

FROG NO.	R1	R2	R3	R4
8	18"	4"	4"	8"
9	20 1/4"	4 1/2"	4 1/2"	9"
10	22 1/2"	5"	5"	10"

FORMULA FOR VARIABLE RADIUS OF RAISED GUARDS

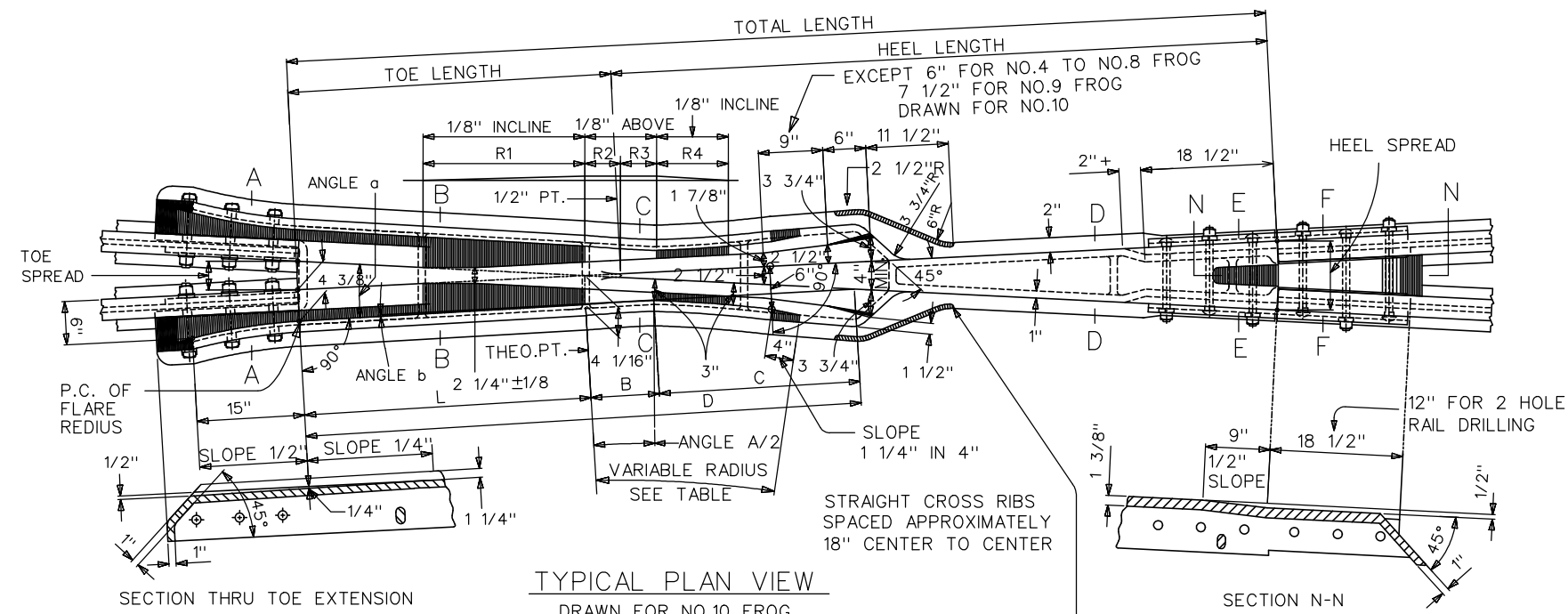
$$\text{TAN. ANGLE } \alpha = \frac{5/16''}{L}$$

$$\angle a = \angle b + \text{FROG ANGLE}$$

$$D = \frac{\text{TOE SPREAD} + 4 \cdot 3/8''}{\text{TAN. } \alpha}$$

$$C = \frac{3''}{\text{SIN. } \alpha}$$

$$B = D - (L + C)$$

$$\text{RADIUS} = \frac{B}{\text{TAN. } \alpha/2}$$


FOR RAILS 115LB OR HEAVIER
SEE NOTES 2A & 2B FOR DETAILS OF HEEL AND TOE JOINTS

GROUP A RAIL				
FROG NO.	TOTAL LENGTH	TOE LENGTH	HEEL LENGTH	VAR. RADIUS*
8	7'-7"	2'-4"	5'-3"	8'-9 1/2"
9	8'-5"	2'-7"	5'-10"	11'-2 5/8"
10	9'-4"	2'-10"	6'-6"	13'-11 1/4"

