~ NOTES ~

(100) *ON THE PLAN SHEETS, THE DESIGNER MUST DOCUMENT THE APPROXIMATE STATION AND OFFSET, OR APPROXIMATE COORDINATES FOR THE CENTER OF POSTS 5A AND 5B. THESE VALUES ARE INTENDED TO SERVE AS GUIDANCE FOR CONSTRUCTION LAYOUT AND SHOULD ALLOW FOR TYPICAL CONSTRUCTION TOLERANCES. REFER TO SHEET 3 FOR INSTALLATION DETAILS AND BULLNOSE TERMINAL LAYOUT.*

(101) *U-BOLT CABLE CLIPS (3 PER CABLE) SPACED OUT ON NOSE, TO HOLD CABLE TO BACKSIDE OF THE RAIL.*

(102) *NOSE CABLE WITH SWAGGED END BUTTONS.*

(103) *NOSE CABLE ANCHOR BRACKET (BACKSIDE OF SPLICE).*

(104) *THE SLACK IN THE NOSE CABLES SHALL BE EVENLY DISTRIBUTED BETWEEN THE CABLE CLIP FASTENERS AND POST NO. 1 ON EITHER SIDE OF THE NOSE.*

(105) *MODIFIED THRIE-BEAM (BULLNOSE) MINIMUM WORKING WIDTH 4' - 6". GUARDRAIL-STEEL W BEAM-S FACE MINIMUM WORKING WIDTH 5' - 0".*

GRADING INSIDE W-BEAM GUARDRAIL OR MODIFIED THRIE-BEAM (BULLNOSE) GUARDRAIL BEYOND POST 12 MAY BE ADJUSTED FOR DRAINAGE, PROVIDED THERE IS A MINIMUM OF 2' OF FILL BEHIND THE POSTS TO ENSURE ADEQUATE SUPPORT FOR THE SYSTEM.

(106) *MINIMUM WIDTH OF SYSTEM FROM POST 5 TO POST 12 IS 14' - 9¼" MEASURED FROM FACE OF GUARDRAIL TO FACE OF GUARDRAIL.*

(107) *FIXED OBJECT OR OTHER OBSTACLE.*

108 *PARTS E1 THROUGH E4 ARE THRIE-BEAM RAILS. SEE SHEET 9 FOR DETAILS.*

- E1 *SLOTTED THRIE-BEAM RAIL (POST 1B TO POST 1A)*
- E2 *SLOTTED THRIE-BEAM RAIL (POST 1 TO POST 5)*
- E3 *SLOTTED THRIE-BEAM RAIL (POST 5 TO POST 8)*
- E4 *UNBENT STANDARD THRIE-BEAM RAIL (POST 8 TO POST 12 AND BEYOND POST 12 WHEN MODIFIED THRIE-BEAM (BULLNOSE) USED)*

(109) *BEYOND POST 12, EITHER MODIFIED THRIE-BEAM (BULLNOSE) OR W-BEAM GUARDRAIL MAY BE CONSTRUCTED. BOTH OPTIONS ARE PAID PER LINEAR FOOT. INDICATE THE SELECTED TYPE IN THE ROADWAY PLANS.*

(110) *MODIFIED THRIE-BEAM (BULLNOSE) IS SHOWN IN PLAN VIEW - TYPICAL BULLNOSE LAYOUT. TRANSITIONING TO W-BEAM GUARDRAIL WILL HAVE A DIFFERENT LAYOUT. SEE SHEET 4 DETAIL B.*

111 *SEE SHEET 6 FOR DETAILS ON THE INSTALLATION OF DELINEATOR REFLECTORS.*

112 *SEE SHEET 5 FOR MEDIAN GRADING.*

113 *THRIE-BEAM RAILS MAY NEED TO BE FIELD BENT TO FIT THE LOCATION.*

114 *IF ROCK IS ENCOUNTERED, REMOVE ROCK TO FULL DEPTH OF POST PLUS 2 1/2". MINIMUM DIAMETER OF THE ROCK REMOVAL IS 12" DIAMETER. BACKFILL WITH CUTTING SPOILS, PLACING GRANULAR MATERIAL, OR SMALL ROCK (#9 OR #57 STONE) IN THE BOTTOM 2 1/2" FOR DRAINAGE. THE REMOVAL OF ROCK AND BACKFILL MATERIAL IS INCIDENTAL.*

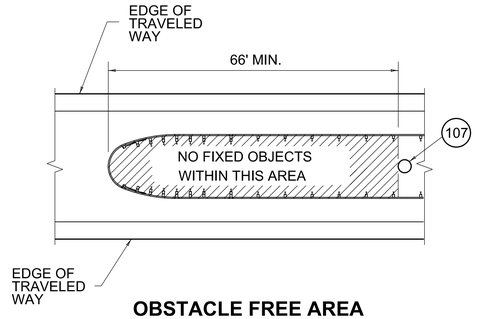
BID ITEMS AND UNIT TO BID

THRIE-BEAM BULLNOSE TERMINAL	*EACH*

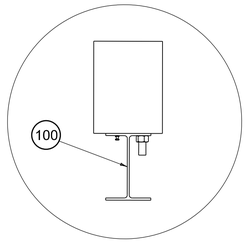
BID ITEMS AS APPLICABLE

GUARDRAIL-STEEL W BEAM-S FACE	*LF*
MODIFIED THRIE-BEAM (BULLNOSE)	*LF*
THRIE BEAM TO W BEAM CONNECTOR	*EACH*

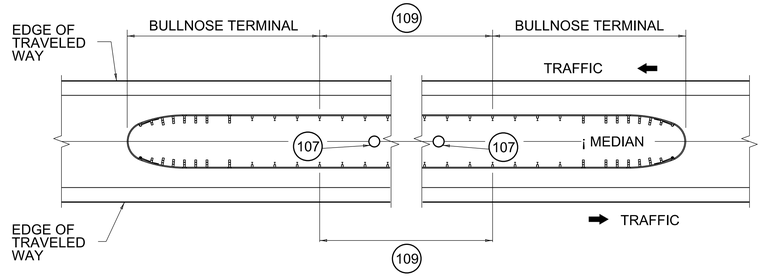
LAPPING DETAIL



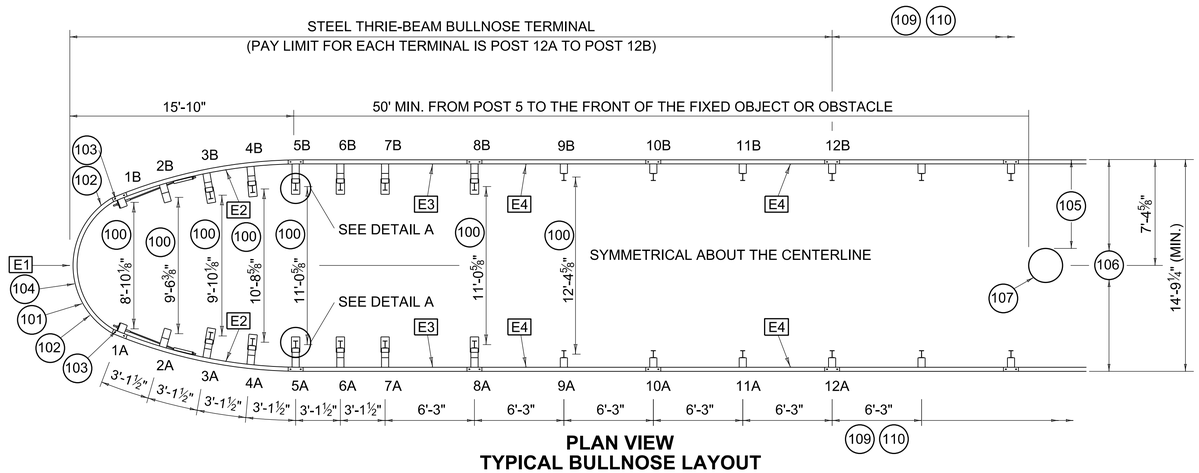
OBSTACLE FREE AREA INSIDE BULLNOSE



DETAIL A



MEDIAN FIXED OBJECT SHIELDING PAY LIMITS



PLAN VIEW
TYPICAL BULLNOSE LAYOUT

REVISION DATE: 08/11/2025
REVISION NUMBER: 0

SUBMITTED — DIVISION DIRECTOR — DATE 08-11-2025
APPROVED — STATE HIGHWAY ENGINEER — DATE 08-11-2025

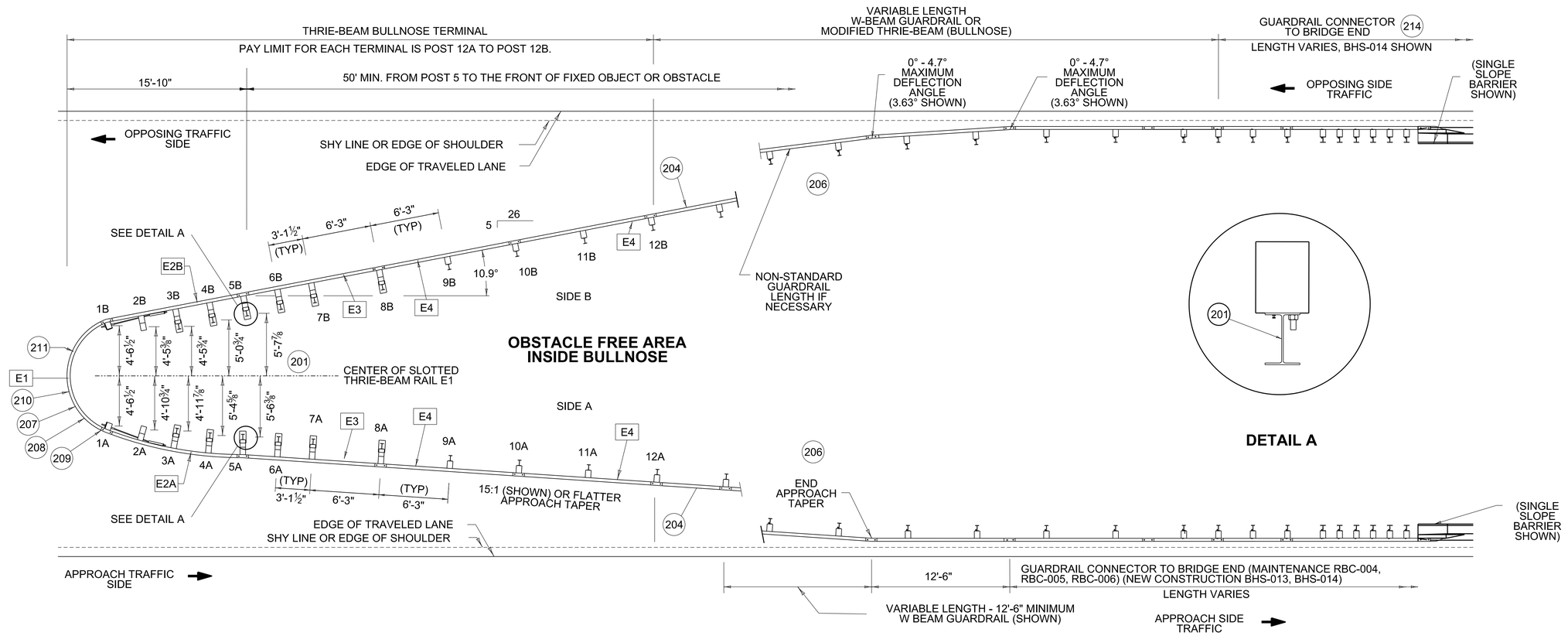
BARRIERS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY TRANSPORTATION CABINET

STEEL THRIE-BEAM BULLNOSE TERMINAL

SHEET 001: SYMMETRICAL BULLNOSE

STANDARD DRAWING NUMBER
RBE-210



TYPICAL LAYOUT FOR ASYMMETRICAL BULLNOSE FOR SYSTEM WIDTHS GREATER THAN 24'

~ NOTES ~

(201) *DIMENSIONS ARE MEASURED FROM THE CENTER OF SLOTTED THRIE-BEAM RAIL E1 TO THE CENTER OF EACH GUARDRAIL POST.*

ON THE PLAN SHEETS, THE DESIGNER MUST DOCUMENT THE APPROXIMATE STATION AND OFFSET, OR APPROXIMATE COORDINATES FOR THE CENTER OF POSTS 5A AND 5B. THESE VALUES ARE INTENDED TO SERVE AS GUIDANCE FOR CONSTRUCTION LAYOUT AND SHOULD ALLOW FOR TYPICAL CONSTRUCTION TOLERANCES. REFER TO SHEET 3 FOR INSTALLATION DETAILS AND BULLNOSE TERMINAL LAYOUT.

