ACCESS MANAGEMENT PLAN

Olathe, Kansas

Revised August 5, 2003
Resolution No. 03-1101

CONTENTS

DEFINITIONS

Access - A means of vehicular or pedestrian approach, entry to, or exit from property.

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

Access Management - The process of providing and managing access to land development while preserving public street traffic flow with respect safety, capacity, and speed.

Access Management Plan - A plan illustrating the design of streets and access for property along an arterial street segment that is developed by the City and, in some cases, other applicable public agencies, e.g., bordering city or State Department of Transportation.

Arterial Street - A street or highway that provides for rapid and efficient movement of large volumes of through traffic between sections of the city and across the urbanized area. It is not intended to provide primary land access service.

Collector Street - A street which provides traffic circulation away from arterial streets. Land access is a secondary function of the street. The collector distributes traffic from the arterial streets to the local street network.

Cross Access - A service drive providing vehicular access between two or more contiguous sites to facilitate travel without a driver using the public street system.

Downstream – In the direction traffic is flowing, i.e., ahead of a driver.

Driveway - A private roadway or service drive providing for the movement of vehicles within a development and connecting to a public street.

Driveway Spacing - The distance between successive driveways or a driveway and street that intersect a public street.

Expressway - A street or highway which provides for rapid and efficient movement of large volumes of through traffic between major activity concentrations, frequently on a regional scale. No property access is allowed. Access to an expressway is provided through either interchanges or intersecting major streets.

Functional Classification - A system used to group public streets into classes according to their purpose in moving traffic and providing access.

Highway - A thoroughfare controlled and/or maintained by the Kansas Department of Transportation.

Infill – Those parcels of vacant land between, adjacent to or in close proximity to existing development where water, sewer and other public improvements are currently in place, where capacity exists, and where a development pattern has been established. Public services include storm sewers, police and fire coverage, libraries and roadways.

Influence Area (Intersection) - That area beyond the physical intersection of two streets that comprises decision and maneuver distance, plus any vehicle storage length, that is to remain free of any driveway or side street connection.

Intersection Sight Distance - The generally unobstructed view along an uncontrolled street from a side street or driveway wherein drivers have sufficient view to safely enter or cross the uncontrolled street.

Joint Access (or Shared Access) - A driveway connecting two or more contiguous sites to the public street system.

Local Street - A street which provides direct traffic access to abutting land.

Median Break - A break in a raised median that is designed to allow drivers to cross or turn into or from either direction of travel separated by the raised median.

Partial Median Break - A break in a raised median that is designed to allow drivers to turn left across the opposing direction of travel separated by the median, but to physically prohibit drivers from crossing the partial median break from an intersecting street or driveway.

Raised Median - A physical barrier in the roadway that separates traffic traveling in the opposite directions, that is intended to exclude drivers from traveling across it except where designated openings are provided.

Right-of-Way - Land reserved, used, or to be used for a highway, street, alley, walkway, trail, drainage facility or other public purpose.

Sight Distance Triangle - A triangular shaped portion of land established at street intersections in which nothing is erected, placed, planted or allowed to grow in such a manner as to limit or obstruct the sight distance of motorists entering or leaving an intersection.

Upstream – In the direction opposite to which traffic is flowing, i.e., behind a driver.

INTRODUCTORY INFORMATION

Many of the problems on our street system can be traced to the access provided to abutting property via side streets and driveways. Historically, most decisions to allow access were 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.

"Access management" takes a holistic view of property access relative to the function of the streets from which it is provided. The objective of access management is to optimize, or find that right balance, between property access and traffic safety and efficiency, particularly along arterial streets. In other words, access is viewed in the context of the street system instead of the individual property. Even further, access should be viewed in the context of the ultimate traffic volumes. What might appear acceptable one day may well be perceived differently in a long-term perspective.

In short, access management can be characterized as the strategic provision of access along streets. This is done to maintain the viability of the street network to safely and efficiently accommodate traffic volumes commensurate with its functions. It is the arterial street network that is 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.

The ultimate configuration of a street and its function are typically the result of land use planning, transportation planning, and traffic engineering. Unfortunately, many times these activities are not coordinated. The concept of access management integrates these activities in order to, again, optimize the safety and performance of the public street network, a significant infrastructure investment vital to the well being of the community.

This document is not intended to impose unreasonable conditions on infill conditions, small development sites or building expansions. In as much as is reasonable, however, these requirements shall be applied to infill conditions, small development sites or building expansions, but the principle application of the Access Management Plan is new and green-field development.

Experience

Every community has experienced safety and traffic operational problems associated with too much or poorly planned access to abutting properties. Many have also found it necessary to retrofit solutions to solve these problems. In the course of this experience, it has been discovered that limiting access to promote safer and more orderly flow has had significant positive effects, including reducing accident experience, lessening congestion, and improving air quality.

Obviously the degree of impact will vary based on the specific circumstances of any street segment, but this experience has provided valuable insight into the factors that have a negative influence on traffic safety and efficiency. Some of these factors 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 collector and local streets.

Recent studies in this country are finding a definite correlation between the number of side streets and driveways along a street and the capacity and safety of that street. As the number of driveways increases, particularly those serving commercial development, the capacity of the street decreases and the number of accidents increases.

The "change" to more restrictive access control certainly has its critics in the property owners and business operators who perceive that more circuitous travel has a negative effect on property values and income. Studies to ascertain the impact of stricter access management, whether retrofitting an existing condition or imposing it on new development, have been limited. In general though, recent studies are finding that the vast majority of businesses are not negatively impacted by changes in access. Further, customers appreciate safer and more efficient roadway conditions and access is typically not the most important reason someone decides to visit a particular establishment.

