Access Management Policy

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City of Hagerstown
Department of Parks and Engineering

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Section 1 – Introduction

1.1. Introduction

Historically, decisions to allow access were typically made relative to individual properties and not the function and characteristic of the street to which access was allowed. This piece-meal approach to access planning has frequently resulted in an illogical and excessive number of access points that have led to increased congestion and accidents.

Consider at the current US Crash Rate, one child of every 90 born today will die in a vehicle crash. Seventy out of 100 will be injured at some point in their lives. Of these crashes, 55% (3.5 million annually) occur at driveways and intersections.

"Access management" takes a comprehensive view of property access relative to the function of the streets from which it is provided. The objective of access management is to balance access for land development while preserving the safe operation and mobility of vehicles on the street, particularly along arterial streets. Proper access management strives to maintain or improve the traffic – carrying capacity and safety of Hagerstown's street system.

Access management is the careful planning and design of driveways, median openings, interchanges, and street connections to a roadway. It also involves the application of median treatments and turning lanes, and the appropriate separation of traffic signals. This is done to maintain the viability of major roadways to safely and efficiently accommodate traffic volumes commensurate with their function.

The arterial street network is the key to the success of transportation within a community and it represents perhaps the greatest financial infrastructure investment. The net effect of access management along arterial streets is that the supporting networks of collector and local streets, and even inter-parcel connectivity, become more critical to effective circulation and property access.

Managing access to major roadways has significant positive effects, including reducing accident experience, lessening congestion, enhancing community character, and improving air quality. Effective access management program can result in significant decreases in accidents and travel delays. Factors that have a negative influence on traffic safety and efficiency include:

- Driveways or side streets in close proximity to major intersections;
- Driveways or side streets spaced too close together;
- Lack of left-turn lanes to store turning vehicles;
- Deceleration of turning traffic in through lanes; and
- Traffic signals too close together.

Sometimes these problems on major streets have unintended and undesirable consequences such as encouraging drivers to find alternate routes on local neighborhood streets.

The appearance of corridors and gateways is also critical to the image of a community and its overall attractiveness to investors. Minimizing the number of curb cuts, consolidating access drives, constructing landscaped medians, and buffering parking lots from adjacent thoroughfares results in a visually pleasing and efficient corridor that, in turn, can help attract new investment. Effective management of roadway corridors protects property values over time.

1.2. Conflicts or Discrepancies

While every effort has been made to ensure that this Access Management Policy does not conflict with either the City's Public Ways Construction Standards, the Land Management Code, or other accepted design standards, there may be occasions where discrepancies between these documents arise. Upon such an occasion, the City Engineer (or designee) shall determine the more restrictive provision and it shall apply. This decision can be appealed to the Board of Technical Appeals.

1.3 Jurisdiction

This policy applies to City-maintained public streets. Driveways that access Washington County or Maryland State Highway roads must comply with their respective regulations.

Section 2 - Glossary

AASHTO - The American Association of State Highway and Transportation Officials.

Access - Any way or means of approach to provide vehicular or pedestrian entrance to a property.

Access Management - Measures to assure the appropriate location, design, and operation of driveways, median openings, interchanges, and street connections to a roadway, as well as the application of median treatments and turning lanes in roadway design, and the appropriate separation of traffic signals for the purpose of maintaining the safety and operational performance of roadways.

Access or Entrance Permit - A permit issued by a governmental agency for the construction, maintenance, and use of a driveway or public street that connects to a highway.

Annual Average Daily Traffic (AADT) - The annual average two-way daily traffic volume on a route. AADT represents the total traffic on a road per year, divided by 365. Often referred to as "ADT".

Auxiliary Lane - A lane adjoining a roadway that is used for acceleration, deceleration, or storage of turning vehicles.

Capacity – The maximum rate of flow at which vehicles reasonably can be expected to traverse a point on a lane or road during a specified period under prevailing traffic, roadway, and signalization conditions, usually expressed as vehicles per hour; most often considered the maximum amount of traffic that can be accommodated by a roadway during peak hours of demand.

Change in Use - A change in use may include, but is not limited to, increase in traffic generation, structural modifications, remodeling, a change in the type of business conducted, expansion of an existing business, a change in zoning, or a division of property creating new parcels. Change of use does not include modifications in advertising, landscaping, general maintenance or aesthetics that do not affect internal or external traffic flow or safety.

City Engineer – The duly authorized Engineer for the City of Hagerstown.

Commercial - Property developed for nonresidential purposes which includes retail, wholesale, or industrial activities, offices, and which typically generate higher numbers of trips and traffic volumes than residential properties.

Conflict - A traffic-related event that causes evasive action by a driver to avoid a collision.

Conflict Point - Any point where the paths of two through or turning vehicles diverge, merge, or cross and create the potential for conflicts.

Congestion - A condition resulting from more vehicles trying to use a given road during a specific period of time than the road is able to convey with what are considered acceptable levels of delay or inconvenience.

Connection - Any driveway, street, or other means of providing for the movement of vehicles to or from the public roadway system.

Connection Spacing - The distance between connections, measured from centerline to centerline along the edge of the traveled way.

Corner Clearance - The distance from an intersection of a public or private road to the nearest access connection, measured from the closest edge of the pavement of the intersecting road to the closest edge of the pavement of the connection along the traveled way.

Cross Access - A service drive that provides vehicular access between two or more abutting sites so that the driver need not enter the public street system to move between them.

Curb Cut - An opening along the curb line where vehicles may enter or leave the roadway.

Deceleration Lane - A speed-change lane that enables a vehicle to leave the through traffic lane and decelerate to stop or make a slow-speed turn.

Directional Median Opening - An opening in a raised median that provides for specific traffic movements and physically restricts other movements. For example, a directional median opening may allow only right turns at a particular location.

