



## 5I-3 Driveway Spacing

### A. General

The separation of conflict points simplifies the driving task by giving drivers a longer time to respond to successive access related events. The higher the speed, the longer the distance a vehicle will travel during a given perception-reaction time. Also, drivers need more time to react to complex conflict areas. Hence minimum separation distances are a function of both the speed of traffic on a given section of roadway and the complexity of the decision with which the driver may be presented. The complexity of the problem, in turn, increases with both the number and type of conflicts and the volume of traffic.

Driveways generate turning movements. Motorists turn both into and out of driveways in both left and right directions, when permitted. Traffic turning into and out of driveways moves more slowly than through traffic. This causes conflicts that lead to broadside and rear-end collisions between vehicles. For example, an urban route with 100 feet between driveways will experience roughly twice as many crashes as a similar route with 250 feet between drives.

The various methods that can be utilized to separate conflict areas include the following:

- Minimum access spacing
- Minimum corner clearance
- Minimum property line clearance
- Limit the number of accesses per property
- Designate the access for each property

### B. Major/principal arterial (urban/suburban) access spacing

#### 1. Driveway density vs. crashes

The number of driveways per block or per mile and driveway consolidation are the two most important considerations in access management. These are the basic issues in any access management plan or program. Crash rates go up very quickly as the number of driveways per mile increases on suburban arterial/collector roadways.

**Table 1:** Crashes vs. driveway density

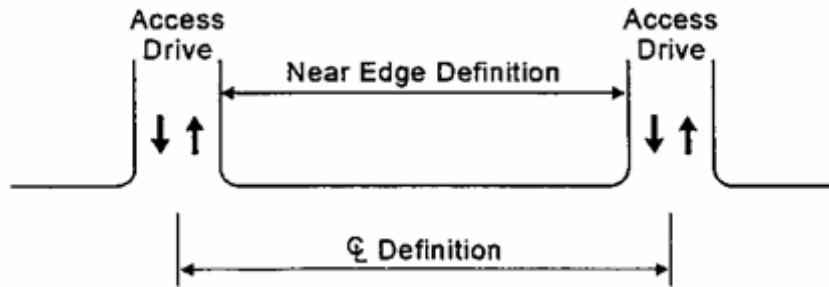
<b>Driveways Per Mile</b>	<b>Approximate Driveways Per 500 ft.</b>	<b>Representative Crash Rate for a Multi-lane, Undivided Roadway</b>	<b>Increase in Crashes Associated with More Driveway Density</b>
Under 20	Under 2	3.4	----
20 to 40	2 to 4	5.9	+74%
40 to 60	4 to 6	7.4	+118%
Over 60	Over 6	9.2	+171%

Source: National Cooperative Highway Research Program Report 3-52.

Although 500 feet might be a typical city block, lengths vary from place to place. Some older neighborhoods have 400 to 500 foot long blocks. Some newer communities use much longer block lengths. A common block face length design in suburban areas today is 660 feet, which provides for eight city blocks per mile.

2. Provide separation between access connections so that drivers can access any potential conflict locations one-at-a-time.

**Figure 1:** Regulate minimum spacing of access connections



3. Minimum access spacing needs to provide drivers with sufficient perception-reaction time to address one potential conflict area at a time.
4. Minimum Major/Principal Arterial (Urban/Suburban) access spacing may be based on the prevention of right-turn conflict of a driveway or intersection or stopping sight distance. Right turn overlap egress occurs when a through vehicle must monitor two egress right turning vehicles at once while still performing other driving tasks. By separating at a proper distance the overlap does not occur and the through driver has only one egress right turning vehicle to monitor.

**Table 2A:** Minimum major/principal arterial access spacing to prevent right turn overlap<sup>1</sup>

Speed MPH	Recommended Minimum (ft)*
25	120
30	185
35	245
40	300
45	350

<sup>1</sup>Transportation Research Board Record 644, 1977.

\* Intersection clearance should be the same as driveway spacings or at least as long as stopping sight distance.

