



Traffic Engineering & Highway Safety Bulletin



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Access Management

WHAT IS ACCESS MANAGEMENT?

The *Access Management Manual*, published by the Transportation Research Board (TRB), defines access management as "...the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway." In simple terms, it is the management of access points along a roadway such that the impact to traffic operations is minimized, while maintaining reasonable access.

By preserving the safety and efficiency of a roadway network, access management procedures balance mobility and access, which are a roadway's two primary functions. This is ac-

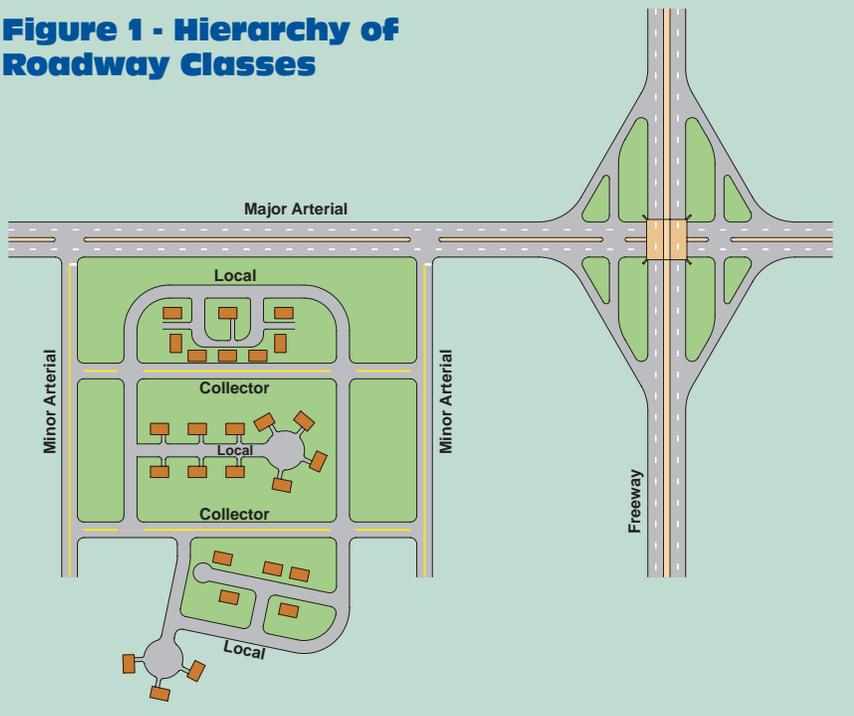
complished by carefully managing the number of conflicts that are introduced by intersecting driveways and streets.

For roadways such as freeways, access is limited to interchanges with the primary function being mobility. At the other end of the spectrum is a local street in a residential neighborhood. This roadway type functions mainly as



a means of providing access to homes and serves minimally as a means of mobility. Figure 1 shows a hierarchy of roadway classes, each with varying degrees of access and mobility. 

Figure 1 - Hierarchy of Roadway Classes



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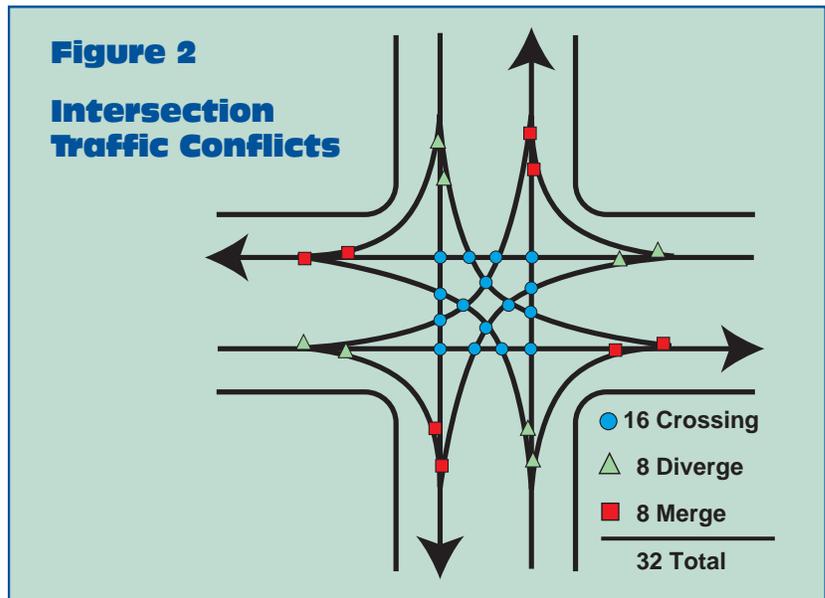
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WHY IS ACCESS MANAGEMENT NEEDED?