202 *SAW, DRILL, OR PUNCH THE RAIL AS REQUIRED. DO NOT TORCH-CUT. REPAIR GALVANIZED COATINGS IN ACCORDANCE WITH ASTM A780 (THIS IS INCIDENTAL). SPACING BETWEEN INDIVIDUAL POSTS FROM POST 1 TO POST 7 IS 3'-1½"*

203 *PARTS E1 THROUGH E4 ARE THRIE-BEAM RAILS. SEE SHEET 9 FOR DETAILS.*

- E1 *SLOTTED THRIE-BEAM RAIL (POST 1B TO POST 1A)*
- E2 *SLOTTED THRIE-BEAM RAIL (POST 1 TO POST 5) WITH A RADIAL OPTION ON THE APPROACH SIDE AND A TANGENT OPTION ON THE OPPOSING SIDE.*
- E3 *SLOTTED THRIE-BEAM RAIL (POST 5 TO POST 8)*
- E4 *UNBENT STANDARD THRIE-BEAM RAIL (POST 8 TO POST 12, AND BEYOND POST 12 WHEN MODIFIED THRIE-BEAM (BULLNOSE) USED)*

(204) *BEYOND POST 12, EITHER MODIFIED THRIE-BEAM (BULLNOSE) OR W-BEAM GUARDRAIL MAY BE CONSTRUCTED. BOTH OPTIONS ARE PAID PER LINEAR FOOT. INDICATE THE SELECTED TYPE IN THE ROADWAY PLANS.*

FOR WIDER MEDIANS, TAPER THE OPPOSING TRAFFIC SIDE BEFORE TAPERING THE APPROACH TRAFFIC SIDE, AS SHOWN.

EXTEND THE RAIL BEYOND POST 12 AT A TAPER RATE OF 15:1 OR FLATTER ON THE APPROACH SIDE, AND UP TO A MAXIMUM TAPER RATE OF 26:5 ON THE OPPOSING TRAFFIC SIDE, AS NEEDED. THE LENGTH OF EXTENSION WILL VARY BASED ON MEDIAN WIDTH OR WORKING WIDTH REQUIREMENTS.

205 *SEE SHEET 5 FOR MEDIAN GRADING.*

(206) *MODIFIED THRIE-BEAM (BULLNOSE) MINIMUM WORKING WIDTH 4' - 6". GUARDRAIL-STEEL W BEAM-S FACE MINIMUM WORKING WIDTH 5' - 0".*

GRADING INSIDE W-BEAM GUARDRAIL OR MODIFIED THRIE-BEAM (BULLNOSE) GUARDRAIL BEYOND POST 12 MAY BE ADJUSTED FOR DRAINAGE, PROVIDED THERE IS A MINIMUM OF 2' OF FILL BEHIND THE POSTS TO ENSURE ADEQUATE SUPPORT FOR THE SYSTEM.

(207) *U-BOLT CABLE CLIPS (3 PER CABLE) SPACED OUT ON NOSE, TO HOLD CABLE TO BACKSIDE OF THE RAIL.*

(208) *NOSE CABLE WITH SWAGGED END BUTTONS.*

(209) *NOSE CABLE ANCHOR BRACKET (BACKSIDE OF SPLICE).*

(210) *THE SLACK IN THE NOSE CABLES SHALL BE EVENLY DISTRIBUTED BETWEEN THE CABLE CLIP FASTENERS AND POST NO. 1 ON EITHER SIDE OF THE NOSE.*

(211) *BEND THE RAIL IN THE FIELD AS NEEDED TO MAKE CONNECTIONS. THE MAXIMUM DEFLECTION ANGLE IS 4.7° (3.63° SHOWN).*

212 *IF ROCK IS ENCOUNTERED, REMOVE ROCK TO FULL DEPTH OF POST PLUS 2 1/2". MINIMUM DIAMETER OF THE ROCK REMOVAL IS 12" DIAMETER. BACKFILL WITH CUTTING SPOILS, PLACING GRANULAR MATERIAL, OR SMALL ROCK (#9 OR #57 STONE) IN THE BOTTOM 2 1/2" FOR DRAINAGE. THE REMOVAL OF ROCK AND BACKFILL MATERIAL IS INCIDENTAL.*

213 *SEE SHEET 6 FOR DETAILS ON THE INSTALLATION OF DELINEATOR REFLECTORS.*

(214) *GUARDRAIL CONNECTOR TO BRIDGE END. FOR NEW CONSTRUCTION USE BHS-013 OR BHS-014. FOR MAINTENANCE ONLY RBC-004, RBC-005, RBC-006.*

BID ITEM AND UNIT TO BID

THRIE-BEAM BULLNOSE TERMINAL	*EACH*

BID ITEMS AS APPLICABLE

MODIFIED THRIE-BEAM (BULLNOSE)	*LF*
GUARDRAIL-STEEL W BEAM-S FACE	*LF*
THRIE BEAM TO W BEAM CONNECTOR	*EACH*
THRIE-BEAM GUARDRAIL TRANSITION TL-3	*EACH*
THRIE-BEAM GUARDRAIL TRANSITION TL-2	*EACH*

REVISION DATE: 08/11/2025
REVISION NUMBER: 0

SUBMITTED — DIVISION DIRECTOR — 08-11-2025 DATE

APPROVED — STATE HIGHWAY ENGINEER — 08-11-2025 DATE

BARRIERS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY TRANSPORTATION CABINET

STEEL THRIE-BEAM BULLNOSE TERMINAL

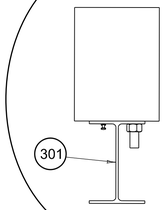
SHEET 002: ASYMMETRICAL BULLNOSE

STANDARD DRAWING NUMBER
RBE-210

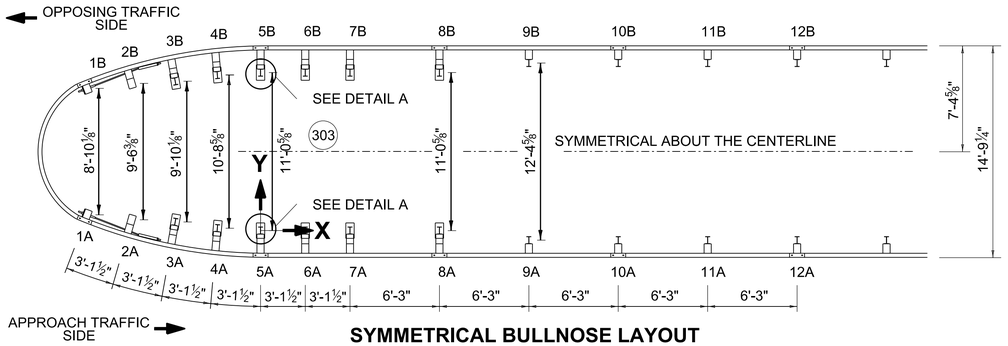
BULLNOSE TERMINAL INSTALLATION LAYOUT GUIDE

SYMMETRICAL BULLNOSE POST COORDINATES (APPROXIMATE)			
POST NUMBER	X (FT, IN)	Y (FT, IN)	ANGLE OF POST (FLANGE FACE)
12A	37' - 6"	- 0' - 8 1/8"	0
11A	31' - 3"	- 0' - 8 1/8"	0
10A	25' - 0"	- 0' - 8 1/8"	0
9A	18' - 9"	- 0' - 8 1/8"	0
8A	12' - 6"	0' - 0"	0
7A	6' - 3"	0' - 0"	0
6A	3' - 1 1/2"	0' - 0"	0
5A	0' - 0"	0' - 0"	0
4A	- 3' - 1/4"	0' - 2"	5
3A	- 5' - 11 5/8"	0' - 7 1/4"	10
2A	- 9' - 1/4"	0' - 9 "	16
1A	- 12' - 1 3/8"	1' - 1 5/8"	21
1B	- 12' - 1 3/8"	9' - 10 3/4"	21
2B	- 9' - 1/4"	10' - 3 3/8"	16
3B	- 5' - 11 5/8"	10' - 5 1/8"	10
4B	- 3' - 1/4"	10' - 10 3/8"	5
5B	0' - 0"	11' - 3/8"	0
6B	3' - 1 1/2"	11' - 3/8"	0
7B	6' - 3"	11' - 3/8"	0
8B	12' - 6"	11' - 3/8"	0
9B	18' - 9"	11' - 8 1/2"	0
10B	25' - 0"	11' - 8 1/2"	0
11B	31' - 3"	11' - 8 1/2"	0
12B	37' - 6"	11' - 8 1/2"	0

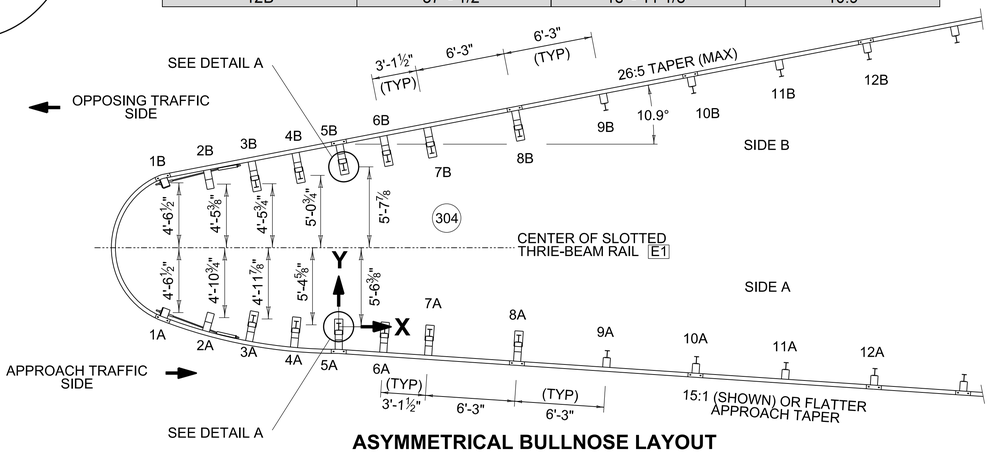
DETAIL A



ASYMMETRICAL BULLNOSE POST COORDINATES (APPROXIMATE)			
POST NUMBER	X (FT, IN)	Y (FT, IN)	ANGLE OF POST (FLANGE FACE)
12A	37' - 5 5/8"	- 3' - 2"	3.8
11A	31' - 3 1/8"	- 2' - 9"	3.8
10A	25' - 0"	- 2' -4"	3.8
9A	18' - 9 1/8"	- 1' - 11"	3.8
8A	12' - 6 7/8"	- 0' - 10"	3.8
7A	6' - 4 1/4"	- 0' - 5 1/8"	3.8
6A	3' - 2 5/8"	- 0' - 2 5/8"	3.8
5A	0' - 0"	0' - 0"	0
4A	- 2' - 11 3/4"	0' - 1 5/8"	5
3A	- 5' - 11 3/4"	0' - 6 1/2"	10
2A	- 9' - 1/4"	0' - 7 5/8"	16
1A	- 12' - 1 1/2"	0' - 11 5/8"	21
1B	- 12' - 1 1/2"	10' - 7/8"	21
2B	- 9' - 1/8"	9' - 11 5/8"	10.9
3B	- 5' - 9 1/2"	10' - 0"	10.9
4B	- 2' - 8 5/8"	10' - 7"	10.9
5B	0' - 4 1/8"	11' - 2 1/8"	10.9
6B	3' - 5"	11' - 9 1/4"	10.9
7B	6' - 5 3/4"	12' - 4 3/8"	10.9
8B	12' - 7 1/2"	13' - 6 1/2"	10.9
9B	18' - 7 5/8"	15' - 4 1/2"	10.9
10B	24' - 9 1/4"	16' - 6 3/4"	10.9
11B	30' - 10 7/8"	17' - 8 7/8"	10.9
12B	37' - 1/2"	18' - 11 1/8"	10.9