Street Hierarchy

Olathe, like most suburban communities, has developed a hierarchical street system - one that contains a balance of arterial, collector, and local streets that, in turn, mesh with the highway system serving the metropolitan area and region. An appropriate access management plan begins with recognition of the function of each street type and strives to preserve the intended function.

Arterial streets are intended to provide the connections with the highway system and tend to serve larger traffic volumes and longer-distance trips. These streets are the backbone of the street network and should provide the highest degree of mobility, i.e., free flow with minimal conflict. In an era witnessing few new highways, the importance of arterial streets to suburban communities is increasing.

In order to preserve the highest degree of mobility, access to arterial streets is frequently limited to collector streets which, in turn, connect with other collector streets and local streets where access to property is provided. Some direct access can be provided if it makes sense in the overall circulation pattern of the street system. For example, a right-in/right-out driveway might lessen the demand on an adjacent signalized intersection.

Local streets, on the other extreme, are intended to provide a high degree of accessibility to property. Because of this function, traffic volumes and traffic speeds tend to be relatively low and traffic safety quite good. Collector streets provide that connection between arterial streets and local streets and tend to have characteristics of both. It is desired that collector streets provide some degree of mobility and some degree of access; hence, traffic volumes and traffic speeds tend to be moderate. While arterial streets and local streets tend to be generally consistent in their function, operation, and appearance, collector streets serve a wide variety of circumstances and consequently can vary in appearance and operation. For example, a collector street in a residential area versus one in a commercial area.

The hierarchical street network, and the associated functions of each roadway type, is the foundation from which access management should be applied. Access management should be considered an integral part of the design criteria of each roadway type to ensure that the resulting traffic operations are safe and efficient relative to the intended function.

Prototype Street Configurations

The ideal situation would be to plan all arterial, collector, and local streets before development begins. Unfortunately, this approach is impractical for many reasons. However, the intent or goal of an access management plan, coupled with other street system policies, is to ultimately achieve a safe and efficient street network through the piece-meal process of land development. **It cannot be overlooked that access management must be complemented by a true network of arterial, collector, and local streets.**

The provisions of the access management plan begin, therefore, with what are deemed appropriate geometric and traffic control configurations for arterial and collector streets. These configurations will vary between the street types because of the means available to effectively control movements to and from side streets and driveways.

There are, however, some basic principles to traffic operations that should be incorporated into access management for any street type. These principles are discussed below.

BASIC PRINCIPALS

Spacing of Traffic Signals - As traffic volume increases, the level of service a street provides is dictated by the performance of signalized intersections. In other words, the traffic signals become the limiting factor to a street's capacity. Traffic signal coordination becomes a critical traffic management tool and the objective is to move platoons of vehicles from one traffic signal to and through another as efficiently as possible in order to maximize the capacity of the street. **Experience has taught us that a minimum desirable spacing of traffic signals for optimum coordination is about one-quarter mile.**

Influence Area of Intersections - One dynamic of traffic flow not evident on a drawing is the relatively complex decision-making of drivers and the vehicle queuing that can occur near intersections, particularly intersections with traffic signals. This dynamic is evident on both the upstream and downstream sides of traffic signals and includes turns from the major street and turns onto the major street. The physical configuration of the intersection, particularly the turn lanes, also define the influence area of an intersection. This dynamic suggests that no intersecting streets or driveways be situated in the influence area of an intersection.

Spacing of Intersecting Streets and Driveways - The close spacing of driveways increases the complexity of the driving task, and the resulting behavior leads to safety and operational problems for many. For example, a series of closely spaced driveways makes it difficult for a driver on the major street to clearly identify his/her destination and makes it difficult for drivers on the driveways to ascertain where the other driver might be turning. Further, drivers attempting to turn onto the major street must also observe and account for traffic on the other driveways before maneuvering, all of which leads to indecisiveness and confusion.

Median Breaks - The primary function of raised median on a roadway is to control turning and crossing movements in order to maintain a high degree of safety and efficiency. Raised medians are generally used on streets with relatively high traffic volumes and/or travel speeds. Due to these conditions, it is imperative that left-turn lanes be provided at every median break. The distance between median breaks, therefore, will be significantly influenced by the design of the left-turn lanes. Another key consideration at median breaks is the degree of access provided. This can either be full access where all intersection movements are allowed or partial access where only the left turns from the major street are allowed. The configuration of a partial access median break physically prohibits the left-turn and crossing movements from the minor street or driveway.

The location of median breaks and the degree of access provided could both change over time. Whereas the design criteria in this plan focus on a mature roadway corridor, it can take decades for full development to occur. It is private development that will typically construct the collector and local streets that will provide the full complement of streets to allow an access management plan along a corridor to function effectively. Therefore, median breaks can be otherwise allowed so long as the ultimate configuration of the mature corridor is assured. For example, a median break that might not fit in the ultimate corridor configuration could be allowed for a single development if the surrounding land is undeveloped and the road system incomplete. This median break, however, might be closed in the future in favor of another location that better fits with the ultimate configuration. If the area were planned well, the original development would have access to another or other median breaks by circulating through local streets and/or adjacent properties. Another example is that full access might be allowed at a median break in the early stages of development along a corridor but might be changed to partial median access or no median access as other streets and median openings develop or as safety experience might dictate. Traffic signal spacing will also factor into the appropriate degree of access provided at a median break.

