Chapter 1240 Turning Roadways

1240.01 General

The roadway on a curve may need to be widened to make the operating conditions comparable to those on tangents. There are two main reasons to do this. One is the off-tracking of vehicles such as trucks and buses. The other is the increased difficulty drivers have in keeping their vehicles in the center of the lane. Apply turning roadway widths only when there is a need to optimize the operational or safety performance of a particular segment of roadway with larger volumes of trucks or when trucks are the identified modal priority. The application of turning roadway width is not applicable on managed access low-speed roadways or managed access intermediate-speed highways in suburban or urban contexts.

For additional information, see the following:

Chapter 1230 Cross section design element widths

Chapter 1250 Superelevation

Chapter 1360 Lane and shoulder widths for ramps

1240.02 Turning Roadway Widths

1240.02(1) Two-Lane Two-Way Roadways

Exhibit 1240-1 shows the traveled way width (W) for two-lane two-way roadways. For values of radius (R) between those given, interpolate W and round up to the next foot.

Minimum traveled way width (W), based on the delta angle of the curve (shown in Exhibit 1240-2), may be used. Document the reasons for using the minimum width. Round W to the nearest foot.

Widths given in Exhibit 1240-1 and Exhibit 1240-2 are for facilities with 12-foot lanes. When 11-foot lanes are selected, width (W) may be reduced by 2 feet.

1240.02(2) Two-Lane One-Way Roadways

Exhibit 1240-3 shows the traveled way width (W) for two-lane one-way turning roadways, including two-lane ramps and four-lane highways. For values of radius (R) between those given, interpolate W and round up to the next foot. Treat each direction of travel on four-lane facilities as a one-way roadway.

Minimum traveled way width (W), based on the delta angle of the curve (shown in Exhibit 1240-4), may be used. Document the reasons for using the minimum width. Round W to the nearest foot.

Widths given in Exhibit 1240-3 and Exhibit 1240-4 are for facilities with 12-foot lanes. When 11-foot lanes are selected, width (W) may be reduced by 2 feet.

To keep widths to a minimum, the traveled way widths for Exhibit 1240-3 and Exhibit 1240-4 were calculated using the WB-40 design vehicle. When volumes are high for trucks larger than the WB-40 and other traffic, consider using the widths from Exhibit 1240-1 and Exhibit 1240-2.

1240.02(3) One-Lane Roadways

Exhibit 1240-5 shows the traveled way width (W) for one-lane turning roadways. For values of R between those given, interpolate W and round up to the next foot. Exhibit 1240-5 applies to one-lane ramps only when the largest vehicles present demonstrate a safety or operational need based on frequency of use and shoulder pavement depths, and when turn simulation software shows that the total roadway width cannot accommodate the turning movement within the structural pavement section.

Minimum width (W), based on the delta angle of the curve for one-lane roadways, may be used. Exhibit 1240-6 gives W using the radius to the outer edge of the traveled way. Exhibit 1240-7 gives W using the radius on the inner edge of the traveled way. Document the reasons for using the minimum width. Round W to the nearest foot.

Build shoulder pavements at full depth for one-lane roadways. To keep widths to a minimum, traveled way widths were calculated using the WB-40 design vehicle, which may force larger vehicles to encroach on the shoulders. This also helps to maintain the integrity of the roadway structure during partial roadway closures.

1240.02(4) Other Roadways

For roadways where the traveled way is more than two lanes in any direction:

- For each lane in addition to two, additional width in excess of the selected lane width dimension (see Chapter 1230 and Chapter 1106) is not needed.
- For three-lane ramps with HOV lanes, see Chapter 1410.

1240.02(5) Total Roadway Width

Shoulder widths for the highway or ramp are added to the traveled way width to determine the total roadway width.

Small amounts of widening add to the cost with little added benefit. When the traveled way width for turning roadways results in widening less than 0.5 foot per lane, or a total widening of less than 2 feet on existing roadways that are to remain in place, it may be disregarded.

