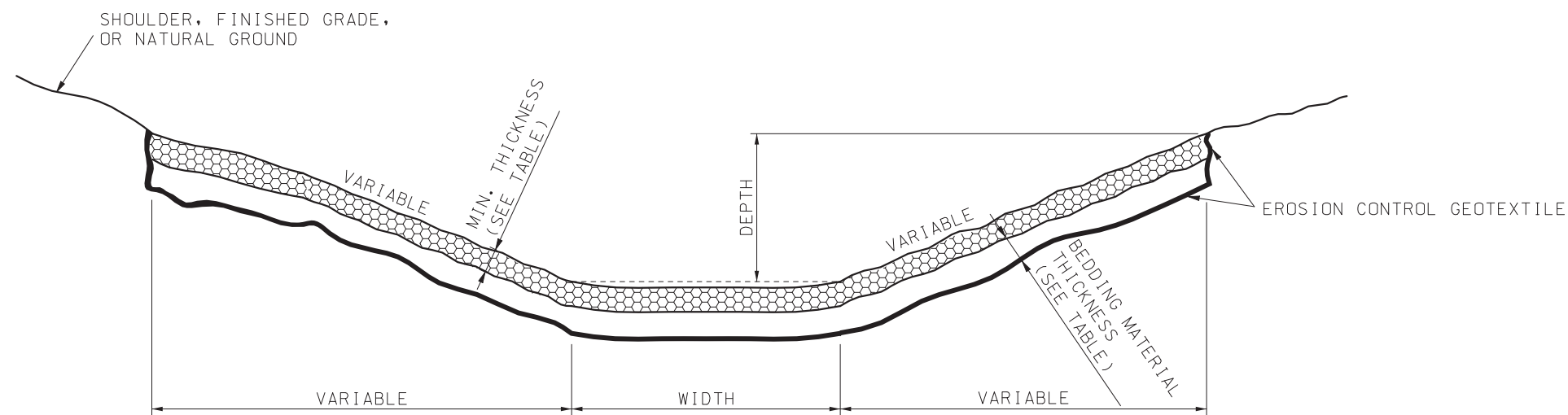
**DATE PREPARED:** 7/6/2023

**609.40U**

SHEET NO.  
**3 OF 3**



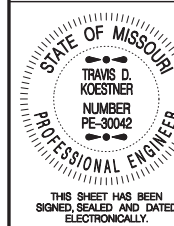
FLAT BOTTOM DITCH  
WITHOUT BEDDING MATERIAL



FLAT BOTTOM DITCH  
WITH BEDDING MATERIAL  
TYPICAL DITCH LINER DETAILS

TYPE	ROCK DITCH LINER MIN. THICKNESS	BEDDING MATERIAL MIN. THICKNESS
1	8"	--
2	12"	--
3	22"	8"
4	30"	12"

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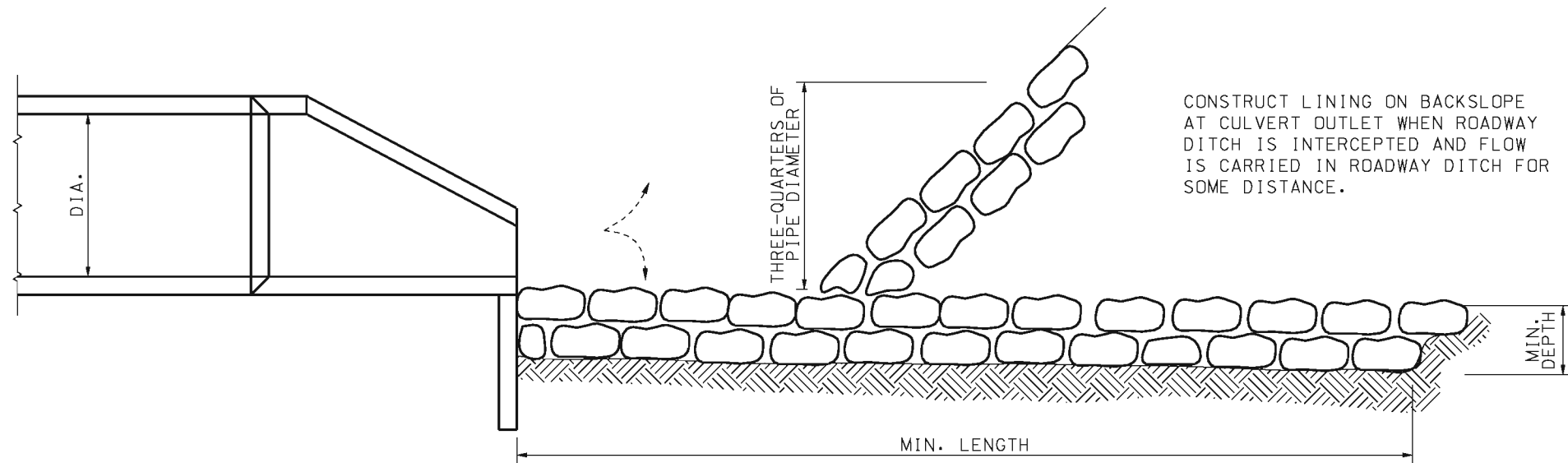
**ROCK DITCH LINER**

DATE EFFECTIVE: 7/1/2023  
DATE PREPARED: 4/5/2023

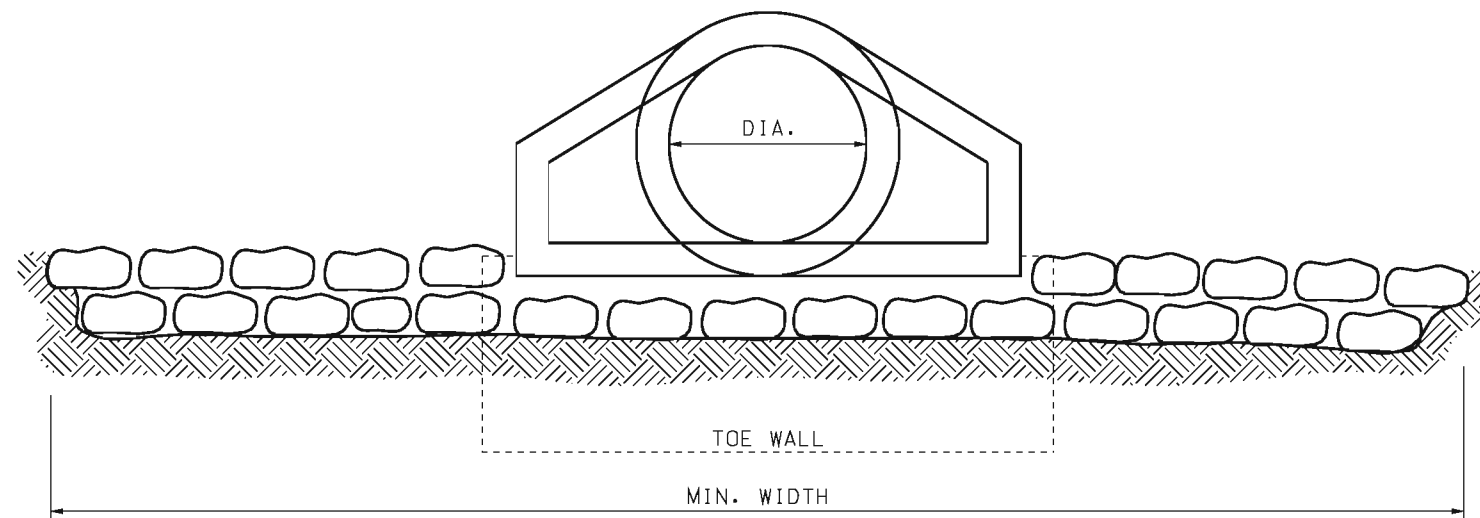
**609.60D**

SHEET NO.  
1 OF 1

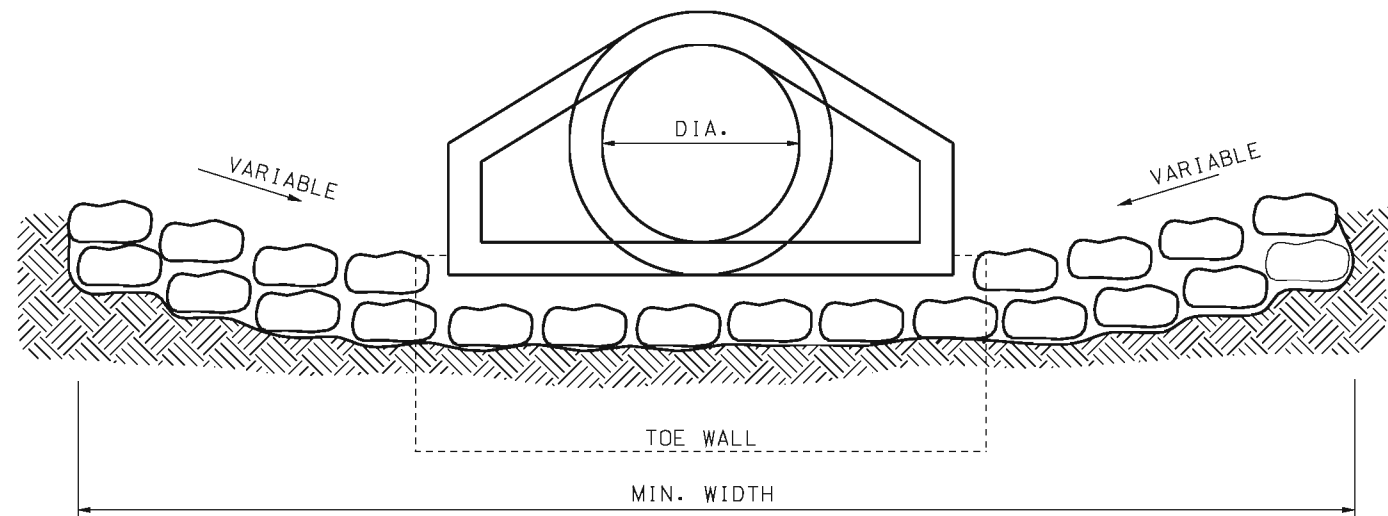
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SIDE VIEW



END VIEW



END VIEW  
(ALTERNATE METHOD)

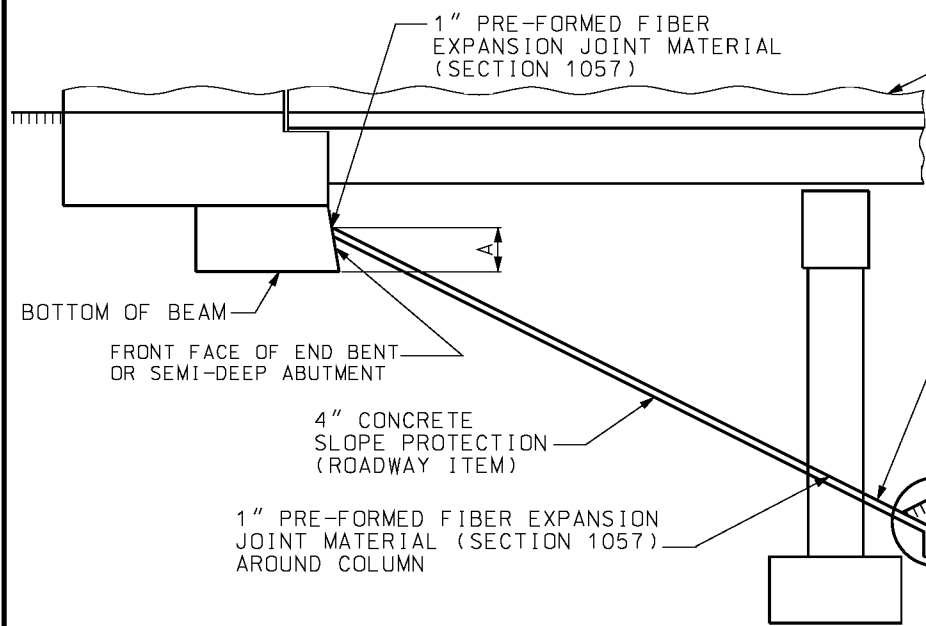
ROCK LINING FOR CULVERT OUTLETS					
CULVERT SIZE, DIA (IN.)	MINIMUM DEPTH AND WIDTH (FT.)	MINIMUM LENGTH (FT.)	ROCK LINING (CU. YD.)	EQUIVALENT PIPE ARCH CULVERT (APPROX.)	EQUIVALENT CONCRETE BOX CULVERT (APPROX.)
18	1 X 4	12	2		
24	1 X 6	14	3		2' X 1 1/2'
30	1 X 7	16	4	B-5	2' X 2'
36	1.5 X 9	18	9	B-6	3' X 2'
42	2 X 10	20	15	B-7	3' X 3'
48	2 X 12	20	18	B-8	4' X 3'
54	2 X 13.5	22	22	B-9	4' X 4'
60	2 X 15	25	28	B-10	5' X 4'
66	2 X 18	25	33	B-11	5' X 5'
72	2 X 20	30	44	B-12	5' X 6'
84	2.5 X 25	35	81		6' X 6'
96	2.5 X 30	40	111		7' X 7'
108	3 X 32	40	142		8' X 8'

GENERAL NOTES:

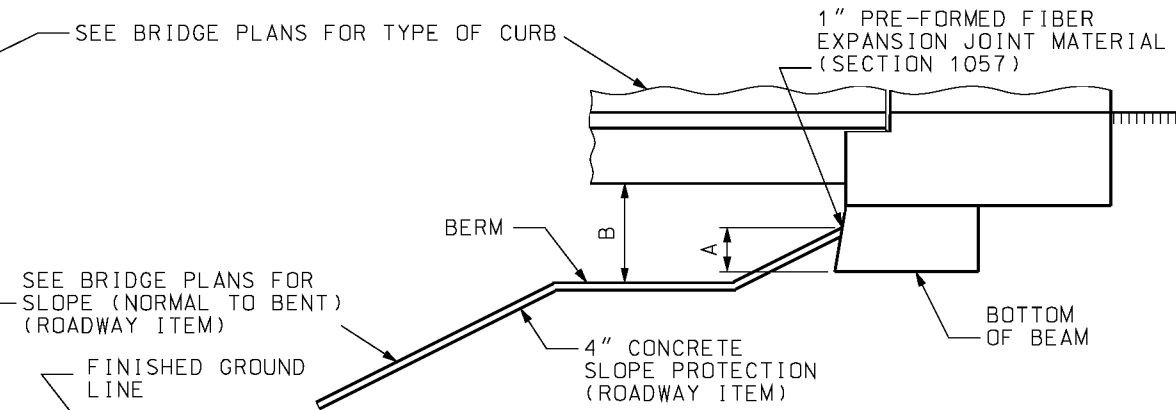
THE DIMENSIONS SHOWN IN THE TABLE CAN BE APPLIED TO BOX OR ARCH CULVERTS OF EQUIVALENT WATERWAY AREA.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p style="text-align: center;"><b>ROCK LINING FOR CULVERT OUTLET</b></p>
DATE EFFECTIVE: 10/01/1981 DATE PREPARED: 8/21/2009	<p style="text-align: center;"><b>609.70C</b></p>	SHEET NO. 1 OF 1

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

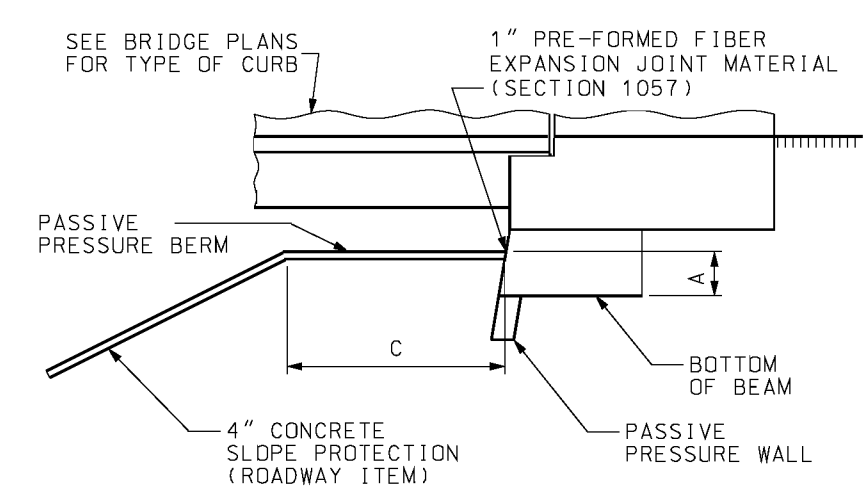


**ELEVATION**  
(STRAIGHT SLOPE TYPE)



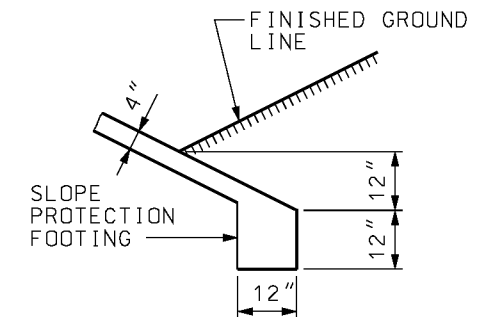
**ELEVATION**  
(USE ON STRUCTURES WITHOUT  
PASSIVE PRESSURE BERM)

- A - SEE BRIDGE PLANS
- B - BERM SHALL BE CONSTRUCTED TO ELEVATION SHOWN ON PLANS WITH A MINIMUM OF 4'-0" BELOW BOTTOM OF SUPERSTRUCTURE.
- C - DIMENSION OF BERM (SEE BRIDGE PLANS).



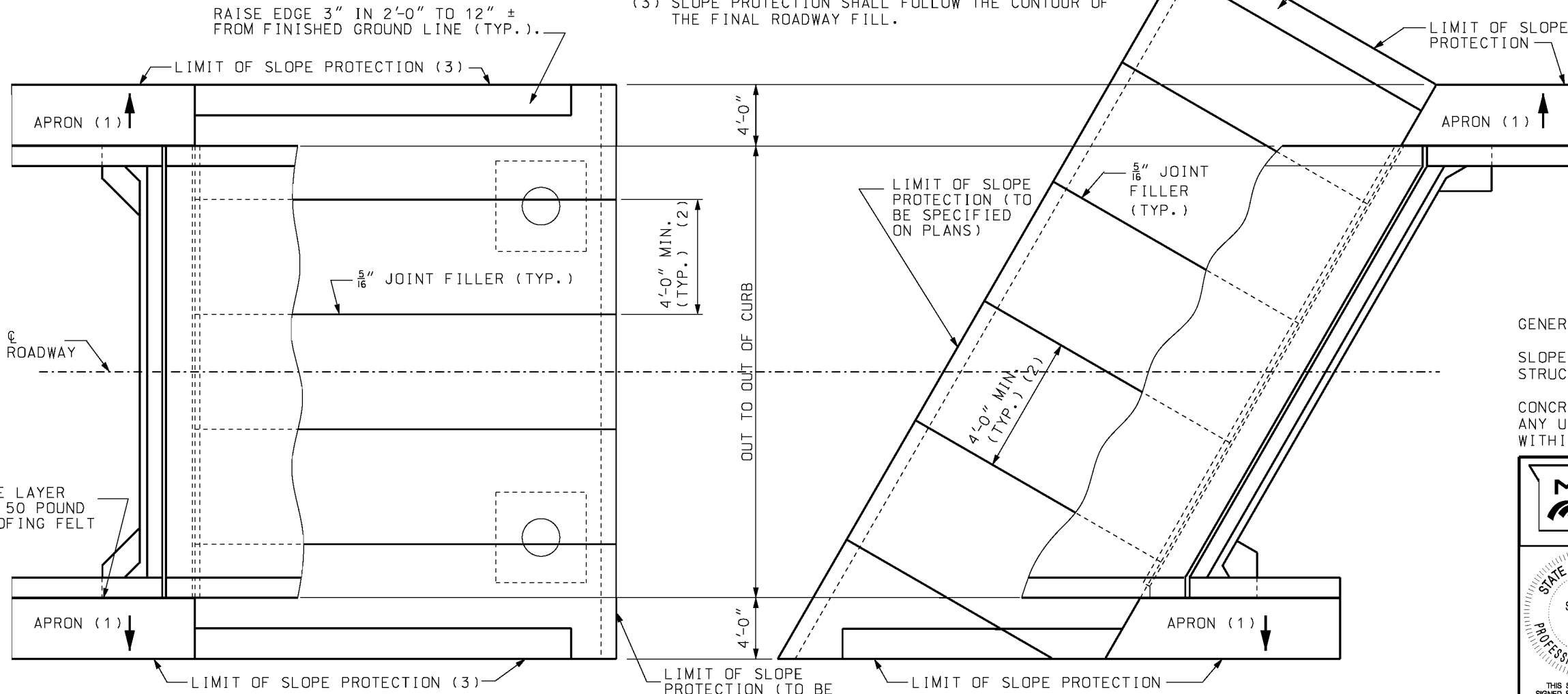
**ELEVATION**  
(USE ON STRUCTURES WITH  
PASSIVE PRESSURE BERM)

- (1) SLOPE  $\frac{1}{4}$ " PER FOOT MINIMUM.
- (2) PROTECTION SHALL BE PLACED IN CONTINUOUS PANELS FROM TOE OF THE SLOPE TO THE TOP OF THE SLOPE.
- (3) SLOPE PROTECTION SHALL FOLLOW THE CONTOUR OF THE FINAL ROADWAY FILL.



**DETAIL A**

NOTE:  
IF SLOPE PROTECTION FOOTING FALLS ON OR AROUND OTHER FOOTINGS, ONE LAYER OF 50# ROOFING FELT SHALL BE PLACED BETWEEN CONTACT SURFACES OF FOOTINGS.



**SQUARE**


**PART PLAN**


**SKewed**

**GENERAL NOTES:**

SLOPE PROTECTION SHALL BE MADE CONTINUOUS BETWEEN STRUCTURES WHEN MEDIAN IS 60' OR LESS.

CONCRETE SLOPE PROTECTION SHALL BE FORMED AROUND ANY UNDISTURBED ROCK THAT IS PERMITTED TO REMAIN WITHIN THE SLOPE PROTECTION AREA.

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

STATE OF MISSOURI  
  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

**CONCRETE SLOPE PROTECTION**

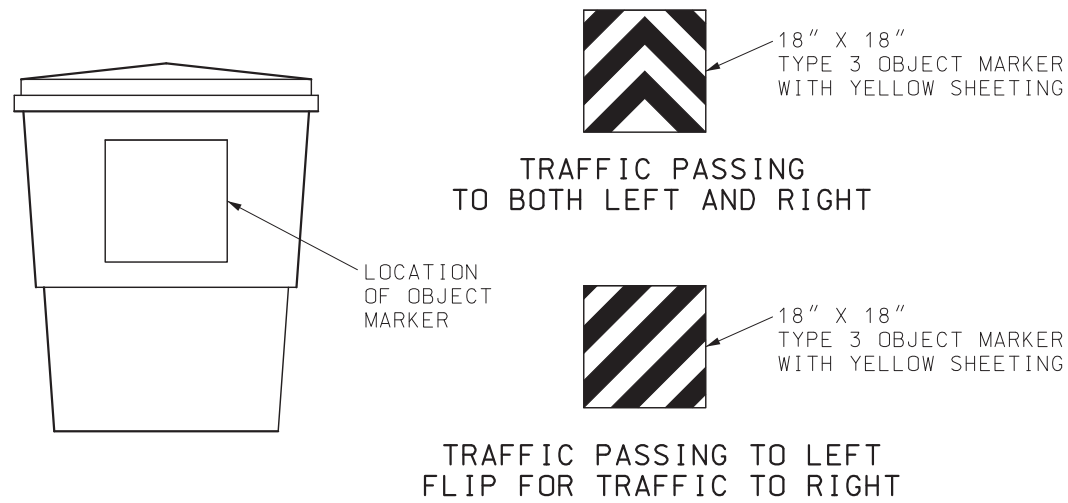
DATE EFFECTIVE: 07/01/2015  
 DATE PREPARED: 5/29/2015

**611.60R**

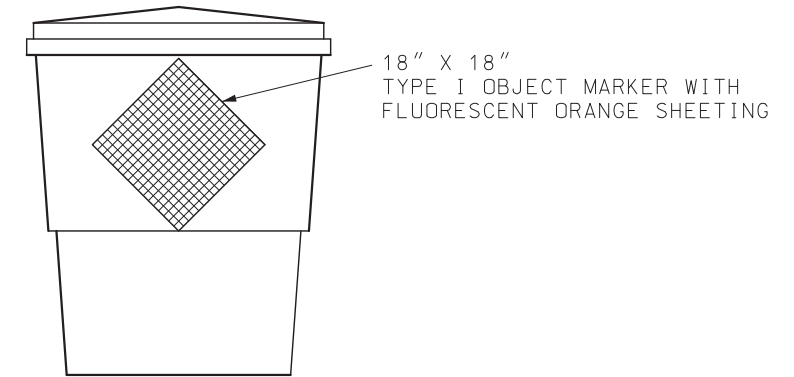
SHEET NO.  
1 OF 1

**ATTENUATOR LAYOUT:**

**ALL SAND FILLED ATTENUATORS SHOULD MEET MANUFACTURER'S RECOMMENDATIONS FOR THE ARRAY AND SAND WEIGHT.**




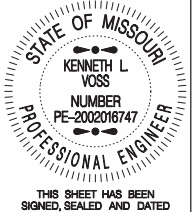
**TYPE 3 OBJECT MARKER PLACEMENT FOR PERMANENT INSTALLATIONS**



**TYPE I OBJECT MARKER PLACEMENT FOR TEMPORARY INSTALLATIONS**

GENERAL NOTES:

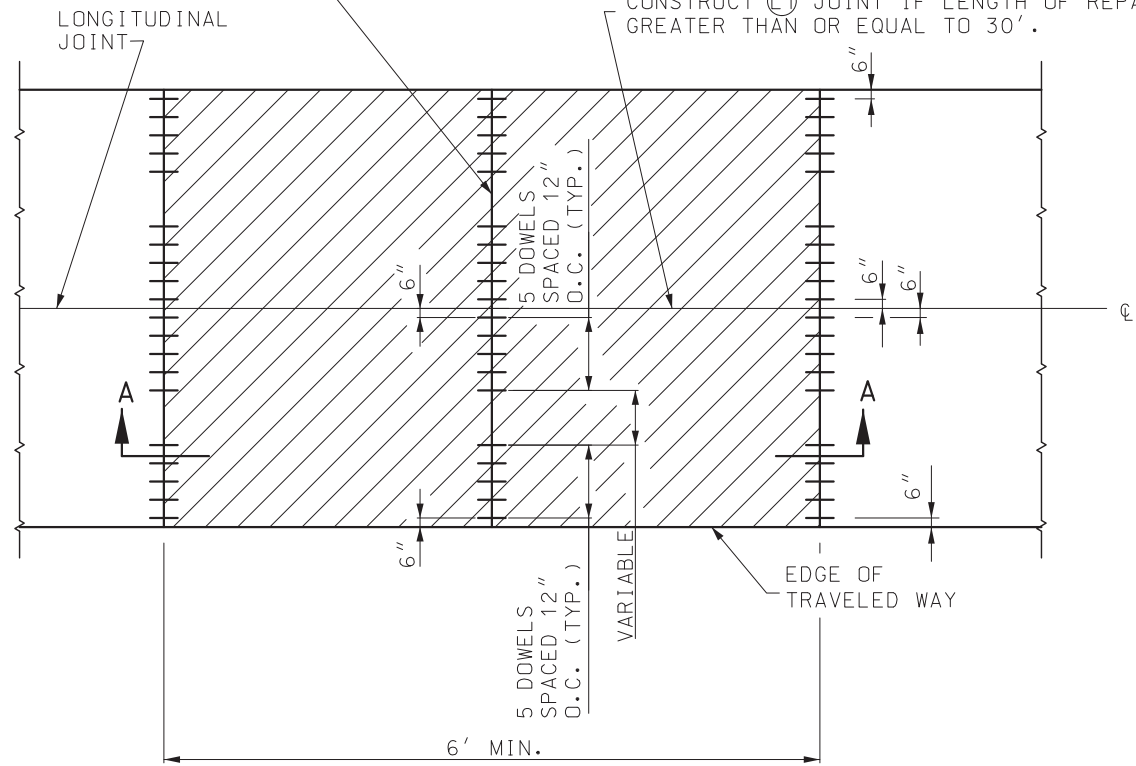
OBJECT MARKER SHALL BE PLACED ON THE LEAD MODULE FACING TRAFFIC.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI KENNETH L. VOSS NUMBER PE-2002016747 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>SAND FILLED IMPACT ATTENUATORS</b></p>
DATE EFFECTIVE: 4/1/2024 DATE PREPARED: 1/16/2024	<p><b>612.20F</b></p>
SHEET NO. 1 OF 1	

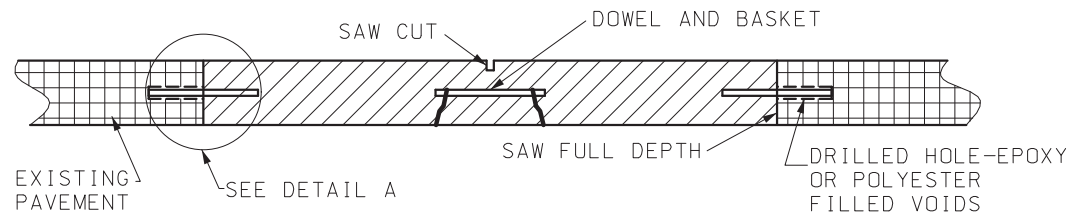


CONSTRUCT (C) JOINT(S) SPACED AT 15' ± 5' IF REPAIR LENGTH IS GREATER THAN OR EQUAL TO 30'. JOINTS SHALL BE AS EQUALLY SPACED AS POSSIBLE.

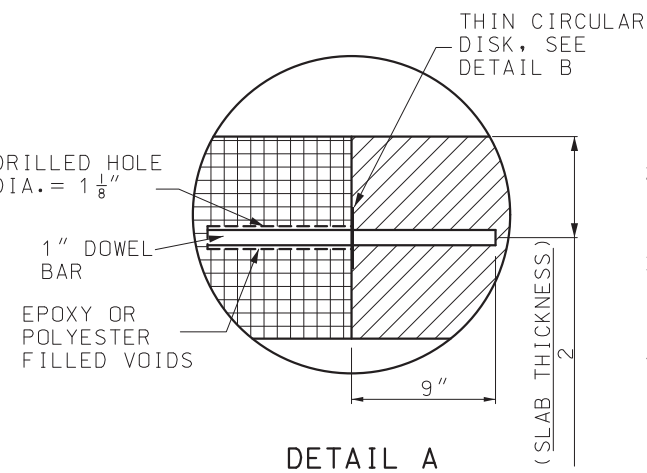
CONSTRUCT (L) JOINT IF LENGTH OF REPAIR IS GREATER THAN OR EQUAL TO 30'.



TWO OR MORE LANES



SECTION A-A



DETAIL A

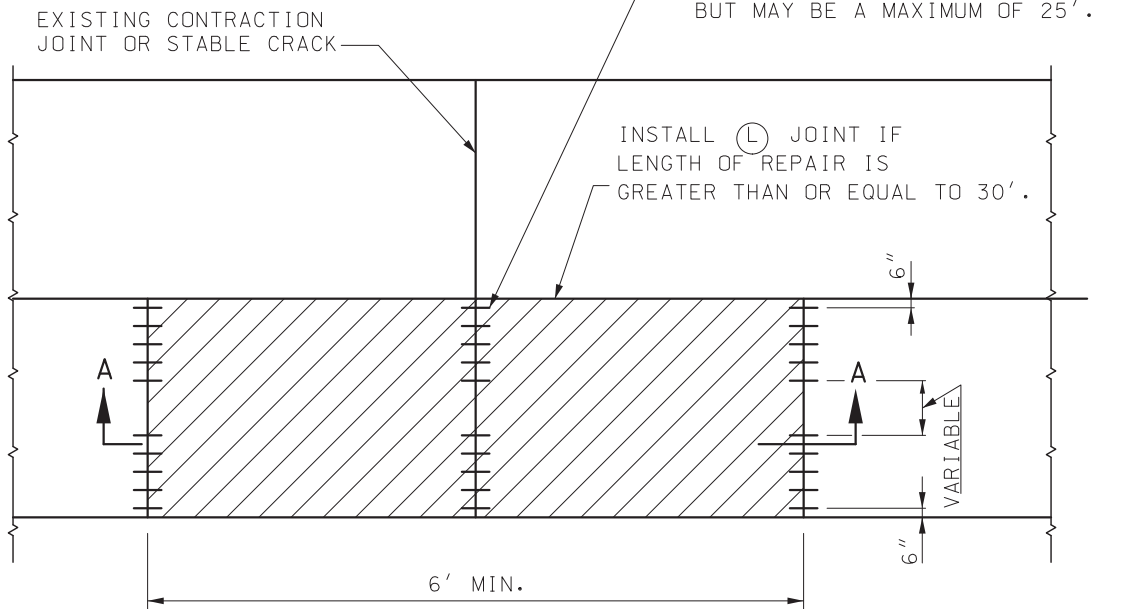
1. SMOOTH EPOXY COATED DOWELS SHALL BE USED IN ALL FULL DEPTH PAVEMENT REPAIR TRANSVERSE JOINTS.
2. THE ANCHORING MATERIAL (EPOXY OR POLYESTER) SHALL BE PLACED TO THE BACK OF THE PREDRILLED HOLE BEFORE INSERTING THE DOWEL BAR.
3. THE DOWEL IS INSERTED INTO THE HOLE WITH A TWISTING MOTION SO THAT THE MATERIAL IN THE BACK OF THE HOLE IS FORCED UP AND AROUND THE BAR.
4. EXPOSED END OF DOWEL SHALL BE COATED WITH A THIN UNIFORM COAT OF GRAPHITE GREASE. DOWEL BASKET ASSEMBLIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD PLAN 502.10. IN LIEU OF GRAPHITE GREASE, THE DOWEL BAR BASKET SUPPLIER MAY PROVIDE COMPLETED BASKET UNITS PRE-DIPPED IN AN APPROVED BONDBREAKER.

5. REPAIR ONLY ONE LANE AT A TIME.

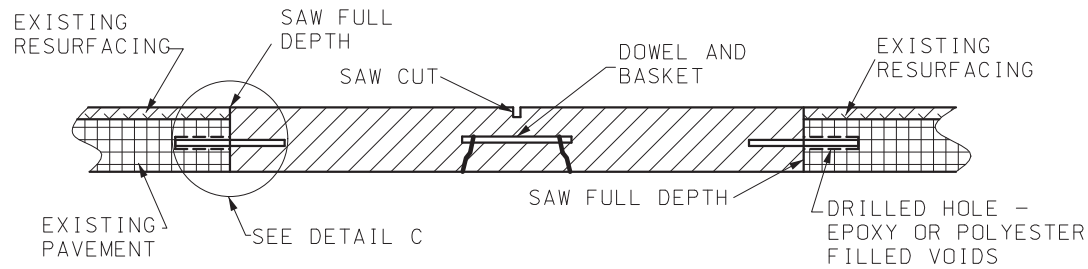
**NON-REINFORCED AND REINFORCED PORTLAND CEMENT CONCRETE**

CONSTRUCT (C1) JOINT(S) IF REPAIR LENGTH IS GREATER THAN OR EQUAL TO 30'. JOINTS SHALL BE CONSTRUCTED AT LOCATIONS OF EXISTING TRANSVERSE JOINTS OR CRACKS IN ADJACENT PAVEMENT AND EQUALLY SPACED AS MUCH AS POSSIBLE. THE PREFERRED JOINT SPACING IS 15' ± 5', BUT MAY BE A MAXIMUM OF 25'.

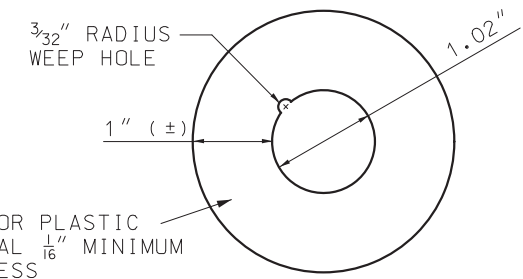
INSTALL (L) JOINT IF LENGTH OF REPAIR IS GREATER THAN OR EQUAL TO 30'.



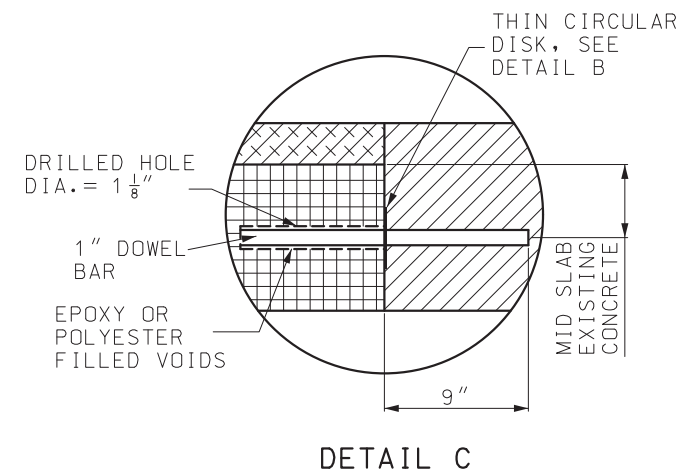
ONE LANE



SECTION A-A ALTERNATE WITH ASPHALT OVERLAY



DETAIL B THIN CIRCULAR DISK





DETAIL C

**GENERAL NOTES:**

ALL SAW CUTS SHALL BE MADE WITH A DIAMOND SAW EXCEPT THE CENTER RELIEF CUT.

FOR DETAILS OF TYPE (C), (L) AND (L1) JOINTS. SEE STANDARD PLAN 502.05.

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

STATE OF MISSOURI  
  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

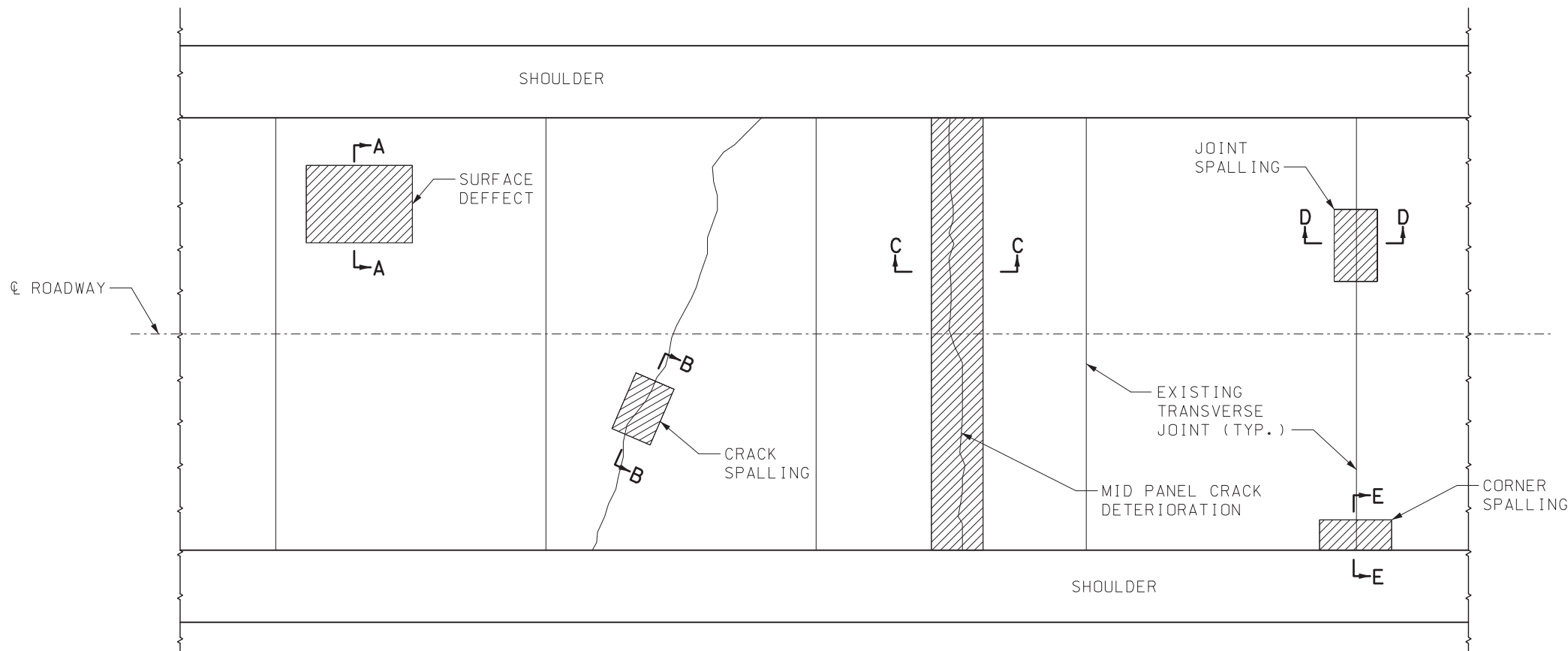
**PAVEMENT REPAIR  
 FULL DEPTH**

DATE EFFECTIVE: 01/01/2020  
 DATE PREPARED: 10/17/2019

**613.00T**

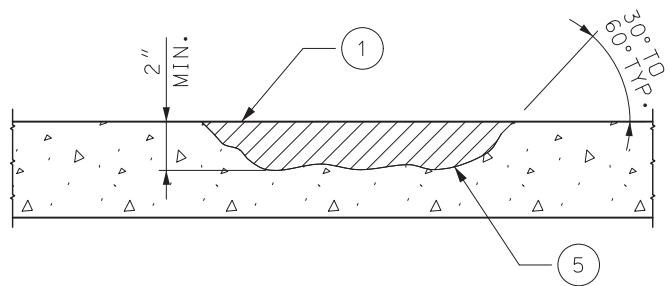
SHEET NO.  
 1 OF 4

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

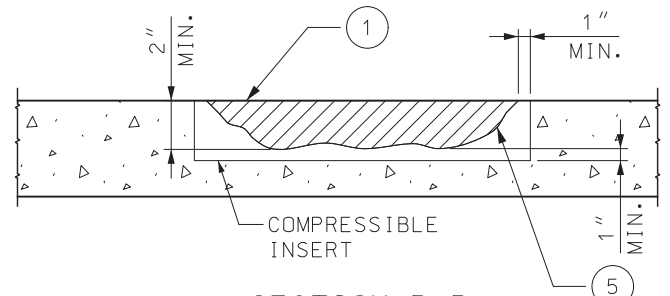


PLAN VIEW

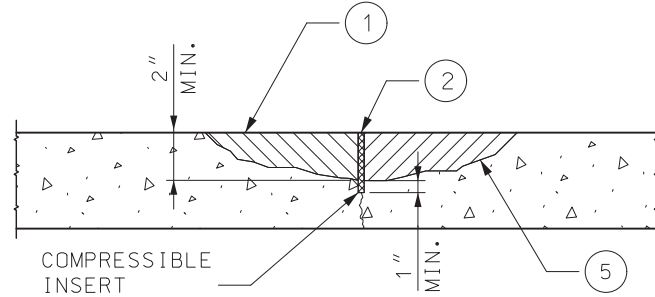
- 1 REMOVE ALL CONCRETE, TO LIMITS SHOWN, TO MAX. OF  $\frac{1}{2}$  THE PAVEMENT DEPTH OR TOP OF DOWELS BY MILLING.
- 2 PLACE COMPRESSIBLE INSERT IN JOINT OR CRACK. INSERT SHALL BE THICKNESS OF JOINT OR CRACK WIDTH, BUT NOT LESS THAN  $\frac{1}{4}$ ".
- 3 CHIP VERTICAL REPAIR EDGES AT APPROXIMATE 1:1 SLOPE.
- 4 PLACE  $\frac{1}{8}$ " MIN. COMPRESSIBLE INSERT ADJACENT TO LONGITUDINAL LANE OR SHOULDER JOINT.
- 5 EXPOSED SURFACE SHALL BE CLEANED BY SANDBLASTING OR SHOTBLASTING.
- 6 EXPOSED SURFACE OF DOWEL BARS SHALL BE COATED WITH AN APPROVED BONDBREAKER.



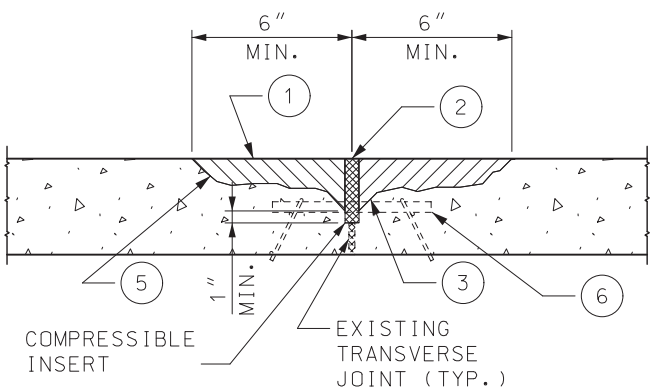
SECTION A-A



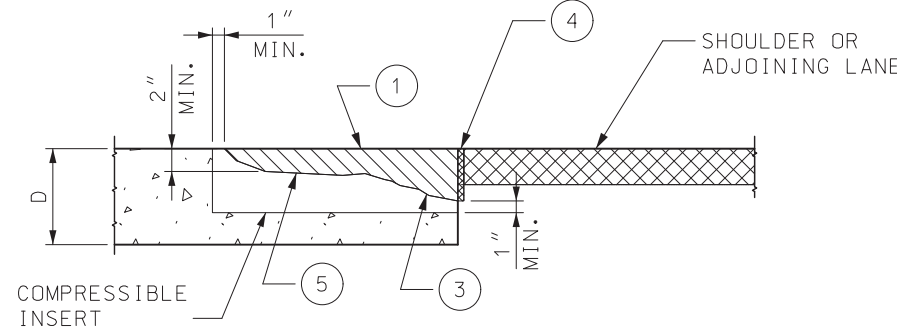
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

AREA TO BE REMOVED

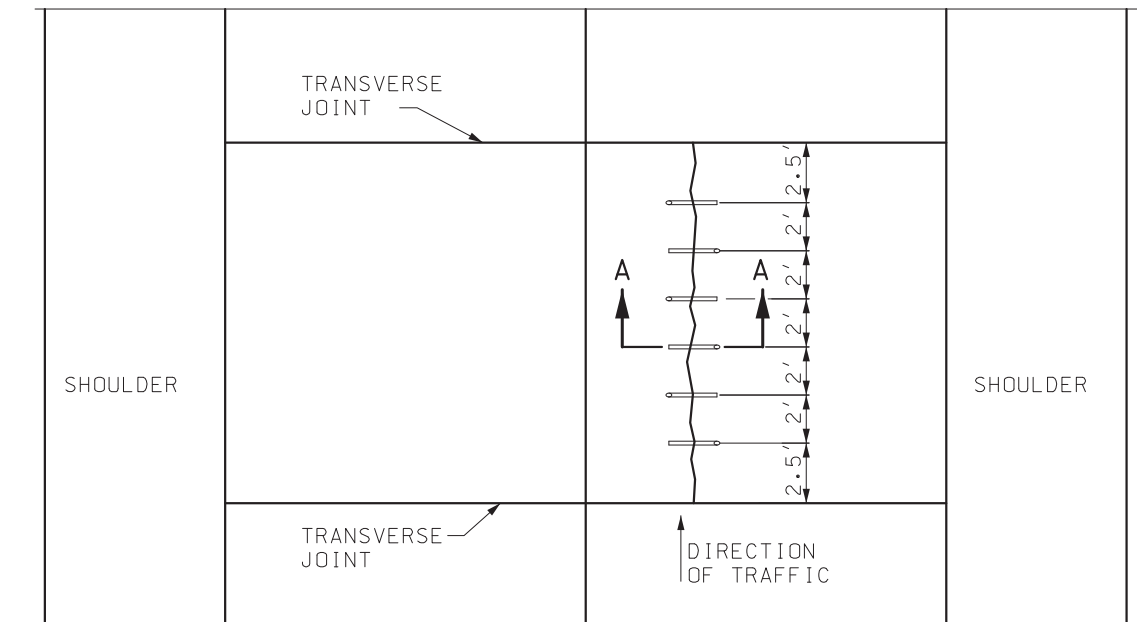
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

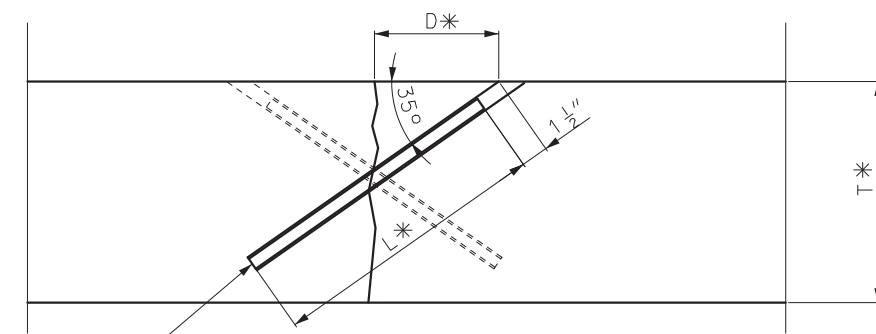
**PAVEMENT REPAIR**  
 PARTIAL DEPTH  
 CLASS A

DATE EFFECTIVE: 01/01/2020	<b>613.00T</b>	SHEET NO. 2 OF 4
DATE PREPARED: 10/17/2019		

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



**CROSS STITCHING PLAN**



#6 EPOXY REBAR  
CROSS STITCH  
BAR

\* SEE TABLE

T	SLAB THICKNESS (IN)	8	9	10	11	12
D	DISTANCE TO HOLE (IN)	5 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>
L	LENGTH OF BAR (IN)	8 <sup>1</sup> / <sub>2</sub>	11	12 <sup>1</sup> / <sub>2</sub>	14	16

**SECTION A-A**

**GENERAL NOTES:**

AT EACH REPAIR LOCATION, HOLES SHALL BE DRILLED AT 35° ANGLES TO THE PAVEMENT SURFACE, PERPENDICULAR TO THE CRACK. THE DRILL BIT DIAMETER SHALL NOT EXCEED 1 <sup>1</sup>/<sub>8</sub>".

DRILLING SHALL ALTERNATE BACK AND FORTH ON EITHER SIDE OF THE LONGITUDINAL JOINT FROM HOLE TO HOLE.

DRILLED HOLES SHALL NOT PENETRATE THROUGH THE SLAB BOTTOM.

DRILLED HOLES SHALL BE CLEANED OF LOOSE DEBRIS AND DUST. EPOXY OR POLYESTER BONDING AGENTS FOR DOWELS, MEETING THE MATERIAL REQUIREMENTS OF SECTION 1039, SHALL BE INJECTED OR POURED INTO EACH HOLE. A CROSS-STITCH BAR SHALL BE INSERTED IN EACH HOLE SUCH THAT THE EPOXY MATERIAL IS EVENLY DISTRIBUTED AROUND THE BAR AND EXTRUDING FROM THE SURFACE OPENING. EACH BAR SHALL BE INSERTED FAR ENOUGH TO ALLOW 1 <sup>1</sup>/<sub>2</sub>" OF COVER AS SHOWN IN THE PROFILE DETAIL.

THE SURFACE SHALL HAVE ALL EXCESS EPOXY REMOVED AND HAVE A FLUSH FINISH.

**GENERAL NOTES:**

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

STATE OF MISSOURI  
TRAVIS D. KOESTNER  
NUMBER PE-30042  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

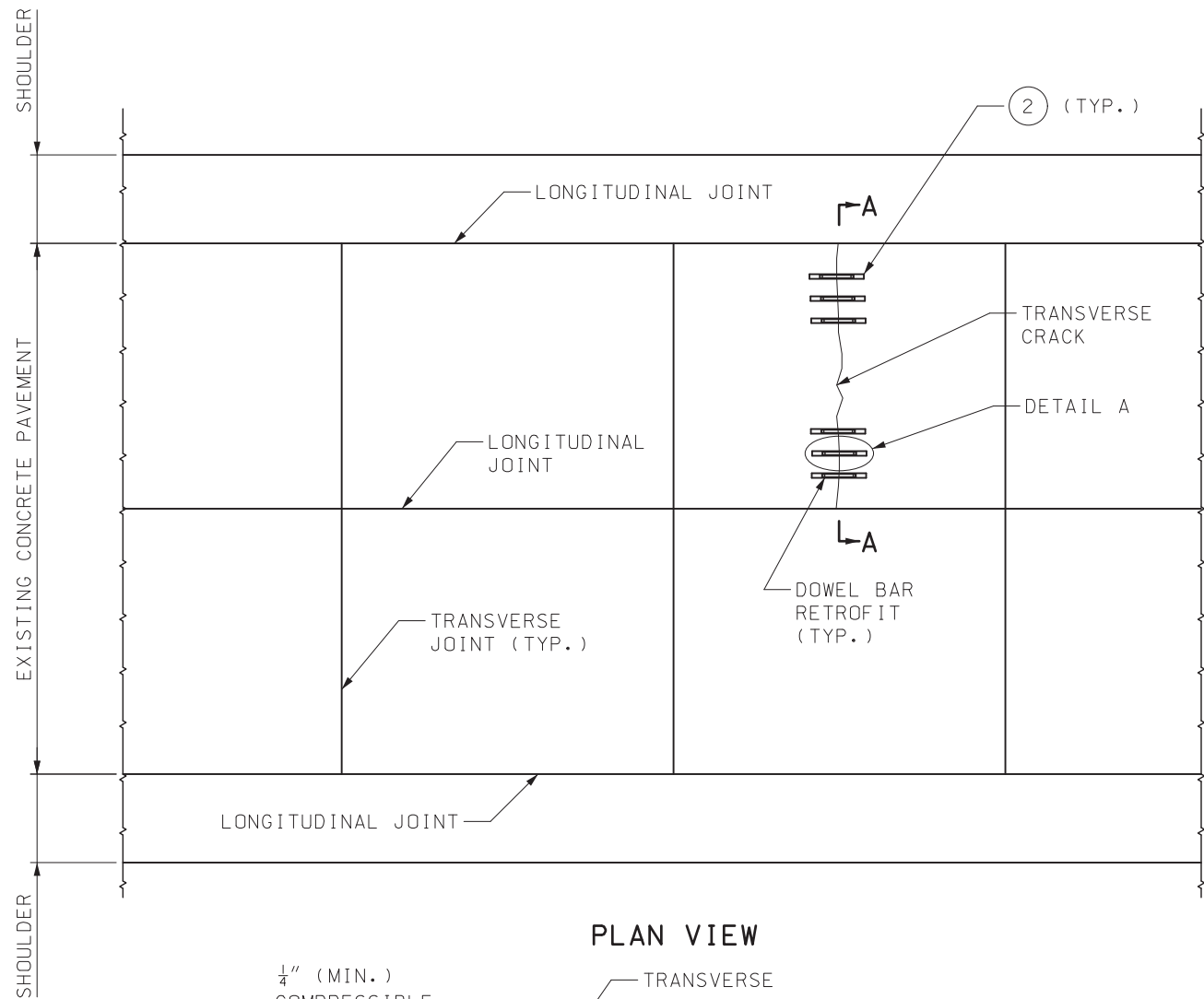
**PAVEMENT REPAIR  
CROSS STITCHING**

DATE EFFECTIVE: 01/01/2020  
DATE PREPARED: 10/17/2019

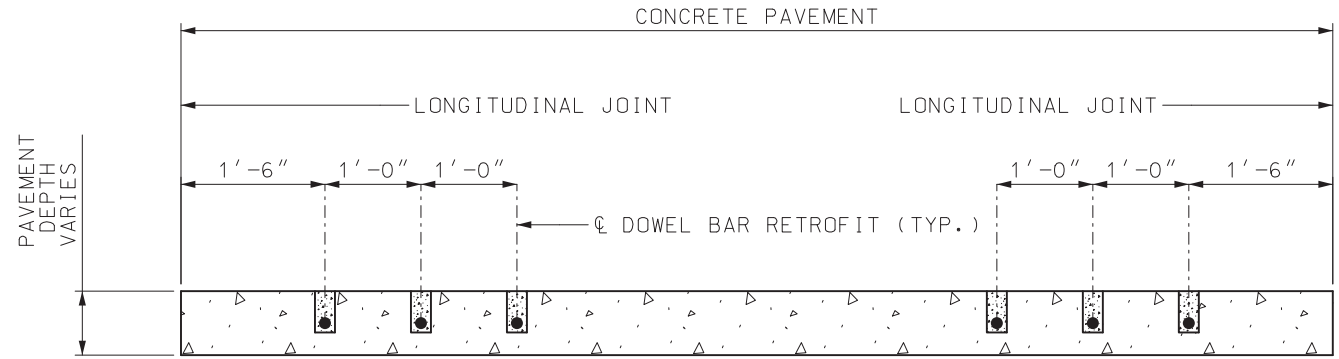
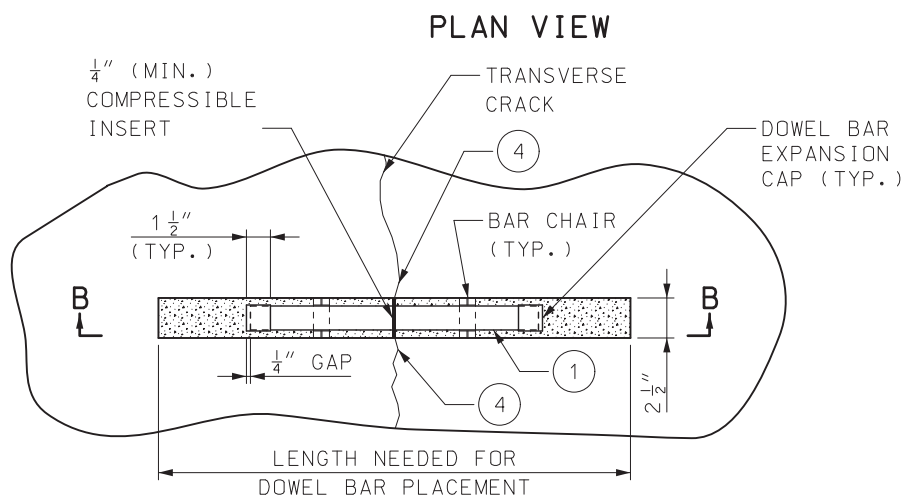
**613.00T**

SHEET NO.  
3 OF 4

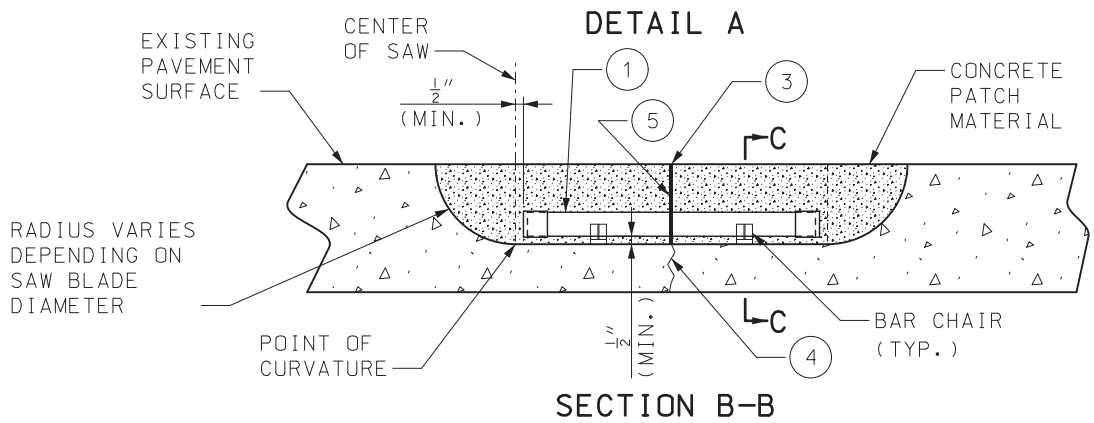
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



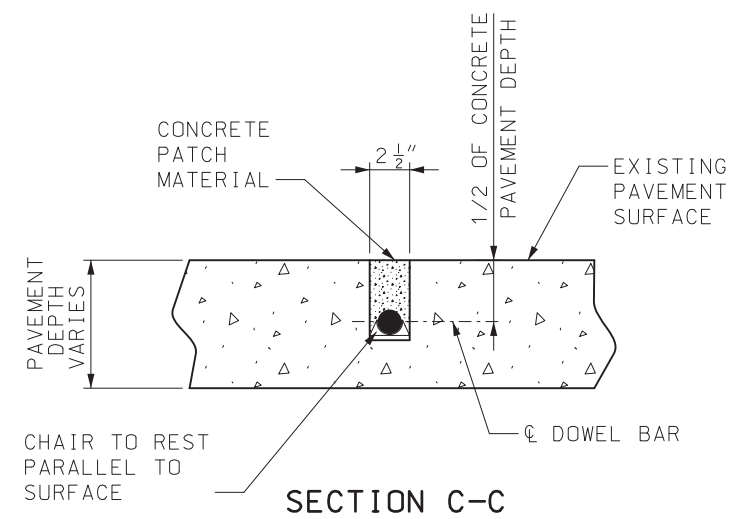
- ① 1 1/2" DIAMETER DOWEL BAR X 18" LENGTH.
- ② DOWEL BAR SLOTS SHALL BE PARALLEL TO ROADWAY.
- ③ TOP OF COMPRESSIBLE INSERT SHALL BE FLUSH WITH PAVEMENT SURFACE.
- ④ CRACK PERIMETER IN SLOT SHALL BE SEALED WITH SILICONE.
- ⑤ COMPRESSIBLE INSERT SHALL BE PLACED AT MIDDLE OF DOWEL BAR.



SECTION A-A



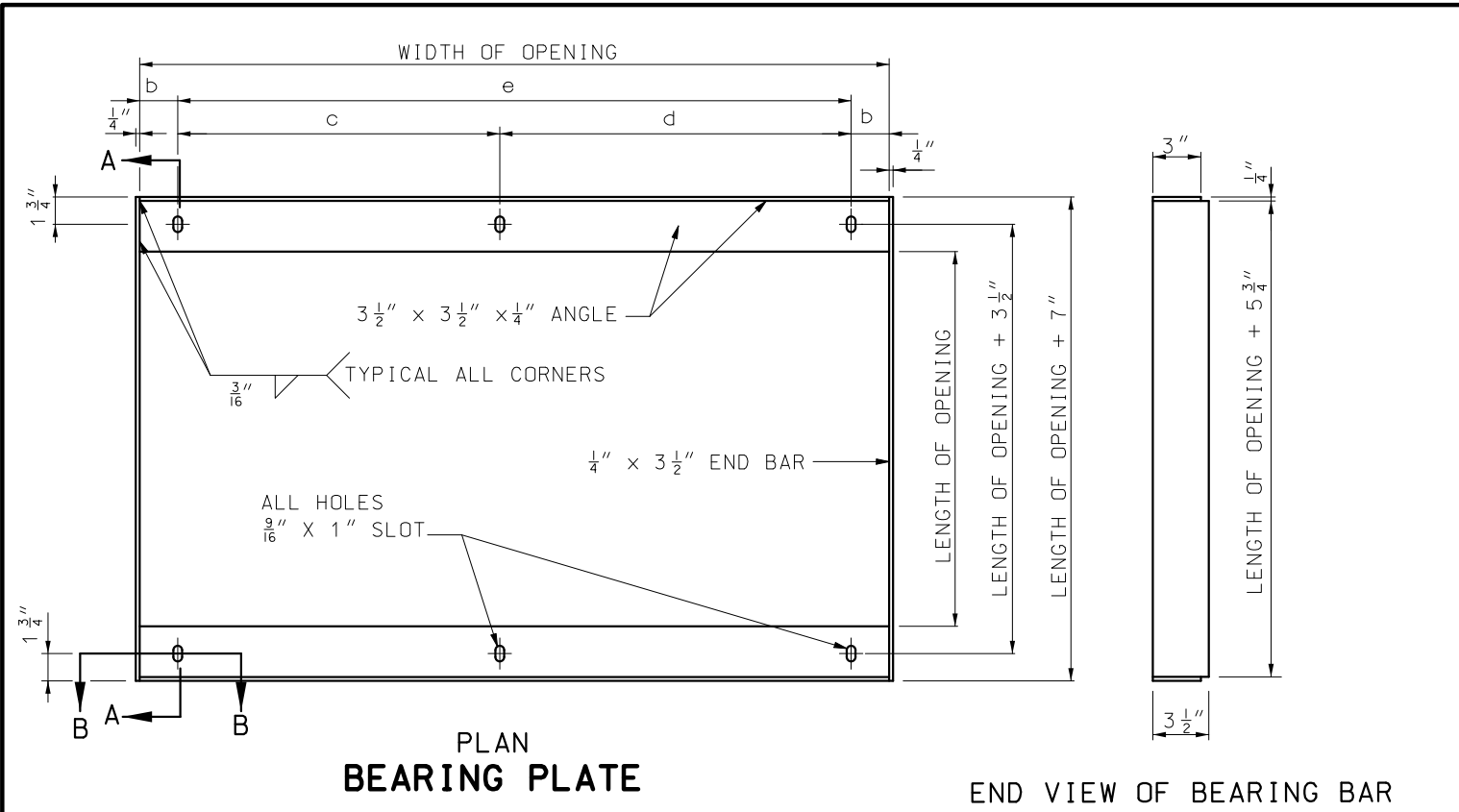
SECTION B-B



SECTION C-C

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PAVEMENT REPAIR</b> <b>DOWEL BAR RETROFIT</b>	
	DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019	<b>613.00T</b>
		SHEET NO. <b>4 OF 4</b>

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

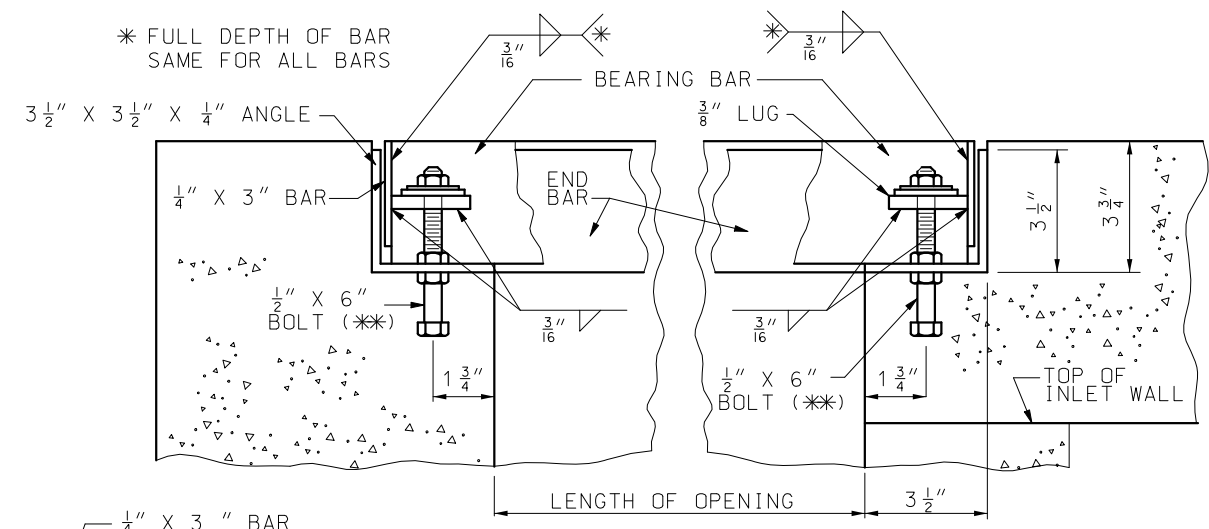


PLAN  
BEARING PLATE

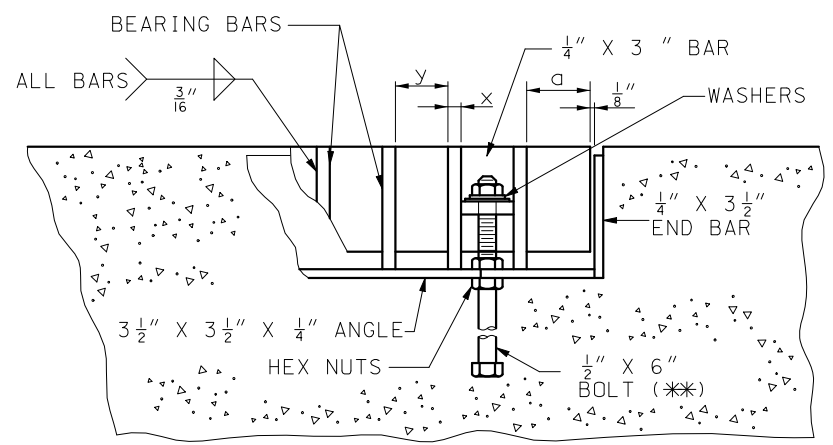
END VIEW OF BEARING BAR

WEIGHT AND DIMENSIONS DATA												
OPENING		WEIGHT (1) LBS.	BEARING BARS				DIMENSIONS					REMARKS
WIDTH	LENGTH		x	y	LENGTH	NUMBER	a	b	c	d	e	
3'-0"	2'-0"	190	3/8"	3"	2'-5 3/4"	11	13/16"	2 13/16"			2'-6 3/8"	USE WITH TYPE S-1 INLETS AND TYPE S HEADWALLS
3'-0"	3'-0"	330	5/8"	3"	3'-5 3/4"	10	1 1/4"	3 1/2"			2'-5"	
5'-0"	2'-0"	300	3/8"	3"	2'-5 3/4"	18	1"	3"	2'-3"	2'-3"		
5'-0"	3'-0"	550	5/8"	3"	3'-5 3/4"	17	9/16"	2 13/16"	2'-1 3/8"	2'-5"		
3'-1"	2'-1"	200	3/8"	3"	2'-6 3/4"	11	1 5/16"	3 5/16"			2'-6 3/8"	USE WITH TYPE S-2 AND TYPE S-3 INLETS ONLY
3'-1"	3'-1"	340	5/8"	3"	3'-6 3/4"	10	1 3/4"	4"			2'-5"	
5'-1"	2'-1"	310	3/8"	3"	2'-6 3/4"	18	1 1/2"	3 1/2"	2'-3"	2'-3"		
5'-1"	3'-1"	560	5/8"	3"	3'-6 3/4"	17	1 1/16"	3 5/16"	2'-1 3/8"	2'-5"		

(1) THE WEIGHT OF THE GRATE AND BEARING PLATE INCLUDES THE BOLTS, NUTS, AND WASHERS AND SHALL BE AS SHOWN WITH A TOLERANCE OF 5 PERCENT.



SECTION A-A

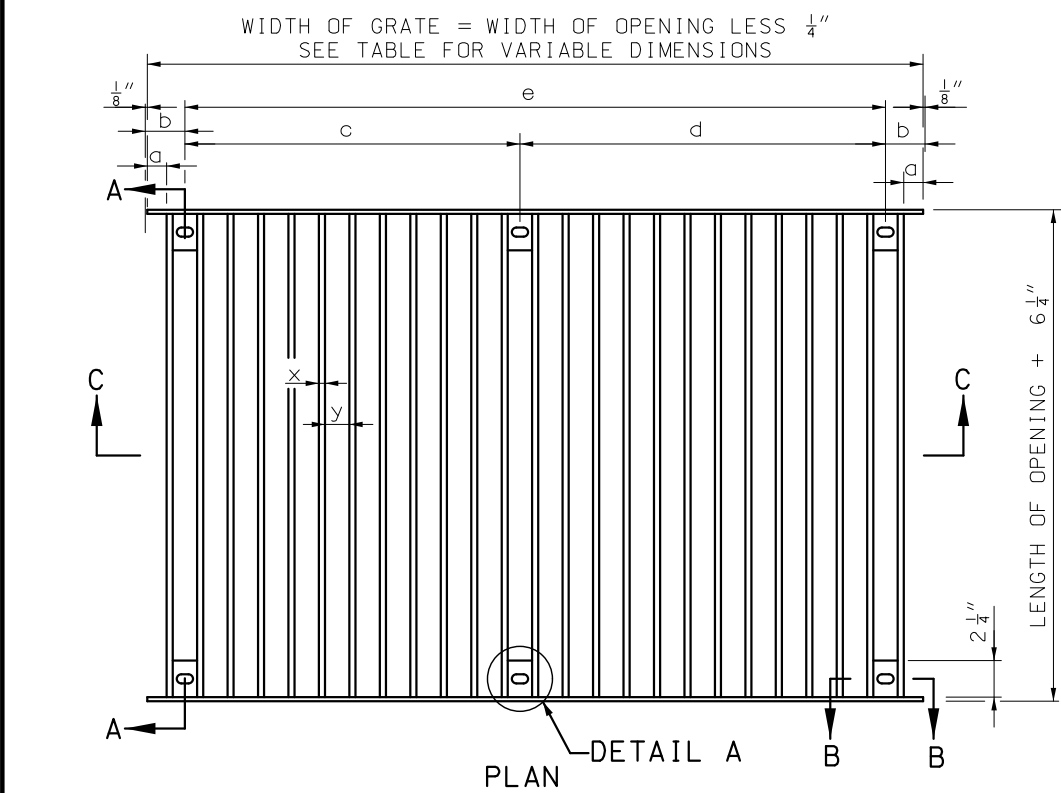


SECTION B-B

GENERAL NOTES:

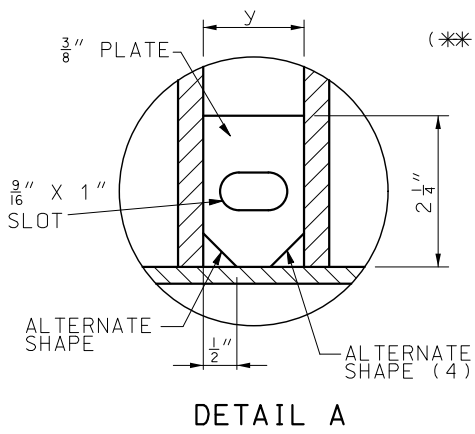
WHEN BOLTS ARE CUT IN THE FIELD, THREADS MUST BE CLEANED TO PERMIT THE FINAL NUT TO RUN FREELY ON THE BOLT.

THE WELDING REQUIREMENTS SHOWN ON THIS DRAWING ARE FOR PAINTED GRATES AND BEARING PLATES. IF GALVANIZED, ALL TIGHTLY CONTACTING SURFACES SHALL BE COMPLETELY SEALED, ON ALL SIDES BY WELDING, PRIOR TO GALVANIZING.



PLAN

SECTION C-C  
GRATE



DETAIL A

(\*\*) 1/2" DIA. ASTM F1554, GRADE 36 ANCHOR BOLTS.

(4) OTHER ALTERNATE SHAPES ARE ALLOWED, UPON APPROVAL, PROVIDED 4 LINEAR INCHES WELD IS MAINTAINED SYMMETRICALLY AROUND THE PLATE AND THE NOMINAL DIMENSIONS OF THE PLATE AND SLOT ARE MAINTAINED.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**GRATES AND BEARING PLATES**

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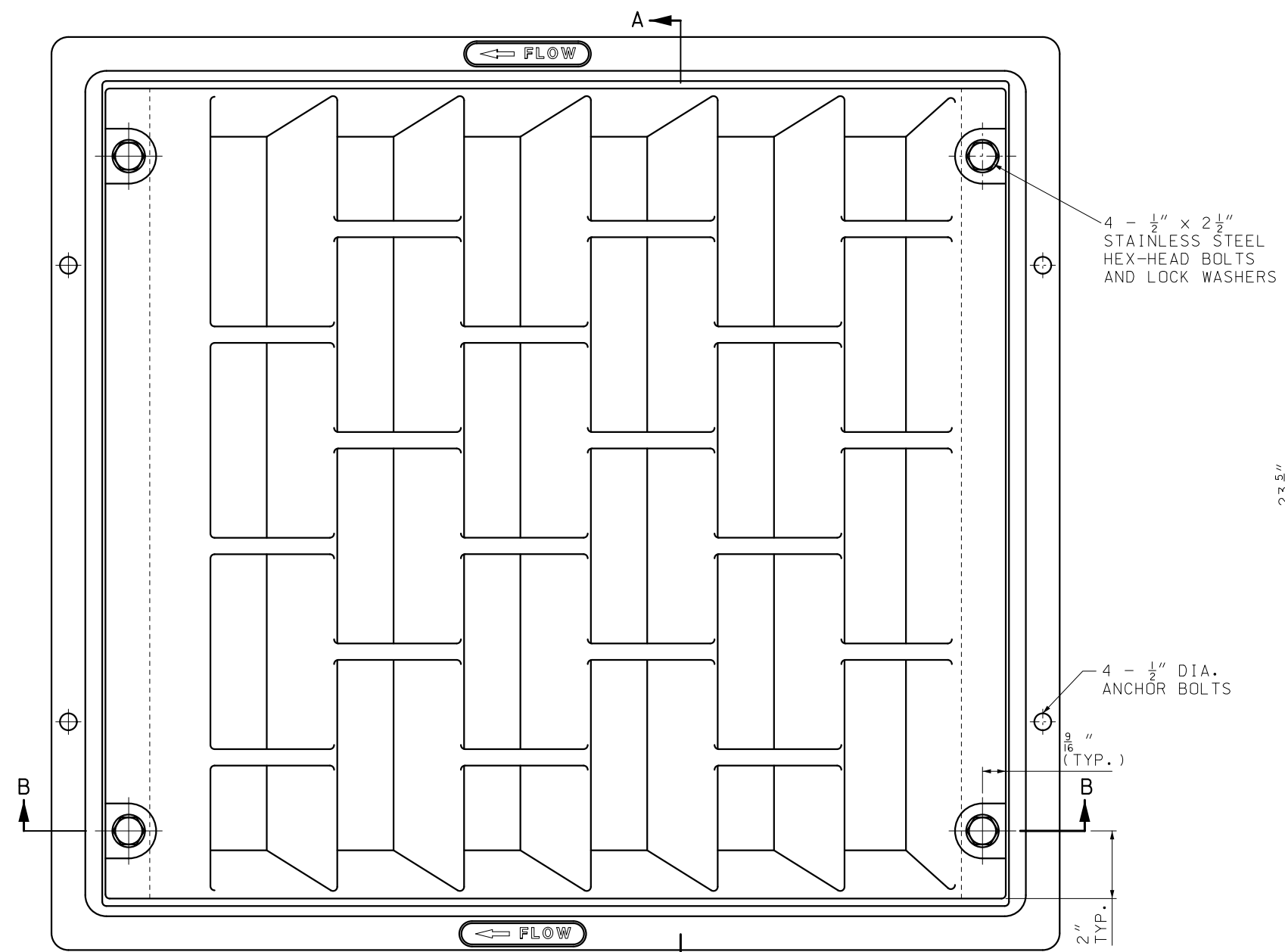
**614.10U**

SHEET NO.  
1 OF 1

DATE EFFECTIVE: 10/01/2021  
DATE PREPARED: 7/13/2021

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



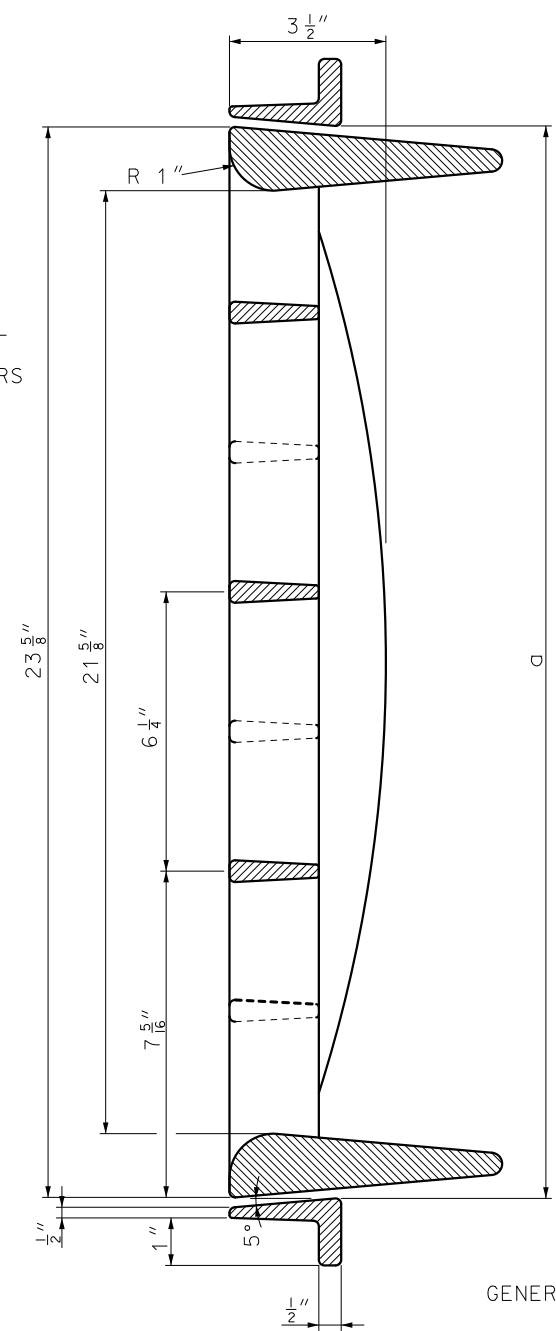
4 - 1/2" x 2 1/2" STAINLESS STEEL HEX-HEAD BOLTS AND LOCK WASHERS

4 - 1/2" DIA. ANCHOR BOLTS

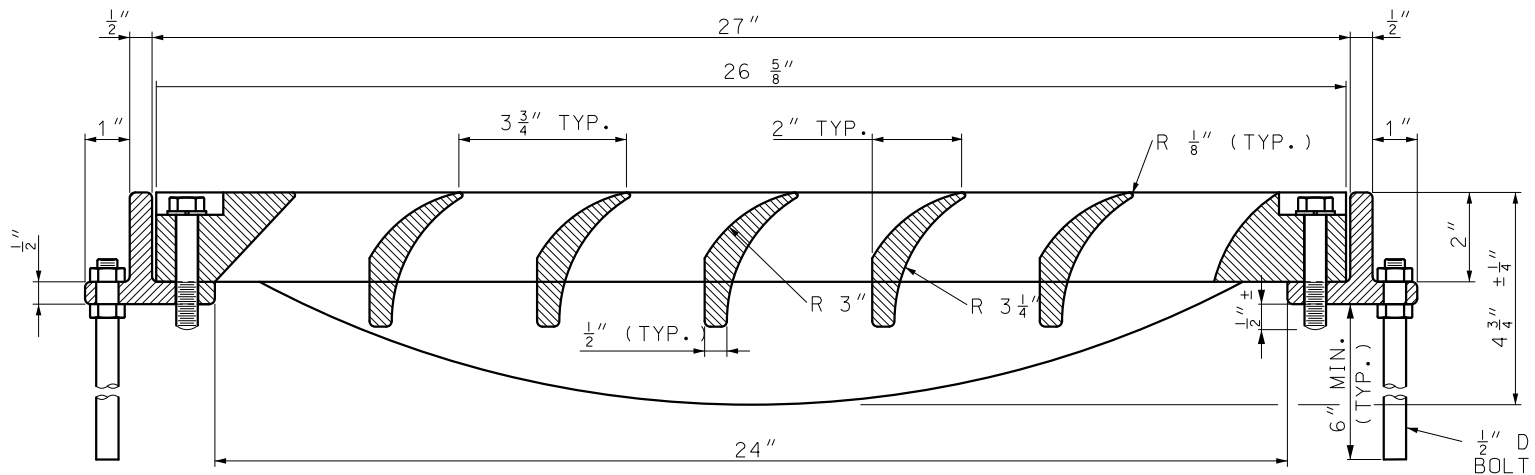
9/16" (TYP.)

2" TYP.

PLAN



SECTION A-A



SECTION B-B

(\* ) 1/2" DIA. ASTM F1554, GRADE 36 ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 232 (ASTM A153), CLASS C OR SHALL BE MECHANICALLY GALVANIZED. IF MECHANICALLY GALVANIZED, THE COATING THICKNESS, ADHERENCE AND QUALITY REQUIREMENTS SHALL BE IN ACCORDANCE WITH AASHTO M 232 (ASTM A153), CLASS C. DAMAGED SPALTER COATING SHALL BE REPAIRED IN ACCORDANCE WITH SEC 1081.

1/2" DIA. ANCHOR BOLT (TYP.)(\* )

NOMINAL DIMENSIONS AND WEIGHTS					
OPENING		a	WEIGHT (LB.)	NUMBER OF	
WIDTH	LENGTH			ANCHOR BOLTS	STAINLESS STEEL BOLTS
2'-0"	2'-0"	24"	200	4	4
4'-0"	2'-0"	48"	348	8	8

NOTE: TWO 2' X 2' GRATES MAY BE USED IN LIEU OF SINGLE 4' X 2' GRATES.

INSTALLATION INSTRUCTIONS:

DRILL AND TAP FRAME.

INSTALL 1/2" DIA. BOLTS WITHOUT WASHERS BEFORE CONCRETE POUR TO FORM 1/2" ± BOLT EXTENSION INTO CONCRETE BELOW FRAME. LUBRICATE EXPOSED THREADS.

AFTER CONCRETE HARDENS SUFFICIENTLY, FINAL INSTALLATION SHALL REMOVE AND REINSTALL 1/2" DIA. BOLTS AND LOCK WASHERS THROUGH GRATE AND FRAME. TORQUE 1/2" DIA. BOLTS TO 35-40 FT. LB. APPLY THREAD ADHESIVE TO ALL 1/2" DIA. STAINLESS STEEL BOLTS.

GENERAL NOTES:

GRATES TO BE CONSTRUCTED OF CAST GRAY IRON AND MEET REQUIREMENTS OF AASHTO M 306. MINOR VARIATIONS IN VANE SHAPE TO MEET MANUFACTURER'S STANDARD PRACTICE ARE PERMITTED.

MINIMUM CLEAR OPEN AREA: 2.10 SQUARE FEET.

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

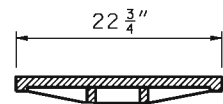
STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CURVED VANE GRATE AND FRAME**

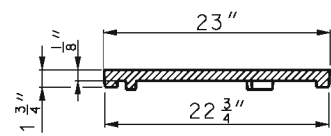
DATE EFFECTIVE: 01/01/2021  
 DATE PREPARED: 10/14/2020

**614.11D**

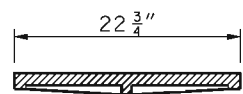
SHEET NO.  
 1 OF 1



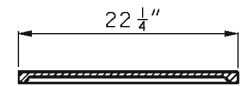
SECTION A-A



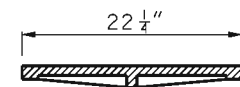
SECTION C-C



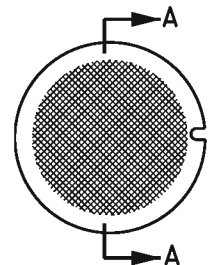
SECTION E-E



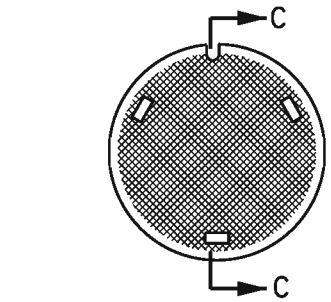
SECTION G-G



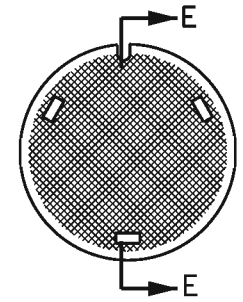
SECTION I-I



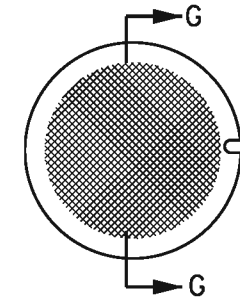
PLAN



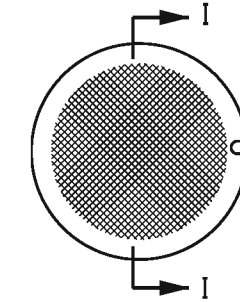
PLAN



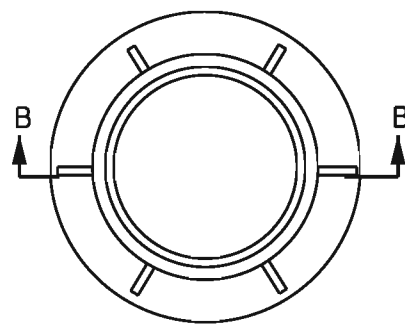
PLAN



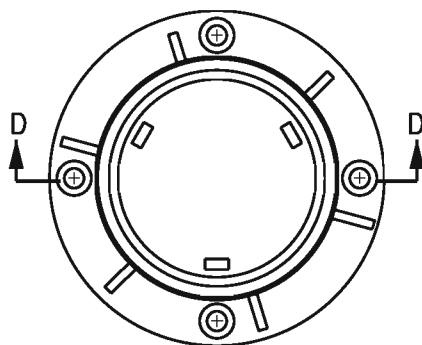
PLAN



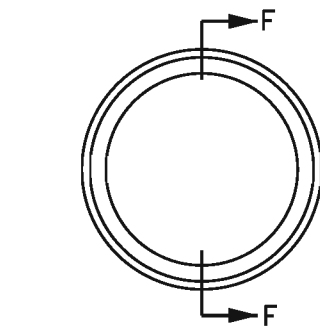
PLAN



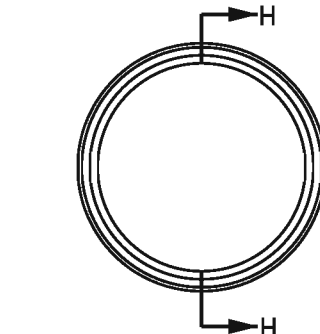
SECTION B-B



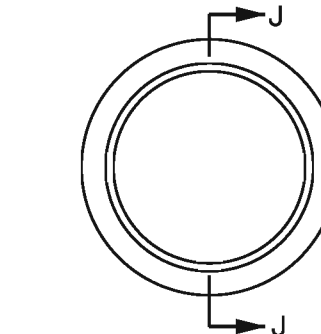
SECTION D-D



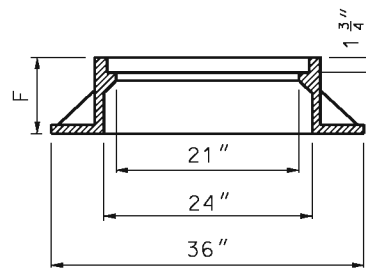
SECTION F-F



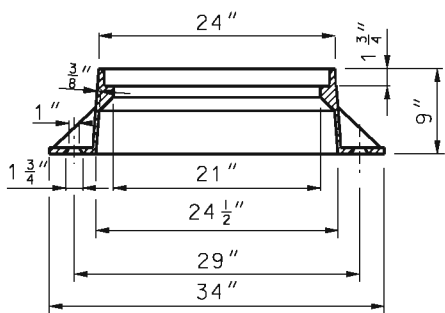
SECTION H-H



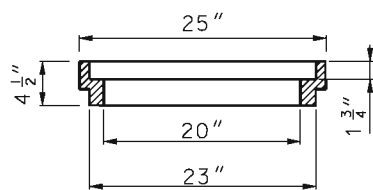
SECTION J-J



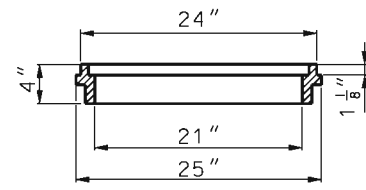
SECTION B-B



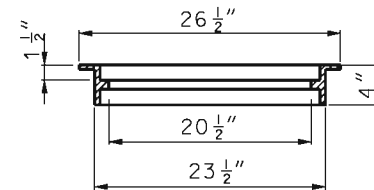
SECTION D-D



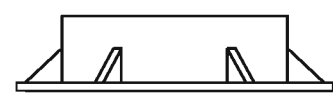
SECTION F-F



SECTION H-H

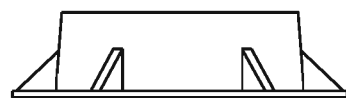


SECTION J-J



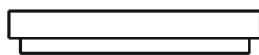
ELEVATION  
TYPE 1A AND 1B

APPROXIMATE WEIGHT OF  
FRAME AND COVER  
TYPE 1A 540 LBS.  
TYPE 1B 570 LBS.



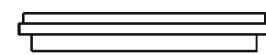
ELEVATION  
TYPE 1C

APPROXIMATE WEIGHT OF  
FRAME AND COVER 290 LBS.



ELEVATION  
TYPE 2

APPROXIMATE WEIGHT OF  
FRAME AND COVER 250 LBS.



ELEVATION  
TYPE 3

APPROXIMATE WEIGHT OF  
FRAME AND COVER 115 LBS.



ELEVATION  
TYPE 4

APPROXIMATE WEIGHT OF  
FRAME AND COVER 160 LBS.

GENERAL NOTES:

TYPE 1A:  
WHEN "P" (PAVEMENT THICKNESS) IS 8" USE MANHOLE  
FRAME WITH 9" HEIGHT (F) APPROXIMATE WEIGHT OF  
FRAME AND COVER, 540 LBS., CLASS 35 CASTING.

TYPE 1B:  
WHEN "P" (PAVEMENT THICKNESS) IS 9" OR 10", USE  
MANHOLE FRAME WITH 10" HEIGHT (F) APPROXIMATE  
WEIGHT OF FRAME AND COVER, 570 LBS., CLASS 35  
CASTING.

TYPE 1C:  
TYPE 1C MANHOLE FRAME AND COVER WILL BE ACCEPTED AS  
AN ALTERNATE TO TYPE 1A OR TYPE 1B. APPROXIMATE  
WEIGHT OF FRAME AND COVER, 290 LBS..

FOR "P" GREATER THAN 10" ADJUSTING RINGS COMBINED  
WITH MANHOLE FRAMES WITH "F" EQUAL TO 9" OR 10"  
SHALL BE USED TO MATCH THE PAVEMENT THICKNESS.

THE PRICE BID FOR MANHOLE FRAME AND COVER SHALL  
INCLUDE THE NUMBER OF ADJUSTING RINGS REQUIRED TO  
MATCH PAVEMENT THICKNESS.

WHEN SPECIFIED, USE A LOCK TYPE FRAME AND COVER  
WITH A MINIMUM OF 3 LOCK BLOCKS AND BOLTS.

MANHOLE ADJUSTING RINGS SHALL BE SECURED TO EITHER  
THE FRAME OR PAVEMENT TO PREVENT MOVEMENT UNDER  
TRAFFIC.

A CHECKERED DESIGN TOP SHALL BE FURNISHED.

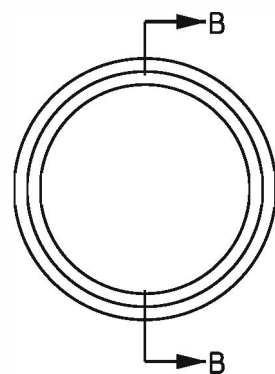
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
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STATE OF MISSOURI  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN  
SIGNED, SEALED, AND DATED  
ELECTRONICALLY.

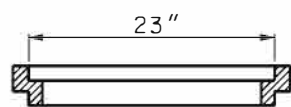
DATE EFFECTIVE: 03/01/1996  
DATE PREPARED: 8/21/2009  
614.30E  
SHEET NO. 1 OF 2

**MANHOLE  
FRAMES AND COVERS**

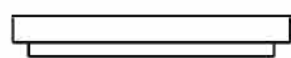
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN

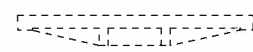


SECTION B-B

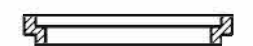


ELEVATION

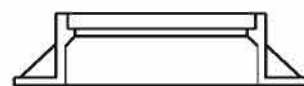
ADJUSTING RING  
SOLID OR ADJUSTABLE



COVER

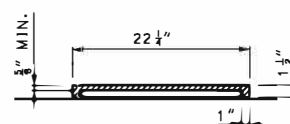


ADJUSTING RING

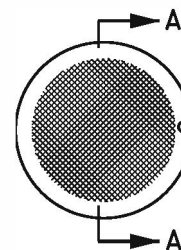


FRAME

INSTALLATION  
DETAILS



SECTION A-A



APPROXIMATE WEIGHT OF  
FRAME AND COVER 150 LBS.

ALTERNATE  
TYPE 4 COVER

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KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN  
SIGNED, SEALED, AND DATED  
ELECTRONICALLY.

**MANHOLE  
FRAMES AND COVERS**

DATE EFFECTIVE: 03/01/1996  
DATE PREPARED: 8/21/2009

**614.30E**

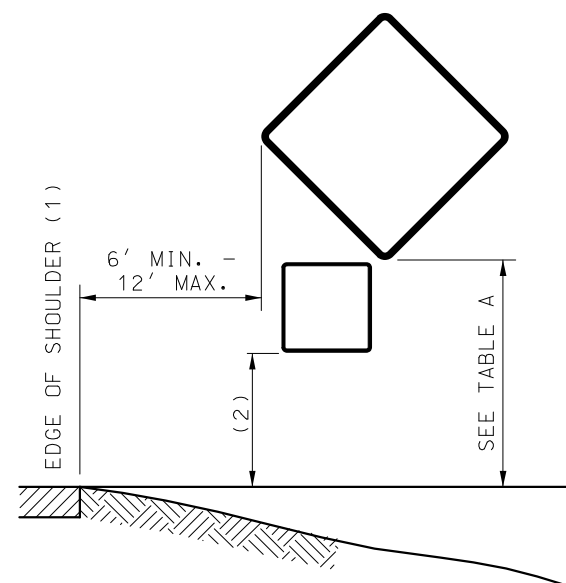
SHEET NO.  
2 OF 2



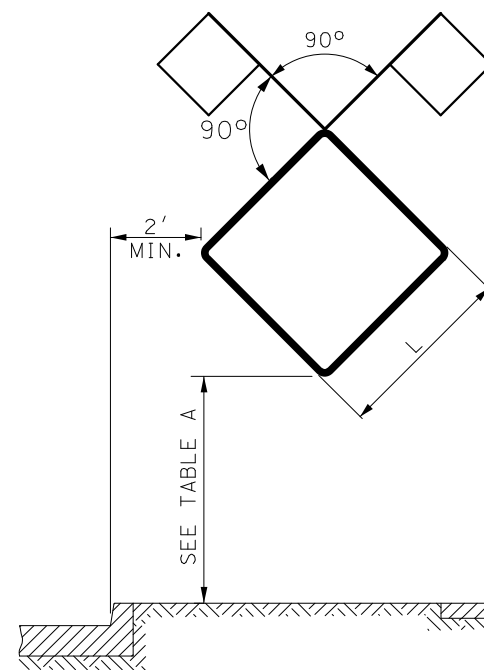
**TABLE A  
WORK ZONE SIGN MOUNTING REQUIREMENTS**

TYPE	SIGN SUPPORT	SIGN SUBSTRATE	MINIMUM MOUNTING HEIGHT(3)	USAGE LIMITATIONS	COMMENTS
POST	PERFORATED SQUARE STEEL TUBE U-CHANNEL WOOD	RIGID	5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS	NONE	POSTS SHALL BE FREE OF ANY BRACING AND EXTEND NO FURTHER ABOVE THE SIGN EXCEPT AS NEEDED FOR WARNING LIGHT ATTACHMENT. FOR DETAILS OF POST INSTALLATION DETAILS SEE SHEET NO. 2 OF 9. GALVANIZATION OF POSTS WILL NOT BE REQUIRED.
TYPE 1 PORTABLE	SKID FOLD-UP STAND	RIGID	5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS	PERMITTED ONLY WHERE POST MOUNTING IS NOT FEASIBLE.	SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 OR MASH 2016 TL-3 AND MAY BE PLACED ADJACENT TO OR WITHIN THE ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF DESIGNATED TRAVELED WAY, IS MAINTAINED.
TYPE 2 PORTABLE	EASEL FOLD-UP STAND SELF-DRIVING POST TYPE III MOVABLE BARRICADE SKID	FLEXIBLE RIGID	12" (4)	PERMITTED FOR PROGRESSIVE WORK SUCH AS ASPHALT OVERLAYS. PERMITTED FOR STATIONARY WORK EXPECTED TO BE COMPLETED IN 3 DAYS OR LESS. PERMITTED FOR INTERMEDIATE/DISCONTINUOUS STATIONARY WORK THAT MAY EXCEED 3 DAYS IN TOTALITY, AS APPROVED BY THE ENGINEER.(5) WHERE SIGNS ARE OBSCURED BY OTHER OBJECTS (I.E., TRAFFIC CONTROL DEVICES, PARKED VEHICLES, BARRIERS, VEGETATION, ETC.) OR INSTALLED ON MULTILANE UNDIVIDED FACILITIES OR MULTILANE DIVIDED FACILITIES WITH 3 OR MORE LANES IN ONE DIRECTION, MOUNTING HEIGHTS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS.	SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 OR MASH 2016 TL-3 AND MAY BE PLACED ADJACENT TO OR WITHIN THE ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF DESIGNATED TRAVELED WAY, IS MAINTAINED.
BARRIER	CONCRETE TRAFFIC BARRIER GUARDRAIL	FLEXIBLE RIGID	5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS	PERMITTED ONLY WHERE LONGITUDINAL BARRIER IS PRESENT.	SYSTEMS SHALL PROVIDE POSITIVE CONNECTION TO THE BARRIER AND MINIMIZE POTENTIAL FOR VEHICLE SNAGGING.
VEHICLE	PAVEMENT MARKING EQUIPMENT PILOT CAR PROTECTIVE VEHICLE	FLEXIBLE RIGID	48" (6)	PERMITTED ONLY IN PILOT CAR OR MOVING OPERATIONS.	

- (3) MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF THE PAVEMENT.
- (4) MOUNTING HEIGHTS FOR REGULATORY AND GUIDE SIGNS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS.
- (5) SIGNS MOUNTED ON TYPE III BARRICADES, GORE EXIT SIGN, AND SIGNS FOR CROSSWALK/ SIDEWALK CLOSURES MAY BE LEFT IN PLACE FOR MORE THAN 3 DAYS.
- (6) DEVIATIONS AS APPROVED BY THE ENGINEER.



- (1) EDGE OF TRAVELED WAY WHERE THERE IS NO PAVED OR STABILIZED SHOULDER.
- (2) ONE-FOOT LESS THAN MOUNTING HEIGHT NOTED IN TABLE A.



**HEIGHT AND LATERAL LOCATIONS FOR  
POST AND PORTABLE SIGN MOUNTING**


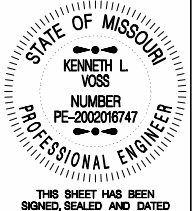
**GENERAL NOTES:**

LONGITUDINAL SPACING OF SIGNS SHOWN IN THE PLANS ARE PREFERRED MINIMUMS, BUT MAY BE ADJUSTED TO MEET EXISTING FIELD CONDITIONS WITH APPROVAL FROM THE ENGINEER.

SIGNS SHALL NOT BE MOUNTED IN OR ON CHANNELIZERS.

ALL POSTS AND SIGNS SHALL BE INSTALLED AND MAINTAINED IN A PLUMB POSITION.

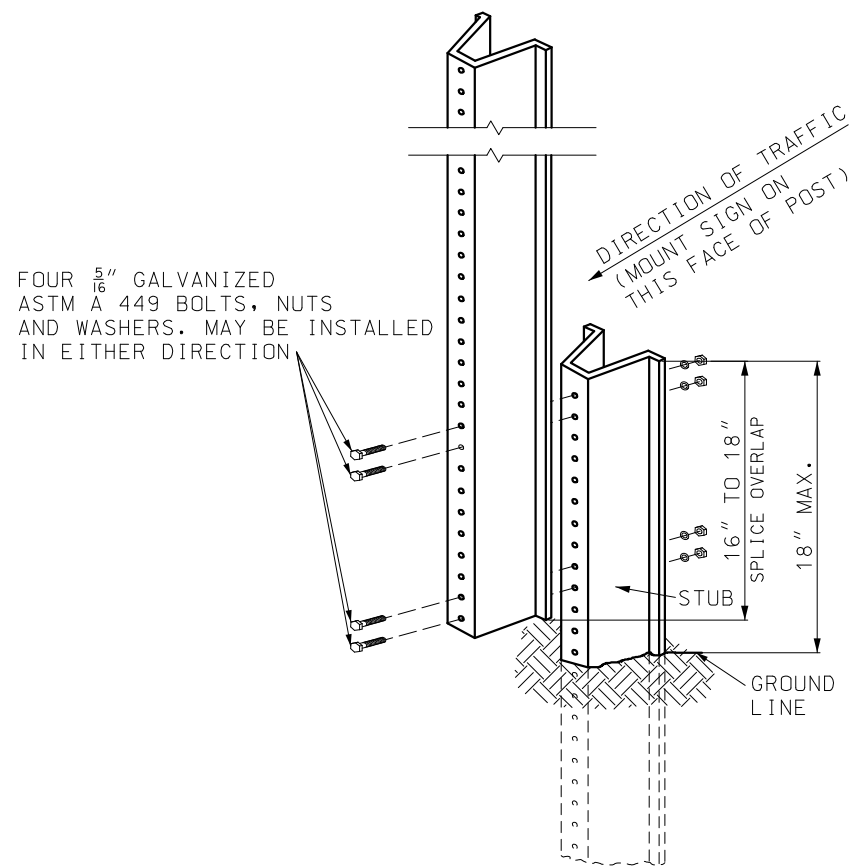
CONSTRUCTION SIGNS SHALL NOT BE LOCATED ON SIDEWALKS, BICYCLE LANES, OR AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE TRAFFIC.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	<b>TEMPORARY TRAFFIC CONTROL DEVICES SIGN MOUNTING REQUIREMENTS</b>
 <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small>	
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/12/2024	<b>616.10BE</b> SHEET NO. <b>1 OF 9</b>

POST TYPE

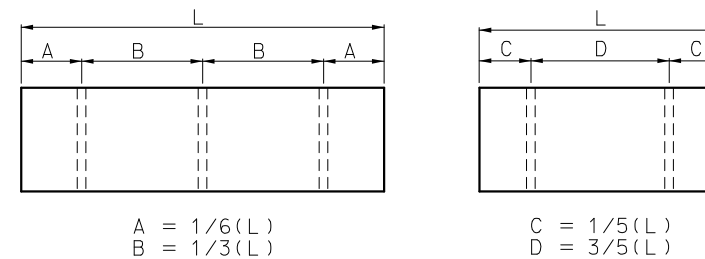
SIGN AREA (SQ.FT.)	U-CHANNEL	WOOD	PERFORATED SQUARE STEEL TUBING
≤ 10	1 - 3.0 LB./FT.*	1 - 4" X 4"*	1 - 2" 12 GA.*
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4"* 1 - 4" X 6"*	2 - 2" 12 GA. 1 - 2½" 12 GA.
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"	3 - 2" 12 GA.**
> 24 ≤ 32	3 - 3.0 LB./FT.	2 - 4" X 6"	N/A
> 30 ≤ 50	N/A	2 - 6" X 6"	N/A

\* SIGNS GREATER THAN 4 FEET IN WIDTH, EXCEPT DIAMOND SHAPE SIGNS, REQUIRE TWO POSTS.  
\*\* REQUIRES SLIP BASE PER MANUFACTURER'S RECOMMENDATION.



U-CHANNEL POST DETAIL

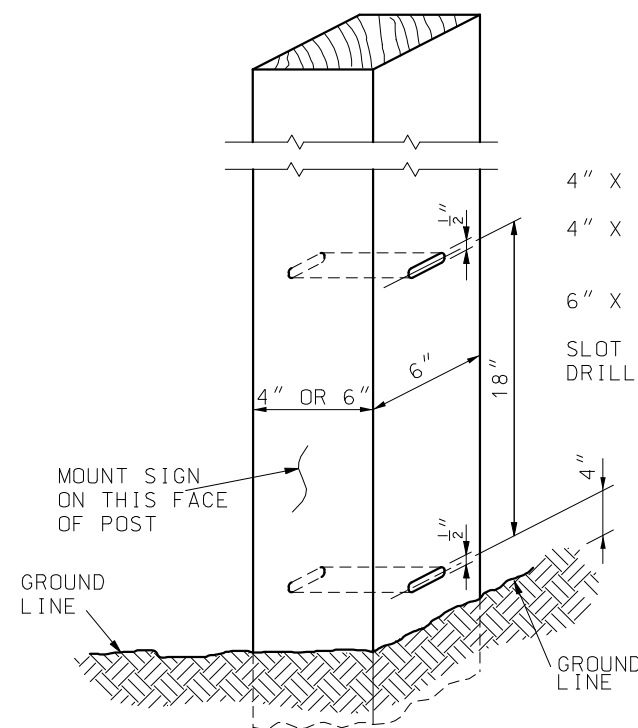
USE OF SPLICE IS OPTIONAL.  
SPLICE OVERLAP SHALL BE POSITION ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.  
ONLY ONE SPLICE WILL BE ALLOWED PER POST.



POST SPACING

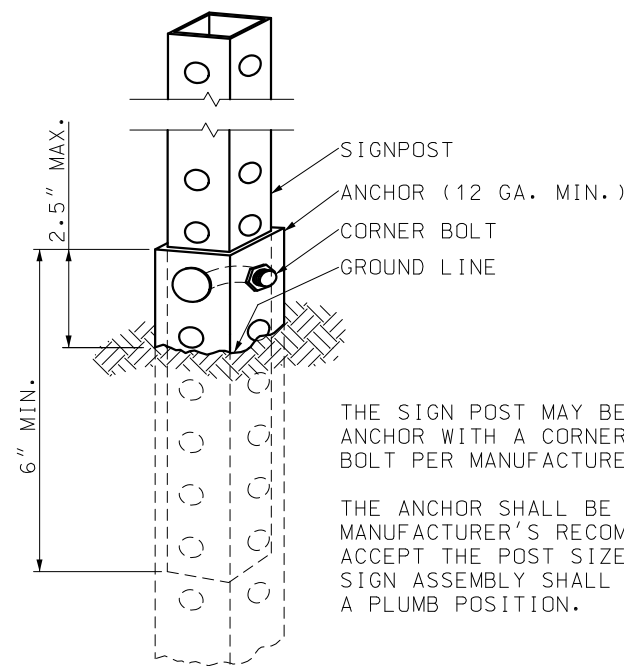
A = 1/6(L)  
B = 1/3(L)

C = 1/5(L)  
D = 3/5(L)



WOOD POST DETAIL

4" X 4" WOOD POST - NO SLOTS OR HOLES REQUIRED  
4" X 6" WOOD POST - 1½" X ½" SLOT ON 6" SIDE OR 1½" DIA. HOLE ON 6" SIDE  
6" X 6" WOOD POST - 2" X ½" SLOT OR 2" DIA. HOLE  
SLOT ACROSS NEUTRAL AXIS FORMED BY SUCCESSIVE DRILLING WITH ½" BIT.



PERFORATED SQUARE STEEL TUBE POST DETAIL

THE SIGN POST MAY BE ATTACHED TO THE ANCHOR WITH A CORNER BOLT OR STRAIGHT BOLT PER MANUFACTURER'S SPECIFICATION.  
THE ANCHOR SHALL BE SIZED AS PER MANUFACTURER'S RECOMMENDATIONS TO ACCEPT THE POST SIZE SPECIFIED. THE SIGN ASSEMBLY SHALL BE MAINTAINED IN A PLUMB POSITION.

GENERAL NOTES:

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET.

SIGN INSTALLATION DETAILS SHOWN SHALL APPLY TO ALL POSTS IN A MULTI-POST INSTALLATION.

AT THE ENGINEERS DISCRETION A FLUORESCENT PAINT SHALL BE APPLIED HEAVILY TO BOTH SIDES OF U-CHANNEL POST STUB FOR A LENGTH OF AT LEAST 6 INCHES BELOW THE TOP OF THE STUB.

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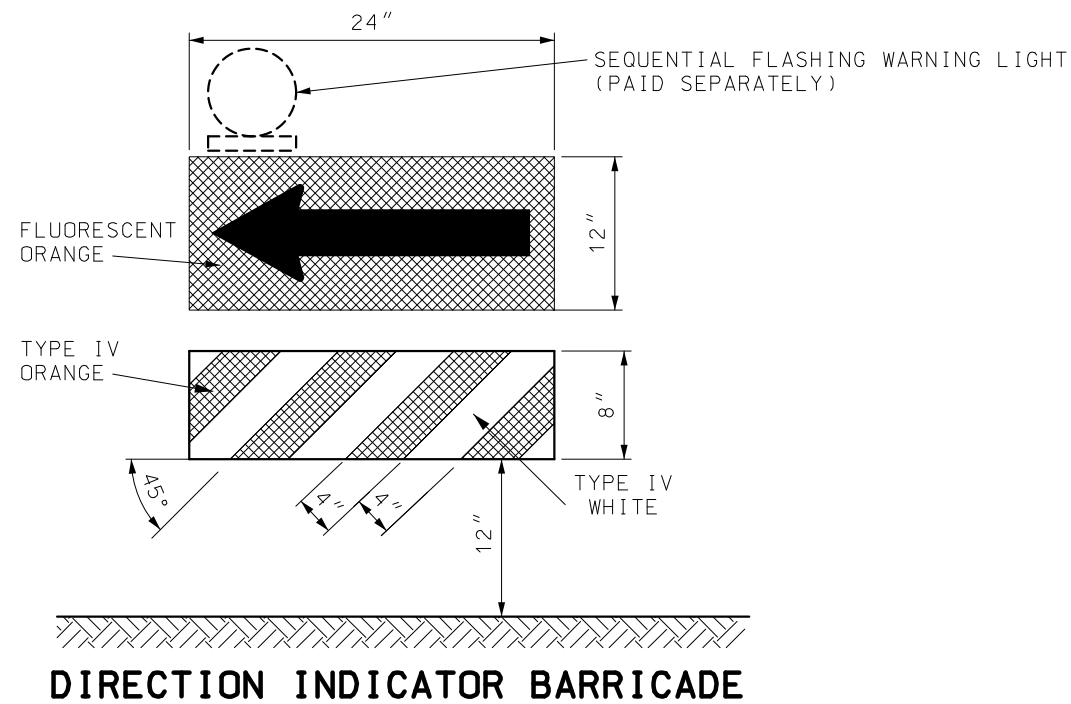
STATE OF MISSOURI  
KENNETH L. VOSS  
NUMBER PE-2002016747  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TEMPORARY TRAFFIC CONTROL DEVICES POST INSTALLATION DETAILS

DATE EFFECTIVE: 7/1/2024  
DATE PREPARED: 4/12/2024

616.10BE

SHEET NO. 2 OF 9

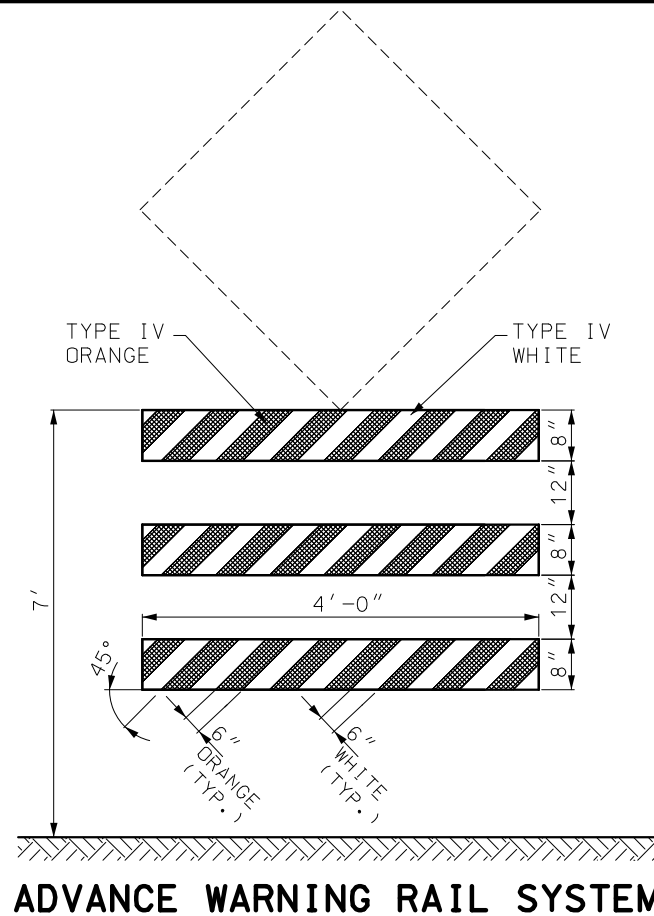


**DIRECTION INDICATOR BARRICADE**

VERTICAL DIMENSIONS DO NOT INCLUDE PROJECTIONS DESIGNED FOR EASE OF HANDLING.

DIRECTION INDICATOR BARRICADES SHALL NOT BE USED IN SHIFTING TAPERS UNLESS SHOWN ON THE PLANS.

THE PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.



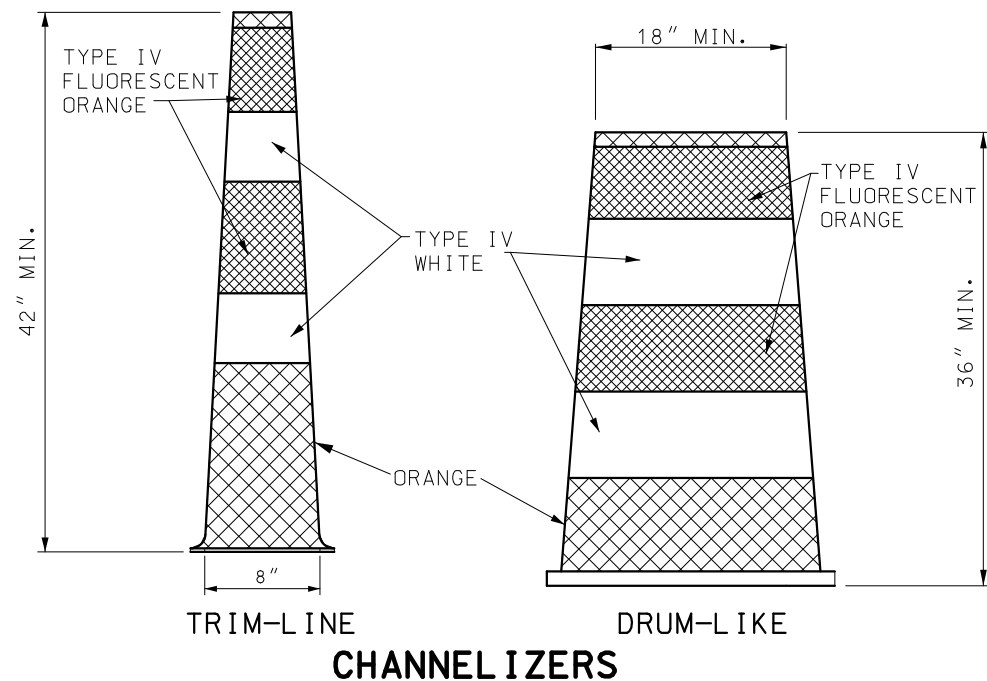
**ADVANCE WARNING RAIL SYSTEM**

MAXIMUM WEIGHT OF SIGN SHALL NOT EXCEED 25 LBS.

THE SIGN AND RAIL SYSTEM MAY BE MOUNTED AS TWO SEPARATE CRASHWORTHY DEVICES. THE RAIL SYSTEM SHALL BE LOCATED DIRECTLY IN FRONT OF THE SIGN WITH 7 TO 10 FEET SEPARATING THE TWO DEVICES.

WHERE MARKING IS NOT PROVIDED ON THE BACKSIDE, STRIPS OF 3" WIDE TYPE IV ORANGE SHEETING MAY BE APPLIED TO THE ENDS OF EACH RAIL TO HELP DELINEATE THE DEVICE.

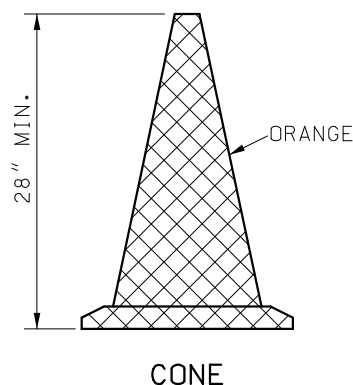
WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.4.



**TRIM-LINE CHANNELIZERS**

STRIPES ON TRIM-LINE CHANNELIZERS SHALL BE 6" TO 8". STRIPES ON DRUM-LIKE CHANNELIZERS SHALL BE 4" TO 6".

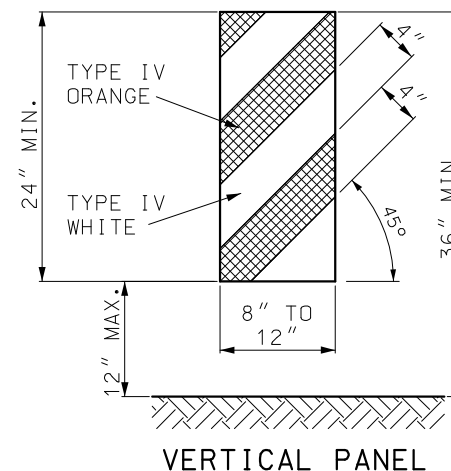
WHITE AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.3.



**CONE**

CONES SHALL MAINTAIN THEIR SHAPE UPON EXPOSURE TO NORMAL WORK CONDITIONS.

CONES SHALL BE USED DURING DAYLIGHT HOURS ONLY.



**VERTICAL PANEL**

VERTICAL PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.

**GENERAL NOTES:**

WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.

BALLAST FOR TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUFACTURERS' RECOMMENDATION FOR FIELD CONDITIONS WHEN APPLICABLE.

SEQUENTIAL FLASHING WARNING LIGHTS SHALL BE IN ACCORDANCE WITH SEC 1063.5.


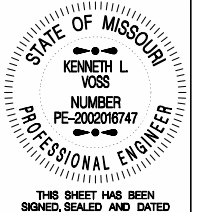
UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DRUM-LIKE CHANNELIZERS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONGITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA WHERE NO RAMPS, INTERSECTIONS OR LIMITED LATERAL CLEARANCE EXISTS.

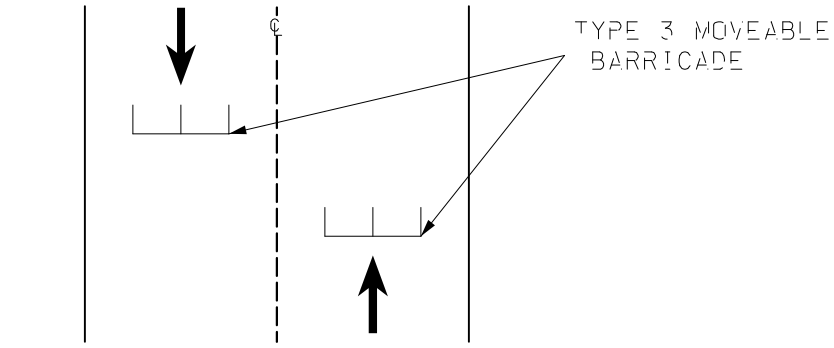
UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DIRECTION INDICATOR BARRICADES IN LIEU OF TRIM-LINE CHANNELIZERS IN MERGING TAPERS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE VERTICAL PANELS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONGITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE CONES IN LIEU OF TRIM-LINE CHANNELIZERS DURING DAYTIME OPERATIONS ON MINOR ROUTES.

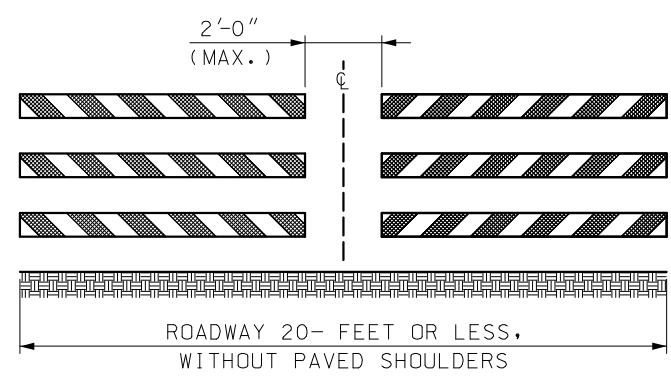
PANEL AND RAIL MARKINGS FOR TRAFFIC DELINEATION SHALL SLOPE DOWNWARD TOWARD THE INTENDED DIRECTION OF TRAVEL. ILLUSTRATIONS SHOWN ARE FOR INSTANCES WHERE TRAFFIC MOVES TO THE LEFT, REVERSE CONFIGURATIONS SHALL BE USED FOR TRAFFIC MOVEMENTS TO THE RIGHT. MARKINGS SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR PANEL, OR MAY BE APPLIED TO BOTH THE FRONT AND BACK PROVIDING THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.

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 <p>STATE OF MISSOURI KENNETH L. VOSS NUMBER PE-2002016747 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>TEMPORARY TRAFFIC CONTROL DEVICES CHANNELIZERS AND DIRECTION INDICATOR BARRICADE</b></p>
<p>DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/12/2024</p>	<p>616.10BE</p>
<p>SHEET NO. 3 OF 9</p>	

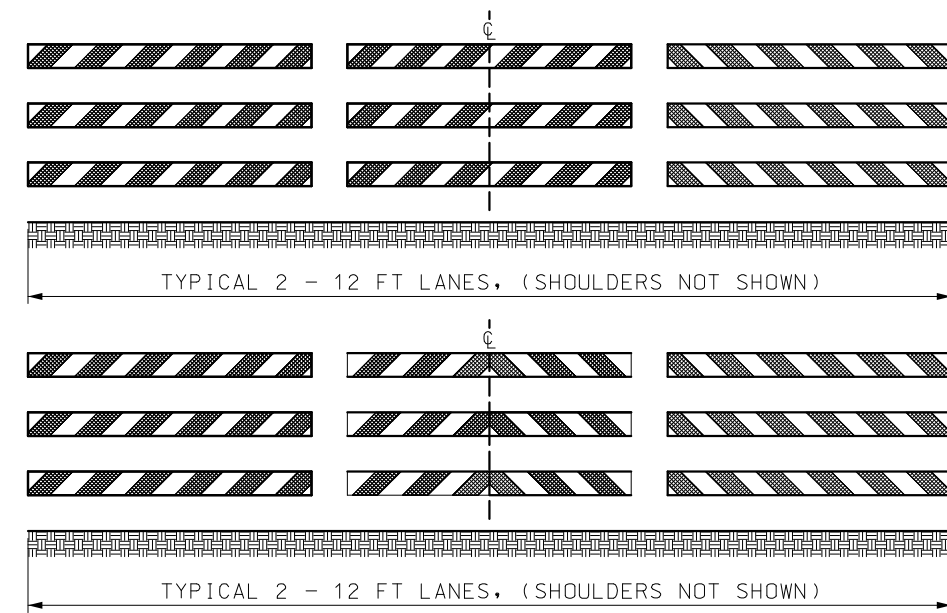


RETROREFLECTIVE MARKING ON TYPE 3 BARRICADES SHALL BE ON BOTH SIDES OF EACH RAIL AND DIRECT TRAFFIC MOVEMENT APPROPRIATELY TO ALLOW VEHICLES TO PASS THROUGH

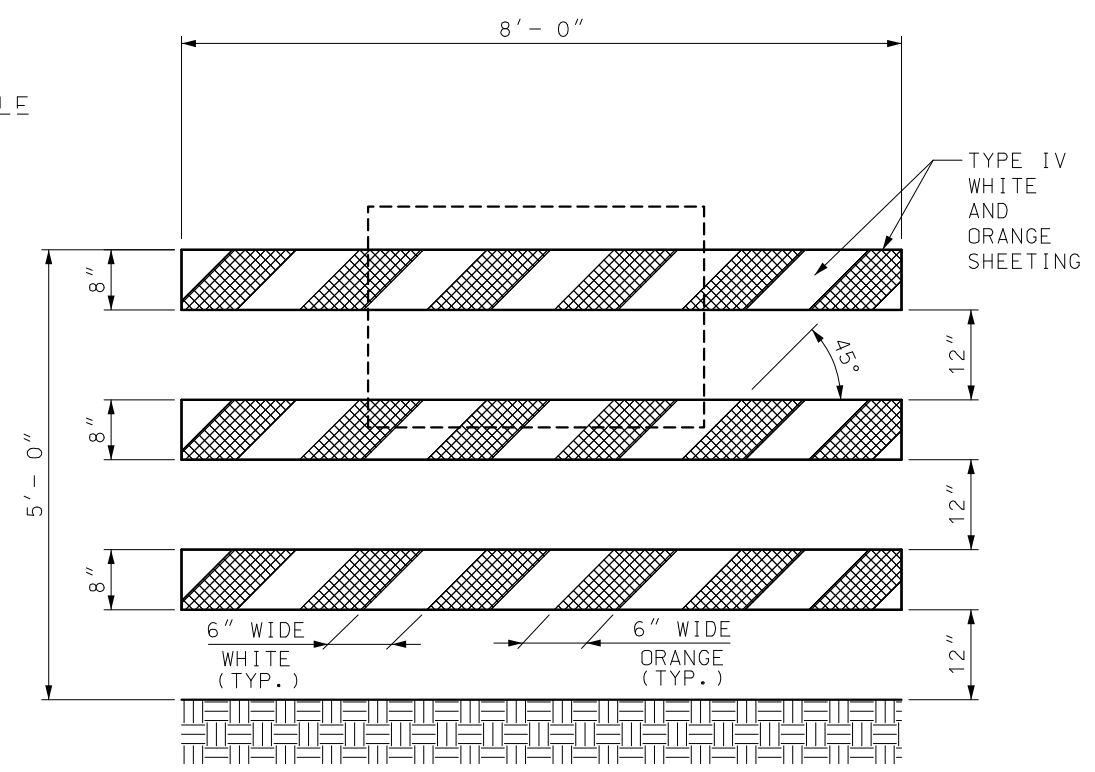
SOFT CLOSURE PLAN VIEW



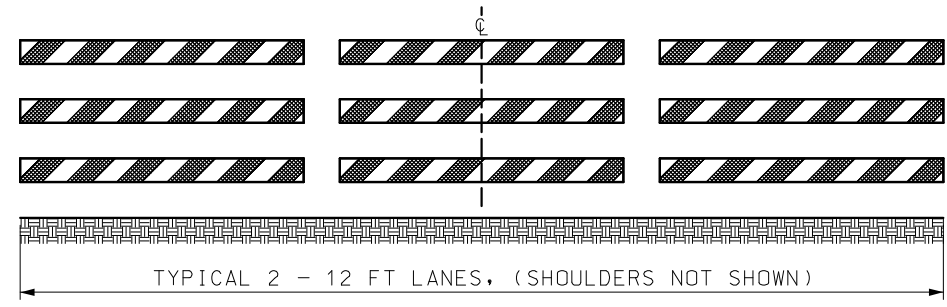
EXAMPLE 2



EXAMPLE 4

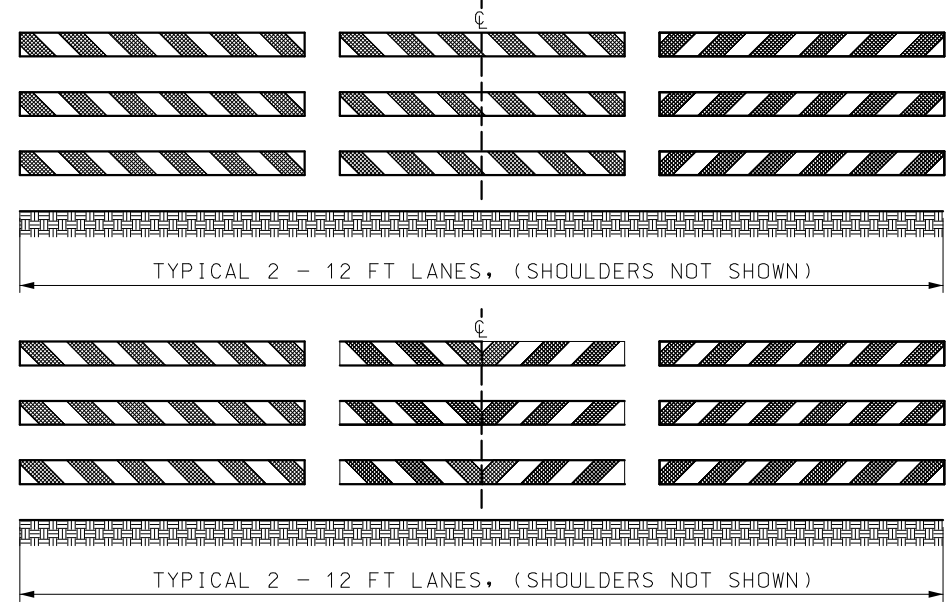


EXAMPLE 1



EXAMPLE SHOWS STRIPES SLOPING TO DIRECT VEHICULAR MOVEMENT TOWARD THE LEFT

EXAMPLE 3



EXAMPLE 5

EXAMPLE 1 – ONE TYPE 3 MOVABLE BARRICADE WILL BE REQUIRED TO COMPLETELY CLOSE EACH 8' OF PAVEMENT. PAVED SHOULDERS SHALL BE INCLUDED IN THE AREA TO BE CLOSED.

SIGNS SHALL BE LIGHT WEIGHT (ROLL-UP OR PLASTIC) AND SHOULD NOT OBSCURE MORE THAN 50 PERCENT OF THE TOP 2 RAILS OR 33 PERCENT OF ALL THREE RAILS.

IF SIGNS CANNOT MEET THE ABOVE REQUIREMENTS, THEY SHALL BE MOUNTED ON SEPARATE CRASHWORTHY DEVICES AT HEIGHTS SPECIFIED FOR POST MOUNTED SIGNS, LOCATED IN TABLE A ON SHEET 1. THE BARRICADE SHALL BE LOCATED IN FRONT OF THE SIGNS WITH 7 TO 10 FEET SEPARATING THE DEVICES.

TYPE 3 MOVABLE BARRICADES SHALL BE ENTIRELY FREE STANDING AND PORTABLE. MARKING SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR MAY BE APPLIED TO BOTH THE FRONT AND THE BACK OF EACH RAIL PROVIDED THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.

WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 104.2.7.4.

EXAMPLE 2 – FOR PAVED ROADWAYS WITH A WIDTH OF 20- FEET OR LESS AND WITHOUT PAVED SHOULDERS, TWO BARRICADES ARE ACCEPTABLE.

EXAMPLE 3 – WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

EXAMPLE 4 – WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, STRIPES SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES.

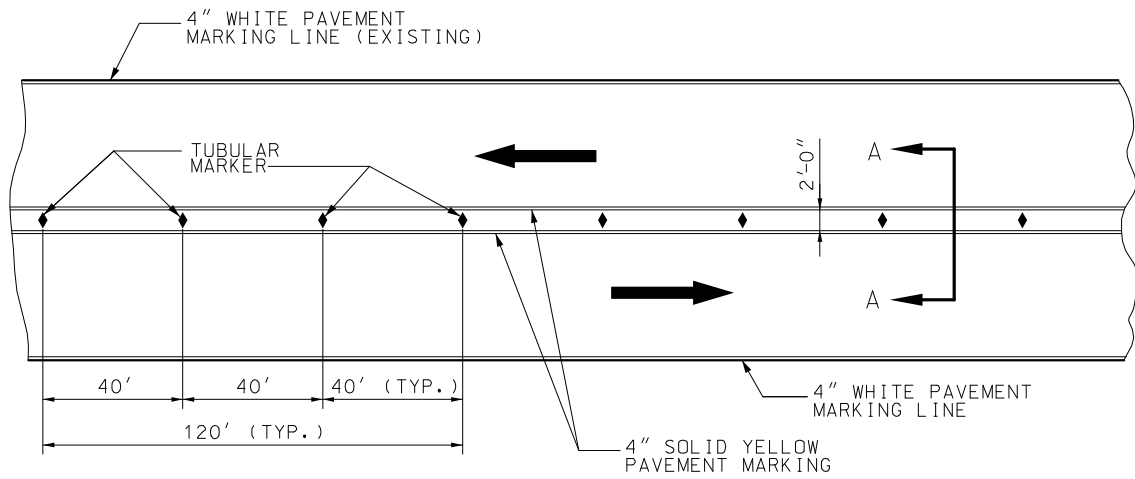
EXAMPLE 5 – WHERE NO TURNS ARE INTENDED, STRIPES POSITIONED TO SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

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

STATE OF MISSOURI  
 KENNETH L. VOSS  
 NUMBER PE-2002016747  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

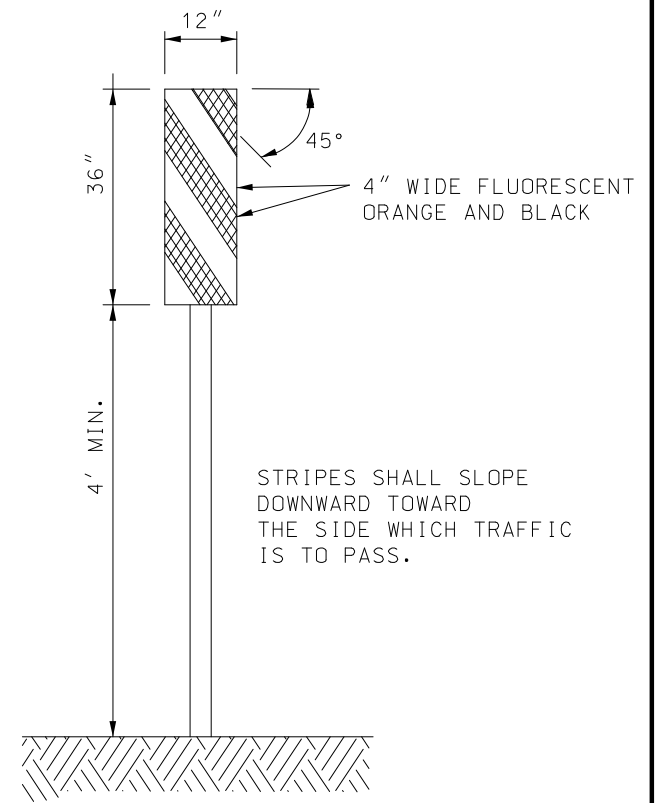
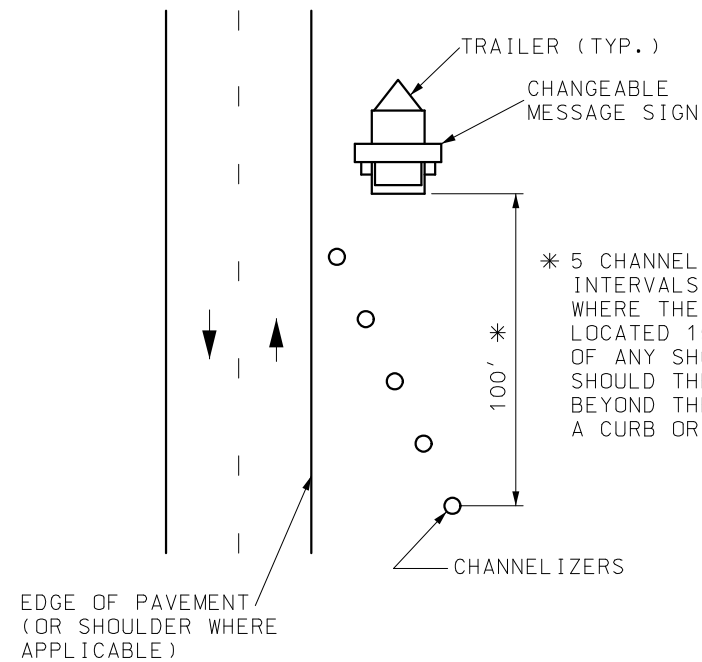
TEMPORARY TRAFFIC CONTROL DEVICES  
 TYPE 3 MOVABLE BARRICADE

DATE EFFECTIVE: 7/1/2024	616.10BE	SHEET NO. 4 OF 9
DATE PREPARED: 4/12/2024		

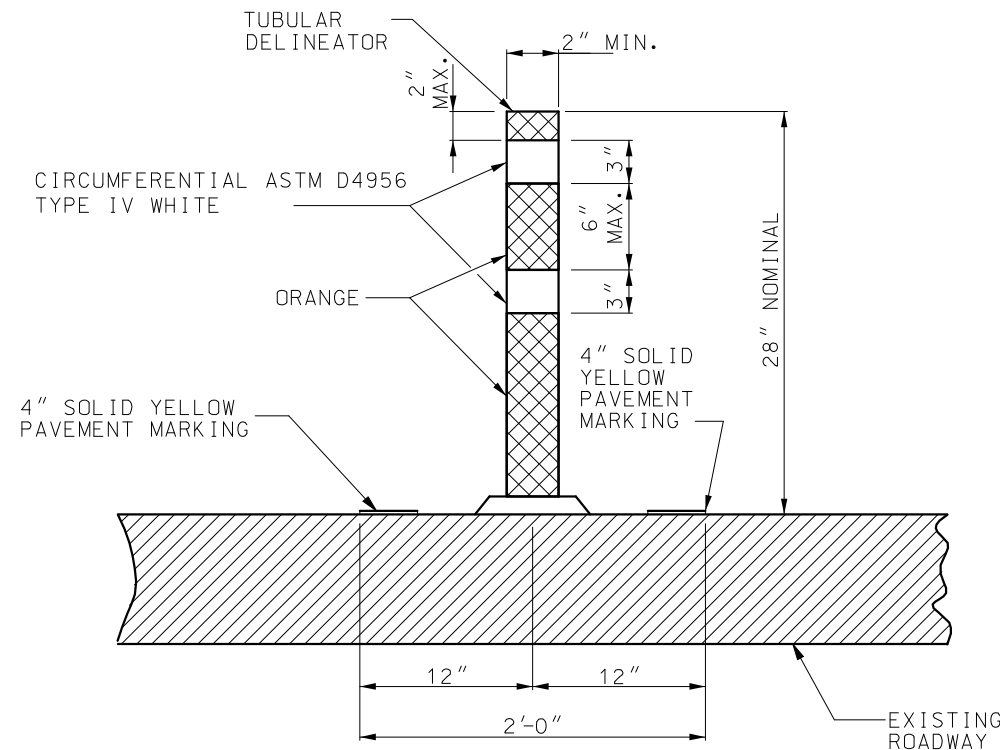


**TWO LANE / TWO WAY TRAFFIC DELINEATION PLAN FOR DIVIDED HIGHWAY**

IF RAISED PAVEMENT MARKERS ARE PRESENT, THE LENSES SHALL BE REMOVED OR COVERED TO THE SATISFACTION OF THE ENGINEER.



**TYPE 3 OBJECT MARKERS**  
FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.

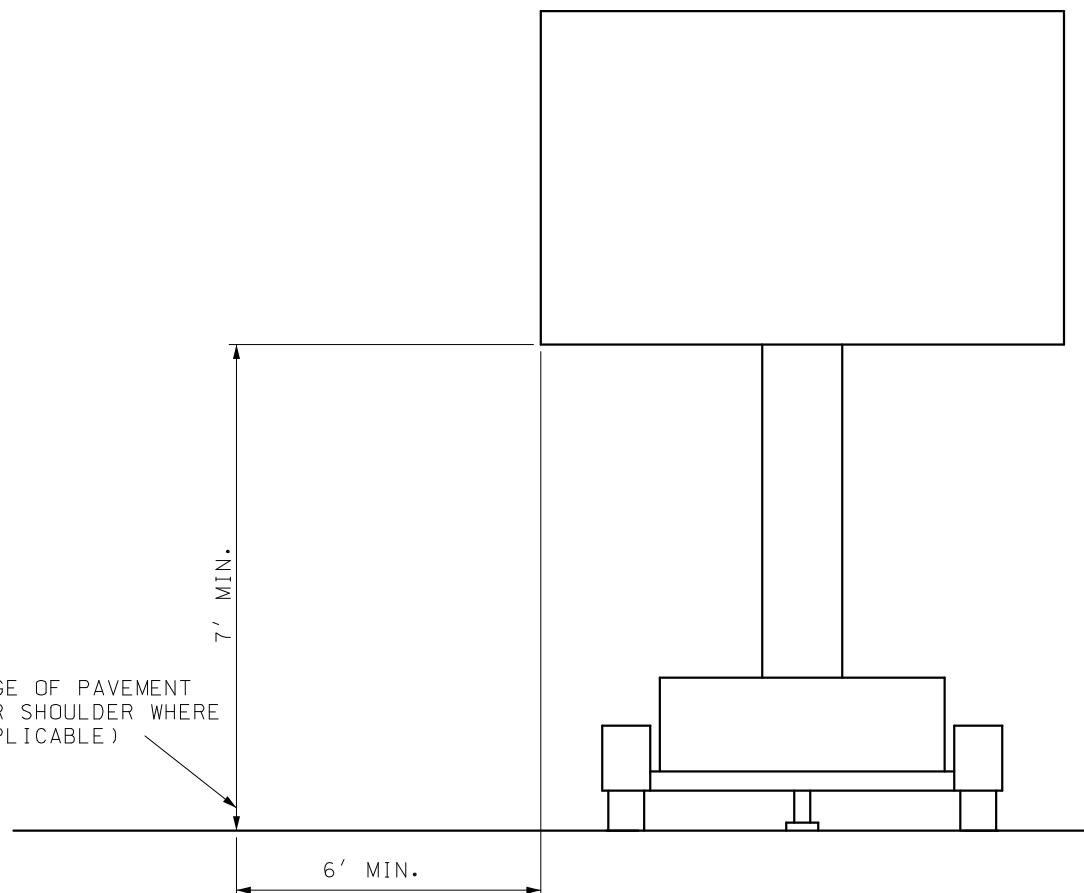


**SECTION A-A  
TUBULAR DELINEATOR DETAIL**



AN ADHESIVE, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, SHALL BE USED TO APPLY THE TUBULAR DELINEATOR TO THE ROADWAY SURFACE. THE ADHESIVE SHALL PERMIT EASY REMOVAL OF THE TUBULAR DELINEATOR WITHOUT DAMAGE TO THE ROADWAY SURFACE.

REFLECTIVE SHEETING APPLIED TO TUBULAR DELINEATORS SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.

EDGE OF PAVEMENT (OR SHOULDER WHERE APPLICABLE)



**CHANGEABLE MESSAGE SIGN**

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p align="center"><b>TEMPORARY TRAFFIC CONTROL DEVICES</b></p>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/12/2024	SHEET NO. <b>616.10BE</b> <b>5 OF 9</b>

SIGN	SIZE (IN.)	AREA (SQ. FT.)	SHEETING	COLOR		DESIGNATION (6)	DESCRIPTION
				SYM. LEG. BRD.	BACK- GROUND		
<b>WARNING SIGNS</b>							
W01-1L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TURN (SYMBOL LEFT)
W01-1R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TURN (SYMBOL RIGHT)
W01-2L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	CURVE (SYMBOL LEFT)
W01-2R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	CURVE (SYMBOL RIGHT)
W01-3L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE TURN (SYMBOL LEFT)
W01-3R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE TURN (SYMBOL RIGHT)
W01-4L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE CURVE (SYMBOL LEFT)
W01-4R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE CURVE (SYMBOL RIGHT)
W01-4bL	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE ARROW REVERSE CURVE (SYMBOL LEFT) (2)
W01-4bR	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE ARROW REVERSE CURVE (SYMBOL RIGHT) (2)
W01-4cL	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRIPLE ARROW REVERSE CURVE (SYMBOL LEFT) (2)
W01-4cR	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRIPLE ARROW REVERSE CURVE (SYMBOL RIGHT) (2)
W01-6	60X30	12.50	ASTM 9 OR 11	BK	FL. OR	SHF	HORIZONTAL ARROW (SYMBOL)
W01-6a	72X36	18.00	ASTM 9 OR 11	BK	FL. OR	SHF	HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE) (1)
W01-7	60X30	12.50	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL)
W01-7a	72X36	18.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE) (1)
W01-8	18X24	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	CHEVRON (SYMBOL)
W01-8a	30X36	7.50	ASTM 9 OR 11	BK	FL. OR	SHF	CHEVRON (SYMBOL FOR DIVIDED HIGHWAYS)
W03-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	STOP AHEAD (SYMBOL)
W03-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	YIELD AHEAD (SYMBOL)
W03-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SIGNAL AHEAD (SYMBOL)
W03-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BE PREPARED TO STOP
W03-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SPEED LIMIT AHEAD
W04-1L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (SYMBOL FROM LEFT)
W04-1R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (SYMBOL FROM RIGHT)
W04-1aL	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (LEFT) (3)
W04-1aR	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (RIGHT) (3)
W05-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD/BRIDGE/RAMP NARROWS (4)
W05-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ONE LANE BRIDGE
W05-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	NARROW LANES (3)
W06-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIVIDED HIGHWAY (SYMBOL)
W06-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIVIDED HIGHWAY END (SYMBOL)
W06-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TWO WAY TRAFFIC (SYMBOL)
W07-3a	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	NEXT XX MILES (PLAQUE)
W08-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BUMP
W08-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIP
W08-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	PAVEMENT ENDS
W08-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SOFT SHOULDER
W08-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SLIPPERY WHEN WET (SYMBOL)
W08-6	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRUCK CROSSING
W08-6c	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRUCK ENTRANCE (3)
W08-7a	36X36	9.00	ASTM 9 OR 11	BK	FL. OR	SHF	FRESH OIL / LOOSE GRAVEL (3)
W08-9	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW SHOULDER
W08-11	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	UNEVEN LANES
W08-12	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	NO CENTER LINE
W08-15	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	GROOVED PAVEMENT
W08-15P	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	MOTORCYCLE (PLAQUE)
W08-17L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP-OFF (SYMBOL LEFT)
W08-17R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP-OFF (SYMBOL RIGHT)
W08-17P	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP-OFF (PLAQUE)
W10-1	42 RND.	9.62	ASTM 9 OR 11	BK	FL. YL	SHF	RAILROAD CROSSING
W012-1	24X24	4.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE DOWN ARROW (SYMBOL)
W012-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE (SYMBOL)
W012-2x	24X18	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE (PLAQUE) (3)
W012-2a	84X24	14.00	ASTM 9 OR 11	BK	FL. OR	SHF	OVERHEAD LOW CLEARANCE (FEET AND INCHES) (3)
W012-4	120X60	50.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE XX FT XX IN XX MILES AHEAD (3)
W012-5	120X60	50.00	ASTM 9 OR 11	BK	FL. OR	SHF	WIDTH RESTRICTION XX FT XX IN XX MILES AHEAD (3)
W013-1	30X30	6.25	ASTM 9 OR 11	BK	FL. OR	SHF	ADVISORY SPEED (PLAQUE)
W016-2P	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	XXX FEET (PLAQUE)
W016-3P	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	X MILE (PLAQUE)
W020-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD/BRIDGE/RAMP WORK AHEAD (4)
W020-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR AHEAD
W020-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD CLOSED AHEAD
W020-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ONE LANE ROAD AHEAD
W020-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/CENTER/LEFT LANE CLOSED AHEAD (4)

- (1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA FOR SIGN DEPICTION. ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
- (5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.
- (6) SHF AND SH DESIGNATIONS, REFER TO STD. 903.02 SHEET 1 OF 8.


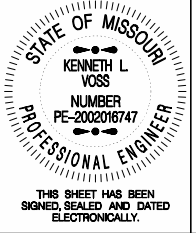
GENERAL NOTES:

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.

SIGN DIMENSIONS SHOWN ARE MINIMUM. NO ADDITIONAL PAYMENT WILL BE MADE IF CONTRACTORS USE LARGER SIGNS.

NO ADDITIONAL PAYMENT WILL BE MADE FOR PLATES.

ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	<b>TEMPORARY TRAFFIC CONTROL DEVICES WARNING SIGNS</b>	
	 <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small>	DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/12/2024

SIGN	SIZE (IN.)	AREA (SQ. FT.)	SHEETING	COLOR		DESIGNATION (6)	DESCRIPTION
				SYM. LEG. BRD.	BACK- GROUND		
WARNING SIGNS CONT.							
WO20-5a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	2 RIGHT/CENTER/LEFT LANES CLOSED AHEAD (4)
WO20-6a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/CENTER/LEFT LANE CLOSED (3)(4)
WO20-7	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	FLAGGER (SYMBOL)
WO21-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER WORK / SHOULDER WORK AHEAD (3)
WO21-5a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/LEFT SHOULDER CLOSED (4)
WO21-5b	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/LEFT SHOULDER CLOSED AHEAD (4)
WO22-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BLASTING ZONE AHEAD
WO22-2	42X36	10.50	ASTM 9 OR 11	BK	FL. OR	SHF	TURN OFF 2-WAY RADIO AND PHONE
WO22-3	42X36	10.50	ASTM 9 OR 11	BK	FL. OR	SHF	END BLASTING ZONE
GO22-1	15X21	2.19	ASTM 9 OR 11	BK	FL. OR	SHF	WET PAINT (ARROW PIVOTS) (3)
GUIDE SIGNS							
E05-1	36X48	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	GORE EXIT (3)
E05-2	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	EXIT OPEN
E05-2a	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	EXIT CLOSED
GO20-1	60X24	10.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD WORK NEXT XX MILES
GO20-2	48X24	8.00	ASTM 9 OR 11	BK	FL. OR	SHF	END ROAD WORK
GO20-4	36X18	4.50	ASTM 9 OR 11	BK	FL. OR	SHF	PILOT CAR FOLLOW ME - REAR VEHICLE MOUNT SIGN
GO20-4a	42X30	8.75	ASTM 9 OR 11	BK	FL. OR	SHF	PILOT CAR IN USE WAIT & FOLLOW - STATE ROUTE SIGN
GO20-4a	18X12	1.50	ASTM 9 OR 11	BK	FL. OR	SHF	PILOT CAR IN USE WAIT & FOLLOW - NON-STATE ROUTE SIGN
GO20-5aP	36X24	6.00	ASTM 9 OR 11	BK	FL. OR	SHF	WORK ZONE (PLAQUE) (3)(5)
MO4-8a	24X18	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	END DETOUR
MO4-9L	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (LEFT)
MO4-9R	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (RIGHT)
MO4-9P	48X12	4.00	ASTM 9 OR 11	BK	FL. OR	SHF	STREET NAME (PLAQUE)
MO4-10L	48X18	6.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR ARROW (LEFT)
MO4-10R	48X18	6.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR ARROW (RIGHT)
REGULATORY SIGNS							
R1-1	48X48	13.25	ASTM 4	WH	RD	SH	STOP
R1-2	48 TRI.	6.93	ASTM 4	RD	WH	SH	YIELD
R1-2aP	36X36	9.00	ASTM 4	BK	WH	SH	TO ONCOMING TRAFFIC (PLAQUE)
R1-3P	30X12	2.50	ASTM 4	WH	RD	SH	ALL WAY (PLAQUE)
R2-1	36X48	12.00	ASTM 4	BK	WH	SH	SPEED LIMIT XX
R3-1	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO RIGHT TURN (SYMBOL)
R3-2	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO LEFT TURN (SYMBOL)
R3-3	36X36	9.00	ASTM 4	BK	WH	SH	NO TURNS
R3-4	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO U-TURN (SYMBOL)
R3-7L	30X30	6.25	ASTM 4	BK	WH	SH	LEFT LANE MUST TURN LEFT
R3-7R	30X30	6.25	ASTM 4	BK	WH	SH	RIGHT LANE MUST TURN RIGHT
R4-1	36X48	12.00	ASTM 4	BK	WH	SH	DO NOT PASS
R4-2	36X48	12.00	ASTM 4	BK	WH	SH	PASS WITH CARE
R4-7a	36X48	12.00	ASTM 4	BK	WH	SH	KEEP RIGHT (HORIZONTAL ARROW)
R4-8a	36X48	12.00	ASTM 4	BK	WH	SH	KEEP LEFT (HORIZONTAL ARROW)
R5-1	30X30	6.25	ASTM 4	RD	WH	SH	DO NOT ENTER
R5-1a	36X24	6.00	ASTM 4	WH	RD	SH	WRONG WAY
R6-1L	54X18	6.75	ASTM 4	BK	WH	SH	ONE WAY ARROW (LEFT)
R6-1R	54X18	6.75	ASTM 4	BK	WH	SH	ONE WAY ARROW (RIGHT)
R6-2L	24X30	5.00	ASTM 4	BK	WH	SH	ONE WAY (LEFT)
R6-2R	24X30	5.00	ASTM 4	BK	WH	SH	ONE WAY (RIGHT)
R9-9	24X12	2.00	ASTM 4	BK	WH	SH	SIDEWALK CLOSED
R9-11L	24X18	3.00	ASTM 4	BK	WH	SH	SIDEWALK CLOSED AHEAD (LEFT ARROW) CROSS HERE
R9-11R	24X18	3.00	ASTM 4	BK	WH	SH	SIDEWALK CLOSED AHEAD (RIGHT ARROW) CROSS HERE
R10-6	24X36	6.00	ASTM 4	BK	WH	SH	STOP HERE ON RED (45° ARROW)
R11-2	48X30	10.00	ASTM 4	BK	WH	SH	ROAD CLOSED
R11-3a	60X30	12.50	ASTM 4	BK	WH	SH	ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY
R11-4	60X30	12.50	ASTM 4	BK	WH	SH	ROAD CLOSED TO THRU TRAFFIC
CONST-3A	60X48	20.00	ASTM 4	BK	WH/FL. OR	SH	FINE SIGN (3)
CONST-3X	56X12	4.67	ASTM 4	BK	WH	SH	SPEEDING/PASSING (PLATE) (3)
MISCELLANEOUS SIGNS							
CONST-5	48X36	12.00	ASTM 4	WH	BL	SH	POINT OF PRESENCE
CONST-5	96X48	32.00	ASTM 4	WH	BL	SH	POINT OF PRESENCE
CONST-8	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	WORK ZONE NO PHONE ZONE

- (1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA FOR SIGN DEPICTION. ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
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- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
- (5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.
- (6) SHF AND SH DESIGNATIONS, REFER TO STD. 903.02 SHEET 1 OF 8.


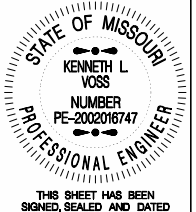
GENERAL NOTES:

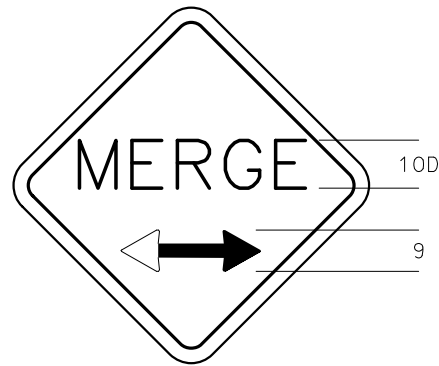
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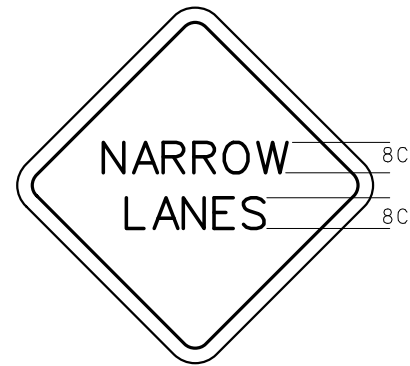
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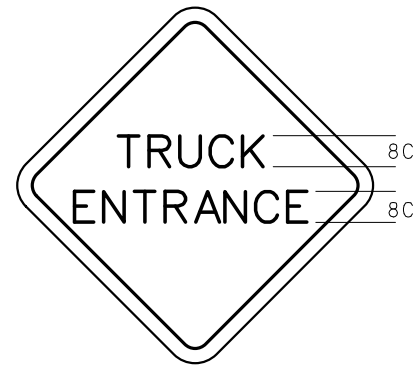
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TEMPORARY TRAFFIC CONTROL DEVICES WARNING, GUIDE AND REGULATORY SIGNS</b>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/12/2024	<b>616.10BE</b> SHEET NO. <b>7 OF 9</b>



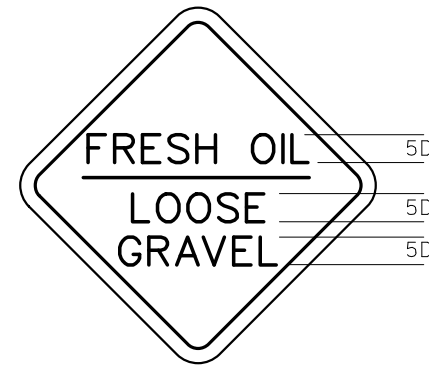
W04-1a



W05-5 (3)



W08-6c (3)



W08-7a (3)

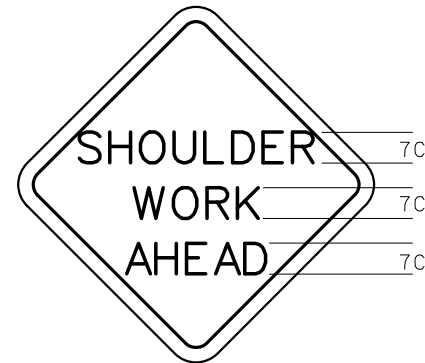
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- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
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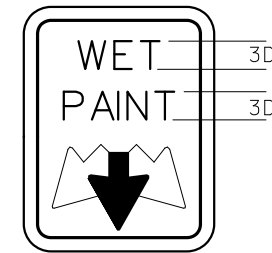
W012-4 (3)



W020-6a (3)(4)



W021-5 (3)

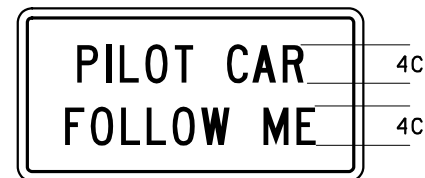


G022-1 (3)

\* SHALL ONLY BE USED AT PRIVATE AND COMMERCIAL ENTRANCES TO ENHANCE THE WORK ZONE SIGNING AND WILL NOT BE PERMITTED FOR USE ON INTERSECTING STATE, COUNTY OR CITY ROADS. SIGN SHALL BE PRINTED ON 4MM CORRUGATED PLASTIC OR SIMILAR AND SUPPORTED WITH A 10"x30" 9-GAUGE GALVANIZED STEEL H-FRAME OR SIMILAR. COST OF SIGNS AND STANDS IS INCIDENTAL TO OTHER TRAFFIC CONTROL ITEMS.



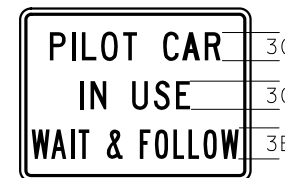
W012-5 (3)



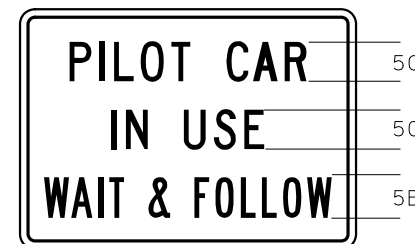
G020-4 (3)



18X12  
NON-STATE ROUTE



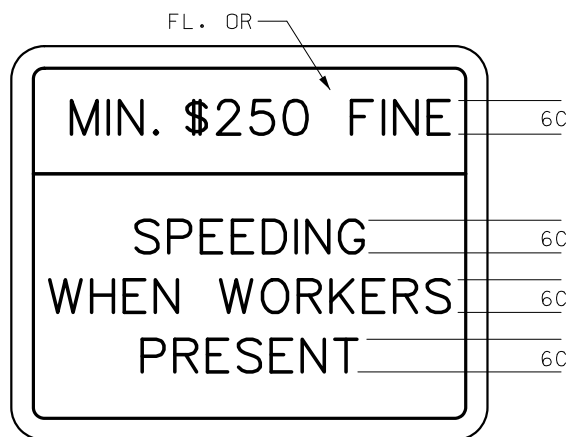
24X18 \*  
ENTRANCE



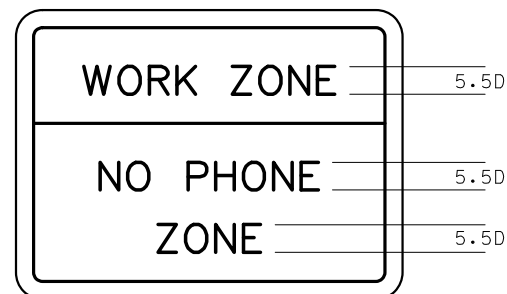
42X30  
STATE ROUTE

G020-4a (3)

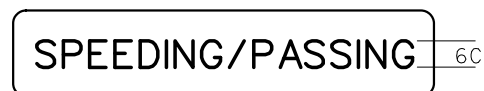
GENERAL NOTES:  
SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.  
SIGN DIMENSIONS SHOWN ARE MINIMUM. NO ADDITIONAL PAYMENT WILL BE MADE IF CONTRACTORS USE LARGER SIGNS.  
NO ADDITIONAL PAYMENT WILL BE MADE FOR PLATES.  
ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.  
LETTER DIMENSIONS SHALL BE AS SHOWN.




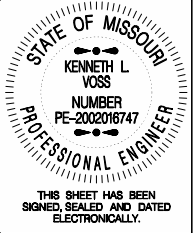
CONST-3A (3)



CONST-8 (3)



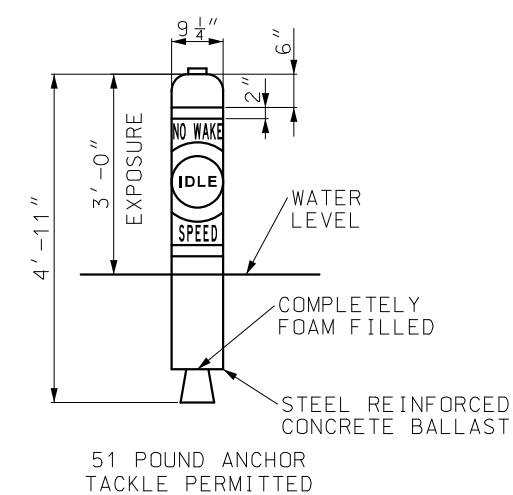
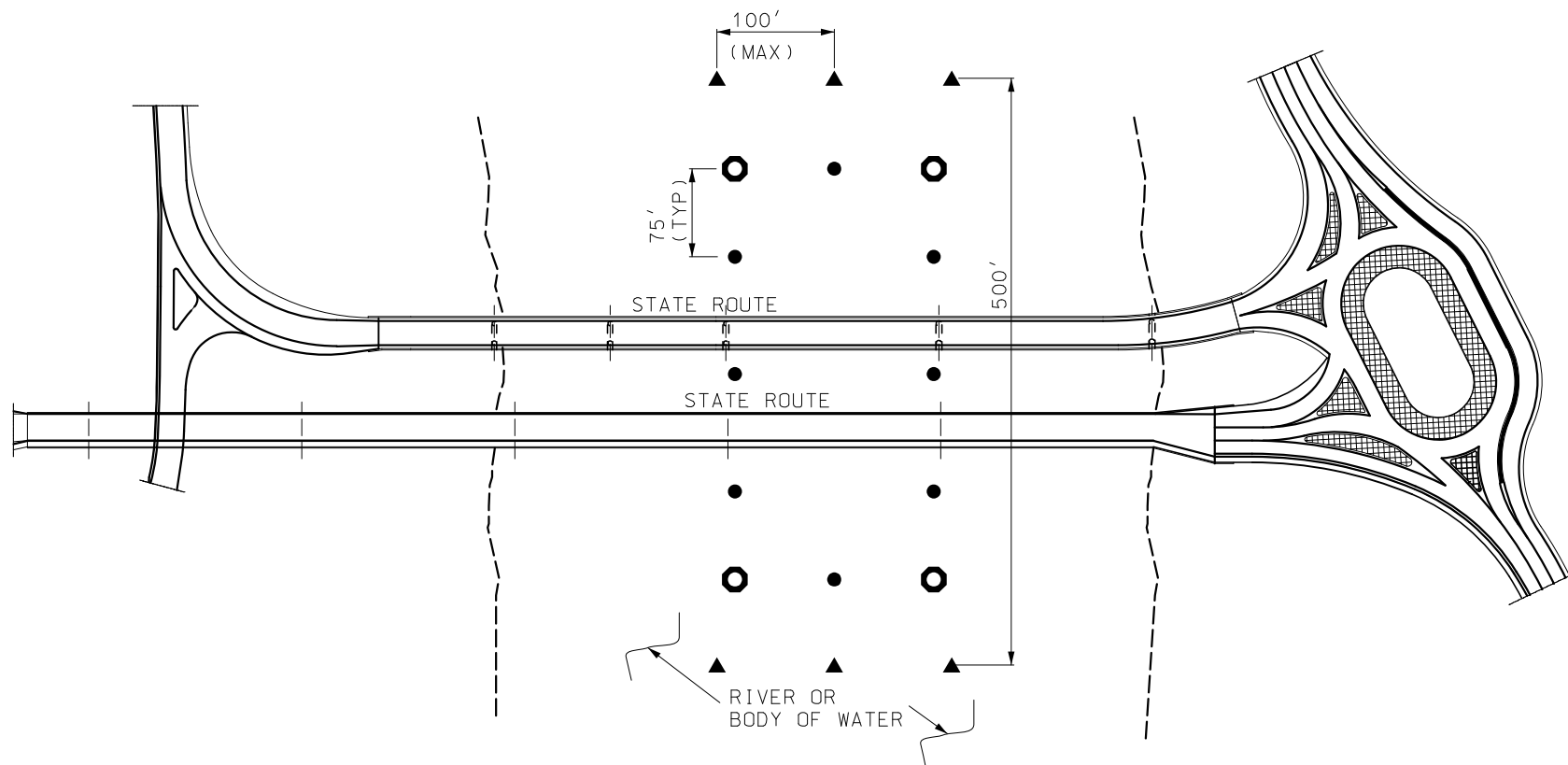
CONST-3X (3)

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TEMPORARY TRAFFIC CONTROL DEVICES</b>
DATE EFFECTIVE: 7/1/2024 DATE PREPARED: 4/12/2024	SHEET NO. <b>616.10BE</b> <b>8 OF 9</b>

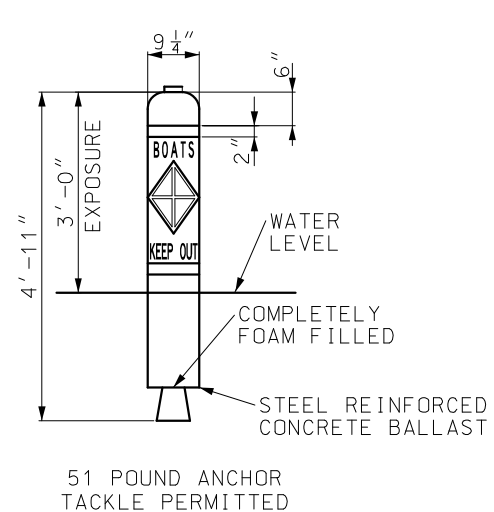


**LEGEND**

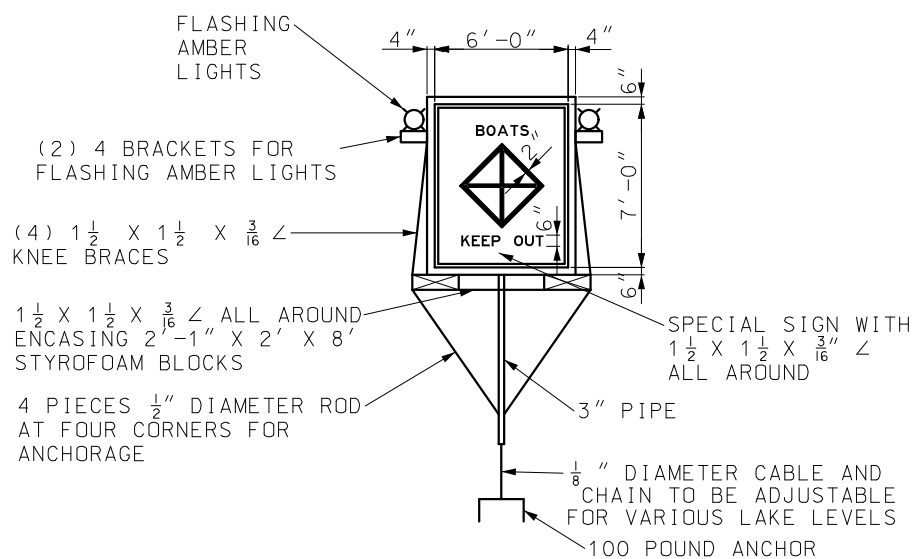
- - BOATS KEEP OUT (SIGN)
- - BOATS KEEP OUT (BUOY)
- ▲ - NO WAKE (BUOY)



**RESTRICTED AREA BUOY**  
("NO WAKE")  
(6 REQUIRED - ROADWAY ITEM)



**CONTROLLED AREA BUOY**  
("BOATS KEEP OUT")  
(8 REQUIRED - ROADWAY ITEM)



**SPECIAL SIGN ASSEMBLY**  
("BOATS KEEP OUT")  
(4 REQUIRED - ROADWAY ITEM)

**GENERAL NOTES:**

INFORMATION SHOWN IS SCHEMATIC ONLY. FINAL LOCATION AND NUMBER OF SIGNS AND BUOYS IS SUBJECT TO APPROVAL OF MISSOURI STATE WATER PATROL

THE DETAILS SHOWN ARE FOR BIDDING PURPOSES ONLY. ALL MATERIALS AND LABOR NECESSARY TO INSTALL AND REMOVE

SIGNS SHALL BE INCIDENTAL TO OTHER ITEMS

THE CONTRACTOR IS RESPONSIBLE FOR BUOY MAINTENANCE THROUGHOUT CONSTRUCTION AND FOR DETERMINING ANTICIPATED WATER LEVELS DURING CONSTRUCTION. EACH SIGN AND BUOY SHALL BE ANCHORED TO BOTTOM OF LAKE.

SIGNS SHALL BE DOUBLE FACED

EACH SIGN SHALL BE EQUIPPED WITH TWO (2) FLASHING LIGHT UNITS WITH AMBER LENS. FLASHING LIGHT UNITS SHALL BE FURNISHED AND MAINTAINED BY THE CONTRACTOR

ALL LETTERING TO BE BLACK IN COLOR IN BLOCK FORM.

FOR OTHER INFORMATION AND LOCATION OF SIGNS AND BUOYS SEE SPECIAL PROVISIONS.

SCHEMATIC SHOWN IS FOR ONE NAVIGATIONAL SPAN. FOR WORK ON OTHER SPANS MOVE APPROPRIATE SIGNS WITH NO DIRECT PAY

**COLOR:**  
BACKGROUND - WHITE  
LEGEND - BLACK  
2" REFLECTIVE BAND AND SYMBOL - INTERNATIONAL ORANGE

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

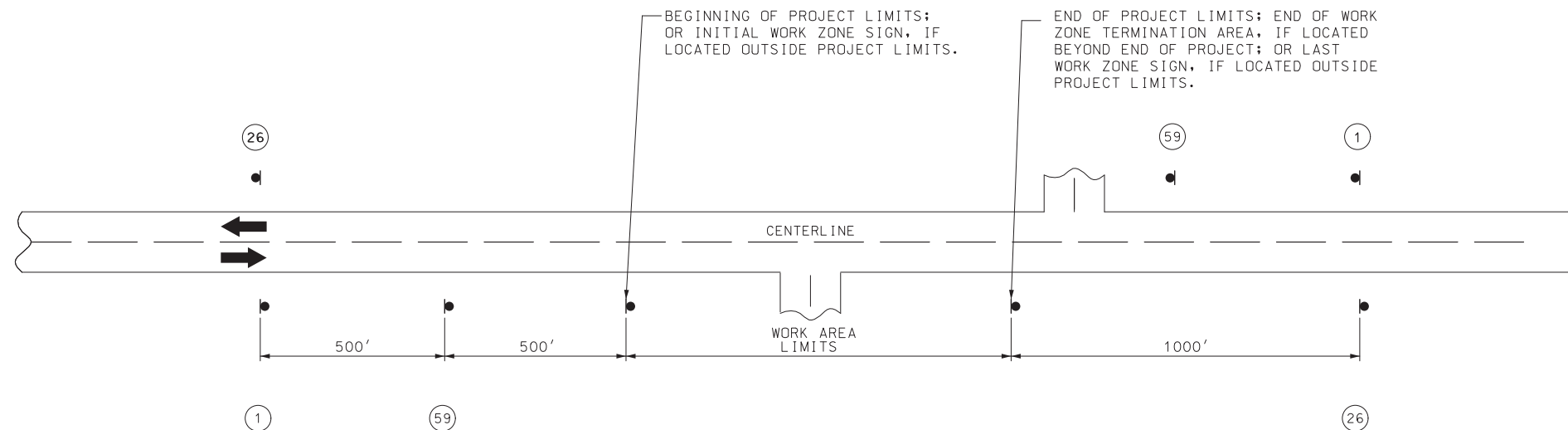
STATE OF MISSOURI  
KENNETH L. VOSS  
NUMBER PE-2002016747  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TEMPORARY TRAFFIC CONTROL DEVICES**  
**TRAFFIC CONTROL FOR WATERWAYS**

DATE EFFECTIVE: 7/1/2024  
DATE PREPARED: 4/12/2024

616.10BE

SHEET NO.  
9 OF 9

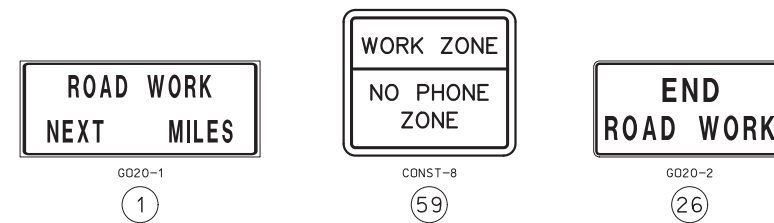


NOTES:

SIGN 1 AND 26 ARE ONLY USED ON PROJECT LENGTHS 2 MILES OR GREATER.

PROVIDE SIGNS IN EACH DIRECTION ON TWO-WAY HIGHWAY.

DISTANCE MAY BE ADJUSTED ACCORDING TO FIELD CONDITIONS.



THIS TEMPORARY TRAFFIC CONTROL IS FOR USE ON THE FOLLOWING PAVEMENT TREATMENT PROJECTS AND IS NOT INTENDED FOR USE WHEN ADDITIONAL CONSTRUCTION ITEMS SUCH AS SHOULDER WIDENING, PIPE REPLACEMENT OR EXTENSIONS, GUARDRAIL CONSTRUCTION OR REPAIR, AND/OR SIGN INSTALLATIONS ARE PART OF THE PROJECT:

- ASPHALTIC RESURFACING (SECTIONS 401 AND 402)
- SEAL COAT
- SCRUB SEAL/SAND SEAL

NOT TO SCALE

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI KENNETH L. VOSS NUMBER PE-2002016747 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>TEMPORARY TRAFFIC CONTROL PLANS</b></p> <p>PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS</p>
DATE EFFECTIVE: 10/1/2024 DATE PREPARED: 7/11/2024	<p><b>616.20D</b></p>
SHEET NO. <b>1 OF 5</b>	



W020-1

2



W020-4

7



W020-7a

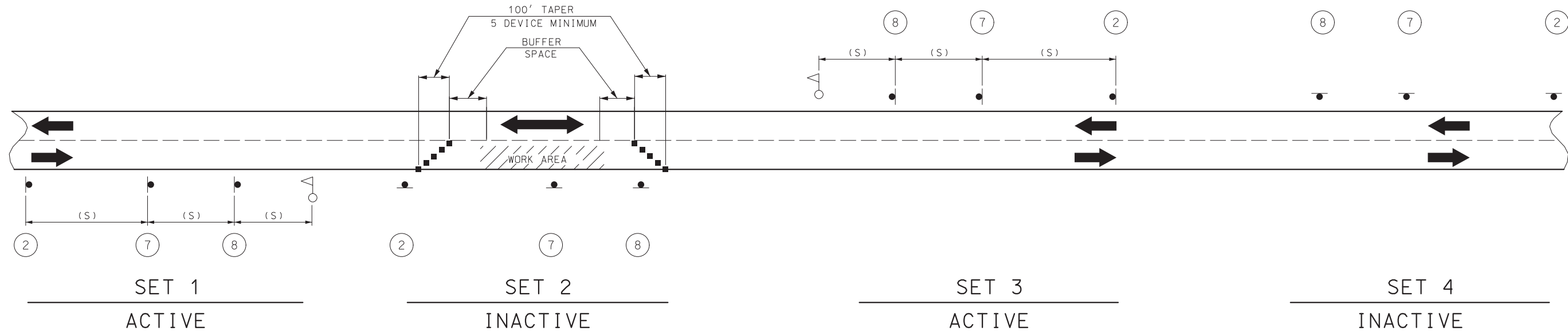
8



G020-4

53

SIGN 53, "PILOT CAR FOLLOW ME" SHALL BE THE CONTRACTOR'S RESPONSIBILITY WHEN IN USE DURING OPERATION.



NOTES:

THIS PLAN IS FOR DAYLIGHT FLAGGING OPERATIONS ONLY. WHEN NIGHT WORK IS REQUIRED, OR OTHERWISE ALLOWED BY THE ENGINEER, WORK ZONE LIGHTING SHALL BE PROVIDED IN ACCORDANCE WITH SEC 616.5.2.

CHANNELIZING DEVICES LOCATED DOWNSTREAM OF THE ONE-LANE, TWO-WAY TAPER ARE OPTIONAL. THESE DEVICES SHOULD BE ELIMINATED WHEN THEIR USE WILL REDUCE THE USABLE LANE WIDTH, INCLUDING ANY ACCEPTABLE SHOULDERS, TO LESS THAN 10' OR WILL SIGNIFICANTLY AFFECT THE RESURFACING OPERATION.

SIGN SETS 1 AND 3 ARE ACTIVE AND (I.E., SIGNS FACE ONCOMING TRAFFIC) SIGN SETS 2 AND 4 ARE INACTIVE (I.E., SIGNS DO NOT FACE EITHER DIRECTION OF TRAFFIC) WHEN THE RESURFACING OPERATION IS LOCATED BETWEEN SIGN SETS 1 AND 3.

WHEN SIGN SETS 2 AND 4 ARE ACTIVE, SIGN SETS 1 AND 3 BECOME INACTIVE AND ARE ADVANCED TO BECOME SETS 2 AND 4 WITH SIGN LEGENDS TURNED AWAY FROM BOTH DIRECTIONS OF TRAFFIC. WHEN THE RESURFACING OPERATION ADVANCES TO BETWEEN SIGN SETS 2 AND 4, SIGN SETS 2 AND 4 BECOME ACTIVE (I.E., NEW SIGN SETS 1 AND 3) AND SIGN SETS 1 AND 3 ADVANCED IN THE DIRECTION OF THE OPERATION (I.E., NEW SIGN SETS 2 AND 4).

■ - CHANNELIZERS

○ - FLAGGER

SPEED	SIGN SPACING (FT) (1)	BUFFER SPACE LENGTH (FT)
0-35	200	250
40-45	350	360
50-55	500	495
60-70	1000	730

(1) SPACING BETWEEN SIGNS, BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER OR SIGNED CONDITION.

SPACING MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.

NOT TO SCALE

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

**TEMPORARY TRAFFIC CONTROL PLANS**  
 PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

STATE OF MISSOURI  
 KENNETH L. VOSS  
 NUMBER PE-2002016747  
 PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10/1/2024  
 DATE PREPARED: 7/11/2024

**616.20D**

SHEET NO. 2 OF 5

SPEED	SIGN SPACING (FT) (1)	CHANNELIZER SPACING (FT)
PERMANENT POSTED (MPH)	NON-DIVIDED HIGHWAYS (S)	BUFFER/ WORK AREA (TYP.)
0-35	200	40
40-45	350	80
50-55	500	80
60-70	1000	120

(1) SPACING BETWEEN SIGNS, BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER OR SIGNED CONDITION.

SPACING MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.

NOTES:

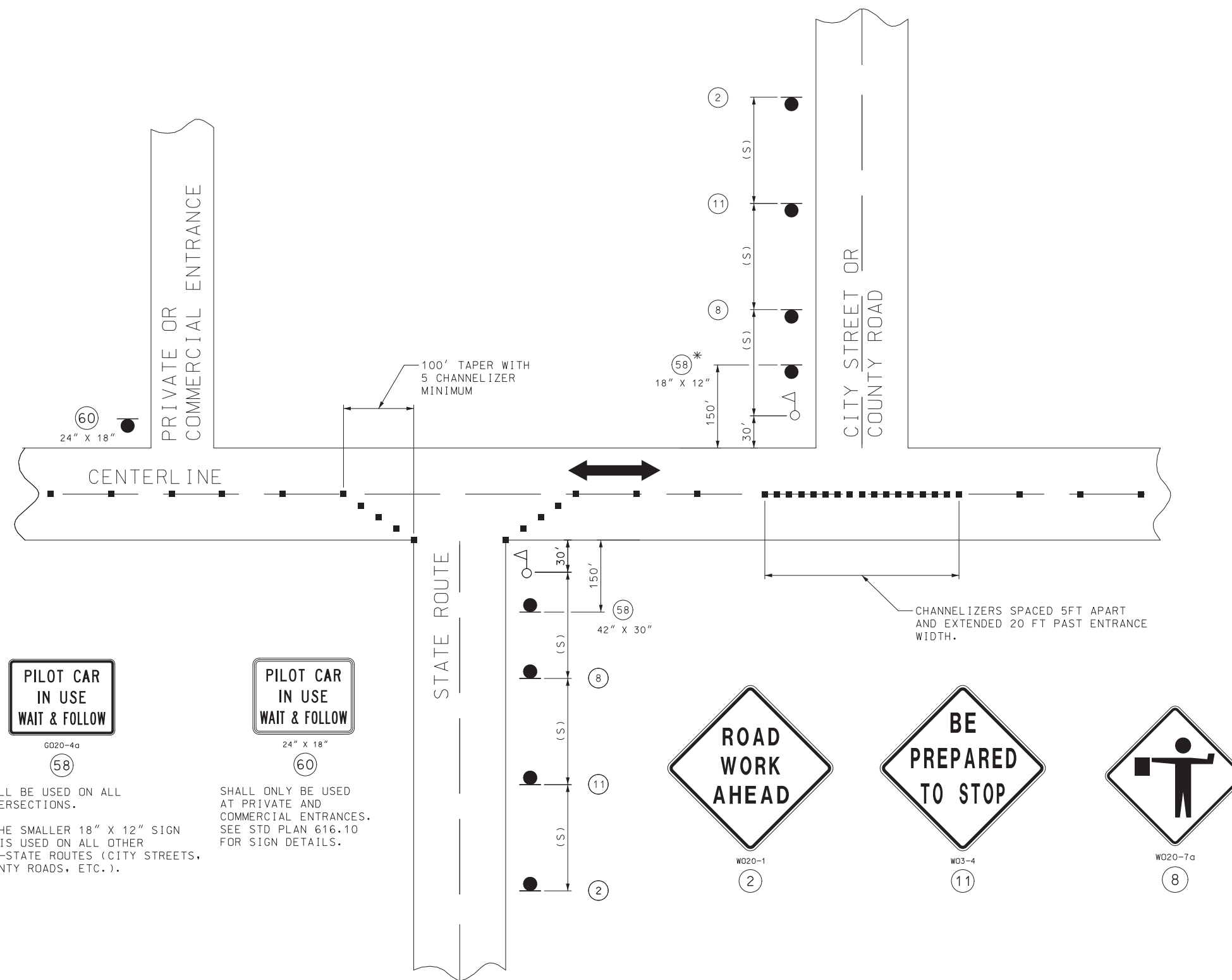
WARNING SIGNS SHALL BE ERECTED AT EACH INTERSECTION WITH ANOTHER STATE HIGHWAY WITHIN THE WORK ZONE.

ADDITIONAL WARNING SIGNS SHALL BE ERECTED AT OTHER INTERSECTIONS WITHIN THE WORK ZONE, AS DIRECTED BY THE ENGINEER.

■ - CHANNELIZERS (AS SPECIFIED)

⚠ - FLAGGER

NOT TO SCALE



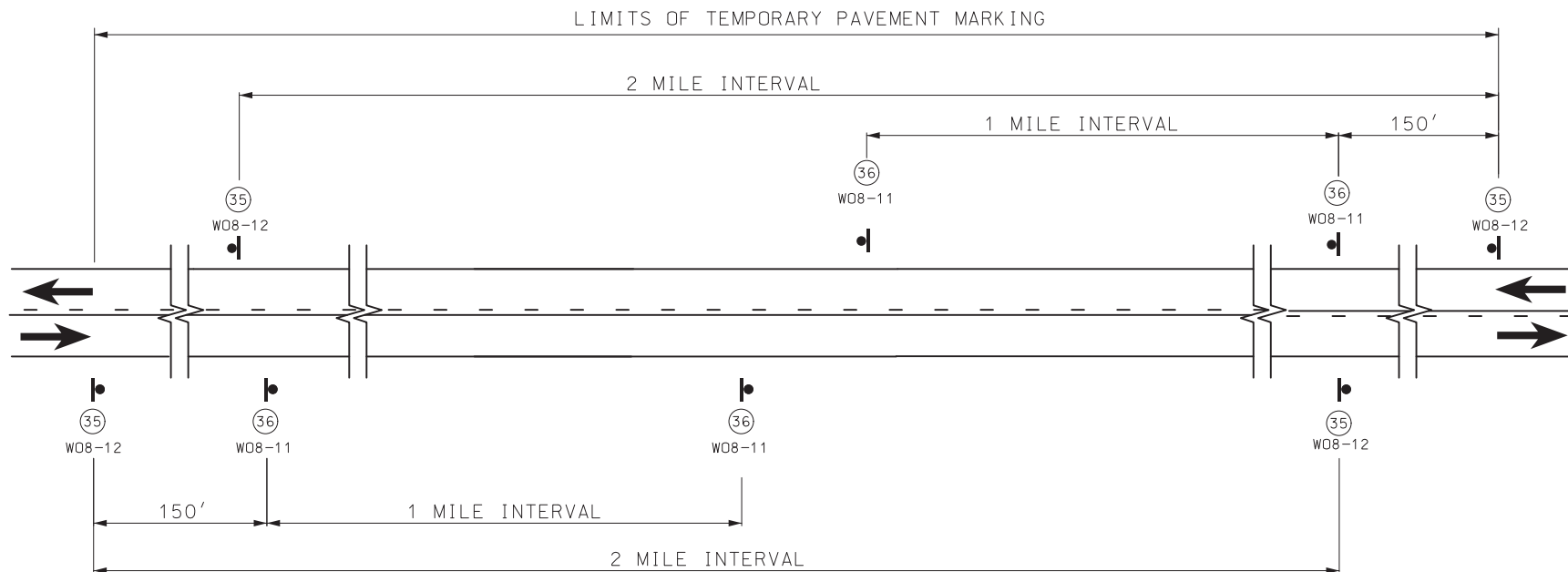
SHALL BE USED ON ALL INTERSECTIONS.

\* THE SMALLER 18" X 12" SIGN 58 IS USED ON ALL OTHER NON-STATE ROUTES (CITY STREETS, COUNTY ROADS, ETC.).

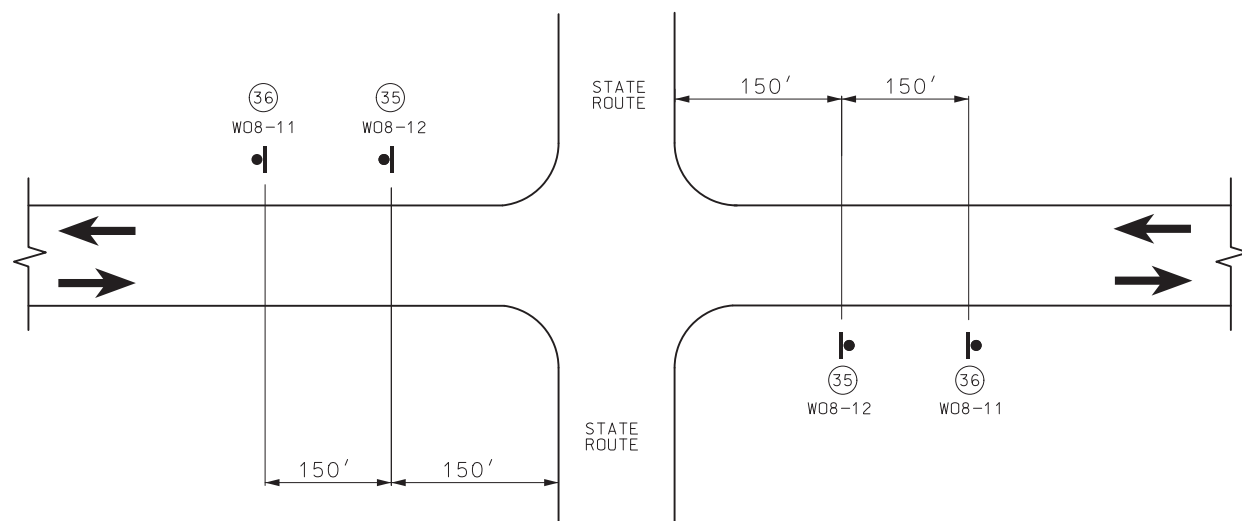
SHALL ONLY BE USED AT PRIVATE AND COMMERCIAL ENTRANCES. SEE STD PLAN 616.10 FOR SIGN DETAILS.

SIDE ROADS ENTERING WORK ZONES

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TEMPORARY TRAFFIC CONTROL PLANS</b> PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS	
	DATE EFFECTIVE: 10/1/2024 DATE PREPARED: 7/11/2024	<b>616.20D</b> SHEET NO. 3 OF 5



SIGN SPACING AND TEMPORARY STRIPING FOR MAINLINE



SIGN SPACING AT STATE ROUTE INTERSECTIONS SHOWING TEMPORARY STRIPING FOR MAINLINE



NOTES:

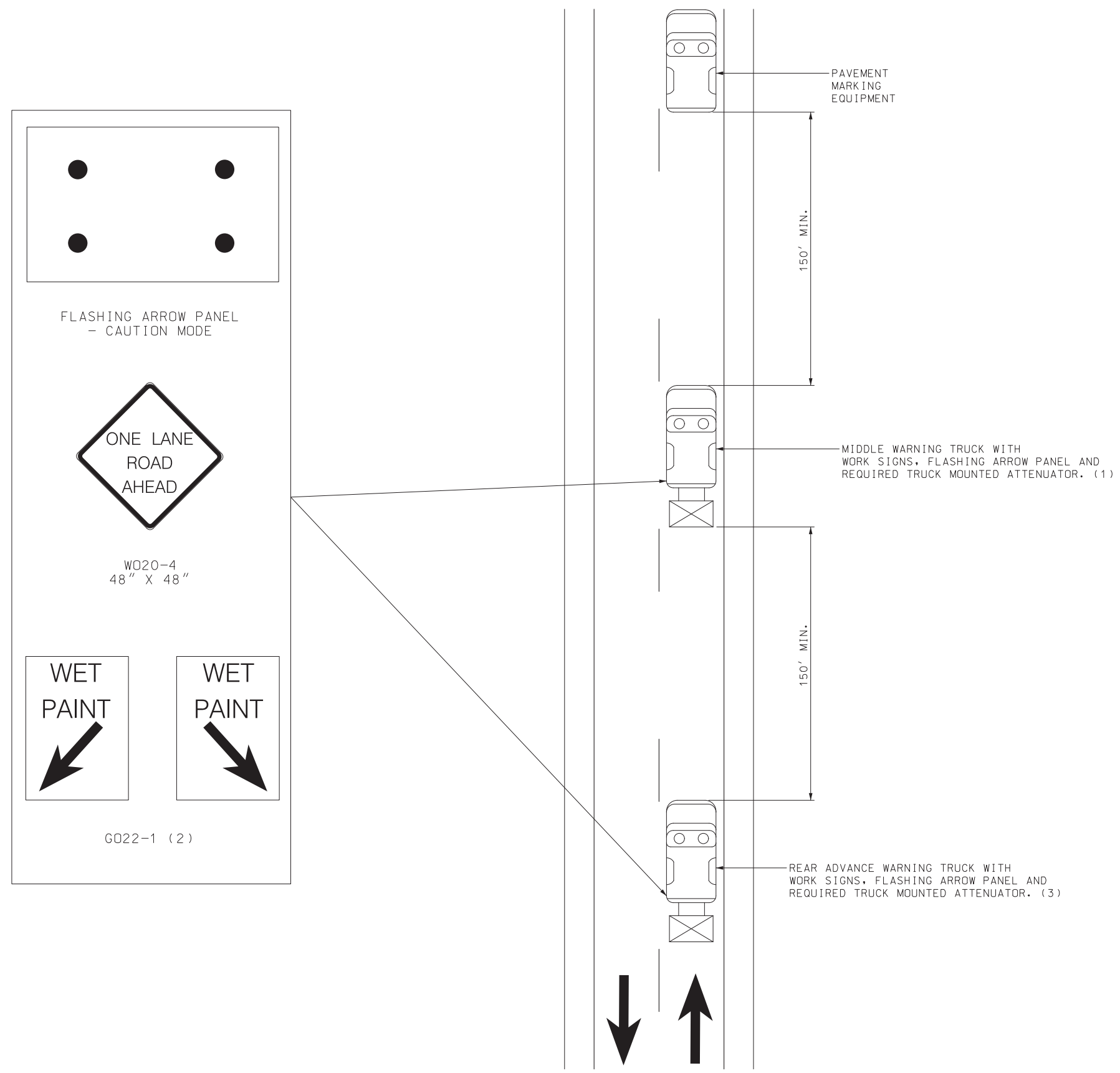
SIGN (35) AND TEMPORARY RAISED PAVEMENT MARKING (SEE STANDARD PLAN 620.10) INSTALLED WHERE CENTERLINE STRIPING HAS BEEN COVERED OR REMOVED. SIGNS ARE TO REMAIN IN PLACE UNTIL THE PERMANENT CENTERLINE PAVEMENT MARKINGS ARE IN PLACE. SIGNS SHALL BE COVERED OR REMOVED WHEN PAVEMENT CENTERLINE MARKING HAS BEEN INSTALLED.

SIGN (35) IS PLACED AT APPROXIMATELY TWO-MILE INTERVALS AND AT STATE ROUTE JUNCTIONS. WHEN THE INSTALLATION AT A JUNCTION IS WITHIN ONE-EIGHTH MILE OF THE NORMAL MAINLINE SIGN (35), THE LATTER MAY BE ELIMINATED.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLAN 616.10 AND 903.03.

SEE STANDARD PLAN 620.10 FOR ALL TEMPORARY PAVEMENT MARKING.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TEMPORARY TRAFFIC CONTROL PLANS</b>	
	PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS	
DATE EFFECTIVE: 10/1/2024 DATE PREPARED: 7/11/2024	<b>616.20D</b>	SHEET NO. <b>4 OF 5</b>



NOTES:

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY PROVIDE ADDITIONAL PROTECTIVE TRUCK EQUIPPED WITH PROPER WARNING DEVICES.

PROTECTIVE TRUCK AND WORK VEHICLES SHALL DISPLAY HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING, OR STROBE LIGHTS.

VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING, OR STROBE LIGHTS.

FLASHING ARROW PANELS SHALL BE INCIDENTAL TO TRUCK MOUNTED ATTENUATORS, WHEREVER USED. NO ADDITIONAL PAYMENT WILL BE MADE.

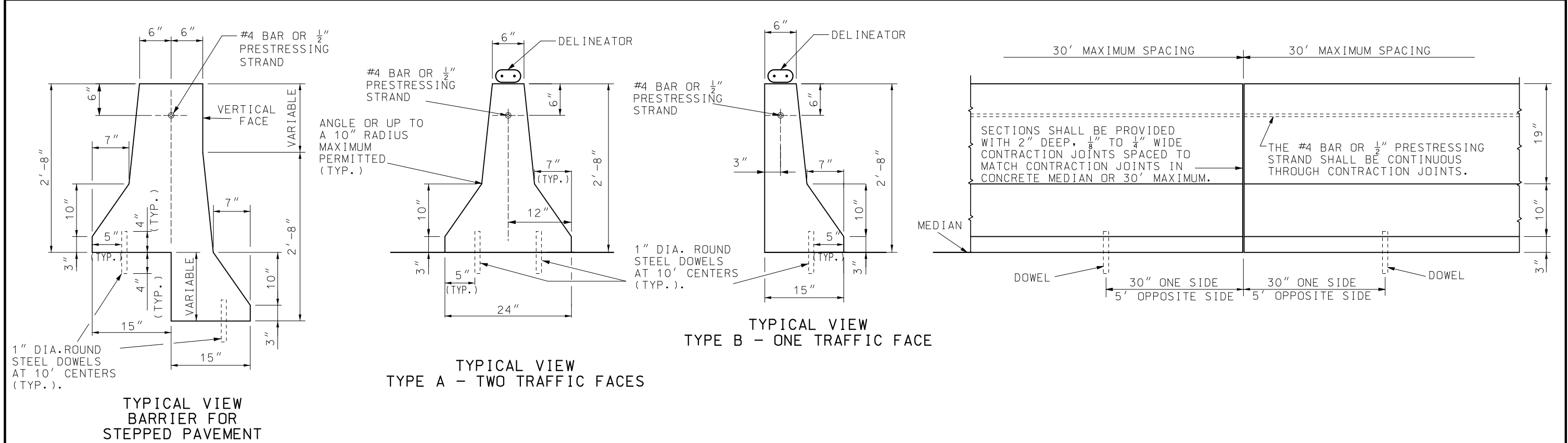
(1) TRUCK IS OPTIONAL ON TWO-LANE UNDIVIDED HIGHWAYS IF SIGNING AND ARROW BOARD IS MOUNTED ON THE PAVEMENT MARKING EQUIPMENT.

(2) WET PAINT SIGNS ARE INSTALLED TO INDICATE THE SIDE IN WHICH THE PAVEMENT MARKING MATERIAL IS BEING APPLIED. AT THE CONTRACTOR'S OPTION, A FRONT FACING WET PAINT SIGN MAY BE INSTALLED ON THE LEFT SIDE OF THE PAVEMENT MARKING EQUIPMENT.

(3) REAR ADVANCE WARNING TRUCK IS POSITIONED AT THE NO TRACK POINT OF THE PAVEMENT MARKING MATERIAL, OR VERTICAL OR HORIZONTAL CURVES THAT RESTRICT SIGHT DISTANCE, OR SPACING SHOWN.

CENTERLINE/EDGELINE STRIPING ON TWO-LANE HIGHWAYS

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>TEMPORARY TRAFFIC CONTROL PLANS</b> PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS
DATE EFFECTIVE: 10/1/2024 DATE PREPARED: 7/11/2024	<b>616.20D</b>	SHEET NO. <b>5 OF 5</b>



**GENERAL NOTES:**


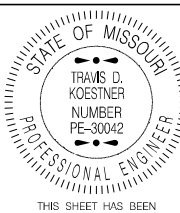
HEIGHT TRANSITIONS SHALL NOT BE USED IN LOCATIONS WHERE THE POSTED SPEED IS GREATER THAN 35 MPH.

ALL TOP AND END EDGES SHALL BE CHAMFERED  $\frac{3}{4}$  INCH.

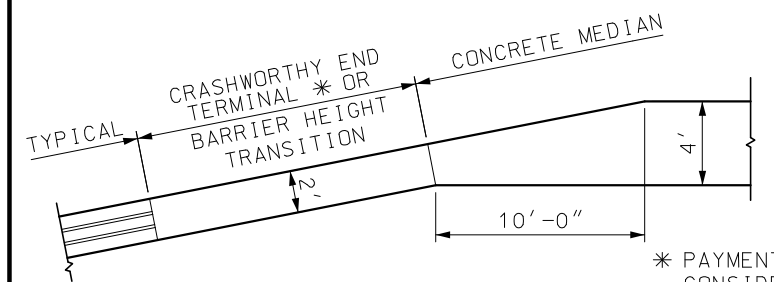
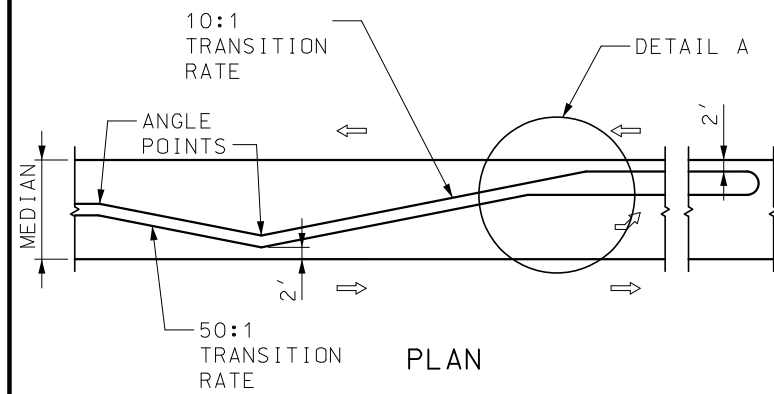
EXPANSION JOINTS SHALL BE PROVIDED IN THE BARRIER TO MATCH EXPANSION JOINTS IN PAVEMENT.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

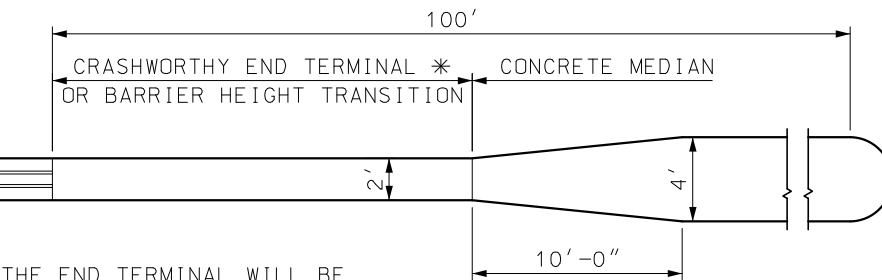
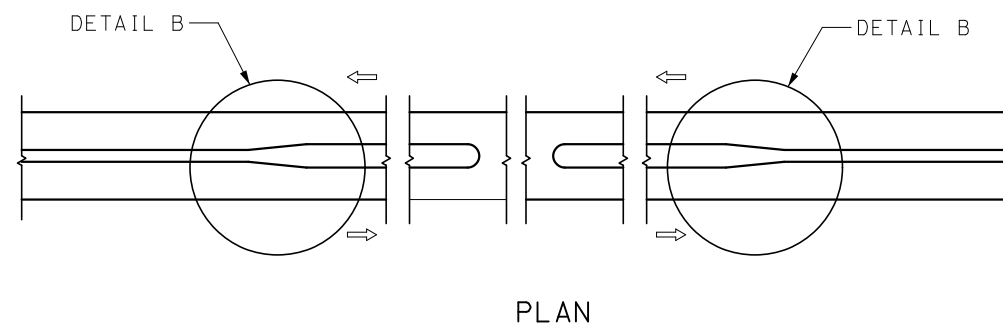
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER</b> <b>TYPE A AND B</b>
DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020	SHEET NO. <b>617.10M</b> <b>1 OF 11</b>

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

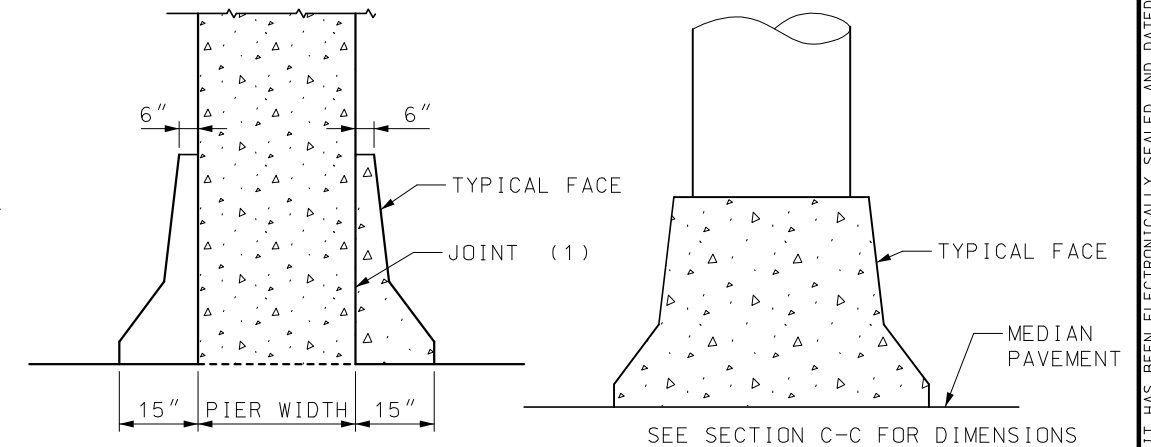


**DETAIL A  
LEFT TURN LANE TRANSITION**

\* PAYMENT FOR THE END TERMINAL WILL BE CONSIDERED FULL COMPENSATION FOR END TERMINAL, BACKUP ASSEMBLIES, AND OTHER ITEMS NECESSARY FOR PROPER INSTALLATION AS REQUIRED BY THE MANUFACTURER.

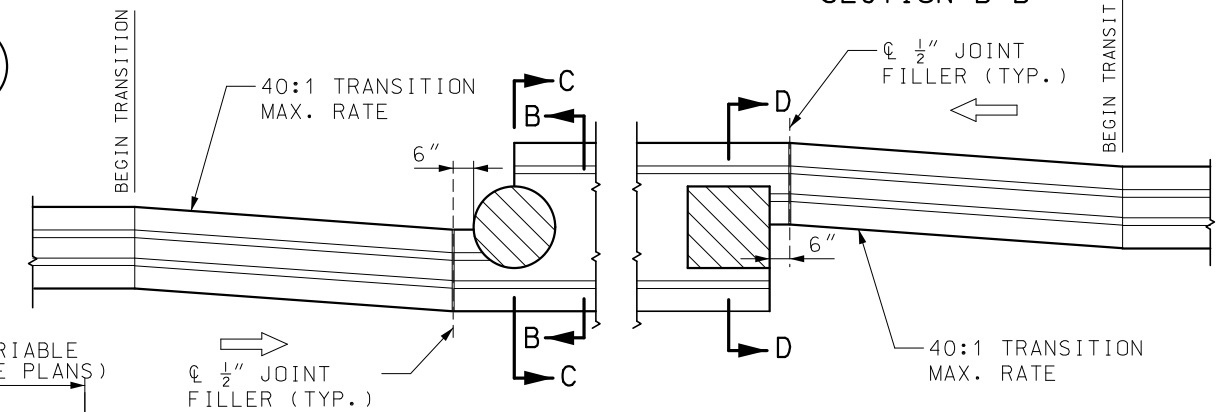


**DETAIL B  
MEDIAN OPENING TRANSITION**

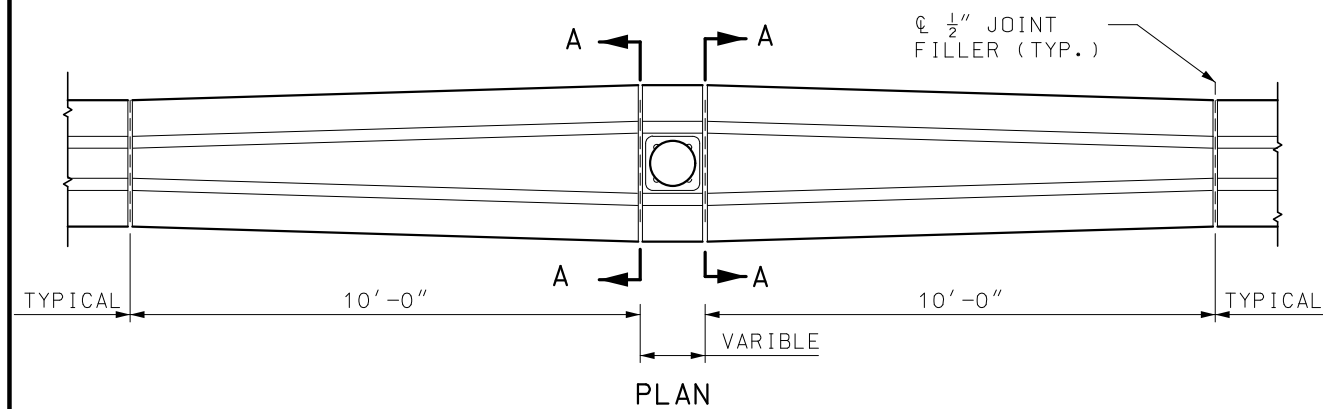


**SECTION C-C**

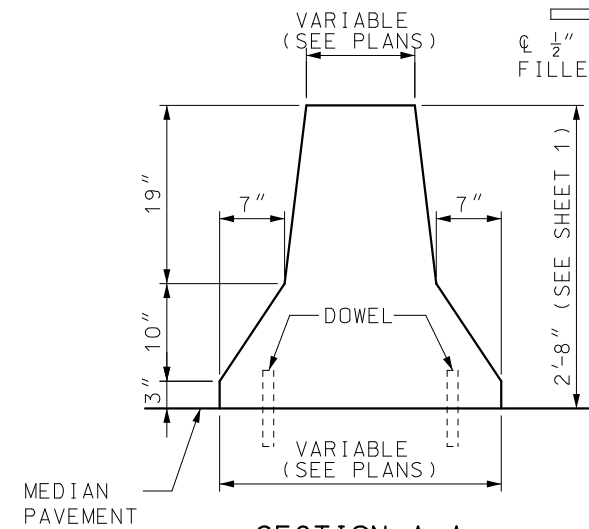
**SECTION B-B**



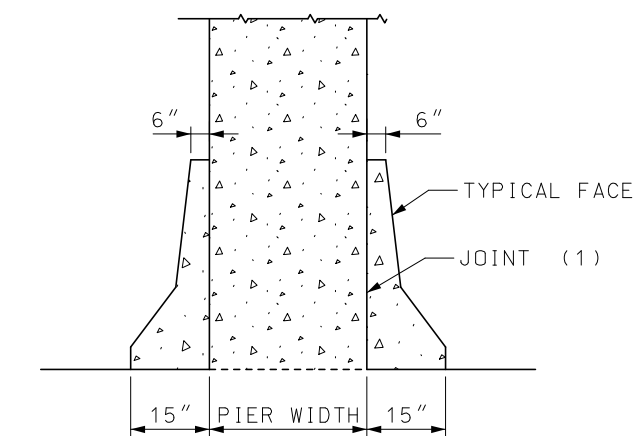
**PLAN  
TRANSITION DETAILS FOR  
PIER PROTECTION**



**PLAN**



**SECTION A-A**



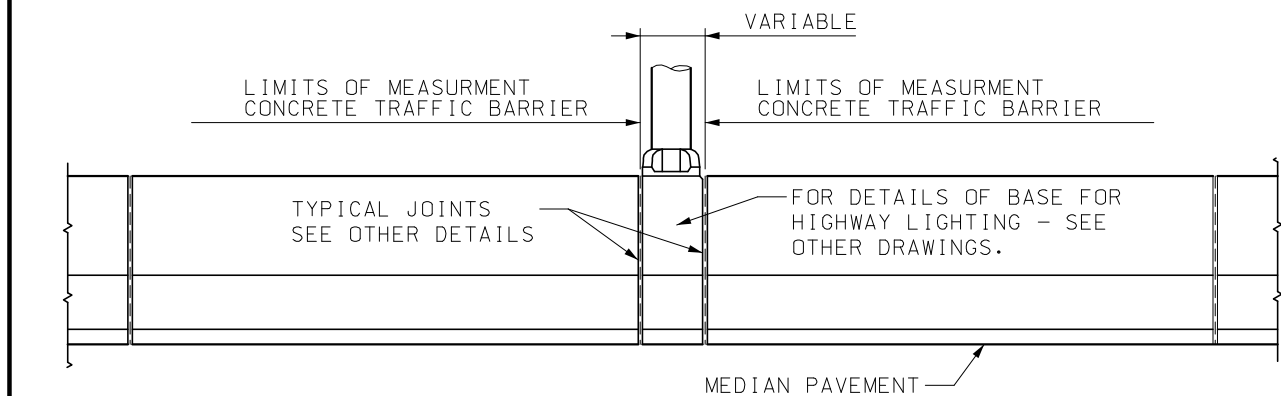
**SECTION D-D**

(1) 1 IN. JOINT WITH JOINT FILLER AND SEALER

GENERAL NOTES:


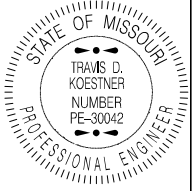
FOR DETAILS AND LOCATION OF DOWELS, SEE SHEET 1.

#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.



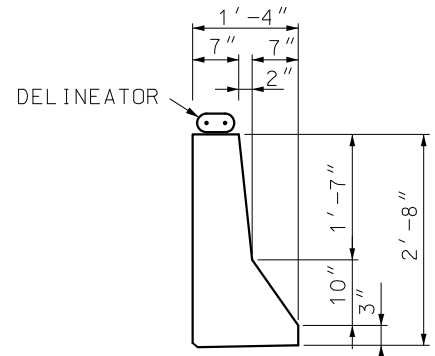
**ELEVATION**

**TRANSITION DETAILS FOR MEDIAN LIGHTING**

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER TYPE A AND B</b>
DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020	SHEET NO. <b>617.10M</b> <b>2 OF 11</b>

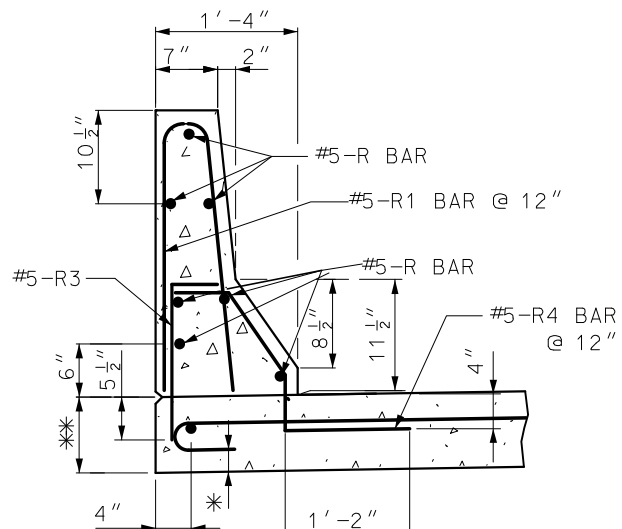
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



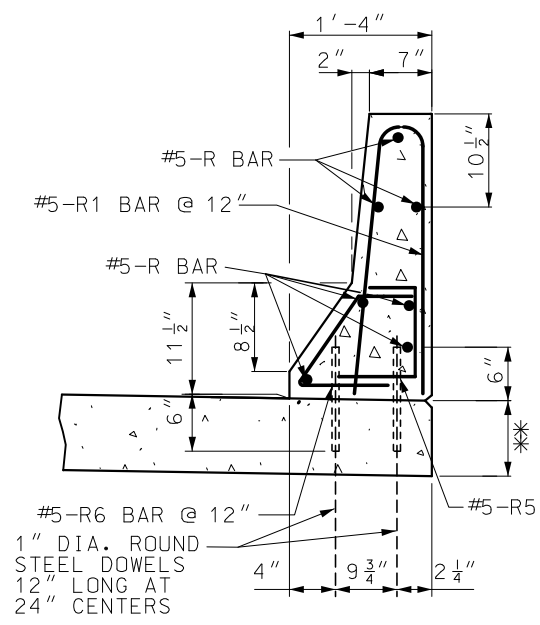


**TYPE B (MODIFIED)  
TYPICAL SECTION**

TABLE A TRANSVERSE PAVEMENT REINFORCEMENT	
PAVEMENT THICKNESS	BAR SIZE & SPACING
8"	#5 @ 5" *
9"	#5 @ 6" *
10"	#5 @ 8"
11"	#5 @ 9"
≥ 12"	#6 @ 12"



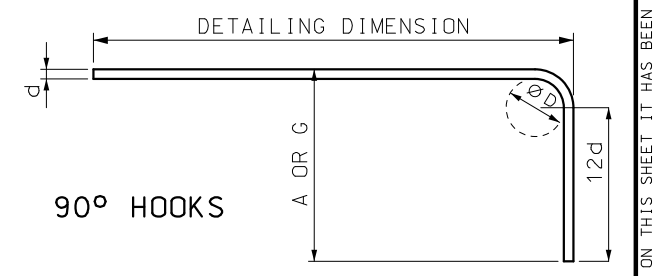
**PART SECTION THROUGH  
UPPER BARRIER**



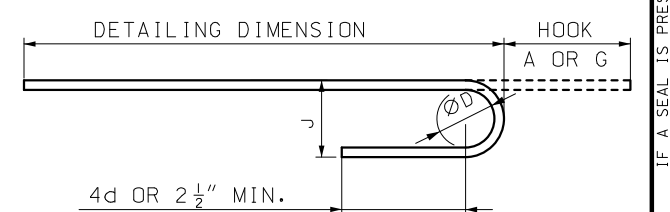
**PART SECTION THROUGH  
LOWER BARRIER**

END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS	J	90° HOOKS
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"

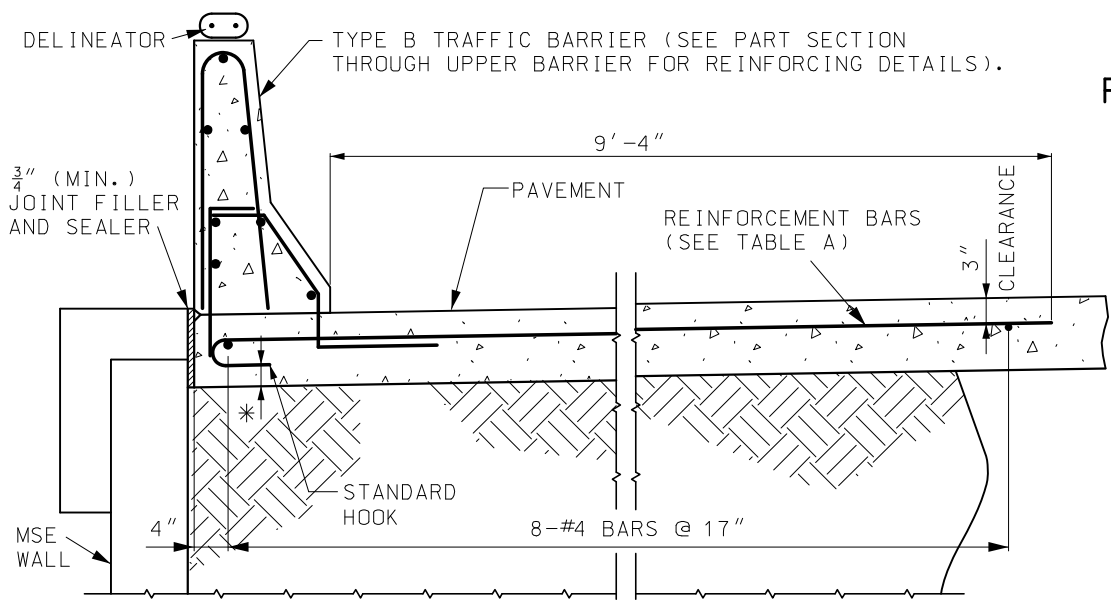
ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.



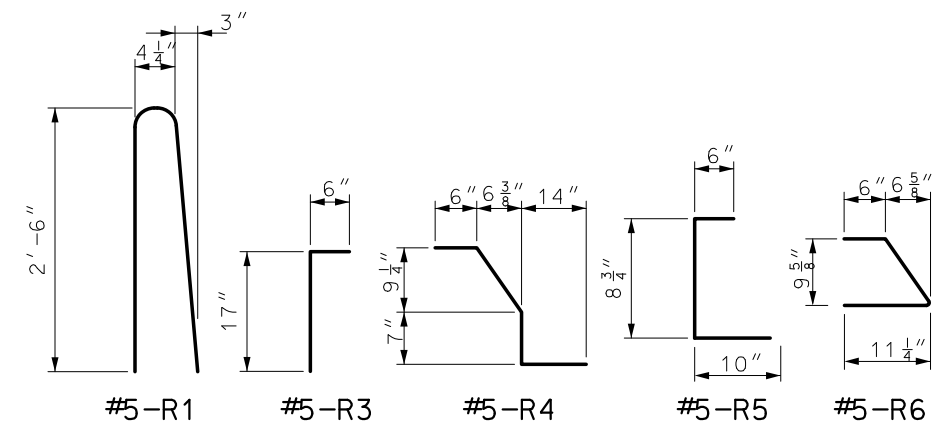
**90° HOOKS**



**180° HOOKS**

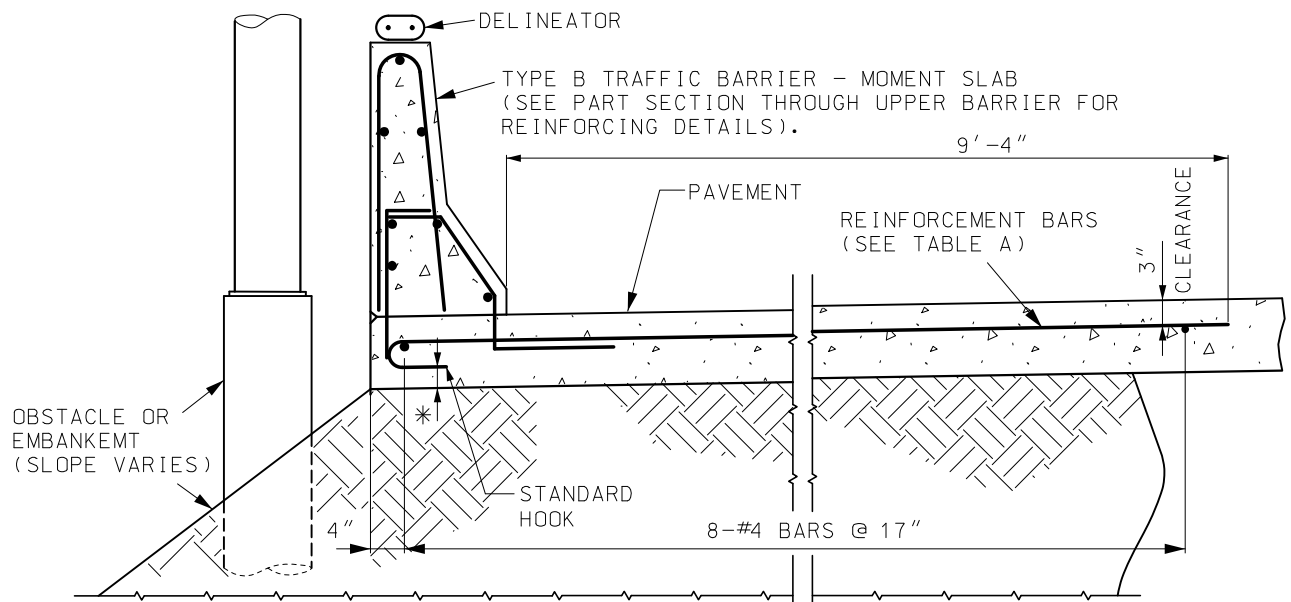


**TYPE B TRAFFIC BARRIER ON TOP OF MSE WALL**

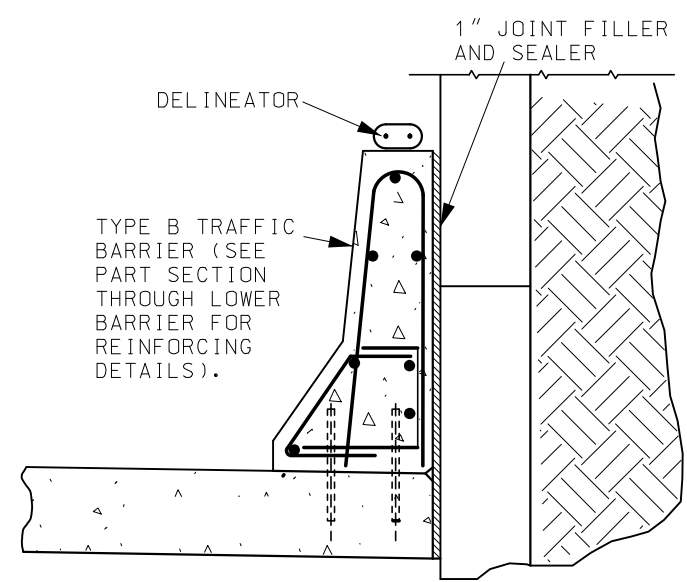


**NOTES:**

- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.
- TYPE B (MODIFIED) SHALL BE USED ONLY AT LOCATIONS SHOWN IN PLANS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
- #8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.
- \* TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1 1/2" MINIMUM CLEARANCE.
- \*\* SEE ROADWAY PAVEMENT DESIGN.



**TYPE B TRAFFIC BARRIER - MOMENT SLAB\*\***



**TYPE B TRAFFIC BARRIER AT THE  
SIDE OF MSE WALL**

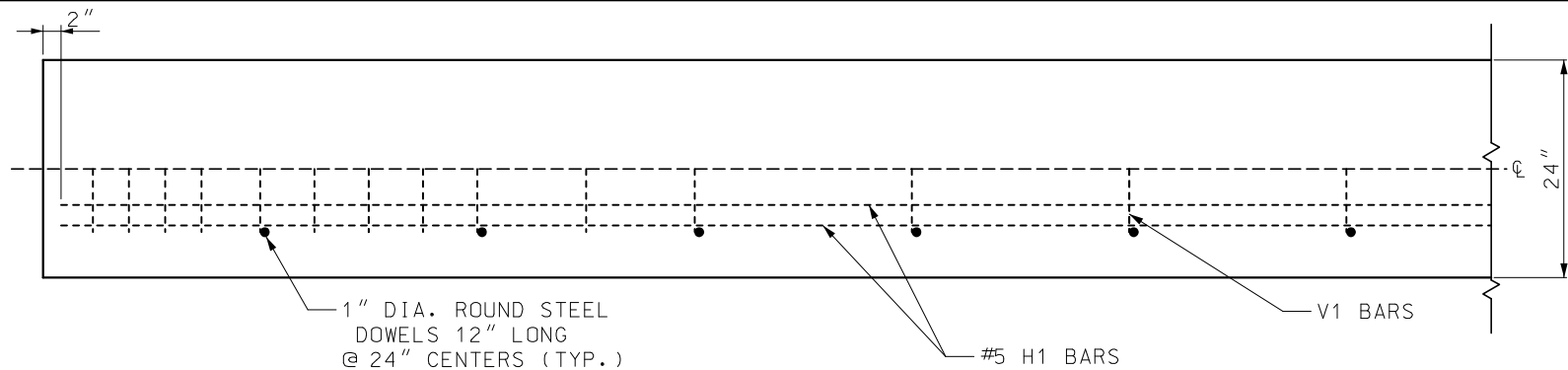
**MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**PERMANENT CONCRETE TRAFFIC BARRIER AT MSE WALL OR MOMENT SLAB TYPE B MODIFIED**

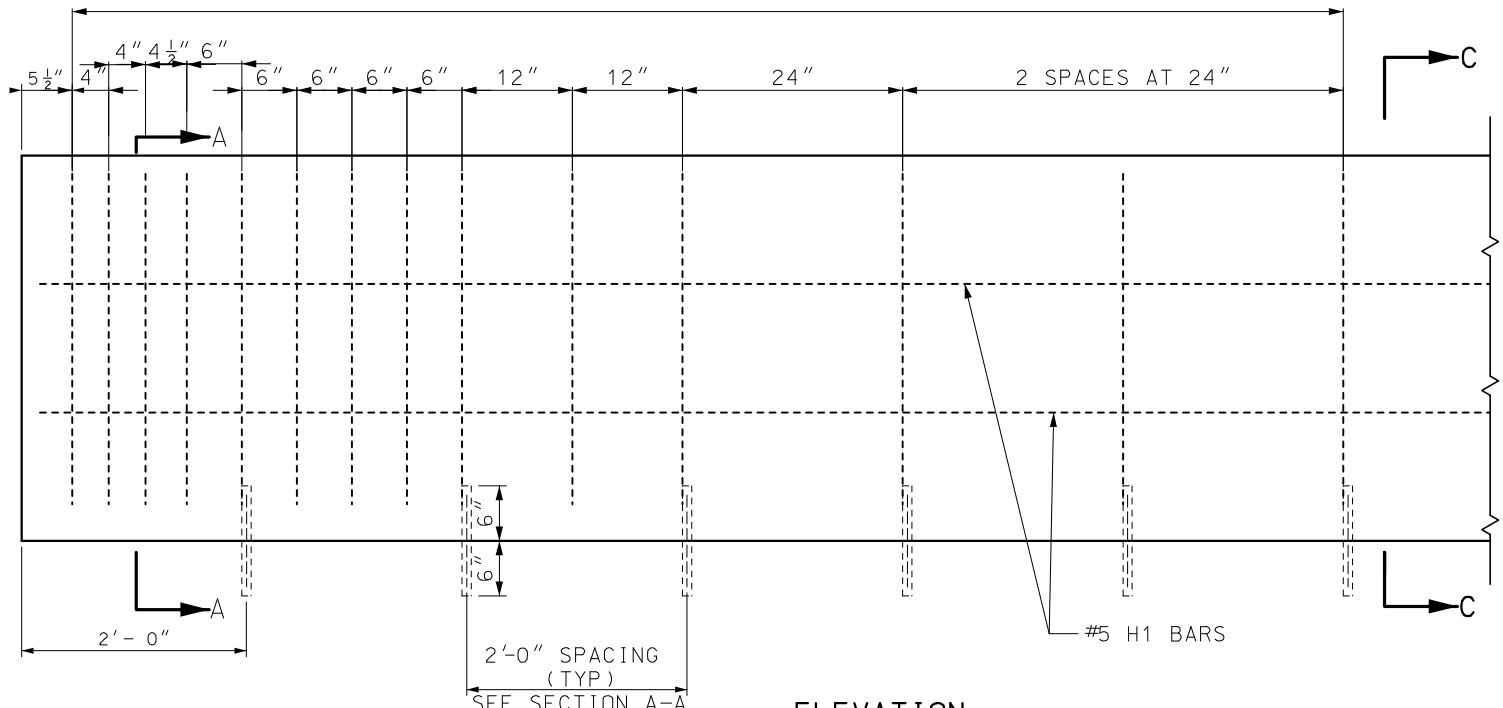
DATE EFFECTIVE: 10/01/2020	617.10M	SHEET NO. 3 OF 11
DATE PREPARED: 7/21/2020		

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

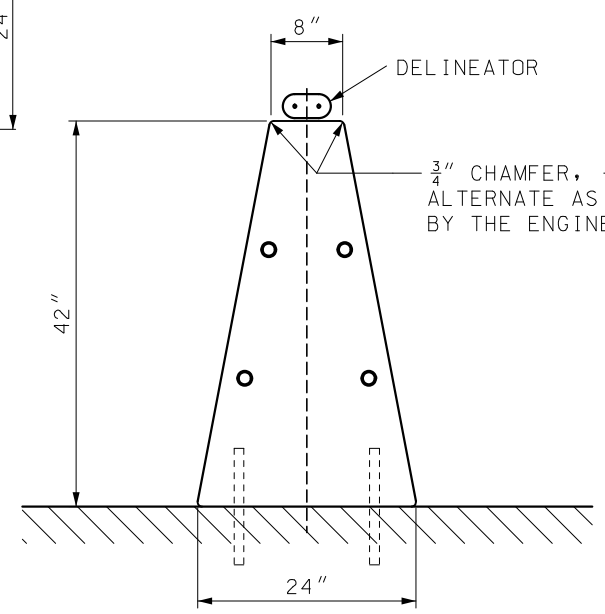


PLAN VIEW  
(SYMMETRICAL ABOUT CENTERLINE)

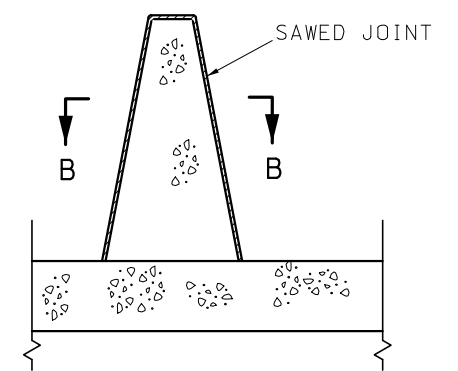
LIMITS OF #4 - V1 SPACED AS SHOWN BELOW  
AT TERMINAL ENDS OF BARRIER ONLY



ELEVATION



TYPE C  
TYPICAL SECTION



SECTION THROUGH SAWED JOINT

NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

ANY REINFORCING BAR INSTALLATION METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm 1/2$  INCH AS DIMENSIONED WILL BE SATISFACTORY.

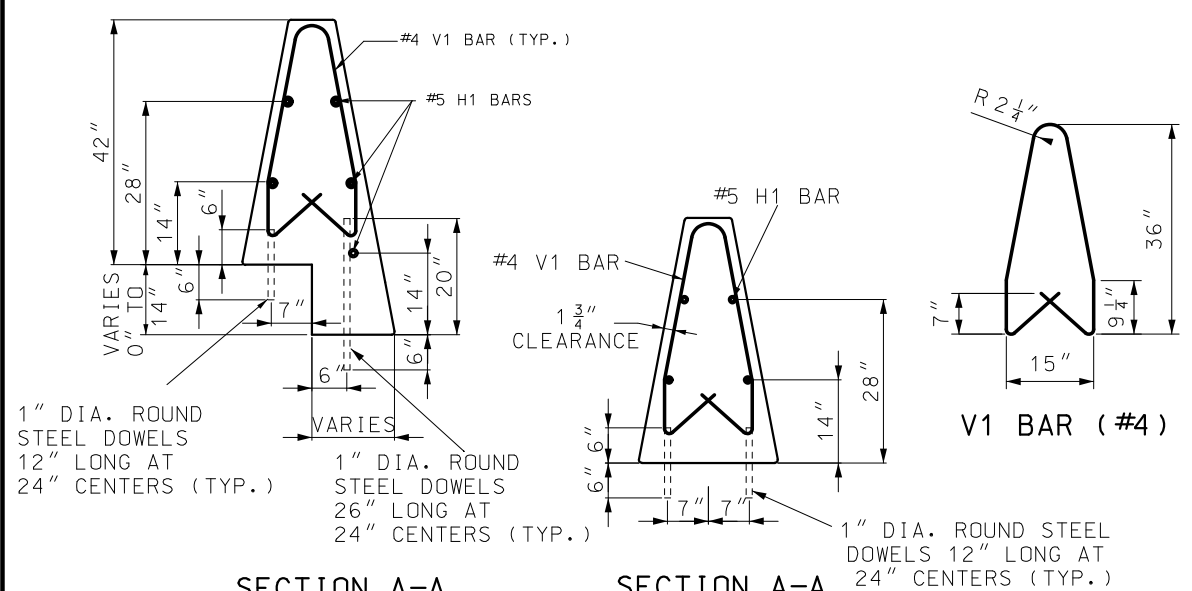
THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

ANCHORING DOWELS MAY BE OMITTED WHEN THE PLANS SPECIFY A MINIMUM  $1 3/4$  INCH PAVEMENT SURFACE TO BE PLACED ABUTTING BOTH BARRIER FACES.

SAWED JOINTS SHALL BE LOCATED AT PAVEMENT TRANSVERSE JOINTS.

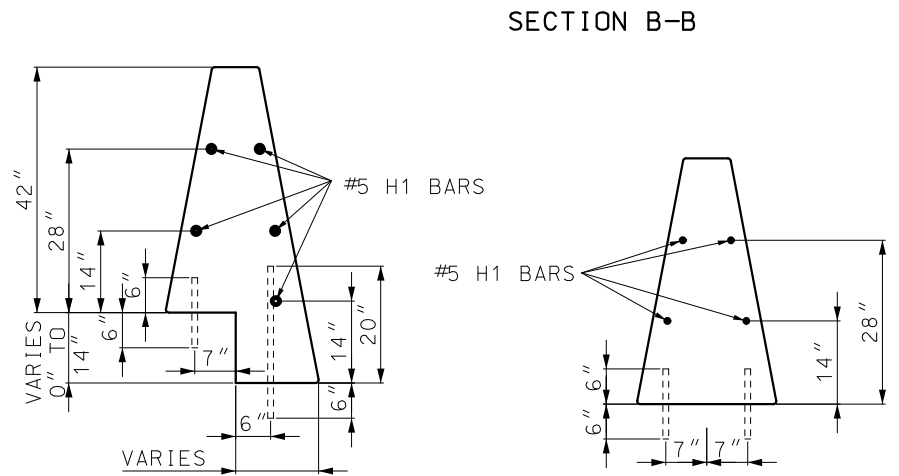
#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1 INCH DIAMETER ROUND STEEL DOWELS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.



SECTION A-A  
(STEPPED PAVEMENT)      SECTION A-A  
(NORMAL PAVEMENT)

REINFORCING DETAILS



SECTION C-C  
(STEPPED PAVEMENT)      SECTION C-C  
(NORMAL PAVEMENT)

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  

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

STATE OF MISSOURI  

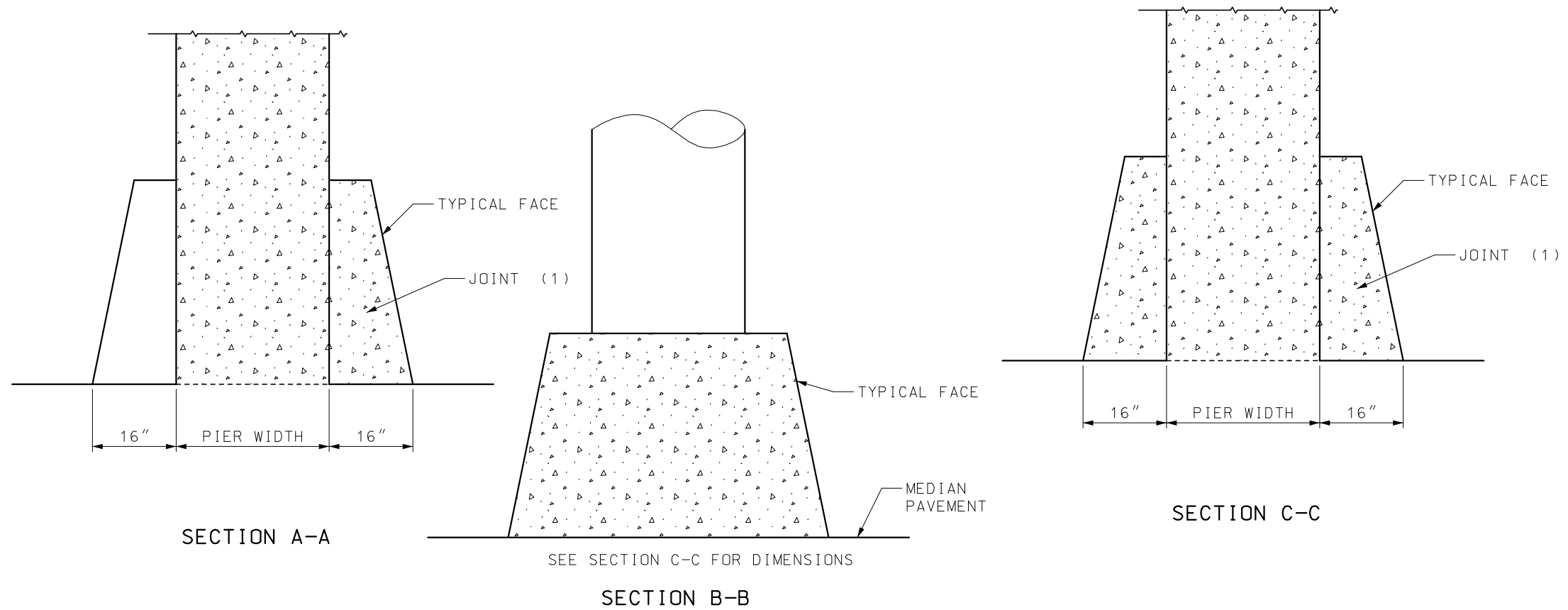
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**PERMANENT CONCRETE TRAFFIC BARRIER TYPE C**

DATE EFFECTIVE: 10/01/2020	617.10M	SHEET NO. 4 OF 11
DATE PREPARED: 7/21/2020		

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

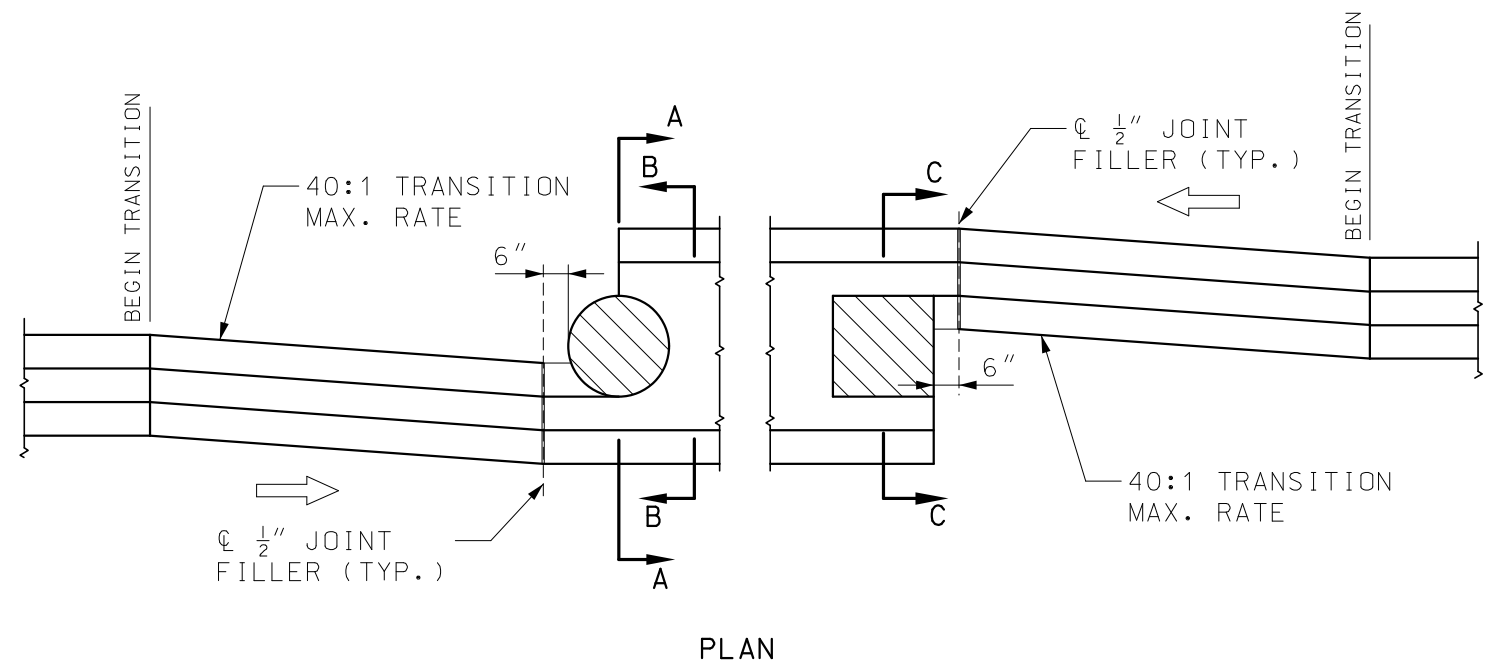
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SECTION A-A

SECTION B-B


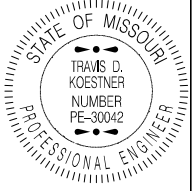
SECTION C-C

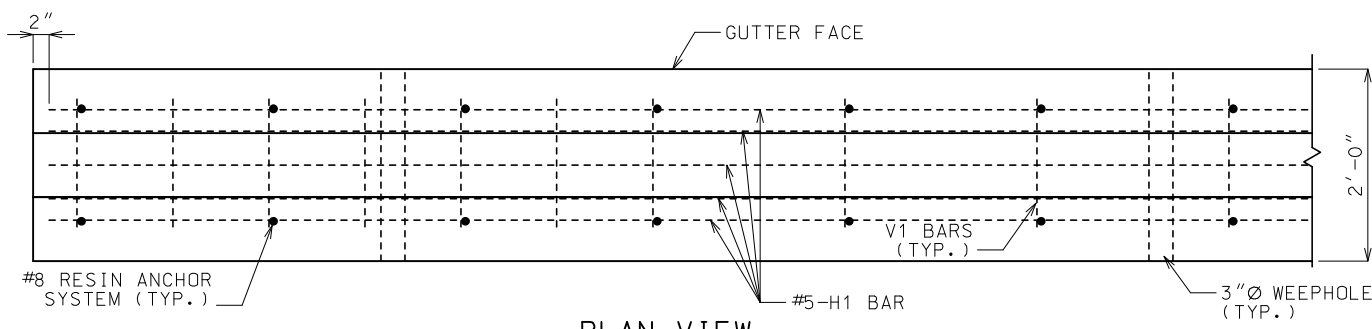


PLAN

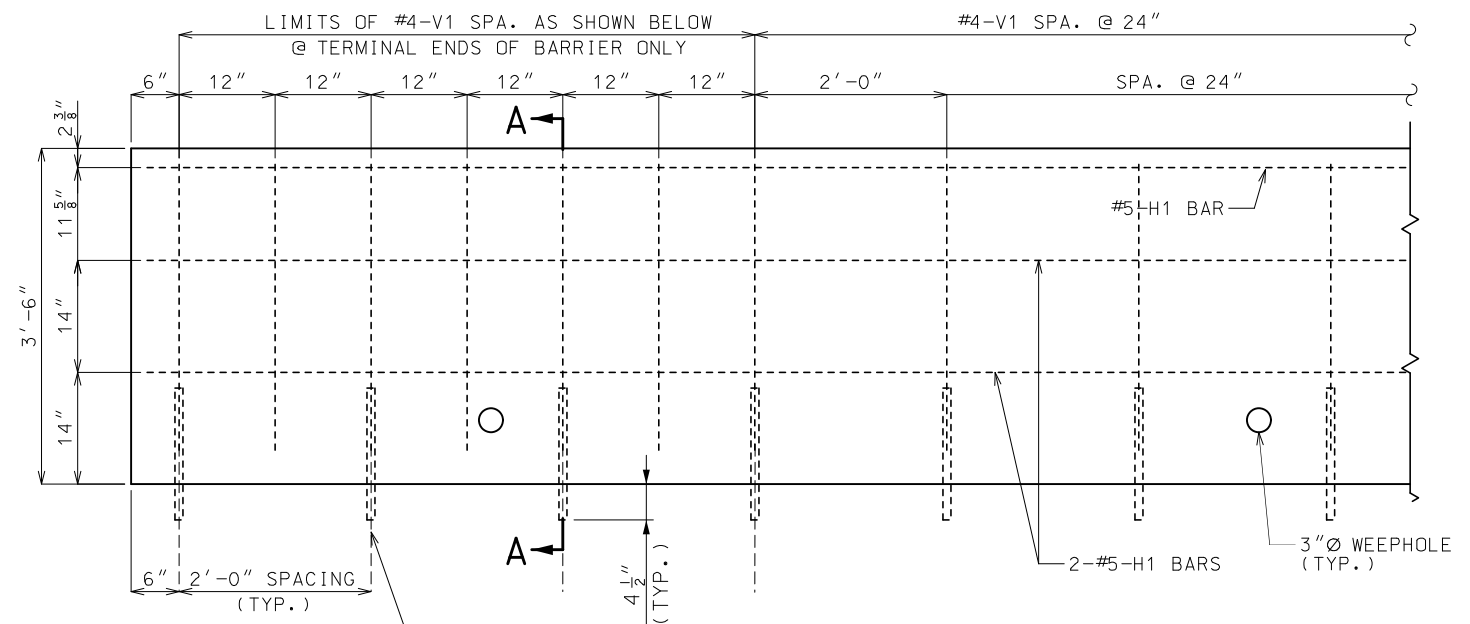
TRANSITION DETAILS FOR PIER PROTECTION

(1) 1 IN. JOINT WITH JOINT FILLER AND SEALER

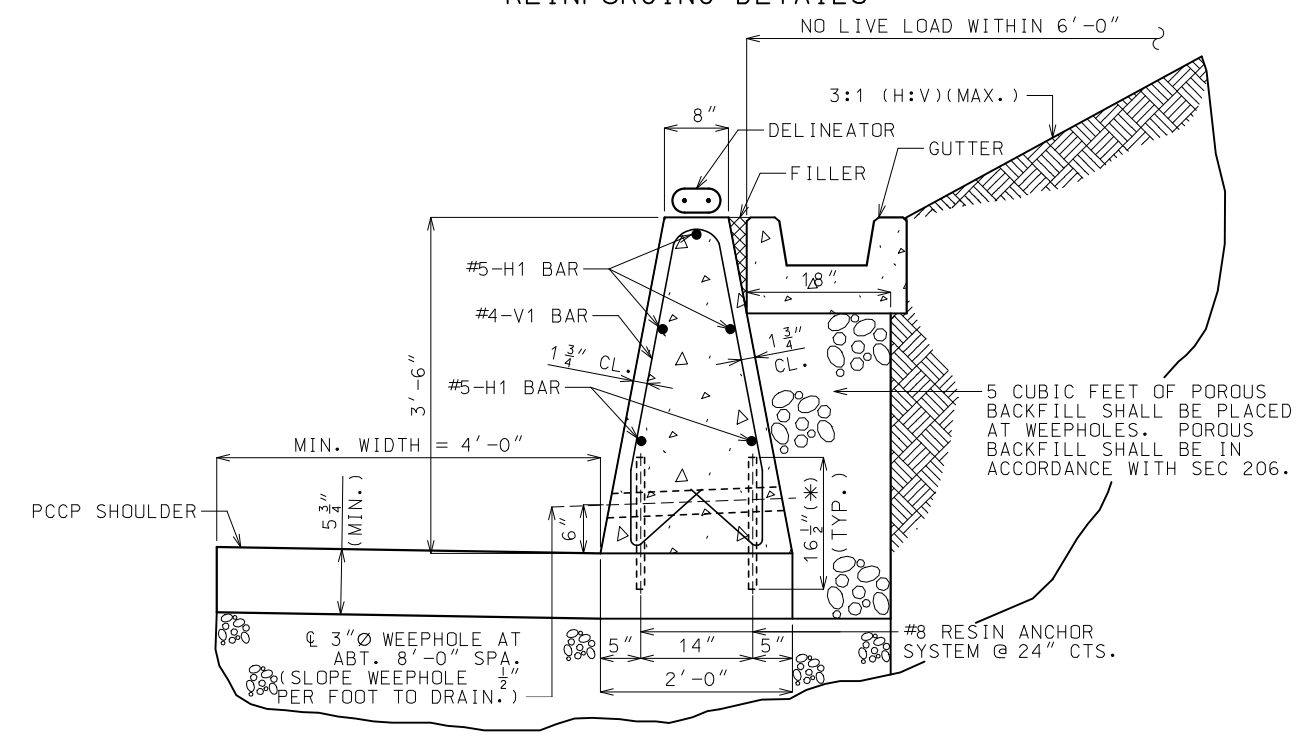
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>PERMANENT CONCRETE TRAFFIC BARRIER TYPE C</b>
DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020	<b>617.10M</b>	SHEET NO. <b>5 OF 11</b>



PLAN VIEW  
NOTE: GUTTER NOT SHOWN FOR CLARITY.

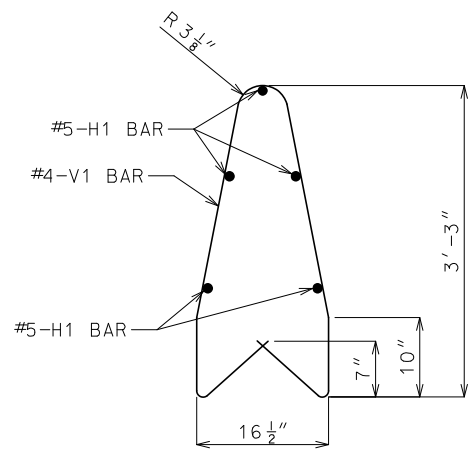


ELEVATION REINFORCING DETAILS



SECTION A-A  
(FOR SLOPING AND NONSLOPING BACKSLOPE)

(\*) EMBED ANCHOR 4 1/2" INTO PCCP SHOULDER.



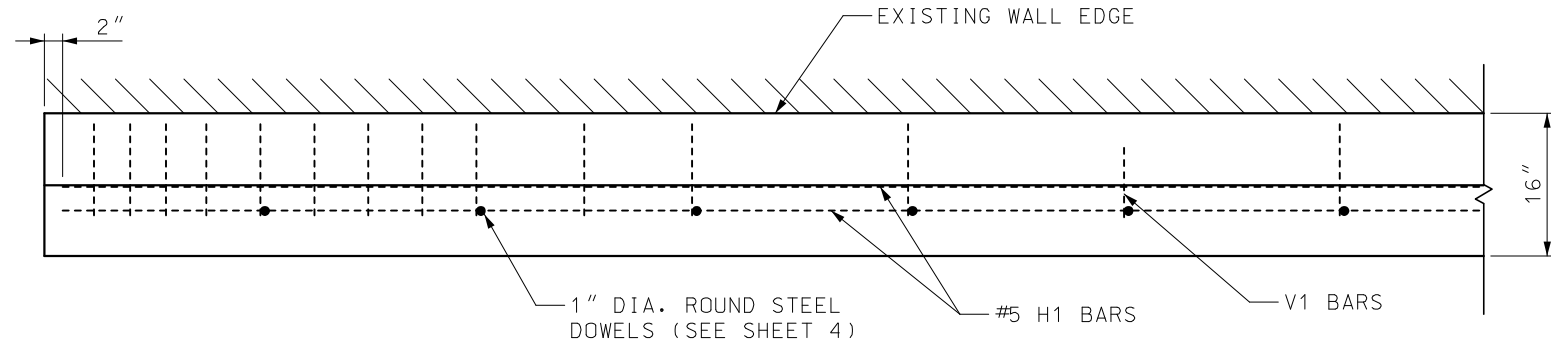
PART SECTION OF #4-V1 BAR

GENERAL NOTES:

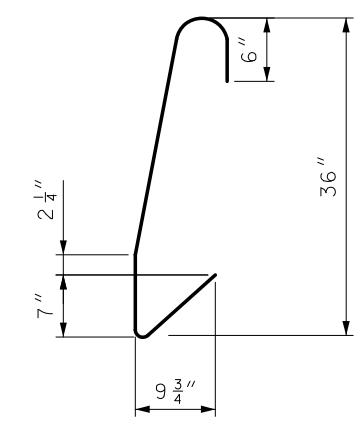
- CONCRETE SHALL BE CLASS B F'C = 4,000 PSI.
- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- ANGLE OF INTERNAL FRICTION,  $\phi$   $\geq$  27° FOR BACKFILL MATERIAL.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.
- BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.
- ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm$  1/2 INCH AS DIMENSIONED WILL BE SATISFACTORY.
- THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.
- THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.
- THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.
- SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.
- TYPE C BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
- RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.
- WHEN BARRIER HEIGHT EXCEEDS 42" OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN 6'-0", CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER</b> TYPE C AS RETAINING WALL	
	DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020	617.10M

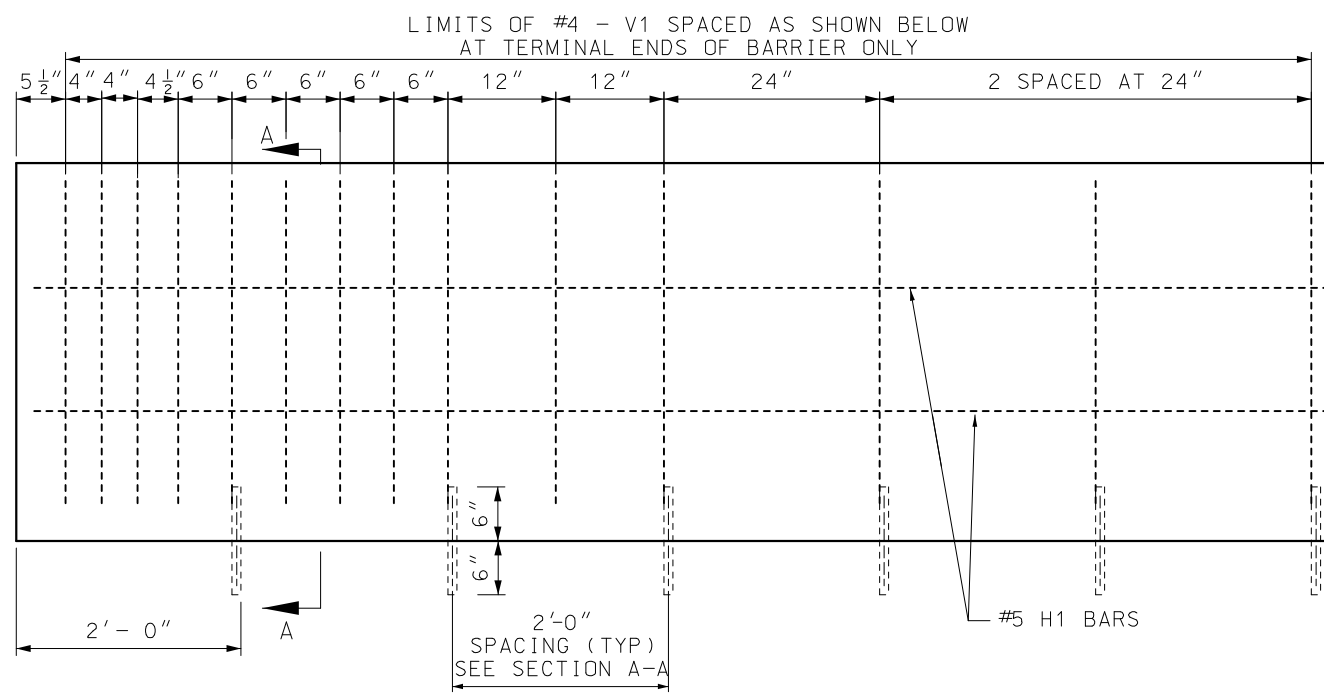
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



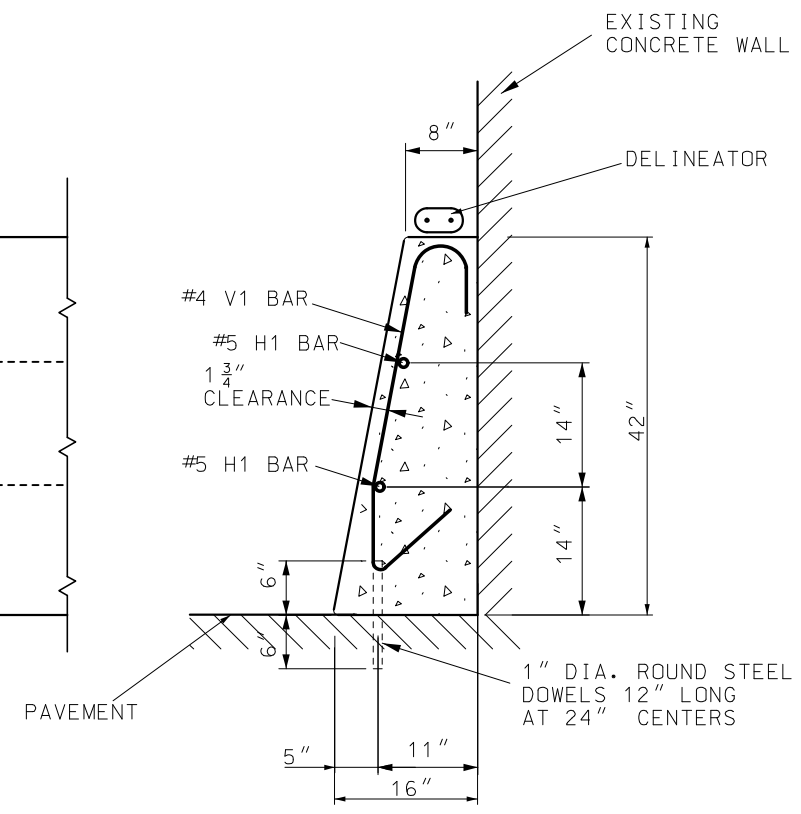
PLAN VIEW



V1 BAR (#4)



ELEVATION REINFORCING DETAILS



SECTION A-A

NOTES:

- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.
- ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm \frac{1}{2}$  INCH AS DIMENSIONED WILL BE SATISFACTORY.
- THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.
- THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.
- THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.
- SAWED JOINTS SHALL BE LOCATED AT PAVEMENT TRANSVERSE JOINTS.
- TYPE D SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.
- #8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

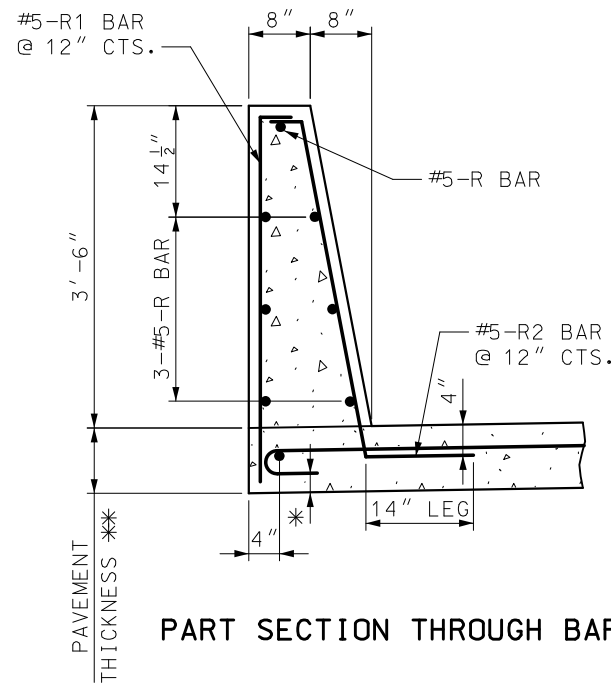
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

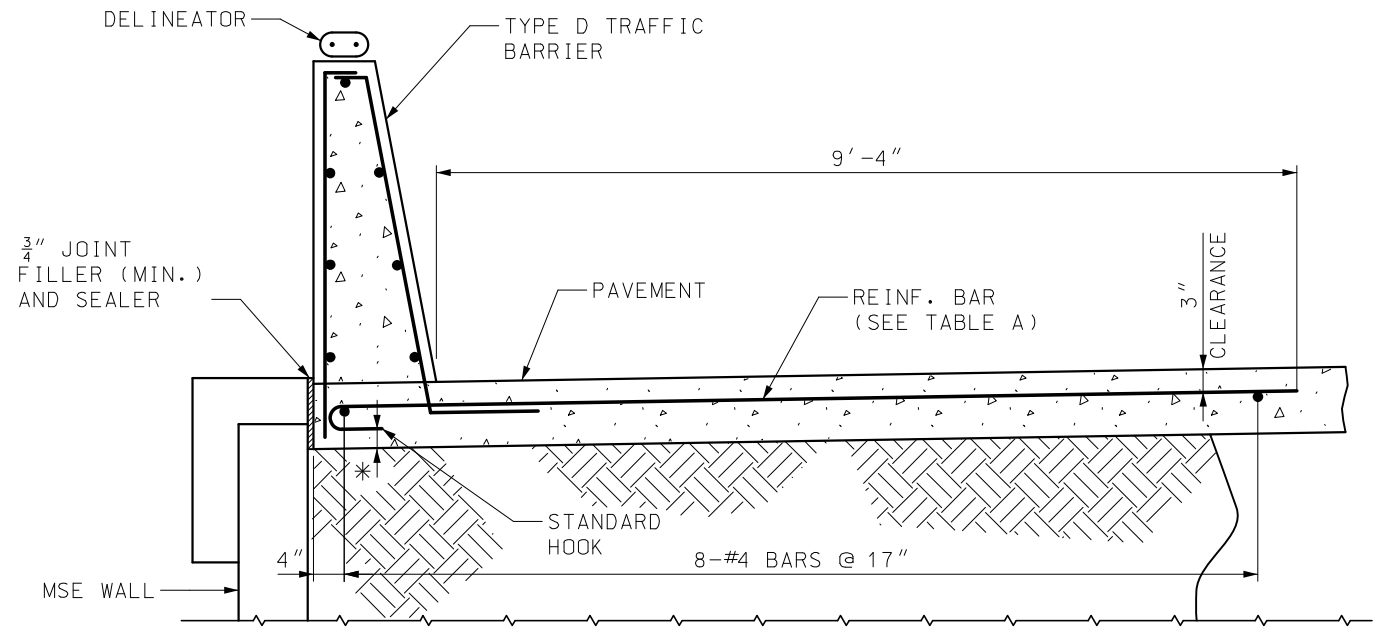
PERMANENT CONCRETE TRAFFIC BARRIER TYPE D

DATE EFFECTIVE: 10/01/2020	617.10M	SHEET NO. 7 OF 11
DATE PREPARED: 7/21/2020		

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

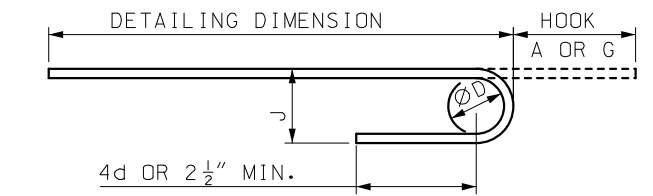
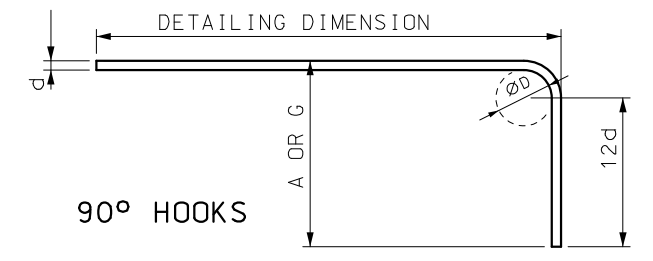


PART SECTION THROUGH BARRIER



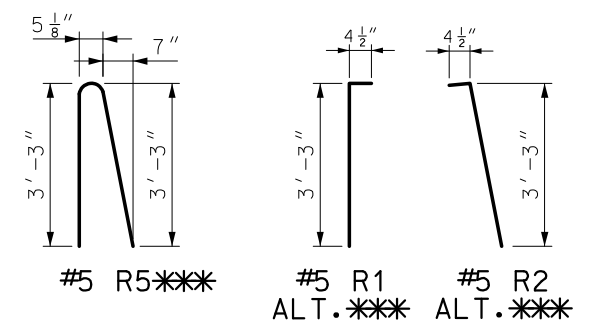
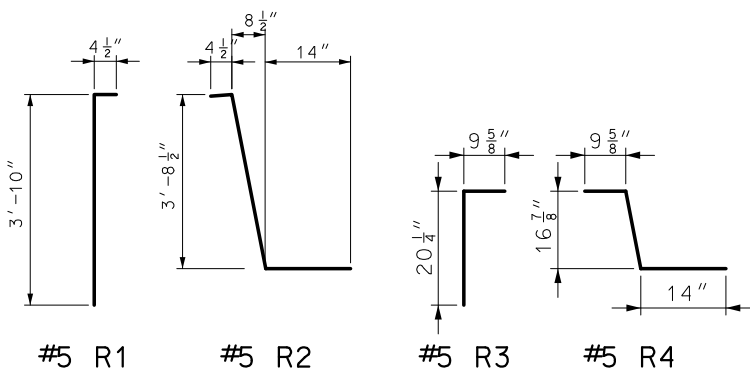
TYPE D (MSE WALL) TRAFFIC BARRIER ON TOP OF MSE WALL

END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS		90° HOOKS
		A OR G	J	A OR G
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"



180° HOOKS

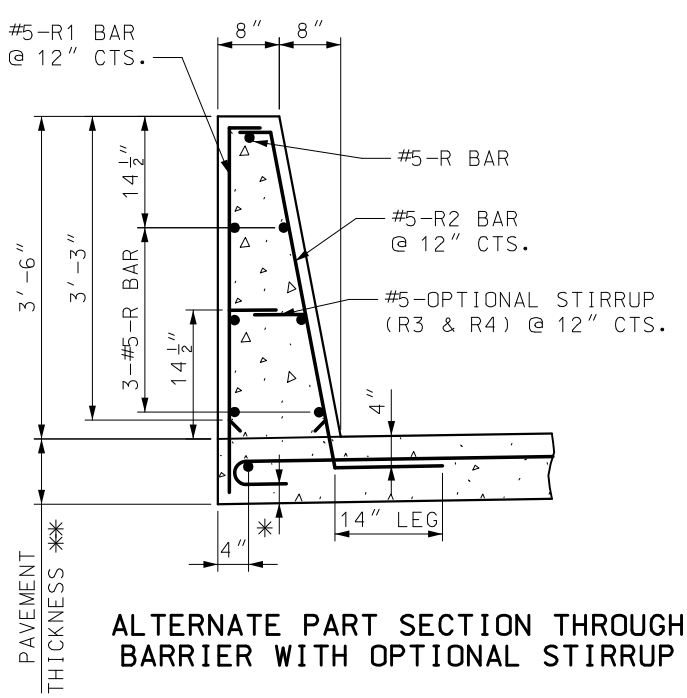
ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.



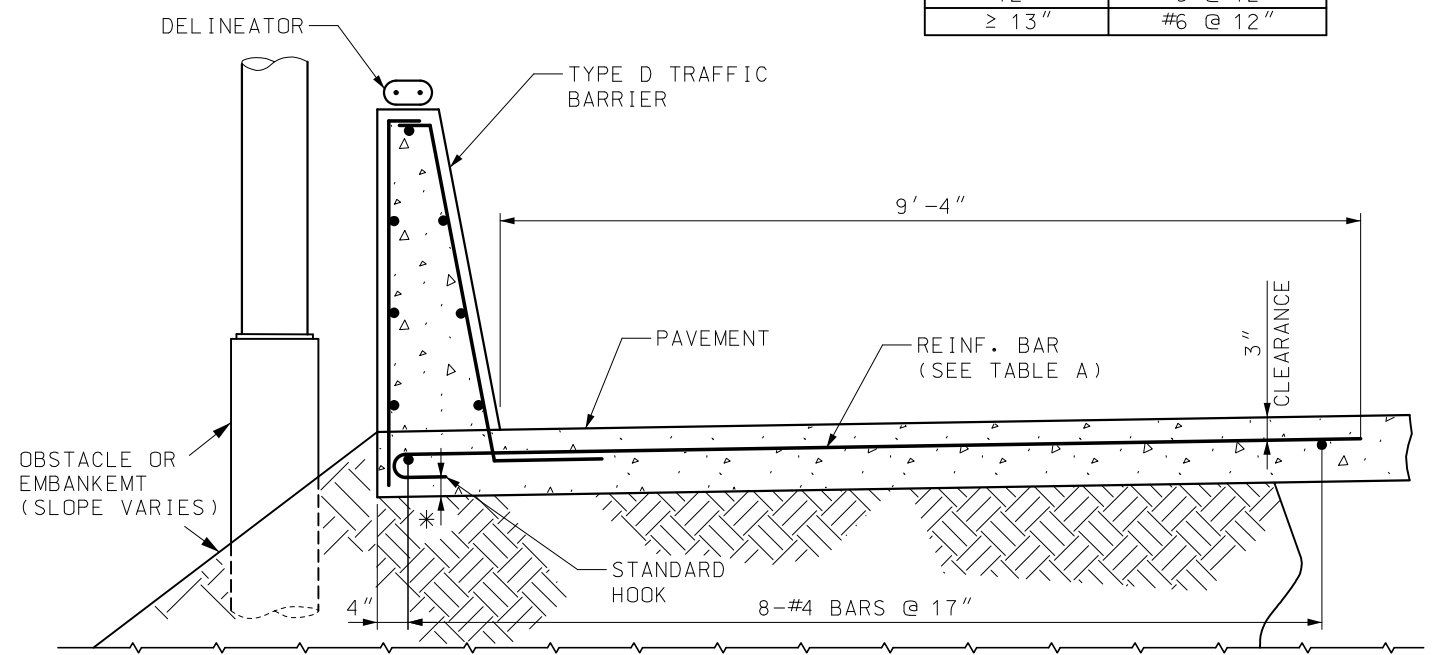
PAVEMENT THICKNESS **	BAR SIZE & SPACING
8"	#5 @ 4"*
9"	#5 @ 5"*
10"	#5 @ 6"
11"	#5 @ 7"
12"	#6 @ 12"
≥ 13"	#6 @ 12"

NOTES:

- TYPE D SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2" UNLESS OTHERWISE SHOWN.
- \* TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1 1/2" MINIMUM CLEARANCE.
- \*\* SEE ROADWAY PAVEMENT DESIGN.
- \*\*\* R1 AND R2 MAY BE REPLACED WITH ALTERNATE (3'-3") R1 AND R2 OR R5 ONLY FOR USE WITH OPTIONAL STIRRUP.



ALTERNATE PART SECTION THROUGH BARRIER WITH OPTIONAL STIRRUP



TYPE D TRAFFIC BARRIER - MOMENT SLAB\*\*

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**PERMANENT CONCRETE TRAFFIC BARRIER**

TYPE D ATOP MSE WALL AND MOMENT SLAB

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

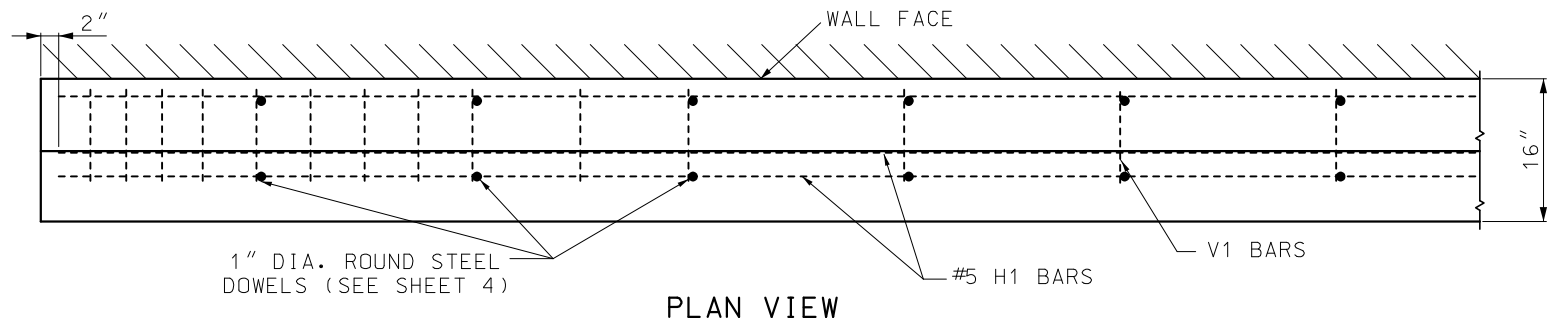
DATE EFFECTIVE: 10/01/2020

DATE PREPARED: 7/21/2020

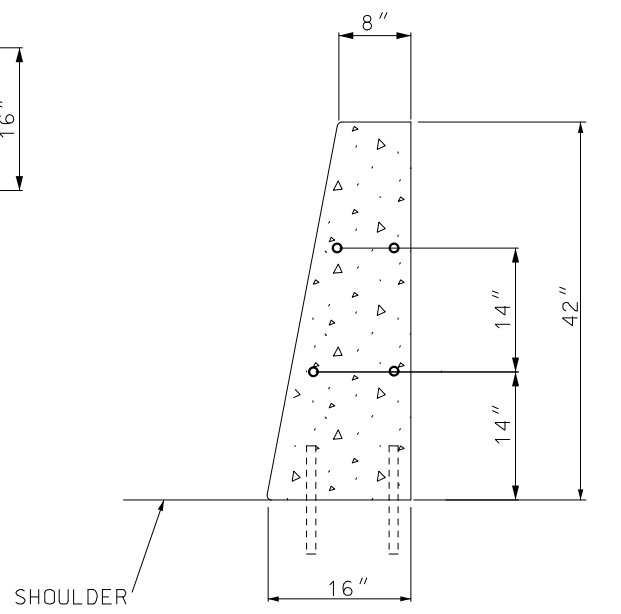
617.10M

SHEET NO.  
8 OF 11

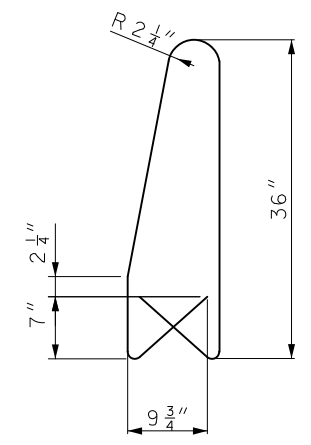
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



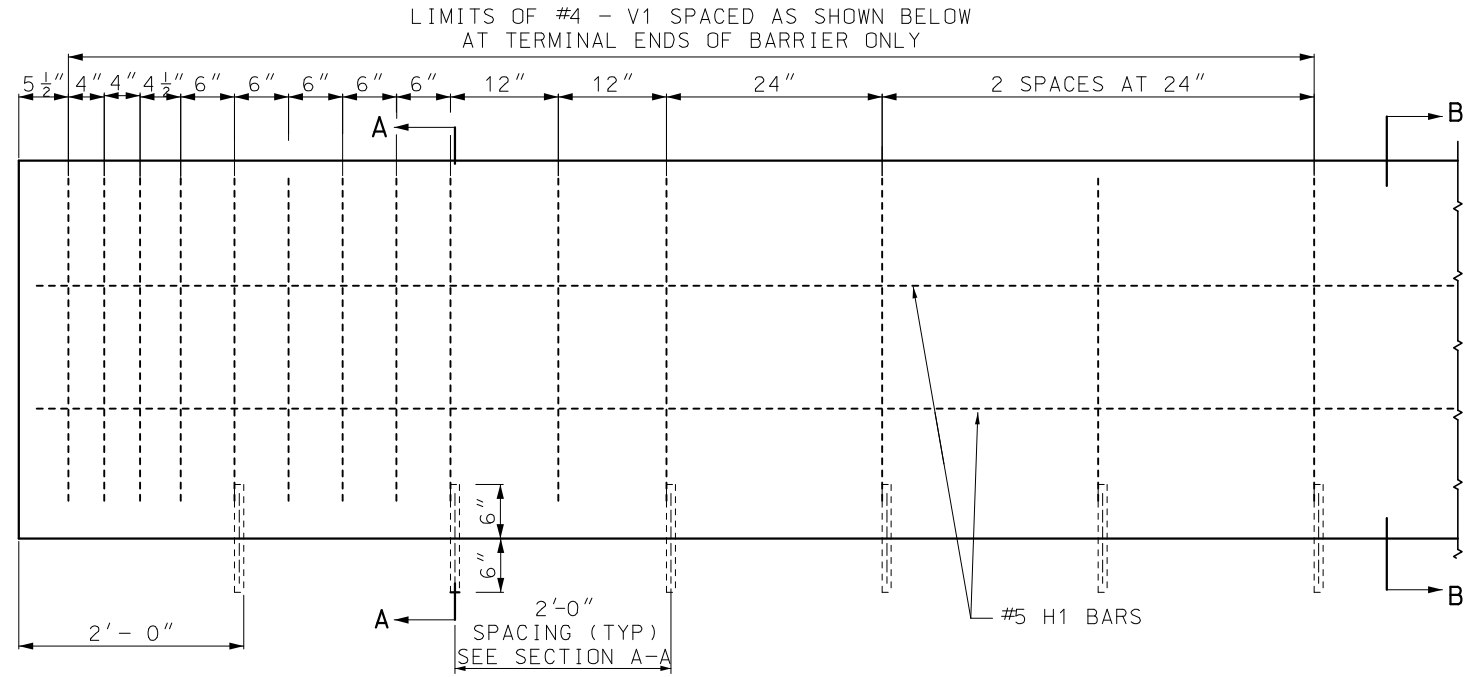
PLAN VIEW



TYPE D TYPICAL SECTION



V1 BAR (#4)

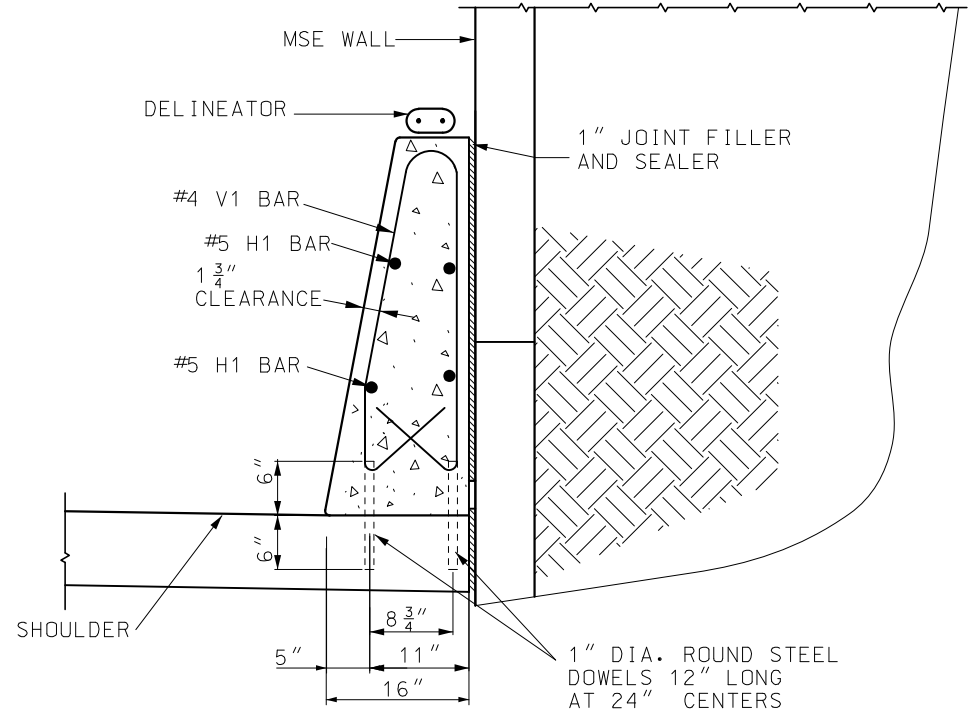


ELEVATION REINFORCING DETAILS

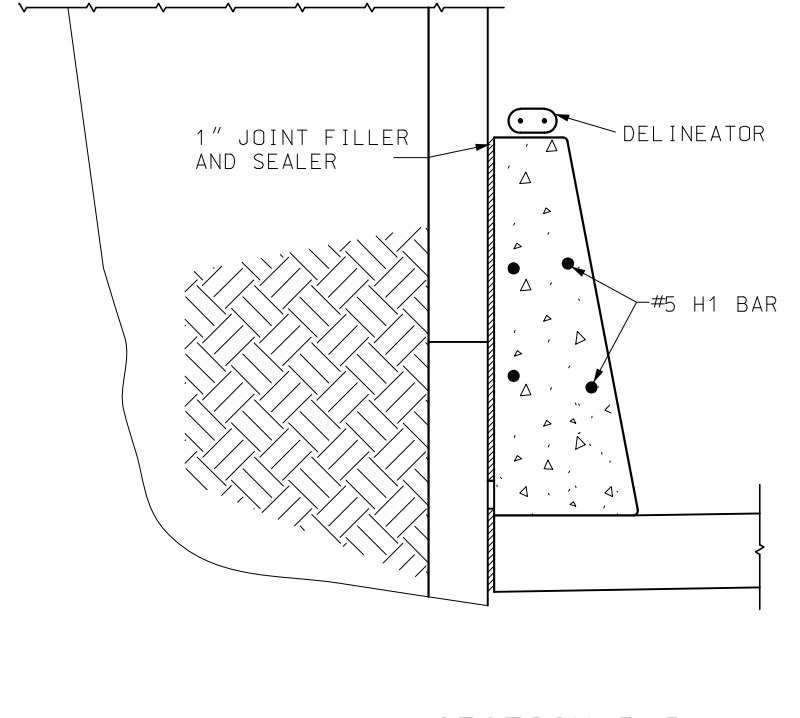
NOTES:

- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.
- ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED ± 1/2 INCH AS DIMENSIONED WILL BE SATISFACTORY.
- THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

- THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.
- THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.
- SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE STANDARD PLANS FOR SAWED JOINT DETAIL
- TYPE D BARRIER SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.
- #8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.



SECTION A-A



SECTION B-B

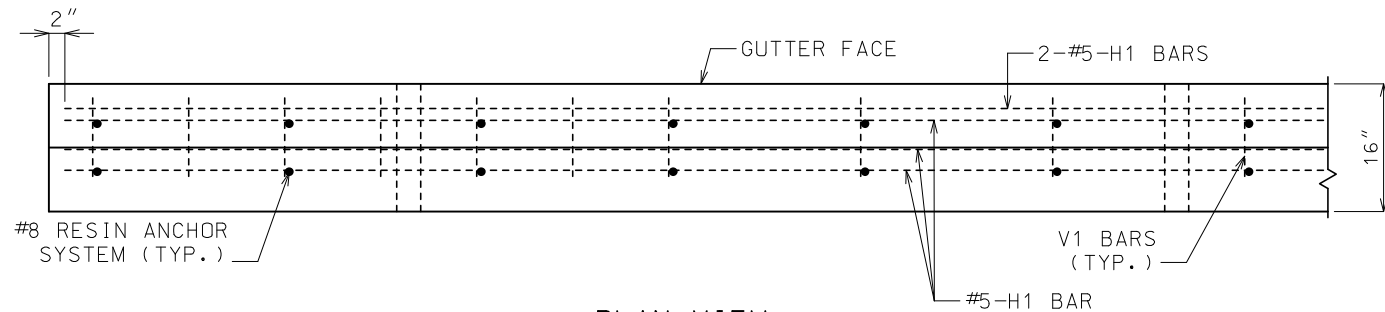
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**PERMANENT CONCRETE TRAFFIC BARRIER**  
 TYPE D BESIDE MSE WALL

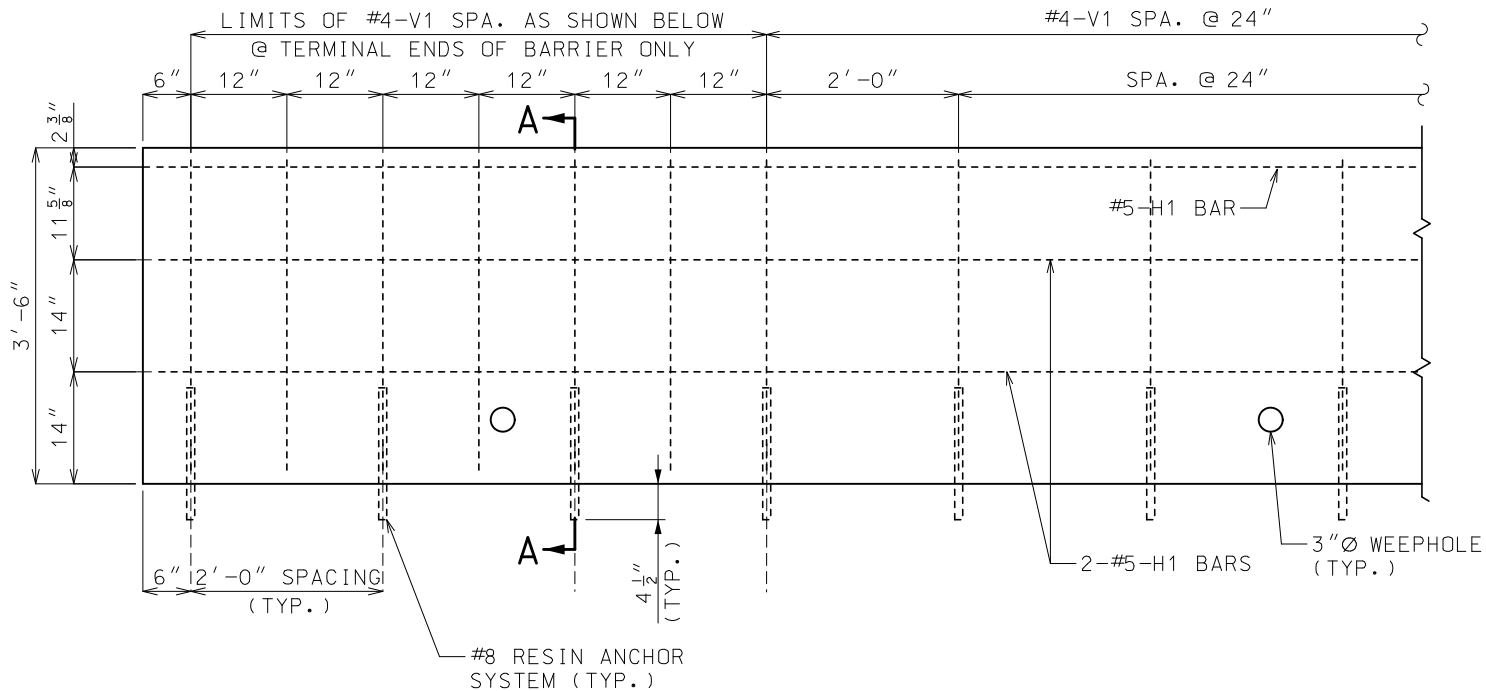
DATE EFFECTIVE: 10/01/2020	617.10M	SHEET NO. 9 OF 11
DATE PREPARED: 7/21/2020		

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

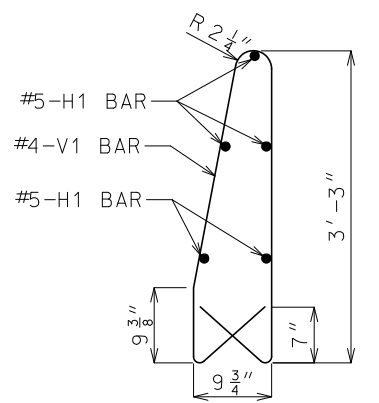


PLAN VIEW

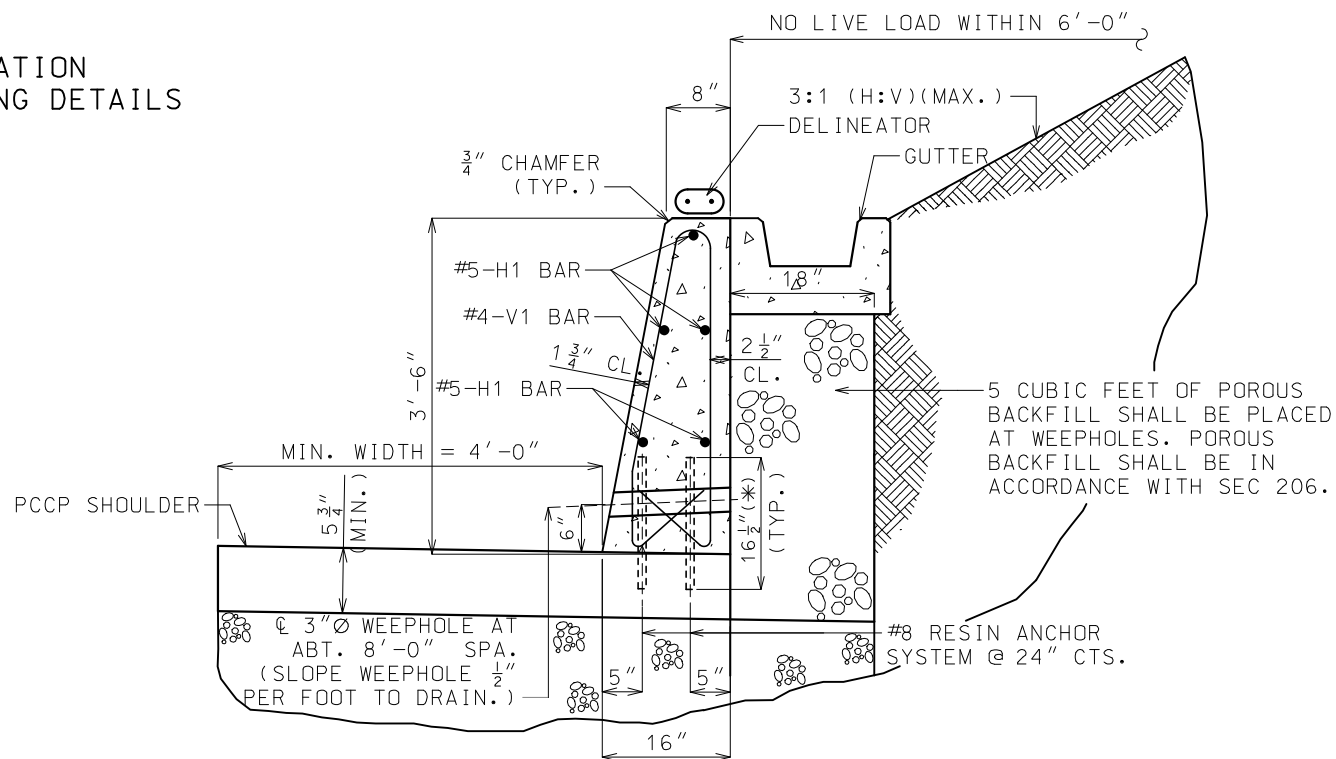
NOTE: GUTTER NOT SHOWN FOR CLARITY.



ELEVATION REINFORCING DETAILS



PART SECTION OF #4-V1 BAR



SECTION A-A (FOR SLOPING AND NONSLOPING BACKSLOPE)

(\* EMBED ANCHOR 4 1/2" INTO PCCP SHOULDER.)

GENERAL NOTES:

CONCRETE SHALL BE CLASS B  $f'c = 4,000$  PSI.

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

ANGLE OF INTERNAL FRICTION,  $\phi_f \geq 30^\circ$  FOR BACKFILL MATERIAL.

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

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm 1/2$  INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.

THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATION.


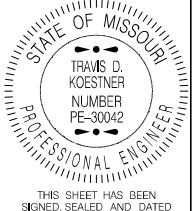
SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.

TYPE D BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATOR DETAILS SEE STD PLAN 903.03.

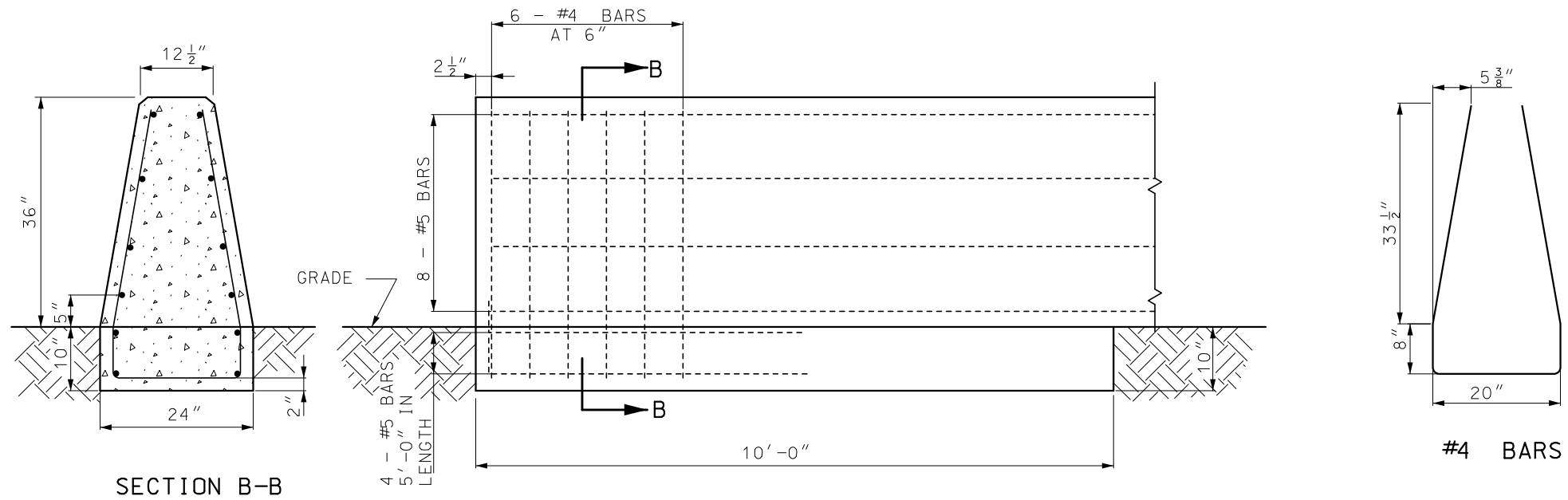
RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.

WHEN BARRIER HEIGHT EXCEEDS 42" OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN 6'-0", CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.

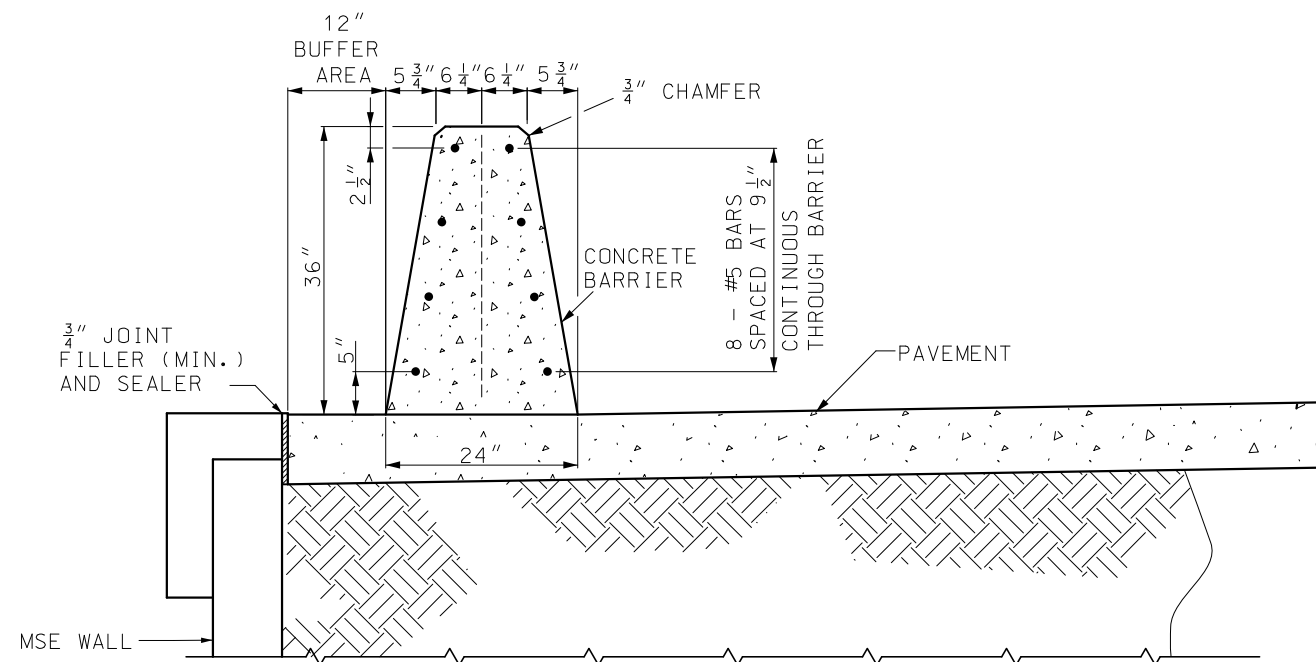
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER</b> TYPE D AS RETAINING WALL
DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020	SHEET NO. <b>617.10M 10 OF 11</b>

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






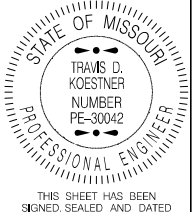
CONCRETE BARRIER END ANCHORAGE ON GRADE



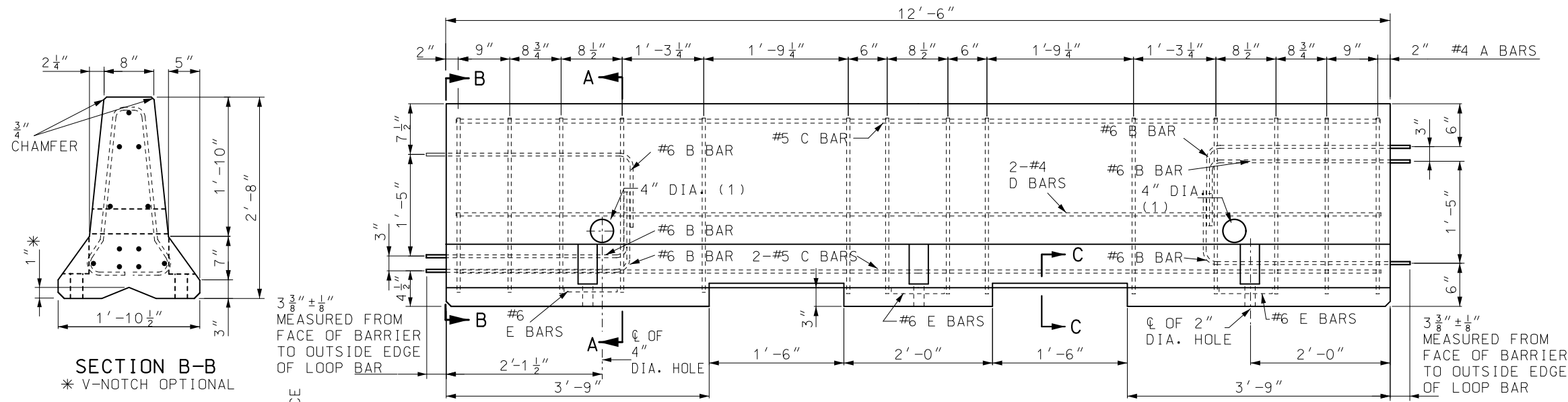
TRAFFIC BARRIER ON TOP OF MSE WALL

GENERAL NOTES:

- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.
- A 12" BUFFER REQUIRED WITHIN THE LIMITS OF THE TRAFFIC BARRIER EXCLUDING THE END ANCHORAGE SECTIONS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
- PAVEMENT SURFACE DIFFERENTIAL SHALL NOT EXCEED 1 1/2".
- BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

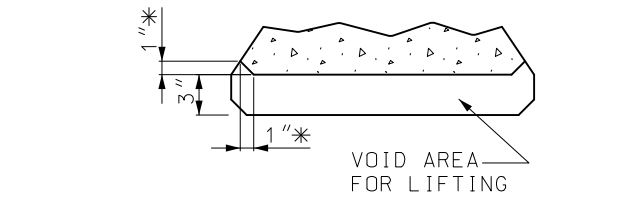
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER</b> TYPE E ATOP MSE WALL
DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020	SHEET NO. <b>617.10M 110F 11</b>

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

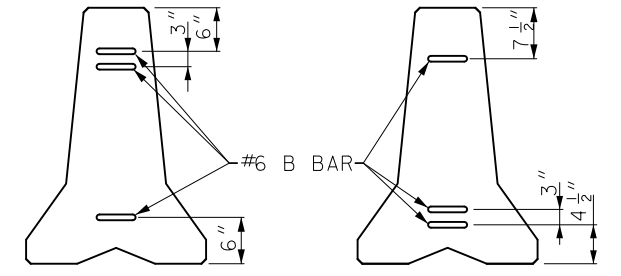


ELEVATION VIEW

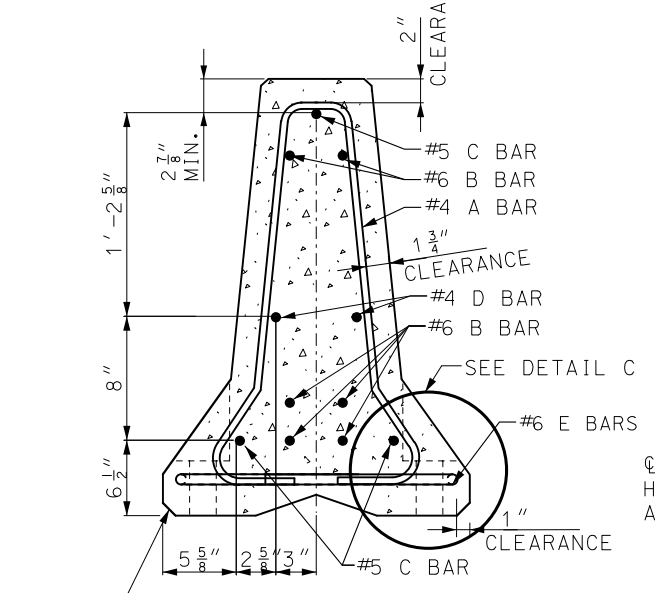
(1) 4 INCH DIAMETER - 11 GAUGE STEEL ROUND MECHANICAL TUBING SLEEVE. THESE HOLES ARE OPTIONAL.



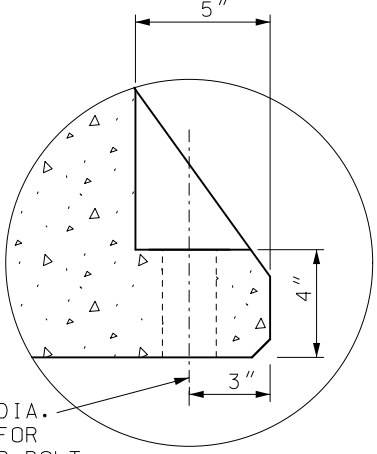
PART SECTION C-C LIFTING SLOT DETAIL  
\* RADIUS EDGER TO PREVENT SPALLING



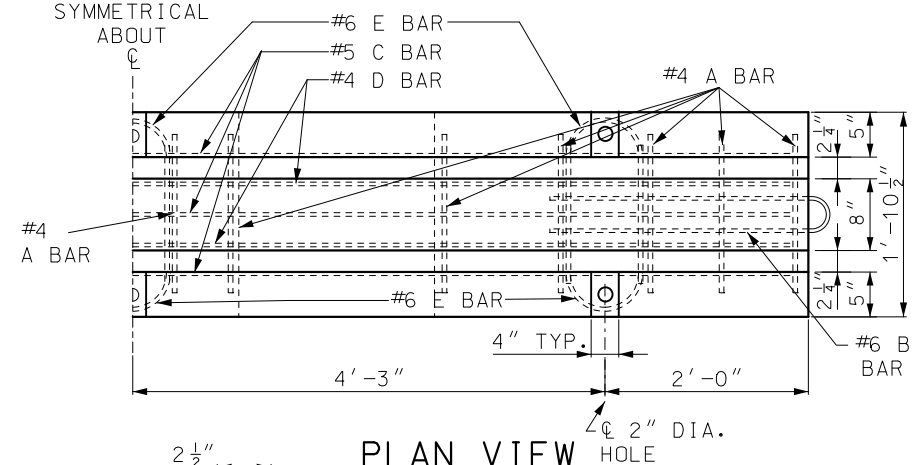
ALTERNATING END VIEWS FOR BARRIER LOOP CONNECTION



SECTION B-B  
\* V-NOTCH OPTIONAL



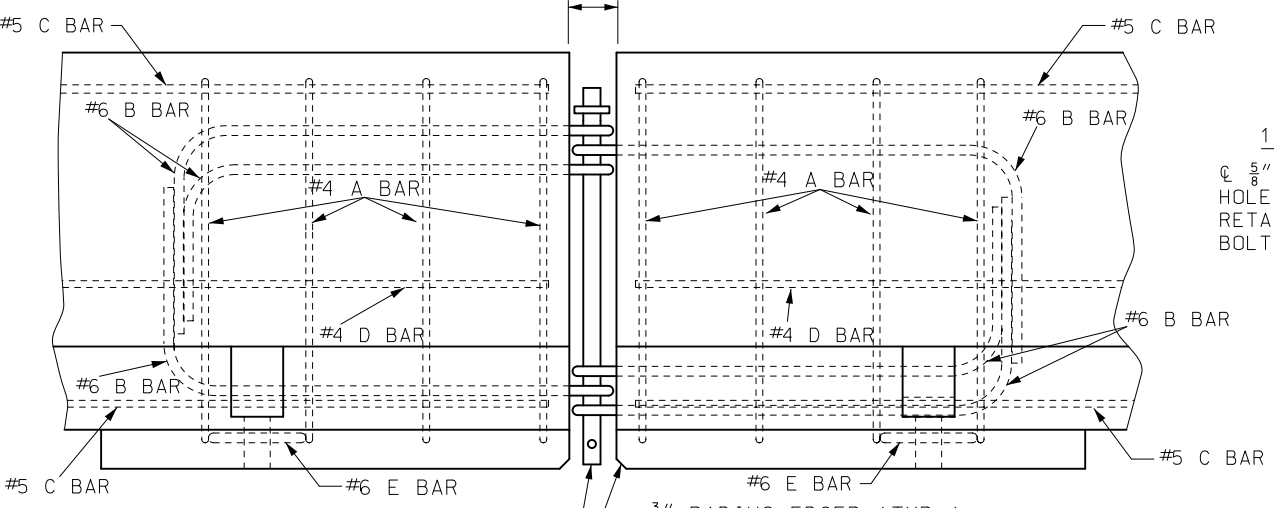
DETAIL C



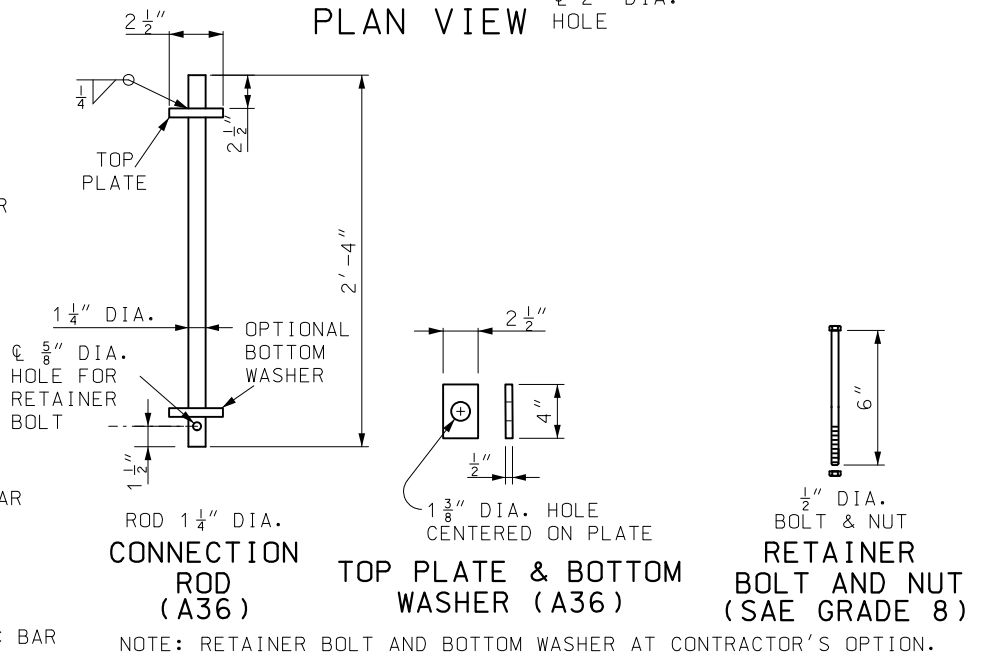
PLAN VIEW



SECTION A-A  
STIRRUP PLACEMENT WITH BAR REINFORCEMENT



SEE DETAIL A  
DETAILS OF BARRIER CONNECTION



DETAIL A  
CONNECTION ROD ASSEMBLY

GENERAL NOTES:

- ALL REINFORCING SHALL MEET REQUIREMENTS OF CRSI EXCEPT WHERE SHOWN ON PLANS.
- REINFORCING STEEL CLEARANCE TO EDGE OF CONCRETE SHALL BE 1 3/4" UNLESS OTHERWISE SHOWN.
- AT NO TIME SHALL THE BARRIERS BE LIFTED OR MOVED BY USE OF THE LOOP BARS.
- THE SECTION FURNISHED SHALL COMPLY WITH DIMENSIONS SHOWN, AS APPROVED BY THE ENGINEER.
- SEE SHEET 3 FOR DELINEATOR DETAILS.

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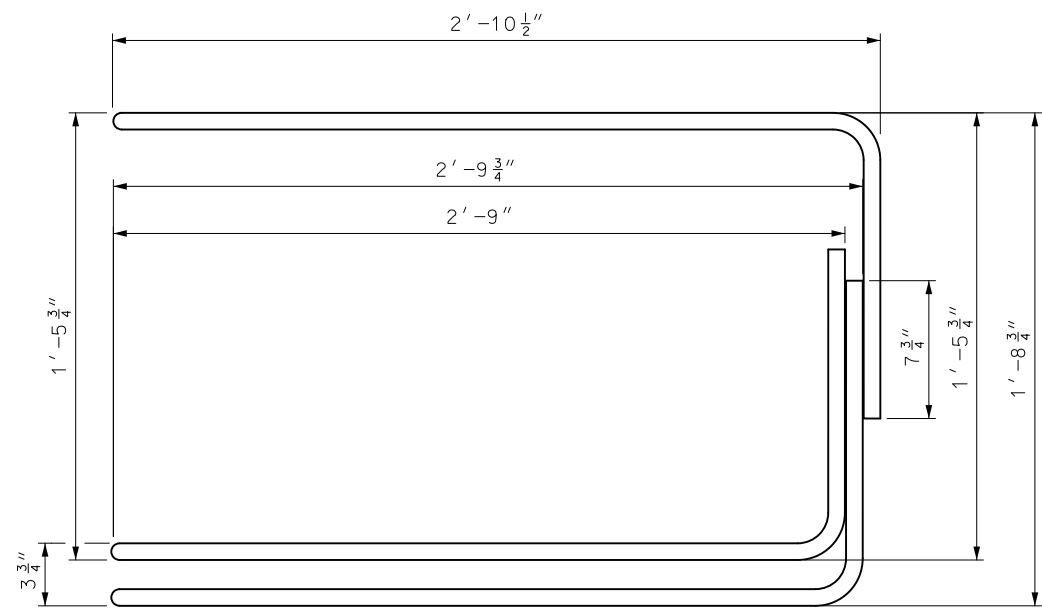
STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

**TEMPORARY CONCRETE TRAFFIC BARRIER**  
TYPE F

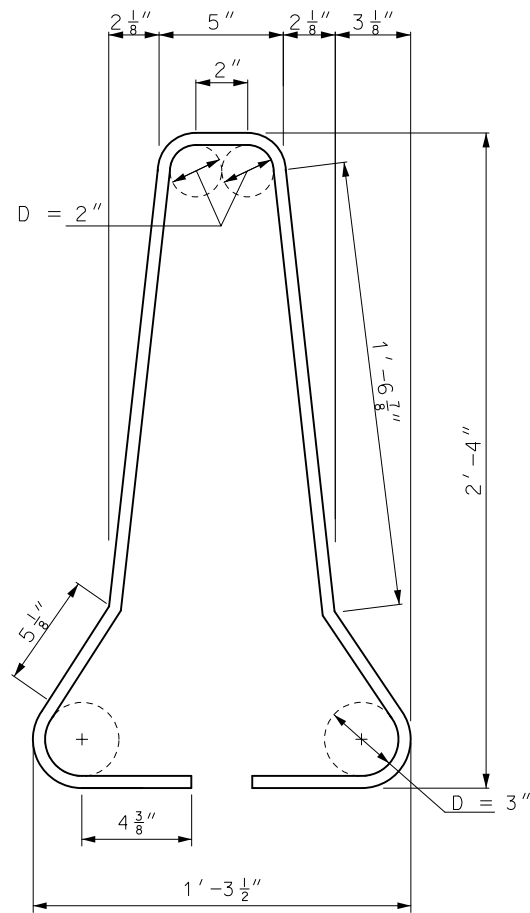
DATE EFFECTIVE: 01/01/2021	<b>617.20F</b>	SHEET NO. 1 OF 8
DATE PREPARED: 10/14/2020		

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

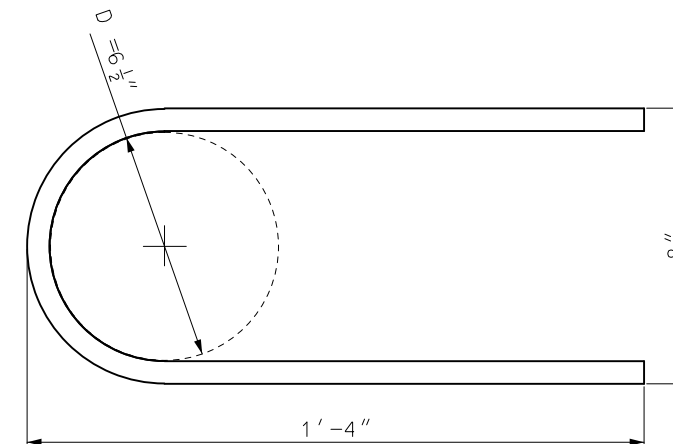
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



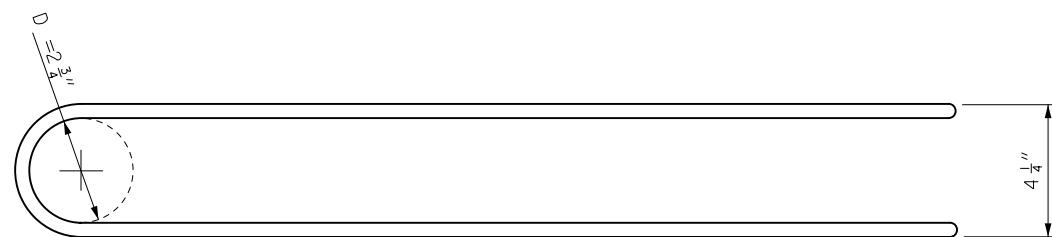
#6 B BAR ELEVATION








#4 A BARS



#6 E BAR



#6 B BAR PLAN

REINFORCING BARS					
PER 12'-6" BARRIER SECTION					
MARK	BAR SIZE	NO. OF BARS	SHAPE OF EACH	LENGTH EACH (NOM.)	WEIGHT
A	4	14		6'-5"	60.8 lbs
C	5	3		12'-2"	38.1 lbs
D	4	2		12'-2"	16.3 lbs
E	6	6		2'-11"	26.3 lbs
LOOP ASSEMBLY					
B	6	6		7'-10"	70.5 lbs

CONCRETE VOLUME 1.3 CU YDS APPROXIMATE WEIGHT 5601 LBS.

GENERAL NOTE:

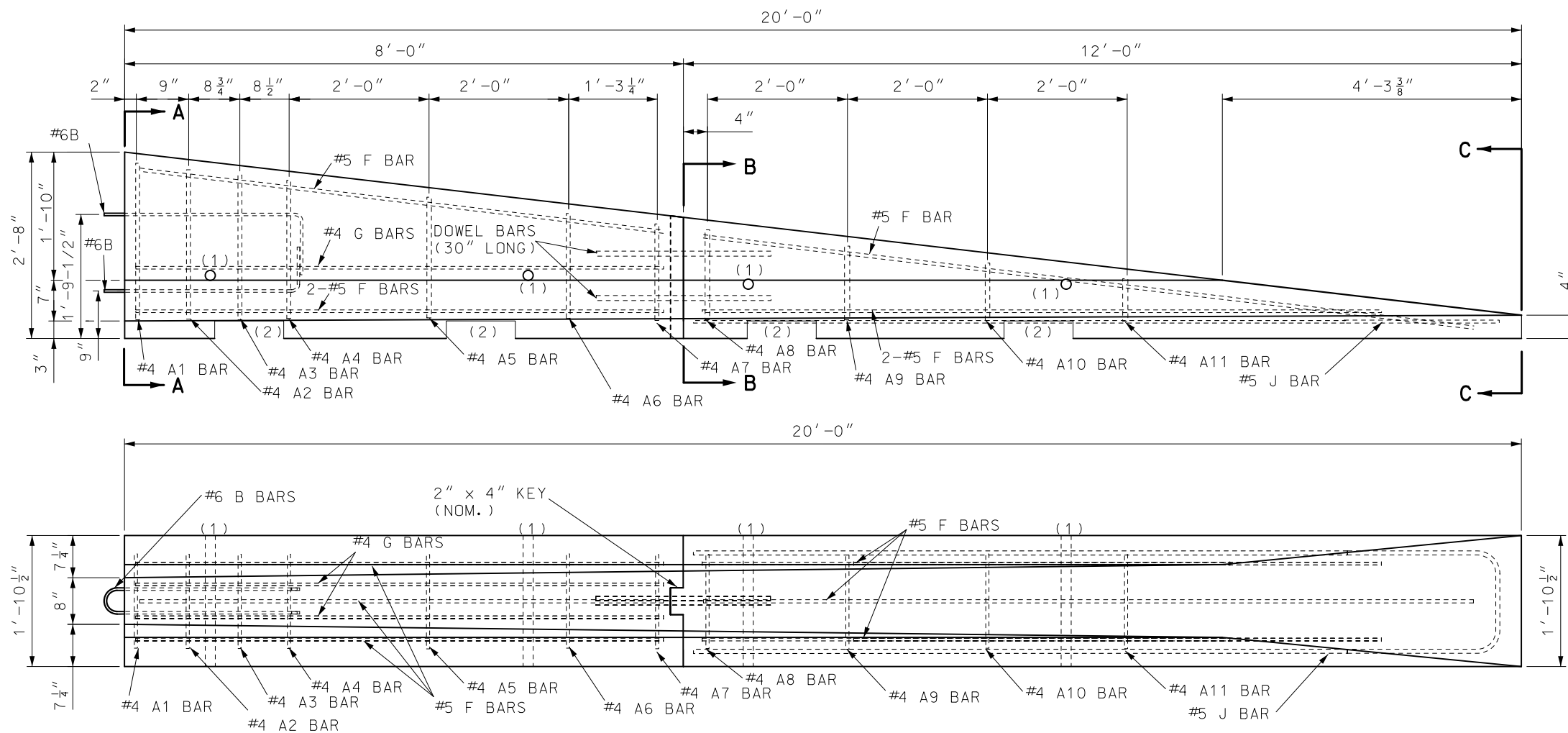
DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE NOTED.

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

STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

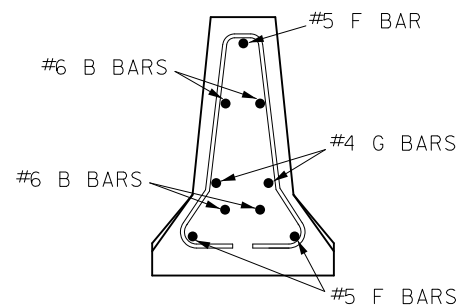
**TEMPORARY CONCRETE TRAFFIC BARRIER**  
 TYPE F

DATE EFFECTIVE: 01/01/2021	<b>617.20F</b>	SHEET NO. 2 OF 8
DATE PREPARED: 10/14/2020		

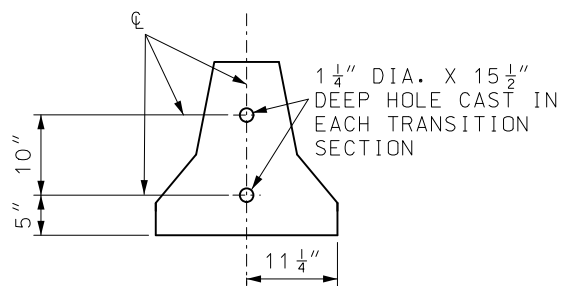


**PRECAST BARRIER HEIGHT TRANSITION**  
(TEMPORARY INSTALLATIONS ONLY)

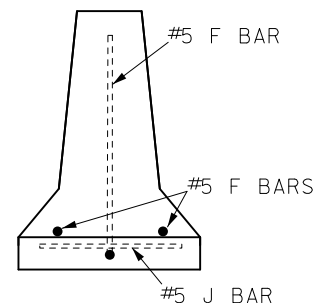
- (1) OPTIONAL 4 INCH DIAMETER, 11 GAUGE STEEL ROUND MECHANICAL TUBING SLEEVE FOR LIFT HOLE ALLOWED. THE LOCATION OF THE HOLE MAY VARY TO ACCOMMODATE THE DIFFERING WEIGHT DISTRIBUTIONS OF TRANSITION SECTIONS.
- (2) 3" X 1'-0" SLOTS FOR LIFTING - TWO PER SECTION. LOCATION TO BE DETERMINED BY CONTRACTOR.



SECTION A-A

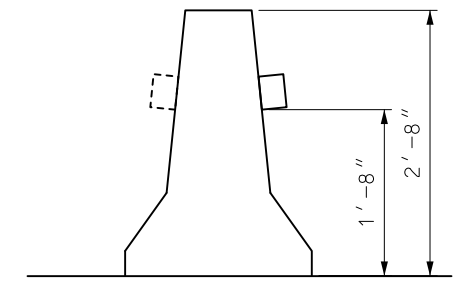


SECTION B-B



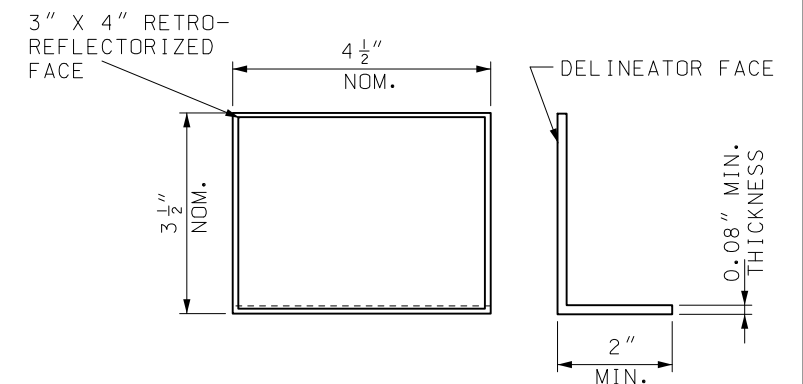
SECTION C-C

NOTE: SECTIONS TO BE CONNECTED WITH TWO- 1" DIA. BARS OR #8 REINFORCING BARS 30" LONG IN 1 1/4" DIA. HOLES AS SHOWN.



**TRAFFIC BARRIER DELINEATORS**

REFLECTIVE SHEETING APPLIED TO TRAFFIC BARRIER DELINEATORS SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.



DELINEATOR

GENERAL NOTES:


REINFORCING STEEL CLEARANCE TO EDGE OF CONCRETE SHALL BE 1 3/4" UNLESS OTHERWISE SHOWN.


HEIGHT TRANSITIONS SHALL NOT BE USED ON INTERSTATE ROUTES OR IN LOCATIONS WHERE THE POSTED SPEED PRIOR TO CONSTRUCTION IS GREATER THAN 35 MPH.

AT NO TIME SHALL THE BARRIERS BE LIFTED OR MOVED BY USE OF THE LOOP BARS.

RETAINER BOLT AND NUT MUST BE USED WITH TRANSITION BARRIER.

AT THE OPTION OF THE CONTRACTOR, HEIGHT TRANSITIONS MAY BE MANUFACTURED IN ONE SECTION. THE PLANS FOR REINFORCEMENT ACROSS JOINT SHALL BE APPROVED BY THE ENGINEER PRIOR TO MANUFACTURE.

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

STATE OF MISSOURI  
  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

**TEMPORARY CONCRETE TRAFFIC BARRIER**  
TYPE F HEIGHT TRANSITIONS

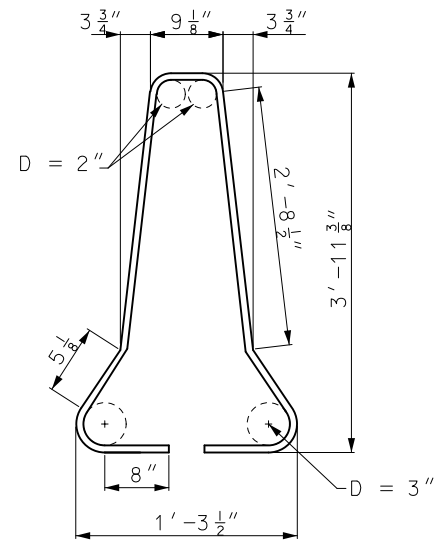
DATE EFFECTIVE: 01/01/2021  
 DATE PREPARED: 10/14/2020

**617.20F**

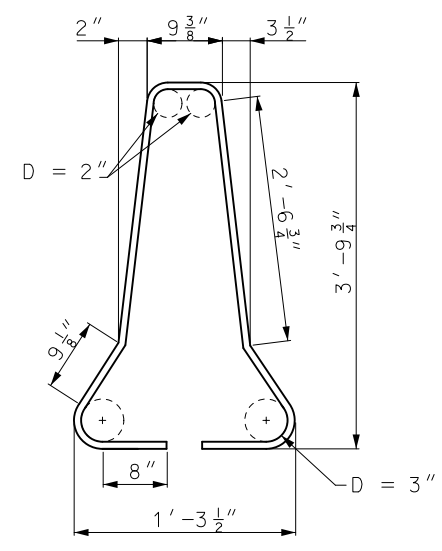
SHEET NO.  
3 OF 8

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

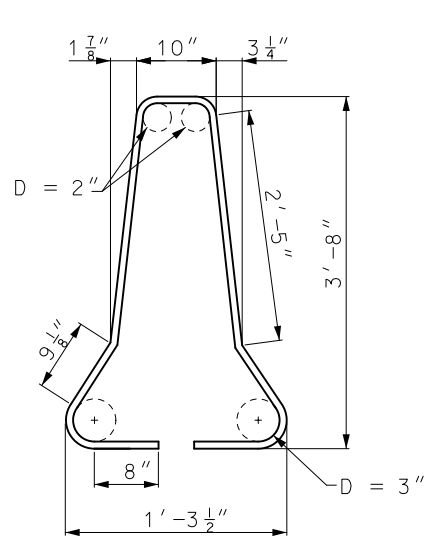
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



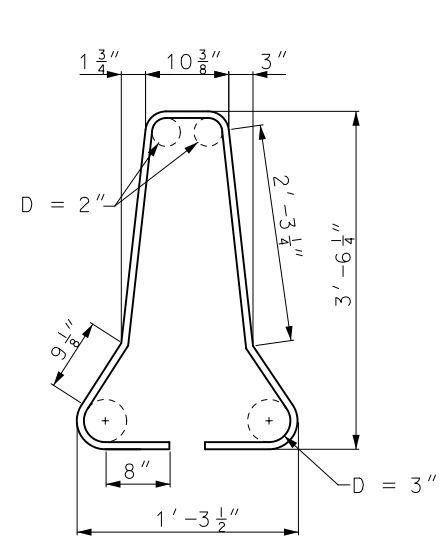
#4 A1 BAR



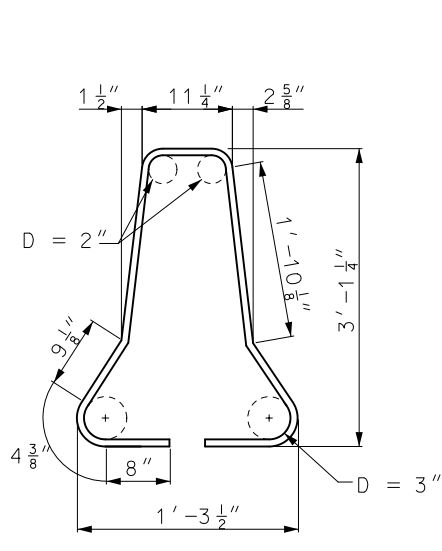
#4 A2 BAR



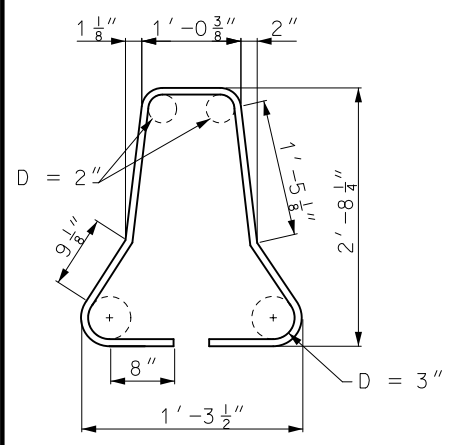
#4 A3 BAR



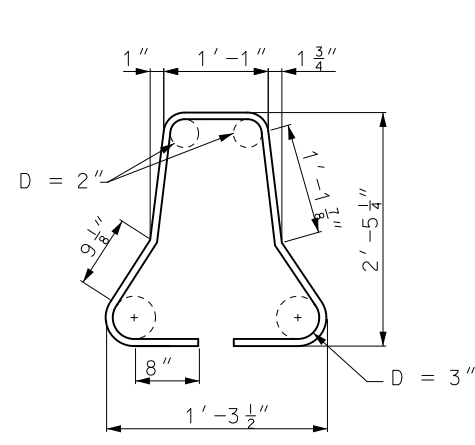
#4 A4 BAR



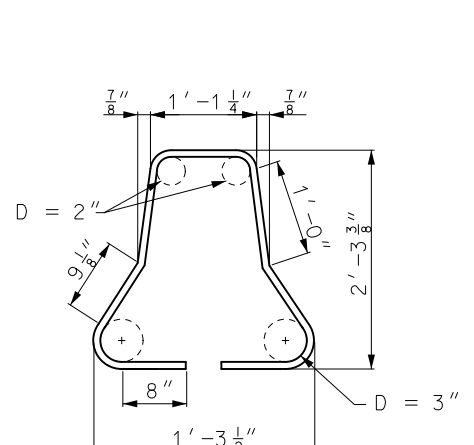
#4 A5 BAR



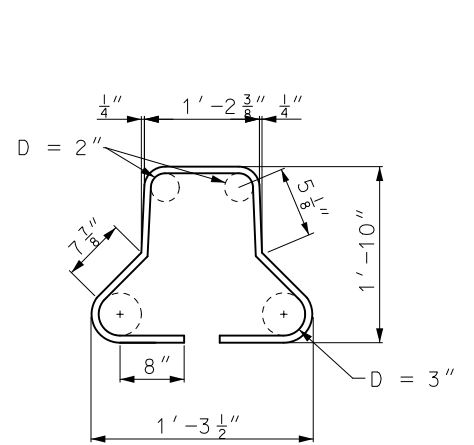
#4 A6 BAR



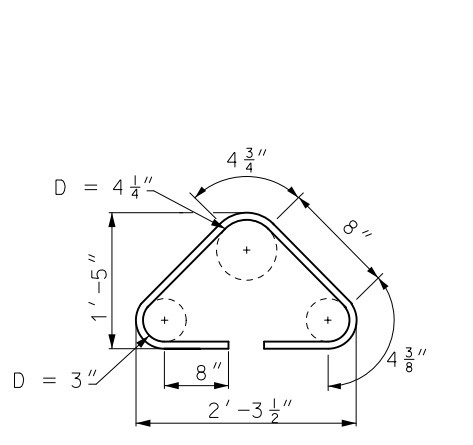
#4 A7 BAR



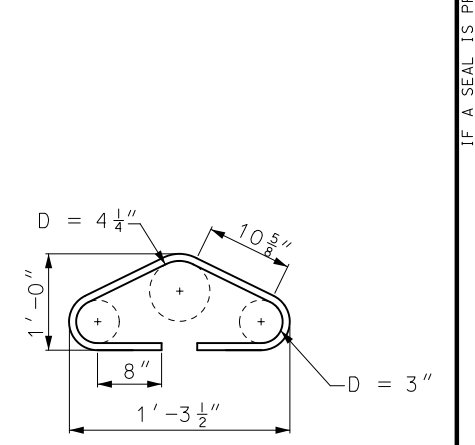
#4 A8 BAR



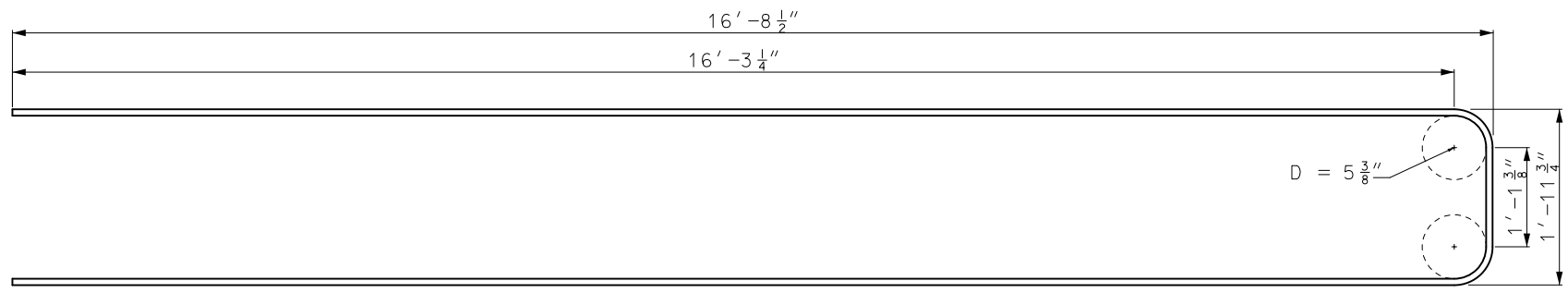
#4 A9 BAR



#4 A10 BAR



#4 A11 BAR



#5 J BAR

NOTE: FOR DETAILS OF B BARS, SEE SHEET 2 OF 6.