Without any type of access control along a roadway, access points will likely increase. Access management is important to minimize traffic conflicts (Figure 2) along a roadway. Traffic conflicts occur when the paths of vehicles intersect. This results when vehicles are stopping in, crossing, entering, or exiting the traffic stream. At each conflict point there exists a potential collision. As more conflict points are introduced to a segment of roadway, driving becomes more complex and motorists are more likely to make mistakes. Congestion increases and safety deteriorates. Effective access management preserves roadway capacity and reduces crashes. 

PRINCIPLES OF ACCESS MANAGEMENT

The focus of access management is to limit and consolidate access along major roadways while ensuring that the supporting roadway network can safely and efficiently provide the necessary access.



The goals of access management can be realized by adhering to the principles set forth in the *Access Management Manual*. Those principles most applicable to access management on military installations are described below:

1. Limit direct access allowed onto major roadways – Roadways serving high-traffic volumes should require a higher level of access control to protect the roadway’s intended function of moving through traffic.

Access to major roadways should be restricted and instead be provided along roadways with a lower classification such as local or collector streets.

2. Locate signals to favor through movements – When signalized intersections are located with long, uniform spacing, coordination between the signals ensures minimal interruption to traffic flow. If signals are located close to access that may in the future become signalized,

disruption of the coordinated traffic flow will result, thereby creating congestion and greater delays. For this reason, spacing between a signal and access should be as large as possible.

3. Limit the number of conflict points – More mistakes and a higher likelihood of collisions result when drivers are faced with a high conflict area (Figure 3). These

Figure 3 - High-Conflict Areas



Wide driveway slightly offset from opposite street results in many conflicts.

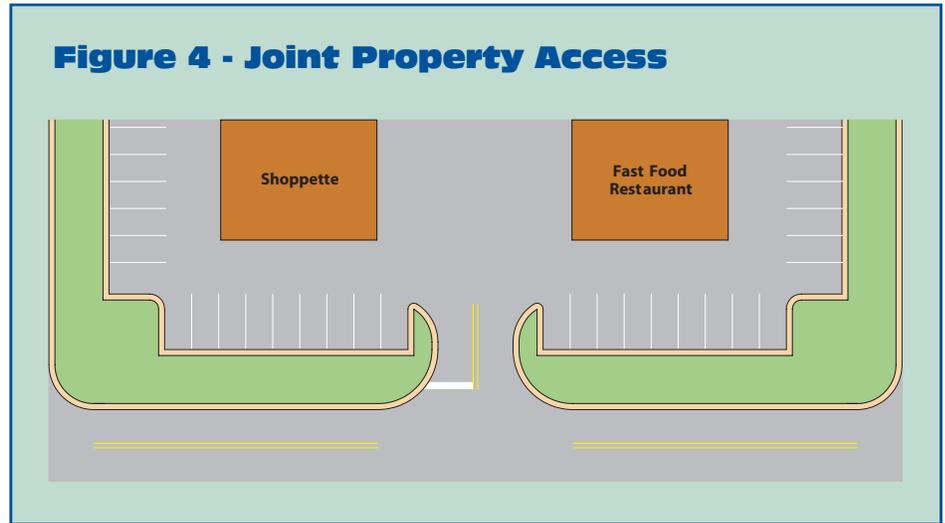


Driveways too close to signalized intersection become blocked by stopped vehicles.

areas create stressful situations that require a high degree of attention. By minimizing conflicts, traffic operations improve and the potential for collisions decrease. This simplifies the driving task, resulting in a lower-stress environment results for the driver.

