

# **Chapter 8**

## **Traffic Operations Improvements**



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### TRAFFIC OPERATIONS IMPROVEMENTS

Operational improvements, such as access management and improved signalization, can be very effective in reducing congestion. By facilitating traffic turns, merging, and other movements, operational improvements enhance both mobility and safety. By enabling roadways to perform more efficiently, operational improvements increase roadway capacity, may reduce the need for expansion projects, and help preserve and maintain the existing infrastructure, which is a high priority at national and regional levels.

In comparison to capacity construction projects, most operational improvements can be implemented relatively quickly and at low cost. This plan recommends operational improvements to help achieve regional transportation goals, but their implementation depends on local government initiative.

Although congestion is an area-wide phenomenon, operational improvements are especially effective on arterials. Before the interstate highways were constructed, it was arterials — mostly federal and state highways — that determined the locations of major travel origins and destinations, and these facilities continue to shape current travel patterns. The region's arterial system accounts for about 35 percent of daily vehicle miles of travel and is critical to regional mobility.

As development and single-occupant vehicle (SOV) travel have increased, the region's arterials have become more congested and less efficient. Proliferation of curb cuts (driveways), frequent and improperly spaced traffic signals, inadequate turn lanes, and other factors have reduced arterials' ability to move traffic. Within the OKI region, prime examples of congested arterials include Colerain and Beechmont Avenues (US 27 and SR 125, respectively) in Ohio and Dixie Highway (US 25/42/127) and Turfway Road (KY 1017) in Kentucky.

As curb cuts and cross streets have multiplied on arterials, they have also reduced safety. Every accelerating, decelerating, or turning vehicle increases accident risk. Typically, more than half of all accidents occur at intersections or are access-related. As traffic volume increases, so does the potential for accidents from conflicting maneuvers.

Another consequence of development that impairs arterial performance is the use of traffic signals to move vehicles safely through intersections. Every signalized intersection reduces arterial capacity. Frequent and poorly spaced traffic signals can reduce roadway capacity by more than 50 percent.

Where curb cuts, cross streets, and traffic signals are already in place, their adverse impacts can be mitigated by a variety of operational improvements. On arterials where development is pending or just beginning, arterial capacity can be preserved and mobility problems can be mitigated by a preventative approach.

### **ACCESS MANAGEMENT IN DEVELOPING AREAS**

In developing areas, access management is fundamental to preventing the mobility and safety problems caused by multiple curb cuts and traffic signals. Access management is also appropriate for developed areas, but it takes a different approach, as discussed in the next section.

Access management controls the design and operation of driveway and street connections onto a highway. Control is achieved by public plans or policies aimed at preserving the functional integrity of the existing roadway system.

In managing vehicular access between the public roadway system and adjacent private property, access management may address:

- The number, location, and design of private access points
- The frequency and spacing of cross streets and signalized intersections
- The additions of turn lanes or the prohibition of turns
- Land planning and development activities
- Safety operational issues such as sight distances and corner clearances

Access management has been demonstrated as an effective means of reducing congestion and improving safety. A Florida study found that travel delays during peak hours, an indicator of congestion, decreased by as much as 76 percent after half the median openings were closed. In Colorado, case studies of access management applications on urban and suburban arterials show crashes reduced by 20 to 60 percent. According to the Ohio Department of Transportation, access management can increase travel speeds as much as 50 percent and reduce accidents by as much as 50 percent.

There are a number of means by which local governments can implement access management, including the following:

- **Case-by-case negotiation**, in which a governmental agency negotiates with developers and landowners on a case-by-case basis
- **A corridor access management plan**, which is formally adopted by the appropriate unit of local government

- **Planned unit development and/or subdivision regulations**, which incorporate language ranging from specific and detailed requirements to simply recognizing access management as a legitimate governmental function for which authority is vested in an appropriate official or agency, such as the city public works director or the county engineer
- **An access management ordinance** that is legally enforceable, which can be adopted as a policy or planning document for all lands and roads under a local government's jurisdiction

For implementation to be consistent, predictable, and equitable for all private development within a jurisdiction, local governments should officially adopt access management as a policy or plan. Access management can be incorporated into local laws by modifying county or municipal subdivision regulations, amending local zoning laws, or including access management as part of a comprehensive plan, master plan, or thoroughfare plan.

In developing areas, access management focuses on preserving roadway capacity and functional integrity. Even as adjoining property approaches full development, access management applications can minimize an arterial's loss of roadway capacity and maintain a high level of safety.

It is recommended that local governments in developing areas take the initiative to develop access management plans to reduce the potential for future congestion.

For arterials in corridors where development pressures are just beginning or will soon occur, plans should propose a system of public and private streets and access points and be officially adopted for governing the provision of access to these roadways. These plans should also specify appropriate number, location, and spacing of traffic signals, a key component in the long range preservation of mobility in the corridor.

