

STANDARD GUARD RAIL

TWO END POSTS WITH ANCHOR

NOTES

GENERAL: Guard rail details hereon are shown to depict various requirements of the Standard Construction and Material Specifications. These details and notes are to supplement the Specifications. In furnishing and erecting guard rail the drawings and the Specifications should be used together. The information hereon also supplements Standard Construction Drawings I-15 N^o 2 and I-15 N^o 3 which show the various types of guard rail.

POSTS: Posts and braces shall conform to the requirements of Specifications shown hereon. Steel for posts shall meet the requirements of Sec. M-74(a), Structural steel. The intermediate posts, except as otherwise specified hereon, shall be made of No. 14 gage steel unless otherwise specified. The end posts shall be No. 10 gage steel. Lateral analysis determination only will be required. Check analysis may be made by the Laboratory from the finished material.

In addition to the necessary holes for bolts to fasten brackets and for rail elements there shall be three 1 3/16 inch holes for reflector buttons punched with their centers 1 1/2 inch below the top of the post. One of these holes shall be in the center of each of the three flat faces of the post.

All posts shall be driven or set in the ground. The height of posts above the ground line shall be such that the top of the posts will extend 3 inches above the top of the uppermost rail element.

3/8 inch "U" bolts or brackets must be used to fasten cable or tape to steel posts where the plans permit fastening with "J" or "L" bolts to wood posts.

Post spacing, measured along the center line of the rail, shall be as follows:

- For flexible plate 16'
- For cable, traffic tape and woven wire band 16'
- On curves having radii less than 600 they shall be spaced as called for in the Specifications.
- For steel beam type 12'-6"

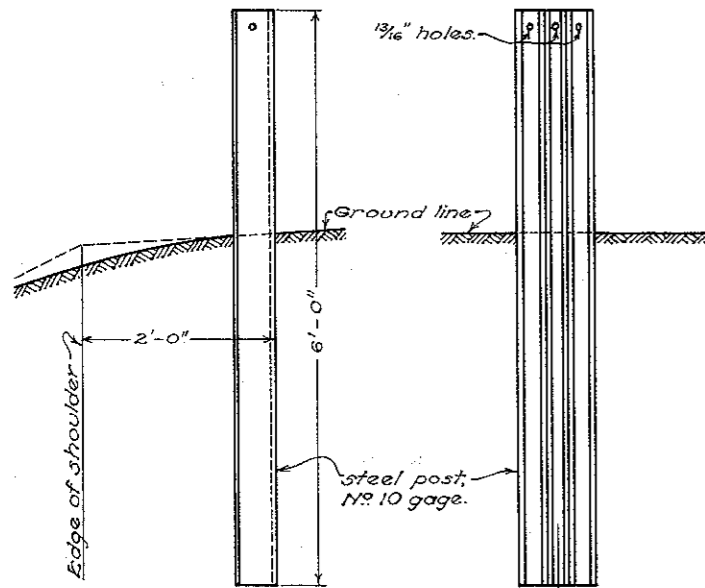
END ANCHORAGE: Deadmen shall be used for end anchorage except where physical features such as bridges, drives, road intersections, etc. make this impractical, in which case the end anchorage shall be of the bracing type as shown hereon. In lieu of the concrete anchor shown a 30"x30" bituminous coated metal anchor made of two 10 gage (or thicker) corrugated metal plates with their corrugations at right angles and welded together may be used. The corrugations shall have a pitch of 5/16" to 6" and a depth of 1 1/2" to 2". A 4"x3"x8 gage bearing plate shall be used on the anchor rod. For runs of 160' or less the springs may be omitted from the tension assembly at one end.

FITTINGS: Wedge connections, bolts, nuts, turn-buckles, anchor rods, brace rods, bearing plates and washers, except those of cast iron, shall be galvanized to conform with the requirements of the Material Details.

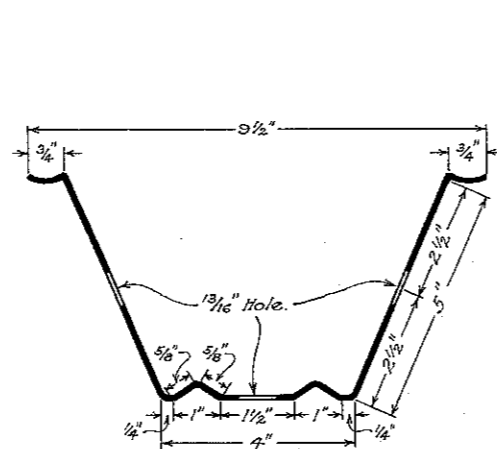
RAILS: The various types of rail shall be erected and conform with the requirements of the Specifications and Material Details.

PAINTING: Guard rail and appurtenances, except galvanized parts and posts, shall be painted with one shop coat as specified in Sec. I-15.08 and two field coats of white as specified in Sec. I-15.10.

