

1320.01 General

Modern roundabouts are near-circular intersections at grade. They are an effective intersection type with fewer conflict points and lower speeds, and they provide for easier decision making than other intersection types. They also require less maintenance than traffic signals. Well-designed roundabouts have been found to reduce crashes (especially fatal and severe injury collisions), traffic delays, fuel consumption, and air pollution. They also have a traffic-calming effect by reducing vehicle speeds using geometric design rather than relying solely on traffic control devices.

Roundabout design is an iterative process.

A well-designed roundabout achieves a balance of safety and efficiency.

Good design is a process of creating the smooth curvature, channelization, and deflection required to achieve consistent speeds, well-marked lane paths, and appropriate sight distance.

The decision to install a roundabout is the result of an Intersection Control Evaluation (ICE) (see Chapter 1300) approved by the region Traffic Engineer or other designated authority.
1320.02 Roundabout Types

There are five basic roundabout types: mini, compact, single-lane, multilane, and teardrop described in the following sections.

1320.02(1) Mini-Roundabouts

Mini-roundabouts are small single-lane roundabouts generally used in 25 mph or less urban/suburban environments. Because of this, mini-roundabouts are typically not suitable for use on higher-volume (greater than 6,000 AADT) state routes. In retrofit applications, mini-roundabouts are relatively inexpensive because they normally require minimal additional pavement at the intersecting roads. A 2-inch mountable curb for the splitter islands and the central island is desirable because larger vehicles might be required to cross over it.

A common application is to replace a stop-controlled or uncontrolled intersection with a mini-roundabout to reduce delay and increase capacity. With mini roundabouts, the existing curb and sidewalk at the intersection can sometimes be left in place.

1320.02(2) Compact Roundabouts

Compact roundabouts are a hybrid of attributes found in mini- and single-lane roundabouts. Similar to a mini-roundabout, a compact roundabout may require minimal additional pavement, has a completely mountable center island, and in many cases existing curb or sidewalk can be left in place. As a result, compact roundabouts rarely require the purchase of right of way. Compact roundabouts are similar to single-lane roundabouts regarding design vehicle assumptions, ability to process traffic volumes, and signing.
1320.02(2) **Single-Lane Roundabouts**

Single-lane roundabouts have single-lane entries at all legs and one circulating lane. They typically have mountable raised splitter islands, a mountable truck apron, and a landscaped central island.

![Single-lane roundabout](image1.png)

1320.02(3) **Multilane Roundabouts**

Multilane roundabouts have at least one entry or exit with two or more lanes and more than one circulating lane. The operational practice for trucks negotiating roundabouts is to straddle adjacent lanes.

![Multilane roundabout](image2.png)
1320.02(4) Teardrop Roundabout

Teardrops are usually associated with ramp terminals at interchanges: typically, at diamond interchanges. Teardrop roundabouts allow the “wide node, narrow link” concept. Unlike circular roundabouts, teardrops do not allow for continuous 360° travel resulting in less vehicle conflicts as traffic traveling on the crossroad (link) between ramp terminal intersections (nodes) does not encounter a yield as it enters the teardrop intersections. At higher ADT locations this lack of conflicting vehicles can result in a higher throughput, but can also result in limited gaps for the off ramp approach. Consult HQ or region Traffic Office for guidance.

1320.03 Capacity Analysis

Use the capacity analysis completed as part of the Intersection Control Evaluation (see Chapter 1300) to verify the number of lanes required for every individual movement in the design year.

1320.04 Geometric Design

1320.04(1) Selecting Shape and Placement

Roundabout shape is an important decision, because the shape can affect design elements that affect safety performance and operation of the roundabout.

1320.04(1)(a) Circular

The circular shape is the most desirable roundabout shape when constraints allow. If a circular shape is not feasible, contact the region Traffic Office to investigate other shapes described below. Sometimes a circular shape can be used by slightly offsetting the placement of the roundabout.
1320.04(1)(b) Non-Circular

A non-circular roundabout is a good choice when constraints such as right of way, existing roadway alignments, buildings, and/or environmentally sensitive areas influence the shape.

