B. Access Management Strategies

Streets and highways constitute a valuable resource as well as a major public investment. It is essential to operate them safely and efficiently by managing the access to and from abutting properties. Owners have a right of reasonable access to the general system of streets and highways. Roadway users also have certain rights. They have the right to freedom of movement, safety, and efficient expenditure of public funds. The need to balance these competing rights is especially acute where significant changes to the transportation system and/or land use have occurred or are envisioned to occur. The safe and efficient operation of the transportation system calls for effectively managing the highway access, via driveways or streets, to adjacent developments. This requires the proper spacing of streets and driveways.

The spacing of access for driveways and streets is an important element in the planning, design, and operation of roadways. Access points are a primary source of accidents and congestion. Their location and spacing directly affect the safety and functional integrity of streets and highways. Too many closely spaced street and driveway intersections, for example, increase accident potential and delays and preclude effective traffic signal coordination. Too few inhibit access and over-concentrate entering and exiting traffic movements.

Despite the importance of access spacing for driveways and streets, it is often overlooked in current roadway and site planning efforts. Part of the problem stems from the constraints posed by existing streets and developments and the previous subdivision of property along the highway system. However, the lack of sound spacing standards and guidelines is an equal, if not more important, constraint.

Regulating access is called “access control.” It is achieved through the regulation of public access rights to and from properties abutting the highway facilities. These regulations generally are categorized as full control of access, partial control of access, access management, and driveway/entrance regulations. The principal advantages of controlling access are the preservation or improvement of service and safety.

The functional advantage of providing access control on a street or highway is the management of the interference with through traffic. This interference is created by vehicles or pedestrians entering, leaving and crossing the highway. Where access to a highway is managed, entrances and exits are located at points best suited to fit traffic and land-use needs and are designed to enable vehicles to enter and leave safely with minimum interference from through traffic. Vehicles are prevented from entering or leaving elsewhere so that, regardless of the type and intensity of development of the roadside areas, a high quality of service is preserved and crash potential is lessened. Conversely, on streets or highways where there is no access management and roadside businesses are allowed to develop haphazardly, interference from the roadside can become a major factor in reducing the capacity, increasing the crash potential, and eroding the mobility function of the facility.

Access management involves providing (or managing) access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. Access management applies to all types of roads and streets. It calls for setting access policies for various types of roadway, keying designs to these policies, having the access policies incorporated into legislation, and having the legislation upheld in the courts.

Access management views the highway and its surrounding activities as part of a single system. Individual parts of the system include the activity center and its circulation systems, access to and from the center, the availability of public transportation, and the roads serving the center. All parts are important and interact with each other. The goal is to coordinate the planning and design of each activity center to preserve the capacity of the overall system and to allow efficient access to and from the activities.

Access management extends traffic engineering principles to the location, design, and operation of access roads that serve activities along streets and highways. It also includes evaluating the suitability of a site for different types of development from an access standpoint and is, in a sense, a new element of roadway design.

Driveway/entrance regulations may be applied even though no control of access is obtained. Each abutting property is permitted access to the street or highway; however, the location, number, and geometric design of the access points are governed by the regulations.

Access management addresses the basic questions of when, where, and how access should be provided or denied, and what legal or institutional changes are needed to enforce these decisions. In a broad context, access management is resource management, since it is a way to anticipate and prevent congestion and to improve traffic flow.

As the number of driveways along a highway increases, the crash rate also increases. The effect of driveway and business frequency on crash rates is shown in Figure V-1 and V-2. As the number of business and access points increases along a roadway, there is a corresponding increase in crash rates. This contrasts sharply with freeway crash rates that remain the same or even decrease slightly over time.

The generalized effects of access spacing on traffic crashes were derived from a literature synthesis and an analysis of 37,500 crashes. This study’s analysis shows the relative increase in crash rates that can be expected as the total driveway density increases. Increasing the access frequency from 10 to 30 access points per kilometer [20 to 50 access points per mile] will result in almost a doubling of the crash rate. Each additional access point per kilometer increases the crash rate about 5 percent; thus, each additional access point per mile increases the crash rate about 3 percent.

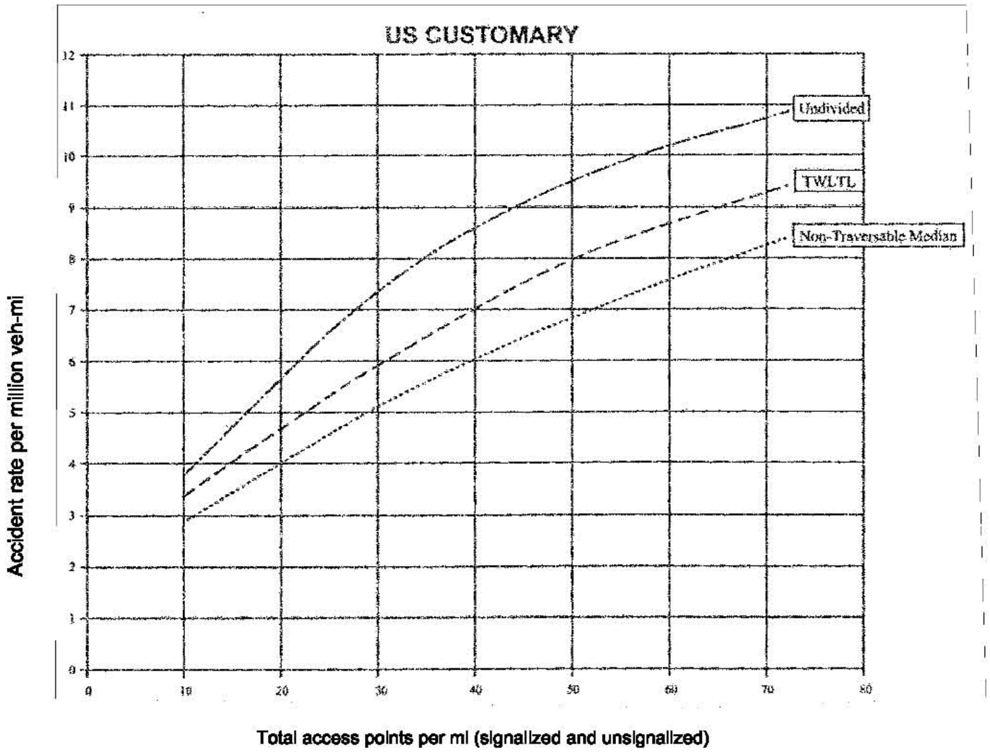


FIGURE V-1
ESTIMATED CRASH RATES
BY TYPE OF MEDIAN-
URBAN AND SUBURBAN AREAS

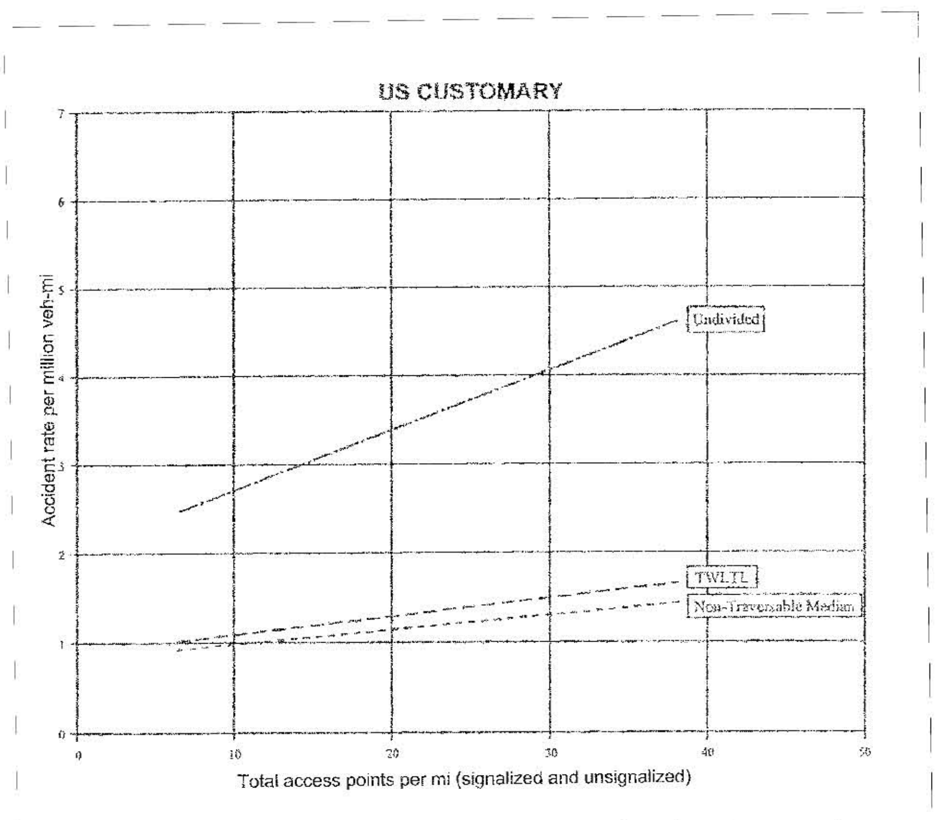


FIGURE V-2
ESTIMATED CRASH RATES
BY TYPE OF MEDIAN-
RURAL AREAS (18)

