Highway Factors
Group Chairman's Factual Report

Cross-Median Accident
Orland, California
Thursday April 10, 2014, 5:41 PDT

HWY14MH009
Attachment 3 Caltrans Median Barrier Warrants
(29 Pages)

Topic 7-04 – Median Barrier

7-04.1 Purpose

The purpose of median barriers is to reduce the risk of an errant vehicle crossing the median and colliding with opposing traffic. (Note: A cross-median collision is strictly defined as one in which an errant vehicle crosses the median of a highway with four or more lanes and strikes, or is struck, by a vehicle from the opposite direction.)

7-04.2 Function

Median barriers are designed to reduce the risk of an errant vehicle:

- Colliding with a vehicle traveling in the opposite direction,
- Deflecting a vehicle back into the traffic stream traveling in the same direction, or,
- Decelerating beyond tolerable occupant limits.

While median barriers are capable of preventing nearly all cross-median collisions, they are a fixed object and their installation can result in collisions that might not otherwise occur.

7-04.3 Barrier Types

The approved standard types of median barriers (compliant with NCHRP Report 350) for new installation are:

1. Concrete median barrier (Type 60 series),
2. Thrie Beam barrier (single or double),
3. Cable barrier (three or four strand), and
4. Portable Concrete Barrier (PCB), for interim use only.

More information on the different types of median barriers is located in Topic 7-04.5.

7-04.4 Study Warrants

The collision study warrant and freeway volume/width study warrant are used to identify locations for investigation. These study warrants, their uses and limitations are described below.

Collision Study Warrant

The following collision study warrants are applicable to freeways, expressways, and conventional highways with four or more lanes:

- A collision study warrant for any severity is met if a location has three or more cross-median collisions and a total cross-median collision rate of at least 0.5 collisions per mile per year in a five year period, or
- The Fatal collision study warrant is met if a location has three fatal collisions or more and a fatal cross-median collision rate of at least 0.12 collisions per mile per year in a five year period.

Highway locations with four or more lanes satisfying either of the above collision warrants should be studied. The collision warrant for two- or three-lane highways is based on the above fatal study warrant criteria only.

Freeway Traffic Volume/Width Study Warrant

The freeway median barrier volume/width study warrant, illustrated in Figure 7-12, has been developed through an extensive study of freeway cross-median collisions. The need for a median barrier should be considered on freeways whenever the volume and median width plot in the gray area. The probability of an errant vehicle crossing the freeway median and colliding with an opposing vehicle is low when either one or both of the following conditions exist:

- The Annual Average Daily Traffic is less than 20,000, or
- The median width is more than 75 feet.

Use of Study Warrants

1. *Freeways*: A freeway is defined as a divided arterial highway with full control of access and with grade separations at intersections. The Highway Safety Improvement Program Guidelines, Chapter 4, Section 4.2.1, titled "Median Barrier Monitoring Program" provides guidance for study warrants.

   Freeway locations without median barrier are to be studied when the collision or volume/width study warrant is met. The need for a median barrier should also be studied when building a new freeway or when adding a lane to an existing freeway. If the median barrier volume/width study warrant will be met within five years of completion of construction, then the feasibility of placing a median barrier should be considered.

All studies must document the decision to install or not to install a median barrier on the freeway system, and the District Traffic Safety Engineer must approve the decision to install or not install median barrier, and the decision must be documented in the project files.

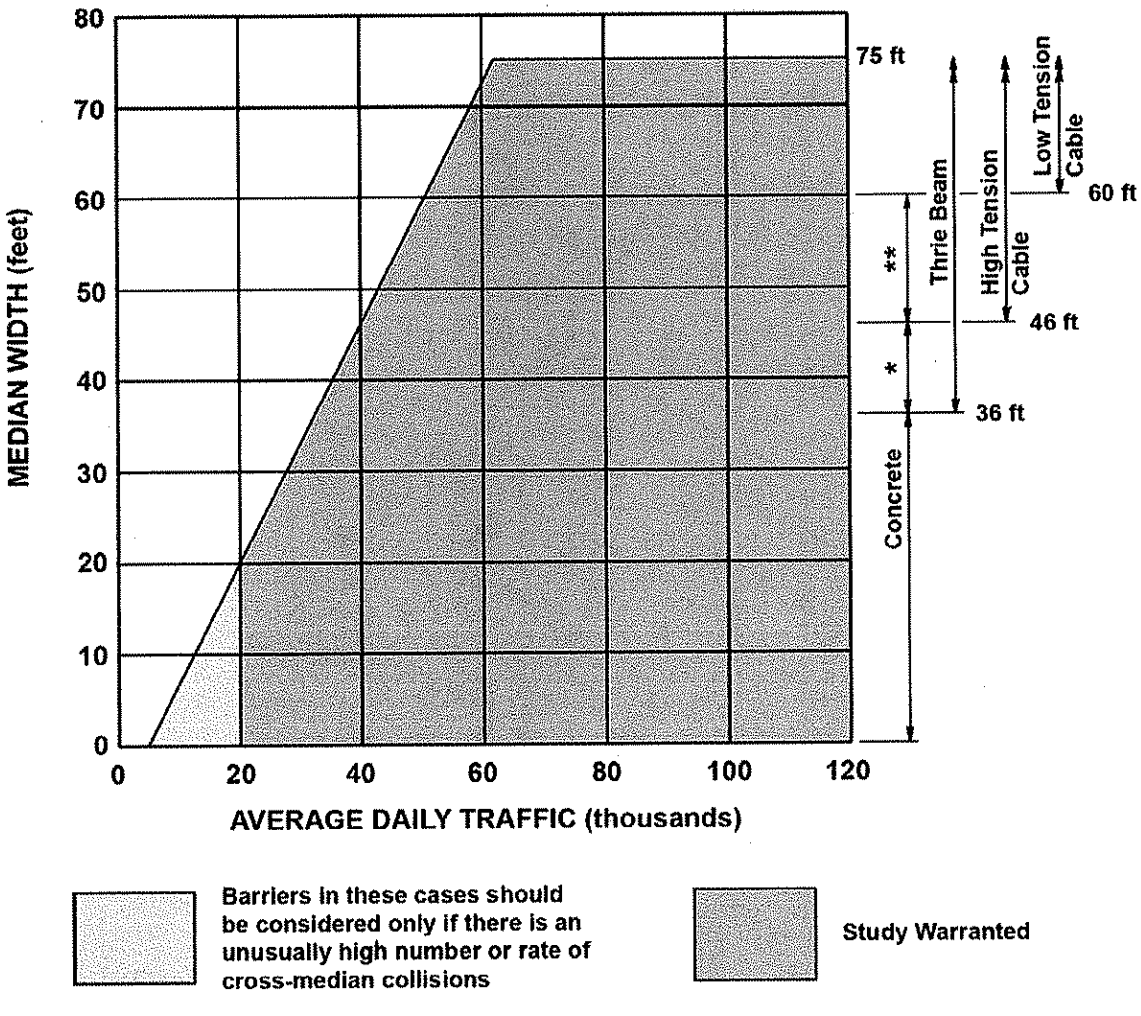
2. *Expressways*: An expressway is defined as an arterial highway with at least partial control of access, and which may or may not be divided. Expressways normally do not have grade separations at intersections.

   Expressway locations are to be reviewed when the collision study warrant is met. The freeway volume/width study warrant, although developed for freeways, may be used for studying expressways for the installation of median barrier.

   For new construction and when upgrading from a conventional highway to an expressway, if there are less than five years of existing collision data the District Traffic Safety Engineer must be consulted to determine if a study should be conducted to install median barrier. Any decision to install or not to install a median barrier must be documented in the study.

   Note: Access openings on expressways, multilane conventional highways and two-lane and three-lane conventional highway facilities present sight distance issues with respect to installation of a median barrier. All access openings must be studied to maintain both corner sight distance at approach intersections and stopping sight distance on the specific facility types themselves (see the *Highway Design Manual* for sight distance standards).

Figure 7-12: Freeway Median Barrier Study Warrant



* Consult with the Headquarters Traffic Liaison

** Offset up to 17 ft from the ETW and pave up to the barrier face

Some of the issues to consider in the study include but are not limited to the following:

- Collision history
- Travel speed on the facility
- Out of direction travel and turn around points for the abutting property owners,
- Accommodation for design vehicles to turn around
- The need for crash cushions where the median barrier stops adjacent to travel

3. *Multilane Conventional Highways*: A multilane conventional highway (two or more lanes in each direction) is defined as a highway without control of access, where property owners have a right to access highway facilities with driveways and at grade intersections. These highways may or may not be divided.

   Median barriers may be an appropriate solution to cross-median or cross-centerline collisions on multilane conventional highways. Multilane conventional highway locations are to be studied when the collision study warrant is met. The freeway volume/width study warrant, although developed for freeways, may be used to study multilane conventional highways for installation of a median barrier.

   Installation of a median barrier on multilane conventional highways may not be feasible due to the numerous issues presented in the note under *Expressways*. The District Traffic Safety Engineer may consider installation of a raised median or buffer to reduce cross centerline collisions on urban or suburban facilities operating at 45 mph or less.

4. *Two- and Three-Lane Conventional Highways*: Two- and three-lane conventional highways are defined as highways without control of access, and where property owners have a right to access highway facilities with driveways, and there are at-grade intersections. The Highway Safety Improvement Program guidelines, Chapter 4, Section 4.2.2, titled "Two- and Three-Lane Monitoring Program", along with Deputy Directive 50, provide guidance on study warrants and median barrier policy for two- and three-lane facilities, respectively.

   Installation of a median barrier on two- and three-lane highways is rare, and requires analysis of the issues presented in the note under expressways above. In addition, consideration is to be given to the fact that a median barrier will eliminate any passing zones and may impact emergency vehicle response within the barrier's limits.

Headquarters Traffic Operations Liaison approval must be obtained for installation of median barrier on two- and three-lane conventional highways.

Note: Due to environmental considerations, right of way purchases, impacts to the abutters of the state highway and other considerations, incremental improvements should be considered on two- and three-lane conventional highways. These incremental improvements include, but are not limited to: barrier striping, rumble strips on the outside paved shoulder, shoulder widening with rumble strips, centerline buffer zones, rumble strips on the centerline stripe, surface mounted channelizers on a centerline buffer zone, and other appropriate devices and applications.

7-04.5 Criteria for Choice of Type

After the decision to install permanent median barriers has been made, Table 7-5, Median Barrier Type Selection Table, is to be used to determine the appropriate barrier type at a given location. (Note: All median barrier offset dimensions are measured from the edge of traveled way to the bottom face of barrier.)

Any exceptions to the barrier type selection criteria listed in Table 7-5 must be approved by the Headquarters Traffic Operations Liaison.

