

Access Management Considerations for High Capacity Multi-Lane Roundabout Design and Implementation

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Abstract

Roundabouts are compatible with many access management principles. The operational characteristics differ from signalized intersections in many substantial ways. This allows for more flexibility that can be of significant benefit when balancing the competing objectives of roadway safety, capacity, and access needs of existing and or proposed land uses. This paper explores examples of the different opportunities that roundabouts can provide and the effects on how the transportation infrastructure is planned and designed. It specifically addresses business access into and near roundabouts, roundabouts in series, and other access management issues compatible with roundabouts in redevelopment, new development and urban constrained environments.



State Trunk Highway 78 and State Trunk Highway 92 Mt. Horeb, WI

The STH 78/92 intersection has a constrained urban environment where the horizontal alignment was limited by a gas station, a cemetery, and two other commercial properties. The roundabout provides an efficient flow of traffic and maintained business accesses within 50 ft of the intersection. The existing peak hour volume is ~2,500 vph and the design hour volumes were estimated at 3,200 vph with 8% heavy trucks.



US 23, Lee Road Interchange Livingston County, MI

A proposed 600,000 square foot mixed retail development, interchange provided many challenges.

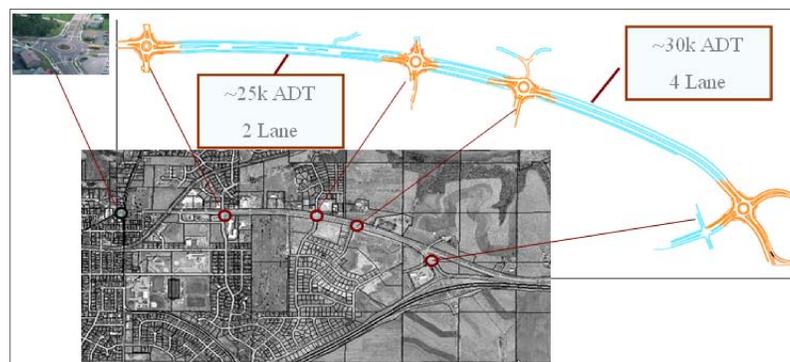
Of the seven alternatives evaluated, a proposed partial diamond interchange with a two-lane bridge combined with a double roundabout with two 4-lane entries on the west side and a single 2-lane roundabout on the east side was analyzed and designed. The roundabout alternative was selected as it could provide the future capacity, safety and access needs and requirements for this system.



Roundabouts in Series

A common concern of roundabouts in series along a corridor is the impact to traffic flow (Isebrands et al, 2008) and compatibility with traffic signals and stop controlled intersections, however, with good engineering analysis, planning and design, roundabouts, signals and stop controlled intersections can coexist adjacent to each other and along the same corridor. Issues such as platoon arrivals, lane-use needs of nearby intersections, or access points must be accounted for and designed accordingly.

Mt. Horeb, WI - Main Street/Springdale Street



After the success of the STH 78/92 roundabout, the village went forward with plans to construct four more roundabouts along a newly developing corridor, Main Street/Springdale Street to the interchange with US 18/151. The flexibility of the roundabouts afforded the opportunity to optimize the layout for a proposed new development and to accommodate existing business along this commercial corridor. The projected traffic volumes were between 25,000 and 30,000 ADT at full build out.

Business Access

Unlike traditional signalized intersections, roundabouts provide more flexibility to accommodate business accesses into and near the intersections. Commercial entrances, ranging from big box retail centers to health care facilities, can have direct access into a roundabout via a separate approach leg. Accesses near intersections are often blocked by queues and access onto the roadway is often difficult, if not impossible during peak hour.

Wal-Mart Super Center on South Town Drive/ Industrial Drive

Roundabout provided the key access solution leading to approval of this \$200M commercial 'Brown Fields' retail/commercial redevelopment. Providing improved access and safety for the existing industrial park and retail shopping traffic along this corridor.



Access to Minor Roadways and Driveways

Minor driveway and roadway access near roundabouts must be evaluated on a case-by-case basis. Roadway volumes, context, trip generation all must be considered to determine the appropriateness of these access points. Private entrances often do not generate more than 10 trips a day and the impacts may be negligible to the operation of a low to moderate capacity roundabout and may be accommodated (if no other option exists) as direct access.

Springfield, OR - MLK Boulevard

Access via a fifth minor leg was required to be maintained to an established residential neighborhood that serves ~13 residences



and helps maintain good neighborhood circulation. Additionally, residential access is accommodated 125 ft from the roundabout on the east leg and small commercial driveway within 100 ft on the west leg.

Summary

The significant differences and advantages roundabouts provide in some situations related to transportation planning and access management, are just beginning to be developed and applied. Roundabout applications on our roadway systems can provide significant advantages to operational and safety principles which are, as of yet, not clearly understood or documented in industry planning and access management standards. Roundabouts provide flexibility for accesses at and near intersections as well as along a corridor.