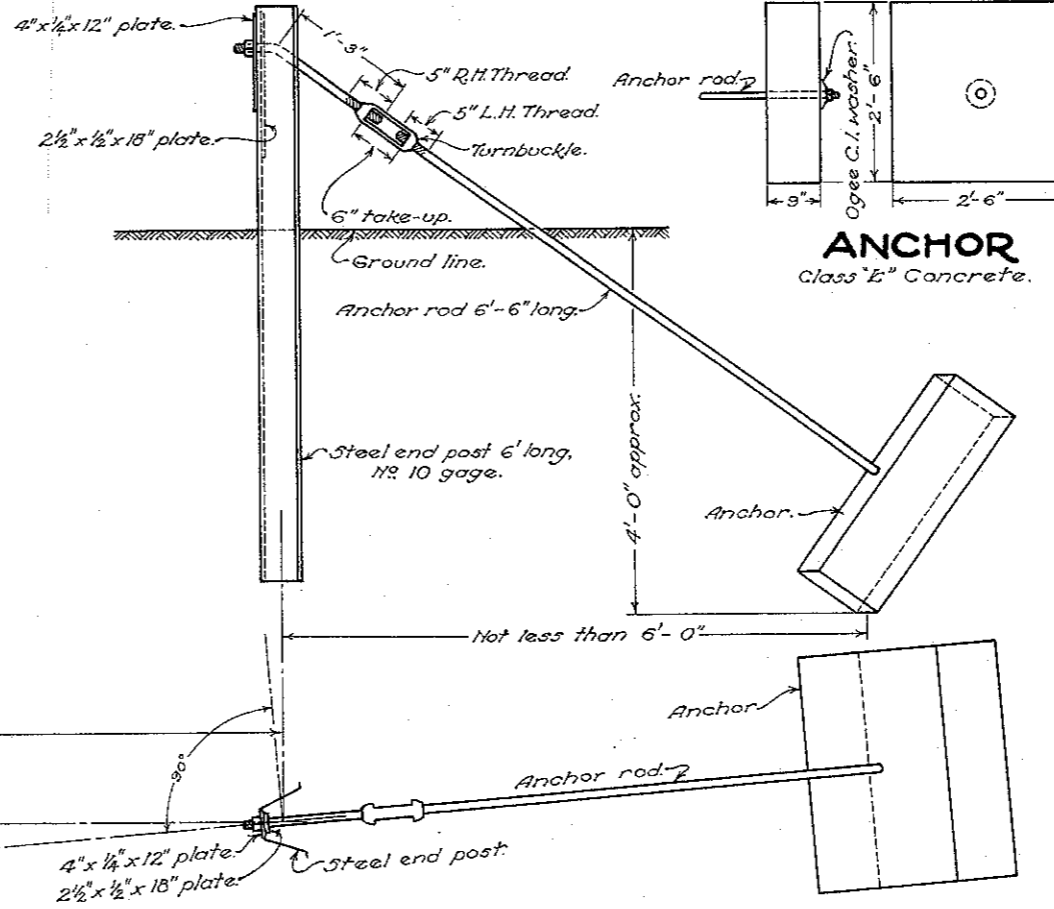
The entire length of the posts shall be given one shop coat of paint as specified in Sec. I-15.08 and the upper three feet of the posts shall be given two shop coats of white paint meeting the requirements of Sec. M-9.6.



SIDE VIEW



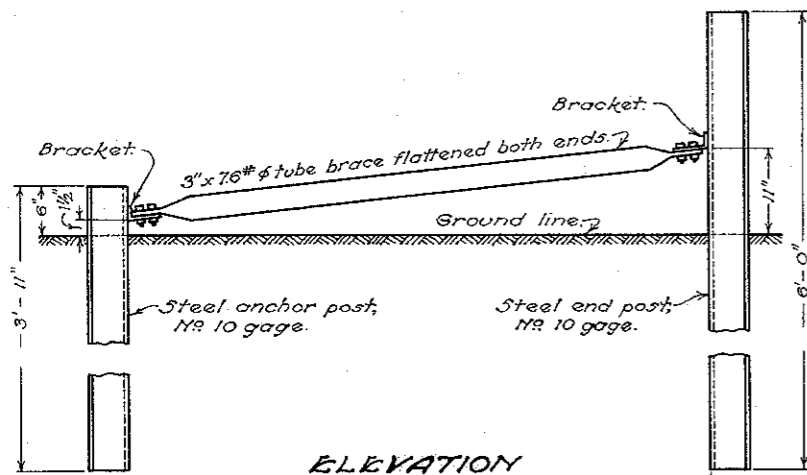
SECTION OF STEEL POST



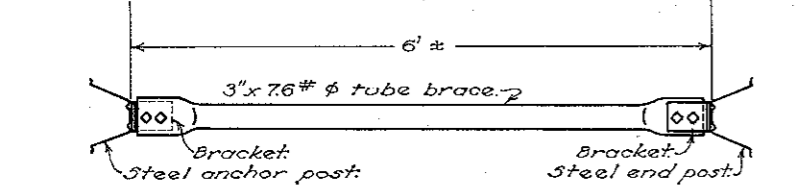
ANCHOR
Class "E" Concrete.

Type I-15.03	5" to 8"
Type I-15.04	5" to 7"
Type I-15.06	5" to 7"
Type I-15.04 A	0"
Type I-15.06 A	0"
Type I-15.06 B	0"