Figures V-1 and V-2 show crash rates by access frequency and type of median for urban/suburban and rural roads, respectively. Crash rates rise for each type of median treatment with an increase in access frequency. Non-traversable medians generally have a lower crash rate than two-way left turn lanes and undivided roadway sections for all access densities. Provision of non-traversable medians will eliminate left-turn movements at some intersections and driveways, but may increase U-turn volumes at other locations on the same road or may divert some traffic to other roads.

In summary, some degree of access control or access management should be included in the development of any street or highway, particularly on a new facility where the likelihood of commercial development exists. The type of street or highway to be built should be coordinated with the local land-use plan to ensure that the desired type of access can be maintained through local zoning ordinances or subdivision regulations. The control of access may range from minimal driveway regulations to full control of access. Thus, the extent and degree of access management that is practical is a significant factor in defining the type of street or highway.

An access classification system defines the type and spacing of allowable access for each class of road. Direct access may be denied, limited to right turns in and out, or allowed for all or most movements depending upon the specific class and type of road. Spacing of signals in terms of distance between signals or through bandwidth (progression speed) is also specified.

Highways with full access control consistently experience only 25 to 50% of the crash rates observed on roadways without access control. These rates are defined in terms of crashes per million vehicle kilometers [miles] of travel. Freeways limit the number and variety of events to which drivers must respond and thus lower crash rates result. Sunrise Highway is such a facility and the roadway proposed for the joint uses corridor would also be a limited or controlled access facility.

The safety and operating benefits of controlling access to a highway have long been recognized and well documented. As access density increases, there is a corresponding increase in crashes and travel times.

It is not necessary to apply access management techniques to every roadway within the Town. Rather, **the most important roads within the Town should be identified for protection through access management strategies**. These roadways should be those that currently carry substantial traffic volumes or ones that may in the future as the Town continues to develop. At a minimum all State highway facilities should be identified for protection as well as most County Highway facilities. These highways are the principal arterial routes which carry most of the vehicular trips within the Town. They are:

- North Sea Road (C.R. 38)
- Sandy Hollow Road (C.R. 52)

- Old Riverhead Road (C.R. 31)
- Quogue-Riverhead Road (C.R. 104)
- Cross River Drive (C.R. 105)
- Bridgehampton-Sag Harbor Turnpike (C.R. 79)
- Montauk Highway (C.R. 80, NYS Route 27 and NYS Route 900W)
- County Road 39
- Flanders Road (NYS Route 24)

Several Town roadways that currently carry in excess of 5,000 vehicles per day should be added to the listing of principal arterials. These roadways include:

- Old Country Road (Town) – Southampton/Brookhaven Town Line to Montauk Highway (C.R. 80).

- Noyack Road/Brickiln Road (Town) – North Sea Road (C.R. 38) to Bridgehampton-Sag Harbor Turnpike (C.R. 79).

- Scuttle Hole Road (Town) – Montauk Highway (NYS Route 27) to Bridgehampton-Sag Harbor Turnpike (C.R. 79).

The important roadways within Southampton Town traverse hamlet centers, strip commercial areas and rural residential areas. Access management techniques for each general land use type would be different. In the hamlet centers, while the movement of traffic thru the community is important, pedestrian activity and the preservation of the community character are also important. In the rural residential areas, the issues differ from those created by commercial driveways and activities. In all locations access management techniques are often pitted against existing land subdivision which created small lots, each seeking its own access to the highway.

Hamlet Centers

Each hamlet center needs to have its own strategy developed to protect its character while at the same time accommodating the present and future traffic demands. Strategies should be developed that reduce the number of through trips through these communities by either providing a successful public transportation system or by moving traffic to by-pass routes such as the joint use corridor. Connectivity between parking areas and improved circulation behind the hamlet centers as developed in the Water Mill, Bridgehampton and Hampton Bays Hamlet Studies is important.

Commercial Areas Outside Hamlet Centers

High density traffic generating land uses should be kept within the hamlet centers as a means of maintaining the centers' viability rather than placing new uses outside the center and drawing the traffic away from the hamlet centers. Lighter density uses which generate less traffic and are not always suitable for hamlet centers could be located on arterials outside the hamlet centers. Such uses would include:

- Plumbing contractors and supply facilities
- Electrical contractors and supply facilities
- Automotive dealerships
- Automotive repair shops
- Garden centers
- Marine sales

In addition to the above uses, which generate light volumes, there are several uses found outside the hamlet centers which generate considerable numbers of turning movements in and out of relatively small sites. These uses are:

- Gas Stations/Quick Marts
- Convenience Stores
- Fast-food and Take Out Restaurants
- Deli's

To date, the Town's Highway Business Zoning Districts have fostered generally low traffic generating uses with the exception of those land uses noted above. The high volume uses that are found on C.R. 39, Montauk Highway and other important Town arterials (e.g., Route 24) tend to benefit from high pass-by activity meaning that traffic utilizing the site comes from the passing traffic stream rather than generating new destination type traffic. Indeed, a high percentage of traffic utilizing some of the high volume uses and gas stations in particular, come from the adjacent stream of traffic. This means that a high percentage of traffic using the site is a right turn in and right turn out.

The Town should be encouraged to reduce the presence of high traffic volume uses in the Highway Business Zone where possible.

In some cases where the size of property permits adequate buffering senior citizen or multi-family housing may be appropriate provided adequate safe access to the adjacent highway can be provided. For high volume roadways such as C.R. 39 or Montauk Highway this would mean access via a traffic signal, preferably an existing traffic signal or to another roadway which intersects the major arterial highway at a traffic signal.

Formalizing Access Points

The quality of the site access to commercial property along major highways within the Town varies greatly. Some properties have no formal access. Rather they are provided with a continuous asphalt apron along the entire frontage of the site and no formal designated parking area. Movements in and out of these sites are chaotic. Traffic movements from one site can also interfere with those of an adjacent site. Formalized access should be developed for each of the existing sites where formalized access does not exist.

Access Spacing and Reducing Access Points

Driveway spacing is one of the principle tools used to minimize the potential conflicts between through traffic and traffic generated by development. The establishment of traffic-sensitive minimum driveway spacing standards has two principal effects; it limits the number of conflict points and separates conflict points. Spacing standards are particularly effective in helping to avoid future traffic problems in lightly to moderately developed areas facing development pressure. The contrast between good and poor driveway spacing is illustrated in Figure V-3.