4. Separate conflict areas – Nearby conflict areas can block movements and increase congestion (Figure 3, page 2). Drivers need time to react to each conflict area they are presented with. As travel speeds along a roadway increase, the necessary distance between access points increases because of driver perception-reaction time. Once drivers recognize a potential hazard, they need time to react to that hazard. For this reason, it is important to provide sufficient distance between access points.

5. Remove turning vehicles from through traffic lanes – Turning lanes remove lower speed vehicles from the higher speed through lane. Once out of the through lane, turning vehicles can wait safely in a protected lane to complete their turn. This improves the safety and efficiency of an intersection with a street or driveway.



6. Provide a supporting street and circulation system – During planning stages it is important to include a supporting network of local and collector streets (Figure 1, page 1) to accommodate development such as restaurants or a BX/Commissary.

7. Eliminate the need for multiple driveways – Joint property access is also key in eliminating the need for each property to have a separate driveway (Figure 4). This connectivity allows motorists to visit adjacent properties without having to drive separately to each.

8. Preserve the functional area of intersections – The functional area of an intersection is the area critical to safe and efficient vehicular movement. This area is where all maneuvering/lane-changing takes place for drivers to complete the necessary turning movements. When access is located too close to this critical area, it can cause traffic conflicts that seriously disrupt the function of the intersection.

ACCESS MANAGEMENT STRATEGIES

When constructing new access points or upgrading existing access, it is important to consider location and spacing. These components are critical to safe and efficient roadway operation.

Access Location

Proper access location involves several considerations:

- ✓ Sight distance
- ✓ Following hierarchy of roadways
- ✓ Functional area of intersections



Sight Distance

Providing adequate sight distance at a driveway ensures motorists can safely enter or exit a roadway. Adequate sight distance also allows approaching drivers sufficient distance to react to entering or exiting vehicles if necessary.

The two types of sight distance are:

1. Stopping Sight Distance

(Figure 5) – The minimum distance drivers need to react to a potential conflict and come to a stop. These distances are provided in Table 1.

2. Intersection Sight Distance

(Figure 5) – Distance needed to provide a driver waiting at an access with an opportunity to enter or cross the major roadway. These distances are provided in Table 2.

Roadway Hierarchy

Avoid connecting a roadway of low functional class to one with a much higher functional class. When possible, connections should be made only between roadways with similar classification. For example, a connection between a minor and major arterial is acceptable, but connecting a local road to a major arterial should be avoided.

Functional Area of Intersections

Constructing access points in the area of an intersection where maneuvering/lane-changing takes place should be avoided. This area extends at least to the end of turning lanes and to where stopped traffic typically would queue.

Access Spacing

Wide spacing between successive driveways is the single most important element of access management since each new access introduces numerous traffic conflicts to the roadway. These conflicts reduce travel speeds and contribute to congestion and higher crash potential.