END POST WITH BRACE



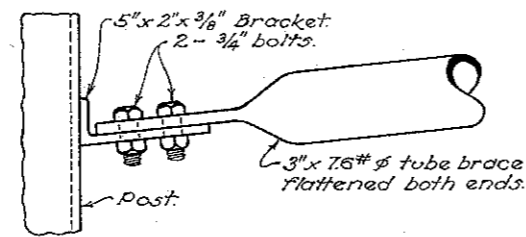
ELEVATION



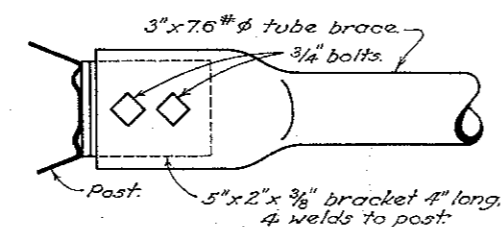
PLAN

ELEVATION

TUBE BRACE AND BRACKET

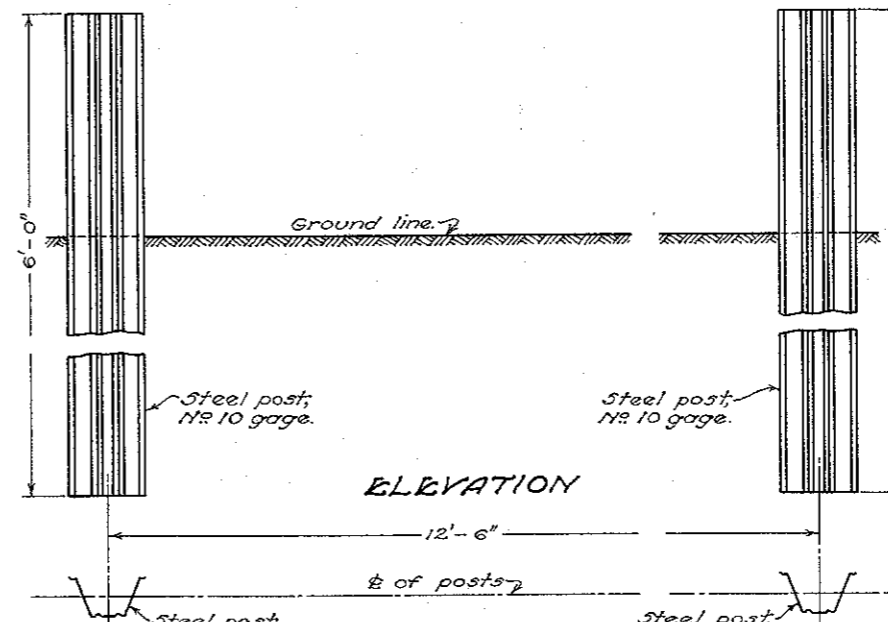


ELEVATION



PLAN

TWO END POSTS FOR BEAM TYPE RAIL



ELEVATION

PLAN

BUREAU OF LOCATION & RIGHT OF WAY
OHIO DEPARTMENT OF HIGHWAYS

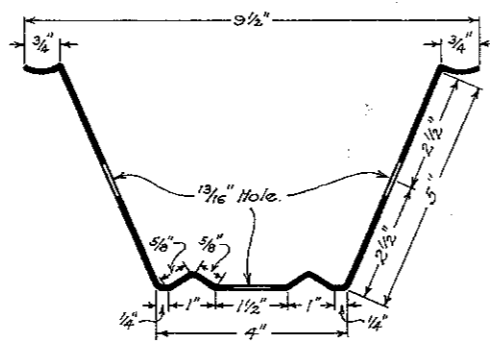
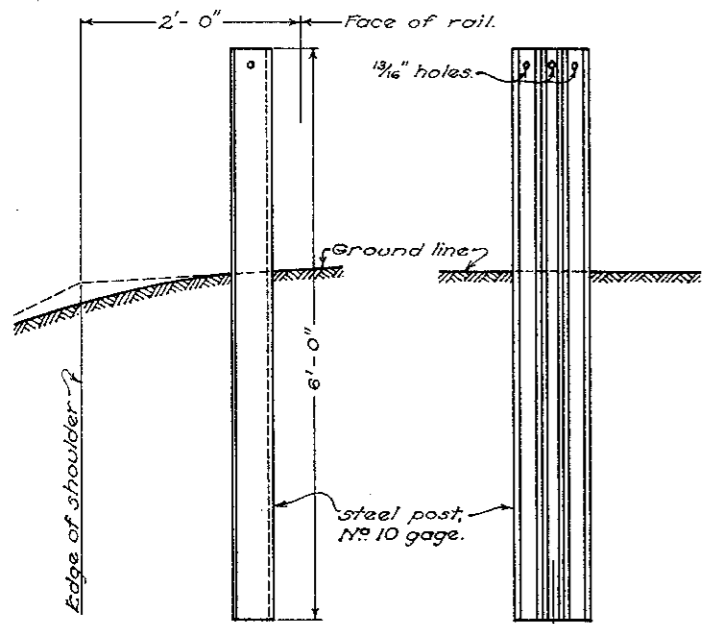
GUARD RAIL

STANDARD CONSTRUCTION DRAWING
I-15 N^o 5
APPROVED M.D.S. CHIEF ENGINEER.

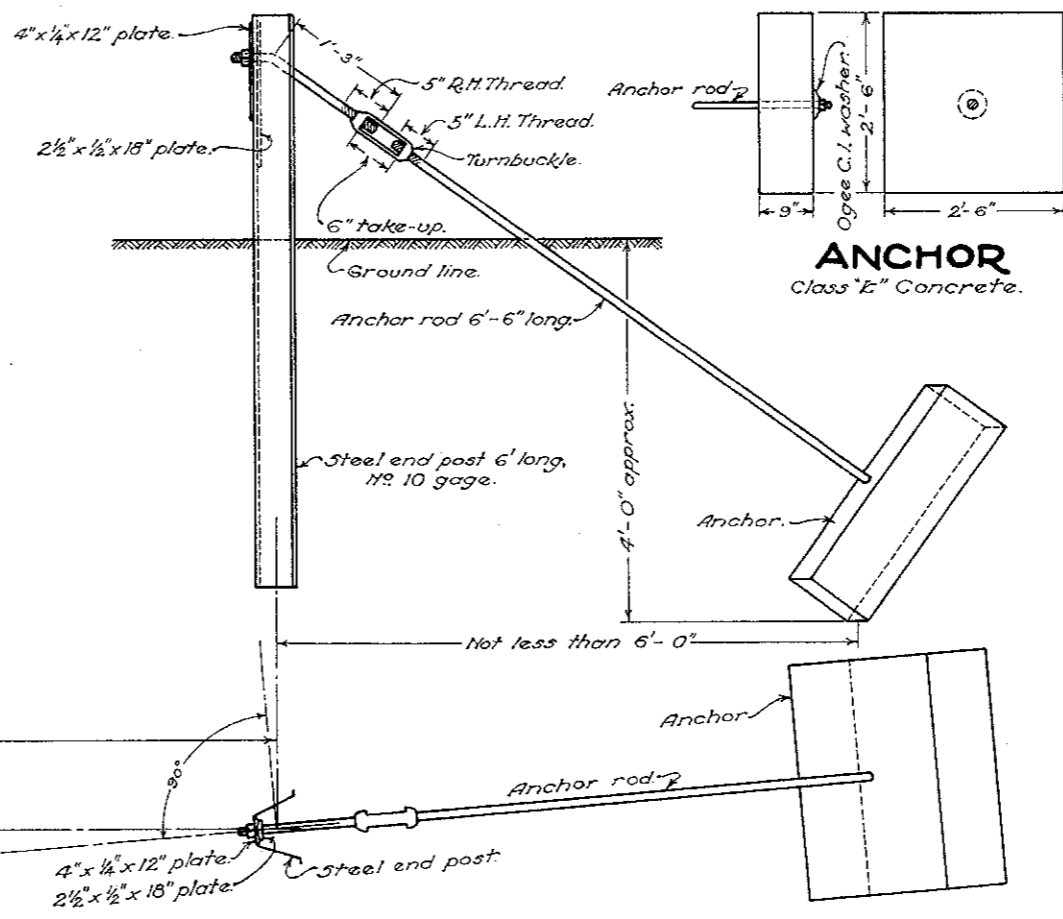
DATE: 6-16-41

STANDARD GUARD RAIL

TWO END POSTS WITH ANCHOR



SECTION OF STEEL POST



ANCHOR
Class "E" Concrete.

NOTES

GENERAL: Guard rail details hereon are shown to depict various requirements of the Standard Construction and Material Specifications. These details and notes are to supplement the Specifications. In furnishing and erecting guard rail the drawings and the Specifications should be used together. The information hereon also supplements Standard Construction Drawings I-15 No. 2 and I-15 No. 3 which show the various types of guard rail.