SYMMETRICAL BULLNOSE LAYOUT



ASYMMETRICAL BULLNOSE LAYOUT

~ NOTES ~

300 *ON THE PLAN SHEETS, THE DESIGNER MUST DOCUMENT THE APPROXIMATE STATION AND OFFSET, OR APPROXIMATE COORDINATES FOR THE CENTER OF POSTS 5A AND 5B. THESE VALUES ARE INTENDED TO SERVE AS GUIDANCE FOR CONSTRUCTION LAYOUT AND SHOULD ALLOW FOR TYPICAL CONSTRUCTION TOLERANCES.*

301 *DIMENSIONS ARE MEASURED TO THE CENTER OF GUARDRAIL POSTS. REFER TO DETAIL A FOR ADDITIONAL INFORMATION. THE CONTRACTOR SHALL LAYOUT THE BULLNOSE TERMINAL IN THE FIELD USING THE STATION AND OFFSET (OR OTHER LOCATION INFORMATION) FOR POST 5A, ENSURING A MINIMUM LENGTH OF 50' FROM POST 5 TO THE FRONT OF THE FIXED OBJECT OR OBSTACLE. POST COORDINATES IN THE TABLES ABOVE MAY BE USED TO LAYOUT THE REMAINING POSTS. NORMAL CONSTRUCTION TOLERANCES APPLY.*

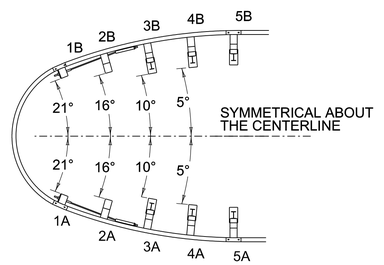
302 *TO ASSIST WITH LAYING OUT THE BULLNOSE TERMINAL, ASSEMBLE THE E1 BEAM AND E2 BEAMS (WITHOUT ATTACHING TO THE POSTS) TO SERVE AS AN ON-THE-GROUND TEMPLATE FOR THE TERMINAL SYSTEM. DURING THIS DEMONSTRATION ASSEMBLY, POST LOCATIONS MAY BE ADJUSTED TO MATCH THE LAYOUT. ERECT THE RAIL ELEMENTS TO FORM A SMOOTH, CONTINUOUS RAIL AS SHOWN IN THE PLANS AND STANDARD DRAWINGS. SET POSTS PLUMB AND ACCURATELY ALIGNED AND SPACED. KYTC WILL REVIEW THE LAYOUT PRIOR TO THE CONTRACTOR DRIVING POSTS.*

303 *FOR THE SYMMETRIC BULLNOSE, LAYOUT AND ANGLE DIMENSIONS FOR POST 1-5 ARE MEASURED FROM THE CENTER OF THE POSTS ON SIDE A TO THE CENTER OF POSTS ON SIDE B.*

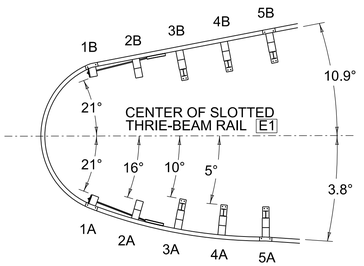
304 *FOR THE ASYMMETRIC BULLNOSE, LAYOUT AND ANGLE DIMENSIONS FOR POST 1-5 ARE MEASURED FROM THE CENTER OF SLOTTED THRIE-BEAM RAIL E1 TO THE CENTER OF EACH GUARDRAIL POST.*

305 *POSTS LABELED AS 'A' SHALL BE ALIGNED TO THE APPROACH TRAFFIC SIDE. THE ABOVE CHARTS SHALL BE MIRRORED ACCORDINGLY IF PLACED IN A DIFFERENT ORIENTATION. THE CHART SPACING SHALL STILL APPLY.*

306 *FOR ADDITIONAL ASSEMBLY INFORMATION, SCAN THE QR CODE TO ACCESS THE MASH BULLNOSE INSTALLATION MANUAL.*



SYMMETRICAL POST ANGLE (APPROX.)



ASYMMETRICAL POST ANGLE (APPROX.)

REVISION DATE: 08/11/2025
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SUBMITTED — DIVISION DIRECTOR — DATE 08-11-2025
APPROVED — STATE HIGHWAY ENGINEER — DATE 08-11-2025

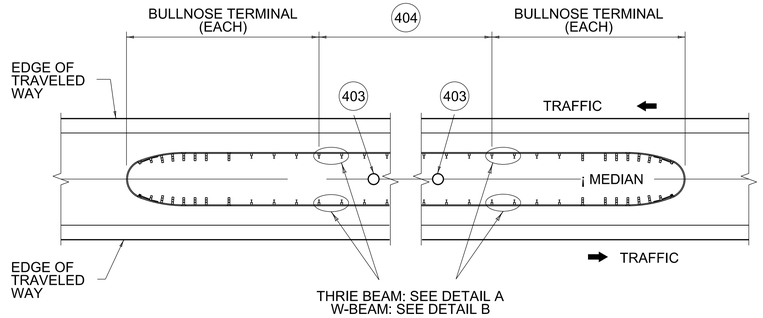
BARRIERS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY TRANSPORTATION CABINET

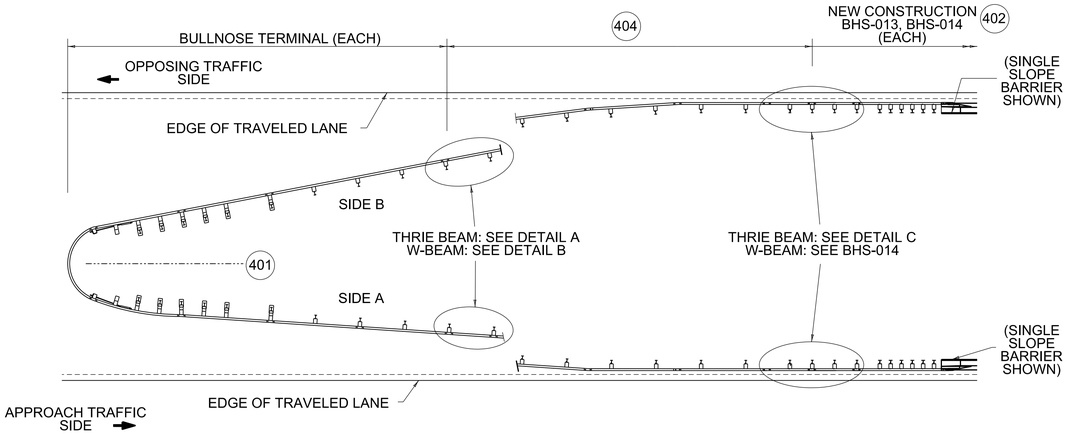
STEEL THRIE-BEAM BULLNOSE TERMINAL

SHEET 003: BULLNOSE TERMINAL INSTALLATION LAYOUT

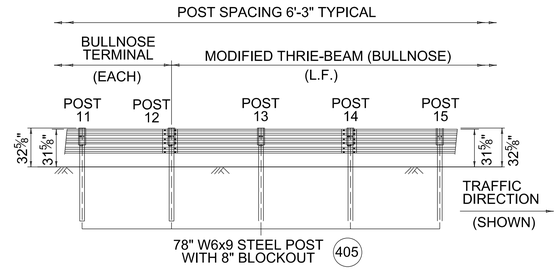
STANDARD DRAWING NUMBER
RBE-210



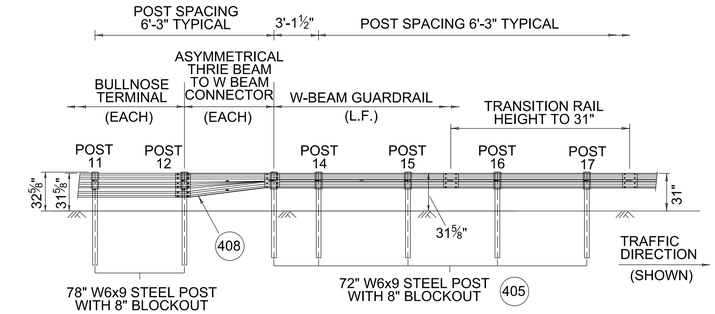
SYMMETRICAL BULLNOSE



ASYMMETRICAL BULLNOSE



DETAIL A
BULLNOSE TERMINAL TRANSITION TO MODIFIED THRIE-BEAM (BULLNOSE)



DETAIL B
BULLNOSE TERMINAL TRANSITION TO W-BEAM GUARDRAIL

~ NOTES ~

400 *SEE SHEET 5 FOR MEDIAN GRADING*

401 *SYMMETRY LINE OF SLOTTED THRIE-BEAM RAIL E1.*

402 *FOR MAINTENANCE ONLY USE RBC-004, RBC-005, RBC-006*

403 *FIXED OBJECT*

MODIFIED THRIE-BEAM (BULLNOSE) MINIMUM WORKING WIDTH 4' - 6"
GUARDRAIL-STEEL W BEAM-S FACE MINIMUM WORKING WIDTH 5' - 0"

404 *BEYOND POST 12, EITHER MODIFIED THRIE-BEAM (BULLNOSE) OR W-BEAM GUARDRAIL MAY BE CONSTRUCTED. BOTH OPTIONS ARE PAID PER LINEAR FOOT. INDICATE THE SELECTED TYPE IN THE ROADWAY PLANS.*

405 *SEE SHEET 7 FOR POST, RAIL, AND BLOCKOUT DETAILS.*

406 *CONTRARY TO BHS-013 AND BHS-014, IF MODIFIED THRIE-BEAM (BULLNOSE) IS USED TO CONNECT TO A THRIE-BEAM GUARDRAIL TRANSITION (BHS-013 OR BHS-014), THE ASYMMETRICAL THRIE BEAM TO W BEAM CONNECTOR PIECE IS REPLACED WITH A 12' - 6" LONG THRIE-BEAM RAIL WITH POST SPACING AS SHOWN IN DETAIL C. 6" X 8" X 18" BLOCKOUTS (SEE BHS-013 AND BHS-014 FOR DETAILS) ARE TO BE USED IN THIS SECTION OF THRIE BEAM. BEYOND THIS, STANDARD BLOCKOUTS FOR GUARDRAIL THRIE BEAM (BULLNOSE) IS USED.*