Experiment with different roundabout sizes and radii, and use design vehicle turning software (such as AutoTURN®) to refine the shape to find the best operation while retaining desired speeds.

1320.04(2) Roundabout Design Elements

This section provides guidance for roundabout design elements. The photo below labels many of them.
1320.04(2)(a) Curbing

All curbing within a roundabout should be rolled. The type of rolled curbing appropriate for a roundabout is shown in the Standard Plan Roundabout Cement Concrete Curbs: F-10.18.

Exception: existing curb untouched as part of a mini or compact roundabout installation may remain.

1320.04(2)(b) Truck Apron

A truck apron is the mountable portion of the central island used to accommodate the turning path of a design vehicle larger than a passenger vehicle or BUS, and helps to minimize the overall footprint of the roundabout. Generally, the truck tractor can traverse the roundabout in the circulating lane while the trailer is allowed to off track onto the apron. The apron is raised above the circulating path to provide guidance for drivers in the circulating lane.

A truck apron’s width is based on the needs of the design vehicle. If buses are a consistent vehicle using the intersection try to minimize apron use for all movements, however this is not a requirement. Use turn simulation software (such as AutoTURN®) to fine tune the width of apron needed, so as not to design an apron that won’t be used.

The apron color should be easily distinguishable in contrast with the adjacent circulating roadway and pedestrian facilities. Work with the region Landscape Architect (HQ Roadside and Site Development Section for regions without a Landscape Architect) for concrete color and texture.

1320.04(2)(c) Central Island

The central island is the portion of the roundabout that is inside of the circulating roadway and typically includes an inside truck apron and a landscaped area (except for mini-roundabouts and compact roundabouts, which have no landscaped area and are entirely mountable).

Central island shape is a function of the site-specific needs of a roundabout intersection. It doesn’t have to be an identical shape of the inscribed circle diameter (ICD) dimensions, but
should support the design principles of deflection and low speeds, and the accommodation of the design vehicle.

Roundabouts present opportunities to create community focal points, landscaping, and other gateway features within an intersection. The central island may include enhancements (such as landscaping, sculptures, or fountains), which serve both an aesthetic purpose and provide visual indication of the intersection for approaching motorists (this is particularly important for high speed approaches). Ideal central island treatments fit the context and result in minimal consequence to any vehicle that may encroach on the non-mountable portion of the central island. These treatments should not attract pedestrians to the central island, as pedestrians should never cross the circulating roadway. Work with the region Landscape Architect (HQ Roadside and Site Development Section for regions without a Landscape Architect) for central island features. See Chapter 950 Public Art for policy and guidance.

1320.04(2)(d) Splitter Island

A splitter island is the raised island at each two-way leg between entering and exiting vehicles, designed primarily to control the entry and exit speeds by providing deflection. They also discourage wrong-way movements, and provide pedestrian refuge. Splitter islands can have different shapes based on entry angle requirements and exit design speeds.

Raised channelization, or the appearance of raised curbing, is important, as research shows that drivers will slow down when they perceive that the driving width is narrowing.

The length of the splitter island will vary (typical lengths: 30 ft. to 350 ft.) based on the terrain, access considerations, site-specific mainline and crossroad operational speeds and the stepdown speeds to the final desired entry speed, which is usually 15–25 mph. (See 1320.04(3)(a) for using chicanes on higher-speed roadways.)

Try to maximize the splitter island width adjacent to the circulating roadway. The larger achieved width, the better a driver approaching the roundabout can perceive whether a driver in the circulating lane will exit or continue inside the roundabout. This results in better gap acceptance. This may also support a better pedestrian refuge design.
1320.04(2)(e) Inscribed Circle Diameter (ICD)

The Inscribed Circle Diameter (ICD), that is, the overall outside diameter of a roundabout, is determined by the variables design vehicle, design speed, and the number of circulatory lanes.

