	TRAFFIC CONTROL DEVICE APPLICATION GUIDELINES OFFICE OF TRAFFIC AND SAFETY		
	Issuing Unit TDS	Application Guideline No. 6-F10	Originally Issued: 05/06/2021

GUIDELINES FOR TEMPORARY PORTABLE RUMBLE STRIPS (TPRS)

BACKGROUND AND PURPOSE

This document should be used as a guideline for implementing Temporary Portable Rumble Strips (TPRS) in work zones along Maryland Department of Transportation State Highway Administration (MDOT SHA) roadways. Any TPRS used shall conform to the requirements of the MdMUTCD Chapter 6F, and MDOT SHA Standard Specifications Book, appropriated standards from the Book of Standards for Highway and Incidental Structures. The use of TPRS on any project must have the approval of the Project Engineer and the Assistant District Engineer for Traffic (ADE-T).

These guidelines replace all previous directives and guidelines related to use of temporary portable rumble strips.

SCOPE

These guidelines apply to work performed along MDOT SHA owned and maintained roads.

EXCEPTIONS

N/A

GUIDELINES

Definitions

Temporary Portable Rumble Strips (TPRS): TPRS are removeable raised patterns on the roadway that provide audible and vibratory warnings to drivers that their vehicles are approaching an upcoming hazards or changes in roadway features, such as unexpected changes in alignment, and conditions requiring a reduction in speed and/or a stop. TPRS are used to alert motorists that they are about to enter a work zone where unusual or unexpected road condition exist, and to bring driver’s attention to other warning devices.

Array: An array consists of 3 complete TPRS spanning a single lane.

Usage Guidelines

1. TPRS should be considered for use in work zones in advance of detours, flaggers, lane closures, temporary traffic signals, and locations that require reduction in speed limits to alert drivers of the upcoming changes to the road conditions.
2. If TPRS are installed at the beginning of a non-stationary flagging operation, they will be required to be repositioned as the work advances if directed by the Project Engineer.

3. TPRS shall only be used on concrete or asphalt road surfaces.
4. TPRS shall NOT be installed:
 - On loose gravel, bleeding asphalt, heavily rutted pavements, milled or unpaved surfaces.
 - In pedestrian and railroad crossings.
 - In heavy rain, snow or icy weather conditions.
 - For permanent installations.
 - Using glue or anchoring.
5. TPRS color shall be black, white or orange and the colors shall be uniform within the work zone.
6. When used, the rumble strips shall be placed in arrays. A TPRS array (set) shall consist of three rumble strips placed perpendicular to the centerline and parallel to one another in accordance with the following center-to-center spacing requirements.

Posted Speed Limit (MPH)	≤ 40	41 - 55	≥ 56
TPRS Spacing Center to Center (FT)	10	15	20

7. TPRS shall be installed across the entire travel lane but not intrude into the opposing travel lane.
8. TPRS should be designed to be safely traversed by a bicyclist. However, traversing TPRS on a bicycle could be uncomfortable for the bicyclist. For locations with dedicated bicycle facilities, the preference is for the TPRS to remain in the travel lane and to avoid placing the TPRS across the dedicated bike lane. Where there are shared bicycle facilities, consideration should be given to placement of the TPRS relative to the anticipated bicycle path. Design preferences include providing a 4 ft clear path for the bicyclist or spanning the entire width of the bicycle path with the TPRS. If possible, avoid placing the edge of the TPRS within the bicycle’s path.
9. TPRS do not provide drivers any indication of what action may be desired. Therefore, a fluorescent orange “RUMBLE STRIPS AHEAD” warning sign (48”x48”) shall be utilized when installing TPRS.
10. When used, TPRS shall be installed in advance of the closing lane(s) according to MDOT SHA standards or as directed by the Project Engineer. On multi-lane closure, TPRS should only be installed in advance of the lane(s) being closed.
11. The use of TPRS near residential areas should be evaluated due to concern with noise.
12. TPRS should not be placed on sharp horizontal or vertical curves. However, TPRS can be installed in advance of the curves, so they are visible to approaching motorists.

13. The preferred location of the TPRS arrays and advance warning sign should generally follow MDOT SHA standards, however, they can be moved to other locations within the advanced warning area based on field conditions, traffic queue and engineering judgement.
14. TPRS should not be used for slow moving operations unless directed by the District Engineer for Traffic (ADE-T).