407 *EXTEND STANDARD HEADER CURB OR STANDARD HEADER CURB AND GUTTER TO THE END OF THE SECOND THRIE-BEAM PIECE FROM THE BRIDGE END. TAPER DOWN TO 4" IN HEIGHT OVER THE LAST 3' - 1 ½".*

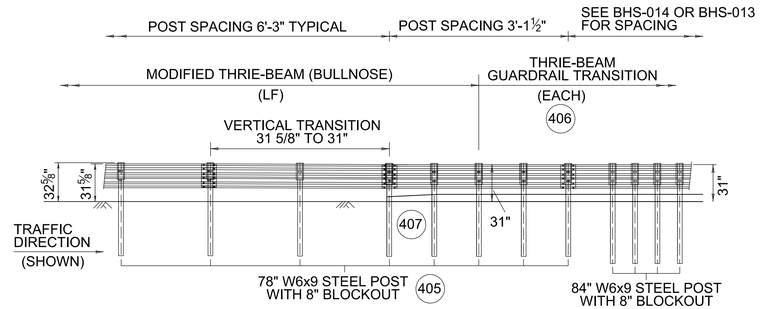
408 *THRIE BEAM TO W BEAM CONNECTOR PAID AS EACH. USE 10 GAUGE STEEL. SEE HARDWARE GUIDE DRAWING RWT02 FOR ADDITIONAL DETAILS.*

BID ITEM AND UNIT TO BID

THRIE-BEAM BULLNOSE TERMINAL	*EACH*

BID ITEMS AS APPLICABLE

MODIFIED THRIE-BEAM (BULLNOSE)	*LF*
GUARDRAIL-STEEL W BEAM-S FACE	*LF*
THRIE BEAM TO W BEAM CONNECTOR	*EACH*
THRIE-BEAM GUARDRAIL TRANSITION TL-3	*EACH*
THRIE-BEAM GUARDRAIL TRANSITION TL-2	*EACH*



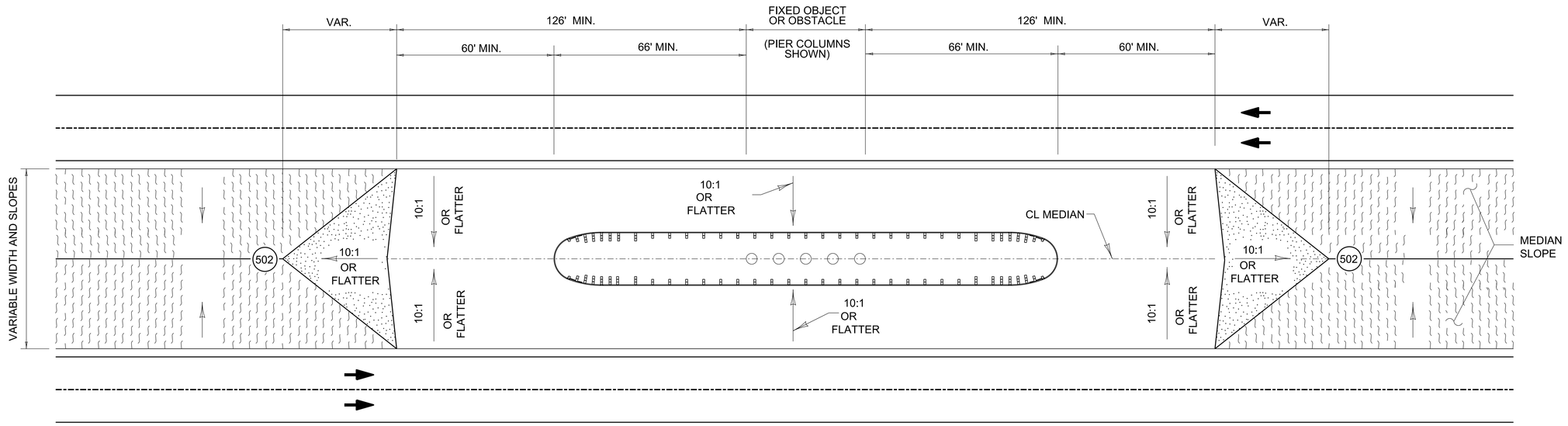
DETAIL C
MODIFIED THRIE-BEAM (BULLNOSE) TO THRIE-BEAM TRANSITION (BHS-014 SHOWN)

REVISION DATE: 08/11/2025
REVISION NUMBER: 0

SUBMITTED — DIVISION DIRECTOR — 08-11-2025 DATE

APPROVED — STATE HIGHWAY ENGINEER — 08-11-2025 DATE

BARRIERS



GRADING AT BULLNOSE

~ NOTES ~

(500) *MODIFIED THRIE-BEAM (BULLNOSE) MINIMUM WORKING WIDTH 4' - 6". GUARDRAIL-STEEL W BEAM-S FACE MINIMUM WORKING WIDTH 5' - 0".*

GRADING FROM POST 1 TO POST 12 AND THE 60' LEADING OR TRAILING THE THRIE-BEAM TERMINAL SHALL BE 10:1 OR FLATTER.

GRADING BEYOND POST 12 MAY BE ADJUSTED FOR DRAINAGE, PROVIDED THERE IS A MINIMUM OF 2' OF FILL BEHIND THE POSTS TO ENSURE ADEQUATE SUPPORT FOR THE SYSTEM.

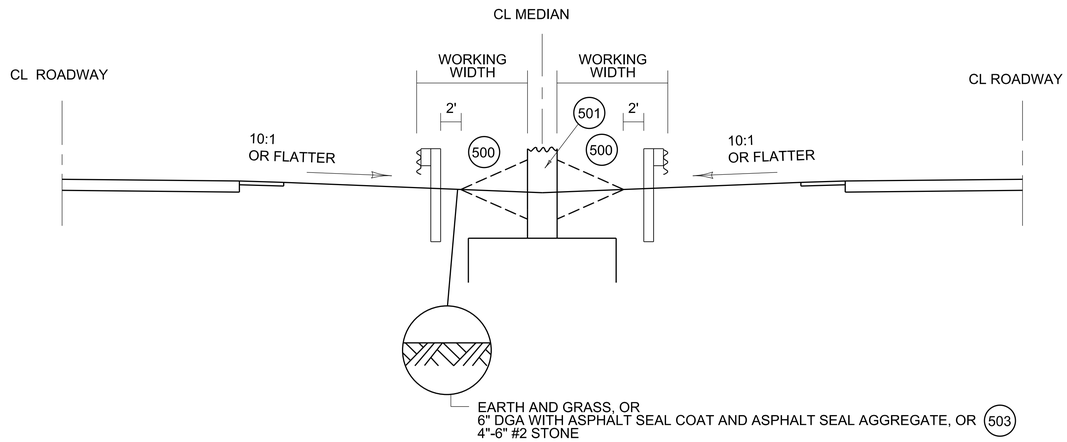
(501) *FIXED OBJECT OR OTHER OBSTACLE.*

(502) *EVALUATE MEDIAN DRAINAGE AND ENSURE POSITIVE FLOW. INCLUDE A DROP BOX INLET AND PIPING AS NEEDED, AND ENSURE THAT ALL NECESSARY BID ITEMS ARE INCLUDED.*

(503) *AT THE DISCRETION OF THE ENGINEER, MATERIAL CAN BE ANY OF THE FOLLOWING:*
EARTH AND GRASS, OR
6" DGA WITH ASPHALT SEAL COAT AND ASPHALT SEAL AGGREGATE, OR
4"-6" #2 STONE

504 *WHILE MEDIAN GRADING DETAIL DEPICTS SYMMETRICAL THRIE-BEAM BULLNOSE TERMINAL, ALL GRADING REQUIREMENTS APPLY TO ASYMMETRICAL THRIE-BEAM BULLNOSE TERMINALS ALSO.*

505 *GRADING QUANTITIES MUST BE CALCULATED AND SHOWN AS BID ITEMS.*



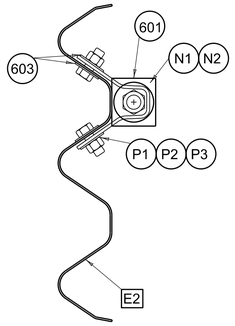
CROSS SECTION AT FIXED OBJECT

REVISION DATE: 08/11/2025
REVISION NUMBER: 0

SUBMITTED — DIVISION DIRECTOR — DATE 08-11-2025

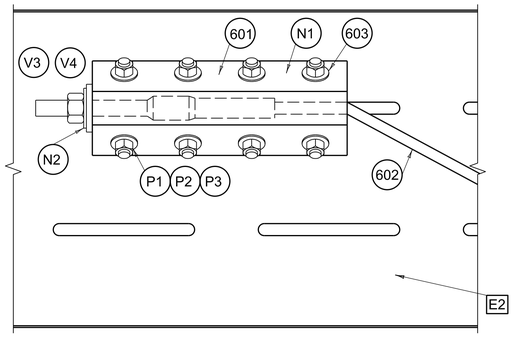
APPROVED — STATE HIGHWAY ENGINEER — DATE 08-11-2025

