PURPOSE OF THE BROCHURE

This brochure serves as a guide to the major benefits of several access management techniques in use across the United States. The purpose of this brochure is to provide a comprehensive and succinct examination of the benefits of access management and address major concerns that are often raised about access management.

The benefits usually identified with access management include improved movement of through traffic, reduced crashes, and fewer vehicle conflicts. Most major concerns about access management relate to potential reductions in revenue to local businesses that depend on pass-by traffic.

This brochure does not describe the precise strategies that transportation departments should follow to implement an access management program, but rather provides an introduction to the key concepts. The brochure may also be a useful tool to distribute at public meetings for both general access management plans and specific applications of access management techniques.

This brochure describes the relevant benefits and issues with three key sets of access management techniques:

1. Access spacing, including spacing between signalized intersections and distance between driveways;
2. Turning lanes, including dedicated left- and right-turn lanes, as well as indirect left turns and U-turns, and roundabouts; and
3. Median treatments, including two-way left-turn lanes and raised medians.

WHAT IS ACCESS MANAGEMENT?

Access management is a set of techniques that state and local governments can use to control access to highways, major arterials, and other roadways. Access management includes several techniques that are designed to increase the capacity of these roads, manage congestion, and reduce crashes.

- Increasing spacing between signals and interchanges;
- Driveway location, spacing, and design;
- Use of exclusive turning lanes;
- Median treatments, including two-way left-turn lanes (TWLTL) that allow turn movements in multiple directions from a center lane and raised medians that prevent movements across a roadway;
- Use of service and frontage roads; and
- Land use policies that limit right-of-way access to highways.

State, regional, and local governments across the United States use access management policies to preserve the functionality of their roadway systems. This is often done by designating an appropriate level of access control for each of a variety of facilities. Local residential roads are allowed full access, while major highways and freeways allow very little. In between are a series of road types that require standards to help ensure the free flow of traffic and minimize crashes, while still allowing access to major businesses and other land uses along a road.
**ACCESS SPACING**

**Signal Spacing**

Increasing the distance between traffic signals improves the flow of traffic on major arterials, reduces congestion, and improves air quality for heavily traveled corridors. The appropriate spacing between signals for a particular corridor depends greatly upon the speed and flow of traffic, but any thing greater than two signals per mile has a significant impact on congestion and safety.

A major synthesis of research on access management found that each additional signal over two per mile (i.e., a one-half mile signal spacing) increased travel time by over six percent. [4] A study of an intersection in Cincinnati where a signal was added found a 20 percent increase in peak travel times. [11]

A demonstration project in Colorado revealed that half mile signal spacing and raised medi-ans on a five-mile roadway segment reduced total hours of vehicle travel by 42 percent and total hours of delay by 59 percent, compared to quarter mile signal spacing.

**Driveway Spacing**

Appropriate driveway spacing presents another major access issue. Large numbers of driveways increase the potential conflicts on the road. Fewer driveways spaced further apart allow for more orderly merging of traffic and easier access for emergency vehicles. The congestion impacts of reduced driveways are fairly clear. It is impossible for a major arterial or highway to maintain free flow speeds with numerous access points that add slow moving vehicles. A research synthesis found that roadway speeds were reduced an average of 2.5 miles per hour for every 10 access points per mile. [4] With higher numbers of access points, congestion increases significantly.

An overabundance of driveways also increases the rate of car crashes. An examination of crash data in seven states found that half mile signal spacing reduced car crashes by as much as 70 percent, improved level of service by one full grade in some areas, and increased lane capacity by as much as 36 percent. [5] Raised medians also provide extra protection for pedestrians. A study of median treat-ments in Georgia found that raised medians reduced pedestrian-involved crashes by 45 percent and fatalities by 78 percent, compared to two-way left-turn lanes. [12]

**Right Turns**

Right-turn lanes typically have a less substantial impact on crashes and roadway capacity than other types of turn strategies, because there are fewer limitations on right turns. Though there are fewer studies of these impacts, there is a clear relationship between the number of vehicles attempting a right turn in a through traffic lane and its delay to through traffic. This relationship is exponential – each additional car that must wait for a right turn will increase the delay more than the previous car. At intersections with substantial right-turn move-ments, a dedicated right-turn lane segregates these cars from through traffic and increases the capacity of the road.

**Roundabouts**

Roundabouts represent a potential solution for inter-sections with many conflict points. Though not appropriate for all situations, roundabouts reduce vehicle conflicts across traffic. Only a few studies have examined the safety benefits of roundabouts. One study of four intersections that were replaced with roundabouts in Maryland found a drop in crashes between 18 and 29 percent and a reduction in injury crashes between 63 and 88 percent. The cost of crashes at these locations, one measure of severity was also reduced by 68 percent. Overall crashes on roundabouts were more minor than those at left-turn locations. [8] A study of roundabouts in several locations found a 51 percent reduction in crashes, including a 73 percent reduction in injury crashes. [9] A study of 32 percent on roundabouts found only crashes for single-lane round-abouts. Multi-lane roundabouts only experienced a 29 percent reduction in crashes. [6]

**Business Concerns**

Installing raised medians often raises serious concerns by the business community that local businesses that depend upon pass-by traffic (especially gas stations and fast-food restaurants) [10] will be adversely affected by medians. Though there are few studies of the actual impacts of medians on business sales, there are several sur-veys of business owner opinions. Surveys conducted in mul-tiple corridors in Texas, Iowa, and Florida demonstrate that the vast majority of business owners believe there have been no declines in sales, with some believing there are actually improvements in business sales. [2,5,8] One study in Texas indicated that corridors with access control improvements experienced an 18 percent increase in property values after construction. [2]

**TURNS**

**Left Turns**

Left-turn lanes for vehicles remove stopped vehicles from through traffic. Left-turn lanes at intersections substantially reduce rear-end crashes. A major synthesis of research on left-turn lanes demonstrated that exclusive turn lanes reduce crashes by 18 to 77 percent (50 percent average) and reduce rear-end collisions between 60 and 88 percent. [4]

Left-turn lanes also substantially increase the capacity of many roadways. A shared left-turn and through lane has about 40 to 60 percent of the capacity of a standard through lane. [4] A synthesis of research on this topic found a 25 percent increase in capacity on average, for roadways that added a left-turn lane. [13]

**Indirect Turns**

Some of the biggest issues with managing access come at intersections where vehicles must cross traffic. Some states and cities have adopted indirect turns to reduce these conflicts. In New Jersey, the jug-handle left turn requires a right turn on a feeder street, followed by a left onto a cross street. Detroit has extensively used an indirect U-turn that requires a U-turn past an intersection, followed by a right turn instead of a regular left turn.

Like dedicated left-turn lanes, indirect left-turns reduce crashes, improve conges-tion, and add capacity. Crashes decline by 20 percent on average, and 35 percent if the indirect turn intersection is signalized. Capacity typically shows a 15 to 20 percent gain. [4]

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