



# Standard Drawing Report

**Date:** July 12, 2024

**Technical Owner:** Justin King, P.E.  
State Work Zone Engineer

**Standard Drawing Number:** TM800

**Drawing Title:** Tables, Abrupt Edge, and PCMS Details



**Original Report Date:** January 1, 2009.

## Background Information, Including Reference Material:

1. "Manual on Uniform Traffic Control Devices" (MUTCD), FHWA 2003 Edition.
2. "A Policy on Geometric Design of Highways and Streets" (PDG), AASHTO 2004 Edition.
3. "Roadside Design Guide" (RDG), AASHTO 2002 Edition.
4. "Traffic Control Devices Handbook", ITE 2001 Edition.
5. "Manual on Uniform Traffic Control Devices" (MUTCD), FHWA 2009 Edition.
6. "Roadside Design Guide" (RDG), AASHTO 4<sup>th</sup> Edition 2011.

## Assumption Made:

Guidance is provided from the above named documents. Specific references are cited in the design narrative. This drawing is to be used in conjunction with all other standard drawings. The pre-construction posted speed represents the value used in the speed column from the tables. Lane arrows shown depict traffic movements and are not necessarily pavement legends. The general notes bulleted on this drawing apply to all drawings in this series.



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## Design Narrative:

The Concrete Barrier Flare Rate Table is prepared from the guidance provided in the RDG. Section 5.6.3 Flare Rate provides descriptive information about recommended flare rates. Table 5.7 Suggested Flare Rate for Barrier Design is the basis for the Concrete Barrier Flare Rate Table shown in this drawing. When barrier is placed inside the shy line, additional devices are installed to accomplish the required taper rate.

The Minimum Lengths Table is prepared from the guidance provide in the MUTCD for recommended taper lengths. When the speed is 40 mph or less, taper (L) equals  $W \times S^2/60$ . For speed greater than 40 mph, taper (L) equals  $W \times S$ . Although a full L is recommended for merging tapers and may be desirable in other applications, it may be reduced by  $\frac{1}{2}L$  for shifting tapers and  $\frac{1}{3}L$  for shoulder tapers. The buffer lengths shown are derived from the PGD. To provide a reasonable recovery length the breaking distance from Exhibit 3.1 was reduced by  $\frac{1}{2}$  and represents the desirable buffer length. See Calculation Book No. TM09-01 for buffer calculations.

The Traffic Control Devices Spacing Table is prepared from the guidance provide in the MUTCD. Recommended sign spacing's are given in Table 6C-1, Suggested Advance Warning Sign Spacing. The column for Channelizing Device Spacing is derived from Table 8-3, Channelizing Device Spacing from the TCDH. Spacing's shown is in consideration for construction application and uniformity.

The Excavation Abrupt Edge Detail is typically established for pavement excavations of 2 inches or greater. Guidance for pavement edge drop-off is provided in Section 9.5.2, Pavement Edge Drop-Offs of the RDG. Abrupt Edge signage includes the use of a rider or placard, which indicates the location of the hazard.

Implementation of the Portable Changeable Message Sign (PCMS) Installation Detail began on October 1, 2005. This detail expanded the delineation required for this device, which is consistent with the guidance provided in Section 6F.55, Portable Changeable Message Signs of the MUTCD.



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**Update:** January, 1, 2010

The title of the "TYPICAL EXCAVATION ABRUPT EDGE SIGNING DETAIL" configuration was changed to "TYPICAL ABRUPT EDGE SIGNING DETAIL". This provides signing for paving operations as well as roadway grading.

A new bulleted was added to this configuration. It describes the type of work relevant to this detail, and provides guidance for the pavement abrupt edge height.

The last bulleted was modified to provide clarification about the use of roll-up sign and barricades.

**Update:** January 1, 2011

The Portable Changeable Message Sign (PCMS) Installation Detail was modified. The last bullet under Notes now includes this application for the Portable Traffic Management System. The speed designations were dropped from the freeway criteria on the TCD Spacing table.

With the release of the 2009 MUTCD, ODOT has examined many of its current practices and standards for consistency with the MUTCD. The 2009 MUTCD, like the 2003 edition, discusses Buffer Spaces, both lateral and longitudinal. From **Part 6, Section 6C.06 – Activity Area**, the MUTCD provides **Table 6C-2 – Stopping Sight Distance as a Function of Speed**, to use as lengths for longitudinal buffer spaces.

While both the distances in this table and the longitudinal buffer spaces are optional according to the 2009 MUTCD, ODOT requires leading longitudinal buffer spaces in advance of the work area within its highway construction contracts. Speed-based buffer spaces ("B") are listed on **ODOT Standard Drawing TM800** under the **Minimum Lengths Table**.

