Median Crossovers

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This section discusses the design considerations involved with median crossovers. Median crossovers are used on divided four-lane highways during construction staging. Unlike other types of median crossings they are designed for high-speed operation. Two types of median crossovers exist: temporary (Figure 1) and permanent (Figure 2). Temporary median crossovers are used to divert traffic around work areas, whereas permanent median crossovers are used to divert traffic in areas where two lane highways are being converted to four lane divided highways. Standard Road Plans RV-12, RV-13, RV-14, and Road Design Detail 531-2 provide construction details for temporary and permanent median crossovers with standard median widths.

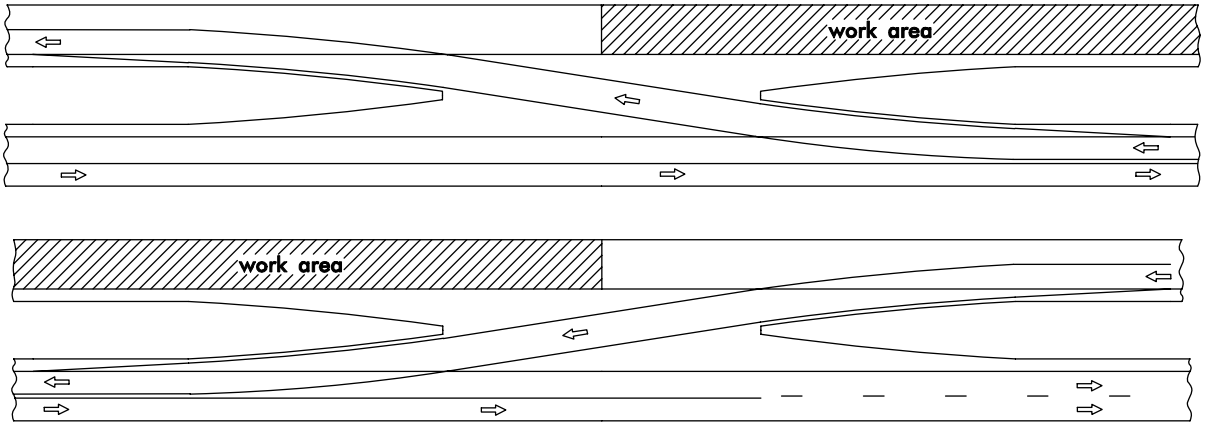

Figure 1: Temporary median crossovers.

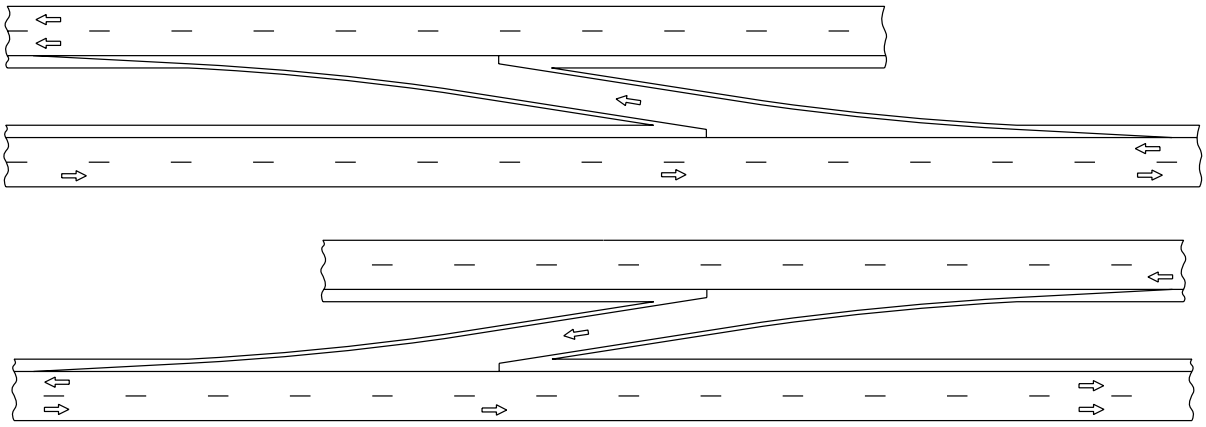

Figure 2: Permanent median crossovers.

Design Considerations

Several considerations are involved with the design of a median crossover:

- The design speed for median crossovers should be the posted speed prior to the construction area, with the minimum design speed being 10 mph below the posted unless unusual site conditions require that a lower speed be used.
- Median crossovers should be located to provide the maximum advance warning to the driver based on the vertical and horizontal alignment at the site. The driver should be able to see the entire crossover area well in advance of the median crossover.
- Advance signing and proper pavement markings are also necessities for the safe operation of a median crossover. Standard Road Plans TC-61 and TC-62, provide traffic control and pavement marking details for median crossovers.
- No access points should occur in a crossover area.
- Road Design Detail 500-18 applies to permanent crossovers. Road Design Detail 500-19 may be used with temporary crossovers. In certain situations, a cross roadway culvert may be used in place of Road Design Detail 500-19.