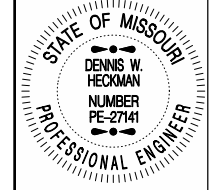
GENERAL NOTES:

DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE NOTED.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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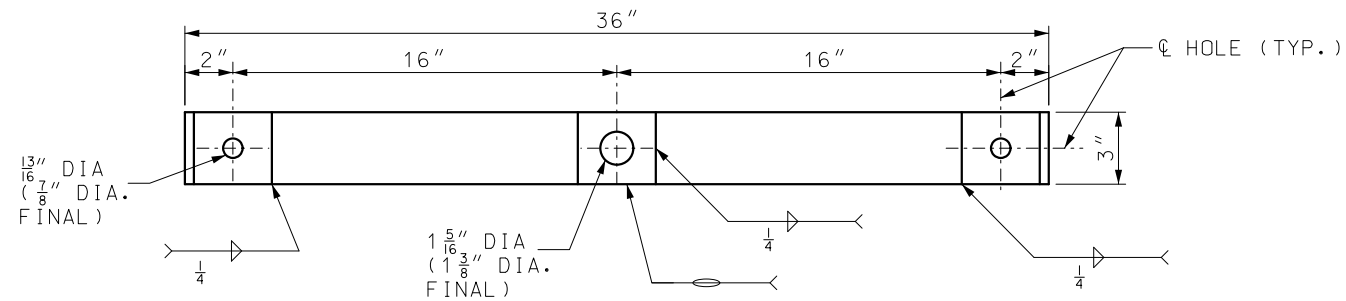
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TEMPORARY CONCRETE TRAFFIC BARRIER  
TYPE F HEIGHT TRANSITIONS

DATE EFFECTIVE: 01/01/2021  
DATE PREPARED: 10/14/2020

617.20F

SHEET NO.  
4 OF 8



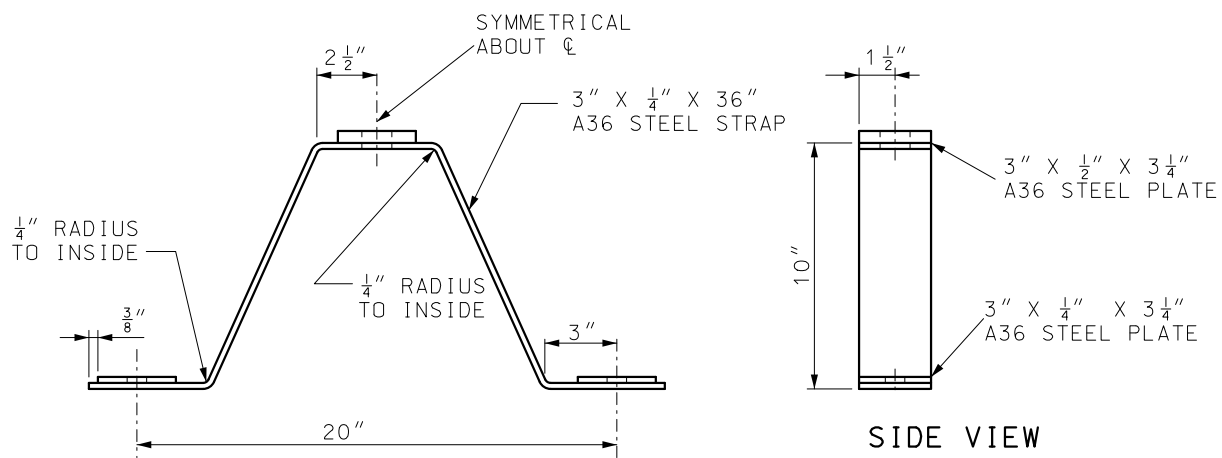
PLAN OF TIE-DOWN STRAP

(1) TIE-DOWN STRAP ANCHOR SHALL BE ONE OF THE FOLLOWING:

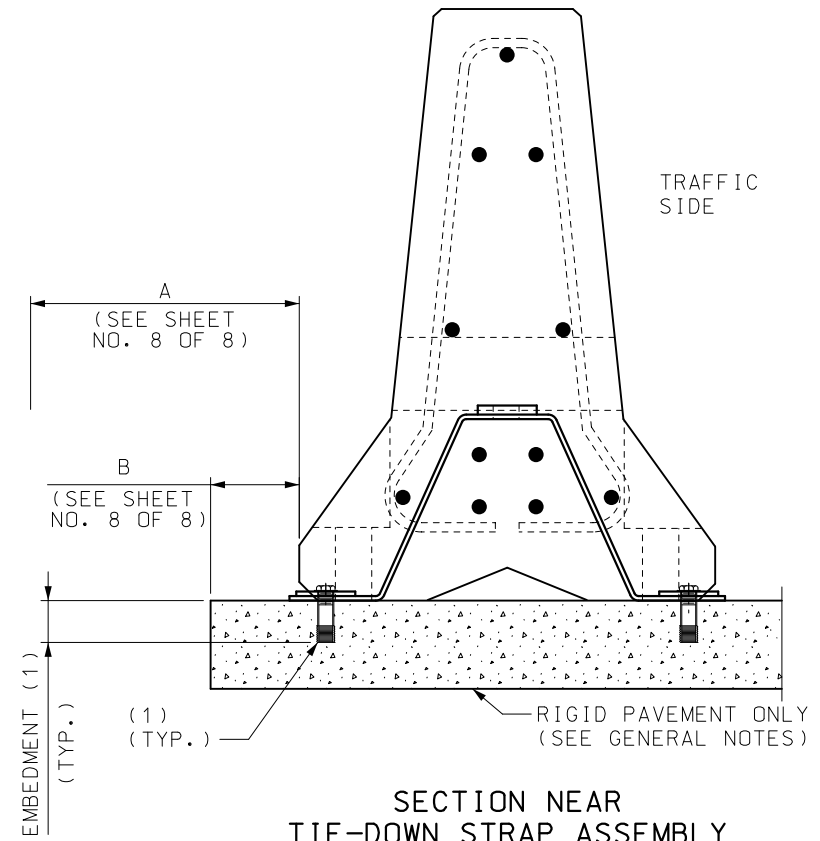
3/4" DROP IN ANCHOR WITH A 3 1/4" EMBEDMENT AND 3/4" DIA. X 1 3/4" LONG GRADE 5 BOLT.

RED HEAD LARGE DIAMETER TAPCON (LDT) 3/4" X 4 1/2" LONG WITH A 4" EMBEDMENT.

SIMPSON TITEN HD 3/4" DIA. X 5" LONG WITH A 4 1/2" EMBEDMENT.

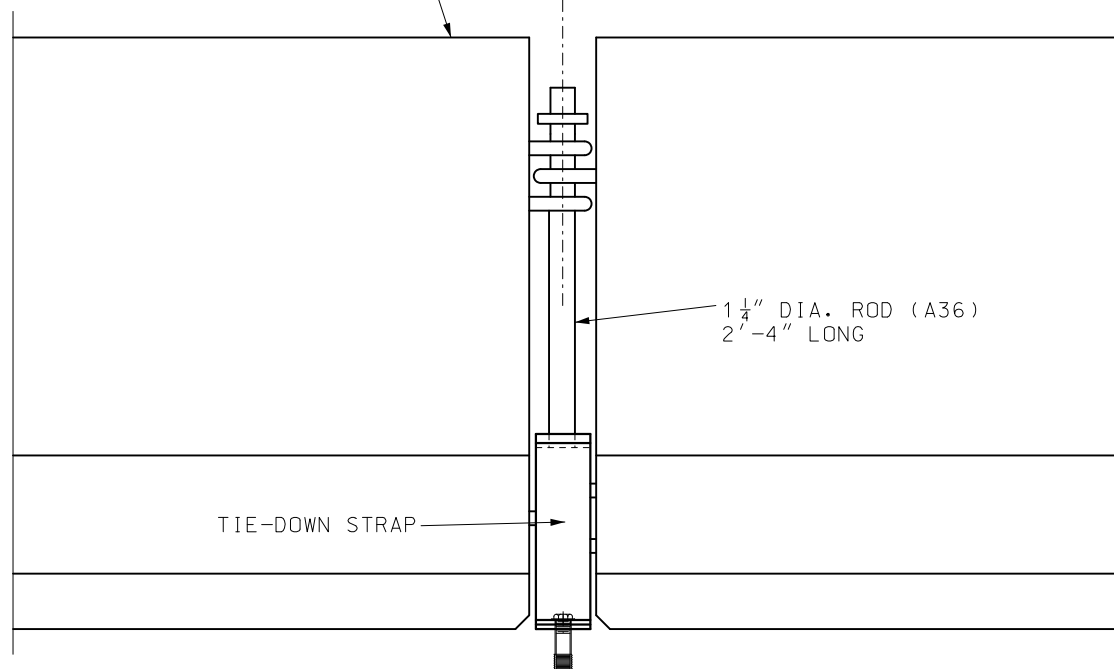


DETAILS OF TYPE F TEMPORARY BARRIER TIE-DOWN STRAP

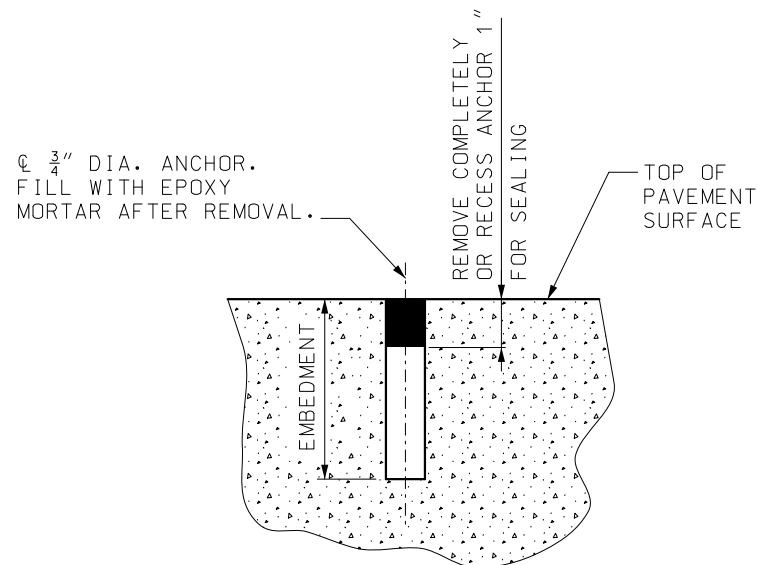


SECTION NEAR TIE-DOWN STRAP ASSEMBLY

TYPE F BARRIER (TYP.) CONNECTION ROD ASSEMBLY



PART ELEVATION OF BARRIER



DETAIL SHOWING SEALING OF HOLES AFTER REMOVAL OF TIE-DOWN BOLTS

GENERAL NOTES:

TIE-DOWN STRAP SYSTEMS ARE ONLY APPLICABLE ON RIGID PAVEMENTS.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
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STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER  
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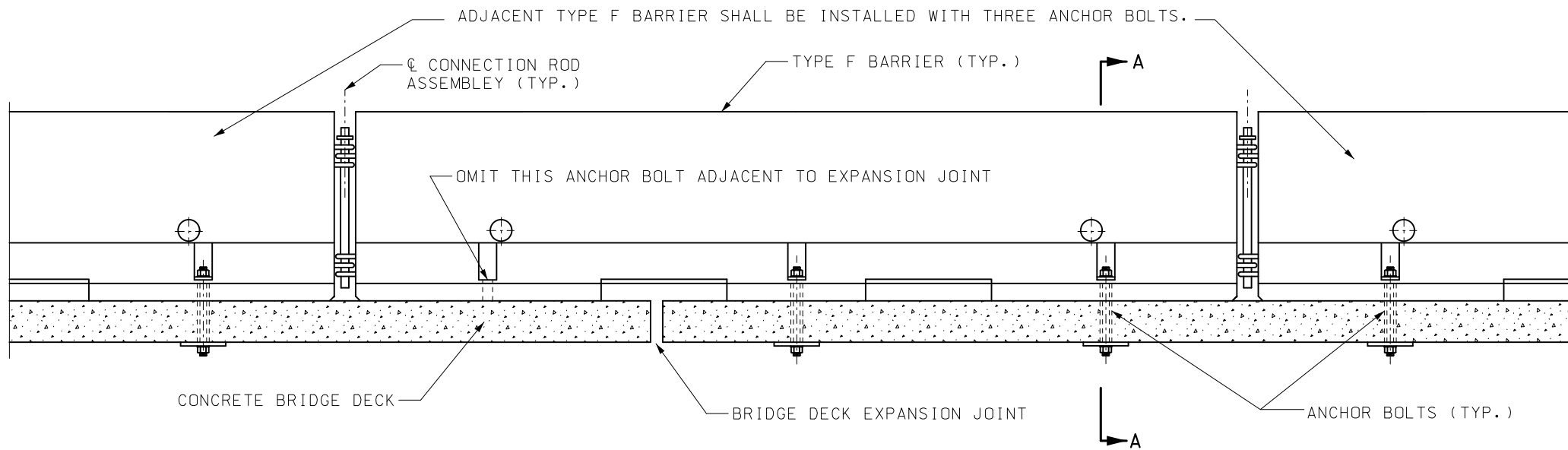
**TEMPORARY CONCRETE TRAFFIC BARRIER**  
 ANCHORED (TIE-DOWN STRAP SYSTEM)

DATE EFFECTIVE: 01/01/2021  
 DATE PREPARED: 10/14/2020

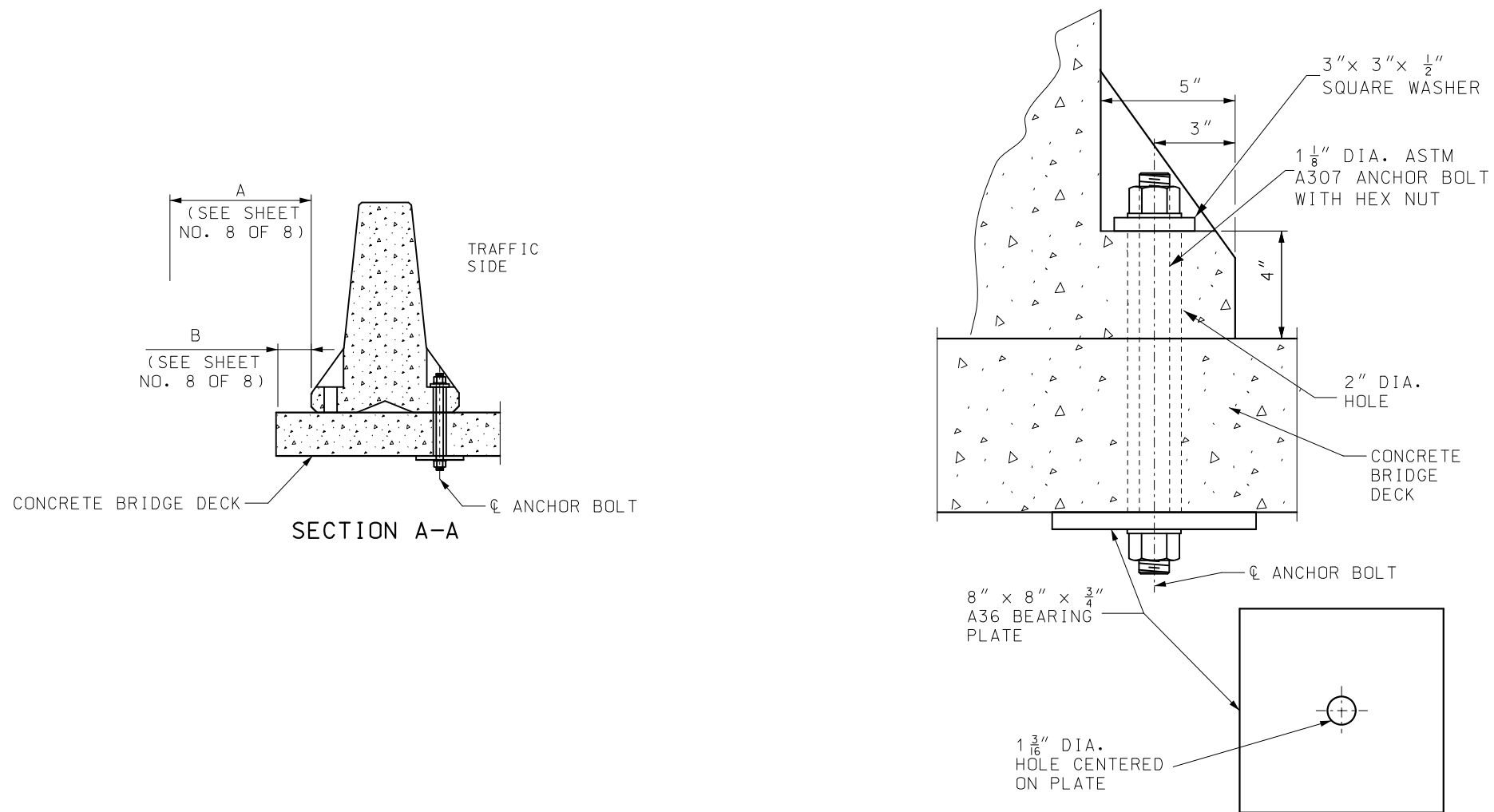
**617.20F**

SHEET NO. 5 OF 8

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



BOLT THROUGH DECK AT THERMAL EXPANSION JOINTS



BOLT THROUGH DECK DETAIL


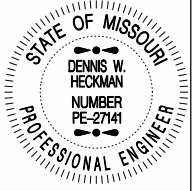
GENERAL NOTES:

ANCHOR BOLT SYSTEMS ARE ONLY APPLICABLE ON BRIDGE DECKS AND RIGID PAVEMENTS.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

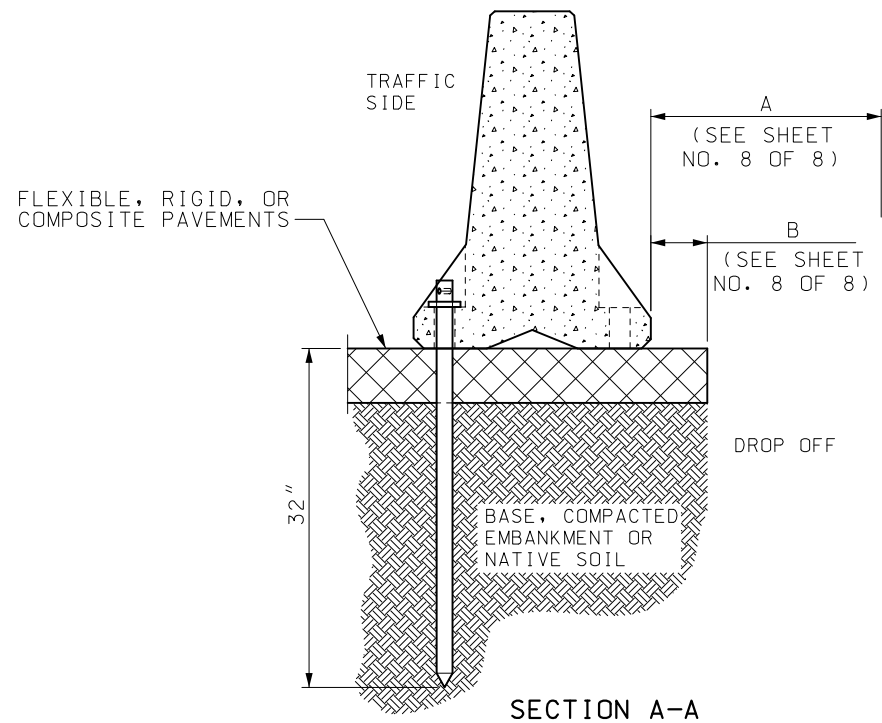
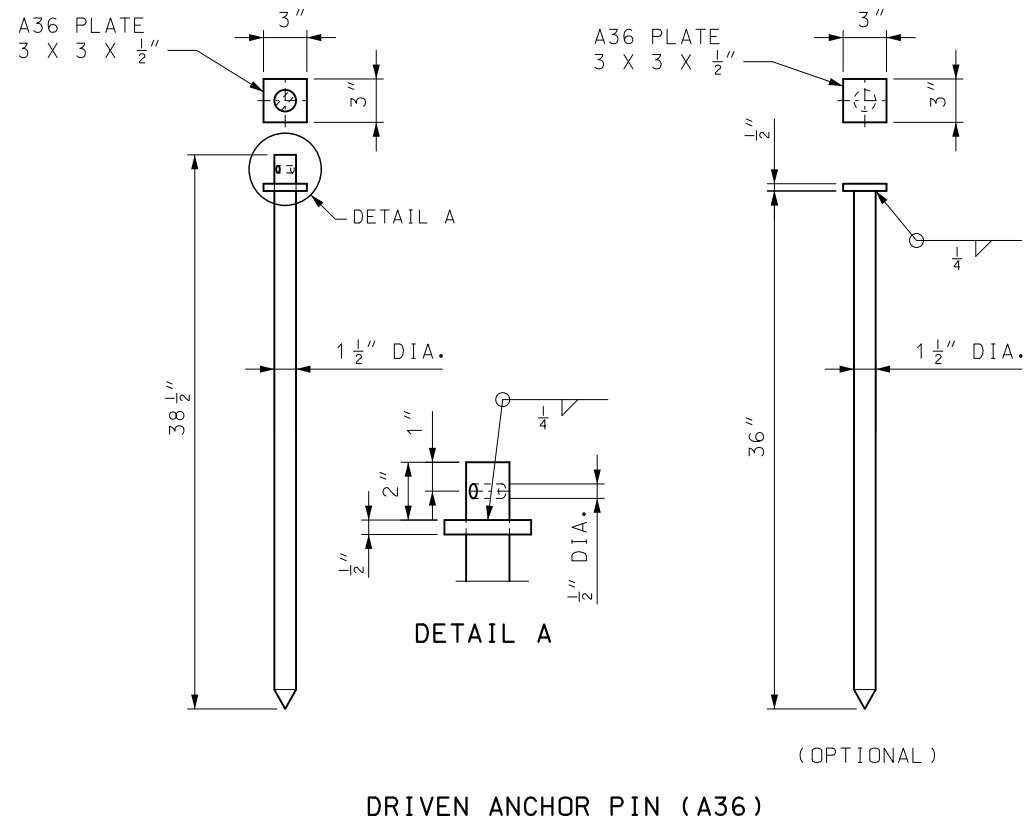
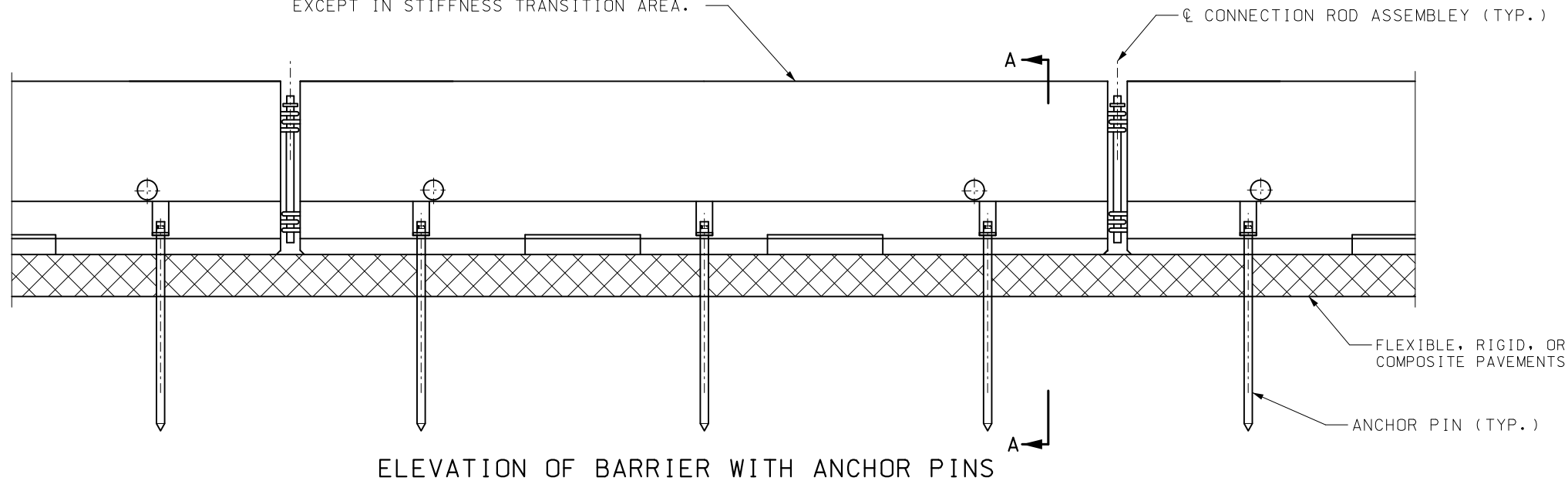
SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

AFTER REMOVAL OF ANCHOR BOLTS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704 OR AN EPOXY BONDING AGENT IN ACCORDANCE WITH SEC 1039.

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI DENNIS W. HECKMAN NUMBER PE-27141 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>TEMPORARY CONCRETE TRAFFIC BARRIER</b> ANCHORED (BOLT SYSTEM)</p>
<p>DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020</p>	<p><b>617.20F</b></p>
<p>SHEET NO. 6 OF 8</p>	

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

TYPE F BARRIER SHALL BE INSTALLED WITH THREE DRIVEN ANCHOR PINS (TYP.), EXCEPT IN STIFFNESS TRANSITION AREA.



GENERAL NOTES:

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

WHERE EXISTING FLEXIBLE PAVEMENT OR RIGID PAVEMENT IS NOT PRESENT A 2" THICK X 30" WIDE MINIMUM ASPHALT PAD SHALL BE CONSTRUCTED.

COST OF FURNISHING AND INSTALLING THE ASPHALT PAD COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

AFTER REMOVAL OF ANCHOR PINS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

STATE OF MISSOURI  
DENNIS W. HECKMAN  
NUMBER PE-27141  
PROFESSIONAL ENGINEER

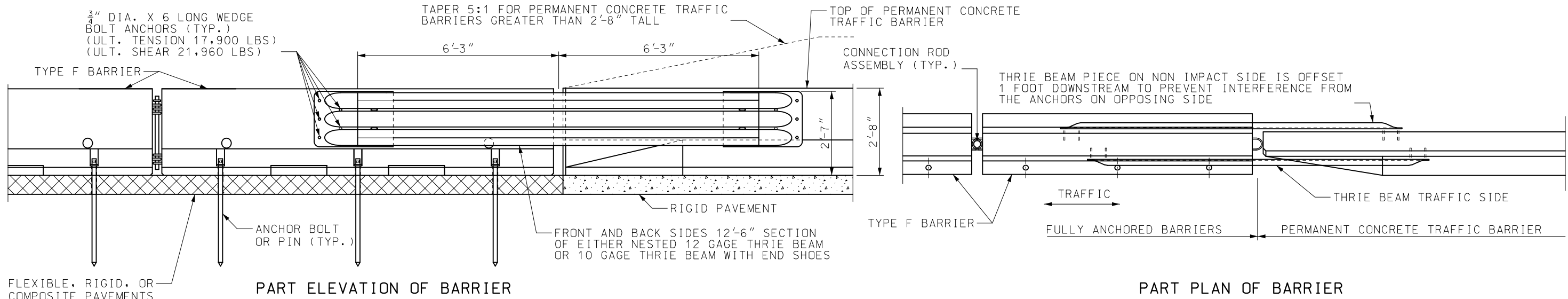
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TEMPORARY CONCRETE TRAFFIC BARRIER**  
ANCHORED (PIN SYSTEM)

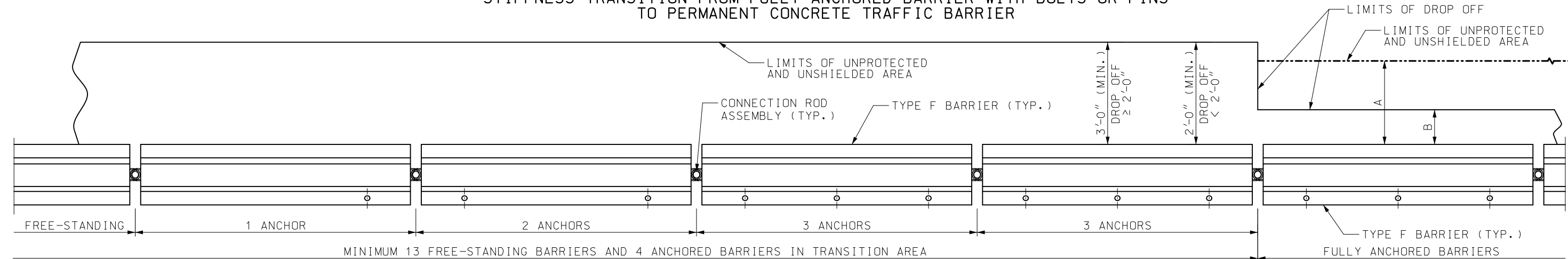
DATE EFFECTIVE: 01/01/2021	<b>617.20F</b>	SHEET NO. 7 OF 8
DATE PREPARED: 10/14/2020		

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

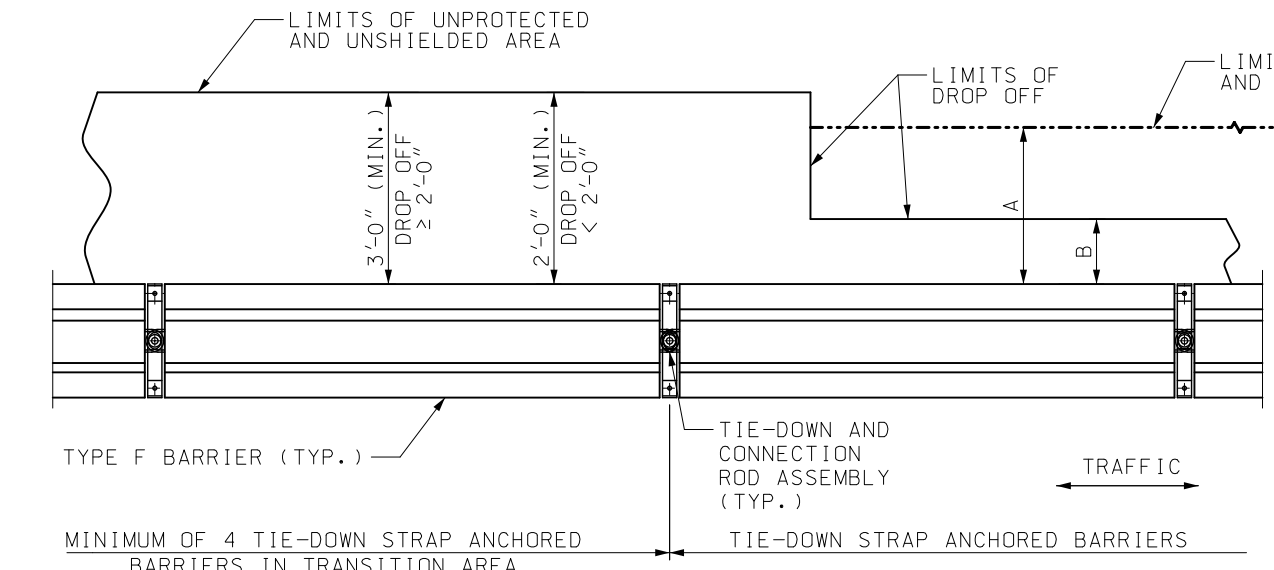




STIFFNESS TRANSITION FROM FULLY ANCHORED BARRIER WITH BOLTS OR PINS TO PERMANENT CONCRETE TRAFFIC BARRIER



PLAN OF STIFFNESS TRANSITION FROM FREE-STANDING BARRIERS TO FULLY ANCHORED BARRIER WITH BOLTS OR PINS



STIFFNESS TRANSITION FOR BARRIER ANCHORED WITH TIE-DOWN STRAPS  
(13 FREE-STANDING BARRIERS NOT REQUIRED)

LIMITS OF UNPROTECTED AND UNSHIELDED AREA	
$6'' \leq A < 2'$	ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS
$2' \leq A < 3'$	ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS
$A \geq 3'$	NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS

EDGE OF DROP OFF	
$1'' \leq B < 6''$	ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS
$6'' \leq B < 2'$	ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS
$B \geq 2'$	NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS

NOTE: TEMPORARY CONCRETE TRAFFIC BARRIER MUST MEET BOTH A AND B DIMENSIONS, UNLESS OTHERWISE SHOWN ON PLANS.

GENERAL NOTES:  
CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.  
  
COST OF FURNISHING AND INSTALLING THE ANCHOR BOLT SYSTEM, ANCHOR PINS SYSTEM, TIE-DOWN STRAP SYSTEM AND THRIE BEAM COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

ALL TYPE F BARRIERS SHALL BE CONNECTED TO ADJACENT TYPE F BARRIERS WITH CONNECTION ROD ASSEMBLY, AND PULLED TIGHT DURING INSTALLATION TO REMOVE SLACK TO PROVIDE LONGITUDINAL TENSION DURING IMPACT.

AFTER REMOVAL OF ANCHORS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

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

STATE OF MISSOURI  
DENNIS W. HECKMAN  
NUMBER PE-27141  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TEMPORARY CONCRETE TRAFFIC BARRIER STIFFNESS TRANSITION

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

	CROSS SECTION	CONDITION		TREATMENT	SIGN		
		DIFFERENTIAL	TIME		MAINLINE (1)	SIDE ROAD (2)	
EDGE DROP-OFF		PAVEMENT EDGE DIFFERENTIAL > 2" TO ≤ 3"	NON-WORKING HOURS	WEDGE SLOPE TO 1V:1H OR FLATTER	 W08-17 (3)(4) W08-17p (6)	NO SIGNS REQUIRED	<p>(1) SIGNS SHALL BE SPACED AT APPROXIMATELY ONE MILE INTERVALS AND LOCATED WITHIN 150 FT. BEYOND ANY STATE ROADS. WHEN A SIGN PLACED AT THE ONE MILE INTERVAL FALLS WITHIN 1/2 MILE OF A SIGN PLACED AFTER AN INTERSECTION, THE SIGN PLACED AT THE 1/2 MILE INTERVAL MAY BE OMITTED. WHEN SHOULDER DROP-OFF SIGNS WITH UNEVEN LANES ARE BOTH SPECIFIED, ALTERNATING SIGN MESSAGES SHALL BE USED AT 1 MILE SPACINGS.</p> <p>(2) ON SIDE ROADS WITH POSTED SPEED OF 45 MPH OR GREATER, SIGNS SHALL BE PLACED 150 FT. IN ADVANCE OF INTERSECTION WITH MAINLINE.</p> <p>(3) SIGNS SHALL BE LOCATED ON THE SIDE OF THE ROADWAY WHERE THE PAVEMENT EDGE DIFFERENTIAL EXISTS.</p> <p>(4) SIGNS TO REMAIN VISIBLE UNTIL SHOULDER SHAPING IS COMPLETE.</p> <p>(5) SIGNS SHALL BE LOCATED ON RIGHT SIDE OF NON-DIVIDED HIGHWAYS AND ON BOTH SIDES OF DIVIDED HIGHWAYS WHERE A LANE LINE DIFFERENTIAL EXISTS.</p> <p>(6) WHEN THE SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.</p>
	WORKING HOURS		NO EDGE TREATMENT REQUIRED				
		PAVEMENT EDGE DIFFERENTIAL > 2" TO ≤ 3"	NON-WORKING HOURS	WEDGE SLOPE TO 1V:1H OR FLATTER	 W08-17 (3)(4) W08-17p (6)	NO SIGNS REQUIRED	
	WORKING HOURS		NO EDGE TREATMENT REQUIRED				
	PAVEMENT EDGE DIFFERENTIAL > 3"	NON-WORKING HOURS	WEDGE SLOPE TO 1V:3H OR FLATTER	 W08-17 (3)(4) W08-17p (6)	 W08-1 (3)		
WORKING HOURS		DELINEATE DIFFERENTIAL WITH CHANNELIZERS					
		ANY PAVEMENT EDGE OR LANE LINE DIFFERENTIAL	NON-WORKING AND WORKING HOURS WHERE PLANS REQUIRE ADJACENT LANE CLOSURE WITH CHANNELIZATION OR PARTIAL LANE CLOSURE WITH BARRIER.	NO EDGE TREATMENT REQUIRED	NO SIGNS REQUIRED	NO SIGNS REQUIRED	
LANE DIFFERENTIAL		LANE LINE DIFFERENTIAL ≤ 2"	NON-WORKING AND WORKING HOURS	NO EDGE TREATMENT REQUIRED	 W08-11 (5)	NO SIGNS REQUIRED	
		LANE LINE DIFFERENTIAL > 2"	NON-WORKING AND WORKING HOURS WHERE LANES OPEN TO TRAFFIC	WEDGE SLOPE TO 1V:3H OR FLATTER	 W08-11 (5)	 W08-1	
		NON-WORKING AND WORKING HOURS WHERE LANE CLOSED TO TRAFFIC	DELINEATE DIFFERENTIAL WITH CHANNELIZERS				

- LEGEND
- RIGID PAVEMENT
  - FLEXIBLE PAVEMENT
  - ALL PAVEMENT TYPES

GENERAL NOTES:

SIGNS SHALL BE VISIBLE TO TRAFFIC ONLY WHEN AND WHERE CONDITIONS EXIST.

FOR ADDITIONAL SIGN SPACING AND DETAILS SEE STANDARD PLAN 620.10.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

**MoDOT**

105 WEST CAPITOL  
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1-888-ASK-MODOT (1-888-275-6636)

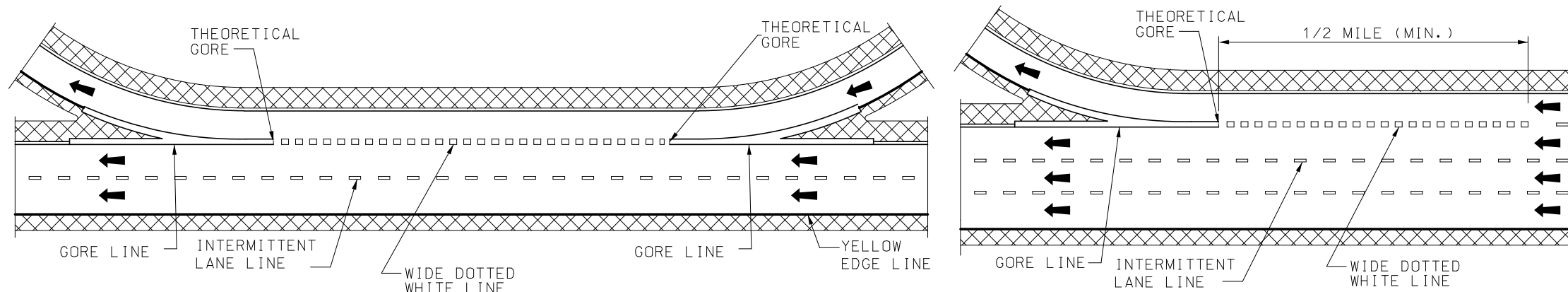
STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

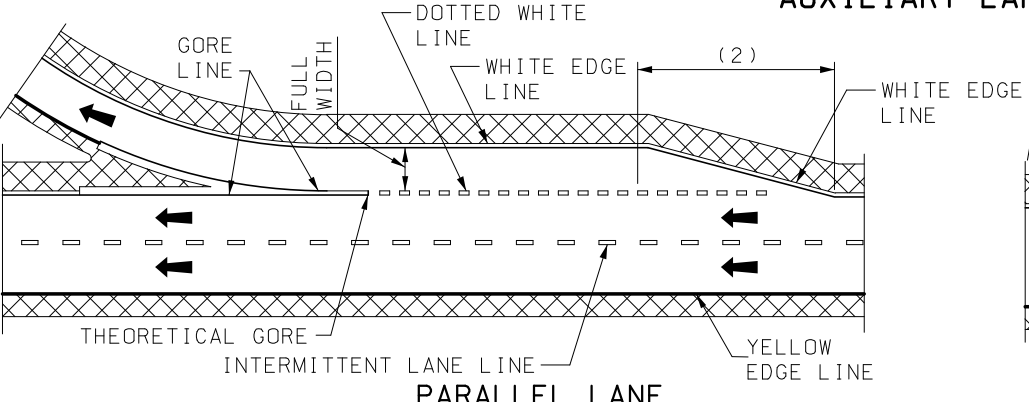
**PAVEMENT EDGE TREATMENT**

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

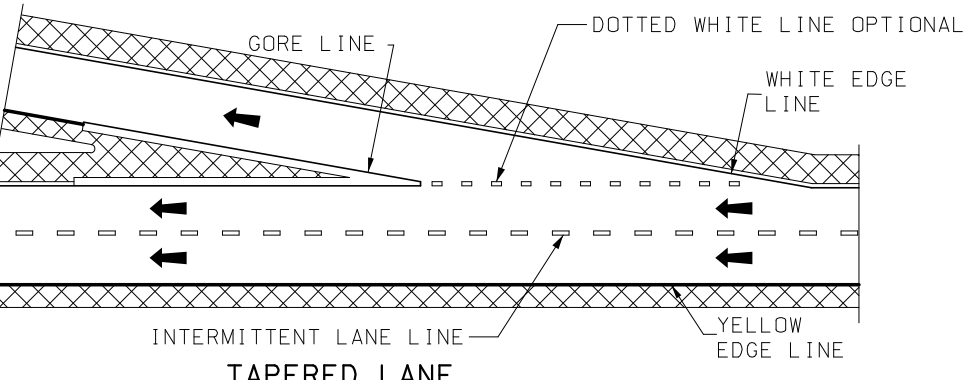
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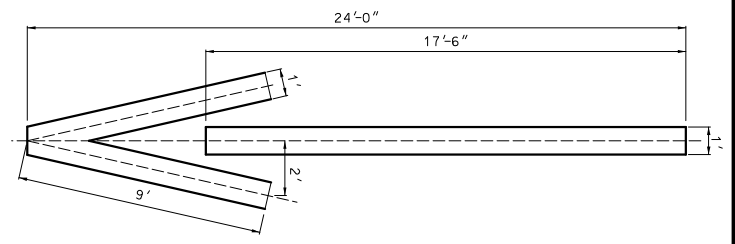
**AUXILIARY LANE MARKING**



**PARALLEL LANE**



**TAPERED LANE**



FIRST ARROW 25' FROM CROSSROAD OR STOP LINE.  
 MAXIMUM 3 ARROWS AT 100' INTERVALS.  
 ON MULTI-LANE RAMP USE ARROW IN EACH LANE.  
 WRONG WAY ARROWS ARE NOT USED WHEN RAMP HAS LANE USE CONTROL ARROWS.

**OFF RAMP WRONG WAY ARROW**

**GENERAL NOTES:**

DOTTED LINES SHALL BE 3 FEET IN LENGTH SEPARATED BY 9 FOOT GAPS.  
 REFER TO THE STANDARD PLAN 626.00 WHEN INSTALLING PAVEMENT MARKINGS OVER RUMBLE STRIPS.  
 WIDE LINES ARE TWICE THE WIDTH OF NORMAL LINES.  
 LANE LINES SHALL BE AN INTERMITTENT OR SOLID WHITE.  
 INTERMITTENT LINES SHALL BE 10 FEET IN LENGTH SEPARATED BY 30 FOOT GAPS.

EDGELINES SHALL BE CONTINUOUS SOLID WHITE OR YELLOW LINES. RIGHT SIDE EDGELINES SHALL BE SOLID WHITE. MEDIAN OR LEFT SIDE EDGELINES ON DIVIDED HIGHWAYS AND ON THE LEFT SIDE OF RAMPS SHALL BE SOLID YELLOW. EDGELINES SHALL BE CONTINUOUS ACROSS DRIVEWAYS AND MINOR INTERSECTING ROADS.

"NO PASSING" LINES SHALL BE CONTINUOUS SOLID YELLOW.  
 "NO PASSING" LINES SHALL BE PLACED AS SHOWN IN "LINE DETAIL". "NO PASSING" LINES ON A TWO-LANE, TWO-WAY HIGHWAY WHEN PASSING IS PROHIBITED IN EACH DIRECTION SHALL BE PLACED 4 INCHES APART AND THE INTERMITTENT CENTERLINE SHALL BE OMITTED.

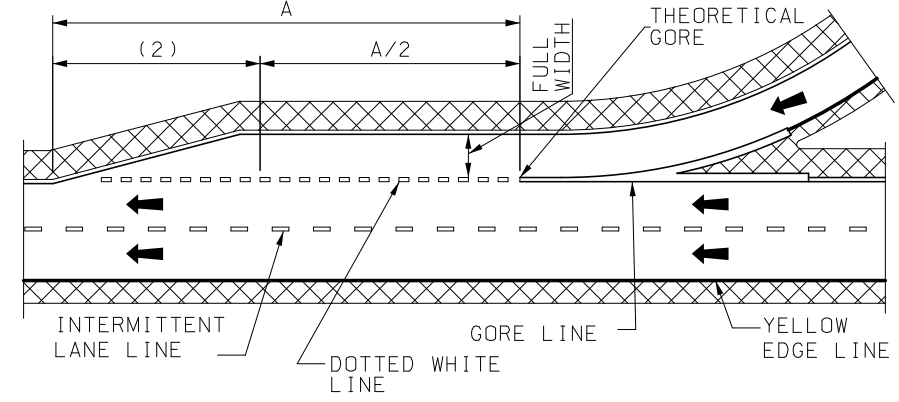
STOP LINES SHALL BE A SOLID WHITE TRANSVERSE LINE 24 INCHES WIDE, LOCATED AT LEAST 4 FEET FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY.

CROSSWALK LINES SHALL BE SOLID WHITE TRANSVERSE LINES 6 INCHES WIDE AT LEAST 6 FEET APART. CROSSWALK LINES ON THE INTERSECTION SIDE OF THE CROSSWALK SHALL MEET AT THE CURB.

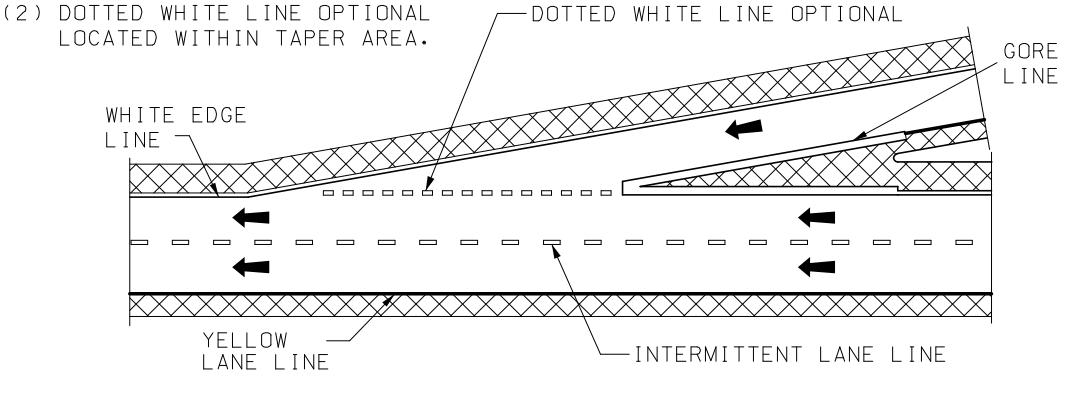
GORE LINES SHALL BE A SOLID WHITE LINE WITH A WIDTH TWICE THAT OF THE EDGELINE.

ARROWS AND WORD SYMBOLS SHALL BE SOLID WHITE.

A = LENGTH OF ACCERLERATION LANE PLUS TAPER.



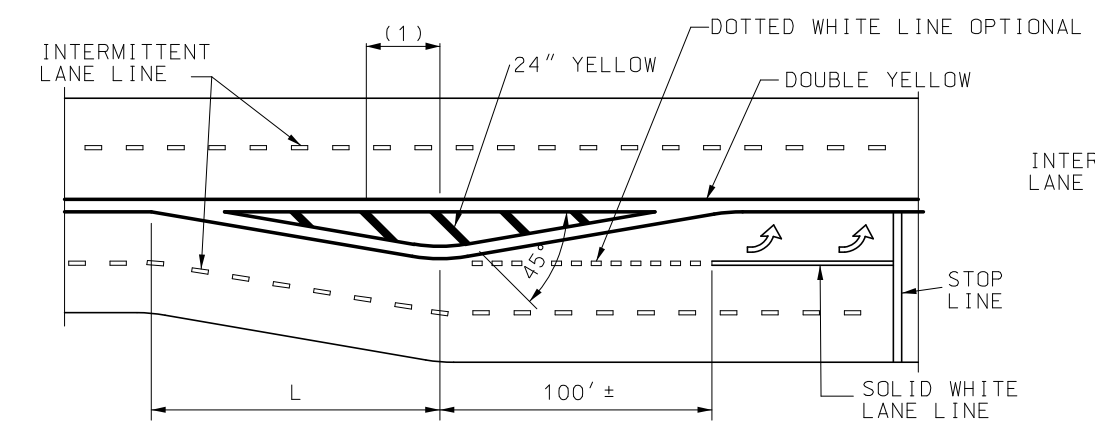
**PARALLEL LANE**



**TAPERED LANE**

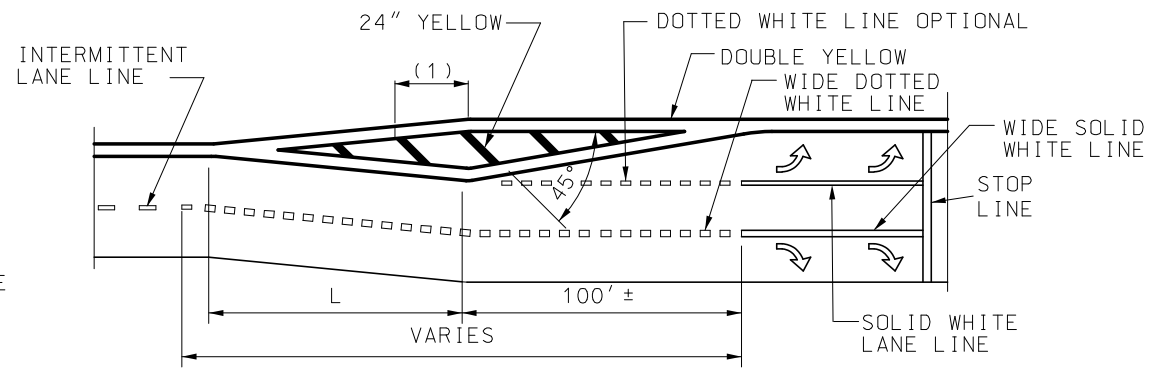
**EXIT RAMP MARKING**

L = LENGTH OF TAPER IN FEET.



**MEDIAN ISLAND MARKING**

(1) 50' (TYP.) SPACE BETWEEN BARS. A MINIMUM OF 3 BARS ARE REQUIRED. IF NECESSARY, THE DISTANCE BETWEEN THE BARS SHALL BE DECREASED TO INSTALL 3 BARS.



**LANE DROP MARKING**

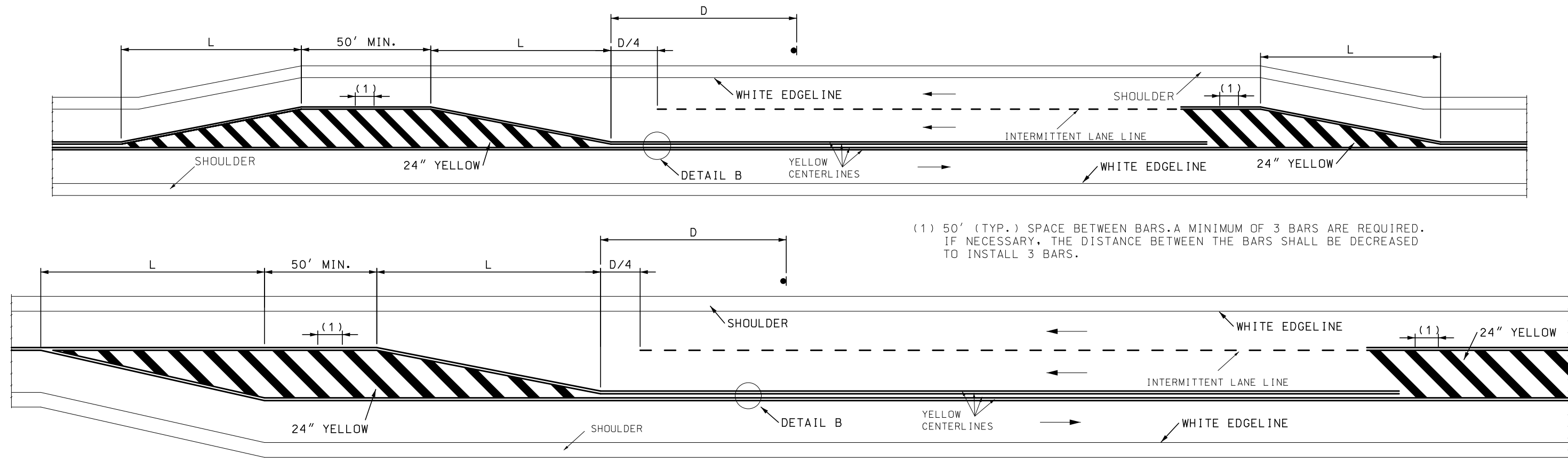
**MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 04/01/2022	620.00N	SHEET NO. 1 OF 6
DATE PREPARED: 1/19/2022		

**PAVEMENT MARKING**

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



(1) 50' (TYP.) SPACE BETWEEN BARS. A MINIMUM OF 3 BARS ARE REQUIRED. IF NECESSARY, THE DISTANCE BETWEEN THE BARS SHALL BE DECREASED TO INSTALL 3 BARS.

$L = S \times W$  WHEN POSTED SPEED 45 MPH OR GREATER OR  $WS^2 / 60$  WHEN POSTED SPEED IS 40 MPH OR LESS. EXTEND DISTANCE (L) AS REQUIRED BY SIGHT DISTANCE CONDITIONS.

L = LENGTH OF TAPER IN FEET.

S = POSTED OR 85 PERCENTILE SPEED IN MPH.

W = OFFSET DISTANCE IN FEET.

D = WARNING SIGN SPACING MEASURED FROM BEGINNING OF THE TAPER TO WARNING SIGN "LANE ENDS MERGE RIGHT"

**GENERAL NOTES:**

INTERMITTENT LINES SHALL BE 10 FEET IN LENGTH SEPARATED BY 30 FOOT GAPS.

RIGHT SIDE EDGELINES SHALL BE SOLID WHITE. EDGELINES SHALL BE CONTINUOUS ACROSS DRIVEWAYS AND MINOR INTERSECTING ROADS.

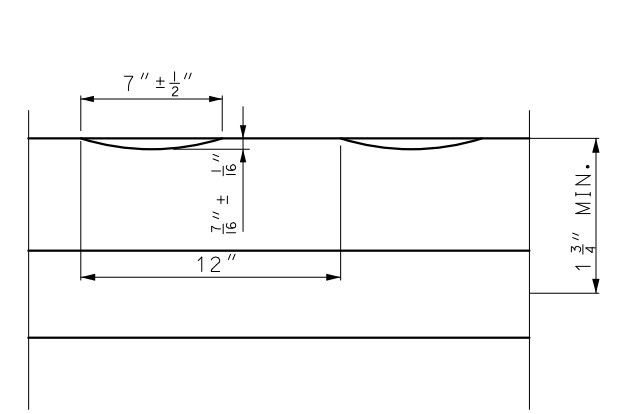
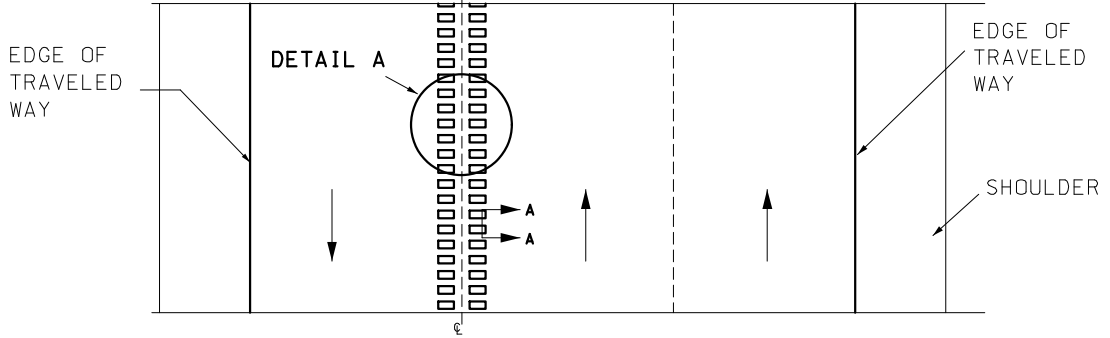
CENTERLINE RUMBLE STRIPS ON PASSING ROADWAYS SHALL FOLLOW PAVEMENT STRIPING THROUGH TRANSITIONS. SEE CONTRACT PLANS FOR STRIPING DETAILS.

RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.

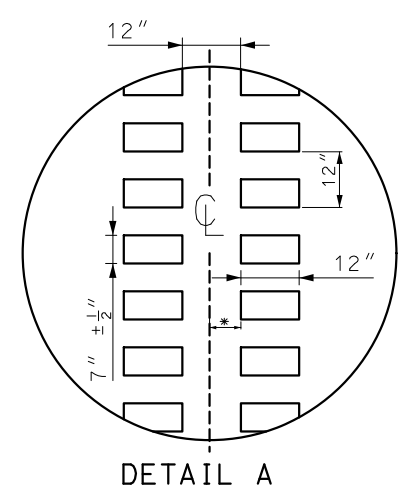
ALL RUMBLE STRIPS SHALL BE MILLED.

CENTERLINE RUMBLE STRIPS SHALL BE CONTINUOUS THROUGH CONNECTIONS OF SIDEROADS WITH NO LEFT TURN LANES.

DISCONTINUE CENTERLINE RUMBLE STRIPS THROUGH THE LIMITS OF ALL LEFT TURN LANES, INCLUDING ANY LANE TAPER SECTIONS.

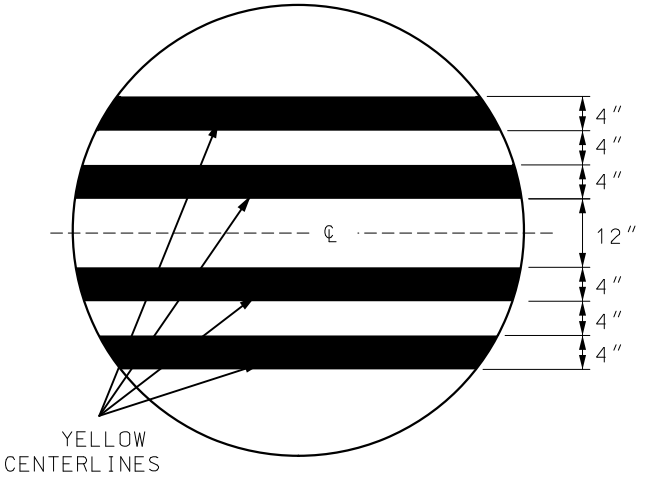


SECTION A-A



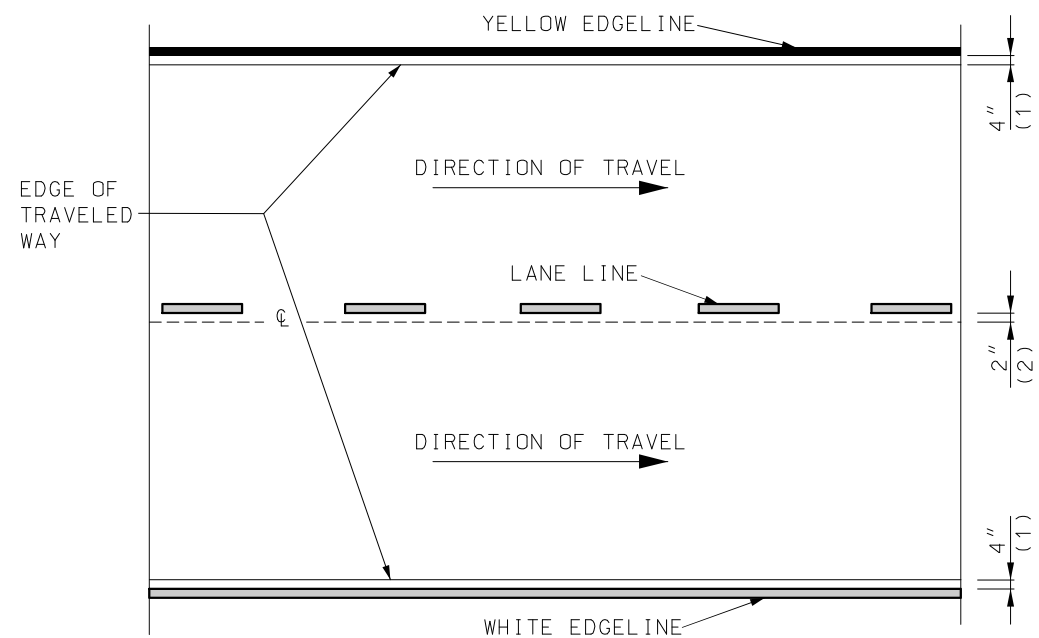
DETAIL A

\* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.

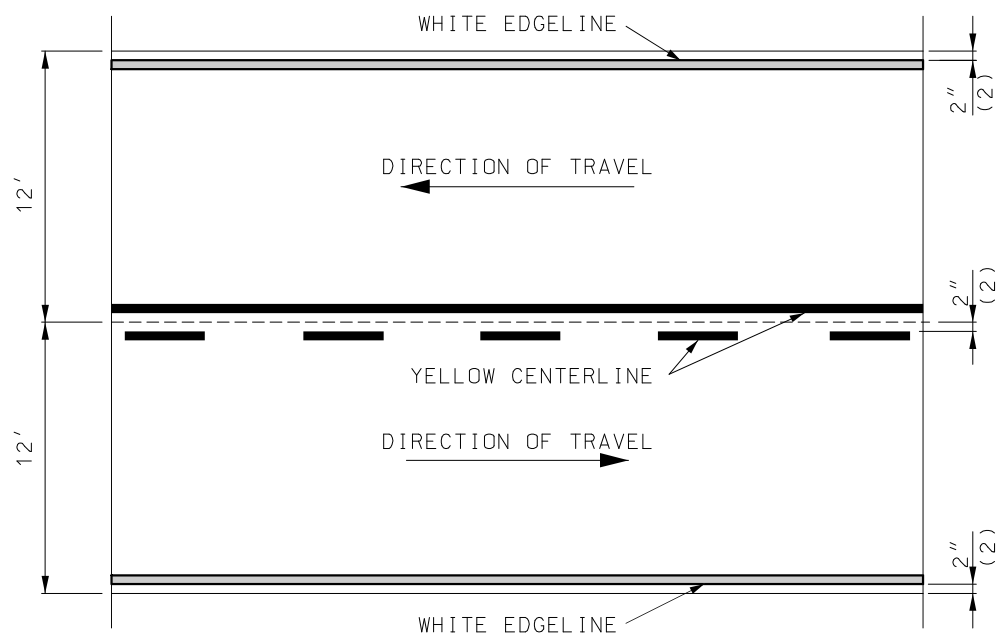


DETAIL B

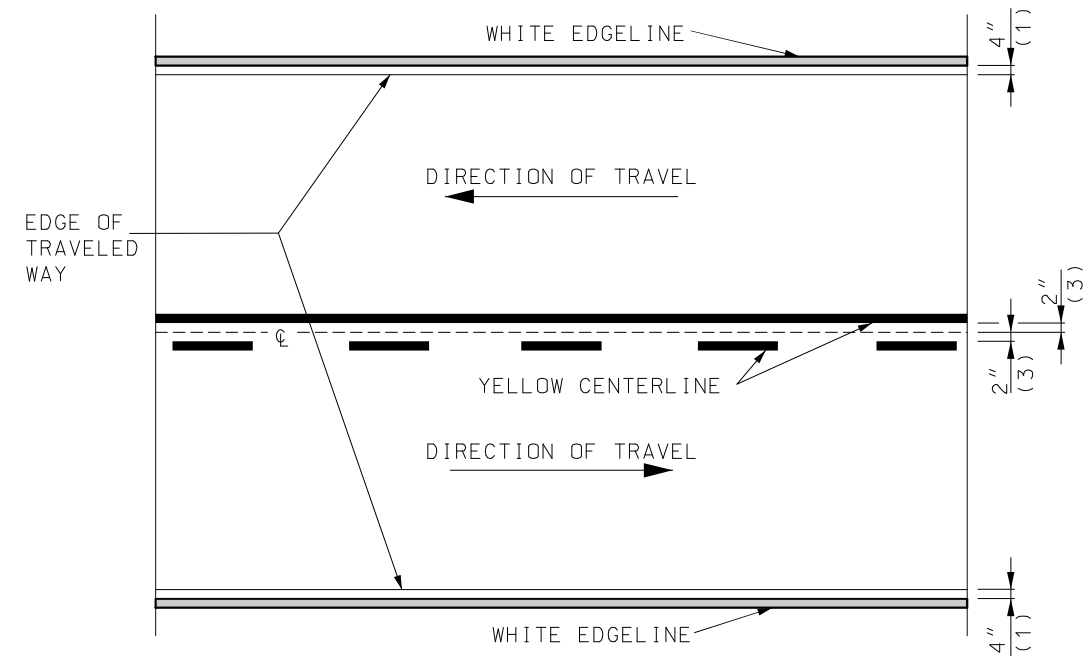
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PAVEMENT MARKING</b> <b>ALTERNATE PASSING LANE</b>	
	DATE EFFECTIVE: 04/01/2022 DATE PREPARED: 1/19/2022	SHEET NO. <b>2 OF 6</b> 620.00N



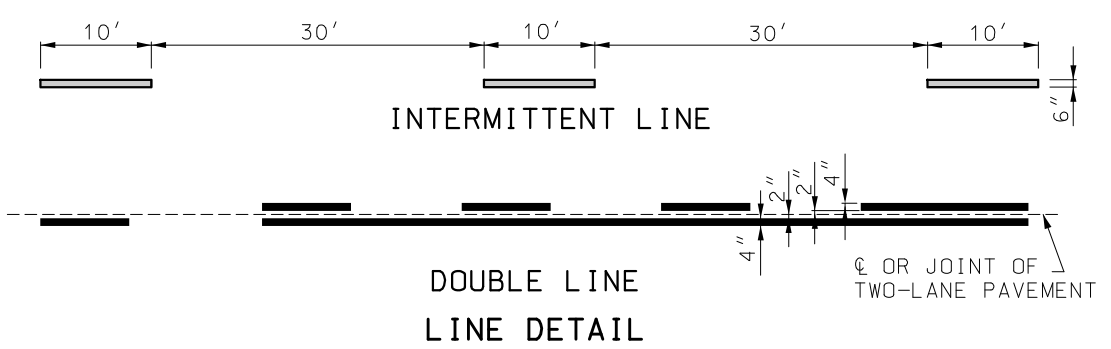
DIVIDED PAVEMENT



TWO-LANE TWO-WAY  
TYPICAL STRIPING OFFSETS  
WITHOUT RUMBLE STRIPES



TWO-LANE TWO-WAY  
TYPICAL STRIPING OFFSETS  
FOR RUMBLE STRIPES



DOUBLE LINE  
LINE DETAIL

LEGEND  
 WHITE LINE  
 YELLOW LINE

- (1) OFFSET FROM EDGE OF TRAVELED WAY (TYP.)
- (2) OFFSET FROM JOINT (TYP.)
- (3) OFFSET FROM CENTERLINE (TYP.)

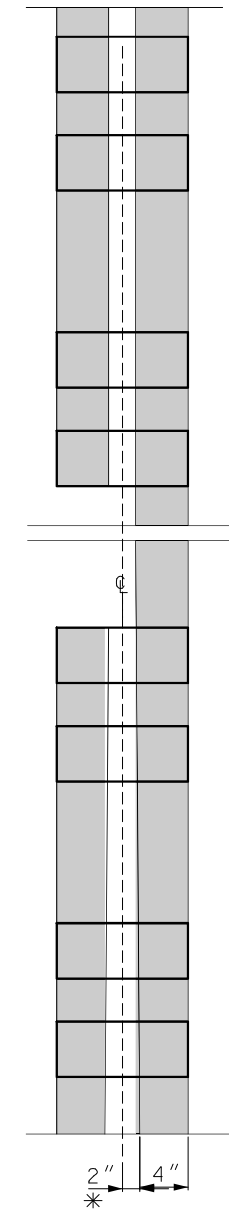
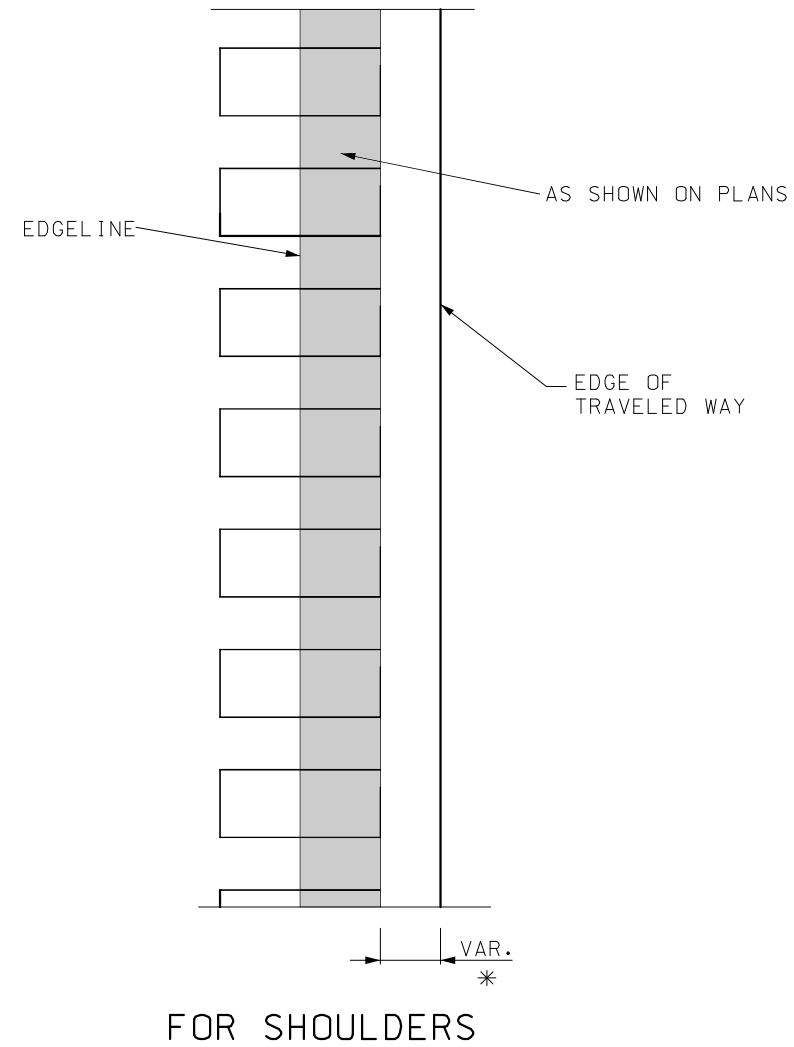
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PAVEMENT MARKING

DATE EFFECTIVE: 04/01/2022	620.00N	SHEET NO. 3 OF 6
DATE PREPARED: 1/19/2022		

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

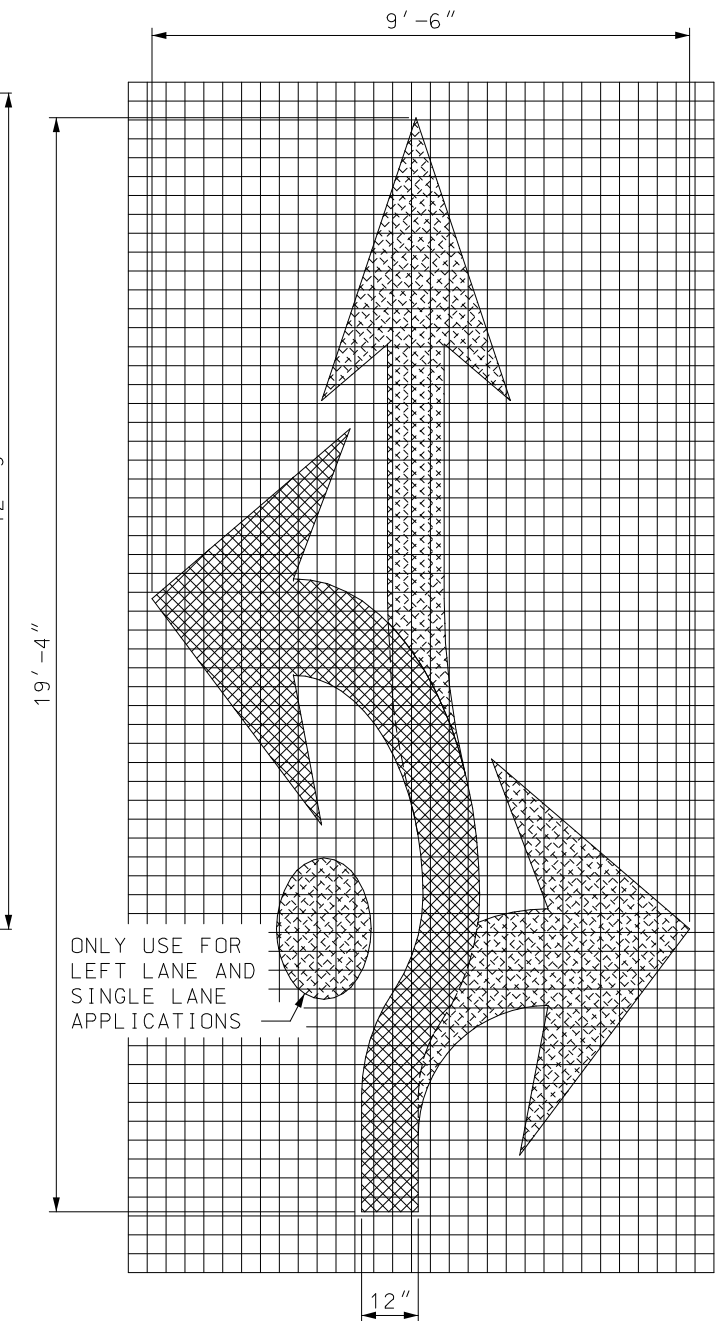
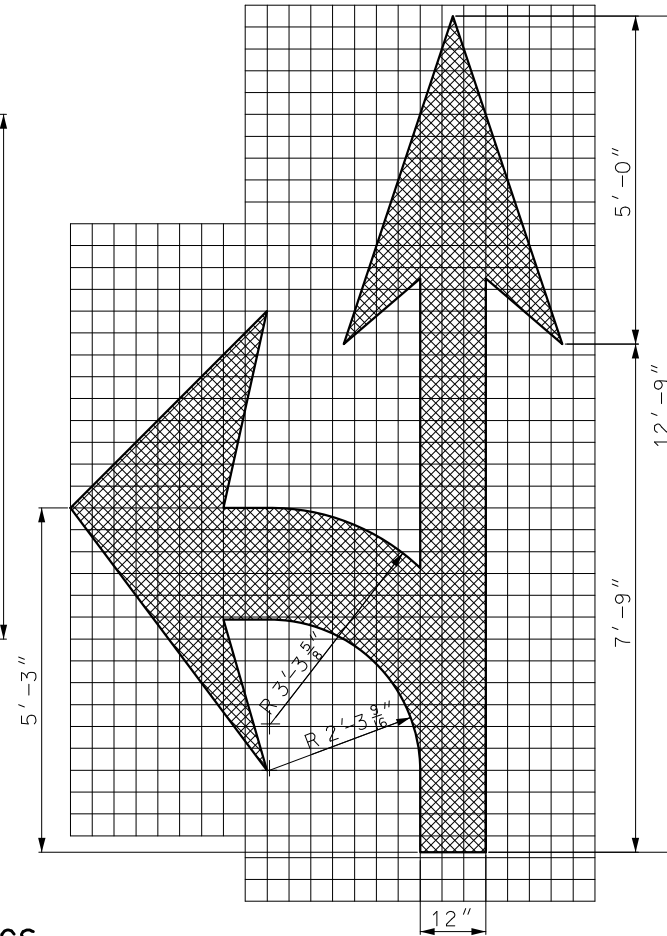
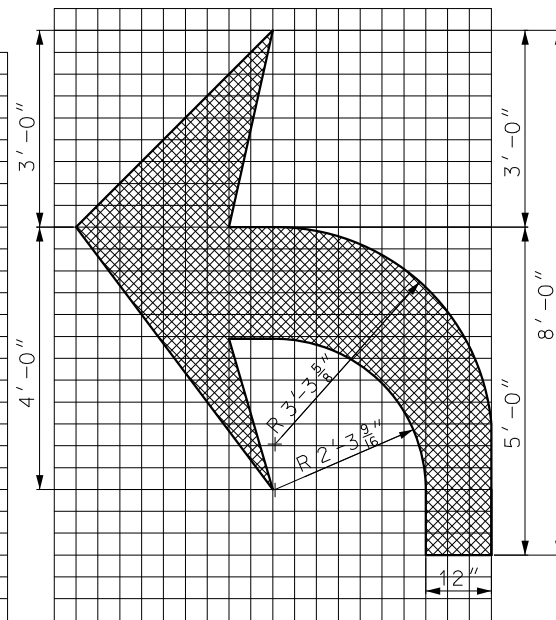
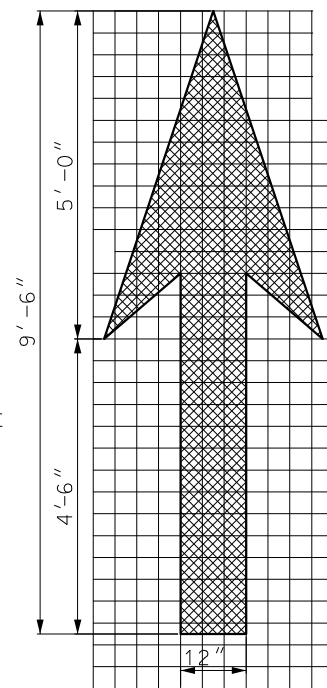
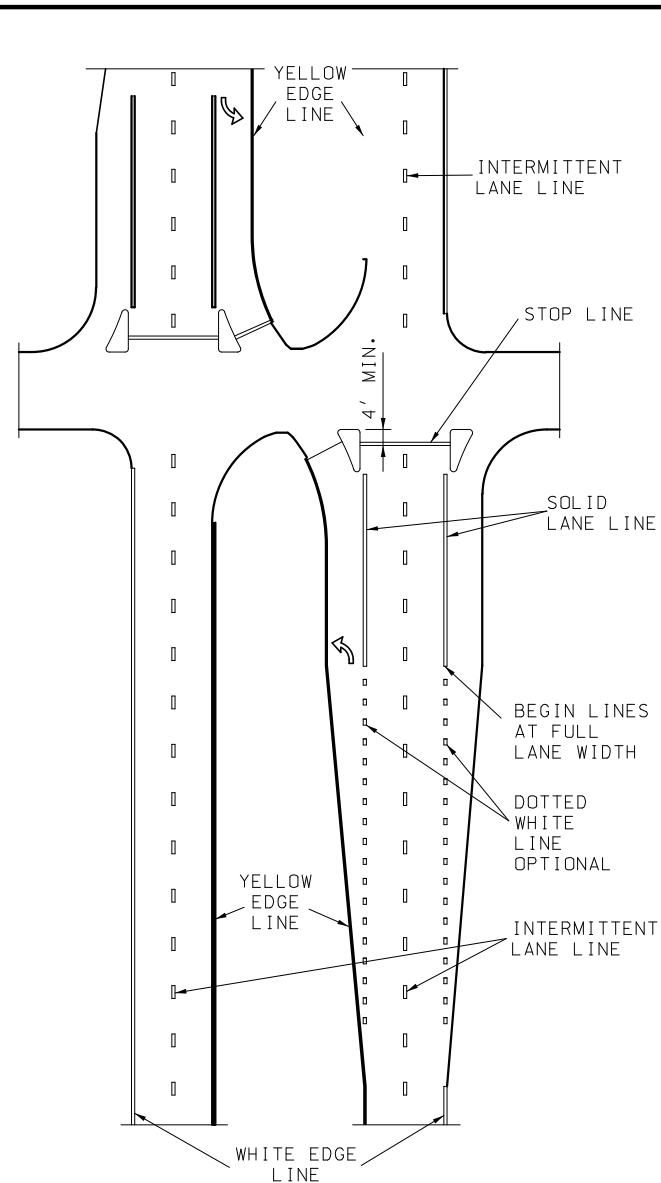


2 WAY 2 LANE  
(SEE TYPICAL STRIPING FOR RUMBLESTRIPS)

\* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>PAVEMENT MARKING STRIPING THROUGH RUMBLE STRIPS</b>
DATE EFFECTIVE: 04/01/2022 DATE PREPARED: 1/19/2022	<b>620.00N</b>	SHEET NO. <b>4 OF 6</b>

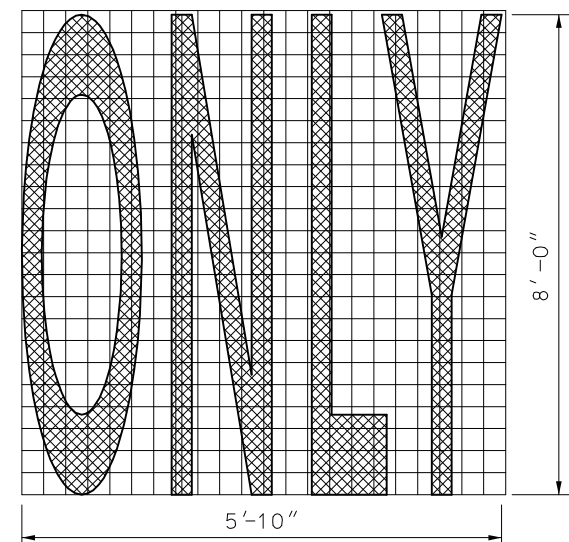
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



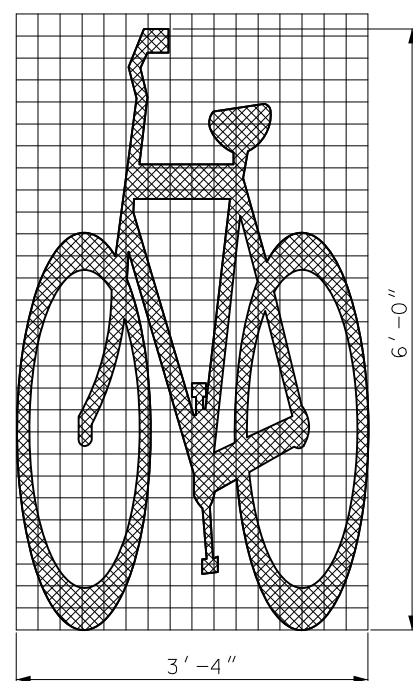
**ARROW MARKINGS**

TWO LANE USE CONTROL ARROWS FOR FIRST 200 FEET WITH ONE ADDITIONAL ARROW EVERY 400 FEET OF MANDATORY MOVEMENT LANE. FIRST ARROW 75 FEET FROM STOP LINE.

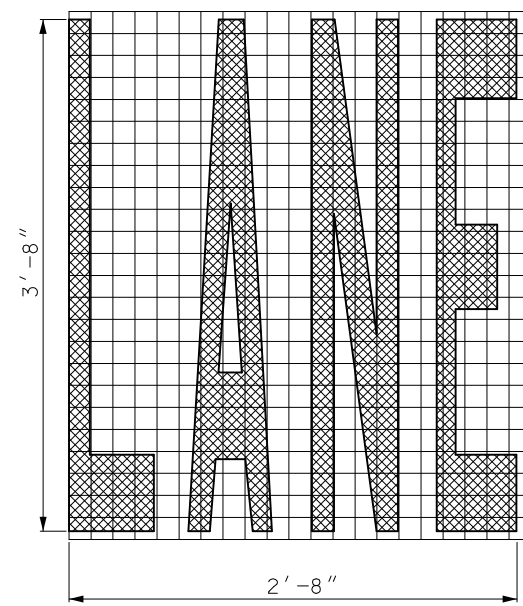
**SIGNALIZED GRADE INTERSECTION MARKING**



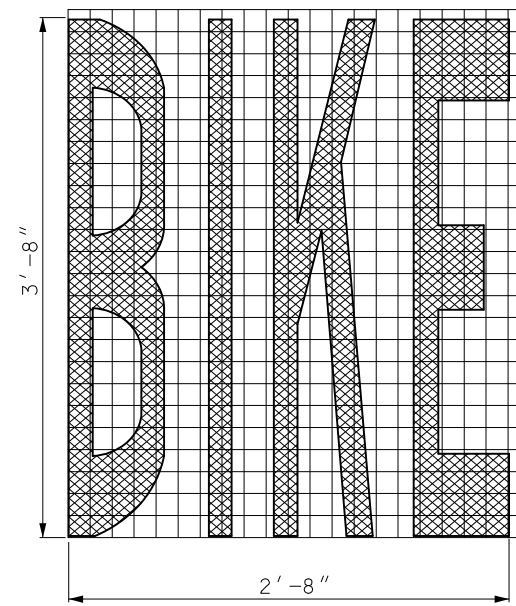
**WORD MARKING  
ELONGATED WORD & SYMBOL**



**BICYCLE SYMBOL**



**WORD MARKING  
ELONGATED WORD & SYMBOL**



**FISH-HOOK ARROW  
ROUNDBOUT APPROACH  
MARKINGS**

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

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
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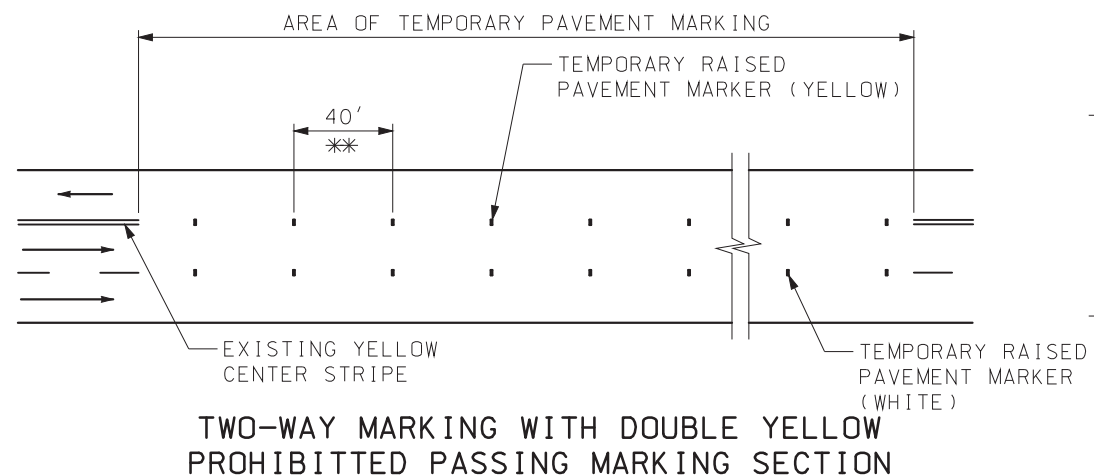
**PAVEMENT MARKING**

DATE EFFECTIVE: 04/01/2022	620.00N	SHEET NO. 5 OF 6
DATE PREPARED: 1/19/2022		

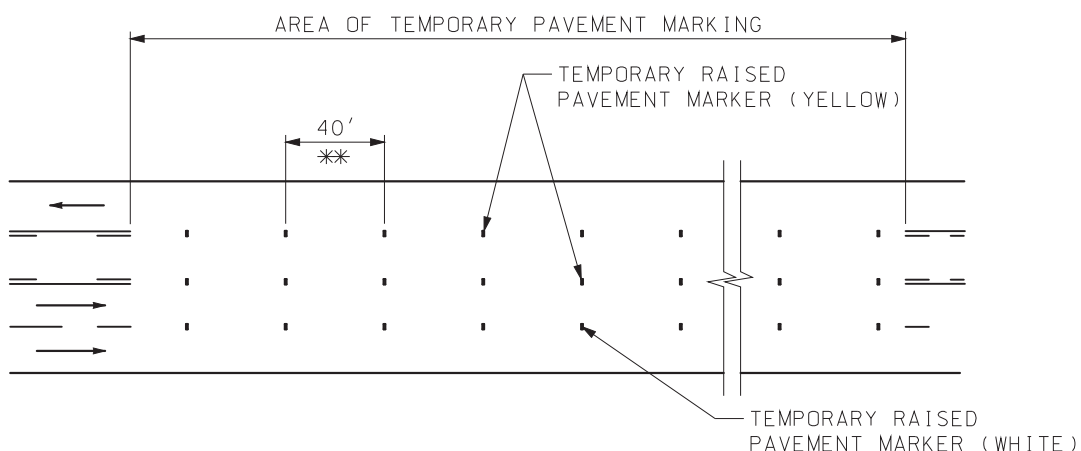
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



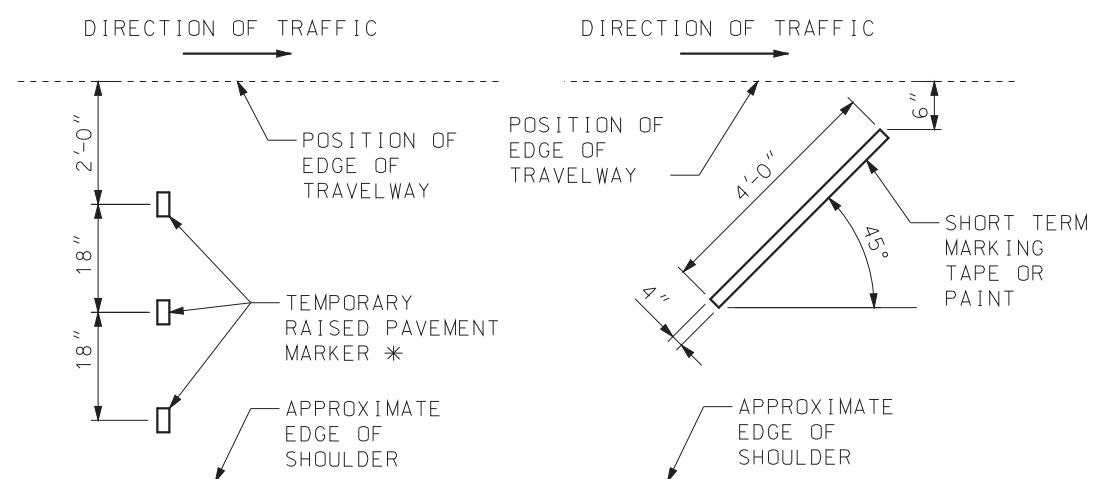




**TWO-WAY MARKING WITH DOUBLE YELLOW PROHIBITED PASSING MARKING SECTION**



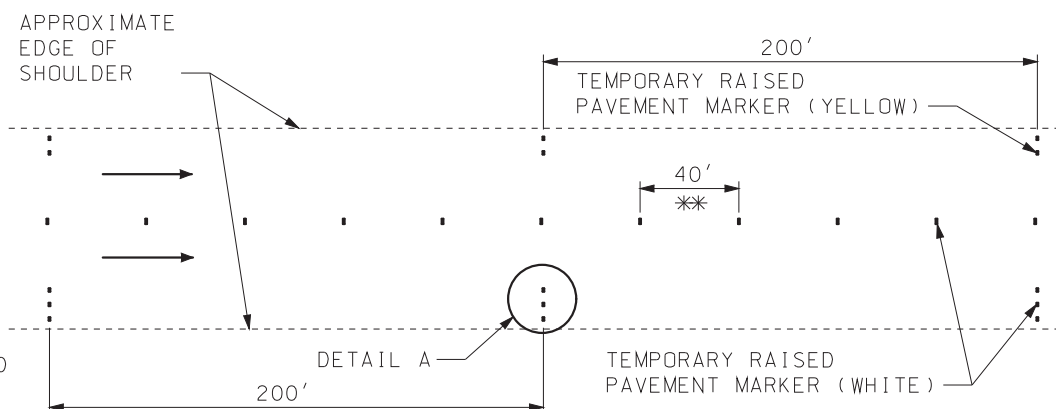
**TWO-WAY WITH LEFT-TURN LANE MARKING SECTION**



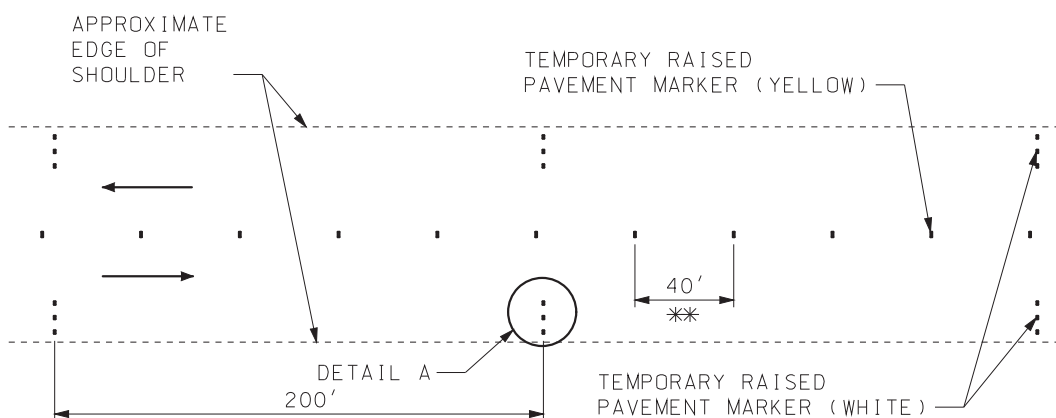
**DETAIL A**

\* THREE TEMPORARY RAISED PAVEMENT MARKERS SHALL BE USED IF SHOULDER IS 6' OR WIDER. OTHERWISE, USE TWO TEMPORARY RAISED PAVEMENT MARKERS.

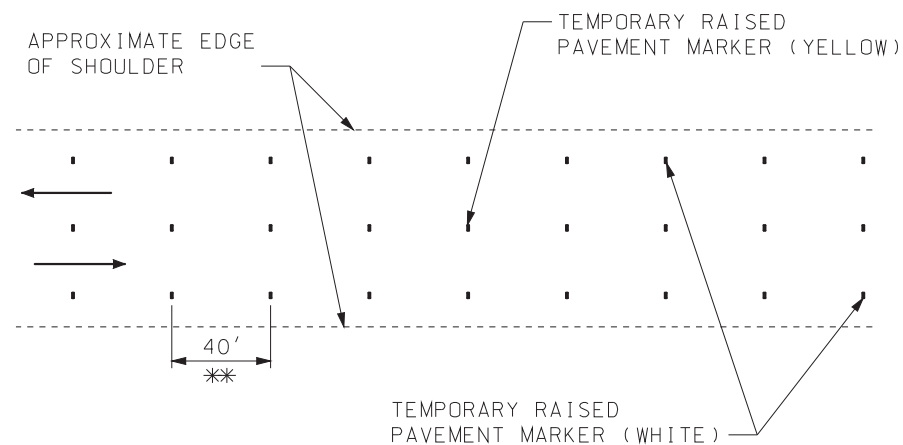
**OPTIONAL DETAIL A FOR INTERMEDIATE LIFT**



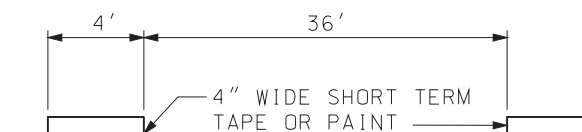
**EDGE LINES AND LANE LINES ON MULTILANE DIVIDED SECTIONS**



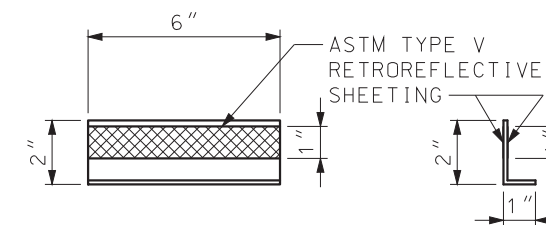
**EDGE LINES AND CENTERLINE ON TWO-WAY SECTIONS WITH PAVED SHOULDERS GREATER THAN 4 FEET WIDE**



**EDGE LINES AND CENTERLINE ON TWO-WAY SECTIONS WITH PAVED SHOULDERS 4 FEET WIDE OR LESS, AGGREGATE OR EARTH SHOULDERS OR NO SHOULDERS**



**\*\* OPTIONAL TEMPORARY PAVEMENT MARKING DETAIL FOR INTERMEDIATE LIFTS**



**ELEVATION SIDE TYPICAL TEMPORARY RAISED PAVEMENT MARKER DETAIL**

**GENERAL NOTES:**

TEMPORARY PAVEMENT MARKING IS REQUIRED WHEN 200 CONSECUTIVE LINEAR FEET OR MORE OF PERMANENT PAVEMENT MARKING HAS BEEN OBLITERATED, OR AS DIRECTED BY THE ENGINEER.

TEMPORARY RAISED PAVEMENT MARKERS (TRPMS), OR THE OPTIONAL 4"X 4' SHORT TERM TAPE OR PAINT, WHEN ALLOWED, SHALL BE MAINTAINED IN PLACE AND RETROREFLECTIVE UNTIL THE PERMANENT PAVEMENT MARKINGS ARE INSTALLED. MISSING OR NON-REFLECTIVE MARKINGS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE COMMISSION WHEN 10% OR MORE ARE DEFICIENT WITHIN ONE MILE OR WHEN 4 OR MORE CONSECUTIVE MARKINGS ARE DEFICIENT.

FOR INTERMEDIATE LIFTS, 4"X 4' SHORT TERM TAPE OR TEMPORARY PAINT MAY BE USED IN LIEU OF TRPMS.

TRPMS USED ON INTERMEDIATE LIFTS SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEXT LIFT.

ALL TEMPORARY MARKINGS SHALL BE REMOVED BY THE CONTRACTOR AFTER INSTALLATION OF PERMANENT MARKINGS, EXCEPT WHEN PERMANENT MARKINGS ARE TO BE INSTALLED BY OTHERS.

TEMPORARY TAPE SHALL NOT BE USED FOR TEMPORARY MARKING ON THE FINAL SURFACE EXCEPT WHEN SPECIFIED IN THE PLANS.

**MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
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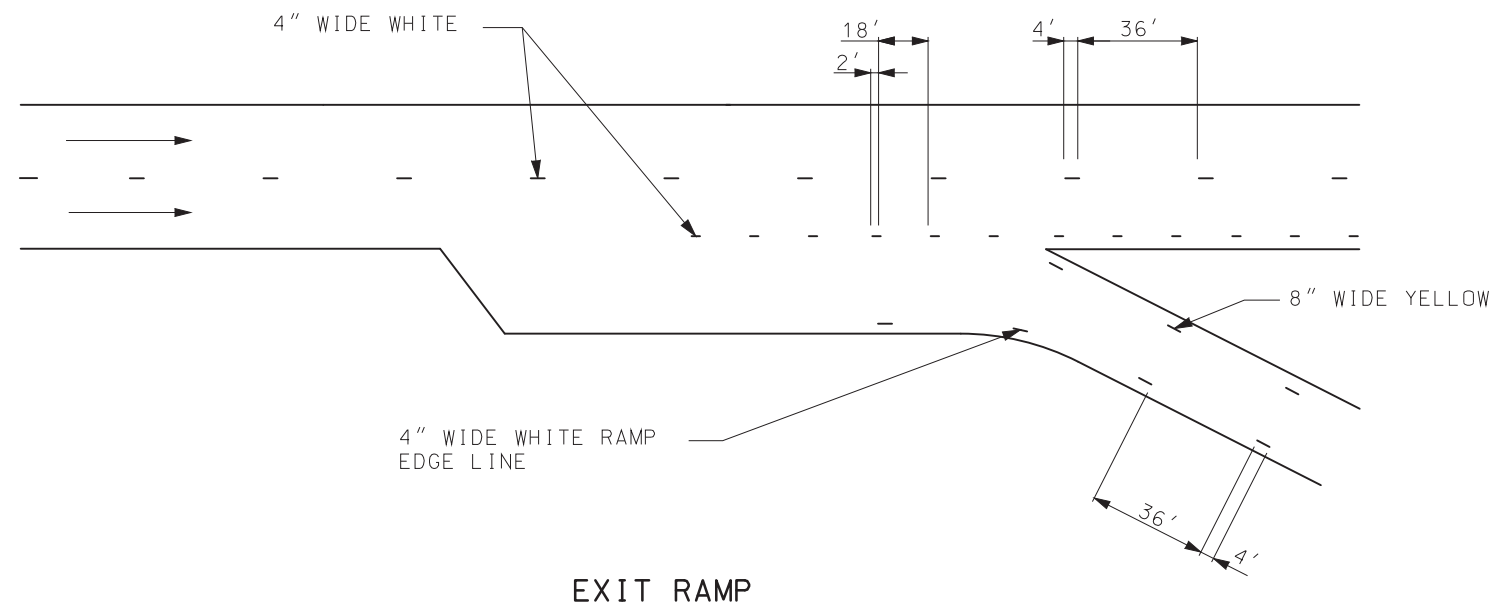
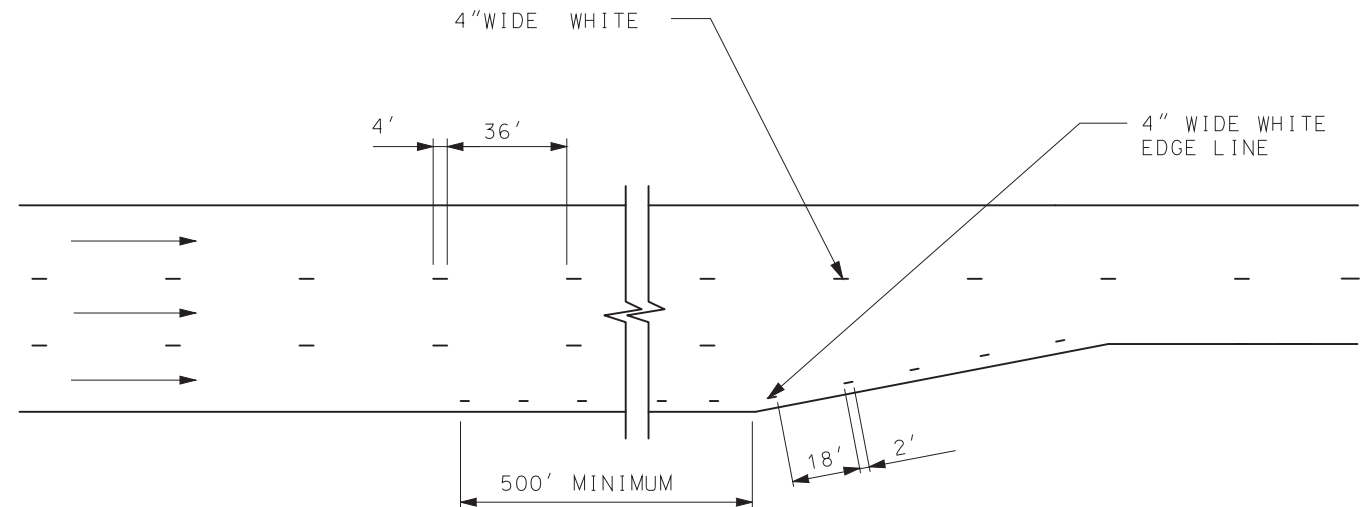
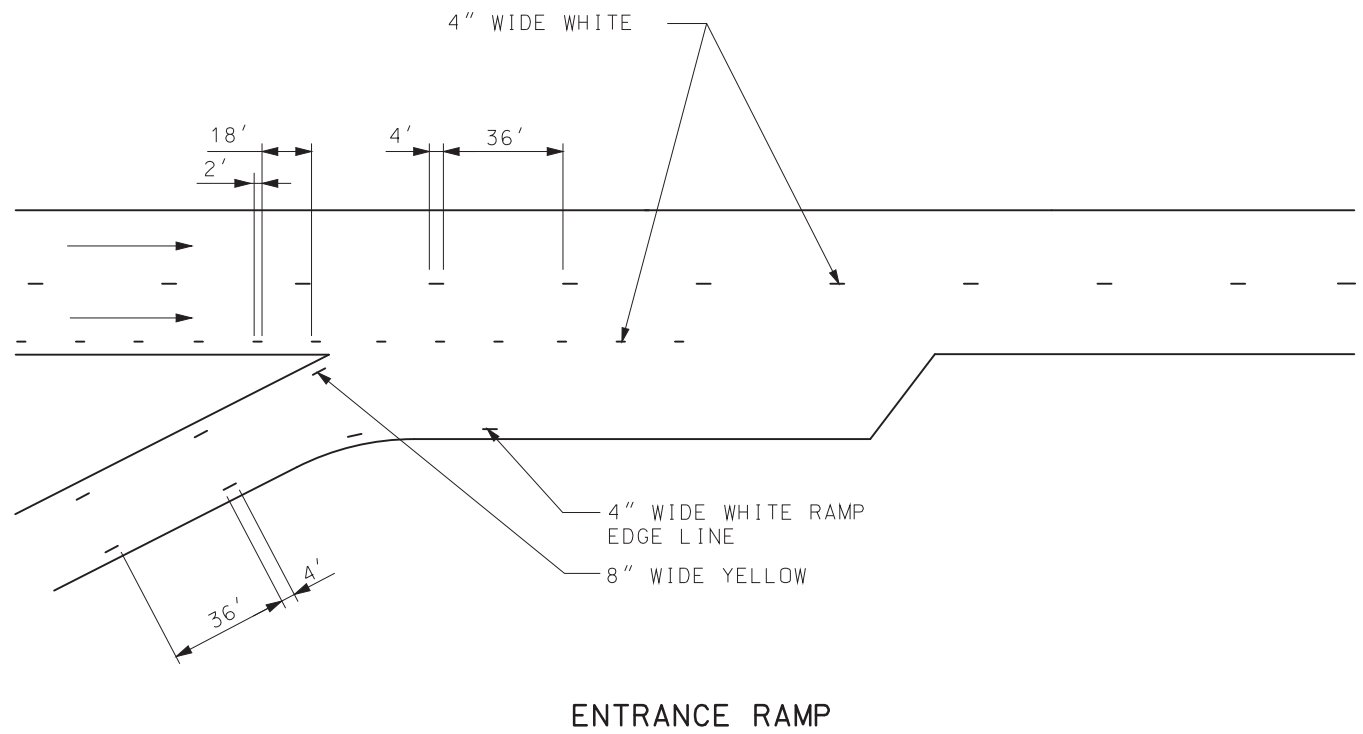
STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

**TEMPORARY PAVEMENT MARKING  
 TEMPORARY PAVEMENT MARKING**

DATE EFFECTIVE: 07/01/2017  
 DATE PREPARED: 5/1/2017

620.10G

SHEET NO.  
 1 OF 5

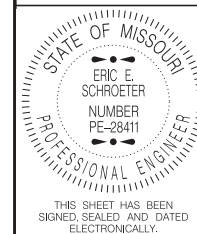


GENERAL NOTES:

TEMPORARY PAVEMENT MARKING IN INTERSECTIONS, RAMPS, GORES AND OTHER TRANSITION AREAS USE AN INTERMITTENT MARKING OF 2 FEET LONG AT A CYCLE OF 20 FEET.

LIMITS OF TEMPORARY GORE MARKING ARE THE SAME AS THE EXISTING GORE LINES.

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 JEFFERSON CITY, MO 65102  
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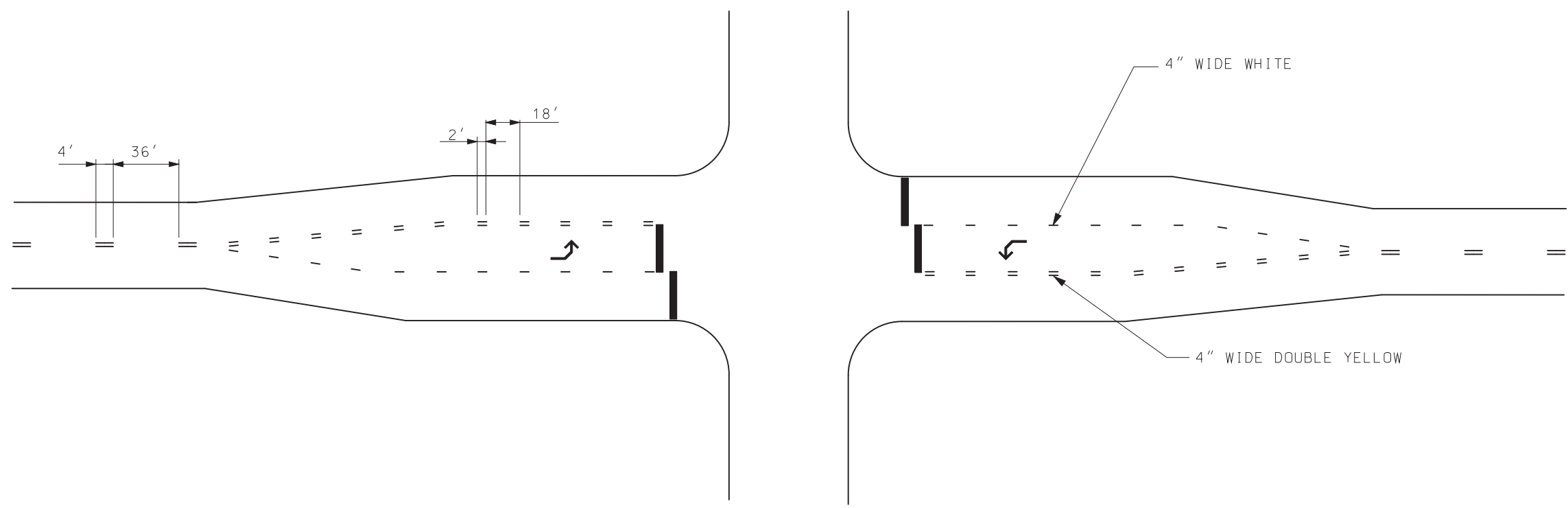
TEMPORARY PAVEMENT MARKING  
 LANE TRANSITION AND RAMP AREAS

DATE EFFECTIVE: 07/01/2017  
 DATE PREPARED: 5/1/2017

620.10G

SHEET NO.  
 2 OF 5

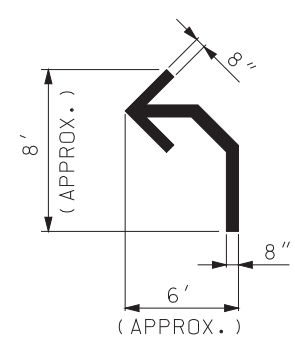
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



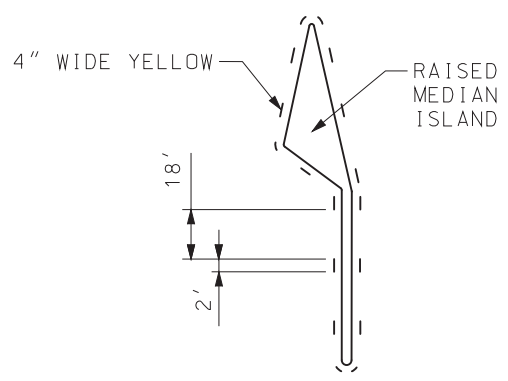
PLAN VIEW



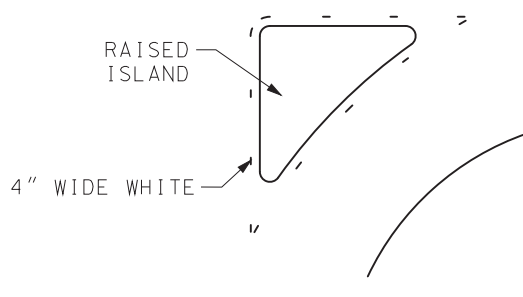
TEMPORARY STOP BAR DETAIL (WHITE)



TEMPORARY ARROW DETAIL (WHITE)



RAISED DIVISIONAL ISLAND



RAISED CHANNELIZING ISLAND

GENERAL NOTES:

TEMPORARY ARROWS AND STOP BARS ARE REQUIRED WHEN GOEMETRIC MODIFICATIONS DURING CONSTRUCTION CREATE LANE CONFIGURATIONS DIFFERENT THAN EXISTING, OR THE EXISTING PAVEMENT MARKING INCLUDES THEM.

YELLOW AND WHITE TEMPORARY MARKING AROUND ISLANDS ONLY REQUIRED WHEN THE ISLAND CURB IS NOT PAINTED.

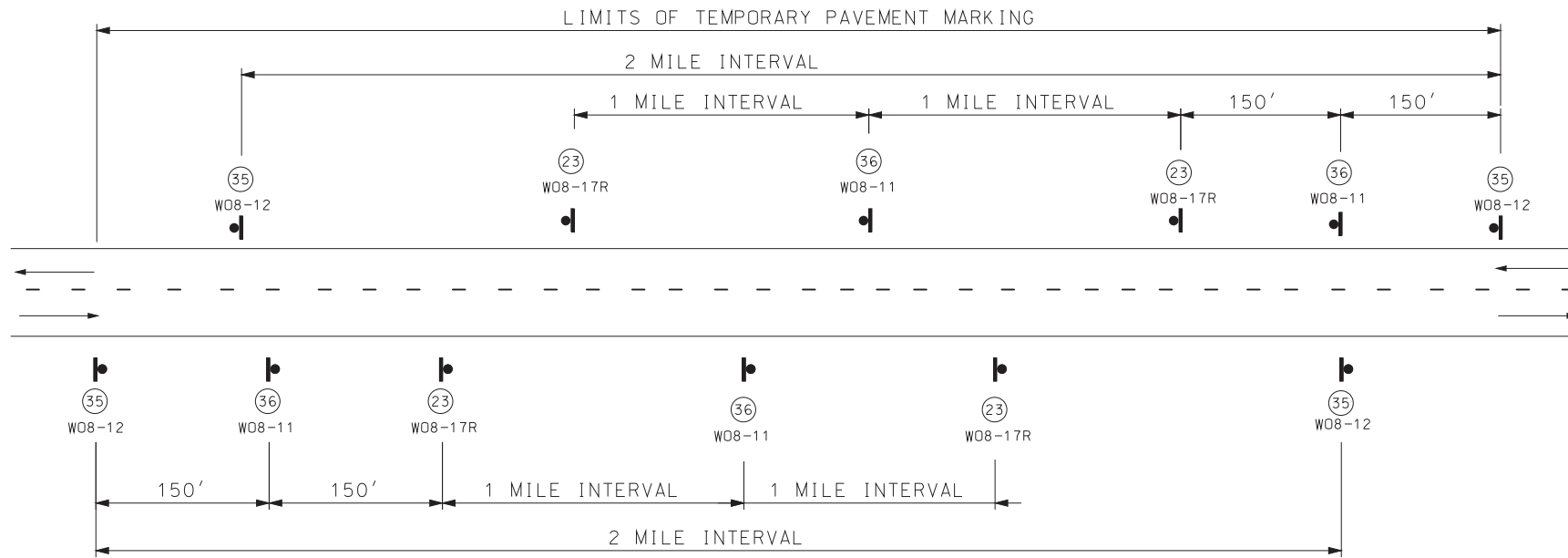
TEMPORARY PAVEMENT MARKING IN INTERSECTIONS, RAMP GORES AND OTHER TRANSITION AREAS USE AN INTERMITTENT MARKING 2' LONG AT A CYCLE OF 20'.

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 105 WEST CAPITOL  
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 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
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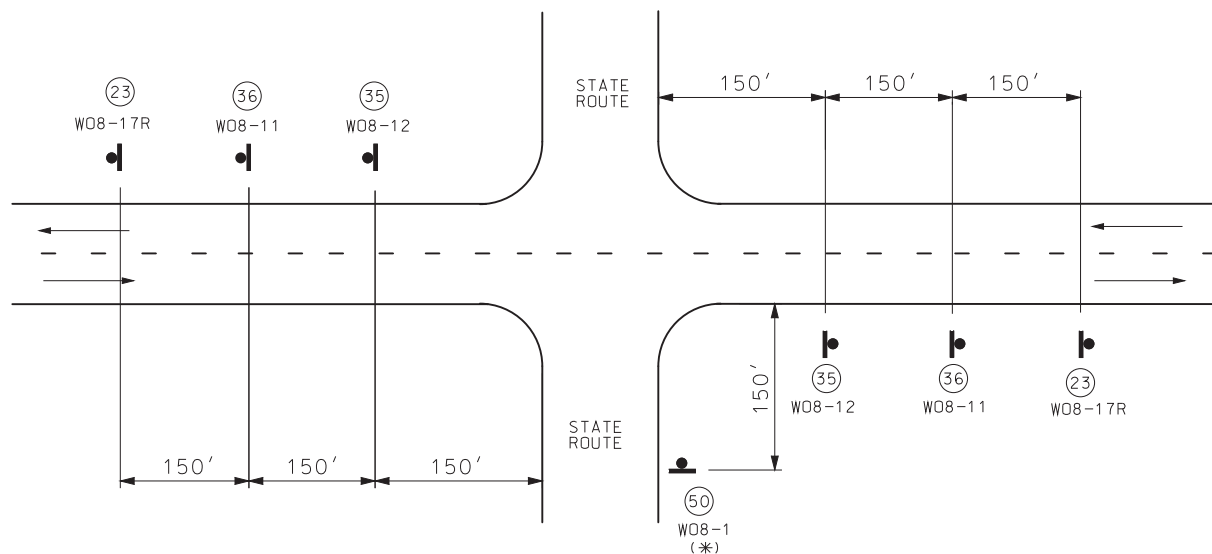
TEMPORARY PAVEMENT MARKING INTERSECTIONS

DATE EFFECTIVE: 07/01/2017	620.10G	SHEET NO. 3 OF 5
DATE PREPARED: 5/1/2017		



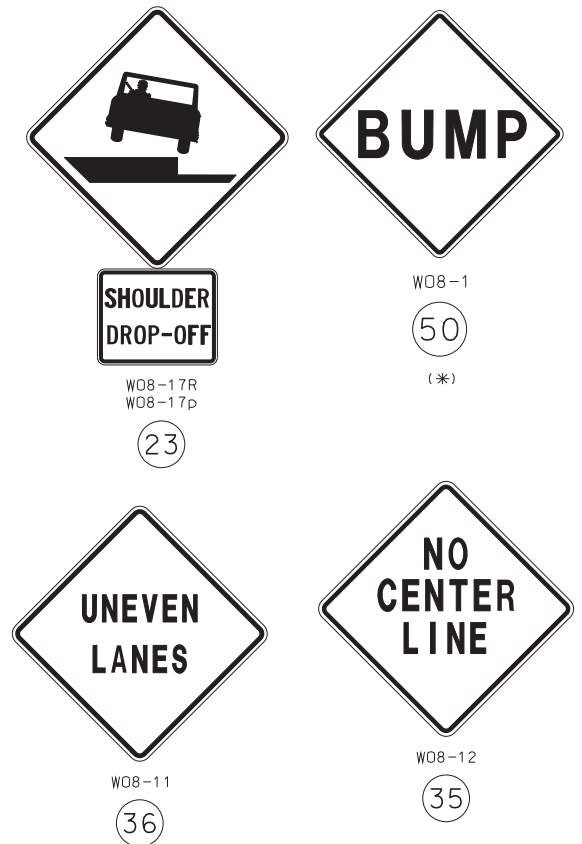
### SIGN SPACING FOR MAINLINE

(DETAIL SHOWN IS BASED ON A PROJECT MEETING ALL CONDITIONS: NO CENTER STRIPE, UNEVEN LANES, SHOULDER DROP-OFF AND BUMP.)  
 WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGNS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXIST.  
 IF ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF), THE SIGN SPACING SHALL BE AT 1 MILE INTERVALS.



### SIGN SPACING AT STATE ROUTE INTERSECTIONS

(\*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



#### GENERAL NOTES:

FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

SIGN (35) AND TEMPORARY PAVEMENT MARKING INSTALLED WHERE CENTERLINE STRIPING HAS BEEN COVERED OR REMOVED. SIGNS ARE TO REMAIN IN PLACE UNTIL THE PERMANENT CENTERLINE PAVEMENT MARKINGS ARE IN PLACE. SIGNS SHALL BE COVERED OR REMOVED WHEN PAVEMENT CENTERLINE MARKING HAS BEEN INSTALLED.

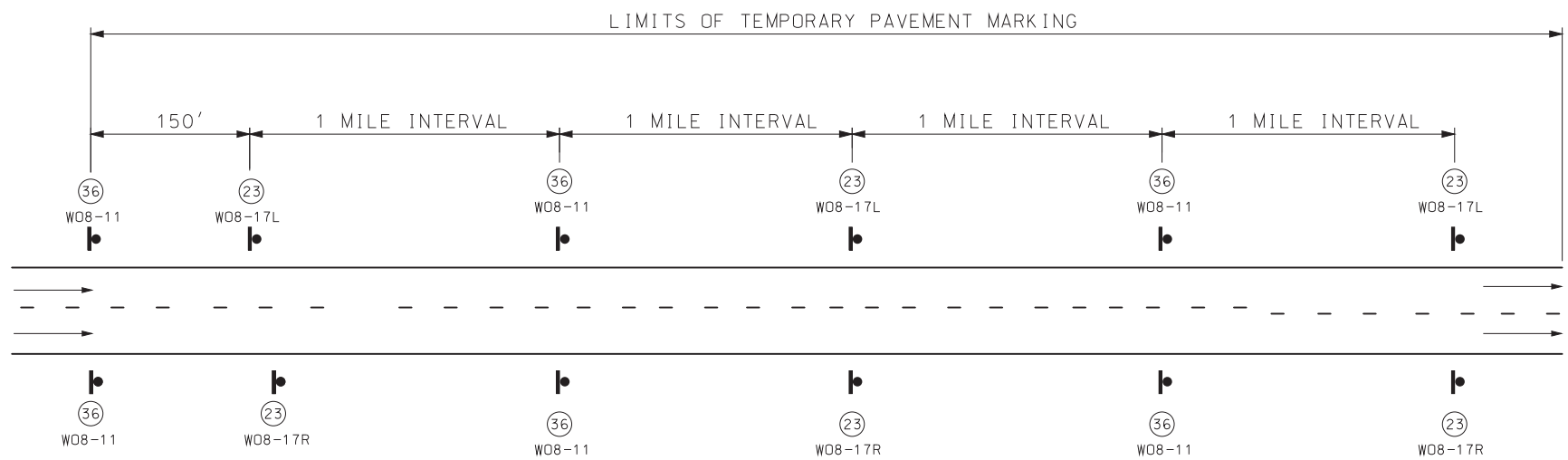
SIGN (35) IS PLACED AT APPROXIMATELY TWO-MILE INTERVALS AND AT STATE ROUTE JUNCTIONS. WHEN THE INSTALLATION AT A JUNCTION IS WITHIN ONE-EIGHTH MILE OF THE NORMAL MAINLINE SIGN (35), THE LATTER MAY BE ELIMINATED.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLAN 616.10 AND 903.03.

WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.

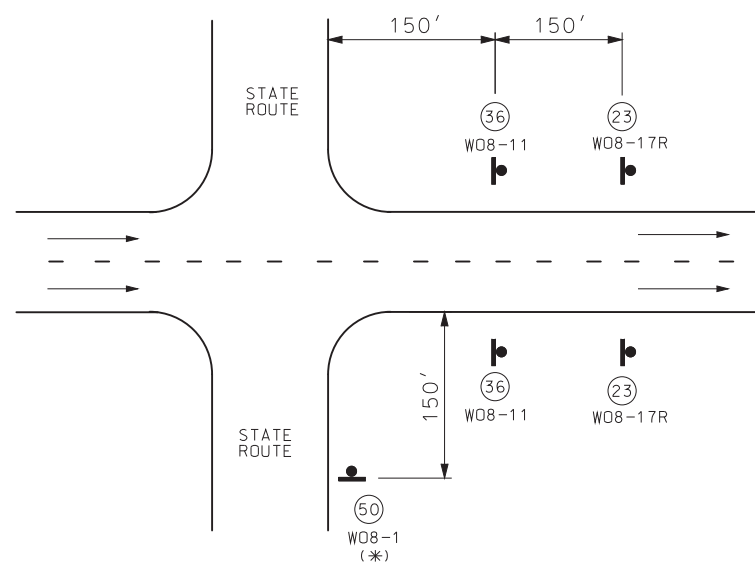
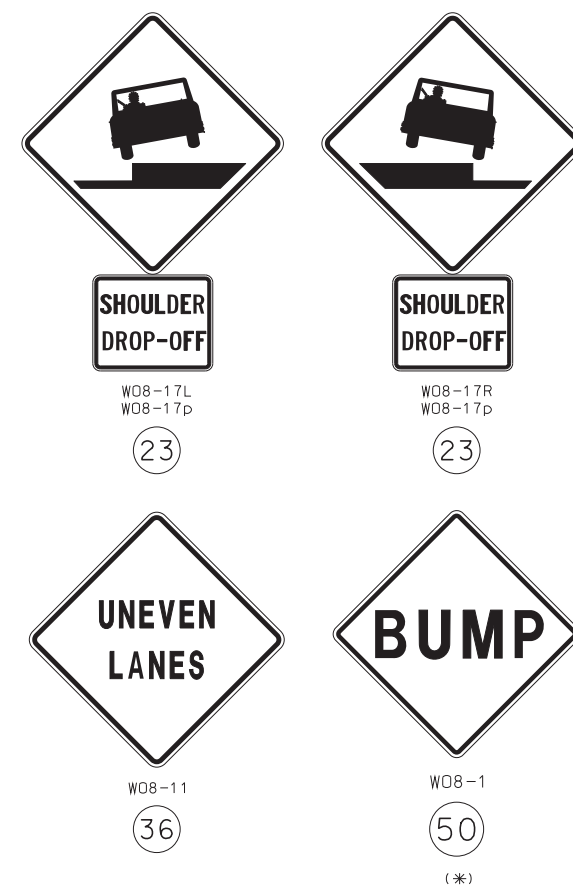
<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TEMPORARY PAVEMENT MARKING</b> <b>TWO-LANE TWO-WAY HIGHWAY</b>
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017	SHEET NO. <b>4 OF 5</b>

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



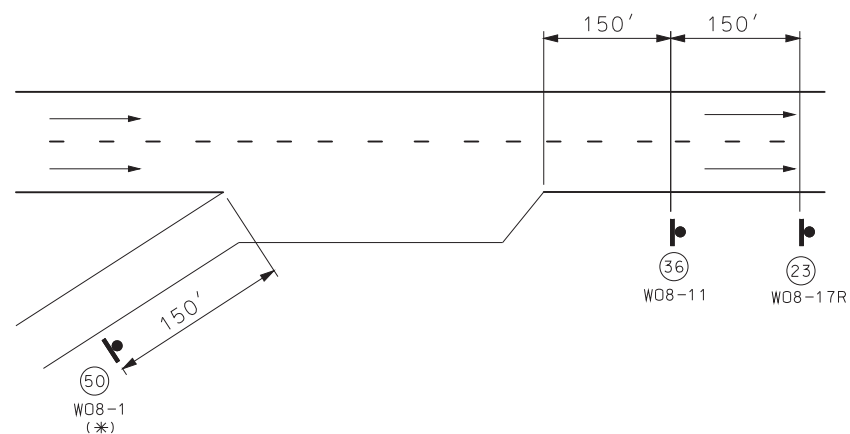
**SIGN SPACING FOR DIVIDED OR MULTI-LANE HIGHWAY**

(DETAIL SHOWN IS BASED ON A PROJECT MEETING CONDITIONS OF UNEVEN LANES AND SHOULDER DROP-OFF.)  
 WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGNS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXISTS.  
 WHEN ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF), SIGN SPACING SHALL BE AT 1 MILE INTERVALS



**SIGN SPACING AT STATE ROUTE INTERSECTIONS**

(\*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



**SIGN SPACING AT RAMPS**

(\*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.

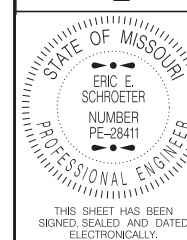
**GENERAL NOTES:**

FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLANS 616.10 AND 903.03.

WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.

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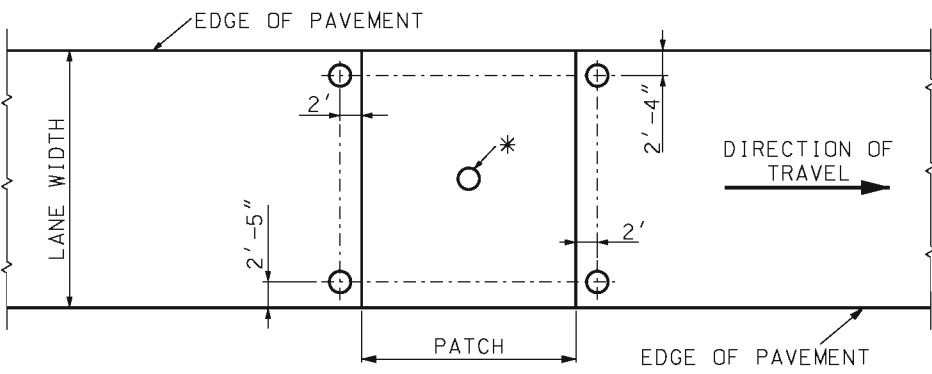
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TEMPORARY PAVEMENT MARKING DIVIDED AND MULTI-LANE HIGHWAYS**

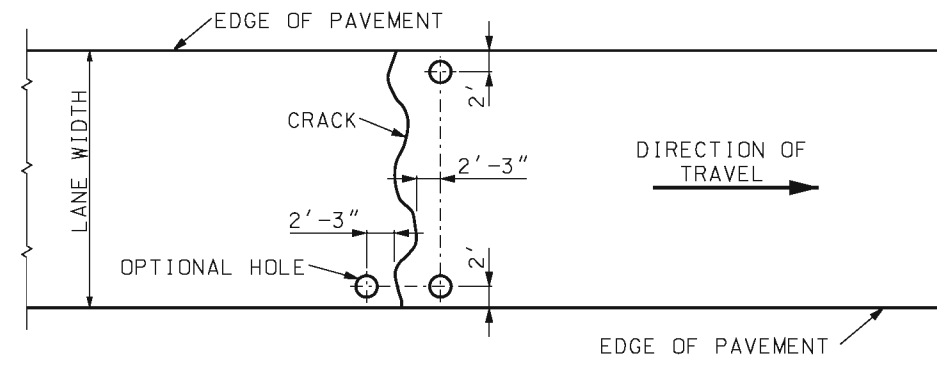
DATE EFFECTIVE: 07/01/2017  
 DATE PREPARED: 5/1/2017

620.10G

SHEET NO. 5 OF 5

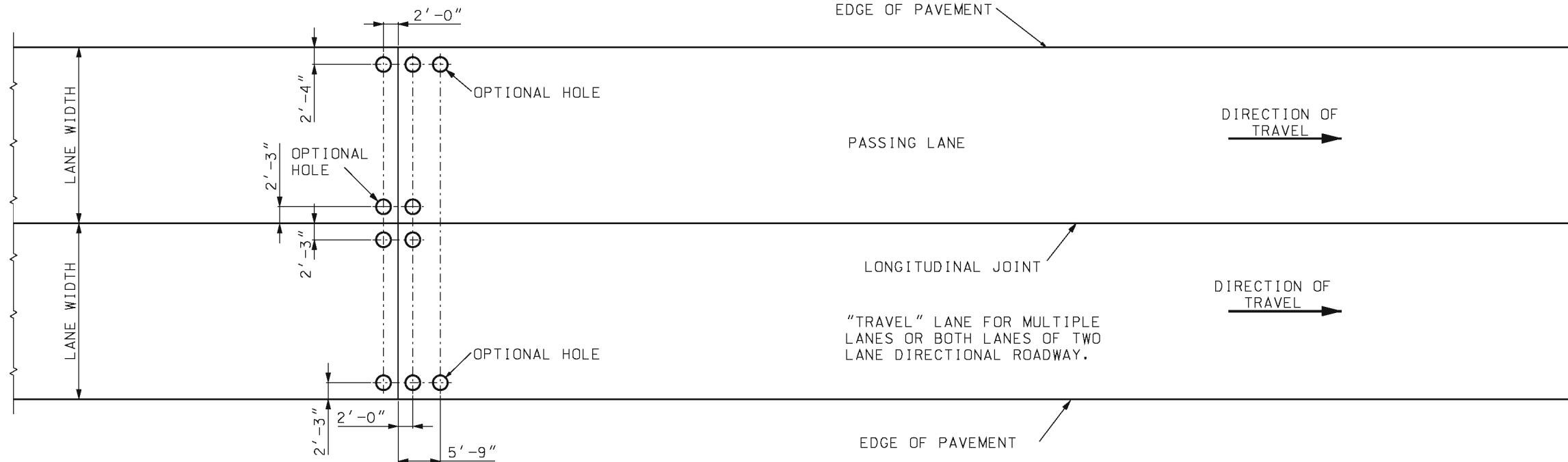


**PATCH**


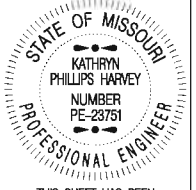


**CRACK**

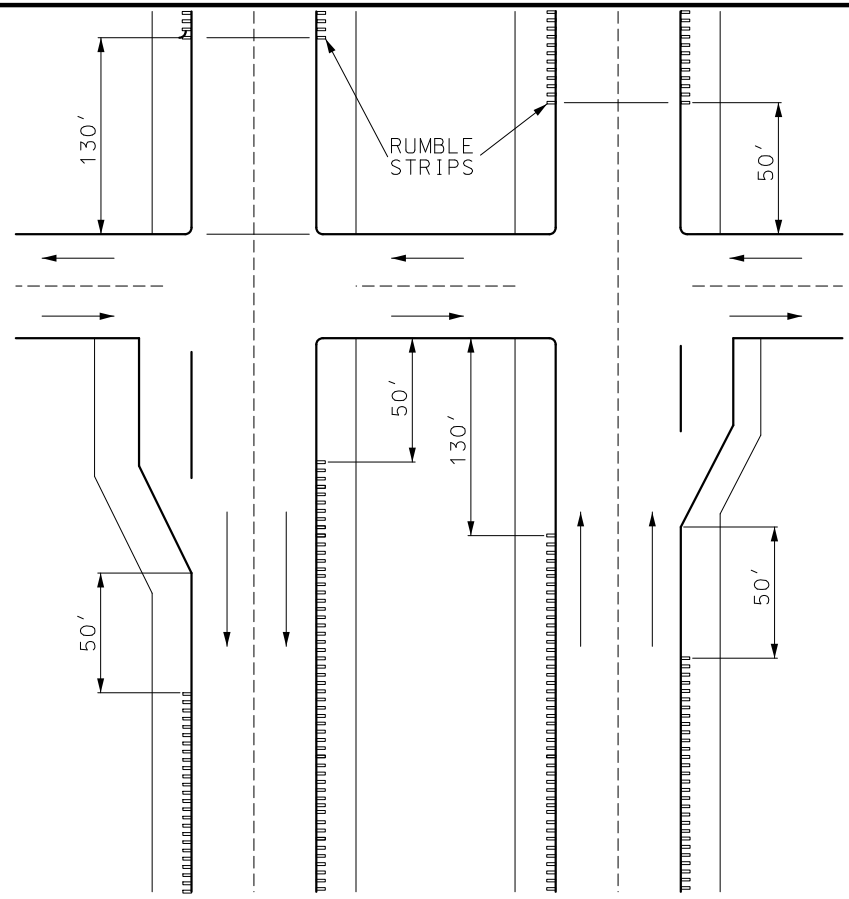
\* THIS HOLE SHOULD ONLY BE USED ON PATCHES EXISTING PRIOR TO CONSTRUCTION. THE HOLE SHOULD BE LOCATED CLOSE TO THE CENTER OF THE PATCH. BY USING THIS HOLE, THE TWO HOLES LOCATED AT THE SHOULDER COULD BE ELIMINATED.



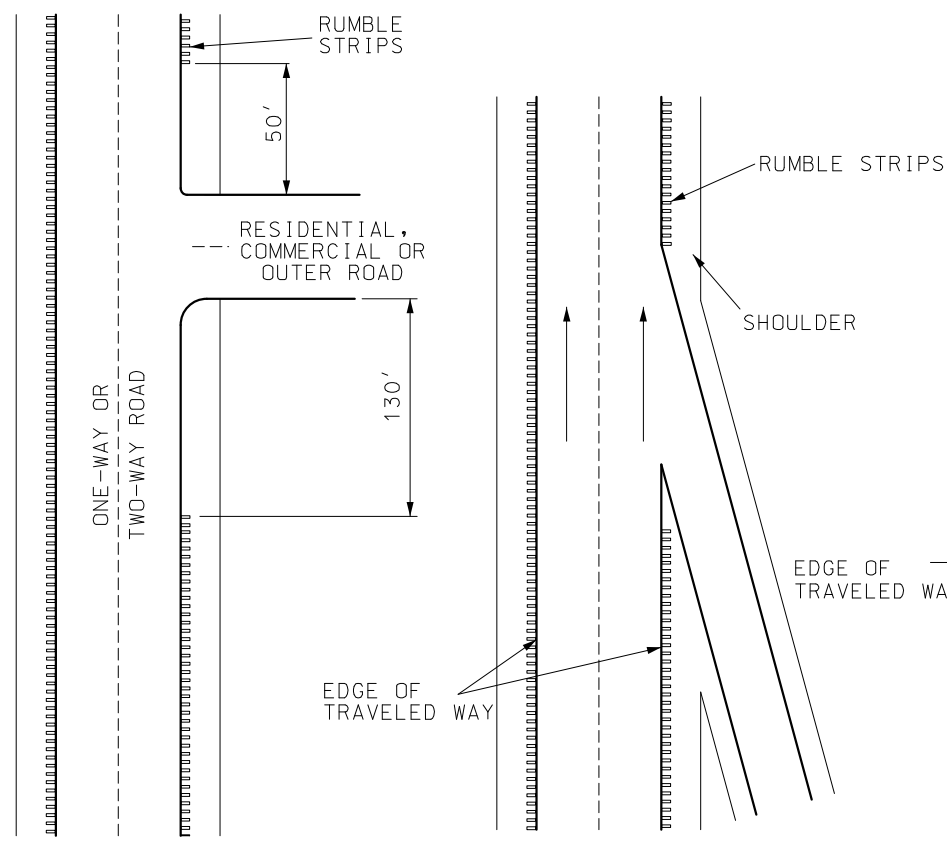
**JOINT**

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p><b>HOLE PATTERN FOR PAVEMENT SLAB STABILIZATION</b></p>
DATE EFFECTIVE: 10/01/1998 DATE PREPARED: 8/21/2009	<p><b>625.00</b></p>
SHEET NO. 1 OF 1	

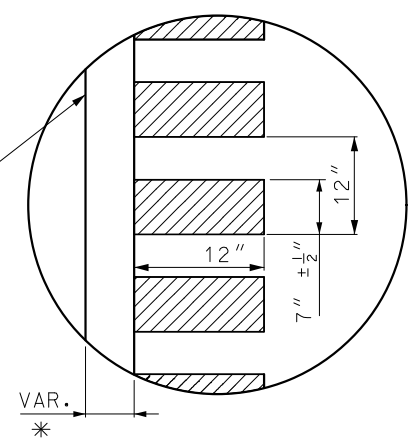
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



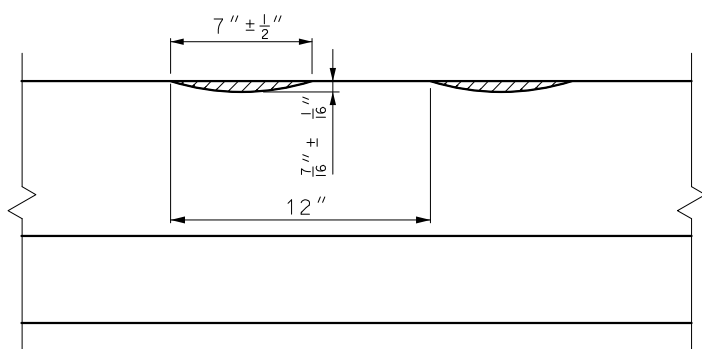
EXPRESSWAY DIVIDED



INTERSECTIONS  
ACCELERATION OR DECELERATION LANE  
**RUMBLE STRIP LAYOUTS**



RUMBLE STRIP PLAN VIEW



RUMBLE STRIP CROSS SECTION VIEW

14' PAVEMENT STRUCTURES, ALL SHOULDER TYPES	
13' PAVEMENT STRUCTURES, ALL SHOULDER TYPES	
PAVEMENT STRUCTURES ≤ 12' WITH A2 SHOULDER	
PAVEMENT STRUCTURES ≤ 12' WITH A3 SHOULDER	
PAVEMENT STRUCTURES ≤ 12' WITH EARTH OR AGGREGATE SHOULDER	

\* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.

GENERAL NOTES:  
 SEE STANDARD PLAN 620.00 FOR PAVEMENT MARKING.  
 RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.  
 ALL RUMBLE STRIPS SHALL BE MILLED.  
 RUMBLE STRIPS SHALL NOT BE MILLED ONTO TRANSVERSE JOINTS.  
 FOR CONCRETE PAVEMENT WITH 15' JOINT SPACING, AT LEAST TWELVE RUMBLE STRIPS SHALL BE MILLED PER PANEL.  
 RUMBLE STRIPS SHALL BE OMITTED IF SHOULDERS ARE LESS THAN 2' WIDE.

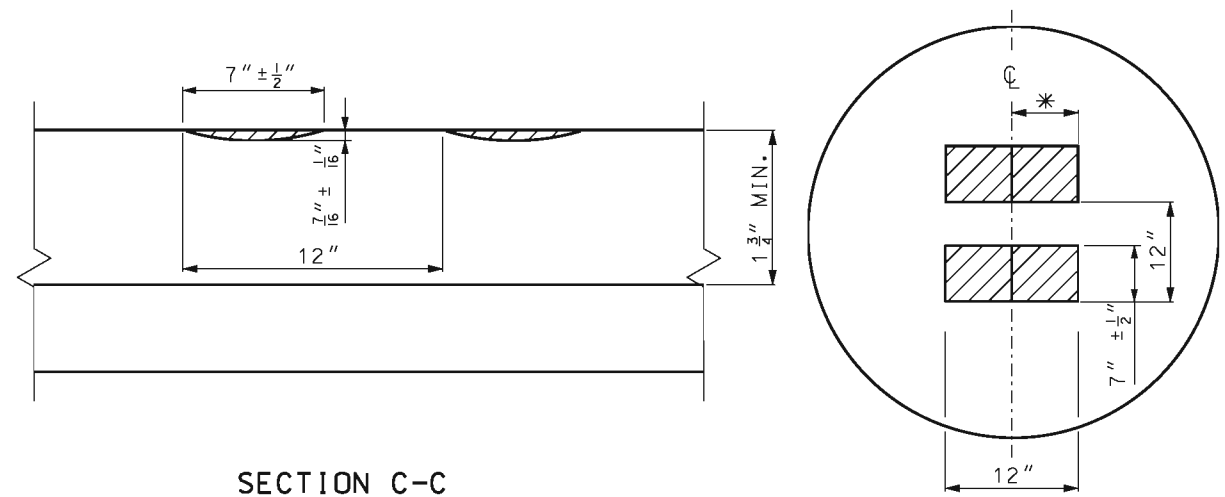
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
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 JEFFERSON CITY, MO 65102  
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STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

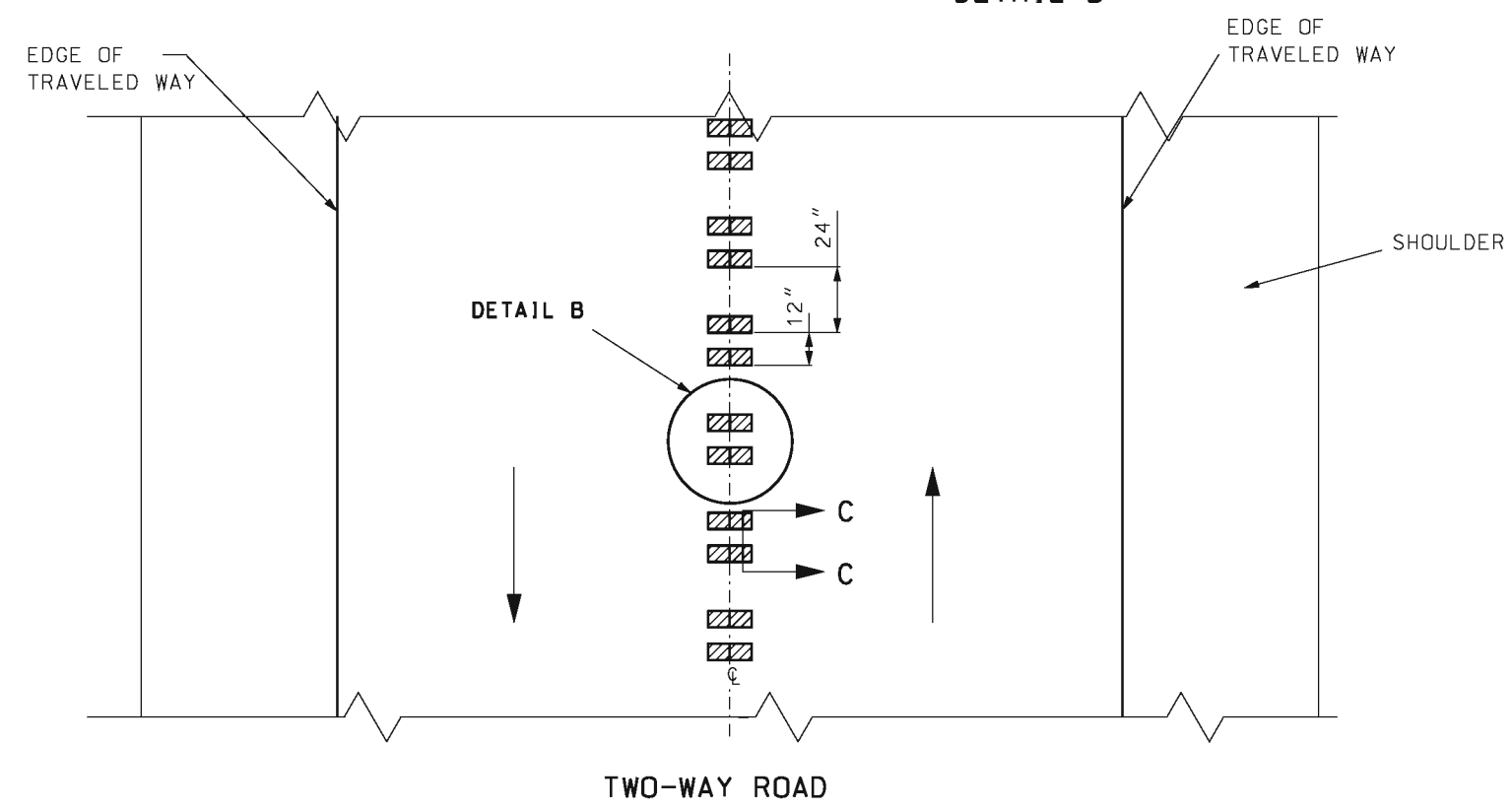
**RUMBLE STRIPS**  
 SHOULDER

DATE EFFECTIVE: 07/01/2022	<b>626.00H</b>	SHEET NO. 1 OF 2
DATE PREPARED: 3/9/2022		


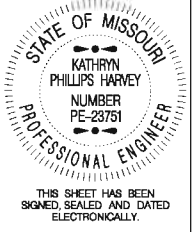
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



\* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.



GENERAL NOTES:  
 SEE STANDARD PLAN 620.00 FOR PAVEMENT MARKING.  
 RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.  
 ALL RUMBLE STRIPS SHALL BE MILLED.  
 CENTERLINE RUMBLE STRIPS SHALL BE CONTINUOUS THROUGH CONNECTIONS OF SIDEROADS WITH NO LEFT TURN LANES.  
 DISCONTINUE CENTERLINE RUMBLE STRIPS THROUGH THE LIMITS OF ALL LEFT TURN LANES, INCLUDING ANY LANE TAPER SECTIONS.

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	<b>RUMBLE STRIPS</b> CENTERLINE
DATE EFFECTIVE: 04/01/2009 DATE PREPARED: 2/20/2009	<b>626.00H</b>
SHEET NO. <b>2 OF 2</b>	

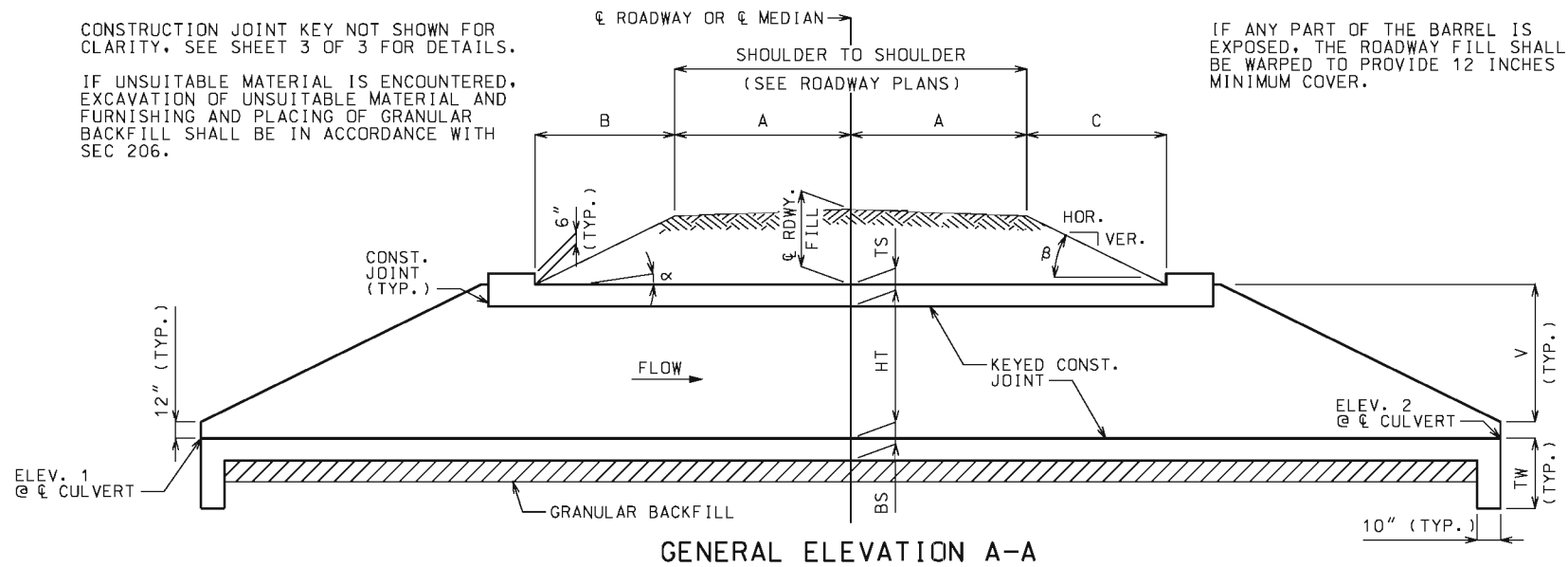
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.

EQUATIONS FOR COMPUTING  $\alpha$ ,  $\beta$ , B AND C

$\alpha$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN}\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W}\right)$

$\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN}\left(\frac{\text{VER.}}{\text{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\frac{\phi \text{ RDWY. FILL} + A(\text{CS}) - A(\text{TAN}\alpha)}{\text{TAN}\beta + \text{TAN}\alpha}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\frac{\phi \text{ RDWY. FILL} + A(\text{CS}) + A(\text{TAN}\alpha)}{\text{TAN}\beta - \text{TAN}\alpha}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM  $\phi$  ROADWAY OR  $\phi$  MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN  $\phi$  ROADWAY OR  $\phi$  MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE  $\phi$  ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES,  $\phi$  ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION
$\alpha$	SEE EQUATIONS
$\beta$	SEE EQUATIONS
B	SEE EQUATIONS
C	SEE EQUATIONS
E	G + 23"
F	S + 2TX
G	2V
V	HT + TS - 12"
W	2A + B + C + 2E
TW	MAX{3'-4" OR (BS + 12")}

GENERAL NOTES:

**DESIGN SPECIFICATIONS:**  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

**DESIGN LOADING:**  
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

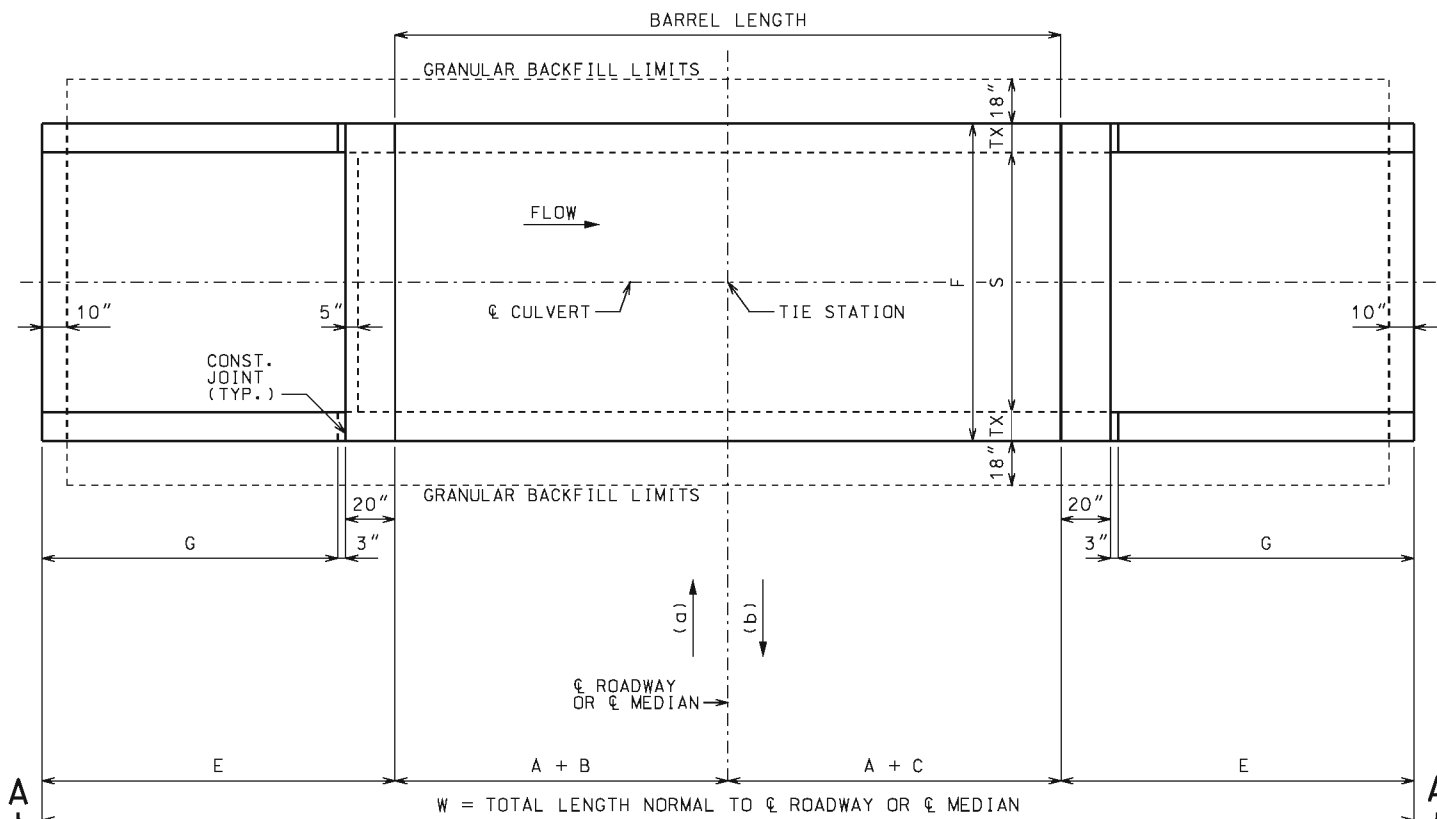
**DESIGN UNIT STRESSES:**  
CLASS B-1 CONCRETE (BOX CULVERT)  $f'c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

**MISCELLANEOUS:**  
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
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**CONCRETE SINGLE BOX CULVERT**

SKEW: SQUARED  
WINGS: STRAIGHT

LAYOUT

STATE OF MISSOURI

DENNIS W. HECKMAN

NUMBER PE-27141

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2015

DATE PREPARED: 5/13/2015

**703.10J**

SHEET NO.  
**1 OF 3**

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

### LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

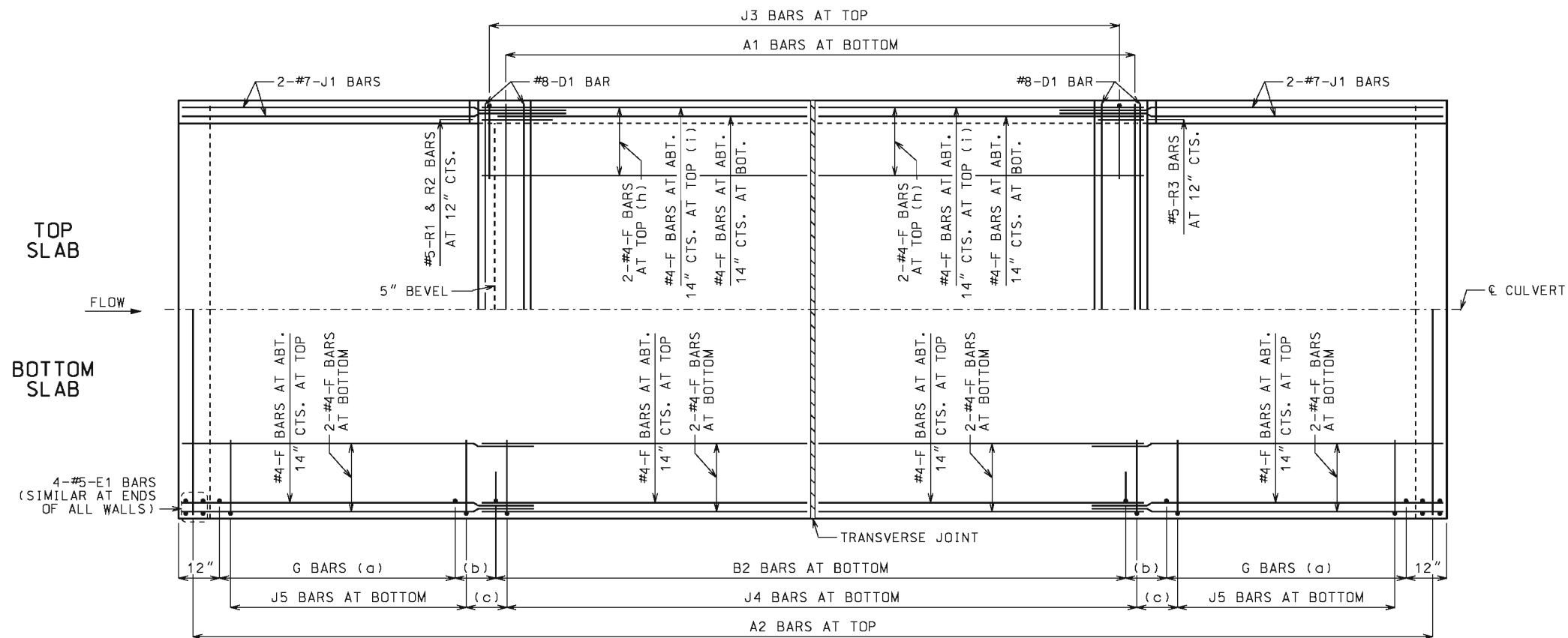
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.



### HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT C CULVERT.

### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) NOT SPECIFIED ON THIS SHEET

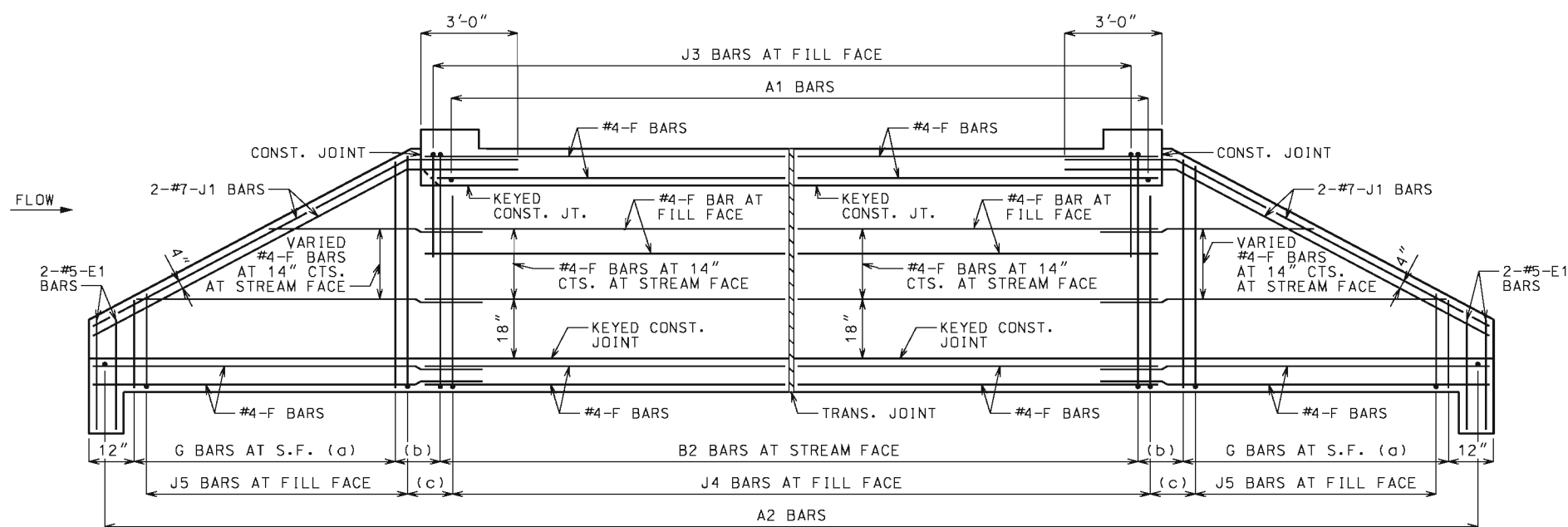
(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET


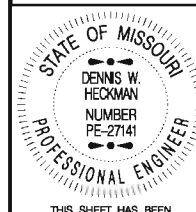
(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

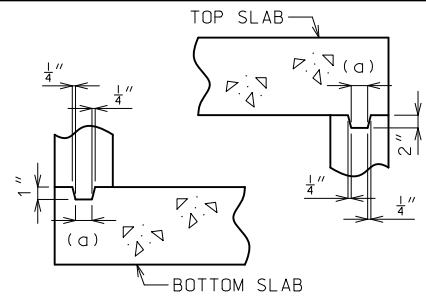


### ELEVATION

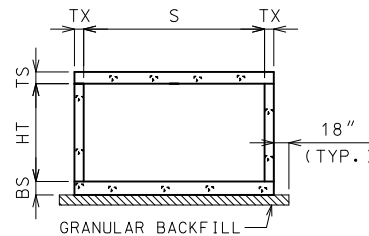
J1 BARS MAY BE BENT IN FIELD OR SHOP.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b> SKEW: SQUARED WINGS: STRAIGHT <b>REINFORCEMENT</b>
DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u>	<b>703.10J</b>
SHEET NO. <b>2 OF 3</b>	

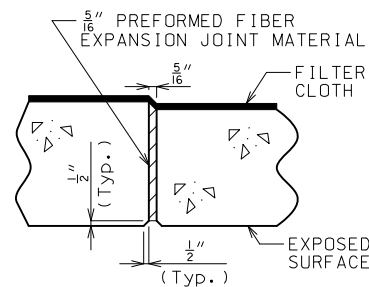
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



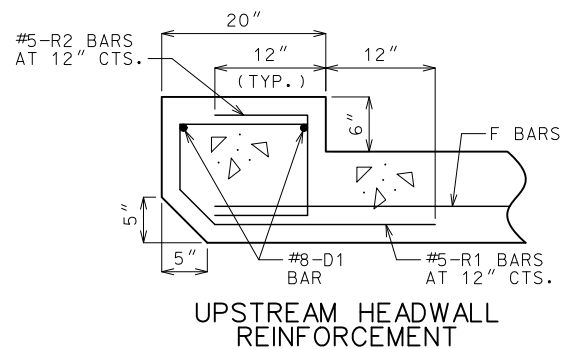
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



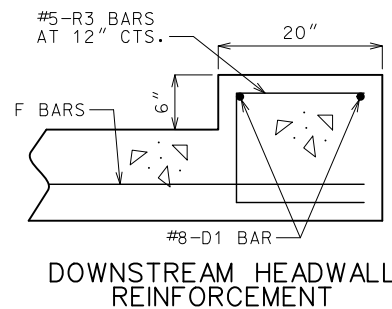
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

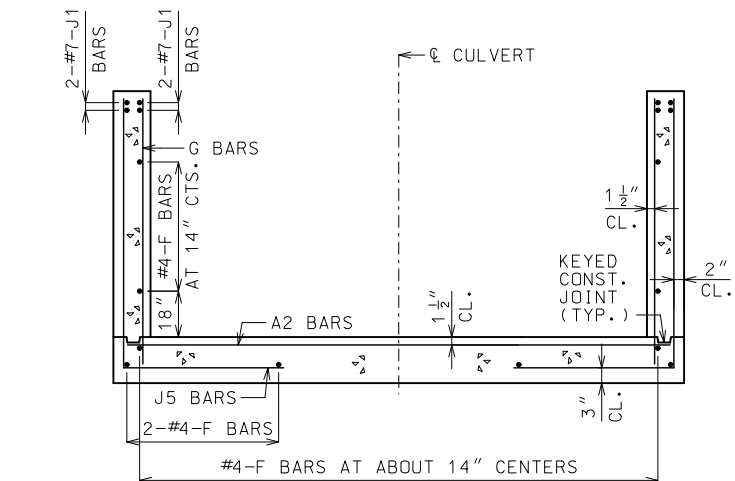
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



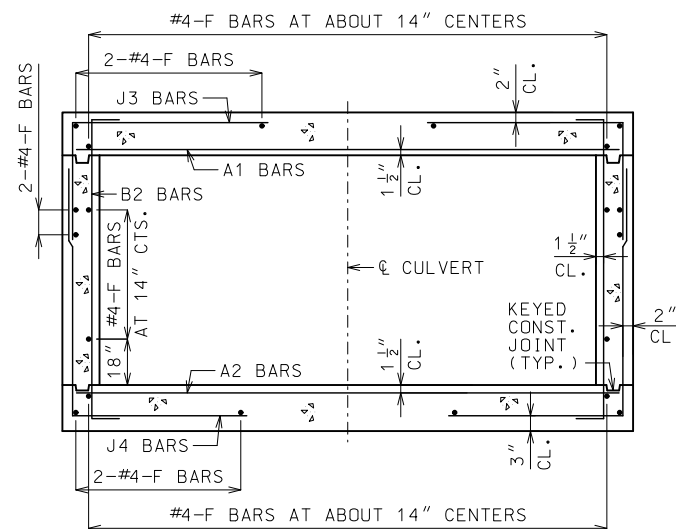
**UPSTREAM HEADWALL REINFORCEMENT**



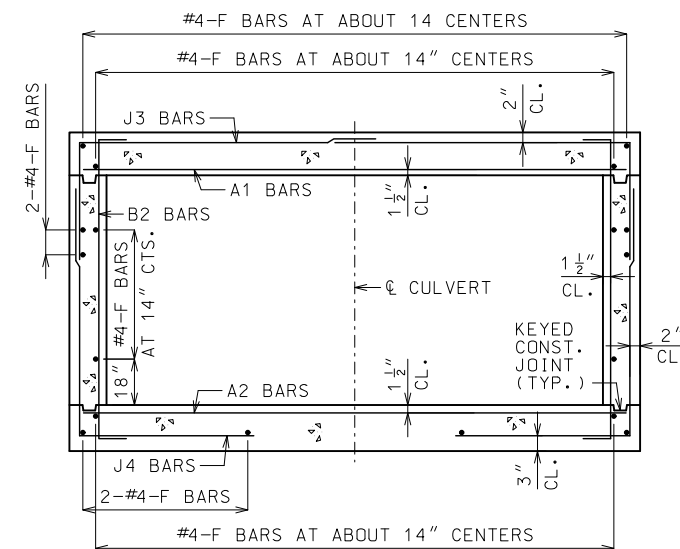
**DOWNSTREAM HEADWALL REINFORCEMENT**



**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 inch.

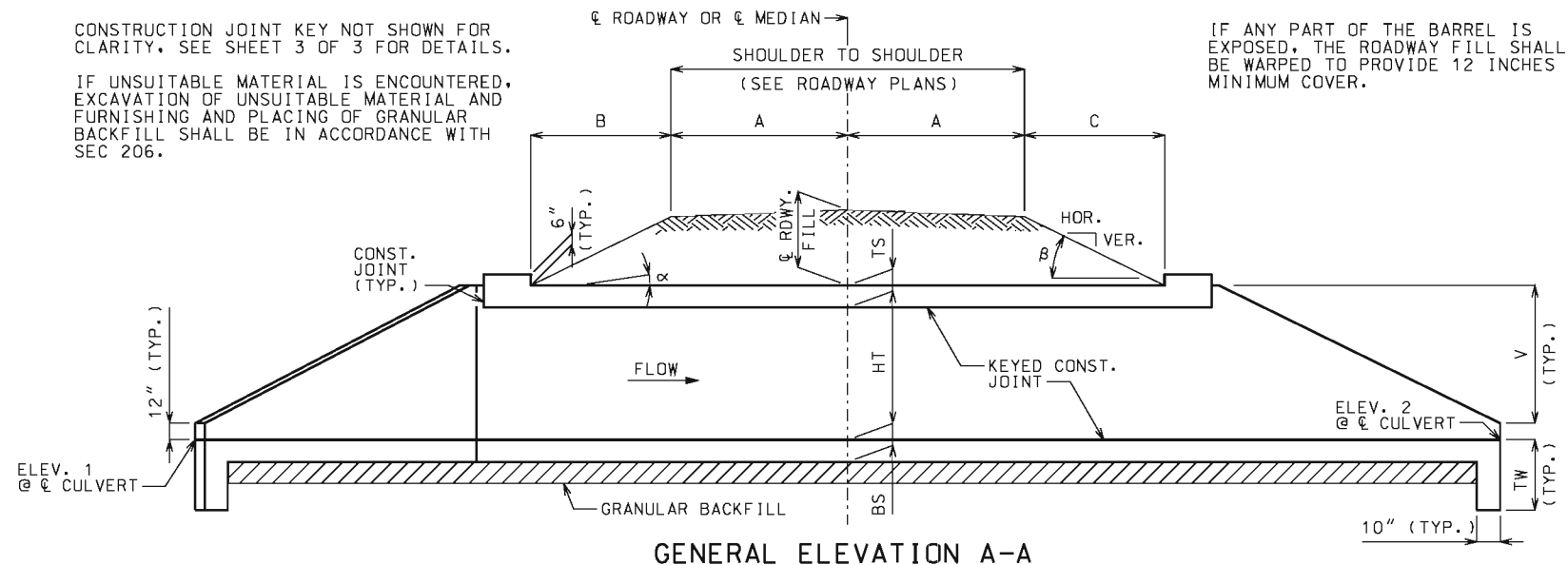
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b>	
	SKEW: SQUARED WINGS: STRAIGHT	
<b>SECTIONS</b>		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.10J</b>	SHEET NO. <b>3 OF 3</b>

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

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.

### EQUATIONS FOR COMPUTING $\alpha$ , $\beta$ , B AND C

$\alpha$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN} \left( \frac{\text{ELEV. 1} - \text{ELEV. 2}}{W} \right)$

$\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN} \left( \frac{\text{VER.}}{\text{HOR.}} \right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\frac{\phi \text{ RDWY. FILL} + A(\text{CS}) - A(\text{TAN} \alpha)}{\text{TAN} \beta + \text{TAN} \alpha}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\frac{\phi \text{ RDWY. FILL} + A(\text{CS}) + A(\text{TAN} \alpha)}{\text{TAN} \beta - \text{TAN} \alpha}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM  $\phi$  ROADWAY OR  $\phi$  MEDIAN.

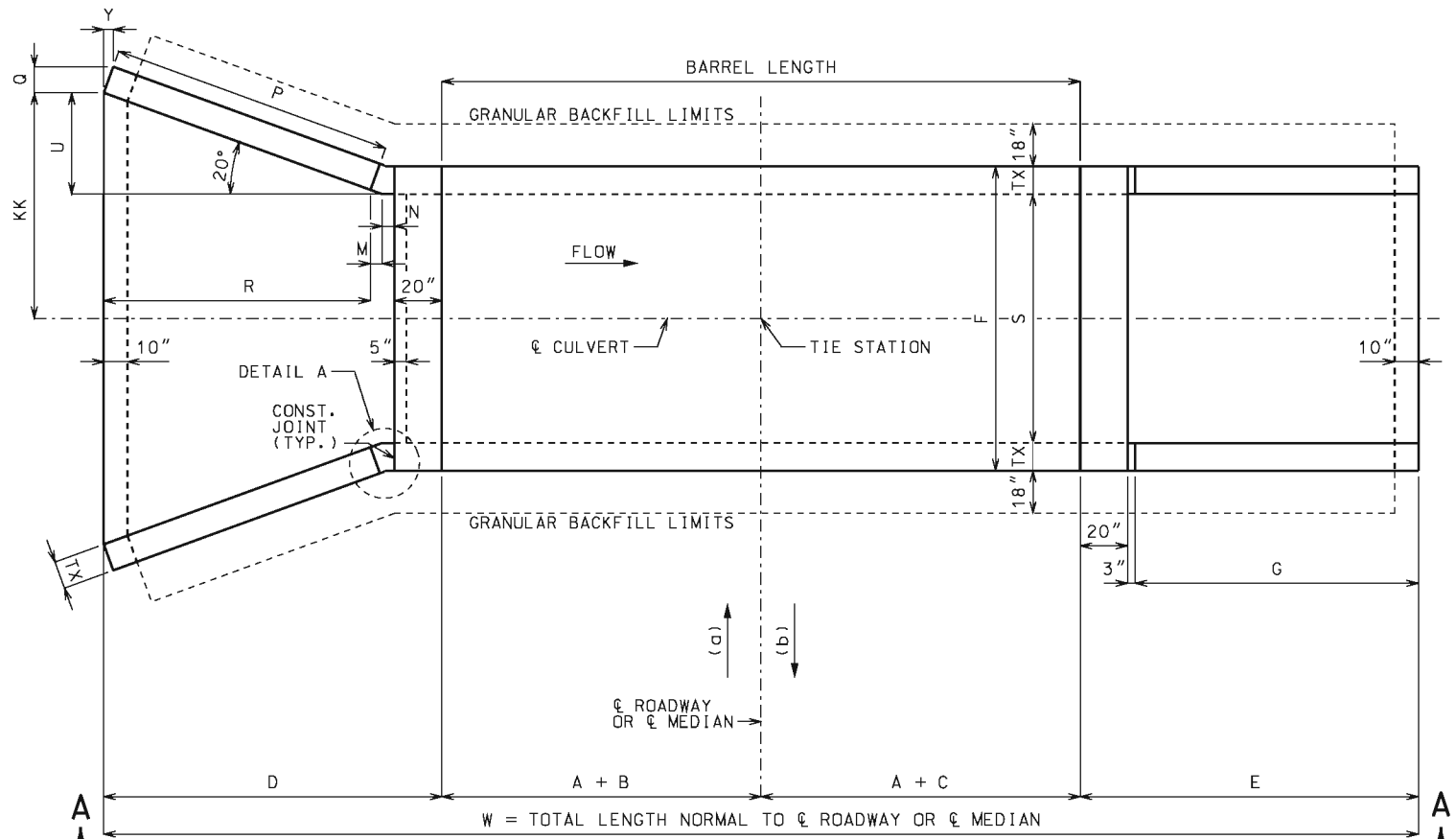
THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN  $\phi$  ROADWAY OR  $\phi$  MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE  $\phi$  ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES,  $\phi$  ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

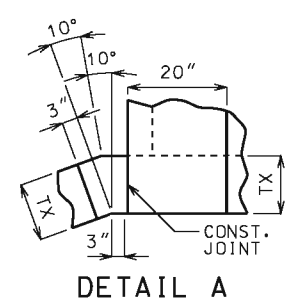
### LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION
$\alpha$	SEE EQUATIONS	P	$2V(\text{SEC } 20^\circ)$
$\beta$	SEE EQUATIONS	Q	$TX(\text{COS } 20^\circ)$
B	SEE EQUATIONS	R	$P(\text{COS } 20^\circ)$
C	SEE EQUATIONS	U	$(R + M)(\text{TAN } 20^\circ)$
D	$R + M + N + 20''$	V	$HT + TS - 12''$
E	$G + 23''$	W	$2A + B + C + D + E$
F	$S + 2TX$	Y	$TX(\text{SIN } 20^\circ)$
G	2V	KK	$S/2 + U$
M	$N(\text{COS } 20^\circ)$	TW	$\text{MAX}\{3'-4'' \text{ OR } (BS + 12'')\}$
N	$3'' + TX(\text{TAN } 10^\circ)$		



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.



### GENERAL NOTES:

**DESIGN SPECIFICATIONS:**  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

**DESIGN LOADING:**  
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

**DESIGN UNIT STRESSES:**  
CLASS B-1 CONCRETE (BOX CULVERT)  $f'c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

**MISCELLANEOUS:**  
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**CONCRETE SINGLE BOX CULVERT**

SKEW: SQUARED  
WINGS: FLARED

LAYOUT

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2015

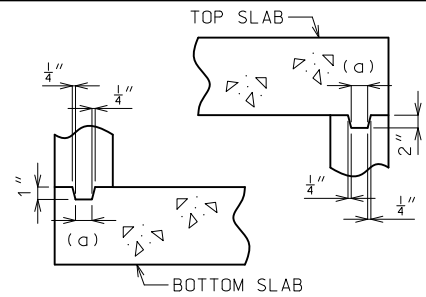
DATE PREPARED: 5/13/2015

**703.11J**

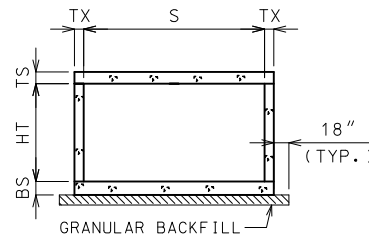
SHEET NO.  
**1 OF 3**

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

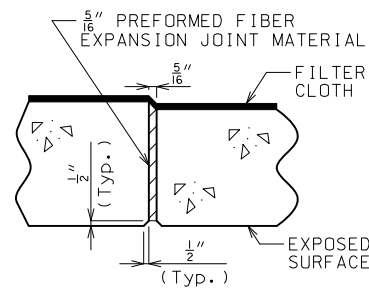




**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



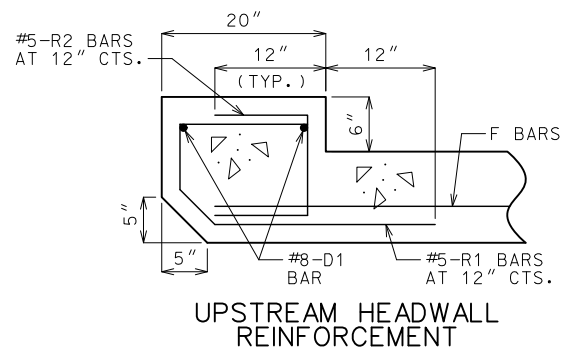
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



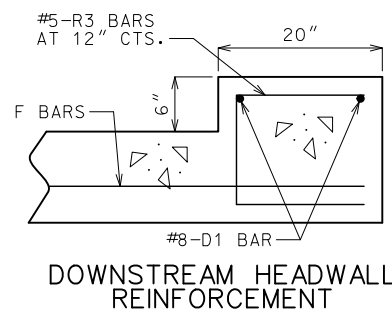
**TRANSVERSE JOINT THRU BARREL**

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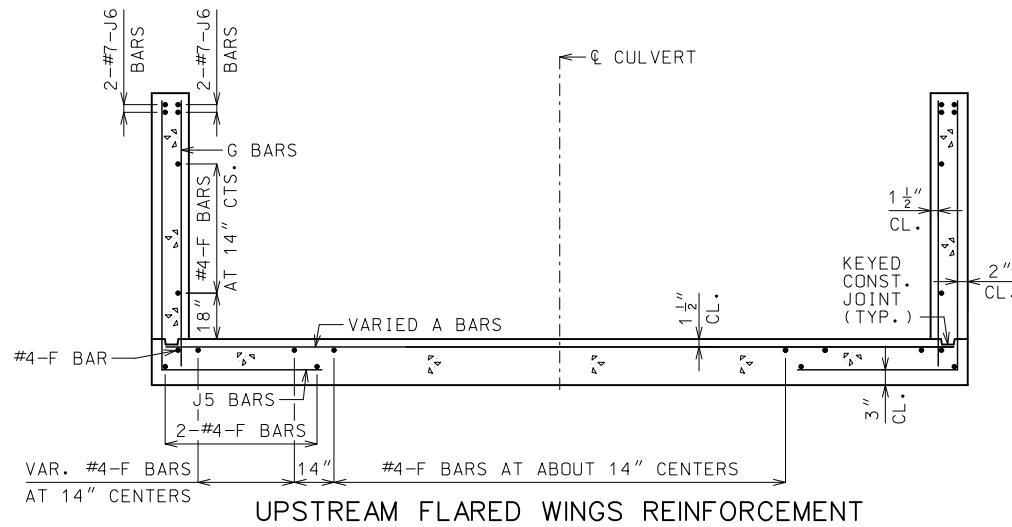
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



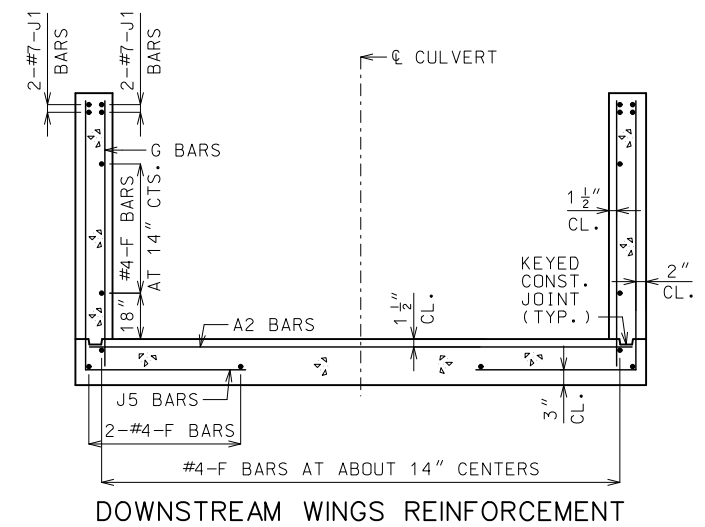
**UPSTREAM HEADWALL REINFORCEMENT**



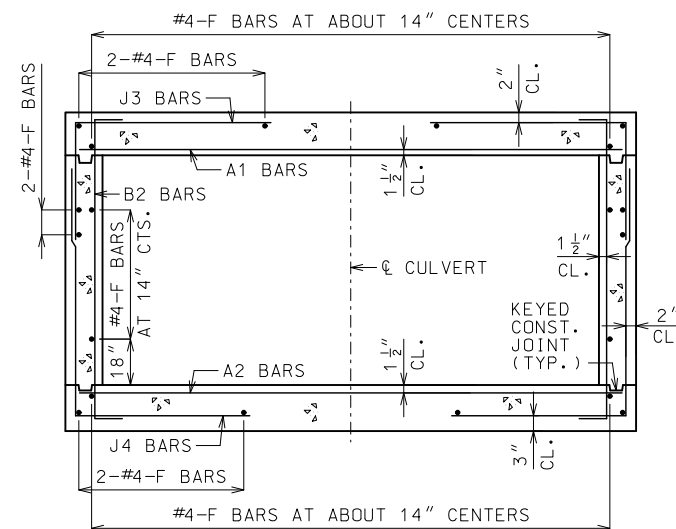
**DOWNSTREAM HEADWALL REINFORCEMENT**



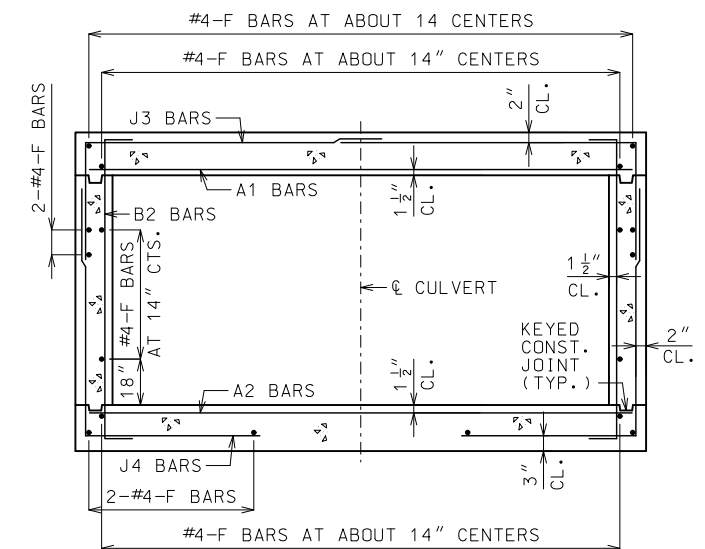
**UPSTREAM FLARED WINGS REINFORCEMENT**



**DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO  $\phi$  CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

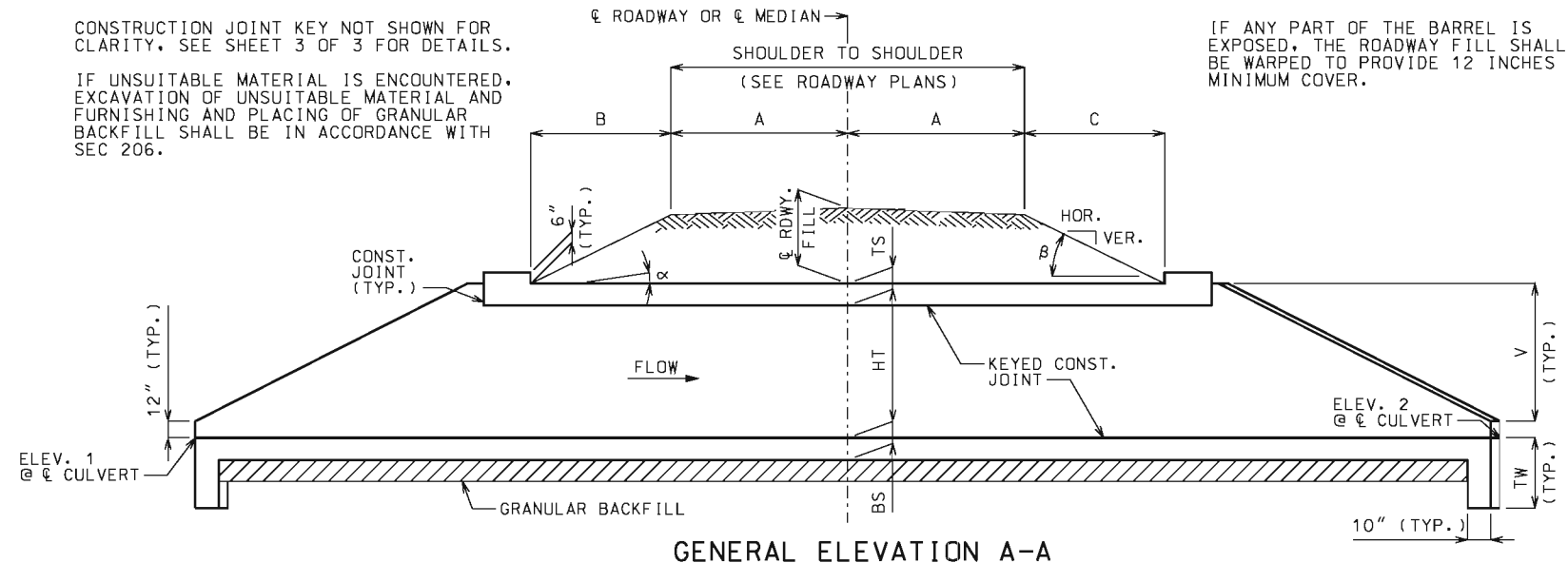
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b>	
	SKEW: SQUARED WINGS: FLARED	
<b>SECTIONS</b>		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.11J</b>	SHEET NO. <b>3 OF 3</b>

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

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

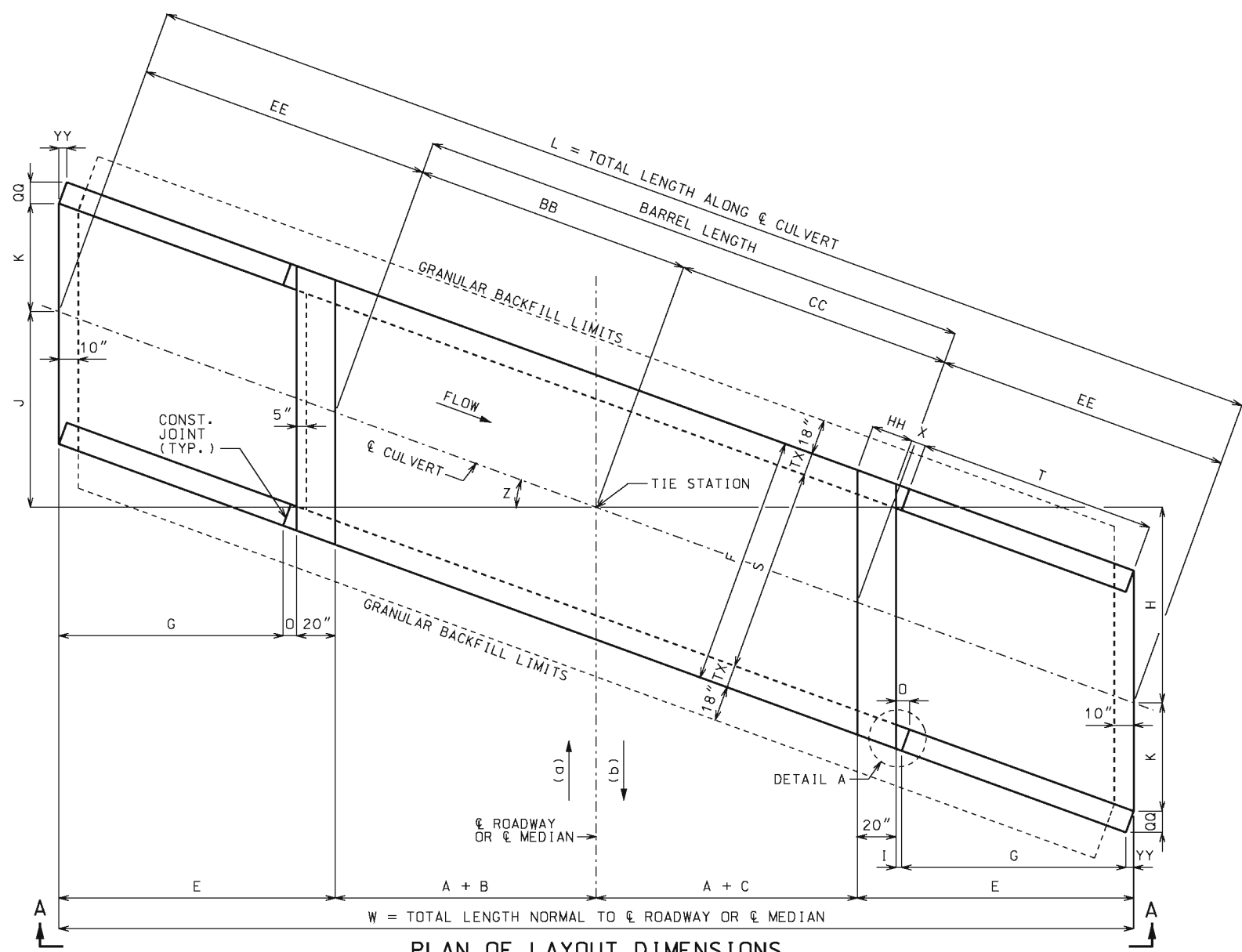
IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING  $\alpha$ ,  $\beta$ , B AND C

$\alpha$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN} \left( \frac{\text{ELEV. 1} - \text{ELEV. 2}}{W} \right)$

$\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN} \left( \frac{\text{VER.}}{\text{HOR.}} \right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO =  $\phi$  RDWY. FILL +  $\frac{A(\text{CS}) - A(\text{TAN}\alpha)}{\text{TAN}\beta + \text{TAN}\alpha}$   
UPSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO =  $\phi$  RDWY. FILL +  $\frac{A(\text{CS}) + A(\text{TAN}\alpha)}{\text{TAN}\beta - \text{TAN}\alpha}$   
DOWNSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN

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THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN  $\phi$  ROADWAY OR  $\phi$  MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE  $\phi$  ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES,  $\phi$  ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION
$\alpha$	SEE EQUATIONS	T	G(SEC Z)
$\beta$	SEE EQUATIONS	V	HT + TS - 12"
B	SEE EQUATIONS	W	2A + B + C + 2E
C	SEE EQUATIONS	X	3" + TX(TAN Z)
E	G + O + 20"	Z	SKEW ANGLE
F	S + 2TX	BB	(A + B)(SEC Z)
G	2V	CC	(A + C)(SEC Z)
H	(A + C + E)(TAN Z)	EE	E(SEC Z)
I	3"(COS Z)	HH	20"(SEC Z)
J	(A + B + E)(TAN Z)	OO	TX(COS Z)
K	S(SEC Z)/2	YY	TX(SIN Z)
L	2EE + BB + CC	TW	MAX{3'-4" OR (BS + 12")}
O	I + YY		

GENERAL NOTES:

**DESIGN SPECIFICATIONS:**  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

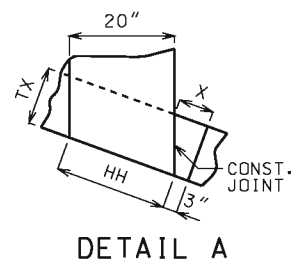
**DESIGN LOADING:**  
VEHICULAR = HL-93 MINUS LANE LOAD. EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

**DESIGN UNIT STRESSES:**  
CLASS B-1 CONCRETE (BOX CULVERT)  $f'c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

**MISCELLANEOUS:**  
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.  
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



DETAIL A

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**CONCRETE SINGLE BOX CULVERT**

SKEW: LEFT ADVANCE  
WINGS: STRAIGHT

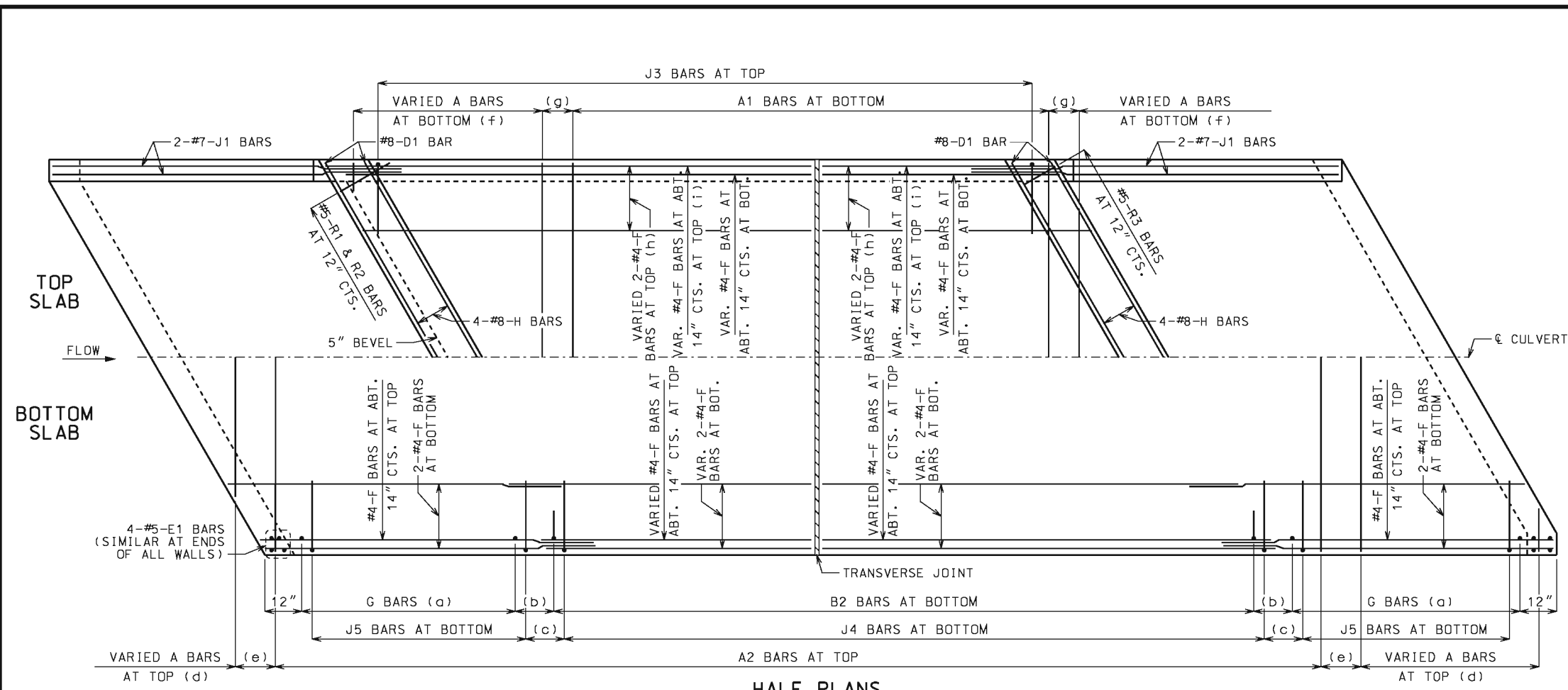
LAYOUT

DATE EFFECTIVE: 07/01/2015  
DATE PREPARED: 5/13/2015

**703.12J**

SHEET NO.  
1 OF 3

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



**HALF PLANS**

HALF PLANS ARE SYMMETRICAL ABOUT CULVERT.

**LAYING OUT TRANSVERSE JOINTS**  
 UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

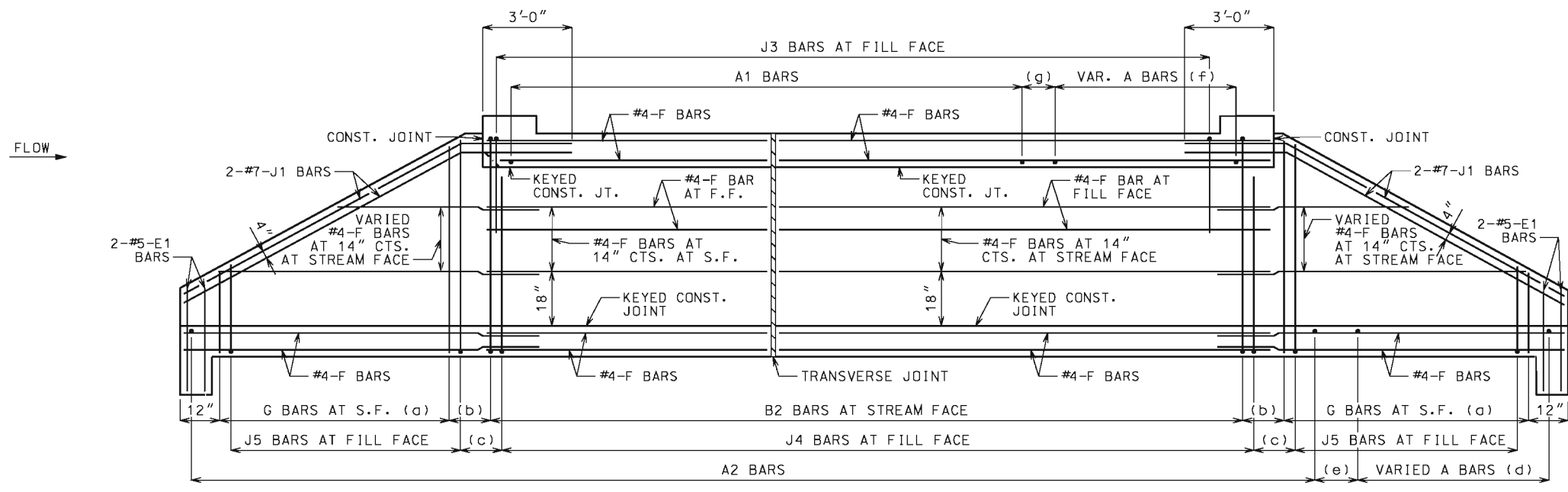
(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING



(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS



**ELEVATION**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: STRAIGHT <b>REINFORCEMENT</b>
	DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u>
<b>703.12J</b>	SHEET NO. <b>2 OF 3</b>

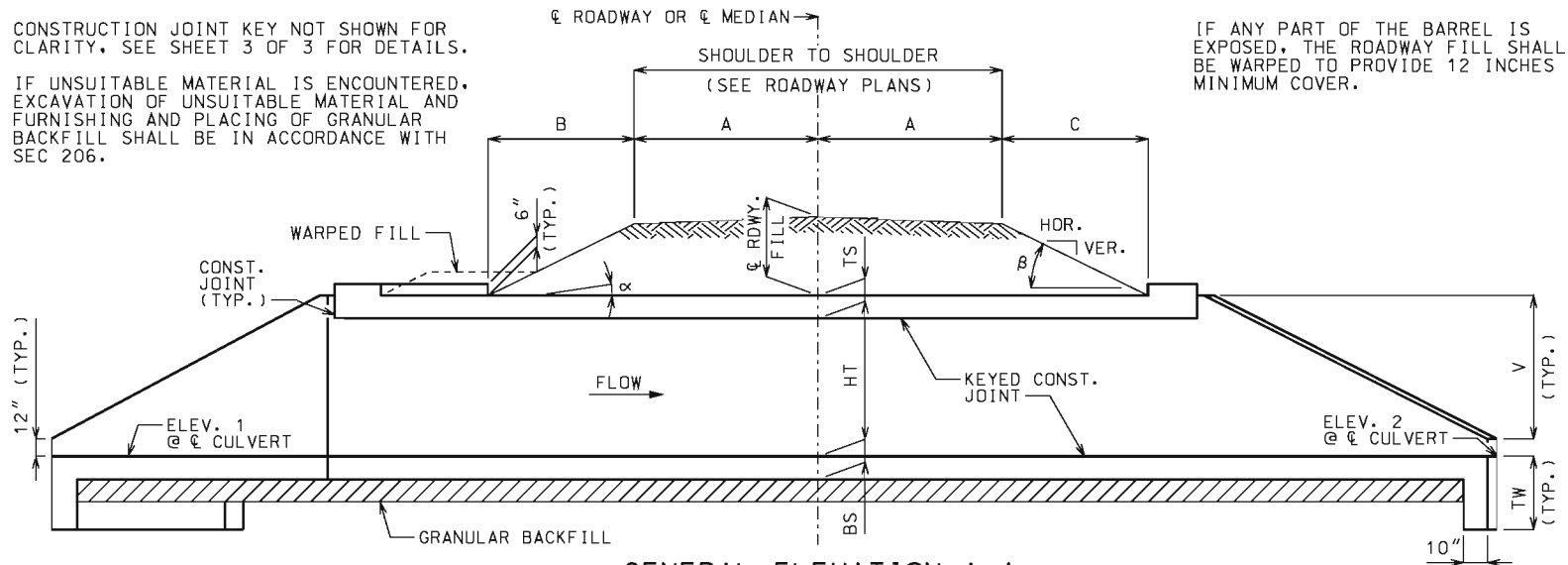
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.





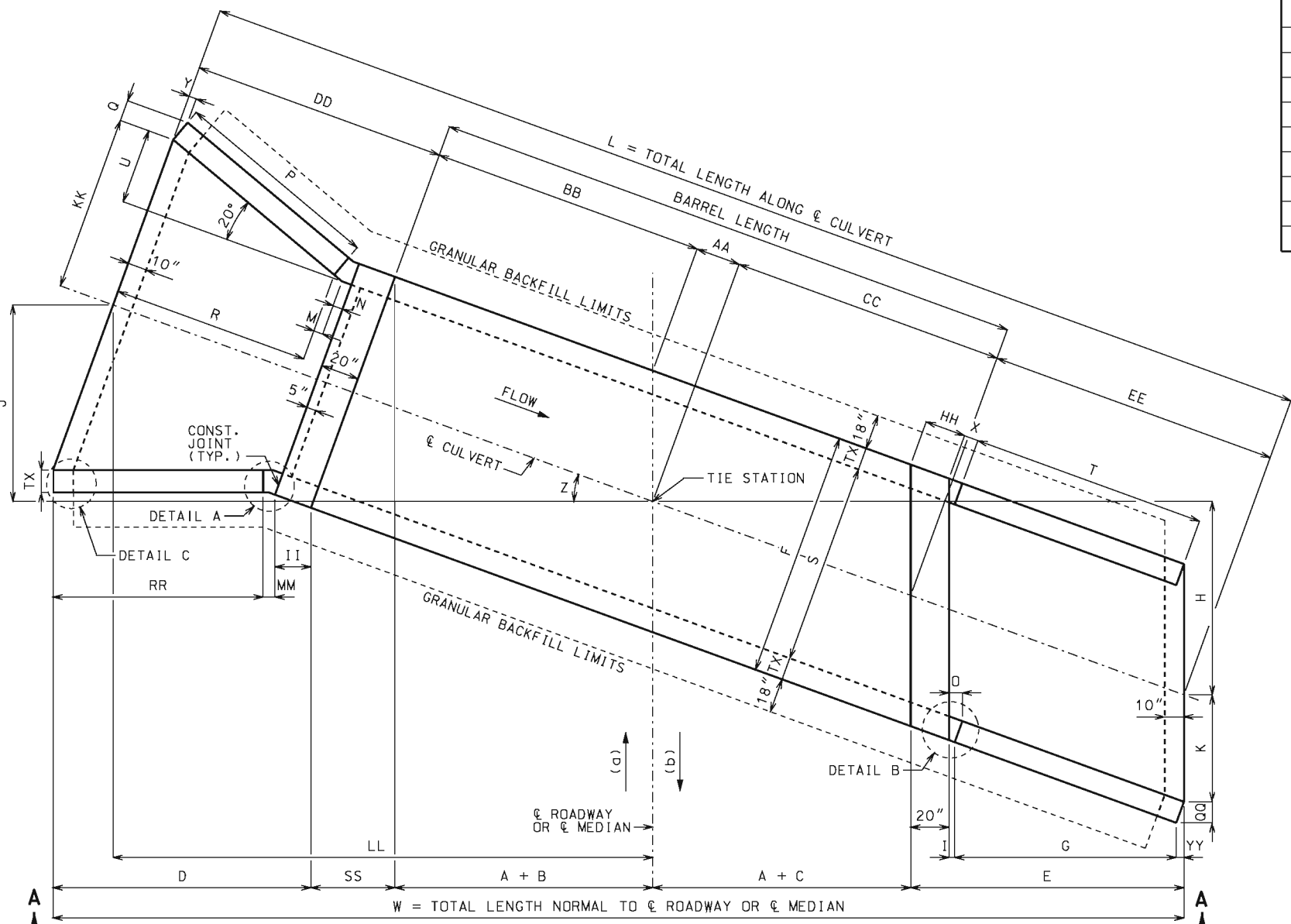
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.  
 IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING  $\alpha$ ,  $\beta$ , B AND C

$\alpha$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN}\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{LL + A + C + E}\right)$   
 $\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN}\left(\frac{\text{VER.}}{\text{HOR.}}\right)$   
 B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO  $\phi$  RDWY. FILL +  $A(\text{CS}) - A(\text{TAN}\alpha)$   
 UPSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN  $\text{TAN}\beta + \text{TAN}\alpha$   
 C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO  $\phi$  RDWY. FILL +  $A(\text{CS}) + A(\text{TAN}\alpha)$   
 DOWNSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN  $\text{TAN}\beta - \text{TAN}\alpha$   
 CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM  $\phi$  ROADWAY OR  $\phi$  MEDIAN.  
 THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN  $\phi$  ROADWAY OR  $\phi$  MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.  
 TO ACCOUNT FOR A VARYING PROFILE GRADE THE  $\phi$  ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.  
 SEE ROADWAY PLANS FOR SLOPES,  $\phi$  ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION	VARIABLE	DIMENSION
$\alpha$	SEE EQUATIONS	N	$3" + \text{TX}(\text{TAN } 10^\circ)$	CC	$(A + C)(\text{SEC } Z)$
$\beta$	SEE EQUATIONS	O	$I + \text{YY}$	DD	$R + M + N + 20"$
B	SEE EQUATIONS	P	$2\text{V}[\text{SEC}(Z + 20^\circ)]$	EE	$E(\text{SEC } Z)$
C	SEE EQUATIONS	Q	$\text{TX}(\text{COS } 20^\circ)$	HH	$20"(\text{SEC } Z)$
D	$Z \geq 20^\circ$ : $\text{II} + \text{MM} + \text{RR}$	R	$\text{P}(\text{COS } 20^\circ)$	II	$20"(\text{COS } Z)$
	$Z < 20^\circ$ : $\text{II} + \text{MM} + \text{RR} + \text{TT}$	T	$\text{G}(\text{SEC } Z)$	KK	$\text{S}/2 + \text{U}$
E	$\text{G} + \text{O} + 20"$	U	$(R + M)(\text{TAN } 20^\circ)$	LL	$(\text{AA} + \text{BB} + \text{DD})(\text{COS } Z)$
F	$\text{S} + 2\text{TX}$	V	$\text{HT} + \text{TS} - 12"$	MM	$3"[\text{COS } Z + \text{COS}(Z - 20^\circ)]$
G	2V	W	$2\text{A} + \text{B} + \text{C} + \text{D} + \text{E} + \text{SS}$	QQ	$\text{TX}(\text{COS } Z)$
H	$(A + C + E)(\text{TAN } Z)$	X	$3" + \text{TX}(\text{TAN } Z)$	RR	$\text{P}[\text{COS}(Z - 20^\circ)]$
I	$3"(\text{COS } Z)$	Y	$\text{TX}(\text{SIN } 20^\circ)$	SS	$\text{F}(\text{SIN } Z)$
J	$(\text{AA} + \text{BB} + \text{DD})(\text{SIN } Z)$	Z	SKEW ANGLE	TT	$\text{TX}[\text{SIN}(20^\circ - Z)]$
K	$\text{S}(\text{SEC } Z)/2$	AA	$\text{F}(\text{TAN } Z)/2$	YY	$\text{TX}(\text{SIN } Z)$
L	$\text{AA} + \text{BB} + \text{CC} + \text{DD} + \text{EE}$	BB	$(A + B)(\text{SEC } Z)$	TW	$\text{MAX}\{3'-4" \text{ OR } (\text{BS} + 12")\}$
M	$\text{N}(\text{COS } 20^\circ)$				

GENERAL NOTES:

DESIGN SPECIFICATIONS:  
 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:  
 VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
 EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES:  
 CLASS B-1 CONCRETE (BOX CULVERT)  $f'c = 4,000$  PSI  
 REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

MISCELLANEOUS:  
 FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

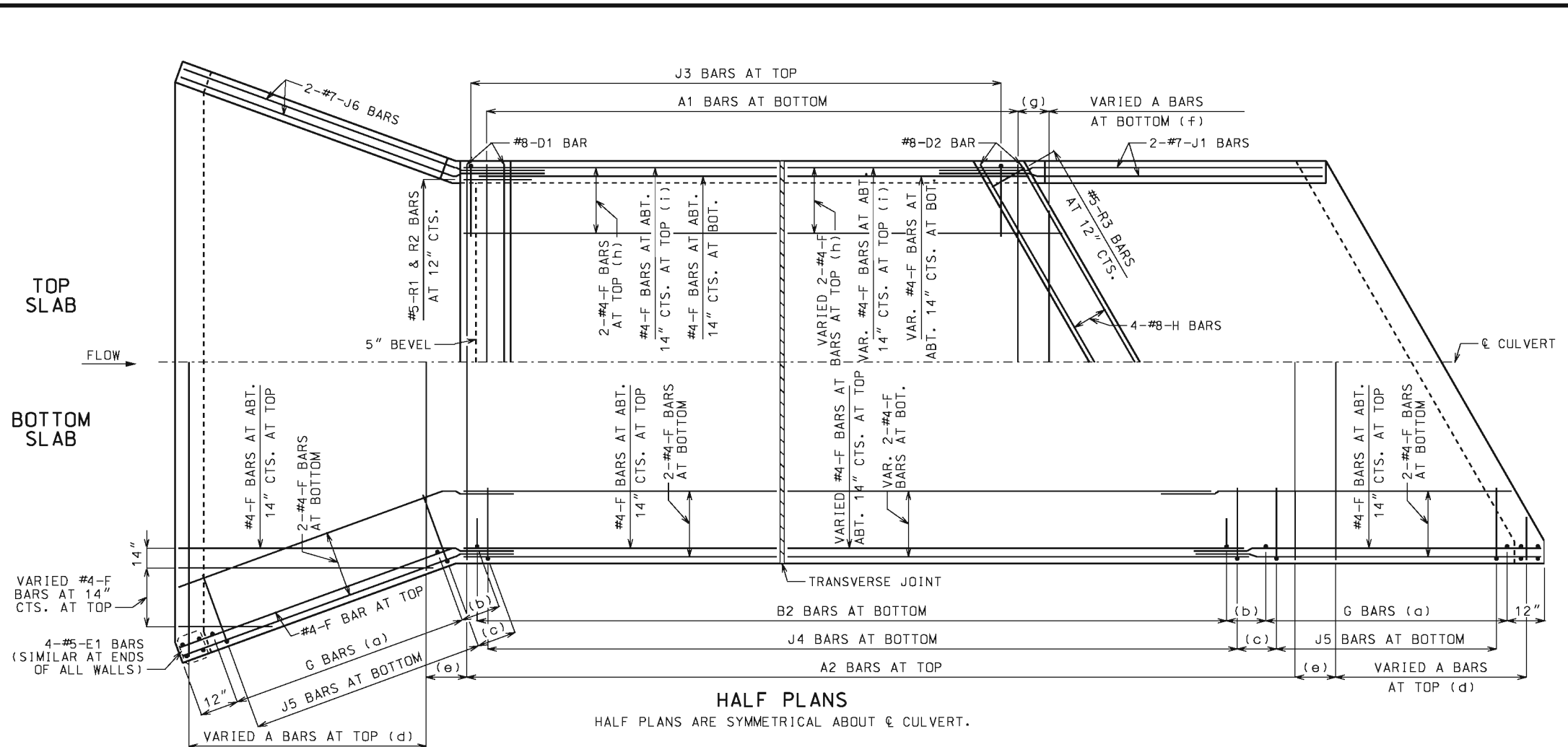
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

**STATE OF MISSOURI**  
  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CONCRETE SINGLE BOX CULVERT**  
 SKEW: LEFT ADVANCE  
 WINGS: FLARED  
 LAYOUT

DATE EFFECTIVE: 07/01/2015	703.13J	SHEET NO. 1 OF 3
DATE PREPARED: 5/13/2015		

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



**HALF PLANS**

HALF PLANS ARE SYMMETRICAL ABOUT CULVERT.

**LAYING OUT TRANSVERSE JOINTS**  
UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

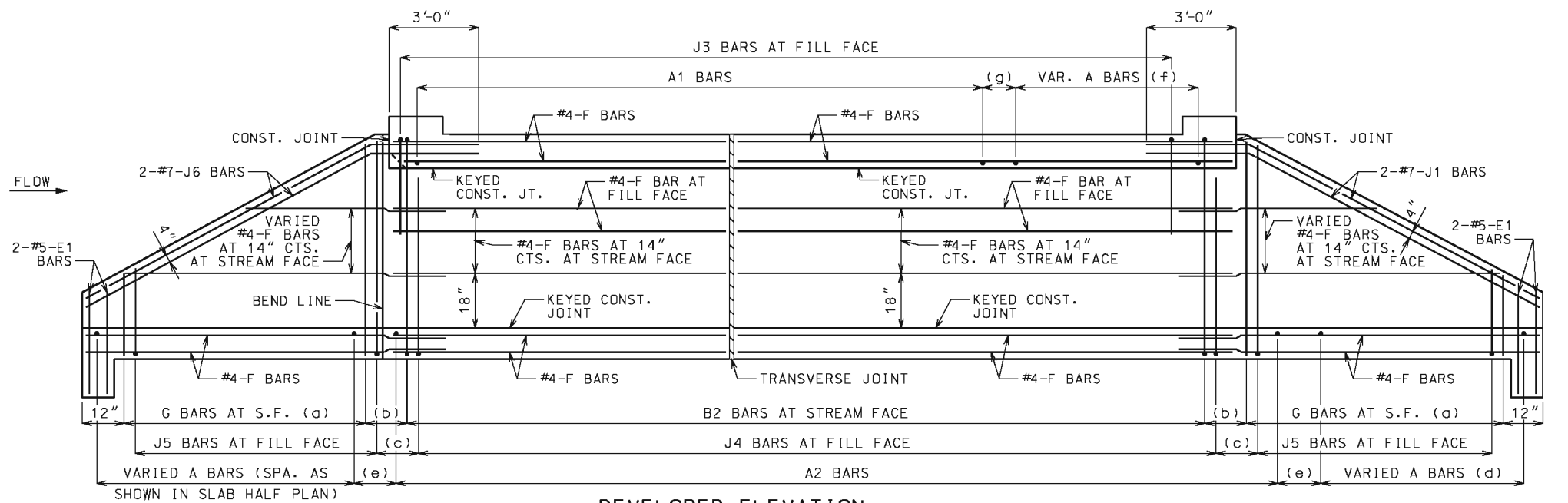
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

**GENERAL NOTES:**

- FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.
- CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.
- DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".
- LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.
- BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.
- (a) SAME SIZE AND SPACING AS B2 BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS

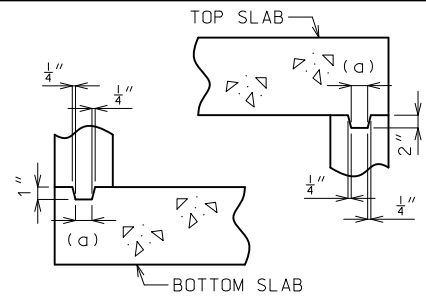


**DEVELOPED ELEVATION**

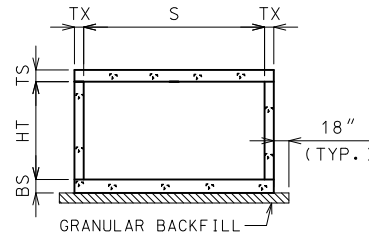
J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: FLARED <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u>	<b>703.13J</b> SHEET NO. <b>2 OF 3</b>

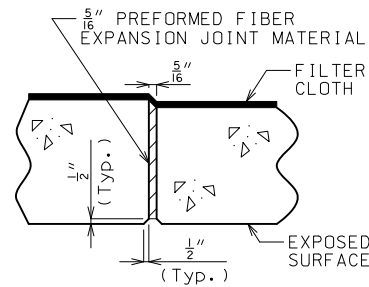
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



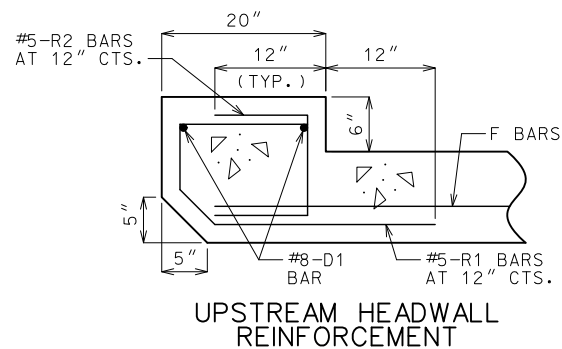
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



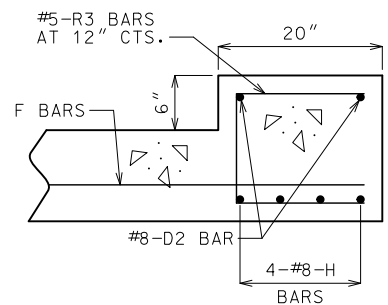
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

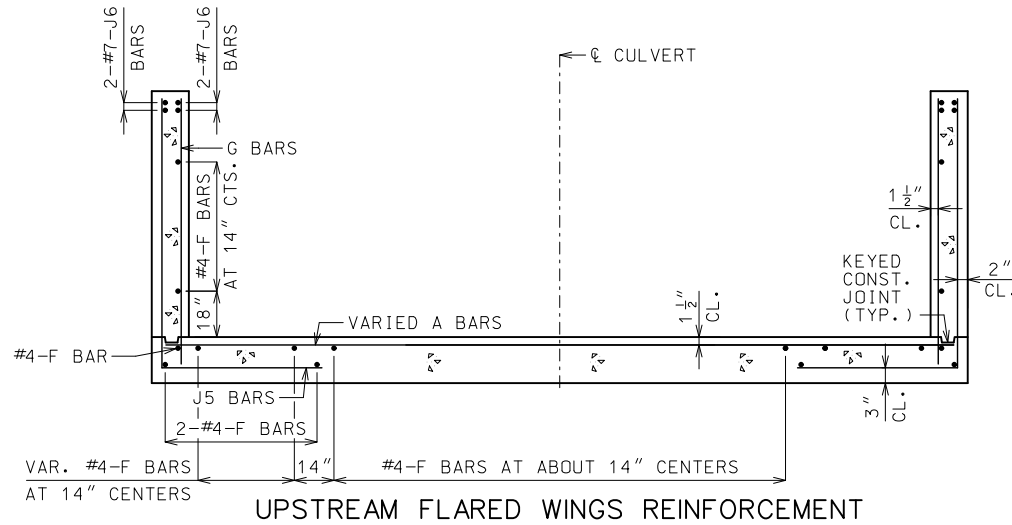
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



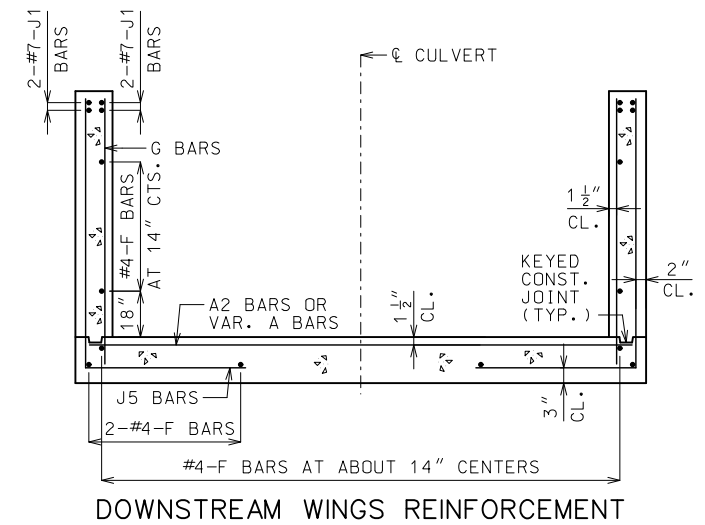
**UPSTREAM HEADWALL REINFORCEMENT**



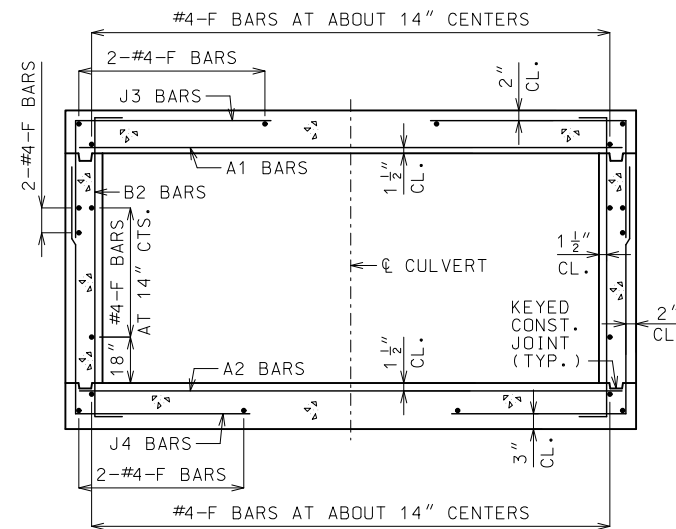
**DOWNSTREAM HEADWALL REINFORCEMENT**



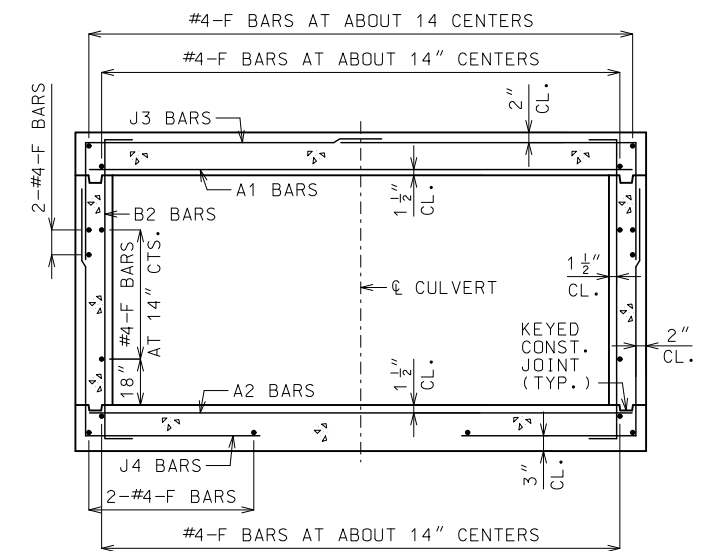
**UPSTREAM FLARED WINGS REINFORCEMENT**



**DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

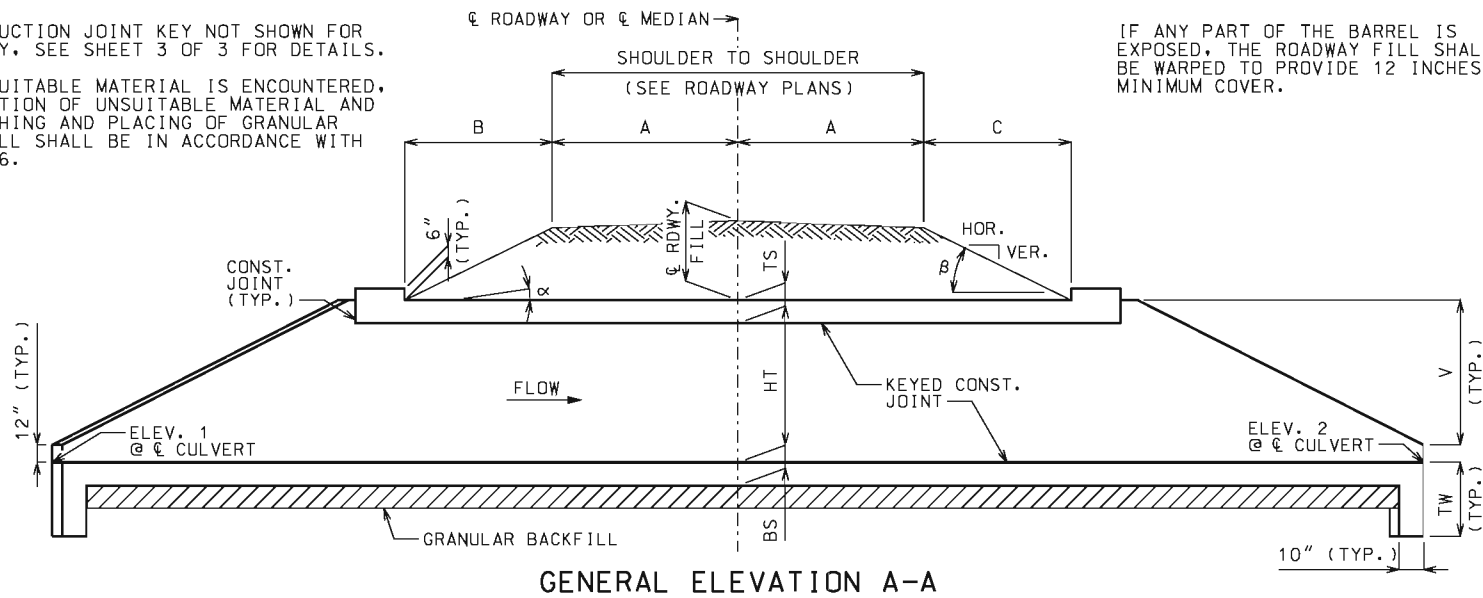
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: FLARED	
	SECTIONS	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.13J</b>	SHEET NO. <b>3 OF 3</b>

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

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 3 FOR DETAILS.

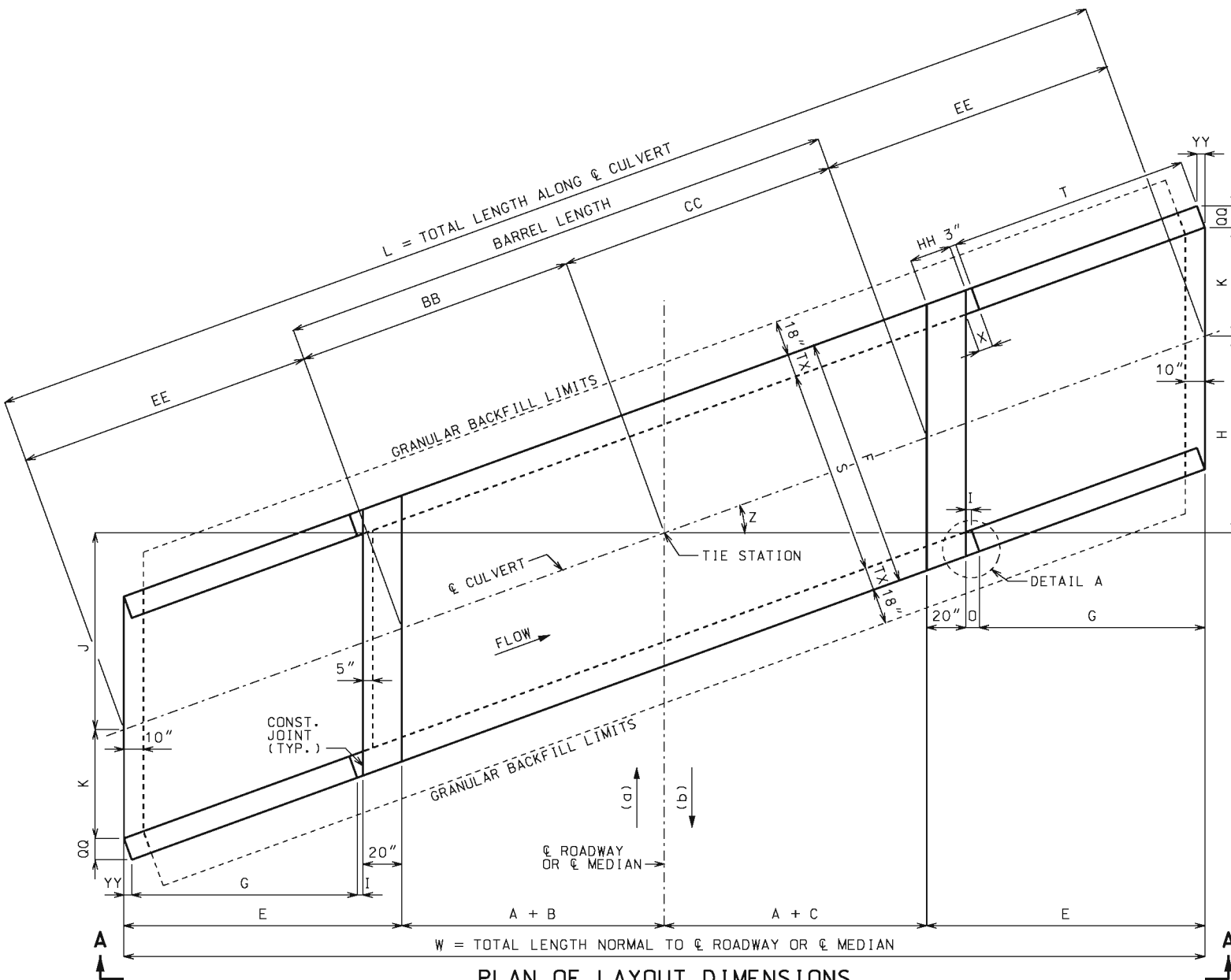
IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING  $\alpha$ ,  $\beta$ , B AND C

$\alpha$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN}\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W}\right)$

$\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN}\left(\frac{\text{VER.}}{\text{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO =  $\phi$  RDWY. FILL +  $\frac{A(\text{CS}) - A(\text{TAN}\alpha)}{\text{TAN}\beta + \text{TAN}\alpha}$   
UPSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO =  $\phi$  RDWY. FILL +  $\frac{A(\text{CS}) + A(\text{TAN}\alpha)}{\text{TAN}\beta - \text{TAN}\alpha}$   
DOWNSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM  $\phi$  ROADWAY OR  $\phi$  MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN  $\phi$  ROADWAY OR  $\phi$  MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE  $\phi$  ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES,  $\phi$  ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION
$\alpha$	SEE EQUATIONS	T	G(SEC Z)
$\beta$	SEE EQUATIONS	V	HT + TS - 12"
B	SEE EQUATIONS	W	2A + B + C + 2E
C	SEE EQUATIONS	X	3" + TX(TAN Z)
E	G + O + 20"	Z	SKEW ANGLE
F	S + 2TX	BB	(A + B)(SEC Z)
G	2V	CC	(A + C)(SEC Z)
H	(A + C + E)(TAN Z)	EE	E(SEC Z)
I	3"(COS Z)	HH	20"(SEC Z)
J	(A + B + E)(TAN Z)	OO	TX(COS Z)
K	S(SEC Z)/2	YY	TX(SIN Z)
L	2EE + BB + CC	TW	MAX{3'-4" OR (BS + 12")}
O	I + YY		

GENERAL NOTES:

**DESIGN SPECIFICATIONS:**  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

**DESIGN LOADING:**  
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

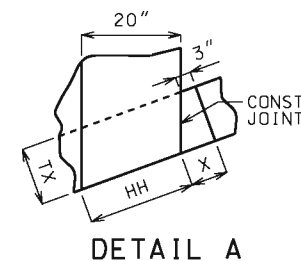
**DESIGN UNIT STRESSES:**  
CLASS B-1 CONCRETE (BOX CULVERT)  $f'c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

**MISCELLANEOUS:**  
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**CONCRETE SINGLE BOX CULVERT**

SKEW: RIGHT ADVANCE  
WINGS: STRAIGHT

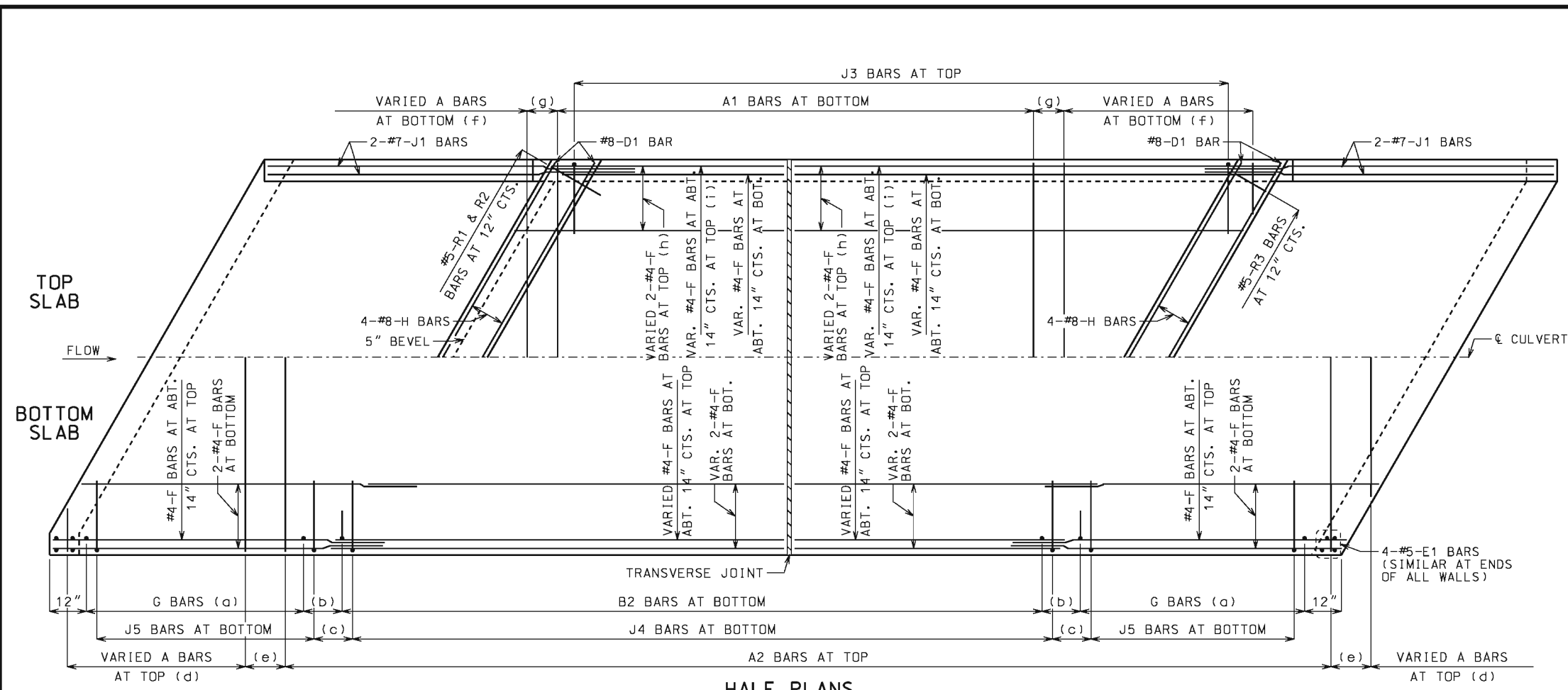
LAYOUT

DATE EFFECTIVE: 07/01/2015  
DATE PREPARED: 5/13/2015

703.14J

SHEET NO. 1 OF 3

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



**HALF PLANS**  
HALF PLANS ARE SYMMETRICAL ABOUT CULVERT.

**LAYING OUT TRANSVERSE JOINTS**  
UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

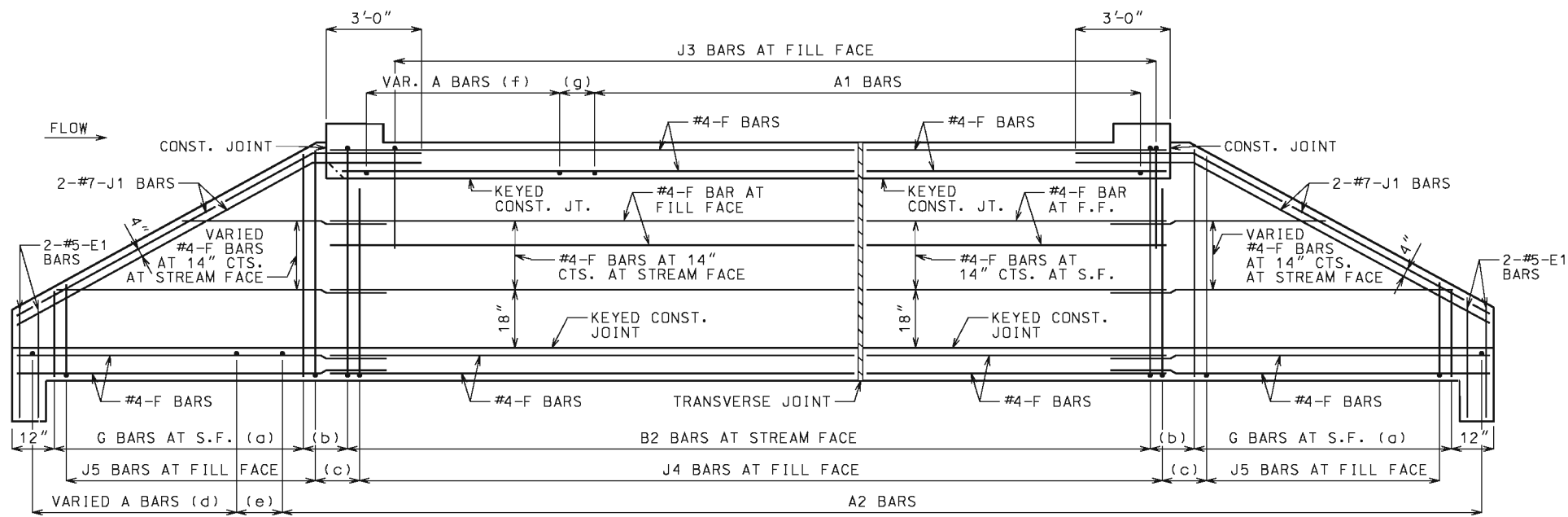
(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS



(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

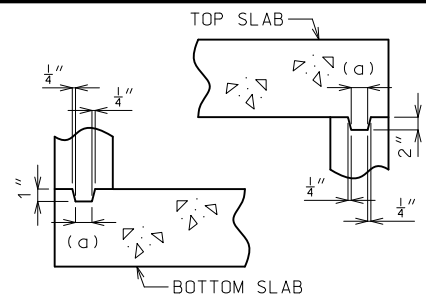
(i) FOR DESIGN FILLS 2'-0" OR LESS



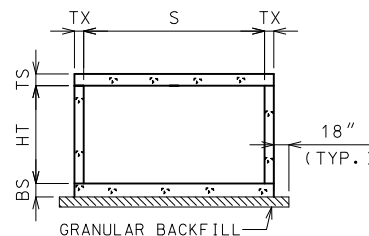
**ELEVATION**  
J1 BARS MAY BE BENT IN FIELD OR SHOP.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)		
	<b>CONCRETE SINGLE BOX CULVERT</b> SKEW: RIGHT ADVANCE WINGS: STRAIGHT <b>REINFORCEMENT</b>	
DATE EFFECTIVE: 07/01/2015 DATE PREPARED: 5/13/2015	<b>703.14J</b>	SHEET NO. <b>2 OF 3</b>

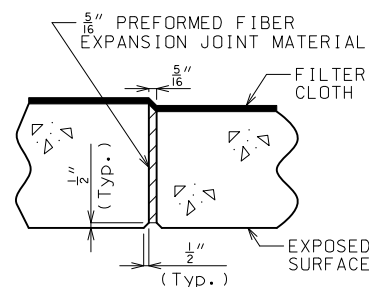
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



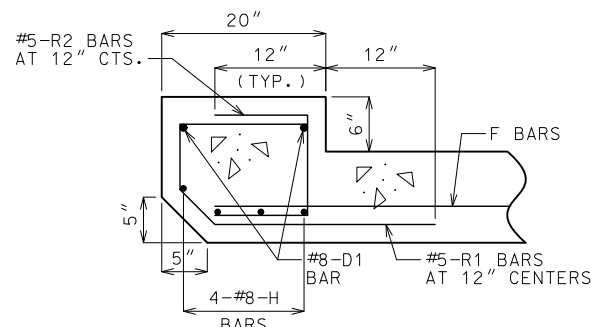
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



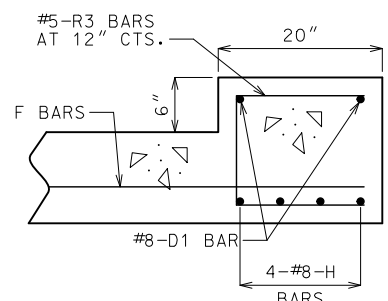
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

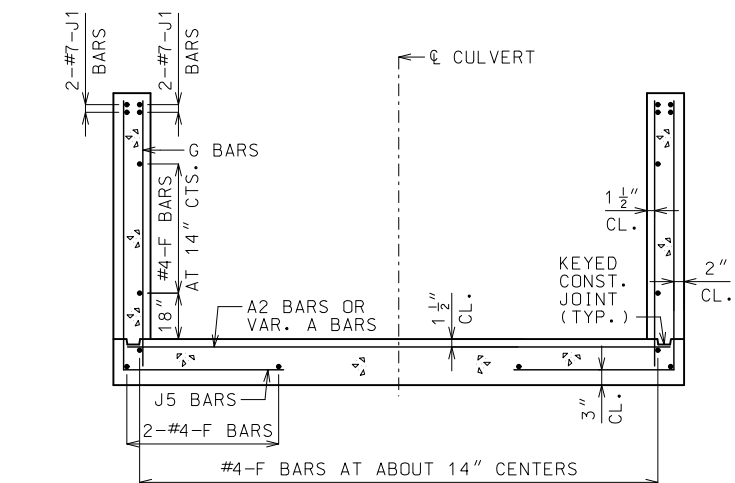
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



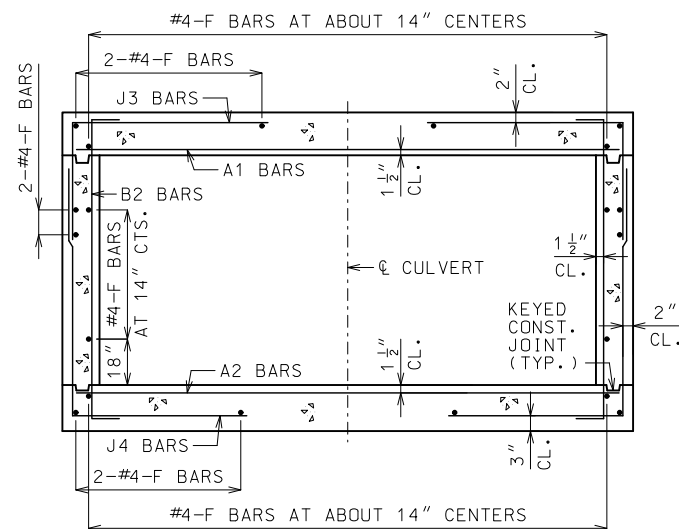
**UPSTREAM HEADWALL REINFORCEMENT**



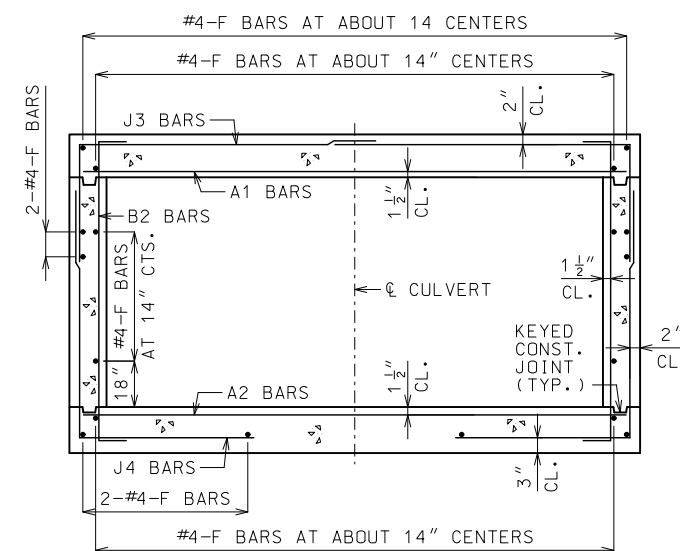
**DOWNSTREAM HEADWALL REINFORCEMENT**



**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

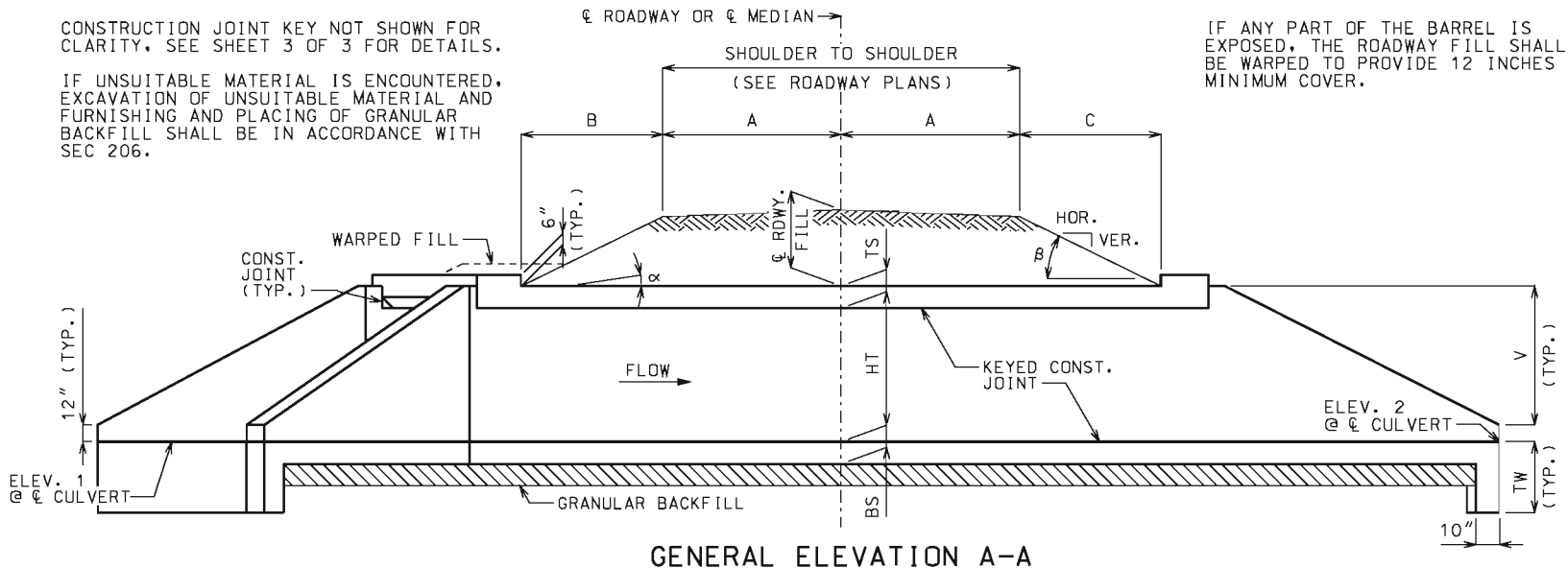
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b> SKEW: RIGHT ADVANCE WINGS: STRAIGHT	
	<b>SECTIONS</b>	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.14J</b>	SHEET NO. <b>3 OF 3</b>

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

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

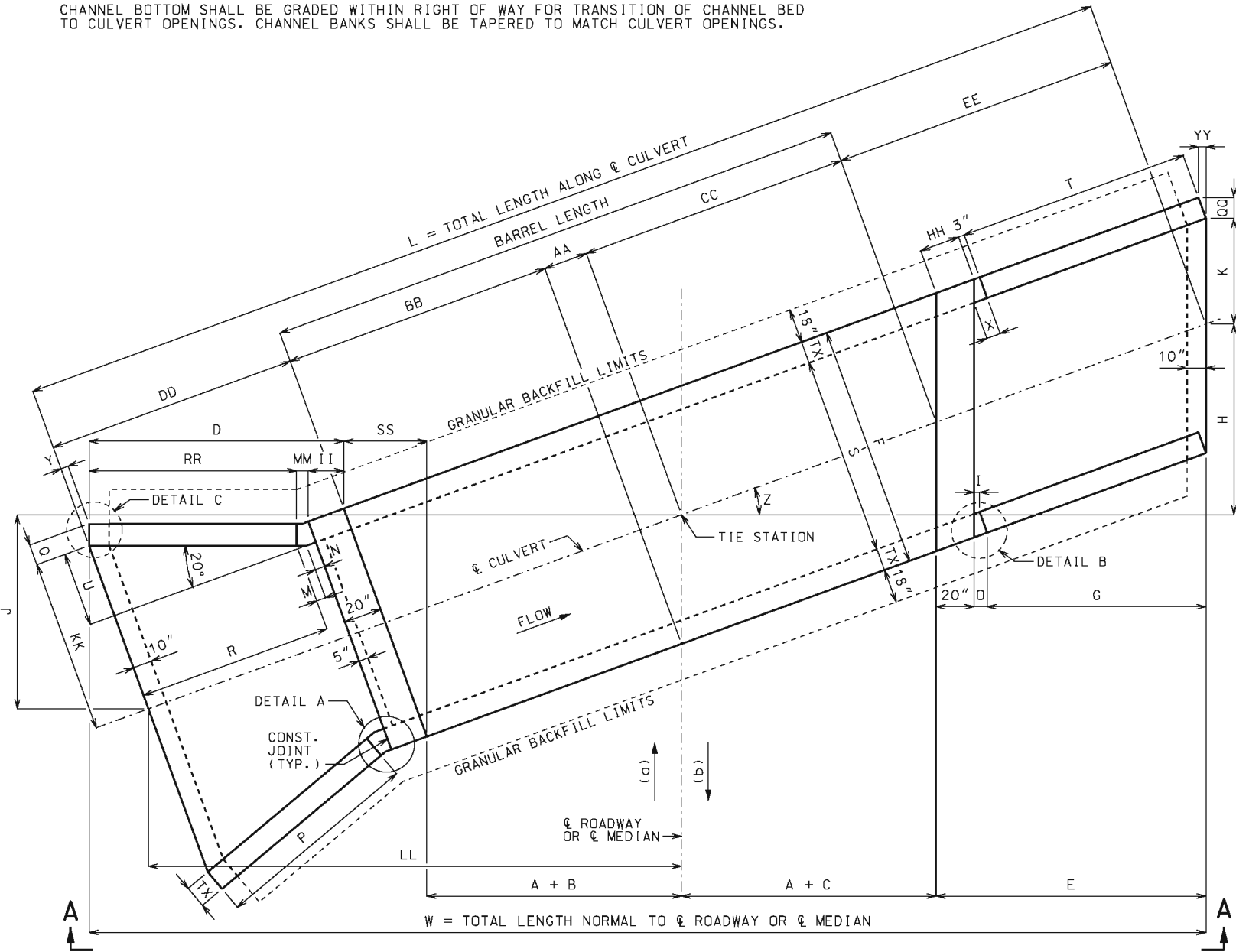
IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING  $\alpha$ ,  $\beta$ , B AND C

$\alpha$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN} \left( \frac{\text{ELEV. 1} - \text{ELEV. 2}}{A + C + E + LL} \right)$

$\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN =  $\text{ARCTAN} \left( \frac{\text{VER.}}{\text{HOR.}} \right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO  $\phi$  RDWY. FILL +  $\frac{A(CS)}{\text{TAN } \beta} - A(\text{TAN } \alpha)$   
UPSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO  $\phi$  RDWY. FILL +  $\frac{A(CS)}{\text{TAN } \beta} + A(\text{TAN } \alpha)$   
DOWNSTREAM HEADWALL NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM  $\phi$  ROADWAY OR  $\phi$  MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN  $\phi$  ROADWAY OR  $\phi$  MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO  $\phi$  ROADWAY OR  $\phi$  MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE  $\phi$  ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES,  $\phi$  ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION	VARIABLE	DIMENSION
$\alpha$	SEE EQUATIONS	N	3" + TX(TAN 10°)	CC	(A + C)(SEC Z)
$\beta$	SEE EQUATIONS	O	I + YY	DD	R + M + N + 20"
B	SEE EQUATIONS	P	2V[SEC(Z + 20°)]	EE	E(SEC Z)
C	SEE EQUATIONS	Q	TX(COS 20°)	HH	20"(SEC Z)
D	Z ≥ 20°: II + MM + RR	R	P(COS 20°)	II	20"(COS Z)
	Z < 20°: II + MM + RR + TT	T	G(SEC Z)	KK	S/2 + U
E	G + O + 20"	U	(R + M)(TAN 20°)	LL	(AA + BB + DD)(COS Z)
F	S + 2TX	V	HT + TS - 12"	MM	3"[COS Z + COS(Z - 20°)]
G	2V	W	2A + B + C + D + E + SS	QQ	TX(COS Z)
H	(A + C + E)(TAN Z)	X	3" + TX(TAN Z)	RR	P[COS(Z - 20°)]
I	3"(COS Z)	Y	TX(SIN 20°)	SS	F(SIN Z)
J	(AA + BB + DD)(SIN Z)	Z	SKEW ANGLE	TT	TX[SIN(20° - Z)]
K	S(SEC Z)/2	AA	F(TAN Z)/2	YY	TX(SIN Z)
L	AA + BB + CC + DD + EE	BB	(A + B)(SEC Z)	TW	MAX{3'-4" OR (BS + 12")}
M	N(COS 20°)				

GENERAL NOTES:

DESIGN SPECIFICATIONS: 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

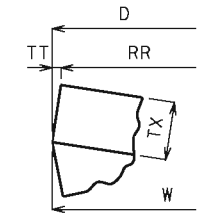
DESIGN LOADING: VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT)  $f'c = 4,000$  PSI REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

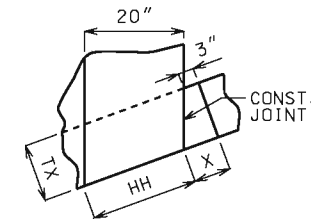
MISCELLANEOUS: FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

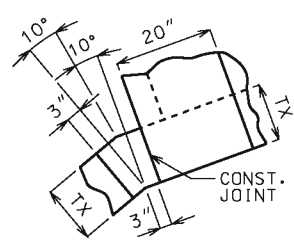
WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



DETAIL C For Z < 20°




DETAIL B



DETAIL A

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

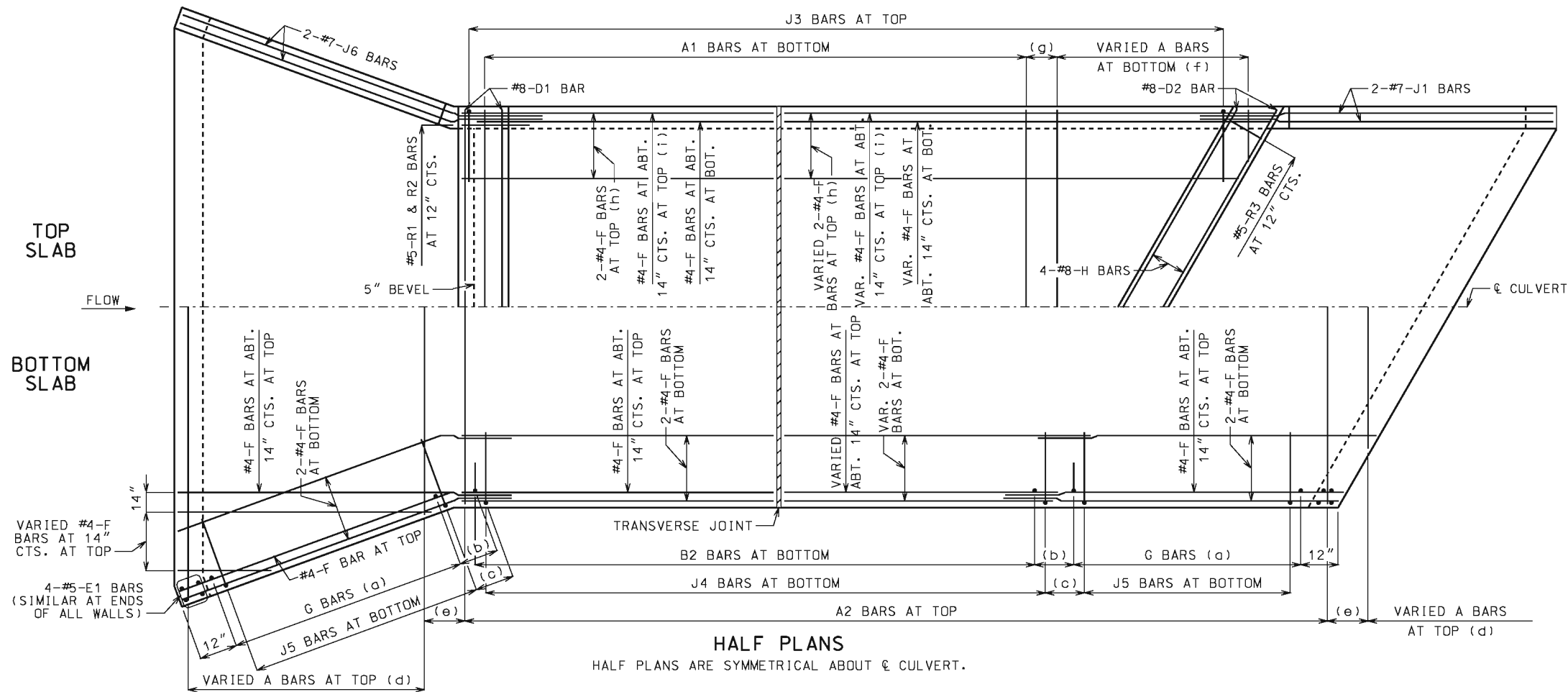
STATE OF MISSOURI  
  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CONCRETE SINGLE BOX CULVERT**  
 SKEW: RIGHT ADVANCE  
 WINGS: FLARED  
 LAYOUT

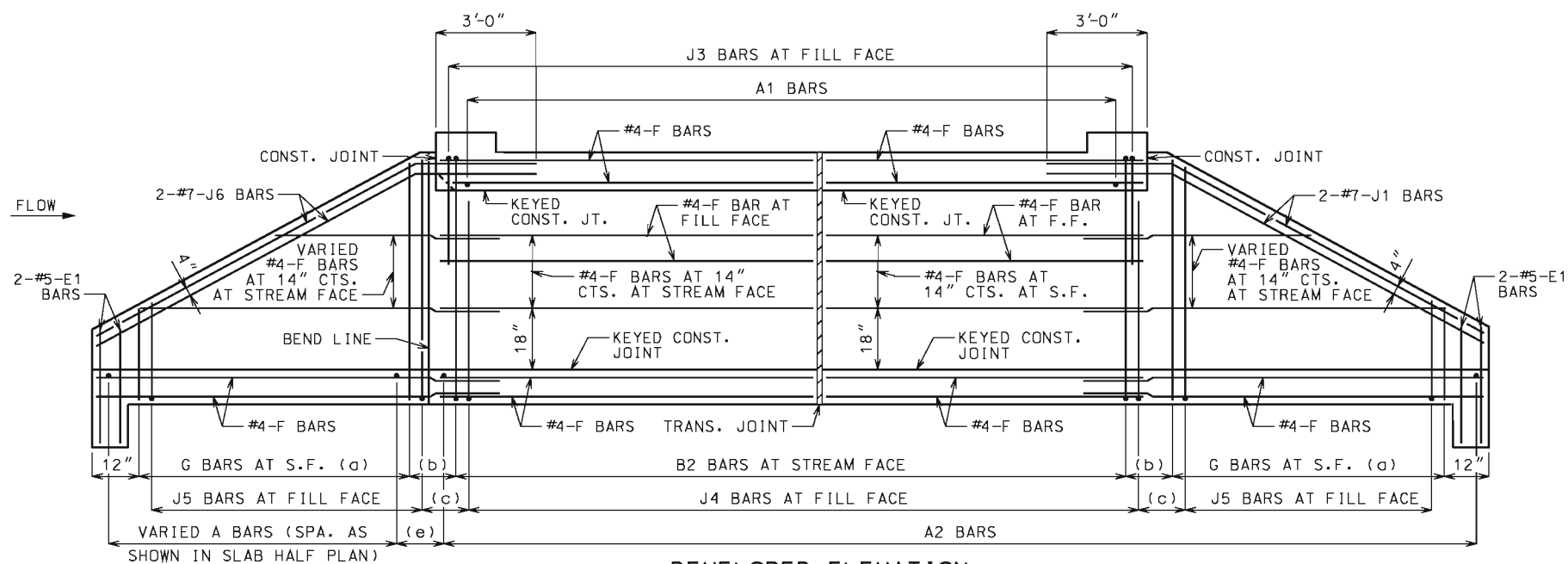
DATE EFFECTIVE: 07/01/2015	703.15E	SHEET NO. 1 OF 3
DATE PREPARED: 6/4/2015		

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





**HALF PLANS**  
HALF PLANS ARE SYMMETRICAL ABOUT  $\epsilon$  CULVERT.



**DEVELOPED ELEVATION**  
J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

**LAYING OUT TRANSVERSE JOINTS**

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS


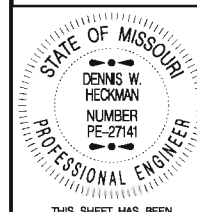
(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

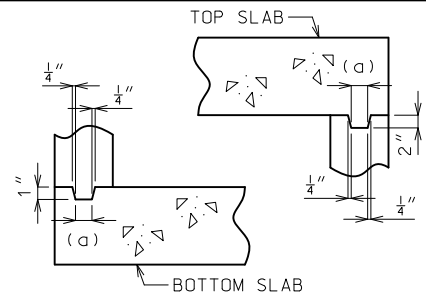
(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

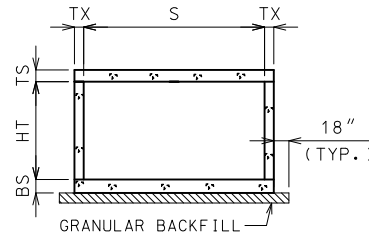
(i) FOR DESIGN FILLS 2'-0" OR LESS

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>		
 <p>STATE OF MISSOURI DENNIS W. HECKMAN NUMBER PE-27141 PROFESSIONAL ENGINEER</p> <p><small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small></p>	<p><b>CONCRETE SINGLE BOX CULVERT</b></p> <p>SKEW: RIGHT ADVANCE WINGS: FLARED</p> <p><b>REINFORCEMENT</b></p>	
	<p>DATE EFFECTIVE: 07/01/2015 DATE PREPARED: 5/13/2015</p>	<p><b>703.15E</b></p>
		<p>SHEET NO. <b>2 OF 3</b></p>

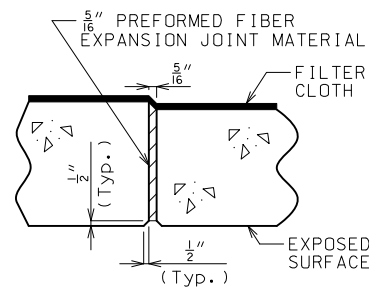
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



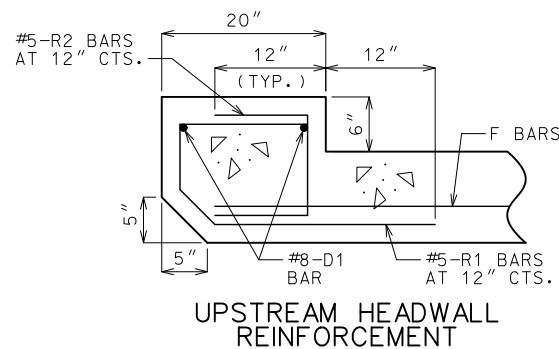
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



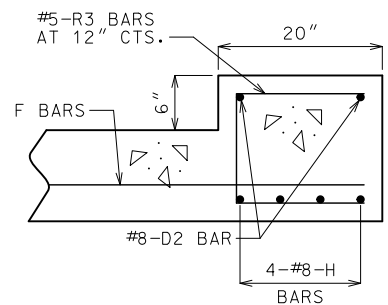
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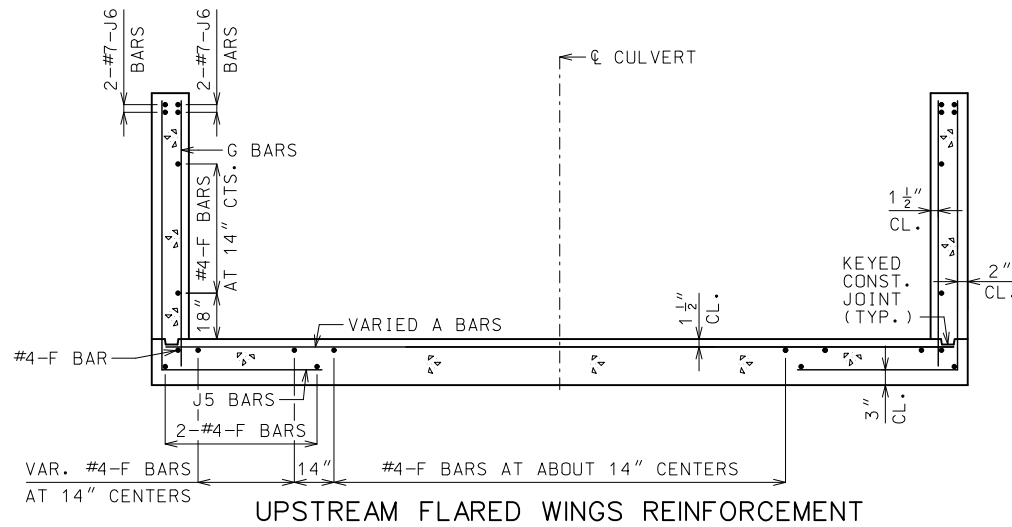
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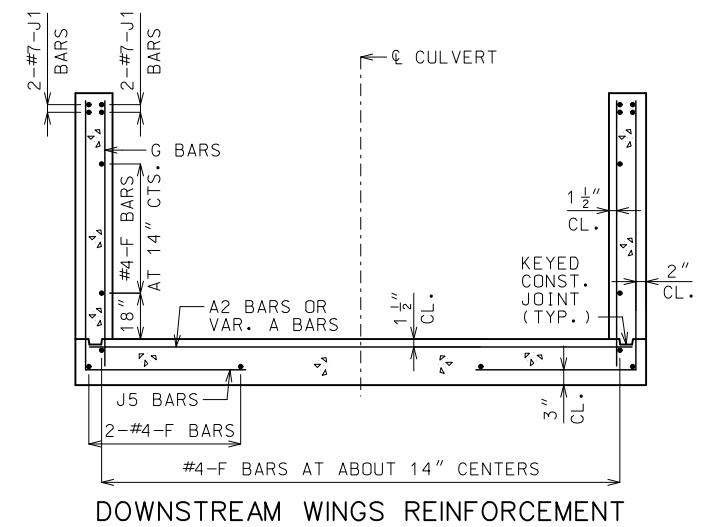
**UPSTREAM HEADWALL REINFORCEMENT**



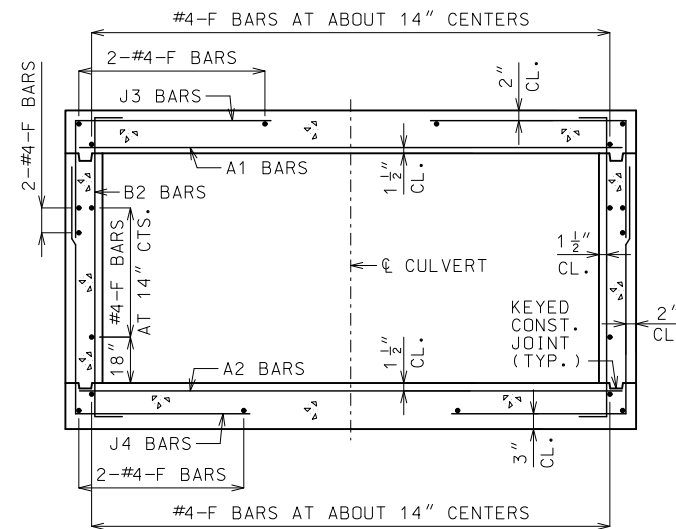
**DOWNSTREAM HEADWALL REINFORCEMENT**



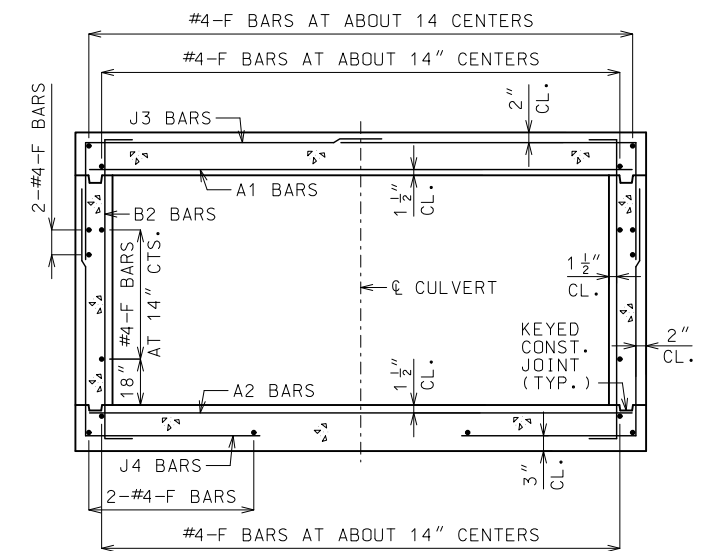
**UPSTREAM FLARED WINGS REINFORCEMENT**



**DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**

**GENERAL NOTES:**

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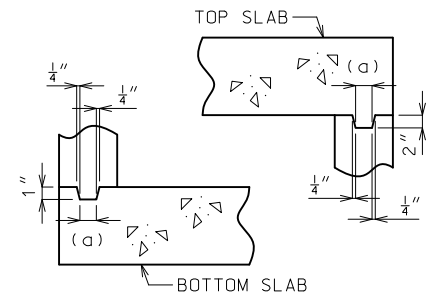
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

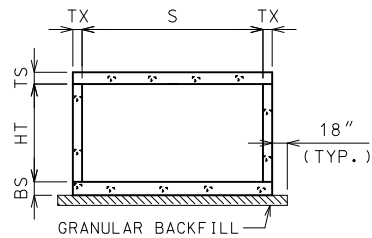
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b>	
	SKEW: RIGHT ADVANCE WINGS: FLARED	
<b>SECTIONS</b>		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.15E</b>	SHEET NO. <b>3 OF 3</b>

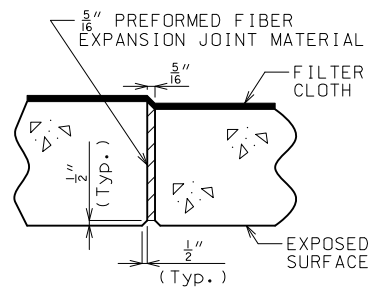
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**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



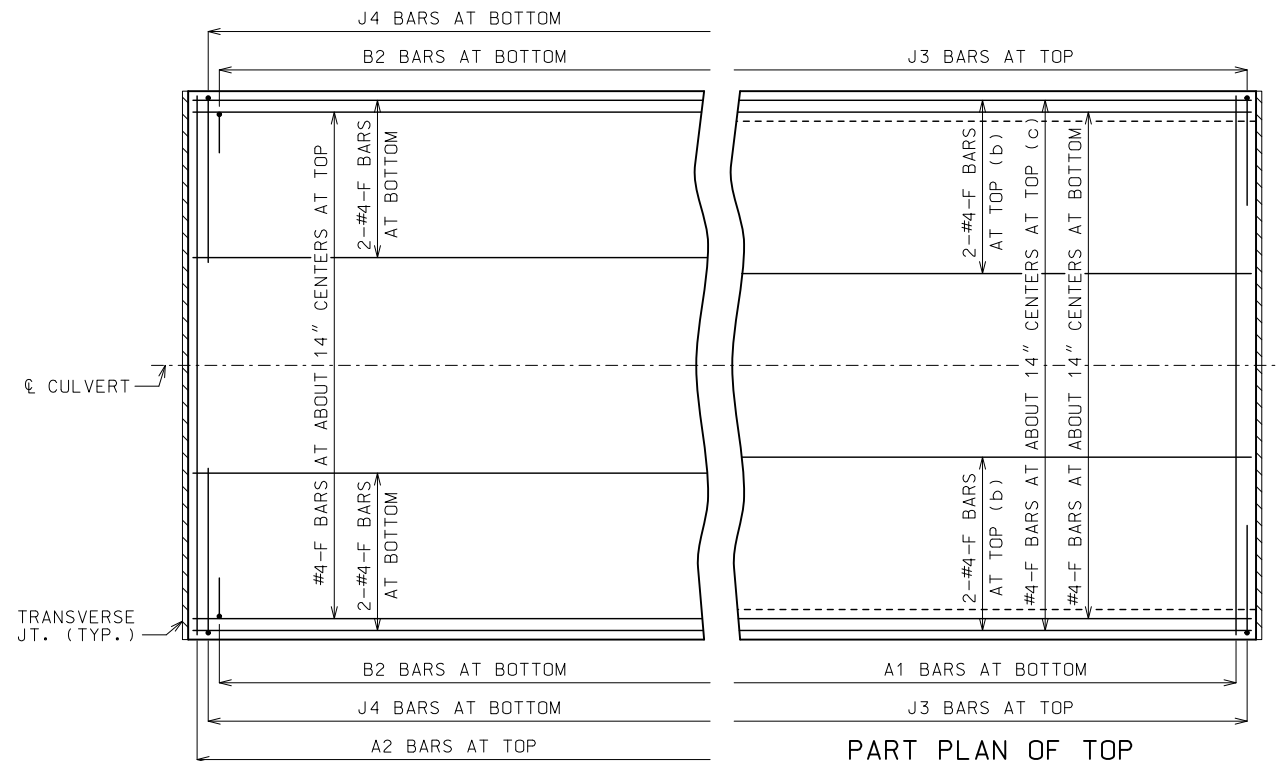
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



**TRANSVERSE JOINT THRU BARREL**

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FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

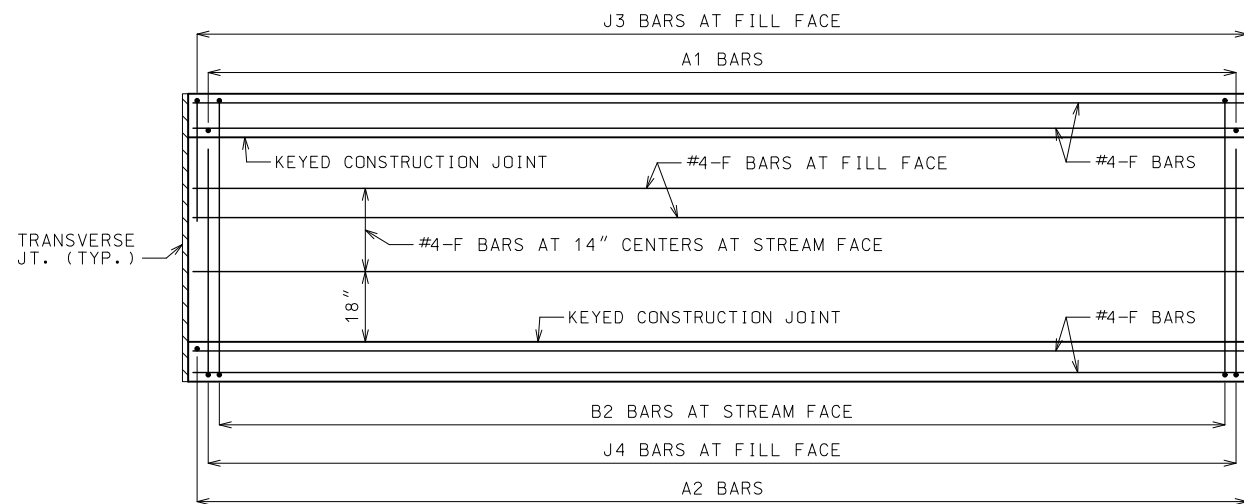


**PART PLAN OF TOP SLAB REINFORCEMENT**

(b) FOR DESIGN FILLS OVER 2'-0"  
(c) FOR DESIGN FILLS 2'-0" OR LESS



**PART PLAN OF BOTTOM SLAB REINFORCEMENT**



**ELEVATION OF WALL REINFORCEMENT**

**GENERAL NOTES**

**DESIGN SPECIFICATIONS:**  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

**DESIGN LOADING:**  
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

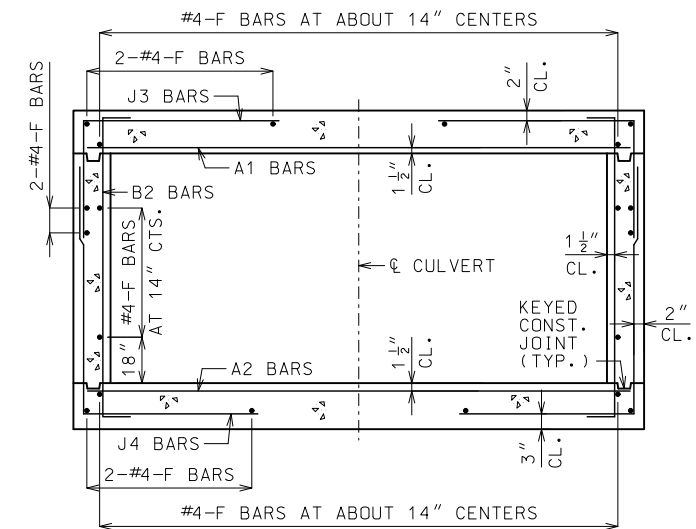
**DESIGN UNIT STRESSES:**  
CLASS B-1 CONCRETE (BOX CULVERT)  $f'_c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

**MISCELLANEOUS:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.17.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS AND ELEVATION.

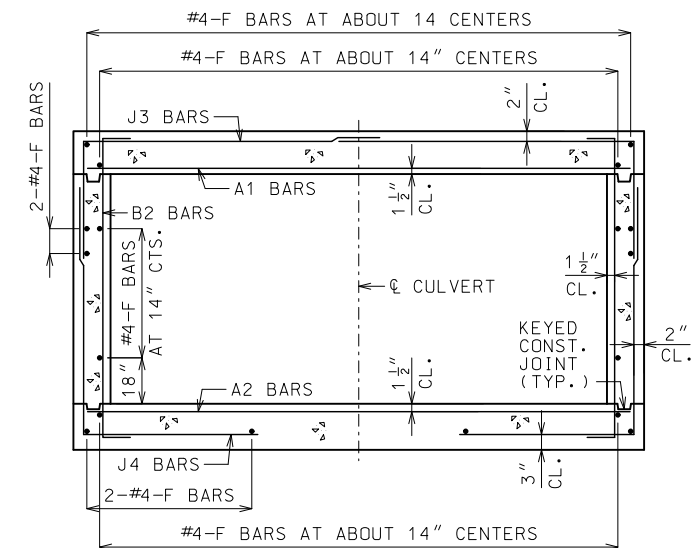
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".



**BARREL REINFORCEMENT**

FOR DESIGN FILLS OVER 2'-0"  
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.



**BARREL REINFORCEMENT**

FOR DESIGN FILLS 2'-0" OR LESS  
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.

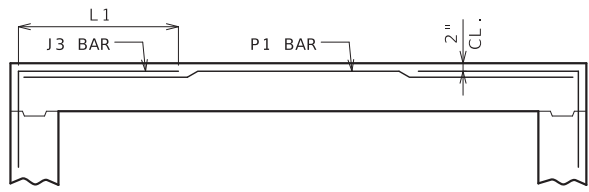
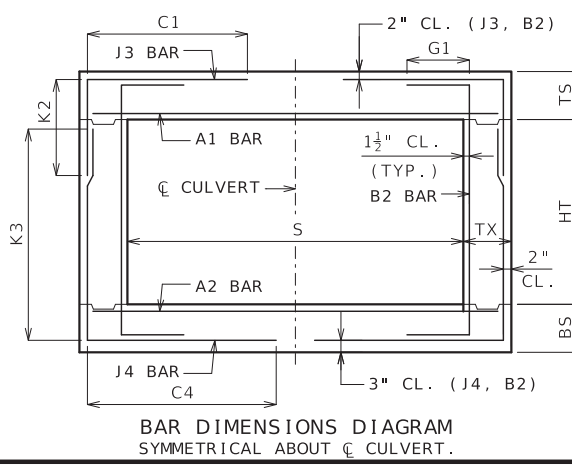
		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE SINGLE BOX CULVERT</b> CUT SECTION	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020		<b>703.16</b> SHEET NO. 1 OF 1	

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

		SPAN (S) = 3 FT										HEIGHT (HT) = 2 FT OR 3 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=2'	HT=3'						HT=2'	HT=3'				
1 FT	9	8	8	4	7	4	12	32.5	25.3	33.6	4	11.5	4	12	32.5	28	40	5	12	12	
2 FT	9	8	8	4	7	4	12	32.5	25.3	33.6	4	11.5	4	12	30.8	28	40	5	12	12	
2'- 4'	9	8	8	4	7	4	12	32.5	25.3	33.6	4	11.5	4	12	30.8	28	40	5	12	12	
4 FT	8	8	8	4	12	4	12	26.4	24.1	32.4	4	12	4	12	26.0	28	40	5	12	0	
6 FT	8	8	8	4	12	4	12	24.6	24.1	32.4	4	12	4	12	24.6	28	40	5	12	0	
8 FT	8	8	8	4	12	4	12	23.8	24.1	32.4	4	12	4	12	23.8	28	40	5	12	0	
10 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0	
12 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0	
14 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0	
16 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0	
18 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0	
20 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	11	4	12	22.0	28	40	5	12	0	
22 FT	8	8	8	4	11.5	4	12	22.0	24.1	32.4	4	10	4	12	22.0	28	40	5	12	0	
24 FT	8	8	8	4	10.5	4	12	22.0	24.1	32.4	4	9	4	12	22.0	28	40	5	12	0	
26 FT	8	8	8	4	9.5	4	12	22.0	24.1	32.4	4	8.5	4	11.5	22.0	28	40	5	12	0	
28 FT	8	8	8	4	9	4	11.5	22.0	24.1	32.4	4	8	4	10.5	22.0	28	40	5	12	0	
30 FT	8	8	8	4	8.5	4	11	22.0	24.1	32.4	4	7.5	4	10	22.0	28	40	5	12	0	
32 FT	8	8	8	4	8	4	10	22.0	24.1	32.4	4	7	4	9.5	22.0	28	40	5	12	0	
34 FT	8	8	8	4	7.5	4	9.5	22.0	24.1	32.4	4	6.5	4	8.5	22.0	28	40	5	12	0	
36 FT	8	8	8	4	7	4	9	22.0	24.1	32.4	4	6	4	8	22.0	28	40	5	12	0	
38 FT	8	8	8	4	6.5	4	8.5	22.0	24.1	32.4	5	9	4	8	22.0	28	40	5	12	0	
40 FT	8	9	8	4	6.5	4	8	22.0	24.1	32.1	4	6	4	11	21.5	29	41	5	12	0	
42 FT	8	9	8	4	6	4	8	22.0	24.1	32.1	5	9	4	10	21.5	29	41	5	12	0	
44 FT	8	9	8	4	6	4	7.5	22.0	24.1	32.1	5	8.5	4	10	21.5	29	41	5	12	0	
46 FT	8	9	8	4	6	4	7	22.0	24.1	32.1	5	8	4	9.5	21.5	29	41	5	12	0	
48 FT	8	10	8	4	6	4	7	22.0	24.0	31.9	5	8.5	4	12	21.5	30	42	5	12	0	
50 FT	8	10	8	4	6	4	6.5	22.0	24.0	31.9	5	8	4	12	21.5	30	42	5	12	0	

		SPAN (S) = 3 FT										HEIGHT (HT) = 4 FT OR 5 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=4'	HT=5'						HT=4'	HT=5'				
1 FT	9	8	8	4	6.5	4	12	32.5	25.3	30.3	4	10.5	4	12	32.5	52	64	5	12	12	
2 FT	9	8	8	4	6.5	4	12	32.5	25.3	30.3	4	10	4	12	32.5	52	64	5	12	12	
2'- 4'	9	8	8	4	6.5	4	12	32.5	25.3	30.3	4	10	4	12	32.5	52	64	5	12	12	
4 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0	
6 FT	8	8	8	4	12	4	12	36.1	24.3	29.1	4	12	4	12	33.5	52	64	5	12	0	
8 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0	
10 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0	
12 FT	8	8	8	4	12	4	12	35.6	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0	
14 FT	8	8	8	4	12	4	12	34.4	24.3	29.1	4	12	4	11.5	36.1	52	64	5	12	0	
16 FT	8	8	8	4	12	4	12	33.5	24.3	29.1	4	12	4	11	35.3	52	64	5	12	0	
18 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	10.5	34.8	52	64	5	12	0	
20 FT	8	8	8	4	12	4	12	31.6	24.3	29.1	4	10.5	4	10	34.4	52	64	5	12	0	
22 FT	8	8	8	4	11.5	4	11	31.6	24.3	29.1	4	9.5	4	9.5	33.9	52	64	5	12	0	
24 FT	8	8	8	4	10.5	4	10	31.6	24.3	29.1	4	9	4	9	33.9	52	64	5	12	0	
26 FT	8	8	8	4	9.5	4	9.5	31.3	24.3	29.1	4	8.5	4	8	33.5	52	64	5	12	0	
28 FT	8	8	8	4	9	4	8.5	31.3	24.3	29.1	4	7.5	4	7.5	33.0	52	64	5	12	0	
30 FT	8	8	8	4	8.5	4	8	31.3	24.3	29.1	4	7	4	7	33.0	52	64	5	12	0	
32 FT	8	8	8	4	8	4	7.5	30.8	24.3	29.1	4	7	4	6.5	33.0	52	64	5	12	0	
34 FT	8	8	8	4	7.5	4	7	30.8	24.3	29.1	4	6.5	4	6.5	32.5	52	64	5	12	0	
36 FT	8	8	8	4	7	4	7	30.8	24.3	29.1	4	6	4	6	32.5	52	64	5	12	0	
38 FT	8	8	8	4	6.5	4	6.5	30.8	24.3	29.1	5	9	5	7	32.5	52	64	5	12	0	
40 FT	8	9	8	4	6.5	4	6	30.8	24.0	28.8	4	6	4	6.5	32.5	53	65	5	12	0	
42 FT	8	9	8	4	6	4	6	30.8	24.0	28.8	5	9	4	6	32.5	53	65	5	11.5	0	
44 FT	8	9	8	4	6	5	6.5	30.8	24.0	28.8	5	8.5	4	6	32.5	53	65	5	11	0	
46 FT	8	9	8	4	6	5	6.5	30.4	24.0	28.8	5	8	5	6.5	34.8	53	65	5	10.5	0	
48 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	5	8	5	6.5	34.8	53	65	5	10	0	
50 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	5	7.5	5	6	34.8	53	65	5	9.5	0	

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



AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE SINGLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 3 FEET HEIGHT (HT): 2 THRU 5 FEET	
	DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	SHEET NO. <b>703.17A</b> 1 OF 14

		SPAN (S) = 4 FT										HEIGHT (HT) = 2 FT OR 3 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=2'	HT=3'						HT=2'	HT=3'				
1 FT	10	8	8	4	6	4	10.5	38.6	26.3	34.8	4	7	4	7	30.3	28	40	5	12	12	
2 FT	10	8	8	4	6	4	10.5	38.6	26.3	34.8	4	7	4	7	28.0	28	40	5	12	12	
2'- 4'	10	8	8	4	6	4	10.5	38.6	26.3	34.8	4	7	4	7	28.0	28	40	5	12	12	
4 FT	8	8	8	4	12	4	12	25.3	24.1	32.4	4	11	4	12	25.3	28	40	5	12	0	
6 FT	8	8	8	4	12	4	12	24.6	24.1	32.4	4	12	4	12	24.6	28	40	5	12	0	
8 FT	8	8	8	4	12	4	12	24.1	24.1	32.4	4	12	4	12	24.1	28	40	5	12	0	
10 FT	8	8	8	4	12	4	12	23.0	24.1	32.4	4	12	4	12	23.0	28	40	5	12	0	
12 FT	8	8	8	4	12	4	12	23.0	24.1	32.4	4	11	4	12	23.0	28	40	5	12	0	
14 FT	8	8	8	4	11	4	12	23.0	24.1	32.4	4	9.5	4	11.5	23.0	28	40	5	12	0	
16 FT	8	8	8	4	10	4	11	23.0	24.1	32.4	4	8.5	4	10	23.0	28	40	5	12	0	
18 FT	8	8	8	4	8.5	4	10	23.0	24.1	32.4	4	7.5	4	9	22.4	28	40	5	12	0	
20 FT	8	8	8	4	8	4	9	23.0	24.1	32.4	4	6.5	4	8	22.4	28	40	5	12	0	
22 FT	8	8	8	4	7	4	8	23.0	24.1	32.4	4	6	4	7.5	22.4	28	40	5	12	0	
24 FT	8	8	8	4	6.5	4	7.5	23.0	24.1	32.4	5	8.5	4	6.5	22.4	28	40	5	12	0	
26 FT	8	8	8	4	6	4	7	23.0	24.1	32.4	5	8	4	6	22.4	28	40	5	12	0	
28 FT	8	9	8	4	6	4	6.5	23.0	24.1	32.1	5	8	4	8	21.9	29	41	5	12	0	
30 FT	8	9	8	4	6	4	6	23.0	24.1	32.1	5	7.5	4	7.5	21.9	29	41	5	12	0	
32 FT	8	10	8	4	6	5	6.5	23.0	24.0	31.9	5	7.5	4	10	21.3	30	42	5	12	0	
34 FT	9	10	8	5	8.5	4	7	22.4	25.1	33.0	5	7.5	4	9.5	21.3	30	42	5	12	0	
36 FT	9	10	8	5	8.5	4	7	22.4	25.1	33.0	5	7	4	9	21.3	30	42	5	12	0	
38 FT	9	11	8	5	8.5	4	6.5	22.4	25.4	33.1	5	7	4	10	20.8	31	43	5	12	0	
40 FT	9	11	8	5	8.5	4	6	22.4	25.4	33.1	5	6.5	4	9.5	20.8	31	43	5	12	0	
42 FT	10	11	8	5	8	4	7	21.9	26.0	33.8	5	6.5	4	9	21.3	31	43	5	12	0	
44 FT	10	11	8	5	8	4	6.5	21.9	26.0	33.8	5	6.5	4	8.5	21.3	31	43	5	12	0	
46 FT	10	12	8	5	8	4	6.5	21.9	26.3	33.9	5	6	4	9.5	20.8	32	44	5	12	0	
48 FT	10	12	8	5	8	4	6	21.9	26.3	33.9	5	6	4	9.5	20.8	32	44	5	12	0	
50 FT	11	12	8	5	7.5	4	7	21.3	27.3	35.1	5	6	4	9.5	21.3	32	44	5	12	0	

		SPAN (S) = 4 FT										HEIGHT (HT) = 4 FT OR 5 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=4'	HT=5'						HT=4'	HT=5'				
1 FT	10	8	8	5	9	4	10.5	38.6	26.3	31.4	4	6	4	8	38.6	52	64	5	12	12	
2 FT	10	8	8	5	9	4	10.5	38.6	26.3	31.4	4	6	4	7.5	38.6	52	64	5	12	12	
2'- 4'	10	8	8	5	9	4	10.5	38.6	26.3	31.4	4	6	4	7.5	38.6	52	64	5	12	12	
4 FT	8	8	8	4	11.5	4	12	38.6	24.3	29.1	4	9.5	4	11.5	38.6	52	64	5	12	0	
6 FT	8	8	8	4	12	4	12	35.9	24.3	29.1	4	11	4	11.5	35.3	52	64	5	12	0	
8 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	11	4	11	32.5	52	64	5	12	0	
10 FT	8	8	8	4	12	4	12	28.0	24.3	29.1	4	11.5	4	11.5	28.0	52	64	5	12	0	
12 FT	8	8	8	4	12	4	12	27.5	24.3	29.1	4	10	4	10.5	28.0	52	64	5	12	0	
14 FT	8	8	8	4	10.5	4	12	27.5	24.3	29.1	4	9	4	10	27.5	52	64	5	12	0	
16 FT	8	8	8	4	9.5	4	11	26.9	24.3	29.1	4	8	4	9.5	27.5	52	64	5	12	0	
18 FT	8	8	8	4	8.5	4	9.5	26.9	24.3	29.1	4	7	4	8.5	27.5	52	64	5	12	0	
20 FT	8	8	8	4	7.5	4	9	26.9	24.3	29.1	4	6.5	4	7.5	27.5	52	64	5	12	0	
22 FT	8	8	8	4	7	4	8	26.9	24.3	29.1	4	6	4	7	27.5	52	64	5	12	0	
24 FT	8	8	8	4	6	4	7.5	26.9	24.3	29.1	5	8.5	4	6.5	26.9	52	64	5	12	0	
26 FT	8	8	8	4	6	4	6.5	26.9	24.3	29.1	5	8	4	6	26.9	52	64	5	12	0	
28 FT	8	9	8	4	6	4	6	26.9	24.0	28.8	5	8	4	7.5	27.5	53	65	5	12	0	
30 FT	8	9	8	4	6	4	6	26.9	24.0	28.8	5	7.5	4	7	27.5	53	65	5	12	0	
32 FT	8	9	8	4	6	5	6.5	26.9	24.0	28.8	5	7.5	4	6.5	27.5	53	65	5	12	0	
34 FT	9	10	8	5	8.5	4	6.5	26.9	25.4	30.4	5	7	4	7.5	28.0	54	66	5	12	0	
36 FT	9	10	8	5	8.5	4	6	26.9	25.4	30.4	5	7	4	7	28.0	54	66	5	12	0	
38 FT	9	10	8	5	8.5	5	7	26.9	25.4	30.4	5	7	4	7	28.0	54	66	5	12	0	
40 FT	9	11	8	5	8.5	5	6.5	26.9	25.3	30.0	5	6.5	4	7	28.5	55	67	5	12	0	
42 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6.5	28.5	55	67	5	12	0	
44 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6	28.5	55	67	5	12	0	
46 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6	28.5	55	67	5	12	0	
48 FT	10	12	8	5	8	5	7.5	27.5	26.0	30.8	5	6	4	6	29.1	56	68	5	11.5	0	
50 FT	11	12	8	5	7.5	5	8	28.0	27.0	32.0	5	6	4	6	29.1	56	68	5	11	0	

		SPAN (S) = 4 FT										HEIGHT (HT) = 6 FT OR 7 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=6'	HT=7'						HT=6'	HT=7'				
1 FT	10	8	8	5	8.5	4	10.5	38.6	26.4	30.1	5	9	4	7	38.6	76	88	5	12	12	
2 FT	10	8	8	5	8.5	4	10.5	38.6	26.4	30.1	5	8.5	4	6.5	38.6	76	88	5	12	12	
2'- 4'	10	8	8	5	8.5	4	10.5	38.6	26.4	30.1	5	8.5	4	6.5	38.6	76	88	5	12	12	
4 FT	8	8	8	4	11	4	11	38.6	24.1	27.5	4	9	4	8	38.6	76	88	5	12	0	
6 FT	8	8	8	4	12	4	11	38.6	24.1	27.5	4	10.5	4	7	38.6	76	88	5	12	0	
8 FT	8	8	8	4	12	4	10	38.6	24.1	27.5	4	10.5	4	7	38.6	76	88	5	12	0	
10 FT	8	8	8	4	12	4	11	38.6	24.1	27.5	4	11	4	7	38.6	76	88	5	12	0	
12 FT	8	8	8	4	12	4	9.5	38.6	24.1	27.5	4	10	4	6.5	38.6	76	88	5	12	0	
14 FT	8	8	8	4	10.5	4	8	38.6	24.1	27.5	4	8.5	4	6	38.6	76	88	5	12	0	
16 FT	8	9	8	4	9.5	4	7	38.6	24.4	27.9	4	8.5	4	6.5	38.6	77	89	5	12	0	
18 FT	8	9	8	4	8.5	4	6.5	38.6	24.4	27.9	4	7.5	4	6	38.6	77	89	5	12	0	
20 FT	8	10	8	4	8	4	6	38.6	24.6	28.1	4	7.5	4	6	40.9	78	90	5	11.5	0	
22 FT	8	10	9	4	7.5	4	6.5	40.5	24.6	28.1	4	7	4	7	39.9	78	90	5	11.5	0	
24 FT	8	10	9	4	7	4	6	39.9	24.6	28.1	4	6.5	4	6.5	39.9	78	90	5	11	0	
26 FT	8	10	9	4	6.5	5	6.5	39.4	24.6	28.1	4	6	4	6	39.9	78	90	5	10	0	
28 FT	8	10	9	4	6	5	6	38.8	24.6	28.1	5	9	5	7	41.6	78	90	5	9.5	0	
30 FT	8	10	9	4	6	6	7.5	41.0	24.6	28.1	5</										

		SPAN (S) = 5 FT										HEIGHT (HT) = 3 FT OR 4 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=3'	HT=4'						HT=3'	HT=4'				
1 FT	10	8	8	5	8	4	10.5	44.9	26.5	33.0	5	8.5	4	6	35.4	40	52	5	12	12	
2 FT	10	8	8	5	8	4	10.5	44.9	26.5	33.0	5	8	4	6	32.0	40	52	5	12	12	
2'- 4'	10	8	8	5	8	4	10.5	44.9	26.5	33.0	5	8	4	6	32.0	40	52	5	12	12	
4 FT	8	8	8	4	8.5	4	10.5	28.5	24.5	30.6	4	7.5	4	10	28.5	40	52	5	12	0	
6 FT	8	8	8	4	10	4	12	27.3	24.5	30.6	4	8	4	10	27.3	40	52	5	12	0	
8 FT	8	8	8	4	9.5	4	11	26.5	24.5	30.6	4	8	4	9.5	26.5	40	52	5	12	0	
10 FT	8	8	8	4	10	4	12	25.1	24.5	30.6	4	8.5	4	10.5	25.1	40	52	5	12	0	
12 FT	8	8	8	4	8.5	4	10	25.1	24.5	30.6	4	7	4	9	25.1	40	52	5	12	0	
14 FT	8	8	8	4	7.5	4	8.5	25.1	24.5	30.6	4	6	4	7.5	25.1	40	52	5	12	0	
16 FT	8	8	8	4	6.5	4	7.5	25.1	24.5	30.6	5	8.5	4	7	25.1	40	52	5	12	0	
18 FT	8	8	8	4	6	4	6.5	25.1	24.5	30.6	5	8	4	6	25.1	40	52	5	12	0	
20 FT	8	8	8	4	6	4	6	25.1	24.5	30.6	5	8	5	6.5	25.1	40	52	5	12	0	
22 FT	8	9	8	4	6	5	6.5	25.1	24.0	30.6	5	7.5	4	7	23.8	41	53	5	12	0	
24 FT	8	9	8	4	6	5	6	25.1	24.0	30.6	5	7.5	4	6.5	23.8	41	53	5	12	0	
26 FT	9	10	8	5	8.5	4	6.5	24.5	25.0	31.0	5	7	4	8.5	23.8	42	54	5	12	0	
28 FT	9	10	8	5	8.5	4	6	24.5	25.0	31.0	5	7	4	8	23.8	42	54	5	12	0	
30 FT	9	11	8	5	8	5	6.5	24.5	25.5	31.5	5	6.5	4	9	23.1	43	55	5	12	0	
32 FT	10	11	8	5	8	4	6	23.8	26.0	32.0	5	6.5	4	8	23.1	43	55	5	12	0	
34 FT	10	12	8	5	7.5	5	7.5	23.8	26.5	32.5	5	6	4	9	22.5	44	56	5	12	0	
36 FT	10	12	8	5	7	5	7.5	23.8	26.5	32.5	5	6	4	8.5	22.5	44	56	5	12	0	
38 FT	11	12	8	5	7	4	6	23.8	27.0	33.0	5	6	4	8	23.1	44	56	5	12	0	
40 FT	11	13	8	5	6.5	5	8.5	23.8	27.5	33.5	5	6	4	8.5	22.5	45	57	5	12	0	
42 FT	12	13	8	5	6.5	4	6	23.1	28.0	34.0	5	6	4	8	23.1	45	57	5	12	0	
44 FT	12	13	8	5	6.5	5	9	23.1	28.0	34.0	5	6	4	7.5	23.1	45	57	5	12	0	
46 FT	12	14	8	5	6	5	8.5	23.8	28.5	34.5	6	8	4	7.5	22.5	46	58	5	12	0	
48 FT	13	14	8	5	6	4	6	23.1	29.0	35.0	6	8	4	7.5	23.1	46	58	5	12	0	
50 FT	13	14	8	5	6	5	8.5	23.1	29.0	35.0	6	8	4	7.5	23.1	46	58	5	12	0	

		SPAN (S) = 5 FT										HEIGHT (HT) = 5 FT OR 6 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=5'	HT=6'						HT=5'	HT=6'				
1 FT	10	8	8	5	8	4	10.5	44.9	26.3	30.6	5	8	4	6	44.9	64	76	5	12	12	
2 FT	10	8	8	5	8	4	10.5	44.9	26.3	30.6	5	8	4	6	44.9	64	76	5	12	12	
2'- 4'	10	8	8	5	8	4	10.5	44.9	26.3	30.6	5	8	4	6	44.9	64	76	5	12	12	
4 FT	8	8	8	4	8	4	11	44.9	24.1	28.3	4	7	4	8.5	44.9	64	76	5	12	0	
6 FT	8	8	8	4	9	4	10.5	39.5	24.1	28.3	4	7.5	4	8	38.1	64	76	5	12	0	
8 FT	8	8	8	4	9	4	10	34.6	24.1	28.3	4	7	4	7.5	34.6	64	76	5	12	0	
10 FT	8	8	8	4	9.5	4	11	30.6	24.1	28.3	4	8	4	8	30.6	64	76	5	12	0	
12 FT	8	8	8	4	8	4	9	29.9	24.1	28.3	4	6.5	4	7.5	30.6	64	76	5	12	0	
14 FT	8	8	8	4	7	4	8	29.9	24.1	28.3	4	6	4	6.5	29.9	64	76	5	12	0	
16 FT	8	8	8	4	6	4	7	29.3	24.1	28.3	5	8	4	6	29.9	64	76	5	12	0	
18 FT	8	8	8	4	6	4	6	29.3	24.1	28.3	5	8	5	6.5	29.9	64	76	5	12	0	
20 FT	8	8	8	4	6	5	6.5	29.3	24.1	28.3	5	8	5	6	29.9	64	76	5	12	0	
22 FT	8	9	8	4	6	5	6	29.3	24.5	28.5	5	7.5	4	6	29.9	65	77	5	12	0	
24 FT	8	9	8	5	9	6	7.5	32.0	28.1	32.8	5	7.5	5	6.5	29.9	65	77	5	12	0	
26 FT	9	10	8	5	8.5	5	6.5	29.3	25.1	29.3	5	7	4	6	30.6	66	78	5	12	0	
28 FT	9	10	8	5	8	5	6.5	29.3	25.1	29.3	5	7	5	7	29.9	66	78	5	12	0	
30 FT	9	10	8	5	7.5	5	6.5	29.3	29.6	34.4	5	6.5	5	6.5	29.9	66	78	5	12	0	
32 FT	10	11	8	5	7.5	5	7	29.3	26.6	30.8	5	6.5	5	7.5	30.6	67	79	5	12	0	
34 FT	10	11	8	5	7.5	5	6.5	29.3	26.6	30.8	5	6.5	5	7	30.6	67	79	5	11.5	0	
36 FT	10	11	8	5	7	5	6.5	29.3	30.4	35.3	5	6	5	6	30.6	67	79	5	11	0	
38 FT	11	12	8	5	7	5	7	29.9	27.3	31.5	5	6	5	7	31.3	68	80	5	10	0	
40 FT	11	12	8	5	6.5	5	6.5	29.9	31.3	36.0	5	6	5	6.5	31.3	68	80	5	10	0	
42 FT	11	13	8	5	6.5	5	6	29.9	27.6	31.9	5	6	5	7	31.3	69	81	5	9.5	0	
44 FT	12	13	8	5	6.5	5	6.5	29.9	28.0	32.3	5	6	5	6.5	32.0	69	81	5	9.5	0	
46 FT	12	13	8	5	6	5	6	29.9	32.0	36.8	5	6	5	6	31.3	69	81	5	9.5	0	
48 FT	12	14	9	5	6	5	7	30.4	28.4	32.5	6	8	5	8	31.8	70	82	5	9.5	0	
50 FT	13	14	9	5	6	5	7.5	30.4	29.5	33.9	6	8	5	7.5	32.4	70	82	5	9	0	

		SPAN (S) = 5 FT										HEIGHT (HT) = 7 FT OR 8 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS					BOTTOM SLAB BARS					WALL BARS							
				A1 BARS		J3 BARS			A2 BARS		J4 BARS						B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	G1	
									HT=7'	HT=8'						HT=7'	HT=8'				
1 FT	10	9	8	5	8	4	9.5	44.9	26.5	29.8	5	7.5	4	7	44.9	89	101	5	12	12	
2 FT	10	9	8	5	8	4	8.5	44.9	26.5	29.8	5	7.5	4	6.5	44.9	89	101	5	12	12	
2'- 4'	10	9	8	5	8	4	7.5	44.9	26.5	29.8	5	7.5	4	6	44.9	89	101	5	12	12	
4 FT	8	8	8	4	7.5	4	7.5	44.9	24.8	27.9	4	6.5	4	6	44.9	88	100	5	12	0	
6 FT	8	9	8	4	9	4	7.5	44.9	24.0	27.0	4	7.5	4	6.5	44.9	89	101	5	12	0	
8 FT	8	9	8	4	9	4	7	44.9	24.0	27.0	4	7.5	4	6	44.9	89	101	5	12	0	
10 FT	8	9	8	4	10	4	7.5	44.9	24.0	27.0	4	8	4	6.5	44.9	89	101	5	12	0	
12 FT	8	10	8	4	8.5	4	6.5	44.9	24.3	27.3	4	8	4	6.5	44.9	90	102	5	12	0	
14 FT	8	10	9	4	7.5	4	6.5	41.4	24.3	27.3	4	7	4	7	45.5	90	102	5	12	0	
16 FT	8	10	9	4	6.5	4	6	40.8	24.3	27.3	4	6	4	6.5	45.5	90	102	5	11.5	0	
18 FT	8	10	9	4	6	5	6.5	40.0	24.3	27.3	5	9	4	6	45.5	90	102	5	10.5	0	
20 FT	8	10	9	4	6	5	6	39.4	25.3	28.4	5	8	5	6.5	47.6	90	102	5	10	0	
22 FT	8	10	9	4	6	6	7	42.1	25.3	28.4	5	7.5	5	6	47.6	90	102	5	9	0	
24 FT	9	11	9	5	8.5	5	6	41.4	26.8	30.0	5	7.5	5	6	47.6	91	103	5	8.5	0	
26 FT	9	11	9	5	8.5	5	6	41.4	26.8	30.0	5	7	6	7.5	49.6	91	103	5	8.5	0	
28 FT	9	11	9	5	8.5	5	6	41.4	29.8	33.3	5	6.5	6	7	49.6	91	103	5	8.5	0	
30 FT	9	11	9	5	8	5	6	40.8	29.8	33.3	5	6									

		SPAN (S) = 6 FT												HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS							
				A1 BARS		J3 BARS				A2 BARS		J4 BARS							B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
									HT=3'	HT=4'	HT=5'							HT=3'	HT=4'	HT=5'			
1 FT	10	8	8	5	8	4	9	51.3	26.5	33.0	39.4	5	8	5	6	41.6	40	52	64	5	12	12	
2 FT	11	8	8	5	7.5	4	9.5	51.3	27.0	33.5	40.0	5	8	6	7.5	36.0	40	52	64	5	12	12	
2'- 4'	11	8	8	5	7.5	4	7.5	51.3	27.0	33.5	40.0	5	8	6	7.5	36.0	40	52	64	5	12	12	
4 FT	8	8	8	4	6.5	4	7.5	32.8	24.5	30.6	36.9	5	8.5	4	6.5	32.0	40	52	64	5	12	0	
6 FT	8	8	8	4	7	4	8	30.4	24.5	30.6	36.9	5	9	4	7	30.4	40	52	64	5	12	0	
8 FT	8	8	8	4	6.5	4	7.5	29.6	24.5	30.6	36.9	5	8.5	4	6.5	29.6	40	52	64	5	12	0	
10 FT	8	8	8	4	7	4	8	27.3	24.5	30.6	36.9	4	6	4	7	27.3	40	52	64	5	12	0	
12 FT	8	8	8	4	6	4	7	27.3	24.5	30.6	36.9	5	8	4	6	27.3	40	52	64	5	12	0	
14 FT	8	8	8	4	6	4	6	27.3	24.5	30.6	36.9	5	8	5	6	27.3	40	52	64	5	12	0	
16 FT	8	8	8	4	6	5	6	27.3	28.3	35.4	42.6	5	8	6	7	30.4	40	52	64	5	12	0	
18 FT	8	9	8	5	8.5	6	7.5	30.4	24.0	30.0	36.0	5	7.5	4	6	26.4	41	53	65	5	12	0	
20 FT	8	9	8	5	7.5	6	7.5	30.4	28.4	35.4	42.5	5	7	5	6.5	26.4	41	53	65	5	12	0	
22 FT	9	10	8	5	7.5	5	6.5	26.4	25.0	31.0	37.0	5	7	4	6.5	25.6	42	54	66	5	12	0	
24 FT	9	11	8	5	7	5	6.5	26.4	25.5	31.5	37.5	5	6.5	4	7	24.8	43	55	67	5	12	0	
26 FT	10	11	8	5	7	5	7.5	26.4	26.0	32.0	38.0	5	6.5	4	6.5	25.6	43	55	67	5	12	0	
28 FT	10	12	8	5	6.5	5	7.5	26.4	26.5	32.5	38.5	5	6	4	7	24.8	44	56	68	5	12	0	
30 FT	11	12	8	5	6.5	5	8.5	25.6	27.0	33.0	39.0	5	6	4	6	24.8	44	56	68	5	12	0	
32 FT	11	13	8	5	6	5	8	25.6	27.5	33.5	39.5	5	6	4	7	24.8	45	57	69	5	12	0	
34 FT	12	13	8	5	6	5	8.5	25.6	28.0	34.0	40.0	5	6	4	6	24.8	45	57	69	5	12	0	
36 FT	12	14	8	6	8	5	8.5	25.6	28.5	34.5	40.5	6	8	4	6.5	24.8	46	58	70	5	12	0	
38 FT	13	14	8	6	8	5	8.5	24.8	29.0	35.0	41.0	6	8	4	6	24.8	46	58	70	5	12	0	
40 FT	13	14	8	6	7.5	5	8.5	24.8	29.0	35.0	41.0	6	7.5	5	9	24.8	46	58	70	5	12	0	
42 FT	14	15	8	6	8	5	8.5	24.8	30.0	36.0	42.0	6	7.5	4	6	24.8	47	59	71	5	12	0	
44 FT	14	15	8	6	7.5	5	8.5	24.8	30.0	36.0	42.0	6	7.5	5	8.5	24.8	47	59	71	5	12	0	
46 FT	14	16	8	6	7	5	8.5	24.8	30.5	36.5	42.5	6	7	4	6	24.8	48	60	72	5	12	0	
48 FT	15	16	8	6	7	5	8	29.6	31.0	37.0	43.0	6	7	5	8	25.6	48	60	72	5	12	0	
50 FT	15	16	8	6	7	5	8	29.6	31.0	37.0	43.0	6	7	5	8	24.8	48	60	72	5	12	0	

		SPAN (S) = 6 FT												HEIGHT (HT) = 6 FT OR 7 FT								
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS				A2 BARS		J4 BARS							B2 BARS			
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1
									HT=6'	HT=7'								HT=6'	HT=7'			
1 FT	10	8	8	5	8	4	9.5	51.3	26.4	30.1	36.8	5	8	5	6	52.8	76	88	5	12	12	
2 FT	11	9	8	5	7.5	4	9.5	51.3	27.9	31.6	38.5	5	7.5	4	6.5	51.3	77	89	5	12	12	
2'- 4'	11	9	8	5	7.5	4	7	51.3	27.9	31.6	38.5	5	7.5	4	6	51.3	77	89	5	12	12	
4 FT	8	8	8	4	6	4	7	51.3	24.1	27.5	34.0	5	8	4	6	51.3	76	88	5	12	0	
6 FT	8	8	8	4	6.5	4	7.5	42.4	24.1	27.5	34.0	5	8	4	6	41.6	76	88	5	12	0	
8 FT	8	8	8	4	6.5	4	7	38.4	24.1	27.5	34.0	5	8	5	6.5	38.4	76	88	5	12	0	
10 FT	8	8	8	4	7	4	7.5	32.8	24.1	27.5	34.0	5	8.5	4	6	33.6	76	88	5	12	0	
12 FT	8	9	8	4	6	4	6	32.8	24.4	27.9	34.4	5	8	4	7	33.6	77	89	5	12	0	
14 FT	8	9	8	4	6	5	6.5	32.0	24.4	27.9	34.4	5	7.5	4	6	32.8	77	89	5	12	0	
16 FT	8	9	8	4	6	6	6	7.5	35.3	28.5	32.6	5	7.5	5	6.5	32.8	77	89	5	12	0	
18 FT	8	9	8	5	8.5	6	7.5	34.4	28.5	32.6	38.5	5	7.5	6	7.5	35.3	77	89	5	12	0	
20 FT	8	9	8	5	7.5	6	7.5	34.4	28.5	32.6	38.5	5	6.5	6	7	35.3	77	89	5	12	0	
22 FT	9	10	8	5	7.5	5	6	32.0	25.8	29.4	35.0	5	7	5	6	32.8	78	90	5	12	0	
24 FT	9	11	8	5	7	6	7	34.4	29.6	33.6	40.0	5	6.5	5	6.5	32.8	79	91	5	12	0	
26 FT	10	11	8	5	6.5	5	6	32.0	30.8	35.0	41.0	5	6.5	5	6	32.8	79	91	5	11	0	
28 FT	10	12	8	5	6.5	6	7	34.4	30.3	34.4	41.0	5	6	5	6.5	33.6	80	92	5	10.5	0	
30 FT	11	12	8	5	6.5	5	6	32.0	31.5	35.8	42.0	5	6	5	6	33.6	80	92	5	9.5	0	
32 FT	11	13	8	5	6	6	7	35.3	31.9	36.0	43.0	5	6	5	6	33.6	81	93	5	9.5	0	
34 FT	11	13	8	6	7.5	6	6.5	35.3	31.9	36.0	43.0	5	6	5	6	33.6	81	93	5	9.5	0	
36 FT	12	13	8	6	8	6	7	35.3	32.3	36.4	44.0	6	8	6	7	36.8	81	93	5	9.5	0	
38 FT	12	14	8	6	8	6	6.5	35.3	32.5	36.8	44.0	6	8	5	6	34.4	82	94	5	9.5	0	
40 FT	13	14	9	6	8	5	6	32.4	33.9	38.1	45.0	6	8	5	6.5	34.0	82	94	5	8.5	0	
42 FT	13	15	10	6	8	5	7	32.8	33.3	37.5	45.0	6	7.5	5	7.5	34.5	83	95	5	9	0	
44 FT	14	15	10	6	8	5	7.5	32.8	34.5	38.9	46.0	6	7.5	5	7.5	34.5	83	95	5	8.5	0	
46 FT	14	16	11	6	7.5	5	7	33.3	34.9	39.3	46.0	6	7	5	7	34.9	84	96	5	9	0	
48 FT	14	16	11	6	7.5	5	6.5	33.3	34.9	39.3	46.0	6	7	5	7	34.9	84	96	5	9	0	
50 FT	15	16	11	6	7.5	5	7	38.1	35.3	39.6	46.0	6	7	5	7	34.9	84	96	5	8.5	0	

		SPAN (S) = 6 FT												HEIGHT (HT) = 8 FT OR 9 FT								
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS				A2 BARS		J4 BARS							B2 BARS			
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1
									HT=8'	HT=9'								HT=8'	HT=9'			
1 FT	10	10	8	5	8	4	7	51.3	26.6	29.5	36.4	5	7	4	6.5	51.3	102	114	5	12	12	
2 FT	11	10	8	5	7.5	4	7	51.3	28.0	31.0	38.0	5	7	4	6	51.3	102	114	5	12	12	
2'- 4'	11	10	9	5	7.5	4	6.5	51.9	28.0	31.0	38.0	5	7	4	6	51.9	102	114	5	12	12	
4 FT	8	9	9	4	6	4	6.5	51.9	24.9	27.6	34.6	5	8	4	6.5	51.9	101	113	5	12	0	
6 FT	8	9	9	4	6.5	4	6.5	51.9	24.9	27.6	34.6	5	8.5	4	6	51.9	101	113	5	12	0	
8 FT	8	10	9	4	6.5	4	6	51.9	25.1	27.9	34.6	4	6	4	6	51.9	102	114	5	11.5	0	
10 FT	8	10	9	4	7.5	4	6.5	45.4	25.1	27.9	34.6	4	6.5	4	6.5	51.9	102	114	5	12	0	
12 FT	8	10	9	4	6	5	6.5	43.8	25.1	27.9	34.6	5	8.5	4	6	51.9	102	114	5	11.5	0	
14 FT	8	10	9	4	6	5	6	42.1	26.1	29.0	35.5	5	7.5	5	6.5	54.3	102	114	5	10	0	
16 FT	8	10	9	4	6	6	7	44.5	28.4	31.5	38.5	5	7	5	6	54.3	102	114	5	9.5	0	
18 FT	8	10	9	5	9	6	7	43.8	29.4	32.6	39.6	5	7	6	7	55.9	102	114	5	8.5	0	
20 FT	9	10	9																			

		SPAN (S) = 7 FT											HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT													
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS										
				A1 BARS		J3 BARS				A2 BARS		J4 BARS						B2 BARS								
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1				
						HT=4'			HT=5'			HT=6'						HT=7'			HT=8'					
1 FT	11	9	8	5	7.5	4	9	57.0	27.1	32.3	37.4	5	7.5	4	6	54.3	53	65	77	5	12	12				
2 FT	11	9	8	5	7.5	4	9	57.0	27.1	32.3	37.4	5	7.5	5	7	43.3	53	65	77	5	12	12				
2'- 4'	11	9	8	5	7.5	4	6	57.0	27.1	32.3	37.4	5	7.5	5	6	43.3	53	65	77	5	12	12				
4 FT	8	8	8	4	6	4	6	36.8	24.3	29.1	34.0	5	8	5	6	35.9	52	64	76	5	12	0				
6 FT	8	8	8	4	6	4	6	33.1	24.3	29.1	34.0	5	8	5	6	33.1	52	64	76	5	12	0				
8 FT	8	9	8	4	6	5	6.5	32.3	24.0	28.8	33.6	5	7.5	4	6.5	32.3	53	65	77	5	12	0				
10 FT	8	9	8	4	6	4	6	30.4	24.0	28.8	33.6	5	7.5	4	7.5	29.5	53	65	77	5	12	0				
12 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	33.6	5	7.5	4	6	28.5	53	65	77	5	12	0				
14 FT	8	9	8	5	8	6	7.5	33.1	28.3	33.9	39.5	5	7	5	6.5	28.5	53	65	77	5	12	0				
16 FT	8	9	8	5	7	6	7	33.1	28.3	33.9	39.5	5	6.5	6	7.5	31.3	53	65	77	5	12	0				
18 FT	9	10	8	5	7	5	6.5	28.5	25.4	30.4	35.3	5	6	5	7	28.5	54	66	78	5	12	0				
20 FT	9	10	8	5	6	5	6	28.5	29.1	34.8	40.4	6	8	5	6	27.6	54	66	78	5	12	0				
22 FT	10	11	8	5	6	5	6	28.5	26.3	31.1	36.1	6	8	5	7.5	27.6	55	67	79	5	12	0				
24 FT	10	12	8	6	8	5	6	28.5	26.0	30.8	35.6	6	8	5	8.5	26.6	56	68	80	5	12	0				
26 FT	11	13	8	6	8	5	7	27.6	27.5	32.4	37.3	6	8	5	8.5	26.6	57	69	81	5	12	0				
28 FT	12	13	8	6	7.5	5	8	27.6	28.5	33.6	38.6	6	7.5	5	8.5	27.6	57	69	81	5	12	0				
30 FT	12	14	8	6	7.5	5	7	27.6	28.3	33.3	38.1	6	7.5	5	8.5	26.6	58	70	82	5	12	0				
32 FT	13	14	8	6	7	5	8	26.6	29.4	34.5	39.5	6	7	5	8.5	27.6	58	70	82	5	12	0				
34 FT	13	15	8	6	7	5	7	27.6	29.1	34.0	39.0	6	7	5	8.5	26.6	59	71	83	5	12	0				
36 FT	14	15	8	6	6.5	5	7.5	26.6	30.3	35.3	40.4	6	7	5	8.5	27.6	59	71	83	5	12	0				
38 FT	14	16	8	6	6.5	5	7	26.6	30.6	35.8	40.8	6	7	5	8	26.6	60	72	84	5	11.5	0				
40 FT	15	16	8	6	6.5	5	7.5	32.3	31.1	36.1	41.1	6	6.5	5	8	27.6	60	72	84	5	10.5	0				
42 FT	15	17	8	6	6	5	7	32.3	35.3	40.9	46.5	6	6.5	5	7	27.6	61	73	85	5	10	0				
44 FT	16	17	8	6	6	5	7	32.3	36.5	42.3	48.0	6	6.5	5	7	27.6	61	73	85	5	9.5	0				
46 FT	16	18	8	6	6	5	6	32.3	36.3	41.9	47.5	6	6.5	5	6.5	27.6	62	74	86	5	9.5	0				
48 FT	17	18	9	6	6	5	7.5	32.5	33.5	38.8	43.9	6	6.5	5	8	27.9	62	74	86	5	10	0				
50 FT	17	19	9	6	6	5	7	32.5	37.1	42.8	48.4	6	6	5	7.5	27.9	63	75	87	5	9	0				

		SPAN (S) = 7 FT											HEIGHT (HT) = 7 FT OR 8 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS							
				A1 BARS		J3 BARS				A2 BARS		J4 BARS						B2 BARS					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
						HT=7'			HT=8'						HT=7'			HT=8'					
1 FT	11	9	8	5	7.5	4	8	57.0	27.8	31.1	37.4	5	7.5	5	6.5	58.9	89	101	113	5	12	12	
2 FT	11	9	8	5	7.5	4	7.5	57.0	27.8	31.1	37.4	5	7.5	5	6	58.9	89	101	113	5	12	12	
2'- 4'	11	9	8	5	7.5	5	6.5	58.9	27.8	31.1	37.4	5	7.5	5	6	58.9	89	101	113	5	12	12	
4 FT	8	9	8	4	6	5	6.5	58.9	24.0	27.0	32.0	5	7.5	4	6	57.0	89	101	113	5	12	0	
6 FT	8	9	8	4	6	5	6.5	46.0	25.0	28.1	33.1	5	7.5	5	6.5	50.6	89	101	113	5	12	0	
8 FT	8	9	8	4	6	5	6	41.4	25.0	28.1	33.1	5	7.5	5	6.5	44.1	89	101	113	5	12	0	
10 FT	8	9	8	4	6	5	6.5	35.9	25.0	28.1	33.1	5	7.5	5	6.5	36.8	89	101	113	5	12	0	
12 FT	8	9	8	4	6	6	7.5	38.6	28.8	32.4	37.4	5	7.5	5	6	36.8	89	101	113	5	12	0	
14 FT	8	9	8	5	8	6	7.5	37.8	28.8	32.4	37.4	5	7	6	6.5	38.6	89	101	113	5	12	0	
16 FT	8	9	8	5	7	6	7	37.8	32.6	36.8	41.8	5	6	6	6	38.6	89	101	113	5	12	0	
18 FT	9	10	8	5	6.5	6	7	37.8	29.4	33.0	38.0	5	6	6	6.5	38.6	90	102	114	5	12	0	
20 FT	9	10	8	5	6	6	6	36.8	33.4	37.4	41.4	6	7.5	6	6	38.6	90	102	114	5	11	0	
22 FT	10	11	9	5	6	5	6	34.4	30.0	33.6	38.6	6	8	5	6	35.4	91	103	115	5	12	0	
24 FT	10	12	9	6	8.5	5	6	34.4	30.3	33.9	38.6	6	8	5	6.5	36.3	92	104	116	5	11	0	
26 FT	11	13	9	6	8	6	7.5	38.1	31.9	35.6	40.6	6	8	5	6.5	36.3	93	105	117	5	10	0	
28 FT	11	13	9	6	7	6	7	37.3	31.9	35.6	40.6	6	7.5	5	6	36.3	93	105	117	5	9.5	0	
30 FT	12	13	9	6	7.5	6	7.5	37.3	33.3	37.1	41.1	6	7	6	7.5	39.0	93	105	117	5	8.5	0	
32 FT	12	14	9	6	6.5	6	6.5	37.3	32.5	36.3	40.3	6	7	5	6	36.3	94	106	118	5	8.5	0	
34 FT	13	14	9	6	7	6	7	38.1	33.9	37.8	41.8	6	7	6	7	39.0	94	106	118	5	8.5	0	
36 FT	14	15	10	6	7	5	6.5	34.8	34.5	38.4	42.4	6	7	5	7	36.6	95	107	119	5	8	0	
38 FT	14	16	11	6	7	5	6.5	36.1	34.9	38.8	43.3	6	7	5	7	37.0	96	108	120	5	8.5	0	
40 FT	15	16	11	6	7	5	6.5	40.9	35.3	39.0	43.9	6	7	5	7	37.0	96	108	120	5	8	0	
42 FT	15	17	11	6	6.5	5	6	40.9	35.5	39.4	44.3	6	7	5	7	37.0	97	109	121	5	7.5	0	
44 FT	16	17	12	6	6.5	5	6.5	41.3	37.0	40.9	44.7	6	6.5	5	6.5	37.5	97	109	121	5	8	0	
46 FT	16	18	12	6	6.5	5	6.5	41.3	36.1	40.0	44.0	6	6.5	5	6.5	37.5	98	110	122	5	8	0	
48 FT	17	18	12	6	6.5	5	6.5	41.3	37.6	41.6	45.6	6	6.5	5	6.5	38.4	98	110	122	5	7.5	0	
50 FT	17	18	12	6	6	5	6	41.3	37.6	41.6	45.6	6	6	5	6.5	38.4	98	110	122	5	7	0	

		SPAN (S) = 7 FT											HEIGHT (HT) = 9 FT OR 10 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS							
				A1 BARS		J3 BARS				A2 BARS		J4 BARS						B2 BARS					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
						HT=9'			HT=10'						HT=9'			HT=10'					
1 FT	11	10	8	5	7.5	4	6	57.0	27.3	29.9	35.1	5	7	5	6.5	58.9	114	126	138	5	12	12	
2 FT	11	10	8	5	7.5	5	8.5	58.9	28.5	31.3	36.5	5	7	5	6	58.9	114	126	138	5	11	12	
2'- 4'	11	10	9	5	7.5	5	6	59.5	28.8	31.6	36.8	5	7	5	6	59.5	114	126	138	5	10.5	12	
4 FT	8	9	9	4	6	5	6	59.5	28.8	31.6	36.8	5	7.5	5	6	59.5	113	125	137	5	10.5	0	
6 FT	8	10	9	4	6	5	6	59.5	29.0	31.9	37.1	5	7	5	6.5	59.5	114	126	138	5	10	0	
8 FT	8	10	9	4	6	6	7	62.3	29.0	31.9	37.1	5	7	5	6	59.5	114	126	138	5	9	0	
10 FT	8	10	9	4	6	5	6	46.5	26.6	29.3	34.5	5	7.5	5	6	59.5	114	126	138	5	10	0	
12 FT	8	11	9	4	6	6	7	47.4	25.6	28.1	33.3	5	7	5	6	59.5	115	127	139	5	9	0	
14 FT	8	11	9	5	8.5	6	7	46.5	29.3	32.1	37.3	5	6.5	6	7	62.3	115	127	139	5	8.5	0	
16 FT	9	11	9	5	8	5	6	46.5	29.5	32.4	37.6	5	6.5	6	6.5	62.3	115	127	139	5	8.5	0	
18																							



DESIGN FILL	SPAN (S) = 8 FT										HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT											
	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS				A2 BARS		J4 BARS				B2 BARS						
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1
								HT=4'	HT=5'	HT=6'						HT=4'	HT=5'	HT=6'				
1 FT	12	9	8	5	7	4	8.5	63.5	28.1	33.5	38.8	5	7.5	5	6	44.8	53	65	77	5	12	12
2 FT	12	9	8	5	7	4	8	63.5	28.1	33.5	38.8	5	7	6	7.5	43.6	53	65	77	5	12	12
2'- 4'	12	9	8	5	7	6	7.5	63.5	32.5	39.0	45.6	5	6.5	6	6	43.6	53	65	77	5	12	12
4 FT	8	8	8	5	8	6	7.5	38.5	32.5	39.0	45.6	5	6.5	6	6	38.5	52	64	76	5	12	0
6 FT	8	8	8	5	8.5	6	7.5	37.5	32.5	39.0	45.6	5	7	6	6	36.4	52	64	76	5	12	0
8 FT	8	8	8	5	8	6	7.5	36.4	32.5	39.0	45.6	5	6.5	6	6	35.4	52	64	76	5	12	0
10 FT	8	8	8	5	8.5	6	7.5	34.4	32.5	39.0	45.6	5	7	6	6	34.4	52	64	76	5	12	0
12 FT	8	9	8	5	7.5	6	7.5	34.4	32.4	38.9	45.4	5	6.5	6	7.5	32.3	53	65	77	5	12	0
14 FT	8	9	8	5	6.5	6	6.5	34.4	32.4	38.9	45.4	6	8	6	7	32.3	53	65	77	5	12	0
16 FT	9	10	8	5	6	5	6	30.1	29.1	34.8	40.4	6	8	5	6.5	28.1	54	66	78	5	12	0
18 FT	9	11	8	6	7.5	6	7	33.3	29.6	35.3	40.9	6	7.5	5	7.5	27.0	55	67	79	5	12	0
20 FT	10	12	8	6	7.5	5	6	29.1	26.0	30.8	35.6	6	7.5	5	8.5	26.0	56	68	80	5	12	0
22 FT	11	13	8	6	7	5	6.5	28.1	27.5	32.4	37.3	6	7	5	8.5	26.0	57	69	81	5	12	0
24 FT	12	13	8	6	7	5	7.5	27.0	32.6	38.4	44.1	6	7	5	8	26.0	57	69	81	5	12	0
26 FT	13	14	8	6	7	5	8	27.0	29.4	34.5	39.5	6	7	5	8.5	26.0	58	70	82	5	12	0
28 FT	13	15	8	6	6.5	5	7	27.0	29.1	34.0	39.0	6	6.5	5	8.5	26.0	59	71	83	5	12	0
30 FT	14	15	8	6	6	5	7.5	26.0	30.3	35.3	40.4	6	6.5	5	8.5	26.0	59	71	83	5	12	0
32 FT	15	16	8	6	6	5	7.5	31.3	35.5	41.3	47.0	6	6.5	5	8	26.0	60	72	84	5	12	0
34 FT	15	17	8	6	6	5	7	31.3	31.5	36.5	41.6	6	6.5	5	7	26.0	61	73	85	5	12	0
36 FT	16	17	8	6	6	5	7	31.3	32.6	37.9	43.0	6	6	5	7	26.0	61	73	85	5	12	0
38 FT	16	18	8	7	7.5	5	7	31.3	36.3	41.9	47.5	6	6	5	6.5	26.0	62	74	86	5	11.5	0
40 FT	17	18	8	7	7.5	5	6.5	31.3	37.5	43.3	49.0	6	6	5	6.5	26.0	62	74	86	5	10.5	0
42 FT	17	19	8	7	7	5	6.5	31.3	37.1	42.8	48.4	6	6	5	6.5	26.0	63	75	87	5	10	0
44 FT	18	19	8	7	7	5	6.5	30.1	38.4	44.1	49.9	7	7.5	5	6.5	26.0	63	75	87	5	9.5	0
46 FT	18	20	8	7	7	5	6	31.3	38.1	43.8	49.4	7	7.5	5	6	26.0	64	76	88	5	9.5	0
48 FT	19	20	8	7	7	5	6	31.3	39.4	45.1	50.9	7	7.5	5	6	26.0	64	76	88	5	9.5	0
50 FT	19	20	8	7	6.5	5	6	31.3	39.4	45.1	50.9	7	7	6	7.5	29.1	64	76	88	5	9.5	0

DESIGN FILL	SPAN (S) = 8 FT										HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT											
	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS				A2 BARS		J4 BARS				B2 BARS						
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1
								HT=7'	HT=8'	HT=9'						HT=7'	HT=8'	HT=9'				
1 FT	12	10	8	5	7	4	6.5	63.5	28.3	31.6	35.0	5	7	5	6.5	65.5	90	102	114	5	12	12
2 FT	12	10	8	5	7	4	6	63.5	28.3	31.6	35.0	5	7	5	6.5	65.5	90	102	114	5	12	12
2'- 4'	12	10	8	5	7	6	7.5	66.5	28.8	32.4	36.0	5	6.5	6	6.5	66.5	90	102	114	5	12	12
4 FT	8	9	8	5	7.5	6	7.5	66.5	28.8	32.4	36.0	5	6.5	6	6.5	66.5	89	101	113	5	12	0
6 FT	8	9	8	5	8	6	7.5	53.0	28.8	32.4	36.0	5	7	6	6.5	58.3	89	101	113	5	12	0
8 FT	8	9	8	5	7.5	6	7.5	47.9	28.8	32.4	36.0	5	6.5	6	6	51.0	89	101	113	5	11.5	0
10 FT	8	9	8	5	8	6	7.5	41.6	28.8	32.4	36.0	5	7	6	6	43.6	89	101	113	5	12	0
12 FT	8	9	9	5	7.5	6	7	41.0	32.6	36.8	40.8	5	6.5	6	6.5	42.0	89	101	113	5	12	0
14 FT	8	10	9	5	6.5	6	6.5	41.0	28.1	31.6	35.1	5	6	6	7	42.0	90	102	114	5	12	0
16 FT	9	10	9	5	6	6	7.5	41.0	29.4	33.0	36.6	6	7.5	6	6.5	42.0	90	102	114	5	12	0
18 FT	9	11	9	6	8	6	6.5	39.9	29.8	33.3	36.9	6	7.5	6	7	42.0	91	103	115	5	11	0
20 FT	10	11	9	6	7.5	6	7	39.9	30.0	33.6	37.3	6	6.5	6	6	42.0	91	103	115	5	10	0
22 FT	11	12	9	6	7.5	6	7	39.9	31.6	35.4	39.0	6	7	6	6.5	42.0	92	104	116	5	9	0
24 FT	11	13	9	6	6.5	6	6.5	39.9	31.9	35.6	39.4	6	6.5	6	7	42.0	93	105	117	5	8.5	0
26 FT	12	14	10	6	7	5	6	38.1	32.5	36.3	40.0	6	7	5	6.5	39.3	94	106	118	5	9	0
28 FT	13	15	10	6	7	6	7.5	40.3	33.1	36.9	40.6	6	7	5	6.5	39.3	95	107	119	5	8	0
30 FT	13	15	10	6	6.5	6	6.5	40.3	33.1	36.9	40.6	6	6.5	5	6	39.3	95	107	119	5	8	0
32 FT	14	16	11	6	6.5	6	8.5	40.6	34.9	38.8	42.5	6	6.5	5	7	39.6	96	108	120	5	8	0
34 FT	15	17	11	6	6.5	6	8	47.1	35.5	39.4	43.3	6	6.5	5	7	39.6	97	109	121	5	7.5	0
36 FT	15	17	11	6	6	6	7	47.1	35.5	39.4	43.3	6	6	5	6.5	39.6	97	109	121	5	7.5	0
38 FT	16	18	12	6	6	6	8	47.5	36.1	40.0	43.9	6	6	5	6.5	40.0	98	110	122	5	7.5	0
40 FT	17	18	12	6	6	6	8	47.5	37.6	41.6	45.5	6	6	5	6.5	40.0	98	110	122	5	7	0
42 FT	17	19	12	7	8	6	7.5	47.5	38.0	41.9	45.9	6	6	5	6.5	41.0	99	111	123	5	7	0
44 FT	18	19	13	7	8	5	6	44.8	38.3	42.3	46.3	6	6	5	6	40.4	99	111	123	5	7	0
46 FT	18	20	13	7	7.5	6	8	48.0	38.6	42.6	46.5	7	8	5	6	41.4	100	112	124	5	6.5	0
48 FT	19	20	13	7	7.5	6	8	48.0	40.1	44.3	48.3	7	7.5	5	6	41.4	100	112	124	5	6.5	0
50 FT	19	21	13	7	7	6	7	48.0	39.3	43.3	47.3	7	7.5	5	6	41.4	101	113	125	5	6.5	0

DESIGN FILL	SPAN (S) = 8 FT										HEIGHT (HT) = 10 FT OR 11 FT											
	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS				A2 BARS		J4 BARS				B2 BARS						
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1
								HT=10'	HT=11'						HT=10'	HT=11'						
1 FT	11	10	8	5	6.5	5	7.5	65.5	31.3	34.0	5	6.5	6	6.5	66.5	126	138	5	9.5	12		
2 FT	11	10	8	5	6.5	5	7	65.5	31.3	34.0	5	6	6	6	66.5	126	138	5	9.5	12		
2'- 4'	11	10	9	5	6.5	6	7	68.3	33.0	36.0	5	6	6	6	68.3	126	138	5	8.5	12		
4 FT	8	9	9	5	7.5	6	7	68.3	33.0	36.0	5	6	6	6	68.3	125	137	5	8.5	0		
6 FT	8	10	9	5	8.5	6	7	68.3	30.6	33.4	5	7	6	6.5	68.3	126	138	5	8.5	0		
8 FT	8	10	9	5	8	6	7	68.3	33.3	36.3	5	7	6	6	68.3	126	138	5	8.5	0		
10 FT	8	10	9	5	8.5	6	7	52.5	30.6	33.4	5	7	6	6	68.3	126	138	5	8.5	0		
12 FT	8	10	9	5	7.5	6	6.5	50.4	33.3	36.3	5	6.5	6	6	65.1	126	138	5	8.5	0		
14 FT	9	11	9	5	7	6	7	52.5	31.0	33.8	5	6.5	6	6	69.3	127	139	5	8.5	0		
16 FT	9	11	9	5	6	6	6	50.4	33.8	36.8	6	8	6	6	64.0	127	139	5	8.5	0		
18 FT	10	12	9	5	6	6	6	52.5	34.3	37.3	6	8										

DESIGN FILL	SPAN (S) = 9 FT						HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT											WALL BARS				
	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS												
				A1 BARS		J3 BARS				A2 BARS		J4 BARS				B2 BARS						
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3					SIZE	SPA.
						HT=5'	HT=6'	HT=7'					HT=5'	HT=6'	HT=7'							
1 FT	12	9	8	5	6.5	4	7	69.6	28.1	32.5	37.0	5	6.5	6	7.5	54.5	65	77	89	5	12	12
2 FT	12	9	8	5	6.5	4	7	69.6	28.1	32.5	37.0	5	6	6	7	48.8	65	77	89	5	12	12
2'- 4'	12	9	8	5	6.5	6	7	69.6	32.4	37.8	43.3	5	6	6	7	48.8	65	77	89	5	12	12
4 FT	8	9	8	5	6.5	6	7	42.9	32.4	37.8	43.3	5	6	6	7.5	42.9	65	77	89	5	12	0
6 FT	8	9	8	5	7	6	7.5	40.6	32.4	37.8	43.3	5	6	6	7	39.5	65	77	89	5	12	0
8 FT	8	10	8	5	6.5	6	7	39.5	24.1	28.0	32.0	5	6	5	6.5	33.6	66	78	90	5	12	0
10 FT	8	10	8	5	7	6	7.5	37.1	24.1	28.0	32.0	5	6.5	4	6	31.4	66	78	90	5	12	0
12 FT	8	10	8	5	6	6	6	37.1	28.5	33.1	37.9	6	8	5	6.5	30.1	66	78	90	5	12	0
14 FT	9	10	8	6	7.5	6	7	34.8	29.6	34.4	39.3	6	7	5	6	30.1	66	78	90	5	12	0
16 FT	9	11	8	6	7	6	6	34.8	29.3	33.9	38.6	6	6.5	5	7	29.0	67	79	91	5	12	0
18 FT	10	12	8	6	6.5	6	6.5	33.6	30.0	34.8	39.4	6	6.5	5	7.5	29.0	68	80	92	5	12	0
20 FT	11	13	8	6	6	6	7	33.6	31.6	36.4	41.3	6	6	5	8	29.0	69	81	93	5	12	0
22 FT	12	14	8	6	6	5	6	29.0	32.4	37.3	42.0	6	6	5	8.5	27.9	70	82	94	5	12	0
24 FT	13	15	8	6	6	5	6	29.0	29.0	33.3	37.5	6	6	5	8.5	27.9	71	83	95	5	12	0
26 FT	14	16	8	6	6	5	6	29.0	30.6	34.9	39.3	6	6	5	8	27.9	72	84	96	5	12	0
28 FT	15	16	8	7	7.5	5	6.5	33.6	35.3	40.1	45.1	7	8	5	8	27.9	72	84	96	5	12	0
30 FT	15	17	8	7	7	6	8	37.1	35.6	40.6	45.5	7	7.5	5	7	27.9	73	85	97	5	11.5	0
32 FT	16	17	8	7	7	5	6	32.5	36.1	41.0	45.9	7	7.5	5	6.5	27.9	73	85	97	5	10	0
34 FT	17	18	8	7	7	5	6	32.5	37.8	42.9	47.9	7	7.5	5	6.5	29.0	74	86	98	5	9.5	0
36 FT	17	19	9	7	7	5	6	33.9	37.3	42.3	47.1	7	7.5	5	7.5	29.3	75	87	99	5	10.5	0
38 FT	18	20	9	7	7	5	6	33.9	38.1	43.0	48.0	7	7.5	5	7	29.3	76	88	100	5	9.5	0
40 FT	19	20	9	7	6.5	5	6.5	33.9	39.5	44.5	49.5	7	7	5	7	29.3	76	88	100	5	8.5	0
42 FT	19	21	10	7	6.5	5	6.5	34.3	39.9	45.0	50.0	7	7	5	7.5	29.5	77	89	101	5	10	0
44 FT	20	21	10	7	6.5	5	6.5	34.3	40.4	45.4	50.4	7	6.5	5	7.5	29.5	77	89	101	5	9.5	0
46 FT	21	22	10	7	6.5	5	6.5	34.3	41.1	46.3	51.3	7	7	5	7	29.5	78	90	102	5	8.5	0
48 FT	21	22	10	7	6	5	6.5	34.3	41.1	46.3	51.3	7	6.5	5	7	29.5	78	90	102	5	8	0
50 FT	22	23	10	7	6	5	6.5	34.3	42.0	47.0	52.1	7	6.5	5	6.5	30.6	79	91	103	5	8	0

DESIGN FILL	SPAN (S) = 9 FT						HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT											WALL BARS				
	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS												
				A1 BARS		J3 BARS				A2 BARS		J4 BARS				B2 BARS						
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3					SIZE	SPA.
						HT=8'	HT=9'	HT=10'					HT=8'	HT=9'	HT=10'							
1 FT	12	11	8	5	6.5	5	8.5	70.8	29.6	32.8	35.9	5	6.5	5	6.5	70.8	103	115	127	5	12	12
2 FT	12	11	8	5	6.5	5	8.5	70.8	29.6	32.8	35.9	5	6	5	6	70.8	103	115	127	5	11.5	12
2'- 4'	12	11	9	5	6.5	6	7	70.8	29.6	32.8	35.9	5	6	5	6	72.5	103	115	127	5	11.5	12
4 FT	8	10	9	5	6.5	6	7	67.9	26.1	29.0	31.9	5	6	5	6	72.5	102	114	126	5	11.5	0
6 FT	8	10	9	5	7	6	7	53.9	28.4	31.5	34.6	5	6	6	7	64.4	102	114	126	5	11	0
8 FT	8	10	9	5	6.5	6	6.5	49.1	28.4	31.5	34.6	5	6	6	6.5	55.0	102	114	126	5	10.5	0
10 FT	8	10	9	5	7	6	7	44.5	28.4	31.5	34.6	5	6.5	6	7	46.8	102	114	126	5	12	0
12 FT	9	10	9	5	6.5	5	6	41.0	29.8	33.0	36.1	6	8	6	6	45.6	102	114	126	5	11.5	0
14 FT	9	10	9	6	6	6	6.5	43.3	33.0	36.6	40.3	6	6.5	6	6	45.6	102	114	126	5	10.5	0
16 FT	10	11	9	6	7.5	6	7	43.3	30.3	33.5	36.8	6	6.5	6	6	45.6	103	115	127	5	9.5	0
18 FT	10	12	9	6	6.5	6	6	43.3	31.6	35.0	38.4	6	6.5	6	6	45.6	104	116	128	5	8.5	0
20 FT	11	13	9	6	6.5	6	6.5	43.3	31.0	34.3	37.5	6	6.5	6	6	45.6	105	117	129	5	8.5	0
22 FT	12	13	9	6	6	6	6.5	43.3	33.6	37.1	40.6	6	6	7	6.5	48.0	105	117	129	5	8.5	0
24 FT	13	14	10	6	6	6	7	43.6	33.0	36.4	39.8	6	6	6	6.5	44.9	106	118	130	5	8	0
26 FT	14	15	10	6	6	6	7	43.6	34.8	38.3	41.8	6	6	6	7	44.9	107	119	131	5	8	0
28 FT	14	16	11	7	8	6	7	44.0	35.1	38.6	42.0	7	8	5	6	42.9	108	120	132	5	7.5	0
30 FT	15	17	11	7	8	6	6.5	50.0	35.6	39.1	42.6	6	6	5	6	42.9	109	121	133	5	7.5	0
32 FT	16	18	12	6	6	6	7.5	50.4	36.3	39.8	43.3	6	6	5	6	43.3	110	122	134	5	7	0
34 FT	16	18	12	7	7.5	6	7	50.4	36.3	39.8	43.3	7	7.5	5	6	43.3	110	122	134	5	7	0
36 FT	17	19	13	7	7.5	6	7.5	50.9	38.1	41.8	45.3	7	7.5	5	6	43.5	111	123	135	5	7	0
38 FT	18	20	13	7	7.5	6	7.5	50.9	38.8	42.3	45.9	7	7.5	5	6	43.5	112	124	136	5	6.5	0
40 FT	18	20	13	7	7	6	7	50.9	38.8	42.3	45.9	7	7	6	8.5	46.0	112	124	136	5	6.5	0
42 FT	19	21	13	7	7	6	6.5	50.9	39.3	42.9	46.5	7	7	6	8	47.3	113	125	137	5	6.5	0
44 FT	19	21	14	7	6.5	6	6.5	51.3	39.3	42.9	46.5	7	7	5	6	43.9	113	125	137	5	6	0
46 FT	20	22	14	7	6.5	6	7	51.3	41.3	45.0	48.6	7	7	6	8.5	47.6	114	126	138	5	6	0
48 FT	20	22	14	7	6.5	6	6	51.3	45.3	49.3	53.4	7	6.5	6	7.5	47.6	114	126	138	5	6	0
50 FT	21	23	14	7	6.5	6	6	51.3	41.9	45.6	49.3	7	6.5	6	8	47.6	115	127	139	5	6	0

DESIGN FILL	SPAN (S) = 9 FT						HEIGHT (HT) = 11 FT OR 12 FT											WALL BARS				
	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS												
				A1 BARS		J3 BARS				A2 BARS		J4 BARS				B2 BARS						
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	SIZE	SPA.	C4	K3					SIZE	SPA.
						HT=11'	HT=12'							HT=11'	HT=12'							
1 FT	11	11	8	5	6	5	6	70.8	31.3	33.8	35.6	5	6	6	6	73.1	139	151	163	5	9.5	12
2 FT	11	12	8	6	8.5	6	7	73.1	33.0	35.6	37.4	5	6	6	6	73.1	140	152	164	5	9.5	12
2'- 4'	11	12	9	6	8.5	6	6.5	73.8	33.4	36.1	37.9	6	8	6	6	73.8	140	152	164	5	8.5	12
4 FT	8	10	9	5	6	6	6.5	73.8	33.4	36.1	37.9	6	8	6	6	73.8	138	150	162	5	8.5	0
6 FT	8	11	9	5	7	6	6.5	73.8	32.1	34.8	36.5	5	6	6	6	73.8	139	151	163	5	8.5	0
8 FT	9	11	9	5	7	6	7	73.8	30.9	33.4	35.9	5	6	6	6	73.8	139	151	163	5	8.5	0
10 FT	9	11	9	5	7.5	6	7	58.5	30.9	33.4	35.9	5	6.5	6	6	73.8	139	151	163	5	8.5	0
12 FT	9	12	9	5	6.5	6	6	56.1	34.0	36.8	38.6	5	6	6	6	73.8	140	152	164	5	8.5	0
14 FT	10	12	9	5	6	6	6	57.4	34.3	37.0	38.8	6	8	6	6	73.8	140	152	164	5	7.5	0
16 FT	10	12	1																			



		SPAN (S) = 11 FT											HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS							
				A1 BARS		J3 BARS				A2 BARS		J4 BARS							B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
									HT=6'	HT=7'	HT=8'							HT=6'	HT=7'	HT=8'			
1 FT	12	10	8	6	7.5	5	7	82.6	32.0	36.4	40.6	6	8	6	7.5	61.6	78	90	102	5	12	12	
2 FT	12	10	8	6	7.5	5	6.5	82.6	32.0	36.4	40.6	6	7.5	6	7	53.3	78	90	102	5	12	12	
2'- 4'	12	10	8	6	7	6	6.5	82.6	32.0	36.4	40.6	6	7	6	7	53.3	78	90	102	5	12	12	
4 FT	9	10	8	6	7	6	6.5	46.3	29.3	33.4	37.4	6	7	6	7.5	46.3	78	90	102	5	12	0	
6 FT	9	10	8	6	7	6	6.5	43.4	29.3	33.4	37.4	6	6.5	6	6.5	42.0	78	90	102	5	12	0	
8 FT	9	10	8	6	6.5	6	6	42.0	33.5	38.3	42.9	6	6	6	6	40.6	78	90	102	5	12	0	
10 FT	10	11	8	6	6.5	6	6.5	39.3	30.8	35.0	39.3	7	8	6	7	37.8	79	91	103	5	12	0	
12 FT	10	11	8	6	6.5	6	6.5	37.8	30.8	35.0	39.3	6	6	6	7	35.0	79	91	103	5	12	0	
14 FT	10	11	8	7	7.5	6	6	36.4	34.4	39.0	43.6	7	7	6	6	35.0	79	91	103	5	12	0	
16 FT	11	13	8	7	7	6	6	36.4	31.9	36.0	40.3	7	7	5	6.5	30.8	81	93	105	5	12	0	
18 FT	11	14	8	7	6	7	6	39.3	31.3	35.4	39.5	7	6.5	5	7	29.4	82	94	106	5	12	0	
20 FT	13	15	8	7	6.5	6	6.5	33.6	33.3	37.5	41.6	7	6.5	5	7	29.4	83	95	107	5	12	0	
22 FT	14	16	8	7	6	6	6.5	33.6	34.9	39.3	43.5	7	6.5	5	7	29.4	84	96	108	5	12	0	
24 FT	15	17	8	7	6	6	6.5	39.3	35.6	40.0	44.3	7	6.5	5	6.5	29.4	85	97	109	5	12	0	
26 FT	16	18	8	7	6	6	6.5	37.8	36.4	40.6	45.0	7	6.5	5	6.5	29.4	86	98	110	5	10	0	
28 FT	17	19	8	7	6.5	6	6.5	37.8	37.1	41.4	45.8	7	6	5	6.5	29.4	87	99	111	5	9.5	0	
30 FT	18	20	8	7	6.5	6	6	37.8	38.9	43.3	47.8	7	6	5	6	29.4	88	100	112	5	9.5	0	
32 FT	19	21	9	8	7.5	6	7	39.5	39.6	44.0	48.5	7	6	5	6.5	29.6	89	101	113	5	9	0	
34 FT	20	22	10	8	7.5	6	8	39.8	40.4	44.8	49.3	7	6	5	7	31.3	90	102	114	5	10	0	
36 FT	21	23	10	8	7.5	6	8	39.8	41.1	45.5	50.0	7	6	5	6.5	31.3	91	103	115	5	9	0	
38 FT	22	24	10	8	7	6	8	39.8	42.5	47.1	51.6	8	7.5	5	6.5	31.3	91	103	115	5	8	0	
40 FT	22	24	11	8	7	6	7	40.0	43.0	47.5	52.0	8	7.5	5	7	31.5	92	104	116	5	9	0	
42 FT	23	25	11	8	7	6	8	40.0	43.8	48.3	52.9	8	7.5	5	7	31.5	93	105	117	5	8.5	0	
44 FT	24	26	11	8	7	6	8	40.0	44.5	49.0	53.6	8	7.5	5	6.5	31.5	94	106	118	5	7.5	0	
46 FT	25	26	11	8	6.5	6	8	40.0	46.0	50.8	55.4	8	7	5	6.5	31.5	94	106	118	5	7.5	0	
48 FT	25	27	11	8	6.5	6	7.5	40.0	45.3	49.8	54.4	8	7	5	6	31.5	95	107	119	5	7.5	0	
50 FT	26	27	11	8	6.5	6	8	40.0	46.8	51.5	56.1	8	7	5	6	31.5	95	107	119	5	7.5	0	

		SPAN (S) = 11 FT											HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS							
				A1 BARS		J3 BARS				A2 BARS		J4 BARS							B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
									HT=9'	HT=10'	HT=11'							HT=9'	HT=10'	HT=11'			
1 FT	12	11	8	6	7.5	5	7	82.6	32.8	35.9	39.0	6	7.5	6	6.5	85.4	115	127	139	5	9.5	12	
2 FT	12	11	8	6	7	5	6.5	82.6	32.8	35.9	39.0	6	7	6	6	85.4	115	127	139	5	9.5	12	
2'- 4'	12	11	9	6	7	6	6.5	82.6	34.1	37.5	40.9	6	6.5	6	6	85.4	115	127	139	5	9.5	12	
4 FT	9	10	9	6	7	6	6.5	70.5	34.1	37.5	40.9	6	6.5	6	6	73.4	114	126	138	5	9.5	0	
6 FT	9	11	9	6	7.5	6	6	57.8	30.8	33.8	36.8	6	6.5	6	6	64.9	115	127	139	5	9.5	0	
8 FT	9	11	9	6	7	7	6.5	56.4	30.8	33.8	36.8	6	6	6	6	56.4	115	127	139	5	9	0	
10 FT	10	12	9	6	6.5	6	6	50.8	31.3	34.3	37.3	6	6	6	6	55.0	116	128	140	5	8.5	0	
12 FT	10	12	9	6	6.5	6	6	46.5	31.3	34.3	37.3	6	6	6	6	48.0	116	128	140	5	10	0	
14 FT	11	12	9	6	6	6	6.5	45.1	35.3	38.6	42.0	7	7.5	6	6	46.5	116	128	140	5	9	0	
16 FT	11	13	10	7	7.5	6	6	45.5	33.0	36.1	39.3	7	7	6	6.5	46.9	117	129	141	5	9.5	0	
18 FT	12	14	10	7	7	6	6.5	45.5	32.3	35.3	38.3	7	7	6	6.5	45.5	118	130	142	5	8.5	0	
20 FT	13	15	10	7	7	6	6	45.5	34.0	37.1	40.3	7	6.5	6	6.5	45.5	119	131	143	5	8	0	
22 FT	14	16	11	7	7	6	6.5	45.8	35.9	39.1	42.4	7	6.5	6	7.5	45.8	120	132	144	5	8	0	
24 FT	15	17	11	7	6.5	6	6	51.5	36.5	39.8	42.9	7	6.5	6	7.5	45.8	121	133	145	5	7.5	0	
26 FT	16	18	12	7	6.5	6	6.5	51.9	37.0	40.3	43.5	7	6.5	6	8	46.1	122	134	146	5	7.5	0	
28 FT	17	19	12	7	6.5	6	6.5	51.9	37.5	40.8	44.0	7	6.5	6	7.5	46.1	123	135	147	5	7	0	
30 FT	18	20	13	7	6.5	6	6.5	52.3	38.1	41.3	44.5	7	6.5	6	8	46.4	124	136	148	5	7.5	0	
32 FT	19	21	13	7	6	6	6.5	52.3	40.0	43.4	46.8	7	6	6	7.5	46.4	125	137	149	5	6.5	0	
34 FT	20	22	13	7	6	6	6	52.3	40.6	44.0	47.4	7	6	6	7.5	46.4	126	138	150	5	6.5	0	
36 FT	21	22	13	7	6	6	6	52.3	45.3	49.0	52.8	7	6	6	6.5	46.4	126	138	150	5	6.5	0	
38 FT	21	23	14	8	7.5	6	6	52.5	41.1	44.5	47.9	7	6	6	7.5	46.8	127	139	151	5	6	0	
40 FT	22	24	14	8	7.5	6	6	52.5	43.3	46.8	50.1	8	7.5	6	7	48.1	128	140	152	5	6	0	
42 FT	23	25	15	8	7.5	6	6.5	52.9	48.4	52.1	56.0	8	7.5	6	7.5	48.5	129	141	153	5	6	0	
44 FT	24	25	15	8	7	6	6.5	52.9	48.6	52.5	56.4	8	7	6	6.5	48.5	129	141	153	6	8	0	
46 FT	24	26	15	8	7	6	6	52.9	49.0	52.8	56.6	8	7	6	7	48.5	130	142	154	6	8	0	
48 FT	25	27	16	8	7	6	6	53.3	49.6	53.5	57.3	8	7	6	7.5	48.9	131	143	155	6	8	0	
50 FT	26	27	16	8	6.5	6	6	53.3	51.5	55.5	59.4	8	7	6	6.5	48.9	131	143	155	6	8	0	

		SPAN (S) = 11 FT											HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS							
				A1 BARS		J3 BARS				A2 BARS		J4 BARS							B2 BARS				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
									HT=12'	HT=13'	HT=14'							HT=12'	HT=13'	HT=14'			
1 FT	12	12	9	6	7.5	6	7	86.0	32.6	35.0	37.4	6	7.5	6	6	86.0	152	164	176	5	8.5	12	
2 FT	12	12	9	6	7	6	6.5	86.0	34.3	36.8	39.3	6	7	6	6	86.0	152	164	176	5	8	12	
2'- 4'	12	12	10	6	7	6	6	86.6	34.3	36.8	39.3	6	6.5	6	6	86.6	152	164	176	5	7.5	12	
4 FT	9	11	10	6	7	6	6	86.6	33.4	35.9	38.4	6	6.5	6	6	86.6	151	163	175	5	7.5	0	
6 FT	9	12	10	6	7.5	6	6	86.6	33.6	36.1	38.6	6	6.5	6	6	88.0	152	164	176	5	7	0	
8 FT	10	13	10	6	7.5	6	6	86.6	34.0	36.5	39.0	6	7	6	6	86.6	153	165	177	5	6.5	0	
10 FT	10	13	11	6	7	6	6	70.1	34.0	36.5	39.0	6	6.5	6	6.5	88.6	153	165	177	5	6.5	0	
12 FT	10	13	11	6	7.5	6	6	60.0	32.4	34.8	37.3	6	6.5	6	6.5	74.4	153	165	177	5	7.5	0</	

		SPAN (S) = 12 FT												HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT														
DESIGN FILL	MEMBER THICKNESS	TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS		
		A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS			G1											
		TS	BS	TX	SIZE	SPA.	C1	HT=6'	HT=7'	HT=8'	SIZE	SPA.	C4	HT=6'	HT=7'	HT=8'		SIZE	SPA.									
1 FT	13	10	8	6	7.5	5	8.5	89.6	33.3	37.8	42.1	6	7.5	6	6.5	57.8	78	90	102	5	12	12						
2 FT	14	10	8	6	7	5	8.5	89.6	34.6	39.1	43.8	6	7	6	6	51.6	78	90	102	5	12	12						
2'- 4'	14	11	8	6	6.5	6	6.5	89.6	34.6	39.1	43.8	6	6.5	6	6	51.6	79	91	103	5	12	12						
4 FT	10	11	8	6	6.5	6	6.5	47.1	30.8	35.0	39.3	6	6.5	5	6.5	42.5	79	91	103	5	12	0						
6 FT	10	11	8	6	6.5	6	6.5	44.1	30.8	35.0	39.3	6	6	5	6	39.5	79	91	103	5	12	0						
8 FT	10	11	8	6	6	6	6.5	41.0	30.8	35.0	39.3	7	7.5	6	6.5	39.5	79	91	103	5	12	0						
10 FT	10	11	8	7	7	7	6	42.5	34.4	39.0	43.6	7	6.5	6	6	38.0	79	91	103	5	12	0						
12 FT	11	12	8	7	7	6	6	38.0	35.1	39.8	44.5	7	6.5	6	6.5	36.5	80	92	104	5	12	0						
14 FT	11	13	8	7	7	6	6	36.5	31.9	36.0	40.3	7	6.5	5	7	30.4	81	93	105	5	12	0						
16 FT	12	14	8	7	6.5	6	6	35.0	32.5	36.8	41.0	7	6.5	5	7	30.4	82	94	106	5	12	0						
18 FT	13	15	8	7	6	6	6.5	33.5	33.3	37.5	41.6	7	6	5	6.5	30.4	83	95	107	5	12	0						
20 FT	15	17	8	7	6	6	7	39.5	35.6	40.0	44.3	7	6.5	5	7	30.4	85	97	109	5	12	0						
22 FT	16	18	8	7	6	6	7	39.5	36.4	40.6	45.0	7	6	5	6.5	30.4	86	98	110	5	12	0						
24 FT	17	19	8	8	7.5	6	7	39.5	37.1	41.4	45.8	7	6	5	6.5	30.4	87	99	111	5	11	0						
26 FT	18	20	8	8	7	6	7	39.5	38.9	43.3	47.8	7	6	5	6	30.4	88	100	112	5	9.5	0						
28 FT	19	21	8	8	7	6	7	39.5	39.6	44.0	48.5	7	6	6	7.5	33.5	89	101	113	5	9.5	0						
30 FT	20	21	8	8	7	6	6.5	39.5	44.3	49.3	54.1	8	7	6	7.5	33.5	89	101	113	5	9.5	0						
32 FT	21	23	9	8	7	6	7.5	39.8	41.1	45.5	50.0	8	7.5	5	6	30.6	91	103	115	5	8.5	0						
34 FT	22	23	9	8	6.5	6	7.5	39.8	42.5	47.1	51.6	8	7	5	6	30.6	91	103	115	5	8.5	0						
36 FT	23	24	9	8	6.5	6	7	39.8	47.9	52.9	58.0	8	7	6	7	33.6	92	104	116	5	8.5	0						
38 FT	24	25	9	8	6.5	6	6.5	39.8	48.8	53.8	58.8	8	7	6	7	33.6	93	105	117	5	8.5	0						
40 FT	24	26	10	8	6	6	7	40.0	44.5	49.0	53.6	8	7	5	6	30.8	94	106	118	5	8	0						
42 FT	25	27	10	8	6	6	7	40.0	45.3	49.8	54.4	8	7	6	7	33.9	95	107	119	5	8	0						
44 FT	26	27	10	8	6	6	7	40.0	50.4	55.5	60.5	8	6.5	6	7	33.9	95	107	119	5	8	0						
46 FT	27	28	10	8	6	6	7	40.0	51.3	56.3	61.4	8	6.5	6	7	33.9	96	108	120	5	7.5	0						
48 FT	28	29	11	8	6	6	7.5	40.3	52.1	57.1	62.1	8	6.5	6	7.5	34.1	97	109	121	5	7.5	0						
50 FT	28	30	11	8	6	6	7.5	40.3	52.5	57.5	62.6	8	6.5	6	7	34.1	98	110	122	5	7.5	0						

		SPAN (S) = 12 FT												HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT														
DESIGN FILL	MEMBER THICKNESS	TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS		
		A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS			G1											
		TS	BS	TX	SIZE	SPA.	C1	HT=9'	HT=10'	HT=11'	SIZE	SPA.	C4	HT=9'	HT=10'	HT=11'		SIZE	SPA.									
1 FT	11	12	8	6	6.5	6	7	91.3	31.5	34.5	37.5	6	7.5	6	7	91.3	116	128	140	5	10	12						
2 FT	11	12	8	6	6	6	6.5	91.3	31.5	34.5	37.5	6	7	6	6.5	91.3	116	128	140	5	9.5	12						
2'- 4'	11	12	8	6	6	6	6	91.3	31.5	34.5	37.5	6	6.5	6	6.5	91.3	116	128	140	5	9.5	12						
4 FT	10	12	8	6	6	6	6	69.9	30.0	32.9	35.8	6	6.5	6	6.5	83.6	116	128	140	5	9.5	0						
6 FT	10	12	8	6	6.5	6	6	57.8	31.3	34.3	37.3	6	6	6	6	62.4	116	128	140	5	9.5	0						
8 FT	10	12	9	6	6	6	6	52.0	31.3	34.3	37.3	7	8	6	6	55.1	116	128	140	5	10	0						
10 FT	10	12	9	7	7.5	7	6	52.0	35.0	38.4	41.8	7	7	6	6	50.5	116	128	140	5	9.5	0						
12 FT	11	13	10	7	7.5	6	6	49.3	33.0	36.1	39.3	7	7	6	6.5	49.3	117	129	141	5	10	0						
14 FT	11	13	10	7	7.5	6	6	46.3	31.8	34.8	37.8	7	7	6	6.5	46.3	117	129	141	5	12	0						
16 FT	12	14	10	7	7	6	6.5	46.3	32.3	35.3	38.3	7	6.5	6	7	44.6	118	130	142	5	11	0						
18 FT	13	15	10	7	6.5	6	6	44.6	38.0	41.5	45.0	7	6	6	7	44.6	119	131	143	5	9.5	0						
20 FT	14	16	10	7	6	6	7	47.8	38.6	42.0	45.5	7	6	6	6.5	44.6	120	132	144	5	8.5	0						
22 FT	16	18	11	7	6.5	6	6.5	51.1	37.0	40.3	43.5	7	6.5	6	7.5	45.0	122	134	146	5	8.5	0						
24 FT	17	19	11	7	6	6	6	49.6	37.5	40.8	44.0	7	6	6	7.5	45.0	123	135	147	5	7.5	0						
26 FT	18	20	12	7	6	6	6.5	49.9	38.1	41.3	44.5	7	6	6	7.5	45.3	124	136	148	5	8	0						
28 FT	19	21	12	7	6	6	6	49.9	40.0	43.4	46.8	7	6	6	7.5	45.3	125	137	149	5	7	0						
30 FT	20	22	13	8	7.5	6	6.5	51.8	40.6	44.0	47.4	7	6	6	8	45.5	126	138	150	5	7.5	0						
32 FT	21	23	13	8	7.5	6	6	50.3	41.1	44.5	47.9	8	7.5	6	7.5	45.5	127	139	151	5	7	0						
34 FT	21	23	13	8	7	6	6	50.3	45.6	49.3	53.0	8	7	6	7	45.5	127	139	151	5	6.5	0						
36 FT	22	24	14	8	7	6	6	52.1	43.3	46.8	50.1	8	7	6	7.5	45.9	128	140	152	5	7	0						
38 FT	23	25	14	8	6.5	6	6	50.5	43.8	47.3	50.8	8	7	6	7.5	45.9	129	141	153	5	6	0						
40 FT	24	26	14	8	6.5	6	6	50.5	44.4	47.9	51.4	8	7	6	7	45.9	130	142	154	5	6	0						
42 FT	25	27	15	8	6.5	6	6	52.5	49.6	53.5	57.3	8	7	6	7.5	46.1	131	143	155	5	6	0						
44 FT	26	28	15	8	6.5	6	6	52.5	50.3	54.1	57.9	8	6.5	6	7.5	47.8	132	144	156	6	8	0						
46 FT	27	28	15	8	6.5	6	6	50.9	52.1	56.1	60.0	8	6.5	6	7	47.8	132	144	156	6	8	0						
48 FT	27	29	15	8	6	6	6	52.5	52.5	56.4	60.4	8	6.5	6	7	47.8	133	145	157	6	8	0						
50 FT	28	30	16	8	6	6	6	52.8	53.1	57.1	61.0	8	6.5	6	7.5	48.0	134	146	158	6	8	0						

		SPAN (S) = 12 FT												HEIGHT (HT) = 12 FT OR 13 FT														
DESIGN FILL	MEMBER THICKNESS	TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS		
		A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS			G1											
		TS	BS	TX	SIZE	SPA.	C1	HT=12'	HT=13'	SIZE	SPA.	C4	HT=12'	HT=13'	SIZE	SPA.												
1 FT	12	11	9	6	6.5	5	6	90.3	32.4	34.8	37.8	6	6.5	6	6	91.8	151	163	5	8.5	12							
2 FT	12	11	9	6	6.5	6	7	91.8	34.0	36.5	39.5	6	6.5	6	6	91.8	151	163	5	8.5	12							
2'- 4'	12	12	9	6	6.5	6	6	91.8	35.4	38.0	40.8	6	6.5	6	6	91.8	152	164	5	8.5	12							
4 FT	10	12	9	6	6.5	6	6	91.8	35.4	38.0	40.8	6	6.5	6	6	91.8	152	164	5	8.5	0							
6 FT	10	12	9	6	6.5	7	6.5	81.1	35.4	38.0	40.8	6	6	6	6	91.8	152	164	5	8	0							
8 FT	10	12	10	6	6.5	6	6	64.6	35.4	38.0	40.8	7	7.5	6	6	73.9	152	164	5	8	0							
10 FT	11	13	10	6	6	6	6	61.6	35.9	38.5	41.7	7	7.5	6	6	69.3	153	165	5	8	0							
12 FT	12	13	11	6	6	6	7	58.9	36.1	38.8	42.7	7	7	6	6	62.0	153	165	5	7.5	0							
14 FT	12	13	11	6	6	6	7	54.3	36.1	38.8	42.7	7	7	6	6	55.8	153	165	5	7.5	0							
16 FT	12	14	11	7	7	6	6	52.8	36.3	39.0	42.7	7	6.5	6	6.5	55.8	154	166	5	7.5	0							
18 FT	13	16	12	7	7	6	6	53.0	38.6	41.4	44.7	7	6.5	6	7	56.1	156	168	5	7	0							
20 FT	14	16	12	7	6.5	6	6	53.0	38.9	41.6	44.																	