Driveway - A (typically) private roadway or entrance used to access residential, commercial, or other property from an abutting public roadway.

Driveway Density - The number of driveways divided by the length of a particular roadway.

Driveway Spacing - (see Connection Spacing)

Driveway Throat Width - The width of a driveway measured from edge to edge measured at the right-of-way line.

Easement - A grant of one or more property rights by a property owner. For example, one property owner may allow a neighbor to access public roads across his or her property.

Entering (or Intersection) Sight Distance - The distance of minimum visibility needed for a passenger vehicle to safely enter a roadway and accelerate without unduly slowing through traffic.

Frontage - The length of a property that directly abuts a highway.

Functional Classification System - A system used to categorize the design and operational standards of roadways according to their purpose in moving vehicles; higher functional classification implies higher traffic capacity and speeds, and typically longer traveling distances. Refer to Public Ways Construction Standards for definitions on the "Street Classification Map".

Intersection – Any at-grade connection with a roadway, including two roads or a driveway and a road.

Joint (or Shared) Access - A single access point connecting two or more contiguous sites to a public roadway that serves more than one property or development, including those in different ownership or in which access rights are provided in legal descriptions.

Lane - The portion of a roadway used in the movement of a single line of vehicles.

Left-Turn Lane - A lane used for acceleration, deceleration, and/or storage of vehicles conducting left turning maneuvers.

MDSHA – Maryland Department of Transportation, State Highway Administration.

Median - A barrier that separates opposing flows of traffic. Raised medians (with curbs and a paved or landscaped area in the center) are generally used. Medians can be both functional and attractive.

Merge - The process by which two separate traffic streams moving in the same direction combine or unite to form a single stream.

MUTCD – Manual of Uniform Traffic Control Devices, latest edition.

Non-Conforming Access - An access point/entrance that is existing but does not meet the standards of this policy.

Parallel Access Road - A road that is used to provide alternative access to a road with higher functional classification; parallel access roads typically run parallel with the main route and provide access at the front or back of a line of adjacent properties.

Peak Hour - The number of vehicles passing over a section of roadway during its most active 60-minute period each day, as determined in the field.

Private Street – A street or driveway, open for use by the general public, but under the jurisdiction, control, and maintenance of a private entity.

Public Street - A highway, street or road, open for use by the general public and which is under the jurisdiction, control, and maintenance of the City of Hagerstown or other public body.

Public Ways Construction Standards – Manual developed and maintained by the City of Hagerstown Department of Parks and Engineering.

Queue Storage - That portion of a traffic lane that is used to temporarily hold traffic that is waiting to make a turn or proceed through a traffic control device such as a stop sign or traffic signal.

Residential - Property developed for the purpose of single family, multi-unit, or other housing.

Right-In, Right-Out - A driveway where left turns are prohibited either by physical or regulatory means.

Right-of-Way (ROW) - Land reserved, used, or slated for use for a highway, street, alley, walkway, drainage facility, or other public purpose related to transportation or utilities.

Service Road - A road that is used to provide alternative access to a road with higher functional classification; service roads may include internal circulation systems, frontage roads, or backage roads.

Shared Driveway - A single, private driveway serving two or more lots.

Sight Distance - The distance visible to the driver of a passenger vehicle measured along the normal travel path of a roadway to a specified height above the roadway when the view is unobstructed to oncoming traffic.

Spacing - For purposes of this policy, the distance between two roadways or driveways measured from the center of one roadway to the center of the next roadway, unless otherwise defined for a specific application.

Speed Differential - The difference in travel speed between through traffic, and traffic entering or exiting a roadway.

Stopping Sight Distance - The minimum distance required for a vehicle traveling on a roadway to come to a complete stop upon the driver seeing a potential conflict; it includes driver reaction and braking time and is based on a wet pavement and the actual street slope.

Taper - The transitional area of a roadway where lanes are added or dropped.

Throat Length -The distance parallel to the centerline of a driveway to the first on-site location at which a driver can make a right-turn or a left turn. On roadways with curb and gutter, the throat length shall be measured from the back of the curb. (see Section 17)

Traffic Impact Study - A report that compares relative roadway conditions with and without a proposed development; typically including an analysis of mitigation measures.

Turning Radius - The radius of an arc that approximates the turning path of a vehicle.

Two-Way Left-Turn Lane (TWLTL)— A lane located between opposing traffic flows which provides a transition area for left-turning vehicles.

Weaving - Crossing of traffic streams moving in the same general direction through merging and diverging, for instance near an interchange or intersection.

Section 3 - Street Classification System

Safe and efficient operation of streets and highways requires that these facilities be classified and designed for the functions that they will perform. The entire road system is traditionally classified by relating the proportion of through movement to the proportion of access. Freeways, which have full control of access and serve only the movement function, are at one end of the scale; local streets, which predominately provide for land access, are at the other end of the scale because they have little or no through movement. Collector and arterial streets normally must provide a balance between movement and access functions; it is along these streets that access management actions become important.

City streets range from local streets to arterial streets. Four street classifications are presented in the Public Ways Construction Standards Manual by the City of Hagerstown's Department of Engineering and Parks. These include:

- Arterial
- Major Collector
- Minor Collector
- Local

Street classification shall be as defined in the Public Ways Construction Standards on the "Street Classification Map".

Section 4 - Street Planning

4.1. Planning Requirements

Through the Comprehensive Plan or other long-range planning documents, the City shall develop a conceptual street system for areas of potential development. Consideration must also be given to existing or planned connections and streets in adjacent sections, existing property lines and topographic features.

The proposed development plan may propose an alternative street system as long as the principles described above are followed. The alternative street system must be approved along with the development plan. Any alternative street system proposed shall provide the appropriate class of roads to maintain or improve traffic flow and the roads should provide connectivity between developments.

