TABLE I (SIGN SPACING)

ROAD TYPE	DISTANCE BETWEEN SIGNS (FT)	
	A	B
MAJOR CONVENTIONAL	500	500
FREEWAY & EXPRESSWAY	1000	1500

TABLE II

SPEED LIMIT (MPH)	SHOULDER TAPER RATE MINIMUM	PB FLARE RATE MINIMUM	MAXIMUM DRUM SPACING (FT)		BUFFER (C) (FT) MINIMUM	CLEAR ZONE WIDTH (D) (FT)
			TAPER SEC.	TANGENT SEC.		
25	4:1	8:1	25	40	155	15
30	5:1	8:1	30	40	200	15
35	7:1	9:1	35	40	250	15
40	9:1	10:1	40	80	305	15
45	15:1	12:1	45	80	360	19
50	17:1	14:1	50	80	425	19
55	19:1	16:1	55	80	495	23
60	20:1	18:1	60	120	570	30
65	22:1	19:1	65	120	645	30
70	24:1	20:1	70	120	730	30

LEGEND

- WORK AREA
- DRUMS
- PORTABLE BARRIER (PB)
- ATTENUATOR
- OPTIONAL TREATMENT
- DIRECTION OF TRAVEL
- DRUMS FOR USE WITH TAPERED END SECTION

THIS DRAWING REPLACES MT-95.45 DATED 04-19-2019.

STANDARD ROADWAY CONSTRUCTION DRAWING

CLOSING SHOULDER OF A MULTI-LANE DIVIDED HIGHWAY

SCD NUMBER **MT-95.45**

STATE OF OHIO DEPARTMENT OF TRANSPORTATION ADMINISTRATOR: David L. Holstein

STDS. ENGINEER: Soisson

OFFICE OF ROADWAY ENGINEERING

REVISION DATE: 01-17-2020

NOTES:

DESIGN SPEED

1. The design speed used for taper rates should typically be the permanent legal speed. However, on construction projects for which the speed limit is reduced, the reduced speed may be used in determining the taper rate when the taper is not the first active construction area within the project.

TAPERS

2A. The minimum acceptable rate for the shoulder taper is provided in Table II.

SIGN SPACING

3A. The work zone sign spacings shown in Table I are minimums. Maximum spacing should not be greater than 1.5 times the distances shown in Table I.

3B. Sign spacing should be adjusted to avoid conflict with existing signs. Minimum spacing to existing signs shall be 200′ for speeds of 45 mph or less and a minimum of 400′ for speeds 50 mph or greater.

ADJUSTMENTS FOR SIGHT DISTANCE

4. The location of the shoulder taper and the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.

BASIC SIGNING

5A. ROAD WORK AHEAD (W20-1) signs shall be provided on entrance ramps or roadways entering the work limits.

5B. END ROAD WORK (G20-2) signs are only required for shoulder closures of more than 1 day. It is intended that these signs be placed on the mainline, on all exit ramps, and on roadways exiting the work limits.

5C. Overlapping of signing for adjacent projects should be avoided where the messages could be confusing. Any W20-1 or G20-2 signs which falls within the limits of another traffic control zone shall be omitted or covered during the period when both projects are active.

SIGNING DETAILS

6A. When the approach speed limit is 40 mph or less, 36″ warning signs may be used.

6B. The distance plaque W16-2aP shall indicate the distance to the beginning of the shoulder taper. Distances less than 1 mile may be expressed in feet.

EXTRA ADVANCE WARNING SIGNING

7. Extra Advance Warning Sign Groups consisting of ROAD WORK AHEAD (W20-1), RIGHT SHOULDER CLOSED (W21-5a) signs plus Distance plaques may be specified in the plans or may be required to be erected, as determined by the Engineer (see Standard Construction Drawing (SCD) MT-95.50).

PAVEMENT MARKINGS / RPMs

8A. If a shoulder closure of greater than 3 days is required, the following shall be performed:

a) The appropriate color work zone edge lines shall be applied along the taper and tangent sections.
b) The existing conflicting pavement markings shall be removed or covered per CMS 614.11G.

8B. Work zone pavement markings which would conflict with final traffic lanes shall be removable tape (CMS 740.06, Type I) unless the area will be resurfaced prior to project completion.

8C. After completion of the work, pavement markings other than CMS 740.06, Type I shall be removed in accordance with CMS 614.11 I. The original markings and raised pavement marker reflectors shall be restored at no additional cost unless separately itemized in the plans.

(RESERVED FOR FUTURE USE)

9A. (intentionally blank)

10A. (intentionally blank)

FLASHING WARNING LIGHTS

11. Type A flashing warning lights shown on the ROAD WORK AHEAD (W20-1) signs and on the RIGHT SHOULDER CLOSED (W21-5a) signs are required whenever a night lane closure is necessary.