5. The number of crashes is disproportionately higher at driveways than at other intersections; thus their design and location merit special consideration. AASHTO states that “ideally, driveways should not be located within the functional area of an intersection or in the influence area of an adjacent driveway. The functional area extends both upstream and downstream from the physical intersection area and includes the longitudinal limits of auxiliary lanes.” (2001, p.733) The functional area of the intersection can be further defined as the approach to an intersection that requires the driver to change speeds in order to complete a movement, such as entering an auxiliary lane or slowing down for a signal. The influence area associated with a driveway includes:
  - a. the impact length (the distance back from a driveway that vehicles begin to be affected)
  - b. the perception-reaction distance and the vehicle length

The spacing of driveways should reflect the impact lengths and influence areas associated with motorists entering or leaving a driveway. The impact length represents the distance upstream when the brake lights of through vehicles are activated or there is a lane change due to a turning vehicle. The impact lengths associated with motorists entering or leaving a driveway should be considered in establishing driveway separation distances. This is verified by recent research, which shows that vehicles making right turns into driveways have a significant impact on through vehicles. For example, 82% of the right-lane through vehicles was impacted at an approximate distance of 65 feet in advance of a driveway at 30 mph. As the distance between driveways increases, the percent of impacted vehicles decreases. For example, 52% of through vehicles are impacted through a distance of 100 feet in advance of a driveway at 30 mph and only 28% were impacted at 145 feet.

Therefore, "driveways should not be located within the functional area of an intersection or in the influence area of an adjacent driveway. The functional area extends both upstream and downstream from the physical intersection area and includes the longitudinal limits of auxiliary lanes." (AASHTO 2001 p.733)

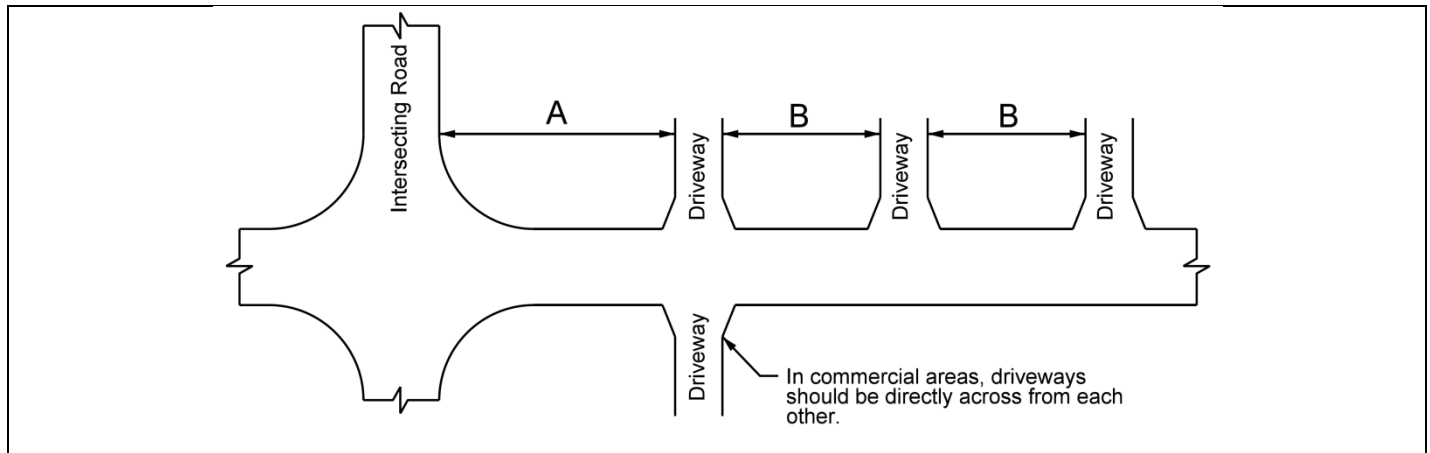
**Table 2B:** Minimum major/principal arterial access spacing for functional boundary<sup>1</sup>

Speed MPH	Recommend Minimum (ft)*
25	130
30	145
35	170
40	200
45	250
<sup>1</sup> Adapted from NCHRP Project 3-52.	
* Intersection clearance should be the same as driveway spacings or at least as long as stopping sight distance.	