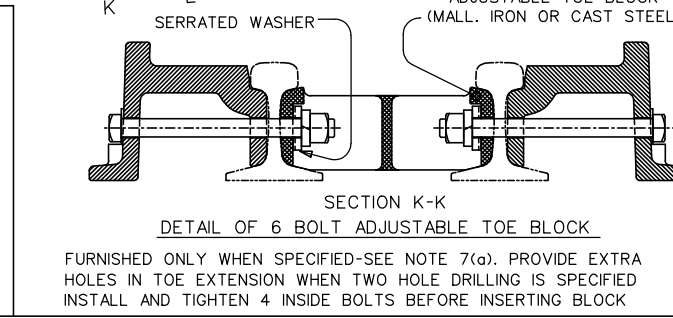
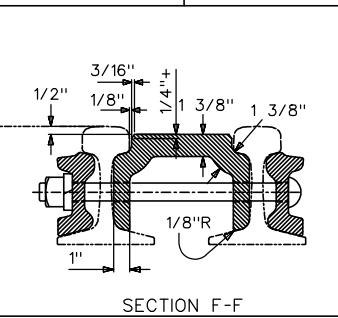
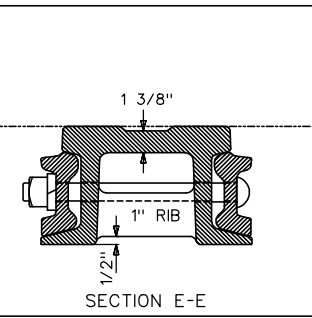
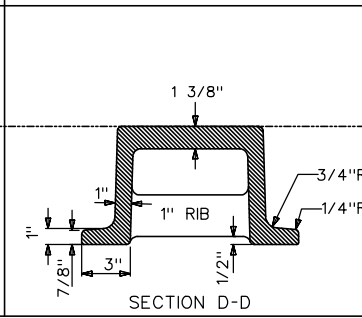
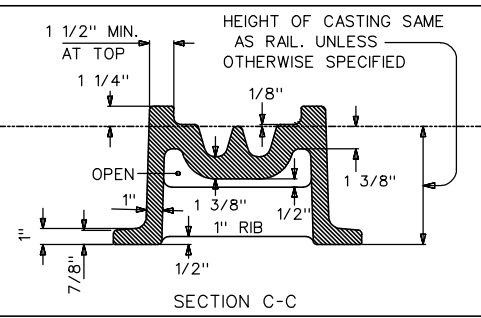
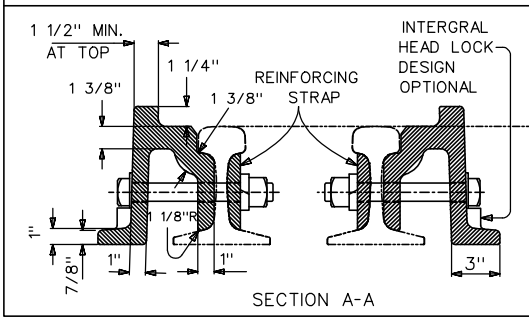
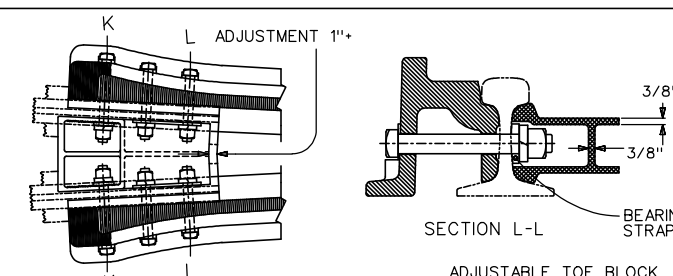
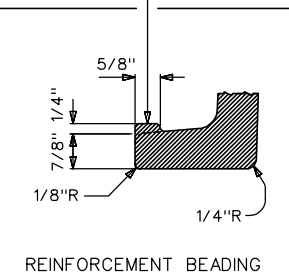
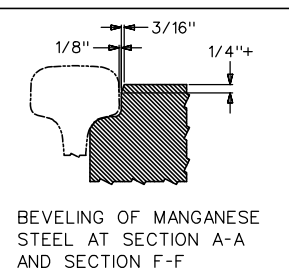
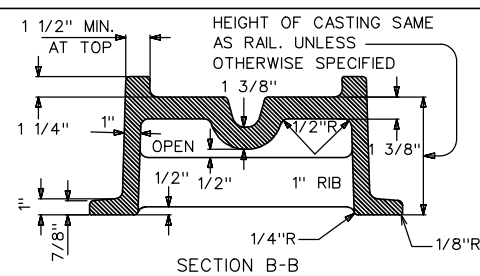
RAILS 115LB. OR HEAVIER				
FROG NO.	TOTAL LENGTH	TOE LENGTH	HEEL LENGTH	VAR. RADIUS*
8	8'-11"	2'-11"	6'-0"	9'-1 3/4"
9	9'-9"	2'-11"	6'-10"	11'-6"
10	11'-4 1/2"	3'-9"	7'-7 1/2"	14'-8 1/8"