Sight Distances - the provision of appropriate sight distances is a fundamental design factor on any street. One cornerstone of street design is "stopping" sight distance, the ability to view a potential hazard a sufficient distance in advance that allows a driver to stop the vehicle and avoid the hazard. Appropriate "stopping" sight distances are achieved through the design of the horizontal and vertical alignments of a street. With respect to access management, "intersection" sight distance becomes more critical. "Intersection" sight distance refers to the ability of a driver to look along a street and view traffic a sufficient distance in order to safely turn into or cross the street. "Intersection" sight distances tend to be longer than "stopping" sight distances, primarily because it is preferable to have a condition that does not require drivers on the uncontrolled street to adjust their travel speed or travel path based on the action of the driver on the intersecting street or driveway. A Policy on Geometric Design of Streets and Highways published by the American Association of State Highway and Transportation Officials includes suggested "stopping" and "intersection" sight distances. "Intersection" sight distances are based on a complex formula based more on the characteristics of accelerating into traffic and it appears to go well beyond the basic need to yield safe operating conditions. More recent studies of driver behavior suggest that a "critical gap", measured in seconds and converted to distance based on operating speeds, reveals an acceptable "intersection" sight distance for passenger car drivers proceeding from a stop condition. This "critical gap" was found to be 7.5 seconds for left-turn, right-turn, and crossing movements. In light of the sometimes complex nature of urban/suburban traffic conditions, **it is recommended that "intersection" sight distance of 8 to 10 seconds be provided from each stop-controlled side street and driveway.** This distance should be based on either the design speed of or the 85th percentile speed on the major street, whichever is higher. Where trucks comprise a significant percentage of the side street or driveway traffic, longer sight distances should be considered due to the slower accelerating characteristics of large trucks.

ARTERIAL STREET

The Olathe street network includes many section-line roads that result in one-mile spacing of arterial streets. Therefore, a one-mile segment has been selected as the prototype on which to base design criteria. Based on street network hierarchical design, a collector street would typically intersect at the one-half mile point, with minor collectors at the one-quarter mile points. On the other hand, recent street network planning in Olathe has modified this traditional approach to one that has collector streets planned for one-third mile intervals. Therefore, both conditions are likely to be encountered in future years.

The unique characteristic of arterial streets in Olathe (and other communities) that significantly influences access management is the use of raised median. The raised median introduces both constraints and opportunities to achieve safe and effective traffic operations. These opportunities and constraints are listed below.

Intersection Influence Area - A typical arterial street intersection with another arterial street experiences significant left- and right-turn traffic. A prototype intersection should include double left-turn lanes and separate right-turn lanes on all approaches. A typical maximum length for the left-turn lanes is about 250 feet. A right-turn lane generally needs to be long enough to extend beyond vehicle queues in the through lanes to be effective. Another consideration to maximize through capacity is to provide sufficient right-turn lane length such that a trailing vehicle fills the gap of a vehicle entering the turn lane. A minimum recommended right-turn lane would be 250 feet plus a 150-foot taper.

On the upstream side of an intersection, it is desirable to avoid driveways across from the left-turn lanes on the arterial street so drivers do not attempt to cross multiple lanes and risk blocking through traffic. It is also desirable to avoid driveways within the length of the right-turn lane and its taper so that drivers on the driveway or side street are not confused as the intent of the driver on the major street.

On the downstream side, it must be recognized that drivers turning onto the street are primarily focused on the navigation of their vehicles. Further, traffic is typically released in tightly spaced platoons from the signal. Driveways in close proximity to the intersection introduce deceleration and potential conflict to the traffic stream.

The influence area should encompass the turning lanes and tapers as well as the distance over which driver attention is focused on intersection activity. At 45 miles per hour, a driver typically needs about 500 to 600 feet to perceive conditions and decelerate (to a stop if necessary) on the approach to a major intersection. Therefore, it is recommended that the intersection influence distance on an arterial street should be at least 600 feet at the intersection with arterial streets and 500 feet at the intersection with collector streets. This distanced is measured along the arterial street from the centerline of the intersecting street. In short, access to the arterial street should not be introduced in the influence area.

<u>Minimum Spacing of Median Breaks</u> - The left-turn lanes provided at each opening will define the absolute minimum separation between median breaks. The minimum left-turn lane on an arterial street, irrespective of demand, should be 200 feet plus the reverse-curve transition taper of about 100 feet. This distance allows some deceleration to occur in the turning lane but also provides a length so that the lane is evident to the higher-speed traffic. The left-turn lane length actually ends 50 to 75 feet from the center of the median break, so the minimum distance between median breaks merely to satisfy minimum left-turn lane lengths is about 650 feet. Where one of the median breaks is an intersecting arterial street, this distance is approximately 750 to 800 feet due to the longer left-turn lane length and width of the intersecting street. Further, it is desired that some full-width median remain in place between left-turn lanes serving opposing directions of travel. Therefore, an additional criterion is that left-turn lanes shall be separated by at least 150 feet. This distance is measured from the beginning of the tapers introducing the left-turn lanes.

The first consideration in an arterial street access strategy is the spacing or location of the median breaks. Whereas minimum spacing indicates that six median breaks could be provided over a one-mile segment (excluding the arterial street intersections), optimal signal spacing and typical collector street configurations suggest that two or three such median breaks, each about one-quarter mile to one-third mile apart. A key factor in providing median breaks on arterial streets is the potential for the resulting intersection to be signalized. For predominately residential development, the potential is highest at the one-half mile collector. Where commercial development is prevalent, any median break carries a high potential for warranting traffic signals.

The other access consideration on arterial streets is the provision of driveways limited to right turns in and out. Due to the large speed differential created by turning vehicles on an arterial street, right-turn lanes should be provided at <u>every</u> driveway and cross street. A minimum turn lane length of 150 feet plus a 150-foot taper is recommended. Lengths of 200 to 300 feet would be preferred. These dimensions suggest that the minimal spacing between any driveway and side street should be about 500 feet (center to center).