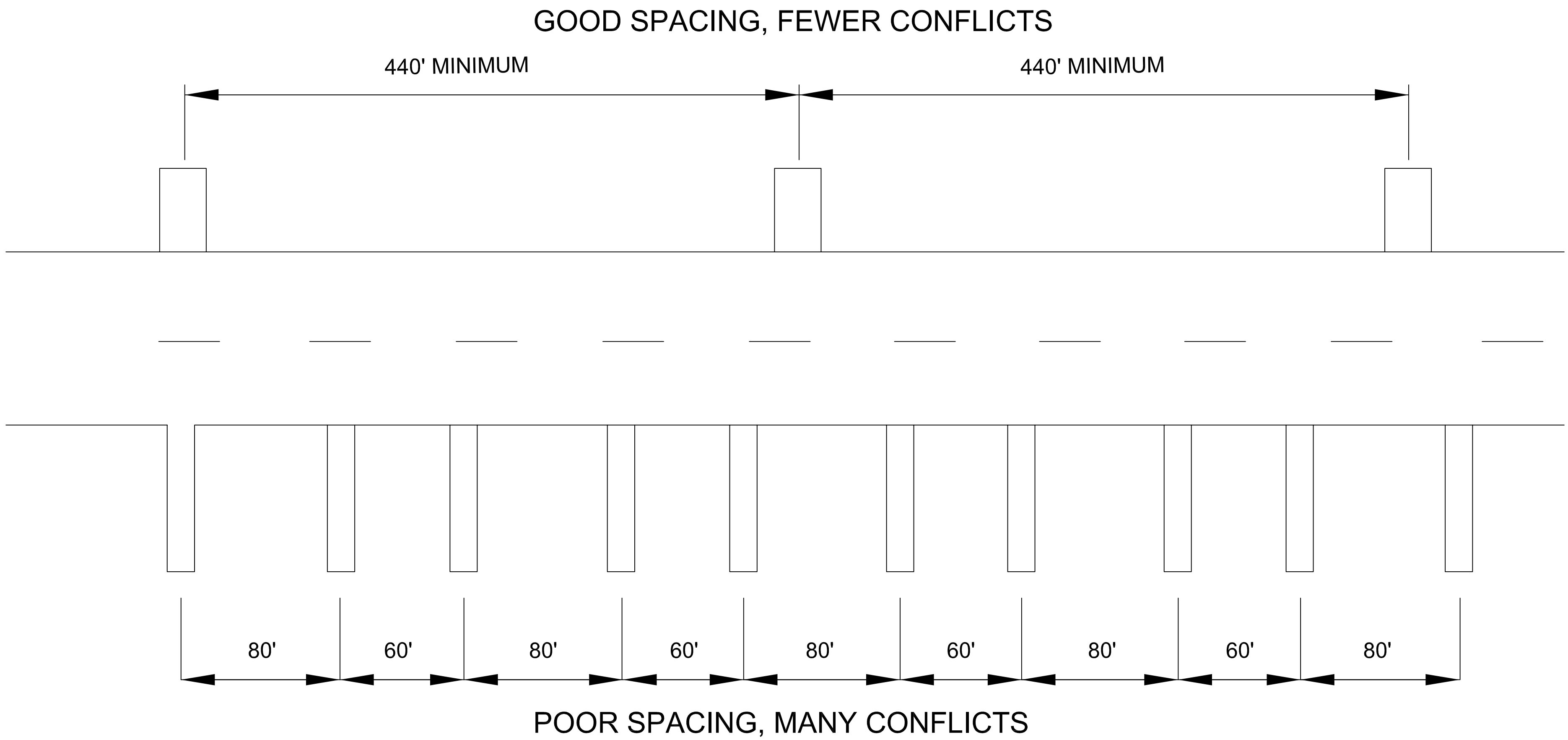
There are no clear, widely accepted standards for driveway spacing. Standards based strictly on traffic and engineering factors are generally quite large and may be difficult, particularly in areas where existing frontage requirements are as narrow as 150-feet and some existing parcels may be smaller. In practice, existing or proposed standards generally reflect a balance between traffic and engineering considerations and requirements, local development objectives, and existing land-use characteristics (lot sizes, land-use type, frontage requirements, and the like). Further, even where minimum spacing standards have been adopted the actual spacing allowed between driveways is a function of the size of each proposed development, the volume of traffic generated by development, roadway characteristics, and existing and projected traffic conditions. Larger developments, thus, generally require larger driveway spacing.

In contrast with a number of other states, New York has not established driveway spacing standards but rather left such action to municipal discretion. As a result, a number of Towns in the State have moved to establish local standards. The standards proposed for two Towns, Canadaigua and Farmington, reflect two of the most significant determinants of driveway spacing, speed and the size of development, as shown below.

Posted Speed	Small Generator	Medium Generator	Large Generator
	0 to 100 PHT	101 to 200 PHT	201 PHT or more
Less than 45 mph	220 feet, 67 meters	330 feet, 100 meters	550 feet, 168 meters
45 mph or greater	330 feet, 100 meters	440 feet, 134 meters	660 ft, 200 meters

PHT, Peak Hour Trips

Table V-1
Proposed Driveway Spacing Standards for Canadaigua and Farmington



DRIVEWAY SPACING CAN DRAMATICALLY AFFECT THE NUMBER OF CONFLICT POINTS ALONG A ROADWAY

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SOUTHAMPTON TRANSPORTATION PLAN

FIGURE V-3

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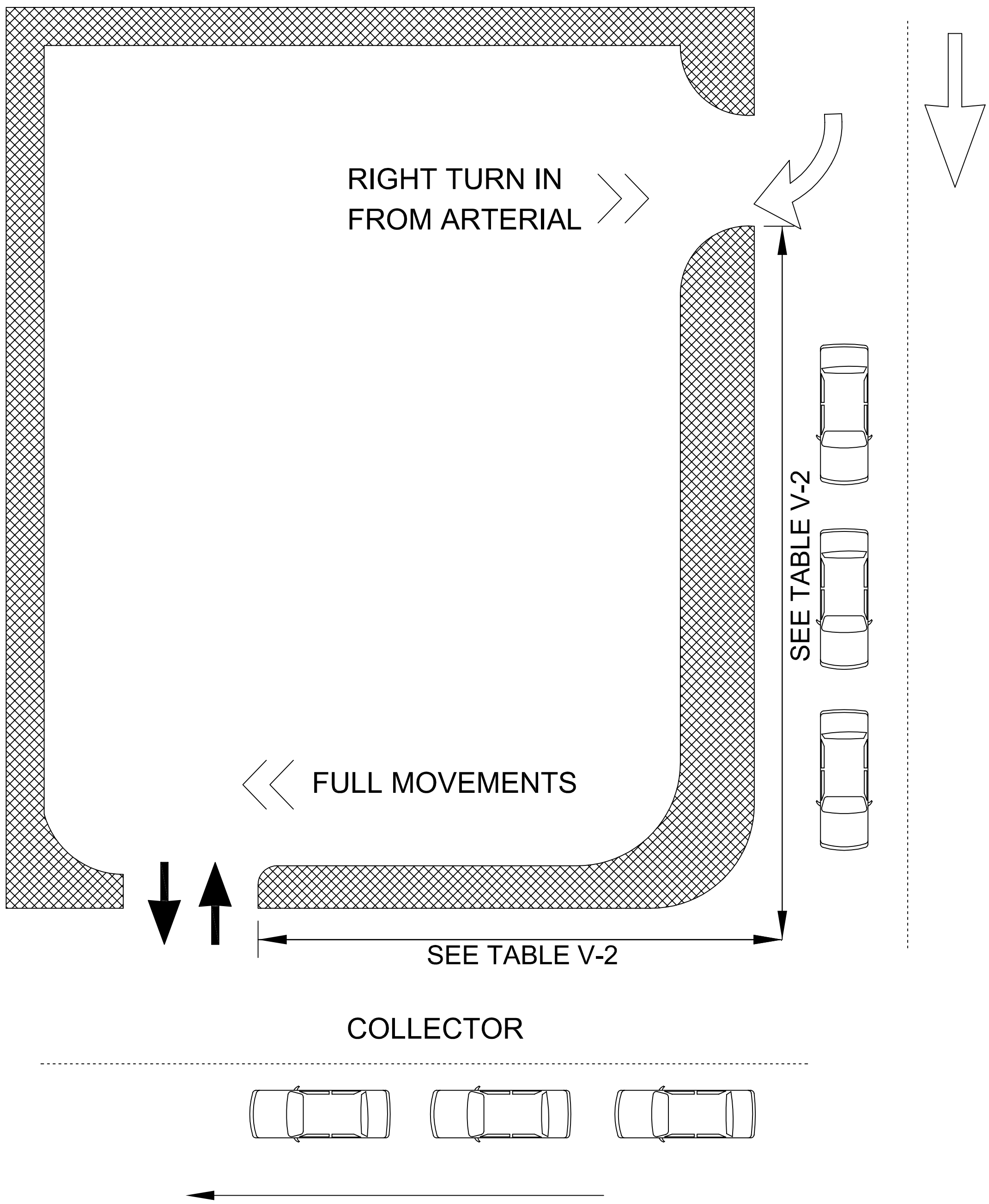
Minimum Corner Clearance Standards

Corner properties, properties with frontage on intersecting roads, present special problems in the location and design of driveways. Such properties are particularly attractive to businesses which generate a high volume of drive-by, drop-in customers (e.g., gas stations, convenience stores and fast food franchises) and, thus occasion frequent conflicts between through traffic, vehicles entering or exiting the intersection, and vehicles entering or exiting the site. Vehicles stopped in the travel lanes waiting to turn into a corner property may, and often do, block traffic on the adjacent roadways. Further, because these driveways increase the number and density of conflict points, they place increased demands on drivers attention with a resulting deterioration in driver performance. Accidents at intersections are about three times more frequent than between intersections.