Each barrier system exhibits characteristics that make a given type of barrier more desirable in one location than another type of barrier. These characteristics are:

1. *Concrete Barrier*: This barrier is rigid and does not deflect upon impact, but dissipates impact energy within the vehicle suspension system at shallow angle impacts and by displacement of vehicle sheet metal at severe impact angles. The severity of impact may be greater with concrete than with thrie beam barriers at high impact angles. Because impact angles tend to increase as the distance to the barrier increases, the use of concrete median barrier is guided by Figure 7-12 and Table 7-5. For median widths equal to or less than 36 feet, concrete barriers are the preferred barrier type.

Table 7-5: Median Barrier Type Selection

		Median Width			
		Equal to or less than 36 feet (ft)	Greater than 36 ft to less than 46 ft	Equal to 46 ft to less than 60 ft	Equal to or Greater than 60 ft
NO PLANTINGS	Barrier Type	Type 60 concrete[1]	Consult HQ Traffic Operations Liaison	Type 60 concrete, Thrie beam or cable[3]	Thrie beam or cable[4]
	Placement	On centerline[2] pave up to face of barrier	Consult HQ Traffic Operations Liaison	Offset up to 17 ft and pave up to it, or on centerline (no paving)	On centerline
PLANTINGS	Barrier Type	Type 60 concrete[1]	Type 60 concrete or Thrie beam	Thrie beam	Thrie beam
	Placement	On each side of planting, pave up to the barrier	Consult HQ Traffic Operations Liaison	On each side of plantings, minimum offset 17 ft	On each side of plantings, minimum offset 17 ft

[1]Obtain approval from the Headquarters Traffic Operations Liaison, in consultation with the District Maintenance Engineer for using thrie beam barrier

[2]Except when offset for barrier openings

[3]High tension cable barrier requires approval by the Headquarters Traffic Operations Liaison and Deputy District Directors of Traffic Operations and Maintenance

[4]Low tension cable barrier or high tension cable barrier requires approval by the Headquarters Traffic Operations and Deputy District Directors of Traffic Operations and Maintenance

Concrete barrier requires little maintenance; consequently, traffic is not disrupted by extensive maintenance operations, and maintenance workers are not exposed to large volumes of relatively high-speed traffic. Concrete barrier is believed to have the highest percentage of unreported "accidents" since, in shallow angle collisions with this barrier most vehicles are redirected with minimal damage and can be driven away. Finally, this barrier is the cleanest and has no projections to collect debris.

If appurtenances are needed on top of concrete barriers, such as steel sign posts, refer to Topic 7-03.2(2) for guidance and restrictions.

Proposed appurtenances on top of concrete barriers, such as steel sign supports or chain link fence, must be approved by the District Traffic Safety Engineer and documented in the project files.

2. *Thrie Beam Barrier*: This barrier is semi-rigid and may deflect up to 2 feet on impact, providing some dissipation of energy through the displacement of posts and flattening of barrier elements. Thrie beam barrier can sustain minor impacts without requiring immediate and extensive restoration work. This barrier system is wider than concrete barrier, and has higher maintenance costs. Vegetation control should be considered beneath thrie beam barrier, and details are in the Standard Plans. If an aesthetic appearance for thrie beam barrier elements is desired, refer to Topic 7-03.6(5)(g), Aesthetic Metal Guardrail Treatment, for options.

For new installations of thrie beam barrier, a minimum distance of 17 ft between the face of rail and the edge of travel way shall be provided for maintenance activities. If the 17 ft distance cannot be provided due to plantings, concrete barrier should be placed instead.

Thrie beam barriers may also be installed in medians where there is a history of sand accumulation the median due to high wind, or in designated Federal Emergency Management Agency floodplain areas. Refer to Table 7-5 for requirements for exceptions where thrie beam barrier is necessary under these conditions.

3. *Cable Barrier*: Three or four-strand cable barrier is a flexible barrier and may be placed in wider medians with no plantings. Although lower in cost than concrete or thrie beam barrier, cable barrier experiences large deflections upon impact. Approved high tension cable barriers may be considered for medians 46 feet or wider. An approved low tension cable barrier, called the Washington State Cable Median Barrier, may be considered for medians 60 feet or wider, though it requires more maintenance than the high tension types.

   Installation of any new cable barrier must be approved by the Headquarters Traffic Operations Liaison and Deputy District Directors of Traffic Operations and Maintenance

4. *Portable Concrete Barrier*: If there is widening or other type of work that will reposition barriers in five years or less, consider a Portable Concrete Barrier (PCB), such as Portable Concrete Barrier (Type 60K) or Temporary Railing (Type K), as an interim barrier. This applies to all median widths with or without plantings. Cases in which an interim barrier may be used include stage construction where a PCB is left in place after project acceptance, a programmed project to construct permanent median barrier and a programmed project in the State Transportation Improvement Program. The project which repositions the barrier shall include the cost of installing the permanent median barrier.

   Approved safety end treatments such as inertial barriers (sand barrels) must be used in conjunction with the PCB to shield the approach ends of the barrier. Refer to the Standard Plans for PCB staking details and conditions of use.

   The interim PCB offset distance must be approved by the Headquarters Traffic Operations Liaison. In addition, use of the PCB exceeding five years must be approved by the Headquarters Traffic Operations Liaison.

7-04.6 Barrier Design Details

The details for each type of barrier installed in medians are background for the criteria used in the selections of those types. This topic provides the details of those barrier designs.

1. *Concrete Barriers*: Construction details for concrete barriers are shown in the Standard Plans. The Concrete barrier Type 50 series, with its "Jersey-style" sides and a height of 32 inches, was the standard concrete barrier for many years. It has been replaced by the concrete barrier Type 60 series, with the Type 60 typically used, having a height of 36 inches and a constant slope on each side. **The Concrete barrier Type 60 series is the current standard and shall be used when concrete median barrier is to be constructed.** If glare screen is required, the 56-inch tall Type 60G concrete barrier is to be used. Refer to Topic 7-04.9 for more information about use of glare screens. The Type 60S concrete barrier is 32 inches tall and may be used where stopping sight distance would be impaired if the standard Type 60 barrier were used.

   The typical Type 60 concrete barrier is normally constructed by slip-forming without a footing on pavement. Ends of the barrier at gaps or contraction joints where the concrete and reinforcement is not continuous requires a 10-inch deep by 10-foot long footing under the end of the barrier. This is intended to prevent displacement of the barrier in an impact at the end. Other versions of the Type 60 series concrete barriers usually require fixed forms for construction.

   Pavement overlays can compromise the performance of existing concrete median barriers. Normally, Type 50 concrete barrier can tolerate the addition of 3 inches of pavement against its base, reducing its effective height to 29 inches, without replacement of the barrier per Table 7-4. The Type 60 series can tolerate overlays of pavement that would reduce their effective height to not less than 29 inches without replacement of the barrier per Table 7-4. Where overlays are planned, the designer needs to be cognizant of what the existing and end result effective barrier height will be. If the end result height is less than 29 inches, replace with new barrier for all projects except those overlaying 0.15 feet (2 inches) or less. For those projects, taper the pavement cross slope to no steeper than 10:1 to maintain the barrier's effective height, if feasible.

2. *Thrie Beam Barrier*: Thrie beam barrier is a corrugated galvanized steel beam, nominally 20-inches wide by 3¼-inch deep, mounted on wood or plastic blocks fastened to wood or galvanized steel posts. The top of the barrier element is 32 inches above the surface at the face of the barrier. See the Standard Plans for

construction details. Line posts shall not be installed in structural pavements that would restrict movement of the posts during impact. The ends of thrie beam barrier are anchored to ensure proper performance.

Where larger posts are required in transitions approaching fixed objects, refer to "Thrie Beam Barrier at Fixed Objects in the Median" in the Standard Plans for more details.

Where transitions are needed to concrete bridge barriers, the single thrie beam barrier transition railing (Type STB) and double thrie beam barrier transition railing (Type DTB) are used. Refer to the Type STB and Type DTB transition railings in the Standard Plans for more details. Where a transition is needed to Type 60 concrete median barrier, refer to "Double Thrie Beam Barrier Connection to Concrete Barrier" in the Standard Plans.

Where a double-faced thrie beam barrier is proposed to accommodate cross-median drainage and a saw-toothed median section requires the rail elements to be mounted at different elevations, the thrie beam elements on the lower roadway shall be used with 6 inch x 12 inch x 22 inch blocks. Approval must be obtained from the Headquarters Traffic Operations Liaison.

Steel posts shall be used for the construction of a saw-toothed median section. Field drilling a second pair of holes parallel to each other and the original pair should not be done.

3. *Cable Barriers*: Cable barrier types currently approved are low-tension and high-tension systems. A low-tension cable barrier, called the Washington State Cable Median Barrier, is generic and contains three wire rope strands, each 0.75 inches in diameter and positioned 30.3, 25.6 and 20.9 inches above ground. The supporting posts are steel "H" shaped and installed at 16-foot centers, and the crash tested deflection is approximately 11.2 feet. This barrier may require extensive maintenance and is approved only as an interim barrier until a permanent median barrier is installed. See Figures 7-13 to 7-15.

   The approved high-tension cable barriers are three- and four-strand types and are proprietary. These systems are typically pretensioned or pre-stretched and are installed with a significantly greater tension in the cables than the low-tension cable systems. The deflections of the high-tension barriers are also smaller than that of the low-tension systems, typically 6.6 to 9.2 feet. These systems may be considered for permanent use in medians according to Table 7-5. The conditions for use and the design details (which vary between the approved systems) are available on the Department's Pre-Qualified Products List for Highway Safety Features.

4. *End Treatments*: All blunt ends of median barriers are fixed objects and need to be shielded. This may be done by flaring the end of the barrier away from approaching traffic or placing an appropriate crash cushion at the approach end of the barrier. Sloping ends or ends that are turned down into the ground are not to be constructed.

7-04.7 Median Design Considerations

Many of the difficulties encountered with irregular medians or continuous obstruction in the median can be avoided by the following considerations:

1. *Longitudinal Median Dikes Under a Thrie Beam Barrier*: When required, the dike should be as close to the thrie beam barrier as possible. **If six-inch high dike is needed with thrie beam barrier, the dike may be placed under the barrier but the front edge of the dike shall not be more than seven inches in front of the face of the barrier. Dikes over 2 inches high shall not be placed between 1 and 13 feet in front of thrie beam barrier. Dike shall not be placed in front of concrete barriers.**
2. *Median Ditches*: Drainage ditches should be as shallow and as flat as possible. Where deep ditches are unavoidable, a barrier may be needed on both sides of the ditch. See the *AASHTO Roadside Design Guide*, Chapter 6, for recommended barrier placement.
3. *Median Drainage*: Thrie beam barrier is adaptable to most median drainage conditions. Where thrie beam barrier crosses a drainage inlet and one or more posts are installed within the depression or swale, a rub rail is needed. The rub rail prevents a vehicle from snagging the post with a wheel and should span the length of the depression or swale. See Figure 7-16.

5.