When widening the traveled way:

- Widening may be constructed on the inside of the traveled way or divided equally between the inside and outside. Do not construct widening only on the outside of a curve.
- Place final marked lane lines, and any longitudinal joints, at equal spacing between the edges of the widened traveled way.
- Provide widening throughout the curve length.
- For widening on the inside, make transitions on a tangent where possible.
- For widening on the outside, develop the widening by extending the tangent. This avoids the appearance of a reverse curve that a taper would create.
- For widening of 6 feet or less, use a 1:25 taper. For widths greater than 6 feet, use a 1:15 taper.

1240.03 References

1240.03(1) Design Guidance

Standard Plans for Road, Bridge, and Municipal Construction (Standard Plans), M 21-01, WSDOT

Standard Specifications for Road, Bridge, and Municipal Construction (Standard Specifications), M 41-10, WSDOT

1240.03(2) Supporting Information

A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, current edition

Exhibit 1240-1 Traveled Way Width for Two-Lane Two-Way Turning Roadways

Radius on Centerline of Traveled Way, R (ft)	Design Traveled Way Width, W (ft) [1]
3,000 to tangent	24
2,999	25
2,000	26
1,000	27
800	28
600	29
500	30
400	31
350	32
300	33
250	35
200	37
150	41

Note:

[1] Width (W) is based on:

- WB-67 design vehicle
- 3-ft clearance per lane (12-ft lanes)

When 11-ft lanes are selected, width may be reduced by 2 ft.

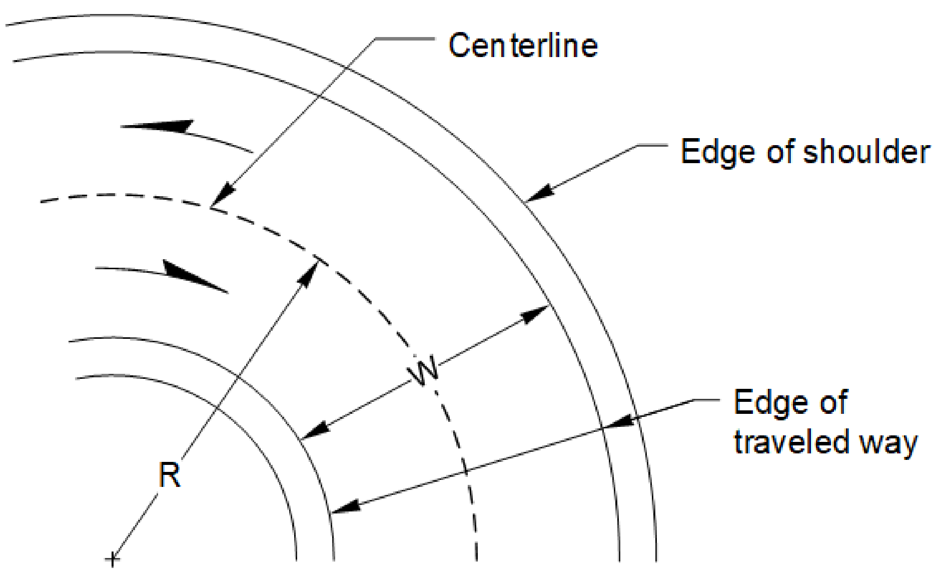
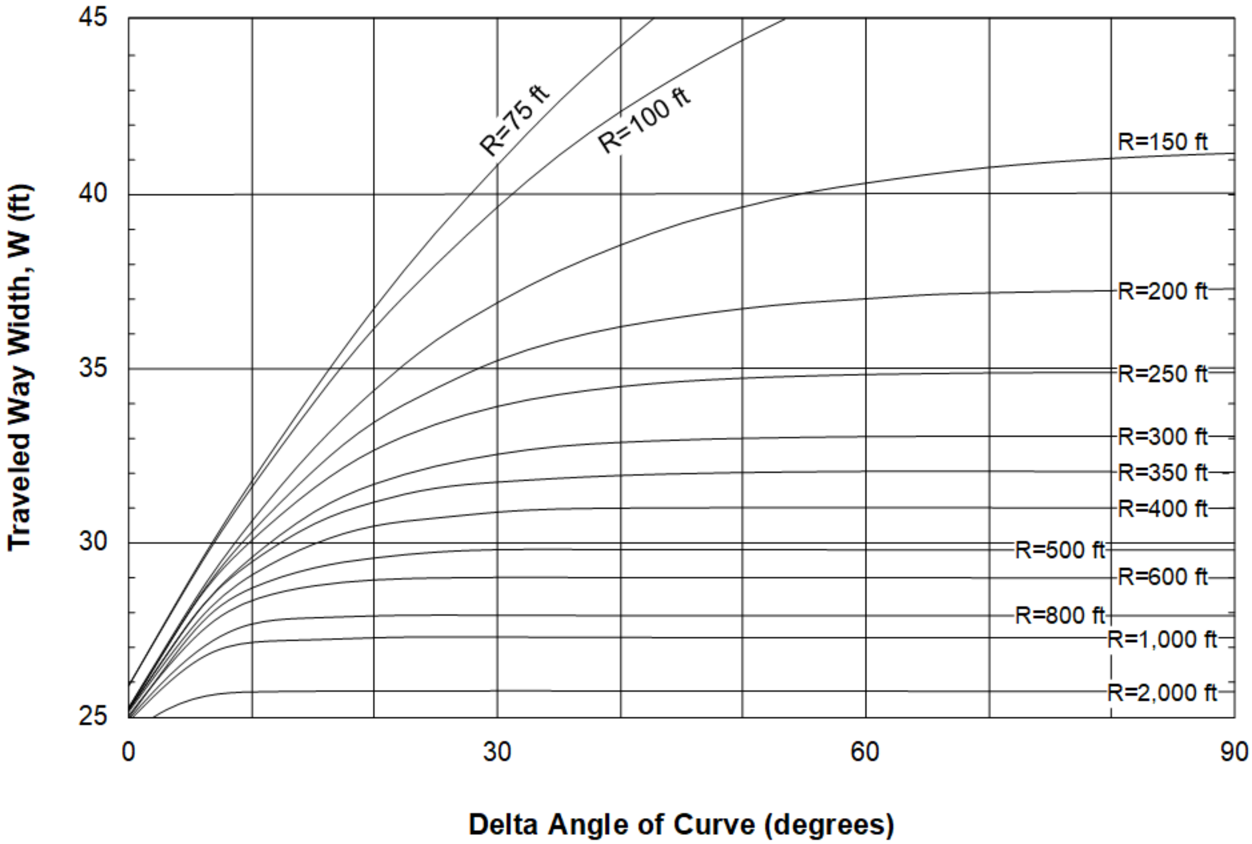