Figure 5 - Sight Distance

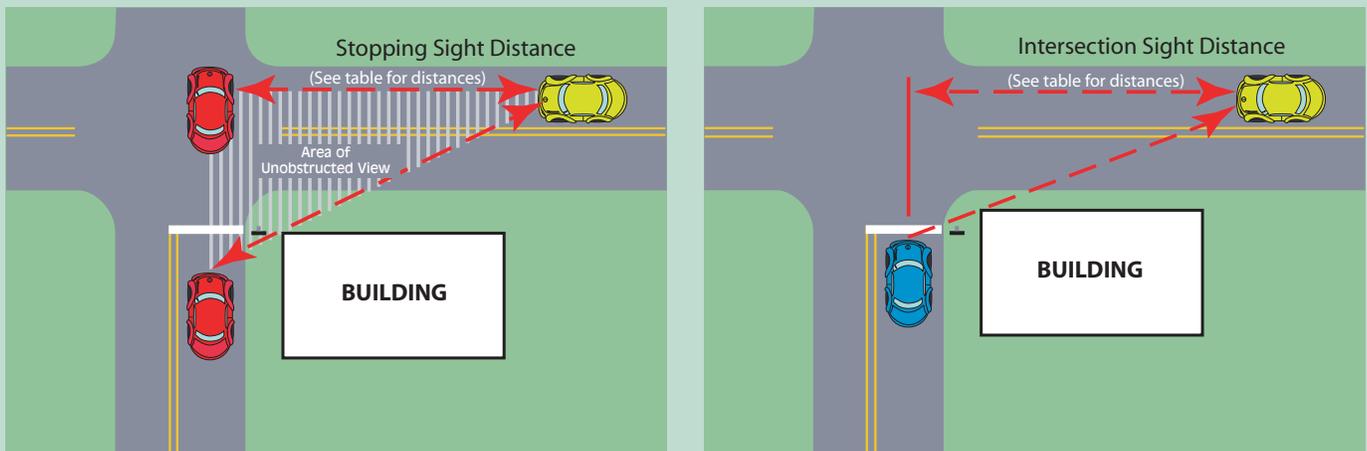


Table 1

Speed (mph)	Stopping Sight Distance (ft)				
	Level Grade	Downgrade		Upgrade	
		3%	9%	3%	9%
30	200	205	227	200	179
40	305	315	354	289	269
50	425	446	507	405	375
60	570	598	686	538	495
70	730	771	891	690	631

Table 2

Speed (mph)	Intersection Sight Distance (ft)	
	Left Turn	Right Turn
30	335	290
40	445	385
50	555	480
60	665	575
70	775	670

Source: *A Policy on Geometric Design of Highways and Streets, 2001.*

The closer these access points are, the more profound are these effects. Minimum access spacing requirements attempt to minimize these impacts.

Various sets of guidelines exist for the spacing of access points. Spacing requirements should be based on number of expected trips, speed limits, and roadway classification among other considerations. General spacing guidelines have been published by the Transportation Research Board's (TRB) NCHRP Report 348 (Table 3).

Table 3

Unsignalized Access Guidelines	
Operating Speed (mph)	Spacing (ft)
30	100-200+
45	300-500+
Type of Facility	Spacing (ft)
Major Arterials	300-500+
Minor Arterials	100-300
Collectors	100-200

Lower values applicable to roadways on most military installations. Higher values would only apply to high-speed or median-divided roadways.

The spacing guidelines shown in Table 3 provide a range of values. The lower values apply to lower class roads or roadways with raised medians where no left turns are permitted. 

ACCESS DESIGN

The three basic design components of an access are:

- ✓ Corner radius
- ✓ Width
- ✓ Throat length

Corner Radius

Sufficient corner radius will enable a vehicle to enter or exit an access without encroaching into adjacent traffic lanes. The radius should be designed for the largest type of vehicle expected to use the intersection. For passenger cars, this radius is typically 30 feet; for trailer trucks, the minimum radius is 50 feet.

Width

While width must be sufficient to accommodate intended traffic movements, too large a width will result in conflicts spread over a large area. Consequently drivers will be uncertain where to position their

SDDCTEA Can Help!

SDDCTEA highway engineers stand ready to help installations with their traffic engineering concerns—especially those involving high crash locations or access control. We perform many types of studies with an emphasis on low-cost improvements that are immediate or short-term and yield high benefits to their implementation costs. Generally, the studies conducted include:

- ❖ Access control
- ❖ Access roads
- ❖ Fatal crash analysis
- ❖ Force protection
- ❖ High crash locations
- ❖ Safety audits
- ❖ Signal operations
- ❖ Traffic calming evaluations
- ❖ Traffic engineering
- ❖ Traffic impact (such as BRAC)

vehicles with such a wide access. The recommended width is 12 feet for each lane. Greater widths may be necessary where truck traffic is expected.