Because of the importance of the buffer space, but also the practicality of the amount of space available in many of our work zones, ODOT adopted the following buffer space lengths. From the history available



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to date, the space lengths were developed using 1/2 of the stopping sight distance values from the current MUTCD Table 6C-2.

MINIMUM LENGTHS TABLE					
★ Speed (mph)	TAPER "L" (ft)				BUFFER "B" (ft)
	W = Width being closed: (Lane or Shoulder)				
	W ≤ 10	W = 12	W = 14	W = 16	
25	105	125	145	165	75
30	150	180	210	240	100
35	205	245	285	325	125
40	265	320	375	430	150
45	450	540	630	720	180
50	500	600	700	800	210
55	550	660	770	880	250
60	600	720	840	960	285
65	650	780	910	1040	325
70	700	840	980	1120	365

The reduced space lengths can also be attributed to the physics of an errant driver and the likelihood that the driver, contacting temporary traffic control devices (e.g. cones, tubular markers, plastic drums, barricades, signs, etc.) is already decelerating, even veering back into their travel lane, before reaching the Buffer Space. ODOT adopted this buffer space length before the State's adoption of the 2003 MUTCD and has exhibited years' worth of successful experience with these distances.

**Update:** July 1, 2011

The first note under the Traffic Control Devices (TCD) Spacing Table was revised. The speed qualifier was removed based upon that all intersections, regardless of speed should have less spacing for TCD on intersection radii. The requirement to place TCD on 10 ft. spacing around work areas was deleted because it conflicted with TM851 and TM852. TM851 & TM852 notes stated that TCD *may* be placed at 10' spacing around work areas.

An additional note was added to the General Notes for all TCP Drawings clarifying that all of the signs shown on the TM800 Standard Drawings are type "O4" unless otherwise indicated.

**Update:** January 1, 2012

The "Concrete Barrier Flare Rate Table" was updated with a title to clarify that the flare rates are minimums.



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The title of the "Typical Abrupt Edge Signing Detail" was changed to "Typical Abrupt Edge Delineation" because the detail includes more TCD than just signs.

The Flagger Station Lighting Delineation" detail was included to be consistent with guidance in the AASHTO Roadside Design Guide and the MUTCD suggesting items placed on the shoulder of a roadway or within the clear zone should be delineated with retro-reflective TTC devices.

**Update:** July 1, 2012

The Flagger Station Lighting Delineation detail was corrected. The dimension for the length of the 5 spaces among the tubular markers was changed from 60' to 50'.

The Concrete Barrier Flare Rate Table was updated based on Table 5-9 Suggested Flare Rates for Barrier Design from the "Roadside Design Guide" (RDG), 4<sup>th</sup> Edition 2011 AASHTO. This Table is shown in Section 5.6.3. The lower limit for the flare rate shown on TM800 is established for speeds 30 mph and below.

**Update:** April 1, 2014

The Flagger Station Lighting Delineation detail was updated to include a four foot Type 3 barricade. Another bulleted item was added to provide guidance to place the cart/generator/power supply off the shoulder as far as practical.

These mitigation strategies were added to improve the safety of the work zone, and to help prevent the flagger station lighting unit from being struck by traffic.

**Update:** July 1, 2014

Taper Types and Formula table was added to clarify the length of different types of tapers. The tapers types and formulas are taken directly from the MUTCD.



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The Minimum Lengths Table was modified to replace the note that stated all "L" values for tapers on Freeways was equal to 1000'. The table shows the 1000' in relation to Freeways and different highway speeds and widths.

The Portable Changeable Message Sign Installation detail was modified to show the barricade 20' from the PCMS board instead of 40'. This mitigation strategy was added to improve the safety of the work zone, and to help prevent the PCMS board from being struck by traffic.

**Update:** January 1, 2015

Notes for the Minimum Lengths Table were added to clarify how to calculate the L distance for Widths less than 10 ft. Formulas used for the calculations are taken from the 2009 MUTCD. The general notes were modified to be more clear, including rewriting several notes to indicated a barricade is located a certain distance from a certain TCD. To make the drawings more clear a general statement was added that all signs are 48"x48", unless stated otherwise. This statement will remove many references to 48"x48" signs throughout the entire TM800 series.

**Update:** July 1, 2015

"Typical Abrupt Edge Delineation" detail notes modified to exclude sign sizes, as the sign sizes are shown on the detail. Sign riders and plaques on the detail have been labeled with rider or plaque name. Detail shows barricades, so note pointing to barricades was modified to remove number of barricades. Two notes are added to the General Notes. First added note specifies the difference between high speed and low speed roadways, consistent with the MUTCD and other Traffic Control Plans Design Manual. The second added note specifies to not locate sign supports in locations designated for bicycle or pedestrian traffic.