Exhibit 1240-2 Traveled Way Width for Two-Lane Two-Way Turning Roadways: Based on the Delta Angle



Note:

Width (W) is based on:

- WB-67 design vehicle
- 3-ft clearance per lane (12-ft lanes)

When 11-ft lanes are selected, width may be reduced by 2 ft.

Exhibit 1240-3 Traveled Way Width for Two-Lane One-Way Turning Roadway

Radius on Centerline of Traveled Way, R (ft)	Design Traveled Way Width, W (ft)[1]
3,000 to tangent	24
1,000 to 2,999	25
999	26
600	26
500	27
400	27
300	28
250	29
200	29
150	31
100	34

Note:

[1] Width (W) is based on:

- WB-40 design vehicle
- 3-ft clearance per lane (12-ft lanes)

When 11-ft lanes are selected, width may be reduced by 2 ft.

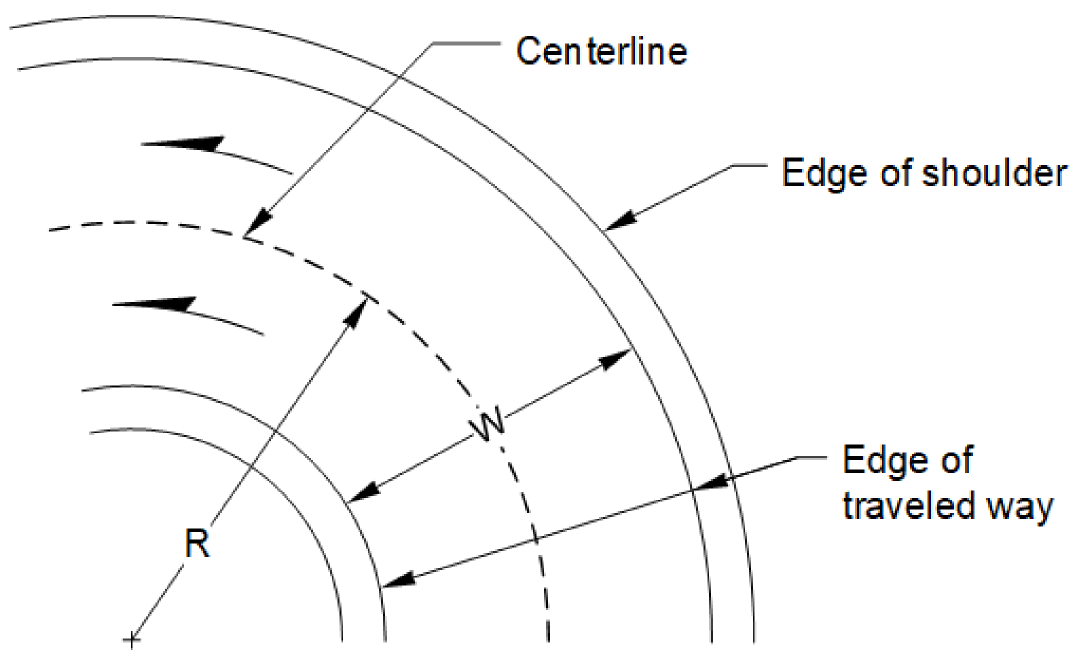
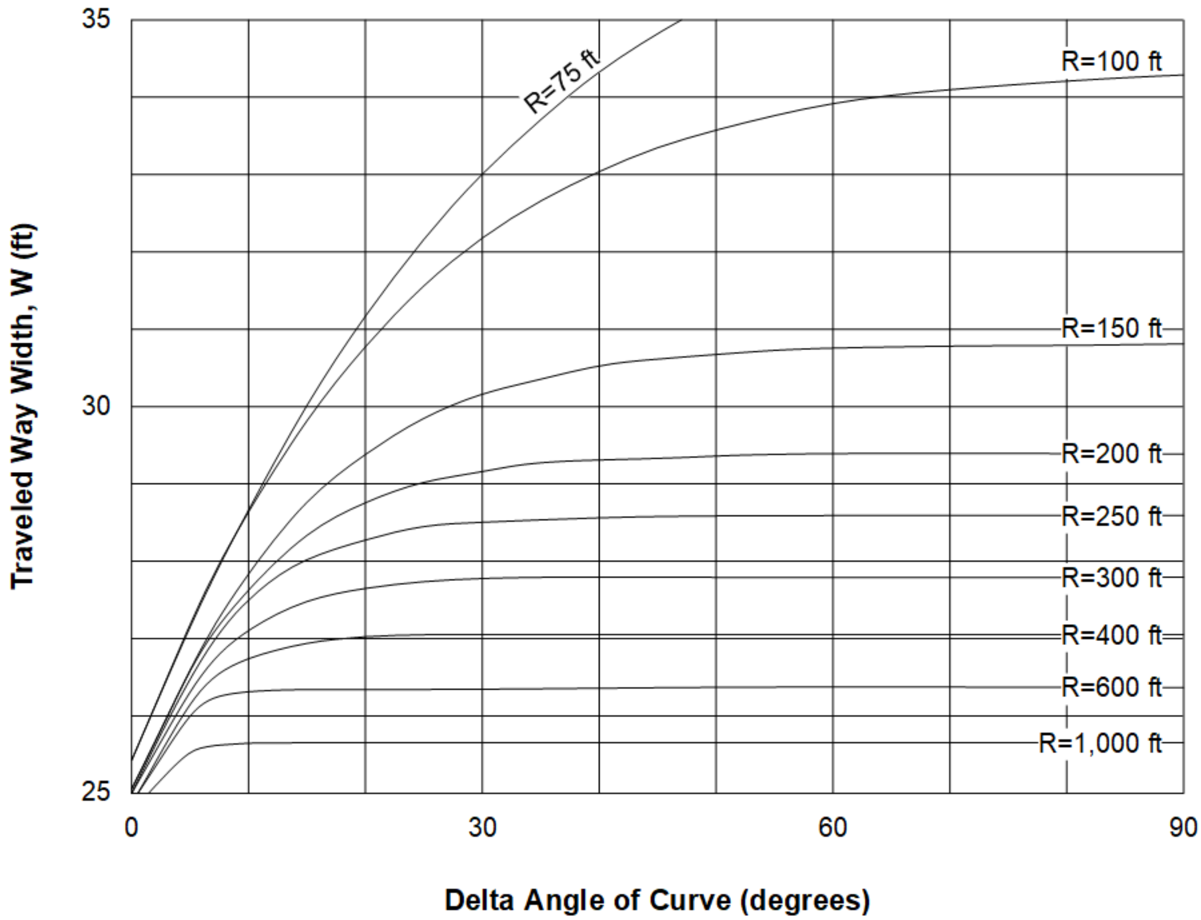


