

Design Standards Letter

Letter Number: G-1966-33

Letter Date: 12/12/1966

Effective Date: 01/20/1967

Section/Plan No.: None

Subject: Design Revisions for Guard Rail and Signs - Revised Special Provisions and Standard Drawings, Form SP-29

Body

ALL DIVISION AND DISTRICT ENGINEERS AND CHIEF COUNSEL:

We are attaching hereto information relating to design revisions of guard rail and signs. The revisions herein set out are effective immediately upon receipt of this letter, and all plans should be revised accordingly, except that plans already submitted will be revised in this office. All revisions will be effective with the January 20, 1967 letting, and for subsequent lettings where the present roadway typical sections are used.

GUARD RAIL

A new Standard Drawing 86.00 (2 sheets) is attached hereto which indicates revised guard rail types, fabrication and installation details, and typical location sketches.

Type A Guard Rail has the guard rail beam mounted on one side only of the post and Type B Guard Rail has the guard rail beam mounted on both sides of the post for use in narrow medians.

Unless otherwise specified, Type A Guard Rail gives the contractor the following options: (1) Wood post with wood block, (2) Steel post with wood block, and (3) Steel post with steel block. Unless otherwise specified, Type B Guard Rail gives the contractor the following options: (1) Steel post with wood blocks, and (2) Steel post with steel blocks.

In general, all "point" obstacles such as bridge and posts, sign truss footings, and sign posts which are not equipped with a "break-away" feature, require the use of 6' 3" post spacing for the guard rail. Guard rail installations for high fills where no "point" obstacle exists will be at the 12' 6" post spacing. These post spacings are illustrated on the drawing showing typical location sketches.

The drawings also show a newly developed "terminal section" consisting of two 12' 6" panels of guard rail which are twisted and bent down to prevent impalement if a vehicle hits the approach end of the guard rail. This terminal section requires specially fabricated

attachments for securing the guard rail beam to the posts as shown on the drawings.

Where guard rail terminates at bridge ends, a bridge anchor device is provided consisting of a bolted connection to the bridge and post using a "closure section." This is the normal anchor for all bridges with 6-inch wide brush curbs and for all bridges having an 18-inch wide curb which tapers to 6-inches at the bridge end. A special design of bridge anchors will be furnished by the Division of Bridges in the rare case that a newly designed bridge has an 18-inch wide curb with no taper at the bridge end.

The guard rail location sketches are believed to be self explanatory insofar as the lengths are concerned; however, the following information may be helpful:

High Fills. The Design Manual states that guard rail is specified on plans for highways with 400 ADT or more when fill heights of 20 feet or more extend 100 feet or more in length. This statement now establishes the basic length only. To this basic length it is now necessary to add additional guard rail, extending toward the approaching traffic, to the point where the fill height is 10 feet. For dual divided pavements, a terminal section is then added to the approach end. For two-way pavements, a terminal section is added to both ends of the guard rail. For information only, a location sketch showing the above criteria is included to assist in establishing the required length of guard rail.

Along Outer Roadways. The Design Manual criteria for guard rail along outer roadways is still applicable; however, the above criteria for additional lengths because of high fills and the criteria for addition of terminal sections must be adhered to.

In Medians. The Type B guard rail (beam both sides) is specified in narrow medians with mountable curbs, as required to protect traffic. This guard rail is placed in the center of the median. Terminal sections are added only at the beginning and ending of the total run of guard rail and not at each break caused by intersections and crossovers. Breaks caused by intersections and crossovers will be closed by means of the standard buffer end.

In special cases where the use of a four-foot raised median is precommitted and the driving lane is adjacent to such median, the use of guard rail having beams on both sides of the post with no blocks, will be approved. The design must, however, be included in the plans by use of a special sheet since this design is now deleted from the standard drawing.

At Bridge Ends. Guard rail is specified at bridge ends for all highways with 400 ADT or more. Guard rail is anchored to the bridge ends as herein before described. A length of 125 feet including the terminal section is used at all four corners of a bridge carrying two-way traffic and only at the two corners facing the approaching traffic for dual divided pavements. The guard rail is transitioned as necessary in order that the beginning of the turned-down terminal section is at the normal shoulder line. For information only, a location sketch showing the above criteria is included to assist in establishing the required length of guard rail.

Guard Rail is not generally used to protect the end of bridges carrying a cross road or street

over the through lanes in developed areas. If, however, at the ends of such bridges, the crossroad or street is on a high fill or has a sharp curvature, guard rail may be considered. In this case, it will not be necessary to anchor such guard rail to the bridge structure.