Section 5 - Review / Exceptions Process

The following administrative procedures are intended to provide flexibility, while maintaining an equitable and consistent process for access management decisions. The exception/waiver process described below applies to all of the standards in this policy.

5.1. Approval Required

A. Driveways and entrances must be approved by the City Engineer per Section 216-48 of the City Code, and appropriate Access/Entrance permit issued by the City.

B. Access connections that do not conform to this policy and were constructed before the effective date of this policy shall be considered legal nonconforming connections and may continue until a change in use occurs as defined in this policy. Temporary access connections are legal nonconforming connections until such time as the temporary condition expires.

5.2. Requests for Modification of Access

A. Any requests for access modification shall require approval by the City Engineer (or designee). Any appeal of the decision of the City Engineer (or designee) shall be to the Board of Technical Appeals.

B. Access modifications shall require documentation justifying the need for the modification and an access management plan for the site. The analysis shall address existing and future access, evaluate impacts of the proposed plan, adherence to standards, and include improvements and recommendations necessary to implement the proposed plan.

5.3. Waiver for Nonconforming Situations

Where the existing configuration of properties and driveways in the vicinity of the subject site precludes the location of an access point in accordance with the standards of this policy, joint access shall be considered with the property adjacent to the farthest property line. In the event joint access cannot be developed, the City Engineer (or designee), shall be authorized to waive the requirement if all of the following conditions are met as determined by an analysis prepared by the applicant's professional engineer:

A. No other reasonable access to the property is available.

B. The connection does not create a potential safety or operational problem as determined by the applicant's professional engineer.

C. An access connection along the property line farthest from a street intersection may be allowed. The construction of a median may be required on the street to restrict movements to right-in/right-out.

5.4. Joint-Use Access

When joint access is developed, the following shall be incorporated:

- A joint-use driveway with cross-access easements will be established by a legally recorded document to serve two abutting building sites,
- The building site is designed to provide cross access and unified circulation with abutting sites; and
- The property owner agrees to close any pre-existing curb cuts after the construction of both sides of the joint use driveway.

5.5. Temporary Access

A development that cannot meet the connection spacing standards of this policy and has no reasonable alternative means of access to the public road system may be allowed a temporary connection. When adjoining parcels develop which can provide joint or cross access, permission for the temporary connection shall be rescinded and the property owner must remove the temporary access and apply for another connection. Conditions shall be included in the approval of a temporary connection including, but not limited to the following:

- Applicants must sign an agreement to participate in any future project to consolidate access points.
- Applicants must sign an agreement to abandon the interim or temporary access when adequate alternative access becomes available.
- The transportation impact study should consider both the temporary and final access/circulation plan. A limit may be placed on the development intensity on the subject property until alternative access becomes available.

Section 6 - Access Management and Subdivision Practices

The design of property access is established when land is subdivided for development and will be reviewed to assure that property access is designed in accordance with the access management guidelines of this policy.

6.1. Creation of New Lots

New lots shall not be created on any arterial or collector roadway unless they comply with this policy.

6.2. Subdivision Access

A. When a subdivision is proposed that would abut or contain an arterial or major collector street, it shall be designed to provide lots with access from an interior local street.

B. Direct residential driveway access to individual lots shall be prohibited from any arterial or major collector street.

C. Residential corner lots shall obtain access from the street with the lowest functional classification, and access shall be placed as far from the intersection as possible to achieve the maximum available corner clearance.

D. Access locations to subdivisions shall provide appropriate acceleration/deceleration lanes, sight distance, driveway spacing, and align with driveways on opposite side of street.

Section 7 - Unified Access and Circulation

7.1. Outparcels and Shopping Center Access

Outparcels are lots on the perimeter of a larger parcel that break its frontage along a roadway. They are often created along arterial street frontage of shopping center sites, and leased or sold separately to businesses that desire the visibility of major street locations. Outparcel access policies foster unified access and circulation systems that serve outparcels as well as interior development, thereby reducing the need for driveways on an arterial street.

Development sites site shall prepare a unified access and circulation plan, and the following shall apply:

A. The number of connections shall be the minimum number necessary to provide reasonable access to the overall development site and not the maximum available for that frontage under the connection spacing requirements in this policy.

B. Access to outparcels shall be internalized using the shared circulation system of the principal development.

C. All necessary easements and agreements shall be recorded in an instrument that runs with the deed to the property.

D. Unified access for abutting properties under different ownership and not part of an overall development plan shall be addressed through the Joint and Cross Access provisions below.

7.2. Joint and Cross Access (Private service roads)

Joint and cross access policies promote connections between major developments, as well as between smaller businesses along a corridor. These policies help to achieve unified access and circulation systems for individual developments under separate ownership that could not otherwise meet access spacing standards or that would benefit from interconnection, i.e., adjacent shopping centers or office parks that abut shopping centers and restaurants.

A. Adjacent commercial or office properties and major traffic generators, e.g. shopping plazas, shall provide a cross-access drive and pedestrian access way to allow circulation between adjacent properties. This requirement shall also apply to a building site that abuts an existing developed property unless the City Engineer (or designee) finds that this would be impractical.

B. To promote efficient circulation between smaller development sites, the City Engineer (or designee) may require dedication of easement that extends to the edges of the property lines of the development site under consideration to provide for the development of a service road system. The service road shall be of sufficient width to accommodate two-way travel aisles and incorporate stub-outs and other design features that make it visually obvious that abutting properties may be tied in to it. Abutting properties shall be required to continue the service road as they develop or redevelop in accordance with the requirements of this policy. The easement may be provided to the front or rear of the site or across the site where it connects to a public roadway.