BARRIERS

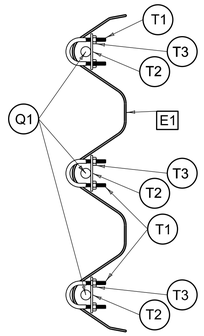


PROFILE VIEW

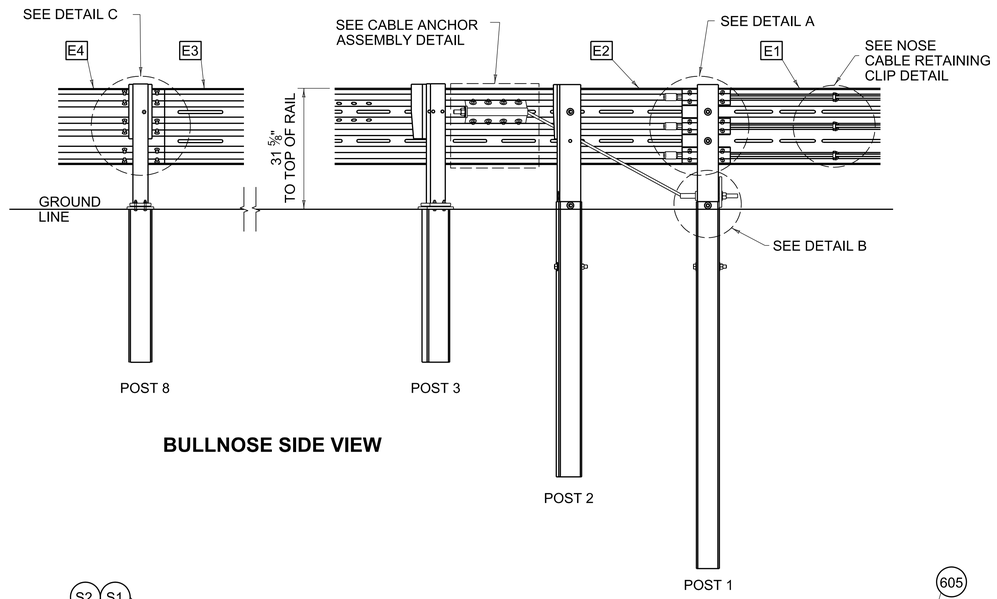
CABLE ANCHOR
ASSEMBLY CONNECTION



CABLE ANCHOR ASSEMBLY



NOSE CABLE RETAINING CLIP



BULLNOSE SIDE VIEW

~ NOTES ~

600 *SEE SHEET 10 FOR PART DESCRIPTIONS.*

(601) *SEE ANCHOR BRACKET ASSEMBLY DETAIL ON SHEET 10.*

(602) *SEE ANCHOR CABLE ASSEMBLY DETAIL ON SHEET 10.*

(603) *ONE WASHER BETWEEN BOLT HEAD AND RAIL AND BETWEEN NUT AND ANCHOR BRACKET ASSEMBLY.*

(604) *ONE WASHER BETWEEN BOLT HEAD AND FOUNDATION TUBE AND BETWEEN NUT AND FOUNDATION TUBE.*

(605) *BEND TWO NAILS OVER THE BEARING PLATE TO PREVENT ROTATION.*

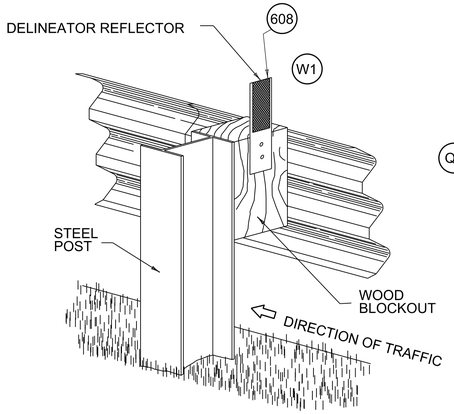
606 *NO MATERIAL IS TO BE PLACED AGAINST THE VERTICAL FACES OF BEARING PLATE.*

607 *PREVENT OR REMOVE MATERIALS THAT BLOCK ACCESS TO BOLTS FOR POST ASSEMBLIES.*

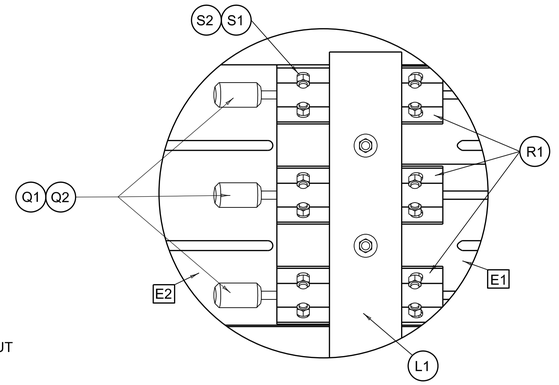
(608) *THE COLOR OF DELINEATORS MUST MATCH THE COLOR OF THE EDGELINE THEY SUPPLEMENT.*

609 *DELINEATOR SPACING SHOULD BE 100' WITH A MINIMUM OF 3 REFLECTORS. THE FIRST DELINEATOR SHOULD BE PLACED ON POST 3, ON THE ADJACENT TRAFFIC SIDE OF THE BULLNOSE.*

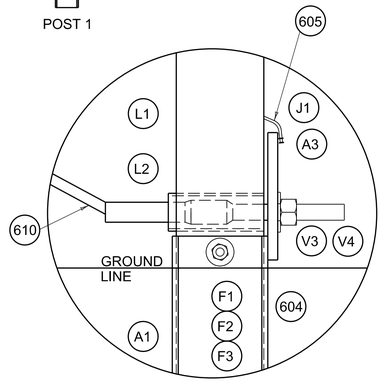
(610) *ANCHOR CABLE ASSEMBLY INCLUDES PARTS V1, V2, V3, AND V4.*



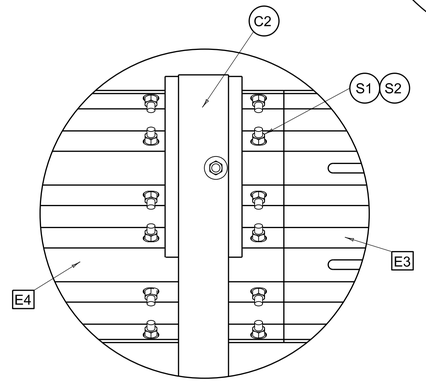
ONE-SIDED REFLECTOR DETAIL AND TYPICAL INSTALLATION



DETAIL A



DETAIL B



DETAIL C
THRIE-BEAM SPLICE

REVISION DATE: 08/11/2025
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APPROVED — STATE HIGHWAY ENGINEER — 08-11-2025 DATE

BARRIERS

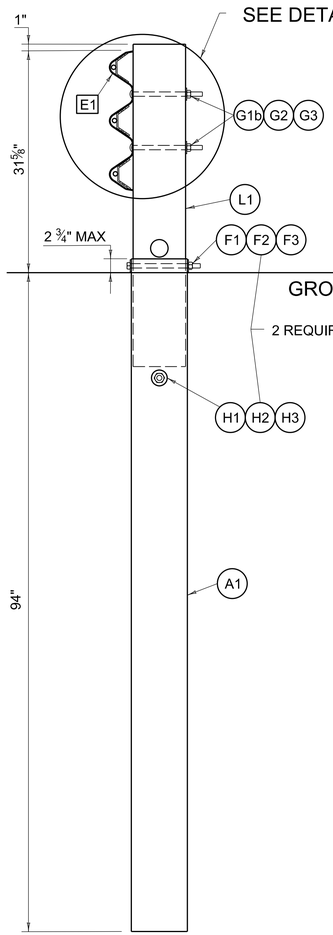
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

TEAM KENTUCKY TRANSPORTATION CABINET

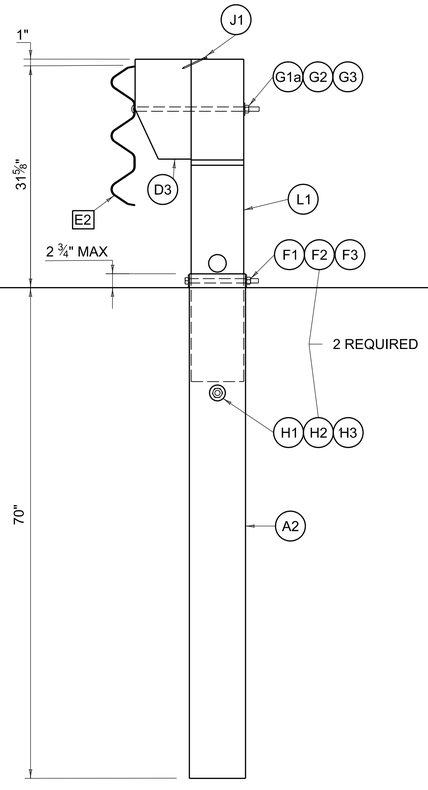
STEEL THRIE-BEAM BULLNOSE TERMINAL

SHEET 006: NOSE AND ANCHOR DETAILS

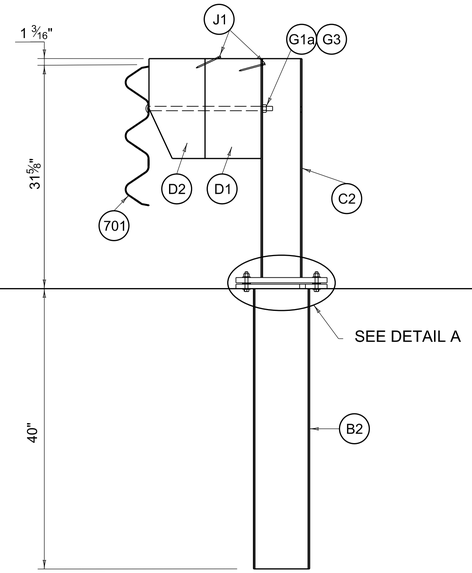
STANDARD DRAWING NUMBER
RBE-210



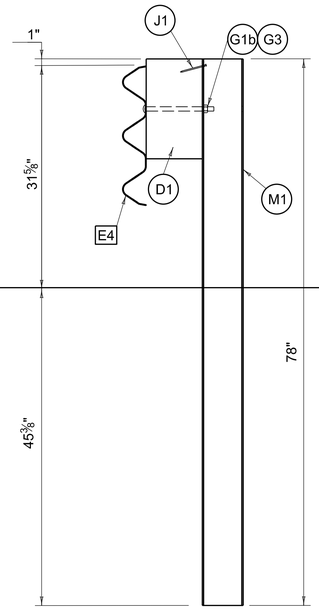
POST NO. 1



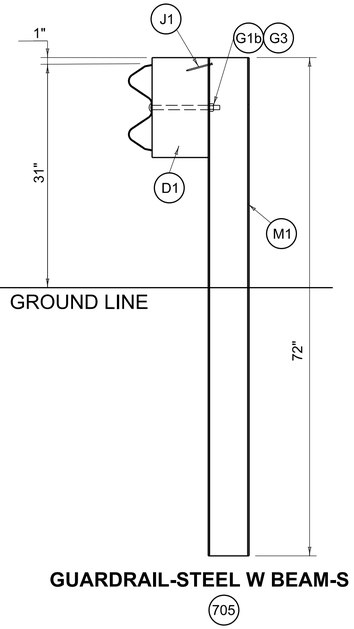
POST NO. 2



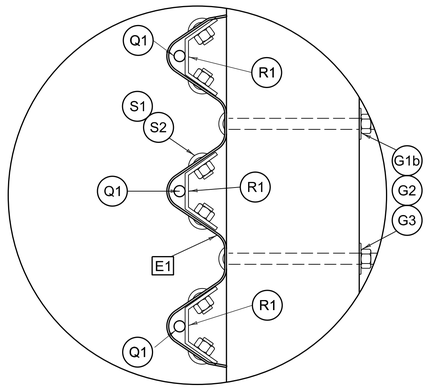
POST NOS. 3-8



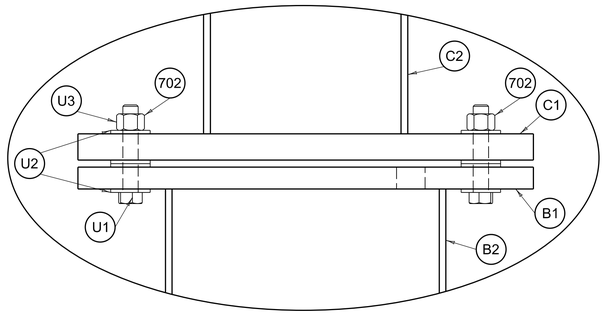
POST NOS. 9-12
AND
MODIFIED THRIE-BEAM (BULLNOSE)
704



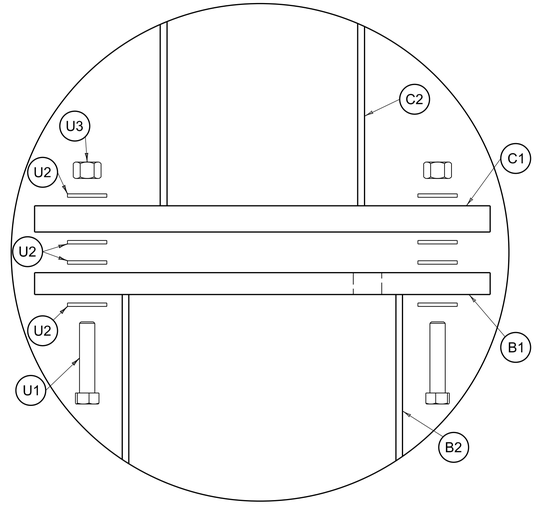
GUARDRAIL-STEEL W BEAM-S FACE
705



DETAIL B



DETAIL A



EXPLODED VIEW
DETAIL A

~ NOTES ~

700 *SEE SHEET 10 FOR PART DESCRIPTIONS.*

701 *RAIL CAN BE E2 OR E3 DEPENDING ON POST LOCATION.*

702 *TORQUE BOLT BETWEEN 60-75 FT-LB*

703 *SEE SHEET 4 FOR BULLNOSE TRANSITIONS. BEYOND POST 12 EITHER MODIFIED THRIE-BEAM (BULLNOSE) OR W-BEAM GUARDRAIL MAY BE CONSTRUCTED. BOTH OPTIONS PAID FOR AS LINEAR FOOT. INDICATE THE TYPE SELECTED IN THE ROADWAY PLANS.*