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**Update:** January 1, 2016

The "Concrete Barrier Flare Rate Table", "Minimum Lengths Table", and "Traffic Control Devices Spacing Table" all have been updated for speeds up to 70 mph.

The "Concrete Barrier Flare Rate Table" was updated with information for 70 mph from the Roadside Design Guide Table 5-9.

The "Minimum Lengths Table" was updated with information for 70 mph from the MUTCD Chapter 6C.08 and Table 6C-4. A maximum value of 1000' feet for the tapers has been maintained.

The "Traffic Control Devices Spacing Table" was updated with information for 70 mph from the MUTCD Chapter 6C.04 and Tables 6C-1 and 6C-2, as well with information gathered from other resources, including other DOT's. Engineering judgement was used to choose a spacing of 700 feet for 60-70 mph non-freeway highways.

The "Portable Changeable Message Sign (PCMS) Installation" fourth bullet was modified as the name of the Portable Traffic Management System has been changed to Smart Work Zone System.

In the General Notes for all TCP Drawings detail, the second bullet "Place a barricade approx. 10' ahead of all Temporary Sign Supports(TSS)" has been deleted because all TSS's are now delineated by retroreflective sheeting as detailed on TM821. All barricades exclusively used for delineation of TSS's have been removed from the standard drawing and as a hazard on the roadway.

**Update:** July 1, 2016

The Traffic Control Devices (TCD Spacing Table notes were changed to allow sign spacing adjustments up to 30% of the "A" dimension for all speeds. Typical sign legibility distances are 180-250 feet. Reducing the sign spacing's for each speed by 30% and then adding in the legibility distance is greater than the stopping sign distance for all speeds in the table.



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The third note in the Portable Changeable Message Sign (PCMS) Installation detail was modified to allow the omission of drums and the Type III barricade to delineate the PCMS when PCMS are placed behind a roadside barrier. The barrier will protect the PCMS, therefore no delineation is needed.

A general note was added for all TCP drawings. The note clarifies that different drawings in the TM800 series can be combined to complete temporary traffic control for a work activity.

**Update:** January 1, 2017

Sign Types are being removed from the Oregon Standard Specifications for Construction. Currently TCP signs included in the standard drawings are identified by sign types. Signs will now be identified by their MUTCD, Standard Highway Signs, or ODOT Sign Policy and Guidelines sign number, which include the information to size and identify the sheeting for each sign. Signs on TM800 have been updated to include sign identifications.

A general note was added to TM800 to clarify to use fluorescent orange sheeting for the background of all signs, replacing the reference to Type O4 signs.

A general note was added to support the Concrete Barrier Sign Support detail on TM822.

**Update:** January 1, 2017

Updated PCMS Installation detail to use 4' wide barricade instead of 8' barricade, 4' barricade maintains delineation of PCMS board but is better able to fit into most work zones. Clarified the use of drums and barricade for use with Smart Work Zone components.

Update the Flagger Station Lighting Delineation detail to remove barricade.



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**Update:** January 1, 2019

The font for notes in the standard drawing was updated from ODOT Helvetica to Lucida Sans Unicode.

**Update:** July 1, 2020

The "CONCRETE BARRIER FLARE RATE TABLE" was renamed to "TEMPORARY BARRIER FLARE RATE TABLE" to reflect the additional use of barriers made of materials other than concrete (i.e., Metal).

Re-wrote the sixth bullet, second line under General Notes for All TCP Drawings to match MUTCD language. It used to read: "... posted speed of > 40 mph." It is now reading: "... posted speed 45 mph or higher."

The primary and secondary title fonts for the details in the standard drawing were updated from Lucida Sans Unicode to Franklin Gothic Medium. The update makes the standard detail easier to navigate and is more consistent with the ODOT Drafting Standards.

The abbreviation for Drawing was revised from "Drg." to "Dwg." To match the abbreviation in Contract Plans Manual.

**Update:** July 1, 2021

Drawing was fixed for spelling.

**Update:** January 4, 2022

Drawing was fixed for spelling.

**Update:** July 1, 2022

Added the following note under general notes for all TCP drawing: "Coordinate and control pedestrian movements through a Temporary Accessible Route using Flaggers, Traffic Control Measures, or as directed."



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**Update:** July 1, 2022

Added a general note for all TCP drawings: "Provide a truck mounted attenuator (TMA) to protect the work area on high speed divided highways or freeway when positive protection is not available, or as directed."