C. Property owners shall record all necessary easements and agreements, including an easement allowing cross access to and from the adjacent properties, an agreement to close driveways provided for access in the interim after construction of the joint use driveway(s) or service road system, and a joint maintenance agreement defining maintenance responsibilities of property owners that share the joint-use driveway and cross-access system.

D. Joint and cross access requirements may be waived by the City Engineer (or designee) for special circumstances such as incompatible uses, (e.g. a gas station next to a child care center), or major physical constraints, (e.g. change in grade between properties makes connection impractical).

Section 8 - Redevelopment

Nonconforming access situations may pose safety dilemmas, contribute to traffic congestion, deter economic development, or undermine community character. Access to nonconforming properties is best addressed when a change in use occurs so applicants can finance access improvements as part of the overall property improvement. In some instances, opportunities to improve the location or design of property access can also occur during the roadway improvement process. This plan includes the following conditions or circumstances where property owners or permittees may be required to relocate or reconstruct conconforming access features and/or pursue alternative access measures.

8.1. Requirements

Properties with nonconforming access connections shall be allowed to continue, but must be brought into compliance with this Access Management Policy to the maximum extent possible when modifications to the roadway are made or when a change in use on the property results in one or more of the following conditions:

A. When a new access is requested or required.

B. When a development plan is required.

C. When a site experiences an increase of ten percent (10%) or greater in peak hour trips or 100 vehicles per hour in the peak hour, whichever is less, as determined by one of the following methods:

1. An estimation based on the ITE Trip Generation manual (latest edition) for typical land uses, or
2. Traffic counts made at similar traffic generators in the City, or
3. Actual traffic monitoring conducted during the peak hour of the adjacent roadway traffic for the property.

D. If the principal activity on a property is discontinued for a period of one year or more, or construction has not been initiated for a previously approved development plan within a period of two years from the date of approval, then that property must thereafter be brought into conformance with all applicable access management requirements of this policy, unless otherwise exempted by the permitting authority. This shall include the need to update any previously approved transportation impact study where new traffic projections are available. For uses or approved plats in existence upon adoption of this policy, the one-year period for the purposes of this section begins upon the effective date of these requirements.

E. Access to all change-in-use activities shall be approved by the City Engineer (or designee). All relevant requirements of this policy shall apply.

Section 9 - Traffic Impact Study Guidelines

Refer to the Public Ways Construction Standards for the City of Hagerstown's "Traffic Impact Study Guidelines".

Section 10 – Intersection Functional Area

The functional area of an intersection includes the area **upstream** of the intersection where vehicles react to slowing vehicles in front of them, decelerate and wait in queues. The **downstream** functional area includes the area where through traffic merges with traffic turning from the cross street, and where vehicles accelerate back to normal driving speed. This is also known as the "intersection corner clearance" area.

Driveways should not be located within the functional area of an intersection

10.1. Upstream Intersection Functional Area

The upstream intersection functional area can be determined by summing two primary components, the reaction/deceleration distance values from Table 10-1 and the queue length:

A. Reaction/Deceleration Time - This is the distance traveled while the driver recognizes that action is required, i.e. sees vehicles stopping ahead, reacts, i.e. presses break pedal, and decelerates i.e., slows to a stop. These values can be obtained from ***Table 10-1***.

Table 10-1 Reaction/Deceleration Distances for Upstream Functional Areas			
Design Speed (mph)	**Reaction/Deceleration Distance (D1) (ft)**	**Braking Distance (D2) (on level) (ft)**	**Stopping sight distance (D1 plus D2 Rounded to nearest 5 ft)**
15	**55**	**22**	**80**
20	**74**	**38**	**115**
25	**92**	**60**	**155**
30	**110**	**86**	**200**
35	**129**	**118**	**250**
40	**147**	**154**	**305**
45	**165**	**194**	**360**
50	**184**	**240**	**425**
Note: Reaction/Deceleration distance predicted on a time of 2.5 s; deceleration rate of 3.4 m/s² [11.2 ft/s²] used to determine calculated sight distance. Source*: AASHTO-Geometric Design of Highways and Streets*			

B. Queue Storage Length - Queue lengths should be calculated based on existing (or existing plus development for new development projects) and future (horizon-year) traffic conditions. For development projects, turn lane storage improvements may be based on existing plus development conditions, however, site access and right-of-way should be planned to accommodate ultimate conditions.

Queue lengths should be calculated for left-turn, through and right-turn lanes. Queue lengths should consider 95th percentile queues and should be calculated using established procedures or software that reports 95th percentile or maximum back of queue. As traffic signals on most arterial corridors have the potential to be coordinated, it is recommended that a cycle length of at least 120 seconds be used. Analysis should conform to the Maryland State Highway formula:

Queue Length (ft) = [Volume X LUF/(Cycles/Hour) X (Surge Factor) X (Vehicle Length) where:

Volume is the peak hour volume in vehicles/hour
LUF is the Lane Utilization Factor (1.0 for one lane in each left or right-turn lane group)
Surge Factor is 1.5 to account for the randomness of vehicle arrival rates.
Vehicle Length is 25 feet.

Software analysis may also be used or to supplement the analysis. SYNCHRO is the recommended software.

In these cases, queue lengths should be evaluated for both coordinated arrival and random vehicle arrival and the larger of the two values used, as future changes in coordination timings can significantly change queue patterns.

10.2. Downstream Functional Area

Downstream functional areas based on AASHTO stopping sight distances are given in ***Table 10-2.***

Table 10-2 Downstream Functional Area, in Feet	
Speed (mph)	**AASHTO Stopping Distance (1)**
20	**125**
25	**150**
30	**200**
35	**250**
40	**335**
45	**400**
50	**475**
[1]Source: Reference (1) Table III-1, page 120, 1990 AASHTO "Green Book" (rounded to 25 ft.)	