In practice, corner clearance for driveways from existing, developed properties reflects the tension between traffic and safety needs (generally determined through an analysis which addresses the type of development and development generated traffic, road and intersection characteristics, and existing and projected traffic conditions) and property rights and local development objectives. That is, the corner clearance of existing driveways at many developed properties is in conflict with the safe and efficient movement of traffic through the intersection.

Corner properties often offer the motorist on opportunity to exit the site onto a low (or lower) volume side street that, in turn, allows signalized access to the major arterial or an alternate path to a destination. The presence of the traffic signal, however, often creates queues and driveway placement must therefore be sensitive to actual queuing that takes place. The driveway to the site must be placed far enough from the stop line at the signal so that queues do not impair the ability of traffic to enter and exit the site.

While there are no widely accepted standards for minimum corner clearance those developed in Florida are frequently used as a model. In New York, the Town of Penfield for instance requires a minimum corner clearance of 230 feet. While the Towns of Canandaigua and Farmington have proposed ordinances which would set corner clearance at 220 feet for full access – all movements, and 110 for partial access – right turn in and/or out only. Such ordinances often conflict with property sizes that have smaller frontage then the distances prescribed. Key geometric considerations in the placement of driveways on corner properties are illustrated in Figure V-4. In determining the actual location for driveways proposed to serve corner properties three conditions are generally attached to minimum corner clearance spacing requirements as shown in Table V-2.



CORNER TREATMENTS INCLUDE DRIVEWAY LOCATION AND MAY INCLUDE TURN RESTRICTIONS

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FIGURE V-4

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Position Relative to Intersection	Access Allowed	Minimum Distance from Intersection (ft.)	Restrictive Median
Approaching	Right In/Out	115	Yes
Approaching	Right In	75	Yes
Departing	Right In/Out	230	Yes
Departing	Right Out	100	Yes
Approaching	Full	230	No
Approaching	Right In	100	No
Departing	Full	230	No
Departing	Right Out	100	No

Table V-2
Corner Clearance At Intersections

The actual driveway spacing is to be determined through an analysis of the effect vehicles entering or exiting a corner property have on traffic operations and safety on the road. Actual queuing at a signalized intersection is an important factor that must be considered. Thus, driveways from corner properties generating a high volume of trips should be spaced to exceed minimum spacing requirements and should be placed outside of queuing that may normally occur at an adjacent traffic signal.

Driveways should not be allowed within the functional area of an intersection and particularly within the boundaries of turn or merge lanes. That is, driveways should not be placed where the attention of through drivers is focused on entering and exiting an intersection or diverging from or merging with through traffic.

For properties that cannot meet the minimum corner clearance standards or where there is a high volume of through traffic across the driveway, driveways should be sited as far as possible from the intersection, shared and/or cross access with abutting properties should be provided, and turn restrictions (right in and/or out only) should be required.

As with driveway spacing, minimum corner clearance standards in New York have been adopted by local law applying within an overlay district. Supporting elements can include zoning and/or site plan requirements for minimum frontage, lot sizes exceeding the corner clearance standard, reverse access, and the like.

Full access to State, County and important town facilities should be discouraged where properties have access to adjacent side streets, particularly when signalized. In addition, when access to these roadways is via an approaching lane right turns out of the access driveway should be prohibited in order to avoid vehicles exiting the site and crossing the thru lanes to access the left turn lane on arterial highway.

Shared Driveways and Cross Access Driveways

Shared driveways are driveways serving two or more abutting properties. They may or may not be comprised of land from each property. Shared driveways allow for larger driveway spacing and improved management of traffic entering and exiting a development.

Cross access driveways interconnect the parking facilities of two or more abutting properties. They are always comprised of land from each property. Cross access driveways provide an opportunity for vehicles to move from one development to another without recourse to the roadway, thus reducing traffic volumes on the road and eliminating conflicts with entering or exiting vehicles.

Shared and cross access driveways are key elements of almost all access management plans. Indeed, in areas which are heavily developed cross access driveways provide the most significant traffic relief short of closure and retrofit of existing driveways, driveway signalization, and capacity enhancement.

Provisions for shared and cross access driveways are most effective and uniformly applied if enacted by local law. These requirements would then be implemented as part of a subdivision or site plan approval. In all cases the land comprising the shared or cross access driveway should be recorded as an easement and constitute a covenant running with the land. Joint maintenance agreements should also be incorporated to the property deed.

Incentives for cross access agreements provisions within the Zoning Code could be made so that combining of accesses is more palatable to the developer. Normally properties are required to have vegetative buffers along each side yard adjacent to an adjoining commercial property. The code could be modified to allow this provision to be waived when adjoining properties combine parking and access facilities. This gives the properties more room for parking and also permits a larger building. Each property that comes before the Planning Board would be requested to provide a reciprocal access easement for the adjoining property and allowed to reduce the ten foot buffer requirement as long as the reciprocal access is granted.

So as not to burden the property owner granting the easement the Planning Board also should have the ability to waive the requirement for any parking spaces lost in actually creating the access between the adjacent sites.

It will take many years before the impact of such a policy is felt. Reciprocal access agreements can usually only be obtained when a site comes before the Planning Board and as the initial approvals and easements are granted the adjoining properties are unlikely to have an access easement in place. The actual connection between the adjacent properties cannot be accomplished until agreements are in place for both properties. As more and more existing properties have the easements, the likelihood of making actual connections will increase.

Recommendations for Cross Access and Shared Driveways

It appears that cross access between sites works best when placed in front of the development's buildings. Access behind the buildings is useful but is not readily apparent to motorists unless internal signing is provided. The cross access provided should not require circuitous movements. In addition, it is more likely that a successful joint access plan can be more readily implemented in front of site building rather than behind. Many of the highway business uses have secured rear yards for the storage of building materials, automobiles or service vehicles. These businesses cannot readily connect through these secure yards.