		SPAN (S) = 14 FT											HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT											
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS									BOTTOM SLAB BARS									WALL BARS		
				A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS								
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	HT=9'	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	HT=9'	SIZE	SPA.	G1		
1 FT	13	12	8	6	6	5	7	102.1	33.3	37.1	41.0	6	6.5	6	6.5	66.9	92	104	116	5	12	12		
2 FT	13	12	8	7	8	5	6	102.1	33.3	37.1	41.0	6	6	6	6	58.1	92	104	116	5	12	12		
2'- 4'	13	12	8	7	6.5	7	6	102.1	34.0	38.1	42.1	7	7	6	6	58.1	92	104	116	5	12	12		
4 FT	10	11	8	7	6.5	7	6	52.8	34.0	38.1	42.1	7	7	6	6	49.3	91	103	115	5	12	0		
6 FT	11	12	8	7	7	6	6	45.8	31.6	35.4	39.0	7	7	6	7	44.0	92	104	116	5	12	0		
8 FT	11	12	8	7	6.5	7	6.5	45.8	35.8	39.9	44.1	7	6	6	6	42.3	92	104	116	5	12	0		
10 FT	12	13	8	7	6	7	6.5	44.0	33.3	37.1	41.0	8	7.5	6	6.5	38.8	93	105	117	5	12	0		
12 FT	12	14	8	8	7	7	6	42.3	36.8	41.0	45.1	8	7	6	7	37.0	94	106	118	5	12	0		
14 FT	13	16	8	8	6.5	7	6	42.3	33.5	37.3	40.9	8	7	5	6	31.6	96	108	120	5	12	0		
16 FT	13	16	8	8	6.5	7	6	40.5	33.5	37.3	40.9	8	7	5	6	31.6	96	108	120	5	12	0		
18 FT	15	17	8	8	6.5	7	7	45.8	35.5	39.4	43.3	8	6.5	6	7.5	35.3	97	109	121	5	12	0		
20 FT	16	19	8	8	6	7	6.5	45.8	36.5	40.4	44.1	8	7	5	6	31.6	99	111	123	5	11.5	0		
22 FT	18	20	8	8	6	7	7.5	45.8	38.6	42.6	46.5	8	6.5	6	7.5	35.3	100	112	124	5	9.5	0		
24 FT	19	21	8	8	6	7	7	45.8	44.0	48.5	52.9	8	6.5	6	7.5	35.3	101	113	125	5	9.5	0		
26 FT	21	23	9	8	6	6	6.5	42.5	41.9	45.9	50.0	8	6.5	5	6	33.6	103	115	127	5	8.5	0		
28 FT	22	24	9	8	6	6	6	42.5	46.3	50.8	55.1	8	6.5	6	7	35.4	104	116	128	5	8.5	0		
30 FT	23	25	10	8	6	6	6.5	42.8	43.1	47.3	51.4	8	6.5	5	6	33.9	105	117	129	5	8.5	0		
32 FT	24	26	10	9	7.5	6	6	42.8	45.1	49.4	53.5	8	6	5	6	33.9	106	118	130	5	8	0		
34 FT	25	27	11	9	7	6	7	43.0	45.9	50.0	54.3	8	6	5	6	34.0	107	119	131	5	8.5	0		
36 FT	26	28	11	9	7	6	7	43.0	46.5	50.8	55.0	8	6	5	6	34.0	108	120	132	5	7.5	0		
38 FT	27	29	11	9	7	6	7	43.0	51.3	55.9	60.4	8	6	6	7.5	37.6	109	121	133	5	7.5	0		
40 FT	28	30	11	9	7	6	6.5	43.0	52.0	56.6	61.1	8	6	6	7	37.6	110	122	134	5	7.5	0		
42 FT	29	31	12	9	6.5	6	7	43.3	54.3	58.9	63.6	9	7.5	6	7.5	37.8	111	123	135	5	7	0		
44 FT	30	32	12	9	6.5	6	7	43.3	55.0	59.6	64.4	9	7	6	7.5	37.8	112	124	136	5	7	0		
46 FT	31	33	12	9	6.5	6	7	43.3	55.8	60.5	65.1	9	7	6	7	37.8	113	125	137	5	7	0		
48 FT	32	33	12	9	6.5	6	7	43.3	56.1	60.9	65.5	9	7	6	7	37.8	113	125	137	5	7	0		
50 FT	33	34	12	9	6.5	6	7	43.3	58.4	63.3	68.0	9	7	6	7	37.8	114	126	138	5	6.5	0		

		SPAN (S) = 14 FT											HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT											
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS									BOTTOM SLAB BARS									WALL BARS		
				A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS								
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	HT=11'	HT=12'	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	HT=11'	HT=12'	SIZE	SPA.	G1		
1 FT	13	12	9	6	6	5	6.5	102.6	33.6	36.5	39.4	6	6	6	6	106.3	128	140	152	5	9	12		
2 FT	13	12	9	7	7.5	5	6	102.6	33.6	36.5	39.4	7	7.5	6	6	106.3	128	140	152	5	8.5	12		
2'- 4'	13	12	9	7	7	6	6.5	102.6	35.9	39.0	42.1	7	7.5	6	6	106.3	128	140	152	5	8.5	12		
4 FT	11	12	9	7	7	6	6.5	69.0	35.9	39.0	42.1	7	7.5	6	6	72.6	128	140	152	5	9	0		
6 FT	11	12	9	7	7	6	6	60.1	35.9	39.0	42.1	7	6.5	6	6	62.0	128	140	152	5	9	0		
8 FT	11	12	10	7	7	6	6	55.1	35.9	39.0	42.1	7	6.5	6	6	57.0	128	140	152	5	10	0		
10 FT	12	13	10	7	6.5	6	6	53.4	36.4	39.5	42.6	7	6	6	6	53.4	129	141	153	5	9.5	0		
12 FT	12	14	10	8	7.5	7	6	55.1	36.6	39.8	42.9	8	7	6	6	51.6	130	142	154	5	9	0		
14 FT	14	16	10	8	7.5	7	7	53.4	39.1	42.4	45.6	8	7.5	6	6	49.9	132	144	156	5	8	0		
16 FT	14	16	10	8	7	7	7	49.9	39.1	42.4	45.6	8	7	6	6.5	46.3	132	144	156	5	9	0		
18 FT	15	17	11	8	7	7	7.5	59.1	39.8	42.9	46.1	8	7	6	6	46.5	133	145	157	5	9.5	0		
20 FT	16	19	11	8	6.5	7	6.5	57.3	37.5	40.5	43.5	8	7	6	7	46.5	135	147	159	5	8	0		
22 FT	18	20	12	8	7	7	7.5	57.6	39.8	42.9	46.0	8	7	6	6.5	46.8	136	148	160	5	8	0		
24 FT	19	21	12	8	6.5	7	7	57.6	43.4	46.8	50.1	8	6.5	6	6.5	46.8	137	149	161	5	7.5	0		
26 FT	20	23	13	8	6.5	7	7	57.9	41.1	44.3	47.4	8	6.5	6	7	47.0	139	151	163	5	7.5	0		
28 FT	21	24	13	8	6	7	6.5	57.9	43.3	46.5	49.6	8	6.5	6	7	47.0	140	152	164	5	7	0		
30 FT	22	25	14	8	6	7	6.5	58.3	43.8	47.0	50.3	8	6.5	6	7	47.4	141	153	165	5	7	0		
32 FT	24	26	14	8	6	7	7.5	58.3	46.3	49.5	52.9	8	6	6	6.5	47.4	142	154	166	5	6.5	0		
34 FT	25	27	14	8	6	7	7.5	58.3	46.8	50.1	53.5	8	6	6	6.5	47.4	143	155	167	5	6	0		
36 FT	26	28	14	9	7.5	7	6.5	58.3	47.4	50.6	54.0	8	6	6	6.5	47.4	144	156	168	5	6	0		
38 FT	27	29	15	9	7	7	7.5	58.5	51.3	54.9	58.5	8	6	6	6.5	47.6	145	157	169	6	8	0		
40 FT	28	30	15	9	7	7	7.5	58.5	53.6	57.4	61.1	8	6	6	6.5	47.6	146	158	170	6	8	0		
42 FT	29	31	15	9	7	7	6.5	58.5	54.3	58.0	61.8	9	7.5	6	6.5	47.6	147	159	171	6	8	0		
44 FT	30	32	16	9	7	7	7.5	58.9	54.9	58.6	62.3	9	7	6	6.5	49.6	148	160	172	6	8	0		
46 FT	31	33	16	9	6.5	7	7.5	58.9	55.5	59.3	62.9	9	7	6	6.5	49.6	149	161	173	6	8	0		
48 FT	31	33	16	9	6.5	7	6.5	58.9	55.5	59.3	62.9	9	7	6	6	49.6	149	161	173	6	8	0		
50 FT	32	34	17	9	6.5	7	7	59.3	56.1	59.9	63.5	9	7	6	6.5	50.0	150	162	174	6	7.5	0		

		SPAN (S) = 14 FT											HEIGHT (HT) = 13 FT OR 14 FT											
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS									BOTTOM SLAB BARS									WALL BARS		
				A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS								
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=13'	HT=14'	HT=13'	HT=14'	SIZE	SPA.	SIZE	SPA.	C4	HT=13'	HT=14'	HT=13'	HT=14'	SIZE	SPA.	G1
1 FT	12	12	10	6	6	6	7	105.0	36.8	39.3	42.8	6	6	6	6	105.0	164	176	188	5	8	12		
2 FT	13	13	10	7	8	6	7	105.0	35.4	37.8	41.3	7	8	6	6.5	105.0	165	177	189	5	8	12		
2'- 4'	13	13	10	7	7.5	6	6.5	105.0	36.5	39.0	42.5	7	7	6	6	105.0	165	177	189	5	8	12		
4 FT	11	12	10	7	7.5	6	6.5	105.0	36.5	39.0	42.5	7	7	6	6	105.0	164	176	188	5	8	0		
6 FT	11	13	10	7	7.5	6	6	76.5	35.0	37.4	40.8	7	7	6	6	87.3	165	177	189	5	8	0		
8 FT	11	13	11	7	7.5	6	6	66.3	35.0	37.4	40.8	7	6.5	6	6	71.6	165	177	189	5	7.5	0		
10 FT	12	14	11	7	7	6	6	64.5	37.1	39.8	43.2	7	6	6	6	68.0	166	178	190	5	7.5	0		
12 FT	13	15	12	7	6.5	6	6	61.3	37.6	40.1	43.6	7	6	6	6.5	64.8	167	179	191	5	7	0		
14 FT	14	16	13	7	6.5	6	6	59.8	38.0	40.5	44.0	7	6	6	6.5	63.4	168	180	192	5	6.5	0		
16 FT	14	16	13	7	6	7	8	59.8	38.0	40.5	44.0	8	7.5	6	6	56.1	168	180	192					

			SPAN (S) = 15 FT										HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS		A2 BARS		J4 BARS		B2 BARS										
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	HT=9'	HT=10'	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	HT=9'	HT=10'	SIZE	SPA.	G1
1 FT	12	13	8	7	7	6	7	109.0	32.5	35.9	39.3	6	6	6	7	82.8	105	117	129	5	12	12
2 FT	12	13	8	7	6.5	6	6.5	109.0	33.6	37.1	40.6	7	7.5	6	6.5	65.8	105	117	129	5	12	12
2'- 4'	12	13	8	7	6	6	6	109.0	35.4	39.0	42.8	7	7	6	6	65.8	105	117	129	5	12	12
4 FT	11	12	8	7	6	6	6	52.6	35.4	39.0	42.8	7	7	6	6	52.6	104	116	128	5	12	0
6 FT	11	12	9	7	6.5	6	6	51.0	35.4	39.0	42.8	7	6.5	6	6	49.1	104	116	128	5	12	0
8 FT	11	12	9	7	6	7	6	51.0	35.4	39.0	42.8	8	7.5	6	6	47.3	104	116	128	5	12	0
10 FT	12	14	9	8	7.5	7	6	49.1	32.8	36.1	39.5	8	7	6	7	43.5	106	118	130	5	12	0
12 FT	13	15	9	8	6.5	7	6.5	47.3	34.5	38.0	41.5	8	6.5	6	7	41.6	107	119	131	5	12	0
14 FT	14	17	9	8	6.5	7	6.5	45.4	34.1	37.5	40.9	8	6.5	6	8	39.8	109	121	133	5	12	0
16 FT	14	17	9	8	6	7	6	43.5	34.1	37.5	40.9	8	6.5	6	8	37.8	109	121	133	5	12	0
18 FT	16	19	9	8	6	7	7	49.1	36.5	40.0	43.5	8	6.5	6	8	37.8	111	123	135	5	12	0
20 FT	17	20	9	9	7.5	7	6	49.1	37.1	40.6	44.1	8	6.5	6	7.5	37.8	112	124	136	5	11	0
22 FT	19	21	9	9	7.5	7	7	49.1	43.3	47.3	51.1	8	6	6	7	37.8	113	125	137	5	9	0
24 FT	21	23	10	8	6	6	6	43.8	41.9	45.6	49.3	8	6	6	8	38.0	115	127	139	5	9	0
26 FT	22	24	11	9	7.5	6	6	43.9	42.5	46.3	49.9	8	6	6	8	38.3	116	128	140	5	10.5	0
28 FT	23	25	11	9	7	6	6	43.9	43.1	46.8	50.5	8	6	6	8	38.3	117	129	141	5	9	0
30 FT	24	26	11	9	7	7	7.5	49.6	49.4	53.5	57.8	9	7.5	6	7	38.3	118	130	142	5	8	0
32 FT	26	28	12	9	7	6	6.5	46.1	46.4	50.3	54.1	8	6	6	8.5	38.4	120	132	144	5	8	0
34 FT	27	29	12	9	7	6	6.5	46.1	51.5	55.6	59.9	9	7.5	6	8	38.4	121	133	145	5	7.5	0
36 FT	28	30	12	9	6.5	6	6.5	46.1	52.1	56.4	60.5	9	7	6	8	38.4	122	134	146	5	7	0
38 FT	29	31	12	9	6.5	6	6	46.1	54.4	58.6	63.0	9	7	6	7.5	38.4	123	135	147	5	7	0
40 FT	30	32	13	9	6.5	6	6.5	46.4	55.1	59.4	63.8	9	7	6	7.5	40.5	124	136	148	5	6.5	0
42 FT	31	33	13	9	6.5	6	6.5	46.4	55.8	60.1	64.5	9	7	6	7	40.5	125	137	149	5	6.5	0
44 FT	32	34	13	9	6	6	6.5	46.4	56.5	60.9	65.1	9	6.5	6	7	40.5	126	138	150	5	6.5	0
46 FT	33	35	13	9	6	6	6.5	46.4	57.3	61.5	65.9	9	6.5	6	6.5	40.5	127	139	151	5	6.5	0
48 FT	34	36	13	9	6	6	6.5	46.4	59.6	64.0	68.5	9	6.5	6	6.5	40.5	128	140	152	5	6.5	0
50 FT	35	36	13	9	6	6	6.5	46.4	60.0	64.4	68.9	9	6.5	6	6	40.5	128	140	152	5	6	0

			SPAN (S) = 15 FT										HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS		A2 BARS		J4 BARS		B2 BARS										
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	HT=13'	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	HT=13'	SIZE	SPA.	G1
1 FT	12	12	9	7	7	6	6.5	109.6	36.3	39.1	42.0	7	7	6	6	109.6	140	152	164	5	8.5	12
2 FT	13	14	9	7	7	6	6.5	109.6	38.5	41.5	44.5	7	7.5	6	6	109.6	142	154	166	5	8.5	12
2'- 4'	13	14	10	7	6.5	6	6	109.6	38.5	41.5	44.5	7	7	6	6	109.6	142	154	166	5	8	12
4 FT	11	12	10	7	6.5	6	6	74.1	36.0	38.9	41.8	7	7	6	6	76.0	140	152	164	5	8	0
6 FT	12	13	10	7	7	6	6.5	64.6	36.5	39.4	42.3	7	6.5	6	6.5	68.4	141	153	165	5	8	0
8 FT	12	13	10	7	6.5	6	6	58.9	36.5	39.4	42.3	7	6	6	6	62.8	141	153	165	5	8	0
10 FT	13	14	10	7	6	7	7	58.9	38.5	41.5	44.5	8	7	6	6	58.9	142	154	166	5	8	0
12 FT	13	15	10	8	7	7	6	57.0	38.8	41.8	44.8	8	6.5	7	6.5	58.9	143	155	167	5	8	0
14 FT	14	17	11	8	7	7	6.5	57.3	39.5	42.5	45.5	8	6.5	6	6	53.5	145	157	169	5	7.5	0
16 FT	14	17	11	8	6.5	7	6	53.5	39.5	42.5	45.5	8	6.5	6	6	49.6	145	157	169	5	8.5	0
18 FT	16	19	12	8	6.5	7	7	61.5	40.5	43.5	46.5	8	6.5	6	6.5	49.9	147	159	171	5	8.5	0
20 FT	17	20	12	8	6	7	6	61.5	41.0	44.0	47.0	8	6.5	6	6	49.9	148	160	172	5	7.5	0
22 FT	19	22	13	8	6.5	7	7	61.8	43.6	46.8	49.9	8	6.5	6	6.5	50.1	150	162	174	5	7.5	0
24 FT	20	23	13	8	6	7	6.5	59.9	44.3	47.4	50.5	8	6	6	6	50.1	151	163	175	5	6.5	0
26 FT	21	24	14	8	6	7	6	62.1	46.5	49.6	52.9	8	6	6	6.5	50.5	152	164	176	5	7	0
28 FT	23	25	14	8	6	7	7	60.1	47.3	50.5	53.8	8	6	6	6	50.5	153	165	177	5	6	0
30 FT	24	27	15	9	7.5	7	7	60.5	48.0	51.3	54.5	8	6	6	6.5	50.8	155	167	179	5	6	0
32 FT	25	28	15	9	7	7	6.5	60.5	50.4	53.8	57.1	8	6	6	6	50.8	156	168	180	6	8	0
34 FT	26	29	15	9	7	7	6	60.5	51.0	54.4	57.6	9	7.5	6	6	50.8	157	169	181	6	8	0
36 FT	27	30	16	9	7	7	6	60.8	51.5	54.9	58.3	9	7	6	6	51.0	158	170	182	6	8	0
38 FT	28	31	16	9	6.5	7	6	60.8	52.1	55.5	58.8	9	7	6	6	51.0	159	171	183	6	8	0
40 FT	29	32	17	9	6.5	7	6	61.1	54.5	58.0	61.5	9	7	6	6	51.3	160	172	184	6	7.5	0
42 FT	31	33	17	9	6.5	7	7	61.1	55.4	58.9	62.4	9	7	6	6	51.3	161	173	185	6	7.5	0
44 FT	32	34	17	9	6.5	7	6.5	61.1	57.9	61.5	65.1	9	6.5	6	6	51.3	162	174	186	6	7.5	0
46 FT	33	35	17	9	6	7	6	61.1	58.5	62.1	65.8	9	6.5	6	6	53.3	163	175	187	6	7.5	0
48 FT	34	36	18	9	6	7	7	61.4	59.1	62.8	66.3	9	6.5	6	6	53.5	164	176	188	6	7	0
50 FT	34	37	18	9	6	7	6	61.4	59.4	63.0	66.6	9	6.5	6	6	53.5	165	177	189	6	7	0

			SPAN (S) = 15 FT										HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT									
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS						BOTTOM SLAB BARS						WALL BARS						
				A1 BARS		J3 BARS		A2 BARS		J4 BARS		B2 BARS										
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=14'	HT=15'	HT=16'	SIZE	SPA.	SIZE	SPA.	C4	HT=14'	HT=15'	HT=16'	SIZE	SPA.	G1
1 FT	13	14	11	7	8	6	7.5	112.8	36.1	38.4	40.6	7	8	6	7	112.8	178	190	202	5	7.5	12
2 FT	13	14	11	7	7.5	6	6.5	112.8	38.0	40.4	42.8	7	7.5	6	6.5	112.8	178	190	202	5	7	12
2'- 4'	13	14	11	7	7	6	6.5	112.8	38.0	40.4	42.8	7	7	6	6	112.8	178	190	202	5	6.5	12
4 FT	12	13	11	7	7	6	6.5	112.8	37.6	40.0	42.4	7	7	6	6	112.8	177	189	201	5	6.5	0
6 FT	12	13	12	7	7.5	6	6.5	92.1	37.6	40.0	42.4	7	6.5	6	6	97.9	177	189	201	5	6.5	0
8 FT	12	14	13	7	7.5	6	6	77.3	37.8	40.3	42.6	7	6.5	6	6	84.9	178	190	202	5	6.5	0
10 FT	13	15	13	7	6.5	6	6	73.4	38.3	40.6	43.0	7	6	6	6	81.0	179	191	203	5	6.5	0
12 FT	14	16	14	7	6.5	7	8	73.8	38.6	41.0	43.4	8	7.5	6	6	75.6	180	192	204	5	6	0
14 FT	15	17	14	7	6	7	7	81.5	41.0	43.5	46.0	8	7	7	7.5	75.6	181	193	205	5	6	0
16 FT	16	18	15	8	7.5	7	7	80.0	45.3	48.1	50.9	8	7	7	7	74.1	182	194				



		SPAN (S) = 16 FT											HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS									BOTTOM SLAB BARS						WALL BARS				
				A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS							
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
									HT=8'	HT=9'	HT=10'							HT=8'	HT=9'	HT=10'			
1 FT	12	13	8	7	6.5	6	6.5	116.0	37.1	41.0	44.8	7	7.5	6	6.5	76.0	105	117	129	5	12	12	
2 FT	12	13	8	7	6	6	6	116.0	37.1	41.0	44.8	7	7	6	6	64.0	105	117	129	5	12	12	
2'- 4'	12	13	9	7	6	6	6	116.0	37.1	41.0	44.8	7	6.5	6	6	64.0	105	117	129	5	12	12	
4 FT	12	12	9	7	6.5	6	6.5	54.3	36.8	40.6	44.5	7	6.5	6	6	54.3	104	116	128	5	12	0	
6 FT	12	12	9	7	6	6	6.5	50.3	36.8	40.6	44.5	7	6	6	6	50.3	104	116	128	5	12	0	
8 FT	12	13	9	8	7.5	7	6.5	50.3	37.1	41.0	44.8	8	7	6	6	46.3	105	117	129	5	12	0	
10 FT	13	14	9	8	6.5	7	6.5	48.3	37.8	41.6	45.5	8	6.5	6	6	44.3	106	118	130	5	12	0	
12 FT	14	16	9	8	6.5	7	6.5	46.3	35.1	38.6	42.0	8	6.5	6	7.5	40.3	108	120	132	5	12	0	
14 FT	15	18	9	8	6	7	6	52.3	36.0	39.5	42.9	8	6	6	8	38.3	110	122	134	5	12	0	
16 FT	16	19	9	9	7	7	6	50.3	36.5	40.0	43.5	8	6	6	7.5	38.3	111	123	135	5	12	0	
18 FT	17	20	9	9	7	7	6.5	50.3	37.1	40.6	44.1	8	6	6	8	38.3	112	124	136	5	12	0	
20 FT	19	21	9	9	7	7	7	50.3	39.3	42.9	46.5	8	6	6	7.5	38.3	113	125	137	5	10.5	0	
22 FT	20	23	9	9	6.5	7	6.5	50.3	40.3	43.8	47.4	8	6	6	7.5	38.3	115	127	139	5	9	0	
24 FT	22	24	10	9	7	7	7.5	50.5	42.5	46.3	49.9	9	7.5	6	7.5	38.4	116	128	140	5	9.5	0	
26 FT	23	25	10	9	6.5	7	7	50.5	47.3	51.4	55.4	9	7	6	7	38.4	117	129	141	5	8.5	0	
28 FT	25	27	11	9	6.5	6	6	46.8	45.8	49.6	53.5	9	7	6	8	40.6	119	131	143	5	8.5	0	
30 FT	26	28	11	9	6.5	6	6	46.8	46.4	50.3	54.1	9	7	6	8	40.6	120	132	144	5	7.5	0	
32 FT	28	29	11	9	6.5	6	6.5	46.8	53.3	57.6	61.9	9	7	6	7	40.6	121	133	145	5	7.5	0	
34 FT	29	31	12	9	6.5	6	6.5	46.9	54.4	58.6	63.0	9	7	6	7.5	40.8	123	135	147	5	7	0	
36 FT	30	32	12	9	6	6	6.5	46.9	55.1	59.4	63.8	9	6.5	6	7.5	40.8	124	136	148	5	7	0	
38 FT	31	33	12	9	6	6	6.5	46.9	55.8	60.1	64.5	9	6.5	6	7	40.8	125	137	149	5	7	0	
40 FT	32	34	12	9	6	6	6.5	46.9	56.5	60.9	65.1	9	6.5	6	7	40.8	126	138	150	5	7	0	
42 FT	33	35	12	9	6	6	6	46.9	57.3	61.5	65.9	9	6.5	6	6.5	40.8	127	139	151	5	6.5	0	
44 FT	34	36	13	10	7.5	6	6.5	47.1	59.6	64.0	68.5	9	6	6	6.5	41.0	128	140	152	5	6.5	0	
46 FT	35	37	13	10	7	6	6	47.1	60.3	64.8	69.3	9	6	6	6.5	41.0	129	141	153	5	6.5	0	
48 FT	36	38	13	10	7	6	6.5	47.1	61.0	65.5	69.9	9	6	6	6	41.0	130	142	154	5	6	0	
50 FT	37	39	13	10	7	6	6	47.1	61.8	66.3	70.6	9	6	6	6	41.0	131	143	155	6	8.5	0	

		SPAN (S) = 16 FT											HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS									BOTTOM SLAB BARS						WALL BARS				
				A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS							
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
									HT=11'	HT=12'	HT=13'							HT=11'	HT=12'	HT=13'			
1 FT	12	14	9	7	6.5	6	6	116.6	36.8	39.6	42.5	7	7.5	6	6	116.6	142	154	166	5	8.5	12	
2 FT	13	14	10	7	7	6	7	117.1	38.5	41.5	44.5	7	7.5	6	6	101.0	142	154	166	5	8.5	12	
2'- 4'	13	14	10	7	6.5	6	6.5	117.1	38.5	41.5	44.5	7	6.5	6	6	101.0	142	154	166	5	8.5	12	
4 FT	12	13	10	7	6.5	6	6.5	72.8	36.5	39.4	42.3	7	6.5	6	6.5	74.8	141	153	165	5	8.5	0	
6 FT	12	13	10	7	6	6	6	62.6	36.5	39.4	42.3	7	6	6	6	64.6	141	153	165	5	8.5	0	
8 FT	12	14	10	7	6	7	6	62.6	36.8	39.6	42.5	8	7.5	6	6	60.6	142	154	166	5	8.5	0	
10 FT	13	15	11	8	7.5	7	6.5	60.9	37.3	40.1	43.0	8	7	6	6.5	56.9	143	155	167	5	9	0	
12 FT	14	16	11	8	6.5	7	6.5	58.9	39.3	42.3	45.3	8	6.5	6	6	54.8	144	156	168	5	8.5	0	
14 FT	15	17	11	8	6	7	6	65.0	46.1	49.6	53.1	8	6	7	7	56.9	145	157	169	5	8	0	
16 FT	16	19	12	8	6	7	6	65.3	40.5	43.5	46.5	8	6	6	6	53.0	147	159	171	5	8	0	
18 FT	17	20	12	8	6	7	6.5	61.3	41.0	44.0	47.0	8	6	6	6.5	49.0	148	160	172	5	9	0	
20 FT	19	21	12	8	6	7	6.5	59.1	43.4	46.5	49.6	8	6	6	6	49.0	149	161	173	5	7.5	0	
22 FT	20	23	13	9	7.5	7	6.5	61.5	44.3	47.4	50.5	8	6	6	6.5	49.3	151	163	175	5	8	0	
24 FT	22	24	13	9	7	7	6.5	59.5	46.8	50.0	53.3	9	7.5	6	6	49.3	152	164	176	5	6.5	0	
26 FT	23	26	14	9	7	7	6.5	59.8	47.5	50.8	54.0	9	7.5	6	6.5	49.5	154	166	178	5	7	0	
28 FT	24	27	14	9	7	7	6.5	59.8	48.0	51.3	54.5	9	7	6	6	49.5	155	167	179	5	6	0	
30 FT	26	28	14	9	6.5	7	6	59.8	50.6	54.0	57.4	9	7	6	6	49.5	156	168	180	5	6	0	
32 FT	27	29	15	9	6.5	7	6.5	60.0	51.3	54.6	58.0	9	7	6	6	49.6	157	169	181	5	6	0	
34 FT	28	31	15	9	6.5	7	6	60.0	52.1	55.5	58.8	9	7	6	6	49.6	159	171	183	6	8	0	
36 FT	29	32	16	9	6.5	7	6.5	60.4	54.5	58.0	61.5	9	6.5	6	6	49.9	160	172	184	6	8	0	
38 FT	30	33	16	9	6	7	6	60.4	55.1	58.6	62.0	9	6.5	6	6	49.9	161	173	185	6	8	0	
40 FT	32	34	16	9	6	7	6.5	60.4	57.9	61.5	65.1	9	6.5	6	6	49.9	162	174	186	6	8	0	
42 FT	33	35	17	9	6	7	7	60.6	58.5	62.1	65.8	9	6.5	6	6	50.1	163	175	187	6	7.5	0	
44 FT	34	36	17	9	6	7	7	60.6	59.1	62.8	66.3	9	6	6	6	50.1	164	176	188	6	7.5	0	
46 FT	35	37	17	10	7.5	7	6.5	60.6	59.8	63.3	66.9	9	6	6	6	50.1	165	177	189	6	7.5	0	
48 FT	36	38	18	10	7	7	7	60.9	60.3	63.9	67.5	9	6	6	6	52.5	166	178	190	6	7	0	
50 FT	37	39	18	10	7	7	7	60.9	62.9	66.6	70.4	9	6	6	6	52.5	167	179	191	6	7	0	

		SPAN (S) = 16 FT											HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS									BOTTOM SLAB BARS						WALL BARS				
				A1 BARS			J3 BARS			A2 BARS			J4 BARS			B2 BARS							
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	G1	
									HT=14'	HT=15'	HT=16'							HT=14'	HT=15'	HT=16'			
1 FT	13	14	11	7	7.5	6	7	117.8	38.0	40.4	42.8	7	7.5	6	6.5	117.8	178	190	202	5	7.5	12	
2 FT	13	14	11	7	7	7	7.5	121.8	38.0	40.4	42.8	7	7	6	6.5	117.8	178	190	202	5	7	12	
2'- 4'	13	14	11	7	6.5	7	7.5	121.8	38.0	40.4	42.8	7	6.5	6	6	117.8	178	190	202	5	6.5	12	
4 FT	12	14	11	7	6.5	6	6	117.8	37.8	40.3	42.6	7	6.5	6	6	117.8	178	190	202	5	6.5	0	
6 FT	12	14	12	7	6.5	6	6	83.6	37.8	40.3	42.6	7	6.5	6	6	95.9	178	190	202	5	7	0	
8 FT	12	14	13	7	6.5	7	6.5	77.9	37.8	40.3	42.6	7	6	6	6	80.0	178	190	202	5	6.5	0	
10 FT	13	16	13	7	6	7	6.5	75.9	38.4	40.8	43.3	8	7.5	6	6	77.9	180	192	204	5	6.5	0	
12 FT	14	17	14	7	6	7	6.5	72.1	40.8	43.3	45.8	8	7										

**AREA OF STEEL REQUIRED FOR J5 BARS IN WINGS (SQ. IN./FT.)  
WALL HEIGHT VS. WALL THICKNESS**

Ⓢ Backfill Slope = 2:1

Wall Thickness TX (in.)	Wall Height (ft.)																			
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
8	0.168	0.168	0.197	0.291	0.414	0.429	0.578	0.766	1.003											
9	0.168	0.168	0.168	0.244	0.346	0.456	0.477	0.626	0.809	1.034	1.312									
10	0.168	0.168	0.168	0.211	0.298	0.407	0.487	0.532	0.683	0.864	1.084	1.349								
11	0.168	0.168	0.168	0.185	0.261	0.357	0.475	0.520	0.592	0.746	0.929	1.147	1.405							
12		0.168	0.168	0.168	0.233	0.318	0.422	0.548	0.554	0.658	0.816	1.002	1.220	1.475						
13		0.168	0.168	0.168	0.210	0.287	0.380	0.493	0.588	0.589	0.729	0.892	1.081	1.301						
14			0.168	0.168	0.192	0.261	0.346	0.448	0.569	0.623	0.659	0.805	0.973	1.167	1.390					
15				0.168	0.176	0.240	0.317	0.411	0.521	0.652	0.658	0.734	0.886	1.059	1.258					
16				0.168	0.222	0.293	0.379	0.481	0.601	0.693	0.693	0.813	0.971	1.151						
17				0.168	0.206	0.273	0.352	0.447	0.557	0.686	0.729	0.752	0.897	1.061	1.247					
18					0.255	0.329	0.417	0.520	0.639	0.764	0.764	0.834	0.985	1.156						
19								0.309	0.391	0.487	0.599	0.727	0.800	0.800	0.920	1.078				
20								0.291	0.368	0.459	0.563	0.684	0.821	0.836	0.863	1.011				
21									0.348	0.433	0.532	0.645	0.774	0.871	0.871	0.952				
22										0.411	0.504	0.611	0.733	0.870	0.907	0.970				
23											0.479	0.580	0.696	0.826	0.943	0.943				
24											0.456	0.552	0.662	0.786	0.925	0.979				
25												0.527	0.632	0.750	0.882	1.015				
26													0.604	0.717	0.843	0.984				
27														0.686	0.807	0.942				

**AREA OF STEEL REQUIRED FOR J5 BARS IN WINGS (SQ. IN./FT.)  
WALL HEIGHT VS. WALL THICKNESS**

Ⓢ Backfill Slope = 3:1

Wall Thickness TX (in.)	Wall Height (ft.)																			
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
8	0.168	0.168	0.168	0.187	0.264	0.362	0.425	0.475	0.612											
9	0.168	0.168	0.168	0.168	0.222	0.303	0.403	0.456	0.504	0.637	0.795									
10	0.168	0.168	0.168	0.168	0.191	0.261	0.346	0.450	0.487	0.541	0.671	0.824	1.005	1.217						
11	0.168	0.168	0.168	0.168	0.168	0.229	0.304	0.394	0.501	0.520	0.583	0.713	0.864	1.039						
12		0.168	0.168	0.168	0.168	0.204	0.271	0.351	0.445	0.554	0.554	0.629	0.760	0.910						
13		0.168	0.168	0.168	0.168	0.185	0.244	0.316	0.401	0.501	0.588	0.588	0.679	0.812	0.963					
14			0.168	0.168	0.168	0.168	0.223	0.288	0.365	0.455	0.560	0.623	0.623	0.733	0.868					
15				0.168	0.168	0.168	0.204	0.264	0.335	0.417	0.513	0.623	0.658	0.669	0.791					
16					0.168	0.168	0.189	0.244	0.309	0.385	0.474	0.575	0.690	0.693	0.727					
17					0.168	0.168	0.176	0.227	0.287	0.358	0.440	0.533	0.640	0.729	0.729	0.788				
18						0.168	0.212	0.269	0.334	0.411	0.498	0.597	0.709	0.764	0.764					
19							0.199	0.252	0.314	0.385	0.467	0.559	0.664	0.782	0.800					
20							0.188	0.237	0.295	0.362	0.439	0.526	0.625	0.735	0.836					
21								0.224	0.279	0.342	0.415	0.497	0.590	0.694	0.810					
22									0.265	0.325	0.393	0.471	0.558	0.657	0.766					
23										0.308	0.373	0.447	0.530	0.624	0.727					
24											0.294	0.356	0.426	0.505	0.594	0.692				
25												0.340	0.407	0.482	0.566	0.661				
26													0.389	0.461	0.542	0.632				
27														0.442	0.519	0.605				


**NOTE:**

THE WALL HEIGHT IS EQUAL TO THE BARREL HEIGHT (HT) PLUS THE TOP SLAB THICKNESS (TS). WHEN WALL HEIGHT IS IN BETWEEN OR OUTSIDE TABULATED WALL HEIGHTS, THE AREA OF STEEL REQUIRED SHOULD BE INTERPOLATED BETWEEN OR EXTRAPOLATED FROM ADJACENT AREAS OF STEEL USING THE ACTUAL WALL HEIGHT.

IF AREA OF STEEL IN THE WALL OF THE CULVERT (J4 BARS) IS GREATER THAN THAT INDICATED IN THE TABLE, USE THE SAME SIZE AND SPACING FOR THE J5 BARS IN THE WINGS. HOWEVER, IF THE AREA OF STEEL PROVIDED BY MATCHING SIZE AND SPACING OF THE J4 BARS IS INSUFFICIENT, INCREASE THE SIZE OF THE J5 BARS (#8 MAX.) AND/OR DECREASE THE SPACING OF THE J5 BARS (6" MIN.). USE SMALLEST BAR SIZE POSSIBLE BASED ON MINIMUM SPACING.

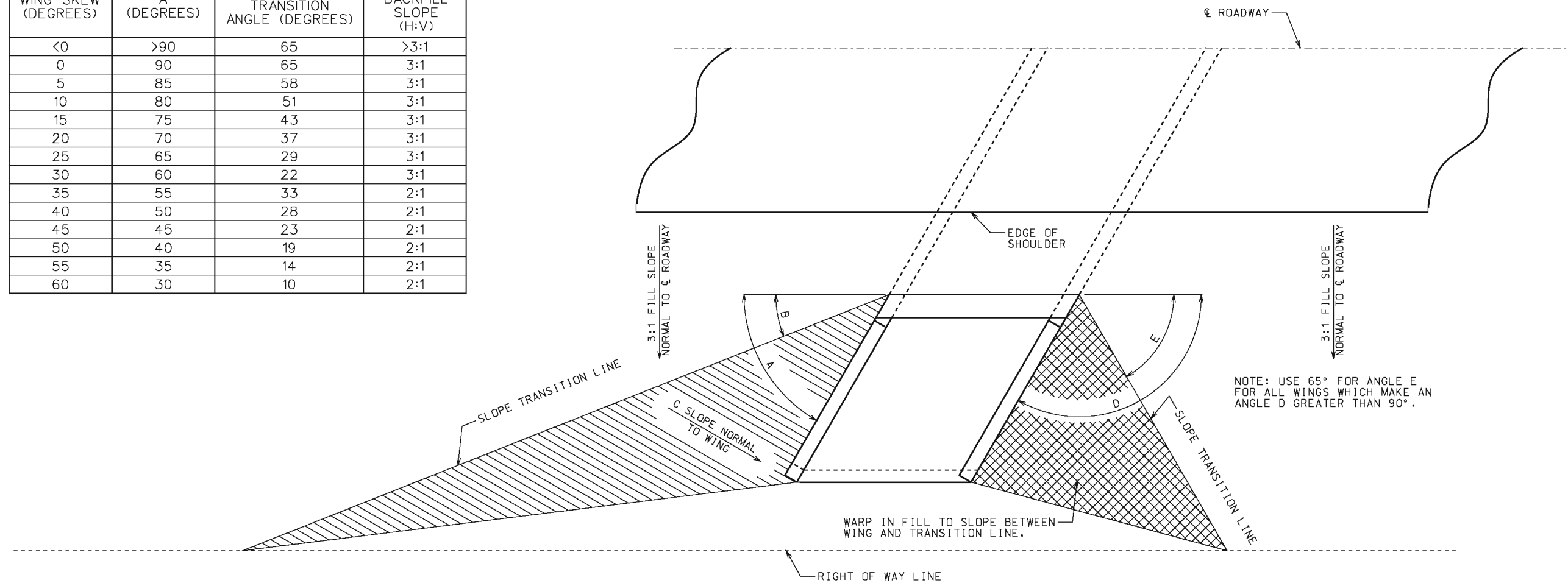
MINIMUM STEEL TO BE USED IN THE WINGS FOR J5 BARS IS #4 BARS AT 14" CENTERS (AREA OF STEEL = 0.1683 SQ. IN./FT.)

Ⓢ SEE STANDARD PLAN 703.37C, SHEET 2 OF 2 FOR BACKFILL SLOPE TO BE USED BASED ON SKEW.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	<h2>CONCRETE BOX CULVERT</h2> <h3>EXTERIOR WING REINFORCEMENT</h3>
 <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small>	
DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 4/18/2011	<h1>703.37C</h1>
	SHEET NO. <b>1 OF 2</b>

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

WING BACKFILL TABLE			
WING SKEW (DEGREES)	A (DEGREES)	B TRANSITION ANGLE (DEGREES)	C BACKFILL SLOPE (H:V)
<0	>90	65	>3:1
0	90	65	3:1
5	85	58	3:1
10	80	51	3:1
15	75	43	3:1
20	70	37	3:1
25	65	29	3:1
30	60	22	3:1
35	55	33	2:1
40	50	28	2:1
45	45	23	2:1
50	40	19	2:1
55	35	14	2:1
60	30	10	2:1

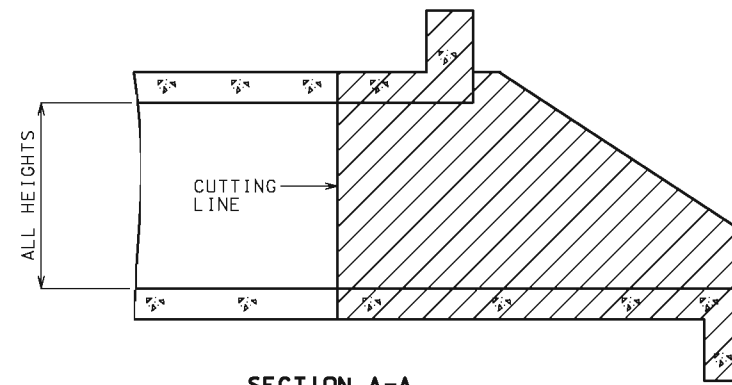


**PLAN OF WINGS AND SLOPE TRANSITION LINES**

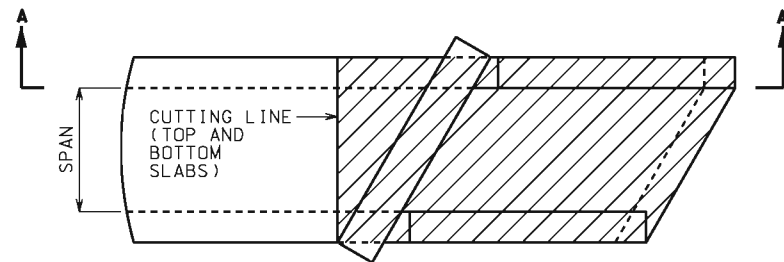
NOTE: BACKFILL TRANSITION ANGLE AND BACKFILL SLOPE SHALL APPLY TO ALL BOX CULVERTS REGARDLESS OF TYPE - SINGLE, DOUBLE, OR TRIPLE.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE BOX CULVERT</b> EXTERIOR WING BACKFILL SLOPE TRANSITION
DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 4/18/2011	<b>703.37C</b>	SHEET NO. <b>2 OF 2</b>

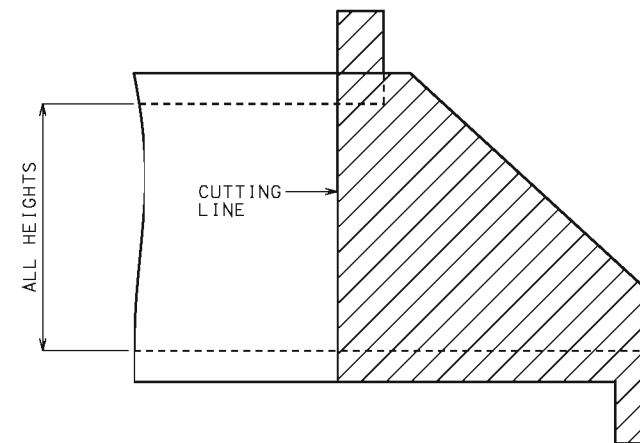
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



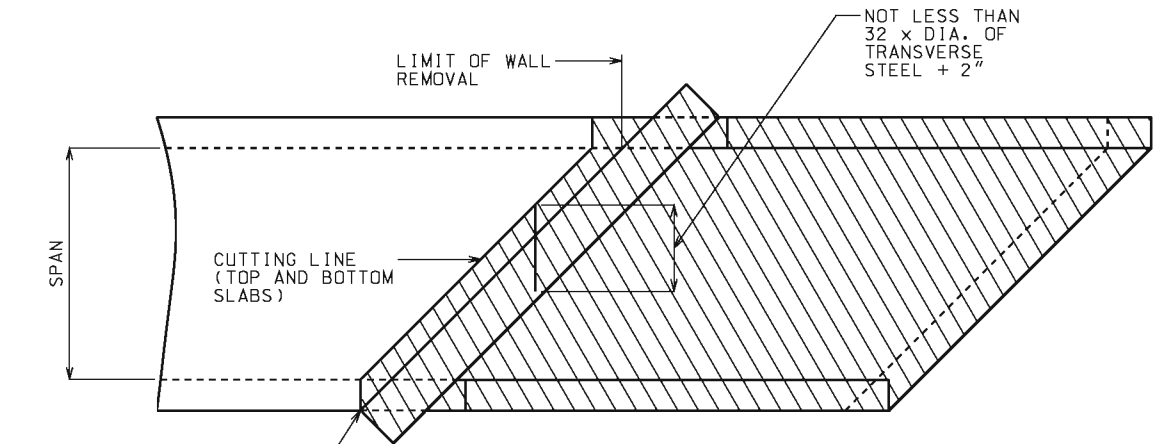
SECTION A-A



PLAN

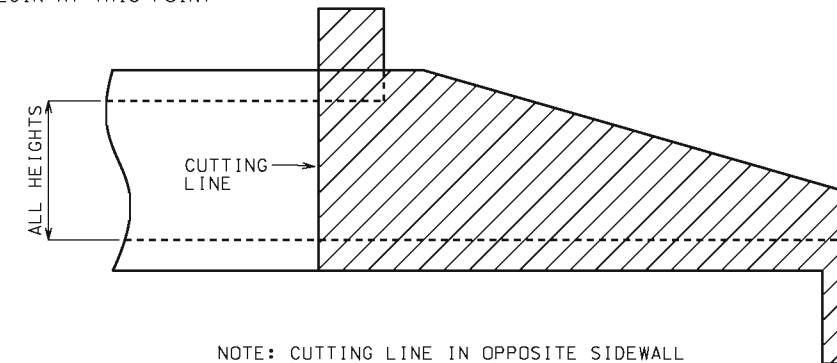


SIDE ELEVATION  
NO SKEW OR SKEWS LESS THAN 20°



PLAN

CUT IN TOP AND BOTTOM  
SLABS ALWAYS TO  
BEGIN AT THIS POINT



NOTE: CUTTING LINE IN OPPOSITE SIDEWALL  
IS TO MEET CUT IN BOTTOM SLAB.

SIDE ELEVATION  
SKEW OF 20° OR MORE

**GENERAL NOTES:**



THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED, THAT ARE BONDED IN UNDISTURBED OLD CONCRETE, SHALL BE CLEANLY STRIPPED, STRAIGHTENED, AND EXTENDED INTO NEW CONCRETE.

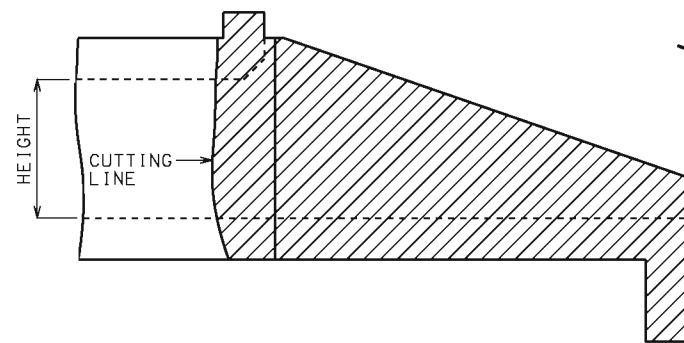
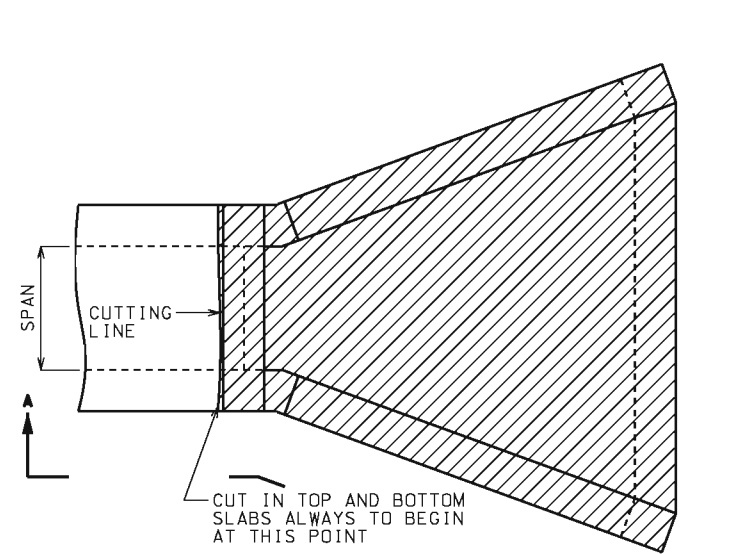
SEE STANDARD SPECIFICATIONS FOR REQUIRED BUSHHAMMERING AND TREATING OF OLD CONCRETE SURFACES WHICH ARE TO RECEIVE NEW CONCRETE.

A CONTINUOUS V-GROOVE AT LEAST 1" IN DEPTH SHALL BE CUT ON THE FACE OF THE CONCRETE AS A GUIDE FOR THE LINE OF BREAK AND TO PREVENT SPALLING.

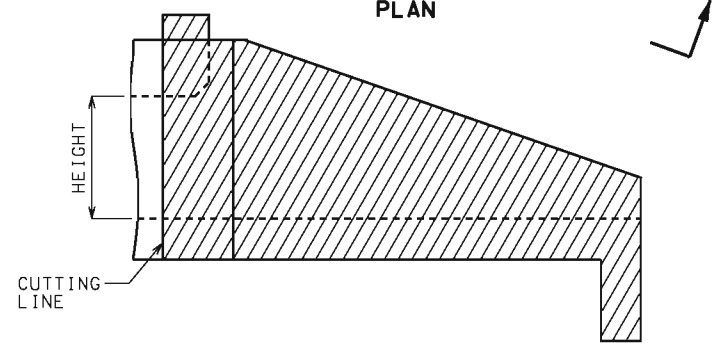
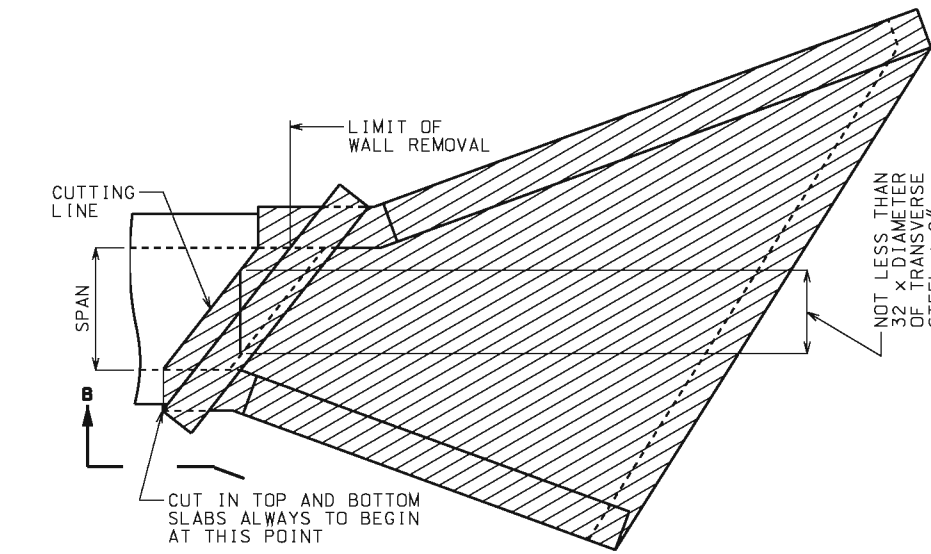
THE BOX EXTENSION OPENING SHALL BE BUILT TO MATCH THE EXISTING BOX OPENING. WHEN THE EXISTING OPENING DOES NOT MATCH A SIZE FROM THE TABLES, THE NEXT LARGER SIZE SHALL BE USED FOR DETERMINING THE MEMBER SIZES AND REINFORCEMENT.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE BOX CULVERTS</b> CUTTING DETAILS EXTENSION TO STRAIGHT WINGS
DATE EFFECTIVE: 10-01-2009 DATE PREPARED: 8/18/2009	<b>703.38A</b>	SHEET NO. <b>1 OF 2</b>

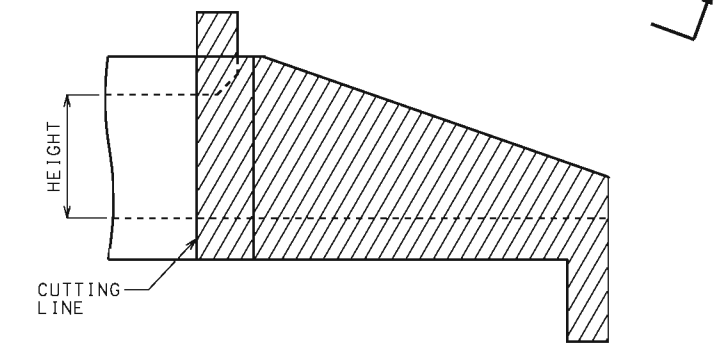
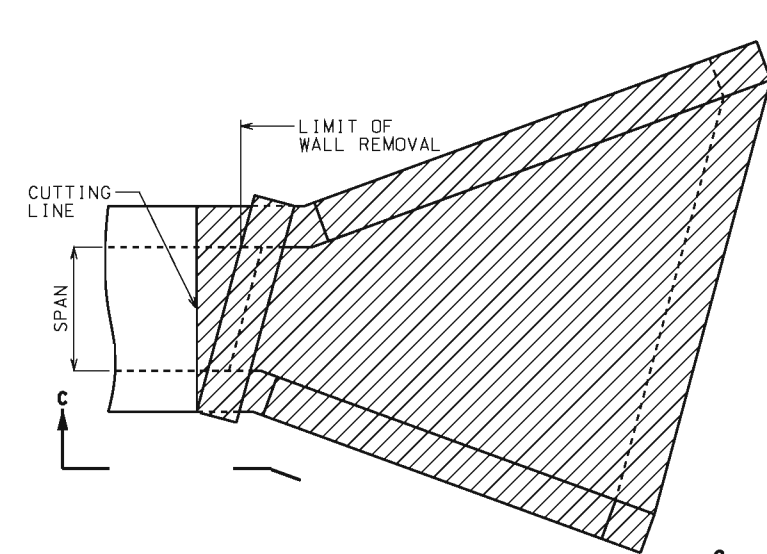
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



ELEVATION A-A  
NO SKEW



ELEVATION B-B  
SKEWS OF 20° OR MORE



ELEVATION C-C  
SKEWS LESS THAN 20°

**GENERAL NOTES:**



THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED, THAT ARE BONDED IN UNDISTURBED OLD CONCRETE, SHALL BE CLEANLY STRIPPED, STRAIGHTENED, AND EXTENDED INTO NEW CONCRETE.

SEE STANDARD SPECIFICATIONS FOR REQUIRED BUSHHAMMERING AND TREATING OF OLD CONCRETE SURFACES WHICH ARE TO RECEIVE NEW CONCRETE.

A CONTINUOUS V-GROOVE AT LEAST 1" IN DEPTH SHALL BE CUT ON THE FACE OF THE CONCRETE AS A GUIDE FOR THE LINE OF BREAK AND TO PREVENT SPALLING.

THE BOX EXTENSION OPENING SHALL BE BUILT TO MATCH THE EXISTING BOX OPENING. WHEN THE EXISTING OPENING DOES NOT MATCH A SIZE FROM THE TABLES, THE NEXT LARGER SIZE SHALL BE USED FOR DETERMINING THE MEMBER SIZES AND REINFORCEMENT.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE BOX CULVERTS</b> CUTTING DETAILS EXTENSION TO FLARED WINGS
DATE EFFECTIVE: 10-01-2009 DATE PREPARED: 8/18/2009	<b>703.38A</b>	SHEET NO. <b>2 OF 2</b>

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

### LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

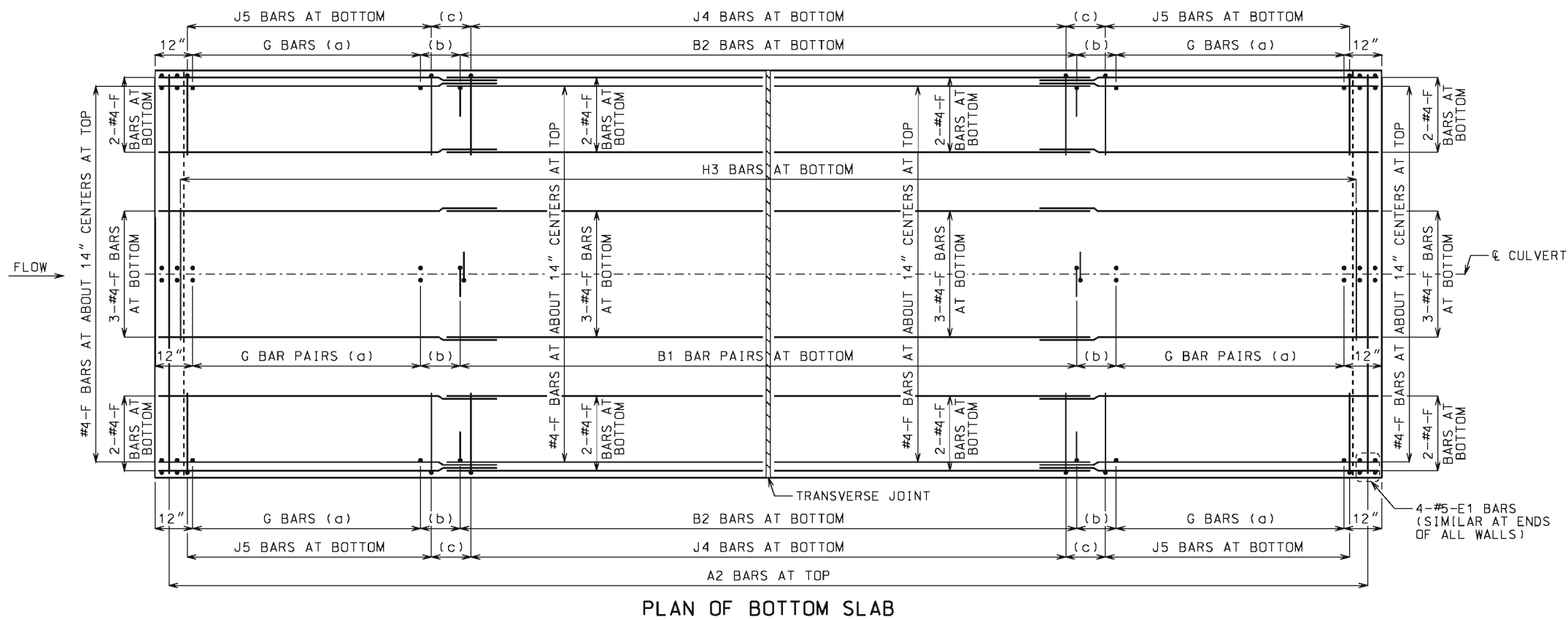
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

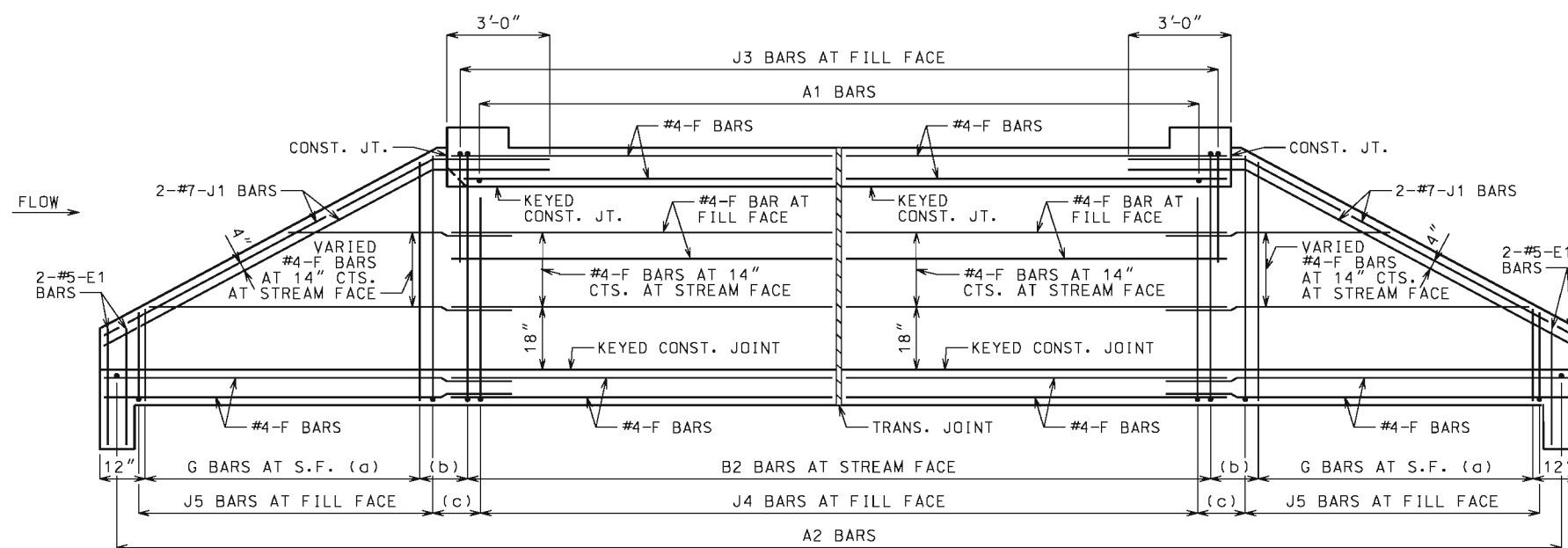
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL  
J1 BARS MAY BE BENT IN FIELD OR SHOP.

### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".



LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

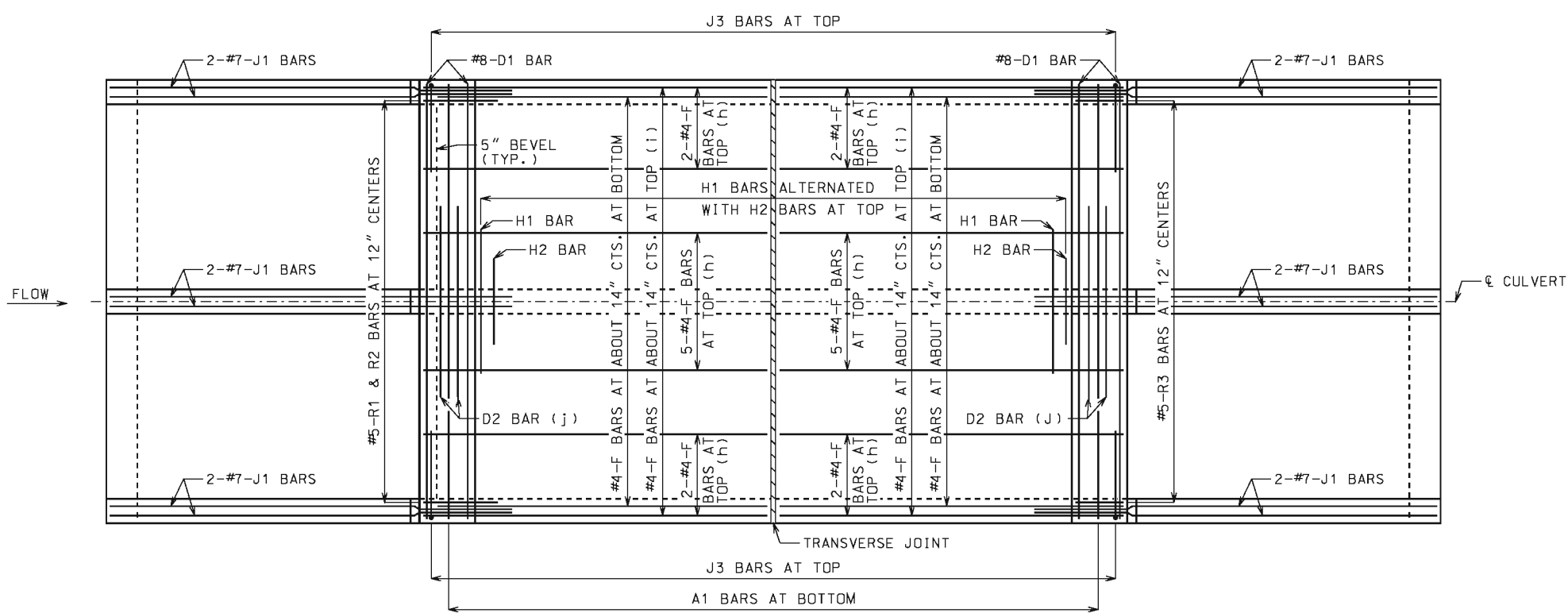
(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

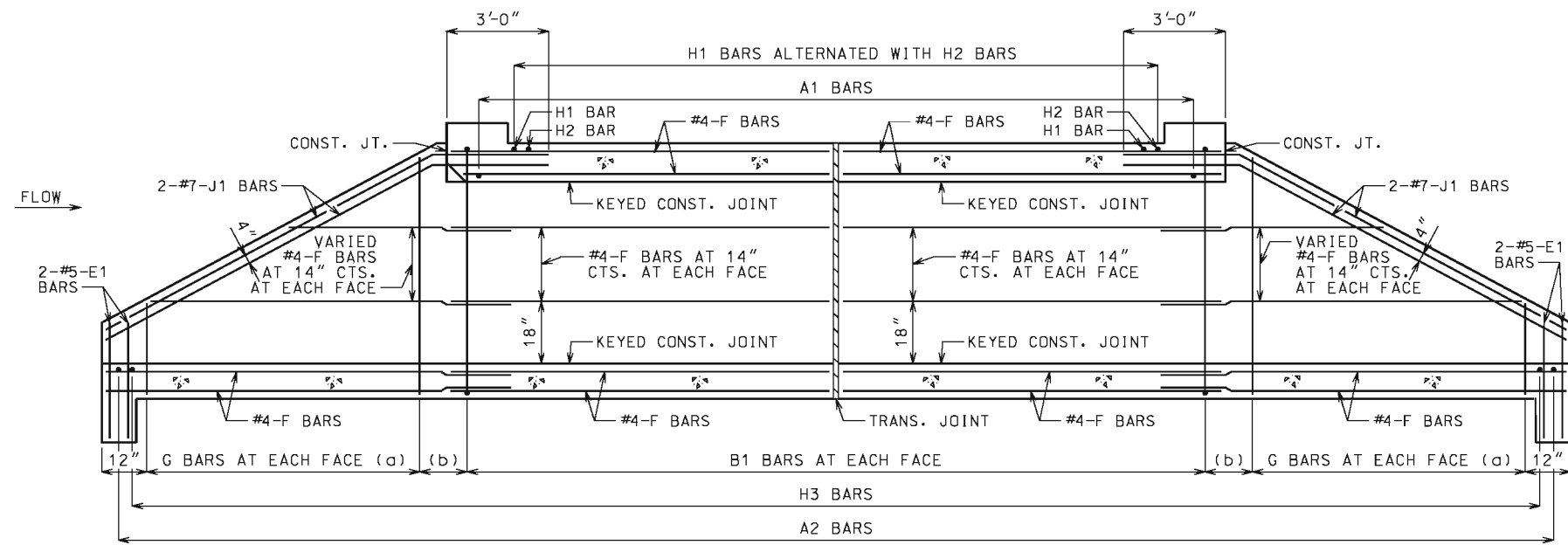
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: SQUARED WINGS: STRAIGHT REINFORCEMENT	
	DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	SHEET NO. <b>703.40H</b> 1 OF 3

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

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



**PLAN OF TOP SLAB**  
 B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.  
 FOR PLACEMENT, SEE SHEET 1 OF 3.

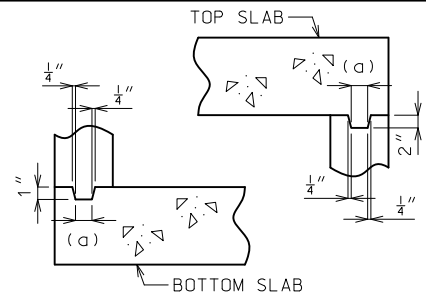


**SECTION NEAR INTERIOR WALL**  
 J1 BARS MAY BE BENT IN FIELD OR SHOP.

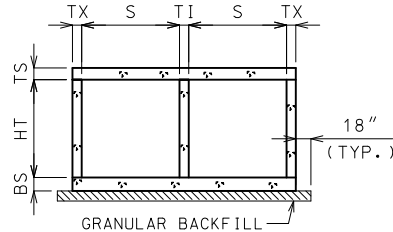
**GENERAL NOTES:**

- FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.
- CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.
- DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".
- LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.
- BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.
- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) NOT SPECIFIED ON THIS SHEET
- (e) NOT SPECIFIED ON THIS SHEET
- (f) NOT SPECIFIED ON THIS SHEET
- (g) NOT SPECIFIED ON THIS SHEET
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"  
 #8 FOR CLEAR SPAN > 10'-0"  
 #9 FOR CLEAR SPAN > 13'-0"
- IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/3 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

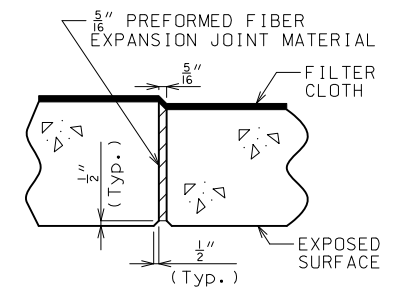
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	<b>CONCRETE          DOUBLE BOX CULVERT</b> SKEW: SQUARED WINGS: STRAIGHT <b>REINFORCEMENT</b>	
		THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.
DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.40H</b>	SHEET NO. <b>2 OF 3</b>



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



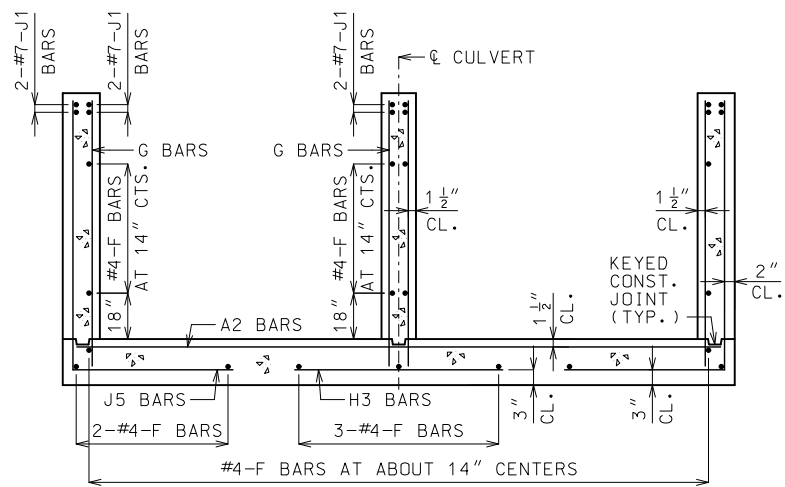
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



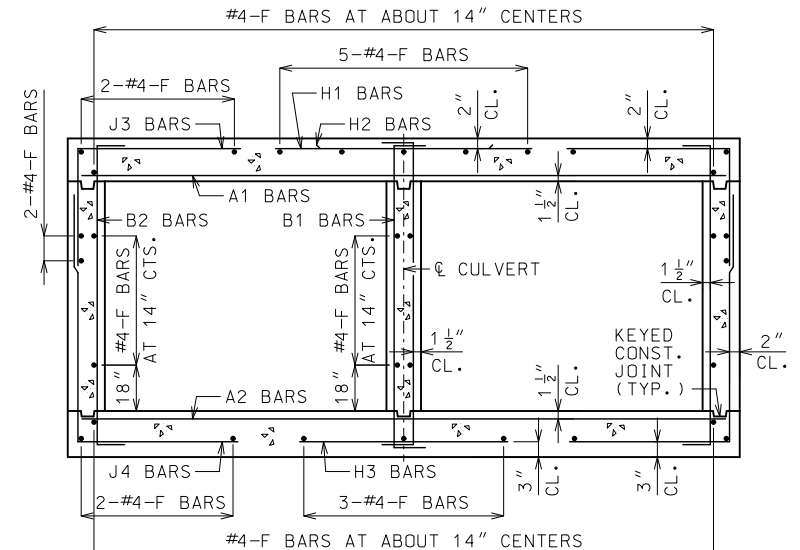
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

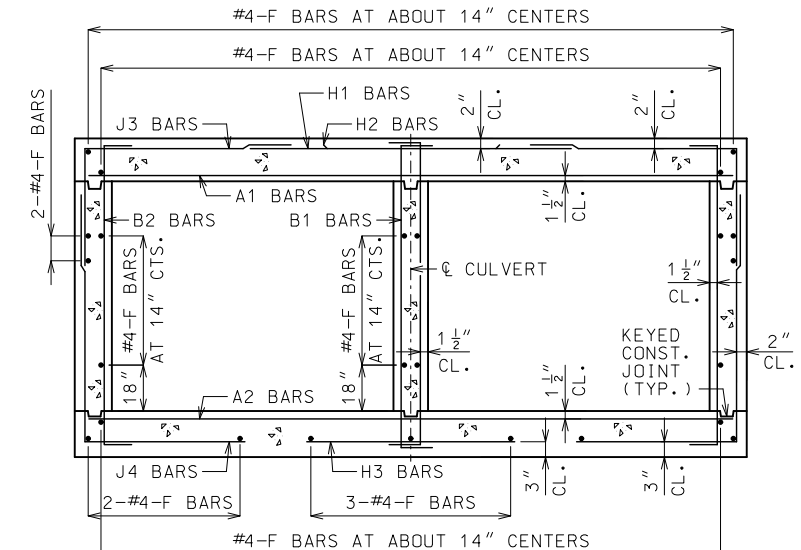
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



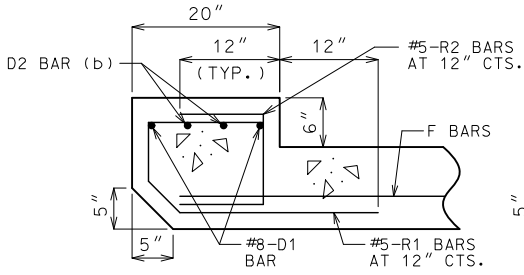
**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



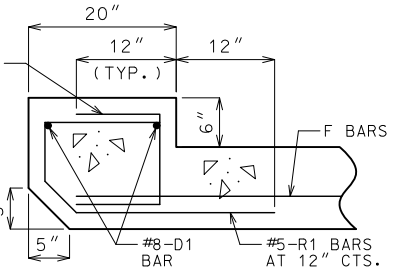
**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



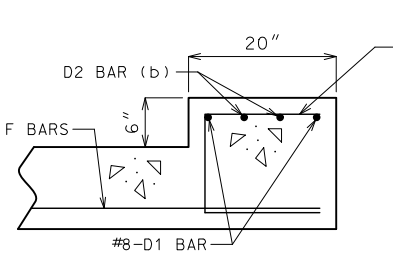
**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**



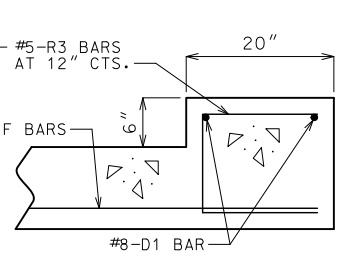
**UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**

(b) #8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"  
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

**GENERAL NOTES:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

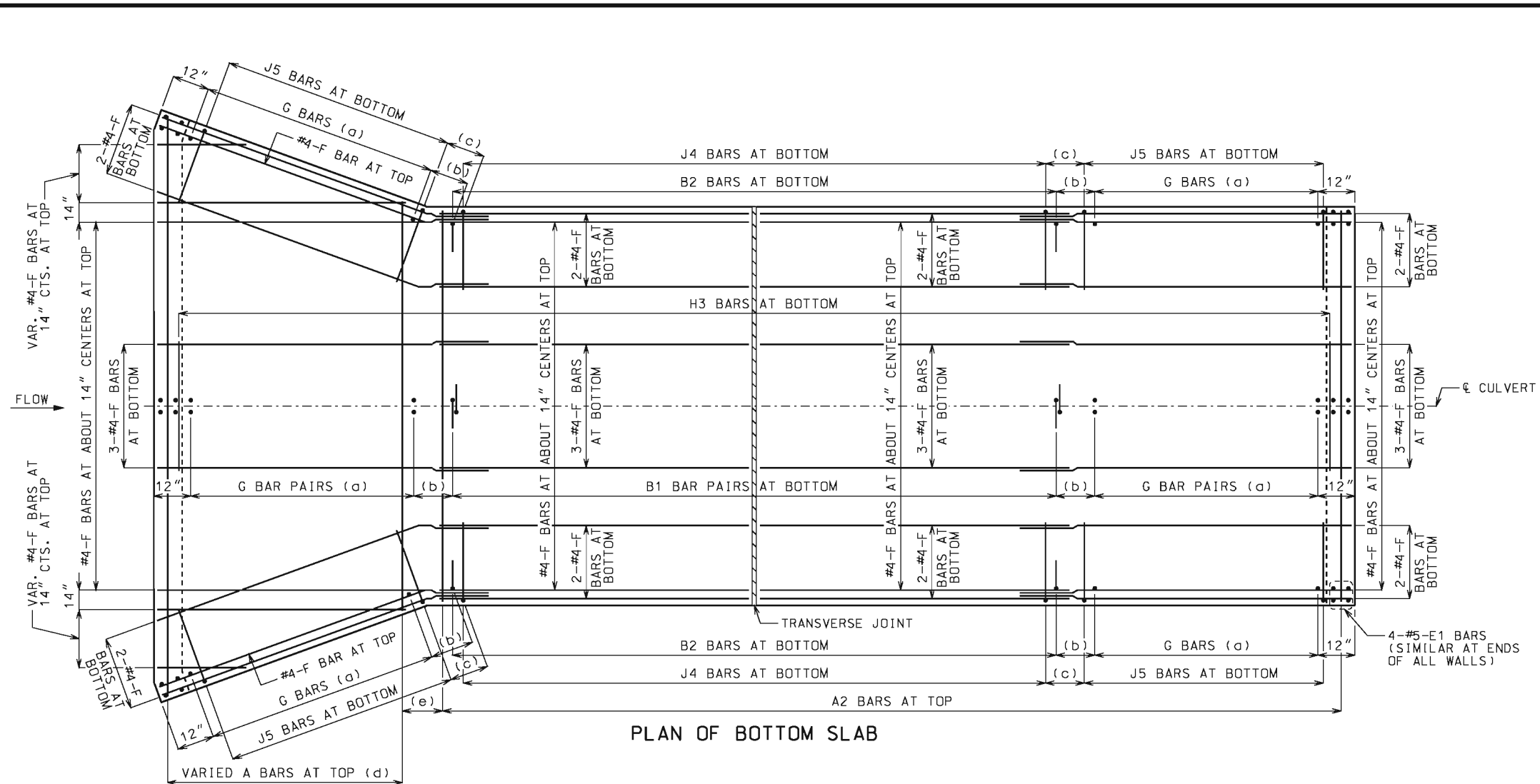
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

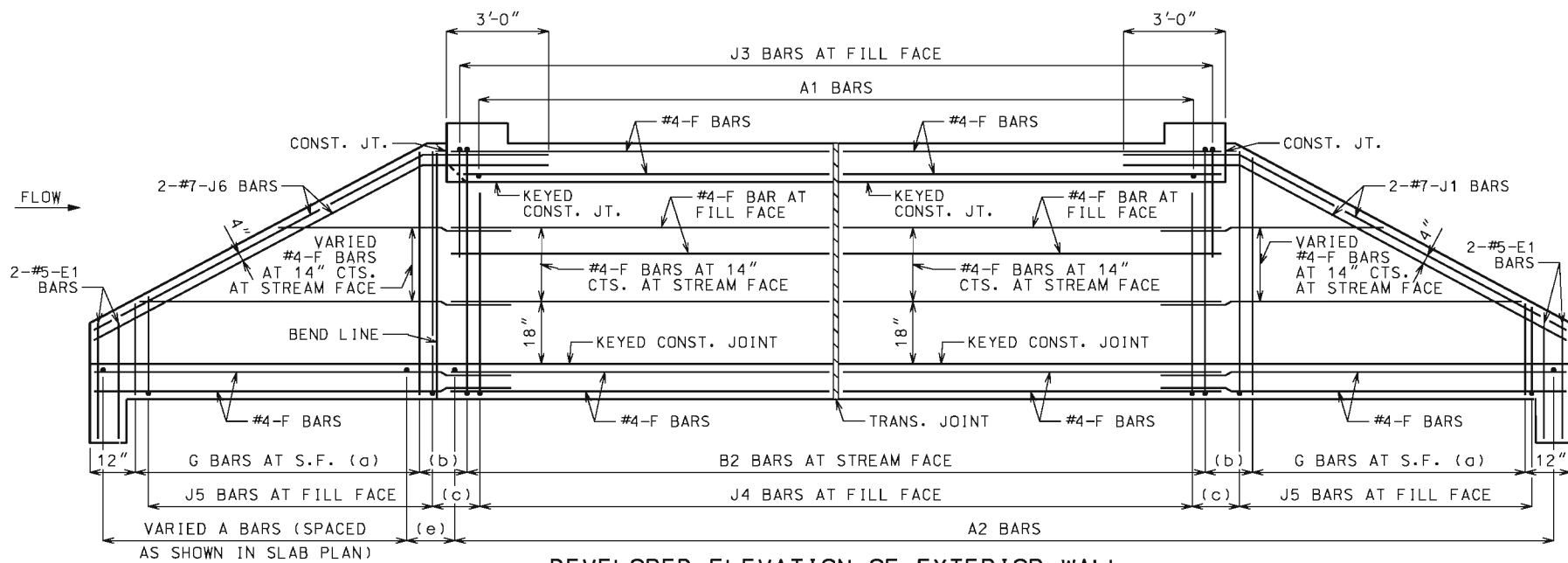
		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
		105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: SQUARED WINGS: STRAIGHT SECTIONS	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.40H</b>		SHEET NO. <b>3 OF 3</b>

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





PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL  
J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

**LAYING OUT TRANSVERSE JOINTS**  
UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

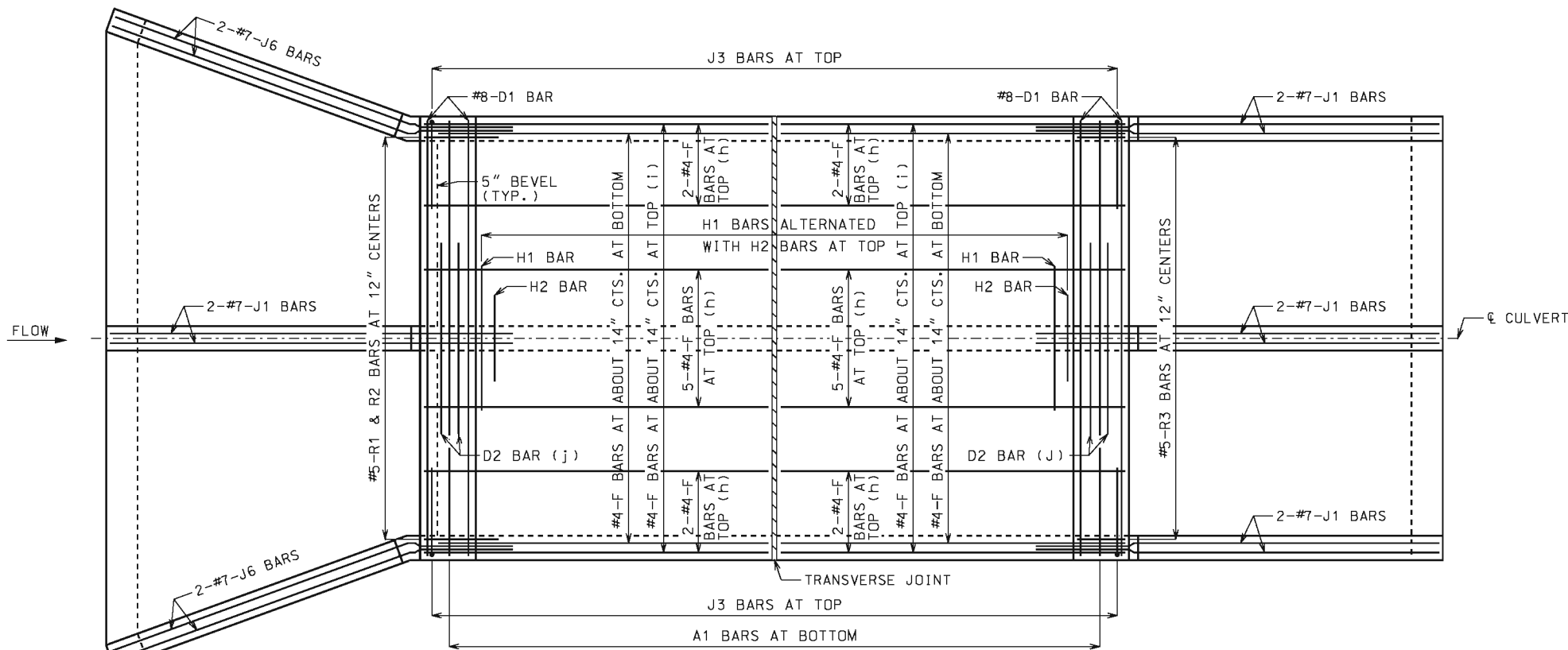
(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

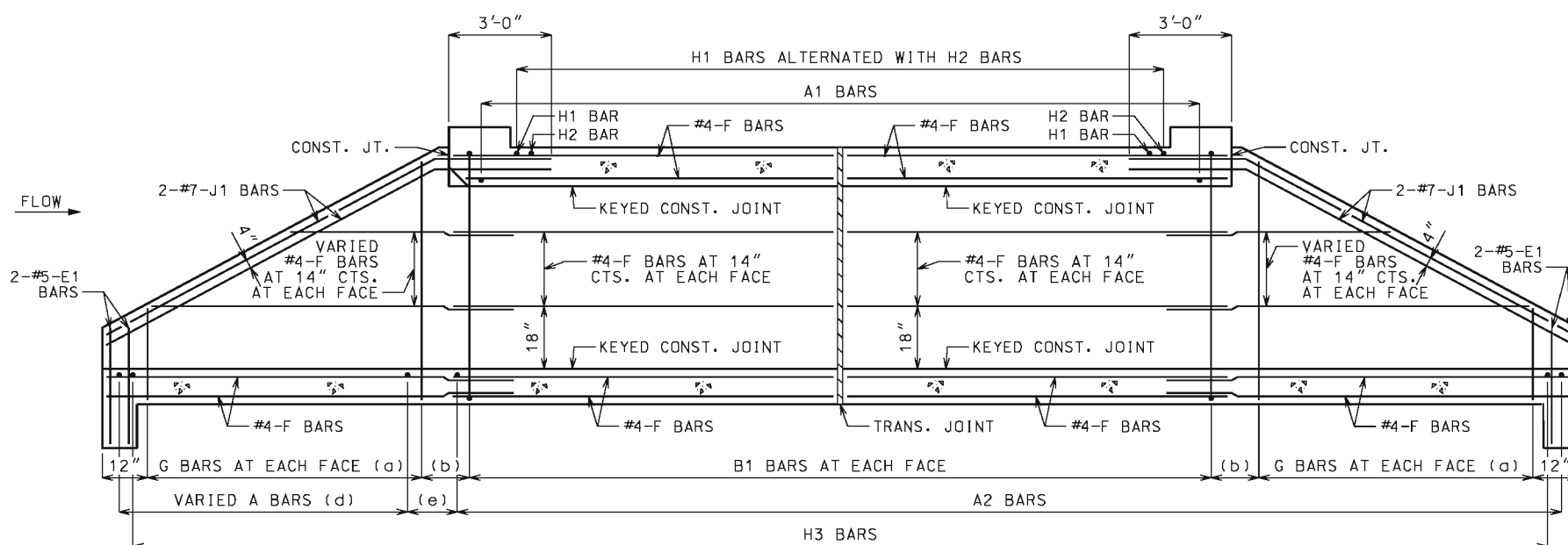
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: SQUARED WINGS: FLARED <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.41H</b> SHEET NO. 1 OF 3

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

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



**PLAN OF TOP SLAB**  
 B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.  
 FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**  
 J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2\"/>

LAP LONGITUDINAL BARS A MINIMUM OF 23\"/>

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12\"/>

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0\"/>

(i) FOR DESIGN FILLS 2'-0\"/>

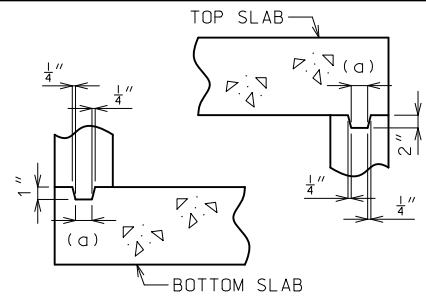
(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0\"/>

#8 FOR CLEAR SPAN > 10'-0\"/>

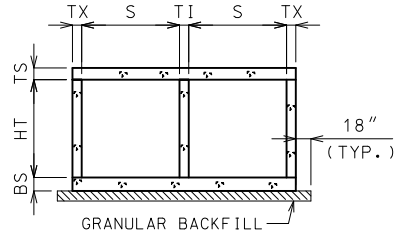
#9 FOR CLEAR SPAN > 13'-0\"/>

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

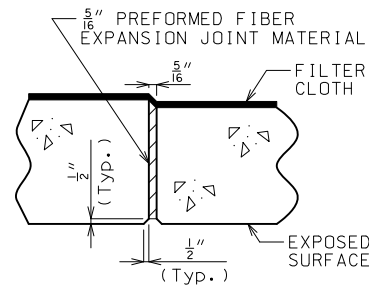
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: SQUARED WINGS: FLARED	
	<b>REINFORCEMENT</b>	
DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.41H</b>	SHEET NO. <b>2 OF 3</b>



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



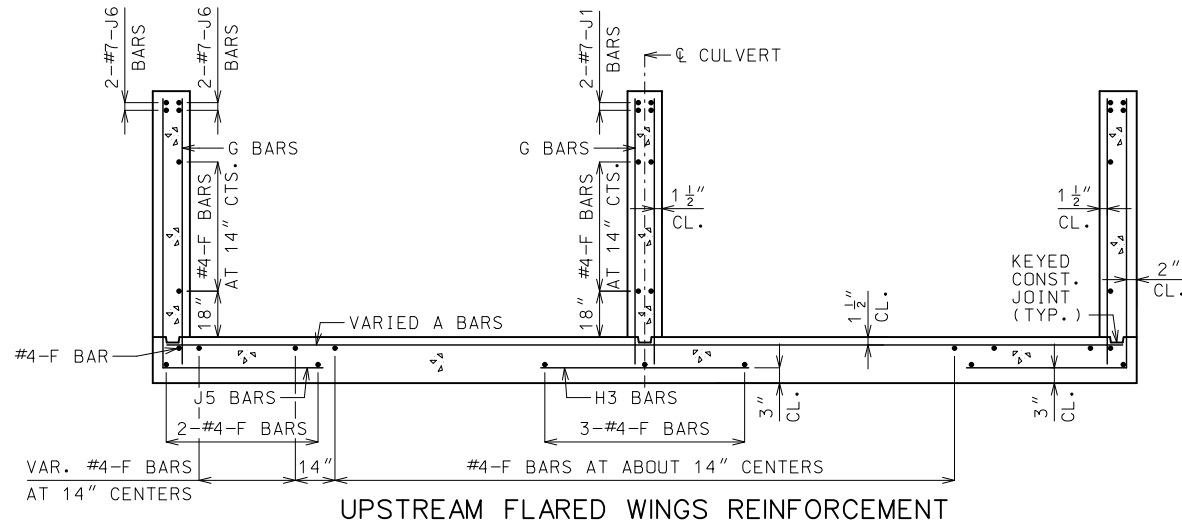
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



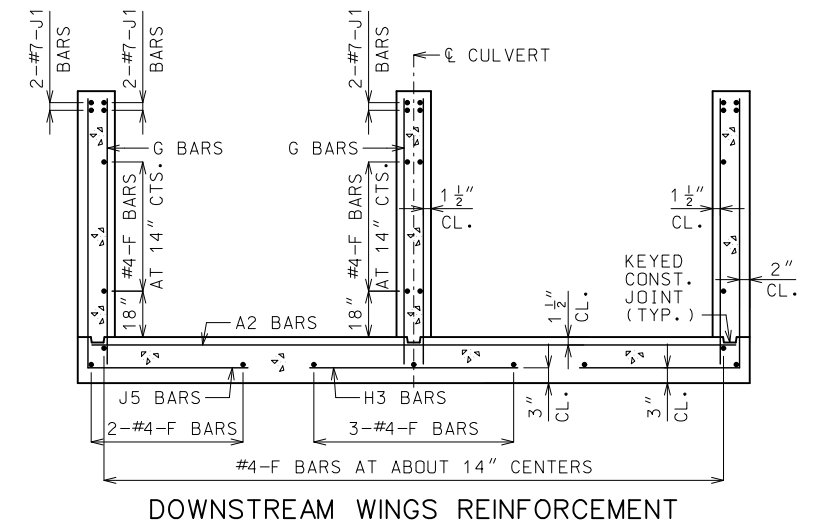
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

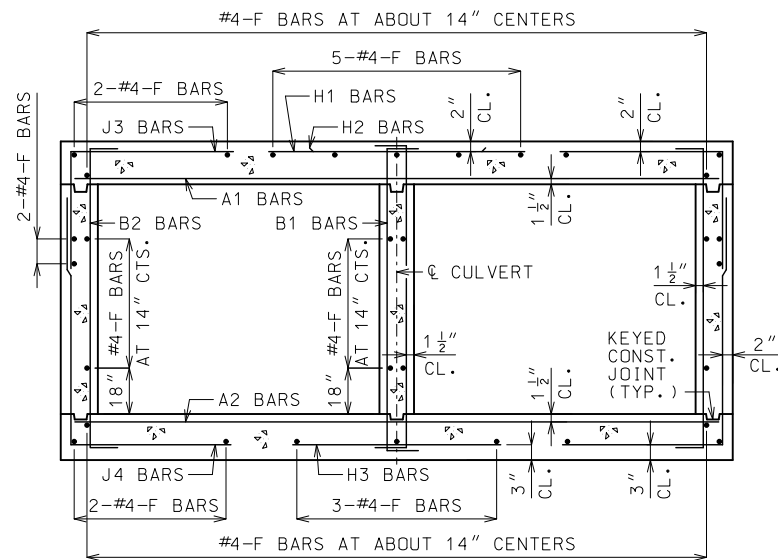
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



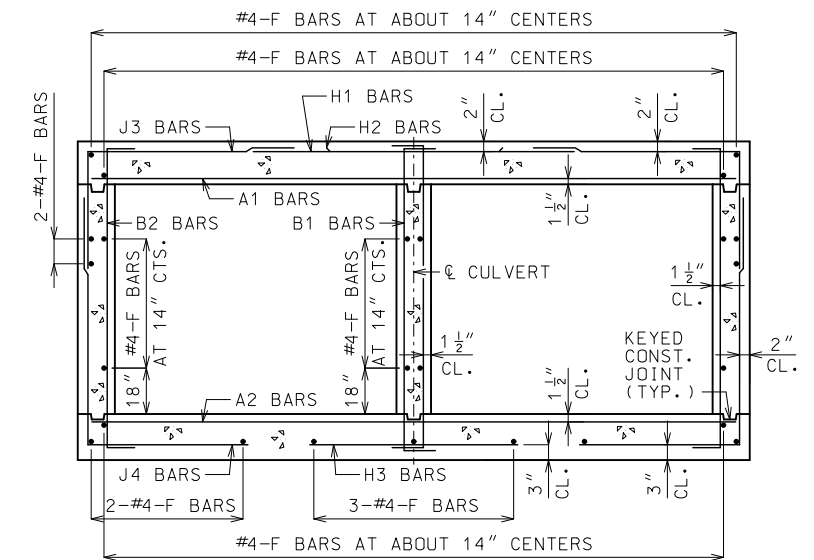
**UPSTREAM FLARED WINGS REINFORCEMENT**



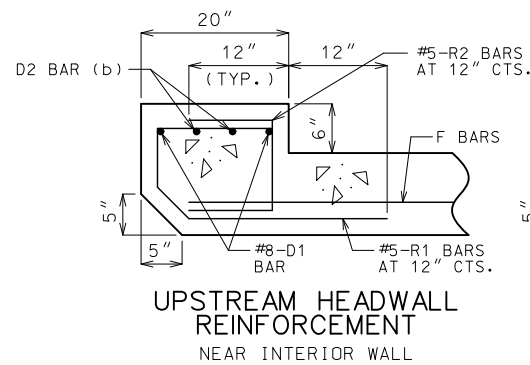
**DOWNSTREAM WINGS REINFORCEMENT**



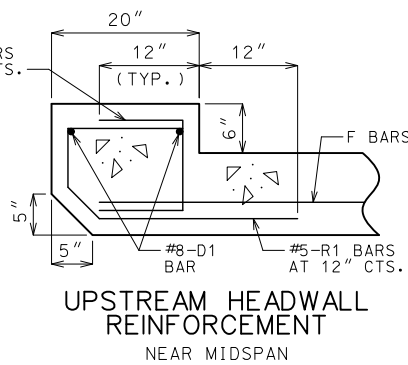
**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"



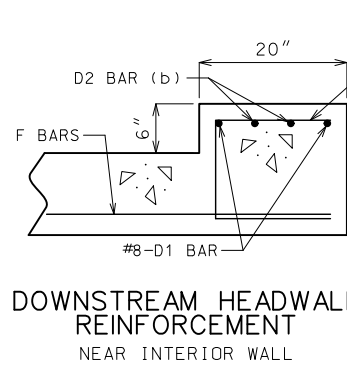
**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS



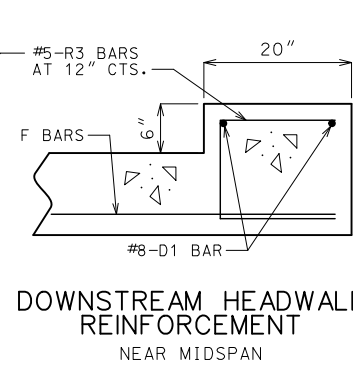
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"  
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF  $\emptyset$  WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.


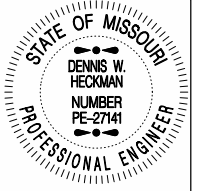
**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO  $\emptyset$  CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: SQUARED WINGS: FLARED  <b>SECTIONS</b>
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.41H</b>
	SHEET NO. <b>3 OF 3</b>

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

### LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

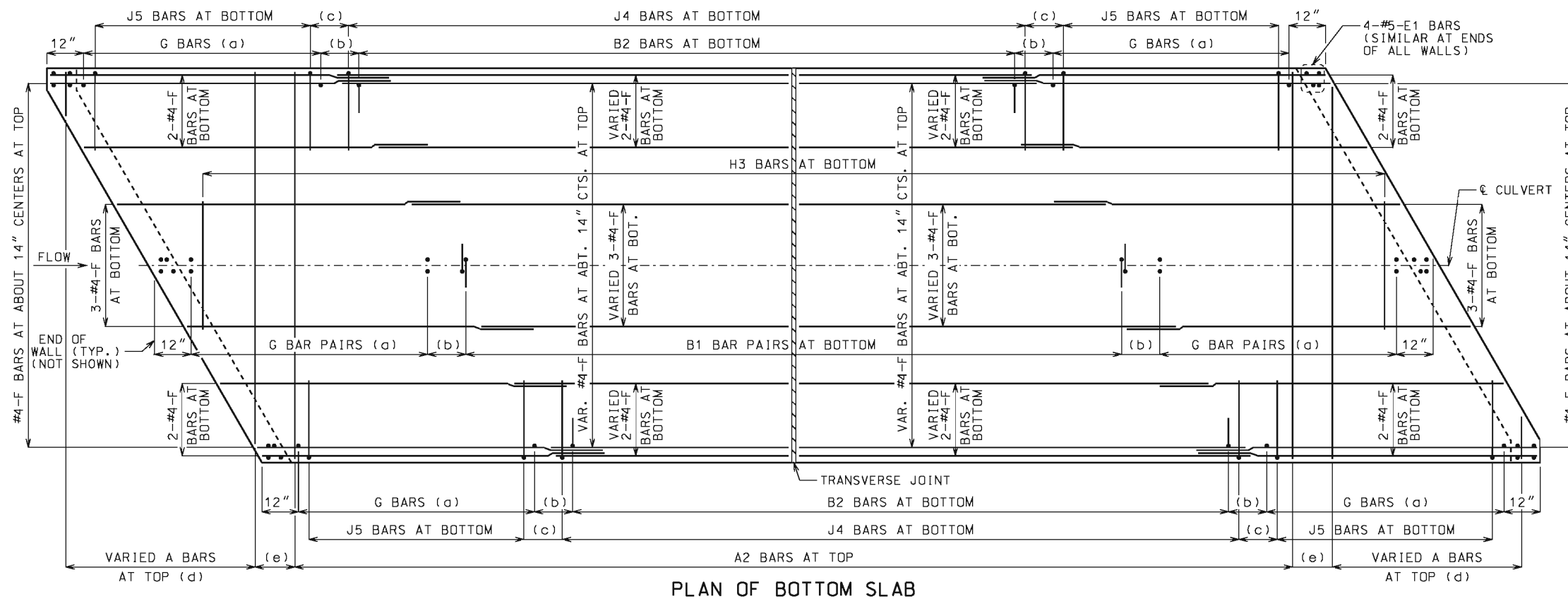
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

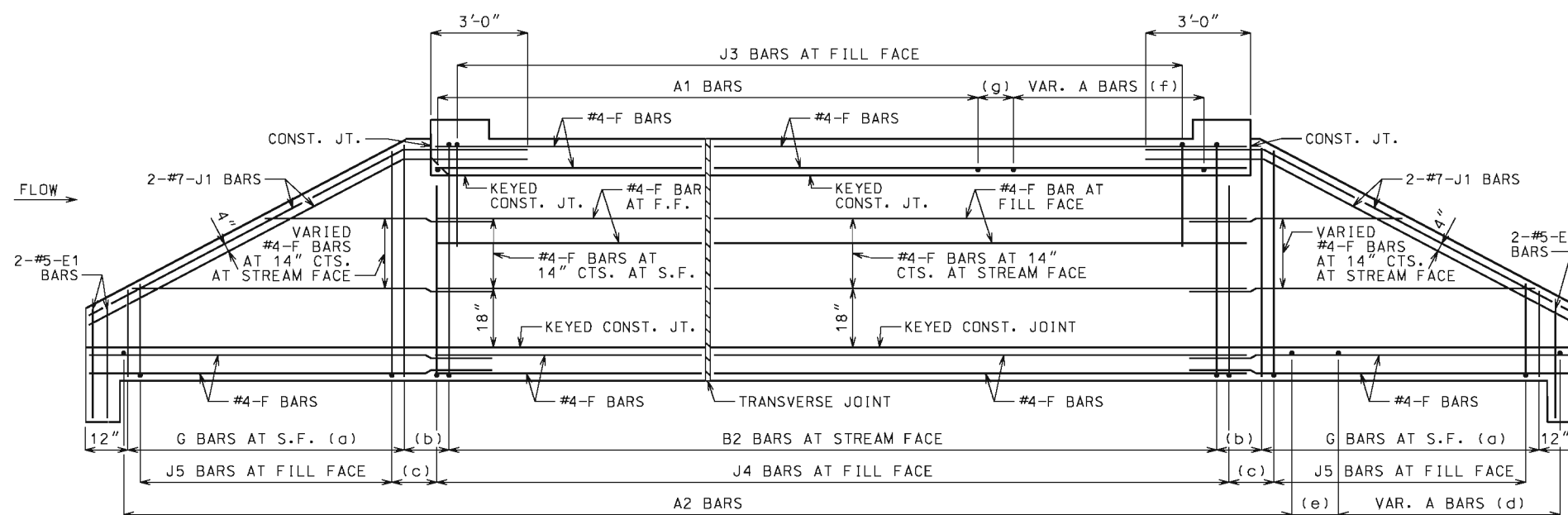
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL  
J1 BARS MAY BE BENT IN FIELD OR SHOP.

### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

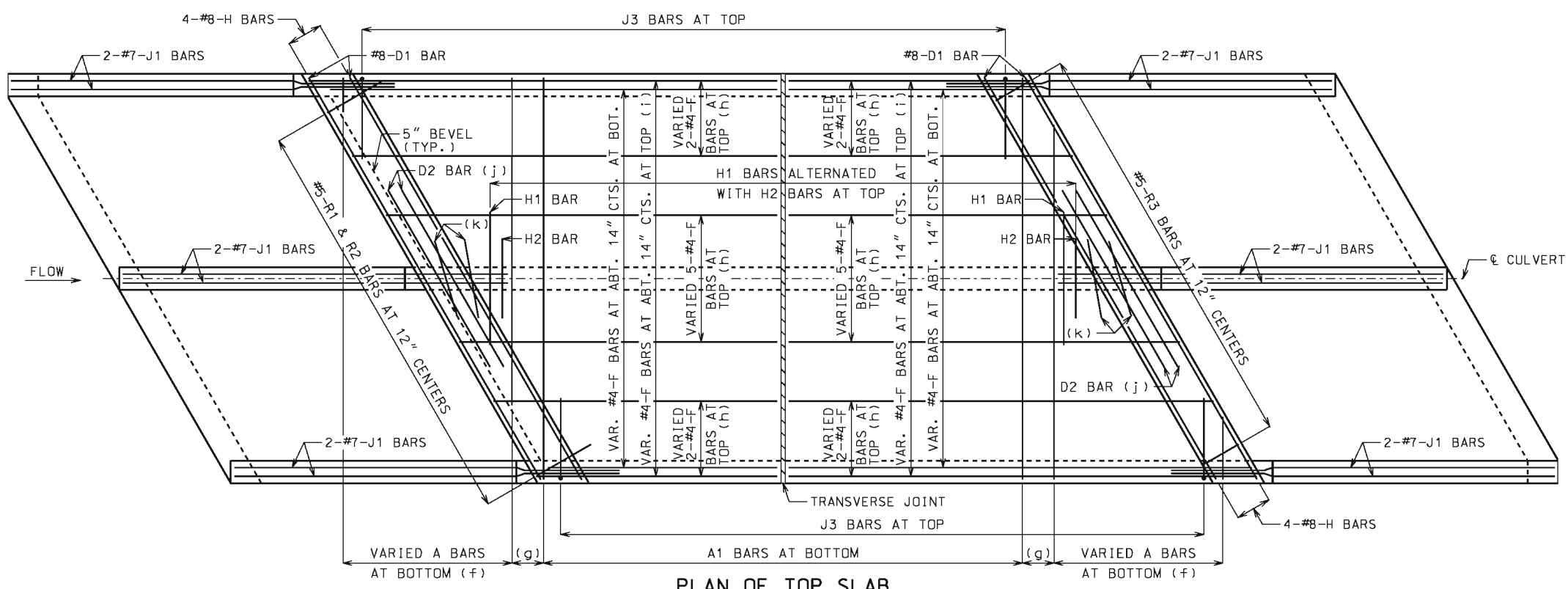
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

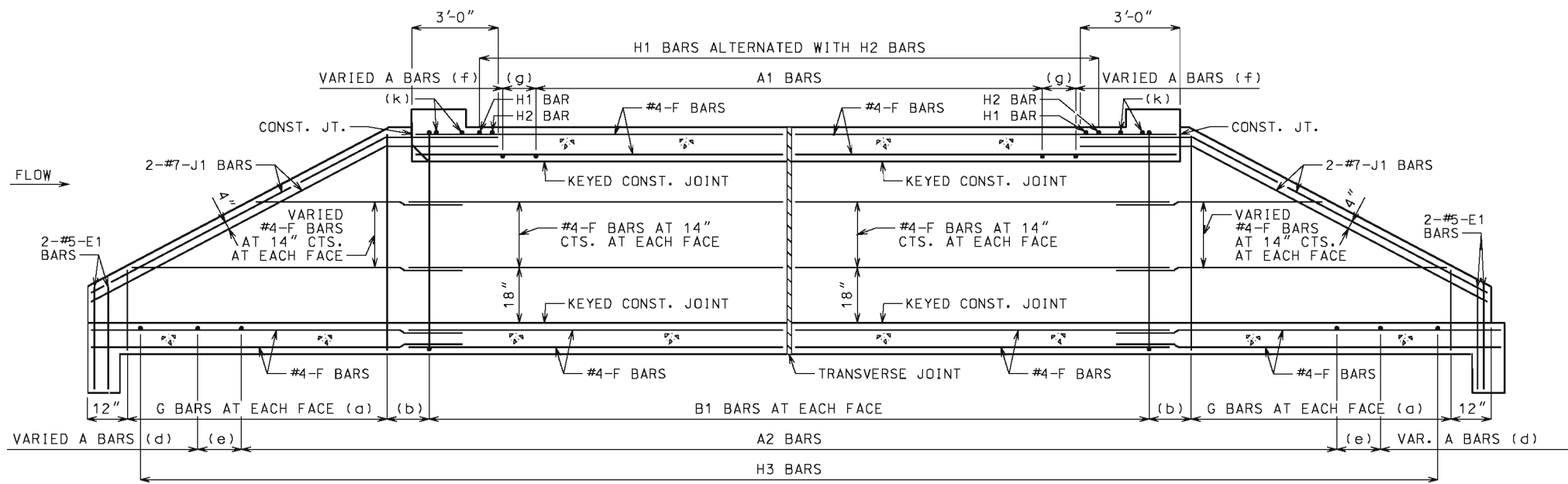
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b>	
	SKEW: LEFT ADVANCE WINGS: STRAIGHT	
<b>REINFORCEMENT</b>		SHEET NO. 1 OF 3
DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.42H</b>	

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

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



**PLAN OF TOP SLAB**  
 B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.  
 FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**  
 J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

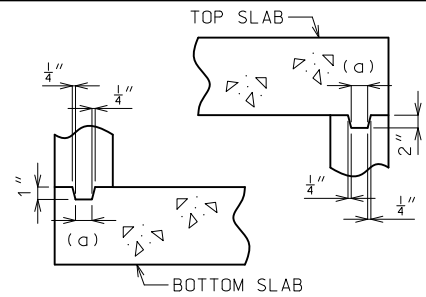
#8 FOR CLEAR SPAN > 10'-0"

#9 FOR CLEAR SPAN > 13'-0"

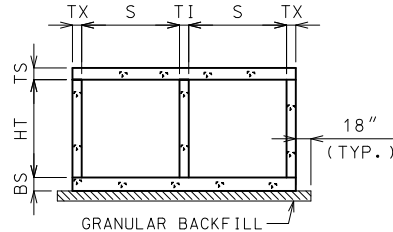
IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

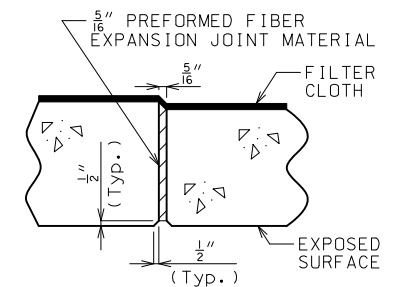
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: STRAIGHT <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.42H</b> SHEET NO. 2 OF 3



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



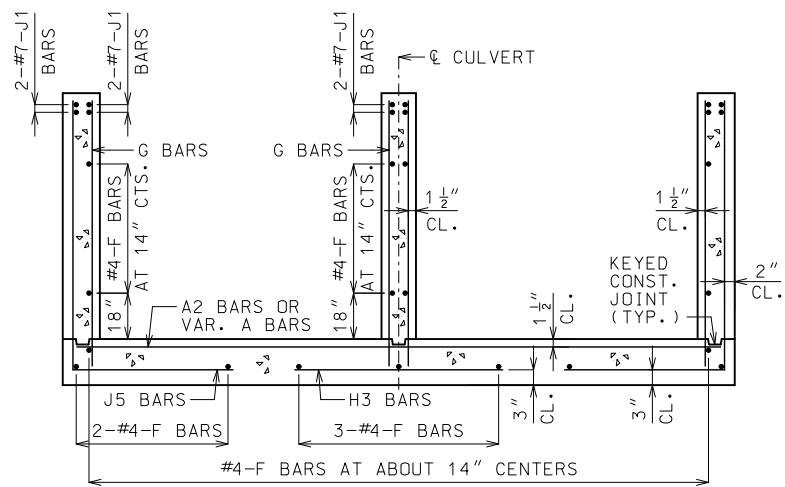
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



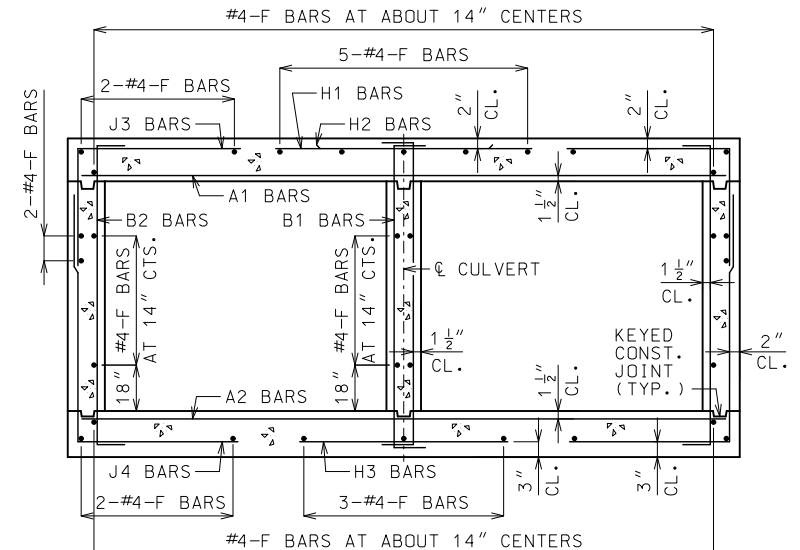
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

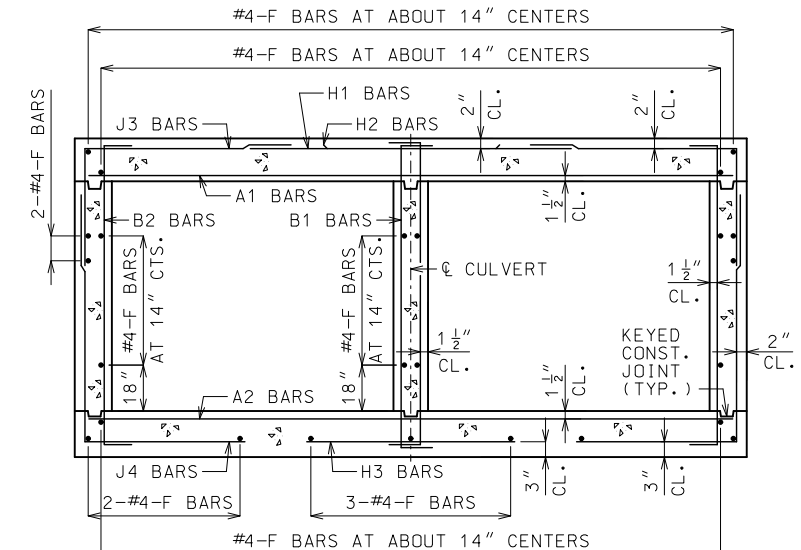
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



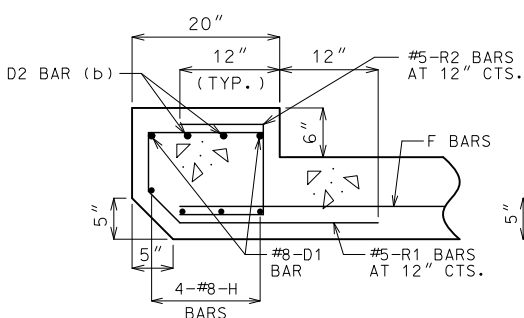
**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



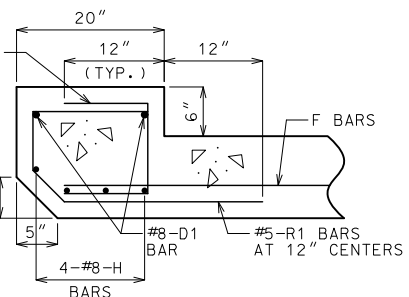
**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



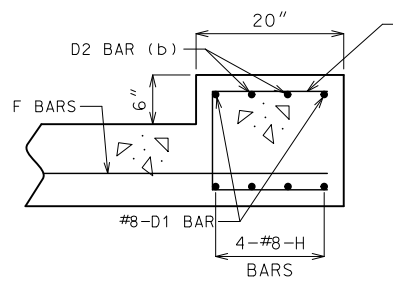
**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**



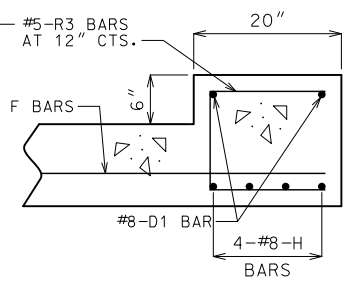
**UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**

(b) #8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"  
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

**GENERAL NOTES:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

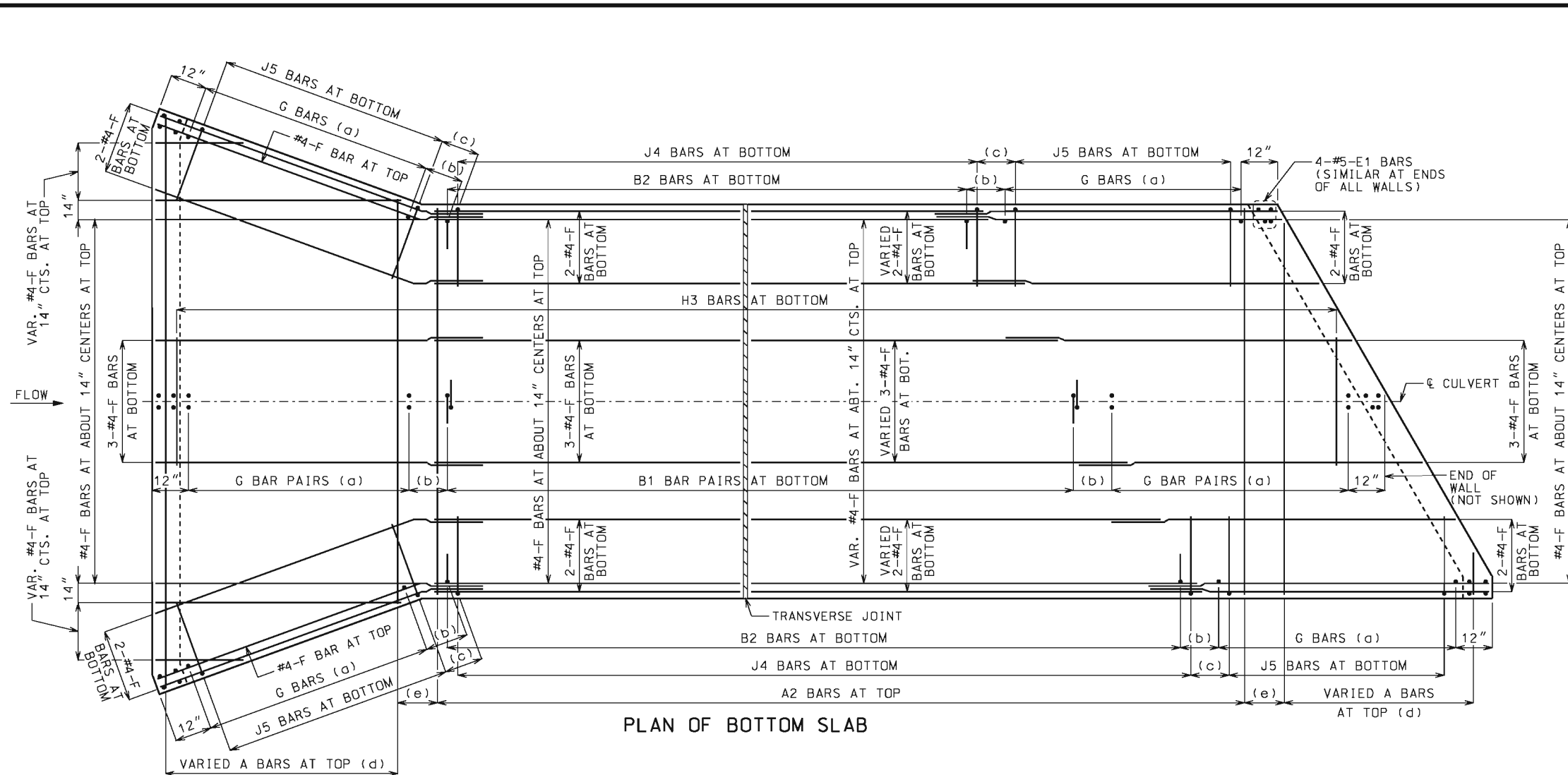
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

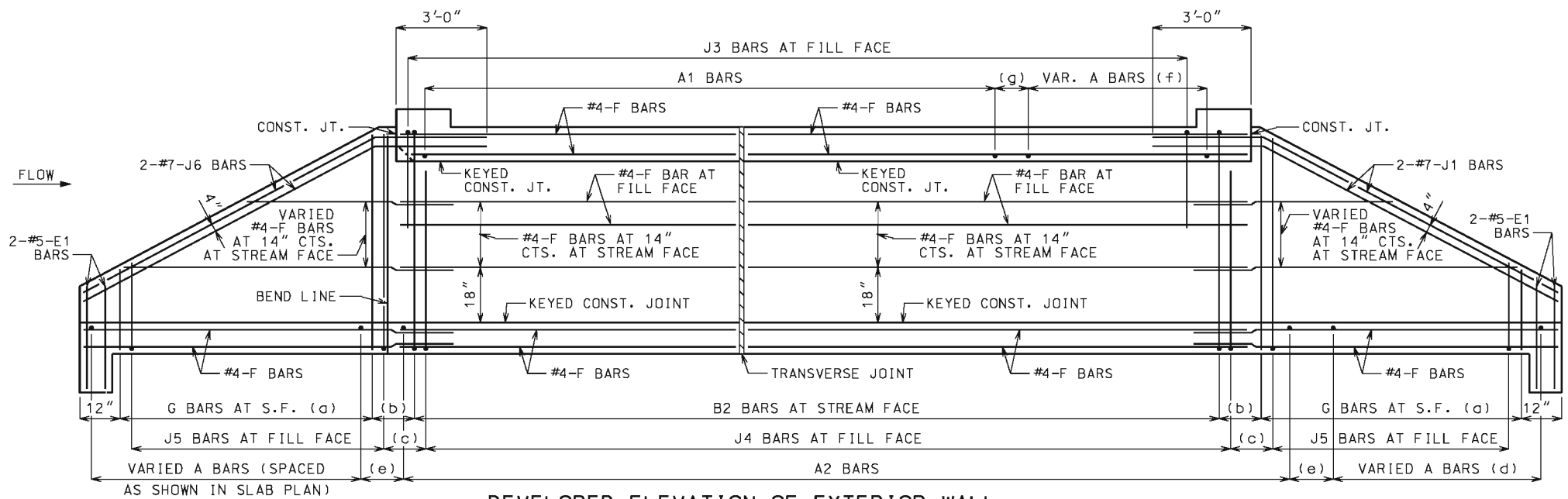
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: STRAIGHT	
	<b>SECTIONS</b>	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.42H</b>	SHEET NO. <b>3 OF 3</b>

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



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL  
J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

**LAYING OUT TRANSVERSE JOINTS**

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

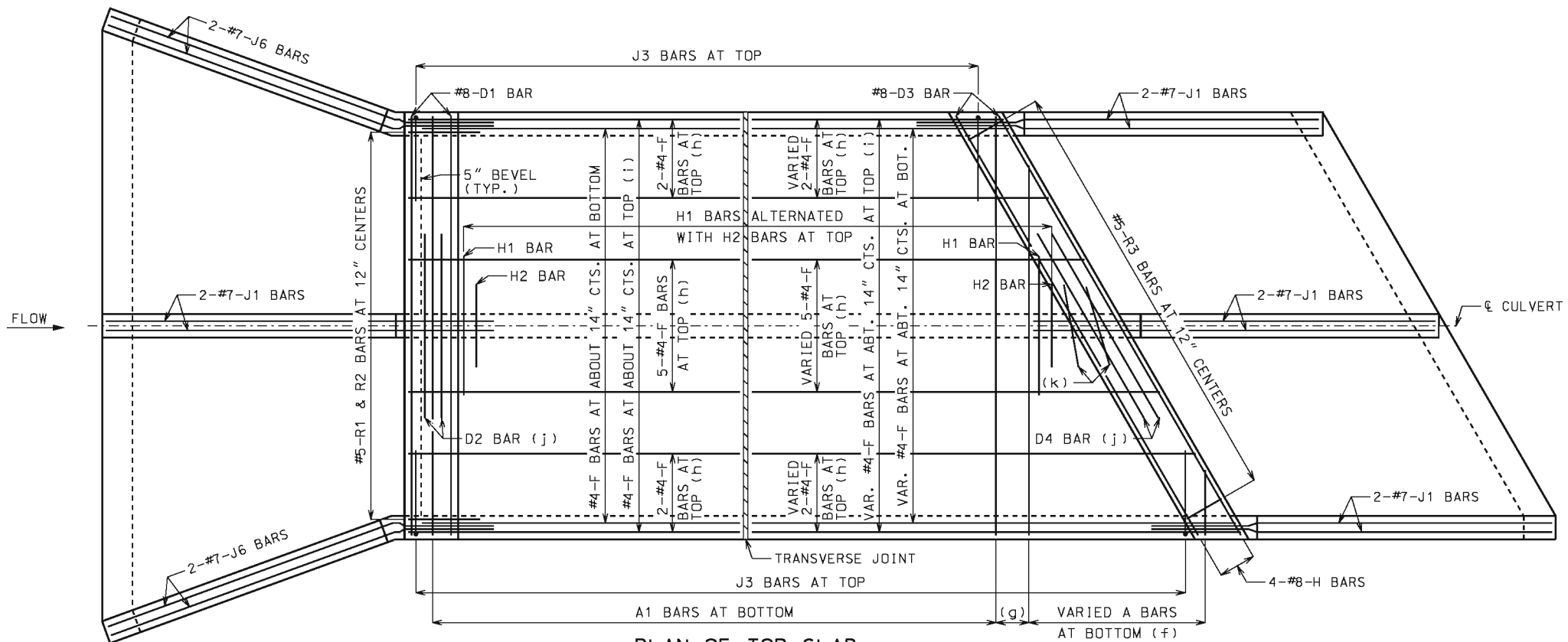
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

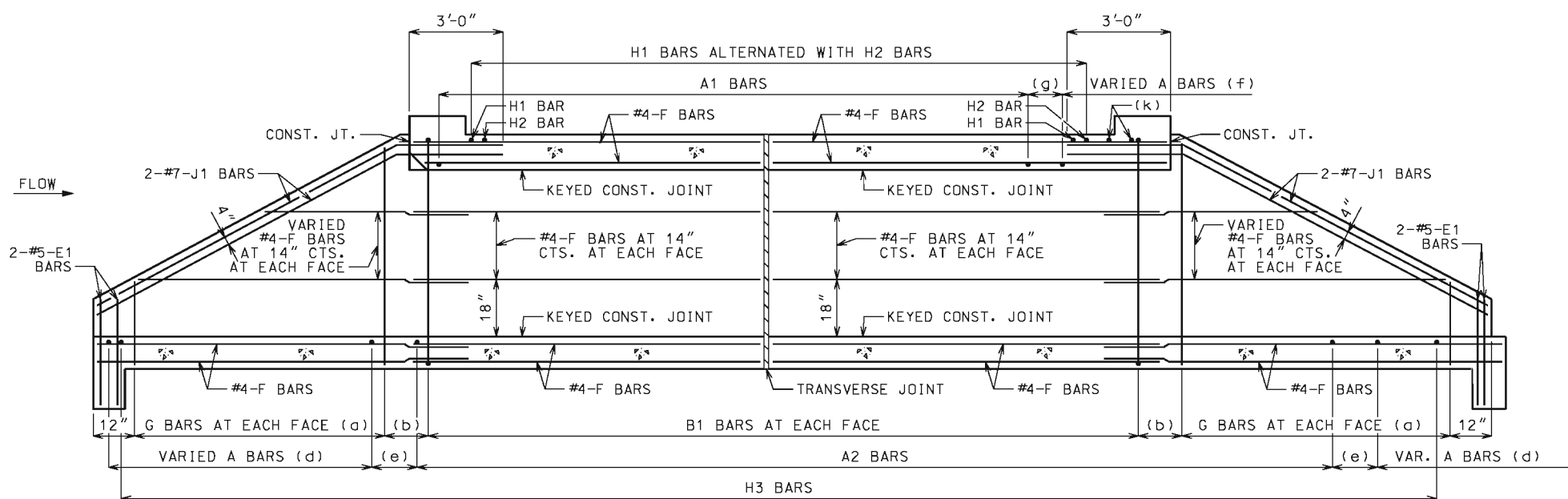
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b>	
	SKEW: LEFT ADVANCE WINGS: FLARED	
<b>REINFORCEMENT</b>		SHEET NO. <b>1 OF 3</b>
DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.43H</b>	

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

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



**PLAN OF TOP SLAB**  
 B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.  
 FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**  
 J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2\"/>

LAP LONGITUDINAL BARS A MINIMUM OF 23\"/>

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12\"/>

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0\"/>

(i) FOR DESIGN FILLS 2'-0\"/>

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0\"/>

#8 FOR CLEAR SPAN > 10'-0\"/>

#9 FOR CLEAR SPAN > 13'-0\"/>

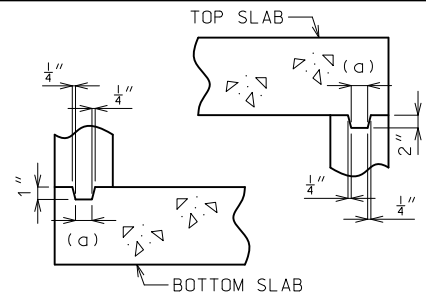
IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN.

THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

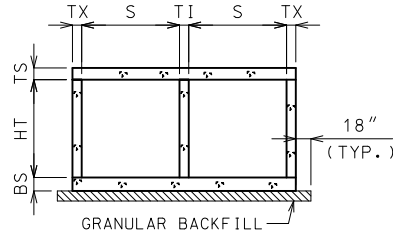
(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: FLARED	
	<b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.43H</b>

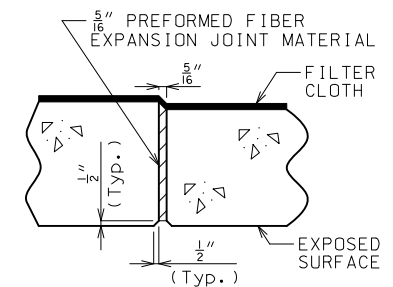




**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



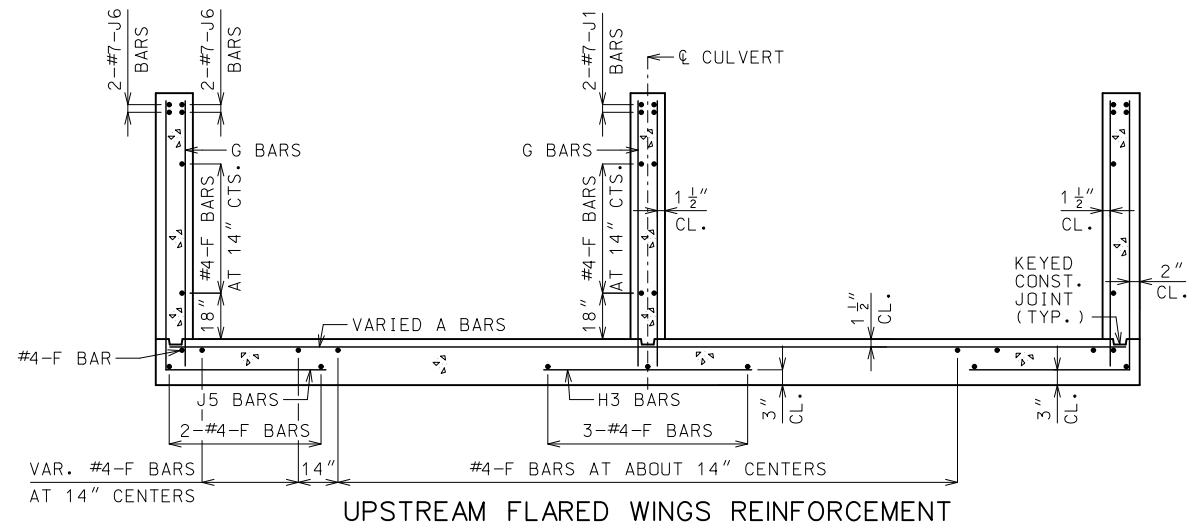
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



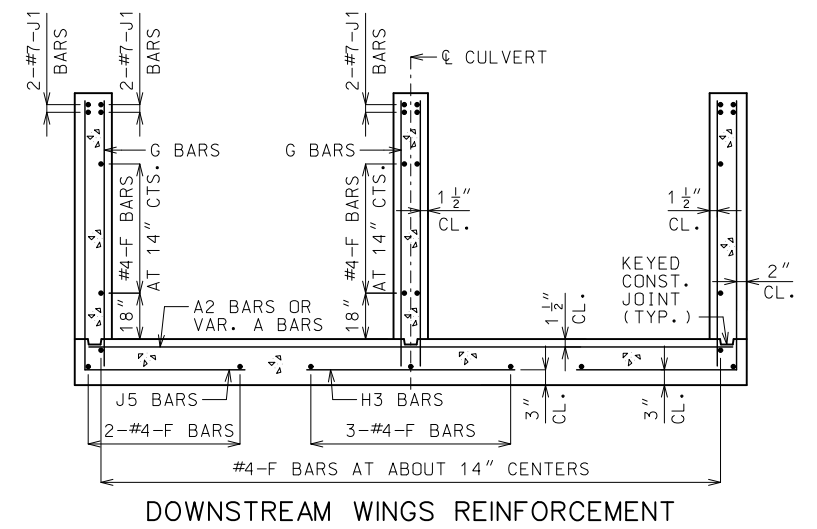
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

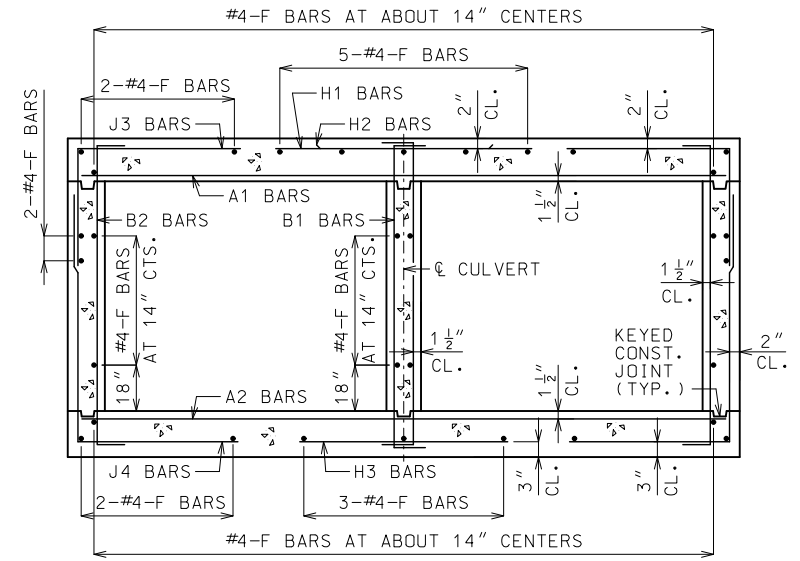
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



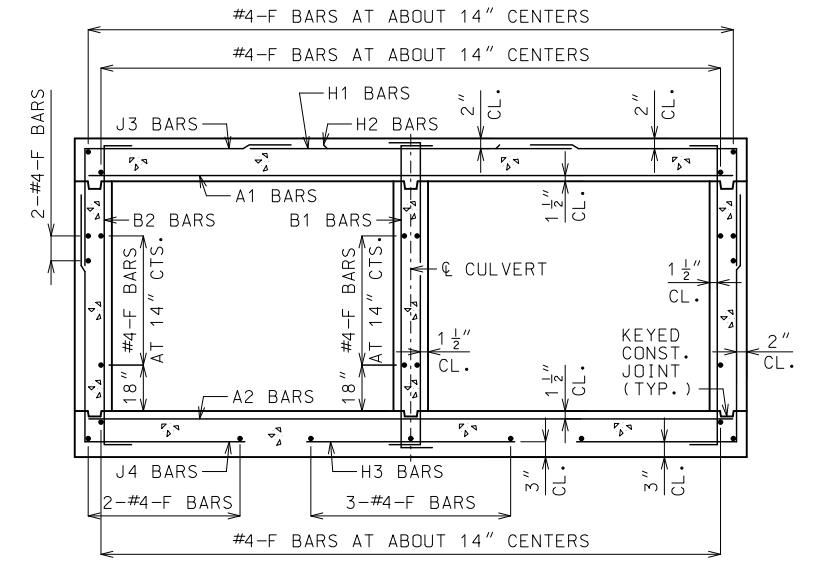
**UPSTREAM FLARED WINGS REINFORCEMENT**



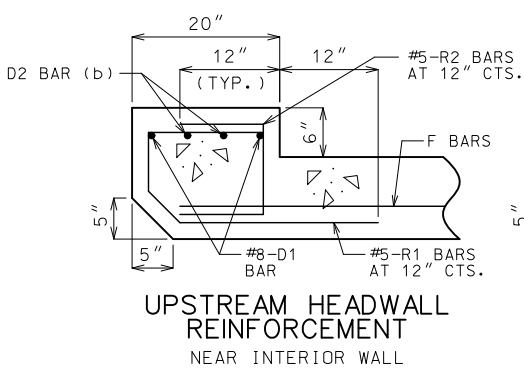
**DOWNSTREAM WINGS REINFORCEMENT**



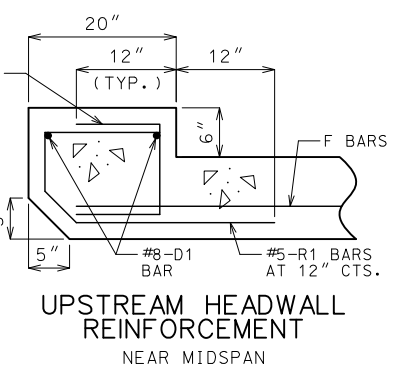
**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



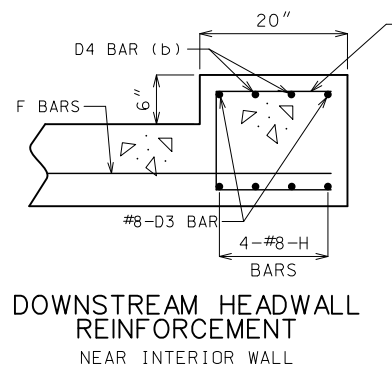
**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**



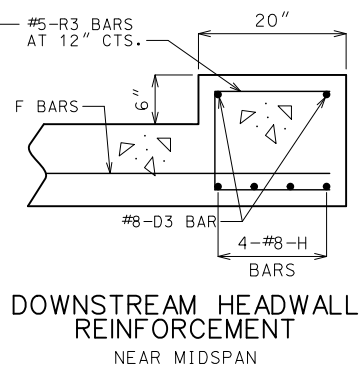
**UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**

(b) #8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"  
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF  $\phi$  WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO  $\phi$  CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p><b>CONCRETE DOUBLE BOX CULVERT</b></p> <p>SKEW: LEFT ADVANCE WINGS: FLARED</p> <p>SECTIONS</p>
<p>DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020</p>	<p><b>703.43H</b></p>
	<p>SHEET NO. <b>3 OF 3</b></p>

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

### LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

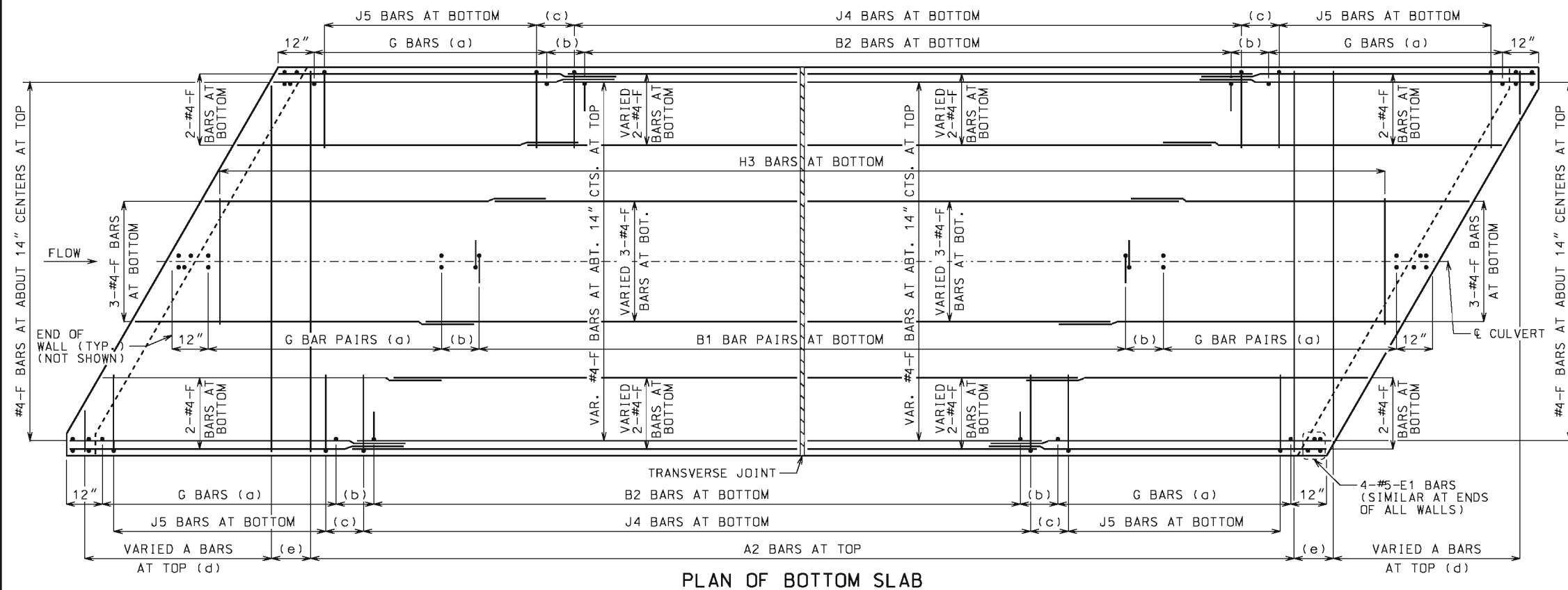
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

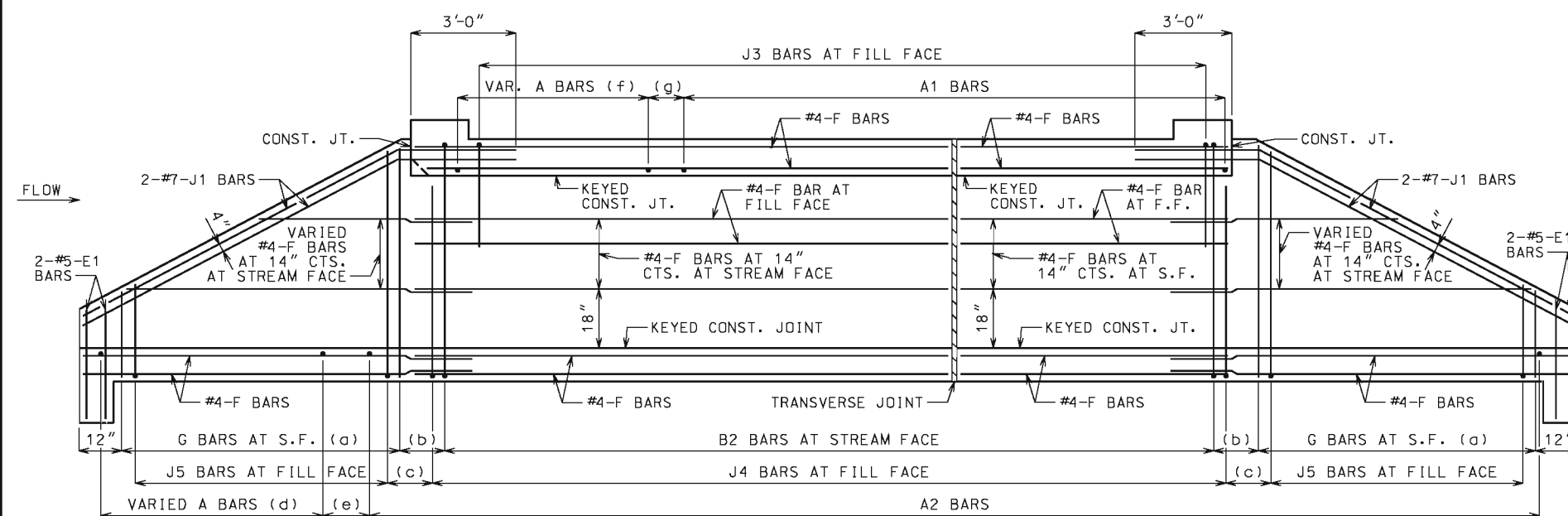
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL  
J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

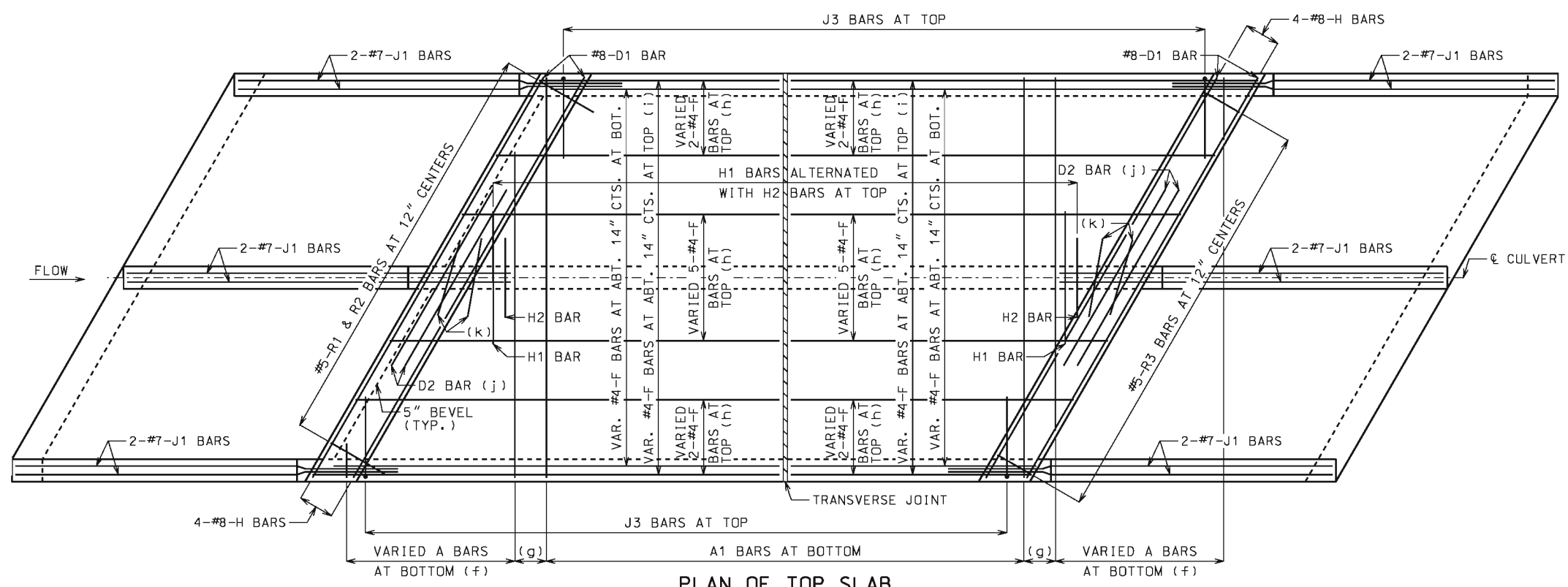
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

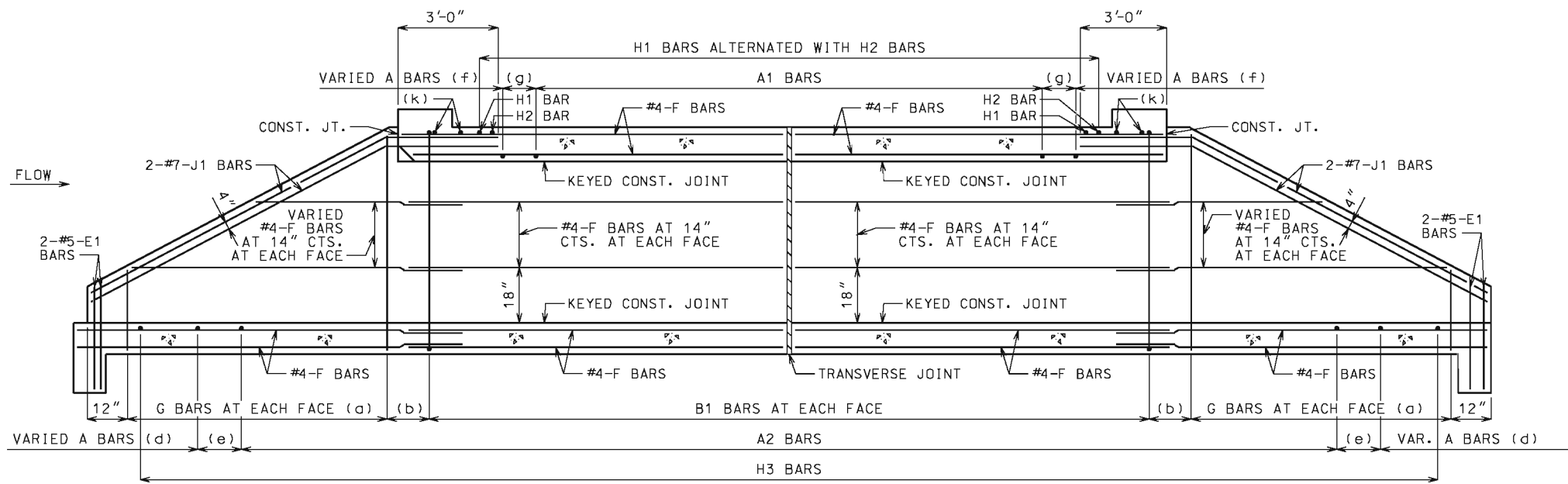
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b>	
	SKEW: RIGHT ADVANCE WINGS: STRAIGHT	
REINFORCEMENT		SHEET NO. 1 OF 3
DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.44H</b>	

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

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



**PLAN OF TOP SLAB**  
 B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.  
 FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**  
 J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#8 FOR CLEAR SPAN > 10'-0"

#9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

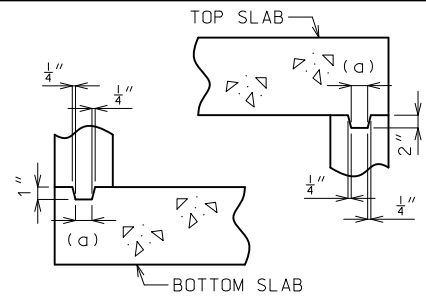
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

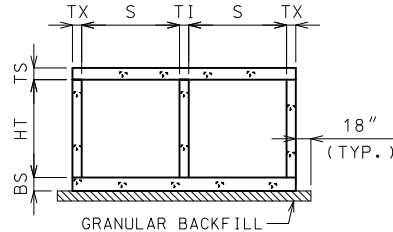
THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.  
 DATE EFFECTIVE: 10/01/2011  
 DATE PREPARED: 5/13/2015

**CONCRETE DOUBLE BOX CULVERT**  
 SKEW: RIGHT ADVANCE  
 WINGS: STRAIGHT  
 REINFORCEMENT

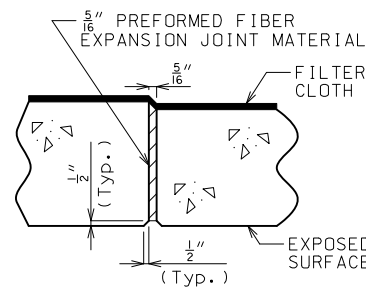
DATE EFFECTIVE: 10/01/2011  
 DATE PREPARED: 5/13/2015  
**703.44H**  
 SHEET NO. 2 OF 3



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



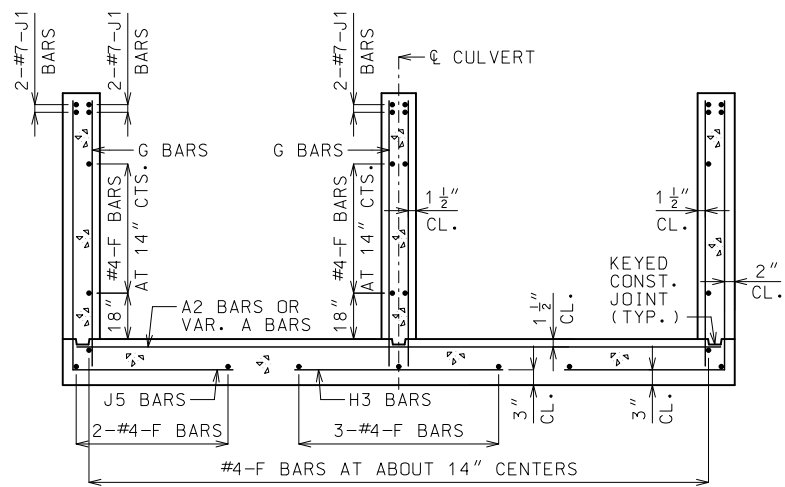
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



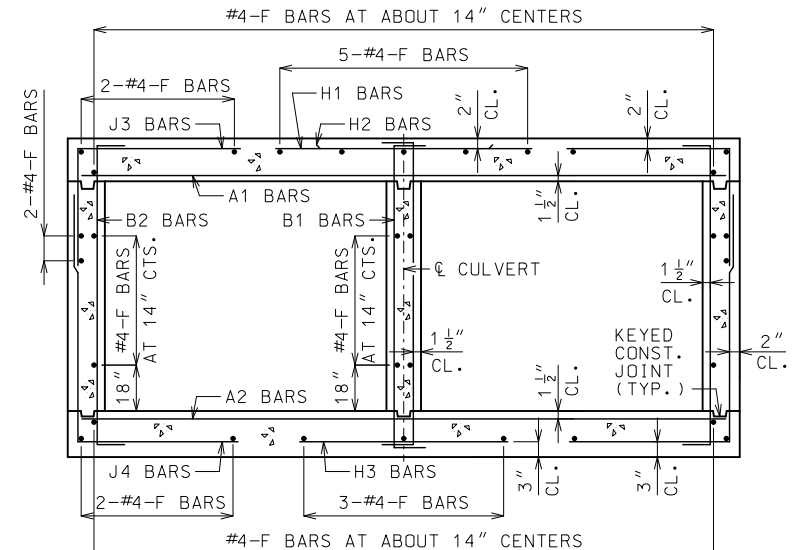
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

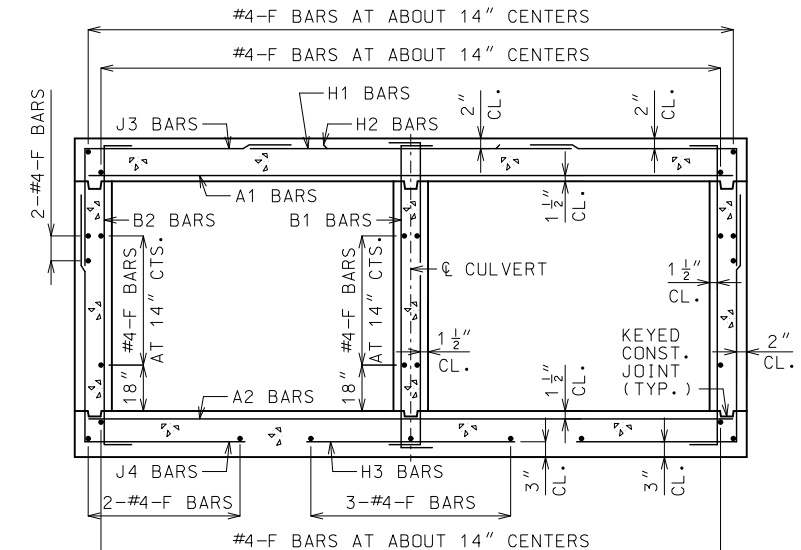
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



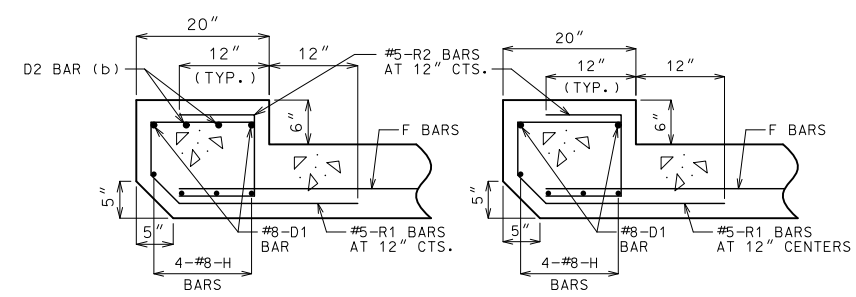
**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**

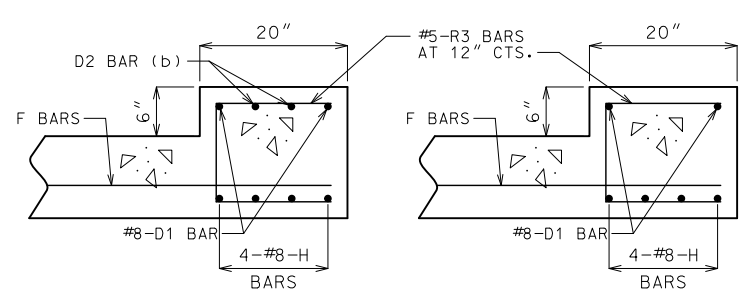


**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**



**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL      NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"  
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"



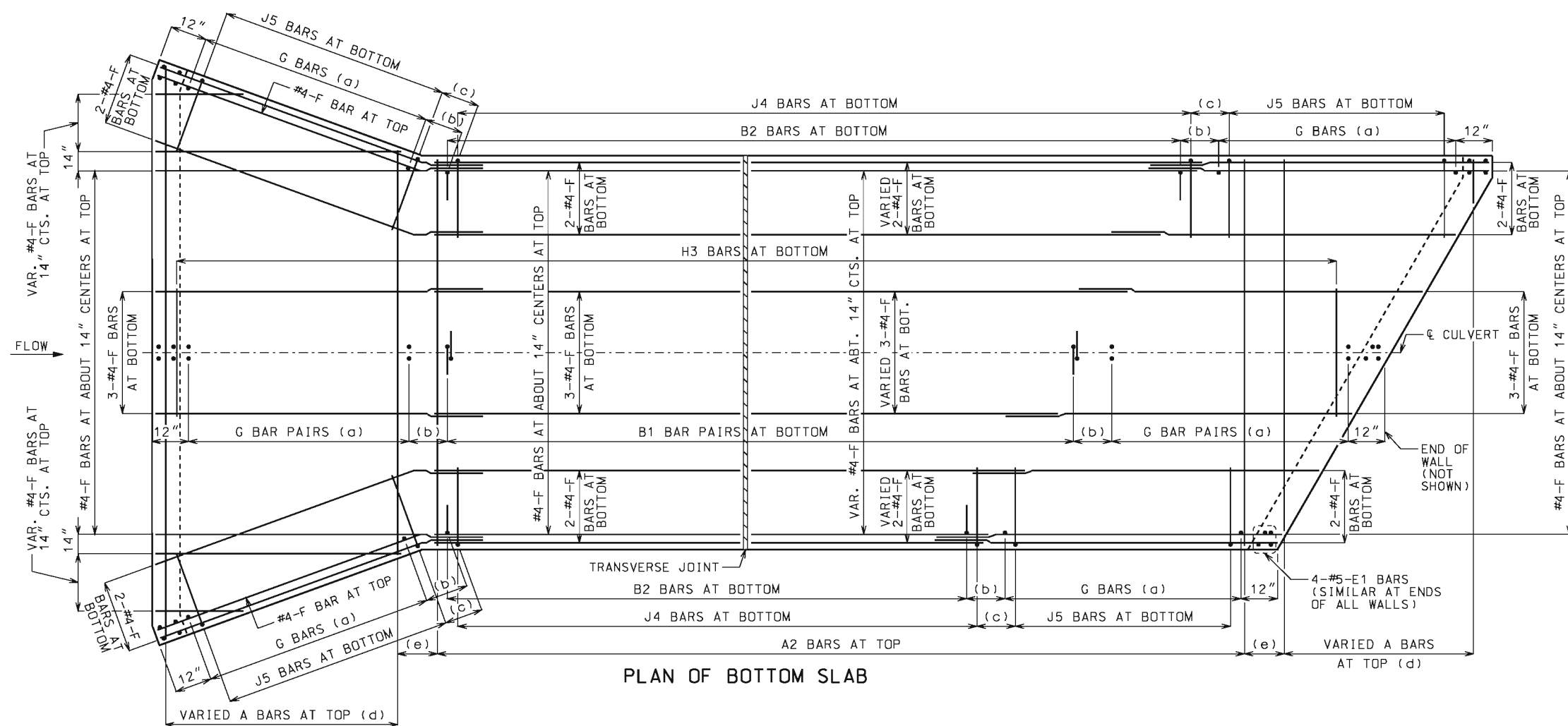
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL      NEAR MIDSPAN

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

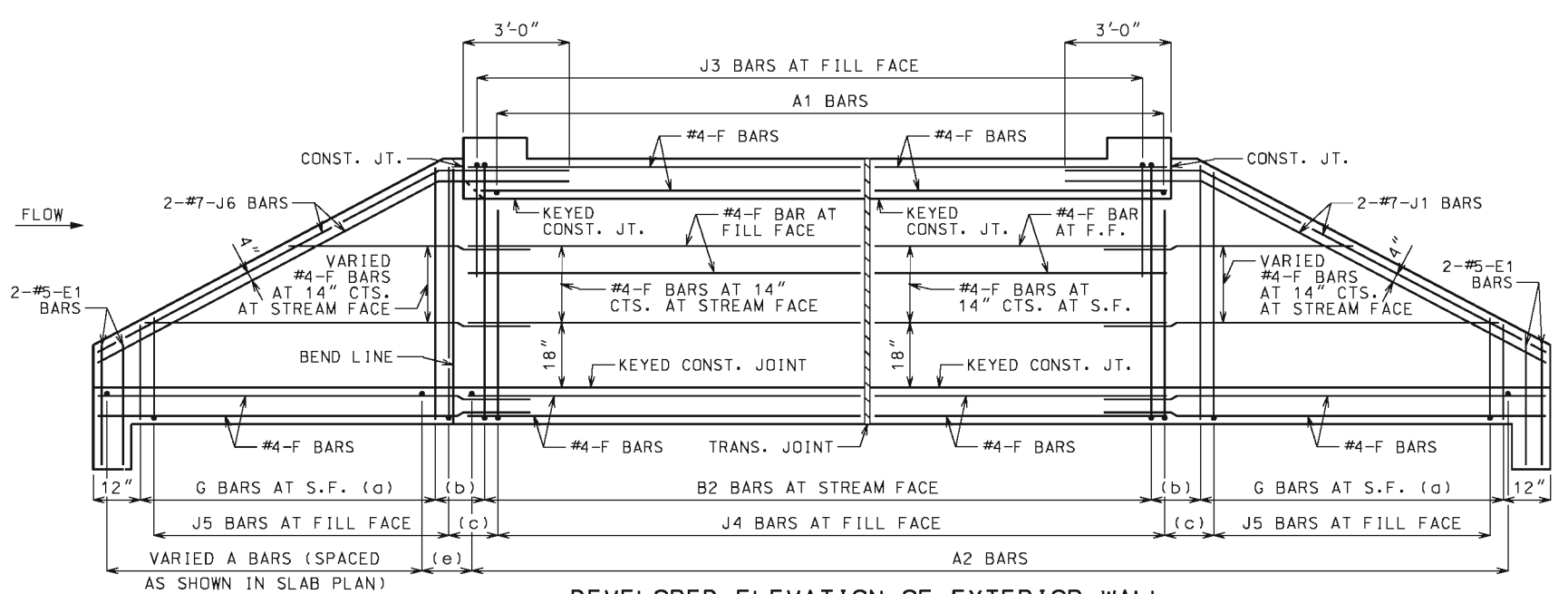
**GENERAL NOTES:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.  
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.  
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.  
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: RIGHT ADVANCE WINGS: STRAIGHT  SECTIONS	
	DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.44H</b> SHEET NO. 3 OF 3

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



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL  
J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

- BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT
- CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

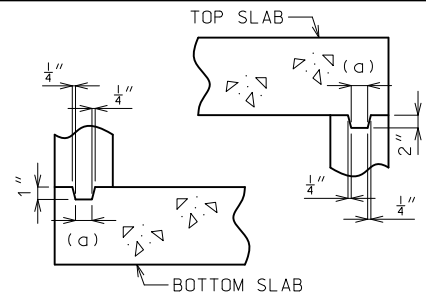
(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

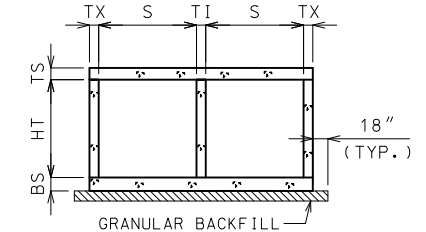
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: RIGHT ADVANCE WINGS: FLARED <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015	<b>703.45C</b> SHEET NO. 1 OF 3

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

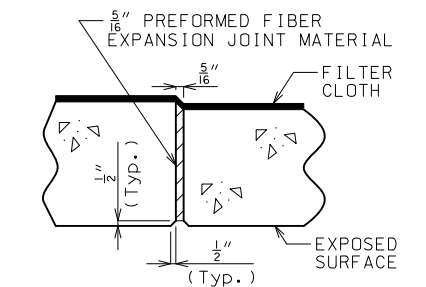




**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



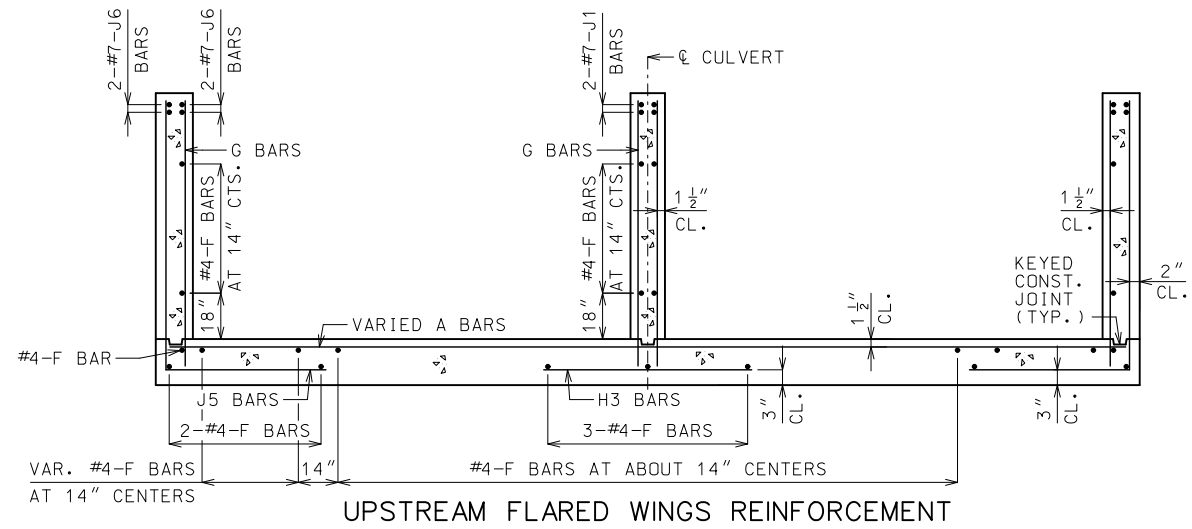
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



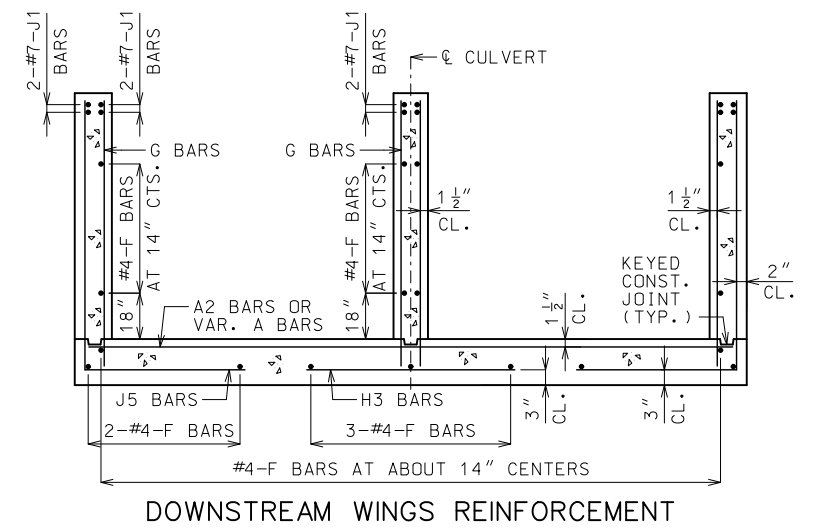
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

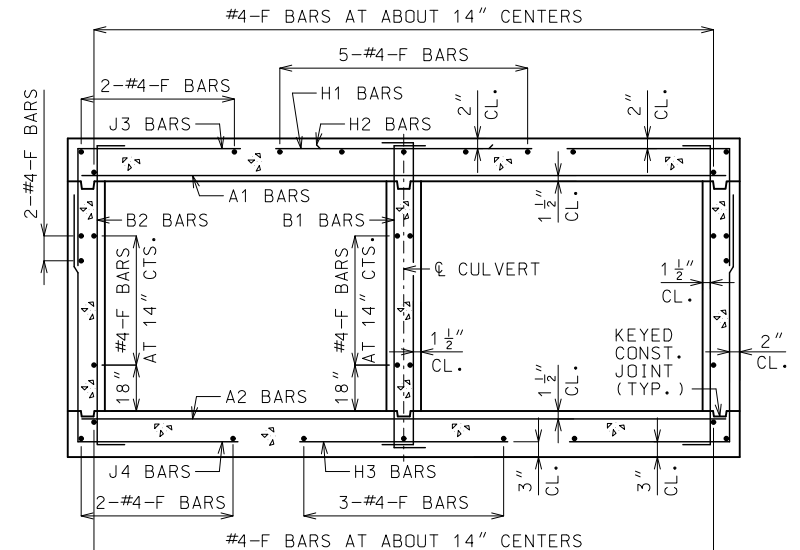
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



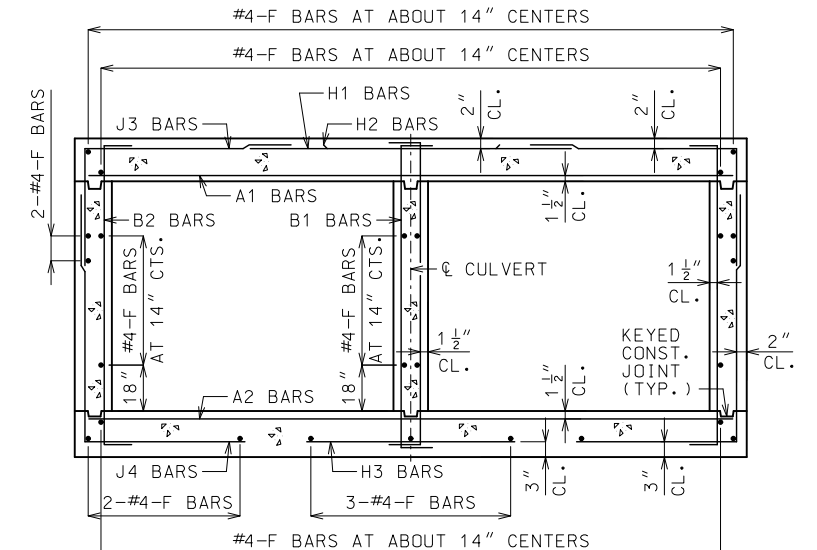
**UPSTREAM FLARED WINGS REINFORCEMENT**



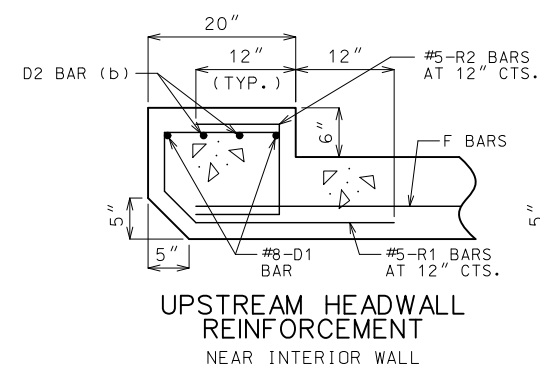
**DOWNSTREAM WINGS REINFORCEMENT**



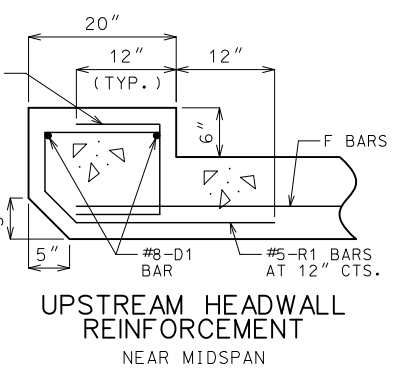
**BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"**



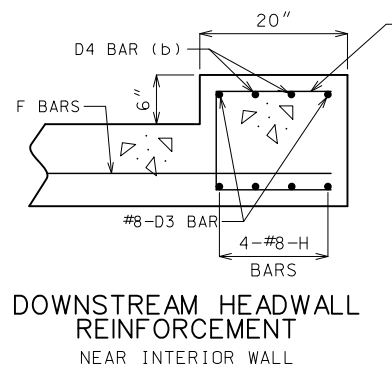
**BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS**



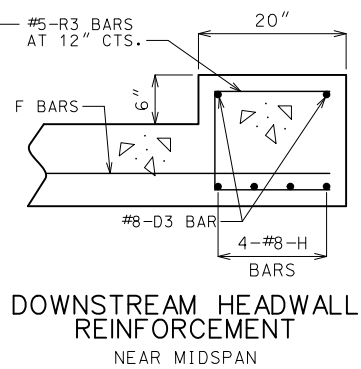
**UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL**



**DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN**

(b) #8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"  
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"



IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

**GENERAL NOTES:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

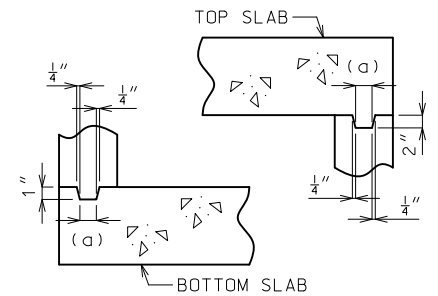
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

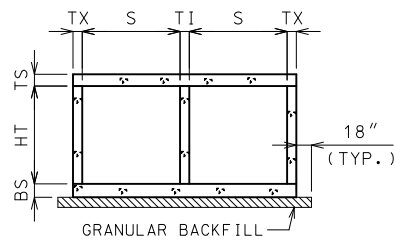
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> SKEW: RIGHT ADVANCE WINGS: FLARED  SECTIONS
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.45C</b>
	SHEET NO. <b>3 OF 3</b>

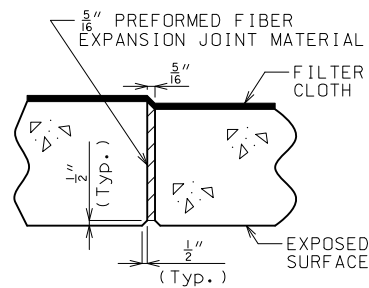
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



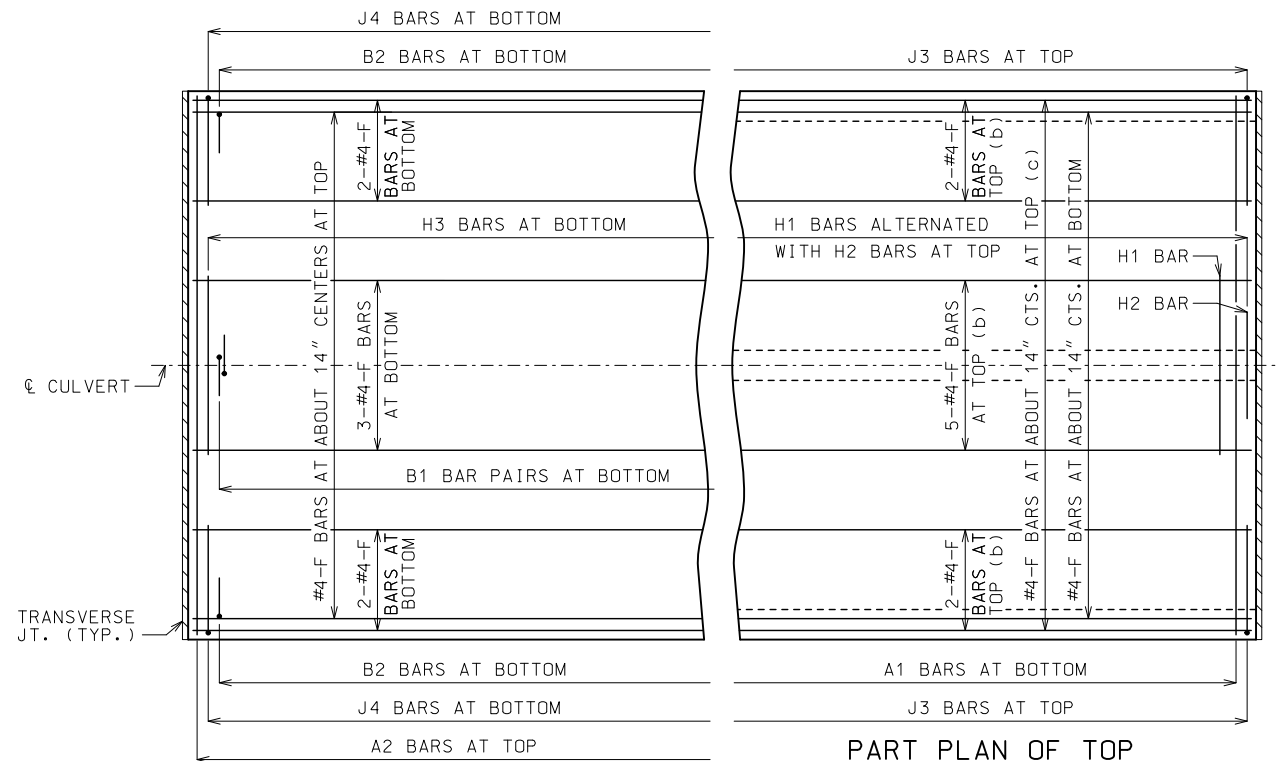
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

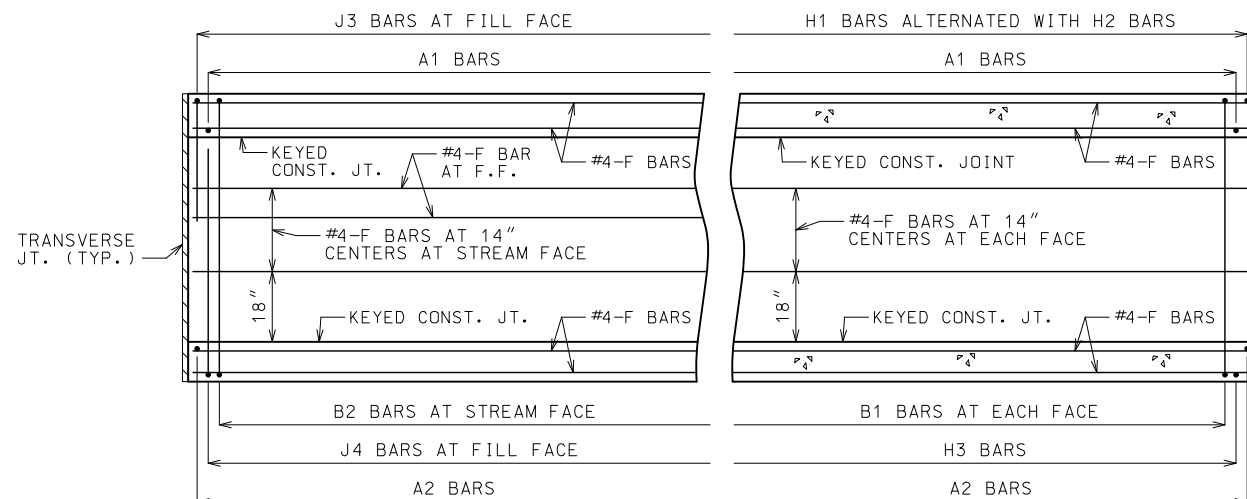
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



**PART PLAN OF BOTTOM SLAB REINFORCEMENT**

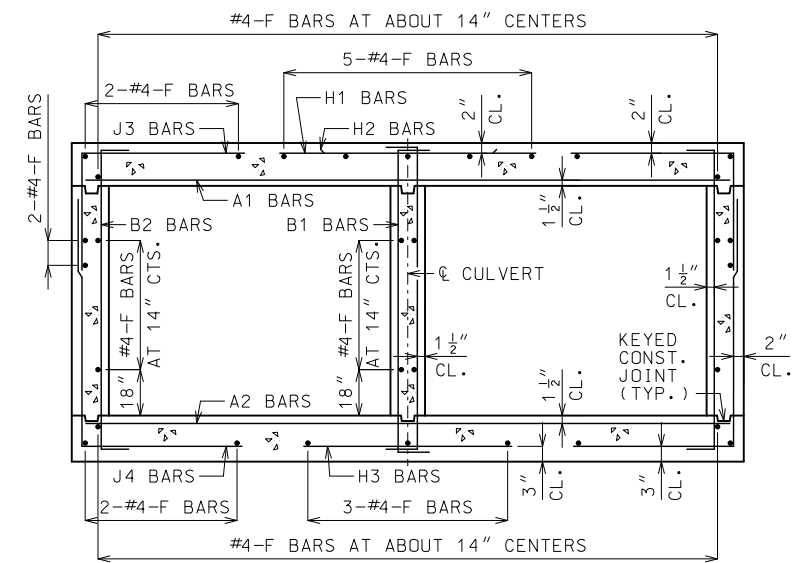
**PART PLAN OF TOP SLAB REINFORCEMENT**

(b) FOR DESIGN FILLS OVER 2'-0"  
(c) FOR DESIGN FILLS 2'-0" OR LESS



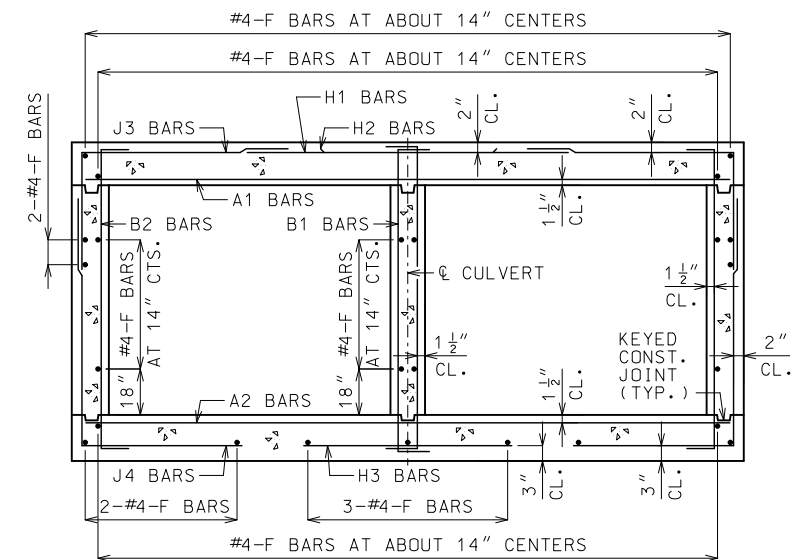
**PART ELEVATION OF EXTERIOR WALL REINFORCEMENT**

**PART SECTION NEAR INTERIOR WALL REINFORCEMENT**



**BARREL REINFORCEMENT**

FOR DESIGN FILLS OVER 2'-0"  
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.



**BARREL REINFORCEMENT**

FOR DESIGN FILLS 2'-0" OR LESS  
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.

**GENERAL NOTES**

**DESIGN SPECIFICATIONS:**  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

**DESIGN LOADING:**  
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)


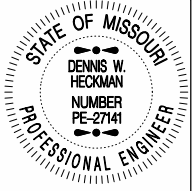
**DESIGN UNIT STRESSES:**  
CLASS B-1 CONCRETE (BOX CULVERT)  $f'_c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

**MISCELLANEOUS:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.47.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS, PART ELEVATION AND PART SECTION.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> CUT SECTION
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.46</b>
	SHEET NO. <b>1 OF 1</b>

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



SPAN (S) = 3 FT      HEIGHT (HT) = 2 FT OR 3 FT OR 4 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	12	35.3	28	40	52	4	12	24.5	5	12	5	12	12
2 FT	10	8	8	8	4	9	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	12	33.0	28	40	52	4	12	24.5	5	12	5	12	12
2'-4'	10	8	8	8	4	9	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	12	33.0	28	40	52	4	12	24.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	23.8	24.0	24.0	24.0	4	24	39.5	4	24	15.5	4	12	4	12	30.1	28	40	52	4	12	23.5	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	30.0	24.0	24.0	24.0	4	24	24.5	4	24	15.0	4	12	4	12	28.0	28	40	52	4	12	23.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	28.0	24.0	24.0	24.0	4	24	23.5	4	24	15.0	4	12	4	12	27.0	28	40	52	4	12	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	25.0	24.0	24.0	24.0	4	24	22.0	4	24	14.5	4	12	4	12	24.6	28	40	52	4	12	22.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	24.9	24.0	24.0	24.0	4	24	22.0	4	24	15.5	4	12	4	12	24.5	28	40	52	4	12	22.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	24.0	4	24	22.0	4	24	16.0	4	12	4	12	24.5	28	40	52	4	11.5	22.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	24.0	4	24	22.0	4	24	17.0	4	12	4	12	24.4	28	40	52	4	10.5	22.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	24.0	4	24	22.0	4	24	17.5	4	12	4	12	24.4	28	40	52	4	10	22.5	5	12	5	12	0
20 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	17.5	4	12	4	12	24.3	28	40	52	4	9.5	22.5	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	12	4	12	24.3	28	40	52	4	9	22.5	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	12	4	12	24.3	28	40	52	4	8.5	22.5	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	11	4	11	24.3	28	40	52	4	8	22.5	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	11	24.4	24.0	24.0	24.0	4	23	22.0	4	23	18.0	4	10.5	4	10.5	24.1	28	40	52	4	7.5	22.5	5	12	5	12	0
30 FT	8	8	8	8	4	11.5	4	10.5	24.4	24.0	24.0	24.0	4	22	22.0	4	22	18.0	4	9	4	9.5	24.1	28	40	52	4	7.5	22.5	5	12	5	12	0
32 FT	8	9	8	8	4	11	4	9.5	24.5	24.0	24.0	24.0	4	21	22.0	4	21	18.0	4	10.5	4	12	24.5	29	41	53	4	8	22.5	5	12	5	12	0
34 FT	8	9	8	8	4	10.5	4	9	24.5	24.0	24.0	24.0	4	20	22.0	4	20	18.0	4	9.5	4	11.5	24.4	29	41	53	4	8	22.5	5	12	5	12	0
36 FT	8	9	8	8	4	10	4	8.5	24.4	24.0	24.0	24.0	4	19	22.0	4	19	18.0	4	9	4	11	24.4	29	41	53	4	7.5	22.5	5	12	5	12	0
38 FT	8	10	8	8	4	9.5	4	8	24.5	24.0	24.0	24.0	4	18	22.0	4	18	17.5	4	10	4	12	24.8	30	42	54	4	8.5	22.5	5	12	5	12	0
40 FT	8	10	8	8	4	9	4	7.5	24.5	24.0	24.0	24.0	4	17	22.0	4	17	17.5	4	9.5	4	12	24.8	30	42	54	4	8	22.5	5	12	5	12	0
42 FT	9	10	8	8	4	9	4	9	24.6	25.0	25.0	25.0	4	19	22.0	4	19	17.5	4	9	4	11.5	24.8	30	42	54	4	8	22.5	5	12	5	12	0
44 FT	9	10	8	8	4	9	4	8.5	24.6	25.0	25.0	25.0	4	18	22.0	4	18	17.5	4	8.5	4	11	24.8	30	42	54	4	8	22.5	5	12	5	12	0
46 FT	9	11	8	8	4	8.5	4	8	24.8	25.0	25.0	25.0	4	18	22.0	4	18	17.5	4	9	4	10.5	25.0	31	43	55	4	8.5	22.5	5	12	5	12	0
48 FT	9	11	8	8	4	8	4	7.5	24.8	25.0	25.0	25.0	4	17	22.0	4	17	17.5	4	8.5	4	10.5	25.0	31	43	55	4	8	22.5	5	12	5	12	0
50 FT	10	11	8	8	4	8.5	4	8	24.9	26.0	26.0	26.0	4	19	21.5	4	19	17.5	4	8.5	4	10.5	25.1	31	43	55	4	8	22.5	5	12	5	12	0

SPAN (S) = 3 FT      HEIGHT (HT) = 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.
1 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	11.5	39.0	64	76	4	12	24.5	5	12	5	12	12
2 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	11	39.9	64	76	4	11.5	24.5	5	12	5	12	12
2'-4'	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	10	39.9	64	76	4	11.5	24.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	23.8	24.0	24.0	24.0	4	24	39.5	4	24	15.0	4	12	4	10	38.6	64	76	4	12	23.5	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	36.9	24.0	24.0	24.0	4	24	25.0	4	24	14.5	4	12	4	9.5	36.9	64	76	4	12	23.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	38.6	24.0	24.0	24.0	4	24	23.5	4	24	15.0	4	12	4	9	35.8	64	76	4	12	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	33.1	24.0	24.0	24.0	4	24	21.5	4	24	14.0	4	12	4	9.5	32.8	64	76	4	12	22.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	32.8	24.0	24.0	24.0	4	24	21.5	4	24	15.0	4	12	4	9	32.5	64	76	4	12	22.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	11	32.4	24.0	24.0	24.0	4	24	21.5	4	24	16.0	4	12	4	8.5	32.3	64	76	4	12	22.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	10	32.1	24.0	24.0	24.0	4	24	21.5	4	24	16.5	4	12	4	8	32.1	64	76	4	11.5	22.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	9	32.0	24.0	24.0	24.0	4	24	21.5	4	24	17.0	4	12	4	7.5	32.0	64	76	4	11	22.5	5	12	5	12	0
20 FT	8	8	8	8	4	12	4	8	31.8	24.0	24.0	24.0	4	24	21.5	4	24	17.0	4	12	4	7	31.9	64	76	4	10	22.5	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	7.5	31.6	24.0	24.0	24.0	4	24	21.5	4	24	17.5	4	12	4	6.5	31.8	64	76	4	9.5	22.5	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	7	31.6	24.0	24.0	24.0	4	24	21.5	4	24	17.5	4	12	4	6	31.6	64	76	4	9.5	22.5	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	6.5	31.5	24.0	24.0	24.0	4	24	21.5	4	24	17.5	4	11.5	5	6.5	31.6	64	76	4	9	22.5	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	6	31.5	24.0	24.0	24.0	4	24	21.5	4	24	17.5	4	10.5	5	6	31.5	64	76	4	8.5	22.5	5	12	5	12	0
30 FT	8	9	8	8	4	12	5	6.5	31.3	24.0	28.0	28.0	4	24	21.5	4	24	17.5	4	11.5	5	6.5	32.8	65	77	4	10	22.5	5	12	5	11.5	0
32 FT	8	9	8	8	4	11	5	6	31.3	24.0	28.0	28.0	4	24	21.5	4	24	17.5	4	11	5	6	32.6	65	77	4	9.5	22.5	5	12	5	11	0
34 FT	8	9	8	8	4	10.5	5	6																									

		SPAN (S) = 4 FT										HEIGHT (HT) = 2 FT OR 3 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=2' HT=3'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=2' HT=3'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	29.3	28	40	4	9.5	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.0	4	12	4	12	27.3	28	40	4	9	27.5	5	12	5	12	12
2' - 4'	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.0	4	12	4	12	27.3	28	40	4	9	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	26.3	24.0	24.0	4	24	34.0	4	24	19.0	4	12	4	12	25.0	28	40	4	9.5	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	12	24.0	28	40	4	9.5	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	24.1	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	12	23.4	28	40	4	9	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	22.6	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	22.1	28	40	4	9	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	22.1	28	40	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	22	25.5	4	22	18.5	4	12	4	12	22.1	28	40	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	20	25.5	4	20	18.5	4	11	4	12	22.1	28	40	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	18	25.5	4	18	18.5	4	10	4	11.5	22.0	28	40	4	6.5	25.5	5	12	5	12	0
20 FT	8	8	8	8	4	10.5	4	11.5	22.5	24.0	24.0	4	17	25.5	4	17	18.5	4	9	4	10.5	22.0	28	40	4	6	25.5	5	12	5	12	0
22 FT	8	9	8	8	4	10	4	10.5	22.6	24.0	24.0	4	15	25.5	4	15	18.5	4	9	4	12	21.4	29	41	4	6.5	26.0	5	12	5	12	0
24 FT	8	9	8	8	4	9	4	9.5	22.6	24.0	24.0	4	14	25.5	4	14	18.5	4	8.5	4	12	21.4	29	41	4	6	26.0	5	12	5	12	0
26 FT	8	10	8	8	4	8.5	4	8.5	22.8	24.0	24.0	4	13	25.5	4	13	18.5	4	8.5	4	12	20.9	30	42	4	6.5	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	8	22.8	24.0	24.0	4	12	25.5	4	12	18.5	4	8	4	12	20.9	30	42	4	6.5	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	8	4	10.5	22.3	25.0	25.0	4	13	25.5	4	13	18.5	4	7.5	4	12	21.0	30	42	4	6	26.0	5	12	5	12	0
32 FT	9	11	8	8	4	7.5	4	10	22.4	25.0	25.0	4	12	25.5	4	12	18.5	4	8	4	10.5	20.6	31	43	4	6.5	26.0	5	12	5	12	0
34 FT	10	11	8	8	4	7.5	4	10.5	22.0	26.0	26.0	4	13	25.0	4	13	18.5	4	7.5	4	10.5	20.9	31	43	4	6	26.0	5	12	5	12	0
36 FT	10	12	8	8	4	7.5	4	10	22.1	26.0	26.0	4	12	25.0	4	12	18.5	4	7.5	4	9.5	20.6	32	44	4	6.5	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	7	4	9.5	22.1	26.0	26.0	4	12	25.0	4	12	18.5	4	7.5	4	9.5	20.6	32	44	4	6	26.0	5	12	5	12	0
40 FT	11	12	8	8	4	7	4	9.5	21.8	27.0	27.0	4	13	25.0	4	13	18.5	4	7	4	9.5	20.9	32	44	4	6	26.0	5	12	5	12	0
42 FT	11	13	8	8	4	6.5	4	9.5	21.9	27.0	27.0	4	12	25.0	4	12	18.5	4	7	4	8.5	20.6	33	45	4	6	26.0	5	12	5	12	0
44 FT	11	13	8	8	4	6.5	4	9	21.9	27.0	27.0	4	12	25.0	4	12	18.5	4	7	4	8.5	20.6	33	45	4	6	26.0	5	12	5	12	0
46 FT	12	13	8	8	4	6.5	4	8.5	21.6	28.0	28.0	4	12	24.5	4	12	18.5	4	6.5	4	8.5	20.9	33	45	5	8.5	26.0	5	12	5	12	0
48 FT	12	13	8	8	4	6.5	4	8.5	21.6	28.0	28.0	4	12	24.5	4	12	18.5	4	6	4	8.5	20.9	33	45	5	8.5	26.0	5	12	5	12	0
50 FT	12	14	8	8	4	6	4	8.5	21.8	28.0	28.0	4	12	24.5	4	12	18.5	4	6.5	4	7.5	20.8	34	46	5	9	26.0	5	12	5	12	0

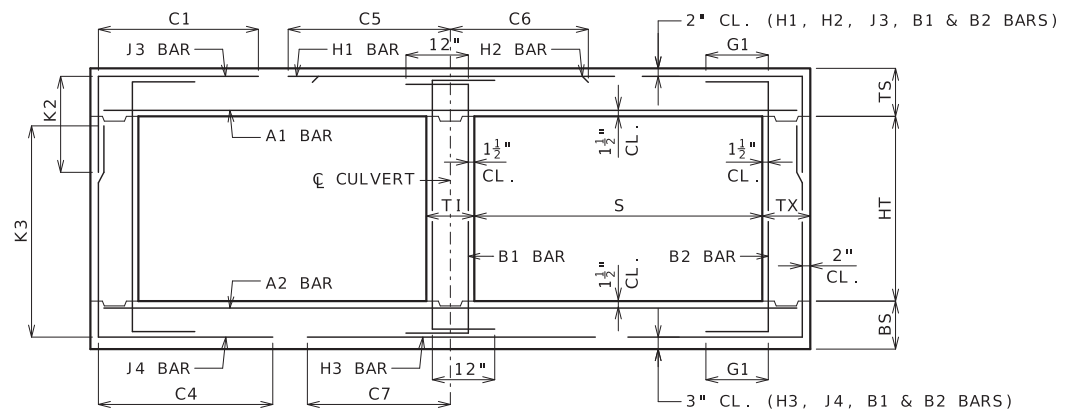
		SPAN (S) = 4 FT										HEIGHT (HT) = 4 FT OR 5 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=4' HT=5'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=4' HT=5'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	39.9	52	64	4	9	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	36.8	52	64	4	9	27.5	5	12	5	12	12
2' - 4'	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	36.8	52	64	4	9	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	27.3	24.0	24.0	4	24	48.0	4	24	19.5	4	12	4	12	33.8	52	64	4	9	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	33.5	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	11.5	31.3	52	64	4	9	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	30.6	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	11	29.9	52	64	4	8.5	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	27.4	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	27.1	52	64	4	9	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	27.1	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	11	26.9	52	64	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	27.0	24.0	24.0	4	22	25.0	4	22	18.5	4	12	4	10.5	26.8	52	64	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	11	26.9	24.0	24.0	4	21	25.0	4	21	18.5	4	10.5	4	10	26.6	52	64	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	11.5	4	10	26.8	24.0	24.0	4	19	25.0	4	19	18.5	4	9.5	4	9	26.6	52	64	4	6.5	25.5	5	12	5	12	0
20 FT	8	8	8	8	4	10.5	4	9	26.6	24.0	24.0	4	17	25.0	4	17	18.5	4	8.5	4	8	26.5	52	64	4	6	25.5	5	12	5	12	0
22 FT	8	9	8	8	4	9.5	4	8	26.8	24.0	24.0	4	15	25.0	4	15	18.5	4	9	4	9.5	26.8	53	65	4	6.5	26.0	5	12	5	12	0
24 FT	8	9	8	8	4	9	4	7.5	26.6	24.0	24.0	4	14	25.0	4	14	18.5	4	8.5	4	9	26.6	53	65	4	6.5	26.0	5	12	5	12	0
26 FT	8	10	8	8	4	8.5	4	6.5	26.6	24.0	24.0	4	13	25.0	4	13	18.5	4	8.5	4	10.5	26.9	54	66	4	7	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	6	26.6	24.0	24.0	4	12	25.0	4	12	18.5	4	8	4	10	26.9	54	66	4	6.5	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	8	4	7.5	26.8	25.0	25.0	4	13	25.0	4	13	18.5	4	7	4	9	26.9	54	66	4	6	26.0	5	12	5	12	0
32 FT	9	11	8	8	4	7.5	4	6.5	26.9	25.0	25.0	4	12	25.0	4	12	18.5	4	8	4	9	27.1	55	67	4	6.5	26.0	5	12	5	12	0
34 FT	10	11	8	8	4	7.5	4	6.5	27.0	26.0	26.0	4	14	24.5	4	14	18.5	4	7.5	4	8.5	27.1	55	67	4	6	26.0	5	12	5	12	0
36 FT	10	12	8	8	4	7.5	4	6.5	27.1	26.0	26.0	4	13	24.5	4	13	18.5	4	8	4	8.5	27.4	56	68	4	6.5	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	7	4	6	27.1	26.0</																						

		SPAN (S) = 4 FT										HEIGHT (HT) = 6 FT OR 7 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=6' HT=7'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=6' HT=7'		SIZE	SPA.	C7	SIZE	SPA.	G1				
1 FT	10	8	8	8	4	6.5	4	10.5	27.3	26.0	26.0	4	24	48.0	4	24	20.5	4	12	4	8.5	46.6	76	88	4	8.5	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	6.5	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	8.5	45.3	76	88	4	8.5	27.5	5	12	5	12	12
2'- 4'	10	8	8	8	4	6.5	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	7.5	45.3	76	88	4	8.5	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	10.5	27.3	24.0	24.0	4	24	48.0	4	24	19.5	4	12	4	7.5	43.0	76	88	4	9	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10	47.3	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	7	40.8	76	88	4	9	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	9	41.4	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	6.5	39.0	76	88	4	8.5	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	10	35.4	24.0	24.0	4	24	25.0	4	24	18.5	4	12	4	7	35.1	76	88	4	8.5	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	8.5	34.9	24.0	24.0	4	24	25.0	4	24	18.5	4	12	4	6.5	34.9	76	88	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	7.5	34.6	24.0	24.0	4	23	25.0	4	23	18.5	4	12	4	6	34.6	76	88	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	6.5	34.4	24.0	24.0	4	22	25.0	4	22	18.5	4	10.5	5	6.5	34.4	76	88	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	6	34.1	24.0	24.0	4	19	25.0	4	19	18.5	4	9.5	5	6	34.3	76	88	4	6.5	25.5	5	12	5	12	0
20 FT	8	9	9	8	4	11	4	6.5	33.6	24.0	24.0	4	18	24.5	4	18	18.5	4	10	4	6.5	34.9	77	89	4	7.5	25.5	5	12	5	12	0
22 FT	8	9	9	8	4	10	4	6	33.5	24.0	24.0	4	16	25.0	4	16	18.5	4	9	4	6	34.8	77	89	4	7	25.5	5	12	5	12	0
24 FT	8	9	9	8	4	9	5	6.5	33.4	24.0	28.0	4	15	25.0	4	15	18.5	4	8.5	5	7	34.6	77	89	4	6.5	25.5	5	12	5	12	0
26 FT	8	10	9	8	4	8.5	5	6	33.1	24.0	24.0	4	14	24.5	4	14	18.5	4	9	4	6	35.5	78	90	4	7	26.0	5	12	5	11.5	0
28 FT	8	10	9	8	4	8	6	7.5	36.1	24.0	28.0	4	13	24.5	4	13	18.5	4	8.5	5	7	35.5	78	90	4	6.5	26.0	5	12	5	10.5	0
30 FT	9	10	9	8	4	8	5	6	34.0	25.0	29.0	4	14	24.5	4	14	18.5	4	7.5	5	6.5	35.3	78	90	4	6	25.5	5	12	5	10	0
32 FT	9	11	9	8	4	8	5	6	33.9	25.0	29.0	4	13	24.5	4	13	18.5	4	8	5	6.5	35.9	79	91	4	6.5	26.0	5	12	5	9.5	0
34 FT	9	11	9	8	4	7.5	5	6	33.9	25.0	29.0	4	13	24.5	4	13	18.5	4	7.5	5	6.5	35.9	79	91	4	6	26.0	5	12	5	9	0
36 FT	10	11	9	8	4	7.5	5	6.5	34.6	26.0	30.0	4	14	24.0	4	14	18.0	4	7	5	6	35.8	79	91	4	6	25.5	5	12	5	8.5	0
38 FT	10	12	9	8	4	7	5	6	34.5	26.0	30.0	4	14	24.0	4	14	18.0	4	7.5	5	6	36.3	80	92	4	6	25.5	5	12	5	8.5	0
40 FT	10	12	9	8	4	7	5	6	34.5	26.0	30.0	4	13	24.0	4	13	18.0	4	7.5	5	6	36.3	80	92	4	6	25.5	5	12	5	8.5	0
42 FT	11	12	9	8	4	7	5	6	35.1	31.0	31.0	4	14	23.5	4	14	18.0	4	6.5	6	7.5	39.1	80	92	5	9	25.5	5	12	5	8.5	0
44 FT	11	13	10	8	4	6.5	5	7	35.1	27.0	31.0	4	14	23.0	4	14	18.0	4	7.5	5	7.5	36.8	81	93	4	6	25.5	5	12	5	8	0
46 FT	11	13	10	8	4	6.5	5	6.5	35.0	27.0	31.0	4	13	23.0	4	13	18.0	4	7	5	7	36.8	81	93	5	9	26.0	5	12	5	8	0
48 FT	11	13	10	8	4	6	5	6	35.0	27.0	31.0	4	13	23.0	4	13	18.0	4	6.5	5	6.5	36.8	81	93	5	8.5	25.5	5	12	5	8	0
50 FT	12	14	11	8	4	6.5	5	7	35.6	28.0	32.0	4	15	23.0	4	15	18.0	4	7	5	7.5	37.3	82	94	5	9	26.0	5	12	5	8	0

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

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT CULVERT.



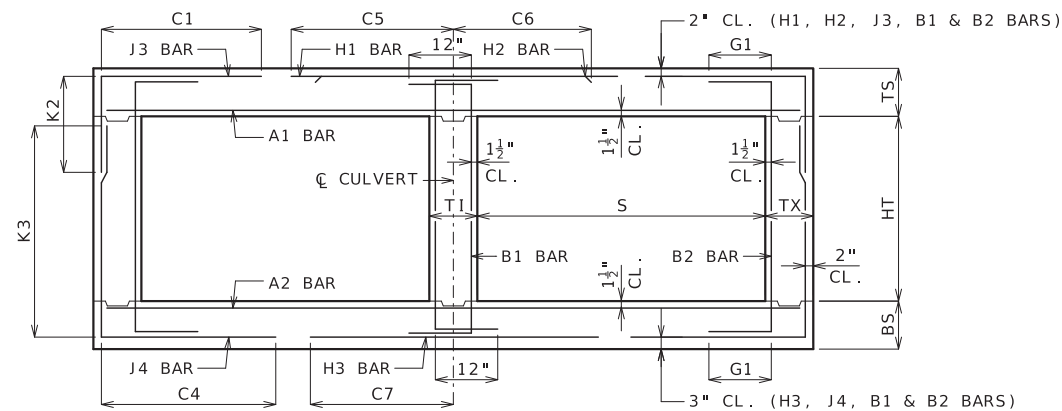
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 4 FEET HEIGHT (HT): 6 THRU 7 FEET	
	DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	SHEET NO. <b>703.47A</b> 3 OF 27

		SPAN (S) = 5 FT										HEIGHT (HT) = 3 FT OR 4 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=3' HT=4'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=3' HT=4'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	11	8	8	8	4	6.5	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	21.5	4	12	4	12	33.3	40	52	4	7.5	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6.5	4	9.5	30.9	27.0	27.0	4	19	56.0	4	19	21.5	4	11.5	4	11.5	31.0	40	52	4	7	31.0	5	12	5	12	12
2' - 4'	11	8	8	8	4	6.5	4	9.5	30.9	27.0	27.0	4	18	56.0	4	18	21.5	4	11.5	4	11.5	31.0	40	52	4	7	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	11	4	12	30.0	24.0	24.0	4	18	39.0	4	18	20.0	4	12	4	12	28.4	40	52	4	7	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	27.4	24.0	24.0	4	19	32.0	4	19	20.0	4	11.5	4	12	26.9	40	52	4	7	29.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	26.6	24.0	24.0	4	18	30.5	4	18	19.5	4	10.5	4	11.5	26.0	40	52	4	6.5	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	11	4	12	26.1	24.0	24.0	4	16	29.5	4	16	19.5	4	9.5	4	10.5	25.5	40	52	4	6	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	4	16	28.5	4	16	19.0	4	9.5	4	11	24.4	40	52	5	7.5	28.5	5	12	5	12	0
14 FT	8	8	8	8	4	10	4	11	24.6	24.0	24.0	4	14	28.5	4	14	19.0	4	8.5	4	10	24.3	40	52	5	7	28.5	5	12	5	12	0
16 FT	8	9	8	8	4	9	4	9.5	24.8	24.0	24.0	4	12	28.5	4	12	19.0	4	8.5	4	12	23.5	41	53	5	7.5	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	8	4	8.5	24.8	24.0	24.0	5	17	28.5	5	17	19.5	4	7.5	4	11.5	23.5	41	53	5	7	29.0	5	12	5	12	0
20 FT	8	10	8	8	4	7.5	4	7.5	24.9	24.0	24.0	5	17	28.0	5	17	20.0	4	7.5	4	12	22.9	42	54	5	7.5	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	9	24.3	25.0	25.0	5	16	28.5	5	16	19.0	4	7	4	12	23.1	42	54	5	7	29.0	5	12	5	12	0
24 FT	9	11	8	8	4	6.5	4	8	24.5	25.0	25.0	5	16	28.5	5	16	20.0	4	7	4	10.5	22.8	43	55	5	7.5	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	4	8.5	24.0	26.0	26.0	5	16	28.5	5	16	19.0	4	6.5	4	10.5	23.0	43	55	5	7	29.0	5	12	5	12	0
28 FT	10	12	8	8	4	6.5	4	8	24.1	26.0	26.0	5	15	28.0	5	15	19.5	4	6.5	4	9.5	22.6	44	56	5	7.5	29.0	5	12	5	12	0
30 FT	11	12	8	8	4	6.5	4	8.5	23.8	27.0	27.0	5	15	28.0	5	15	19.0	4	6	4	9.5	22.9	44	56	5	7	29.0	5	12	5	12	0
32 FT	11	13	8	8	4	6	4	7.5	23.9	27.0	27.0	5	15	28.0	5	15	19.0	4	6.5	4	8.5	22.8	45	57	5	7.5	29.0	5	12	5	12	0
34 FT	12	13	8	8	4	6	4	8.5	23.6	28.0	28.0	5	15	28.0	5	15	19.0	4	6	4	8.5	22.9	45	57	5	7	29.0	5	12	5	12	0
36 FT	12	14	8	8	5	9	4	7.5	23.8	28.0	28.0	5	15	28.0	5	15	19.0	4	6	4	7.5	22.8	46	58	5	7.5	29.0	5	12	5	12	0
38 FT	13	14	8	8	5	9	4	7.5	23.5	29.0	29.0	5	15	27.5	5	15	19.0	4	6	4	7.5	23.0	46	58	5	7	29.0	5	12	5	12	0
40 FT	13	15	8	8	5	8.5	4	7.5	23.8	29.0	29.0	5	15	27.5	5	15	19.0	4	6	4	7	22.9	47	59	5	7.5	29.0	5	12	5	12	0
42 FT	13	15	8	8	5	8	4	7	23.8	29.0	29.0	5	14	27.5	5	14	19.0	5	9	4	7	22.9	47	59	5	7	29.0	5	12	5	12	0
44 FT	14	15	8	8	5	8.5	4	7	23.5	30.0	30.0	5	15	27.0	5	15	19.0	5	8.5	4	7	23.1	47	59	5	6.5	29.0	5	12	5	12	0
46 FT	14	16	8	8	5	8	4	7	23.6	30.0	30.0	5	14	27.0	5	14	19.0	5	9	4	6.5	23.1	48	60	5	7	29.0	5	12	5	12	0
48 FT	14	16	8	8	5	7.5	4	6.5	23.6	30.0	30.0	5	14	27.0	5	14	19.0	5	8.5	4	6.5	23.1	48	60	5	6.5	29.0	5	12	5	12	0
50 FT	15	16	8	8	5	7.5	4	6.5	25.6	31.0	31.0	5	15	31.5	5	15	24.0	5	8	4	6.5	23.3	48	60	5	6.5	29.0	5	12	5	12	0

		SPAN (S) = 5 FT										HEIGHT (HT) = 5 FT OR 6 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=5' HT=6'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=5' HT=6'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	11.5	4	9.5	44.1	64	76	4	7	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	19	56.0	4	19	21.5	4	10.5	4	9	40.6	64	76	4	7	31.0	5	12	5	12	12
2' - 4'	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	18	56.0	4	18	21.5	4	10.5	4	9	40.6	64	76	4	7	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10.5	4	10.5	30.9	24.0	24.0	4	18	56.0	4	18	20.0	4	11.5	4	9	37.6	64	76	4	7	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10.5	37.1	24.0	24.0	4	19	32.0	4	19	20.0	4	11	4	8.5	34.6	64	76	4	6.5	29.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	10	33.8	24.0	24.0	4	18	30.5	4	18	19.5	4	10	4	8	33.0	64	76	4	6	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	11	4	9	32.3	24.0	24.0	4	16	29.5	4	16	19.5	4	9	4	7.5	31.9	64	76	5	7.5	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	11.5	4	9.5	29.5	24.0	24.0	4	16	28.5	4	16	19.0	4	9	4	7.5	29.4	64	76	5	7.5	28.5	5	12	5	12	0
14 FT	8	8	8	8	4	10	4	8	29.3	24.0	24.0	4	14	28.5	4	14	19.0	4	8	4	7	29.1	64	76	5	7	28.5	5	12	5	12	0
16 FT	8	9	8	8	4	9	4	7	29.3	24.0	24.0	4	12	28.0	4	12	19.0	4	8	4	8	29.3	65	77	5	7.5	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	8	4	6.5	29.1	24.0	24.0	5	17	28.0	5	17	19.5	4	7	4	7.5	29.1	65	77	5	7	29.0	5	12	5	12	0
20 FT	8	10	8	8	4	7	5	7	29.0	24.0	24.0	5	17	28.0	5	17	20.0	4	7.5	4	8.5	29.3	66	78	5	7.5	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	6.5	29.1	25.0	25.0	5	16	28.0	5	16	19.0	4	7	4	7.5	29.3	66	78	5	7	29.0	5	12	5	12	0
24 FT	9	11	8	8	4	6.5	4	6	29.1	25.0	25.0	5	16	28.0	5	16	19.5	4	7	4	7.5	29.5	67	79	5	7.5	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	5	8	29.3	26.0	26.0	5	16	28.0	5	16	19.0	4	6.5	4	6.5	29.5	67	79	5	7.5	29.0	5	12	5	12	0
28 FT	10	12	8	8	4	6.5	5	7.5	29.3	26.0	26.0	5	15	28.0	5	15	19.0	4	6.5	4	6.5	29.6	68	80	5	7.5	29.0	5	12	5	12	0
30 FT	11	12	8	8	4	6.5	5	8.5	29.4	27.0	27.0	5	16	27.5	5	16	19.0	4	6.5	4	6	29.8	68	80	5	7.5	29.0	5	12	5	12	0
32 FT	11	13	8	8	4	6	5	8	29.5	27.0	27.0	5	15	27.5	5	15	19.0	4	6.5	4	6	29.9	69	81	5	7.5	29.0	5	12	5	12	0
34 FT	12	13	8	8	4	6	5	8.5	29.5	28.0	32.0	5	16	27.5	5	16	19.0	4	6	5	8.5	30.0	69	81	5	7	29.0	5	12	5	11.5	0
36 FT	12	14	8	8	5	9	5	7.5	29.6	28.0	32.0	5	15	27.0	5	15	19.0	4	6.5	5	9	30.1	70	82	5	7.5	29.0	5	12	5	10.5	0
38 FT	12	14	8	8	5	8.5	5																									

		SPAN (S) = 5 FT										HEIGHT (HT) = 7 FT OR 8 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=7' HT=8'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=7' HT=8'		SIZE	SPA.	C7	SIZE	SPA.	G1				
1 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	10.5	4	7	52.1	88	100	4	7	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	10	4	6.5	50.0	88	100	4	6.5	31.0	5	12	5	12	12
2'- 4'	11	8	8	8	4	6	4	7	30.9	27.0	27.0	4	18	56.0	4	18	22.0	4	10	4	6	50.0	88	100	4	6.5	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10	4	7	30.9	24.0	24.0	4	18	56.0	4	18	20.5	4	10.5	4	6	47.4	88	100	4	6.5	30.0	5	12	5	12	12
6 FT	8	9	8	8	4	12	4	7	51.6	24.0	24.0	4	19	32.5	4	19	20.0	4	12	4	6.5	46.3	89	101	4	7.5	29.5	5	12	5	12	12
8 FT	8	9	8	8	4	12	4	6.5	44.5	24.0	24.0	4	18	30.5	4	18	19.5	4	11	4	6	44.0	89	101	4	7	29.5	5	12	5	12	0
10 FT	8	9	9	8	4	11.5	4	7	40.8	24.0	24.0	4	16	29.5	4	16	19.5	4	10	4	6.5	41.4	89	101	4	6.5	29.0	5	12	5	12	0
12 FT	8	9	9	8	4	12	4	7	36.9	24.0	24.0	4	17	28.0	4	17	19.0	4	10.5	4	7	38.3	89	101	4	6.5	29.0	5	12	5	12	0
14 FT	8	9	9	8	4	10.5	4	6.5	36.4	24.0	24.0	4	15	28.0	4	15	19.0	4	9	4	6.5	37.9	89	101	4	6	29.0	5	12	5	12	0
16 FT	8	9	9	8	4	9	5	7	36.0	24.0	28.0	4	13	28.0	4	13	19.0	4	8	5	7	37.5	89	101	5	7.5	28.5	5	12	5	12	0
18 FT	8	9	9	8	4	8	5	6	35.8	24.0	28.0	5	18	28.0	5	18	19.0	4	7.5	5	6	37.3	89	101	5	7	28.5	5	12	5	12	0
20 FT	8	10	9	8	4	7.5	6	7	38.4	24.0	28.0	5	17	28.0	5	17	19.5	4	7.5	5	6.5	38.1	90	102	5	7.5	29.0	5	12	5	11	0
22 FT	9	10	9	8	4	7.5	5	6	36.4	25.0	29.0	5	17	27.5	5	17	19.0	4	7	5	6	37.8	90	102	5	7.5	29.0	5	12	5	10	0
24 FT	9	11	9	8	4	7	5	6	36.1	25.0	29.0	5	16	27.5	5	16	19.0	4	7	5	6	38.5	91	103	5	8	29.0	5	12	5	9.5	0
26 FT	10	11	9	8	4	7	5	6	36.9	26.0	30.0	5	17	27.5	5	17	19.0	4	6.5	5	6	38.3	91	103	5	7.5	29.0	5	12	5	9	0
28 FT	10	12	9	8	4	6.5	5	6	36.8	30.0	30.0	5	16	27.5	5	16	19.0	4	7	5	6	38.9	92	104	5	8	29.0	5	12	5	8.5	0
30 FT	11	12	9	8	4	6.5	5	6	37.4	31.0	31.0	5	17	27.0	5	17	19.0	4	6.5	6	7.5	41.6	92	104	5	7.5	29.0	5	12	5	8.5	0
32 FT	11	13	9	8	4	6.5	6	7	40.3	31.0	31.0	5	16	27.0	5	16	19.0	4	6.5	5	6	39.1	93	105	5	7.5	29.0	5	12	5	8.5	0
34 FT	11	13	9	8	4	6	6	7	40.1	31.0	35.0	5	15	27.0	5	15	19.0	4	6.5	6	7	42.1	93	105	5	7.5	29.0	5	12	5	8.5	0
36 FT	12	14	10	8	4	6	5	6.5	37.8	32.0	32.0	5	17	26.0	5	17	19.0	4	6.5	5	7	39.5	94	106	5	7.5	29.0	5	12	5	8	0
38 FT	12	14	10	8	5	9	5	6	37.6	32.0	32.0	5	16	26.0	5	16	19.0	4	6	5	6.5	39.5	94	106	5	7	29.0	5	12	5	8	0
40 FT	12	15	11	8	5	8.5	5	7	37.8	28.0	32.0	5	15	26.0	5	15	19.0	4	6	5	7	40.0	95	107	5	7.5	29.0	5	12	5	7.5	0
42 FT	13	15	11	8	5	8.5	5	7	38.3	33.0	33.0	5	17	25.5	5	17	18.5	4	6	5	7	39.9	95	107	5	7	29.0	5	12	5	7.5	0
44 FT	13	15	11	8	5	8.5	5	6.5	38.1	33.0	33.0	5	16	25.5	5	16	18.5	5	9	5	7	39.9	95	107	5	6.5	29.0	5	12	5	7.5	0
46 FT	13	16	12	8	5	8	5	6.5	38.3	29.0	33.0	5	16	25.5	5	16	18.5	4	6	5	7	40.4	96	108	5	7	29.0	5	12	5	7.5	0
48 FT	14	16	12	8	5	8	5	6.5	38.8	34.0	34.0	5	17	25.0	5	17	18.5	5	9	5	6.5	40.4	96	108	5	6.5	29.0	5	12	5	7	0
50 FT	14	16	12	8	5	7.5	5	6.5	38.8	34.0	34.0	5	17	25.0	5	17	18.5	5	8.5	5	6.5	40.3	96	108	5	6.5	29.0	5	12	5	7	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE DOUBLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 5 FEET HEIGHT (HT): 7 THRU 8 FEET
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.47A</b>	SHEET NO. <b>5 OF 27</b>

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

SPAN (S) = 6 FT      HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	11	8	8	8	5	8.5	4	9.5	34.5	27.0	27.0	27.0	4	16	64.5	4	16	23.0	4	9.5	4	9.5	37.6	40	52	64	4	6	34.5	5	12	5	12	12
2 FT	11	8	8	8	5	8.5	4	9.5	34.5	27.0	27.0	27.0	4	15	64.5	4	15	22.5	4	9	4	9	35.0	40	52	64	5	7.5	34.0	5	12	5	12	12
2' - 4'	11	8	8	8	5	8.5	4	9	34.5	27.0	27.0	27.0	4	13	64.5	4	13	22.5	4	9	4	9	35.0	40	52	64	5	7.5	34.0	5	12	5	12	12
4 FT	8	8	8	8	4	8	4	9	34.0	24.0	24.0	24.0	4	13	43.5	4	13	21.0	4	9	4	9.5	32.0	40	52	64	5	7.5	33.5	5	12	5	12	12
6 FT	8	8	8	8	4	9.5	4	9.5	30.4	24.0	24.0	24.0	4	13	35.5	4	13	20.5	4	8.5	4	9	29.9	40	52	64	5	7	32.5	5	12	5	12	12
8 FT	8	8	8	8	4	9	4	9	29.3	24.0	24.0	24.0	4	12	34.0	4	12	20.5	4	7.5	4	8	28.9	40	52	64	5	6.5	32.0	5	12	5	12	0
10 FT	8	9	8	8	4	8	4	8	28.8	24.0	24.0	24.0	5	17	33.0	5	17	20.5	4	7.5	4	10	27.8	41	53	65	5	7	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	4	7	28.4	24.0	24.0	24.0	5	16	32.5	5	16	21.5	4	6.5	4	9	27.3	41	53	65	5	6.5	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	7.5	4	7	27.0	24.0	24.0	24.0	5	16	31.5	5	16	21.5	4	6.6	4	9.5	25.9	41	53	65	5	6	32.0	5	12	5	12	0
16 FT	8	10	8	8	4	6.5	4	6	27.1	24.0	24.0	24.0	5	15	31.5	5	15	22.5	4	6.5	4	11.5	25.3	42	54	66	5	6.5	32.0	5	12	5	12	0
18 FT	9	11	8	8	4	6.5	4	7.5	26.6	25.0	25.0	25.0	5	16	31.5	5	16	21.5	4	6.5	4	10.5	25.0	43	55	67	5	7	32.0	5	12	5	12	0
20 FT	10	11	8	8	4	6	4	7.5	26.1	26.0	26.0	26.0	5	15	31.5	5	15	21.0	4	6	4	10	25.3	43	55	67	5	6.5	32.0	5	12	5	12	0
22 FT	10	12	8	8	5	9	4	6.5	26.3	26.0	26.0	26.0	5	15	31.5	5	15	21.5	4	6	4	9.5	24.9	44	56	68	5	6.5	32.0	5	12	5	12	0
24 FT	11	12	8	8	5	9	4	7	25.9	27.0	27.0	27.0	5	14	31.5	5	14	21.0	5	8.5	4	9	25.1	44	56	68	5	6	32.0	5	12	5	12	0
26 FT	11	13	8	8	5	8.5	4	6	26.0	27.0	27.0	27.0	5	14	31.5	5	14	21.5	5	8.5	4	8.5	24.9	45	57	69	5	6	32.0	5	12	5	12	0
28 FT	12	14	8	8	5	8.5	4	6.5	25.9	28.0	28.0	28.0	5	13	31.5	5	13	20.5	5	9	4	7.5	25.0	46	58	70	5	6.5	32.0	5	12	5	12	0
30 FT	13	14	8	8	5	8.5	4	6.5	25.6	29.0	29.0	29.0	5	12	31.0	5	12	20.0	5	8.5	4	7.5	25.1	46	58	70	5	6	32.0	5	12	5	12	0
32 FT	13	15	8	8	5	8	4	6	25.8	29.0	29.0	29.0	5	12	31.0	5	12	20.5	5	8.5	4	7	25.1	47	59	71	5	6	32.0	5	12	5	12	0
34 FT	14	15	8	8	5	8	4	6	25.5	30.0	30.0	30.0	5	12	31.0	5	12	20.0	5	8	4	7	25.3	47	59	71	6	8.5	35.0	5	12	5	12	0
36 FT	14	16	8	8	5	7.5	5	8.5	25.8	30.0	30.0	30.0	5	12	31.0	5	12	20.0	5	8	4	6.5	25.3	48	60	72	5	6	32.0	5	12	5	12	0
38 FT	15	16	8	8	5	7.5	4	6	27.5	31.0	31.0	31.0	5	12	35.5	5	12	25.0	5	7.5	4	6.5	25.4	48	60	72	6	8	35.0	5	12	5	12	0
40 FT	15	17	8	8	5	7	5	8	30.8	31.0	31.0	31.0	6	17	39.5	6	17	29.0	5	7.5	4	6	25.4	49	61	73	6	8.5	35.0	5	12	5	12	0
42 FT	16	17	8	8	5	7	5	7	30.6	32.0	32.0	32.0	5	12	35.0	5	12	25.0	5	7.5	4	6	25.6	49	61	73	6	8	35.0	5	12	5	12	0
44 FT	16	18	8	8	5	6.5	5	7	30.8	32.0	32.0	36.0	6	17	39.0	6	17	29.0	5	7.5	5	6.5	25.6	50	62	74	6	8	35.0	5	12	5	12	0
46 FT	16	18	8	8	5	6	5	7	30.8	32.0	32.0	36.0	6	16	39.0	6	16	29.0	5	7	5	6.5	25.6	50	62	74	6	8	35.0	5	12	5	11.5	0
48 FT	17	19	8	8	5	6.5	5	6.5	30.8	37.0	37.0	37.0	5	12	34.5	5	12	24.5	5	7.5	5	6.5	25.9	51	63	75	6	8	35.0	5	12	5	10.5	0
50 FT	17	19	8	8	5	6	5	6.5	30.8	37.0	37.0	37.0	6	16	38.5	6	16	28.5	5	7	5	6.5	25.9	51	63	75	6	7.5	35.0	5	12	5	10	0

SPAN (S) = 6 FT      HEIGHT (HT) = 6 FT OR 7 FT

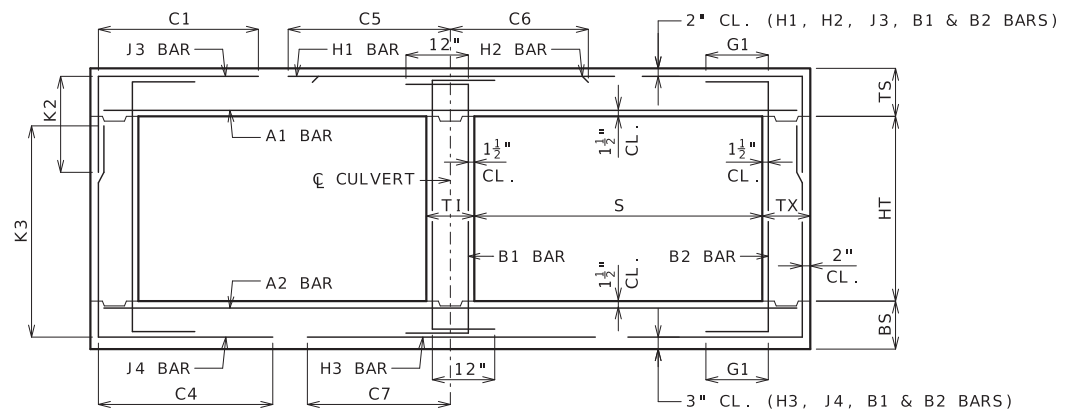
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS						
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1	
1 FT	11	8	8	8	5	8	4	9.5	34.5	27.0	27.0	27.0	4	16	64.5	4	16	23.0	4	9	4	7.5	48.9	76	88	5	7.5	34.5	5	12	5	12	12
2 FT	11	8	8	8	5	8	4	9.5	34.5	27.0	27.0	27.0	4	15	64.5	4	15	23.0	4	8.5	4	7	45.0	76	88	5	7.5	34.0	5	12	5	12	12
2' - 4'	11	8	8	8	5	8	4	7.5	34.5	27.0	27.0	27.0	4	13	64.5	4	13	23.0	4	8.5	4	7	45.0	76	88	5	7	34.0	5	12	5	12	12
4 FT	8	8	8	8	4	7.5	4	7.5	34.5	24.0	24.0	24.0	4	13	64.5	4	13	21.0	4	8.5	4	7	41.6	76	88	5	7	33.5	5	12	5	12	12
6 FT	8	8	8	8	4	9	4	7.5	40.9	24.0	24.0	24.0	4	13	36.0	4	13	20.5	4	8	4	6.5	38.1	76	88	5	7	32.5	5	12	5	12	12
8 FT	8	8	8	8	4	9	4	7	37.0	24.0	24.0	24.0	4	12	34.0	4	12	20.5	4	7.5	4	6	36.3	76	88	5	6.5	32.0	5	12	5	12	0
10 FT	8	9	8	8	4	8	4	6	35.1	24.0	24.0	24.0	5	17	33.0	5	17	21.0	4	7.5	4	6.5	35.5	77	89	5	7	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	5	6.5	34.1	24.0	24.0	24.0	5	16	32.5	5	16	21.5	4	6.5	4	6	34.5	77	89	5	6.5	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	7	5	6.5	31.8	24.0	24.0	24.0	5	16	31.5	5	16	21.5	4	6.5	4	6	32.0	77	89	5	6	32.0	5	12	5	12	0
16 FT	8	10	8	8	4	6.5	5	6	31.6	24.0	24.0	24.0	5	15	31.0	5	15	22.5	4	6.5	4	7	32.0	78	90	5	6.5	32.0	5	12	5	12	0
18 FT	9	11	8	8	4	6.5	5	6.5	31.8	25.0	25.0	25.0	5	16	31.0	5	16	21.5	4	6.5	4	6.5	32.3	79	91	5	7	32.0	5	12	5	12	0
20 FT	10	11	8	8	4	6	5	7.5	31.8	26.0	30.0	30.0	5	15	31.0	5	15	21.0	4	6	5	7.5	32.1	79	91	5	6.5	32.0	5	12	5	12	0
22 FT	10	12	8	8	5	9	5	7	31.6	26.0	30.0	30.0	5	15	31.0	5	15	21.5	4	6	5	8	32.3	80	92	5	6.5	32.0	5	12	5	12	0
24 FT	11	12	8	8	5	9	5	7.5	31.8	27.0	31.0	31.0	5	14	31.0	5	14	20.5	5	8.5	5	7.5	32.1	80	92	5	6	32.0	5	12	5	12	0
26 FT	11	13	8	8	5	8.5	5	6.5	31.8	27.0	31.0	31.0	5	14	31.0	5	14	21.0	5	9	5	7.5	32.3	81	93	5	6	32.0	5	12	5	11	0
28 FT	12	14	8	8	5	8.5	5	7	31.9	28.0	32.0	32.0	5	13	30.5	5	13	20.0	5	9	5	8	32.6	82	94	5	6.5	32.0	5	12	5	10	0
30 FT	12	14	8	8	5	7.5	5	6.5	31.8	28.0	32.0	32.0	5	13	30.5	5	13	20.5	5	8.5	5	7.5	32.5	82	94	5	6	32.0	5	12	5	9.5	0
32 FT	13	15	8	8	5	8	5	6.5	32.0	29.0	33.0	33.0	5	12	30.0	5	12	20.0	5	8.5	5	7.5	32.8	83	95	5	6	32.0	5	12	5	9.5	0
34 FT	13	15	8	8	5	7	5	6	31.9	29.0																							

		SPAN (S) = 6 FT										HEIGHT (HT) = 8 FT OR 9 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=8' HT=9'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=8' HT=9'		SIZE	SPA.	C7	SIZE	SPA.	G1				
1 FT	11	9	8	8	5	8	4	7	34.5	27.0	27.0	4	16	64.5	4	16	23.5	4	9.5	4	6.5	59.4	101	113	4	6.5	34.5	5	12	5	12	12
2 FT	11	9	8	8	5	8	4	6.5	34.5	27.0	27.0	4	16	64.5	4	16	23.0	4	9	4	6	57.0	101	113	4	6	34.0	5	12	5	12	12
2'- 4'	11	9	9	8	5	8	4	6.5	35.1	27.0	27.0	4	13	65.0	4	13	23.0	4	9	4	6	57.0	101	113	4	6	34.0	5	12	5	12	12
4 FT	8	9	9	8	4	7.5	4	6.5	35.1	24.0	24.0	4	13	65.0	4	13	21.0	4	9.5	4	6.5	53.0	101	113	4	6	33.5	5	12	5	12	12
6 FT	8	9	9	8	4	9	4	6	53.1	24.0	24.0	4	13	36.0	4	13	20.5	4	9	4	6	49.5	101	113	4	6	33.0	5	12	5	12	12
8 FT	8	9	9	8	4	9	5	7	46.5	24.0	28.0	4	12	33.5	4	12	20.5	4	8	5	6.5	46.5	101	113	5	7.5	32.5	5	12	5	12	0
10 FT	8	9	9	8	4	8	5	6	43.8	24.0	28.0	5	17	32.5	5	17	20.5	4	7.5	5	6	44.6	101	113	5	6.5	32.0	5	12	5	11.5	0
12 FT	8	9	10	8	4	7.5	5	6.5	41.8	24.0	28.0	5	17	32.0	5	17	21.5	4	6.5	5	6.5	42.9	101	113	5	6.5	32.0	5	12	5	11.5	0
14 FT	8	9	10	8	4	7.5	5	6.5	38.5	24.0	28.0	5	17	31.0	5	17	21.0	4	6.5	5	6.5	39.6	101	113	5	6	31.5	5	12	5	12	0
16 FT	8	10	10	8	4	6.5	5	6	38.1	24.0	28.0	5	16	31.0	5	16	22.0	4	6.5	5	7	40.6	102	114	5	6.5	32.0	5	12	5	11.5	0
18 FT	9	11	10	8	4	6.5	5	6	38.8	25.0	29.0	5	16	31.0	5	16	21.0	4	6.5	5	7	41.1	103	115	5	7	32.0	5	12	5	10.5	0
20 FT	9	11	10	8	4	6	5	6	38.5	25.0	29.0	5	16	31.0	5	16	22.0	4	6	5	6.5	40.9	103	115	5	6	32.0	5	12	5	10	0
22 FT	10	12	10	8	4	6	5	6.5	39.1	30.0	30.0	5	15	30.5	5	15	21.0	4	6	5	6.5	41.4	104	116	5	6.5	32.0	5	12	5	9	0
24 FT	11	13	10	8	4	6	5	6.5	39.6	31.0	31.0	5	14	30.5	5	14	20.0	4	6	5	6.5	41.8	105	117	5	6.5	32.0	5	12	5	8.5	0
26 FT	11	13	10	8	5	9	5	6	39.4	31.0	31.0	5	14	30.5	5	14	20.5	5	9	5	6.5	41.6	105	117	5	6	32.0	5	12	5	8	0
28 FT	12	14	10	8	5	9	5	6	40.0	32.0	32.0	5	13	30.0	5	13	19.5	4	6	5	6.5	42.0	106	118	5	6.5	32.0	5	12	5	8	0
30 FT	12	14	10	8	5	8	5	6	39.9	32.0	32.0	5	13	30.0	5	13	20.0	5	8.5	5	6	41.9	106	118	5	6	32.0	5	12	5	8	0
32 FT	13	15	11	8	5	8.5	5	7	40.4	33.0	33.0	5	13	29.0	5	13	19.5	5	8.5	5	7	42.3	107	119	5	6	32.0	5	12	5	7.5	0
34 FT	13	15	11	8	5	8	5	6.5	40.3	33.0	33.0	5	13	29.0	5	13	19.5	5	8	5	7	42.1	107	119	6	8	35.0	5	12	5	7.5	0
36 FT	14	16	11	8	5	8	5	6	40.8	34.0	34.0	5	14	28.5	5	14	19.5	5	8.5	5	7	42.6	108	120	5	6	32.0	5	12	5	7.5	0
38 FT	14	16	12	8	5	7.5	5	6.5	40.8	34.0	34.0	5	13	28.5	5	13	19.5	5	7.5	5	6.5	42.5	108	120	6	8	35.0	5	12	5	7	0
40 FT	14	17	12	8	5	7	5	6	40.8	34.0	34.0	5	12	28.5	5	12	19.5	5	8	5	6.5	43.0	109	121	6	8	35.0	5	12	5	7	0
42 FT	15	17	13	8	5	7	5	6	46.4	35.0	35.0	5	13	33.0	5	13	24.5	5	7	5	6	42.8	109	121	6	7.5	35.0	5	12	5	7	0
44 FT	15	18	13	8	5	7	5	6	46.4	35.0	35.0	5	13	33.0	5	13	24.5	5	7.5	5	6	43.3	110	122	6	8	35.0	5	12	5	6.5	0
46 FT	15	18	13	8	5	6	5	6	46.3	35.0	35.0	5	12	33.0	5	12	24.5	5	7.5	5	6	43.3	110	122	6	7.5	35.0	5	12	5	6.5	0
48 FT	16	19	14	8	5	6.5	5	6	47.0	36.0	36.0	5	14	32.5	5	14	24.0	5	7.5	5	6	43.8	111	123	6	7.5	35.0	5	12	5	6.5	0
50 FT	16	19	14	8	5	6	5	6	46.9	36.0	36.0	5	13	32.5	5	13	24.0	5	7	5	6	43.6	111	123	6	7.5	35.0	5	12	5	6.5	0

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

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT CULVERT.



	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE DOUBLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 6 FEET HEIGHT (HT): 8 THRU 9 FEET
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.47A</b>	SHEET NO. <b>7 OF 27</b>

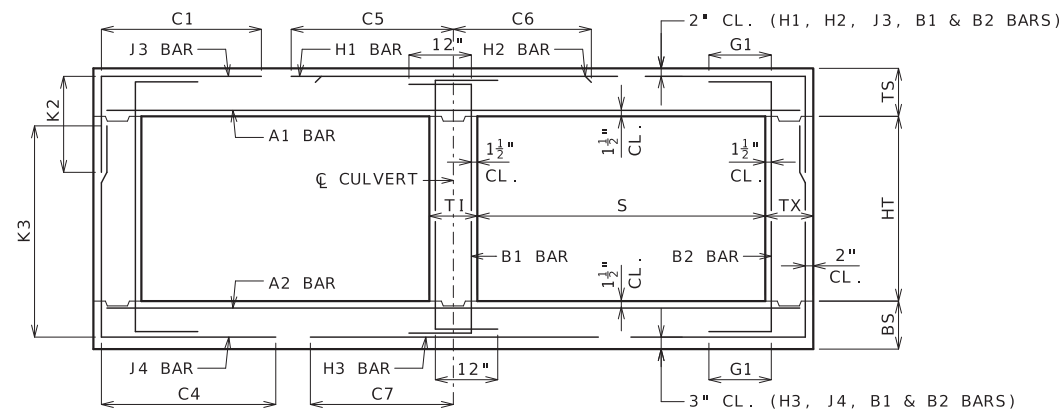
		SPAN (S) = 7 FT												HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
									HT=4'	HT=5'	HT=6'											HT=4'	HT=5'	HT=6'										
1 FT	12	8	8	8	5	8	4	8.5	38.1	28.0	28.0	28.0	4	15	73.0	4	15	25.5	4	7	4	6.5	41.8	52	64	76	5	6.5	37.5	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	4	8.5	38.1	28.0	28.0	28.0	4	14	73.0	4	14	24.5	4	7.5	4	8.5	39.9	53	65	77	5	7	37.5	5	12	5	12	12
2'- 4'	12	9	8	8	5	7.5	4	6.5	38.4	28.0	28.0	28.0	5	17	73.0	5	17	24.5	4	7	4	7	39.9	53	65	77	5	6	37.5	5	12	5	12	12
4 FT	8	8	8	8	4	6	4	6.5	38.4	24.0	24.0	24.0	5	17	48.0	5	17	23.5	4	7	4	7	35.8	52	64	76	5	6	36.5	5	12	5	12	12
6 FT	8	8	8	8	4	7	4	7	33.9	24.0	24.0	24.0	5	17	39.0	5	17	23.5	4	6.5	4	6.5	33.3	52	64	76	6	7	38.5	5	12	5	12	12
8 FT	8	9	8	8	4	7	4	6.5	32.1	24.0	24.0	24.0	5	16	37.0	5	16	24.0	4	6.5	4	8	31.8	53	65	77	5	6	35.5	5	12	5	12	0
10 FT	8	10	8	8	4	6	5	7	31.5	24.0	24.0	24.0	5	15	36.0	5	15	24.0	4	6.5	4	9.5	30.5	54	66	78	5	6.5	35.5	5	12	5	12	0
12 FT	9	10	8	8	4	6	4	6.5	30.5	25.0	25.0	25.0	5	15	35.5	5	15	24.0	5	9	4	8.5	29.8	54	66	78	5	6	35.5	5	12	5	12	0
14 FT	9	11	8	8	5	8.5	5	7	30.4	25.0	25.0	25.0	5	14	35.5	5	14	24.0	5	9	4	8.5	29.1	55	67	79	5	6	35.5	5	12	5	12	0
16 FT	10	11	8	8	4	6	4	6.5	28.5	26.0	26.0	26.0	5	15	34.5	5	15	23.0	5	8.5	4	8	27.8	55	67	79	5	6	35.0	5	12	5	12	0
18 FT	10	12	8	8	5	8	5	8	28.6	26.0	26.0	26.0	5	14	34.5	5	14	23.5	5	8.5	4	8.5	27.4	56	68	80	5	6	35.0	5	12	5	12	0
20 FT	11	12	8	8	5	8	5	9	28.1	27.0	27.0	27.0	5	14	34.5	5	14	23.5	5	7	4	7	27.5	56	68	80	6	7	38.0	5	12	5	12	0
22 FT	12	13	8	8	5	8	5	8.5	27.9	28.0	28.0	28.0	5	13	34.5	5	13	23.0	5	7.5	4	7	27.5	57	69	81	6	7.5	38.0	5	12	5	12	0
24 FT	12	14	8	8	5	7.5	5	8.5	28.0	28.0	28.0	28.0	5	13	34.5	5	13	23.5	5	7.5	4	7	27.3	58	70	82	6	7.5	38.0	5	12	5	12	0
26 FT	13	15	8	8	5	7	5	8.5	27.9	29.0	29.0	29.0	5	12	34.5	5	12	22.5	5	7.5	4	7	27.4	59	71	83	6	7.5	38.0	5	12	5	12	0
28 FT	14	15	8	8	5	7	5	8.5	27.6	30.0	30.0	30.0	5	12	34.0	5	12	22.0	5	7	4	6.5	27.6	59	71	83	6	7	38.0	5	12	5	12	0
30 FT	14	16	8	8	5	6.5	5	8.5	27.8	30.0	30.0	30.0	5	12	34.0	5	12	22.5	5	7	4	6.5	27.5	60	72	84	6	7	38.0	5	12	5	12	0
32 FT	15	17	8	8	5	6.5	5	8	32.8	31.0	31.0	31.0	6	16	43.0	6	16	30.5	5	7.5	4	6	27.8	61	73	85	6	7.5	38.0	5	12	5	12	0
34 FT	16	17	8	8	5	6.5	5	7	32.6	32.0	32.0	32.0	6	15	42.5	6	15	29.5	5	7	4	6	27.9	61	73	85	6	7	38.0	5	12	5	11.5	0
36 FT	16	18	8	8	5	6	5	7	32.8	32.0	32.0	32.0	6	15	42.5	6	15	30.0	5	7	5	6.5	27.9	62	74	86	6	7	38.0	5	12	5	10.5	0
38 FT	17	18	8	8	5	6	5	6.5	32.8	37.0	37.0	37.0	6	14	42.0	6	14	29.5	5	6	5	6.5	28.0	62	74	86	6	6.5	38.0	5	12	5	10	0
40 FT	17	19	8	8	5	6	5	6.5	32.8	37.0	37.0	37.0	6	14	42.0	6	14	30.0	5	6.5	5	6.5	28.0	63	75	87	6	7	38.0	5	12	5	9.5	0
42 FT	18	20	8	8	5	6	5	6.5	32.9	38.0	38.0	38.0	6	14	41.5	6	14	29.5	5	6.5	5	6	28.3	64	76	88	6	7	38.0	5	12	5	9.5	0
44 FT	18	20	8	8	6	8	5	6.5	32.9	38.0	38.0	38.0	6	14	41.5	6	14	29.5	5	6.5	5	6	28.3	64	76	88	6	6.5	38.0	5	12	5	9.5	0
46 FT	19	21	8	8	6	8	5	6	33.0	39.0	39.0	39.0	6	14	41.0	6	14	29.5	5	6.5	6	7.5	31.5	65	77	89	6	6.5	38.0	5	12	5	9.5	0
48 FT	19	21	8	8	6	8	5	6	32.9	39.0	39.0	39.0	6	14	41.0	6	14	29.5	5	6	6	7.5	31.4	65	77	89	6	6.5	38.0	5	12	5	9.5	0
50 FT	20	22	9	8	6	8	5	6.5	33.8	40.0	40.0	40.0	6	15	40.0	6	15	29.0	5	6	5	6	29.0	66	78	90	6	6.5	38.0	5	12	5	8.5	0

		SPAN (S) = 7 FT												HEIGHT (HT) = 7 FT OR 8 FT																		
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS			
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS					
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
									HT=7'	HT=8'												HT=7'	HT=8'									
1 FT	12	9	8	8	5	7.5	4	8.5	38.1	28.0	28.0	4	15	73.0	4	15	25.5	4	7.5	4	7	56.0	89	101	5	7	37.5	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	4	8	38.1	28.0	28.0	4	15	73.0	4	15	25.0	4	7	4	6.5	51.4	89	101	5	7	37.5	5	12	5	12	12
2'- 4'	12	9	8	8	5	7.5	5	6.5	40.1	28.0	28.0	5	17	75.0	5	17	25.0	4	7	4	6.5	51.4	89	101	5	7	37.5	5	12	5	12	12
4 FT	8	9	8	8	4	6	5	6.5	40.1	24.0	24.0	5	17	75.0	5	17	23.5	4	7.5	4	6.5	47.8	89	101	5	7	37.0	5	12	5	12	12
6 FT	8	9	8	8	4	7	5	6.5	44.6	24.0	24.0	5	17	39.5	5	17	23.5	4	7	4	6	43.5	89	101	5	6.5	36.0	5	12	5	12	12
8 FT	8	9	9	8	4	7	4	6	40.1	24.0	24.0	5	16	37.0	5	16	23.5	4	6.5	4	6.5	40.4	89	101	5	6	35.5	5	12	5	12	0
10 FT	8	10	9	8	4	6.5	5	6	38.4	24.0	24.0	5	15	36.0	5	15	24.0	4	6.5	4	7	39.5	90	102	5	6.5	35.5	5	12	5	12	0
12 FT	9	10	9	8	4	6	5	6.5	37.8	25.0	25.0	5	15	35.5	5	15	24.0	5	9	4	6	38.1	90	102	5	6	35.0	5	12	5	12	0
14 FT	9	11	9	8	5	8.5	5	6	37.1	25.0	25.0	5	14	35.0	5	14	23.5	5	9	4	6	37.9	91	103	5	6	35.5	5	12	5	12	0
16 FT	9	11	9	8	5	8.5	5	6	34.8	25.0	25.0	5	14	34.0	5	14	23.5	5	8.5	4	6	35.3	91	103	5	6	35.0	5	12	5	12	0
18 FT	10	12	9	8	5	8.5	5	7	34.9	26.0	30.0	5	14	34.0	5	14	23.5	5	8.5	5	8.5	35.3	92	104	5	6	35.0	5	12	5	12	0
20 FT	11	13	9	8	5	8	5	7.5	34.9	27.0	31.0	5	14	34.0	5	14	23.0	5	8.5	5	8	35.4	93	105	6	8	38.0	5	12	5	12	0
22 FT	11	13	9	8	5	7	5	6.5	34.8	27.0	31.0	5	13	34.0	5	13	23.5	5	7.5	5	8	35.1	93	105	6	7.5	38.0	5	12	5	11.5	0
24 FT	12	14	9	8	5	7.5	5	7	34.8	28.0	32.0	5	13	34.0	5	13	23.0	5	8	5	8	35.4	94	106	6	7.5	38.0	5	12	5	10.5	0
26 FT	13	15	9	8	5	7.5	5	7	34.9	29.0	33.0	5	12	33.5	5	12	22.0	5	8	5	8	35.6	95	107	6	7.5	38.0	5	12	5	9.5	0
28 FT	13	15	9	8	5	6.5	5	6.5	34.8	33.0	33.0	5	12	33.5	5	12	22.5	5	7	5	7.5	35.4	95	107	6	7	38.0	5	12	5	9	0
30 FT	14	16	9	8	5	7	5	6.5	34.9	34.0	34.0	5	12	33.0	5	12	21.5	5	7.5	5	7.5	35.6	96	108	6	7	38.0	5	12	5	8.5	0
32 FT	15																															



		SPAN (S) = 7 FT										HEIGHT (HT) = 9 FT OR 10 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=9' HT=10'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=9' HT=10'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7.5	4	6	38.1	28.0	28.0	4	16	73.0	4	16	26.0	4	7	6	7	68.1	113	125	5	7	38.0	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	5	8.5	38.1	28.0	32.0	4	15	73.0	4	15	25.0	4	6.5	6	6.5	64.9	113	125	5	6.5	37.5	5	12	5	12	12
2'- 4'	12	9	9	8	5	7.5	5	6	40.8	28.0	32.0	5	17	75.5	5	17	25.0	4	6.5	6	6.5	64.9	113	125	5	6.5	37.5	5	12	5	11.5	12
4 FT	8	9	9	8	4	6	5	6	40.8	24.0	28.0	5	17	75.5	5	17	23.5	4	7.5	5	6	57.8	113	125	5	7	37.0	5	12	5	11.5	12
6 FT	8	9	10	8	4	7	5	6.5	55.0	24.0	28.0	5	17	39.5	5	17	23.0	4	7	5	6.5	51.9	113	125	5	6.5	36.0	5	12	5	11.5	12
8 FT	8	9	10	8	4	7	5	6	49.0	28.0	28.0	5	16	37.0	5	16	23.5	4	6.5	5	6	49.3	113	125	5	6	35.5	5	12	5	10.5	0
10 FT	8	10	10	8	4	6.5	6	7	49.0	28.0	28.0	5	15	36.0	5	15	24.0	4	6.5	5	6	49.1	114	126	5	6	35.5	5	12	5	10	0
12 FT	9	10	10	8	4	6	5	6	46.1	29.0	29.0	5	16	35.5	5	16	23.5	5	9	6	7	50.3	114	126	5	6	35.0	5	12	5	9.5	0
14 FT	9	11	10	8	5	9	5	6	44.6	29.0	29.0	5	15	35.0	5	15	23.5	5	9	6	7.5	50.6	115	127	5	6	35.0	5	12	5	8.5	0
16 FT	9	11	10	8	5	9	5	6	41.5	29.0	29.0	5	14	34.0	5	14	23.5	5	8.5	5	6	44.0	115	127	5	6	35.0	5	12	5	9.5	0
18 FT	10	12	10	8	5	8.5	5	6.5	42.0	30.0	30.0	5	15	34.0	5	15	23.5	5	8.5	5	6	44.3	116	128	5	6	35.0	5	12	5	8.5	0
20 FT	11	13	10	8	5	8.5	5	6	42.4	31.0	31.0	5	14	33.5	5	14	22.5	5	8.5	5	6	44.6	117	129	6	8	38.0	5	12	5	8	0
22 FT	11	13	10	8	5	7.5	5	6	42.1	31.0	31.0	5	14	33.5	5	14	23.5	5	7.5	6	7	47.3	117	129	6	7.5	38.0	5	12	5	8	0
24 FT	12	14	10	8	5	7.5	5	6	42.5	32.0	32.0	5	13	33.5	5	13	22.5	5	8	6	7.5	47.6	118	130	6	7.5	38.0	5	12	5	8	0
26 FT	13	15	10	8	5	7.5	6	7	45.8	33.0	37.0	5	12	33.0	5	12	21.5	5	8	6	7.5	47.9	119	131	6	7.5	38.0	5	12	5	8	0
28 FT	13	16	11	8	5	7	5	6	42.9	33.0	33.0	5	12	32.5	5	12	22.0	5	8	5	6.5	45.3	120	132	6	7.5	38.0	5	12	5	7.5	0
30 FT	14	16	11	8	5	7	6	7.5	46.1	34.0	34.0	5	12	32.0	5	12	21.0	5	7.5	5	6	45.0	120	132	6	7	38.0	5	12	5	7.5	0
32 FT	14	17	12	8	5	7	5	6	43.4	34.0	34.0	5	12	32.0	5	12	21.5	5	7.5	5	6.5	45.4	121	133	6	7	38.0	5	12	5	7	0
34 FT	15	17	12	8	5	6.5	6	8.5	52.6	35.0	35.0	6	16	40.5	6	16	29.5	5	6.5	5	6.5	45.1	121	133	6	7	38.0	5	12	5	7	0
36 FT	15	18	13	8	5	6	6	8.5	52.9	35.0	35.0	6	16	40.0	6	16	29.5	5	7	5	6	45.5	122	134	6	7	38.0	5	12	5	6.5	0
38 FT	16	19	13	8	5	6.5	6	8	53.1	36.0	36.0	6	16	39.5	6	16	29.0	5	7	5	6	45.9	123	135	6	7	38.0	5	12	5	6.5	0
40 FT	17	19	13	8	5	6	6	7.5	53.4	37.0	37.0	5	12	35.0	5	12	25.0	5	6.5	5	6	45.8	123	135	6	6.5	38.0	5	12	5	6.5	0
42 FT	17	20	14	8	5	6	6	8	53.8	37.0	37.0	6	16	39.0	6	16	29.0	5	6.5	5	6	46.1	124	136	6	6.5	38.5	5	12	5	6	0
44 FT	17	20	14	8	6	8.5	6	7.5	53.6	37.0	37.0	6	15	39.0	6	15	29.0	5	6	5	6	46.1	124	136	6	6.5	38.5	5	12	5	6	0
46 FT	18	21	14	8	6	8	6	7	53.9	38.0	38.0	6	17	38.5	6	17	29.0	5	6.5	5	6	46.5	125	137	6	6.5	38.0	5	12	5	6	0
48 FT	18	22	15	8	6	8	6	7.5	54.3	38.0	42.0	6	16	38.5	6	16	29.0	5	6.5	6	8	49.9	126	138	6	6.5	38.5	5	12	5	6	0
50 FT	18	22	15	8	6	7.5	6	7.5	54.3	38.0	42.0	6	15	38.5	6	15	29.0	5	6	6	8	49.9	126	138	6	6	38.5	5	12	6	8	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS	
SPAN (S): 7 FEET HEIGHT (HT): 9 THRU 10 FEET		SHEET NO. <b>703.47A</b>
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>9 OF 27</b>	

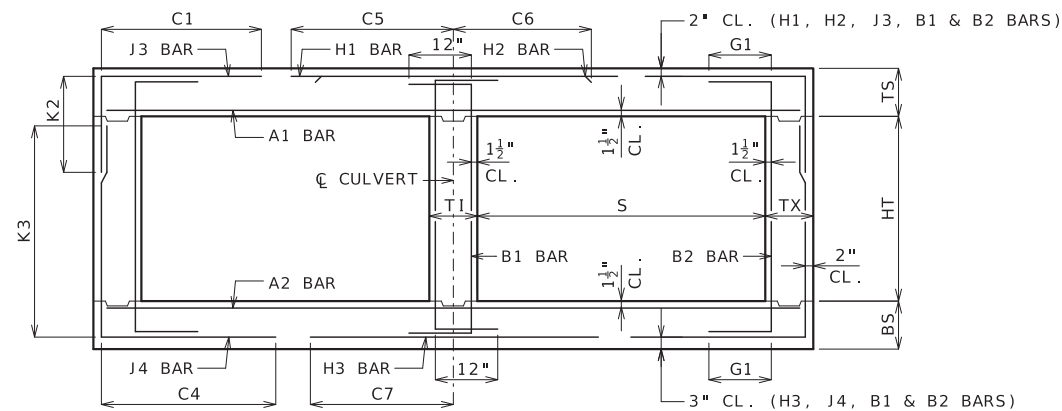
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
										HT=4'	HT=5'	HT=6'										HT=4'	HT=5'	HT=6'										
1 FT	12	9	8	8	5	7	4	8.5	41.8	28.0	28.0	28.0	4	12	81.5	4	12	26.5	4	7	4	8	43.0	53	65	77	5	6.5	41.0	5	12	5	12	12
2 FT	13	9	8	8	5	7.5	4	7.5	41.8	29.0	29.0	29.0	4	13	81.5	4	13	26.5	4	6.5	4	7	39.1	53	65	77	5	6	40.5	5	12	5	12	12
2' - 4'	13	9	8	8	5	7.5	5	6.5	41.8	29.0	29.0	29.0	5	15	81.5	5	15	26.5	4	6	4	6	39.1	53	65	77	6	6.5	42.5	5	9.5	5	12	12
4 FT	8	8	8	8	4	6	5	6.5	36.4	24.0	24.0	24.0	5	15	51.0	5	15	26.5	4	6	4	6	35.3	52	64	76	6	6.5	42.5	5	9.5	5	12	12
6 FT	8	9	8	8	4	6	5	6.5	34.3	24.0	24.0	24.0	5	15	42.5	5	15	26.0	4	6	4	7.5	33.1	53	65	77	6	7	42.0	5	12	5	12	12
8 FT	8	9	8	8	4	6	5	6	33.1	24.0	24.0	24.0	5	13	40.5	5	13	25.5	5	8.5	4	7	31.6	53	65	77	6	6.5	41.5	5	12	5	12	0
10 FT	9	10	8	8	5	8.5	4	6	31.9	25.0	25.0	25.0	5	14	39.5	5	14	25.5	5	8	4	8	30.4	54	66	78	6	7	41.5	5	12	5	12	0
12 FT	10	11	8	8	5	8	4	6	30.6	26.0	26.0	26.0	5	14	39.0	5	14	25.0	5	8	4	8	29.3	55	67	79	6	7	41.5	5	12	5	12	0
14 FT	11	12	8	8	5	8	4	6	29.8	27.0	27.0	27.0	5	14	38.5	5	14	25.0	5	7.5	4	7.5	28.6	56	68	80	6	7	41.5	5	12	5	12	0
16 FT	11	13	8	8	5	7.5	5	8.5	29.6	27.0	27.0	27.0	5	12	38.5	5	12	25.0	5	7.5	4	8	28.0	57	69	81	6	7	41.5	5	12	5	12	0
18 FT	12	13	8	8	5	7.5	4	6	27.5	28.0	28.0	28.0	5	13	37.5	5	13	25.0	5	7	4	7.5	26.8	57	69	81	6	7	41.0	5	12	5	12	0
20 FT	12	14	8	8	5	7	5	8.5	27.8	28.0	28.0	28.0	5	12	37.5	5	12	25.0	5	7	4	7.5	26.4	58	70	82	6	7	41.5	5	12	5	12	0
22 FT	13	15	8	8	5	6.5	6	8.5	27.4	29.0	29.0	29.0	5	12	37.5	5	12	25.0	5	7	4	7	26.4	59	71	83	6	7	41.5	5	12	5	12	0
24 FT	14	16	8	8	5	6.5	5	8.5	27.3	30.0	30.0	30.0	5	12	37.5	5	12	24.5	5	7	4	6.5	26.5	60	72	84	6	7	41.5	5	12	5	12	0
26 FT	15	16	8	8	5	6.5	5	8	31.9	31.0	31.0	31.0	6	16	46.5	6	16	33.0	5	6.5	4	6.5	26.6	60	72	84	6	7	41.0	5	12	5	12	0
28 FT	16	17	8	8	5	6	5	7	31.8	32.0	32.0	32.0	6	15	46.0	6	15	32.0	5	6.5	4	6	26.8	61	73	85	6	6.5	41.0	5	12	5	12	0
30 FT	16	18	8	8	5	6	5	7	32.0	32.0	32.0	36.0	6	15	46.0	6	15	33.0	5	6.5	5	6.5	26.6	62	74	86	6	6.5	41.0	5	12	5	12	0
32 FT	17	19	8	8	5	6	5	6.5	31.9	37.0	37.0	37.0	6	14	45.5	6	14	32.0	5	6.5	5	6.5	26.8	63	75	87	6	6.5	41.0	5	12	5	12	0
34 FT	18	19	8	8	6	8.5	5	6.5	31.8	38.0	38.0	38.0	6	13	45.5	6	13	31.0	5	6	5	6.5	26.9	63	75	87	6	6	41.0	5	12	5	11	0
36 FT	18	20	8	8	6	8	5	6.5	31.9	38.0	38.0	38.0	6	13	45.5	6	13	32.0	5	6	5	6	26.9	64	76	88	6	6	41.0	5	12	5	10	0
38 FT	19	21	8	8	6	8	5	6	32.0	39.0	39.0	39.0	6	13	45.0	6	13	31.0	5	6	6	7.5	30.1	65	77	89	6	6	41.0	5	12	5	9.5	0
40 FT	20	22	8	8	6	7.5	6	7.5	36.0	44.0	44.0	44.0	6	13	44.5	6	13	30.5	5	6	6	7	30.4	66	78	90	6	6	41.0	5	12	5	9.5	0
42 FT	20	22	8	8	6	7.5	6	7.5	36.0	44.0	44.0	44.0	6	12	44.5	6	12	30.5	6	8.5	6	7	30.3	66	78	90	6	6	41.0	5	12	5	9.5	0
44 FT	21	23	8	8	6	7.5	6	7	36.0	45.0	45.0	45.0	6	12	43.5	6	12	30.0	6	8.5	6	6.5	30.5	67	79	91	6	6	41.0	5	12	5	9.5	0
46 FT	21	23	8	8	6	7	6	7	36.0	45.0	45.0	45.0	6	12	43.5	6	12	30.0	6	8	6	6.5	30.5	67	79	91	7	7.5	44.0	5	12	5	9.5	0
48 FT	22	24	8	8	6	7	6	6.5	36.1	46.0	46.0	46.0	6	12	43.0	6	12	30.0	6	8	6	6	30.8	68	80	92	7	7.5	44.0	5	12	5	9	0
50 FT	22	24	8	8	6	6.5	6	6.5	36.1	46.0	46.0	46.0	6	12	43.0	6	12	30.0	6	7.5	6	6	30.8	68	80	92	7	7.5	44.0	5	12	5	8.5	0

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
										HT=7'	HT=8'	HT=9'										HT=7'	HT=8'	HT=9'										
1 FT	12	9	8	8	5	7	4	6.5	41.8	28.0	28.0	28.0	4	12	81.5	4	12	27.5	4	6	5	6.5	61.6	89	101	113	5	6	41.0	5	12	5	12	12
2 FT	13	10	8	8	5	7	4	6.5	41.8	29.0	29.0	29.0	4	13	81.5	4	13	27.0	4	6.5	4	6	58.3	90	102	114	5	6.5	40.5	5	12	5	12	12
2' - 4'	13	10	8	8	5	7	6	7.5	43.8	29.0	29.0	29.0	5	15	83.5	5	15	27.0	4	6	5	6	58.3	90	102	114	5	6	40.5	5	11	5	12	12
4 FT	8	9	8	8	4	6	6	7.5	43.8	24.0	24.0	28.0	5	15	83.5	5	15	27.0	4	6	5	6	52.3	89	101	113	5	6	40.0	5	11	5	12	12
6 FT	8	10	8	8	4	6	6	7.5	51.4	24.0	24.0	28.0	5	15	43.0	5	15	26.0	4	6.5	5	6	49.0	90	102	114	5	6.5	39.5	5	12	5	12	12
8 FT	8	11	8	8	4	6	6	7.5	46.6	24.0	24.0	28.0	5	13	40.5	5	13	25.5	4	6.5	5	6.5	46.3	91	103	115	5	6	39.0	5	12	5	12	0
10 FT	9	11	8	8	5	8.5	6	7	45.3	25.0	25.0	29.0	5	14	39.5	5	14	25.5	5	8.5	5	6	43.6	91	103	115	5	6	38.5	5	12	5	11	0
12 FT	10	12	8	8	5	8	6	7	44.4	26.0	30.0	30.0	5	14	39.0	5	14	25.0	5	8.5	5	6	42.5	92	104	116	5	6	38.5	5	12	5	10	0
14 FT	11	12	8	8	5	8	6	7	43.5	27.0	31.0	35.0	5	14	38.5	5	14	25.0	5	7.5	6	7	44.4	92	104	116	6	7	41.5	5	12	5	9.5	0
16 FT	11	13	8	8	5	7.5	6	6.5	42.9	27.0	31.0	35.0	5	12	38.0	5	12	25.0	5	7.5	6	7	44.0	93	105	117	6	7.5	41.5	5	12	5	9.5	0
18 FT	12	13	8	8	5	7.5	5	6	37.1	28.0	32.0	32.0	5	13	37.5	5	13	25.0	5	7	6	7.5	41.1	93	105	117	6	7	41.0	5	12	5	9.5	0
20 FT	12	14	8	8	5	7	6	7	39.9	32.0	32.0	36.0	5	12	37.5	5	12	25.0	5	7	6	7.5	41.1	94	106	118	6	7	41.0	5	12	5	9.5	0
22 FT	13	15	8	8	5	6.5	6	7	39.9	33.0	33.0	37.0	5	12	37.0	5	12	25.0	5	7	6	7.5	41.3	95	107	119	6	7	41.0	5	12	5	9.5	0
24 FT	14	16	8	8	5	6.5	6	7	40.0	34.0	34.0	38.0	5	12	37.0	5	12	24.0	5	7	6	7	41.4	96	108	120	6	7	41.0	5	12	5	9	0
26 FT	15	16	9	8	5	6.5	5	6	42.4	35.0	35.0	35.0	6	16	45.5	6	16	32.0	5	6.5	5	6	38.5	96	108	120	6	7	41.0	5	12	5	8.5	0
28 FT	15	17	10	8	5	6	5	6.5	42.9	31.0	35.0	35.0	6	16	45.5	6	16	33.0	5	6.5	5	7.5	38.8	97	109	121	6	6.5	41.5	5	12	5	8	0
30 FT	16	18	11	8	5	6	5	6.5	43.6	32.0	36.0	36.0	6	15	44.5	6	15	31.5	5	6.5	5	7	39.1	98	11									

		SPAN (S) = 8 FT										HEIGHT (HT) = 10 FT OR 11 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=10 HT=11		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=10 HT=11		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	9	5	7	5	7.5	41.9	32.0	32.0	4	12	81.5	4	12	27.5	5	9	6	6	73.9	125	137	5	6	41.5	5	12	5	10.5	12
2 FT	13	10	9	9	5	7	5	8	42.5	29.0	33.0	4	13	82.0	4	13	27.0	4	6	5	6	66.8	126	138	5	6.5	41.0	5	12	5	11	12
2'- 4'	13	11	9	9	5	7	6	7	44.5	29.0	33.0	5	16	84.0	5	16	27.0	4	6	5	6	66.8	127	139	5	6.5	41.0	5	10.5	5	9.5	12
4 FT	8	11	9	9	4	6	6	7	44.5	24.0	28.0	5	16	84.0	5	16	27.0	4	7	5	6	66.0	127	139	5	7.5	41.0	5	10.5	5	9.5	12
6 FT	8	11	9	9	4	6	6	7	61.5	28.0	32.0	5	15	43.0	5	15	26.0	4	6.5	6	7	64.5	127	139	5	7	40.0	5	11.5	5	9	12
8 FT	8	11	9	9	4	6	6	7	55.6	28.0	32.0	5	14	40.5	5	14	25.5	4	6	6	6.5	60.4	127	139	5	6	39.5	5	11.5	5	8.5	0
10 FT	9	11	9	9	5	8.5	6	7.5	54.9	29.0	33.0	5	14	39.5	5	14	25.5	5	8.5	6	6	57.5	127	139	5	6	39.0	5	12	5	8.5	0
12 FT	10	11	9	9	5	8	5	6	51.1	30.0	30.0	5	14	39.0	5	14	25.5	5	7.5	6	6	55.3	127	139	6	7	41.5	5	12	5	8.5	0
14 FT	10	12	9	9	5	8	6	6.5	52.0	30.0	34.0	5	13	38.5	5	13	25.5	5	7.5	6	6	54.8	128	140	6	7	41.5	5	12	5	8.5	0
16 FT	11	13	10	9	5	7.5	5	6	48.6	31.0	31.0	5	13	38.0	5	13	25.5	5	7.5	6	6.5	54.1	129	141	6	7.5	41.5	5	12	5	8	0
18 FT	11	13	10	9	5	7.5	5	6	45.1	31.0	31.0	5	12	37.0	5	12	25.0	5	7	6	6.5	50.4	129	141	6	7	41.5	5	12	5	8	0
20 FT	12	14	10	9	5	7	6	7.5	48.4	32.0	36.0	5	13	37.0	5	13	25.0	5	7	6	6.5	50.5	130	142	6	7.5	41.5	5	12	5	8	0
22 FT	13	15	10	9	5	7	6	7	48.5	33.0	37.0	5	12	37.0	5	12	24.5	5	7	6	6.5	50.6	131	143	6	7	41.5	5	12	5	8	0
24 FT	13	16	11	9	5	6.5	6	8	48.5	33.0	33.0	5	12	36.5	5	12	25.0	5	7	5	6	47.8	132	144	6	7	41.5	5	12	5	7.5	0
26 FT	14	16	12	9	5	6.5	5	6	46.0	34.0	34.0	5	12	36.0	5	12	24.5	5	6	5	6	47.5	132	144	6	7	41.5	5	12	5	7	0
28 FT	15	17	12	9	5	6.5	6	8	55.3	35.0	35.0	6	16	44.5	6	16	32.5	5	6.5	5	6	47.8	133	145	6	6.5	41.5	5	12	5	7	0
30 FT	16	18	13	9	5	6.5	6	8	55.8	36.0	36.0	6	15	44.0	6	15	31.5	5	6.5	5	6	48.0	134	146	6	6.5	41.5	5	12	5	6.5	0
32 FT	16	19	13	9	5	6	6	7.5	55.8	36.0	36.0	6	15	44.0	6	15	32.0	5	6.5	5	6	48.3	135	147	6	6	41.5	5	12	5	6.5	0
34 FT	17	20	13	9	5	6	6	7	56.0	37.0	37.0	6	14	43.5	6	14	31.0	5	6.5	5	6	48.5	136	148	6	6.5	41.5	5	12	5	6.5	0
36 FT	17	20	14	9	6	8	6	7.5	56.1	37.0	37.0	6	14	43.0	6	14	31.5	5	6	5	6	48.6	136	148	6	6	41.5	5	12	5	6	0
38 FT	18	21	14	9	6	8	6	7	56.4	38.0	38.0	6	13	42.5	6	13	30.5	5	6	5	6	48.9	137	149	6	6	41.5	5	12	5	6	0
40 FT	18	22	15	9	6	7	6	7.5	56.8	38.0	42.0	6	13	42.5	6	13	30.5	5	6	6	8	52.3	138	150	6	6	41.5	5	12	6	8	0
42 FT	19	22	15	9	6	7.5	6	7	57.0	39.0	43.0	6	14	42.0	6	14	30.0	6	8.5	6	8	52.3	138	150	7	7.5	44.5	5	12	6	8	0
44 FT	19	23	15	9	6	6.5	6	6.5	56.9	39.0	43.0	6	13	42.0	6	13	30.0	6	8.5	6	8	52.5	139	151	7	8	44.5	5	12	6	8	0
46 FT	20	24	16	9	6	7	6	7	57.6	40.0	44.0	6	14	41.5	6	14	30.0	6	8	6	7.5	52.9	140	152	7	8	44.5	5	12	6	8	0
48 FT	20	24	16	9	6	6.5	6	6.5	57.5	40.0	44.0	6	13	41.5	6	13	30.0	6	8	6	7.5	52.9	140	152	7	7.5	44.5	5	12	6	8	0
50 FT	21	25	16	9	6	6.5	6	6	57.8	41.0	45.0	6	14	41.0	6	14	30.0	6	8	6	7.5	53.1	141	153	7	7.5	44.5	5	12	6	8	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE DOUBLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 8 FEET HEIGHT (HT): 10 THRU 11 FEET
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.47A</b>	SHEET NO. <b>11 OF 27</b>

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

SPAN (S) = 9 FT      HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

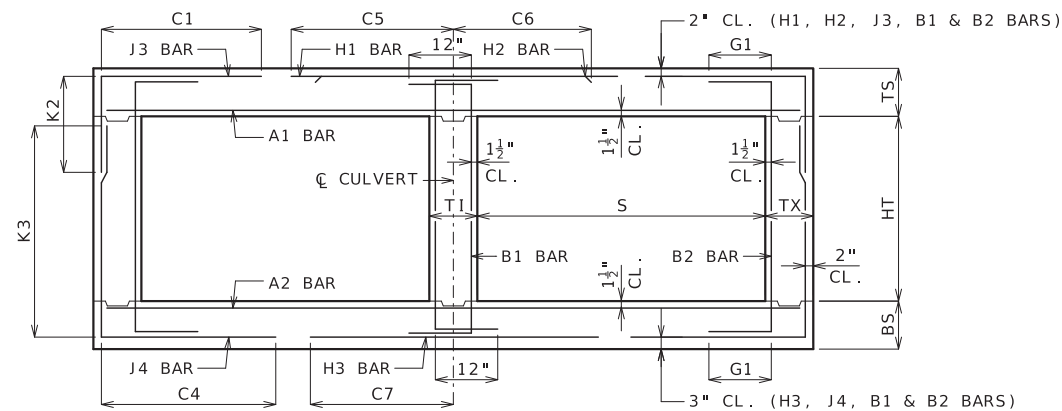
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	4	7.5	45.3	29.0	29.0	29.0	5	17	89.5	5	17	28.5	4	6	4	6	47.3	65	77	89	5	6	44.0	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	4	7.5	45.3	29.0	29.0	29.0	5	16	89.5	5	16	27.5	4	6	4	7.5	44.5	66	78	90	5	6.5	44.0	5	12	5	12	12
2' - 4'	13	10	8	8	5	6.5	5	6.5	45.3	29.0	29.0	29.0	5	15	89.5	5	15	28.5	5	8	4	6	44.5	66	78	90	6	6.5	46.0	5	11	5	12	12
4 FT	9	9	8	8	5	8.5	5	6.5	42.1	25.0	25.0	25.0	5	15	59.0	5	15	28.5	5	8	4	6	39.5	65	77	89	6	6.5	46.0	5	11	5	12	12
6 FT	9	9	8	8	5	8.5	5	6.5	36.9	25.0	25.0	29.0	5	14	47.0	5	14	27.5	5	7.5	5	7	36.5	65	77	89	6	6	45.0	5	12	5	12	12
8 FT	9	10	8	8	5	8.5	5	6.5	35.6	25.0	25.0	25.0	5	12	44.0	5	12	27.0	5	7.5	4	6.5	34.6	66	78	90	6	6.5	45.0	5	12	5	12	0
10 FT	10	11	8	8	5	8	5	7.5	34.3	26.0	26.0	26.0	5	12	43.0	5	12	26.5	5	7.5	4	6.5	33.3	67	79	91	6	6.5	44.5	5	12	5	12	0
12 FT	11	12	8	8	5	7.5	5	8.5	33.0	27.0	27.0	27.0	5	12	42.5	5	12	26.5	5	7	4	6	32.1	68	80	92	6	6.5	44.5	5	12	5	12	0
14 FT	12	13	8	8	5	7	5	8.5	32.1	28.0	28.0	28.0	5	12	42.0	5	12	26.5	5	6.5	4	6	31.5	69	81	93	6	6.5	44.5	5	12	5	12	0
16 FT	13	14	8	8	5	6.5	5	8.5	31.5	29.0	29.0	33.0	6	16	44.5	6	16	29.5	5	6.5	5	8.5	31.0	70	82	94	6	6.5	44.5	5	12	5	12	0
18 FT	13	15	8	8	5	6.5	5	8	31.3	29.0	29.0	33.0	6	15	44.5	6	15	29.5	5	6.5	5	8.5	30.5	71	83	95	6	6.5	44.5	5	12	5	12	0
20 FT	14	15	8	8	5	6	5	8.5	29.3	30.0	30.0	34.0	6	16	43.5	6	16	29.0	5	6	5	8.5	29.1	71	83	95	6	6.5	44.5	5	12	5	12	0
22 FT	15	16	8	8	5	6	5	8	34.1	31.0	31.0	35.0	6	15	49.5	6	15	35.0	5	6	5	8	29.1	72	84	96	6	6.5	44.5	5	12	5	12	0
24 FT	15	17	8	8	6	7.5	5	8	34.3	31.0	31.0	35.0	6	14	49.5	6	14	35.0	5	6	5	7	28.9	73	85	97	6	6.5	44.5	5	12	5	12	0
26 FT	16	18	8	8	6	8	5	7	34.1	32.0	36.0	36.0	6	14	49.0	6	14	35.0	5	6	5	6.5	29.0	74	86	98	6	6.5	44.5	5	12	5	11	0
28 FT	17	19	8	8	6	7.5	5	6.5	34.0	37.0	37.0	37.0	6	14	49.0	6	14	35.0	5	6	5	6.5	29.1	75	87	99	6	6	44.5	5	12	5	10	0
30 FT	18	20	8	8	6	7.5	5	6.5	34.0	38.0	38.0	38.0	6	13	48.5	6	13	34.0	6	8.5	5	6	29.3	76	88	100	6	6	44.5	5	12	5	9.5	0
32 FT	19	21	8	8	6	7.5	5	6	34.1	39.0	39.0	39.0	6	13	48.0	6	13	33.0	6	8.5	6	7.5	32.5	77	89	101	7	7.5	47.0	5	12	5	9.5	0
34 FT	20	21	8	8	6	7.5	6	7.5	38.0	44.0	44.0	44.0	6	12	47.5	6	12	32.5	6	7.5	6	7.5	32.6	77	89	101	7	7.5	47.0	5	12	5	9.5	0
36 FT	20	22	8	8	6	7	6	7.5	38.0	44.0	44.0	44.0	6	12	47.5	6	12	33.0	6	8	6	7	32.6	78	90	102	7	7.5	47.0	5	12	5	9.5	0
38 FT	21	23	8	8	6	7	6	7	38.1	45.0	45.0	45.0	6	12	47.0	6	12	32.0	6	7.5	6	6.5	32.8	79	91	103	7	7	47.0	5	12	5	9	0
40 FT	22	24	8	8	6	6.5	6	6.5	38.3	46.0	46.0	46.0	7	15	51.5	7	15	36.0	6	7.5	6	6	33.0	80	92	104	7	7	47.0	5	12	5	8	0
42 FT	22	24	8	8	6	6.5	6	6	38.1	46.0	46.0	46.0	7	15	51.5	7	15	36.5	6	7.5	6	6	33.0	80	92	104	7	7	47.0	5	12	5	7.5	0
44 FT	23	25	9	8	6	6.5	6	7	39.0	47.0	47.0	47.0	7	15	50.5	7	15	36.0	6	7.5	6	7	33.5	81	93	105	7	7	47.0	5	12	5	8.5	0
46 FT	24	26	9	8	6	6	6	7	39.0	48.0	48.0	48.0	7	15	49.5	7	15	35.5	6	7.5	6	6.5	33.8	82	94	106	7	7	47.0	5	12	5	8	0
48 FT	24	26	9	8	6	6	6	7	39.0	48.0	48.0	48.0	7	15	49.5	7	15	35.5	6	6.5	6	6.5	33.8	82	94	106	7	6.5	47.0	5	12	5	8	0
50 FT	25	27	9	8	6	6	6	6.5	39.0	49.0	49.0	49.0	7	15	49.0	7	15	35.5	6	7	6	6.5	34.0	83	95	107	7	6.5	47.0	5	12	5	7.5	0

SPAN (S) = 9 FT      HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	8	8	5	6.5	5	8.5	47.3	29.0	29.0	33.0	5	18	91.5	5	18	29.0	4	6	5	6	69.0	102	114	126	5	6.5	44.5	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	5	8.5	47.3	29.0	29.0	33.0	5	17	91.5	5	17	28.0	5	9	6	7	66.6	102	114	126	5	6	44.0	5	12	5	12	12
2' - 4'	13	10	8	8	5	6.5	6	7	47.3	29.0	33.0	33.0	5	15	91.5	5	15	29.0	5	7.5	6	6	66.6	102	114	126	6	6	46.0	5	12	5	10.5	12
4 FT	9	9	8	8	5	8.5	6	7	47.3	29.0	33.0	33.0	5	15	91.5	5	15	29.0	5	7.5	6	6	59.4	101	113	125	6	6	46.0	5	12	5	10.5	12
6 FT	9	10	9	8	5	8.5	5	6	54.1	25.0	25.0	29.0	5	14	48.0	5	14	27.5	5	8	5	6	51.8	102	114	126	6	6.5	45.5	5	12	5	11.5	12
8 FT	9	11	9	8	5	8.5	5	6	48.0	25.0	29.0	29.0	5	13	44.0	5	13	27.0	5	8	5	6	49.3	103	115	127	6	7	45.0	5	12	5	11	0
10 FT	10	11	9	8	5	8	5	6	46.6	26.0	30.0	30.0	5	12	43.0	5	12	26.5	5	7	6	7	50.0	103	115	127	6	6.5	44.5	5	12	5	10	0
12 FT	11	12	9	8	5	7.5	6	7	48.4	31.0	31.0	35.0	5	12	42.0	5	12	26.5	5	7	6	7	49.0	104	116	128	6	6.5	44.5	5	12	5	9.5	0
14 FT	12	13	9	8	5	7	6	7.5	47.4	32.0	32.0	36.0	5	12	41.5	5	12	26.5	5	6.5	6	7	48.1	105	117	129	6	6.5	44.5	5	12	5	8.5	0
16 FT	12	14	9	8	5	7	6	6.5	46.4	32.0	32.0	36.0	6	15	44.5	6	15	29.5	5	6.5	6	7	47.5	106	118	130	6	6.5	44.5	5	12	5	8.5	0
18 FT	13	15	9	8	5	6.5	6	6.5	46.0	33.0	33.0	37.0	6	15	44.0	6	15	29.0	5	6.5	6	7.5	47.3	107	119	131	6	7	44.5	5	12	5	8.5	0
20 FT	14	15	9	8	5	6.5	5	6	40.1	34.0	34.0	34.0	6	16	43.0	6	16	29.0	5	6	6	7.5	44.4	107	119	131	6	6.5	44.5	5	12	5	8.5	0
22 FT	14	16	10	8	5	6	5	6	40.5	34.0	34.0	34.0	6	15	43.0	6	15	29.0	5	6	5	7	41.5	108	120	132	6	6.5	44.5	5	12	5	8	0
24 FT	15	17	10	8	6	8	6	8	49.5	35.0	35.0	35.0	6	15	48.5	6	15	35.0	5	6	5	6.5	41.6	109	121	133	6	6.5	44.5	5	12	5	8	0
26 FT	16	18	11	8	6	8	5	6	46.1	36.0	36.0	36.0	6	15	48.0	6	15	34.5	5	6	5	7	41.9	110	122	134	6	6.5	44.5	5	12	5	7.5	0
28 FT	17	19	11	8	6	8	6	8	50.1	37.0	37.0	37.0	6	14	47.5	6	14	33.5	5	6	5	7	42.0	111	123	135	6	6	44.5	5	12	5	7.5	0
30 FT	18	20	12	8	6	8	5	6	46.8	38.0	38.0	38.0	6	13	47.0	6	13	32.5	6	8.5	5	6.5	42.4	112	124	136	6	6	44.5	5	12	5	7.5	0
32 FT	18	21	12	8	6	7.5	6	8	50.8	38.0																								

		SPAN (S) = 9 FT										HEIGHT (HT) = 11 FT OR 12 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=11' HT=12'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=11' HT=12'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	9	10	5	6.5	5	8	48.3	33.0	33.0	5	17	93.0	5	17	29.0	5	9	6	6.5	79.4	138	150	5	6	44.5	5	12	5	9.5	12
2 FT	13	11	9	10	5	6.5	5	7.5	48.3	33.0	33.0	5	16	93.0	5	16	28.0	4	6	6	7	77.0	139	151	5	6	44.5	5	12	5	9	12
2'- 4'	13	11	9	10	5	6.5	5	6	48.3	33.0	33.0	5	15	93.0	5	15	29.0	5	8	6	6	77.0	139	151	6	7	46.5	5	12	5	8.5	12
4 FT	9	10	9	10	5	8.5	5	6	48.3	29.0	29.0	5	15	93.0	5	15	29.0	5	8	6	6	71.4	138	150	6	7	46.5	5	12	5	8.5	12
6 FT	9	11	9	10	5	8.5	6	7	69.3	29.0	33.0	5	15	47.0	5	15	28.0	5	8.5	6	6	68.0	139	151	5	6	43.0	5	12	5	8.5	12
8 FT	9	11	9	10	5	8.5	6	6.5	61.6	29.0	33.0	5	13	44.0	5	13	27.5	5	7.5	6	6	63.8	139	151	6	7	45.5	5	12	5	8.5	0
10 FT	10	11	10	10	5	8	5	6	56.4	30.0	30.0	5	13	43.0	5	13	27.5	5	7	6	6	60.1	139	151	6	6.5	45.0	5	12	5	8	0
12 FT	11	12	10	10	5	7.5	5	6	55.0	31.0	31.0	5	13	42.5	5	13	27.0	5	6.5	6	6.5	59.1	140	152	6	6.5	45.0	5	12	5	8	0
14 FT	11	13	10	10	5	7.5	6	7	55.6	31.0	35.0	6	16	45.0	6	16	30.0	5	6.5	6	6.5	58.5	141	153	6	6.5	45.0	5	12	5	8	0
16 FT	12	14	11	10	5	7	6	8.5	54.6	32.0	36.0	6	16	44.5	6	16	30.0	5	6.5	6	7	57.4	142	154	6	6.5	45.0	5	12	5	7.5	0
18 FT	13	15	11	10	5	6.5	6	7.5	54.6	33.0	37.0	6	16	44.0	6	16	30.0	5	6.5	6	6.5	57.1	143	155	6	7	44.5	5	12	5	7.5	0
20 FT	13	15	11	10	5	6.5	6	7.5	51.5	33.0	37.0	6	15	43.5	6	15	29.5	5	6	6	6.5	53.4	143	155	6	6.5	44.5	5	12	5	7.5	0
22 FT	14	16	12	10	5	6	6	8	51.9	34.0	38.0	6	16	43.0	6	16	29.5	5	6	6	7.5	53.6	144	156	6	6.5	44.5	5	12	5	7	0
24 FT	15	17	12	10	5	6	6	7.5	58.0	35.0	39.0	6	16	48.5	6	16	35.5	5	6	6	7.5	53.8	145	157	6	6.5	44.5	5	12	5	7	0
26 FT	16	18	13	10	6	8.5	6	7.5	58.5	36.0	40.0	6	15	48.0	6	15	34.5	5	6	6	8	54.0	146	158	6	6.5	44.5	5	12	5	6.5	0
28 FT	17	19	13	10	6	8	6	7	58.6	37.0	41.0	6	14	47.5	6	14	33.5	6	8.5	6	8	54.1	147	159	6	6	44.5	5	12	5	6.5	0
30 FT	17	20	13	10	6	7.5	6	6.5	58.5	37.0	41.0	6	14	47.5	6	14	34.5	6	8	6	7	54.4	148	160	6	6	44.5	5	12	5	6.5	0
32 FT	18	21	14	10	6	7.5	6	7	59.1	38.0	42.0	6	13	47.0	6	13	33.5	6	8	6	8	54.6	149	161	7	7.5	47.5	5	12	5	6	0
34 FT	19	22	14	10	6	7.5	6	6.5	59.3	39.0	43.0	6	13	46.5	6	13	32.5	6	8	6	8	54.9	150	162	7	7.5	47.5	5	12	5	6	0
36 FT	19	22	15	10	6	7	6	6.5	59.5	43.0	43.0	6	13	46.0	6	13	33.0	6	7	6	8	54.9	150	162	7	7.5	48.0	5	12	6	8	0
38 FT	20	23	15	10	6	7	6	6.5	59.6	44.0	44.0	6	12	45.5	6	12	32.0	6	7.5	6	8	55.1	151	163	7	7	47.5	5	12	6	8	0
40 FT	20	24	16	10	6	6	6	6.5	60.0	44.0	44.0	6	12	45.0	6	12	32.5	6	7.5	6	7.5	55.5	152	164	7	7	48.0	5	12	6	8	0
42 FT	21	25	16	10	6	6.5	6	6	60.3	45.0	45.0	6	12	44.5	6	12	31.5	6	7.5	6	7.5	55.8	153	165	7	7	48.0	5	12	6	8	0
44 FT	22	25	17	10	6	6.5	6	6.5	60.8	46.0	46.0	6	12	44.0	6	12	31.0	6	6.5	6	7	55.9	153	165	7	6.5	48.0	5	12	6	7.5	0
46 FT	22	26	17	10	6	6	6	6	60.8	46.0	46.0	6	12	44.0	6	12	31.0	6	7	6	7	56.1	154	166	7	6.5	48.0	5	12	6	7.5	0
48 FT	23	27	18	10	6	6	6	6.5	61.5	47.0	47.0	6	12	43.5	6	12	31.0	6	7	6	6.5	56.6	155	167	7	6.5	48.0	5	12	6	7	0
50 FT	23	28	19	10	6	6	6	6.5	62.0	43.0	47.0	6	12	43.5	6	12	31.0	6	7	6	7	57.0	156	168	7	6.5	48.0	5	12	6	7	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 9 FEET HEIGHT (HT): 11 THRU 12 FEET	
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.47A</b>	SHEET NO. <b>13 OF 27</b>

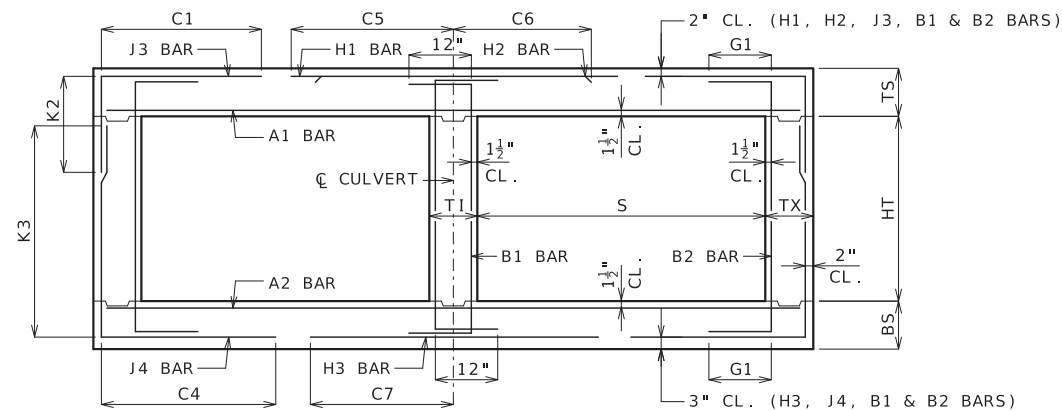
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

		SPAN (S) = 10 FT												HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
									HT=5'	HT=6'	HT=7'											HT=5'	HT=6'	HT=7'										
1 FT	13	10	8	8	5	6.5	4	7	48.9	29.0	29.0	29.0	5	15	98.0	5	15	29.0	4	6	4	7	48.1	66	78	90	5	6	47.5	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	4	7	48.9	29.0	29.0	29.0	5	13	98.0	5	13	28.5	5	8.5	4	6.5	43.8	66	78	90	6	7	50.0	5	12	5	12	12
2' - 4'	13	10	8	8	5	6.5	6	7.5	48.9	29.0	29.0	29.0	5	12	98.0	5	12	30.0	5	8	4	6.5	43.8	66	78	90	6	6.5	50.0	5	8.5	5	12	12
4 FT	9	10	8	8	5	7.5	6	7.5	43.1	25.0	25.0	25.0	5	12	62.0	5	12	30.0	5	8	4	7	38.9	66	78	90	6	6.5	49.5	5	8.5	5	12	12
6 FT	9	10	8	8	5	8.5	5	6	38.0	25.0	25.0	25.0	6	15	53.5	6	15	32.0	5	7	4	6.5	36.1	66	78	90	6	6	48.5	5	12	5	12	12
8 FT	10	11	8	8	5	8	5	7.5	36.0	26.0	26.0	26.0	6	16	51.0	6	16	31.5	5	7	4	6.5	34.1	67	79	91	6	6	48.0	5	12	5	12	0
10 FT	11	12	8	8	5	7.5	5	8	34.1	27.0	27.0	27.0	6	15	49.5	6	15	31.0	5	6.5	4	6	32.6	68	80	92	6	6.5	48.0	5	12	5	12	0
12 FT	12	13	8	8	5	7	5	8.5	32.8	28.0	28.0	28.0	6	15	48.5	6	15	31.0	5	6.5	4	6	31.5	69	81	93	6	6.5	48.0	5	12	5	12	0
14 FT	13	14	8	8	5	6.5	5	8.5	31.6	29.0	29.0	33.0	6	15	48.5	6	15	31.0	5	6	5	9	30.8	70	82	94	6	6	47.5	5	12	5	12	0
16 FT	14	15	8	8	5	6	5	8.5	30.8	30.0	30.0	34.0	6	14	48.0	6	14	31.0	5	6	5	8.5	30.1	71	83	95	6	6	47.5	5	12	5	12	0
18 FT	15	16	8	8	6	8	5	8	35.1	31.0	31.0	35.0	6	14	53.5	6	14	36.5	6	8	5	8	29.9	72	84	96	6	6	47.5	5	12	5	12	0
20 FT	15	17	8	8	6	7.5	5	8	35.1	31.0	31.0	35.0	6	13	53.5	6	13	36.5	6	8	5	7	29.4	73	85	97	6	6	47.5	5	12	5	12	0
22 FT	16	18	8	8	6	8	5	7	33.4	32.0	36.0	36.0	6	13	52.5	6	13	36.5	6	8	5	6.5	28.0	74	86	98	6	6.5	47.5	5	12	5	12	0
24 FT	17	19	8	8	6	7.5	5	6.5	33.3	37.0	37.0	37.0	6	13	52.5	6	13	36.5	6	8	5	6.5	28.0	75	87	99	6	6	47.5	5	12	5	12	0
26 FT	18	20	8	8	6	7	5	6.5	33.1	38.0	38.0	38.0	6	13	52.0	6	13	36.0	6	7.5	6	7.5	31.3	77	89	101	7	7.5	50.5	5	12	5	9.5	0
28 FT	19	21	8	8	6	7	5	6	33.1	39.0	39.0	39.0	6	12	52.0	6	12	35.5	6	7.5	6	7	31.4	78	90	102	7	7.5	50.5	5	12	5	9.5	0
30 FT	20	22	8	8	6	7	6	7.5	37.1	44.0	44.0	44.0	6	12	51.5	6	12	35.5	6	7.5	6	7	31.4	78	90	102	7	7.5	50.5	5	12	5	9.5	0
32 FT	21	23	8	8	6	6.5	6	7	37.1	45.0	45.0	45.0	6	12	51.0	6	12	34.5	6	7.5	6	6.5	31.5	79	91	103	7	7	50.5	5	12	5	9.5	0
34 FT	22	23	8	8	6	6.5	6	6.5	37.0	46.0	46.0	46.0	7	15	55.5	7	15	38.5	6	6.5	6	6.5	31.6	79	91	103	7	7	50.5	5	12	5	9.5	0
36 FT	22	24	8	8	6	6	6	6.5	37.1	46.0	46.0	46.0	7	15	55.5	7	15	39.5	6	7	6	6	31.6	80	92	104	7	7	50.0	5	12	5	9	0
38 FT	23	25	8	8	6	6	6	6	37.1	47.0	47.0	47.0	7	15	55.0	7	15	38.5	6	7	6	6	31.9	81	93	105	7	6.5	50.0	5	12	5	8.5	0
40 FT	24	26	9	8	6	6	6	7	38.0	48.0	48.0	48.0	7	14	54.0	7	14	37.5	6	7	6	6.5	32.5	82	94	106	7	6.5	50.0	5	12	5	8.5	0
42 FT	25	27	9	8	6	6	6	6.5	38.0	49.0	49.0	49.0	7	14	53.5	7	14	37.0	6	7	6	6.5	32.6	83	95	107	7	6	50.0	5	12	5	8.5	0
44 FT	25	28	9	8	7	7.5	6	6.5	38.1	49.0	49.0	49.0	7	14	53.0	7	14	37.5	6	6.5	6	6	32.8	84	96	108	7	6	50.0	5	12	5	8.5	0
46 FT	26	28	9	8	7	7.5	6	6.5	38.1	50.0	50.0	50.0	7	13	52.5	7	13	36.5	6	6.5	6	6	32.9	84	96	108	7	6	50.0	5	12	5	8	0
48 FT	27	29	9	8	7	7.5	6	6	38.1	51.0	51.0	51.0	7	14	51.5	7	14	36.5	6	6.5	6	6	33.0	85	97	109	7	6	50.0	5	12	5	7.5	0
50 FT	27	30	10	8	7	7	6	7	39.0	51.0	51.0	51.0	7	13	51.5	7	13	36.0	6	6.5	6	6.5	33.5	86	98	110	7	6	50.0	5	12	5	8	0

		SPAN (S) = 10 FT												HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
									HT=8'	HT=9'	HT=10'													HT=8'	HT=9'	HT=10'								
1 FT	13	10	8	8	5	6.5	5	8.5	50.9	29.0	33.0	33.0	5	14	100.0	5	14	29.5	5	8.5	6	7.5	71.6	102	114	126	5	6	47.5	5	12	5	12	12
2 FT	13	11	8	8	5	6.5	5	8.5	50.9	29.0	33.0	33.0	5	13	100.0	5	13	28.5	5	8.5	5	6	64.1	103	115	127	5	6	47.0	5	12	5	12	12
2' - 4'	13	11	9	8	5	6.5	5	6	69.0	29.0	33.0	33.0	5	12	100.0	5	12	30.0	5	7.5	5	6	64.1	103	115	127	6	6.5	49.5	5	10	5	12	12
4 FT	9	10	9	8	5	7.5	5	6	69.0	25.0	25.0	29.0	5	12	73.0	5	12	30.0	5	7.5	5	6	55.4	102	114	126	6	6.5	49.5	5	10	5	12	12
6 FT	9	10	9	8	5	8.5	5	6	51.4	25.0	29.0	29.0	6	15	54.0	6	15	32.0	5	7	6	7	53.4	102	114	126	6	6	48.5	5	12	5	12	12
8 FT	10	11	9	8	5	8	5	6	48.0	26.0	30.0	30.0	5	12	48.0	5	12	28.5	5	7	6	7.5	50.9	103	115	127	6	6	48.0	5	12	5	11.5	0
10 FT	11	12	9	8	5	7.5	5	6	46.0	31.0	31.0	31.0	6	16	49.5	6	16	31.0	5	6.5	5	6	46.3	104	116	128	6	6	48.0	5	12	5	10.5	0
12 FT	12	13	9	8	5	7	5	6	44.5	32.0	32.0	32.0	6	15	48.5	6	15	31.0	5	6.5	5	6	45.0	105	117	129	6	6	47.5	5	12	5	9.5	0
14 FT	13	14	9	8	5	6.5	5	6	43.3	33.0	33.0	33.0	6	15	48.0	6	15	30.5	5	6	5	6	43.9	106	118	130	6	6	47.5	5	12	5	8.5	0
16 FT	14	15	9	8	5	6	5	6	42.1	34.0	34.0	34.0	6	15	47.5	6	15	30.5	5	6	5	6	43.0	107	119	131	6	6	47.5	5	12	5	8.5	0
18 FT	15	16	10	8	6	8.5	5	6.5	47.1	35.0	35.0	35.0	6	15	53.0	6	15	36.5	6	8	5	7	42.8	108	120	132	6	6	47.5	5	12	5	8.5	0
20 FT	15	17	10	8	6	8	6	8	50.6	35.0	35.0	35.0	6	13	52.5	6	13	36.5	6	8	5	6.5	42.3	109	121	133	6	6	47.5	5	12	5	8	0
22 FT	16	18	10	8	6	8	5	6	44.5	36.0	36.0	36.0	6	14	52.0	6	14	36.0	6	8	5	7	40.0	110	122	134	6	6.5	47.5	5	12	5	8	0
24 FT	17	19	10	8	6	7.5	6	8	48.4	37.0	37.0	37.0	6	14	51.5	6	14	36.0	6	8	5	6.5	40.1	111	123	135	6	6	47.5	5	12	5	8	0
26 FT	18	20	11	8	6	7.5	5	6	45.0	38.0	38.0	38.0	6	13	51.0	6	13	35.5	6	7.5	5	7	40.5	112	124	136	6	6	47.5	5	12	5	7.5	0
28 FT	19	21	11	8	6	7	6	8	49.0	39.0	39.0	39.0	6	13	50.5	6	13	35.0	6	7.5	5													

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS									WALL BARS								
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	G1				
										HT=11'	HT=12'	HT=13'										HT=11'	HT=12'	HT=13'										
1 FT	13	10	9	10	5	6.5	5	6.5	51.9	33.0	33.0	33.0	5	14	101.0	5	14	30.0	5	7.5	6	6	85.4	138	150	162	6	7	51.0	5	12	5	8.5	12
2 FT	13	11	9	10	5	6.5	5	6	51.9	33.0	33.0	33.0	5	13	101.0	5	13	29.0	5	8	6	6	82.6	139	151	163	5	6	47.5	5	12	5	8.5	12
2'- 4'	13	11	10	10	5	6.5	6	7	52.5	33.0	33.0	33.0	5	12	101.5	5	12	30.5	5	7	6	6	82.6	139	151	163	6	6	50.0	5	10	5	8	12
4 FT	9	10	10	10	5	7.5	6	7	52.5	29.0	29.0	33.0	5	12	101.5	5	12	30.5	5	7	6	6	74.5	138	150	162	6	6	50.0	5	10	5	8	12
6 FT	9	11	10	10	5	8.5	6	7	70.4	29.0	29.0	33.0	5	12	50.5	5	12	29.5	5	7	6	6	71.0	139	151	163	6	6.5	49.5	5	12	5	8	12
8 FT	10	12	11	10	5	8	5	6	62.6	30.0	30.0	30.0	5	12	47.5	5	12	29.0	5	7	5	6	64.6	140	152	164	6	6.5	48.5	5	12	5	7.5	0
10 FT	11	12	11	10	5	7.5	5	6.5	60.9	31.0	31.0	31.0	5	12	46.5	5	12	28.5	5	6.5	6	6.5	64.4	140	152	164	6	6	48.0	5	12	5	7.5	0
12 FT	11	13	11	10	5	7.5	6	7.5	60.6	31.0	31.0	35.0	6	15	48.5	6	15	31.5	5	6	6	6.5	63.6	141	153	165	6	6	48.0	5	12	5	7.5	0
14 FT	12	14	11	10	5	7	6	7.5	59.6	32.0	32.0	36.0	6	14	48.0	6	14	31.5	5	6	6	6.5	62.5	142	154	166	6	6	48.0	5	12	5	7.5	0
16 FT	13	15	12	10	5	6.5	6	7.5	58.4	33.0	33.0	37.0	6	14	47.5	6	14	31.0	6	8	6	7	61.1	143	155	167	6	6	48.0	5	12	5	7	0
18 FT	14	16	12	10	5	6	6	7	58.0	34.0	38.0	38.0	6	14	47.0	6	14	31.0	6	8	6	6.5	60.5	144	156	168	6	6.5	48.0	5	12	5	7	0
20 FT	15	17	13	10	6	8	6	7	64.0	35.0	39.0	39.0	6	14	52.5	6	14	37.0	6	8	6	6.5	59.9	145	157	169	6	6.5	48.0	5	12	5	6.5	0
22 FT	15	18	13	10	6	7.5	6	7	61.1	35.0	35.0	39.0	6	13	52.0	6	13	37.0	6	8	6	7.5	57.4	146	158	170	6	6.5	48.0	5	12	5	6.5	0
24 FT	16	19	13	10	6	7.5	6	6.5	61.3	36.0	36.0	40.0	6	13	51.5	6	13	36.5	6	7.5	6	7.5	57.4	147	159	171	6	6	48.0	5	12	5	6.5	0
26 FT	17	20	14	10	6	7.5	6	7	61.8	37.0	37.0	41.0	6	13	51.5	6	13	36.5	6	7.5	6	7.5	57.6	148	160	172	6	6	48.0	5	12	5	6	0
28 FT	18	21	14	10	6	7	6	6.5	61.9	38.0	38.0	42.0	6	13	51.0	6	13	36.5	6	7.5	6	7.5	57.8	149	161	173	7	7.5	51.0	5	12	5	6	0
30 FT	19	22	15	10	6	7	6	6.5	62.4	39.0	43.0	43.0	6	13	50.0	6	13	35.5	6	7.5	6	7.5	58.0	150	162	174	7	7.5	51.0	5	12	6	8	0
32 FT	20	23	15	10	6	7	6	6	62.5	44.0	44.0	44.0	6	12	49.5	6	12	34.5	6	7	6	7.5	58.1	151	163	175	7	7	51.0	5	12	6	8	0
34 FT	21	24	16	10	6	6.5	6	6.5	63.0	41.0	45.0	45.0	6	12	48.5	6	12	33.5	6	7	6	7.5	58.5	152	164	176	7	7	51.0	5	12	6	8	0
36 FT	21	25	16	10	6	6	6	6	62.9	45.0	45.0	45.0	6	12	48.5	6	12	34.0	6	7	6	7.5	58.6	153	165	177	7	6.5	51.0	5	12	6	8	0
38 FT	22	26	17	10	6	6.5	6	6	63.5	42.0	46.0	46.0	7	15	52.5	7	15	38.5	6	7	6	7	59.0	154	166	178	7	6.5	51.0	5	12	6	7.5	0
40 FT	23	26	17	10	6	6	6	6	63.5	47.0	47.0	47.0	7	15	52.0	7	15	37.5	6	6	6	7	58.9	154	166	178	7	6.5	51.0	5	12	6	7.5	0
42 FT	24	27	18	10	6	6	6	6	64.1	44.0	48.0	48.0	7	15	51.5	7	15	37.0	6	6.5	6	6.5	59.3	155	167	179	7	6	51.0	5	12	6	7	0
44 FT	24	28	19	10	7	8	6	6	64.6	44.0	48.0	48.0	7	14	51.5	7	14	37.0	6	6.5	6	6.5	59.6	156	168	180	7	6	51.0	5	12	6	7	0
46 FT	25	29	19	10	7	7.5	6	6	64.8	49.0	49.0	49.0	7	15	51.0	7	15	36.5	6	6.5	6	6.5	59.9	157	169	181	7	6	51.0	5	12	6	6.5	0
48 FT	25	30	20	10	7	7.5	7	8	70.3	49.0	49.0	49.0	7	15	51.0	7	15	36.5	6	6.5	6	6.5	60.3	158	170	182	7	6	51.0	5	12	6	6.5	0
50 FT	26	31	20	10	7	7	7	7	70.4	50.0	50.0	50.0	7	15	50.5	7	15	36.5	6	6	6	6	60.5	159	171	183	7	6	51.0	5	12	6	6.5	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE DOUBLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS	
SPAN (S): 10 FEET HEIGHT (HT): 11 THRU 13 FEET		SHEET NO. <b>15 OF 27</b>
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.47A</b>	

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

SPAN (S) = 11 FT      HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	10	8	8	5	6	4	6.5	52.5	30.0	30.0	30.0	5	13	106.5	5	13	30.0	5	8	5	7	52.9	78	90	102	6	7	53.5	5	12	5	12	12
2 FT	14	11	8	8	5	6	4	6	52.5	30.0	30.0	30.0	5	12	106.5	5	12	29.0	5	8	5	8	49.1	79	91	103	6	7	53.0	5	12	5	12	12
2' - 4'	14	11	8	8	5	6	5	6	52.5	30.0	30.0	30.0	6	16	106.5	6	16	35.0	5	7	5	6.5	49.1	79	91	103	6	6	53.0	5	10.5	5	12	12
4 FT	10	10	8	8	5	7	5	6	45.6	26.0	26.0	30.0	6	16	72.5	6	16	35.0	5	7	5	6.5	43.0	78	90	102	6	6	52.5	5	10.5	5	12	12
6 FT	10	11	8	8	5	7.5	5	6	40.8	26.0	26.0	30.0	6	15	58.5	6	15	33.5	5	6.5	5	7.5	39.5	79	91	103	6	6	52.0	5	12	5	12	12
8 FT	11	12	8	8	5	7.5	5	7	38.6	27.0	27.0	31.0	6	15	54.5	6	15	33.0	5	6.5	5	8	37.3	80	92	104	6	6	51.5	5	12	5	12	0
10 FT	12	13	8	8	5	7	5	7.5	36.6	28.0	28.0	32.0	6	14	53.0	6	14	32.5	5	6	5	8	35.6	81	93	105	6	6	51.0	5	12	5	12	0
12 FT	13	14	8	8	5	6.5	5	7.5	35.3	29.0	33.0	33.0	6	14	52.0	6	14	32.5	6	8.5	5	8.5	34.6	82	94	106	6	6	51.0	5	12	5	12	0
14 FT	14	15	8	8	5	6	5	8	34.1	30.0	34.0	34.0	6	13	51.5	6	13	32.0	6	8	5	8.5	33.8	83	95	107	6	6	51.0	5	12	5	12	0
16 FT	15	16	8	8	6	8	5	7.5	38.3	31.0	35.0	35.0	6	13	57.0	6	13	38.0	6	7.5	5	8	33.1	84	96	108	6	6	51.0	5	12	5	12	0
18 FT	16	17	8	8	6	8	5	7	37.5	32.0	36.0	36.0	6	12	56.5	6	12	38.0	6	7	5	7	32.6	85	97	109	7	7	53.5	5	12	5	10.5	0
20 FT	17	18	8	8	6	7.5	5	6.5	37.1	37.0	37.0	37.0	6	12	56.5	6	12	38.0	6	7	5	6.5	32.4	86	98	110	7	7	53.5	5	12	5	9.5	0
22 FT	18	20	8	8	6	7	5	6.5	37.1	38.0	38.0	38.0	6	12	56.0	6	12	37.5	6	7.5	5	6	32.4	88	100	112	6	6	50.5	5	12	5	9.5	0
24 FT	19	20	8	8	6	6.5	5	6	35.1	39.0	39.0	39.0	6	12	55.0	6	12	37.5	6	7	5	6	30.9	88	100	112	6	6	50.5	5	12	5	9.5	0
26 FT	20	21	8	8	6	6.5	6	7.5	39.1	44.0	44.0	44.0	6	12	54.5	6	12	37.5	6	6.5	6	7.5	33.9	89	101	113	7	7	53.5	5	12	5	9.5	0
28 FT	21	22	8	8	6	6.5	6	7	39.1	45.0	45.0	45.0	6	12	54.5	6	12	37.0	6	6	6	7	34.0	90	102	114	7	7	53.5	5	12	5	9.5	0
30 FT	22	23	8	8	6	6	6	6.5	39.1	46.0	46.0	46.0	7	15	59.0	7	15	41.0	6	6	6	6.5	34.1	91	103	115	7	7	53.5	5	12	5	8.5	0
32 FT	23	24	8	8	6	6	6	6	39.1	47.0	47.0	47.0	7	15	58.5	7	15	40.5	6	6	6	6	34.3	92	104	116	7	7	53.5	5	12	5	8	0
34 FT	23	26	9	8	7	7.5	6	7	40.3	47.0	47.0	47.0	7	15	58.0	7	15	41.0	6	6.5	6	6.5	34.8	94	106	118	7	6.5	53.5	5	12	5	8.5	0
36 FT	24	27	9	8	7	7.5	6	7	40.3	48.0	48.0	48.0	7	14	57.5	7	14	40.5	6	6.5	6	6.5	34.9	95	107	119	7	6	53.5	5	12	5	8	0
38 FT	25	27	9	8	7	7.5	6	6.5	40.1	49.0	49.0	49.0	7	14	57.0	7	14	39.5	6	6	6	6.5	35.0	95	107	119	7	6	53.5	5	12	5	7.5	0
40 FT	26	28	10	8	7	7.5	6	7	40.9	50.0	50.0	50.0	7	13	56.0	7	13	38.5	6	6	6	7	35.5	96	108	120	7	6	53.5	5	12	5	8	0
42 FT	27	29	10	8	7	7	6	7	41.0	51.0	51.0	51.0	7	13	55.0	7	13	37.5	6	6	6	6.5	35.8	97	109	121	8	7.5	59.5	5	12	5	8	0
44 FT	27	30	11	8	7	6.5	5	6	37.9	47.0	47.0	47.0	7	13	54.5	7	13	38.0	6	6	6	7	36.1	98	110	122	8	7.5	59.5	5	12	5	7.5	0
46 FT	28	31	11	8	7	6.5	6	7.5	41.9	52.0	52.0	52.0	7	12	54.0	7	12	37.5	6	6	6	7	36.4	99	111	123	8	7	59.5	5	12	5	7.5	0
48 FT	29	32	11	8	7	6.5	6	7	41.9	53.0	53.0	53.0	7	12	53.5	7	12	37.0	6	6	6	6.5	36.5	100	112	124	8	7	59.0	5	12	5	7.5	0
50 FT	29	33	11	8	7	6.5	6	7	42.0	53.0	53.0	53.0	7	12	53.5	7	12	37.0	6	6	6	6.5	36.6	101	113	125	8	7	59.0	5	12	5	7	0

SPAN (S) = 11 FT      HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	10	8	9	5	6	5	8	54.6	34.0	34.0	34.0	5	13	109.0	5	13	30.5	5	7.5	6	6	76.4	114	126	138	6	6.5	54.0	5	12	5	10	12
2 FT	14	11	8	9	5	6	5	8	54.6	34.0	34.0	34.0	5	12	109.0	5	12	29.5	5	7.5	6	6.5	71.8	115	127	139	6	7	53.5	5	12	5	10	12
2' - 4'	14	11	9	9	5	6	5	6	82.4	34.0	34.0	34.0	6	16	109.0	6	16	35.0	5	7	6	6.5	71.8	115	127	139	7	7	55.5	5	10.5	5	10	12
4 FT	10	10	9	9	5	7	5	6	82.4	30.0	30.0	30.0	6	16	84.0	6	16	35.0	5	7	6	6.5	62.1	114	126	138	7	7	55.5	5	10.5	5	10	12
6 FT	10	11	9	9	5	7.5	5	6	56.3	30.0	30.0	30.0	6	15	58.5	6	15	33.5	5	6.5	6	6.5	58.1	115	127	139	6	6	52.0	5	12	5	9.5	12
8 FT	11	12	10	9	5	7.5	5	6	52.4	31.0	31.0	31.0	6	15	54.5	6	15	33.0	5	6	5	6	52.1	116	128	140	6	6	51.5	5	12	5	10.5	0
10 FT	11	13	10	9	5	7.5	5	6	49.6	31.0	31.0	31.0	6	14	52.5	6	14	32.5	5	6	5	6	50.5	117	129	141	6	6	51.5	5	12	5	9.5	0
12 FT	12	14	10	9	5	6.5	5	6	48.1	32.0	32.0	32.0	6	13	52.0	6	13	32.5	6	8	5	6	49.0	118	130	142	6	6	51.0	5	12	5	9	0
14 FT	14	15	10	9	5	6	5	6	47.1	34.0	34.0	34.0	6	14	51.5	6	14	32.5	6	8	5	6	47.9	119	131	143	6	6	51.0	5	12	5	8	0
16 FT	15	16	10	9	6	8	6	8	55.0	35.0	35.0	35.0	6	13	57.0	6	13	38.5	6	7.5	5	6	46.9	120	132	144	6	6	51.0	5	12	5	8	0
18 FT	16	17	10	9	6	8	6	7.5	53.9	36.0	36.0	40.0	6	13	56.5	6	13	38.0	6	7	6	7	49.0	121	133	145	6	6	51.0	5	12	5	8	0
20 FT	17	18	11	9	6	7.5	6	8	54.0	37.0	37.0	37.0	6	13	56.0	6	13	38.0	6	6.5	5	6	45.9	122	134	146	6	6	51.0	5	12	5	7.5	0
22 FT	18	20	12	9	6	7	6	8	54.4	38.0	38.0	38.0	6	13	55.5	6	13	38.0	6	7.5	5	6.5	46.0	124	136	148	6	6	51.0	5	12	5	7	0
24 FT	18	20	12	9	6	7	6	8	52.1	38.0	38.0	38.0	6	12	54.5	6	12	37.5	6	6.5	5	6.5	43.5	124	136	148	6	6	51.0	5	12	5	7.5	0
26 FT	19	22	12	9	6	6.5	6	7.5	52.1	39.0	39.0	39.0	6	12	54.5	6	12	37.5	6	7	5	6.5	43.6	126	138	150	7	7.5	54.0	5	12	5	7	0
28 FT	20	23	12	9	6	6.5	6	7	52.1	40.0	40.0	40.0	6	12	54.0	6	12	37.5	6	7	5	6	43.8	127	139	151	7	7	54.0	5	12	5	7	0
30 FT	21	24	13	9	6	6	6	7.5	52.8	41.0	41.0	41.0	6	12	53.0	6	12	37.0	6	6.5	5	6	44.1	128	140	152	7	7	54.0	5	12	5	6.5	0
32 FT	22	25	13	9	6	6	6	7	52.8	42.0	42.0	42.0	7	15	56.5																			

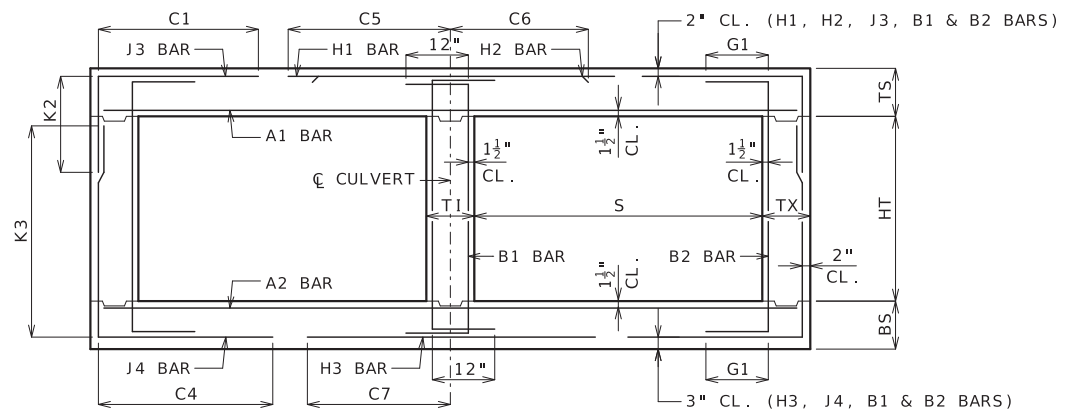


DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
					HT=12'	HT=13'	HT=14'							HT=12'	HT=13'	HT=14'																		
1 FT	14	12	9	11	5	6	5	6	55.6	34.0	34.0	34.0	5	13	110.0	5	13	30.5	5	8	6	6	94.6	152	164	176	5	6	51.5	5	12	5	8.5	12
2 FT	14	12	9	11	5	6	6	7.5	55.6	34.0	34.0	38.0	5	12	110.0	5	12	30.0	5	7.5	6	6	89.4	152	164	176	5	6	51.0	5	12	5	8.5	12
2'- 4'	14	12	10	11	5	6	6	7	58.3	34.0	34.0	38.0	6	16	112.5	6	16	35.5	5	7	6	6	89.4	152	164	176	6	7	53.5	5	11.5	5	8	12
4 FT	10	12	10	11	5	7	6	7	58.3	30.0	30.0	34.0	6	16	112.5	6	16	35.5	5	7	6	6.5	83.4	152	164	176	6	7	53.5	5	11.5	5	8	12
6 FT	10	12	10	11	5	7.5	6	6.5	78.8	30.0	34.0	34.0	6	15	57.5	6	15	34.0	5	6.5	6	6	77.1	152	164	176	6	6.5	52.5	5	12	5	7.5	12
8 FT	10	13	10	11	5	7.5	6	6	70.1	34.0	34.0	34.0	6	14	54.0	6	14	33.5	5	6	6	6	74.1	153	165	177	6	6.5	52.0	5	12	5	7	0
10 FT	11	13	11	11	5	7.5	6	7	67.0	31.0	31.0	35.0	6	14	52.5	6	14	33.0	5	6	6	6	69.9	153	165	177	6	6	51.5	5	12	5	7.5	0
12 FT	12	14	12	11	5	7	6	8	64.6	32.0	32.0	36.0	6	14	51.5	6	14	33.0	6	8	6	7	67.6	154	166	178	6	6	51.5	5	12	5	7	0
14 FT	13	15	12	11	5	6.5	6	7	63.4	33.0	37.0	37.0	6	13	51.0	6	13	33.0	6	7.5	6	6.5	66.4	155	167	179	6	6	51.0	5	12	5	7	0
16 FT	14	16	13	11	5	6	6	7	62.3	34.0	38.0	38.0	6	13	51.0	6	13	33.0	6	7	6	7	64.8	156	168	180	6	6	51.0	5	12	5	6.5	0
18 FT	15	17	13	11	6	8	6	6.5	67.6	35.0	39.0	39.0	6	12	56.5	6	12	38.5	6	6.5	6	6	63.8	157	169	181	6	6	51.0	5	12	5	6.5	0
20 FT	16	19	14	11	6	8	6	6.5	67.4	36.0	40.0	40.0	6	12	56.0	6	12	38.5	6	7.5	6	6.5	63.8	159	171	183	6	6	51.5	5	12	5	6	0
22 FT	17	20	14	11	6	7.5	6	6	67.3	37.0	41.0	41.0	6	12	55.5	6	12	38.5	6	7	6	6	63.5	160	172	184	6	6	51.0	5	12	5	6	0
24 FT	18	21	15	11	6	7	6	6.5	67.4	42.0	42.0	42.0	6	12	55.0	6	12	38.5	6	7	6	6.5	63.4	161	173	185	7	7.5	54.5	5	12	6	8	0
26 FT	19	22	15	11	6	6.5	6	6.5	65.3	43.0	43.0	43.0	6	13	54.5	6	13	38.0	6	7	6	7	61.1	162	174	186	7	7.5	54.0	5	12	6	8	0
28 FT	20	23	15	11	6	6.5	6	6	65.3	44.0	44.0	44.0	6	12	54.0	6	12	38.0	6	7	6	6.5	61.3	163	175	187	7	7	54.0	5	12	6	8	0
30 FT	21	24	16	11	6	6.5	6	6	65.8	45.0	45.0	45.0	6	12	53.0	6	12	37.0	6	6.5	6	7	61.4	164	176	188	7	7	54.0	5	12	6	8	0
32 FT	22	25	16	11	6	6	7	7.5	70.8	46.0	46.0	46.0	7	15	57.5	7	15	41.0	6	6.5	6	6.5	61.6	165	177	189	7	6.5	54.0	5	12	6	8	0
34 FT	23	26	17	11	6	6	6	6	66.4	47.0	47.0	47.0	7	15	56.5	7	15	40.0	6	6.5	6	7	61.9	166	178	190	7	6.5	54.5	5	12	6	7.5	0
36 FT	23	27	17	11	7	7.5	7	7	71.3	47.0	47.0	47.0	7	15	56.5	7	15	41.0	6	6.5	6	6.5	62.0	167	179	191	7	6	54.5	5	12	6	7.5	0
38 FT	24	28	18	11	7	7.5	7	7.5	71.8	48.0	48.0	48.0	7	14	55.5	7	14	40.0	6	6	6	6.5	62.4	168	180	192	7	6	54.5	5	12	6	7	0
40 FT	25	29	19	11	7	7.5	7	7.5	72.4	49.0	49.0	49.0	7	14	55.0	7	14	39.0	6	6	6	6.5	62.6	169	181	193	8	7.5	60.5	5	12	6	6.5	0
42 FT	26	30	19	11	7	7.5	7	7	72.5	50.0	50.0	50.0	7	13	54.5	7	13	38.0	6	6	6	6.5	62.9	170	182	194	8	7.5	60.5	5	12	6	6.5	0
44 FT	27	31	20	11	7	7	7	7.5	73.0	51.0	51.0	51.0	7	14	54.0	7	14	38.0	6	6	6	6	63.3	171	183	195	8	7	60.5	5	12	6	6.5	0
46 FT	28	32	20	11	7	7	7	6.5	73.1	52.0	52.0	52.0	7	14	53.5	7	14	38.0	6	6	6	6	63.5	172	184	196	8	7	60.5	5	12	6	6.5	0
48 FT	28	32	21	11	7	6.5	7	6.5	73.6	52.0	52.0	52.0	7	14	53.5	7	14	37.5	7	7	6	6	63.5	172	184	196	8	7	60.5	5	12	6	6	0
50 FT	28	33	22	11	7	6.5	7	6.5	74.1	52.0	52.0	52.0	7	13	53.5	7	13	37.5	7	7.5	6	6	63.9	173	185	197	8	7	60.5	5	12	6	6	0

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

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT CULVERT.