INTERSECTION / DRIVEWAY ACCESS

12. Within the length of the closure, provision shall be made to control traffic entering from intersecting streets and major drives as necessary to prevent wrong-way movements and to keep vehicles off of new pavement not ready for traffic. The Contractor shall:

a) Place across the closed shoulder, barricades, and/or
b) Provide an additional flagger at every public street intersection and major driveway.

Barricades placed across the closed shoulder shall be located 25′ beyond the projected pavement edges of the driveway or cross highway, as shown in SCD MT-101.60.

Existing STOP signs shall be relocated as necessary to assure proper location for the traffic conditions. The method of control shall be subject to the approval of the Engineer.

DRUMS/CONES

13A. The maximum drum spacing along tapers and along tangent sections shall be as shown in Table II. A minimum of 5 drums in the taper shall be used to close the upstream shoulder.

13B. Cones may be substituted for drums as follows:

a) Use of cones is permissible for either daytime operation or for nighttime operation, but shall not be used continuously, day and night. Upon completion of work within the work period, the cones shall be removed. They may again be placed on the highway in order to resume work in the following such work period.
b) Cones used for daytime traffic control shall have a minimum height of 28″.
c) Cones used for nighttime traffic control shall have a minimum height of 42″.
d) Use of cones at night shall be prohibited along tapers.
e) Cone spacing at night shall be at a maximum of 40′.
f) Where cones are substituted for drums along tangents, intermixing of channelizing devices within the same run will not be permitted. Either cones shall be used for the entire length of the tangent section, or drums shall be used for the entire length.

13C. Provisions shall be made to stabilize the cones and drums to prevent them from blowing over.

13D. All drums and cones should have a minimum offset from the edge of the traveled lanes of 1.5 feet.

13E. The use of drums or cones in lieu of portable barrier should be based on engineering judgement.

PORTABLE BARRIER (PB)

14A. A tapered end section may be used in place of the impact attenuator at locations where the last full section of NCHRP 350 PB can be extended outside of the clear zone for approaching traffic. See Table II for clear zone widths. When a tapered end section is used, drums shall extend parallel to the travel lanes from the shoulder taper to the first section of PB parallel to the traveled lanes.

14B. If it is necessary to provide the Contractor with access to the work area behind the PB flare, the PB end treatment shall include an impact attenuator. The maximum width of the opening shall be 9′ between the impact attenuator and the outside edge of the paved shoulder. Where space constraints do not allow for 4′ between the lane line and attenuator, a minimum of 1′ may be used.

14C. If Contractor access is provided per Note 14B, the length of PB shall be adequate to shield the work area from the motorist. This length of need of PB shall be determined from the calculations provided in SCD MT-101.75 and the L&D Manual, Volume 1, Figure 602-1E, and shall require the approval of the Engineer.

14D. When used, impact attenuators shall be installed parallel to traffic. Also, the last full section of PB, adjacent to the impact attenuator, shall be located parallel to traffic.

14E. Where narrow medians are provided, see Table II to determine whether or not the downstream end of the PB is located within the clear zone of opposing traffic. If the PB is located within the clear zone of opposing traffic, the downstream end shall be flared away from opposing traffic to shield the work area from potential errant vehicles crossing the median.

14F. If the NCHRP 350PB is located beyond the clear zone of opposing traffic, the downstream end of the NCHRP 350 PB may be provided with a tapered end, located 10′ beyond the work area.

14G. Where PB is located beyond the edge of the paved shoulder, the cross slope within the clear zone, including the surface on which the PB is placed, shall be graded at 10:1, or flatter. If the cross slope is steeper than 10:1, the PB shall be terminated on the paved shoulder. The PB shall be extended along the paved shoulder as necessary to satisfy the length of need, and then terminated using an impact attenuator.

14H. The work area shall be adequately protected from traffic approaching from intersections and driveway approaches using PB and impact attenuators as called for by the Engineer.

14I. For installation procedures, refer to the manufacturer's installation instructions.

14J. For details on delineation of PB, see Standard Construction Drawing MT-101.70.

SHADOW VEHICLE

15A. If cones and drums are used in lieu of Portable Barrier, the shadow vehicle shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area.

15B. The shadow vehicle shall be equipped with a high-intensity yellow rotating, flashing, oscillating, or strobe light(s).

15C. The shadow vehicle shall be equipped with a truck-mounted or trailer attenuator (TMA) in accordance with CMS 614.03.

REVISION DATE 01-17-2020

STATE OF OHIO DEPARTMENT OF TRANSPORTATION ADMINISTRATOR David L. Holstein

STDS. ENGINEER Soisson

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