Example

A single lane median crossover is required to redirect traffic around a work area. The road is a 65 mph four lane divided highway with a 50-foot median. The width of a crossover (W) should equal the approach lane width plus 2 feet on each side, see Figure 3. For a single lane crossover, the width should be W = 12’ + 2’ + 2’ = 16’. To simplify construction, the radii for the crossover and all offsets and drops are measured to the edge of the 16-foot lane. The 12-foot lane lines are for pavement markings only.

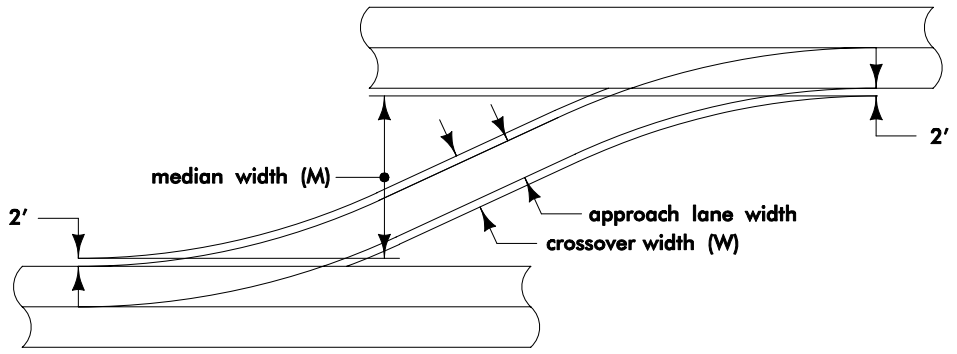

Figure 3: Establishing crossover pavement width.

Figure 4 on the next page shows how to set up the geometric calculations to determine the length “bd” and the curve data for curves R_1 and R_2 when the median is on tangent alignment and is uniform in width throughout the length of the median crossover.

1. For median crossovers, the radius is set at 3500 feet.
2. Curves R_1 and R_2 are normally the same to permit use of the crossover in either direction of travel.
3. A transition length, L, is provided between the reverse curves to permit change in cross slope. The length L is twice the “x” value found in the superelevation tables in Section 2A-3 of this manual. This length will accommodate reversal of the 2% normal crown slope at the selected design speed, which will be 65mph (the posted speed before the construction area). Although the width of the pavement is actually 16 feet, it is striped as a 12-foot lane. Therefore, Table 7 (Table

8 if metric) in Section 2A-3 is used to determine "x" for a single lane crossover. For a design speed of 65 mph, x = 56 feet, thus L = 2 x 56' = 112 feet.

4. The median width for calculation purposes is 46 feet (50'-2'-2' = 46') because the 3500-foot radius curves are located at the edge of the 16-foot lane, which ties into a 2-foot parallel offset from the inside edge of slab, see Figure 2.

5. The length "bd" is determined by solving the two right triangles "abc" and "abd" in Figure 3.

a) triangle "abc" is solved by setting side "ac" equal to R_1+R_2+W = 3500' +3500' + 16' = 7016 feet. Side "bc" = L = 112 feet and ∠ acb = 90°.

b) the hypotenuse "ab" is used to solve triangle "abd".

c) Triangle "abd" is solved by setting side "ad" equal to R_1+R_2-M = 3500' + 3500 – 46' = 6954'.

6. The Δ for curves R_1 and R_2 = ∠dab - ∠cab.

7. If $R_1 = R_2$, all curve data will be the same for both curves. If R_1 and R_2 are not equal, the curve data must be calculated for each curve using the common delta and the individual radius.

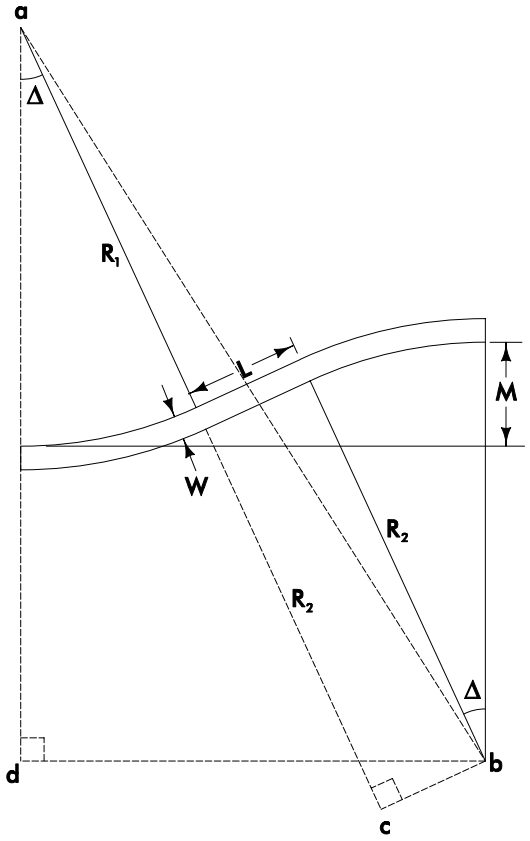

Figure 4: Median crossover geometry.