Section 11 - Medians and Continuous Center Turn Lanes

Restrictive medians and well designed median openings are known to be some of the most imortant features in a safe and efficient street system. The design and placement of these medians and openings is an integral part of the access management practice.

Raised medians are important for several reasons.

- Vehicular Safety - to prevent accidents caused by crossover traffic, headlight glare distraction and traffic turning left from through lanes.
- Pedestrian Safety - to provide a refuge for pedestrians crossing the street.
- Vehicular Efficiency - to remove turning traffic from through lanes thereby maintaining/increasing operating speed. This reduces fuel consumption and emissions which is an environmental benefit.
- Improved Aesthetics - Landscaped and grass medians offer aesthetic benefits over paved turn lanes or undivided roadways.

Continuous two-way center turn lanes do not provide all of the safety benefits of restrictive medians, but do offer substantial safety improvements over roadways where no left-turn lanes are provided, particularly in areas with frequent driveways. These facilities provide more flexibility than restrictive medians and operate safely and efficiently under appropriate circumstances. However, once the driveway density, left-turning traffic volumes, and through traffic volumes reach certain levels, the safety benefits diminish rapidly.

11.1. Median Standards

Restrictive medians shall prohibit vehicles from crossing the median except at designated median openings through the use of a barrier curb or wide landscaped median treatment. Restrictive medians shall be required under the following conditions:

- On arterial and collector streets where existing daily traffic volumes are in excess of 24,000 [where traffic volumes are projected to exceed 24,000 in the future (horizon year) the roadway and access should be designed to accommodate the future installation of a raised median, e.g. identify potential median opening locations, use 16-foot center turn lane].
- Adjacent to left-turn lanes at signalized intersections (existing or planned signal locations) where driveways are present within the intersection functional area.
- Adjacent to all dual left-turn lanes.

11.2. Continuous Two-Way Center Turn Lanes

Continuous two-way center turn lanes shall be considered (except where restrictive medians are required as described above) on all arterial and collector streets adjacent to property that is developed as or planned for commercial development or in areas where there is a need for frequent left-turn lanes.

Section 12 - Median Openings

Openings in raised medians should only be provided to accommodate turning traffic in locations where this can be safely done. Where openings are provided, an adequate spacing between them is required to allow for weaving of traffic so as to preserve traffic flow and provide for safe lane changes and turns. A full opening allows turns to be made in both directions; a directional opening allows turns to be made in only one direction. An example of a directional median would be one that allows left turns into a driveway, but does not allow left turns to be made out. Examples of these median opening types are shown on ***Figure 12-1*** and ***Figure 12-2***.

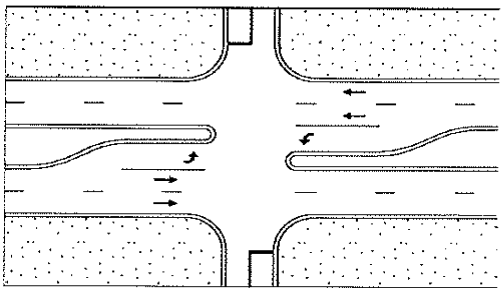

Figure 12-1
Full Median Opening

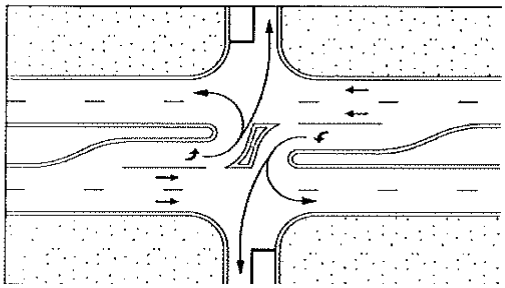

Figure 12-2
Directional Median Opening

12.1. Median Opening Standards

The minimum access spacing standards where medians are involved shall be per ***Table 12-3*** subject to the following limitations:

* Median openings shall not be permitted where an opening would be unsafe due to inadequate sight distance.
* Full median openings must meet the requirements of both one-quarter mile spacing and the minimum connection spacing.
* Directional median openings may be provided at any connection that meets the connection spacing requirements, and is found to be an acceptable location based on a transportation impact study.
* Left-turn lanes shall be required at all median openings. Median openings shall not be permitted where adequate queue storage cannot be provided for the left-turn lanes.

Median Openings and Access Spacing				
Table 12-3 Example of Guidelines for Access Spacing				
Functional class of roadway	**Undivided roadway (feet)**	**Divided Roadway**		
		Full median Opening (feet)	**Right in/out only (feet)**	**Directional median opening (feet)**
Arterial	**660**	**1,320**	**330**	**660**
NOTE: These are the minimum spacing requirements but a proof of driveway necessity is still required. A 750' full median opening may be acceptable on under 40 mph routes where route function is not compromised. Source: *Access Management Spacing Standards and MDSHA Table 10.8.1*				

12.2. U-Turns

As access management principles and standards are applied, the U-turn becomes an increasing important movement for accessing local streets and driveways. A standard passenger vehicle cannot make a U-turn from a left-turn lane with minimal 4 feet median width, and only two lanes in the opposing direction. In order to accommodate U-turn movements at median openings on a four-lane roadway, provide a wide median near the intersection (30 feet or more) or provide some sort of widening of the downstream approach near the U-turn location. Examples of these techniques are illustrated on ***Figure 12-4*** and ***Figure 12-5***.