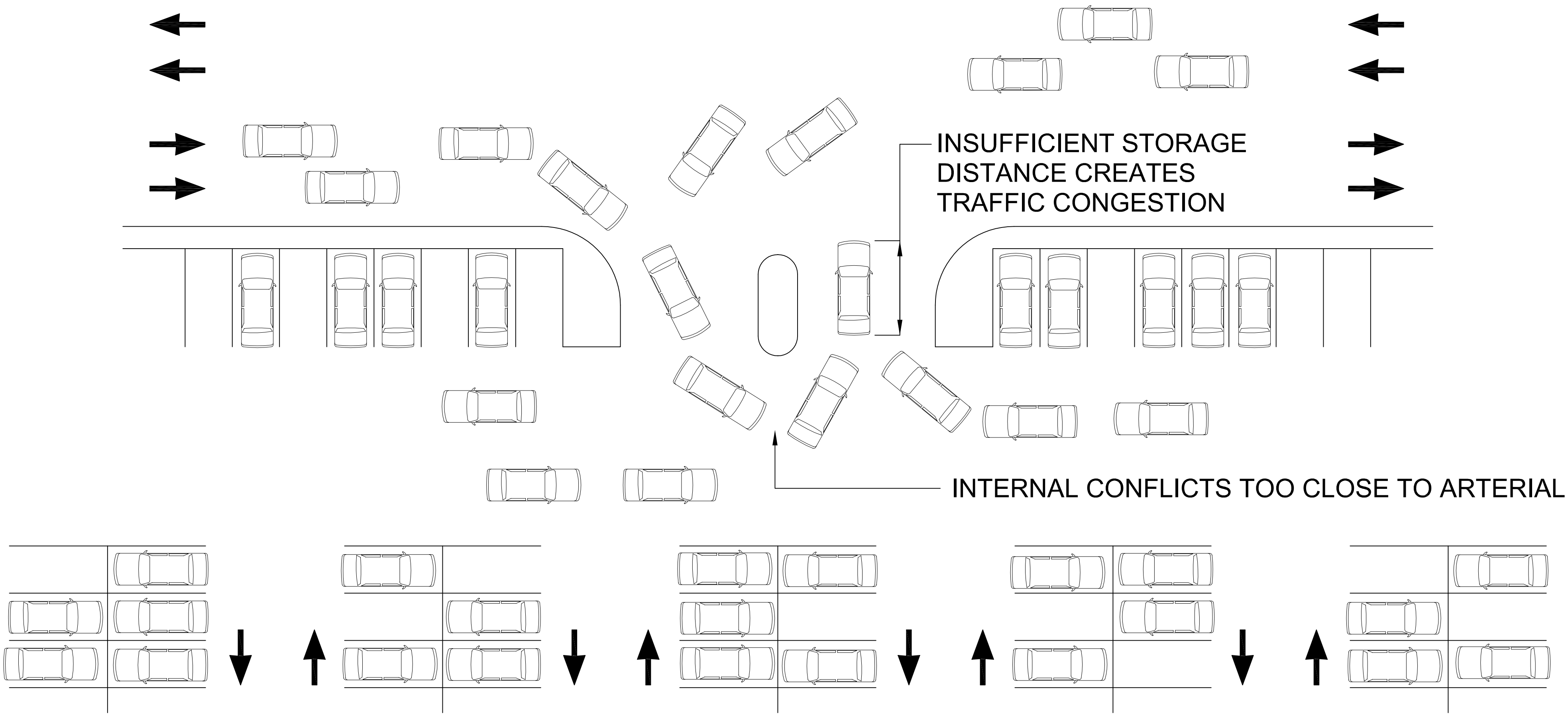
Shared and joint access driveways should be provided wherever possible to reduce the number of commercial access points. All commercial properties should provide reciprocal access easements to adjacent commercial properties with potential future connection points defined but also allow for adjustments when the adjoining property is eventually developed.

Access Point Design Standards

Traffic entering and exiting a development conflicts with through traffic under the best of normal circumstances. Inadequately designed driveways can, however, measurably reduce safety and increase congestion, as shown below and as exemplified by traffic back-ups on roads serving developments with inadequate driveway designs.

Driveways should be designed to allow vehicles to exit and enter the roadway quickly and safely, and with as little impact as possible on through traffic. Driveway design needs are based on existing and projected traffic conditions; the type and volume of traffic generated by the development; the physical characteristics of the road and site; necessary accommodations for transit, pedestrians and bicyclists; and, parking and internal site circulation requirements. The principal elements of driveway design affecting traffic and safety include driveway width, radii, and flare as well as throat length, turn restrictions (e.g., islands) and driveways crossing pedestrian paths.

Figure V-5 shows a driveway with inadequate throat between the highway and the first internal conflict point. There is only queuing for one vehicle in the exit driveway. If two or more vehicles wish to leave they will likely interfere with incoming traffic. An incoming vehicle may encounter a conflict with internal traffic while still trying to get off of the highway safely. A minimum of 50 feet of throat should be provided for low volume driveways. As driveway volumes increase, the length of throat should be



POORLY DESIGNED DRIVEWAYS AND PARKING AREAS CAN DEGRADE TRAFFIC OPERATIONS ON THE ROAD AND SITE

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SOUTHAMPTON TRANSPORTATION PLAN

FIGURE V-5

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increased. High volume sites with signalized access should have at least 150 feet of stacking or queuing area so that the traffic signal's green time can effectively be used and that entering traffic is not impeded by internal conflicts that could cause queuing onto the highway.

In addition to the length of the driveway throat, the presence of turning lanes, width of the ingress lanes, curb radius (if used) and type of intersection are all important in facilitating safe traffic flow.

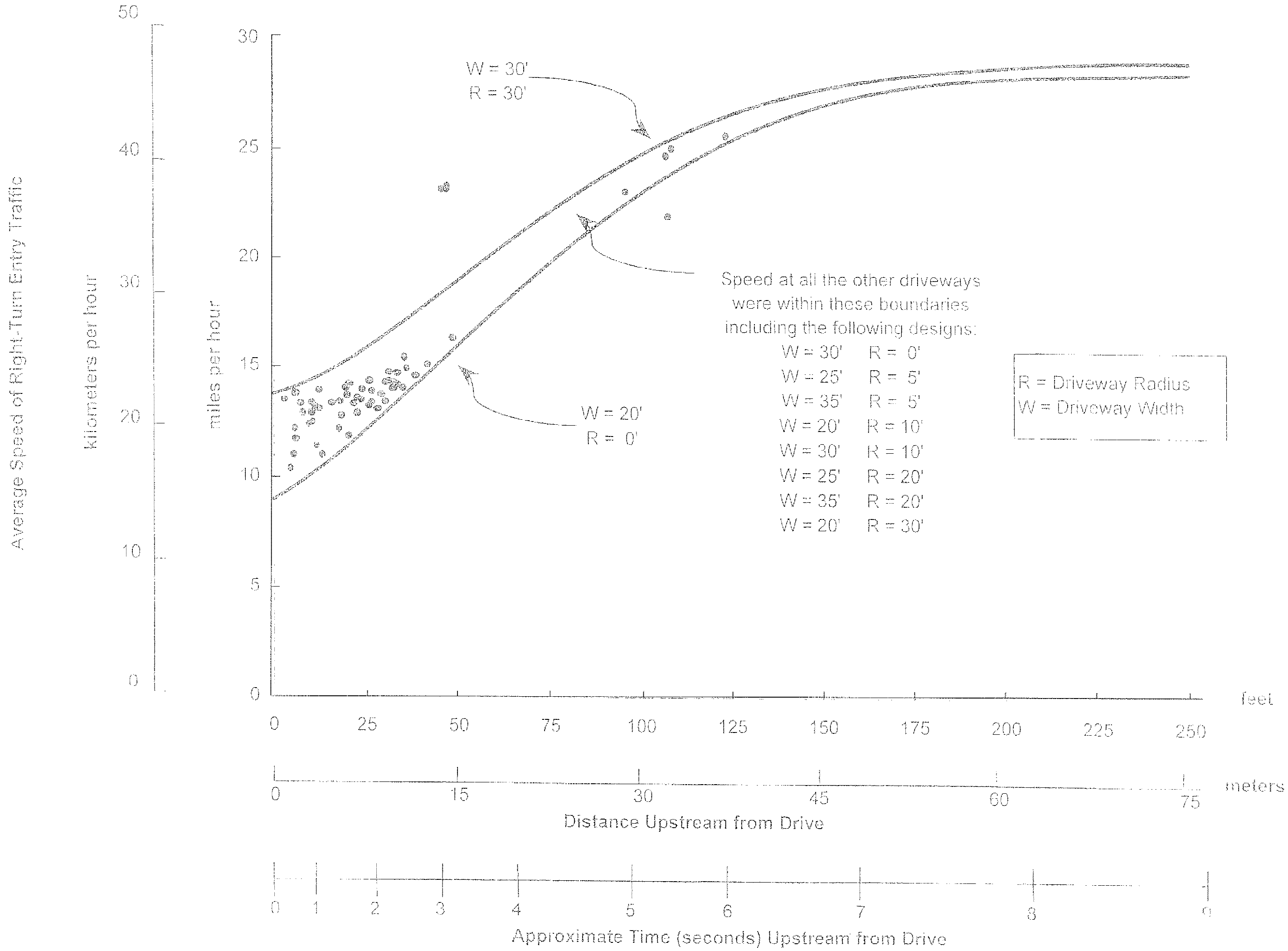
Research has found that accident rates increase exponentially as the speed differential in the traffic stream increases (V.G. Stover and F.J. Koepke, *Transportation and Land Development*, ITE, 1988). While the actual accident rates may change over time and by location, the ratio of the accident rates provides a good indication of the relative accident potential at different speed differentials. The relative accident potential values in Table VII-3 were obtained by dividing the accident rate at each speed differential by the accident rate of vehicle(s) traveling about 10 mph slower than other traffic. This indicates, for example, that a vehicle traveling 35 mph slower (a 35 mph speed differential) than other traffic is 90 times more likely to become involved in an accident than a vehicle traveling only 10 mph slower. A vehicle traveling 20 mph slower than the traffic stream has 3.3 times the likelihood of being involved in an accident as one going 10 mph slower than the other traffic.