WHAT'S WRONG WITH THIS PHOTOGRAPH?

Answers from Page 3

1. Wide, uncontrolled access to property abuts much of the roadway, resulting in a large conflict area.
2. Intersection of minor street is shown at near right of photo (A). The first property access is much too close to this intersection (B).



Throat Length

The throat of an access is the distance between the adjacent roadway and the point internally where drivers are presented with conflicts. The throat lengths at Base Exchange/Commissary complexes are often too short, which leaves little room for vehicles to stack when present with an internal conflict (Figure 6). Eventually vehicles back out onto the adjacent street, which increases crash potential significantly. A short throat length also results in insufficient reaction time to the conflicts that a driver will be presented with upon entering the site. Table 4 provides some general guidelines for throat lengths. Figure 6 illustrates the many problems associated with such a short throat length and provides an example of adequate throat length. The drawback to longer throat length is the impact to parking. However, ensuring safe entry into the site is more important. 

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Table 4

Throat Length Requirements		
Type of Retail Establishment (or similar military facility)	Recommended Throat Length	Approximate Number of Cars
Small strip mall (shoppette/video store/fast food restaurant)	75-95 feet	5
Small shopping center or large supermarket (BX/Commissary)	200 feet	11

Source: Access Management Manual, 2003.

Figure 6 - Driveway Throat Length

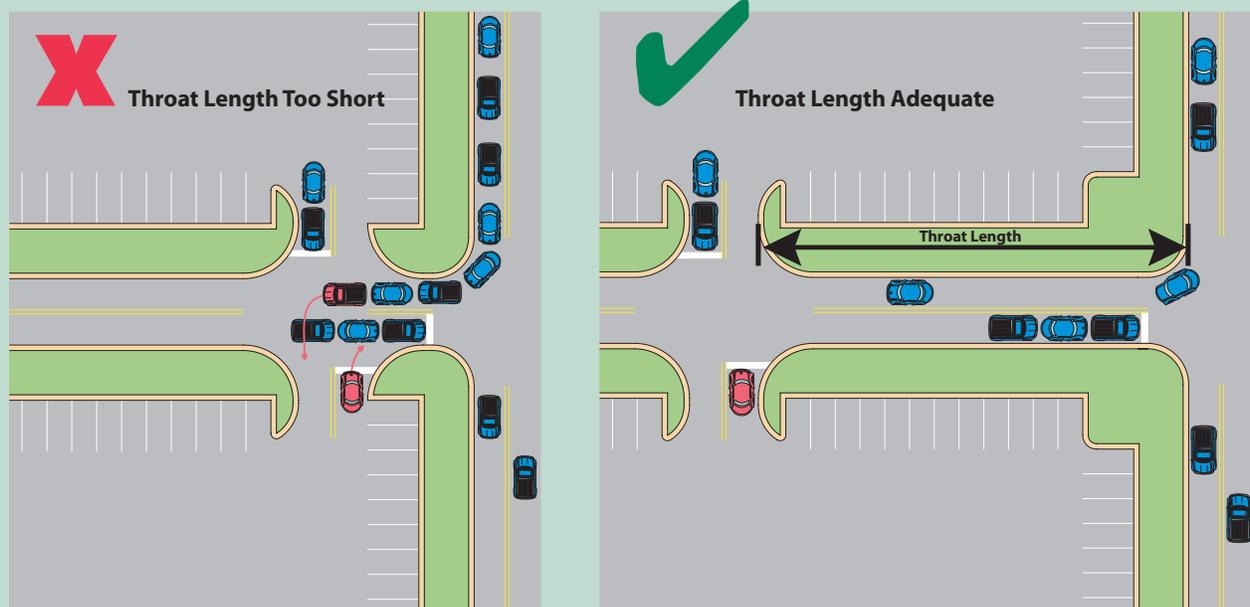
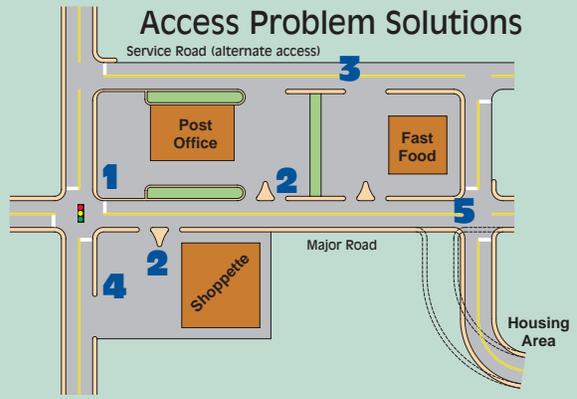
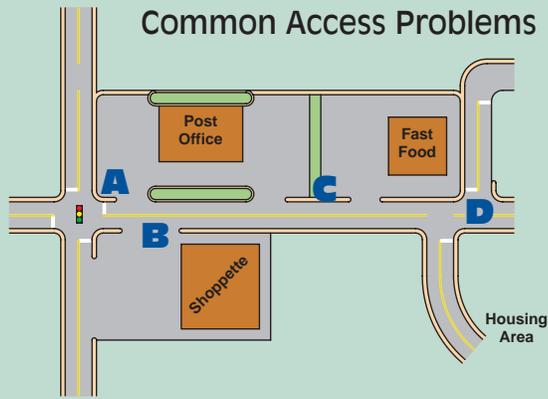
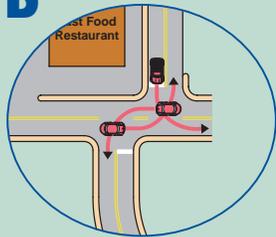
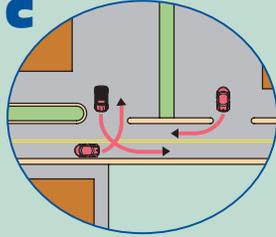
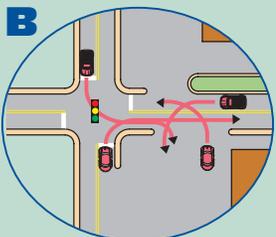
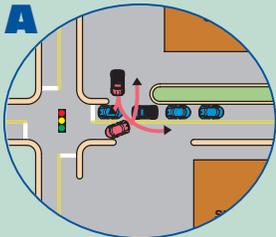