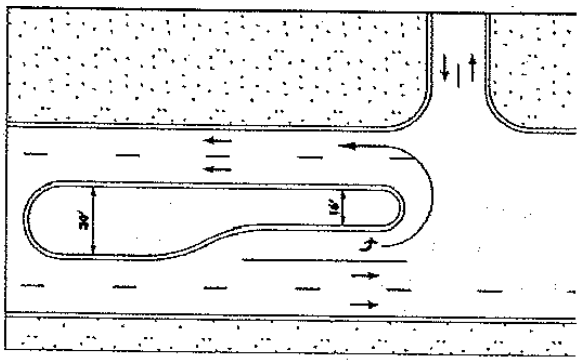

Figure 12-4
U-Turns at Wide Median

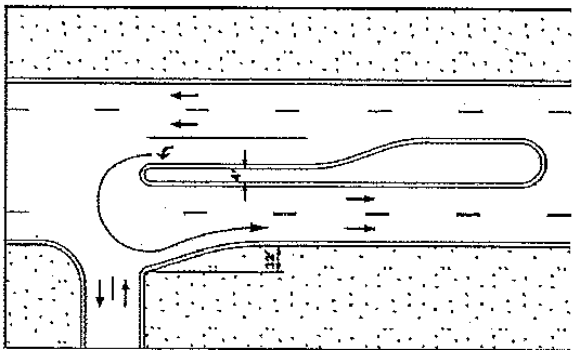

Figure 12-5
U-Turns into Flared Approach

Section 13 - Traffic Signals

Minimum spacing is mainly intended to preserve efficient traffic flow and progression on urban arterial streets. Quarter mile (1320 feet) spacing allows traffic signals to be effectively interconnected and synchronized. Effective signal coordination will also tend to reduce rear-end collisions and stop-and-go driving that increases congestion, delay, and air pollution.

13.1. Traffic Signal Standards

An intersection should meet the following requirements to be considered for installation of a traffic signal.

A. The intersection shall meet a warrant or warrants in the Manual on Uniform Traffic Control Devices MUTCD). Installation of a traffic signal based on the peak hour or four- hour warrant will only be considered at the intersection of an arterial street with a major collector street.

B. For intersections where one or more of the roadways is a collector street, existing traffic volumes shall be utilized in evaluating the signal warrants (installation of a traffic signal based on existing plus proposed development traffic volumes may be approved based on traffic volume increases projected to occur within the next 12 months).

C. The desired location of the traffic signal is at least one-quarter mile (1320 feet) from another traffic signal, either existing or anticipated. The City may accept 800 feet as a minimum spacing provided proper analysis justifies the location.

D. Traffic signal interconnect (conduit and cable) shall be installed between traffic signals within 3,000 feet of the proposed location.

Section 14 - Connection Spacing

The minimum allowable spacing between connections (side streets and private driveways) varies by the classifications of streets. Access points introduce conflicts and friction into the traffic stream. Vehicles entering and leaving the main roadway often slow the through traffic, and the difference in speeds between through and turning traffic increases accident potential. As stated in the AASHTO: A Policy on Geometric Design of Highways and Streets, "Driveways are, in effect, at-grade intersections. The number of accidents is disproportionately higher at driveways than at other intersections; thus their design and location merit special consideration." The consensus is that increasing the spacing between access points improves arterial flow and safety by reducing the number of conflicts per mile, by providing greater distance to anticipate and recover from turning maneuvers, and by providing opportunities for use of turn lanes. Many studies have shown that driveway spacing is one of the key factors that influence accidents.

14.1. Connection Spacing Standards

Connections to all streets other than "locals" shall conform to the following requirements. All applicable criteria must be met to be deemed conforming.

A. Be outside any intersection functional areas.

B. Provide sufficient right-turn lanes and left-turn lanes.

C. Be aligned with existing or planned connectors on the opposite side of the street (except where movements are limited to right turns in and right turns out).

D. Minimum connection spacing on arterials and collectors shall meet the following ***Table 14-1***

Table 14-1
Downstream Intersection Area, in Feet

Speed[2]	AASHTO Stopping Distance[1]
20	125
25	150
30	200
35	250
40	335
45	400
50	475

[1]Source: Reference (1) Table III-1, page 120, 1990
[2]Greater of design speed and 85th percentile speed.
AASHTO "Green Book" (rounded to 25 ft.)

E. Connectors/Driveways onto local street shall be evaluated on a case-by-case basis considering street vertical and horizontal geometry, traffic volumes, and on-street parking.

Section 15 - Turn Lanes

Vehicles slowing to turn right or left onto cross streets or into driveways cause disruptions to through street traffic flow and increase accidents along a corridor. Thus, the treatment of turning vehicles is one of the major access management concerns.

Left turns may increase conflicts, delays, and accidents and often complicate traffic signal timing. These problems are especially acute at major arterial intersections where heavy left-turn movements take place, but occur also where left turns enter or leave driveways serving adjacent land development. The following illustrate these problems:

- More than two-thirds of all driveway-related accidents involve left-turning vehicles.
- Where there are more than six left turns per traffic signal cycle, virtually all through vehicles in the shared lane may be blocked by the left-turning vehicles.

15.1. Left-Turn Lane Standards

The design of the length of left turn lanes is critical for safety. Lanes that are too short cause vehicles in the ends of the turning queue to block into thru lanes. Designs to determine left-turn lane lengths shall be submitted to the Citiy.

A. Left turn lanes are required on arterial streets at each intersecting street or driveway. Minimum length should be 250 feet plus the taper at the intersection with another arterial street and 200 feet plus the taper at other locations.

B. Left-turn lanes should be provided on all approaches to intersections controlled by, or planned to be controlled by, traffic signals.

C. Left-turn lanes should be provided on arterial streets at the intersection with other arterials, collector streets, and all driveways.

D. Left-turn lanes should be provided on connectors intersecting with arterial streets (where left-turn egress is permitted).