The ranges of ICD in Exhibit 1320-1 are only suggestions to start a roundabout design. The ICD for noncircular shapes should be defined with dimensions along the X and Y axis.

Exhibit 1320-1 Suggested Initial Design Ranges

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of Lanes</td>
<td>1</td>
<td>1+</td>
<td>1</td>
<td>2+</td>
</tr>
<tr>
<td>Circulating Roadway Width</td>
<td>N/A</td>
<td>N/A</td>
<td>14’ – 19’</td>
<td>29’</td>
</tr>
<tr>
<td>Entry Widths</td>
<td>N/A</td>
<td>N/A</td>
<td>16’ – 18’</td>
<td>25’</td>
</tr>
</tbody>
</table>

Notes:
The “+” symbol used here means that a portion of the circulating roadway may have more than one lane.

[1] Reserved for urban/suburban intersections with a 25 mph or less posted speed.
[2] The given diameters assume a circular roundabout; adjust accordingly for other shapes.

Some conditions may require ICDs outside ranges shown here.
1320.04(2)(f) Entry

1. Deflection

Ideal alignment offers an entry design that provides deflection, speed control, and reasonable view angles to drivers while balancing property impacts and costs. While most intersections are at 90º angles and most through movements are straight, deflection contributes to the safety performance of a roundabout. Deflection is primarily achieved with the central island and supporting it with splitter islands on all entries to the roundabout.

2. Alignment Offset

There are three alignment choices for attaching entry legs to the circulatory roadway:

- The offset left alignment is preferred. It constrains the entry, slowing a vehicle’s approach speed, and opens up the exit for efficient egress.
- The symmetrical alignment (if needed) is acceptable for lower speed contexts such as 30 mph.
- The offset right alignment tends to allow faster entry speeds and constrains the exit; it is undesirable.

3. Entry Angle

To achieve the proper amount of deflection for each approach to a roundabout, there is a range of angle values that are desirable. This range is usually between 20 and 40 degrees. The purpose of entry angle is so vehicles don’t hit broadside.

4. Entry Width

Entry width is determined by the turning template of the design vehicle turning through the entry curve at the desired entry speed. The ranges of entry widths in Exhibit 1320-1 are only suggestions to start a roundabout design.
5. Path Overlap

In a multilane roundabout, if the vehicles in the entry are aligned toward the central island or the truck apron, the vehicle on the right is pointed toward the inside lane and tends to go in that direction, while the vehicle on the left tends to be squeezed to the right toward the vehicle on the right. Avoid path overlap. Avoid a design that aligns an entering vehicle at the incorrect lane in the circulatory roadway. As a vehicle enters the circulating roadway it should be headed directly toward its respective lane within the circulating roadway. For multilane roundabouts, if inside lane is pointing at truck apron this is also considered to be path overlap. If right entry lane is pointing to left circulatory lane, then there is path overlap.
1320.04(2)(g) Right-Turn Slip Lanes

Right-turn slip lanes are a proven way to increase the “life” of an intersection by removing traffic that would otherwise enter the roundabout and reduce the available capacity to other movements. If a right-turn movement has 250 vehicles/hour or more, or if over 40% of the total approach volume is taking right turns, a slip lane should be considered.

The conflicting volume of vehicles on the merge will influence the length of merge lane prior to termination. Speeds can be very low and vehicles can take turns at these low speeds. Multimodal considerations will influence the length based on crosswalk location and bicycle use.

1320.04(3) Speed Control

Roundabout operation performance is dependent on low, consistent vehicle speeds. Low and consistent operating speeds facilitate appropriate gap acceptance by an entering driver. Design for travel path operating speeds between 15 mph and 25 mph (see 1320.04(3)(b)). Design to have low-speed differentials (12 mph or under) between entering and circulating traffic. Multilane roundabouts might have higher speeds along their respective travel paths, but generally 30 mph or less.