Figure 7-13: Washington State Cable Median Barrier

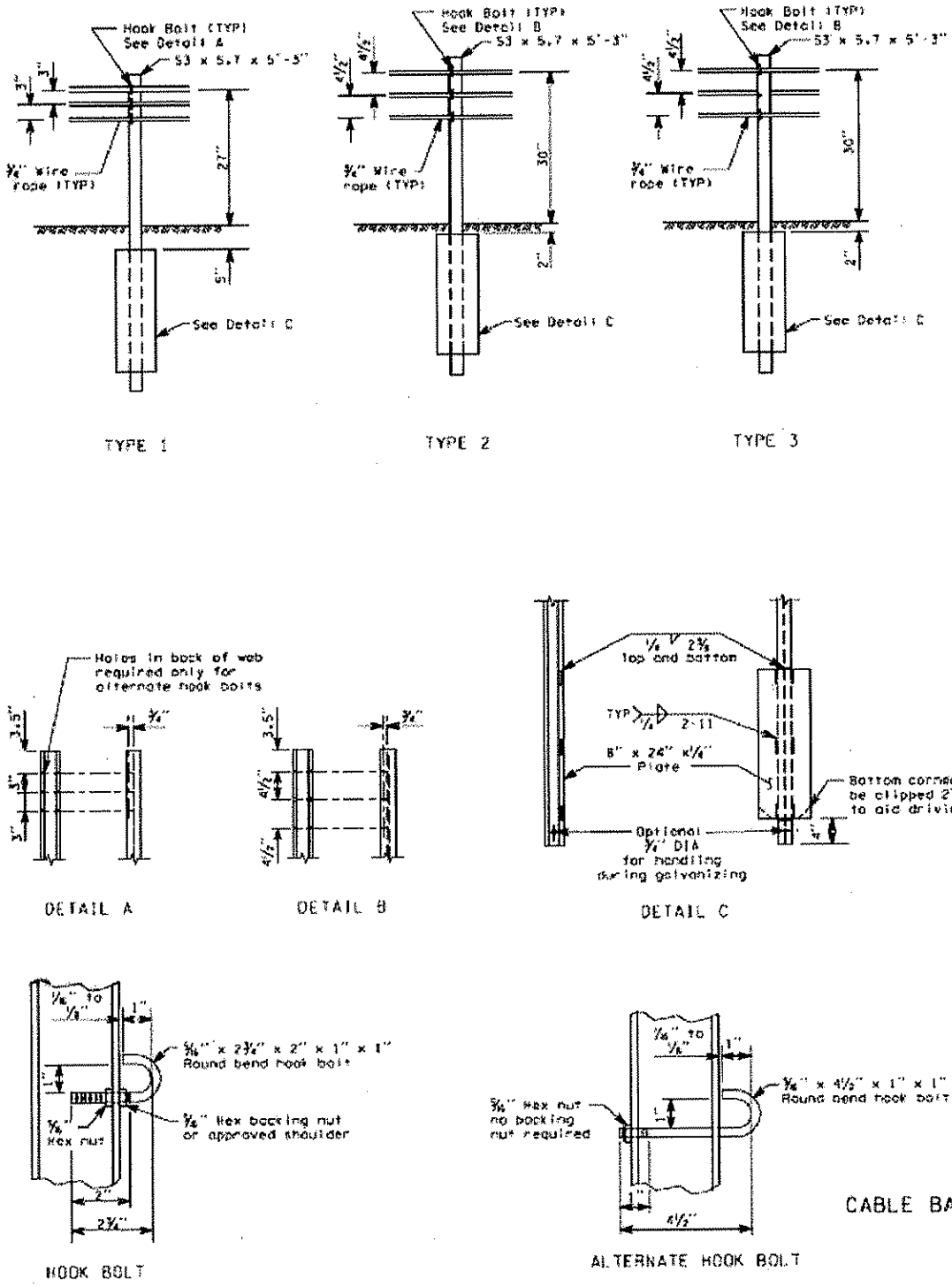


Figure 7-14: Washington State Cable Median Barrier Terminal

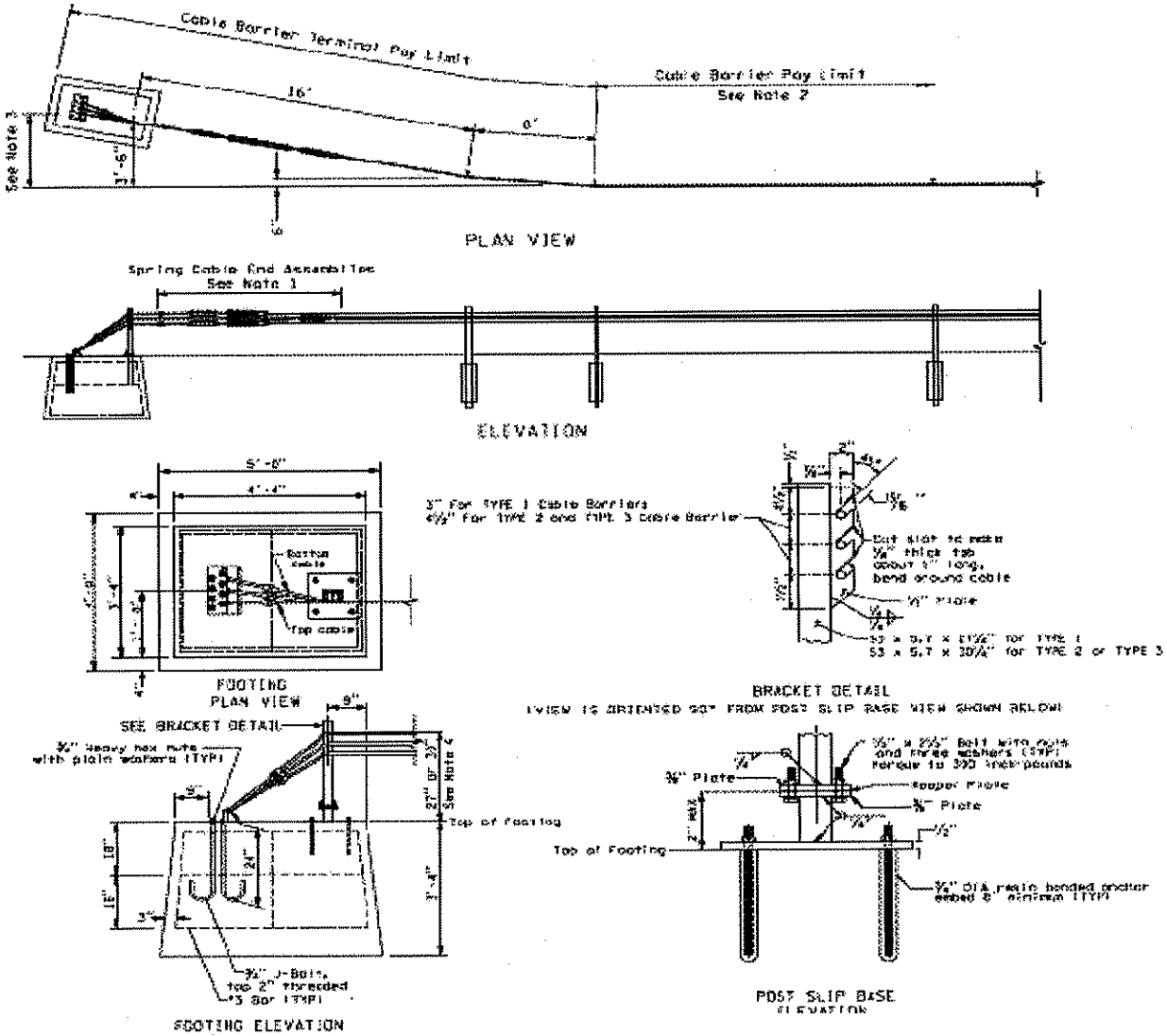


TABLE A	
Curve Radius	Post Spacing
700' or more	16'
699' to 220'	12'
219' to 110'	8'
Less Than 110'	Use Not Recommended

NOTES

1. Stagger Spring Cable End assemblies for clearance between units. Installation of cable end assemblies shall be as follows:

   LENGTH OF CABLE RUNS:

   Up to 500' - Use the Spring Cable End Assembly on one end, and turnbuckle only on the other end of each cable.

   Over 500' to 2000' - Use the Spring Cable End Assembly on each end of each cable.

2. See Table A for post spacing.

3. Distance from tangent of barrier run to notch for top cable on breakaway anchor angle shall be 4".

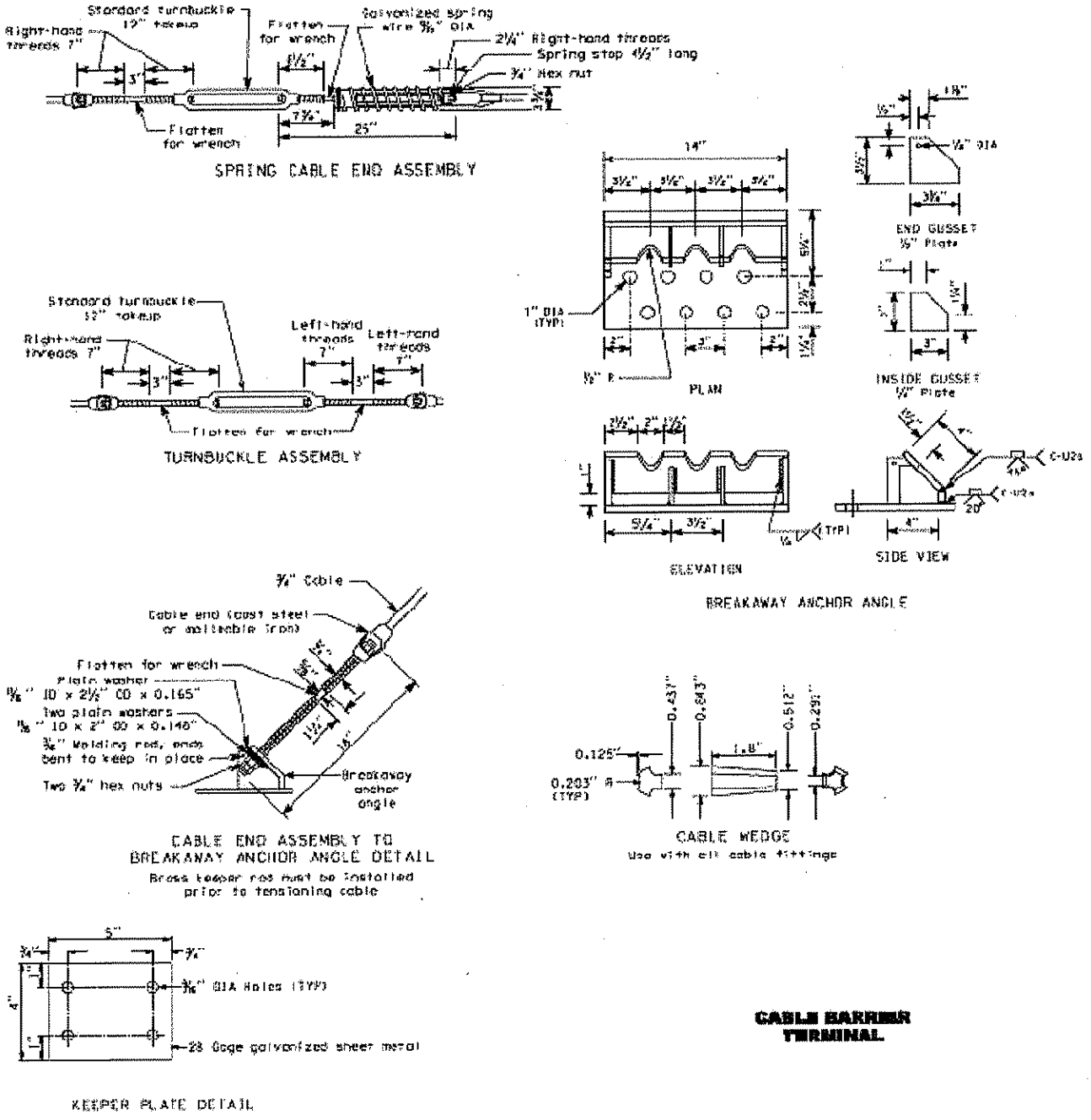
4. The distance from the top of the footing to top of the highest cable is:

   27" for TYPE 1 Cable Barrier.
   30" for TYPE 2 and TYPE 3 Cable Barrier.