E. Left-turn lanes should be provided at all median openings on roadways with medians.

F. Left-turn lanes should be provided on collector streets at the intersection with a connector serving non-residential development.

G. Continuous two-way left turn lanes may be used in lieu of individual left-turn lanes where permitted.

H. Dual-left-turn lanes should be planned for all approaches of an arterial/arterial intersection.

I. The length of the left-turn lane at intersections controlled by traffic signals should be increased, if necessary, based on the longer of the queues in the turn lane or the adjacent through lane.

15.2. Right-Turn Lane Standards

A. Right turn lanes are required on arterial streets at each intersecting street or driveway. Minimum length should be 250 feet plus the taper at the intersection with another arterial street and 150 feet plus the taper at other locations.

B. Required on collector streets at the intersection with any street or driveway where the right-turn volume on the collector street is or is projected to be at least 100 vehicles in any hour. The minimum length should be 100 feet plus the taper.

C. The length of the right-turn lane at intersections should be increased, if necessary, based on the longer of the queues in the turn lane or the adjacent through lane.

D. Right-turn lane lengths cover the full-width segment between the taper and the end of the lane at an intersection with a public street or driveway. The end of the lane at the intersection should be determined as the point of curvature for the corner radius.

E. The minimum length on controlled approaches should be exceeded based on the estimated queue length determined for 20-year traffic volume projections. The turn lane length should be based on the longer of the queues in the turn lane or the adjacent through lane.

F. The introductory taper should be a straight line and its length should be determined by using a rate of 12.5 to 1 based on the width of the right-turn lane.

G. The beginning of a taper should be no closer than 100 feet from the centerline of the nearest connector preceding the turn lane.

H. Continuous right-turn lanes are allowable on a case-by-case basis but is a practice that is generally discouraged.

15.3. Variances

The standards outlined in the section may be altered or waived by the City Engineer (or designee) for a specific situation in which extraordinary conditions are encountered.

15.4. Acceleration Lanes

Acceleration lanes are required on streets when speed limits are 40 mph or more.

Section 16 - Sight Distance

Sight distance for driveway construction is essential in the design and issuance of permits for all driveways. Sight distance is always the most important consideration in allowing, not allowing, or placing driveways. Both vertical and horizontal alignment can limit sight distance. Special consideration is required for skewed intersections. The sight distance standards are based on criteria in the AASHTO Green Book.

16.1. Exceptions to Sight Distance Requirements

If no location on the applicant's frontage meets or exceeds the sight distance requirements, but a location does meet or exceed the distances shown in the ***Minimum Stopping Sight Distance*** column on ***Table 16-1***, a driveway may be located with the City Engineer's (or designee's) approval, in accordance with the following criteria:

- The proposed driveway location has the maximum sight distance available on the entire property frontage.
- The proposed location is not for a public street approach or a high-volume commercial driveway (more than 50 trips (in plus out) existing or projected during the peak hour).
- There is no other available access, having equal or greater sight distance.

- The Applicant will submit a letter to the City Engineer (or designee) stating the following: "Applicant is aware that the sight distance of this driveway is restricted. The sight distance is the minimum necessary for a vehicle traveling at the posted speed to come to a complete stop prior to the driveway." The permit may also be issued with conditions limiting the number and types of vehicles using the driveway.

If these conditions are not met the permit shall not be issued for the driveway.

Table 16-1
Minimum Stopping Sight Distance, in Feet

Speed[1]	25	30	35	40	45	50
Distance	150	200	225	275	325	400

[1] Greater of design speed or 85th percentile speed

16.2. How to Measure Sight Distance

The sight distance for the proposed driveway is measured for each direction of travel and the smaller distance is then located in the sight distance chart for the speed (greater of the design speed and 85th percentile speed) of the roadway to determine which sight distance criteria is met, if any.

To measure actual sight distance limited by vertical alignment in the field, place a sighting target 3.50 feet above the edge of pavement at a point 20 feet from the edge of the nearest travel lane (approximate location of a driver waiting to exit the driveway) at the proposed driveway location. On streets classified collector and below, the target may be placed at a point 10 feet from edge of the nearest travel lane. Sighting from a height of 3.5 feet for cars (7.6 feet for trucks), move along the roadway away from the proposed driveway site to a point beyond where the target disappears. Move toward the target until it can first be seen and place a mark on the pavement. The target should remain visible as you continue toward the driveway. The line of sight should stay within the limits of the right-of-way. Measure the distance along the roadway between the mark and the target. This measured distance is the sight distance.

Sight distance should take into account both the horizontal and vertical profile of the roadway. Consideration may also be given to vegetation both on the right-of-way and adjacent to the right-of-way as it may impede vision more during certain times of the year. Where providing adequate sight distance requires visibility across private property, provisions must be made to preserve sight lines across the property.

Section 17 - Driveway/Connection Geometry

The design of driveways is important in that it affects the speed of traffic turning into and out of driveways. This in turn affects the speed differential between through traffic and turning traffic where auxiliary lanes are not provided. Large speed differentials are created where driveways are inadequately designed and these higher speed differentials are associated with higher crash rates and diminished traffic operations.

Another critical aspect of the driveway or connection design is the potential for traffic operations off of the public street to become congested and spill or queue back onto the public street. The proper separation of internal conflict points from the public street is necessary to eliminate or diminish this potential.

17.1. Driveway/Connection Standards

A. Driveways shall align with driveways across the roadway on roadways without nontraversable medians or shall be offset as described in the connection spacing standards.

B. Driveways should have angles of intersection with the public street of 90 degrees or very near 90 degrees. Refer to Public Ways Construction Standards Manual for more details.