### **OPTIMIZING THE EXISTING SYSTEM**

For arterials in developed corridors, access management is one of several measures that can be applied to improve traffic flow. Other operational improvements that may be appropriate include improvements to signalization and spot or localized improvements such as traffic channelization, one-way streets, improved lighting and signing, and intersection improvements (left or right turn lanes, or increasing the radius of corners to facilitate the movement of trucks and buses through the intersection).

In developed corridors, the focus of access management is on reducing the potential for additional congestion from new projects and moderating existing

congestion problems. Local governments can apply access management by negotiating with developers and landowners to incorporate access management concepts into site designs; by reviewing current regulations for opportunities to incorporate access management considerations; or by developing and implementing corridor studies.

Approaches for managing access range from simply addressing new access points to retrofitting existing roadways, which can be effective in the most heavily developed and congested arterials. Retrofit plans may involve constructing new facilities such as access/service drives, providing cross-access between parking lots, or consolidating or relocating existing driveways.

In addition to access management, improvements to signalization are often effective means of improving traffic flow in developed corridors. Since computerized traffic signal systems have become available, options have increased for reducing congestion by applying and coordinating progressive signal systems, as exemplified by closed loop systems. On a corridor, areawide or multi-jurisdictional basis, centralized networks may involve dozens or even hundreds of signalized intersections.

The benefits of improved signal systems are commonly measured by reductions in travel time, vehicle stops, delay, fuel consumption, and emissions, and increases in travel speed. Studies of implemented projects show reductions in travel time ranging from 8 to 15 percent and increases in travel speed ranging from 14 to 22 percent, as well as virtual elimination of certain types of accidents.

A third means of optimizing existing streets is to incorporate bicycle facilities in the form of wide right travel lanes or striped bike lanes to facilitate road-sharing and encourage additional bicycle use. This can be accomplished either when roadway improvements are scheduled by providing additional travel lane width for bike lanes, or it may be possible to provide additional room through re-striping the existing roadway. This has the dual benefits of reducing the need for lane changing by overtaking motorists as well as providing a safer cycling environment to encourage greater use of cycling for transportation.

Cycling also benefits from access management improvements by reducing the number of potential turning conflicts. Bicycle traffic should be considered in developing local access management plans.

In the OKI region, a number of major efforts are already well under way to improve traffic operations. Among the local governments that have taken initiatives to improving traffic operations on a corridor basis is Hamilton County, where the county engineer has undertaken studies of options for access management along the following heavily developed and congested arterials:

- A 4.5-mile segment of Colerain Avenue (US 27 from Struble Road to Blue Rock Road)
- Beechmont Avenue in Anderson Township (SR 125 between the eastern county line and the City of Cincinnati boundary)
- 7.5 miles of Harrison Avenue

In these studies, representatives from the corridor's local businesses, communities, and local and sometimes state governments work together to determine how to improve traffic flow and safety. In both the Colerain and Beechmont Avenue studies, a variety of operational improvements focused on access management have been recommended for which implementation is under way.

The projects implemented as a result of these studies will undoubtedly improve traffic flow. For the Colerain Avenue project, results will be quantified in a joint research study by the Ohio Department of Transportation and University of Cincinnati over the next several years. On a regional basis, potential benefits of operational improvements cannot be quantified because of each potential project's unique combination of operational improvements, roadway conditions, and traffic characteristics. The results of the Colerain Avenue research project will be useful, however, in estimating the benefits of other corridor applications that may be undertaken in the region.

For improving traffic operations in developed areas, priority should be given to corridors that are well-developed and experiencing congestion and for which current access management is inadequate. For these corridors, "retrofit" plans should be developed that integrate access management concepts.

It is recommended that local governments in developed areas prepare plans for improving operation of the region's major roadways.

To reduce congestion along the region's arterials, major efforts are needed beyond those which local governments have already initiated and those recommended in Chapter 9. Because of the high cost of additional lanes on urban freeways, it is recommended that a detailed operations analysis such as traffic signal coordination and interconnectivity with the local Intelligent Transportation System, ARTIMIS (Advanced Regional Traffic Interactive Management and Information System) be advanced for key arterials that parallel these freeways. The goal is to provide an efficient alternate route to the freeway by maximizing the utility of the arterial.

Specifically, it is recommended that a pilot study be undertaken to determine specific recommendations for signal synchronization, ITS integration and operational improvements. The Dixie Highway Corridor Traffic Operations Study is proposed to look at US-25-42-127 from the Ohio River to I-75 in Florence.

The estimated cost for the study is \$500,000.

For operational improvements to work on a corridor basis, coordination is critical. Governments in congested corridors need to coordinate the planning and implementation of operational improvements, which is complicated by home-rule provisions in Ohio.

To support local government initiatives in undertaking operational improvements, OKI provides technical assistance in response to requests.

It is recommended that operational improvements for major roadways be given funding priority at all governmental levels.

For freeways, several additional items are discussed in Chapter 9 – Intelligent Transportation Systems – which can be effective in optimizing the existing system. Some of these are already being implemented in the OKI region.