5. Where the cable is connected to a cable socket with a wedge type connector, one wire of the wire rope shall be crimped over the back of the wedge to hold it firmly in place.

CABLE BARRIER TERMINAL

Figure 7-15: Washington State Cable Median Barrier Terminal Details



CABLE BARRIER TERMINAL

Concrete median barrier, however, may require special designs to provide drainage. Slotted drain inlets are the recommended means of providing drainage in paved medians with concrete median barrier. Design details for slotted drains are contained in the Standard Plans. Where a concrete barrier spans or crosses an existing drainage inlet, special barrier gap closure details are available. Passing runoff under a concrete median barrier with scuppers on an all-paved cross section is not desirable. What was sheet flow becomes concentrated into streams across the lower roadway. Scuppers, if used, should not extend higher than 3 inches at the base of the barrier. Also, each scupper should be no more than 3-feet long and a series of scuppers should not occupy more than 25 percent of any 20 foot length of concrete barrier.

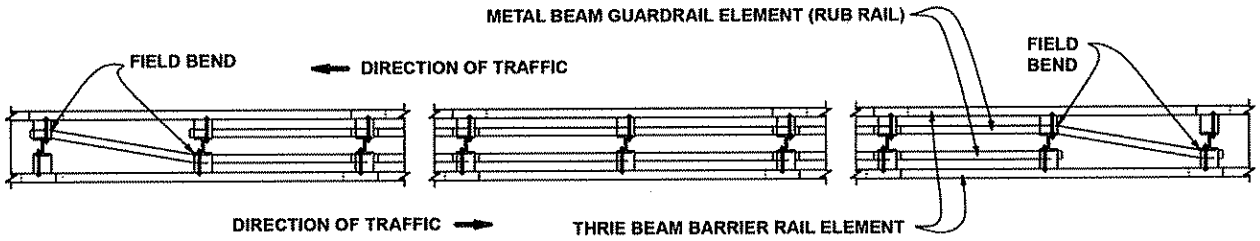
For additional discussion of median drainage, see the *Highway Design Manual*, Topic 834.2, Median Drainage.

4. *Raised Medians*: Median barriers should not be placed on raised medians. For proposed or existing median barrier on a raised median, the barrier should be flush with curb face and the barrier height is measured from top of curb.
5. *Flat Medians*: On paved medians, 10:1 cross slope or flatter, the barrier height is measured from the paved surface exclusive of any localized ditch surface. Consideration should be given to paving medians adjacent to concrete barriers to reduce maintenance activities. See the *Highway Design Manual*, Topic 305.5 for paving requirements.
6. *Planted Medians*: **Where plants are located in the median and the plantings cannot be removed, two barriers, one on each side of the plants, shall be placed.** See Topic 7-04.5, Criteria for Choice of Type, to determine if the use of concrete or thrie beam barrier is appropriate. Existing earth berms used with median plantings are to be eliminated.
7. *Future Construction*: Where traffic lanes are to be added to the median within five years of barrier construction, the median grade line should be adjusted and the barrier installed for the ultimate condition. If it is not practical to do this, concrete barrier should not be used since, unlike the other barrier types, the height of concrete cannot be readily adjusted.
8. *Median Cross-Slope*: Where median cross-slopes are greater than 10:1, vehicle trajectory can affect barrier performance. If median cross slopes are greater than 10:1, refer to the *AASHTO Roadside Design Guide*, Chapter 6, for recommended barrier placement.

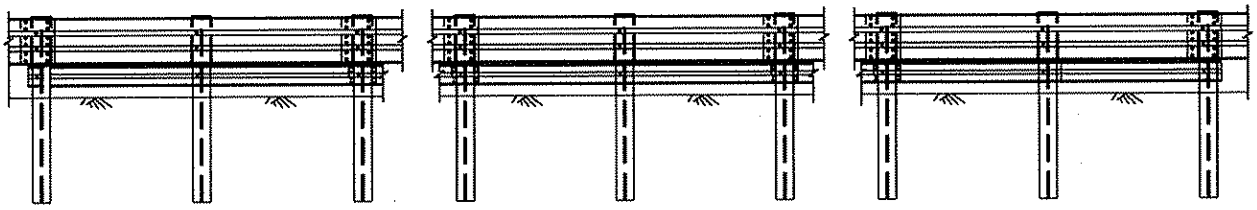
   To ensure desired barrier performance, the relationship between median and traveled way cross-slopes must be checked using the procedures outlines in Traffic Bulletin No. 15 and approved by the District Traffic Safety Engineer. The approval must be documented in the project files.
9. *Adding Lanes in the Median*: Where lanes are added in the median, thereby reducing the median width, the median barrier type to be used is selected in accordance with Topic 7-04.5, Criteria for Choice of Type. In some cases it will be necessary to evaluate the need to upgrade or replace existing non-concrete barrier. Costs associated with upgrading the barrier type should be included in the preliminary scoping document estimate.
10. *Structure Approach*: Where traffic is one-way, approach speeds are less than 45 mph, and thrie beam barrier connection to bridge curb or sidewalk is needed, Figure 7-17 may be used.
11. *Effective Barrier Height*: **Overlay and rehabilitation projects, including any maintenance activities, which will impact existing barriers, shall include required actions in accordance with the guidelines in Table 7-4, Barrier Restoration Practice. If an overlay results in a barrier height out of the indicated tolerances, then the barrier shall be reconstructed or replaced.** The standard heights and tolerances listed in Table 7-4 for each type of barrier are recommended limits based on crash test performance.
12. *Wildlife Passageways*: Openings in concrete barriers for animals should be considered if recommended by district environmental staff. See the Standard Plans for details of wildlife passageways in concrete barriers for small, medium and large animals.

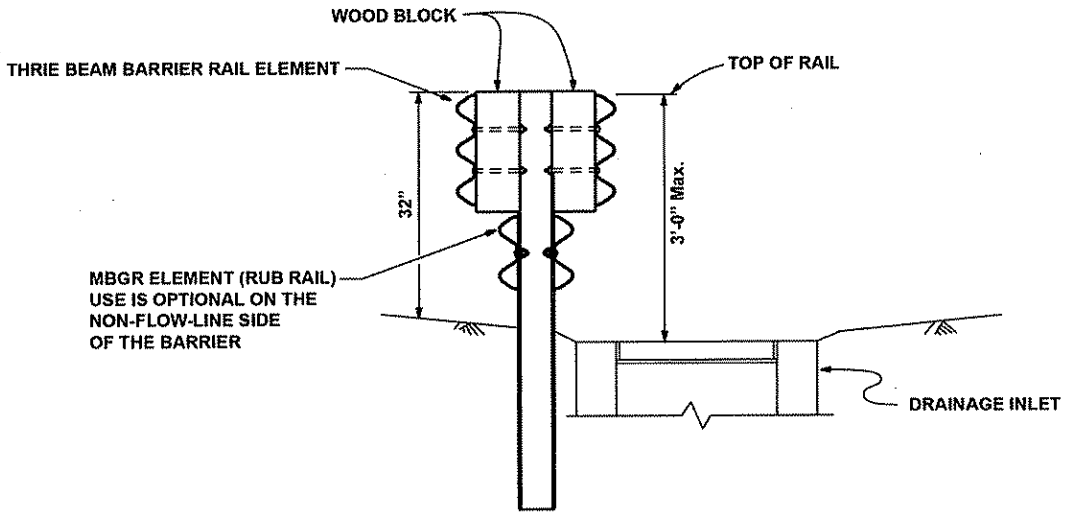
    The District Traffic Safety Engineer must approve the decision to install wildlife passageways, and the decision must be documented in the project files.

Figure 7-16: Thrie Beam Barrier Rub Rail Detail



PLAN

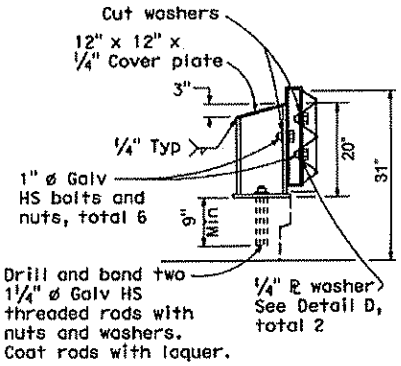




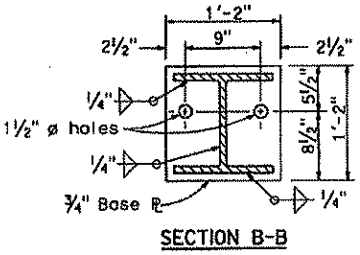
RUB RAIL DETAIL

NO SCALE

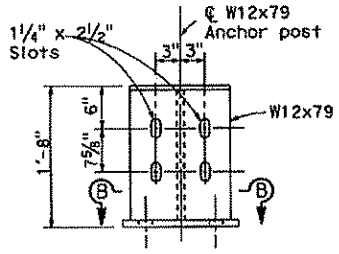
Figure 7-17: Thrie Beam Connection to Bridge Curbs



