Design Standards Letter

Letter Number: **G-1967-14**

Letter Date: **04/17/1967**

Effective Date: **05/26/1967**

Section/Plan No.: **None**

Subject: **Revised Standard Drawings and Special Provision 16" Precast Concrete Piles Guard Rail Signs Design Criteria for Guard Rail and Signs**

Body

ALL DIVISION AND DISTRICT ENGINEERS AND CHIEF COUNSELS:

We are furnishing you herewith several copies of the following revised standard drawings.

16" Precast Concrete Piles

Drawing 52.01. Sheet 1 of 2 has been revised to change the longitudinal reinforcement bar size from No. 5 to No. 6. For the octagonal constant section piles, the lengths affected are the 15' 0" to 26' 0", inclusive, and the 27' 0" to 36' 0", inclusive. For the octagonal tapered section piles, the lengths affected are the 15' 0" to 25' 0", inclusive, and the 26' 0" to 37' 0", inclusive.

This drawing will be used where applicable, beginning with the May 26, 1967 Lettings.

Guard Rail

Drawing 86.00. This drawing has been revised to add two new sheets, making a total of four sheets, and has otherwise been revised as follows:

Sheet 1 of 4. Height of beam from ground line to center of rail revised from 1' 6" to 1' 9". This revision places the top of the rail 27 inches above the ground line, which more nearly meets the requirements dictated by present vehicle designs, and which has proven more satisfactory by tests. Also, notes have been added to the plan view of the guard rail differentiating the normal shoulder line and the widened shoulder line. Post lengths remain unchanged.

Sheet 2 of 4. The elevation of the guard rail for anchorage to bridges has been revised 18 inches to 21 inches. The bridge anchor bolt has been revised to a 3/4" x 4" bolt and washer. Distinction between normal and widened shoulder has been made on the sketch showing taper at outside shoulder for bridges. The guard rail on the median side of dual divided

pavements has been removed from this sheet and notes added to see Sheet three for such treatment. Guard rail in medians will be the same for sections with or without safety zones. Added note to see Sheet three for guard rail at bridges of diamond interchanges.

Sheet 3 and 4 of 4. These sheets have been added to provide typical installation plans for guard rail wherever safety zone typical sections are used, except that the typical guard rail layout at diamond interchanges on Sheet three, Case five, is applicable to typical sections both with and without safety zones.

The use of guard rail with safety zone typical sections will be as follows:

1. High Fills. Guard rail will not be used for fill height protection except for exceptional conditions. Examples of these conditions may be a body of water along, or at the toe of, a fill slope extending a considerable distance along the roadway, an exceptionally high fill for a considerable distance, or a high fill in combination with the high side of a super-elevated curve. Considerable judgment should be exercised to select those areas for guard rail, keeping in mind that the guard rail should be provided only if the severity of an accident involving the fill being protected would be greater than that involving the protective guard rail. If guard rail is used for fills using the safety zone, it should be located two feet inside the outer edge of the 20-foot safety zone and utilize the 12' 6" post spacing. Terminal sections will be required on the leading ends in the direction of traffic. Lengths should be established to place the guard rail well in advance of the point of theoretical need, but in no case should the total length be less than 100 feet plus required terminal sections.

2. Bridge Ends. Bridge ends will require protective guard rail. Post spacing will be 6' 3" and the rail will be anchored to the bridge. Cases one through five, inclusive, provide typical examples of the treatment.

3. Bridge Piers. Bridge piers located within the limits of a safety zone will require protective guard rail. Post spacing will be 6' 3". If restricted lateral clearance exists, anchorage to bridge piers may be considered in order to maintain a continuos line of guard rail. A masonry anchor similar to that used at bridge ends may be used for this purpose. Terminal sections will be required on the leading ends in the direction of traffic. Cases six through eight, inclusive, provide typical examples of the treatment.