	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE DOUBLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 11 FEET HEIGHT (HT): 12 THRU 14 FEET
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.47A</b>	SHEET NO. <b>17 OF 27</b>

SPAN (S) = 12 FT      HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
										HT=6'	HT=7'	HT=8'										HT=6'	HT=7'	HT=8'										
1 FT	14	10	8	8	5	6	4	6	56.1	30.0	30.0	30.0	5	12	115.0	5	12	31.5	5	7.5	5	6.5	52.4	78	90	102	6	6.5	56.5	5	12	5	12	12
2 FT	15	11	8	8	6	8	4	6.5	59.1	31.0	31.0	31.0	6	16	118.0	6	16	39.0	5	7.5	5	7.5	47.9	79	91	103	6	6.5	56.0	5	12	5	12	12
2' - 4'	15	11	8	8	6	8	5	7	59.1	31.0	31.0	31.0	6	15	118.0	6	15	39.0	5	6.5	5	6	47.9	79	91	103	7	6.5	58.5	5	12	5	12	12
4 FT	11	10	8	8	5	6.5	5	7	43.6	31.0	31.0	31.0	6	15	77.5	6	15	36.5	5	6.5	5	6	42.6	78	90	102	7	6.5	58.5	5	12	5	12	12
6 FT	11	11	8	8	5	7	5	6.5	40.9	27.0	31.0	31.0	6	14	63.0	6	14	35.0	5	6.5	5	7	39.3	79	91	103	7	6.5	57.5	5	12	5	12	12
8 FT	11	13	8	8	5	7	5	6	39.1	27.0	27.0	31.0	6	12	58.0	6	12	34.0	5	6	5	8.5	36.3	81	93	105	6	6	54.5	5	12	5	12	0
10 FT	12	14	8	8	5	6.5	5	6.5	37.0	28.0	28.0	32.0	6	12	56.5	6	12	33.5	6	8	5	8.5	34.5	82	94	106	6	6	54.5	5	12	5	12	0
12 FT	14	15	8	8	5	6	5	8	34.6	30.0	34.0	34.0	6	13	55.5	6	13	33.5	6	7.5	5	8.5	33.8	83	95	107	7	7	57.0	5	12	5	12	0
14 FT	15	16	8	8	6	8	5	7.5	38.4	31.0	35.0	35.0	6	12	61.0	6	12	39.5	6	7.5	5	8	32.9	84	96	108	7	7	57.0	5	12	5	12	0
16 FT	16	17	8	8	6	8	5	7	37.5	32.0	36.0	36.0	7	16	65.5	7	16	44.5	6	7	5	7	32.3	85	97	109	7	6.5	57.0	5	12	5	12	0
18 FT	17	19	8	8	6	7.5	5	6.5	37.0	37.0	37.0	37.0	7	15	65.0	7	15	44.0	6	7	5	6.5	31.6	87	99	111	7	7	57.0	5	12	5	10.5	0
20 FT	18	20	8	8	6	7	5	6.5	36.4	38.0	38.0	38.0	7	15	64.5	7	15	44.0	6	6.5	5	6	31.3	88	100	112	7	7	57.0	5	12	5	9.5	0
22 FT	19	21	8	8	6	6	5	6	36.0	39.0	39.0	39.0	7	14	64.0	7	14	44.0	6	6.5	6	7.5	34.1	89	101	113	7	7	57.0	5	12	5	9.5	0
24 FT	21	22	8	8	6	6	6	7	39.6	45.0	45.0	45.0	7	15	63.5	7	15	44.0	6	6.5	6	7	34.4	90	102	114	7	7	56.5	5	12	5	9.5	0
26 FT	21	23	8	8	6	6	6	7	38.3	45.0	45.0	45.0	7	14	63.0	7	14	43.5	6	6.5	6	6.5	32.8	91	103	115	7	7	56.5	5	12	5	9.5	0
28 FT	23	24	8	8	6	6	6	7	38.3	47.0	47.0	47.0	7	15	62.0	7	15	43.0	6	6	6	6	33.0	92	104	116	7	7	56.5	5	12	5	9	0
30 FT	23	25	8	8	7	7	6	6	38.3	47.0	47.0	47.0	7	14	62.0	7	14	43.5	6	6	6	6	33.0	93	105	117	7	6.5	56.5	5	12	5	8.5	0
32 FT	25	27	9	8	7	7.5	6	6.5	39.1	49.0	49.0	49.0	7	14	61.0	7	14	41.5	6	6	6	6.5	33.8	95	107	119	7	6	56.5	5	12	5	8.5	0
34 FT	25	28	9	8	7	6.5	6	6.5	39.3	49.0	49.0	49.0	7	13	61.0	7	13	42.5	6	6	6	6	33.8	96	108	120	7	6	56.5	5	12	5	8.5	0
36 FT	26	29	9	8	7	6.5	6	6.5	39.3	50.0	50.0	50.0	7	13	60.0	7	13	41.5	6	6	6	6	33.9	97	109	121	8	7.5	62.5	5	12	5	8	0
38 FT	27	30	10	8	7	6.5	6	7	40.1	51.0	51.0	51.0	7	13	59.0	7	13	41.0	6	6	6	6.5	34.5	98	110	122	8	7.5	62.5	5	12	5	8	0
40 FT	28	31	10	8	7	6.5	6	6.5	40.1	52.0	52.0	52.0	7	12	58.5	7	12	40.0	7	8	6	6	34.6	99	111	123	8	7	62.5	5	12	5	8	0
42 FT	29	32	10	8	7	6.5	6	6.5	40.1	53.0	53.0	53.0	7	12	57.5	7	12	39.0	7	8	6	6	34.9	100	112	124	8	7	62.5	5	12	5	7.5	0
44 FT	30	33	10	8	7	6.5	6	6	40.3	54.0	54.0	54.0	7	12	56.5	7	12	38.5	7	7.5	7	6.5	38.1	101	113	125	8	6.5	62.0	5	12	5	7	0
46 FT	31	34	10	8	7	6	6	6	40.3	55.0	55.0	55.0	8	15	64.0	8	15	45.5	7	7.5	7	6.5	38.3	102	114	126	8	6.5	62.0	5	12	5	6.5	0
48 FT	31	34	11	8	7	6	6	6.5	41.0	55.0	55.0	55.0	8	15	64.0	8	15	46.0	7	6.5	6	6	35.6	102	114	126	8	6.5	62.5	5	12	5	7.5	0
50 FT	32	35	11	8	8	7.5	6	6.5	41.0	56.0	56.0	56.0	8	15	63.5	8	15	45.5	7	7	6	6	35.8	103	115	127	8	6.5	62.0	5	12	5	7	0

SPAN (S) = 12 FT      HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
										HT=9'	HT=10'	HT=11'										HT=9'	HT=10'	HT=11'										
1 FT	14	11	8	9	5	6	5	8	58.3	34.0	34.0	34.0	5	12	117.5	5	12	32.0	5	7.5	6	6.5	77.5	115	127	139	6	7	57.0	5	12	5	10	12
2 FT	15	12	8	9	6	8	5	8	62.3	35.0	35.0	35.0	6	16	121.5	6	16	39.5	5	7.5	6	7	71.9	116	128	140	6	7	56.5	5	12	5	10	12
2' - 4'	15	12	9	9	6	8	6	7	76.1	35.0	35.0	35.0	6	15	121.5	6	15	39.5	5	6.5	6	7	71.9	116	128	140	6	6	56.5	5	11.5	5	10	12
4 FT	11	11	9	9	5	6.5	6	7	76.1	31.0	31.0	35.0	6	15	86.0	6	15	37.0	5	6.5	6	7	61.8	115	127	139	6	6	56.0	5	11.5	5	10.5	12
6 FT	11	12	9	9	5	7	6	7	59.0	31.0	31.0	35.0	6	14	63.0	6	14	35.5	5	6	6	7	57.6	116	128	140	6	6	55.0	5	12	5	10	12
8 FT	11	13	9	9	5	7	6	7	54.0	31.0	31.0	35.0	6	13	58.0	6	13	34.5	5	6	6	7	54.5	117	129	141	6	6	55.0	5	12	5	9.5	0
10 FT	12	14	10	9	5	7	5	6	49.0	32.0	32.0	32.0	6	12	56.0	6	12	34.0	6	8	5	6.5	49.3	118	130	142	7	7	57.5	5	12	5	10	0
12 FT	13	15	10	9	5	6.5	6	7.5	50.1	33.0	33.0	33.0	6	12	55.0	6	12	33.5	6	7.5	5	6.5	47.6	119	131	143	7	7	57.5	5	12	5	9	0
14 FT	15	16	10	9	6	8	5	6	50.6	35.0	35.0	35.0	6	12	60.5	6	12	39.5	6	7	5	6	46.4	120	132	144	7	7	57.0	5	12	5	8	0
16 FT	16	17	10	9	6	8	6	7.5	53.8	36.0	36.0	36.0	6	12	60.0	6	12	39.5	6	6.5	5	6	45.4	121	133	145	7	6.5	57.0	5	12	5	8	0
18 FT	17	19	10	9	6	7.5	6	7	53.1	37.0	37.0	41.0	7	16	64.5	7	16	44.5	6	7	6	7.5	47.8	123	135	147	7	7	57.0	5	12	5	8	0
20 FT	18	20	11	9	6	7	6	7.5	53.1	38.0	38.0	38.0	7	15	64.0	7	15	44.0	6	6.5	5	6	44.6	124	136	148	7	7	57.0	5	12	5	7.5	0
22 FT	19	21	12	9	6	6.5	6	7.5	53.5	39.0	39.0	39.0	7	15	63.5	7	15	44.0	6	6.5	5	6.5	44.8	125	137	149	7	7	57.0	5	12	5	7.5	0
24 FT	20	23	12	9	6	6.5	6	7	53.4	40.0	40.0	40.0	7	15	63.0	7	15	44.0	6	6.5	5	6.5	44.6	127	139	151	7	7	57.0	5	12	5	7	0
26 FT	21	23	12	9	6	6	6	7.5	51.4	41.0	41.0	41.0	7	15	62.0	7	15	43.5	6	6	5	6.5	42.8	127	139	151	7	7	57.0	5	12	5	7	0
28 FT	22	25	12	9	6	6	6	7	51.4	42.0	42.0	42.0	7	15	61.5	7	15	43.5	6	6.5	5	6.5	42.9	129	141	153	7	6.5	57.0	5	12	5	7	0
30 FT																																		

		SPAN (S) = 12 FT										HEIGHT (HT) = 12 FT OR 13 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=12' HT=13'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=12' HT=13'		SIZE	SPA.	C7	SIZE	SPA.	G1				
1 FT	14	11	9	10	5	6	5	6.5	59.0	34.0	34.0	5	12	118.0	5	12	32.5	5	7	6	6	88.9	151	163	6	6.5	57.5	5	12	5	8.5	12
2 FT	15	12	9	10	6	8	5	7	63.0	35.0	35.0	6	16	122.0	6	16	39.5	5	7	6	6	83.6	152	164	6	7	57.0	5	12	5	8.5	12
2'- 4'	15	12	9	10	6	8	6	7	63.0	35.0	35.0	6	15	122.0	6	15	39.5	5	6.5	6	6	83.6	152	164	6	6.5	57.0	5	12	5	8.5	12
4 FT	11	12	9	10	5	6.5	6	7	61.0	35.0	35.0	6	15	120.0	6	15	37.0	5	6.5	6	6	76.5	152	164	6	6.5	56.5	5	12	5	8.5	12
6 FT	11	12	9	10	5	7	6	6.5	73.5	35.0	35.0	6	14	63.5	6	14	35.5	5	6	6	6	70.0	152	164	6	6	55.5	5	12	5	8.5	12
8 FT	11	13	10	10	5	7	6	7	63.9	31.0	35.0	6	13	58.0	6	13	34.5	5	6	6	6.5	65.8	153	165	6	6	55.0	5	12	5	8	0
10 FT	12	14	10	10	5	7	6	7	61.6	36.0	36.0	6	12	56.5	6	12	34.5	6	8	6	6	63.1	154	166	7	7	57.5	5	12	5	8	0
12 FT	13	15	11	10	5	6.5	6	7.5	59.9	33.0	37.0	6	12	55.0	6	12	34.0	6	7.5	6	6.5	61.4	155	167	7	7	57.5	5	12	5	7.5	0
14 FT	14	16	12	10	5	6	6	7.5	58.8	34.0	38.0	6	12	54.5	6	12	34.0	6	7	6	7.5	60.0	156	168	7	7	57.5	5	12	5	7	0
16 FT	16	18	12	10	6	8	6	7	64.1	36.0	40.0	6	12	60.0	6	12	40.0	6	7	6	7.5	59.5	158	170	6	6	54.0	5	12	5	7	0
18 FT	17	19	12	10	6	7.5	6	6.5	63.1	37.0	41.0	6	12	59.5	6	12	39.5	6	7	6	6.5	58.5	159	171	7	7	57.0	5	12	5	7	0
20 FT	18	20	13	10	6	7	6	6.5	62.6	38.0	42.0	6	12	58.5	6	12	39.5	6	6.5	6	7.5	57.9	160	172	7	7	57.0	5	12	5	6.5	0
22 FT	19	21	13	10	6	6.5	6	6.5	62.3	39.0	43.0	7	16	63.0	7	16	44.5	6	6	6	6.5	57.5	161	173	7	7	57.0	5	12	5	6.5	0
24 FT	20	23	14	10	6	6.5	6	6.5	62.5	40.0	44.0	7	16	62.5	7	16	44.0	6	6.5	6	7.5	57.8	163	175	7	7	57.0	5	12	5	6	0
26 FT	21	24	14	10	6	6	6	6	62.3	41.0	45.0	7	15	62.0	7	15	44.0	6	6.5	6	7	57.6	164	176	7	7	57.0	5	12	5	6	0
28 FT	22	25	14	10	6	6	6	6	59.8	42.0	46.0	7	15	61.0	7	15	43.5	6	6.5	6	7.5	55.1	165	177	7	6.5	57.0	5	12	5	6	0
30 FT	23	26	15	10	7	8	6	6	60.3	47.0	47.0	7	15	60.0	7	15	42.5	6	6	6	7.5	55.4	166	178	7	6.5	57.0	5	12	6	8	0
32 FT	24	27	15	10	7	7.5	6	6	60.3	48.0	48.0	7	14	59.5	7	14	42.0	6	6	6	7.5	55.5	167	179	7	6	57.0	5	12	6	8	0
34 FT	25	28	16	10	7	7.5	6	6	60.9	49.0	49.0	7	14	58.5	7	14	41.0	6	6	6	7.5	55.8	168	180	7	6	57.0	5	12	6	8	0
36 FT	25	29	16	10	7	6.5	7	7.5	65.8	49.0	49.0	7	13	58.5	7	13	41.5	6	6	6	7.5	55.8	169	181	8	7.5	63.0	5	12	6	8	0
38 FT	26	30	17	10	7	7	6	6	61.5	50.0	50.0	7	13	57.5	7	13	40.5	7	7.5	6	7	56.1	170	182	8	7.5	63.0	5	12	6	7.5	0
40 FT	27	31	17	10	7	6.5	7	7.5	66.5	51.0	51.0	7	13	57.0	7	13	40.0	7	7.5	6	7	56.3	171	183	8	7	63.0	5	12	6	7.5	0
42 FT	28	32	18	10	7	6.5	7	7.5	67.1	52.0	52.0	7	12	56.5	7	12	39.0	7	7.5	6	6.5	56.6	172	184	8	7	63.0	5	12	6	7	0
44 FT	29	33	18	10	7	6.5	7	7	67.1	53.0	53.0	7	12	56.0	7	12	38.0	7	7.5	6	6.5	56.9	173	185	8	6.5	63.0	5	12	6	7	0
46 FT	29	34	19	10	7	6	7	7.5	67.9	53.0	53.0	7	12	56.0	7	12	38.5	7	7.5	6	6.5	57.0	174	186	8	6.5	63.0	5	12	6	6.5	0
48 FT	30	35	19	10	7	6	7	6.5	67.9	54.0	54.0	7	12	55.0	7	12	38.0	7	7	6	6.5	57.3	175	187	8	6.5	63.0	5	12	6	6.5	0
50 FT	31	36	20	10	7	6	7	7	68.6	55.0	55.0	7	13	54.5	7	13	37.5	7	7	6	6.5	57.6	176	188	8	6	63.0	5	12	6	6.5	0

		SPAN (S) = 12 FT										HEIGHT (HT) = 14 FT OR 15 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=14' HT=15'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=14' HT=15'		SIZE	SPA.	C7	SIZE	SPA.	G1				
1 FT	14	12	10	12	5	6	5	6	60.0	34.0	34.0	5	12	119.0	5	12	32.5	5	7	6	6	98.8	176	188	6	7	58.0	5	12	5	8	12
2 FT	15	12	10	12	6	8	6	8	67.0	35.0	39.0	6	16	126.0	6	16	40.0	5	6.5	6	6	92.5	176	188	6	6.5	57.0	5	12	5	8	12
2'- 4'	15	13	10	12	6	8	6	6.5	67.0	35.0	39.0	6	16	126.0	6	16	40.0	5	6.5	6	6	92.5	177	189	6	6.5	57.0	5	12	5	7	12
4 FT	11	13	10	12	5	6.5	6	6.5	62.0	35.0	35.0	6	16	121.0	6	16	37.5	5	6.5	6	6	89.8	177	189	6	7	57.0	5	12	5	7	12
6 FT	11	13	11	12	5	7	6	7	83.8	31.0	35.0	6	15	61.0	6	15	36.0	5	6	6	6.5	81.4	177	189	6	6.5	56.0	5	12	5	7	12
8 FT	11	13	12	12	5	7	6	7.5	73.9	35.0	35.0	6	13	57.5	6	13	35.0	5	6	6	6.5	76.1	177	189	7	7	58.0	5	12	5	7	0
10 FT	12	14	12	12	5	7	6	7	71.4	36.0	36.0	6	13	56.0	6	13	35.0	6	8	6	6.5	74.1	178	190	7	7	58.0	5	12	5	7	0
12 FT	13	15	13	12	5	6.5	6	7.5	68.8	37.0	37.0	6	13	55.0	6	13	34.5	6	7.5	6	6.5	71.6	179	191	7	7	57.5	5	12	5	6.5	0
14 FT	14	16	13	12	5	6	6	6.5	67.3	38.0	38.0	6	12	54.5	6	12	34.5	6	6.5	6	6	70.1	180	192	7	7	57.5	5	12	5	6.5	0
16 FT	15	18	14	12	6	8	6	6.5	72.1	39.0	39.0	6	12	60.0	6	12	40.5	6	7	6	6.5	69.5	182	194	6	6	54.5	5	12	5	6	0
18 FT	17	19	14	12	6	7.5	6	6	72.1	41.0	41.0	6	12	59.5	6	12	40.5	6	6.5	6	6	68.1	183	195	6	6	54.5	5	12	5	6	0
20 FT	18	20	15	12	6	7	6	6	71.5	42.0	42.0	6	12	59.0	6	12	40.0	6	6.5	6	6	67.1	184	196	7	7	57.5	5	12	6	8	0
22 FT	19	22	16	12	6	6.5	6	6	71.4	43.0	43.0	6	12	58.5	6	12	40.0	6	6.5	6	6	67.4	186	198	7	7	57.5	5	12	6	8	0
24 FT	20	23	16	12	6	6.5	6	6	71.3	44.0	44.0	6	12	58.0	6	12	40.0	6	6.5	6	6	67.1	187	199	7	7	57.5	5	12	6	8	0
26 FT	21	24	17	12	6	6	6	6	71.4	45.0	45.0	6	12	57.0	6	12	39.5	6	6	6	6	67.1	188	200	7	7	57.5	5	12	6	7.5	0
28 FT	22	25	17	12	6	6	6	6	69.1	46.0	46.0	7	15	61.5	7	15	44.0	6	6	6	6.5	64.9	189	201	7	6.5	57.5	5	12	6	7.5	0
30 FT	23	26	17	12	6	6	7	7.5	74.1	47.0	47.0	7	15	61.0	7	15	43.0	6	6	6	6.5	64.9	190	202	7	6.5	57.5	5	12	6	7.5	0
32 FT	23	27	17	12	7	7	7	6.5	74.0	47.0	47.0	7	14	61.0	7	14	44.0	6	6	6	6	65.0	191	203	7	6	57.5	5	12	6	7.5	0
34 FT	24	28	18	12	7	7	7	7	74.5	48.0	48.0	7	14	60.0	7	14	43.0	6	6	6	6	65.3	192	204	7	6	57.5	5	12	6	7	0
36 FT	25	29	19	12	7	7	7	7	75.0	49.0	49.0	7	14	59.0	7	14	42.0	7	7.5	6	6.5	65.5	193									

		SPAN (S) = 13 FT												HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8	8	5	6	5	8.5	61.8	30.0	34.0	34.0	5	12	125.5	5	12	36.5	5	7	6	7	61.0	90	102	114	6	6	60.0	5	12	5	12	12
2 FT	15	12	8	8	6	8	5	8	65.8	31.0	35.0	35.0	6	16	129.5	6	16	43.5	5	7	5	7	53.8	92	104	116	6	6.5	59.5	5	12	5	12	12
2' - 4'	15	12	8	8	6	8	6	7	65.8	31.0	35.0	35.0	6	13	129.5	6	13	43.5	5	6.5	5	6	53.8	92	104	116	7	6.5	62.0	5	11	5	12	12
4 FT	11	11	8	8	6	8	6	7	52.1	31.0	31.0	31.0	6	13	82.0	6	13	38.0	5	6.5	5	6	46.5	91	103	115	7	6.5	62.0	5	11	5	12	12
6 FT	12	12	8	8	5	6.5	5	6.5	44.1	32.0	32.0	32.0	6	13	68.0	6	13	36.5	5	6	5	6.5	42.8	92	104	116	7	6.5	61.0	5	12	5	12	12
8 FT	12	13	8	8	5	6	5	6	41.5	32.0	32.0	32.0	7	16	65.0	7	16	38.5	5	6	5	6.5	40.0	93	105	117	7	6.5	60.5	5	12	5	12	0
10 FT	13	15	8	8	5	6	5	6	39.5	29.0	33.0	33.0	7	15	63.0	7	15	38.0	6	7.5	5	8	38.0	95	107	119	7	7	60.5	5	12	5	12	0
12 FT	15	16	8	8	6	8	5	6.5	42.4	35.0	35.0	35.0	7	16	70.0	7	16	46.0	6	7	5	7.5	37.1	96	108	120	7	6.5	60.0	5	12	5	11	0
14 FT	16	17	8	8	6	8	5	6	41.1	36.0	36.0	36.0	7	15	69.0	7	15	46.0	6	7	5	7	36.1	97	109	121	7	6.5	60.0	5	12	5	10	0
16 FT	17	18	8	8	6	7.5	5	6	40.1	37.0	37.0	37.0	7	14	68.5	7	14	45.5	6	6	5	6.5	35.4	98	110	122	7	6.5	60.0	5	12	5	9.5	0
18 FT	18	20	8	8	6	6.5	6	8	43.5	38.0	38.0	38.0	7	14	68.0	7	14	45.5	6	6.5	5	6	34.8	100	112	124	7	6.5	60.0	5	12	5	9.5	0
20 FT	20	21	8	8	6	6.5	6	7.5	42.6	44.0	44.0	44.0	7	14	67.0	7	14	45.5	6	6	6	7.5	37.5	101	113	125	7	6.5	60.0	5	12	5	9	0
22 FT	21	23	8	8	6	6	6	6.5	42.5	45.0	45.0	45.0	7	14	66.5	7	14	45.0	6	6	6	6.5	37.3	103	115	127	7	6.5	60.0	5	12	5	8	0
24 FT	22	24	9	8	6	6	6	7.5	43.1	42.0	42.0	46.0	7	13	66.0	7	13	45.0	6	6	6	7	37.6	104	116	128	7	6.5	60.0	5	12	5	8.5	0
26 FT	23	25	9	8	7	7.5	6	6.5	42.9	47.0	47.0	47.0	7	13	65.5	7	13	45.0	6	6	6	7	37.6	105	117	129	7	6.5	60.0	5	12	5	8.5	0
28 FT	24	26	9	8	7	7.5	6	7	41.3	48.0	48.0	48.0	7	13	64.5	7	13	44.5	7	8	6	6.5	36.1	106	118	130	7	6.5	59.5	5	12	5	8.5	0
30 FT	25	27	9	8	7	7	6	6	41.3	49.0	49.0	49.0	7	13	64.0	7	13	44.5	7	7.5	6	6.5	36.3	107	119	131	7	6	59.5	5	12	5	7.5	0
32 FT	26	29	10	8	7	7	6	7	42.3	50.0	50.0	50.0	7	13	63.5	7	13	44.0	7	8	6	6.5	36.9	109	121	133	8	7.5	65.5	5	12	5	8	0
34 FT	27	30	10	8	7	6.5	6	6.5	42.3	51.0	51.0	51.0	7	13	62.5	7	13	43.5	7	7.5	6	6.5	37.0	110	122	134	8	7.5	65.5	5	12	5	7.5	0
36 FT	28	31	11	8	7	6.5	6	7.5	43.1	52.0	52.0	52.0	7	12	62.0	7	12	42.5	7	7.5	6	7	37.5	111	123	135	8	7	65.5	5	12	5	7.5	0
38 FT	29	32	11	8	7	6	6	7	43.1	53.0	53.0	53.0	7	12	61.0	7	12	41.5	7	7.5	6	6.5	37.6	112	124	136	8	7	65.5	5	12	5	7.5	0
40 FT	30	33	11	8	7	6	6	7	43.1	54.0	54.0	54.0	7	12	60.0	7	12	41.0	7	7	6	6.5	37.9	113	125	137	8	6.5	65.5	5	12	5	7	0
42 FT	31	34	12	8	7	6	6	7.5	44.0	55.0	55.0	55.0	8	15	67.0	8	15	48.0	7	7	6	7	38.4	114	126	138	8	6.5	65.5	5	12	5	7	0
44 FT	32	35	12	8	8	7.5	6	7	44.0	56.0	56.0	56.0	8	14	66.5	8	14	47.0	7	7	6	6.5	38.5	115	127	139	8	6.5	65.5	5	12	5	7	0
46 FT	33	36	12	8	8	7	6	7	44.0	57.0	57.0	57.0	8	14	66.0	8	14	46.0	7	7	6	6.5	38.8	116	128	140	8	6	65.5	5	12	5	6.5	0
48 FT	33	37	12	8	8	6.5	6	7	44.0	57.0	57.0	57.0	8	13	66.0	8	13	46.5	7	6.5	6	6.5	38.8	117	129	141	8	6	65.5	5	12	5	6.5	0
50 FT	34	38	12	8	8	7	6	6	44.0	58.0	58.0	58.0	8	14	65.0	8	14	46.0	7	6.5	6	6	39.0	118	130	142	8	6	65.5	5	12	5	6	0

		SPAN (S) = 13 FT												HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	11	9	10	5	6	5	7.5	62.6	34.0	34.0	34.0	5	12	126.5	5	12	36.5	5	6.5	6	6.5	81.1	127	139	151	6	6.5	60.5	5	11.5	5	9.5	12
2 FT	15	12	9	10	6	8	5	7.5	66.6	35.0	35.0	35.0	6	16	130.5	6	16	43.5	5	6.5	6	6.5	75.6	128	140	152	6	6.5	60.0	5	12	5	9	12
2' - 4'	15	12	9	10	6	8	6	7	78.5	35.0	35.0	35.0	6	13	130.5	6	13	43.5	5	6.5	6	6	75.6	128	140	152	7	6.5	62.0	5	9	5	8.5	12
4 FT	11	11	9	10	6	8	6	7	78.5	35.0	35.0	35.0	6	13	84.0	6	13	38.0	5	6.5	6	6	66.3	127	139	151	7	6.5	62.0	5	9	5	8.5	12
6 FT	12	12	9	10	5	6.5	6	6.5	63.6	32.0	36.0	36.0	6	13	67.0	6	13	37.0	5	6	6	6	61.5	128	140	152	7	6.5	61.5	5	12	5	8.5	12
8 FT	12	14	9	10	5	6	6	6.5	58.3	32.0	32.0	36.0	6	12	61.5	6	12	36.0	6	8	6	6.5	59.1	130	142	154	7	7	61.0	5	12	5	8.5	0
10 FT	13	15	9	10	5	6	6	6	55.4	33.0	33.0	37.0	7	15	63.0	7	15	38.5	6	7.5	6	6.5	56.6	131	143	155	7	7	61.0	5	12	5	8.5	0
12 FT	14	16	10	10	5	6	6	6.5	53.6	34.0	34.0	38.0	7	15	61.5	7	15	38.5	6	7	6	7	54.6	132	144	156	7	6.5	60.5	5	12	5	8	0
14 FT	16	17	10	10	6	8	6	7	58.0	36.0	36.0	40.0	7	15	69.0	7	15	46.5	6	7	6	6.5	53.3	133	145	157	7	6.5	60.5	5	12	5	8	0
16 FT	17	19	11	10	6	7.5	6	7	57.5	37.0	37.0	41.0	7	15	68.5	7	15	46.0	6	6.5	6	8	52.4	135	147	159	7	7	60.5	5	12	5	7.5	0
18 FT	18	20	12	10	6	7	6	7.5	57.4	38.0	38.0	38.0	7	14	68.0	7	14	46.0	6	6.5	5	6	48.8	136	148	160	7	6.5	60.5	5	12	5	7	0
20 FT	19	21	12	10	6	6.5	6	7	56.6	39.0	39.0	43.0	7	14	67.5	7	14	46.0	6	6	6	8	51.1	137	149	161	7	6.5	60.5	5	12	5	7	0
22 FT	21	23	12	10	6	6	6	6.5	56.1	41.0	41.0	45.0	7	14	66.5	7	14	45.5	6	6	6	7.5	51.0	139	151	163	7	6.5	60.5	5	12	5	7	0
24 FT	22	24	13	10	6	6	6	7	56.5	42.0	42.0	46.0	7	14	66.0	7	14	45.5	6	6	6	8	51.1	140	152	164	7	6.5	60.5	5	12	5	6.5	0
26 FT	23	25	13	10	7	7.5	6	6.5	56.3	43.0	43.0	47.0	7	14	65.5	7	14	45.5	7	7.5	6	7.5	51.0	141	153	165	7	6.5	60.5	5	12	5	6.5	0
28 FT	24	26	13	10	7	7.5	6	6.5	54.4	44.0	44.0	48.0	7	14	64.5	7	14	45.0	7	7.5	6	8	49.1	142	154	166	7	6.5	60.0	5	12	5	6.5	0
30 FT	25	28	13	10	7	7	6	6	54.4	45.0	45.0	49.0	7	14	64.0	7	14	45.0	7	8	6	8	49.3	144										

		SPAN (S) = 13 FT										HEIGHT (HT) = 13 FT OR 14 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS	B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=13' HT=14'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=13' HT=14'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	11	11	11	5	6	5	7	64.1	34.0	34.0	5	12	127.5	5	12	36.5	5	6.5	5	6	85.3	163	175	6	6	60.5	5	12	5	8	12
2 FT	15	12	11	11	6	8	5	7	68.1	35.0	35.0	6	16	131.5	6	16	43.5	5	6.5	5	6	80.9	164	176	6	6.5	60.0	5	12	5	7.5	12
2'- 4'	15	12	11	11	6	8	5	6	92.9	35.0	35.0	6	13	131.5	6	13	43.5	5	6	5	6	80.9	164	176	7	7	62.5	5	11.5	5	7.5	12
4 FT	11	12	11	11	5	6	5	6	92.9	31.0	31.0	6	13	82.5	6	13	38.0	5	6	5	6	75.5	164	176	7	7	62.5	5	11.5	5	7.5	12
6 FT	11	12	11	11	5	6	6	7.5	74.6	31.0	35.0	6	12	64.5	6	12	37.0	5	6	6	6.5	72.1	164	176	7	6.5	61.5	5	12	5	7.5	12
8 FT	12	14	11	11	5	6.5	6	7.5	68.5	32.0	36.0	6	12	61.5	6	12	36.5	6	8	6	7	70.1	166	178	7	7	61.5	5	12	5	7.5	0
10 FT	13	15	11	11	5	6.5	6	7	65.9	37.0	37.0	6	12	59.5	6	12	36.0	6	7.5	6	6.5	67.4	167	179	7	6.5	61.0	5	12	5	7.5	0
12 FT	14	16	12	11	5	6	6	7	64.0	38.0	38.0	7	15	61.5	7	15	38.5	6	7	6	7	65.5	168	180	7	6.5	60.5	5	12	5	7	0
14 FT	15	17	12	11	6	7.5	6	6.5	68.5	39.0	39.0	7	15	69.0	7	15	46.5	6	6.5	6	6	64.1	169	181	7	6.5	60.5	5	12	5	7	0
16 FT	17	19	13	11	6	7.5	6	6.5	68.0	41.0	41.0	7	15	68.0	7	15	46.5	6	6.5	6	7	63.4	171	183	7	6.5	60.5	5	12	5	6.5	0
18 FT	18	20	13	11	6	7	6	6	66.9	42.0	42.0	7	15	67.5	7	15	46.5	6	6	6	6	62.4	172	184	7	6.5	60.5	5	12	5	6.5	0
20 FT	19	22	14	11	6	6.5	6	6	66.5	43.0	43.0	7	14	67.0	7	14	46.0	6	6	6	7	62.0	174	186	7	7	60.5	5	12	5	6	0
22 FT	20	23	14	11	6	6	7	8	70.6	44.0	44.0	7	14	66.5	7	14	46.0	6	6	6	6	61.3	175	187	7	6.5	60.5	5	12	5	6	0
24 FT	22	25	15	11	6	6	6	6	66.1	46.0	46.0	7	15	65.5	7	15	45.5	6	6	6	7	61.5	177	189	7	6.5	60.5	5	12	6	8	0
26 FT	23	25	15	11	7	7.5	7	7.5	70.6	47.0	47.0	7	14	65.0	7	14	45.5	7	7	6	6	60.9	177	189	7	6.5	60.5	5	12	6	8	0
28 FT	24	27	16	11	7	7.5	7	8	71.0	48.0	48.0	7	14	64.5	7	14	45.0	7	8	6	7	61.3	179	191	7	6	60.5	5	12	6	8	0
30 FT	25	28	16	11	7	7	7	8	68.5	49.0	49.0	7	14	63.5	7	14	44.0	7	7.5	6	7	58.9	180	192	7	6	60.5	5	12	6	8	0
32 FT	26	29	16	11	7	7	7	7.5	68.4	50.0	50.0	7	13	62.5	7	13	43.5	7	7.5	6	6.5	58.9	181	193	8	7.5	66.5	5	12	6	8	0
34 FT	27	30	17	11	7	6.5	7	7.5	69.0	51.0	51.0	7	13	61.5	7	13	42.5	7	7.5	6	7	59.1	182	194	8	7.5	66.5	5	12	6	7.5	0
36 FT	27	31	17	11	7	6	7	6.5	68.9	51.0	51.0	7	12	61.5	7	12	43.5	7	7	6	7	59.1	183	195	8	7	66.5	5	12	6	7.5	0
38 FT	28	33	18	11	7	6	7	7	69.8	52.0	52.0	7	12	60.0	7	12	42.5	7	7	6	6.5	59.6	185	197	8	6.5	66.5	5	12	6	7	0
40 FT	29	34	19	11	7	6	7	7	70.4	53.0	53.0	7	12	59.5	7	12	41.5	7	7	6	6.5	60.0	186	198	8	6.5	66.5	5	12	6	6.5	0
42 FT	30	35	19	11	7	6	7	6.5	70.4	54.0	54.0	7	12	59.0	7	12	40.5	7	7	6	6.5	60.1	187	199	8	6.5	66.5	5	12	6	6.5	0
44 FT	31	36	20	11	7	6	7	7	71.0	55.0	55.0	8	15	66.5	8	15	47.5	7	7	6	6	60.5	188	200	8	6	66.5	5	12	6	6.5	0
46 FT	32	37	21	11	8	7.5	7	7	71.8	56.0	56.0	8	15	66.0	8	15	47.0	7	6.5	6	6	60.8	189	201	8	6	66.5	5	12	6	6	0
48 FT	32	38	21	11	8	7	7	6	71.8	56.0	56.0	8	14	66.0	8	14	47.0	7	6.5	6	6	60.9	190	202	8	6	66.5	5	12	6	6	0
50 FT	33	39	22	11	8	7	7	6.5	72.5	57.0	57.0	8	15	65.5	8	15	47.0	7	6.5	6	6	61.3	191	203	8	6	66.5	5	12	6	6	0

		SPAN (S) = 13 FT										HEIGHT (HT) = 15 FT OR 16 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS	B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=15' HT=16'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=15' HT=16'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	12	12	13	5	6	5	6	65.0	34.0	34.0	5	12	128.5	5	12	36.0	5	6.5	6	7	99.8	188	200	6	6.5	61.0	5	12	5	7	12
2 FT	15	13	12	13	6	8	6	8.5	72.0	35.0	39.0	6	16	135.5	6	16	43.5	5	6.5	6	7	96.4	189	201	6	6.5	60.5	5	12	5	7	12
2'- 4'	15	13	12	13	6	8	6	7	115.0	35.0	39.0	6	14	135.5	6	14	43.5	5	6	6	6.5	96.4	189	201	6	6	60.5	5	12	5	7	12
4 FT	11	13	12	13	5	6	6	7	115.0	35.0	35.0	6	14	81.0	6	14	38.5	5	6	6	6.5	91.6	189	201	6	6	60.5	5	12	5	7	12
6 FT	11	13	12	13	5	6.5	6	6.5	84.8	35.0	35.0	6	13	63.5	6	13	37.5	5	6	6	6	84.8	189	201	7	7	62.0	5	12	5	6.5	12
8 FT	12	14	13	13	5	6.5	6	7	78.8	36.0	36.0	6	13	61.0	6	13	37.0	6	8	6	6.5	80.6	190	202	7	7	61.5	5	12	5	6.5	0
10 FT	13	15	13	13	5	6.5	6	7	75.9	37.0	37.0	6	12	59.5	6	12	36.5	6	7.5	6	6.5	78.4	191	203	7	6.5	61.0	5	12	5	6.5	0
12 FT	14	16	14	13	5	6	6	6	72.9	38.0	38.0	6	12	58.5	6	12	36.5	6	6.5	6	6.5	75.6	192	204	7	6.5	61.0	5	12	5	6	0
14 FT	15	18	14	13	6	8	6	6	77.1	39.0	39.0	7	16	69.0	7	16	47.0	6	6.5	6	6	75.3	194	206	7	7	61.0	5	12	5	6	0
16 FT	16	19	15	13	6	7.5	6	6	76.0	40.0	40.0	7	15	68.0	7	15	47.0	6	6.5	6	6	73.3	195	207	7	6.5	61.0	5	12	6	8	0
18 FT	18	20	16	13	6	7	6	6	76.0	42.0	42.0	7	15	67.5	7	15	47.0	6	6	6	6	71.6	196	208	7	6.5	61.0	5	12	6	8	0
20 FT	19	22	16	13	6	6.5	7	8	80.4	43.0	49.0	7	15	67.5	7	15	47.0	6	6	7	7.5	74.5	198	210	7	7	61.0	5	12	6	8	0
22 FT	20	23	17	13	6	6.5	7	8	79.9	44.0	50.0	7	14	67.0	7	14	46.5	6	6	7	7.5	73.9	199	211	7	6.5	61.0	5	12	6	7.5	0
24 FT	21	24	17	13	6	6	7	7.5	79.6	45.0	51.0	7	14	66.5	7	14	46.5	7	7	7	7	73.6	200	212	7	6.5	61.0	5	12	6	7.5	0
26 FT	23	26	18	13	7	7.5	7	7.5	80.1	47.0	53.0	7	15	65.5	7	15	46.0	7	8	7	8	73.9	202	214	7	6.5	61.0	5	12	6	7	0
28 FT	23	27	19	13	7	7.5	7	7.5	80.0	47.0	47.0	7	14	65.0	7	14	46.0	7	7.5	6	6	70.9	203	215	7	6	61.0	5	12	6	6.5	0
30 FT	24	28	19	13	7	7.5	7	7.5	77.8	48.0	48.0	7	14	64.5	7	14	46.0	7	7.5	6	6	68.5	204	216	7	6	61.0	5	12	6	6.5	0
32 FT	25	29	19	13	7	7	7	7	77.8	49.0	49.0	7	14	63.5	7	14	45.5	7	6.5	6	6	68.6	205	217	8	7.5	67.0	5	12	6	6.5	0
34 FT	26	30	20	13	7	7	7	7	78.3	50.0	50.0	7	13	63.0	7	13	44.5	7	6.5	6	6	68.9	206	218	8	7.5	67.0	5	12	6	6.5	0
36 FT	27	32	21	13	7	6.5	7	7	78.9	51.0	51.0	7	13	62.0	7	13	43.5	7	7	6	6											

SPAN (S) = 14 FT      HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
					HT=7'	HT=8'	HT=9'				HT=7'	HT=8'	HT=9'				HT=7'	HT=8'	HT=9'															
1 FT	15	11	8	8	6	8	5	8	69.3	31.0	35.0	35.0	6	16	137.5	6	16	46.5	5	6.5	5	6	57.8	91	103	115	6	6	63.0	5	12	5	12	12
2 FT	15	12	8	8	6	8	5	8	69.3	35.0	35.0	35.0	6	16	137.5	6	16	48.0	5	6	5	6.5	52.5	92	104	116	6	6	62.5	5	12	5	12	12
2'- 4'	15	12	8	8	6	7.5	5	6	69.3	35.0	35.0	35.0	6	12	137.5	6	12	48.0	5	6	6	7	52.5	92	104	116	7	6	64.5	5	12	5	12	12
4 FT	12	11	8	8	6	7.5	5	6	48.0	32.0	32.0	32.0	6	12	86.0	6	12	39.5	5	6.5	6	7	49.3	91	103	115	7	6	64.5	5	12	5	12	12
6 FT	12	13	8	8	6	8	6	7.5	47.6	32.0	32.0	32.0	7	15	74.0	7	15	41.0	5	6	5	7	41.9	93	105	117	7	6.5	64.5	5	12	5	12	12
8 FT	13	14	8	8	5	6	5	6.5	41.1	33.0	33.0	33.0	7	15	68.5	7	15	40.0	6	8	5	7.5	39.1	94	106	118	7	6.5	64.0	5	12	5	12	0
10 FT	14	15	8	8	6	8	5	6.5	38.6	34.0	34.0	34.0	7	14	66.5	7	14	39.5	6	7.5	5	7.5	37.4	95	107	119	7	6	63.5	5	12	5	12	0
12 FT	16	17	8	8	6	8	5	6.5	41.5	36.0	36.0	36.0	7	14	73.0	7	14	47.5	6	7	5	7	36.1	97	109	121	7	6.5	63.5	5	12	5	11	0
14 FT	17	18	8	8	6	7.5	5	6	40.3	37.0	37.0	37.0	7	14	72.5	7	14	47.0	6	6.5	5	6.5	35.1	98	110	122	7	6.5	63.0	5	12	5	10	0
16 FT	18	20	8	8	6	7	6	8	43.4	38.0	38.0	38.0	7	13	71.5	7	13	47.0	6	6	5	6	34.4	100	112	124	7	6.5	63.0	5	12	5	9.5	0
18 FT	20	21	8	8	6	6.5	6	7.5	42.4	44.0	44.0	44.0	7	13	71.0	7	13	46.5	6	6	6	7.5	37.0	101	113	125	7	6.5	63.0	5	12	5	9.5	0
20 FT	21	22	8	8	6	6	6	7	41.8	45.0	45.0	45.0	7	13	70.5	7	13	46.5	7	7.5	6	7	36.5	102	114	126	7	6	63.0	5	12	5	9	0
22 FT	23	24	8	8	7	7.5	6	6	41.3	47.0	47.0	47.0	7	13	69.5	7	13	46.5	7	7.5	6	6	36.4	104	116	128	7	6	63.0	5	12	5	8	0
24 FT	24	26	9	8	7	7.5	6	7	42.1	48.0	48.0	48.0	7	13	69.0	7	13	46.0	7	7.5	6	6.5	36.8	106	118	130	7	6.5	63.0	5	12	5	8.5	0
26 FT	25	27	9	8	7	7	6	6.5	41.9	49.0	49.0	49.0	7	12	68.5	7	12	46.0	7	7.5	6	6.5	36.6	107	119	131	7	6	63.0	5	12	5	8	0
28 FT	26	28	9	8	7	7	6	6	41.8	50.0	50.0	50.0	7	12	68.0	7	12	46.0	7	7.5	6	6	36.6	108	120	132	7	6	63.0	5	12	5	7.5	0
30 FT	27	29	9	8	7	6.5	6	6	41.1	51.0	51.0	51.0	7	12	67.0	7	12	45.5	7	7	6	6	35.4	109	121	133	8	7.5	68.5	5	12	5	7.5	0
32 FT	28	31	10	8	7	6.5	6	6.5	41.8	52.0	52.0	52.0	7	12	66.0	7	12	45.0	7	7	6	6	35.9	111	123	135	8	7	68.5	5	12	5	8	0
34 FT	29	32	10	8	7	6	6	6.5	41.8	53.0	53.0	53.0	7	12	65.5	7	12	44.5	7	7	6	6	36.0	112	124	136	8	7	68.5	5	12	5	7.5	0
36 FT	31	33	10	8	7	6	6	6	41.8	55.0	55.0	55.0	8	15	71.5	8	15	50.5	7	7	7	6.5	39.4	113	125	137	8	6.5	68.5	5	12	5	6.5	0
38 FT	31	34	11	8	8	7	6	6.5	42.3	55.0	55.0	55.0	8	14	71.5	8	14	51.0	7	6.5	6	6	36.8	114	126	138	8	6.5	68.5	5	12	5	7.5	0
40 FT	33	35	11	8	8	7.5	6	6	42.3	57.0	57.0	57.0	8	14	69.5	8	14	49.0	7	6	6	6	37.0	115	127	139	8	6.5	68.5	5	12	5	7	0
42 FT	33	37	11	8	8	7	6	6	42.3	57.0	57.0	57.0	8	14	69.5	8	14	49.5	7	6.5	7	6.5	40.1	117	129	141	8	6	68.5	5	12	5	6.5	0
44 FT	34	38	12	8	8	7	6	6.5	43.3	58.0	58.0	58.0	8	14	69.0	8	14	48.5	7	6.5	6	6	37.6	118	130	142	8	6	68.5	5	12	5	7	0
46 FT	35	39	12	8	8	6.5	6	6.5	43.1	59.0	59.0	59.0	8	13	68.5	8	13	47.5	7	6.5	6	6	37.9	119	131	143	8	6	68.5	5	12	5	6.5	0
48 FT	36	40	12	8	8	6.5	6	6.5	43.1	60.0	60.0	60.0	8	13	67.5	8	13	46.5	7	6.5	6	6	38.1	120	132	144	9	7	74.5	5	11.5	5	6	0
50 FT	37	41	12	8	8	6.5	6	6	43.3	61.0	61.0	61.0	8	13	67.0	8	13	46.5	7	6	7	6.5	41.3	121	133	145	9	7	74.5	5	8.5	6	8	0

SPAN (S) = 14 FT      HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
					HT=10'	HT=11'	HT=12'				HT=10'	HT=11'	HT=12'				HT=10'	HT=11'	HT=12'															
1 FT	15	12	8	10	6	8	5	7	69.6	35.0	35.0	35.0	6	16	138.5	6	16	47.0	5	6.5	6	6	83.9	128	140	152	6	6.5	63.5	5	12	5	9.5	12
2 FT	15	13	8	10	6	8	5	6.5	69.6	35.0	35.0	35.0	6	16	138.5	6	16	48.0	5	6	6	6	77.4	129	141	153	6	6.5	63.0	5	12	5	9.5	12
2'- 4'	15	13	10	10	6	8	5	6	70.1	35.0	35.0	35.0	6	13	138.5	6	13	48.0	5	6	6	6	77.4	129	141	153	7	6.5	65.5	5	10	5	9.5	12
4 FT	12	12	10	10	6	8	5	6	70.1	32.0	32.0	32.0	6	13	85.5	6	13	40.0	5	6	6	7	65.5	128	140	152	7	6.5	65.5	5	10	5	9.5	12
6 FT	12	13	10	10	6	8.5	5	6	58.6	32.0	32.0	32.0	6	12	69.0	6	12	38.0	5	6	6	7	60.8	129	141	153	7	6.5	64.5	5	12	5	9.5	12
8 FT	13	14	10	10	5	6	6	7	57.1	33.0	33.0	37.0	7	15	68.0	7	15	40.5	6	8	6	7	57.4	130	142	154	7	6.5	64.0	5	12	5	9	0
10 FT	14	16	10	10	5	6	6	7	54.4	34.0	34.0	34.0	7	15	66.5	7	15	40.0	6	7	5	6	52.0	132	144	156	7	6.5	64.0	5	12	5	8	0
12 FT	15	17	10	10	6	8	6	7	58.6	35.0	35.0	39.0	7	14	73.0	7	14	48.0	6	7	6	7.5	53.1	133	145	157	7	6.5	63.5	5	12	5	8	0
14 FT	17	18	10	10	6	7.5	6	7	57.1	37.0	37.0	41.0	7	14	72.5	7	14	47.5	6	6.5	6	6.5	52.0	134	146	158	7	6.5	63.5	5	12	5	8	0
16 FT	18	20	11	10	6	7	6	7	57.0	38.0	38.0	42.0	7	14	71.5	7	14	47.5	6	6	6	8	51.5	136	148	160	7	6.5	63.5	5	12	5	7.5	0
18 FT	19	21	12	10	6	6.5	6	7	56.9	39.0	39.0	43.0	7	13	71.0	7	13	47.5	6	6	6	8.5	51.1	137	149	161	7	6.5	63.5	5	12	5	7	0
20 FT	21	23	12	10	6	6	6	7	56.1	41.0	41.0	45.0	7	13	70.5	7	13	47.0	7	8	6	8	50.8	139	151	163	7	6.5	63.5	5	12	5	7	0
22 FT	22	24	12	10	6	6	6	6.5	55.5	42.0	42.0	46.0	7	13	70.0	7	13	47.0	7	7.5	6	7.5	50.1	140	152	164	7	6.5	63.5	5	12	5	7	0
24 FT	23	26	13	10	7	7	6	6.5	55.9	43.0	43.0	47.0	7	12	69.5	7	12	47.0	7	7.5	6	8.5	50.3	142	154	166	7	6.5	63.5	5	12	5	6.5	0
26 FT	25	27	13	10	7	7	6	6.5	55.5	45.0	45.0	49.0	7	13	68.5	7	13	46.5	7	7.5	6	8	50.3	143	155	167	7	6	63.5	5	12	5	6.5	0
28 FT	26	29	14	10	7	7	6	6.5	56.3	46.0	50.0	50.0	7	13	67.5	7	13	46.5	7	7.5	6	8.5	50.5	145	157	169	8	7.5	69.5	5				

		SPAN (S) = 14 FT												HEIGHT (HT) = 13 FT OR 14 FT																		
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS			
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=13 HT=14		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=13 HT=14		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	15	12	9	11	6	8	5	6	70.4	35.0	35.0	6	16	139.0	6	16	47.0	5	6	6	6	96.1	164	176	6	6	64.0	5	12	5	8.5	12
2 FT	15	13	10	11	6	8	5	6	71.0	35.0	35.0	6	16	139.5	6	16	47.5	5	6	6	6.5	87.6	165	177	6	6.5	63.5	5	12	5	8	12
2'- 4'	15	13	10	11	6	7.5	6	7.5	100.0	36.0	36.0	6	13	139.5	6	13	47.5	5	6	6	6	87.6	165	177	7	6.5	65.5	5	12	5	8	12
4 FT	12	12	10	11	6	7.5	6	7.5	100.0	36.0	36.0	6	13	94.5	6	13	40.0	5	6	6	6	77.9	164	176	7	6.5	65.5	5	12	5	8	12
6 FT	12	13	10	11	6	8	6	7	74.8	36.0	36.0	6	12	69.0	6	12	38.5	5	6	6	6	72.4	165	177	7	6.5	65.0	5	12	5	8	12
8 FT	13	14	11	11	5	6	6	7	68.4	37.0	37.0	7	16	68.0	7	16	41.0	6	8	6	7	68.4	166	178	7	6	64.0	5	12	5	7.5	0
10 FT	14	16	11	11	5	6	6	6.5	65.4	38.0	38.0	7	15	66.5	7	15	40.5	6	7	6	6.5	66.8	168	180	7	6.5	64.0	5	12	5	7.5	0
12 FT	15	17	12	11	6	8	6	6.5	69.4	39.0	39.0	7	14	73.0	7	14	48.0	6	7	6	7	64.6	169	181	7	6.5	64.0	5	12	5	7	0
14 FT	17	18	12	11	6	7.5	6	6.5	67.9	41.0	41.0	7	15	72.0	7	15	48.0	6	6	6	6	63.0	170	182	7	6	63.5	5	12	5	7	0
16 FT	18	20	13	11	6	7	6	6.5	66.9	42.0	42.0	7	14	71.5	7	14	47.5	6	6	6	7	62.1	172	184	7	6.5	63.5	5	12	5	6.5	0
18 FT	19	21	13	11	6	6.5	6	6	65.6	43.0	43.0	7	13	71.0	7	13	47.5	7	8	6	6	61.0	173	185	7	6.5	63.5	5	12	5	6.5	0
20 FT	21	23	14	11	6	6	6	6	65.4	45.0	45.0	7	14	70.0	7	14	47.5	7	8	6	7	60.6	175	187	7	6.5	63.5	5	12	5	6	0
22 FT	22	24	14	11	6	6	7	8	69.4	46.0	46.0	7	13	69.5	7	13	47.0	7	7	6	6	59.8	176	188	7	6.5	63.5	5	12	5	6	0
24 FT	23	26	15	11	7	7.5	7	8	69.5	47.0	47.0	7	13	69.0	7	13	47.0	7	7.5	6	7	59.5	178	190	7	6.5	63.5	5	12	6	8	0
26 FT	24	27	15	11	7	7	7	7.5	69.0	48.0	48.0	7	13	68.5	7	13	47.0	7	7	6	6.5	59.3	179	191	7	6	63.5	5	12	6	8	0
28 FT	25	29	16	11	7	6.5	7	7.5	69.5	49.0	49.0	7	13	67.5	7	13	46.5	7	7	6	7	59.5	181	193	8	7.5	69.5	5	12	6	8	0
30 FT	27	30	16	11	7	6.5	7	7	69.3	51.0	51.0	7	13	66.0	7	13	45.5	7	7	6	6.5	59.5	182	194	8	7.5	69.5	5	12	6	8	0
32 FT	28	31	16	11	7	6.5	7	7.5	67.1	52.0	52.0	7	12	65.0	7	12	44.5	7	7	6	7	57.1	183	195	8	7	69.5	5	12	6	8	0
34 FT	29	32	17	11	7	6	7	7.5	67.8	53.0	53.0	7	12	64.0	7	12	44.0	7	6.5	6	7	57.5	184	196	8	7	69.5	5	12	6	7.5	0
36 FT	30	34	17	11	7	6	7	6.5	67.8	54.0	54.0	7	12	63.0	7	12	43.0	7	7	6	7	57.6	186	198	8	6.5	69.5	5	12	6	7.5	0
38 FT	31	35	18	11	7	6	7	7	68.5	55.0	55.0	8	15	70.0	8	15	50.5	7	6.5	6	6.5	58.0	187	199	8	6.5	69.5	5	12	6	7	0
40 FT	32	36	18	11	8	7.5	7	6.5	68.4	56.0	56.0	8	14	69.5	8	14	49.5	7	6.5	6	6.5	58.1	188	200	8	6	69.5	5	12	6	7	0
42 FT	33	37	19	11	8	7	7	7	69.1	57.0	57.0	8	14	69.0	8	14	48.5	7	6.5	6	6.5	58.5	189	201	8	6	69.5	5	12	6	6.5	0
44 FT	33	38	20	11	8	7	7	7	69.9	57.0	57.0	8	14	69.0	8	14	49.0	7	6	6	6	58.9	190	202	8	6	69.5	5	12	6	6.5	0
46 FT	34	39	20	11	8	7	7	6	69.8	58.0	58.0	8	14	68.5	8	14	48.5	7	6	6	6	59.0	191	203	8	6	69.5	5	12	6	6.5	0
48 FT	35	41	21	11	8	6.5	7	6.5	70.6	65.0	65.0	8	13	68.0	8	13	47.5	7	6	7	8	62.5	193	205	9	7	75.5	5	12	6	6	0
50 FT	36	42	22	11	8	6.5	7	6.5	71.4	66.0	66.0	8	14	67.0	8	14	47.5	7	6	7	7.5	63.0	194	206	9	7	75.5	5	12	6	6	0

		SPAN (S) = 14 FT												HEIGHT (HT) = 15 FT OR 16 FT																		
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS			
					A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=15 HT=16		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3 HT=15 HT=16		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	15	13	12	13	6	8	5	6	72.6	35.0	35.0	6	16	141.0	6	16	46.0	5	6.5	6	7.5	102.5	189	201	6	6.5	64.5	5	12	5	7	12
2 FT	15	13	12	13	6	8	6	8	75.6	35.0	39.0	6	16	144.0	6	16	47.5	5	6	6	7	95.8	189	201	6	6	63.5	5	12	5	7	12
2'- 4'	15	13	12	13	6	8	6	7.5	118.3	36.0	39.0	6	13	144.0	6	13	47.5	5	6	6	6	95.8	189	201	7	6.5	65.5	5	12	5	7	12
4 FT	12	12	12	13	6	8	6	7.5	118.3	36.0	36.0	6	13	86.5	6	13	40.0	5	6	6	6	86.6	188	200	7	6.5	65.5	5	12	5	7	12
6 FT	12	13	12	13	5	6	6	7	86.4	36.0	36.0	6	12	68.0	6	12	39.0	5	6	6	6	83.0	189	201	7	6	65.0	5	12	5	7	12
8 FT	13	15	13	13	5	6	6	7	78.9	37.0	37.0	6	12	64.5	6	12	38.0	6	7.5	6	6.5	80.3	191	203	7	6.5	64.5	5	12	5	6.5	0
10 FT	14	16	13	13	5	6	6	6.5	75.0	38.0	38.0	7	15	66.0	7	15	41.0	6	7	6	6.5	77.3	192	204	7	6.5	64.5	5	12	5	6.5	0
12 FT	15	17	14	13	6	8	6	6.5	78.5	39.0	39.0	7	15	73.0	7	15	48.5	6	6.5	6	6.5	74.1	193	205	7	6.5	64.0	5	12	5	6	0
14 FT	16	19	14	13	6	8	6	6	77.0	40.0	40.0	7	14	72.0	7	14	48.5	6	6	6	6	73.6	195	207	7	6.5	64.0	5	12	5	6	0
16 FT	18	20	15	13	6	7	6	6	76.5	42.0	42.0	7	14	71.5	7	14	48.5	6	6	6	6	72.1	196	208	7	6.5	64.0	5	12	6	8	0
18 FT	19	21	15	13	6	6.5	7	7.5	80.5	43.0	49.0	7	14	71.0	7	14	48.5	7	8	7	7	74.1	197	209	7	6.5	64.0	5	12	6	8	0
20 FT	20	23	16	13	6	6.5	7	7.5	79.9	44.0	50.0	7	13	70.5	7	13	48.0	7	7.5	7	8	73.8	199	211	7	6.5	64.0	5	12	6	8	0
22 FT	22	25	17	13	6	6	7	7.5	79.8	46.0	46.0	7	14	69.5	7	14	48.0	7	7.5	6	6	70.5	201	213	7	6.5	64.0	5	12	6	7.5	0
24 FT	23	26	18	13	7	7.5	7	7.5	79.5	47.0	47.0	7	13	69.0	7	13	47.5	7	7.5	6	6	69.9	202	214	7	6.5	64.0	5	12	6	7	0
26 FT	24	27	18	13	7	7.5	7	7	79.1	48.0	48.0	7	13	68.5	7	13	47.5	7	6.5	6	6	69.6	203	215	7	6	64.0	5	12	6	7	0
28 FT	25	29	19	13	7	7	7	7	79.5	49.0	49.0	7	13	68.0	7	13	47.5	7	7	6	6	70.0	205	217	8	7.5	70.0	5	12	6	6.5	0
30 FT	26	30	20	13	7	6.5	7	7	79.8	50.0	50.0	7	13	67.0	7	13	47.0	7	6.5	6	6	69.9	206	218	8	7.5	70.0	5	12	6	6.5	0
32 FT	27	31	20	13	7	6.5	7	7	77.4	51.0	51.0	7	13	66.5	7	13	47.0	7	6.5	6	6	67.5	207	219	8	7	70.0	5	12	6	6.5	0
34 FT	28	32	20	13	7	6	7	7	77.4	52.0	52.0	7	12	65.5	7	12	46.0	7	6	6	6	67.6	208	220	8	7	70.0	5	12	6	6.5	0
36 FT	29	34	21	13	7	6	7	7	78.0	53.0	53.0	7	12	64.5	7	12	45.0	7	6.5	6	6											

		SPAN (S) = 15 FT												HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	15	12	8	8	6	8	5	8	72.9	35.0	35.0	35.0	6	16	146.0	6	16	51.0	5	6	5	6	64.9	104	116	128	6	6	66.5	5	12	5	12	12
2 FT	17	13	8	8	6	7.5	5	6.5	72.9	37.0	37.0	37.0	6	14	146.0	6	14	45.5	5	6	5	6	57.8	105	117	129	6	6	65.5	5	12	5	12	12
2' - 4'	17	13	8	8	6	7	5	6	72.9	37.0	37.0	37.0	6	12	146.0	6	12	45.5	5	6	6	6.5	57.8	105	117	129	7	6	68.0	5	12	5	12	12
4 FT	13	12	8	8	6	7	5	6	53.1	33.0	33.0	33.0	6	12	92.5	6	12	41.5	5	6	6	6.5	53.3	104	116	128	7	6	68.0	5	12	5	12	12
6 FT	13	13	8	8	6	7.5	6	7.5	50.4	33.0	33.0	37.0	7	15	78.5	7	15	42.5	5	6	6	7	48.9	105	117	129	7	6	67.0	5	12	5	12	12
8 FT	14	15	8	8	6	8	5	6	44.0	34.0	34.0	34.0	7	14	72.5	7	14	41.5	6	7.5	5	6.5	42.8	107	119	131	7	6	67.0	5	12	5	11	0
10 FT	15	16	8	8	6	7.5	6	8	50.5	35.0	35.0	35.0	7	13	78.0	7	13	49.0	6	7	5	6.5	40.9	108	120	132	7	6	66.5	5	12	5	10	0
12 FT	17	18	8	8	6	7.5	6	8	48.4	37.0	37.0	37.0	7	13	76.5	7	13	48.5	6	6.5	5	6	39.6	110	122	134	7	6	66.5	5	12	5	9.5	0
14 FT	18	19	8	8	6	7	6	7.5	47.0	38.0	38.0	42.0	7	13	75.5	7	13	48.5	6	6	6	8	41.5	111	123	135	7	6	66.5	5	12	5	9.5	0
16 FT	19	21	8	8	6	6	6	6.5	46.1	39.0	43.0	43.0	7	12	75.0	7	12	48.0	6	6	6	7	40.8	113	125	137	7	6	66.5	5	12	5	9	0
18 FT	21	22	9	8	6	6	6	7.5	46.0	41.0	41.0	41.0	7	12	74.0	7	12	48.0	7	7.5	5	6	37.8	114	126	138	7	6	66.0	5	12	5	8.5	0
20 FT	22	24	9	8	6	6	6	6.5	45.5	42.0	42.0	46.0	7	12	73.5	7	12	47.5	7	7.5	6	7	40.3	116	128	140	7	6	66.0	5	12	5	8.5	0
22 FT	24	26	10	8	7	7.5	6	7.5	46.0	44.0	44.0	44.0	7	12	72.5	7	12	47.5	7	7.5	5	6	37.5	118	130	142	7	6	66.0	5	12	5	8	0
24 FT	25	27	11	8	7	7	6	8	46.5	45.0	45.0	45.0	7	12	71.5	7	12	47.0	7	6.5	5	6	37.5	119	131	143	8	7	72.0	5	12	5	7.5	0
26 FT	27	29	11	8	7	6.5	6	8	46.1	47.0	47.0	51.0	7	12	70.5	7	12	47.0	7	7	6	7.5	40.6	121	133	145	8	7	72.0	5	12	5	7.5	0
28 FT	28	30	11	8	7	6.5	6	7	45.9	52.0	52.0	52.0	7	12	69.5	7	12	46.5	7	6.5	6	7	40.5	122	134	146	8	7	72.0	5	12	5	7.5	0
30 FT	29	32	12	8	7	6	6	7.5	46.9	53.0	53.0	53.0	7	12	69.0	7	12	46.5	7	7	6	7.5	41.0	124	136	148	8	7	72.0	5	12	5	7	0
32 FT	30	33	12	8	7	6	6	7.5	45.4	54.0	54.0	54.0	7	12	67.5	7	12	46.0	7	6.5	6	7	39.5	125	137	149	8	6.5	72.0	5	12	5	7	0
34 FT	31	34	12	8	8	7.5	6	7.5	45.3	55.0	55.0	55.0	8	15	75.0	8	15	53.0	7	6.5	6	7	39.6	126	138	150	8	6.5	72.0	5	12	5	7	0
36 FT	32	36	12	8	8	7	6	7	45.4	56.0	56.0	56.0	8	14	73.5	8	14	52.5	7	6.5	6	6.5	39.9	128	140	152	8	6	72.0	5	12	5	7	0
38 FT	33	37	12	8	8	6.5	6	6.5	45.4	57.0	57.0	57.0	8	13	72.5	8	13	51.5	7	6.5	6	6.5	40.0	129	141	153	8	6	72.0	5	12	5	6.5	0
40 FT	35	38	12	8	8	6.5	6	6.5	45.1	59.0	59.0	59.0	8	13	71.0	8	13	49.5	7	6	6	6	40.3	130	142	154	8	6	71.5	5	12	5	6	0
42 FT	35	39	13	8	8	6	6	6.5	46.1	59.0	59.0	59.0	8	12	71.0	8	12	50.0	7	6	6	6	40.6	131	143	155	8	6	72.0	5	12	5	6.5	0
44 FT	36	41	13	8	8	6	6	6.5	46.3	60.0	60.0	60.0	8	12	70.5	8	12	49.0	7	6	7	7	43.9	133	145	157	9	7	77.5	5	9	5	6	0
46 FT	37	42	13	8	8	6	6	6	46.3	61.0	61.0	61.0	8	12	70.0	8	12	48.0	7	6	7	7	44.1	134	146	158	9	7	77.5	5	6.5	6	8.5	0
48 FT	38	43	13	9	8	6	6	6	46.3	62.0	62.0	62.0	8	12	70.5	8	12	48.5	7	6	7	6.5	44.3	135	147	159	9	7	77.5	5	12	6	8	0
50 FT	39	44	14	9	8	6	6	6	47.1	63.0	63.0	63.0	8	12	70.0	8	12	47.5	8	7.5	7	7	44.8	136	148	160	9	6.5	77.5	5	12	6	8	0

		SPAN (S) = 15 FT												HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	15	12	9	10	6	8	5	6.5	73.9	35.0	35.0	35.0	6	16	147.0	6	16	51.0	5	6	6	6	88.3	140	152	164	6	6	67.0	5	12	5	8.5	12
2 FT	17	13	9	10	6	7.5	5	6.5	73.9	37.0	37.0	37.0	6	14	147.0	6	14	46.0	5	6	6	6	80.4	141	153	165	6	6	66.0	5	12	5	8.5	12
2' - 4'	17	13	9	10	6	7	6	6	85.5	37.0	37.0	37.0	6	12	147.0	6	12	46.0	5	6	6	6	80.4	141	153	165	7	6	68.5	5	12	5	8.5	12
4 FT	13	12	9	10	6	7	6	6	85.5	33.0	37.0	37.0	6	12	96.0	6	12	42.0	5	6	6	6	70.6	140	152	164	7	6	68.5	5	12	5	8.5	12
6 FT	13	14	10	10	6	8	6	7	67.4	33.0	33.0	37.0	7	15	76.5	7	15	43.0	6	8	6	6.5	60.0	142	154	166	7	6.5	68.0	5	12	5	8	12
8 FT	14	15	10	10	6	8	6	6.5	62.0	34.0	34.0	38.0	7	14	72.0	7	14	42.0	6	7.5	6	6.5	62.1	143	155	167	7	6	67.0	5	12	5	8	0
10 FT	15	17	10	10	6	8	6	6.5	64.6	35.0	35.0	39.0	7	14	78.0	7	14	49.5	6	7	6	6.5	59.6	145	157	169	7	6.5	67.0	5	12	5	8	0
12 FT	16	18	11	10	6	7.5	6	6.5	62.6	36.0	36.0	40.0	7	13	76.5	7	13	49.0	6	6.5	6	7.5	57.4	146	158	170	7	6	67.0	5	12	5	7.5	0
14 FT	18	20	12	10	6	7	6	7	62.0	38.0	38.0	42.0	7	13	75.5	7	13	49.0	6	6	6	8	56.4	148	160	172	7	6.5	67.0	5	12	5	7	0
16 FT	19	21	12	10	6	6.5	6	6.5	60.9	39.0	39.0	43.0	7	13	74.5	7	13	48.5	7	8	6	7.5	55.4	149	161	173	7	6	66.5	5	12	5	7	0
18 FT	21	22	12	10	6	6	6	6.5	59.8	41.0	45.0	45.0	7	13	74.0	7	13	48.5	7	7	6	6	54.6	150	162	174	7	6	66.5	5	12	5	7	0
20 FT	22	24	13	10	6	6	6	6.5	59.9	42.0	42.0	46.0	7	12	73.5	7	12	48.5	7	7	6	7.5	54.4	152	164	176	7	6	66.5	5	12	5	6.5	0
22 FT	23	26	13	10	7	7	6	6	59.3	43.0	43.0	47.0	7	12	72.5	7	12	48.0	7	7	6	7	53.9	154	166	178	7	6	66.5	5	12	5	6.5	0
24 FT	25	28	14	10	7	7	6	6	59.5	45.0	45.0	49.0	7	12	71.5	7	12	48.0	7	7	6	7.5	54.0	156	168	180	7	6	66.5	5	12	5	6	0
26 FT	26	29	14	10	7	6.5	6	6	59.0	50.0	50.0	50.0	7	12	71.0	7	12	47.5	7	7	6	7.5	53.6	157	169	181	8	7	72.5	5	12	5	6	0
28 FT	27	31	15	10	7	6	6	6	59.6	51.0	51.0	51.0	7	12	70.5	7	12	47.5	7	7	6	7.5	53.9	159	171	183	8	7	72.5	5	12	6	8	0
30 FT	29	32	15	10	7	6	7	8	64.3	53.0	53.0	53.0	7	12	69.0	7	12	47.0	7	6.5	6	7.5	54.0	160	172	184	8	7	72.5	5	12	6	8	

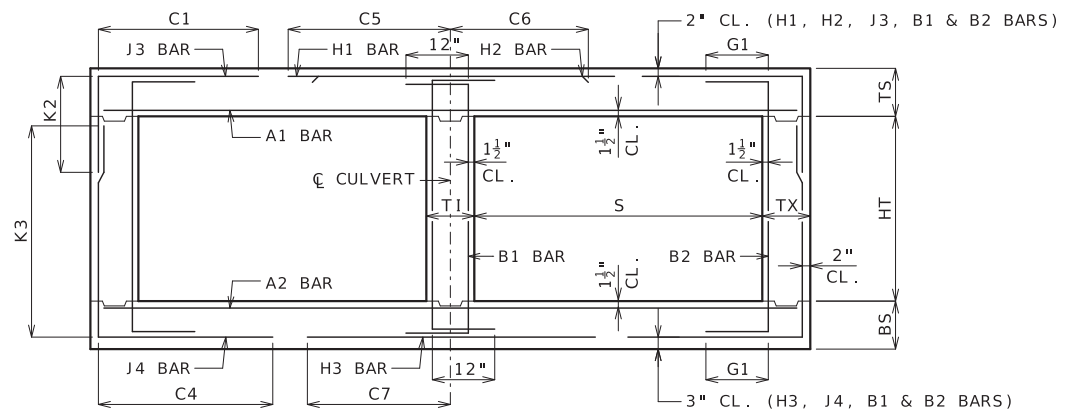


		SPAN (S) = 15 FT												HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS						H1 BARS		H2 BARS		A2 BARS		J4 BARS						H3 BARS		B1 BARS		B2 BARS					
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
									HT=14'	HT=15'	HT=16'													HT=14'	HT=15'	HT=16'								
1 FT	15	13	12	13	6	8	6	8.5	79.3	35.0	35.0	39.0	6	16	152.5	6	16	50.0	5	6	6	7	102.4	177	189	201	6	6	67.5	5	11	5	7	12
2 FT	16	14	12	13	6	7.5	5	6	76.3	36.0	36.0	36.0	6	15	149.5	6	15	48.5	6	8	6	7.5	96.3	178	190	202	6	6	67.0	5	12	5	7	12
2'- 4'	16	14	12	13	6	7	6	7	101.4	36.0	36.0	36.0	6	12	149.5	6	12	48.5	6	8	6	6.5	96.3	178	190	202	7	6.5	69.0	5	10.5	5	7	12
4 FT	12	13	12	13	6	7	6	7	101.4	36.0	36.0	36.0	6	12	86.5	6	12	41.5	5	6	6	6.5	88.5	177	189	201	7	6.5	69.0	5	10.5	5	7	12
6 FT	13	14	12	13	6	8	6	6.5	86.3	37.0	37.0	37.0	7	16	74.5	7	16	43.5	6	8	6	6.5	82.9	178	190	202	7	6	68.0	5	12	5	7	12
8 FT	13	15	13	13	6	8	6	6.5	76.4	37.0	37.0	37.0	7	14	70.5	7	14	42.5	6	7.5	6	6.5	77.9	179	191	203	7	6	68.0	5	12	5	6.5	0
10 FT	15	17	13	13	6	8	6	6	80.6	39.0	39.0	39.0	7	14	77.5	7	14	50.5	6	7	6	6.5	76.0	181	193	205	7	6.5	67.5	5	12	5	6.5	0
12 FT	16	18	14	13	6	8	6	6	78.4	40.0	40.0	40.0	7	14	76.5	7	14	50.0	6	6.5	6	6.5	73.8	182	194	206	7	6	67.5	5	12	5	6	0
14 FT	17	20	14	13	6	7.5	7	7.5	81.6	41.0	41.0	41.0	7	13	75.5	7	13	50.0	6	6	6	6	72.9	184	196	208	7	6	67.5	5	12	5	6	0
16 FT	19	21	15	13	6	6.5	7	8	80.9	43.0	43.0	49.0	7	13	75.0	7	13	49.5	7	8	7	8	74.4	185	197	209	7	6	67.0	5	12	6	8	0
18 FT	20	23	16	13	6	6.5	7	8	80.1	44.0	44.0	44.0	7	13	74.0	7	13	49.5	7	7.5	6	6	70.8	187	199	211	7	6	67.0	5	12	6	8	0
20 FT	21	24	17	13	6	6	7	7.5	79.5	45.0	45.0	45.0	7	12	73.5	7	12	49.5	7	7	6	6	69.8	188	200	212	7	6	67.0	5	12	6	7.5	0
22 FT	23	26	17	13	7	7.5	7	7.5	78.9	47.0	47.0	47.0	7	12	73.0	7	12	49.0	7	7	6	6	69.4	190	202	214	7	6	67.0	5	12	6	7.5	0
24 FT	24	28	18	13	7	7	7	7.5	78.6	48.0	48.0	48.0	7	12	72.5	7	12	49.0	7	7	6	6.5	69.0	192	204	216	7	6	67.0	5	12	6	7	0
26 FT	26	29	18	13	7	7	7	7	78.1	50.0	50.0	50.0	7	12	71.5	7	12	49.0	7	6	6	6	68.5	193	205	217	8	7	73.0	5	12	6	7	0
28 FT	27	31	19	13	7	6.5	7	7	78.5	51.0	51.0	51.0	7	12	71.0	7	12	48.5	7	6.5	6	6	68.6	195	207	219	8	7	73.0	5	12	6	6.5	0
30 FT	28	32	19	13	7	6	7	6	78.1	52.0	52.0	52.0	7	12	70.5	7	12	48.5	7	6.5	6	6	68.5	196	208	220	8	7	73.0	5	12	6	6.5	0
32 FT	30	34	20	13	7	6	7	6.5	78.8	54.0	54.0	54.0	7	12	69.0	7	12	47.0	7	6.5	6	6	68.9	198	210	222	8	6.5	73.0	5	12	6	6.5	0
34 FT	31	35	20	13	7	6	7	6.5	76.3	55.0	55.0	55.0	8	15	76.0	8	15	54.0	7	6.5	6	6	66.4	199	211	223	8	6.5	73.0	5	12	6	6.5	0
36 FT	32	36	21	13	8	7.5	7	6.5	76.8	56.0	56.0	56.0	8	14	75.0	8	14	53.5	7	6	6	6	66.6	200	212	224	8	6	73.0	5	12	6	6	0
38 FT	33	37	21	13	8	7	7	6	76.8	57.0	57.0	57.0	8	14	74.0	8	14	53.0	7	6	6	6	66.6	201	213	225	8	6	73.0	5	12	6	6	0
40 FT	34	39	22	13	8	7	7	6	77.5	58.0	58.0	64.0	8	14	73.0	8	14	52.0	7	6	7	7.5	70.1	203	215	227	8	6	73.0	5	12	6	6	0
42 FT	35	40	23	13	8	7	7	6.5	78.1	59.0	59.0	65.0	8	13	72.5	8	13	51.0	7	6	7	7.5	70.4	204	216	228	9	7	79.0	5	12	7	7.5	0
44 FT	35	41	24	13	8	6	7	6	78.9	65.0	65.0	65.0	8	12	72.5	8	12	52.0	8	7.5	7	7	70.6	205	217	229	9	7	79.5	5	12	7	8	0
46 FT	36	42	25	13	8	6	7	6	79.5	66.0	66.0	66.0	8	12	72.0	8	12	51.0	8	7	7	7.5	70.9	206	218	230	9	7	79.5	5	12	7	8	0
48 FT	37	43	26	13	8	6.5	7	6	80.3	67.0	67.0	67.0	8	12	71.5	8	12	50.0	8	6.5	7	7.5	71.3	207	219	231	9	7	79.5	5	12	7	8	0
50 FT	38	45	27	13	8	6	7	6	81.1	68.0	68.0	68.0	8	12	71.0	8	12	49.0	8	7	7	7	71.8	209	221	233	9	6.5	79.5	5	12	7	8	0

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

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT CULVERT.



	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CONCRETE DOUBLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 15 FEET HEIGHT (HT): 14 THRU 16 FEET
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.47A</b>	SHEET NO. <b>25 OF 27</b>

		SPAN (S) = 16 FT												HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	15	12	8	8	6	7.5	5	8	76.5	35.0	35.0	35.0	6	15	154.5	6	15	54.0	5	6	6	7	66.9	104	116	128	7	7	72.5	5	12	5	12	12
2 FT	17	13	8	8	6	7	5	6.5	76.5	37.0	37.0	37.0	6	14	154.5	6	14	50.0	5	6	5	6	56.4	105	117	129	7	7	71.5	5	12	5	12	12
2' - 4'	17	13	8	8	6	6.5	6	7	76.5	37.0	37.0	37.0	7	14	154.5	7	14	50.0	5	6	5	6	56.4	105	117	129	7	6	71.5	5	12	5	12	12
4 FT	13	13	8	8	6	6.5	6	7	55.6	33.0	33.0	33.0	7	14	97.0	7	14	45.5	5	6	5	6	49.6	105	117	129	7	6	71.0	5	12	5	12	12
6 FT	14	14	8	8	6	7	5	6	47.1	34.0	34.0	34.0	7	14	82.0	7	14	44.0	6	8	5	6	45.1	106	118	130	7	6	70.5	5	12	5	12	12
8 FT	15	16	8	8	6	7.5	5	6	48.4	35.0	35.0	35.0	7	13	84.0	7	13	51.0	6	7	5	7	41.9	108	120	132	7	6	70.0	5	12	5	11	0
10 FT	16	17	8	8	6	7	6	8	49.6	36.0	36.0	36.0	7	12	81.5	7	12	50.5	6	7	5	6.5	39.9	109	121	133	7	6	69.5	5	12	5	10	0
12 FT	18	19	8	8	6	7	6	7.5	47.5	38.0	38.0	38.0	7	12	80.0	7	12	50.0	6	6	5	6	38.6	111	123	135	7	6	69.5	5	12	5	9.5	0
14 FT	19	20	8	8	6	6.5	6	7	46.0	39.0	39.0	43.0	7	12	79.0	7	12	49.5	6	6	6	7.5	40.5	112	124	136	7	6	69.5	5	12	5	9.5	0
16 FT	21	22	8	8	6	6	6	7	44.9	45.0	45.0	45.0	7	12	78.0	7	12	49.5	7	7.5	6	7	39.9	114	126	138	7	6	69.5	5	12	5	8.5	0
18 FT	22	23	9	8	6	6	6	7.5	45.1	42.0	42.0	42.0	8	15	85.0	8	15	57.0	7	6.5	5	6	36.8	115	127	139	8	6.5	75.5	5	12	5	8.5	0
20 FT	24	25	9	8	7	7.5	6	7	44.4	48.0	48.0	48.0	8	15	84.0	8	15	57.0	7	7	6	7	39.4	117	129	141	8	7	75.5	5	12	5	8.5	0
22 FT	25	27	10	8	7	7	6	7.5	45.0	45.0	45.0	49.0	8	14	83.5	8	14	56.5	7	6.5	6	7	39.5	119	131	143	8	7	75.5	5	12	5	8	0
24 FT	27	29	10	8	7	6.5	6	6.5	44.5	51.0	51.0	51.0	8	14	82.5	8	14	56.5	7	6.5	6	6.5	39.3	121	133	145	8	7	75.0	5	12	5	8	0
26 FT	28	31	11	8	7	6	6	7.5	45.3	52.0	52.0	52.0	8	14	81.5	8	14	56.0	7	6.5	6	7	39.5	123	135	147	8	7	75.0	5	12	5	7.5	0
28 FT	30	32	11	8	7	6	6	7	44.9	54.0	54.0	54.0	8	14	80.5	8	14	56.0	7	6.5	6	6.5	39.6	124	136	148	8	7	75.0	5	12	5	7.5	0
30 FT	31	34	11	8	8	7.5	6	6	44.9	55.0	55.0	55.0	8	14	79.5	8	14	55.5	7	6.5	6	6	39.6	126	138	150	8	6.5	75.0	5	12	5	7	0
32 FT	32	35	12	8	8	7	6	7	45.8	56.0	56.0	56.0	8	14	78.5	8	14	55.0	7	6	6	6.5	40.0	127	139	151	8	6.5	75.0	5	12	5	7	0
34 FT	33	36	12	8	8	7	6	7	45.3	57.0	57.0	57.0	8	14	77.5	8	14	54.5	7	6	6	6.5	39.3	128	140	152	8	6	75.0	5	12	5	7	0
36 FT	35	38	12	8	8	6.5	6	6.5	45.3	59.0	59.0	59.0	8	13	75.0	8	13	52.0	7	6	6	6	39.3	130	142	154	8	6	75.0	5	12	5	7	0
38 FT	36	39	12	8	8	6.5	6	6.5	45.3	60.0	60.0	60.0	8	13	74.0	8	13	51.5	7	6	6	6	39.3	131	143	155	8	6	75.0	5	12	5	6.5	0
40 FT	37	41	12	8	8	6.5	6	6	45.3	61.0	61.0	61.0	8	12	73.5	8	12	50.5	7	6	7	6.5	42.5	133	145	157	9	7	80.5	5	11	5	6	0
42 FT	38	42	12	8	8	6	6	6	45.3	62.0	62.0	62.0	8	12	73.0	8	12	50.0	7	6	7	6	42.6	134	146	158	9	7	80.5	5	7	6	8	0
44 FT	39	43	13	9	8	6	6	6	45.8	63.0	63.0	63.0	8	12	73.5	8	12	50.5	8	7.5	7	6.5	43.1	135	147	159	9	7	81.0	5	12	5	6	0
46 FT	40	44	13	9	8	6	7	7	50.8	70.0	70.0	70.0	8	12	73.0	8	12	49.5	8	7.5	7	6.5	43.4	136	148	160	9	6.5	80.5	5	12	6	8	0
48 FT	41	45	13	9	9	7.5	7	7	50.8	71.0	71.0	71.0	9	15	80.5	9	15	56.5	8	7	7	6.5	43.5	137	149	161	9	6.5	80.5	5	12	6	7.5	0
50 FT	42	46	13	9	9	7	7	6.5	50.8	72.0	72.0	72.0	9	14	80.0	9	14	56.0	8	7	7	6	43.8	138	150	162	9	6.5	80.5	5	9.5	6	7	0

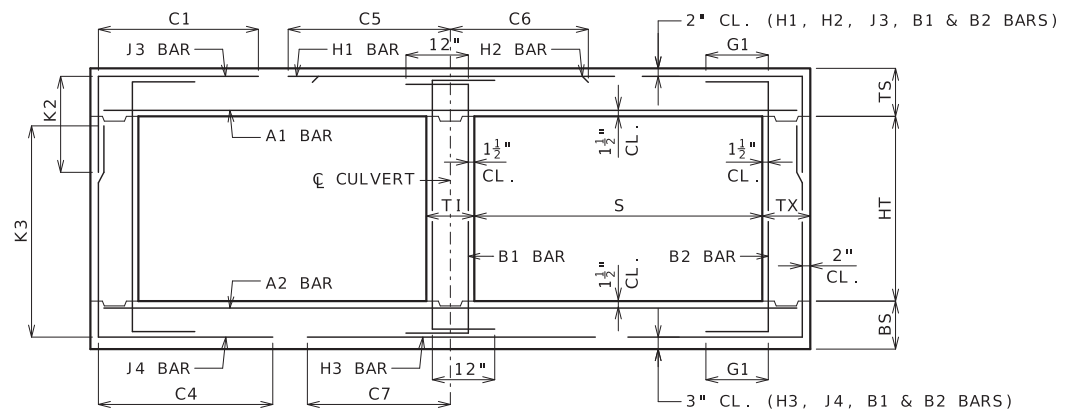
		SPAN (S) = 16 FT												HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT																				
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS				H3 BARS			B1 BARS		B2 BARS							
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	15	13	9	10	6	7.5	5	6	77.5	35.0	35.0	35.0	6	15	155.5	6	15	53.5	5	6	6	6	89.5	141	153	165	6	6	70.0	5	11.5	5	8.5	12
2 FT	17	14	9	10	6	7.5	5	6.5	77.5	37.0	37.0	37.0	6	14	155.5	6	14	50.0	6	8	6	6.5	79.8	142	154	166	6	6	69.5	5	12	5	8.5	12
2' - 4'	17	14	10	10	6	6.5	6	7	77.5	37.0	37.0	37.0	7	15	155.5	7	15	50.0	6	8	6	6.5	79.8	142	154	166	7	6	71.5	5	11	5	8.5	12
4 FT	13	13	10	10	6	6.5	6	7	76.9	33.0	37.0	37.0	7	15	96.5	7	15	46.0	5	6	6	6.5	70.0	141	153	165	7	6	71.5	5	11	5	8.5	12
6 FT	13	14	10	10	6	7	6	7	65.3	33.0	37.0	37.0	7	13	79.5	7	13	44.0	6	8	6	6.5	64.5	142	154	166	7	6	71.0	5	12	5	8	12
8 FT	14	16	10	10	6	7	6	6.5	60.3	34.0	34.0	38.0	7	13	75.0	7	13	43.0	6	7	6	7	60.6	144	156	168	7	6	70.5	5	12	5	8	0
10 FT	16	17	10	10	6	7	6	6.5	63.1	36.0	40.0	40.0	7	13	81.5	7	13	51.0	6	7	6	6.5	57.8	145	157	169	7	6	70.0	5	12	5	8	0
12 FT	17	19	11	10	6	7	6	6.5	62.3	37.0	37.0	41.0	7	12	80.0	7	12	50.5	6	6	6	7.5	56.5	147	159	171	7	6	70.0	5	12	5	7.5	0
14 FT	19	21	12	10	6	6.5	6	7	61.5	39.0	39.0	43.0	7	12	78.5	7	12	50.5	7	8	6	8	55.8	149	161	173	7	6	70.0	5	12	5	7	0
16 FT	20	22	12	10	6	6.5	6	6.5	60.3	40.0	40.0	44.0	7	12	78.0	7	12	50.0	7	7.5	6	7	54.6	150	162	174	7	6	70.0	5	12	5	7	0
18 FT	22	24	12	10	6	6	6	6	59.3	42.0	46.0	46.0	7	12	77.0	7	12	50.0	7	7	6	6.5	54.0	152	164	176	7	6	69.5	5	12	5	7	0
20 FT	23	25	13	10	7	7.5	6	6	59.1	43.0	43.0	47.0	8	15	84.5	8	15	57.5	7	6.5	6	7	53.6	153	165	177	8	7	75.5	5	12	5	6.5	0
22 FT	25	27	13	10	7	7	6	6	58.4	45.0	45.0	49.0	8	15	83.5	8	15	57.5	7	6.5	6	7	53.1	155	167	179	8	7	75.5	5	12	5	6.5	0
24 FT	27	29	14	10	7	6.5	6	6	58.6	51.0	51.0	51.0	8	15	82.5	8	15	57.0	7	6.5	6	7.5	53.3	157	169	181	8	7	75.5	5	12	5	6	0
26 FT	28	31	14	10	7	6.5	6	6	58.3	52.0	52.0	52.0	8	14	82.0	8	14	57.0	7	6.5	6	7.5	52.9	159	171	183	8	7	75.5	5	12	5	6	0
28 FT	30	33	15	10	7	6	6	6	58.8	54.0	54.0	54.0	8	15	80.5	8	15	56.5	7	6.5	6	7	53.3	161	173	185	8	6.5	75.5	5	12	6	8	0
30 FT	31	34	15	10	8	7.5	7	8	63.5	55.0	55.0	55.0	8	15	79.5	8	15	56.0	7	6	6	7	53.1	162	174	186	8	6.5	75.5	5	12	6		


		SPAN (S) = 16 FT											HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT																					
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS											BOTTOM SLAB BARS											WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS		A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS											
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
									HT=14'	HT=15'	HT=16'													HT=14'	HT=15'	HT=16'								
1 FT	15	13	12	13	6	7.5	6	8	82.9	35.0	35.0	39.0	6	15	160.5	6	15	53.0	5	6	6	7	101.1	177	189	201	6	6	70.5	5	10	5	7	12
2 FT	17	14	12	13	6	7.5	6	8.5	82.9	37.0	37.0	41.0	6	14	160.5	6	14	50.0	6	8	6	7	95.1	178	190	202	7	7	73.0	5	12	5	7	12
2'- 4'	17	14	12	13	6	7	6	7	99.8	37.0	37.0	41.0	7	15	160.5	7	15	50.0	6	8	6	6	95.1	178	190	202	7	6	73.0	5	11	5	7	12
4 FT	13	13	12	13	6	7	6	7	99.8	37.0	37.0	37.0	7	15	94.0	7	15	46.0	6	8.5	6	6	86.1	177	189	201	7	6	72.0	5	11	5	7	12
6 FT	13	15	12	13	6	7	6	6.5	82.6	37.0	37.0	37.0	7	14	77.5	7	14	44.5	6	7.5	6	6.5	82.5	179	191	203	7	6	71.5	5	12	5	7	12
8 FT	14	16	13	13	6	7.5	6	6.5	76.6	38.0	38.0	38.0	7	13	74.5	7	13	44.0	6	7	6	6.5	77.6	180	192	204	7	6	71.0	5	12	5	6.5	0
10 FT	15	18	13	13	6	6.5	6	6	79.5	39.0	39.0	39.0	7	13	80.5	7	13	51.5	6	6.5	6	6	75.6	182	194	206	7	6	71.0	5	12	5	6.5	0
12 FT	17	19	14	13	6	7	6	6	77.8	41.0	41.0	41.0	7	13	79.5	7	13	51.5	6	6	6	6	73.1	183	195	207	7	6	70.5	5	12	5	6	0
14 FT	18	21	15	13	6	7	6	6	76.3	42.0	42.0	42.0	7	12	78.5	7	12	51.0	7	8	6	6	71.8	185	197	209	7	6	70.5	5	12	6	8	0
16 FT	20	22	15	13	6	6.5	7	7.5	79.9	44.0	44.0	44.0	7	12	78.0	7	12	51.0	7	7.5	6	6	70.3	186	198	210	7	6	70.0	5	12	6	8	0
18 FT	22	24	15	13	6	6	7	7	78.8	46.0	46.0	52.0	7	12	77.5	7	12	51.0	7	7	7	7	72.4	188	200	212	7	6	70.0	5	12	6	8	0
20 FT	23	25	16	13	7	7.5	7	7	78.0	47.0	47.0	53.0	8	15	85.0	8	15	58.5	7	6	7	7.5	71.4	189	201	213	8	7	76.0	5	12	6	8	0
22 FT	25	27	17	13	7	7	7	7.5	77.8	49.0	49.0	49.0	7	12	76.0	7	12	50.5	7	6	6	6	68.0	191	203	215	8	7	76.0	5	12	6	7.5	0
24 FT	26	29	17	13	7	7	7	7	76.9	50.0	50.0	56.0	8	15	83.5	8	15	58.5	7	6.5	7	7.5	70.4	193	205	217	8	7	76.0	5	12	6	7.5	0
26 FT	28	31	18	13	7	6.5	7	7	76.9	52.0	52.0	52.0	8	15	82.5	8	15	58.0	7	6.5	6	6	67.1	195	207	219	8	7	76.5	5	12	6	7	0
28 FT	29	33	19	13	7	6	7	7	77.1	53.0	53.0	53.0	8	15	82.0	8	15	58.0	7	6	6	6	67.1	197	209	221	8	6.5	76.5	5	12	6	6.5	0
30 FT	31	34	19	13	8	7.5	7	6.5	76.8	55.0	55.0	55.0	8	15	80.5	8	15	57.0	7	6	6	6	67.0	198	210	222	8	6.5	76.0	5	12	6	6.5	0
32 FT	32	36	20	13	8	7.5	7	6.5	77.3	56.0	56.0	56.0	8	14	79.5	8	14	56.5	7	6	6	6	67.3	200	212	224	8	6	76.5	5	12	6	6.5	0
34 FT	33	37	21	13	8	7	7	6.5	77.6	57.0	57.0	57.0	8	14	78.5	8	14	55.5	7	6	6	6	67.3	201	213	225	8	6	76.5	5	12	6	6	0
36 FT	34	38	21	13	8	7	7	6.5	75.5	58.0	58.0	58.0	8	14	77.5	8	14	55.0	8	7	6	6	64.9	202	214	226	8	6	76.5	5	12	6	6	0
38 FT	35	40	21	13	8	6.5	7	6	75.5	59.0	59.0	59.0	8	13	76.5	8	13	54.0	8	7.5	6	6	65.1	204	216	228	9	7	82.0	5	12	6	6	0
40 FT	36	41	22	13	8	6.5	7	6	76.1	66.0	66.0	66.0	8	13	75.5	8	13	53.5	8	7.5	7	7.5	68.5	205	217	229	9	7	82.0	5	12	6	6	0
42 FT	37	42	23	13	8	6.5	7	6.5	76.9	67.0	67.0	67.0	8	12	75.0	8	12	52.5	8	6.5	7	7.5	68.8	206	218	230	9	7	82.5	5	12	7	7.5	0
44 FT	38	44	24	13	8	6	7	6	77.6	68.0	68.0	68.0	8	12	74.5	8	12	52.0	8	7	7	7	69.4	208	220	232	9	6.5	82.5	5	12	7	7.5	0
46 FT	39	45	25	13	8	6	7	6	78.4	69.0	69.0	69.0	8	12	74.0	8	12	51.0	8	7	7	7	69.8	209	221	233	9	6.5	82.5	5	12	7	7.5	0
48 FT	40	46	26	13	8	6	7	6	79.1	70.0	70.0	70.0	8	12	73.5	8	12	50.0	8	6.5	7	7	70.1	210	222	234	9	6.5	82.5	5	12	7	8	0
50 FT	41	47	27	13	9	7.5	7	6	79.9	71.0	71.0	71.0	8	12	73.0	8	12	49.5	8	6	7	6.5	70.5	211	223	235	9	6	82.5	5	12	7	8	0

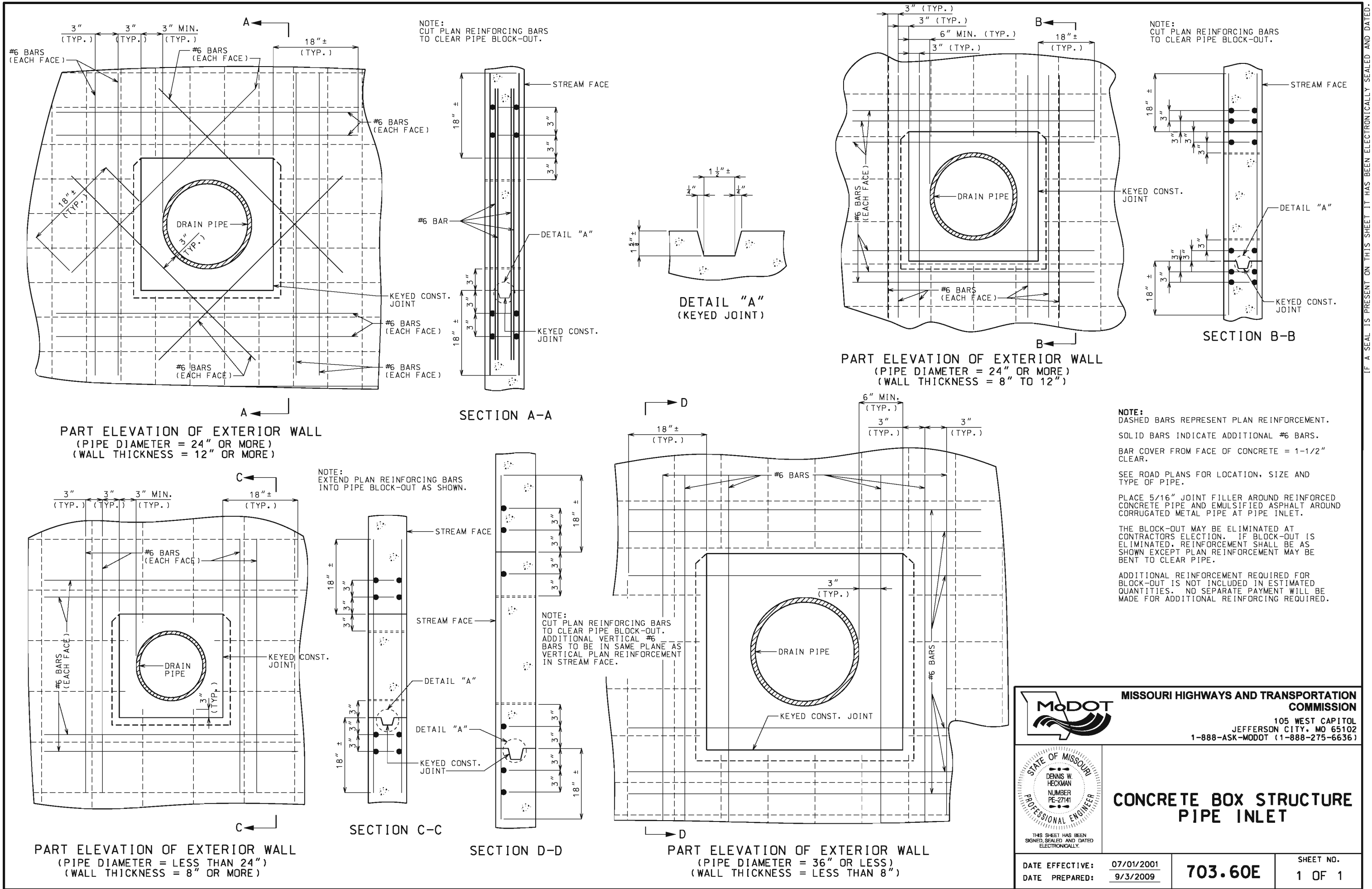
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



BAR DIMENSIONS DIAGRAM  
 SYMMETRICAL ABOUT CULVERT.



 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	<b>CONCRETE          DOUBLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 16 FEET HEIGHT (HT): 14 THRU 16 FEET	
	STATE OF MISSOURI BRYAN A. HARTNAGEL NUMBER PE-2002024473 PROFESSIONAL ENGINEER <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small>	DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023



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

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE BOX STRUCTURE PIPE INLET</b>
DATE EFFECTIVE: 07/01/2001 DATE PREPARED: 9/3/2009	<b>703.60E</b>
	SHEET NO. <b>1 OF 1</b>

### LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

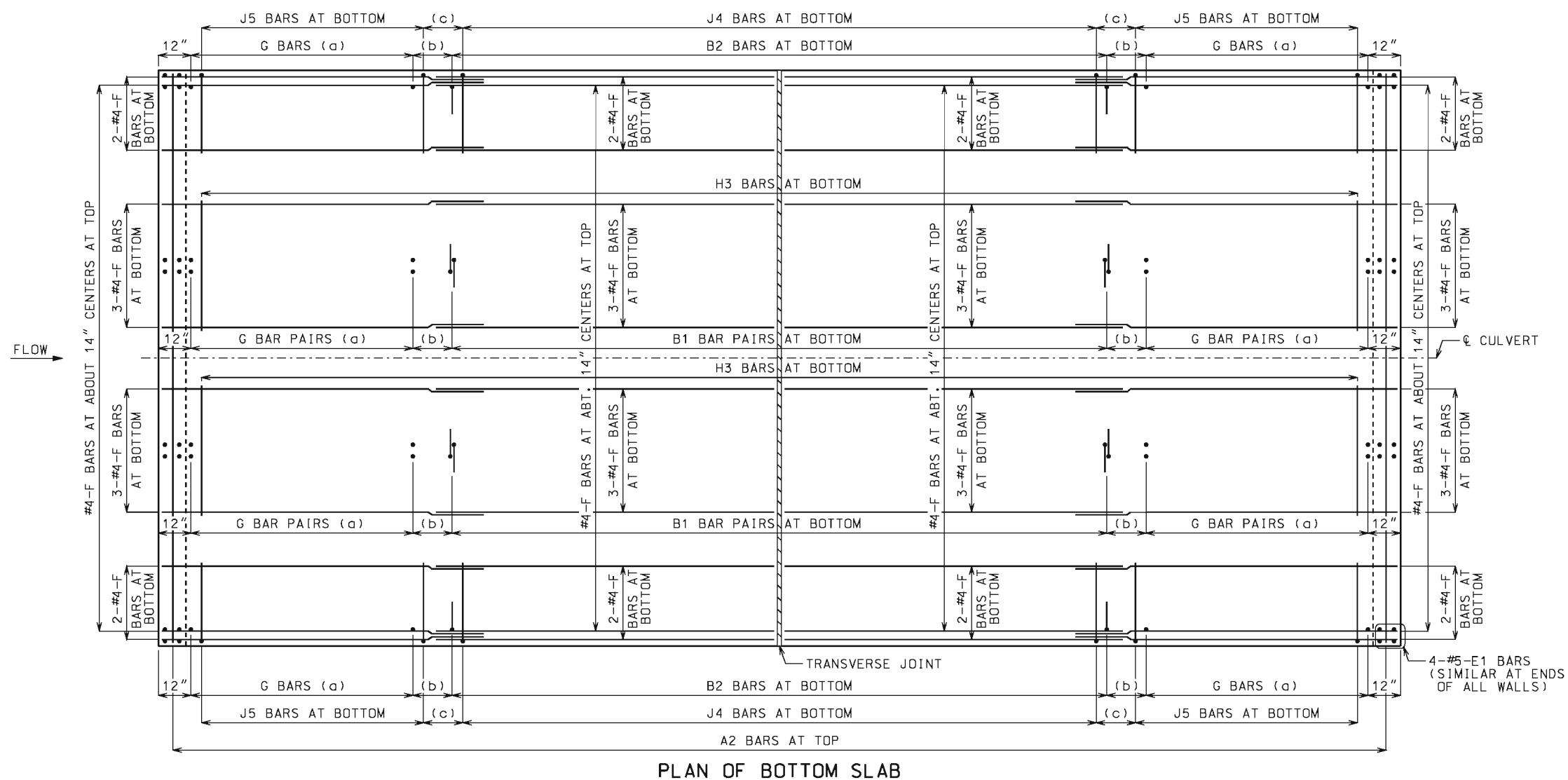
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

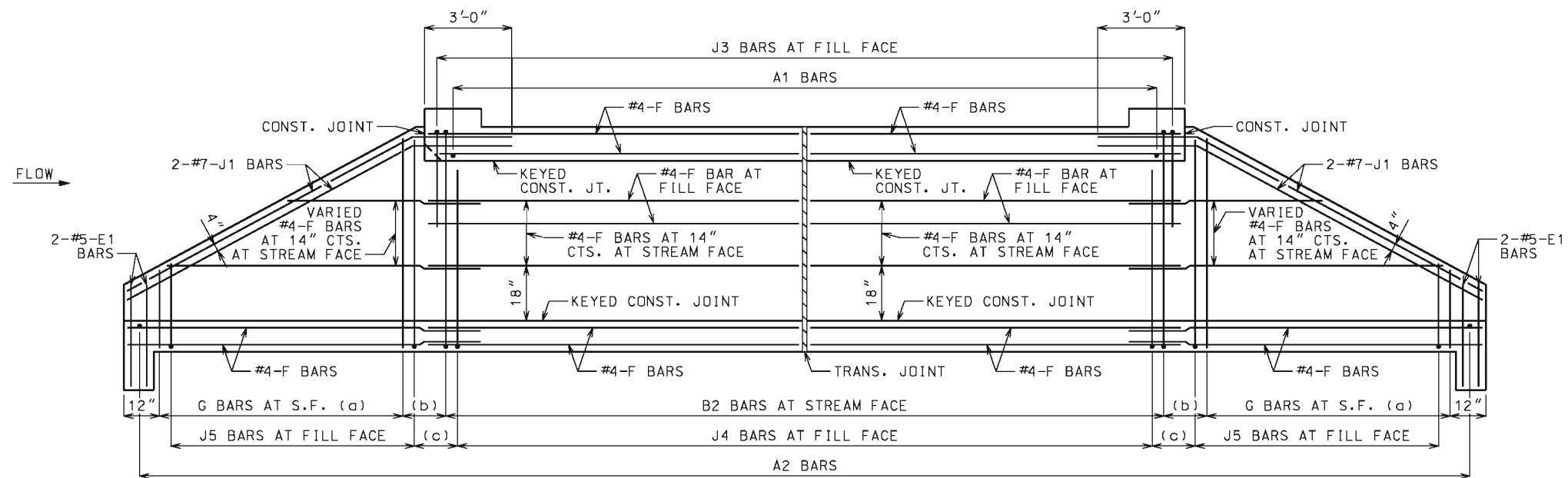
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

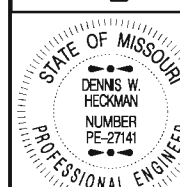
(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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



THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

SKEW: SQUARED  
WINGS: STRAIGHT

REINFORCEMENT

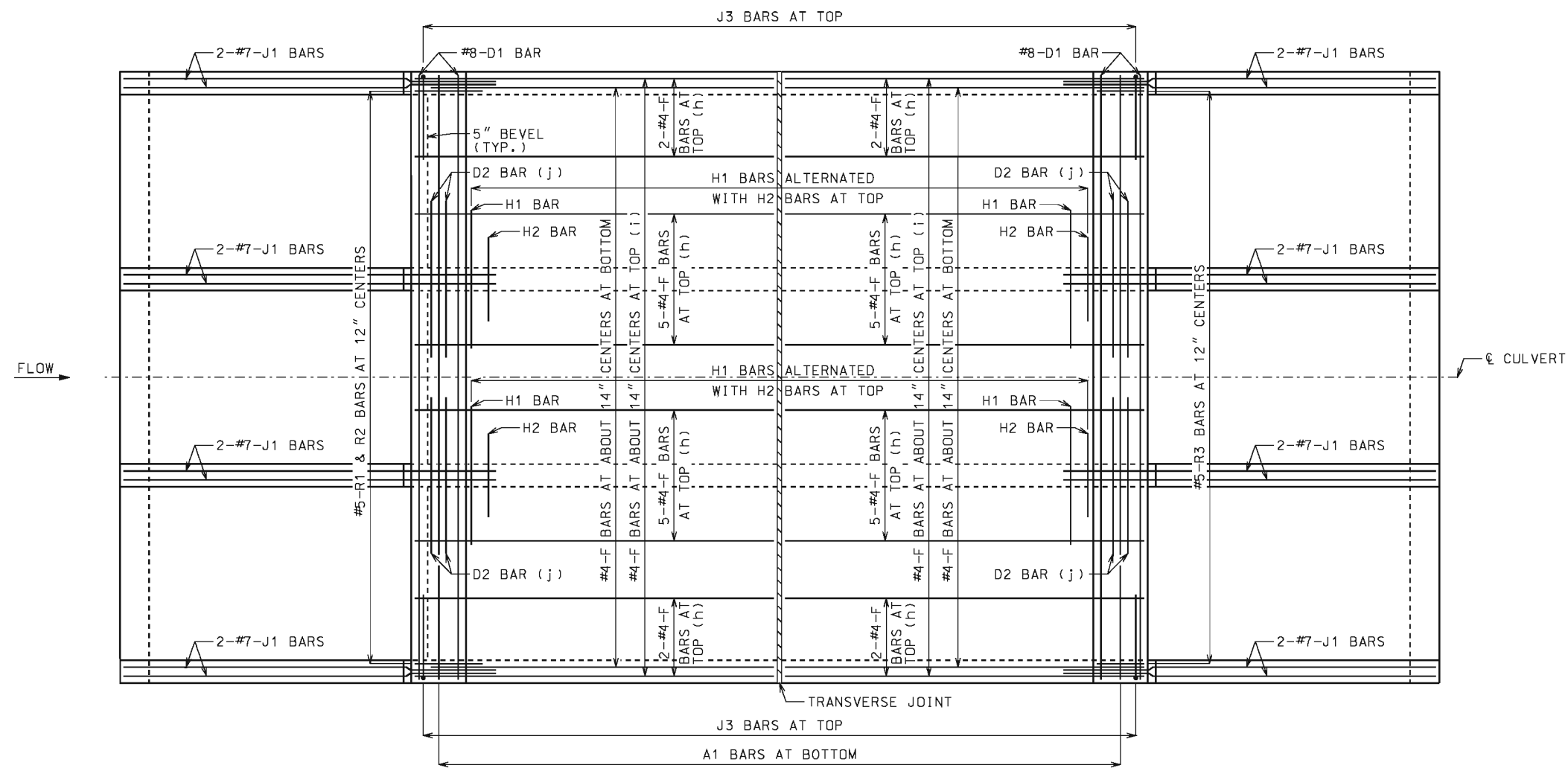
DATE EFFECTIVE: 12/01/2011  
DATE PREPARED: 5/13/2015

703.80H

SHEET NO.  
1 OF 3

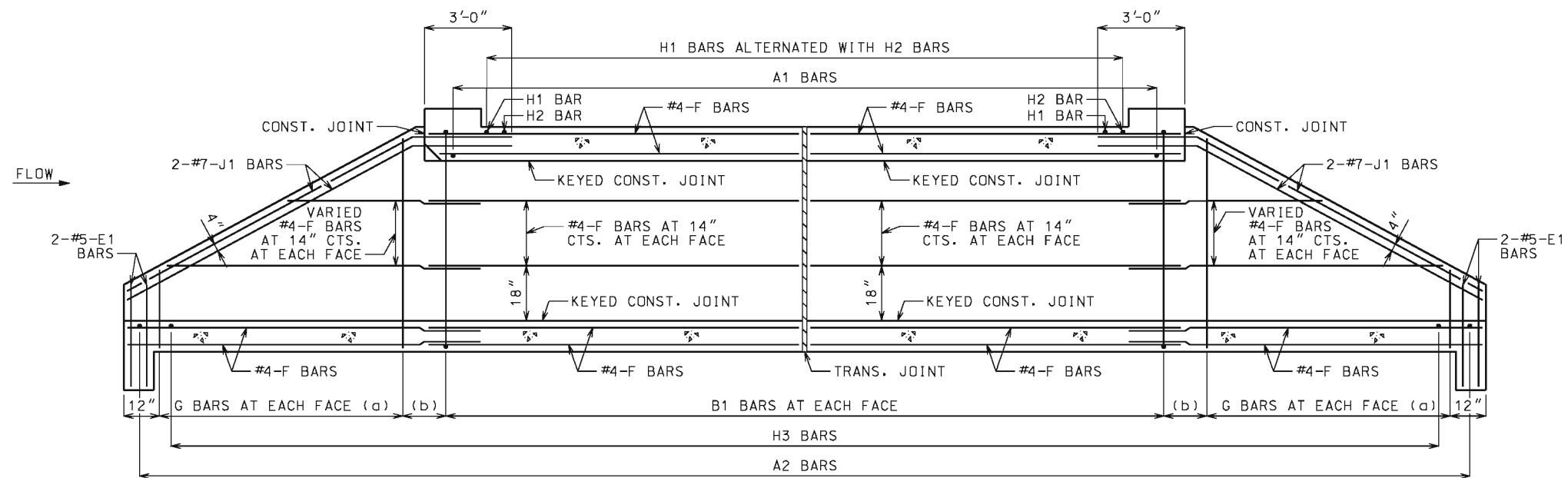
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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



**PLAN OF TOP SLAB**

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) NOT SPECIFIED ON THIS SHEET

(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

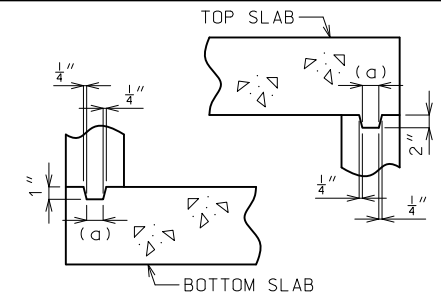
(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#8 FOR CLEAR SPAN > 10'-0"

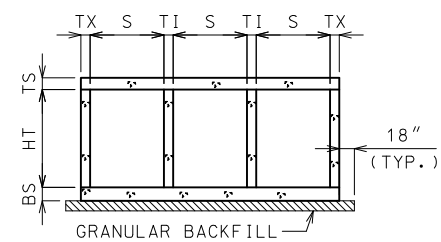
#9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C/WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

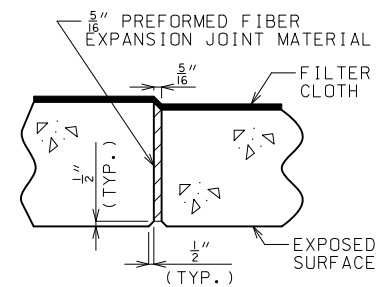
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	SKEW: SQUARED WINGS: STRAIGHT	
<b>REINFORCEMENT</b>		
DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015	<b>703.80H</b>	SHEET NO. 2 OF 3



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



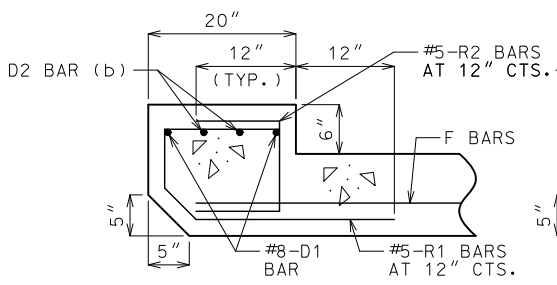
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



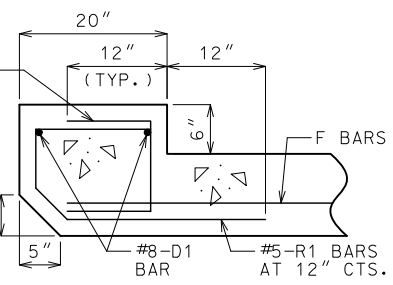
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

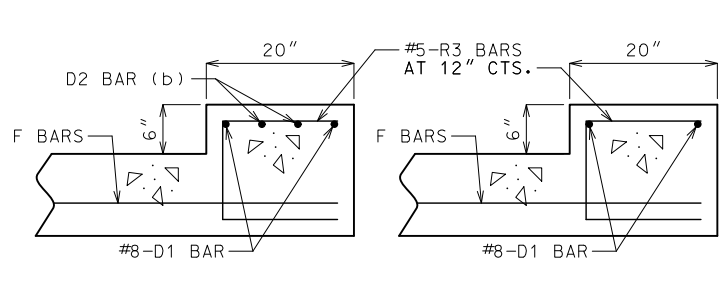
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



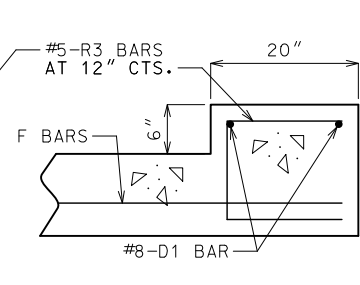
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



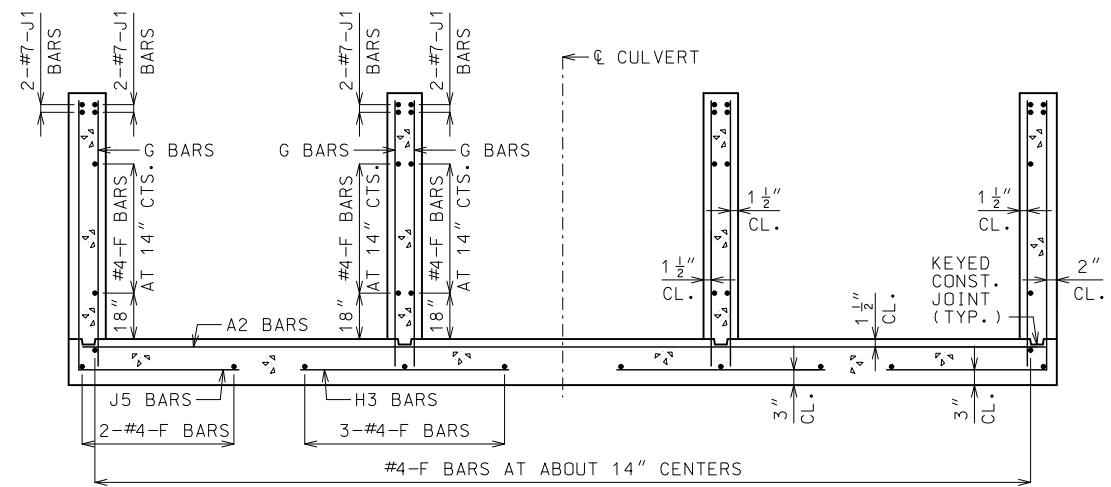
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



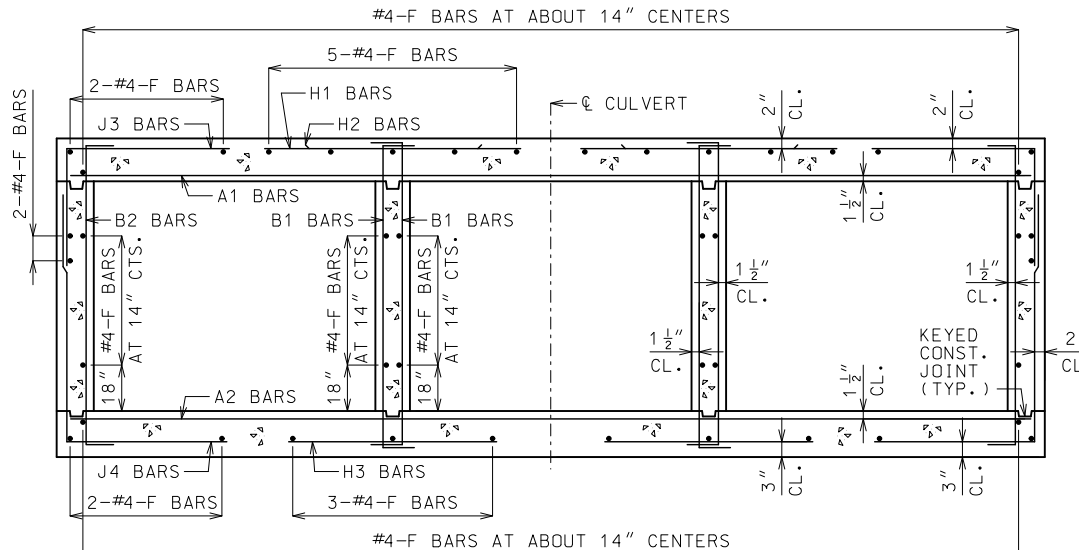
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"  
#8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"

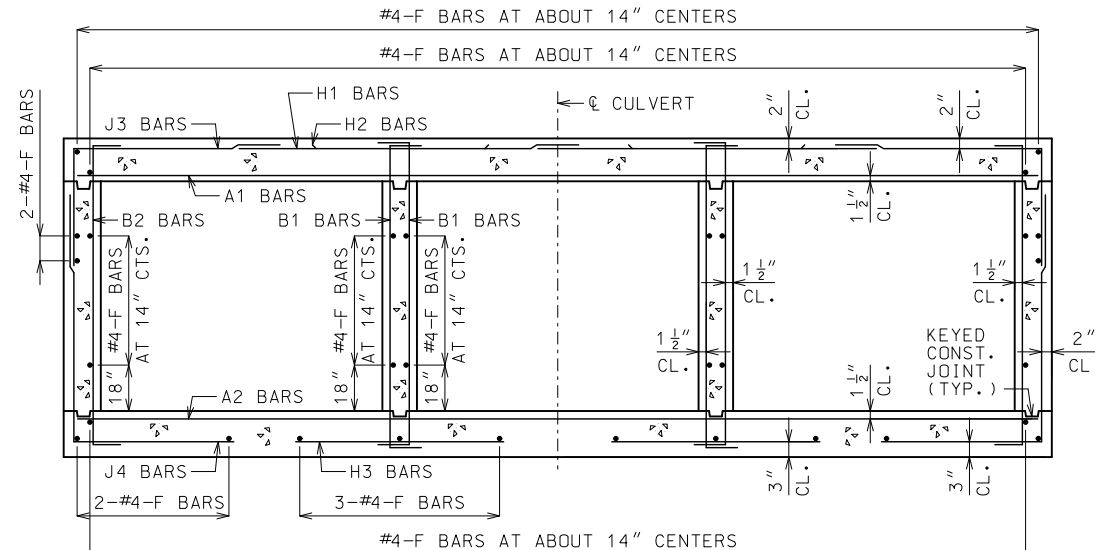
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

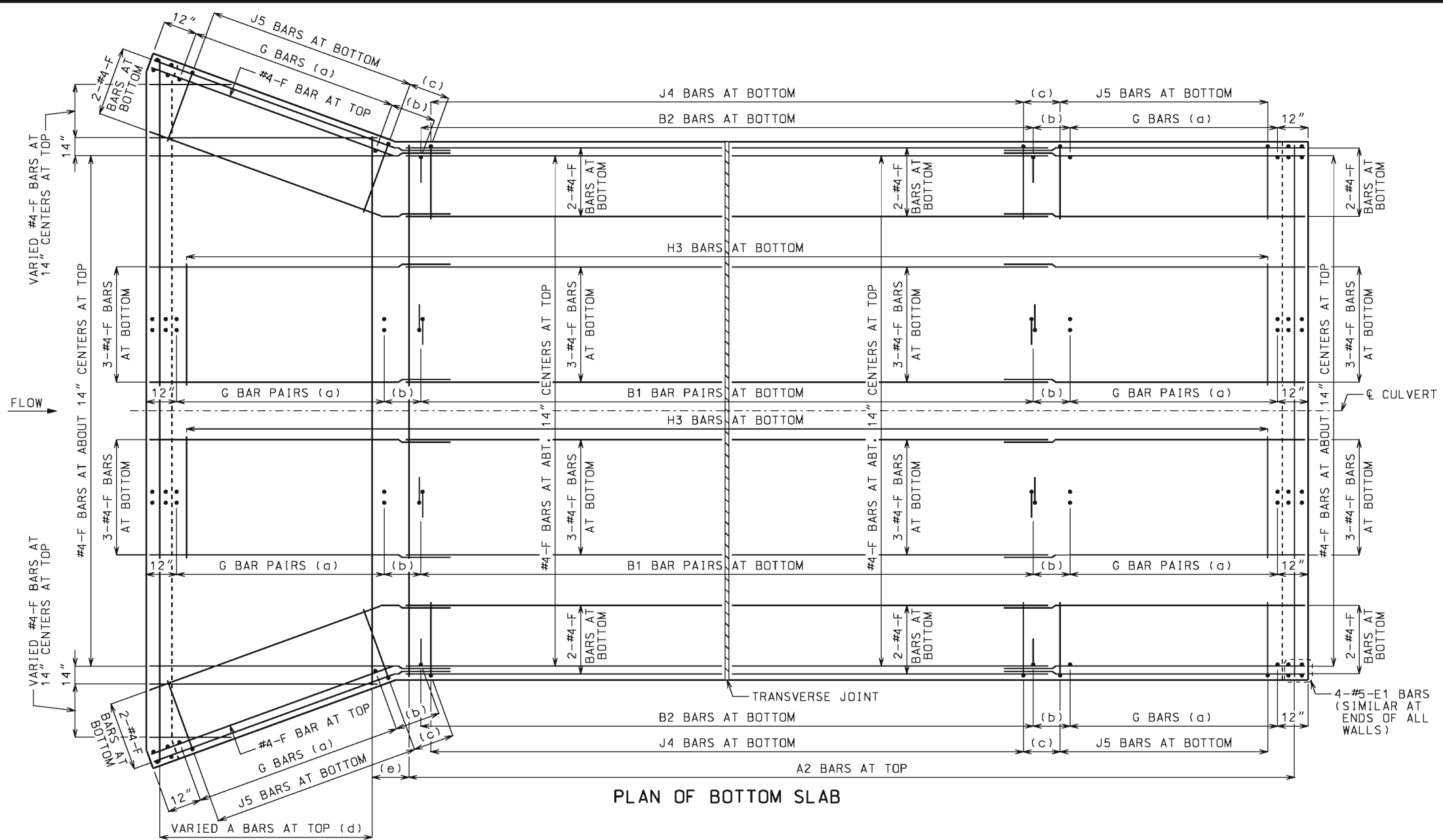
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

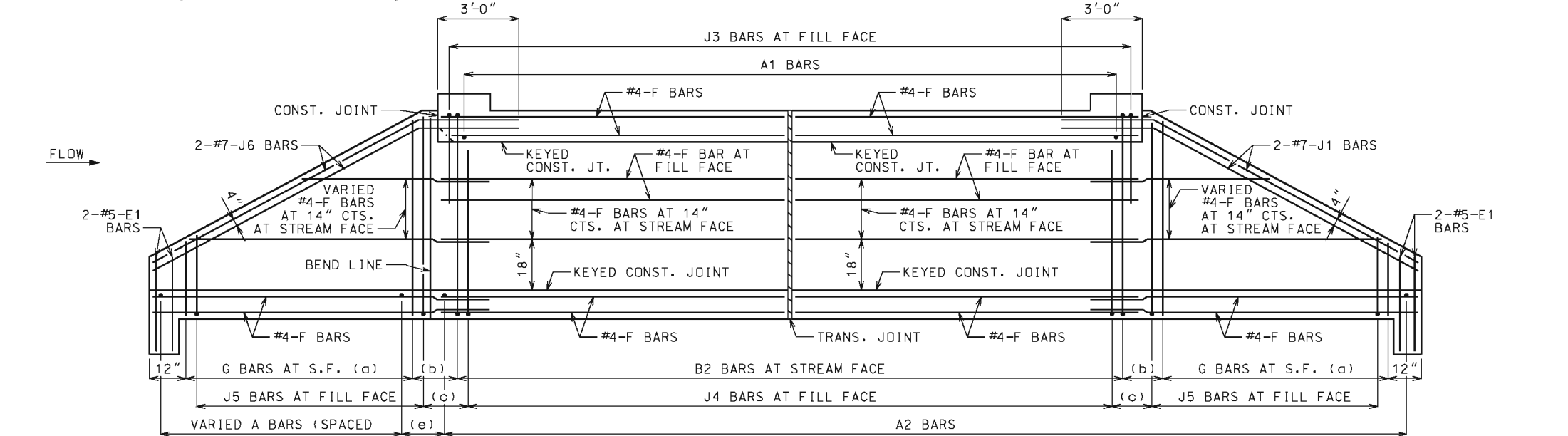
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	SKEW: SQUARED WINGS: STRAIGHT	
<b>SECTIONS</b>		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.80H</b>	SHEET NO. 3 OF 3

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



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

- BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT
- CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

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

STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

**CONCRETE TRIPLE BOX CULVERT**  
 SKEW: SQUARED  
 WINGS: FLARED

REINFORCEMENT

DATE EFFECTIVE: 12/01/2011  
 DATE PREPARED: 5/13/2015

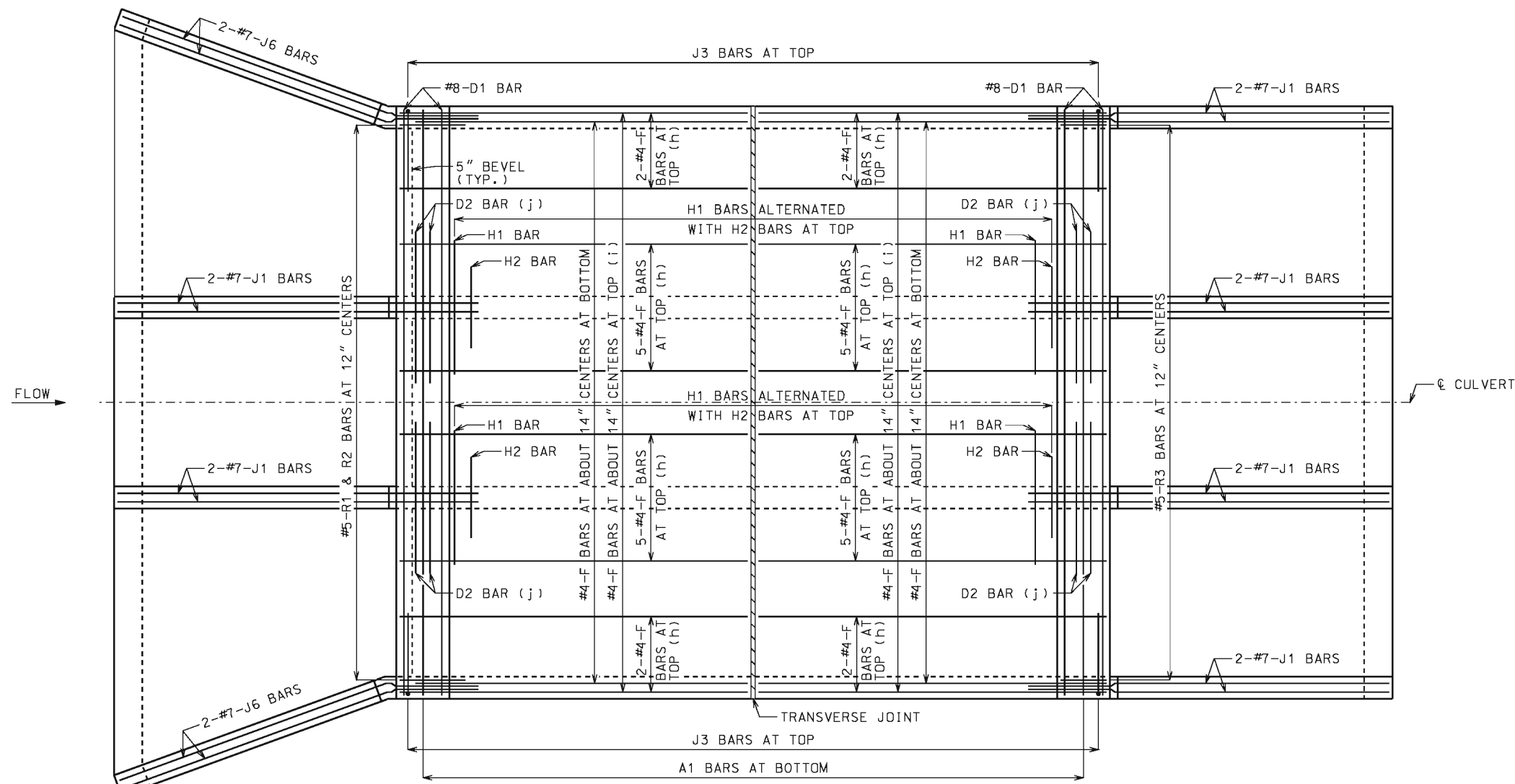
**703.81H**

SHEET NO.  
 1 OF 3

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

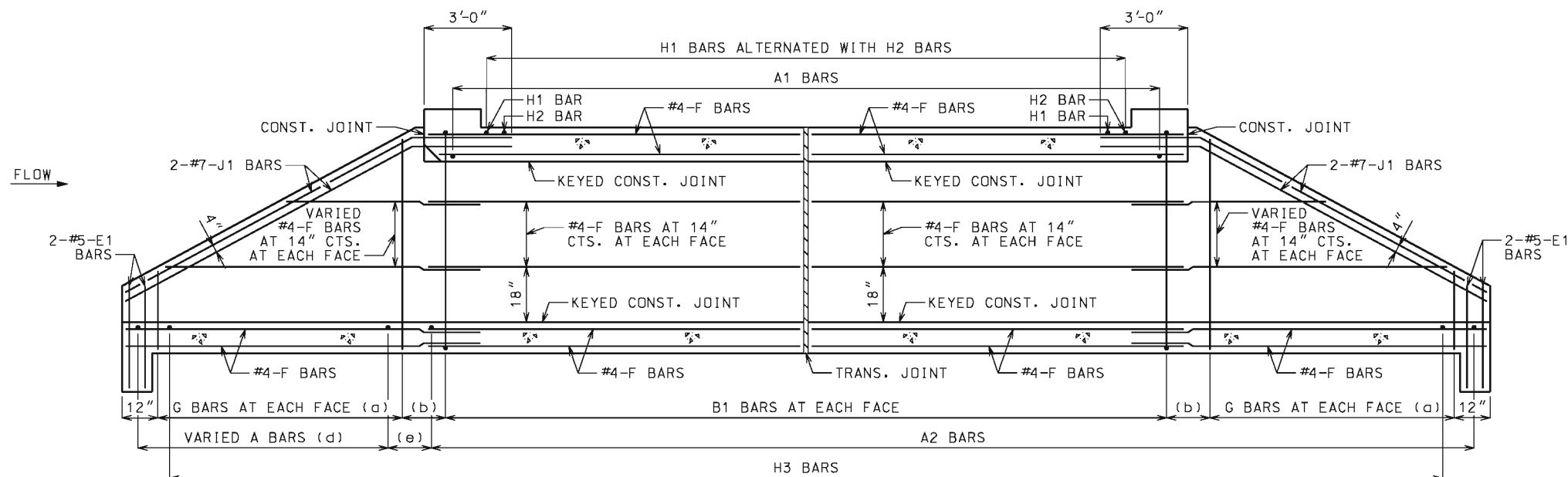


IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**PLAN OF TOP SLAB**

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.  
FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2\".

LAP LONGITUDINAL BARS A MINIMUM OF 23\" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12\" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0\"

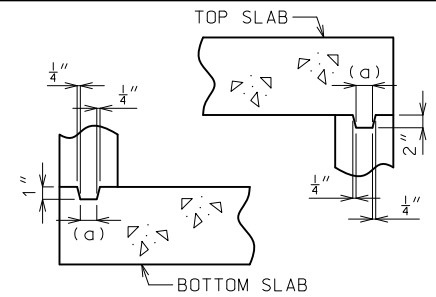
(i) FOR DESIGN FILLS 2'-0\" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0\"

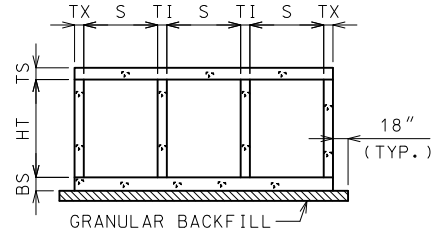
#8 FOR CLEAR SPAN > 10'-0\"  
#9 FOR CLEAR SPAN > 13'-0\"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

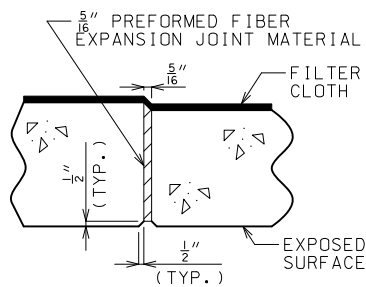
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> SKEW: SQUARED WINGS: FLARED <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015	<b>703.81H</b> SHEET NO. 2 OF 3



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS

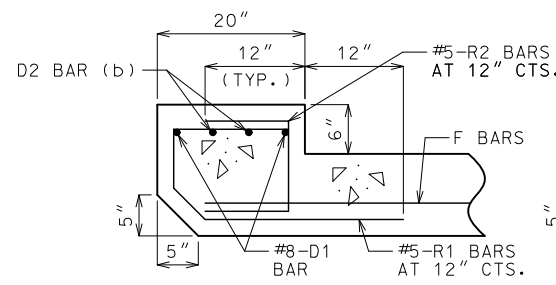


**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**

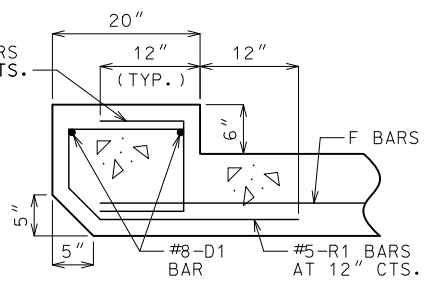


**TRANSVERSE JOINT THRU BARREL**  
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

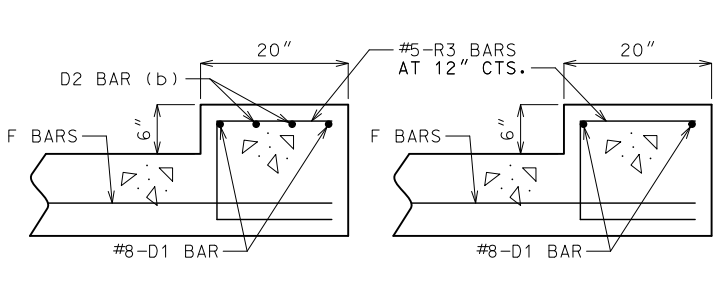
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



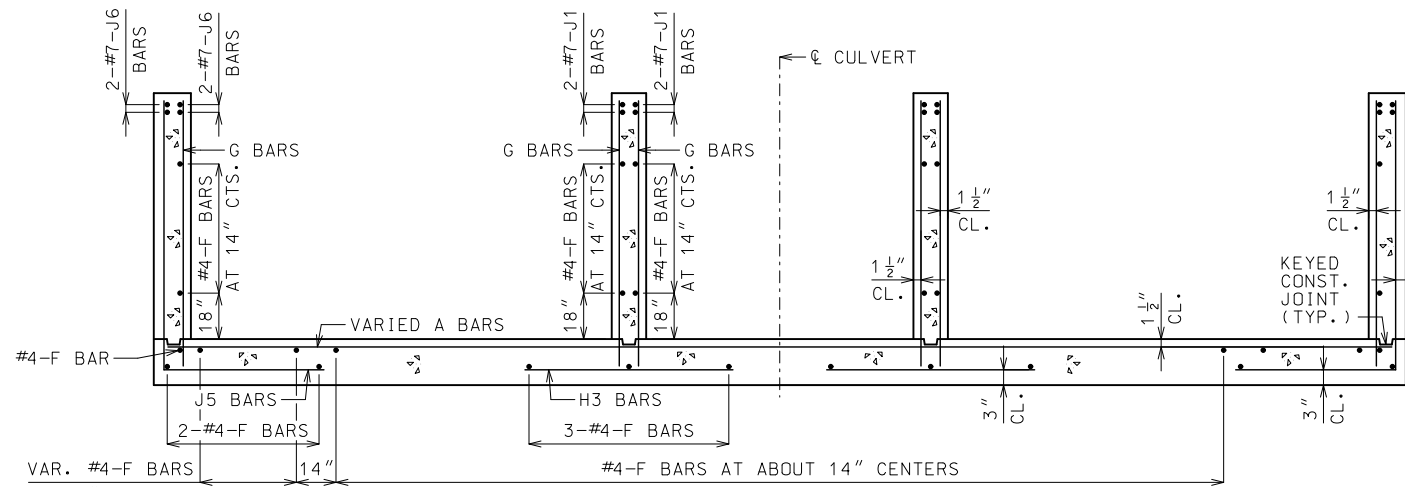
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



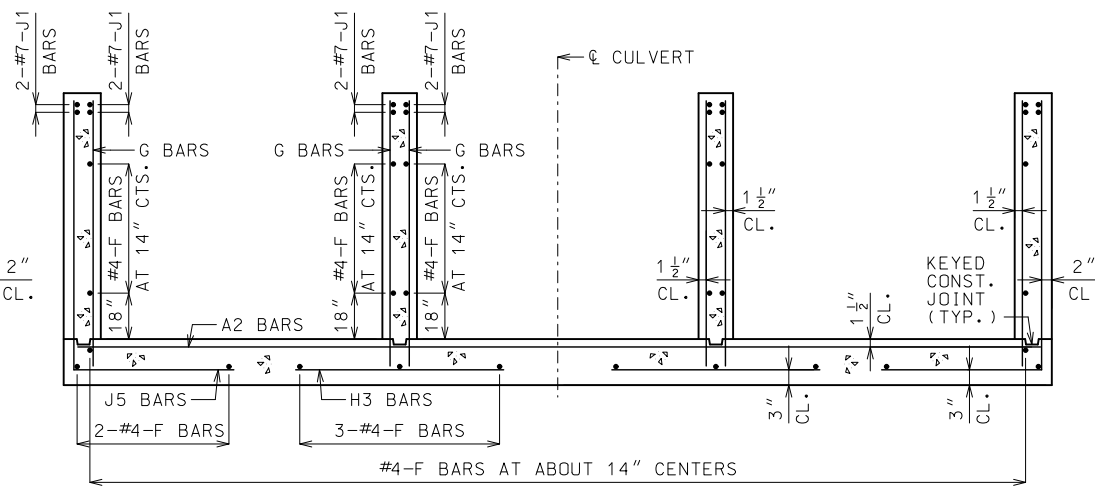
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL

(b) NOT REQUIRED FOR CLEAR SPANS  $\leq 10'-0"$   
#8 FOR CLEAR SPAN  $> 10'-0"$   
#9 FOR CLEAR SPAN  $> 13'-0"$

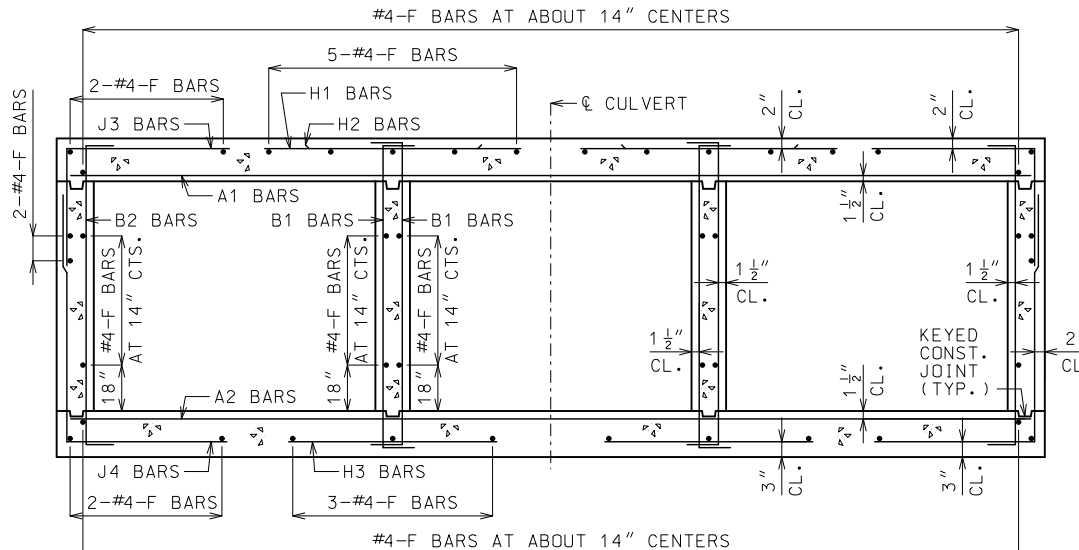
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF  $\phi$  WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



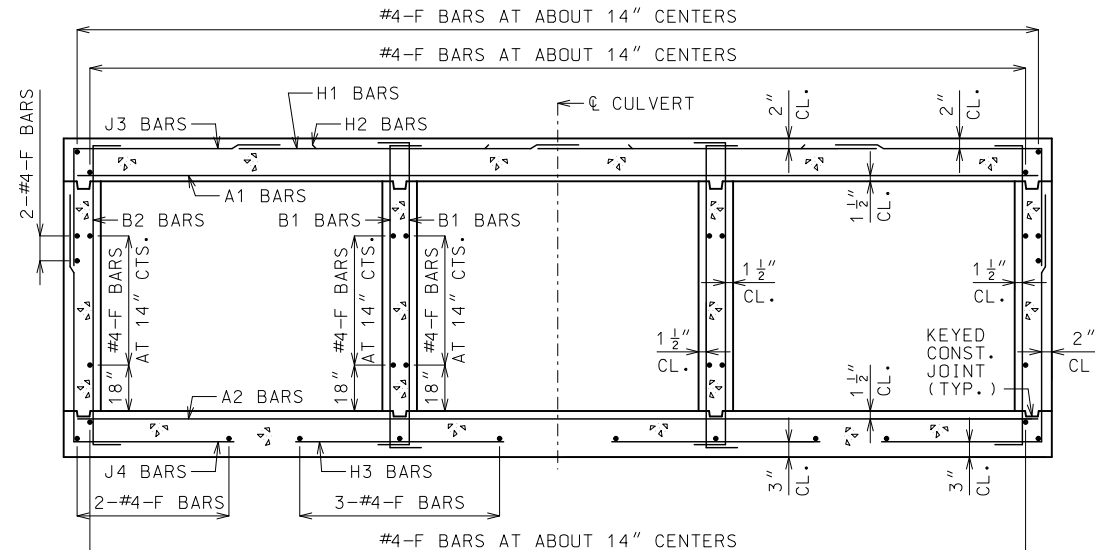
**UPSTREAM FLARED WINGS REINFORCEMENT**



**DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS

**GENERAL NOTES:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.  
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO  $\phi$  CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.  
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.  
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}"$ .

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	<b>CONCRETE TRIPLE BOX CULVERT</b> SKEW: SQUARED WINGS: FLARED SECTIONS	
	DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.81H</b> SHEET NO. 3 OF 3

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

**LAYING OUT TRANSVERSE JOINTS**

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

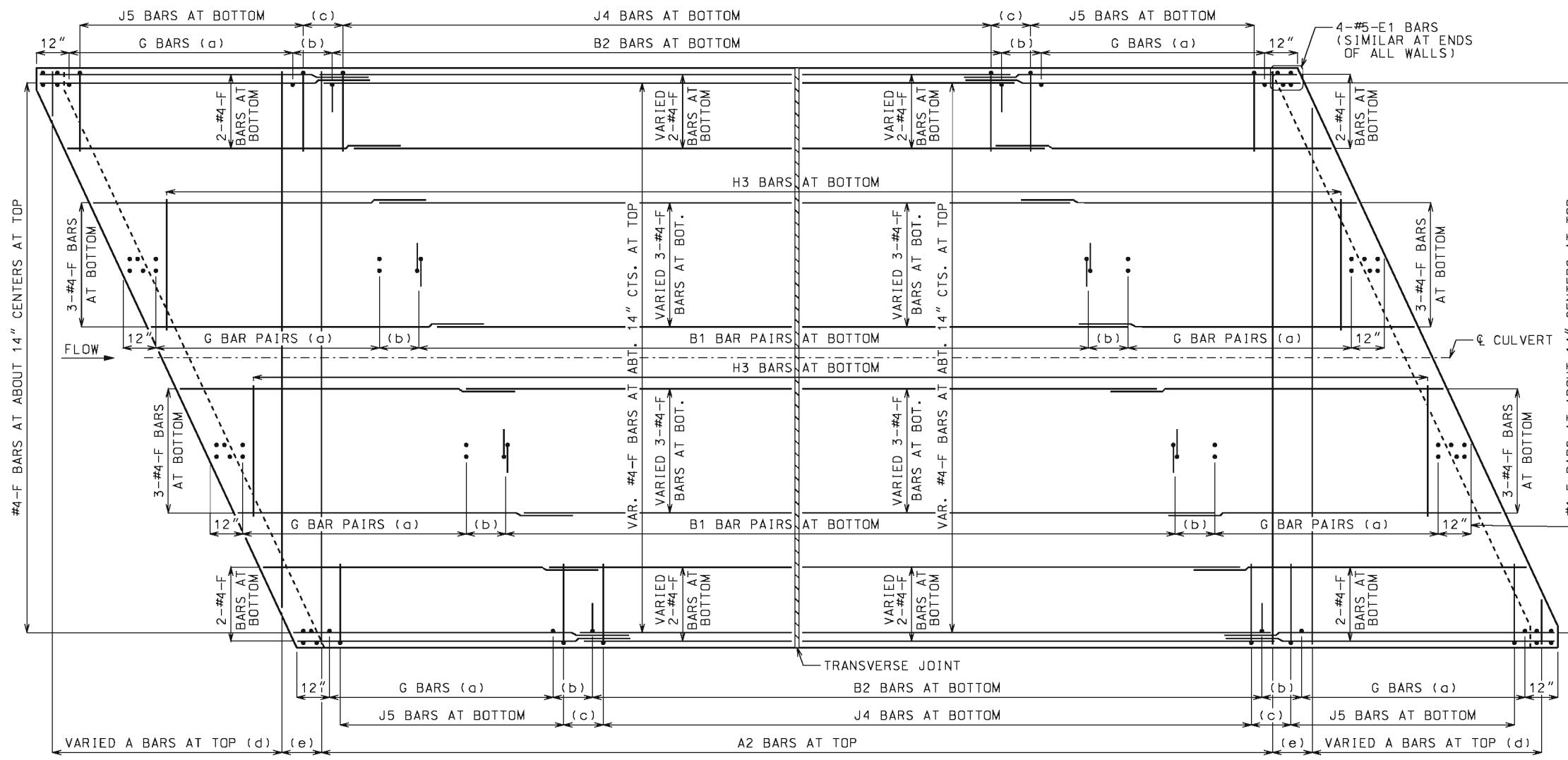
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

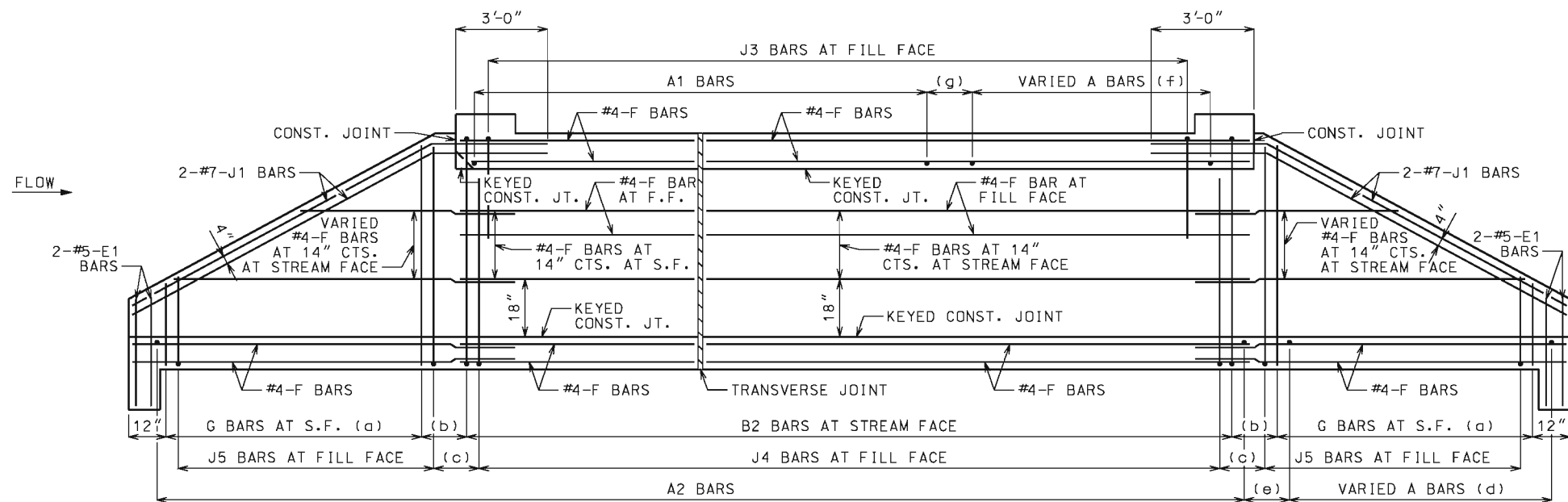
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.



**PLAN OF BOTTOM SLAB**



**ELEVATION OF EXTERIOR WALL**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

END OF WALL (TYP.) (NOT SHOWN)

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

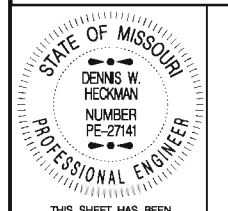
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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



**CONCRETE TRIPLE BOX CULVERT**

**SKEW: LEFT ADVANCE  
WINGS: STRAIGHT**

**REINFORCEMENT**

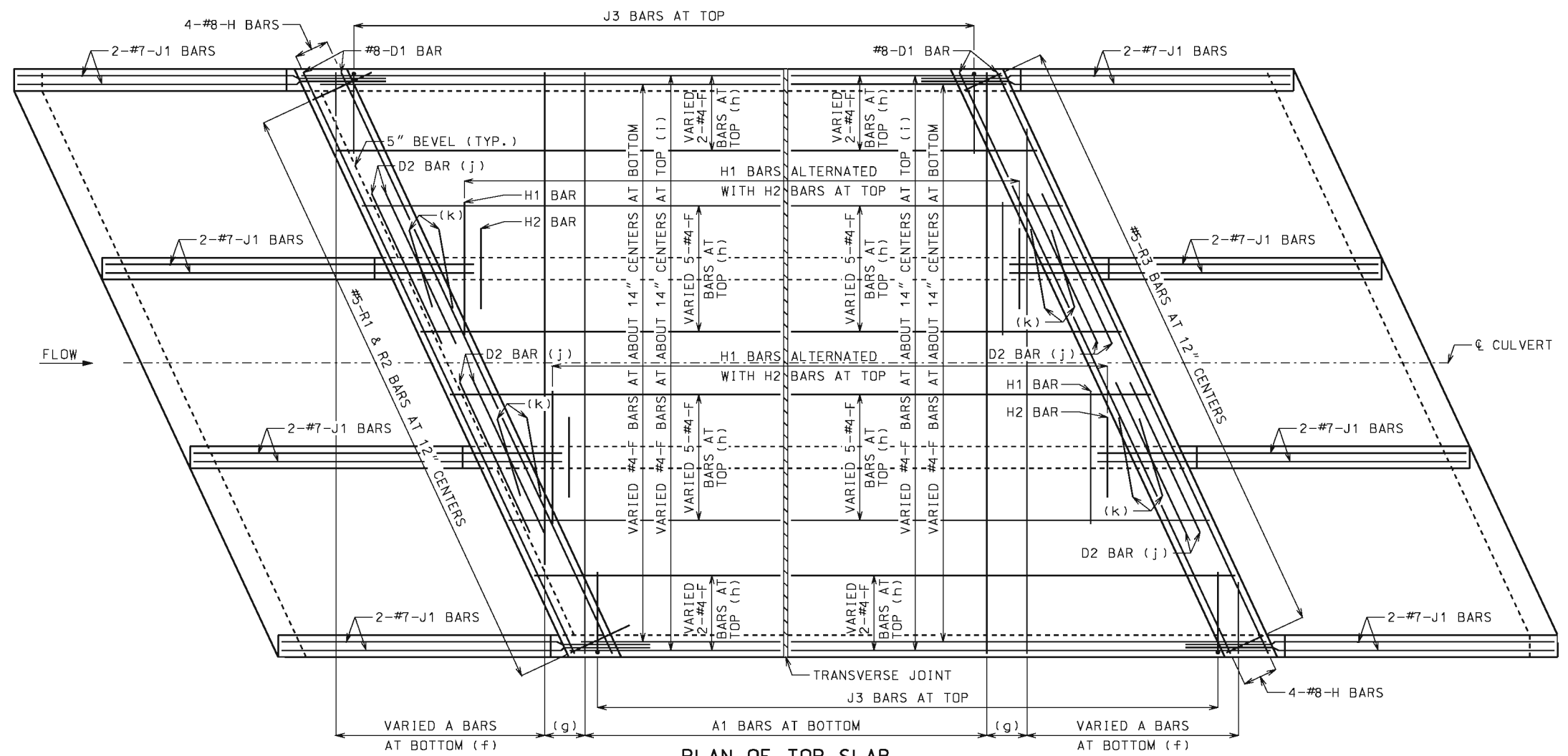
DATE EFFECTIVE: 12/01/2011  
DATE PREPARED: 5/13/2015

**703.82H**

SHEET NO.  
**1 OF 3**

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

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



**PLAN OF TOP SLAB**

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

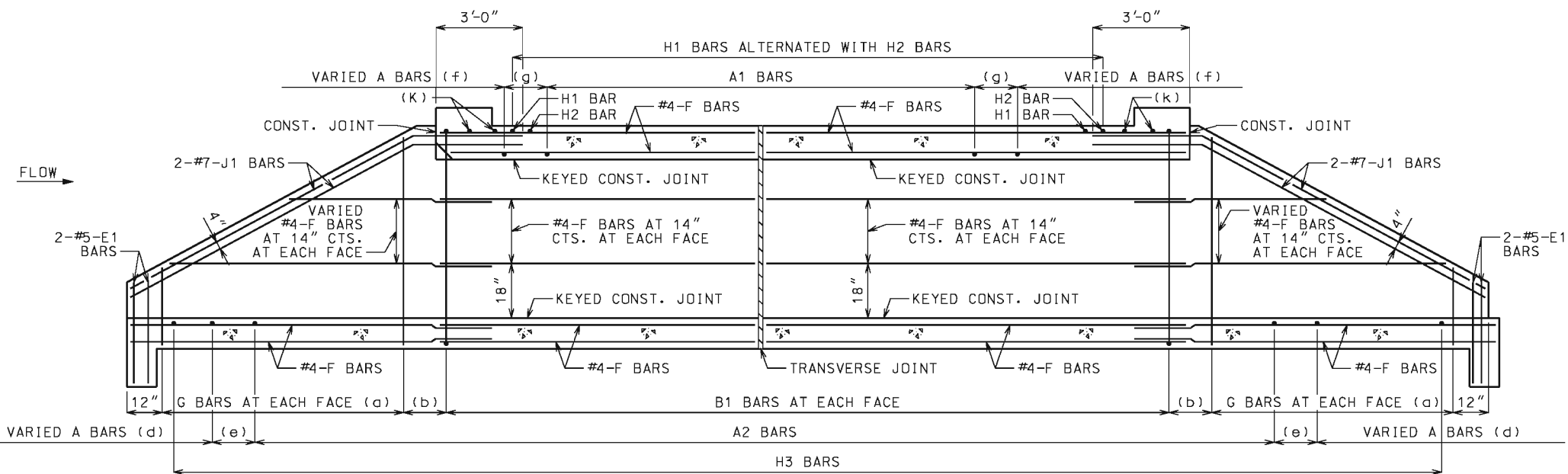
(i) FOR DESIGN FILLS 2'-0" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"



IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

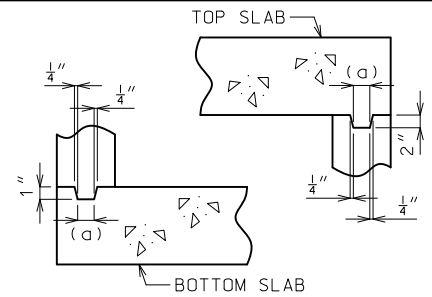
(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



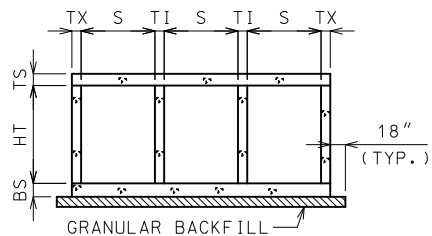
**SECTION NEAR INTERIOR WALL**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

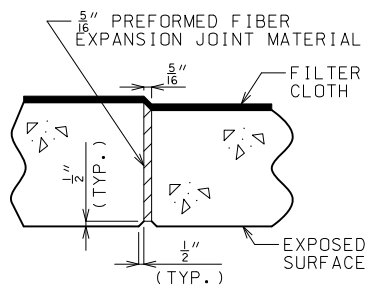
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: STRAIGHT <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015	<b>703.82H</b> SHEET NO. 2 OF 3



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



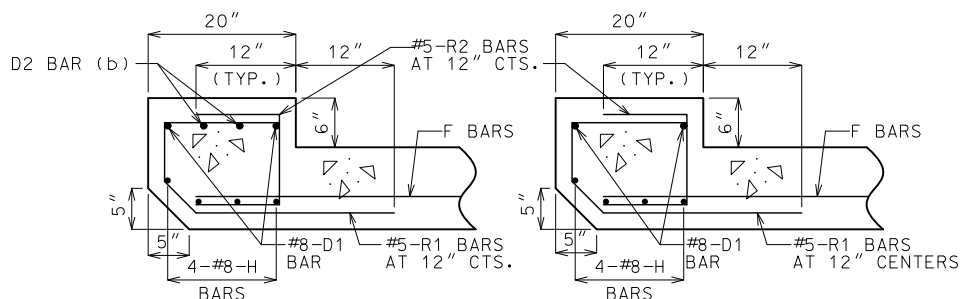
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



**TRANSVERSE JOINT THRU BARREL**

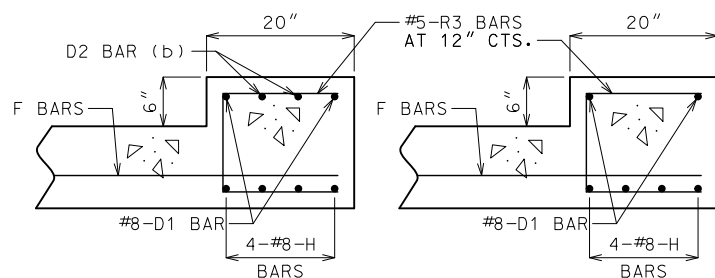
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL

**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN

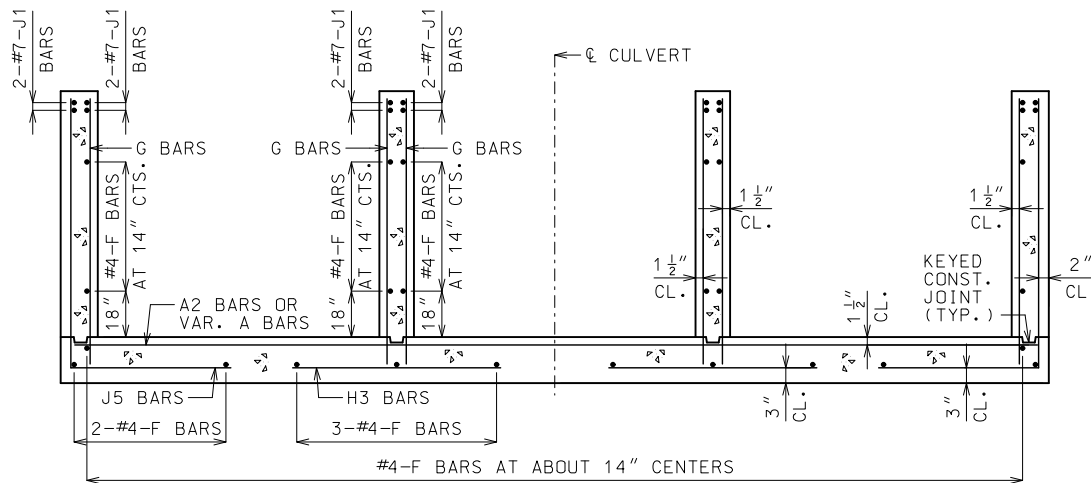


**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL

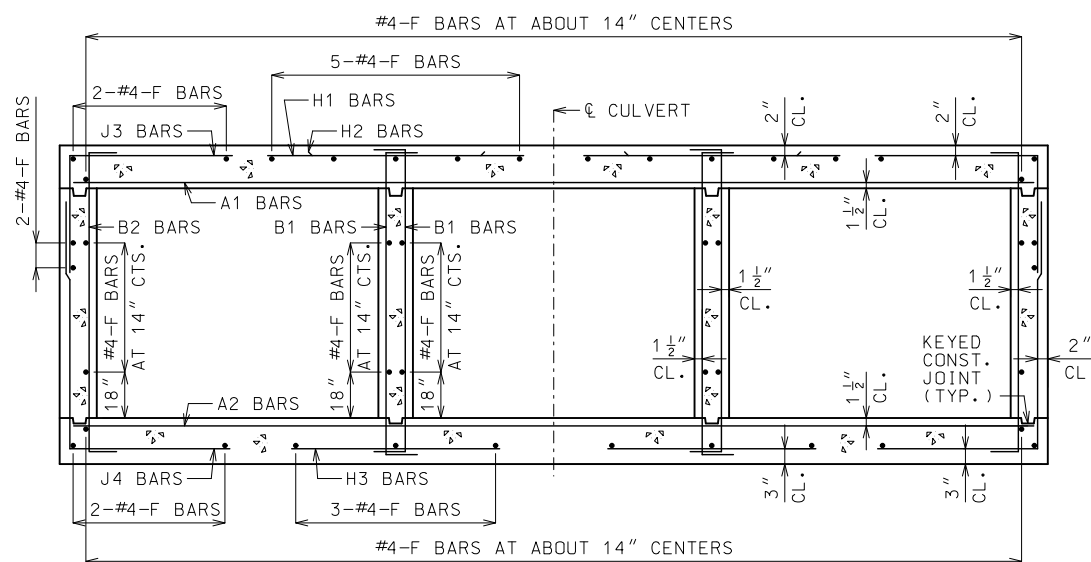
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS  $\leq 10'-0"$   
#8 FOR CLEAR SPAN  $> 10'-0"$   
#9 FOR CLEAR SPAN  $> 13'-0"$

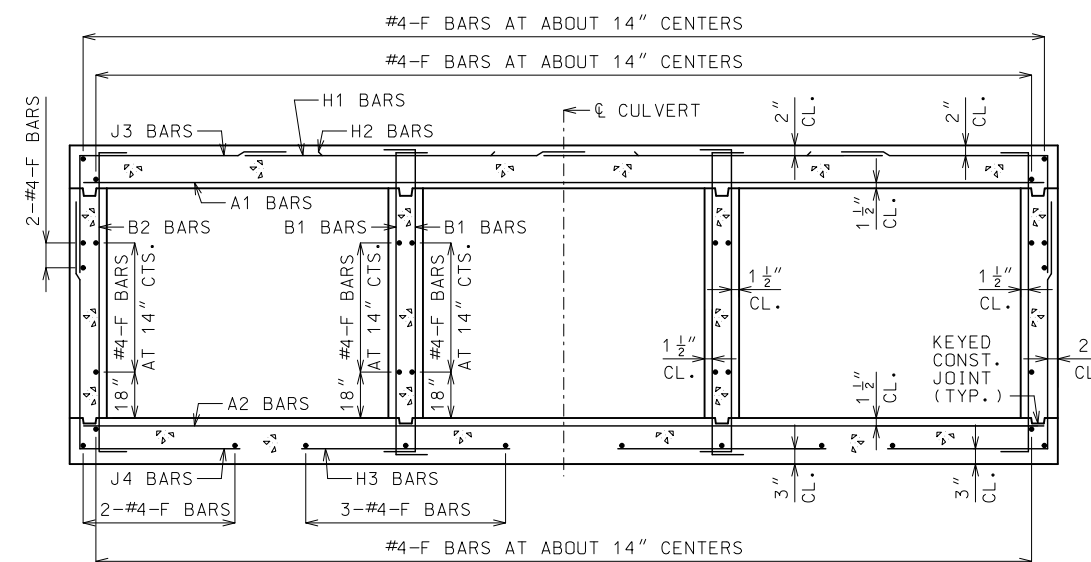
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF  $\phi$  WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO  $\phi$  CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}"$ .

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

STATE OF MISSOURI  
DENNIS W. HECKMAN  
NUMBER PE-27141  
PROFESSIONAL ENGINEER

**CONCRETE TRIPLE BOX CULVERT**  
SKEW: LEFT ADVANCE  
WINGS: STRAIGHT

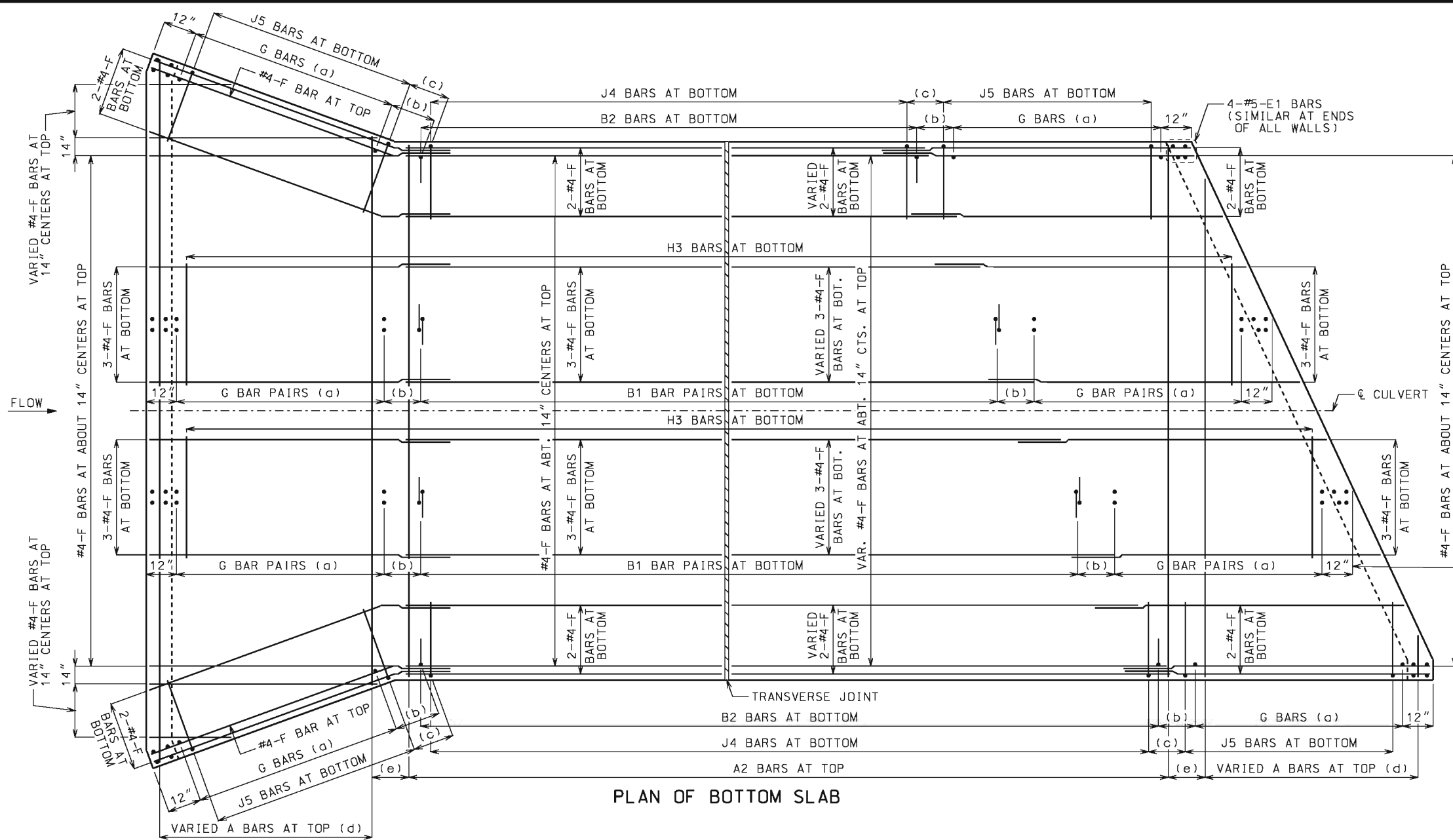
SECTIONS

DATE EFFECTIVE: 01/01/2021  
DATE PREPARED: 10/14/2020

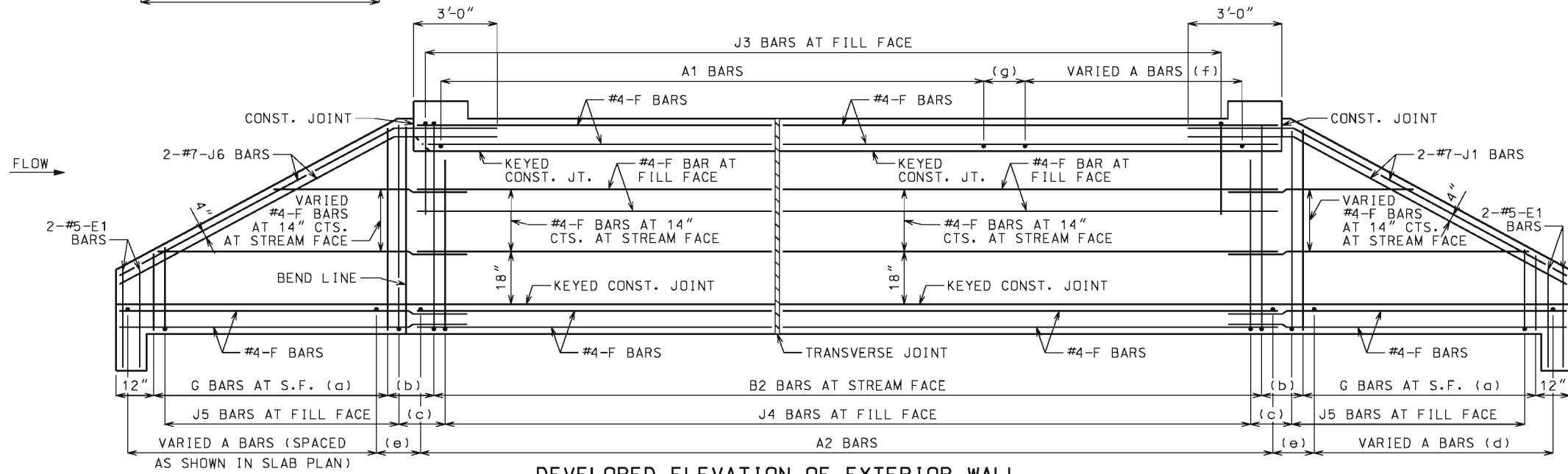
**703.82H**

SHEET NO.  
3 OF 3

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



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

END OF WALL (TYP.) (NOT SHOWN)

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

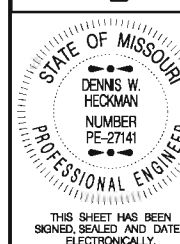
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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



DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015

CONCRETE TRIPLE BOX CULVERT

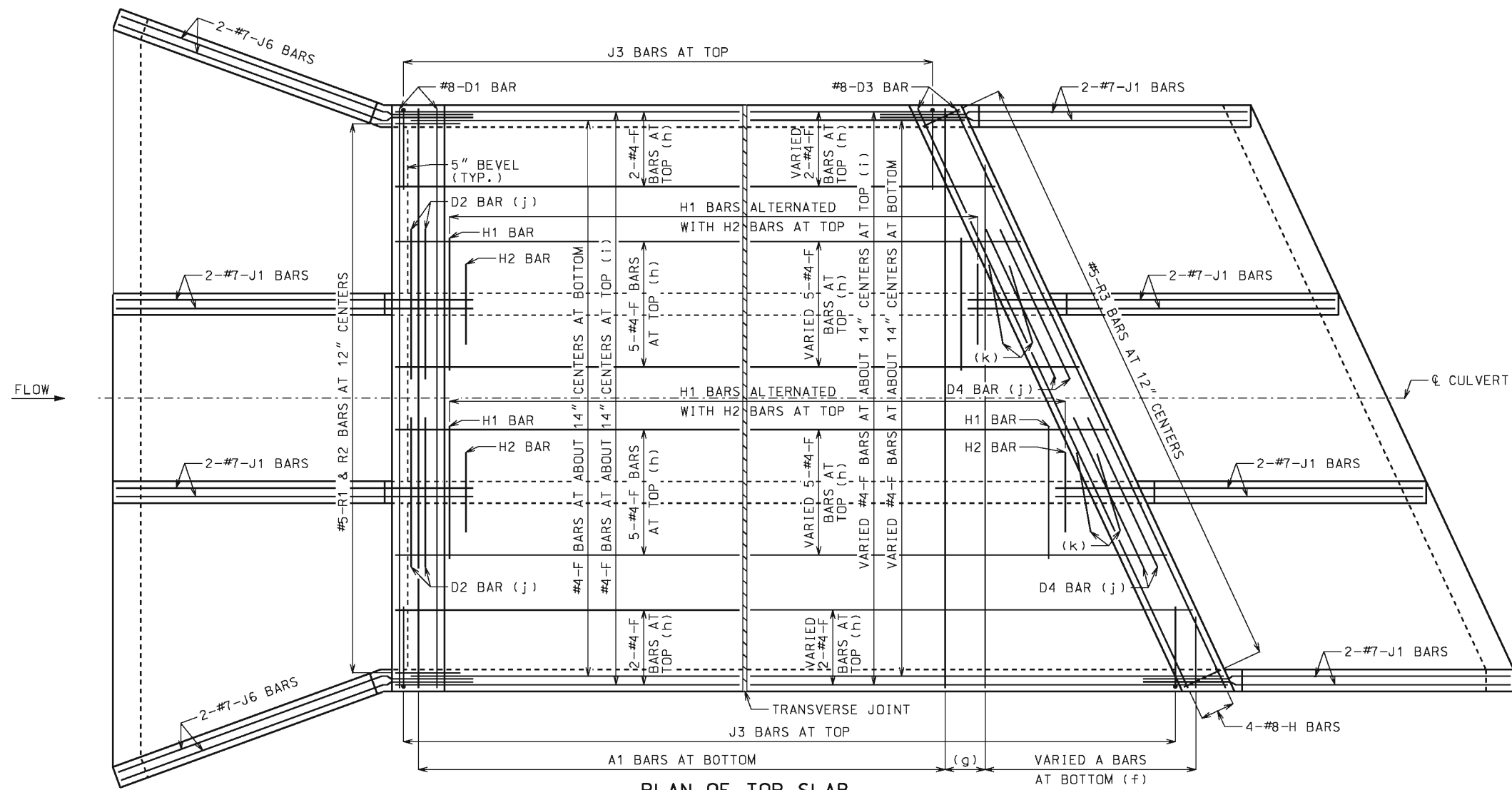
SKEW: LEFT ADVANCE WINGS: FLARED

REINFORCEMENT

703.83H

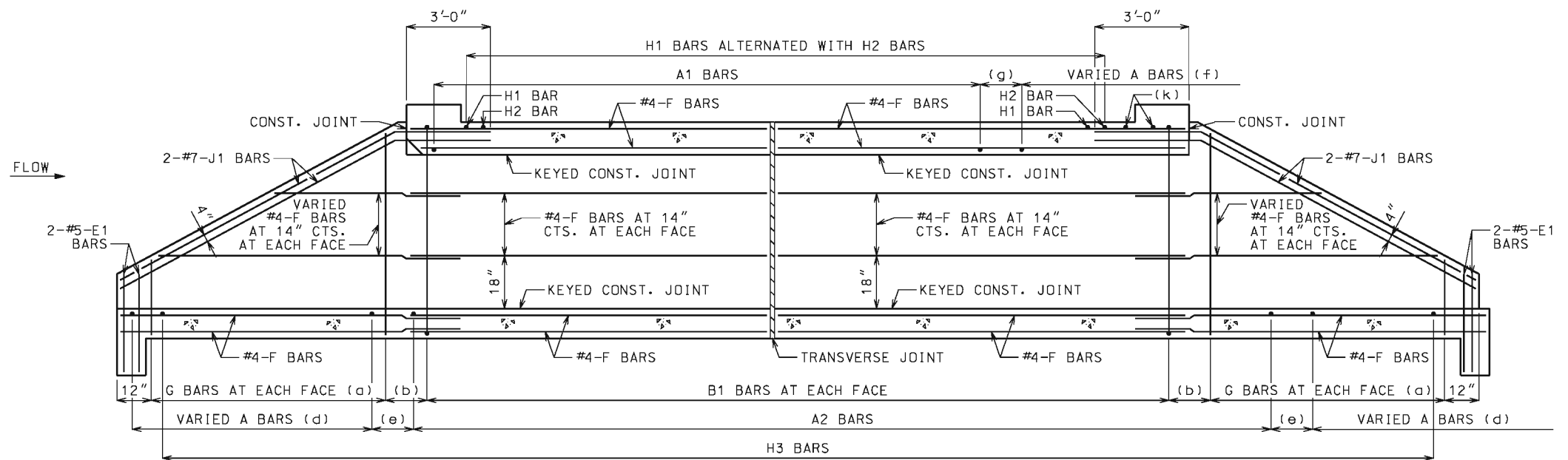
SHEET NO. 1 OF 3

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



**PLAN OF TOP SLAB**

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#8 FOR CLEAR SPAN > 10'-0"

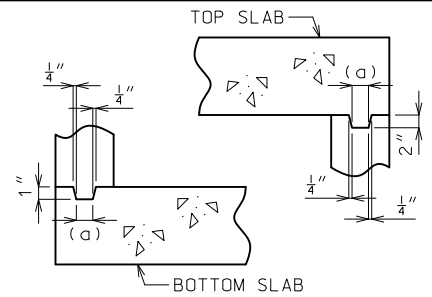
#9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

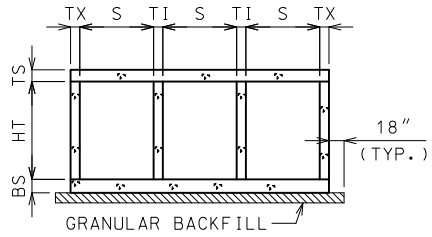
(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> SKEW: LEFT ADVANCE WINGS: FLARED <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015	<b>703.83H</b> SHEET NO. 2 OF 3

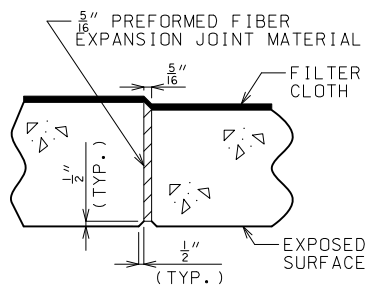
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



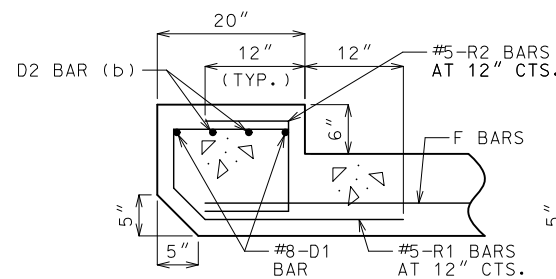
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



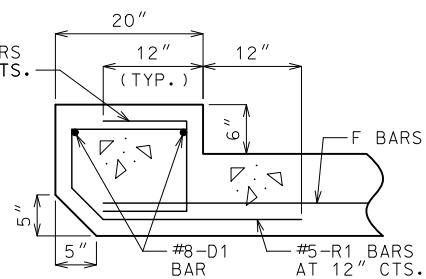
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

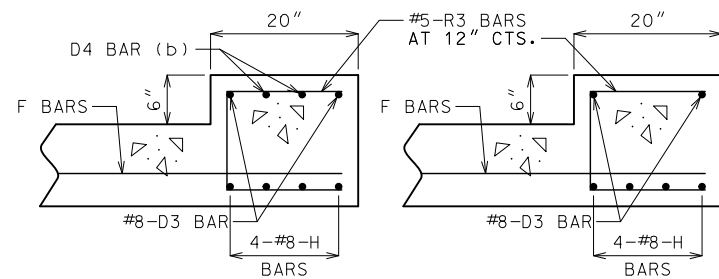
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



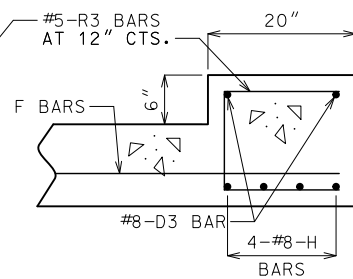
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



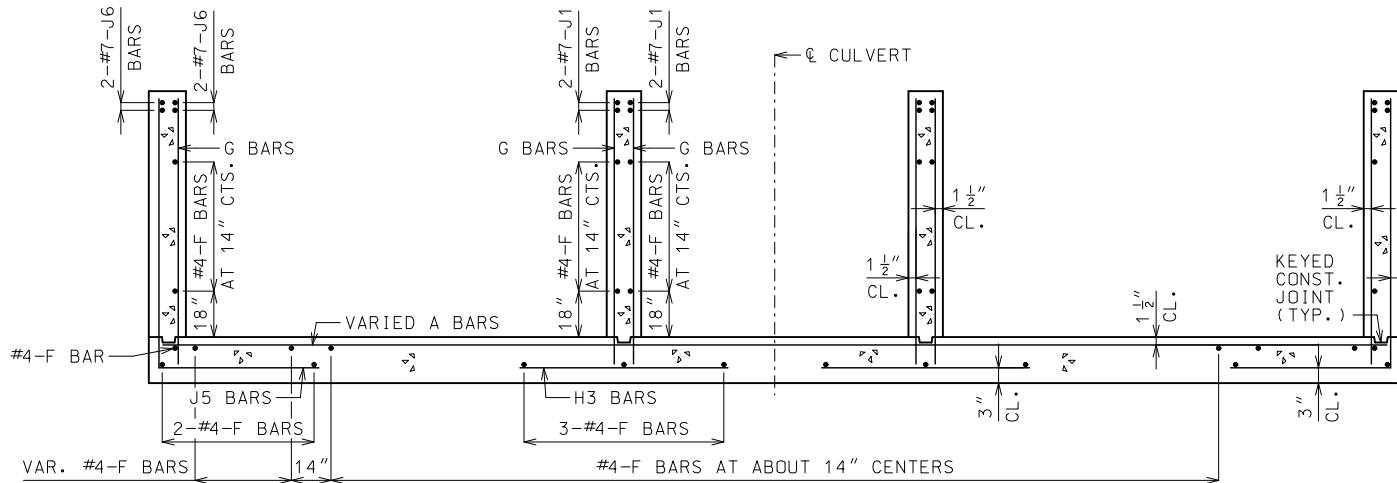
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



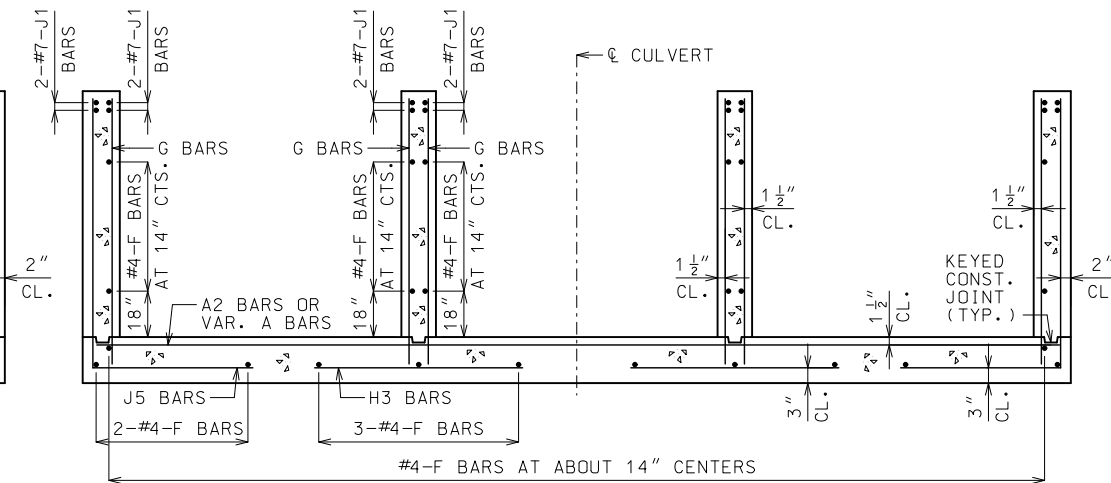
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



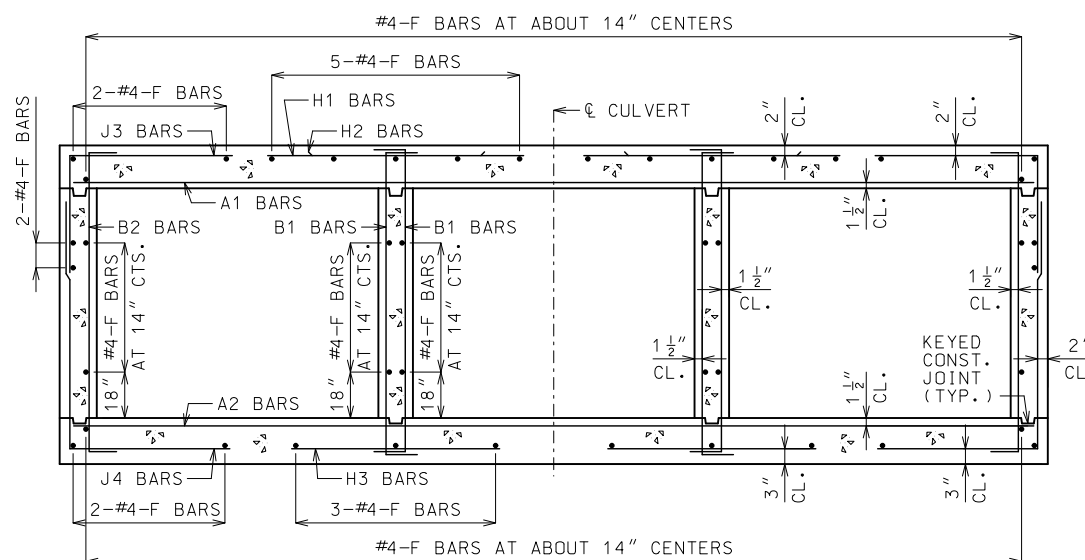
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



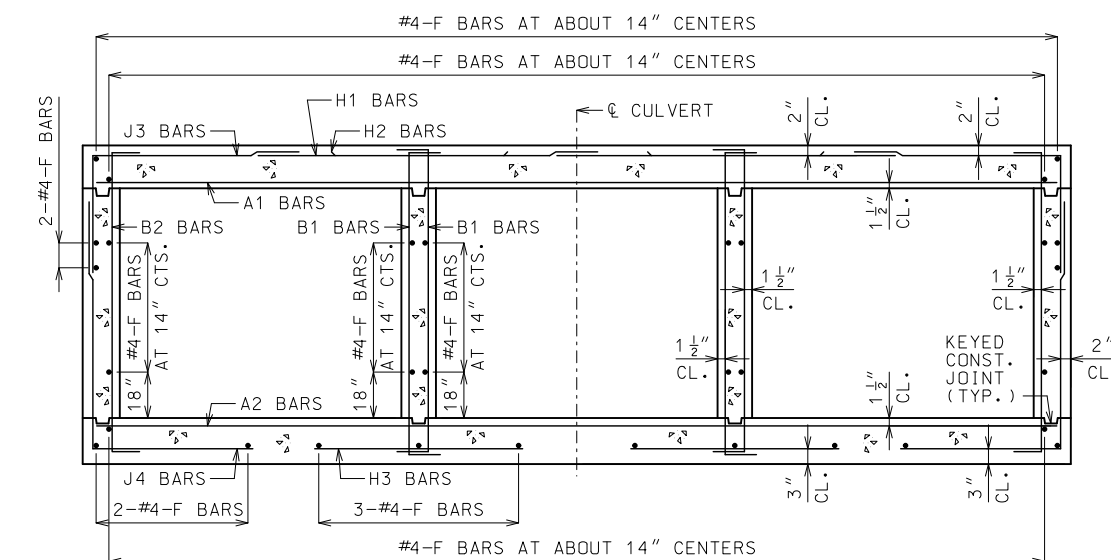
**UPSTREAM FLARED WINGS REINFORCEMENT**



**DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

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

STATE OF MISSOURI  
DENNIS W. HECKMAN  
NUMBER PE-27141  
PROFESSIONAL ENGINEER

**CONCRETE TRIPLE BOX CULVERT**  
SKEW: LEFT ADVANCE  
WINGS: FLARED

SECTIONS

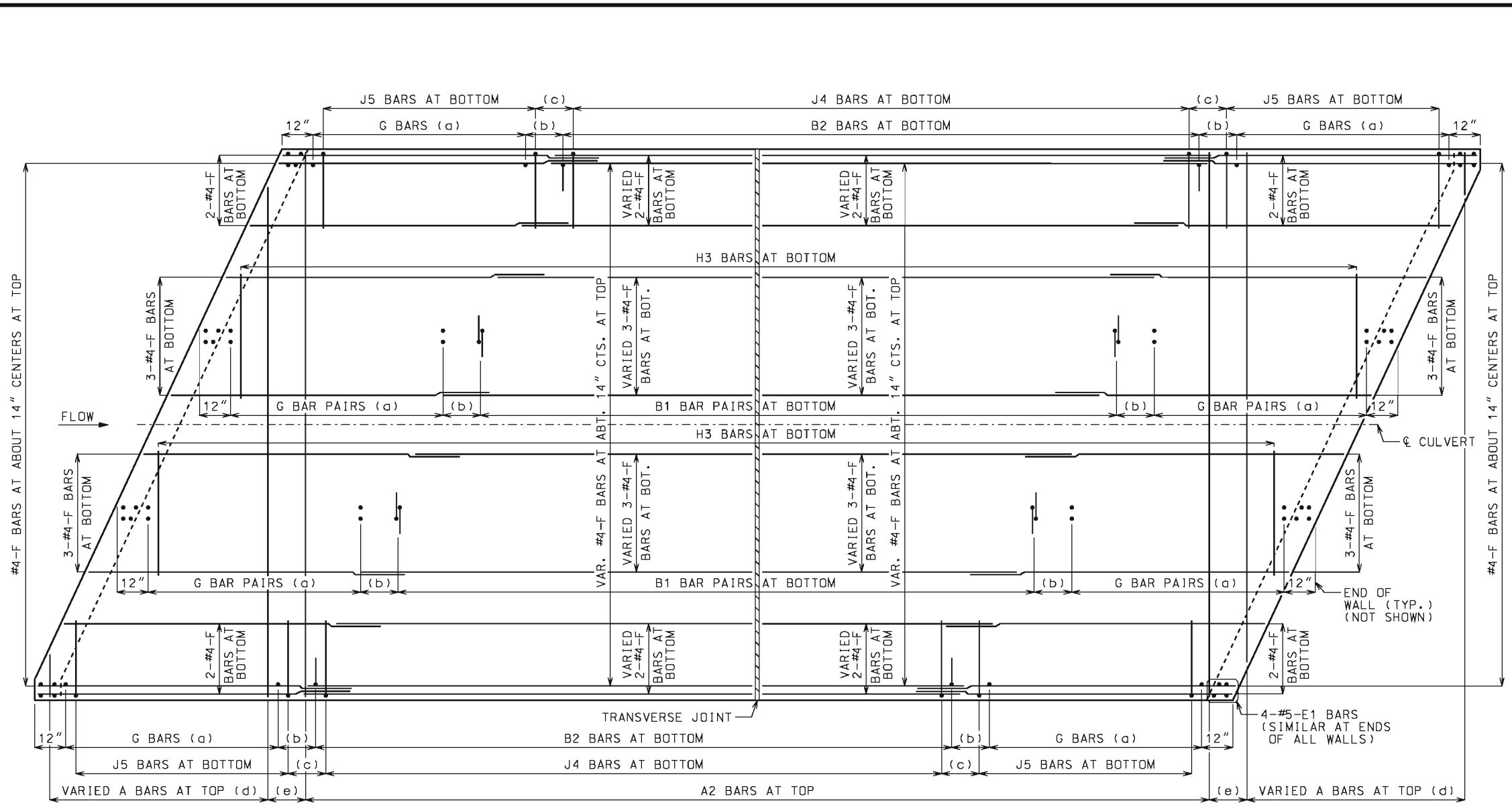
DATE EFFECTIVE: 01/01/2021  
DATE PREPARED: 10/14/2020

**703.83H**

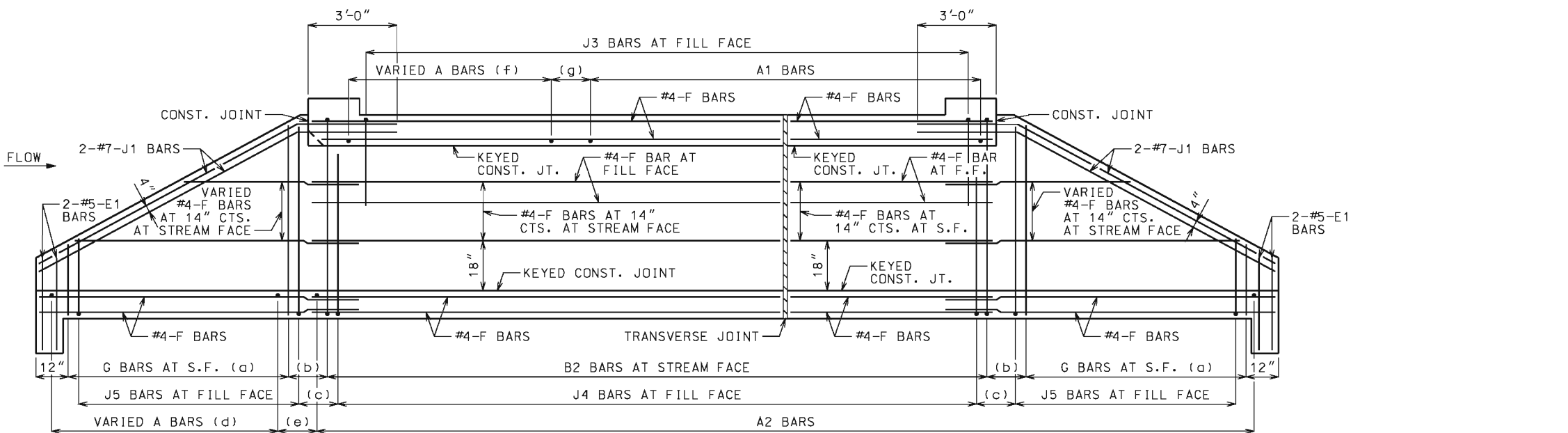
SHEET NO.  
3 OF 3

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





PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

- BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT
- CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

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STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

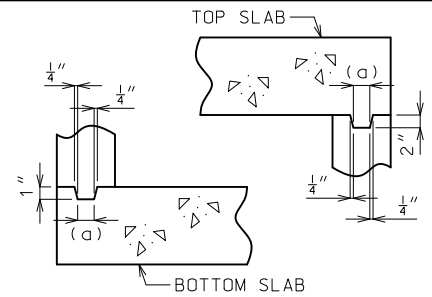
DATE EFFECTIVE: 12/01/2011  
 DATE PREPARED: 5/13/2015

**CONCRETE TRIPLE BOX CULVERT**  
 SKEW: RIGHT ADVANCE  
 WINGS: STRAIGHT  
 REINFORCEMENT

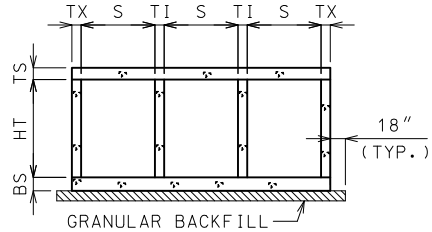
**703.84H**  
 SHEET NO. 1 OF 3

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

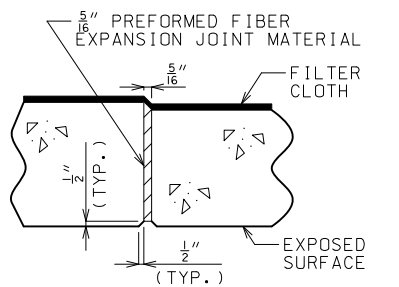




**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS

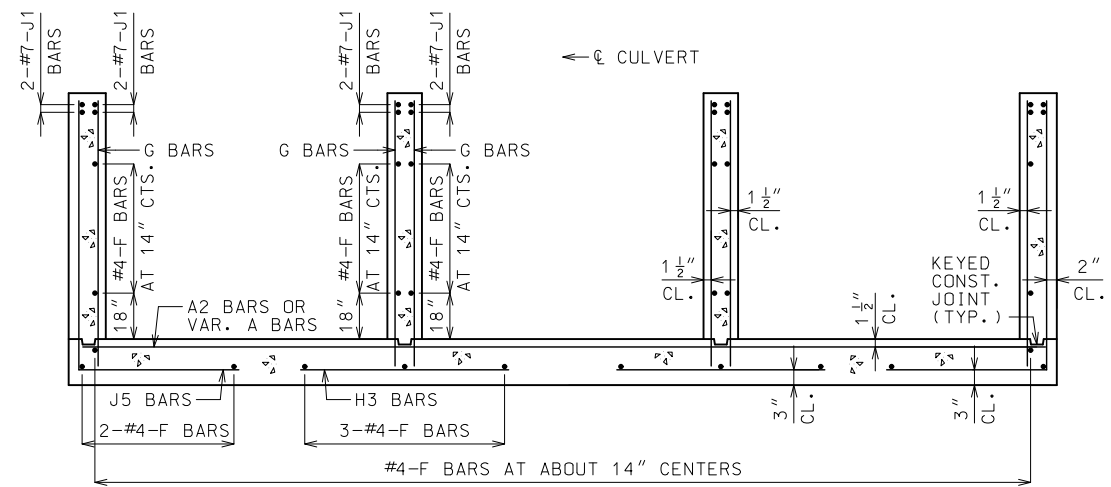


**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**

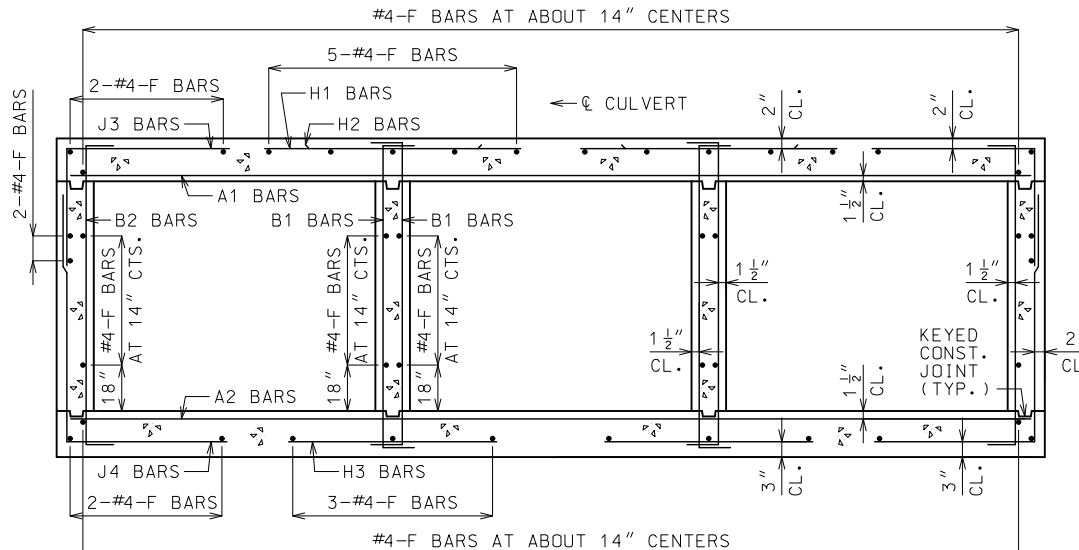


**TRANSVERSE JOINT THRU BARREL**  
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

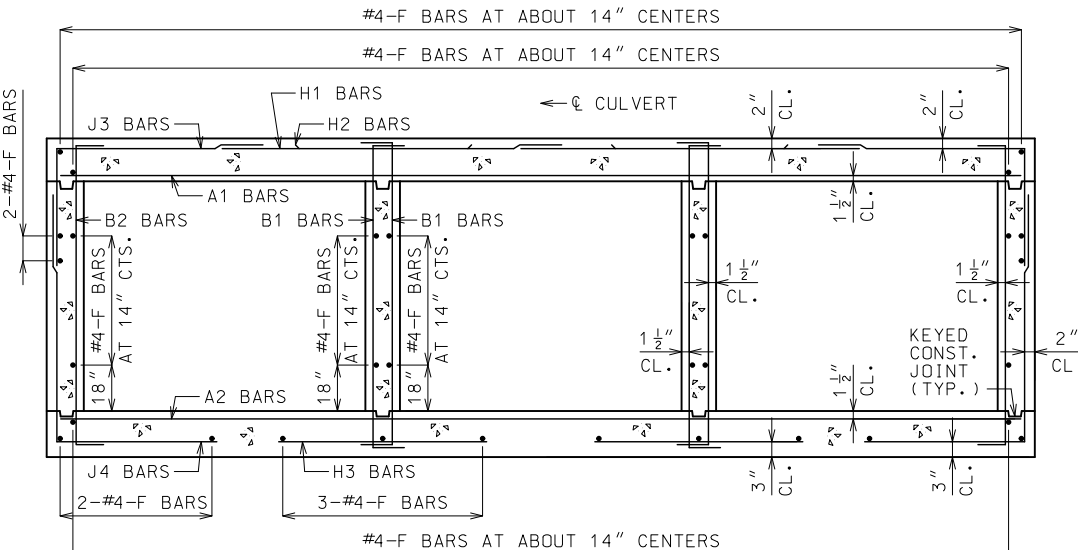
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



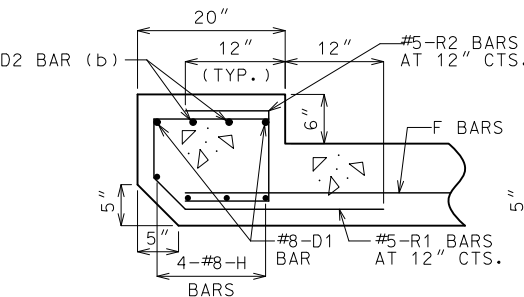
**UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT**



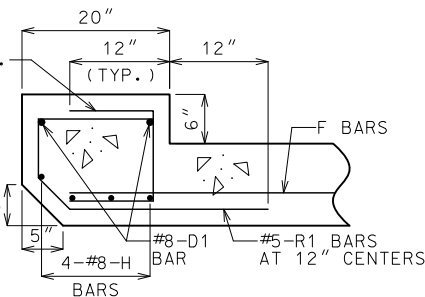
**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"



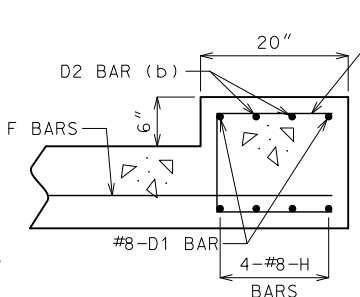
**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS



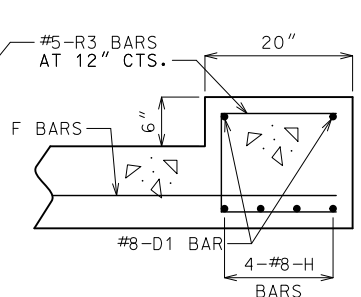
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN

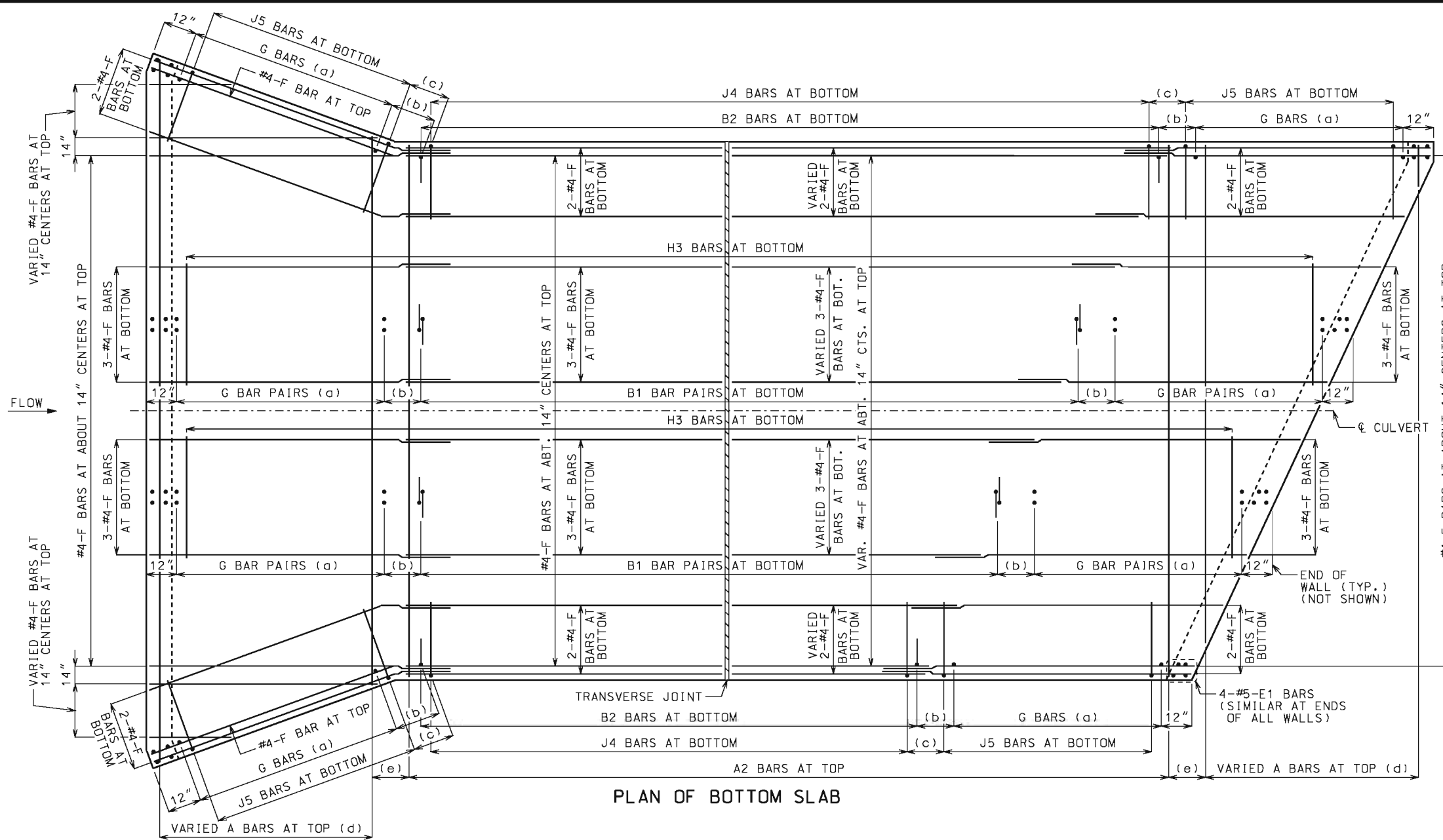
(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"  
#8 FOR CLEAR SPAN > 10'-0"  
#9 FOR CLEAR SPAN > 13'-0"

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF & CULVERT SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

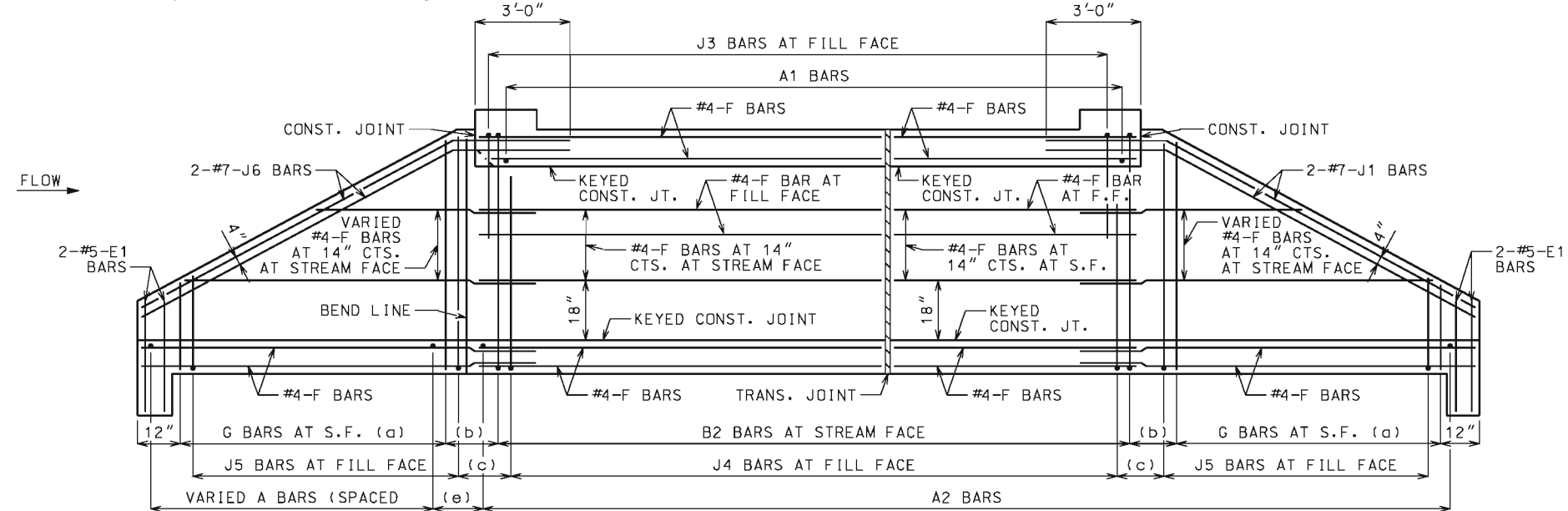
**GENERAL NOTES:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.  
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO & CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.  
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.  
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> SKEW: RIGHT ADVANCE WINGS: STRAIGHT  SECTIONS	
	DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.84H</b> SHEET NO. 3 OF 3

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



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

- BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT
- CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

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

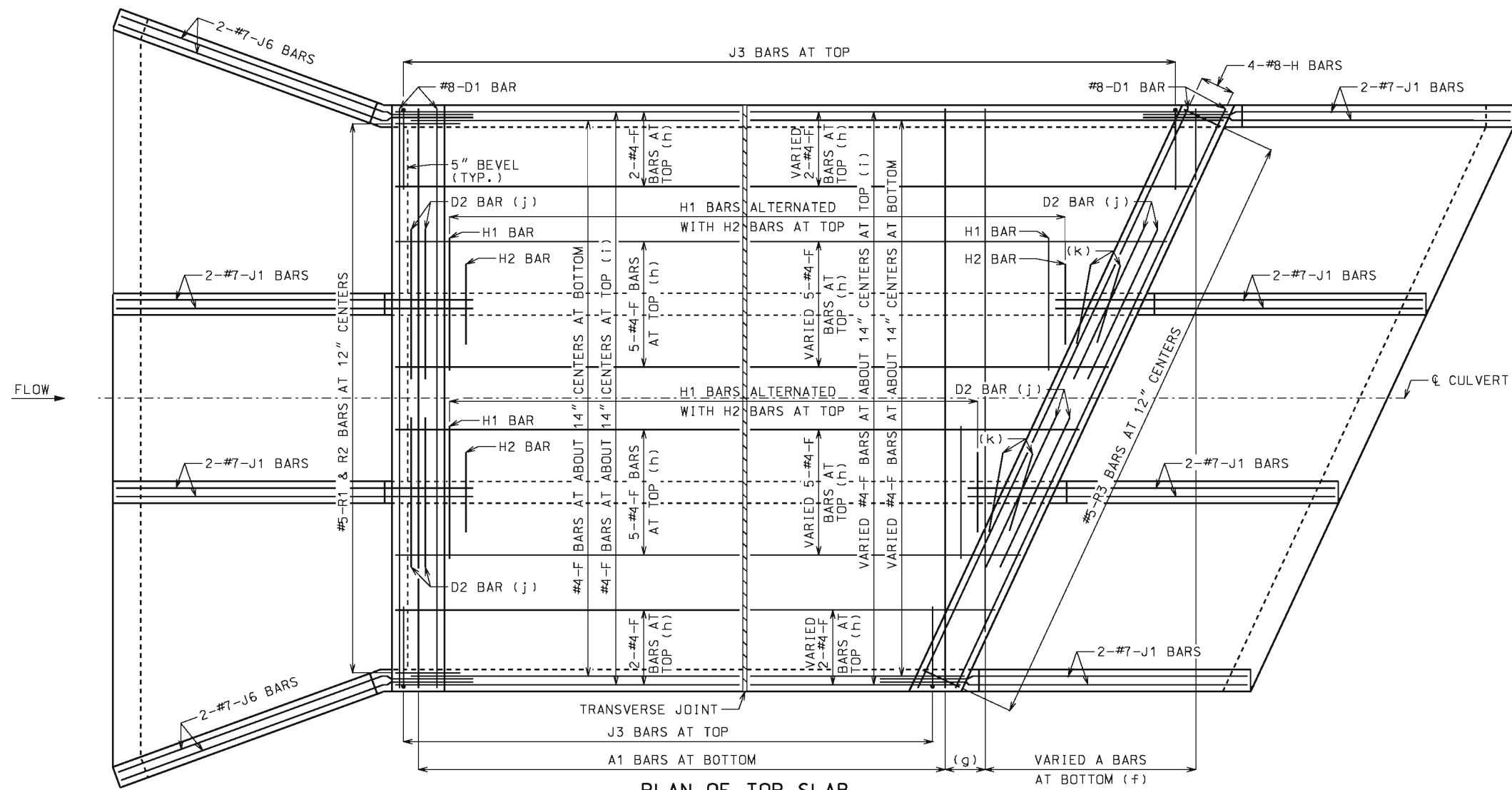
STATE OF MISSOURI  
 DENNIS W. HECKMAN  
 NUMBER PE-27141  
 PROFESSIONAL ENGINEER

DATE EFFECTIVE: 12/01/2011  
 DATE PREPARED: 5/13/2015

**CONCRETE TRIPLE BOX CULVERT**  
 SKEW: RIGHT ADVANCE  
 WINGS: FLARED  
 REINFORCEMENT

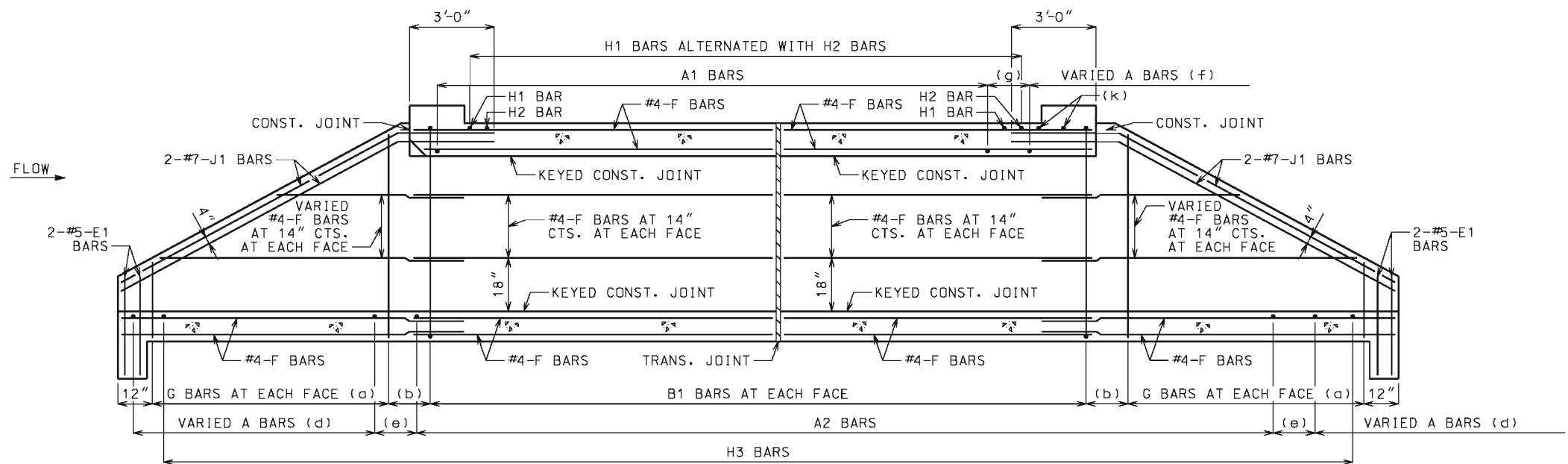
703.85C  
 SHEET NO. 1 OF 3

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



**PLAN OF TOP SLAB**

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



**SECTION NEAR INTERIOR WALL**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

**GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#8 FOR CLEAR SPAN > 10'-0"

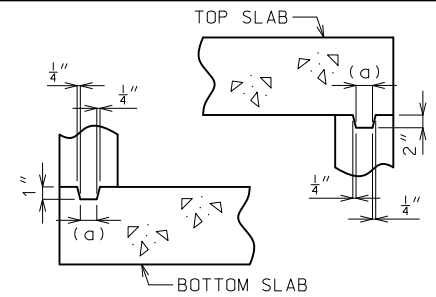
#9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CL WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

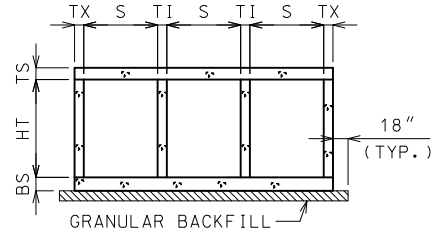
(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> SKEW: RIGHT ADVANCE WINGS: FLARED <b>REINFORCEMENT</b>	
	DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015	<b>703.85C</b> SHEET NO. 2 OF 3

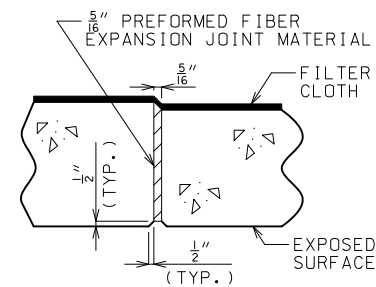
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



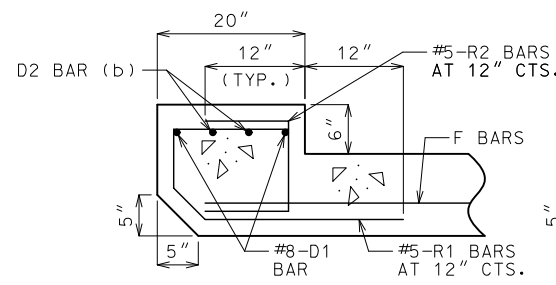
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



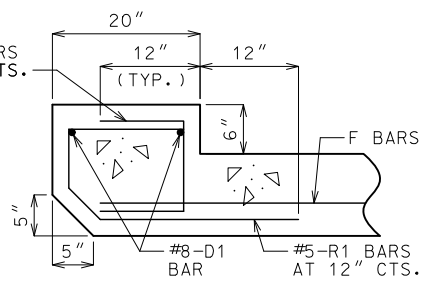
**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

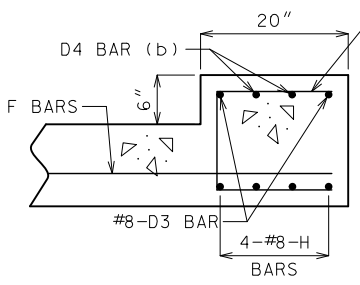
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



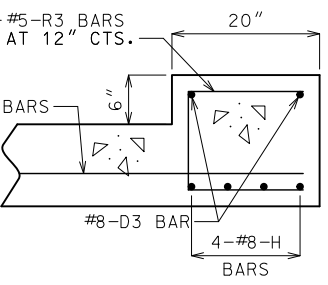
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



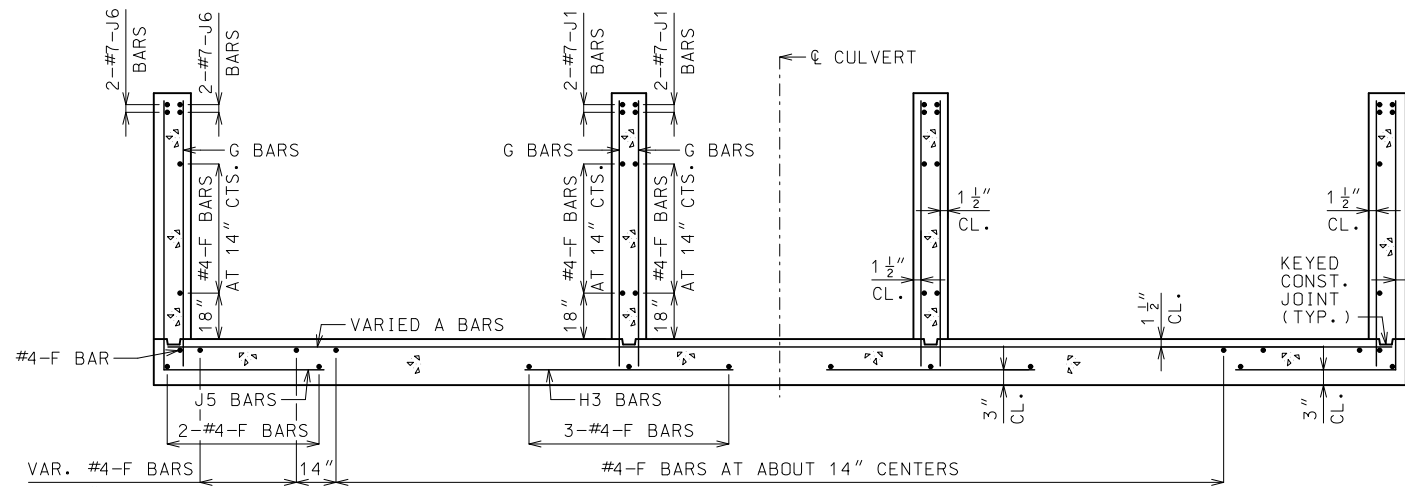
**UPSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



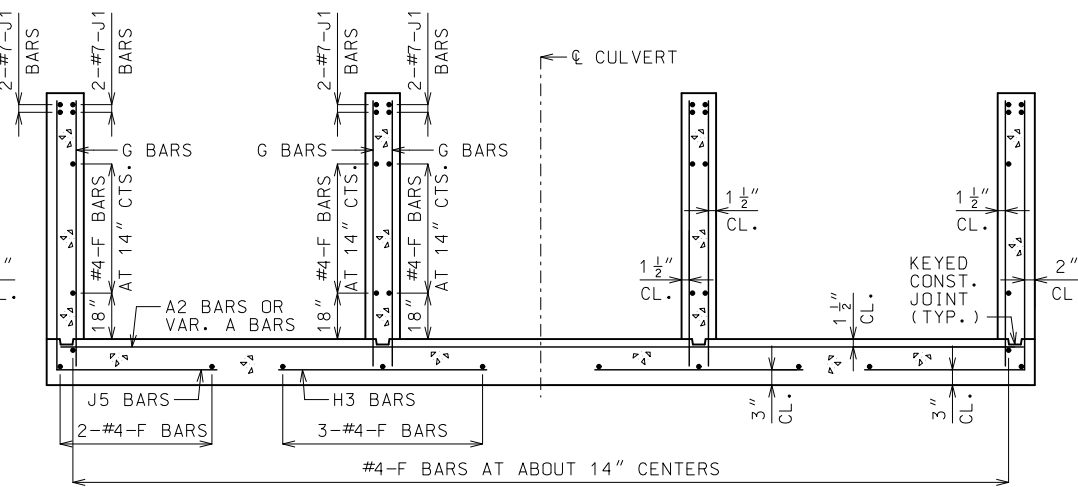
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR INTERIOR WALL



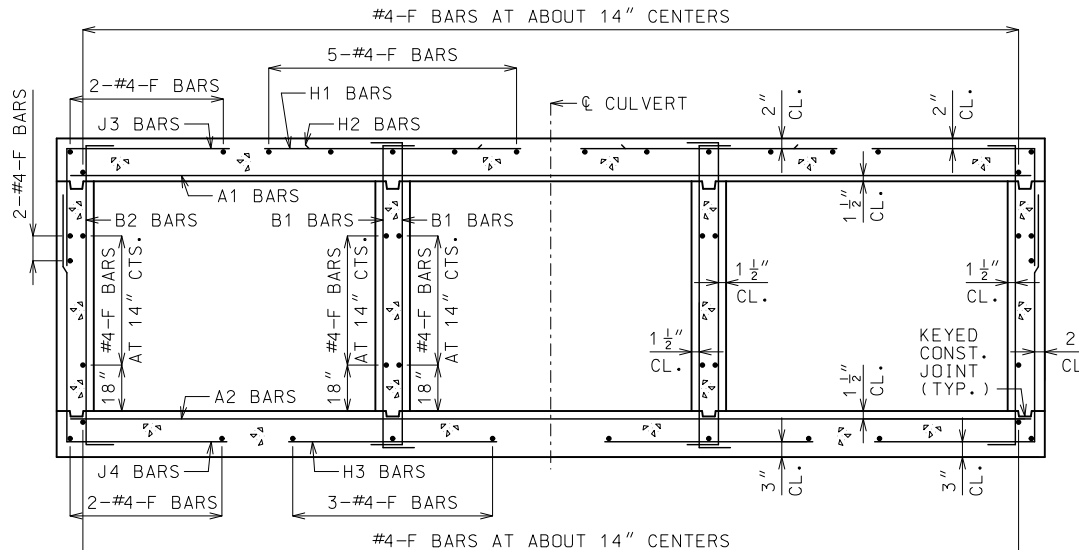
**DOWNSTREAM HEADWALL REINFORCEMENT**  
NEAR MIDSPAN



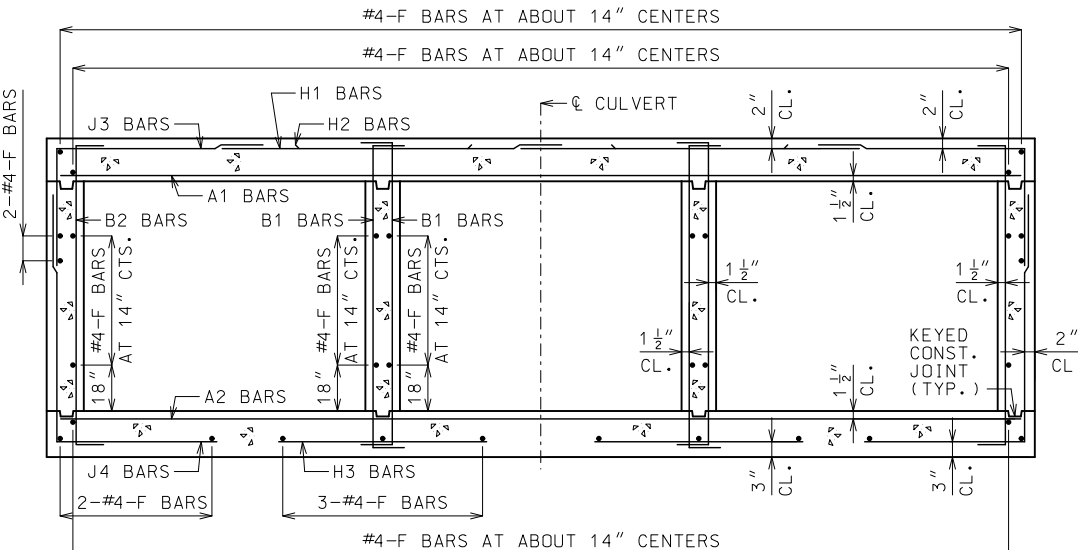
**UPSTREAM FLARED WINGS REINFORCEMENT**



**DOWNSTREAM WINGS REINFORCEMENT**



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS

**GENERAL NOTES:**

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

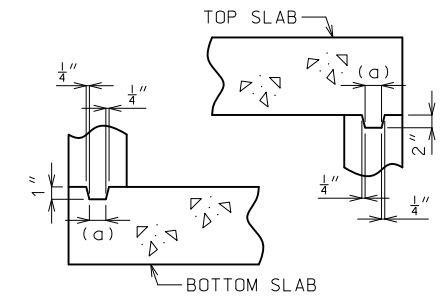
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	SKEW: RIGHT ADVANCE WINGS: FLARED	
<b>SECTIONS</b>		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.85C</b>	SHEET NO. <b>3 OF 3</b>

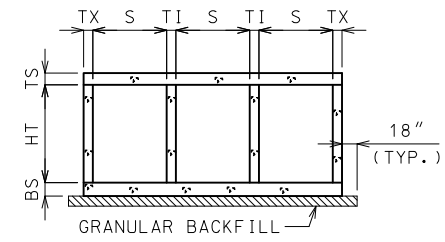
(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"  
 #8 FOR CLEAR SPAN > 10'-0"  
 #9 FOR CLEAR SPAN > 13'-0"

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

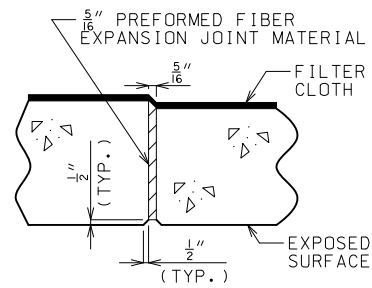
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**KEYED CONSTRUCTION JOINT**  
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



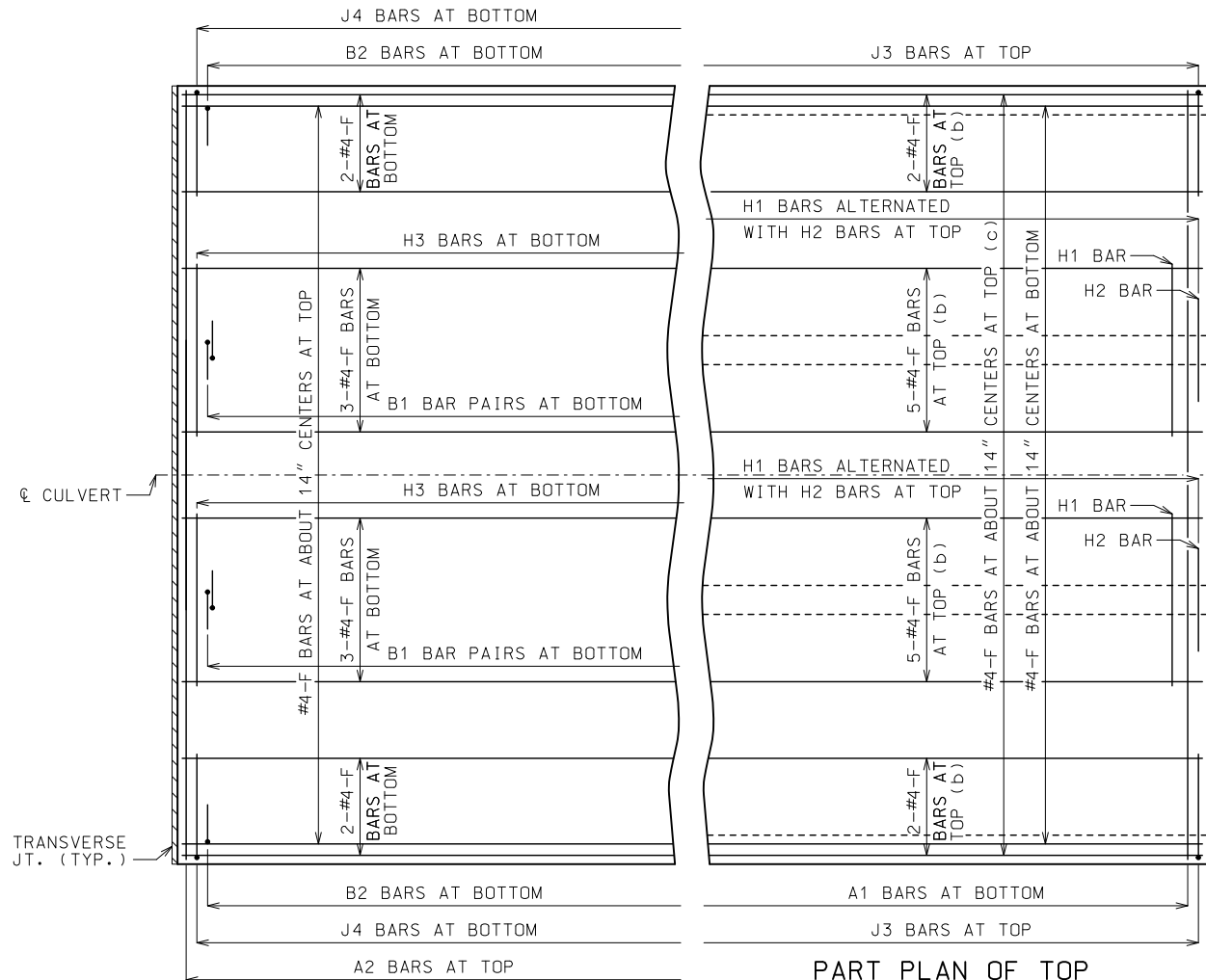
**GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS**



**TRANSVERSE JOINT THRU BARREL**

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

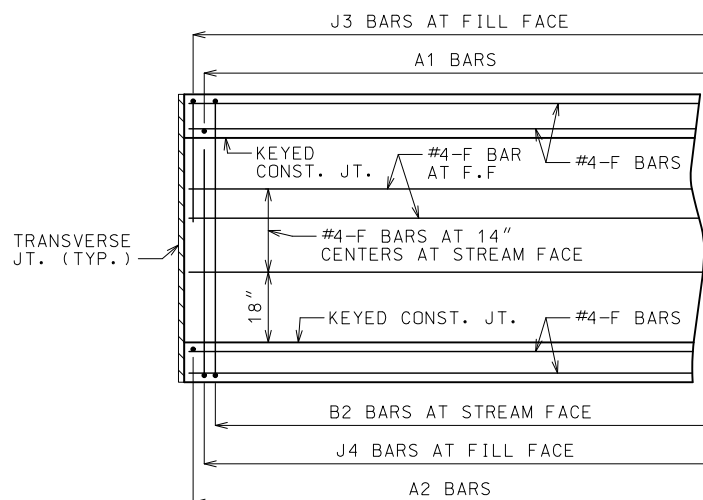
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



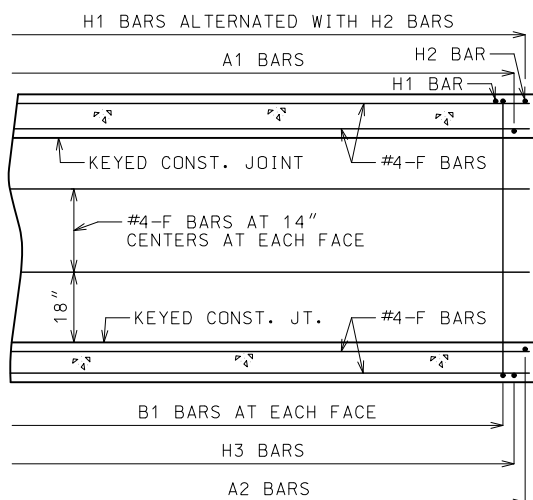
**PART PLAN OF BOTTOM SLAB REINFORCEMENT**

**PART PLAN OF TOP SLAB REINFORCEMENT**

(b) FOR DESIGN FILLS OVER 2'-0"  
(c) FOR DESIGN FILLS 2'-0" OR LESS



**PART ELEVATION OF EXTERIOR WALL REINFORCEMENT**



**PART SECTION NEAR INTERIOR WALL REINFORCEMENT**

**GENERAL NOTES**

**DESIGN SPECIFICATIONS:**  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

**DESIGN LOADING:**  
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

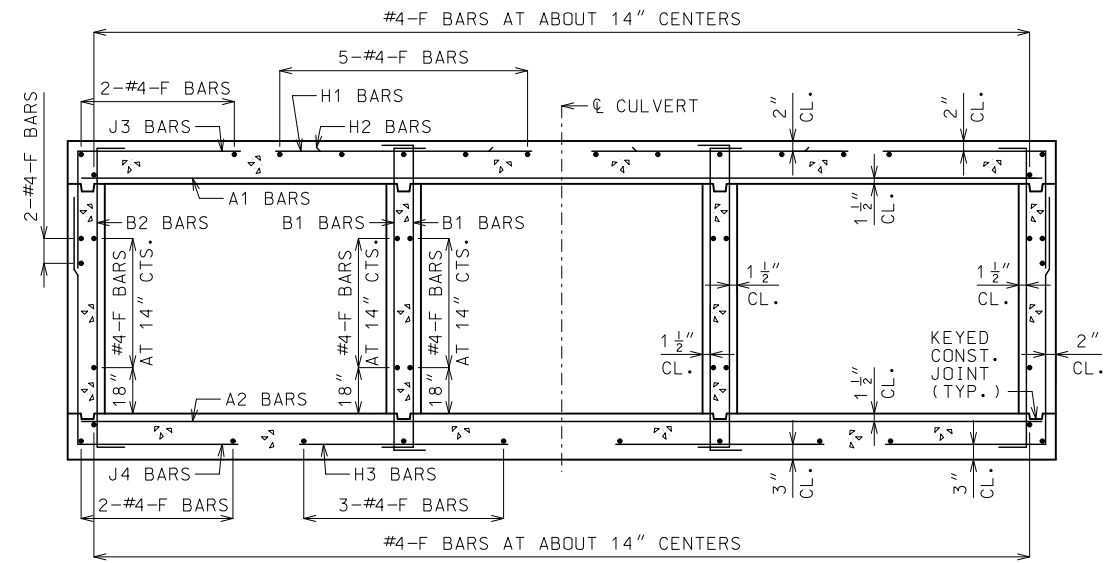
**DESIGN UNIT STRESSES:**  
CLASS B-1 CONCRETE (BOX CULVERT)  $f'_c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

**MISCELLANEOUS:**  
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.87.

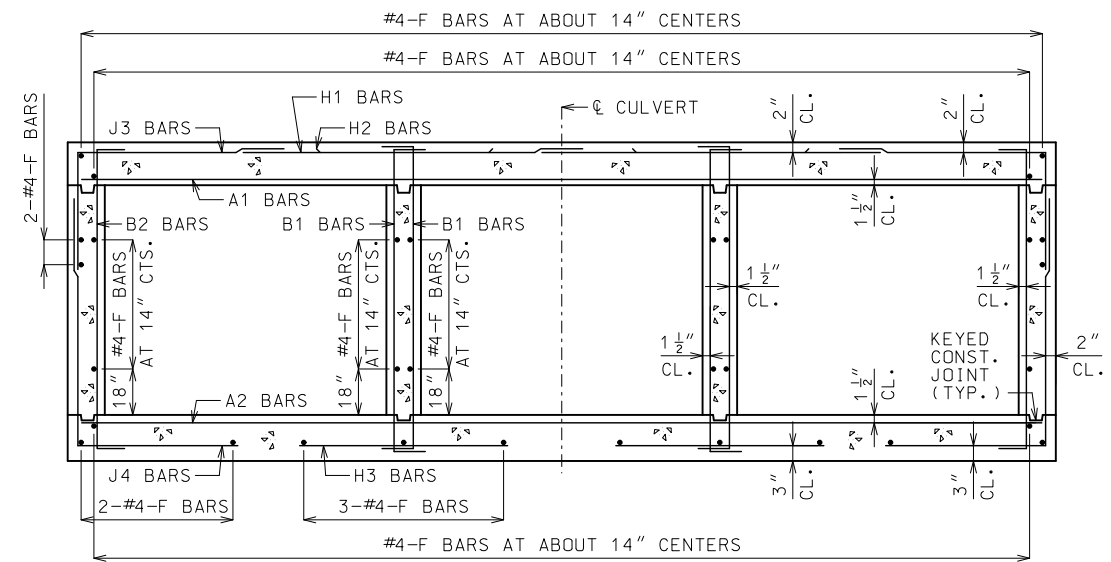
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS, PART ELEVATION AND PART SECTION.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS OVER 2'-0"  
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.



**BARREL REINFORCEMENT**  
FOR DESIGN FILLS 2'-0" OR LESS  
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> CUT SECTION	
	DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<b>703.86</b> SHEET NO. 1 OF 1

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

		SPAN (S) = 3 FT														HEIGHT (HT) = 2 FT OR 3 FT OR 4 FT																						
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS														WALL BARS					
	TS	BS	TX	T1	A1 BARS				J3 BARS						H1 BARS				H2 BARS				A2 BARS				J4 BARS						H3 BARS		B1 BARS		B2 BARS	
					SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1			
									HT=2'	HT=3'	HT=4'											HT=2'	HT=3'	HT=4'														
1 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	12	36.0	28	40	52	4	12	25.0	25.0	5	12	5	12	12		
2 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	12	35.0	28	40	52	4	12	24.0	24.0	5	12	5	12	12		
2'-4'	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	34.0	4	24	20.0	20.0	4	12	4	12	35.0	28	40	52	4	12	24.0	24.0	5	12	5	12	12		
4 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	34.0	4	24	19.0	19.0	4	12	4	12	31.1	28	40	52	4	12	23.0	24.0	5	12	5	12	12		
6 FT	8	8	8	8	4	12	4	12	31.1	24.0	24.0	4	24	26.0	26.0	4	24	18.0	18.0	4	12	4	12	28.9	28	40	52	4	12	22.0	23.0	5	12	5	12	12		
8 FT	8	8	8	8	4	12	4	12	28.5	24.0	24.0	4	24	24.0	24.0	4	24	18.0	18.0	4	12	4	12	27.3	28	40	52	4	12	22.0	23.0	5	12	5	12	0		
10 FT	8	8	8	8	4	12	4	12	27.1	24.0	24.0	4	24	23.0	24.0	4	24	18.0	18.0	4	12	4	12	26.5	28	40	52	4	12	22.0	23.0	5	12	5	12	0		
12 FT	8	8	8	8	4	12	4	12	25.0	24.0	24.0	4	24	21.0	23.0	4	24	18.0	18.0	4	12	4	12	24.5	28	40	52	4	12	22.0	23.0	5	12	5	12	0		
14 FT	8	8	8	8	4	12	4	12	24.9	24.0	24.0	4	24	21.0	23.0	4	24	18.0	18.0	4	12	4	12	24.5	28	40	52	4	12	22.0	23.0	5	12	5	12	0		
16 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.4	28	40	52	4	11.5	22.0	23.0	5	12	5	12	0		
18 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.4	28	40	52	4	11	22.0	23.0	5	12	5	12	0		
20 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.3	28	40	52	4	10.5	22.0	23.0	5	12	5	12	0		
22 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.3	28	40	52	4	9.5	22.0	23.0	5	12	5	12	0		
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26 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	10.5	4	11	24.1	28	40	52	4	9	22.0	23.0	5	12	5	12	0		
28 FT	8	8	8	8	4	12	4	11	24.5	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	10	4	10	24.1	28	40	52	4	8.5	22.0	23.0	5	12	5	12	0		
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32 FT	8	9	8	8	4	10.5	4	9.5	24.5	24.0	24.0	4	23	21.0	22.0	4	23	18.0	18.0	4	9.5	4	12	24.5	29	41	53	4	9.5	21.0	23.0	5	12	5	12	0		
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36 FT	8	9	8	8	4	9.5	4	8.5	24.5	24.0	24.0	4	21	21.0	22.0	4	21	18.0	18.0	4	8.5	4	10.5	24.4	29	41	53	4	8.5	21.0	23.0	5	12	5	12	0		
38 FT	8	9	8	8	4	9	4	8	24.5	24.0	24.0	4	20	21.0	22.0	4	20	18.0	18.0	4	8	4	10	24.4	29	41	53	4	8.5	21.0	23.0	5	12	5	12	0		
40 FT	8	10	8	8	4	8.5	4	7.5	24.5	24.0	24.0	4	19	21.0	22.0	4	19	18.0	18.0	4	8.5	4	12	24.8	30	42	54	4	9	21.0	23.0	5	12	5	12	0		
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48 FT	9	11	8	8	4	8	4	7.5	24.9	25.0	25.0	4	19	21.0	22.0	4	19	18.0	18.0	4	8	4	10.5	25.0	31	43	55	4	9.5	21.0	23.0	5	12	5	12	0		
50 FT	10	11	8	8	4	8	4	8	25.1	26.0	26.0	4	20	21.0	23.0	4	20	17.0	18.0	4	7.5	4	10.5	25.1	31	43	55	4	9	21.0	23.0	5	12	5	12	0		

		SPAN (S) = 3 FT														HEIGHT (HT) = 5 FT OR 6 FT																						
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS														WALL BARS					
	TS	BS	TX	T1	A1 BARS				J3 BARS						H1 BARS				H2 BARS				A2 BARS				J4 BARS						H3 BARS		B1 BARS		B2 BARS	
					SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1			
									HT=5'	HT=6'												HT=5'	HT=6'															
1 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	30.5	4	24	21.0	20.0	4	12	4	11.5	36.0	64	76	4	12	34.0	25.0	5	12	5	12	12			
2 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	11	36.0	64	76	4	12	34.0	24.0	5	12	5	12	12			
2'-4'	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	34.0	4	24	20.0	20.0	4	12	4	10	36.0	64	76	4	12	34.0	24.0	5	12	5	12	12			
4 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	34.0	4	24	19.0	19.0	4	12	4	10	36.0	64	76	4	12	34.0	24.0	5	12	5	12	12			
6 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	26.0	4	24	18.0	19.0	4	12	4	9.5	36.0	64	76	4	12	34.0	23.0	5	12	5	12	12			
8 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	24.0	4	24	18.0	18.0	4	12	4	9	36.0	64	76	4	12	24.0	23.0	5	12	5	12	0			
10 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	23.0	4	24	18.0	18.0	4	12	4	8.5	36.0	64	76	4	12	23.0	23.0	5	12	5	12	0			
12 FT	8	8	8	8	4	12	4	12	34.9	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	9	34.4	64	76	4	12	22.0	23.0	5	12	5	12	0			
14 FT	8	8	8	8	4	12	4	11	34.5	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	8.5	34.1	64	76	4	12	22.0	23.0	5	12	5	12	0			
16 FT	8	8	8	8	4	12	4	10	34.3	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	8	33.9	64	76	4	12	22.0	23.0	5	12	5	12	0			
18 FT	8	8	8	8	4	12	4	9	34.0	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	7.5	33.8	64	76	4	12	22.0	23.0	5	12	5	12	0			
20 FT	8	8	8	8	4	12	4	8	33.8	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	7	33.6	64	76	4	11.5	22.0	23.0	5	12	5	12	0			
22 FT	8	8	8	8	4	12	4	7.5	33.6	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	6.5	33.5	64	76	4	10.5	22.0	23.0	5	12	5	12	0			
24 FT	8	8	8	8	4	12	4																															

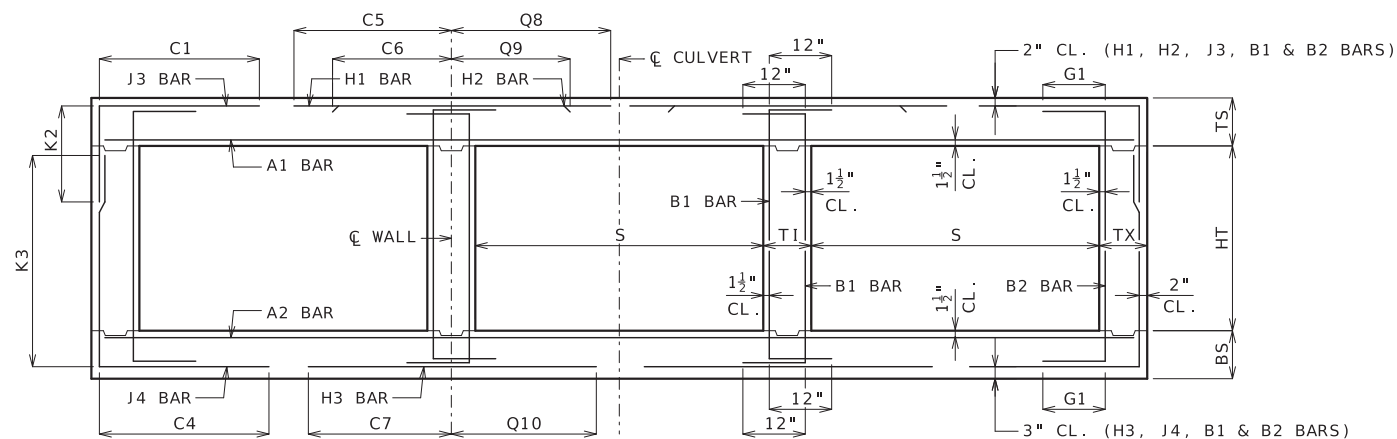


		SPAN (S) = 4 FT										HEIGHT (HT) = 2 FT OR 3 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS										
	TS	BS	TX	TI	A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
					SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
							HT=2'	HT=3'														HT=2'	HT=3'												
1 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	20.0	4	12	4	12	29.4	28	40	4	12	27.0	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	20.0	4	12	4	12	27.3	28	40	4	11.5	27.0	27.0	5	12	5	12	12
2'- 4'	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	20.0	4	12	4	12	27.3	28	40	4	11.5	27.0	27.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	28.6	24.0	24.0	4	24	33.0	36.0	4	24	20.0	20.0	4	12	4	12	25.0	28	40	4	11.5	26.0	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	26.0	24.0	24.0	4	24	28.0	29.0	4	24	19.0	19.0	4	12	4	12	24.1	28	40	4	10.5	25.0	26.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	26.0	28.0	4	24	19.0	19.0	4	12	4	12	23.5	28	40	4	10	25.0	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	24.1	24.0	24.0	4	24	26.0	27.0	4	24	19.0	19.0	4	12	4	12	23.1	28	40	4	9	25.0	26.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	23.6	24.0	24.0	4	23	25.0	26.0	4	23	18.0	19.0	4	12	4	12	22.9	28	40	4	8	25.0	26.0	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	23.4	24.0	24.0	4	22	25.0	26.0	4	22	18.0	18.0	4	11	4	12	22.6	28	40	4	7.5	24.0	26.0	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	21	24.0	25.0	4	21	18.0	18.0	4	10.5	4	12	22.1	28	40	4	7.5	24.0	25.0	5	12	5	12	0
18 FT	8	8	8	8	4	11.5	4	12	22.5	24.0	24.0	4	20	24.0	25.0	4	20	18.0	18.0	4	9.5	4	10.5	22.1	28	40	4	7	24.0	25.0	5	12	5	12	0
20 FT	8	8	8	8	4	10.5	4	11	22.4	24.0	24.0	4	18	24.0	25.0	4	18	18.0	18.0	4	8.5	4	9.5	22.1	28	40	4	6.5	24.0	25.0	5	12	5	12	0
22 FT	8	8	8	8	4	9.5	4	10	22.4	24.0	24.0	4	17	24.0	25.0	4	17	18.0	18.0	4	7.5	4	9	22.0	28	40	4	6	24.0	25.0	5	12	5	12	0
24 FT	8	9	8	8	4	8.5	4	9	22.6	24.0	24.0	4	15	24.0	25.0	4	15	18.0	18.0	4	8	4	11.5	21.4	29	41	4	7	24.0	26.0	5	12	5	12	0
26 FT	8	9	8	8	4	8	4	8.5	22.5	24.0	24.0	4	14	24.0	25.0	4	14	18.0	18.0	4	7	4	11	21.4	29	41	4	6.5	24.0	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	8	22.8	24.0	24.0	4	13	24.0	25.0	4	13	18.0	18.0	4	7.5	4	12	20.9	30	42	4	7	24.0	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	7.5	4	10	22.1	25.0	25.0	4	15	24.0	26.0	4	15	18.0	18.0	4	7	4	12	21.0	30	42	4	7	24.0	26.0	5	12	5	12	0
32 FT	9	10	8	8	4	7	4	9.5	22.1	25.0	25.0	4	14	24.0	26.0	4	14	18.0	18.0	4	6	4	12	21.0	30	42	4	6	24.0	26.0	5	12	5	12	0
34 FT	9	11	8	8	4	6.5	4	9	22.3	25.0	25.0	4	13	24.0	26.0	4	13	18.0	18.0	4	6.5	4	10.5	20.6	31	43	4	7	24.0	26.0	5	12	5	12	0
36 FT	10	11	8	8	4	7	4	10	21.9	26.0	26.0	4	14	24.0	26.0	4	14	18.0	19.0	4	6.5	4	10.5	20.9	31	43	4	7	24.0	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	6.5	4	9.5	22.0	26.0	26.0	4	13	24.0	26.0	4	13	18.0	19.0	4	6.5	4	9.5	20.5	32	44	4	7.5	24.0	27.0	5	12	5	12	0
40 FT	10	12	8	8	4	6	4	9	22.0	26.0	26.0	4	13	24.0	26.0	4	13	18.0	19.0	4	6.5	4	9.5	20.5	32	44	4	7	24.0	27.0	5	12	5	12	0
42 FT	11	12	8	8	4	6.5	4	9.5	21.6	27.0	27.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6	4	9.5	20.8	32	44	4	6.5	24.0	26.0	5	12	5	12	0
44 FT	11	12	8	8	4	6	4	9.5	21.6	27.0	27.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	9.5	20.8	32	44	4	6	24.0	26.0	5	12	5	12	0
46 FT	11	13	8	8	4	6	4	8.5	21.8	27.0	27.0	4	12	23.0	26.0	4	12	18.0	19.0	4	6	4	8.5	20.5	33	45	4	6.5	23.0	27.0	5	12	5	12	0
48 FT	12	13	8	8	4	6	4	8.5	21.5	28.0	28.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	8.5	20.8	33	45	4	6.5	24.0	27.0	5	12	5	12	0
50 FT	12	13	8	8	5	9	4	8.5	21.5	28.0	28.0	4	13	23.0	26.0	4	13	18.0	19.0	5	8.5	4	8.5	20.8	33	45	4	6	24.0	27.0	5	12	5	12	0

		SPAN (S) = 4 FT										HEIGHT (HT) = 4 FT OR 5 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS										
	TS	BS	TX	TI	A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
					SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
							HT=4'	HT=5'														HT=4'	HT=5'												
1 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	12	42.0	52	64	4	12	28.0	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	12	39.1	52	64	4	11	27.0	28.0	5	12	5	12	12
2'- 4'	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	37.0	4	24	21.0	21.0	4	12	4	12	39.1	52	64	4	11	27.0	28.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	30.3	24.0	24.0	4	24	47.5	37.0	4	24	20.0	20.0	4	12	4	12	34.8	52	64	4	11	26.0	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	34.6	24.0	24.0	4	24	29.0	30.0	4	24	19.0	19.0	4	12	4	11.5	32.1	52	64	4	10.5	25.0	26.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	31.4	24.0	24.0	4	24	27.0	28.0	4	24	19.0	19.0	4	12	4	11	30.3	52	64	4	9.5	25.0	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	29.9	24.0	24.0	4	24	26.0	27.0	4	24	19.0	19.0	4	12	4	10.5	29.3	52	64	4	9	25.0	26.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	29.1	24.0	24.0	4	24	25.0	27.0	4	24	18.0	19.0	4	11.5	4	10	28.5	52	64	4	8.5	24.0	26.0	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	11	28.5	24.0	24.0	4	23	25.0	26.0	4	23	18.0	19.0	4	10.5	4	9.5	28.1	52	64	4	7.5	24.0	26.0	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	11	26.9	24.0	24.0	4	22	24.0	26.0	4	22	18.0	19.0	4	10	4	9.5	26.6	52	64	4	7.5	24.0	26.0	5	12	5	12	0
18 FT	8	8	8	8	4	11	4	10	26.8	24.0	24.0	4	21	24.0	26.0	4	21	18.0	19.0	4	9	4	8.5	26.5	52	64	4	7	24.0	26.0	5	12	5	12	0
20 FT	8	8	8	8	4	10	4	9	26.8	24.0	24.0	4	19	24.0	26.0	4	19	18.0	19.0	4	8	4	8	26.4	52	64	4	6.5	24.0	26.0	5	12	5	12	0
22 FT	8	8	8	8	4	9	4	8	26.6	24.0	24.0	4	17	24.0	26.0	4	17	18.0	18.0	4	7	4	7	26.4	52	64	4	6	24.0	26.0	5	12	5	12	0
24 FT	8	9	8	8	4	8.5	4	7.5	26.6	24.0	24.0	4	16	24.0	25.0	4	16	18.0	18.0	4	7.5	4	8.5	26.6	53	65	4	7	24.0	26.0	5				

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
										HT=6'	HT=7'														HT=6'	HT=7'									
1 FT	10	8	8	8	4	6.5	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	22.0	21.0	4	12	4	9	42.0	76	88	4	11.5	40.0	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	6.5	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	8.5	42.0	76	88	4	11	40.0	28.0	5	12	5	12	12
2'- 4'	10	8	8	8	4	6.5	4	10	30.3	26.0	26.0	4	24	47.5	37.0	4	24	21.0	21.0	4	12	4	7.5	42.0	76	88	4	11	40.0	28.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	10	30.3	24.0	24.0	4	24	47.5	37.0	4	24	20.0	20.0	4	12	4	7.5	42.0	76	88	4	11	29.0	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10	30.3	24.0	24.0	4	24	47.5	29.0	4	24	19.0	19.0	4	12	4	7	42.0	76	88	4	10	27.0	26.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	9	30.3	24.0	24.0	4	24	47.5	28.0	4	24	19.0	19.0	4	12	4	6.5	42.0	76	88	4	9.5	26.0	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	8	43.1	24.0	24.0	4	24	28.0	27.0	4	24	18.0	19.0	4	12	4	6.5	40.6	76	88	4	9	25.0	26.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	7.5	40.5	24.0	24.0	4	24	27.0	26.0	4	24	18.0	19.0	4	11.5	4	6	39.1	76	88	4	8.5	25.0	26.0	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	6.5	39.3	24.0	24.0	4	23	26.0	26.0	4	23	18.0	19.0	4	10.5	5	6.5	38.4	76	88	4	8	25.0	26.0	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	6.5	35.5	24.0	24.0	4	23	24.0	25.0	4	23	18.0	19.0	4	10	5	6.5	35.4	76	88	4	7.5	24.0	26.0	5	12	5	12	0
18 FT	8	8	8	8	4	11.5	4	6	35.3	24.0	24.0	4	21	24.0	25.0	4	21	18.0	18.0	4	9	5	6	35.1	76	88	4	7	24.0	26.0	5	12	5	12	0
20 FT	8	8	8	8	4	10	5	6.5	35.0	24.0	28.0	4	19	24.0	25.0	4	19	18.0	18.0	4	8	6	6.5	38.0	76	88	4	6.5	24.0	26.0	5	12	5	12	0
22 FT	8	9	8	8	4	9.5	5	6	34.6	24.0	28.0	4	18	24.0	25.0	4	18	18.0	18.0	4	8.5	5	6	36.1	77	89	4	8	25.0	26.0	5	12	5	11.5	0
24 FT	8	9	9	8	4	8.5	5	6.5	34.1	24.0	28.0	4	16	24.0	25.0	4	16	18.0	18.0	4	8	5	7	35.6	77	89	4	7.5	25.0	26.0	5	12	5	11.5	0
26 FT	8	9	9	8	4	8	5	6	34.0	24.0	28.0	4	15	24.0	25.0	4	15	18.0	18.0	4	7.5	5	6.5	35.5	77	89	4	7	25.0	26.0	5	12	5	11	0
28 FT	8	10	9	8	4	7.5	6	7.5	36.8	24.0	28.0	4	14	24.0	25.0	4	14	18.0	18.0	4	7.5	5	7	36.6	78	90	4	7.5	25.0	26.0	5	12	5	10.5	0
30 FT	9	10	9	8	4	8	5	6	35.0	25.0	29.0	4	15	24.0	25.0	4	15	18.0	18.0	4	7	5	6.5	36.4	78	90	4	7	25.0	26.0	5	12	5	10	0
32 FT	9	10	9	8	4	7.5	5	6	35.0	25.0	29.0	4	14	24.0	25.0	4	14	18.0	18.0	4	6.5	5	6	36.3	78	90	4	6.5	25.0	26.0	5	12	5	9.5	0
34 FT	9	11	9	8	4	7	5	6	34.9	25.0	29.0	4	13	24.0	25.0	4	13	18.0	18.0	4	7	5	6.5	37.4	79	91	4	7	25.0	26.0	5	12	5	9	0
36 FT	10	11	9	8	4	7	5	6.5	35.9	26.0	30.0	4	15	24.0	25.0	4	15	18.0	18.0	4	7	5	6	37.0	79	91	4	7	25.0	26.0	5	12	5	8.5	0
38 FT	10	11	9	8	4	7	5	6	35.8	26.0	30.0	4	14	24.0	25.0	4	14	18.0	18.0	4	6.5	6	7.5	40.0	79	91	4	6.5	25.0	26.0	5	12	5	8.5	0
40 FT	10	12	9	8	4	6.5	5	6	35.6	26.0	30.0	4	13	24.0	25.0	4	13	18.0	18.0	4	6.5	5	6	38.3	80	92	4	7	25.0	26.0	5	12	5	8.5	0
42 FT	10	12	9	8	4	6	5	6	35.6	30.0	30.0	4	12	24.0	25.0	4	12	18.0	18.0	4	6.5	6	7.5	41.1	80	92	4	6.5	25.0	26.0	5	12	5	8.5	0
44 FT	11	12	9	8	4	6.5	6	7.5	39.5	31.0	35.0	4	14	24.0	25.0	4	14	18.0	18.0	4	6	6	7	40.9	80	92	4	6.5	25.0	26.0	5	12	5	8.5	0
46 FT	11	13	9	8	4	6	6	6.5	39.4	31.0	35.0	4	13	24.0	25.0	4	13	18.0	18.0	4	6.5	6	7.5	42.0	81	93	4	6.5	26.0	26.0	5	12	5	8.5	0
48 FT	11	13	10	8	4	6	5	6	36.3	27.0	31.0	4	13	23.0	25.0	4	13	18.0	18.0	4	6	5	6.5	38.4	81	93	4	6.5	25.0	26.0	5	12	5	8	0
50 FT	12	13	11	8	4	6	5	7	37.0	28.0	32.0	4	14	23.0	25.0	4	14	18.0	18.0	4	6	5	7.5	37.9	81	93	4	6	25.0	26.0	5	12	5	7.5	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS	
SPAN (S): 4 FEET HEIGHT (HT): 6 THRU 7 FEET		SHEET NO. <b>703.87A</b>
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>3 OF 27</b>	

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

SPAN (S) = 5 FT      HEIGHT (HT) = 3 FT OR 4 FT

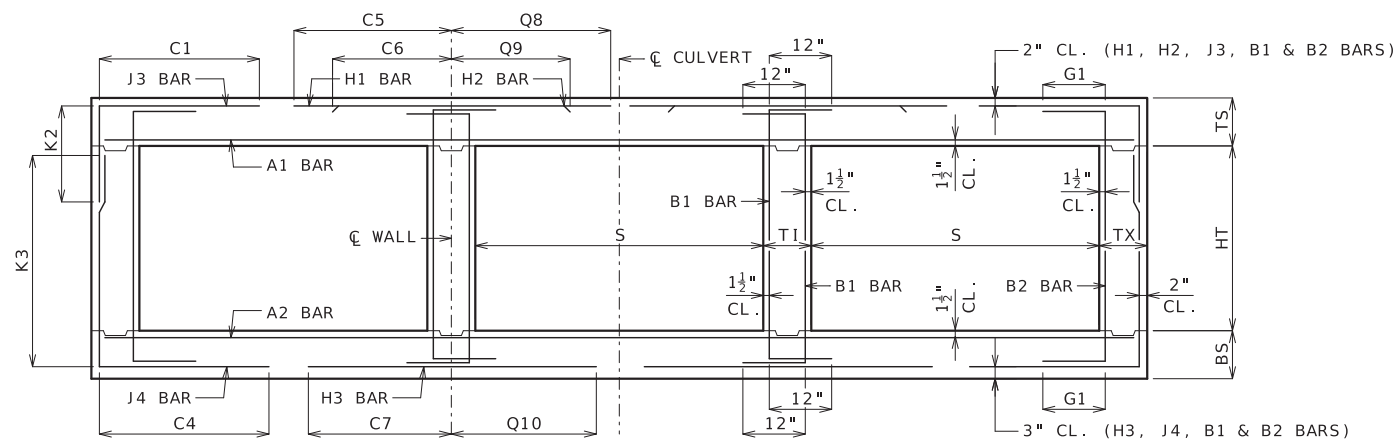
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS								WALL BARS										
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=3' HT=4'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=3' HT=4'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	5	9	4	10.5	33.9	26.0	26.0	4	19	56.5	42.5	4	19	22.0	21.0	4	12	4	12	33.9	40	52	4	8.5	30.0	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	22.0	21.0	4	12	4	12	31.1	40	52	4	8.5	30.0	31.0	5	12	5	12	12
2' - 4'	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	20	56.5	46.0	4	20	22.0	21.0	4	12	4	12	31.1	40	52	4	8.5	30.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10.5	4	12	32.1	24.0	24.0	4	20	38.0	46.0	4	20	20.0	20.0	4	12	4	12	28.4	40	52	4	8.5	29.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	29.3	24.0	24.0	4	21	31.0	34.0	4	21	20.0	20.0	4	12	4	12	27.0	40	52	4	8	28.0	29.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	27.5	24.0	24.0	4	20	30.0	31.0	4	20	19.0	19.0	4	11	4	11	26.3	40	52	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	11	4	12	26.6	24.0	24.0	4	18	29.0	30.0	4	18	19.0	19.0	4	9.5	4	10.5	25.6	40	52	4	6.5	27.0	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	10	4	10.5	26.1	24.0	24.0	4	16	28.0	30.0	4	16	19.0	19.0	4	8	4	9.5	25.3	40	52	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	8	8	8	4	8.5	4	9.5	25.6	24.0	24.0	4	14	28.0	29.0	4	14	19.0	19.0	4	7	4	8.5	25.0	40	52	5	7	27.0	29.0	5	12	5	12	0
16 FT	8	9	8	8	4	8	4	8.5	25.6	24.0	24.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	4	11	24.3	41	53	4	6	27.0	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	7.5	4	8	24.8	24.0	24.0	4	12	27.0	28.0	4	12	19.0	19.0	4	7	4	10.5	23.5	41	53	4	6	27.0	29.0	5	12	5	12	0
20 FT	8	9	8	8	4	7	4	7.5	24.6	24.0	24.0	5	17	27.0	28.0	5	17	19.0	19.0	4	6	4	9.5	23.5	41	53	5	7	27.0	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	9	24.3	25.0	25.0	4	12	27.0	29.0	4	12	19.0	19.0	4	6.5	4	12	23.1	42	54	4	6	27.0	29.0	5	12	5	12	0
24 FT	9	11	8	8	4	6.5	4	8	24.4	25.0	25.0	5	17	27.0	29.0	5	17	19.0	19.0	4	6.5	4	10.5	22.6	43	55	4	6	26.0	30.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	4	8.5	23.9	26.0	26.0	5	18	26.0	29.0	5	18	19.0	19.0	4	6	4	10.5	22.9	43	55	5	8	26.0	29.0	5	12	5	12	0
28 FT	10	11	8	8	4	6	4	8	23.9	26.0	26.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	10.5	22.9	43	55	5	8	26.0	29.0	5	12	5	12	0
30 FT	10	12	8	8	5	8	4	7	24.0	26.0	26.0	5	16	26.0	29.0	5	16	19.0	19.0	5	9	4	9.5	22.5	44	56	5	8.5	26.0	30.0	5	12	5	12	0
32 FT	11	12	8	8	5	9	4	8	23.6	27.0	27.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	9.5	22.8	44	56	5	8	26.0	30.0	5	12	5	12	0
34 FT	11	13	8	8	5	8.5	4	7	23.8	27.0	27.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8.5	4	8.5	22.5	45	57	5	8.5	26.0	30.0	5	12	5	12	0
36 FT	12	13	8	8	5	8.5	4	8	23.5	28.0	28.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8	4	8.5	22.8	45	57	5	8	26.0	30.0	5	12	5	12	0
38 FT	12	14	8	8	5	8	4	7	23.6	28.0	28.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8	4	7.5	22.6	46	58	5	8.5	26.0	30.0	5	12	5	12	0
40 FT	13	14	8	8	5	8	4	7.5	23.4	29.0	29.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8	4	7.5	22.8	46	58	5	8	26.0	30.0	5	12	5	12	0
42 FT	13	14	8	8	5	7.5	4	7.5	23.4	29.0	29.0	5	16	26.0	29.0	5	16	19.0	19.0	5	7.5	4	7.5	22.8	46	58	5	7.5	26.0	30.0	5	12	5	12	0
44 FT	13	15	8	8	5	7.5	4	7	23.6	29.0	29.0	5	15	26.0	29.0	5	15	19.0	19.0	5	7.5	4	7	22.8	47	59	5	8	26.0	30.0	5	12	5	12	0
46 FT	14	15	8	8	5	7.5	4	7	23.4	30.0	30.0	5	16	25.0	29.0	5	16	18.0	19.0	5	7.5	4	7	22.9	47	59	5	7.5	26.0	30.0	5	12	5	12	0
48 FT	14	15	8	8	5	7	4	7	23.4	30.0	30.0	5	15	25.0	29.0	5	15	18.0	19.0	5	7	4	7	22.9	47	59	5	7	26.0	30.0	5	12	5	12	0
50 FT	14	16	8	8	5	7	4	6.5	23.6	30.0	30.0	5	15	25.0	29.0	5	15	18.0	19.0	5	7	4	6.5	22.9	48	60	5	7.5	26.0	30.0	5	12	5	12	0

SPAN (S) = 5 FT      HEIGHT (HT) = 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS								WALL BARS										
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS									
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=5' HT=6'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=5' HT=6'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	22	56.5	42.5	4	22	23.0	23.0	4	12	4	10	47.5	64	76	4	8.5	31.0	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	22.0	22.0	4	11	4	9.5	42.8	64	76	4	8	30.0	31.0	5	12	5	12	12
2' - 4'	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	20	56.5	46.0	4	20	22.0	22.0	4	11	4	9	42.8	64	76	4	8	30.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10	4	10	33.9	24.0	24.0	4	20	56.5	46.0	4	20	21.0	21.0	4	12	4	9	38.9	64	76	4	8.5	29.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10.5	38.3	24.0	24.0	4	21	33.0	35.0	4	21	20.0	20.0	4	12	4	8.5	35.5	64	76	4	7.5	28.0	30.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	10	34.4	24.0	24.0	4	20	30.0	31.0	4	20	19.0	20.0	4	10.5	4	8	33.5	64	76	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	10.5	4	9	32.9	24.0	24.0	4	18	29.0	30.0	4	18	19.0	19.0	4	9	4	7.5	32.3	64	76	4	6.5	27.0	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	9.5	4	8	31.9	24.0	24.0	4	16	28.0	30.0	4	16	19.0	19.0	4	7.5	4	7	31.3	64	76	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	8	8	8	4	8.5	4	7	31.1	24.0	24.0	4	14	28.0	29.0	4	14	19.0	19.0	4	7	4	6	30.8	64	76	5	7	27.0	29.0	5	12	5	12	0
16 FT	8	9	8	8	4	8	4	6.5	30.8	24.0	24.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	4	7	30.9	65	77	4	6	27.0	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	7.5	4	6.5	29.1	24.0	24.0	4	12	27.0	28.0	4	12	19.0	19.0	4	6.5	4	7	29.1	65	77	4	6	27.0	29.0	5	12	5	12	0
20 FT	8	9	8	8	4	7	5	7	29.0	24.0	24.0	5	17	27.0	28.0	5	17	19.0	19.0	4	6	4	6.5	29.0	65	77	5	7.5	27.0	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	6.5	29.1	25.0	25.0	4	12	26.0	29.0	4	12	19.0	19.0	4	6	4	7.5	29.3	66	78	4	6	27.0	29.0	5	12	5	12	0
24 FT	9	10	8	8	4	6.5	4	6	29.1	25.0	25.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	7	29.1	66	78	5	7.5	27.0	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	5	8	29.4	26.0	26.0	4	12	26.0	29.0	4	12	19.0	19.0	4	6	4	6.5	29.4	67	79	5	8.5	26.0	29.0	5	12	5	12	0
28 FT	10	11	8	8	4	6	5	7.5	29.3	26.0	26.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	6												

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=7' HT=8'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=7' HT=8'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
	1 FT	11	8	8	8	4	6	4	9	33.9	27.0	27.0	4	22	56.5	42.5	4	22	23.0	23.0	4	11	4	7	48.0	88	100	4	8	46.0	31.0	5	12	5	12
2 FT	11	8	8	8	4	6	4	8.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	23.0	23.0	4	10.5	4	6.5	48.0	88	100	4	8	32.0	31.0	5	12	5	12	12
2'- 4'	11	8	8	8	4	6	4	7	33.9	27.0	27.0	4	20	56.5	46.0	4	20	23.0	23.0	4	10.5	4	6	48.0	88	100	4	8	32.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	9.5	4	7	33.9	24.0	24.0	4	20	56.5	46.0	4	20	21.0	21.0	4	11.5	4	6	48.0	88	100	4	8	31.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	7	33.9	24.0	24.0	4	21	56.5	35.0	4	21	20.0	20.0	4	11	5	6	48.0	88	100	4	7.5	29.0	30.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	6.5	51.8	24.0	24.0	4	20	34.0	31.0	4	20	19.0	20.0	4	10	5	6	46.0	88	100	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	9	8	4	11	4	7	43.8	24.0	24.0	4	18	30.0	30.0	4	18	19.0	20.0	4	9	4	6	41.6	88	100	4	6.5	28.0	29.0	5	12	5	12	0
12 FT	8	8	9	8	4	9.5	4	6	41.3	24.0	24.0	4	16	29.0	30.0	4	16	19.0	19.0	4	8	5	6	40.4	88	100	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	9	9	8	4	9	5	7	39.9	24.0	28.0	4	15	28.0	29.0	4	15	19.0	19.0	4	8	5	6.5	41.4	89	101	4	6.5	27.0	29.0	5	12	5	11.5	0
16 FT	8	9	9	8	4	8	5	6	39.1	24.0	28.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	5	6	40.8	89	101	4	6	27.0	29.0	5	12	5	11	0
18 FT	8	9	9	8	4	7.5	5	6	36.5	24.0	28.0	4	13	26.0	28.0	4	13	19.0	19.0	4	7	5	6	38.1	89	101	4	6	27.0	29.0	5	12	5	11.5	0
20 FT	8	9	9	8	4	7	6	7	39.1	24.0	32.0	5	18	26.0	28.0	5	18	19.0	19.0	4	6	6	7	40.9	89	101	5	7.5	27.0	29.0	5	12	5	10.5	0
22 FT	8	10	9	8	4	6.5	6	7	38.8	24.0	28.0	5	17	27.0	28.0	5	17	19.0	20.0	4	6.5	5	6	39.0	90	102	5	8	27.0	29.0	5	12	5	10	0
24 FT	9	11	9	8	4	6.5	5	6	37.0	25.0	29.0	5	18	26.0	28.0	5	18	19.0	19.0	4	6.5	5	6	39.8	91	103	4	6	27.0	29.0	5	12	5	9.5	0
26 FT	9	11	9	8	4	6	5	6	36.9	25.0	29.0	5	16	26.0	28.0	5	16	19.0	19.0	4	6	5	6	39.6	91	103	5	8.5	27.0	29.0	5	12	5	8.5	0
28 FT	10	12	9	8	4	6	5	6	37.9	30.0	30.0	5	17	26.0	28.0	5	17	19.0	19.0	4	6	5	6	40.3	92	104	4	6	27.0	29.0	5	12	5	8.5	0
30 FT	10	12	9	8	4	6	5	6	37.8	30.0	30.0	5	16	26.0	28.0	5	16	19.0	19.0	4	6	6	7.5	43.1	92	104	5	8.5	27.0	29.0	5	12	5	8.5	0
32 FT	11	12	10	8	4	6	5	6.5	38.4	31.0	31.0	5	17	26.0	28.0	5	17	18.0	19.0	5	9	5	6.5	39.6	92	104	5	8	27.0	29.0	5	12	5	8	0
34 FT	11	13	10	8	5	9	5	6.5	38.3	31.0	31.0	5	16	26.0	28.0	5	16	19.0	19.0	5	9	5	6.5	40.4	93	105	5	8.5	28.0	30.0	5	12	5	8	0
36 FT	12	13	10	8	5	9	5	6.5	39.1	32.0	32.0	5	17	26.0	28.0	5	17	18.0	19.0	5	8.5	5	6.5	40.3	93	105	5	8	27.0	30.0	5	12	5	8	0
38 FT	12	14	10	8	5	8.5	5	6	39.0	32.0	32.0	5	17	26.0	28.0	5	17	18.0	19.0	5	9	5	6.5	40.9	94	106	5	8.5	28.0	30.0	5	12	5	8	0
40 FT	12	14	11	8	5	8	5	7	38.9	32.0	32.0	5	16	26.0	28.0	5	16	18.0	19.0	5	8.5	5	7	40.8	94	106	5	8	28.0	30.0	5	12	5	7.5	0
42 FT	13	14	11	8	5	8.5	5	7	39.6	33.0	33.0	5	17	26.0	28.0	5	17	18.0	19.0	5	8	5	7	40.5	94	106	5	7.5	28.0	30.0	5	12	5	7.5	0
44 FT	13	15	11	8	5	8	5	6.5	39.5	33.0	33.0	5	16	26.0	28.0	5	16	18.0	19.0	5	8	5	7	41.3	95	107	5	8	28.0	30.0	5	12	5	7.5	0
46 FT	13	15	12	8	5	7.5	5	6.5	39.5	33.0	33.0	5	15	26.0	28.0	5	15	18.0	19.0	5	8	5	6.5	41.0	95	107	5	7.5	28.0	30.0	5	12	5	7	0
48 FT	14	15	12	8	5	8	5	6.5	40.3	34.0	34.0	5	17	26.0	27.0	5	17	18.0	19.0	5	7.5	5	6.5	40.9	95	107	5	7	28.0	30.0	5	12	5	7	0
50 FT	14	16	12	8	5	7.5	5	6.5	40.1	34.0	34.0	5	16	26.0	27.0	5	16	18.0	19.0	5	8	5	6.5	41.6	96	108	5	7.5	28.0	30.0	5	12	5	7	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 5 FEET HEIGHT (HT): 7 THRU 8 FEET	
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.87A</b>	SHEET NO. <b>5 OF 27</b>

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

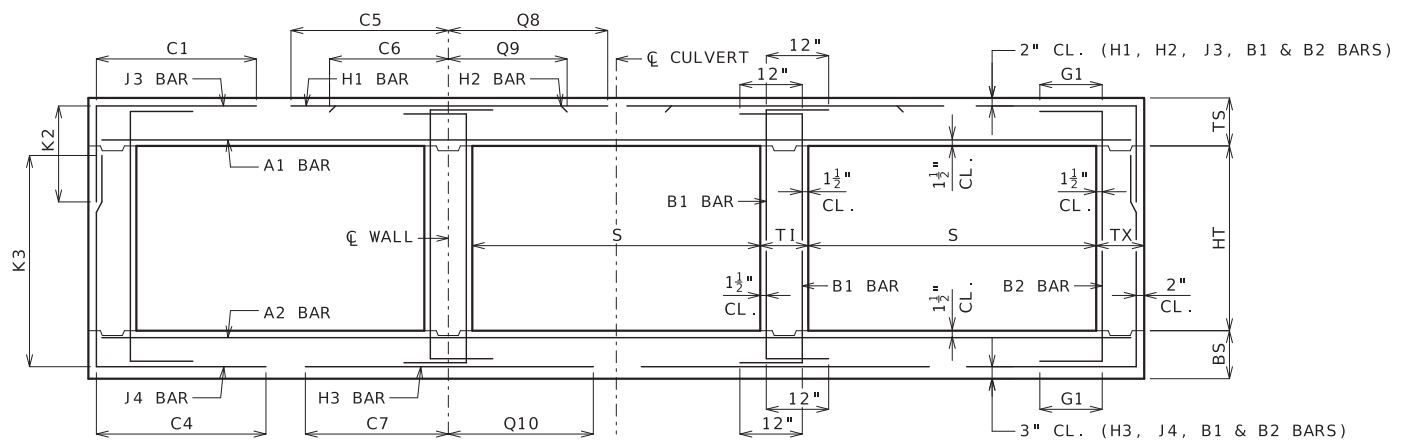
SPAN (S) = 6 FT      HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS												
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS													
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	23.0	23.0	4	9.5	4	7	47.3	76	88	4	6.5	33.0	34.0	5	12	5	12	12	
2 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	23.0	23.0	4	8.5	4	7	47.3	76	88	4	6.5	33.0	34.0	5	12	5	12	12	
2'- 4'	11	8	8	8	5	8	4	7	37.5	27.0	27.0	27.0	4	14	64.5	52.0	4	14	23.0	23.0	4	8.5	4	7	47.3	76	88	4	6.5	33.0	34.0	5	12	5	12	12	
4 FT	8	8	8	8	4	7.5	4	8.5	35.8	24.0	24.0	24.0	4	14	43.0	52.0	4	14	21.0	21.0	4	9	4	9.5	32.1	40	52	64	4	6.5	32.0	33.0	5	12	5	12	12
6 FT	8	8	8	8	4	9	4	9.5	32.6	24.0	24.0	24.0	4	14	35.0	38.0	4	14	21.0	20.0	4	8.5	4	8.5	30.0	40	52	64	4	6	31.0	32.0	5	12	5	12	12
8 FT	8	8	8	8	4	9	4	9	30.4	24.0	24.0	24.0	4	13	33.0	35.0	4	13	20.0	20.0	4	8	4	8	29.0	40	52	64	5	7.5	30.0	32.0	5	12	5	12	0
10 FT	8	8	8	8	4	8	4	8	29.4	24.0	24.0	24.0	4	12	32.0	34.0	4	12	20.0	20.0	4	7	4	7	28.4	40	52	64	5	6.5	30.0	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	4	7	28.8	24.0	24.0	24.0	5	17	31.0	33.0	5	17	20.0	20.0	4	6.5	4	9	27.4	41	53	65	5	7	30.0	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	6.5	4	6.5	28.3	24.0	24.0	24.0	5	16	31.0	32.0	5	16	21.0	21.0	5	9	4	8	26.9	41	53	65	5	6.5	30.0	32.0	5	12	5	12	0
16 FT	9	10	8	8	4	6	4	7.5	27.6	25.0	25.0	25.0	5	16	30.0	33.0	5	16	20.0	20.0	5	9	4	9.5	26.5	42	54	66	5	7	29.0	32.0	5	12	5	12	0
18 FT	9	10	8	8	5	9	4	6.5	27.4	25.0	25.0	25.0	5	16	30.0	32.0	5	16	21.0	21.0	5	8	4	8.5	26.3	42	54	66	5	6.5	29.0	32.0	5	12	5	12	0
20 FT	10	11	8	8	5	9	4	7	27.0	26.0	26.0	26.0	5	15	30.0	33.0	5	15	20.0	20.0	5	8	4	8.5	26.0	43	55	67	5	7	29.0	33.0	5	12	5	12	0
22 FT	10	11	8	8	5	8.5	4	6.5	26.0	26.0	26.0	26.0	5	15	29.0	32.0	5	15	20.0	20.0	5	7.5	4	8.5	25.0	43	55	67	5	7	29.0	33.0	5	12	5	12	0
24 FT	11	12	8	8	5	8.5	4	6.5	25.8	27.0	27.0	27.0	5	15	29.0	32.0	5	15	20.0	20.0	5	8	4	8.5	24.9	44	56	68	5	7	29.0	33.0	5	12	5	12	0
26 FT	11	12	8	8	5	7.5	4	6	25.6	27.0	27.0	27.0	5	14	29.0	32.0	5	14	20.0	20.0	5	6.5	4	8	24.9	44	56	68	5	6.5	29.0	33.0	5	12	5	12	0
28 FT	12	13	8	8	5	7.5	4	6.5	25.5	28.0	28.0	28.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7.5	4	8	24.9	45	57	69	5	7	29.0	33.0	5	12	5	12	0
30 FT	12	14	8	8	5	7	4	6	25.6	28.0	28.0	28.0	5	13	29.0	32.0	5	13	19.0	20.0	5	7.5	4	7.5	24.8	46	58	70	5	7	28.0	33.0	5	12	5	12	0
32 FT	13	14	8	8	5	7	4	6	25.4	29.0	29.0	29.0	5	14	28.0	33.0	5	14	19.0	20.0	5	7	4	7.5	24.9	46	58	70	5	6.5	28.0	33.0	5	12	5	12	0
34 FT	13	15	8	8	5	7	5	8.5	25.6	29.0	29.0	29.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	4	7	24.8	47	59	71	5	7	28.0	33.0	5	12	5	12	0
36 FT	14	15	8	8	5	7	4	6	25.4	30.0	30.0	30.0	5	13	28.0	33.0	5	13	19.0	20.0	5	6.5	4	7	25.0	47	59	71	5	6.5	28.0	33.0	5	12	5	12	0
38 FT	14	16	8	8	5	6.5	5	8.5	25.5	30.0	30.0	30.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	4	6.5	24.9	48	60	72	5	6.5	28.0	33.0	5	12	5	12	0
40 FT	15	16	8	8	5	6.5	5	8	30.4	31.0	31.0	31.0	5	13	33.0	38.0	5	13	24.0	25.0	5	6.5	4	6.5	25.1	48	60	72	5	6.5	28.0	33.0	5	12	5	12	0
42 FT	15	17	8	8	5	6.5	5	8	30.6	31.0	31.0	31.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6.5	4	6	25.1	49	61	73	5	6.5	28.0	33.0	5	12	5	12	0
44 FT	16	17	8	8	5	6.5	5	7	30.5	32.0	32.0	32.0	5	13	33.0	37.0	5	13	24.0	25.0	5	6.5	4	6	25.3	49	61	73	5	6	28.0	33.0	5	12	5	12	0
46 FT	16	17	8	8	5	6	5	7	30.5	32.0	32.0	32.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6	4	6	25.3	49	61	73	5	6	28.0	33.0	5	12	5	12	0
48 FT	17	18	8	8	5	6	5	6.5	30.6	37.0	37.0	37.0	5	13	33.0	37.0	5	13	24.0	25.0	5	6	5	6.5	25.5	50	62	74	5	6	28.0	33.0	5	12	5	11	0
50 FT	17	18	8	8	5	6	5	6.5	30.6	37.0	37.0	37.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6	5	6.5	25.4	50	62	74	5	6	28.0	33.0	5	12	5	10.5	0

SPAN (S) = 6 FT      HEIGHT (HT) = 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS											
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS												
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.
1 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	24.0	24.0	4	9.5	4	7.5	52.8	76	88	4	7	34.0	34.0	5	12	5	12	12
2 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	23.0	23.0	4	8.5	4	7	47.3	76	88	4	6.5	33.0	34.0	5	12	5	12	12
2'- 4'	11	8	8	8	5	8	4	7	37.5	27.0	27.0	27.0	4	14	64.5	52.0	4	14	23.0	23.0	4	8.5	4	7	47.3	76	88	4	6.5	33.0	34.0	5	12	5	12	12
4 FT	8	8	8	8	4	7	4	7	37.5	24.0	24.0	24.0	4	14	64.5	52.0	4	14	21.0	22.0	4	8.5	4	7	43.0	76	88	4	6.5	32.0	34.0	5	12	5	12	12
6 FT	8	8	8	8	4	8.5	4	7.5	41.9	24.0	24.0	24.0	4	14	37.0	39.0	4	14	21.0	21.0	4	8	4	6.5	39.1	76	88	4	6	31.0	33.0	5	12	5	12	12
8 FT	8	8	8	8	4	8.5	4	7	37.6	24.0	24.0	24.0	4	13	34.0	35.0	4	13	20.0	20.0	4	7.5	4	6	36.9	76	88	5	7	30.0	32.0	5	12	5	12	0
10 FT	8	8	8	8	4	8	4	8	36.0	24.0	24.0	24.0	4	12	32.0	34.0	4	12	20.0	20.0	4	6.5	5	6	35.4	76	88	5	6.5	30.0	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	5	6.5	34.8	24.0	24.0	24.0	5	17	31.0	33.0	5	17	20.0	20.0	4	6.5	4	6	35.0	77	89	5	7	30.0	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	6	5	6	33.9	24.0	28.0	28.0	5	16	31.0	33.0	5	16	21.0	21.0	5	8.5	5	6.5	34.1	77	89	5	6.5	30.0	32.0	5	12	5	12	0
16 FT	9	10	8	8	4	6	5	6.5	33.8	25.0	25.0	25.0	5	16	30.0	33.0	5	16	20.0	20.0	5	9	4	6	34.0	78	90	5	7	29.0	33.0	5	12	5	12	0
18 FT	9	10	8	8	5	9	5	6.5	33.4	25.0	29.0	29.0	5	16	30.0	32.0	5	16	21.0	21.0	5	8	5	6.5	33.6	78	90	5	6.5	29.0	32.0	5	12	5	12	0
20 FT	9	11	8	8	5	8	5	6	33.1	25.0	29.0	29.0	5	16	30.0	32.0	5	16	21.0	22.0	5	8	5	7	33.8	79	91	5	7.5	29.0	33.0	5	12	5	12	0
22 FT	10	11	8	8	5	8.5	5	7	31.6	26.0	30.0	30.0	5	15	29.0	32.0	5	15	20.0	20.0	5	7.5	5	7	31.9	79	91	5	7	29.0	33.0	5	12	5	12	0
24 FT	10	12	8	8	5	7.5	5	6.5	31.6	26.0	30.0	30.0	5	15	29.0	32.0	5	15	20.0	21.0	5	8	5	7.5												

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS								WALL BARS						
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1		
										HT=8'	HT=9'												HT=8'	HT=9'											
1 FT	11	8	8	8	5	7.5	4	7	37.5	27.0	27.0	4	17	64.5	48.5	4	17	24.0	25.0	4	8.5	5	6.5	54.0	100	112	4	7	52.0	35.0	5	12	5	12	12
2 FT	11	8	8	8	5	7.5	4	6.5	37.5	27.0	27.0	4	17	64.5	48.5	4	17	23.0	24.0	4	8	5	6	54.0	100	112	4	6.5	35.0	34.0	5	12	5	12	12
2'- 4'	11	8	8	8	5	7.5	4	6	38.1	27.0	27.0	4	14	64.5	52.0	4	14	23.0	24.0	4	8	5	6	54.8	100	112	4	6	35.0	34.0	5	12	5	12	12
4 FT	8	8	9	8	4	7	4	6	38.1	24.0	24.0	4	14	64.5	52.0	4	14	22.0	22.0	4	8	5	6.5	54.8	100	112	4	6	33.0	34.0	5	12	5	12	12
6 FT	8	8	9	8	4	8.5	4	6	38.1	24.0	24.0	4	14	64.5	40.0	4	14	21.0	21.0	4	8	5	6	50.8	100	112	4	6	32.0	33.0	5	12	5	12	12
8 FT	8	9	9	8	4	8.5	4	6	50.1	24.0	24.0	4	14	35.0	35.0	4	14	20.0	20.0	4	8.5	5	6.5	50.8	101	113	4	6.5	31.0	33.0	5	12	5	12	0
10 FT	8	9	9	8	4	8	5	6.5	45.8	24.0	28.0	4	12	33.0	33.0	4	12	20.0	20.0	4	7.5	5	6	47.5	101	113	4	6	31.0	33.0	5	12	5	11	0
12 FT	8	9	10	8	4	7	5	6.5	43.0	24.0	28.0	5	17	32.0	33.0	5	17	20.0	20.0	4	6.5	5	6.5	44.8	101	113	5	7	30.0	32.0	5	12	5	11	0
14 FT	8	9	10	8	4	6.5	5	6	41.6	28.0	28.0	5	17	31.0	32.0	5	17	21.0	21.0	4	6	5	6	43.5	101	113	5	6.5	30.0	32.0	5	12	5	10	0
16 FT	8	10	10	8	4	6	6	7	43.3	28.0	28.0	5	16	30.0	32.0	5	16	22.0	22.0	5	9	5	6	44.4	102	114	5	7	30.0	33.0	5	12	5	9.5	0
18 FT	9	10	10	8	4	6	5	6	41.8	29.0	29.0	5	16	30.0	32.0	5	16	20.0	21.0	5	8.5	6	7.5	46.4	102	114	5	7	30.0	32.0	5	12	5	9	0
20 FT	9	11	10	8	5	8.5	5	6	41.0	29.0	29.0	5	16	30.0	32.0	5	16	21.0	22.0	5	8.5	5	6	44.4	103	115	5	7	30.0	33.0	5	12	5	8.5	0
22 FT	10	11	10	8	5	9	5	6.5	39.9	30.0	30.0	5	15	29.0	32.0	5	15	20.0	20.0	5	8	5	6	41.4	103	115	5	7	30.0	33.0	5	12	5	9	0
24 FT	10	12	10	8	5	8	5	6.5	39.5	30.0	30.0	5	15	29.0	32.0	5	15	20.0	21.0	5	8	5	6	42.3	104	116	5	7	30.0	33.0	5	12	5	8.5	0
26 FT	11	12	10	8	5	8	5	6	40.5	31.0	31.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7	5	6	41.9	104	116	5	6.5	30.0	33.0	5	12	5	8	0
28 FT	11	13	10	8	5	7.5	5	6	40.3	31.0	31.0	5	14	29.0	32.0	5	14	20.0	20.0	5	7.5	5	6	42.8	105	117	5	7	30.0	33.0	5	12	5	8	0
30 FT	12	14	10	8	5	8	5	6	41.0	32.0	32.0	5	14	29.0	31.0	5	14	19.0	20.0	5	8	5	6	43.3	106	118	5	7	30.0	33.0	5	12	5	8	0
32 FT	12	14	11	8	5	7.5	5	6.5	40.8	32.0	32.0	5	13	29.0	31.0	5	13	19.0	20.0	5	7.5	5	7	42.9	106	118	5	6.5	30.0	33.0	5	12	5	7.5	0
34 FT	13	15	11	8	5	7.5	5	6.5	41.5	33.0	33.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7.5	5	7	43.5	107	119	5	7	30.0	33.0	5	12	5	7.5	0
36 FT	13	15	11	8	5	7	5	6	41.4	33.0	33.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.4	107	119	5	6.5	30.0	33.0	5	12	5	7.5	0
38 FT	14	16	12	8	5	7	5	6.5	42.1	34.0	34.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.8	108	120	5	6.5	30.0	33.0	5	12	5	7	0
40 FT	14	16	12	8	5	7	5	6	42.0	34.0	34.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.6	108	120	5	6.5	30.0	33.0	5	12	5	7	0
42 FT	15	17	12	8	5	7	5	6	47.6	35.0	35.0	5	13	33.0	36.0	5	13	24.0	25.0	5	7	5	6.5	44.3	109	121	5	6.5	30.0	33.0	5	12	5	7	0
44 FT	15	17	13	8	5	6.5	5	6	47.6	35.0	35.0	5	13	33.0	36.0	5	13	24.0	25.0	5	6.5	5	6	44.0	109	121	5	6	30.0	33.0	5	12	5	6.5	0
46 FT	15	17	13	8	5	6	5	6	47.6	35.0	35.0	5	12	33.0	36.0	5	12	24.0	25.0	5	6	5	6	43.9	109	121	5	6	30.0	33.0	5	12	5	6.5	0
48 FT	16	18	13	8	5	6.5	5	6	48.3	36.0	36.0	5	13	33.0	35.0	5	13	24.0	25.0	5	6.5	5	6	44.5	110	122	5	6	30.0	33.0	5	12	5	6.5	0
50 FT	16	18	14	8	5	6	5	6	48.3	36.0	36.0	5	12	33.0	35.0	5	12	24.0	25.0	5	6	5	6	44.3	110	122	6	8.5	32.0	37.0	5	12	5	6.5	0



BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CL CULVERT.