SECTION A-A

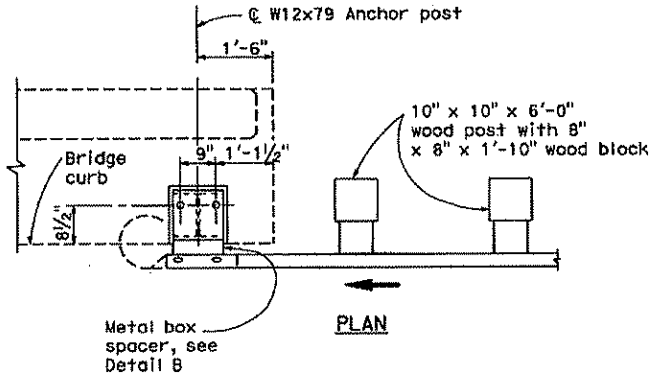


SECTION B-B

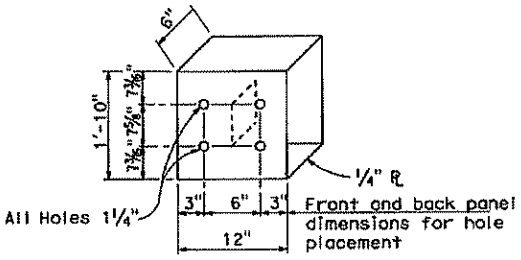


DETAIL A

ANCHOR POST ASSEMBLY

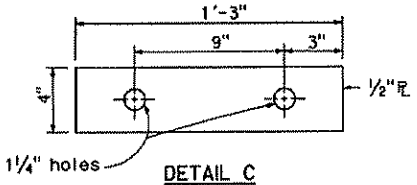


PLAN



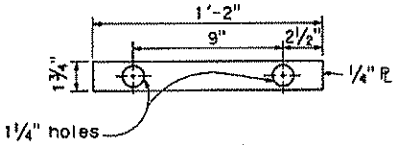
DETAIL B

STRAIGHT METAL BOX SPACER



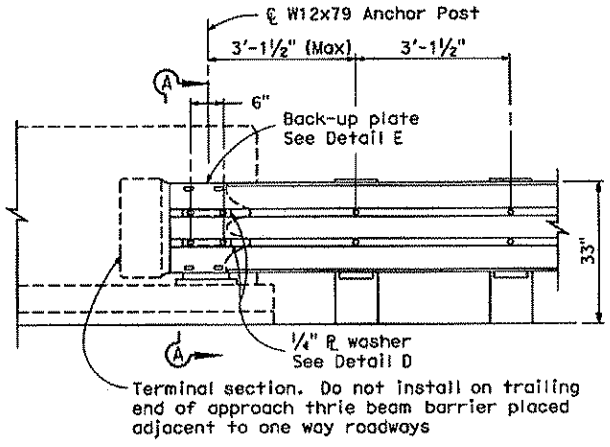
DETAIL C

½" PLATE WASHER



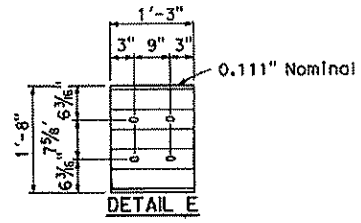
DETAIL D

¼" PLATE WASHER



ELEVATION

THRIE BEAM BARRIER CONNECTION TO BRIDGE CURB



DETAIL E

BACK-UP PLATE

(Same shape as thrie beam rail element. Required when thrie beam rail is attached to bridge railing with metal box spacer and terminal section not used).

7-04.8 CHP Enforcement Areas / Emergency Passageways

Except for CHP enforcement areas/emergency passageways in median barriers, median openings are not allowed on freeways. The use of passageways are to be kept to a minimum and carefully located to provide adequate stopping sight distance to and from the opening along the freeway. Emergency passageways may be appropriate for highway patrol vehicles, emergency service vehicles such as tow trucks, ambulances, fire fighting apparatus and maintenance equipment. Emergency openings in glare screens for passage of stretchers or personnel are covered in Topic 7-04.9.

The need for CHP enforcement areas/emergency passageways and their locations must be established by the District Traffic Safety Engineer in cooperation with the local Department of Highway Patrol office, fire district and emergency services, and the decision must be documented in the project files.

Where emergency openings are provided, they are to be designed based on the following considerations:

1. *Types of Vehicles*: Emergency passageways are designed for motorcycles or for motor vehicles. Openings for motorcycles are 6 feet to 8 feet long, and openings for motor vehicles are 12 feet to 16 feet long.
2. *Types of Passageways*: Permanent openings and temporary openings with removable sections of barrier are the two types of emergency passageways used. Emergency passageways may be either temporary, removable sections of barrier or permanent openings where the barrier ends are offset away from approaching traffic. All temporary openings are to be closed immediately after use.
3. *Spacing of Passageways*: Access to the opposite side of the freeway may be provided by a combination of interchange ramps and emergency passageways. **Access openings shall not be placed at less than three mile intervals.**
4. *Median Widths*: The median needs to be wide enough to accommodate turning vehicles safely and contain the barrier with any necessary tapers. Therefore, motorcycle emergency passageways are typically not provided where the median is less than 22 feet wide, and motor vehicle emergency passageways are typically not provided where the median is 32 feet or less in width, unless there are unusual circumstances.
5. *Barrier Design Details*: Designs for barrier emergency passageways are shown under Emergency Passageways in the Standard Plans.
6. *CHP Enforcement Area*: For CHP enforcement area design details refer to the HOV Guidelines at http://www.dot.ca.gov/hq/traffops/systemops/hov/files/hov_guidelines/HOV%20Guideline.pdf

7-04.9 Glare Screens

Glare screens are designed to screen out the headlight glare of opposing traffic. Glare screens may be considered on new or existing median barriers where the median is 20 feet or less in width, except on horizontal curves where the glare screen would reduce sight distance to less than the stopping distance for the design speed. Glare screens are typically not installed in medians wider than 20 feet.

Glare screen may only be installed where an engineering evaluation shows it would be of overall benefit to the motorist considering the cost and other impacts of the glare screen. Engineering evaluations should consider glare due to the combined effects of grades, horizontal alignment, traffic volumes, as well as any public complaints. Where glare is determined to affect safety performance and glare screen is not cost-effective or creates impacts that cannot be mitigated, highway lighting should be considered to reduce the level/intensity and effects of headlight glare. On route segments with scenic views, the sensitivity of the public to the blocking of these views should be considered.

A glare screen engineering evaluation must be incorporated in the appropriate project initiation document.

Based on an engineering evaluation, glare screens may be installed on segments or spot locations along frontage roads. Chain link fence with slats may be appropriate in these situations.

Glare screens are subject to the following considerations:

1. *Thrie Beam Barrier*: Glare screen is not generally used with thrie beam barrier.

2. *Concrete Barrier*: When glare screen is determined appropriate, the standard permanent glare screen is the 56-inch tall Type 60G concrete barrier.
3. *Emergency Openings*: When glare screen is included with the barrier, openings may be provided at approximately 600-foot intervals if requested by local emergency agencies. In areas with above average traffic collision rates, openings may be spaced at 300-foot intervals. Spacing may be varied to provide such an opening at each structure crossing over the highway.

7-04.10 Delineation

To provide enhanced delineation, approved retro-reflective units may be placed on thrie-beam and concrete barrier where the clearance from the barrier to the edge of traveled way is less than 8 feet. For further details regarding delineation for median barriers, refer to the California MUTCD.

Topic 7-05 – Outer Separation Barrier

7-05.1 Introduction

The need for outer separation barrier between a freeway and a frontage road should be considered when there are concerns regarding collisions of vehicles crossing these separated facilities. Installation of an outer separation barrier is generally studied at locations where the freeway volume/width warrant or the collision warrant is met. Refer to Topics 7-04.4 and 7-05.2 for more information about these study warrants.

7-05.2 Outer Separation Barrier Criteria

The following criteria shall be satisfied for installation of outer separation barrier:

1. The direction of travel of the frontage road opposes freeway traffic, and
2. The opposing frontage road traffic volume is greater than or equal to 5,000 annual average daily traffic (AADT), and
3. The location meets the criteria described in Figure 7-12: Freeway Median Barrier Study Warrant. Use the distance from the freeway edge of traveled way to the frontage road edge of traveled way for the width, and for the traffic volume, use one-half the freeway AADT plus the opposing AADT on the frontage road. Or:
4. If a location does not meet the above three criteria, but can be shown to meet either of the two criteria below, then a barrier may be recommended if:
   a. A collision study warrant for any severity is based on a location having three or more collisions involving frontage road and freeway vehicles, and a total frontage road and freeway collision rate of at least 0.5 collisions per mile per year in a five year period, or
   b. The Fatal collision study warrant is based on a location having three or more fatal collisions involving frontage road and freeway vehicles, and a fatal frontage road and freeway collision rate of at least 0.12 collisions per mile per year in a five year period.

Topic 7-06 – Crash Cushions

7-06.1 Purpose

Crash cushions, also known as impact attenuators, are intended to shield fixed objects that cannot be removed or where other protective systems such as guardrail are not suitable. When a vehicle strikes a crash cushion it decelerates by the transfer of inertia in displacing sand or water, expending kinetic energy through compressing a hydraulic cylinder or collapsible material, tearing metal, or moving a metal cable or strap through a restricted path.

7-06.2 Available Crash Cushion Types

The various types of crash cushions currently available include several mechanical systems previously mentioned, arrays of sand-filled plastic drums, and water-filled modules. These types vary in regard to costs of installation, size, ease of repair and maintenance. These aspects should be

Table B Accident Records

REQUEST-& LINE	ARS	P P	POST MILE	P S	F T	I R L	S O H	D A Y	ACCIDENT DATE MM-DD-YY	TIME HHMM	COMMON ACCIDENT NUMBER	P C F	ENVIR COND W	L	S	R C	T W C	O C	NO MTR VEH	P T	D I R	V H I	S I	PERSON K	I	O L S P	O L O C	O L O C	O L O C	O L O C	OA F 12	M O V	SD P 12
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Table B Accident Records

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1 45	03 GLE 005	R	025.830		H	-	N	1	10-09-11	2000	916016473	4	A	D	A	H	D	E	01	A	N	1	C	00	00	29B	---	---	---	5<	C	G<
1 45	03 GLE 005	R	025.920		H	-	N	1	07-31-11	1130	916017070	4	A	A	A	H	D	E	01	D	N	1	C	00	00	29B	27A	---	---	N<	R	A<
1 45	03 GLE 005	R	026.030		H	-	N	5	11-06-08	1110	916017227	6	A	A	A	D	D	B	02	A	N	1	C	00	00	V2D	---	---	---	N<	J	A<
																				A	N	1	C	00	00	V1F	---	---	---	N<	B	A<