4. Signs. Sign truss bases, and sign posts other than those equipped with a breakaway assembly, will require protective guard rail. Post spacing will be 6' 3" and terminal sections will be required on the leading ends in the direction of traffic. Cases night thorough 11, inclusive, provide typical examples of the treatment.

5. Headwalls. All pipe culverts, arches, and standard roadway design box culverts located under minimum or low fills should be designed to place the headwall or

culvert end at the outer edge of, or beyond the safety zone to preclude the use of guard rail. Where so designed, the culvert should be covered over with earth as shown on Sheet four. For single or multiple boxes designed by the Division of Bridges, a separate decision will be made on the location of the headwall. If such headwall is located within the safety zone, guard rail protection will be required as shown in Cases 12 and 13. For the present time, current drop inlets and headwall standards will be used in medians for drainage and no guard rail protection will be required for these items. It is intended, however, to develop new standards for these median drainage structures in the future. These instructions supersede those contained in General Letter No. 34, 1966 on Page four, Item 12.

6. Guard Rail Flare. Most of the illustrative cases shown on Sheets three and four require a flared installation. The detail of this flare is shown on Sheet three. It should be noted that the terminal section may be located within the 50-foot curved portion, or may be located on the straight portion of the flare as indicated by the respective case.

For medians on divided pavements where the grade differential will not permit standard safety zones, the safety zone should first be modified to provide as safe a slope treatment as possible for the roadway on the high side, or secondly, may be eliminated where necessary, using only a variable slope between the shoulder point on the high side to the ditch point on the low side. In either case, modified safety zone or eliminated safety zone, guard rail will not be required, except for exceptional or unusual conditions.

The standard sheets three and four covering typical installation cases, are intended as a guide for the proper use of guard rail on typical sections using the safety zone. The plan sheets and "B" sheets should fully describe variations from the typical cases.

The above revisions on guard rail will be effective, beginning with June 23, 1967 Letting, and plans should be revised accordingly.

Signs

The following standard drawings and special provision have been revised to provide non-breakaway sign posts for all sizes of posts. It is still the intent that wherever possible, Post Designs No. 8 and smaller should be designed with the breakaway assembly, and with no guard rail protection.

If, however, a post of Design No. 8 and smaller is located behind a guard rail which is provided for other reasons, such as a bridge end or high fill protection, such post should be designed as a non-breakaway post.

It has been further established that whenever the breakaway post is used, the post itself will be measured and paid for as Item 72006, Structural Steel Posts, per pound, and the breakaway assembly will be paid for on a per each basis.

To provide for the above changes, and to add two new signs; i.e. WRONG WAY and 48" ONE WAY, the following drawings and special provision have been revised.

Drawing 72.02. Sheet four has been revised to delete the 'KEEP OFF MEDIAN" sign and to add a "WRONG WAY" sign. This sign is to be used in accordance with the Division of Maintenance and Traffic Manual on Standard Highway Signs. Sheet five has been revised to add a 48" x 18" "ONE WAY" sign to be used in accordance with the above Manual. Sheet 12 has been revised to restore the previously deleted footing detail for the 6" x 4" x 8.5 lbs. embedded, non-breakaway posts.

Drawing 72.03. Sheet two of this drawing dated January 1, 1967 has been deleted and is replaced by the original sheet, which restores Post Design Numbers one through eight, inclusive, for use as a non-breakaway sign.

Drawing 72.04. Sheet six has been revised to restore the previously deleted detail for the 6" x 4" x 8.5 pound embedded non-breakaway posts.

Special Provision on Highway Signing. This special provision has been revised as follows:

> Section 72.6.2 - Included Class B1 Concrete footings for measurement.
>
> Inserted a new Section 72.7.1 covering payment for breakaway assemblies and renumbered the succeeding section numbers.
>
> Added a pay item - Item 72007: Breakaway Assembly, per each.

The above revisions on signs will be effective beginning with he May 26, 1967 Letting, and plans should be revised accordingly.

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Surveys and Plans