POSTS: Posts and braces shall conform to the requirements of Specifications shown hereon. Steel for posts shall meet the requirements of Sec. M-74(a), Structural steel. The intermediate posts, except as otherwise specified hereon, shall be made of No. 14 gage steel unless otherwise specified. The end posts shall be No. 10 gage steel. Lateral analysis determination only will be required. Check analysis may be made by the Laboratory from the finished material.

In addition to the necessary holes for bolts to fasten brackets and for rail elements there shall be three 1 3/8 inch holes for reflector buttons punched with their centers 1 1/2 inch below the top of the post. One of these holes shall be in the center of each of the three flat faces of the post.

All posts shall be driven or set in the ground. The height of posts above the ground line shall be such that the top of the posts will extend 3 inches above the top of the uppermost rail element.

3/8 inch "U" bolts or brackets must be used to fasten cable or tape to steel posts where the plans permit fastening with "J" or "L" bolts to wood posts.

Post spacing, measured along the center line of the rail, shall be as follows:

- For flexible plate 16'
- For cable, traffic tape and woven wire band 16'
- On curves having radii less than 600' they shall be spaced as called for in the Specifications.
- For steel beam type 12'-6"

END ANCHORAGE: Deadmen shall be used for end anchorage except where physical features such as bridges, drives, road intersections, etc. make this impractical, in which case the end anchorage shall be of the bracing type as shown hereon. In lieu of the concrete anchor shown a 30" x 30" bituminous coated metal anchor made of two 10 gage (or thicker) corrugated metal plates with their corrugations at right angles and welded together may be used. The corrugations shall have a pitch of 5 3/4" to 6" and a depth of 1 1/2" to 2". A 4" x 3" x 8 gage bearing plate shall be used on the anchor rod. For runs of 160' or less the springs may be omitted from the tension assembly at one end.

FITTINGS: Wedge connections, bolts, nuts, turn-buckles, anchor rods, brace rods, bearing plates and washers, except those of cast iron, shall be galvanized to conform with the requirements of the Material Details.

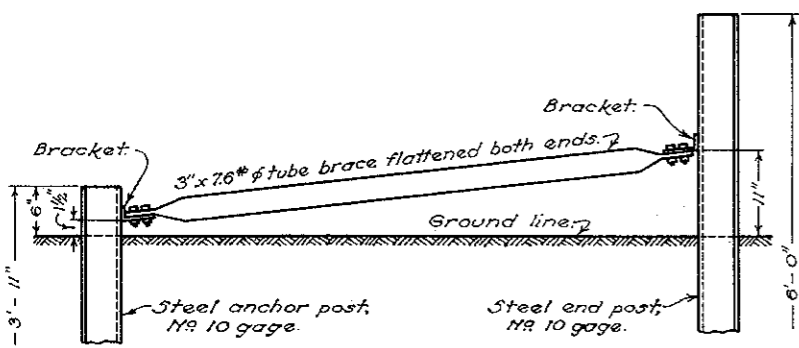
RAILS: The various types of rail shall be erected and conform with the requirements of the Specifications and Material Details.

PAINTING: Guard rail and appurtenances, except galvanized parts and posts, shall be painted with one shop coat as specified in Sec. I-15.08 and two field coats of white as specified in Sec. I-15.10.

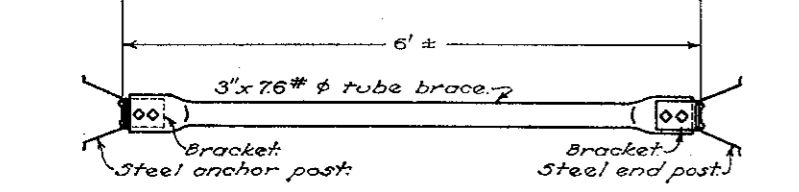
The entire length of the posts shall be given one shop coat of paint as specified in Sec. I-15.08 and the upper three feet of the posts shall be given two shop coats of white paint meeting the requirements of Sec. M-9.6.

Type I-15.03	5" to 8"
Type I-15.04	5" to 7"
Type I-15.06	5" to 7"
Type I-15.04 A	0"
Type I-15.06 A	0"
Type I-15.06 B	0"