Table B Accident Records

REQUEST-& LINE	ARS	P P	POST MILE	P S	I F T	R L	S O H	D A Y	ACCIDENT DATE MM-DD-YY	TIME HHMM	COMMON ACCIDENT NUMBER	P C F	ENVIR COND W	L	S	R C	R W C	T O C	NO MTR VEH	P T	D I R	V H I	S I	PERSON K	I	O L S P	O L O C	O L S O	O L O C	O L S O	O L O C	OA F 12	M O V	SD P 12
1 45	03 GLE 005	R	026.150		H	-	S	3	03-17-09	1118	916015824	4	B	A	A	H	D	E	02	A	S	1	C	00	00	29B	V2F	---	---	N<	R	A<
																					G	S	1	<	00	00	---	V1F	---	---	<<	<	<<
1 45	03 GLE 005	R	026.240		H	-	S	2	04-07-08	0135	916016355	C	A	D	A	H	D	E	01	D	S	1	C	00	00	29B	---	---	---	N<	B	A<
1 45	03 GLE 005	R	026.330		H	-	N	5	05-24-12	1655	916015118	4	A	A	A	H	D	E	01	A	N	1	C	00	02	01B	24H	27H	---	N<	C	A<
1 45	03 GLE 005	R	026.460		H	-	N	4	09-17-08	2150	916017070	4	A	D	A	D	A	E	01	A	N	1	C	00	00	41D	---	---	---	N<	R	A<
1 45	03 GLE 005	R	026.490		H	-	S	6	09-19-08	2010	916017070	4	A	D	A	D	A	B	01	G	S	1	C	00	01	01B	41F	16B	44A	N<	R	A<
1 45	03 GLE 005	R	026.500		H	-	S	1	09-21-08	2018	916015681	4	A	D	A	D	A	E	01	G	S	1	B	00	00	41B	07B	01B	44A	N<	C	A<
																					O	<	1	<	00	00	---	99A	---	---	<<	R	<<
1 45	03 GLE 005	R	026.530		H	-	S	2	03-22-10	2315	916018429	1	A	C	A	H	B	C	02	A	S	1	C	00	01	V2F	---	---	---	6<	R	B<
																					A	S	1	C	00	01	V1F	---	---	---	N<	B	A<
1 45	03 GLE 005	R	026.540		H	-	S	6	08-12-11	1455	916016447	4	A	A	A	H	A	E	01	D	S	1	C	00	00	06H	24H	44H	27H	N<	R	AI
1 45	03 GLE 005	R	026.630		H	-	S	1	06-12-11	0114	916015118	4	A	D	A	H	D	F	01	A	S	1	C	00	00	24H	44H	---	---	N<	C	G<
1 45	03 GLE 005	R	026.690		H	-	S	7	05-03-08	1950	916016991	4	A	A	A	H	D	E	01	A	S	1	C	00	00	24H	44H	27H	---	N<	B	A<
1 45	03 GLE 005	R	026.850		H	-	N	7	01-08-11	1120	916017250	6	B	A	B	H	D	E	02	G	<	1	C	00	00	---	---	---	---	N<	J	G<
																					A	N	1	C	00	00	15H	---	---	---	N<	B	A<
1 45	03 GLE 005	R	026.920		H	-	N	6	08-05-11	1655	916017700	4	A	A	A	H	D	E	01	D	N	1	C	00	01	01H	44G	---	---	K<	B	A<
1 45	03 GLE 005	R	027.090		H	-	S	3	02-22-11	2045	916016473	4	A	C	A	H	D	E	01	D	S	1	C	00	00	07B	---	---	---	N<	C	A<
1 45	03 GLE 005	R	027.100		H	-	N	2	06-02-08	0440	916015118	C	A	D	A	H	D	E	01	D	N	1	C	00	00	V2F	---	---	---	N<	B	A<
																					X	<	-	<	00	00	V1-	---	---	---	<<	-	<<
1 45	03 GLE 005	R	027.200		H	-	S	1	05-04-08	0520	916016473	1	A	D	A	H	D	E	01	A	S	1	C	00	01	13H	24H	44H	27H	4<	B	B<
1 45	03 GLE 005	R	027.200		H	-	S	1	07-27-08	1505	916016355	C	A	A	A	H	D	E	01	D	S	1	C	00	00	27H	---	---	---	N<	C	A<
1 45	03 GLE 005	R	027.210		H	-	N	5	08-13-09	0845	916015118	6	A	A	A	H	D	B	02	A	N	1	B	00	00	V2D	---	---	---	A<	J	A<
																					G	N	1	C	00	00	V1F	---	---	---	N<	B	A<
1 45	03 GLE 005	R	027.500		H	-	N	2	07-13-09	0555	916015225	4	A	A	A	H	D	E	01	A	N	1	C	00	02	10H	44H	27H	---	N<	C	<I
1 45	03 GLE 005	R	027.550		H	-	N	6	05-06-11	1655	916016447	6	A	A	A	H	A	C	02	A	N	1	C	00	00	V2D	---	---	---	N<	J	G<
																					A	N	1	C	00	02	V1D	13H	23H	27H	N<	B	A<
1 45	03 GLE 005	R	027.674		R	2	N	4	05-28-08	2003	916016389	4	A	B	A	H	D	E	01	C	N	1	C	00	01	44B	---	---	---	6<	C	A<
1 45	03 GLE 005	R	027.674		R	2	N	7	02-19-11	1007	916013178	4	B	A	A	H	D	E	01	D	N	1	C	00	00	18B	23H	44H	---	N<	B	A<
1 45	03 GLE 005	R	027.760		H	-	N	4	03-31-10	1210	916017700	4	B	A	A	H	D	E	01	A	N	1	C	00	01	29B	---	---	---	N<	R	A<
1 45	03 GLE 005	R	027.800		H	-	S	5	06-02-11	1500	916016008	6	A	A	A	H	A	B	02	A	S	1	C	00	00	V2D	---	---	---	N<	J	A<
																					2	S	1	C	00	00	V1F	---	---	---	N<	B	A<
1 45	03 GLE 005	R	027.910		H	-	S	2	02-06-12	0750	916015225	4	A	A	A	H	D	E	01	A	S	1	C	00	00	99J	---	---	---	N<	B	<I
1 45	03 GLE 005	R	027.940		H	-	N	2	05-31-10	1850	916015681	4	B	A	A	H	D	E	01	D	N	1	C	00	01	29B	44B	---	---	N<	C	A<
1 45	03 GLE 005	R	028.010		H	-	N	7	05-24-08	0100	916015824	4	B	D	A	H	D	F	01	A	N	1	C	00	00	29B	44B	---	---	N<	C	A<
1 45	03 GLE 005	R	028.010		H	-	N	6	04-08-11	1740	916017700	4	A	A	A	H	D	E	01	A	N	1	C	00	02	99B	22H	27H	28H	N<	R	A<
1 45	03 GLE 005	R	028.210		H	-	N	4	05-28-08	2005	916016389	5	A	B	A	H	D	E	01	J	N	1	C	00	00	29B	---	---	---	N<	B	A<
1 45	03 GLE 005	R	028.210		H	-	N	1	01-10-10	0420	916018311	4	E	D	B	H	D	F	01	A	N	1	C	00	00	24H	44H	---	---	N<	C	<I
1 45	03 GLE 005	R	028.240		H	-	N	1	03-09-08	0805	916016790	4	A	D	A	H	D	E	01	A	N	1	C	00	00	99B	27H	---	---	N<	R	A<
1 45	03 GLE 005	R	028.260		H	-	S	2	08-02-10	0945	916017692	5	A	A	A	H	A	C	02	G	S	1	C	00	00	V2F	---	---	---	N<	B	A<
																					G	S	1	C	00	00	V1F	---	---	---	N<	H	A<
1 45	03 GLE 005	R	028.460		H	-	N	6	12-03-10	1655	916016447	1	B	D	A	H	A	B	03	A	N	1	C	00	01	V2D	V2F	---	---	4<	R	B<
																					G	N	1	C	00	00	V1F	V1F	---	---	N<	B	A<
																					A	N	1	C	00	00	---	V4D	---	---	N<	B	A<
																					N	N	1	<	00	00	---	V3D	---	---	<<	R	<<
1 45	03 GLE 005	R	028.810		H	-	S	7	04-05-08	2320	916013178	1	A	D	A	H	D	E	01	A	S	1	C	00	00	51H	22H	---	---	4<	C	B<

Table B Accident Records

REQUEST- & LINE	ARS	P POST P MILE	P S	F T	I R L	S O H	D A Y	ACCIDENT DATE MM-DD-YY	TIME HHMM	COMMON ACCIDENT NUMBER	P C F	ENVIR COND W	L	S	R C	T W C	O C	NO MTR VEH	P T	D I R	V H I	S I	PERSON K	I	O S P	L O C	O S O	L O C	O S O	L O C	OA F 12	M O V	SD P 12
1 45	03 GLE 005	R 028.820		H	-	S	7	10-11-08	0615	916017956	C	A	D	A	H	D	E	01	A	S	1	C	00	00	42D	29B	---	---	N<	B	A<

California Department of Transportation

OTM22130

Table B - Selective Accident Rate Calculation

Policy controlling the use of Traffic Accident Surveillance and Analysis System (TASAS) - Transportation Systems Network (TSN) Reports

1. TASAS - TSN has officially replaced the TASAS - "Legacy" database.

2. Reports from TSN are to be used and interpreted by the California Department of Transportation (Caltrans) officials or authorized representative.

3. Electronic versions of these reports may be emailed between Caltrans' employees only using the State computer system.

4. The contents of these reports shall be considered confidential and may be privileged pursuant to 23 U.S.C. Section 409, and are for the sole use of the intended recipient(s). Any unauthorized review, use, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy all copies of the original message. Do not print, copy or forward.

OTM22130

Table B - Selective Accident Rate Calculation

Report Parameters-

Event ID: 3622252
Request Name: MAIT
Ref Date: 04/12/2014

Request- & Line	LOC	DIR	LSC	Route/Location	Begin Date	End Date	Rate Type	Out Seq	Override Rates			Override ADT		Req. Type	Com- bine?	Excl Ramp?
									Rate	Inj%	Fat%	Main	Cross			
1 46	H	T	I	02 TEH 005 R000.000 - 02 TEH 005 R002.179	01-JAN-08	31-DEC-12	N	L						N	N	N

Event Log:

Job id is : 550825 Accidents Table B Request MAIT Submitted by T2KREED
02 TEH 005 R 0 - 02 TEH 005 R 2.179 01/01/2008 TO 12/31/2012

California Department of Transportation
Table B - Selective Accident Rate Calculation

Location Description	Rate Group (RUS)	No. of Accidents / Significance							Pers Kld Inj	ADT Main X-St	Total MV+ or MVM	Accident Rates Actual		Accident Rates Average			
		Tot	Fat	Inj	F+I	Multi Veh	Wet	Dark				Fat	F+I	Tot	Fat	F+I	Tot
02 TEH 005 R000.000 - 02 TEH 005 R002.178	**2.179 MI** H	14	1	6	7	4	2	6	1	24.2	96.27	0.010	.07	.15	0.008	.16	.44
0001-0046 2008-01-01 2012-12-31 *60 mo.*	R								9								

Accident Rates expressed as: **# of accidents / Million vehicle miles**

+ denotes that **Million Vehicles** (MV) used in accident rates instead (for intersections and ramps).