C. Corner Radius - The corner radius at intersections should be large enough to allow entering vehicles to do so at a reasonable rate of speed. The Public Ways Construction Standards Manual describes minimum corner radii, measured from the edge of the driving surface of the roadway. Larger approach radii are allowable for driveways, however the impact on lane definition, the view angle of right-turning traffic to see cross traffic, and the impact on pedestrian crossing times should all be considered. Corner radii of greater than 50 feet should not be used.

D. Driveway Width

1. All commercial and industrial driveways shall be curbed.
2. All parking lots and driveways leading to or connecting with parking lots shall also be curbed.
3. All driveways with four or more lanes shall have a raised, landscaped median at least 8 feet in width. On industrial drives with primarily heavy truck traffic, medians may be omitted, or "rollover" or mountable type median may be used but should be constructed with a pavement surface of a contrasting color.
4. Single inbound or outbound lanes on driveways with a median shall be 16 to 18 feet in width.
5. The width of any driveway shall conform to the Public Ways Construction Standards Manual
6. Low volume driveways may be permitted to have a width of 24 feet (back of curb to back of curb) on local roadways or in the City Center provided no truck traffic will be allowed to use the driveway.

E. Driveways and Accommodation of Pedestrians - In current and future urban places, all driveways must adequately accommodate pedestrians using sidewalks or paths. The crosswalk location should be placed to balance the pedestrian crossing distance and the width of the intersection for vehicular traffic (typically this is at about the center point of the corner radius). Crosswalks should not be placed where pedestrians would likely have to cross behind or between stopped vehicles. Where four or more driveway lanes are created, they should be designed so that the pedestrians have a refuge from entering and exiting traffic.

F. Driveway Throat Length - The driveway throat length should minimize or eliminate the condition where inbound traffic queues back onto a public street (see ***Figure 17-1***). The throat length also provides for a place for exiting vehicles to queue, better definition of the driving lanes, and separation between the parking area and the adjacent street. Driveway throat lengths shall meet the following requirements and should be based on the ultimate public street section anticipated:

The following throat lengths shall be provided:

1. For driveways serving low volumes (less than 30 vehicles existing or projected in any hour), a throat depth of 30 feet may be permitted at the City Engineer's (or designee's) discretion.

2. For driveways serving between 30 and 400 vehicles in the peak hour (two-way traffic volumes) the driveways shall provide at least 125 feet of throat length.

3. For driveways serving over 400 vehicles per hour (two-way traffic volume) and for all driveways controlled by a traffic signal, adequate throat length shall be determined by a transportation impact study.

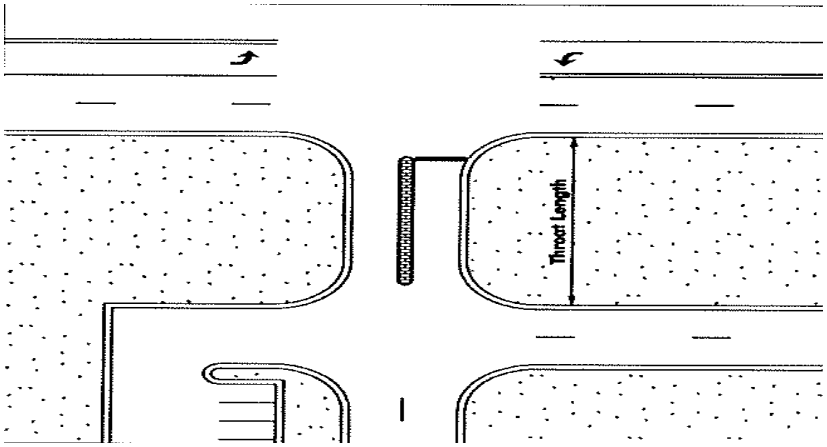

Figure 17-1
Driveway Throat Length

G. Turning Radius – Designers shall use AutoTURN software to evaluate the path of a vehicle to establish stop bar locations, designs of medians, noses, curb radius, etc. Designers shall use a WB-67 (53’ trailer) truck to ensure clearances. If a WB-67 truck is not applicable to the project, a minimum of a WB-50 (42’ trailer) shall be the accommodated.

H. Left outbound turns must be considered in driveway design. Outbound lanes of unsignalized driveways should include a separate left turn lane when turn volumes are estimated at over 10 vehicles in the peak hour.

17.2. Corner Right-of-Way Sight Triangles:

A 25-foot triangle shall be provided at the corners or two intersecting streets that both have a designated classification of arterial or collector. The triangle is determined by measuring along both right-of-way lines 25 feet from their point of intersection and striking a line to connect the two points (see ***Figure 17-2***). The purpose of this triangle is to provide appropriate sight distances at the corner.

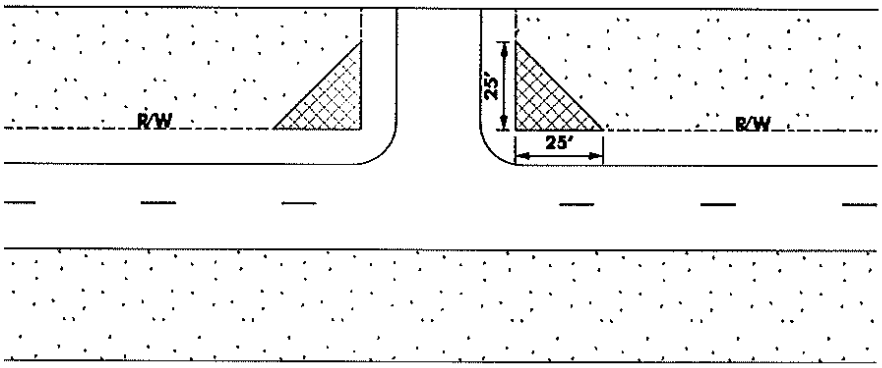

Figure 17-2
Corner Right-of-Way Triangle