END POST WITH BRACE

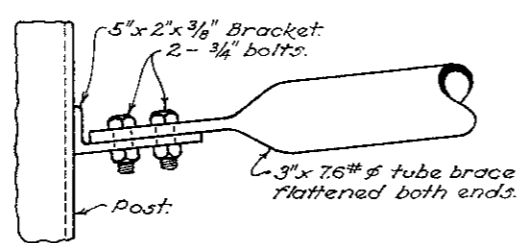


ELEVATION

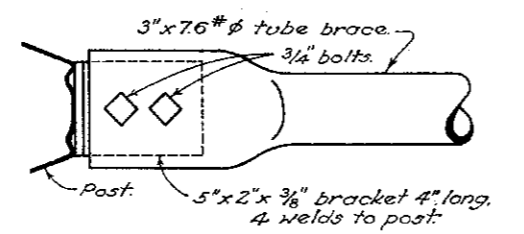


PLAN

TUBE BRACE AND BRACKET

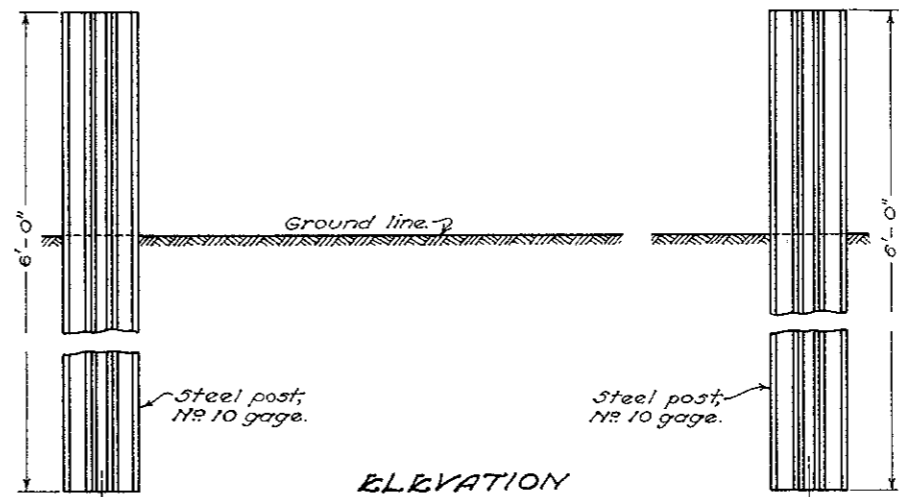


ELEVATION

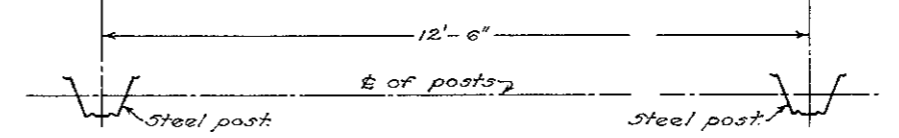


PLAN

TWO END POSTS FOR BEAM TYPE RAIL



ELEVATION



PLAN

BUREAU OF LOCATION & RIGHT OF WAY
OHIO DEPARTMENT OF HIGHWAYS

GUARD RAIL

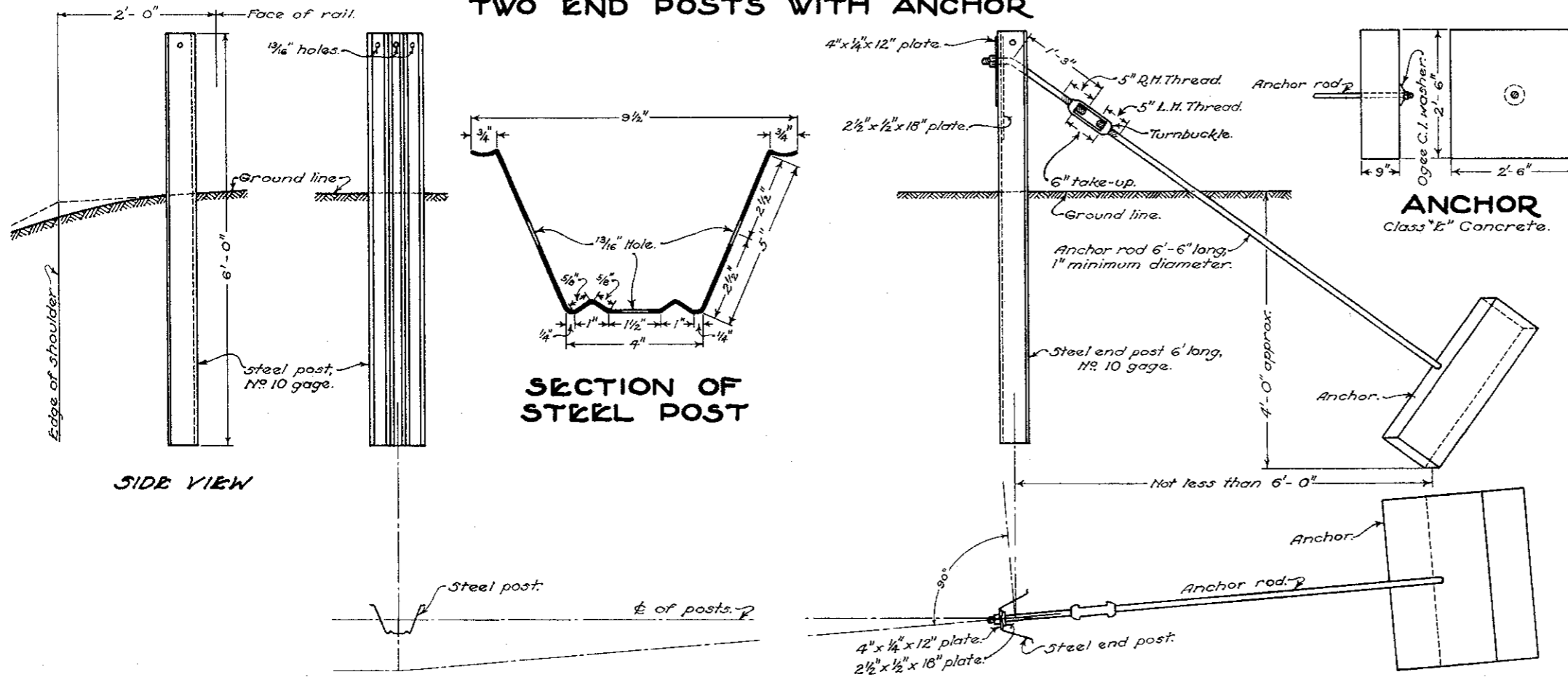
DATE: 6-16-'41
11-1-'41

STANDARD CONSTRUCTION DRAWING I-15 No. 5

APPROVED M.D.S. CHIEF ENGINEER

STANDARD METAL GUARD RAIL POSTS

TWO END POSTS WITH ANCHOR



NOTES

GENERAL: Standard Construction Drawings showing rail types shall be used in conjunction with this drawing. POSTS and braces shall conform to the requirements of the specifications shown hereon.

Steel for posts shall meet the requirements of Sec. M-7.4 (a), Structural Steel. The intermediate posts shall be made of No. 14 gage steel unless otherwise specified. The end posts shall be No. 10 gage steel. Ladle analysis determination only will be required. Check analysis may be made by the Laboratory from the finished material.

In addition to the necessary holes for bolts to fasten brackets and for rail element there shall be three 13/16" holes for reflector buttons punched with their centers 1/2" below the top of the post. One of these holes shall be in the center of each of the three flat faces of the post.

All posts shall be driven or set in the ground. The height of posts above the ground line shall be such that the top of the posts will be 3" above the top of the uppermost rail element.

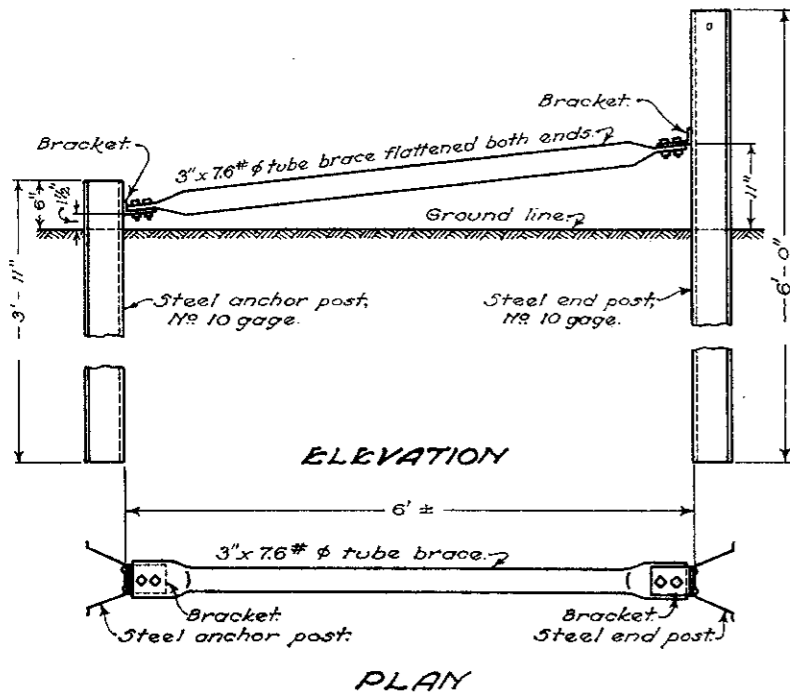
Posts shall be spaced 16 feet on centers for all types of rail except steel beam, measured along the center line of the rail except where otherwise noted in the Specifications for curves. Posts for steel beam type shall be spaced 12'-6" on centers measured along the center line of the rail.