Figure 7 - Access Problems and Solutions



<p style="text-align: center;">Access Problem Solutions</p>	<p>1. Driveway closure – Eliminating driveways when other alternative access is provided will eliminate points of conflict along the adjacent roadway.</p>	<p>2. Restrict left-turn movements – If alternate access can be provided, such as a service road, left turns can be restricted using raised concrete islands.</p>	<p>3. Construct service road – Service roads eliminate access from major roadways.</p>	<p>4. Reduce width of access – Access width reduction minimizes the length of roadway along which traffic conflicts are present.</p>	<p>5. Intersection realignment – Relocate legs of intersections, when possible, to align with opposing legs.</p>
<p>Common Access Problems</p> <p>A. Driveways too close to intersections - When a driveway is too close to an intersection, blocking of turning movements will occur. This can have detrimental effects on the operation of the intersection.</p>					
<p>B. Wide, uncontrolled access along a property's frontage - Inadequate access control, especially at the corner of an intersection, will result in a high-conflict area with frequent unpredictable, unsafe turning movements.</p>					
<p>C. Driveways spaced too close together - When drivers are simultaneously exiting nearby driveways, uncertainty is involved trying to predict other nearby maneuvers. Left turns from the major street may also block multiple accesses.</p>					
<p>D. Intersecting roads with a slight offset - When intersecting roads are slightly offset from one another, blocking of turning movements may result. For vehicles crossing the major roadway a slight jog results instead of a straight-line movement.</p>					



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