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**Remarks and Instructions**

The complete manual, revision packages, and individual chapters can be accessed at [www.wsdot.wa.gov/publications/manuals/m22-87.htm](http://www.wsdot.wa.gov/publications/manuals/m22-87.htm).

For updating printed manuals, page numbers indicating portions of the manual that are to be removed and replaced are shown below.

Chapter	Remove Pages	Insert Pages
Title Page	i – ii	i – ii
Chapter 9 Control Zone Guidelines	9-5 – 9-6 9-21 – 9-22	9-5 – 9-6 9-21 – 9-22

Please contact Rhonda Wiest at 360-705-7318 or [WiestR@wsdot.wa.gov](mailto:WiestR@wsdot.wa.gov) with comments, questions, or suggestions for improvement to the manual.

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Approved By \_\_\_\_\_

Signature \_\_\_\_\_





**Washington State  
Department of Transportation**

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# **Utilities Manual**

M 22-87.06

May 2013

**Engineering and Regional Operations**  
Development Division, Design Office

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## (2) Determining the Control Zone Distance for Various Highway Geometric Conditions

Control Zone distance at a particular location is determined using the following methods. Choose one of the six Conditions with matching highway section characteristics and follow the listed steps and instructions. The table referred to in this section is the Clear Zone Distance Table (see [Figure 900-9](#)).

### (3) Cut Sections: Conditions 1, 2, 3, and 4

#### (a) Cut Section: Condition 1

- No ditch
- Backslopes of 3H:1V or flatter

The Control Zone is read directly from the table based on posted speed, average daily traffic (ADT), and backslope.

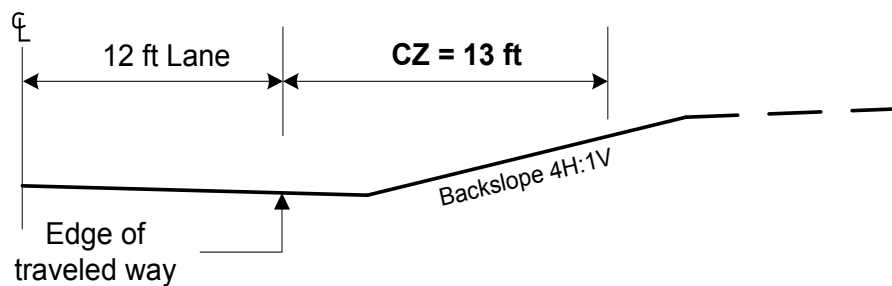
**Step 1:** Locate posted speed

**Step 2:** Locate ADT

**Step 3:** Locate backslope

**Step 4:** Read CZ directly from table

**Example:**



- Step 1: Speed is 45 mph  
 Step 2: Traffic is 1900 ADT  
 Step 3: Backslope is 4H:1V  
 Step 4: Read 13 feet directly from table

**Control Zone = 13 feet**

#### Control Zone Cut Section: Condition 1

*Figure 900-3*

**(b) Cut Section: Condition 2**

- Ditch foreslopes of 4H:1V or flatter
- For all backslopes, use 10H:1V cut section in calculations

The Control Zone distance is the greater of:

1. Read directly from the table based on posted speed, average daily traffic (ADT), and a backslope of 10H:1V.

**Step 1:** Locate posted speed

**Step 2:** Locate ADT

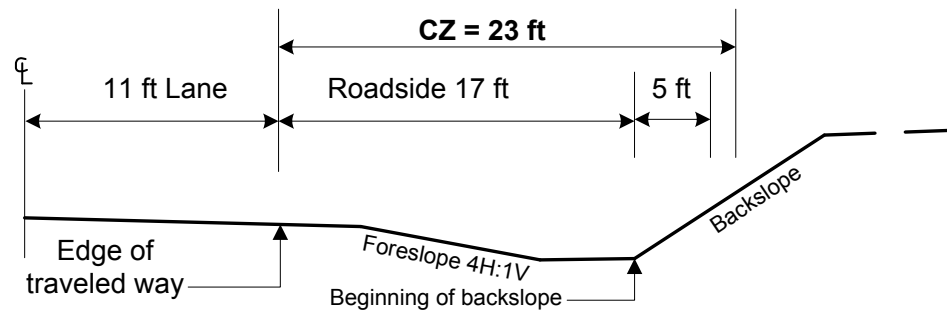
**Step 3:** Use backslope of 10H:1V

**Step 4:** Read directly from table

2. Five feet beyond the roadside width.

**Step 1:** Locate roadside width

**Step 2:** Add 5 feet to the roadside width

**Example:**

1. Step 1: Speed is 55 mph  
Step 2: Traffic is 4200 ADT  
Step 3: Foreslope 4H:1V or flatter: use a backslope of 10H:1V (from table)  
Step 4: Read 23 feet directly from table