3/8" U bolts or brackets shall be used to fasten cable or tape to steel posts where the plans permit fastening with "J" or "L" bolts to wood posts.

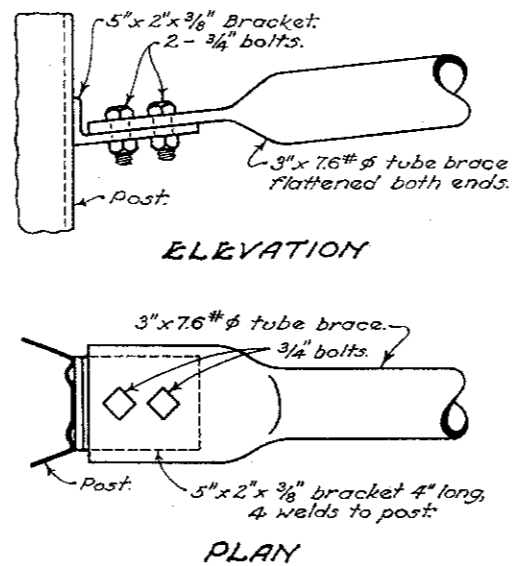
END ANCHORAGE: Where end anchorage is required deadmen shall be used except where physical features such as bridges, drives, road intersections, etc. make this impractical, in which case the end anchorage shall be of the bracing type as shown hereon. In lieu of the concrete anchor shown a 30"x30" bituminous coated metal anchor made of two 10 gage (or thicker) corrugated metal plates with their corrugations at right angles and welded together may be used. The corrugations shall have a pitch of 5 3/4" to 6" and a depth of 1 1/2" to 2". A 4"x3"x8 gage bearing plate shall be used on the anchor rod.

PAINTING: The entire length of the post and tube brace, when used, shall be given one shop coat of paint. The portion of the post above the ground shall have two additional coats of paint. The paint below the lower edge of the rail shall be black and the paint above the lower edge of the rail shall be white.

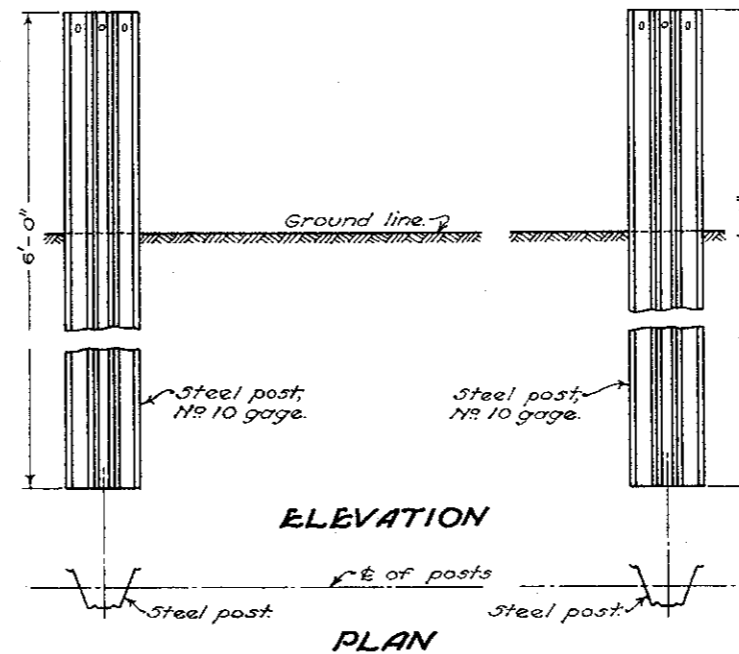
END POST WITH BRACK



PLAN TUBE BRACK AND BRACKET



TWO END POSTS FOR BEAM TYPE RAIL



BUREAU OF LOCATION AND DESIGN
 OHIO DEPARTMENT OF HIGHWAYS

GUARD RAIL

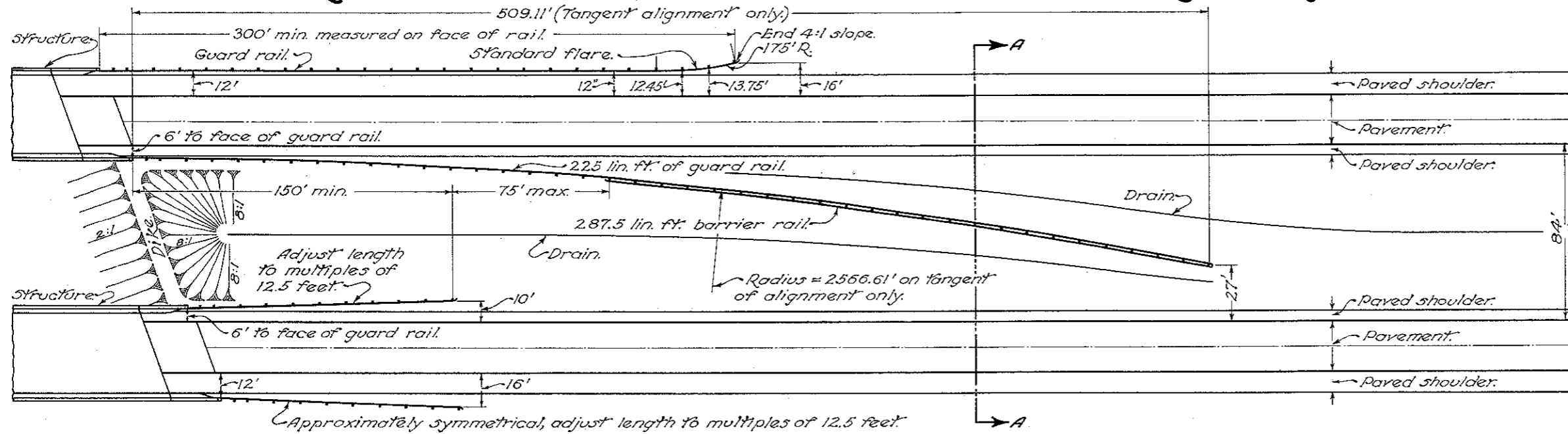
STANDARD CONSTRUCTION DRAWING
 APPROVED 4/27 CHIEF ENGINEER.