For Ramps RUS only considers R(Rural) U(Urban)

California Department of Transportation

OTM22131

Table B Accident Records

Policy controlling the use of Traffic Accident Surveillance and Analysis System (TASAS) - Transportation Systems Network (TSN) Reports

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California Department of Transportation

OTM22131

Table B Accident Records

Report Parameters:

REPORT DATE:	04/12/2014
REFERENCE DATE:	04/12/2014
SUBMITTOR:	T2KREED
REPORT TITLE:	MAIT
EVENT ID:	3622252

Total Accidents Retrieved

14

Table B Accident Records

REQUEST- & LINE	ARS	P P	POST MILE	P S	F T	I R L	S O H	D A Y	ACCIDENT DATE MM-DD-YY	TIME HHMM	COMMON ACCIDENT NUMBER	P C F	ENVIR COND W	L	S	R C	R W	T O C	NO MTR VEH	P T	D I R	V H I	S I	PERSON K	I	O S P	L O C	O S O	L O C	O S O	L O C	OA F 12	M O V	SD P 12
1 46	02 TEH 005	R	000.020		H	-	S	5	08-04-11	0310	913016313	4	A	D	A	H	D	E	01	G	S	1	C	00	00	22H	27H	---	---	N<	C	A<
1 46	02 TEH 005	R	000.040		H	-	S	6	04-22-11	0934	913011066	4	A	A	A	H	D	E	01	A	S	1	C	00	01	29B	44B	---	---	5<	R	A<
1 46	02 TEH 005	R	000.100		H	-	N	3	10-04-11	1805	913012193	4	C	B	B	H	D	E	01	A	N	1	C	00	00	29B	---	---	---	N<	C	A<
1 46	02 TEH 005	R	000.180		H	-	S	1	10-16-11	0122	913011066	4	A	D	A	H	D	E	01	A	S	1	C	00	01	23H	44H	---	---	N<	R	A<
1 46	02 TEH 005	R	000.240		H	-	S	2	07-26-10	2010	913017956	1	A	A	A	H	D	E	01	A	S	1	C	00	01	16B	---	---	---	4<	C	<E
1 46	02 TEH 005	R	000.290		H	-	S	2	08-02-10	1545	913014509	4	A	A	A	H	D	F	01	D	S	1	C	00	02	99B	44G	---	---	N<	R	A<
1 46	02 TEH 005	R	000.430		H	-	N	4	03-18-09	1420	913015565	4	A	A	A	H	D	F	01	C	N	1	C	01	00	24H	44H	---	---	N<	C	A<
1 46	02 TEH 005	R	000.500		H	-	S	5	04-07-11	1515	913015400	6	B	A	A	H	D	D	02	A	S	1	C	00	00	V2A	---	---	---	N<	F	A<
																				A	N	1	C	00	00	V1D	---	---	---	N<	B	A<
1 46	02 TEH 005	R	000.900		H	-	S	3	12-28-10	1740	913013552	4	C	D	B	H	D	E	01	D	S	1	C	00	00	24H	27H	---	---	M<	C	<F
1 46	02 TEH 005	R	001.170		H	-	N	4	03-19-08	0611	913011068	4	B	D	A	H	D	B	02	G	N	1	C	00	00	V2F	---	---	---	N<	R	G<
																				A	N	1	C	00	00	V1D	---	---	---	N<	B	A<
1 46	02 TEH 005	R	001.390		H	-	S	6	07-10-09	1720	913017334	4	A	A	A	H	D	E	01	A	S	1	C	00	00	29B	---	---	---	M<	B	A<
1 46	02 TEH 005	R	001.390		H	-	S	5	09-29-11	0925	913016313	4	A	A	A	H	D	F	01	A	S	1	C	00	01	24H	44H	---	---	N<	B	A<
1 46	02 TEH 005	R	001.640		H	-	S	1	06-27-10	2135	913014975	4	A	D	A	H	D	B	02	D	S	1	C	00	02	V2D	44H	---	---	N<	J	A<
																				B	S	1	C	00	01	V1F	44H	---	---	N<	B	A<
1 46	02 TEH 005	R	002.070		H	-	N	4	05-28-08	1710	913011068	5	A	A	A	D	A	C	02	A	N	1	C	00	00	V2D	---	---	---	N<	H	A<
																				D	N	1	C	00	00	V1D	---	---	---	N<	H	A<

Traffic and Vehicle Data Systems Unit

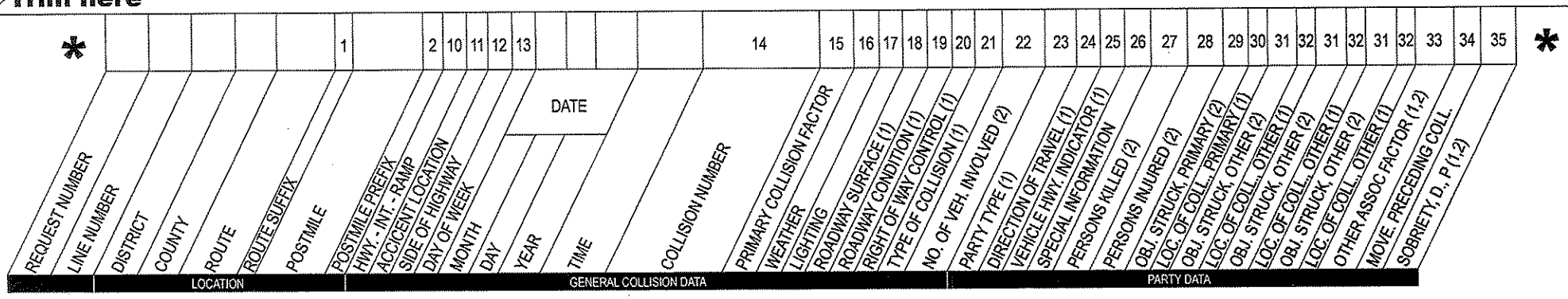
2012 All Traffic Volumes on CSHS

Home

Dist	Rte	CO		Post Mile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
3	5	COL	R	26.73	MAXWELL/COLUSA ROADS	2850	33500	24600	2400	33000	24300
3	5	COL	R	29.25	NORTH MAXWELL OVERHEAD	2400	33000	24300	2550	32000	24600
3	5	COL	R	31.84	DELEVAN ROAD	2550	32000	24600	2550	32000	24500
3	5	COL	R	34.37	COLUSA/GLENN COUNTY LINE	2550	32000	24500			
3	5	GLE	R	0	COLUSA/GLENN COUNTY LINE				2550	32000	24500
3	5	GLE	R	1.517	COUNTY ROAD 68	2550	32000	24500	2850	32500	24000
3	5	GLE	R	7.607	COUNTY ROAD 57	2850	32500	24000	3000	31000	23600
3	5	GLE	R	9.872	WILLOWS, JCT. RTE. 162	3000	31000	23600	3150	32000	23800
3	5	GLE	R	13.9	COUNTY ROAD 39	3150	32000	23800	2700	27500	23200
3	5	GLE	R	16.8	COUNTY ROAD 33	2700	27500	23400	2450	27000	23200
3	5	GLE	R	20.82	COUNTY ROAD 27	2450	27000	23200	2650	30000	23200
3	5	GLE	R	24.82	COUNTY ROAD 16	2650	30000	23200	2500	28500	23400
3	5	GLE	R	25.53	JCT. RTE. 32 EAST	2500	28500	23400	2900	28500	23400
3	5	GLE	R	27.81	COUNTY ROAD 7	2900	28500	23400	2700	28000	23400
3	5	GLE	R	28.82	GLENN/TEHAMA COUNTY LINE	2700	28000	23400			
2	5	TEH	R	0	GLENN/TEHAMA COUNTY LINE				2650	28000	23400
2	5	TEH	R	5.769	LIBERAL AVENUE	2650	28000	23400	2700	28500	24100
2	5	TEH	R	7.486	SOUTH AVENUE	2700	28500	24100	2750	29000	24500
2	5	TEH	R	8.975	CORNING ROAD	2750	29000	24500	2900	30500	26000
2	5	TEH	R	10.97	FINNELL AVENUE	2900	30500	26000	2900	30500	26000
2	5	TEH	R	13.97	GYLE ROAD	2900	30500	26000	2800	29500	24800
2	5	TEH	R	19.78	FLORES AVENUE	2800	29500	24800	2850	29500	25500
2	5	TEH	R	24.87	RED BLUFF, SOUTH MAIN STREET	2850	29500	25500	3050	32000	27500
2	5	TEH	R	24.94	RED BLUFF, DIAMOND AVENUE	3050	32000	27500	3250	34000	30500
2	5	TEH	R	26.53	RED BLUFF, JCT. RTE. 36	3250	34000	30500	3750	39500	36500

RTE	DIST	CNTY	POST MILE	LEG	DESCRIPTION	VEHICLE AADT TOTAL	TRUCK AADT TOTAL	TRUCK % TOT VEH	TRUCK AADT TOTAL By Axle 2	3	4	5+	% TRUCK AADT By Axle 2	3	4	5+	EAL 2-WAY (1000)	YEAR VER/ EST
005	03	COL	R18.722	B	JCT. RTE. 20	28000	8142	29.08	1366	512	379	5883	16.78	6.29	4.66	72.26	2180	06E
005	03	COL	R18.722	A	JCT. RTE. 20	24700	7059	28.58	1643	150	70	5197	23.27	2.12	.99	73.62	1875	07E
005	03	GLE	R9.872	B	WILLOWS, JCT. RTE. 162	23600	5329	22.58	1299	115	51	3864	24.38	2.16	.96	72.51	1397	12V
005	03	GLE	R9.872	A	WILLOWS, JCT. RTE. 162	23800	6802	28.58	1583	145	67	5007	23.27	2.13	.99	73.61	1806	07V
005	03	GLE	R25.529	B	JCT. RTE. 32 EAST	23400	6688	28.58	1556	142	66	4924	23.27	2.12	.99	73.62	1776	07E
005	03	GLE	R25.529	A	JCT. RTE. 32 EAST	23400	5927	25.33	372	292	152	5112	6.27	4.92	2.57	86.25	1826	06E
005	03	GLE	R28.821	O	GLENN/TEHAMA COUNTY LINE	23400	4982	21.29	327	171	85	4400	6.56	3.43	1.7	88.31	1558	12E
005	02	TEH	R0	O	GLENN/TEHAMA COUNTY LINE	23400	4982	21.29	327	171	85	4400	6.56	3.43	1.7	88.31	1558	12E
005	02	TEH	R5.769	A	LIBERAL AVENUE	24100	5131	21.29	337	176	87	4531	6.56	3.43	1.7	88.31	1604	12E
005	02	TEH	R7.486	A	SOUTH AVENUE	24500	5216	21.29	342	179	89	4606	6.56	3.43	1.7	88.31	1631	12E
005	02	TEH	R8.975	A	CORNING ROAD	26000	5535	21.29	363	190	94	4888	6.56	3.43	1.7	88.31	1730	12V
005	02	TEH	R10.969	A	FINNELL AVENUE	26000	5535	21.29	363	190	94	4888	6.56	3.43	1.7	88.31	1730	12E
005	02	TEH	R13.965	A	GYLE ROAD	24800	5280	21.29	346	181	90	4663	6.56	3.43	1.7	88.31	1651	12E
005	02	TEH	R19.781	A	FLORES AVENUE	25500	5567	21.83	370	205	106	4886	6.64	3.68	1.91	87.76	1733	10E
005	02	TEH	R24.871	A	RED BLUFF, SOUTH MAIN STREET	27500	6122	22.26	496	218	158	5249	8.11	3.56	2.58	85.74	1872	10E
005	02	TEH	R24.942	A	RED BLUFF, DIAMOND AVENUE INTERCHANGE	30500	6201	20.33	515	183	159	5344	8.3	2.95	2.57	86.18	1902	10E
005	02	TEH	R26.525	A	RED BLUFF, JCT. RTE. 36	36500	6939	19.01	577	203	154	6005	8.32	2.92	2.22	86.54	2133	10E
005	02	TEH	R28.377	A	NORTH RED BLUFF	37000	6889	18.62	590	207	125	5967	8.56	3	1.82	86.62	2117	10E
005	02	TEH	31.043	A	WILCOX ROAD	36500	6888	18.87	591	207	114	5976	8.58	3	1.66	86.76	2118	10E
005	02	TEH	32.236	A	JELLYS FERRY ROAD	35000	6836	19.53	592	180	96	5968	8.66	2.63	1.41	87.3	2110	10E