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 6 FEET HEIGHT (HT): 8 THRU 9 FEET	
	DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.87A</b>

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

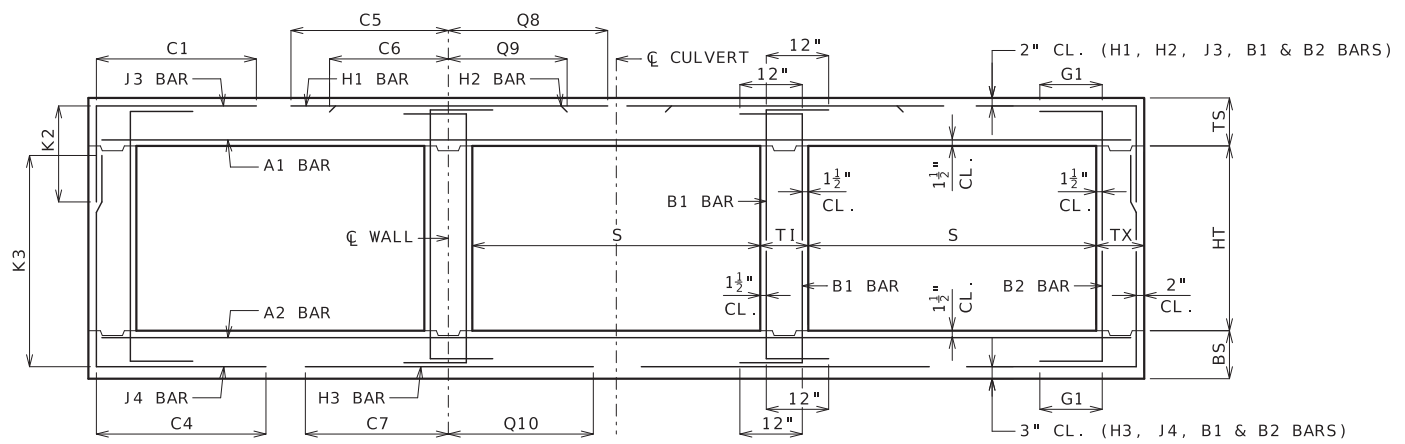
SPAN (S) = 7 FT      HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS													
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	12	8	8	8	5	7.5	4	8.5	41.1	28.0	28.0	28.0	4	16	72.5	54.5	4	16	25.0	25.0	4	8.5	4	7.5	42.5	52	64	76	4	6	36.0	37.0	5	12	5	12	12
2 FT	12	8	8	8	5	7.5	4	8.5	41.1	28.0	28.0	28.0	4	15	72.5	54.5	4	15	24.0	24.0	4	7.5	4	7	39.0	52	64	76	5	7.5	35.0	37.0	5	12	5	12	12
2'- 4'	12	8	8	8	5	7.5	4	6.5	41.1	28.0	28.0	28.0	5	17	72.5	58.0	5	17	24.0	24.0	4	7	4	7	39.0	52	64	76	5	7	35.0	37.0	5	12	5	12	12
4 FT	8	8	8	8	4	6	4	6.5	39.5	24.0	24.0	24.0	5	17	47.0	58.0	5	17	23.0	23.0	4	7	4	7	36.0	52	64	76	5	7	35.0	37.0	5	12	5	12	12
6 FT	8	8	8	8	4	6.5	4	7	36.0	24.0	24.0	24.0	5	17	38.0	42.0	5	17	22.0	22.0	4	6.5	4	6.5	33.4	52	64	76	5	6.5	34.0	36.0	5	12	5	12	12
8 FT	8	8	8	8	4	6.5	4	6.5	33.5	24.0	24.0	24.0	5	17	36.0	38.0	5	17	23.0	22.0	5	9	4	6	32.0	52	64	76	5	6	33.0	35.0	5	12	5	12	0
10 FT	8	9	8	8	4	6	5	7	32.3	24.0	24.0	24.0	5	16	35.0	37.0	5	16	23.0	23.0	5	9	4	7	30.9	53	65	77	5	6.5	33.0	35.0	5	12	5	12	0
12 FT	8	9	8	8	4	6	5	6	31.4	24.0	24.0	24.0	5	14	34.0	36.0	5	14	23.0	23.0	5	7.5	4	6	30.1	53	65	77	5	6	32.0	35.0	5	12	5	12	0
14 FT	9	10	8	8	5	8.5	4	6	30.5	25.0	25.0	25.0	5	15	33.0	36.0	5	15	23.0	23.0	5	7.5	4	7	29.5	54	66	78	5	6	32.0	36.0	5	12	5	12	0
16 FT	10	11	8	8	5	8	5	8	29.9	26.0	26.0	26.0	5	15	33.0	36.0	5	15	22.0	22.0	5	7.5	4	7	29.0	55	67	79	5	6.5	32.0	36.0	5	12	5	12	0
18 FT	10	11	8	8	5	8	5	7.5	29.5	26.0	26.0	26.0	5	15	33.0	36.0	5	15	23.0	24.0	5	6	4	6.5	28.6	55	67	79	5	6	32.0	36.0	5	12	5	12	0
20 FT	11	12	8	8	5	7.5	5	8.5	29.1	27.0	27.0	27.0	5	14	32.0	36.0	5	14	22.0	23.0	5	6.5	4	6.5	28.4	56	68	80	5	6	31.0	36.0	5	12	5	12	0
22 FT	12	13	8	8	5	7	5	8.5	28.9	28.0	28.0	28.0	5	13	32.0	36.0	5	13	21.0	22.0	5	6.5	4	6	28.3	57	69	81	5	6	31.0	36.0	5	12	5	12	0
24 FT	12	13	8	8	5	7	5	8.5	27.6	28.0	28.0	28.0	5	13	31.0	36.0	5	13	21.0	22.0	5	6	4	6	27.1	57	69	81	6	8	34.0	39.0	5	12	5	12	0
26 FT	13	14	8	8	5	6.5	5	8.5	27.5	29.0	29.0	29.0	5	12	31.0	36.0	5	12	20.0	21.0	5	6.5	4	6	27.1	58	70	82	5	6	31.0	36.0	5	12	5	12	0
28 FT	13	15	8	8	5	6.5	5	8.5	27.6	29.0	29.0	29.0	5	12	31.0	36.0	5	12	21.0	22.0	5	6.5	4	6.5	27.0	59	71	83	5	6	31.0	37.0	5	12	5	12	0
30 FT	14	15	8	8	5	6	5	8.5	27.5	30.0	30.0	34.0	5	12	31.0	36.0	5	12	20.0	21.0	5	6	5	8.5	27.1	59	71	83	6	8	34.0	39.0	5	12	5	12	0
32 FT	15	16	8	8	5	6	5	8	32.5	31.0	31.0	35.0	6	17	39.0	45.0	6	17	29.0	30.0	5	6	5	8	27.3	60	72	84	6	8	34.0	40.0	5	12	5	12	0
34 FT	15	17	8	8	5	6	5	8	32.6	31.0	31.0	31.0	6	16	39.0	45.0	6	16	29.0	30.0	5	6	4	6	27.3	61	73	85	6	8.5	34.0	40.0	5	12	5	11.5	0
36 FT	16	17	8	8	5	6	5	7	32.5	32.0	32.0	36.0	6	16	39.0	45.0	6	16	29.0	30.0	6	8.5	5	7	27.4	61	73	85	6	8	34.0	40.0	5	12	5	11	0
38 FT	16	18	8	8	6	8	5	7	32.6	32.0	36.0	36.0	6	15	39.0	45.0	6	15	29.0	30.0	5	6	5	6.5	27.4	62	74	86	6	8	34.0	40.0	5	12	5	10	0
40 FT	17	18	8	8	6	8	5	6.5	32.6	37.0	37.0	37.0	6	16	39.0	45.0	6	16	29.0	30.0	6	8	5	6.5	27.6	62	74	86	6	7.5	34.0	40.0	5	12	5	9.5	0
42 FT	17	19	8	8	6	7.5	5	6.5	32.8	37.0	37.0	37.0	6	15	39.0	45.0	6	15	29.0	30.0	6	8	5	6.5	27.6	63	75	87	6	8	34.0	40.0	5	12	5	9.5	0
44 FT	18	19	8	8	6	7.5	5	6.5	32.6	38.0	38.0	38.0	6	15	39.0	45.0	6	15	29.0	30.0	6	7.5	5	6.5	27.8	63	75	87	6	7.5	34.0	40.0	5	12	5	9.5	0
46 FT	18	20	8	8	6	7.5	5	6.5	32.8	38.0	38.0	38.0	6	15	39.0	44.0	6	15	29.0	30.0	6	8	5	6	27.8	64	76	88	6	7.5	34.0	40.0	5	12	5	9.5	0
48 FT	19	20	8	8	6	7.5	5	6	32.8	39.0	39.0	39.0	6	15	39.0	44.0	6	15	29.0	30.0	6	7.5	5	6	27.9	64	76	88	6	7	34.0	40.0	5	12	5	9.5	0
50 FT	19	21	8	8	6	7	5	6	32.9	39.0	39.0	39.0	6	14	39.0	44.0	6	14	29.0	30.0	6	7.5	6	7.5	31.0	65	77	89	6	7.5	34.0	40.0	5	12	5	9	0

SPAN (S) = 7 FT      HEIGHT (HT) = 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS							
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS												
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1	
1 FT	12	8	8	8	5	7.5	4	8	41.1	28.0	28.0	28.0	4	16	72.5	54.5	4	16	25.0	26.0	4	8	4	6	57.4	88	100	4	6	37.0	37.0	5	12	5	12	12
2 FT	12	8	8	8	5	7.5	4	7.5	41.1	28.0	28.0	28.0	4	15	72.5	54.5	4	15	25.0	25.0	4	7	5	6.5	51.3	88	100	5	7	36.0	37.0	5	12	5	12	12
2'- 4'	12	8	9	8	5	7.5	4	6	41.8	28.0	28.0	28.0	5	17	73.5	58.0	5	17	25.0	25.0	4	7	5	6.5	51.3	88	100	5	7	36.0	37.0	5	12	5	12	12
4 FT	8	8	9	8	4	6	4	6	41.8	24.0	24.0	24.0	5	17	73.5	58.0	5	17	23.0	23.0	4	7	4	6.5	45.9	88	100	5	7	35.0	37.0	5	12	5	12	12
6 FT	8	8	9	8	4	6.5	4	6	44.3	24.0	24.0	24.0	5	17	40.0	43.0	5	17	22.0	22.0	4	6.5	5	6.5	41.8	88	100	5	6.5	34.0	36.0	5	12	5	12	12
8 FT	8	8	9	8	4	6.5	4	6	40.9	24.0	24.0	24.0	5	17	37.0	38.0	5	17	22.0	23.0	5	9	5	6	39.9	88	100	5	6	33.0	35.0	5	12	5	12	0
10 FT	8	9	9	8	4	6	5	6.5	39.1	24.0	28.0	28.0	5	16	35.0	37.0	5	16	23.0	23.0	5	9	5	7	39.4	89	101	5	6.5	33.0	36.0	5	12	5	12	0
12 FT	8	9	9	8	4	6	6	7	41.0	24.0	28.0	28.0	5	15	34.0	36.0	5	15	23.0	24.0	5	9	5	6	38.3	89	101	5	6	32.0	35.0	5	12	5	12	0
14 FT	9	10	9	8	5	8.5	5	6	37.8	25.0	29.0	29.0	5	15	34.0	36.0	5	15	23.0	23.0	5	7.5	5	6.5	37.9	90	102	5	6	32.0	36.0	5	12	5	12	0
16 FT	10	11	9	8	5	8	5	7	37.4	26.0	30.0	30.0	5	15	33.0	36.0	5	15	22.0	22.0	5	7.5	5	7	37.6	91	103	5	6.5	32.0	36.0	5	12	5	12	0
18 FT	10	11	9	8	5	8	5	6.5	36.8	30.0	30.0	30.0	5	15	33.0	36.0	5	15	23.0	23.0	5	6	5	6.5	36.9	91	103	5	6	32.0	36.0	5	12	5	12	0
20 FT	11	12	9	8	5	7.5	5	6.5	36.8	31.0	31.0	31.0	5	14	32.0	36.0	5	14	21.0	22.0	5	7	5	6.5	37.0	92	104	5	6	32.0	36.0	5	12	5	11	0
22 FT	11	13	9	8	5	7	5	6	36.5	31.0	31.0	31.0	5	14	32.0	35.0	5	14	22.0	23.0	5	7	5	7	37.0	93	105	5	6	32.0	36.0	5	12	5	10	0
24 FT	12	13	9	8	5	7	5	7	34.8	32.0	32.0	32.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6	5	7	35.0	93	105									

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
										HT=9'	HT=10'														HT=9'	HT=10'									
1 FT	12	9	8	8	5	7.5	5	9	41.1	28.0	32.0	4	16	72.5	54.5	4	16	26.0	27.0	4	8	5	6	60.0	113	125	4	7	58.0	38.0	5	12	5	12	12
2 FT	12	9	8	8	5	7	5	8.5	41.1	28.0	32.0	4	15	72.5	54.5	4	15	25.0	26.0	4	7.5	6	7	63.0	113	125	4	6.5	39.0	38.0	5	12	5	12	12
2'- 4'	12	9	9	8	5	7	5	6	44.8	28.0	32.0	5	17	75.5	58.0	5	17	25.0	26.0	4	7	6	7	63.0	113	125	4	6	39.0	38.0	5	12	5	11	12
4 FT	8	9	9	8	4	6	5	6	44.8	24.0	28.0	5	17	75.5	58.0	5	17	23.0	23.0	4	7	5	6	60.8	113	125	4	6	37.0	38.0	5	12	5	11	12
6 FT	8	9	10	8	4	6.5	5	6.5	59.1	24.0	28.0	5	17	45.0	43.0	5	17	22.0	22.0	4	7	5	6.5	56.3	113	125	5	7.5	34.0	37.0	5	12	5	11	12
8 FT	8	9	10	8	4	6.5	5	6.5	50.8	28.0	28.0	5	17	38.0	38.0	5	17	22.0	22.0	4	6.5	5	6	51.8	113	125	5	7	33.0	36.0	5	12	5	10.5	0
10 FT	8	9	10	8	4	6	6	7.5	50.9	28.0	32.0	5	16	36.0	37.0	5	16	23.0	23.0	5	9	6	6.5	52.6	113	125	5	6	33.0	36.0	5	12	5	9.5	0
12 FT	8	10	10	8	4	6	6	6.5	48.5	28.0	32.0	5	15	35.0	36.0	5	15	23.0	24.0	5	8.5	6	7	53.1	114	126	5	6.5	33.0	36.0	5	12	5	9	0
14 FT	9	10	10	8	5	8.5	5	6	46.4	29.0	29.0	5	16	34.0	36.0	5	16	23.0	23.0	5	8	6	7	51.3	114	126	5	6	33.0	36.0	5	12	5	8.5	0
16 FT	9	11	10	8	5	8	5	6	44.8	29.0	29.0	5	15	33.0	35.0	5	15	23.0	24.0	5	7.5	6	7	51.8	115	127	5	6	33.0	36.0	5	12	5	8	0
18 FT	10	12	10	8	5	8	5	6.5	45.3	30.0	30.0	5	15	33.0	35.0	5	15	22.0	23.0	5	7.5	6	7	51.8	116	128	5	6.5	33.0	36.0	5	12	5	8	0
20 FT	11	12	10	8	5	7.5	5	6	46.1	31.0	31.0	5	14	33.0	35.0	5	14	21.0	22.0	5	7	6	6.5	50.8	116	128	5	6	33.0	36.0	5	12	5	8	0
22 FT	11	13	10	8	5	7.5	5	6	45.4	31.0	31.0	5	14	32.0	35.0	5	14	22.0	23.0	5	7	6	6.5	51.4	117	129	5	6	33.0	36.0	5	12	5	8	0
24 FT	12	13	10	8	5	7	5	6	43.4	32.0	32.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6	6	6.5	48.0	117	129	6	8	35.0	39.0	5	12	5	8	0
26 FT	12	14	10	8	5	7	6	7.5	46.1	32.0	36.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6.5	6	7	48.6	118	130	6	8.5	35.0	39.0	5	12	5	8	0
28 FT	13	15	11	8	5	6.5	5	6	43.6	33.0	33.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6.5	5	6.5	45.9	119	131	5	6	32.0	36.0	5	12	5	7.5	0
30 FT	14	15	11	8	5	6.5	5	6	44.3	34.0	34.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6	5	6	45.5	119	131	6	8	35.0	39.0	5	12	5	7.5	0
32 FT	14	16	12	8	5	6.5	5	6	44.1	34.0	34.0	5	12	31.0	34.0	5	12	20.0	21.0	5	6.5	5	6	45.9	120	132	6	8	35.0	40.0	5	12	5	7	0
34 FT	15	17	12	8	5	6.5	5	6	49.6	35.0	35.0	6	17	40.0	43.0	6	17	29.0	30.0	5	6.5	5	6.5	46.5	121	133	6	8	36.0	40.0	5	12	5	7	0
36 FT	15	17	13	8	5	6	5	6	49.6	35.0	35.0	6	16	40.0	43.0	6	16	29.0	30.0	5	6	5	6	46.0	121	133	6	7.5	35.0	40.0	5	12	5	6.5	0
38 FT	16	18	13	8	5	6	6	8.5	54.1	36.0	36.0	6	16	40.0	43.0	6	16	29.0	29.0	5	6	5	6	46.6	122	134	6	8	36.0	40.0	5	12	5	6.5	0
40 FT	16	18	13	8	6	8.5	6	8	54.0	36.0	36.0	6	15	40.0	43.0	6	15	29.0	30.0	5	6	5	6	46.5	122	134	6	7.5	36.0	40.0	5	12	5	6.5	0
42 FT	17	19	14	8	5	6	6	8	54.8	37.0	37.0	6	16	39.0	42.0	6	16	29.0	29.0	5	6	5	6	46.9	123	135	6	7.5	36.0	40.0	5	12	5	6	0
44 FT	17	19	14	8	6	8	6	8	54.6	37.0	37.0	6	15	39.0	42.0	6	15	29.0	29.0	6	8	5	6	46.8	123	135	6	7	36.0	40.0	5	12	5	6	0
46 FT	18	20	14	8	6	8	6	7.5	55.3	38.0	38.0	6	16	39.0	42.0	6	16	28.0	29.0	6	8	5	6	47.3	124	136	6	7.5	36.0	40.0	5	12	5	6	0
48 FT	18	20	15	8	6	7.5	6	8	55.4	38.0	42.0	6	15	39.0	42.0	6	15	28.0	29.0	6	7.5	6	8	50.0	124	136	6	7	36.0	40.0	5	12	6	8.5	0
50 FT	18	21	15	8	6	7	6	7.5	55.4	38.0	42.0	6	14	39.0	42.0	6	14	28.0	29.0	6	8	6	8	50.6	125	137	6	7	36.0	40.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 7 FEET HEIGHT (HT): 9 THRU 10 FEET	
	DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	SHEET NO. <b>703.87A</b> 9 OF 27

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

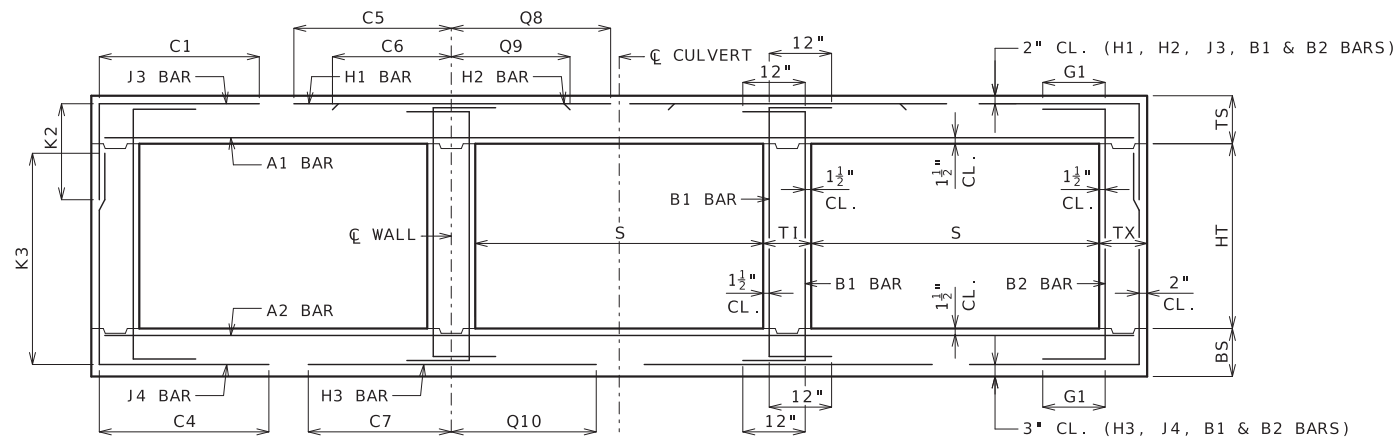


		SPAN (S) = 8 FT												HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	8	8	8	5	7	4	8.5	44.8	28.0	28.0	28.0	4	13	81.5	60.5	4	13	27.0	23.0	4	7.5	4	6.5	42.0	52	64	76	5	7	39.0	40.0	5	12	5	12	12
2 FT	12	8	8	8	5	7	4	8.5	44.8	28.0	28.0	28.0	4	12	81.5	60.5	4	12	26.0	25.0	4	6.5	4	6	38.8	52	64	76	5	6.5	38.0	40.0	5	12	5	12	12
2'- 4'	12	8	8	8	5	7	5	6	44.8	28.0	28.0	28.0	5	16	81.5	64.0	5	16	27.0	27.0	4	6	4	6	38.8	52	64	76	5	6	38.0	40.0	5	11	5	12	12
4 FT	8	8	8	8	4	6	5	6	40.6	24.0	24.0	24.0	5	16	50.0	64.0	5	16	27.0	27.0	4	6	4	6	35.4	52	64	76	5	6	38.0	40.0	5	11	5	12	12
6 FT	8	8	8	8	4	6	5	6.5	36.5	28.0	24.0	28.0	5	15	42.0	45.0	5	15	26.0	26.0	5	8.5	5	6.5	33.5	52	64	76	6	7	39.0	41.0	5	12	5	12	12
8 FT	8	9	8	8	4	6	5	6	34.4	24.0	24.0	24.0	5	14	39.0	41.0	5	14	25.0	25.0	5	8	4	6.5	31.9	53	65	77	5	6	36.0	39.0	5	12	5	12	0
10 FT	9	10	8	8	5	8.5	4	6	32.6	25.0	25.0	25.0	5	15	38.0	41.0	5	15	25.0	25.0	5	8	4	7.5	30.5	54	66	78	5	6	35.0	39.0	5	12	5	12	0
12 FT	9	10	8	8	5	8.5	5	6.5	31.6	25.0	25.0	25.0	5	14	37.0	40.0	5	14	24.0	25.0	5	7	4	6.5	29.8	54	66	78	6	7	38.0	42.0	5	12	5	12	0
14 FT	10	11	8	8	5	8	5	7.5	30.5	26.0	26.0	26.0	5	14	36.0	40.0	5	14	24.0	25.0	5	6.5	4	6.5	29.0	55	67	79	5	6	34.0	39.0	5	12	5	12	0
16 FT	11	12	8	8	5	7.5	5	8.5	29.6	27.0	27.0	27.0	5	14	35.0	40.0	5	14	24.0	25.0	5	6.5	4	6.5	28.4	56	68	80	5	6	34.0	39.0	5	12	5	12	0
18 FT	11	13	8	8	5	7.5	5	8	29.5	27.0	27.0	27.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	4	6.5	27.6	57	69	81	6	8	37.0	43.0	5	12	5	12	0
20 FT	12	14	8	8	5	7	5	8.5	28.8	28.0	28.0	28.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	4	6.5	27.3	58	70	82	6	8	36.0	43.0	5	12	5	12	0
22 FT	13	14	8	8	5	6.5	5	8.5	28.1	29.0	29.0	29.0	5	12	34.0	40.0	5	12	23.0	24.0	6	8	4	6	27.4	58	70	82	6	7.5	37.0	43.0	5	12	5	12	0
24 FT	14	15	8	8	5	6	5	8.5	27.9	30.0	30.0	30.0	5	12	34.0	40.0	5	12	22.0	23.0	6	8	4	6	27.3	59	71	83	6	7.5	36.0	43.0	5	12	5	12	0
26 FT	15	16	8	8	6	8.5	5	8	32.6	31.0	31.0	31.0	6	16	42.0	49.0	6	16	30.0	32.0	6	8	4	6	27.3	60	72	84	6	7.5	36.0	43.0	5	12	5	12	0
28 FT	15	16	8	8	6	8	5	8	31.6	31.0	31.0	31.0	6	16	42.0	48.0	6	16	31.0	32.0	6	7.5	4	6	26.1	60	72	84	6	7	36.0	43.0	5	12	5	12	0
30 FT	16	17	8	8	6	8	5	7	31.5	32.0	32.0	32.0	6	15	42.0	48.0	6	15	30.0	31.0	6	7.5	4	6	26.3	61	73	85	6	7	36.0	43.0	5	12	5	12	0
32 FT	16	18	8	8	6	7.5	5	7	31.6	32.0	36.0	36.0	6	15	42.0	48.0	6	15	31.0	32.0	6	7.5	5	6.5	26.1	62	74	86	6	7	36.0	43.0	5	12	5	12	0
34 FT	17	19	8	8	6	7.5	5	6.5	31.6	37.0	37.0	37.0	6	14	42.0	48.0	6	14	30.0	31.0	6	7.5	5	6.5	26.3	63	75	87	6	7	36.0	43.0	5	12	5	11.5	0
36 FT	18	19	8	8	6	7.5	5	6.5	31.5	38.0	38.0	38.0	6	14	42.0	48.0	6	14	30.0	31.0	6	7.5	5	6.5	26.4	63	75	87	6	7	36.0	43.0	5	12	5	10.5	0
38 FT	18	20	8	8	6	7	5	6.5	31.6	38.0	38.0	38.0	6	13	42.0	48.0	6	13	30.0	31.0	6	7.5	5	6	26.4	64	76	88	6	7	36.0	43.0	5	12	5	10	0
40 FT	19	20	8	8	6	7	5	6	31.6	39.0	39.0	39.0	6	13	42.0	48.0	6	13	29.0	31.0	6	6.5	5	6	26.5	64	76	88	6	6.5	36.0	43.0	5	12	5	9.5	0
42 FT	19	21	8	8	6	6	5	6	31.8	39.0	39.0	39.0	6	12	42.0	48.0	6	12	30.0	31.0	6	7	6	7.5	29.6	65	77	89	6	6.5	36.0	43.0	5	12	5	9.5	0
44 FT	20	22	8	8	6	6.5	6	7.5	35.9	44.0	44.0	44.0	6	13	41.0	48.0	6	13	29.0	30.0	6	7	6	7	29.8	66	78	90	6	6.5	36.0	43.0	5	12	5	9.5	0
46 FT	21	22	8	8	6	6.5	6	7	35.8	45.0	45.0	45.0	6	13	41.0	48.0	6	13	29.0	30.0	6	6.5	6	7	29.9	66	78	90	6	6.5	36.0	43.0	5	12	5	9.5	0
48 FT	21	23	8	8	6	6.5	6	7	36.0	45.0	45.0	45.0	6	13	41.0	48.0	6	13	29.0	30.0	6	7	6	6.5	30.0	67	79	91	6	6.5	36.0	43.0	5	12	5	9.5	0
50 FT	22	23	8	8	6	6.5	6	6.5	35.9	46.0	46.0	46.0	6	13	41.0	47.0	6	13	29.0	30.0	6	6.5	6	6.5	30.1	67	79	91	6	6	36.0	43.0	5	12	5	9	0

		SPAN (S) = 8 FT												HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7	4	6	44.8	28.0	28.0	28.0	4	13	81.5	60.5	4	13	27.0	25.0	4	7.5	4	6	66.0	89	101	113	5	8	41.0	41.0	5	12	5	12	12
2 FT	12	9	8	8	5	7	4	6	44.8	28.0	28.0	28.0	4	12	81.5	60.5	4	12	26.0	24.0	4	6.5	5	6.5	61.3	89	101	113	5	7.5	39.0	41.0	5	12	5	12	12
2'- 4'	12	9	8	8	5	7	6	7.5	47.8	28.0	32.0	32.0	5	16	83.5	64.0	5	16	27.0	28.0	5	8.5	6	6	61.3	89	101	113	5	6	39.0	41.0	5	12	5	12	12
4 FT	8	8	8	8	4	6	6	7.5	47.8	28.0	32.0	32.0	5	16	83.5	64.0	5	16	27.0	28.0	5	8.5	6	6	55.0	88	100	112	5	6	38.0	40.0	5	12	5	12	12
6 FT	8	9	8	8	4	6	6	7.5	52.5	24.0	28.0	32.0	5	15	44.0	47.0	5	15	26.0	26.0	5	8.5	6	6.5	52.3	89	101	113	5	6.5	37.0	40.0	5	12	5	12	12
8 FT	8	9	8	8	4	6	6	7.5	47.4	24.0	28.0	32.0	5	14	40.0	42.0	5	14	25.0	25.0	5	7.5	6	6	48.1	89	101	113	5	6	36.0	39.0	5	12	5	11.5	0
10 FT	9	10	8	8	5	8.5	6	7	46.3	25.0	29.0	33.0	5	15	39.0	41.0	5	15	25.0	25.0	5	7.5	6	6.5	46.9	90	102	114	5	6	35.0	39.0	5	12	5	11	0
12 FT	9	10	8	8	5	8.5	6	7	44.8	29.0	33.0	33.0	5	14	37.0	40.0	5	14	24.0	25.0	5	6.5	6	6	45.4	90	102	114	6	7	38.0	42.0	5	12	5	10	0
14 FT	10	11	8	8	5	8	6	6.5	44.1	30.0	30.0	34.0	5	14	37.0	40.0	5	14	24.0	25.0	5	6.5	6	6	44.9	91	103	115	5	6	35.0	39.0	5	12	5	9.5	0
16 FT	11	12	8	8	5	7.5	6	6.5	43.6	31.0	31.0	35.0	5	14	36.0	40.0	5	14	24.0	25.0	5	6.5	6	6.5	44.4	92	104	116	5	6	34.0	39.0	5	12	5	9.5	0
18 FT	11	13	8	8	5	7.5	6	6	42.8	31.0	31.0	35.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	6	6.5	43.9	93	105	117	6	8	37.0	43.0	5	12	5	9.5	0
20 FT	12	14	8	8	5	7	6	6	42.4	32.0	32.0	36.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	6	6.5	43.4	94	106	118	6	8	37.0	43.0	5	12	5	9.5	0
22 FT	13	14	8	8	5	6.5	6	6	42.1	33.0	33.0	37.0	5	12	35.0	39.0	5	12	23.0	24.0	6	8	6	6	43.0	94	106	118	6	7.5	37.0	43.0					

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 8 FT HEIGHT (HT) = 10 FT OR 11 FT																														
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS														
	TS	BS	TX	TI	A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
					SIZE	SPA.	SIZE	SPA.	C1	K2 HT=10' HT=11'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=10' HT=11'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	9	5	7	5	7	44.9	32.0	32.0	4	13	81.5	61.5	4	13	28.0	26.0	4	6.5	6	6	69.3	125	137	5	7.5	43.0	42.0	5	11.5	5	10	12
2 FT	12	9	9	9	5	7	5	8	45.5	32.0	32.0	4	12	82.5	61.5	4	12	27.0	24.0	4	6.5	6	6.5	70.0	125	137	5	7	41.0	41.0	5	11.5	5	10.5	12
2'- 4'	12	9	10	9	5	7	6	7	49.1	32.0	32.0	5	16	84.5	65.0	5	16	27.0	27.0	4	6	6	6.5	70.0	125	137	5	7	41.0	41.0	5	11.5	5	9.5	12
4 FT	8	9	10	9	4	6	6	7	49.1	28.0	28.0	5	16	84.5	65.0	5	16	27.0	27.0	4	6	5	6	65.8	125	137	5	7	39.0	41.0	5	11.5	5	9.5	12
6 FT	8	9	11	9	4	6	5	6	57.1	28.0	28.0	5	16	44.0	44.0	5	16	26.0	26.0	5	9	5	6	56.6	125	137	5	6.5	37.0	39.0	5	11.5	5	9.5	12
8 FT	8	10	11	9	4	6	6	7	54.8	28.0	28.0	5	15	41.0	41.0	5	15	25.0	26.0	5	9	5	6.5	56.4	126	138	5	6.5	37.0	39.0	5	12	5	9	0
10 FT	8	10	11	9	4	6	6	6.5	51.9	28.0	28.0	5	14	39.0	40.0	5	14	25.0	25.0	5	7.5	5	6	54.0	126	138	5	6	36.0	39.0	5	12	5	8.5	0
12 FT	9	11	11	9	5	8.5	6	7	52.5	29.0	29.0	5	14	38.0	39.0	5	14	25.0	25.0	5	7.5	5	6	53.9	127	139	5	6	36.0	39.0	5	12	5	8	0
14 FT	10	11	11	9	5	8	5	6	50.1	30.0	30.0	5	15	37.0	39.0	5	15	25.0	25.0	5	7	5	6	51.9	127	139	5	6	35.0	39.0	5	12	5	7.5	0
16 FT	10	12	11	9	5	7.5	5	6	48.3	30.0	30.0	5	13	36.0	39.0	5	13	24.0	25.0	5	6.5	5	6	52.3	128	140	5	6	35.0	39.0	5	12	5	7.5	0
18 FT	11	13	11	9	5	7.5	5	6.5	48.6	31.0	31.0	5	14	36.0	39.0	5	14	24.0	25.0	5	6.5	6	7	55.0	129	141	6	8	38.0	42.0	5	12	5	7.5	0
20 FT	12	14	11	9	5	7	5	6	48.8	32.0	32.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6.5	6	7	54.9	130	142	6	8	38.0	43.0	5	12	5	7.5	0
22 FT	13	15	11	9	5	6.5	6	8	52.1	33.0	37.0	5	12	35.0	39.0	5	12	23.0	24.0	5	6	6	7	54.9	131	143	6	8	38.0	43.0	5	12	5	7.5	0
24 FT	13	15	12	9	5	6.5	5	6	48.3	33.0	33.0	5	12	35.0	38.0	5	12	23.0	25.0	5	6	6	7.5	53.9	131	143	6	7	38.0	43.0	5	12	5	7	0
26 FT	14	16	12	9	5	6	6	8	51.8	34.0	38.0	5	12	35.0	38.0	5	12	22.0	24.0	5	6	6	7.5	54.1	132	144	6	7.5	38.0	43.0	5	12	5	7	0
28 FT	15	16	12	9	5	6	6	8	56.1	35.0	39.0	6	16	43.0	47.0	6	16	31.0	32.0	6	7.5	6	8	51.0	132	144	6	7	38.0	43.0	5	12	5	7	0
30 FT	15	17	12	9	6	8	6	7	55.9	35.0	39.0	6	16	43.0	47.0	6	16	31.0	32.0	6	8	6	7.5	51.5	133	145	6	7	38.0	43.0	5	12	5	7	0
32 FT	16	18	13	9	6	8	6	8	56.5	36.0	40.0	6	15	42.0	47.0	6	15	30.0	31.0	6	8	6	8.5	51.8	134	146	6	7	38.0	43.0	5	12	5	6.5	0
34 FT	17	19	13	9	6	8	6	7.5	56.9	37.0	41.0	6	14	42.0	47.0	6	14	30.0	31.0	6	8	6	8.5	52.3	135	147	6	7	38.0	43.0	5	12	5	6.5	0
36 FT	17	19	14	9	6	7.5	6	7.5	57.0	37.0	41.0	6	14	42.0	46.0	6	14	30.0	31.0	6	7.5	6	8	51.9	135	147	6	6.5	38.0	43.0	5	12	5	6	0
38 FT	18	20	14	9	6	7.5	6	7.5	57.4	38.0	42.0	6	14	42.0	46.0	6	14	30.0	31.0	6	7.5	6	8	52.3	136	148	6	7	38.0	43.0	5	12	5	6	0
40 FT	18	20	14	9	6	7	6	6.5	57.3	38.0	42.0	6	13	42.0	46.0	6	13	30.0	31.0	6	6.5	6	8	52.1	136	148	6	6.5	38.0	43.0	5	12	5	6	0
42 FT	19	21	15	9	6	7	6	7	57.9	43.0	43.0	6	14	42.0	46.0	6	14	30.0	30.0	6	7	6	8	52.6	137	149	6	6.5	38.0	43.0	5	12	6	8	0
44 FT	19	22	15	9	6	7	6	7	57.9	43.0	43.0	6	13	42.0	46.0	6	13	30.0	30.0	6	7	6	8	53.0	138	150	6	6.5	38.0	43.0	5	12	6	8	0
46 FT	20	22	15	9	6	7	6	6	58.1	44.0	44.0	6	14	42.0	45.0	6	14	30.0	30.0	6	7	6	7.5	52.9	138	150	6	6.5	38.0	43.0	5	12	6	8	0
48 FT	20	23	16	9	6	6.5	6	7	58.5	44.0	44.0	6	13	42.0	45.0	6	13	30.0	30.0	6	7	6	7.5	53.3	139	151	6	6.5	38.0	44.0	5	12	6	8	0
50 FT	21	23	16	9	6	6.5	6	6.5	58.9	45.0	45.0	6	13	42.0	45.0	6	13	29.0	30.0	6	6.5	6	7.5	53.3	139	151	6	6	38.0	44.0	5	12	6	8	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 8 FEET HEIGHT (HT): 10 THRU 11 FEET	
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.87A</b>	SHEET NO. <b>11 OF 27</b>

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

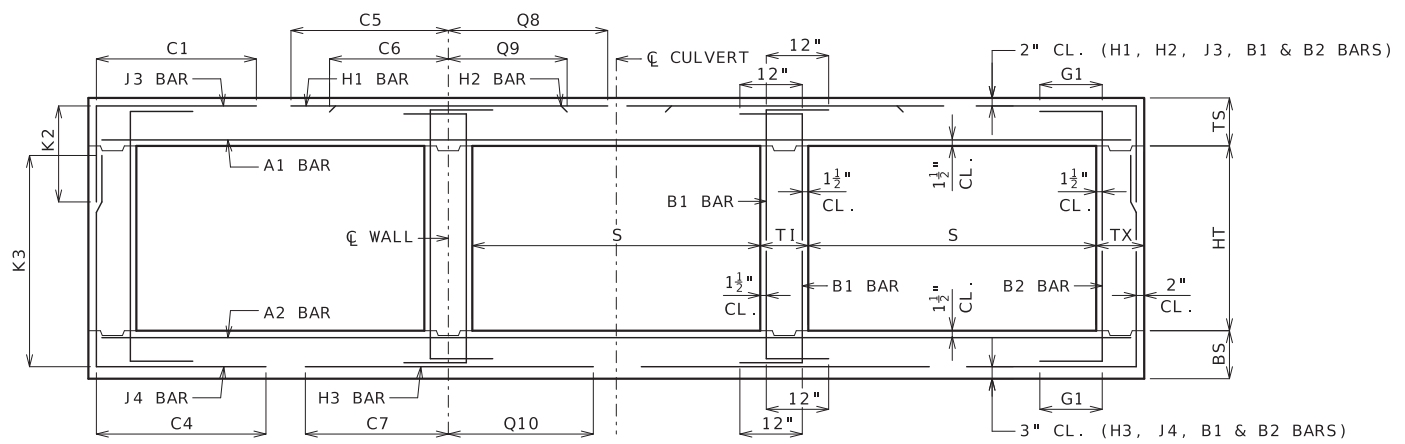
SPAN (S) = 9 FT      HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	8	8	8	5	6.5	4	7.5	48.3	29.0	29.0	29.0	4	12	89.5	66.5	4	12	28.0	26.0	4	6.5	5	6	46.1	64	76	88	5	6	42.0	43.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	4	7.5	48.3	29.0	29.0	29.0	5	17	89.5	68.5	5	17	27.0	27.0	4	6.5	4	6	43.9	65	77	89	5	6.5	41.0	43.0	5	12	5	12	12
2'- 4'	13	9	8	8	5	6.5	5	6.5	48.3	29.0	29.0	29.0	5	16	89.5	70.0	5	16	29.0	29.0	5	8.5	4	6	43.9	65	77	89	5	6	41.0	43.0	5	12	5	12	12
4 FT	9	9	8	8	5	8.5	5	6.5	44.8	25.0	25.0	25.0	5	16	57.0	70.0	5	16	29.0	29.0	5	8.5	4	6	39.6	65	77	89	5	6	40.0	43.0	5	12	5	12	12
6 FT	9	9	8	8	5	8.5	5	6.5	39.6	25.0	25.0	29.0	5	15	46.0	52.0	5	15	27.0	28.0	5	7.5	5	6.5	36.5	65	77	89	6	7	42.0	45.0	5	12	5	12	12
8 FT	9	10	8	8	5	8.5	5	6.5	36.8	25.0	25.0	25.0	5	14	42.0	45.0	5	14	26.0	27.0	5	7.5	4	6.5	34.8	66	78	90	5	6	38.0	42.0	5	12	5	12	0
10 FT	9	10	8	8	5	8.5	5	6	35.4	25.0	25.0	29.0	5	12	41.0	44.0	5	12	26.0	26.0	5	7	5	7	33.5	66	78	90	6	6.5	41.0	45.0	5	12	5	12	0
12 FT	10	11	8	8	5	8	5	7	33.9	26.0	26.0	30.0	5	12	40.0	44.0	5	12	26.0	26.0	5	6.5	5	7.5	32.4	67	79	91	6	7	40.0	45.0	5	12	5	12	0
14 FT	11	12	8	8	5	7.5	5	7.5	32.8	27.0	27.0	31.0	5	13	39.0	43.0	5	13	25.0	26.0	5	6	5	8.5	31.6	68	80	92	6	7	40.0	46.0	5	12	5	12	0
16 FT	12	13	8	8	5	7	5	8	31.9	28.0	28.0	32.0	5	13	38.0	43.0	5	13	25.0	27.0	5	6	5	8.5	31.0	69	81	93	6	7	39.0	46.0	5	12	5	12	0
18 FT	13	14	8	8	5	6.5	5	8	31.3	29.0	29.0	33.0	5	12	37.0	43.0	5	12	25.0	26.0	6	8	5	8.5	30.6	70	82	94	6	7.5	39.0	46.0	5	12	5	12	0
20 FT	14	15	8	8	5	6	5	8.5	30.6	30.0	30.0	34.0	5	12	37.0	43.0	5	12	24.0	26.0	6	8	5	8.5	30.3	71	83	95	6	7	39.0	46.0	5	12	5	12	0
22 FT	15	16	8	8	6	8	5	8	35.3	31.0	31.0	35.0	6	16	45.0	52.0	6	16	32.0	34.0	6	7.5	5	8	30.0	72	84	96	6	7	39.0	46.0	5	12	5	12	0
24 FT	15	16	8	8	6	8	5	7.5	35.0	31.0	35.0	35.0	6	16	45.0	52.0	6	16	33.0	35.0	6	6.5	5	8	29.8	72	84	96	6	6.5	39.0	46.0	5	12	5	11.5	0
26 FT	16	17	8	8	6	8	5	7	34.9	32.0	36.0	36.0	6	15	45.0	52.0	6	15	32.0	34.0	6	7	5	7	29.8	73	85	97	6	6.5	39.0	46.0	5	12	5	10.5	0
28 FT	17	18	8	8	6	7.5	5	6.5	34.8	32.0	37.0	37.0	6	14	45.0	52.0	6	14	32.0	34.0	6	7	5	6.5	29.8	74	86	98	6	6.5	39.0	46.0	5	12	5	9.5	0
30 FT	18	19	8	8	6	7	5	6.5	33.6	38.0	38.0	38.0	6	13	44.0	52.0	6	13	31.0	32.0	6	7	5	6.5	28.8	75	87	99	6	6	39.0	46.0	5	12	5	9.5	0
32 FT	18	20	8	8	6	7	5	6.5	33.8	38.0	38.0	38.0	6	13	44.0	51.0	6	13	32.0	33.0	6	7	5	6	28.8	76	88	100	6	6.5	39.0	46.0	5	12	5	9.5	0
34 FT	19	20	8	8	6	6.5	5	6	33.6	39.0	39.0	39.0	6	13	44.0	51.0	6	13	31.0	33.0	6	6	5	6	28.9	76	88	100	6	6	39.0	46.0	5	12	5	9.5	0
36 FT	20	21	8	8	6	6.5	6	7	37.8	44.0	44.0	44.0	6	12	44.0	51.0	6	12	30.0	32.0	6	6.5	6	7.5	32.0	77	89	101	6	6	39.0	46.0	5	12	5	9.5	0
38 FT	20	22	8	8	6	6	6	7.5	37.9	44.0	44.0	44.0	6	12	44.0	51.0	6	12	31.0	32.0	6	6.5	6	7	32.0	78	90	102	6	6	39.0	46.0	5	12	5	9	0
40 FT	21	23	8	8	6	6	6	7	38.0	45.0	45.0	45.0	6	12	44.0	51.0	6	12	30.0	32.0	6	6.5	6	6.5	32.3	79	91	103	6	6	39.0	46.0	5	12	5	8.5	0
42 FT	22	23	8	8	6	6	6	6.5	37.9	46.0	46.0	46.0	6	12	44.0	51.0	6	12	30.0	31.0	6	6	6	6.5	32.3	79	91	103	7	8	42.0	49.0	5	12	5	8	0
44 FT	23	24	9	8	6	6	6	7	38.8	47.0	47.0	47.0	6	12	44.0	50.0	6	12	30.0	31.0	6	6	6	7	33.0	80	92	104	7	8	42.0	50.0	5	12	5	8.5	0
46 FT	23	25	9	8	7	8	6	7	38.9	47.0	47.0	47.0	7	16	49.0	55.0	7	16	35.0	36.0	6	6	6	7	33.0	81	93	105	7	8	42.0	50.0	5	12	5	8.5	0
48 FT	24	25	9	8	7	8	6	7	38.9	48.0	48.0	48.0	6	12	43.0	50.0	6	12	30.0	31.0	6	6	6	7	33.1	81	93	105	7	7.5	42.0	50.0	5	12	5	8	0
50 FT	24	26	9	8	7	7.5	6	6.5	39.0	48.0	48.0	48.0	7	15	48.0	55.0	7	15	35.0	36.0	6	6	6	6.5	33.3	82	94	106	7	7.5	42.0	50.0	5	12	5	7.5	0

SPAN (S) = 9 FT      HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	5	8.5	48.3	29.0	29.0	33.0	4	12	89.5	66.5	4	12	29.0	27.0	4	6.5	6	6.5	75.0	101	113	125	5	7	43.0	44.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	5	8.5	51.3	29.0	33.0	33.0	5	18	91.5	68.5	5	18	28.0	25.0	5	9	6	6.5	69.0	101	113	125	5	6.5	42.0	44.0	5	12	5	11.5	12
2'- 4'	13	9	8	8	5	6.5	6	7	51.3	29.0	33.0	33.0	5	16	91.5	70.0	5	16	29.0	30.0	5	8	6	6	69.0	101	113	125	5	6	42.0	44.0	5	12	5	10	12
4 FT	9	9	8	8	5	8.5	6	7	51.3	29.0	33.0	33.0	5	16	91.5	70.0	5	16	29.0	30.0	5	8	6	6	62.0	101	113	125	5	6	41.0	44.0	5	12	5	10	12
6 FT	9	10	9	8	5	8.5	5	6	54.9	25.0	25.0	29.0	5	15	49.0	53.0	5	15	27.0	28.0	5	8	5	6	53.9	102	114	126	5	6.5	39.0	43.0	5	12	5	11	12
8 FT	9	10	9	8	5	8.5	5	6	48.8	25.0	29.0	29.0	5	14	44.0	46.0	5	14	26.0	27.0	5	7	6	6.5	52.4	102	114	126	6	7	41.0	46.0	5	12	5	10.5	0
10 FT	9	11	9	8	5	8.5	5	6	46.5	25.0	29.0	29.0	5	12	42.0	44.0	5	12	26.0	26.0	5	6.5	6	7	51.4	103	115	127	5	6	38.0	43.0	5	12	5	9.5	0
12 FT	10	11	9	8	5	8	5	6	45.8	30.0	30.0	30.0	5	13	40.0	43.0	5	13	26.0	27.0	5	6.5	6	6	49.5	103	115	127	6	7	40.0	45.0	5	12	5	9	0
14 FT	11	12	9	8	5	7.5	6	7	48.1	31.0	31.0	35.0	5	13	39.0	43.0	5	13	25.0	27.0	5	6	6	6.5	48.8	104	116	128	6	7	40.0	46.0	5	12	5	8.5	0
16 FT	12	13	9	8	5	7	6	6.5	47.4	32.0	32.0	36.0	5	13	39.0	43.0	5	13	25.0	27.0	5	6	6	6.5	48.3	105	117	129	6	7	40.0	46.0	5	12	5	8.5	0
18 FT	13	14	9	8	5	6.5	6	7	46.9	33.0	33.0	37.0	5	12	38.0	43.0	5	12	24.0	26.0	6	8	6	6.5	47.6	106	118	130	6	7.5	40.0	46.0	5	12	5	8.5	0
20 FT	13	15	9	8	5	6.5	6	6	46.0	33.0	33.0	37.0	5	12	38.0	43.0	5	12	25.0	27.0	6	8	6	6.5	47.1	107	119	131	6	7	40.0	46.0	5	12	5	8.5	0
22 FT	14	16	11	8	5	6	5	6	43.5	34.0	34.0	34.0	5	12	37.0	42.0	5	12	25.0	26.0	6	7.5	5	7	44.0	108	120										

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 9 FT																HEIGHT (HT) = 11 FT OR 12 FT														
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS														
	A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=11' HT=12'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=11' HT=12'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	9	10	5	6.5	5	7.5	49.3	33.0	33.0	4	12	90.5	67.5	4	12	29.0	27.0	4	6	6	6	76.3	137	149	5	6.5	44.0	44.0	5	10	5	9	12
2 FT	13	10	9	10	5	6.5	5	7	52.3	33.0	33.0	5	18	92.5	69.5	5	18	28.0	25.0	4	6	6	6.5	76.3	138	150	5	7	44.0	45.0	5	11.5	5	9	12
2'- 4'	13	10	9	10	5	6.5	5	6	52.3	33.0	33.0	5	16	92.5	71.0	5	16	29.0	30.0	5	8.5	6	6	76.3	138	150	5	7	44.0	45.0	5	11.5	5	8.5	12
4 FT	9	10	9	10	5	8.5	5	6	52.3	29.0	29.0	5	16	92.5	71.0	5	16	29.0	30.0	5	8.5	6	6	76.3	138	150	5	7	43.0	45.0	5	11.5	5	8.5	12
6 FT	9	10	10	10	5	8.5	5	6	69.4	29.0	29.0	5	16	51.0	49.0	5	16	28.0	28.0	5	7.5	6	6.5	68.8	138	150	5	6	41.0	43.0	5	12	5	8	12
8 FT	9	10	10	10	5	8.5	5	6	60.0	29.0	29.0	5	14	45.0	45.0	5	14	27.0	27.0	5	7	6	6	63.9	138	150	6	7	43.0	45.0	5	12	5	8	0
10 FT	9	11	10	10	5	8.5	6	7	59.0	29.0	33.0	5	13	42.0	43.0	5	13	27.0	27.0	5	6.5	6	6	63.6	139	151	5	6	39.0	43.0	5	12	5	8	0
12 FT	10	12	10	10	5	8	6	7	58.6	30.0	34.0	5	13	41.0	43.0	5	13	26.0	27.0	5	6.5	6	6.5	62.8	140	152	5	6	39.0	43.0	5	12	5	8	0
14 FT	11	12	10	10	5	7.5	6	7.5	58.5	31.0	35.0	5	13	41.0	43.0	5	13	26.0	27.0	5	6	6	6	60.4	140	152	6	7	41.0	45.0	5	12	5	8	0
16 FT	12	13	11	10	5	7	5	6	54.4	32.0	32.0	5	13	40.0	42.0	5	13	26.0	27.0	5	6	6	7	59.1	141	153	6	7	41.0	45.0	5	12	5	7.5	0
18 FT	12	14	11	10	5	7	6	7.5	55.6	32.0	36.0	5	12	39.0	42.0	5	12	26.0	27.0	6	8	6	6.5	59.0	142	154	6	7.5	41.0	46.0	5	12	5	7.5	0
20 FT	13	15	12	10	5	6.5	6	8	55.0	33.0	37.0	5	12	38.0	42.0	5	12	26.0	27.0	6	8	6	7	58.1	143	155	6	7	41.0	46.0	5	12	5	7	0
22 FT	14	16	12	10	5	6	6	7.5	55.0	34.0	38.0	5	12	38.0	42.0	5	12	25.0	27.0	6	7.5	6	7	57.9	144	156	6	7	41.0	46.0	5	12	5	7	0
24 FT	15	17	13	10	6	8	6	7.5	61.0	35.0	39.0	6	16	47.0	51.0	6	16	33.0	35.0	6	7.5	6	7.5	57.4	145	157	6	6.5	41.0	46.0	5	12	5	6.5	0
26 FT	16	17	13	10	6	8	6	7	61.3	40.0	40.0	6	15	46.0	51.0	6	15	33.0	34.0	6	6.5	6	7	56.6	145	157	6	6.5	41.0	46.0	5	12	5	6.5	0
28 FT	16	18	14	10	6	8	6	7.5	61.0	36.0	40.0	6	15	46.0	51.0	6	15	33.0	35.0	6	7	6	7	56.6	146	158	6	6.5	41.0	46.0	5	12	5	6	0
30 FT	17	19	14	10	6	7.5	6	7.5	59.6	37.0	41.0	6	14	45.0	50.0	6	14	32.0	34.0	6	7	6	7.5	54.8	147	159	6	6	41.0	46.0	5	12	5	6	0
32 FT	18	20	14	10	6	7	6	7	59.9	38.0	42.0	6	13	45.0	50.0	6	13	32.0	33.0	6	7	6	7.5	55.0	148	160	6	6	41.0	46.0	5	12	5	6	0
34 FT	18	20	14	10	6	6.5	6	6.5	59.8	38.0	42.0	6	13	45.0	50.0	6	13	32.0	34.0	6	6	6	7.5	54.9	148	160	6	6	41.0	46.0	5	12	5	6	0
36 FT	19	21	15	10	6	6.5	6	7	60.3	43.0	43.0	6	13	45.0	50.0	6	13	31.0	33.0	6	6.5	6	7.5	55.3	149	161	6	6	41.0	47.0	5	12	6	8	0
38 FT	20	22	15	10	6	6.5	6	6.5	60.6	44.0	44.0	6	12	45.0	50.0	6	12	31.0	32.0	6	6.5	6	7.5	55.5	150	162	6	6	41.0	47.0	5	12	6	8	0
40 FT	20	23	16	10	6	6.5	6	6.5	60.9	44.0	44.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6.5	6	7.5	55.9	151	163	6	6	41.0	47.0	5	12	6	8	0
42 FT	21	23	16	10	6	6.5	6	6.5	61.1	45.0	45.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6	6	7.5	55.8	151	163	7	7.5	44.0	50.0	5	12	6	8	0
44 FT	22	24	17	10	6	6	6	6.5	61.9	46.0	46.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6	6	7	56.3	152	164	7	7.5	44.0	50.0	5	12	6	7.5	0
46 FT	22	25	17	10	6	6	6	6	61.9	46.0	46.0	6	12	45.0	48.0	6	12	31.0	32.0	6	6	6	7	56.5	153	165	7	8	44.0	50.0	5	12	6	7.5	0
48 FT	23	26	18	10	6	6	6	6.5	62.5	47.0	47.0	6	12	44.0	48.0	6	12	31.0	31.0	6	6	6	6.5	57.0	154	166	7	8	44.0	50.0	5	12	6	7	0
50 FT	23	26	18	10	7	8	6	6	62.5	47.0	47.0	6	12	44.0	48.0	6	12	31.0	31.0	6	6	6	6.5	56.9	154	166	7	7.5	44.0	50.0	5	12	6	7	0



BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.

**GENERAL NOTES:**  
 IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.  
 SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.  
 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
 DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.  
 CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b> MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 9 FEET HEIGHT (HT): 11 THRU 12 FEET	
	DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	SHEET NO. <b>703.87A</b> 13 OF 27

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

SPAN (S) = 10 FT      HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

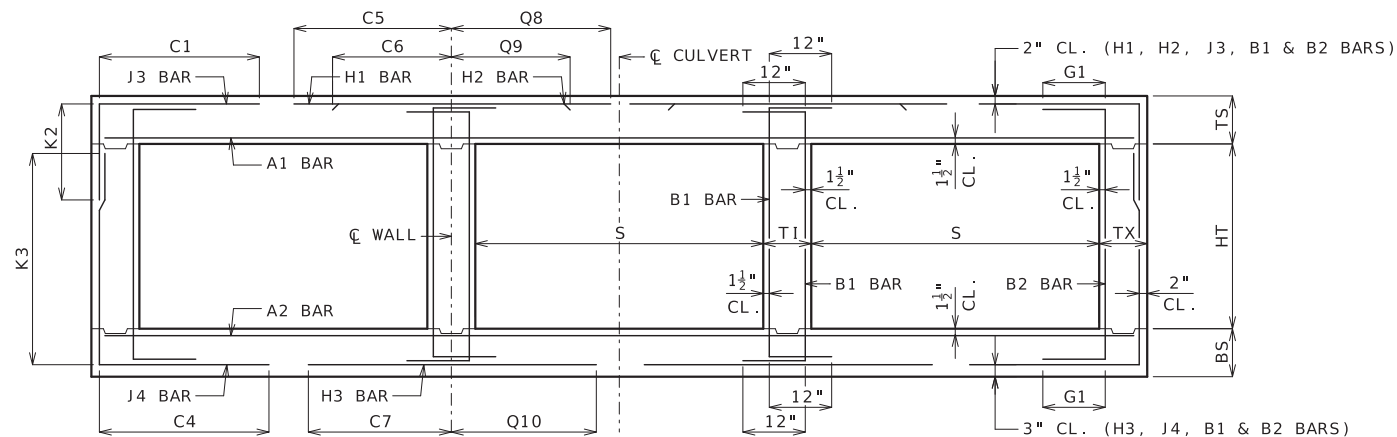
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	4	7	51.9	29.0	29.0	29.0	5	16	98.5	74.5	5	16	29.0	27.0	4	6	4	6	47.4	65	77	89	5	6.5	45.0	47.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	4	6.5	51.9	29.0	29.0	29.0	5	14	98.5	74.5	5	14	28.0	29.0	5	8.5	5	6.5	43.3	65	77	89	5	6	44.0	46.0	5	12	5	12	12
2' - 4'	13	9	8	8	5	6.5	6	7.5	51.9	29.0	29.0	29.0	5	13	98.5	76.0	5	13	30.0	30.0	5	7.5	5	6.5	43.3	65	77	89	6	6.5	46.0	49.0	5	10	5	12	12
4 FT	9	9	8	8	5	7.5	6	7.5	48.4	25.0	29.0	29.0	5	13	59.0	76.0	5	13	30.0	30.0	5	7.5	5	6.5	39.0	65	77	89	6	6.5	46.0	49.0	5	10	5	12	12
6 FT	9	9	8	8	5	8	5	6	39.8	29.0	29.0	29.0	5	13	49.0	55.0	5	13	28.0	29.0	5	7.5	6	7	39.8	65	77	89	6	6	45.0	48.0	5	12	5	12	12
8 FT	10	10	8	8	5	8	5	7.5	36.8	26.0	26.0	30.0	5	13	45.0	50.0	5	13	28.0	28.0	5	7	5	6.5	34.8	66	78	90	6	6.5	44.0	48.0	5	12	5	12	0
10 FT	10	11	8	8	5	8	5	6.5	35.4	26.0	26.0	30.0	6	15	47.0	51.0	6	15	30.0	31.0	5	6.5	5	7.5	32.9	67	79	91	6	6.5	43.0	49.0	5	12	5	12	0
12 FT	11	12	8	8	5	7.5	5	7	33.6	27.0	27.0	31.0	6	16	45.0	50.0	6	16	30.0	31.0	5	6	5	8.5	31.6	68	80	92	6	6.5	42.0	49.0	5	12	5	12	0
14 FT	12	13	8	8	5	7	5	8	32.4	28.0	28.0	32.0	6	16	44.0	50.0	6	16	29.0	31.0	5	6	5	8.5	30.9	69	81	93	6	6.5	42.0	49.0	5	12	5	12	0
16 FT	13	14	8	8	5	6.5	5	8	31.3	29.0	29.0	33.0	6	16	44.0	50.0	6	16	29.0	31.0	6	8	5	8.5	30.3	70	82	94	6	7	42.0	49.0	5	12	5	12	0
18 FT	14	15	8	8	5	6	5	8.5	30.5	30.0	30.0	34.0	6	16	43.0	50.0	6	16	29.0	31.0	6	7.5	5	8.5	29.8	71	83	95	6	7	41.0	49.0	5	12	5	12	0
20 FT	15	16	8	8	6	8	5	8	34.9	31.0	31.0	35.0	6	16	48.0	56.0	6	16	35.0	37.0	6	7	5	8	29.4	72	84	96	6	7	41.0	49.0	5	12	5	12	0
22 FT	16	17	8	8	6	8	5	7	34.4	32.0	32.0	36.0	6	15	48.0	56.0	6	15	34.0	37.0	6	7	5	7	29.0	73	85	97	6	6.5	41.0	50.0	5	12	5	12	0
24 FT	17	18	8	8	6	7.5	5	6.5	34.0	37.0	37.0	37.0	6	14	48.0	56.0	6	14	34.0	36.0	6	6.5	5	6.5	28.9	74	86	98	6	6.5	41.0	50.0	5	12	5	11	0
26 FT	18	19	8	8	6	7	5	6.5	33.9	38.0	38.0	38.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6.5	28.8	75	87	99	6	6	41.0	50.0	5	12	5	10	0
28 FT	19	20	8	8	6	6.5	5	6	33.8	39.0	39.0	39.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6	28.8	76	88	100	6	6	41.0	50.0	5	12	5	9.5	0
30 FT	19	21	8	8	6	6	5	6	33.8	39.0	39.0	39.0	6	12	47.0	55.0	6	12	33.0	36.0	6	6	6	7.5	31.6	77	89	101	7	7.5	44.0	53.0	5	12	5	9.5	0
32 FT	20	22	8	8	6	6.5	6	7.5	37.8	44.0	44.0	44.0	6	12	47.0	55.0	6	12	33.0	35.0	6	6	6	7	31.8	78	90	102	7	7.5	44.0	53.0	5	12	5	9.5	0
34 FT	21	23	8	8	6	6	6	6	36.8	45.0	45.0	45.0	6	12	46.0	55.0	6	12	32.0	34.0	6	6	6	6.5	30.9	79	91	103	7	7.5	44.0	53.0	5	12	5	9.5	0
36 FT	22	23	8	8	6	6	6	6.5	36.8	46.0	46.0	46.0	7	15	51.0	60.0	7	15	36.0	38.0	6	6	6	6.5	31.0	79	91	103	7	7	44.0	53.0	5	12	5	9.5	0
38 FT	23	24	8	8	7	7.5	6	6	36.8	47.0	47.0	47.0	7	15	51.0	59.0	7	15	36.0	37.0	6	6	6	6	31.1	80	92	104	7	7	44.0	53.0	5	12	5	8.5	0
40 FT	23	25	8	8	7	7.5	6	6	36.9	47.0	47.0	47.0	7	15	51.0	59.0	7	15	36.0	38.0	6	6	6	6	31.1	81	93	105	7	7	44.0	53.0	5	12	5	8	0
42 FT	24	26	8	8	7	7.5	6	6	37.0	48.0	48.0	48.0	7	14	51.0	59.0	7	14	36.0	37.0	7	8	7	6.5	34.4	82	94	106	7	7	44.0	53.0	5	12	5	7.5	0
44 FT	25	26	9	8	7	7	6	6.5	37.8	49.0	49.0	49.0	7	14	51.0	59.0	7	14	36.0	37.0	7	7.5	6	6.5	32.0	82	94	106	7	7	44.0	53.0	5	12	5	8.5	0
46 FT	25	27	9	8	7	7	6	6.5	37.9	49.0	49.0	49.0	7	14	51.0	59.0	7	14	36.0	37.0	7	7.5	6	6.5	32.0	83	95	107	7	7	44.0	53.0	5	12	5	8	0
48 FT	26	28	9	8	7	7	6	6.5	38.0	50.0	50.0	50.0	7	14	51.0	58.0	7	14	35.0	37.0	7	7.5	6	6	32.3	84	96	108	7	7	44.0	53.0	5	12	5	7.5	0
50 FT	27	28	9	8	7	7	6	6	38.0	51.0	51.0	51.0	7	14	51.0	58.0	7	14	35.0	37.0	7	7	6	6	32.4	84	96	108	7	6.5	44.0	53.0	5	12	5	7	0

SPAN (S) = 10 FT      HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	5	8.5	54.9	29.0	33.0	33.0	5	16	100.5	74.5	5	16	30.0	30.0	5	8.5	6	6.5	74.1	101	113	125	5	6	46.0	47.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	5	8	54.9	29.0	33.0	33.0	5	14	100.5	74.5	5	14	28.0	28.0	5	7.5	6	6	65.8	101	113	125	6	7	47.0	50.0	5	12	5	11.5	12
2' - 4'	13	9	9	8	5	6.5	5	6	65.9	29.0	33.0	33.0	5	13	100.5	76.0	5	13	30.0	31.0	5	7.5	6	6	65.8	101	113	125	6	6.5	47.0	50.0	5	12	5	11.5	12
4 FT	9	9	9	8	5	7	5	6	65.9	29.0	29.0	29.0	5	13	74.0	76.0	5	13	30.0	31.0	5	7.5	6	6.5	57.6	101	113	125	6	6.5	46.0	50.0	5	12	5	11.5	12
6 FT	9	9	9	8	5	8	5	6	51.8	29.0	29.0	29.0	5	13	51.0	57.0	5	13	29.0	29.0	5	7	6	6	52.9	101	113	125	6	6	45.0	48.0	5	12	5	11.5	12
8 FT	9	10	9	8	5	8	5	6	48.1	29.0	29.0	29.0	6	15	49.0	52.0	6	15	30.0	31.0	5	7	6	6.5	51.0	102	114	126	6	6	44.0	49.0	5	12	5	11	0
10 FT	10	11	9	8	5	8	5	6	46.5	30.0	30.0	30.0	5	12	44.0	48.0	5	12	27.0	28.0	5	6.5	6	6.5	49.5	103	115	127	6	6.5	43.0	49.0	5	12	5	10.5	0
12 FT	11	12	9	8	5	7.5	6	7	48.1	31.0	31.0	35.0	6	16	45.0	50.0	6	16	30.0	31.0	5	6	6	6.5	48.4	104	116	128	6	6.5	43.0	49.0	5	12	5	9.5	0
14 FT	12	13	9	8	5	7	6	7	47.0	32.0	32.0	36.0	6	16	45.0	50.0	6	16	29.0	31.0	5	6	6	7	47.4	105	117	129	6	6.5	42.0	49.0	5	12	5	8.5	0
16 FT	13	14	9	8	5	6.5	6	7	46.0	33.0	33.0	37.0	6	16	44.0	50.0	6	16	29.0	31.0	6	8	6	7	46.5	106	118	130	6	7	42.0	49.0	5	12	5	8.5	0
18 FT	14	15	9	8	5	6	6	7	45.3	34.0	34.0	38.0	6	16	43.0	49.0	6	16	29.0	31.0	6	7.5	6	7	45.9	107	119	131	6	7	42.0	49.0	5	12	5	8.5	0
20 FT	15	16	9	8	6	8	6	7	50.5	35.0	35.0	39.0	6	16	49.0	55.0	6	16	35.0	37.0	6	7	6	6.5	45.3	108	120	132	6	7	42.0	49.0	5	12	5	8.5	0
22 FT	15	17	11	8	6	7.5	5	6	47.1	35.0	35.0	35.0	6	15	48.0	55.0	6	15	35.0	37.0	6	7	5	7	42.1	109	121	133	6	6.5	42.0	50.0	5	12	5	8	0
24 FT	17	18																																			

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 10 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT																																
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS																
	A1 BARS		J3 BARS			H1 BARS			H2 BARS		A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS																
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=11' HT=12' HT=13'			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=11' HT=12' HT=13'			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	9	10	5	6.5	5	6.5	55.9	33.0	33.0	33.0	5	16	101.5	75.5	5	16	30.0	29.0	5	8.5	6	6	82.3	138	150	162	5	6.5	49.0	49.0	5	10	5	8.5	12
2 FT	13	10	10	10	5	6.5	5	6.5	56.5	33.0	33.0	33.0	5	14	101.5	75.5	5	14	29.0	29.0	5	8	6	6.5	83.0	138	150	162	5	6.5	47.0	48.0	5	12	5	8	12
2'- 4'	13	10	10	10	5	6.5	6	7	56.5	33.0	33.0	33.0	5	13	101.5	77.0	5	13	31.0	31.0	5	7	6	6	83.0	138	150	162	5	6	47.0	48.0	5	11	5	8	12
4 FT	9	10	10	10	5	7	6	7	56.5	29.0	29.0	33.0	5	13	101.5	77.0	5	13	31.0	31.0	5	7	6	6	81.3	138	150	162	5	6	46.0	48.0	5	11	5	8	12
6 FT	9	11	10	10	5	8	6	7	75.6	29.0	29.0	33.0	5	13	54.0	53.0	5	13	29.0	29.0	5	7	6	6	77.8	139	151	163	5	6	44.0	47.0	5	12	5	8	12
8 FT	9	11	11	10	5	8	6	7	64.6	29.0	29.0	33.0	5	12	47.0	48.0	5	12	28.0	28.0	5	6.5	6	6.5	69.5	139	151	163	6	7	45.0	49.0	5	12	5	7.5	0
10 FT	10	11	11	10	5	8	5	6	61.1	30.0	30.0	30.0	5	12	46.0	47.0	5	12	28.0	28.0	5	6	6	6	65.8	139	151	163	6	6.5	45.0	48.0	5	12	5	7.5	0
12 FT	11	12	11	10	5	7.5	5	6	60.3	31.0	31.0	31.0	5	12	44.0	47.0	5	12	27.0	28.0	5	6	6	6	65.1	140	152	164	6	6.5	44.0	49.0	5	12	5	7.5	0
14 FT	12	13	11	10	5	7	6	7.5	62.6	32.0	32.0	36.0	5	12	43.0	46.0	5	12	27.0	28.0	5	6	6	6.5	64.4	141	153	165	6	6.5	44.0	49.0	5	12	5	7	0
16 FT	13	14	12	10	5	6.5	6	8	61.3	33.0	33.0	37.0	5	12	42.0	46.0	5	12	27.0	28.0	6	8	6	7	63.0	142	154	166	6	7	44.0	49.0	5	12	5	7	0
18 FT	13	15	12	10	5	6.5	6	7	59.3	33.0	37.0	37.0	6	15	45.0	48.0	6	15	30.0	31.0	6	7.5	6	6.5	62.8	143	155	167	6	7	44.0	49.0	5	12	5	7	0
20 FT	14	16	13	10	5	6	6	7.5	58.8	34.0	38.0	38.0	6	15	44.0	48.0	6	15	30.0	31.0	6	7	6	7	61.8	144	156	168	6	7	44.0	49.0	5	12	5	6.5	0
22 FT	15	17	13	10	6	8	6	6.5	64.6	35.0	39.0	39.0	6	15	50.0	54.0	6	15	36.0	37.0	6	7	6	6.5	61.4	145	157	169	6	6.5	44.0	50.0	5	12	5	6.5	0
24 FT	16	18	14	10	6	8	6	7	64.6	36.0	40.0	40.0	6	15	49.0	54.0	6	15	35.0	37.0	6	6.5	6	6.5	60.5	146	158	170	6	6.5	44.0	50.0	5	12	5	6	0
26 FT	17	19	14	10	6	7.5	6	6.5	64.5	37.0	41.0	41.0	6	14	49.0	54.0	6	14	35.0	37.0	6	6.5	6	6.5	60.4	147	159	171	6	6	44.0	50.0	5	12	5	6	0
28 FT	18	20	15	10	6	7	6	6.5	64.9	42.0	42.0	42.0	6	13	48.0	54.0	6	13	34.0	36.0	6	6.5	6	6.5	60.3	148	160	172	6	6	44.0	50.0	5	12	6	8	0
30 FT	19	21	15	10	6	6.5	6	6.5	65.1	43.0	43.0	43.0	6	13	48.0	54.0	6	13	33.0	35.0	6	6.5	6	6.5	60.4	149	161	173	7	7.5	47.0	53.0	5	12	6	8	0
32 FT	20	22	16	10	6	6.5	6	6.5	65.5	44.0	44.0	44.0	6	12	48.0	53.0	6	12	33.0	34.0	6	6	6	7	60.5	150	162	174	7	7.5	47.0	53.0	5	12	6	8	0
34 FT	20	23	16	10	6	6.5	6	6.5	63.5	44.0	44.0	44.0	6	12	47.0	53.0	6	12	33.0	35.0	6	6	6	7.5	58.9	151	163	175	7	7.5	46.0	53.0	5	12	6	8	0
36 FT	21	24	16	10	6	6	6	6	63.9	45.0	45.0	45.0	6	12	47.0	53.0	6	12	32.0	34.0	6	6	6	7	59.1	152	164	176	7	7.5	46.0	53.0	5	12	6	8	0
38 FT	22	24	17	10	6	6	6	6	64.4	46.0	46.0	46.0	7	15	52.0	58.0	7	15	37.0	38.0	6	6	6	7	59.0	152	164	176	7	7	46.0	53.0	5	12	6	7.5	0
40 FT	23	25	17	10	6	6	6	6	64.6	47.0	47.0	47.0	7	15	52.0	57.0	7	15	36.0	37.0	6	6	6	7	59.3	153	165	177	7	7	46.0	53.0	5	12	6	7.5	0
42 FT	23	26	18	10	7	7.5	6	6	65.0	47.0	47.0	47.0	7	15	52.0	57.0	7	15	37.0	38.0	7	8	6	6.5	59.6	154	166	178	7	7	46.0	54.0	5	12	6	7	0
44 FT	24	27	19	10	7	7.5	6	6	65.8	44.0	48.0	48.0	7	15	52.0	57.0	7	15	36.0	37.0	7	8	6	6.5	60.0	155	167	179	7	7	46.0	54.0	5	12	6	7	0
46 FT	24	27	19	10	7	7	6	6	65.6	48.0	48.0	48.0	7	14	52.0	57.0	7	14	36.0	38.0	7	7.5	6	6.5	59.9	155	167	179	7	6.5	46.0	54.0	5	12	6	6.5	0
48 FT	25	28	20	10	7	7	6	6	66.4	45.0	49.0	49.0	7	14	52.0	56.0	7	14	36.0	37.0	7	7.5	6	6	60.4	156	168	180	7	6.5	46.0	54.0	5	12	6	6.5	0
50 FT	26	29	20	10	7	7	7	7.5	71.6	50.0	50.0	50.0	7	15	51.0	55.0	7	15	36.0	37.0	7	7.5	6	6	60.6	157	169	181	7	6.5	47.0	54.0	5	12	6	6.5	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 10 FEET HEIGHT (HT): 11 THRU 13 FEET	
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.87A</b>	SHEET NO. <b>15 OF 27</b>

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

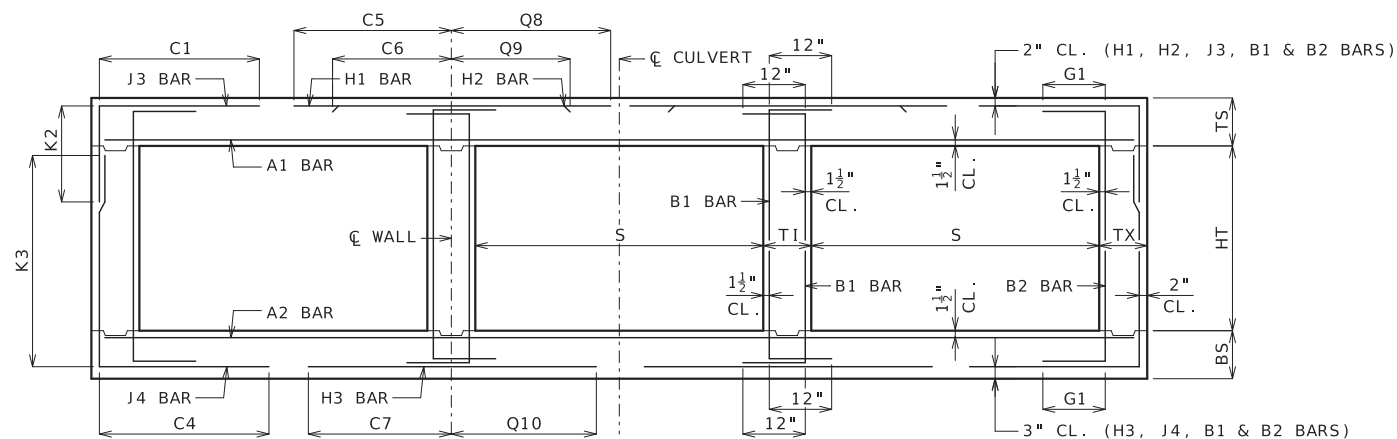
DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 11 FT HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT																																
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS																
	A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS																
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	5	9	58.5	29.0	29.0	33.0	5	13	108.5	80.5	5	13	30.0	33.0	5	8.5	5	6	52.6	77	89	101	6	7	50.0	53.0	5	12	5	12	12
2 FT	14	9	8	8	5	6	4	6	55.5	30.0	30.0	30.0	5	14	106.5	80.5	5	14	29.0	28.0	5	7.5	6	6.5	50.8	77	89	101	6	6.5	49.0	52.0	5	12	5	12	12
2'- 4'	14	9	8	8	5	6	5	6	55.5	30.0	30.0	30.0	5	12	106.5	82.0	5	12	32.0	33.0	5	7.5	6	6.5	50.8	77	89	101	6	6	49.0	52.0	5	11.5	5	12	12
4 FT	10	9	8	8	5	6.5	5	6	49.1	30.0	30.0	30.0	5	12	66.0	82.0	5	12	32.0	33.0	5	7.5	6	6.5	45.9	77	89	101	6	6	49.0	52.0	5	11.5	5	12	12
6 FT	10	10	8	8	5	7	5	6	42.8	30.0	30.0	30.0	5	12	53.0	63.0	5	12	30.0	31.0	5	7	5	6	39.8	78	90	102	6	6	47.0	52.0	5	12	5	12	12
8 FT	10	11	8	8	5	7	6	7	43.0	26.0	30.0	30.0	6	15	52.0	56.0	6	15	32.0	32.0	5	6.5	5	6.5	37.4	79	91	103	6	6.5	46.0	52.0	5	12	5	12	0
10 FT	11	12	8	8	5	7	5	6	37.6	27.0	31.0	31.0	6	15	50.0	55.0	6	15	31.0	32.0	5	6	5	7	35.6	80	92	104	6	6.5	45.0	52.0	5	12	5	12	0
12 FT	12	13	8	8	5	7	5	6.5	36.0	28.0	32.0	32.0	6	15	48.0	54.0	6	15	31.0	32.0	5	6	5	7.5	34.6	81	93	105	6	6.5	45.0	52.0	5	12	5	12	0
14 FT	13	14	8	8	5	6.5	5	7	34.6	33.0	33.0	33.0	6	15	47.0	54.0	6	15	31.0	32.0	6	8	5	7.5	33.8	82	94	106	6	6.5	44.0	53.0	5	12	5	12	0
16 FT	14	15	8	8	5	6	5	7	33.6	34.0	34.0	34.0	6	14	46.0	53.0	6	14	30.0	32.0	6	7.5	5	7.5	33.1	83	95	107	6	6.5	44.0	53.0	5	12	5	12	0
18 FT	15	16	8	8	6	8	5	6.5	37.9	35.0	35.0	35.0	6	14	51.0	59.0	6	14	36.0	38.0	6	7	5	7.5	32.6	84	96	108	6	6.5	44.0	53.0	5	12	5	11	0
20 FT	16	17	8	8	6	8	5	6.5	37.3	36.0	36.0	36.0	6	14	51.0	59.0	6	14	36.0	38.0	6	7	5	7	32.1	85	97	109	6	6.5	44.0	53.0	5	12	5	10	0
22 FT	17	18	8	8	6	7.5	5	6	36.9	37.0	37.0	37.0	6	14	50.0	59.0	6	14	36.0	38.0	6	6.5	5	6.5	31.9	86	98	110	6	6.5	44.0	53.0	5	12	5	9.5	0
24 FT	18	19	8	8	6	7	5	6	36.5	38.0	38.0	38.0	6	13	50.0	59.0	6	13	36.0	38.0	6	6	5	6.5	31.6	87	99	111	6	6	44.0	53.0	5	12	5	9.5	0
26 FT	19	21	8	8	6	6.5	6	7.5	40.4	39.0	39.0	43.0	6	13	50.0	59.0	6	13	35.0	38.0	6	6	6	7.5	34.4	89	101	113	7	7.5	47.0	56.0	5	12	5	9.5	0
28 FT	20	22	9	8	6	6.5	5	6	37.1	40.0	40.0	40.0	6	12	49.0	58.0	6	12	35.0	37.0	6	6	5	6	31.9	90	102	114	7	7.5	47.0	56.0	5	12	5	8.5	0
30 FT	21	23	10	8	6	6	5	6.5	37.9	41.0	41.0	41.0	6	12	49.0	58.0	6	12	34.0	37.0	7	8	5	6.5	32.4	91	103	115	7	7	47.0	56.0	5	12	5	8.5	0
32 FT	22	24	10	8	6	6	5	6.5	37.8	42.0	42.0	42.0	7	15	54.0	63.0	7	15	39.0	41.0	7	7.5	5	6.5	32.5	92	104	116	7	7	47.0	57.0	5	12	5	8	0
34 FT	23	25	10	8	7	7.5	5	6.5	37.8	43.0	43.0	43.0	7	15	54.0	63.0	7	15	38.0	40.0	7	7.5	5	6	32.5	93	105	117	7	6.5	47.0	57.0	5	12	5	8	0
36 FT	24	25	10	8	7	7.5	5	6	36.5	44.0	44.0	44.0	7	14	54.0	62.0	7	14	37.0	39.0	7	7	5	6	31.6	93	105	117	7	6.5	47.0	56.0	5	12	5	8	0
38 FT	25	26	10	8	7	7	5	6	36.6	45.0	45.0	45.0	7	14	53.0	62.0	7	14	37.0	38.0	7	7	5	6	31.8	94	106	118	7	6.5	47.0	56.0	5	12	5	8	0
40 FT	25	27	10	8	7	6.5	5	6	36.8	45.0	45.0	45.0	7	13	53.0	62.0	7	13	37.0	39.0	7	7	6	7	34.6	95	107	119	7	6.5	46.0	56.0	5	12	5	8	0
42 FT	26	28	10	8	7	7	6	7	40.8	50.0	50.0	50.0	7	13	53.0	62.0	7	13	37.0	38.0	7	7	6	7	34.9	96	108	120	7	6.5	46.0	56.0	5	12	5	8	0
44 FT	27	29	10	8	7	6.5	6	7	40.9	51.0	51.0	51.0	7	13	53.0	61.0	7	13	36.0	37.0	7	7	6	6.5	35.0	97	109	121	7	6.5	46.0	56.0	5	12	5	7.5	0
46 FT	28	29	11	8	7	6.5	6	7.5	41.6	52.0	52.0	52.0	7	13	53.0	61.0	7	13	36.0	37.0	7	6	6	7.5	35.6	97	109	121	7	6	47.0	57.0	5	12	5	7.5	0
48 FT	28	30	11	8	7	6	6	7.5	41.8	52.0	52.0	52.0	7	12	53.0	61.0	7	12	36.0	37.0	7	6.5	6	7	35.6	98	110	122	7	6	47.0	57.0	5	12	5	7.5	0
50 FT	29	31	11	8	7	6	6	7	41.9	53.0	53.0	53.0	7	12	53.0	60.0	7	12	36.0	37.0	7	6.5	6	7	35.9	99	111	123	7	6	47.0	57.0	5	12	5	7.5	0

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 11 FT HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT																																
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS																
	A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS																
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	9	9	5	6.5	5	8	59.3	33.0	33.0	33.0	5	13	109.5	81.5	5	13	31.0	33.0	5	7.5	6	6	74.5	113	125	137	6	7	51.0	53.0	5	11.5	5	10.5	12
2 FT	14	10	9	9	5	6	5	8	59.3	34.0	34.0	34.0	5	14	109.5	81.5	5	14	29.0	28.0	5	7.5	6	7	70.6	114	126	138	5	6	47.0	50.0	5	12	5	10.5	12
2'- 4'	14	10	9	9	5	6	5	6	59.3	34.0	34.0	34.0	5	13	109.5	83.0	5	13	32.0	33.0	5	7	6	6.5	70.6	114	126	138	6	6.5	50.0	53.0	5	11.5	5	9.5	12
4 FT	10	10	9	9	5	6.5	5	6	59.3	30.0	30.0	30.0	5	13	109.5	83.0	5	13	32.0	33.0	5	7	6	6.5	64.1	114	126	138	6	6.5	50.0	53.0	5	11.5	5	9.5	12
6 FT	10	10	9	9	5	7	5	6	56.6	30.0	30.0	30.0	5	12	55.0	61.0	5	12	30.0	31.0	5	7	6	6	57.8	114	126	138	6	6	48.0	52.0	5	12	5	9.5	12
8 FT	10	11	9	9	5	7	6	7.5	55.5	30.0	30.0	34.0	6	15	53.0	56.0	6	15	32.0	33.0	5	6.5	6	6	55.6	115	127	139	6	6	47.0	52.0	5	12	5	9	0
10 FT	11	12	9	9	5	7	6	7	53.5	31.0	35.0	35.0	6	15	51.0	55.0	6	15	32.0	33.0	5	6	6	6	53.8	116	128	140	6	6.5	46.0	52.0	5	12	5	8.5	0
12 FT	12	13	9	9	5	7	6	6.5	51.9	32.0	36.0	36.0	6	15	49.0	54.0	6	15	31.0	33.0	5	6	6	6	52.4	117	129	141	6	6.5	46.0	52.0	5	12	5	8.5	0
14 FT	13	14	9	9	5	6.5	6	6	50.5	33.0	37.0	37.0	6	15	48.0	53.0	6	15	31.0	33.0	6	8	6	6	51.3	118	130	142	6	6.5	45.0	52.0	5	12	5	8.5	0
16 FT	14	15	10	9	5	6	6	7	49.9	34.0	34.0	38.0	6	15	47.0	53.0	6	15	31.0	33.0	6	7.5	6	7	50.4	119	131	143	6	6.5	45.0	52.0	5	12	5	8	0
18 FT	15	16	10	9	6	8	6	7	54.9	35.0	35.0	39.0	6	15	52.0	59.0	6	15	37.0	39.0	6	7	6	7	49.6	120	132	144	6	6.5	45.0	53.0	5	12	5	8	0
20 FT	16	17	11	9	6	8	6	7.5	54.8	36.0	36.0	40.0	6	14	52.0	58.0	6	14	36.0	39.0	6	7	6	8	49.3	121	133	145	6	6.5	45.0	53.0	5	12	5	7.5	0
22 FT	17	18	12	9	6	7.5	6	8	54.8	37.0	37.0	37.0	6	14	51.0	58.0	6	14	36.0	39.0	6	6.5	5	6	45.9	122	134	146	6	6.5	45.0	53.0	5				

SPAN (S) = 11 FT      HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	10	11	5	6.5	5	6	60.3	33.0	33.0	33.0	5	13	110.5	82.5	5	13	31.0	33.0	5	7.5	6	6	89.3	150	162	174	5	6	51.0	51.0	5	10	5	8	12
2 FT	14	11	10	11	5	6	5	6	60.3	34.0	34.0	34.0	5	14	110.5	82.5	5	14	30.0	32.0	5	7.5	6	6	89.3	151	163	175	5	6	50.0	51.0	5	12	5	8	12
2'- 4'	14	11	11	11	5	6	5	6	60.9	34.0	34.0	34.0	5	13	110.5	82.5	5	13	33.0	33.0	5	7	6	6	89.3	151	163	175	5	6	50.0	51.0	5	12	5	7.5	12
4 FT	10	11	11	11	5	7	5	6	60.9	30.0	30.0	30.0	5	13	110.5	80.0	5	13	33.0	33.0	5	7	6	6.5	85.9	151	163	175	5	6	49.0	51.0	5	12	5	7.5	12
6 FT	10	11	11	11	5	7.5	5	6	79.0	30.0	30.0	30.0	5	12	58.0	57.0	5	12	31.0	31.0	5	6.5	6	6	77.5	151	163	175	6	6.5	50.0	53.0	5	12	5	7.5	12
8 FT	10	11	12	11	5	7.5	6	7.5	70.1	30.0	30.0	34.0	6	15	54.0	55.0	6	15	33.0	33.0	5	6.5	6	6	70.9	151	163	175	6	6	48.0	52.0	5	12	5	7	0
10 FT	11	12	12	11	5	7.5	6	8	68.5	31.0	31.0	35.0	6	16	52.0	54.0	6	16	32.0	33.0	5	6	6	6	69.9	152	164	176	6	6	47.0	52.0	5	12	5	7	0
12 FT	12	13	12	11	5	7	6	8	67.4	32.0	32.0	36.0	6	16	50.0	53.0	6	16	32.0	33.0	5	6	6	6.5	69.0	153	165	177	6	6	47.0	52.0	5	12	5	7	0
14 FT	13	14	12	11	5	6.5	6	7	66.4	33.0	37.0	37.0	6	16	49.0	53.0	6	16	32.0	33.0	6	8	6	6.5	68.3	154	166	178	6	6.5	47.0	52.0	5	12	5	6.5	0
16 FT	14	15	13	11	5	6	6	7	64.9	34.0	38.0	38.0	6	15	48.0	52.0	6	15	32.0	33.0	6	7.5	6	7	66.6	155	167	179	6	6.5	47.0	52.0	5	12	5	6.5	0
18 FT	15	16	13	11	6	8	6	6.5	70.3	39.0	39.0	39.0	6	15	54.0	58.0	6	15	37.0	39.0	6	7	6	6	66.0	156	168	180	6	6.5	47.0	52.0	5	12	5	6.5	0
20 FT	15	17	14	11	6	8	6	6.5	68.4	39.0	39.0	39.0	6	14	53.0	58.0	6	14	37.0	39.0	6	7	6	6.5	65.1	157	169	181	6	6.5	46.0	53.0	5	12	5	6	0
22 FT	17	18	14	11	6	7.5	6	6.5	69.0	41.0	41.0	41.0	6	14	53.0	58.0	6	14	37.0	39.0	6	6	6	6	64.5	158	170	182	6	6	46.0	53.0	5	12	5	6	0
24 FT	18	20	15	11	6	7	6	6.5	68.9	42.0	42.0	42.0	6	13	52.0	58.0	6	13	36.0	38.0	6	6	6	6	64.6	160	172	184	6	6	46.0	53.0	5	12	6	8	0
26 FT	19	21	15	11	6	6.5	6	6	68.6	43.0	43.0	43.0	6	13	52.0	57.0	6	13	36.0	38.0	6	6	6	6	64.3	161	173	185	7	7.5	49.0	56.0	5	12	6	8	0
28 FT	20	22	16	11	6	6.5	6	6	68.6	44.0	44.0	44.0	6	12	51.0	57.0	6	12	35.0	37.0	6	6	6	6	63.9	162	174	186	7	7.5	49.0	56.0	5	12	6	8	0
30 FT	21	23	17	11	6	6	6	6	69.0	45.0	45.0	45.0	6	12	51.0	57.0	6	12	34.0	36.0	7	8	6	6.5	64.0	163	175	187	7	7	49.0	57.0	5	12	6	7.5	0
32 FT	21	24	17	11	6	6	6	6	68.6	45.0	45.0	45.0	6	12	51.0	57.0	6	12	35.0	37.0	7	7.5	6	6.5	64.1	164	176	188	7	7	49.0	57.0	5	12	6	7.5	0
34 FT	22	25	18	11	6	6	6	6	69.1	46.0	46.0	46.0	7	15	55.0	62.0	7	15	40.0	41.0	7	7.5	6	6.5	64.4	165	177	189	7	6.5	49.0	57.0	5	12	6	7	0
36 FT	23	26	18	11	7	7.5	7	7.5	74.3	47.0	47.0	47.0	7	15	55.0	61.0	7	15	39.0	41.0	7	7.5	6	6	64.5	166	178	190	7	6.5	49.0	57.0	5	12	6	7	0
38 FT	24	26	18	11	7	7.5	7	8	72.6	48.0	48.0	48.0	7	14	55.0	61.0	7	14	38.0	40.0	7	7	6	6.5	62.4	166	178	190	7	6.5	49.0	57.0	5	12	6	7	0
40 FT	25	27	18	11	7	7	7	7	72.9	49.0	49.0	49.0	7	14	55.0	61.0	7	14	38.0	39.0	7	7	6	6	62.6	167	179	191	7	6.5	49.0	57.0	5	12	6	7	0
42 FT	25	28	19	11	7	7	7	7	73.3	49.0	49.0	49.0	7	14	55.0	60.0	7	14	38.0	40.0	7	7	6	6	62.9	168	180	192	7	6.5	49.0	57.0	5	12	6	6.5	0
44 FT	26	29	20	11	7	7	7	7.5	74.0	50.0	50.0	50.0	7	13	54.0	60.0	7	13	38.0	39.0	7	7	6	6	63.3	169	181	193	7	6	49.0	57.0	5	12	6	6.5	0
46 FT	27	30	21	11	7	6.5	7	7.5	74.6	51.0	51.0	51.0	7	13	54.0	59.0	7	13	37.0	38.0	7	7	6	6	63.6	170	182	194	7	6	49.0	57.0	5	12	6	6	0
48 FT	27	30	21	11	7	6	7	7	74.5	51.0	51.0	51.0	7	12	54.0	59.0	7	12	37.0	39.0	7	6	6	6	63.5	170	182	194	7	6	49.0	57.0	5	12	6	6	0
50 FT	28	31	22	11	7	6.5	7	7	75.3	52.0	52.0	58.0	7	13	54.0	59.0	7	13	37.0	38.0	7	6.5	7	7.5	67.0	171	183	195	7	6	49.0	58.0	5	12	6	6	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



**GENERAL NOTES:**

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 11 FEET HEIGHT (HT): 12 THRU 14 FEET	
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.87A</b>	SHEET NO. <b>17 OF 27</b>

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



DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS													
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1		
										HT=6'	HT=7'	HT=8'												HT=6'	HT=7'	HT=8'											
1 FT	14	9	8	8	5	6	4	6	59.1	30.0	30.0	30.0	5	12	114.5	86.5	5	12	31.0	34.0	5	7.5	6	7	54.6	77	89	101	6	6.5	53.0	56.0	5	12	5	12	12
2 FT	14	9	8	8	5	6	5	8.5	62.1	30.0	30.0	34.0	5	12	116.5	86.5	5	12	30.0	33.0	5	7.5	6	6.5	50.3	77	89	101	6	6	52.0	55.0	5	12	5	12	12
2'- 4'	14	10	8	8	5	6	5	6.5	62.1	31.0	31.0	34.0	5	12	116.5	88.0	5	12	33.0	35.0	5	7	6	6.5	50.3	78	90	102	6	6	52.0	56.0	5	12	5	12	12
4 FT	11	10	8	8	5	6	5	6.5	48.9	31.0	31.0	31.0	5	12	69.0	88.0	5	12	33.0	35.0	5	7	5	6	42.6	78	90	102	6	6	51.0	56.0	5	12	5	12	12
6 FT	11	11	8	8	5	6.5	5	6.5	42.8	31.0	31.0	31.0	6	16	59.0	71.0	6	16	34.0	36.0	5	6.5	5	6.5	39.3	79	91	103	6	6.5	49.0	56.0	5	12	5	12	12
8 FT	11	12	8	8	5	6.5	5	6	39.9	31.0	31.0	31.0	6	14	55.0	61.0	6	14	33.0	34.0	5	6	5	7.5	36.6	80	92	104	6	6.5	48.0	56.0	5	12	5	12	0
10 FT	12	13	8	8	5	6.5	5	6.5	37.3	32.0	32.0	32.0	6	14	52.0	59.0	6	14	32.0	34.0	5	6	5	7.5	34.9	81	93	105	6	6	47.0	56.0	5	12	5	12	0
12 FT	13	14	8	8	5	6	5	7	35.4	33.0	33.0	33.0	6	14	51.0	58.0	6	14	32.0	34.0	6	8	5	8	33.8	82	94	106	6	6	47.0	56.0	5	12	5	12	0
14 FT	14	15	8	8	5	6	5	7	33.9	34.0	34.0	34.0	6	13	49.0	57.0	6	13	32.0	34.0	6	7.5	5	8	32.8	83	95	107	6	6	47.0	56.0	5	12	5	12	0
16 FT	15	16	8	8	6	8	5	6.5	37.9	35.0	35.0	35.0	6	13	55.0	63.0	6	13	37.0	40.0	6	7	5	8	32.1	84	96	108	6	6	46.0	56.0	5	12	5	12	0
18 FT	16	17	8	8	6	8	5	6.5	37.0	36.0	36.0	36.0	6	13	54.0	63.0	6	13	37.0	40.0	6	7	5	7	31.6	85	97	109	6	6	46.0	56.0	5	12	5	11.5	0
20 FT	17	18	8	8	6	7.5	5	6.5	36.4	37.0	37.0	37.0	6	12	53.0	63.0	6	12	37.0	40.0	6	6.5	5	6.5	31.1	86	98	110	6	6	46.0	56.0	5	12	5	10	0
22 FT	18	20	8	8	6	6.5	5	6	36.1	38.0	38.0	38.0	6	12	53.0	62.0	6	12	37.0	40.0	6	6	5	6	30.8	88	100	112	6	6	46.0	57.0	5	12	5	9.5	0
24 FT	20	21	8	8	6	6.5	6	7.5	39.5	44.0	44.0	44.0	6	12	52.0	62.0	6	12	36.0	39.0	7	8	6	7.5	33.8	89	101	113	7	7.5	49.0	59.0	5	12	5	9.5	0
26 FT	21	22	8	8	6	6	6	7	39.3	45.0	45.0	45.0	6	12	52.0	62.0	6	12	36.0	39.0	7	7.5	6	7	33.6	90	102	114	7	7.5	49.0	60.0	5	12	5	9.5	0
28 FT	22	23	8	8	6	6	6	6.5	39.0	46.0	46.0	46.0	7	15	57.0	67.0	7	15	41.0	44.0	7	7	6	6.5	33.4	91	103	115	7	7	49.0	60.0	5	12	5	8.5	0
30 FT	23	24	8	8	7	7.5	6	6	38.9	47.0	47.0	47.0	7	15	56.0	67.0	7	15	40.0	43.0	7	6.5	6	6	33.4	92	104	116	7	6.5	49.0	60.0	5	12	5	8	0
32 FT	24	25	9	8	7	7.5	6	7	39.8	48.0	48.0	48.0	7	14	56.0	66.0	7	14	40.0	42.0	7	6.5	6	7	34.0	93	105	117	7	6.5	49.0	60.0	5	12	5	8.5	0
34 FT	25	26	9	8	7	7	6	6.5	39.8	49.0	49.0	49.0	7	14	56.0	66.0	7	14	39.0	42.0	7	6	6	6.5	34.0	94	106	118	7	6	49.0	60.0	5	12	5	8	0
36 FT	26	27	9	8	7	7	6	6.5	39.8	50.0	50.0	50.0	7	13	56.0	66.0	7	13	39.0	41.0	7	6	6	6.5	34.1	95	107	119	7	6	49.0	60.0	5	12	5	7.5	0
38 FT	27	28	9	8	7	6.5	6	6	39.8	51.0	51.0	51.0	7	13	56.0	66.0	7	13	38.0	40.0	7	6	6	6	34.3	96	108	120	7	6	49.0	60.0	5	12	5	7	0
40 FT	28	29	9	8	7	6.5	6	6	38.9	52.0	52.0	52.0	7	12	56.0	65.0	7	12	37.0	39.0	7	6.5	6	6	33.4	97	109	121	8	7.5	55.0	66.0	5	12	5	7	0
42 FT	28	30	10	8	7	6	6	6.5	39.8	52.0	52.0	52.0	7	12	56.0	65.0	7	12	38.0	40.0	7	6.5	6	6.5	33.9	98	110	122	8	7.5	55.0	66.0	5	12	5	8	0
44 FT	29	31	10	8	7	6	6	6.5	39.9	53.0	53.0	53.0	7	12	55.0	64.0	7	12	38.0	39.0	7	6.5	6	6	34.0	99	111	123	8	7.5	55.0	66.0	5	12	5	7	0
46 FT	30	32	10	8	7	6	6	6	40.0	54.0	54.0	54.0	7	12	55.0	64.0	7	12	37.0	38.0	7	6	6	6	34.3	100	112	124	8	7.5	55.0	66.0	5	12	5	6.5	0
48 FT	31	33	10	8	8	7.5	6	6	40.1	55.0	55.0	55.0	8	15	63.0	71.0	8	15	45.0	46.0	7	6	7	6.5	37.5	101	113	125	8	7.5	55.0	66.0	5	12	5	6.5	0
50 FT	32	34	11	8	8	7.5	6	6.5	41.0	56.0	56.0	56.0	7	12	55.0	63.0	7	12	37.0	38.0	7	6	6	6	35.1	102	114	126	8	7	55.0	66.0	5	12	5	7	0

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS													
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1		
										HT=9'	HT=10'	HT=11'												HT=9'	HT=10'	HT=11'											
1 FT	14	10	8	9	5	6	5	7.5	62.3	34.0	34.0	34.0	5	12	117.5	87.5	5	12	31.0	35.0	5	7.5	6	6	79.4	114	126	138	5	6	51.0	54.0	5	12	5	10	12
2 FT	14	10	9	9	5	6	5	8	62.9	34.0	34.0	34.0	5	12	117.5	87.5	5	12	30.0	33.0	5	7	6	6.5	68.6	114	126	138	6	6.5	53.0	56.0	5	12	5	10.5	12
2'- 4'	14	10	9	9	5	6	6	7	75.1	34.0	34.0	35.0	5	12	117.5	89.0	5	12	34.0	36.0	5	7	6	6	68.6	114	126	138	6	6	53.0	56.0	5	12	5	10	12
4 FT	11	10	9	9	5	6	6	7	75.1	31.0	31.0	35.0	5	12	82.0	89.0	5	12	34.0	36.0	5	7	6	6	61.3	114	126	138	6	6	52.0	56.0	5	12	5	10	12
6 FT	11	11	9	9	5	6.5	6	7	59.8	31.0	31.0	35.0	6	16	61.0	70.0	6	16	35.0	36.0	5	6.5	6	6	57.5	115	127	139	6	6	50.0	56.0	5	12	5	9.5	12
8 FT	11	12	9	9	5	6.5	6	7	55.3	31.0	31.0	35.0	6	15	56.0	60.0	6	15	33.0	34.0	5	6	6	6.5	54.5	116	128	140	6	6	49.0	56.0	5	12	5	9	0
10 FT	12	13	9	9	5	6.5	6	6.5	52.5	32.0	32.0	36.0	6	14	54.0	59.0	6	14	33.0	34.0	5	6	6	6.5	52.4	117	129	141	6	6	48.0	56.0	5	12	5	8.5	0
12 FT	13	14	9	9	5	6	6	6.5	50.4	33.0	33.0	37.0	6	14	52.0	58.0	6	14	32.0	34.0	6	8	6	6.5	50.6	118	130	142	6	6	48.0	56.0	5	12	5	8.5	0
14 FT	14	15	9	9	5	6	6	6.5	48.8	34.0	34.0	38.0	6	14	51.0	57.0	6	14	32.0	34.0	6	7.5	6	6.5	49.4	119	131	143	6	6	48.0	56.0	5	12	5	8.5	0
16 FT	15	16	10	9	6	8	6	7.5	54.3	35.0	35.0	39.0	6	13	55.0	63.0	6	13	38.0	40.0	6	7	6	7.5	48.5	120	132	144	6	6	47.0	56.0	5	12	5	8	0
18 FT	16	17	11	9	6	8	6	8	54.3	36.0	36.0	36.0	6	13	55.0	62.0	6	13	38.0	40.0	6	7	5	6	45.4	121	133	145	6	6	47.0	56.0	5	12	5	8	0
20 FT	17	18	11	9	6	7.5	6	7.5	53.6	37.0	37.0	41.0	6	13	54.0	62.0	6	13	37.0	40.0	6	6	6	8	47.8	122	134	146	6	6	47.0	56.0	5	12	5	7.5	0
22 FT	18	20</																																			

		SPAN (S) = 12 FT																		HEIGHT (HT) = 12 FT OR 13 FT																	
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS												
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS				B1 BARS		B2 BARS						
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=12' HT=13'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=12' HT=13'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	10	10	10	5	6	5	7	63.8	34.0	34.0	5	12	118.5	87.5	5	12	32.0	35.0	5	7	6	6.5	89.1	150	162	6	7	55.0	57.0	5	12	5	8.5	12		
2 FT	14	10	10	10	5	6	5	7	63.8	34.0	34.0	5	12	118.5	87.5	5	12	31.0	33.0	5	7	6	6	79.6	150	162	6	6.5	54.0	56.0	5	12	5	8	12		
2'- 4'	14	11	10	10	5	6	5	6	63.8	34.0	34.0	5	12	118.5	89.0	5	12	34.0	35.0	5	6.5	6	6	79.6	151	163	6	6.5	54.0	57.0	5	12	5	8	12		
4 FT	11	11	10	10	5	6.5	5	6	63.8	31.0	31.0	5	12	118.5	89.0	5	12	34.0	35.0	5	6.5	6	6.5	76.3	151	163	6	6.5	53.0	57.0	5	12	5	8	12		
6 FT	11	11	10	10	5	6.5	5	6	71.3	31.0	31.0	6	16	65.0	69.0	6	16	35.0	36.0	5	6.5	6	6	69.1	151	163	6	6	51.0	56.0	5	12	5	8	12		
8 FT	11	12	10	10	5	6.5	6	7	65.4	31.0	35.0	6	15	57.0	60.0	6	15	34.0	35.0	5	6	6	6	66.4	152	164	6	6	50.0	56.0	5	12	5	8	0		
10 FT	12	13	10	10	5	6.5	6	7	62.9	36.0	36.0	6	15	55.0	58.0	6	15	33.0	34.0	5	6	6	6	63.8	153	165	6	6	49.0	56.0	5	12	5	8	0		
12 FT	13	14	11	10	5	6.5	6	7.5	61.1	33.0	37.0	6	14	53.0	57.0	6	14	33.0	34.0	6	8	6	7	62.0	154	166	6	6	49.0	56.0	5	12	5	7.5	0		
14 FT	14	15	11	10	5	6	6	7	59.9	38.0	38.0	6	14	51.0	57.0	6	14	32.0	34.0	6	7.5	6	6	60.9	155	167	6	6	48.0	56.0	5	12	5	7.5	0		
16 FT	15	16	12	10	6	8	6	7	65.0	39.0	39.0	6	14	56.0	62.0	6	14	38.0	40.0	6	7	6	7	59.9	156	168	6	6	48.0	56.0	5	12	5	7	0		
18 FT	16	17	12	10	6	8	6	6.5	64.1	40.0	40.0	6	13	55.0	62.0	6	13	38.0	40.0	6	7	6	6	59.1	157	169	6	6	48.0	56.0	5	12	5	7	0		
20 FT	17	18	13	10	6	7.5	6	6.5	63.8	41.0	41.0	6	13	55.0	61.0	6	13	38.0	40.0	6	6	6	7	58.5	158	170	6	6	48.0	56.0	5	12	5	6.5	0		
22 FT	18	20	13	10	6	7	6	6	63.3	42.0	42.0	6	13	54.0	61.0	6	13	38.0	40.0	6	6	6	6.5	58.4	160	172	6	6	48.0	56.0	5	12	5	6.5	0		
24 FT	19	21	14	10	6	6.5	6	6.5	63.1	39.0	43.0	6	12	54.0	61.0	6	12	37.0	40.0	7	8	6	7	58.0	161	173	7	7.5	51.0	60.0	5	12	5	6	0		
26 FT	20	22	14	10	6	6.5	6	6	62.8	44.0	44.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7.5	6	6.5	57.6	162	174	7	7.5	51.0	60.0	5	12	5	6	0		
28 FT	21	23	15	10	6	6	6	6	62.9	45.0	45.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7	6	7	57.4	163	175	7	7	51.0	60.0	5	12	6	8	0		
30 FT	23	25	15	10	7	7.5	6	6	62.8	47.0	47.0	7	15	57.0	65.0	7	15	40.0	42.0	7	7	6	7	57.5	165	177	7	6.5	51.0	60.0	5	12	6	8	0		
32 FT	23	26	16	10	7	7	6	6	63.1	47.0	47.0	7	14	57.0	65.0	7	14	41.0	43.0	7	7	6	7.5	57.5	166	178	7	6.5	51.0	60.0	5	12	6	8	0		
34 FT	24	27	16	10	7	7	7	7.5	68.1	48.0	48.0	7	14	57.0	65.0	7	14	40.0	42.0	7	7	6	7	57.5	167	179	7	6	51.0	60.0	5	12	6	8	0		
36 FT	25	28	17	10	7	7	6	6	63.6	49.0	49.0	7	14	57.0	64.0	7	14	40.0	42.0	7	7	6	7	57.8	168	180	7	6	51.0	60.0	5	12	6	7.5	0		
38 FT	26	29	17	10	7	7	7	7.5	68.6	50.0	50.0	7	13	57.0	64.0	7	13	39.0	41.0	7	6.5	6	7	57.9	169	181	7	6	51.0	60.0	5	12	6	7.5	0		
40 FT	27	29	17	10	7	6.5	7	8	66.8	51.0	51.0	7	13	56.0	63.0	7	13	38.0	40.0	7	6	6	7	55.9	169	181	8	7.5	57.0	66.0	5	12	6	7.5	0		
42 FT	28	30	17	10	7	6.5	7	7	66.9	52.0	52.0	7	12	56.0	63.0	7	12	38.0	39.0	7	6	6	7	56.0	170	182	8	7.5	57.0	66.0	5	12	6	7.5	0		
44 FT	29	31	18	10	7	6	7	7.5	67.8	53.0	53.0	7	12	56.0	62.0	7	12	37.0	38.0	7	6	6	6.5	56.4	171	183	8	7.5	57.0	66.0	5	12	6	7	0		
46 FT	29	32	19	10	7	6	7	7.5	68.5	53.0	53.0	7	12	56.0	62.0	7	12	38.0	39.0	7	6	6	6.5	56.8	172	184	8	7	57.0	67.0	5	12	6	6.5	0		
48 FT	30	33	19	10	7	6	7	7	68.5	54.0	54.0	7	12	56.0	61.0	7	12	37.0	38.0	7	6	6	6.5	56.9	173	185	8	7	57.0	67.0	5	12	6	6.5	0		
50 FT	31	34	19	10	7	6	7	6.5	68.6	55.0	55.0	7	12	56.0	61.0	7	12	37.0	38.0	7	6	6	6.5	57.3	174	186	8	7	57.0	67.0	5	12	6	6.5	0		

		SPAN (S) = 12 FT																		HEIGHT (HT) = 14 FT OR 15 FT																	
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS												
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS				B1 BARS		B2 BARS						
	TS	BS	TX	T1	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=14' HT=15'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=14' HT=15'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	11	10	12	5	6	6	7.5	64.0	34.0	38.0	5	12	119.5	88.5	5	12	32.0	35.0	5	7	6	6	95.5	175	187	5	6	55.0	55.0	5	12	5	8	12		
2 FT	14	12	10	12	5	6	6	7	64.0	34.0	38.0	5	12	119.5	88.5	5	12	31.0	34.0	5	7	6	6	95.5	176	188	5	6	54.0	55.0	5	12	5	8	12		
2'- 4'	14	12	12	12	5	6	6	7	68.3	34.0	38.0	6	15	121.5	88.5	6	15	37.0	37.0	5	6.5	6	6	95.5	176	188	6	6.5	55.0	57.0	5	11	5	7	12		
4 FT	10	11	12	12	5	6	6	7.5	68.3	34.0	34.0	6	15	121.5	77.0	6	15	37.0	37.0	5	6.5	6	6	86.8	175	187	6	6.5	55.0	57.0	5	11	5	7	12		
6 FT	10	12	12	12	5	6.5	6	7	80.0	34.0	34.0	6	15	61.0	61.0	6	15	35.0	35.0	5	6	6	6.5	83.1	176	188	6	6.5	53.0	57.0	5	12	5	7	12		
8 FT	11	12	12	12	5	7	6	7.5	76.8	35.0	35.0	6	15	58.0	59.0	6	15	35.0	35.0	5	6	6	6	77.1	176	188	6	6	52.0	55.0	5	12	5	7	0		
10 FT	12	13	12	12	5	6.5	6	7.5	74.4	36.0	36.0	6	15	56.0	58.0	6	15	34.0	35.0	5	6	6	6	75.5	177	189	6	6	51.0	55.0	5	12	5	6.5	0		
12 FT	13	14	13	12	5	6.5	6	7.5	71.5	37.0	37.0	6	15	54.0	57.0	6	15	34.0	35.0	6	8	6	6	73.0	178	190	6	6	50.0	55.0	5	12	5	6.5	0		
14 FT	14	15	13	12	5	6	6	6.5	70.3	38.0	38.0	6	14	52.0	56.0	6	14	33.0	35.0	6	7.5	6	6	72.0	179	191	6	6	50.0	55.0	5	12	5	6.5	0		
16 FT	15	16	14	12	6	8	6	6.5	74.5	39.0	39.0	6	14	57.0	62.0	6	14	39.0	41.0	6	7	6	6.5	70.3	180	192	6	6	49.0	55.0	5	12	5	6	0		
18 FT	15	17	15	12	6	7.5	6	6.5	72.4	39.0	39.0	6	13	56.0	61.0	6	13	39.0	40.0	6	6.5	6	6.5	69.0	181	193	6	6	49.0	56.0	5	12	6	8	0		
20 FT	17	19	15	12	6	7.5	6	6	73.0	41.0	41.0	6	13	56.0	61.0	6	13	39.0	41.0	6	6	6	6	69.6	183	195	6	6	49.0	56.0	5	12	6	8	0		
22 FT	18	20	16	12	6	7	6	6.5	72.8	42.0	42.0	6	13	55.0	61.0	6	13	39.0	41.0	6	6	6	6	68.4	184	196	6	6	49.0	56.0	5	12	6	8	0		
24 FT	19	21	16	12	6	6.5	6	6	72.4	43.0	43.0	6	13	55.0	61.0	6	13	38.0	41.0	7	8	7	7.5	71.1	185	197	7	7.5	52.0	59.0	5	12	6	8	0		
26 FT	20	22	16	12	6	6.5	7	7.5	77.1	44.0	50.0	6	12	55.0	61.0	6	12	38.0	40.0	7	7.5	7	7	70.8	186	198											

		SPAN (S) = 13 FT												HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	9	8	8	5	6	5	8.5	65.8	34.0	34.0	34.0	5	12	125.5	92.5	5	12	34.0	38.0	5	7.5	6	6	60.0	89	101	113	6	6	56.0	59.0	5	12	5	12	12
2 FT	15	10	8	8	6	8	5	8	65.8	31.0	35.0	35.0	6	16	129.5	99.5	6	16	40.0	44.0	5	7	6	6.5	55.5	90	102	114	6	6	54.0	59.0	5	12	5	12	12
2'- 4'	15	10	8	8	6	8	6	7	65.8	31.0	35.0	35.0	6	14	129.5	99.5	6	14	40.0	44.0	5	7	6	6	55.5	90	102	114	7	6.5	57.0	62.0	5	12	5	12	12
4 FT	11	10	8	8	6	8	6	7	56.4	31.0	35.0	35.0	6	14	77.0	97.0	6	14	38.0	40.0	5	7	6	6	49.5	90	102	114	7	6.5	57.0	62.0	5	12	5	12	12
6 FT	11	11	8	8	6	8.5	6	7	49.0	31.0	31.0	35.0	6	13	63.0	75.0	6	13	35.0	37.0	5	6.5	6	7	45.9	91	103	115	7	7	55.0	62.0	5	12	5	12	12
8 FT	12	12	8	8	5	6	5	6	42.0	32.0	32.0	32.0	6	14	58.0	67.0	6	14	34.0	36.0	5	6	6	7	43.3	92	104	116	7	7	54.0	62.0	5	12	5	12	0
10 FT	13	14	8	8	5	6	5	6	39.8	33.0	33.0	33.0	6	13	55.0	63.0	6	13	33.0	36.0	6	8	5	6.5	38.1	94	106	118	6	6	50.0	59.0	5	12	5	12	0
12 FT	14	15	8	8	6	8	5	6	37.9	34.0	34.0	34.0	6	13	53.0	62.0	6	13	33.0	35.0	6	7.5	5	6.5	36.9	95	107	119	6	6	49.0	59.0	5	12	5	12	0
14 FT	15	16	8	8	6	7.5	5	6	41.4	35.0	35.0	35.0	6	12	58.0	67.0	6	12	39.0	41.0	6	7	5	6.5	35.9	96	108	120	6	6	49.0	59.0	5	12	5	10.5	0
16 FT	16	17	8	8	6	7.5	6	8	44.4	36.0	36.0	36.0	6	12	57.0	67.0	6	12	38.0	41.0	6	7	5	6.5	35.1	97	109	121	6	6	49.0	60.0	5	12	5	9.5	0
18 FT	17	18	8	8	6	7	6	7.5	43.5	37.0	37.0	37.0	6	12	56.0	66.0	6	12	38.0	41.0	6	6.5	5	6	34.5	98	110	122	7	7	52.0	63.0	5	12	5	9.5	0
20 FT	18	20	9	8	6	6.5	6	8	44.3	38.0	38.0	38.0	7	15	61.0	71.0	7	15	43.0	46.0	6	6	5	7	34.6	100	112	124	6	6	49.0	60.0	5	12	5	9	0
22 FT	20	21	9	8	6	6.5	6	8	43.4	40.0	40.0	40.0	6	12	55.0	66.0	6	12	38.0	41.0	7	8	5	6.5	34.5	101	113	125	7	7	52.0	63.0	5	12	5	8.5	0
24 FT	21	22	9	8	6	6	6	7.5	43.0	41.0	41.0	41.0	7	15	60.0	71.0	7	15	43.0	46.0	7	7.5	5	6	34.3	102	114	126	7	7	51.0	63.0	5	12	5	8.5	0
26 FT	22	24	10	8	6	6	6	8	43.8	42.0	42.0	42.0	7	15	59.0	70.0	7	15	42.0	46.0	7	7	5	6.5	34.5	104	116	128	7	7	51.0	63.0	5	12	5	8	0
28 FT	23	25	11	8	7	7	5	6	40.5	43.0	43.0	43.0	7	14	59.0	70.0	7	14	42.0	46.0	7	6.5	5	7	34.9	105	117	129	7	6.5	51.0	63.0	5	12	5	8.5	0
30 FT	25	26	11	8	7	7	5	6	40.0	45.0	45.0	45.0	7	14	59.0	70.0	7	14	41.0	44.0	7	6.5	5	6.5	34.9	106	118	130	7	6.5	51.0	63.0	5	12	5	7.5	0
32 FT	26	27	11	8	7	7	5	6	39.8	46.0	46.0	46.0	7	13	59.0	69.0	7	13	40.0	43.0	7	6	5	6	34.8	107	119	131	7	6	51.0	63.0	5	12	5	7.5	0
34 FT	27	29	11	8	7	6.5	6	8	43.9	47.0	47.0	51.0	7	13	58.0	69.0	7	13	40.0	42.0	7	6.5	6	7.5	37.9	109	121	133	8	7.5	57.0	69.0	5	12	5	7.5	0
36 FT	28	30	11	8	7	6.5	6	7.5	43.9	52.0	52.0	52.0	7	12	58.0	68.0	7	12	40.0	42.0	7	6	6	7	37.9	110	122	134	8	7.5	57.0	69.0	5	12	5	7.5	0
38 FT	29	31	11	8	7	6	6	6.5	43.9	53.0	53.0	53.0	7	12	58.0	68.0	7	12	39.0	41.0	7	6	6	7	38.0	111	123	135	8	7	57.0	69.0	5	12	5	7	0
40 FT	30	32	12	8	7	6	6	7.5	44.8	54.0	54.0	54.0	7	12	58.0	68.0	7	12	38.0	40.0	7	6	6	7.5	38.5	112	124	136	8	7	57.0	70.0	5	12	5	7	0
42 FT	31	33	12	8	8	7.5	6	7.5	43.8	55.0	55.0	55.0	8	15	66.0	75.0	8	15	46.0	47.0	7	6	6	7	37.6	113	125	137	8	7	57.0	69.0	5	12	5	7	0
44 FT	32	34	12	8	8	7.5	6	7	43.9	56.0	56.0	56.0	8	14	65.0	74.0	8	14	45.0	47.0	7	6	6	7	37.8	114	126	138	8	7	57.0	69.0	5	12	5	7	0
46 FT	32	35	12	8	8	7	6	7	43.9	56.0	56.0	56.0	8	14	65.0	74.0	8	14	46.0	47.0	7	6	6	6.5	37.8	115	127	139	8	7	57.0	69.0	5	12	5	7	0
48 FT	33	35	12	8	8	7	6	7	43.9	57.0	57.0	57.0	8	14	65.0	74.0	8	14	45.0	47.0	8	7	6	6.5	37.9	115	127	139	8	6.5	57.0	69.0	5	12	5	6.5	0
50 FT	34	36	12	8	8	7	6	6.5	43.9	58.0	58.0	58.0	8	14	65.0	73.0	8	14	45.0	46.0	8	7	6	6.5	38.1	116	128	140	8	6.5	57.0	69.0	5	12	5	6	0

		SPAN (S) = 13 FT												HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	9	10	5	6	5	7	66.6	34.0	34.0	34.0	5	12	126.5	93.5	5	12	35.0	38.0	5	7	6	6	81.5	126	138	150	6	6.5	57.0	60.0	5	12	5	9	12
2 FT	15	10	10	10	6	8	5	7.5	67.3	35.0	35.0	35.0	6	16	130.5	100.5	6	16	41.0	44.0	5	7	6	6	70.1	126	138	150	6	6	56.0	58.0	5	12	5	9.5	12
2'- 4'	15	10	10	10	6	8	5	6	72.3	35.0	35.0	35.0	6	15	130.5	100.5	6	15	41.0	44.0	5	7	6	6	70.1	126	138	150	7	6.5	58.0	61.0	5	9.5	5	9	12
4 FT	11	10	10	10	6	8	5	6	72.3	31.0	31.0	31.0	6	15	82.0	97.0	6	15	38.0	39.0	5	7	6	6	64.6	126	138	150	7	6.5	58.0	61.0	5	9.5	5	9	12
6 FT	11	11	10	10	5	6	5	6	60.5	31.0	31.0	31.0	6	14	64.0	71.0	6	14	36.0	37.0	5	6.5	6	6	61.0	127	139	151	7	6.5	57.0	61.0	5	12	5	9	12
8 FT	12	13	10	10	5	6	5	6	56.8	32.0	32.0	32.0	6	14	60.0	64.0	6	14	35.0	36.0	5	6	6	6.5	59.1	129	141	153	6	6	52.0	59.0	5	12	5	8.5	0
10 FT	13	14	10	10	5	6	6	7	56.9	33.0	33.0	37.0	6	13	57.0	62.0	6	13	34.0	36.0	6	8	6	6.5	56.8	130	142	154	6	6	51.0	59.0	5	12	5	8	0
12 FT	14	15	10	10	5	6	6	6.5	54.6	34.0	34.0	38.0	6	13	55.0	61.0	6	13	34.0	36.0	6	7.5	6	6.5	54.9	131	143	155	6	6	51.0	59.0	5	12	5	8	0
14 FT	15	16	10	10	6	8	6	6.5	58.9	35.0	35.0	39.0	6	13	60.0	66.0	6	13	39.0	42.0	6	7	6	6	53.5	132	144	156	6	6	50.0	59.0	5	12	5	8	0
16 FT	16	17	11	10	6	7.5	6	7	58.0	36.0	36.0	40.0	6	12	58.0	66.0	6	12	39.0	42.0	6	7	6	7.5	52.5	133	145	157	6	6	50.0	59.0	5	12	5	7.5	0
18 FT	17	18	12	10	6	7.5	6	7	57.9	37.0	37.0	41.0	6	12	58.0	66.0	6	12	39.0	42.0	6	6	6	7.5	52.0	134	146	158	7	7	53.0	62.0	5	12	5	7	0
20 FT	18	20	12	10	6	7	6	6.5	57.3	38.0	38.0	42.0	6	12	57.0	65.0	6	12	39.0	42.0	6	6	6	7.5	51.5	136	148	160	6	6	50.0	60.0	5	12	5	7	0
22 FT	19	21	12	10	6	6	6	6.5	56.8	39.0	39.0	43.0	7	15	62.0	70.0	7	15	44.0	47.0	7	8	6	7	51.0	137	149	161									

		SPAN (S) = 13 FT																HEIGHT (HT) = 13 FT OR 14 FT																						
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS																WALL BARS			
					A1 BARS				J3 BARS				H1 BARS				H2 BARS				A2 BARS				J4 BARS				H3 BARS				B1 BARS		B2 BARS					
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=13'/HT=14'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=13'/HT=14'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1					
1 FT	14	11	10	11	5	6	5	6	67.5	34.0	34.0	5	12	127.5	94.5	5	12	35.0	38.0	5	7	6	6.5	100.1	163	175	5	6	56.0	58.0	5	12	5	8	12					
2 FT	15	11	10	11	6	8	5	6	67.5	35.0	35.0	6	16	131.5	101.5	6	16	41.0	44.0	5	6.5	6	6	88.9	163	175	6	6.5	57.0	60.0	5	12	5	8	12					
2'-4'	15	11	11	11	6	8	5	6	68.1	35.0	35.0	6	15	131.5	101.5	6	15	41.0	44.0	5	6.5	6	6	88.9	163	175	6	6	57.0	60.0	5	12	5	7.5	12					
4 FT	11	11	11	11	6	8	5	6	68.1	31.0	31.0	6	15	127.5	92.0	6	15	38.0	39.0	5	6.5	6	6	78.6	163	175	6	6	56.0	60.0	5	12	5	7.5	12					
6 FT	11	12	11	11	5	6	6	7.5	75.9	31.0	35.0	6	14	65.0	69.0	6	14	36.0	37.0	5	6	6	6.5	74.6	164	176	6	6	54.0	59.0	5	12	5	7.5	12					
8 FT	12	13	11	11	5	6	6	7.5	70.1	32.0	36.0	6	14	61.0	64.0	6	14	35.0	36.0	5	6	6	6.5	70.9	165	177	6	6	53.0	59.0	5	12	5	7.5	0					
10 FT	12	14	12	11	5	6	6	7.5	65.9	36.0	36.0	6	12	58.0	61.0	6	12	35.0	35.0	6	8	6	7	67.9	166	178	6	6	52.0	59.0	5	12	5	7	0					
12 FT	13	15	12	11	6	8	6	7	64.4	37.0	37.0	6	12	56.0	60.0	6	12	34.0	35.0	6	7.5	6	7	66.3	167	179	6	6	52.0	59.0	5	12	5	7	0					
14 FT	15	16	12	11	6	8	6	6.5	69.9	39.0	39.0	6	13	60.0	66.0	6	13	40.0	42.0	6	7	6	6	64.9	168	180	6	6	51.0	59.0	5	12	5	7	0					
16 FT	16	17	13	11	6	8	6	6.5	68.9	40.0	40.0	6	13	59.0	65.0	6	13	40.0	42.0	6	7	6	6.5	63.8	169	181	6	6	51.0	59.0	5	12	5	6.5	0					
18 FT	17	19	14	11	6	7.5	6	6.5	68.3	41.0	41.0	6	12	58.0	65.0	6	12	40.0	42.0	6	6	6	6.5	63.5	171	183	6	6	51.0	60.0	5	12	5	6	0					
20 FT	18	20	14	11	6	7	6	6	67.5	42.0	42.0	6	12	58.0	65.0	6	12	39.0	42.0	6	6	6	6.5	62.8	172	184	6	6	51.0	60.0	5	12	5	6	0					
22 FT	19	21	14	11	6	6.5	6	6	66.9	43.0	43.0	6	12	57.0	65.0	6	12	39.0	42.0	7	8	6	6	62.1	173	185	7	7	54.0	63.0	5	12	5	6	0					
24 FT	20	22	16	11	6	6	6	6	67.3	44.0	44.0	7	15	62.0	69.0	7	15	44.0	47.0	7	7	6	6.5	61.8	174	186	7	7	54.0	63.0	5	12	6	8	0					
26 FT	22	24	16	11	6	6	6	6	67.1	46.0	46.0	7	15	61.0	69.0	7	15	43.0	46.0	7	7	6	7	61.8	176	188	7	7	54.0	63.0	5	12	6	8	0					
28 FT	23	25	16	11	7	7.5	7	8	71.6	47.0	47.0	7	15	61.0	69.0	7	15	43.0	46.0	7	6.5	6	6.5	61.4	177	189	7	6.5	54.0	63.0	5	12	6	8	0					
30 FT	24	26	16	11	7	7.5	7	7	71.3	48.0	48.0	7	14	60.0	69.0	7	14	42.0	45.0	7	6.5	6	6	61.0	178	190	7	6.5	54.0	63.0	5	12	6	8	0					
32 FT	25	28	17	11	7	7	7	7.5	71.6	49.0	49.0	7	14	60.0	68.0	7	14	42.0	45.0	7	6.5	6	6.5	61.1	180	192	7	6	54.0	64.0	5	12	6	7.5	0					
34 FT	26	29	17	11	7	6.5	7	6.5	71.4	50.0	50.0	7	13	60.0	68.0	7	13	42.0	44.0	7	6.5	6	6.5	61.0	181	193	8	7.5	60.0	70.0	5	12	6	7.5	0					
36 FT	27	30	18	11	7	6.5	7	7	72.0	51.0	51.0	7	13	60.0	68.0	7	13	41.0	43.0	7	6	6	6.5	61.3	182	194	8	7.5	60.0	70.0	5	12	6	7	0					
38 FT	28	31	19	11	7	6.5	7	7.5	72.5	52.0	52.0	7	12	59.0	67.0	7	12	41.0	43.0	7	6	6	6.5	61.5	183	195	8	7	60.0	70.0	5	12	6	6.5	0					
40 FT	29	32	19	11	7	6	7	6.5	72.6	53.0	53.0	7	12	59.0	67.0	7	12	40.0	42.0	7	6	6	6	61.5	184	196	8	7	60.0	70.0	5	12	6	6.5	0					
42 FT	30	33	20	11	7	6	7	7	73.3	54.0	54.0	7	12	59.0	66.0	7	12	39.0	41.0	7	6	6	6	61.9	185	197	8	7	60.0	70.0	5	12	6	6.5	0					
44 FT	31	34	20	11	8	7.5	7	7	71.6	55.0	55.0	8	15	67.0	73.0	8	15	47.0	48.0	7	6	6	6	60.1	186	198	8	7	60.0	70.0	5	12	6	6.5	0					
46 FT	32	35	20	11	8	7.5	7	6.5	71.6	56.0	56.0	8	15	67.0	73.0	8	15	46.0	48.0	8	7.5	6	6	60.3	187	199	8	7	60.0	70.0	5	12	6	6.5	0					
48 FT	32	36	21	11	8	7	7	7	72.4	56.0	56.0	8	14	67.0	73.0	8	14	47.0	48.0	8	7.5	6	6	60.5	188	200	8	6.5	60.0	70.0	5	12	6	6	0					
50 FT	33	36	22	11	8	7	7	7	73.1	57.0	63.0	8	14	66.0	72.0	8	14	46.0	47.0	8	6.5	7	7.5	63.8	188	200	8	6.5	60.0	70.0	5	12	6	6	0					

		SPAN (S) = 13 FT																HEIGHT (HT) = 15 FT OR 16 FT																						
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS																WALL BARS			
					A1 BARS				J3 BARS				H1 BARS				H2 BARS				A2 BARS				J4 BARS				H3 BARS				B1 BARS		B2 BARS					
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=15'/HT=16'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=15'/HT=16'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1					
1 FT	14	11	12	13	5	6	5	6	69.0	34.0	34.0	5	12	128.5	95.5	5	12	35.0	37.0	5	6.5	6	6.5	103.3	187	199	6	7	60.0	61.0	5	10.5	5	7	12					
2 FT	15	11	12	13	6	8	6	8	72.0	35.0	39.0	6	16	135.5	102.5	6	16	41.0	44.0	5	6.5	6	6	95.4	187	199	6	6.5	58.0	59.0	5	12	5	7	12					
2'-4'	15	11	12	13	6	8	6	7	72.0	35.0	39.0	6	15	135.5	102.5	6	15	41.0	44.0	5	6.5	7	6	95.4	187	199	6	6	58.0	59.0	5	12	5	6.5	12					
4 FT	11	11	12	13	6	8	6	7	72.0	35.0	35.0	6	15	130.5	82.0	6	15	39.0	39.0	5	6.5	7	6	92.5	187	199	6	6	57.0	59.0	5	12	5	6.5	12					
6 FT	11	12	12	13	5	6	6	6.5	90.4	35.0	35.0	6	14	65.0	66.0	6	14	37.0	37.0	5	6	7	6	88.9	188	200	6	6	56.0	59.0	5	12	5	6.5	12					
8 FT	11	13	13	13	5	6	6	6.5	78.1	35.0	35.0	6	13	60.0	62.0	6	13	36.0	36.0	5	6	6	6	82.4	189	201	6	6	55.0	59.0	5	12	5	6.5	0					
10 FT	12	14	13	13	5	6	6	6.5	76.0	36.0	36.0	6	13	58.0	60.0	6	13	35.0	36.0	6	8	6	6	80.4	190	202	6	6	54.0	59.0	5	12	5	6	0					
12 FT	13	15	14	13	5	6	6	6.5	73.3	37.0	37.0	6	12	57.0	59.0	6	12	35.0	36.0	6	7.5	6	6	77.5	191	203	6	6	53.0	59.0	5	12	5	6	0					
14 FT	14	16	14	13	6	8	6	6	72.3	38.0	38.0	6	12	55.0	59.0	6	12	35.0	36.0	6	7	6	6	76.3	192	204	7	7	55.0	62.0	5	12	5	6	0					
16 FT	15	17	16	13	6	7.5	6	6.5	76.6	39.0	39.0	6	12	60.0	64.0	6	12	41.0	42.0	6	6.5	6	6.5	73.3	193	205	7	7	55.0	62.0	5	12	6	8	0					
18 FT	16	19	16	13	6	7	6	6	76.3	40.0	40.0	6	12	59.0	64.0	6	12	40.0	42.0	6	6	6	6	74.1	195	207	6	6	52.0	60.0	5	12	6	8	0					
20 FT	18	20	16	13	6	7	6	6	76.8	42.0	42.0	6	12	59.0	64.0	6	12	40.0	42.0	6	6	6	6	73.0	196	208	6	6	52.0	60.0	5	12	6	8	0					
22 FT	19	21	17	13	6	6.5	6	6	76.4	43.0	43.0	6	12	58.0	64.0	6	12	40.0	42.0	7	7.5	7	7.5	75.1	197	209	7	7	55.0	63.0	5	12	6	7.5	0					
24 FT	20	23	17	13	6	6.5	7	7.5	81.1	44.0	50.0	6	12	58.0	64.0	6	12	40.0	42.0	7	7	7	7	75.4	199	211	7	7	55.0	63.0	5	12	6	7.5	0					
26 FT	22	24	18	13	6	6	7	7.5	81.5	46.0	52.0	7	15	62.0	69.0	7	15	44.0	46.0	7	7	7	7.5	74.9	200	212	7	7	55.0	63.0	5	12</								

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 14 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT																																
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS																
	A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS																
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8	8	6	8.5	5	8.5	69.3	34.0	34.0	34.0	5	12	133.5	98.5	5	12	39.0	43.0	5	7	6	7	60.9	90	102	114	6	6.5	58.0	63.0	5	12	5	12	12
2 FT	15	10	8	8	6	8	5	8	69.3	35.0	35.0	35.0	6	16	137.5	105.5	6	16	45.0	49.0	5	7	6	6	54.8	90	102	114	7	7	60.0	64.0	5	12	5	12	12
2' - 4'	15	11	8	8	6	7.5	5	6	69.3	35.0	35.0	35.0	6	14	137.5	105.5	6	14	45.0	49.0	5	6.5	6	6	54.8	91	103	115	6	6	60.0	64.0	5	12	5	12	12
4 FT	12	11	8	8	6	7.5	5	6	52.4	32.0	32.0	32.0	6	14	80.0	103.0	6	14	39.0	42.0	5	6.5	6	7	49.1	91	103	115	6	6	56.0	62.0	5	12	5	12	12
6 FT	12	12	8	8	6	8	6	7.5	48.9	32.0	32.0	32.0	6	13	66.0	81.0	6	13	37.0	39.0	5	6	5	6	42.1	92	104	116	7	7	57.0	65.0	5	12	5	12	12
8 FT	12	13	8	8	6	7.5	6	7	45.5	32.0	32.0	32.0	6	12	61.0	69.0	6	12	35.0	37.0	6	8.5	5	6	39.1	93	105	117	7	7	56.0	66.0	5	12	5	12	0
10 FT	13	14	9	8	6	7	5	6	41.3	33.0	33.0	33.0	7	15	61.0	69.0	7	15	38.0	40.0	6	8	5	7	38.4	94	106	118	7	6.5	55.0	65.0	5	12	5	12	0
12 FT	15	16	9	8	6	7.5	5	6.5	43.5	35.0	35.0	35.0	6	12	62.0	71.0	6	12	40.0	43.0	6	7	5	8	36.8	96	108	120	6	6	52.0	63.0	5	12	5	12	0
14 FT	16	17	9	8	6	7	5	6	41.9	36.0	36.0	36.0	6	12	61.0	70.0	6	12	40.0	43.0	6	7	5	7.5	35.8	97	109	121	7	7	54.0	66.0	5	12	5	12	0
16 FT	17	18	9	8	6	7	5	6	40.8	37.0	37.0	37.0	7	15	65.0	75.0	7	15	44.0	48.0	6	6.5	5	7	34.9	98	110	122	7	7	54.0	66.0	5	12	5	12	0
18 FT	18	20	9	8	6	6.5	6	8	44.0	38.0	38.0	38.0	7	15	64.0	75.0	7	15	44.0	47.0	6	6	5	7	34.0	100	112	124	7	7	54.0	66.0	5	12	5	10	0
20 FT	20	21	9	8	6	6.5	5	6	38.9	40.0	40.0	40.0	7	15	63.0	75.0	7	15	44.0	48.0	7	8	5	6.5	33.9	101	113	125	7	7	54.0	66.0	5	12	5	9	0
22 FT	21	22	9	8	6	6	6	8	42.4	41.0	41.0	41.0	7	14	63.0	74.0	7	14	44.0	47.0	7	7	5	6	33.5	102	114	126	7	6.5	54.0	66.0	5	12	5	8.5	0
24 FT	23	24	9	8	7	7.5	6	7	42.0	47.0	47.0	47.0	7	15	62.0	74.0	7	15	44.0	47.0	7	7	6	7	36.4	104	116	128	7	7	54.0	66.0	5	12	5	8.5	0
26 FT	24	25	9	8	7	7.5	6	7	41.6	48.0	48.0	48.0	7	14	62.0	74.0	7	14	43.0	47.0	7	6.5	6	7	36.1	105	117	129	7	6.5	54.0	66.0	5	12	5	8.5	0
28 FT	25	26	9	8	7	7	6	6	41.4	49.0	49.0	49.0	7	14	61.0	73.0	7	14	43.0	47.0	7	6	6	6.5	35.9	106	118	130	7	6	54.0	66.0	5	12	5	7.5	0
30 FT	27	28	10	8	7	6.5	6	7	42.3	51.0	51.0	51.0	7	13	61.0	73.0	7	13	42.0	45.0	7	6	6	7	36.5	108	120	132	7	6	54.0	67.0	5	12	5	8	0
32 FT	28	29	10	8	7	6.5	6	6.5	42.0	52.0	52.0	52.0	7	12	61.0	73.0	7	12	41.0	44.0	7	6	6	6.5	36.4	109	121	133	8	7.5	60.0	73.0	5	12	5	7.5	0
34 FT	29	30	10	8	7	6	6	6	41.9	53.0	53.0	53.0	7	12	61.0	72.0	7	12	41.0	44.0	8	7	6	6.5	36.4	110	122	134	8	7	60.0	73.0	5	12	5	7	0
36 FT	30	32	11	8	7	6	6	7	42.9	54.0	54.0	54.0	7	12	61.0	72.0	7	12	41.0	43.0	7	6	6	6.5	36.9	112	124	136	8	7	60.0	73.0	5	12	5	7.5	0
38 FT	31	33	11	8	8	7.5	6	6.5	42.9	55.0	55.0	55.0	8	15	68.0	79.0	8	15	48.0	51.0	8	7.5	6	6.5	37.0	113	125	137	8	6.5	60.0	73.0	5	12	5	7	0
40 FT	32	34	11	8	8	7.5	6	6.5	42.9	56.0	56.0	56.0	8	14	68.0	79.0	8	14	48.0	50.0	8	7.5	6	6	37.1	114	126	138	8	6.5	60.0	73.0	5	12	5	6.5	0
42 FT	33	35	12	8	8	7	6	7	43.8	57.0	57.0	57.0	8	14	68.0	78.0	8	14	47.0	49.0	8	7	6	6.5	37.6	115	127	139	8	6.5	60.0	73.0	5	12	5	7	0
44 FT	34	36	12	8	8	7	6	6.5	43.8	58.0	58.0	58.0	8	14	68.0	78.0	8	14	47.0	48.0	8	7	6	6.5	37.8	116	128	140	8	6	60.0	73.0	5	12	5	6.5	0
46 FT	35	37	12	8	8	6.5	6	6.5	42.9	59.0	59.0	59.0	8	13	67.0	77.0	8	13	46.0	47.0	8	7	6	6.5	37.0	117	129	141	8	6	60.0	73.0	5	12	5	6.5	0
48 FT	36	38	12	8	8	6.5	6	6.5	43.0	60.0	60.0	60.0	8	13	67.0	76.0	8	13	46.0	47.0	8	7	6	6	37.1	118	130	142	8	6	60.0	73.0	5	12	5	6	0
50 FT	37	39	12	8	8	6.5	6	6	43.1	61.0	61.0	61.0	8	13	67.0	75.0	8	13	46.0	47.0	8	7	6	6	37.4	119	131	143	8	6	60.0	73.0	5	12	5	6	0

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 14 FT HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT																																
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS																
	A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS																
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	9	10	6	8.5	5	7	70.3	34.0	34.0	34.0	5	12	134.5	99.5	5	12	39.0	43.0	5	7	6	6	80.1	126	138	150	6	6	60.0	63.0	5	10.5	5	9	12
2 FT	15	11	9	10	6	8	5	7	70.3	35.0	35.0	35.0	6	16	138.5	106.5	6	16	45.0	48.0	5	6.5	6	6	73.6	127	139	151	6	6.5	59.0	62.0	5	12	5	9	12
2' - 4'	15	11	11	10	6	7	5	6	70.3	35.0	35.0	35.0	6	13	138.5	106.5	6	13	45.0	48.0	5	6.5	6	6	73.6	127	139	151	7	7	61.0	65.0	5	9.5	5	9	12
4 FT	11	11	11	10	6	7	5	6	66.6	31.0	31.0	31.0	6	13	81.0	94.0	6	13	39.0	40.0	5	6.5	5	6	61.8	127	139	151	7	7	61.0	65.0	5	9.5	5	10	12
6 FT	12	12	11	10	6	8	5	6.5	60.6	32.0	32.0	32.0	6	13	67.0	75.0	6	13	37.0	39.0	5	6	5	6	57.3	128	140	152	7	7	59.0	65.0	5	12	5	10.5	12
8 FT	12	13	11	10	6	8	5	6	56.3	32.0	32.0	32.0	6	12	62.0	67.0	6	12	36.0	37.0	5	6	6	7	57.4	129	141	153	7	6.5	57.0	65.0	5	12	5	10	0
10 FT	13	14	11	10	6	7.5	6	8	56.3	33.0	33.0	37.0	6	12	59.0	65.0	6	12	35.0	37.0	6	7.5	6	7	55.0	130	142	154	7	6.5	57.0	65.0	5	12	5	9.5	0
12 FT	14	16	12	10	6	7.5	6	8	54.9	34.0	34.0	34.0	7	15	61.0	67.0	7	15	38.0	39.0	6	7	5	6	50.9	132	144	156	7	7	56.0	66.0	5	12	5	9.5	0
14 FT	16	17	12	10	6	7.5	6	8	59.3	36.0	36.0	36.0	6	12	62.0	70.0	6	12	41.0	43.0	6	7	5	6	49.9	133	145	157	7	7	56.0	66.0	5	12	5	9	0
16 FT	17	18	12	10	6	7	6	7.5	58.1	37.0	37.0	41.0	7	16	66.0	74.0	7	16	45.0	48.0	6	6.5	6	8	52.0	134	146	158	7	7	56.0	66.0	5	12	5	8	0
18 FT	18	20	12	10	6	7	6	7	57.5	38.0	38.0	42.0	7	15	65.0	74.0	7	15	45.0	48.0	6	6	6	8	51.3	136	148	160	7	7	55.0	66.0	5	12	5	7.5	0
20 FT	19	21	12	10	6	6	6	6.5	56.6	39.0	39.0	43.0	7	14	64.0	74.0	7	14	45.0	48.0	7	8	6	7.5	50.6	137	149	161	7	7	55.0	66.0	5	12	5	7	0
22 FT	21	22	12	10	6	6	6	6.5	55.9	41.0	41.0	45.0	7	15	64.0	74.0	7	15	45.0	48.0	7	7															

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS								WALL BARS						
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
										HT=13'	HT=14'														HT=13'	HT=14'									
1 FT	14	10	11	11	5	6	5	6.5	71.8	34.0	34.0	5	12	135.5	100.5	5	12	39.0	42.0	5	7	6	6	87.3	162	174	6	6	60.0	62.0	5	12	5	7.5	12
2 FT	15	11	11	11	6	8	5	6.5	71.8	35.0	35.0	6	16	139.5	107.5	6	16	45.0	48.0	5	6.5	6	6.5	83.4	163	175	6	6	59.0	62.0	5	12	5	7.5	12
2'- 4'	15	11	11	11	6	6.5	6	7	88.0	35.0	35.0	6	13	139.5	107.5	6	13	45.0	48.0	5	6.5	6	6	83.4	163	175	7	6.5	62.0	66.0	5	10.5	5	7.5	12
4 FT	11	11	11	11	6	6.5	6	7	88.0	31.0	35.0	6	13	86.0	92.0	6	13	40.0	40.0	5	6.5	6	6	76.4	163	175	7	6.5	62.0	66.0	5	10.5	5	7.5	12
6 FT	12	12	11	11	6	8	6	7.5	74.5	32.0	36.0	6	13	68.0	75.0	6	13	38.0	39.0	5	6	6	6	71.3	164	176	7	6.5	60.0	65.0	5	12	5	7.5	12
8 FT	12	13	11	11	6	8	6	7	68.5	36.0	36.0	6	12	63.0	67.0	6	12	36.0	37.0	6	8	6	6.5	68.8	165	177	7	6.5	58.0	65.0	5	12	5	7.5	0
10 FT	13	15	11	11	6	7.5	6	6.5	66.0	37.0	37.0	6	12	60.0	65.0	6	12	36.0	37.0	6	7.5	6	6	67.4	167	179	6	6	55.0	63.0	5	12	5	7.5	0
12 FT	14	16	12	11	6	7.5	6	6.5	64.0	38.0	38.0	7	16	61.0	67.0	7	16	38.0	40.0	6	7	6	7	65.3	168	180	7	7	57.0	66.0	5	12	5	7	0
14 FT	16	17	13	11	6	7.5	6	7	69.1	40.0	40.0	6	12	63.0	69.0	6	12	41.0	43.0	6	7	6	6.5	63.6	169	181	7	7	57.0	65.0	5	12	5	6.5	0
16 FT	17	18	13	11	6	7	6	6.5	67.8	41.0	41.0	6	12	62.0	69.0	6	12	41.0	43.0	6	6	6	6.5	62.4	170	182	7	6.5	56.0	66.0	5	12	5	6.5	0
18 FT	18	20	13	11	6	7	6	6	66.6	42.0	42.0	7	15	66.0	74.0	7	15	46.0	48.0	6	6	6	6	61.9	172	184	7	7	56.0	66.0	5	12	5	6.5	0
20 FT	19	21	14	11	6	6.5	6	6	66.3	43.0	43.0	7	15	65.0	73.0	7	15	45.0	48.0	7	8	6	6.5	61.0	173	185	7	7	56.0	66.0	5	12	5	6	0
22 FT	21	23	14	11	6	6	7	8	70.6	45.0	45.0	7	15	64.0	73.0	7	15	45.0	48.0	7	7	6	6	60.8	175	187	7	7	56.0	66.0	5	12	5	6	0
24 FT	22	24	15	11	6	6	7	8	70.5	46.0	46.0	7	15	64.0	73.0	7	15	45.0	48.0	7	7	6	6.5	60.3	176	188	7	7	56.0	66.0	5	12	6	8	0
26 FT	23	25	15	11	7	7.5	7	7.5	69.9	47.0	47.0	7	14	64.0	73.0	7	14	45.0	48.0	7	6.5	6	6	59.6	177	189	7	6.5	56.0	67.0	5	12	6	8	0
28 FT	25	27	16	11	7	7	7	7.5	70.3	49.0	49.0	7	14	63.0	72.0	7	14	44.0	47.0	7	6.5	6	6.5	59.9	179	191	7	6	56.0	67.0	5	12	6	8	0
30 FT	26	28	16	11	7	7	7	7	69.8	50.0	50.0	7	13	62.0	72.0	7	13	43.0	46.0	7	6	6	6	59.4	180	192	7	6	56.0	67.0	5	12	6	8	0
32 FT	27	30	17	11	7	6.5	7	7.5	70.1	51.0	51.0	7	13	62.0	72.0	7	13	43.0	46.0	7	6	6	6.5	59.5	182	194	8	7.5	62.0	73.0	5	12	6	7.5	0
34 FT	28	31	17	11	7	6	7	6.5	69.8	52.0	52.0	7	12	62.0	71.0	7	12	43.0	45.0	7	6	6	6.5	59.1	183	195	8	7	62.0	73.0	5	12	6	7.5	0
36 FT	29	32	18	11	7	6	7	7	70.3	53.0	53.0	7	12	62.0	71.0	7	12	42.0	45.0	8	7.5	6	6.5	59.3	184	196	8	7	62.0	73.0	5	12	6	7	0
38 FT	31	33	19	11	8	7.5	7	7.5	71.0	55.0	55.0	8	15	70.0	78.0	8	15	48.0	50.0	8	7.5	6	6.5	59.6	185	197	8	6.5	62.0	73.0	5	12	6	6.5	0
40 FT	31	34	19	11	8	7	7	6.5	70.9	55.0	55.0	8	14	70.0	78.0	8	14	49.0	51.0	8	7	6	6.5	59.5	186	198	8	6.5	62.0	73.0	5	12	6	6.5	0
42 FT	32	35	20	11	8	7	7	7	71.5	56.0	56.0	8	14	69.0	77.0	8	14	49.0	51.0	8	7	6	6	59.8	187	199	8	6.5	62.0	74.0	5	12	6	6.5	0
44 FT	33	36	20	11	8	7	7	6.5	71.5	57.0	57.0	8	14	69.0	77.0	8	14	48.0	50.0	8	7	6	6	59.9	188	200	8	6	62.0	74.0	5	12	6	6.5	0
46 FT	34	37	20	11	8	7	7	7	70.1	58.0	58.0	8	14	69.0	76.0	8	14	47.0	49.0	8	7	6	6	58.5	189	201	8	6	62.0	74.0	5	12	6	6.5	0
48 FT	35	38	21	11	8	6.5	7	7	70.9	59.0	59.0	8	13	68.0	75.0	8	13	47.0	48.0	8	7	6	6	59.0	190	202	8	6	62.0	74.0	5	12	6	6	0
50 FT	36	39	21	11	8	6.5	7	6.5	70.9	60.0	60.0	8	13	68.0	75.0	8	13	47.0	48.0	8	6.5	6	6	59.1	191	203	8	6	62.0	74.0	5	12	6	6	0

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS								WALL BARS						
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS						
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
										HT=15'	HT=16'														HT=15'	HT=16'									
1 FT	14	11	12	13	5	6	5	6	72.6	34.0	34.0	5	12	136.5	101.5	5	12	38.0	41.0	5	6.5	6	6	103.4	187	199	6	6.5	62.0	63.0	5	11.5	5	7	12
2 FT	15	12	12	13	6	8	6	8	75.6	35.0	39.0	6	16	143.5	108.5	6	16	45.0	48.0	5	6	6	6.5	99.0	188	200	6	6.5	61.0	63.0	5	12	5	7	12
2'- 4'	15	12	12	13	6	8	6	7.5	75.6	36.0	39.0	6	15	143.5	108.5	6	15	45.0	48.0	5	6	6	6	99.0	188	200	6	6	61.0	63.0	5	12	5	7	12
4 FT	12	12	12	13	6	8	6	7.5	75.6	36.0	36.0	6	15	138.5	89.0	6	15	40.0	41.0	5	6	6	6	90.1	188	200	6	6	60.0	63.0	5	12	5	7	12
6 FT	12	12	12	13	6	8	6	7	89.3	36.0	36.0	6	14	69.0	71.0	6	14	38.0	39.0	5	6	6	6	86.4	189	201	6	6	58.0	63.0	5	12	5	6.5	12
8 FT	12	14	13	13	6	8	6	6.5	78.1	36.0	36.0	6	12	64.0	66.0	6	12	37.0	37.0	6	8	6	6	81.9	190	202	6	6	57.0	62.0	5	12	5	6.5	0
10 FT	13	15	13	13	6	8	6	6.5	75.1	37.0	37.0	6	12	61.0	64.0	6	12	37.0	37.0	6	7.5	6	6.5	79.1	191	203	7	7	59.0	65.0	5	12	5	6.5	0
12 FT	14	16	14	13	6	7.5	6	6.5	72.9	38.0	38.0	6	12	59.0	63.0	6	12	36.0	37.0	6	7	6	6.5	75.6	192	204	7	7	58.0	65.0	5	12	5	6	0
14 FT	15	17	15	13	6	7.5	6	6.5	77.6	39.0	39.0	7	16	69.0	73.0	7	16	47.0	48.0	6	7	6	6.5	73.6	193	205	7	7	58.0	65.0	5	12	6	8	0
16 FT	17	19	15	13	6	7.5	6	6	77.6	41.0	41.0	6	12	63.0	68.0	6	12	42.0	44.0	6	6	6	6	73.5	195	207	6	6	55.0	63.0	5	12	6	8	0
18 FT	18	20	15	13	6	7	7	7.5	81.8	42.0	48.0	7	16	67.0	73.0	7	16	46.0	49.0	6	6	7	7	75.6	196	208	7	7	57.0	66.0	5	12	6	8	0
20 FT	19	21	16	13	6	6.5	7	7.5	81.1	43.0	49.0	7	15	66.0	73.0	7	15	46.0	49.0	7	7.5	7	7.5	74.8	197	209	7	7	57.0	66.0	5	12	6	8	0
22 FT	20	23	17	13	6	6	7	7.5	80.8	44.0	50.0	7	15	65.0	73.0	7	15	46.0	49.0	7	7	7	7.5	74.6	199	211	7	7	57.0	66.0	5	12	6	7.5	0
24 FT	22	24	17	13	6	6	7	7	80.8	46.0	52.0	7	15	65.0	73.0	7	15	46.0	49.0	7	7	7	7	74.1	200	212	7	7	57.0	66.0	5	12	6	7.5	0
26 FT	23	25	18	13																															

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 15 FT															HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT																	
					TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS												
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS													
					TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE
1 FT	15	10	8	8	6	8	5	8	72.9	35.0	35.0	35.0	6	16	146.5	111.5	6	16	48.0	53.0	5	7	7	6.5	69.0	102	114	126	6	6	61.0	65.0	5	12	5	12	12
2 FT	15	11	9	8	6	7.5	5	8	73.5	35.0	35.0	35.0	6	16	146.5	111.5	6	16	49.0	53.0	5	6.5	6	7	60.4	103	115	127	6	6	59.0	65.0	5	12	5	12	12
2'- 4'	15	11	9	8	6	6.5	6	7	73.5	35.0	36.0	36.0	6	12	146.5	111.5	6	12	49.0	53.0	5	6.5	6	6.5	60.4	103	115	127	7	6.5	61.0	68.0	5	11.5	5	12	12
4 FT	12	11	9	8	6	6.5	6	7	60.8	32.0	36.0	36.0	6	12	84.0	109.0	6	12	40.0	43.0	5	6.5	6	6.5	53.9	103	115	127	7	6.5	61.0	68.0	5	11.5	5	12	12
6 FT	12	12	9	8	6	7	6	6.5	53.5	32.0	32.0	36.0	7	16	72.0	86.0	7	16	41.0	43.0	6	8	6	7	49.9	104	116	128	7	6.5	60.0	68.0	5	12	5	12	12
8 FT	13	14	9	8	6	7	6	7	49.5	33.0	33.0	33.0	7	15	67.0	77.0	7	15	39.0	42.0	6	8	5	6.5	43.4	106	118	130	7	7	58.0	69.0	5	12	5	12	0
10 FT	14	15	9	8	6	7	6	7.5	46.6	34.0	34.0	34.0	7	15	64.0	73.0	7	15	39.0	41.0	6	7.5	5	6.5	41.5	107	119	131	7	6.5	58.0	69.0	5	12	5	12	0
12 FT	15	16	9	8	6	6	6	7.5	50.4	35.0	35.0	35.0	7	14	70.0	80.0	7	14	46.0	49.0	6	6	5	6	40.0	108	120	132	7	6.5	57.0	69.0	5	12	5	11.5	0
14 FT	17	18	9	8	6	6.5	6	7.5	48.4	37.0	37.0	37.0	7	15	68.0	79.0	7	15	46.0	49.0	6	6.5	5	6	38.9	110	122	134	7	6.5	57.0	69.0	5	12	5	9.5	0
16 FT	18	19	9	8	6	6.5	6	7.5	47.1	38.0	38.0	42.0	7	14	67.0	79.0	7	14	45.0	49.0	6	6	6	8.5	41.0	111	123	135	7	6.5	57.0	69.0	5	12	5	8.5	0
18 FT	19	21	10	8	6	6	6	7.5	47.8	39.0	39.0	39.0	7	14	66.0	78.0	7	14	45.0	49.0	7	8	5	6.5	37.9	113	125	137	7	6.5	57.0	70.0	5	12	5	9.5	0
20 FT	21	22	10	8	6	6	6	7.5	46.6	41.0	41.0	41.0	7	14	66.0	78.0	7	14	45.0	49.0	7	7.5	5	6	37.5	114	126	138	7	6.5	56.0	70.0	5	12	5	8	0
22 FT	23	24	10	8	7	7.5	6	7.5	46.0	43.0	43.0	43.0	7	14	65.0	77.0	7	14	45.0	49.0	7	7	5	6	37.3	116	128	140	7	6.5	56.0	70.0	5	12	5	8	0
24 FT	24	25	11	8	7	7.5	6	8	46.5	44.0	44.0	44.0	7	13	64.0	77.0	7	13	45.0	49.0	7	6.5	5	6.5	37.5	117	129	141	7	6.5	56.0	70.0	5	12	5	7.5	0
26 FT	25	27	11	8	7	7	6	7.5	46.4	45.0	45.0	45.0	7	13	64.0	77.0	7	13	44.0	48.0	7	6.5	5	6	37.1	119	131	143	7	6	56.0	70.0	5	12	5	7.5	0
28 FT	27	28	11	8	7	6.5	6	7.5	45.8	47.0	47.0	47.0	7	13	64.0	76.0	7	13	44.0	48.0	7	6	5	6	37.1	120	132	144	7	6	56.0	70.0	5	12	5	7.5	0
30 FT	28	30	12	8	7	6.5	6	7.5	46.8	52.0	52.0	52.0	7	12	63.0	76.0	7	12	43.0	47.0	8	7.5	6	8	40.4	122	134	146	8	7.5	62.0	76.0	5	12	5	7	0
32 FT	30	31	12	8	7	6	6	7.5	46.3	54.0	54.0	54.0	7	12	63.0	75.0	7	12	42.0	45.0	8	7.5	6	7.5	40.5	123	135	147	8	7	62.0	76.0	5	12	5	7	0
34 FT	31	32	12	8	8	7.5	6	7.5	46.1	55.0	55.0	55.0	8	15	71.0	83.0	8	15	50.0	53.0	8	6.5	6	7.5	40.3	124	136	148	8	6.5	62.0	76.0	5	12	5	7	0
36 FT	32	34	12	8	8	7.5	6	7	46.1	56.0	56.0	56.0	8	14	71.0	82.0	8	14	49.0	52.0	8	7	6	7	40.3	126	138	150	8	6.5	62.0	76.0	5	12	5	7	0
38 FT	33	35	13	8	8	7	6	7	47.0	57.0	57.0	57.0	8	14	71.0	82.0	8	14	49.0	51.0	8	7	6	6.5	40.8	127	139	151	8	6.5	62.0	76.0	5	12	5	6.5	0
40 FT	34	36	13	8	8	7	6	6.5	46.9	58.0	58.0	58.0	8	14	70.0	81.0	8	14	49.0	51.0	8	6.5	6	6.5	40.8	128	140	152	8	6	62.0	76.0	5	12	5	6.5	0
42 FT	35	37	13	8	8	6.5	6	6.5	46.9	59.0	59.0	59.0	8	13	70.0	81.0	8	13	48.0	50.0	8	6	6	6.5	40.9	129	141	153	8	6	62.0	76.0	5	12	5	6.5	0
44 FT	36	38	13	8	8	6.5	6	6.5	46.9	60.0	60.0	60.0	8	13	70.0	80.0	8	13	48.0	49.0	8	6	6	6	41.0	130	142	154	8	6	62.0	76.0	5	12	5	6	0
46 FT	37	39	13	8	8	6.5	6	6	46.9	61.0	61.0	61.0	8	12	70.0	79.0	8	12	47.0	49.0	8	6	6	6	41.1	131	143	155	8	6	62.0	76.0	5	12	6	8	0
48 FT	38	41	13	8	8	6	6	6	46.1	62.0	62.0	62.0	8	12	69.0	78.0	8	12	46.0	48.0	8	6.5	7	7	43.3	133	145	157	9	7.5	68.0	82.0	5	12	6	8	0
50 FT	39	42	14	8	8	6	6	6	47.1	63.0	63.0	63.0	8	12	69.0	77.0	8	12	46.0	47.0	8	6.5	7	7.5	43.9	134	146	158	9	7	68.0	82.0	5	12	5	6	0

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 15 FT															HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT																	
					TOP SLAB BARS										BOTTOM SLAB BARS										WALL BARS												
					A1 BARS		J3 BARS			H1 BARS		H2 BARS			A2 BARS		J4 BARS			H3 BARS		B1 BARS		B2 BARS													
					TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE
1 FT	15	11	9	10	6	8	5	6.5	73.9	35.0	35.0	35.0	6	16	147.5	112.5	6	16	48.0	52.0	5	6.5	6	6	89.3	139	151	163	6	6.5	63.0	67.0	5	12	5	8.5	12
2 FT	15	11	10	10	6	7.5	5	6.5	74.5	35.0	35.0	35.0	6	16	147.5	112.5	6	16	49.0	53.0	5	6.5	6	6	77.1	139	151	163	6	6	61.0	65.0	5	12	5	8	12
2'- 4'	15	12	10	10	6	7	6	7.5	77.5	35.0	36.0	36.0	6	13	147.5	112.5	6	13	49.0	53.0	5	6	6	6	77.1	140	152	164	6	6	61.0	67.0	5	10	5	8	12
4 FT	12	12	10	10	6	7	6	7.5	77.5	32.0	36.0	36.0	6	13	89.0	107.0	6	13	41.0	43.0	5	6	6	6.5	71.3	140	152	164	6	6	60.0	67.0	5	10	5	8	12
6 FT	12	12	10	10	6	7	6	7	67.9	32.0	36.0	36.0	7	16	74.0	83.0	7	16	41.0	43.0	6	8	6	6	65.1	140	152	164	7	6	61.0	68.0	5	12	5	8	12
8 FT	13	14	10	10	6	7.5	6	6.5	63.0	33.0	37.0	37.0	7	16	69.0	75.0	7	16	40.0	42.0	6	7.5	6	6	62.3	142	154	166	7	6.5	60.0	69.0	5	12	5	8	0
10 FT	14	15	10	10	6	7	6	6.5	59.4	34.0	38.0	38.0	7	15	66.0	73.0	7	15	40.0	42.0	6	7	7	6.5	62.4	143	155	167	7	6.5	59.0	69.0	5	12	5	8	0
12 FT	15	17	11	10	6	7	6	6.5	63.5	35.0	35.0	39.0	7	14	71.0	79.0	7	14	47.0	49.0	6	7	6	7	57.5	145	157	169	7	7	59.0	69.0	5	12	5	7.5	0
14 FT	17	18	12	10	6	7	6	6.5	62.4	37.0	41.0	41.0	7	15	70.0	78.0	7	15	47.0	49.0	6	6.5	6	7	56.4	146	158	170	7	6.5	58.0	69.0	5	12	5	7	0
16 FT	18	19	12	10	6	6.5	6	6.5	61.1	38.0	42.0	42.0	7	14	68.0	78.0	7	14	46.0	49.0	6	6	6	7	55.4	147	159	171	7	6.5	58.0	69.0	5	12	5	7	0
18 FT	19	21	12	10	6	6	6	6	60.4	39.0	43.0	43.0	7	14	68.0	77.0	7	14	46.0	49.0	7	8	6	6	54.6	149	161	173	7	6.5	58.0	70.0	5	12	5	7	0
20 FT	21	22	13	10	6	6	6	6	60.3	41.0	45.0	45.0	7	14	67.0	77.0	7	14	46.0	49.0	7	7	6	6.5	54.5	150	162	174	7	6.5	58.0	70.0	5	12	5	6.5	0
22 FT	22	24	13	10	6	6	6	6	59.6	42.0	46.0	46.0	7	14	66.0	77.0	7	14																			

DESIGN FILL	MEMBER THICKNESS				SPAN (S) = 15 FT HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT																																
					TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS																
	A1 BARS		J3 BARS				H1 BARS		H2 BARS		A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS																
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	15	11	12	13	6	8	6	8	79.3	35.0	35.0	39.0	6	16	152.5	114.5	6	16	48.0	51.0	5	6.5	6	6	99.0	175	187	199	6	6	64.0	65.0	5	11.5	5	7	12
2 FT	15	12	12	13	6	8	6	8	79.3	35.0	35.0	39.0	6	16	152.5	114.5	6	16	49.0	52.0	5	6	6	6.5	95.5	176	188	200	6	6	63.0	66.0	5	11.5	5	7	12
2'- 4'	15	12	12	13	6	7	6	7	111.5	36.0	36.0	39.0	6	13	152.5	114.5	6	13	49.0	52.0	5	6	6	6	95.5	176	188	200	7	6.5	65.0	69.0	5	9.5	5	7	12
4 FT	12	12	12	13	6	7	6	7	111.5	36.0	36.0	36.0	6	13	99.0	91.0	6	13	41.0	42.0	5	6	6	6	88.6	176	188	200	7	6.5	65.0	69.0	5	9.5	5	7	12
6 FT	12	13	12	13	6	7.5	6	6.5	85.6	36.0	36.0	36.0	6	12	71.0	73.0	6	12	40.0	40.0	6	8	6	6	84.0	177	189	201	7	6.5	64.0	69.0	5	12	5	6.5	12
8 FT	13	14	13	13	6	7.5	6	7	77.4	37.0	37.0	37.0	6	12	67.0	70.0	6	12	38.0	39.0	6	7.5	6	6	78.1	178	190	202	7	6.5	62.0	68.0	5	12	5	6.5	0
10 FT	14	16	13	13	6	7.5	6	6	75.0	38.0	38.0	38.0	7	15	67.0	71.0	7	15	41.0	42.0	6	7	6	6	77.0	180	192	204	7	7	61.0	69.0	5	12	5	6.5	0
12 FT	15	17	14	13	6	7	6	6	78.9	39.0	39.0	39.0	7	15	73.0	78.0	7	15	48.0	50.0	6	7	6	6.5	74.8	181	193	205	7	6.5	60.0	69.0	5	12	5	6	0
14 FT	16	18	15	13	6	7	6	6	77.5	40.0	40.0	40.0	7	14	71.0	77.0	7	14	48.0	49.0	6	6.5	6	6.5	73.0	182	194	206	7	6.5	60.0	69.0	5	12	6	8	0
16 FT	18	20	15	13	6	7	7	8	81.9	42.0	42.0	42.0	7	15	70.0	77.0	7	15	48.0	50.0	6	6	6	6	72.4	184	196	208	7	7	60.0	69.0	5	12	6	8	0
18 FT	19	21	15	13	6	6.5	7	7	80.8	43.0	43.0	49.0	7	14	69.0	77.0	7	14	48.0	50.0	7	8	7	7	74.4	185	197	209	7	6.5	60.0	69.0	5	12	6	8	0
20 FT	20	23	16	13	6	6	7	7	80.3	44.0	44.0	50.0	7	14	69.0	76.0	7	14	47.0	50.0	7	7	7	7.5	74.0	187	199	211	7	7	59.0	70.0	5	12	6	8	0
22 FT	22	24	17	13	6	6	7	7.5	80.1	46.0	46.0	52.0	7	14	68.0	76.0	7	14	47.0	50.0	7	7	7	7.5	73.3	188	200	212	7	6.5	59.0	70.0	5	12	6	7.5	0
24 FT	23	25	17	13	7	7.5	7	7	79.4	47.0	47.0	53.0	7	14	67.0	76.0	7	14	47.0	50.0	7	6	7	7	72.5	189	201	213	7	6	59.0	70.0	5	12	6	7.5	0
26 FT	25	27	18	13	7	7	7	7	79.6	49.0	49.0	55.0	7	14	67.0	76.0	7	14	47.0	50.0	7	6.5	7	7.5	72.5	191	203	215	7	6	59.0	70.0	5	12	6	7	0
28 FT	26	29	19	13	7	7	7	7	79.6	50.0	50.0	50.0	7	13	66.0	76.0	7	13	46.0	50.0	7	6	6	6	69.5	193	205	217	8	7.5	65.0	76.0	5	12	6	6.5	0
30 FT	27	30	19	13	7	6.5	7	6.5	79.3	51.0	51.0	57.0	7	13	66.0	76.0	7	13	46.0	49.0	8	7.5	7	7.5	72.1	194	206	218	8	7.5	65.0	77.0	5	12	6	6.5	0
32 FT	29	31	20	13	7	6	7	7	79.5	53.0	53.0	59.0	7	12	65.0	75.0	7	12	44.0	47.0	8	7	7	8	71.9	195	207	219	8	7	65.0	77.0	5	12	6	6.5	0
34 FT	30	33	21	13	7	6	7	7	79.9	54.0	54.0	54.0	7	12	65.0	75.0	7	12	44.0	47.0	8	7	6	6	69.0	197	209	221	8	6.5	65.0	77.0	5	12	6	6	0
36 FT	31	34	22	13	8	7.5	7	6.5	80.1	55.0	61.0	61.0	8	15	73.0	82.0	8	15	52.0	55.0	8	7	7	7.5	71.9	198	210	222	8	6.5	65.0	77.0	5	12	6	6	0
38 FT	32	35	22	13	8	7	7	6	79.8	56.0	62.0	62.0	8	14	73.0	82.0	8	14	52.0	54.0	8	6.5	7	7.5	71.6	199	211	223	8	6.5	65.0	77.0	5	12	6	6	0
40 FT	33	36	23	13	8	6.5	7	6.5	80.4	57.0	63.0	63.0	8	13	73.0	82.0	8	13	51.0	54.0	8	6	7	7.5	71.8	200	212	224	8	6	65.0	77.0	5	12	7	7.5	0
42 FT	34	38	24	13	8	6.5	7	6.5	81.1	58.0	64.0	64.0	8	13	72.0	81.0	8	13	51.0	53.0	8	6.5	7	7	72.4	202	214	226	8	6	65.0	78.0	5	12	7	7.5	0
44 FT	35	39	25	13	8	6.5	7	6.5	81.9	59.0	65.0	65.0	8	13	72.0	81.0	8	13	50.0	52.0	8	6.5	7	7	72.5	203	215	227	8	6	65.0	78.0	5	12	7	7.5	0
46 FT	36	40	26	13	8	6.5	7	6.5	82.5	60.0	66.0	66.0	8	13	72.0	80.0	8	13	50.0	52.0	8	6.5	7	7	72.9	204	216	228	9	7.5	71.0	84.0	5	12	7	8	0
48 FT	37	41	27	13	8	6.5	7	6	83.3	67.0	67.0	67.0	8	12	72.0	79.0	8	12	49.0	51.0	8	6.5	7	7	73.1	205	217	229	9	7	71.0	84.0	5	12	7	8	0
50 FT	38	42	27	13	8	6	7	6.5	81.8	68.0	68.0	68.0	8	12	71.0	79.0	8	12	49.0	50.0	8	6	7	7	71.4	206	218	230	9	7	71.0	84.0	5	12	6	6	0

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

**GENERAL NOTES:**

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

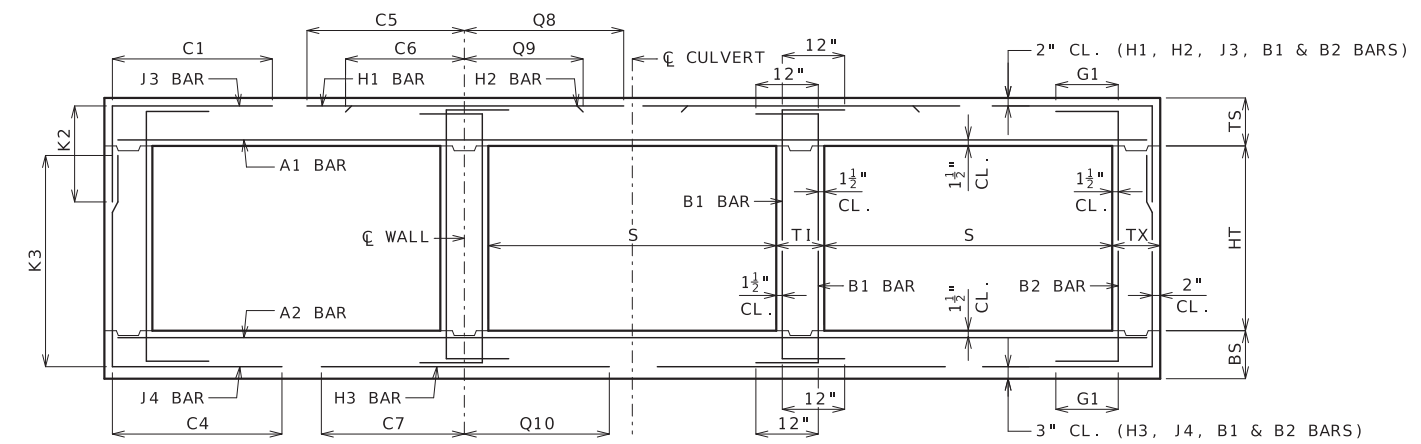
SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS SPAN (S): 15 FEET HEIGHT (HT): 14 THRU 16 FEET	
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 3/22/2023	<b>703.87A</b>	SHEET NO. <b>25 OF 27</b>



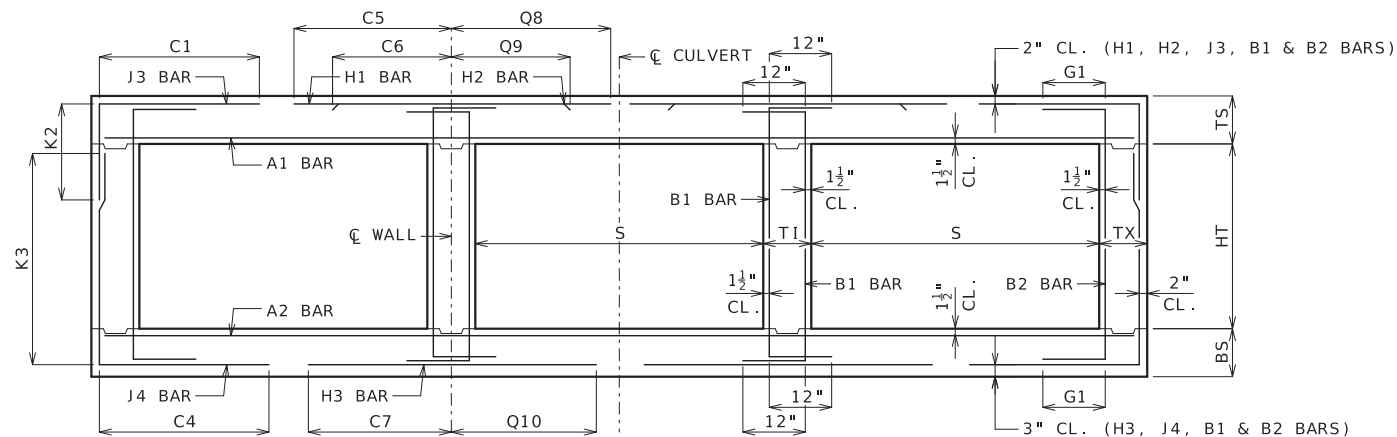
		SPAN (S) = 16 FT												HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	10	9	8	6	7.5	5	8	77.1	35.0	35.0	35.0	6	16	154.5	117.5	6	16	52.0	57.0	5	7	6	6	64.6	102	114	126	7	6.5	66.0	71.0	5	12	5	12	12
2 FT	16	11	9	8	6	7	5	8	77.1	36.0	36.0	36.0	6	14	154.5	117.5	6	14	48.0	53.0	5	6.5	6	6.5	59.3	103	115	127	7	7	65.0	71.0	5	12	5	12	12
2'- 4'	16	11	9	8	6	6.5	5	6	77.1	36.0	36.0	36.0	6	12	154.5	117.5	6	12	48.0	53.0	6	8	6	6	59.3	103	115	127	7	6	65.0	71.0	5	12	5	12	12
4 FT	13	11	9	8	6	6.5	5	6	55.9	33.0	33.0	33.0	6	12	87.0	115.0	6	12	42.0	45.0	6	8	6	6	54.0	103	115	127	7	6	64.0	71.0	5	12	5	12	12
6 FT	13	12	10	8	6	7	5	6	51.4	33.0	33.0	33.0	7	15	75.0	91.0	7	15	42.0	45.0	6	7	6	6.5	51.4	104	116	128	7	6	62.0	70.0	5	12	5	12	12
8 FT	14	14	10	8	6	7	5	6	47.3	34.0	34.0	34.0	7	15	70.0	81.0	7	15	41.0	43.0	6	7.5	5	6.5	44.5	106	118	130	7	6	61.0	71.0	5	12	5	12	0
10 FT	15	16	10	8	6	6.5	6	8	53.6	35.0	35.0	35.0	7	14	75.0	85.0	7	14	48.0	51.0	6	7	5	7	41.6	108	120	132	7	6.5	60.0	72.0	5	12	5	12	0
12 FT	16	17	10	8	6	6.5	6	8	51.3	36.0	36.0	36.0	7	13	73.0	83.0	7	13	47.0	50.0	6	6.5	5	6.5	40.1	109	121	133	7	6	60.0	72.0	5	12	5	12	0
14 FT	18	19	10	8	6	6	6	8	49.0	38.0	38.0	38.0	7	14	71.0	83.0	7	14	47.0	50.0	6	6	5	6.5	38.8	111	123	135	7	6.5	59.0	73.0	5	12	5	12	0
16 FT	19	20	10	8	6	6	6	7.5	47.6	39.0	39.0	39.0	7	13	69.0	82.0	7	13	46.0	50.0	6	6	5	6.5	37.8	112	124	136	7	6	59.0	73.0	5	12	5	11	0
18 FT	20	22	10	8	7	7	6	7.5	46.9	40.0	40.0	40.0	7	13	69.0	81.0	7	13	46.0	50.0	7	7.5	5	6.5	36.8	114	126	138	7	6.5	59.0	73.0	5	12	5	9.5	0
20 FT	22	23	10	8	7	7.5	6	7.5	45.6	42.0	42.0	42.0	7	13	68.0	81.0	7	13	46.0	50.0	7	6.5	5	6	36.5	115	127	139	7	6	59.0	73.0	5	12	5	8	0
22 FT	24	25	10	8	7	7.5	6	7.5	45.0	44.0	44.0	44.0	7	13	67.0	81.0	7	13	46.0	50.0	7	6.5	5	6	36.3	117	129	141	7	6.5	59.0	73.0	5	12	5	8	0
24 FT	25	27	11	8	7	7	6	7.5	45.9	45.0	45.0	45.0	7	12	67.0	80.0	7	12	46.0	50.0	7	6.5	5	6	36.4	119	131	143	7	6	59.0	73.0	5	12	5	7.5	0
26 FT	27	28	11	8	7	6.5	6	7.5	45.1	47.0	47.0	47.0	7	12	66.0	80.0	7	12	45.0	50.0	7	6	5	6	36.4	120	132	144	7	6	59.0	73.0	5	12	5	7.5	0
28 FT	28	30	11	8	7	6	6	7	45.0	52.0	52.0	52.0	7	12	66.0	80.0	7	12	45.0	50.0	8	7.5	6	7	39.0	122	134	146	8	7.5	65.0	79.0	5	12	5	7.5	0
30 FT	30	31	11	8	7	6	6	6.5	44.6	54.0	54.0	54.0	7	12	66.0	79.0	7	12	44.0	48.0	8	7	6	7	39.0	123	135	147	8	7	65.0	79.0	5	12	5	7.5	0
32 FT	31	33	12	8	8	7.5	6	7.5	45.5	55.0	55.0	55.0	8	15	74.0	87.0	8	15	52.0	56.0	8	7	6	7	39.4	125	137	149	8	6.5	65.0	80.0	5	12	5	7	0
34 FT	33	34	12	8	8	7	6	7	45.3	57.0	57.0	57.0	8	14	73.0	86.0	8	14	51.0	54.0	8	6.5	6	7	39.5	126	138	150	8	6.5	65.0	80.0	5	12	5	7	0
36 FT	34	36	12	8	8	7	6	6.5	45.3	58.0	58.0	58.0	8	14	73.0	85.0	8	14	50.0	53.0	8	6.5	6	6.5	39.4	128	140	152	8	6	65.0	80.0	5	12	5	6.5	0
38 FT	35	37	12	8	8	6.5	6	6.5	45.3	59.0	59.0	59.0	8	13	73.0	85.0	8	13	50.0	53.0	8	6.5	6	6.5	39.4	129	141	153	8	6	65.0	80.0	5	12	5	6	0
40 FT	36	39	13	8	8	6	6	6.5	46.1	60.0	60.0	60.0	8	12	73.0	84.0	8	12	50.0	52.0	8	6.5	6	6	39.9	131	143	155	8	6	65.0	80.0	5	12	5	6.5	0
42 FT	38	40	13	8	8	6	6	6	46.0	62.0	62.0	62.0	8	12	72.0	83.0	8	12	48.0	50.0	8	6.5	6	6	40.1	132	144	156	9	7	71.0	86.0	5	12	5	6	0
44 FT	39	41	13	8	8	6	6	6	46.0	63.0	63.0	63.0	8	12	72.0	82.0	8	12	48.0	49.0	8	6	7	7	43.3	133	145	157	9	7	71.0	86.0	5	12	6	8	0
46 FT	40	42	13	8	8	6	7	7	51.1	70.0	70.0	70.0	8	12	72.0	82.0	8	12	47.0	48.0	8	6	7	7	43.4	134	146	158	9	7	71.0	86.0	5	12	6	7.5	0
48 FT	41	43	13	8	9	7.5	7	7	51.1	71.0	71.0	71.0	9	15	79.0	89.0	9	15	55.0	56.0	8	6	7	6.5	43.5	135	147	159	9	7	70.0	86.0	5	12	6	7.5	0
50 FT	42	45	13	8	9	7	7	6	51.4	72.0	72.0	72.0	9	15	79.0	88.0	9	15	55.0	56.0	8	6	7	6.5	43.8	137	149	161	9	7	70.0	86.0	5	10.5	6	7	0

		SPAN (S) = 16 FT												HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT																							
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS				H1 BARS				H2 BARS				A2 BARS		J4 BARS				H3 BARS		B1 BARS		B2 BARS								
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	11	9	10	6	7.5	5	6	77.5	35.0	35.0	35.0	6	16	155.5	118.5	6	16	52.0	57.0	5	6.5	6	6	79.6	139	151	163	6	6	65.0	69.0	5	12	5	8.5	12
2 FT	16	12	9	10	6	7	5	6	77.5	36.0	36.0	36.0	6	14	155.5	118.5	6	14	49.0	54.0	5	6	6	6	79.0	140	152	164	6	6	64.0	69.0	5	12	5	8.5	12
2'- 4'	16	12	10	10	6	6.5	6	7	77.5	37.0	37.0	37.0	6	12	155.5	118.5	6	12	49.0	54.0	5	6	6	6	79.0	140	152	164	7	6.5	65.0	72.0	5	10.5	5	8	12
4 FT	13	12	10	10	6	6.5	6	7	76.3	37.0	37.0	37.0	6	12	91.0	115.0	6	12	42.0	45.0	5	6	6	6	69.6	140	152	164	7	6.5	65.0	72.0	5	10.5	5	8	12
6 FT	13	13	10	10	6	6.5	6	7	67.3	37.0	37.0	37.0	7	15	77.0	88.0	7	15	43.0	45.0	6	7.5	6	6.5	64.3	141	153	165	7	6	64.0	72.0	5	12	5	8	12
8 FT	14	14	10	10	6	7	6	6.5	61.5	38.0	38.0	38.0	7	15	71.0	79.0	7	15	41.0	44.0	6	7	6	6	60.3	142	154	166	7	6	62.0	72.0	5	12	5	8	0
10 FT	15	16	10	10	6	6.5	6	6	63.9	35.0	39.0	39.0	7	14	76.0	85.0	7	14	49.0	51.0	6	6.5	6	6	57.6	144	156	168	7	6.5	61.0	72.0	5	12	5	8	0
12 FT	16	18	11	10	6	6.5	6	6	62.9	36.0	40.0	40.0	7	14	74.0	83.0	7	14	48.0	51.0	6	6.5	6	7	56.4	146	158	170	7	6.5	61.0	73.0	5	12	5	7.5	0
14 FT	18	19	12	10	6	6.5	6	6.5	61.8	38.0	42.0	42.0	7	14	72.0	82.0	7	14	48.0	51.0	6	6	6	7	55.8	147	159	171	7	6.5	61.0	73.0	5	12	5	7	0
16 FT	19	21	12	10	6	6	6	6	60.8	39.0	43.0	43.0	7	13	71.0	81.0	7	13	47.0	51.0	7	8	6	7	54.6	149	161	173	7	6.5	60.0	73.0	5	12	5	7	0
18 FT	20	22	12	10	7	8	7	8	64.6	40.0	44.0	44.0	7	13	70.0	81.0	7	13	47.0	51.0	7	7.5	6	6	53.8	150	162	174	7	6.5	60.0	73.0	5	12	5	7	0
20 FT	22	24	13	10	7	8	6	6	59.6	42.0	46.0	46.0	7	13	69.0	81.0	7	13	47.0	51.0	7	7	6	7	53.6	152	164	176	7	6.5	60.0	73.0	5	12	5	6.5	0
22 FT	23	25	14	10	7	7	6	6	59.8	43.0	47.0	47.0	7	12	69.0	80.0	7	12																			

SPAN (S) = 16 FT      HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS												BOTTOM SLAB BARS												WALL BARS								
					A1 BARS		J3 BARS			H1 BARS			H2 BARS			A2 BARS		J4 BARS			H3 BARS			B1 BARS		B2 BARS											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2			SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3			SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	11	12	13	6	7.5	6	8	82.9	35.0	35.0	39.0	6	16	160.5	120.5	6	16	51.0	55.0	5	6.5	6	6	97.5	175	187	199	7	7	70.0	71.0	5	10.5	5	7	12
2 FT	16	12	12	13	6	7.5	6	8	82.9	36.0	36.0	40.0	6	15	160.5	120.5	6	15	49.0	52.0	5	6	6	6	93.3	176	188	200	7	7	69.0	71.0	5	12	5	7	12
2'- 4'	16	13	13	13	6	6.5	6	6.5	94.8	36.0	36.0	40.0	7	16	160.5	120.5	7	16	49.0	52.0	5	6	6	6	93.3	177	189	201	7	7	69.0	73.0	5	8.5	5	6.5	12
4 FT	12	13	13	13	6	6.5	6	6.5	94.8	36.0	36.0	36.0	7	16	92.0	94.0	7	16	46.0	46.0	5	6	6	6.5	87.8	177	189	201	7	7	68.0	73.0	5	8.5	5	6.5	12
6 FT	13	13	13	13	6	7	6	7	82.5	37.0	37.0	37.0	7	16	77.0	81.0	7	16	44.0	45.0	6	7.5	6	6	79.3	177	189	201	7	6	66.0	71.0	5	12	5	6.5	12
8 FT	14	15	13	13	6	7	6	6.5	77.9	38.0	38.0	38.0	7	15	73.0	77.0	7	15	43.0	44.0	6	7.5	6	6.5	77.8	179	191	203	7	6.5	64.0	72.0	5	12	5	6.5	0
10 FT	15	16	13	13	6	7	6	6	80.9	39.0	39.0	39.0	7	15	78.0	83.0	7	15	50.0	51.0	6	6.5	6	6	75.3	180	192	204	7	6	63.0	72.0	5	12	5	6.5	0
12 FT	16	18	14	13	6	6.5	6	6	78.5	40.0	40.0	40.0	7	14	76.0	82.0	7	14	49.0	51.0	6	6.5	6	6	73.8	182	194	206	7	6.5	63.0	72.0	5	12	5	6	0
14 FT	17	19	14	13	6	6	7	7.5	81.6	41.0	41.0	47.0	7	13	74.0	81.0	7	13	49.0	51.0	6	6	7	7.5	75.0	183	195	207	7	6.5	62.0	72.0	5	12	5	6	0
16 FT	19	21	15	13	6	6.5	7	7.5	80.9	43.0	43.0	49.0	7	14	73.0	81.0	7	14	49.0	51.0	7	8	7	7.5	74.0	185	197	209	7	6.5	62.0	73.0	5	12	6	8	0
18 FT	20	22	16	13	6	6	7	7.5	80.0	44.0	44.0	50.0	7	13	72.0	80.0	7	13	49.0	51.0	7	7.5	7	7.5	72.9	186	198	210	7	6.5	62.0	73.0	5	12	6	8	0
20 FT	22	24	16	13	6	6	7	7	79.1	46.0	46.0	52.0	7	13	71.0	80.0	7	13	48.0	51.0	7	7	7	7.5	72.3	188	200	212	7	6.5	62.0	73.0	5	12	6	8	0
22 FT	23	25	17	13	7	7.5	7	7	78.8	47.0	47.0	53.0	7	13	70.0	80.0	7	13	48.0	51.0	7	6	7	8	71.5	189	201	213	7	6	62.0	73.0	5	12	6	7.5	0
24 FT	25	27	17	13	7	7	7	7	78.1	49.0	49.0	55.0	7	13	70.0	80.0	7	13	48.0	51.0	7	6.5	7	7	71.3	191	203	215	7	6	61.0	73.0	5	12	6	7.5	0
26 FT	26	29	18	13	7	7	7	7	78.1	50.0	50.0	56.0	7	12	69.0	79.0	7	12	48.0	51.0	7	6	7	8	71.0	193	205	217	8	7.5	67.0	80.0	5	12	6	7	0
28 FT	28	30	19	13	7	6.5	7	7	78.3	52.0	52.0	52.0	7	12	68.0	79.0	7	12	47.0	51.0	8	7.5	6	6	67.8	194	206	218	8	7.5	67.0	80.0	5	12	6	6.5	0
30 FT	29	32	19	13	7	6	7	6.5	77.9	53.0	53.0	59.0	7	12	68.0	79.0	7	12	47.0	51.0	8	7	7	7.5	70.5	196	208	220	8	7	67.0	80.0	5	12	6	6.5	0
32 FT	31	33	20	13	8	7.5	7	6.5	78.1	55.0	55.0	61.0	8	15	76.0	87.0	8	15	53.0	57.0	8	7	7	8	70.4	197	209	221	8	6.5	67.0	80.0	5	12	6	6.5	0
34 FT	32	34	20	13	8	7.5	7	6	77.6	56.0	56.0	62.0	8	14	75.0	86.0	8	14	53.0	56.0	8	6	7	7	70.0	198	210	222	8	6	67.0	80.0	5	12	6	6.5	0
36 FT	33	36	22	13	8	7	7	6.5	78.8	57.0	63.0	63.0	8	14	75.0	86.0	8	14	53.0	56.0	8	6.5	7	7.5	70.3	200	212	224	8	6	67.0	81.0	5	12	6	6	0
38 FT	34	37	23	13	8	6.5	7	6.5	79.1	58.0	64.0	64.0	8	13	75.0	85.0	8	13	53.0	56.0	8	6	7	7.5	70.3	201	213	225	8	6	67.0	81.0	5	12	6	6	0
40 FT	36	39	23	13	8	6.5	7	6.5	79.0	60.0	66.0	66.0	8	13	75.0	85.0	8	13	51.0	54.0	8	6.5	7	7.5	70.3	203	215	227	8	6	67.0	81.0	5	12	7	7.5	0
42 FT	37	40	23	13	8	6.5	7	6	78.9	61.0	67.0	67.0	8	12	74.0	84.0	8	12	51.0	53.0	8	6	7	7	70.3	204	216	228	9	7	73.0	87.0	5	12	7	7.5	0
44 FT	38	42	24	13	8	6	7	6	79.8	68.0	68.0	68.0	8	12	74.0	83.0	8	12	50.0	52.0	8	6	7	7	70.8	206	218	230	9	7	73.0	87.0	5	12	7	7.5	0
46 FT	39	43	26	13	8	6	7	6.5	81.4	69.0	69.0	69.0	8	12	74.0	83.0	8	12	50.0	52.0	8	6	7	7	71.3	207	219	231	9	7	73.0	87.0	5	12	7	7.5	0
48 FT	40	44	27	13	8	6	7	6	82.1	70.0	70.0	70.0	8	12	74.0	82.0	8	12	49.0	51.0	8	6	7	7	71.6	208	220	232	9	7	73.0	88.0	5	12	7	8	0
50 FT	41	45	28	13	9	7.5	7	6	83.0	71.0	71.0	71.0	9	15	82.0	89.0	9	15	57.0	58.0	8	6	7	7	72.0	209	221	233	9	6.5	73.0	88.0	5	12	7	8	0

BAR DIMENSIONS DIAGRAM  
SYMMETRICAL ABOUT CULVERT.



GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2'- 4' TABULATED DESIGN FILL.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

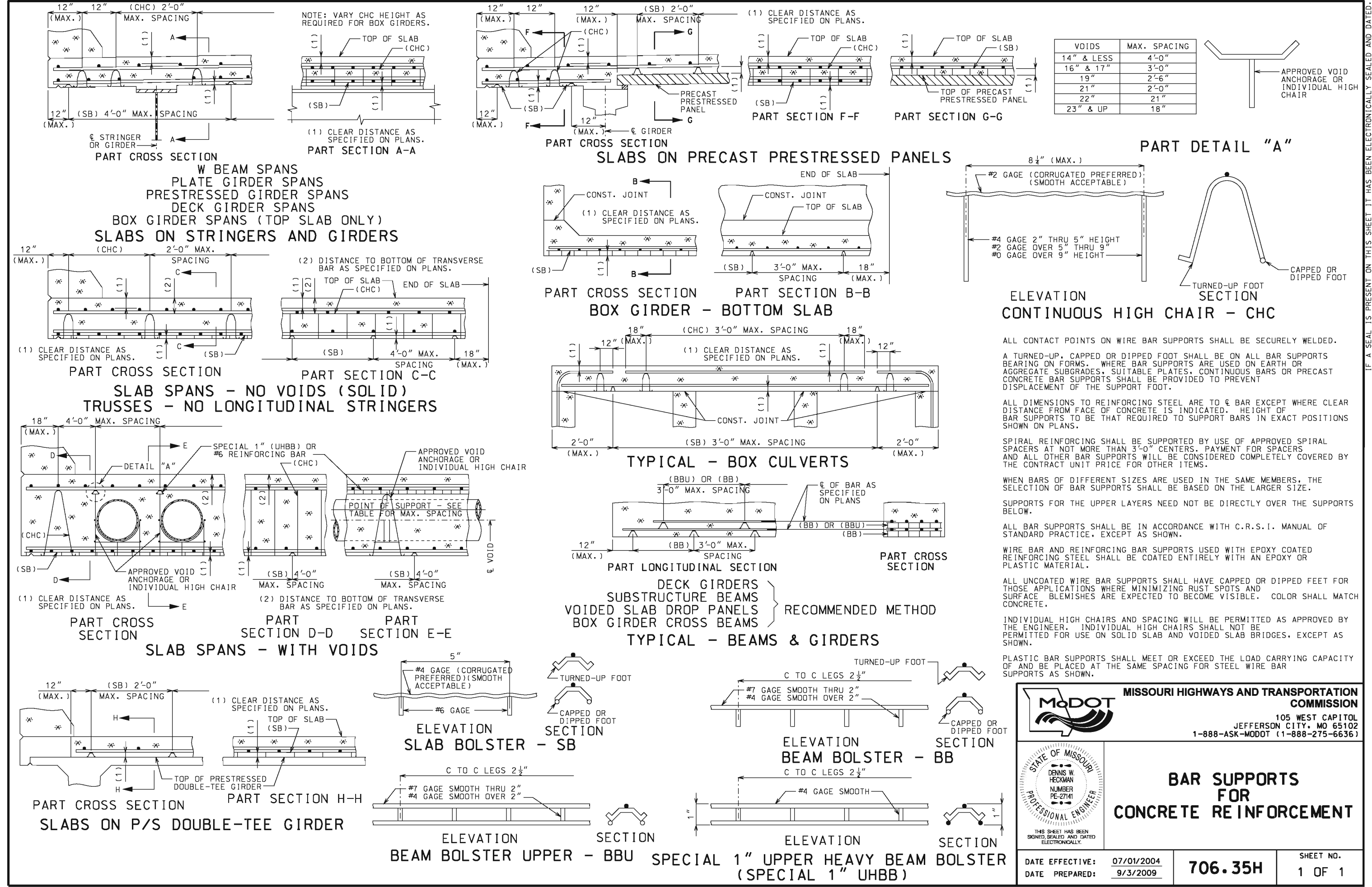
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>CONCRETE TRIPLE BOX CULVERT</b>	
	MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS	
SPAN (S): 16 FEET HEIGHT (HT): 14 THRU 16 FEET		SHEET NO. <b>27 OF 27</b>
DATE EFFECTIVE:	7/1/2023	<b>703.87A</b>
DATE PREPARED:	3/22/2023	

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



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

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**STATE OF MISSOURI**  
DENNIS W. HECKMAN  
NUMBER PE-27141  
PROFESSIONAL ENGINEER

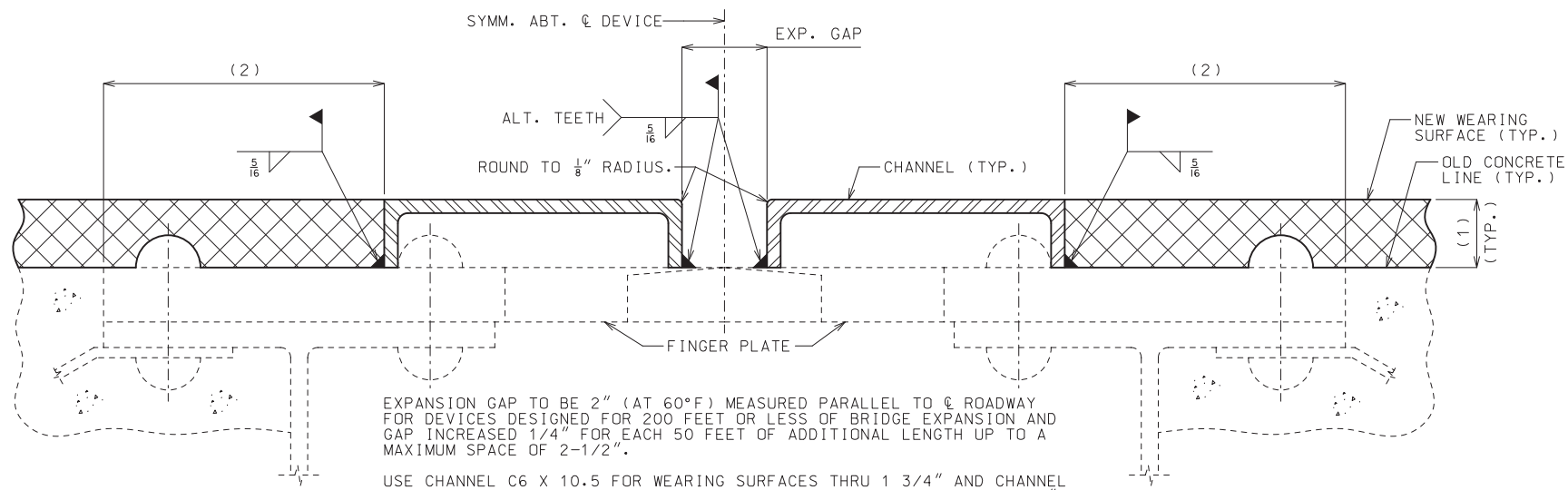
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**BAR SUPPORTS FOR CONCRETE REINFORCEMENT**

DATE EFFECTIVE: 07/01/2004  
DATE PREPARED: 9/3/2009

**706.35H**

SHEET NO. 1 OF 1

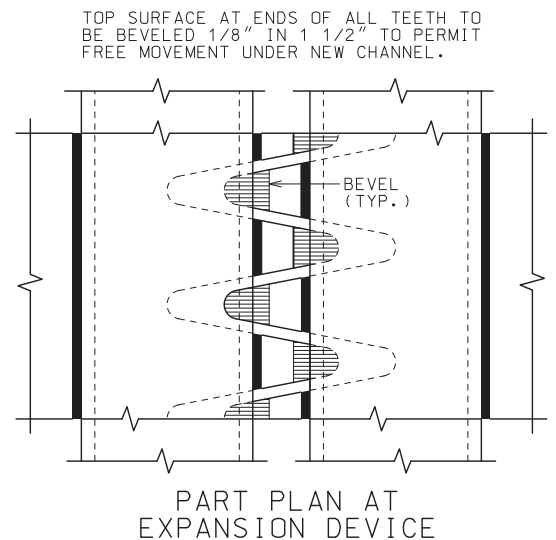


EXPANSION GAP TO BE 2" (AT 60°F) MEASURED PARALLEL TO & ROADWAY FOR DEVICES DESIGNED FOR 200 FEET OR LESS OF BRIDGE EXPANSION AND GAP INCREASED 1/4" FOR EACH 50 FEET OF ADDITIONAL LENGTH UP TO A MAXIMUM SPACE OF 2-1/2".

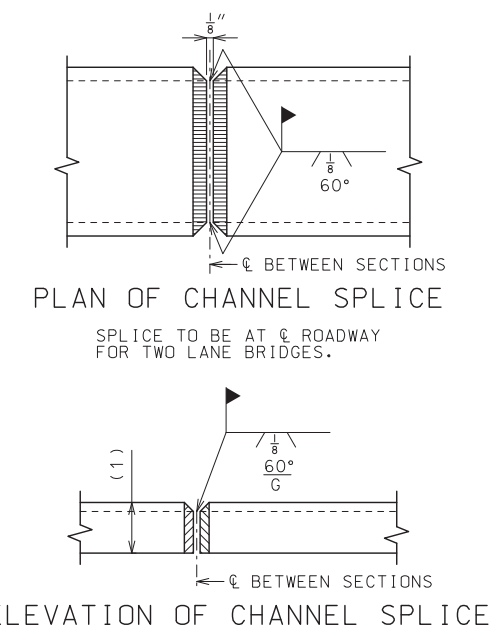
USE CHANNEL C6 X 10.5 FOR WEARING SURFACES THRU 1 3/4" AND CHANNEL C7 X 14.75 OR MC6 X 15.1 FOR WEARING SURFACES GREATER THAN 1 3/4" TO 2 1/4". CUT FLANGES TO MATCH REQUIRED WEARING SURFACE THICKNESS AND NOTCH FLANGE WHERE NECESSARY TO CLEAR RIVET HEADS.

PART SECTION THRU EXPANSION DEVICE

TYPE A - FINGER TYPE EXPANSION DEVICES

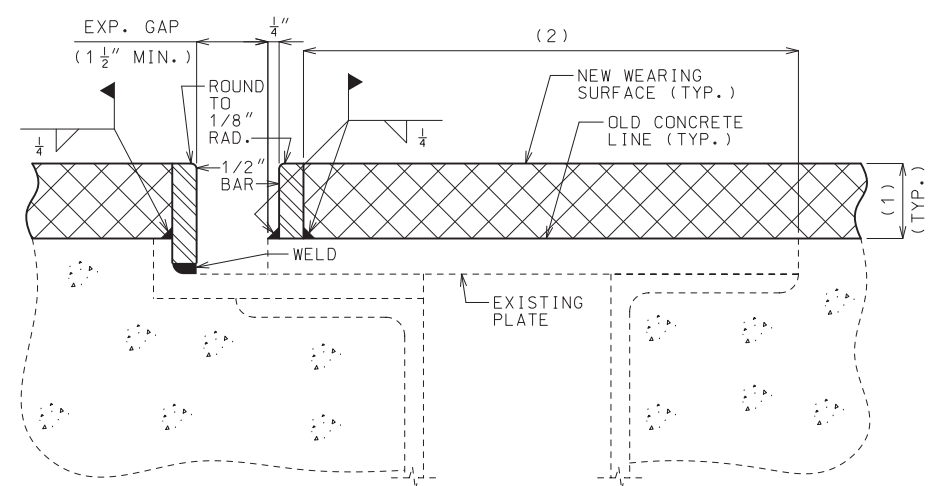


PART PLAN AT EXPANSION DEVICE



PLAN OF CHANNEL SPLICE

ELEVATION OF CHANNEL SPLICE



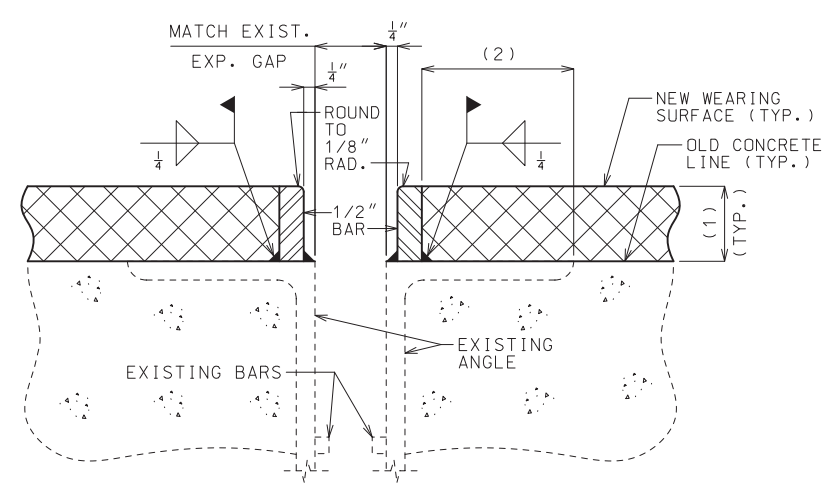
PART SECTION AT EXPANSION DEVICE

TYPE B - PLATE TYPE EXPANSION DEVICES

- (1) WEARING SURFACE THICKNESS
- (2) WHEN THIS DIMENSION EXCEEDS 3" AND A CONCRETE WEARING SURFACE IS USED, TACK WELD A ONE INCH BAR CHAIR TO THE PLATE OR ANGLE FOR EACH 3" OF PLATE OR ANGLE TO BE COVERED BY WEARING SURFACE.

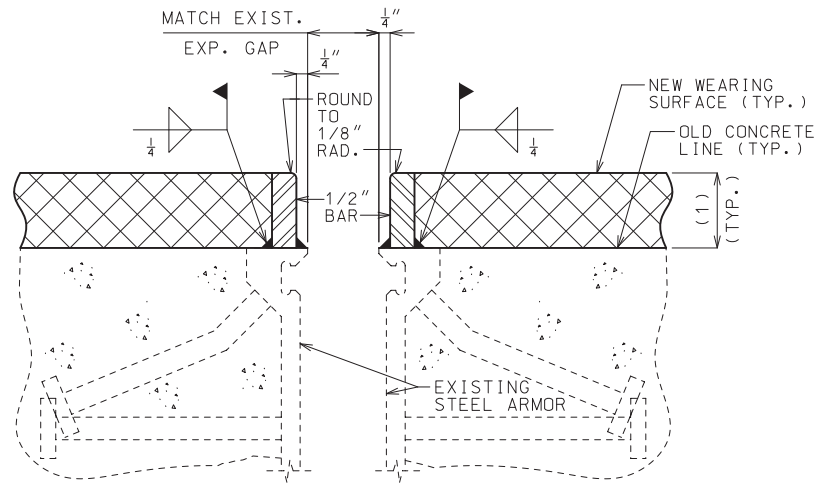
GENERAL NOTES:

- OUTLINE OF OLD WORK IS INDICATED BY LIGHT DASHED LINES. HEAVY LINES INDICATE NEW WORK.
- THE EXISTING EXPANSION DEVICE PLATES SHALL BE CHECKED FOR LOOSENESS AND SECURED BEFORE THE NEW BAR DAM IS INSTALLED.
- STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH ASTM A70 GRADE 36.
- QUALIFICATION OF WELDING OPERATORS WILL BE REQUIRED.
- E7016 OR E7018 ELECTRODES SHALL BE USED.
- THE STEEL DAMS SHALL EXTEND FULL ROADWAY WIDTH BETWEEN CURBS, BUT SHALL BE INSTALLED IN SECTIONS OF SUCH LENGTHS TO PERMIT AT LEAST ONE WAY TRAFFIC AT ALL TIMES. BEFORE TRAFFIC IS PERMITTED TO CROSS OVER SECTIONS OF DAMS IN PLACE, SUFFICIENT WEARING SURFACE SHALL BE PLACED ON ROADWAY SLAB ADJACENT TO BOTH SIDES OF EXPANSION DEVICE TO PREVENT ANY DAMAGE TO EITHER THE STEEL DAMS OR TIRES OF VEHICLES.
- STEEL DAMS SHALL BE FABRICATED AND INSTALLED TO THE CROWN AND GRADE OF THE ROADWAY.
- STEEL CHANNELS OR BARS ON BOTH SIDES OF EXPANSION JOINT, FOR FULL WIDTH OF ROADWAY, WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR STEEL BAR DAM.
- PAINT INSIDE SURFACE OF CHANNEL 5.0 MILS THICKNESS OF INORGANIC ZINC PRIMER.
- SHOP DRAWINGS WILL NOT BE REQUIRED FOR STEEL BAR DAMS.





PART SECTION AT EXPANSION DEVICE

TYPE C - ANGLE TYPE EXPANSION DEVICES

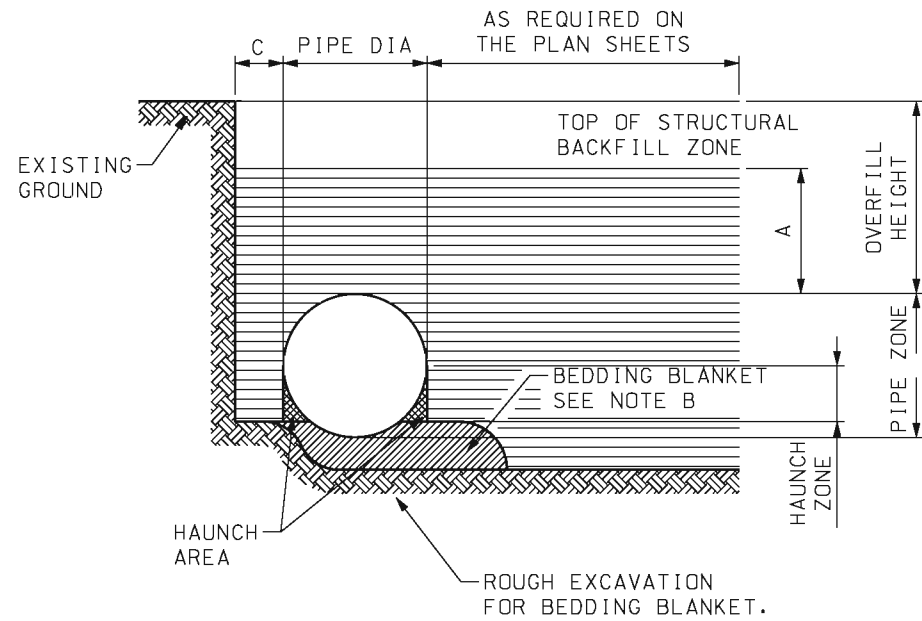


PART SECTION AT EXPANSION DEVICE

TYPE D - STRIP SEAL TYPE EXPANSION DEVICES

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p align="center"><b>STEEL DAMS</b></p> <p align="center">AT EXPANSION DEVICES FOR RESURFACING BRIDGE FLOORS</p>
DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	<p align="center"><b>712.40L</b></p>
SHEET NO. <p align="center">1 OF 1</p>	

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



**TYPICAL TRENCH DETAIL  
PIPE INSTALLATION AND BEDDING**

NOTE:

- A) MINIMUM STRUCTURAL BACKFILL OVER TOP OF PIPE SHALL BE ONE-EIGHTH DIAMETER OR SPAN OF PIPE OR ONE FOOT WHICHEVER IS GREATER.
- B) BEDDING BLANKET OF LOOSE FILL SHALL BE ROUGHLY SHAPED TO FIT BOTTOM OF PIPE. MINIMUM THICKNESS BEFORE PLACING PIPE SHALL BE AS FOLLOWS:

DEPTH OF CORRUGATION	MIN. BEDDING THICKNESS
1/2"	1"
1"	2"
2"	3"

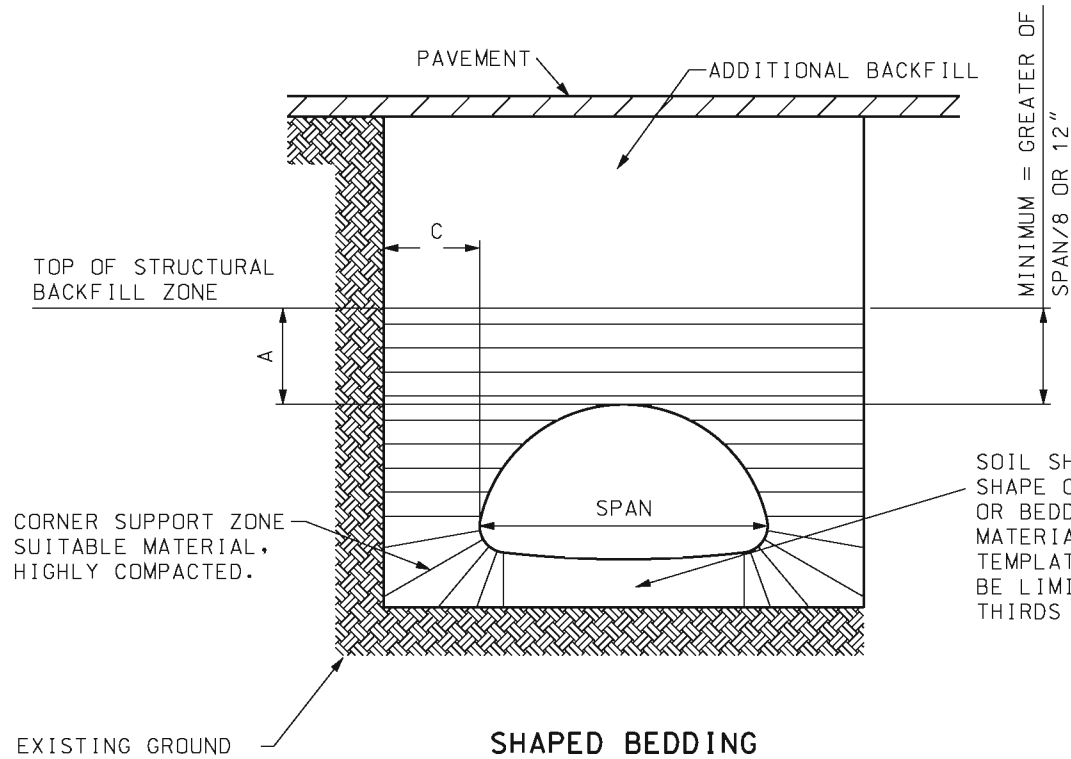
- C) TRENCH INSTALLATIONS - 2 FEET MINIMUM EACH SIDE OF CULVERT. THIS RECOMMENDED LIMIT SHOULD BE MODIFIED AS NECESSARY TO ACCOUNT FOR VARIABLES SUCH AS POOR IN-SITU SOILS. EMBANKMENT INSTALLATIONS - ONE DIAMETER OR SPAN EACH SIDE OF CULVERT.



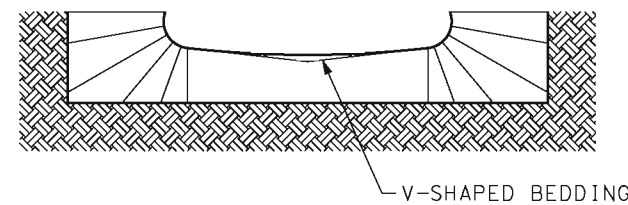
PIPE	
DIAMETER	SPACE S
UP TO 24"	12"
24" TO 72"	1/2 PIPE DIA
72" AND OVER	36"

PIPE-ARCHES	
SPAN	SPACE X
UP TO 36"	12"
36" TO 108"	1/3 ARCH SPAN
108" TO 189"	36"

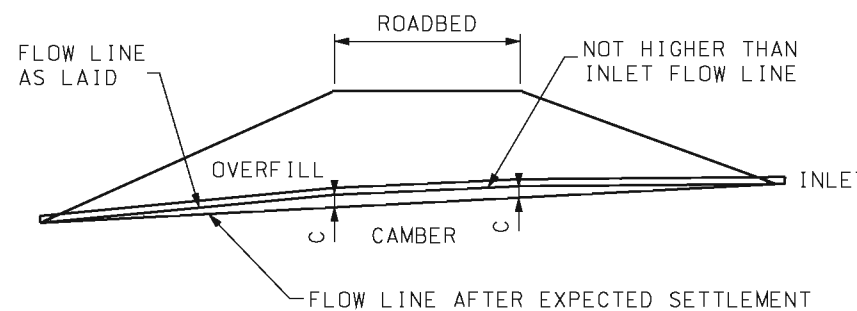
**MULTIPLE STRUCTURE SPACING**



SOIL SHALL BE FINE GRADED TO SHAPE OF BOTTOM OF PIPE-ARCH, OR BEDDING BLANKET OF GRANULAR MATERIAL SHALL BE SHAPED WITH TEMPLATE. BEDDING WIDTH SHALL BE LIMITED TO A MAXIMUM OF TWO-THIRDS THE SPAN.



**ALTERNATIVE-SHAPED BEDDING  
PIPE-ARCH TRENCH DETAIL  
BEDDING AND CORNER ZONE TREATMENT  
FOR PIPE ARCH STRUCTURES**



**TYPICAL CAMBERED FLOW LINE**

NOTE:

ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITIONS AND WILL BE SPECIFIED ON THE DESIGN PLANS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**STATE OF MISSOURI**  
**KATHRYN PHILLIPS HARVEY**  
**NUMBER PE-23751**  
**PROFESSIONAL ENGINEER**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**CORRUGATED METAL PIPE  
INSTALLATION METHODS**

DATE EFFECTIVE: 04/01/2011  
DATE PREPARED: 3/10/2011

**725.00C**

SHEET NO.  
1 OF 5

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

## CORRUGATED METALLIC-COATED STEEL CIRCULAR PIPE LOCK SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.064				0.079				0.109				0.138				0.168			
			A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	
12	1	1	219	251	224	144	273	314	280	201	382	440	392	334	492	566	504	484	602	693	617	
15	1	1	175	201	179	115	218	251	224	161	306	352	314	267	394	453	403	387	481	555	493	
18	1	1	146	167	149	96	182	209	187	134	255	293	261	223	328	378	336	323	401	462	411	
21	1	1	125	143	128	82	156	179	160	115	219	251	224	191	281	324	288	277	344	396	352	
24	1	1	109	126	112	72	137	157	140	100	191	220	196	167	246	283	252	242	301	347	308	
30	1	1	87	100	90	57	109	126	112	80	153	176	157	134	197	227	202	194	241	277	247	
36	1	1	73	84	75	48	91	105	93	67	127	147	131	111	164	189	168	161	201	231	206	
42	1	1	62	72	64	41	78	90	80	57	109	126	112	95	141	162	144	138	172	198	176	
48	1	1	55	63	56	36	68	78	70	50	96	110	98	83	123	142	126	121	150	173	154	
54	1	2		56	50	32*	61	70	62	45	85	98	87	74	109	126	112	108	134	154	137	
60	1	2		50	45			63	56	40	76	88	78	67	98	113	101	97	120	139	123	
66	1	2		46	41			57	51	37*		80	71	61	89	103	92	88	109	126	112	
72	1	2		42	37			52	47			73	65	56	82	94	84	81	100	116	103	
78	1	2		39	34			48	43			68	60	51		87	78	75	89	107	95	
84	1	2		36	32			45	40			63	56	48*		81	72	69	77	99	88	
90	1	2		33	30			42	37			59	52			76	67	65		92	82	
96	1	2						39	35			55	49			71	63	60*		87	77	
102	2	3						37	33			52	46			67	59	53*		82	73	
108	2	3										49	44			63	56			77	69	
114	2	3										46	41			60	53			73	65	
120	2	3										44	39			57	50			69	62	
126	2	3														54	48			66	59	

\* FOR TRENCH INSTALLATION ONLY

## CORRUGATED METALLIC-COATED STEEL CIRCULAR PIPE RIVETED SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.064				0.079				0.109				0.138				0.168			
			SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET	
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	
12	1	1	143		185	245	156		255	305	200		382	440	209		419	544	219		438	604
15	1	1	114		148	196	124		204	244	160		306	352	168		335	436	175		351	483
18	1	1	95		123	164	104		170	203	133		255	293	140		279	363	146		292	403
21	1	1	82		105	140	89		146	174	114		219	251	120		239	311	125		251	345
24	1	1	71		92	123	78		127	153	100		191	220	105		209	272	109		219	302
30	1	1	57		74	98	62		102	122	80		153	176	84		168	218	88		175	242
36	1	1	48		62	82	52		85	102	67		127	147	70		140	181	73		146	201
42	1	1	41		53	70	44		73	87	57		109	126	60		120	156	63		125	173
48	1	1	36		46	61	39		64	76	50		96	110	52		105	136	55		110	151
54	1	2				55	35		57	68	44		85	98	47		93	121	49		97	134
60	1	2				49				61	40		76	88	42		84	109	44		88	121
66	1	2				45				55				80	38		76	99	40		80	110
72	1	2				41				51				73	35		70	91	36		73	101
78	1	2				38				47				68				84	34		67	93
84	1	2				35				44				63				78	31		63	86
90	1	2				33				41				59				73				81
96	1	2								38				55				68				76
102	2	3								36				52				64				71
108	2	3												49				60				67
114	2	3												46				57				64
120	2	3												44				54				60
126	2	3																52				58

A = 2-2/3" X 1/2" CORRUGATIONS  
 B = 3" X 1" CORRUGATIONS  
 C = 5" X 1" CORRUGATIONS  
 D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

CORRUGATED METAL PIPE  
INSTALLATION METHODS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE:	04/01/2011	725.00C	SHEET NO.
DATE PREPARED:	3/22/2022		2 OF 5

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

## CORRUGATED H32 ALUMINUM CIRCULAR PIPE LOCK SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.06				0.075				0.105				0.135				0.164			
			A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	
12	1	1	132	152		71	165	191		97	232	267		156	298	357		221	364	420		
15	1	1	106	122		57	132	153		78	185	213		125	239	286		176	291	336		
18	1	1	88	101		47	110	127		65	155	178		104	199	238		147	243	280		
21	1	1	76	87		41	95	109		56	132	152		89	170	204		126	208	240		
24	1	1	66	76		35	83	96		49	116	133		78	149	178		110	182	210		
30	1	2		61		28	66	76		39	93	107		62	119	143		88	146	168		
36	1	2		51		24*	55	64		32	77	89		52	99	119		74	121	140		
42	1	2		43				55		28*	66	76		45	85	102		63	104	120		
48	1	2		38				48			58	67		39	75	89		55	91	105		
54	1	2		34				42			51	59		35	66	79		49	81	93		
60	1	2		30				38				53		31*	55	71		44	68	84		
66	1	2		28				35				48				65		40	56	76		
72	1	3		25				32				44				59		37*	46	70		
78	1	3						29				41				55				65		
84	1	3										38				51				60		
90	1	3										36				48				56		
96	1	3										33				45				53		
102	2	4														42				49		
108	2	4														39				47		
114	2	4																		42		
120	2	4																		39		
126	2	4																				

\* FOR TRENCH INSTALLATION ONLY

## CORRUGATED H32 ALUMINUM CIRCULAR PIPE RIVETED SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.06				0.075				0.105				0.135				0.164			
			SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET	
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	
12	1	1	77		120	141	77		154	175	133		269	239	138		282	359	144		291	466
15	1	1	62		96	113	62		123	140	107		215	191	111		226	287	115		232	373
18	1	1	51		80	94	51		103	117	89		179	160	92		188	239	96		194	311
21	1	1	44		68	81	44		88	100	76		154	137	79		161	205	82		166	266
24	1	1	38		60	71	38		77	88	67		135	120	69		141	179	72		145	233
30	1	2				56	31		62	70	53		108	96	55		113	144	57		116	186
36	1	2				47	26		51	58	44		90	80	46		94	120	48		97	155
42	1	2				40				50	38		77	68	40		81	103	41		83	133
48	1	2				35				44	33		67	60	35		71	90	36		73	116
54	1	2				31				39	30		56	53	31		63	80	32		65	104
60	1	2				28				35				48	28		56	72	29		58	93
66	1	2				26				32				44				65	26		53	85
72	1	3				24				29				40				60	24		47	78
78	1	3								27				37				55				72
84	1	3												34				51				67
90	1	3												32				48				62
96	1	3												30				45				58
102	2	4																42				55
108	2	4																40				51
114	2	4																				46
120	2	4																				41
126	2	4																				

A = 2-2/3" X 1/2" CORRUGATIONS  
 B = 3" X 1" CORRUGATIONS  
 C = 5" X 1" CORRUGATIONS  
 D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**CORRUGATED METAL PIPE INSTALLATION METHODS**

DATE EFFECTIVE: 04/01/2011  
DATE PREPARED: 3/22/2022

**725.00C**

SHEET NO.  
3 OF 5

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

## CORRUGATED H34 ALUMINUM CIRCULAR PIPE LOCK SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.06				0.075				0.105				0.135				0.164			
			A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	
12	1	1	159	183		85	199	229		117	278	320		187	358	428		265	437	504		
15	1	1	127	146		68	159	183		93	223	256		150	286	343		212	350	403		
18	1	1	106	122		57	132	153		78	185	213		125	239	286		176	291	336		
21	1	1	91	104		49	113	131		67	159	183		107	205	245		151	250	288		
24	1	1	79	91		43	99	115		58	139	160		94	179	214		132	218	252		
30	1	2		73		34	79	92		47	111	128		75	143	171		106	175	202		
36	1	2		61		28*	66	76		39	93	107		62	119	143		88	146	168		
42	1	2		52				66		33*	79	91		54	102	122		76	125	144		
48	1	2		46				57			68	80		47	89	107		66	109	126		
54	1	2		41				51			56	71		42	73	95		59	90	112		
60	1	2		37				46				64		37*	59	86		53	73	101		
66	1	2		33				42				58				78		48	59	92		
72	1	3		30				38				53				71		42*	47	84		
78	1	3						35				49				66				78		
84	1	3										46				61				72		
90	1	3										43				57				67		
96	1	3										39				53				62		
102	2	4														48				56		
108	2	4														43				51		
114	2	4																		46		
120	2	4																		41		
126	2	4																				

\* FOR TRENCH INSTALLATION ONLY

## CORRUGATED H34 ALUMINUM CIRCULAR PIPE RIVETED SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.06				0.075				0.105				0.135				0.164			
			SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET	
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	
12	1	1	77		120	141	77		154	175	133		269	239	138		282	359	144		291	466
15	1	1	62		96	113	62		123	140	107		215	191	111		226	287	115		232	373
18	1	1	51		80	94	51		103	117	89		179	160	92		188	239	96		194	311
21	1	1	44		68	81	44		88	100	76		154	137	79		161	205	82		166	266
24	1	1	38		60	71	38		77	88	67		135	120	69		141	179	72		145	233
30	1	2				56	31		62	70	53		108	96	55		113	144	57		116	186
36	1	2				47	26		51	58	44		90	80	46		94	120	48		97	155
42	1	2				40				50	38		77	68	40		81	103	41		83	133
48	1	2				35				44	33		67	60	35		71	90	36		73	116
54	1	2				31				39	30		56	53	31		63	80	32		65	104
60	1	2				28				35				48	28		56	72	29		58	93
66	1	2				26				32				44				65	26		53	85
72	1	3				24				29				40				60	24		47	78
78	1	3								27				37				55				72
84	1	3												34				51				67
90	1	3												32				48				62
96	1	3												30				45				58
102	2	4																42				55
108	2	4																40				51
114	2	4																				46
120	2	4																				41
126	2	4																				

A = 2-2/3" X 1/2" CORRUGATIONS  
 B = 3" X 1" CORRUGATIONS  
 C = 5" X 1" CORRUGATIONS  
 D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**CORRUGATED METAL PIPE INSTALLATION METHODS**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 04/01/2011  
DATE PREPARED: 3/22/2022

725.00C

SHEET NO.  
4 OF 5

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





MINIMUM COVER FOR CONSTRUCTION LOADS (ROUND AND PIPE-ARCH)				
DIAMETER OR PIPE SPAN	MINIMUM COVER (FT.) FOR INDICATED AXLE LOADS (2)			
	18K LBS.- 50K LBS.	50K LBS.- 75K LBS.	75K LBS.- 110K LBS.	110K LBS.- 150K LBS.
IN.	FT.	FT.	FT.	FT.
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.

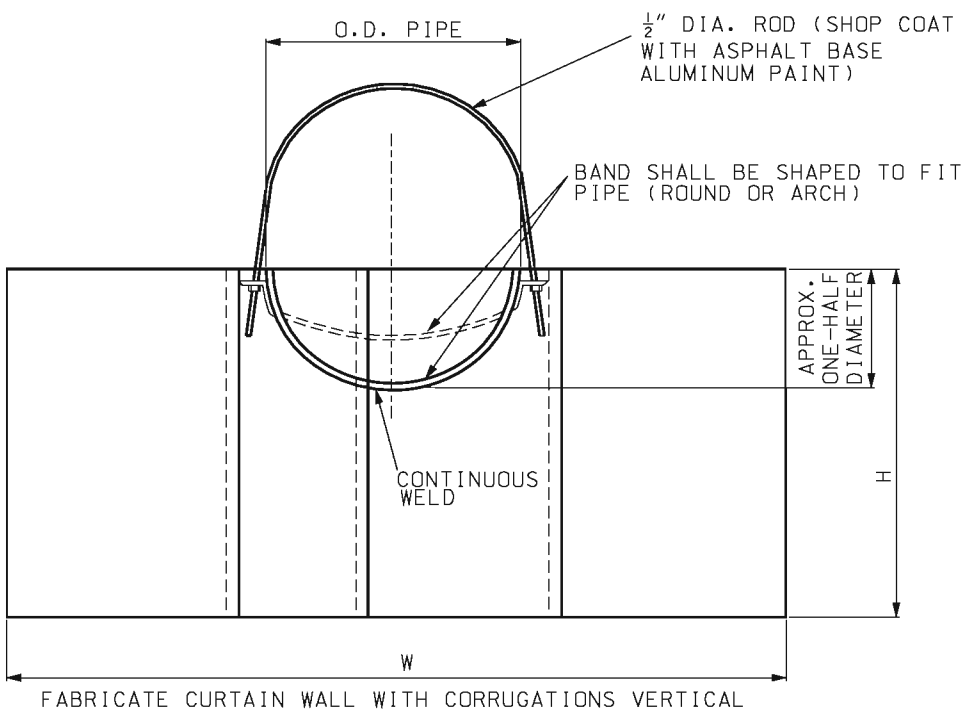
PIPE-ARCH REQUIREMENTS 2-2/3" X 1/2" CORRUGATIONS				
TYPE	SPAN (3) (IN.)	RISE (3) (IN.)	GALVANIZED SHEET	
			THICKNESS (IN.)	GAUGE
B1	17	13	0.064	16
B2	21	15	0.064	16
B3	24	18	0.064	16
B4	28	20	0.064	16
B5	35	24	0.064	16
B6	42	29	0.079	14
B7	49	33	0.109	12
B8	57	38	0.109	12
B9	64	43	0.109	12
B10	71	47	0.138	10
B11	77	52	0.168	8
B12	83	57	0.168	8

PIPE-ARCH REQUIREMENTS							
TYPE	SPAN (4) (IN.)	RISE (4) (IN.)	GALVANIZED SHEET 3" X 1" CORRUGATIONS		GALVANIZED SHEET 5" X 1" CORRUGATIONS		MINIMUM COVER (2) (IN.)
			THICKNESS (IN.)	GAUGE	THICKNESS (IN.)	GAUGE	
B8A	53 (-2.4)	41 (+2.4)	0.079	14	0.109	12	12
B9A	60 (-2.7)	46 (+2.7)	0.079	14	0.109	12	15
B10A	66 (-3.0)	51 (+3.0)	0.079	14	0.109	12	15
B11A	73 (-3.3)	55 (+3.3)	0.079	14	0.109	12	18
B12A	81 (-3.6)	59 (+3.6)	0.079	14	0.109	12	18
B13A	87 (-4.4)	63 (+4.4)	0.079	14	0.109	12	18
B14A	95 (-4.8)	67 (+4.8)	0.079	14	0.109	12	18
B15A	103 (-5.2)	71 (+5.2)	0.079	14	0.109	12	18
B16A	112 (-5.6)	75 (+5.6)	0.109	12	0.109	12	21
B17A	117 (-5.9)	79 (+5.9)	0.109	12	0.109	12	21
B18A	128 (-6.4)	83 (+6.4)	0.109	12	0.109	12	24
B19A	137 (-6.9)	87 (+6.9)	0.109	12	0.109	12	24
B20A	142 (-7.1)	91 (+7.1)	0.138	10	0.138	10	24

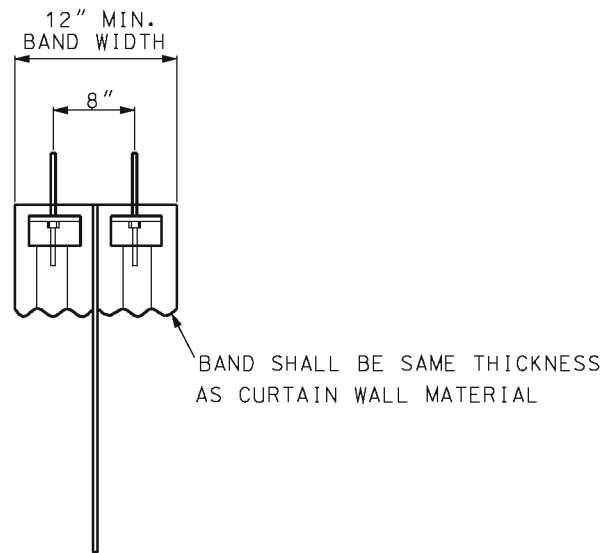
- (2) MINIMUM COVER MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.
- (3) A TOLERANCE OF PLUS OR MINUS ONE INCH OR 2 PERCENT OF EQUIVALENT CIRCULAR DIAMETER, WHICHEVER IS GREATER, WILL BE PERMISSIBLE IN SPAN AND RISE.
- (4) TOLERANCES IN PARENTHESES. NO TOLERANCE IN OPPOSITE DIRECTION.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>CORRUGATED METAL PIPE INSTALLATION METHODS</b>
DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 8/24/2015	<b>725.00C</b>	SHEET NO. 5 OF 5

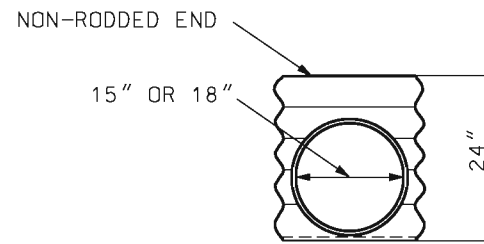
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



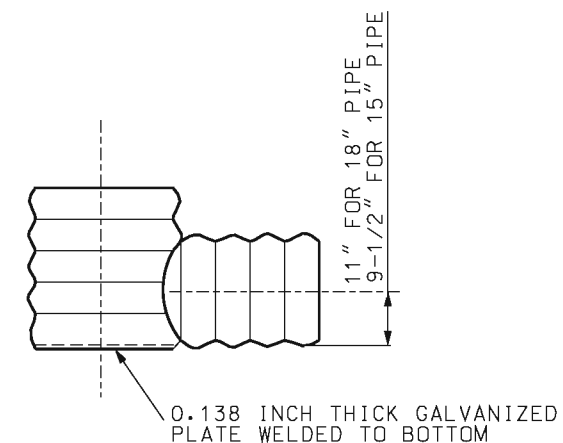
**METAL CURTAIN WALL**



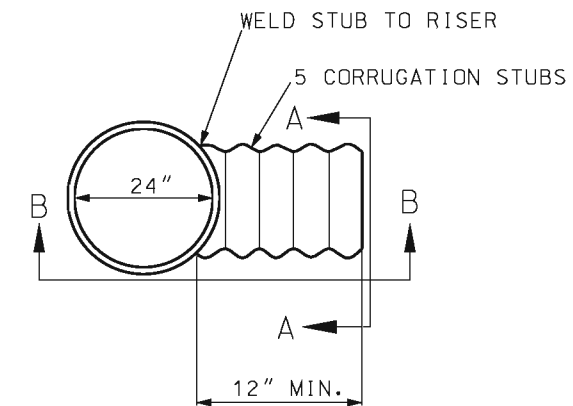
BAND SHALL BE SAME THICKNESS AS CURTAIN WALL MATERIAL



**SECTION A-A**



**SECTION B-B**



**PLAN METAL INLETS**

**TABLE FOR METAL CURTAIN WALL**

FOR ROUND OR ELLIPTICAL PIPE			
DIA. IN.	GALV. SHT. THICK IN.	W IN.	H IN.
18	0.064	72	35
21	0.064	72	35
24	0.064	72	40
30	0.064	84	40
36	0.079	84	49
42	0.079	96	49
48	0.079	96	49
54	0.079	120	58-1/2
60	0.109	120	58-1/2
66	0.109	132	58-1/2
72	0.109	132	68-1/2
78	0.138	132	68-1/2
84	0.138	144	68-1/2
FOR PIPE ARCH			
B-2	0.064	72	30
B-3	0.064	72	30
B-4	0.079	84	30
B-5	0.079	84	30
B-6	0.109	96	35
B-7	0.109	96	35
B-8	0.109	108	35
B-9	0.109	120	35
B-10	0.138	120	40
B-11	0.168	125	50
B-12	0.168	131	54

GENERAL NOTES:

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
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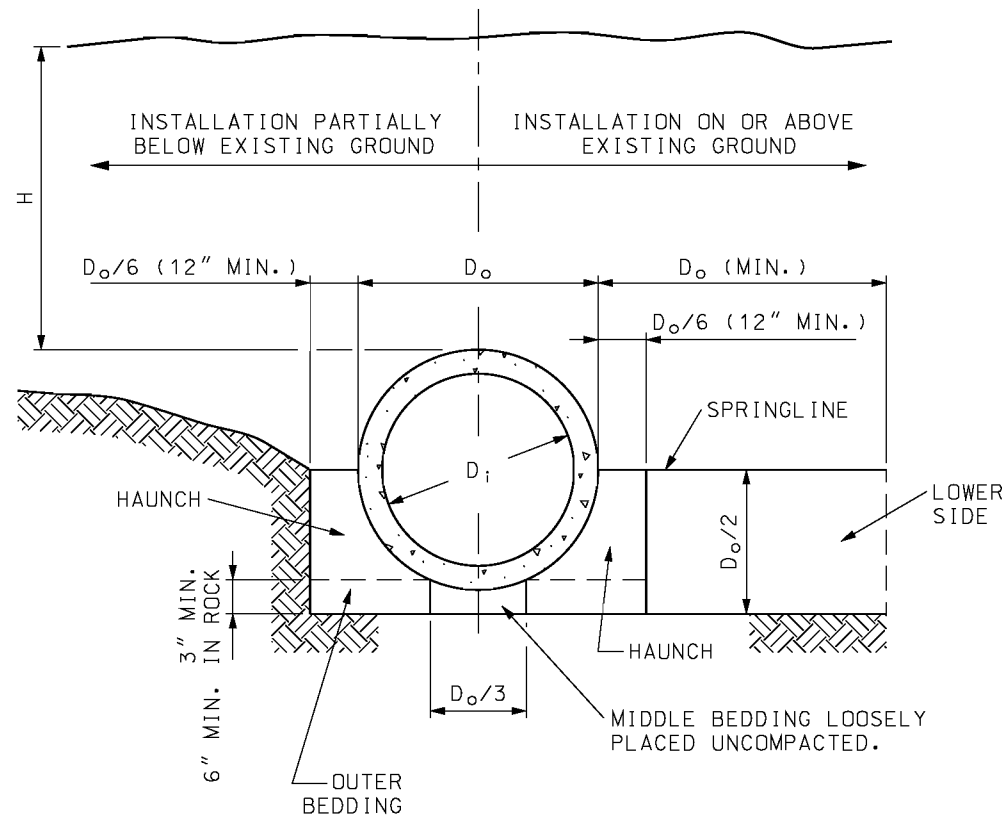
STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED, AND DATED ELECTRONICALLY.

**METAL CURTAIN WALL AND METAL INLETS**

DATE EFFECTIVE: 07/01/2004  
 DATE PREPARED: 8/21/2009  
**725.31C**  
 SHEET NO. 1 OF 1

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

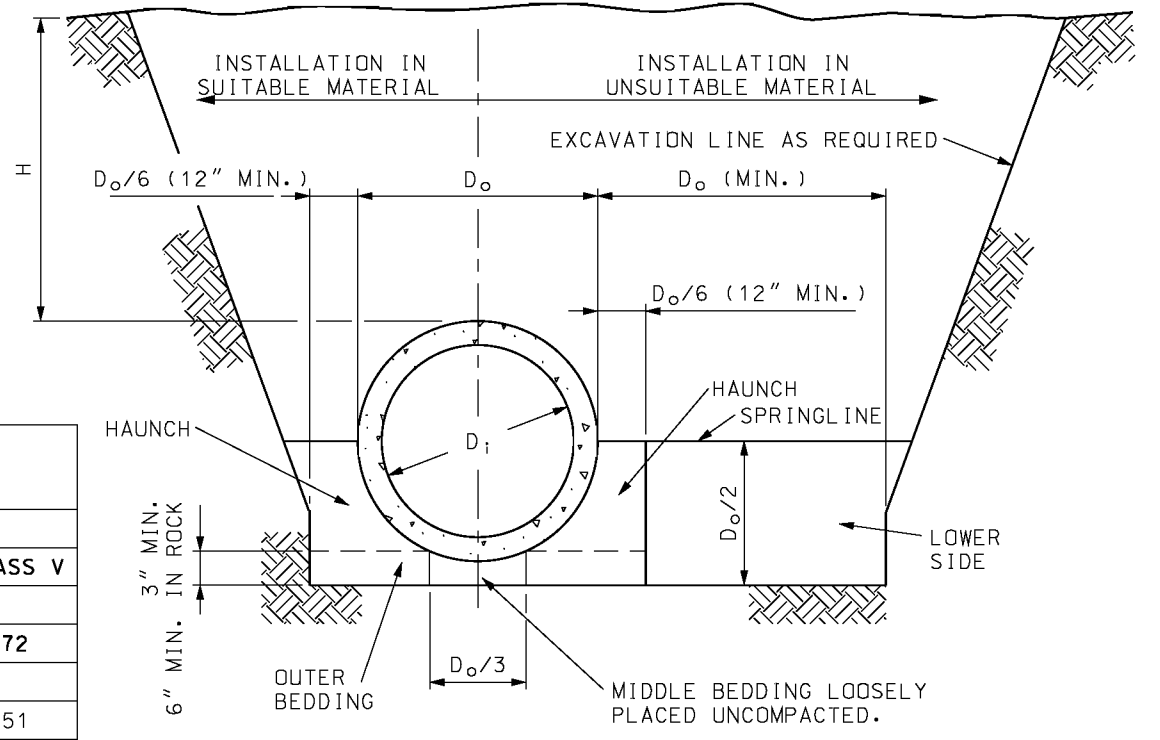


**EMBANKMENT INSTALLATIONS**

- CONSTRUCTION SEQUENCE**
1. PLACE BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
  2. INSTALL PIPE TO GRADE.
  3. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
  4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE SPRINGLINE.
  5. COMPLETE BACKFILL ACCORDING TO SPECIFICATIONS.

MAXIMUM DIAMETER AND MAXIMUM FILL HEIGHT					
INSTALLATION TYPE	CLASS OF PIPE				
	CLASS I	CLASS II	CLASS III	CLASS IV	CLASS V
	MAXIMUM DIAMETER (INCHES)				
	108	108	108	84	72
	MAXIMUM FILL HEIGHT IN (FEET)				
TYPE 1	12	15	21	33	51
TYPE 2	9	12	17	26	39
TYPE 3	7	9	13	20	30
TYPE 4	4	6	9	13	20

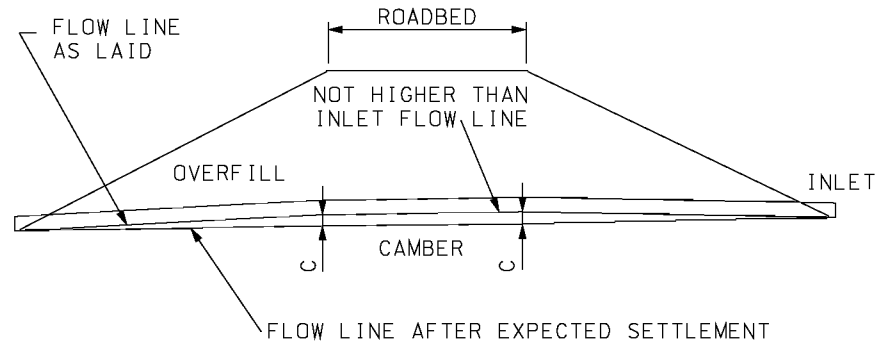
IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS 36 INCHES OR LESS A SPECIAL PIPE DESIGN AND INSTALLATION PROCEDURE SHALL BE REQUIRED. IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS GREATER THAN 36 INCHES A SPECIAL DESIGN PIPE IS NOT ALLOWED.



**TRENCH INSTALLATION**

**- LEGEND -**

- $D_i$  = NORMAL INSIDE DIAMETER OF PIPE.
- $D_o$  = OUTSIDE DIAMETER OF PIPE.
- H = FILL COVER HEIGHT OVER PIPE (FEET)
- MIN. = MINIMUM
- [Hatched pattern] = UNDISTURBED SOIL



**NOTE:**  
ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND SHALL BE SPECIFIED ON THE DESIGN PLANS.

**TYPICAL CAMBERED FLOW LINE**

BEDDING AND COMPACTION REQUIREMENTS							
INSTALLATION TYPE	BEDDING THICKNESS	COMPACTION REQUIREMENTS (MIN. STANDARD PROCTOR %)					
		HAUNCH AND OUTER BEDDING			LOWER SIDE BEDDING		
		CATEGORY 1 SOIL (A)	CATEGORY 2 SOIL (B)	CATEGORY 3 SOIL (C)	CATEGORY 1 SOIL (A)	CATEGORY 2 SOIL (B)	CATEGORY 3 SOIL (C)
1	$D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6".	95	N/A	N/A	90	95	100
2	$D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6".	90	95	N/A	85	90	95
3	$D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6".	85	90	95	85	90	95
4	$D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6".	NO COMPACTION REQUIRED	NO COMPACTION REQUIRED	85	NO COMPACTION REQUIRED	NO COMPACTION REQUIRED	85

- (A) GRAVELLY SAND
- (B) SANDY-SILT
- (C) SILTY CLAY

**GENERAL NOTES:**

MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF  $\frac{1}{2} D_o$  OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".

CLASS I AND CLASS II REINFORCED CONCRETE PIPE SHALL ONLY BE USED FOR SEWERS IN TRENCHES OUTSIDE ROADBED AND STREET LIMITS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER

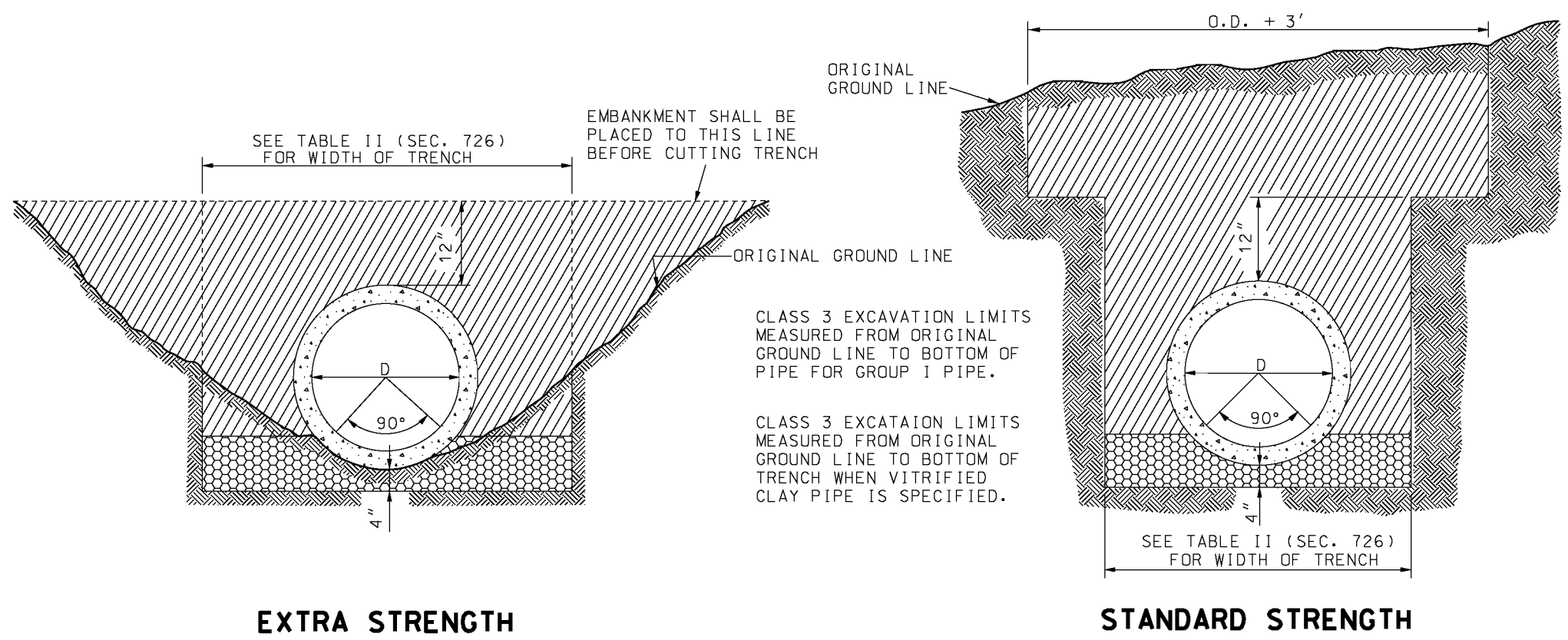
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**RIGID CULVERT INSTALLATION METHODS REINFORCED CONCRETE PIPE CULVERTS**

DATE EFFECTIVE: 04/01/2015	726.30J	SHEET NO. 1 OF 2
DATE PREPARED: 2/20/2015		

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

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



**EXTRA STRENGTH**

**STANDARD STRENGTH**

HEIGHT OF FILL OVER V.C. PIPE CULVERTS						
NOMINAL PIPE DIAMETER (INCH)	STANDARD STRENGTH			EXTRA STRENGTH		
	TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET)	MINIMUM FILL HEIGHT (FEET)	MAXIMUM FILL HEIGHT (FEET)	TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET)	MINIMUM FILL HEIGHT (FEET)	MAXIMUM FILL HEIGHT (FEET)
6	2.0	1.0	9.0			
8	2.0	1.0	7.0	2.5	4.0	12.0
10	2.5	1.0	7.0	2.5	4.0	12.0
12	2.7	1.0	6.0	3.0	4.0	13.0
15	3.5	1.0	6.0	3.0	4.0	17.0
18	3.5	1.0	6.0	3.5	4.0	17.0
21	4.0	1.0	6.0	4.0	4.0	17.0
24	4.0	1.0	8.0	4.0	3.0	19.0
30	4.5	1.0	10.0	4.5	3.0	19.0
36	5.0	1.0	11.0	5.0	3.0	19.0

**LEGEND**

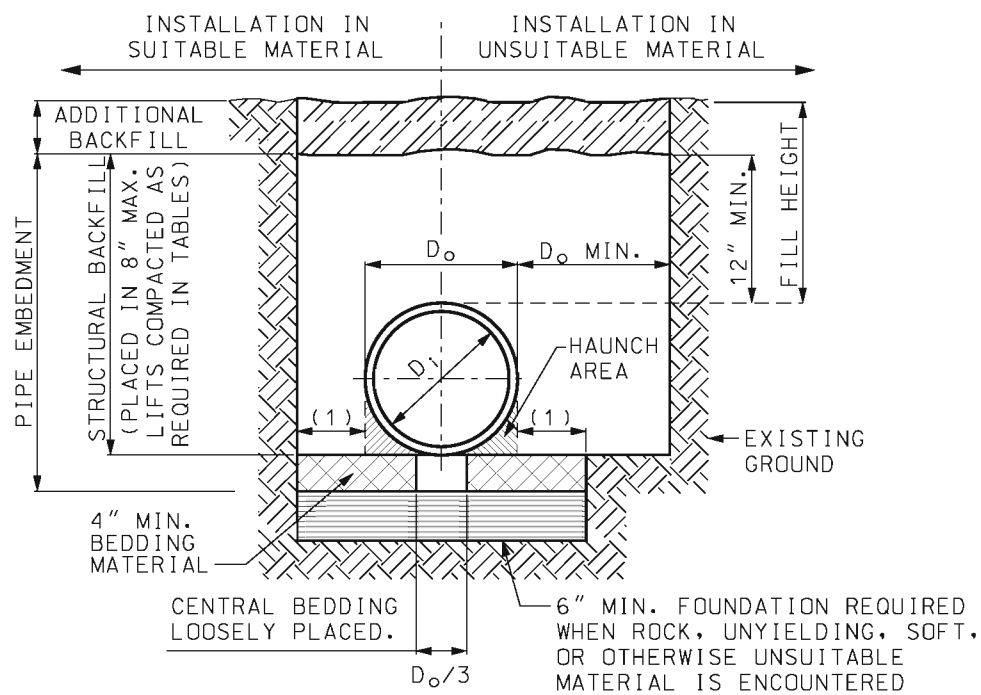
- COMPACTED ROADWAY EMBANKMENT
- SUITABLE BACKFILL
- LOOSE DRY MATERIAL
- COMPACTED SAND

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

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER

**RIGID CULVERT INSTALLATION METHODS**  
 VITRIFIED CLAY PIPE CULVERTS

DATE EFFECTIVE: 04/01/2015  
 DATE PREPARED: 2/20/2015  
**726.30J**  
 SHEET NO. 2 OF 2

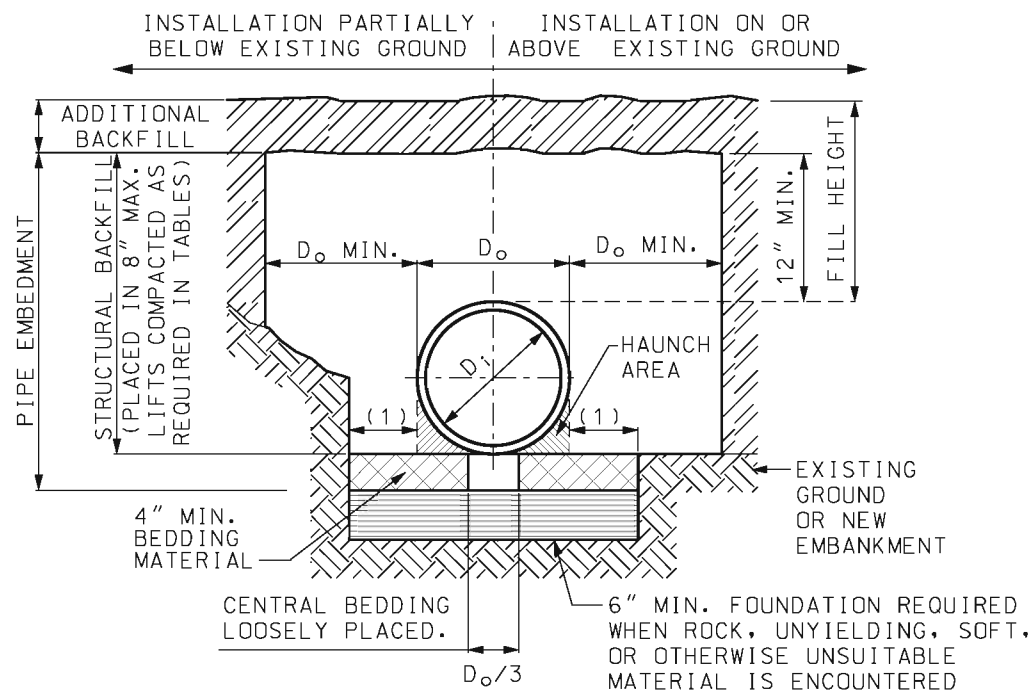


### TRENCH INSTALLATION

#### LEGEND

$D_i$  = INSIDE DIAMETER OF PIPE.  
 $D_o$  = OUTSIDE DIAMETER OF PIPE.  
 (1) =  $(D_o/4)+6$ " (MIN.)

NOTE:  
 MULTIPLE PIPE SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF  $\frac{1}{2} D_o$  OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".



### EMBANKMENT INSTALLATION

#### CONSTRUCTION SEQUENCE

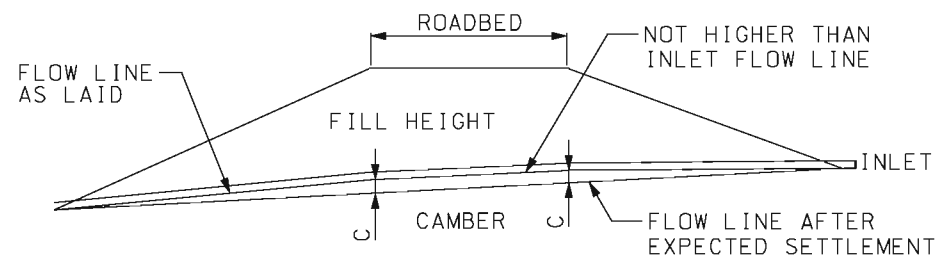
1. PLACE BEDDING MATERIAL TO GRADE.
2. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
3. INSTALL PIPE TO GRADE.
4. COMPLETE STRUCTURAL BACKFILL ACCORDING TO SPECIFICATIONS.

FILL HEIGHT LIMITS																			
STRUCTURAL BACKFILL	SPECIFIED NOMINAL DIA OF PIPE (IN.)	POLYETHYLENE				STEEL REINFORCED POLYETHYLENE		POLYVINYL				DOUBLE WALL POLYPROPYLENE		TRIPLE WALL POLYPROPYLENE					
		COMPACTION 90% SPD		COMPACTION 95% SPD		COMPACTION 90% SPD		COMPACTION 90% SPD		COMPACTION 95% SPD		COMPACTION 90% SPD		COMPACTION 95% SPD		COMPACTION 90% SPD		COMPACTION 95% SPD	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
GRAVEL (AASHTO M145 SOIL TYPE A1 & A3)	12	2'	19'	2'	26'	--	--	2'	32'	2'	61'	2'	21'	2'	29'	--	--	--	--
	15	2'	19'	2'	27'	--	--	2'	32'	2'	55'	2'	22'	2'	31'	--	--	--	--
	18	2'	17'	2'	25'	--	--	2'	31'	2'	60'	2'	19'	2'	27'	--	--	--	--
	24	2'	15'	2'	21'	2'	50'	2'	30'	2'	54'	2'	16'	2'	22'	--	--	--	--
	30	2'	17'	2'	24'	2'	50'	2'	31'	2'	52'	2'	11'	2'	15'	2'	17'	2'	23'
	36	2'	13'	2'	19'	2'	50'	2'	30'	2'	53'	--	--	--	--	2'	15'	2'	21'
	42	2'	13'	2'	19'	2'	50'	--	--	--	--	--	--	--	--	2'	19'	2'	27'
	48	2'	12'	2'	18'	2'	30'	--	--	--	--	--	--	--	--	2'	12'	2'	17'
COURSE SAND (AASHTO M145 SOIL TYPE A-1-b)	12	2'	17'	2'	23'	--	--	2'	32'	2'	55'	2'	18'	2'	24'	--	--	--	--
	15	2'	16'	2'	22'	--	--	2'	32'	2'	49'	2'	22'	2'	31'	--	--	--	--
	18	2'	15'	2'	21'	--	--	2'	31'	2'	53'	2'	16'	2'	21'	--	--	--	--
	24	2'	14'	2'	20'	2'	50'	2'	30'	2'	48'	2'	13'	2'	17'	--	--	--	--
	30	2'	13'	2'	19'	2'	50'	2'	31'	2'	46'	2'	7'	2'	10'	2'	17'	2'	23'
	36	2'	12'	2'	17'	2'	50'	2'	30'	2'	46'	--	--	--	--	2'	15'	2'	21'
	42	2'	13'	2'	18'	2'	50'	--	--	--	--	--	--	--	--	2'	19'	2'	27'
	48	2'	12'	2'	17'	2'	30'	--	--	--	--	--	--	--	--	2'	12'	2'	17'
SILTY SAND OR SILTY GRAVEL (AASHTO M145 SOIL TYPES A-2-4 & A-2-5)	12	3.3'	10'	2'	17'	--	--	2.7'	16'	2'	33'	2.8'	11'	2'	19'	--	--	--	--
	15	3.4'	10'	2'	16'	--	--	2.7'	16'	2'	33'	2.8'	11'	2'	23'	--	--	--	--
	18	3.6'	10'	2'	15'	--	--	2.7'	15'	2'	32'	3'	11'	2'	16'	--	--	--	--
	24	3.8'	9'	2'	14'	2'	50'	2.7'	15'	2'	31'	3.3'	10'	2'	13'	--	--	--	--
	30	3.7'	10'	2'	14'	2'	50'	2.8'	15'	2'	31'	3.4'	6'	2'	7'	3'	10'	2'	17'
	36	4.2'	7'	2'	12'	2'	50'	2.8'	14'	2'	31'	--	--	--	--	3.3'	10'	2'	15'
	42	4.2'	7'	2'	13'	2'	50'	--	--	--	--	--	--	--	--	3.2'	11'	2'	20'
	48	4.5'	6'	2'	12'	2'	30'	--	--	--	--	--	--	--	--	3.1'	9'	2'	13'
60	3.3'	7'	2'	14'	2'	30'	--	--	--	--	--	--	--	--	2'	10'	2'	17'	

### MINIMUM COVER FOR CONSTRUCTION LOADS

NOMINAL PIPE DIA. (IN.)	MINIMUM COVER (FT) FOR INDICATED AXLE LOADS (THOUSANDS OF POUNDS)			
	18-50	50-75	75-110	110-150
12-36	2.0	2.5	3.0	3.0
42-60	3.0	3.0	3.5	4.0

MINIMUM COVER LIMITS ARE NOT SUFFICIENT FOR SILTY SAND OR SILTY GRAVEL STRUCTURAL BACKFILL COMPACTED TO 90% STANDARD PROCTOR DENSITY. THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.



NOTE:  
 ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND WILL BE SPECIFIED ON THE DESIGN PLANS.

### TYPICAL CAMBERED FLOW LINE


NOTE:

SPD = STANDARD PROCTOR DENSITY.

FILL HEIGHT MEASURED FROM THE TOP OF PIPE TO SURFACE.

LIMITS ACCOUNT FOR SHORT-TERM TEMPORARY WATER TABLE DEPTHS OF FIVE FEET ABOVE SPRINGLINE. TABLES ARE NOT APPLICABLE FOR LONG-TERM PERMANENT WATER TABLE DEPTHS ABOVE SPRINGLINE.


WHEN PIPES ARE USED AS GROUP A, FILL HEIGHTS ARE LIMITED TO SHADED VALUES.



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**THERMOPLASTIC PIPE INSTALLATION METHODS**



ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER

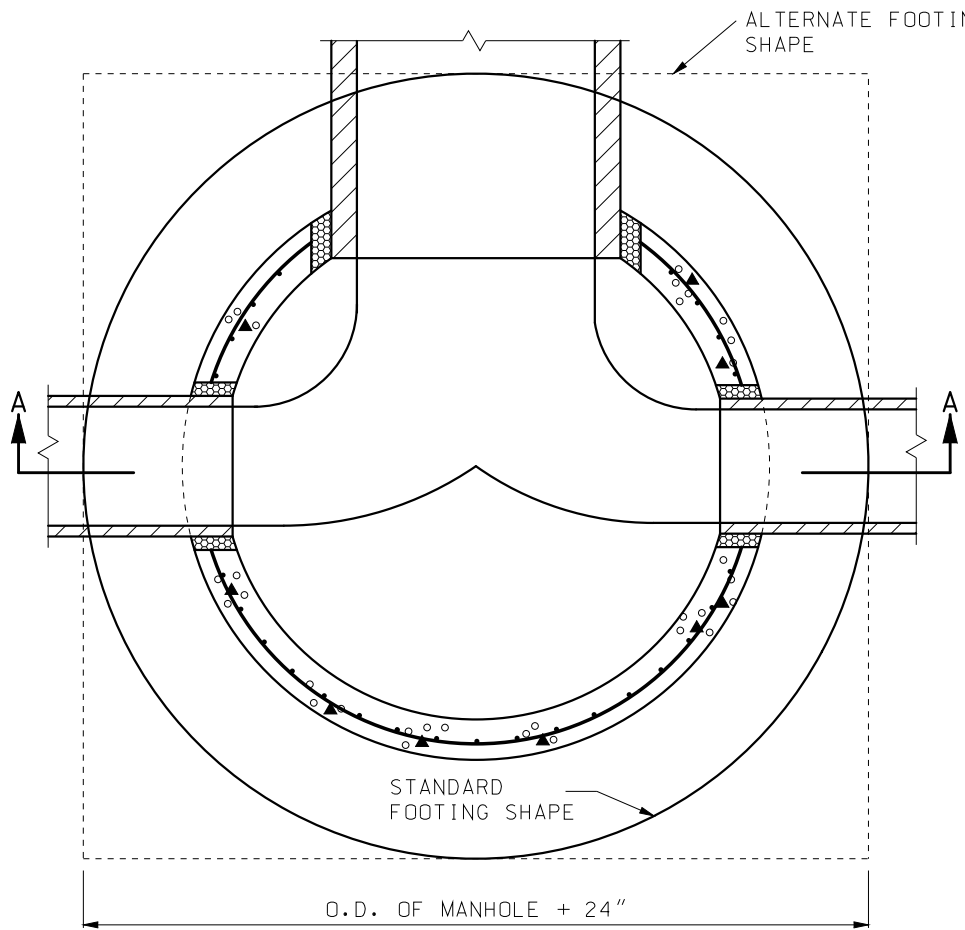
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 04/01/2015  
 DATE PREPARED: 2/27/2015

**730.00E**

SHEET NO.  
 1 OF 1

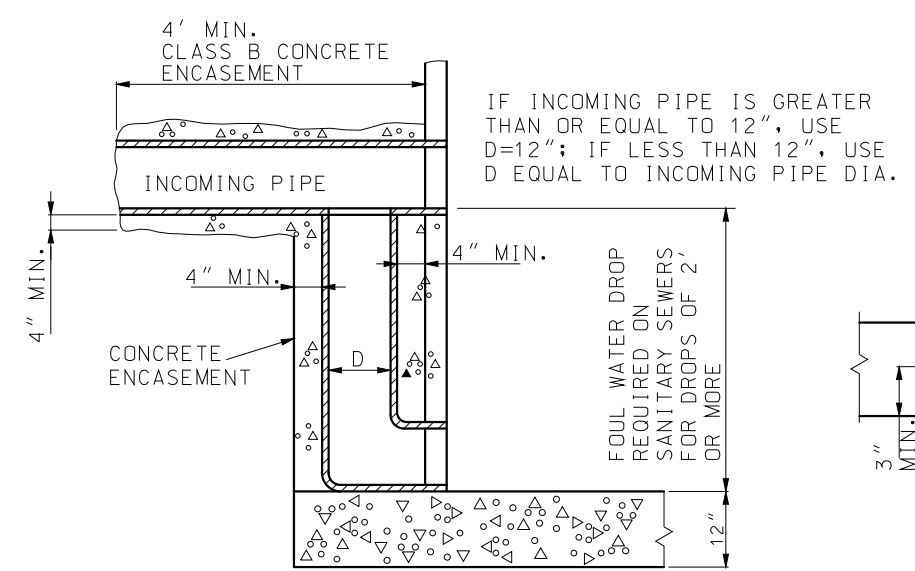
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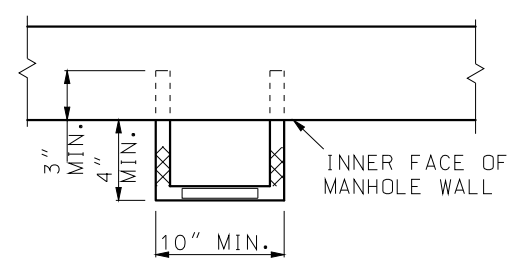
PLAN OF FOOTING

BASE SECTION DIMENSIONS*	
SIZE OF PIPE	MIN. DIA.
24" OR SMALLER	48"
30" - 36"	60"
42" - 48"	72"

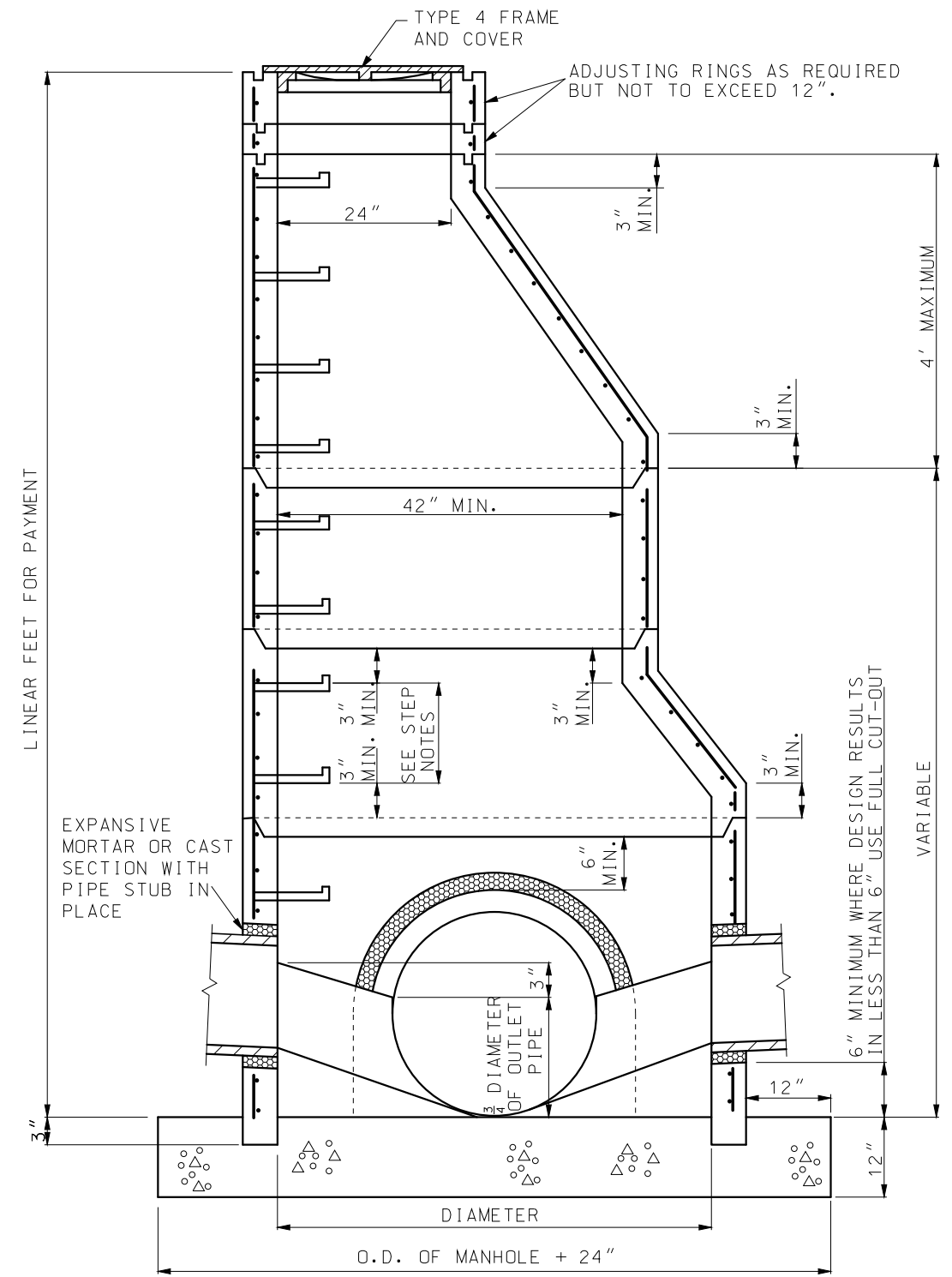
\* RISER SECTIONS SHALL NOT BE LESS THAN 42" DIAMETER.



FOUL WATER DROP



STEP INSTALLATION



SECTION A-A

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL MANHOLES HAVING A DEPTH OF MORE THAN 4'. STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE LEVEL AND IN VERTICAL ALIGNMENT.

NO DIRECT PAYMENT WILL BE MADE FOR MANHOLE STEPS.

GENERAL NOTES:

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE MANHOLES, IN ACCORDANCE WITH THE CONCRETE MANHOLE STANDARD.

IF THE CONTRACTOR ELECTS TO CAST IN PLACE THE MANHOLES, PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE FOR PRECAST MANHOLES.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH AN ESTABLISHED MANUFACTURING PROCEDURE.

FORMED OR CUT OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

THE TOP OF THE INLET SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.

REINFORCEMENT SHALL BE CUT AT PIPE OPENINGS.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE, NOR FOR CUTTING AND BENDING REINFORCING STEEL.

WHERE THE WIDTH OF THE BASE SECTION IS GREATER THAN 42" AN ECCENTRIC TAPER SECTION MAY BE USED TO ALLOW THE USE OF 42" RISER SECTIONS.

THE LOWER TRANSITION SECTION AS SHOWN ON SECTION A-A IS OPTIONAL.

FOUL WATER DROPS ARE REQUIRED WHEN SPECIFIED IN THE PLANS. NO DIRECT PAYMENT WILL BE MADE FOR THE FOUL WATER DROP OR ITS ENCASEMENT.

SEE STANDARD PLAN 614.30 FOR MANHOLE FRAMES AND COVERS.

WHERE PIPES DO NOT ENTER OR EXIT RADIALLY, USE NEXT LARGER SIZE MANHOLE. CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL LIMITS 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION ON THE MANHOLE, CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

ALL PIPE CONNECTED WITH A MANHOLE WILL BE MEASURED AND PAID FOR TO THE INSIDE WALL OF THE MANHOLE.

CIRCUMFERENTIAL REINFORCEMENT SIZE AND PLACEMENT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS TO A MAXIMUM DEPTH OF 20 FEET. OVER 20 FOOT DEPTH CIRCUMFERENTIAL REINFORCEMENT IS INCREASED TO 0.24 SQUARE INCHES STEEL REQUIRED PER LINEAR FOOT, TO A MAXIMUM DEPTH OF 30 FEET.

FOR PIPE CONNECTIONS, A RUBBER GASKET IN ACCORDANCE WITH ASTM RUBBER GASKET SPECIFICATIONS C-443 OR C-923 AND CAST INTEGRALLY IN MANHOLE MAY BE USED AS AN ALTERNATE TO EXPANSIVE MORTAR.

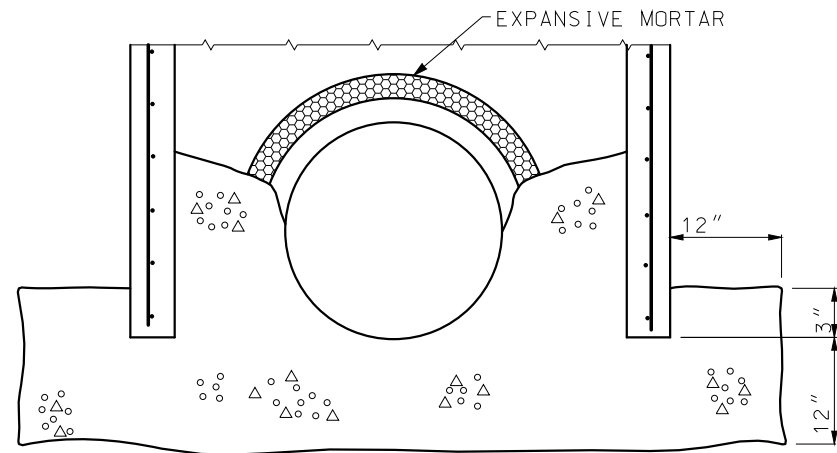
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

PRECAST MANHOLES

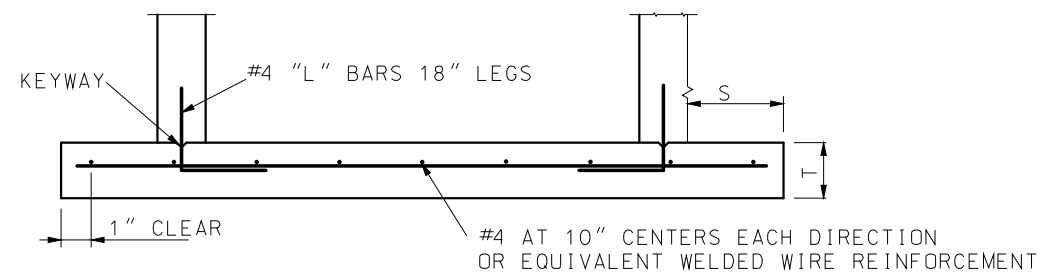
DATE EFFECTIVE: 07/01/2016	731.00U	SHEET NO. 1 OF 2
DATE PREPARED: 5/13/2016		

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



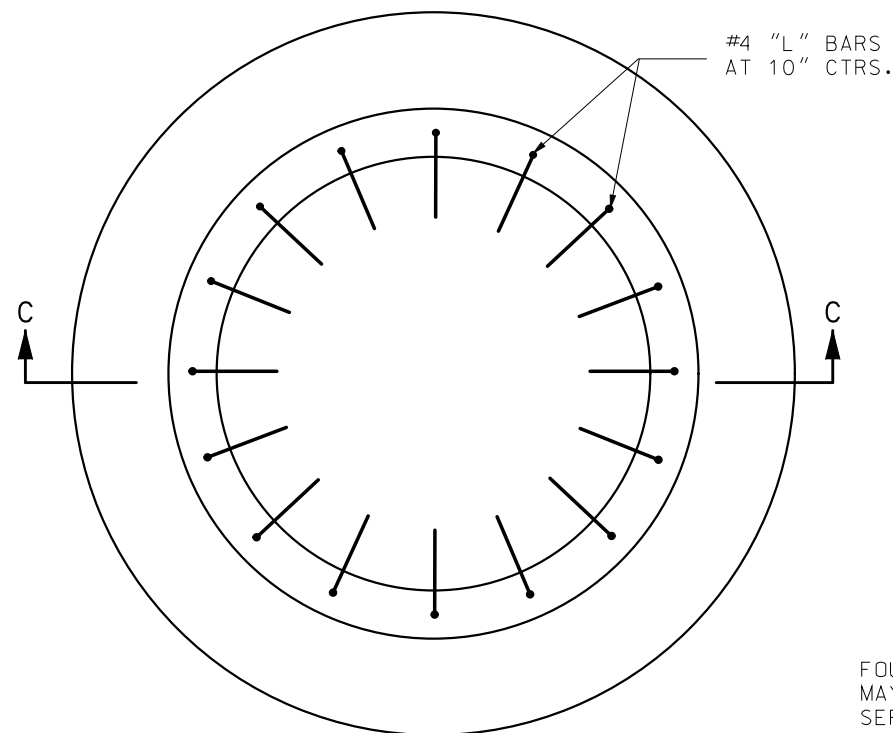
ALTERNATE FOOTING

PRECAST BASE SECTION SET ON CONCRETE BLOCKS FOUNDATION SLAB AND INVERT POURED MONOLITHIC.



SECTION C-C

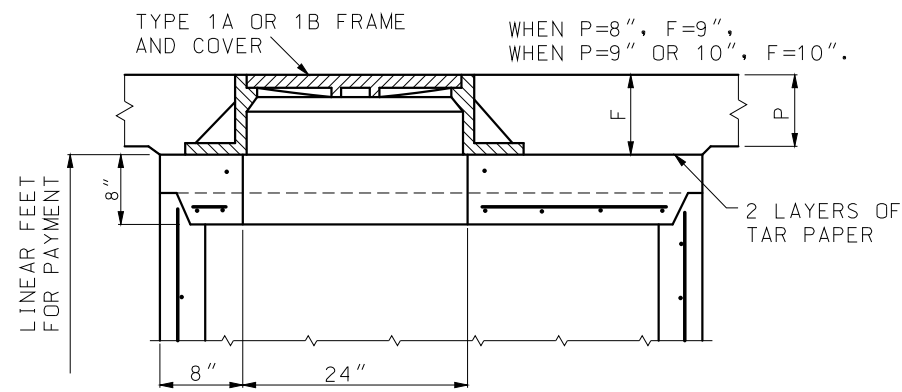
S = 0 FOR DEPTHS LESS THAN OR EQUAL TO 6';  
 S = 9" FOR DEPTHS GREATER THAN 6'.  
 T = 6" FOR DEPTHS OR LESS THAN OR EQUAL TO 6';  
 T = 9" FOR DEPTHS GREATER THAN 6'.



PRECAST FOUNDATION SLAB

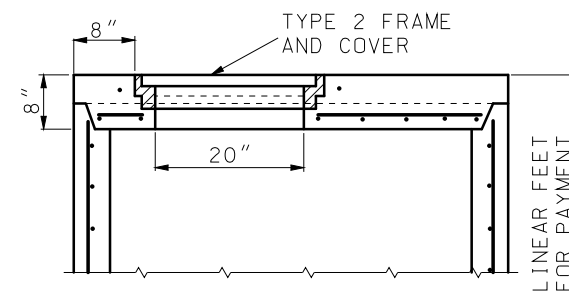
FOUNDATION SLAB AND BASE SECTION MAY BE POURED MONOLITHIC OR SEPARATELY WITH A KEYWAY.

INVERT SHALL BE POURED AFTER PLACEMENT OF MANHOLE.



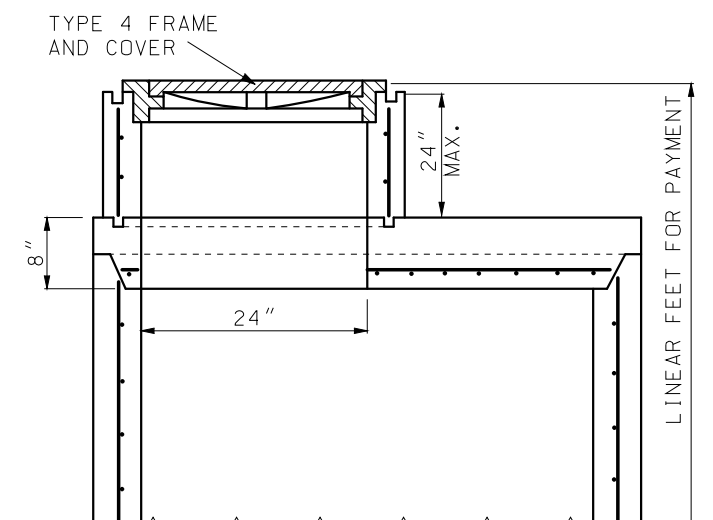
FLAT SLAB MANHOLE TOP (PAVED AREA)

SECTION B-B

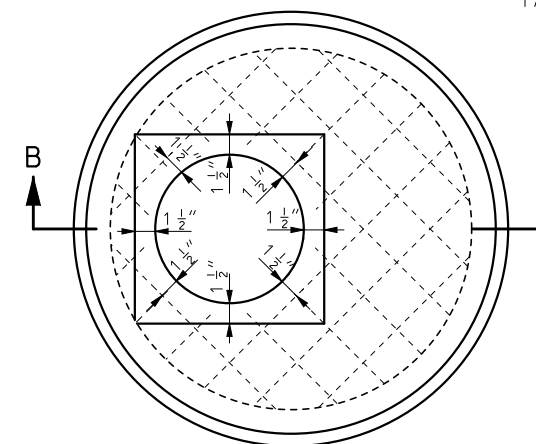


ALTERNATE SECTION B-B


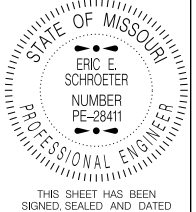
ALTERNATE FLAT SLAB MANHOLE TOP (UNPAVED AREA) USED WHERE DEPTH OF MANHOLE WILL NOT PERMIT USE OF CONE AND TAPER SECTIONS.



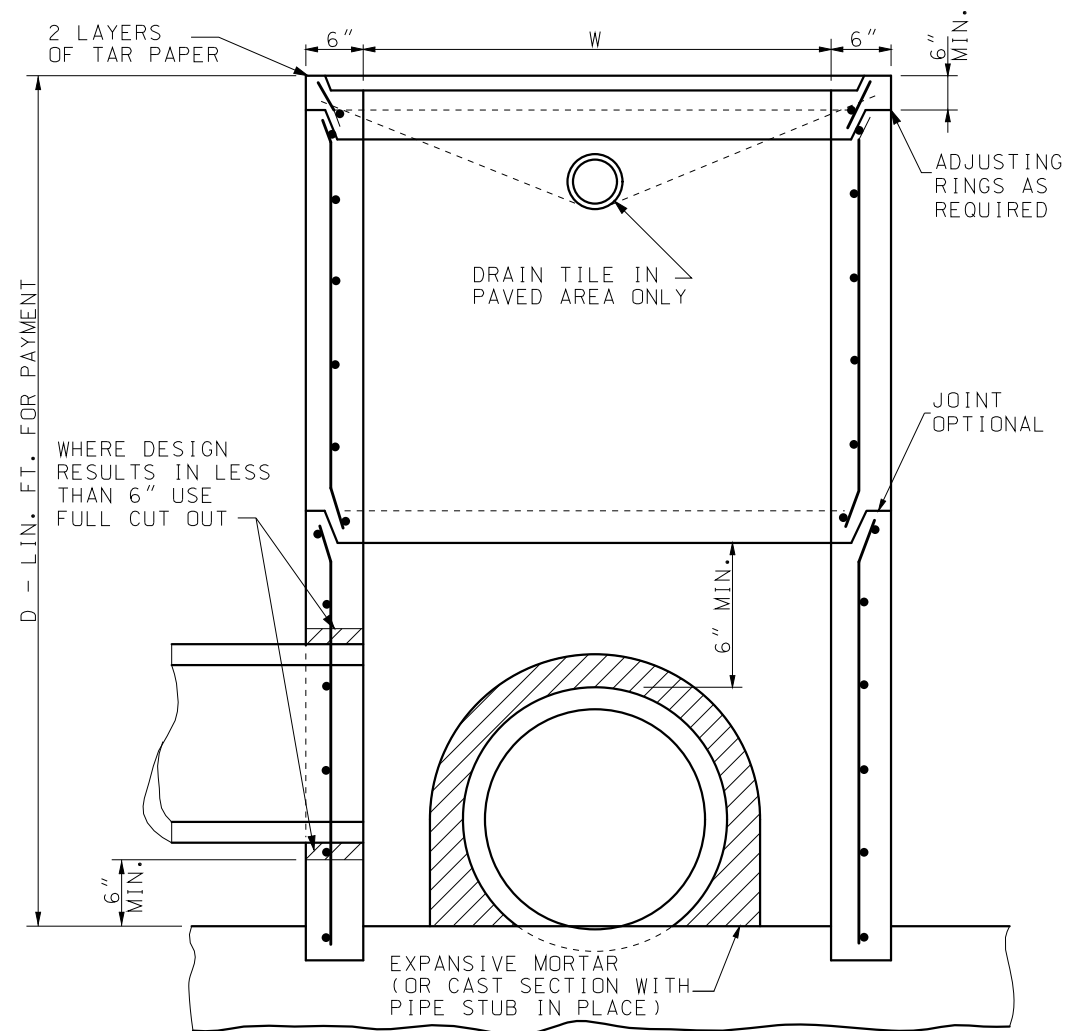
ALTERNATE MANHOLE TOP



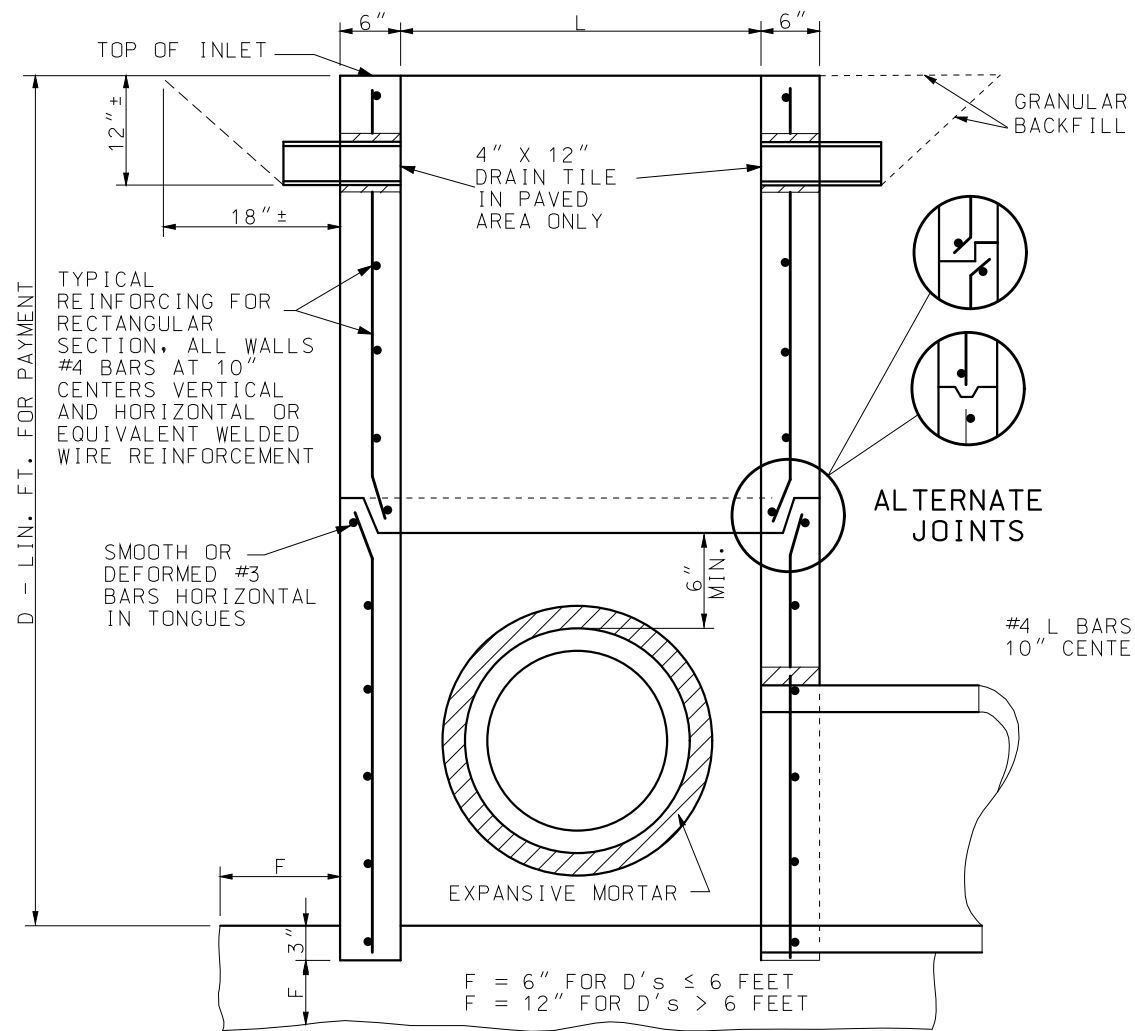
PLAN OF FLAT SLAB MANHOLE TOP

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>		105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>PRECAST MANHOLES</b>	
DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016	731.00U	SHEET NO. <b>2 OF 2</b>	

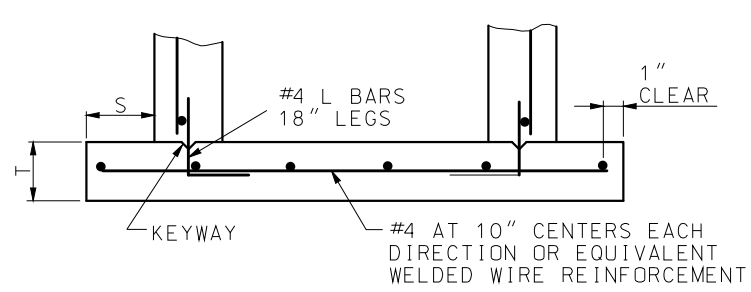
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



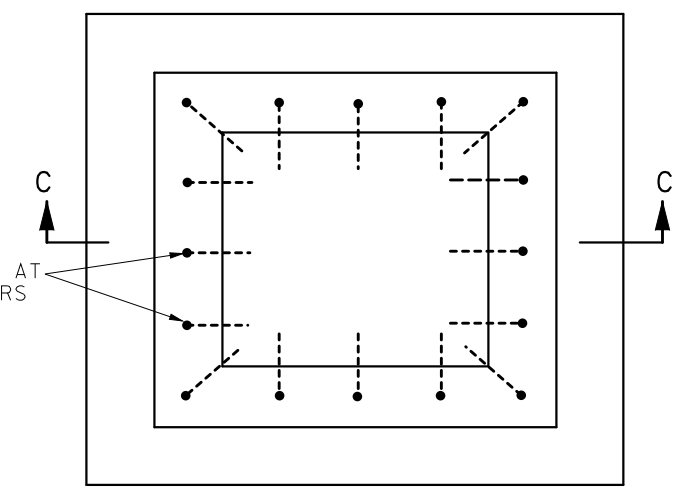
SECTION A-A



SECTION B-B



SECTION C-C



S = 0 FOR D ≤ 6 FEET AND 9"  
 FOR D > 6 FEET  
 T = 6" FOR D ≤ 6 FEET AND 9"  
 FOR D > 6 FEET

FOUNDATION SLAB AND BASE SECTION MAY BE POURED MONOLITHIC OR SEPARATELY WITH A KEYWAY.

PRECAST FOUNDATION SLAB

GENERAL NOTES:

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL INLETS HAVING A DEPTH OF MORE THAN 4 FEET. STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE SET LEVEL AND IN VERTICAL ALIGNMENT AND NOT NEARER THAT 3" TO A JOINT.

NO DIRECT PAYMENT WILL BE MADE FOR INLET STEPS.

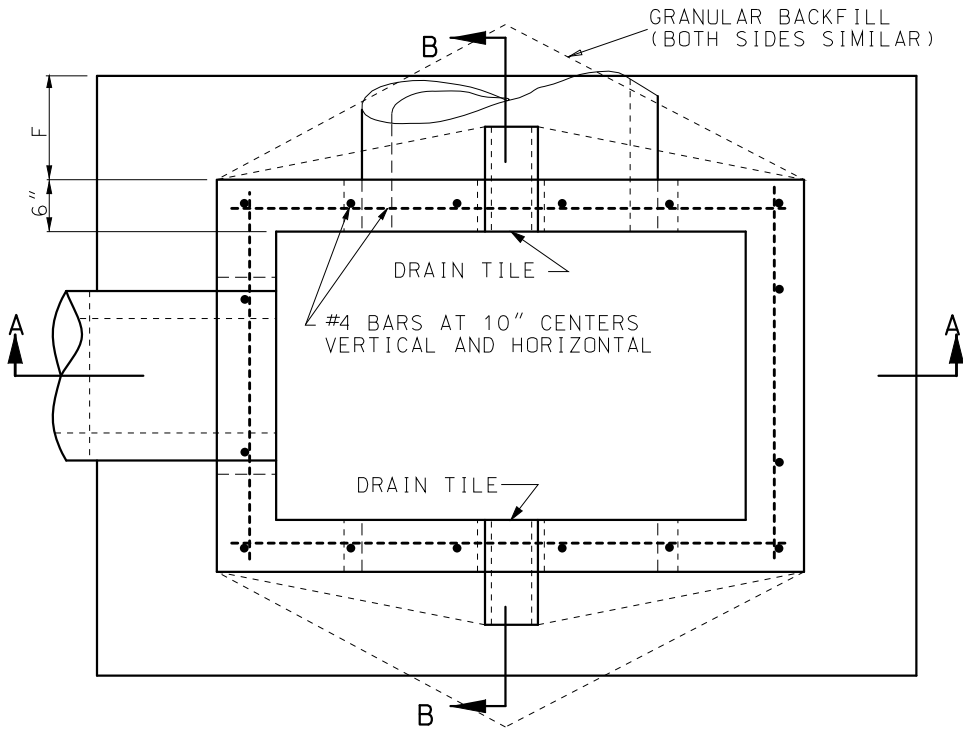
STEPS ARE NOT REQUIRED FOR TYPE D INLETS.

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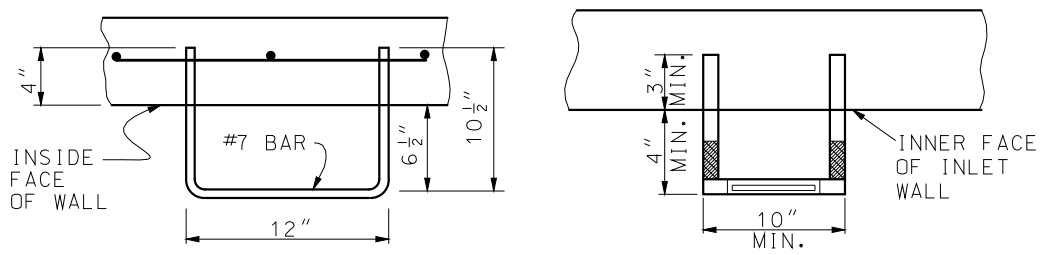
STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PRECAST DROP INLET

DATE EFFECTIVE: 07/01/2016	731.10S	SHEET NO. 1 OF 8
DATE PREPARED: 5/13/2016		

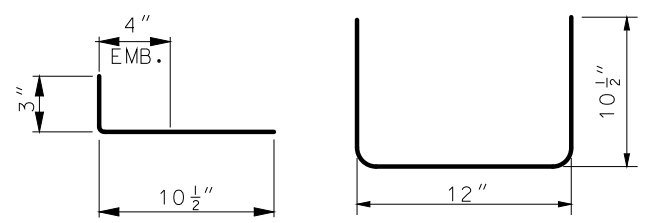


INLET PLAN



STEPS

STEP INSTALLATION (OTHER THAN STEEL BAR)

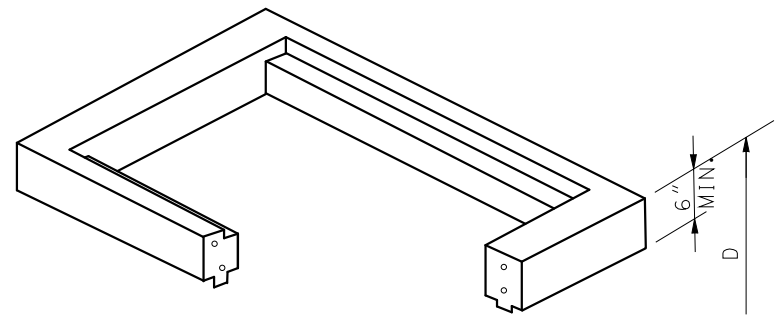


S - BARS

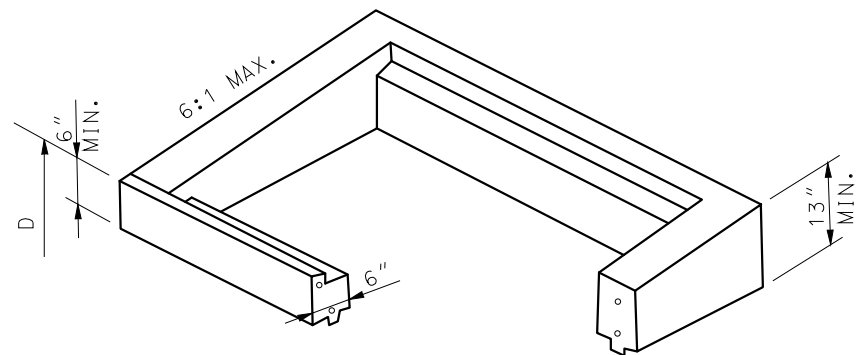
BENDING DIAGRAM STEEL STEP BAR

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

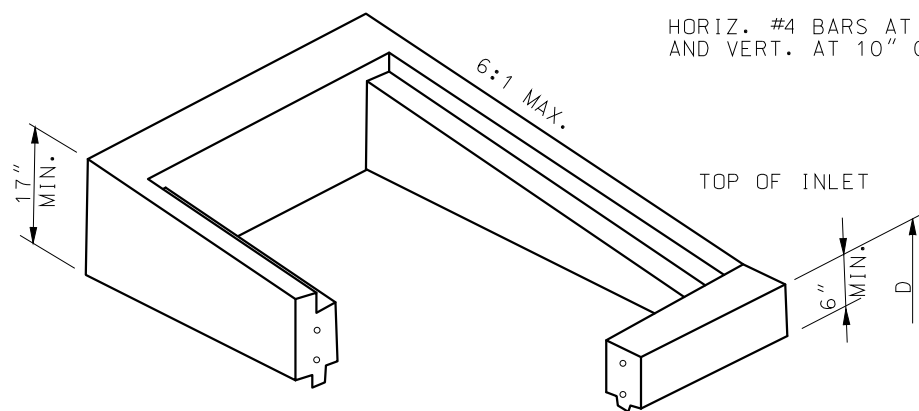




TYPE S-1



TYPE S-2

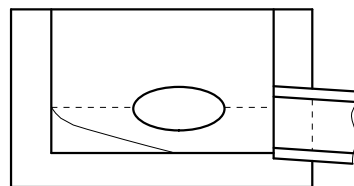
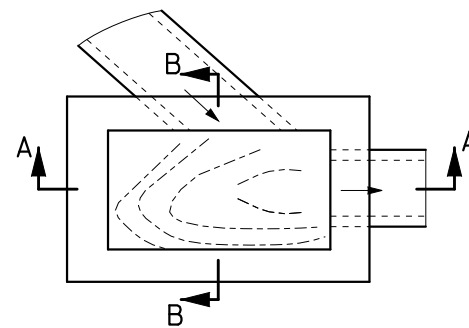


TYPE S-3

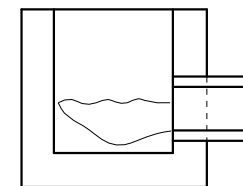
HORIZ. #4 BARS AT 6" CTRS.  
AND VERT. AT 10" CTRS.

SEE STANDARD PLAN 614.10 FOR GRATES AND BEARING PLATES. TYPICAL LOCATION DETAILS ARE INDICATED ON SHEETS 7 AND 8 OF 8. TOP SECTIONS MAY BE CAST MONOLITHIC WITH BASE SECTION.

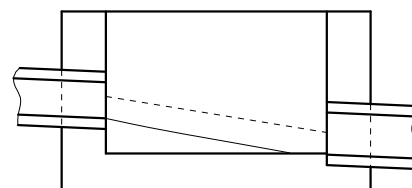
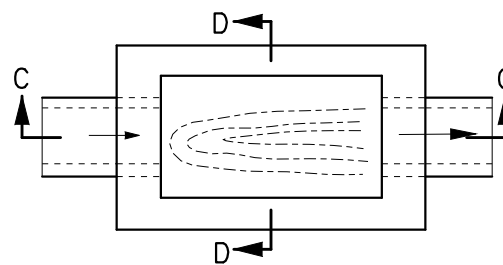
DROP INLET		
WIDTH FT.	LENGTH FT.	TYPE
2	2	A, B, C
4	2	
2	2	D
3	2	E, S-1 S-2, S-3
3	3	
5	2	
5	3	



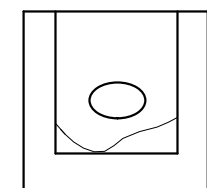
SECTION A-A



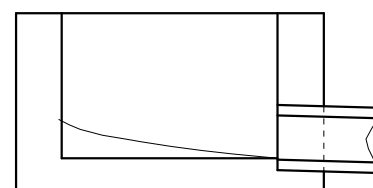
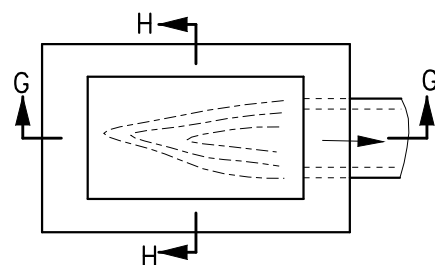
SECTION B-B



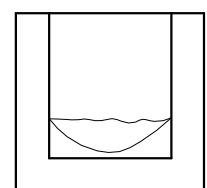
SECTION C-C



SECTION D-D

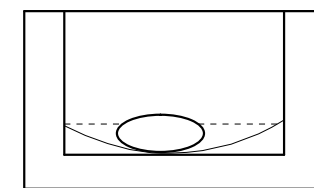
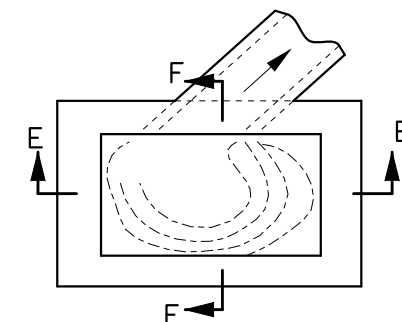


SECTION G-G

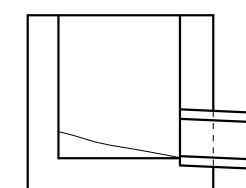


SECTION H-H

TYPICAL INVERTS



SECTION E-E



SECTION F-F

GENERAL NOTES:

THE CONCRETE FOR INVERTS SHALL BE PLACED AFTER COMPLETION OF THE DROP INLET BOX. NO DIRECT PAYMENT WILL BE MADE FOR FURNISHING OR PLACING INVERT CONCRETE.

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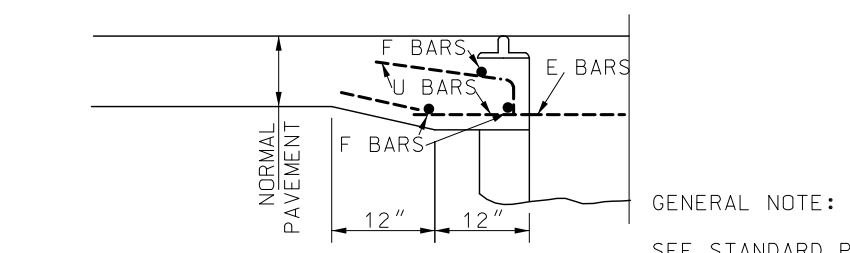
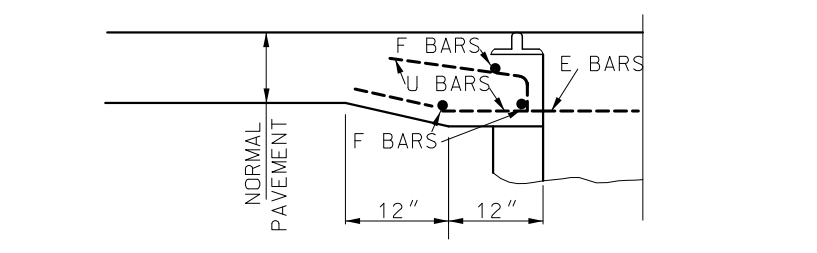
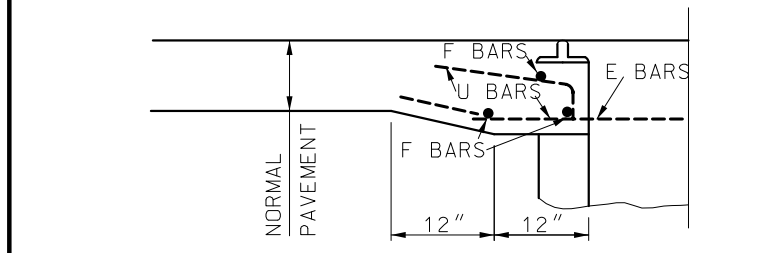
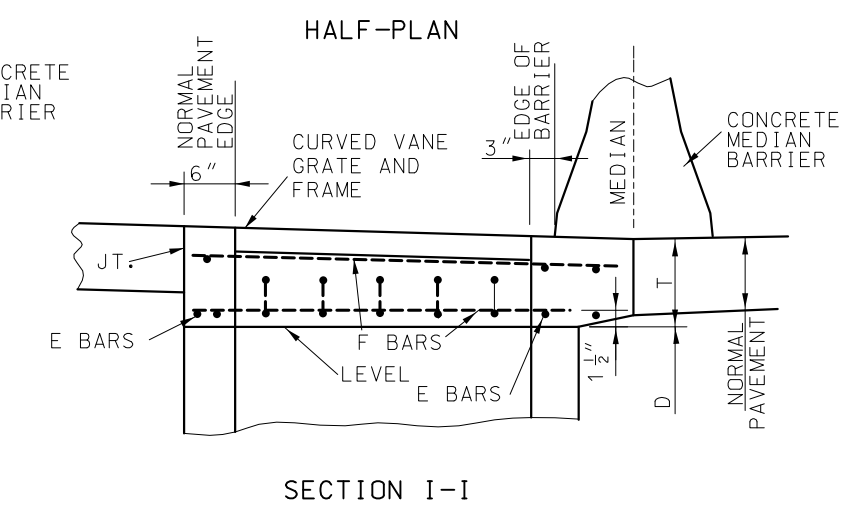
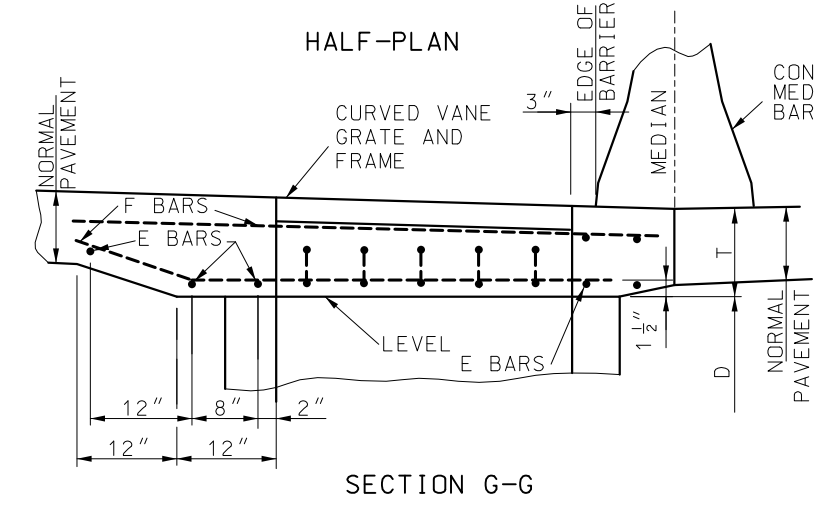
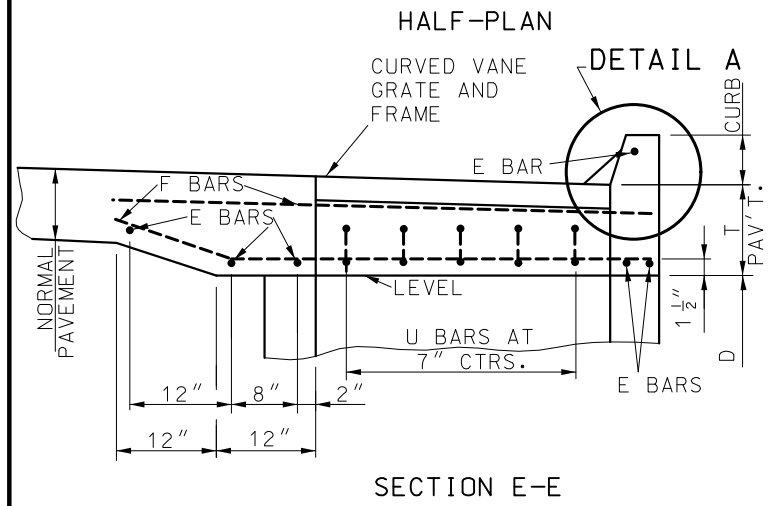
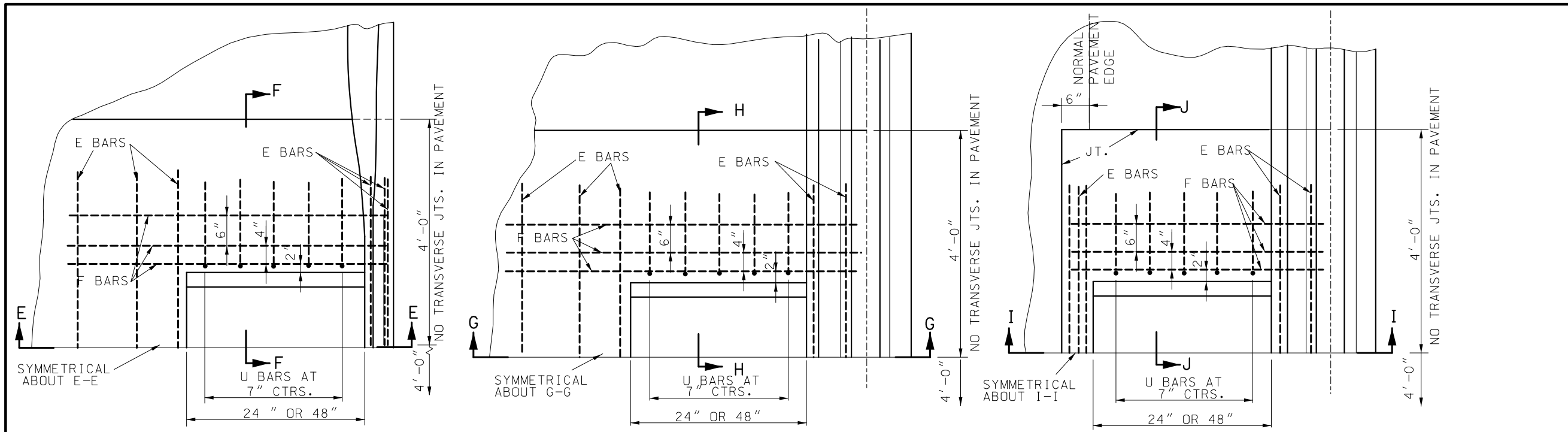
STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PRECAST DROP INLET

DATE EFFECTIVE: 07/01/2016  
DATE PREPARED: 5/13/2016

731.10S

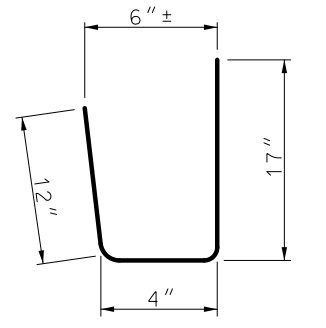
SHEET NO.  
2 OF 8



TYPE A  
INLET ADJACENT TO CURB

TYPE B  
DISTANCE BETWEEN BARRIER AND PAVEMENT EDGE GREATER THAN INLET WIDTH

TYPE C  
DISTANCE BETWEEN BARRIER AND PAVEMENT EDGE EQUAL TO INLET WIDTH



U-BARS BENDING DIAGRAM

PAVEMENT BAR BILL					
TYPE	WIDTH	LENGTH	MARK	NO.	LENGTH
A	4'	2'	F 6	6	6'-0"
			F 6	6	6'-6"
	2'	2'	U 14	14	2'-9"
			F 6	6	6'-0"
B	4'	2'	F 6	6	7'-0"
			U 14	14	2'-9"
	2'	2'	F 6	6	5'-0"
			U 8	8	2'-9"
C	4'	2'	E 7	7	6'-0"
			F 6	6	5'-3"
	2'	2'	E 7	7	6'-0"
			F 6	6	3'-3"
D	2'	2'	E 6	6	7'-0"
			F 6	6	2'-9"
			E 6	6	7'-0"
			U 8	8	2'-9"

BARS E, F, & U.....#4

GENERAL NOTE:  
SEE STANDARD PLAN 614.11 FOR CURVED VANE GRATE.

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JEFFERSON CITY, MO 65102  
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**PRECAST DROP INLET COVERS**

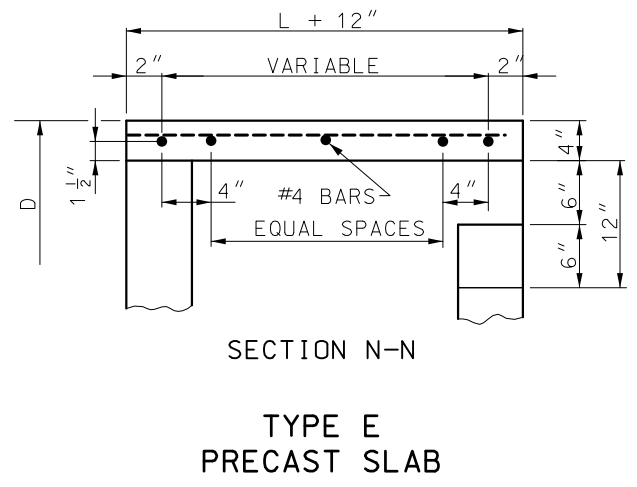
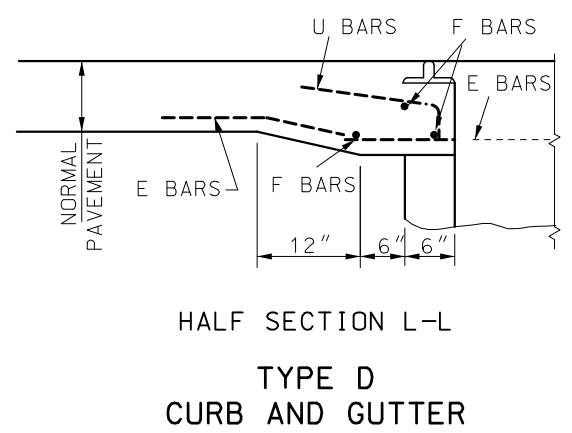
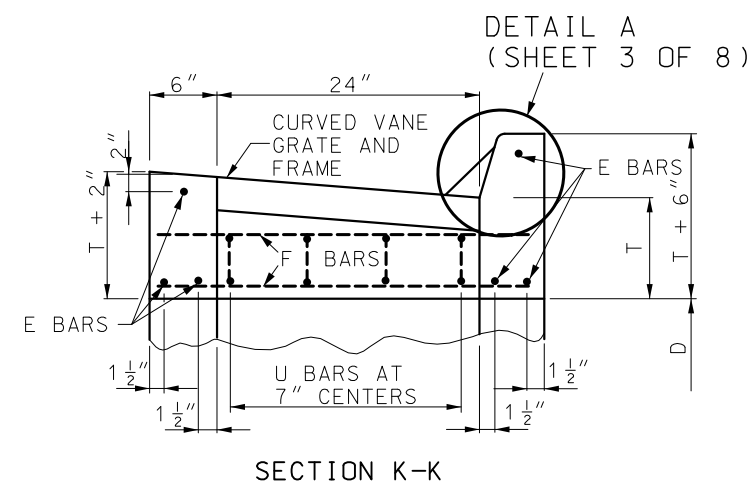
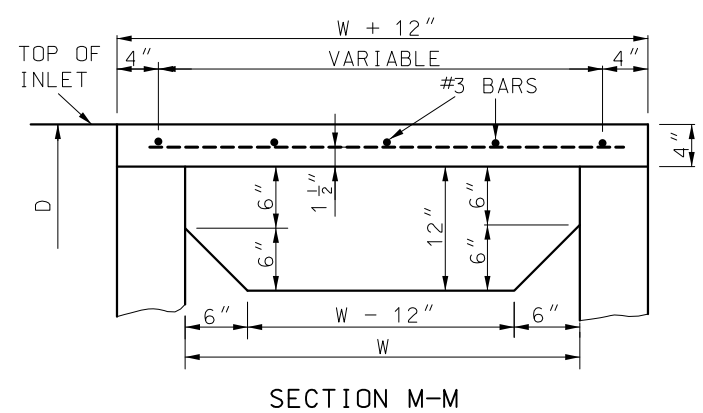
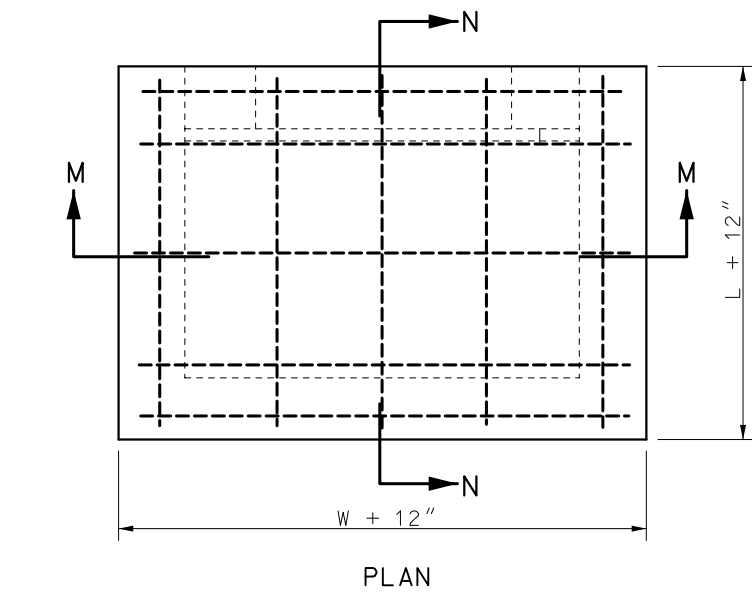
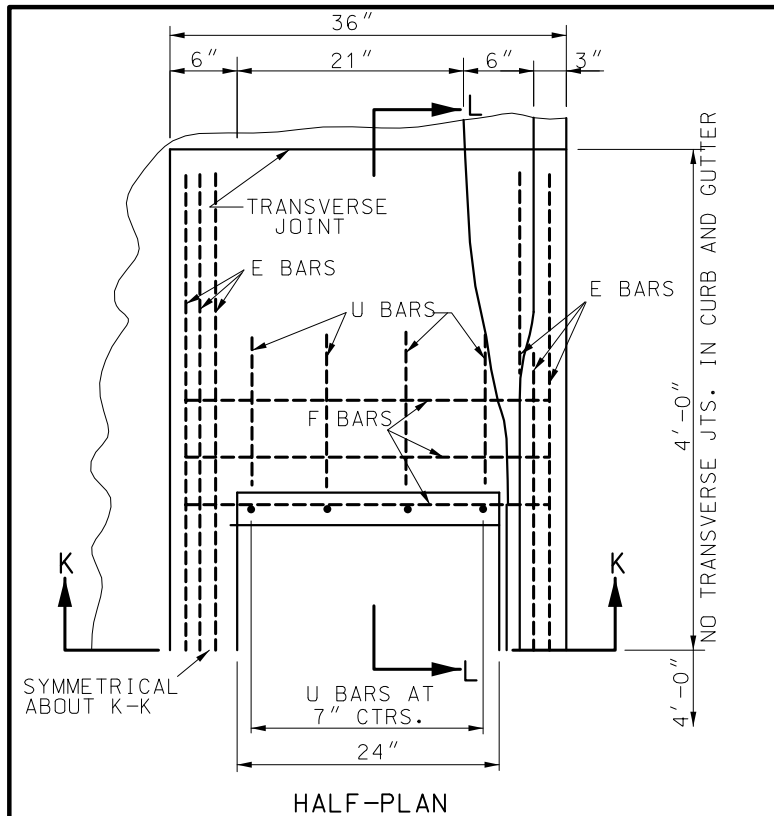
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 01/01/2022  
DATE PREPARED: 10/21/2021

SHEET NO.  
**3 OF 8**

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

DETAIL A



PAVEMENT THICKNESS	"T" DIMENSION
LESS THAN OR EQUAL TO 11"	11"
12"	12"
13"	13"
GREATER THAN OR EQUAL TO 14"	14"

TYPE E COVER BAR BILL				
WIDTH	LENGTH	BAR SIZE	NO.	LENGTH
3'	2'	#3	5	2'-9"
		#4	5	3'-9"
3'	3'	#3	5	3'-9"
		#4	5	3'-9"
5'	2'	#3	6	2'-9"
		#4	6	5'-9"
5'	3'	#3	6	3'-9"
		#4	7	5'-9"

**GENERAL NOTES:**

THE SIZE OF THE DROP INLET AND TYPE OF COVER WILL BE SHOWN ON THE PLANS.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH ESTABLISHED MANUFACTURING PROCEDURES.

TOP OF DROP INLET WALL SHALL BE CONSTRUCTED TO THE ELEVATION OF BOTTOM OF SLAB AT THE EDGE OF PAVEMENT OR BOTTOM OF CURB AND GUTTER AT DROP INLET.

WHERE THE DROP INLET IS LOCATED IN AN UNPAVED AREA, THE TOP OF THE DROP INLET WALLS SHALL BE SET TO THE ELEVATION SHOWN ON THE PLANS.

ALL CONCRETE ABOVE THE TAR PAPER SEPARATION JOINT IS TO BE CONSTRUCTED DURING PAVING OPERATIONS OR CURB AND GUTTER CONSTRUCTION, AND WILL BE PAID FOR AS SQUARE YARDS OF CONCRETE PAVEMENT OR LINEAR FEET OF CURB AND GUTTER.

FORMED OR CUT-OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

REINFORCING BARS IN PAVEMENT SHALL BE EPOXY COATED AND SECURELY TIED TOGETHER AND FASTENED TO AVOID ANY POSSIBLE DISPLACEMENT DURING THE PLACING OF CONCRETE, REINFORCEMENT SHOWN IS IN ADDITION TO ANY REINFORCEMENT SHOWN FOR CONCRETE PAVEMENT OR CURB AND GUTTER.

JOINTS SHALL BE SEALED IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE DROP INLETS CALLED FOR IN THE PLANS, TO THE DIMENSIONS REQUIRED FOR PRECAST DROP INLETS.

WELDED WIRE REINFORCEMENT MAY BE IN LIEU OF REINFORCING BARS, THE REINFORCEMENT SHALL NOT BE LESS THAN .23 SQUARE INCHES PER LINEAR FOOT BOTH HORIZONTALLY AND VERTICALLY.

NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE NOR FOR CUTTING OR BENDING REINFORCING STEEL.

THE TOP OF INLET PIPES SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.

NO DIRECT PAYMENT WILL BE MADE FOR FORMING FOR CURVED VANE GRATES AND FRAMES.

THE REINFORCEMENT SHOWN IS THE MINIMUM REQUIRED. AT THE CONTRACTOR'S OPTION, ADDITIONAL REINFORCEMENT MAY BE USED.

REINFORCING STEEL EDGE DISTANCE WILL BE 1 1/2" UNLESS OTHERWISE SPECIFIED.

NOT MORE THEN TWO LIFT HOLES OR LIFTING INSERTS MAY BE PROVIDED.

CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL PLANES 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION OF THE DROP INLETS, CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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JEFFERSON CITY, MO 65102  
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**PRECAST DROP INLET COVERS**

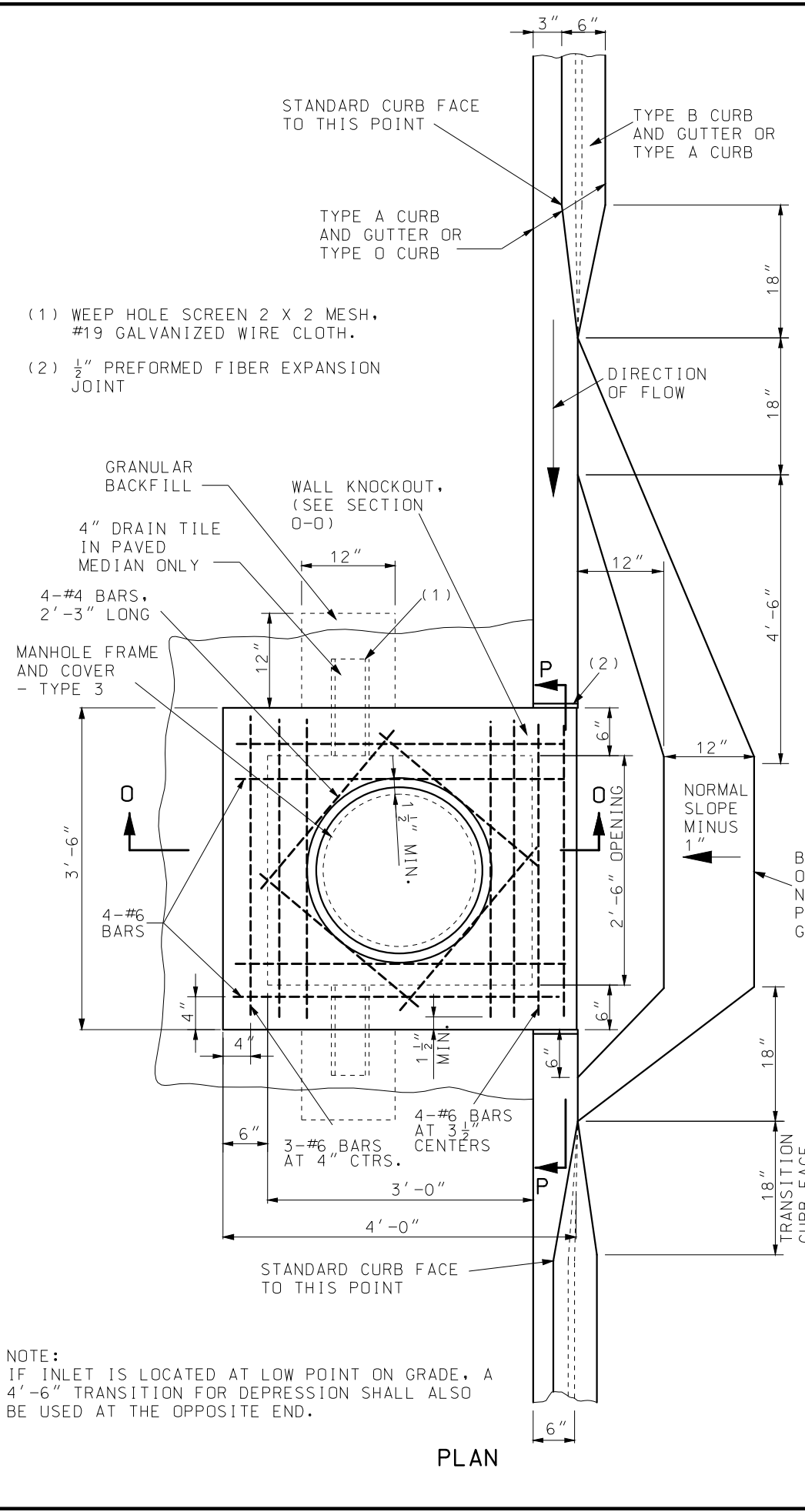
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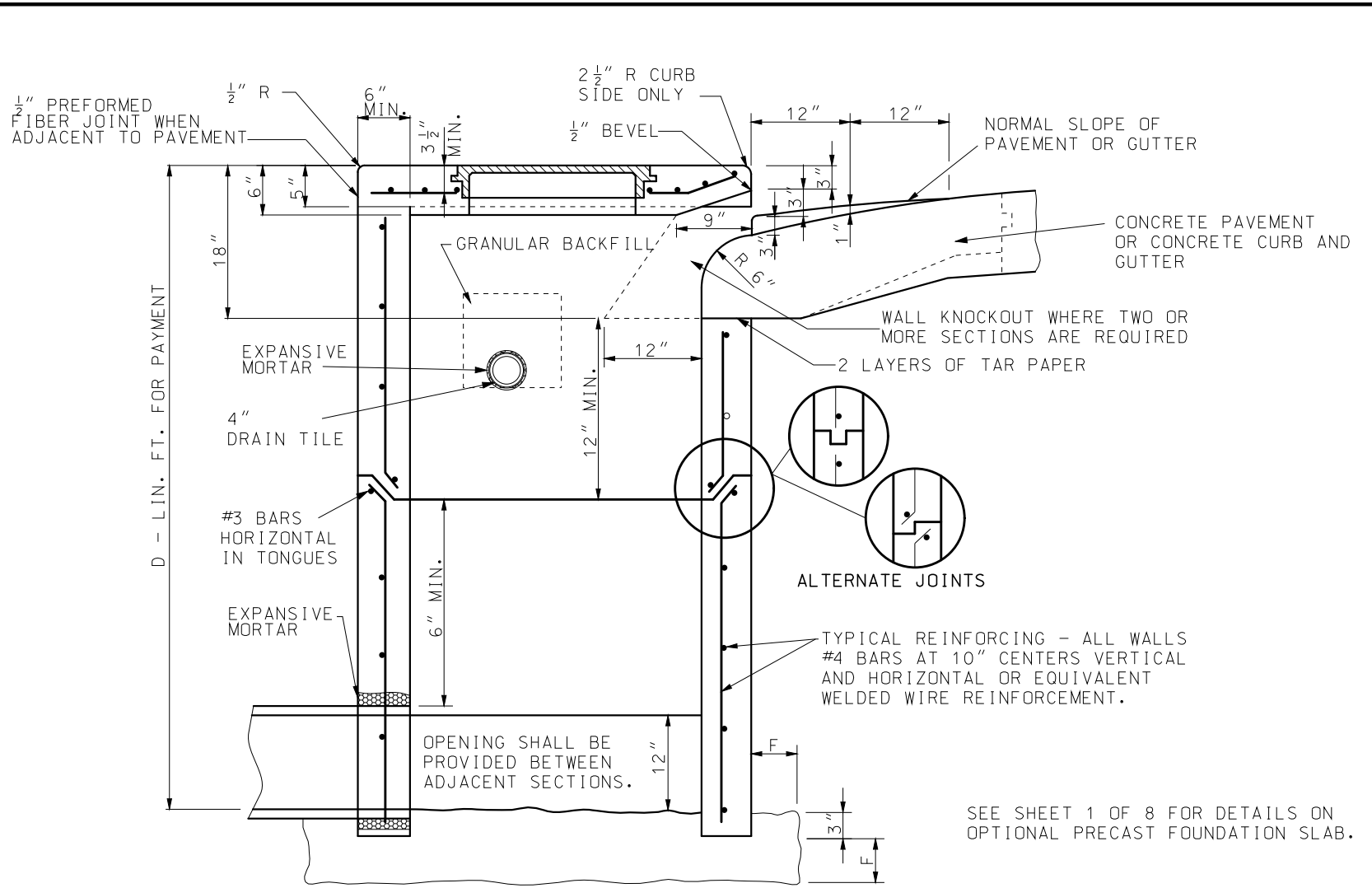
SHEET NO.  
**4 OF 8**

**731.10S**

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

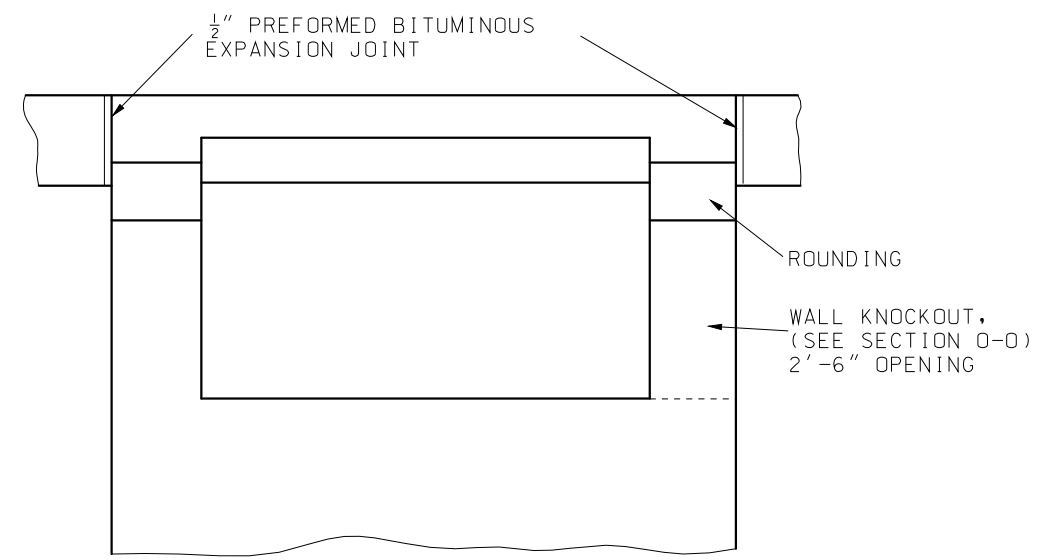


NOTE:  
IF INLET IS LOCATED AT LOW POINT ON GRADE, A 4'-6" TRANSITION FOR DEPRESSION SHALL ALSO BE USED AT THE OPPOSITE END.



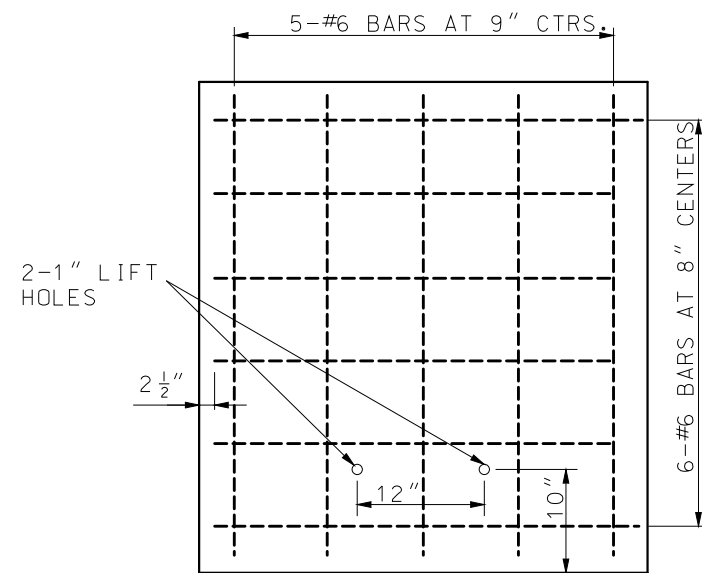
F = 6" FOR D's ≤ 6'  
F = 12" FOR D's > 6'

BEGIN DEPRESSION ON THIS LINE, NORMAL SLOPE OF PAVEMENT OR GUTTER TO HERE.



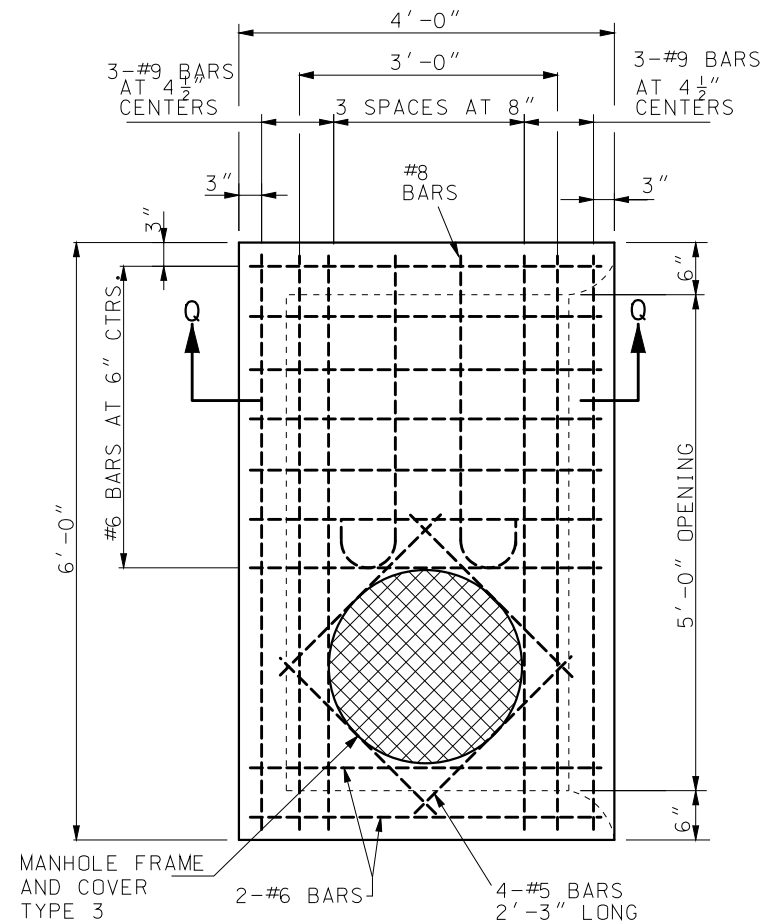
<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	<p><b>PRECAST DROP INLET CURB INLET - TYPE T</b></p>	
<p>DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 8/11/2016</p>	<p>731.10S</p>	<p>SHEET NO. 5 OF 8</p>

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

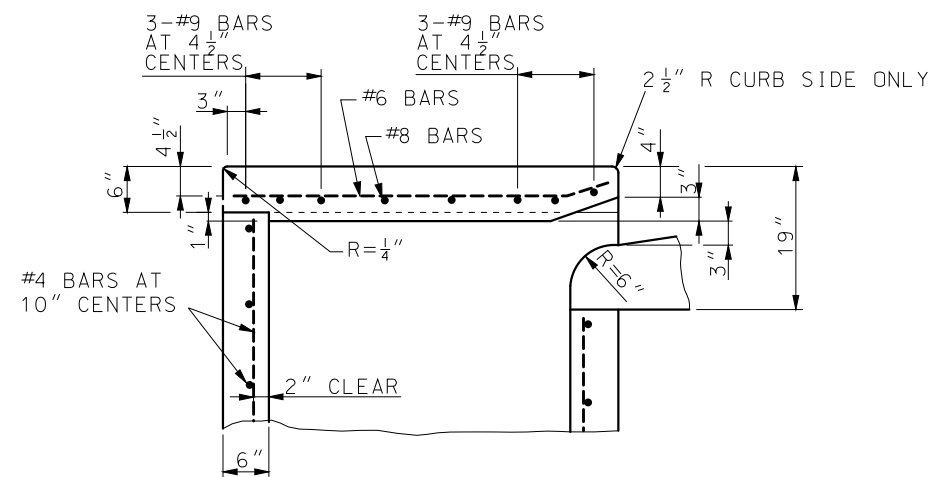


NOTE: REINFORCING FOR LIDS ON UPSTREAM SECTIONS.

LID FOR ADJACENT SECTIONS



PLAN



SECTION Q-Q

OPTIONAL PRECAST CURB INLET  
5'-0" OPENING

OTHER DETAILS ARE SAME AS FOR THE 2'-6" OPENING DROP INLET THIS SHEET.

GENERAL NOTES:

NOTES PERTAINING TO TYPE T:

THE LENGTH AND DEPTH OF THE INLET SHALL BE AS SHOWN ON THE PLANS.

WALLS BETWEEN THE ADJACENT SECTIONS SHALL BE SEALED IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD SPECIFICATIONS.

IF DEPTH OF INLET EXCEEDS 6 FEET THE PRECAST UNITS MAY BE FURNISHED IN TWO OR MORE SECTIONS.

IF TWO OR MORE SECTIONS ARE USED, THE TYPE 3 MANHOLE FRAME AND COVER SHALL BE IN THE DOWNSTREAM SECTION ONLY.

IF A 5 FOOT OPENING IS REQUIRED, TWO 2'-6" OPENING SECTIONS OR ONE 5 FOOT OPENING SECTION MAY BE PROVIDED AT THE CONTRACTOR'S OPTION.

SEE SHEET 1 FOR STEP DETAILS AND SHEET 4 FOR GENERAL NOTES.

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

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PRECAST DROP INLET  
CURB INLET - TYPE T

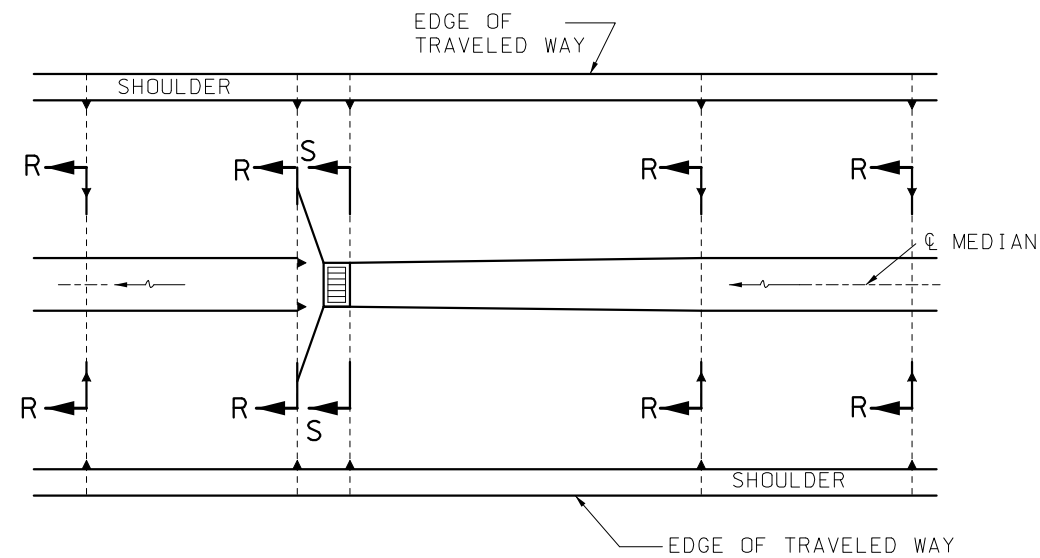
DATE EFFECTIVE: 07/01/2016  
DATE PREPARED: 5/13/2016

731.10S

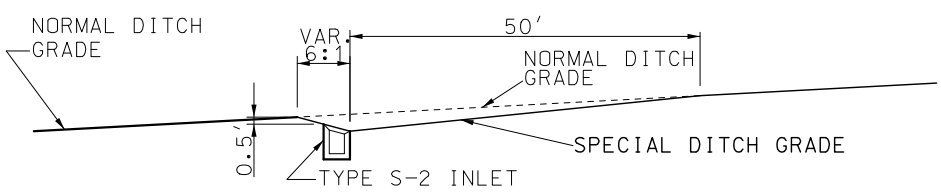
SHEET NO.  
6 OF 8

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

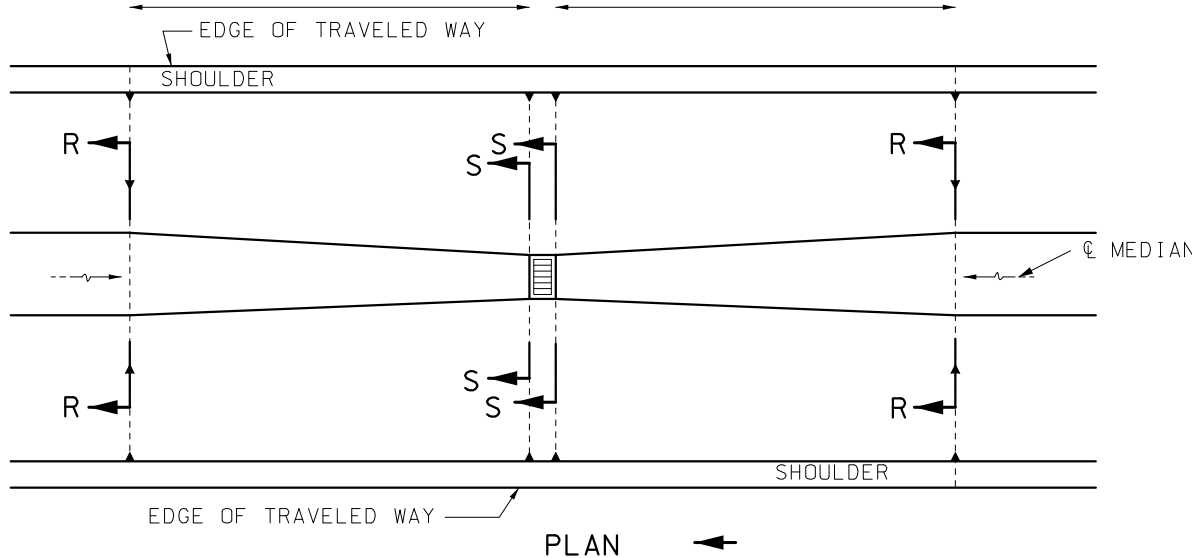
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



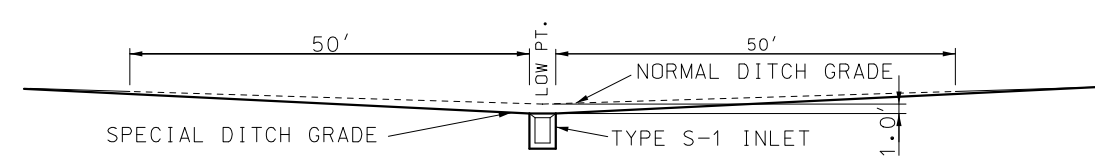
PLAN



SECTION ALONG CENTERLINE OF MEDIAN RELIEF ON GRADE

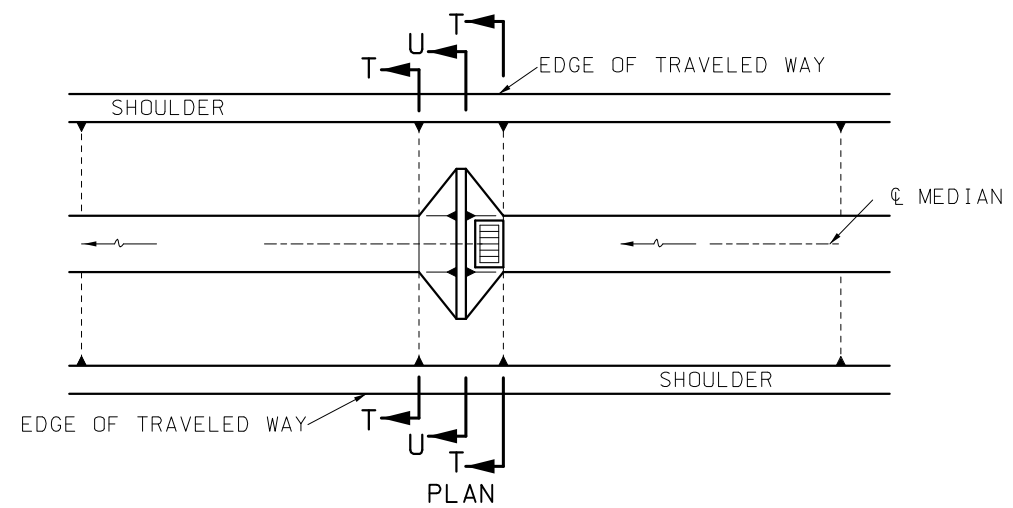


PLAN

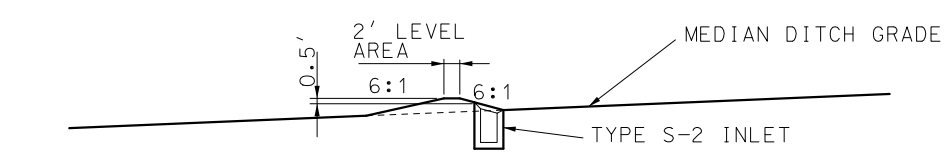


SECTION ALONG CENTERLINE OF MEDIAN RELIEF AT LOW POINT

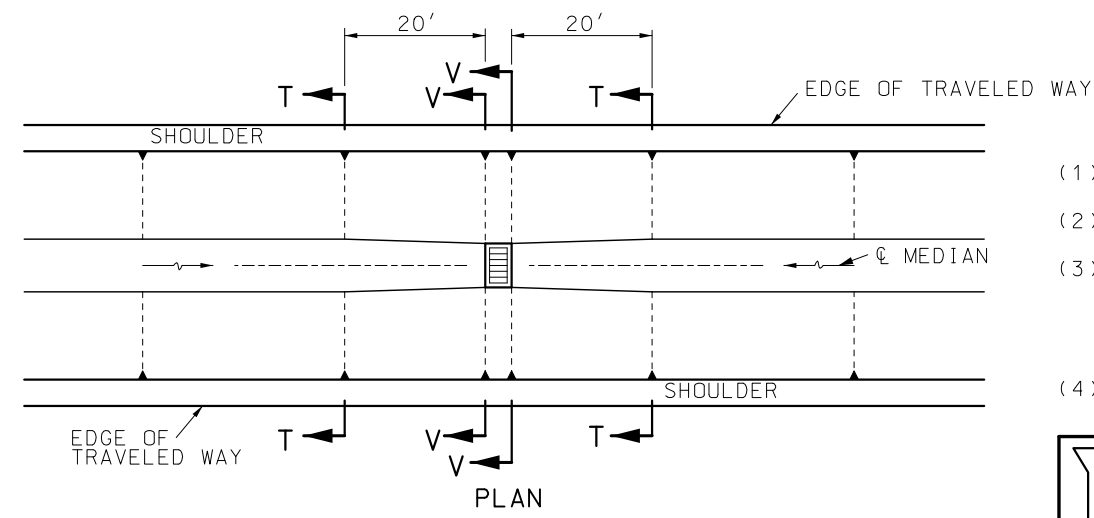
DETAILS FOR MEDIAN RELIEF-60' MEDIAN



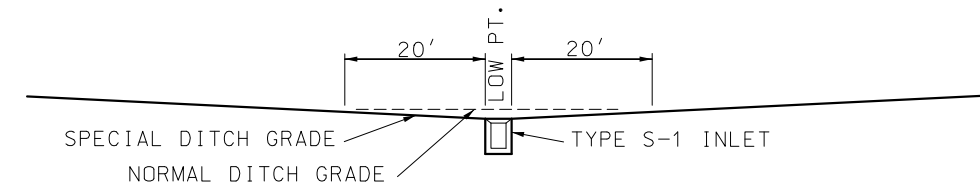
PLAN



SECTION ALONG CENTERLINE OF MEDIAN RELIEF ON GRADE

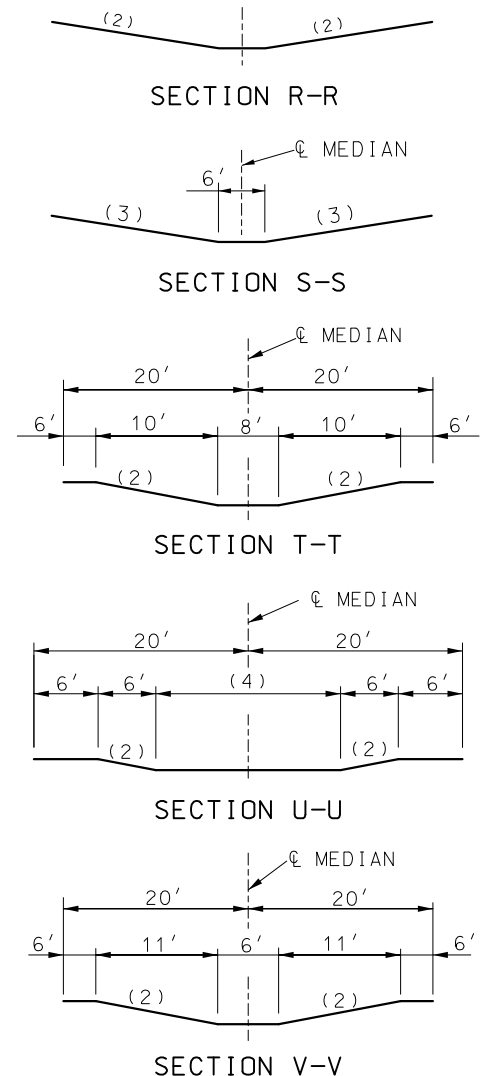


PLAN



SECTION ALONG CENTERLINE OF MEDIAN RELIEF AT LOW POINT

DETAILS FOR MEDIAN RELIEF-40' MEDIAN



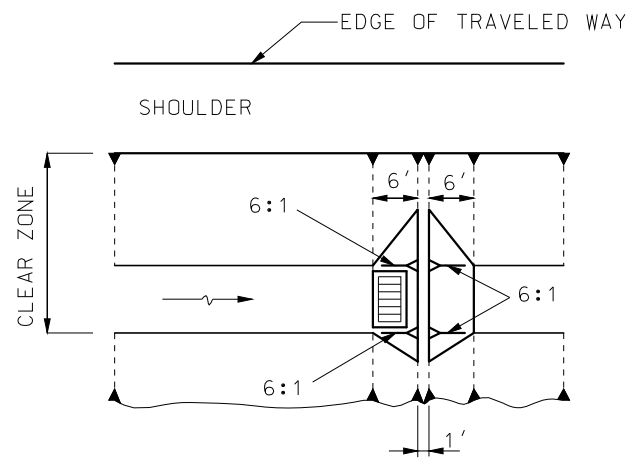
- (1) DITCH WIDTH AS GIVEN ON TYPICAL SECTION.
- (2) DITCH SLOPE AS GIVEN ON TYPICAL SECTION.
- (3) VARY SLOPE TO ACHIEVE MINIMUM 0.5 FT. FREEBOARD ABOVE TOP OF INLET GRATE ON GRADE, OR 1.0 FT. ADDITIONAL DITCH DEPTH BELOW NORMAL DITCH GRADE AT LOW POINT.
- (4) VARY WIDTH TO ACHIEVE MINIMUM 0.5 FEET FREEBOARD ABOVE TOP OF INLET GRATE.