704 *IF THE MODIFIED THRIE-BEAM (BULLNOSE) OPTION IS INSTALLED BEYOND POST 12, MATCH THE CONFIGURATION, SPACING, AND COMPONENTS USED BETWEEN POSTS 9 AND 12.*

705 *BEYOND POST 12, IF W-BEAM GUARDRAIL IS SELECTED, TRANSITION THE RAIL BETWEEN POST 12 AND POST 13 USING A THRIE BEAM TO W BEAM CONNECTOR, FOLLOWED BY A STANDARD POST AND BLOCK SPACED AT 3' - 1½". CONTINUE THE BARRIER SYSTEM WITH STANDARD 6' - 3" POST SPACING, AND TRANSITION THE BULLNOSE RAIL HEIGHT TO 31" OVER A 12' -6" BEAM LENGTH. SEE SHEET 4 FOR W-BEAM TRANSITION DETAILS.*

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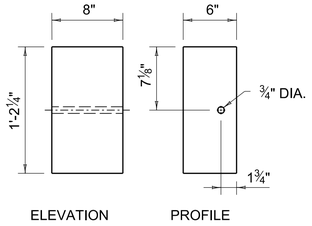
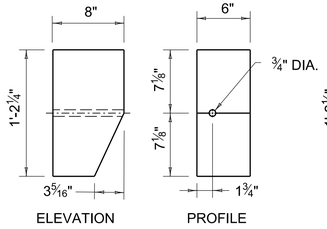
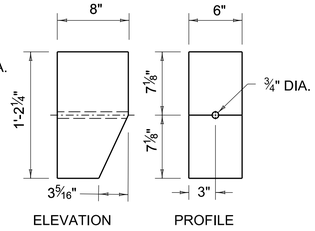
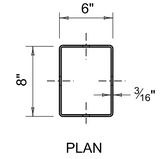
BARRIERS

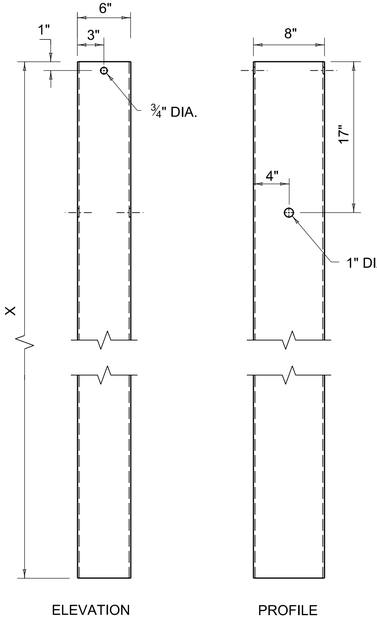


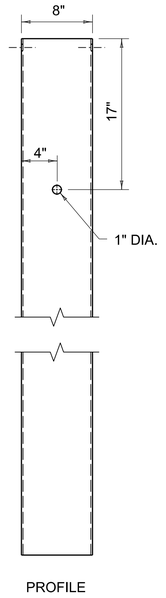




BLOCKOUT (D1) **BLOCKOUT (D2)** **BLOCKOUT (D3)**

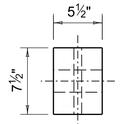


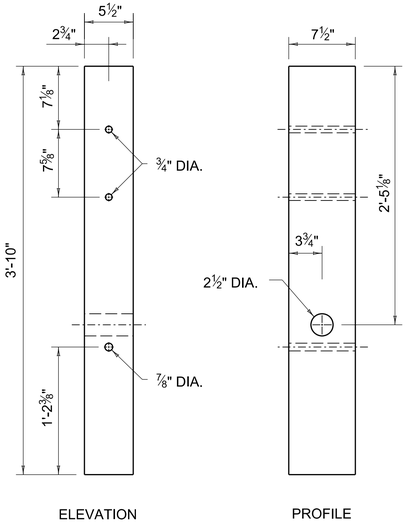




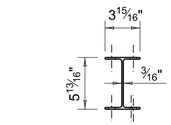
FOUNDATION TUBE (A1, A2, & B2)

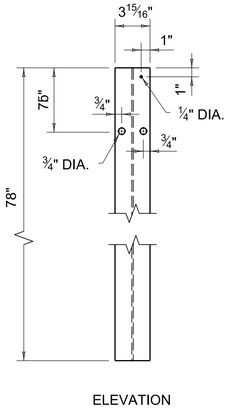
PART	LENGTH "X"
A1	96"
A2	72"
B2	40"



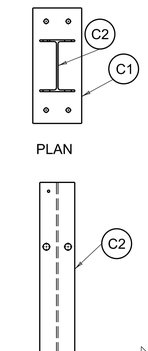


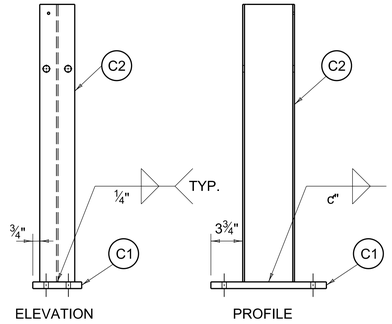
BCT TIMBER POST (L1)



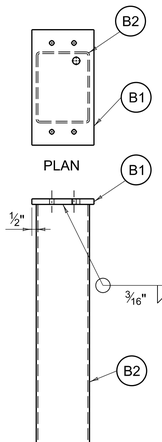


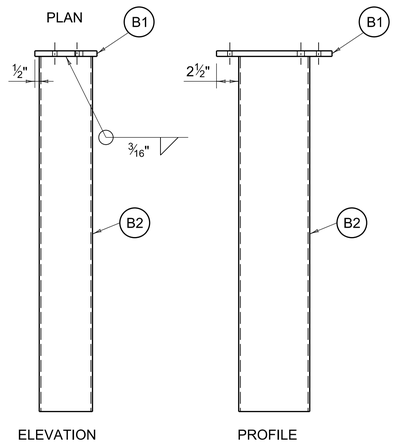
STEEL POST (M1)



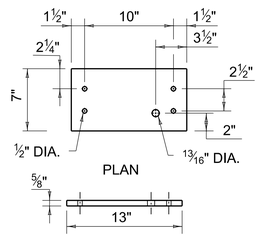


UPPER POST ASSEMBLY

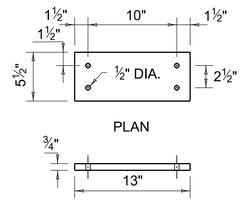




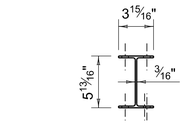
LOWER POST ASSEMBLY

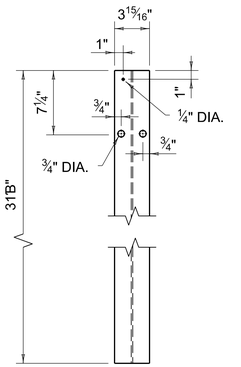


LOWER SHEAR PLATE (B1)



UPPER SHEAR PLATE (C1)





STEEL POST (C2)

~ NOTES ~

800 *SEE SHEET 10 FOR PART DESCRIPTIONS.*

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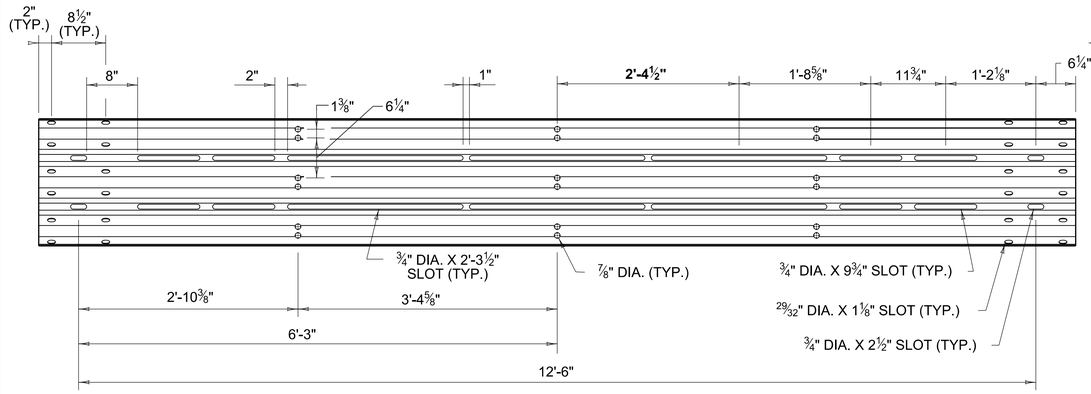
BARRIERS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY TRANSPORTATION CABINET

STEEL THRIE-BEAM BULLNOSE TERMINAL

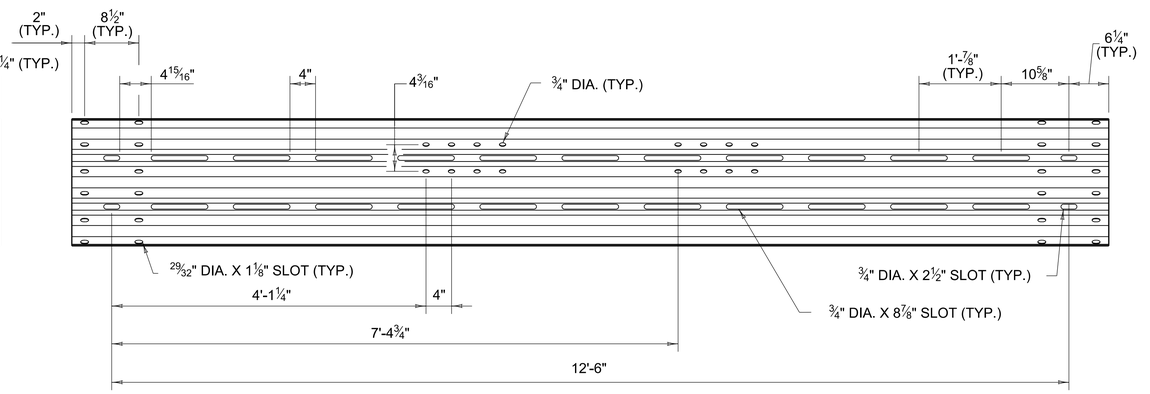
SHEET 008: POST, BLOCK, AND HARDWARE DETAILS