I-15
 No. 5

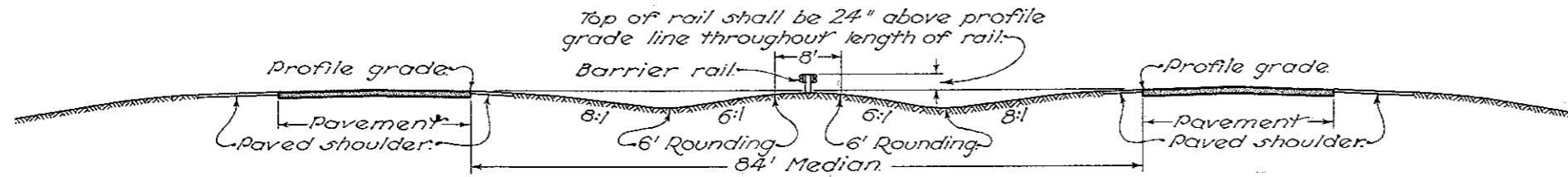
DATE:
 6-16-41
 11-1-41
 2-1-47

GUARD RAIL PROTECTION

FOUR LANE DIVIDED, 84' MEDIAN, AT TWIN STRUCTURES



PLAN



SECTION A-A

DISTANCE BETWEEN EDGE OF PAVEMENT AND FACE OF GUARD RAIL

POST	OFFSET	POST	OFFSET
1/2	6.01	21	19.41
1	6.03	22	20.72
2	6.12	23	22.09
3	6.27	24	23.52
4	6.49	25	25.00
5	6.74	26	26.55
6	7.10	27	28.16
7	7.49	28	29.83
8	7.95	29	31.56
9	8.47	30	33.35
10	9.04	31	35.20
11	9.68	32	37.11
12	10.38	33	39.08
13	11.14	34	41.11
14	11.96	35	43.20
15	12.85	36	45.35
16	13.81	37	47.56
17	14.79	38	49.83
18	15.86	39	52.16
19	16.98	40	54.55
20	18.17	41	57.00

NOTES

GENERAL:— Design details shown hereon shall govern the construction of guard rail at structures and piers unless otherwise shown on the plans.
DIKE shall be provided at each end of each pair of structures.

OFFSETS for guard rail are based on the use of a 10 ft. width median shoulder and 16 ft. width outside shoulder. If other shoulder widths are used, the offsets shall be adjusted accordingly.

BUREAU OF LOCATION AND DESIGN
 OHIO DEPARTMENT OF HIGHWAYS

DATE
 12-9-37

GUARD RAIL

STANDARD CONSTRUCTION DRAWING I-15 No. 5

APPROVED *[Signature]* ENGR. L. & D.

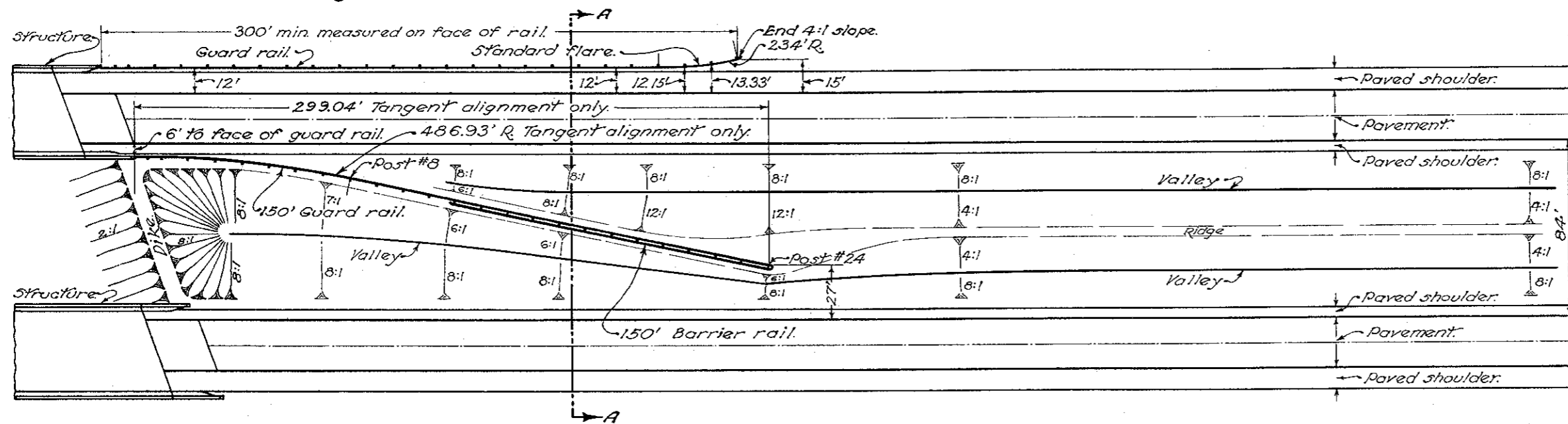
GUARD RAIL PROTECTION

FOUR LANE DIVIDED, 84' MEDIAN, AT TWIN STRUCTURES

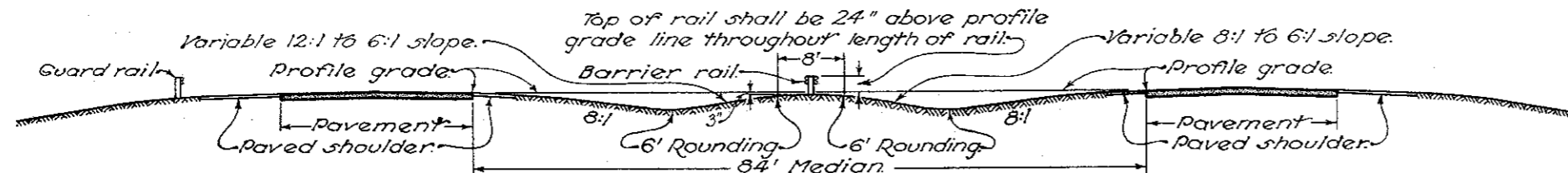
NOTES

GENERAL: Design details shown hereon shall govern the construction of guard rail at structures unless otherwise shown on the plans.
DIKE shall be provided at each end of each pair of structures.