FROG NO.	QUANTITY OF HOOK TWIN TIE PLATES								
	TYPE I RAILS								
MARK	L23	L27	H23	H27	H31	H35	LR23	LR27	LR31
8	6	4	4	4	2	0	0	4	2
9	6	4	4	4	6	0	0	2	4
10	6	4	6	6	2	0	2	4	2

FROG NO.	QUANTITY OF HOOK TWIN TIE PLATES								
	TYPE II RAILS								
MARK	L23	L27	H23	H27	H31	H35	LR23	LR27	LR31
8	4	4	4	4	2	2	0	4	2
9	4	4	6	6	2	0	0	4	2
10	6	4	6	6	2	0	2	4	2

NOTES:

- RAIL AND JOINT BARS, PURCHASER SHALL SPECIFY WEIGHT AND DESIGNATION OF RAIL SECTION AND JOINT DRILLING AND SHALL SUPPLY COMPLETE DETAILS OF JOINT BARS.
- DETAIL OF HEEL AND TOE JOINTS.
 - NO. 8, 9, AND 10 FROGS FOR RAILS 115 LB. AND HEAVIER SHALL BE DESIGNED AS ILLUSTRATED IN MAIN PLAN VIEW FOR THREE-HOLE RAIL DRILLING AND A SIX-HOLE JOINT BARS 36" LONG.
 - JOINT BARS FOR HEEL END ARE NOT FURNISHED WITH FROG UNLESS CALLED FOR. PURCHASER'S JOINT BARS IF LONGER THAN SPECIFIED IN 2(a) SHOULD BE CUT TO THE LENGTHS STATED OR JOINT BARS OF THE REQUIRED LENGTHS CALLED FOR WITH FROGS. FOR PROPER SUPPORT OF THE UPPER FISHING PROJECTIONS SHOWN AS 18-1/2" LONG JOINT BARS AT LEAST 32" LONG SHALL BE FURNISHED WITH FROG IF PURCHASER'S STANDARD BARS ARE SHORTER THAN THIS LENGTH.
 - TRACK BOLTS SHALL BE FURNISHED AT HEEL END AND SQUARE HEAD MACHINE BOLTS AT TOE END TO SUIT JOINT BAR DETAIL SPECIFIED. OTHER DETAILS CONFORMING TO SECTION GTTS-17.5, LATEST EDITION.
- PLATES. HOOK TWIN TIE PLATES AS LISTED IN TABLE SHALL BE FURNISHED WITH FROGS UNLESS OTHERWISE SPECIFIED. FOR DETAILS AND APPLICATIONS OF THESE PLATES SEE GTS-0241, QUANTITIES SHOWN ARE BASED ON 19-1/2" TIE SPACING WITH CENTER OF ONE TIE 4" BACK OF 1/2" POINT. RAILS IN TABLE ARE CLASSIFIED BY THE FOLLOWING WIDTHS.
 - TYPE I RAILS: - RAILS HAVING BASE UP TO 5 1/2" AND HEAD 2 3/4" INCLUSIVE.
 - TYPE II RAILS: - RAILS HAVING BASE UP TO 6" AND HEAD 3" INCLUSIVE.
- WIDTH OF FLANGEWAY, FLANGWAYS UP TO 2" WIDE SHALL BE OBTAINED BY MOVING THE GUARD LINE AND MODIFYING ONLY THE THROAT OPENING AND LENGTH OF FLARE; FOR FLANGWAYS WIDER THAN 2" INCREASE FLARE AND THROAT OPENINGS ACCORDINGLY. BUT DO NOT CHANGE THE WIDTH OF BODY OR OTHER DIMENSIONS.