Speed Differential	-10	-20	-30	-35
Relative Accident Potential	1	3.3	23	90

Table V-3
Relative Accident Potential on At-Grade Arterials

Although the relative accident ratio may vary somewhat, the data clearly shows that the likelihood of accidents increases dramatically as the difference in the speed of vehicles in a traffic stream increases. This underscores the need to separate through traffic from vehicles that are turning right or left.

Figure V-6 shows the observed speed profiles of right-turning vehicles on the approach to a driveway. As indicated in the figure, a variety of driveway throat widths and curb return radii result in very similar speeds. The driveways ranged from a 30-foot width and 30-foot radius (a total curb opening of 90 feet) to a width of 20 feet and zero radius (a "dropped" curb or "dustpan" design) having a total opening of 20 feet. The speed profiles for a variety of throat widths and curb return radii fell between these limits and were surprisingly similar. The forward speed at the point where the right-turning vehicles cleared the through traffic lane ranged from about 9 to 14 mph (14 to 22 km/h).



SPEED PROFILE OF DRIVEWAY TRAFFIC

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FIGURE V-6

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Clearance was considered to have occurred when a following vehicle could pass without encroaching upon the adjacent traffic lane. Thus, the turning vehicle need not have cleared the curb line. Very high speed differentials between the turning vehicles and through traffic are generated which, in turn, produce a high accident potential. Thus, auxiliary left-turn and right-turn lanes (bays) are needed at intersections and driveways on major roadways.

The fact that excessive speed differentials are created a considerable distance upstream from the point at which the driveway maneuver is made likely results in an under-reporting of driveway related accidents. It also shows that turn lanes are needed to achieve acceptable speed differentials between driveway traffic and through vehicles on arterial streets.

Use of a taper on the upstream side of the driveway does not significantly influence the speed of the vehicle making the driveway maneuver. However, the taper results in a reduction in exposure time (the time which the turning vehicle is blocking the through traffic lane).

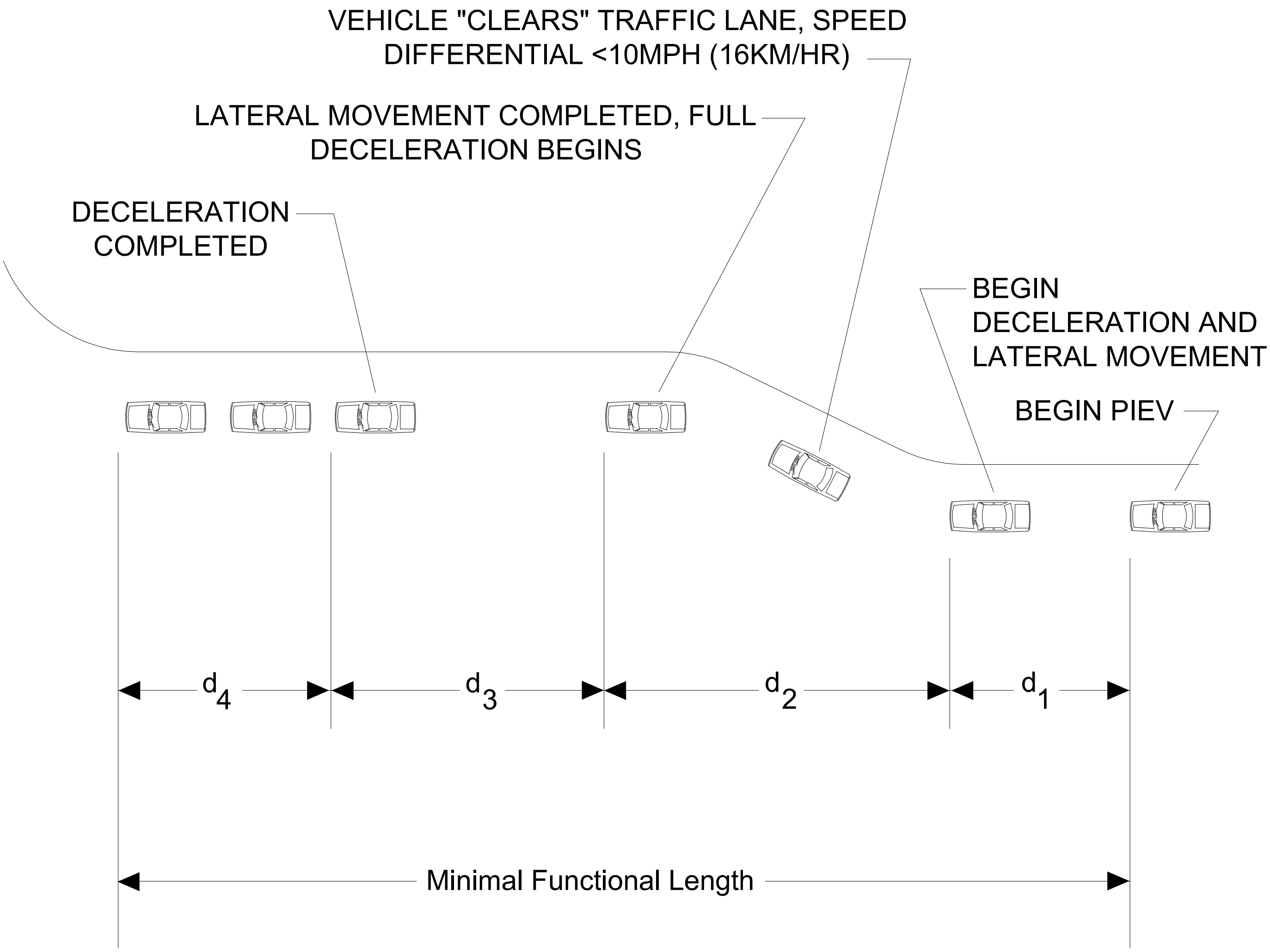
Protecting the Upstream Functional Area of An Intersection

The elements that define the upstream functional area of an intersection are shown in Figure V-7. They include the following:

d_1 – The perception-reaction time required by the driver. For motorists who frequently use the street, this may be as little as one second or less. However, strangers may not be in the proper lane to execute the desired maneuver and may require several seconds.

d_2 – Braking, while moving laterally is a more complex maneuver than braking alone – perhaps one-half the deceleration rate used in d_3. Lateral movement is commonly assumed to be 4 feet per second (1.2 meters per second) under urban conditions and 3 feet per second (0.9 meters per second) for rural conditions. At low deceleration rates, the driver will have shifted laterally so that a following vehicle can pass without encroaching on the adjacent lane before a 10 mph (16 km/h) speed differential occurs. At deceleration rates greater than about 4 fps^2 (1.2 mps^2), the speed differential will exceed 10 mph (16 km/h) before the turning vehicle "clears" the through traffic lane. Clearance is considered to have occurred when a following vehicle can pass without physically encroaching on the adjacent lane.

d_3 – Deceleration after moving laterally into the turn bay should be at a rate that will be used by most drivers. Studies have found that most drivers (85%) will utilize a deceleration rate of 6 fps (1.8 mps^2) or more; only about 50% can be expected to accept a rate of 9 mps^2 (2.7 mps^2) or greater (M.S. Chang, C.J. Messer, and J. Santiago, "Timing Traffic Signal Change Intervals Based on Driver Behavior," TRB, 1985), the rate used by AASHTO in establishing safe stopping sight distances.



d_1 = distance traveled during perception-reaction time.

d_2 = distance traveled while driver decelerates and maneuvers laterally.

d_3 = distance traveled during full deceleration and coming to a stop, or to a speed at which the turn can be comfortably executed.

d_4 = storage length.

Note: Elements (i.e., d_1, d_2, d_3 and d_4) apply equally to left turns and right turns.

DETERMINANTS OF THE INTERSECTION MANEUVER DISTANCE

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SOUTHAMPTON TRANSPORTATION PLAN

FIGURE V-7

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R.H.	T.S.B.	OF

d_4 – Length required to store all turning vehicles.