OFFSETS for guard rail are based on the use of 6 ft. offset to median parapet and 15 ft. width outside shoulder. If other shoulder widths are used, the offsets shall be adjusted accordingly.



PLAN



SECTION A-A

DISTANCE BETWEEN EDGE OF PAVEMENT AND FACE OF GUARD RAIL			
POST	OFFSET	POST	OFFSET
1/2	6.04	13	28.97
1	6.16	14	31.52
2	6.64	15	34.07
3	7.44	16	36.62
4	8.57	17	39.16
5	10.01	18	41.71
6	11.77	19	44.26
7	13.84	20	46.81
8	16.23	21	49.36
9	18.78	22	51.90
10	21.33	23	54.45
11	23.87	24	57.00
12	26.42		

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF HIGHWAYS

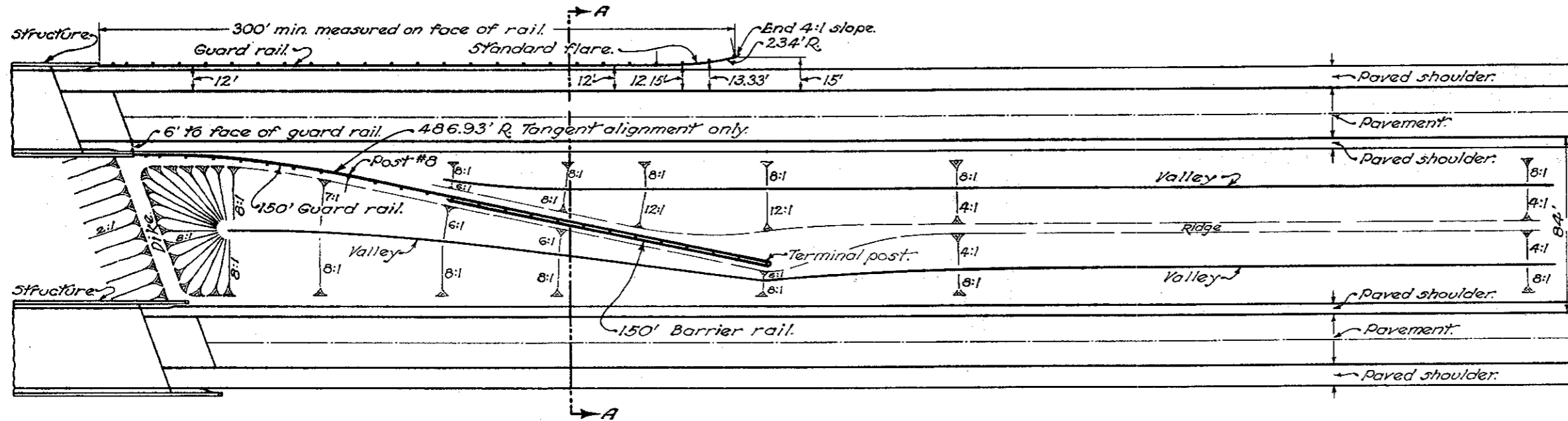
GUARD RAIL

DATE
12-9-57
7-1-59

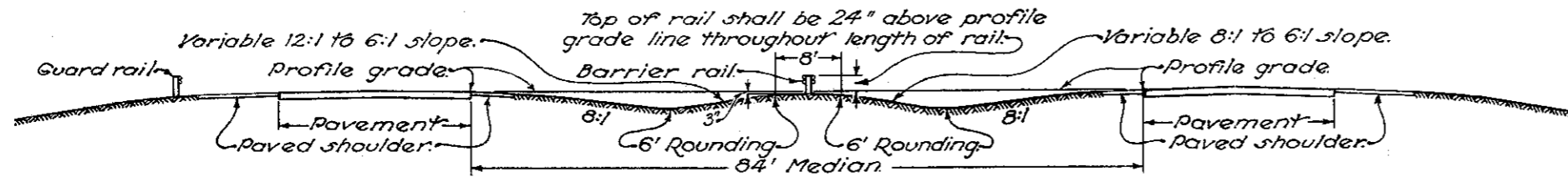
STANDARD CONSTRUCTION DRAWING
I-15
No 5
APPROVED *[Signature]* ENGR. L. & D.

GUARD RAIL PROTECTION

FOUR LANE DIVIDED, 84' MEDIAN, AT TWIN STRUCTURES



PLAN



SECTION A-A

DISTANCE BETWEEN EDGE OF PAVEMENT AND FACE OF GUARD RAIL			
POST	OFFSET	POST	OFFSET
1/2	6.04	13	28.97
1	6.16	14	31.52
2	6.64	15	34.07
3	7.44	16	36.62
4	8.57	17	39.16
5	10.01	18	41.71
6	11.77	19	44.26
7	13.84	20	46.81
8	16.23	21	49.36
9	18.78	22	51.90
10	21.33	23	54.45
11	23.87	24	57.00
12	26.42		

TERMINAL POST OFFSET AND RAIL LENGTH REQUIRED FOR VARIOUS MEDIAN WIDTHS				
MEDIAN WIDTH	TERMINAL POST NO	OFFSET	LENGTH OF GUARD RAIL	LENGTH OF BARRIER RAIL
84	24	57.00	150.0	150.0
60	17	39.16	112.5	100.0
55	16	36.62	100.0	100.0
50	14	31.52	87.5	87.5
40	11	23.87	75.0	62.5

NOTES

GENERAL:— Design details shown hereon shall govern the construction of guard rail at structures unless otherwise shown on the plans.

DIKE shall be provided at each end of each pair of structures.

OFFSETS for guard rail are based on the use of 6 ft. offset to median parapet and 15 ft. width outside shoulder. If other shoulder widths are used, the offsets shall be adjusted accordingly.

Drawing indicates treatment at twin bridges, roadways separated by an 84 ft. wide median. For medians of lesser widths, adjust length of rail and position of terminal post in accordance with table.

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF HIGHWAYS

GUARD RAIL

DATE
12-9-57
7-1-59
6-1-61

STANDARD CONSTRUCTION DRAWING I-15 No. 5
APPROVED *[Signature]* ENGR. L. & D.