At Sign Trusses and Sign Posts. Guard rail is not used to protect traffic from any sign post equipped with break-away features. At all other sign posts and at truss footings the following is used. For dual divided pavements, such posts and footings are protected by 125 feet of guard rail plus a terminal section on the end of the approaching traffic. The guard rail is set with the terminal section and 75 feet of the rail preceding the post or footing and 50 feet trailing. For two-way pavements, a length of guard rail of 150 feet plus two terminal sections are used, centered on the post or footings. For information only, a location sketch showing the above criteria is included to assist in establishing the required length and positioning of the guard rail.

To Barricade Existing Streets and Roads. The present Design Manual criteria is to be used.

Plans. The present Design Manual criteria is to be used except that the example tabulation shown on Figure 14.45 should be as follows:

STA. STA. LOCATION ANCHOR SECTIONS SPACING LIN. FT . REMARKS

837+00 839+25 Right -- 1 12' 6" 225'
1+25 2+50 Ramp A Rt. -- 1 12' 6" 125' At Shoulder Line
851+20 852+45 Left 1 1 6' 3" 125'

Please note that the lengths shown include any required bridge anchors and terminal sections, regardless of the post spacing.

SIGNS

Attached hereto is revised Standard Drawing 72.03 (6 sheets) covering sign posts which are now equipped with a "break-away" feature. These posts are designed to break under impact from vehicles, thus protecting the occupants from severe injury, and no guard rail protection is necessary for these sign posts. The post sizes equipped for break-away are the 6" x 4" x 8.5# Joist and post designs No. 1 through No. 8, inclusive. The break-away posts and footings are all shown on the New Sheet No. 1. All larger post design shown on Sheet No. 2 will require the use of guard rail protection as described in the portion of this letter covering guard rail.

Structural steel posts will continue to be paid for based on the theoretical weight of the various sections less the weight of the cutoffs at the top of the posts. Such weight will now, however, include the theoretical weight of the additional material necessary to provide the break-away features as tabulated on the standard drawing, and the plan weights should be revised accordingly. Concrete footings are now paid for separately for all sign posts, including embedded sign posts, and the plans should include the quantities.

In addition to the above, the plans should be reviewed and the following revisions made:

1. Eliminate from the plans all "Keep Off Median" signs.
2. Eliminate from the plans all "Emergency Stopping Only" and all "Emergency Parking Only" signs.
3. Eliminate from the plans all "\$25 to \$500 Fine for Littering Highways" signs.
4. Eliminate from the plans any route shield markers immediately following off ramps of the main roadway.
5. Speed Limit signs are to be used only at the State Line, at major intersections and interchanges, and at changes in the speed limit. Eliminate from the plans all other speed limit signs.
6. The "Merging Traffic" sign is to be used only when the entering roadway is not visible in through traffic. Where the entering roadway is visible to through traffic, such sign is not to be used.
7. Signs are not to be used in the gore of "off" ramps wherever the interchange is marked with an overhead truss unless the visibility is limited, such as when the "off" ramp is on a descending grade. Standard usage of such gore signs for other locations will be continued. Where such gore signs are used, they are to be offset two feet from the shoulder line of both the through lanes and the ramp.
8. The lateral placement of all signs should be reviewed and, where possible, the minimum offset of two feet from the face of barrier curb or shoulder should be increased up to ten feet maximum. City limit and County Line signs should, where conditions permit, be offset 30 feet or more from the pavement edge. The Division of Maintenance and Traffic will assist in the review of the plans.

SPECIAL PROVISIONS

A revised special provision on Guard Rail is attached covering the requirements for the terminal section and revised method of measurement and payment.

Pages 4, 17, and 18 of the Highway Signing Special Provision have been revised to: (1) delete the use of Class C and D Concrete for embedding sign posts in Section 72.4.1.2; (2) delete the items of "Class B Concrete" and "Concrete for embedding sign posts" from the list of incidental items on which direct payment will not be made in Section 72.7.1; and (3) provide payment for footings or embedded-type sign posts.

FORM SP-29

Form SP-29, Sign post and footing data sheet, has been revised to delete the column for four-pound sign posts, add column for weights of break-away steel, and add a column for tabulation Class B or B1 concrete for embedded type footings. A few full-size reproducibles

are being furnished you under separate cover. Additional reproducibles are available on request.

L.V. McLaughlin
Division Engineer
Surveys and Plans