### C. Minor arterial, collector, and local access spacing (urban & suburban areas)

For minor arterials and major collectors, the limitations associated with direct access roadways are very important. Direct access should be provided by frontage and backage roads and not from individual property driveways. If direct access cannot be avoided, it should be based on lot sizes. The functional area for intersections can still be maintained by increasing the frontage of corner lots. Another method for mid block access is to utilize combined driveways.

**Table 3:** Minimum distance between driveways or from intersecting streets.



	Minor Arterial			Collector			Local		
	Residential Area	Comm / Ind Area	Ag Area	Residential Area <sup>3</sup>	Comm / Ind Area	Ag Area	Residential Area <sup>3</sup>	Comm / Ind Area	Ag Area
<b>A.</b> Minimum intersection clearance <sup>1</sup>	145'	170'	300'	100'	100'	300'	75'	75'	150'
<b>B.</b> Minimum driveway spacing <sup>2</sup>	100'	200'	300'	75'	100'	300'	--- <sup>4</sup>	--- <sup>4</sup>	150'

<sup>1</sup> Values are measured from the back of the curb, intersecting road to the adjacent driveway near edge.

<sup>2</sup> Values are measured between driveway edges.

<sup>3</sup> One access drive allowed per lot. Depending on lot size, an additional drive may be allowed upon approval of the Jurisdiction.

<sup>4</sup> See Jurisdictional Engineer for local requirements.

### D. State primary roads access spacing

In rural areas, travel speeds are usually 55 mile per hour and above. This means that driveway spacing in rural areas must be longer to provide for a safe driving environment. On state highways, spacing is also longer because the routes are primarily designed to carry through traffic rather than to serve as property access routes. The more important a route is for through traffic and commerce, the longer the spacing between driveways. The following table shows the State of Iowa's standards for its highway system.

**Table 4:** Iowa DOT access control - minimum spacings

State Highway Priority	Minimum Spacing Between Driveways	Number of Driveways Per Mile
Priority I Full Access Control	Interchanges at roads	N/A
Priority II Four Lane Divided	2,640' (minimum) 5,280' (preferred)	2 2 Access allowed only at interchanges and selected at-grade locations
Priority III	1,000' rural (minimum) 1,320' rural (preferred)	4 4 8 Access allowed only at interchanges and selected at-grade locations
Priority IV(a)* Priority IV(b)*	600' rural ( $\geq 45$ mph) 300' urban ( $\leq 40$ mph)	8 16
Priority V Access Right Acquired Between 1956 to 1966	1 access per 1,000' of frontage not exceeding 2,000'	5
Priority VI	Safety and need	Varies

\* Refer to Section 5C-1, Tables 1 and 2 for application of Priority III and IV (a) and IV (b) access control.

### E. County road access spacing

On county roads, the spacing standard should also depend on the nature of the road, e.g. how important the road is for through traffic. Even on the lowest functional levels, some sort of driveway spacing standard is important for traffic safety.

**Table 5:** County road minimum access spacings

County Road Route Type	Minimum Spacing Between Driveways	Number of Driveways Per Mile
Minor arterials	600 ft	9
Collectors	300	18
Local traffic service	150	36

## **F. Other access spacing consideration**

1. At a bare minimum, the upstream corner clearance should be longer than the longest expected queue at the adjacent intersection.
2. High speed, high volume roadways need longer corner clearances whereas the corner clearance on a local street can be quite short.
3. Residential streets - driveways on corner lots should be located on the lesser street and near the property line most distant from the intersection.
4. Commonly requires that all elements of an access drive, including the radii be within a property frontage.
5. At a minimum, all driveway geometrics should be along the frontage of the property served by the driveway.
6. On major roadways, the corner clearance should be at least as long as the stopping sight distance so that vehicles turning corners can make safe stops when encountering entering traffic.
7. Encourages owners of adjacent properties to construct joint-use driveways in lieu of separate driveways.
8. Encourages a property owner to replace two or more driveways with a single driveway (or fewer driveways).
9. Adjacent properties: Joint access is located on the property line. Reciprocal easements must be executed.