A special consideration with arterial streets is the approach to major highways, particularly freeways. The limited number of interchanges with the freeway systems means that traffic volumes will be concentrated. Hence, the potential for longer traffic queues and additional traffic lanes will be present. These conditions suggest that **no access be allowed between the interchange and the first full median break** and that the first full median break should desirably be no closer than 1,000 feet from the nearest ramp intersection with the arterial street.

COLLECTOR STREET

The function of collector streets is to distribute traffic between arterial streets and local streets. In a street network developed with sound access management principals, collector streets will play a significant role in the access function to property along arterial streets. Because of this, the appearance and size of a collector street can vary widely depending on the adjacent land uses and traffic demands created by those land uses. In turn, these varying demands create the need to have varying access considerations for collector streets.

For this plan, collector streets are distinguished as residential and non-residential. The primary differences in access design relate to the proximity of access to adjacent arterial streets.

The residential street category envisions the traditional single-family neighborhoods prevalent in Olathe and other suburban communities. Access management and street design criteria is not nearly as significant on residential collector streets due to the lower traffic volumes and lower speeds. From a design standpoint, key issues include spacing of the first intersecting street to the arterial street, the separation of local streets, and the location of private driveways relative to intersecting streets. The focus of these criteria is the separation of conflict points.

Access management along a collector street with commercial or multi-family residential development takes into account the separation of conflicts plus the potential for larger traffic volumes and longer vehicle queues.

LOCAL STREET

The essential access management issue along local residential streets with single-family development is the spacing of the first driveways from intersecting arterial, collector, and local streets.

PRIVATE DRIVEWAY

A key access management issue associated with private driveways is the throat depth (separation from the public street to first intersection on the development site). While the practice of conflict separation is aimed at making traffic flow safe and efficient, another objective on private driveways is to eliminate the potential for internal traffic operations to have a negative influence on the public street system. Furthermore, specific consideration shall be given to driveway consolidation, driveway relocation, and inter-parcel connectivity.

EXPRESSWAY

An expressway is somewhat unique to many cities because it typically plays a role in a regional context. Hence, it is most frequently constructed and maintained by state departments of transportation. An expressway also has characteristics of both a freeway and an arterial street. Because of the design speed, an expressway takes on the appearance of a freeway. The at-grade intersections, however, make it function more like an arterial street. Due to the relatively high speeds characteristic of an expressway, access should be significantly more restrictive relative to an arterial street.

Summary

- Access management design criteria indicates where access is allowed or prohibited for arterial, collector, and local streets, plus private driveways intersecting public streets and specifies minimum intersection spacing.

- These are minimum standards and should be considered with respect to specific development and future (ultimate) conditions.

- A network of supporting local and collector streets is necessary to provide primary access to property. Direct access to arterial streets should be limited to right turns in and out of intersecting local streets and driveways, or left turns through partial median breaks; however, such direct access should be allowed only if overall traffic operations on the public street system will benefit.

STANDARDS

The following standards reflect criteria applicable to the location and design of streets and driveways. It is important to note that more than one criterion will apply to any condition. All applicable criteria need to be satisfied.

Unless stated otherwise, distances between streets and/or driveways are measured from centerline to centerline.

These standards are applicable to new development. Existing properties that have an approved site plan by the Planning Commission and/or an approved plat by the City Council will not be required to comply with this plan. However, any existing property that applies for a new site plan or replat after the adoption of this plan by the City Council shall be required to comply with the criteria in the plan to the greatest extent possible.

STREET SPACING

- No street will be allowed within 1,000 feet of an interchange.
- No street will be allowed within an intersection influence area. The hierarchy of intersections for establishing priority is arterial/arterial, arterial/collector, collector/collector, arterial/local, and collector/local.
- 500 feet minimum on arterial streets.
- 300 feet minimum on collector streets (as specified in the Technical Specifications and Design Criteria).

INTERSECTION INFLUENCE AREAS

- No street or driveway shall intersect a street within its intersection influence area as shown in Exhibit 1.

TRAFFIC SIGNAL SPACING

- One-half mile (2,640 feet) on expressways
- One-quarter mile (1,320 feet) to one-third mile (1,760 feet) on arterial streets

MEDIAN BREAK SPACING ON ARTERIAL STREET

- No median break within 1,000 feet of an interchange.
- No median break within an intersection influence area.
- Must accommodate left-turn lanes and tapers along arterial street. Successive left-turn lanes must be separated by at least 150 feet (measured between the beginning of the taper for each turn lane).
- Full median break access allowed where traffic signals, if installed at some time in the future, would be adequately spaced from adjacent traffic signals.
- Partial access allowed at other median breaks.
- Temporary median breaks may be allowed if adequate left-turn lanes and tapers can be developed for near-term conditions and ultimate location of median breaks along arterial street are assured.

MEDIAN BREAK SPACING ON EXPRESSWAY

- No median break within 1,000 feet of an interchange.
- One-half mile (2,640 feet) spacing.

LEFT-TURN LANES

- Required on expressways at all median breaks. Minimum length shall be 300 feet plus the taper.
- Required on arterial streets at all partial and full median breaks. Minimum length shall be 250 feet plus the taper at the intersection with another arterial street and 200 feet plus the taper at other locations.
- Required on street or driveway intersecting arterial street at full median break. Minimum distance shall be 150 feet plus the taper.
- Required on collector streets in non-residential areas at the intersection with any side street or driveway serving non-residential development. A continuous left-turn lane should be provided where successive left-turn lanes are required. Minimum length shall be 100 feet plus the taper.
- The length of the left-turn lane shall be increased as necessary to accommodate estimated queue length. The minimum length shall be exceeded based on the estimated queue length determined for 20-year traffic volume projections. The queue length shall be estimated using analysis procedures outlined in the latest edition of the Highway Capacity Manual published by the Transportation Research Board. Where the analysis is based on traffic signal control, the minimum cycle length used in the analysis shall be 120 seconds. The queue length shall be for a 95 percent confidence level.
- Left-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 shall be determined as the point of curvature for the turning radius used for design of the particular intersection. On an arterial street, the turning radius shall be no less than 50 feet. On a collector street, the turning radius shall be no less than 30 feet. Where double left-turn lanes are used, the minimum inside turning radius shall be no less than 75 feet.
- The introductory taper shall be a reverse curve using 150-foot radii for a single left-turn lane and 300-foot radii for a double left-turn lane. This reverse curve does not define the redirection taper required where a left-turn lane is introduced.