The ideal design speed mechanism has the entry and circulating speeds being similar. This varies due to size, shape and context of the roundabout.

The vehicle then moves into and through the circulation lane, being controlled all along by the design speed of the circulating lane. The circulating design speed controls the exit speed; therefore, the exit design speed, as calculated in the Travel Path section below, is not as critical.

Designing geometric entry speed control encourages lower speeds and lower speed differentials at conflict points, which reduces the potential for collisions.
1320.04(3)(a) Chicanes

Chicanes are a type of horizontal deflection used in traffic calming to reduce the speed of vehicles. Research has shown that chicanes have value in slowing down higher approach speeds.

Consider chicanes where posted speeds near the roundabout are 45 mph or higher. Design chicane curves with successively smaller radii in order to successively reduce vehicle speeds approaching the roundabout entry. Use Exhibit 1320-2 to determine the radii-speed relationship (the radii are measured using the offsets recommended in the Travel Paths section). The normal cross slope (superelevation in 1320-2) is 2% however, site conditions may require more based on how you tilt the plane of the roundabout for site specific conditions. A minus (-) 2% drains toward the central island.

Also, consider the grade of the roadways that enter the roundabout, because a vehicle can more easily slow down on an upgrade than on a downgrade. Adjust the length of the deceleration based on the “Adjustment Factors for Grades Greater Than 3%” in Design Manual Exhibit 1360-10.
1320.04(3)(b) Travel Paths

Travel path calculations can be used on all roundabout designs to get an understanding of speeds for different paths throughout the roundabout. A travel path is the shortest path through the roundabout, no closer than 5 feet from any curb face or lane line as shown. Use Exhibit 1320-2 and R₁ through R₅ to determine Travel Path speeds.
**1320.04(4) Grades**

Do not use grades as a constraint during scoping to rule out a roundabout. Be aware of how the profiles mesh with sight distances and ADA pedestrian requirements.

**1320.04(4)(a) Circulatory Roadway**

The circulatory roadway grade value should not exceed 4%. Terrain may require benching the roundabout to fit conditions.

**1320.04(4)(b) Grade Transitions for Roadway Entry and Exit to the Circulatory Roadway**

Consider the grade transitions and make them as long as feasible. When designing for pedestrians see Chapter 1510 and work with region ADA subject matter expert to ensure that grades for ADA compliance at all pedestrian crossing are met.
1320.04(5)  Circulatory Roadway Cross Slope

Typical profile of the circulatory roadway is a negative 2% from central island/truck apron radially around 360 degrees of the compass. For the profile of the road through the roundabout when benching the roundabout on a grade, a range of + or – 1.5 percent to +4 or -4 percent slope is allowed on the ICD portion of the benched roundabout.

The circulatory roadway cross slope may range from 1.5% to 4.0% (2.0% preferred), away from the central island to promote lower circulating speeds, improve central island visibility, minimize breaks in cross slope of entry and exit lanes, and facilitate drainage of water to the outside of the roundabout.

Sometimes roundabouts have to be built on a tilted plane or benched and cross slope conditions will vary by leg or quadrant on the circulating roadway and may fall outside the 1.5% - 4.0% range. However, it is desirable to match existing ground elevation as much as possible.

Drawing shows preferred slopes. Site conditions and drainage may require slopes outside these ranges.

Cross slopes

1320.04(6)  Design Tools

During the scoping or preliminary geometric design process, do not to use truck turning paths alone as a constraint to eliminate a roundabout at an intersection. There are several design tools available to aid in the design of a roundabout. It is important to understand how the software works, its default settings, and its application to the design process.

