1 - Access Management

Management of access to arterial roads is vital to creating a safe and efficient transportation system for motorists, bicyclists, and pedestrians. Access guidance is provided through the Region access coordinator, Chapter 7 of the Facilities Development Manual (FDM), and the WisDOT Traffic Impact Analysis (TIA) Guidelines..

The operational characteristics of roundabouts may offer advantages when compared to existing conventional approaches to access management. Some roundabout benefits include:

- Increased capacity along arterial roads,
- Reduction of traffic congestion and delay,
- Improved safety,
- More efficient use of land, and
- Savings on infrastructure investments

For example connecting two roundabout intersections with a raised median will preclude lefts in/out from the side street or business access to protect main-line capacity. U-Turns are not problematic at roundabouts and can increase safety. This provides the desired capacity protection and safety along the mainline with less impact to business accessibility.

Major commercial driveways may be allowed as one leg of the roundabout. However, installation of a signal or roundabout strictly for access to private development is discouraged. They may be designed at a public road access point as an intersecting leg of a roundabout. Moreover the roundabouts may reduce the need for additional through-lanes thus narrowing the overall footprint of the roadway system.

Minor commercial and residential driveways are not recommended along the circulating roadway unless designed as a leg of the roundabout. Some situations may dictate the need for a driveway and must be analyzed on a case-by-case basis. Driveways may be located along entrances and exits, but need to be set back to not interfere with pedestrian movements in the crosswalks, and to minimize the number of conflict points with vehicles approaching or exiting the roundabout

The preliminary planning phase for any intersection including roundabouts should include a comprehensive access management plan for the site. Consider the possible need to realign/relocate existing driveways, and include their associated costs in the project's preliminary estimate. Account for pedestrian accessibility and safety during all stages in the development of a comprehensive access management plan.

2 - Functional Intersection Area

As addressed in FDM 11-25-1 the functional area of an intersection includes the physical area, but also extends upstream and downstream, along all of the intersection roadways, from the physical area. The functional area for a roundabout is generally less restrictive due to low speeds (15 to 20 mph) and less queuing, when compared to a traditional signalized intersection. Roundabouts will reduce queuing and minimize the need for exclusive turning lanes that may be required at a signalized intersection. Also different sight requirements at a roundabout require drivers to judge gaps at higher perception reaction time (PRT) than stated in FDM 11-25-1, Table 1. A roundabout's functional intersection area should be determined by the length of the splitter island and the estimated queue length back from the yield line. Use the RODEL software to analyze the length of queue as discussed in FDM 11-26-20. Also, consider the sight distance and high speed approach requirements discussed in FDM 11-26-30.

3 - Corner Clearance and Driveway Location Considerations

Corner clearance represents the distance that is provided between an intersection and the nearest driveway. FDM 11-25-1 discusses the four types of corner clearance and corner clearance distances for State Trunk Highways (STHs). Corner clearance for roundabouts is generally less restrictive than a signalized intersection because a roundabout reduces speed and queuing. On a case by case basis it may be feasible to consider full access driveway closer to a roundabout than would be considered for other types of control, e.g. a traffic signal.

There are three main considerations for driveway location relative to a roundabout entry or exit:

1. Volume of the driveway: If it is only occasional traffic and off-peak hour, entering the driveway from the highway, i.e. a low volume case, there may be no storage required for left turns. The driveway may be located closer to the roundabout subject to criteria 2 and 3. If the volume entering the driveway from the highway is moderate and the arterial flow impeding the driveway results in a predicted queue spillback then the queue length must be accounted for in the driveway location. In cases where a driveway location is downstream of a roundabout exit there is a potential for the left turning traffic to back up into the roundabout.
2. Operational impacts of the roundabout (queue spillback from the entry across the driveway opening): From the queue prediction results generated from RODEL the designer can assess how often the entry will queue back across the driveway.
3. Sight distance between users: The driveway exit must have proper sight distance of the roundabout exit, the speed of exiting traffic from the roundabout and to the left of the approaching upstream traffic. The approach sight to the driveway from the roundabout or approaches to the roundabout must also meet intersection sight criteria for the approach speeds.

4 - Interchange Ramps

According to FDM 11-5-5 a minimum distance of 1320 feet between a ramp terminal and any adjacent intersection is required. This distance (1320') is typically needed to provide progression for a series of signalized intersections. Roundabouts need less space between adjacent intersections to operate at a high level of service. Operational concerns at an interchange resulting from reduced access spacing, such as traffic blocking adjacent intersection, can be better understood through the analysis of forecasted queue lengths. Queue lengths for a roundabout should be predicted with the use of RODEL traffic modeling and the impacts to the adjacent intersections reviewed using other appropriate traffic modeling software. A traffic analysis is required to justify a less than desirable distance (1320 feet) of access control.