RIGHT-TURN LANES – (REQUIREMENT MAY BE MODIFIED FOR EXCESSIVELY BURDENED SITES)

- Required on expressway at each intersecting street. Minimum length shall be 300 feet plus the taper.
- Required on arterial streets at each intersecting street or driveway. Minimum length shall be 250 feet plus the taper at the intersection with another arterial street and 150 feet plus the taper at other locations.
- Required on collector streets in non-residential areas 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 shall be 100 feet plus the taper.
- The length of the right-turn lane at intersections controlled by traffic signals shall be increased, if necessary, based on the longer of the queues in the turn lane or the adjacent through lane.
- 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 shall be determined as the point of curvature for the corner radius.
- The minimum length on controlled approaches shall be exceeded based on the estimated queue length determined for 20-year traffic volume projections. The turn lane length shall be based on the longer of the queues in the turn lane or the adjacent through lane. The queue length shall be

estimated using analysis procedures outlined in the latest edition of the Highway Capacity Manual published by the Transportation Research Board. Where the analysis is based on traffic signal control, the minimum cycle length used in the analysis shall be 120 seconds. The queue length shall be for a 95 percent confidence level.
- The introductory taper shall be a straight line and its length shall be determined by using a rate of 12.5 to 1 based on the width of the right-turn lane.
- The beginning of a taper shall be no closer than 100 feet from the centerline of the nearest street or driveway preceding the turn lane.
- Continuous right-turn lanes will not be allowed.

PRIVATE DRIVEWAYS

- No driveway will be allowed within 1,000 feet of an interchange.
- No driveway shall intersect an expressway.
- No driveway will be allowed within an intersection influence area.
- No driveway shall be allowed within the taper or storage area of a turn lane.
- No single-family residential driveway shall intersect an arterial or collector street.
- Internal drives and parking stalls must be at least 100 feet from a collector street. This distance is measured from the near edge of the public street (based on its ultimate configuration) to the near edge of the internal drive or parking stall. See Exhibit 1.
- Internal drives and parking stalls must be at least 100 feet from an arterial street where access from the driveway is limited to right turns at the arterial street. This distance is measured from the near edge of the public street (based on its ultimate configuration) to the near edge of the internal drive or parking stall. See Exhibit 1.
- Internal drives and parking stalls must be at least 250 feet from an arterial street where a full median break is provided on the arterial street. This distance is measured from the near edge of the public street (based on its ultimate configuration) to the near edge of the internal drive or parking stall. See Exhibit 1.
- Internal drives and parking stalls must be at least 50 feet from a residential street. This distance is measured from the near edge of the public street (based on its ultimate configuration) to the near edge of the internal drive or parking stall. See Exhibit 1.
- Internal drives and parking stalls for industrial sites in industrial areas could be shorter than 100 feet. See Exhibit 1.

Intersection Sight Distance

- At full access intersections, 8 to 10 seconds of sight distance in both directions from stop sign controlled side street or driveway.
- At partial access intersections, 8 to 10 seconds of sight distance to the left from stop sign controlled side street or driveway.
- Where substantial volumes of heavy vehicles enter the uncontrolled street, the intersection sight distance increases to 12 seconds minimum.
- Sight distance based on the design speed or the 85th percentile speed, whichever is higher.