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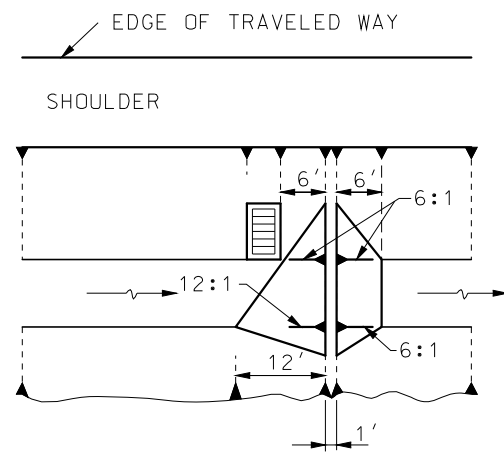
STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PRECAST DROP INLET  
 TYPICAL LOCATION DETAILS  
 - TYPE S

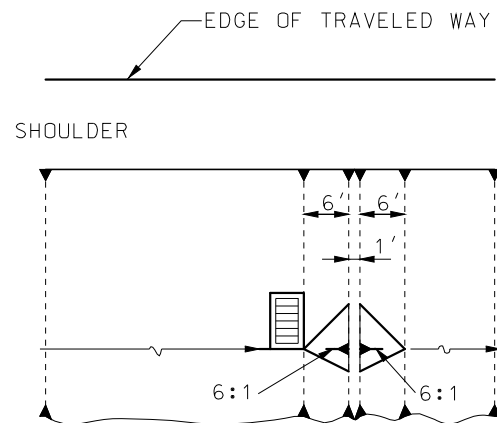
DATE EFFECTIVE: 01/01/2022	731.10S	SHEET NO. 7 OF 8
DATE PREPARED: 10/21/2021		



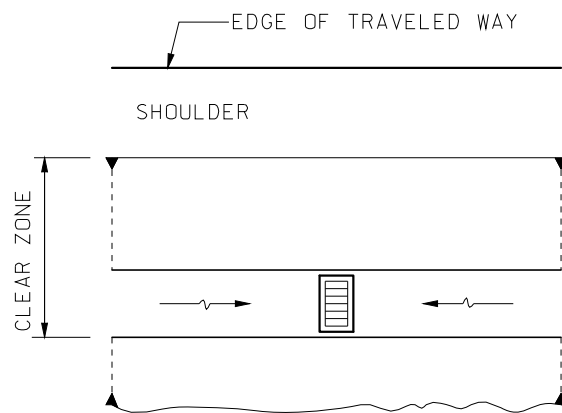
PLAN 1  
TYPE S-2 INLET IN ROADWAY DITCH  
(FLAT DITCH ON GRADE)



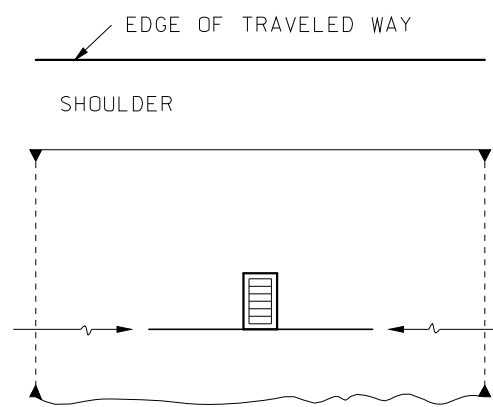
PLAN 2  
TYPE S-3 INLET IN ROADWAY DITCH  
(FLAT DITCH ON GRADE)



PLAN 3  
TYPE S-3 INLET IN ROADWAY DITCH  
(V DITCH ON GRADE)



PLAN 4  
TYPE S-1 INLET AT LOW POINT  
(FLAT DITCH)



PLAN 5  
TYPE S-3 INLET AT LOW POINT  
(LOW DITCH)

DETAILS FOR ROADWAY DITCH INLETS  
LOCATED WITHIN THE CLEAR ZONE

GENERAL NOTES:

THIS DRAWING IS FOR GENERAL INFORMATION ONLY. ACTUAL CONSTRUCTION DETAILS SHALL CONFORM TO THOSE SHOWN ON THE DETAIL PLANS.

DETAILS ON THIS SHEET ARE ONLY FOR USE WITH STRUCTURES LOCATED IN THE MEDIAN OR WITHIN THE CLEAR ZONE.

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

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

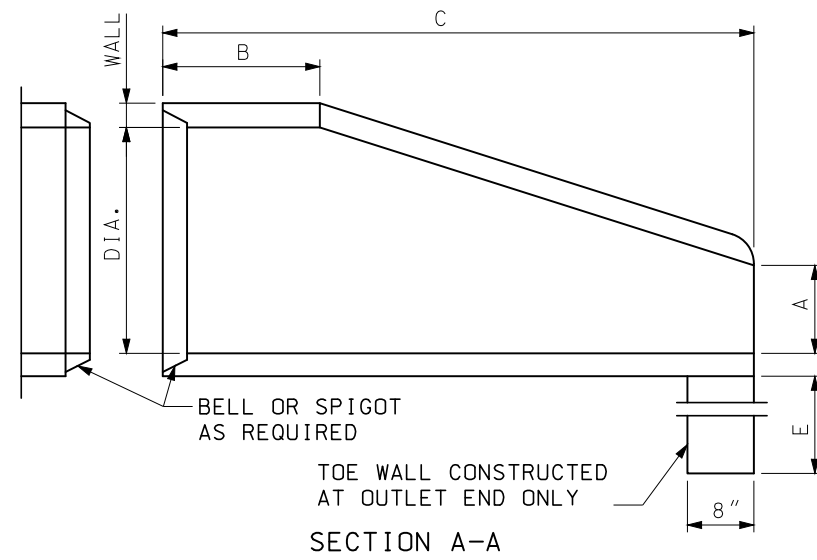
PRECAST DROP INLET  
TYPICAL LOCATION DETAILS  
- TYPE S

DATE EFFECTIVE: 07/01/2016  
DATE PREPARED: 5/13/2016

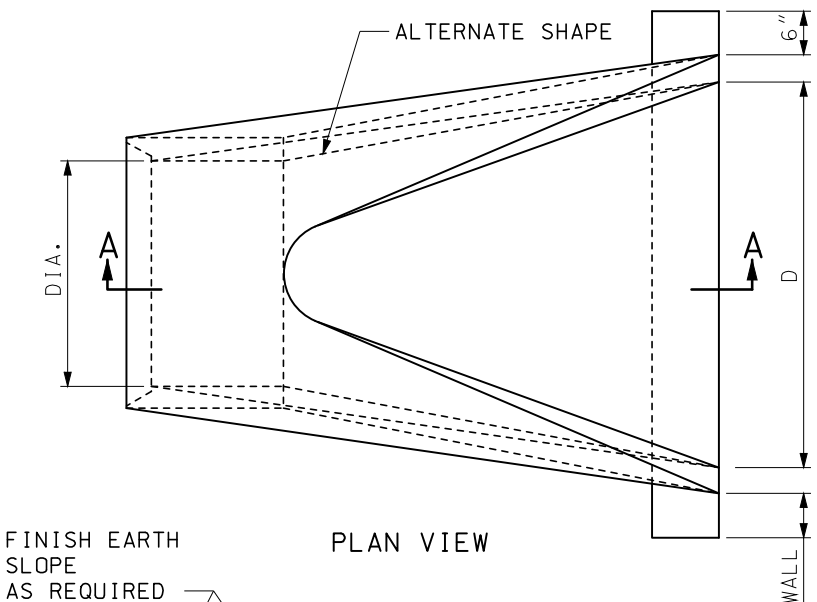
731.10S

SHEET NO.  
8 OF 8

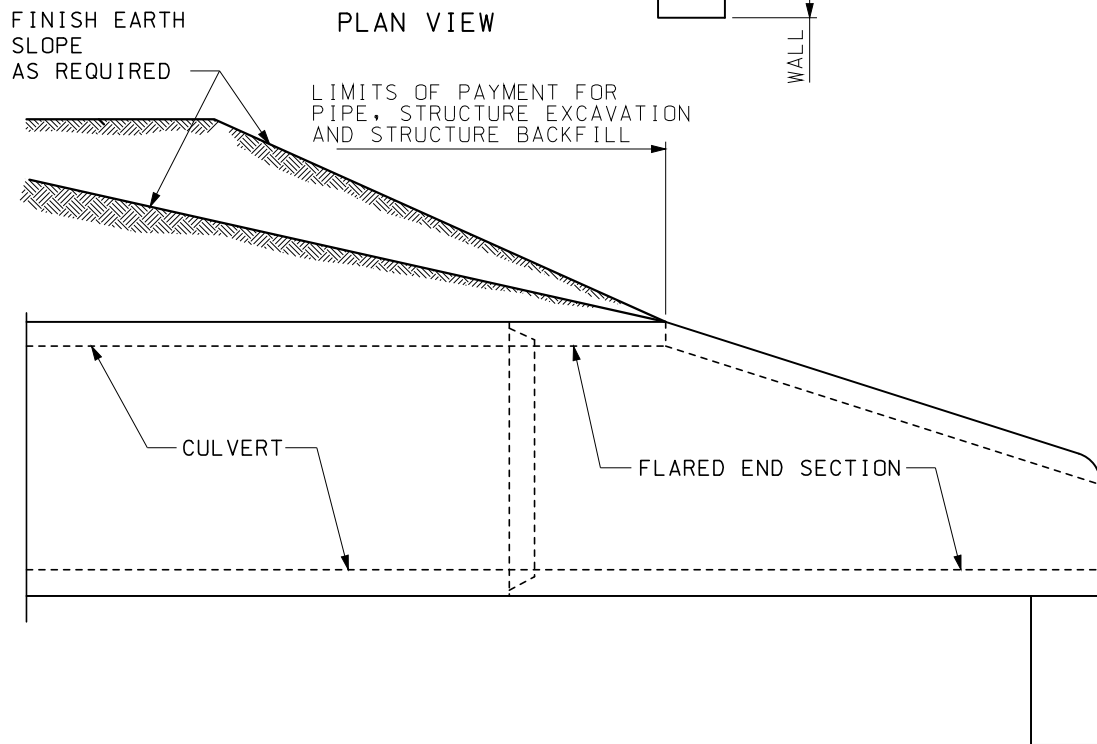
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SECTION A-A

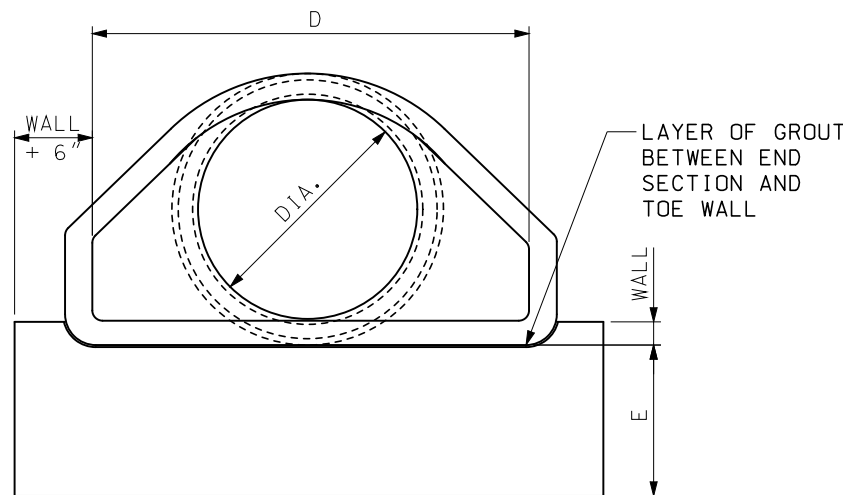


PLAN VIEW



INSTALLATION DETAILS

DIMENSIONS						
DIA.	WALL	A	B MIN.	C MIN.	D	E
12"	2"	4"	4'-0"	6'	2'-0"	18"
15"	2 1/4"	6"	3'-10"	6'	2'-6"	18"
18"	2 1/2"	9"	3'-10"	6'	3'-0"	18"
21"	2 3/4"	9"	3'-2"	6'	3'-6"	18"
24"	3"	9 1/2"	2'-6"	6'	4'-0"	24"
27"	3 1/4"	10 1/2"	2'-1"	6'	4'-6"	24"
30"	3 1/2"	1'-0"	1'-7"	6'	5'-0"	24"
33"	3 3/4"	1'-2"	1'-7"	6'	5'-6"	24"
36"	4"	1'-3"	2'-10"	8'	6'-0"	24"
42"	4 1/2"	1'-9"	2'-11"	8'	6'-6"	24"
48"	5"	2'-0"	2'-2"	8'	7'-0"	24"
54"	5 1/2"	2'-3"	2'-11"	8'	7'-6"	36"
60"	6"	2'-6"	3'-3"	8'	8'-0"	36"
66"	6 1/2"	2'-0"	1'-9"	8'	8'-6"	36"
72"	7"	2'-0"	2'-9"	10'	9'-0"	36"
78"	7 1/2"	2'-3"	2'-3"	10'	9'-6"	36"
84"	8"	2'-6"	2'-0"	10'	10'-0"	36"



END VIEW

ADJOINING PIPE DIA.	REINFORCEMENT				
	BARREL SECTION REINFORCEMENT			FLARE SECTION REINFORCEMENT (ONE LAYER ONLY IN CENTER OF WALL)	
	CIRCULAR		ELLIPTICAL		
	INNER CAGE SQ. IN./LIN. FT.	OUTER CAGE SQ. IN./LIN. FT.	SQ. IN./LIN. FT.	AREA OF LONGITUDINAL SQ. IN./LIN. FT.	AREA OF TRANSVERSE SQ. IN./LIN. FT.
12"	0.07			0.048	0.048
15"	0.07			0.054	0.054
18"	0.07		0.07	0.060	0.060
21"	0.07		0.07	0.066	0.066
24"	0.07		0.07	0.072	0.072
27"	0.13		0.11	0.078	0.078
30"	0.14		0.12	0.084	0.084
33"	0.15		0.13	0.090	0.090
36"	0.12	0.09	0.13	0.096	0.096
42"	0.15	0.12	0.17	0.108	0.108
48"	0.18	0.14	0.20	0.120	0.120
54"	0.22	0.16	0.24	0.132	0.132
60"	0.25	0.19	0.28	0.144	0.144
66"	0.31	0.23	0.34	0.156	0.156
72"	0.35	0.21	0.39	0.170	0.170
78"	0.40	0.24	0.44	0.185	0.185
84"	0.46	0.28	0.51	0.205	0.205

GENERAL NOTES:

SLIGHT VARIATIONS IN BOTH SHAPE AND DIMENSIONS FROM THOSE SHOWN MAY BE ACCEPTED IF APPROVED BY THE ENGINEER.

NOT MORE THAN THREE LIFT HOLES MAY BE DRILLED OR CAST IN THE END SECTION FOR HANDLING AND LAYING.

LIFT LUGS OR BARS WILL BE PERMITTED IN PRECAST TOE WALLS.

TOE WALLS MAY BE CAST-IN-PLACE OR PRECAST.

STEEL FIBERS MAY BE USED IN LIEU OF REBAR OR COLD DRAWN STEEL WIRE AS PER SECTION 1032.3.4.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**FLARED END SECTION**

PRECAST CONCRETE

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 04/01/2016

DATE PREPARED: 2/11/2016

**732.00S**

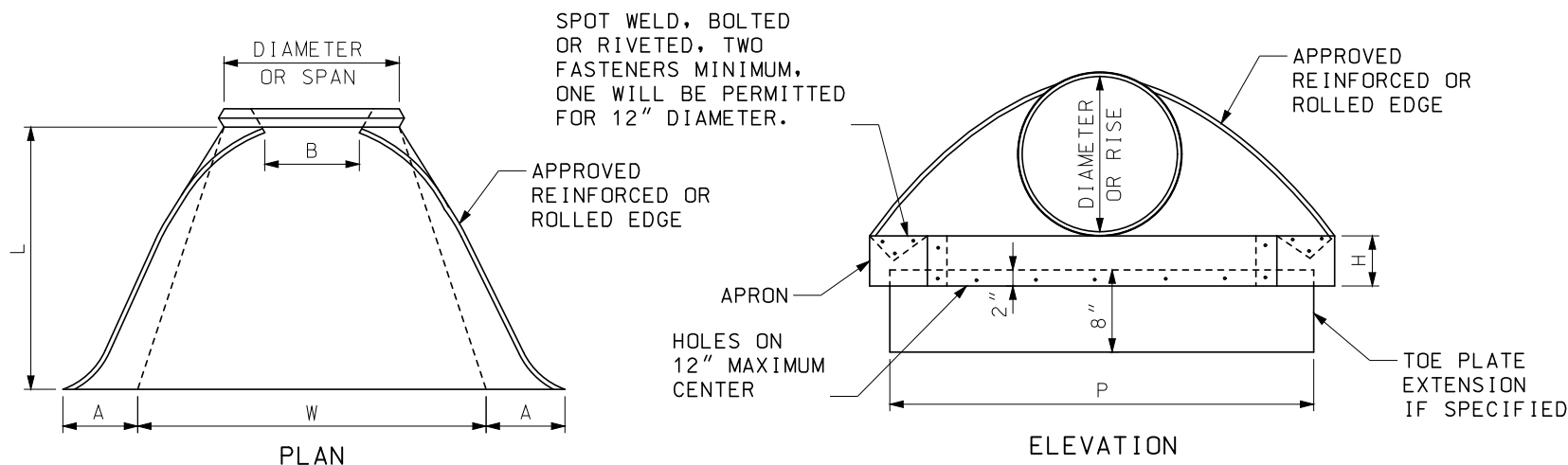
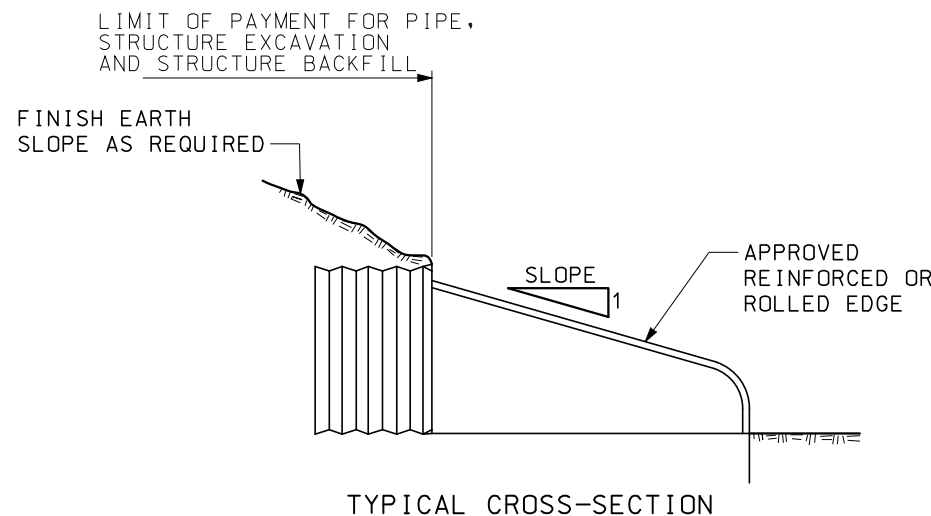
SHEET NO.  
1 OF 3

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END SECTIONS FOR ARCH PIPE										
TYPE	ARCH DIMENSIONS SPAN X RISE	DIAMETER EQUIVALENT ROUND PIPE IN.	GALVANIZED SHEET THICK IN.	DIMENSIONS (IN.)					APPROXIMATE SLOPE (V:H) (1:SLOPE)	TOE PLATE IF SPECIFIED P. (IN.)
				A 1" TOL.	B MAX.	H 1" TOL.	L 1 1/2" TOL.	W 2" TOL.		
B1	SEE STANDARD PLAN 725.00	15	.064	6	9	6	19	30	2 1/8	40
B2		18	.064	7	11	6	23	36	2	46
B3		21	.064	8	12	6	28	42	2 1/8	52
B4		24	.064	8	16	6	32	48	2	58
B5		30	.079	10	16	6	39	60	1 7/8	70
B6 OR B6A		36	.079	12	18	8	46	75	1 3/4	85
B7 OR B7A		42	.109	13	21	9	53	85	1 7/8	107
B8 OR B8A		48	.109	18	26	12	63	90	1 7/8	112
B9 OR B9A		54	.109	18	30	12	70	102	1 7/8	124
B10 OR B10A		60	.109	18	33	12	77	114	1 7/8	136
B11 OR B11A		66	.109	18	36	12	77	126	1 5/8	148
B12 OR B12A		72	.109	18	39	12	77	138	1 1/2	160

END SECTIONS FOR ROUND PIPE									
PIPE DIAMETER (IN.)	GALVANIZED SHEET THICK (IN.)	DIMENSIONS (IN.)					APPROXIMATE SLOPE (V:H) (1:SLOPE)	TOE PLATE IF SPECIFIED P. (IN.)	
		A 1" TOL.	B MAX.	H 1" TOL.	L 1 1/2" TOL.	W 2" TOL.			
12	.064	6	6	6	21	24	2 1/2	34	
15	.064	7	8	6	26	30	2 1/2	40	
18	.064	8	10	6	31	36	2 1/2	46	
21	.064	9	12	6	36	42	2 1/2	52	
24	.064	10	13	6	41	48	2 1/2	58	
30	.079	12	16	8	51	60	2 1/2	70	
36	.079	14	19	9	60	72	2 1/2	94	
42	.109	16	22	11	69	84	2 1/2	106	
48	.109	18	27	12	78	90	2 1/2	112	
54	.109	18	30	12	84	102	2 OR 2 1/4	124	
60	.109	18	33	12	87	114	1 3/4 OR 2	136	
66	.109	18	36	12	87	120	1 1/2 OR 2	144	
72	.109	18	39	12	87	126	1 1/3 OR 2	148	
78	.109	18	42	12	87	132	1 1/4 OR 1 1/2	154	
84	.109	18	45	12	87	138	1 1/6 OR 1 1/2	160	



END SECTION FOR PIPE AND PIPE ARCH

GENERAL NOTES:

MINOR VARIATIONS OF DETAIL AND DIMENSIONS WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

END SECTIONS FABRICATED FROM THICKER METAL THAN INDICATED WILL BE ACCEPTED.

ALL BOLTS SHALL BE 3/8" DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN.

TOE PLATE EXTENSIONS, IF SPECIFIED, SHALL HAVE HOLES TO MATCH HOLES IN TOE PLATE.

SKIRT SECTION IS DEFINED AS THE FLARED PORTION OF THE END SECTION INCLUDING SIDE AND BOTTOM (CENTER) PANELS AND APRON.

SKIRT SECTION FOR 12" THROUGH 24" PIPES SHALL BE MADE IN ONE PIECE.

SKIRT SECTIONS FOR 30" AND LARGER PIPES AND B5 AND LARGER PIPE ARCHES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTIONS FROM 48" AND LARGER PIPES AND B8 OR LARGER PIPE ARCHES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

SKIRT SECTIONS FOR 72" AND LARGER PIPES MAY BE MADE FROM UP TO 4 SHEETS JOINED BY RIVETING AND BOLTING. THE BOTTOM PANEL SHALL BE 2 EQUAL WIDTH SHEETS JOINED ON CENTERLINE.

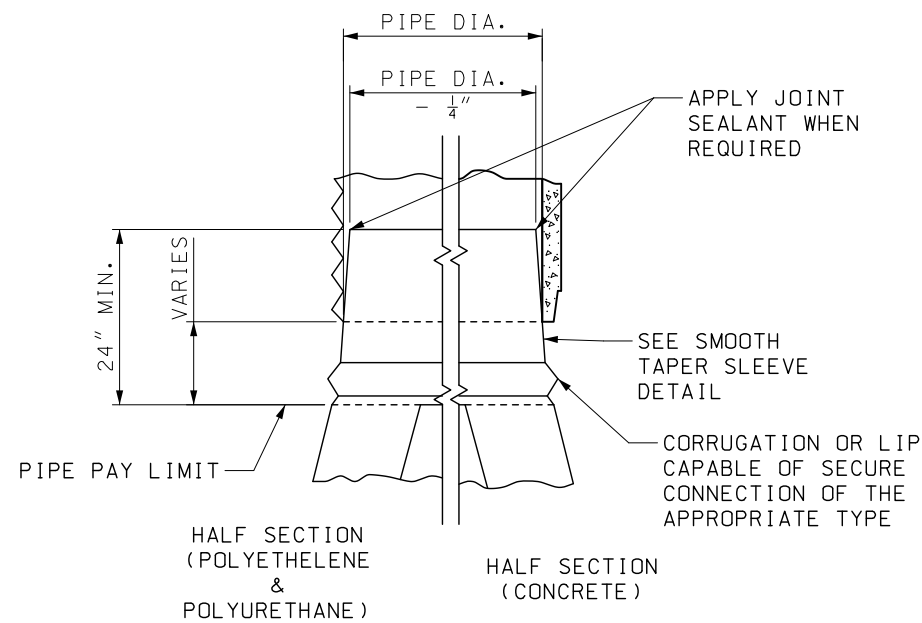
ALL 3 PIECE AND 4 PIECE SKIRTS FOR 60" OR LARGER PIPES AND B10 AND LARGER PIPE ARCHES SHALL HAVE 0.109" THICK SIDES AND 0.138" THICK BOTTOM (CENTER) PANELS. WIDTH OF BOTTOM PANELS SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY CONNECTOR SECTIONS. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.

SEE SHEET 3 OF 3 FOR CONNECTION DETAILS

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>FLARED END SECTION METAL</b></p>
<p>DATE EFFECTIVE: 04/01/2016 DATE PREPARED: 2/11/2016</p>	<p><b>732.00S</b></p>
<p>SHEET NO. 2 OF 3</p>	

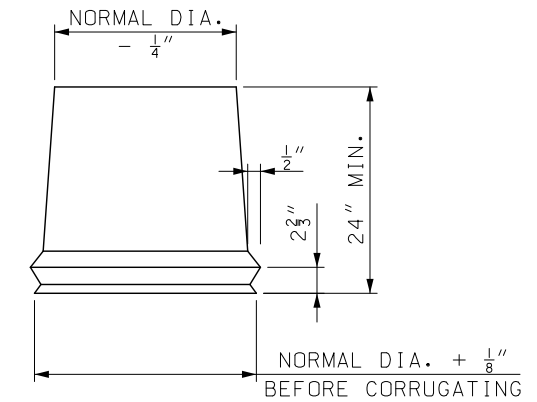
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

CONNECTION REQUIREMENTS					
TYPE	CONNECTION TYPE	ALLOWABLE SIZE RANGE (IN.)	TAPERED SLEEVE REQUIREMENT		
			CMP	RCP PVC	PP PE
SAFETY END SECTION	2	ALL	N	Y	Y
	1	12-24	N	Y	N
METAL FLARED END SECTION	2	ALL	N	Y	N
	3	ALL	N	Y	N
	4	12-24	N	Y	N
	5	12-24	N	Y	N



**TAPERED SLEEVE CONNECTION FOR CONCRETE AND THERMOPLASTIC PIPE**

TAPERED SLEEVE SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.



FORM 1/2" X 2 3/4" CORRUGATIONS. MAINTAIN INSIDE DIAMETER OF SLEEVE. FINISHED END TO BE THE SAME DIAMETER AS CORRUGATED STEEL PIPE DIAMETER. SMOOTH TAPERED SLEEVE DETAIL

**GENERAL NOTES:**

MINOR VARIATIONS OF DETAIL AND DIMENSIONS WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

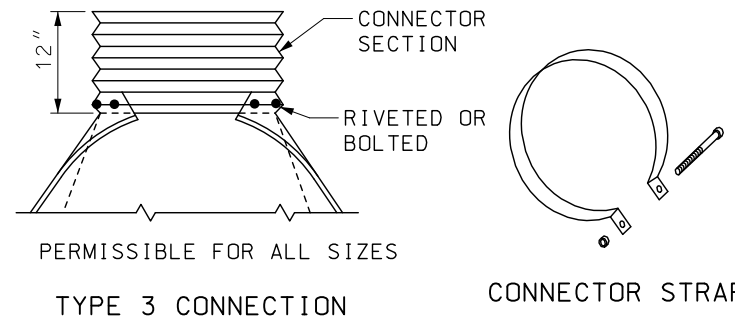
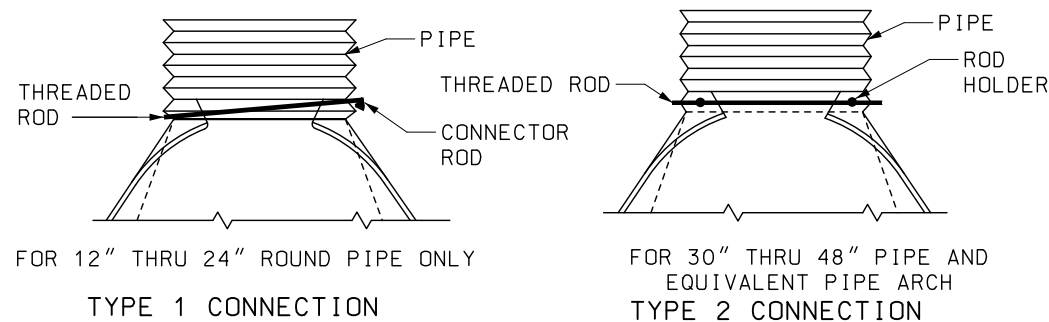
TAPERED SLEEVES SHALL BE FABRICATED FROM SMOOTH 12 GAUGE STEEL COATED IN ACCORDANCE WITH AASHTO M-218.

TAPERED SLEEVES SHALL BE FIRMLY WEDGED INTO THE PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.

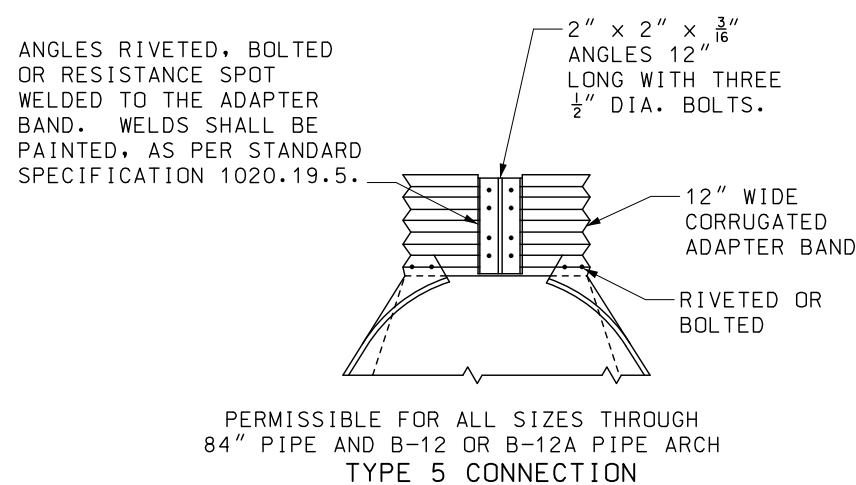
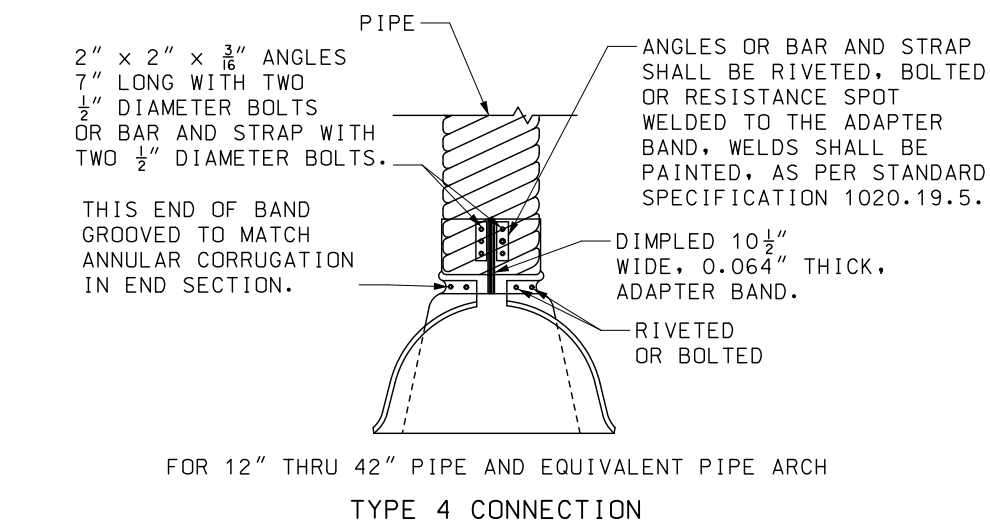
THE LENGTH OF TAPERED SLEEVE SHALL BE SIZED TO PROTECT UV SENSITIVE PIPE MATERIALS FROM SUNLIGHT. THE ENTIRE COST OF THE TAPERED SLEEVE, HARDWARE, AND INSTALLATION SHALL BE INCLUDED IN THE COST OF THE PIPE.

TAPERED SLEEVES SHALL HAVE AT A MINIMUM A HALF CORRUGATION OR LIP DESIGNED TO PROVIDE A SECURE CONNECTION WITH THE END SECTION.

ANY ROD OR STRAP USED FOR MAKING A CONNECTION SHALL BE SECURLY SEATED INTO A VALLEY OF THE PIPE CORRUGATION. THE VALLEY CHOSEN TO HOLD THE ROD OR STRAP SHALL LEAVE AT LEAST ONE FULL INTACT CORRUGATION BEFORE THE END OF THE PIPE. THE FEMALE PORTION OF A BELL END SHALL NOT COUNT AS A FULL INTACT CORRUGATION.



1 INCH WIDE, 0.109" THICK CONNECTOR STRAP OF COMMERCIAL QUALITY STEEL, GALVANIZED WITH SAME WEIGHT COATING AS PIPE, AND 6" X 1/2" GALVANIZED BAND BOLT AND NUT. USE AS ALTERNATE ON TYPE 1 CONNECTION ONLY.

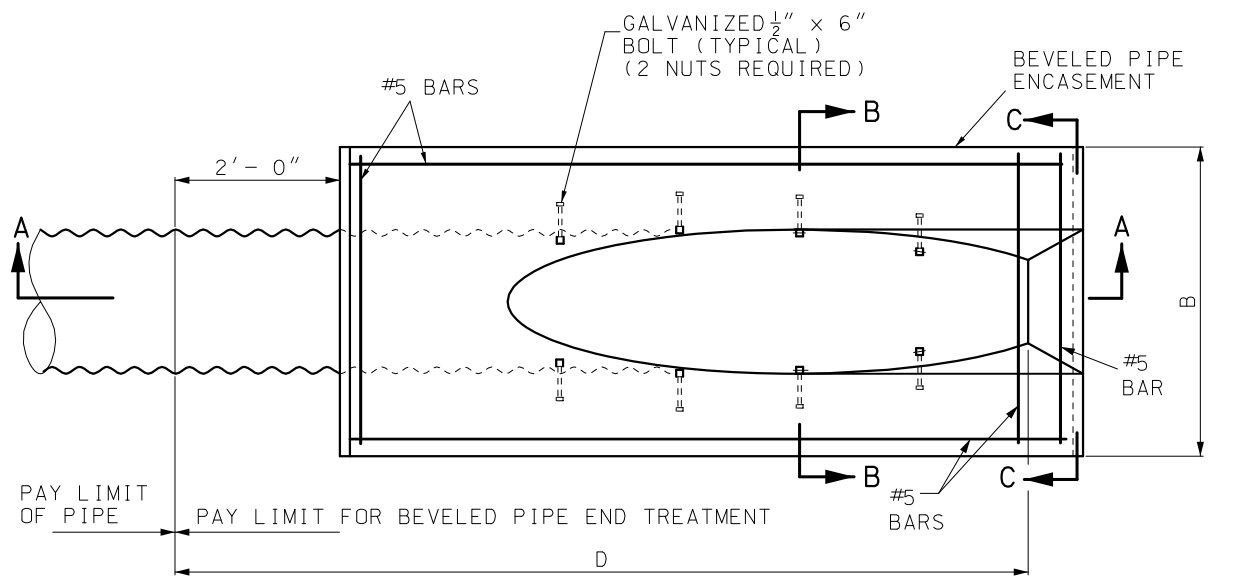


**END SECTION FOR PIPE AND PIPE ARCH**

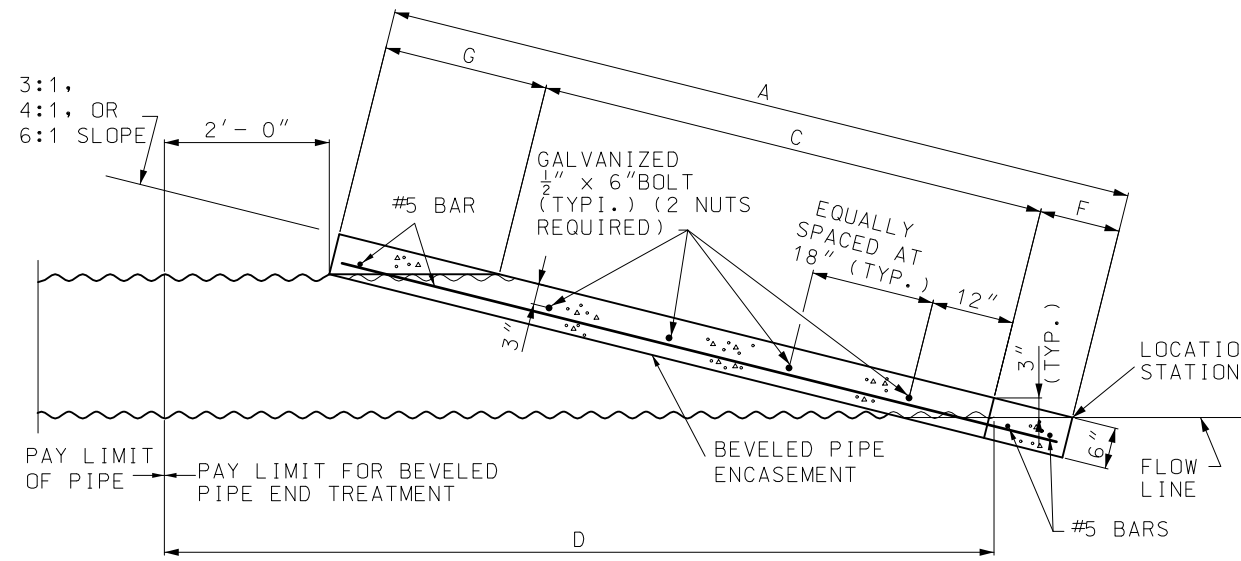
<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>FLARED END SECTION</b></p> <p>METAL</p>
<p>DATE EFFECTIVE: 07/01/2021 DATE PREPARED: 4/29/2021</p>	<p><b>732.00S</b></p> <p>SHEET NO. 3 OF 3</p>

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

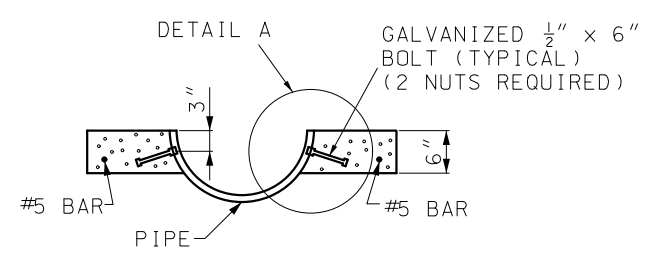
BEVELED PIPE ENCASEMENT DETAILS								
PIPE DIAMETER	SLOPE	A	B	C	D	E	F	G
15"	3:1	5'-5 1/2"	3'-3"	3'-2"	6'-7"	1	9 1/2"	18"
	4:1	7'-2"		4'-1 1/2"	8'-1 1/4"	2	12 1/2"	24"
	6:1	10'-7 1/4"		6'-1"	11'-1 1/2"	3	18 1/4"	36"
18"	3:1	6'-3"	3'-6"	3'-11 1/2"	7'-4"	2	9 1/2"	18"
	4:1	8'-2 1/4"		5'-1 3/4"	9'-1"	3	12 1/2"	24"
	6:1	12'-1 1/2"		7'-7 1/4"	12'-7 1/2"	4	18 1/4"	36"
21"	3:1	7'-1 1/2"	3'-9"	4'-9"	8'-1"	3	9 1/2"	18"
	4:1	9'-2 3/4"		6'-2 1/4"	10'-1 1/4"	3	12 1/2"	24"
	6:1	13'-7 3/4"		9'-1 1/2"	14'-1 1/2"	5	18 1/4"	36"
24"	3:1	7'-10"	4'-0"	5'-6 1/2"	8'-10"	3	9 1/2"	18"
	4:1	10'-3"		7'-2 1/2"	11'-1"	4	12 1/2"	24"
	6:1	15'-2"		10'-7 3/4"	15'-7 1/2"	6	18 1/4"	36"
27"	3:1	8'-7 1/2"	4'-3"	6'-4"	9'-7"	4	9 1/2"	18"
	4:1	11'-3 1/2"		8'-3"	12'-1 1/4"	5	12 1/2"	24"
	6:1	16'-8 1/4"		12'-2"	17'-1 1/2"	7	18 1/4"	36"
30"	3:1	9'-5"	4'-6"	7'-1 1/2"	10'-4"	4	9 1/2"	18"
	4:1	12'-3 3/4"		9'-3 3/4"	13'-1"	6	12 1/2"	24"
	6:1	18'-2 1/2"		13'-8 1/4"	18'-7 1/2"	8	18 1/4"	36"
33"	3:1	10'-2 1/4"	4'-9"	7'-10 3/4"	11'-3 1/4"	5	9 1/2"	18"
	4:1	13'-4 1/4"		10'-3 3/4"	14'-1 1/4"	6	12 1/2"	24"
	6:1	19'-8 3/4"		15'-2 1/2"	20'-1 1/2"	9	18 1/4"	36"
36"	3:1	10'-11 3/4"	5'-0"	8'-8 1/4"	11'-10"	5	9 1/2"	18"
	4:1	14'-4 1/2"		11'-4"	15'-1"	7	12 1/2"	24"
	6:1	21'-3"		16'-8 3/4"	21'-7 1/2"	10	18 1/4"	36"
42"	3:1	12'-6 3/4"	5'-6"	10'-3 1/4"	13'-4"	6	9 1/2"	18"
	4:1	16'-5 1/4"		13'-4 3/4"	17'-1 1/4"	8	12 1/2"	24"
	6:1	24'-3 1/2"		19'-9 1/4"	24'-7 1/2"	13	18 1/4"	36"
48"	3:1	14'-1 3/4"	6'-0"	11'-10 1/4"	14'-10"	7	9 1/2"	18"
	4:1	18'-6"		15'-5 1/2"	19'-1 1/4"	10	12 1/2"	24"
	6:1	27'-4"		22'-9 3/4"	27'-7 1/2"	15	18 1/4"	36"
54"	3:1	15'-8 3/4"	6'-6"	13'-5 1/4"	16'-4"	8	9 1/2"	18"
	4:1	20'-6 3/4"		17'-6 1/4"	21'-1 1/4"	11	12 1/2"	24"
	6:1	30'-4 1/2"		25'-10 1/4"	30'-7 1/2"	17	18 1/4"	36"
60"	3:1	17'-3 3/4"	7'-0"	15'-1 1/4"	17'-10"	9	9 1/2"	18"
	4:1	22'-7 1/2"		19'-7"	23'-1 1/4"	12	12 1/2"	24"
	6:1	33'-5"		28'-10 3/4"	33'-7 1/2"	19	18 1/4"	36"



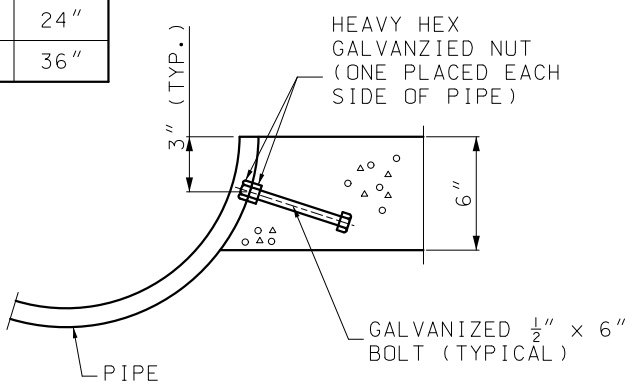
PLAN VIEW FOR HIGHWAYS



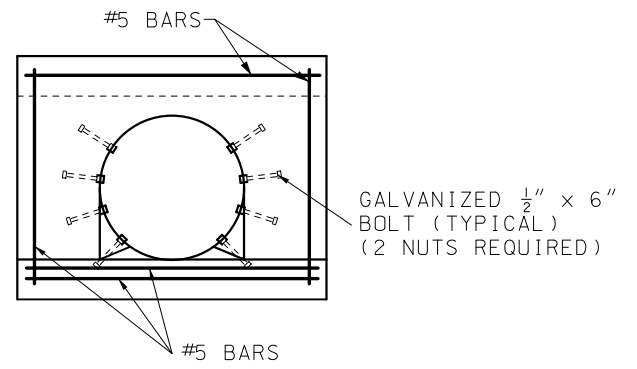
SECTION A-A



SECTION B-B



DETAIL A



SECTION C-C

GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.

REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL PIPE.

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

THE 1/2\"/>

BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF 1/2\"/>

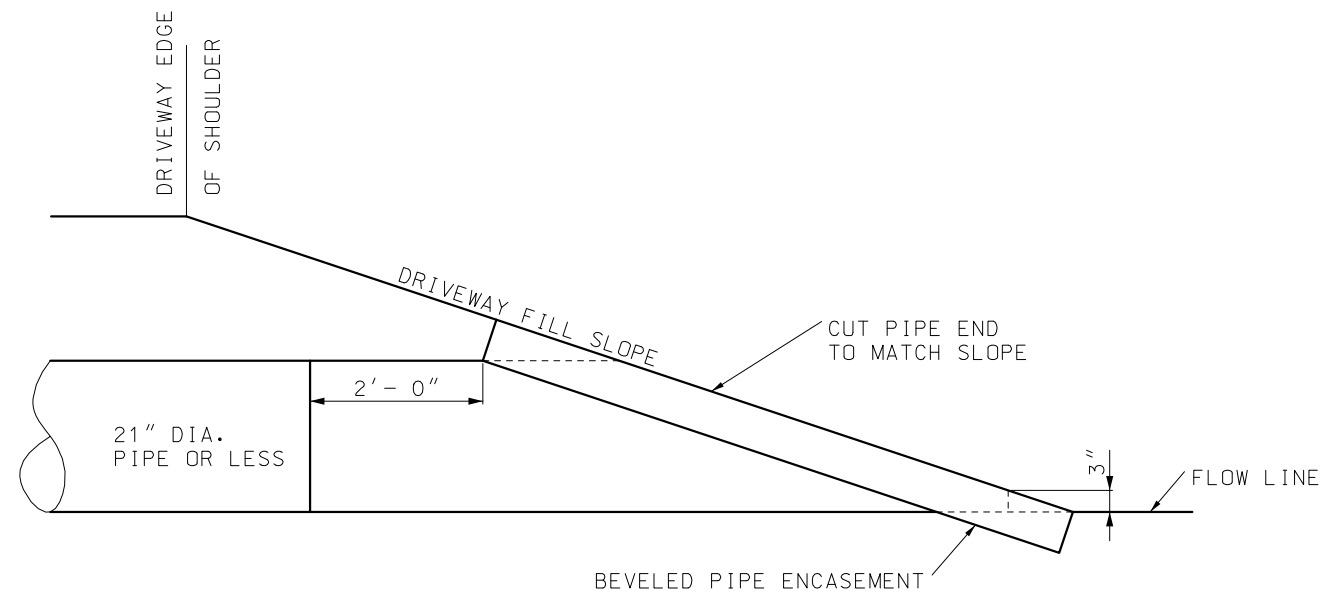
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**BEVELED PIPE END TREATMENT FOR HIGHWAYS**

DATE EFFECTIVE: 01/01/2021	<b>732.05D</b>	SHEET NO. 1 OF 2
DATE PREPARED: 10/14/2020		

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



## PIPE END DETAILS FOR PARALLEL DRAINAGE STRUCTURES FOR DRIVEWAYS

(SINGLE PIPE INSTALLATION)

### NOTE:

FOR MULTIPLE PIPE INSTALLATIONS, END SECTIONS WITH SAFETY BARS SYSTEM OR OPTIONAL BAR GATE SYSTEM SHALL BE PROVIDED. SEE STANDARD PLAN 732.10.

SEE DRIVEWAY STANDARD PLANS FOR BEVELED END SECTION REQUIREMENTS.

### GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.



REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

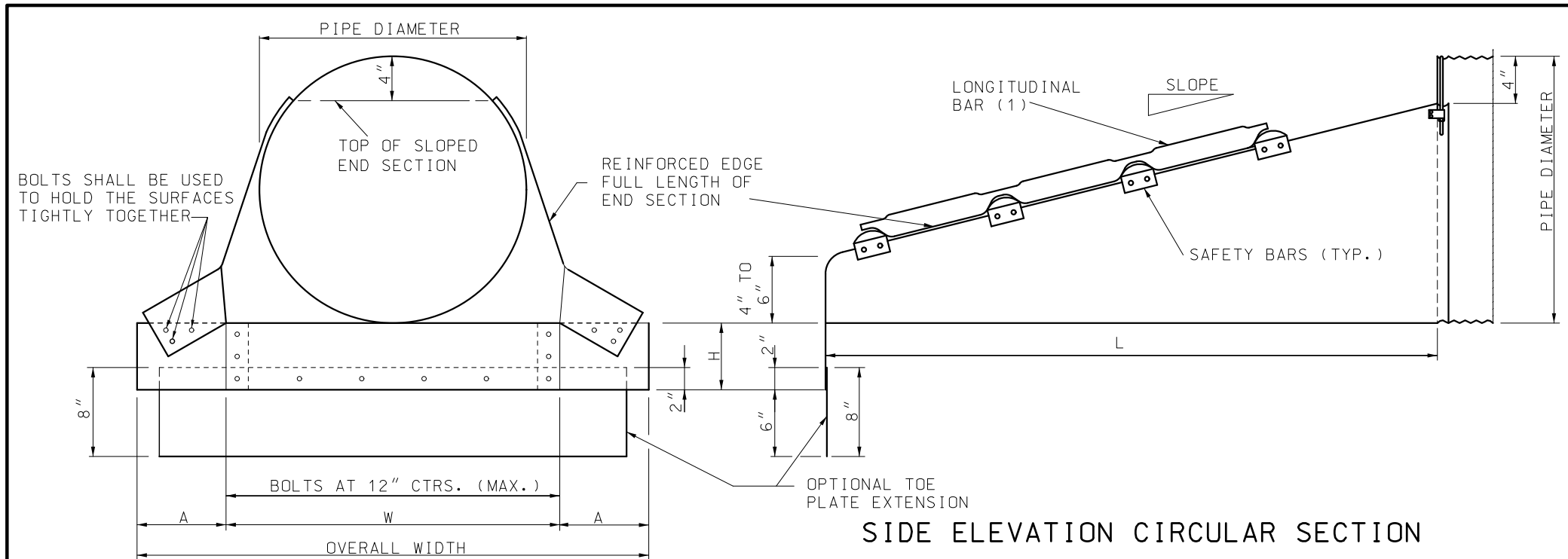
BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL PIPE.

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

THE  $\frac{1}{2}$ " x 6" BOLT AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 (ASTM A153), CLASS C SPECIFICATIONS. LOW CARBON STEEL ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 36.

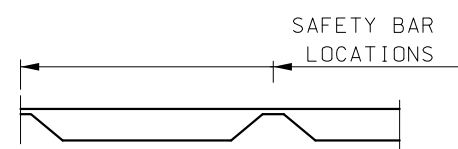
BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF  $\frac{1}{2}$ " x 6" GALVANIZED BOLTS. THE  $\frac{1}{2}$ " x 6" GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI          TRAVIS D. KOESTNER          NUMBER PE-30042          PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<h3>BEVELED PIPE END TREATMENT FOR DRIVEWAYS</h3>
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<h2>732.05D</h2>
SHEET NO. 2 OF 2	

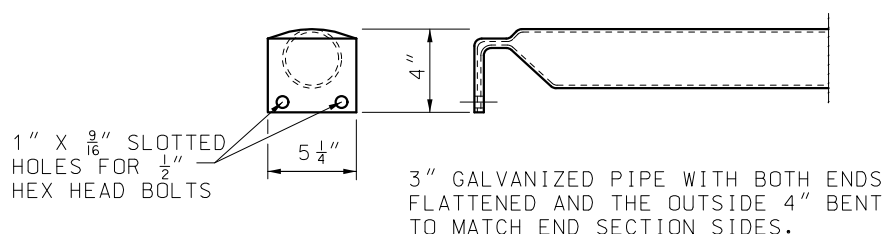


FRONT VIEW CIRCULAR PIPE

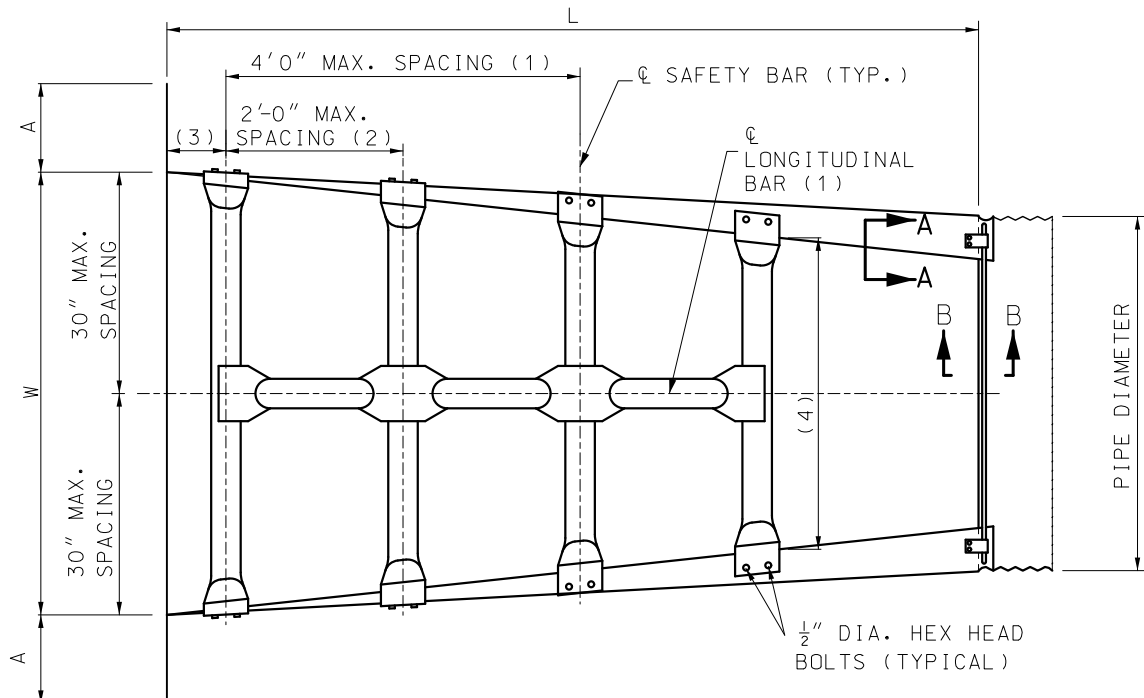
SIDE ELEVATION CIRCULAR SECTION



LONGITUDINAL BAR DETAIL



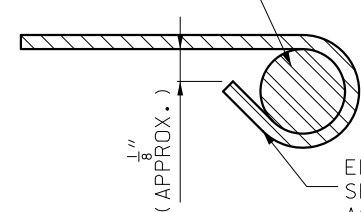
DETAIL OF SAFETY BAR



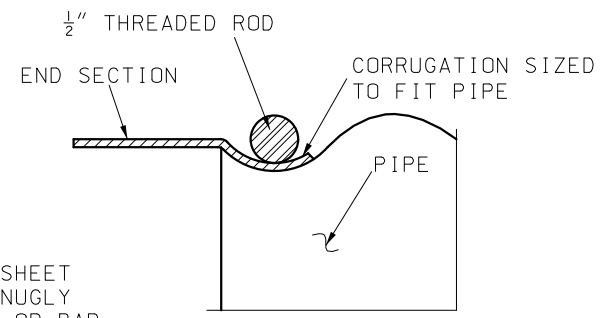
TOP VIEW CIRCULAR SECTION

LONGITUDINAL BAR, WHEN REQUIRED, SHALL BE WELDED TO SAFETY BARS TO FORM SINGLE GRATE STRUCTURE. LONGITUDINAL BAR IS NOT TO BE USED FOR PARALLEL DRAINAGE STRUCTURES.

MINIMUM 7/16" DIAMETER GALVANIZED STEEL ROD OR NO. 4 GALVANIZED REINFORCED BAR



SECTION A-A



SECTION B-B

- NOTES:
- (1) FOR CROSSROAD DRAINAGE STRUCTURES ONLY.
  - (2) FOR PARALLEL DRAINAGE STRUCTURES ONLY.
  - (3) 4" TO 6" MINIMUM
  - (4) SAFETY BARS SHALL BE PROVIDED UNTIL THE LATERAL SPAN OF THE OPENING IS LESS THAN OR EQUAL TO 30".

GENERAL NOTES:

END SECTIONS, INCLUDING ALL BOLTS, NUTS, RODS AND STRAPS, SHALL BE FABRICATED FROM GALVANIZED STEEL MEETING THE REQUIREMENTS OF SECTION 1020.

ALL BOLTS UNLESS OTHERWISE SHOWN SHALL BE ASTM A307 BOLTS.

WHEN REQUIRED, OPTIONAL TOE PLATE EXTENSION SHALL BE PUNCHED OR DRILLED AND BOLTED TO END SECTION TOE PLATE. STEEL FOR TOE PLATE EXTENSION SHALL BE SAME GAUGE AS END SECTION. DIMENSIONS SHALL BE OVERALL WIDTH LESS 6" BY 8" HIGH.

ATTACHMENT TO CIRCULAR PIPES 15" THROUGH 24" DIAMETER SHALL BE MADE WITH TYPE #1 STRAPS. ALL OTHER SIZES SHALL BE ATTACHED WITH TYPE #2 CONNECTORS.

SAFETY BARS AND LONGITUDINAL BARS SHALL BE FABRICATED FROM STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A-53 SCHEDULE 40 SPECIFICATIONS. SAFETY BARS AND LONGITUDINAL BARS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1020 OF STANDARD SPECIFICATIONS.

INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 725 AND 732 OF THE STANDARD SPECIFICATIONS.

SLOTTED HOLES FOR SAFETY BAR ATTACHMENT SHALL BE PROVIDED FOR ALL END SECTIONS.

MINOR VARIATIONS OF DETAIL WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

END SECTIONS FABRICATED FROM THICKER METAL THAN INDICATED WILL BE ACCEPTED.

ALL BOLTS SHALL BE 3/8" DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN.

SKIRT SECTION IS DEFINED AS THE FLARED PORTION OF THE END SECTION INCLUDING SIDE AND BOTTOM (CENTER) PANELS AND APRON.

SKIRT SECTION FOR 12" TROUGH 24" PIPES SHALL BE MADE IN ONE PIECE.

SKIRT SECTIONS FOR 30" AND LARGER PIPES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTIONS FROM 48" AND LARGER PIPES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

ALL 3 PIECE SKIRTS FOR 60" PIPES SHALL HAVE 0.109" THICK SIDES AND 0.138" THICK BOTTOM (CENTER) PANELS. WIDTH OF BOTTOM PANELS SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY CONNECTOR SECTION. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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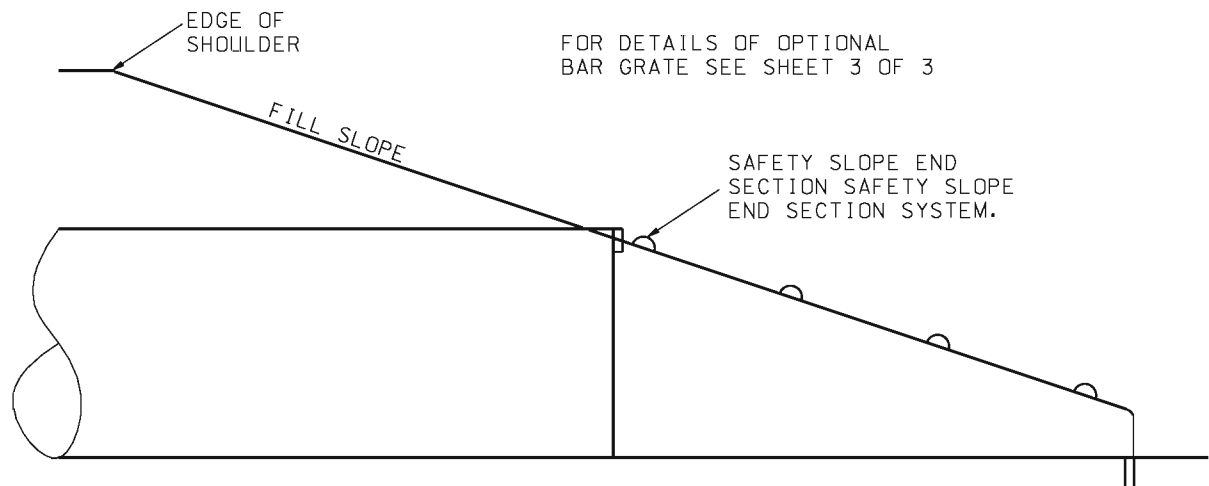
STATE OF MISSOURI  
TRAVIS D. KOESTNER  
NUMBER PE-30042  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**SAFETY SLOPE END SECTION**

DATE EFFECTIVE: 01/01/2021	<b>732.10H</b>	SHEET NO.
DATE PREPARED: 10/14/2020		1 OF 3


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



**PIPE END DETAILS FOR DRAINAGE STRUCTURES**  
(SINGLE PIPE INSTALLATION)


NOTE:  
SEE DRIVEWAY STANDARD PLANS FOR  
BEVELED END SECTION REQUIREMENT.  
FOR CONNECTION DETAILS, SEE 732.00  
SHEET 3 OF 3.

METAL END SECTIONS FOR CIRCULAR PIPES												
PIPE DIA. (IN.)	MIN. GAUGE ENDS (IN.) 4:1 & 6:1	MIN. GAUGE ENDS (IN.) 10:1	DIMENSIONS IN INCHES				L DIMENSIONS					
			A 1" TOL.	H 1" TOL.	W 2" TOL.	OVERALL WIDTH	SLOPE	LENGTH (IN.)	SLOPE	LENGTH (IN.)	SLOPE	LENGTH (IN.)
15	16	12	8	6	21	37	4:1	20	6:1	30	10:1	70
18	16	12	8	6	24	40	4:1	32	6:1	48	10:1	100
21	16	12	8	6	27	43	4:1	44	6:1	66	10:1	130
24	16	12	8	6	30	46	4:1	56	6:1	84	10:1	160
30	12		12	9	36	60	4:1	80	6:1	120	10:1	220
36	12		12	9	42	66	4:1	104	6:1	156	10:1	280
42	12		16	12	48	80	4:1	128	6:1	192		
48	12		16	12	54	86	4:1	152	6:1	228		
54	12		16	12	60	92	4:1	176	6:1	264		
60	12		16	12	66	98	4:1	200	6:1	300		



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
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JEFFERSON CITY, MO 65102  
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**SAFETY SLOPE END SECTION**



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**DATE EFFECTIVE: 06/01/2013**  
**DATE PREPARED: 4/1/2013**

**732.10H**

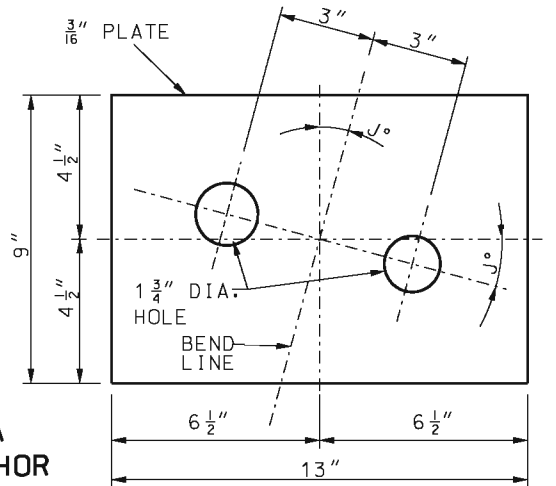
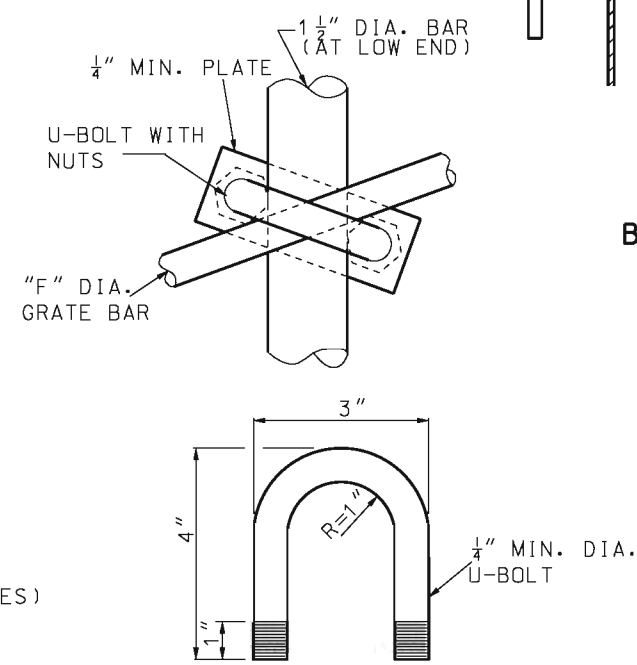
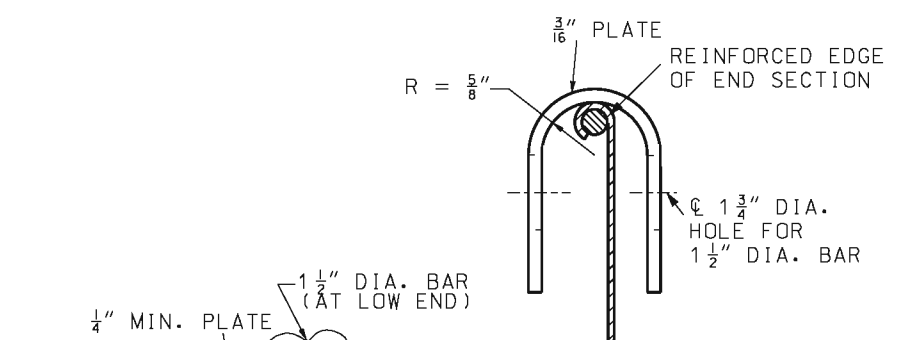
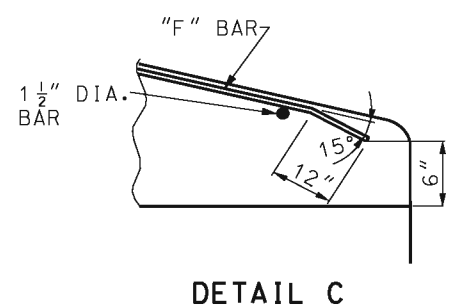
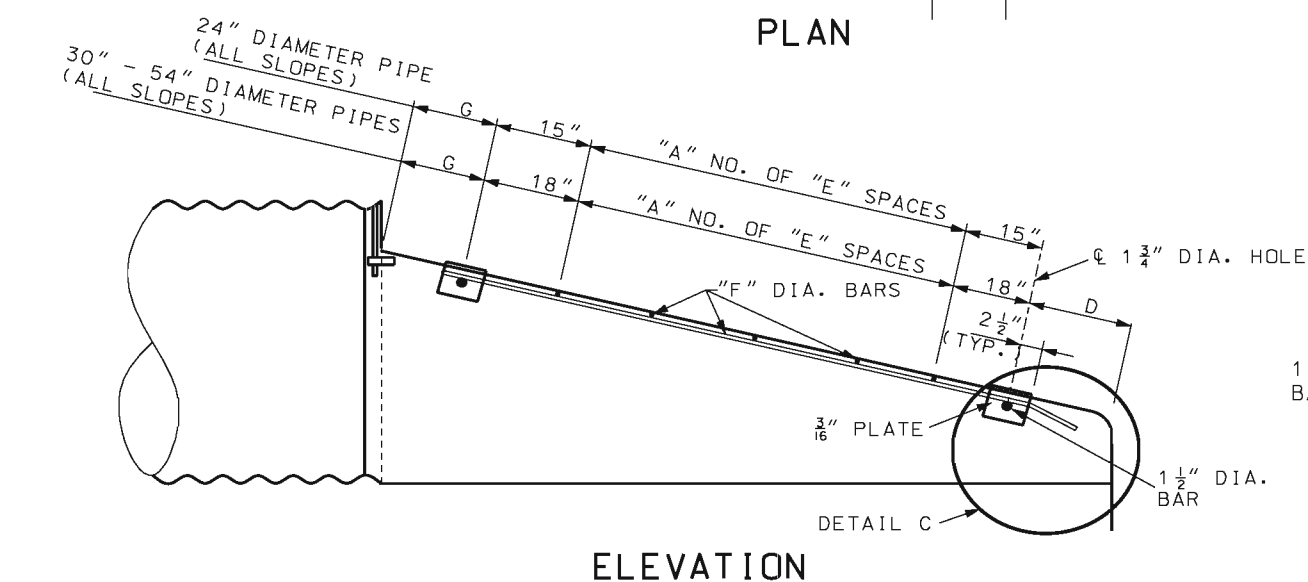
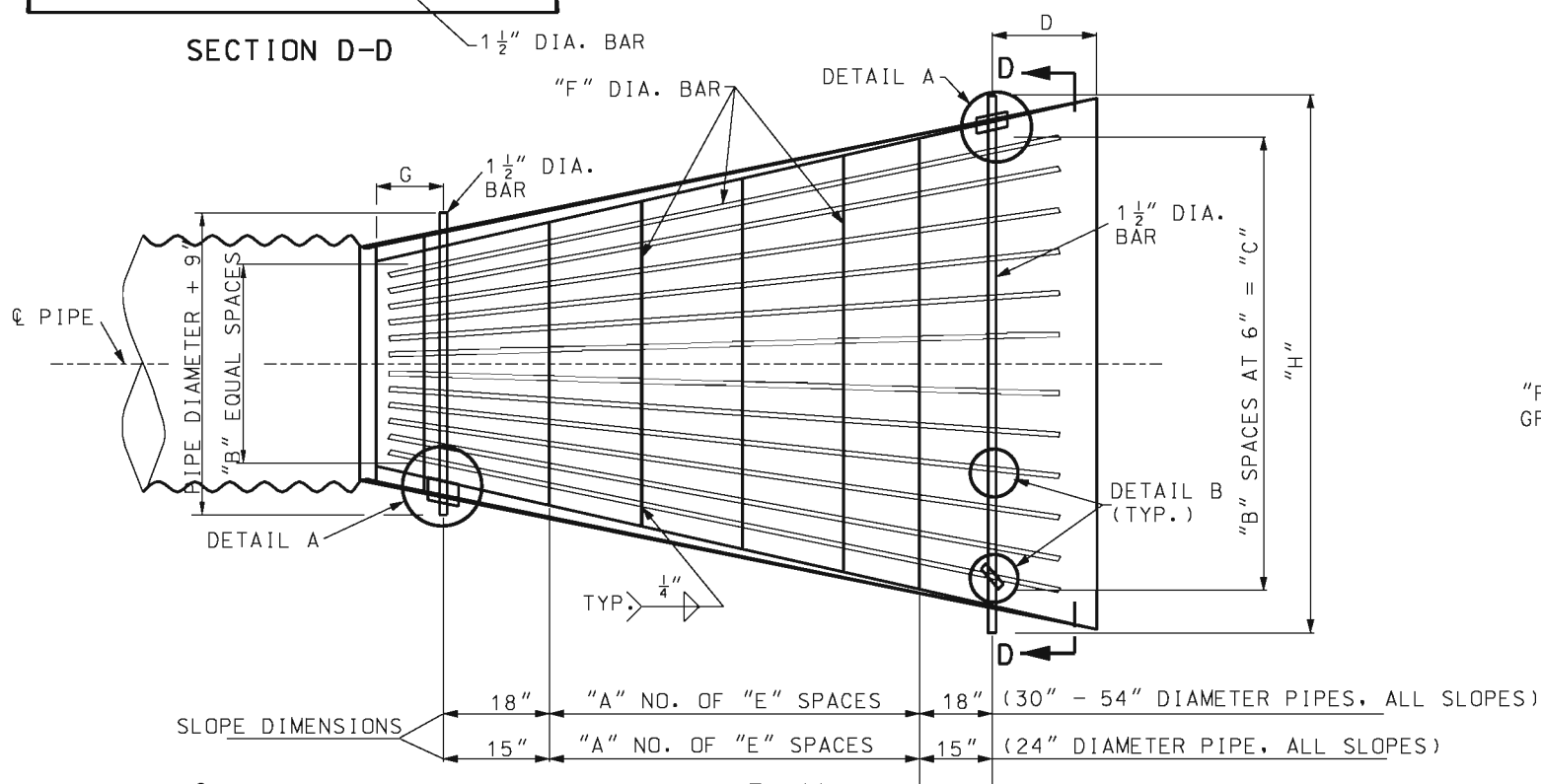
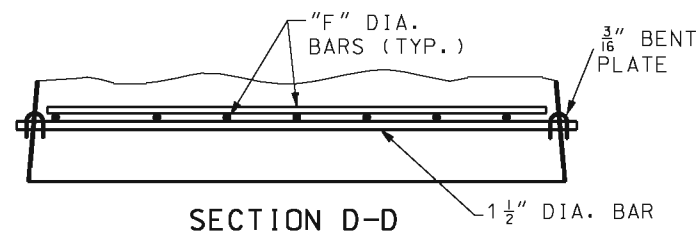
SHEET NO.  
**2 OF 3**

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

**BAR GRATE SYSTEM DATA**

DRAIN PIPE SIZE	3:1 SLOPE									4:1 SLOPE									6:1 SLOPE								
	A	B	C	D	E	"F" BARS	G	H	J	A	B	C	D	E	"F" BARS	G	H	J	A	B	C	D	E	"F" BARS	G	H	J
15"*																											
18"*																											
21"*																											
24"	0	4	2'-0"	6"	15"	$\frac{5}{8}$ "	8 $\frac{1}{4}$ "	3'-3"	18.4°	0	4	2'-0"	15 $\frac{3}{4}$ "	15"	$\frac{5}{8}$ "	12"	3'-3"	14°	2	4	2'-0"	13 $\frac{1}{8}$ "	15"	$\frac{5}{8}$ "	12"	3'-3"	9.5°
30"	0	5	2'-6"	15 $\frac{1}{4}$ "	18"	$\frac{5}{8}$ "	12"	3'-9"	18.4°	1	5	2'-6"	16 $\frac{1}{2}$ "	18"	$\frac{5}{8}$ "	12"	3'-9"	14°	3	5	2'-6"	19 $\frac{5}{8}$ "	18"	$\frac{5}{8}$ "	12"	3'-9"	9.5°
36"	1	6	3'-0"	16 $\frac{1}{4}$ "	18"	$\frac{3}{4}$ "	12"	4'-3"	18.4°	2	6	3'-0"	18"	18"	$\frac{3}{4}$ "	17 $\frac{1}{4}$ "	4'-3"	14°	5	6	3'-0"	20 $\frac{1}{8}$ "	18"	$\frac{3}{4}$ "	12"	4'-3"	9.5°
42"	2	7	3'-6"	17 $\frac{1}{4}$ "	18"	1"	12"	4'-9"	18.4°	4	7	3'-6"	12"	18"	1"	12"	4'-9"	14°	7	7	3'-6"	11 $\frac{7}{8}$ "	18"	1"	9"	4'-9"	10.1°
48"	3	8	4'-0"	18"	18"	1"	12 $\frac{5}{8}$ "	5'-3"	18.4°	5	8	4'-0"	18"	18"	1"	12 $\frac{5}{8}$ "	5'-3"	14°	7	8	4'-0"	13"	18"	1"	9"	5'-3"	11.9°
54"	4	9	4'-6"	18"	18"	1 $\frac{1}{8}$ "	13 $\frac{3}{8}$ "	5'-9"	18.4°	6	9	4'-6"	18"	18"	1 $\frac{1}{8}$ "	19 $\frac{3}{8}$ "	5'-9"	14°	7	9	4'-6"	14 $\frac{1}{4}$ "	18"	1 $\frac{1}{8}$ "	9"	5'-9"	13.7°

\* BAR GRATE SYSTEM IS NOT REQUIRED FOR DRAIN PIPE DIAMETER OF 21" OR LESS, FOR SINGLE PIPE INSTALLATIONS.



**GENERAL NOTES:**


ALL STEEL MATERIAL FOR BAR GRATE SYSTEM SHALL BE IN ACCORDANCE WITH ASTM A575 GRADE 1020 STEEL.

ALL MATERIAL IN GRATE SYSTEM SHALL BE GALVANIZED.

GALVANIZING SHALL BE DONE IN ACCORDANCE WITH ASTM A123.

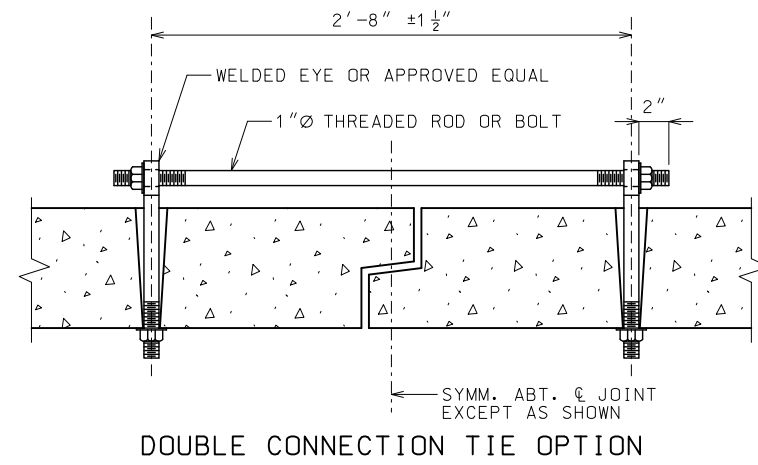
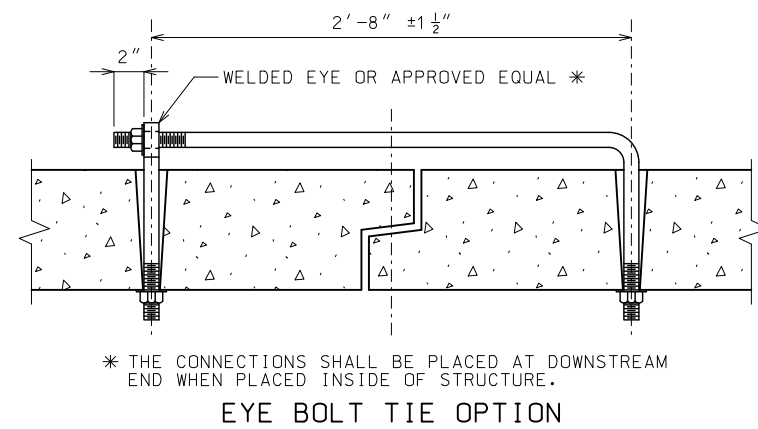
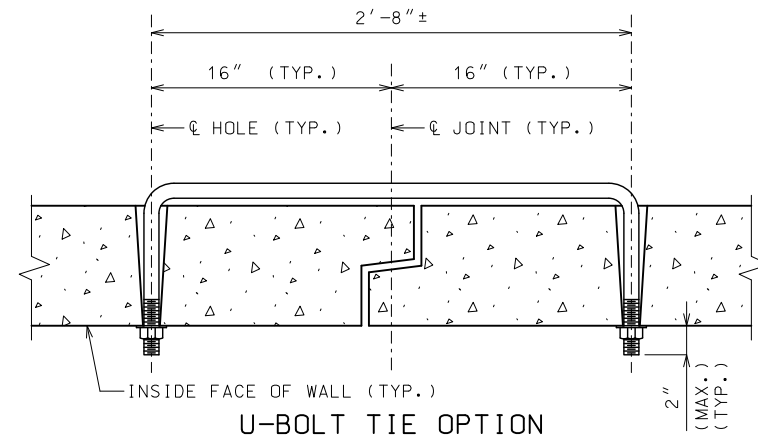
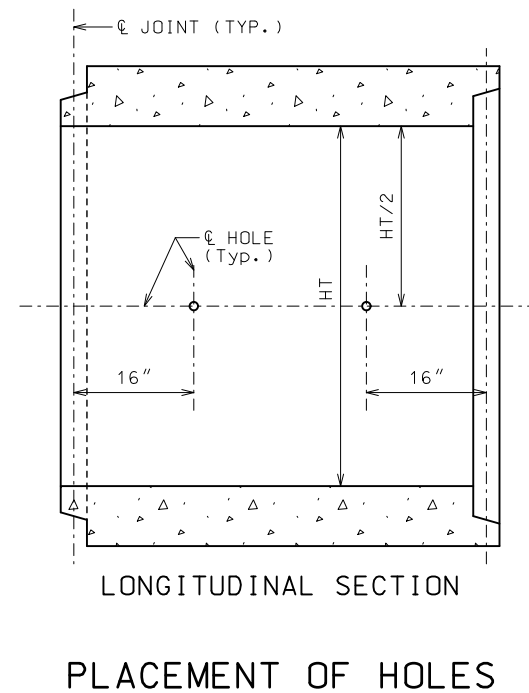
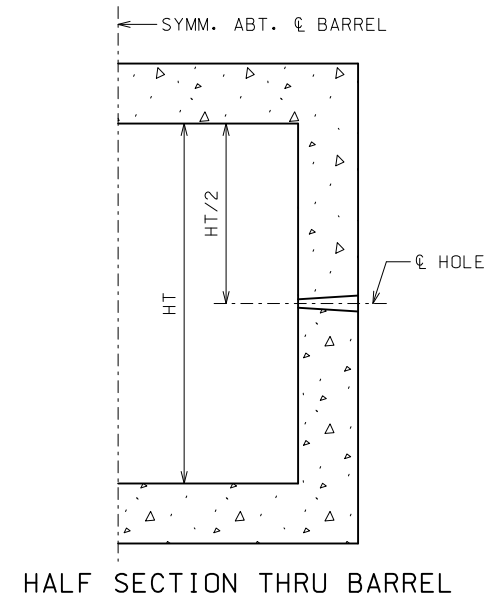
ALL MATERIALS, FABRICATION AND INSTALLATION OF OPTIONAL BAR GRATE SYSTEM USED IN LIEU OF SAFETY BAR SYSTEM SHALL BE INCLUDED IN CONTRACT UNIT PRICE BID FOR END SECTION (SAFETY SLOPE).


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

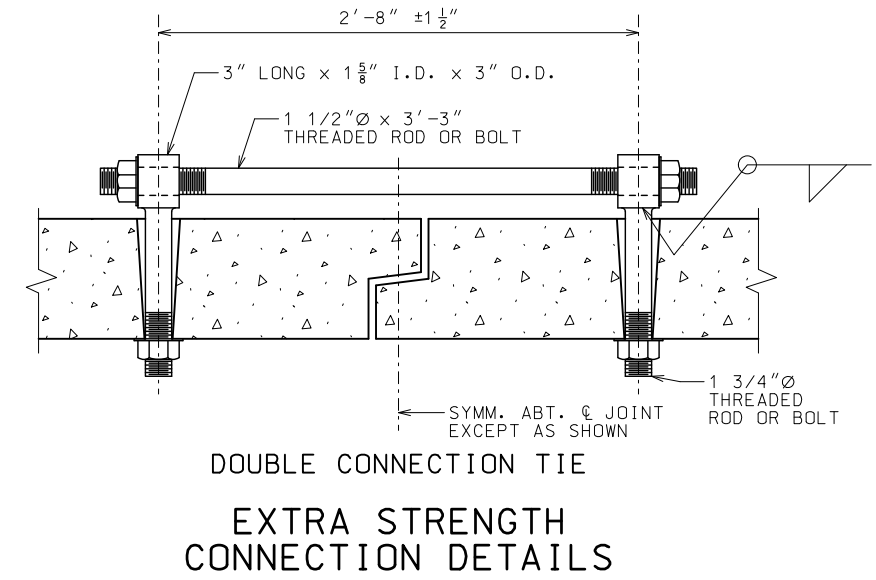
  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**OPTIONAL BAR GRATE SYSTEM FOR SAFETY SLOPE END SECTION**

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



REGULAR STRENGTH CONNECTION DETAILS



**GENERAL NOTES:**

TIES SHALL BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

ALL PARTS OF THE TIE ASSEMBLY EXCEPT FOR ANCHORAGE SHALL BE LOCATED ON THE FILL FACE. ANCHORAGE THAT IS DIFFERENT THAN SHOWN SHALL BE APPROVED BY THE ENGINEER.

TIES SHALL ONLY BE USED FOR CONNECTING ADJACENT PRECAST SECTIONS. TIES ARE NOT TO BE USED TO CONNECT PRECAST TO CAST-IN-PLACE SECTIONS.

**HOLES:**

HOLES SHALL BE CAST OR DRILLED 16 INCHES FROM CENTERLINE OF JOINT AS SHOWN, UNLESS FORMS ARE SET UP FOR 16-INCH SPACING FROM OUTSIDE OF JOINT.

TAPERED HOLES ARE PERMITTED WHEN PRECAST.

**REGULAR STRENGTH CONNECTIONS:**


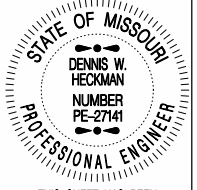
REGULAR STRENGTH CULVERT TIES SHALL BE 1" Ø THREADED RODS.

TIE RODS FOR REGULAR STRENGTH CONNECTIONS SHALL BE GALVANIZED IN ACCORDANCE WITH SEC 1081.

**EXTRA STRENGTH CONNECTIONS:**

THREADED RODS FOR EXTRA STRENGTH CONNECTIONS SHALL BE STAINLESS STEEL IN ACCORDANCE WITH ASTM A193 OR A320.

NUTS FOR EXTRA STRENGTH CONNECTIONS SHALL BE STAINLESS STEEL IN ACCORDANCE WITH ASTM A194 AND OF GRADE EQUIVALENT TO GRADE USED FOR THREADED RODS.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI DENNIS W. HECKMAN NUMBER PE-27141 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>PRECAST CONCRETE BOX CULVERT TIES</b></p>
DATE EFFECTIVE: 07/01/2021 DATE PREPARED: 5/3/2021	<p>733.00</p>
SHEET NO. 1 OF 1	

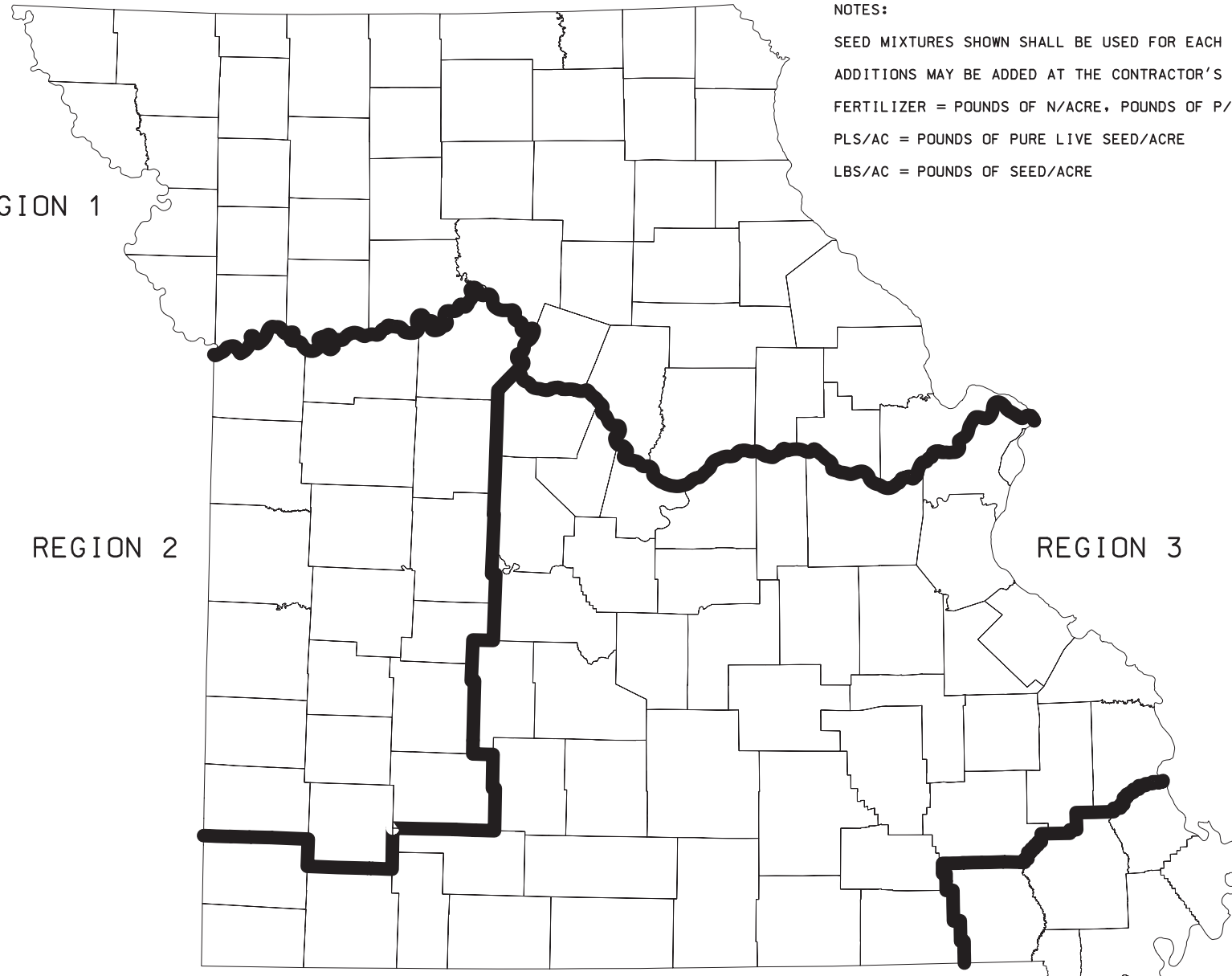
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



REGION 1			
COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME: 0 LBS ENM/AC	FERTILIZER: 80N, 160P, 80K	LIME: 0 LBS ENM/AC	FERTILIZER: 40N, 80P, 40K
SEED MIXTURE	ADDITIONS	SEED MIXTURE	ADDITIONS
COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC	COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC
COOL SEASON TALL FESCUE 70 LBS/AC KENTUCKY BLUEGRASS 20 LBS/AC PERENNIAL RYEGRASS 10 LBS/AC BUFFALO GRASS 15 PLS/AC RED TOP 4 LBS/AC	COOL SEASON ORCHARDGRASS 20 LBS/AC TIMOTHY 10 LBS/AC RED FESCUE 20 LBS/AC SMOOTH BROME 10 LBS/AC	WARM SEASON BUFFALO GRASS 15 PLS/AC BIG BLUESTEM 10 PLS/AC LITTLE BLUESTEM 5 PLS/AC INDIAN GRASS 10 PLS/AC SIDE OATS GRAMA 5 PLS/AC SWITCH GRASS 3 PLS/AC RED TOP 2 PLS/AC PERENNIAL RYEGRASS 10 PLS/AC	WARM SEASON RED FESCUE 5 LBS/AC PRAIRIE COROGRASS 10 PLS/AC PRAIRIE DROPSEED 2 PLS/AC RIVER OATS 10 PLS/AC
LEGUME WHITE CLOVER 8 LBS/AC	LEGUME RED CLOVER 5 LBS/AC ALSIKE CLOVER 4 LBS/AC	LEGUME WHITE CLOVER 5 LBS/AC	LEGUME RED CLOVER 5 LBS/AC
TOTAL SEED/ACRE 148		WILDFLOWER / POLLINATOR LANCELEAF COREOPSIS 0.5 LBS/AC BLACK EYED SUSAN 0.5 LBS/AC GRAY HEADED CONEFLOWER 1 LBS/AC PURPLE CONEFLOWER 2 LBS/AC NEW ENGLAND ASTER 0.25 LBS/AC COMMON MILKWEED 0.5 LBS/AC SWAMP MILKWEED 0.25 LBS/AC WHITE PRAIRIE CLOVER 0.25 LBS/AC PURPLE PRAIRIE CLOVER 0.25 LBS/AC PARTRIDGE PEA 0.5 LBS/AC	WILDFLOWER GOLDEN ALEXANDERS 0.25 LBS/AC SKY BLUE ASTER 0.25 LBS/AC PRAIRIE BLAZING STAR 0.25 LBS/AC
		TOTAL SEED/ACRE 92	

REGION 2			
COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME: 1000 LBS ENM/AC	FERTILIZER: 80N, 80P, 80K	LIME: 600 LBS ENM/AC	FERTILIZER: 40N, 40P, 40K
SEED MIXTURE	ADDITIONS	SEED MIXTURE	ADDITIONS
COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC	COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC
COOL SEASON TALL FESCUE 70 LBS/AC KENTUCKY BLUEGRASS 10 LBS/AC PERENNIAL RYEGRASS 10 LBS/AC BUFFALO GRASS 15 PLS/AC RED TOP 4 LBS/AC BERMUDA GRASS 10 LBS/AC	COOL SEASON ORCHARDGRASS 20 LBS/AC TIMOTHY 10 LBS/AC RED FESCUE 20 LBS/AC SMOOTH BROME 10 LBS/AC	WARM SEASON BUFFALO GRASS 15 PLS/AC BIG BLUESTEM 10 PLS/AC LITTLE BLUESTEM 5 PLS/AC INDIAN GRASS 10 PLS/AC SIDE OATS GRAMA 5 PLS/AC SWITCH GRASS 3 PLS/AC RED TOP 2 PLS/AC PERENNIAL RYEGRASS 10 PLS/AC	WARM SEASON RED FESCUE 5 LBS/AC PRAIRIE COROGRASS 10 PLS/AC PRAIRIE DROPSEED 2 PLS/AC RIVER OATS 10 PLS/AC
LEGUME WHITE CLOVER 8 LBS/AC	LEGUME RED CLOVER 5 LBS/AC ALSIKE CLOVER 4 LBS/AC	LEGUME WHITE CLOVER 5 LBS/AC	LEGUME RED CLOVER 5 LBS/AC
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		TOTAL SEED/ACRE 92	


REGION 3			
COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME: 1500 LBS ENM/AC	FERTILIZER: 80N, 240P, 80K	LIME: 1000 LBS ENM/AC	FERTILIZER: 40N, 120P, 40K
SEED MIXTURE	ADDITIONS	SEED MIXTURE	ADDITIONS
COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC	COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC
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LEGUME WHITE CLOVER 8 LBS/AC	LEGUME RED CLOVER 5 LBS/AC ALSIKE CLOVER 4 LBS/AC	LEGUME WHITE CLOVER 5 LBS/AC	LEGUME RED CLOVER 5 LBS/AC
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		TOTAL SEED/ACRE 92	



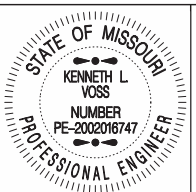
NOTES:  
SEED MIXTURES SHOWN SHALL BE USED FOR EACH REGION.  
ADDITIONS MAY BE ADDED AT THE CONTRACTOR'S DISCRETION FOR NO DIRECT PAY.  
FERTILIZER = POUNDS OF N/ACRE, POUNDS OF P/ACRE, POUNDS OF K/ACRE  
PLS/AC = POUNDS OF PURE LIVE SEED/ACRE  
LBS/AC = POUNDS OF SEED/ACRE

REGION 4			
COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME: 0 LBS ENM/AC	FERTILIZER: 80N, 160P, 80K	LIME: 0 LBS ENM/AC	FERTILIZER: 40N, 80P, 40K
SEED MIXTURE	ADDITIONS	SEED MIXTURE	ADDITIONS
COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC	COVER CROP ANNUAL RYEGRASS 5 LBS/AC TEFF GRASS 4 LBS/AC GERMAN MILLET 2 LBS/AC OATS 10 LBS/AC	COVER CROP VIRGINIA RYE 5 LBS/AC CANADA RYE 5 LBS/AC WHEAT GRAIN 10 LBS/AC
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TOTAL SEED/ACRE 148		WILDFLOWER / POLLINATOR LANCELEAF COREOPSIS 0.5 LBS/AC BLACK EYED SUSAN 0.5 LBS/AC GRAY HEADED CONEFLOWER 1 LBS/AC PURPLE CONEFLOWER 2 LBS/AC NEW ENGLAND ASTER 0.25 LBS/AC COMMON MILKWEED 0.5 LBS/AC SWAMP MILKWEED 0.25 LBS/AC WHITE PRAIRIE CLOVER 0.25 LBS/AC PURPLE PRAIRIE CLOVER 0.25 LBS/AC PARTRIDGE PEA 0.5 LBS/AC	WILDFLOWER GOLDEN ALEXANDERS 0.25 LBS/AC SKY BLUE ASTER 0.25 LBS/AC PRAIRIE BLAZING STAR 0.25 LBS/AC
		TOTAL SEED/ACRE 92	

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
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JEFFERSON CITY, MO 65102  
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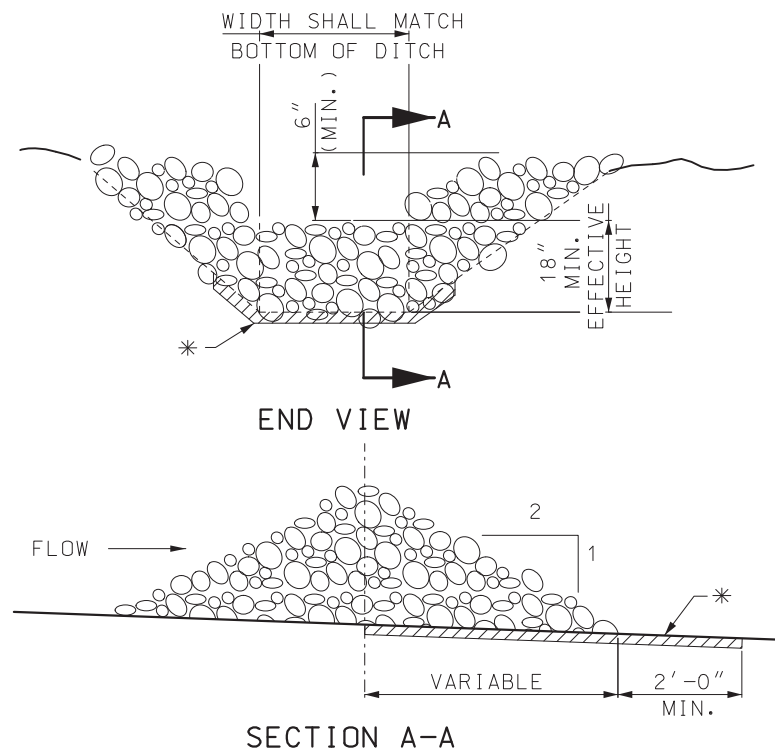
**SEEDING**



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 4/1/2024	SHEET NO. 1 OF 1
DATE PREPARED: 1/16/2024	<b>805.00A</b>

### ROCK DITCH CHECK



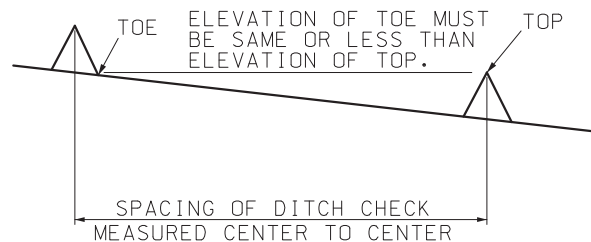
\* GEOTEXTILE LINING MAY BE INSTALLED AS REQUIRED BY THE ENGINEER.

NOTE:

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

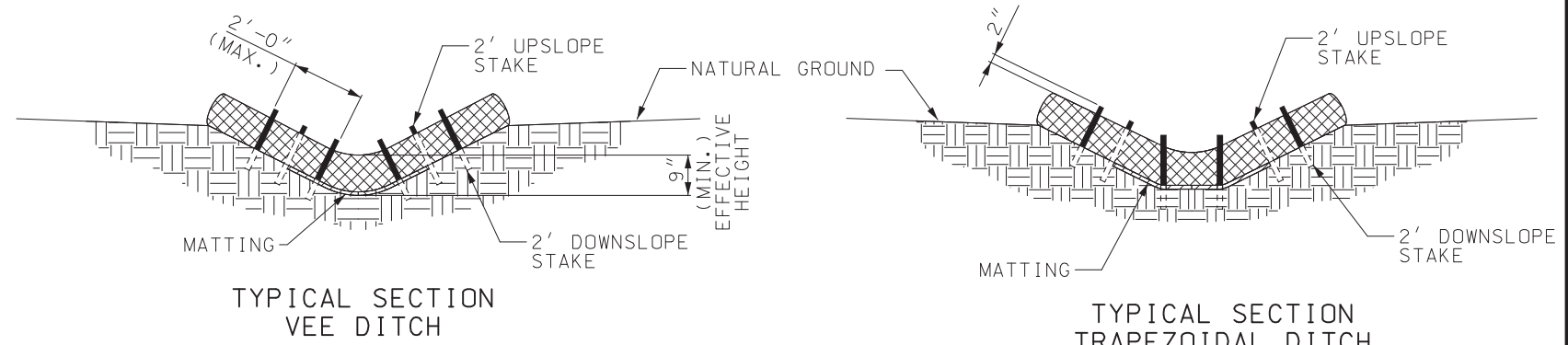
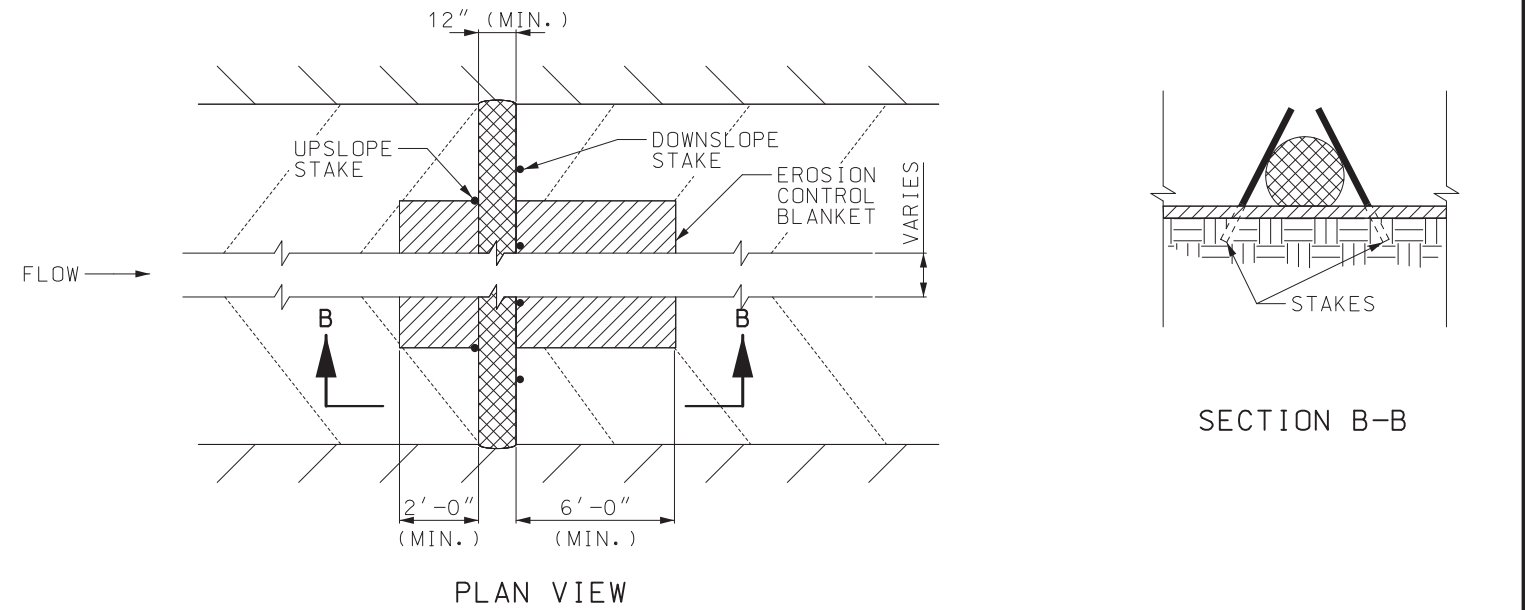
### EXAMPLE DITCH CHECK SPACING FOR STANDARD HEIGHTS (FT.)

DITCH SLOPE %	SPACING FOR 9" EFF. HEIGHT	SPACING FOR 18" EFF. HEIGHT
0.5	150	300
1.0	75	150
1.5	50	100
2.0	37	75
2.5	30	60
3.0	25	50
3.5	21	43
4.0	19	38
4.5	16	33
5.0	15	30
5.5	13	27
6.0	12	25
6.5	11	23
7.0	10	21
7.5	10	20
8.0	9	19
8.5	9	18
9.0	8	17
9.5	8	16
10.0	7	15



### MINIMUM DITCH CHECK SPACING

### ALTERNATE DITCH CHECK



NOTES:

- USE MINIMUM 12 IN. DIAMETER LOG/SOCK.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- INSTALL LOG/SOCK TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND LOG/SOCK AND SCOUR DITCH SLOPES OR AS DIRECTED BY ENGINEER.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE LOG/SOCK TO BOTTOM OF DITCH.

EROSION CONTROL BLANKET SHALL BE ANCHORED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

GENERAL NOTES:

- OTHER PROPRIETARY DITCH CHECKS MAY BE SUBSTITUTED IN ACCORDANCE WITH SEC 806 OR AS DIRECTED BY THE ENGINEER.
- INSTALLATION OF PROPRIETARY DITCH CHECKS SHALL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**TEMPORARY EROSION CONTROL MEASURES**

TEMPORARY DITCH CHECKS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

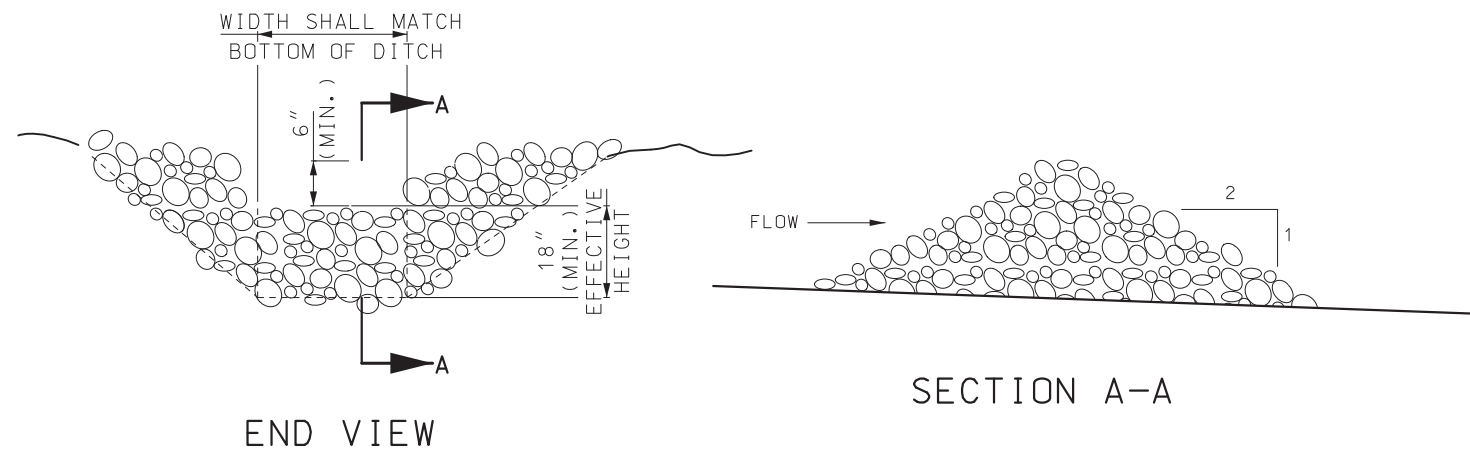
DATE EFFECTIVE: 01/01/2023

DATE PREPARED: 10/11/2022

**806.10K**

SHEET NO.  
1 OF 6

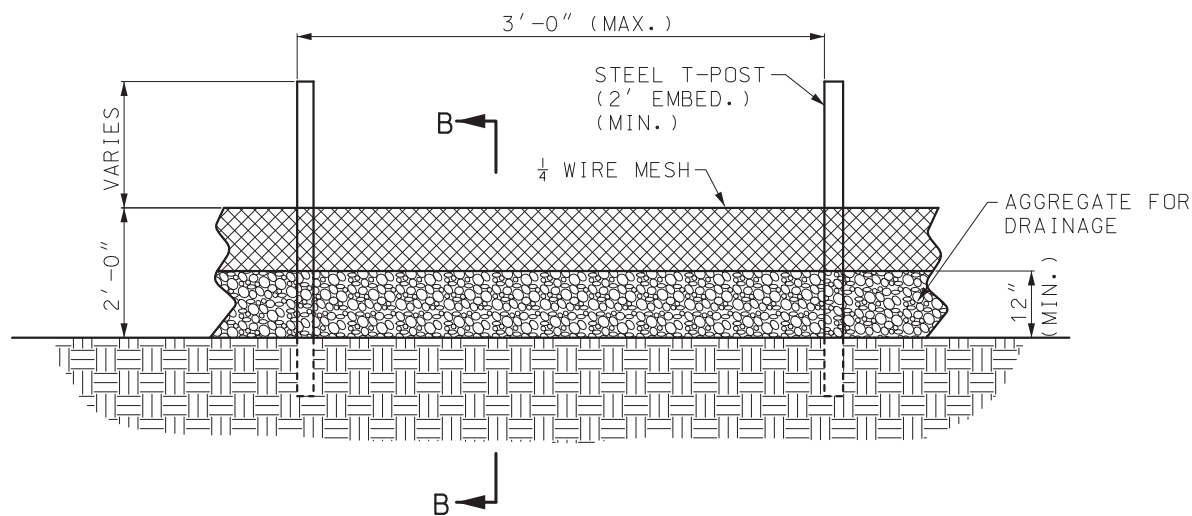
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



END VIEW

SECTION A-A

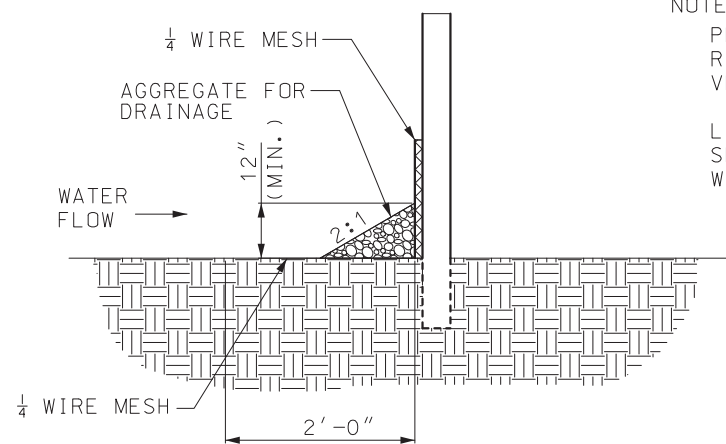
**NOTE:**  
**SEDIMENT TRAP**  
 SEDIMENT TRAP IN THE CLEAR ZONE SHALL BE REMOVED OR LEVELED (IF ALLOWABLE) AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE.



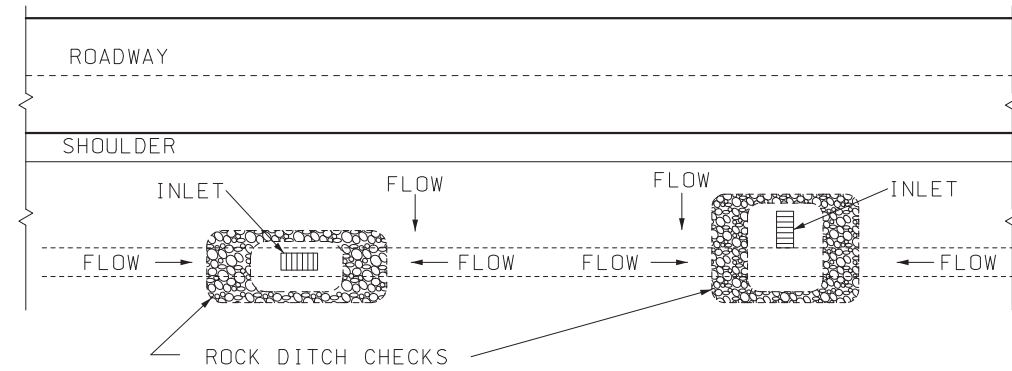
ELEVATION DETAIL

**NOTES:**  
 ROCK/MESH SEDIMENT CONTROL FENCE MAY BE NECESSARY, AS DETERMINED BY THE ENGINEER, IN ISOLATED AREAS WHERE PERIMETER SILT FENCE IS DEEMED INSUFFICIENT TO WITHSTAND SHEET FLOW. WHEN REQUIRED, IT WILL BE PAID PER LINEAR FOOT AS ROCK DITCH CHECK.  
 AGGREGATE FOR DRAINAGE SHALL BE IN ACCORDANCE WITH SEC 1009, GRADE 4 OR GRADE 5.  
 USE HARDWARE CLOTH 24 GAUGE WIRE MESH WITH 1/4 INCH MESH OPENINGS.  
 INSTALL 5 FT. T-POST WITH A 2 FOOT EMBEDMENT DEPTH (MIN.).  
 ATTACH HARDWARE CLOTH TO POST WITH WIRE STAPLE OR OTHER ACCEPTABLE METHODS.  
 SPACE POST A MAXIMUM OF 3 FT.  
 FOR INSTALLATION BETWEEN SECTIONS OF SILT FENCE, EXTEND AGGREGATE FOR DRAINAGE A MINIMUM OF 12 INCHES ON EACH SIDE OF SPECIAL SEDIMENT CONTROL FENCE SECTION.  
 ROCK/MESH SEDIMENT CONTROL FENCE MAY BE USED IN LIEU OF ROCK DITCH CHECK TO SURROUND AN INLET, AT NO ADDITIONAL COST TO THE COMMISSION.

ROCK/MESH SEDIMENT CONTROL FENCE

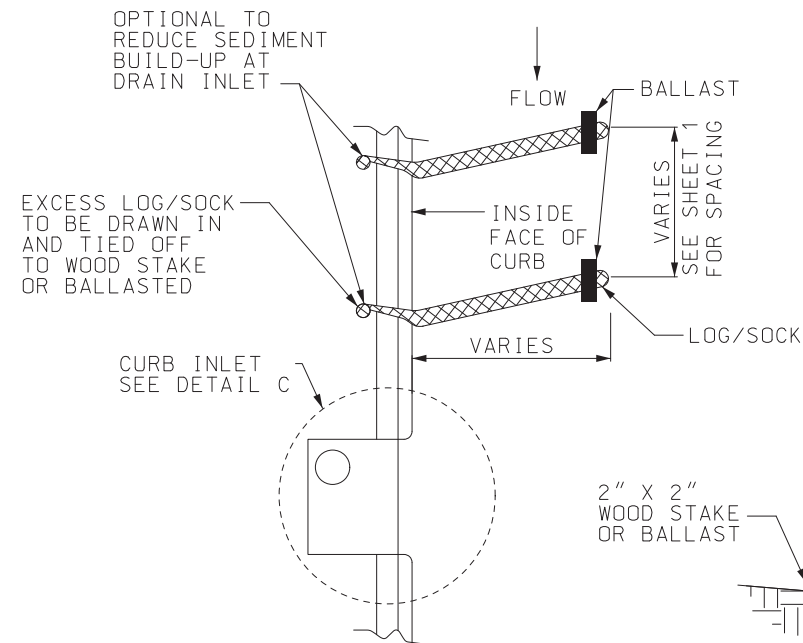


SECTION B-B

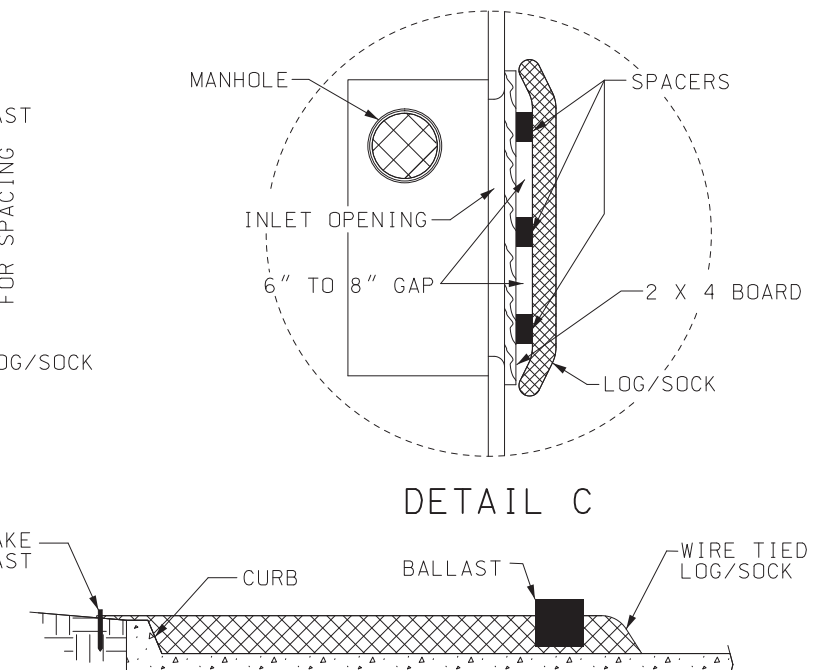


DROP INLET CHECK

SEE SHEET 1 OF 6 FOR DETAILS OF ROCK DITCH CHECK.



PLAN



DETAIL C

SECTION

CURB INLET PROTECTION

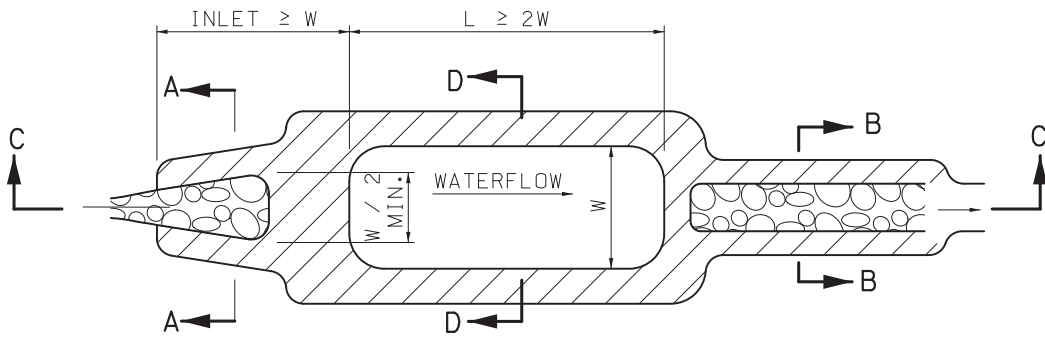
**NOTES:**  
 PRIOR TO PLACEMENT ALL DEBRIS, ROCK, LARGE CLODS AND WOOD VEGETATION SHALL BE CLEARED.  
 LOG/SOCK PLACED ON PAVEMENT SHALL BE WEIGHTED DOWN WITH GRAVEL/SAND BALLAST.

**GENERAL NOTES:**  
 OTHER PROPRIETARY INLET PROTECTION MAY BE SUBSTITUTED IN ACCORDANCE WITH SEC 806 OR AS DIRECTED BY THE ENGINEER.  
 FOR SEDIMENT CONTROL SPACING SEE SHEET 1 OF 6.

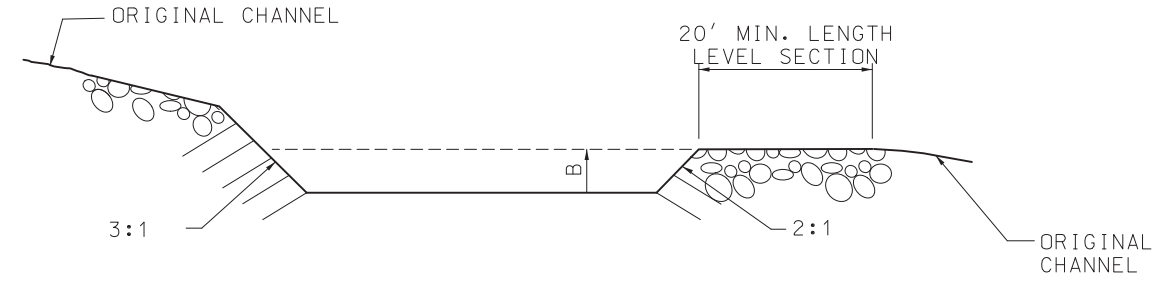
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>TEMPORARY EROSION CONTROL MEASURES</b>

DATE EFFECTIVE: 01/01/2023	806.10K	SHEET NO. 2 OF 6
DATE PREPARED: 10/11/2022		

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

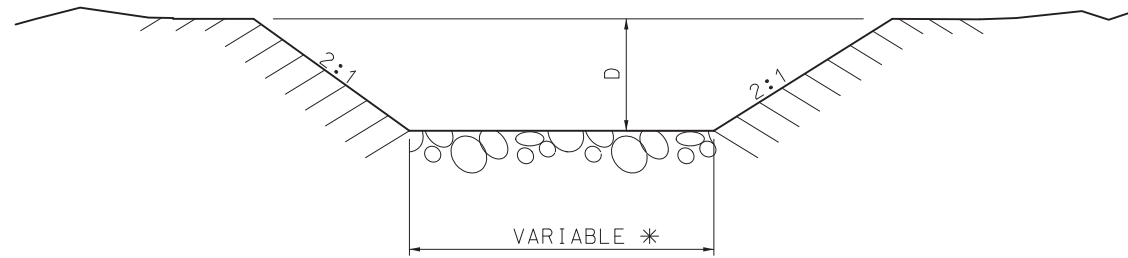


PLAN VIEW



SECTION C-C

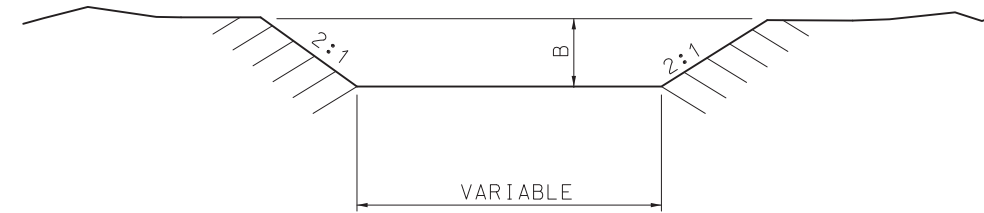
EFFECTIVE DEPTH "B" = MIN. 2', MAX. 6' DEPENDENT UPON CONFIGURATION REQUIRED BY LOCATION AND ESTIMATED VOLUME.



SECTION A-A  
INLET

$D = 1.0' + \text{DESIGN FLOW DEPTH-MIN.}$

\* VARIES FROM WIDTH OF STREAM AT INLET TO ONE-HALF WIDTH OF POND AT OUTLET.



SECTION D-D

GENERAL NOTES:

SEDIMENT BASINS ARE TO BE INCLUDED IN THE BMP SYSTEM WHEN THE GEOMETRY OF RIGHT-OF-WAY ALLOWS. WHERE INCLUDED, SEDIMENT BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE STORAGE VOLUME FOR THE LOCAL 2-YR, 24-HOUR STORM FOR DISTURBED ACREAGE DRAINING TO THEM. IF THE DESIGN STORM VOLUME HAS NOT BEEN CALCULATED, BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE A STORAGE VOLUME OF AT LEAST 3,600 CUBIC FEET PER DISTURBED ACRE DRAINING TO THE BASIN(S).

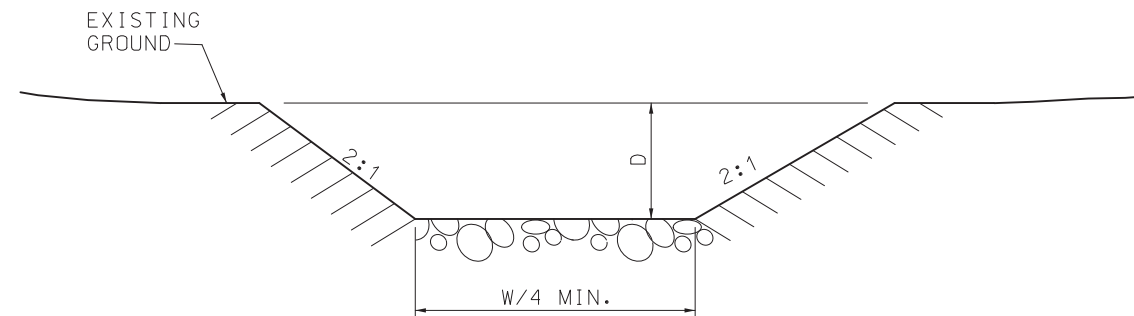
IF SEDIMENT BASIN IS TO BE PERMANENT ITS SLOPES SHALL BE STABILIZED WITH ROCK RIPRAP OR EQUIVALENT.

THE MATERIALS FOR ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF SEC 611.30 FOR TYPE 2 ROCK BLANKET.

SEE PLANS FOR LENGTH, DEPTH AND WIDTH OF BASIN.

SEE PLANS FOR ESTIMATED QUANTITIES OF ROCK RIPRAP - CUBIC YARDS.

 LAYER OF APPROVED STABILIZING MATERIAL FOR SCOUR PREVENTION



SECTION B-B  
OUTLET

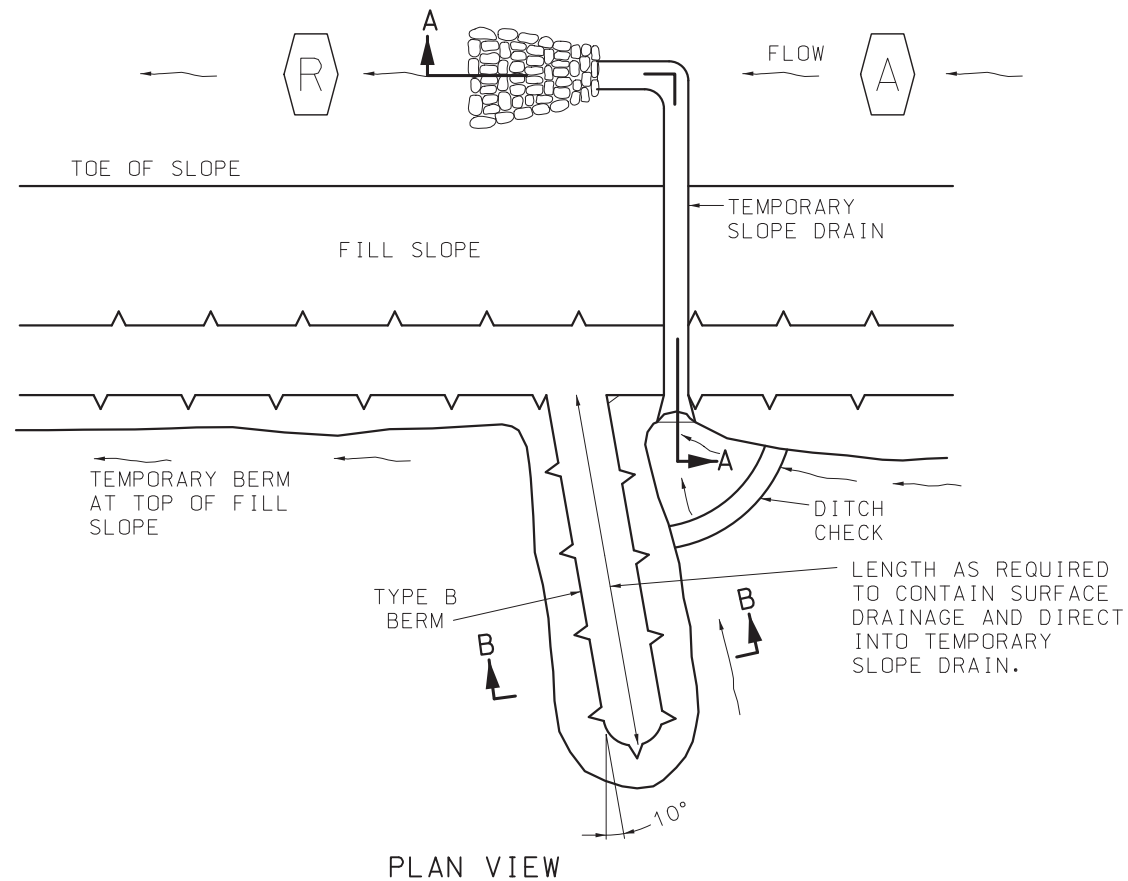
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

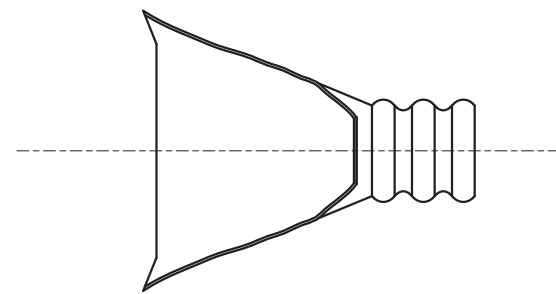
**TEMPORARY EROSION CONTROL MEASURES**  
 SEDIMENT BASIN

DATE EFFECTIVE: 01/01/2023	<b>806.10K</b>	SHEET NO.
DATE PREPARED: 10/11/2022		3 OF 6

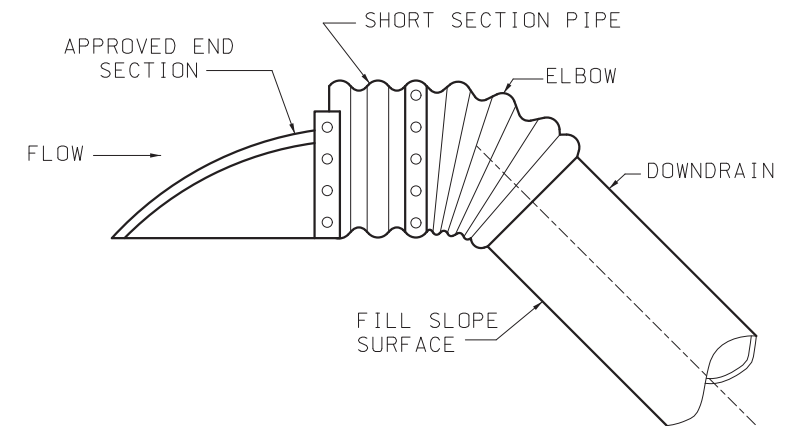
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PLAN VIEW

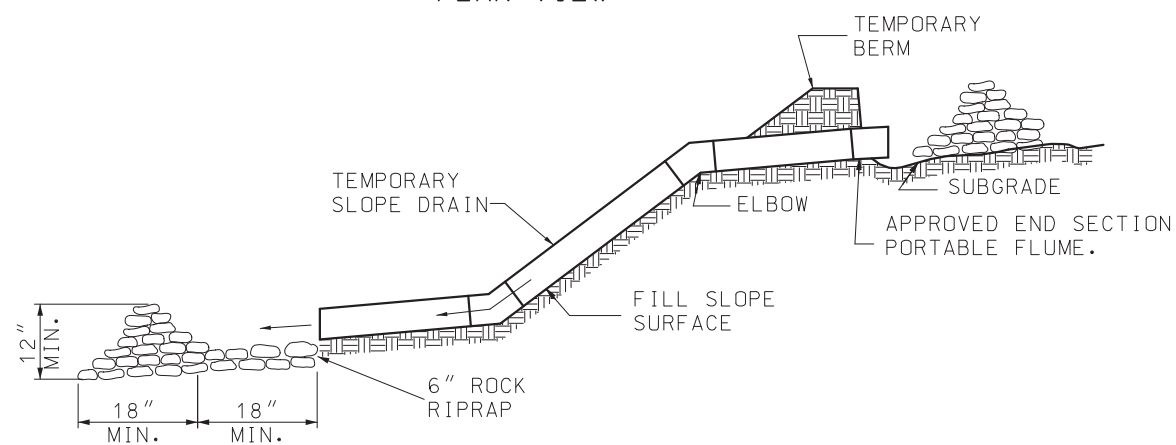


PLAN VIEW



SECTION VIEW

**TEMPORARY SLOPE DRAIN INLET TREATMENT**

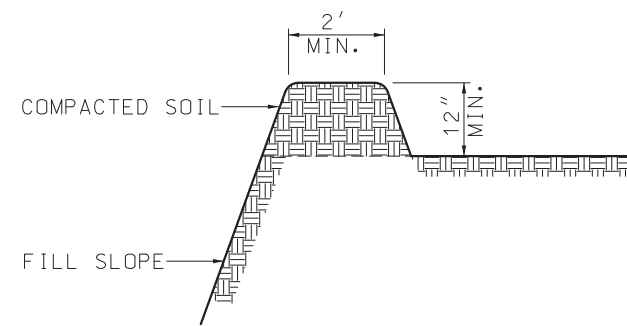


SECTION A-A

**TEMPORARY BERM**

(METAL, FLEXIBLE RUBBER OR PLASTIC PIPE)

NOTE:  
MAXIMUM LENGTH BETWEEN SLOPE DRAINS SHALL BE APPROXIMATELY 500 FEET.



SECTION B-B  
TYPE B BERM

NOTE:

IN SOME CASES IT MAY BE NECESSARY TO EMBED METAL OR PLASTIC PIPE INTO THE FILL SLOPE TO SECURE PROPER ANCHORAGE.

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 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
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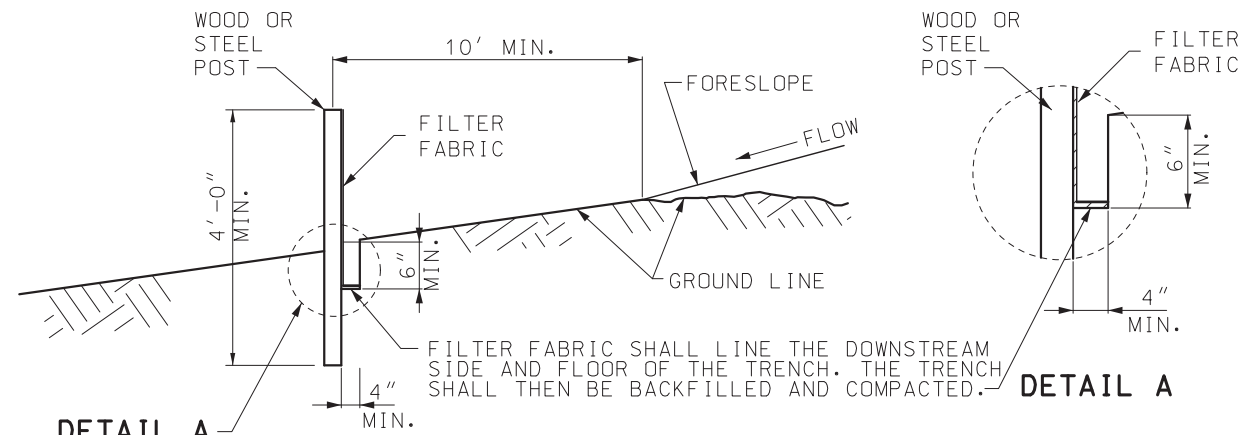
**TEMPORARY EROSION CONTROL MEASURES**  
 SLOPE DRAINS

DATE EFFECTIVE: 01/01/2023  
 DATE PREPARED: 10/11/2022

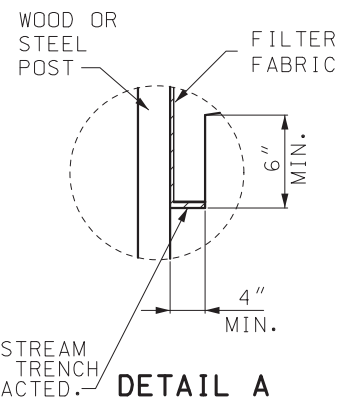
**806.10K**

SHEET NO.  
 4 OF 6

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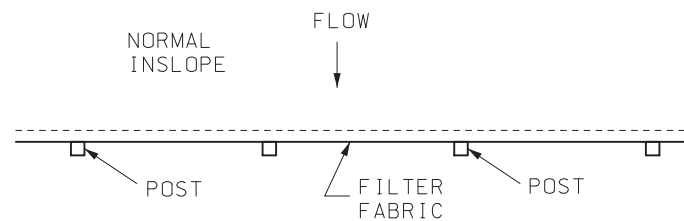
TYPICAL B-B



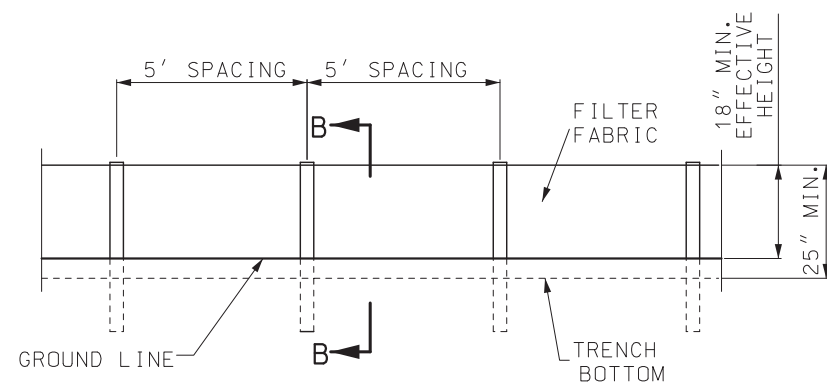
DETAIL A

FILTER FABRIC SHALL LINE THE DOWNSTREAM SIDE AND FLOOR OF THE TRENCH. THE TRENCH SHALL THEN BE BACKFILLED AND COMPACTED.

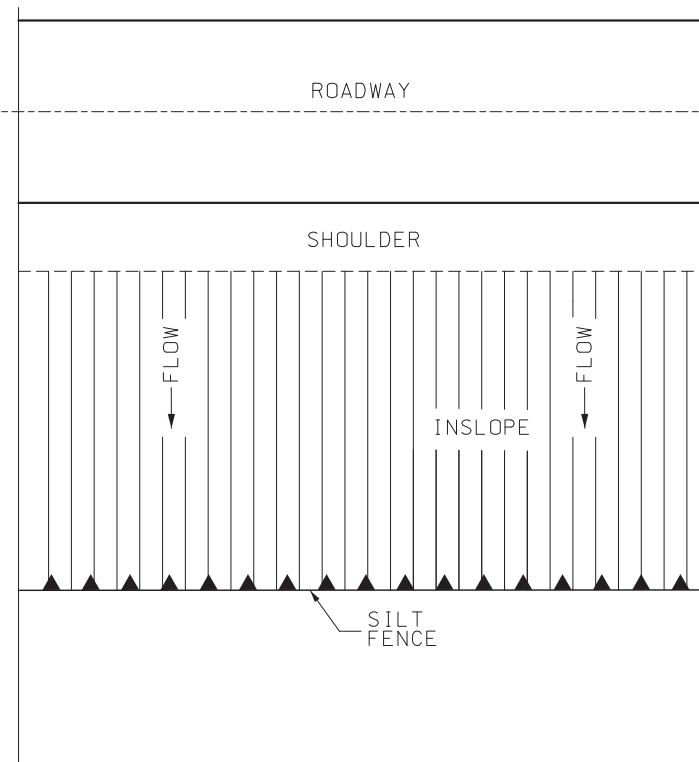
DETAIL A



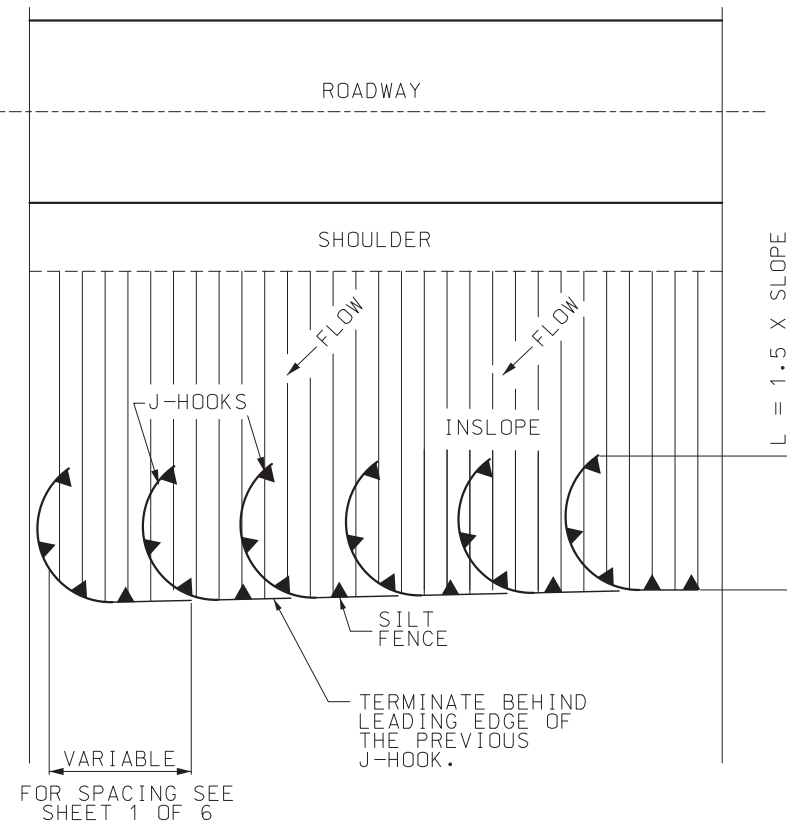
PLAN VIEW



ELEVATION DETAIL FABRIC SILT FENCE



PERIMETER SILT FENCE FOR TRANSVERSE FLOW



PERIMETER SILT FENCE FOR ANGULAR FLOW

GENERAL NOTES:

USE SILT FENCE FOR FILL HEIGHTS GREATER OR EQUAL TO 10 FEET. ON ALL FILLS GREATER THAN 10 FEET HIGH, MID-SLOPE RUNS OF SILT FENCE SHOULD BE CONSIDERED.

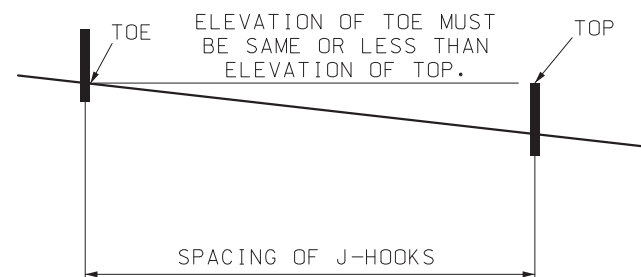
FOR FABRIC SILT FENCE:

MINIMUM LONGITUDINAL SPLICE OVERLAP SHALL BE 2' WITH A POST AT EACH END.

SECURE FABRIC TO POSTS.

INSTEAD OF SILT FENCE ACROSS DRAINAGE DITCHES AND DRAINS, DITCH CHECKS SHALL BE USED AS SHOWN ON PLANS OR AS DIRECTED BY ENGINEER.

AT CULVERTS, PLACE SEDIMENT BARRIERS OVER THE TOP OF THE CULVERTS (NOT IN THE STREAM CHANNEL).



MINIMUM J-HOOK SPACING

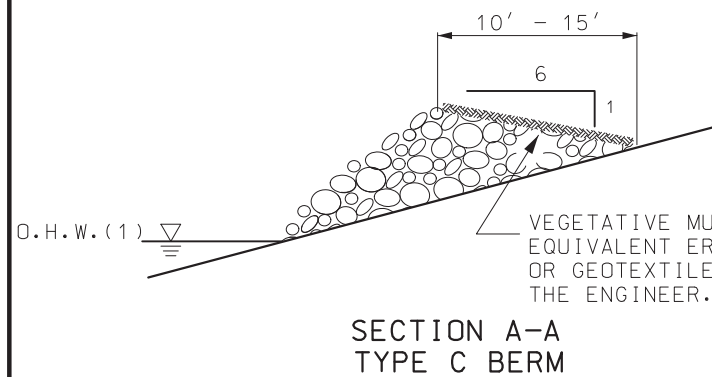
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
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STATE OF MISSOURI  
 TRAVIS D. KOESTNER  
 NUMBER PE-30042  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

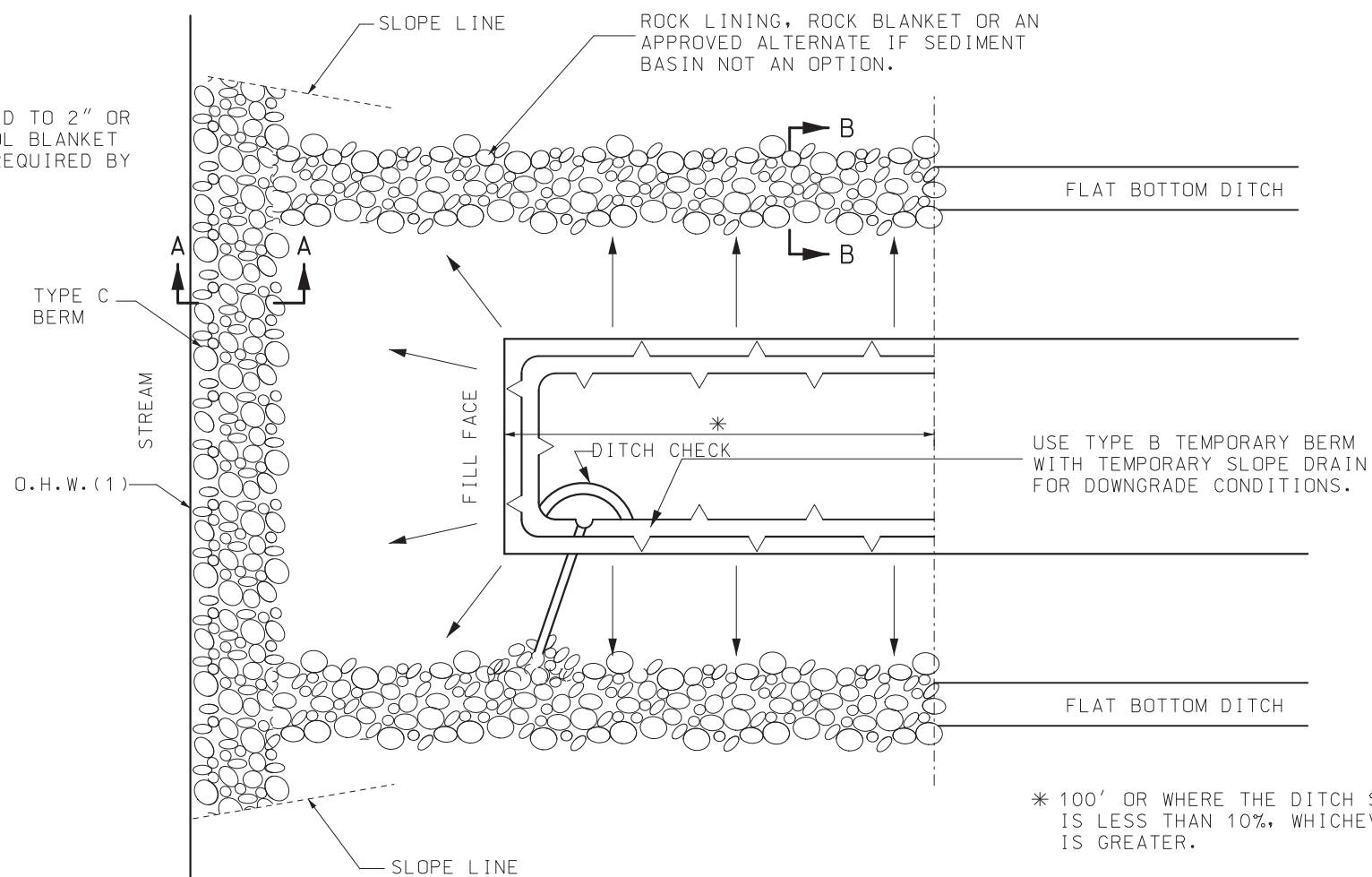
**TEMPORARY EROSION CONTROL MEASURES**  
 SILT FENCE

DATE EFFECTIVE: 01/01/2023	<b>806.10K</b>	SHEET NO. 5 OF 6
DATE PREPARED: 10/11/2022		

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(1) TYPE C BERM SHALL BE PLACED ABOVE THE ORDINARY HIGH WATER (O.H.W.) OR AT AN ELEVATION AS DIRECTED BY THE ENGINEER.



\* 100' OR WHERE THE DITCH SLOPE IS LESS THAN 10%, WHICHEVER IS GREATER.

PLAN VIEW



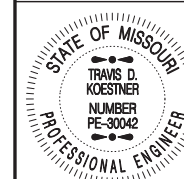
GENERAL NOTES:

TYPE C BERM SHALL BE BUILT TO HANDLE SIGNIFICANT RUN-OFF EVENTS AND SHALL BE INSTALLED PRIOR TO SOIL DISTURBANCE OR PLACEMENT OF FILL IN THE DRAINAGE AREA OF THE BERM.



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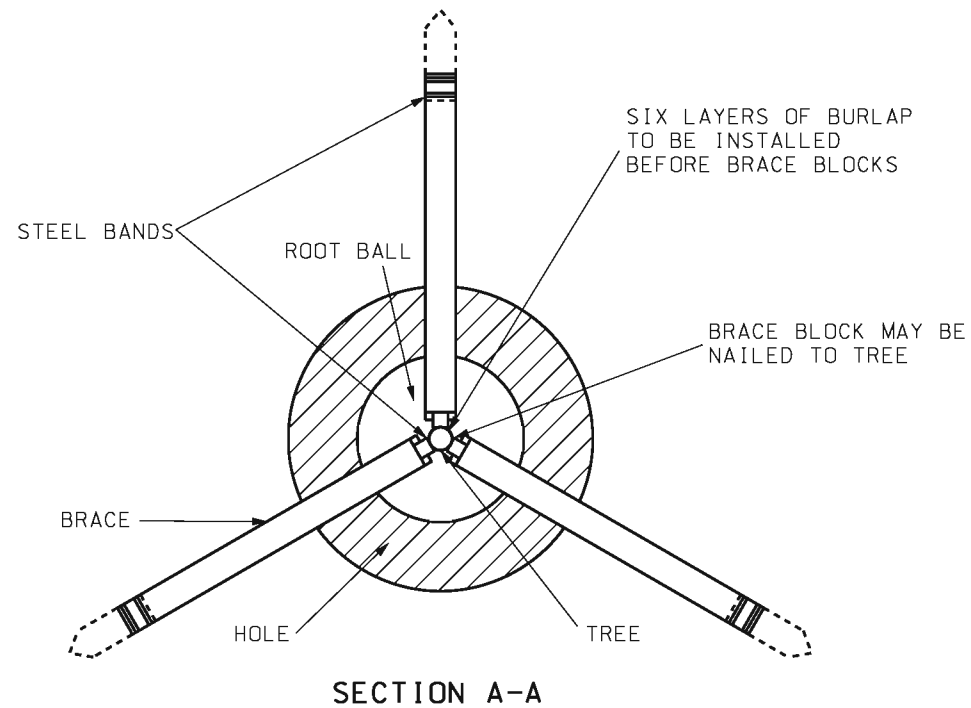
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TEMPORARY EROSION CONTROL MEASURES  
BRIDGES AND BOX CULVERTS  
AT STREAM CROSSINGS

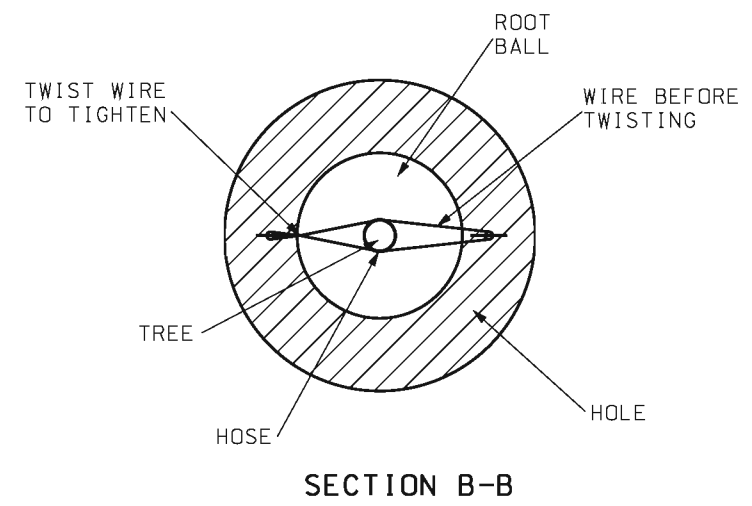
DATE EFFECTIVE: 01/01/2023  
DATE PREPARED: 10/11/2022

806.10K

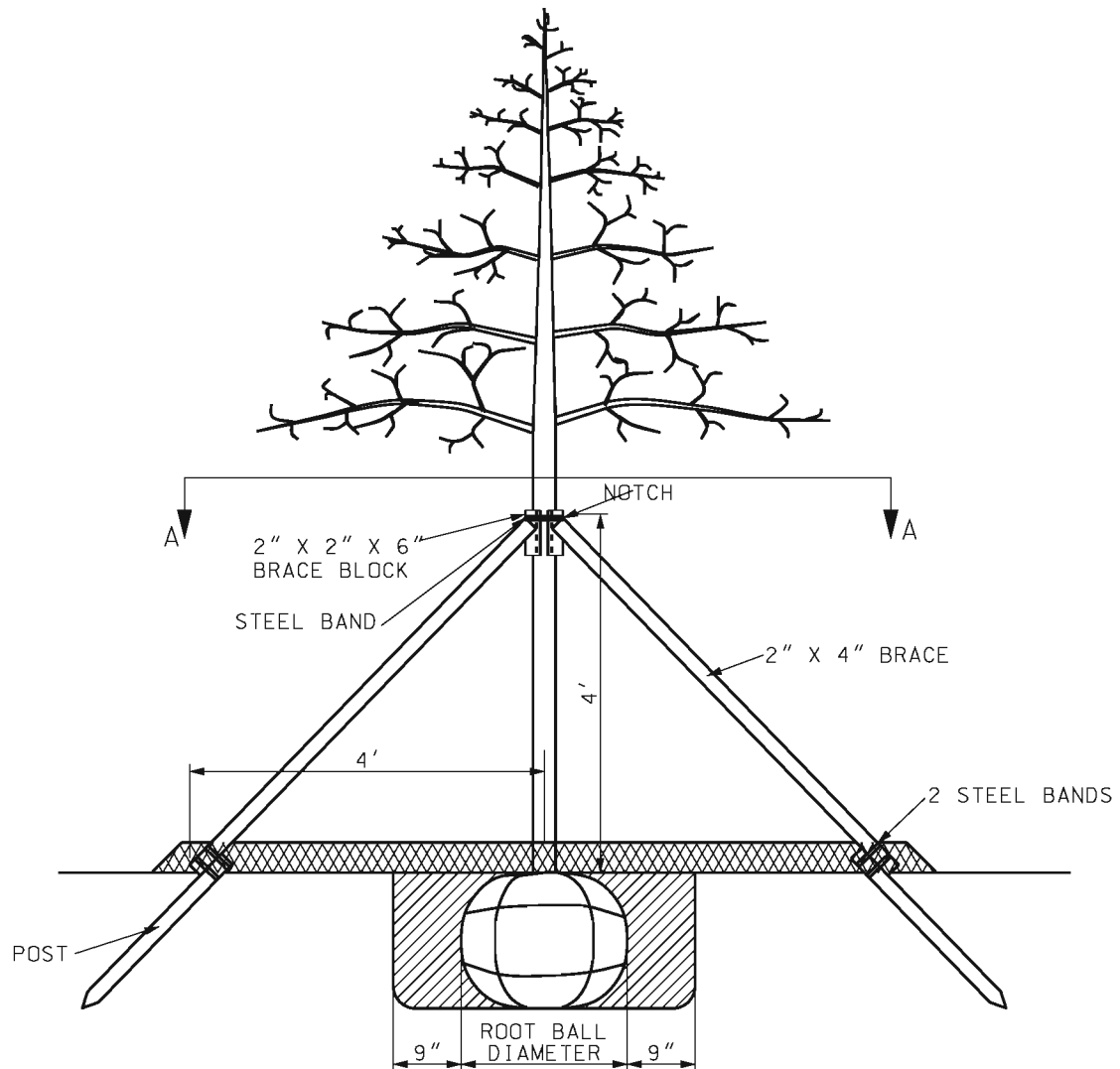
SHEET NO.  
6 OF 6



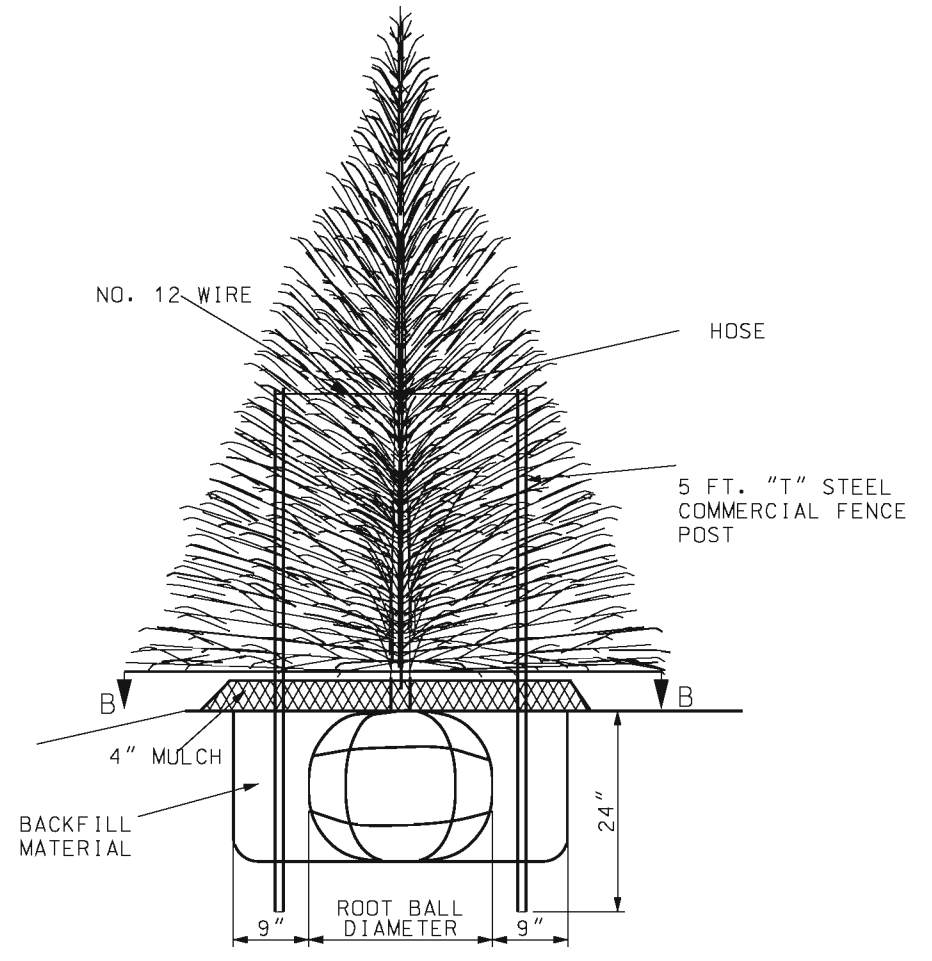
SECTION A-A



SECTION B-B



METHOD OF SUPPORTING DECIDUOUS TREES  
3" CALIBER OR LARGER



METHOD OF SUPPORTING EVERGREEN TREES  
3' OR MORE IN HEIGHT

NOTES:

- TREE WRAP SHALL BE INSTALLED BEFORE BRACING.
- BRACE SHALL BE NAILED SECURELY TO POST AND BRACE BLOCK.
- BANDING SHALL BE DONE WITH A COMMERCIAL BANDING MACHINE.

GENERAL NOTE:

ALL NUMBER MEASUREMENTS ARE NOMINAL.

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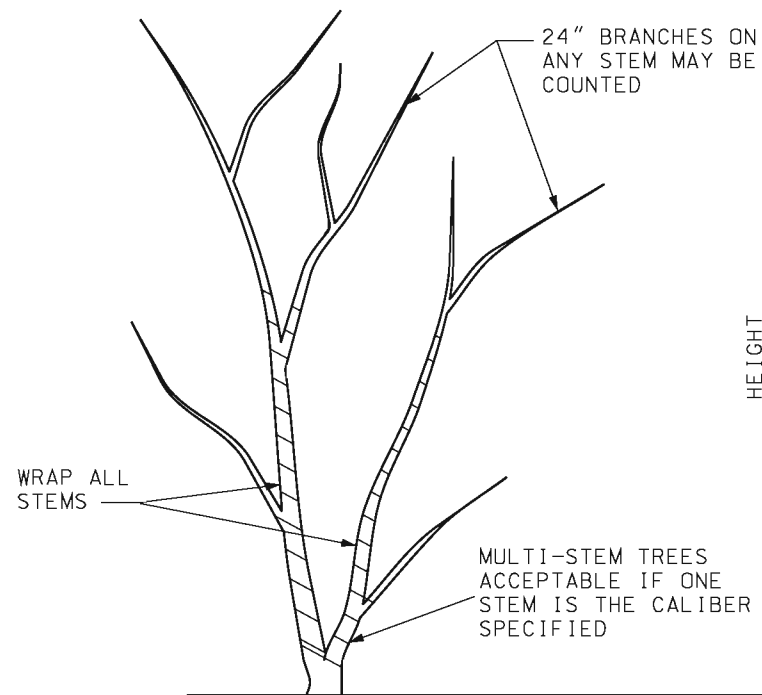
STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TYPICAL PLANTING ILLUSTRATIONS**  
 METHOD OF SUPPORT

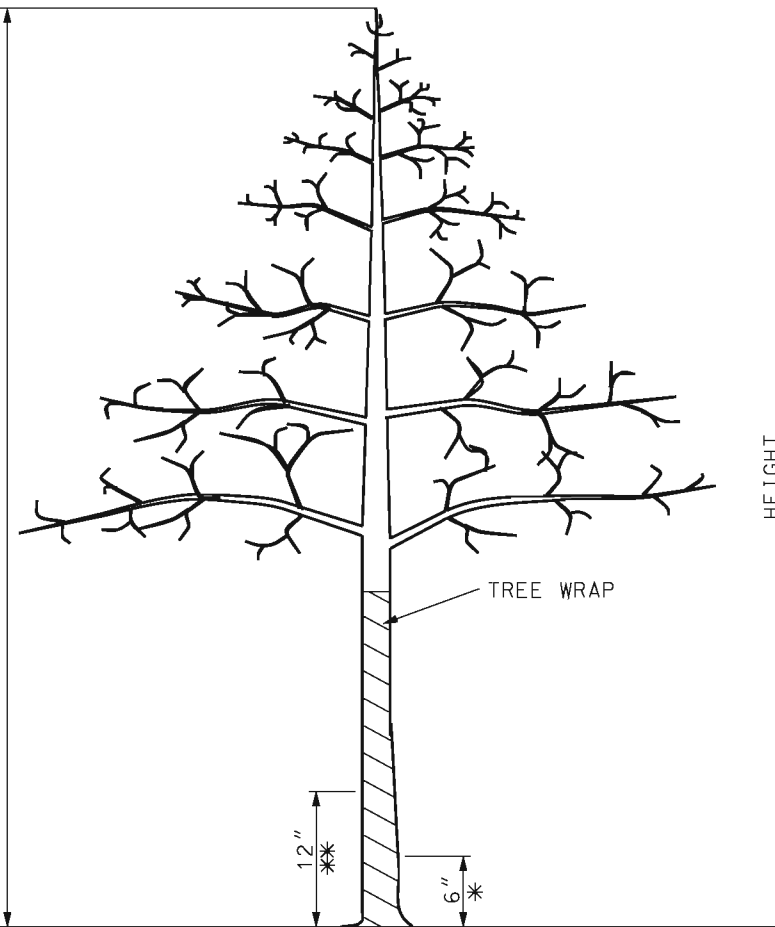
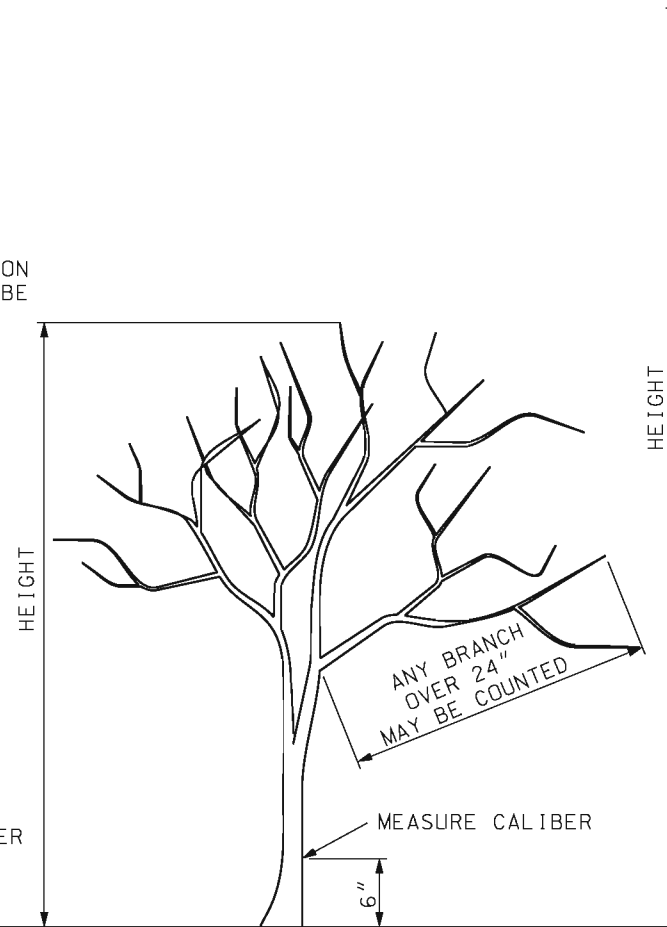
DATE EFFECTIVE: 07/01/2004	<b>808.00</b>	SHEET NO.
DATE PREPARED: 8/26/2009		1 OF 3

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



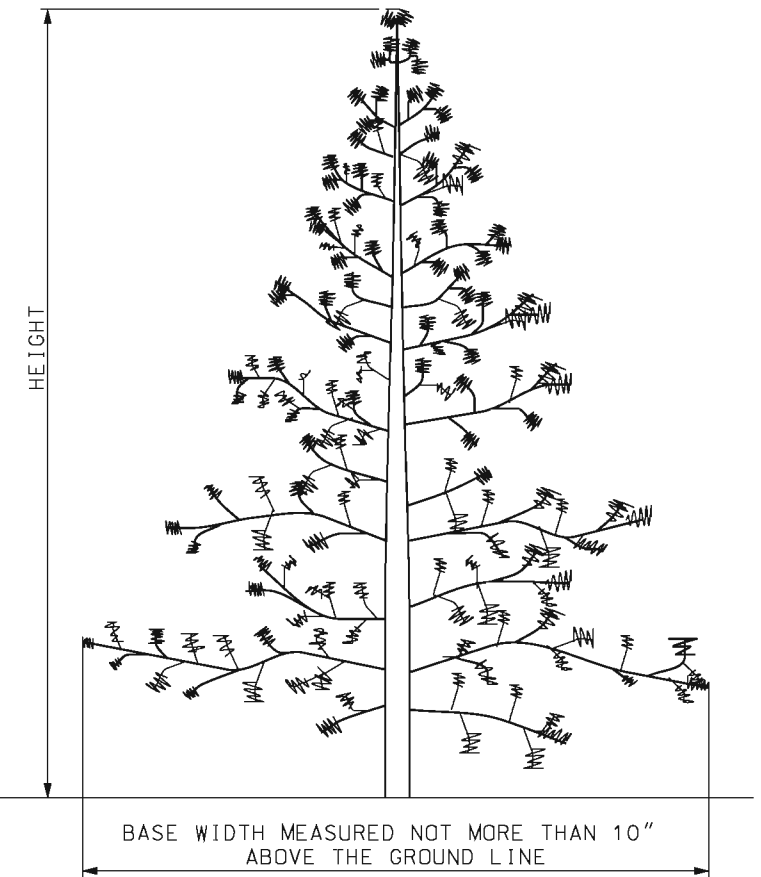


MEASUREMENT OF SMALL TREES

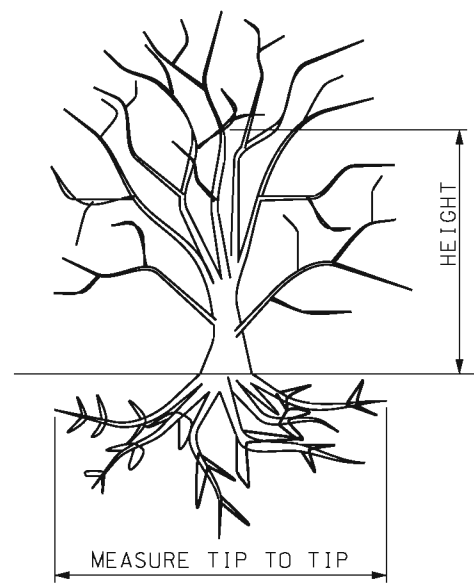


\* MEASURE CALIBER FOR TREES 4" OR LESS.  
 \*\* MEASURE CALIBER FOR TREES MORE THAN 4".

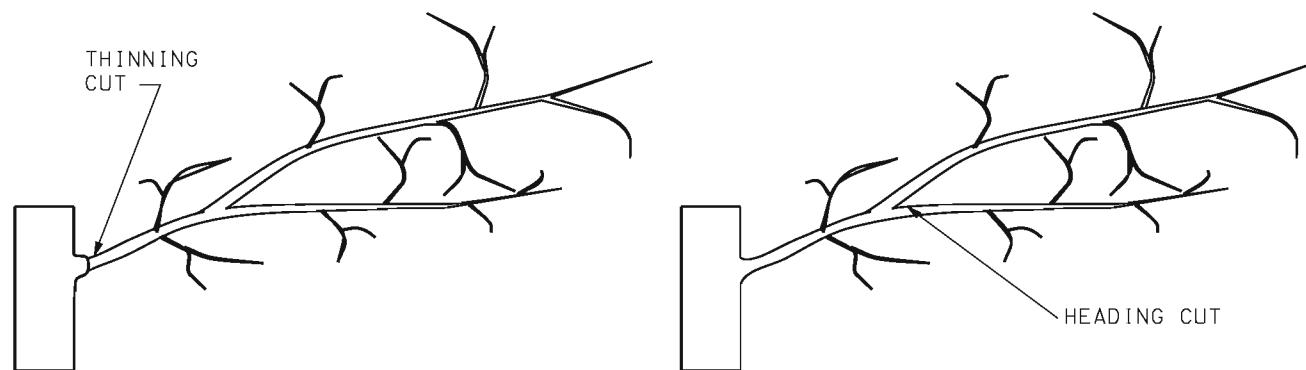
MEASUREMENT OF LARGE TREES





MEASUREMENT OF EVERGREEN TREES



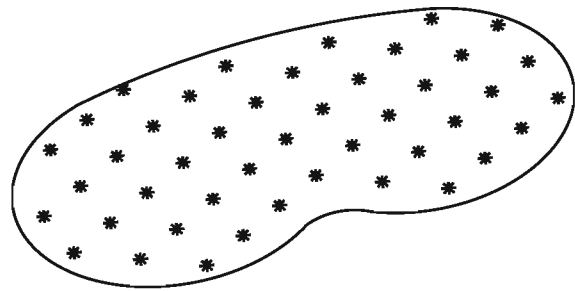
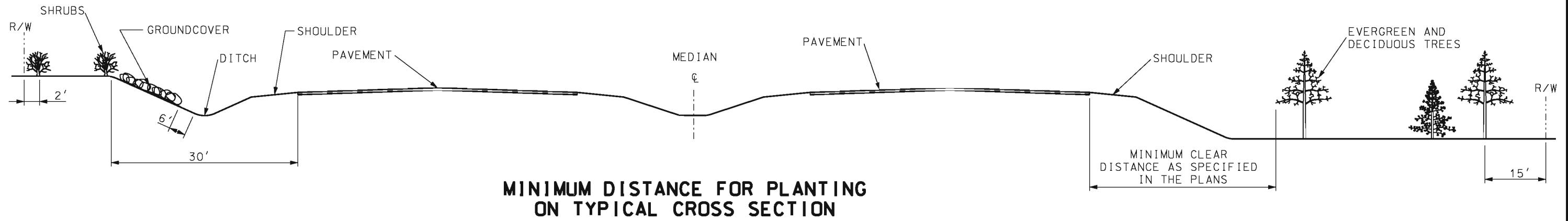
MEASUREMENT OF DECIDUOUS SHRUBS



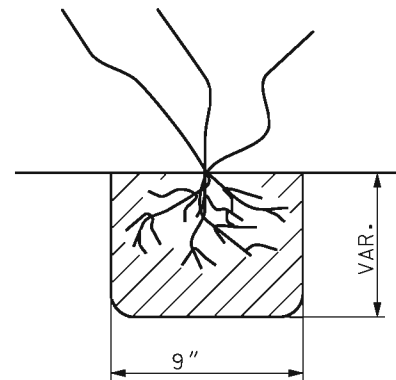
PRUNING CUTS

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TYPICAL PLANTING ILLUSTRATIONS</b> <b>MEASUREMENT AND PRUNING CUTS</b>
DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/26/2009	<b>808.00</b>
SHEET NO. 2 OF 3	

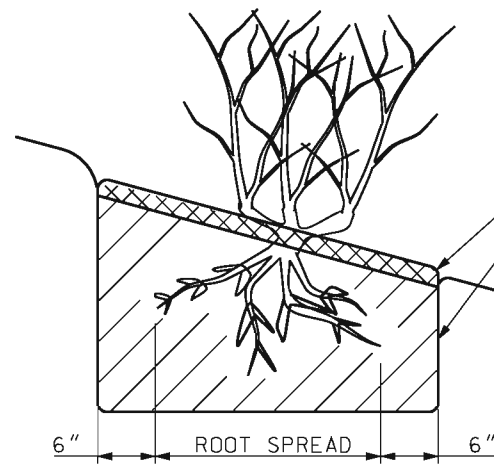
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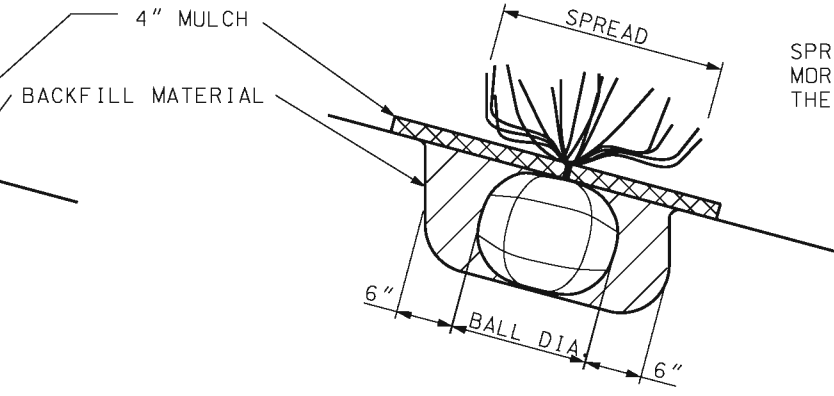
LOCATION OF SHRUBS IN A TYPICAL PLANT BED



VINES AND SEEDLINGS



DECIDUOUS SHRUB SLOPE PLANTING



EVERGREEN SHRUB SLOPE PLANTING

SPREAD MEASURED NO MORE THAN 10" ABOVE THE GROUND LINE.

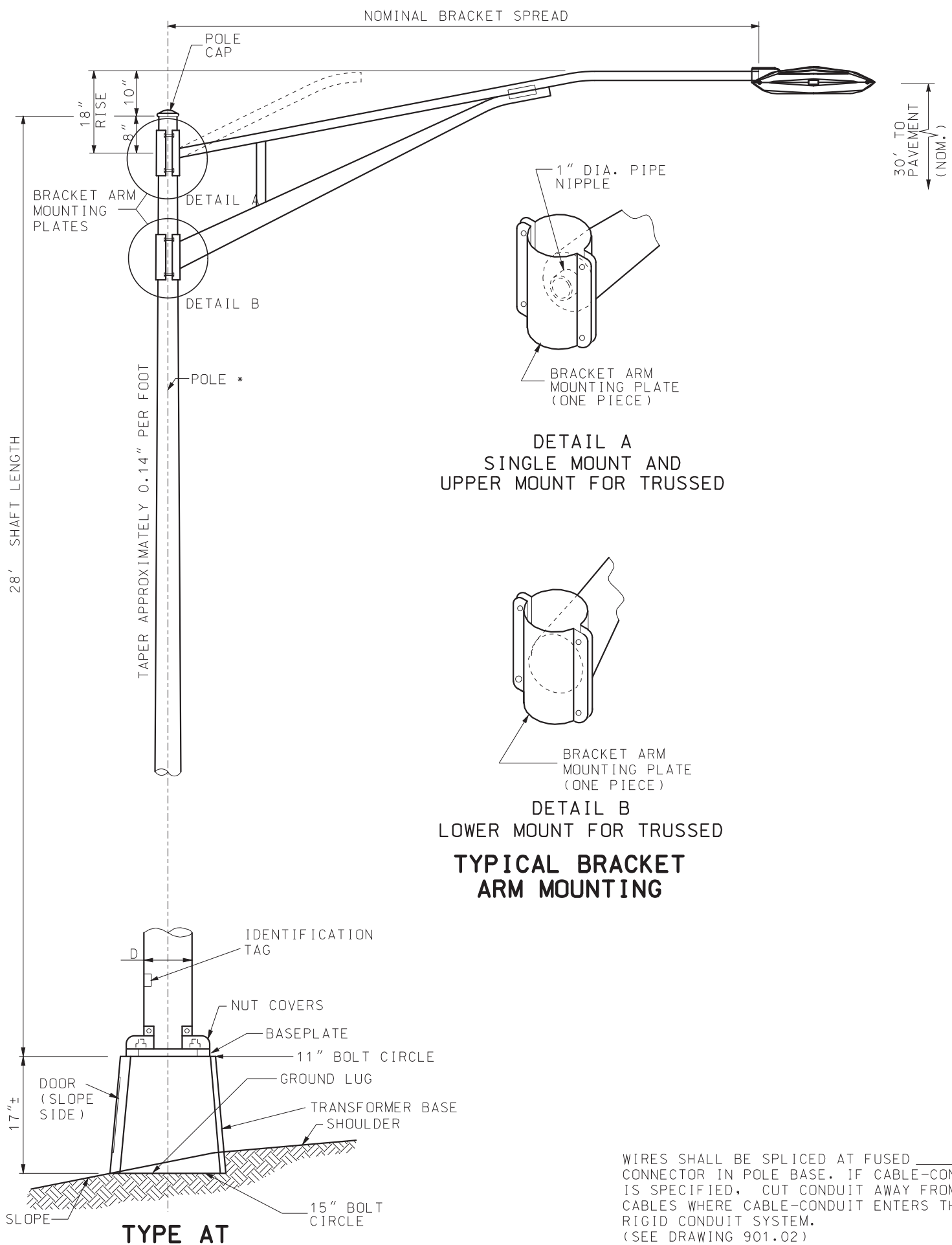
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 JEFFERSON CITY, MO 65102  
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STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
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**TYPICAL PLANTING ILLUSTRATIONS**  
 LOCATION AND SLOPE PLANTING

DATE EFFECTIVE: 07/01/2004	808.00	SHEET NO. 3 OF 3
DATE PREPARED: 8/26/2009		

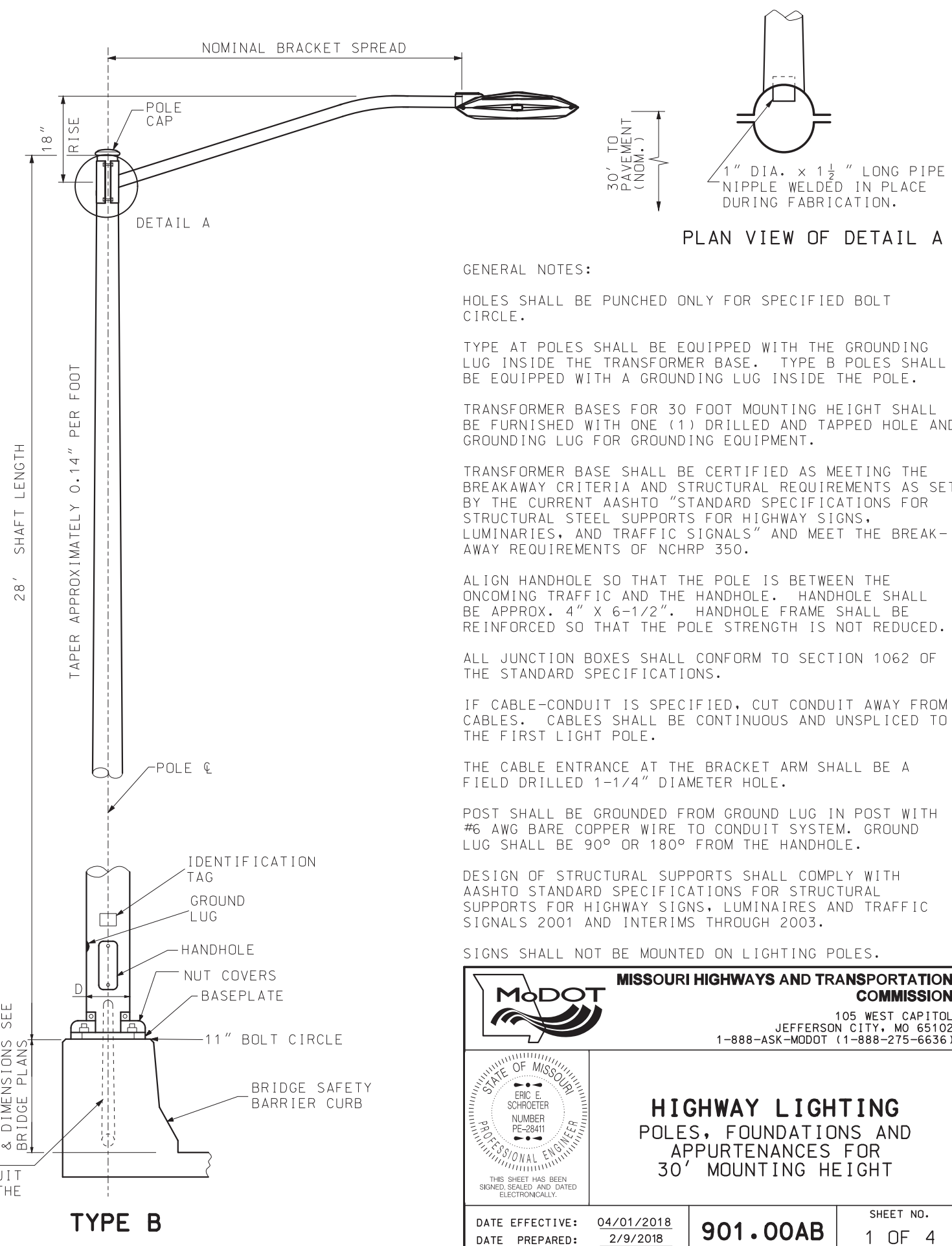
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DETAIL A  
SINGLE MOUNT AND  
UPPER MOUNT FOR TRUSSED

DETAIL B  
LOWER MOUNT FOR TRUSSED  
**TYPICAL BRACKET  
ARM MOUNTING**

WIRES SHALL BE SPLICED AT FUSED CONNECTOR IN POLE BASE. IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM THE CABLES WHERE CABLE-CONDUIT ENTERS THE RIGID CONDUIT SYSTEM. (SEE DRAWING 901.02)



**TYPE B**

**GENERAL NOTES:**

- HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.
- TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B POLES SHALL BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.
- TRANSFORMER BASES FOR 30 FOOT MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE (1) DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.
- TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.
- ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE ONCOMING TRAFFIC AND THE HANDHOLE. HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.
- ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.
- IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM CABLES. CABLES SHALL BE CONTINUOUS AND UNSPLICED TO THE FIRST LIGHT POLE.
- THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIAMETER HOLE.
- POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.
- DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS 2001 AND INTERIMS THROUGH 2003.
- SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

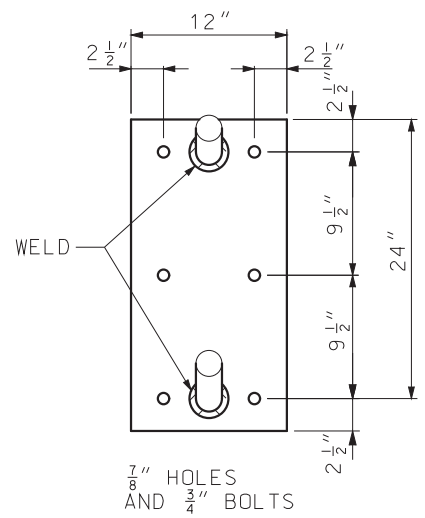
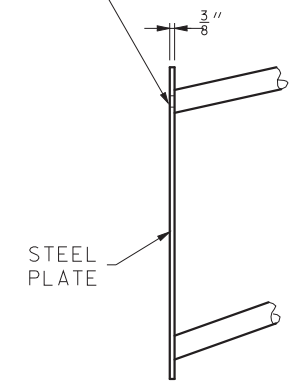
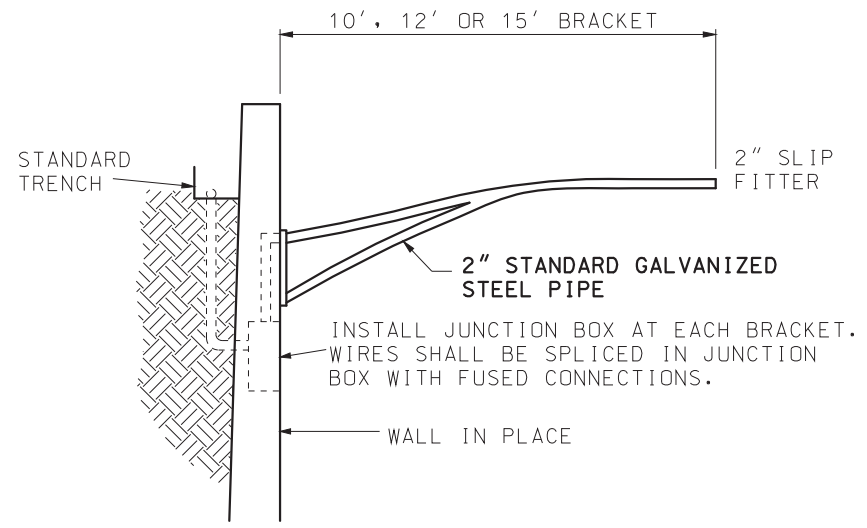
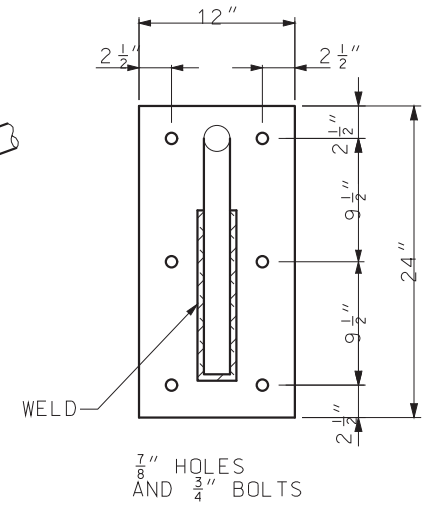
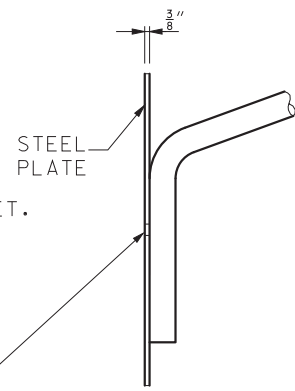
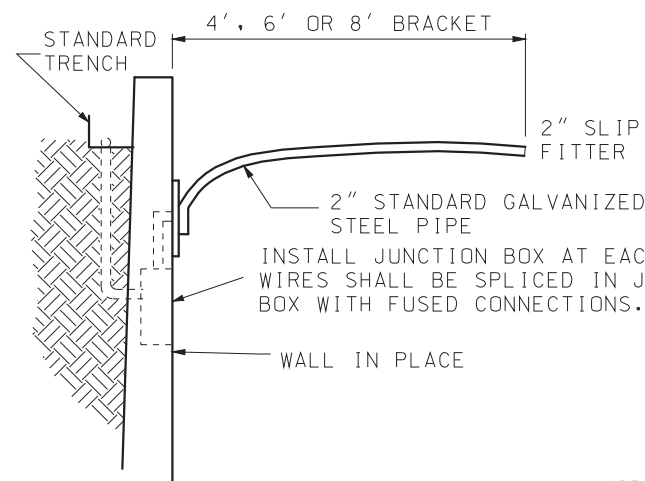
**MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
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DATE EFFECTIVE: 04/01/2018	<b>901.00AB</b>	SHEET NO. 1 OF 4
DATE PREPARED: 2/9/2018		

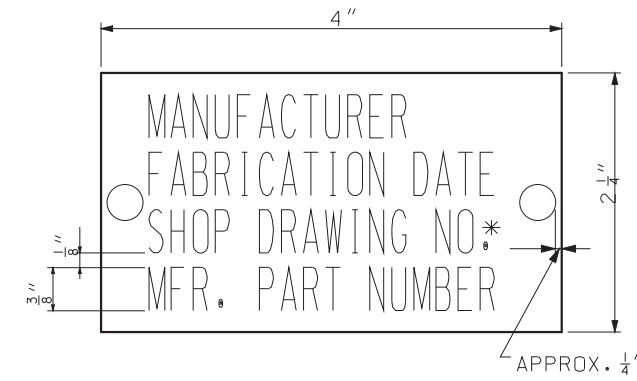
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WALL BRACKETS

FACE PLATE DETAILS



ID TAG NOTE:  
TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS.  
\* INCLUDING REVISION

IDENTIFICATION TAG

GENERAL NOTES:

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B POLES SHALL BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.

TRANSFORMER BASES FOR 30 FOOT MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE (1) DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE ONCOMING TRAFFIC AND THE HANDHOLE. HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM CABLES. CABLES SHALL BE CONTINUOUS AND UNSPLICED TO THE FIRST LIGHT POLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.

ID TAG HOLES SHALL BE DRILLED INTO POLE PRIOR TO GALVANIZING.

LED LUMINAIRES				
FUSE RATING	DESIGNATION	MAX. WATT	DISTRIBUTION TYPE	BACKLIGHT-UPLIGHT-GLARE (BUG) RATING
3 A	LED-A	103	III	B2-U0-G2
LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED ON PLANS.				

TYPE AT POLE				
BRACKET SPREAD	4'-10'	12'	15'	
MAX. LUMINAIRE WEIGHT	75 LB	71 LB	66 LB	
MAX. PROJECTED AREA	3.3 SQ. FT.			
SINGLE AND TRUSSED BRACKET ARMS				
LOCATION	LENGTH POLE	BRACKET SPREAD	TRANS. BASE BOLT CIRC.	D
SHOULDER	28'	4', 6', 8', 10', 12', 15'	15"	8"

TYPE B POLE				
BRACKET SPREAD	4'	6'	8'	
MAX. LUMINAIRE WEIGHT	75 LB	75 LB	54 LB	
MAX. PROJECTED AREA	3.3 SQ. FT.			
SINGLE BRACKET ARM				
LOCATION	LENGTH POLE	BRACKET SPREAD	D	ANCHOR BOLT DIA.
BRIDGE SAFETY BARRIER CURB	28'	4', 6', 8'	8"	1"

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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JEFFERSON CITY, MO 65102  
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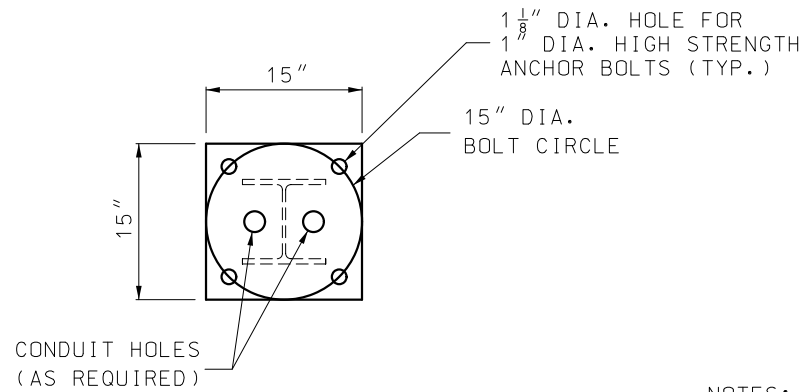
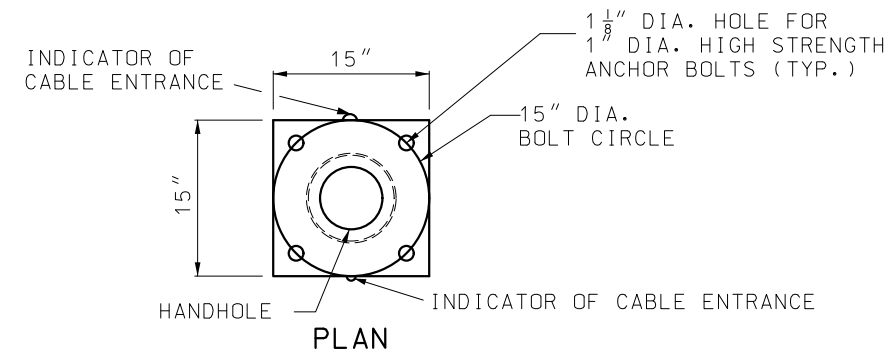
**HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**901.00AB**

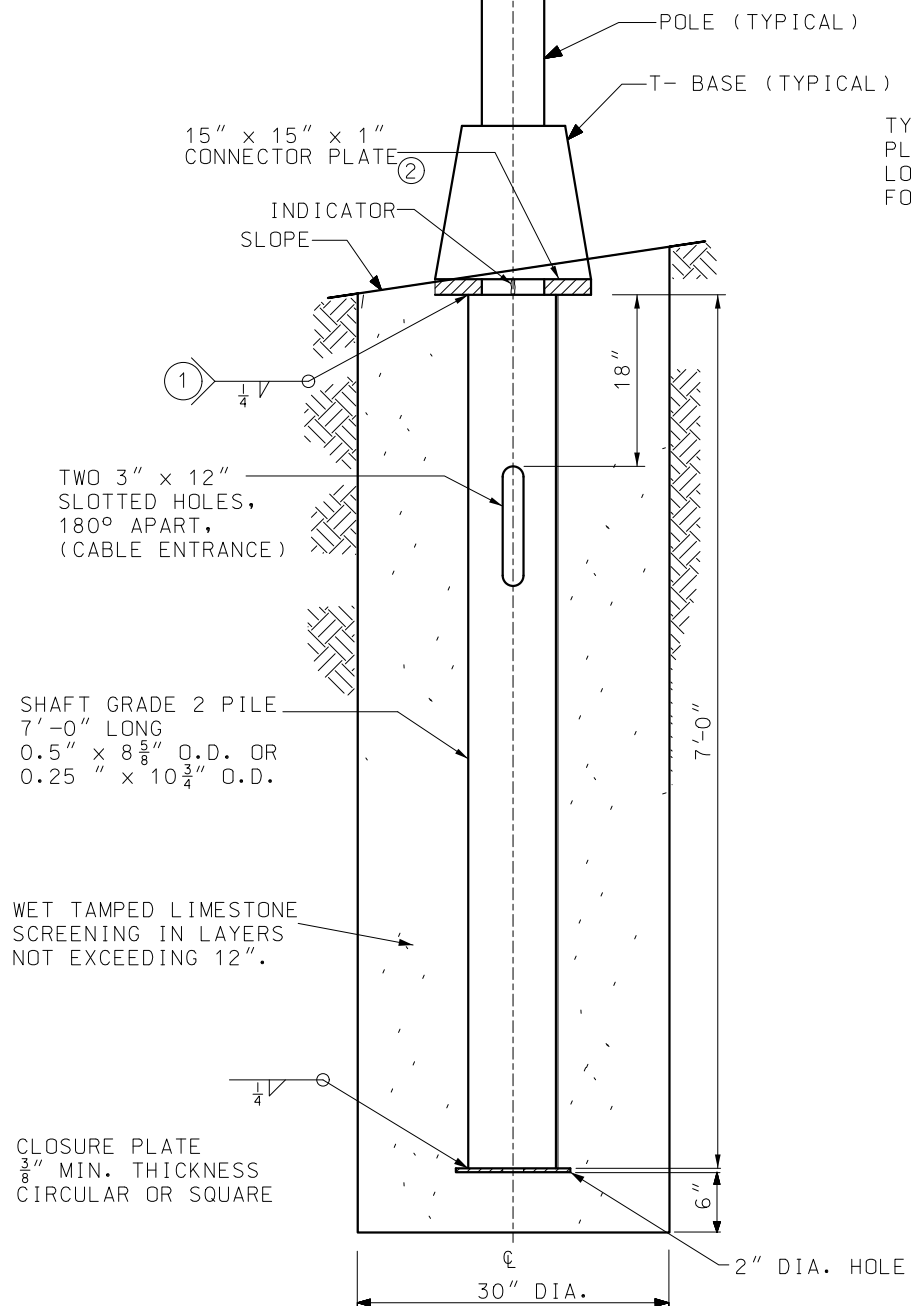
SHEET NO.  
2 OF 4

DATE EFFECTIVE: 04/01/2018  
DATE PREPARED: 2/9/2018

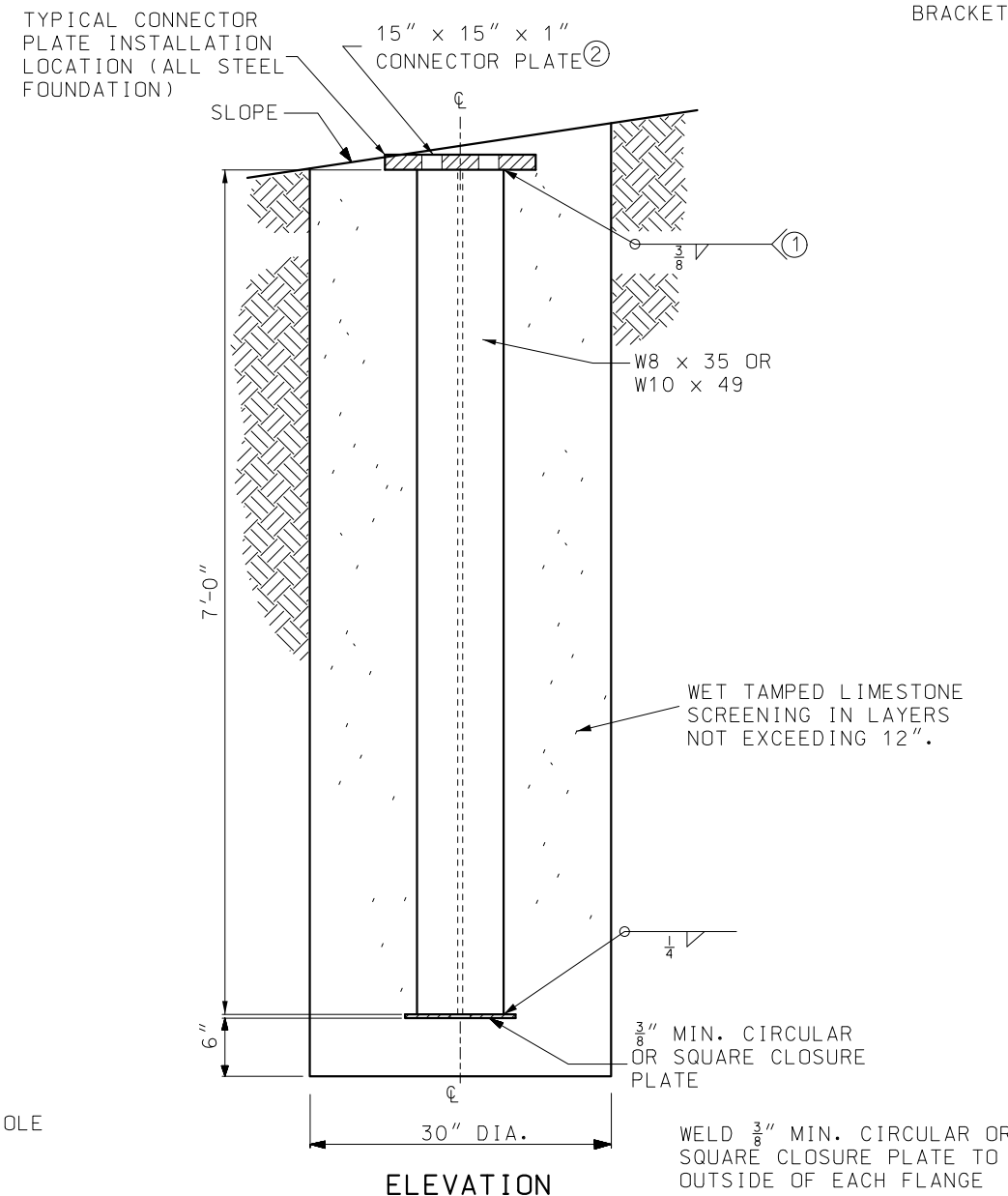


NOTES:

- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.



DETAILS OF CIRCULAR STEEL PILE FOUNDATION



DETAILS OF STEEL "H" PILE FOUNDATION

GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

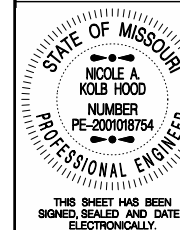
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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



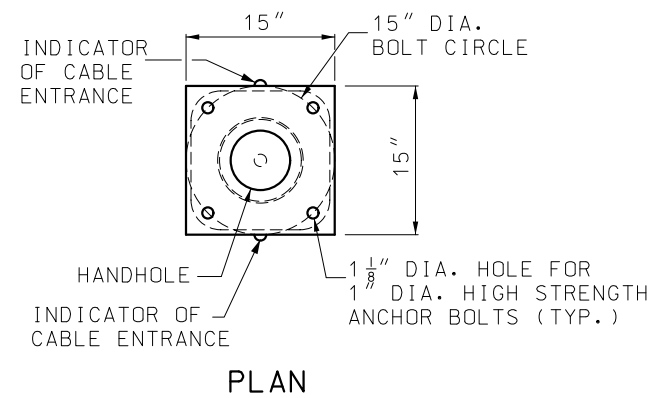
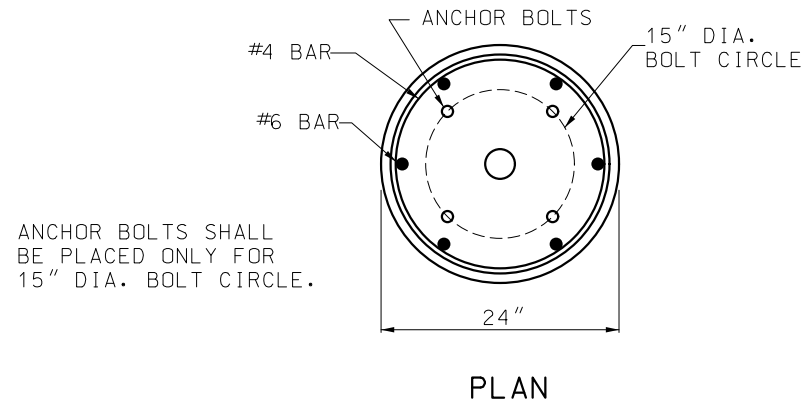
DATE EFFECTIVE: 01/01/2021  
DATE PREPARED: 10/14/2020

901.00AB

SHEET NO.  
3 OF 4

HIGHWAY LIGHTING  
POLES, FOUNDATIONS AND  
APPURTENANCES FOR  
30' MOUNTING HEIGHT

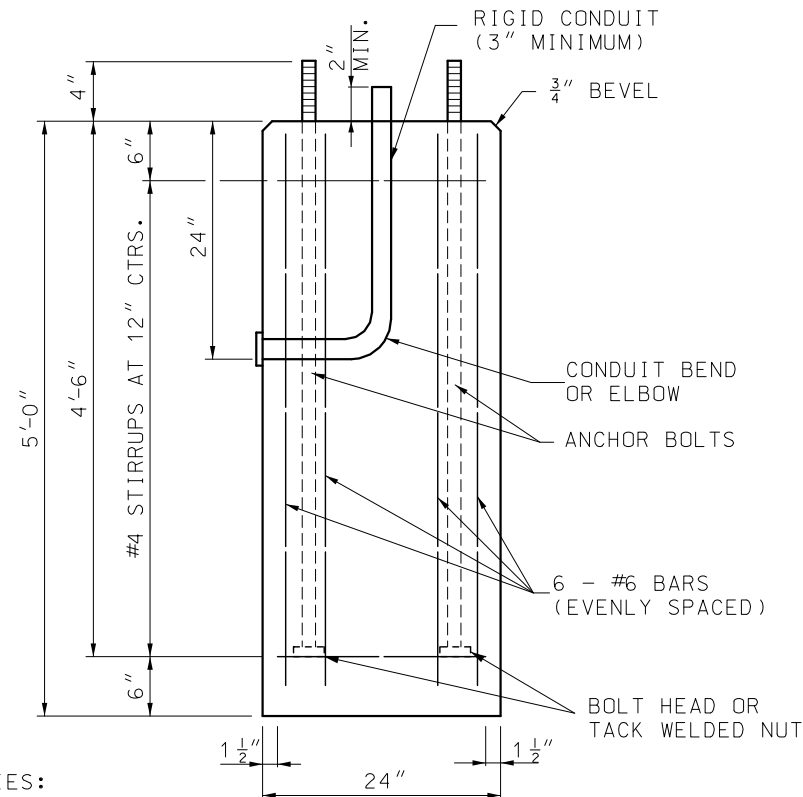
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DRIVE HOLES WILL BE PERMITTED PROVIDED THAT THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE. THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.

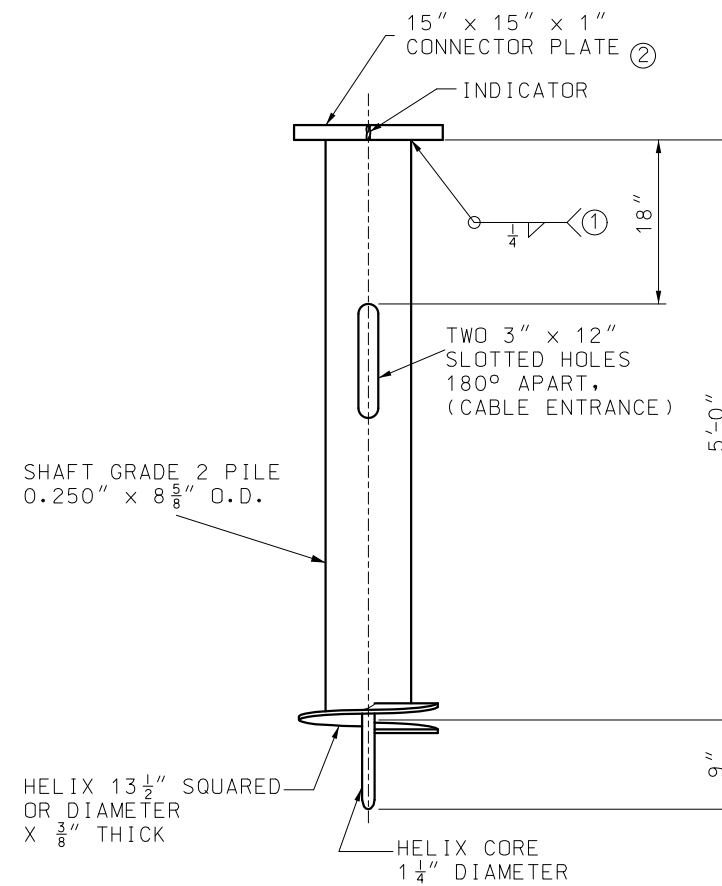
NOTES:

- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.
- ③ AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATION MAY BE PRECAST. IF PRECAST, THEY SHALL BE SET IN DRILLED HOLES 3 FEET IN DIAMETER AND 6 INCHES DEEPER THAN THE BOTTOM OF THE CONCRETE FOUNDATION. THE BOTTOM 6 INCHES OF THE HOLE AND THE REMAINING SPACE AROUND THE FOUNDATION SHALL BE BACKFILLED WITH WET TAMPED LIMESTONE SCREENINGS IN LAYERS NOT EXCEEDING 12 INCHES.



QUANTITIES:  
CONC. = 0.58 CU. YD.  
REIN. = 64 LBS.

ELEVATION  
DETAILS OF CONCRETE FOUNDATION ③



ELEVATION  
DETAILS OF SCREW ANCHOR FOUNDATION

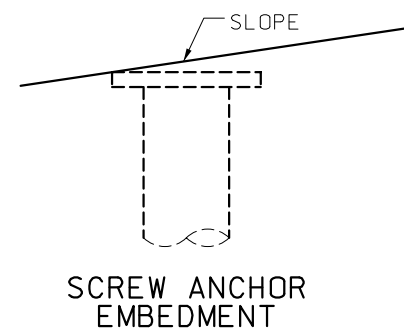
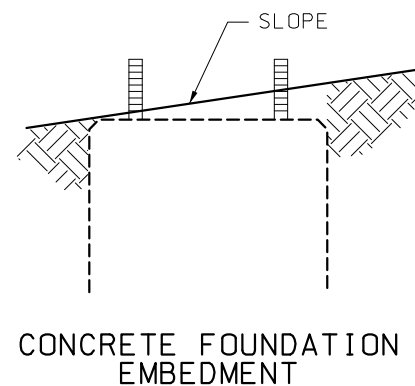
GENERAL NOTES:


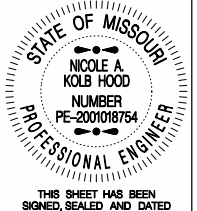
ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

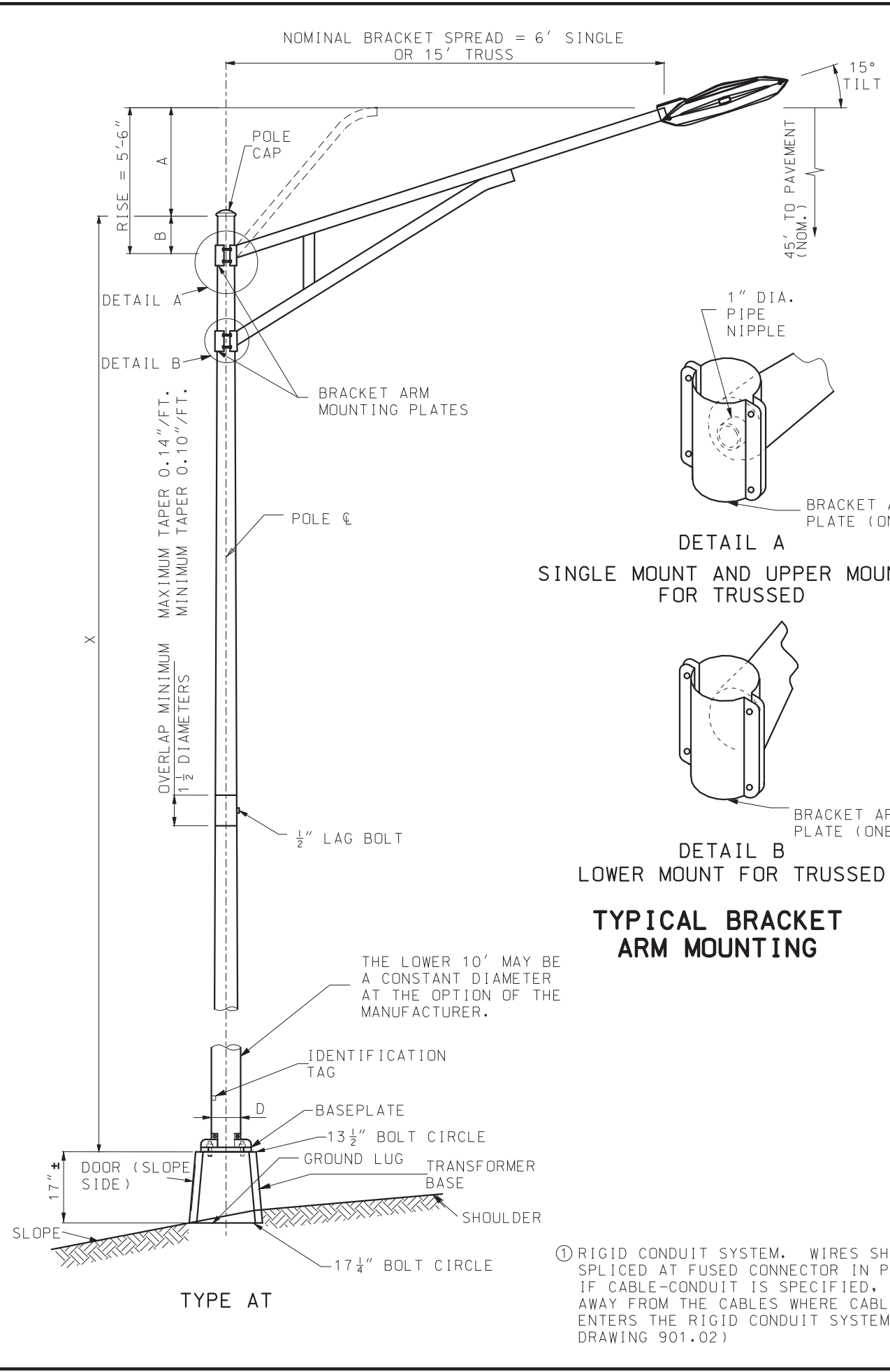
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT</b></p>
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	<p><b>901.00AB</b></p>
SHEET NO. 4 OF 4	

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

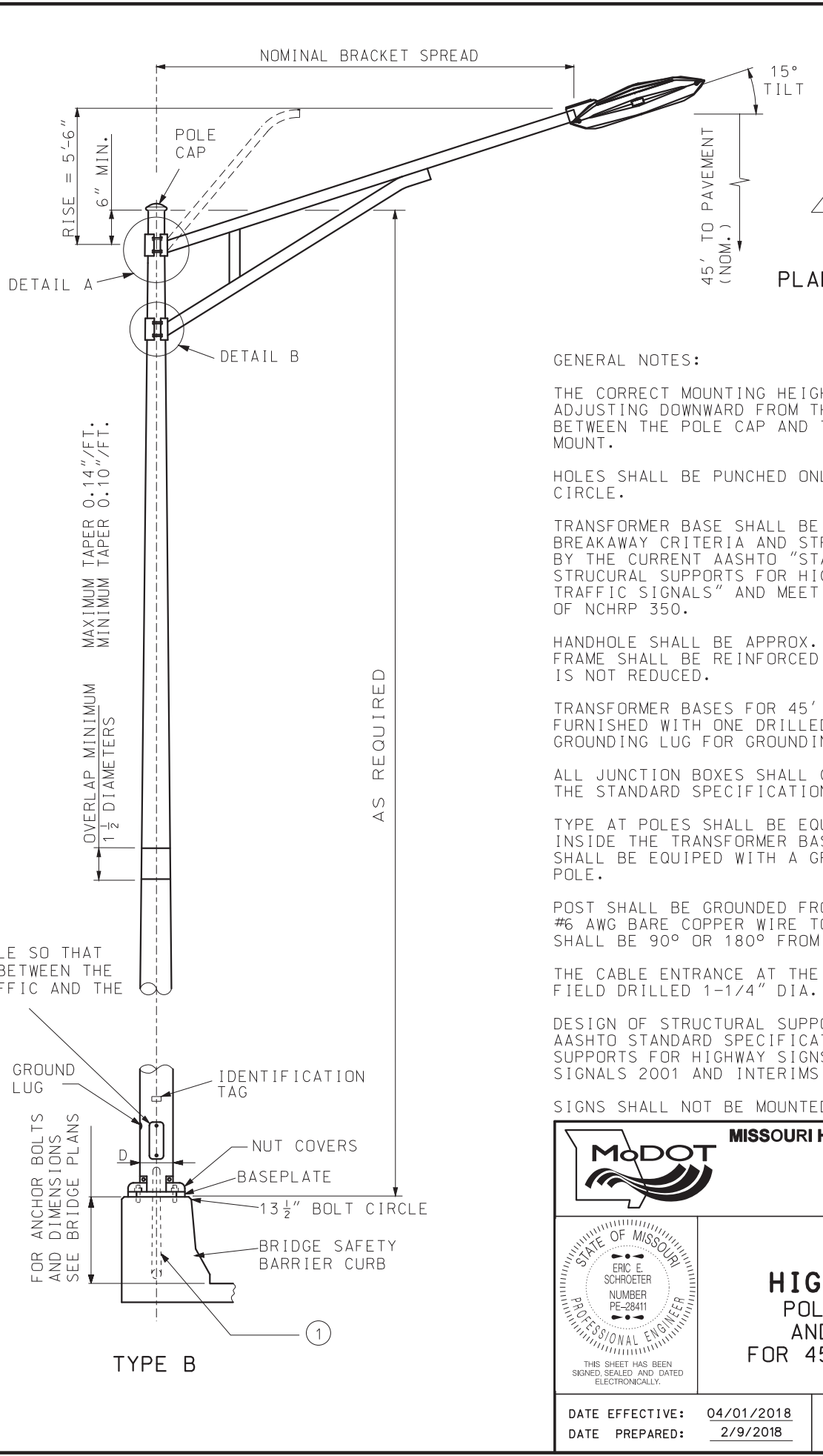


DETAIL A  
SINGLE MOUNT AND UPPER MOUNT  
FOR TRUSSED

DETAIL B  
LOWER MOUNT FOR TRUSSED

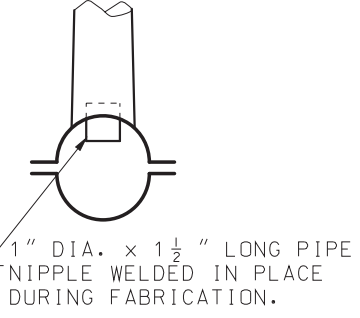
**TYPICAL BRACKET  
ARM MOUNTING**

ALIGN HANDHOLE SO THAT  
THE POLE IS BETWEEN THE  
ONCOMING TRAFFIC AND THE  
HANDHOLE.



TYPE B

PLAN VIEW OF DETAIL A



**GENERAL NOTES:**

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND INTERIMS THROUGH 2003.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

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

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

**HIGHWAY LIGHTING  
 POLES, FOUNDATIONS  
 AND APPURTENANCES  
 FOR 45' MOUNTING HEIGHT**

DATE EFFECTIVE: 04/01/2018  
 DATE PREPARED: 2/9/2018

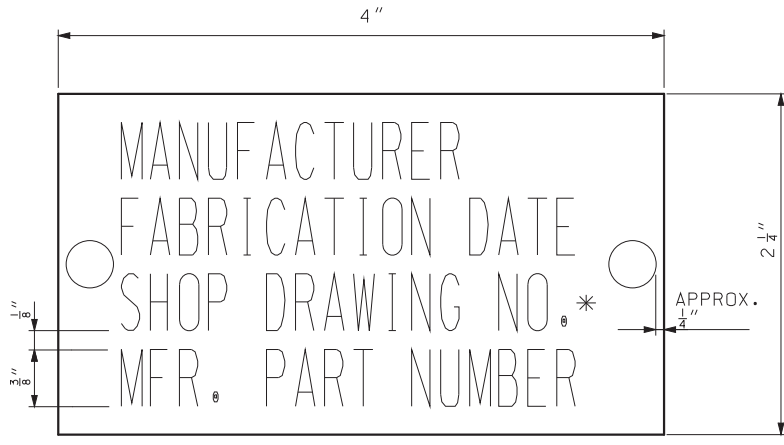
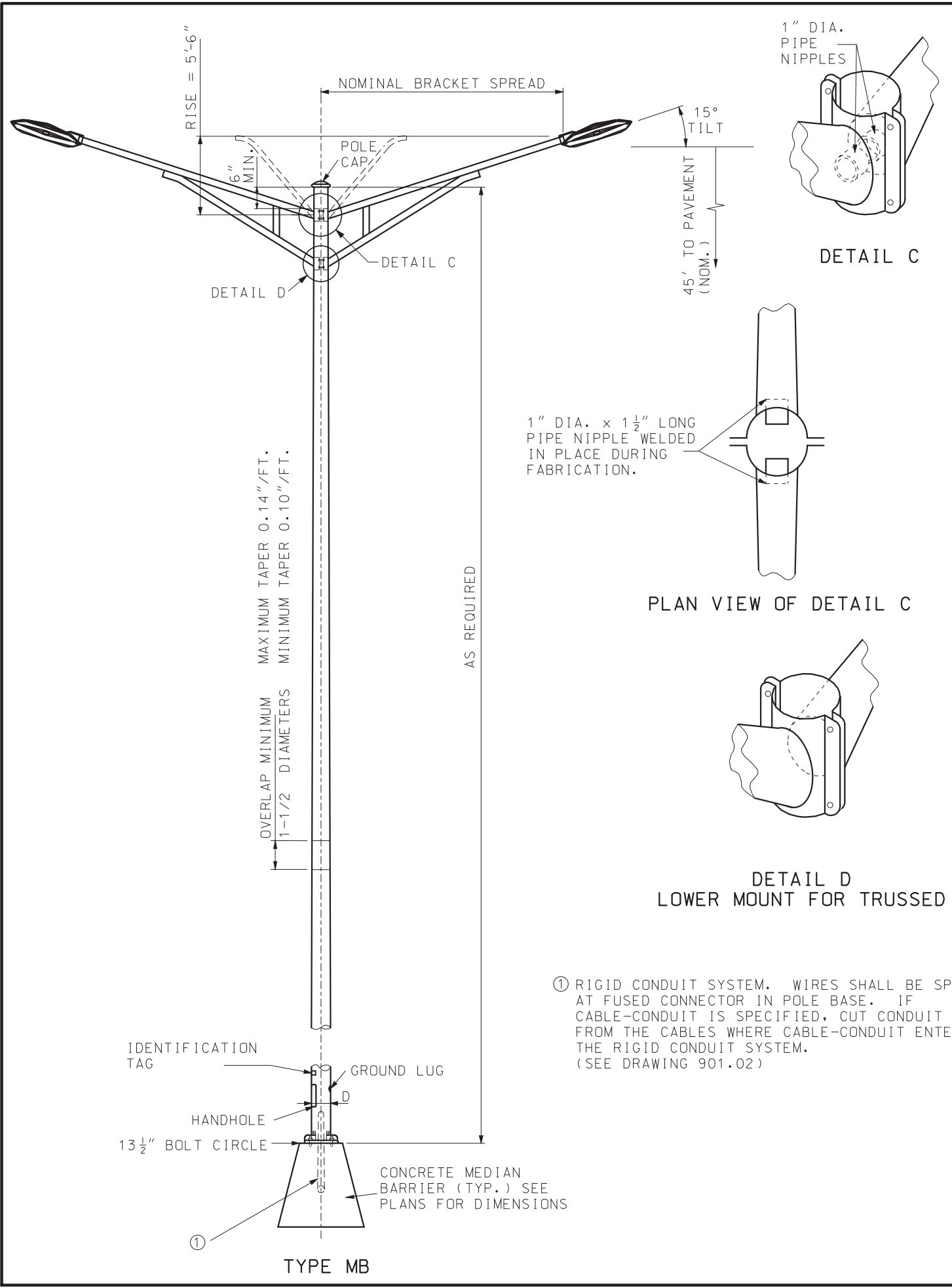
**901.01AJ**

SHEET NO.  
 1 OF 6

① RIGID CONDUIT SYSTEM. WIRES SHALL BE SPLICED AT FUSED CONNECTOR IN POLE BASE. IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM THE CABLES WHERE CABLE-CONDUIT ENTERS THE RIGID CONDUIT SYSTEM. (SEE DRAWING 901.02)

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

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



**IDENTIFICATION TAG**

ID TAG NOTE:

TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS. ID TAG HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

\* INCLUDING REVISION

**GENERAL NOTES:**

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.


TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

① RIGID CONDUIT SYSTEM. WIRES SHALL BE SPLICED AT FUSED CONNECTOR IN POLE BASE. IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM THE CABLES WHERE CABLE-CONDUIT ENTERS THE RIGID CONDUIT SYSTEM. (SEE DRAWING 901.02)

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p><b>HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT</b></p>
DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018	<p><b>901.01AJ</b></p>
SHEET NO. 2 OF 6	

**TYPE MB**



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

TYPE AT POLE				
BRACKET SPREAD		6' OR 15'		
MAX. LUMINAIRE WEIGHT		60 LB		
MAX. PROJECTED AREA		3.3 SQ. FT.		
AT-45 DESIGN NO.	X	A	B	D* (NOMINAL)
1	50'	VAR.	6" MIN.	10"
2	45'	VAR.	6" MIN.	10"
3	40'	VAR.	6" MIN.	10"
4	35'	VAR.	6" MIN.	10"
5	30'	VAR.	6" MIN.	10"

\* THE MINIMUM ALTERNATE DIAMETER SHALL BE 10" FOR A 50' POLE, 9-1/2" FOR A 45' POLE, 9" FOR A 40' POLE, 8-1/2" FOR A 35' POLE AND 8" FOR A 30' POLE.

LED LUMINAIRES				
FUSE RATING	DESIGNATION	MAX. WATT	DISTRIBUTION TYPE	BACKLIGHT-UPLIGHT-GLARE (BUG) RATING
3 A	LED-A	103	III	B2-U0-G2
5 A	LED-B	170	III	B3-U0-G3
7 A	LED-C	275	III	B3-U0-G3
LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED ON PLANS.				

**GENERAL NOTES:**

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6 1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

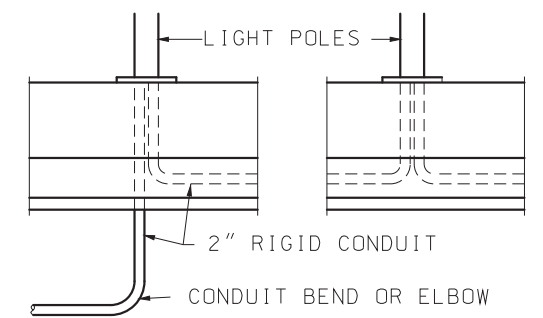
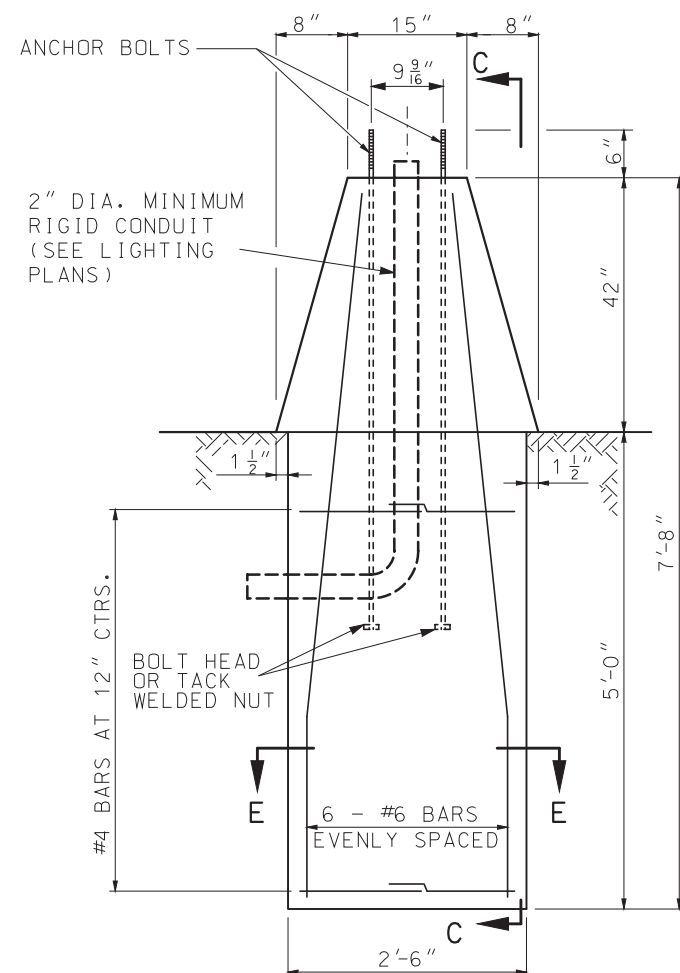
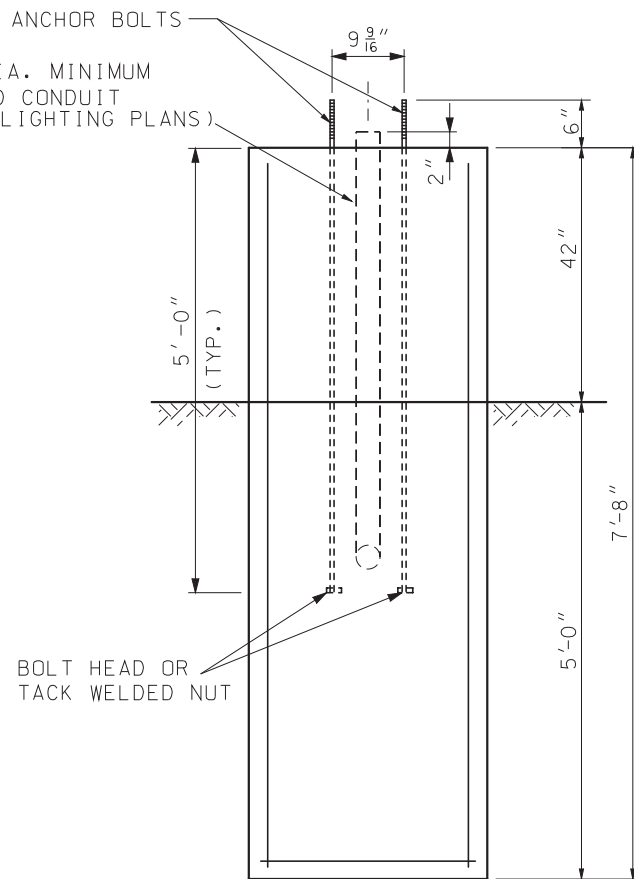
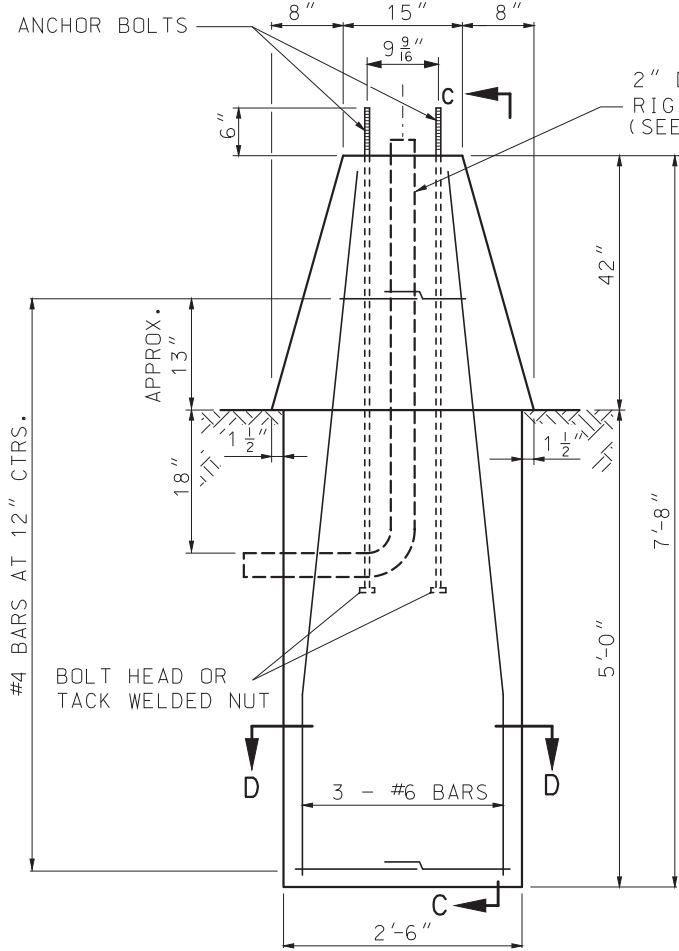
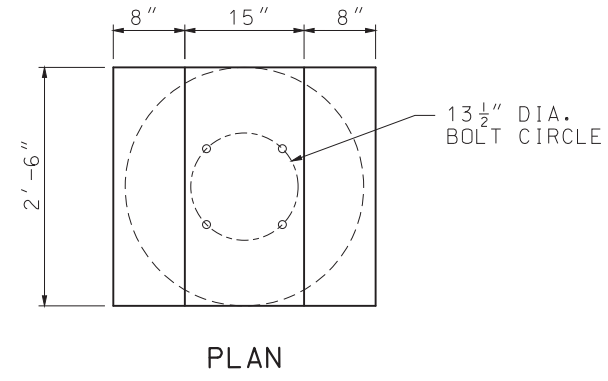
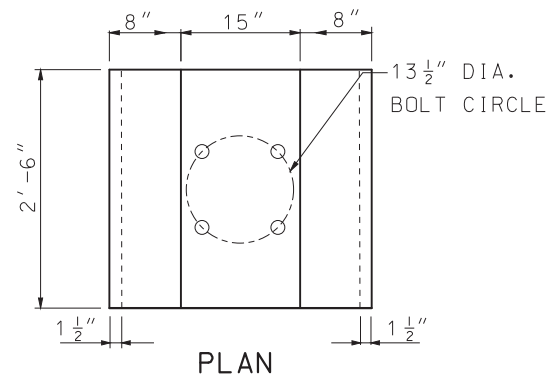
POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1 1/4" DIA. HOLE.

TYPE B POLE			
BRACKET SPREAD		6' OR 15'	
MAX. LUMINAIRE WEIGHT		60 LB	
MAX. PROJECTED AREA		3.3 SQ. FT.	
SINGLE BRACKET ARM			
LOCATION	BRACKET SPREAD	D NOM.	ANCHOR BOLT DIA.
BRIDGE SAFETY BARRIER CURB	6'	10"	1-1/4"
TRUSSED BRACKET ARM			
LOCATION	BRACKET SPREAD	D NOM.	ANCHOR BOLT DIA.
BRIDGE SAFETY BARRIER CURB	15'	10"	1-1/4"

TYPE MB POLE		
BRACKET SPREAD		6' OR 15'
MAX. LUMINAIRE WEIGHT		60 LB
MAX. PROJECTED AREA		3.3 SQ. FT.
DOUBLE BRACKET ARM		
LOCATION	BRACKET SPREAD	D NOM.
MEDIAN BARRIER CURB	6'	10"
DOUBLE TRUSSED BRACKET ARM		
LOCATION	BRACKET SPREAD	D NOM.
MEDIAN BARRIER CURB	15'	10"

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	<p><b>STATE OF MISSOURI</b></p> <p>ERIC E. SCHROETER NUMBER PE-28411 <b>PROFESSIONAL ENGINEER</b></p> <p><small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small></p>	<p><b>HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT</b></p>
	<p>DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018</p>	<p><b>901.01AJ</b></p>



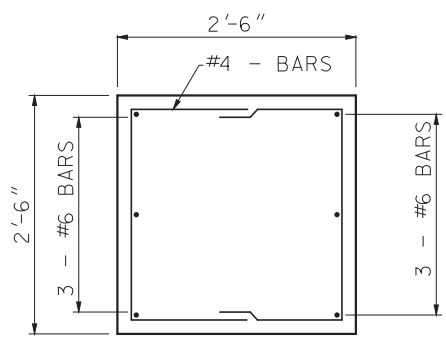
CONDUIT DETAIL FOR ALTERNATE 1 & 2

GENERAL NOTES:

ALL FOUNDATIONS SHALL INCLUDE 4 ANCHOR BOLTS AND NUTS PLACED AS SHOWN.

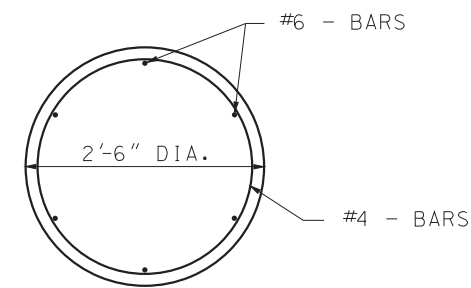
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 1/4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

TOUNGE AND GROOVE REQUIRED ON MEDIAN BARRIER SECTION FOR TYPE MB POLES WHEN ADJACENT MEDIAN BARRIER IS PRECAST, FOR DETAILS, SEE STANDARD PLANS.


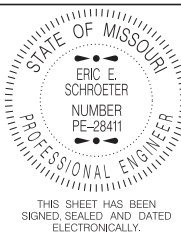


SECTION D-D

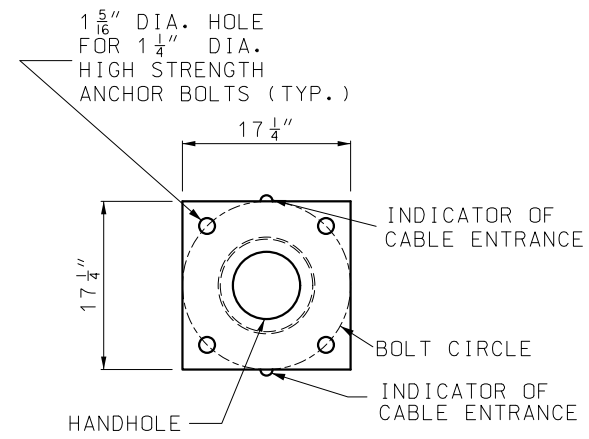
CONCRETE MEDIAN BARRIER AND FOUNDATION DESIGN FOR TYPE MB LIGHT POLE



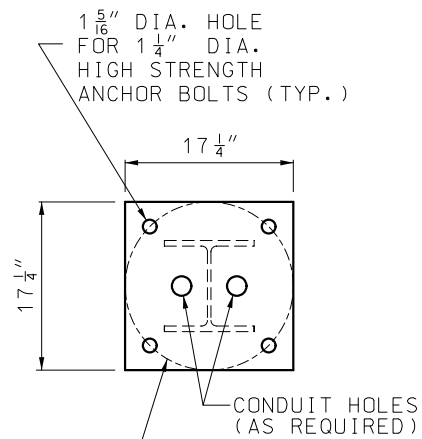
SECTION E-E

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p><b>HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT</b></p>
DATE EFFECTIVE: 12/01/2013 DATE PREPARED: 2/9/2018	<p><b>901.01AJ</b></p>
SHEET NO. 4 OF 6	

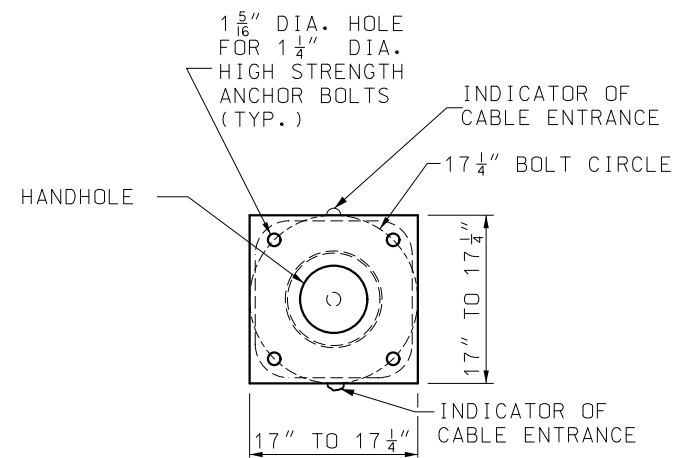
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN

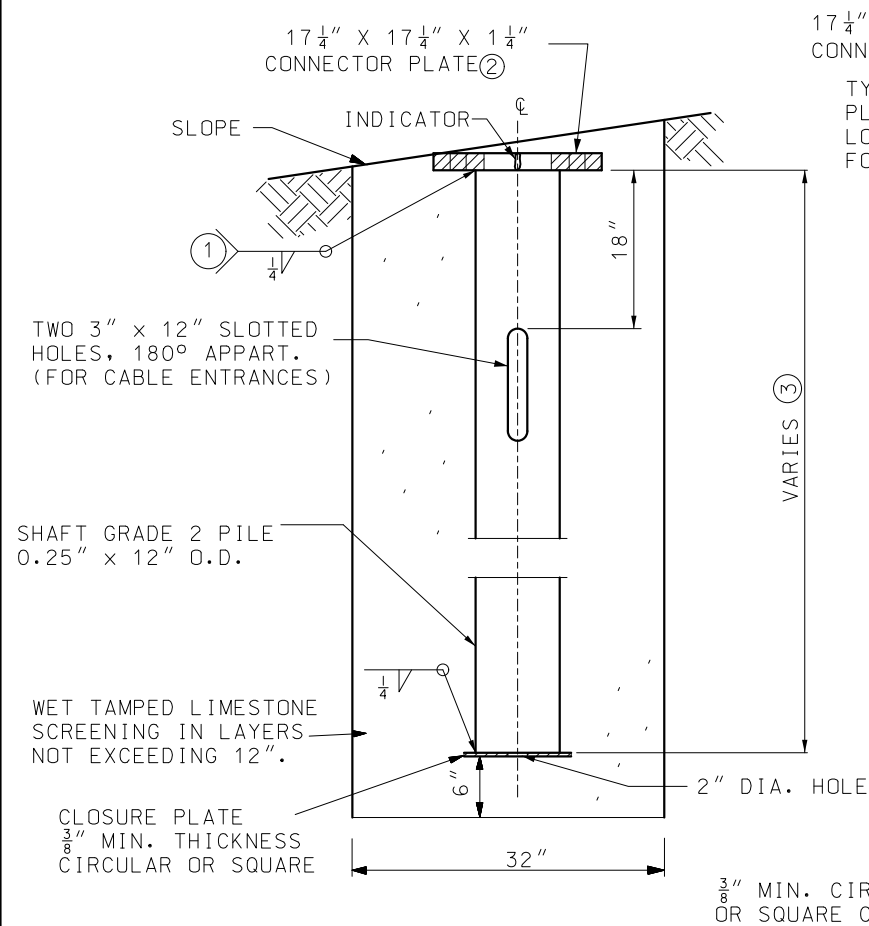


PLAN

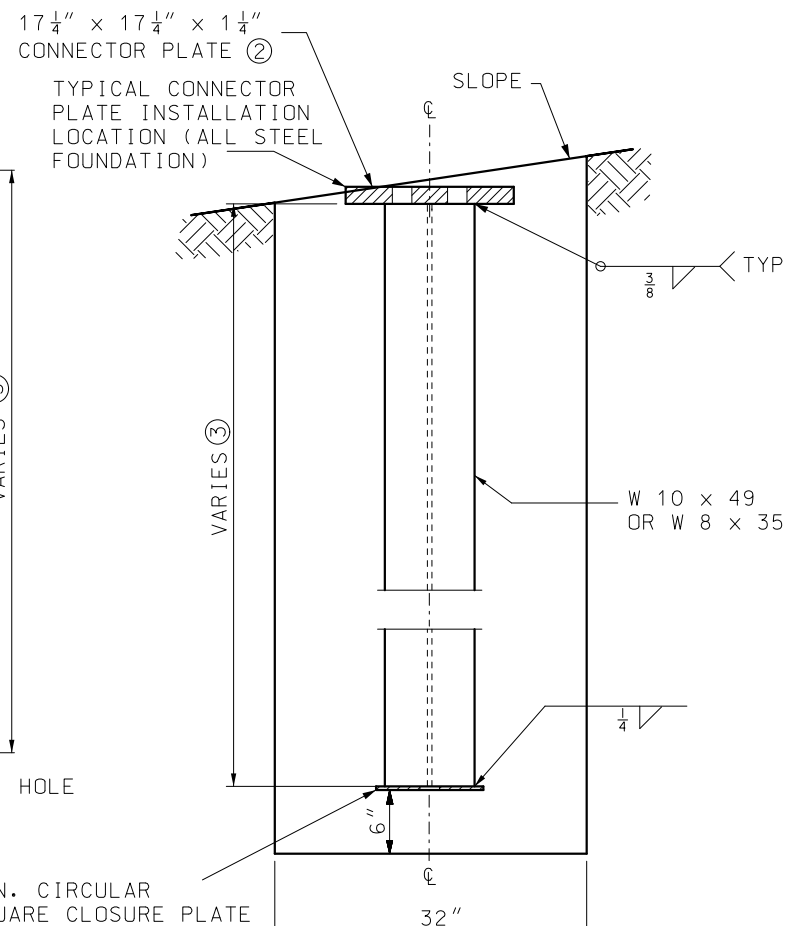


PLAN

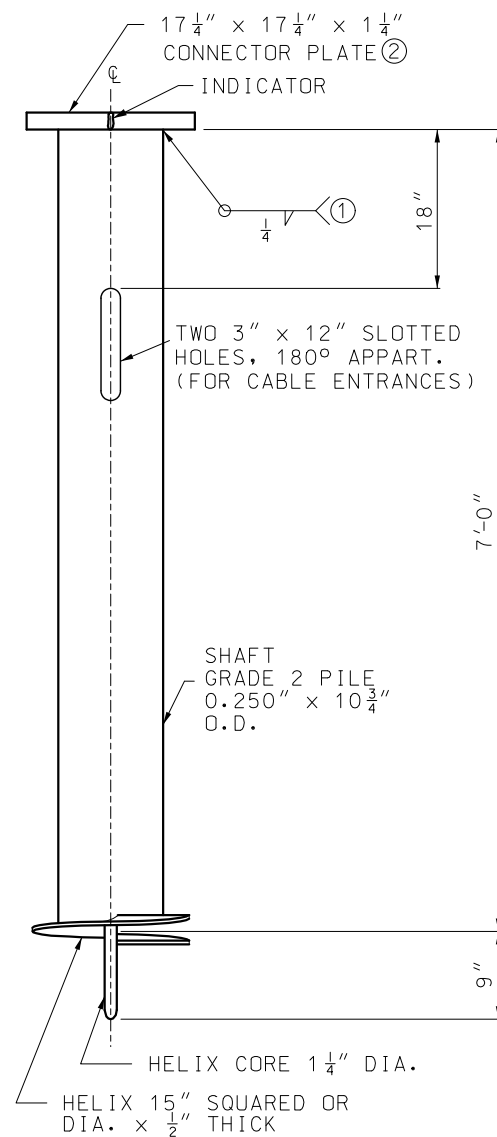
NOTE:  
DRIVE HOLES WILL BE PERMITTED PROVIDED THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE, THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.



ELEVATION  
DETAILS OF CIRCULAR  
STEEL PILE FOUNDATION



ELEVATION  
DETAILS OF STEEL "H"  
PILE FOUNDATION



ELEVATION  
DETAILS OF  
SCREW ANCHOR FOUNDATION

- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.
- ③ PILE LENGTHS FOR STEEL PILE FOUNDATIONS:
 

AT-45 DESIGN NO.	PILE LENGTH
4 & 5	8'-0"
2 & 3	9'-0"
1	10'-0"

GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL BOLT CIRCLES FOR 45' MOUNTING HEIGHT SHALL BE 17 1/4".

ALL CONECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 1/4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**HIGHWAY LIGHTING  
POLES, FOUNDATIONS  
AND APPURTENANCES  
FOR 45' MOUNTING HEIGHT**

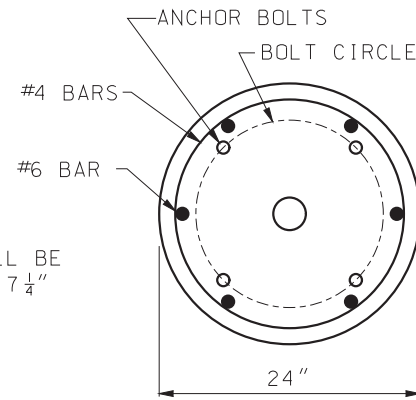
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DATE PREPARED: 10/14/2020

**901.01AJ**

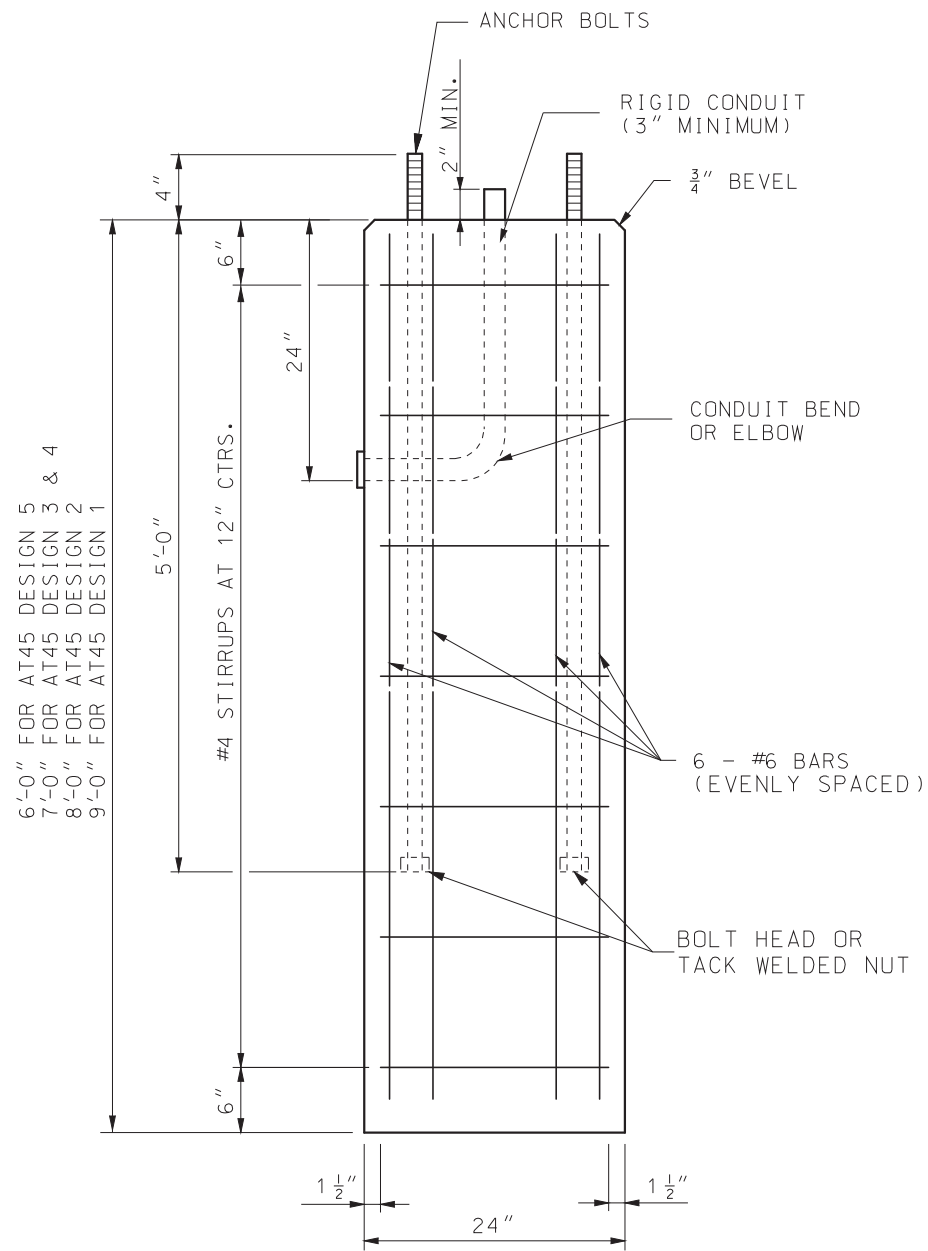
SHEET NO.  
5 OF 6

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

NOTE:  
ANCHOR BOLTS SHALL BE  
PLACED ONLY FOR 17 1/4"  
BOLT CIRCLE



PLAN

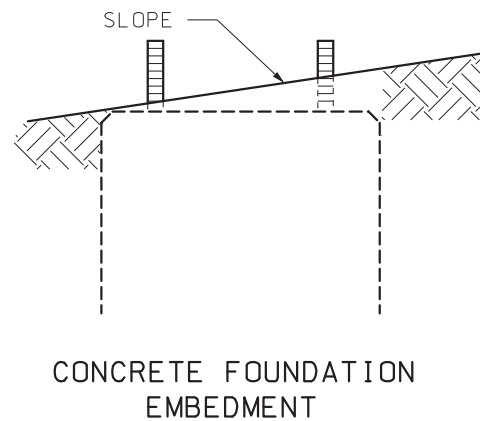


ELEVATION

DETAILS OF CONCRETE  
FOUNDATION ④

④ AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATIONS MAY BE PRECAST. IF PRECAST, THEY SHALL BE SET IN DRILLED HOLES 3 FEET IN DIAMETER AND 6 INCHES DEEPER THAN THE BOTTOM OF THE CONCRETE FOUNDATION. THE BOTTOM 6 INCHES OF THE HOLE AND THE REMAINING SPACE AROUND THE FOUNDATION SHALL BE BACKFILLED WITH WET TAMPED LIMESTONE SCREENINGS IN LAYERS NOT EXCEEDING 12 INCHES.

HEIGHT	QUANTITIES	
	CONC. CU. YD.	REINF. LBS.
6' - 0"	.70	80
7' - 0"	.81	90
8' - 0"	.93	104
9' - 0"	1.05	120



CONCRETE FOUNDATION  
EMBEDMENT

GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL BOLT CIRCLES FOR 45' MOUNTING HEIGHT SHALL BE 17 1/4".

ALL CONECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

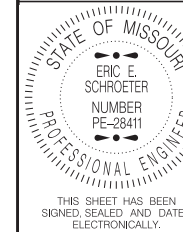
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 1/4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



MISSOURI HIGHWAYS AND TRANSPORTATION  
COMMISSION

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



THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY.

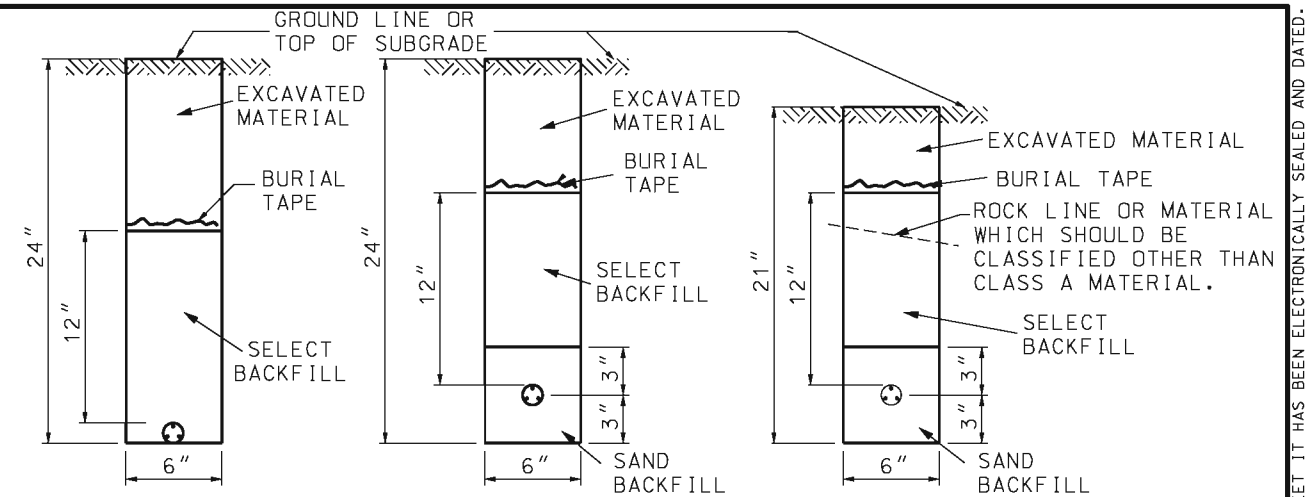
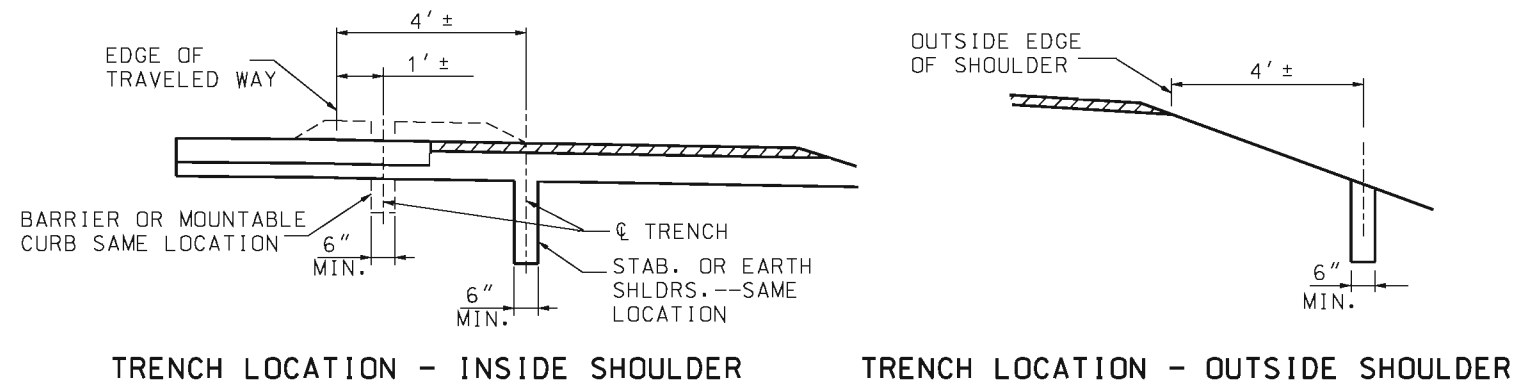
HIGHWAY LIGHTING  
POLES, FOUNDATIONS  
AND APPURTENANCES  
FOR 45' MOUNTING HEIGHT

DATE EFFECTIVE: 12/01/2013  
DATE PREPARED: 2/9/2018

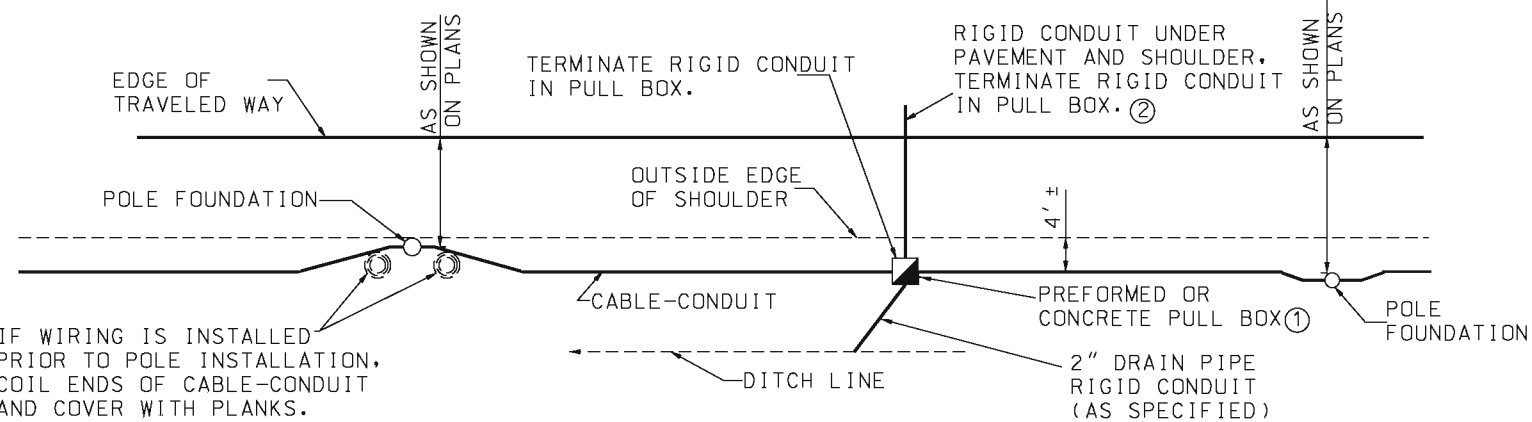
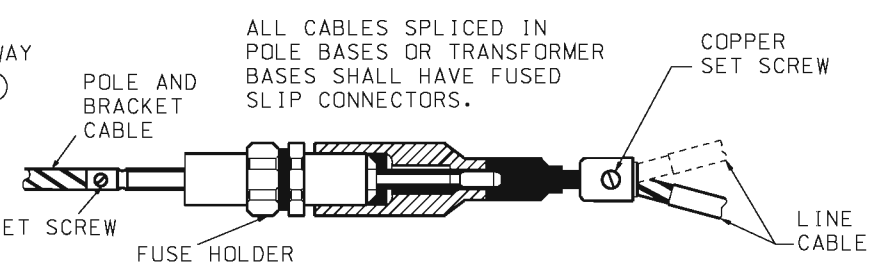
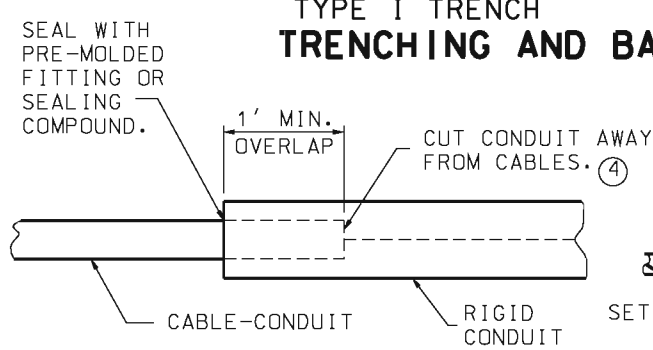
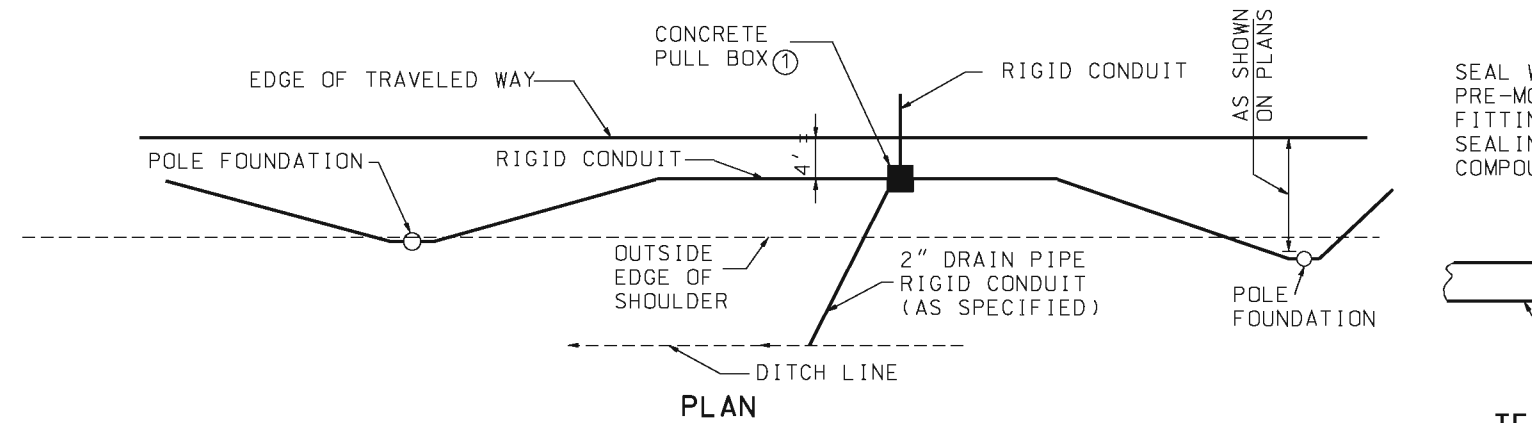
901.01AJ

SHEET NO.  
6 OF 6

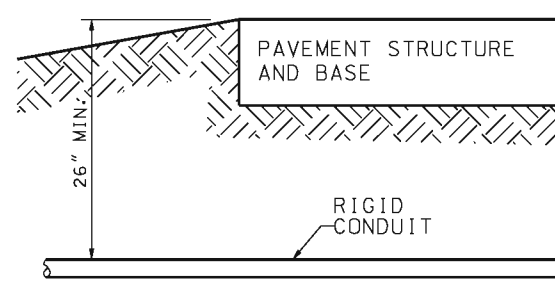
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



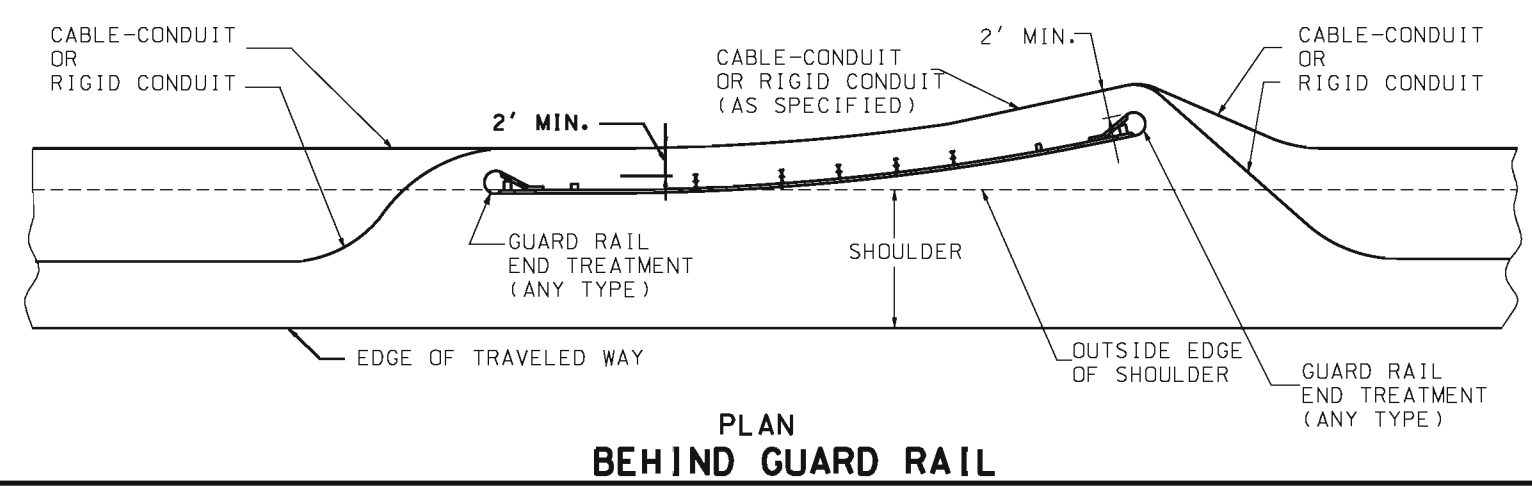
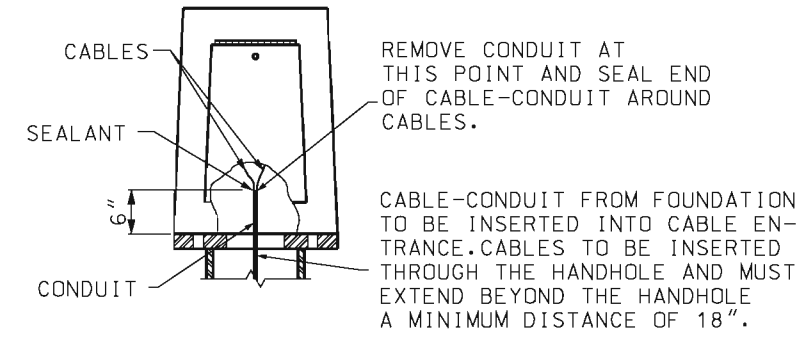
**TRENCHING AND BACKFILLING FOR CABLE-CONDUIT**



**RIGID CONDUIT UNDER PAVEMENT**



**TYPICAL TRANSFORMER BASE ATTACHMENT**



**GENERAL NOTES:**

- NOTES:**
- ① SEE DRAWING 902.20 FOR PULL BOXES.
  - ② CONDUIT MAY BE REMOVED FROM CABLES IN RIGID CONDUIT. SPLICES SHALL NOT BE MADE UNLESS SHOWN ON PLANS.
  - ③ BRAND AND MODEL OF FUSE HOLDER SHALL BE APPROVED BY THE ENGINEER.
  - ④ CABLES SHALL BE CONTINUOUS TO THE FIRST LIGHT POLE. SPLICES SHALL NOT BE MADE FOR THE PURPOSE OF TERMINATING CABLE-CONDUIT.

THE CONDUIT OF THE CABLE-CONDUIT SHALL BE CUT AWAY FROM THE CABLES WHERE THEY ENTER THE RIGID CONDUIT INSIDE A CONCRETE BARRIER OR STRUCTURE.

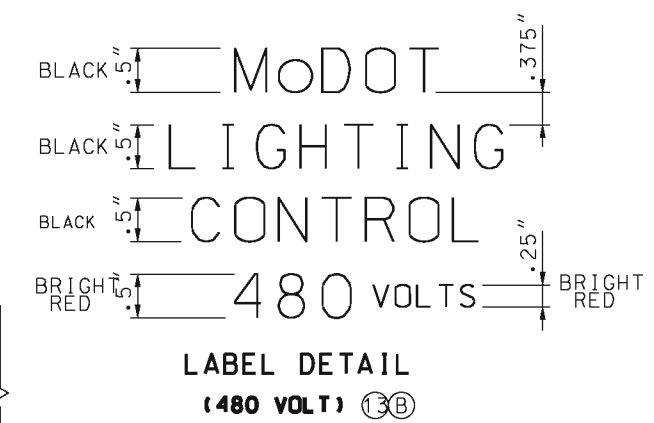
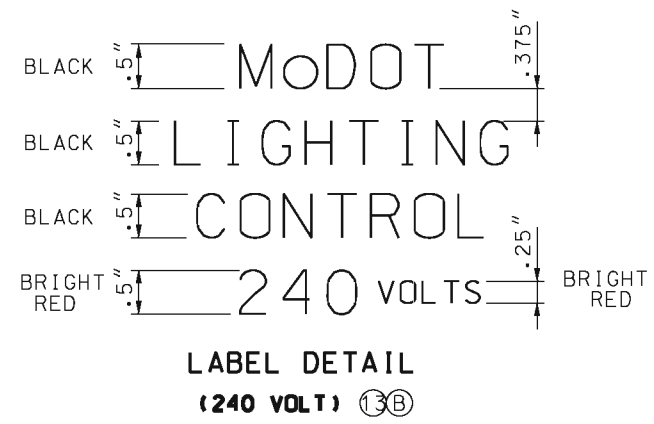
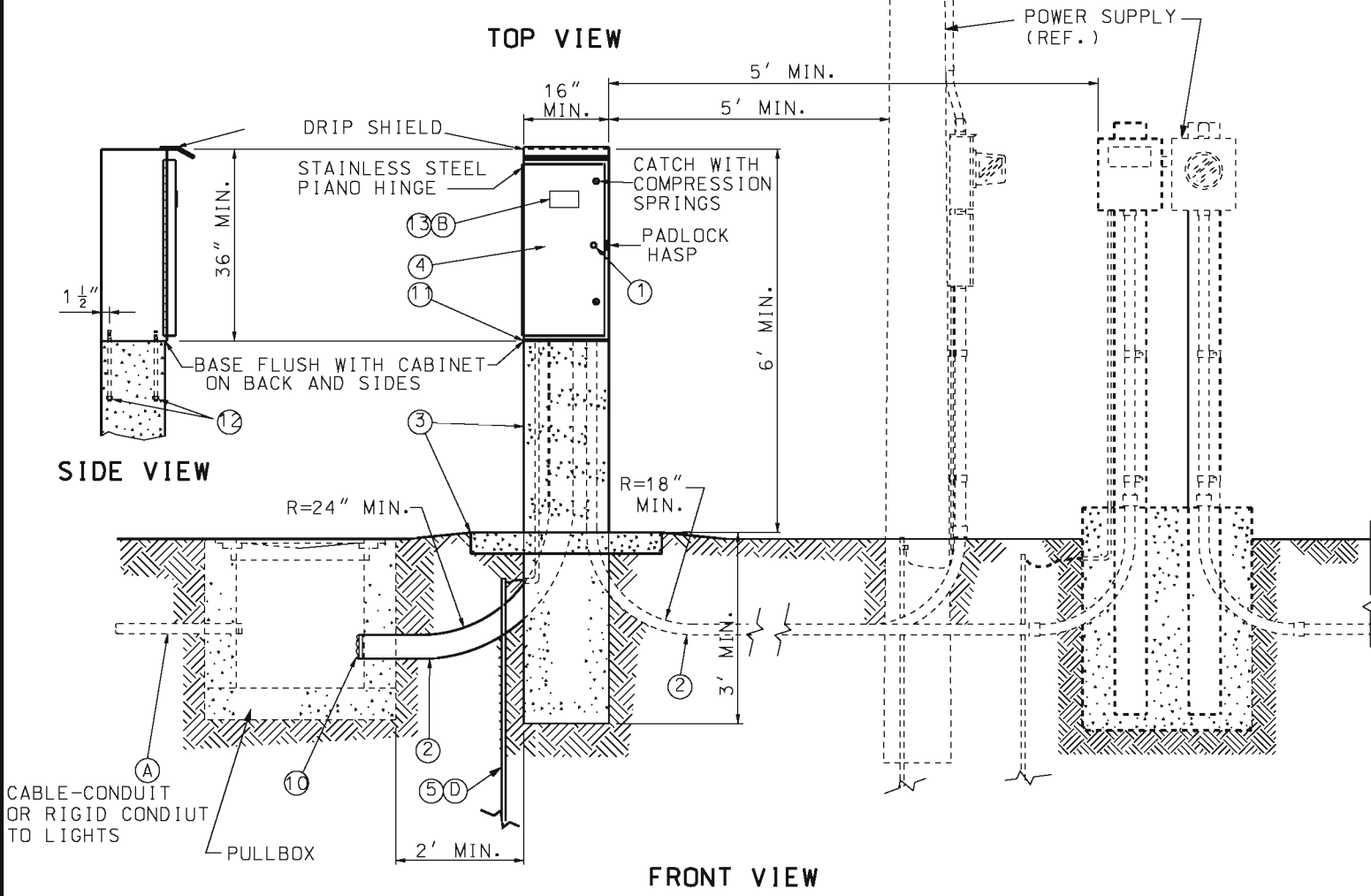
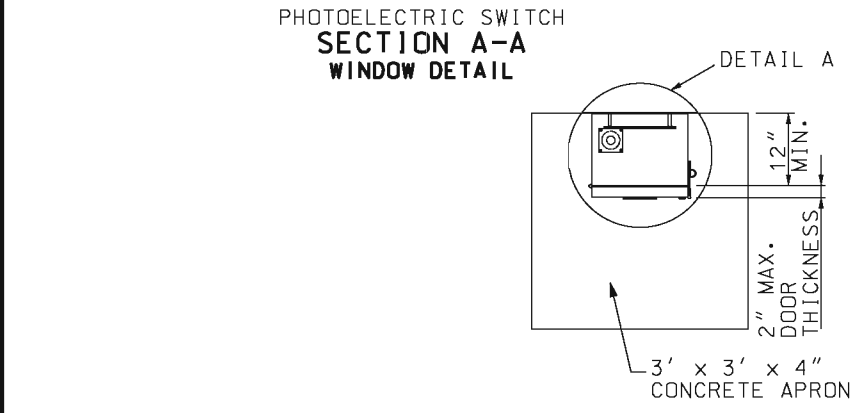
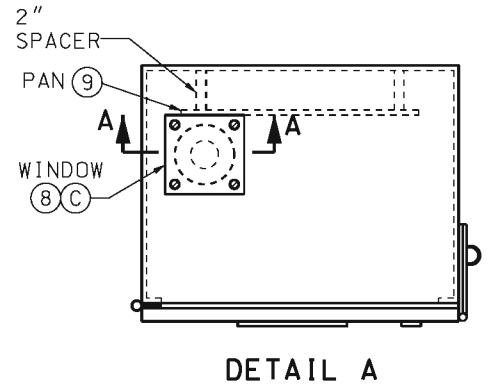
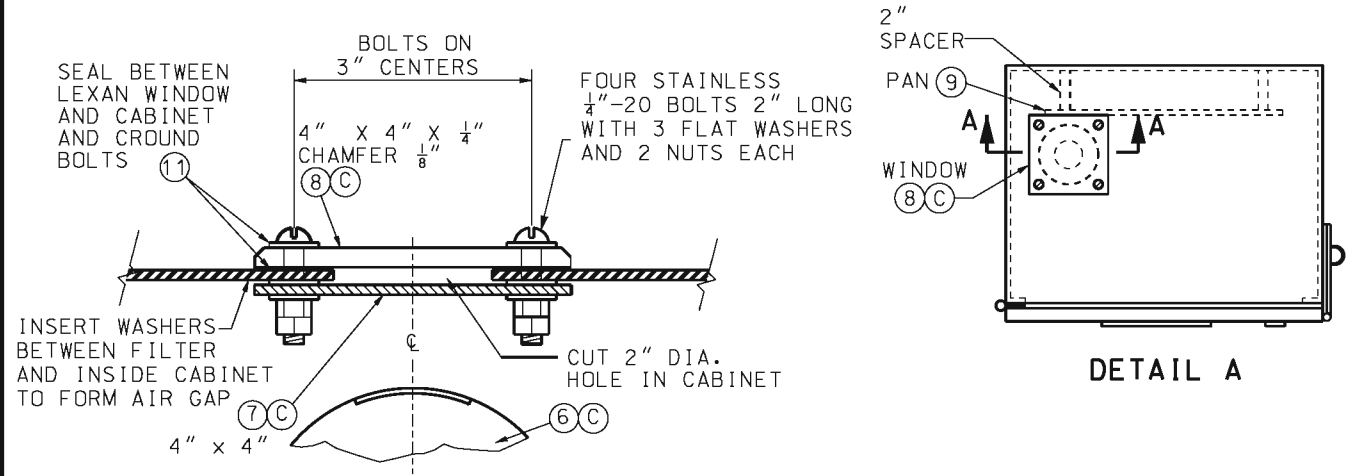
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>HIGHWAY LIGHTING CABLE, CONDUIT AND TRENCHING</b>	
	DATE EFFECTIVE: 04/01/2002 DATE PREPARED: 3/10/2011	<b>901.02B</b>

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

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

LIST OF MATERIALS	
ITEM	DESCRIPTION
1	#2 CORBIN LOCK
2	RIGID CONDUIT *
3	CLASS B CONCRETE, 0.4 C.Y. ±
4	NEMA 4, DUST-TIGHT, WATERTIGHT, CABINET
5	GROUND ROD, 3/4" DIA. X 8' MIN.
6	PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000-WATT
7	TRANSLUCENT, PLEXIGLASS FILTER #W2067, 1/8" THICK
8	CLEAR, LEXAN #9034 WINDOW, 1/4" THICK MIN.
9	MOUNTING PAN, 3 1/2" x 12" x 1/4" ALUMINUM OR STAINLESS STEEL
10	PLIABLE DUCT SEALANT
11	LIFETIME SILICONE CAULK
12	ANCHOR BOLTS, 5/8-11 x 14" LONG BOLTS, HOT DIP GALVANIZED, 4 REQUIRED, USE BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END
13	WEATHERPROOF ADHESIVE LABEL, VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL)
* - SEE PLANS	

- NOTES
- (A) IF CABLE-CONDUIT IS SPECIFIED, THE CONDUIT SHALL BE CUT AWAY FROM CABINET BETWEEN PULL BOX AND CONTROL STATION.
  - (B) LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.
  - (C) PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
  - (D) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.



GENERAL NOTES:

ALTERNATE CABINET DIMENSIONS WILL BE ALLOWED AS APPROVED BY THE ENGINEER. INTERIOR CABINET VOLUME SHALL BE EQUAL TO OR GREATER THAN THAT SHOWN ON PLANS AND PROPER CLEARANCES SHALL BE PROVIDED FOR ALL EQUIPMENT. CONCRETE BASE DIMENSIONS SHALL BE MODIFIED TO FIT THE CABINET SUPPLIER.

PLACEMENT OF ALL ITEMS SHALL BE APPROVED BY THE ENGINEER.

CABINET SHALL BE LOCATED AWAY FROM TRAFFIC. TOP MOUNT PHOTO CONTROL SHALL FACE AN OPEN SKY. SIDE MOUNT PHOTO CONTROL SHALL FACE NORTH.

SEE PLANS FOR CIRCUIT WIRING; MAXIMUM LOADING PER CIRCUIT IS 7,400 WATTS FOR 240 VOLT AND 11,000 WATTS FOR 480 VOLT.

SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.

THE UTILITY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

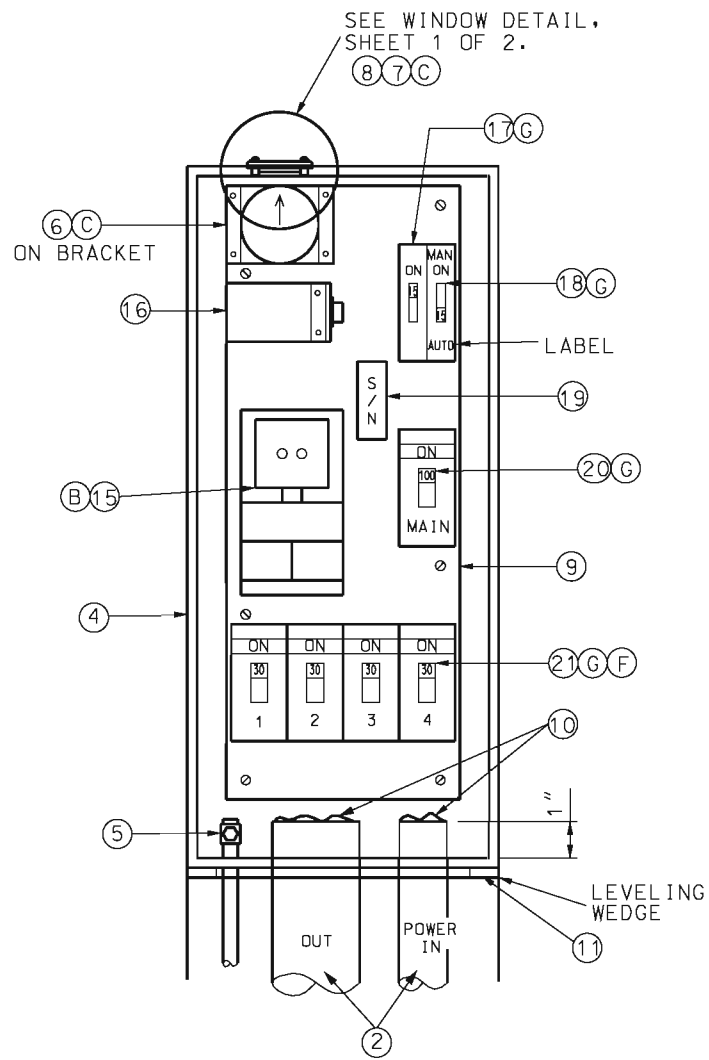
ALL OPENINGS IN CABINET SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR CONTROL STATION.

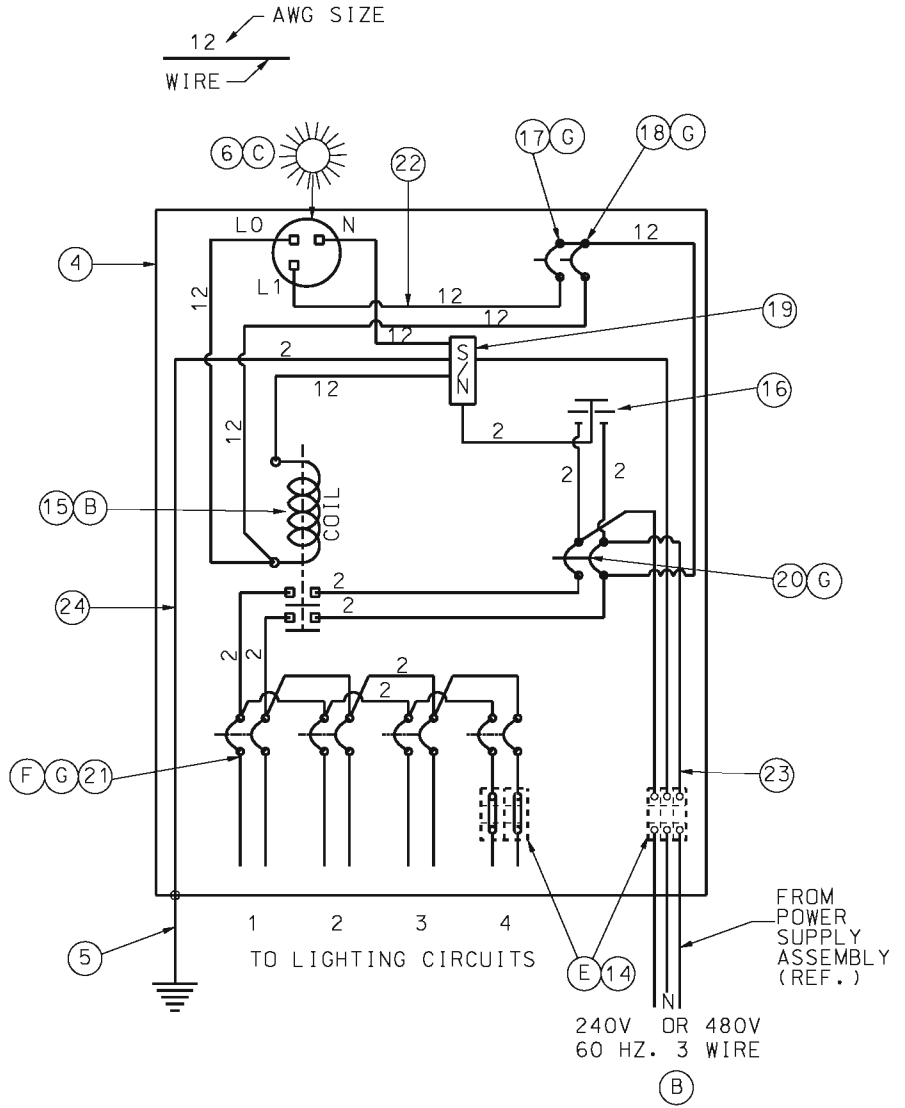
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>HIGHWAY LIGHTING</b> <b>BASE MOUNTED</b> <b>CONTROL STATION</b> <b>240 V OR 480 V - 4 CIRCUIT</b>	
	DATE EFFECTIVE: 04/01/2005 DATE PREPARED: 9/14/2010	<b>901.30F</b>

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

LIST OF MATERIALS	
ITEM	DESCRIPTION
2	RIGID CONDUIT *
4	NEMA 4, DUST-TIGHT, WATERTIGHT CABINET
5	GROUND ROD, 3/4" DIA. X 8' MIN.
6	PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000 WATT
7	TRANSLUCENT, PLEXIGLASS FILTER #W2067, 1/8" THICK
8	CLEAR, LEXAN #9034 WINDOW, 1/4" THICK MIN.
9	MOUNTING PAN, 31 1/2" x 12" x 1/4" ALUMINUM OR STAINLESS STEEL
10	PLIABLE SEALANT
11	LIFETIME SILICONE CAULK
14	INSULATED TERMINAL BLOCK, FOR GREATER THAN 4/0 CABLE
15(240V)	2-POLE, 100 AMP, 120V COIL LIGHTING CONTACTOR
15(480V)	2-POLE, 100 AMP, 240V COIL LIGHTING CONTACTOR
16	2-POLE, 650 VOLT LIGHTING ARRESTER
17	1-POLE, 15 AMP, TYPE B CONTROL BREAKER
18	1-POLE, 15 AMP, TYPE B MANUAL-AUTO SWITCH
19	INSULATED GROUNDABLE NEUTRAL, 100 AMP
20	2-POLE, 100 AMP, TYPE A MAIN BREAKER
21	2-POLE, 15 AMP(MIN), TYPE A LIGHTING BREAKERS
22	#12 AWG MIN., 600 V. CONTROL CABLE
23	#2 AWG MIN., 600 V. * POWER CABLE
24	#2 AWG MIN., 600 V. GROUND CABLE
*	SEE PLANS



**EQUIPMENT LAYOUT**



**WIRING DIAGRAM**

**NOTES**

- (B) LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.
- (C) PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
- (E) IF FOR REASONS OF VOLTAGE DROP A WIRE SIZE IS SPECIFIED LARGER THAN THE BREAKER LUGS CAN ACCOMMODATE, AN INSULATED HEAVY DUTY TERMINAL BLOCK SHALL BE INSTALLED TO TERMINATE THE LARGER WIRES AND A SMALLER JUMPER CONNECTED TO THE BREAKER ITSELF.
- (F) LIGHTING BREAKER SIZING:
 

SIZE (AMPS)	240V TOTAL CIRCUIT LOAD (WATTS)	480V TOTAL CIRCUIT LOAD (WATTS)
15	0-2800	0 - 5500
20	2850-3700	5550 - 7400
25	3750-4600	7450 - 9200
30	4650-5500	9250 - 11,000
35	5550-6500	--
40	6550-7400	--

CIRCUIT LOAD INCLUDES LOAD DUE TO LINE LOSS, LAMP, AND BALLAST LOAD.
- (G) ALL CIRCUIT BREAKERS SHALL CONFORM TO SECTION 901.4 OF THE STANDARD SPECIFICATIONS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

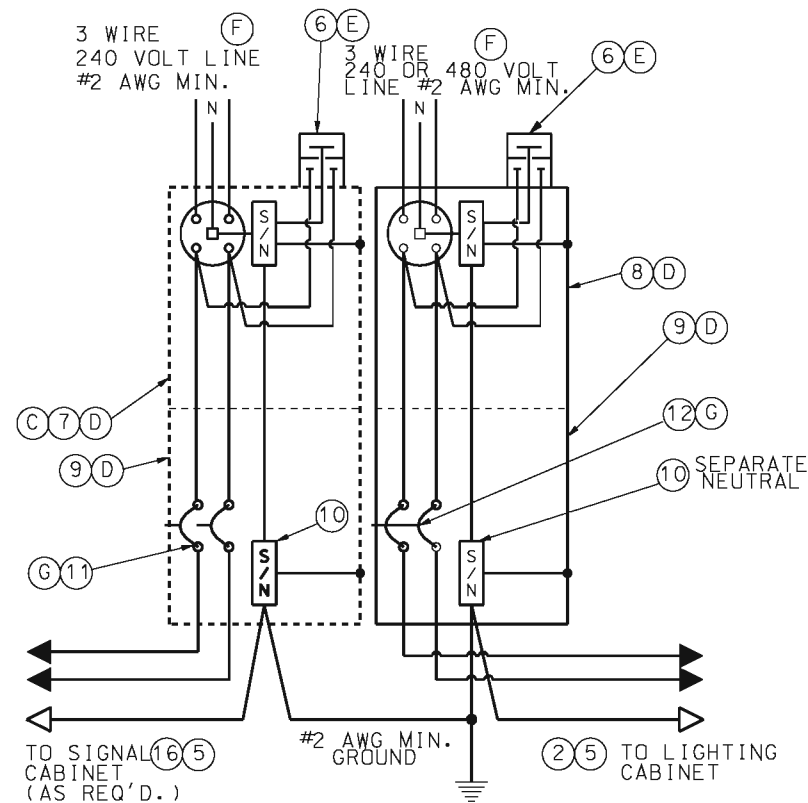
STATE OF MISSOURI  
EILEEN H. RACKERS  
NUMBER PE-28336  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**HIGHWAY LIGHTING  
BASE MOUNTED  
CONTROL STATION  
240 V OR 480 V - 4 CIRCUIT**

DATE EFFECTIVE: 04/01/2005	<b>901.30F</b>	SHEET NO. 2 OF 2
DATE PREPARED: 8/26/2009		

LIST OF MATERIALS	
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN., CLASS 4 WOOD, CONTRACTOR PROVIDED, MoDOT OWNED*
2	#2 AWG MIN. CABLE, 600 VOLT *
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	RIGID CONDUIT, 2" MIN., WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTER, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	METER SOCKET, 200 AMP, FOR LIGHTING
9	LOCKING, RAIN TIGHT, NEMA 4 SERVICE DISCONNECT BOX
10	INSULATED, GROUNDABLE NEUTRAL WIRE, 200 AMP MINIMUM
11	SIGNAL BREAKERS, SINGLE POLE, 40A MIN, TYPE A OR B *
12	LIGHTING BREAKER, 2 POLE, 240 VOLT, 100A, TYPE A OR B
13	1/2" METAL CONDUIT
14	#2 AWG MIN. GROUND WIRE
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT *
17	CLASS B CONCRETE, 0.92 C.Y. ±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	WEATHERPROOF ADHESIVE LABEL (LIGHTING), VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL)
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS), VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL)
21	W6 x 9 OR W6 x 15 GALVANIZED POST
22	#2 AWG MIN. CABLE, 600 VOLT
23	RIGID CONDUIT, 2" MINIMUM
*	SEE PLANS



**WIRING DIAGRAM  
LIGHTING AND/OR SIGNALS**

**NOTES:**

- (A) SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50 FEET.
- (B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 30 FEET.
- (C) SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL. ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAINLESS STEEL. METER SOCKET FOR SIGNALS OR LIGHTING AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.
- (D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.
- (E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET. IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE DISCONNECT CABINET.
- (F) LIGHTING SYSTEM VOLTAGE OF 240 VOLTS OR 480 VOLTS AS SHOWN ON THE PLANS.
- (G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.
- (H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

**GENERAL NOTES:**

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

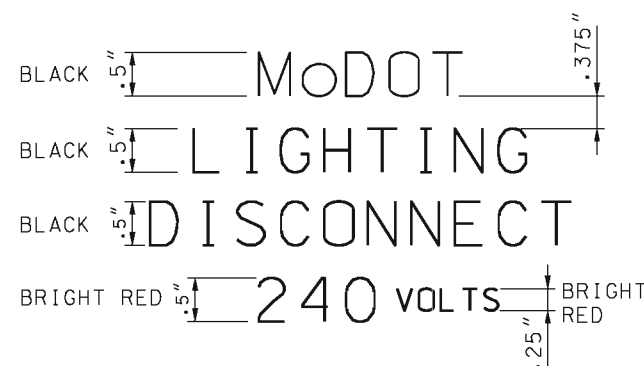
THE POWER SUPPLY ASSEMBLY TYPE IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

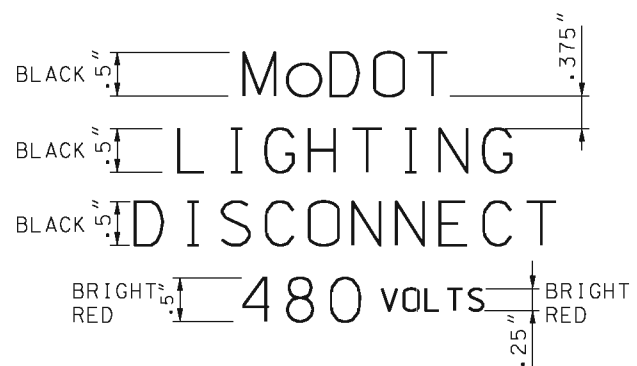
WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED, OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

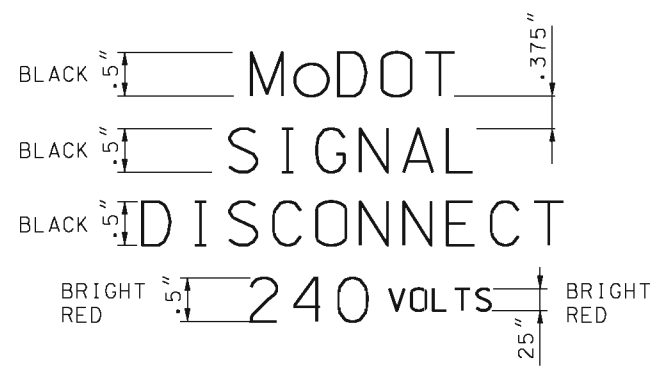
ALL MATERIALS REQUIRED AS SHOWN ON DRAWING, INCLUDING CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES, SHALL BE INCLUDED IN UNIT BID PRICE FOR POWER SUPPLY ASSEMBLY.



**LABEL DETAIL (19) (240 VOLT) (F)**



**LABEL DETAIL (19) (480 VOLT) (F)**



**LABEL DETAIL (20)**

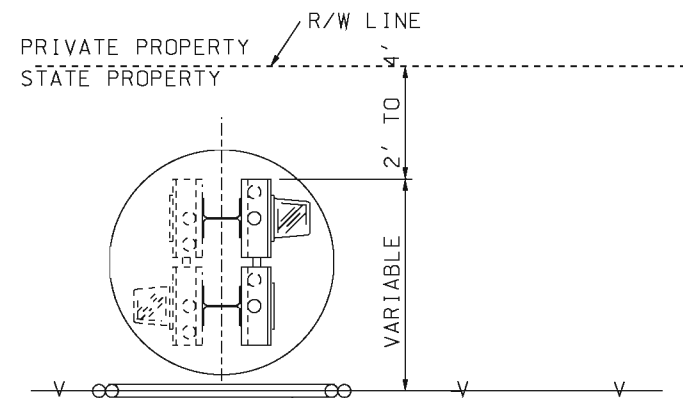
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)
	<b>HIGHWAY LIGHTING POWER SUPPLY ASSEMBLY SECONDARY SERVICE</b>
DATE EFFECTIVE: 04/01/2002 DATE PREPARED: 4/1/2010	<b>901.80D</b>
	SHEET NO. 1 OF 2

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



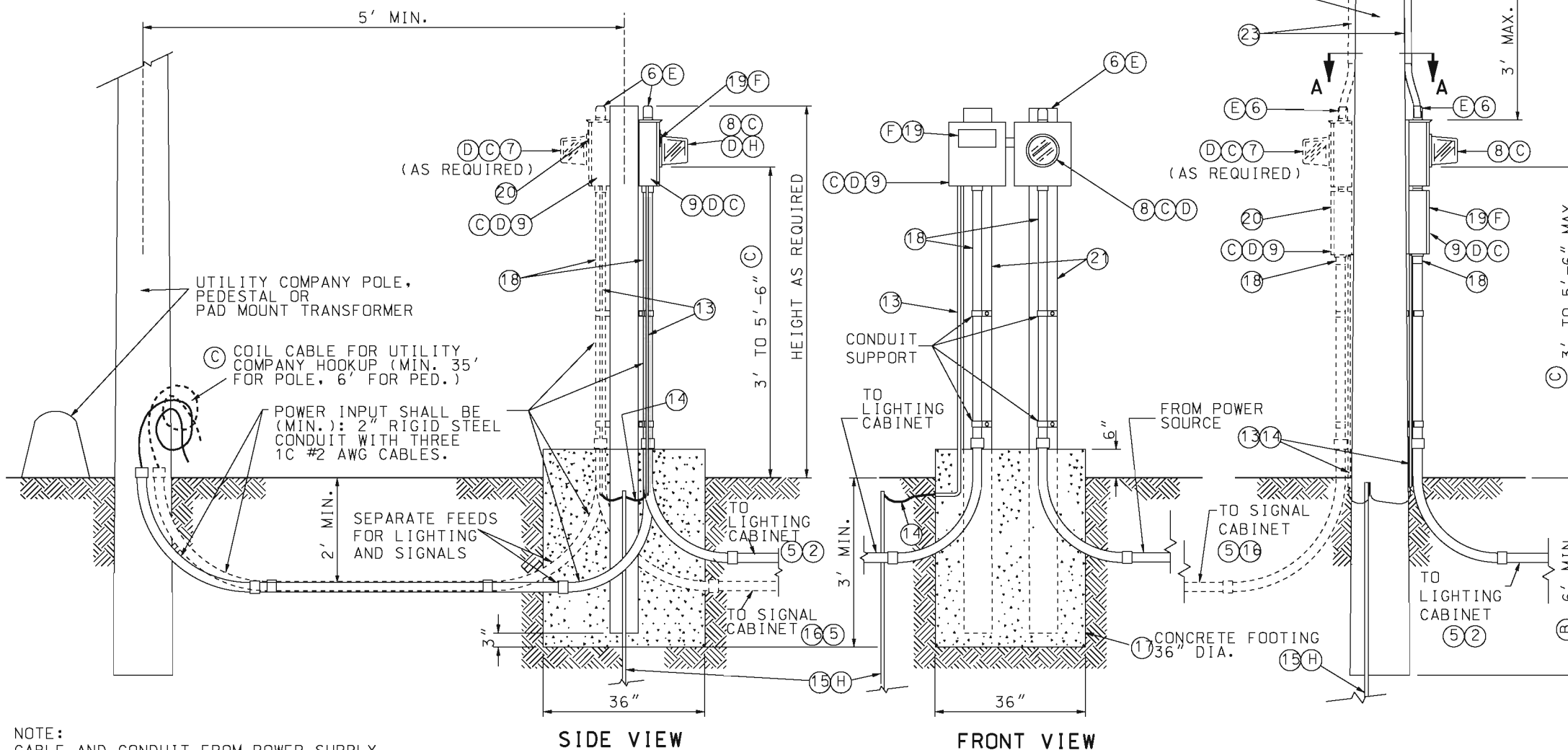
PEDESTAL OR NEW STATE-OWNED POLE TO BE SET WITHIN 2' TO 4' OF RIGHT-OF-WAY LINE.

ALL SERVICE POWER SUPPLY ASSEMBLIES ARE TO BE LOCATED ON STATE PROPERTY.



TOP VIEW

IF FENCE BLOCKS ACCESS TO POWER SUPPLY A 3' MIN. LOCKING GATE IS TO BE INSTALLED. (NO DIRECT PAY)



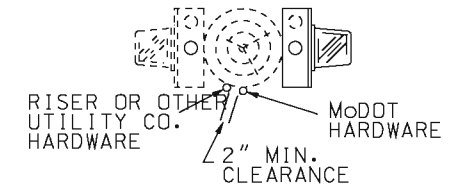
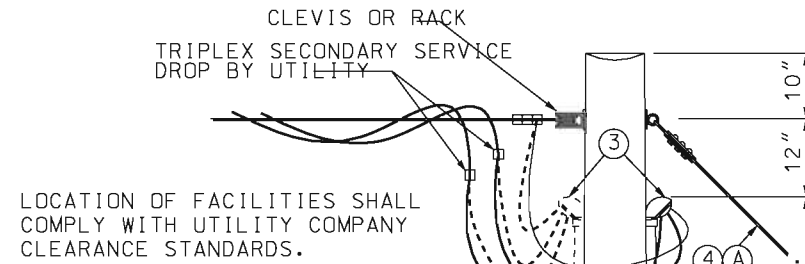
SIDE VIEW

FRONT VIEW

TYPE 2 (PEDESTAL) UNDERGROUND SERVICE

TYPE 1 (POLE) OVERHEAD SERVICE

NOTE: CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.










SECTION A-A









LOCATION OF FACILITIES SHALL COMPLY WITH UTILITY COMPANY CLEARANCE STANDARDS.












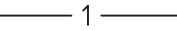

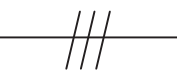
<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p><b>HIGHWAY LIGHTING POWER SUPPLY ASSEMBLY SECONDARY SERVICE</b></p>
<p>DATE EFFECTIVE: 04/01/2002 DATE PREPARED: 5/19/2010</p>	<p>901.80D</p>
<p>SHEET NO. 2 OF 2</p>	


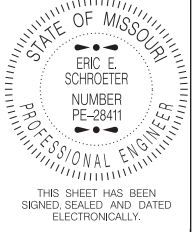
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

-  LED-C LUMINAIRE
-  BRACKET ARM
-  BOLT DOWN LIGHT STANDARD
-  EXISTING LIGHT STANDARD AND LUMINAIRE
-  LED-A LUMINAIRE
-  LED-B LUMINAIRE
-  150 WATT UNDERPASS LUMINAIRE

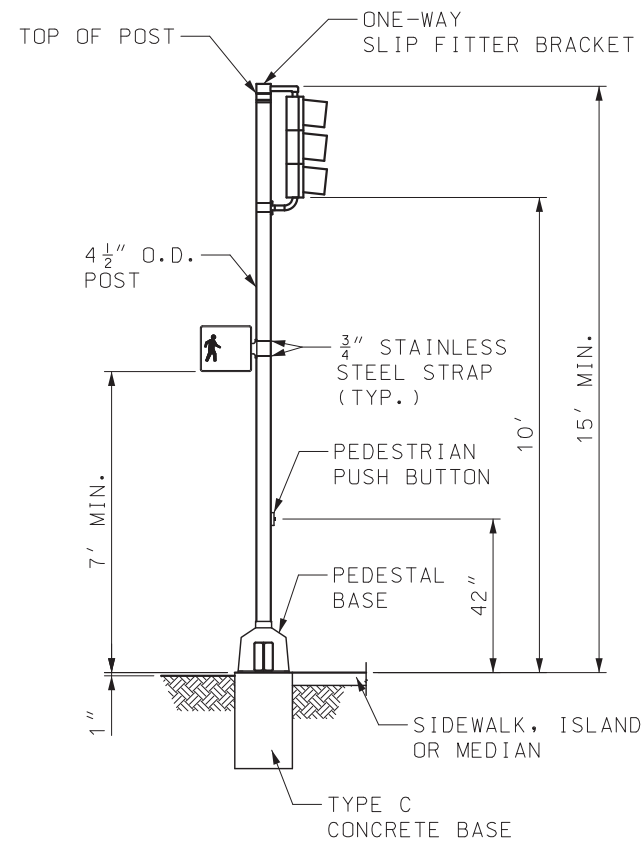


-  PULL BOX, TYPE I DRAIN, CONCRETE
-  PULL BOX, TYPE II DRAIN, CONCRETE
-  PULL BOX, TYPE I DRAIN, PREFORMED
-  PULL BOX, TYPE II DRAIN, PREFORMED
-  EXISTING PULL BOX, TYPE I DRAIN, CONCRETE
-  EXISTING PULL BOX, TYPE II DRAIN, CONCRETE
-  EXISTING PULL BOX, TYPE I DRAIN, PREFORMED
-  EXISTING PULL BOX, TYPE II DRAIN, PREFORMED

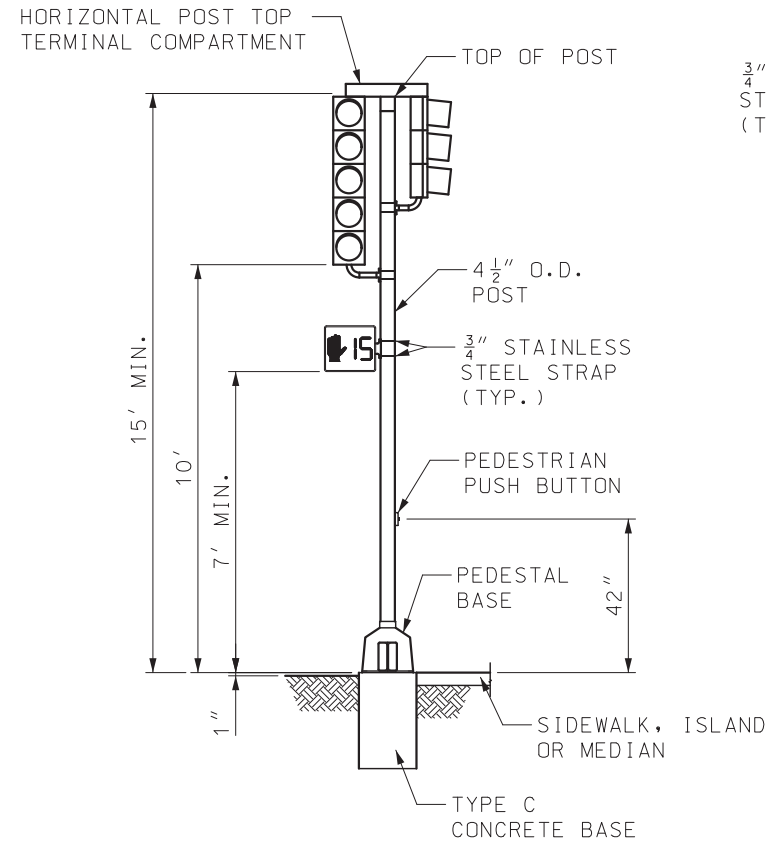
-  SERVICE POLE OR PEDESTAL AND POWER SUPPLY
-  TRANSFORMER OR SUBSTATION POLE
-  BASE MOUNTED LIGHTING CONTROL STATION WITH PAD
-  EXISTING BASE MOUNTED CONTROL STATION
-  GROUND CONNECTION
-  RIGID CONDUIT IN TRENCH
-  CAPPED RIGID CONDUIT
-  RIGID CONDUIT PUSHED
-  EXISTING RIGID CONDUIT
-  RIGID CONDUIT ON BRIDGE
-  RIGID CONDUIT IN MEDIAN
-  CABLE CONDUIT WITH CIRCUIT NUMBER
-  EXISTING CABLE CONDUIT
-  EXPOSED CONDUIT ON UNDER SIDE OF BRIDGES. NUMBER OF HATCHES DENOTES NUMBER OF WIRES IN CONDUIT

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<h2 style="margin: 0;">HIGHWAY LIGHTING SYMBOLS</h2>
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.	
DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018	<b>901.85B</b>
	SHEET NO. <b>1 OF 1</b>

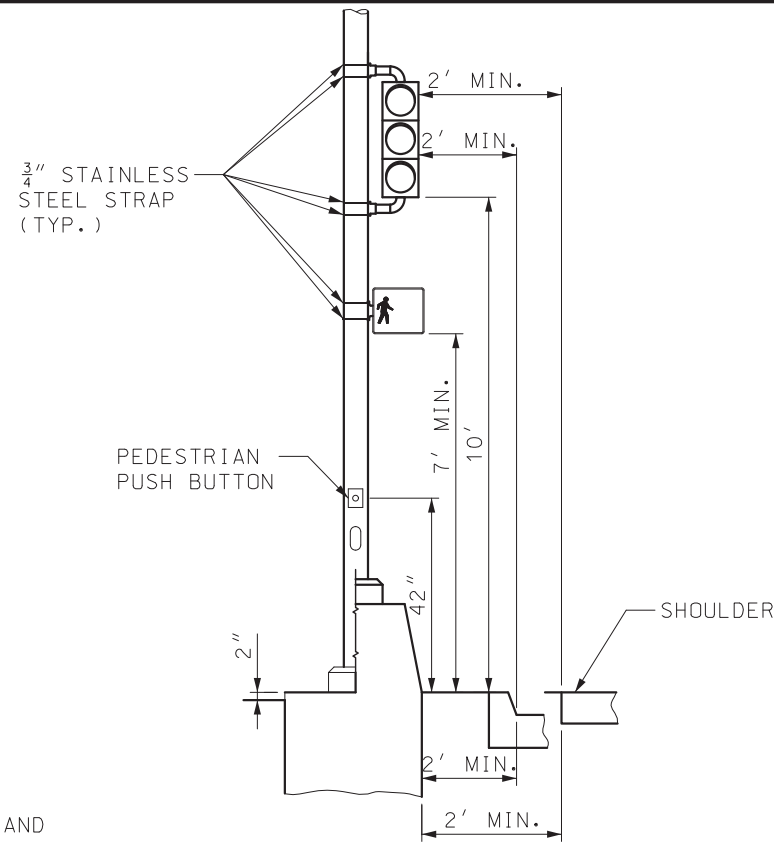
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



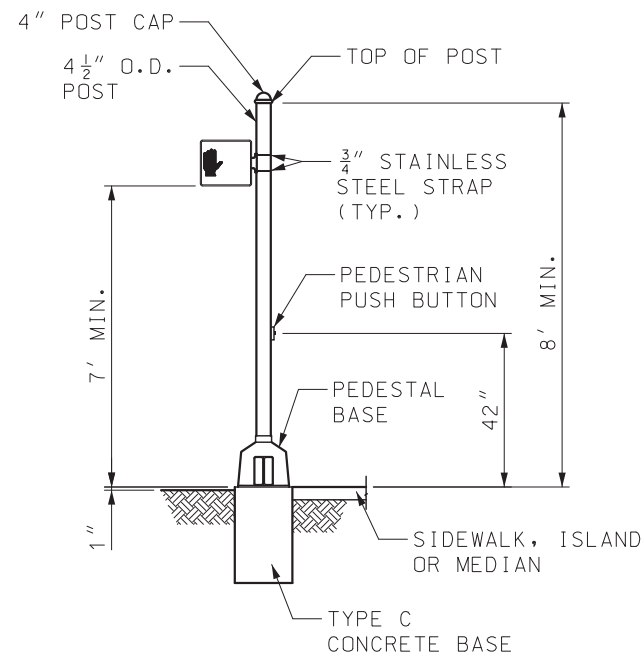
ONE FACE



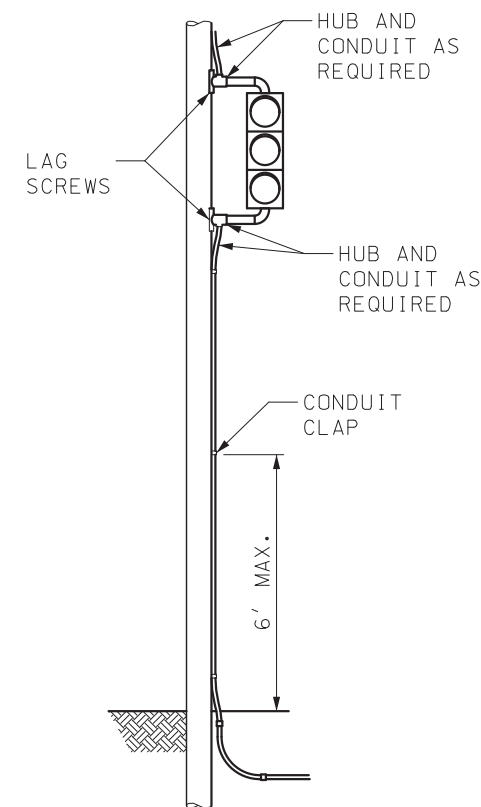
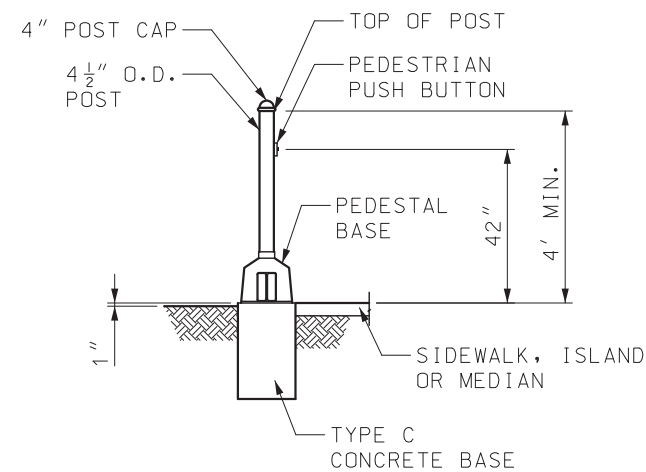
TWO FACE



METAL POST MOUNTING



PEDESTAL POST MOUNTINGS



WOOD POLE MOUNTING

GENERAL NOTES:

ALL POST WIRE OUTLETS SHALL BE DEBURRED AND EQUIPPED WITH BUSHINGS.

BACKPLATES NOT SHOWN IN MOUNTING DIAGRAMS FOR CLARITY.

POSTS SHALL BE GROUNDED WITH #6 AWG BARE COPPER WIRE FROM GROUNDING BUSHING ON CONDUIT TO GROUNDING LUG IN POST BASE IF STEEL CONDUIT IS USED. IF PVC CONDUIT IS USED, PROVIDE #6 AWG BARE COPPER WIRE FROM GROUNDING LUG IN POST TO POWER SUPPLY GROUND BUSS IN CONTROLLER CABINET.

LEADS FROM PEDESTRIAN SIGNAL LAMPS ARE CONNECTED TO THE SIGNAL HEAD TERMINAL COMPARTMENT.

TYPE C MOUNTED SIGNALS SHALL HAVE A DISCONNECT HANGER.


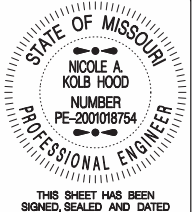
TYPE B MOUNTED SIGNALS SHALL HAVE A TERMINAL COMPARTMENT.

ONE FACE, TOP-MOUNTED (TYPE T) OR SIDE-MOUNTED (TYPE S) SIGNALS HAVE NO TERMINAL COMPARTMENT. TWO FACE, TOP-MOUNTED (TYPE T) OR SIDE-MOUNTED (TYPE S) SIGNALS SHALL HAVE A HORIZONTAL TERMINAL COMPARTMENT.

SIDE-MOUNTED OPTICALLY LIMITING HEADS SHALL HAVE A MINIMUM POST CLEARANCE OF 5 1/2".

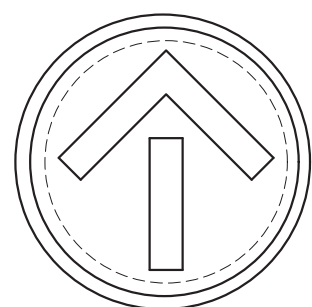
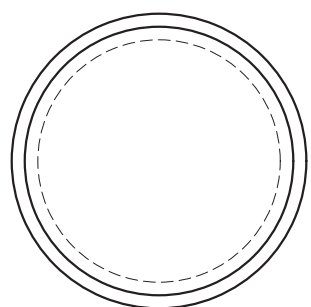
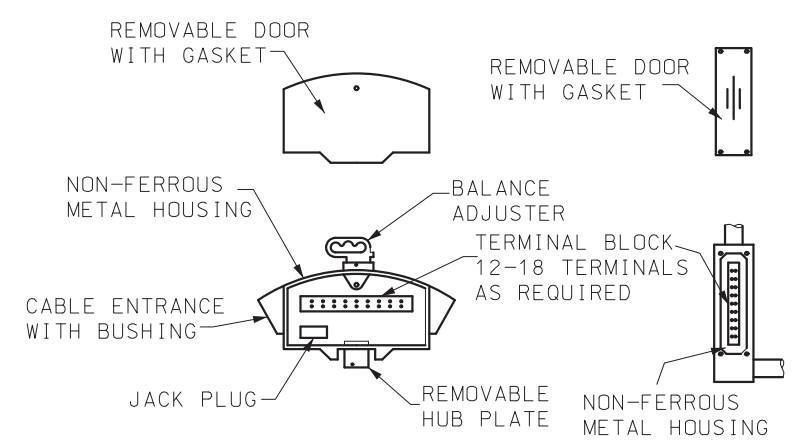
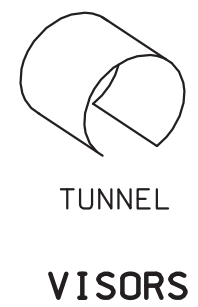
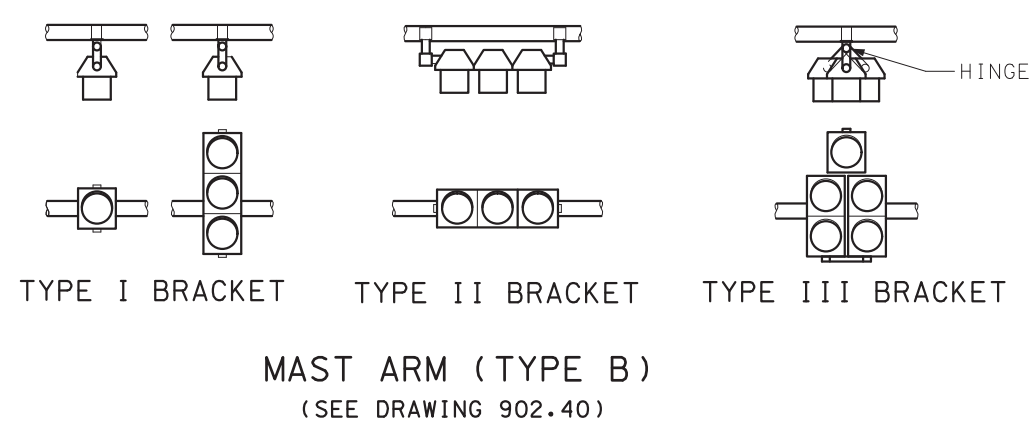
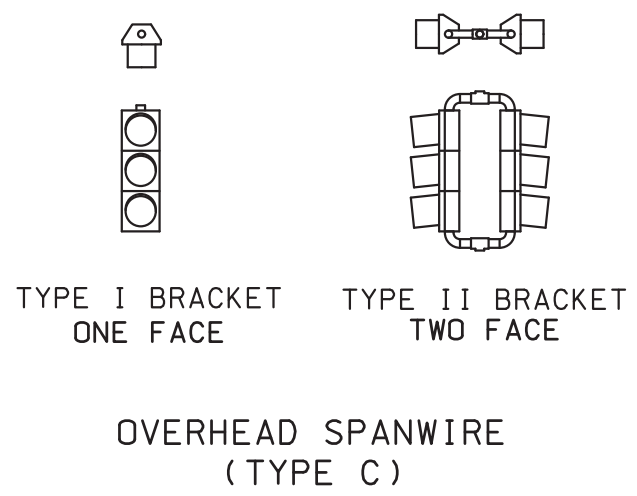
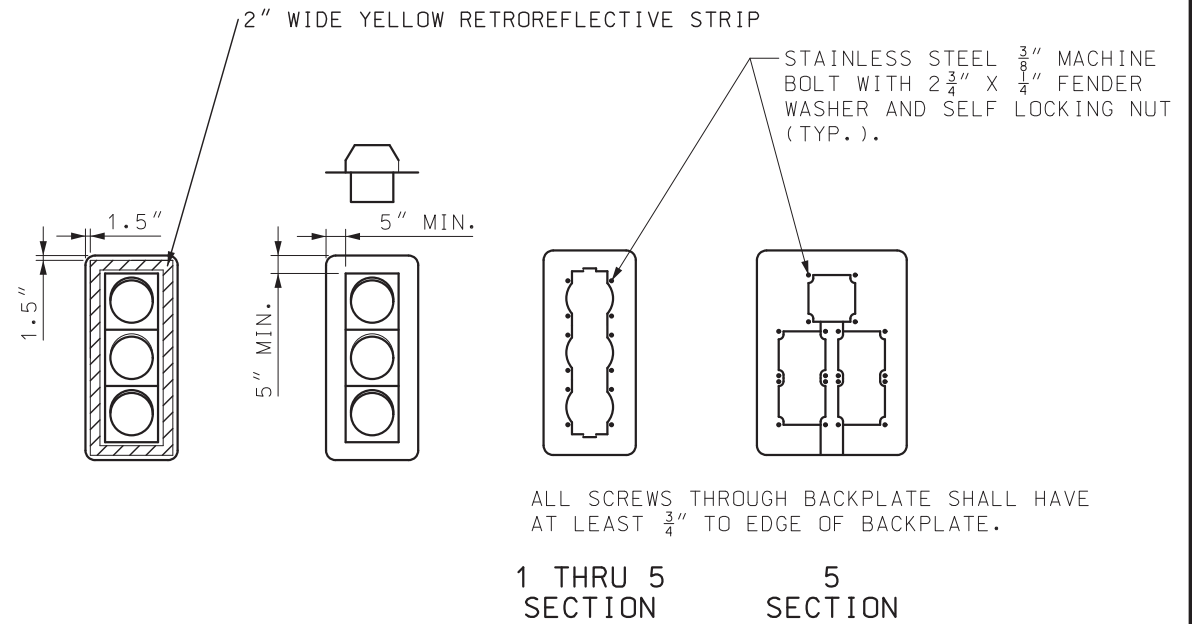
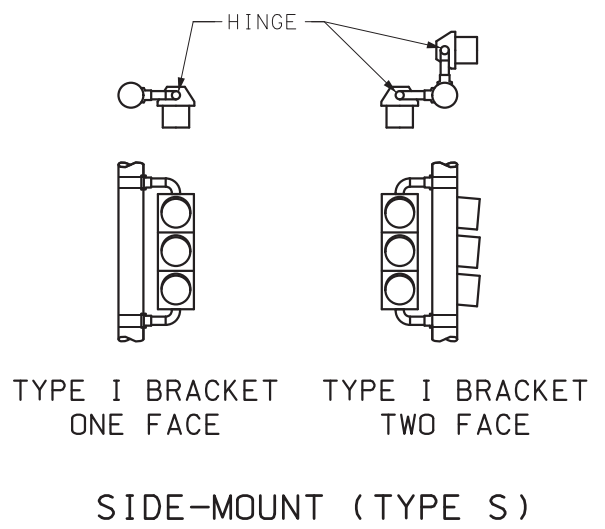
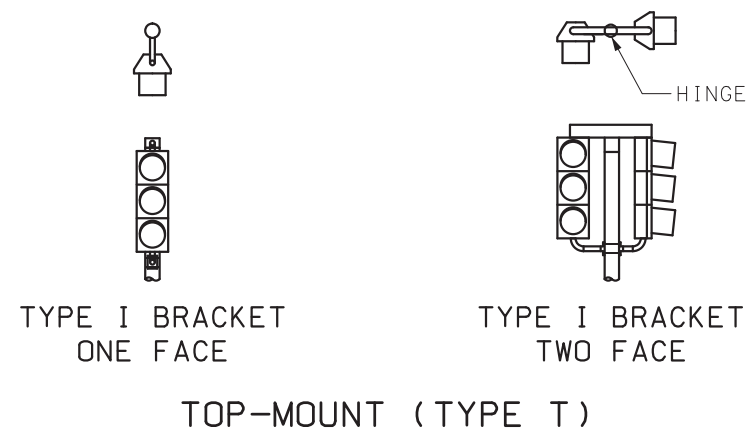
SIGNAL APPURTENANCES SHALL HAVE A HORIZONTAL CLEARANCE NO LESS THAN 2' FROM THE FACE OF A VERTICAL CURB OR FROM THE OUTSIDE EDGE OF A SHOULDER, EXCEPT SIGNALS LOCATED IN A MEDIAN ISLAND.

SEE STANDARD PLAN 902.30 FOR BASE DETAILS AND CONDUIT LOCATIONS.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TRAFFIC SIGNALS</b> <b>SIGNAL HEAD MOUNTING</b>
DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 4/4/2023	<b>902.00Q</b>
	SHEET NO. <b>1 OF 2</b>

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

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



INDICATIONS

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

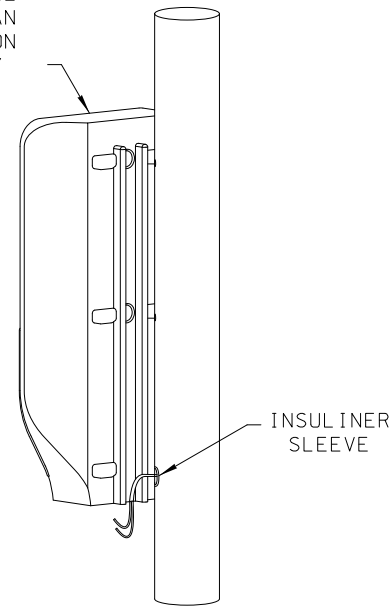
STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

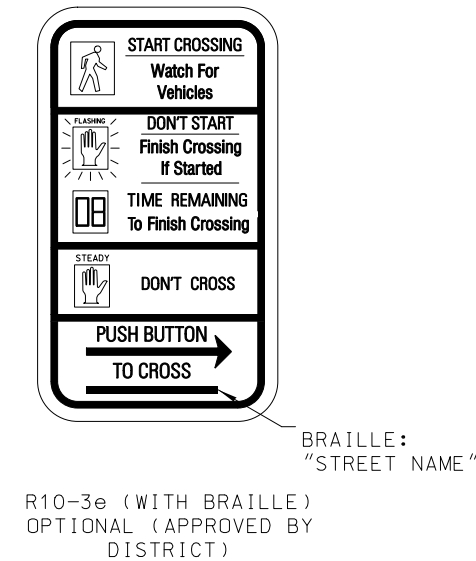
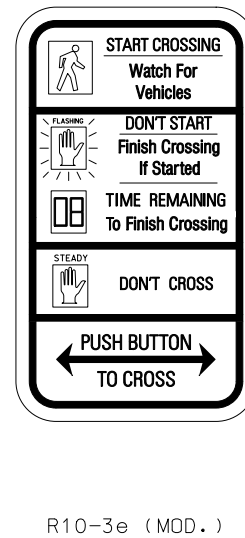
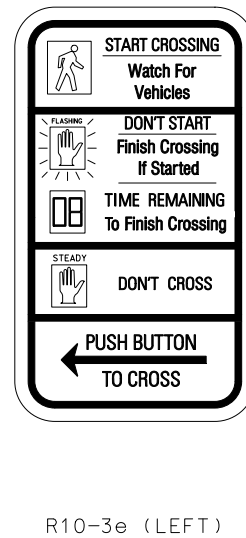
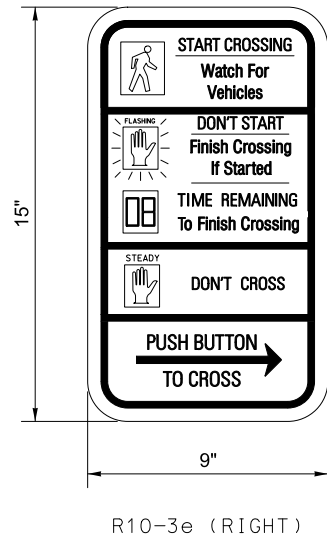
TRAFFIC SIGNALS  
SIGNAL HEAD LOUVERS,  
VISORS, BACKPLATES AND  
TERMINAL COMPARTMENT

DATE EFFECTIVE: 7/1/2023	902.00Q	SHEET NO. 2 OF 2
DATE PREPARED: 4/4/2023		

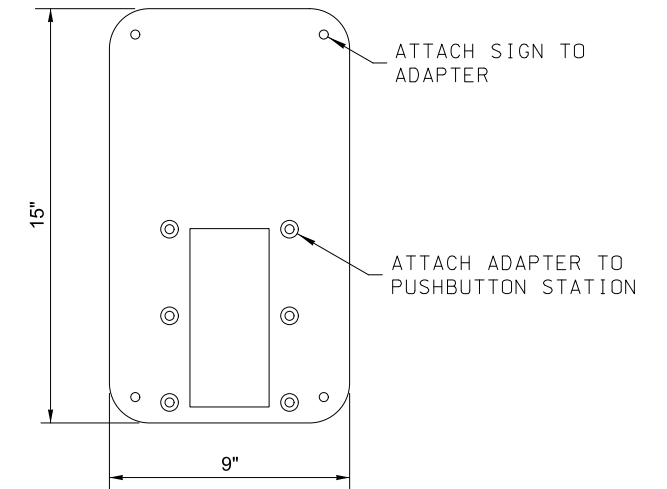
ACCESSIBLE PEDESTRIAN PUSHBUTTON ASSEMBLY



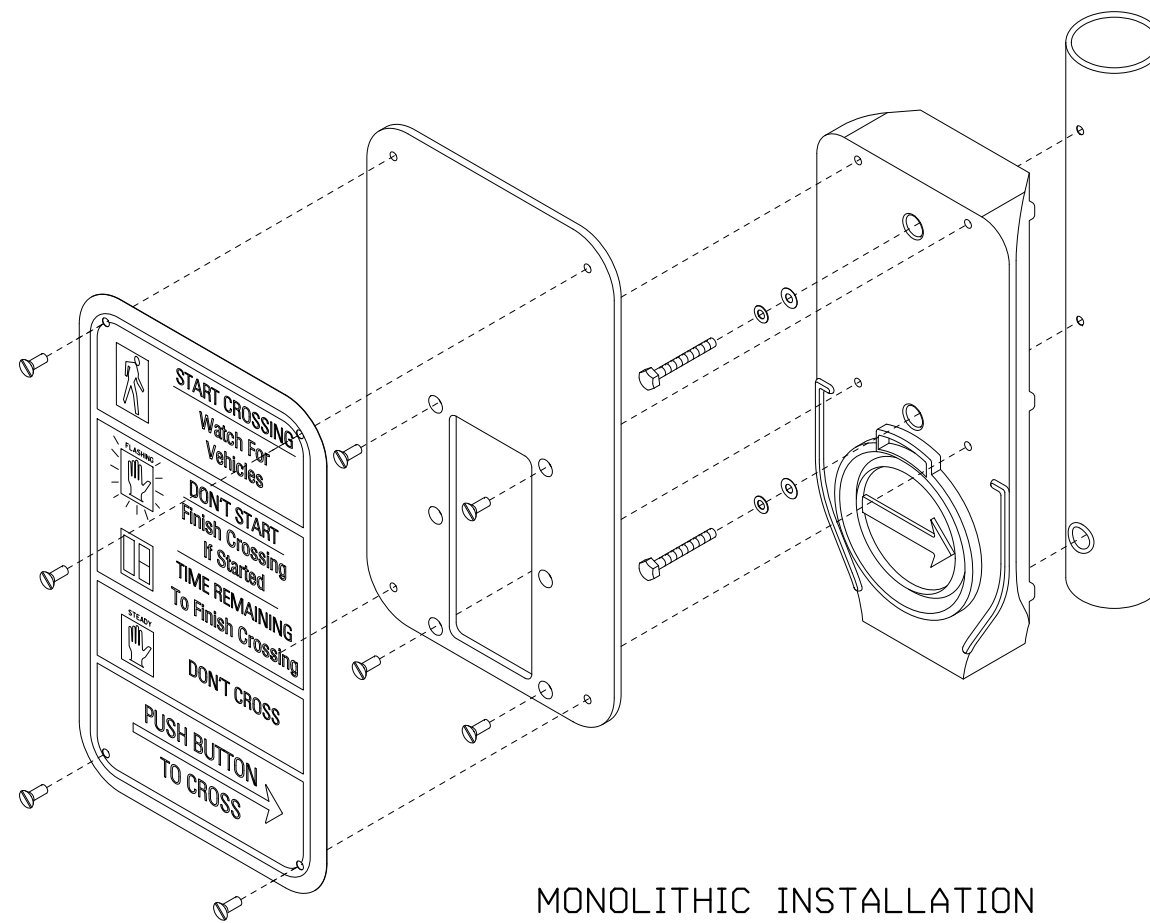
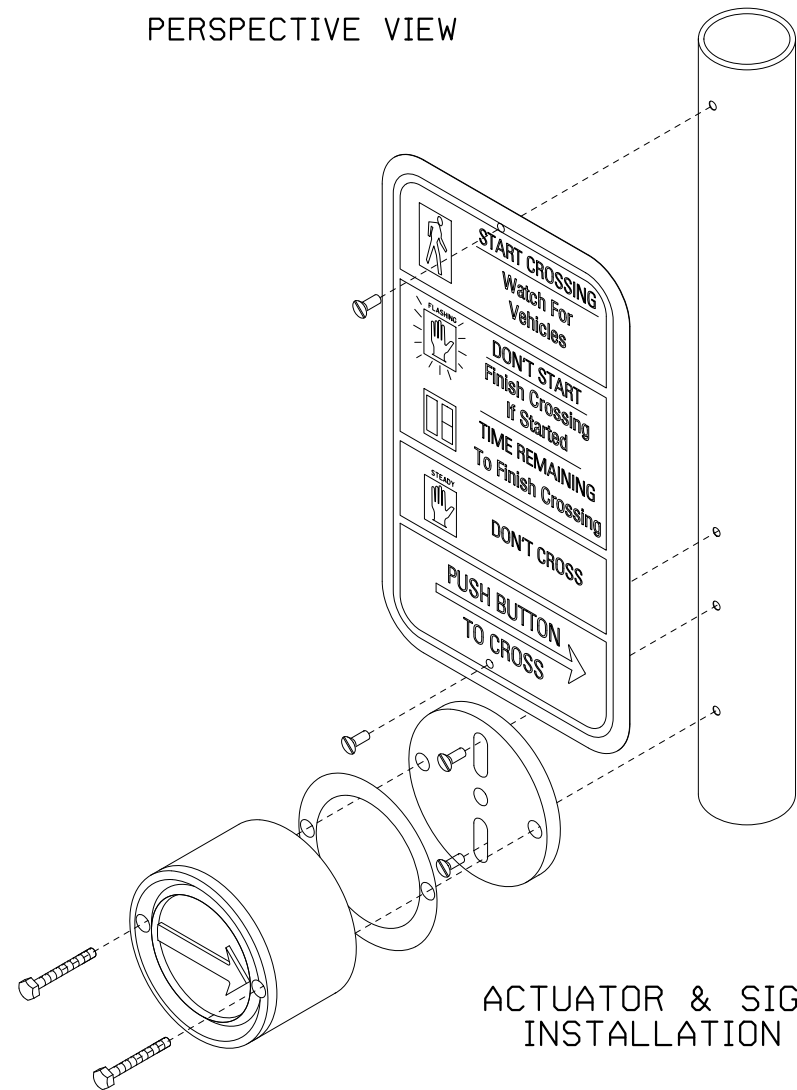
WIRE ROUTING PERSPECTIVE VIEW



PEDESTRIAN PUSHBUTTON INSTRUCTIONAL SIGN



PEDESTRIAN PUSHBUTTON FRAME ADAPTER



ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY

GENERAL NOTES:

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY MAY BE MONOLITHIC OR A SEPARATE ACTUATOR AND SIGN.

SIGNS FOR SIGNAL INSTALLATIONS, INCLUDING ALL MATERIAL REQUIRED FOR SIGN MOUNTING, SHALL BE FURNISHED BY THE CONTRACTOR. SIGNS SHALL BE MANUFACTURED IN ACCORDANCE WITH SEC 903, AND MOUNTED AS SHOWN ON THE PLANS.

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY CAN BE MOUNTED TO SIGNAL POLE, PEDESTRIAN POLE, OR PEDESTRIAN PUSHBUTTON POLE.

INCLUDE A 9" X 15" R10-3E SIGN WITH EACH ASSEMBLY.

REQUIRES POLE ADAPTER WHEN MOUNTING TWO UNITS ON THE SAME PEDESTRIAN POLE. ADDITIONAL MOUNTING EXTENSION BRACKETS SHALL BE PROVIDED IF A 10" MAXIMUM REACH FROM AN ACCESSIBLE SIDEWALK CANNOT BE ACHIEVED.

IF THE CURB RAMP IS NOT ALIGNED WITH THE CROSSWALK, THE ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY SHALL POINT IN THE DIRECTION OF TRAVEL, NOT IN THE DIRECTION OF THE CURB RAMP ORIENTATION.