STANDARD DRAWING NUMBER
RBE-210



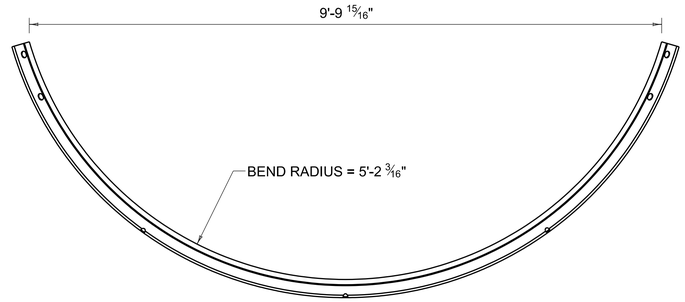
ELEVATION VIEW NON-RADIUSED

SLOTTED THRIE-BEAM RAIL E1



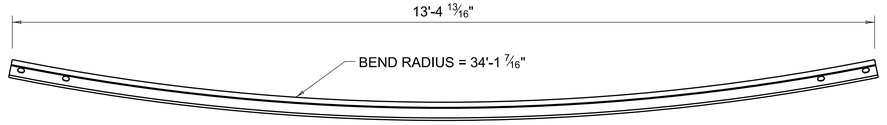
ELEVATION VIEW NON-RADIUSED

SLOTTED THRIE-BEAM RAIL E2



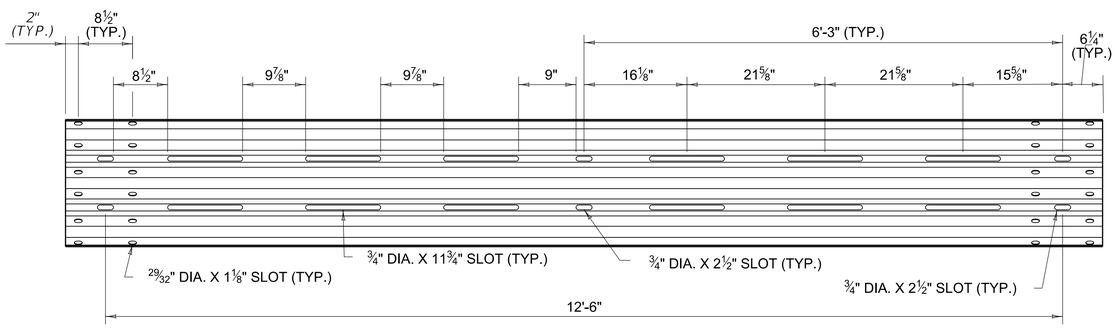
PLAN VIEW

SLOTTED THRIE-BEAM RAIL E1

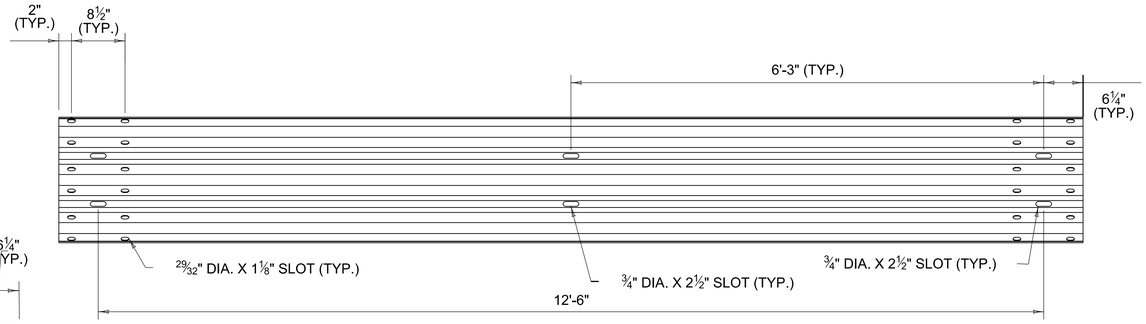


PLAN VIEW

SLOTTED THRIE-BEAM RAIL E2



SLOTTED THRIE-BEAM RAIL E3



UNBENT STANDARD THRIE-BEAM RAIL E4

~ NOTES ~

901 *FOR THRIE-BEAM RAIL, USE AASHTO M180, SPEC SECTION 814, AND GUARDRAIL MANUFACTURER FROM KYTC'S LIST OF APPROVED MATERIALS.*

902 *MARK THE RADIUS OF CURVATURE ON EACH OF THE CURVED ELEMENTS.*

903 *IN AN ASYMMETRICAL BULLNOSE, THE OPPOSING-SIDE E2 THRIE-BEAM IS STRAIGHT, NOT CURVED. THIS TANGENT BEAM HAS A LENGTH OF 13' - 6 ½".*

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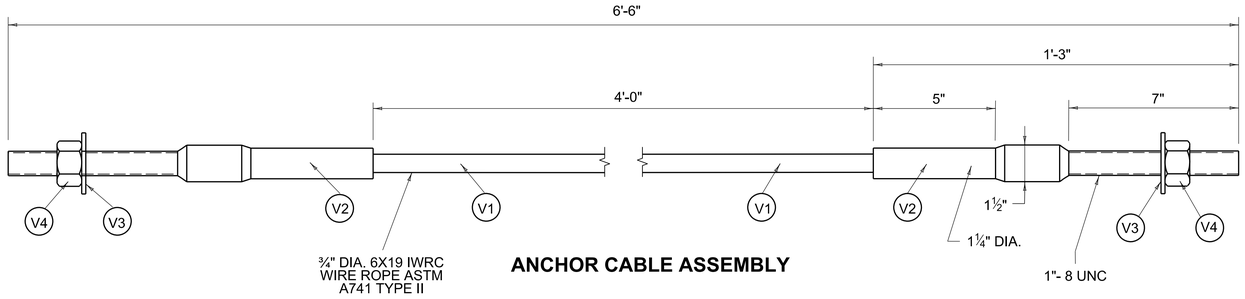
BARRIERS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY TRANSPORTATION CABINET

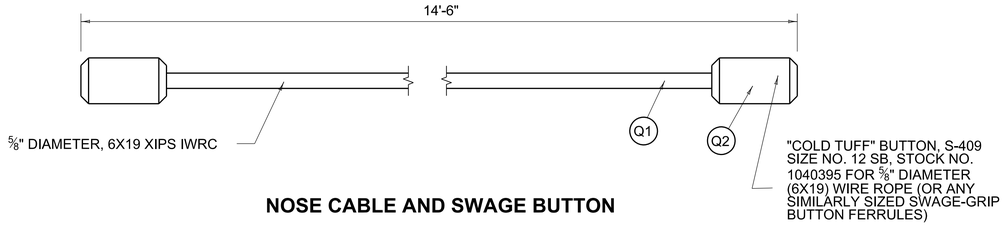
STEEL THRIE-BEAM BULLNOSE TERMINAL

SHEET 009: SLOTTED THRIE-BEAM RAIL

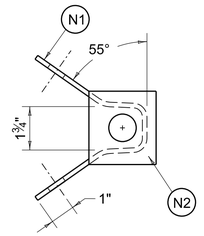
STANDARD DRAWING NUMBER
RBE-210



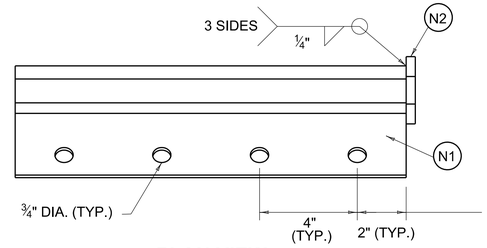
ANCHOR CABLE ASSEMBLY



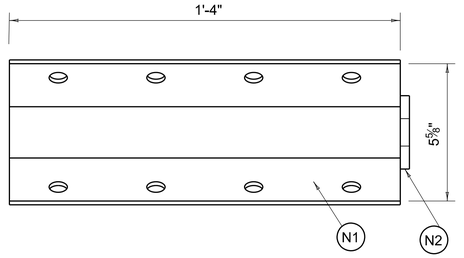
NOSE CABLE AND SWAGE BUTTON



PROFILE VIEW

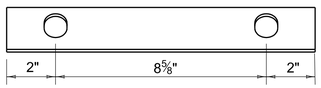


PLAN VIEW

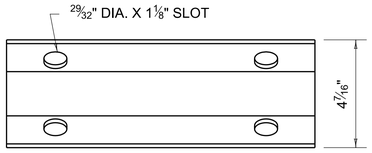


ELEVATION VIEW

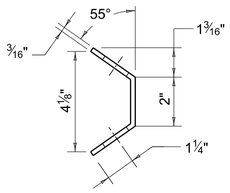
ANCHOR BRACKET ASSEMBLY (N1)



PLAN VIEW

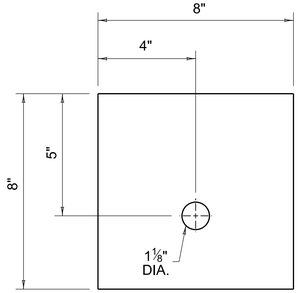


ELEVATION VIEW

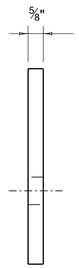


PROFILE VIEW

NOSE CABLE ANCHOR BRACKET (R1)

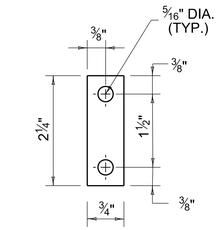


ELEVATION VIEW

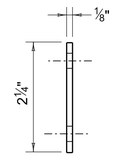


PROFILE VIEW

BCT BEARING PLATE (A3)

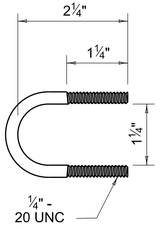


ELEVATION VIEW

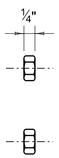


PROFILE VIEW

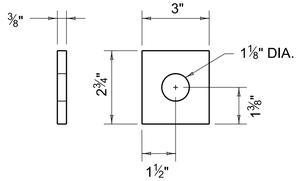
U - BOLT PLATE WASHER (T2)



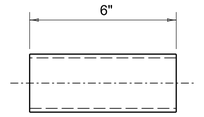
U - BOLT (T1)



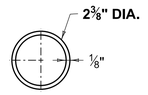
U - BOLT NUT (T3)



ANCHOR BRACKET END PLATE (N2)



ELEVATION VIEW



PROFILE VIEW

BCT POST SLEEVE (L2)