Intersection Sight Distance

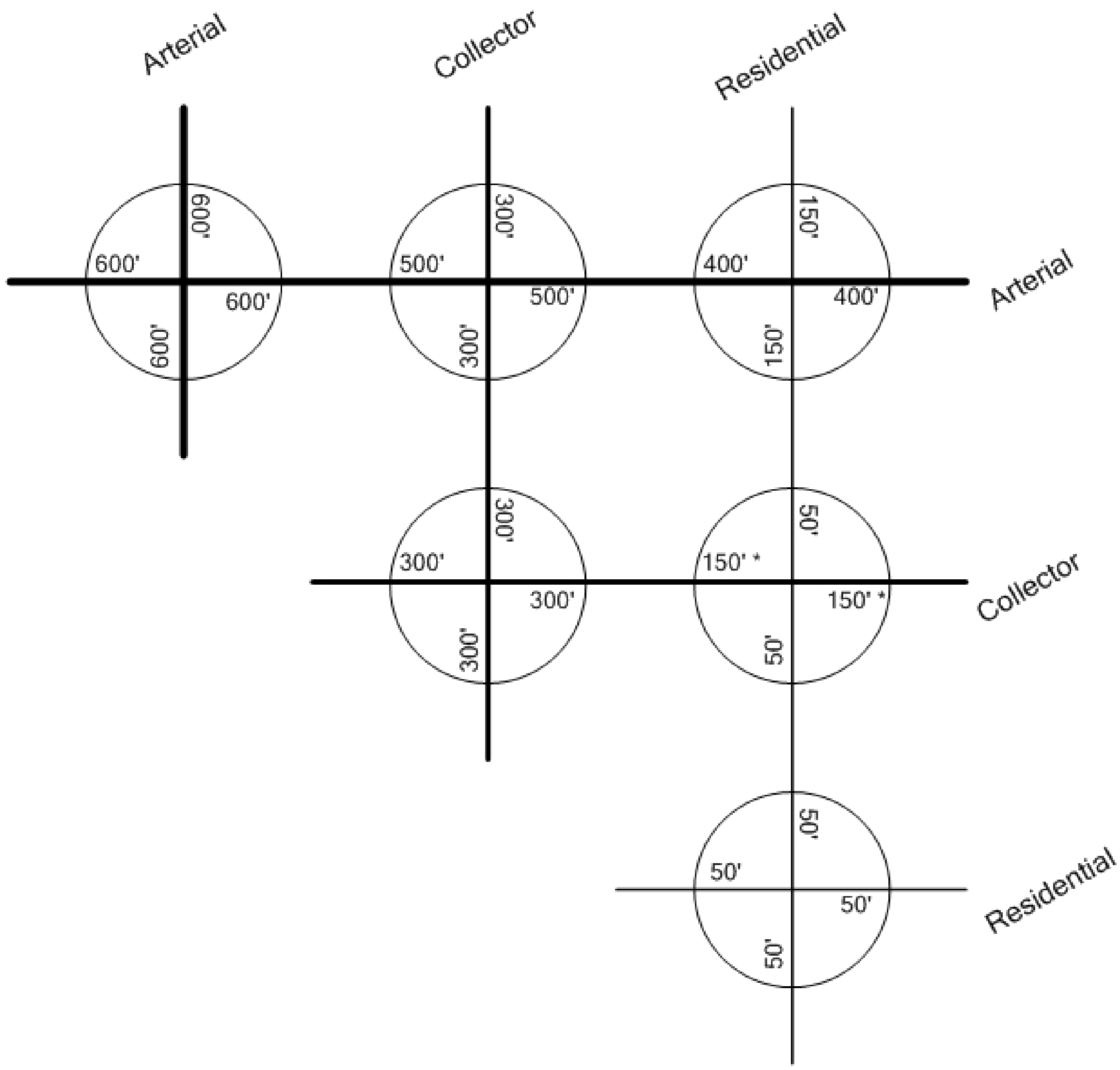
Street Type	**Speed**		**Sight Distance (Feet)**		
	MPH	Ft/Sec	8 sec	9 sec	10 sec
Arterial	45	66	529	594	660
	40	59	472	531	590
Collector	35	51	408	459	510
	30	44	352	396	440
Residential	25	37	296	333	370

APPEAL

An applicant may file a written appeal if the applicant believes the staff comments from the City Planner and/or City Traffic Engineer supporting this plan is unreasonable. This written appeal shall be addressed to the City Planner and comply with the process defined the City of Olathe Unified Development Ordinance (UDO).

The appeal shall provide evidence on the reasonableness of the property's access and shall bear the burden of establishing a preponderance of the evidence that the staff requirements would deprive the applicant of reasonable access to subject property.

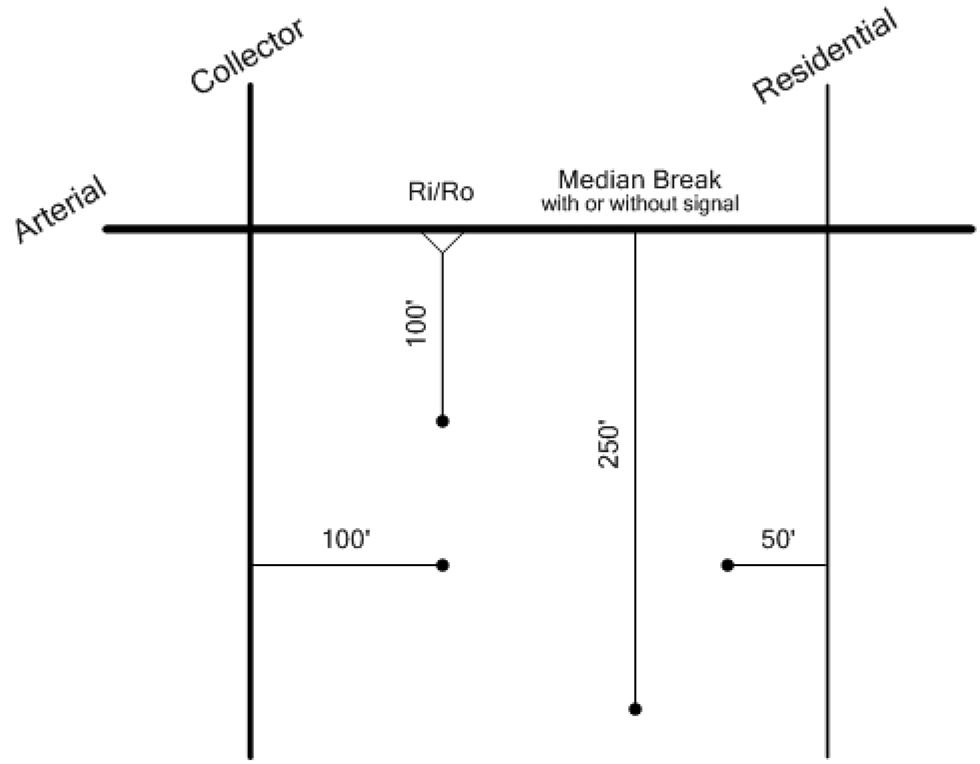
Influence Areas at Various Intersections



All distances are measured from centerline to centerline

* 300' for a Non-Residential Collector

Private Driveway Throat Distances *



All distances are measured from the edge of pavement to edge of pavement

* Industrial sites may have a driveway throat less than 100'

TRANSPORTATION IMPACT STUDY GUIDELINES

The following tasks represent the minimum recommended guidelines for a transportation impact study when such a study is deemed appropriate. The purpose of such a study is to assess the impact of new development or redevelopment on the public street system and to evaluate access and circulation for automobile and truck traffic, pedestrians, bicyclists, and transit.