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

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TRAFFIC SIGNALS**  
 ACCESSIBLE PEDESTRIAN SIGNALS

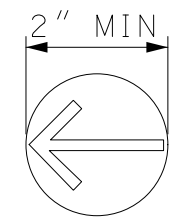
DATE EFFECTIVE: 04/01/2021  
 DATE PREPARED: 2/17/2021

**902.05**

SHEET NO.  
 1 OF 2

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



ACTUATOR DETAIL

GENERAL NOTES:

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY MAY BE MONOLITHIC OR A SEPARATE ACTUATOR AND SIGN.

THE ACCESSIBLE PEDESTRIAN SIGNAL PUSHBUTTON SHALL BE OF THE PRESSURE-ACTIVATED TYPE WITH ESSENTIALLY NO MOVING PARTS. IT SHALL BE "ADA" COMPLIANT AND WEATHERPROOF.

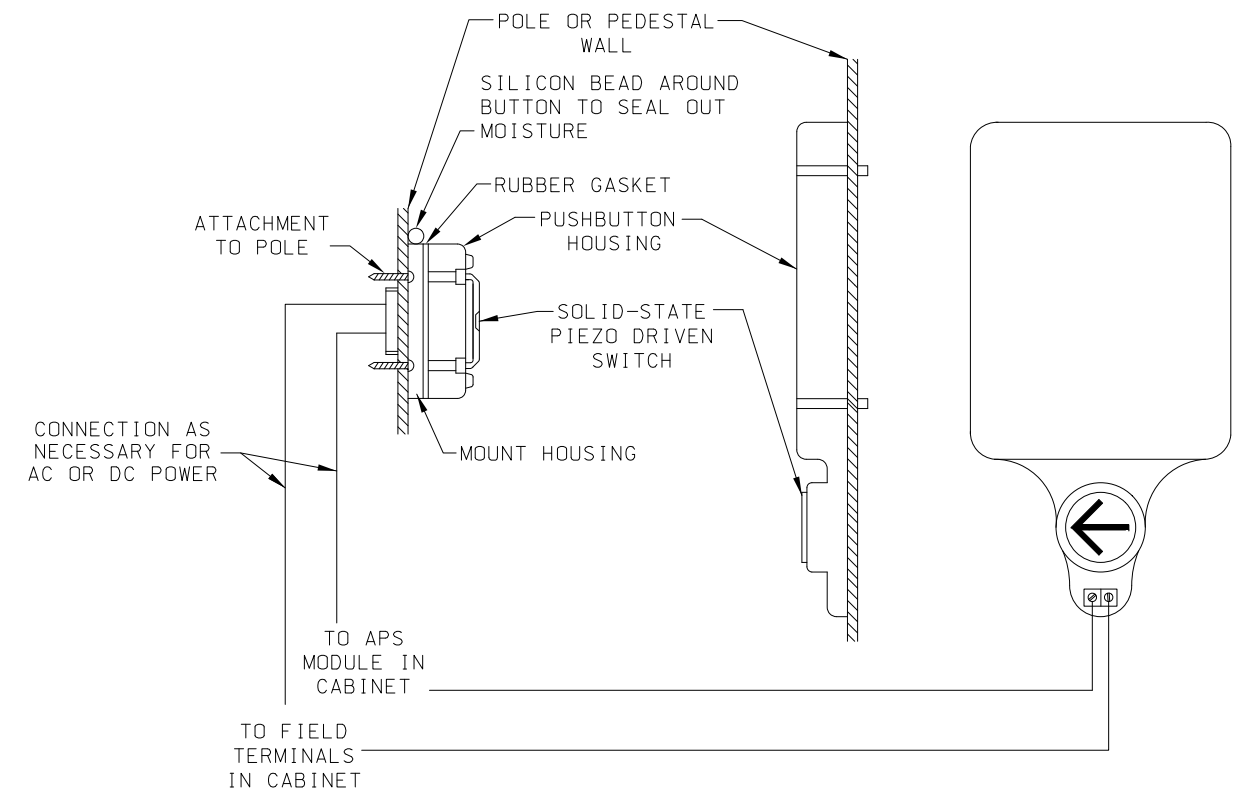
THE HOUSING SHALL BE BLACK, FIT THE CURVATURE OF THE POST TO WHICH IT IS ATTACHED AND SHALL PROVIDE A RIGID INSTALLATION. ACCESSIBLE PEDESTRIAN SIGNAL CAN BE MOUNTED TO THE SIGNAL POLE, PEDESTRIAN POLE, OR PEDESTRIAN PEDESTAL POLE.

THERE SHALL BE A TACTILE ARROW POINTING IN THE DIRECTION OF PEDESTRIAN TRAVEL CONTROLLED BY THE BUTTON.

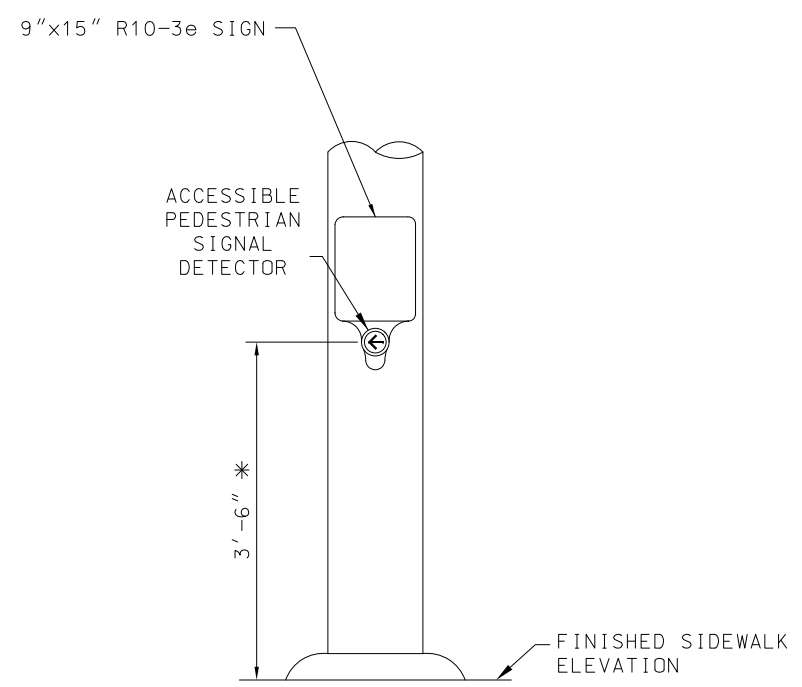
THE ACTUATOR SHALL BE A MINIMUM OF 2 INCHES IN DIAMETER, RAISED, CONTRAST VISUALLY WITH THE HOUSING AND MADE OF BRASS OR CORROSION-RESISTANT METAL ALLOY OR NON-METALLIC MATERIAL. A MAXIMUM FORCE OF 3.5 LBS SHALL BE REQUIRED TO ACTIVATE THE SWITCH. SWITCH SHALL BE OF THE SOLID-STATE ELECTRONIC, PIEZO TYPE.

THE ACCESSIBLE PEDESTRIAN SIGNAL SHALL OPERATE AT A VOLTAGE NO GREATER THAN 24 VOLTS. SOME MANUFACTURERS PROVIDE A 2-WIRE ACCESSIBLE PEDESTRIAN SIGNAL SYSTEM THAT USES THE EXISTING WIRING FROM PREVIOUSLY INSTALLED STANDARD PUSHBUTTONS. SOME MANUFACTURERS PROVIDE 3-WIRE AND 4-WIRE SYSTEMS. A 4-WIRE SYSTEM SHOULD BE SET UP JUST LIKE THE 3-WIRE SYSTEM, BUT IN THE 4-WIRE SYSTEM, AN EXTRA GROUND WIRE RUNS FROM THE PEDESTRIAN HEAD TO THE PUSHBUTTON. BOTH ARE ACCEPTABLE OPTIONS. THERE ARE SOME SYSTEMS THAT PROVIDE WIRELESS CONNECTIVITY FOR BLUETOOTH PROGRAMMING.

THE ACCESSIBLE PEDESTRIAN SIGNAL SHALL BE FULLY OPERATIONAL BETWEEN -30°F TO +165°F (-34°C TO +74°C), SHALL NOT ALLOW ICE TO FORM SUCH TO IMPEDE THE OPERATION OF THE BUTTON, AND SHALL HAVE A WEATHERPROOF SPEAKER.

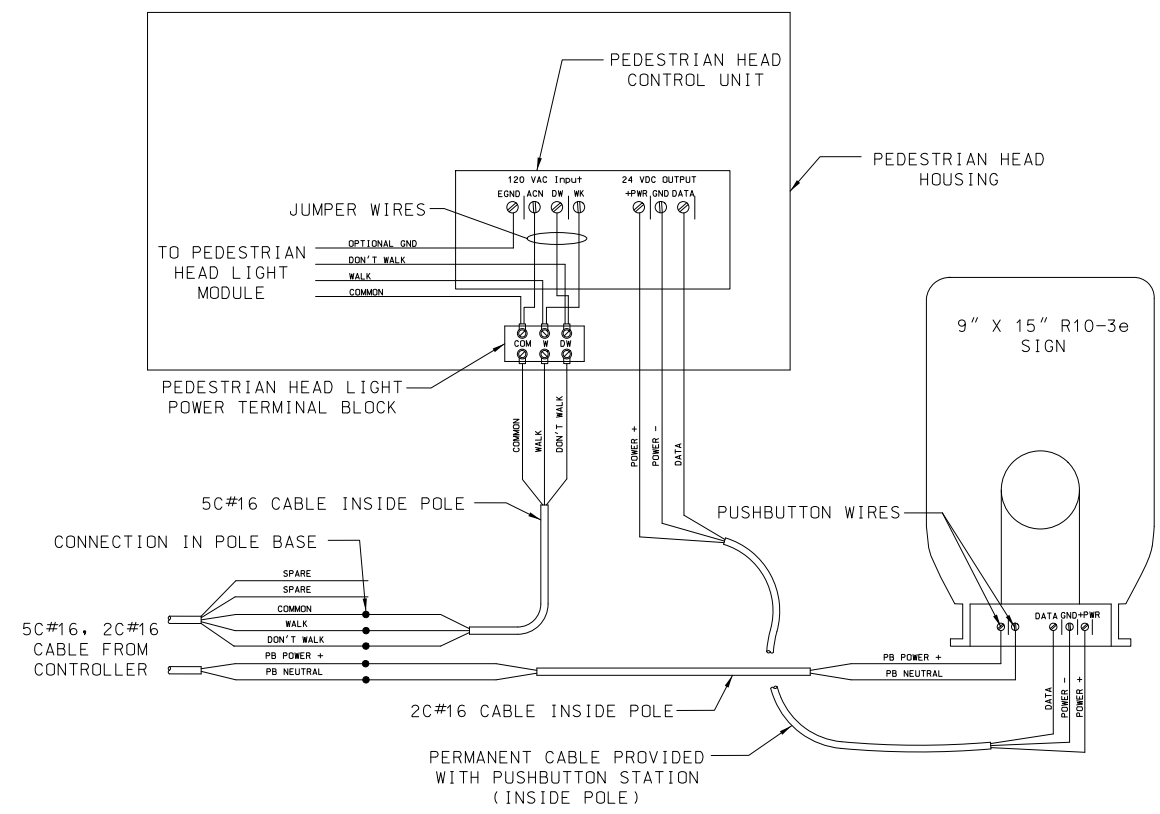


2-WIRE SYSTEM WIRING DETAILS



\* PUSHBUTTON SHOULD BE MOUNTED AS CLOSE TO 3'-6" WITHOUT GOING OVER TO SATISFY THE LIMITATIONS AND GUIDANCE OF THE MUTCD.

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY



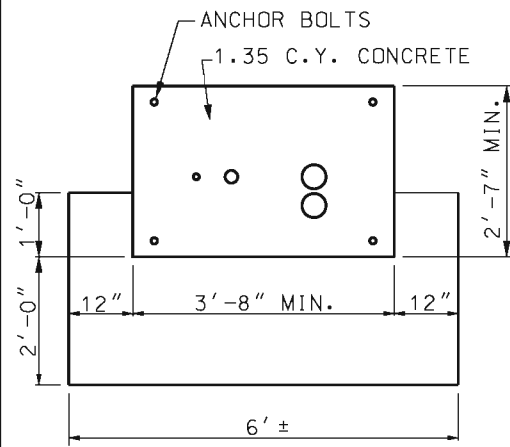
3-WIRE SYSTEM WIRING DETAILS

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

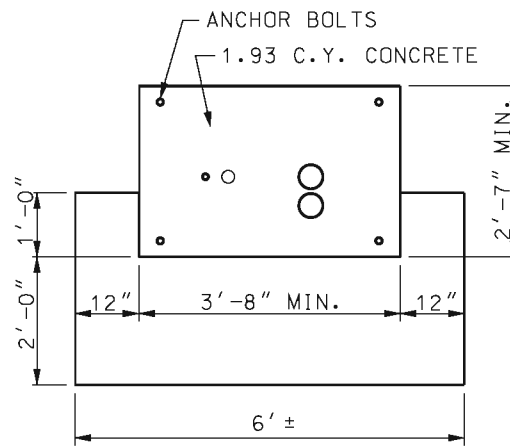
STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TRAFFIC SIGNALS  
 ACCESSIBLE PEDESTRIAN SIGNALS**

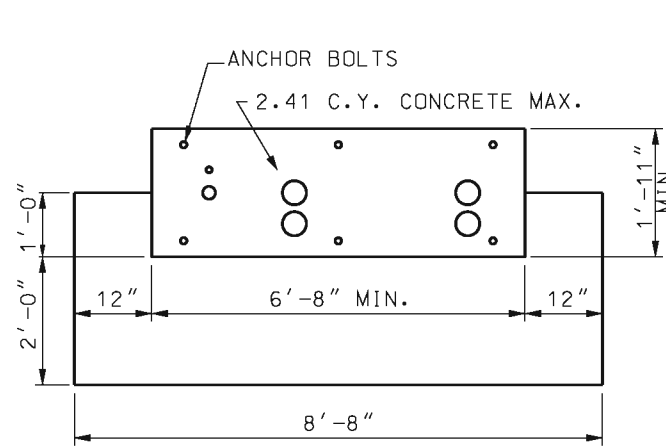
DATE EFFECTIVE: 04/01/2021	<b>902.05</b>	SHEET NO. <b>2 OF 2</b>
DATE PREPARED: 2/17/2021		



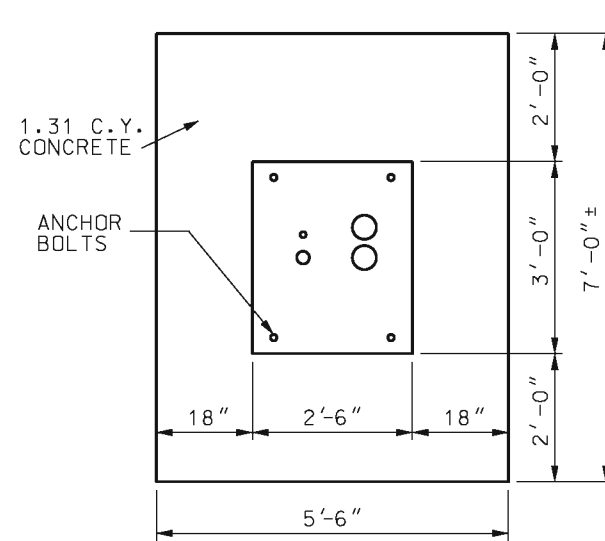
PLAN VIEW



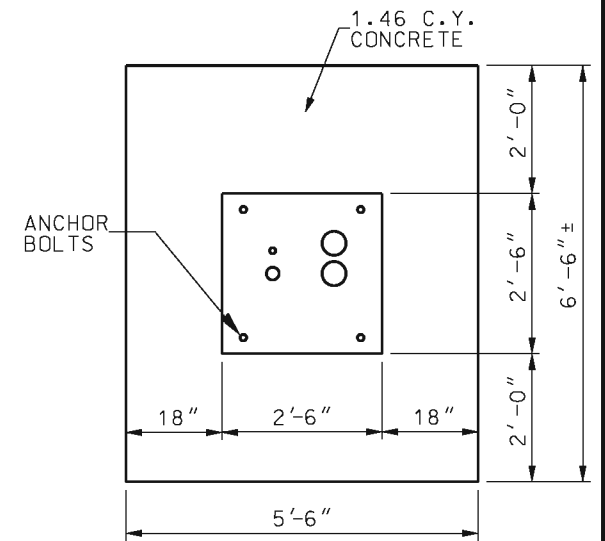
PLAN VIEW



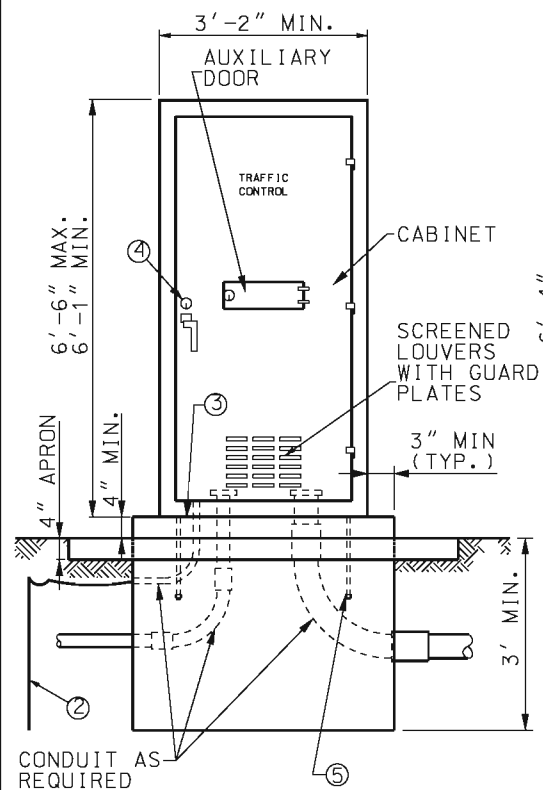
PLAN VIEW



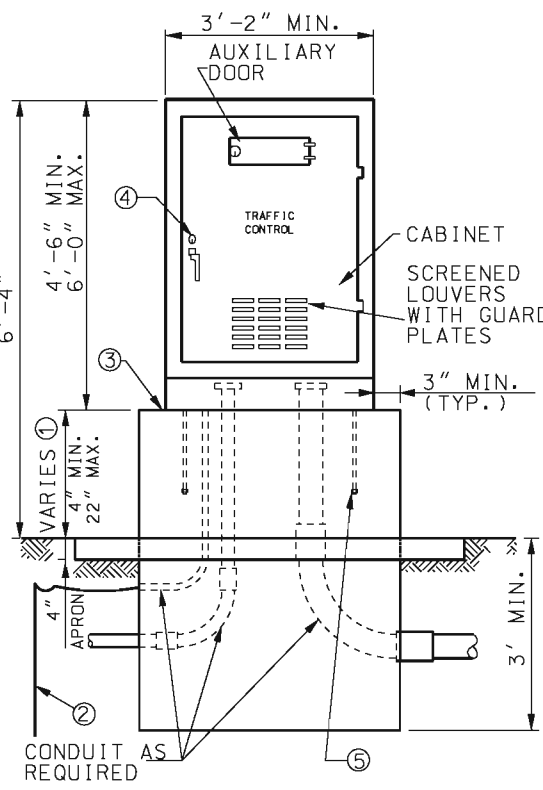
PLAN VIEW



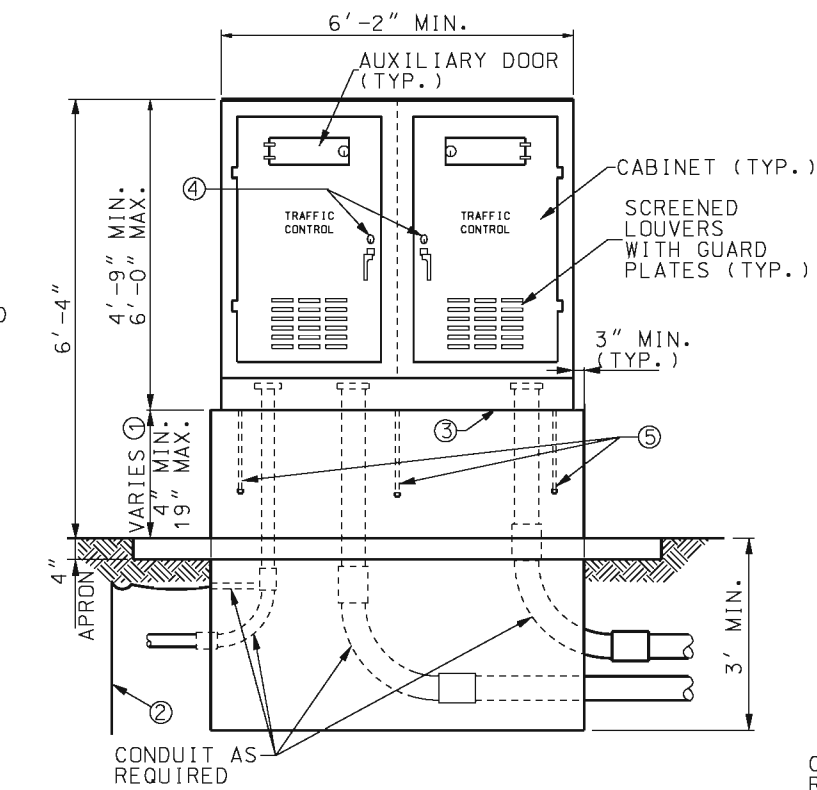
PLAN VIEW



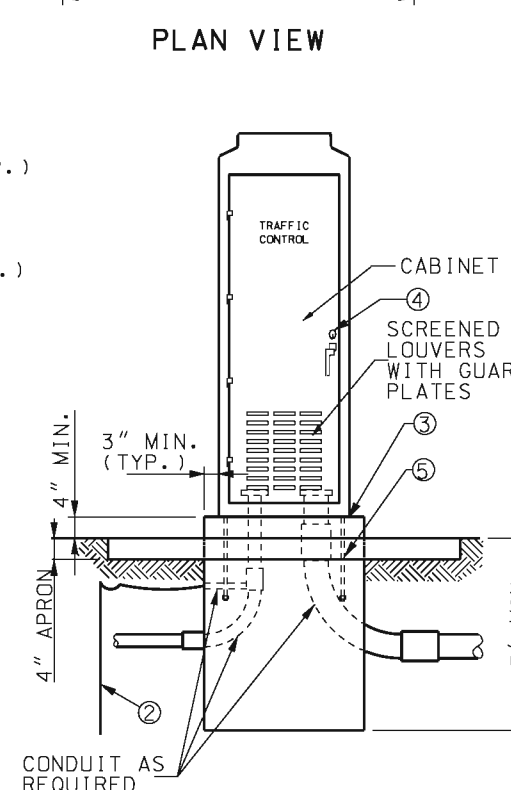
TYPE E



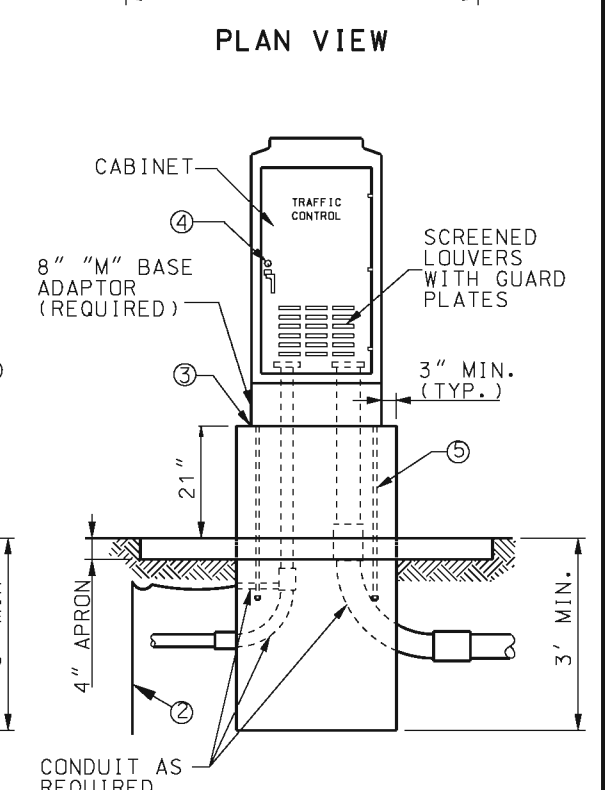
TYPE EV



DOUBLE



FOR TYPE 170  
CONTROLLER CABINETS  
TYPE 332

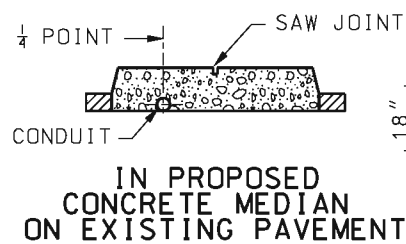


FOR TYPE 170  
CONTROLLER CABINETS  
TYPE 336S

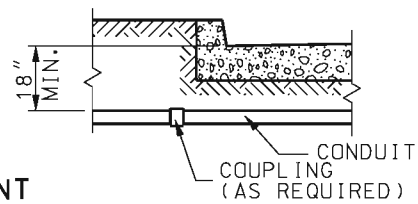
**CONTROLLER CABINETS AND BASE TYPES**

NOTES:

- ① DIMENSION VARIES ACCORDING TO CABINET HEIGHT.
- ② GROUND ROD, 3/4" DIA. x 8' MIN. IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.
- ③ LIFETIME SILICONE CAULK BETWEEN CABINET AND BASE.
- ④ #2 CORBIN LOCK
- ⑤ ANCHOR BOLTS (USE BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END AND SIZE AS SPECIFIED BY CABINET MANUFACTURER).

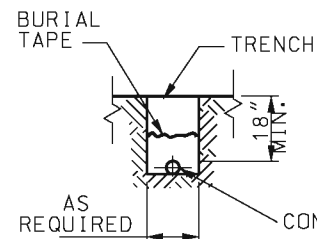


IN PROPOSED  
CONCRETE MEDIAN  
ON EXISTING PAVEMENT

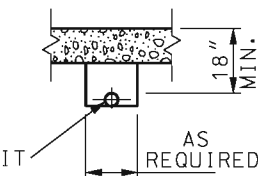


0.5% MINIMUM SLOPE

**CONDUIT LOCATIONS**



NON-PAVED  
SURFACED



PAVED SURFACE

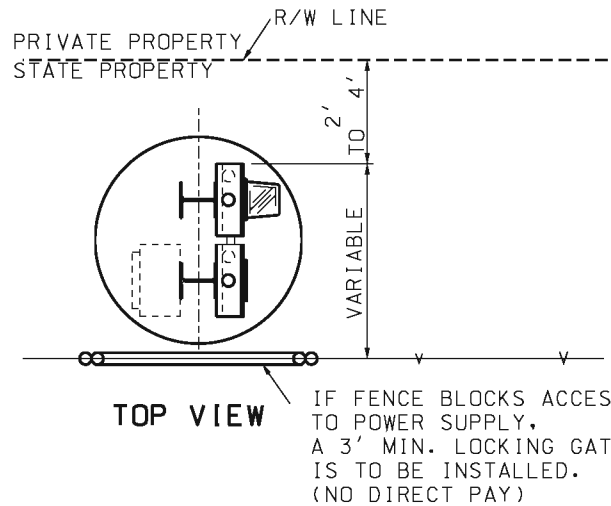
<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI EILEEN H. RACKERS NUMBER PE-28336 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	
<p><b>TRAFFIC SIGNALS CONTROLLERS CONDUIT LOCATION</b></p>	
<p>DATE EFFECTIVE: 04/01/2005 DATE PREPARED: 8/26/2009</p>	<p><b>902.100</b></p>
<p>SHEET NO. 1 OF 1</p>	

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

LIST OF MATERIALS	
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN., CLASS IV WOOD, CONTRACTOR PROVIDED, MODOT OWNED *
2	#8 AWG MIN. CABLE, 600 VOLT *
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	2" MIN. RIGID CONDUIT WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTOR, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	2" MIN. RIGID CONDUIT
9	SERVICE DISCONNECT BOX, LOCKING, RAIN TIGHT, NEMA 4
10	INSULATED, GROUNDABLE NEUTRAL, 200 AMP MINIMUM
11	SIGNAL BREAKER, SINGLE POLE, 40A MIN, TYPE A OR B *
12	LIGHTING BREAKER, SINGLE POLE, 40A, TYPE A OR B
13	METAL CONDUIT, 1/2"
14	GROUND WIRE, #2 AWG MIN.
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT
17	CLASS B CONCRETE, 0.92 C.Y. ±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	LIGHTING CABLES *
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS) VINYL RAISED LETTERING
21	TYPE B CONTROLLER AND SIGNAL BREAKER, AS SPECIFIED.
22	TYPE B AUXILIARY BREAKER, 15 AMP
23	W6 x 9 OR W6 x 15 GALVANIZED POST
24	LIGHTING CONTROL CABINET (SEE SHEET 2)
25	#2 AWG MIN. CABLE, 600 VOLT
*	SEE PLANS

PEDESTAL OR NEW STATE-OWNED POLE TO BE SET WITHIN 2' TO 4' OF RIGHT-OF-WAY LINE.

ALL SERVICE POWER SUPPLY ASSEMBLIES ARE TO BE LOCATED ON STATE PROPERTY.



NOTES

- (A) SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50'.
- (B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 50 FEET.
- (C) SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL, ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAIN-LESS STEEL. METER SOCKET AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.
- (D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF DOOR.
- (E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET, IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE CONNECT CABINET
- (F) IF LIGHTING IS SPECIFIED, INSTALL LIGHTING CONTROL ON POWER SUPPLY.
- (G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.
- (H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CAD WELDED.

GENERAL NOTES:

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

THE TYPE POWER SUPPLY ASSEMBLY IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

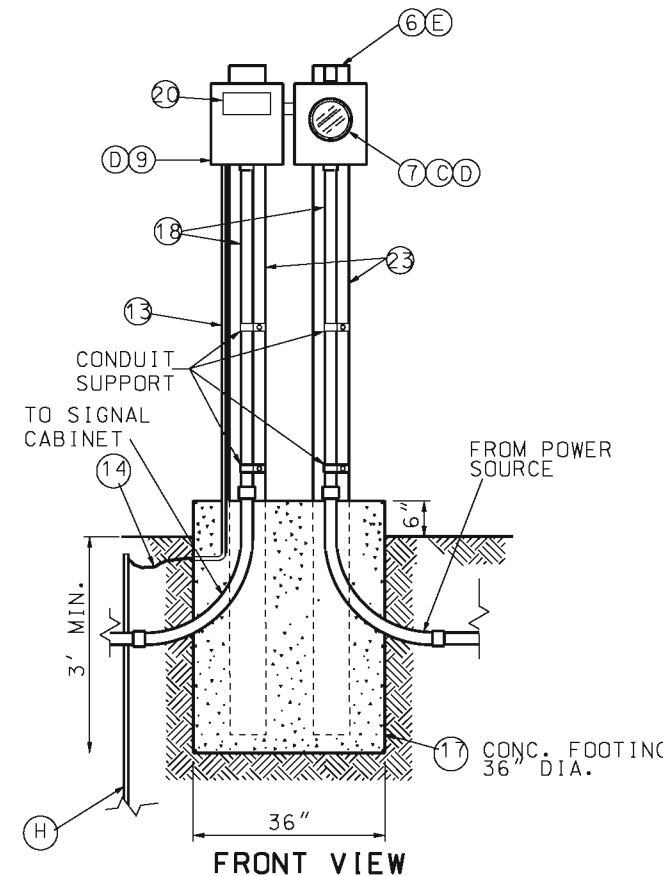
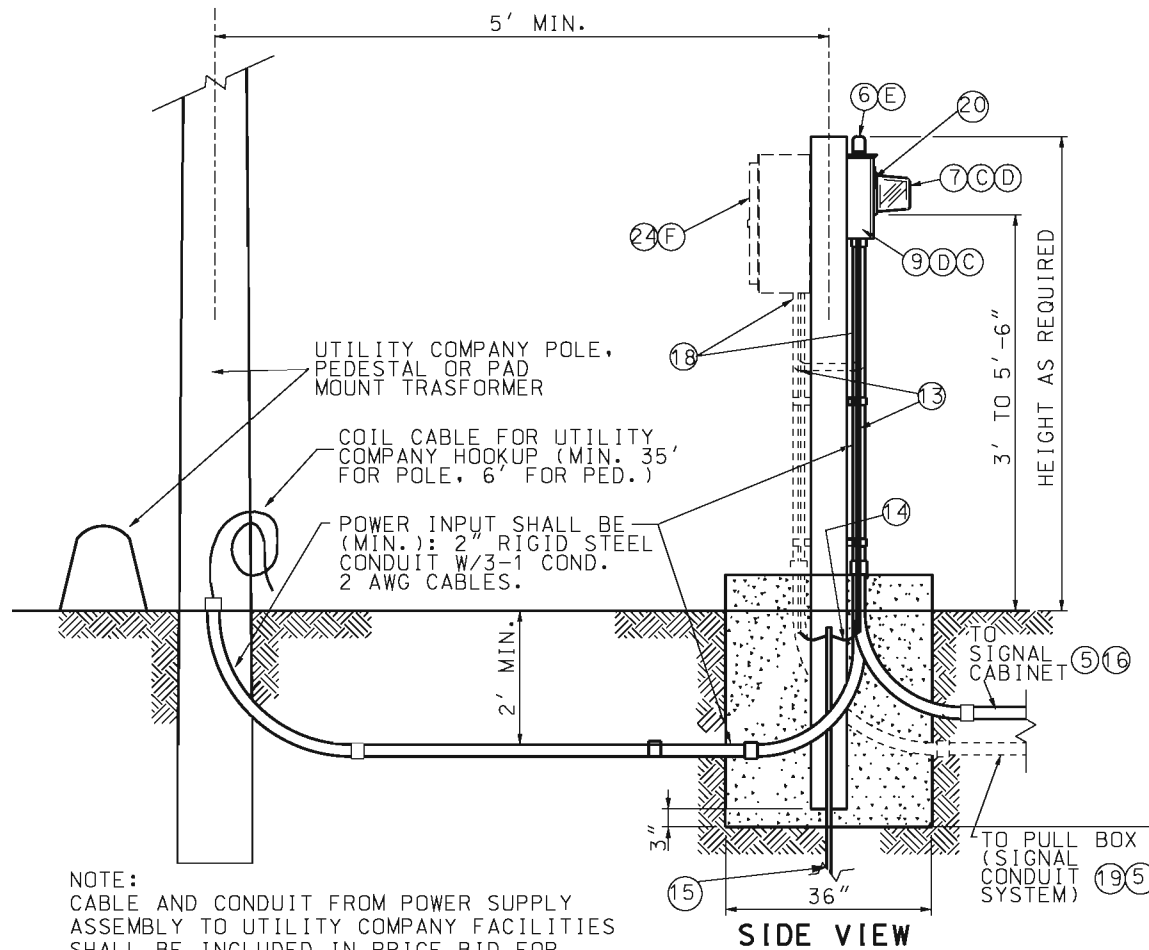
THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED, OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

FOR WIRING DIAGRAM AND LABEL DETAIL SEE SHEET 2 OF 4.



NOTE: CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

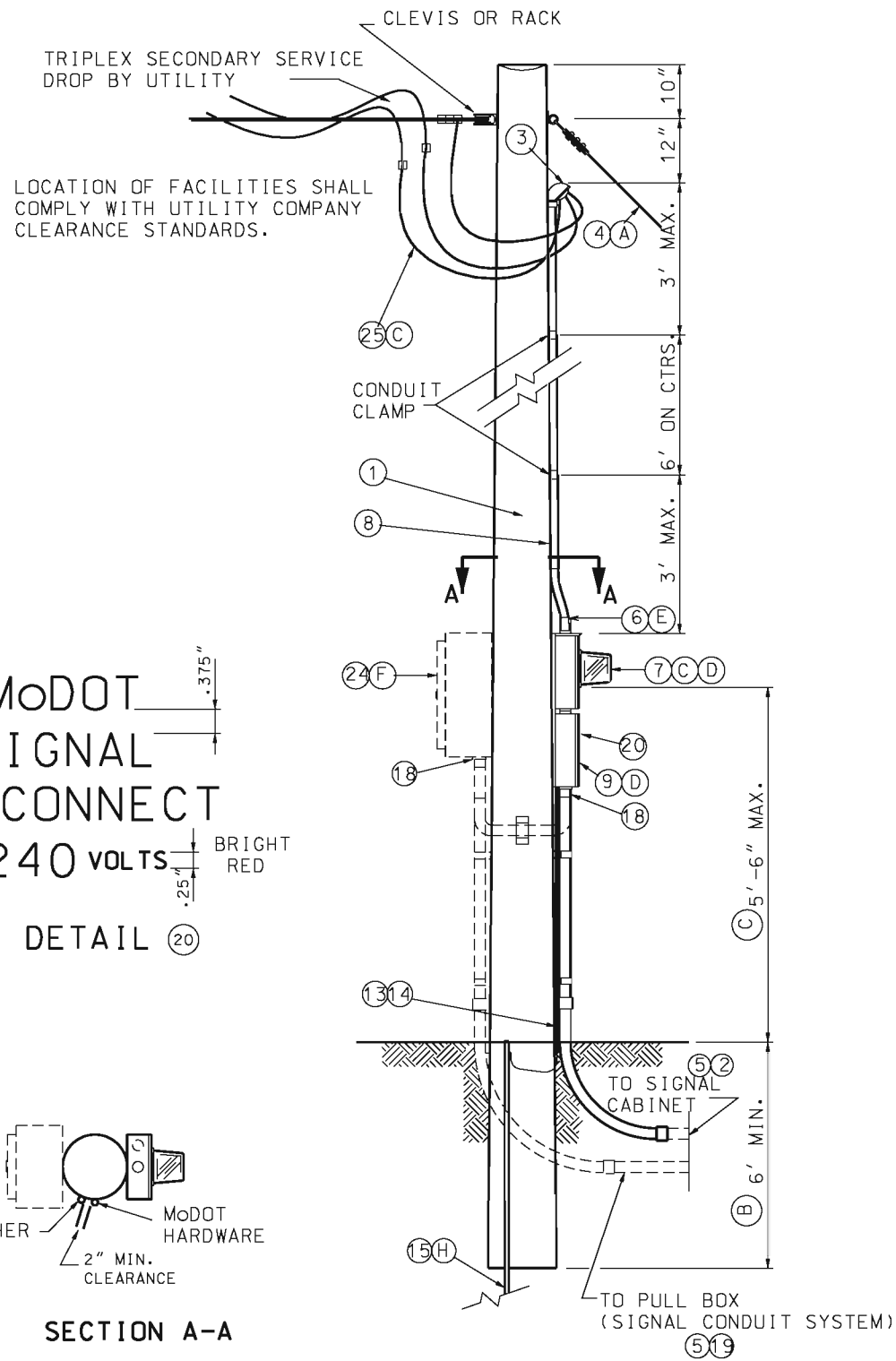
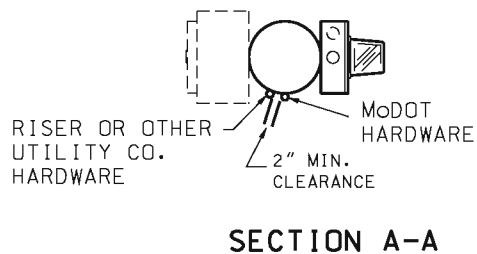
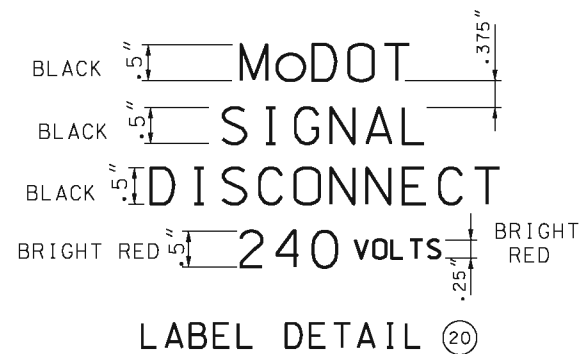
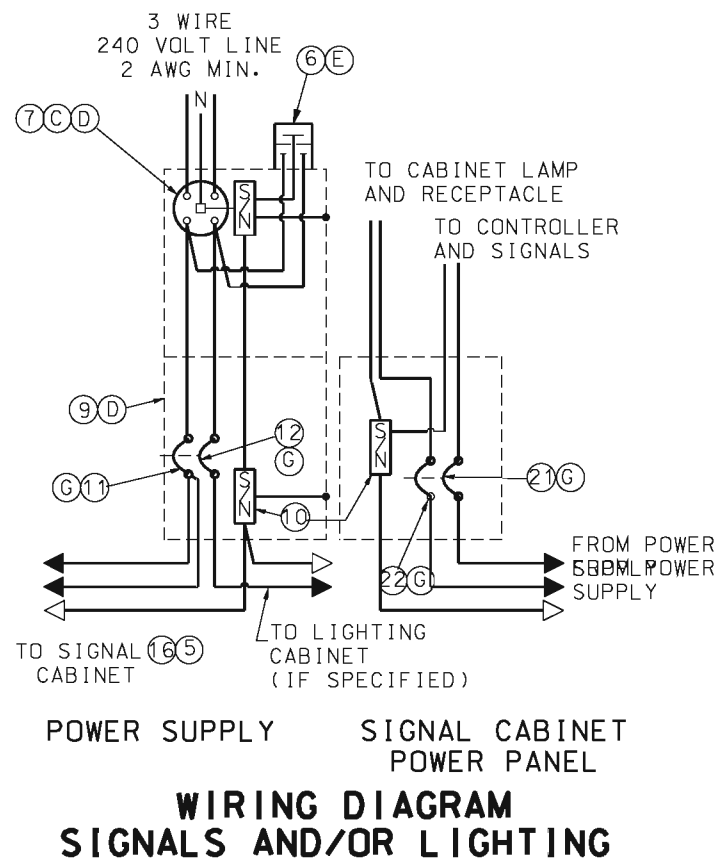
**TYPE 2 (PEDESTAL) UNDERGROUND SERVICE**

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TRAFFIC SIGNALS POWER SUPPLY ASSEMBLY 240/120 VOLT SERVICE</b>	
	DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/26/2009	SHEET NO. <b>902.15K</b> 1 OF 3

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



LIST OF MATERIALS	
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN., CLASS IV WOOD, CONTRACTOR PROVIDED, MoDOT OWNED *
2	#8 AWG MIN. CABLE, 600 VOLT *
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	2" MIN. RIGID CONDUIT WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTOR, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	2" MIN. RIGID CONDUIT
9	SERVICE DISCONNECT BOX, LOCKING, RAIN TIGHT, NEMA 4
10	INSULATED, GROUNDABLE NEUTRAL, 200 AMP MINIMUM
11	SIGNAL BREAKER, SINGLE POLE, 40A MIN, TYPE A OR B *
12	LIGHTING BREAKER, SINGLE POLE, 40A, TYPE A OR B
13	METAL CONDUIT, 1/2"
14	GROUND WIRE, #2 AWG MIN.
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT
17	CLASS B CONCRETE, 0.92 C.Y. ±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	LIGHTING CABLES *
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS) VINYL RAISED LETTERING
21	TYPE B CONTROLLER AND SIGNAL BREAKER, AS SPECIFIED.
22	TYPE B AUXILIARY BREAKER, 15 AMP
23	W6 x 9 OR W6 x 15 GALVANIZED POST
24	LIGHTING CONTROL CABINET (SEE SHEET 2)
25	#2 AWG MIN. CABLE, 600 VOLT
*	SEE PLANS



**NOTES**

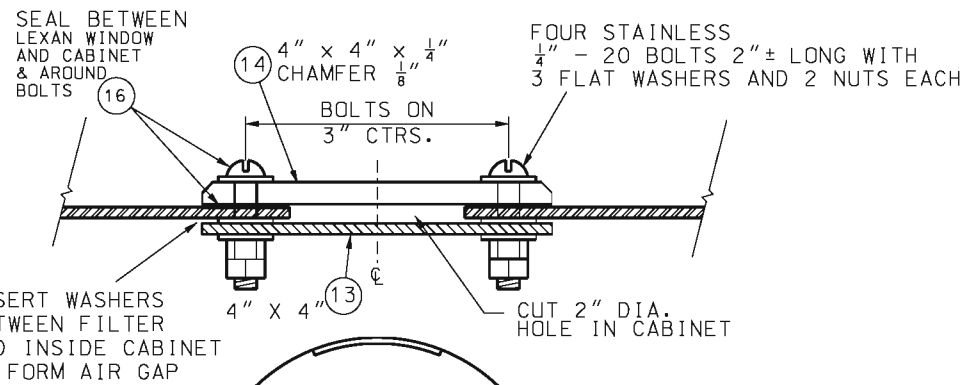
- (A) SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50'.
- (B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 50 FEET.
- (C) SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL. ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAIN-LESS STEEL. METER SOCKET AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.
- (D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF DOOR.
- (E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET, IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE CONNECT CABINET
- (F) IF LIGHTING IS SPECIFIED, INSTALL LIGHTING CONTROL ON POWER SUPPLY.
- (G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.
- (H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CAD WELDED.

**GENERAL NOTES:**

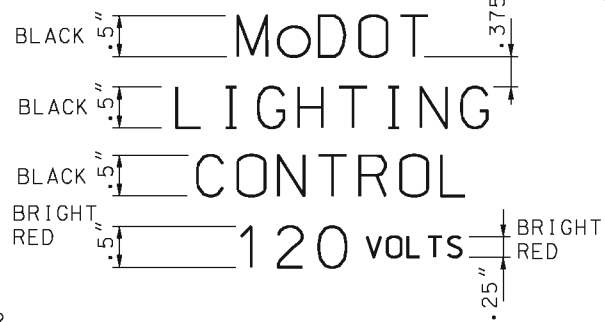
- FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.
- THE TYPE POWER SUPPLY ASSEMBLY IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.
- THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.
- WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED, OMIT ITEMS NOT REQUIRED.
- ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.
- ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	<p><b>TRAFFIC SIGNALS POWER SUPPLY ASSEMBLY 240/120 VOLT SERVICE</b></p>
<p>DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/26/2009</p>	<p><b>902.15K</b></p>
<p>SHEET NO. 2 OF 3</p>	

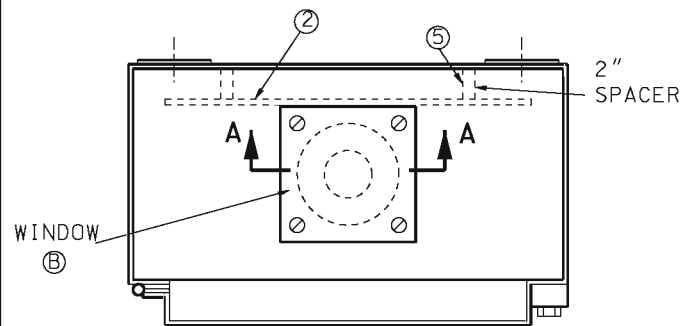
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



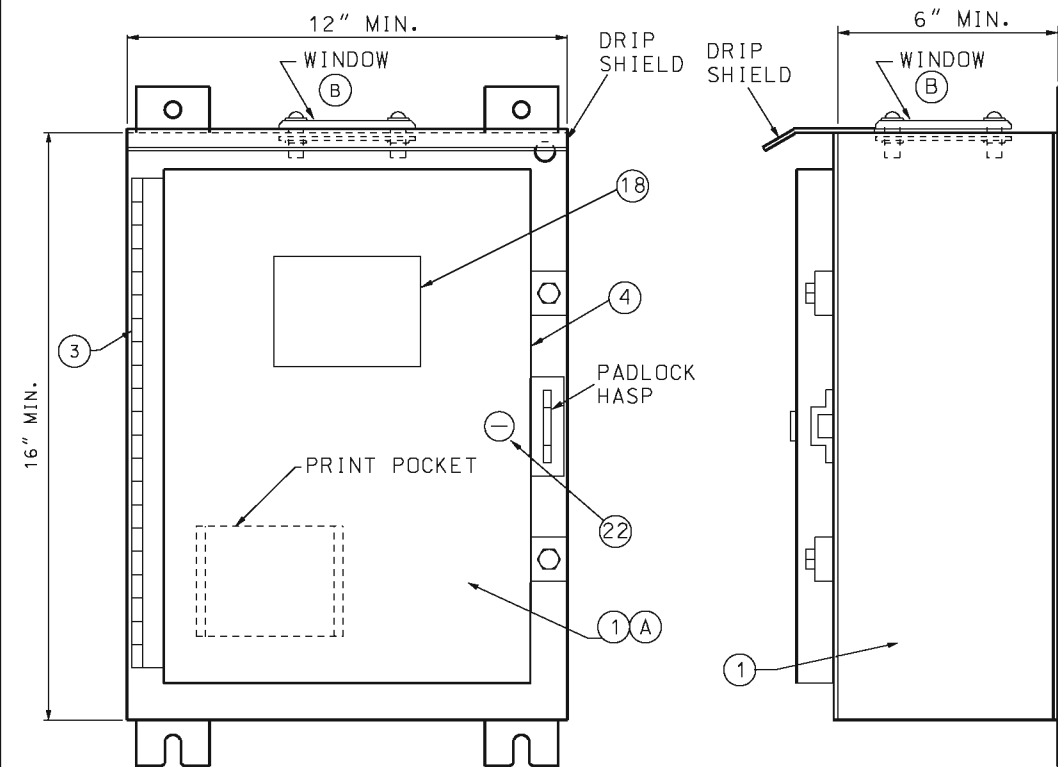
PHOTOELECTRIC SWITCH  
SECTION A-A  
WINDOW DETAIL



LABEL DETAIL

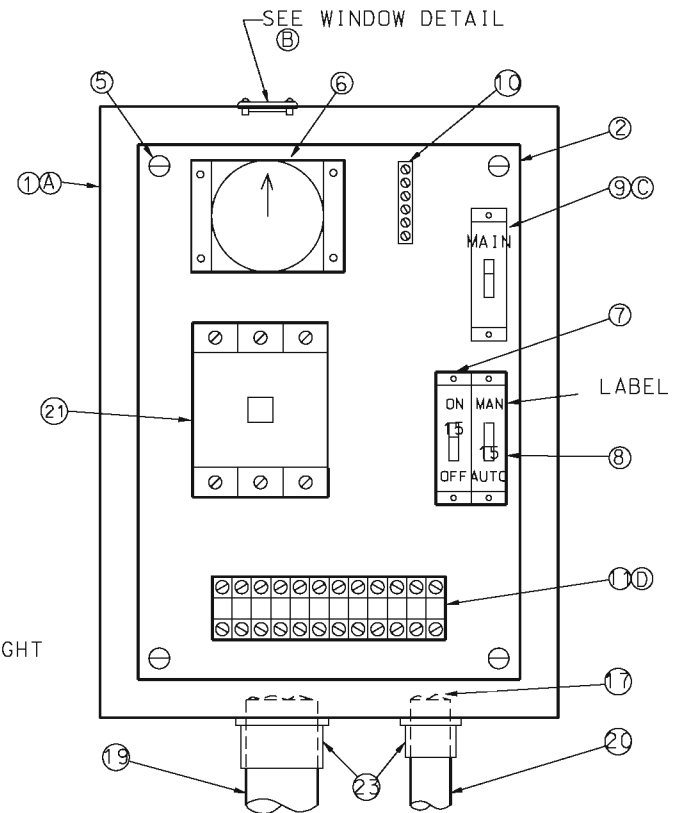


TOP VIEW

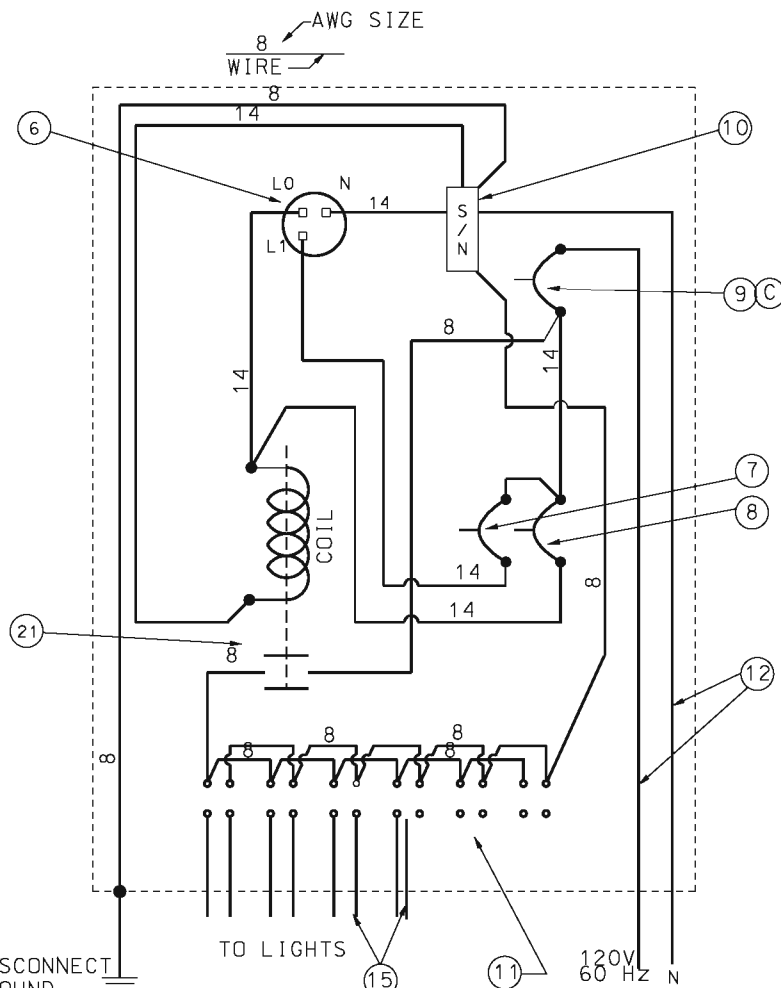


FRONT VIEW

SIDE VIEW



EQUIPMENT LAYOUT



WIRING DIAGRAM

LIST OF MATERIALS	
ITEM	DESCRIPTION
1	CABINET, WATERTIGHT, NEMA 4, 14 GA MINIMUM THICKNESS
2	PANEL, 12 GA MINIMUM THICKNESS, ALUMINUM OR STAINLESS STEEL
3	CONTINUOUS STAINLESS STEEL HINGE
4	NEOPRENE GASKET DOOR
5	3/8" - 16 COLLAR STUD
6	PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000 WATT
7	15 AMP CONTROL BREAKER, SINGLE POLE, TYPE B
8	15 AMP AUTO-MANUAL SWITCH, SINGLE POLE BREAKER, TYPE B, WITH LABEL
9	MAIN BREAKER, SINGLE POLE, TYPE B *
10	NEUTRAL TERMINAL STRIP
11	LIGHTING TERMINAL BLOCK, INSULATED FROM BACK PANEL, 12 POSITION (E)
12	POWER, CABLE, #8 AWG MIN., 600 V.
13	FILTER, TRANSLUCENT, PLEXIGLASS #W2067, 1 8" THICK
14	CLEAR, LEXAN #9034 WINDOW, 1/4" THICK MIN. EXCEPT FOR 15A BREAKER; MIN. WIRE SIZE 10 AWG.
15	CABLE, LIGHTING *
16	LIFETIME SILICONE CAULK
17	PLIABLE DUCT SEALANT
18	LABEL-WEATHERPROOF ADHESIVE-VINYL RAISED LETTERING (OR EQUIV.) (SEE DETAIL)
19	CONDUIT, RIGID, 2" MIN. *
20	CONDUIT, RIGID, 1" MIN.
21	LIGHTING CONTACTOR, 2 POLE, 30 AMP, 600 VOLT, 120 VOLT COIL
22	#2 CORBIN LOCK
23	THREADED CONDUIT HUB WITH SEALING WASHERS
*	SEE PLANS

NOTES:

- (A) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.
- (B) PHOTOELECTRIC SWITCH BRACKET MAY VARY, LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
- (C) MAIN BREAKER SIZE:  

TOTAL LUMINAIRE** LOAD (WATTS)	BREAKER SIZE (AMPS)	MIN. AWG
0-920	15	10
930-1260	20	8
1270-1600	25	8
1610-1930	30	8

\*\* EXCLUDING BALLAST LOAD
- (D) TERMINAL BLOCK SHALL BE RATED AT 600V, SHALL ACCEPT WIRES UP TO 8 AWG AND SHALL HAVE A BARRIER BETWEEN EACH TERMINAL AND ON EACH END.

GENERAL NOTES:

- ALL OPENINGS IN CABINET SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.
- ALL CIRCUIT BREAKERS SHALL CONFORM TO SECTION 901.4 OF THE STANDARD SPECIFICATIONS.
- PLACEMENT OF ALL ITEMS SHALL BE APPROVED BY THE ENGINEER.
- CABINET SHALL BE LOCATED AWAY FROM TRAFFIC. TOP MOUNT PHOTO CONTROL SHALL FACE AN OPEN SKY. SIDE MOUNT PHOTO CONTROL SHALL FACE NORTH.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
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**TRAFFIC SIGNALS  
POWER SUPPLY ASSEMBLY  
240/120 VOLT SERVICE**

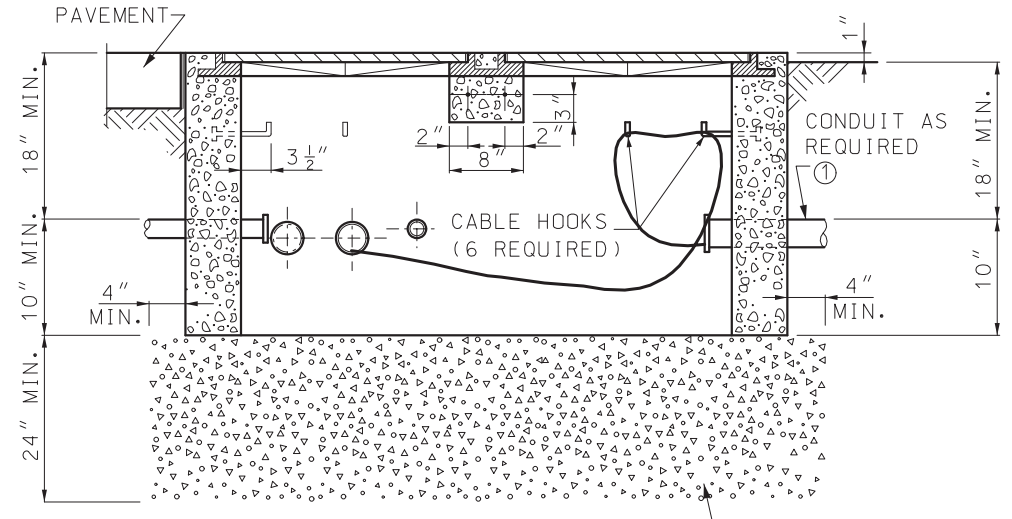
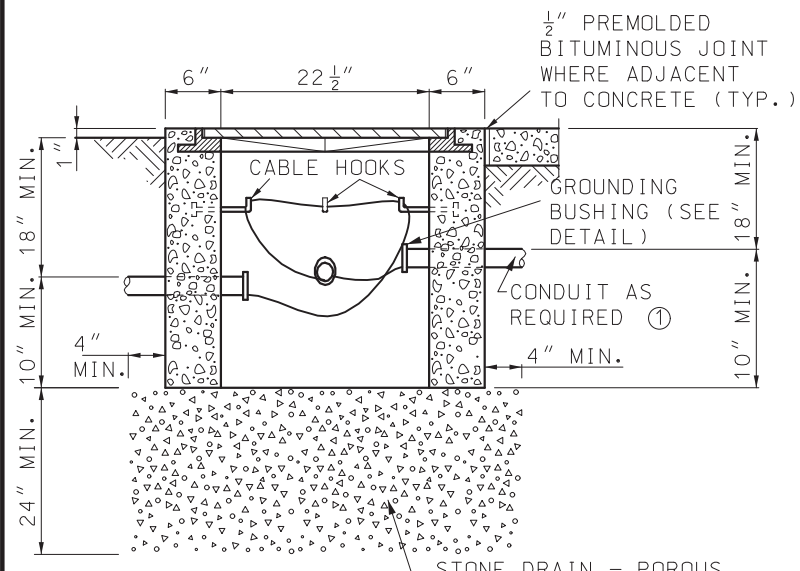
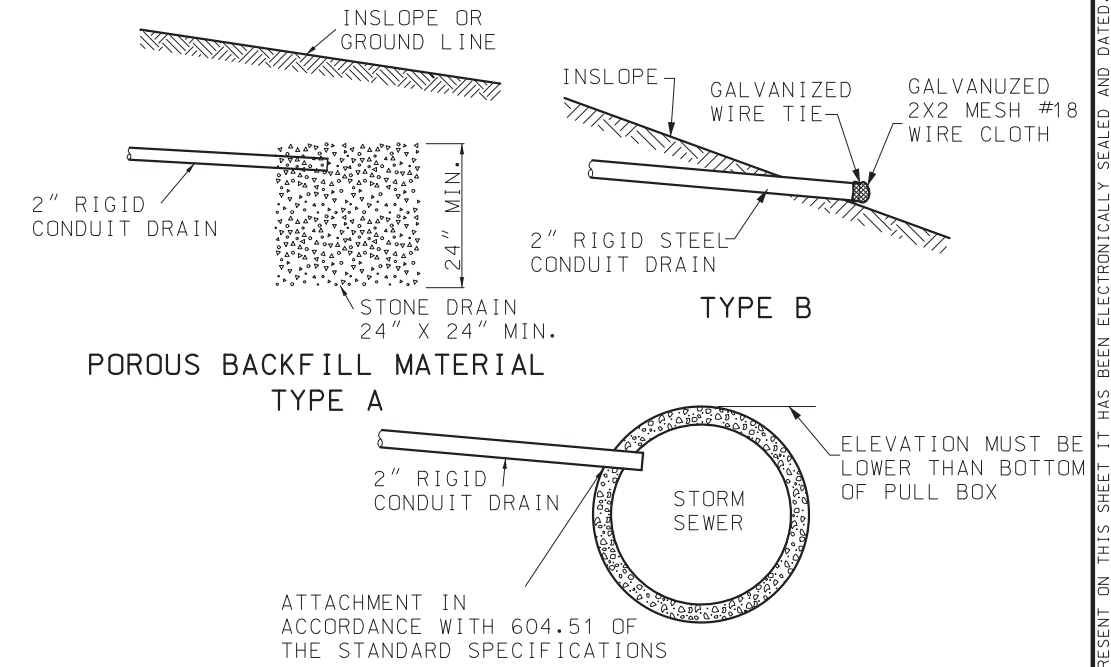
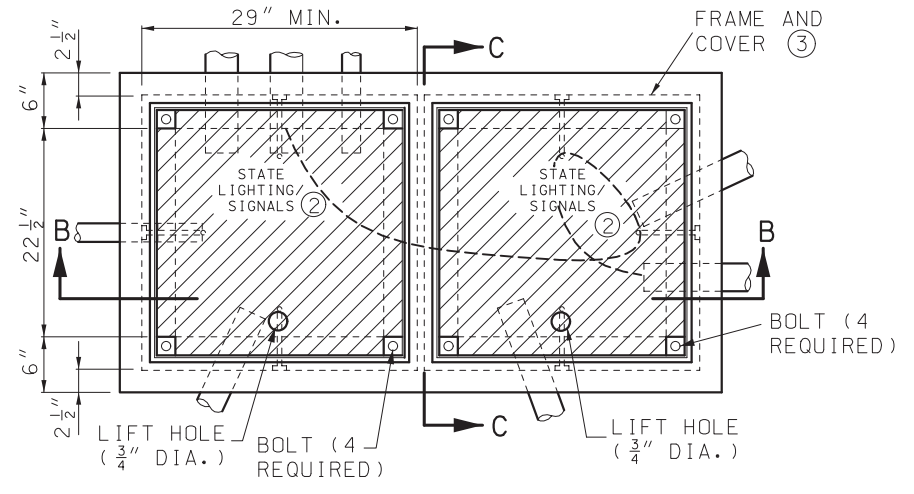
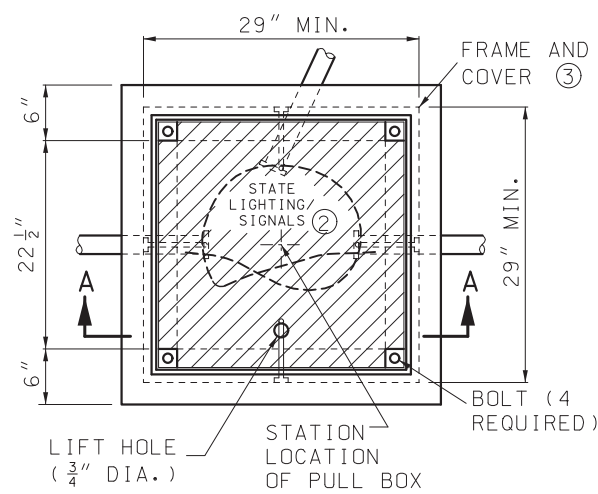
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2004  
DATE PREPARED: 8/26/2009

**902.15K**

SHEET NO.  
3 OF 3

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



ATTACHMENT IN ACCORDANCE WITH 604.51 OF THE STANDARD SPECIFICATIONS

**TYPE II DRAIN OUTLET DETAILS**

- ① ALL METAL CONDUITS SHALL BE ELECTRICALLY BONDED BY A GROUND BUSHING AND #6 AWG BARE COPPER WIRE. FOR PVC CONDUIT, ALL GROUND WIRES SHALL BE CONNECTED.
- ② SIGNAL PULL BOXES SHALL BE EMBOSSED "STATE SIGNALS" AND LIGHTING PULL BOXES "STATE LIGHTING."
- ③ PULL BOX FRAMES AND COVERS SHALL BE CAST IRON AND THE FOLLOWING MINIMUM DIMENSIONS:  
 FRAME SIZE: 29" x 29"  
 FRAME HEIGHT: 4 1/4"  
 OPENING SIZE: 22 1/2" x 22 1/2"  
 FRAME WEIGHT: 120 LBS.  
 COVER SIZE: 22 5/8" x 22 5/8"  
 COVER THICKNESS: 3/4"  
 COVER WEIGHT: 140 LBS.

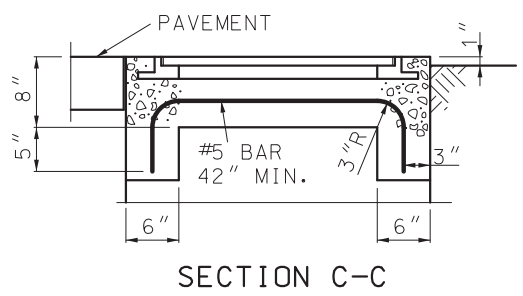
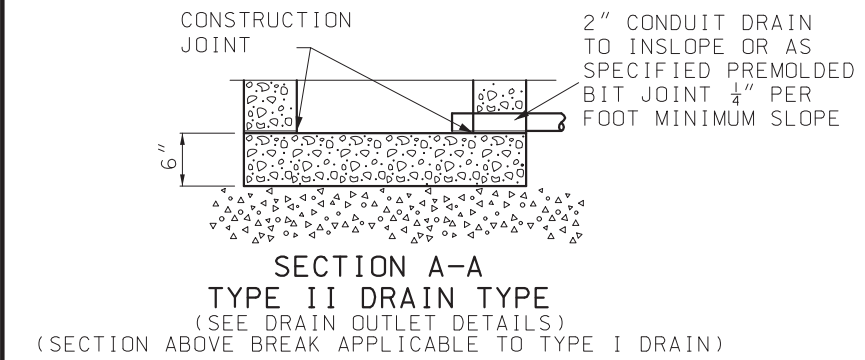
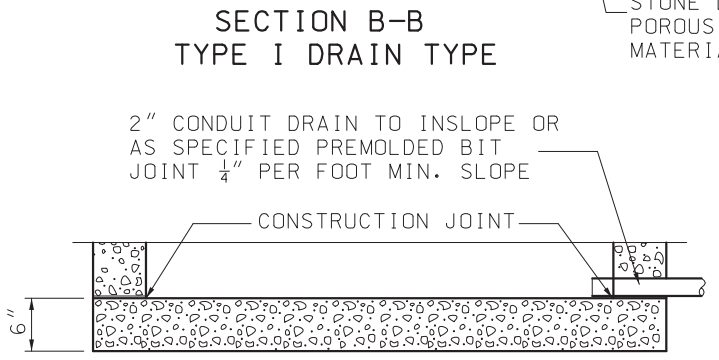
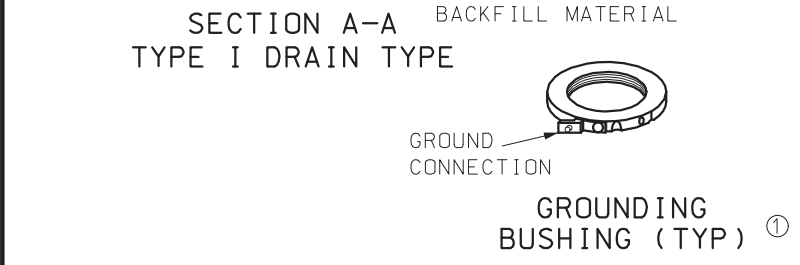
GENERAL NOTES:  
 ALL DIMENSIONS SHOWN ARE NOMINAL.  
 BOLT CLEANOUT DETAIL SHALL BE APPROVED BY ENGINEER.  
 PAVEMENT AND SUBGRADE SHALL BE AS SHOWN ON PLANS.  
 STONE DRAIN MATERIAL SHALL CONFORM TO SECTION 1009 OF THE STANDARD SPECIFICATIONS.

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

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TRAFFIC SIGNALS  
 CONCRETE PULL BOXES**

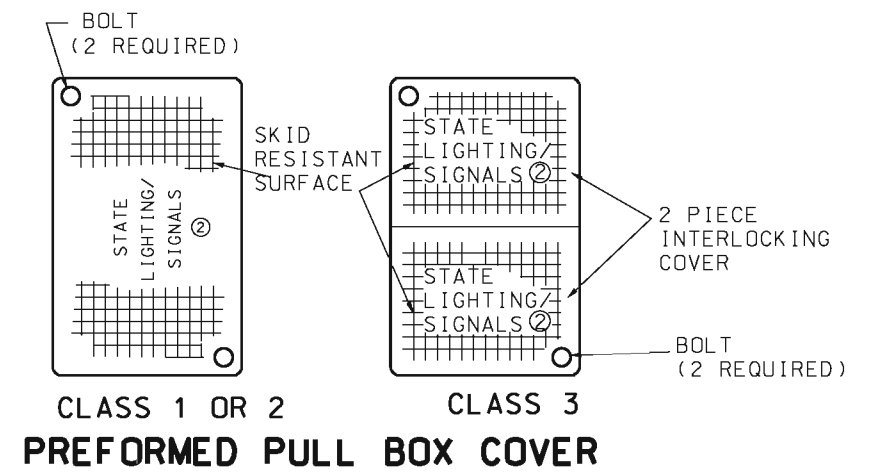
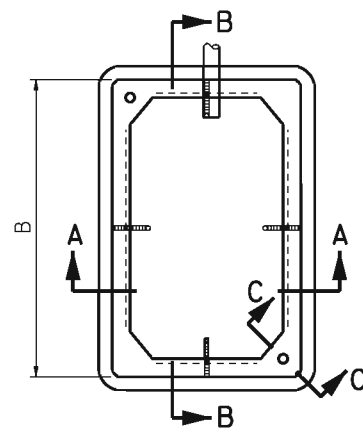
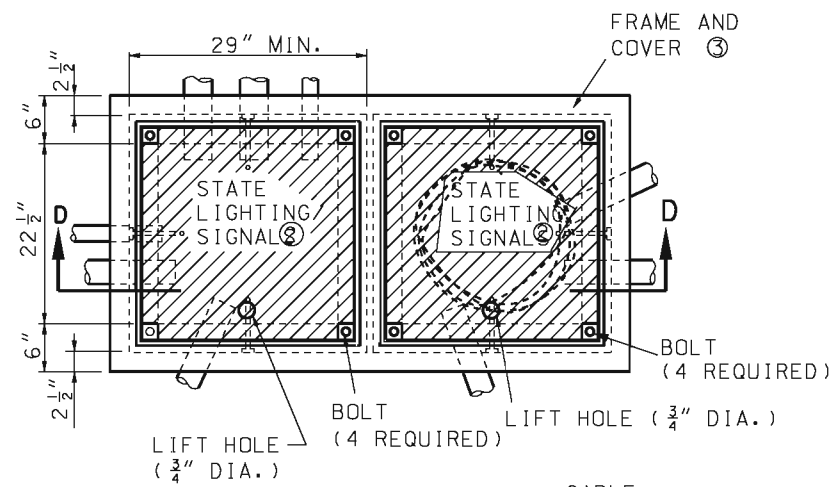
DATE EFFECTIVE: 04/01/2019	<b>902.20G</b>	SHEET NO. 1 OF 3
DATE PREPARED: 1/16/2019		



**STANDARD CONCRETE PULL BOX**

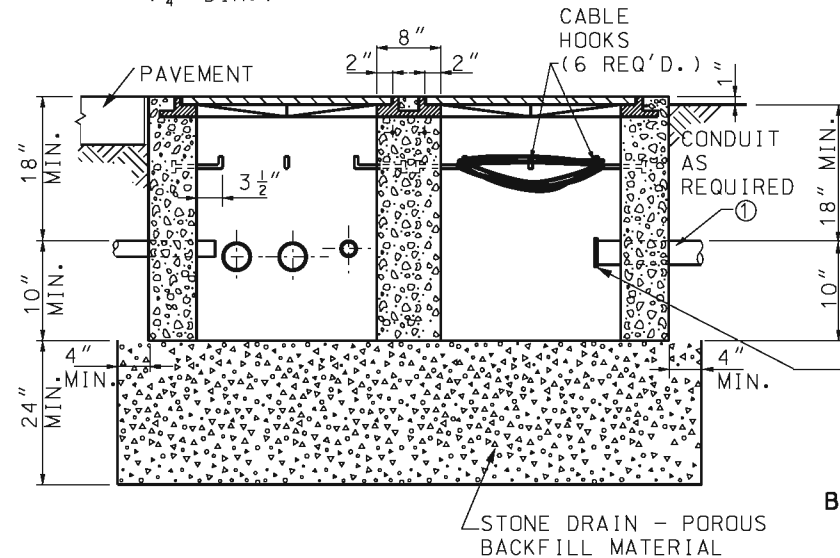
**DOUBLE CONCRETE PULL BOX, TYPE A**

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

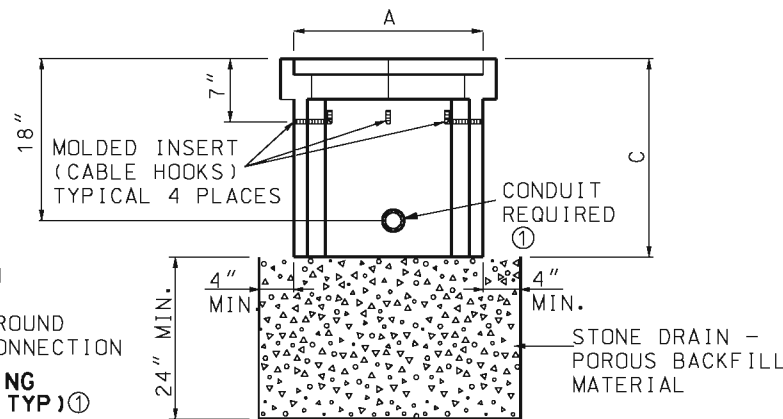


NUMBER OF ENTERING CONDUCTORS	CLASS	PREFORMED PULL BOX MINIMUM DIMENSIONS		
		A	B	C
< 23	1	17"	30"	22"
23 - 68	2	24"	36"	24"
> 68	3	30"	48"	36"

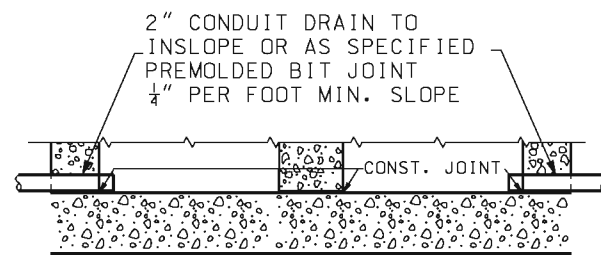
- ① ALL METAL CONDUITS SHALL BE ELECTRICALLY BONDED BY A GROUND BUSHING AND #6 AWG BARE COPPER WIRE. FOR PVC CONDUIT, ALL GROUND WIRES SHALL BE CONNECTED.
- ② SIGNAL PULL BOXES SHALL BE EMBOSSED "STATE SIGNALS" AND LIGHTING PULL BOXES "STATE LIGHTING."
- ③ PULL BOX FRAMES AND COVERS SHALL BE CAST IRON AND THE FOLLOWING MINIMUM DIMENSIONS:  
 FRAME SIZE: 29" X 29"  
 FRAME HEIGHT: 4 1/4"  
 OPENING SIZE: 22 1/2" X 22 1/2"  
 FRAME WEIGHT: 120 LBS.  
 COVER SIZE: 22 5/8" X 22 5/8"  
 COVER THICKNESS: 3/4"  
 COVER WEIGHT: 140 LBS.



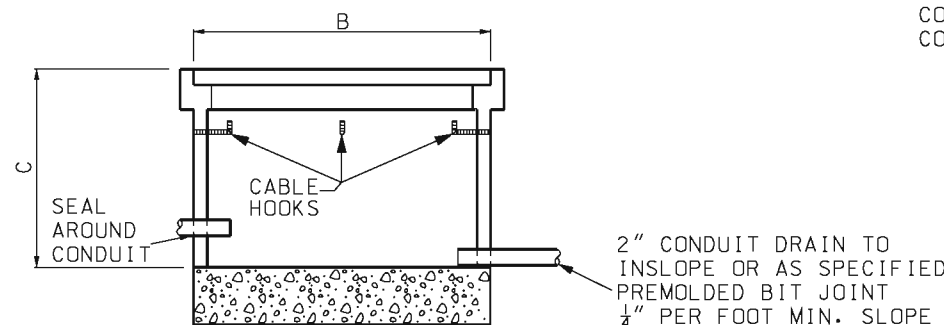
SECTION D-D  
TYPE I DRAIN TYPE



SECTION A-A  
TYPE II DRAIN TYPE



TYPE II DRAIN TYPE  
(SEE DRAIN OUTLET DETAILS)  
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN.)  
**DOUBLE CONCRETE PULL BOX, TYPE B**

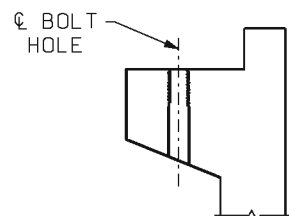


SECTION B-B  
TYPE II DRAIN TYPE  
**PREFORMED PULL BOX**

GENERAL NOTES:

IF AN EXTENSION IS USED WITH A PREFORMED BOX, THE LIP OF THE EXTENSION MAY BE INTERIOR OR EXTERIOR. THE EXTENSION SHALL BE COMPATIBLE AND FROM THE SAME MANUFACTURER.

IF PREFORMED PULL BOXES ARE SPECIFIED, THE CONTRACTOR MAY USE THE STANDARD CONCRETE PULL BOX IN LIEU OF THE CLASS 1 OR 2 PREFORMED PULL BOX OR THE DOUBLE CONCRETE PULL BOX, TYPE A, IN LIEU OF THE CLASS 3 PREFORMED PULL BOXES.



SECTION C-C  
TYPICAL BOLT CLEANOUT

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

**STATE OF MISSOURI**  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER

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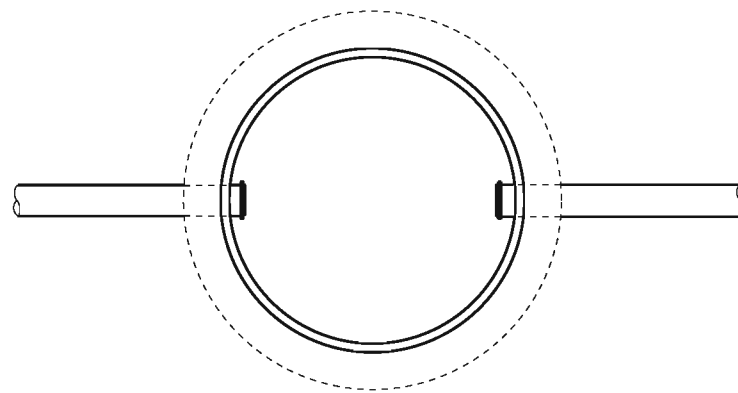
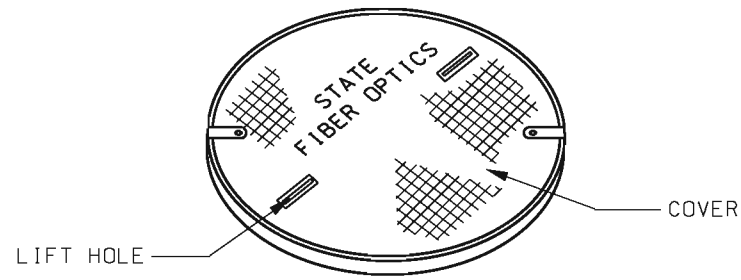
**TRAFFIC SIGNALS**  
**CONCRETE AND PREFORMED PULL BOXES**

DATE EFFECTIVE: 11/01/2010  
 DATE PREPARED: 9/3/2010

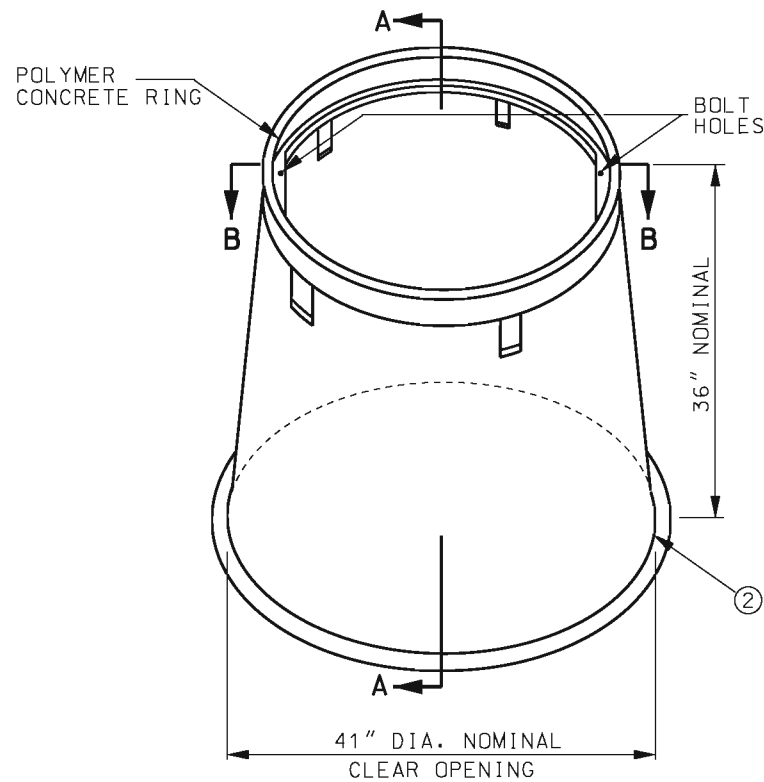
**902.20G**

SHEET NO.  
 2 OF 3

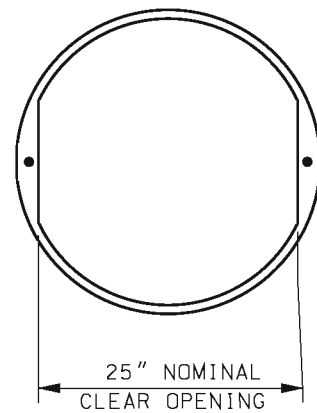
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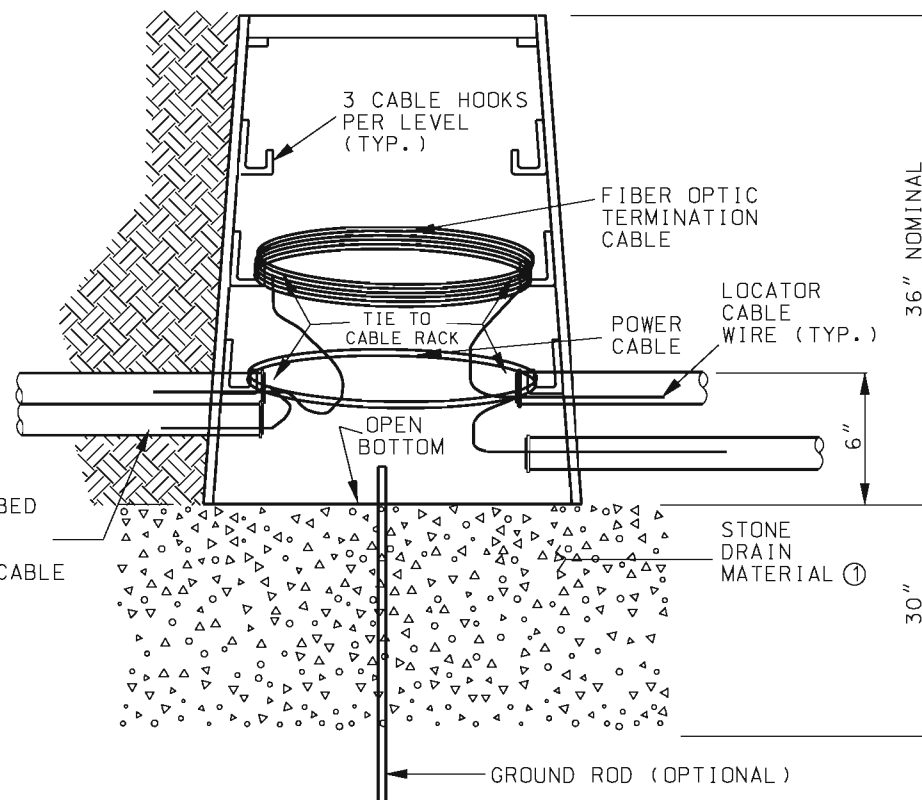
PLAN



CIRCULAR PULL BOX CLASS 5



SECTION B-B



SECTION A-A  
TYPE I DRAIN TYPE

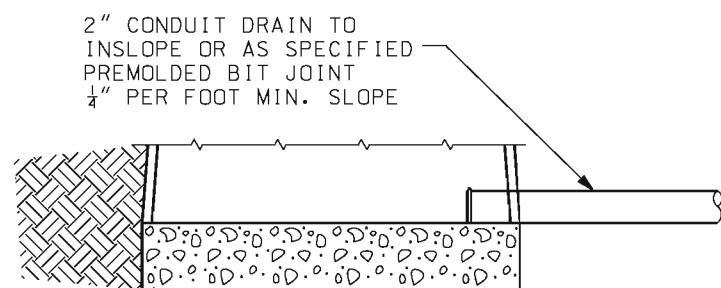
- ① AGGREGATE SHALL BE TYPE 1 CONFORMING TO SEC 1007.
- ② BOX SHALL BE OF A FLARE DESIGN AND HAVE A LIP FOR STABILIZATION.

GENERAL NOTES:

A MINIMUM OF NINE HOOKS, INSTALLED IN THREE LEVELS, SHALL BE INCLUDED WITH EACH PULL BOX.

IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

THE CIRCULAR PULL BOX COVER SHOULD BE SIZED TO FIT A BOX WITH A CLEAR OPENING OF 25".



TYPE II DRAIN TYPE

(SEE DRAIN OUTLET DETAILS)  
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN.)

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

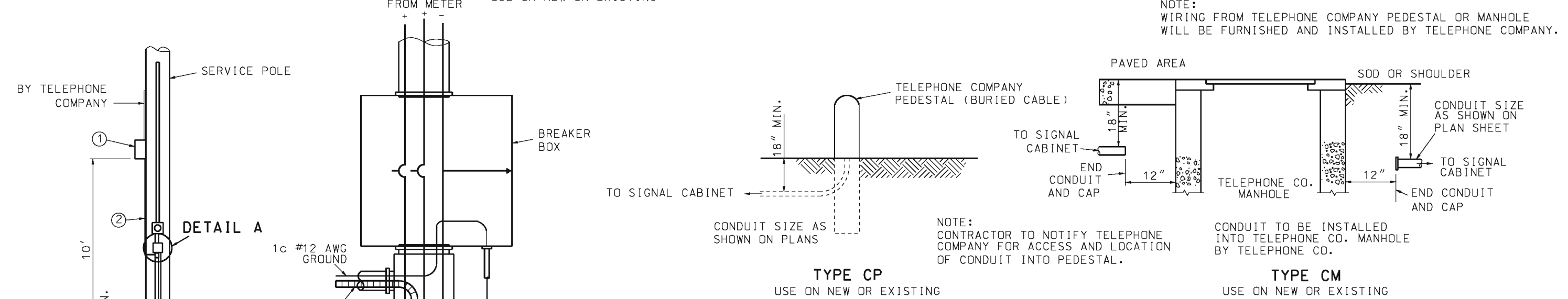
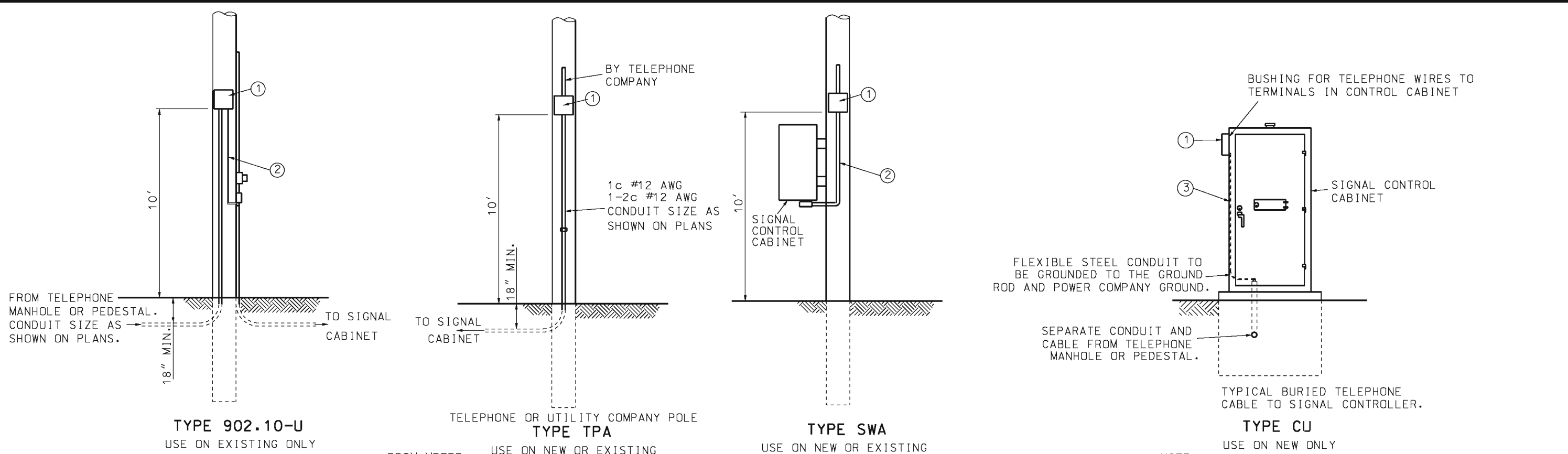
STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TRAFFIC SIGNALS  
 CONCRETE AND PREFORMED  
 PULL BOXES**

DATE EFFECTIVE: 11/01/2010  
 DATE PREPARED: 9/3/2010

**902.20G**

SHEET NO.  
 3 OF 3



**UNDERGROUND TELEPHONE CONNECTION**

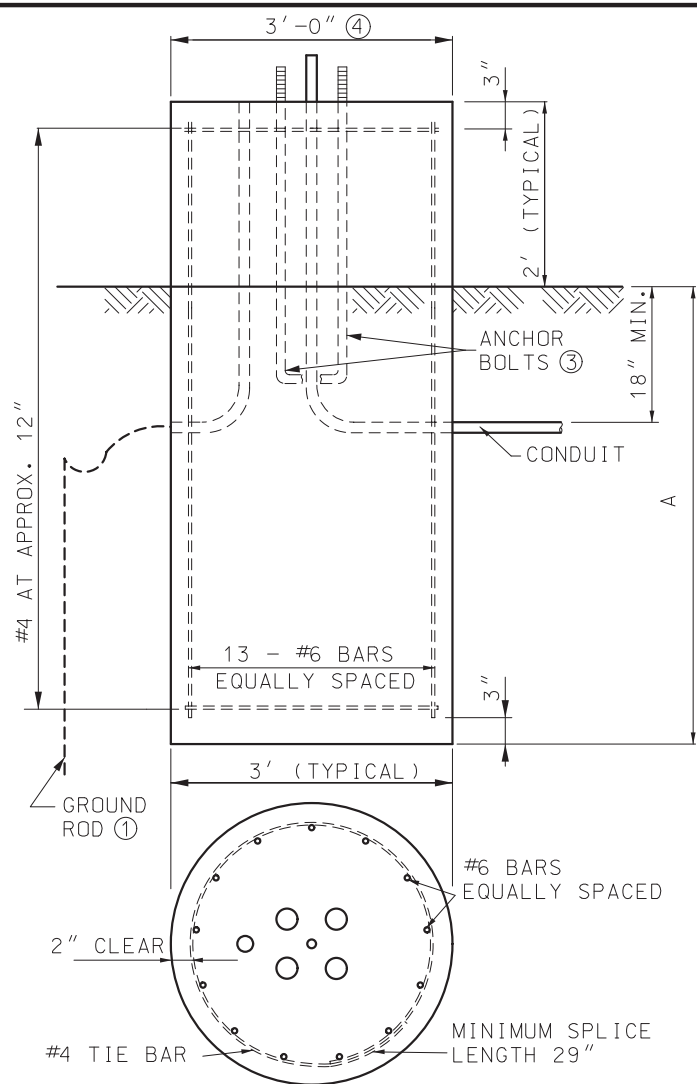
NOTE:  
SCHEMATIC DIAGRAM APPLIES TO  
STANDARD PLANS 901.80 AND 902.15.

- ① 12" x 12" x 6" JUNCTION BOX WITH 3/4" TO 1 1/2" KNOCK-OUT IN BOTTOM.
  - ② 3/4" MINIMUM METAL CONDUIT CONTAINING 1-2c #12 AWG AND 1c #12 AWG.
  - ③ 3/4" MINIMUM FLEXIBLE CONDUIT CONTAINING 1-2c #12 AWG AND 1c #12 AWG.
- ALL ITEMS CONTRACTOR FURNISHED AND INSTALLED.

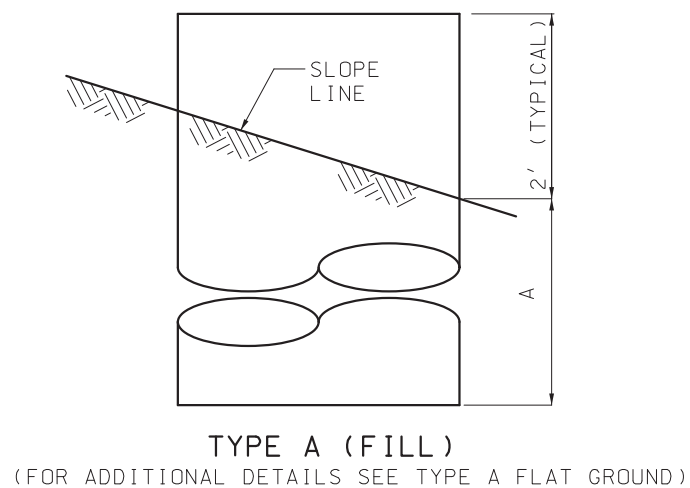
**AERIAL TELEPHONE CONNECTION**

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p><b>TRAFFIC SIGNALS</b> <b>TELEPHONE INTERCONNECT</b></p>
<p>DATE EFFECTIVE: 03/01/1996 DATE PREPARED: 8/26/2009</p>	<p><b>902.21C</b></p>
<p>SHEET NO. 1 OF 1</p>	

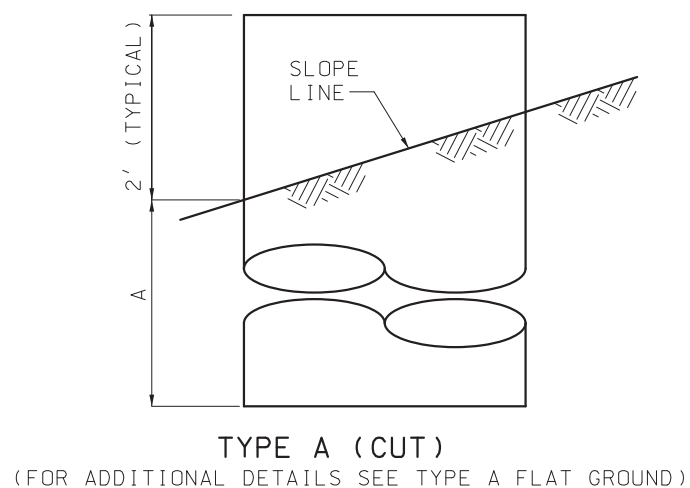
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



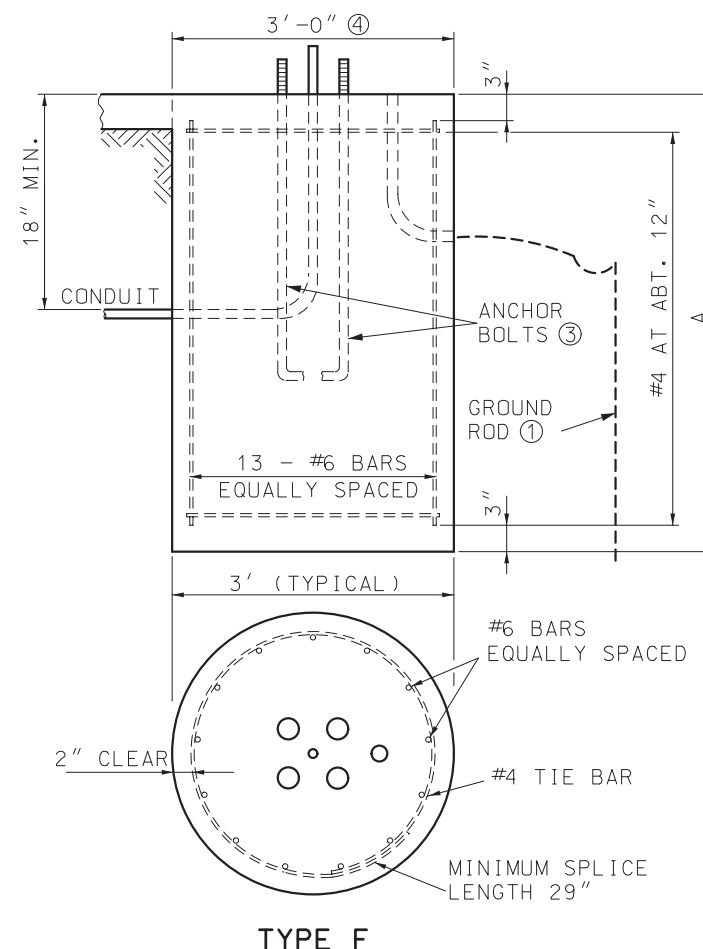
TYPE A (FLAT GROUND)



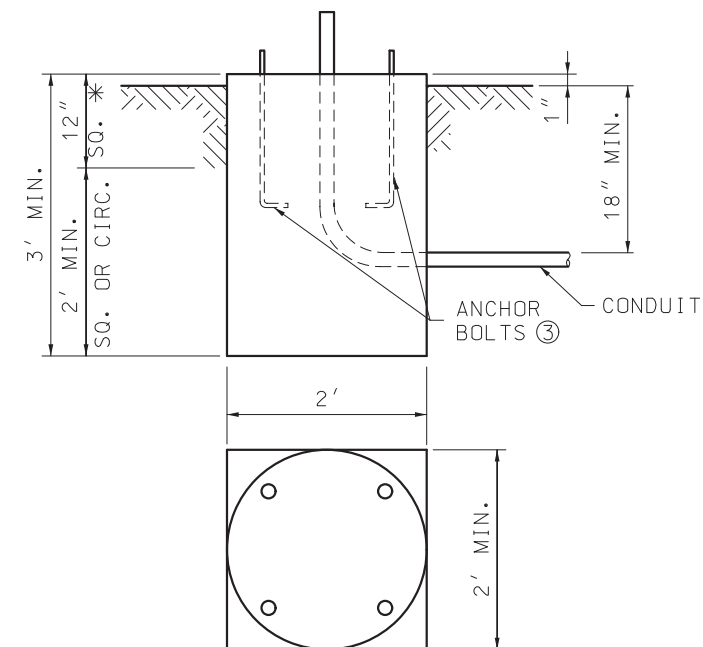
TYPE A (FILL)  
(FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)



TYPE A (CUT)  
(FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)



TYPE F



\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".

TYPE C

- ① APPLICABLE ONLY WHERE CONTROLLER IS MOUNTED TO A SIGNAL POLE.
- ② BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ③ ANCHOR BOLT DIMENSIONS ARE SHOWN ON THE MANUFACTURER'S APPROVED DRAWINGS.
- ④ MAXIMUM BOLT CIRCLE DIAMETER IS 26". BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ⑤ ARM LENGTH DETERMINED BY LENGTH OF LONGEST ARM FOR TYPE B & BL SIGNAL POSTS.
- ⑥ BASE TYPE A OR F DETERMINED BY LOCATION OF POST BASE.
- ⑦ SOIL DEPTH, NO ROCK.
- ⑧ WEIGHT INCLUDES #4 TIE BARS.
- ⑨ WHEN CONCRETE BASE IS LOCATED WITHIN 8" CONCRETE DIVISIONAL ISLAND, EMBEDMENT LENGTH MAY BE REDUCED BY 1/2 DIAMETER OF THE DRILLED SHAFT.

POST BASES

POST BASES		
POST TYPE	ARM LENGTH (FEET) ⑤	BASE TYPE ⑥
C OR CL	15 - 25	A-9 OR F-9
C OR CL	30 - 35	A-9.5 OR F-9.5
C OR CL	40 - 55	A-10.5 OR F-10.5
B OR BL	15 - 25	A-10 OR F-10
B OR BL	30 - 35	A-11 OR F-11
B OR BL	40 - 55	A-12 OR F-12

STEEL AND CONCRETE REQUIREMENTS FOR POST BASES ⑨				
TYPE	BASES	#6 STEEL BAR		CONC. C.Y.
		LENGTH	WEIGHT LBS. ⑧	
A-9	9'-0"	10'-6"	300	2.88
A-9.5	9'-6"	11'-0"	310	3.01
A-10	10'-0"	11'-6"	320	3.14
A-10.5	10'-6"	12'-0"	330	3.27
A-11	11'-0"	12'-6"	350	3.40
A-12	12'-0"	13'-6"	380	3.67
F-9	9'-0"	8'-6"	240	2.36
F-9.5	9'-6"	9'-0"	250	2.49
F-10	10'-0"	9'-6"	270	2.62
F-10.5	10'-6"	10'-0"	280	2.75
F-11	11'-0"	10'-6"	300	2.88
F-12	12'-0"	11'-6"	320	3.14
C*				0.44

\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".

BASE EMBEDMENT IN SOLID ROCK	
SOLID ROCK ENCOUNTER POINT	REQUIRED EMBEDMENT
AT SURFACE	4'-9"
AT ONE-FOURTH NORMAL DEPTH	4'-0"
AT ONE-HALF NORMAL DEPTH	3'-3"
AT THREE-FOURTHS NORMAL DEPTH	1'-3"

1. REQUIRED EMBEDMENT DEPTHS CAN BE INTERPOLATED BETWEEN ENCOUNTER POINTS FOR OTHER SOLID ROCK ENCOUNTER DEPTHS.
2. NORMAL LENGTHS FOR ANCHOR BOLTS AND REINFORCING STEEL WILL BE REQUIRED.
3. CORE DRILL HOLES FOR ANCHOR BOLTS AND REINFORCING STEEL IN SOLID ROCK SHALL BE PROVIDED. CORE DRILL HOLES SHALL BE TWICE THE DIAMETER OF THE ANCHOR BOLT AND REINFORCING STEEL DIAMETER AND TO WITHIN 3 INCHES OF THE NORMAL BASE DEPTH.
4. IF SOIL, SHALE, GRAVEL, FRACTURED ROCK, OR VOIDS ARE ENCOUNTERED DURING CORE DRILLING, THE ROCK SHALL BE REMOVED TO THE POINT OF ENCOUNTER.
5. ANCHOR BOLTS AND REINFORCING STEEL SHALL BE GROUTED IN THE CORE DRILL HOLES WITH NON-SHRINK GROUT HAVING A MINIMUM STRENGTH OF 9,000 POUNDS IN 24 HOURS.
6. STRAIGHT ANCHOR BOLTS OF THE LENGTH SHOWN IN THE ANCHOR BOLT TABLE UNDER THE COLUMN "BOLT LENGTH" ARE ADEQUATE FOR USE IN GROUTED CORE DRILLED HOLES.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**TRAFFIC SIGNALS**

POST BASES

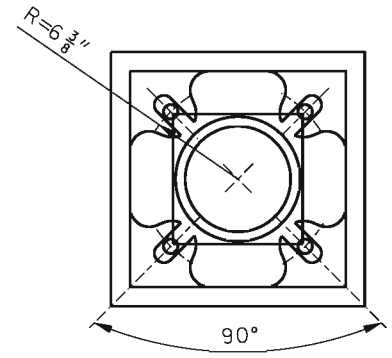
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 4/1/2024

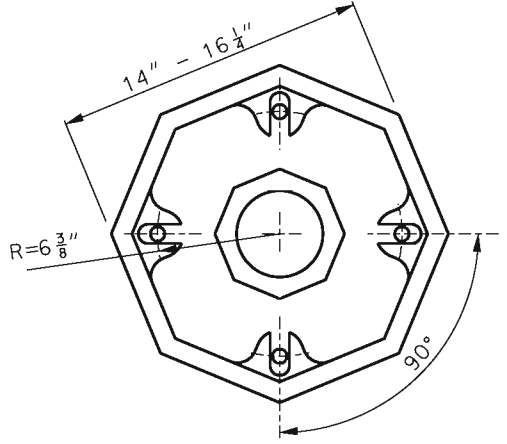
DATE PREPARED: 1/8/2024

**902.30P**

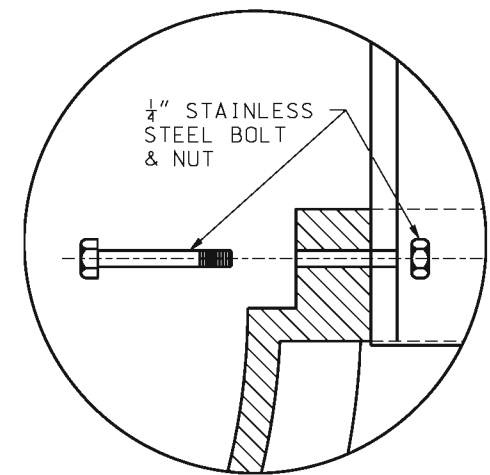
SHEET NO.  
1 OF 2



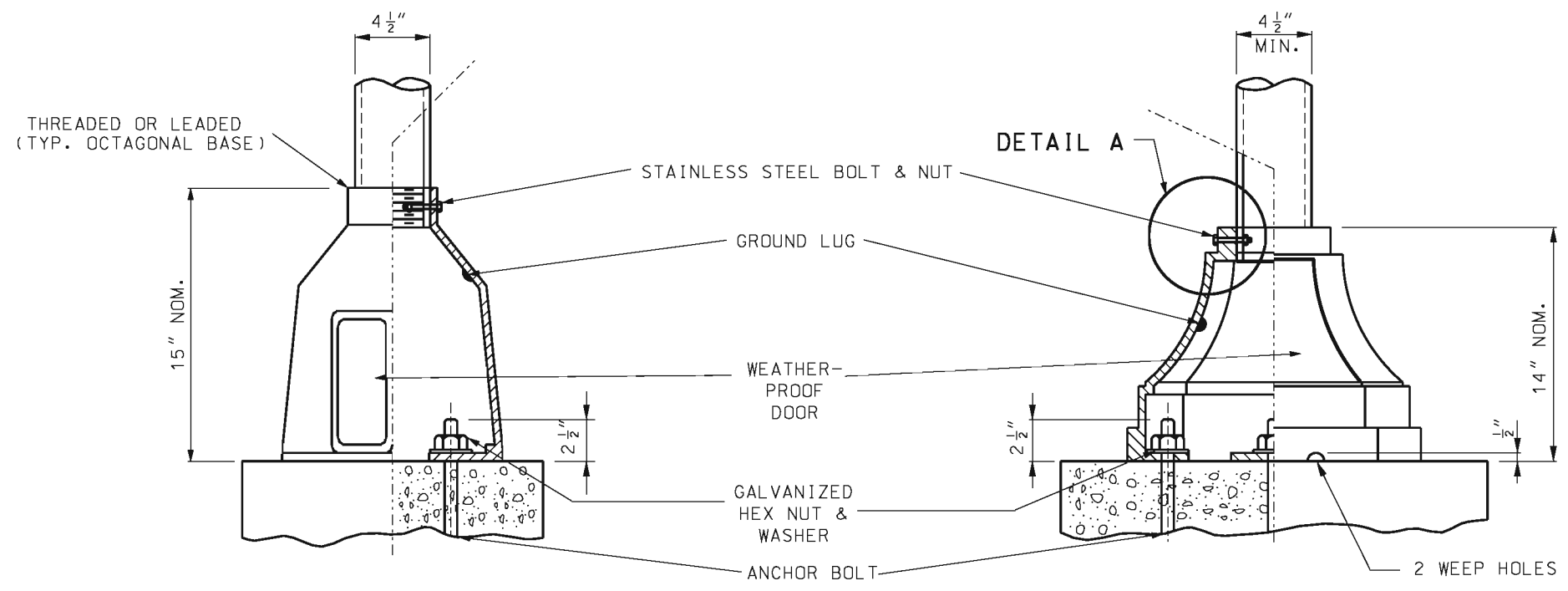
BOLT CIRCLE



BOLT CIRCLE

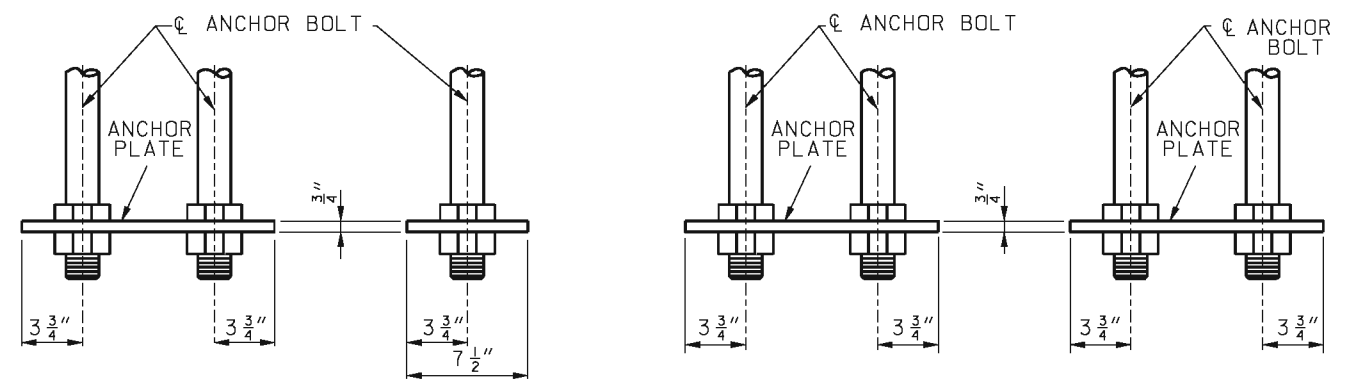


DETAIL A



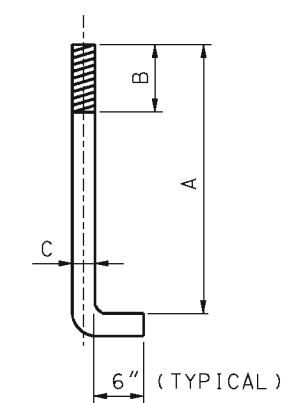
CAST BASE

BOLT LENGTH INCHES	VERT. HT. A INCHES	THREAD LEN. B INCHES	DIA. C INCHES
19	17	1.50	0.625
57	51	7.00	1.250
79	73	7.50	1.500
94	88	8.00	1.750
121	115	8.50	2.000
120	114	9.00	2.250
146	140	9.50	2.500



SIDE VIEW END VIEW

SIDE VIEW END VIEW



ANCHOR BOLT

TWO BOLTS PER PLATE  
HEX NUT OR 5/16" FILLET WELD ALL AROUND BOTH SIDES

FOUR BOLTS PER PLATE  
HEX NUT OR 5/16" FILLET WELD ALL AROUND BOTH SIDES

OPTIONAL STEEL PLATE FOR ANCHOR BOLTS

NOTE:  
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED.

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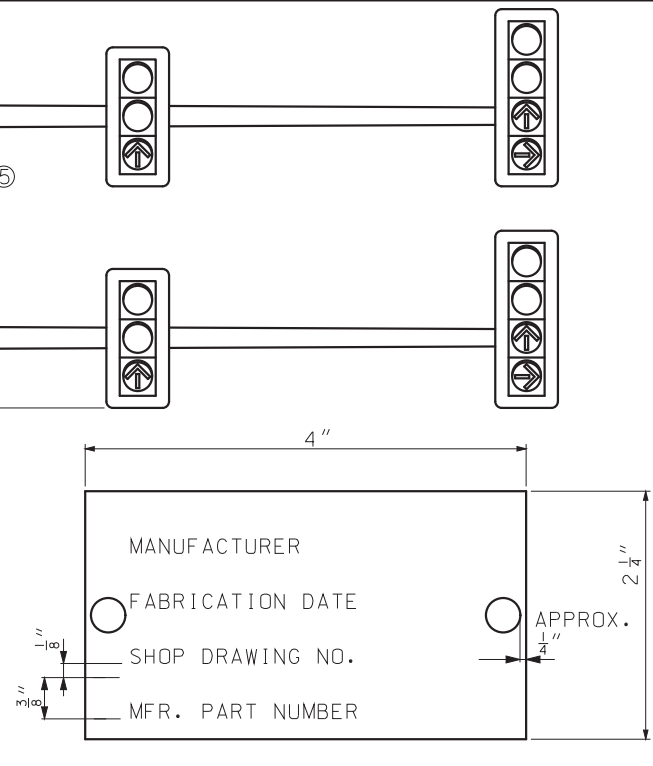
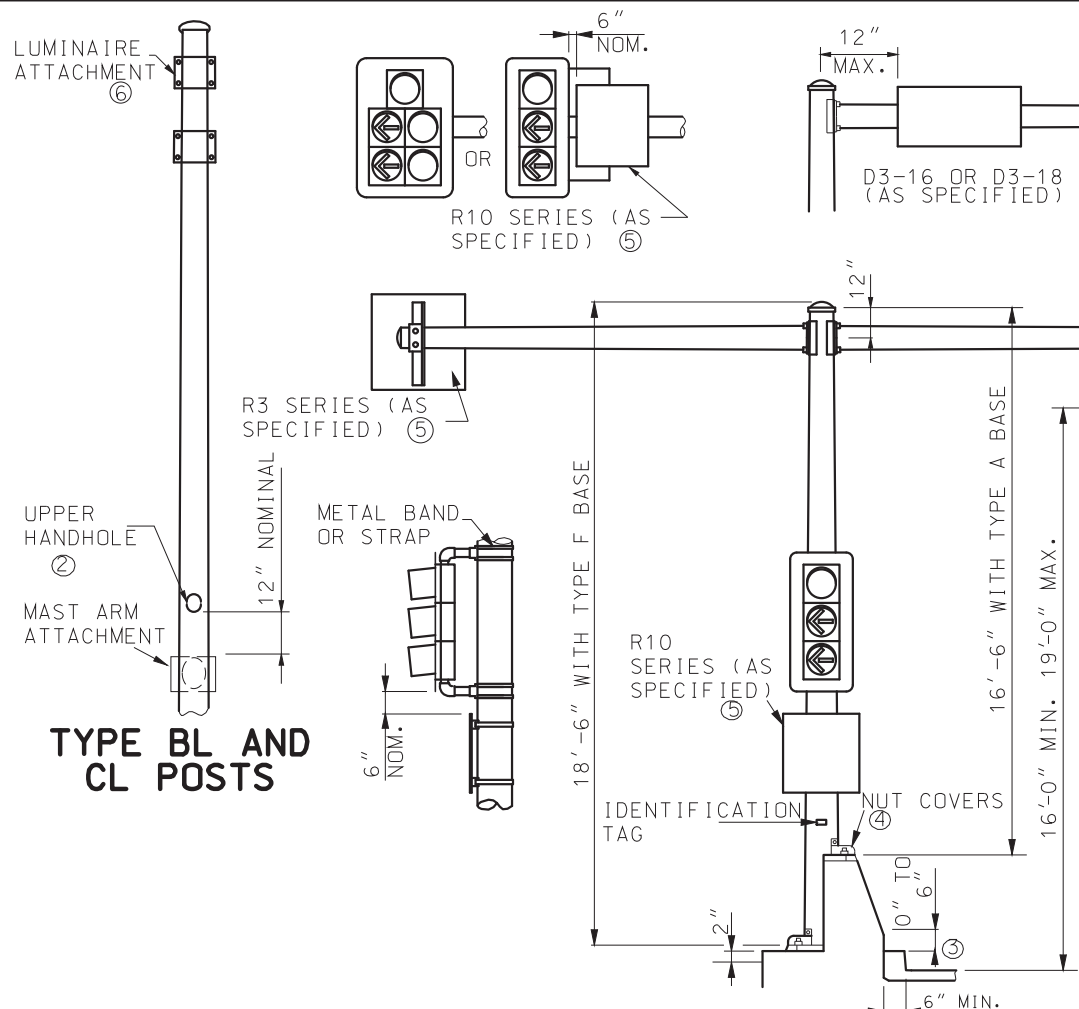
STATE OF MISSOURI  
KATHRYN PHILLIPS HARVEY  
NUMBER PE-23751  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TRAFFIC SIGNALS  
POST BASES**

DATE EFFECTIVE: 02/01/2008	<b>902.30P</b>	SHEET NO. 2 OF 2
DATE PREPARED: 8/26/2009		

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

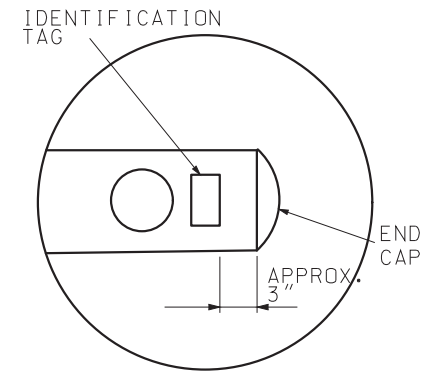
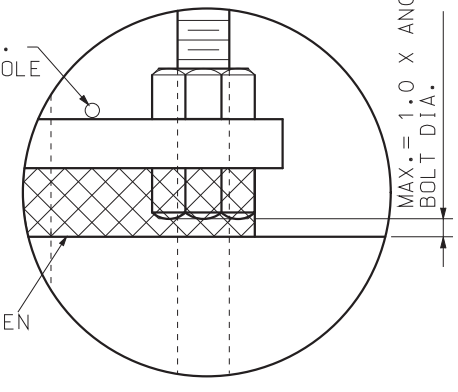




**IDENTIFICATION TAG**

ID TAG NOTE:

TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE OR MAST ARM USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS. ID TAG HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.



**GENERAL NOTES:**

ARMS SHALL BE RAKED UP 0.25" PER FOOT MINIMUM. ARMS SHALL BE PROVIDED WITH A PERMANENT MARKING INDICATING PROPER ORIENTATION FOR INSTALLATION.

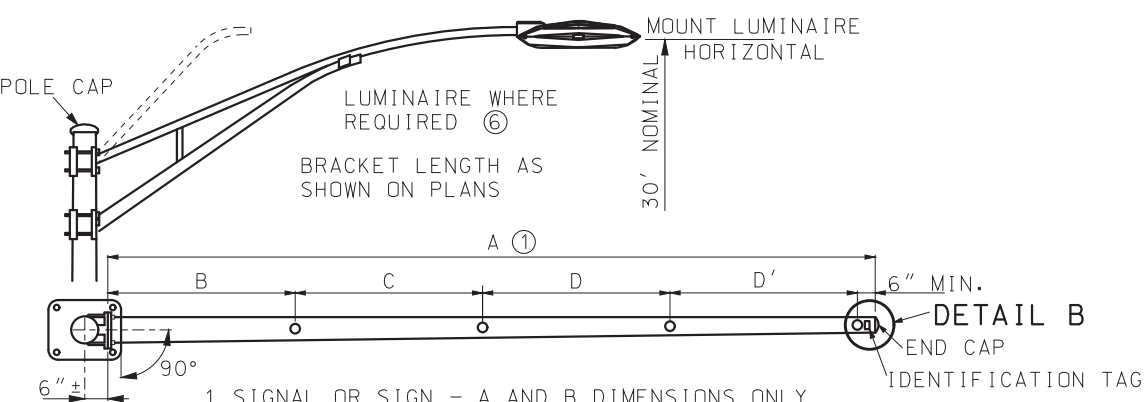
SIGNALS AND SIGNALS SHALL BE VERTICAL. SIGNAL HEADS ON MAST ARMS SHALL BE TILTED FORWARD FROM THE TOP 3 TO 7 DEGREES FROM VERTICAL.

IF A SIGN EXCEEDS 42" IN LENGTH, TWO STRAP SUPPORTS ARE REQUIRED; AND IF A SIGN EXCEEDS 96" IN LENGTH, THREE STRAP SUPPORTS ARE REQUIRED.

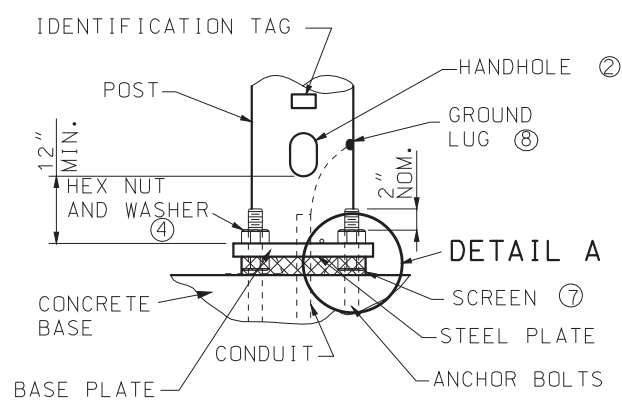
TO DETERMINE LEFT OR RIGHT ON TYPE B OR C SIGNAL POST, VIEWING POSITION SHALL BE FROM THE CENTER OF THE INTERSECTION BEING CONTROLLED AND FACING THE SIGNAL INVOLVED.

TRAFFIC SIGNALS MOUNTED ON MAST ARMS SHALL BE FURNISHED WITH MOUNTING BRACKETS UTILIZING CABLES.

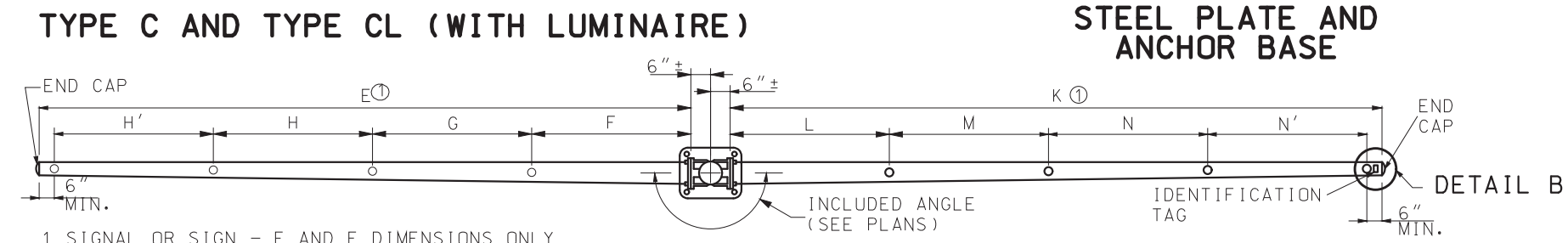
SEE STANDARD 902.30 FOR FOUNDATION AND ANCHOR BOLT DETAILS.



- 1 SIGNAL OR SIGN - A AND B DIMENSIONS ONLY
  - 2 SIGNALS OR SIGNS - A, B, AND C DIMENSIONS ONLY
  - 3 SIGNALS OR SIGNS - A, B, C AND D DIMENSIONS ONLY
  - 4 SIGNALS OR SIGNS - A, B, C, D AND D' DIMENSIONS
- SEE TRAFFIC SIGNAL PLANS FOR DIMENSIONS.



**STEEL PLATE AND ANCHOR BASE**



- 1 SIGNAL OR SIGN - E AND F DIMENSIONS ONLY
- 2 SIGNALS OR SIGNS - E, F, AND G DIMENSIONS ONLY
- 3 SIGNALS OR SIGNS - E, F, G, AND H DIMENSIONS ONLY
- 4 SIGNALS OR SIGNS - E, F, G, H AND H' DIMENSIONS

- 1 SIGNAL OR SIGN - K AND L DIMENSIONS ONLY
  - 2 SIGNALS OR SIGNS - K, L, AND M DIMENSIONS ONLY
  - 3 SIGNALS OR SIGNS - K, L, M, AND N DIMENSIONS ONLY
  - 4 SIGNALS OR SIGNS - K, L, M, N AND N' DIMENSIONS
- SEE TRAFFIC SIGNAL PLANS FOR DIMENSIONS

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

MoDOT

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

STATE OF MISSOURI

ERIC E. SCHROETER

NUMBER PE-28411

PROFESSIONAL ENGINEER

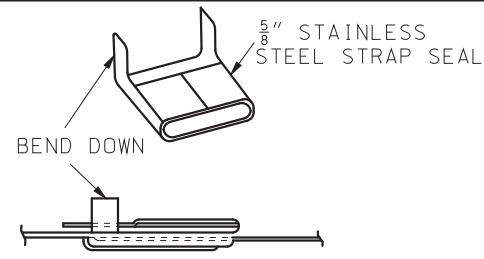
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**TRAFFIC SIGNALS**

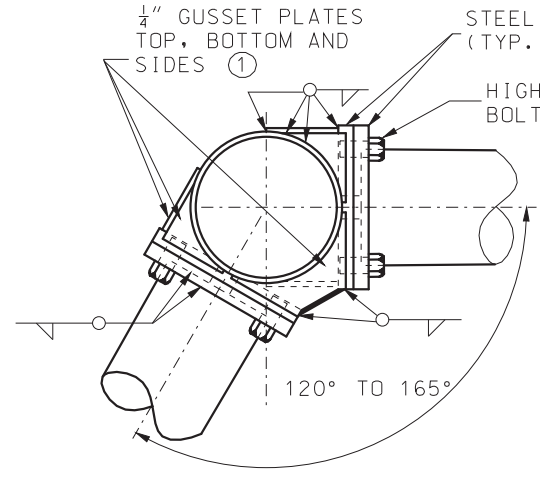
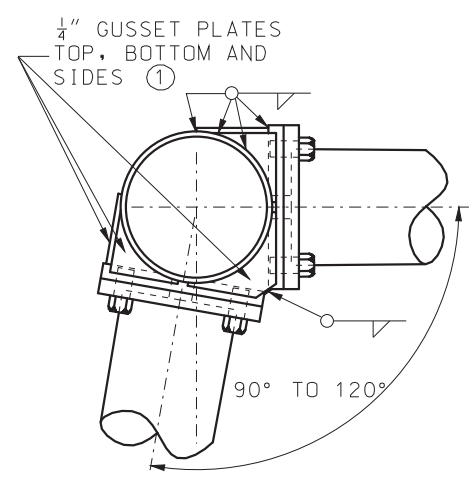
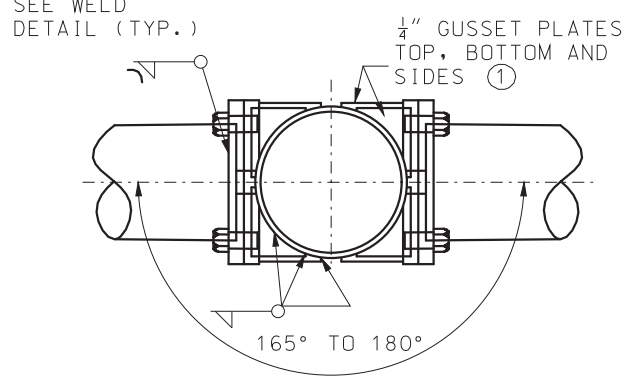
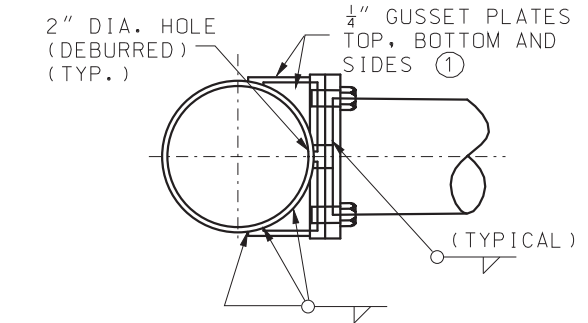
**TUBULAR STEEL POSTS**

DATE EFFECTIVE: 04/01/2018	<b>902.40R</b>	SHEET NO. 1 OF 3
DATE PREPARED: 2/9/2018		

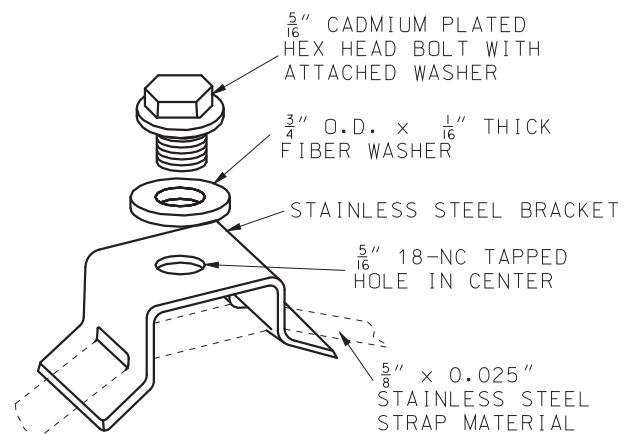
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



VIEW SHOWING  
ENDS OF STRAP  
CLAMPED IN SEAL

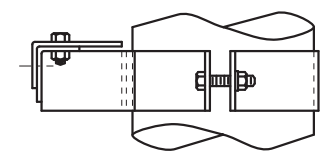


- ① ANY OPENINGS BETWEEN TOP AND SIDE GUSSET PLATES SHALL BE SEALED WITH LIFETIME CAULK AT TIME OF INSTALLATION.
- ② PLATE AND BOLT SIZES SHALL BE SHOWN ON FABRICATORS SHOP DRAWINGS AND SHALL BE SUBJECT TO APPROVAL.

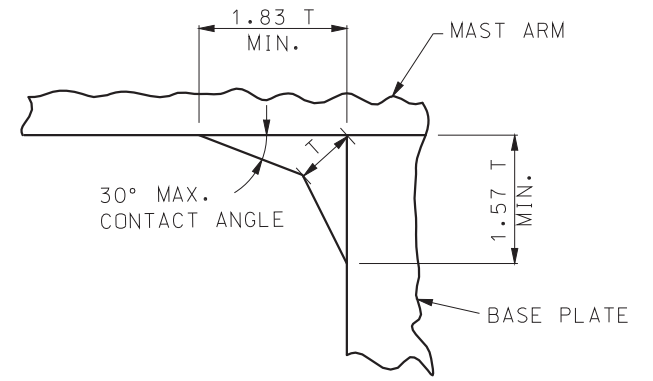


STRAP TYPE  
SIGN SUPPORT

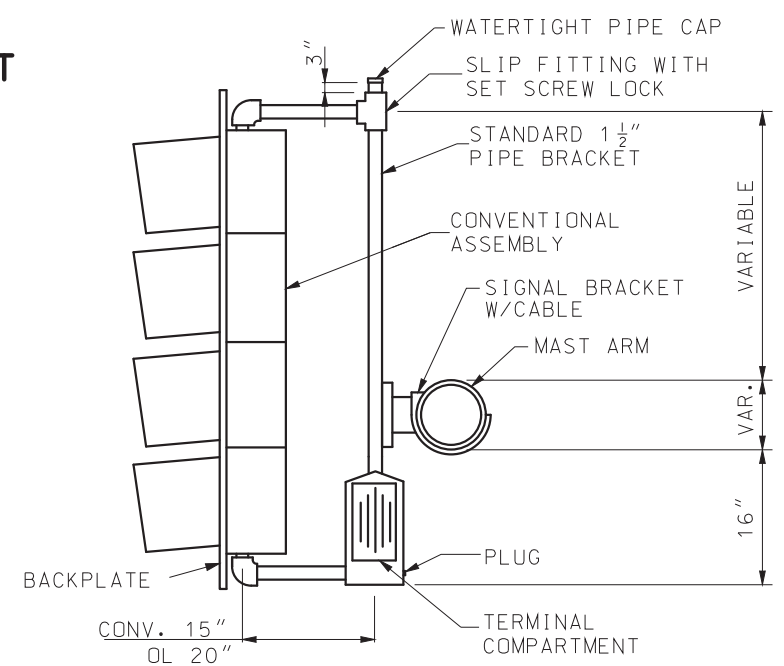
ARM ATTACHMENTS



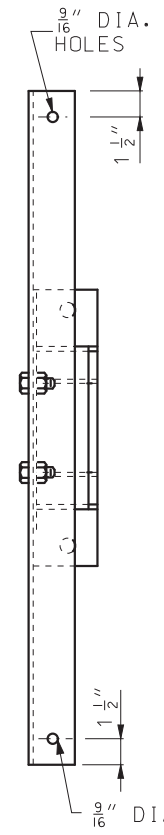
TOP VIEW



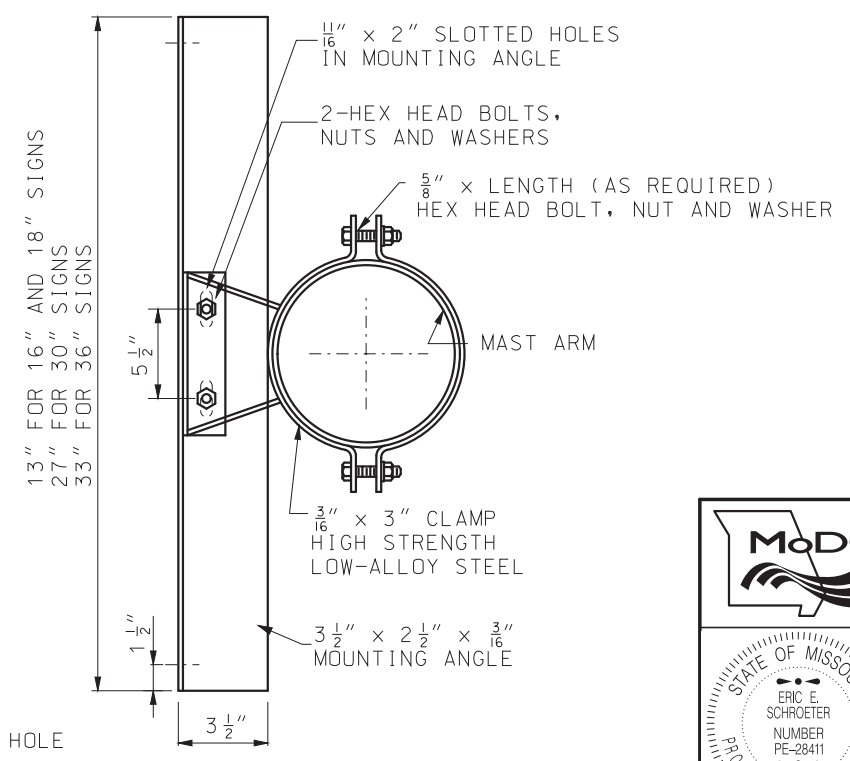
WELD DETAIL



MAST ARM MOUNTED  
SIGNAL HEAD  
(SEE STANDARD 902.00)



FRONT VIEW



SIDE VIEW

SIGN BRACKET ASSEMBLY  
ALTERNATE DESIGN MAY BE PROVIDED  
AS APPROVED BY ENGINEER

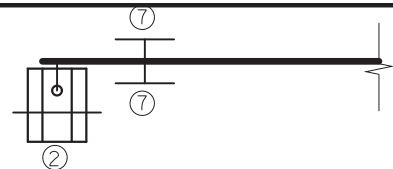
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
105 WEST CAPITOL JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
ERIC E. SCHROETER  
NUMBER PE-28411  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED SEALED AND DATED ELECTRONICALLY.

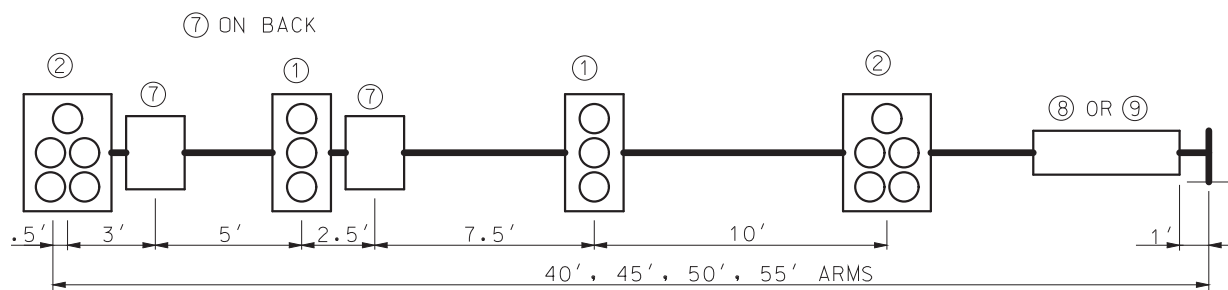
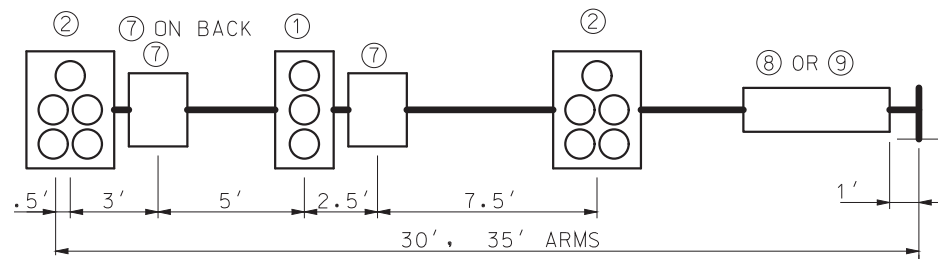
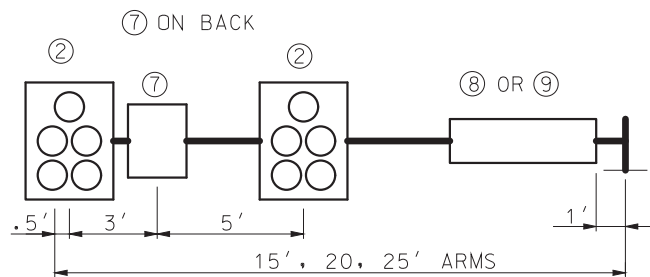
**TRAFFIC SIGNALS**  
TUBULAR STEEL POSTS

DATE EFFECTIVE: 04/01/2018	<b>902.40R</b>	SHEET NO. 2 OF 3
DATE PREPARED: 2/9/2018		

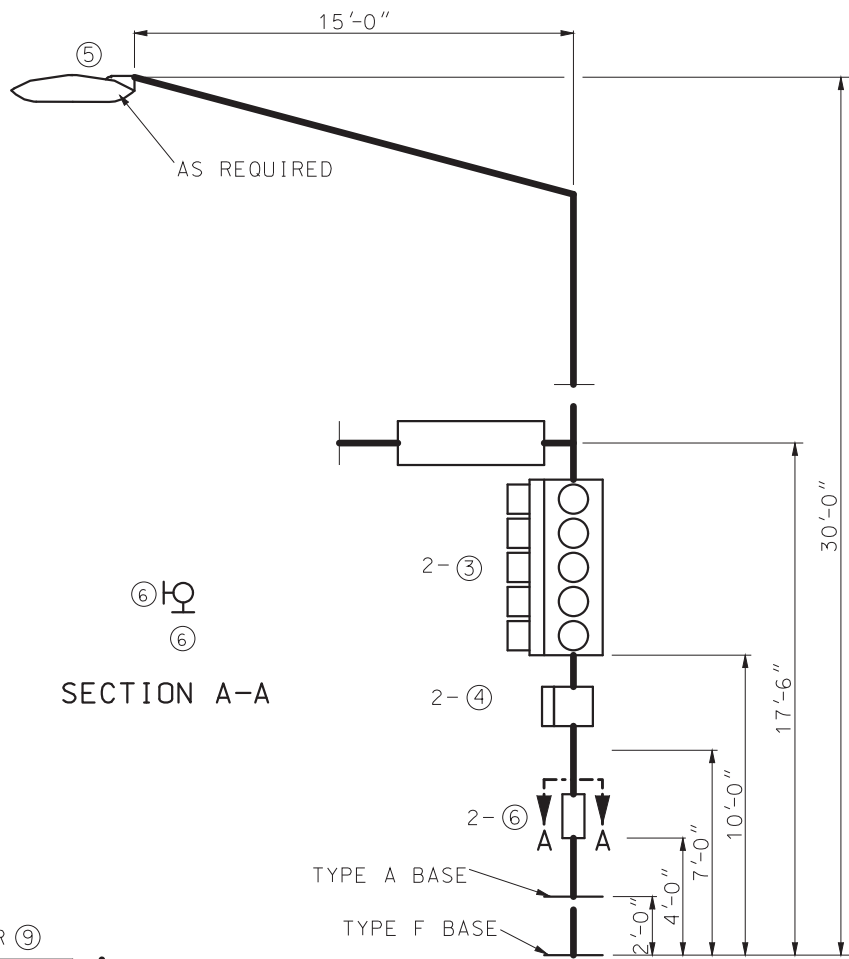
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPICAL TOP VIEW

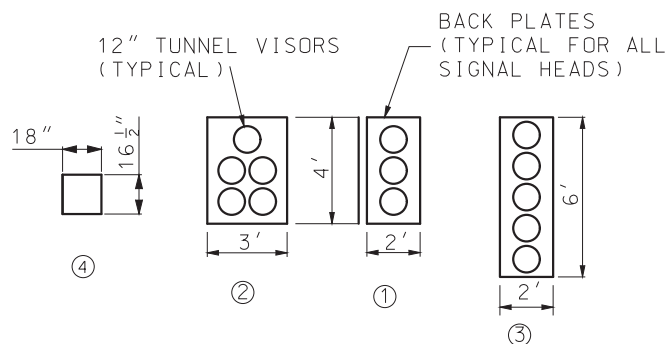


MAST ARM LOADING



SECTION A-A

TYPICAL POST LOADING



MINIMUM DESIGN LOADING FOR POST AND MAST ARM ATTACHMENTS

ITEM NO.	DESCRIPTION	WEIGHT (LBS.)*	PROJ. AREA (SQ.FT.)	SURFACE AREA (SQ.FT.)
①	3-SECTION OL HEAD	95.0	8.0	32.5
②	5-SECTION OL HEAD	173.0	12.0	47.5
③	VERT. 5-SECT. OL HEAD	100.0	12.0	50.5
④	1-SECTION PED HEAD	15.0	2.0	XX.X
⑤	LED-A LUMINAIRE	30.0	1.0	3.5
⑥	9" X 12" SIGN	2.0	0.8	N/A
⑦	30" X 36" SIGN	13.0	7.5	N/A
⑧	120" X 18" SIGN	25.0	15.0	N/A
⑨	96" X 16" SIGN	18.0	10.7	N/A
	96" X 18" SIGN	20.0	12.0	N/A

OL- OPTICALLY LIMITED  
\* MOUNTING HARDWARE INCLUDED

STRUCTURAL DESIGN REQUIREMENTS:

STRUCTURAL SUPPORTS SHALL BE DESIGNED AND FABRICATED TO WITHSTAND THEIR OWN LOADING AND THE ATTACHMENT LOADING SHOWN ON THIS DRAWING OR ON THE PLANS, WHICHEVER IS GREATER. STRUCTURAL MEMBERS INCLUDE POSTS, MAST ARMS AND LUMINAIRE BRACKET ARMS, AS REQUIRED.

DESIGN OF STRUCTURAL SUPPORTS SHALL BE BASED ON AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS, 1994 OR LATEST REVISION, WITH THESE EXCEPTIONS:

MINIMUM DESIGN WIND SPEED OF 90 MPH AT 30 FEET ABOVE GROUND.

GROUP LOADING: LOADS	PERCENT OF ALLOWABLE STRESS (ALL MATERIALS)
GROUP I - DL	100
GROUP II - DL + W	133
GROUP III - DL + ICE + 0.5(W**)	133

\* NO LOAD REDUCTION FACTORS SHALL BE APPLIED IN CONJUNCTION WITH THESE INCREASED ALLOWABLE STRESSES.  
\*\* W TO BE COMPUTED ON THE BASIS OF THE WIND PRESSURE FORMULA, 25 PSF (1197 Pa) MINIMUM FOR W FOR GROUP III.

FOR TYPE B AND BL POSTS, ICE AND DEAD LOADING SHALL BE BASED ON THE COMBINED EFFECT OF DESIGN LOADING ON EACH ARM. WIND LOADING IS APPLIED AS DESCRIBED IN SECTION 1.2.5(5)(b) OF THE STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS, 1994 REVISION.

GENERAL NOTES:

ATTACHMENT LOCATIONS ARE FOR STRUCTURAL DESIGN PURPOSES ONLY. ACTUAL LOCATIONS ARE SHOWN ON THE PLANS.

LUMINAIRE PER MODOT'S STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  

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

STATE OF MISSOURI  
 ERIC E. SCHROETER  
 NUMBER PE-28411  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

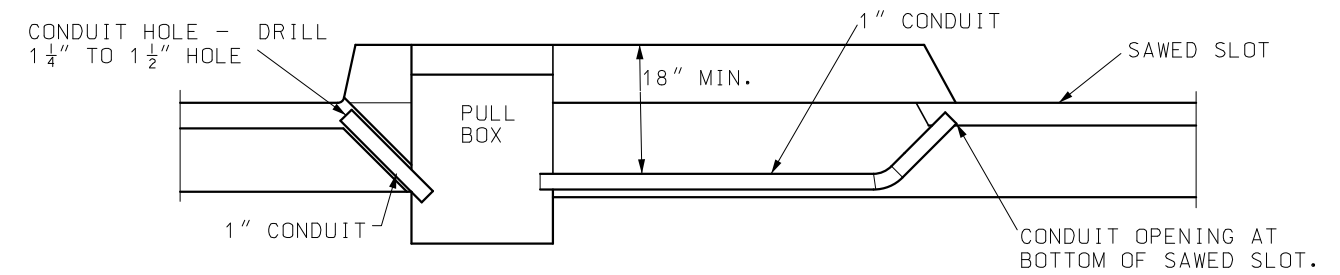
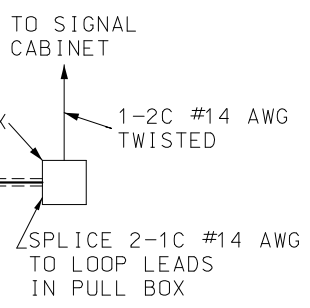
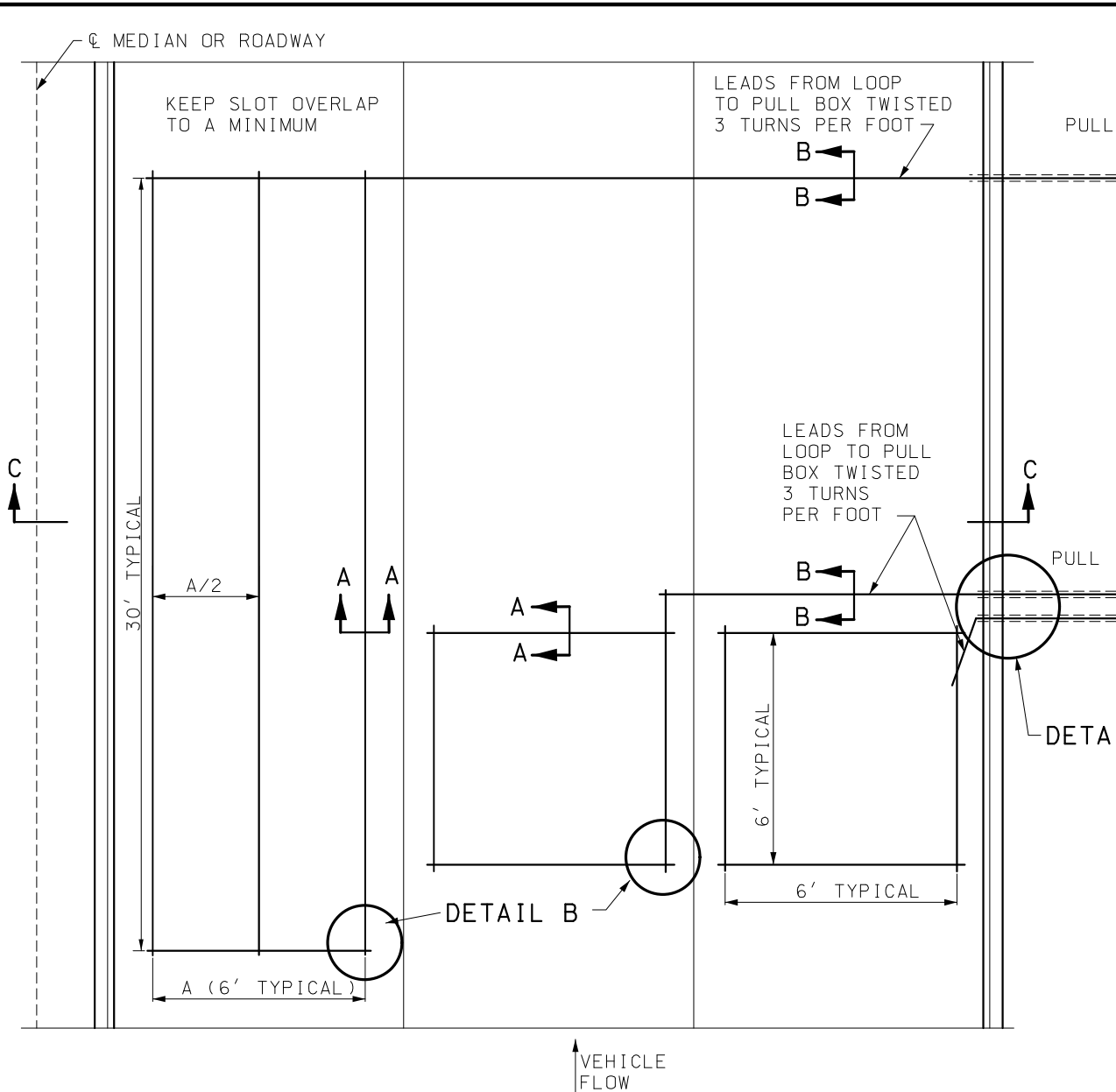
**TRAFFIC SIGNALS  
 TUBULAR STEEL POSTS  
 DESIGN LOADING REQUIREMENTS**

DATE EFFECTIVE: 04/01/2018  
 DATE PREPARED: 2/9/2018

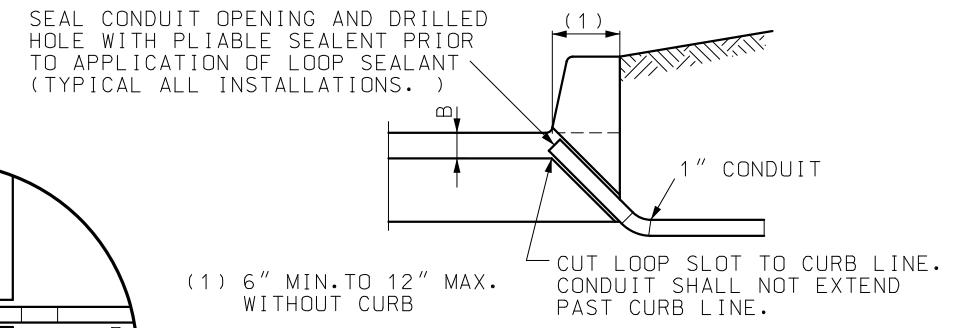
**902.40R**

SHEET NO.  
 3 OF 3

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



ALTERNATE SECTION D-D  
MEDIAN OR ISLAND DETAIL



SECTION D-D

GENERAL NOTES:

SENSOR UNIT SHALL BE HOUSED IN CONTROLLER CABINET UNLESS SPECIFIED OTHERWISE.

LOOPS TO BE INSTALLED, WHEN EXISTING PORTLAND CEMENT CONCRETE OR ASPHALTIC CONCRETE PAVEMENT IS BEING RESURFACED, LOOPS SHALL NOT BE PLACED IN SURFACE COURSE OF THE ASPHALTIC CONCRETE.

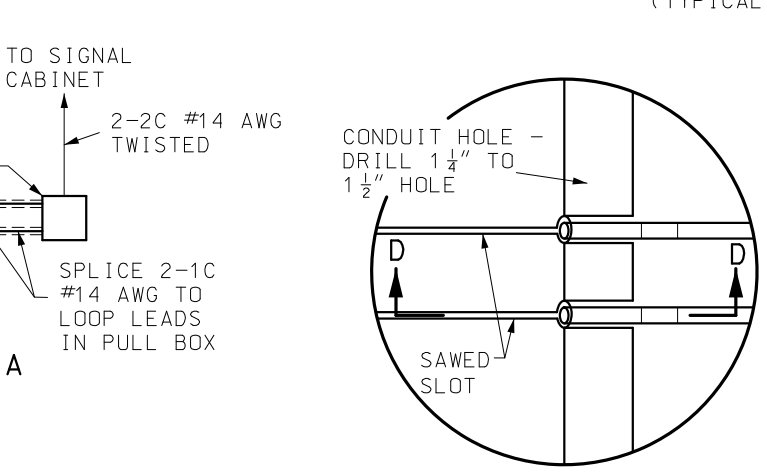
THE CONDUIT SLOT MAY BE POWER OR MANUALLY CONSTRUCTED, ANY FORMING NEEDED TO SECURE CONDUIT IN SLOT SHALL BE REMOVED.

A SEPARATE CONDUIT SHALL BE INSTALLED BETWEEN THE SAWED LOOP SLOT AND THE FIRST PULL BOX FOR EACH LOOP. THE CONDUIT OPENING AT THE END OF THE LEAD-IN SLOT SHALL BE AT THE BOTTOM OF THE SAWED SLOT.

AFTER CABLE INSTALLATION, THE CONDUIT OPENING AT THE LOOP LEAD ENTRANCE SHALL BE SEALED.

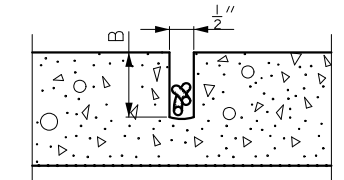
AVOID "E" JOINTS OR OTHER FULL DEPTH JOINTS. MINOR ADJUSTMENTS TO LOOP LOCATION MAY BE MADE.

USE TYPICAL DIMENSIONS UNLESS OTHERWISE SHOWN ON PLANS.

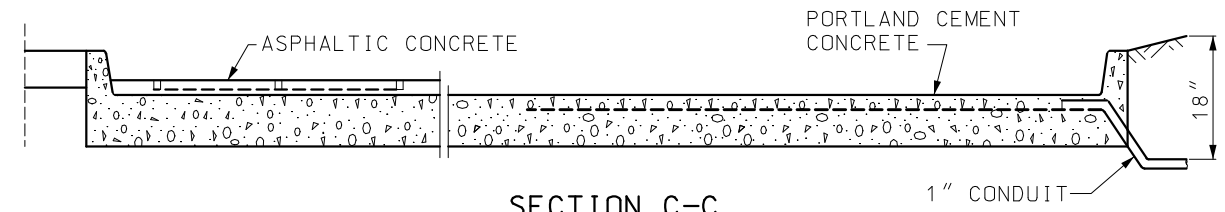


DETAIL A  
CONDUIT SLOT DETAIL

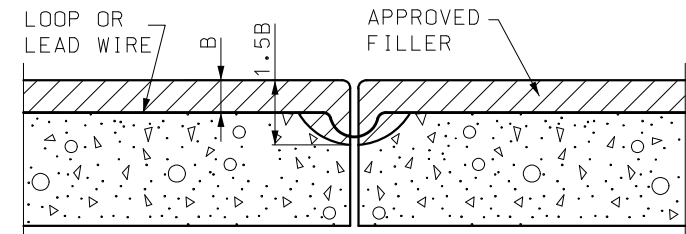
NO. OF CONDUCTORS IN SLOT	B (IN.)
≤4	2
5	2 1/2
6	2 1/2



SECTION B-B  
LEAD SLOT

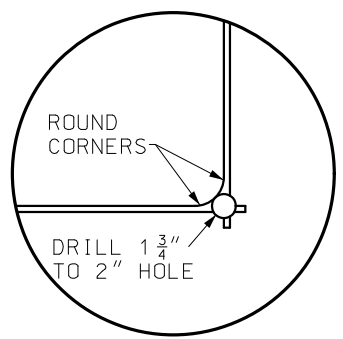


SECTION C-C  
LOOP SLOT DETAIL

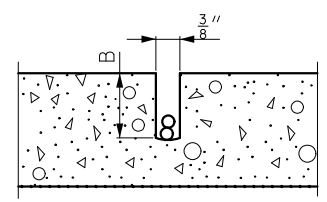


DETAIL OF AN "E" JOINT OR  
OTHER FULL DEPTH JOINT CROSSING

CAUTION:  
WIRE SHALL BE PLACED IN SAWED SLOT WITH DEVICE WHICH WILL NOT DAMAGE THE WIRE INSULATION.



DETAIL B  
TYPICAL LOOP  
CORNER DETAIL



SECTION A-A  
LOOP SLOT

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

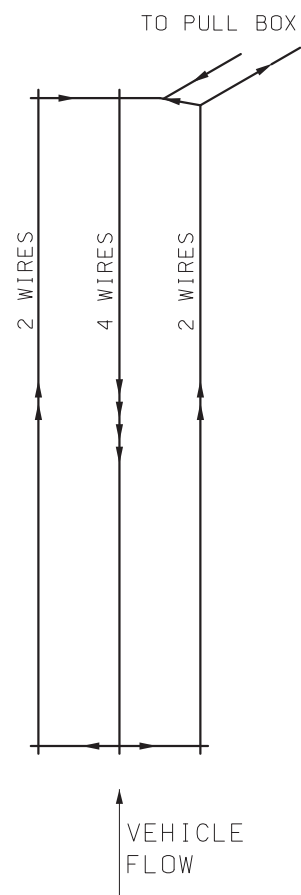
STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**TRAFFIC SIGNALS  
INDUCTION LOOP  
DETECTORS**

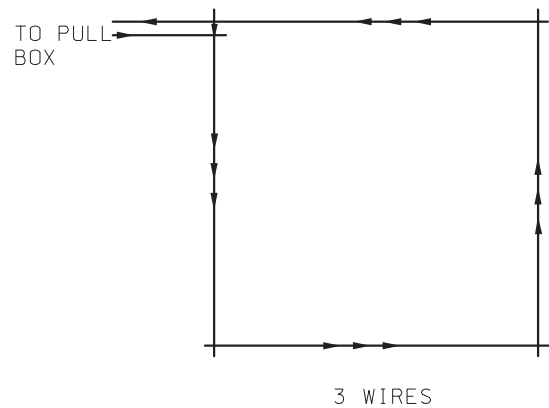
DATE EFFECTIVE: 04/01/2020	<b>902.50M</b>	SHEET NO. 1 OF 2
DATE PREPARED: 1/21/2020		

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

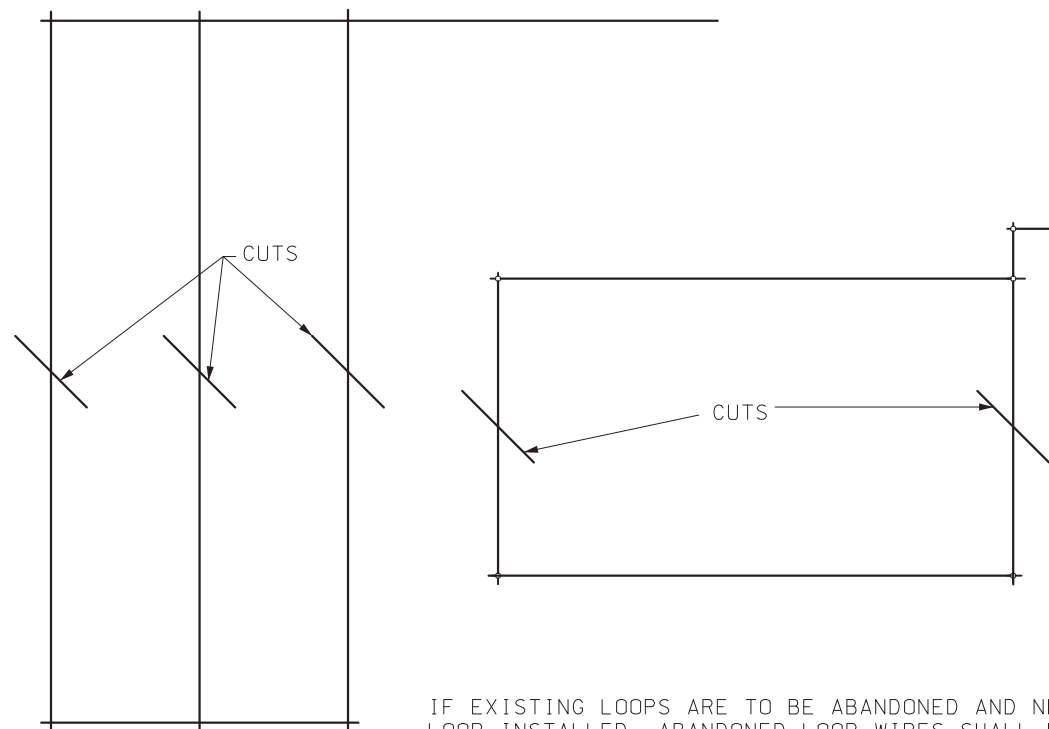
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.




LOOP SHALL BE #14 AWG STRANDED WIRE IN PVC DUCT MADE UP OF 2 NON-TWISTED TURNS IN SINGLE SLOT OR AS RECOMMENDED BY MANUFACTURER OF THE DETECTOR AMPLIFIER. LOOP SHALL BE PLACED IN SAWED SLOTS IN A FIGURE EIGHT MANNER.

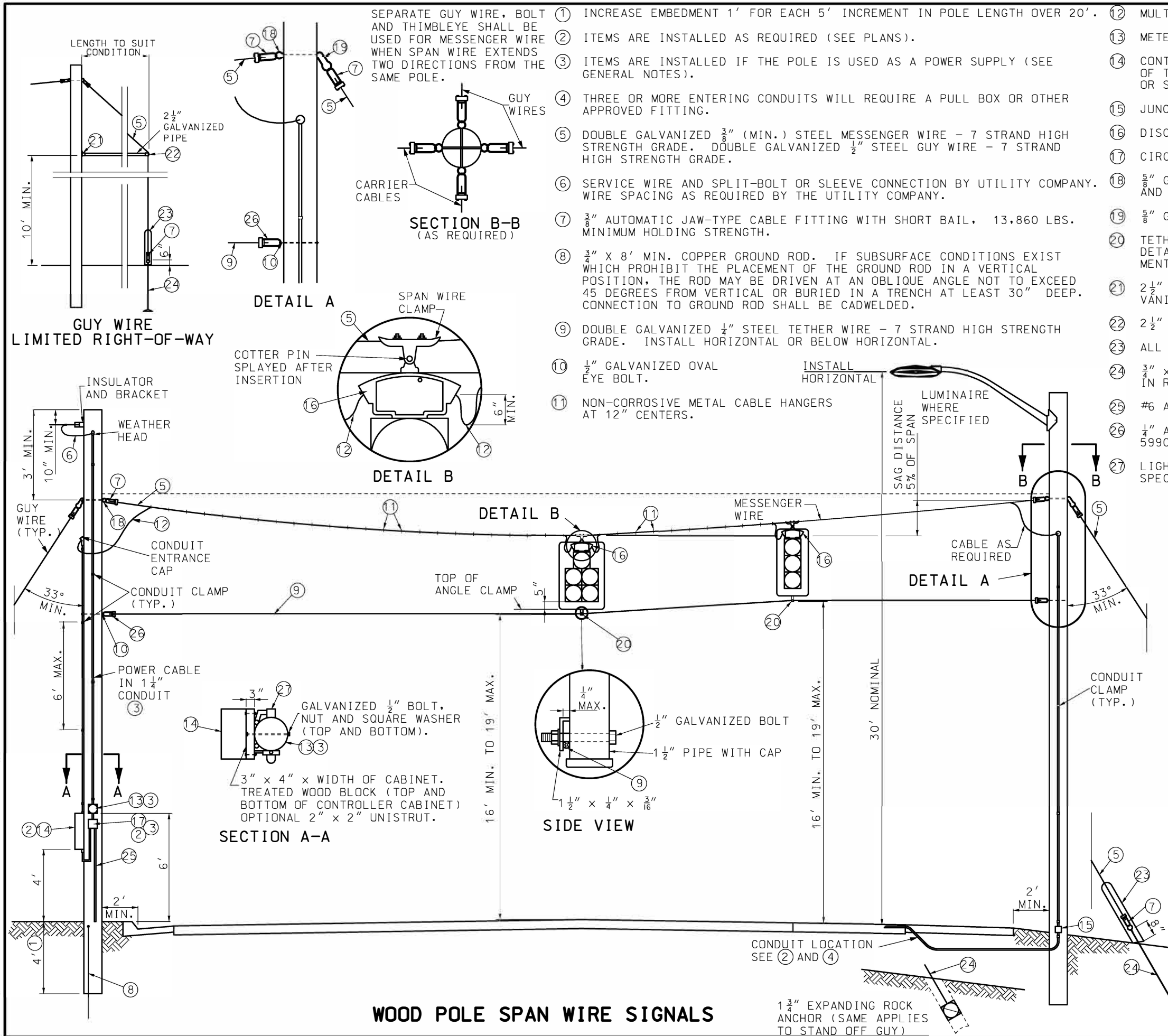


**LOOP CONFIGURATION**

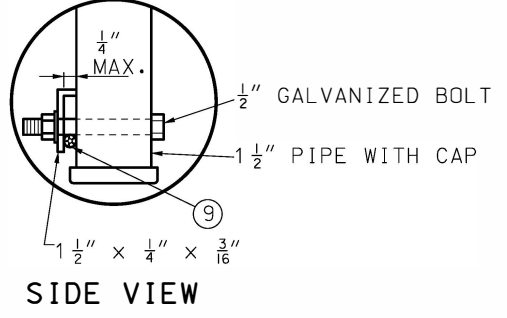
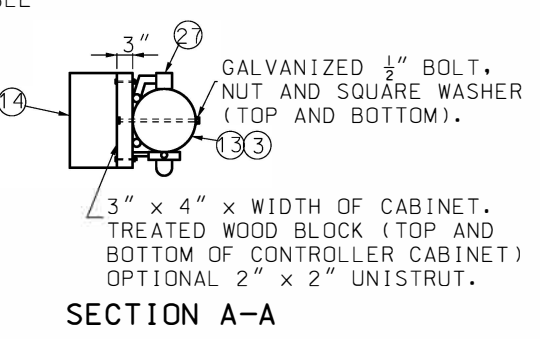
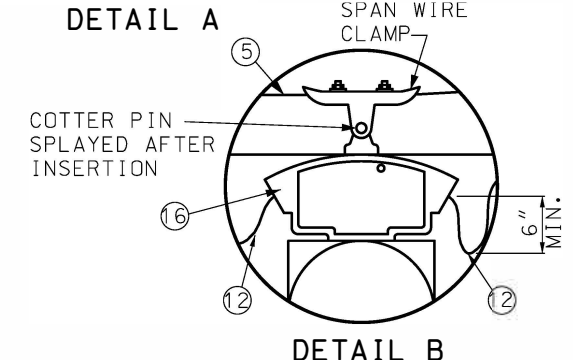
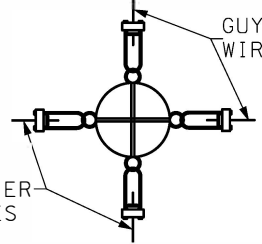


**ABANDONED LOOPS**

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	<p><b>TRAFFIC SIGNALS INDUCTION LOOP DETECTORS</b></p>	
<p><b>902.50M</b></p>		<p>SHEET NO. 2 OF 2</p>



SEPARATE GUY WIRE, BOLT AND THIMBLEYE SHALL BE USED FOR MESSENGER WIRE WHEN SPAN WIRE EXTENDS TWO DIRECTIONS FROM THE SAME POLE.



- ① INCREASE EMBEDMENT 1' FOR EACH 5' INCREMENT IN POLE LENGTH OVER 20'.
- ② ITEMS ARE INSTALLED AS REQUIRED (SEE PLANS).
- ③ ITEMS ARE INSTALLED IF THE POLE IS USED AS A POWER SUPPLY (SEE GENERAL NOTES).
- ④ THREE OR MORE ENTERING CONDUITS WILL REQUIRE A PULL BOX OR OTHER APPROVED FITTING.
- ⑤ DOUBLE GALVANIZED  $\frac{3}{8}$ " (MIN.) STEEL MESSENGER WIRE - 7 STRAND HIGH STRENGTH GRADE. DOUBLE GALVANIZED  $\frac{1}{2}$ " STEEL GUY WIRE - 7 STRAND HIGH STRENGTH GRADE.
- ⑥ SERVICE WIRE AND SPLIT-BOLT OR SLEEVE CONNECTION BY UTILITY COMPANY. WIRE SPACING AS REQUIRED BY THE UTILITY COMPANY.
- ⑦  $\frac{3}{8}$ " AUTOMATIC JAW-TYPE CABLE FITTING WITH SHORT BAIL, 13,860 LBS. MINIMUM HOLDING STRENGTH.
- ⑧  $\frac{3}{4}$ " X 8' MIN. COPPER GROUND ROD. IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30" DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.
- ⑨ DOUBLE GALVANIZED  $\frac{1}{4}$ " STEEL TETHER WIRE - 7 STRAND HIGH STRENGTH GRADE. INSTALL HORIZONTAL OR BELOW HORIZONTAL.
- ⑩  $\frac{1}{2}$ " GALVANIZED OVAL EYE BOLT.
- ⑪ NON-CORROSIVE METAL CABLE HANGERS AT 12" CENTERS.

- ⑫ MULTI-CONDUCTOR CABLE (SEE PLANS).
- ⑬ METER SOCKET AND CABINET.
- ⑭ CONTROLLER CABINET. ALL CONDUITS SHALL ENTER THE BOTTOM OF THE CABINET. NO HOLES SHALL BE MADE IN THE TOP, BACK OR SIDES OF THE CABINET.
- ⑮ JUNCTION BOX (NEMA 4).
- ⑯ DISCONNECT HANGER (NOT REQUIRED IF TEMPORARY)
- ⑰ CIRCUIT BREAKER. SEE STANDARD 902.15 FOR DETAILS.
- ⑱  $\frac{5}{8}$ " GALVANIZED STRAIGHT THIMBLEYE BOLT WITH GALVANIZED NUT AND  $2\frac{1}{2}$ " GALVANIZED CURVE WASHER.
- ⑲  $\frac{5}{8}$ " GALVANIZED ANGLE THIMBLEYE.
- ⑳ TETHER WIRE AND CLAMP WITH QUICK RELEASE PROVISIONS. SEE DETAIL FOR MOUNTING TO POLE AND SIGNAL. OPTIONAL ATTACHMENT PERMITTED WITH APPROVAL OF ENGINEER.
- ㉑  $2\frac{1}{2}$ " GALVANIZED POST PLATE FASTENED TO POLE WITH ONE  $\frac{5}{8}$ " GALVANIZED MACHINE BOLT & TWO  $\frac{3}{8}$ " X 4" GALVANIZED LAG SCREWS.
- ㉒  $2\frac{1}{2}$ " GALVANIZED CONNECTOR END FITTING.
- ㉓ ALL LOCATIONS REQUIRE GUY WIRE PROTECTOR. (7' MIN.)
- ㉔  $\frac{3}{4}$ " X 8' GALVANIZED THIMBLEYE ANCHOR ROD. (30" MIN. LENGTH IN ROCK).
- ㉕ #6 AWG BARE COPPER WIRE IN  $\frac{1}{2}$ " CONDUIT.
- ㉖  $\frac{1}{4}$ " AUTOMATIC JAW TYPE CABLE FITTING WITH SHORT BAIL. 5990 LBS. MINIMUM HOLDING STRENGTH.
- ㉗ LIGHTING CIRCUIT BREAKER CABINET (IF LUMINARIES ARE SPECIFIED SEE STANDARD 902.15 FOR DETAILS).

GENERAL NOTES:  
 DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND CURRENT INTERIMS.  
 MAXIMUM SPAN LENGTH:  
 100' FOR ONE OR TWO SPANS OFF POST, WITH ONE 5-SECTION HEAD SIGNAL, TWO 3-SECTION HEAD SIGNALS AND TWO SIGNS PER SPAN.  
 ALL APPURTENANCES TO BE MOUNTED ON POLE SHALL BE FASTENED TO POLE AS RECOMMENDED BY THE MANUFACTURER.  
 SCHEDULE 40 POLYETHYLENE OR POLYVINYL CHLORIDE CONDUIT AND WEATHER HEAD SHALL BE USED ON UTILITY COMPANY POLES IN LIEU OF RIGID STEEL CONDUIT.  
 NO DIRECT PAYMENT WILL BE MADE FOR GUYS, CONDUIT AND JUNCTION BOXES ON POLES, HARDWARE, LIGHTING BRACKET ARMS OR ANY OTHER ITEMS FOR WHICH SEPARATE PAYMENT IS NOT PROVIDED.  
 ALL GUY WIRES SHALL BE GROUNDED.

<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TRAFFIC SIGNALS</b> <b>RIGID SPAN WIRE DETAILS</b>
DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021	<b>902.70Q</b>
SHEET NO. 1 OF 3	

**WOOD POLE SPAN WIRE SIGNALS**

$1\frac{3}{4}$ " EXPANDING ROCK ANCHOR (SAME APPLIES TO STAND OFF GUY)

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

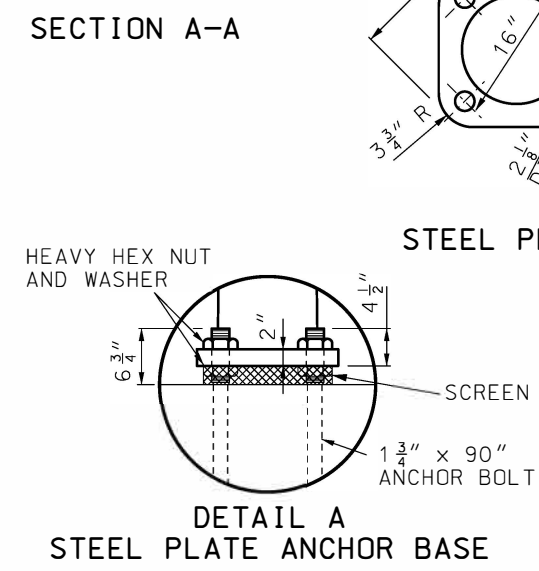
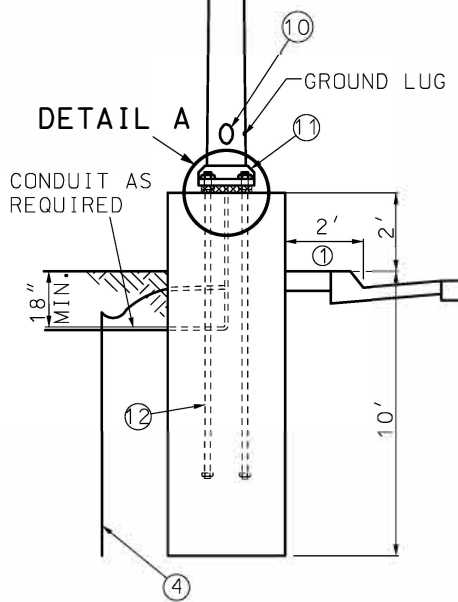
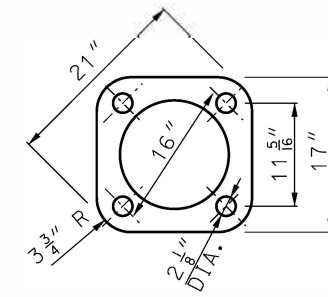
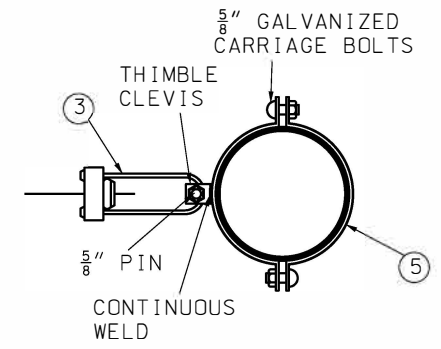
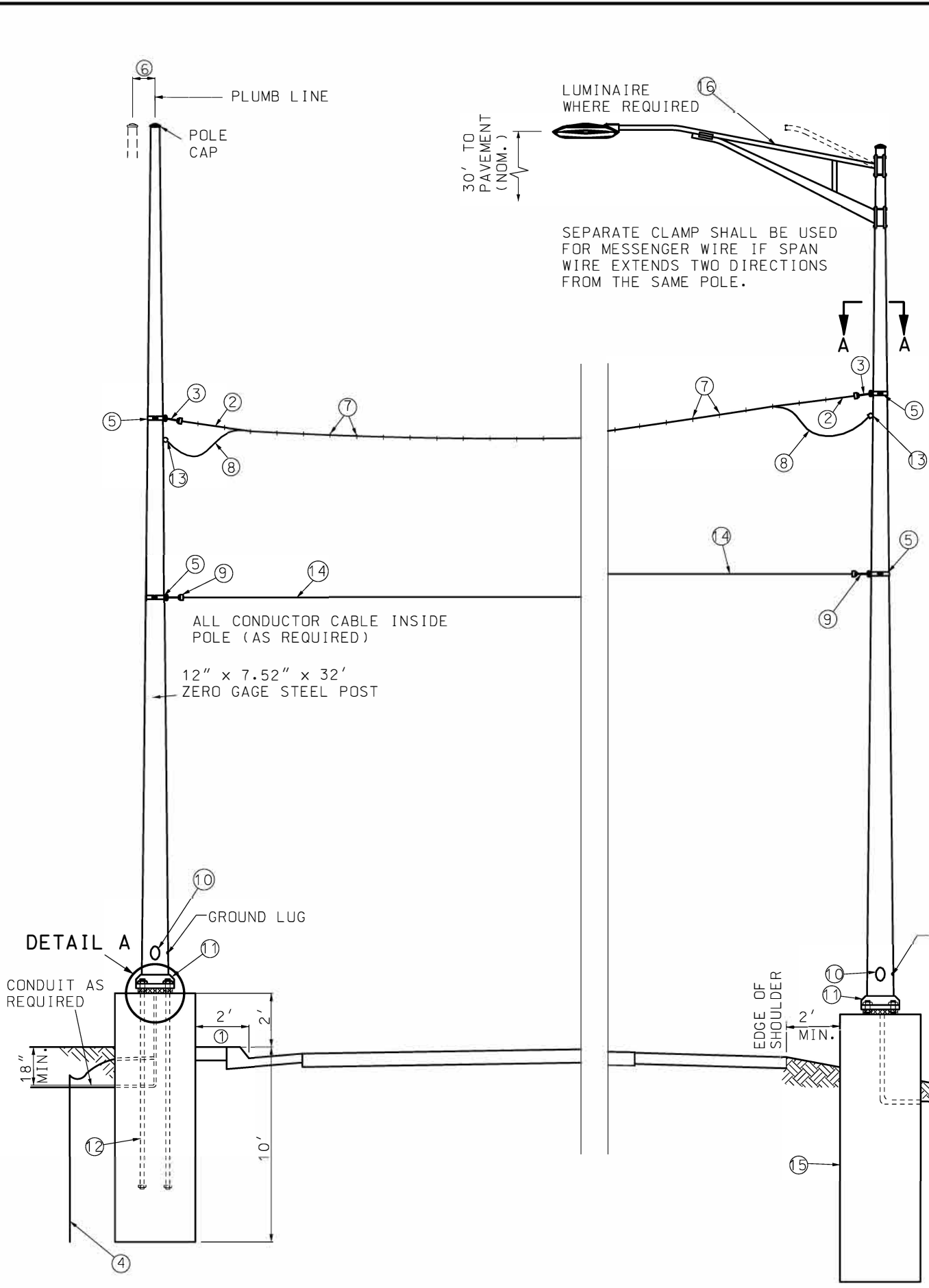
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

- ① 6" IF LOCATED WITHIN 4' OF CONCRETE MEDIAN.
- ② DOUBLE GALVANIZED  $\frac{3}{8}$ " (MIN.) STEEL MESSENGER WIRE - 7 STRAND HIGH STRENGTH GRADE.
- ③  $\frac{3}{8}$ " AUTOMATIC JAW TYPE CABLE FITTING WITH SHORT BAIL. 13,860 LBS. MINIMUM HOLDING STRENGTH.
- ④  $\frac{3}{4}$ " x 8' MIN. COPPER GROUND ROD, ONE POLE SHALL BE GROUNDED BY CONNECTING NO. 6 AWG BARE COPPER WIRE FROM GROUNDING LUG INSIDE POLE TO GROUND ROD BY MEANS OF A GALVANIZED WIRE CLAMP LOCATED INSIDE OF POLE. GROUND LUG SHALL BE ORIENTED 90° OR 180° TO HANDHOLE. IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.
- ⑤ GALVANIZED  $\frac{1}{4}$ " STEEL CLEVIS CLAMP TO FASTEN TO THE POLE WITH  $\frac{5}{8}$ " GALVANIZED CARRIAGE BOLTS.
- ⑥ RAKE AS NECESSARY, 10" MAXIMUM.
- ⑦ NON-CORROSIVE METAL CABLE HANGERS AT 12" CENTERS.
- ⑧ MULTI-CONDUCTOR CABLE (AS REQUIRED).
- ⑨  $\frac{1}{4}$ " AUTOMATIC JAW TYPE CABLE FITTING WITH SHORT BAIL. 5990 LBS. MINIMUM HOLDING STRENGTH.
- ⑩ 4" x 6 $\frac{1}{2}$ " HANDHOLE AND COVER WITH REINFORCED FRAME WELDED TO POLE.
- ⑪ ONE-PIECE OR TWO-PIECE METAL BASE COVER OR INDIVIDUAL NUT COVERS.
- ⑫ FULLY GALVANIZED ANCHOR BOLT WITH BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END.
- ⑬ WIRE ENTRANCE WITH INSULATED WEATHERPROOF BUSHING (AS REQUIRED).
- ⑭ DOUBLE GALVANIZED  $\frac{1}{4}$ " STEEL - 7 STRAND HIGH STRENGTH GRADE TETHER WIRE AND CLAMP WITH QUICK RELEASE PROVISIONS. INSTALL HORIZONTAL OR BELOW HORIZONTAL.
- ⑮ TYPE A-10 BASE. SEE STANDARD 902.30 FOR DETAILS.
- ⑯ LUMINAIRE AND BRACKET ARE AS SPECIFIED ON PLANS. SEE STANDARD 901.00 FOR MOUNTING DETAILS.

GENERAL NOTES:  
 DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND CURRENT INTERIMS.

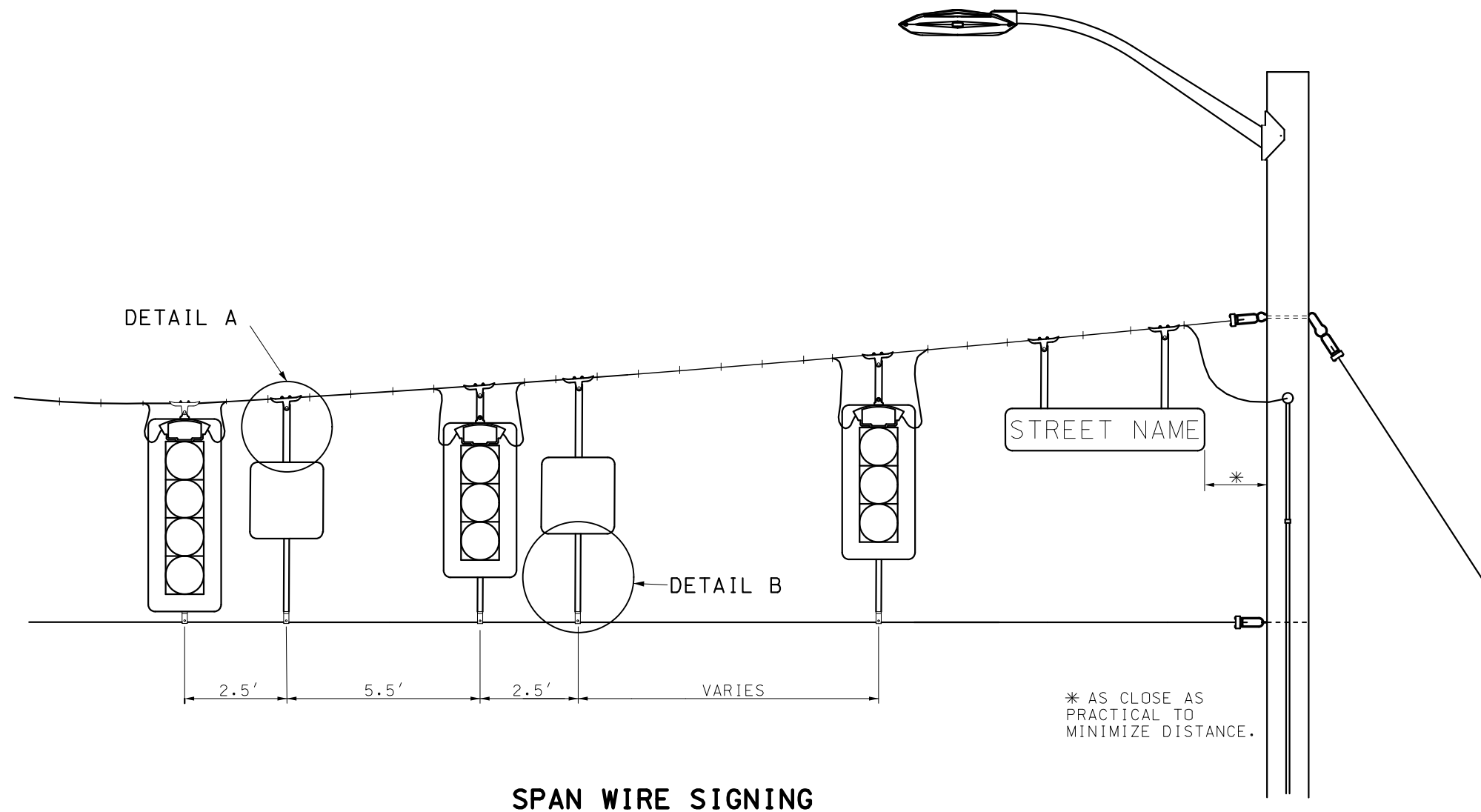
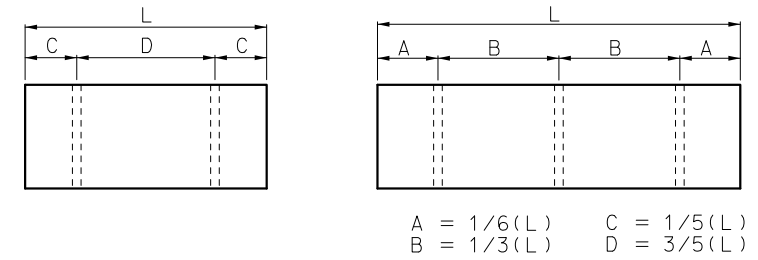
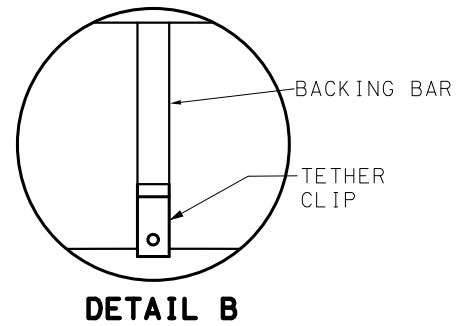
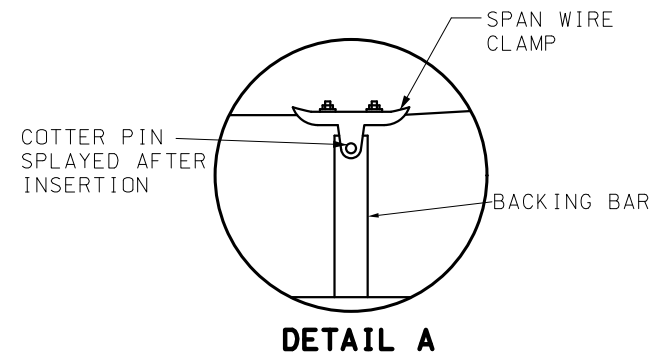
MAXIMUM SPAN LENGTH:  
 160' FOR ONE ONE OR TWO SPANS OFF POST, WITH GUY WIRE, ONE 5-SECTION HEAD SIGNAL, TWO 3-SECTION HEAD SIGNALS AND TWO SIGNS PER SPAN.  
 100' FOR ONE SPAN OFF POST, WITHOUT GUY WIRE, WITH THREE 3-SECTION HEAD SIGNALS AND TWO SIGNS PER SPAN.  
 100' FOR TWO SPANS OFF POST, WITHOUT GUY WIRE, WITH TWO 3-SECTION HEAD SIGNALS AND ONE SIGN PER SPAN.

CONCRETE POLE EMBEDMENT SHALL BE CLASS B CONCRETE.  
 SEE SHEET 1 FOR DOWN GUY INFORMATION WHEN DOWN GUY IS SPECIFIED ON PLANS.  
 EXPANSIVE GROUT SHALL BE USED BETWEEN THE POLE BASE PLATE AND THE CONCRETE BASE WHEN INDIVIDUAL NUT COVERS ARE USED. SEE STANDARD 902.40 FOR SCREEN DETAILS.



**STEEL POST DETAILS**

<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TRAFFIC SIGNALS</b> <b>RIGID SPAN WIRE DETAILS</b>
DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021	<b>902.70Q</b>
SHEET NO. <b>2 OF 3</b>	



**GENERAL NOTES:**

SIGNS UP TO 30" IN WIDTH SHALL BE INSTALLED ON ONE VERTICAL BACKING BAR. SIGNS 30" TO 60" IN WIDTH SHALL BE INSTALLED ON TWO VERTICAL BACKING BARS. SIGNS WIDER THAN 60" SHALL BE INSTALLED ON THREE VERTICAL BACKING BARS.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TRAFFIC SIGNALS</b> RIGID SPAN WIRE SIGN DETAILS	
	DATE EFFECTIVE: 01/01/2022 DATE PREPARED: 10/21/2021	<b>902.70Q</b>

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



	OPTICALLY LIMITING SIGNAL HEAD WITH BACKPLATE
	OPTICALLY LIMITING & CONVENTIONAL SIGNAL HEAD WITH BACKPLATE
	CONVENTIONAL SIGNAL HEAD WITH BACKPLATE
	SIGNAL HEAD - PEDESTRIAN
	POST MOUNTED SIGNAL HEAD WITH SIGN AND BACKPLATE
	STOP LINE
	LANE USE
	TYPE A BASE
	TYPE F BASE
	TYPE C BASE
	EXISTING POST BASE
	WOOD POLE WITH DOWN GUY
	STEEL POLE
	STEEL POLE WITH DOWN GUY
	CONTROLLER WITH PAD
	EXISTING CONTROLLER
	PULL BOX, TYPE I DRAIN, CONCRETE
	PULL BOX, TYPE II DRAIN, CONCRETE
	PULL BOX, TYPE I DRAIN, PREFORMED
	PULL BOX, TYPE II DRAIN, PREFORMED
	DOUBLE PULL BOX, TYPE A, TYPE I DRAIN, CONCRETE
	DOUBLE PULL BOX, TYPE A, TYPE II DRAIN, CONCRETE
	DOUBLE PULL BOX, TYPE B, TYPE I DRAIN
	DOUBLE PULL BOX, TYPE B, TYPE II DRAIN
	PULL BOX, CLASS 5, TYPE I DRAIN, PREFORMED
	PULL BOX, CLASS 5, TYPE II DRAIN, PREFORMED

	EXISTING PULL BOX
	SERVICE POLE OR PEDESTAL AND POWER SUPPLY
	EXISTING SERVICE POLE
	LED - A LUMINAIRE
	SPAN WIRE WITH SIGNAL HEAD
	MAST ARM WITH SIGNAL HEADS AND LED - A LUMINAIRE
	MAST ARM WITH OVERHEAD SIGN
	INDUCTION LOOP DETECTOR
	VIDEO DETECTION ZONE
	PUSH BUTTON DETECTOR
	CAPPED RIGID CONDUIT
	RIGID CONDUIT IN TRENCH
	RIGID CONDUIT PUSHED
	EXISTING RIGID CONDUIT
	RIGID CONDUIT ON BRIDGE
	RIGID CONDUIT IN MEDIAN
	3" SIZE OF CONDUIT
	3-7c #16 NUMBER & AWG SIZE OF CABLE
	SIGNAL FACE NUMBER
	POST NUMBER
	DETECTOR NUMBER
	PULL BOX NUMBER
	WALK INTERVAL
	DON'T WALK INTERVAL
	FLASHING DON'T WALK INTERVAL

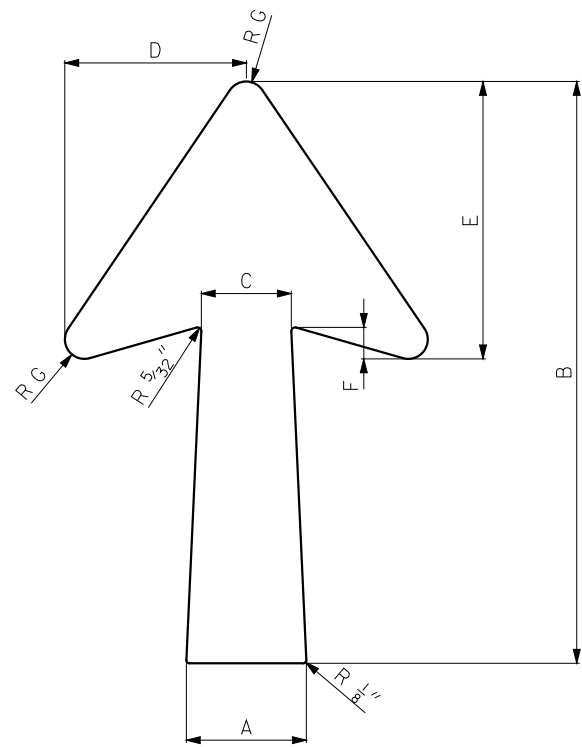
R	RED (CIRCULAR)
FR	FLASHING RED (CIRCULAR)
RL	RED LEFT ARROW
Y	YELLOW (CIRCULAR)
FY	FLASHING YELLOW (CIRCULAR)
FYA	FLASHING YELLOW ARROW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
YL	YELLOW LEFT ARROW
YR+	YELLOW RIGHT ARROW
G	GREEN (CIRCULAR)
S	GREEN STRAIGHT ARROW
L	GREEN LEFT ARROW
R+	GREEN RIGHT ARROW
	TUNNEL VISOR WITH LOUVER

ALL 12 INCH WITH TUNNEL VISOR

<u>SIGN</u>	<u>LEGEND</u>
R10 - 10L	LEFT TURN SIGNAL
R10 - 10R	RIGHT TURN SIGNAL
R3 - 5L	LEFT ARROW (SYMBOL) ONLY
R3 - 5R	RIGHT ARROW (SYMBOL) ONLY
R3 - 5A	STRAIGHT ARROW (SYMBOL) ONLY
R3 - 6L	LEFT ARROW - STRAIGHT ARROW (SYMBOL)
R3 - 6R	RIGHT ARROW - STRAIGHT ARROW (SYMBOL)
R3 - 2	NO LEFT TURN (SYMBOL)
R3 - 1	NO RIGHT TURN (SYMBOL)
R3 - 3	NO TURNS
D3 - 1	STREET NAME (ONE LINE)
D3 - 1B	STREET NAME (TWO LINE)
R10 - 3E	CROSSWALK (PEDESTRIAN SYMBOL)
R10 - 11A	NO TURN ON RED
R10 - 13	EMERGENCY SIGNAL
R10 - 27A	LEFT TURN YIELD ON FLASHING ARROW

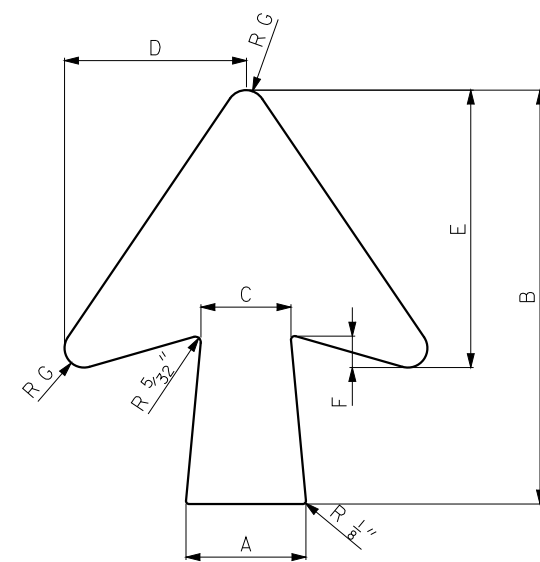
<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>TRAFFIC SIGNALS</b> <b>TRAFFIC SIGNAL SYMBOLS</b>
DATE EFFECTIVE: 04/01/2020 DATE PREPARED: 1/21/2020	<b>902.80L</b> SHEET NO. <b>1 OF 1</b>

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



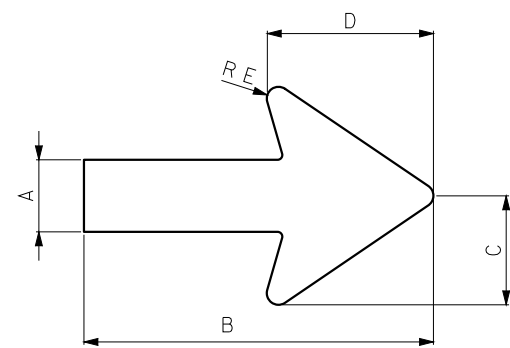
TYPE A

TYPE A ARROW TABLE							
LETTER SIZE	A	B	C	D	E	F	RG
8" U.C.	5"	25"	3 3/4"	7 9/16"	11 9/16"	1 5/16"	13/16"
10.67" & 13.33" U.C.	6"	30"	4 1/2"	9 1/8"	14"	1 1/2"	3/4"
16" U.C.	7 1/8"	35"	5 3/8"	11 1/8"	17"	1 3/4"	1"



TYPE B

TYPE B ARROW TABLE							
LETTER SIZE	A	B	C	D	E	F	RG
8" - 10.67" U.C.	5"	17"	3 3/4"	7 9/16"	11 9/16"	1 5/16"	13/16"
13.33" U.C.	6"	20"	4 1/2"	9 1/8"	14"	1 1/2"	3/4"
16" U.C.	7 1/8"	25"	5 3/8"	11 1/8"	17"	1 3/4"	1"

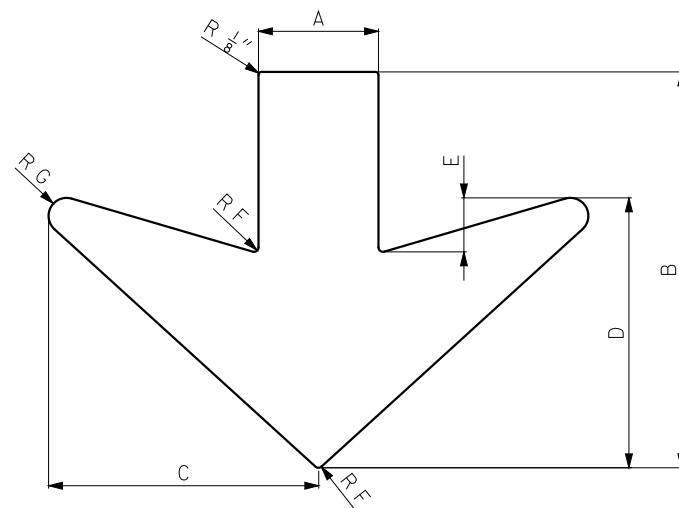


TYPE D

TYPE D ARROW TABLE					
LETTER SIZE	A	B	C	D	RE
6" U.C.**	2 1/4"	9" MIN.	3"	4 1/2"	7/16"
8" U.C.	2 3/4"	12 1/4"	3 9/16"	6 1/8"	9/16"
10.67" U.C.	3 1/4"	14 1/2"	4 3/8"	7 1/4"	5/8"
13.33" U.C.	3 3/4"	16 3/4"	5 1/16"	8 3/8"	3/4"
16" U.C.	4 1/2"	20"	6 1/16"	10"	7/8"
20" U.C.	5 1/2"	24 1/2"	7 1/2"	11 1/8"	1 1/8"

\* FOR HORIZONTAL PLACEMENT UNDER LEGEND, DIMENSION "B" WILL BE EXTENDED, AT 1 FOOT INCREMENTS, TO APPROXIMATELY 50% OF THE MAXIMUM LEGEND WIDTH.

\*\* FOR USE ON SIGNS WITH TYPE L-1 OR L-3 LEGENDS.




TYPE C

TYPE C OVERHEAD ARROW DIMENSIONS							
A	B	C	D	E	RF	RG	
6 1/2"	22"	16"	16"	3"	3/16"	1"	

GENERAL NOTES:

ARROWS FOR REFERENCE ONLY.


ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**STANDARD ARROW DETAILS**



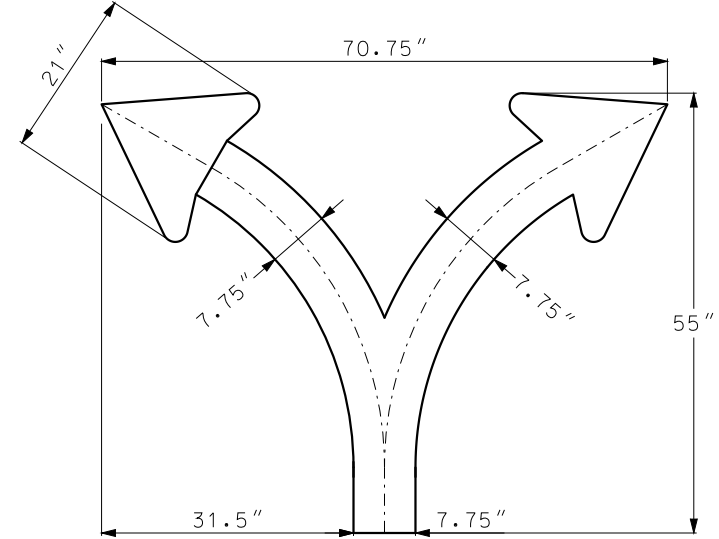
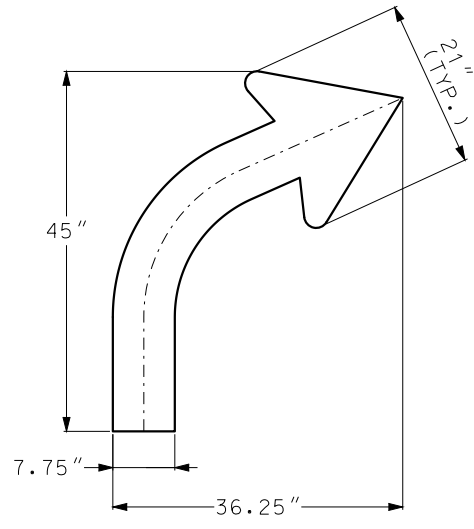
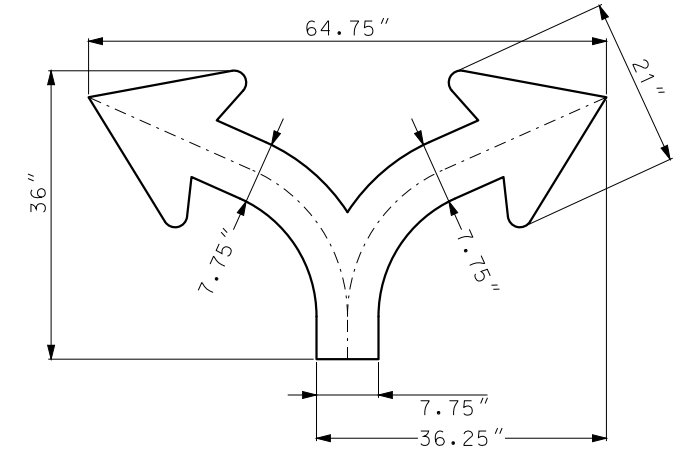
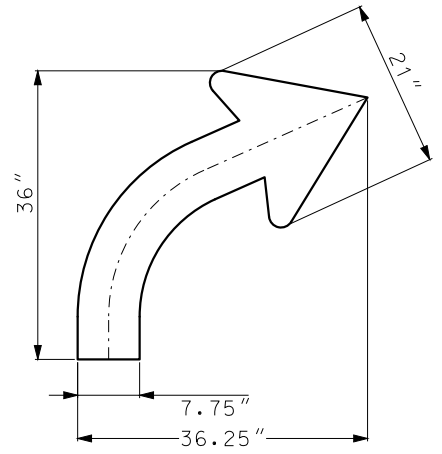
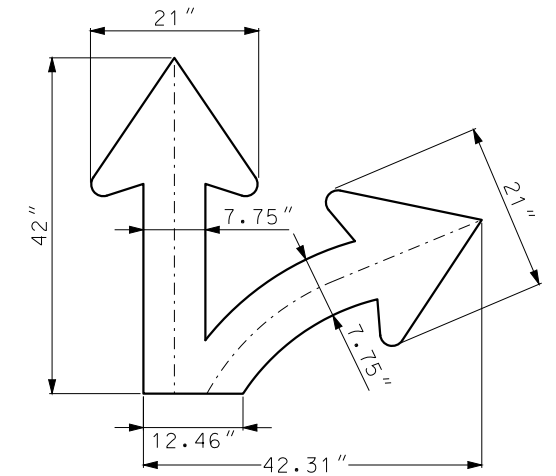
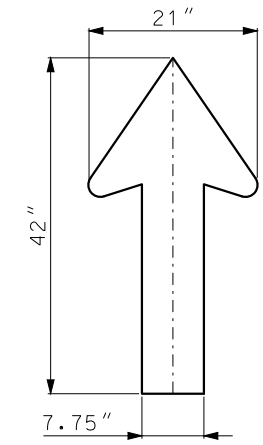
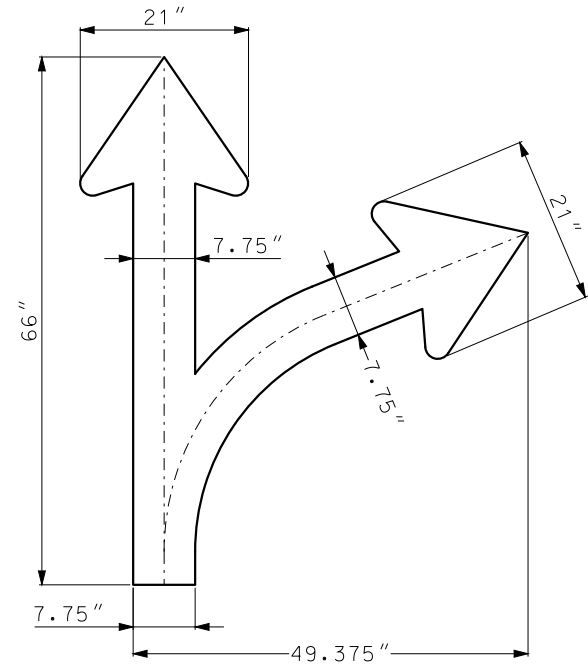
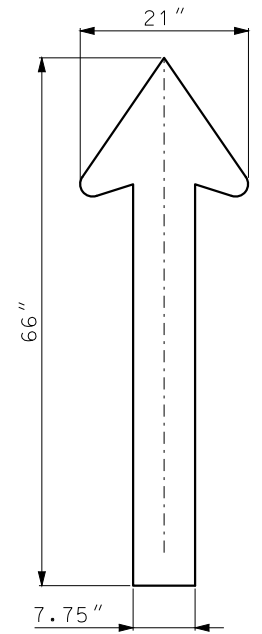
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**903.01J**

SHEET NO.  
1 OF 2

DATE EFFECTIVE: 10/01/2016  
DATE PREPARED: 8/11/2016

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



MUTCD ARROWS

MODOT ARROWS

GENERAL NOTES:  
ARROWS FOR REFERENCE ONLY.  
ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.

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

STATE OF MISSOURI  
EILEEN H. RACKERS  
NUMBER PE-28336  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY.

STANDARD ARROW  
DETAILS

DATE EFFECTIVE:	10/01/2016	903.01J	SHEET NO.
DATE PREPARED:	8/11/2016		2 OF 2

### STRUCTURAL SIGN DATA

DESIGNATION	COLOR SCHEME		SHEETING	
	LEGEND	BACKGROUND	LEGEND	BACKGROUND
STRUCTURAL (ST)	BLACK	WHITE	OPAQUE BLACK FILM	ASTM TYPE 4
	WHITE	RED	ASTM TYPE 9 OR 11	ASTM TYPE 4
	WHITE	GREEN	ASTM TYPE 9 OR 11	ASTM TYPE 4
	WHITE	BLUE	ASTM TYPE 9 OR 11	ASTM TYPE 4
	WHITE	BROWN	ASTM TYPE 9 OR 11	ASTM TYPE 4
STRUCTURAL FLUORESCENT (STF)	BLACK	FL YELLOW	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11
	BLACK	FL YELLOW GREEN	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11
	BLACK	FL ORANGE	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11

NOTE: WHITE LEGEND IS DIRECT APPLIED UNLESS SPECIFIED OTHERWISE.

### FLAT SHEET SIGN DATA

DESIGNATION	COLOR SCHEME		SHEETING
	LEGEND	BACKGROUND	
FLAT SHEET (SH)	BLACK **	WHITE	ASTM TYPE 4 WHITE
	WHITE	BLACK **	ASTM TYPE 4 WHITE
	RED	WHITE	ASTM TYPE 4 WHITE
	WHITE	RED	ASTM TYPE 4 WHITE
	WHITE	GREEN	ASTM TYPE 4 WHITE
	GREEN	WHITE	ASTM TYPE 4 WHITE
	WHITE	BLUE	ASTM TYPE 4 WHITE
	WHITE	BROWN	ASTM TYPE 4 WHITE
FLAT SHEET FLUORESCENT (SHF)	BLACK **	FL YELLOW	ASTM TYPE 9 OR 11 FL YELLOW
	BLACK **	FL YELLOW GREEN	ASTM TYPE 9 OR 11 FL YELLOW GREEN
	BLACK **	FL ORANGE	ASTM TYPE 9 OR 11 FL ORANGE

\*\* OPAQUE INK OR FILM

NOTE: LEGEND AND BACKGROUND COLORS ARE ACHIEVED THROUGH TRANSLUCENT INKS AND FILMS.

FLAT SHEET THICKNESS	
SIGN SIZE	THICKNESS
9 SF OR LESS	0.080 IN.
OVER 9 SF TO 16 SF	0.100 IN.
16 SF OR LARGER	0.125 IN.


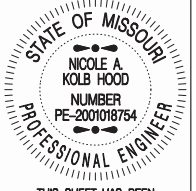
#### GENERAL NOTES:

GROUND MOUNTED SIGNS GREATER THAN 5 FEET WIDE OR SIGNS GREATER THAN 30 SQUARE FEET SHALL BE STRUCTURAL.

ALL NON STANDARD SIGNS NOT FOUND IN THE MUTCD SHS MANUAL SHALL BE DETAILED BY THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

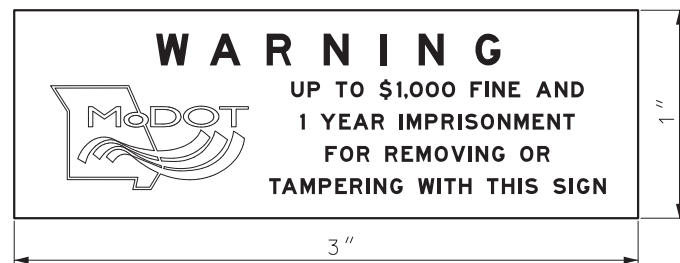
REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING, SUBSTRATE AND FABRICATION DETAILS.

FOR MOUNTING DETAILS, SEE STANDARD PLANS 903.02.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<h2>HIGHWAY SIGNING</h2> <h3>GENERAL SIGN DATA</h3>
DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	<h1>903.02AP</h1>	SHEET NO. 1 OF 8

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

**MODOT ID LABEL DETAILS**  
PLACED ON THE SIGN FACE



(1) USED ON SIGNS 9 SF AND LARGER

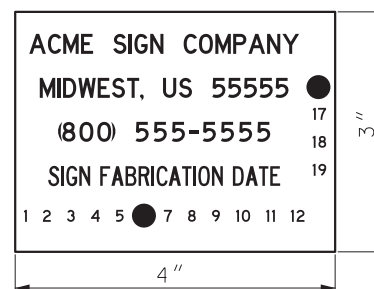


(1) USED ON SIGNS LESS THAN 9 SF

**VENDOR ID LABEL DETAILS**  
PLACED ON THE BACK OF THE SIGN



OPTIONAL



(2)

OPTIONAL



(3)

- (1) MODOT ID LABEL DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.
- (2) TO FACILITATE MASS PRODUCTION OF LABELS, THE FABRICATION DATE MAY BE INDICATED BY DISPLAYING NUMBERS FOR MONTHS ALONG THE BOTTOM OF THE LABEL AND NUMBERS FOR YEARS ALONG THE RIGHT SIDE OF THE LABEL. THE FABRICATION DATE WOULD BE INDICATED BY HOLE PUNCHING THE APPROPRIATE NUMBERS (OR SOME EQUIVALENT PERMANENT METHOD TO BLOCK OUT OF THE NUMBERS) FOR THE MONTH AND YEAR BEFORE THE LABEL IS APPLIED TO THE SIGN.
- (3) INDIVIDUAL DECALS MAY BE USED TO DISPLAY THE VENDOR INFORMATION AND THE FABRICATION DATE. DECALS SHALL BE INSTALLED IN CLOSE VERTICAL PROXIMITY.
- (4) THE MODOT ID LABEL MAY BE PLACED ON THE BACK OF THE SIGN ABOVE THE VENDOR ID LABEL IF THERE IS INSUFFICIENT SPACE AVAILABLE TO DISPLAY THE ID LABEL ON THE SIGN FACE WITHOUT INTERFERING WITH THE SIGN LEGEND OR BORDER.

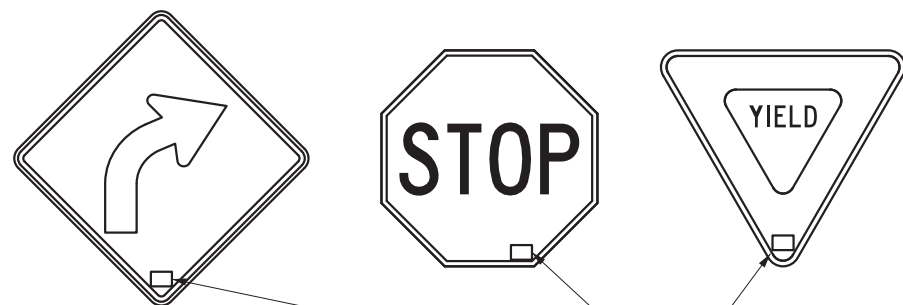
GENERAL NOTES:

ALL DECALS SHALL BE SILK SCREEN PRINTED WITH MATCHED COMPONENT INK AND SHEETING MATERIALS TO PROVIDE A LABEL THAT HAS AN EQUAL LIFE EXPECTANCY AS THE SIGN FACE.

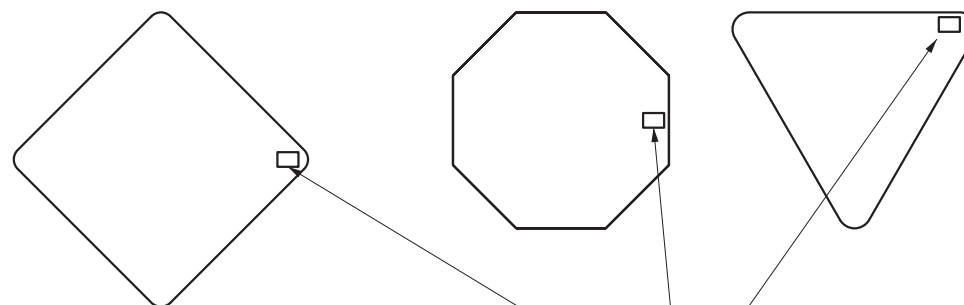
MODOT ID LABELS SHALL BE PRINTED ON CLEAR ELECTRO CUT FILM BACKGROUND WITH BLACK INK OR IT MAY BE INCORPORATED INTO THE SILK SCREEN DETAIL AND PRINTED ALONG WITH THE SIGN FACE. IF THE LABEL IS APPLIED IN THIS MANNER THE LEGEND OF THE LABEL SHALL MATCH THE COLOR OF THE SIGN LEGEND IT IS BEING APPLIED TO. THE LABEL SHALL NOT HAVE ANY BACKGROUND COLOR OR BORDER.

VENDOR ID LABEL SHALL CONTAIN THE COMPANY CONTACT INFORMATION (INCLUDING FULL NAME, CITY, STATE, PHONE NUMBER) AND THE SIGN FABRICATION DATE.

VENDOR ID LABEL SHALL BE PRINTED ON A WHITE BACKGROUND WITH BLACK INK AND THE LEGEND SHALL BE A MINIMUM OF 1/4".



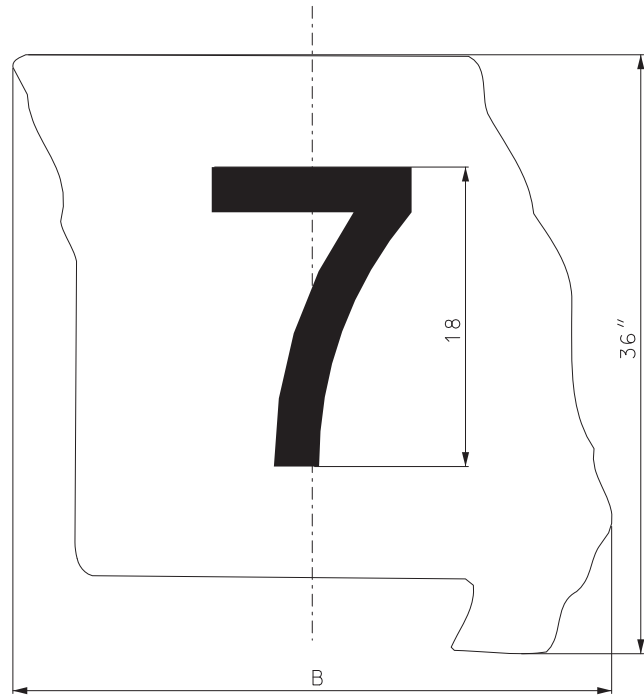
MODOT ID LABELS SHALL BE LOCATED AT THE BOTTOM RIGHT CORNER OF ANY RECTANGULAR SIGN, IN THE BOTTOM POINT OF A DIAMOND OR YIELD SIGN AND AT THE LOWER RIGHT CORNER OF A STOP SIGN IN CLOSE PROXIMITY TO THE SIGN BORDER. AVOID BOLT HOLE LOCATIONS. (4)



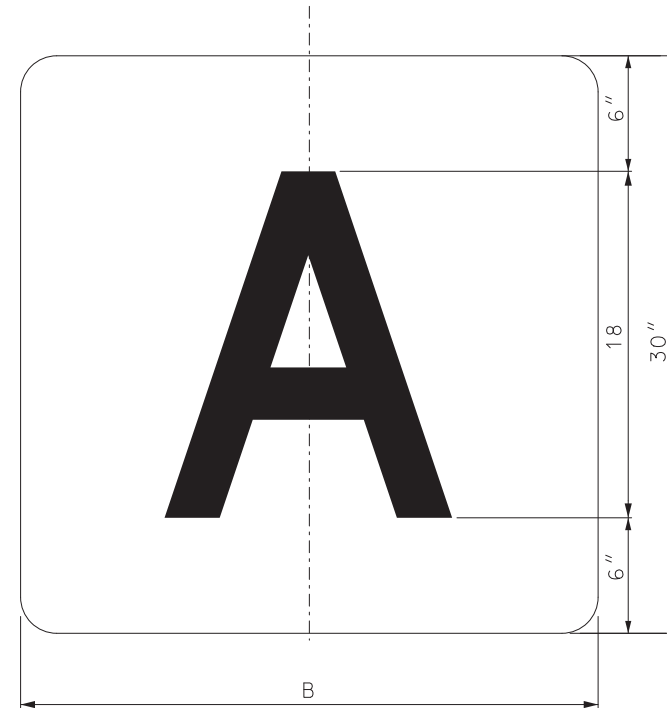
VENDOR ID LABELS SHALL BE LOCATED ON THE BACK OF THE SIGN IN THE LOWER RIGHT CORNER OF RECTANGULAR SIGNS OR RIGHT MOST EDGE OF DIAMOND, STOP OR YIELD SIGNS.

		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>HIGHWAY SIGNING</b> GENERAL SIGN DATA	
DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	<b>903.02AP</b>	SHEET NO. 2 OF 8	

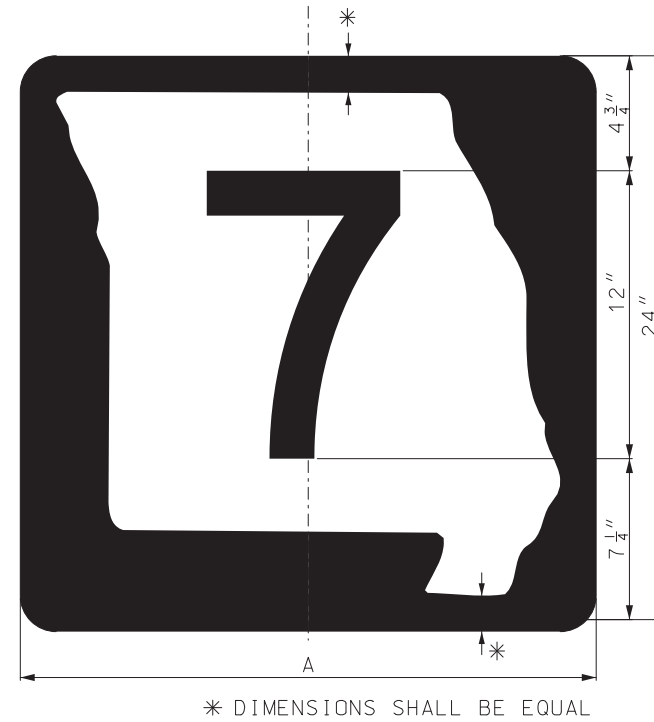
STATE NUMBER ROUTE SHIELD  
GUIDE SIGN USE



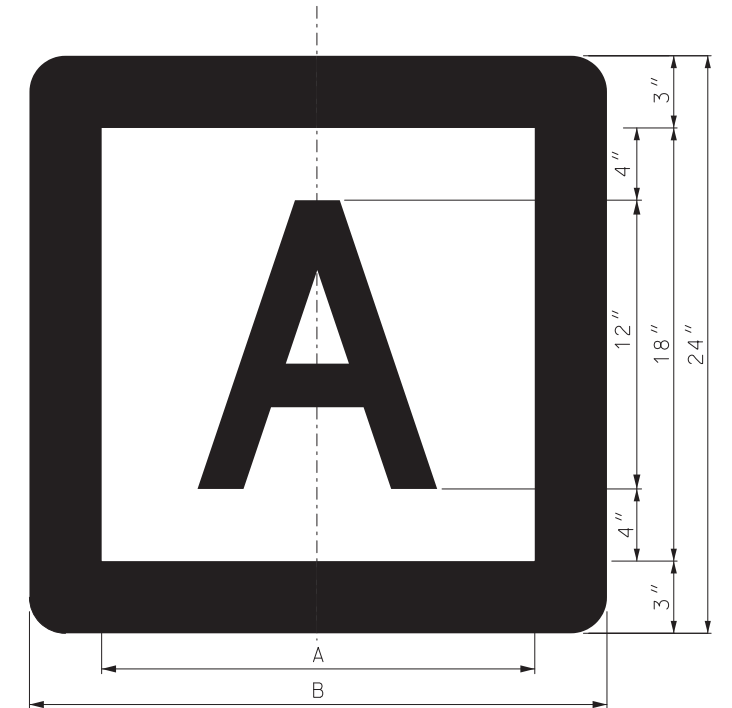
STATE LETTER ROUTE SHIELD  
GUIDE SIGN USE



STATE NUMBER ROUTE SHIELD  
INDEPENDENT USE



STATE LETTER ROUTE SHIELD  
INDEPENDENT USE



LOCATION	NO. OF LETTERS	DIMENSIONS (INCHES)		LEGEND FONTS
		A	B	
INDEPENDENT USE	1	18	24	D
INDEPENDENT USE	2	24	30	D
GUIDE SIGN USE	1	-	30	D
GUIDE SIGN USE	2	-	36	D

LOCATION	ROUTE NUMBER	DIMENSIONS (INCHES)		LEGEND FONTS
		A	B	
INDEPENDENT USE	1 & 2 DIGITS	24	24	D,C
INDEPENDENT USE	3 DIGITS	30	30	D,C,B
GUIDE SIGN USE	1 & 2 DIGITS	-	36	D,C
GUIDE SIGN USE	3 DIGITS	-	45	D,C,B

STATE LETTER ROUTE SHIELD



STATE NUMBER ROUTE SHIELD



GENERAL NOTES:

REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING AND SUBSTRATE DETAILS.

FOR HOLE PUNCHING AND MOUNTING DETAILS SEE OTHER DRAWINGS.

FOR GENERAL SIGN DATA DETAILS SEE OTHER DRAWINGS.


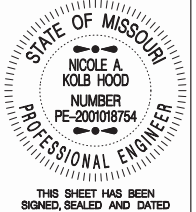
THE MISSOURI SHAPE DETAIL MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

GUIDE SIGN USE SHALL BE DIRECT APPLIED. POST MOUNTED USE SHALL BE APPLIED TO ALUMINUM SUBSTRATE.

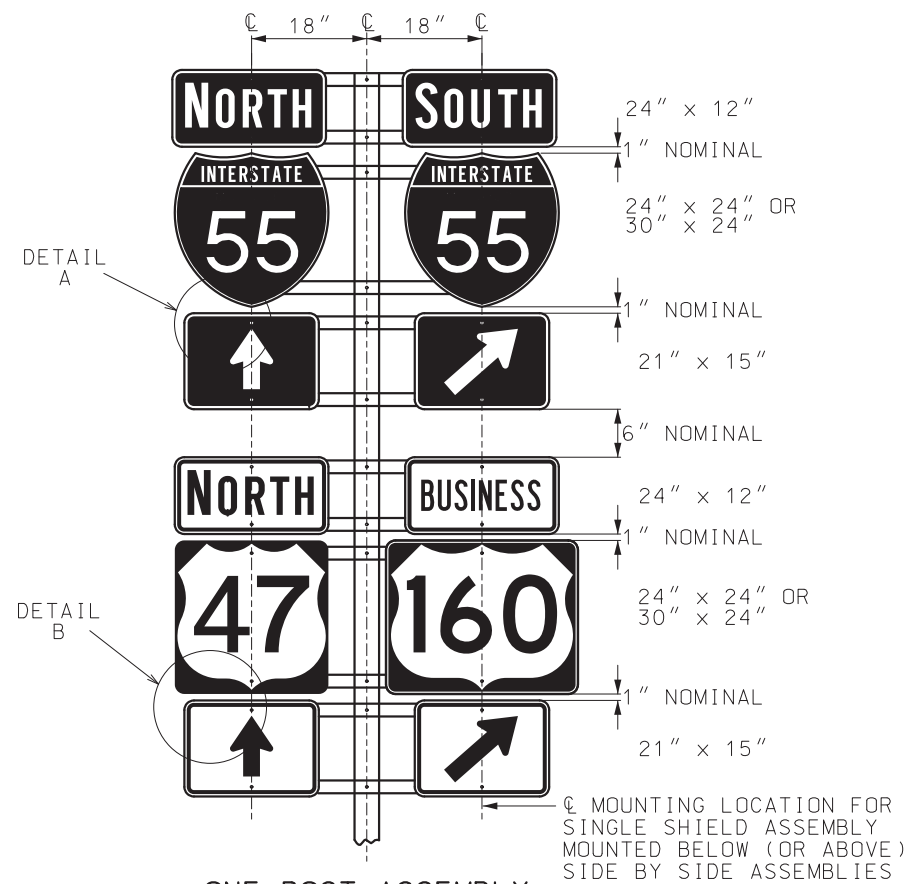
FOR NUMBERED ROUTES WITH MORE THAN 1 DIGIT THE LEGEND FONT MAY NEED TO BE REDUCED TO C OR B FONT.

SEE MUTCD SHS FOR DETAILS FOR US AND INTERSTATE ROUTE SHIELDS.

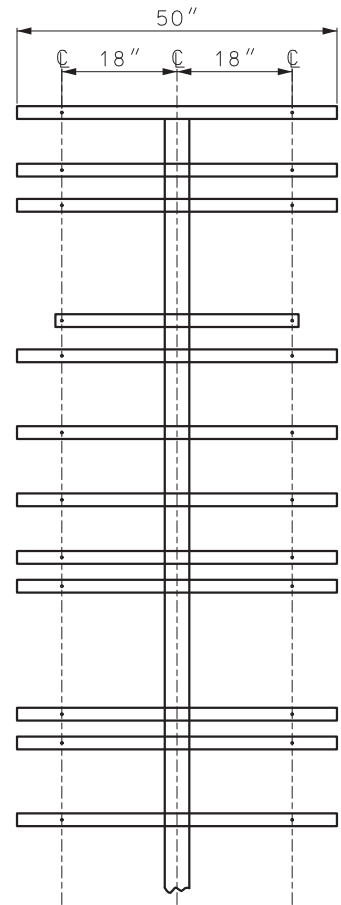
NON-STANDARD SHIELD SIZES MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>HIGHWAY SIGNING STANDARD SHIELDS FOR INDEPENDENT AND GUIDE SIGN USE</b></p>
<p>DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019</p>	<p><b>903.02AP</b></p>
<p>SHEET NO. 3 OF 8</p>	

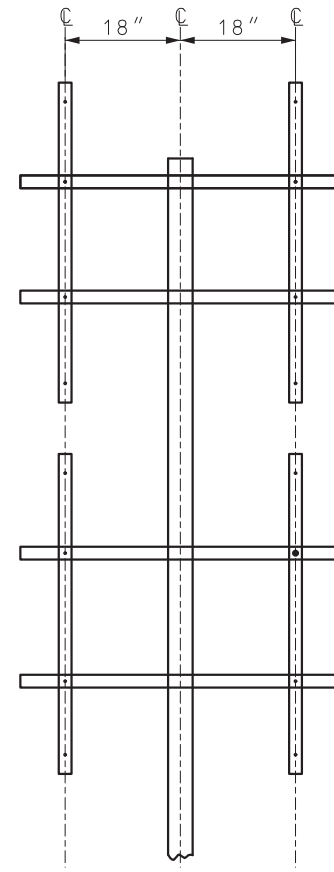
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



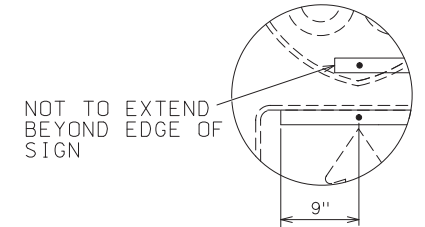
**ONE POST ASSEMBLY**  
USE TO SUPPORT UP TO 4 ROUTE MARKERS



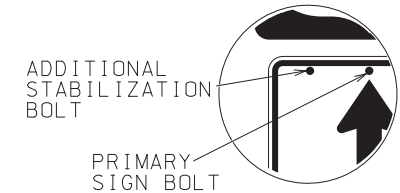
**STANDARD BACKING BAR LAYOUT**



**OPTIONAL BACKING BAR LAYOUT**



**DETAIL A**  
SEE GENERAL NOTES



**DETAIL B**  
SEE GENERAL NOTES

**GENERAL NOTES:**

ALL BACKING BARS SHALL BE 2" x 3/8" STEEL, GALVANIZED AFTER PUNCHING. WEIGHT = 2.55 LBS. PER FOOT. HOLES IN BARS SHALL BE 3/8" AND SHALL BE PUNCHED AS SHOWN ON THIS DRAWING.

DETAIL A - THE END OF THE HORIZONTAL BACKING BARS SHALL EXTEND MAXIMUM OF 9 INCHES PAST THE SIGN BOLT, BUT SHALL NOT EXTEND PAST THE EDGE OF THE SIGN.

DETAIL B - FOR SIGNS INSTALLED ON TWO PARALLEL HORIZONTAL BACKING BARS, ONE ADDITIONAL BOLT SHALL BE ADDED TO THE LEFT SIGN TO KEEP ASSEMBLY SQUARE.

WHEN USING OPTIONAL BACKING BAR LAYOUT, VERTICAL BARS SHALL BE MOUNTED BEHIND HORIZONTAL BARS.

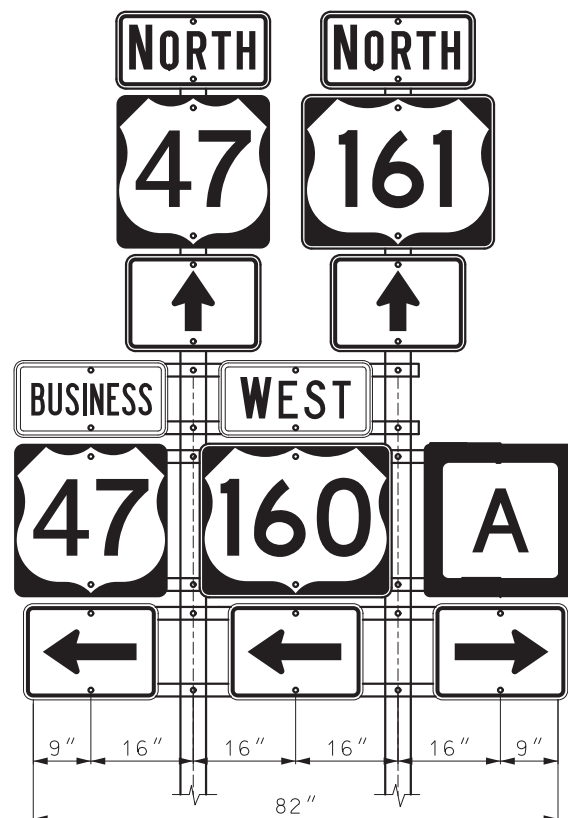
BACKING BARS SHALL MEET MISSOURI STANDARD PLANS OR APPROVED PRODUCTS LIST.

BACKING BARS PAID FOR AS STRUCTURAL STEEL, PER POUND.

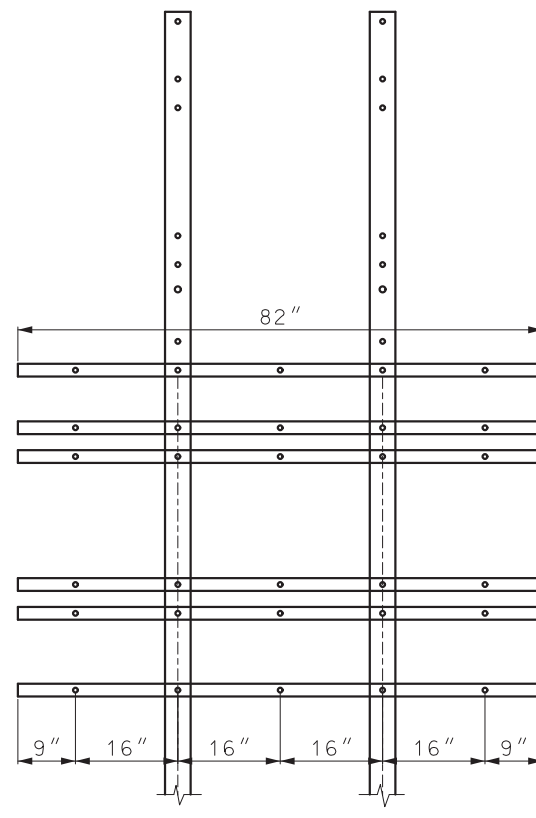
ALL SIGNS TO BE INSTALLED ALONG VERTICAL CENTERLINES.

FOR POST AND FOOTING DATA AND DETAILS OF SHIELDS AND PLAQUES, SEE OTHER DRAWINGS.

NOMINAL VERTICAL SPACING INDICATED BETWEEN SIGNS TO BE ACHIEVED BY USING THE CLOSEST AVAILABLE HOLES WHEN USING PSST.



**TWO POST ASSEMBLY**  
USE TO SUPPORT 5 OR 6 ROUTE MARKERS



**STANDARD BACKING BAR LAYOUT**

**TWO POST ASSEMBLY NOTE:**

OPTIONAL BACKING BAR LAYOUT MAY BE USED WITH TWO POST ASSEMBLY.

FOR 6 ROUTE SHIELD ASSEMBLY ADDITIONAL BACKING BARS ARE REQUIRED.

**POST SELECTION**

SINGLE POST ASSEMBLIES SHALL USE A 4" PIPE POST OR A 2 1/2" PSST POST.

TWO POST ASSEMBLIES SHALL USE TWO 4" PIPE POSTS OR TWO 2 1/2" PSST POST WITH 2 1/4" PSST INSERTS AND BREAKAWAYS. (SEE STANDARD PLAN 903.03)

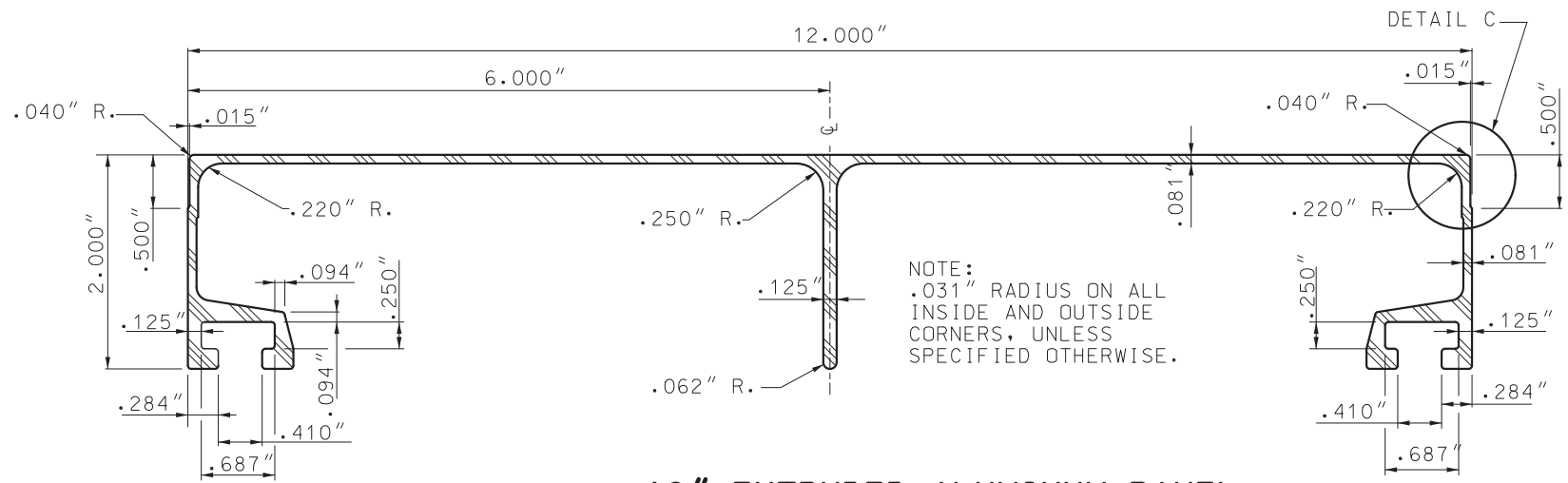
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018764  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**HIGHWAY SIGNING  
BACKING BARS  
SHEET SIGN MOUNTING  
ROUTE SHIELD AND  
MARKER ASSEMBLIES**

DATE EFFECTIVE: 10/01/2019	<b>903.02AP</b>	SHEET NO. 4 OF 8
DATE PREPARED: 7/18/2019		

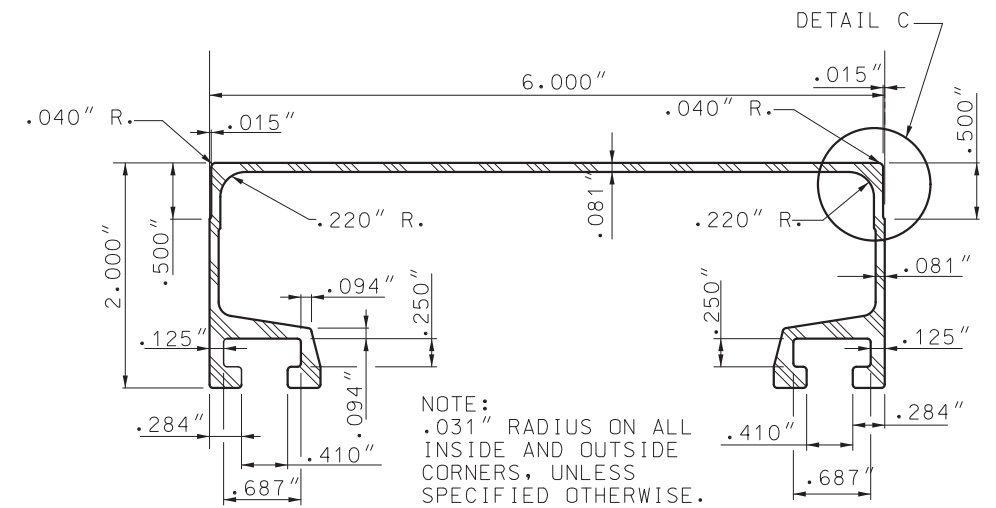
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**12" EXTRUDED ALUMINUM PANEL**  
 MINIMUM WT. = 2.40 LBS./FT.

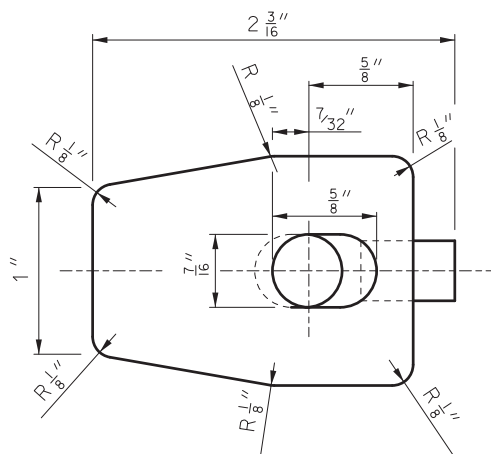
NOTE:  
 MINIMUM WEIGHT AND THICKNESS DIMENSIONS SHOWN.  
 HEAVIER PANELS MAY BE USED.

NOTE:  
 .031" RADIUS ON ALL  
 INSIDE AND OUTSIDE  
 CORNERS, UNLESS  
 SPECIFIED OTHERWISE.

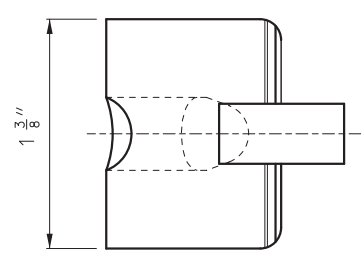


**6" EXTRUDED ALUMINUM PANEL**  
 MINIMUM WT. = 2.40 LBS./FT.

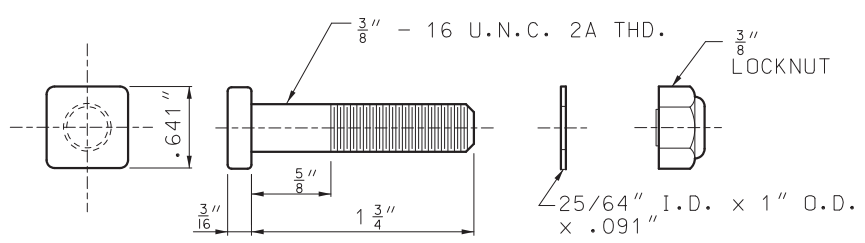
NOTE:  
 .031" RADIUS ON ALL  
 INSIDE AND OUTSIDE  
 CORNERS, UNLESS  
 SPECIFIED OTHERWISE.



PLAN VIEW



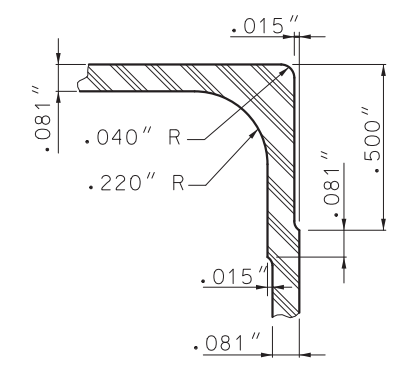
END VIEW



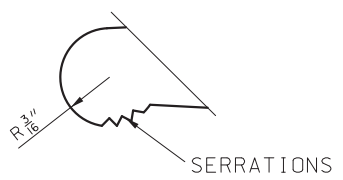
POST CLIP BOLT  
 WITH FLAT WASHER AND LOCKNUT

NOTE:  
 SQUARE BOLT HEAD SHOWN.  
 RECTANGULAR BOLT HEAD WITH  
 LEAST DIMENSION OF .641" MAY  
 BE USED.

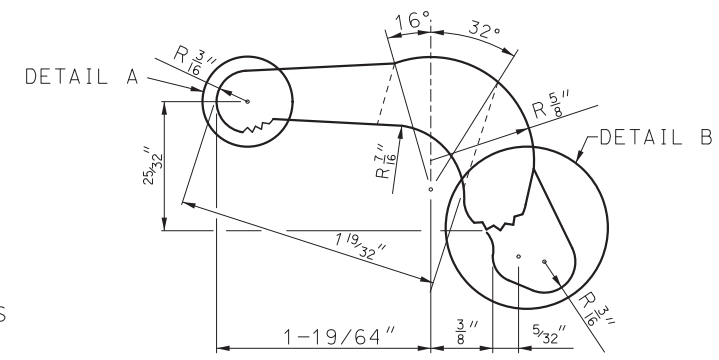
BOLT - 1 3/4 x 3/8 ALUMINUM  
 HEX LOCKNUT - 3/8 ALUMINUM  
 WASHER - ALUMINUM



DETAIL C

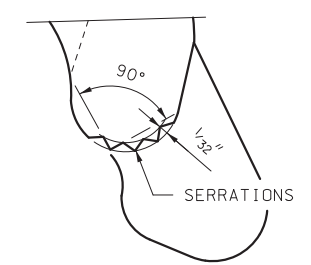


DETAIL A  
 ENLARGED VIEW OF  
 SERRATIONS




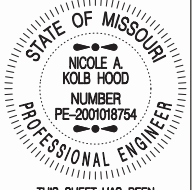
ELEVATION VIEW

**POST CLIP**  
 POST CLIPS SHALL BE ASTM B 108, 356-T6 ALUMINUM ALLOY.



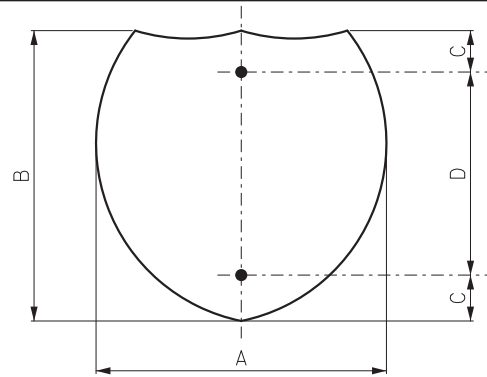
DETAIL B  
 ENLARGED DETAIL OF SERRATIONS

SAW GATING AS SHOWN  
 (APPROXIMATELY FLAT PERMISSABLE)

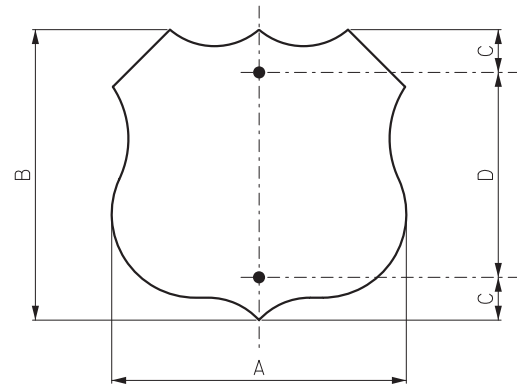
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p align="center"><b>HIGHWAY SIGNING</b>          EXTRUDED ALUMINUM PANEL          DETAILS</p>
DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	<p align="center"><b>903.02AP</b></p>
SHEET NO. 5 OF 8	

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

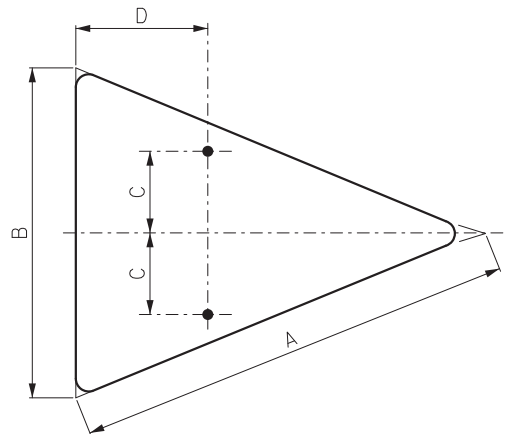
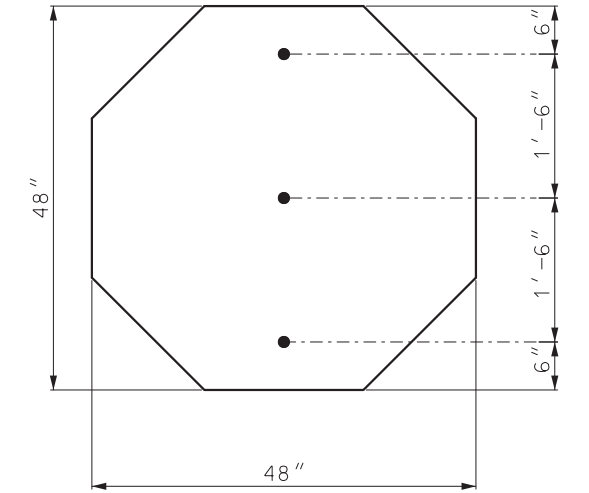
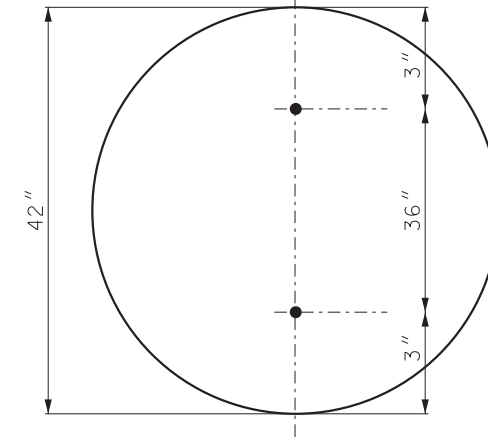




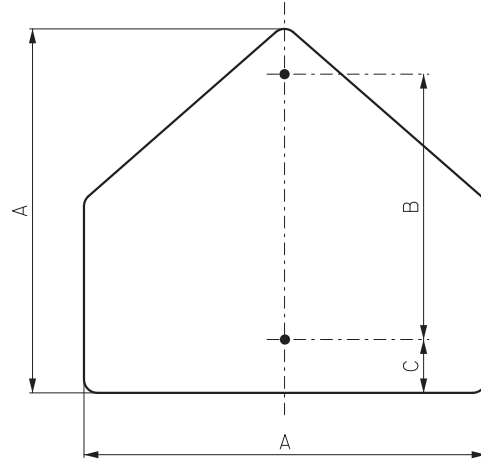
DIMENSIONS (IN.)			
A	B	C	D
24	24	3	18
30	24	3	18
36	36	6	24
45	36	6	24



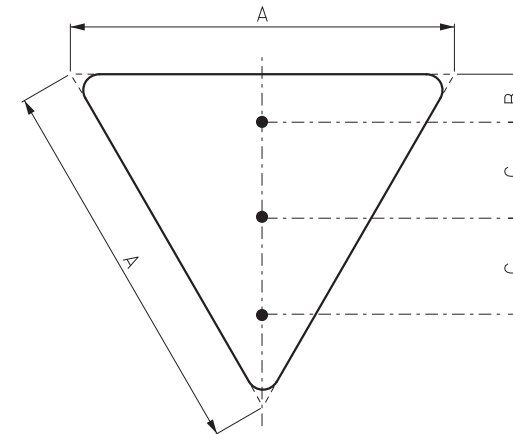
DIMENSIONS (IN.)			
A	B	C	D
24	24	3	18
30	24	3	18
36	36	6	24
45	36	6	24



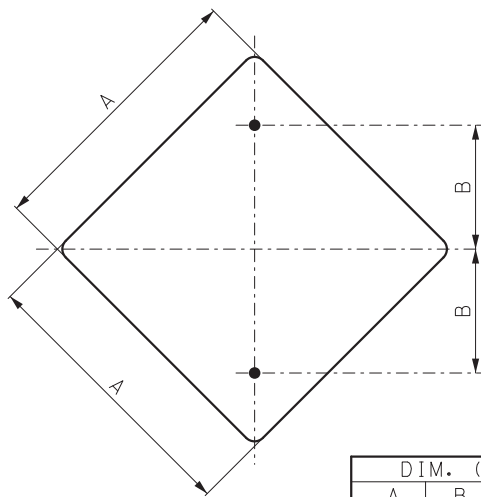
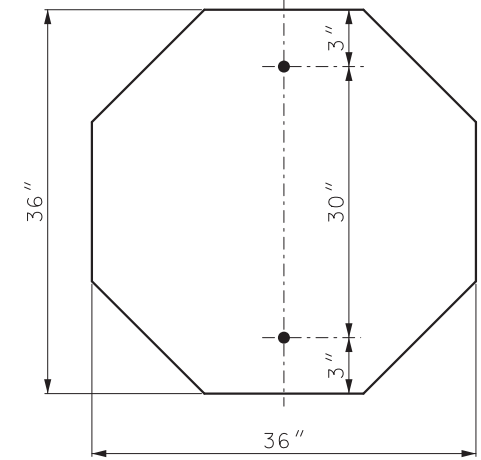
DIMENSIONS (IN.)				
A	B	C	D	RADIUS
40	30	7.5	12	1.875
48	36	9	15	2.25



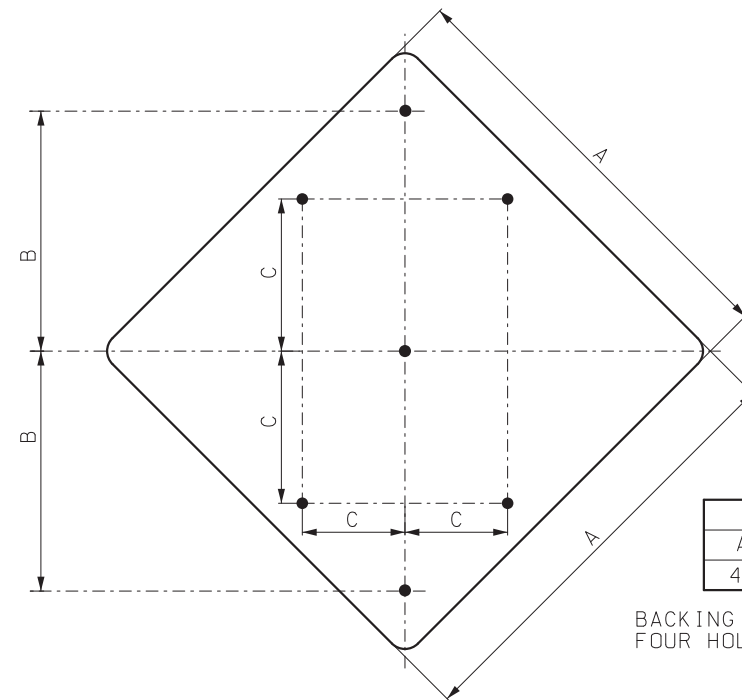
DIMENSIONS (IN.)			
A	B	C	RADIUS
36	24	3	2.25



DIMENSIONS (IN.)			
A	B	C	RADIUS
48	6	12	3
60	8	15	4



DIM. (IN.)		
A	B	RADIUS
18	9	1.5
24	12	1.5
30	15	1.875
36	18	2.25



DIMENSIONS (IN.)			
A	B	C	RADIUS
48	24	15	3

BACKING BARS ONLY REQUIRED FOR FOUR HOLE PUNCH INSTALLATION.

**GENERAL NOTES:**

SIGNS WITH FOUR OR MORE HOLES REQUIRE BACKING BARS OR MULTIPLE POSTS.

HOLES IN SIGNS SHALL BE  $\frac{3}{8}$ " AND PUNCHED AS SHOWN ON THIS DRAWING.

FLAT SHEET FOR SIGNS SHALL BE THE FOLLOWING THICKNESS:

9 SQUARE FEET OR LESS - .080 IN.,

OVER 9 SQUARE FEET BUT LESS THAN 16 SQUARE FEET - .100 IN.,

16 SQUARE FEET OR LARGER - .125 IN.

FOR MOUNTING DETAILS, SEE OTHER DRAWINGS.

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

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN  
 SIGNED, SEALED, AND DATED  
 ELECTRONICALLY.

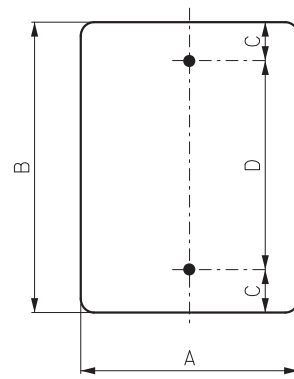
**HIGHWAY SIGNING**  
**HOLE PUNCHING**

DATE EFFECTIVE: 10/01/2019  
 DATE PREPARED: 7/18/2019

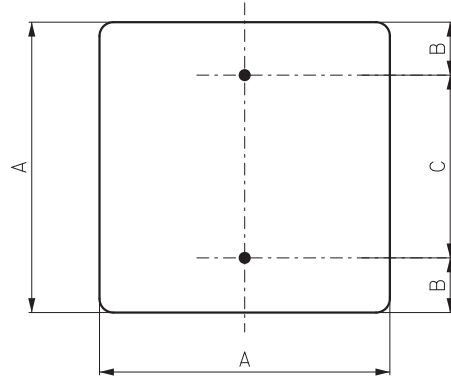
**903.02AP**

SHEET NO.  
 6 OF 8

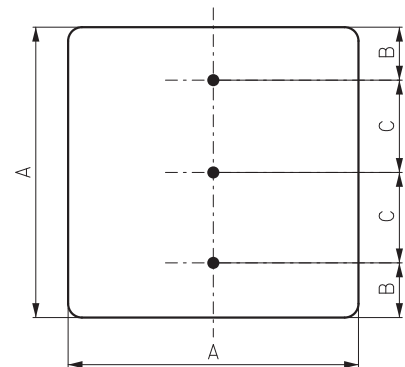
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



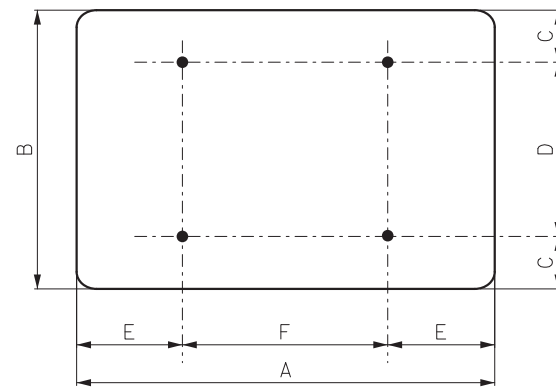
DIMENSIONS (IN.)				
A	B	C	D	RADIUS
4	16	0.75	14.5	SQ
6	12	1.5	9	1
9	12	3.5	5	1.5
9	15	3.75	7.5	1.5
12	18	3	12	1.5
12	24	3	18	1.5
12	36	3	30	1.5
12	48	3	42	1.5
15	21	3	15	1.5
18	24	3	18	1.5
24	30	3	24	1.5
24	36	3	30	1.5
30	36	3	30	1.875
30	42	3	36	1.875
30	48	6	36	1.875



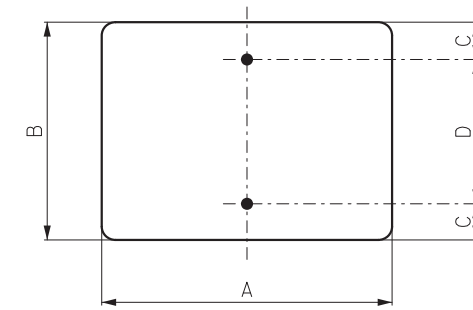
DIMENSIONS (IN.)			
A	B	C	RADIUS
12	1.5	9	1.5
18	3	12	1.5
24	3	18	1.5
30	3	24	1.875
36	6	24	2.25



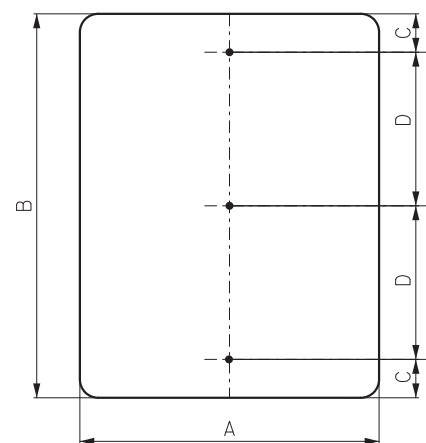
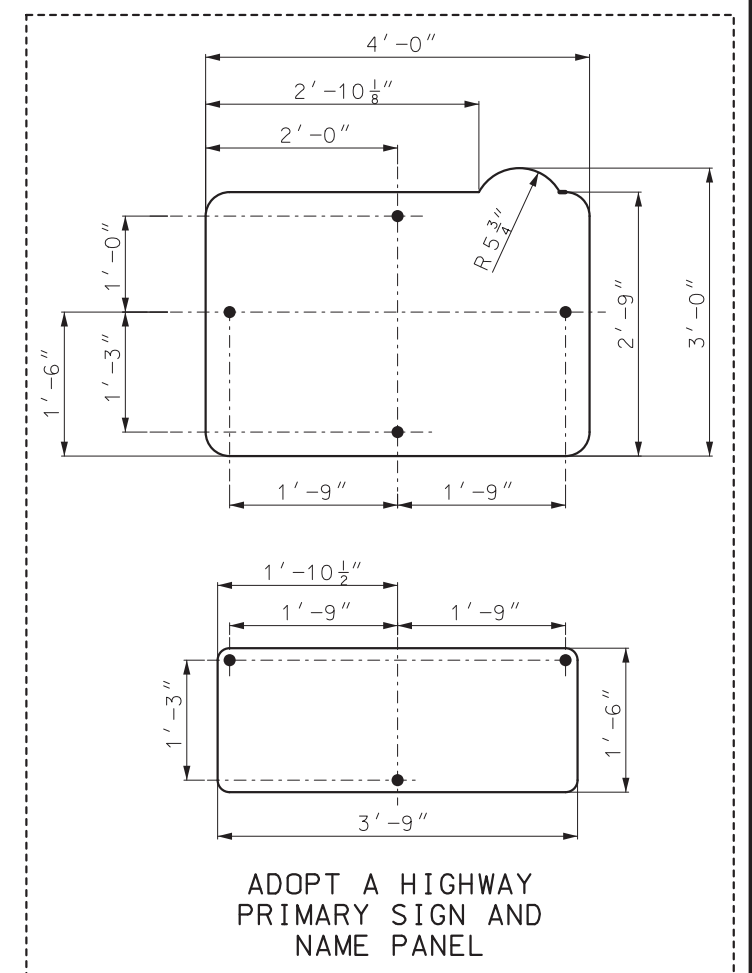
DIMENSIONS (IN.)			
A	B	C	RADIUS
48	6	18	3



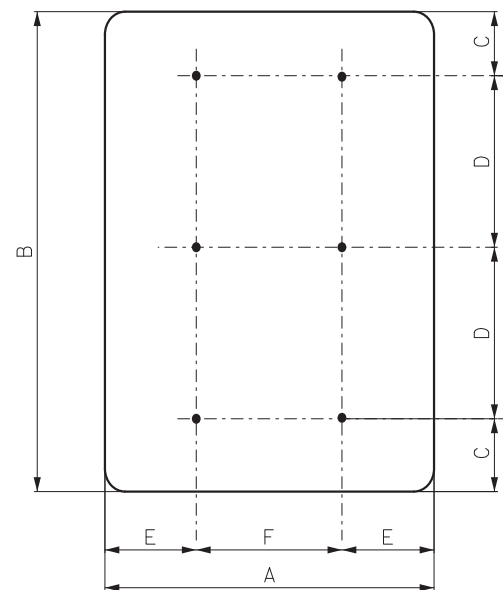
DIMENSIONS (IN.)						
A	B	C	D	E	F	RADIUS
48	12	1.5	9	9	30	1.5
48	18	1.5	15	9	30	1.5
48	24	3	18	9	30	1.5
48	30	3	24	9	30	1.875
48	36	6	24	9	30	2.25
54	18	1.5	15	9	36	1.5
60	12	1.5	9	12	36	1.5
60	18	1.5	15	12	36	1.5
60	24	3	18	12	36	1.5
60	30	3	24	12	36	1.875
60	36	6	24	12	36	2.25
60	48	6	36	12	36	3
72	36	6	24	12	48	2.25
72	48	6	36	12	48	3



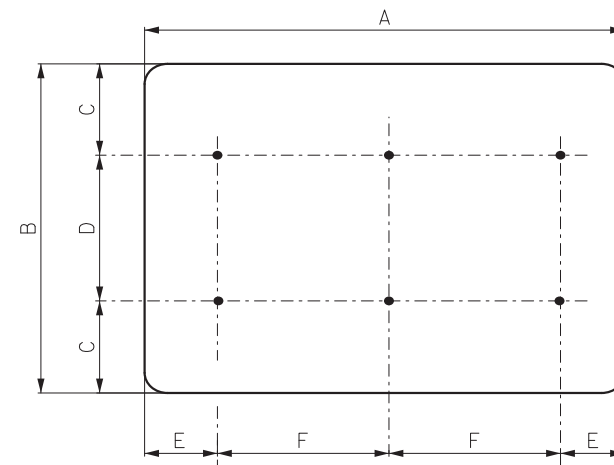
DIMENSIONS (IN.)				
A	B	C	D	RADIUS
4	5	1.5	2	1.5
12	9	1.5	6	1.5
18	9	1.5	6	1.5
18	12	1.5	9	1.5
21	15	1.5	12	1.5
24	8	1.5	5	1.5
24	12	1.5	9	1.5
24	18	3	12	1.5
30	8	1.5	5	1.5
30	12	1.5	9	1.5
30	18	3	12	1.5
30	24	3	18	1.5
36	8	1.5	5	1.5
36	12	1.5	9	1.5
36	18	3	12	1.5
36	24	3	18	1.5
36	30	3	24	1.875
42	8	1.5	5	1.5
42	18	3	12	1.5
42	24	3	18	1.5
42	30	3	24	1.875
42	36	3	30	2.25
48	8	1.5	5	1.5



DIMENSIONS (IN.)				
A	B	C	D	RADIUS
4	72	6	30	SQ
12	72	6	30	1.5
18	60	6	24	1.5
24	48	6	18	1.5
36	48	6	18	2.25
36	60	6	24	2.25
36	72	6	30	2.25

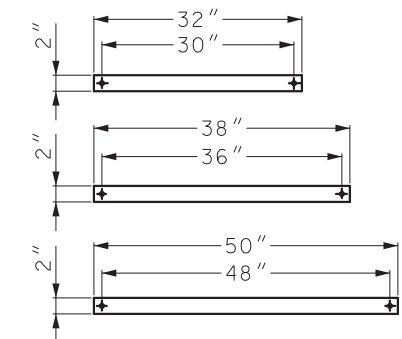


DIMENSIONS (IN.)						
A	B	C	D	E	F	RADIUS
48	60	6	24	9	30	3
48	72	6	30	9	30	3
48	84	6	36	9	30	3
48	96	6	42	9	30	3



DIMENSIONS (IN.)						
A	B	C	D	E	F	RADIUS
84	24	3	18	12	30	3
96	48	6	36	16	32	3

DIMENSIONS (IN.) FOR SIGNS REQUIRING NO HOLE PUNCHING		
A	B	RADIUS
66	18	1.5
72	18	1.5
78	18	1.5
84	18	1.5
90	18	1.5
96	18	1.5
36	78	2.25



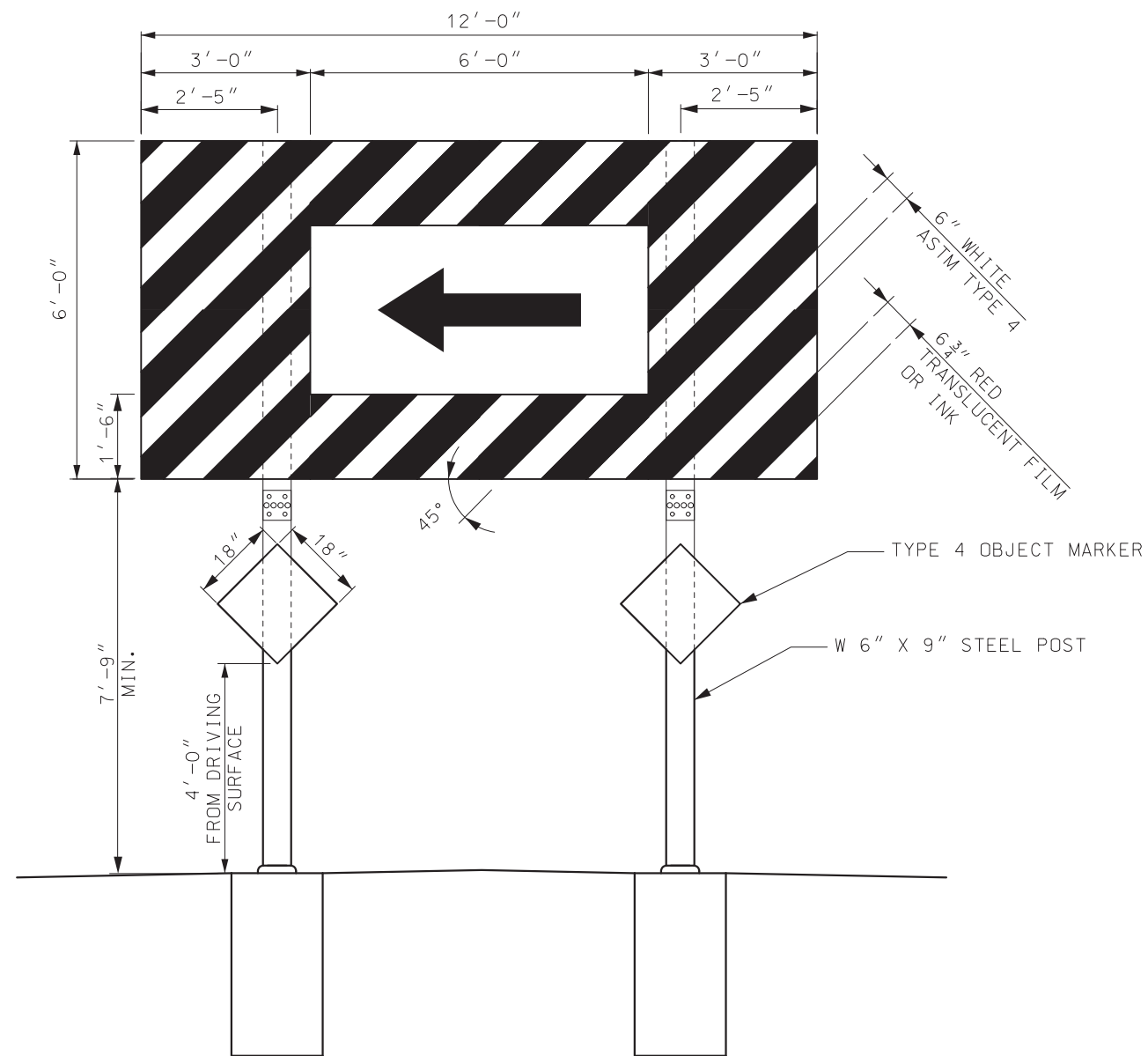
BACKING BARS FOR SINGLE POST SIGNS

GENERAL NOTES:

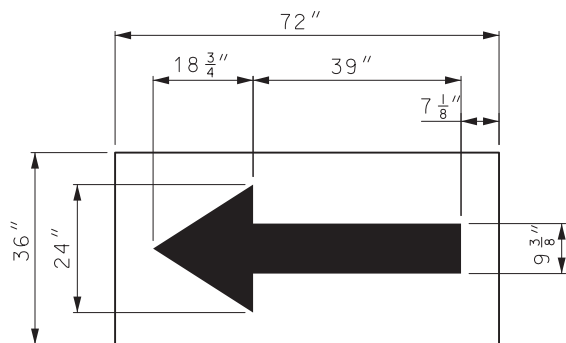
REFER TO GENERAL NOTES ON SHEET 6 OF 8.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>HIGHWAY SIGNING</b> HOLE PUNCHING	
	DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	<b>903.02AP</b>

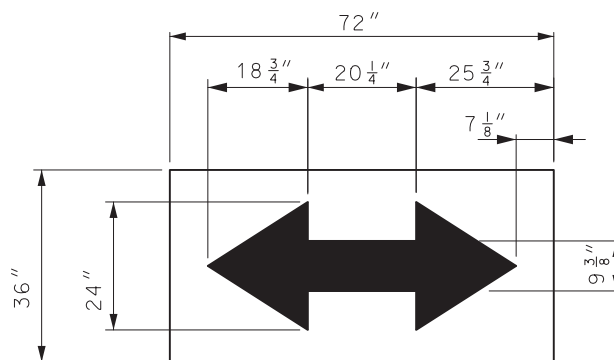
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SEE STANDARD PLAN 903.03  
FOR MOUNTING HEIGHT ON UNLEVEL GROUND



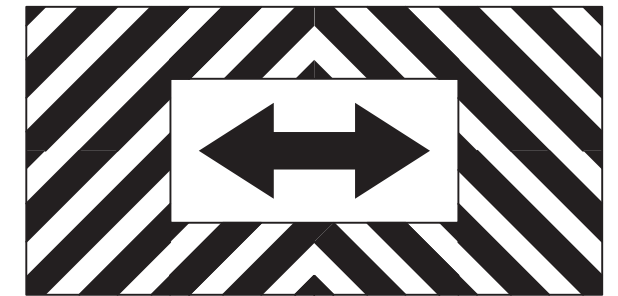
W1-6



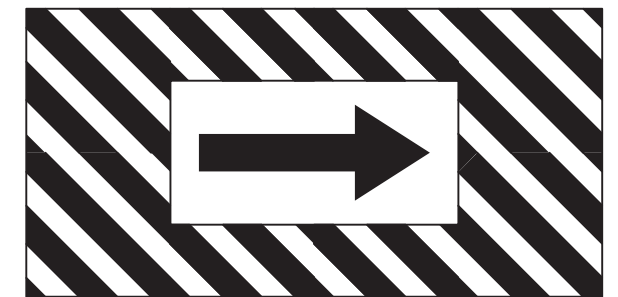
W1-7



DEAD END



T-INTERSECTION



GENERAL NOTES:

SEE STANDARD PLAN 903.03 FOR WIDE FLANGE INSTALLATION.

SIGN BARRICADE SHALL BE CONSTRUCTED AS A STRUCTURAL (ST) SIGN.

DIRECTIONAL ARROWS SHALL BE SHF AND CONSIDERED INCIDENTAL TO THE SIGN.

ALL REFLECTORIZED SURFACES SHALL BE RETROREFLECTIVE SHEETING IN ACCORDANCE WITH SEC 1042.

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>HIGHWAY SIGNING</b></p> <p>SIGN BARRICADE</p>
<p>DATE EFFECTIVE: 10/01/2019</p> <p>DATE PREPARED: 7/18/2019</p>	<p><b>903.02AP</b></p>
<p>SHEET NO. 8 OF 8</p>	

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

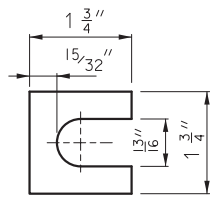
STRUCTURAL STEEL POST FOR GROUND MOUNTED SIGNS																
POST		BOLT			WASHER			BASE CONNECTION DATA TABLE (IN.)								
DES. NO.	NOM SIZE (IN. X LBS)	DIA IN.	LENGTH IN.	TORQUE IN./LB.	OD IN.	ID IN.	THICK IN.	A	B	C	D	E	F	G	W	R
1	W6x9															
2	W6x15	$\frac{5}{8}$	$2\frac{3}{4}$	345	$1\frac{5}{16}$	$\frac{11}{16}$	$\frac{1}{8}$	5	2	$1\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$1\frac{1}{32}$
3	W8x18															
4	W10x22															
5	W10x26	$\frac{3}{4}$	$3\frac{1}{2}$	555	$1\frac{13}{32}$	$\frac{13}{16}$	$\frac{1}{8}$	6	$2\frac{1}{4}$	$1\frac{3}{8}$	$3\frac{1}{2}$	$1\frac{1}{4}$	1	$\frac{3}{4}$	$\frac{5}{16}$	$1\frac{1}{32}$
6	W12x35															

POST AND FOOTING DATA TABLE													
POST		FOOTING											
POST DES. NO.	NOM. SIZE	WEIGHT		STUB LENGTH	DIA.	LEVEL GROUND		6:1 GRADE		4:1 GRADE		3:1 OR 2:1 GRADE	
		LBS/FT	LBS/IN			DEPTH	C.Y.	DEPTH	C.Y.	DEPTH	C.Y.	DEPTH	C.Y.
1	W6	9.0	0.75	3'-0"	15"	3'-0"	0.14	3'-2"	0.15	3'-3"	0.16	3'-6"	0.17
2	W6	15.0	1.25	4'-0"	24"	4'-0"	0.47	4'-2"	0.50	4'-3"	0.51	4'-6"	0.54
3	W8	18.0	1.50	4'-6"	28"	4'-6"	0.71	4'-8"	0.73	4'-9"	0.74	5'-0"	0.78
4	W10	22.0	1.83	5'-0"	36"	5'-0"	1.31	5'-2"	1.36	5'-3"	1.39	5'-6"	1.45
5	W10	26.0	2.17	5'-0"	36"	5'-0"	1.31	5'-3"	1.37	5'-5"	1.43	5'-9"	1.52
6	W12	35.0	2.92	5'-6"	36"	5'-6"	1.44	5'-9"	1.52	5'-11"	1.56	6'-3"	1.65

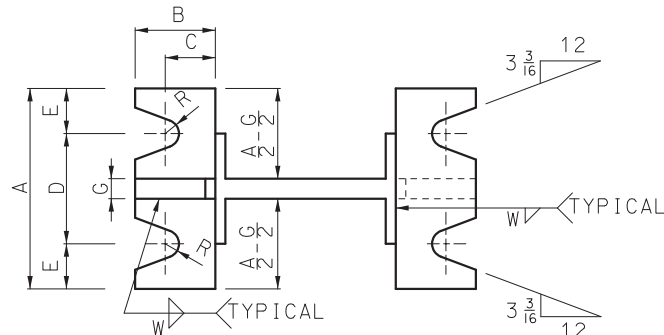
SHEET METAL BOLT RETAINER CUT FROM 30 GAGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES TO BE  $\frac{1}{16}$ " LARGER THAN REQUIRED BOLT SIZE.



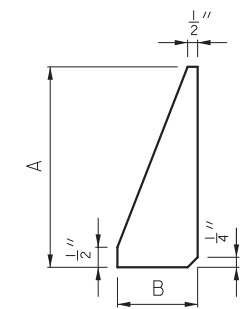
BOLT RETAINER



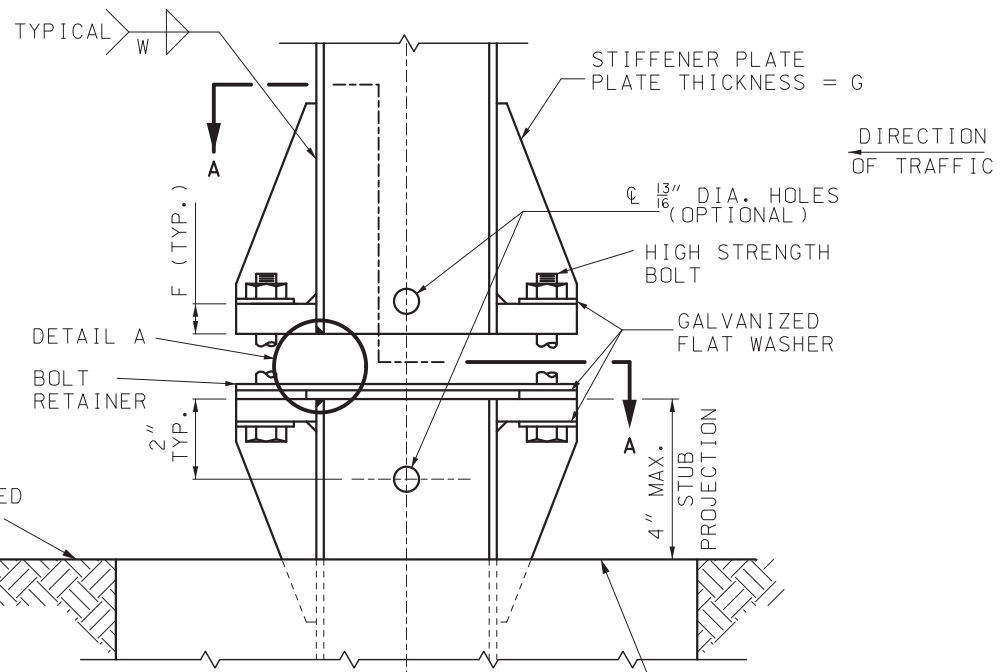
SHIM



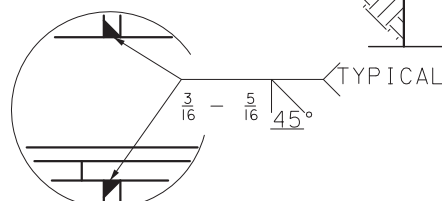
SECTION A-A



STIFFENER PLATE

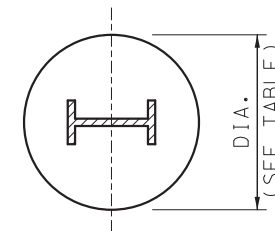


ELEVATION

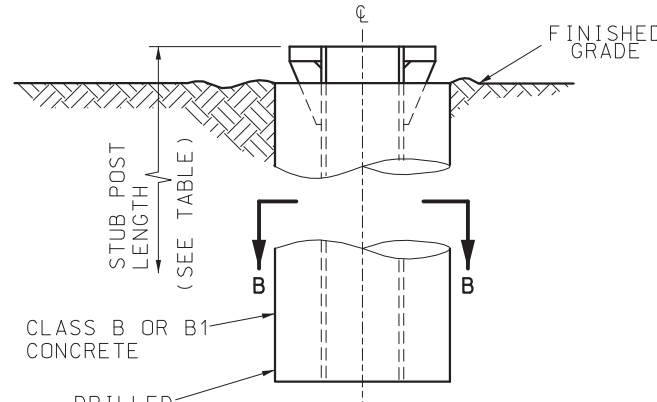


DETAIL A

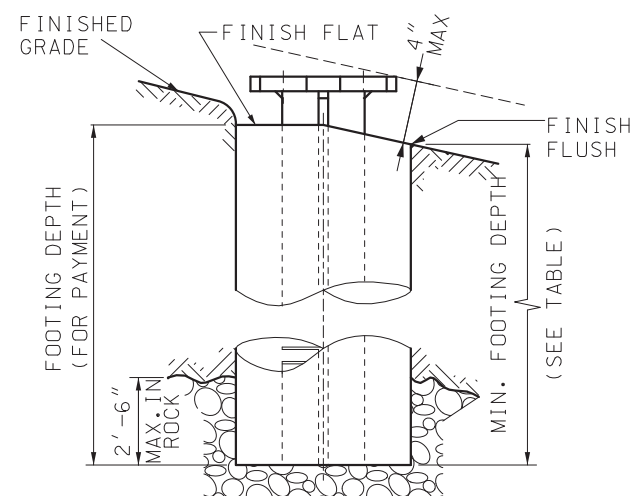
TOP OF FOOTING, FLUSH WITH FINISHED FLAT GRADE. SEE "FOOTING DETAIL" FOR FOOTINGS ON SLOPES.



SECTION B-B



STUB DETAIL



FOOTING DETAIL

GENERAL NOTES:

DESIGN SPECS: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS - 1985 (EXCEPT 2001 AND LATEST INTERIMS FOR STRUCTURAL STEEL POSTS).

POSTS, PERFORATED FUSE PLATE AND SPLICE PLATE TO BE GALVANIZED AFTER FABRICATION.

METAL PROJECTING BEYOND THE PLANE OF THE PLATE FACE WILL NOT BE ALLOWED.

REMOVE ALL GALVANIZING RUNS OR BEADS IN THE WASHER AREA.

ALL STRUCTURAL STEEL STIFFENER PLATES AND BASE PLATES, FOR GROUND MOUNTED SIGNS SHALL MEET THE REQUIREMENTS OF ASTM A 36 OR AASHTO M 270 GRADE 50, MINIMUM YIELD 50,000 PSI.

IN THE EVENT THE DISTANCE BETWEEN THE TOP OF THE FOOTING AND THE BOTTOM OF THE SIGN IS LESS THAN 7'-9", THE SIGN HEIGHT AND POST LENGTH IS TO BE INCREASED SUFFICIENTLY TO ACCOMMODATE THIS MINIMUM SPACING.

HINGE PLATES NOT REQUIRED ON SINGLE POST SIGNS OR ANY SIGNS USING PIPE POSTS.

NUTS ON HINGE PLATE BOLTS SHALL BE TIGHTENED TO THE REQUIRED MINIMUM BOLT TENSION VALUES SHOWN IN TABLE 1 SEC. 1080 OF THE STANDARD SPECIFICATIONS.

THE NUT SHALL BE FREE RUNNING. IF THE NUT WILL NOT SPIN ON THE BOLT BECAUSE OF GALVANIZING IRREGULARITIES, A LUBRICANT SHALL BE APPLIED.

ALL BREAKAWAY ASSEMBLY BOLTS SHALL BE TIGHTENED IN A SYSTEMATIC MANNER TO THE PRESCRIBED TORQUE SHOWN ON THIS DRAWING.

EACH BREAKAWAY ASSEMBLY BOLT SHALL BE LOOSENED AND RE-TIGHTENED TO THE REQUIRED TORQUE IN THE SAME ORDER AS THE INITIAL TIGHTENING.

THE THREADS SHALL BE BURRED AT THE NUT USING A CENTER PUNCH TO PREVENT NUT FROM LOOSENING.

POST LENGTH QUANTITY SHOWN ON PLANS INCLUDES STUB.

1" X 2 1/2" HIGH STRENGTH BOLTS FOR PIPE POSTS SHALL BE OF THE DESIGNATION AASHTO M 164 OR ASTM A 449. ALL OTHER HIGH STRENGTH BOLTS SHALL BE OF THE DESIGNATION ASTM F3125 GRADE A325.

FURNISH TWO .012" ± AND TWO .0032" ± THICK SHIMS PER POST FROM BRASS SHIM STOCK OR STRIP, DESIGNATION ASTM B 36. SHIM AS REQUIRED TO PLUMB POST.

HIGH STRENGTH BOLTS WITH HEX NUT AND THREE WASHERS WITH EACH BOLT ARE TO BE GALVANIZED.

OPTIONAL HOLES (13/16" ROUND FOR "I" SHAPE POSTS AND 9/16" ROUND FOR PIPE POST BASE PLATES) AS SHOWN IN "ELEVATIONS" ARE TO BE USED AS AID FOR GALVANIZING ONLY.

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

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

POST INSTALLATION DETAILS  
 POST AND FOOTING DETAILS  
 WIDE FLANGE (WF) POSTS

DATE EFFECTIVE: 4/1/2023	903.03BR	SHEET NO. 1 OF 16
DATE PREPARED: 1/6/2023		

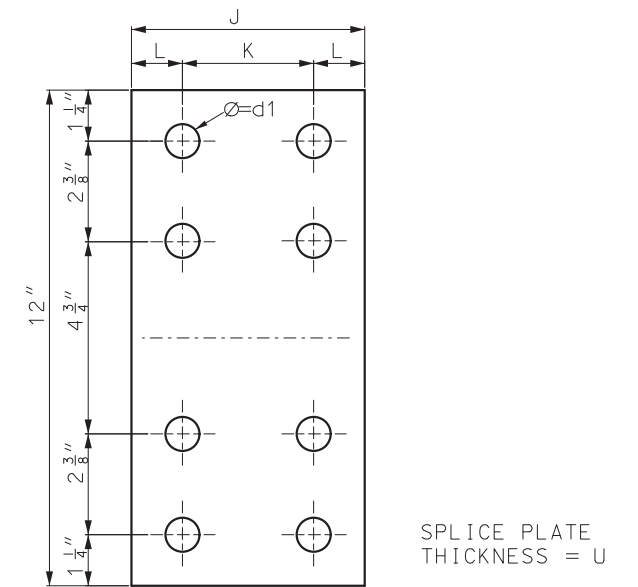
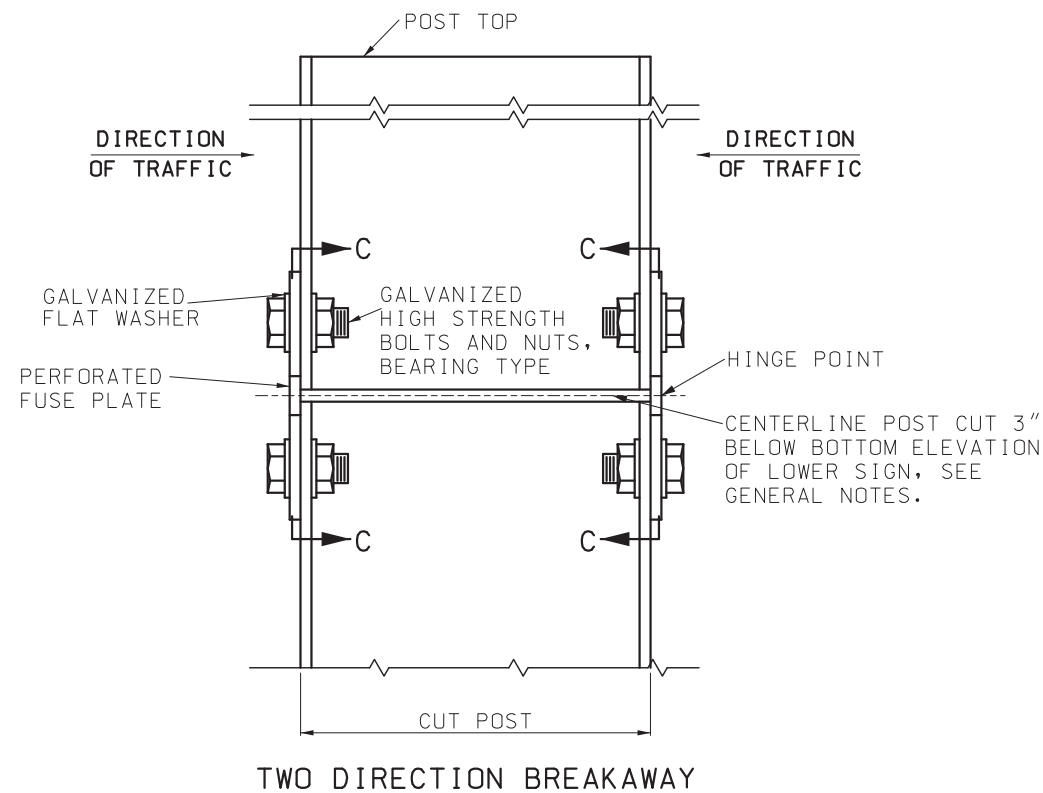
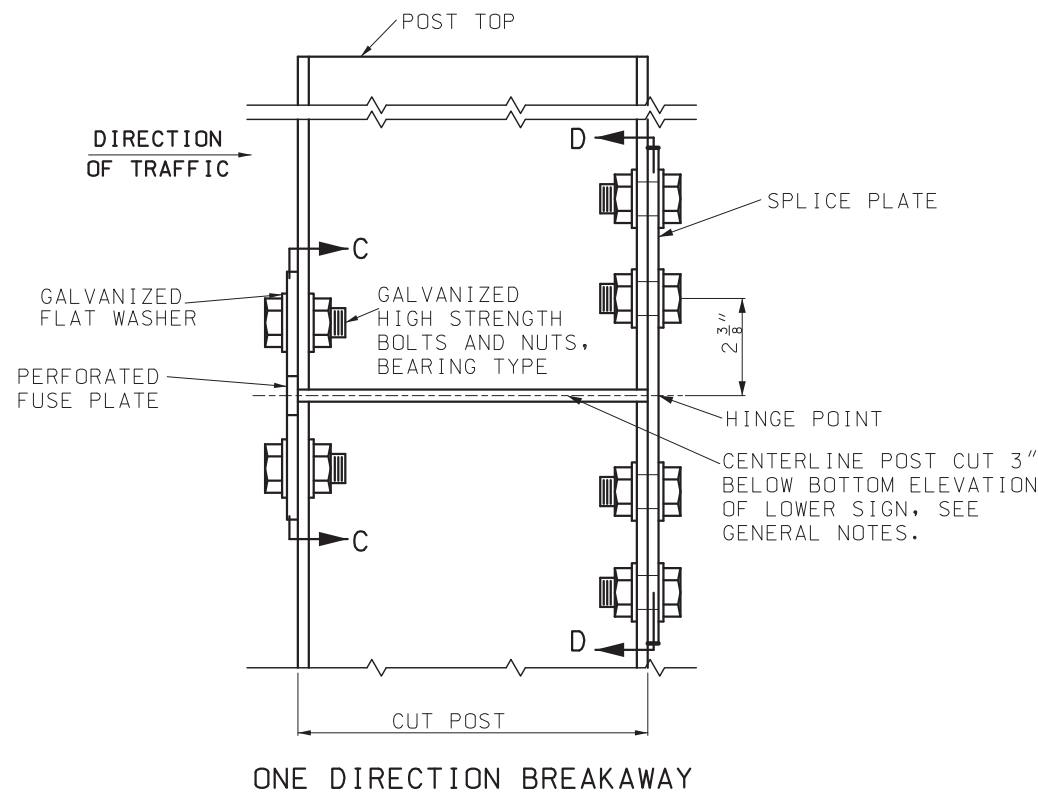
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

WIDE FLANGE STRUCTURAL STEEL POSTS DESIGN DATA							
POST DES. NO.	NOM. SIZE (IN.)	WEIGHT		DEPTH (IN.)	FLANGE		WEB THICK (IN.)
		LB/FT	LB/IN		WIDTH (IN.)	THICK (IN.)	
1	W6	9	0.75	5 7/8	4	3/16	3/16
2	W6	15	1.25	6	6	1/4	1/4
3	W8	18	1.50	8 1/8	5 1/4	5/16	1/4
4	W10	22	1.83	10 1/8	5 3/4	3/8	1/4
5	W10	26	2.17	10 3/8	5 3/4	7/16	1/4
6	W12	35	2.92	12 1/2	6 1/2	1/2	5/16

PERFORATED FUSE PLATE DATA TABLE															
POST DESIGN NO.	F (IN.)	G (IN.)	H (IN.)	J (IN.)	K (IN.)	L (IN.)	M (IN.)	N (IN.)	d1 (IN.)	d2 (IN.)	P (IN.)	BOLT DIA. (IN.)	WT. (E.A.) (LBS.)		
1	4 1/4	1	1 1/8	4	2 1/4	7/8	1	1/2	9/16	3/4	3/16	1/2	0.76		
2	5	1 1/4	1 1/4	6	3 1/2	1 1/4	1 1/2	3/4	11/16	1 1/4	1/4	5/8	1.67		
3	5	1 1/4	1 1/4	5 1/4	2 3/4	1 1/4	1 1/4	3/4	11/16	1 1/16	1/4	5/8	1.51		
4	6	1 1/2	1 1/2	5 3/4	2 3/4	1 1/2	1 3/8	13/16	13/16	1 1/8	5/16	3/4	2.52		
5	6	1 1/2	1 1/2	5 3/4	2 3/4	1 1/2	1 3/8	13/16	13/16	1 1/8	5/16	3/4	2.52		
6	6	1 1/2	1 1/2	6 1/2	3 1/2	1 1/2	1 5/8	13/16	13/16	1 5/16	3/8	3/4	3.35		

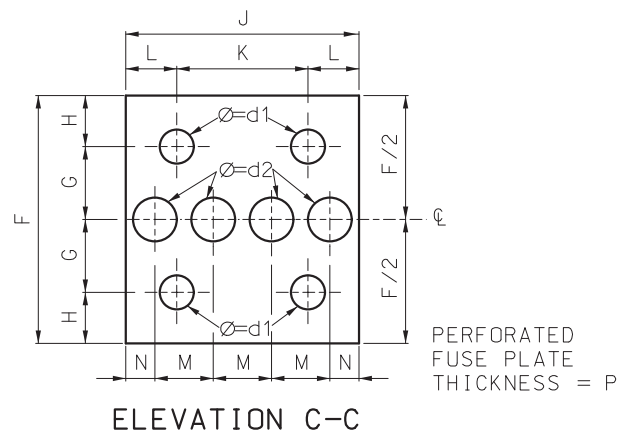
SPLICE PLATE DATA TABLE															
POST DESIGN NO.	J (IN.)	K (IN.)	L (IN.)	U (IN.)	d1 (IN.)	BOLT DIA. (IN.)	WT. (E.A.) (LBS.)	WASHER							
								OD IN.	ID IN.	THICK IN.					
1	4	2 1/4	7/8	3/16	9/16	1/2	2.45	1 3/16	5/8	1/8					
2	6	3 1/2	1 1/4	1/4	11/16	5/8	4.89	1 5/16	1 1/16	1/8					
3	5 1/4	2 3/4	1 1/4	5/16	11/16	5/8	5.32	1 5/16	1 1/16	1/8					
4	5 3/4	2 3/4	1 1/2	5/16	13/16	3/4	5.75	1 5/16	1 1/16	1/8					
5	5 3/4	2 3/4	1 1/2	7/16	13/16	3/4	8.04	1 5/16	1 1/16	1/8					
6	6 1/2	3 1/2	1 1/2	1/2	13/16	3/4	10.47	1 5/16	1 1/16	1/8					

THE WEIGHT OF STRUCTURAL STEEL POSTS SHOWN IN THE CONTRACT HAS BEEN COMPUTED USING THE WEIGHTS SHOWN.



ELEVATION D-D

PERFORATED FUSE PLATE AND SPLICE PLATE DETAIL



ELEVATION C-C

ALL HOLES SHALL BE DRILLED. ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS. HOWEVER: FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND.

PERFORATED FUSE PLATE AND SPLICE PLATE SHALL BE FABRICATED FROM ASTM A 36 STRUCTURAL STEEL.

NOTES:

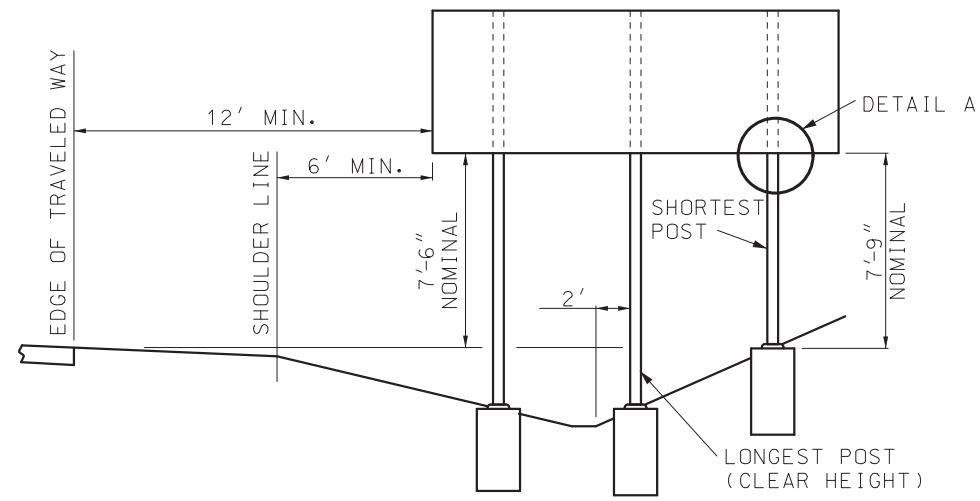
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR ROADWAYS WHERE TRAFFIC MAY STRIKE THE BACKSIDE OF THE POST, PERFORATED FUSE PLATES SHALL BE INSTALLED ON BOTH SIDES OF THE POST.

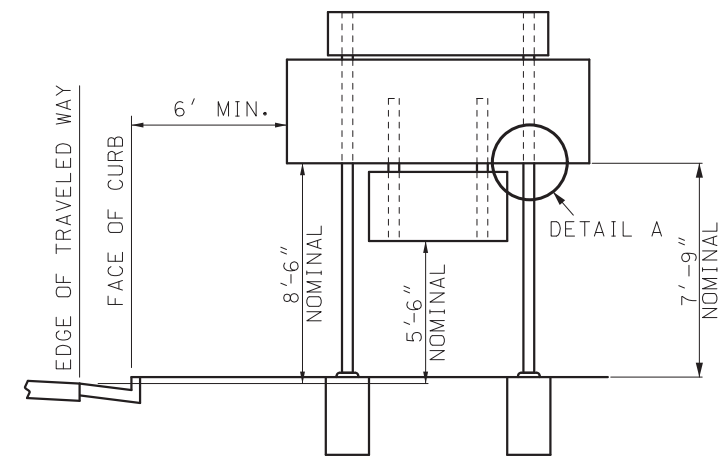
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p style="text-align: center;">POST INSTALLATION DETAILS HINGE DETAILS WIDE FLANGE (WF) POSTS</p>	
	DATE EFFECTIVE: 4/1/2023 DATE PREPARED: 1/6/2023	SHEET NO. <b>903.03BR</b> 2 OF 16

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

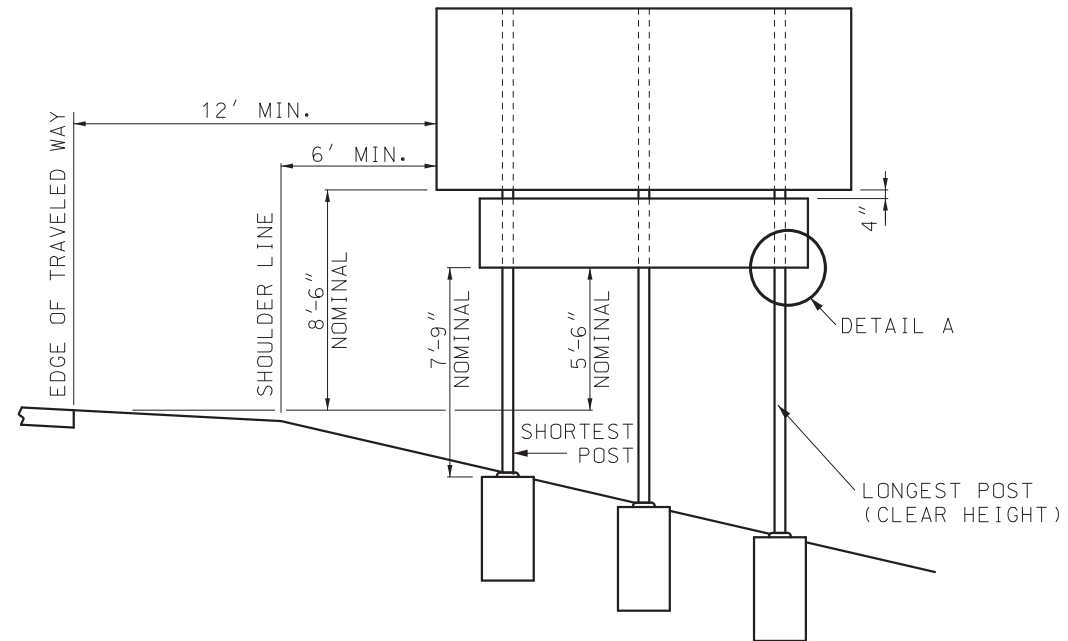
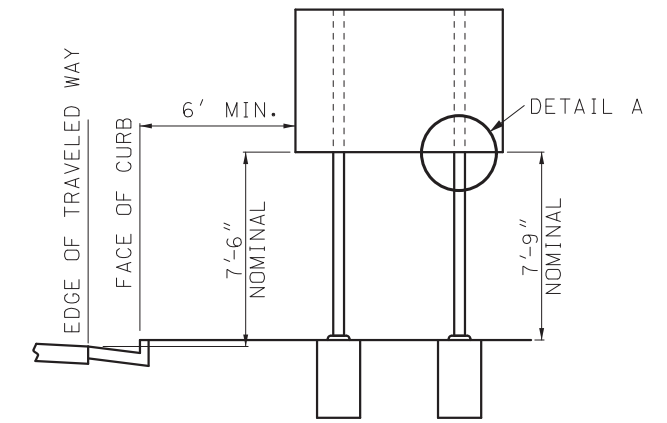
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



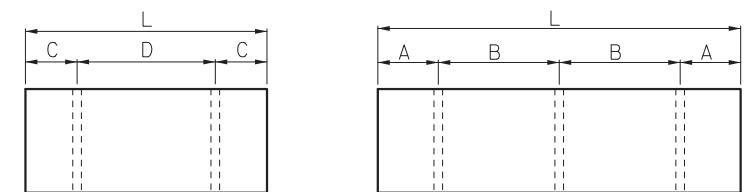
DITCH SECTION



BARRIER CURB SECTIONS



FILL SECTION



$$A = 1/6(L) \quad C = 1/5(L)$$

$$B = 1/3(L) \quad D = 3/5(L)$$

POST SPACING

FOR POST DESIGNS NUMBERS 3, 4, 5 AND 6 HAVING WEIGHTS GREATER THAN 18LBS./FT., POSTS SHALL BE SPACED AT LEAST 7' APART.

FOR POST DESIGNS NUMBERS 1 AND 2, POSTS MAY BE SPACED LESS THAN 7' APART.

DO NOT USE THREE NUMBER 1 OR 2 POSTS FOR L LESS THAN 11'.

FOR L GREATER THAN 11' AND LESS THAN 17', 3 POSTS MAY BE USED DEPENDING ON SOIL CONDITIONS.

FOR L OF 6' TO 17' TYPICALLY USE 2 POSTS.

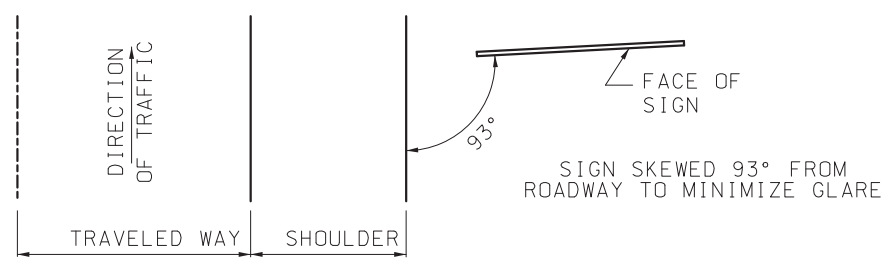
FOR L GREATER THAN 17' TYPICALLY USE 3 POSTS.

GENERAL NOTES:

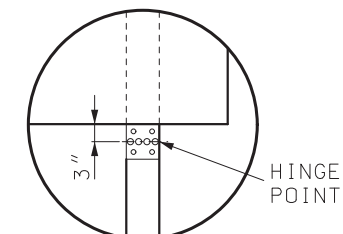
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 7'9" MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

POST SIZE IS DETERMINED USING SIGN HEIGHT, SIGN WIDTH AND CLEAR HEIGHT. THE CLEAR HEIGHT IS EQUAL TO THE LENGTH OF THE LONGEST POST MEASURED FROM THE GROUND TO THE BOTTOM OF THE SIGN.


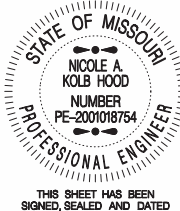


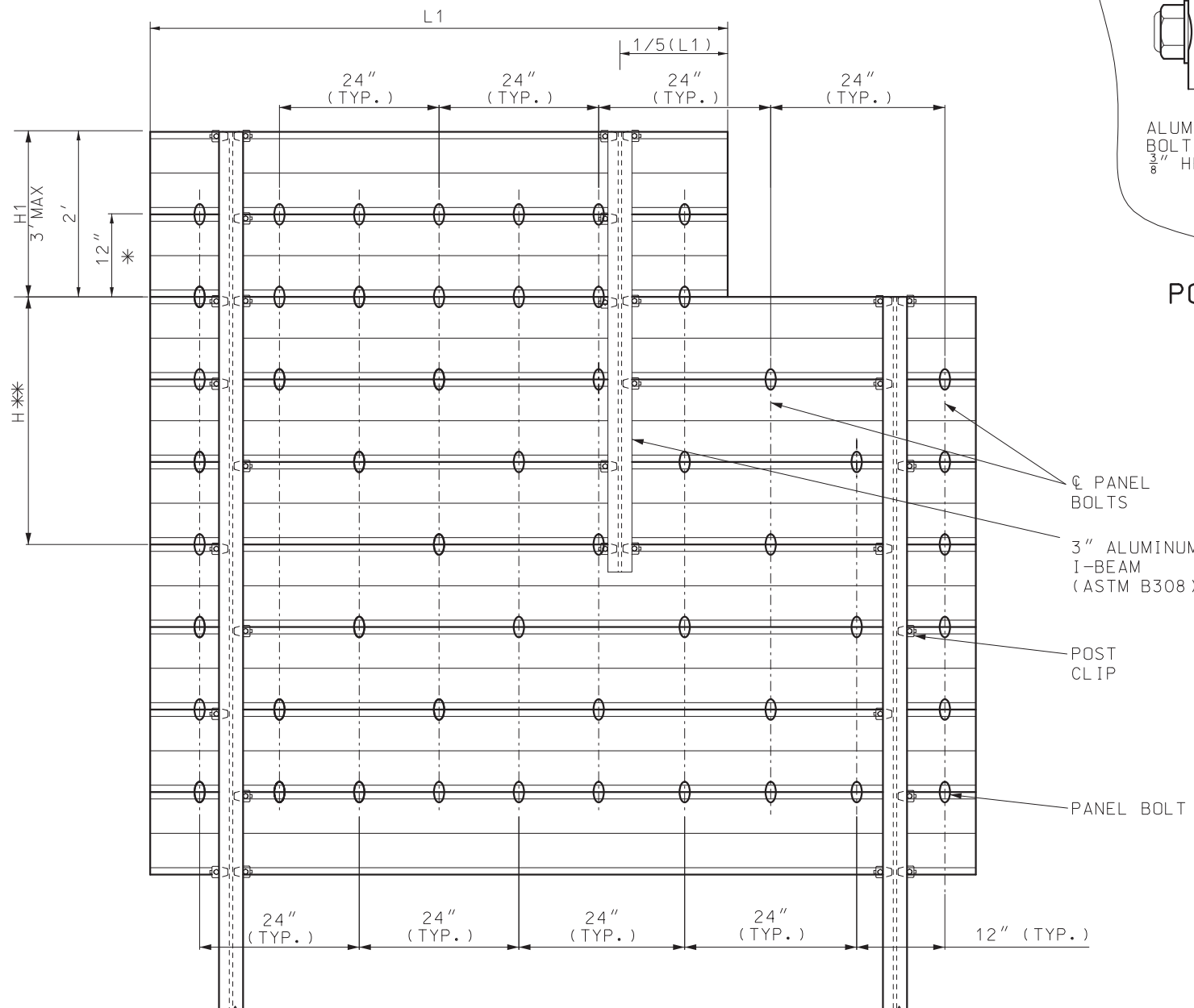
SIGN ORIENTATION



DETAIL A

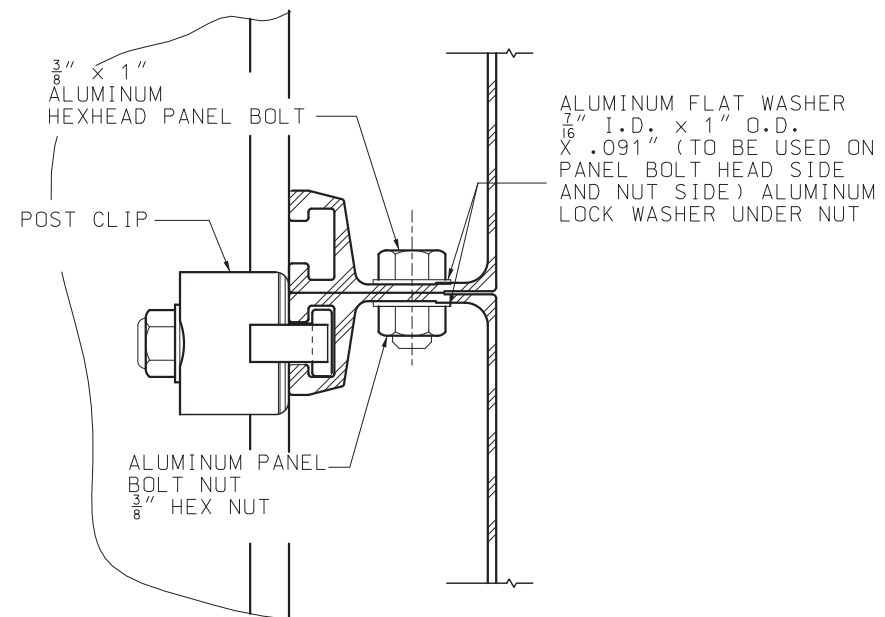
NOTE: SEE SHEET 2 FOR FUSE PLATE DETAILS.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>POST INSTALLATION DETAILS</b> TYPICAL SECTION, MOUNTING HEIGHT AND POST SPACING WIDE FLANGE (WF) POSTS
DATE EFFECTIVE: 4/1/2023 DATE PREPARED: 1/6/2023	<b>903.03BR</b> SHEET NO. 3 OF 16

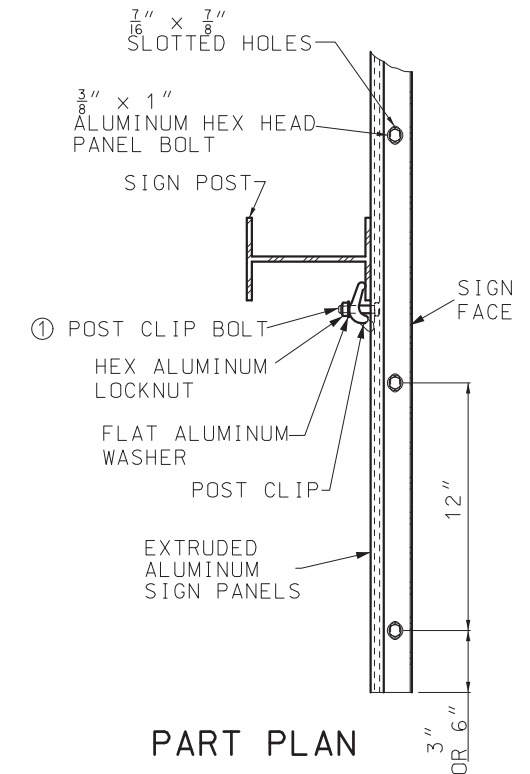


PANEL BOLT LOCATION

\* EXTRUDED ALUMINUM PANEL.  
 \*\* H = H1 + 12". H APPLIES TO SIGNS SUSPENDED ABOVE OR BELOW THE PRIMARY SIGN IF SECONDARY SIGN IS NOT ATTACHED TO THE MAIN SIGN POSTS.



POST CLIP DETAIL



PART PLAN

① SIGNS SHALL BE FIELD ATTACHED TO POSTS WITH POST CLIPS AND BOLTS, SEE POST CLIP DETAIL. THE SHANK OF THE POST CLIP BOLT SHALL FIT TIGHTLY AGAINST THE POST FLANGE AFTER THE LOCKNUTS ARE TORQUED. LOCKNUTS ON THE POST CLIP BOLTS SHALL BE TORQUED TO 225 INCH-POUNDS WHEN USING DRY, CLEAN, UNLUBRICATED THREADS.

NOTES:

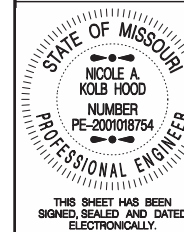
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR EXTRUDED ALUMINUM PANEL AND POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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



DATE EFFECTIVE: 4/1/2023  
 DATE PREPARED: 1/6/2023

SIGN MOUNTING DETAILS  
 WIDE FLANGE (WF) POSTS

903.03BR

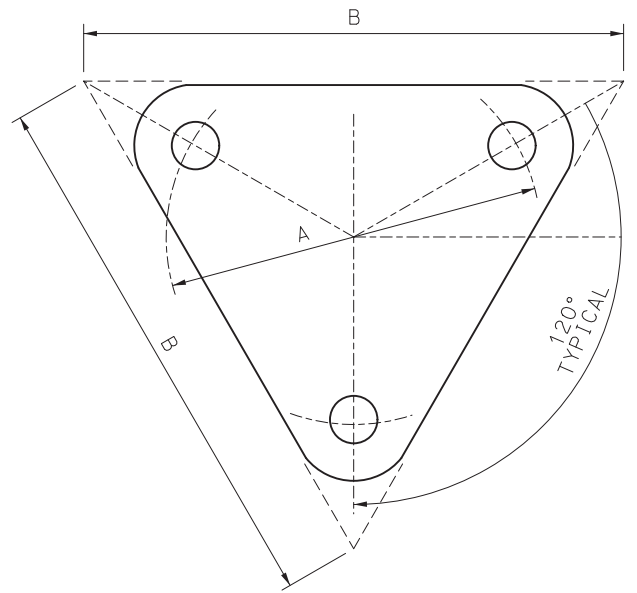
SHEET NO.  
 4 OF 16

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

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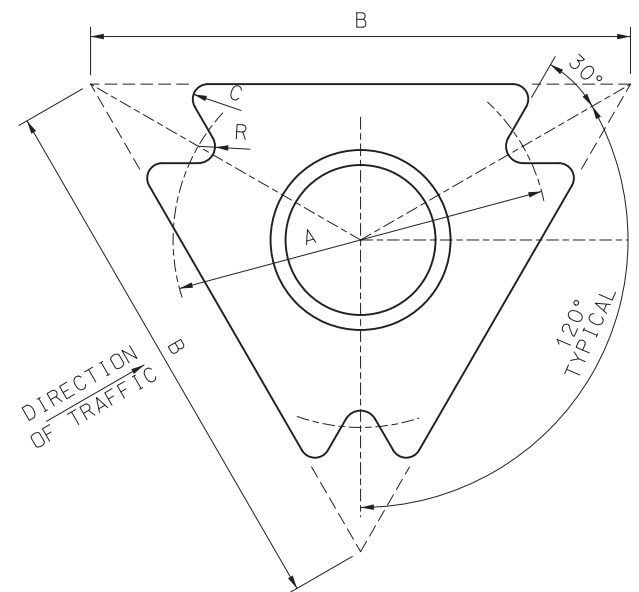
ROUND PIPE POST FOR GROUND MOUNTED SIGNS												
POST NOM SIZE (IN. - ID)	BOLT			WASHER			BASE CONNECTION DATA TABLE (IN.)					
	DIA IN.	LENGTH IN.	TORQUE IN./LB.	OD IN.	ID IN.	THICK IN.	A	B	C	R	T	W
2 1/2	1/2	3 1/2	140	1 1/16	1 7/32	1/8	6 1/4	9	1/4	9/32	1	1/4
4	5/8	3 3/4	345	1 5/16	1 1/16	1/8	7 3/16	10	1/4	3/8	1	5/16

ROUND PIPE POST AND FOOTING DATA TABLE						
NOM. SIZE (IN.)	WEIGHT		STUB LENGTH	FOOTING		CONCRETE C.Y.
	LBS/FT	LBS/IN		DIA.	DEPTH	
2 1/2	5.79	0.48	4' - 3 1/2"	12"	4'-6"	0.13
4	10.79	0.90	5' - 3 1/2"	18"	5'-6"	0.36



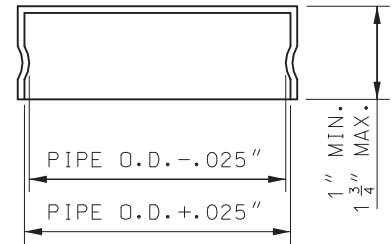
**BOLT RETAINER**

SHEET METAL BOLT RETAINER CUT FROM 30 GAUGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES SHALL BE 1/16" LARGER THAN REQUIRED BOLT SIZE.



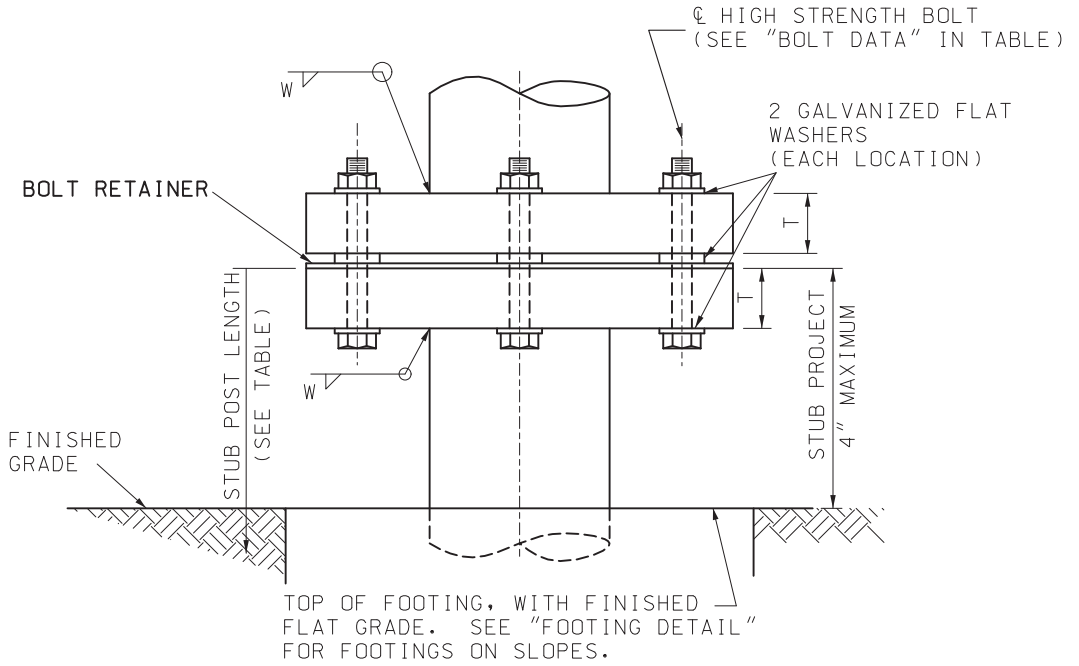
**PLAN VIEW**

ROLLED CRIMP TO ENGAGE PIPE O.D.

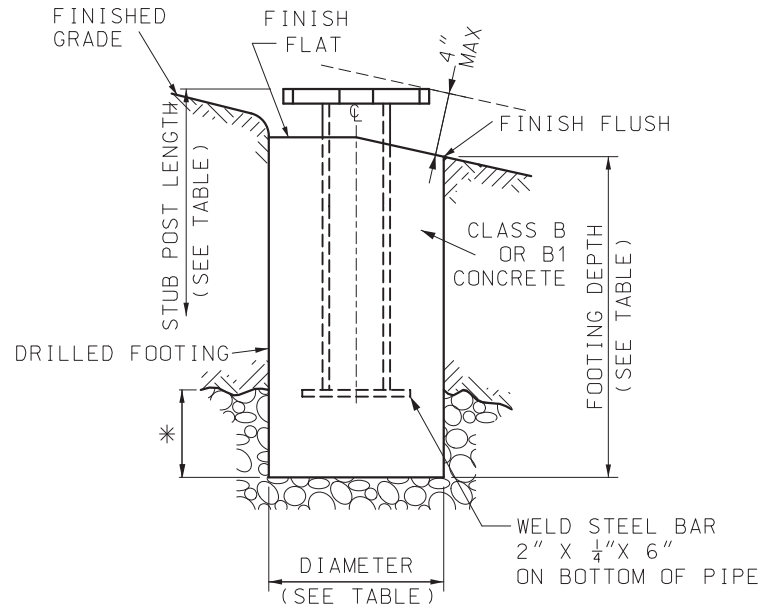


**FRICTION CAP**

NOTE:  
FOR GENERAL NOTES, SEE SHEET 1 OF 16.  
FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE STANDARD PLANS SHEET 10 OF 16.



**ELEVATION**  
(STEEL PIPE POST BASE CONNECTION)  
**MULTI-DIRECTION SLIP BASE**



\* 2' MAXIMUM IN ROCK FOR 2" DIA. PIPE;  
3' MAXIMUM IN ROCK FOR 4" DIA. PIPE.

**FOOTING DETAIL**

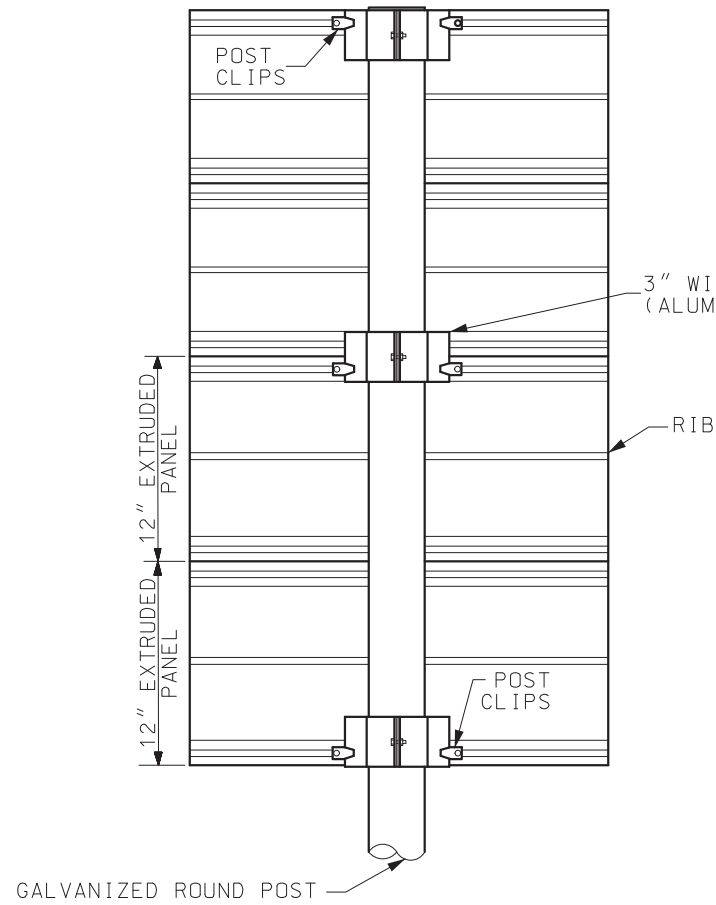
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
105 WEST CAPITOL JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

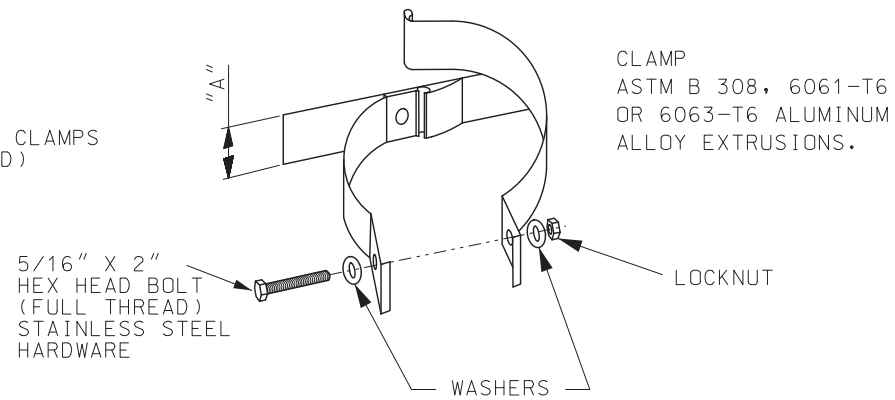
**POST INSTALLATION DETAILS**  
**PIPE POST**

DATE EFFECTIVE: 4/1/2023	903.03BR	SHEET NO. 5 OF 16
DATE PREPARED: 1/6/2023		



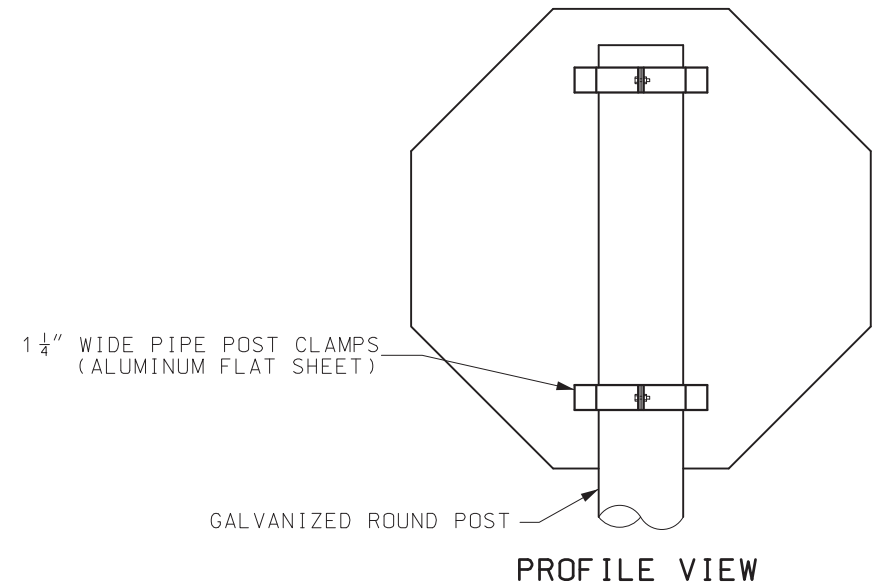


PROFILE VIEW

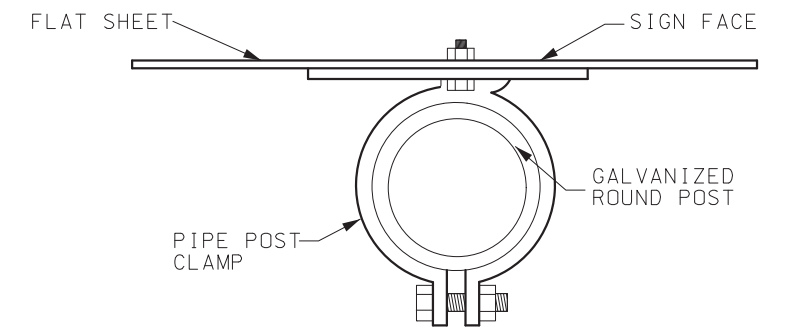


CLAMP TYPE SIGN SUPPORT FOR PIPE POST

WIDTH OF PIPE POST CLAMP	
SIGN TYPE	MINIMUM "A"
FLAT	1 1/4"
STRUCTURAL	3"



PROFILE VIEW



PLAN VIEW

MOUNTING DETAILS FOR FLAT SHEET ON PIPE POST

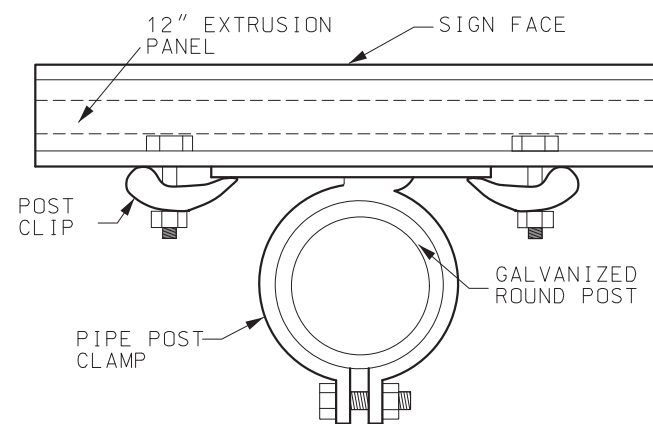
NOTES:  
 FOR GENERAL NOTES, SHEET 1 OF 16.  
 FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.  
 FOR DETAILS OF EXTRUDED ALUMINUM PANEL AND POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

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

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
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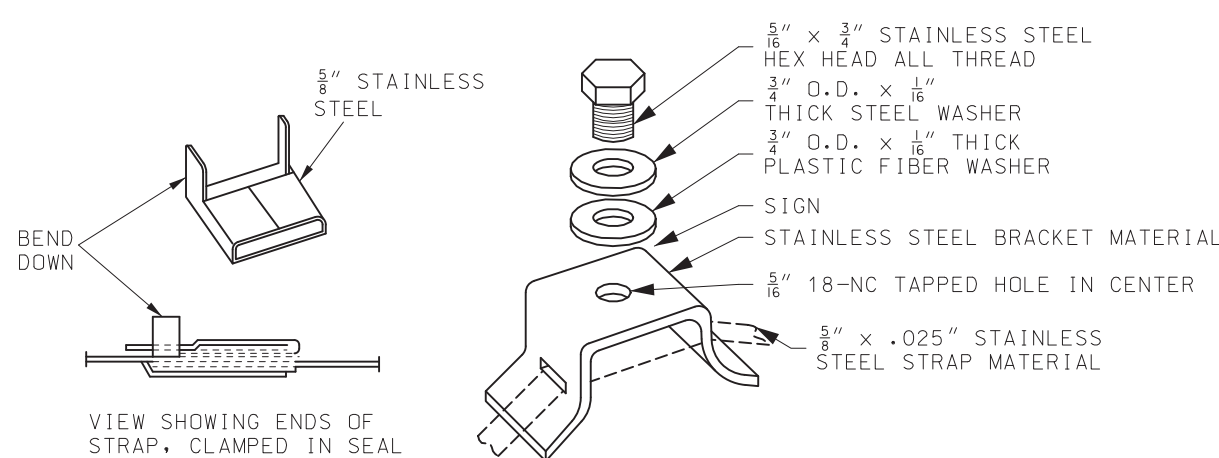
SIGN MOUNTING DETAILS PIPE POST

DATE EFFECTIVE: 4/1/2023	903.03BR	SHEET NO. 6 OF 16
DATE PREPARED: 1/6/2023		



PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS ON PIPE POST

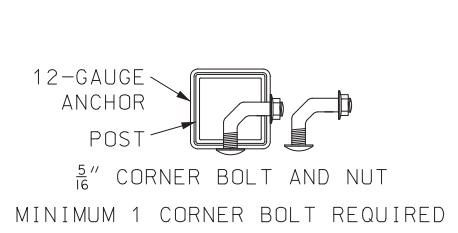


STRAP SEAL

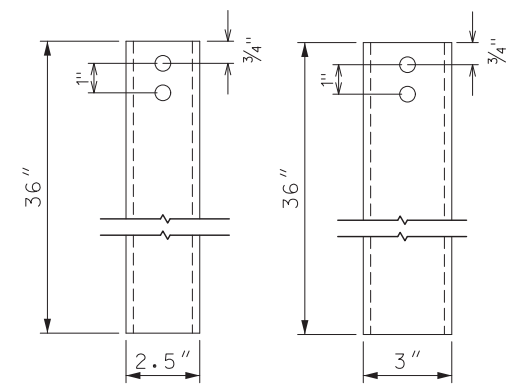
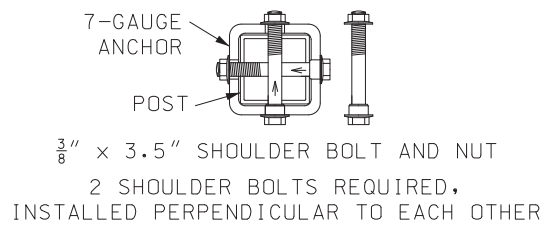
FLARED LEG SIGN BRACKET

MOUNTING DETAILS FOR FLAT SHEET SIGNS ON ROUND STRUCTURES > 4" PIPE POST

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



12-GAUGE ANCHOR  
7-GAUGE ANCHOR  
ANCHOR BOLT DETAIL



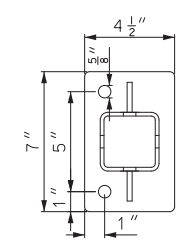
BOLT HOLE DIAMETER - 17/32"  
2 PER SIDE ON ALL 4 SIDES  
7-GAUGE ANCHOR  
FABRICATION DETAIL

ANCHOR TUBE SHALL BE 7-GAUGE  
1/2" X 4 1/2" GALVANIZED MECHANICAL FASTENERS SHALL BE USED TO ATTACH ANCHOR TO BARRIER WALL

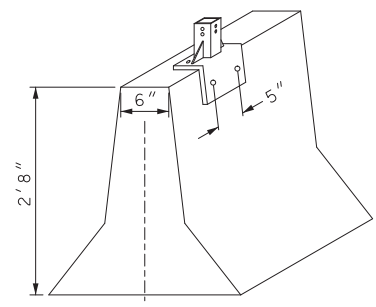
SHOULDER BOLTS SHALL BE USED TO ATTACH PSST POST TO ANCHOR (SEE ANCHOR BOLT DETAIL)

ANCHOR SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION PER SECTION 1080

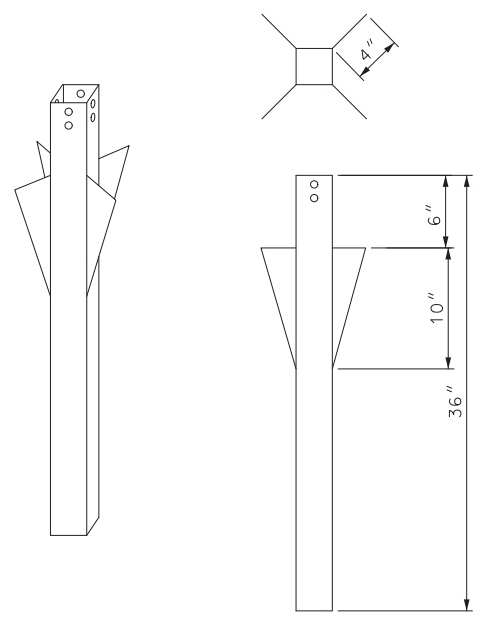
FURNISHING AND INSTALLATION OF BARRIER WALL POST ANCHOR FOR PSST SHALL BE PAID PER EACH AS CONCRETE POST ANCHOR



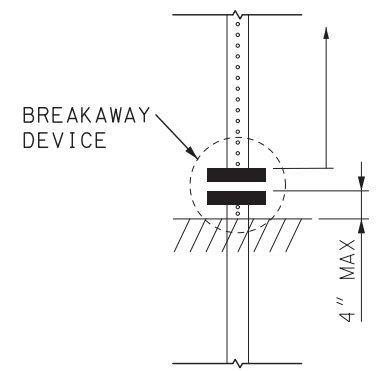
BASED ON POST SIZE, SEE 7-GAUGE ANCHOR DETAIL



BASED ON POST SIZE, SEE 7-GAUGE ANCHOR DETAIL



12-GAUGE (NOT SHOWN) OR 7-GAUGE  
OMNIDIRECTIONAL/STABILIZED DRIVEN ANCHOR DETAIL

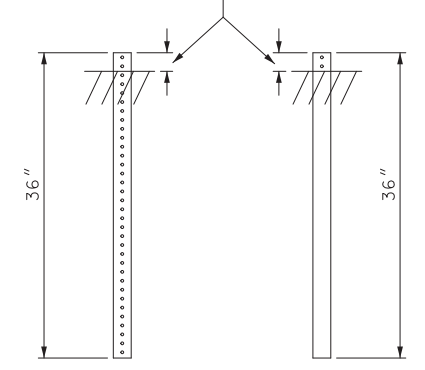


2.5" + 2.25" POST COMPRISED OF 2.5" PSST WITH 6-FT INSERT OF 2.25" PSST THAT RUNS UP FROM THE BREAKAWAY DEVICE  
THE BREAKAWAY DEVICE PORTION FIXED TO THE GROUND ANCHOR SHALL BE NO HIGHER THAN 4" ABOVE THE FINISHED GRADE

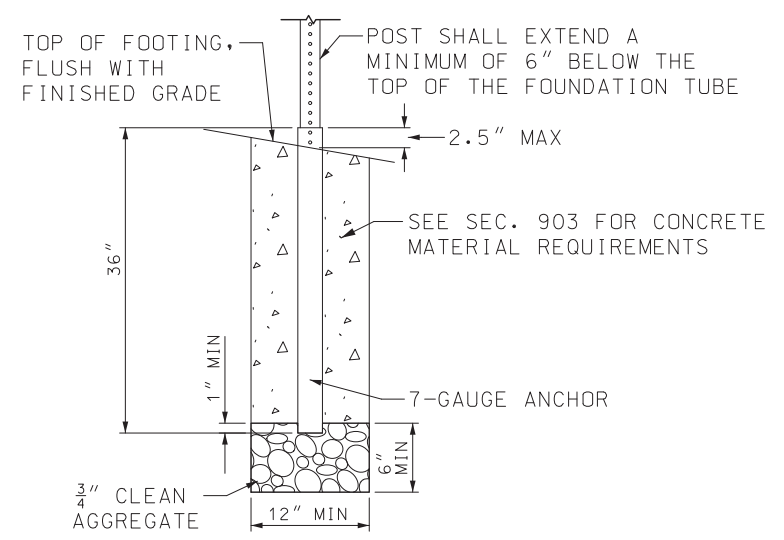
BREAKAWAY AND 2.5" + 2.25" POST DETAIL

BARRIER WALL MOUNTING DETAIL

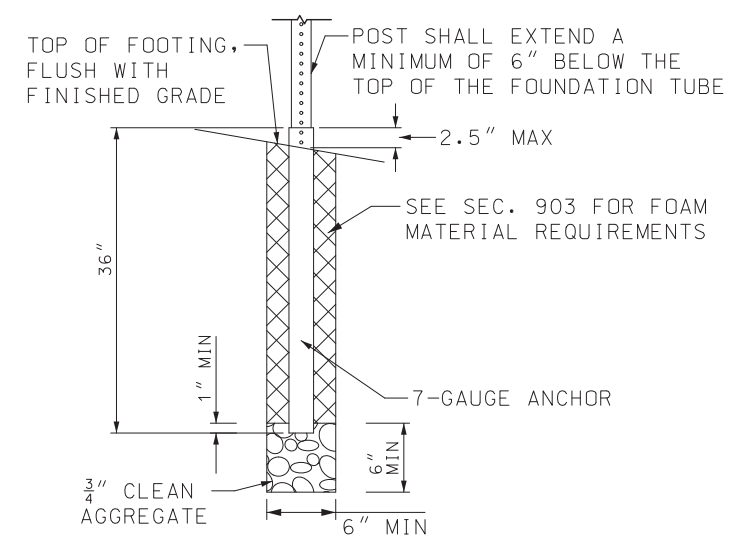
THE ANCHOR SHOULD BE A MAXIMUM OF 2.5" ABOVE THE GROUND LEVEL



12-GAUGE      7-GAUGE  
DRIVEN ANCHOR  
INSTALLATION DETAIL



CONCRETE FOOTING DETAIL



POLYURETHANE FOAM FOOTING DETAIL

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

ALL BREAKAWAY DEVICES USED ON AN INSTALLATION SHALL BE CERTIFIED NCHRP 350 COMPLIANT.