~ NOTES ~

1000 *SEE SHEET 11 FOR PART DESCRIPTIONS.*

REVISION DATE: 08/11/2025
REVISION NUMBER: 0

SUBMITTED — DIVISION DIRECTOR — DATE 08-11-2025

APPROVED — STATE HIGHWAY ENGINEER — DATE 08-11-2025

BARRIERS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

TEAM KENTUCKY TRANSPORTATION CABINET

STEEL THRIE-BEAM BULLNOSE TERMINAL

SHEET 010: ASSEMBLY DETAILS

STANDARD DRAWING NUMBER
RBE-210

THRIE-BEAM BULLNOSE TERMINAL MATERIALS LIST

Part Number	Quantity	Description	Hardware Guide[1]	Material Descriptions[2,3]
A1	2	LONG FOUNDATION TUBE	PTE07	ASTM A500 GRADE B OR ASTM A501
A2	2	FOUNDATION TUBE	PTE06	ASTM A500 GRADE B OR ASTM A501
A3	2	BCT BEARING PLATE	FPB01	ASTM A36 MIN. STRENGTH 36 KSI. SEE SPEC. SECTION 812.01.01 FOR ALTERNATIVE STEEL GRADES
B1	12	LOWER SHEAR PLATE	PTE08	ASTM A36 MIN. STRENGTH 36 KSI. SEE SPEC. SECTION 812.01.01 FOR ALTERNATIVE STEEL GRADES
B2	12	FOUNDATION TUBE	PTE08	ASTM A500 GRADE B OR ASTM A501
C1	12	UPPER SHEAR PLATE	PWE11	ASTM A36 MIN. STRENGTH 36 KSI. SEE SPEC. SECTION 812.01.01 FOR ALTERNATIVE STEEL GRADES
C2	12	STEEL POST	PWE11	W 6X9 OR W 6X8.5 STEEL POST / ASTM A36 MIN. STRENGTH 36 KSI
D1	20	BLOCKOUT FOR STEEL POST - WOOD	PDB09	SYP GRADE NO. 1 OR BETTER / SEE SPEC. SECTION 814.04.02 FOR TIMBER USE
D2	12	TAPERED BLOCKOUT FOR STEEL POST - WOOD	PDB20	SYP GRADE NO. 1 OR BETTER / SEE SPEC. SECTION 814.04.02 FOR TIMBER USE
D3	2	TAPERED BLOCKOUT FOR BCT POST - WOOD	PDB12	SYP GRADE NO. 1 OR BETTER / SEE SPEC. SECTION 814.04.02 FOR TIMBER USE
E1	1	SLOTTED THRIE BEAM RAIL - SHOP BENT AND PUNCHED	RTM07a	12 GUAGE / CURVE GUADRAIL IN SHOP / MARK THE RADIUS OF CURVATURE ON EACH OF THE CURVED ELEMENTS
E2	2	SLOTTED THRIE BEAM RAIL - SHOP BENT AND PUNCHED	RTM07d	12 GUAGE / CURVE GUARDRAIL IN SHOP / MARK THE RADIUS OF CURVATURE ON EACH OF THE CURVED ELEMENTS / NOTE: IN AN ASSYMETRICAL BULLNOSE, THE OPPOSING TRAFFIC SIDE E2 THRIE BEAM IS STRAIGHT AND NOT CURVED WITH A LENGTH OF 13' 6 1/2".
E3	2	SLOTTED THRIE BEAM RAIL - PUNCHED	RTM07e	12 GUAGE
E4	4	UNBENT STANDARD THRIE BEAM RAIL	RTM02a	12 GUAGE
F1	4	5/8" DIA. HEX HEAD GROUND STRUT AND YOKE BOLT - 11 UNC - 10" LONG	FBX16a	ASTM A307
F2	8	5/8" DIA. HEX HEAD GROUND STRUT AND YOKE BOLT - WASHER 1 3/4" OUTSIDE DIAMETER, 11/16" INSIDE DIAMETER, 1/8" THICK	FWC16a	ASTM F844
F3	4	5/8" DIA. HEX HEAD GROUND STRUT AND YOKE BOLT - 5/8" NUT, 9/16" THICK	FBX16a	ASTM A563, GRADE A OR BETTER
G1a	14	5/8" DIA. POST BOLT - 11 UNC - 18" LONG	FBB04	
G1b	12	5/8" DIA. POST BOLT - 11 UNC - 10" LONG	FBB03	
G2	6	POST BOLT - WASHER 1 3/4" OUTSIDE DIAMETER, 11/16" INSIDE DIAMETER, 1/8" THICK	FWC16a	ASTM F844
G3	26	POST BOLT - 5/8" NUT, 9/16" THICK	FBB03/ FBB04	ASTM A563, GRADE A OR BETTER
H1	4	7/8" DIA. HEX HEAD SOIL TUBE BOLT - 9 UNC - 8" LONG	NA	ASTM A307 / AASHTO M232 CLASS C
H2	8	7/8" DIA. HEX HEAD SOIL TUBE BOLT - WASHER 2 1/4" OUTSIDE DIAMETER, 15/16" INSIDE DIAMETER, 3/16" THICK	NA	ASTM F844 / AASHTO M232 CLASS C
H3	4	7/8" DIA. HEX HEAD SOIL TUBE BOLT - 7/8" NUT, 3/4" THICK	NA	ASTM A563, GRADE A OR BETTER / AASHTO M232 C
J1	38	16D DOUBLE HEAD NAIL	NA	AASHTO M232 CLASS D
L1	4	BCT TIMBER POST	PDF04	SYP GRADE NO. 1 OR BETTER / NO KNOTS +/- 18" FROM GROUND ON TENSION FACE / SEE SPEC. SECTION 814.04.02 FOR TIMBER USE
L2	2	BCT POST SLEEVE	FMM02	

Part Number	Quantity	Description	Hardware Guide[1]	Material Descriptions[2,3]
M1	8	W6X8.5 OR W6X9 STEEL POST	NA	W 6X9 OR W 6X8.5 STEEL POST / ASTM A36 MIN. STRENGTH 36 KSI
N1	2	ANCHOR BRACKET ASSEMBLY	FPA01	ASTM A36 MIN. STRENGTH 36 KSI. SEE SPEC. SECTION 812.01.01 FOR ALTERNATIVE STEEL GRADES
N2	2	ANCHOR BRACKET END PLATE	FPA01	ASTM A36 MIN. STRENGTH 36 KSI. SEE SPEC. SECTION 812.01.01 FOR ALTERNATIVE STEEL GRADES
P1	16	5/8" DIA. HEX HEAD ANCHOR BRACKET BOLT - 11 UNC - 1 1/2" LONG	FBX16a	ASTM A307
P2	32	5/8" DIA. HEX HEAD ANCHOR BRACKET BOLT - WASHER, 1 3/4" OUTSIDE DIAMETER, 11/16" INSIDE DIAMETER, 1/8" THICK	FWC16a	ASTM F844
P3	16	5/8" DIA. HEX HEAD ANCHOR BRACKET BOLT - 5/8" NUT, 9/16" THICK	FBX16a	ASTM A563, GRADE A OR BETTER
Q1	3	5/8" DIA. NOSE CABLE 6X19 XIPS IWRC	RCM02	AASHTO M30 CLASS A COATING / NOMINAL BREAKING STRENGTH OF 41.2 KIPS
Q2	6	NOSE CABLE - SWAGE BUTTON	RCM02	COLD TUFF BUTTON, S-409 SIZE NO. 12 SB STOCK NUMBER 1040395 FOR 5/8" DIAMETER (6X19) WIRE ROPE (OR ANY SIMILARLY SIZED SWAGE-GRIP BUTTON FERRULES) / AASHTO M30 CLASS A COATING
R1	6	NOSE CABLE ANCHOR BRACKET	FPA04	ASTM A36 MIN. STRENGTH 36 KSI. SEE SPEC. SECTION 812.01.01 FOR ALTERNATIVE STEEL GRADES
S1	120	5/8" DIA. SPLICE BOLT - 11 UNC - 1 1/4" LONG	FBB01	
S2	120	5/8" DIA. SPLICE BOLT - 5/8" NUT, 9/16" THICK	FBB01	ASTM A563, GRADE A OR BETTER
T1	9	1/4" DIA. NOSE CABLE U BOLT - 20 UNC	NA	ASTM A307 / AASHTO M232 CLASS C
T2	9	1/4" DIA. NOSE CABLE U-BOLT - PLATE WASHER, 1/8" THICK	NA	ASTM A1011 TYPE SS GRADE 36 / AASHTO M232 CLASS C
T3	18	1/4" DIA. NOSE CABLE U-BOLT -1/4" NUT, 1/4" THICK	NA	ASTM A563, GRADE A OR BETTER / AASHTO M232 CLASS C
U1	48	SLIP POST ASSEMBLY - BREAKAWAY 7/16" DIA. HEX HEAD BOLT - 14 UNC - 2 1/2" LONG	FBX12b	ASTM A449 OR SAE J429 GRADE 5
U2	192	SLIP POST ASSEMBLY - BREAKAWAY 7/16" DIA. HEX HEAD BOLT - WASHER, 1 1/4" OUTSIDE DIAMETER, 1/2" INSIDE DIAMETER, 3/32" THICK	FWC12a	ASTM F844
U3	48	SLIP POST ASSEMBLY - BREAKAWAY 7/16" DIA. HEX HEAD BOLT - 7/16" NUT, 1/2" THICK	FBX12b	ASTM A563DH OR SAE J995 GRADE 5
V1	2	3/4" DIA. BCT CABLE	FCA01	
V2	4	ANCHOR CABLE-SWAGE FITTING, 1 1/4" DIAMTER	FCA01	FITTING ASTM A576 GRADE 1035 / STUD ASTM F568 CLASS C
V3	4	1" DIA. ANCHOR CABLE-WASHER	FWC24a	ASTM F844
V4	4	1" DIA. ANCHOR CABLE-NUT	FNX24a	ASTM A563, GRADE A OR BETTER
W1	3	REFLECTOR	NA	SEE SPEC. SECTION 838 AND KYTC LIST OF APPROVED MATERIALS

[1] The Hardware Guide number is referenced in the *Task Force 13 Guide to Standardized Roadside Hardware*, available at https://tf13.org/guides/. When AASHTO and ASTM material specifications are available for a component, they are listed in the guide.

[2] If the *Task Force 13 Guide to Standardized Roadside Hardware* does not reference the AASHTO and ASTM specifications, they are provided in the Material Descriptions column. Additional material specifications can be found in Kentucky Standard Specifications, Section 814 - Guardrail Systems.

[3] If there are discrepancies in material or dimensions between the *Task Force 13 Guide to Standardized Roadside Hardware* and this Standard Drawing set, the details in the Standard Drawing set shall take precedence.

REVISION DATE: 08/11/2025
REVISION NUMBER: 0

SUBMITTED 08-11-2025 DATE
DIVISION DIRECTOR

APPROVED 08-11-2025 DATE
STATE HIGHWAY ENGINEER

BARRIERS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY TRANSPORTATION CABINET

STEEL THRIE-BEAM BULLNOSE TERMINAL

SHEET 011: MATERIALS LIST

STANDARD DRAWING NUMBER
RBE-210

Standard Drawing Reference Report

RBE-210 STEEL THRIE-BEAM BULLNOSE TERMINAL
Effective with the December 11, 2025 Letting

Design Notes

The Steel Thrie-Beam Bullnose (Bullnose) has passed MASH 2016 crash testing. It is commonly considered for three field applications: protecting gaps between twin bridges, shielding gore areas, and addressing narrow median fixed objects such as bridge piers and overhead sign supports. Each application requires evaluation of site-specific design and installation factors to ensure appropriate use.

During a head-on impact, an errant vehicle is expected to come to a stop within the object-free area inside the Bullnose. This area—located adjacent to Posts 1 through 12—must remain clear of fixed objects and be properly graded to ensure stability for vehicle deceleration and containment. In addition, the area in front of and alongside the Bullnose must be graded to provide sufficient stability for an errant vehicle departing the roadway and approaching the Bullnose.

Bullnose posts are embedded deeper than standard guardrail posts, which increases the potential for underground conflicts. Designers must review subsurface and drainage-related features—such as utilities, drainage structures, rock, and foundations—near the Bullnose location. Roadside drainage may need to be addressed through the installation or modification of drainage structures.

Include individual construction details for each Bullnose installation in the project plans, tailored to the specific site. On the plan sheets, the designer must document the approximate station and offset—or approximate coordinates—for the center of Post 5A, ensuring a minimum length of 50 feet from Post 5 to the front of the fixed object or roadside condition. These values serve as guidance for construction layout and are intended to accommodate typical construction tolerances.

The Bullnose is a complex but highly effective system that requires careful attention during both design and construction. Designers and contractors should thoroughly review all notes on the Standard Drawings to ensure proper application and installation. If there are any questions or uncertainties, contact the Standard Drawing staff in the Division of Highway Design for guidance.

References

KYTC Standard Specifications for Road and Bridge Construction

- Section 719 – Guardrail
- Section 814 – Guardrail Systems

Highway Design Guidance Manual

- HD-800 ROADSIDE DESIGN

KYTC Steel Thrie-Beam Bullnose Manual – Assembly, Maintenance, and Repair

Crash Test Reports

MwRSF TRP-03-418-20
MwRSF TRP-03-389-20
MwRSF Pooled Fund Q&A ID 1975

Related Standard Drawings

BHS-013	THRIE-BEAM GUARDRAIL TRANSITION (TL-3)
BHS-014	THRIE-BEAM GUARDRAIL TRANSITION (TL-2)
RBB-002	GUARDRAIL AND BRIDGE END DRAINAGE FOR TWIN STRUCTURES
RBC-004	GUARDRAIL CONNECTOR TO BRIDGE END (MAINTENANCE)
RBC-005	GUARDRAIL CONNECTOR TO BRIDGE END (MAINTENANCE)
RBC-006	GUARDRAIL CONNECTOR TO BRIDGE END (MAINTENANCE)
RBR-001	STEEL BEAM GUARDRAIL (“W” BEAM)

Standard Drawing Revision History