1. Identify the specific development plan under study and any existing development on and/or approved plans for the site (land use types and intensities and the arrangement of buildings, parking and access). Also identify land uses (including types and the arrangement of buildings, parking and access) on property abutting the proposed development site, including property across public streets.

2. Identify the land uses shown in the Olathe Comprehensive Plan for the proposed development site under study, as well as the ultimate arterial and collector street network in the vicinity of the site (at least the first arterial or collector street in each direction around the site).

3. Identify the functional classification of the public street(s) bordering the site and those streets on which access for the development is proposed. The functional classification is shown on the latest Olathe Major Street Map.

4. Identify allowable access to the development site as defined by criteria included in the latest edition of the Olathe Access Management Policy.

5. Document current public street characteristics adjacent to the site, including the nearest arterial and collector streets (number and types of lanes, speed limits or 85th percentile speeds, and sight distances along the public street(s) from proposed access).

6. Compare proposed access with established design criteria (driveway spacing, alignment with other streets and driveways, width of driveway, and minimum sight distances). If appropriate, assess the feasibility of access connections to abutting properties, including shared access with the public street system, in order to comply with access guidelines in the Olathe Access Management Policy.

7. Estimate the number of trips generated by existing and proposed development on the site for a typical weekday and weekday peak hours using the latest edition of <u>Trip Generation</u> published by the Institute of Transportation Engineers. Local trip generation characteristics may be used if deemed to be properly collected and consistent with the subject development application. The City Traffic Engineer shall make such determination. Calculate the net difference in trips between existing and proposed uses. If the development site already has an approved plan, also estimate the number of trips that would be generated by the approved land uses. If the development application is proposing a land use different than indicated in the Olathe Comprehensive Plan, also estimate the number of trips that would be generated by the land use indicated in the Comprehensive Plan. The City Traffic Engineer shall approve the potential land use intensity in such cases.

8. Document current peak hour traffic volumes on a typical weekday (Tuesday, Wednesday, and/or Thursday). Traffic volumes should be measured at any existing site driveway(s) and on the adjacent collector streets, including the nearest collector/arterial street intersection in each direction along streets bordering the development site. The time periods in which existing traffic is counted should generally coincide with the highest combination of existing traffic plus traffic

expected to be generated by the proposed development. Traffic volume counts at intersections shall document left-turn, through and right-turn movements on all approaches and shall be tabulated in no greater than 15-minute increments. The City Traffic Engineer shall determine, based on the nature of the development, additional time periods in which current traffic volumes shall be documented.

9. Estimate future P.M. peak hour traffic volumes for the intersections included in the study area using the Olathe Traffic Model and the recommended practices established by the City Traffic Engineer.

10. Distribute and assign the net development trips through the site driveway(s) plus the nearest collector/arterial street intersections in each direction along streets bordering the development site. If applicable, this and subsequent tasks shall be repeated based on approved land uses and/or land uses identified in the Olathe Comprehensive Plan.

11. Conduct volume/capacity analyses for the peak hours at site driveway(s) and other intersections using methodologies outlined in the latest edition of the Highway Capacity Manual published by the Transportation Research Board. The analyses should be conducted for 1) existing conditions, 2) existing plus development conditions, and 3) future conditions. The analysis of future conditions shall be based initially on the street network characteristics included in the Olathe Traffic Model.

12. Compare existing plus development conditions and future conditions with established City of Olathe guidelines/policies for acceptable levels of service and turn lane requirements.

13. Identify geometric and traffic control improvements needed to mitigate deficiencies and/or comply with established guidelines/policies.

14. Prepare a typewritten report outlining the findings and conclusions of the study, including exhibits illustrating the site plan, traffic volumes (current and projected), and existing street conditions. Any deviation from established guidelines/policies shall be clearly identified and justification provided as to the basis for such a condition and its potential ramifications on the public street system.

Possible Additional Requirements

Extend the study to additional street segments and/or intersections on the public street system. The City Traffic Engineer shall make this determination based on the scale, location, and/or nature of the proposed development and the condition or state of development of the street network in the vicinity of the site.

Warrants for Transportation Impact Studies

The necessity to review all land development applications from a transportation perspective as well as the wide variety of land use types and intensities suggest that multiple thresholds or triggers be established to warrant a transportation impact study. The following triggers are recommended for the City of Olathe.

Development Triggers	Minimum Study Requirements
All Applications (1)	Conduct Tasks 1-7.
Development Plan Generates 100 to 499 Trips in a Peak Hour (2)	Conduct Transportation Impact Study (Tasks 1-14)
Development Plan Generates 500 or More Trips in a Peak Hour	Conduct Transportation Impact Study (Tasks 1-14) plus extend the study in each direction along arterial streets serving the development site to at least the next intersecting arterial street.
Proposed Land Use Deviates from Comprehensive Plan	Conduct Transportation Impact Study (Tasks 1-14) plus extend the study in each direction along streets serving the development site to at least the next intersecting arterial street and conduct comparative studies using the proposed land use versus the land use in the Comprehensive Plan.

(1) Rezonings, Special Use Permits, Preliminary Site Development Plans, Land Use Allocation Maps, or Preliminary Plats
(2) Residential development with a density of less than four (4) dwelling units per acre is excluded.

Other Transportation Issues Associates with Site Planning

While transportation impact studies primarily address automobile traffic, recognition of other vehicle types and travel modes is appropriate, particularly in a community that strives for multi-modal choice. The following text by no means, however, represents a comprehensive list of site planning elements.