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

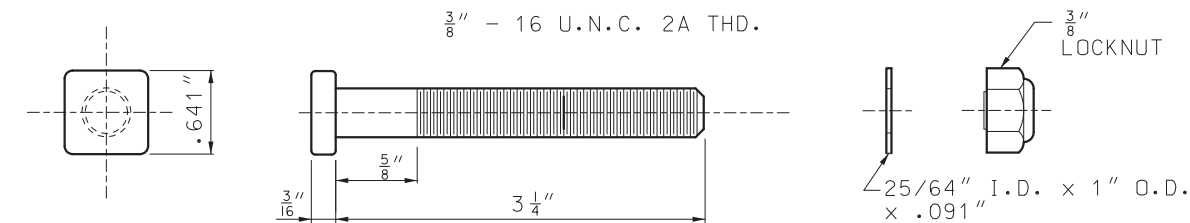
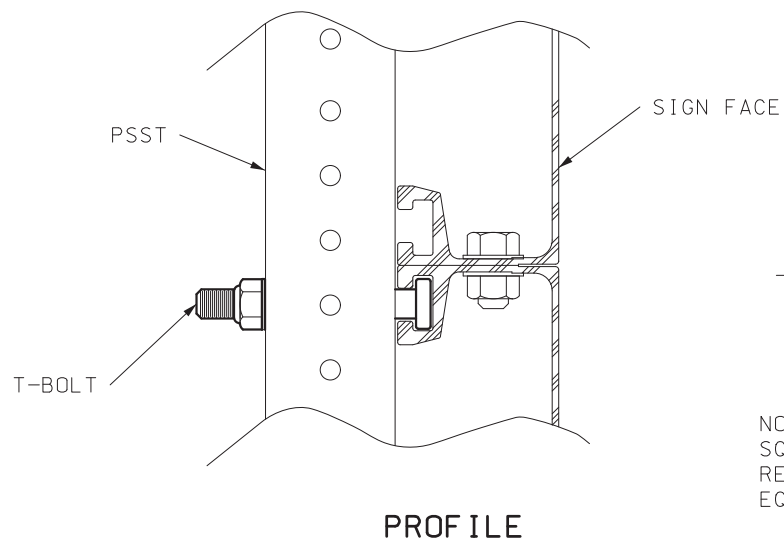
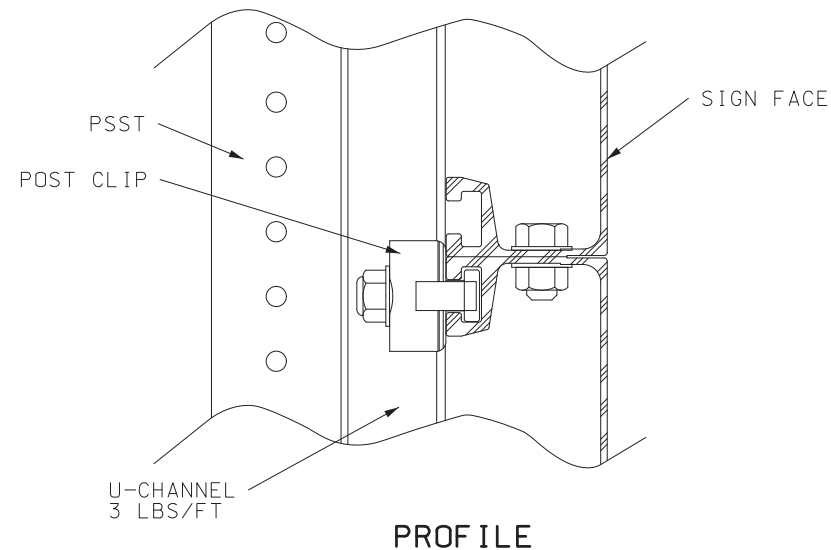
STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER  
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POST INSTALLATION  
DETAILS  
PERFORATED SQUARE  
STEEL TUBE (PSST)

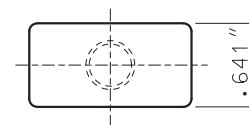
DATE EFFECTIVE: 4/1/2023	903.03BR	SHEET NO. 7 OF 16
DATE PREPARED: 1/6/2023		

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

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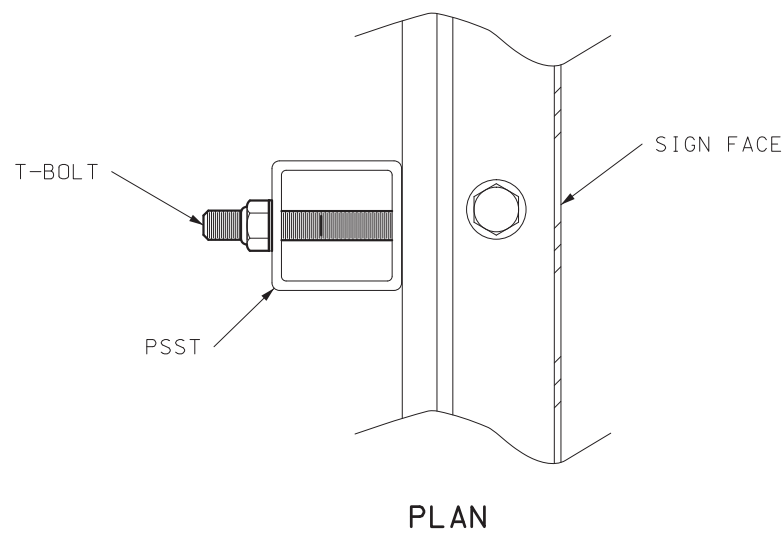
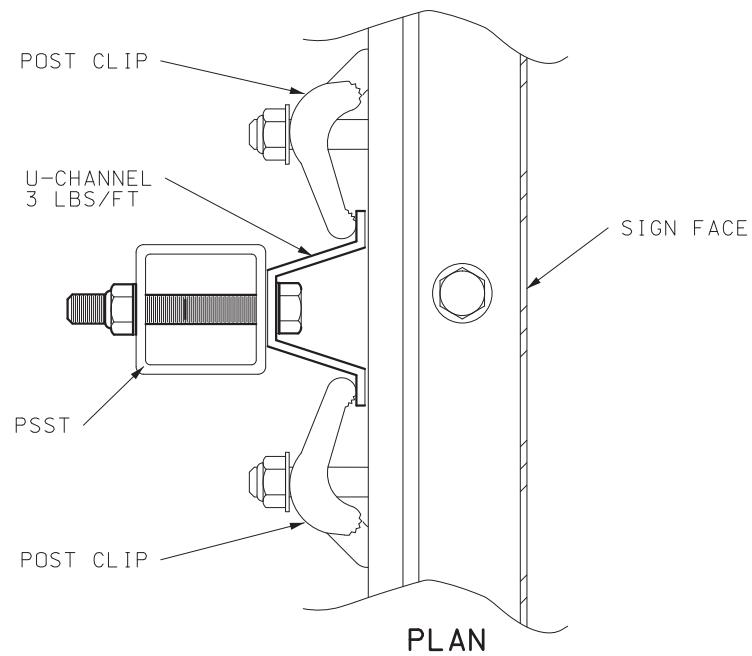
NOTE:  
SQUARE BOLT HEAD SHOWN MAY BE REPLACED WITH  
RECTANGULAR BOLT HEAD WITH THE NARROW DIMENSION  
EQUAL TO .641".



T-BOLT DETAIL

- BOLT -  $1\frac{3}{4}$  x ALUMINUM
- BOLT -  $3\frac{1}{4}$  x ALUMINUM
- HEX LOCKNUT -  $\frac{3}{8}$ " ALUMINUM
- WASHER - ALUMINUM

- NOTES:
- ALUMINUM BOLTS SHALL BE ASTM B 211, 2024-T4 OR 6061-T6
  - ALUMINUM FLAT WASHERS SHALL BE ASTM B 209, ALCLAD 2024-T4 OR 2024-T4
  - ALUMINUM LOCK NUTS (NYLON INSERT) SHALL BE ASTM B 211 OR 2017-T4



POST CLIP METHOD

T-BOLT METHOD

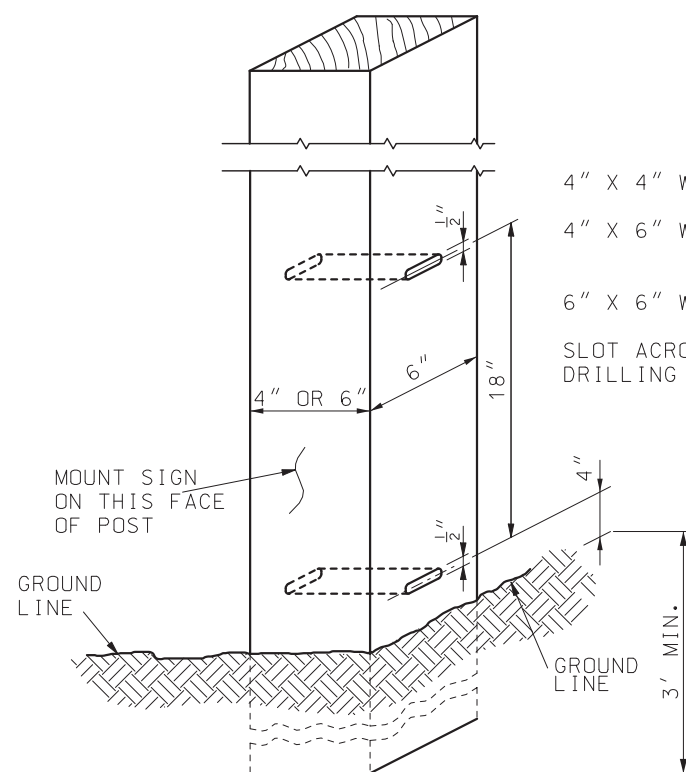
EXTRUDED PANEL MOUNTING DETAIL

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO PSST POST	
SIGN HEIGHT	NO. OF BOLTS PER PSST POST USED
1'	2
2'	3
3'	4
4'	5
5'	6
6'	7
7'	8

NOTES:

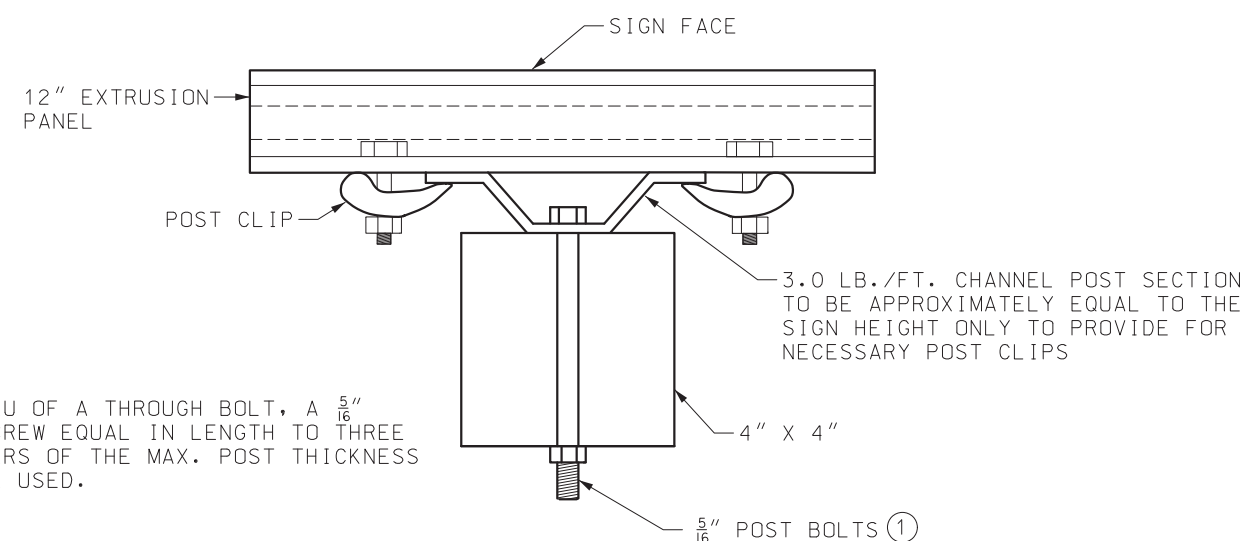
- FOR THE GENERAL NOTES, SEE SHEET 1 OF 16.
- FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.
- FOR POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.
- ALTERNATE PSST MOUNTING HARDWARE USE SHALL BE ON APPROVED LIST.

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	<b>SIGN MOUNTING DETAILS</b> <b>PERFORATED SQUARE STEEL TUBE (PSST)</b>	
	DATE EFFECTIVE: 4/1/2023 DATE PREPARED: 1/6/2023	<b>903.03BR</b> SHEET NO. 8 OF 16



4" X 4" WOOD POST - NO SLOTS OR HOLES REQUIRED  
 4" X 6" WOOD POST - 1 1/2" X 1/2" SLOT ON 6" SIDE OR 1 1/2" DIA. HOLE ON 6" SIDE  
 6" X 6" WOOD POST - 2" X 1/2" SLOT OR 2" DIA. HOLE  
 SLOT ACROSS NEUTRAL AXIS FORMED BY SUCCESSIVE DRILLING WITH 1/2" BIT.

WOOD POST DETAIL

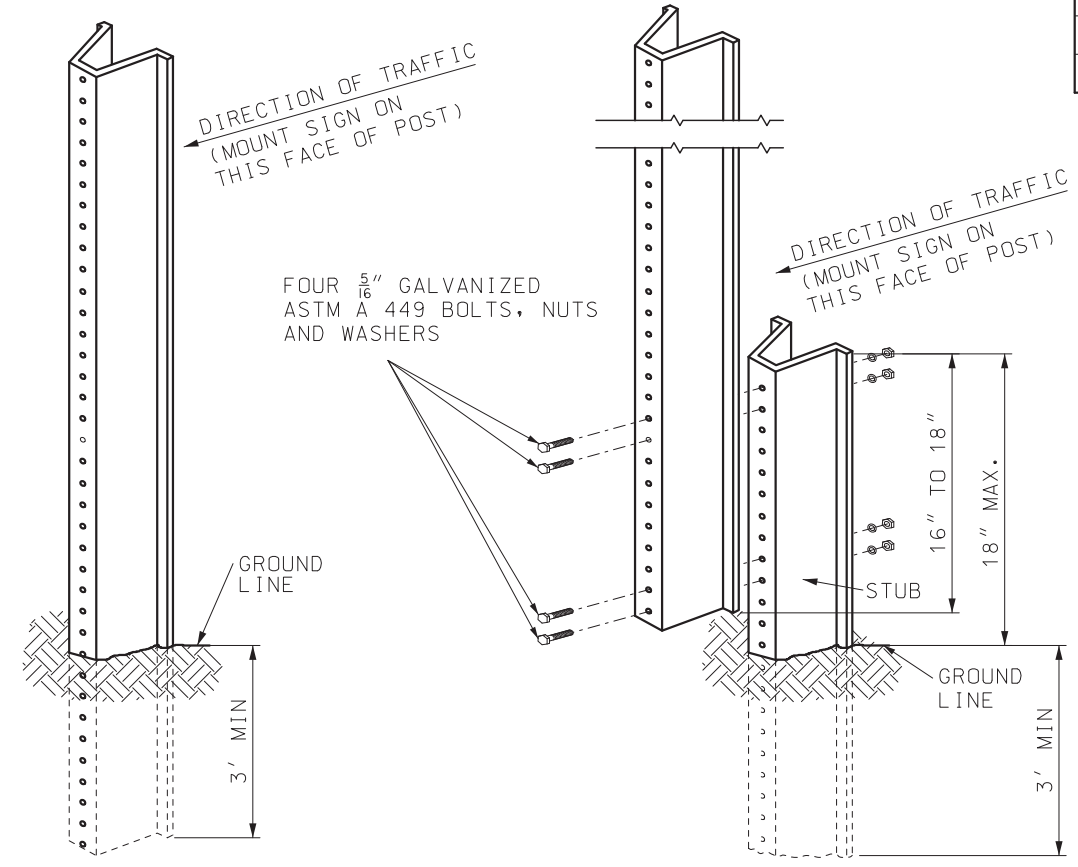


① IN LIEU OF A THROUGH BOLT, A 5/16" LAG SCREW EQUAL IN LENGTH TO THREE QUARTERS OF THE MAX. POST THICKNESS MAY BE USED.

PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS ON WOOD POST

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO WOOD POST	
SIGN HEIGHT	NO. OF BOLTS PER WOOD POST USED
1'	2
2'	3
3'	4
4'	5
5'	6
6'	7
7'	8



U-CHANNEL POST-STUB DETAIL

U-CHANNEL POST DETAIL OPTIONAL INSTALLATION

NOTES:

- FOR GENERAL NOTES, SEE SHEET 1 OF 16.
- ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET INTO THE GROUND.
- U-CHANNEL POST-STUB OVERLAP SHALL BE POSITIONED ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.
- FOR POST SIZING SEE ENGINEERING POLICY GUIDE.
- FOR POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.
- FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

SIGN AREA (SQ.FT.)	POST TYPE	
	U-CHANNEL	WOOD
≤ 10	1 - 3.0 LB./FT.*	1 - 4" X 4"*
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4" 1 - 4" X 6"*
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"
> 24 ≤ 30	3 - 3.0 LB./FT.	2 - 4" X 6"
> 30 ≤ 50	N/A	2 - 6" X 6"

\* SIGNS GREATER THAN 4 FEET IN WIDTH REQUIRE TWO POSTS, EXCEPT DIAMOND SHAPED WARNING SIGNS, YIELD SIGNS, AND ONE WAY SIGNS.

POST SIZE REQUIREMENTS

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**SIGN MOUNTING DETAILS**

WOOD AND U-CHANNEL POST

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

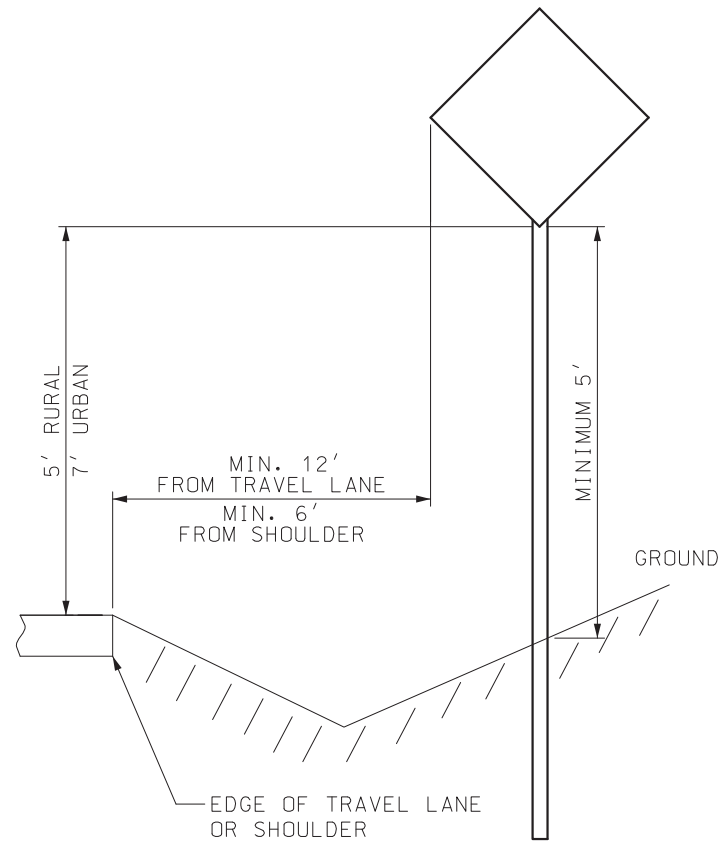
DATE EFFECTIVE: 4/1/2023

DATE PREPARED: 1/6/2023

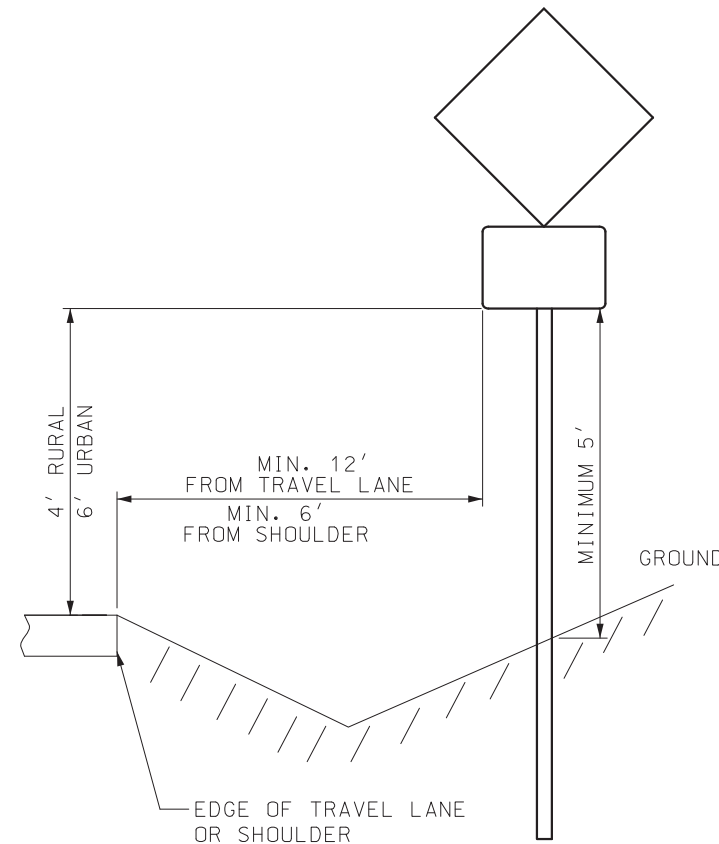
903.03BR

SHEET NO.  
9 OF 16

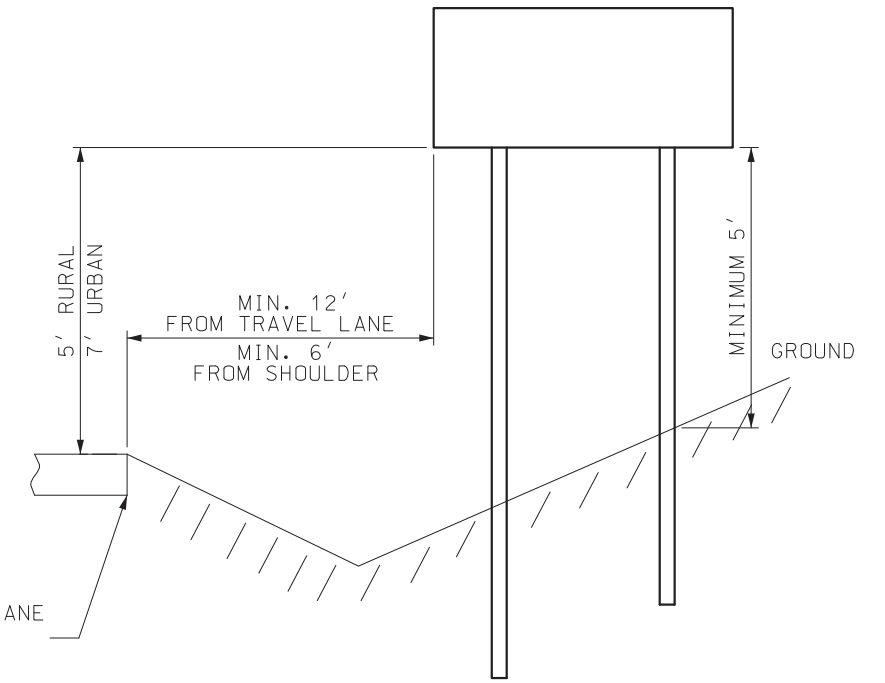
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



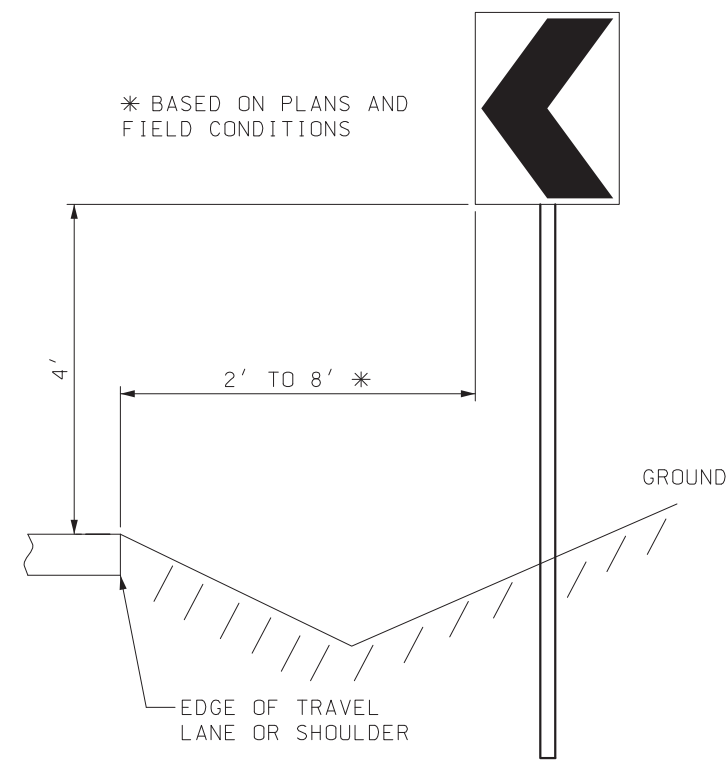
ONE POST - SINGLE SIGN



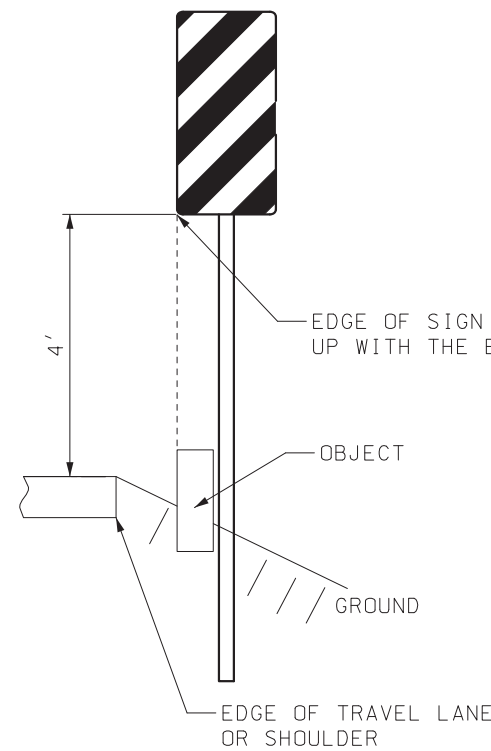
ONE POST - SINGLE SIGN WITH SUPPLEMENTAL PLAGUE



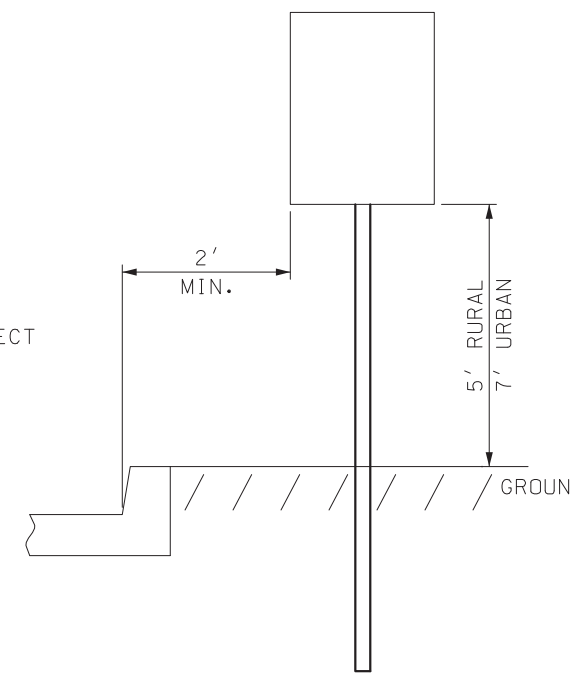
TWO POST



CHEVRON SIGN



TYPE III OBJECT MARKER



ADJACENT TO CURB

GENERAL NOTES:

SIGN MOUNTING BOLTS SHALL BE INSTALLED WITH A NYLON WASHER AGAINST THE SIGN FACE WITH A STEEL WASHER BETWEEN THE NYLON WASHER AND BOLT HEAD.

A LOCKNUT SHALL BE USED TO FASTEN THE SIGN TO THE POST.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 5' MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

HORIZONTAL OFFSET MAY BE ADJUSTED BASED ON FIELD CONDITIONS.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
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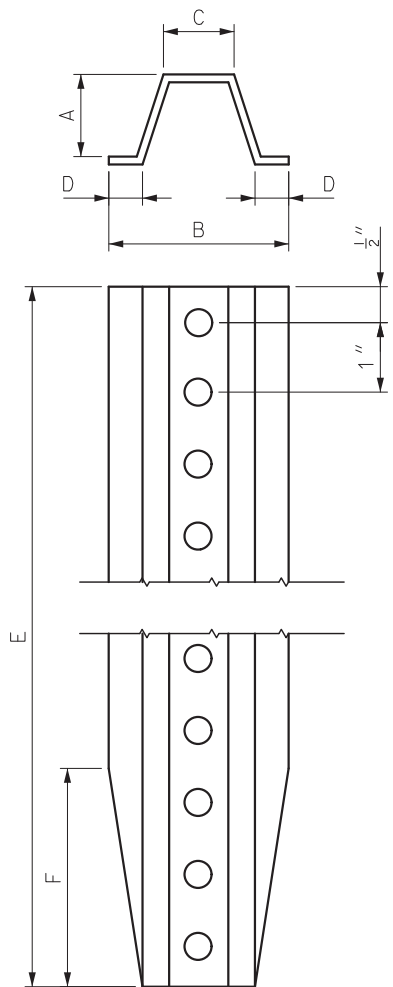
STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**SIGN MOUNTING DETAILS**  
 MOUNTING HEIGHT & OFFSET  
 PIPE POSTS, PSST, WOOD  
 & U-CHANNEL POSTS

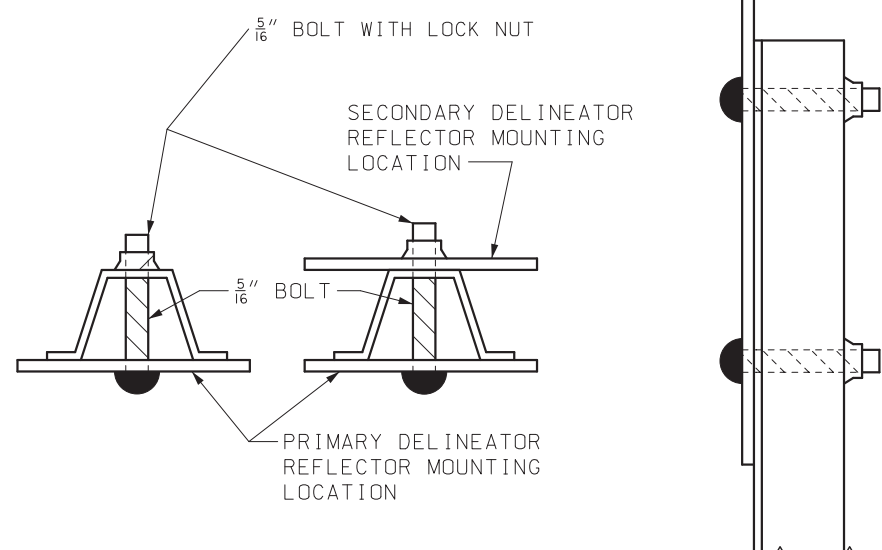
DATE EFFECTIVE:	4/1/2023	903.03BR	SHEET NO. 10 OF 16
DATE PREPARED:	1/6/2023		

**MOUNTING HEIGHT DETAILS**

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



GROUND MOUNT U-CHANNEL

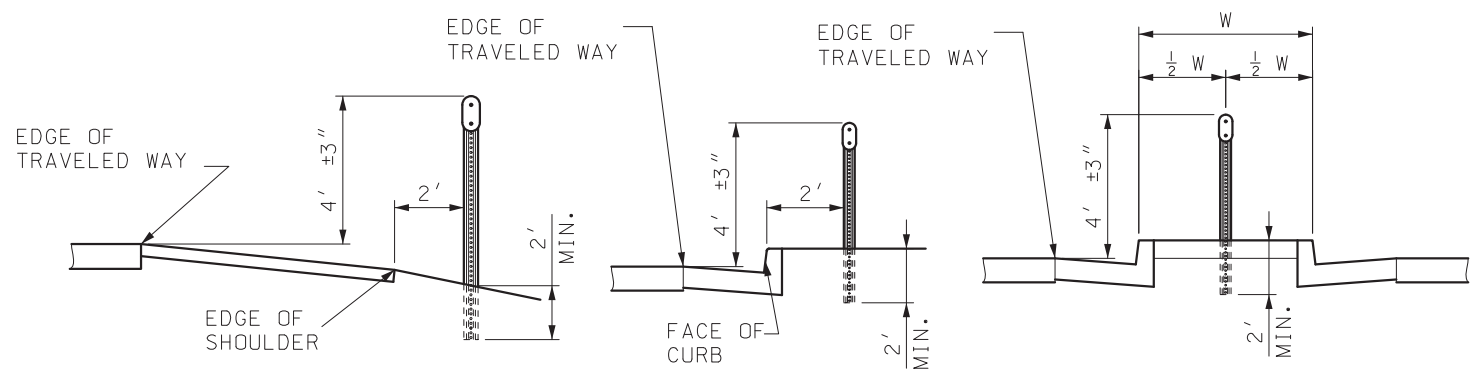


HOLE PUNCHING TO EQUAL 3/8" DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.

LIMITS		CHANNEL POST DELINEATOR						
	LBS/FT (2)	DIMENSIONS - INCHES						
		A	B	C	D	E	F	
NOMINAL	1.12	1	2 1/4	7/8	3/8	84	1	
TOLERANCE	± 5%	± 1/8	± 1/8	± 1/8	± 1/8	± 1	± 1/4	

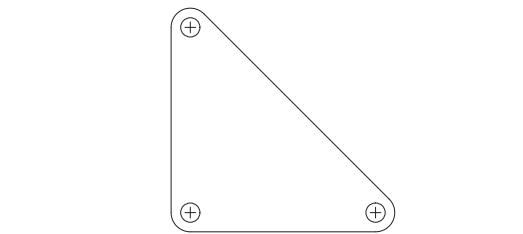
(2) WEIGHT BEFORE GALVANIZING OR PUNCHING.  
THE CHANNEL POST FOR DELINEATORS SHALL BE MANUFACTURED FROM DUCTILE ASTM A 36 OR ASTM A 1011 GR 60.

CHANNEL POST DELINEATOR AND FASTENER DETAILS

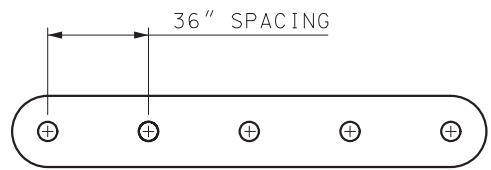


SHOULDER MOUNTED      OUTSIDE BARRIER CURB      NARROW PAVED MEDIAN

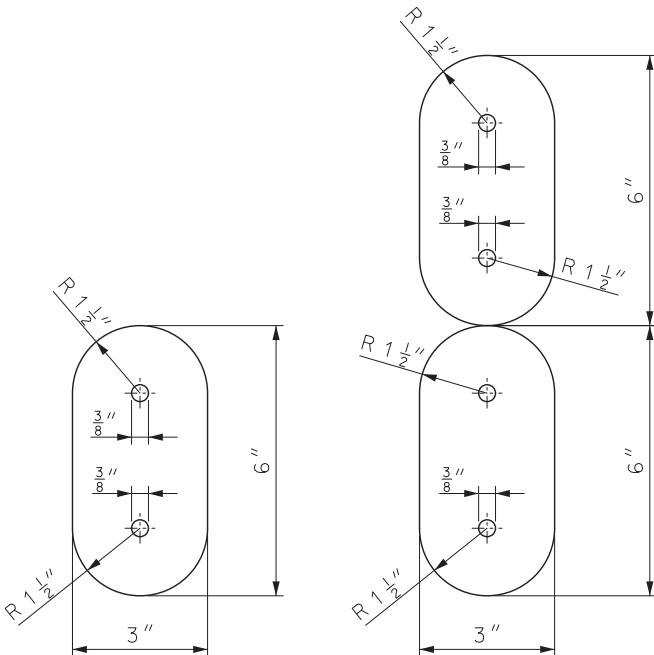
CHANNEL POST DELINEATOR MOUNTING DETAILS



DELINEATOR PLACEMENT LOCATED AT THE RADIUS POINTS  
TUBULAR DELINEATOR PLACEMENT FOR ISLANDS

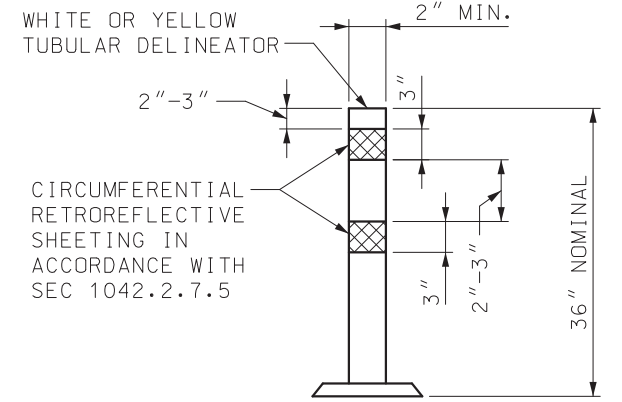


DELINEATOR PLACEMENT FOR MEDIAN STRIPS



SINGLE      DOUBLE STACKED

CHANNEL POST DELINEATOR REFLECTOR



36 INCH SURFACE-MOUNT DELINEATOR POST  
TUBULAR DELINEATOR DETAIL

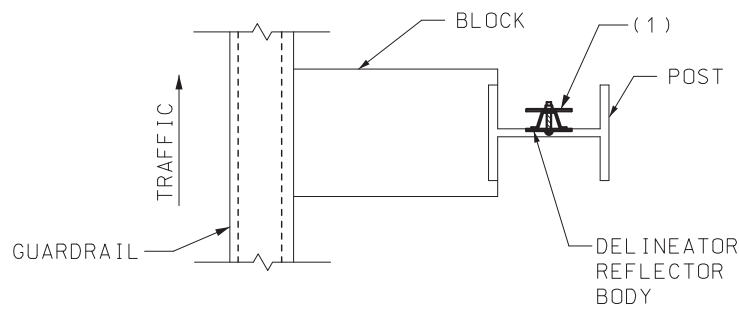
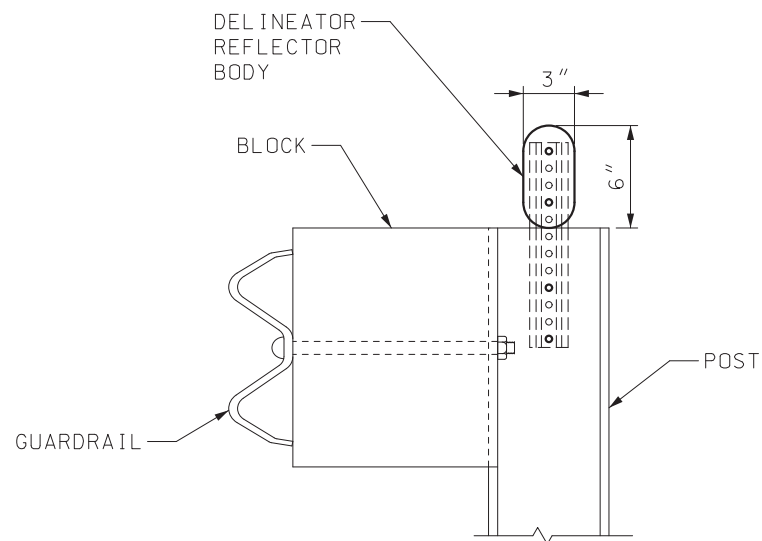
COLOR OF TUBULAR DELINEATOR AND REFLECTIVE SHEETING SHALL MATCH THE COLOR OF THE CLOSEST PAVEMENT MARKING OR CURB MARKING.  
TUBULAR DELINEATOR SHAPE MAY BE ROUND OR T-SHAPED. TUBULAR DELINEATOR SHALL BE PERMANENTLY MOUNTED TO THE PAVEMENT SURFACE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

NOTES:  
RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH SEC 1042.2.7.5 SHALL BE APPLIED TO ONLY ONE SIDE OF THE DELINEATOR REFLECTOR BODY.  
THE COLOR OF THE SHEETING SHALL CORRESPOND TO THE CLOSEST ADJACENT PAVEMENT MARKING.  
3" X 6" DELINEATOR BODY SHALL BE MADE FROM 0.080 INCH ALUMINUM.

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p><b>SIGN MOUNTING DETAILS DELINEATORS</b></p>
<p>DATE EFFECTIVE: 7/1/2023 DATE PREPARED: 4/4/2023</p>	<p>903.03BR</p>
<p>SHEET NO. 11 OF 16</p>	

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

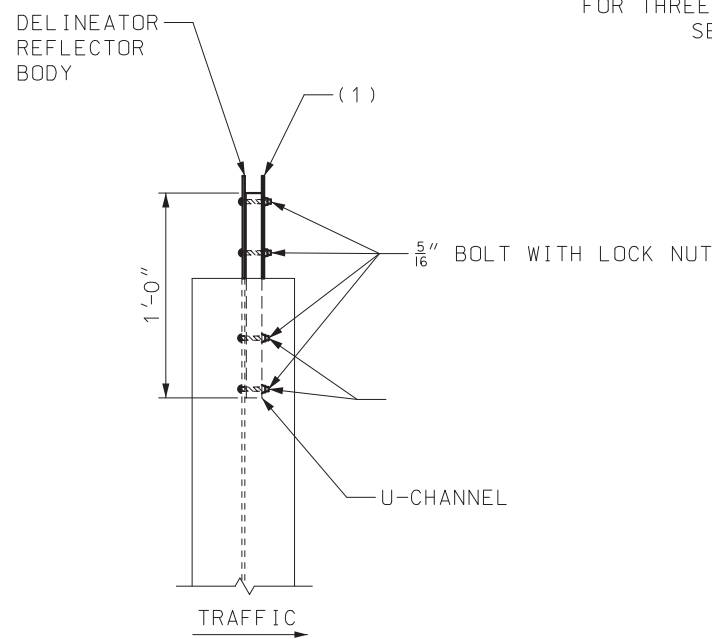




**DELINEATORS ON GUARDRAIL**

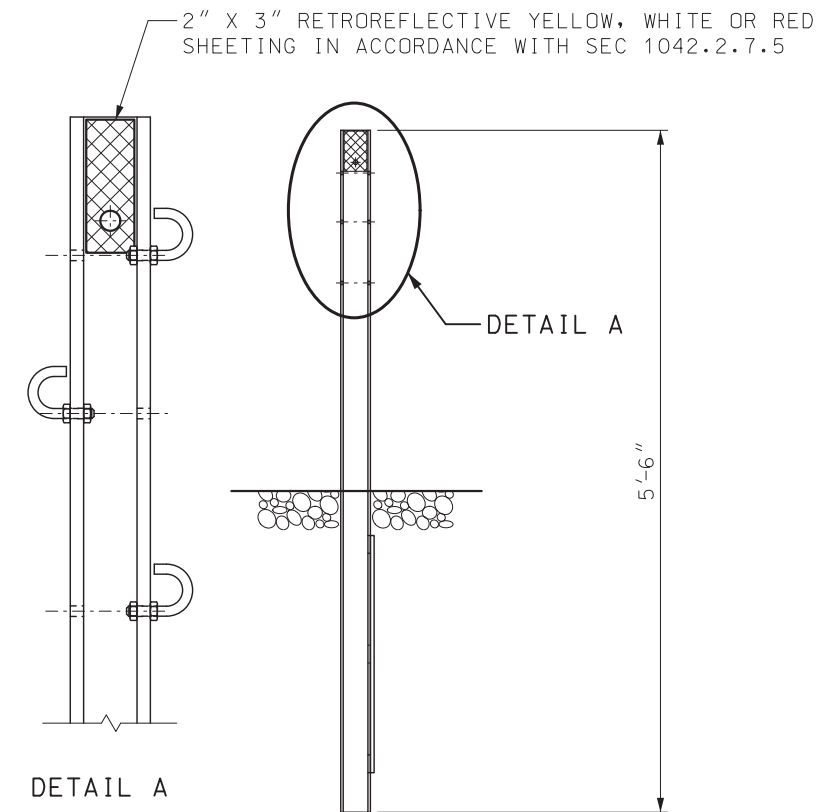
FOR GUARDRAIL DETAILS, SEE STD PLANS 606.00 AND 606.50.

(1) A SECONDARY DELINEATOR WITH RED SHEETING SHALL BE ATTACHED TO THE BACK SIDE OF THE CHANNEL WHEN THE DELINEATION IS PLACED ALONG AN INTERCHANGE RAMP AND COULD BE VIEWED BY WRONG WAY TRAFFIC.



**DELINEATORS ON THREE-STRAND MEDIAN GUARD CABLE**

FOR THREE-STRAND GUARD CABLE DETAILS SEE STD PLANS 606.41.



**NOTES:**

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

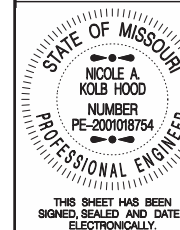
RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH SEC 1042.2.7.5 SHALL BE APPLIED TO ONLY ONE SIDE OF THE DELINEATOR REFLECTOR BODY.

THE COLOR OF THE SHEETING SHALL CORRESPOND TO THE CLOSEST ADJACENT PAVEMENT MARKING.



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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



DATE EFFECTIVE: 7/1/2023  
DATE PREPARED: 4/4/2023

**SIGN MOUNTING DETAILS  
GUARDRAIL AND GUARDCABLE  
DELINEATORS**

**903.03BR**

SHEET NO.  
13 OF 16



DELINEATOR SPACING ON HORIZONTAL CURVES

RADIUS OF CURVE (FEET)	SPACING ON CURVE (FEET)	SPACING IN ADVANCE & BEYOND CURVE (FEET)		
		1ST	2ND	3RD
50	20	40	65	100
150	30	60	90	100
200	35	70	100	100
250	40	85	100	100
300	50	95	100	100
400	55	100	100	100
500	65	100	100	100
600	70	100	100	100
700	75	100	100	100
800	80	100	100	100
900	85	100	100	100
1000	90	100	100	100

"S" SPACING ON CURVE =  $\sqrt[3]{R-50}$  OR MAY BE INTERPOLATED FROM TABLE.  
MINIMUM SPACING = 20 FEET.

SPACING OF FIRST DELINEATOR IN ADVANCE OF AND BEYOND CURVE =  $2 \times S$ , THE SECOND =  $3 \times S$ , AND THE THIRD =  $6 \times S$ , BUT NOT TO EXCEED 100 FEET. MAXIMUM SPACING = 100 FEET.

DELINEATORS SHALL BE INSTALLED FACING APPROACHING TRAFFIC. YELLOW DELINEATORS SHOULD BEGIN EVEN WITH THE GORE EXIT SIGN AND END 60 FEET FROM THE GORE POINT. WHITE DELINEATORS SHOULD EXTEND BEYOND THE FIRST YELLOW DELINEATOR. RED DELINEATORS SHOULD BE PLACED ON THE BACK SIDE OF EITHER THE WHITE OR YELLOW DELINEATOR POSTS WHEN APPLICABLE. RED DELINEATORS ARE TYPICALLY INSTALLED WHERE VEHICLES MAY ACCIDENTALLY TRAVEL DOWN THE RAMP BACKWARDS AND MOUNTED FACING AWAY FROM NORMAL TRAFFIC FLOW.

CHANNEL POST DELINEATORS SHALL BE OMITTED ON SECTIONS WHERE GUARDRAIL IS PRESENT. THESE PORTIONS SHALL BE DELINEATED UTILIZING THE GUARDRAIL DELINEATORS. IN AREAS WHERE RED DELINEATORS ARE INDICATED, RED RETROREFLECTIVE SHEETING WILL BE PLACED ON THE BACK SIDE OF THE GUARDRAIL DELINEATOR.

RETROREFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.

TYPICAL DIAMOND EXIT RAMP

TYPICAL DIAMOND ENTRANCE RAMP  
TYPICAL INTERCHANGE

**NOTES:**

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

THE CONTRACT UNIT PRICE FOR EACH CHANNEL POST DELINEATOR SHALL INCLUDE THE REFLECTOR, FASTENERS AND POST.

- (1) USE YELLOW DOUBLE STACKED DELINEATORS FOR LEFT HAND ACCEL/DECEL LANES.
- (2) DELETE IF EMERGENCY REFERENCE MARKERS ARE USED.
- (3) EXTENT OF DELINEATION ON ROUTES WITH EMERGENCY REFERENCE MARKERS.
- (4) ON ROUTES WITHOUT EMERGENCY REFERENCE MARKERS DELINEATORS SHALL BE INSTALLED BETWEEN INTERCHANGES EVERY 528'.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**SIGN MOUNTING DETAILS  
INTERCHANGE DELINEATION**

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

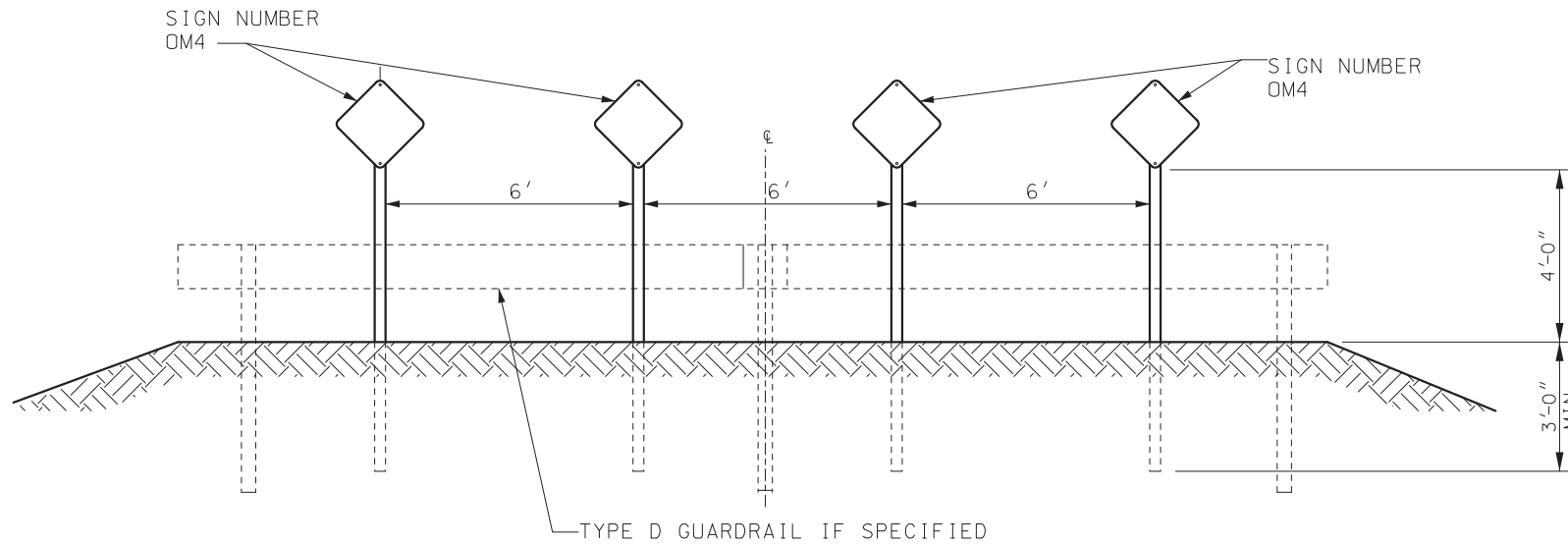
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 7/1/2023  
DATE PREPARED: 4/4/2023

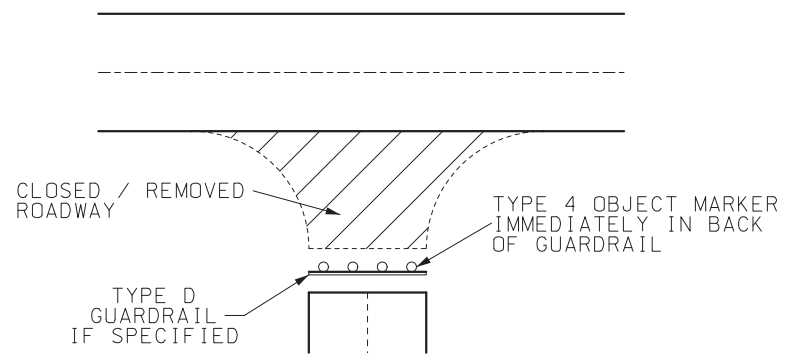
**903.03BR**

SHEET NO.  
14 OF 16

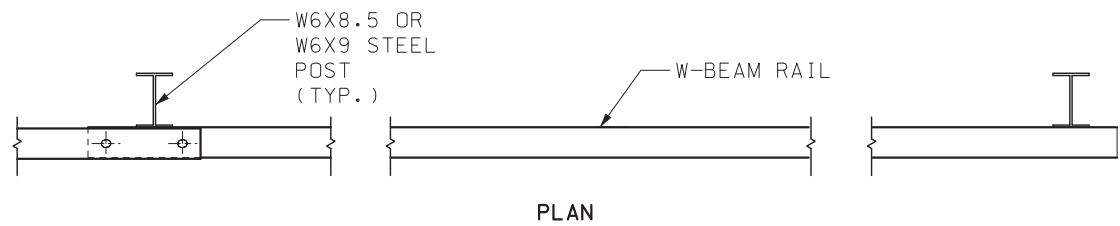
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



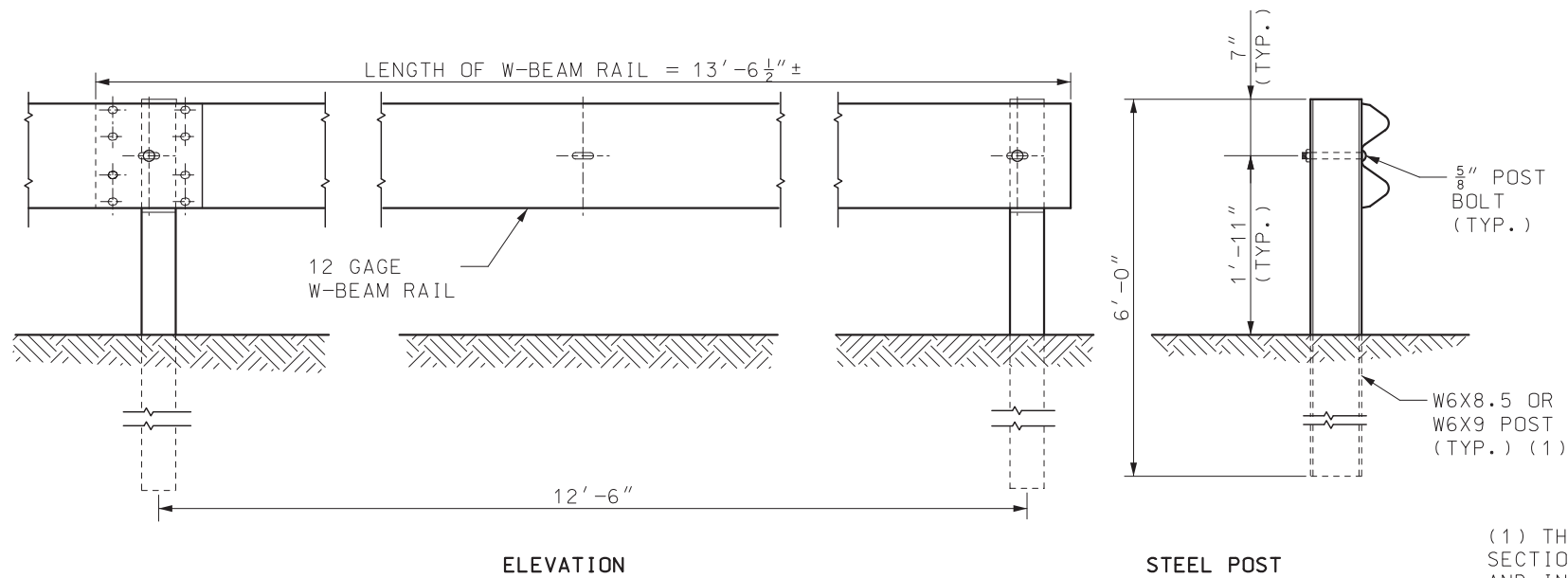
**TYPE 4 OBJECT MARKER INSTALLATION**



**TYPICAL ROAD CLOSURE**



**PLAN**



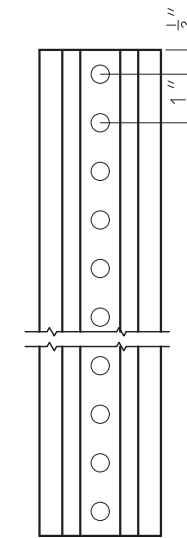
**ELEVATION**

**STEEL POST**

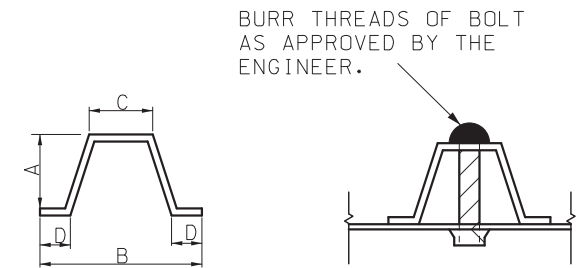
**TYPE D GUARDRAIL**

(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SEC 1040.

STEEL OBJECT MARKER POST					
LIMITS	LBS/FT (2)	DIMENSIONS - INCHES			
		A	B	C	D
MIN.	2.40	1 1/4	2 1/2	1	1/2
MAX.	2.80	1 5/8	3 1/4	1 3/8	3/4



(2) WEIGHT BEFORE GALVANIZING OR PUNCHING. LIMITS SHOWN ARE ABSOLUTE. NO FURTHER WEIGHT, DIMENSIONAL OR COMMERCIAL TOLERANCE WILL BE ACCEPTABLE.



HOLE PUNCHING TO EQUAL 3/8" DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.

**OBJECT MARKER POST AND FASTENER DETAILS**

**NOTES:**

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

TYPE D GUARDRAIL IS ACCESS RESTRAINT AND VISUAL TARGET VALUE ONLY. IT HAS NO REDIRECTIVE CAPABILITY.

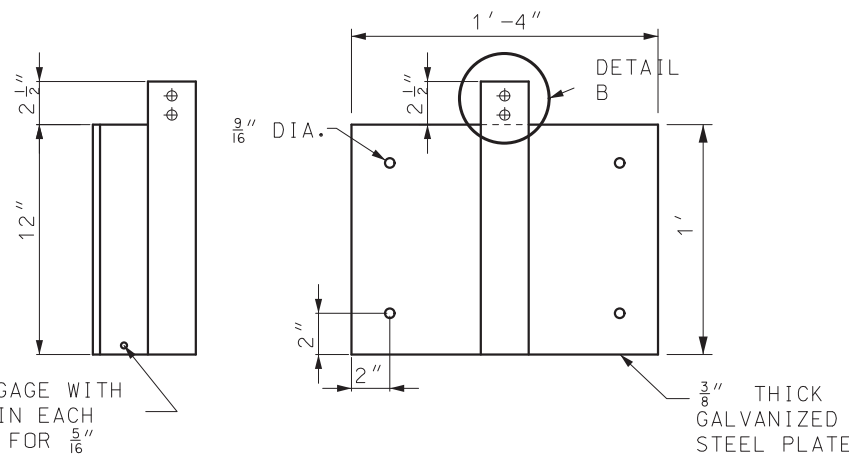
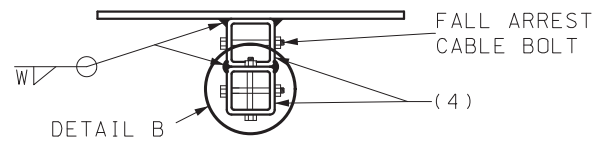
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**SIGN MOUNTING DETAILS  
 OBJECT MARKERS FOR  
 ROAD CLOSURE**

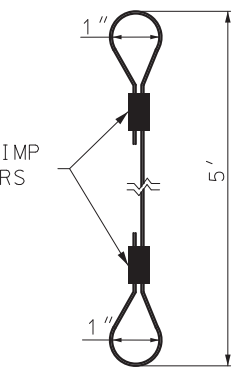
DATE EFFECTIVE:	4/1/2023	903.03BR	SHEET NO. 15 OF 16
DATE PREPARED:	1/6/2023		

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

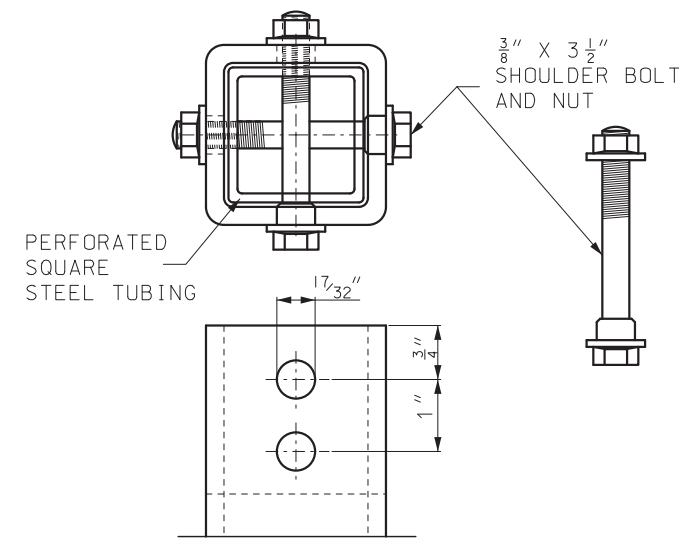


2 1/2" X 2 1/2" 7 GAGE WITH 17/32" DIA HOLE IN EACH SIDE OF TUBE FOR 5/16" THROUGH BOLT TO RETAIN FALL ARREST CABLE

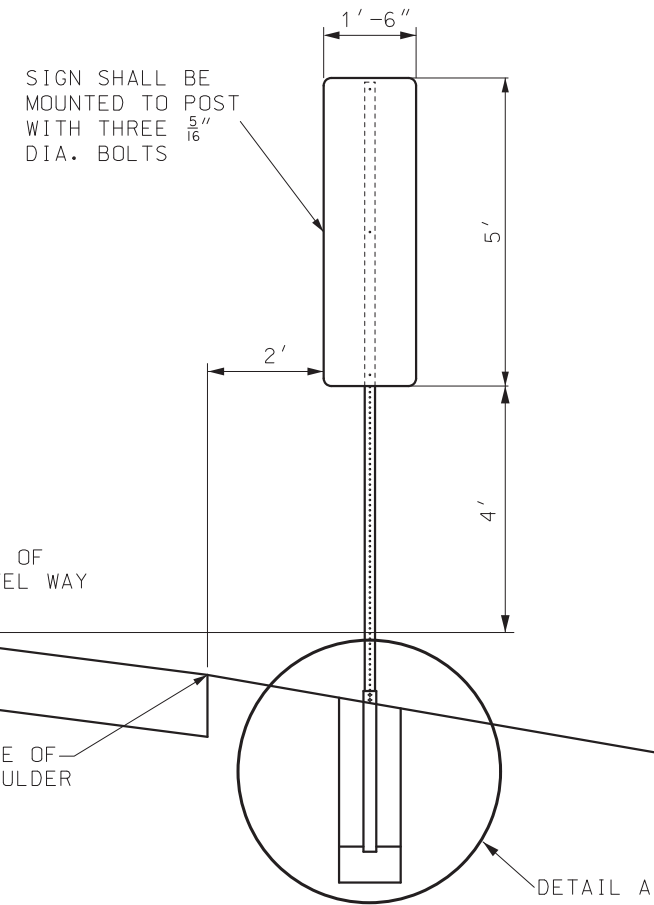
MOUNTING PLATE DETAIL



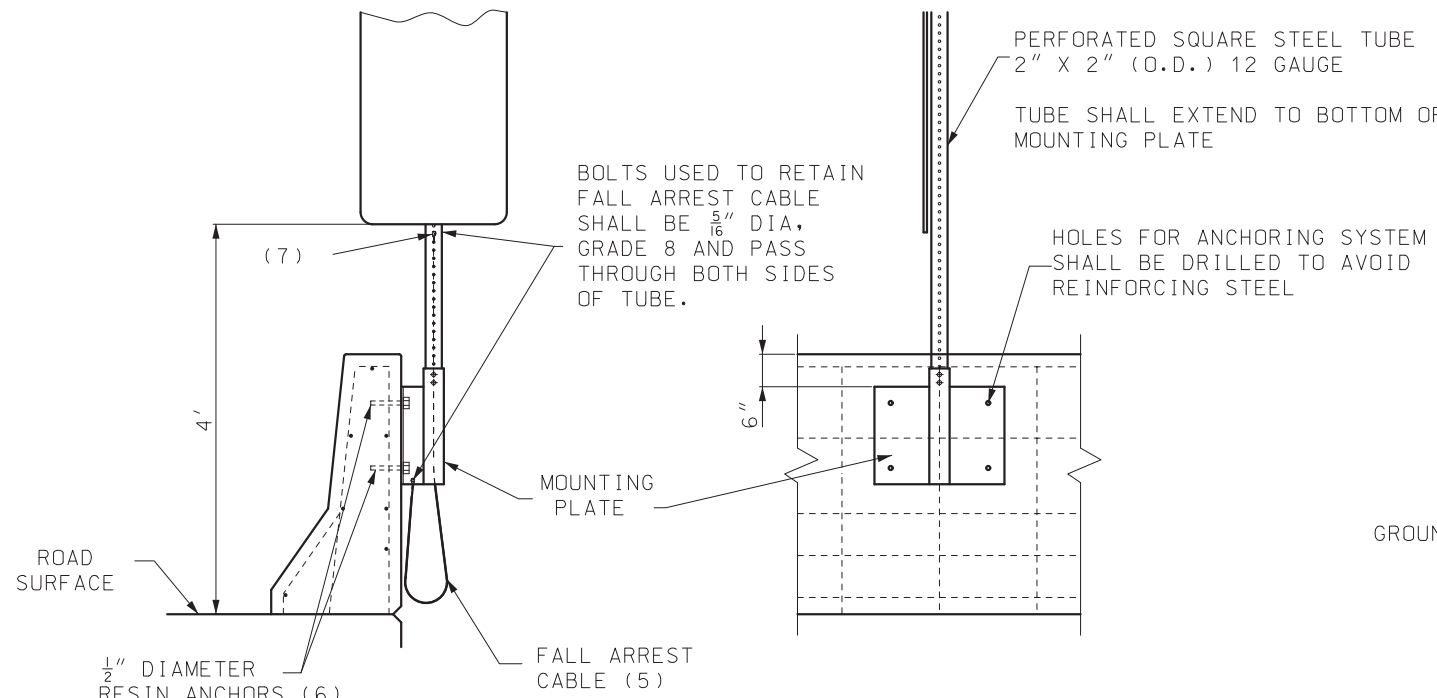
FALL ARREST CABLE DETAIL



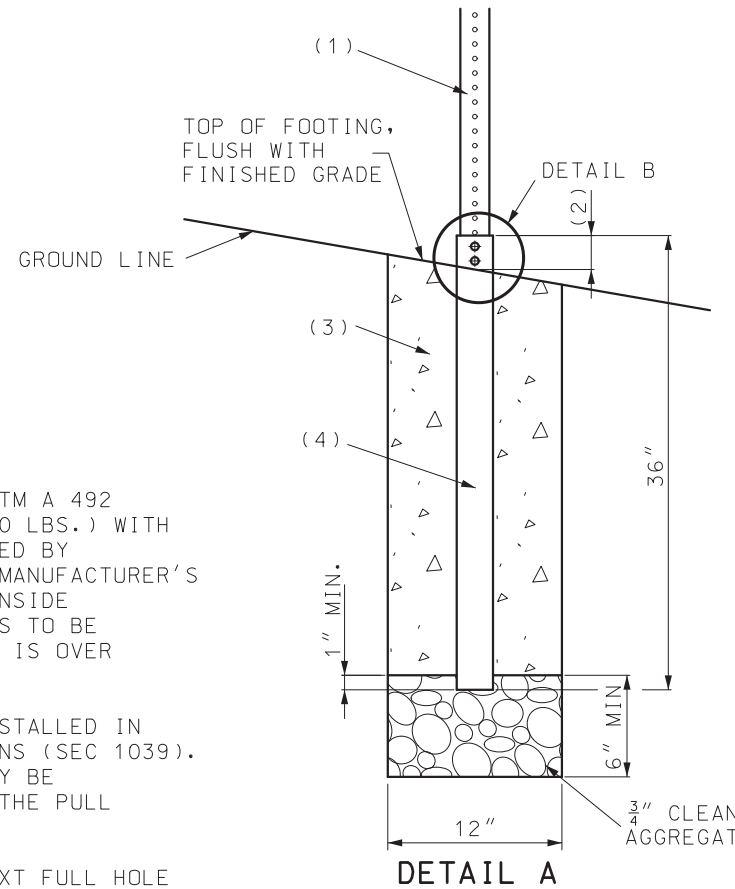
DETAIL B SHOULDER BOLT



GROUND INSTALLATION



BARRIER WALL INSTALLATION



DETAIL A

NOTES:

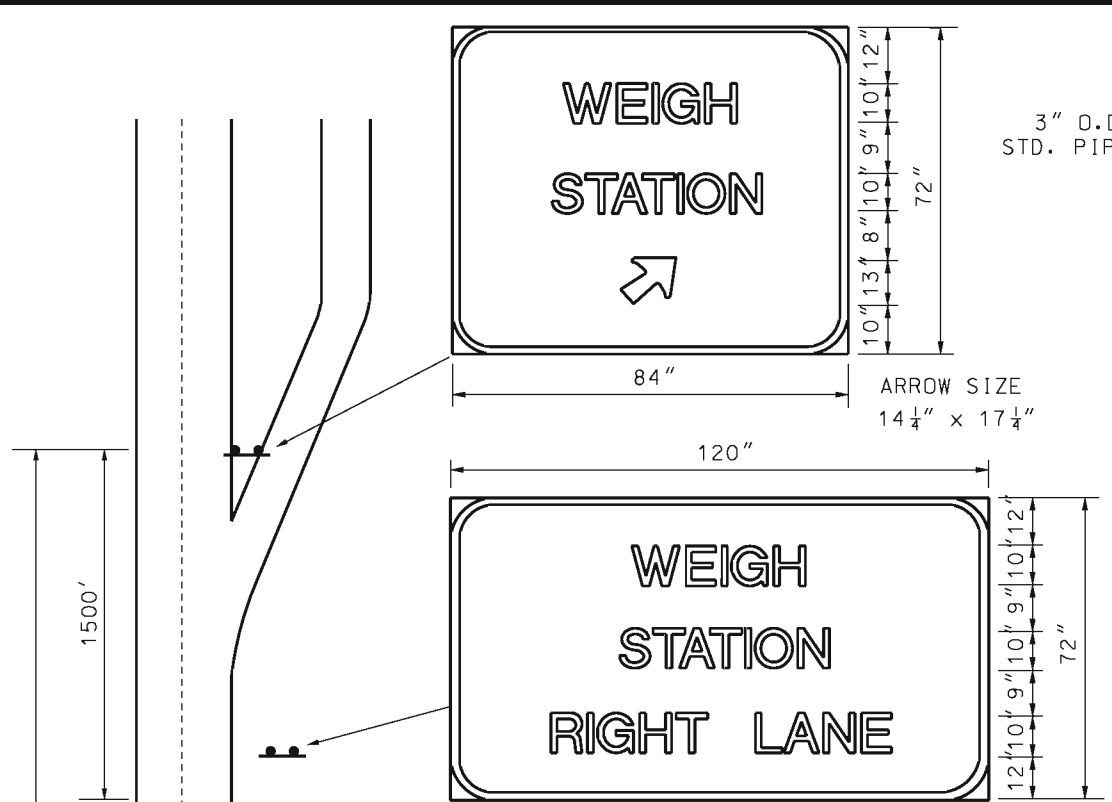
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

PERFORATED SQUARE STEEL TUBE SHALL BE SECURED TO FOUNDATION TUBE OR BARRIER WALL MOUNTING PLATE WITH A SHOULDER BOLT PER PERFORATED SQUARE STEEL TUBE MANUFACTURER'S SPECIFICATION.

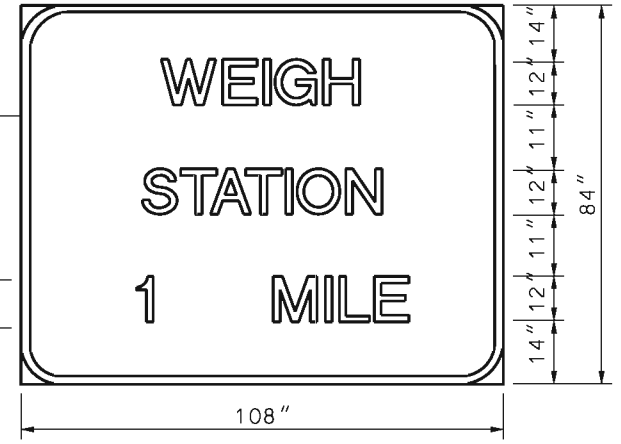
- (1) PERFORATED SQUARE STEEL TUBE 2" X 2" (O.D.) 12 GAUGE. TUBE SHALL EXTEND A MINIMUM OF 6" BELOW THE TOP OF THE FOUNDATION TUBE.
- (2) TUBE TO EXTEND ABOVE FOUNDATION ONLY ENOUGH TO ALLOW BOLT TO BE INSERTED 2 1/2" MAXIMUM.
- (3) SEE SEC 903 FOR CONCRETE MATERIAL REQUIREMENTS.
- (4) 2 1/2" X 2 1/2" (O.D.) SQUARE TUBE GALVANIZED 7 GAGE WITH TWO 17/32" DIAMETER HOLES IN EACH FACE 3/4" BELOW TOP OF TUBE.
- (5) 1/8" X 5' LONG STAINLESS STEEL CABLE (ASTM A 492 TYPE 304 MINIMUM BREAKING STRENGTH 200 LBS.) WITH A 1" DIA. LOOP AT EACH END LOOPS FORMED BY MECHANICAL CRIMP TYPE CONNECTION PER MANUFACTURER'S SPECIFICATIONS. CABLE IS TO BE RUN INSIDE PERFORATED SQUARE STEEL TUBE. CABLE IS TO BE USED ONLY WHEN SIGN MOUNTING LOCATION IS OVER ANOTHER TRAVELED WAY.
- (6) 1/2" DIAMETER RESIN ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD SPECIFICATIONS (SEC 1039). AN APPROVED MECHANICAL TYPE ANCHOR MAY BE USED IF THE DEVICE EQUALS OR EXCEEDS THE PULL TEST REQUIREMENTS OF SEC. 1039.
- (7) FALL ARREST CABLE TO BE SECURED TO NEXT FULL HOLE BELOW SIGN

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>SIGN MOUNTING DETAILS</b></p> <p><b>EMERGENCY REFERENCE MARKERS</b></p>
<p>DATE EFFECTIVE: 4/1/2023</p> <p>DATE PREPARED: 1/6/2023</p>	<p>903.03BR</p> <p>SHEET NO. 16 OF 16</p>

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



NOTE: CHANGEABLE "OPEN/CLOSE" AND "BUSES WEIGH" SIGNS MOUNTED BELOW THIS SIGN. SEE DETAILS THIS SHEET.

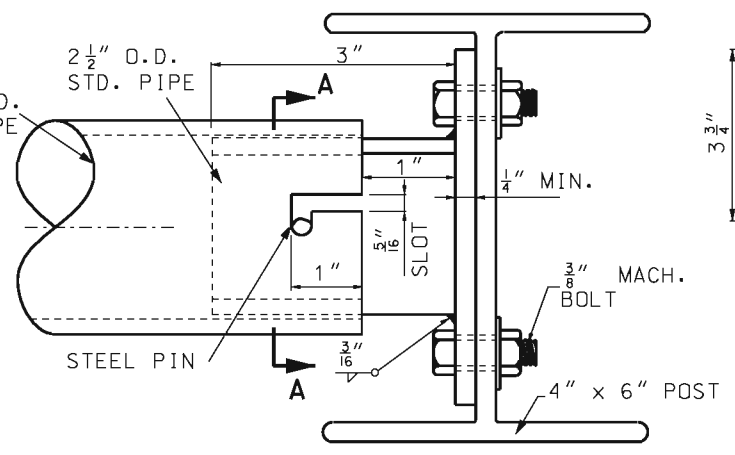


BORDER			
CORNER RADII		WIDTH	
MINIMUM SIGN DIM.	IN.	SIGN SIZE	IN.
5' OR LESS FROM 5' TO 7'	6	6' x 10' OR LARGER	2
OVER 7'	9		
	12	LESS THAN 6' x 10'	1 1/8

BORDER WIDTH SHALL BE AS SHOWN ON CHART BUT NOT TO EXCEED THE STROKE WIDTH OF THE MAJOR LETTERING ON SIGN.

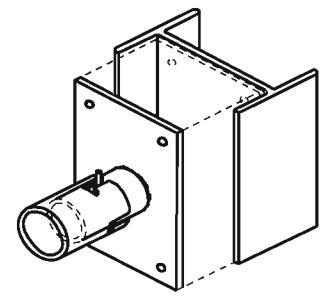
GENERAL SIGN DATA				
STR1L-3	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES
BACKGROUND		1	GREEN	
LEGEND	L-3	4	WHITE	E
SYMBOLS	L-3	4	WHITE	
BORDER	L-3	4	WHITE	
SUBSTRATE	STRUCTURAL			

**GUIDE SIGN DETAIL**



ASSEMBLY SHALL BE GALVANIZED AFTER FABRICATION

**PLAN VIEW**

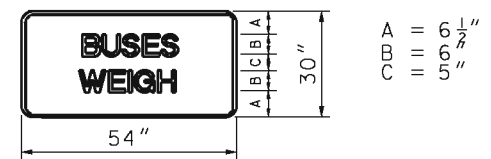


**ISOMETRIC VIEW**

**BUSES WEIGH MOUNTING ASSEMBLY**



FOR OPEN AND CLOSED SIGN SEE SPECIAL PROVISIONS



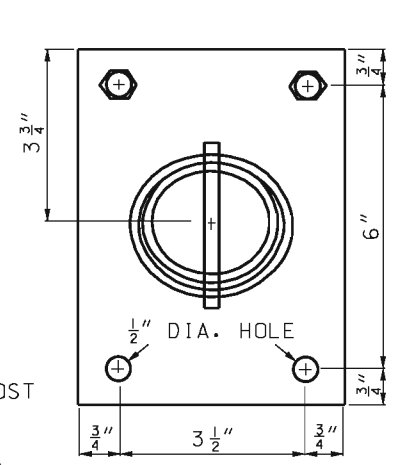
MAXIMUM HEIGHT FROM BOTTOM OF BUSES WEIGH SIGN TO GROUND SHALL BE 60\"/>

GENERAL SIGN DATA				
SHR1L-3	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES
BACKGROUND		1	GREEN	
LEGEND	L-3	4	WHITE	E
SYMBOLS				
BORDER	L-3	4	WHITE	
SUBSTRATE	SHEET			

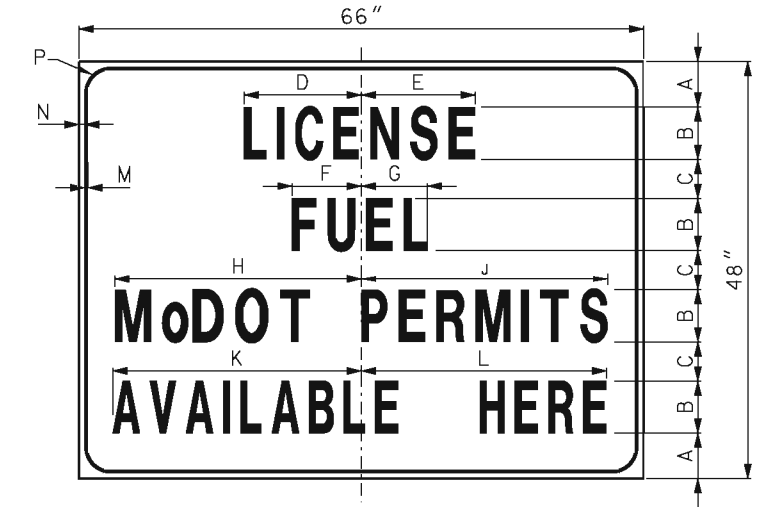
**CHANGEABLE SIGN DETAIL**

SUBSTRATE: ST STRUCTURAL, SH SHEET  
 LEGEND, SYMBOLS, & BORDER: L-1 SCREEN PRINT, L-3 DIRECT APPLIED (CUT FROM MATERIAL SHOWN ON PLANS.)

REFLECTIVE SHEETING: R1 ENGINEERING GRADE IN ACCORDANCE WITH SEC 1042.2.7.1, R4 PRISMATIC IN ACCORDANCE WITH SEC 1042.2.7.3



**SECTION A-A**



SIGN	A	B	C	D	E	F	G	H	J	K	L	M	N	P
R21-1	5 1/4"	6"	4 1/2"	13 1/2"	13 1/8"	8"	7 5/8"	28 3/8"	28 3/8"	28 5/8"	28 1/4"	3/8"	5/8"	3"

GENERAL SIGN DATA				
SHR1L-1	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES
BACKGROUND		1	WHITE	
LEGEND	L-1		BLACK	C
SYMBOLS				
BORDER	L-1		BLACK	
SUBSTRATE	SHEET			

**PERMIT SIGN DETAIL**

MATERIAL LIST		
NO.	DESCRIPTION	LB.
2	1/4" STEEL PLATE	2.26
1	3" STANDARD PIPE	32.44
2	2-1/2" STANDARD PIPE	3.89
8	3/8" GALV. MACH. BOLT	
8	GALV. WASHER	

**GENERAL NOTES:**

DESIGN SPECS: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARES, AND TRAFFIC SIGNALS - 1975.

MATERIALS AND FABRICATION SHALL CONFORM TO THE REQUIREMENTS OF THE STATE HIGHWAY AND TRANSPORTATION COMMISSION STANDARD SPECIFICATIONS AND PROVISIONS.

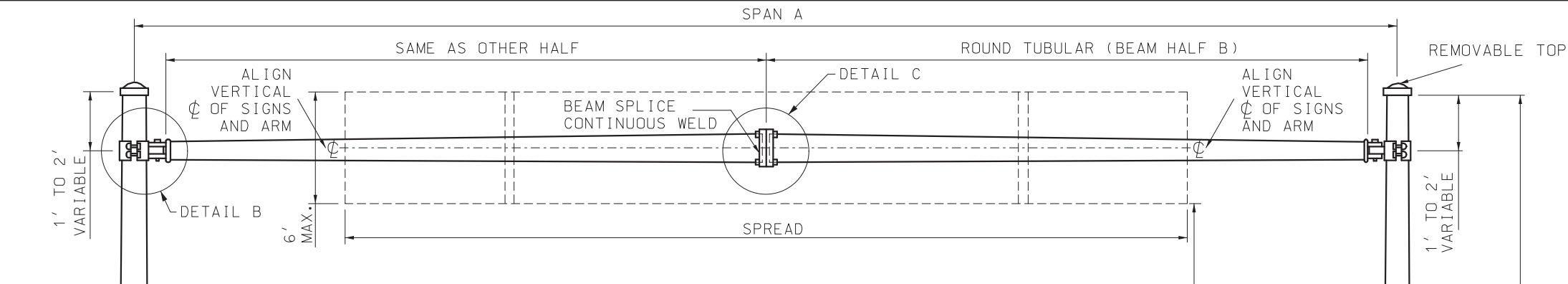
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 KATHRYN PHILLIPS HARVEY  
 NUMBER PE-23751  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**HIGHWAY SIGNING  
 WEIGH STATION**

DATE EFFECTIVE: 02/01/2012	903.04F	SHEET NO. 1 OF 1
DATE PREPARED: 12/19/2011		

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



SPAN A	SPREAD FEET												
	15	20	25	30	35	40	45	50	55	60	65	70	
31'-6"	143	152											
35'-0"	126	138	153										
41'-3"	106	120	130	144									
41'-6"	124	134	144	155									
45'-0"	102	112	121	132	144								
51'-3"	78	88	98	108	118	129							
51'-6"	109	119	129	141	154	168							
55'-0"	88	98	108	119	131	142	155						
61'-3"	69	80	91	101	110	121	130	142					
61'-6"		115	124	133	144	157	170	182					
65'-0"		98	107	117	128	140	152	164	176				
71'-3"		80	89	98	109	121	132	144	156	164			
71'-6"		110	121	131	142	152	162	173	184	197			
75'-0"		94	104	114	124	139	144	154	165	176	187		
81'-3"		84	94	104	116	126	131	146	157	168	179	190	

W=40 POUNDS PER SQUARE FOOT.

TYPE NO.	SPAN A	GA.	DIMENSIONS		END POST	
			GA.	D	GA.	D
S-1310	31'-6" THRU 41'-3"	3	8.8"	6" x 20'	3	10"
S-1310	41'-6" THRU 51'-3"	3	9.5"	6" x 25'	3	10"
S-1310	51'-6" THRU 61'-3"	3	10.5"	6.3" x 30'	3	10"
S-1312	61'-6" THRU 71'-3"	7	14"	9.1" x 35'	3	12"
S-1312	71'-6" THRU 81'-3"	7	16"	10.4" x 40'	3	12"

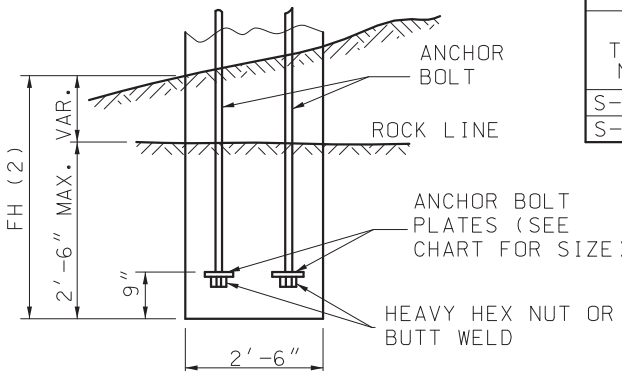
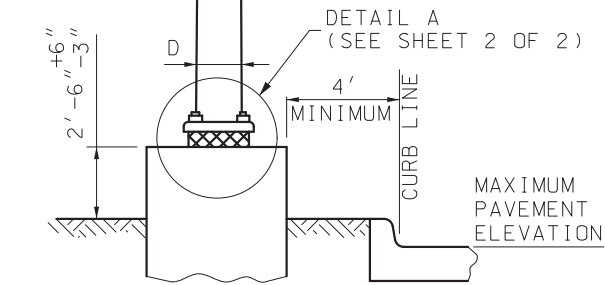
NOTES:  
 DESIGN SPANS IN EVEN 3" INCREMENTS. SPECIFY SPAN A REQUIRED. FOR SPAN LENGTHS LESS THAN MAXIMUM FOR A DESIGNATED RANGE, THE LARGER DIAMETER OF THE CROSS BEAM IS HELD AND THE SMALLER DIAMETER WILL INCREASE AS LENGTH IS REDUCED. DESIGN POSTS IN EVEN 1" INCREMENTS.

TYPE NO.	DIA. FD	ESTIMATED QUANTITIES FOOTING						
		CLASS B CONCRETE		REINFORCING STEEL				
		1' DEPTH	1" DEPTH	#5	#4 (3)	TOTAL		
S-1310	2'-6"	0.1818	0.01515	6	8'-9"	10	7'-2"	103
S-1312	2'-6"	0.1818	0.01515	6	10'-3"	12	7'-2"	121

(3) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 1V:2H SLOPE.

MODIFIED FOOTING IN SOLID ROCK		
TYPE NO.	ANCHOR BOLT (1)	ANCHOR BOLT PLATE
S-1310	1 1/2" DIA.	3 1/2" x 3 1/2" x 3/4"
S-1312	1 3/4" DIA.	3 1/2" x 3 1/2" x 3/4"

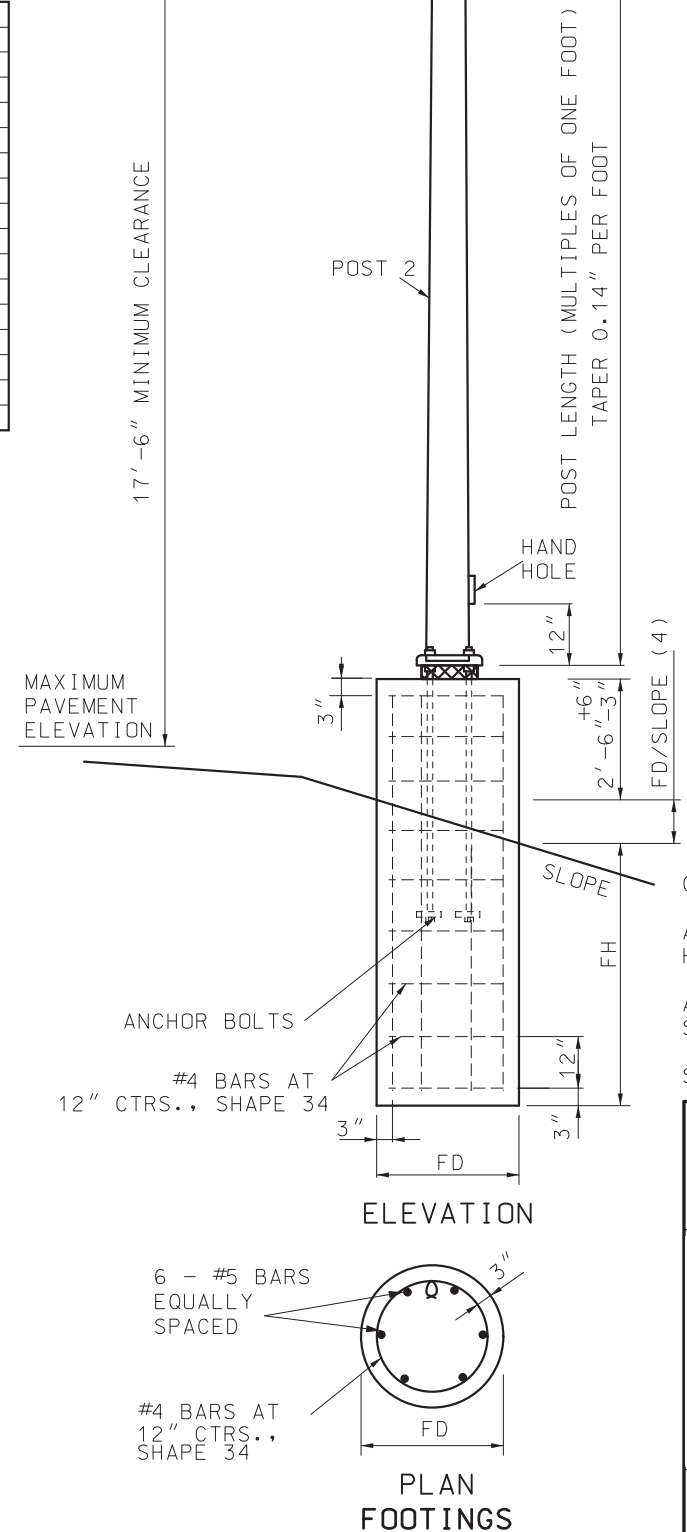
(1) ANCHOR BOLT LENGTH AS REQUIRED



REINFORCEMENT PLACED SAME AS STANDARD FOOTING. CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK.

**MODIFIED FOOTING IN SOLID ROCK**

(2) NOT TO EXCEED 5' FOR S-1310, NOT TO EXCEED 6'-6" FOR S-1312.



(4) EXAMPLE: IF SLOPE IS 1V:6H, THE DENOMINATOR IS 6

**GENERAL NOTES:**

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL C OF THE ARM.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.

SEE SHEET 2 OF 2 FOR DETAILS A, B AND C.

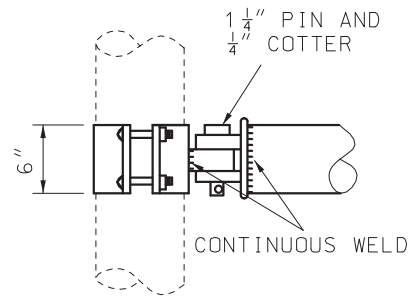
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

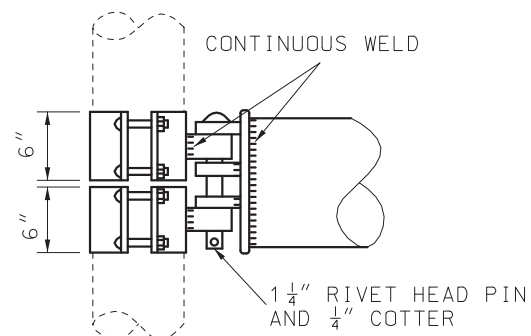
**HIGHWAY SIGNING**  
**TUBULAR SUPPORT STEEL**  
**TYPE S**  
**ONE TUBE**

DATE EFFECTIVE: 10/01/2022	<b>903.05L</b>	SHEET NO. 1 OF 2
DATE PREPARED: 7/19/2022		

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

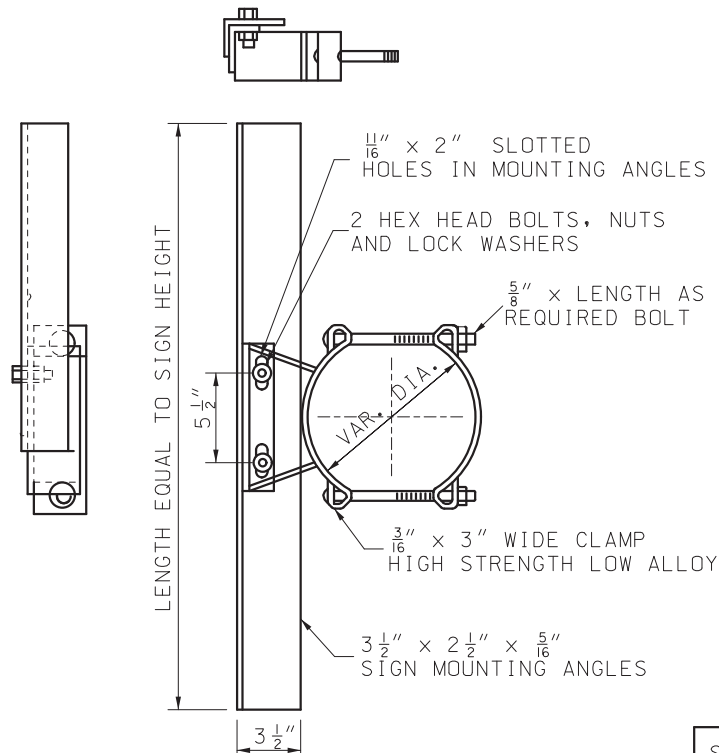


TUBE DIAMETER EQUAL TO OR LESS THAN 10 1/2" AT CENTER OF SPAN



TUBE DIAMETER GREATER THAN 10 1/2" AT CENTER OF SPAN

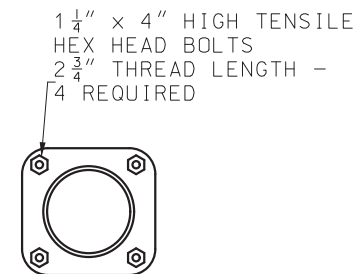
DETAIL B  
BEAM CLAMP



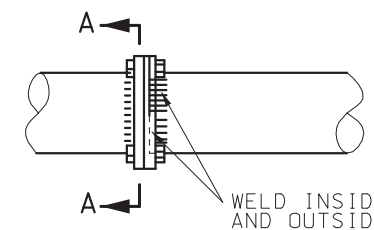
NOTE: MINIMUM OF TWO BRACKETS ARE REQUIRED FOR SIGNS OVER 42" IN LENGTH.

GALVANIZED SIGN BRACKET ASSEMBLY

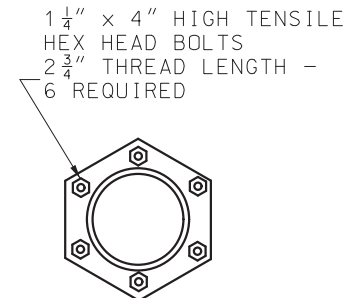
SIGN HEIGHT (INCHES)	MAXIMUM LIN. FT. OF SIGN WIDTH PER BRACKET
48 & UNDER	13
60	8
72	5



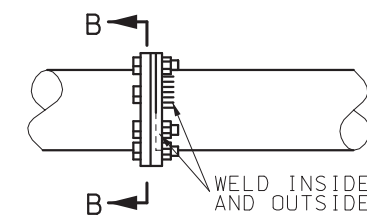
SECTION A-A



TUBE DIAMETER 9 1/2" AND UNDER



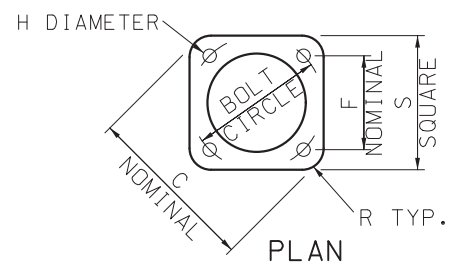
SECTION B-B



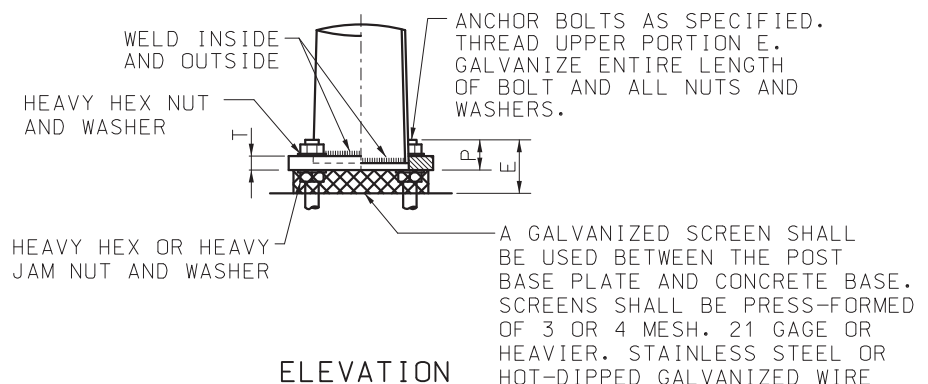
TUBE DIAMETER OVER 9 1/2"

DETAIL C  
BEAM SPLICE

POST BASE DIMENSIONS AND DATA												
TYPE NO.	BOLT CIRCLE	C	F	H	S	R	P	T	E	ANCHOR BOLT	FOOTING	
											FH	FD
S-1310	13 1/2"	17 1/2"	9 9/16"	1 3/4"	14 1/8"	3 1/8"	3 3/4"	1 1/2"	7"	1 1/2" x 60"	5'-0"	2'-6"
S-1312	16"	21"	11 5/16"	2 1/8"	17"	3 3/4"	4 1/2"	2"	7 1/2"	1 3/4" x 90"	6'-6"	2'-6"



DETAIL A  
POST BASE DETAIL



ELEVATION

ANCHOR BOLTS AS SPECIFIED. THREAD UPPER PORTION E. GALVANIZE ENTIRE LENGTH OF BOLT AND ALL NUTS AND WASHERS.

A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE OR HEAVIER, STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT, THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

**HIGHWAY SIGNING**

TUBULAR SUPPORT STEEL  
TYPE S  
ONE TUBE

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

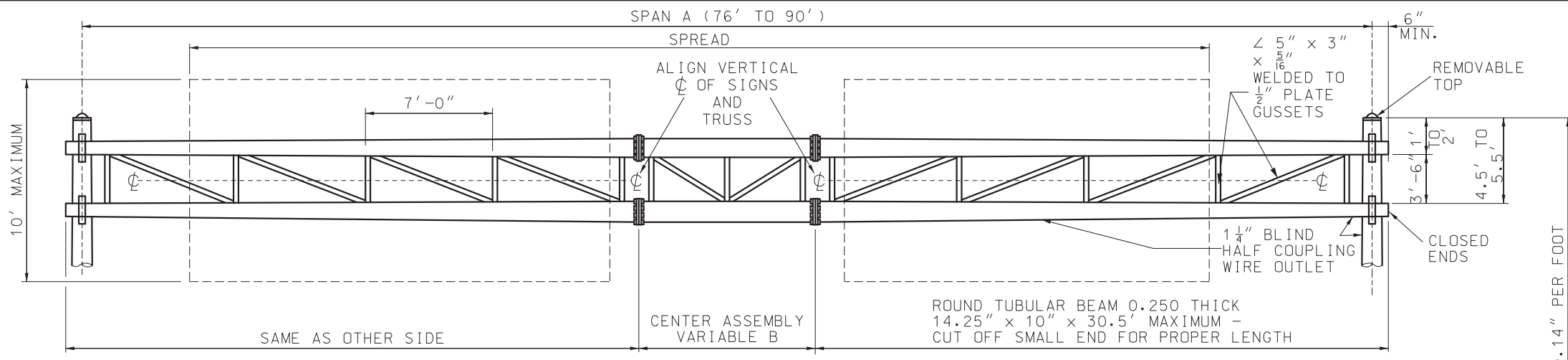
SHEET NO.  
2 OF 2

DATE EFFECTIVE: 10/01/2022

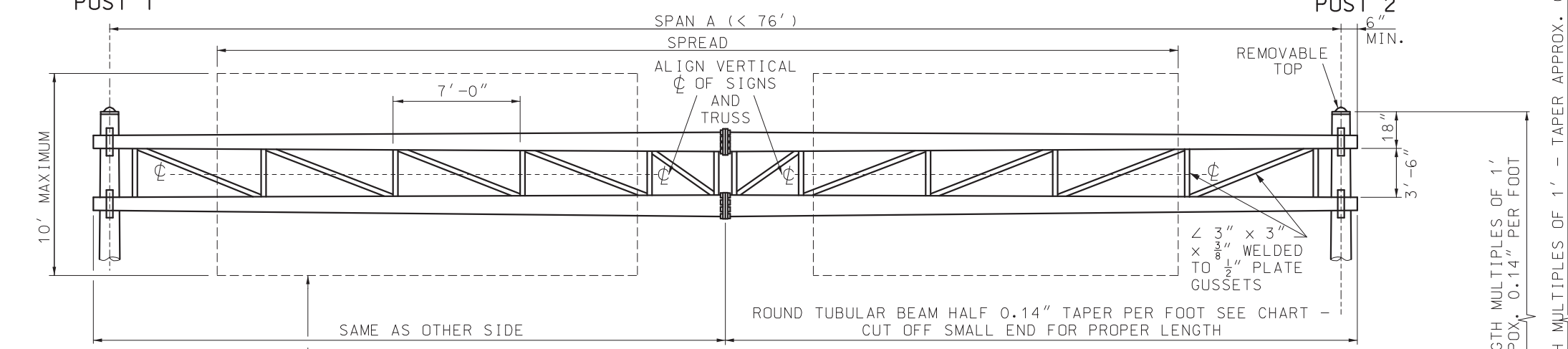
DATE PREPARED: 7/19/2022

903.05L

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



TWO END POST			
TYPE	GA	D INCHES	ALLOWABLE MOMENT-FT-LBS.
S-2315	3	15	120 000
S-2316.5	3	16.5	147 000
S-2318	3	18	177 000
S-27716	7+7	16	214 000
S-2018	0	18	222 000
S-27718	7+7	18	255 000
S-23316.5	3+3	16.5	292 000
S-23317	3+3	17	328 000
S-20018	0+0	18	453 000



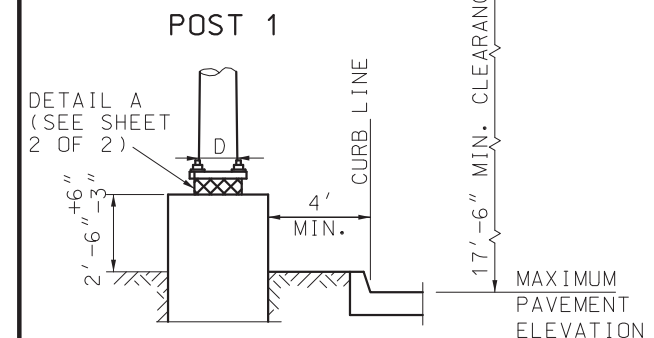
\* EXAMPLE: IF SLOPE IS 1V:6H, THE DENOMINATOR IS 6

GENERAL NOTES:

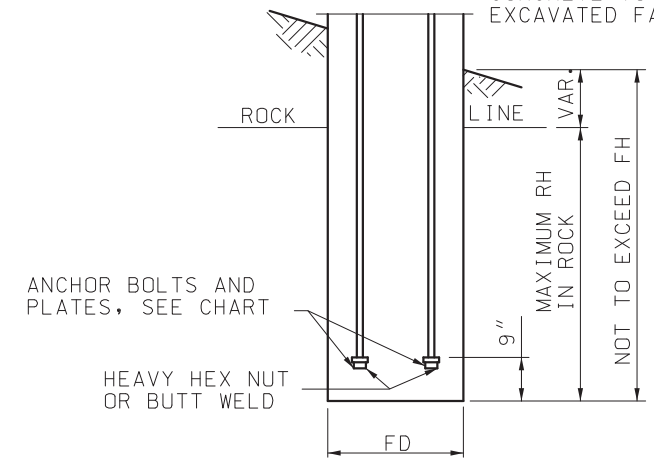
USE LONGEST POST AND SPAN A (NEXT GREATER IF NOT CHARTED) TO DETERMINE END POSTS AND STRUCTURE DESIGNS. MAXIMUM SIGN AREA FOR GIVEN SPREAD (INTERPOLATE FOR UNCHARTED SPREADS) NOT TO BE EXCEEDED. SUPPORTS DESIGNED BY END POST TYPE AND SPAN A (I.E. S-2315-40 ETC.).

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.

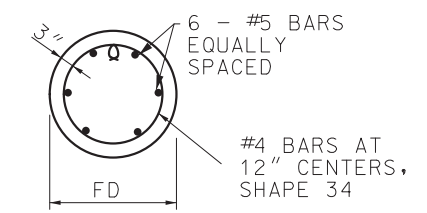
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL  $\phi$  OF THE TRUSS.



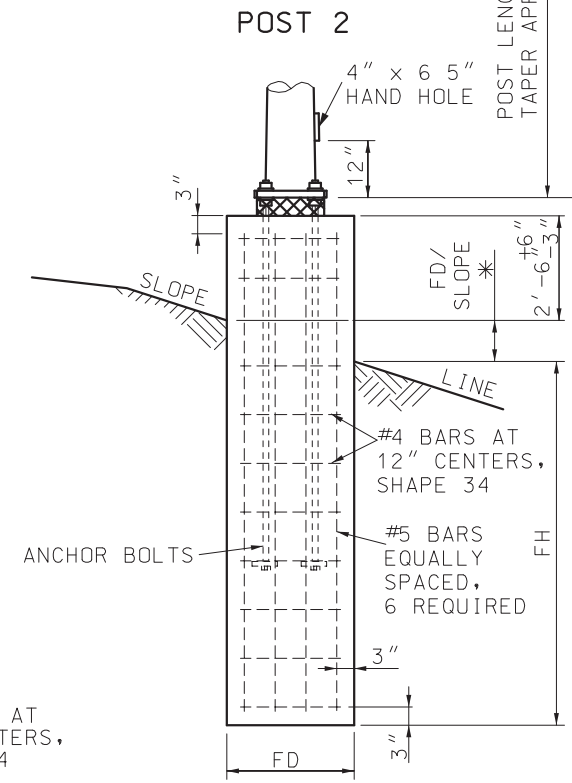
REINFORCEMENT PLACED SAME AS STANDARD FOOTING, CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK.



MODIFIED FOOTING IN SOLID ROCK



PLAN



ELEVATION

FOOTINGS

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**HIGHWAY SIGNING**

**TUBULAR SUPPORT STEEL**

**TYPE S**

**TWO TUBES**

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10/01/2022

DATE PREPARED: 7/19/2022

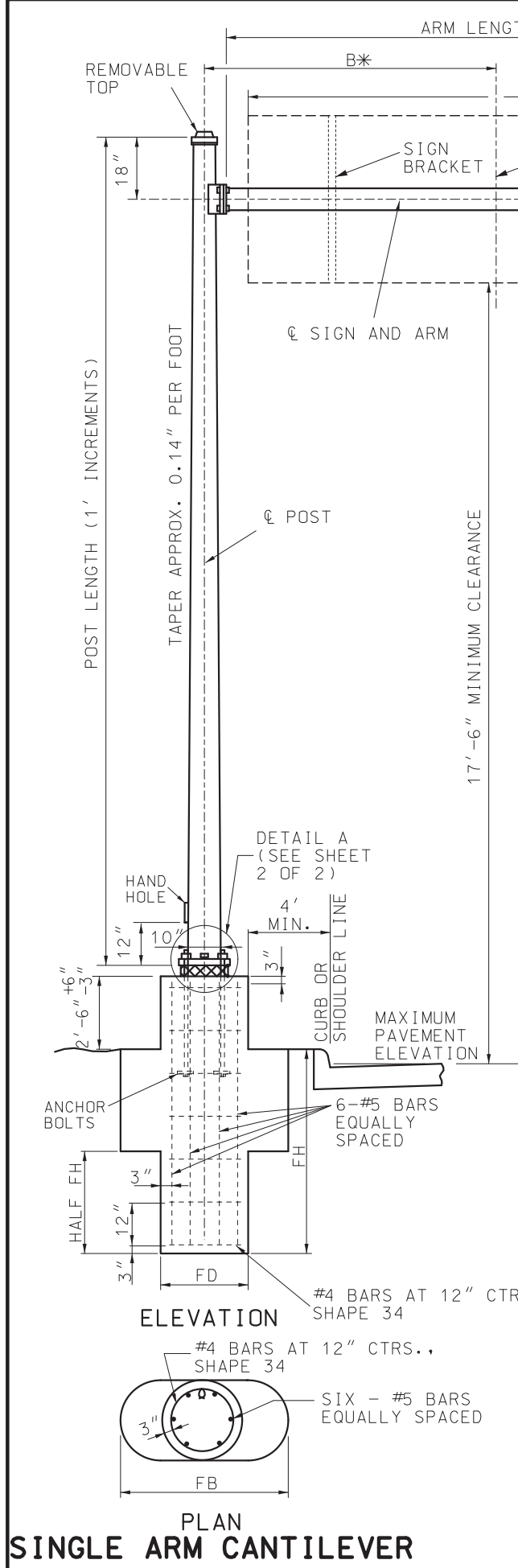
**903.06L**

SHEET NO.  
1 OF 2

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







**SINGLE ARM CANTILEVER**

SIGN BRACKETS	
SIGN HT. (IN.)	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET
	1 CLAMP TYPE
42	16
48	13
60	8
72	5
84	3

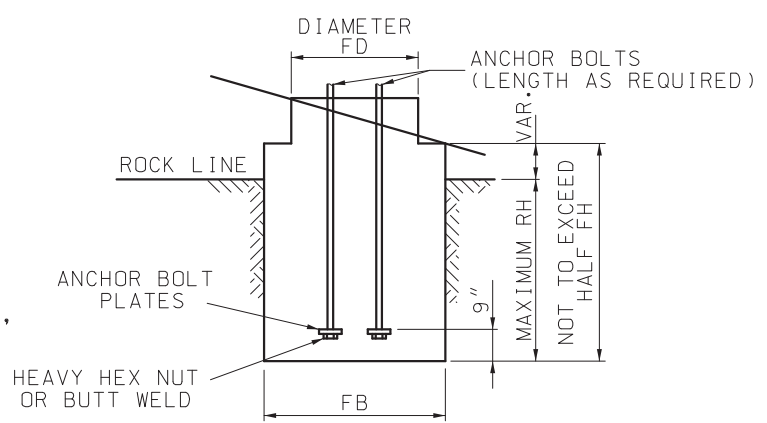
ARM = 35 000 PSI

TYPE NUMBER	ARM DIMENSIONS		POST		MAX SIGN AREA SQ. FT.	MAX. B WITH MAX. SIGN AREA
	LENGTH	DIA. / THK	GA	DIA.		
C-1710-12	12'	6" STD				
C-1710-18	18'	0.280" THK	7	10"	41	8'-0"
C-1310-12	12'	6" EX HVY				
C-1310-18	18'	0.432" THK	3	10"	59	8'-9"

\* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left( \frac{\text{MAX. B FOR TRUE SIGN AREA}}{\text{TRUE SIGN AREA}} \right) \leq \left( \frac{\text{MAX SIGN AREA} \times \left( \frac{\text{MAX. B WITH MAX. SIGN AREA}}{\text{TRUE SIGN AREA}} \right)}{\text{TRUE SIGN AREA}} \right)$$

\*\* THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN 1/4 OF THE SIGN WIDTH

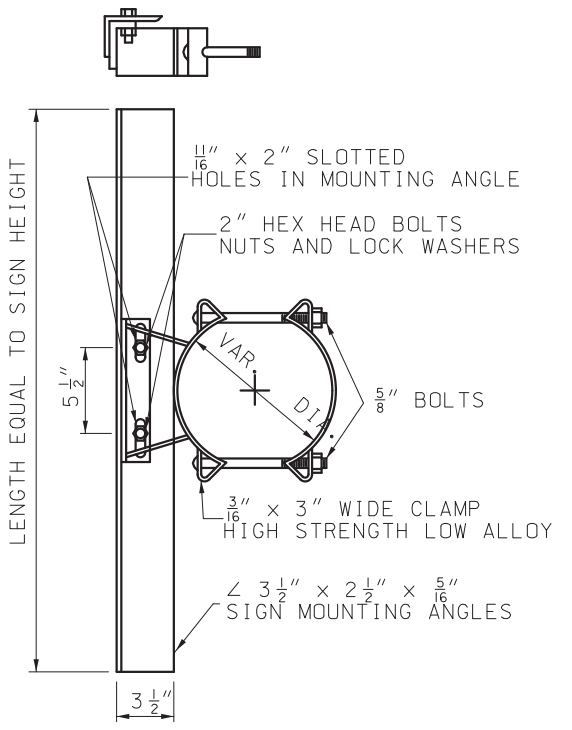


**MODIFIED FOOTING IN SOLID ROCK**

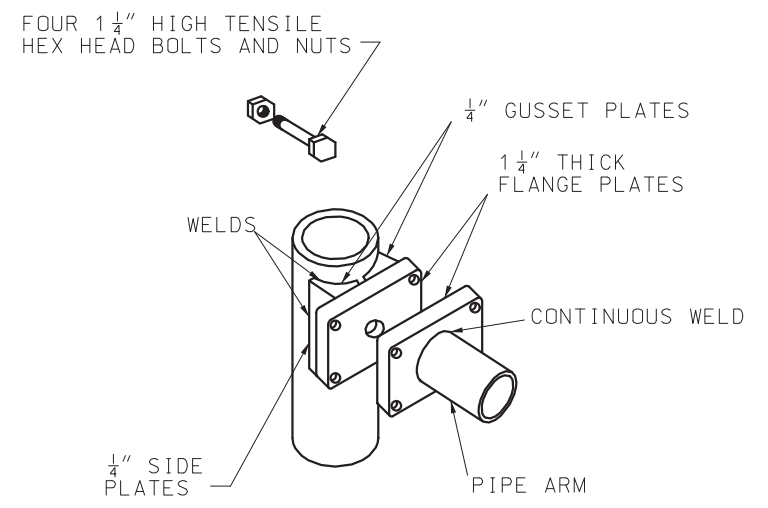
TYPE NUMBER	DIAMETER	ESTIMATED QUANTITIES				REINFORCING STEEL			
		CU YD CLASS B CONCRETE FOOTING							
		FD SECTION		FB SECTION		#5	#4 (1)	TOTAL	
		1' DEPTH	1" DEPTH	1' DEPTH	1" DEPTH	NO. FT-IN	NO. FT-IN	LBS	
C-1710	2'	4'	0.11635	0.0097	0.2645	0.0220	6 7'-6"	9 5'-7"	81
C-1310	2'	4'	0.11635	0.0097	0.2645	0.0220	6 7'-6"	9 5'-7"	81

(1) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

TYPE NUMBER	ANCHOR BOLT DIA.	ANCHOR BOLT PLATE	MODIFIED FOOTING IN SOLID ROCK			CLASS B CONCRETE FOOTING FB SECTION CU. YD.	
			FOOTING			1' DEPTH	1" DEPTH
			RH	FD	FB		
C-1710 & C-1310	1 1/2"	3 1/2" x 3 1/2" x 3/4"	2'-6"	2'-0"	3'-0"	0.1904	0.0159
C-2315	2"	3 1/2" x 3 1/2" x 3/4"	3'-0"	3'-0"	3'-6"	0.3173	0.0264
C-2318	2"	3 1/2" x 3 1/2" x 3/4"	3'-6"	3'-6"	3'-6"	0.3563	0.0297
C-2018	2 1/4"	4 1/2" x 4 1/2" x 3/4"	3'-6"	3'-6"	3'-6"	0.3563	0.0297



**GALVANIZED SIGN BRACKET ASSEMBLY**



**FOR POLE DIAMETER UNDER 12" ARM ATTACHMENT**

GENERAL NOTE:

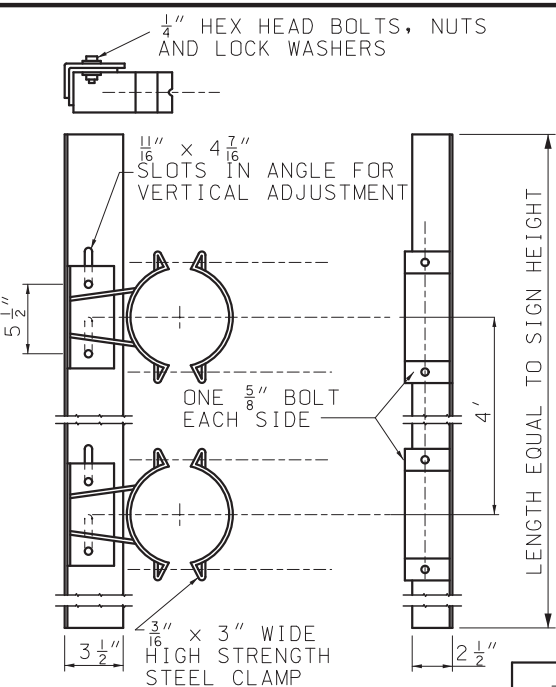
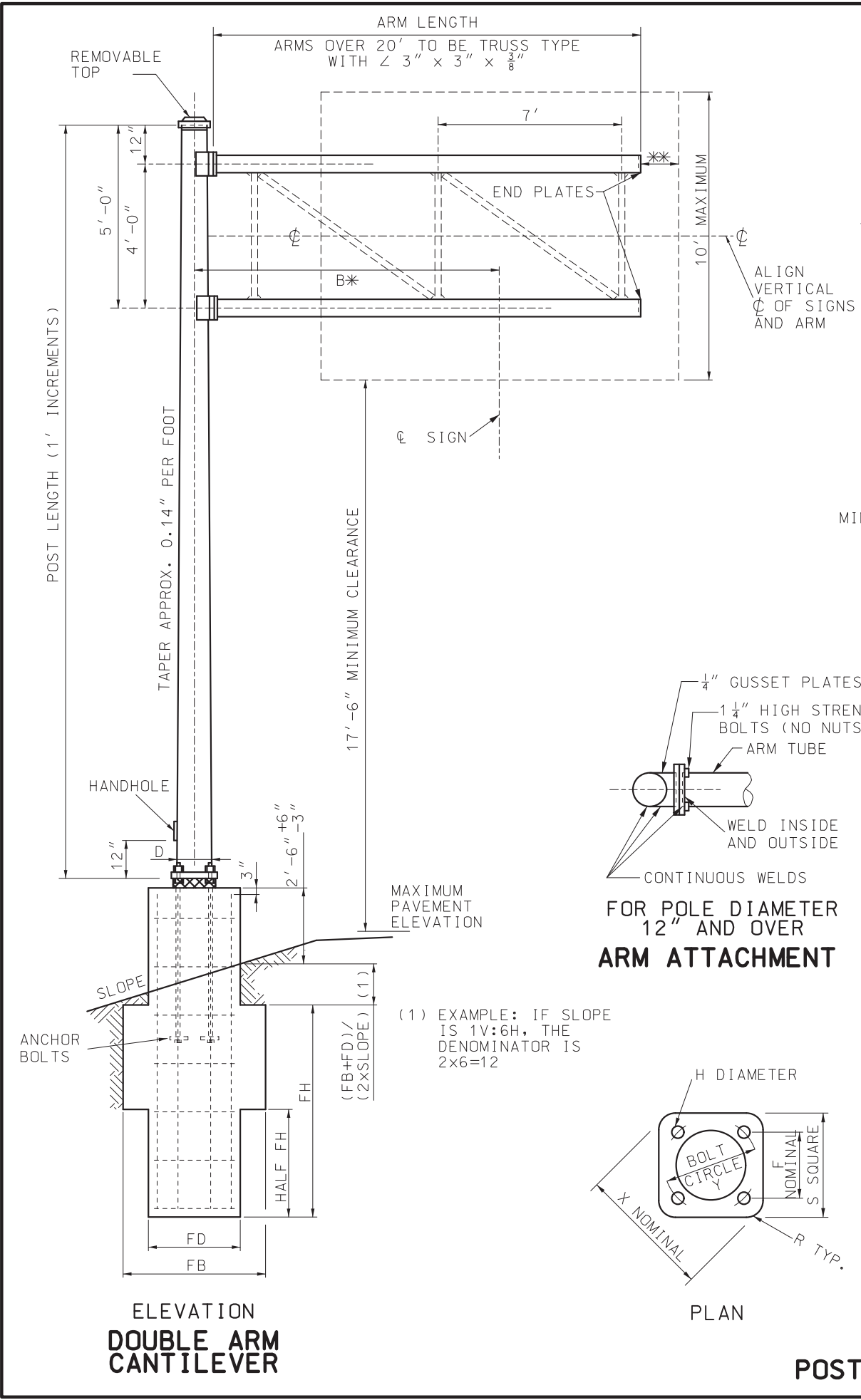
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL CL OF THE ARM.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.

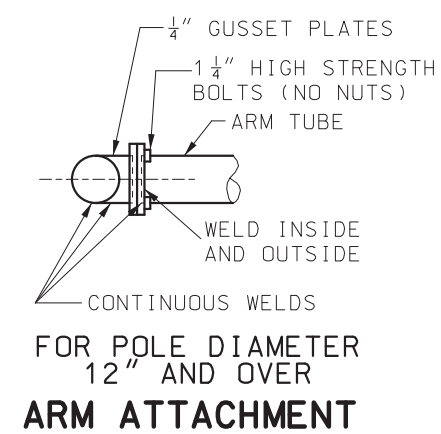
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>HIGHWAY SIGNING TUBULAR SUPPORT STEEL TYPE C</b>	
DATE EFFECTIVE: 10/01/2022 DATE PREPARED: 10/6/2022	<b>903.07L</b>	SHEET NO. 1 OF 2

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

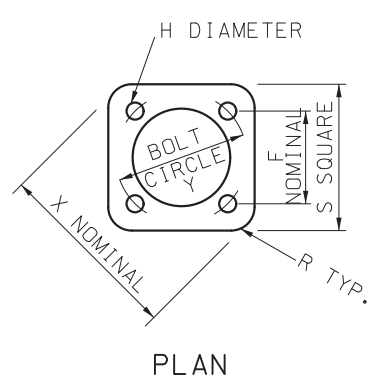
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



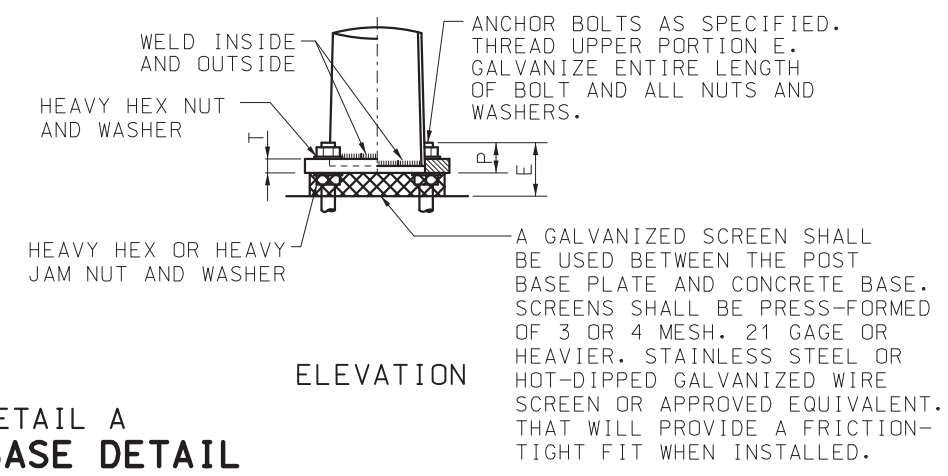
MINIMUM OF TWO BRACKETS REQUIRED ON SIGNS OVER 42" IN LENGTH  
**GALVANIZED SIGN BRACKET ASSEMBLY**



FOR POLE DIAMETER 12" AND OVER  
**ARM ATTACHMENT**



DETAIL A  
**POST BASE DETAIL**



TYPE NUMBER	DIAMETER		CU. YD. CLASS B CONCRETE FOOTING				REINFORCING STEEL				
	FD	FB	FD SECTION		FB SECTION		#5		#4 (2)		TOTAL LBS.
			1' DEPTH	1" DEPTH	1' DEPTH	1" DEPTH	NO.	FT-IN	NO.	FT-IN	
C-2315	3'	4'	0.2618	0.0218	0.3729	0.0311	6	11'-3"	13	8'-9"	146
C-2318	3'-6"	5'	0.3563	0.0297	0.5507	0.0459	6	12'-2"	13	10'-4"	166
C-2018	3'-6"	5'	0.3563	0.0297	0.5507	0.0459	6	12'-8"	14	10'-4"	176

(2) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

TYPE NUMBER	POST		ARM				B *	MAX. AREA SQ FT
	GA	DIA.	GA	DIMENSIONS				
C-2315-12	3	15"	7	7.5" x 5.82" x 12'	8'	130		
C-2315-16	3	15"	7	9.0" x 6.76" x 16'	12'	120		
C-2315-20	3	15"	3	10" x 7.2" x 20'	16'	115		
C-2315-24	3	15"	3	11" x 7.64" x 24'	20'	100		
C-2318-18	3	18"	7	9.0" x 6.48" x 18'	10'	145		
C-2318-22	3	18"	7	11" x 7.92" x 22'	14'	150		
C-2318-26	3	18"	7	12.5" x 8.86" x 26'	18'	150		
C-2018-24	0	18"	7	12.5" x 9.14" x 24'	14'	205		
C-2018-28	0	18"	3	12.5" x 8.58" x 28'	18'	215		
C-2018-34	0	18"	0	13" x 8.24" x 34'	24'	190		

SIGN HT. (IN.)	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET	
	2 CLAMP TYPE	
42	16	
48	16	
60	16	
72	15	
84	11	
96	6	
108	4	
120	3	

\* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left( \frac{\text{MAX. B FOR TRUE SIGN AREA}}{\text{TRUE SIGN AREA}} \right) \leq \left( \frac{\text{MAX. SIGN AREA}}{\text{TRUE SIGN AREA}} \right) \times \left( \frac{\text{MAX. B WITH MAX. SIGN AREA}}{\text{TRUE SIGN AREA}} \right)$$

\*\* THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN 1/4 OF THE SIGN WIDTH

TYPE NUMBER	POST BASE DIMENSIONS										FOOTING		
	Y	X	E	F	H	P	R	S	T	ANCHOR BOLTS	FD	FB	
C-1710 & C-1310	13 1/2"	17 1/2"	7"	9 9/16"	1 3/4"	3 3/4"	3 1/8"	14 1/8"	1 1/2"	1 1/2" x 60"	5'	4'	
C-2315	22"	28 1/8"	8 1/2"	15 1/2"	2 3/8"	4 3/4"	4 3/8"	23"	2"	2" x 96"	7'	4'	
C-2318	25 1/2"	33"	8 1/2"	18"	2 3/8"	4 3/4"	5 1/2"	26 1/2"	2"	2" x 96"	7'-6"	5'	
C-2018	25 1/2"	33"	9 1/2"	18"	2 5/8"	5 1/2"	5 1/2"	26 1/2"	2 1/2"	2 1/4" x 96"	8'	5'	

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

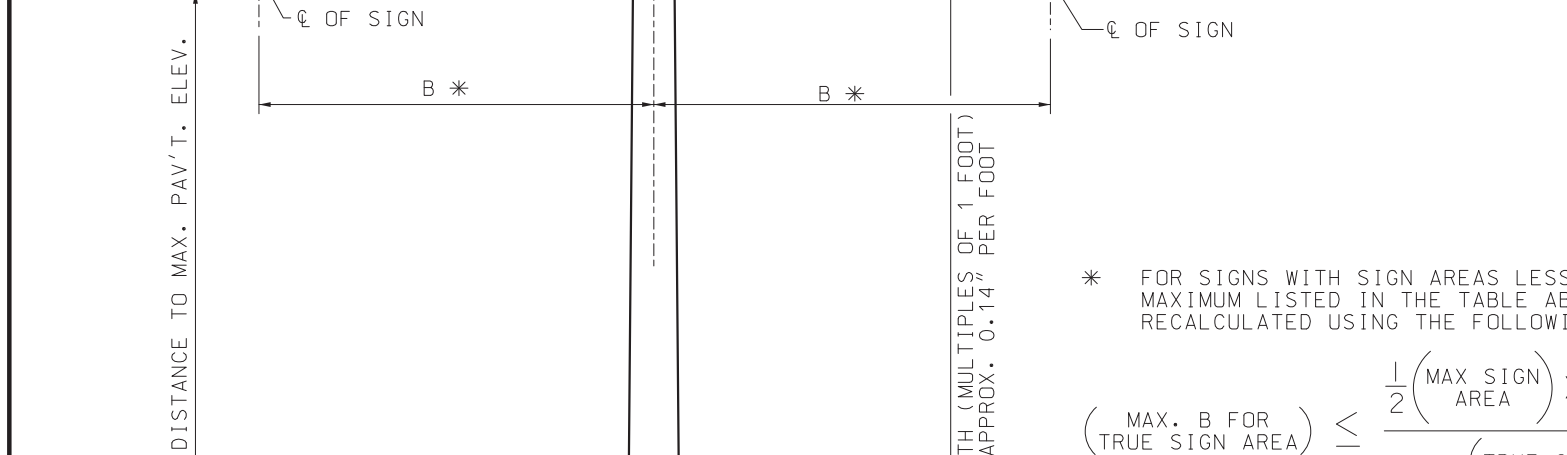
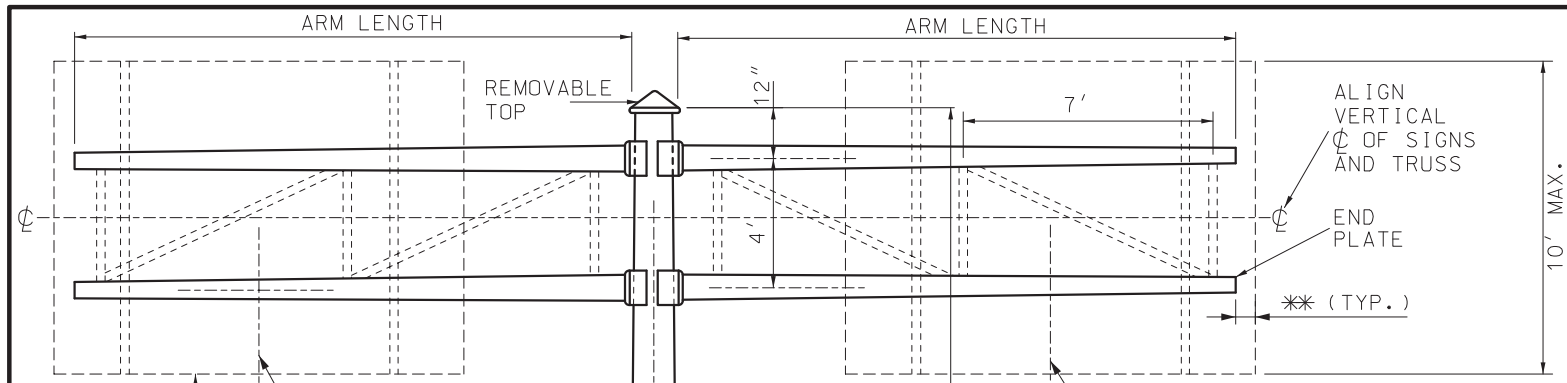
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

**HIGHWAY SIGNING TUBULAR SUPPORT STEEL TYPE C**

DATE EFFECTIVE: 10/01/2022  
DATE PREPARED: 7/19/2022

**903.07L**

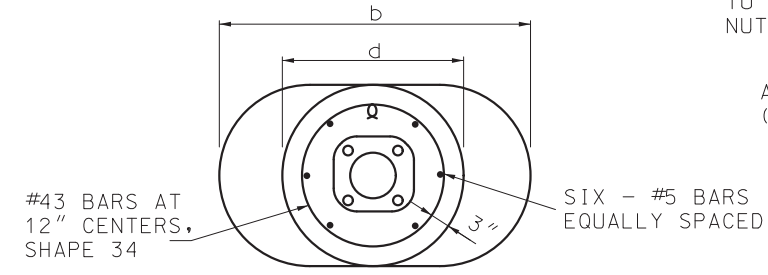
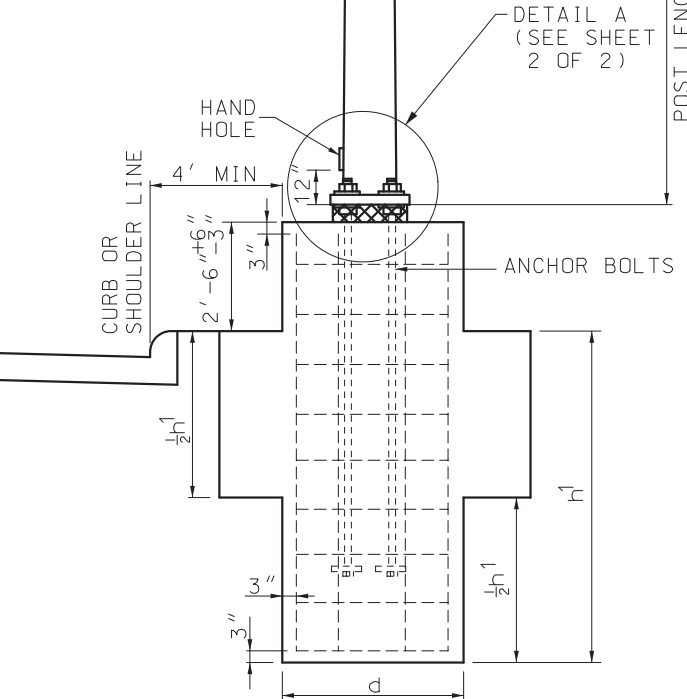
SHEET NO.  
2 OF 2



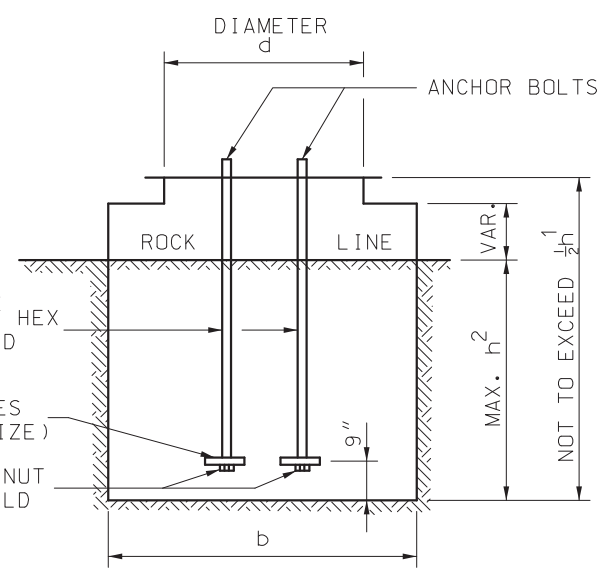
\* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left( \text{MAX. B FOR TRUE SIGN AREA} \right) \leq \frac{\frac{1}{2} \left( \text{MAX SIGN AREA} \right) \times \left( \text{MAX. B WITH MAX. SIGN AREA} \right)}{\left( \text{TRUE SIGN AREA} \right)}$$

\*\* THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN 1/4 OF THE SIGN WIDTH



PLAN FOOTING



FASTEN ANCHOR BOLTS TO PLATE WITH HEAVY HEX NUTS OR BY BUTT WELD

ANCHOR BOLT PLATES (SEE CHART FOR SIZE)

HEAVY HEX NUT OR BUTT WELD

MODIFIED FOOTINGS IN SOLID ROCK

TYPE NUMBER	POST			ARM		MAX. AREA (2) SQ. FT.
	GA.	"B"*	DIA.	GA.	DIMENSIONS	
B-2018	0	8'	18"	7	7.5" x 5.82" x 12'	260
	0	12'	18"	7	9.0" x 6.76" x 16'	240
	0	16'	18"	3	10.0" x 7.2" x 20'	230
	0	20'	18"	3	11.0" x 7.64" x 24' (1)	200
B-23318	3+3	10'	18"	7	9" x 6.48" x 18'	290
	3+3	14'	18"	7	11" x 7.92" x 22' (1)	300
	3+3	18'	18"	7	12.5" x 8.86" x 26' (1)	300
B-20018	0+0	14'	18"	7	12.5" x 9.14" x 24' (1)	410
	0+0	18'	18"	3	12.5" x 8.58" x 28' (1)	430
	0+0	24'	18"	0	13" x 24" x 34' (1)	430

NOTES:

(1) ARMS OVER 20' TO BE TRUSS TYPE WITH  $\angle$  3" x 3" x 3/8" ANGLES.

(2) MAX SIGN AREA ON EACH SIDE EQUALS HALF THE TOTAL IN CHART.

W = 40# PER SQUARE FOOT

TYPE NUMBER	DIA. "d"	DIA. "b"	ESTIMATED QUANTITIES				REINFORCING STEEL				
			CLASS B CONCRETE FOOTING (C.Y.)		REINFORCING STEEL		TOTAL				
			"d" SECTION	"b" SECTION	#5	#4 (3)					
B-2018	3'-6"	6'-0"	0.3563	0.0297	0.6800	0.0567	6	10'-0"	11	10'-4"	139
B-23318	3'-6"	7'-0"	0.3563	0.0297	0.8100	0.0675	6	10'-6"	12	10'-4"	149
B-20018	3'-6"	7'-0"	0.3563	0.0297	0.8100	0.0675	6	12'-0"	13	10'-4"	165

(3) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

TYPE NUMBER	ANCHOR BOLT (4) (DIA.)	ANCHOR BOLT PLATE	MODIFIED FOOTING IN SOLID ROCK			CLASS B CONCRETE FOOTING CU. YD.	
			FOOTING			"b" SECTION	
			"h <sup>2</sup> "	"d"	"b"	1' DEPTH	1' DEPTH
B-2018	2 1/4"	4 1/2" x 4 1/2" x 3/4"	3'-6"	3'-6"	3'-6"	0.3563	0.0297
B-23318	3"	5 1/2" x 5 1/2" x 1"	4'-0"	3'-6"	4'-6"	0.4860	0.0405
B-20018	3"	5 1/2" x 5 1/2" x 1"	5'-0"	3'-6"	4'-6"	0.4860	0.0405

(4) ANCHOR BOLT LENGTH AS REQUIRED

REINFORCEMENT SAME AS STANDARD FOOTING

CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK

GENERAL NOTE:

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL  $\phi$  OF THE TRUSS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

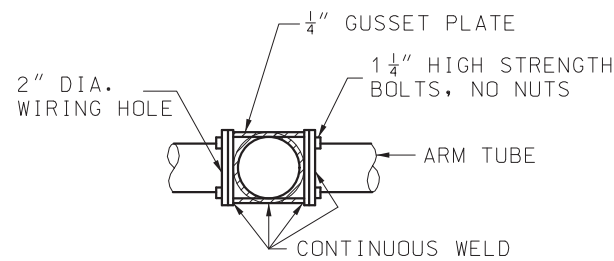
105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

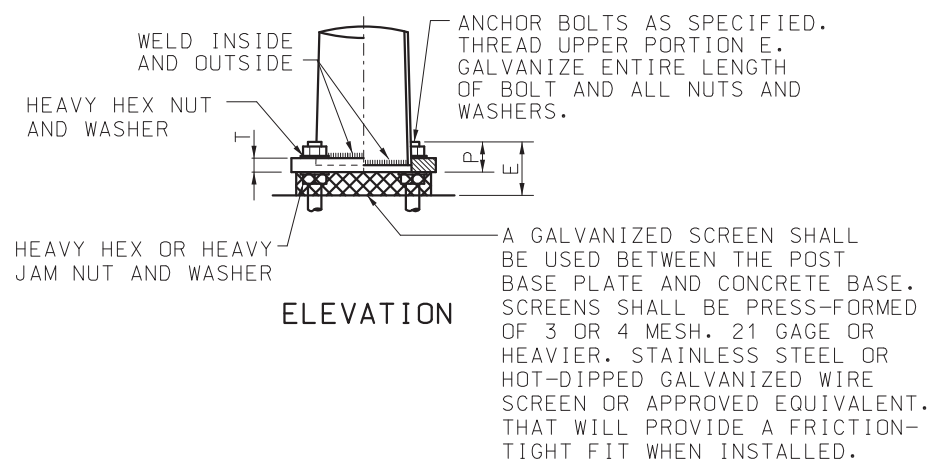
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**HIGHWAY SIGNING  
TUBULAR SUPPORT STEEL  
TYPE B**

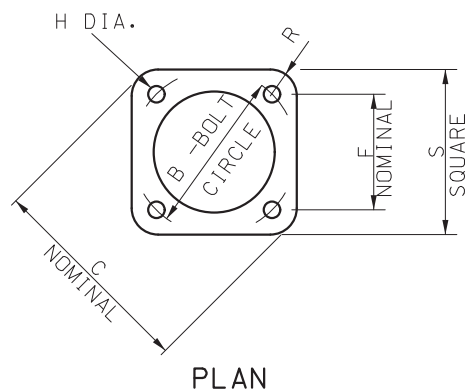
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**ARM ATTACHMENT DETAIL**



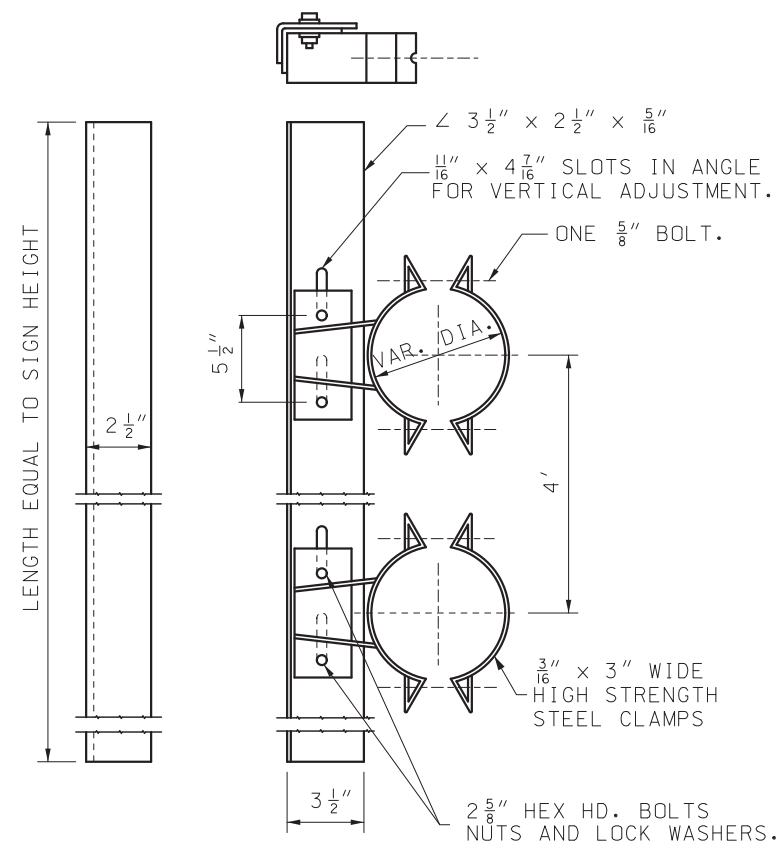
**ELEVATION**



**PLAN**

**DETAIL A  
POST BASE DETAIL**

TYPE NUMBER	POST BASE DIMENSIONS										ANCHOR BOLTS			FOOTING		
	B	C	F	H	S	R	P	T	E				"h"	"d"	"b"	
B-2018	25 1/2"	33"	18"	2 5/8"	26 1/2"	5 1/2"	5 1/2"	2 1/2"	9 1/2"	2 1/4" x 96"	7'-6"	3'-6"	6'-0"			
B-23318	25 1/2"	33"	18"	3 3/8"	26 1/2"	5 1/2"	7"	3"	12"	3" x 120"	8'-0"	3'-6"	7'-0"			
B-20018	25 1/2"	33"	18"	3 3/8"	26 1/2"	5 1/2"	7"	3"	12"	3" x 120"	9'-6"	3'-6"	7'-0"			



**GALVANIZED SIGN BRACKET ASSEMBLY \***

SIGN HEIGHT INCHES	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET
48 & UNDER	16
60	16
72	15
84	11
96	6
108	4
120	3

\* MINIMUM OF TWO BRACKETS REQUIRED ON SIGNS OVER 42" IN LENGTH

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
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**HIGHWAY SIGNING  
TUBULAR SUPPORT STEEL  
TYPE B**

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

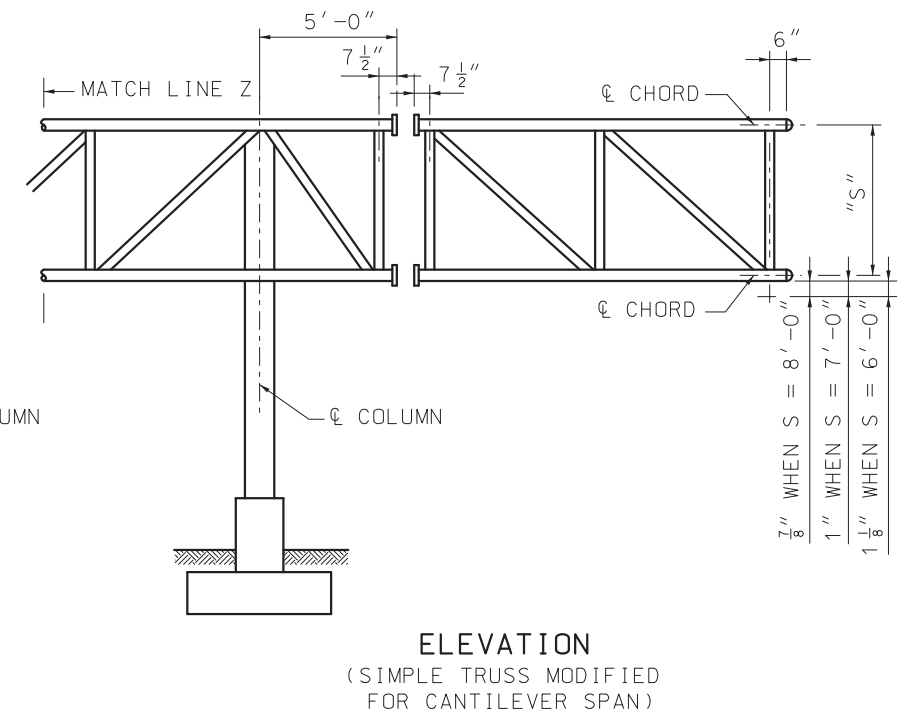
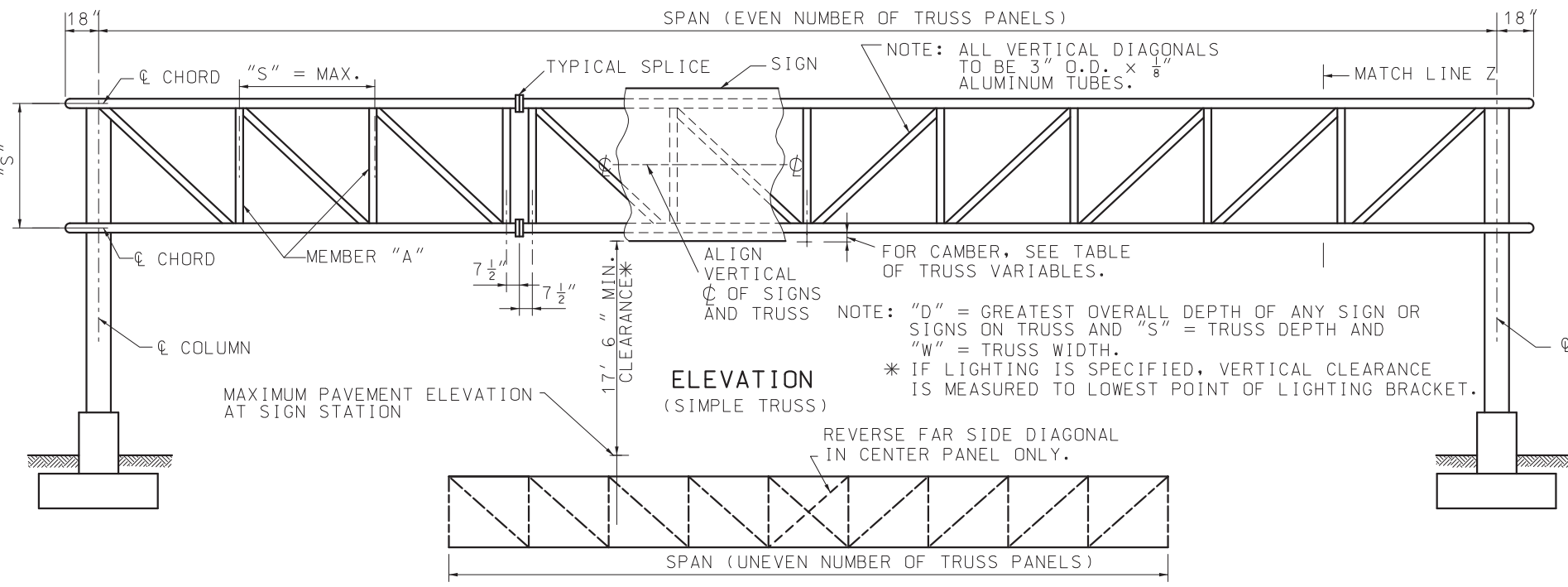
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10/01/2022  
DATE PREPARED: 7/19/2022

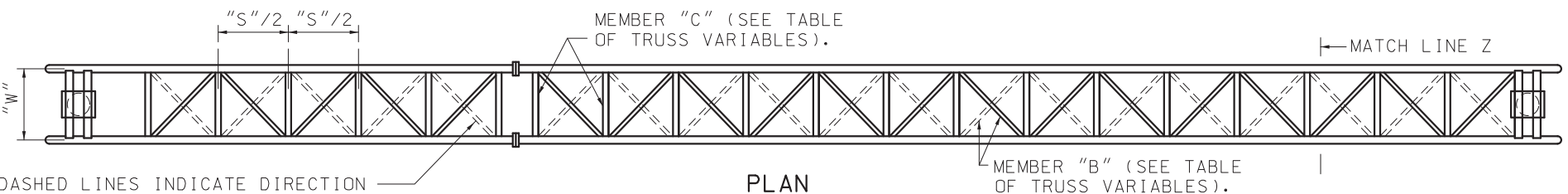
**903.08K**

SHEET NO.  
2 OF 2

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

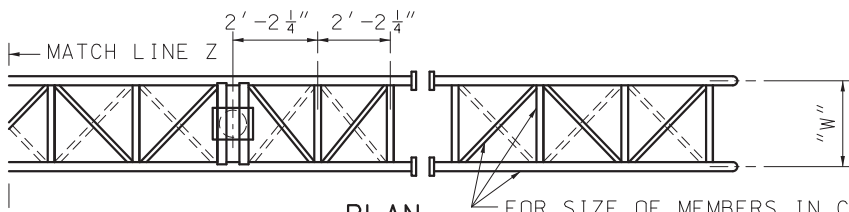


**TRUSS ELEVATION**



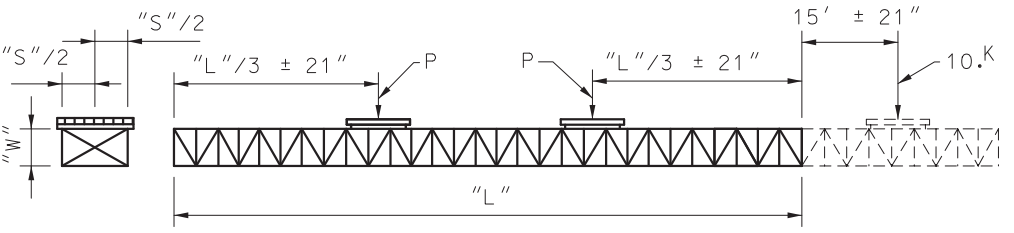
DASHED LINES INDICATE DIRECTION OF BRACING ON BOTTOM CHORD

**PLAN**



**PLAN**

FOR SIZE OF MEMBERS IN CANTILEVER SPAN SEE SHEET NO. 2 OF 8.



$P = \frac{84\alpha W}{L} - 0.02 L$  WHERE  
 $P$  = CONCENTRATED LOAD IN KIPS.  
 $\alpha$  = AREA OF ONE CHORD TUBE IN SQUARE INCHES. (USE 0.76 $\alpha$  FOR 4" DIA. x 1/4" AND 4 1/2" DIA. x 1/4" CHORDS)  
 $W$  = WIDTH OF TRUSS IN FEET.  
 $L$  = SPAN LENGTH IN FEET.

SAMPLE, GIVEN:  $\alpha = 4.123$  SQ. IN.,  $W = 6'-0"$  AND  $L = 100'$ .  
 SOLUTION:  $P = \frac{84 \times 4.123 \times 6.0}{100} - 0.02 \times 100 = 20.8 - 2 = 18.8$

**NOTE:**  
 IF CANTILEVERED, REMOVE CONCENTRATED LOAD NEAREST CANTILEVER END AND LOAD CANTILEVER SPAN AS SHOWN ABOVE.  
 15' OR LESS CANTILEVER SPANS NEED NOT BE TESTED.  
 REPEAT ABOVE TESTS BY ROTATING 180° (TO SIMULATE WIND REVERSAL). NO VERTICAL LOAD (D.L.) TEST WILL BE REQUIRED.

LOADS  $P$  SHALL NOT BE MORE THAN 16° FOR SPANS LESS THAN 55 FEET AND 20°. FOR ALL OTHERS.


**SIMULATED WIND-SHOP TEST LOADING**

TRUSS VARIABLES						
SPAN	"S"	"W"	MEMBER "A"	MEMBER "B"	MEMBER "C"	SHOP CAMBER
UP TO 70'-6"	6'-0"	5'-0"	2 1/2" DIA. x 1/8"	2 1/2" DIA. x 1/8"	1 3/4" DIA. x 1/8"	3/4"
71' TO 80'-6"	6'-0"	6'-0"	2 1/2" DIA. x 1/8"	2 1/2" DIA. x 1/8"	2" DIA. x 1/8"	1 1/4"
81' TO 90'-6"	6'-0"	6'-0"	2 1/2" DIA. x 1/8"	2 3/4" DIA. x 1/8"	2" DIA. x 1/8"	1 1/2"
91' TO 100'-6"	6'-0"	6'-0"	2 1/2" DIA. x 1/8"	2 3/4" DIA. x 1/8"	2" DIA. x 1/8"	2 1/4"
101' TO 110'-6"	7'-0"	7'-0"	2 1/2" DIA. x 1/8"	3" DIA. x 1/8"	2 1/4" DIA. x 1/8"	2 1/2"
111' TO 120'-6"	7'-0"	7'-0"	2 1/2" DIA. x 1/8"	3 1/2" DIA. x 1/8"	2 1/4" DIA. x 1/8"	2 3/4"
121' TO 130'-6"	7'-0"	7'-0"	3" DIA. x 1/8"	3 1/2" DIA. x 1/8"	2 1/4" DIA. x 1/8"	3 3/4"
131' TO 140'-6"	8'-0"	7'-0"	3" DIA. x 1/8"	3 3/4" DIA. x 1/8"	2 1/2" DIA. x 1/8"	3"
141' TO 150'-6"	8'-0"	7'-0"	3" DIA. x 1/8"	3 3/4" DIA. x 1/8"	2 3/4" DIA. x 1/8"	3 3/4"
151' TO 160'-6"	8'-0"	7'-0"	3" DIA. x 1/8"	3 3/4" DIA. x 1/8"	2 3/4" DIA. x 1/8"	4 1/2"

**NOTE:**  
 FOR SIZE OF CHORD MEMBERS, SEE DATA SHEET. SHOP CAMBER MAY BE PARABOLIC OR STRAIGHT, BUT SHALL BE SYMMETRICAL ABOUT CENTERLINE OF SPAN.

**GENERAL NOTES:**

- ALL STRUCTURAL STEEL AND COLUMN BASE PLATES ASTM A36.
- ALL ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 36.
- PROPOSED FIELD SPLICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL OF THE ENGINEER.
- TRUSSES SHALL BE FABRICATED WITH A MINIMUM OF SPLICING IN TRUSS CHORDS.
- FIELD SPLICING WILL NOT BE PERMITTED WITHIN THE MIDDLE ONE-THIRD OF SPAN.
- PERMISSIBLE VENT HOLES (MAXIMUM 1/8" DIAMETER) SHALL BE PLACED A MINIMUM OF 3" FROM WELD ON LOW SIDE OF HORIZONTAL, VERTICAL AND DIAGONAL TUBES.
- ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL  $\phi$  OF THE TRUSS.
- FOR ADDITIONAL INFORMATION SEE DATA SHEET.

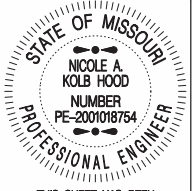


**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**OVERHEAD SIGN TRUSSES**

ALUMINUM



STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

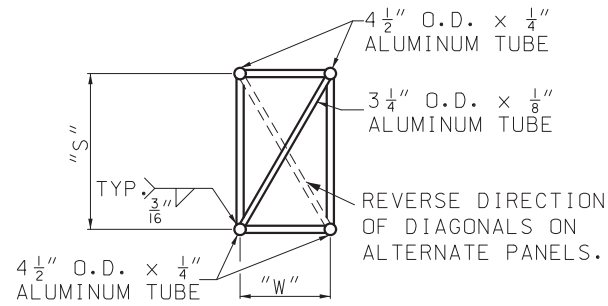
**903.10BE**

SHEET NO.  
1 OF 6

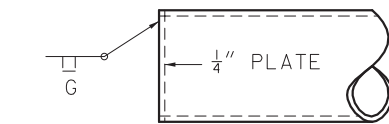
DATE EFFECTIVE: 10/1/2023  
DATE PREPARED: 7/6/2023

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

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

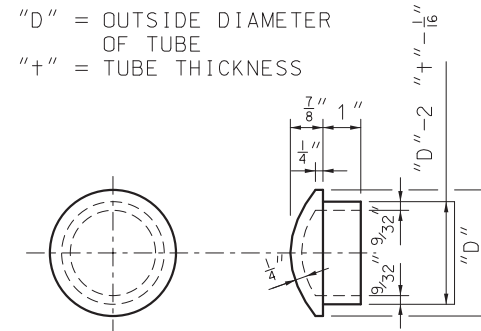


SECTION A-A

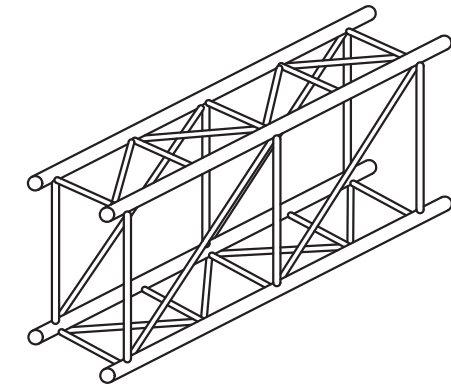


DETAIL OF ALTERNATE END CAP

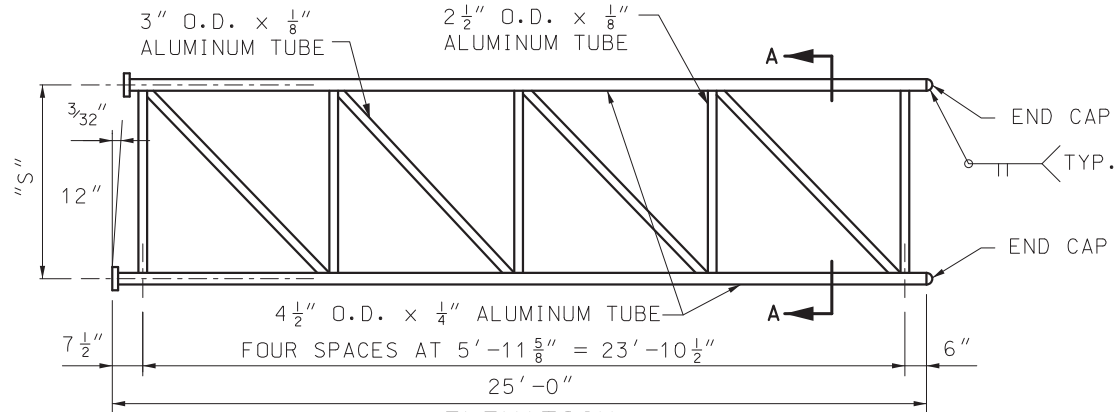
NOTE: WHEN THE VERTICALS, STRUTS AND SWAYS OBSTRUCT THE PLACING OF BOLTS IN THE FLANGES THESE MEMBERS MAY BE MOVED BACK IN ORDER TO CLEAR THE BOLTS. (ONE SIDE OF SPLICE ONLY).



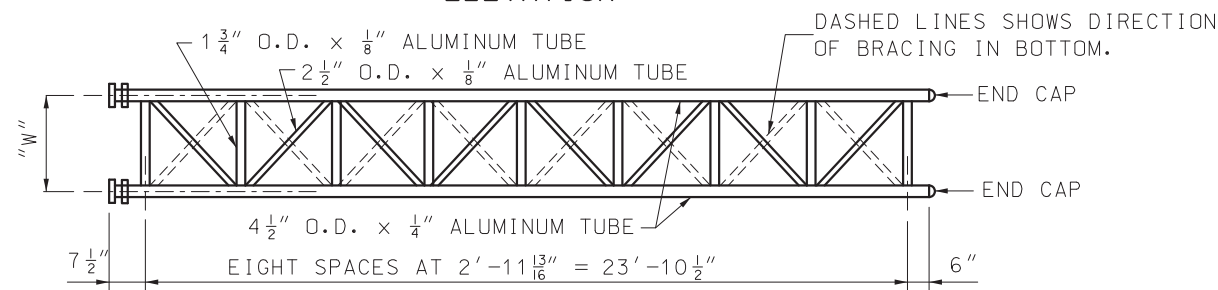
DETAIL OF END CAP CASTING (DRIVE FIT TYPE)



TYPICAL ISOMETRIC VIEW OF TRUSS

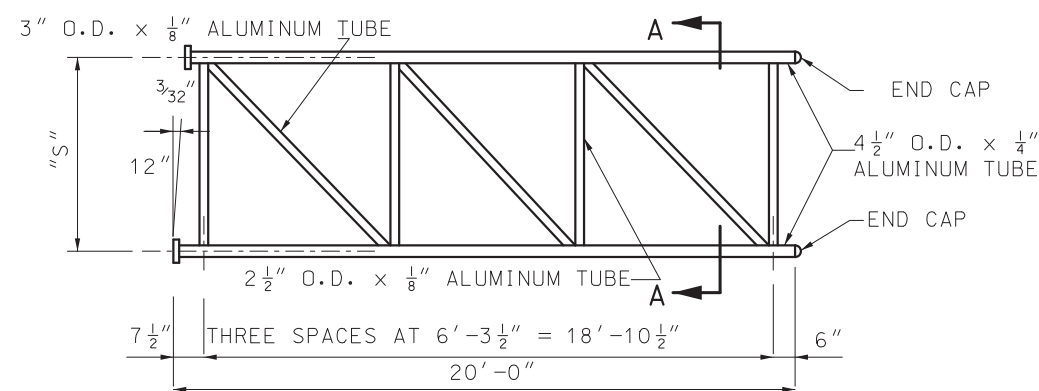


ELEVATION

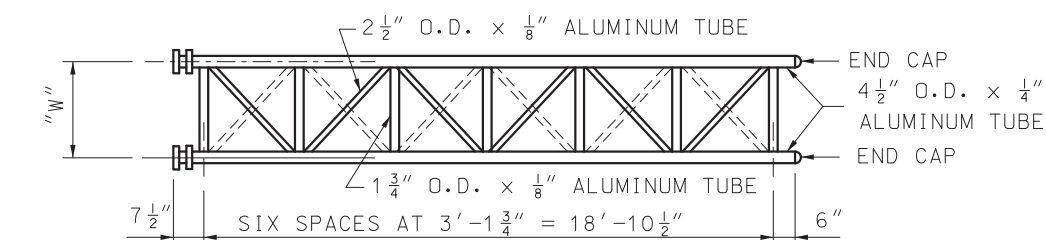


PLAN

25' - CANTILEVER SECTIONS

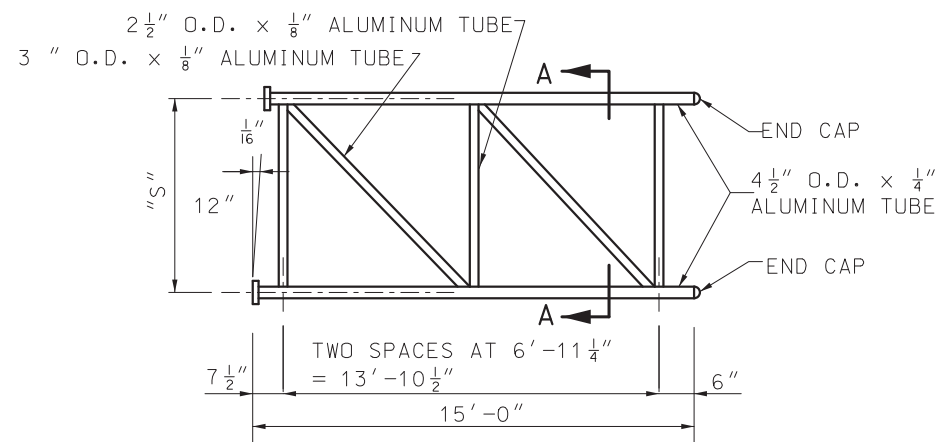


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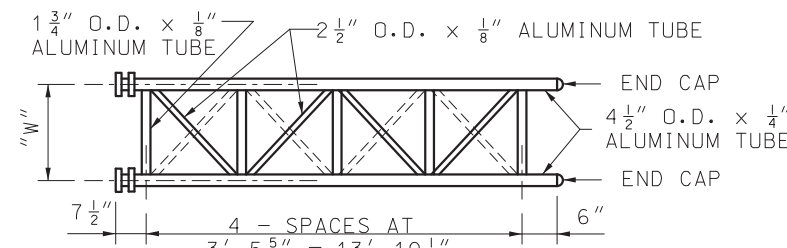


PLAN

20' - CANTILEVER SECTIONS

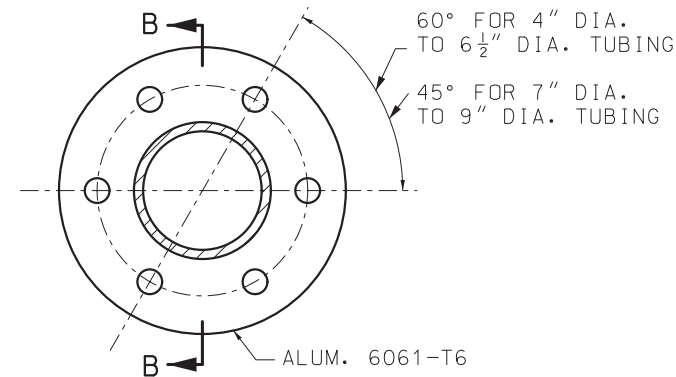


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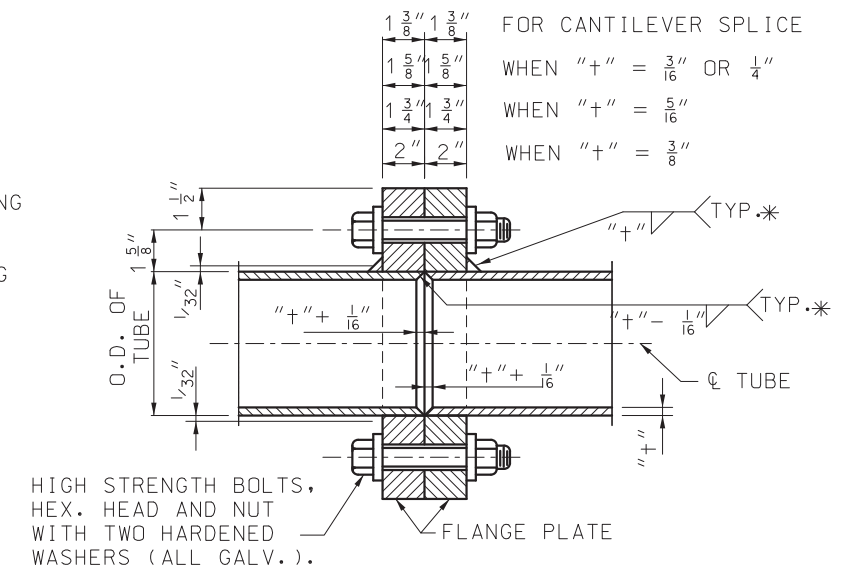


PLAN

15' - CANTILEVER SECTIONS



PLAN OF FLANGE PLATE



SECTION B-B

HIGH STRENGTH BOLTS, HEX. HEAD AND NUT WITH TWO HARDENED WASHERS (ALL GALV.).

\* "+" = SMALLER TUBE WALL THICKNESS.

NOTE: A WELDING SEQUENCE ASSURING FULL CONTACT OF FLANGE FACES SHALL BE REQUIRED. DRILL OR REAM FLANGE HOLES 1/16" LARGER THAN NORMAL DIAMETER OF BOLTS OR TUBING.

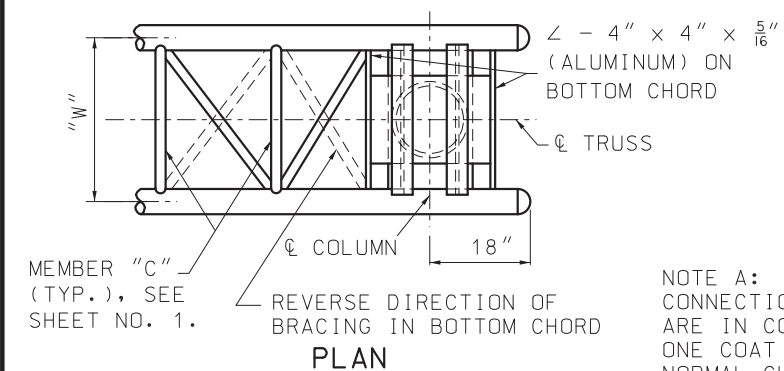
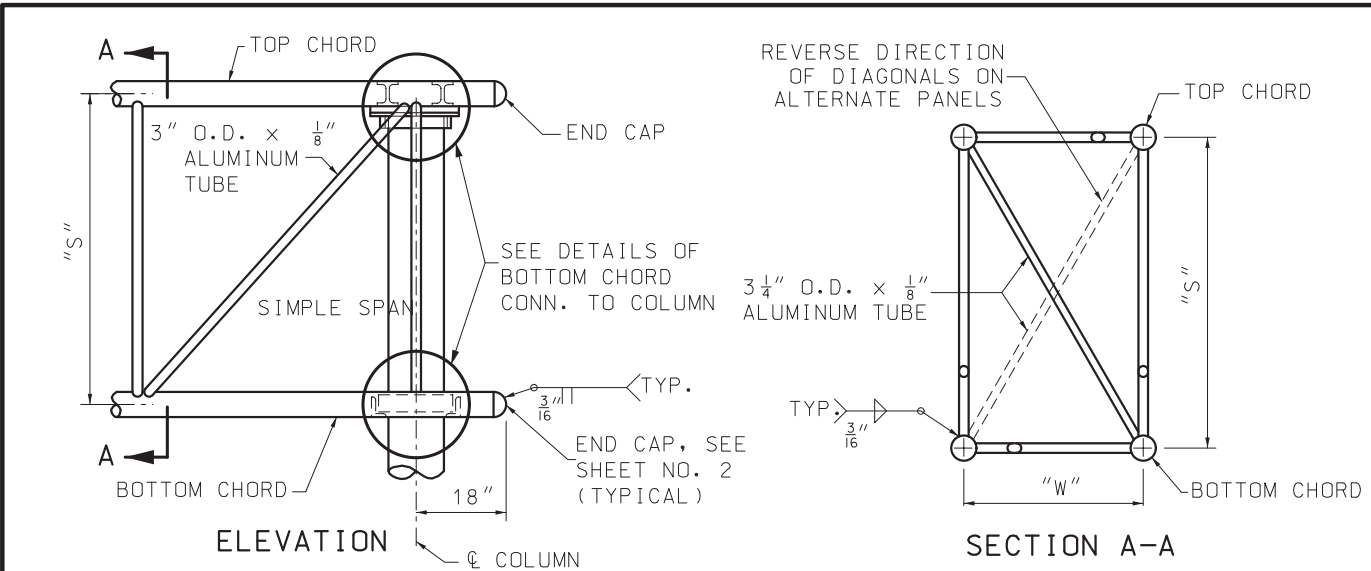
TUBE SIZE	BOLT NO. AND DIA.	TORQUE
4" DIA. TO ALL DIAMETERS	6- 3/4" DIA.	320 FT.LB. OR ONE-HALF TURN
4 1/2" DIA. THROUGH 6 1/2" DIA.	6- 3/4" DIA.	320 FT.LB. OR ONE-HALF TURN
7" DIA. THROUGH 7 1/2" DIA.	8- 3/4" DIA.	320 FT.LB. OR ONE-HALF TURN
8" DIA. THROUGH 9" DIA.	8- 7/8" DIA.	470 FT.LB. OR ONE-HALF TURN

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

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER

**OVERHEAD SIGN TRUSSES**  
 ALUMINUM

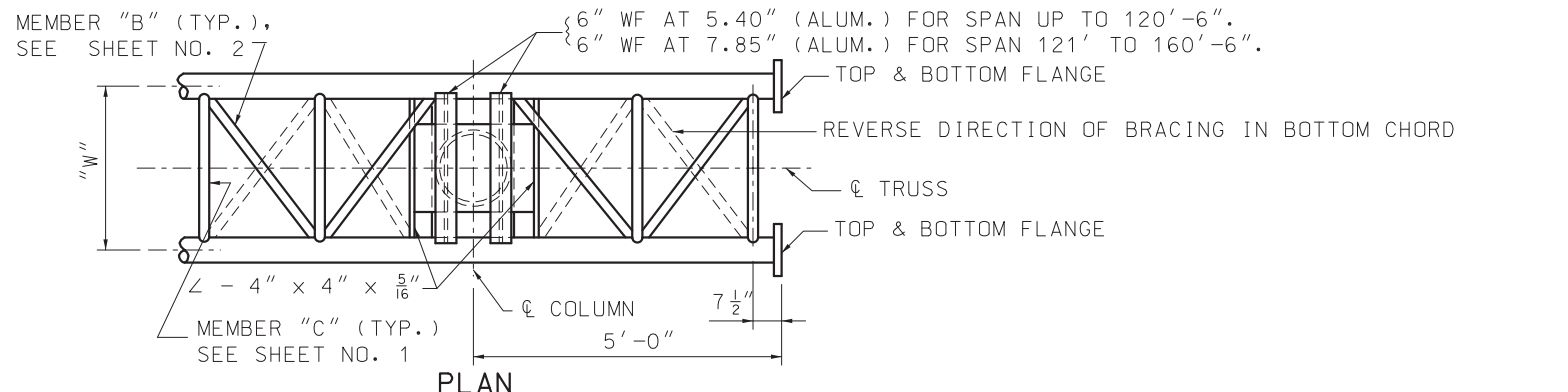
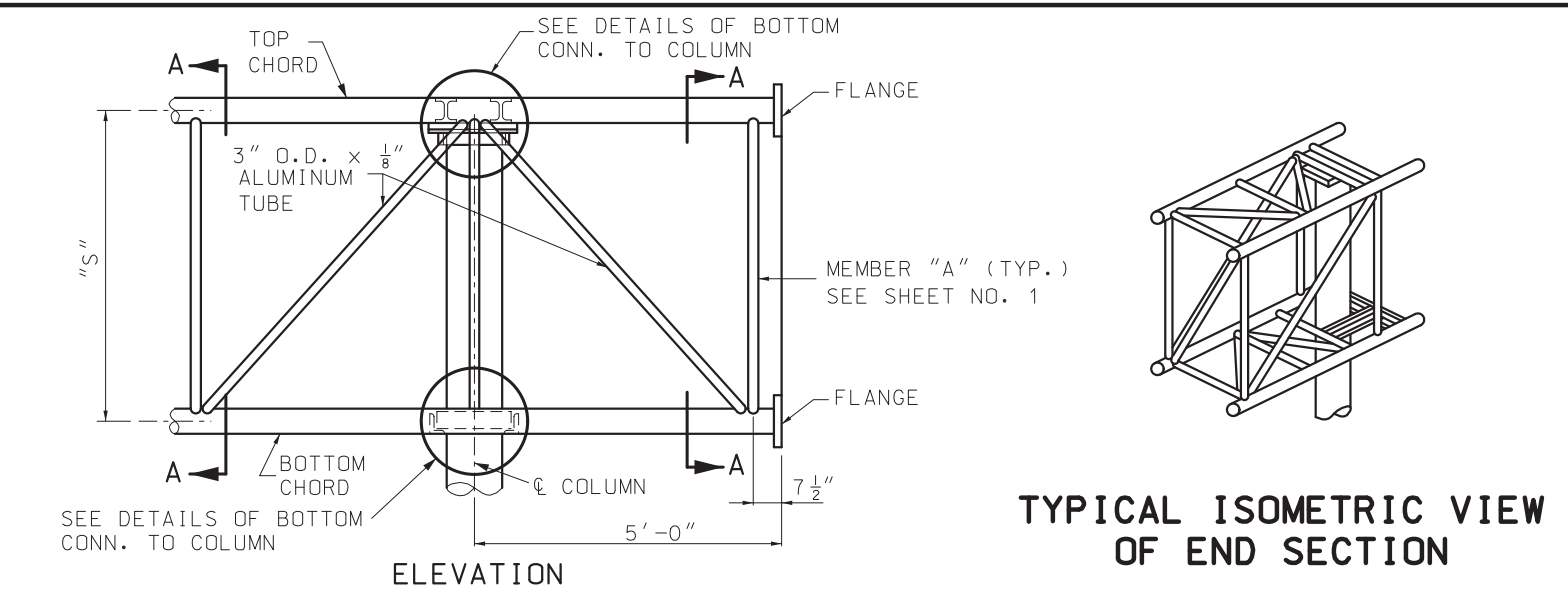
DATE EFFECTIVE: 10/1/2023	<b>903.10BE</b>	SHEET NO. 2 OF 6
DATE PREPARED: 7/6/2023		



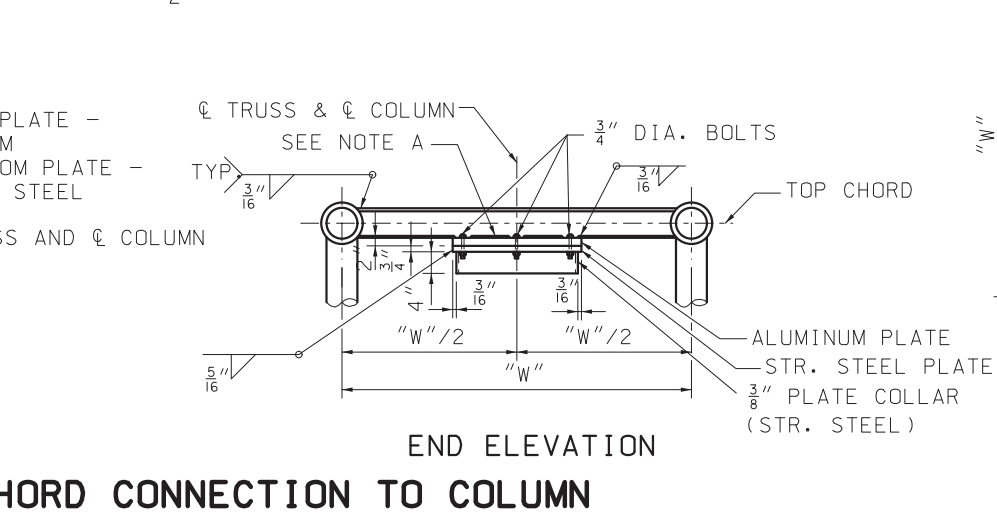
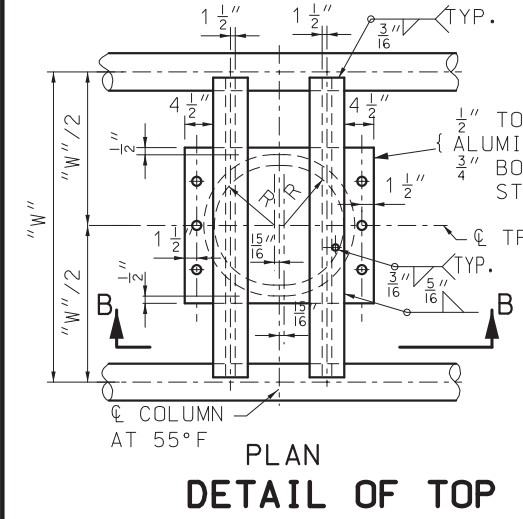
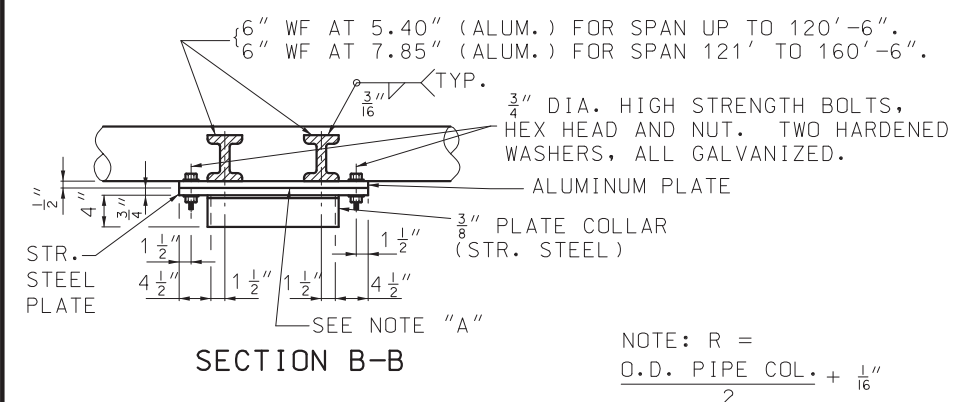
**TRUSS END WITHOUT CANTILEVER**

NOTE:  
FOR DIMENSIONS "S" AND "W" SEE SHEET NO. 1.

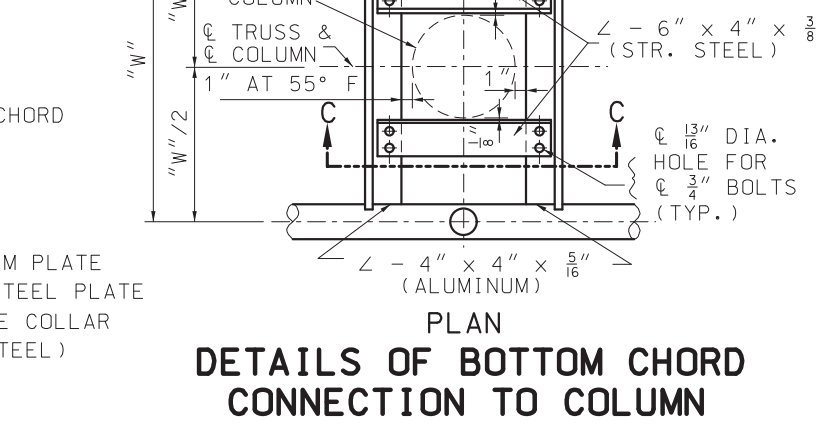
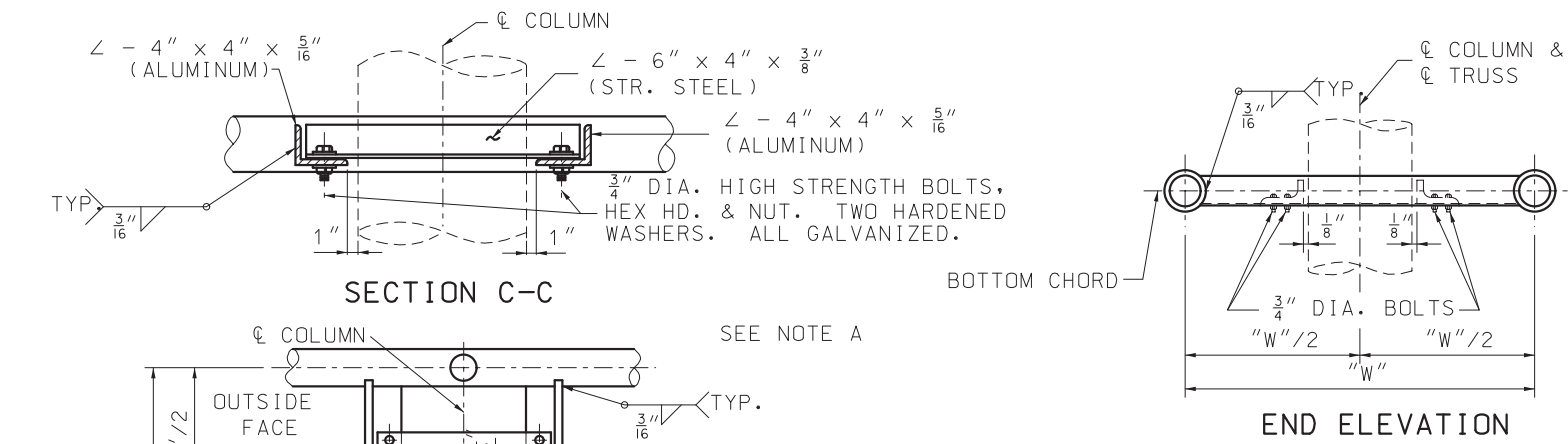
NOTE A:  
CONNECTIONS IN WHICH STEEL AND ALUMINUM ARE IN CONTACT SHALL BE PROTECTED AS FOLLOWS:  
ONE COAT ZINC CHROMATE ON ALUMINUM SURFACES.  
NORMAL CLEANING AND PAINTING ON STEEL SURFACES.  
TWO COATS ZINC CHROMATE REQUIRED IF STEEL IS GALVANIZED.



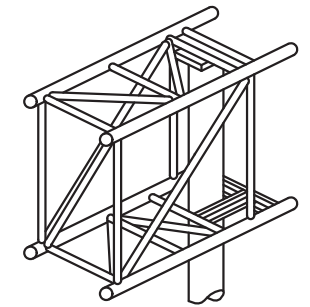
**TRUSS END MODIFIED FOR CANTILEVER**



**DETAIL OF TOP CHORD CONNECTION TO COLUMN**



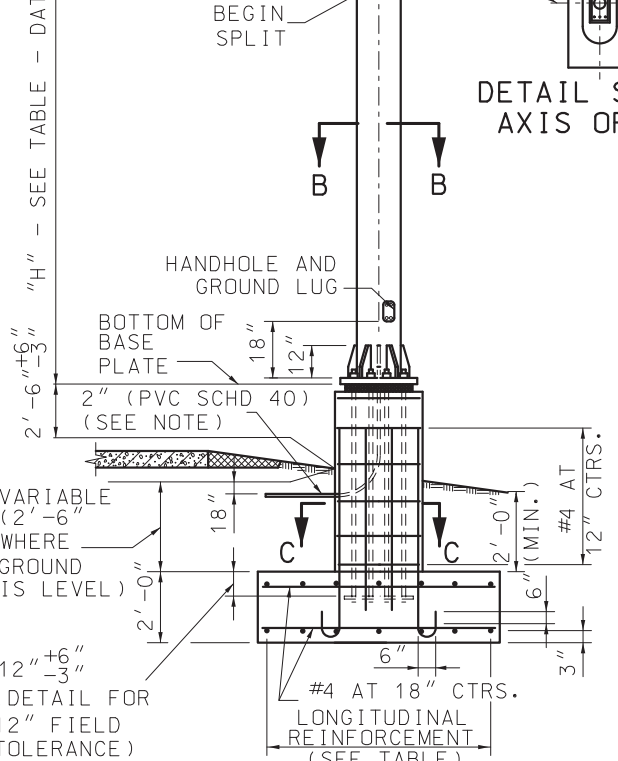
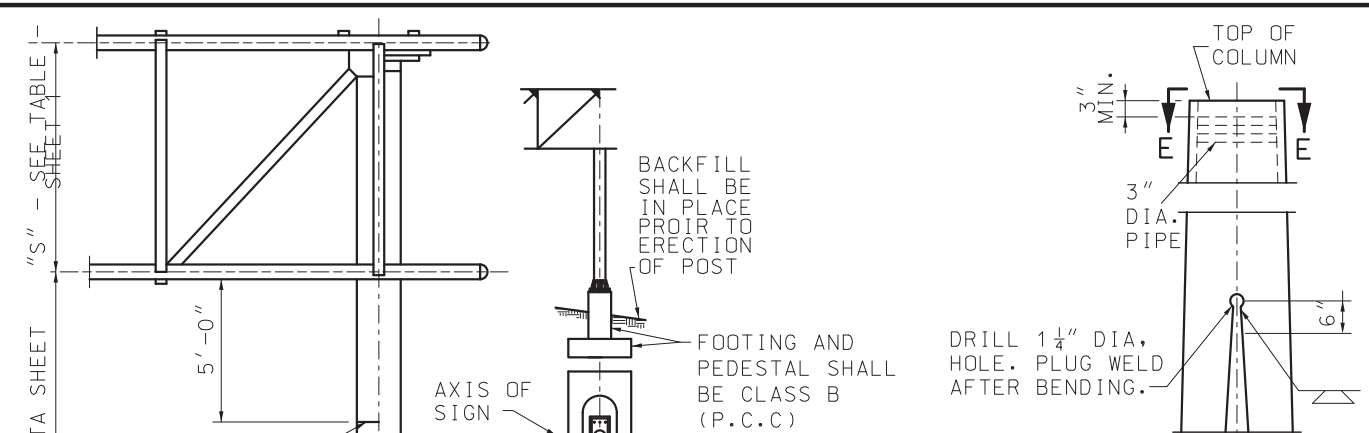
**DETAILS OF BOTTOM CHORD CONNECTION TO COLUMN**



**TYPICAL ISOMETRIC VIEW OF END SECTION**

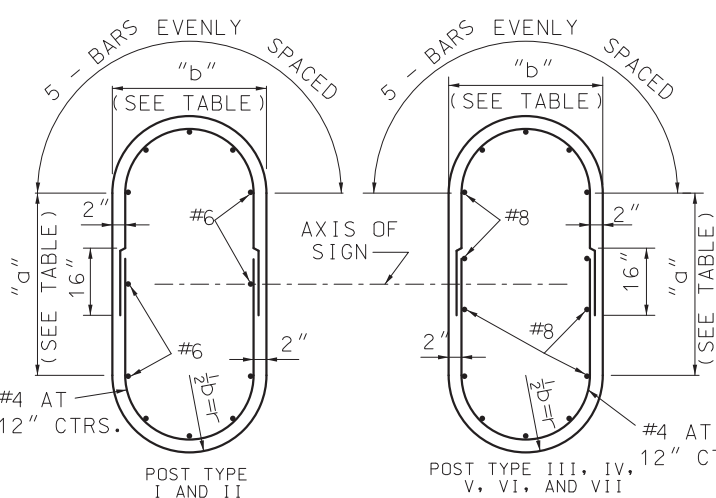
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>OVERHEAD SIGN TRUSSES</b> ALUMINUM	
	DATE EFFECTIVE: 10/1/2023 DATE PREPARED: 7/6/2023	<b>903.10BE</b> SHEET NO. 3 OF 6

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



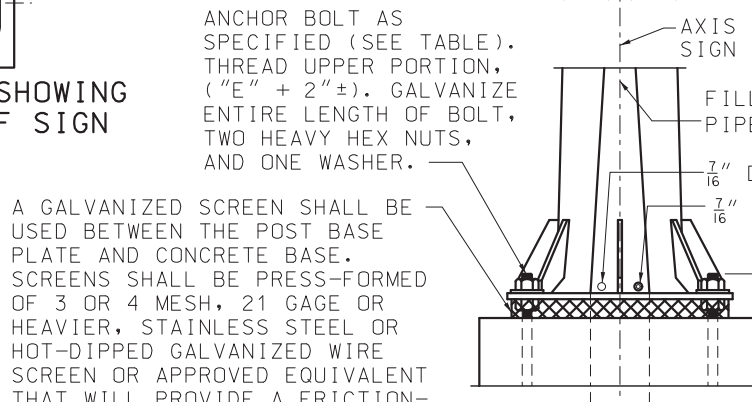
**ELEVATION**

NOTE: THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM RADIUS BEND OF 9 1/2".

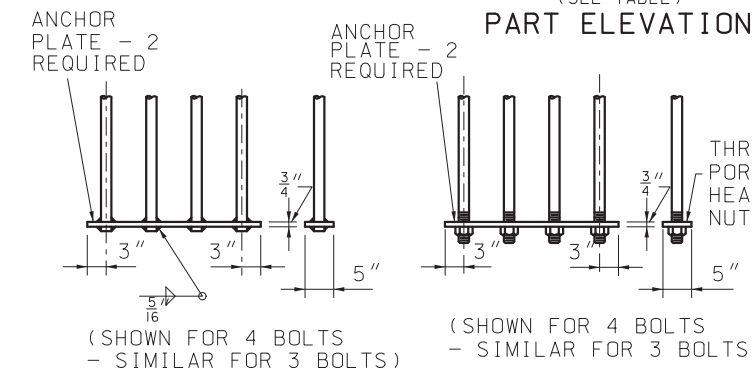


**SECTION C-C**

(TYPICAL SECTION SHOWING REINFORCING STEEL)  
NOTE: FOR DETAILS OF ALTERNATE PEDESTAL, SEE SHEET NO. 5 OF 6.

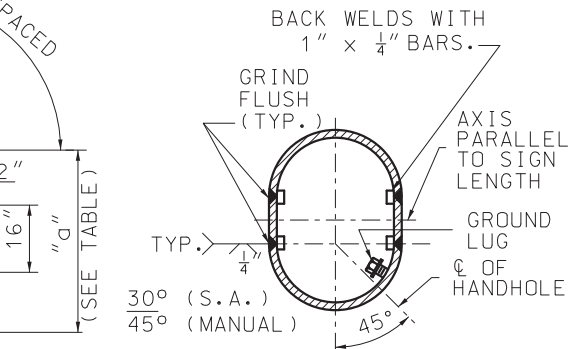


**PART ELEVATION**



**ANCHORAGE DETAIL A**

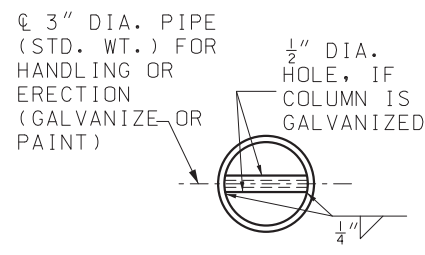
**ANCHORAGE DETAIL B (OPTIONAL)**



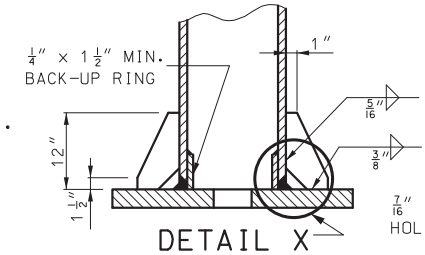
**SECTION B-B (FOR SPLIT COLUMNS ONLY)**

POST TYPE	PIPE COLUMN	DIMENSION "E"	SPLIT	BASE PLATE SIZE*	ANCHOR BOLTS DIA.	PEDESTAL SIZE*		FOOTING SIZE*	LONGITUDINAL FOOTING REINFORCEMENT		CONCRETE C.Y.
						a	b		TOP	BOTTOM	
I	12" STD. AT 65.42	8 1/2"	6"	2'-6" x 23" x 1 1/2"	6 AT 2 1/4"	4'-0"	2'-11"	7'-0" x 14'-6"	7-#5 BARS	7-#6 BARS	10.9
II	14" O.D. AT 72.09	8 1/2"	9 1/2"	3'-0" x 2'-0" x 1 1/2"	6 AT 2 1/4"	4'-4"	3'-0"	8'-0" x 16'-0"	8-#5 BARS	9-#6 BARS	13.2
III	16" O.D. AT 82.77	8 3/4"	11 1/2"	3'-4" x 2'-2" x 1 3/4"	6 AT 2 1/4"	4'-8"	3'-2"	8'-6" x 17'-6"	9-#5 BARS	9-#7 BARS	15.2
IV	18" O.D. AT 93.45	9 1/2"	12 1/2"	3'-7" x 2'-4" x 2"	6 AT 2 1/2"	5'-1"	3'-4"	9'-6" x 19'-0"	10-#5 BARS	10-#8 BARS	18.1
V	20" O.D. AT 104.13	9 1/2"	13"	3'-10" x 2'-9" x 2"	8 AT 2 1/2"	5'-4"	3'-9"	10'-0" x 20'-0"	10-#5 BARS	10-#8 BARS	20.6
VI	24" O.D. AT 125.49	9 1/2"	10 1/2"	4'-0" x 3'-3" x 2"	8 AT 2 1/2"	5'-6"	4'-3"	10'-6" x 21'-0"	11-#5 BARS	11-#8 BARS	23.3
VII	24" O.D. AT 125.49	9 1/2"	13 1/2"	4'-3" x 3'-3" x 2"	8 AT 2 1/2"	5'-9"	4'-3"	11'-0" x 22'-0"	11-#5 BARS	11-#9 BARS	25.1

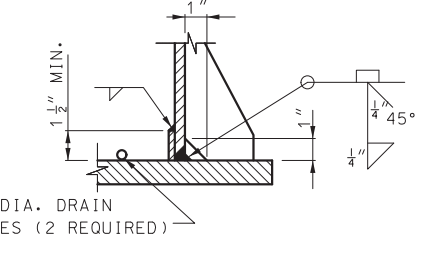
\* BASE PLATES, PEDESTAL, AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



**PART SECTION E-E**



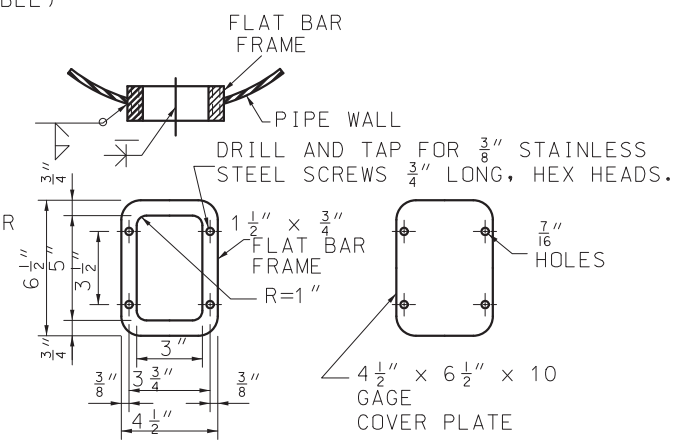
**PART SECTION A-A**



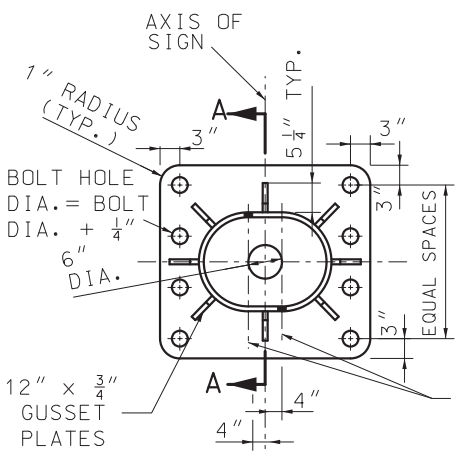
**DETAIL X**

GENERAL NOTES:

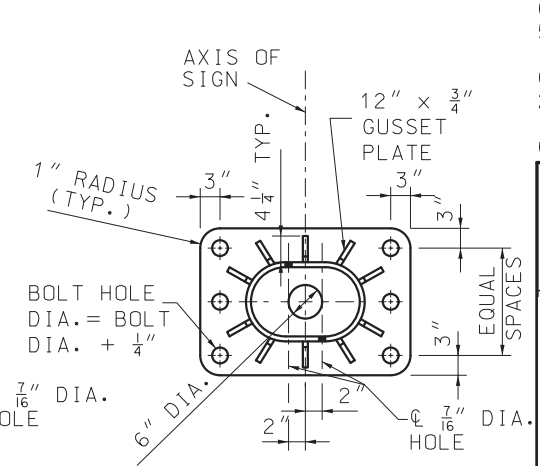
- A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.
- ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53. NO OBJECTIONABLE SEAMS WILL BE PERMITTED.
- ALL STRUCTURES SHALL BE GROUNDED.
- BURR THREADS ON ALL ANCHOR BOLTS.
- A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.



**HANDHOLE AND COVER DETAIL**  
NOTE: HANDHOLE REQUIRED ONLY IN POWER COLUMN.



**8 ANCHOR TYPE**



**6 ANCHOR TYPE**

**TYPICAL BASE PLATES**

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

**STATE OF MISSOURI**  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

**OVERHEAD SIGN TRUSSES**  
ALUMINUM

DATE EFFECTIVE: 10/1/2023  
DATE PREPARED: 7/6/2023

903.10BE

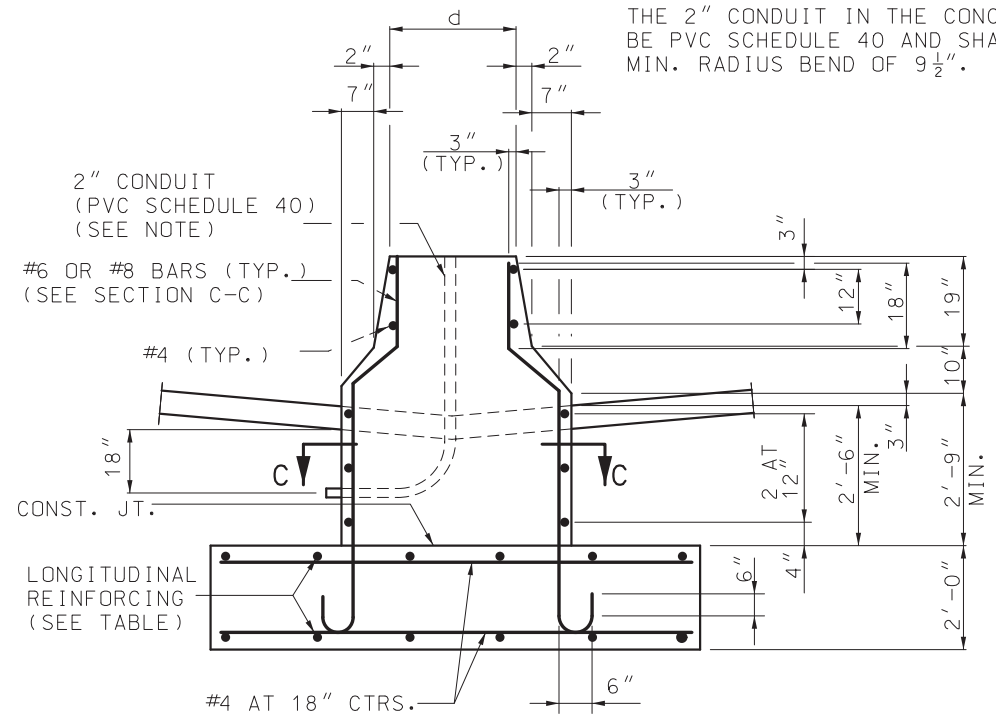
SHEET NO. 4 OF 6

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

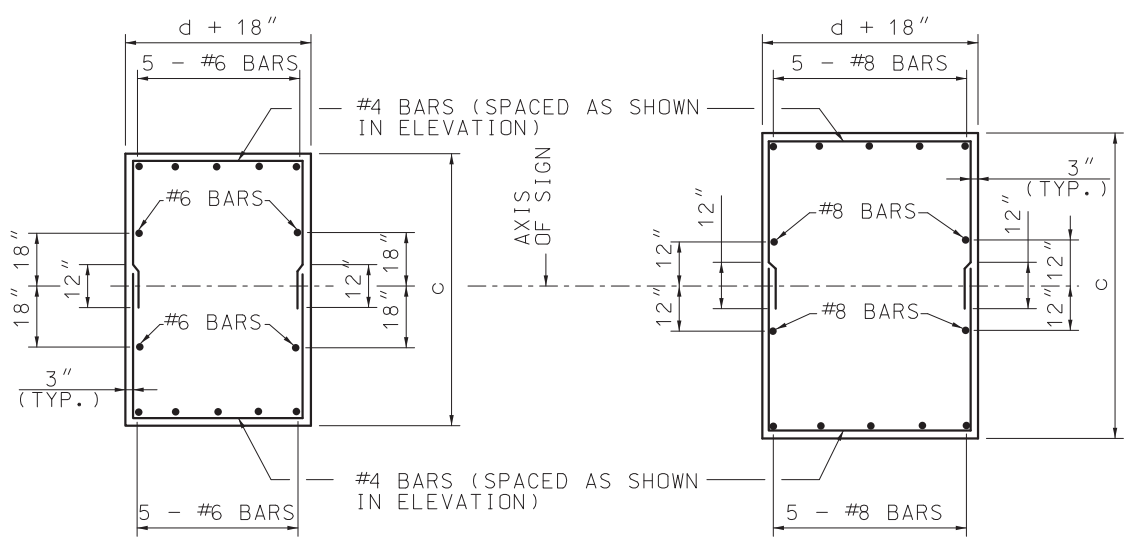


IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

NOTE:  
THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF 9 1/2".



**PART ELEVATION  
(TYPE A CONCRETE TRAFFIC BARRIER)**



**SECTION C-C  
TYPICAL SECTION SHOWING  
REINFORCING STEEL**

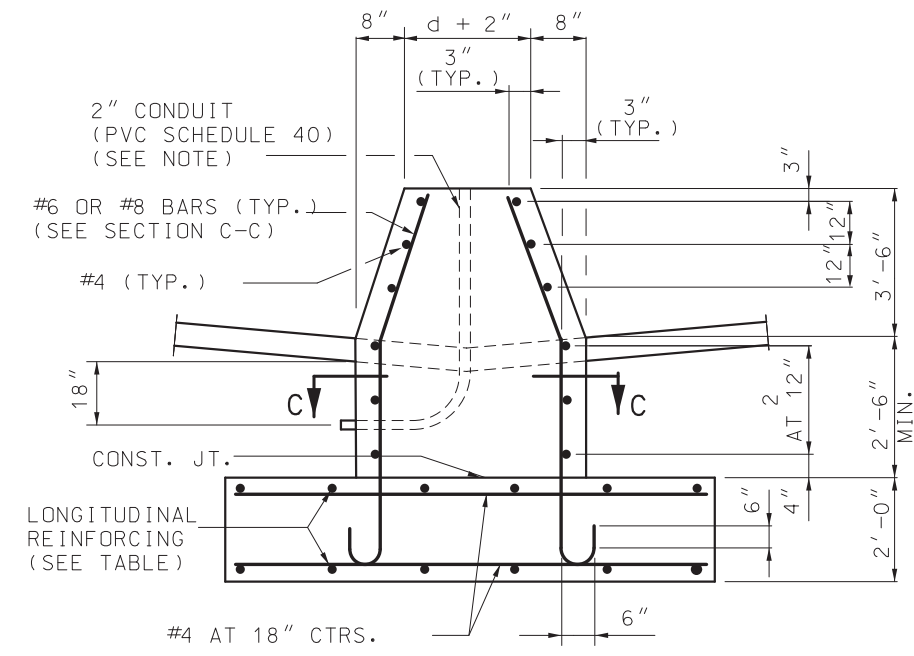
**DETAILS OF ALTERNATE PEDESTAL**

(TO BE USED ADJACENT TO TYPE "A" OR "C" MEDIAN BARRIER)

POST TYPE	PIPE COLUMN	PEDESTAL SIZE *		FOOTING SIZE *	LONGITUDINAL FOOTING REINFORCEMENT		CONCRETE C.Y.	
		c	d		TOP	BOTTOM	TYPE A MEDIAN BARRIER	TYPE C MEDIAN BARRIER
I	12" STD. AT 65.42	5'-9"	2'-1"	7'-0" x 14'-6"	7 - #5 BARS	7 - #6 BARS	10.9	11.6
II	14" O.D. AT 72.09	6'-2"	2'-2"	8'-0" x 16'-0"	8 - #5 BARS	9 - #6 BARS	13.2	14.0
III	16" O.D. AT 82.77	6'-7"	2'-4"	8'-6" x 17'-6"	9 - #5 BARS	9 - #7 BARS	15.2	16.1
IV	18" O.D. AT 93.45	7'-1"	2'-6"	9'-6" x 19'-0"	10 - #5 BARS	10 - #8 BARS	18.1	19.1
V	20" O.D. AT 104.13	7'-8"	2'-11"	10'-0" x 20'-0"	10 - #5 BARS	10 - #8 BARS	20.6	21.7
VI	24" O.D. AT 125.49	8'-3"	3'-5"	10'-6" x 21'-0"	11 - #5 BARS	11 - #8 BARS	23.3	24.6
VII	24" O.D. AT 125.49	8'-6"	3'-5"	11'-0" x 22'-0"	11 - #5 BARS	11 - #9 BARS	25.1	26.5

\* BASE PLATES, PEDESTAL, AND FOOTINGS LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.

NOTE:  
THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF 9 1/2".

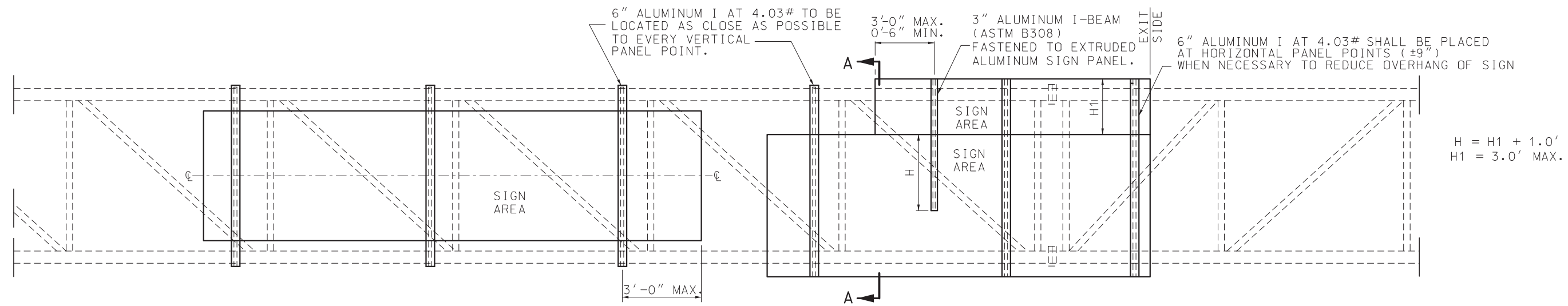


**PART ELEVATION  
(TYPE C CONCRETE TRAFFIC BARRIER)**

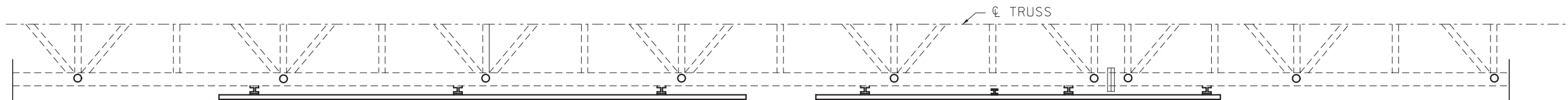
**GENERAL NOTES:**

- A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.
- ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; A.S.T.M. SPECIFICATION A53.
- NO OBJECTIONABLE SEAMS WILL BE PERMITTED.
- ALL STRUCTURES SHALL BE GROUNDED.
- BURR THREADS ON ALL ANCHOR BOLTS.
- PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET NO. 4 OF 6 FOR DETAILS OF THESE ITEMS.
- GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.
- QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5'-2" (TYPE A MEDIAN BARRIER) OR 6'-0" (TYPE C MEDIAN BARRIER).
- QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF 2'-0".
- QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

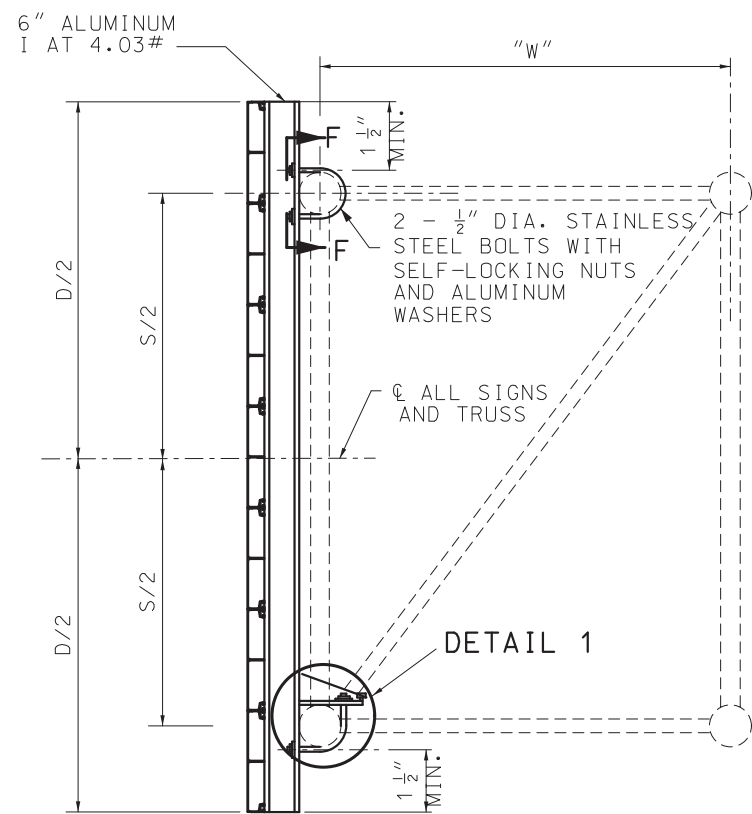
	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>OVERHEAD SIGN TRUSSES</b> ALUMINUM	
	DATE EFFECTIVE: 10/1/2023 DATE PREPARED: 7/6/2023	<b>903.10BE</b>



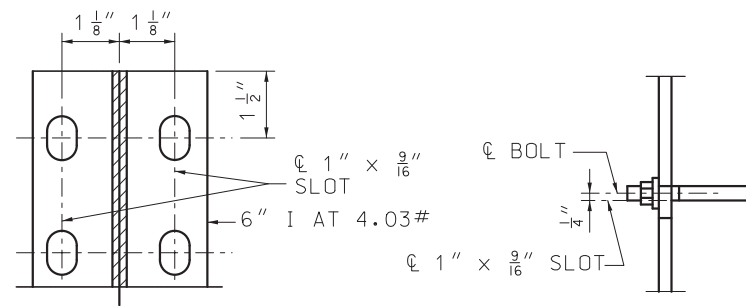
TYPICAL ELEVATION OF SIGN COMPONENTS



TYPICAL HALF PLAN OF SIGN COMPONENTS

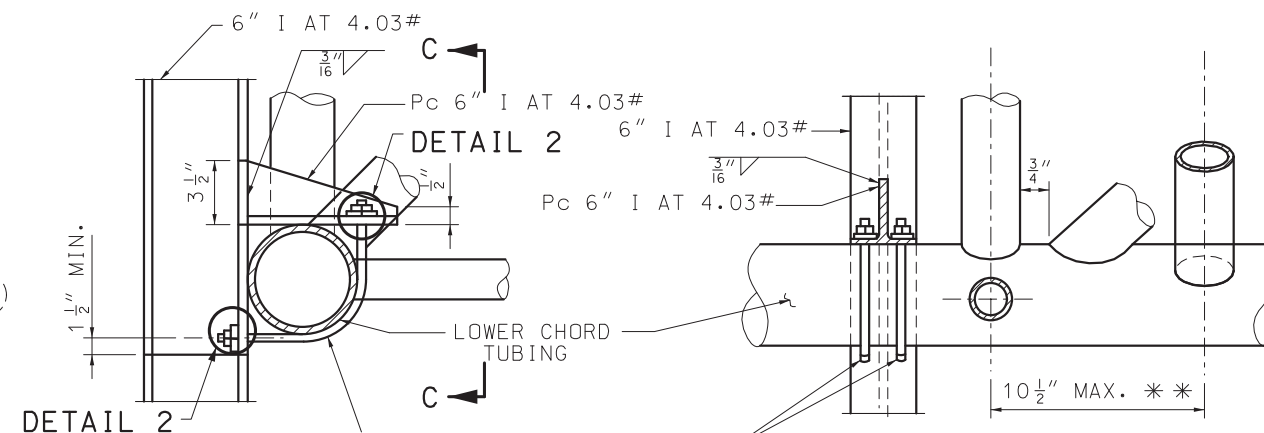


SECTION A-A  
TYPICAL SECTION OF SIGN SUPPORT



SECTION F-F

DETAIL 2



DETAIL 1

SECTION C-C

\*\* LOCATE THE INTERIOR DIAGONAL AS CLOSE AS POSSIBLE TO THE CENTERLINE OF THE PANEL POINT WITHOUT OVER-LAPPING WELDS.

GENERAL NOTES:

EXIT NO. PANELS SHALL BE MOUNTED FLUSH WITH THE EXIT SIDE OF THE GUIDE SIGN.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL CL OF THE TRUSS.

SEE STD. PLAN 903.09 FOR LIGHTING DETAILS IF LIGHTING THE SIGN IS NECESSARY.

SEE STD. PLAN 903.03 FOR SIGN MOUNTING DETAILS.

ALL MATERIAL ALUMINUM EXCEPT AS NOTED.

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

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

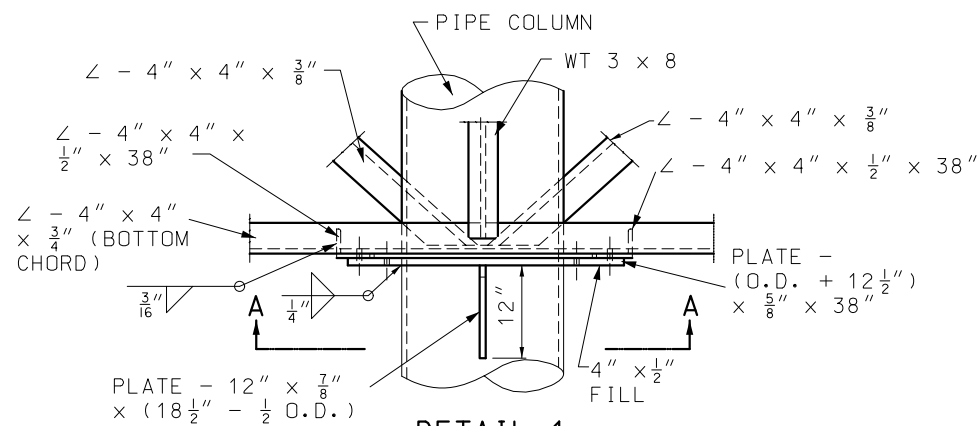
**OVERHEAD SIGN TRUSSES**  
 SIGN MOUNTING DETAIL

DATE EFFECTIVE: 10/1/2023  
 DATE PREPARED: 7/6/2023

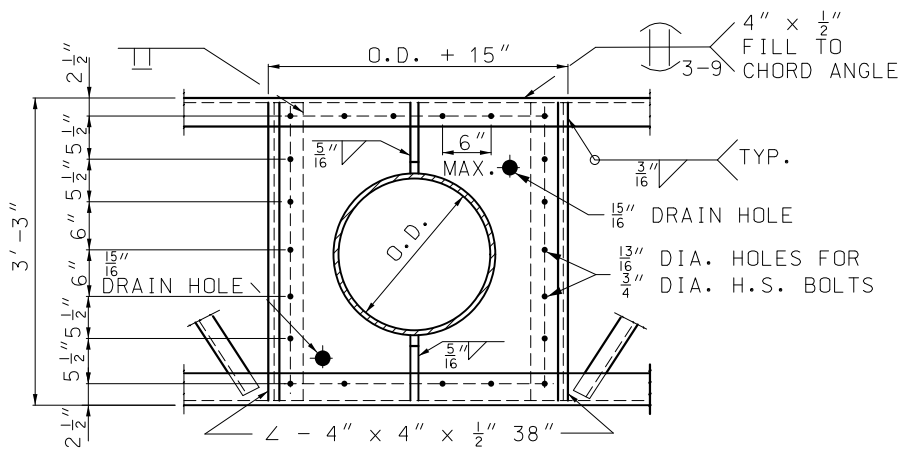
**903.10BE**

SHEET NO.  
 6 OF 6

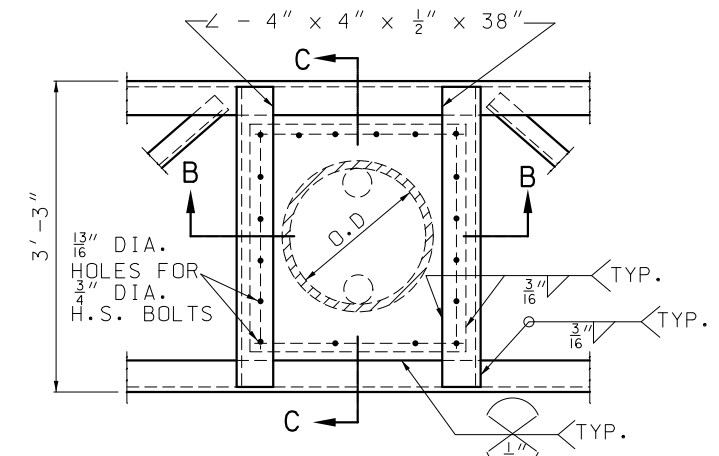
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



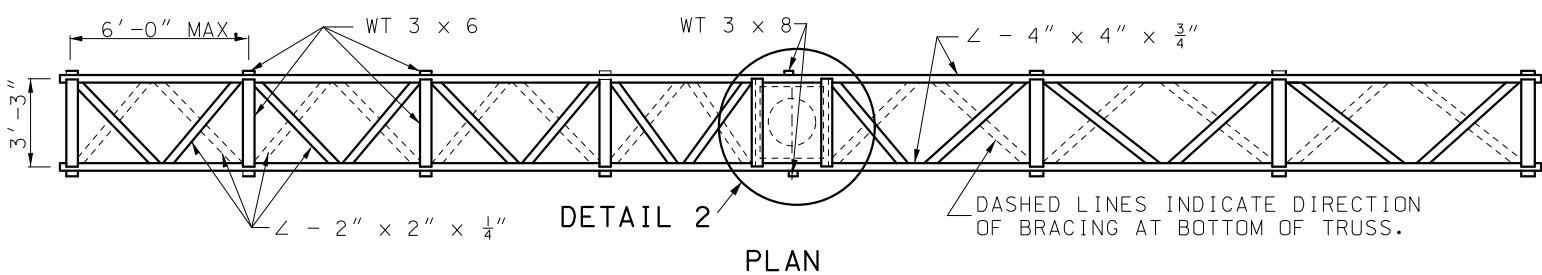
**DETAIL 1**  
TRUSS BOTTOM CONNECTION TO COLUMN



**SECTION A-A**

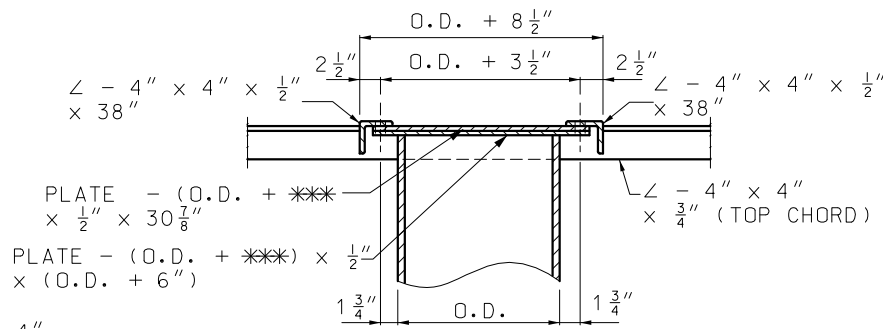


**DETAIL 2**  
TRUSS TOP CONNECTION TO COLUMN

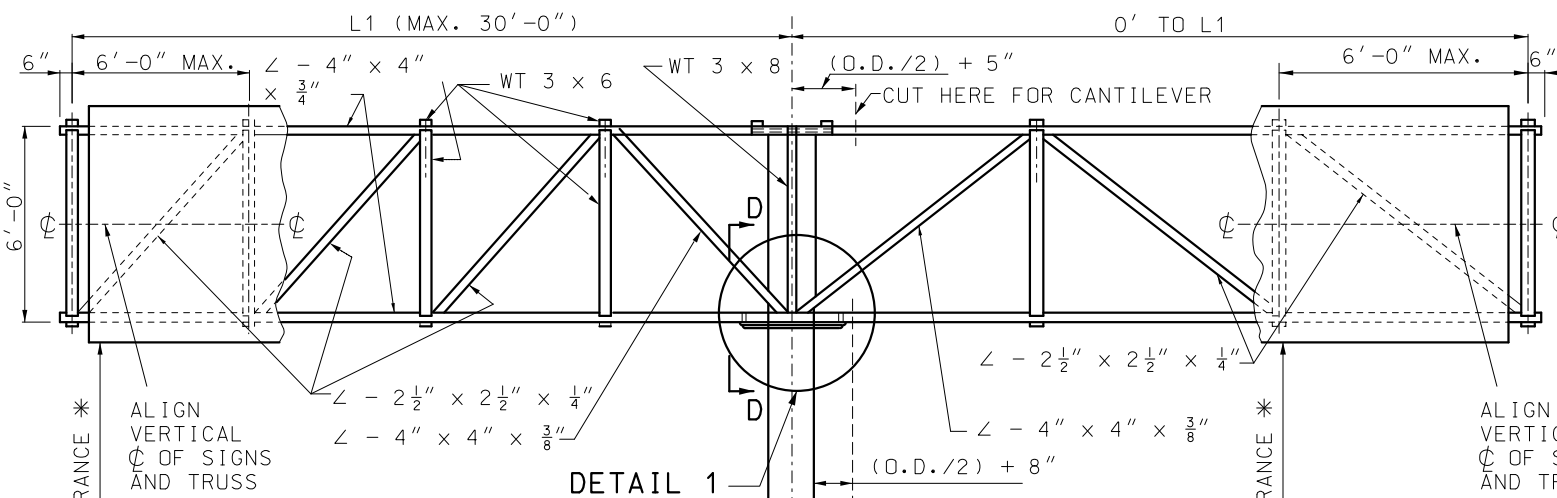


**DETAIL 2**  
PLAN

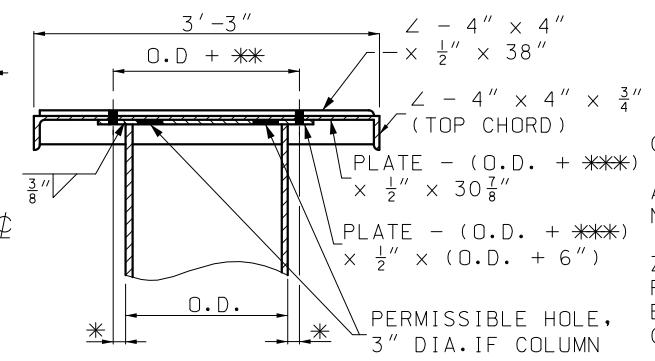
- \* 1 1/2" FOR POST TYPE VII  
1 3/4" FOR ALL OTHER POST TYPES
- \*\* 3" FOR POST TYPE VII  
3 1/2" FOR ALL OTHER POST TYPES
- \*\*\* 5 1/2" FOR POST TYPE VII  
6" FOR ALL OTHER POST TYPES



**SECTION B-B**



**DETAIL 1**

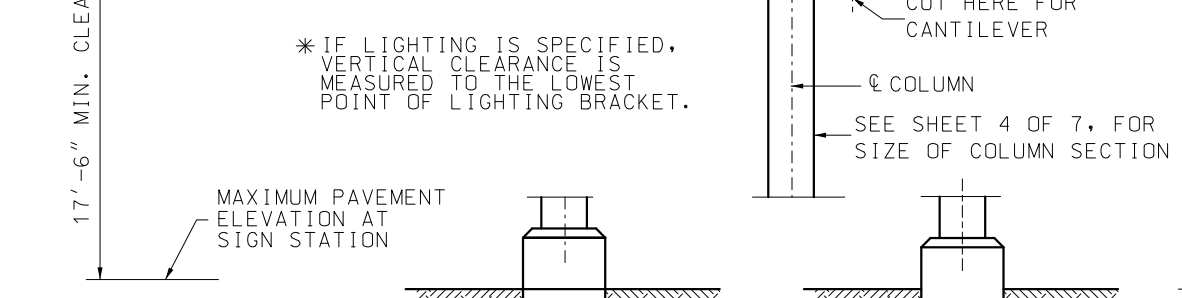


**SECTION C-C**

**GENERAL NOTES:**  
ALL FASTENERS SHALL HAVE A HARDENED WASHER UNDER THE NUT OR BOLT HEAD, WHICHEVER IS TURNED IN TIGHTENING.  
ZINC CHROMATE PRIMER SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATION TT-P-645 OR TT-P-1757 AND SHALL BE ACCEPTED ON THE BASIS OF THE LABEL SHOWING CONFORMANCE OR A MANUFACTURER'S CERTIFICATION.

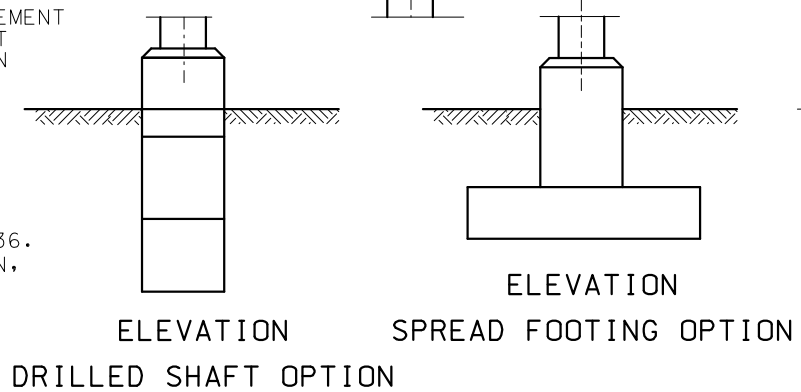
DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND CURRENT INTERIMS.  
DESIGN OF SPREAD FOOTINGS SHALL COMPLY WITH 1994 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL  $\phi$  OF THE TRUSS.

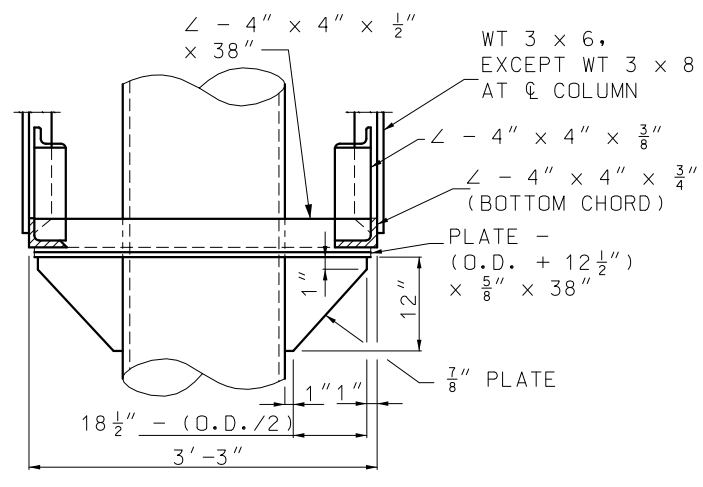


**DETAIL 1**

**NOTE:**  
TRUSSES AND COLUMN BASE PLATES: ASTM A36, ANCHOR BOLTS: ASTM F1554, GRADE 36. FOR ADDITIONAL INFORMATION, SEE DATA SHEET.



**ELEVATION**  
DRILLED SHAFT OPTION      **ELEVATION**  
SPREAD FOOTING OPTION



**SECTION D-D**

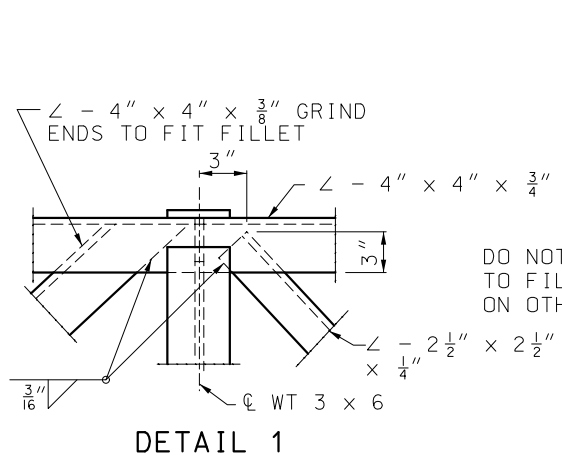
**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
105 WEST CAPITOL JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

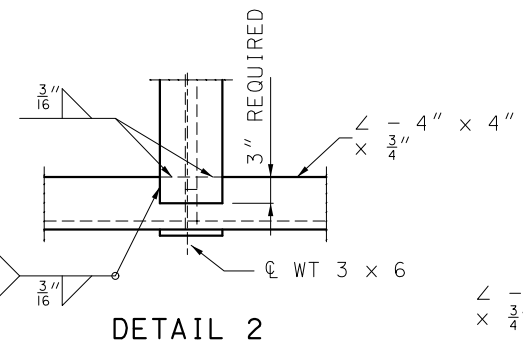
**OVERHEAD SIGN TRUSSES**  
BUTTERFLY AND CANTILEVER  
STRUCTURAL STEEL

DATE EFFECTIVE: 01-01-2021	<b>903.12AA</b>	SHEET NO. 1 OF 7
DATE PREPARED: 10/14/2020		

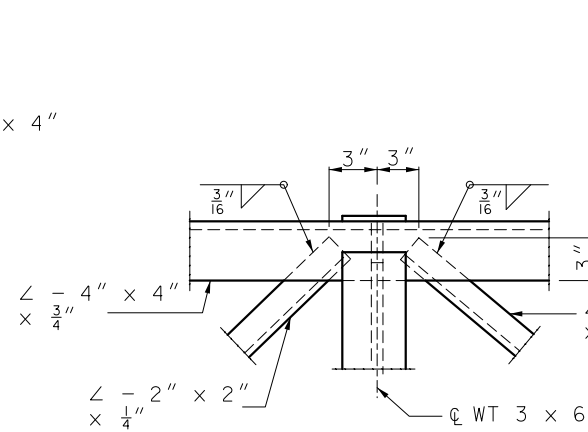
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



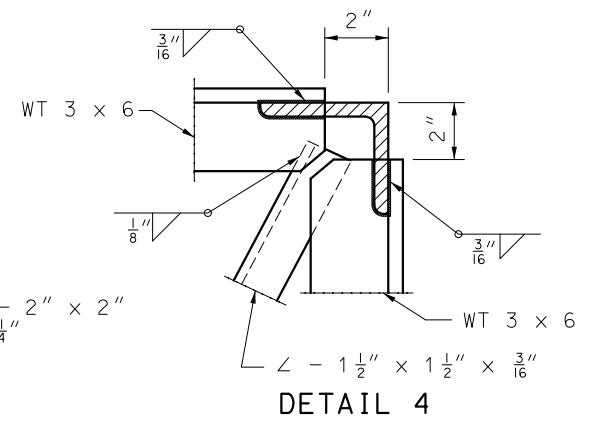
DETAIL 1



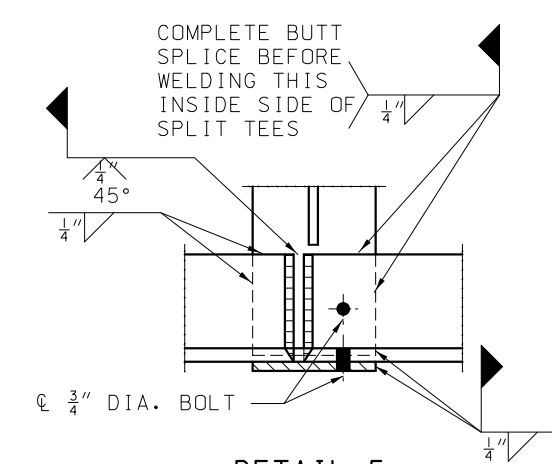
DETAIL 2



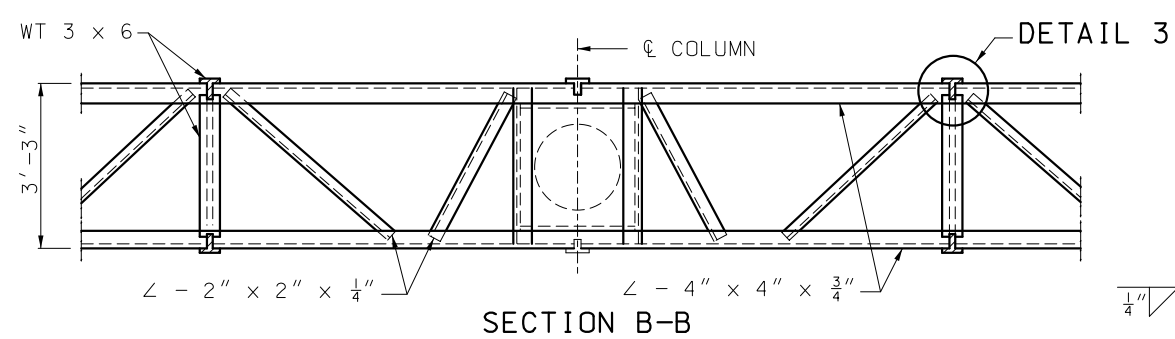
DETAIL 3



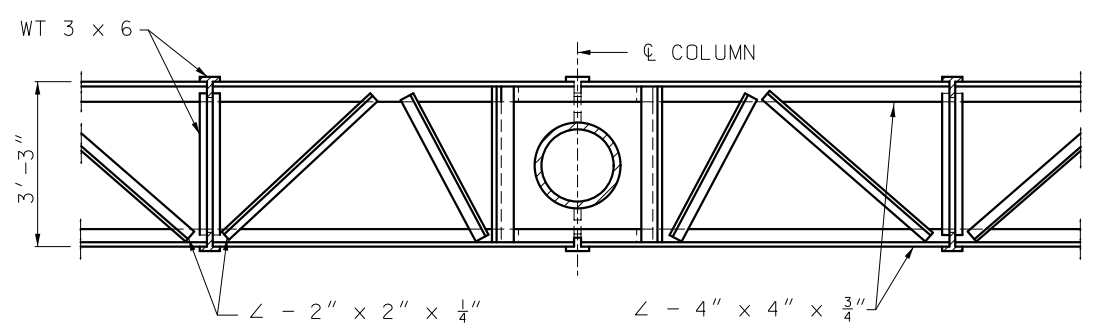
DETAIL 4



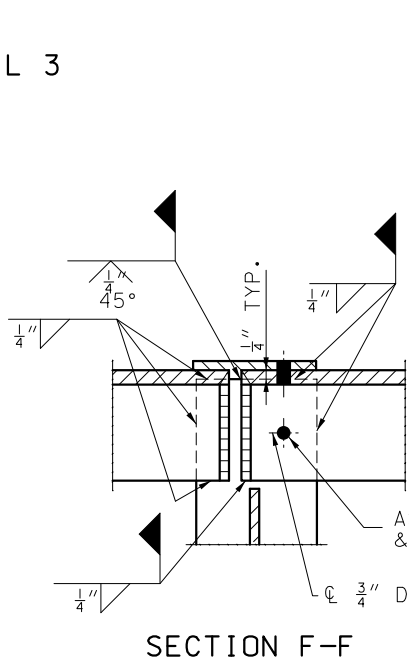
DETAIL 5



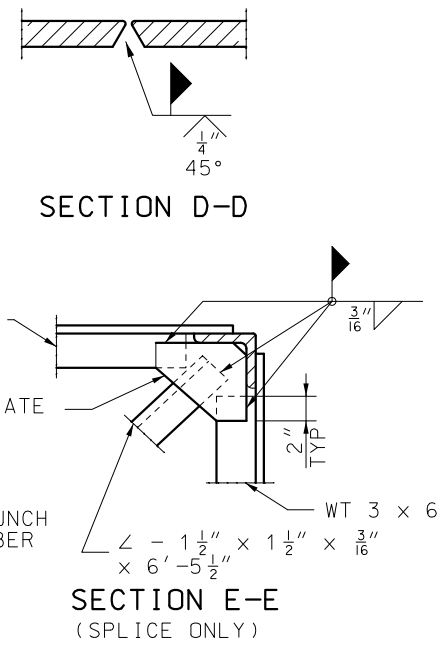
SECTION B-B



SECTION C-C

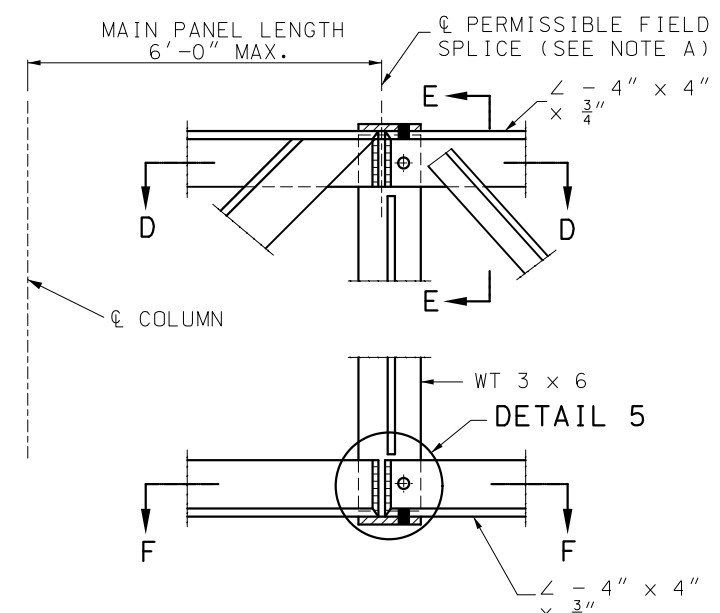


SECTION F-F



SECTION D-D

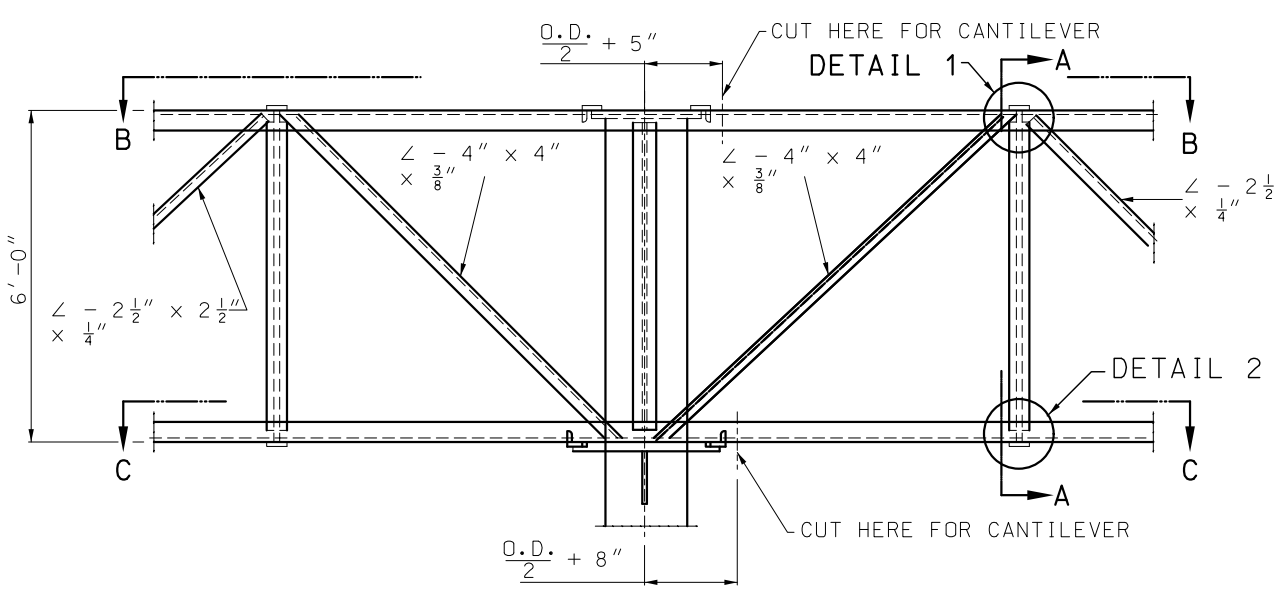
SECTION E-E (SPLICE ONLY)



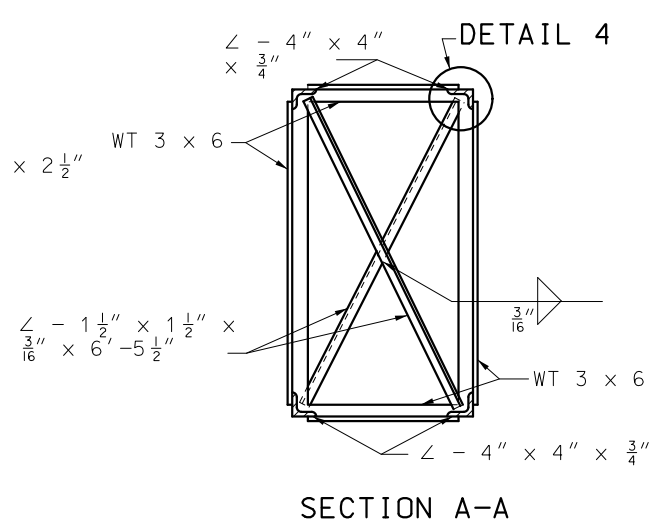
LOCATION OF FIELD SPLICE

NOTE: 3/4" DIA. BOLTS SHALL BE REMOVED AFTER WELDING IS COMPLETE. BOLT HOLES SHALL BE PLUGGED AND THE OUTSIDE FACE GROUND SMOOTH.

NOTE A: SPLICING CHORD ANGLES IN THE SHOP AND THE FIELD SPLICE SHOWN IN THIS SHEET WILL NOT BE ALLOWED WITHOUT SPECIAL PERMISSION. IF PERMISSION IS GRANTED SUCH SPLICES SHALL BE LOCATED AT THE CENTER LINE OF MAIN PANEL POINT NEXT TO COLUMN.



PART ELEVATION OF BUTTERFLY TRUSS

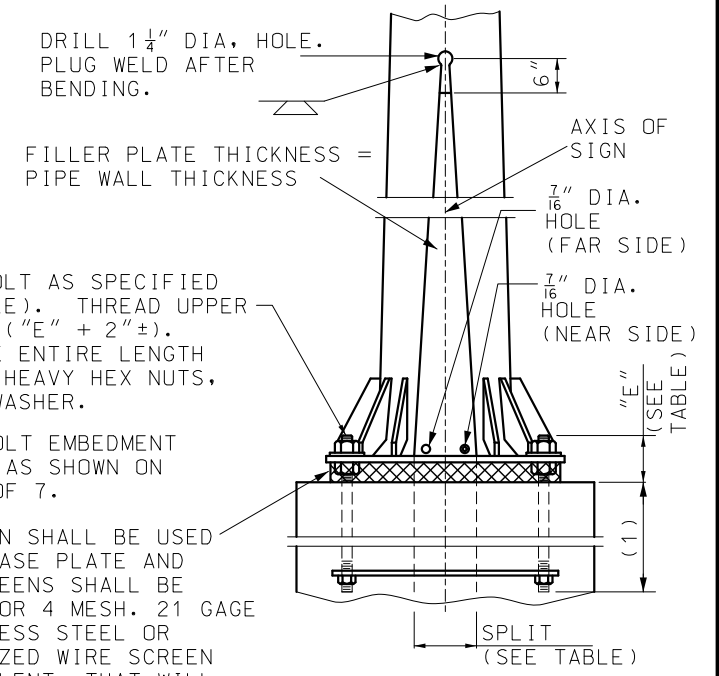
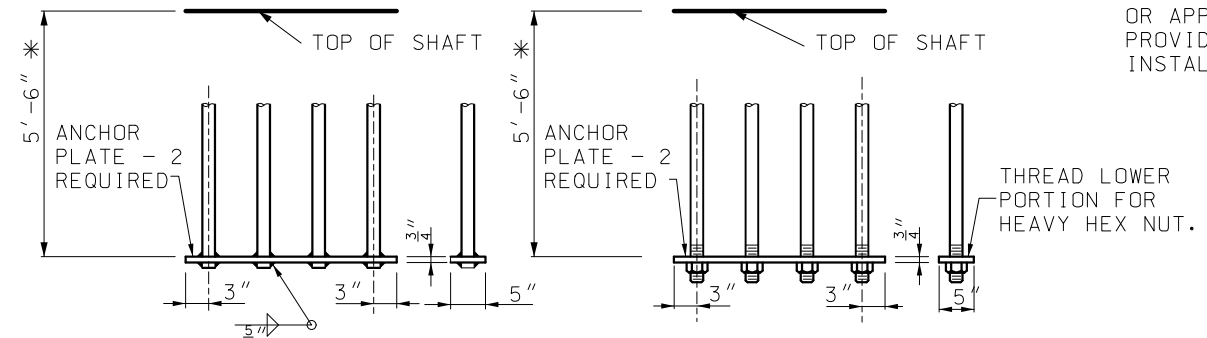
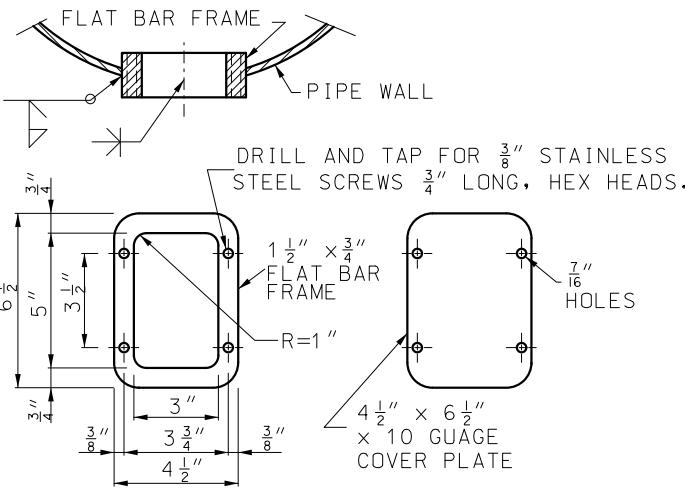
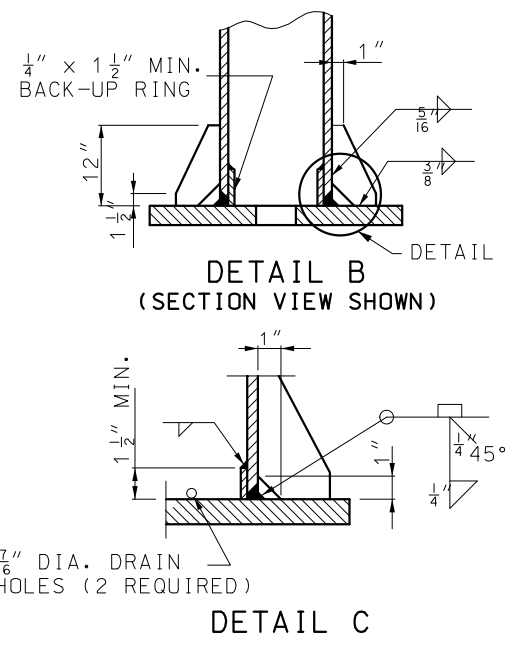
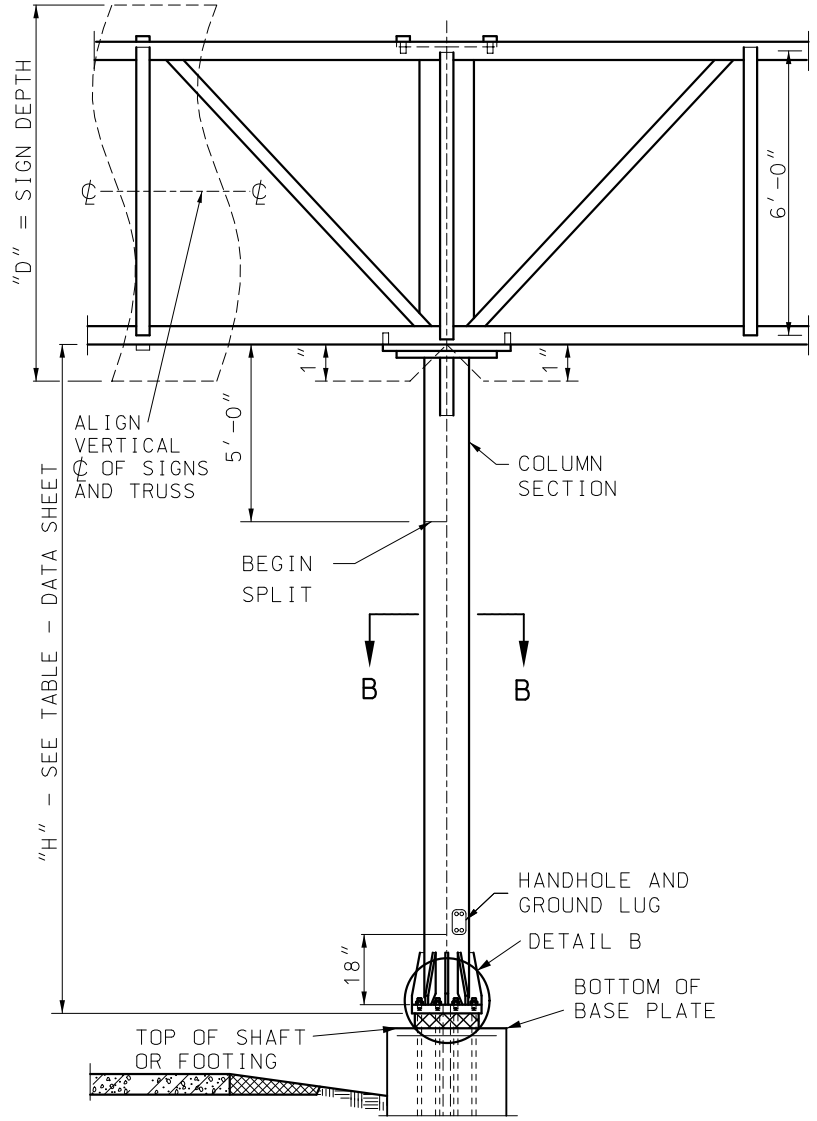


SECTION A-A

NOTE: SHRINK 1 1/2 x 1 1/2 x 3/16 IF NECESSARY TO TAKE UP DISTORTIONAL SLACK.

		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
		105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>OVERHEAD SIGN TRUSSES</b> BUTTERFLY & CANTILEVER STRUCTURAL STEEL	
DATE EFFECTIVE: 01-01-2021 DATE PREPARED: 10/14/2020	<b>903.12AA</b>	SHEET NO. 2 OF 7	

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



ANCHOR BOLT AS SPECIFIED (SEE TABLE). THREAD UPPER PORTION, ("E" + 2"±). GALVANIZE ENTIRE LENGTH OF BOLT, HEAVY HEX NUTS, AND ONE WASHER.

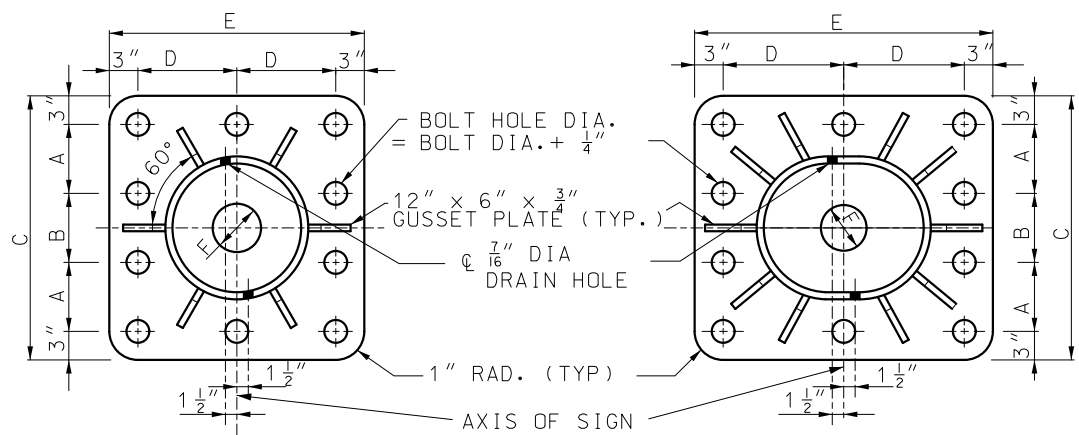
(1) ANCHOR BOLT EMBEDMENT SHALL BE AS SHOWN ON SHEET 6 OF 7.

A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE OR HEAVIER, STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT, THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.

GENERAL NOTES:

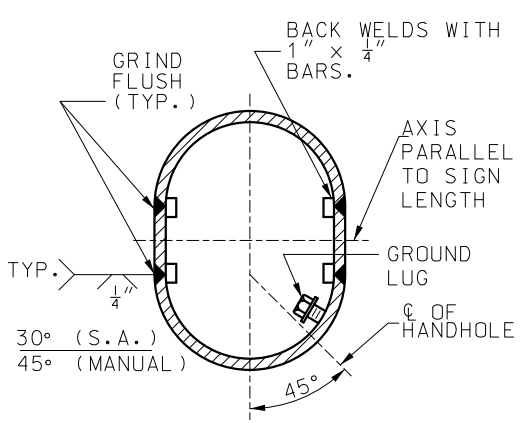
- SUBSTRUCTURE SHALL BE BACKFILLED PRIOR TO ERECTION OF POST.
- ASTM A 106 GRADE B STEEL PIPE OR A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.
- ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53.
- ALL STRUCTURES SHALL BE GROUNDED.
- BURR THREADS ON ALL ANCHOR BOLTS.
- A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.
- GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.
- ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL C OF THE TRUSS.

DETAIL A ANCHORAGE (BOTH DETAILS ARE SHOWN FOR 4 BOLTS - SIMILAR FOR 3 BOLTS)  
 \* DIMENSION SHOWN FOR DRILLED SHAFT OPTION. FOR SPREAD FOOTING OPTION REFER TO SHEET 6 OF 7.



III AND IV B.C. TYPICAL BASE PLATES V, VI, AND VII B.C.

TYPICAL BASE PLATE (10 ANCHOR TYPE) BUTTERFLY AND CANTILEVER (B.C.)					
	III	IV	V	VI	VII
A	8"	9"	8"	9"	10 1/2"
B	10"	10"	10"	10"	11"
C	32"	34"	32"	34"	38"
D	13"	14"	16 1/2"	18"	20"
E	32"	34"	39"	42"	46"
F	6"	6"	6"	6"	6"



SECTION B-B (FOR SPLIT COLUMNS ONLY)

NOTE:  
 FOR DETAILS OF OPTIONAL SUBSTRUCTURES, SEE OTHER SHEETS.  
 ANCHOR BOLTS AND PLATE NOT SHOWN.

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

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**OVERHEAD SIGN TRUSS COLUMN AND BASE PLATES**

DATE EFFECTIVE: 01-01-2021	<b>903.12AA</b>	SHEET NO. 3 OF 7
DATE PREPARED: 10/14/2020		


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

DRILLED SHAFT OPTION																									ALTERNATE PEDESTALS						
POST TYPE	PIPE COLUMN		"E"	SPLIT	BASE PLATE SIZE**	ANCHOR BOLT		C	FA	FB	FC	FD	FH	COLLAR REINFORCEMENT						SHAFT REINFORCEMENT				REBAR TOTAL (LBS.)	CONCRETE (CU.YDS.)	REBAR TOTAL (LBS.)		CONCRETE (CU.YDS.)			
	O.D.	WEIGHT (LBS.)				NO.	DIA.							MOMENT-C1		SHEAR-C2		SKIN-C3		LONGITUDINAL S1		SHEAR-S2				REBAR TOTAL (LBS.)	CONCRETE (CU.YDS.)	TYPE A	TYPE C	TYPE A	TYPE C
														BARS	SPACING	BARS	SPACING	BARS	SPACING	QUANTITY	BARS	BARS	SPACING								
III	18"	93.45	8 1/2"	0"	2'-8" x 2'-8" x 1 3/4"	10	2"	2'-10"	4'-0"	7'-6"	1'-6"	4'-6"	14'-0"	#6	6"	#4	12"	#4	12"	19	#10	#5	6"	2126	12.4	2066	2077	13.4	14.5		
IV	20"	104.13	8 1/2"	0"	2'-10" x 2'-10" x 2"	10	2 1/4"	3'-0"	4'-0"	7'-6"	1'-6"	4'-6"	14'-0"	#6	6"	#4	12"	#4	12"	19	#10	#5	6"	2126	12.4	2066	2077	13.5	14.6		
V	18"	93.45	8 1/2"	7"	3'-3" x 2'-8" x 2"	10	2 1/4"	2'-10"	5'-0"	13'-6"	4'-0"	5'-6"	17'-0"	#6	6"	#4	12"	#4	12"	22	#11	#6	6"	3901	26.5	3763	3782	28.8	30.7		
VI	20"	104.13	8 1/2"	8"	3'-6" x 2'-10" x 2 1/4"	10	2 1/4"	3'-0"	5'-0"	14'-0"	4'-0"	6'-0"	18'-0"	#6	6"	#4	12"	#4	12"	27	#11	#6	6"	4742	31.8	4528	4547	34.1	36.2		
VII	24"	125.49	9"	8"	3'-10" x 3'-2" x 2 1/4"	10	2 1/2"	3'-4"	5'-0"	14'-0"	4'-0"	6'-0"	18'-0"	#6	6"	#4	12"	#4	12"	27	#11	#6	6"	4742	31.8	4528	4547	34.5	36.8		

SPREAD FOOTING OPTION																								
POST TYPE	PIPE COLUMN		"E"	SPLIT	BASE PLATE SIZE**	ANCHOR BOLT		PEDESTAL SIZE *		FOOTING SIZE *	LONGITUDINAL FOOTING REINFORCEMENT				PEDESTAL REINFORCEMENT				REBAR TOTAL (LBS.)	CONCRETE (CU.YDS.)				
	O.D.	WEIGHT (LBS.)				NO.	DIA.	a	b		TOP		BOTTOM											
											NO.	BARS	NO.	BARS	NO.	BARS	NO.	BARS			NO.	BARS		
III	18"	93.45	8 1/2"	0"	2'-8" x 2'-8" x 1 3/4"	10	2"	4'-2"	3'-8"	10'-0" x 13'-0"	10	#5	10	#5	10	#4	14	#8	695	14.4				
IV	20"	104.13	8 1/2"	0"	2'-10" x 2'-10" x 2"	10	2 1/4"	4'-4"	3'-10"	10'-0" x 14'-0"	10	#5	10	#5	10	#4	14	#8	733	15.6				
V	18"	93.45	8 1/2"	7"	3'-3" x 2'-8" x 2"	10	2 1/4"	4'-9"	3'-8"	9'-0" x 17'-0"	9	#5	10	#7	10	#4	14	#8	955	16.5				
VI	20"	104.13	8 1/2"	8"	3'-6" x 2'-10" x 2 1/4"	10	2 1/4"	5'-0"	3'-10"	9'-0" x 19'-0"	9	#5	10	#7	10	#4	14	#8	1028	18.4				
VII	24"	125.49	9"	8"	3'-10" x 3'-2" x 2 1/4"	10	2 1/2"	5'-4"	4'-2"	10'-0" x 20'-0"	9	#5	12	#7	10	#4	14	#8	1196	21.5				

SPREAD FOOTING OPTION WITH ALTERNATE PEDESTALS																															
POST TYPE	PIPE COLUMN		"E"	SPLIT	BASE PLATE SIZE**	ANCHOR BOLT		PEDESTAL SIZE *			FOOTING SIZE *	TYPE A LONGITUDINAL FOOTING REINFORCEMENT				TYPE A PEDESTAL REINFORCEMENT				TYPE A REBAR TOTAL (LBS.)	TYPE A CONCRETE (CU.YDS.)	TYPE C LONGITUDINAL FOOTING REINFORCEMENT				TYPE C PEDESTAL REINFORCEMENT				TYPE C REBAR TOTAL (LBS.)	TYPE C CONCRETE (CU.YDS.)
	O.D.	WEIGHT (LBS.)				NO.	DIA.	c	d	e		TOP		BOTTOM								TOP		BOTTOM							
												NO.	BARS	NO.	BARS	NO.	BARS	NO.	BARS			NO.	BARS	NO.	BARS	NO.	BARS	NO.	BARS		
III	18"	93.45	8 1/2"	0"	2'-8" x 2'-8" x 1 3/4"	10	2"	2'-10"	6'-6"	15"	10'-0" x 13'-0"	10	#5	10	#5	10	#4	14	#8	757	14.4	10	#4	10	#5	12	#4	14	#8	800	15.3
IV	20"	104.13	8 1/2"	0"	2'-10" x 2'-10" x 2"	10	2 1/4"	3'-0"	6'-9"	18"	10'-0" x 14'-0"	10	#5	10	#5	10	#4	14	#8	795	15.6	10	#4	10	#5	12	#4	14	#8	839	16.5
V	18"	93.45	8 1/2"	7"	3'-3" x 2'-8" x 2"	10	2 1/4"	2'-10"	7'-0"	12"	9'-0" x 17'-0"	9	#5	10	#7	10	#4	14	#8	1015	16.5	10	#4	10	#7	12	#4	14	#8	1059	17.5
VI	20"	104.13	8 1/2"	8"	3'-6" x 2'-10" x 2 1/4"	10	2 1/4"	3'-0"	7'-6"	15"	9'-0" x 19'-0"	9	#5	10	#7	10	#4	14	#8	1099	18.4	10	#4	10	#7	12	#4	14	#8	1134	19.5
VII	24"	125.49	9"	8"	3'-10" x 3'-2" x 2 1/4"	10	2 1/2"	3'-4"	7'-10"	15"	10'-0" x 20'-0"	9	#5	12	#7	10	#4	14	#8	1257	21.5	10	#4	12	#7	12	#4	14	#8	1302	22.6


\* BASE PLATES, PEDESTAL AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.  
 \*\* BASE PLATES, PEDESTAL AND FOUNDATIONS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**OVERHEAD SIGN TRUSSES**  
OPTIONAL SUBSTRUCTURE DATA



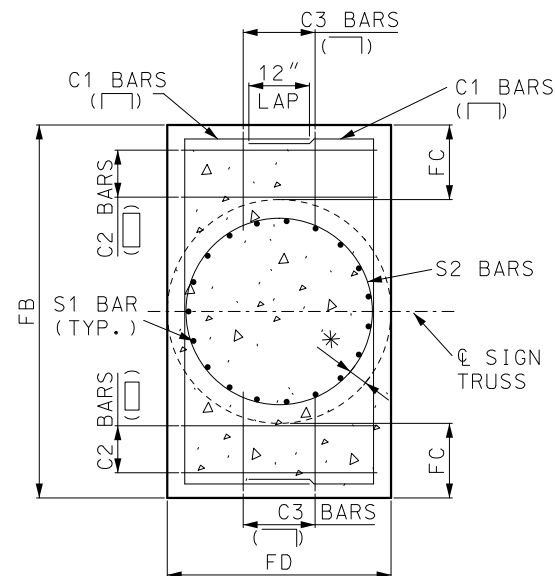
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 01-01-2021  
DATE PREPARED: 10/14/2020

**903.12AA**

SHEET NO.  
4 OF 7

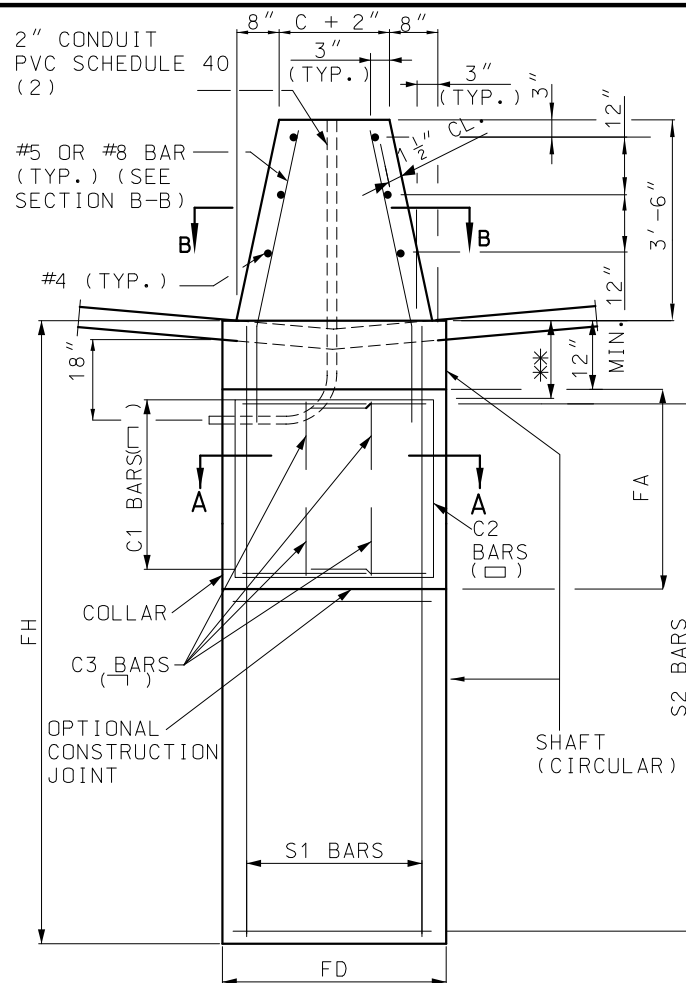
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



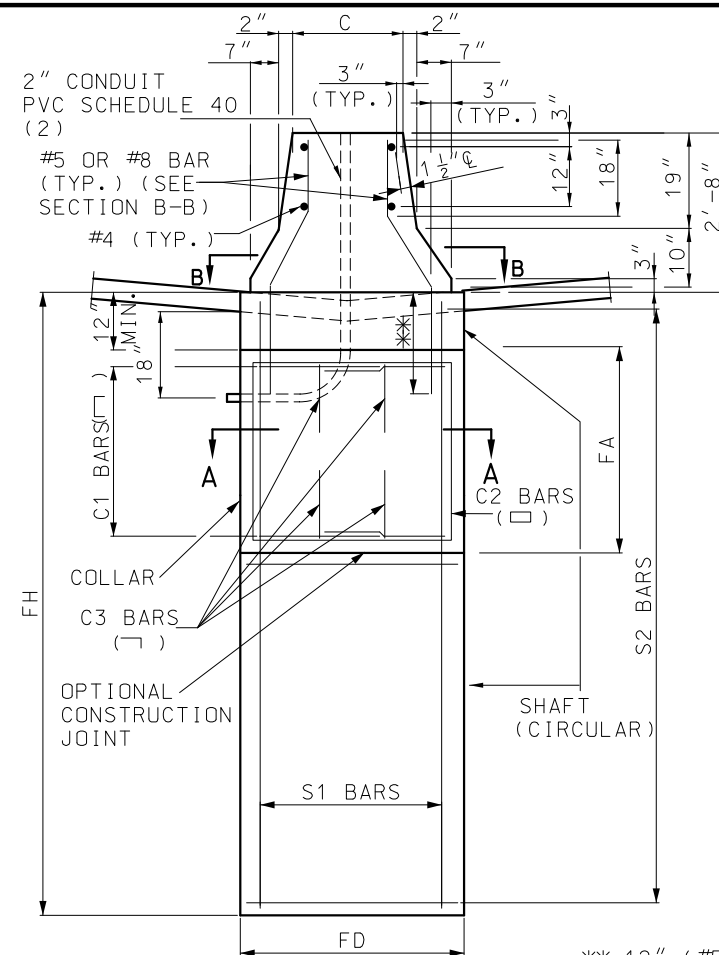
**SECTION A-A**  
(TYPICAL SECTION SHOWING REINFORCING STEEL)

\* 4" CLEAR FOR FD = 4'-6"  
6" CLEAR FOR FD > 4'-6"

VERTICAL LEG OF C3 SHALL BE PLACED INSIDE SHAFT S2 BARS.

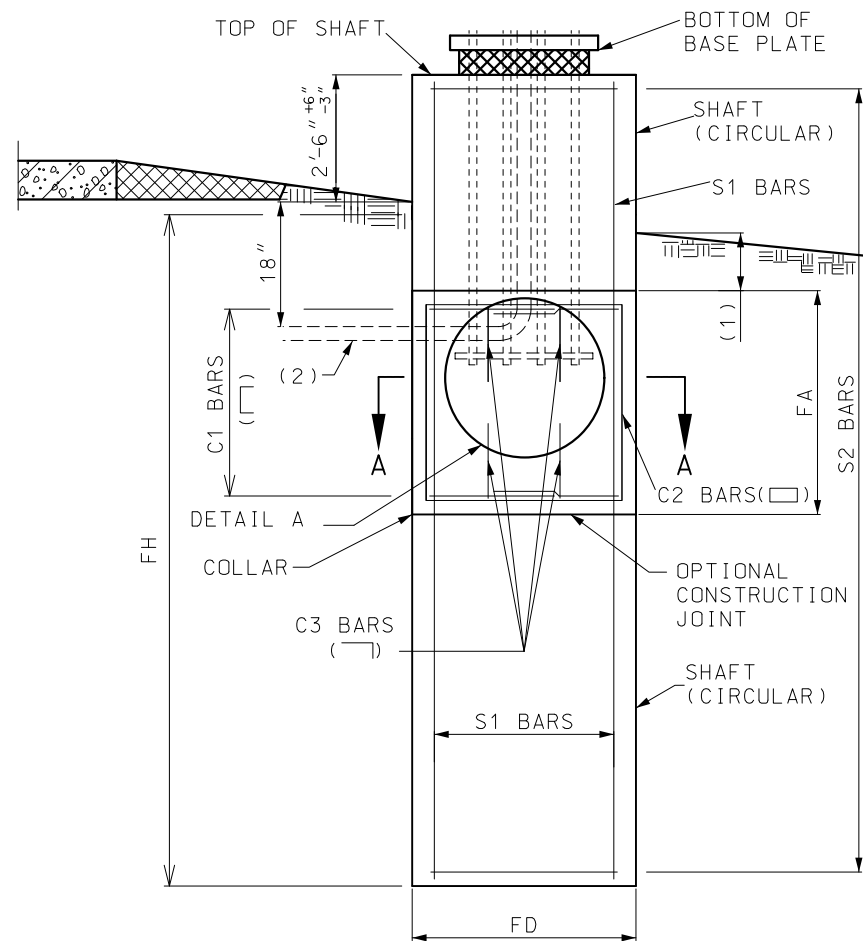


**PART ELEVATION**  
(TYPE C CONCRETE TRAFFIC BARRIER)



**PART ELEVATION**  
(TYPE A CONCRETE TRAFFIC BARRIER)

\*\* 12" (#5 BAR)  
2'-4" (#8 BAR)

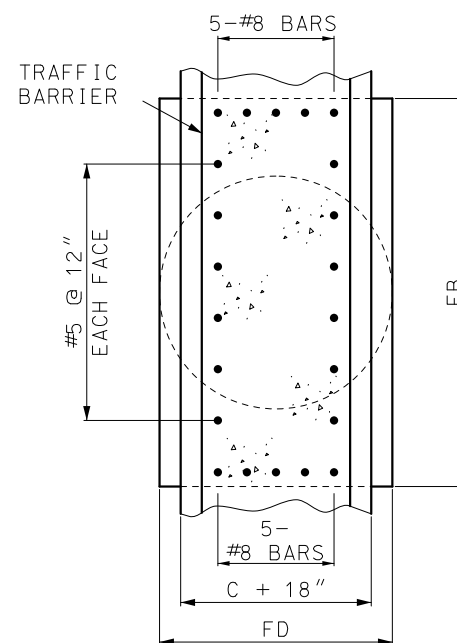


**ELEVATION**

BACKFILL SHALL BE IN PLACE PRIOR TO ERECTION OF POST

- (1) 12" MIN. TO 24" MAX.
- (2) 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM BEND RADIUS OF 9 1/2"

**DETAILS OF ALTERNATE PEDESTAL**  
(TO BE USED ADJACENT TO TYPE A OR TYPE C MEDIAN BARRIER)



**SECTION B-B**

**GENERAL NOTES:**

SHAFT AND COLLAR SHALL BE CLASS B (P.C.C.).

MINIMUM CLEARANCE TO REINFORCEMENT IS 3" EXCEPT AS SHOWN.

WHEN ROCK IS ENCOUNTERED AT A DEPTH NOT EXCEEDING "FH"/2 FOR FD > 3'-0" OR "FH"/4 FOR FD ≤ 3'-0", THE DIMENSION "FH" MAY BE ADJUSTED TO A MINIMUM OF 3 X "FD", SUBJECT TO APPROVAL BY THE ENGINEER.

CONTACT THE ENGINEER IF WATER TABLE IS ENCOUNTERED DURING EXCAVATION.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 7 FOR DETAILS OF THESE ITEMS.

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

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

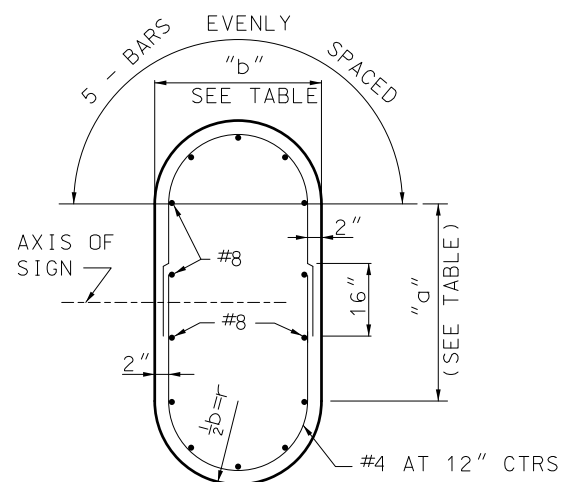
**OVERHEAD SIGN TRUSSES**  
DRILLED SHAFT OPTION

DATE EFFECTIVE: 01-01-2021  
DATE PREPARED: 10/14/2020

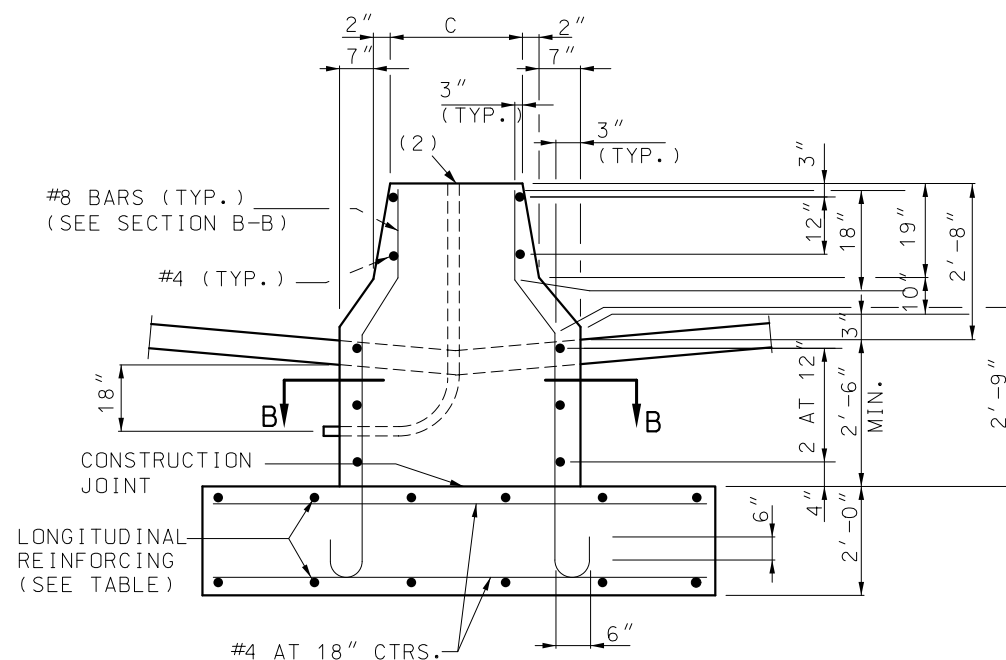
**903.12AA**

SHEET NO.  
5 OF 7

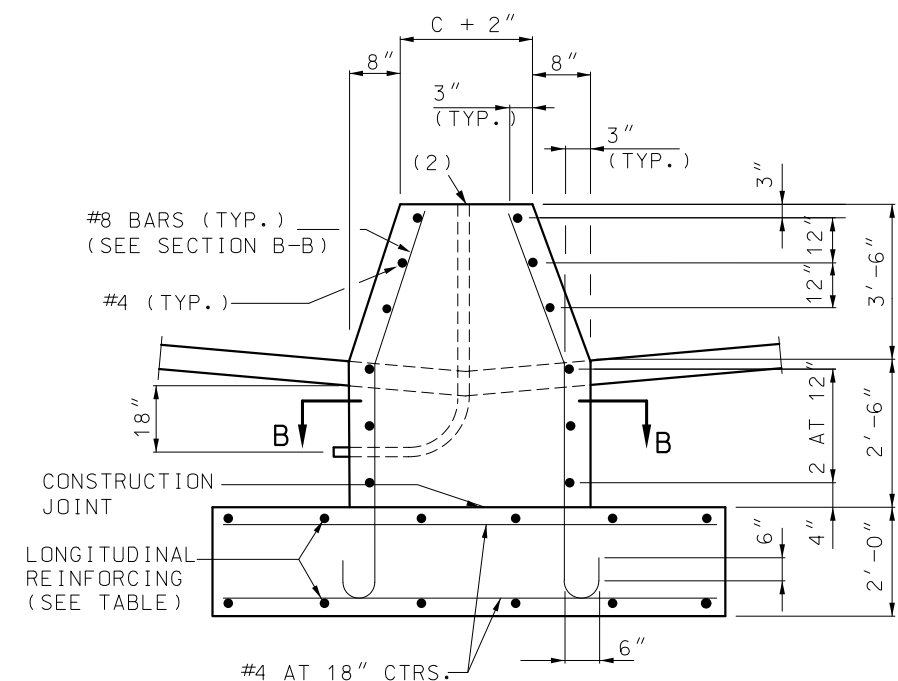
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



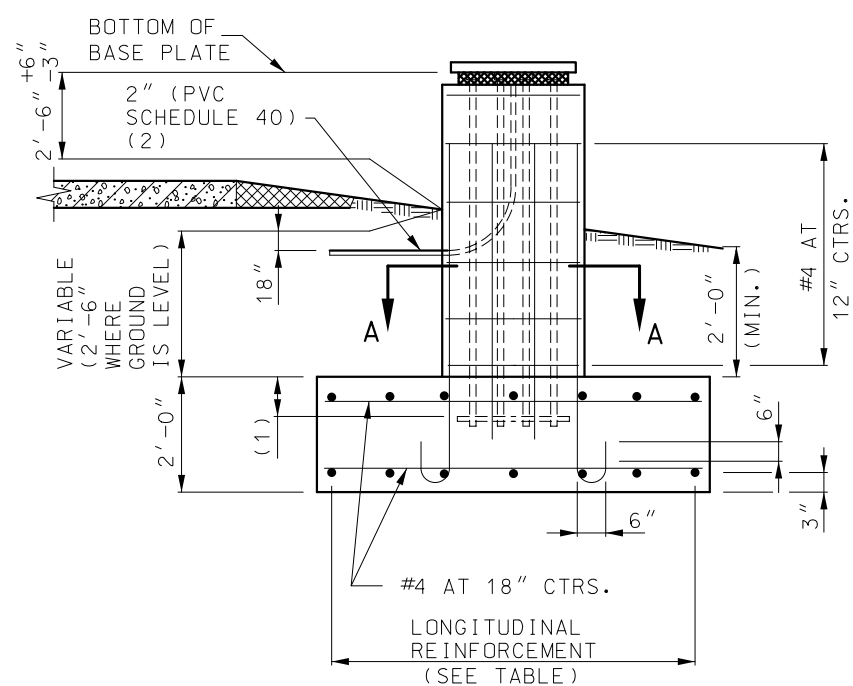
SECTION A-A  
(TYPICAL SECTION SHOWING REINFORCING STEEL)



PART ELEVATION  
(TYPE A CONCRETE TRAFFIC BARRIER)

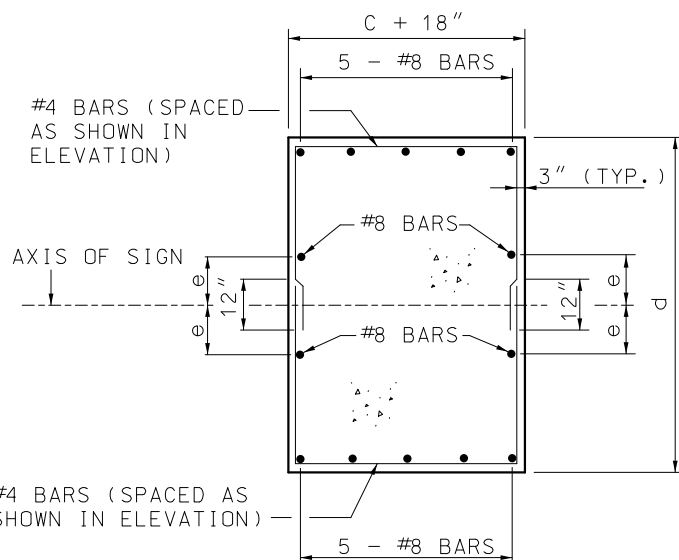


PART ELEVATION  
(TYPE C CONCRETE TRAFFIC BARRIER)



ELEVATION

- (1)  $12'' \pm \frac{6}{3}''$  (DETAIL FOR 12" FIELD TOLERANCE)
- (2) 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM BEND RADIUS OF  $9\frac{1}{2}''$ .



SECTION B-B  
TYPICAL SECTION SHOWING  
REINFORCING STEEL  
DETAILS OF ALTERNATE PEDESTAL



GENERAL NOTES:

PEDESTAL AND FOOTING SHALL BE CLASS B (P.C.C.).

MINIMUM CLEARANCE TO REINFORCEMENT IS 3" EXCEPT AS SHOWN.

CONTACT THE ENGINEER IF WATER TABLE IS ENCOUNTERED DURING EXCAVATION.

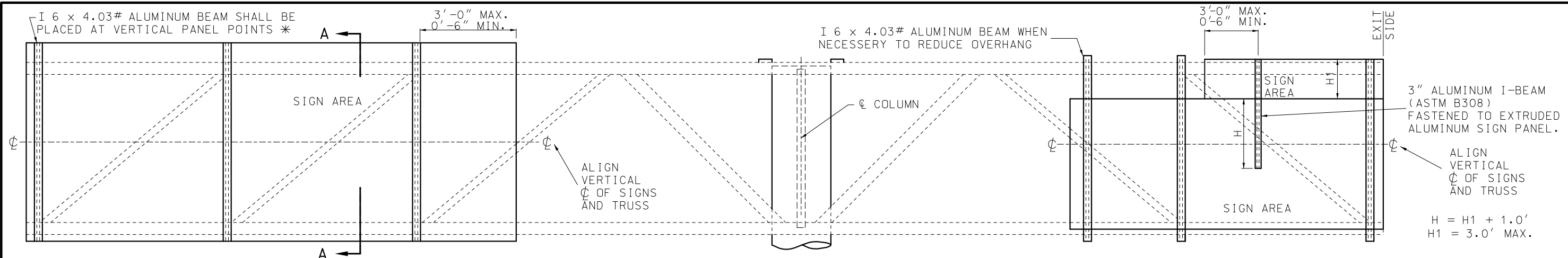
PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 7 FOR DETAILS OF THESE ITEMS.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>OVERHEAD SIGN TRUSSES</b> <b>SPREAD FOOTING</b>
DATE EFFECTIVE: 01-01-2021 DATE PREPARED: 10/14/2020	<b>903.12AA</b>
SHEET NO. <b>6 OF 7</b>	

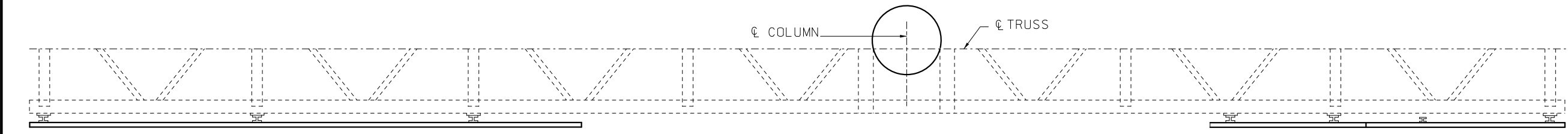
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



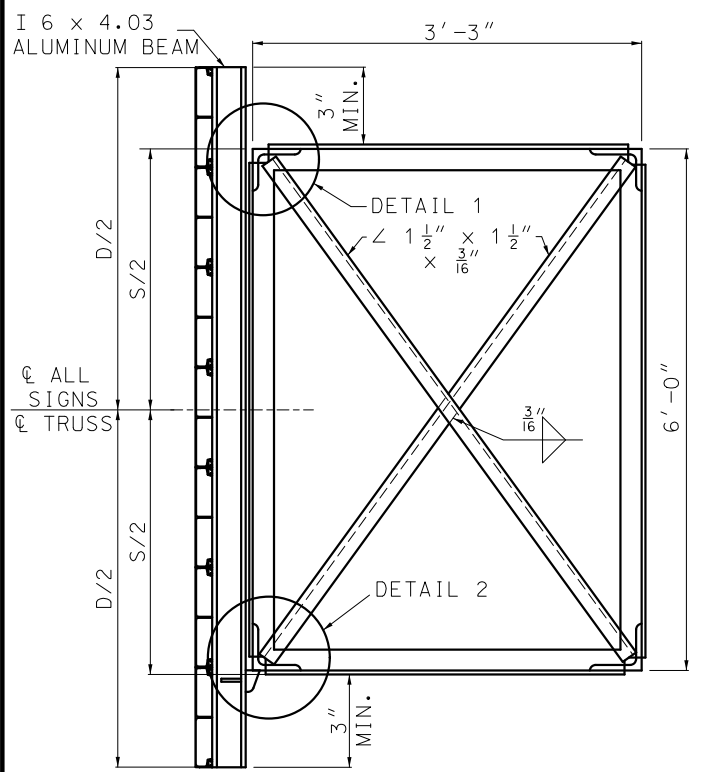
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**TYPICAL ELEVATION OF SIGNS COMPONENTS**



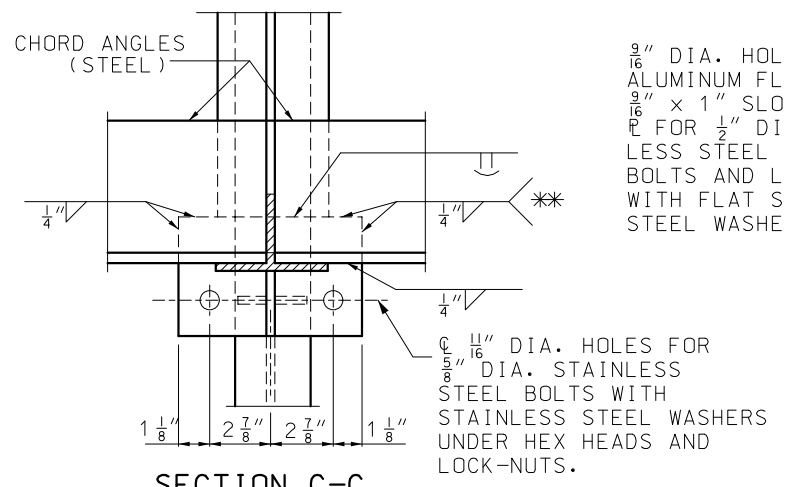
**TYPICAL PLAN OF SIGN COMPONENTS**



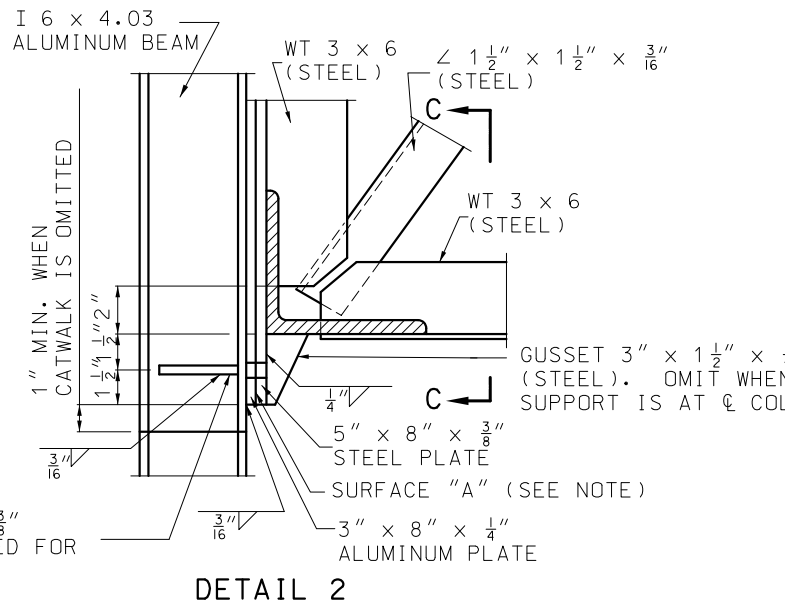
**SECTION A-A  
TYPICAL SECTION  
OF SIGN SUPPORT**

NOTE:  
"D" = GREATEST OVERALL DEPTH  
OF ANY SIGNS ON TRUSSES.

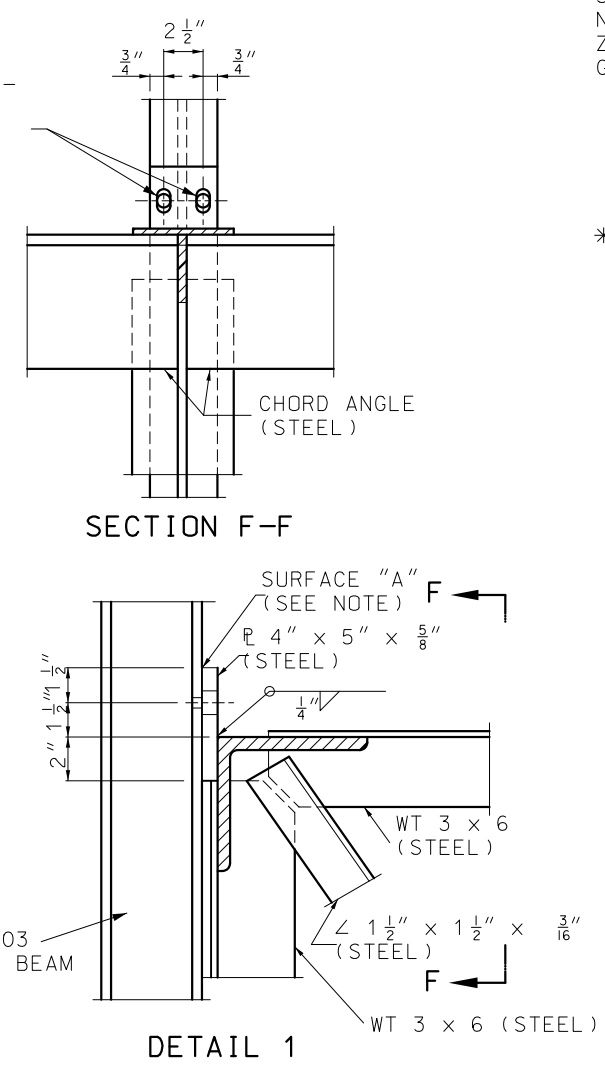
TWO - GUSSETS 5" x 1" x 3/8"  
(ALUM.) OMIT WHEN NOT USED FOR  
CATWALK SUPPORT.



**SECTION C-C**



**DETAIL 2**



**SECTION F-F**

**DETAIL 1**

NOTE:  
SURFACE "A", ZINC CHROMATE ON ALUMINUM SURFACES.  
NORMAL CLEANING AND PAINTING ON STEEL SURFACES.  
ZINC CHROMATE IS NOT REQUIRED WHEN STEEL IS  
GALVANIZED.

\* FOR SIGN HEIGHTS GREATER THAN 17'-0", BUT LESS  
THAN OR EQUAL TO 20'-0" USE ADDITIONAL I 6 x 4.03  
ALUMINUM BEAMS TO ACHIEVE A MAXIMUM SPACING OF  
4'-0" BETWEEN SIGN SUPPORTS.

\*\* WHEN SIGN SUPPORTS ARE PLACED BETWEEN VERTICAL  
PANEL POINTS AS ILLUSTRATED IN TYPICAL ELEVATION  
OF SIGNS COMPONENTS, WELD THE 3/8" STEEL PLATE  
TO THE BOTTOM CHORD WITH A 1/4" FILLET WELD.

**GENERAL NOTES:**

EXIT NO. PANELS SHALL BE MONTED FLUSH WITH THE EXIT  
SIDE OF THE GUIDE SIGN.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE  
HORIZONTAL CL OF THE TRUSS.

FOR SIGN MOUNTING DETAILS, SEE STANDARD PLANS 903.03.

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

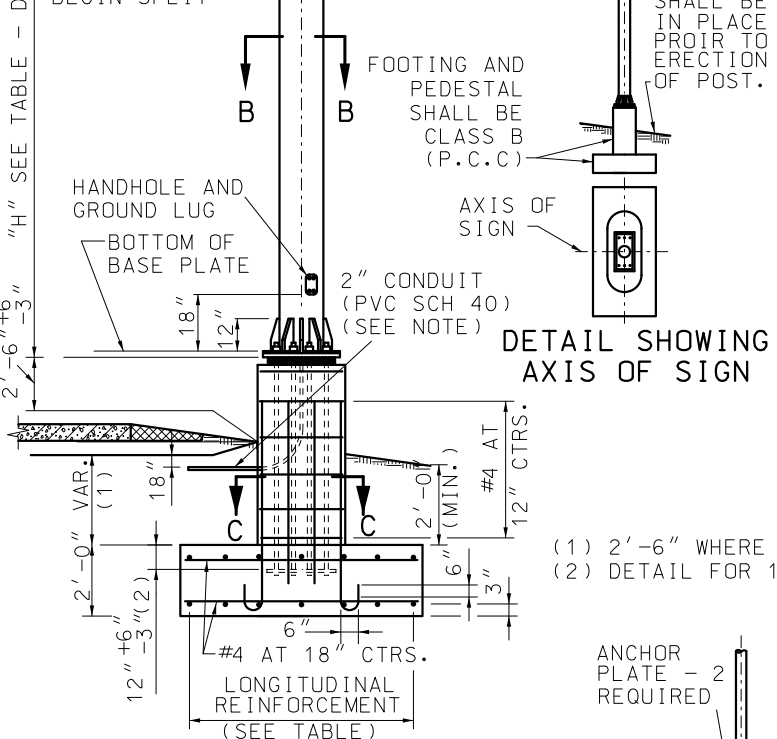
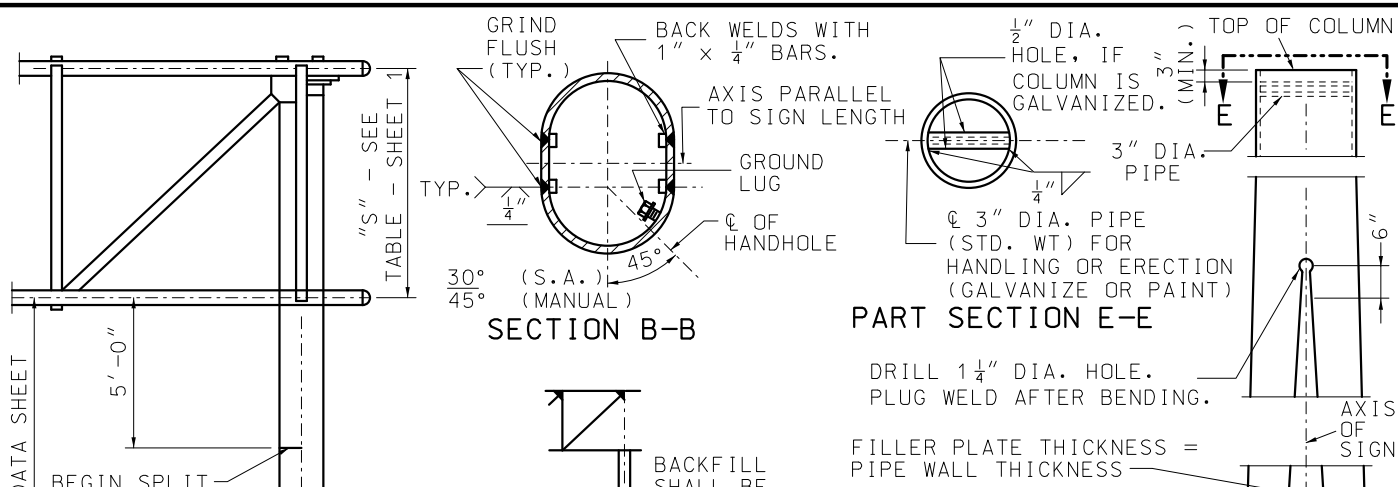
**STATE OF MISSOURI**  
  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN  
 SIGNED, SEALED AND DATED  
 ELECTRONICALLY.

**OVERHEAD SIGN TRUSSES**  
 STRUCTURAL STEEL  
 BUTTERFLY AND CANTILEVER

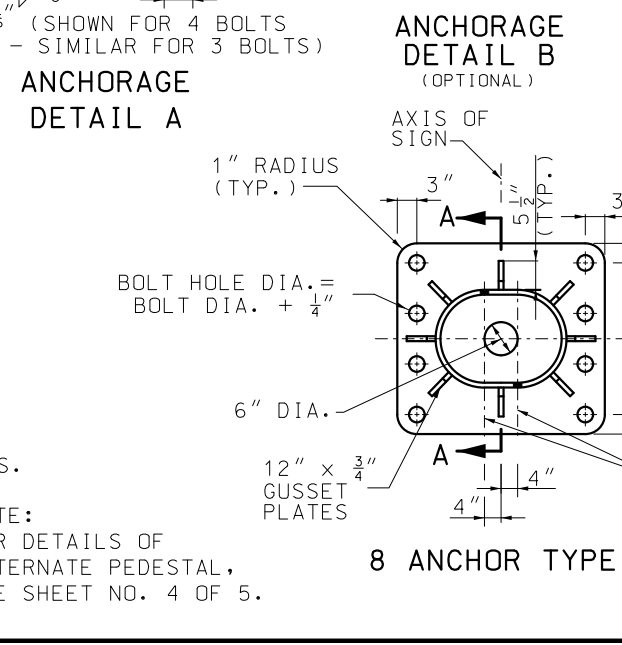
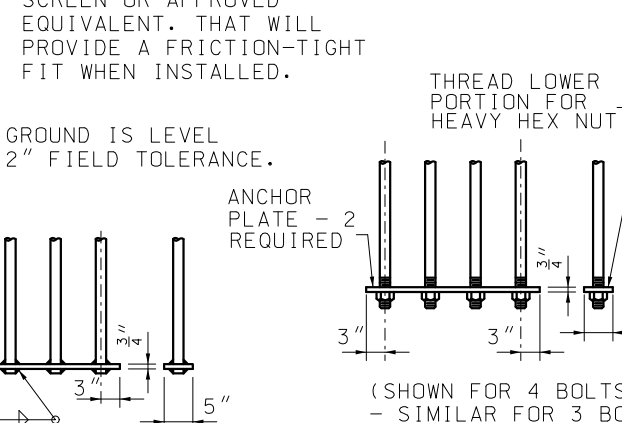
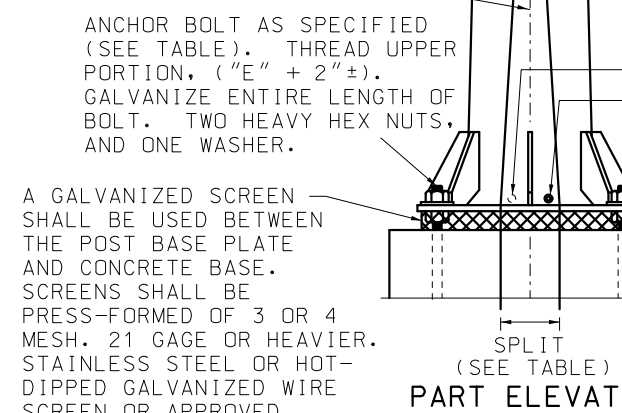
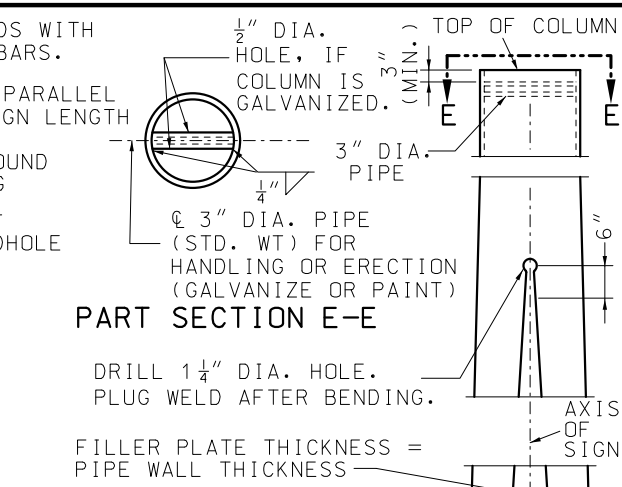
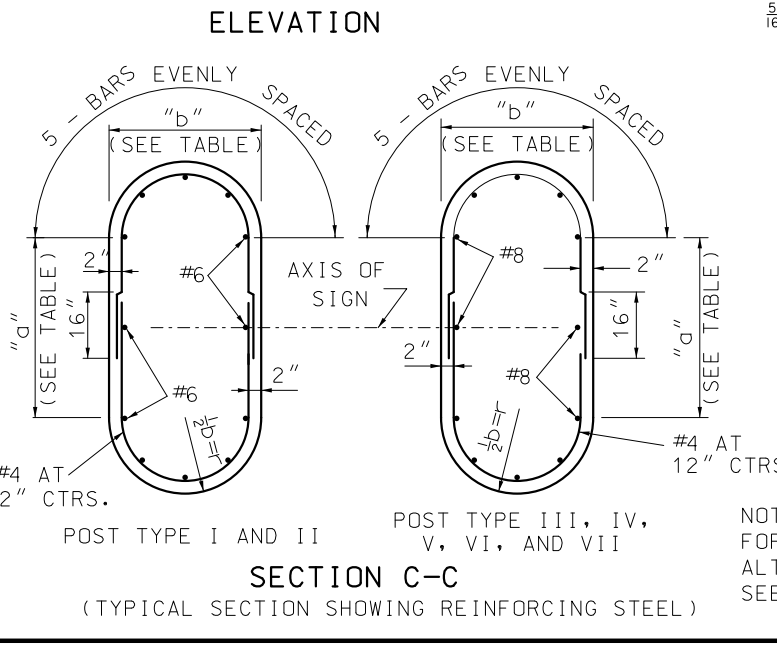
DATE EFFECTIVE: 01-01-2021	<b>903.12AA</b>	SHEET NO. 7 OF 7
DATE PREPARED: 10/14/2020		





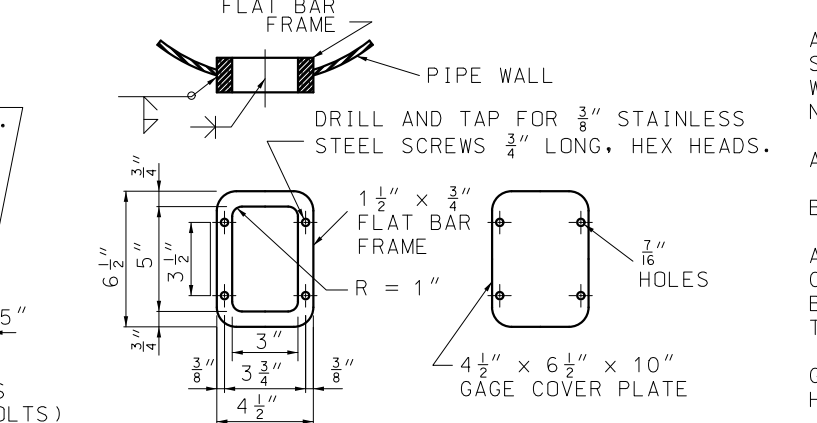
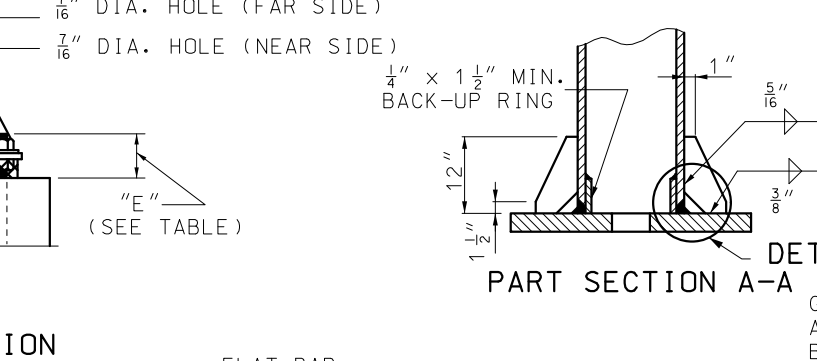


NOTE: THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM RADIUS BEND OF 9 1/2".

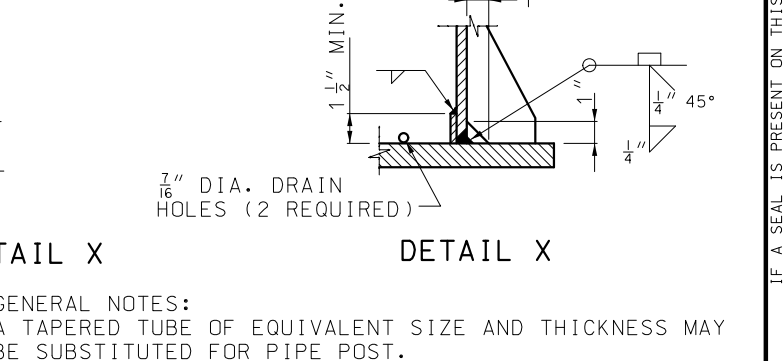


POST TYPE	PIPE COLUMN	DIMENSION "E"	SPLIT	BASE PLATE SIZE*	ANCHOR BOLTS DIA.	PEDESTAL SIZE*		FOOTING SIZE*	LONGITUDINAL FOOTING REINFORCEMENT		CONCRETE C.Y.
						a	b		TOP	BOTTOM	
I	12" STD. AT 65.42	8 1/2"	6"	2'-6" x 23" x 1 1/2"	6 AT 2 1/4"	4'-0"	2'-11"	7'-0" x 14'-6"	7-#5 BARS	7-#6 BARS	10.9
II	14" O.D. AT 72.09	8 1/2"	9 1/2"	3'-0" x 2'-0" x 1 1/2"	6 AT 2 1/4"	4'-4"	3'-0"	8'-0" x 16'-0"	8-#5 BARS	9-#6 BARS	13.2
III	16" O.D. AT 82.77	8 3/4"	11 1/2"	3'-4" x 2'-2" x 1 3/4"	6 AT 2 1/4"	4'-8"	3'-2"	8'-6" x 17'-6"	9-#5 BARS	9-#7 BARS	15.2
IV	18" O.D. AT 93.45	9 1/2"	12 1/2"	3'-7" x 2'-4" x 2"	6 AT 2 1/2"	5'-1"	3'-4"	9'-6" x 19'-0"	10-#5 BARS	10-#8 BARS	18.1
V	20" O.D. AT 104.13	9 1/2"	13"	3'-10" x 2'-9" x 2"	8 AT 2 1/2"	5'-4"	3'-9"	10'-0" x 20'-0"	10-#5 BARS	10-#8 BARS	20.6
VI	24" O.D. AT 125.49	9 1/2"	10 1/2"	4'-0" x 3'-3" x 2"	8 AT 2 1/2"	5'-6"	4'-3"	10'-6" x 21'-0"	11-#5 BARS	11-#8 BARS	23.3
VII	24" O.D. AT 125.49	9 1/2"	13 1/2"	4'-3" x 3'-3" x 2"	8 AT 2 1/2"	5'-9"	4'-3"	11'-0" x 22'-0"	11-#5 BARS	11-#9 BARS	25.1

\* BASE PLATES, PEDESTAL, AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



NOTE: HANDHOLE REQUIRED ONLY IN POWER COLUMN.



GENERAL NOTES:  
 A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.  
 ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53. NO OBJECTIONABLE SEAMS WILL BE PERMITTED.  
 ALL STRUCTURES SHALL BE GROUNDED.  
 BURR THREADS ON ALL ANCHOR BOLTS.  
 A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.  
 GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.  
 QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5'-0".  
 QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF 2'-0".  
 QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

STATE OF MISSOURI  
NICOLE A. KOLB HOOD  
NUMBER PE-2001018754  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**OVERHEAD SIGN TRUSSES**

STRUCTURAL STEEL

SHEET NO.  
3 OF 5

DATE EFFECTIVE: 01/01/2021  
DATE PREPARED: 10/14/2020

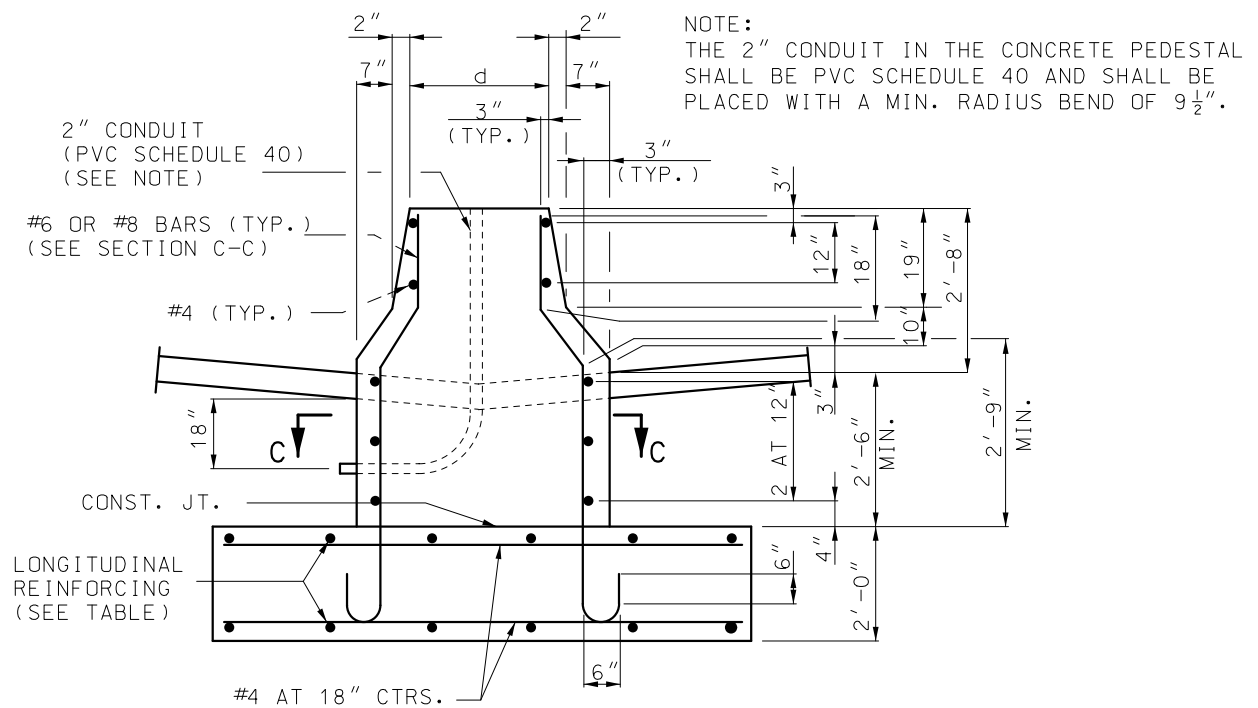
**903.60AC**

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

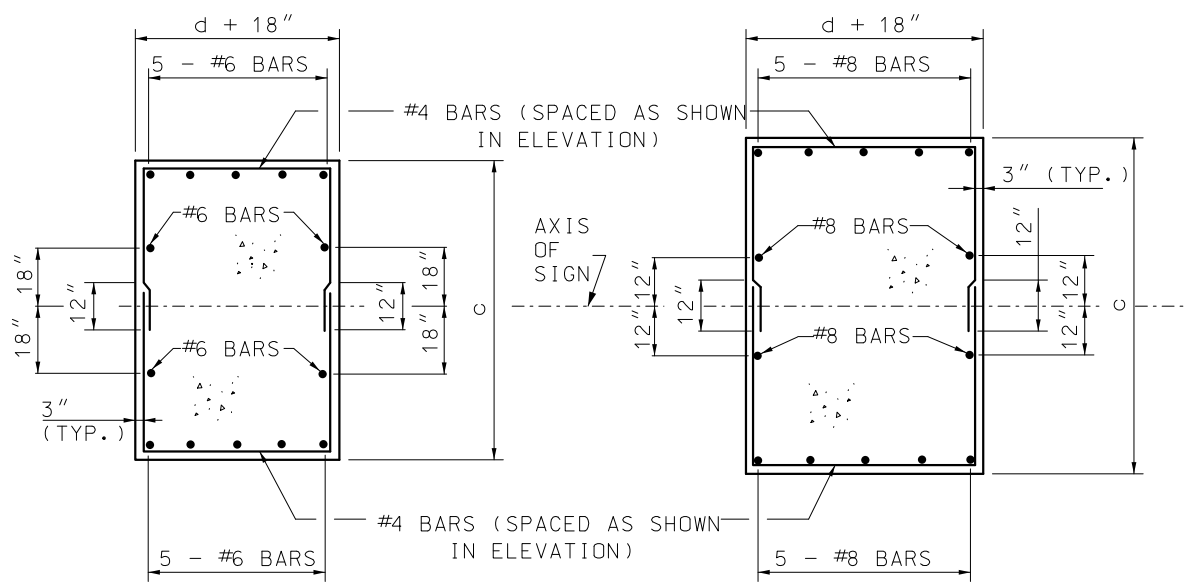
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

POST TYPE	PIPE COLUMN	PEDESTAL SIZE*		FOOTING SIZE*	LONGITUDINAL FOOTING REINFORCEMENT		CONCRETE C.Y.	
		c	d		TOP	BOTTOM	TYPE A MEDIAN BARRIER	TYPE C MEDIAN BARRIER
I	12" STD. AT 65.42	5'-9"	2'-1"	7'-0" x 14'-6"	7-#5 BARS	7-#6 BARS	10.9	11.6
II	14" O.D. AT 72.09	6'-2"	2'-2"	8'-0" x 16'-0"	8-#5 BARS	9-#6 BARS	13.2	14.0
III	16" O.D. AT 82.77	6'-7"	2'-4"	8'-6" x 17'-6"	9-#5 BARS	9-#7 BARS	15.2	16.1
IV	18" O.D. AT 93.45	7'-1"	2'-6"	9'-6" x 19'-0"	10-#5 BARS	10-#8 BARS	18.1	19.1
V	20" O.D. AT 104.13	7'-8"	2'-11"	10'-0" x 20'-0"	10-#5 BARS	10-#8 BARS	20.6	21.7
VI	24" O.D. AT 125.49	8'-3"	3'-5"	10'-6" x 21'-0"	11-#5 BARS	11-#8 BARS	23.3	24.6
VII	24" O.D. AT 125.49	8'-6"	3'-5"	11'-0" x 22'-0"	11-#5 BARS	11-#9 BARS	25.1	26.5

\* BASE PLATES, PEDESTAL, AND FOOTINGS LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



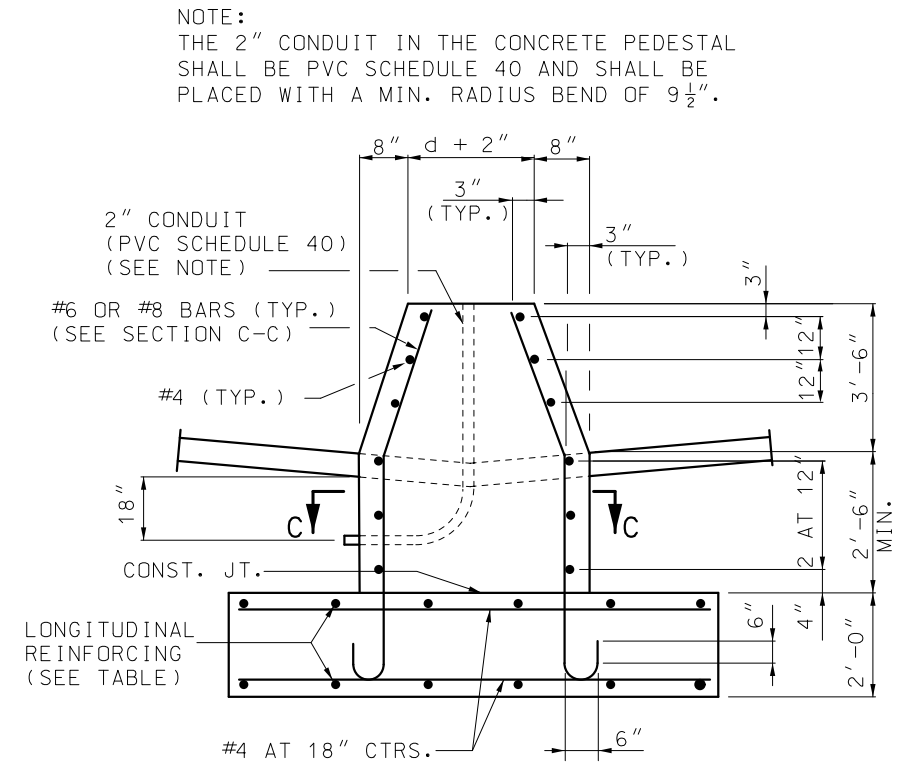
PART ELEVATION  
(TYPE A CONCRETE TRAFFIC BARRIER)



SECTION C-C  
TYPICAL SECTION SHOWING  
REINFORCING STEEL

**DETAILS OF ALTERNATE PEDESTAL**

(TO BE USED ADJACENT TO TYPE "A" OR "C" MEDIAN BARRIER)



PART ELEVATION  
(TYPE C CONCRETE TRAFFIC BARRIER)

GENERAL NOTES:

- A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.
- ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53.
- NO OBJECTIONABLE SEAMS WILL BE PERMITTED.
- ALL STRUCTURES SHALL BE GROUNDED.
- BURR THREADS ON ALL ANCHOR BOLTS.
- PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 5 FOR DETAILS OF THESE ITEMS.
- GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.
- QUANTITIES FOR PEDESTAL ARE BASED ON NOMINAL HEIGHT OF 5'-2" (TYPE A MEDIAN BARRIER) OR 6'-0" (TYPE C MEDIAN BARRIER).
- QUANTITIES FOR FOOTING ARE BASED ON NOMINAL DEPTH OF 2'-0".
- QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

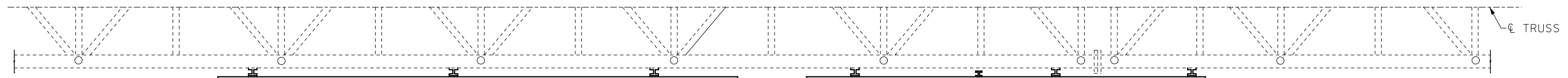
**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**OVERHEAD SIGN TRUSSES**  
STRUCTURAL STEEL

DATE EFFECTIVE: 01/01/2021	<b>903.60AC</b>	SHEET NO. 4 OF 5
DATE PREPARED: 10/14/2020		

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



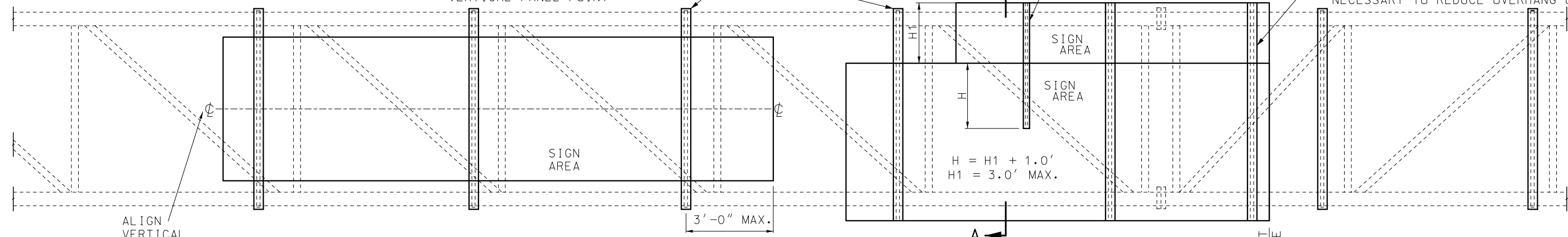
### TYPICAL HALF PLAN OF SIGN COMPONENTS

6" ALUM. I AT 4.03# TO BE LOCATED AS CLOSE AS POSSIBLE TO NEAREST VERTICAL PANEL POINT

3'-0" MAX.  
0'-6" MIN.

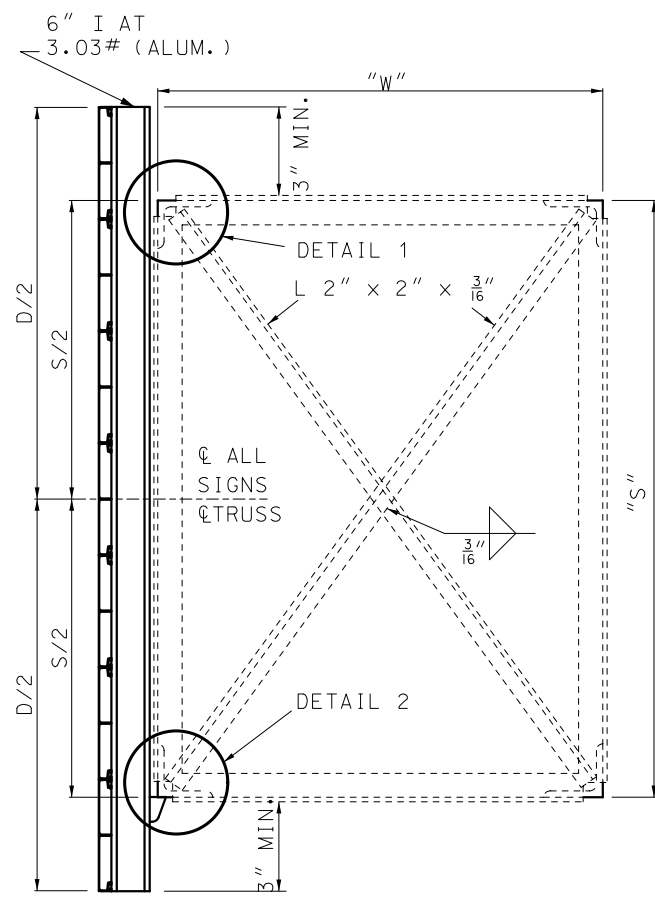
3" ALUMINUM I-BEAM (ASTM B308) FASTENED TO ALUMINUM EXTRUDED SIGN PANEL

6" ALUM. I AT 4.03# SHALL BE PLACED AT HORIZONTAL PANEL POINTS (±9") WHEN NECESSARY TO REDUCE OVERHANG OF SIGN



ALIGN VERTICAL C OF SIGNS AND TRUSS

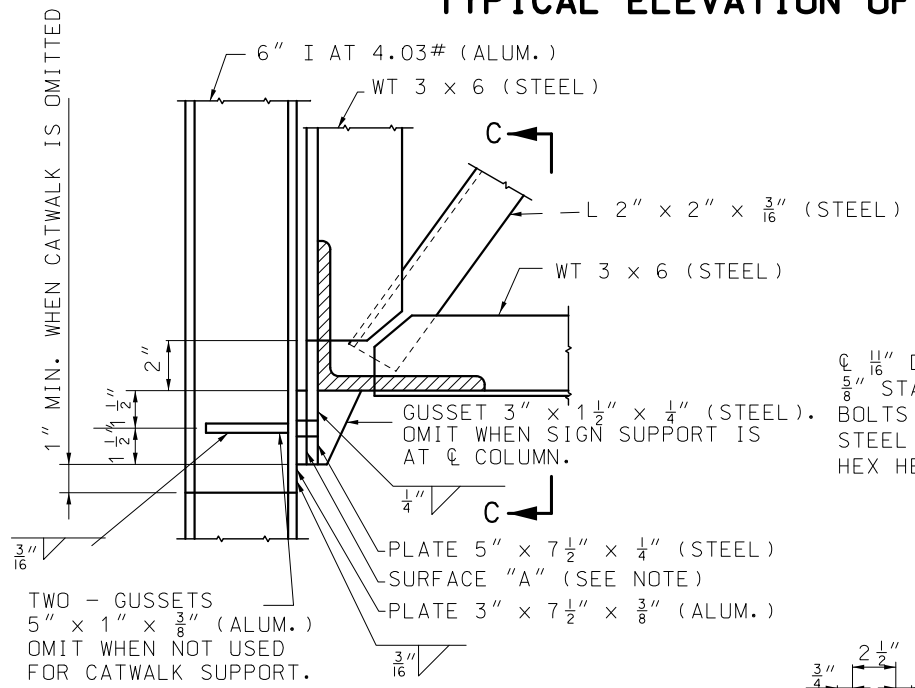
### TYPICAL ELEVATION OF SIGN COMPONENTS



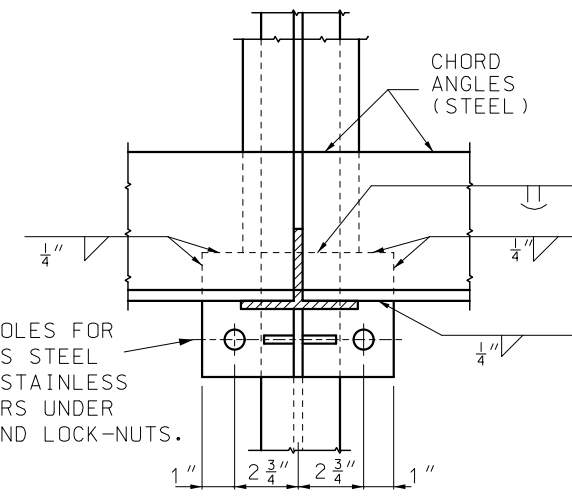
SECTION A-A

### TYPICAL SECTION OF SIGN SUPPORT

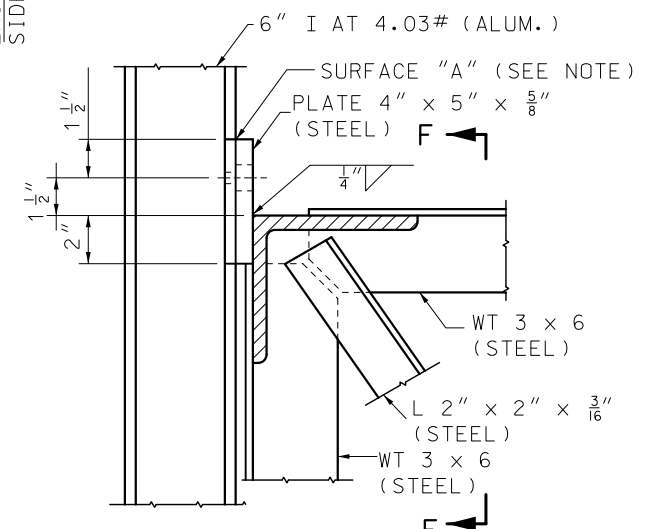
NOTE: "D" = GREATEST OVERALL DEPTH OF ANY SIGN OR SIGNS ON TRUSSES AND "S" = TRUSS DEPTH. SEE SHEET NO. 5 OF 7 FOR LOCATION OF SECTION A-A.



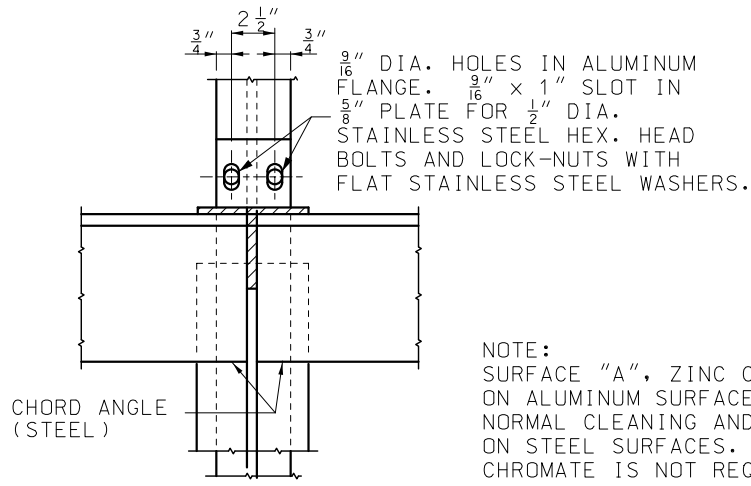
DETAIL 2



SECTION C-C



DETAIL 1



SECTION F-F

NOTE: SURFACE "A", ZINC CHROMATE ON ALUMINUM SURFACES. NORMAL CLEANING AND PAINTING ON STEEL SURFACES. ZINC CHROMATE IS NOT REQUIRED WHEN STEEL IS GALVANIZED.

#### GENERAL NOTES:

EXIT NO. PANELS SHALL BE MOUNTED FLUSH WITH THE EXIT SIDE OF THE GUIDE SIGN.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL C OF THE TRUSS.

**MoDOT** MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
 105 WEST CAPITOL JEFFERSON CITY, MO 65102  
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 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
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### OVERHEAD SIGN TRUSSES STRUCTURAL STEEL

DATE EFFECTIVE: 01/01/2021	<b>903.60AC</b>	SHEET NO. 5 OF 5
DATE PREPARED: 10/14/2020		