Trim here



LOCATION

1 ROUTE SUFFIX (1)
Please see "Table B Reference Card"

2 POSTMILE PREFIX (1)
Please see "Table B Reference Card"

GENERAL ACCIDENT DATA

10 FILE TYPE (1)
Please see "Table B Reference Card"

11 INTERS/RAMP ACC LOC (1)
1 = Ramp Intersection (Exit)
2 = Ramp
3 = Ramp Entry
4 = Ramp Area, Intersection Area
5 = In Intersection
6 = Outside Intersection - Nonstate Route Cross Street
- = Does Not Apply

12 SIDE OF HIGHWAY (1)
N = Northbound
S = Southbound
E = Eastbound
W = Westbound

13 DAY OF WEEK (1)
1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
7 = Saturday

14 COMMON ACC NO (9)
NCIC Number/ Officer's Badge No.

15 PRIMARY COLLISION FACTOR (1)
1 = Influence of Alcohol
2 = Following Too Close
3 = Failure to Yield
4 = Improper Turn
5 = Speeding
6 = Other Violations
B = Improper Driving
C = Other Than Driver
D = Unknown
E = Fell Asleep
< = Not Stated

GENERAL COLLISION DATA continued....

16 WEATHER (1)
A = Clear
B = Cloudy
C = Raining
D = Snowing
E = Fog
F = Other
G = Wind
< = Not Stated

17 LIGHTING (1)
A = Daylight
B = Dusk/Dawn
C = Dark - Street Light
D = Dark - No Street Light
E = Dark - Inoperative Street Light
F = Dark - Not Stated
< = Not Stated
= Invalid Codes

18 ROAD SURFACE (1)
A = Dry
B = Wet
C = Snow, Icy
D = Slippery
< = Not Stated
= Invalid Codes

19 ROADWAY CONDITION (1)
A = Holes, Ruts
B = Loose Material
C = Obstruction on Road
D = Construction - Repair Zone
E = Reduced Road Width
F = Flooded
G = Other
H = No Unusual Condition
< = Not Stated

20 RIGHT OF WAY CONTROL (1)
A = Control Functioning
B = Control Not Functioning
C = Controls Obscured
D = No Controls Present
< = Not Stated

GENERAL COLLISION DATA continued....

21 TYPE OF COLLISION (1)
A = Head-On
B = Sideswipe
C = Rear End
D = Broadside
E = Hit Object
F = Overturn
G = Auto-Pedestrian
H=Other
< = Not Stated

22 NO. MOTOR VEH. INVOLVED (2)
Please see "Table B Reference Card"

PARTY DATA

23 PARTY TYPE (1)
A - Passenger Car/Station Wagon
B - Passenger Car w/Trailer
C - Motorcycle
D - Pickup/Panel Truck
E - Pickup/Panel W/Trailer
F - Truck, Truck Tractor
G - Truck/Tractor w/Trailer
2 - Truck/Tractor w/2 Trailers
3 - Truck/Tractor w/3 Trailers
4 - Single Unit Tanker
5 - Truck/Tractor w/1 Tank Trailer
6 - Truck/Tractor w/2 Tank Trailer
H - School Bus
I - Other Bus
J - Emergency Vehicle
K - Highway Construction Equip. ***
L - Bicycle
M - Other Vehicle
N - Other Non-Vehicle
O - Spilled Load
P - Disengaged Tow
Q - Uninvolved Vehicle
R - Moped
T - Train
U - Pedestrian
V - Dismounted Pedestrian
W - Animal-Livestock
X - Animal-Deer
Z - Animal-Other
< - Not Stated

24 DIRECTION TRAVEL (1)
Please see "Table B Reference Card"

25 VEH. HWY. INDICATOR (1)
Please see "Table B Reference Card"

PARTY DATA continued....

26 SPECIAL INFO (1)
A - Hazardous Materials
B - Cell Phone in use*
C - Cell Phone not in use*
D - Cell Phone none/unknown*
< - Not Stated
- Does Not Apply

27 PERSONS KILLED (2)

28 PERSONS INJURED (2)

29 OBJ STRUCK, PRIMARY (2)
31 OBJ STRUCK, OTHER (2)
01 - Side of Bridge Railing
02 - End of Bridge Railing
03 - Pier, Column, Abutment
04 - Bottom of Structure
05 - Bridge End Posts in Gore
06 - End of Guardrail
07 - Bridge Approach Guardrail
10 - Light or Signal Pole
11 - Utility Pole
12 - Pole (Type Not Stated)
13 - Traffic Sign/Sign Post 14 - Other Signs Not Traffic
15 - Guardrail
16 - Median Barrier
17 - Wall (exc.Soundwall)
18 - Dike or Curb
19 - Traffic Island
20 - Raised Bars
21 - Concrete Object (HDWL, D.I.)
22 - Guidepost, Culvert, PM
23 - Cut Slope or Embankment
24 - Over Embankment
25 - In Water
26 - Drainage Ditch
27 - Fence
28 - Trees
29 - Plants
30 - Sound Walls
40 - Natural Material on Road
41 - Temp Barricades, Cones, Etc.
42 - Other Object On Road
43 - Other Object Off Road
44 - Overturned
45 - Crash Cushions-Sand
46 - Crash Cushion-Other
51 - Call Box
98 - Unknown Object Involved
99 - No Object Involved VI - Thru V9 - Vehicle 1 to 9
« - Not Stated
-- Does Not Apply

PARTY DATA continued....

30 LOC. OF COLL, PRIMARY (1)
32 LOC. OF COLL, OTHER
A - Beyond Median or Stripe – Left (NE-2LN)
B - Beyond Shoulder Drivers Left
C - Left Shoulder Area
D - Left Lane
E - Interior Lanes
F - Right Lane
G - Right Shoulder Area
H - Beyond Shoulder Drivers Right
I - Gore Area
J - Other
V - HOV Lane(s)
W - HOV Buffer Area
« - Not Stated
- - Does Not Apply

33 1st OTHER ASSOC FACTOR (1)
2nd OTHER ASSOC FACTOR (1)
1 - Influence of Alcohol
2 - Following Too Close
3 - Failure To Yield
4 - Improper Turn
5 - Speeding
6 - Other Violations
A - Cell Phone** (INATTN)
B - Electronic Equip** (INATTN)
C - Radio/CD/Headphone** (INATTN)
D - Smoking** (INATTN)
E - Vision Obscurement
F - Inattention - Other
G - Stop & Go Traffic
H - Enter/Leave Ramp
I - Previous Collision
J - Unfamiliar with Road
K - Defective Vehicle Equipment
L - Uninvolved Vehicle
M - Other
N - None Apparent
P - Wind
R - Ramp Collision
S - Runaway Vehicle
T - Eating** (INATTN)
U - Children** (INATTN)
V - Animals** (INATTN)
W - Personal Hygiene** (INATTN)
X - Reading** (INATTN)
< - Not Stated
- - Does Not Apply

PARTY DATA continued....

34 MOVE PRECEDING COLL. (1)
A - Stopped
B - Proceeding Straight
C - Ran Off Road
D - Making Right Turn
E - Making Left Turn
F - Making U-Turn
G - Backing
H - Slowing, Stopping
I - Pass Other Vehicle (2Wy-2Ln)
J - Change Lanes
K - Parking
L - Enter From Shoulder
M - Other Unsafe Turn
N - Cross Into Opposing Lane (Undiv. Only)
0 - Parked
P - Merging
Q - Traveling Wrong Way
R - Other
< - Not Stated
- - Does Not Apply
PEDESTRIAN
2 - Xing Crosswalk - Intersection
3 - Xing Crosswalk - Not Intersection
4 - Xing - Not Crosswalk
5 - Roadway - Include Shoulder
6 - Not in Roadway
7 - Approach/Leave School Bus

35 1st SOBRIETY (1)
2nd (DRUG/PHYSICAL) (1)
A - Had Not Been Drinking (0%)
B - HBD - Under Influence (>0.08%)
C - HBD - Not Under Influence (0.01-.07%)
D - HBD - Impairment Unknown
E - Under Drug Influence
F - Other Physical Impairment
G - Impairment Unknown
H - Not Applicable
I - Driver Fatigue
< - Not Stated
- - Does Not Apply

* Codes Eff. 04-01-2001
** Inattention Codes Eff. 01-01-2001
*** Includes Equipment engaged in Const/Maint activities as of 02/22/2000

Table B Retrieval Key (AXR261)

D5 Cadenasso Sept. 2009

* Use with PDF printout *

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION
QUANTITY CALCULATIONS
DC-CEM-4801 (OLD HC-62 REV. 11/92)

SHEET ___ OF ___

ITEM: Station of AOI
LOCATION: Orland
CALC. BY: K. Reed
DATE: 4/15/14
CHK. BY:

Station of SR-32/5 Separation	=	C259+12.64	①
Postmile of SR-32/5 Separation	=	R25.529	②
Postmile of AOI	=	R26.02	③
Distance from Separation to AOI	=	0.491 miles	③ - ②
	=	2,592.48	④
Station of AOI	=	C285+05.12	① + ④

POSTED BY ___ DATE ___ POSTED TO ___