TRUCKS

Site driveways and internal circulation must be designed to accommodate the largest truck anticipated to serve the development. Vehicle turning paths need to be provided such that trucks do not encroach over curbs and medians. Encroachment into opposing turning lanes should be minimized but can be consistent with the scale of the development and the frequency and timing of truck movements. Truck circulation through a development site should minimize conflicts with customer traffic and loading docks should be configured such that parked trucks do not impede normal traffic flow.

PEDESTRIANS

The investment in sidewalks along public streets or off-street paths is diminished if pedestrians cannot readily travel between public sidewalk facilities and adjacent land uses. All development plans should provide this connectivity whether it is made via proposed parking lot facilities and/or additional sidewalks or paths. The Residential Neighborhood Design Manual, Traditional Neighborhood Design Manual, and Trails & Greenways Plan, all published by the City of Olathe, provide guidance on appropriate pedestrian connectivity, circulation, access, and design standards.

BICYCLES

Similar to pedestrians, development plans should provide reasonable opportunities to travel between adjacent public streets or bicycle trails and the land use. This does not imply that separate facilities are needed; rather, the conditions within a development site should be comparable to conditions adjacent to and near the site. Adequate and properly placed parking facilities for bicycles are a key component to encouraging bicycle travel. The Olathe Trails & Greenways Plan highlights planned facilities and desirable linkages to developed property.

PUBLIC TRANSPORTATION

Bus transportation is currently provided by several private and publicly funded agencies, generally to targeted customers. More widespread public transit could be implemented in the future. Site development should account for both current and potential bus services. Some of these considerations are similar to trucks due to the relatively large size of buses; however, the primary difference is that buses need to circulate with customer traffic flow. One other consideration is that large parking lots can potentially be used as park-and-ride facilities in conjunction with bus transit service.

Qualifications to Conduct a Transportation Impact Study

The parties involved in a land development application sometimes have different objectives and perspectives. Further, the recommended elements of a transportation impact study require skills found only in a trained professional engineer with specific experience in the field of traffic engineering.

For these reasons, the person conducting and the person reviewing the study must be registered professional engineers with demonstrated experience either in the preparation or review of transportation impact studies for land development.

The City Traffic Engineer shall determine whether an individual professional engineer is qualified to conduct a transportation impact study in the City of Olathe.

Review and Use of a Transportation Impact Study

A transportation impact study should be viewed as a technical assessment of existing and projected transportation conditions. The extent to which individual professional judgment has to be applied will be minimized by provision of community polices and practices with respect to street and traffic control design and land development. It is imperative, therefore, that City documents clearly spell out elements such as acceptable levels of service, warrants for and design of auxiliary turn lanes, proper spacing of driveways and side streets, street functional classifications, preferred methods of intersection design, and policies and guidelines for accommodating pedestrian and bicycle travel between public and private facilities.

Access management guidelines and warrants for turn lanes are included in the Olathe Access Management Policy.

The recommended minimum levels of service (LOS) that would guide the need for improvements are LOS D on arterial streets and LOS C on all other streets. This standard would apply to peak hour conditions typically experienced during the early morning and late afternoon peak periods of a typical weekday. This standard would also apply to other peak conditions associated with a proposed development.

OLATHE TRAFFIC MODEL: RECOMMENDED PRACTICES FOR USE IN TRANSPORTATION STUDIES

Recommended Practices

The Olathe Traffic Model (OTM) has can been made available to different public and private entities for use in various transportation studies. As the results of these studies may influence policy decisions within the City of Olathe, it is imperative that the OTM be used in a consistent manner. Therefore we recommend that the following techniques be used to estimate future traffic volumes for use in transportation studies.

Estimating Future Traffic Volumes

The OTM is a tool that can be used to estimate future traffic volumes either on a stretch of roadway or at an intersection, however these volumes are most applicable when compared to the calibrated current-year model as opposed to using them as stand-along projections. **Use of future volume projections, without adjustments, should be avoided whenever possible.** The following steps are recommended for estimating future traffic volumes.

1. Select the intersections and/or roadway sections where future traffic projections are desired.
2. Collect actual count data, by movement, during the P.M. peak hour at these locations. These volumes should not be estimated with the model.
3. Using the OTM, estimate the traffic volumes at the selected intersections and/or roadway sections for the calibrated model and the future model.
4. Calculate the "growth" in traffic from the model by subtracting the calibrated model traffic volumes from the future model traffic volumes. Due to anomalies in the model, this "growth" in traffic should then be assessed to determine if it is reasonable and to ensure that no unrealistic travel patterns have developed. This assessment should be based on experience with the model combined with a familiarity of the general travel patterns in the area.
5. Add the "growth" in traffic calculated in Step 4 to the existing traffic counts. This value becomes the estimate for future traffic volumes.

Additional steps are needed when the OTM is used for transportation impact studies. These additional steps are needed to compare alternative land uses and to perform a detailed analysis at driveways and minor roads that may not be included in the OTM.

6. Identify the Traffic Analysis Zones (TAZ's) which will be involved in a detailed analysis. These TAZ's will typically include the zone where a new development has been proposed as well as adjacent zones in which significant development is anticipated. City staff should identify the TAZ's to be included in a detailed analysis.
7. Calculate the "growth" in traffic associated with each of the selected TAZ's using the "Select Zone" feature of TModel2. This growth in traffic from the selected TAZ's should be subtracted from the overall "growth" calculated in Step 4. The resultant becomes the growth in "background" traffic.
8. Manually estimate and assign the trips generated by the select zones. This task would reflect the alternative land use and/or include the assignment of traffic through streets and driveways not included in the OTM.
9. Calculate the future year traffic volumes by adding the growth in background traffic (calculated in Step 7) and the hand-assigned select zone traffic volumes (from Step 8) to the existing traffic counts.