1320.04(6)(a)  Design Vehicle Assumptions

While all highway-to-highway movements require accommodating a WB-67, there are certain assumptions that must be made with software programs that replicate truck swept paths. Determine which truck percentage defaults are to be used (recognizing that truck percentages can range from 2% to 20%) so that different segments can be modeled accurately. Recognize that within a set percentage, WB-67s may only represent a small sample of the entire truck volume on any given day. Therefore, consider whether a WB-67 should be designed for, or accommodated (also see Chapter 1103).
1. Designing for a WB 67

A roundabout that is being designed for a WB-67 may result in wider lane widths and a larger Inscribed Circle Diameter. For this situation, rolled curb design is critical to the truck’s traversing the roundabout (see Standard Plan F-10.18 for curb details). Outside aprons may not be needed in many situations based on AutoTurn® modeling and knowledge of driver turning behavior when encountering geometric features.

2. Accommodating a WB 67

A roundabout that is designed to accommodate a WB-67 assumes that a WB-67 could utilize truck aprons to maneuver through the roundabout, if necessary, which should reduce the overall footprint of the roundabout. For this situation, rolled curb is critical to the truck’s traversing the roundabout confidently. Although outside truck aprons are needed infrequently, there may be situations where the design may need to incorporate them. Contact HQ Traffic for guidance.

1320.04(6)(b) Truck Swept Path

In some cases, roundabouts of the perfect circular variety with symmetrical roadway attachments require less specific knowledge of truck-turning software and its applications. However, when looking at a non-circular shaped roundabout where the combination of the truck’s speed, its turning angle settings, its rear axle locations, and its alignment are the critical design elements to address, a mastery of the software is required. Designers that are unfamiliar with how to apply the software inputs accurately to model a truck’s swept path need to contact HQ Traffic Office for guidance. Poor alignment of a truck swept path can result in unnecessarily large roundabout footprints, higher than desired Travel Path speeds, or uncomfortable driving maneuvers by the freight community.

Assume that a truck will travel much slower through a roundabout than the Travel Path speed calculated for passenger vehicles (see 1320.04(3)(b)). Adjust the software input to allow a slower truck speed in order to make a good engineering judgment about how fast a truck may use a roundabout (for example, for AutoTURN® use 5 mph). Design tool default settings don’t necessarily allow the maximization of the tool and can prohibit the designer from getting a good, balanced design between passenger car speeds and truck accommodation.
When using a truck-turning software tool like AutoTURN® on multilane roundabouts, assume a truck’s travel path will occupy (straddle) parts of two adjacent lanes.

*Multilane roundabout - truck straddles lanes*
1320.04(7) **Sight Distance**

Sight distance is an important design consideration at roundabouts. Restricting sight distance across the central island with strategic landscaping may enhance the intersection by making the intersection a focal point and encouraging lower speeds. Work with the region Traffic Engineer and Landscape Architect (HQ if there is no region contact) to determine this balance. Provide sight triangle plan sheets for consideration of landscape design.

1320.04(7)(a) **Stopping**

Use the design stopping sight distance in Chapter 1260. Anticipated speeds throughout the roundabout can be calculated using Exhibit 1320-2, based on the Travel Path radius and direction of the particular curve. The design stopping sight distance is measured along the vehicle’s path as it follows the curvature of the roadway; it is not measured as a straight line.

1320.04(7)(b) **Intersection**

Provide minimum intersection sight distance. Longer sight distances can lead to higher vehicle speeds that reduce gap opportunities for entering vehicles. For intersection sight distance at roundabouts, provide entering vehicles a clear view of traffic on the circulating roadway and on the immediate upstream approach in order to aid in judging an acceptable gap.

The intersection sight distance at roundabouts is given in Exhibit 1320-3. The S1 intersection sight distance is based on the average of the entering and circulating speeds, and the S2 intersection sight distance is based on the left-turning speed. The sight distance may also be calculated using the intersection sight distance equation given in Chapter 1310 using a time gap (tg) of 4.5 seconds.
Exhibit 1320-3 Intersection Sight Distance

![Exhibit 1320-3 Intersection Sight Distance](image-url)

- **Intersection Sight Distance, S (ft)** vs. **Design Speed, V (mph)**
- Note: Sight Distance on Circulatory Roadway
1320.04(8) Railroad Crossings

Although it is undesirable to locate any intersection near an at-grade railroad crossing, this situation exists at many locations on the highway system. Experience shows that a roundabout placed near a crossing has some operational advantages. If there is a railroad crossing near the roundabout contact HQ Traffic Office for further guidance.