Exhibit 1240-4 Traveled Way Width for Two-Lane One-Way Turning Roadways: Based on the Delta Angle



Note:

Width (W) is based on:

- WB-40 design vehicle
- 3-ft clearance per lane (12-ft lanes)

When 11-ft lanes are selected, width may be reduced by 2 ft.

Exhibit 1240-5 Traveled Way Width for One-Lane Turning Roadways

Radius, R (ft)	Design Traveled Way Width, W (ft)	
	Radius on Outside Edge of Traveled Way	Radius on Inside Edge of Traveled Way
7,500 to tangent	13[1]	13[1]
1,600	14	14
300	15	15
250	16	16
200	17	17
150	17	17
100	19	18
75	21	19
50	26	22

Note:

[1] On tangents, the minimum lane width is selected based on Chapter 1230 and Chapter 1106.

Width (W) is based on:

- WB-40 design vehicle
- 4-ft clearance

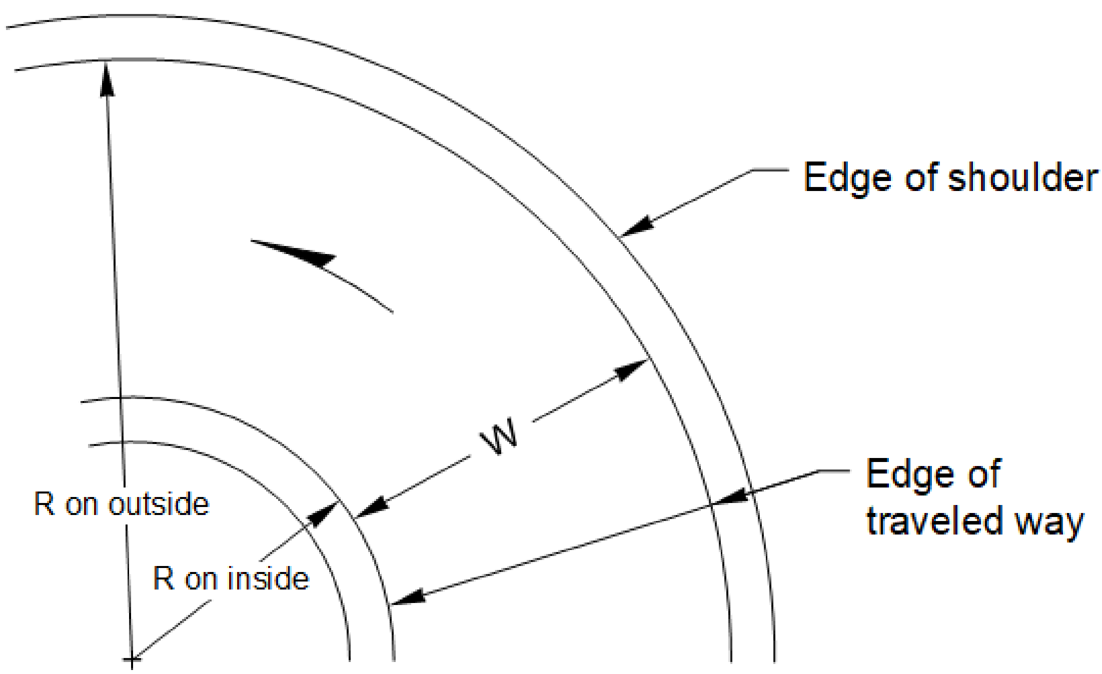
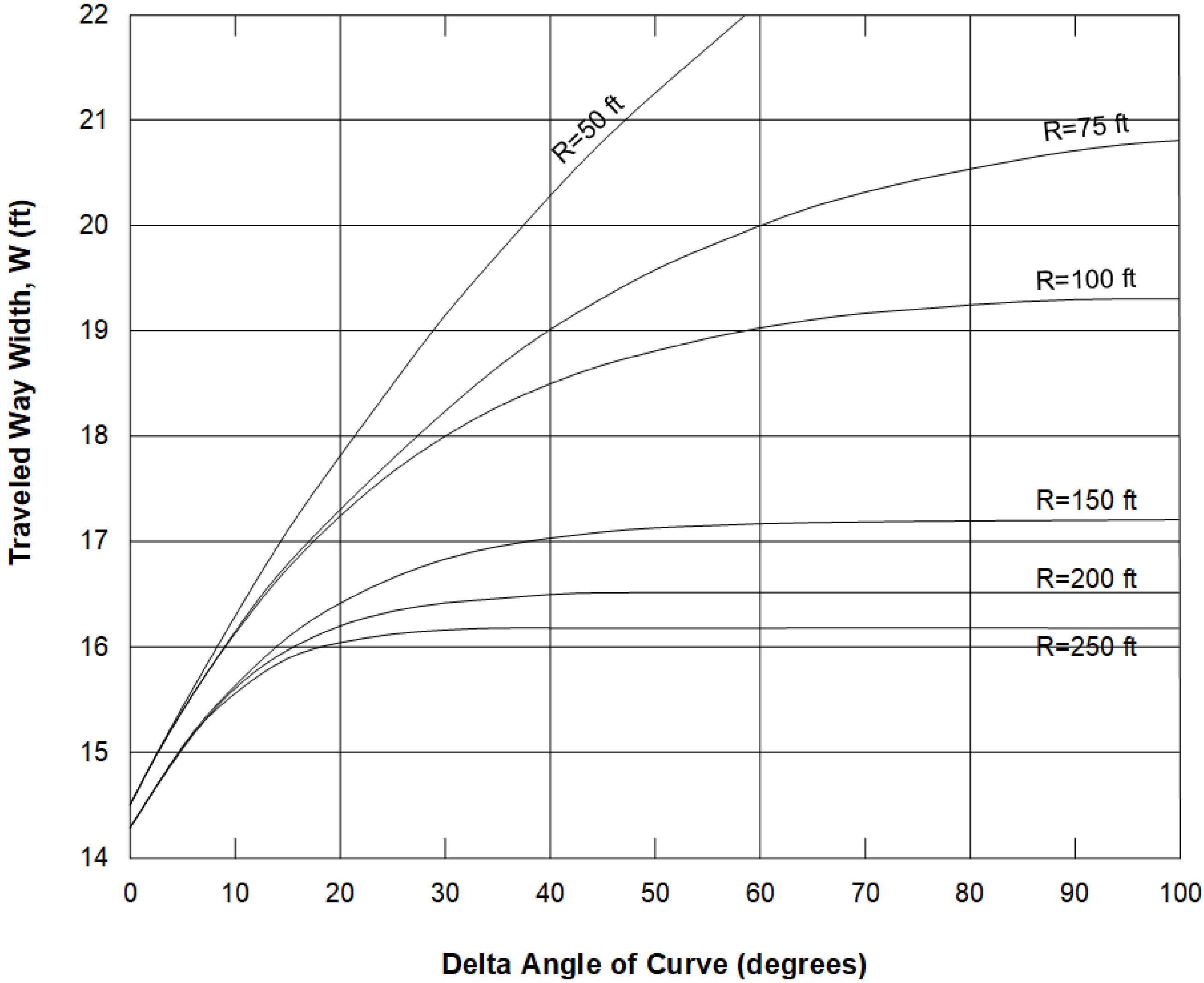


Exhibit 1240-6 Traveled Way Width for One-Lane Turning Roadways: Based on the Delta Angle, Radius on Outside Edge of Traveled Way