Functional upstream intersection areas for different speeds, excluding queue storage, are given in Table VII-6. In calculating the deceleration distances, full deceleration rates of 6 fps^2 (1.8 mps^2) and 9 fps^2 (2.7 mps^2) were used. The 6 fps^2 (1.8 mps^2) deceleration is accepted by 85% of drivers. This value is used for a "desirable condition" since it will be used, or accepted, by most drivers. Since only 50% of drivers accept an acceleration of 9 fps^2 (2.7 mps^2), this value is used as a limiting condition or upper limit for design. Maneuvering from the through lane into a right-turn or left-turn lane while decelerating only. Therefore, a lower deceleration rate was used in calculating distance d_2 and d_3.

The difference in the maneuver distance required for peak (congested) and off-peak speeds will provide some storage during peak periods when queuing is likely to occur. This difference will generally be sufficient to provide the necessary right-turn storage on arterial approaches at intersection with collector streets. At high-volume intersections, the functional limits are commonly controlled by peak-period conditions since pear period maneuver distance plus storage for queuing is longer than the maneuver and storage distances needed in the off-peak. Thus, the functional area is comprised of the distance shown in the "Total" column in Table V-4 plus the queue storage requirement.

Speed		Minimum Maneuver Distance (1) in Meters (Feet)							
		Desirable Conditions (2)				Limiting Conditions (3)			
		Deceleration (4)		Total (5)		Deceleration (4)		Total (5)	
km/hr	mph	meters	feet	meters	feet	meters	feet	meters	feet
50	30	70	225	100	325	50	170	65	215
55	35	90	295	130	425	65	220	80	270
65	40	115	375	160	525	85	275	70	335
70	45	140	465	190	630	105	340	125	405
80	50	170	565	230	750	125	410	145	480
90	55	205	675	265	875	150	495	170	565
95	60	240	785	305	1005	170	565	200	655

(1) All values rounded to nearest 5 meters (5 feet).
(2) 2.5 second perception-reaction time; 1.1 mps^2 (3.5fps^2) average deceleration while moving laterally into the turn bay and an average 1.8 mps^2 (6fps^2) deceleration thereafter. 16 Kps (10 mph) speed differential.
(3) 1.0 second perception-reaction time; 1.4 mps^2 (4.5 fps^2) deceleration while moving laterally into the turn bay and an average 2.7 mps^5 (9.0 fps^2) deceleration thereafter. 16 Kps (10 mph) speed differential.
(4) Distance to decelerate from speed to a stop while maneuvering laterally into a left or right turn bay.
(5) Deceleration distance plus distance traveled in perception-reaction time.

Table V-4
Functional Intersection Area, Excluding Storage

Assuming a zero storage distance for queued vehicles at the driveway, a right turn lane with taper totaling 105 meters (340 feet) would be necessary to provide adequate maneuvering room so that right turning traffic from the highway, with a 45 mile per hour speed limit, would have little or no impact on through traffic movements. This turning lane would also provide the safer condition in that differential speeds between right turning vehicles and through vehicles would be minimized. Driveway spacing and even property widths on along many important roadways are less than the recommended length than that of the right turn lane and taper, so the provision of right turn lanes at driveways may be difficult to achieve. In addition, the construction of the right turn lane would require up to an additional twelve feet of property if there were no shoulder present.

As noted previously the goal is to reduce the speed differential between the vehicle slowing to turn and the through traffic stream. The design of the actual driveway has only marginal impact. However, it is clear that an intersection type driveway with a 30 foot width and 30 foot radius curb returns provides the best design for a relatively high speed roadway. This design provides an exit speed of approximately fourteen miles an hour and will better accommodate trucks which frequent the Highway Business uses.

The fourteen mile per hour exit speed is still substantially less than the posted speed limit along most of the important roadways creating a substantial speed differential. The provision of even a minimal 100 foot of right turn lane will help reduce the speed differential making the driveway safer to operate and with less interference with thru traffic. The longer the right turn lane, to a maximum of 340 feet with taper, the less interference the driveway will have and the safer it will be.

As noted previously, many properties have less frontage width than the length of the desirable right turn lane. Driveways are also likely to be located less the 340 feet apart. In order to minimize the interference and maximize the safety of driveway operation consideration could be given to a full width (12 foot) shoulder along adjacent commercial properties that would essentially operate as a continuous right turn lane. It could also serve as a acceleration lane when exiting a site. Such on option requires considerably more rights-of-way, is costly and will have a negative visual impact because it increases the overall width of the highway.

Commercial Driveway Design

In general, it is recommended that driveways be spaced as widely apart as possible, be constructed with an intersection type approach with a minimum 30-foot width with 30-foot curb returns. Where higher volumes of traffic can be expected to utilize a particular driveway, right turn lanes at least 100 feet long should be used.

Truck Access

The commercial properties along many of the important Town arterials fall within the Highway Business zoning category. Many of the existing properties are service related, building material supply business or automotive dealerships, which generate a relatively high number of large truck trips. While still a small percentage of the overall number of trips found on the highway system, **<u>large trucks can be particularly disruptive if the site they are servicing does not have adequate access or on-site circulation</u>.** It has been observed on a number of occasions both directions of traffic on an important roadway have been stopped while large commercial vehicles are backed into and out of a site. Automotive carriers have been observed unloading in shoulder areas of the road rather then on site. **<u>It is extremely important that during the coarse of site plan review that the types of vehicles that will service a site and how they can be accommodated on site be carefully examined</u>.**

SUMMARY

> **The Arterial highway system supporting the Town of Southampton is valuable. In order to maximize the value of the public's investment, preserve the capacity of the roadway and maintain public safety, an access management plan has been developed.**

<u>The key recommendations of this access management plan are:</u>

- Continue to allow only low traffic generation uses to be developed on certain roadways.
- Require cross access easements between all commercial properties.
- Driveway spacing should be maximized with 330 feet of space between driveways for minor generators and 440 feet of space between driveways for major generators.
- Reduce the total number of driveways by combining access points for adjacent properties.
- Properties with access to side streets should be provided with access to the side street only; set-back at least 150 feet from arterial roadway.
- Through the use of cross access easements interconnectivity between adjacent sites should be developed, so that vehicles can cross adjacent properties to gain access to side streets, particularly those with traffic signalized access to the arterial can be gained.

- Where possible, existing residential properties should be provided with alternate access via side streets, and new subdivision roads.

- Where possible, existing residential driveways onto the arterial highways should be combined and improved to provide adequate sight distance and the smoothest flow possible on and off the roadway.

- A minimum corner clearance of 230 feet for full access driveways and 100 feet for right turns should be maintained wherever possible.

- Right turn acceleration and deceleration lanes should be considered, where feasible.

- A minimum set back of 50 feet from the arterial highway right-of-way for parking and parking aisles should be established.

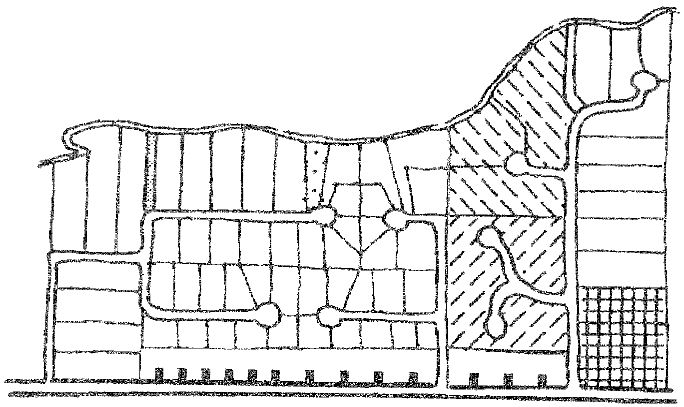
- The minimum width of a commercial driveway should be 30 feet and should have an unobstructed throat of at least fifty feet. Commercial driveways should be constructed to intersection type standards with 30 foot curb return radii.

- Commercial site plans must provide for adequate on-site truck circulation. Adequate space must be provided on site to allow trucks likely to serve the site to turn around on site. Continued enforcement may be necessary to assure that the designated space for truck circulation is maintained.