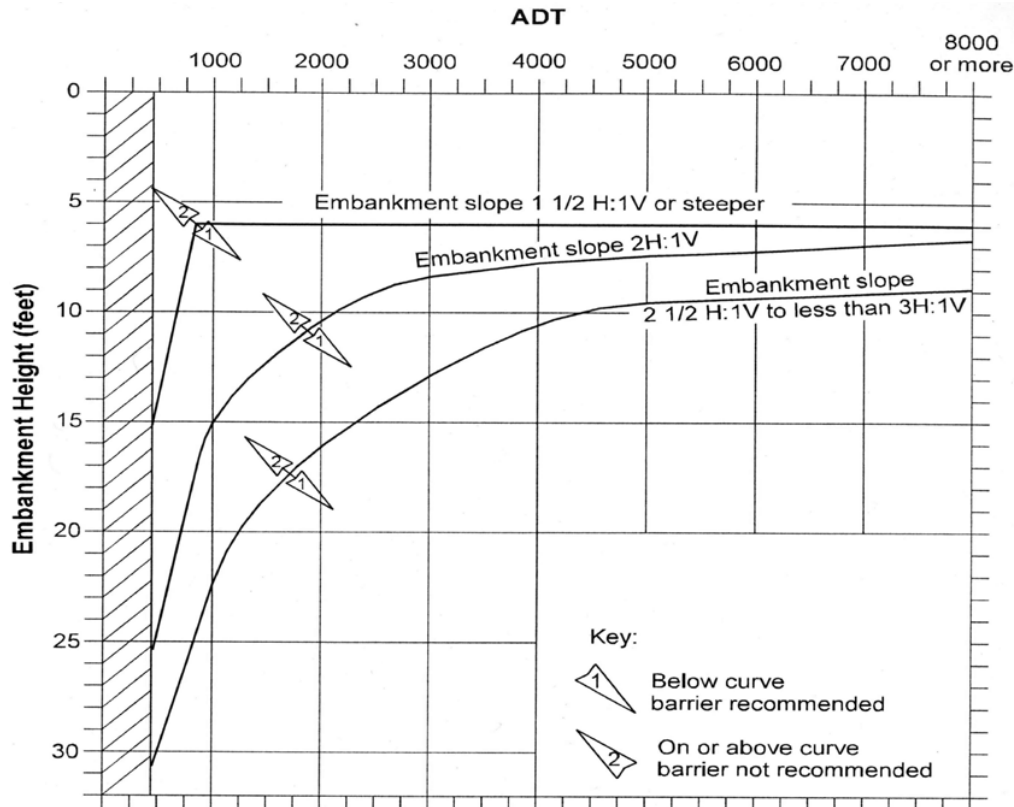
2. Step 1: Roadside width is 17 feet  
Step 2: 17 feet plus 5 feet = 22 feet

Solution = Greater of: 1. = 23 feet or 2. = 22 feet

**Control Zone = 23 feet**

**Control Zone Cut Section: Condition 2**

*Figure 900-4*



Note: Routes with ADTs under 400 may be evaluated on a case-by-case basis.

**Guidelines for Embankment Barrier**  
Figure 900-16

**(c) Variables for the Cost-Effective Selection Procedure (CESP)**

The following AASHTO cost factors<sup>1</sup> will be used in the CESP formula until otherwise notified by WSDOT:

- Fatality collision: \$4,165,000
- Severe injury collision: \$350,000
- Moderate injury collision: \$75,000
- Slight injury collision: \$40,000
- Property Damage Only (PDO) collision: \$7,000

Use the following guidance when calculating with the CESP formula:

- **Traffic Growth Rate:** Use 5% unless otherwise indicated by WSDOT.
- **Severity Index:** 3.6 for 40 mph, 4.2 for 50 mph, 5.0 for 60 mph, and 6.0 for 70 mph.
- **Project Life:** Life of the existing or new pole.
- **Discount Rate:** The rate shall be equal to the weighted rate average cost of capital for each utility.

<sup>1</sup> The WSDOT Statewide Travel and Collision Data Office (STCDO) has applied inflation to the AASHTO cost factors to bring the numbers current as of July 2009.

- **Cost of Installation:** Determined by the utility for the installation being evaluated.
- **Cost of Repair:** Determined by the utility for the installation being evaluated.
- **Maintenance Cost per Year:** Determined by the utility for the installation being evaluated.
- **Salvage Value:** Determined by the utility for the installation being evaluated.

**(d) Initial Encroachment Frequency**

The initial encroachment frequency factors should be as follows:

Highway Type	Initial Encroachment Frequency (encroachment/mile/year)
Rural Interstate	0.0009 ADT
Rural Multilane Divided Highway	0.00059 ADT
Wide Rural Two-Lane Highway (Roadbed > 36 ft)	0.000742 ADT
Narrow Rural Two-Lane Highway (Roadbed < 36 ft)	0.00121 ADT
Urban Interstate	0.0009 ADT
Urban Multilane Divided Highway	0.0009 ADT
Urban Street	0.00133 ADT

**Encroachment Frequency Factors**

*Figure 900-17*

**900.14 The 5/15 Rule for Location II Objects**

Requests for reclassification of existing or relocated utility objects complying with all the following requirements may supersede the Engineering Analysis and Cost-Effective Selection Procedure requirements of the reclassification process.

**(1) Requirements**

- There are no feasible alternative measures for compliance with Control Zone Objective 2 (see [900.03](#)).
- The utility object must be located 15 feet or more from the edge of the through lane.
- The utility object must be located within 5 feet of the highway right of way line.
- The utility object must not be located within an area of concentrated utility object accidents.
- The utility object must not have a recorded accident history.

In these situations, it will be considered cost-effective for Location II Objects to remain within the highway right of way. The Engineering Analysis will consist of a utility-provided written statement that all of the above conditions are met.