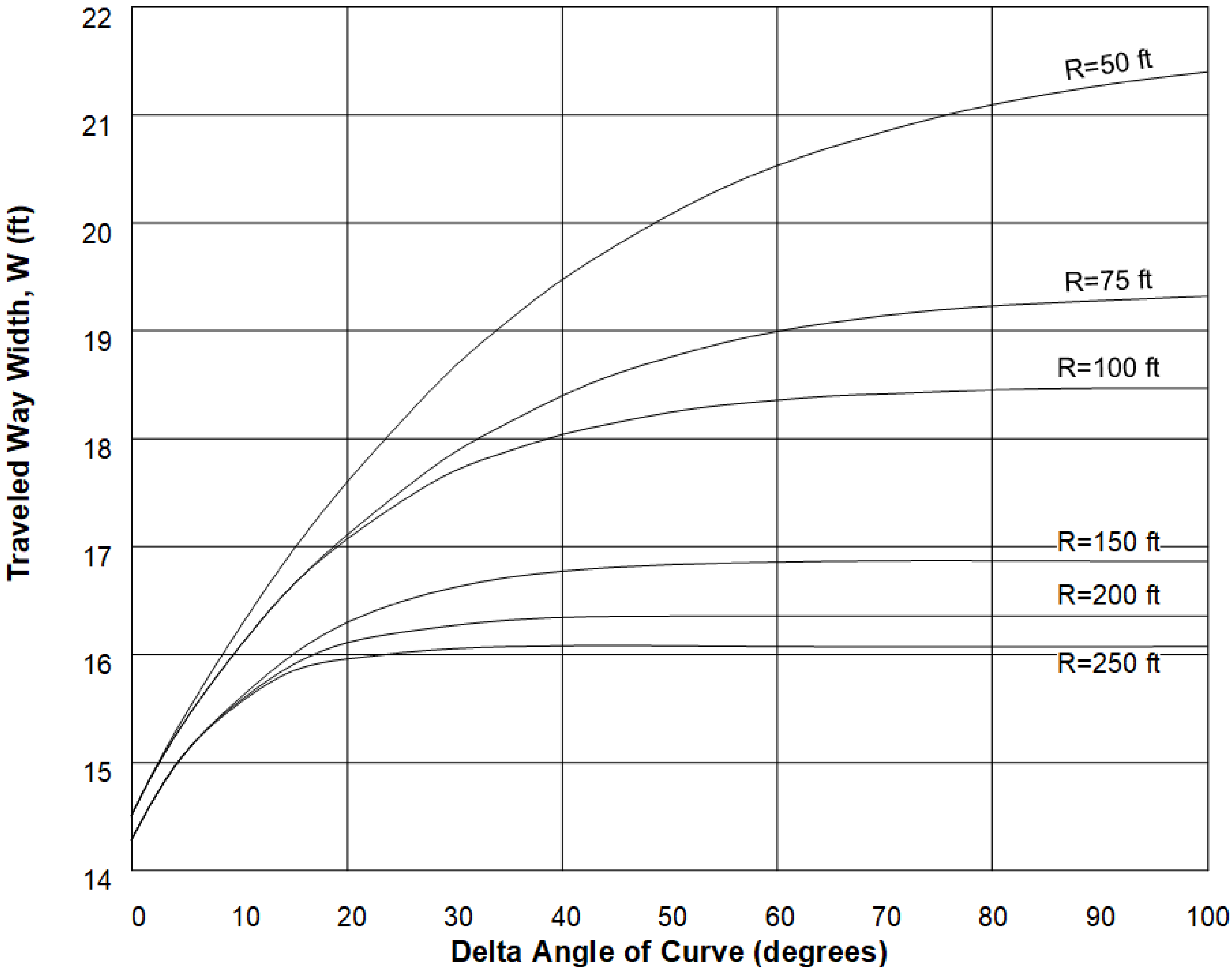
Note:

All radii are to the outside edge of traveled way.

Width (W) is based on:

- WB-40 design vehicle
- 4-ft clearance

Exhibit 1240-7 Traveled Way Width for One-Lane Turning Roadways: Based on the Delta Angle, Radius on Inside Edge of Traveled Way



Note:

All radii are to the inside edge of traveled way.

Width (W) is based on:

- WB-40 design vehicle
- 4-ft clearance