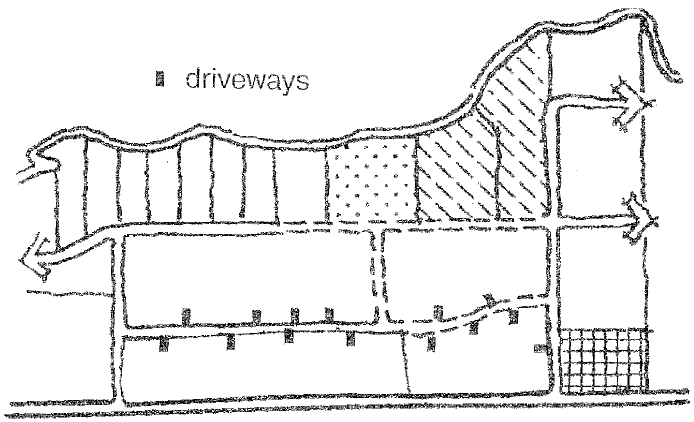
Rural Residential Areas

While access and driveway standards discussed for commercial areas would apply in rural residential areas, parcels of existing properties are larger and there is more opportunity to plan for better connectivity through the design of subdivision roadways. As in commercial areas, direct access to important highways should be discouraged with access ideally provided by subdivision roads which access existing cross streets which in turn access the important highway facilities. Figure V-8, Connectivity of Supporting Streets shows two different subdivisions of property adjacent to an arterial highway, one that places numerous driveways onto the arterial and does not allow for connectivity of cross streets and one that protects the integrity of the arterial by minimizing driveways and provides connectivity.

Flag lots, which are prevalent along many important Town roadways, create numerous additional driveways even when adjacent flag lots use merged driveways. Figure V-9, Stacked Flag Lots shows an example of the unsuitable use of flag lots.



POOR CONNECTIVITY INCREASES DEMAND
FOR ARTERIAL ACCESS.



IMPROVED CONNECTIVITY INCREASES
OPPORTUNITIES FOR ALTERNATIVE ACCESS

FIGURE V-8
CONNECTIVITY OF SUPPORTING STREETS

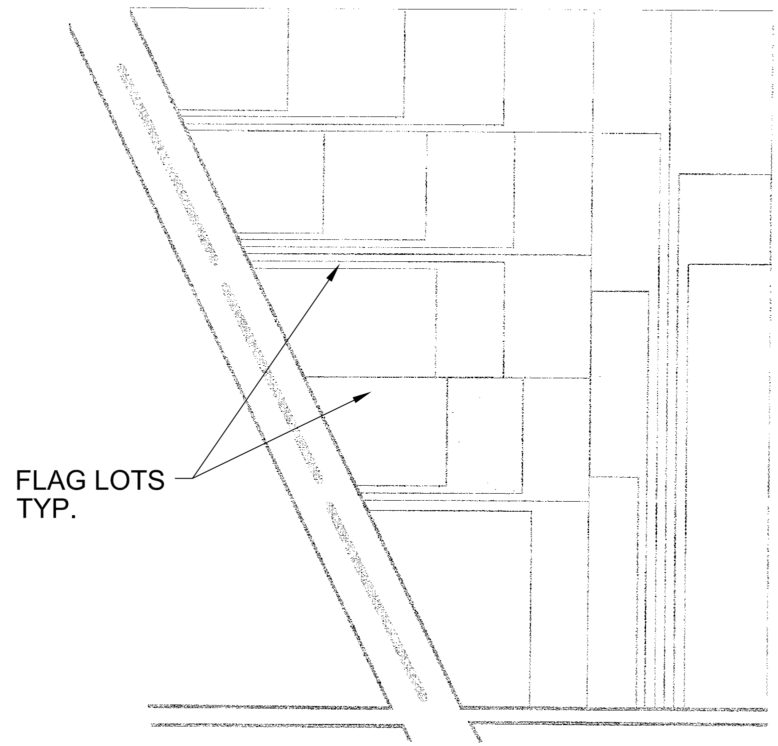


FIGURE V-9
STACKED FLAG LOTS
STATE HIGHWAY

Flag lots are lots shaped like flags with long access “poles”. They can be useful for providing access where there are unique site constraints. However, landowners may stack flag lots when dividing a parcel to provide interior lots with direct access to a major highway facility, thereby avoiding the expense of platting and providing a road and a properly designed and constructed access. That expense is ultimately shifted to the buyer. **<u>The use of flag lots is often done to increase the yield and density on a property, which is not necessarily beneficial to the Town’s overall growth strategy</u>**. The narrow frontages result in a series of immediately adjacent driveways or become shared private access drives for multiple properties. Without formal agreements specifying use and maintenance of the drive, disputes often erupt and local governments may be asked to intervene or to adopt the private drive into the public street system. **<u>Long private shared driveways often provide inadequate access for emergency vehicles and present other difficulties for service vehicles.</u>**

A better practice would be to prohibit flag lots except for specified situations, such as to eliminate access to collector or thoroughfare streets or to preserve natural amenities or important historical or archaeological values. The objective is for sites to be designed with an internal street system that conforms to established access management and street design standards and good site design practices.

When access is to be granted to a State County, and Town Highway facility, the most important aspect is that the access point must have adequate sight distance available in order to operate safely. Ideally, enough sight distance should be available such that vehicles entering the highway from the access driveway or new subdivision road can see a sufficient distance such that an adequate gap in traffic can be found so that the vehicle from the access drive can enter the stream of traffic on the highway without causing vehicles on the highway to slow.

Table V-5 entitled, “Stopping Sight Distance and Recommended Intersection Sight Distance”, provides the stopping sight distance and recommended intersection sight distances for various design speeds. The design speeds should be measured in the field at the access location and should represent the speed at which 85 percent of the vehicles passing that point are at that speed or a lower speed. The stopping sight distance is the distance of an average vehicle operating at the design speed to safely stop. The recommended intersection sight distance are based on the minor street vehicle being able to see a gap in traffic long enough to exit onto the roadway, make the desired right or left turn and get up to speed without interfering with other vehicles or the roadway.

The stopping sight distance should be the absolute minimum sight distance provided for any access point onto a Town, County or State roadway. The recommended intersection sight distance should be provided whenever possible. As the volume of traffic on the roadway to be accessed increases and/or the volume of traffic expected to exit the access point increases, the importance of meeting the recommended intersection sight distance standards increases.

Design Speed (mph)	Stopping Sight Distance (ft)	Right Turning Vehicles Intersection Sight Distance for Passenger Cars		Left Turning Vehicles Intersection Sight Distance for Passenger Cars	
		Calculated (ft)	Design (ft)	Calculated (ft)	Design (ft)
15	80	143.3	145	165.4	170
20	115	191.1	195	220.5	225
25	155	238.9	240	275/6	280
30	200	286.7	290	330.8	335
35	250	334.4	335	385.9	390
40	305	382.2	385	441.0	445
45	360	430.0	430	496.1	500
50	425	477.8	480	551.3	555
55	495	525.5	530	606.4	610
60	570	573.3	575	661.5	665

Note: Intersection sight distance shown is for a stopped passenger car to turn left or right onto a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

Table V-5
Stopping Sight Distance and Recommended Intersection Sight Distance
Assumes Stop Control of Driveway/Minor Street

Sight distance restrictions are caused by both horizontal and vertical roadway features. It is often possible to overcome horizontal sight distance restrictions by trimming vegetation on the applicant's property or along the public rights-of-way. The cleared area would then be planted with vegetation that would grow low to the ground and prevent taller vegetation from intruding into the area needed for sight distance. These improvements mitigate the potential safety concerns inherent with inadequate sight distance and should be the applicant's burden.

Vertical sight distance restrictions are usually harder to remedy because they are often the result of the public highway's profile. Some improvement may result from the grading of the access driveway or subdivision road, but often the remedy is to reshape the roadway profile at considerable expense. There are also occasions when horizontal sight distance restrictions cannot be overcome by clearing on the applicant's property or within the public rights-of-way.

The obstacles to creating the recommended sight distance, or at a minimum the safe stopping distance, must be weighted against the potential for safety problems by examining the potential site exiting traffic and the adjacent highway volume. As both increase, the probability of creating a problem also increases. In many cases, the magnitude of the potential problem may be worth the cost of mitigation measures involving reconstruction of public roadways. Access should not be provided if safe stopping distance requirements cannot be met.