1320.05 Pedestrians

As part of the approved ICE it has already been determined whether pedestrians will use the roundabout and, if so, which legs (see Chapter 1300).

With the knowledge of where pedestrian facilities are needed, design the roundabout while keeping in mind the ADA requirements for crosswalks, sidewalks, paths, and other pedestrian facilities.

1320.05(1) Crossing Location

The pedestrian crossing located on the entry side of a roundabout leg should be at least 20 feet from the yield line so that a pedestrian can walk behind a vehicle that is waiting at the yield line. If there is an extremely large truck percentage, consider moving the crossing to accommodate the most common truck.

The crossing located in the exit side of the roundabout leg can be closer to the roundabout, because as the vehicles leave the roundabout, they accelerate and make it harder to find a break in traffic. As speed increases, drivers are less likely and less able to stop. Verify that no significant, large sight obstructions are located within the sight lines.

1320.05(2) Splitter Island Pass Through

Design the splitter island pass through a minimum of 5 feet wide, or the width of the sidewalk, whichever is greater. The length of the pass through (measured back of curb to back of curb of the splitter island) is to be a minimum of 6 feet long measured along the shortest section of the pedestrian path. Consider a “V” shape pass through as shown.

1320.05(3) Buffers

Wherever feasible, separate sidewalks from the curb with a buffer. Landscaping or colored concrete are acceptable for the buffer. See WSDOT Standard Plan F10-18 for dimension details. Do not compromise required vehicle sight triangle needs.

The buffer discourages pedestrians from crossing to the central island or cutting across the circulatory roadway of the roundabout. It also helps guide pedestrians with vision impairments to the designated crosswalks, and can accommodate the occasional inexperienced truck driver who encroaches up onto a curb while traversing through the roundabout.
1320.05(4)  **Curb Ramps**

Roundabouts with buffers typically have combination-type curb ramps; otherwise, parallel curb ramps are normally used. (See Chapter 1510 and the *Standard Plans* for curb ramp information.)

1320.05(5)  **Sight Triangles**

A vehicle sight triangle specific to pedestrians (see 1320.04(7)) must include the whole curb ramp, including the landing, where pedestrians are likely to wait to cross.

It is also important that pedestrians are also able to see approaching vehicles.

1320.05(6)  **Pedestrian Beacons**

On multilane roundabouts, consider installing pedestrian beacons to warn drivers when a pedestrian wants to cross the roadway. Work with the region Traffic Engineer on types and locations of pedestrian beacons.
1320.06 Bicycles

Provide bicyclists with similar options to negotiate roundabouts as they have at other intersections. Consider how they navigate either as motor vehicles or pedestrians depending on the size of the intersection, traffic volumes, their experience level, and other factors.

Bicyclists are often comfortable riding through single-lane roundabouts in low-volume environments in the travel lane with motor vehicles, as speeds are comparable and potential conflicts are low.

At larger or busier roundabouts, cyclists may be more comfortable using ramps connecting to a sidewalk around the perimeter of the roundabout as a pedestrian. Where bicycle lanes or shoulders are used on approach roadways, they should end before the geometry changes the approach to the roundabout.

Contact the HQ Design Office for bicycle ramp design options.

Bicycle rider using lane
1320.07 Signing

The graphic shown is an example of potential signing for a single-lane roundabout. For additional information, refer to the MUTCD, Plan Sheet Library, and the *Standard Plans* for details on signing.

A preliminary sign plan is developed to identify existing and proposed signing on state highways. Sign plans on state routes are to be reviewed and approved by the region Traffic Engineer and then furnished to the HQ Traffic Office for review.