- LENGTH OF FROGS.
 - RAILS 115 LB. AND HEAVIER, LENGTHS IN TABLE HAVE BEEN DESIGNED FOR UNIFORM TIE SPACING 19 1/2". FOR RAIL SECTIONS WITH WIDTH OF BASE PLUS HEAD EXCEEDING HEEL SPREAD OR BASE MINUS HEAD EXCEEDING TOE SPREAD, LONGER FROGS SHALL BE SPECIFIED BY INCREASING TOE AND/OR HEEL LENGTHS, OR CORNER OF RAIL BASE REMOVED IN FIELD.
 - RAILS LIGHTER THAN 115 LB, LENGTHS IN TABLE PROVIDE CLEARANCE FOR ABUTTING RAILS.
- ALTERNATES AND ADDITIONAL EQUIPMENT. TO BE FURNISHED AS SPECIFIED.
 - SIX BOLT ADJUSTABLE TOE BLOCK WITH SERRATED WASHERS AND BEARING STRAPS, AND OMIT REINFORCING STRAPS SHOWN IN SECTION A-A.
 - WITHOUT WING WHEEL RISERS, OMIT WING WHEEL RISERS AND CROWN OF POINT AND DEPRESS POINT AS DESCRIBED ON AREMA PLAN BASIC NO.600-B.
 - WITH SQUARE END HEEL AND TOE EXTENSIONS.
 - BASE EXTENSIONS, FOR ADDITIONAL SUPPORT BASE FLANGE EXTENSIONS OF APPROVED DESIGN SHALL BE PROVIDED AT TIE LOCATIONS.
 - HOOK TWIN TIE PLATES. FOR USE WITH JOINT BARS HAVING TOE EXTENDING BEYOND RAIL BASE. TYPE H PLATES OF SUITABLE LENGTH TO BE SUBSTITUTED FOR TYPE L PLATES AT HEEL JOINT AND QUANTITIES LISTED IN TABLE MODIFIED TO AGREE.
- GENERAL REFERENCES:
 - POINT AND FLANGEWAY DIMENSIONS, SEE AREMA PLAN BASIC NO.600B FOR- DETAILS.
 - BEVELING OF ENDS ABUTTING RAILS. SEE AREMA PLAN BASIC NO.1005.
 - BONDING. PER DETAILS LS SPECIFIED BY PURCHASER.
- SPECIFICATIONS - GTTS (GO TRANSIT TRACK STANDARD), LATEST EDITION.



GROUPING OF RAILS	
GROUP A	GROUP B RAILS 115LB. OR HEAVIER
BASE 5 1/2"	LENGTHS SHOWN WILL ACCOMMODATE SECTIONS SPECIFIED BELOW.
HEAD 2 13/16" TO 2 9/16" INCLUSIVE OR HEAD AT OR EXCEEDING 2 13/16" WHEN HEAD + BASE DOES NOT EXCEED 8 5/16"	FOR OTHER RAILS 115LB. OR HEAVIER SEE NOTE 5-A
100 A.R.A.-A.	115 R.E. 132 R.E.

METRIC CONVERSION: 1 inch=25.4mm, 1 foot=304.8mm

0	19/03/29	REVISED PDF VERSION ESTABLISHED	
No.	Date	Revision	By Approved

Standard / **SOLID MANGANESE STEEL SELF GUARDED FROGS**

Drawn MG Checked GGS Approved VP Engineering & Asset Management

Date MAR 29, 2019 Plan Number GTS-820 Rev 0

REFERENCE: AREMA- PLAN NO 641-03 Sheet 1 OF 2