Location of TPRS Arrays and Advance Sign

The preferred location of the TPRS arrays and sign should be determined based on the applicable MD 104 Standards and the following typicals.

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

IMPORTANT:

* THIS DRAWING SHOULD BE USED IN COMBINATION WITH MD 104.02-09 AND 104.02-10.

NOTE:

1. REFER TO TPRS SPACING IN ARRAY TABLE FOR SPACING BETWEEN RUMBLE STRIPS IN ARRAY

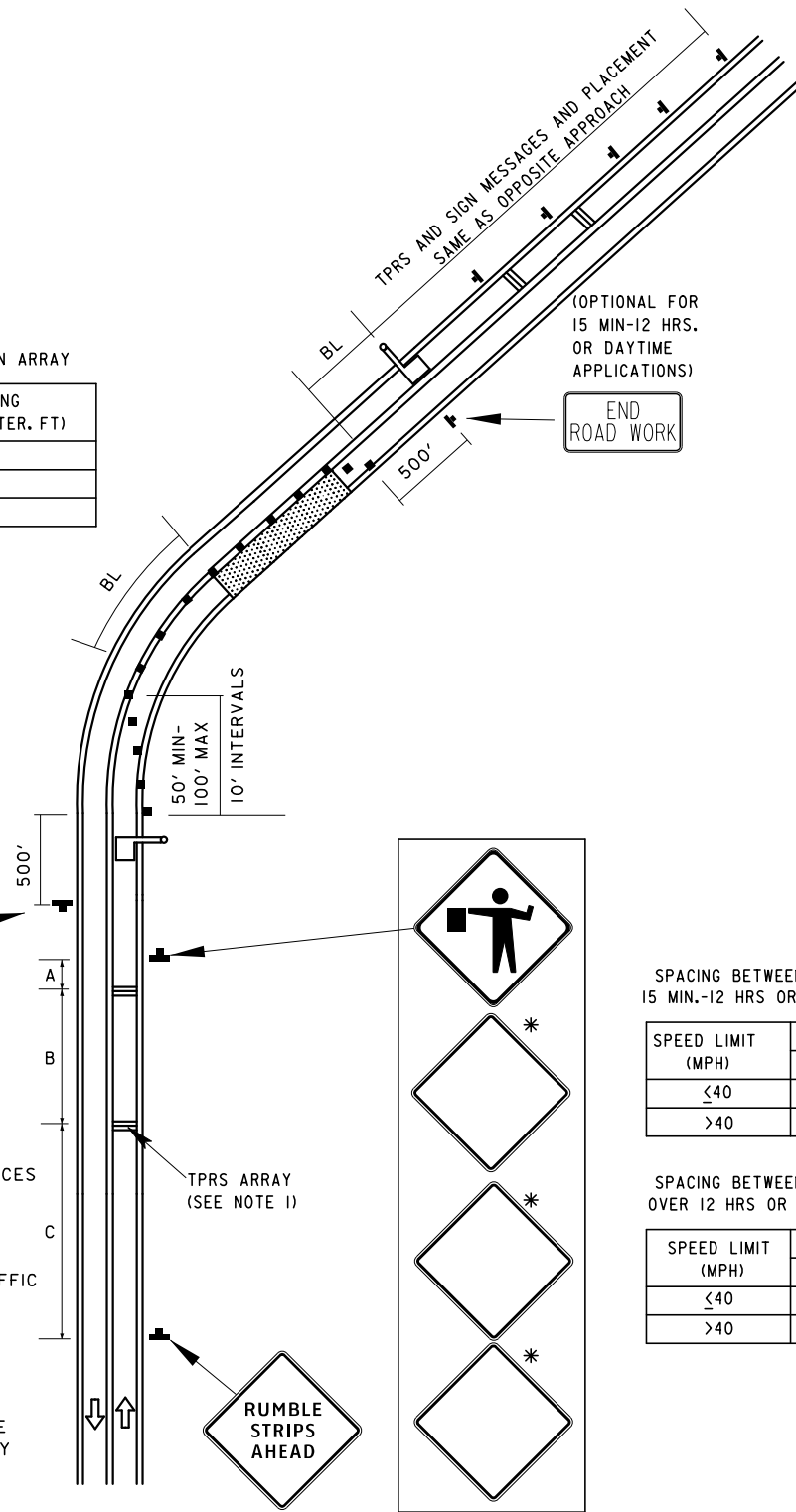
RECOMMENDED TPRS SPACING IN ARRAY

SPEED LIMIT (MPH)	TPRS SPACING (CENTER-TO-CENTER, FT)
<40	10
41-55	15
≥56	20

2. GEOMETRY OF ROADWAY MAY DICTATE THE LOCATION OF RUMBLE STRIPS. CHANGES SHALL BE APPROVED BY THE ENGINEER.

KEY:

- CHANNELIZING DEVICES
- SIGN SUPPORT
- FACE OF SIGN
- DIRECTION OF TRAFFIC
- WORK SITE
- FLAGGER
- TEMPORARY PORTABLE RUMBLE STRIPS ARRAY (TPRS ARRAY)



END ROAD WORK

END ROAD WORK

(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

RUMBLE STRIPS AHEAD

SPACING BETWEEN TPRS AND SIGNS 15 MIN.-12 HRS OR DAYTIME USE ONLY

SPEED LIMIT (MPH)	DISTANCE (FT)		
	A	B	C
<40	150	700	300
>40	200	700	500

SPACING BETWEEN TPRS AND SIGNS OVER 12 HRS OR NIGHTIME USE ONLY

SPEED LIMIT (MPH)	DISTANCE (FT)		
	A	B	C
<40	150	500	850
>40	200	700	1400

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

IMPORTANT:

* THIS DRAWING SHALL BE USED IN COMBINATION WITH STANDARDS MD 104.03-05, MD 104.03-06, MD 104.04-05, MD 104.04-06, MD 104.04.09, MD 104.04-10 (FOR RIGHT LANE CLOSURE(S))

SIMILAR PLACEMENT FOR TPRS AND "RUMBLE STRIP AHEAD" SIGNS SHALL BE USED WITH STANDARD DETAILS MD 104.03-03, MD 104.03-04, MD 104.04-03, MD 104.04-04, MD 104.04.09, MD 104.04-10 (FOR LEFT LANE CLOSURE(S))

NOTE:








- REFER TO TPRS SPACING IN ARRAY TABLE FOR SPACING BETWEEN RUMBLE STRIPS IN ARRAY

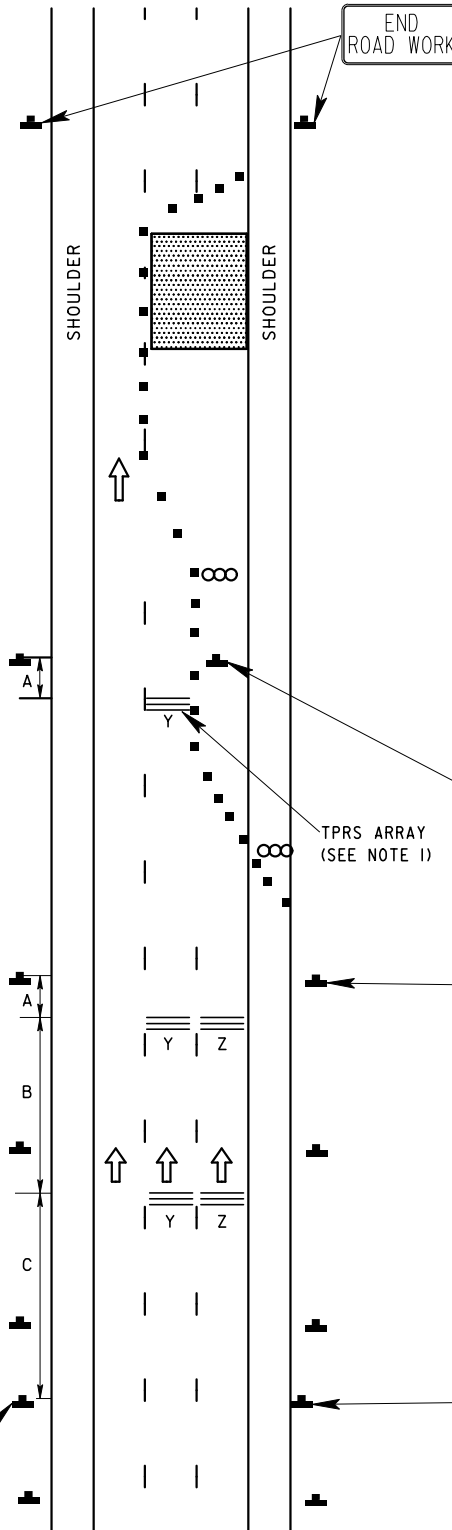
RECOMMENDED TPRS SPACING IN ARRAY

SPEED LIMIT (MPH)	TPRS SPACING (CENTER-TO-CENTER, FT)
<40	10
41-55	15
>56	20

- UNDIVIDED ROADWAYS ONLY REQUIRE SIGNS ON THE SAME SIDE OF THE LANE CLOSURE.

KEY:

-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  ARROW PANEL
-  TEMPORARY PORTABLE RUMBLE STRIPS ARRAY (TPRS ARRAY)



(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

SPACING BETWEEN TPRS AND SIGNS 15 MIN.-12 HRS OR DAYTIME USE ONLY

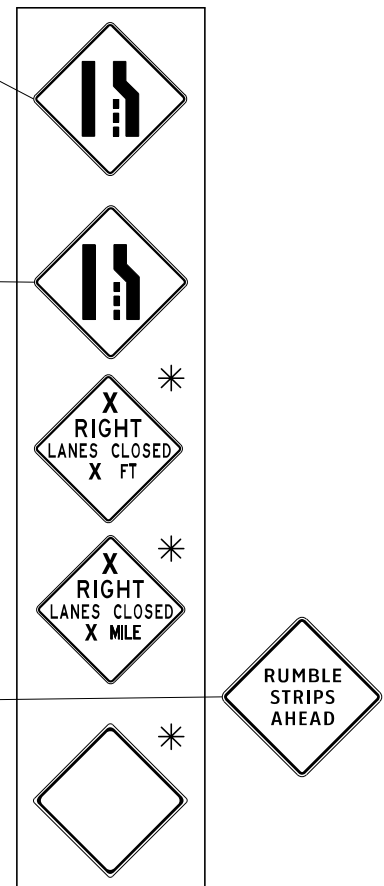
SPEED LIMIT (MPH)	DISTANCE (FT)		
	A	B	C
<40	150	500	700
>40	200	700	1300

SPACING BETWEEN TPRS AND SIGNS OVER 12 HRS OR NIGHTTIME USE ONLY

SPEED LIMIT (MPH)	DISTANCE (FT)		
	A	B	C
<40	150	500	900
>40	200	700	1400

TPRS ARRAYS TO INSTALL

NUMBER OF CLOSED LANES	TPRS ARRAYS	
	Y	Z
ONE	N/A	X
TWO	X	X



TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

IMPORTANT:

* THIS DRAWING SHALL BE USED IN COMBINATION WITH STANDARDS MD 104.05-07, MD 104.05-09, MD 104.05-11 (FOR RIGHT LANE CLOSURE(S))

SIMILAR PLACEMENT FOR TPRS AND "RUMBLE STRIP AHEAD" SIGNS SHALL BE USED WITH STANDARD DETAILS MD 104.05-08, MD 104.05-10, MD 104.05-12 (FOR LEFT LANE CLOSURE(S))

NOTE:

1. REFER TO TPRS SPACING IN ARRAY TABLE FOR SPACING BETWEEN RUMBLE STRIPS IN AN ARRAY.

RECOMMENDED TPRS SPACING IN ARRAY


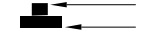




SPEED LIMIT (MPH)	TPRS SPACING (CENTER-TO-CENTER, FT)
≤40	10
41-55	15
≥56	20

(OPTIONAL FOR 15 MIN.-12 HRS. OR DAYTIME APPLICATIONS)

TPRS ARRAYS TO INSTALL (15 MIN.-12 HRS, DAYTIME, OVER 12 HRS OR NIGHTTIME USE)

NUMBER OF CLOSED LANES	TPRS ARRAYS		
	W	Y	Z
ONE	N/A	N/A	X
TWO	N/A	X	X
THREE	X	X	X

KEY:

-  CHANNELIZING DEVICES
-  SIGN SUPPORT FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  ARROW PANEL
-  TEMPORARY PORTABLE RUMBLE STRIPS ARRAY (TPRS ARRAY)