The plan provides an easily understood graphic representation of the signing, and it provides statewide uniformity and consistency for regulatory, warning, and guide signs at roundabouts on the state highway system. For roundabouts located near a port, industrial area, or route that accommodates oversize loads, consider using perforated square steel posts.

1320.08 Pavement Marking

See *Standard Plan* M-12.10 for roundabout pavement marking details. Consult region Traffic on traffic pavement markings and materials.

1320.09 Illumination

Provide illumination for each of the conflict points between circulating and entering traffic in the roundabout and at the beginning of the raised splitter islands. Illuminate raised channelization or curbing. Position the luminaires on the upstream side of each crosswalk to improve the visibility of pedestrians. Light the roundabout from the outside in toward the center. This improves the visibility of the central island and circulating vehicles to motorists approaching the roundabout. Ground-level lighting within the central island that shines upward toward objects in the central island can also improve their visibility. Consult with the region Traffic office for illumination design. (See Chapter 1040 for additional information on illumination.) On higher-speed approaches, consider internally illuminated bollards (IIB) in lieu of other illumination.
1320.10 **Road Approach, Parking, and Transit Facilities**

Road approach (road or driveway) connections to the circulating roadway are not allowed at roundabouts unless they are designed as a leg to the roundabout. It is desirable that road approaches not be located on the approach or departure legs within the length of the splitter island. The minimum distance from the circulating roadway to a road approach is controlled by corner clearance using the outside edge of the circulating roadway as the crossroad. When minimum corner clearance cannot be met, document the decision in accordance with Chapters 530 and 540.

If a parcel adjoins two legs of the roundabout, it is acceptable to provide a right-in/right-out driveway within the length of the splitter islands on both legs. This provides for all movements; design both driveways to accommodate their design vehicles.

Roadways between roundabouts may have restrictive medians with left-turn access provided with U-turns at the roundabouts.

Parking is not allowed in the circulating roadway or on the entry or exit roadway within the length of the splitter island.

Transit stops are not allowed in the circulating roadway, in the approach lanes, or in the exit lanes prior to the crosswalk. Locate transit stops on the roadway before or after the roundabout, in a pullout, or where the pavement is wide enough that a stopped bus does not block the through movement of traffic or impede sight distance.

*Right in / right out driveways*
1320.11 Geometric Design Peer Review

Conduct a peer review of the roundabout design with the following participants.

- Region Traffic Office
- Assistant State Traffic Engineer
- Region Project Development Engineer or Engineering Manager
- Assistant State Design Engineer

The intent of this meeting is to review, discuss, evaluate, and provide feedback on the 2-D roundabout layout design in order to finalize the channelization plan.

1320.12 Documentation and Approvals

Refer to Chapter 300 for design documentation and approval requirements.

1320.13 References

1320.13(1) Federal/State Laws and Codes

See Chapter 1510 for Americans with Disabilities Act Policy and references

Revised Code of Washington (RCW) 47.05.021, Functional classification of highways

Washington Administrative Code (WAC) 468-58-080, Guides for control of access on crossroads and interchange ramps

1320.13(2) Design Guidance

Roundabout Cement Concrete Curbs: Standard Plan F-10.18-00

Roundabout Pavement Markings: Standard Plan M-12.10

Manual on Uniform Traffic Control Devices for Streets and Highways, USDOT, FHWA, as adopted and modified by Chapter 468-95 WAC “Manual on uniform traffic control devices for streets and highways” (MUTCD)

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

1320.13(3) Supporting Information


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

“Crash Reductions Following Installation of Roundabouts in the United States,” Insurance Institute for Highway Safety, March 2000


Truck and Bus Safety; Roundabouts, Journal of the Transportation Research Board No. 2585, 2016.

http://trrjournalonline.trb.org/toc/trr/2585/

Understanding Flexibility in Transportation Design – Washington, WSDOT, 2005

www.wsdot.wa.gov/research/reports/600/638.1.htm